

SR 1601 D3 / LPG3 / P3

Instructions for use

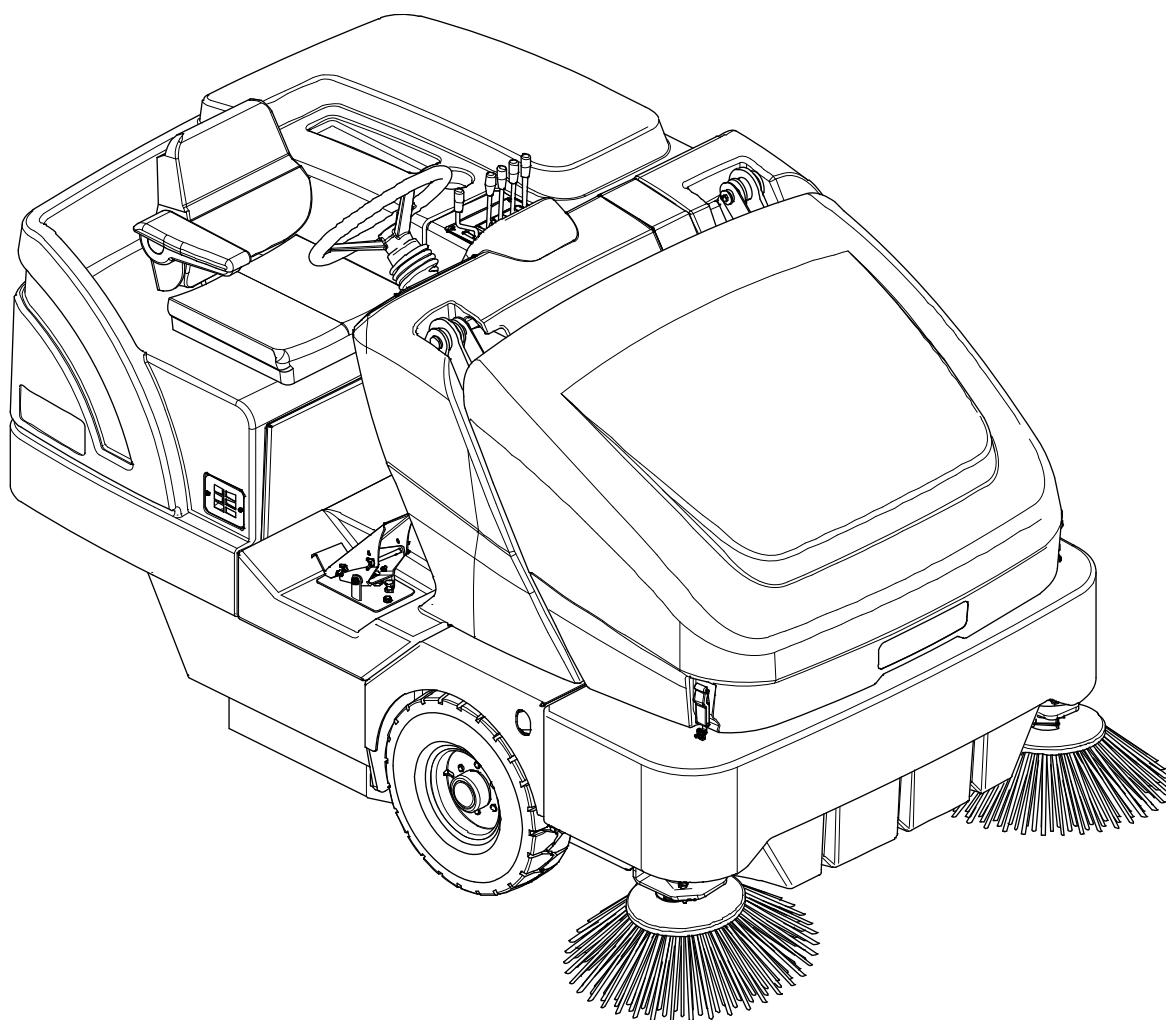
Bedienungshandbuch
Instructions d'utilisation
Instructions for use
Gebruiksaanwijzing



11/2008 - Revised 03/2012
(4)
33019216



Deutsch
Français
English
Nederlands



Model:
13300101 - 13300148 - 13300105 - 13300161 - 13300104

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INTRODUCTION



NOTE

The numbers in brackets refer to the components shown in Machine Description chapter.

MANUAL PURPOSE AND CONTENTS

The purpose of this Manual is to provide the operator with all necessary information to use the machine properly, in a safe and autonomous way. It contains information about technical data, safety, operation, storage, maintenance, spare parts and disposal. Before performing any procedure on the machine, the operators and qualified technicians must read this Manual carefully. Contact Nilfisk in case of doubts concerning the interpretation of the instructions and for any further information.

TARGET

This Manual is intended for operators and technicians qualified to perform the machine maintenance.

The operators must not perform procedures reserved for qualified technicians. Nilfisk will not be responsible for damages coming from failure to follow these instructions.

HOW TO KEEP THIS MANUAL

The User Manual must be kept near the machine, inside an adequate case, away from liquids and other substances that can cause damage to it.

DECLARATION OF CONFORMITY

The Declaration of Conformity, supplied with the machine, certifies the machine conformity with the law in force.



NOTE

Two copies of the original EC Declaration of Conformity are provided together with the machine documentation.

IDENTIFICATION DATA

The machine model and serial number are shown on the plate (10) placed on the frame.

Product code and year of production are marked on the same plate.

The engine model and serial number are shown on the plate (31).

This information is useful when ordering machine and engine spare parts. Use the following table to write down the machine and engine identification data for any further reference.

MACHINE model
PRODUCT code
MACHINE serial number
ENGINE model
ENGINE serial number

OTHER REFERENCE MANUALS

- Engine Manual, supplied with the machine, to be considered an integral part of this Manual.
- Moreover, the following Manuals are available:
 - Spare Parts List (supplied with the machine)
 - Service Manual (that can be consulted at Nilfisk Service Centers)

SPARE PARTS AND MAINTENANCE

All necessary operating, maintenance and repair procedures must be performed by qualified personnel or by Nilfisk Service Centers. Only original spare parts and accessories must be used.

Contact Nilfisk for service or to order spare parts and accessories, specifying the machine model, product code and serial number.

CHANGES AND IMPROVEMENTS

Nilfisk constantly improves its products and reserves the right to make changes and improvements at its discretion without being obliged to apply such benefits to the machines that were previously sold.
Any change and/or addition of accessory must be approved and performed by Nilfisk.

OPERATION CAPABILITIES

This sweeper has been approved to clean/sweep compact and solid floors, in civil and industrial environments, under safe operation conditions by a qualified operator.

CONVENTIONS

Forward, backward, front, rear, left or right are intended with reference to the operator's position, that is to say on the driver's seat (32).

UNPACKING/DELIVERY

Upon delivery, carefully check that the packing and the machine are not damaged. In case of visible damages, keep the packing and have it checked by the carrier that delivered it. Call the carrier immediately to fill in a damage claim.

- Check that the machine is equipped with the following features:
 - Sweeper User Manual
 - Engine Manual
 - Sweeper Spare Parts List
- After removing the packing, remove the wooden blocks next to the wheels.
- Check the engine oil and coolant levels.
- Check the hydraulic system oil level.
- Read the instructions in the Preparing the Machine For Use section of this Manual, then fill the fuel tank.
- Place a ramp next to the front end of the pallet.
- Read the instructions in the Operating Controls and Operating the Machine sections of this Manual and start the engine.



WARNING!

Use extreme caution when operating the sweeper.

Be certain to be thoroughly familiar with all of the operating instructions prior to using this sweeper.

In case of questions, contact a supervisor or local Nilfisk Industrial Dealer.

Should the sweeper malfunction, do not attempt to correct the problem unless the supervisor directs you to do so. Have a qualified company mechanic or an authorised Nilfisk Dealer service person make any necessary corrections to the equipment.

Use extreme care when working on this machine. Neckties, loose clothing, long hair, rings and bracelets can get caught in moving parts.

Before working on the machine, turn the ignition key (66) to "0" and remove it, engage the parking brake and disconnect the battery.

Use good common sense, practice good safety habits and pay attention to the yellow decals on this machine. Drive the machine slowly on inclines. Use the brake pedal (35) to control machine speed while descending inclines.

Do not turn the machine on an incline; drive straight up or down.

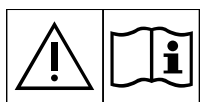
The maximum rated incline during transport with a 3 cylinder model is 17%.

SAFETY

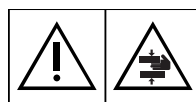
The following symbols indicate potentially dangerous situations. Always read this information carefully and take all necessary precautions to safeguard people and property.

The operator's cooperation is essential in order to prevent injury. No accident prevention program is effective without the total cooperation of the person responsible for the machine operation. Most of the accidents that may occur in a factory, while working or moving around, are caused by failure to comply with the simplest rules for exercising prudence. A careful and prudent operator is the best guarantee against accidents and is essential for successful completion of any prevention program.

VISIBLE SYMBOLS ON THE MACHINE



WARNING!
Carefully read all the instructions
before performing any operation on the
machine.



WARNING!
Moving parts, danger of crushing.



DANGER!
Internal combustion engine.
Do not inhale exhaust gas fumes.
Carbon monoxide (CO) can cause brain
damage or death.



WARNING!
Parts under voltage.
Presence of corrosive fluids.



WARNING!
Do not wash the machine with
pressurized water.



Jacking locations.



WARNING!
Do not use the machine on slopes with
a gradient exceeding the specifications.



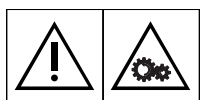
Hydraulic lifting system and/or safety
stands anchoring locations.



WARNING!
Hot parts, danger of burns.



Greasing point.



WARNING!
Moving parts.

SYMBOLS THAT APPEAR ON THIS MANUAL



DANGER!
It indicates a dangerous situation with risk of death for the operator.



WARNING!
It indicates a potential risk of injury for people or damage to objects.



CAUTION!
It indicates a caution or a remark related to important or useful functions. Pay careful attention to the paragraphs marked by this symbol.



NOTE
It indicates a remark related to important or useful functions.



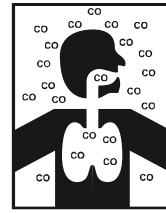
CONSULTATION
It indicates the necessity to refer to the User Manual before performing any procedure.

GENERAL INSTRUCTIONS

Specific warnings and cautions to inform about potential damages to people and machine are shown below.



DANGER!



- Carbon monoxide (CO) can cause brain damage or death.
- The internal combustion engine of this machine can emit carbon monoxide.
- Do not inhale exhaust gas fumes.
- Only use indoors when adequate ventilation is provided, and with the help of an assistant.



DANGER!

- Before performing any maintenance, repair, cleaning or replacement procedure disconnect the battery connector, remove the ignition key and engage the parking brake.
- This machine must be used by properly trained operators only.
- Sharp turns must be made at slowest possible speed. Avoid: abrupt turns on incline, turns when the hopper is lifted.
- Do not lift the hopper when the machine is on incline. The machine loses stability on incline or when the hopper is full.
- Regularly check the tyre pressure (tyres are optional).
- Do not wear jewels when working near electrical components.
- Keep the batteries away from sparks, flames and incandescent material. During the normal operation explosive gases are released.
- Do not work under the lifted machine without supporting it with safety stands.
- When working under the open hood, ensure that it cannot be closed by accident.
- Do not operate the machine near toxic, dangerous, flammable and/or explosive powders, liquids or vapours: This machine is not suitable for collecting dangerous powders.
- Be careful: fuel is highly flammable.
- Do not smoke or bring naked flames in the area where the machine is refuelled or where the fuel is stored.
- Refuel outdoors or in a well-ventilated area, with the engine off.
- Turn off the engine and let it cool down for a few minutes, then remove the fuel tank plug.
- Leave at least a space of 4 cm in the filler to allow the fuel to expand.
- After refuelling, check that the fuel tank cap is firmly closed.
- If any fuel is spilled while refuelling, clean the tank area and allow the vapours to evaporate before starting the engine.
- Do not let fuel come into contact with the skin; do not breathe fuel vapours. Keep out of reach of children.
- Do not tilt the engine too much to avoid fuel spillage.
- During machine transportation, the fuel tank must not be full.
- Do not lay any object on the engine.
- Stop the engine before performing any procedure on it. To prevent the engine from starting accidentally, disconnect the battery negative terminal.
- See also the SAFETY RULES in the Engine Manual, which is to be considered an integral part of this Manual.
- Lead batteries (WET) are installed on this machine, do not tilt the machine more than 30° from its horizontal position to prevent the highly corrosive acid to leak out of the batteries. When the machine is to be tilted to perform maintenance procedures, remove the batteries.
- Do not use the machine in case of gas leaks. Disconnect the fuel hose and replace the LPG tank. If the gas leak persists, disconnect the fuel hose and contact the Nilfisk Service Center.

**WARNING!**

- *Carefully read all the instructions before performing any maintenance/repair procedure.*
- *When working near the hydraulic system, always wear protective clothes and safety glasses.*
- *Pay attention to hot parts when working near the engine, the muffler, the manifold and the cooler.*
- *Use only as shown in this Manual. Use only Nilfisk's recommended accessories.*
- *This machine is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the machine by a person responsible for their safety.*
Children should be supervised to ensure that they do not play with the machine.
- *Close attention is necessary when used near children.*
- *Take all necessary precautions to prevent hair, jewels and loose clothes from being caught by the machine moving parts.*
- *(Only for SR 1601 D3, LPG3 and P3) Wear proper ear protection when using the machine.*
- *To avoid any unauthorised use of the machine, remove the ignition key.*
- *Do not leave the machine unattended without being sure that it cannot move independently.*
- *Do not use the machine on slopes with a gradient exceeding the specifications.*
- *Do not tilt the machine more than the angle indicated on the machine itself, in order to prevent instability.*
- *Use only brooms supplied with the machine or those specified in the User Manual. Using other brooms could reduce safety.*
- *Before using the machine, close all doors and/or covers, as indicated in the User Manual.*
- *Use the machine only where a proper lighting is provided.*
- *Working lights (optional) have to be used only to enhance visibility on the floor to be cleaned, but they do not authorize anyone to use the sweeper in dark environments.*
- *If the machine is to be used where there are other people besides the operator, it is necessary to install the pivoting light and the reverse gear buzzer (optional).*
- *While using this machine, take care not to cause damage to people and property.*
- *Do not bump into shelves or scaffoldings, especially where there is a risk of falling objects.*
- *Do not wash the machine with direct or pressurised water jets, or with corrosive substances.*
- *Do not use compressed air to clean this type of machine, except for the filters (see the relevant paragraph).*
- *Do not lean liquid containers on the machine, use the relevant can holder.*
- *The storage temperature must be between 0°C and +40°C.*
- *The machine working temperature must be between 0°C and +40°C.*
- *The humidity must be between 30% and 95%.*
- *Always protect the machine against the sun, rain and bad weather, both under operation and inactivity condition. Store the machine indoors, in a dry place: This machine must be used in dry conditions, it must not be used or kept outdoors in wet conditions.*
- *Do not use the machine as a means of transport, or for pushing/towing.*
- *Do not allow the brooms to operate while the machine is stationary to avoid damaging the floor.*
- *In case of fire, use a powder fire extinguisher, not a water one.*
- *Adjust the operation speed to suit the floor conditions.*
- *Avoid sudden stops when the machine is going downhill. Avoid sharp turns. Drive at slow speed when going downhill.*
- *This machine cannot be used on roads or public streets.*
- *Do not tamper with the machine safety guards.*
- *Follow the routine maintenance procedures scrupulously.*
- *Do not allow any object to enter into the openings. Do not use the machine if the openings are clogged. Always keep the openings free from dust, hairs and any other foreign material which could reduce the air flow.*

**WARNING!**

- (Only for versions equipped with dust guard system) Pay attention during machine transport when temperature is below freezing point. The water in the system tank or hoses could freeze and seriously damage the machine.
- Do not remove or modify the plates affixed to the machine.
- In case of machine malfunctions, ensure that these are not due to lack of maintenance. If necessary, request assistance from the authorised personnel or from an authorised Service Center.
- If parts must be replaced, require ORIGINAL spare parts from an Authorised Dealer or Retailer.
- To ensure machine proper and safe operation, the scheduled maintenance shown in the relevant chapter of this Manual, must be performed by the authorised personnel or by an authorised Service Center.
- The machine must be disposed of properly, because of the presence of toxic-harmful materials (batteries, oils, plastics, etc.), which are subject to standards that require disposal in special centres (see the Scrapping chapter).
- While the engine is running, the silencer warms up; do not touch the silencer when it is hot to avoid burns or fires.
- Running the engine with an insufficient quantity of oil can seriously damage the engine. Check the oil level with the engine off and the machine on a level surface.
- Never run the engine if the air filter is not installed, because the engine could be damaged.
- Technical service procedures on the engine must be performed by an authorised Dealer.
- Only use original spare parts or parts of matching quality for the engine. Using spare parts of lower quality can seriously damage the engine.
- See also the SAFETY RULES in the Engine Manual, which is to be considered an integral part of this Manual.

Guide lines to bacteria control and other dangers coming from the presence of microbes in the dust guard system.

**WARNING!**

To prevent the operators and other people from developing infections caused by microbes and Legionella that may flourish in the dust guard system, take the following precautions:

- If possible, fill the tank with cold water (< 20°C).
- DO NOT use stagnant water to fill the tank.
- DO NOT use recycled water, undrinkable water or water that has been in contact with the soil.
- Adjust and turn the nozzles towards the floor only, from preventing possible inhaling.
- Do not store the machine outdoors or near sources of heat.
- Do not over-fill the tank. Fill the tank sufficiently so that it can be emptied by using the system.
- Empty the tank every 10 hours or once a week, according to the use.
- If the machine is not used for more than one week, empty the tank completely, and let it dry.
- If the tank cannot be cleaned regularly, consider using a biocide that can kill or exert a controlling effect on Legionella bacteria. Biocide must be chosen according to the local regulations and must be used according to the relevant instructions and cautions, to avoid that the personnel gets affected by dangerous chemical substances.
- If chemical products have to be used in the water tank, it is mandatory to apply the relevant information and caution labels of the product.

HOPPER SAFETY SUPPORT



CAUTION!

Before performing any maintenance procedure under or near to the lifted hopper, pull the locking handle (39) to make sure that the hopper safety support (5) is in place. The hopper safety support (5) holds the hopper in the lifted position to allow work to be performed under the hopper. Never rely on the machine's hydraulic components to safely support the hopper.

JACKING THE MACHINE



WARNING!

Never work under a machine without safety stands or blocks to support the machine.

When jacking the machine, do so at designated locations (do not jack on the hopper) - see jacking locations (8).

MACHINE TRANSPORT



WARNING!

Before transporting the machine on an open truck or trailer, make sure that:

- *All access doors are latched securely.*
- *The machine is tied down securely.*
- *The parking brake is engaged.*

PUSHING/TOWING THE MACHINE



CAUTION!

The hydraulic pump can be damaged if the machine is towed when the screw is in the normal working position (locked).

The machine hydraulic pump (45) is equipped with a screw that disengages the traction system. The system prevents damage to the hydraulic system when the machine is being towed/pushed short distances without using the engine.

1. To access the unlocking screw, open the engine compartment hood (1) by using the unlocking push-button (25) and locate the hydraulic pump (45) in the front part of the engine (44).
2. Remove the supplied wrench (A, Fig. 1) on the pump lever.
3. With the wrench, turn the socket head screw (B) 1/4 of a turn counter-clockwise (C) to disengage the hydrostatic lock between the engine and pump.
4. Tow or push the machine no faster than a normal walking pace (3-4.5 km/h) and for short distances only.



NOTE

If the machine is to be moved long distances the driving wheels need to be raised off the floor and placed on a suitable transport dolly.

5. After pushing/towing the machine, turn the socket head screw 1/4 of a turn clockwise (D) to reset the hydrostatic lock and hydraulic functions.



NOTE

If the screw is left in unlocking position (C), the hydraulic pump cannot drive the machine.

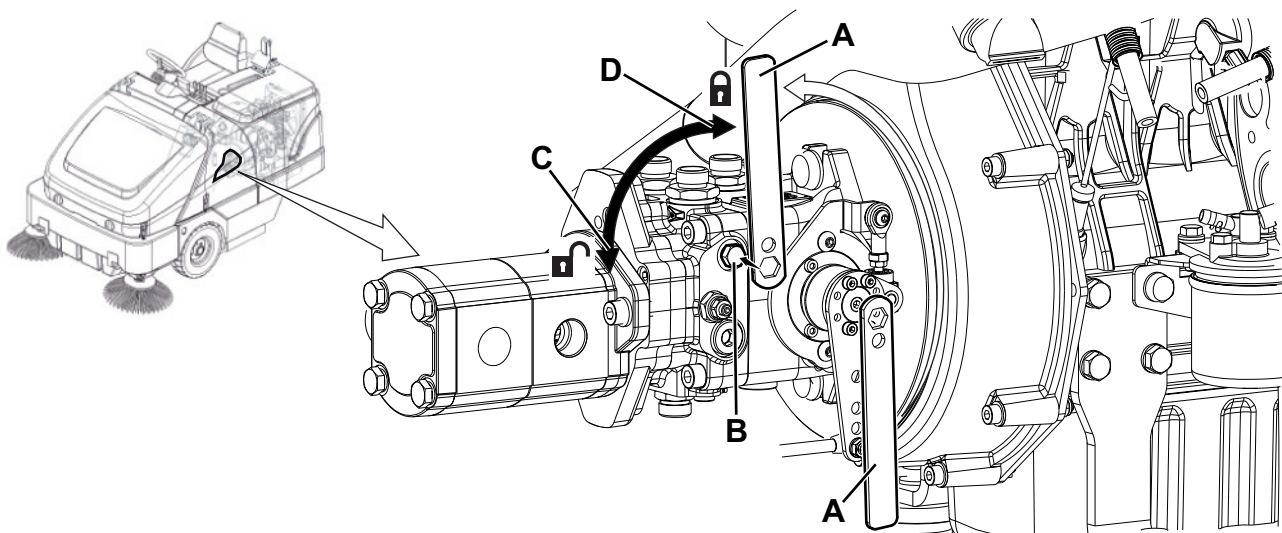


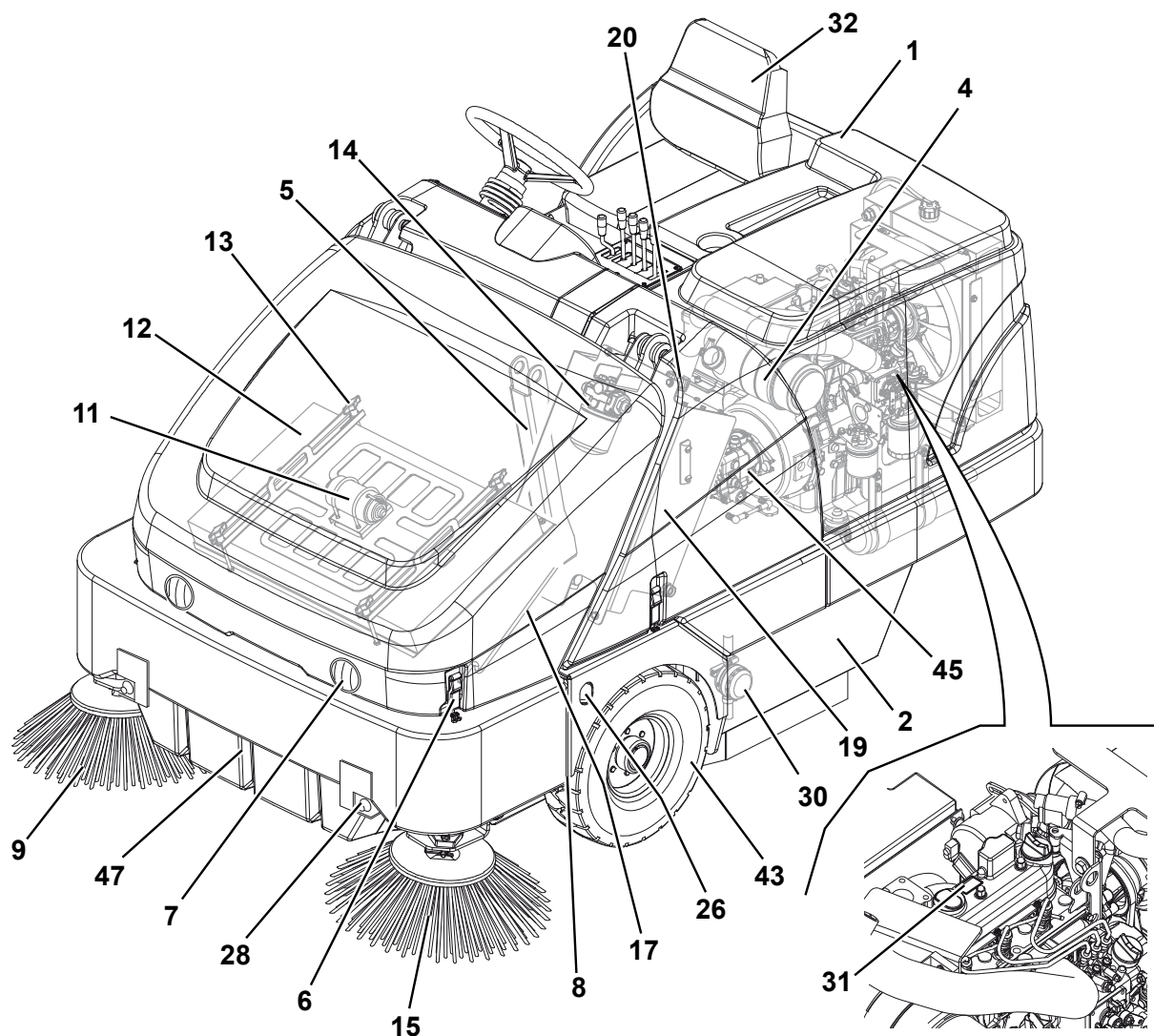
Figure 1

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MACHINE DESCRIPTION

MACHINE STRUCTURE

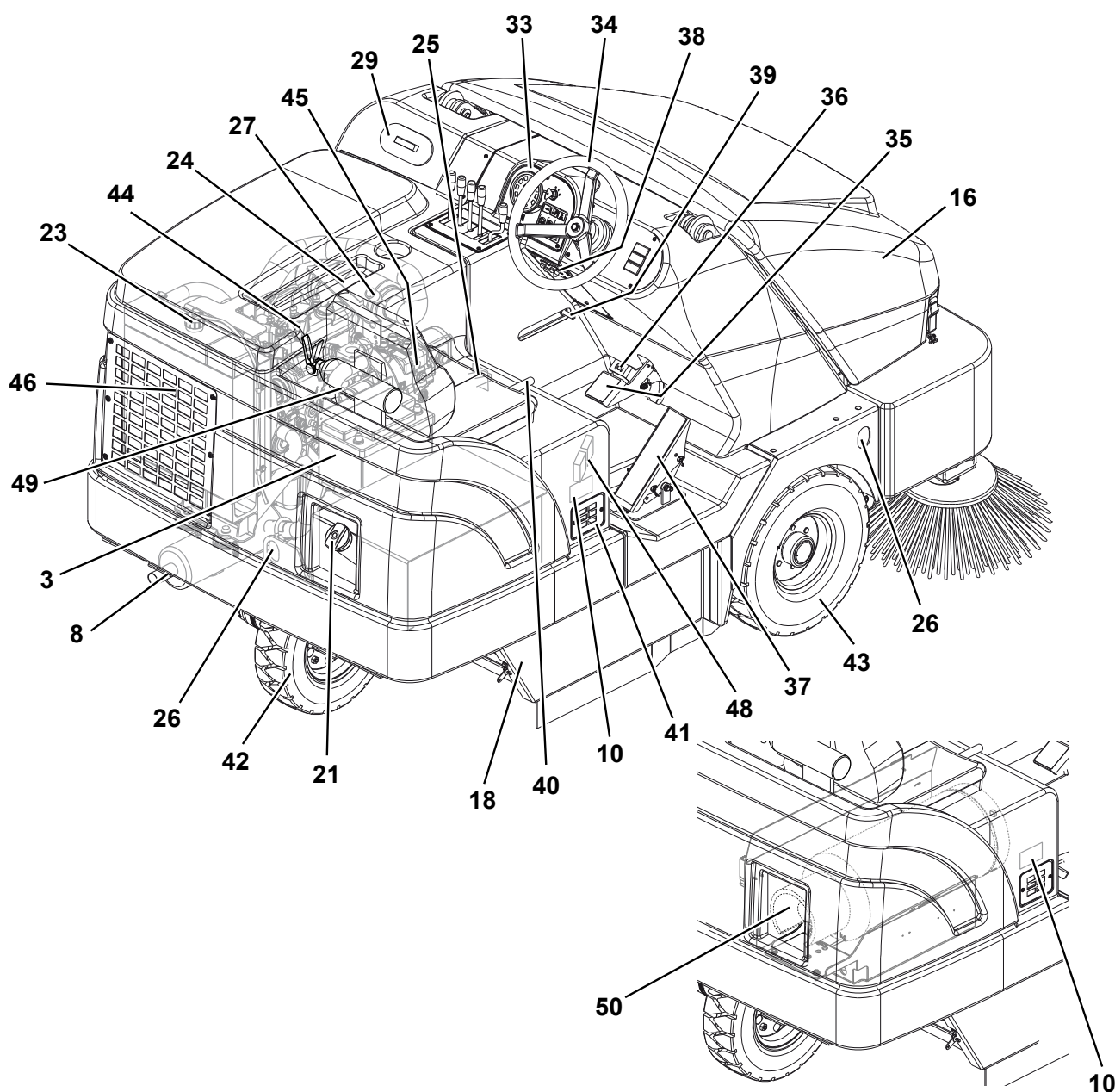
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|---|---|
| 1. Engine compartment hood | 16. Hopper hood |
| 2. Left side main broom access panel | 17. Hopper hood support rod |
| 3. Battery | 18. Right side main broom access panel |
| 4. Left side hood, or dust guard system water tank (optional) | 19. Hydraulic oil tank |
| 5. Hopper safety support | 20. Hydraulic oil tank plug |
| 6. Hopper hood latch | 21. Fuel tank cap |
| 7. Working light (optional) | 22. Fuel tank |
| 8. Jacking locations (rear location is under the engine radiator) | 23. Radiator plug |
| 9. Right side broom | 24. Engine air filter |
| 10. Serial number plate/technical data/conformity certification | 25. Engine compartment hood unlocking push-button |
| 11. Dust filter shaker assembly | 26. Tie-down locations (3) |
| 12. Hopper dust filter | 27. Air filter service indicator |
| Panel filter (standard) | 28. Dust guard system nozzles (optional) |
| Closed pocket filter (optional) | 29. Dust guard system water tank plug (optional) |
| 13. Filter shaker assembly mounting knobs | 30. Water filter (optional) |
| 14. Hydraulic oil filter | 31. Engine model and serial number plate |
| 15. Left side broom (equipped on SR 1601 MAXI) | |



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MACHINE STRUCTURE (Continues)

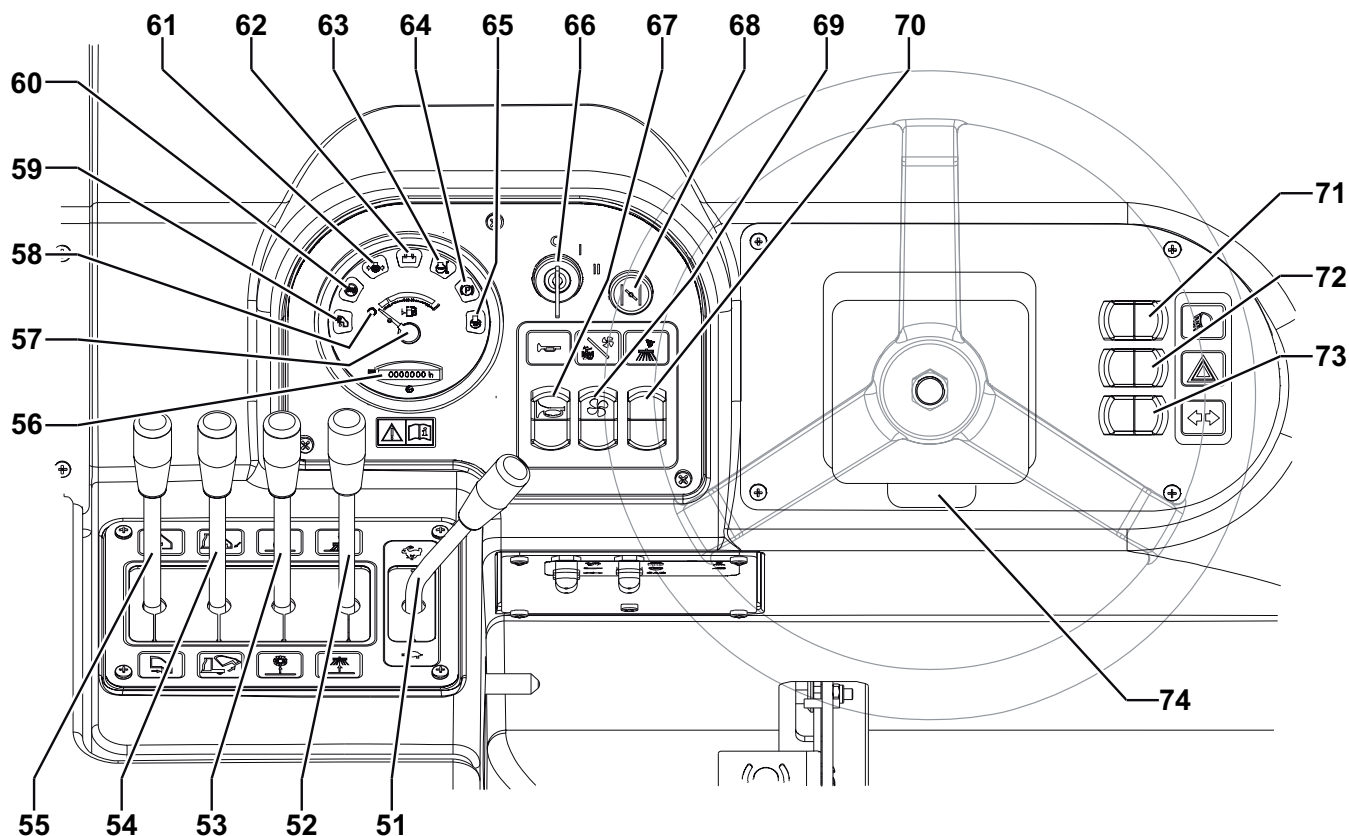
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|--|--|
| 32. Driver's seat | 40. Driver's seat adjustment lever |
| 33. Control panel (see the following paragraph) | 41. Engine air grid |
| 34. Steering wheel | 42. Rear driving and steering wheel |
| 35. Brake pedal | 43. Front wheels |
| 36. Parking brake pedal | 44. Motor |
| (To engage/disengage the parking brake, use simultaneously with the brake pedal) | 45. Hydraulic pump |
| 37. Forward/reverse gear pedal | 46. Engine coolant/hydraulic oil radiator |
| 38. Fuse panel (see the Fuse Check/Replacement/Reset paragraph) | 47. Hopper |
| 39. Hopper safety support handle | 48. Fuses (see the Fuse Check/Replacement/Reset paragraph) |
| • Pull backward to lock the support | 49. Fire extinguisher (optional) |
| • Push forward to unlock the support | 50. LPG cylinder |



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OPERATING CONTROLS

51. Engine speed lever
 - (Forward) working speed
 - (Backward) idle speed
52. Side broom lever
 - (Forward) side broom lowered
 - (Backward) side broom lifted
53. Main broom lever
 - (Forward) main broom lowered
 - (Backward) main broom lifted
54. Hopper lever
 - (Forward) hopper lowered
 - (Backward) hopper lifted
55. Hopper dumping door lever
 - (Forward) dumping door opened
 - (Backward) dumping door closed
56. Hour counter
57. Fuel level indicator
58. Fuel level warning light
59. Hopper overtemperature warning light
60. Clogged hopper filter warning light
61. Low engine oil pressure warning light
62. Battery warning light
63. Engine coolant overtemperature warning light
64. Parking brake warning light (optional)
65. Glow plug pre-heating warning light
66. Ignition key:
 - When turned to "0" it stops the engine and disables all machine functions.
 - When turned to "I", it enables the machines functions.
 - When turned to "II" it starts the engine.
 - As soon as the engine starts release the key, which will return to "I".
67. Horn switch
68. Choke lever (only for LPG3 and P3)
69. Vacuum fan / filter shaker switch
 - (Lower position) filter shaker activation
 - (Upper position) vacuum fan and dust guard system activation
70. Dust guard system switch (optional)
71. Working light switch (optional)
72. Hazard warning light switch (optional)
73. Turn signal switch (optional)
74. Steering wheel adjustment lever (optional, equipped on SR 1601 MAXI)



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ACCESSORIES/OPTIONS

In addition to the standard components, the machine can be equipped with the following accessories/options, according to the machine specific use:

- Left side broom (equipped on SR 1601 MAXI)
- Main and side brooms with harder or softer bristles
- Polyester water proof dust filter
- Polyester closed pocket filter
- Clogged filter sensor
- Dust guard system (equipped on SR 1601 MAXI)
- Headlights
- Working lights
- Flashing light
- Non-marking wheels
- Tilt steering wheel (equipped on SR 1601 MAXI)
- Driver's seat with suspensions
- Driver's seat armrests
- Safety belts
- Side broom guard
- Protective roof
- Overhead guard canopy
- Soft cabin
- Rearview mirrors
- Fire extinguisher
- Rear bumper
- Reverse gear buzzer
- Hopper protection
- Anti-skid mat

For further information concerning the optional accessories, contact an authorised Retailer.

TECHNICAL DATA

Dimensions and weights	SR 1601 D3	SR 1601 LPG3	SR 1601 P3
Cleaning path with main broom	35.5 in (900 mm)		
Cleaning path with one side broom	49.25 in (1,250 mm)		
Cleaning path with two side brooms (equipped on SR 1601 MAXI)	63 in (1,600 mm)		
Machine length	87.5 in (2,220 mm)		
Machine width (broom hubs)	52 in (1,320 mm)		
Maximum machine height	57.5 in (1,460 mm)		
Maximum machine height with overhead guard (optional)	79 in (2,000 mm)		
Minimum distance from the floor (skirts not included)	4.25 in (110 mm)		
Hopper maximum lifting height	62.5 in (1,590 mm)		
Main broom size (diameter x length)	12.2 x 35.5 in (310 x 900 mm)		
Side broom diameter	21.5 in (550 mm)		
Tyre pressure	85 psi (6 Bar)		
Maximum capacity	800 lb (365 kg)		
IP protection class	X3		
Front axle weight in running conditions	1,180 lb (535 kg)		
Rear axle weight in running conditions	905 lb (410 kg)		
Total machine kerb weight (without operator)	2,085 lb (945 kg)		
Maximum weight (GVW)	2,932 lb (1,330 kg)	2,910 lb (1,320 kg)	2,866 lb (1,300 kg)
Machine weight for shipment	2,337 lb (1,060 kg)	2,315 lb (1,050 kg)	2,315 lb (1,050 kg)

Refuelling data	SR 1601 D3	SR 1601 LPG3	SR 1601 P3
Fuel tank capacity	14 USgal (35 litres)	-	14 USgal (35 litres)
Hydraulic system oil tank capacity	30.6 qt (29 litres)		
Engine oil pan capacity (*)	5.4 qt (5.1 litres)	3.59 qt (3.4 litres)	
Engine oil type (**)	SAE 10W-30		
Engine coolant quantity (**)	4.2 qt (4 litres)		

(*) For other engine data/values, see the Engine Manual.

(**) For engine oil and coolant data, and for technical specifications refer to the Engine Manual.

Performance data	SR 1601 D3	SR 1601 LPG3	SR 1601 P3
Total power	16.3 kW 2750 rpm	19 kW 2650 rpm	20 kW 2650 rpm
Maximum forward speed (for transport only)	7.5 mph (12 km/h)		
Maximum gradient when working	17% (9.6°)		
Minimum turning radius	60.2 in (1,530 mm)		
Sound pressure level at workstation (ISO 11201, ISO 4871, EN 60335-2-72) (LpA)	88 ±3 dB(A)	89 ±3 dB(A)	
Machine sound pressure level (ISO 3744, ISO 4871, EN 60335-2-72) (LwA)	108 dB(A)	109 dB(A)	
Vibration level at the operator's arms (ISO 5349-1, EN 60335-2-72)	<2.5 m/s²		
Vibration level at the operator's body (ISO 2631-1, EN 60335-2-72)	<0.5 m/s²		
Hopper capacity	Theoretic: 11.25 cu-ft (315 litres) Real: 8.00 cu-ft (226 litres)		
Hopper maximum lift capacity	800 lb (363 kg)		
Dust guard system (equipped on SR 1601 MAXI)	11.9 USgal (45 litres)		

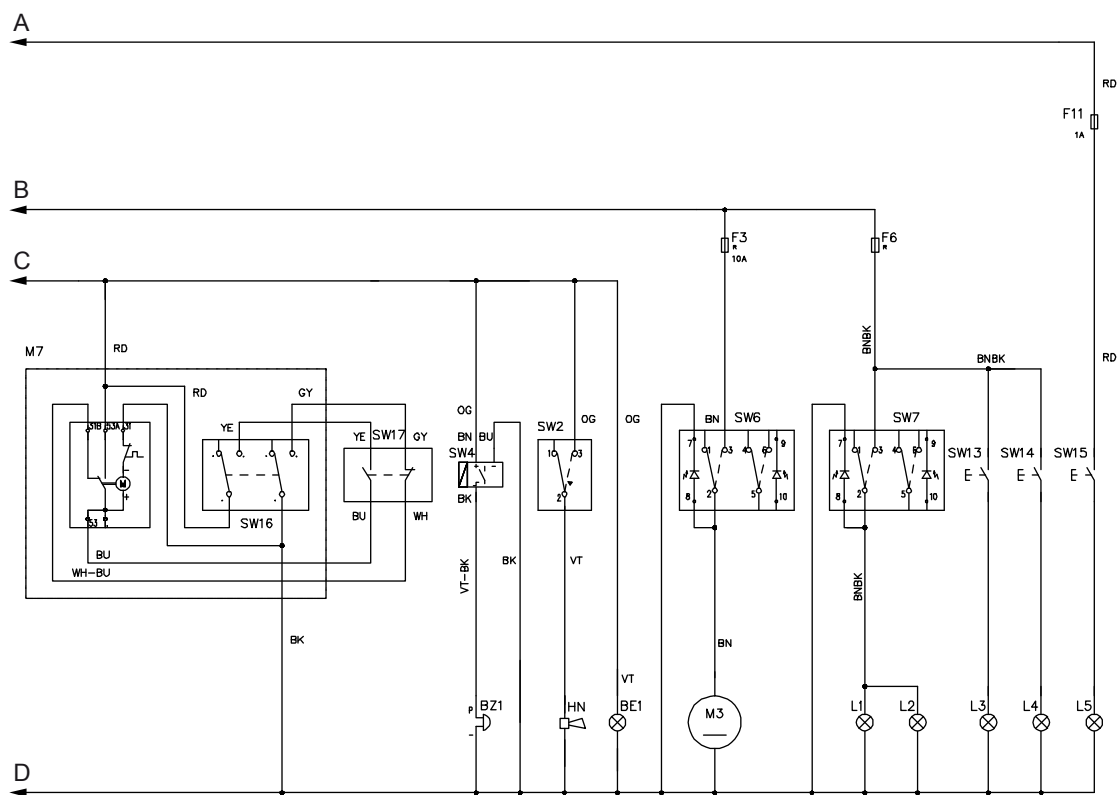
WIRING DIAGRAM

Key

ALT	Alternator	SE1	Oil pressure sensor
BAT	Battery	SE2	Water temperature sensor
BE1	Pivoting light (optional)	SE3	Clogged hopper filter sensor (optional)
BZ1	Reverse gear buzzer (optional)	SE5	Fuel tank float (D3 and P3 versions only)
ES1	Vacuum system relay	SE6	Hopper temperature sensor (optional)
ES2	Filter shaker relay	SE7	Engine speed sensor (LPG3 and P3 versions only)
ES3	LPG safety relay (LPG3 version only)	SE8	Low fuel sensor (LPG3 version only)
EV1	Fuel solenoid valve (D3 and P3 versions only)	SPK	Glow plug coils (LPG3 and P3 versions only)
EV2	LPG solenoid valve (LPG3 version only)	STR	Gage
EV3	LPG safety solenoid valve (LPG3 version only)	SW1	Vacuum system/filter shaker switch
F1	Vacuum system fuse (30 A)	SW2	Horn switch
F2	Filter shaker fuse (16 A)	SW3	Driver's seat microswitch
F3	Water pump fuse (10 A) (if equipped)	SW4	Reverse gear proximity (optional)
F4	Ignition key fuse (30 A)	SW5	Cab blower switch (optional)
F5	Engine accessory fuse (16 A)	SW6	Water pump switch (if equipped)
F6	Working light fuse (10 A) (optional)	SW7	Working light switch (optional)
F8	Cab blower fuse (optional)	SW13	Driver's side working light switch (optional)
F9	Glow plug fuse (50 A) (D3 version only)	SW14	Rear working light switch (optional)
F10	Alternator fuse box and fuse (50 A)	SW15	Hood inner light switch (optional)
F11	Hood inner light fuse (1 A) (optional)	SW16	Windscreen wiper switch (optional)
HN	Horn	SW17	Lifted hood microswitch (optional)
IGN	Ignition unit (LPG3 and P3 versions only)	T1	Filter shaker timer
K1	Ignition switch	T2	Filter shaker timer 2
L1	Front working light (optional)	T3	Driver's seat timer
L2	Front working light (optional)	T4	LPG safety timer (LPG3 version only)
L3	Driver's side working light (optional)	TC	Glow plug timer (D3 version only)
L4	Rear working light (optional)		
L5	Engine hood inner light (optional)		
M1	Vacuum system motor		
M2	Filter shaker motor		
M3	Water pump motor (if equipped)		
M4	Cab blower (optional)		
M7	Windscreen wiper motor (optional)		
MST	Starter		
P1	Fuel pump (P3 version only)		
PLG	Glow plug (D3 version only)		
R1	Glow plug warning light resistance (D3 version only)		

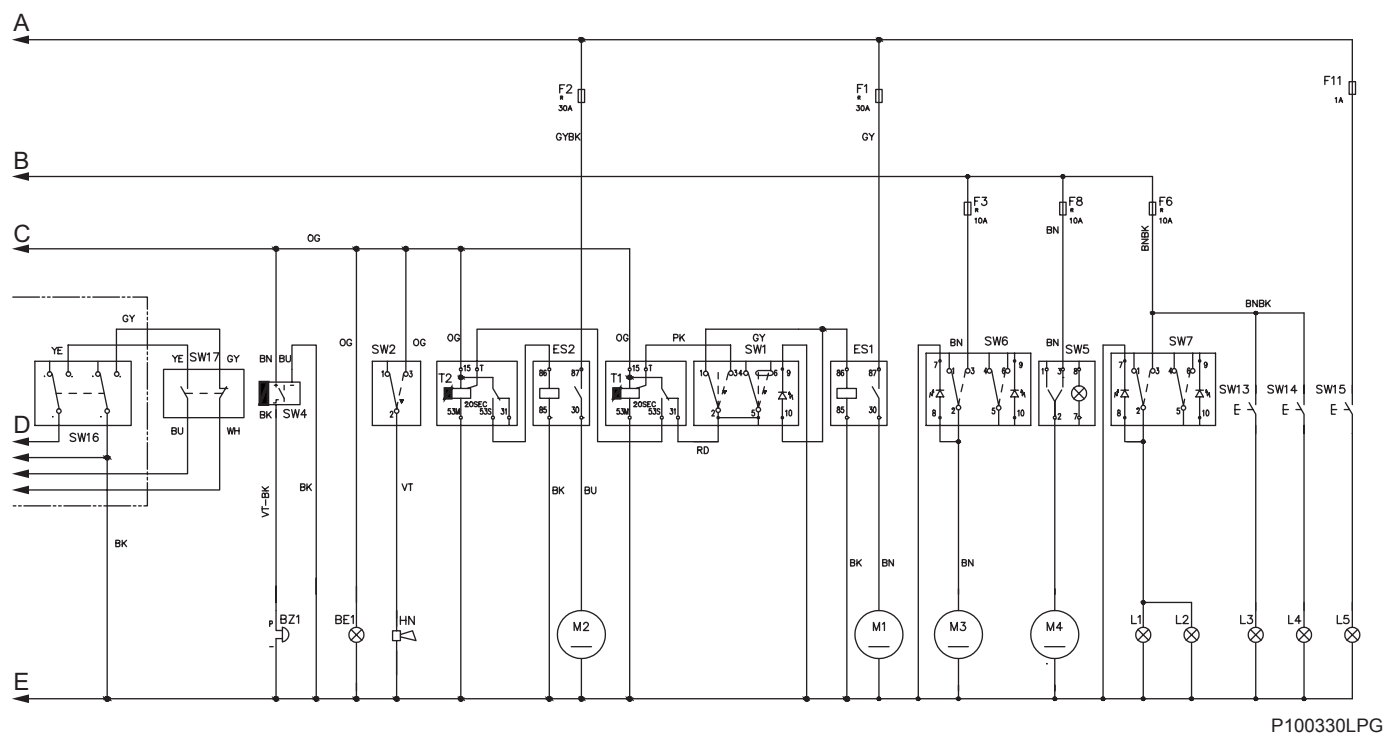
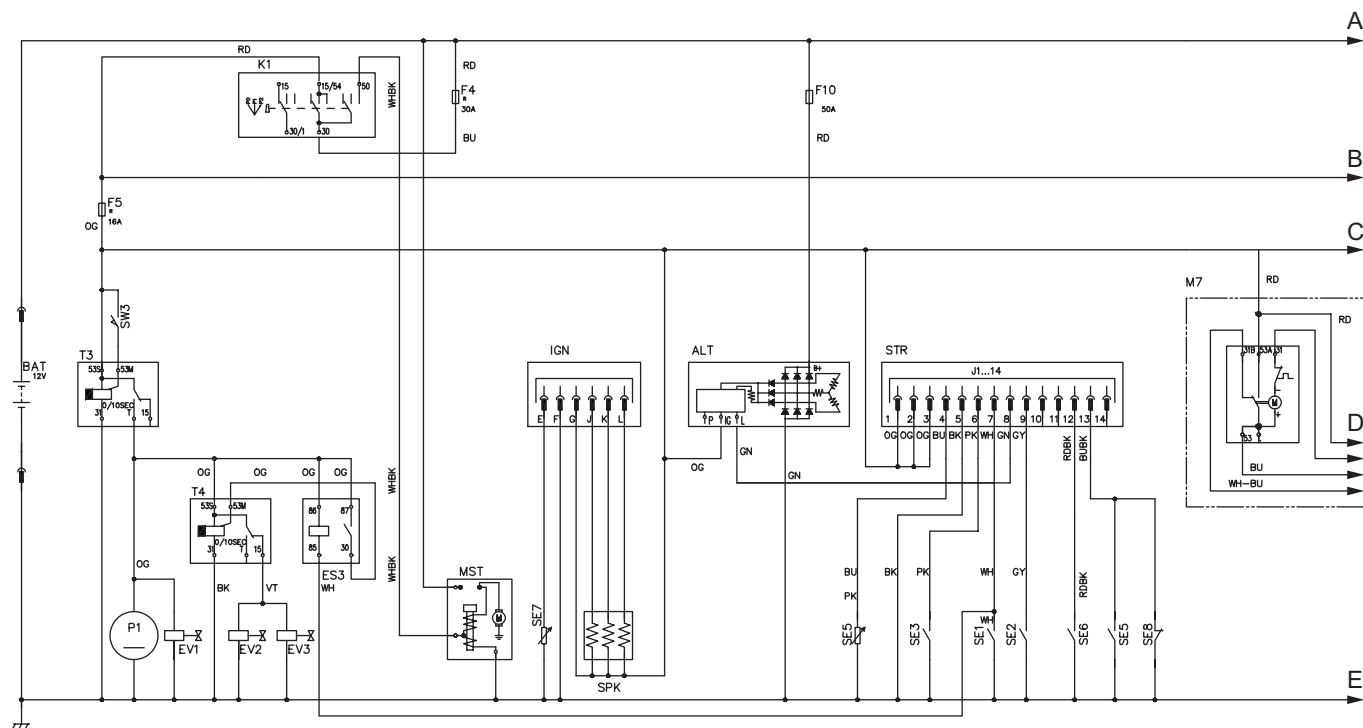
Colour codes

BK	Black
BU	Blue
BN	Brown
GN	Green
GY	Grey
OG	Orange
PK	Pink
RD	Red
VT	Violet
WH	White
YE	Yellow



SR 1601 D3 / LPG3 / P3 - 33019216

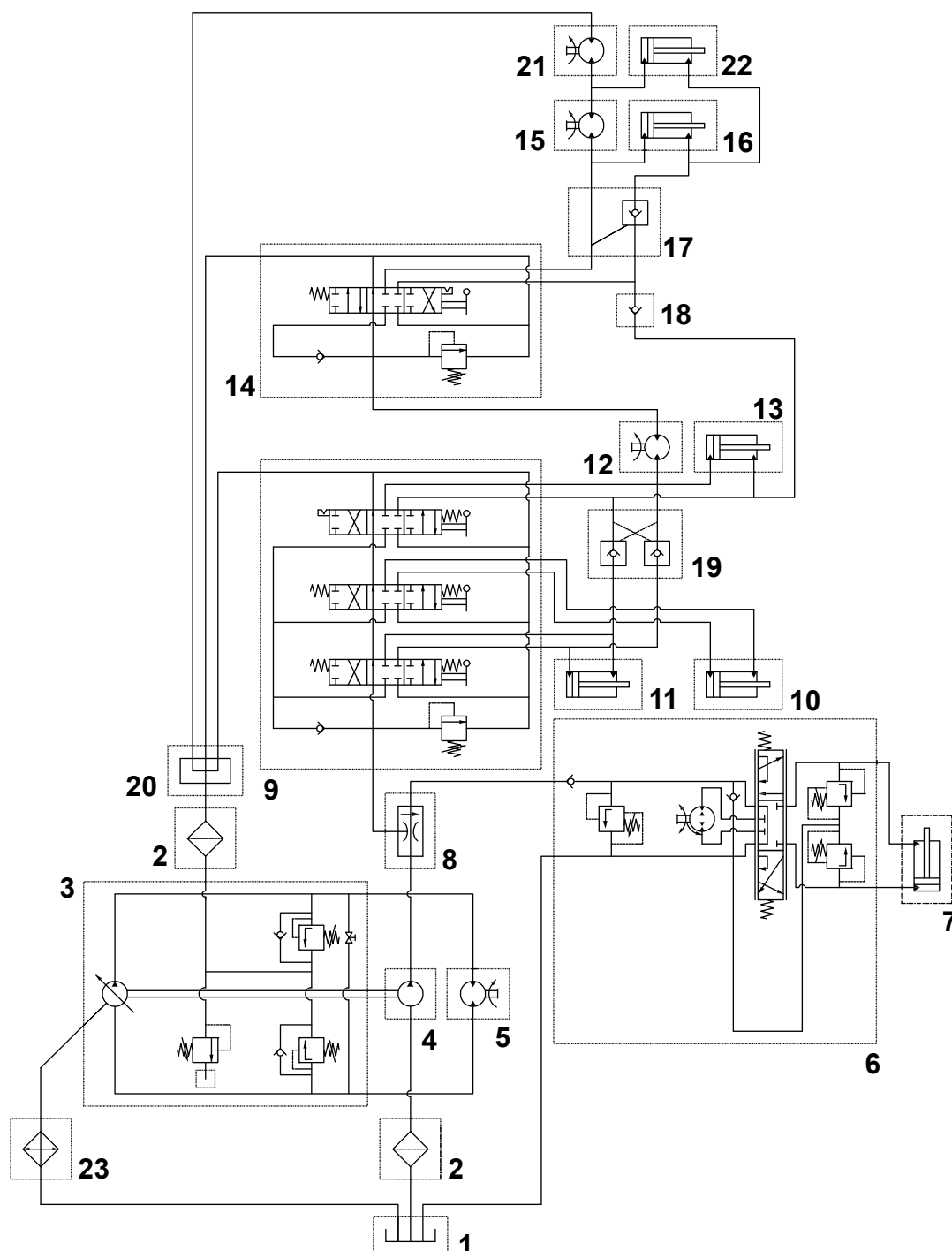
SR 1601 LPG3 - P3 WIRING DIAGRAM



P100330LPG

HYDRAULIC DIAGRAM**Key**

- | | |
|-----------------------|---|
| 1. Oil tank | 12. Main broom motor |
| 2. Oil filter | 13. Main broom cylinder |
| 3. Drive system pump | 14. Manifold 1 lever |
| 4. Accessory pump | 15. Right side broom motor |
| 5. Drive system motor | 16. Right side broom cylinder |
| 6. Power steering | 17. Check valve |
| 7. Steering cylinder | 18. One-way valve |
| 8. Priority valve | 19. Double check valve |
| 9. Manifold 3 levers | 20. Manifold block |
| 10. Hopper cylinder | 21. Left side broom motor (optional) |
| 11. Skirt cylinder | 22. Left side broom cylinder (optional) |
| | 23. Radiator |



P100328

PREPARING THE MACHINE FOR USE



WARNING!

On some points of the machine there are some adhesive plates indicating:

- **DANGER**
- **WARNING**
- **CAUTION**
- **CONSULTATION**

While reading this Manual, the operator must pay particular attention to the symbols shown on the plates (see the Visible Symbols On The Machine paragraph).

Do not cover these plates for any reason and immediately replace them if they are damaged.

PRE-OPERATIONAL CHECKLIST

Before Each Use:

- Inspect the machine for damage, oil or coolant leaks.
- Check the engine coolant level (23) (see the relevant paragraph).
- Check the engine oil level (44) (see the relevant paragraph).
- Check the hydraulic oil level (19) (see the relevant paragraph).
- Check the fuel level indicator (57), if the warning light (58) is on, refuel (SR 1601 D3 / P3) or replace the LPG tank (SR 1601 LPG3).
- Check that the pressure of all three tires is 85 psi (6 Bar).
- Check the air filter service indicator (see the relevant paragraph).

In the driver's seat:

- Be sure to understand the operating controls and their functions.
- Adjust the seat with the lever (40) to allow easy reach of all controls.
- Insert the ignition key (66) and turn it to "I":
 - Check the horn (67), hour counter (56) and headlights (71, optional) for proper operation.
 - Turn the ignition key (66) to "0".
- Check the parking brake (35 and 36). The brake must hold its (locked parked) setting firmly without easily being released (report all defects immediately to service personnel).

Plan cleaning in advance:

- Arrange long runs with a minimum of stopping or starting.
- Allow a small amount of broom path overlap to ensure complete coverage.
- Avoid making sharp turns, bumping into posts, or scraping the side of the machine.

MAIN BROOM

Several different main brooms are available for this machine. To select the best broom for the surface and litter to be swept, contact a Nilfisk Retailer.



NOTE

To install the main broom, refer to Main Broom Maintenance paragraph.

FUEL

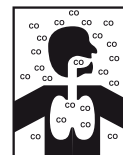


CAUTION!

- **Always stop the engine before filling the fuel tank.**
- **Do not smoke while filling the fuel tank.**
- **Fill the fuel tank in a well-ventilated area.**
- **Do not fill the fuel tank near sparks or open flame.**



DANGER!



- **Carbon monoxide (CO) can cause brain damage or death.**
- **The internal combustion engine of this machine can emit carbon monoxide.**
- **Do not inhale exhaust gas fumes.**
- **Only use indoors when adequate ventilation is provided, and with the help of an assistant.**

Diesel and Petrol Engine (SR 1601 D3 / SR 1601 P3)

1. Unscrew the fuel tank plug (21) and refuel.
2. (Only for **SR 1601 D3**) If using the machine when the outside temperature is lower than 32 °F (0°C), use diesel fuel for low temperatures.
3. (Only for **SR 1601 P3**) Unscrew the plug (21) and fill the tank (22) with unleaded fuel for vehicles.

**NOTE**

If the machine runs out of fuel completely, the fuel system must be bled before the engine can be re-started. To avoid this situation, fill the fuel tank (22) until the fuel indicator (56) indicates 1/4 of the tank. Fuel tank capacity is 14 USgal (35 litres).

LPG Engine (SR 1601 LPG3)**DANGER!**

Before replacing the LPG tank, close the safety valve and disconnect the hose.

1. Install an LPG tank (50) having characteristics which comply with the laws in force in the country where it used.
2. Connect the fuel hose and open the cutoff valve on the LPG tank. Always wear gloves when connecting and disconnecting the fuel hose. When the machine is not operating, close the LPG tank safety valve.

**NOTE**

Place the LPG tank in a proper horizontal position. Connect the hose to the tank and check that there are no gas leaks.

**DANGER!**

Do not use the machine in case of gas leaks. Disconnect the hose and replace the LPG tank. If the gas leak persists, disconnect the fuel hose and contact the Nilfisk Service Center.

OPERATING THE MACHINE

The SR 1601 is a rider-type automatic floor sweeping machine. The controls were designed to be user friendly. For single pass sweeping the operator can simply lower the main broom.

BEFORE STARTING THE MACHINE

1. Be sure to understand the operating controls and their functions.
2. Plan the cleaning route. Arrange long, straight passes with as few turns as possible.
3. Check the brake pedal (35). The pedal should be firm.

**WARNING!**

If the pedal is "spongy" or fades under pressure, do not drive the machine. Report all defects immediately to service personnel.

Filling the dust guard system water tank (optional)

1. Remove the plug (29) to reach the filler neck.
2. Fill the tank (4) with clean water. Do not fill the tank completely, leave a few centimetres from the edge.

STARTING AND STOPPING THE MACHINE

Starting the machine



NOTE

The driver's seat (32) is equipped with a safety sensor, which allows the machine to be started up and driven only when the operator is on the driver's seat.

1. (For **SR 1601 D3**) Turn the ignition key (66) clockwise to "I" and hold it until the pre-heating glow plug indicator (65) turns off. Do not perform the step above, if the engine is already on and warmed up.
(For **SR 1601 LPG3**) Open the LPG tank safety valve (50) slowly. Pull the engine choke lever (68).
(For **SR 1601 P3**) Pull the engine choke lever (68).
2. Turn the ignition key (66) clockwise to "II", then release it when the engine starts.
If the engine does not start after running the starter for 15 seconds, release the ignition key, wait 1 minute and then repeat steps 1 and 2.
(For **SR 1601 LPG3** and **SR 1601 P3**) After the ignition, let the engine run for a few seconds, then release the choke lever (68).
3. Before using the machine, run the engine at idle for 5 minutes by turning the engine speed lever (51) backward (idle speed).
4. Disengage the parking brake.
5. Turn the engine speed lever (51) forward (working speed) and drive the machine at slow speed for 2 or 3 minutes to warm up the hydraulic system.
6. Press the front part of the drive pedal (37) to move forward and the rear part to move backward.
The drive speed can be adjusted from zero to maximum speed by increasing the pressure on the pedal.



WARNING!

When steering, avoid abrupt direction changes, pay careful attention and drive the machine at slow speed, especially when the hopper is full or when operating on inclines.

Drive the machine slowly on inclines. Use the brake pedal (35) to control machine speed while descending inclines.

Do not turn the machine on an incline; drive straight up or down.

Stopping the machine

7. To stop the machine, release the pedal (37).
To stop the machine quickly, press also the brake pedal (36).
8. Turn off the machine by turning the ignition key (66) to "0", then remove it.
9. Engage the parking brake.

PARKING BRAKE

1. Engage the parking brake by pressing the pedals (35) and (36) simultaneously.
2. Disengage the parking brake by pressing and releasing the pedal (35).



WARNING!

Before performing any maintenance, repair, cleaning or replacement procedure engage the parking brake.

Engage the parking brake when parking the machine on a slope or incline.

SWEEPING

Follow the instructions in Preparing The Machine For Use paragraph.

1. Drive the machine to the work area as shown in the previous paragraph.
2. If the hopper is not already lowered, lower it properly by using the lever (54).
3. Lower and turn on the main broom with the lever (53).



NOTE

The side and main brooms can be lowered and lifted even when the machine is moving. The brooms do not turn when they are lifted or when the machine is stationary.



NOTE

The hopper dumping door opens automatically when the main broom lowers and closes automatically as soon as the main broom is lifted.

4. Press the upper part of the switch (69) to turn on the vacuum fan and the dust guard system.



WARNING!

When working on wet floors, turn off the vacuum fan and the dust guard system with the switch (69) to preserve the dust filter.

Turn on the vacuum fan and the dust guard system as soon as the machine returns to a dry floor.

5. Lower and turn on the side brooms (9) (15, equipped on SR 1601 MAXI) with the lever (52).
If equipped, turn on the dust guard system with the switch (70, optional).
6. Drive the machine straight forward at a quick walking speed. Drive the machine slower when sweeping large amounts of dust or debris or when safe operation dictates slower speeds. Overlap passes 5.9 in (15 cm).
7. For proper machine operation, the dust filter must be as clean as possible. To clean the dust filter while sweeping, turn on the filter shaker by pressing the lower part of the switch (69), then turn on the vacuum fan and the dust guard system by pressing the upper part of the switch (69) after shaking has completed.
While working, repeat the procedure every 10 minutes on average (depending on the dustiness of the area to be cleaned).



NOTE

This procedure can also be performed when the machine is moving.



CAUTION!

When the dust filter is clogged and/or the hopper is full, the machine cannot collect dust and debris anymore.

8. Check behind the machine occasionally to make sure that the machine is picking up debris. Dirt left behind in the path of the machine usually indicates that the machine is moving too fast, the main broom needs to be adjusted, or the hopper (47) is full. The hopper (47) should be dumped after each working period and whenever it is full (see the procedure in the next paragraph).

HOPPER DUMPING



DANGER!

***The hopper must be emptied on level grounds only.
Never lift the hopper when the machine is on a slope.***



NOTE

The minimum ceiling height dumping clearance required for lifting the hopper is 108.2 in (275 cm).

1. Lift the main broom with the lever (53).
2. Press the lower part of the switch (69) to turn on the filter shaker and remove the excess dirt from the dust filter (12).



NOTE

For best filter shaker performance always run the filter shaker with the hopper fully lowered.

3. Drive the machine to the area appointed to empty the hopper, or close to a large trash receptacle.
4. Lift the hopper with the lever (54) to the desired dump height.



NOTE

The dumping door automatically closes when using the lever (54) to lift the hopper. The control of the dumping door can be regained with the lever (55) as soon as the hopper begins to lift so that it can be dumped at any height as necessary.

5. Move the machine forward until the hopper is over the receptacle and engage the parking brake.
6. Open the dumping door with the lever (55) and dump the hopper.



NOTE

If not dumping into a trash receptacle, low dumping is recommended to help avoid airborne dust.



WARNING!

Before performing any maintenance procedure under or near to the lifted hopper, fully lift the hopper with the lever (54), then pull the handle (39) backwards to make sure that the hopper safety support (5) is in place. The hopper safety support holds the hopper lifted to allow working under the hopper. Never rely on the machine's hydraulic components to safely support the hopper.

7. Pull the locking handle (39) backwards to make sure that the hopper safety support (5) is in place, then slightly lower the hopper with the lever (54) to secure it.
8. Check the hopper door and its front gasket. If necessary, use a brush to remove litter from these areas.
For proper machine operation, the hopper door must seal tightly against the broom housing.
9. Return to the operator's compartment. Disengage the parking brake.
Move the machine back until the hopper will clear the receptacle.
10. Lift the hopper with the lever (54), pull the locking handle (39) forward until the safety support (5) disengages, then lower the hopper.

AFTER USING THE MACHINE

1. Press the lower part of the switch (69) to turn on the filter shaker, clean the hopper dust filter and empty the hopper (see the previous paragraph).
2. Lift the main broom with the lever (53).
3. Turn all controls to off position.
4. Turn the engine speed lever (51) to idle and let the engine idle for 25 - 30 seconds.
(Only for **SR 1601 LPG3**) Close the safety valve on the LPG tank (50), then let the engine run until all the fuel is expelled from the hoses (then the engine is stopped).
5. Turn off the machine by turning the ignition key (66) to "0", then remove it.
6. Engage the parking brake.
7. Check the maintenance schedule and perform any required maintenance before storage.
8. Store the machine indoors.



NOTE

The machine can be cleaned with a pressure washer as long as it is not sprayed directly at or into electrical components. The machine should always be allowed to dry completely before each use.

Report all defects or malfunctions to any Nilfisk Service Center or to service personnel.

MACHINE LONG INACTIVITY

If the machine is not going to be used for more than 30 days, proceed as follows:

1. Check that the machine storage area is dry and clean.
2. Empty the dust guard system tank (4) (if equipped) and clean the water filter (30).
3. Disconnect the negative connector (–) of the battery (3).
4. Check the engine (44) as shown in the relevant Manual.

FIRST PERIOD OF USE

After the first 5 hours perform the following procedures:

1. Check the fastening and connecting parts for proper tightening.
2. Check the visible parts for integrity and leaks.
3. Change the engine oil (see Maintenance chapter).

MAINTENANCE

The lifespan of the machine and its maximum operating safety are ensured by correct and regular maintenance.

The following table provides the scheduled maintenance. The intervals shown may vary according to particular working conditions, which are to be defined by the person in charge of the maintenance.

All scheduled or extraordinary maintenance procedures must be performed by qualified personnel, or by Nilfisk Service Center.

This Manual contains the Scheduled Maintenance Table and describes only the easiest and most common maintenance procedures. For other maintenance procedures shown in the Scheduled Maintenance Table, refer to the Service Manual that can be consulted at any Service Center.



WARNING!

To perform maintenance procedures, turn off the machine, remove the ignition key, engage the parking brake and disconnect the batteries.

Before performing any maintenance procedure, carefully read the instructions shown in Safety chapter.

SCHEDULED MAINTENANCE TABLE



NOTE

Maintenance intervals given are for average operating conditions. Machines used in severe operational environments may require service more often.

Procedure	Upon delivery	Daily	After the first 50 hours	Every 30 hours	Every 150 hours	Every 300 hours	Every 1,000 hours
Engine coolant check							
Engine oil level check							
Hydraulic oil level check							
Parking brake check							
Main and side broom cleaning							
Engine oil change			(1)		(1)		
Oil filter element replacement			(1)		(1)		
V-belt check			(1)	(1)			
Engine coolant circuit check			(1)				
Battery check							
Dust guard system water filter check and cleaning (optional)							
Engine air filter cleaning				(2)			
Engine radiator and oil cooler cleaning							
Broom check and adjustment							
Hopper dust filter check and cleaning ("A" method)				(2)			
Skirt integrity, height and operation check							
Hopper gasket integrity check							
Engine maintenance					(1) - (3)		
Steering wheel bearing and hydraulic piston lubrication					(1)		
Tank hydraulic oil filter replacement					(1)		
Pump hydraulic oil filter replacement					(1)		
Hopper dust filter check and cleaning ("B" method)					(2)		
Fuel filter replacement						(1)	
Fuel fitting and screw tightening						(1)	
Hopper dust filter check and cleaning ("C" method)						(2)	
Supply hose replacement (LPG3)							(1)
Hydraulic oil "recharge" filter replacement							(1)
Tank hydraulic oil change							(1) - (4)

(1) For the relevant procedure, see the Service Manual.

(2) Or more often in dusty areas.

(3) Maintenance procedures to be performed by an authorised KUBOTA dealer.

(4) Change the hydraulic oil for the first time after 500 hours, then every year.

MAIN BROOM MAINTENANCE

The main broom should be replaced for optimal performance when the bristles are worn to a length of 2 in (50 mm).

Main broom replacement



WARNING!

It is advisable to wear protective gloves when replacing the main broom because there can be sharp debris between the bristles.



NOTE

Brooms with harder or softer bristles are available.

This procedure is applicable to all types of brooms.

1. Drive the machine on a level floor.
2. Engage the parking brake.
3. Turn the ignition key (66) and start the machine.
4. Lower the main broom with the lever (53).
5. Turn the ignition key (66) to "0" to stop the machine.
6. Open the right panel (18).
7. Move aside the right side skirt (A, Fig. 2) and fasten it with the pin (B).
8. Pivot the idler arm assembly (C) out of the main broom core (D).



NOTE

The idler arm is held in place by the right side access panel (18).

9. Pull the main broom (D) out of its housing and remove any string or wire wrapped around it and its hubs.
10. Replace the main broom, slide it back into its housing. Make sure that the slots on the main broom core (D) engage the pins (E) in the main broom drive hub (F) and that the main broom is fully seated.
11. Close and swing the idler arm assembly (C) back into the main broom core.



NOTE

Make sure the lugs on the idler arm engage the slots (G) (right side) of the main broom core.

12. Place the right side skirt back to its position and close the right panel (18) until the lock lever engages.

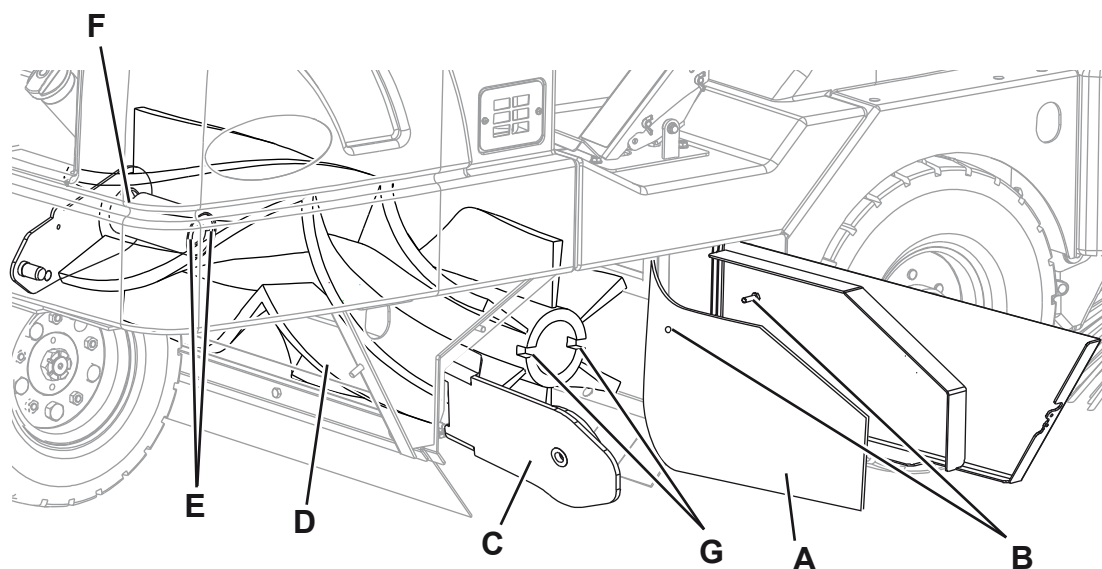


Figure 2

P100321

Main broom height adjustment



NOTE

*Brooms with harder or softer bristles are available.
This procedure is applicable to all types of brooms.*

1. Drive the machine on a level floor.
2. Engage the parking brake.
3. Turn the ignition key (66) and start the machine.
4. Lower the main broom with the lever (53) and let it run for 1 minute.
5. This allows the broom to polish a "strip" on the floor. After 1 minute, lift the main broom, disengage the parking brake and move the machine so that the polished strip is visible.
6. Inspect the polished strip on the floor. If the strip is less than 2 in (50 mm) or more than 3 in (75 mm) wide, the main broom must be adjusted.
7. To adjust, open the engine compartment hood (1) by using the unlocking push-button (25), loosen the knob (A, Fig. 3) and operate on the main broom adjuster (B) by considering the following:
 - When turning clockwise, the main broom pressure and pattern is decreased.
 - When turning counter-clockwise, the side broom pressure and pattern is increased.
 After adjusting, lock the adjuster with the knob (A).
8. Repeat steps 2-7 until the polished strip is 2 - 3 in (50-75 mm) wide.



NOTE

If the broom pattern cannot be properly adjusted, because the broom pressure differs from one end to another, see the adjustment procedure in the Service Manual.

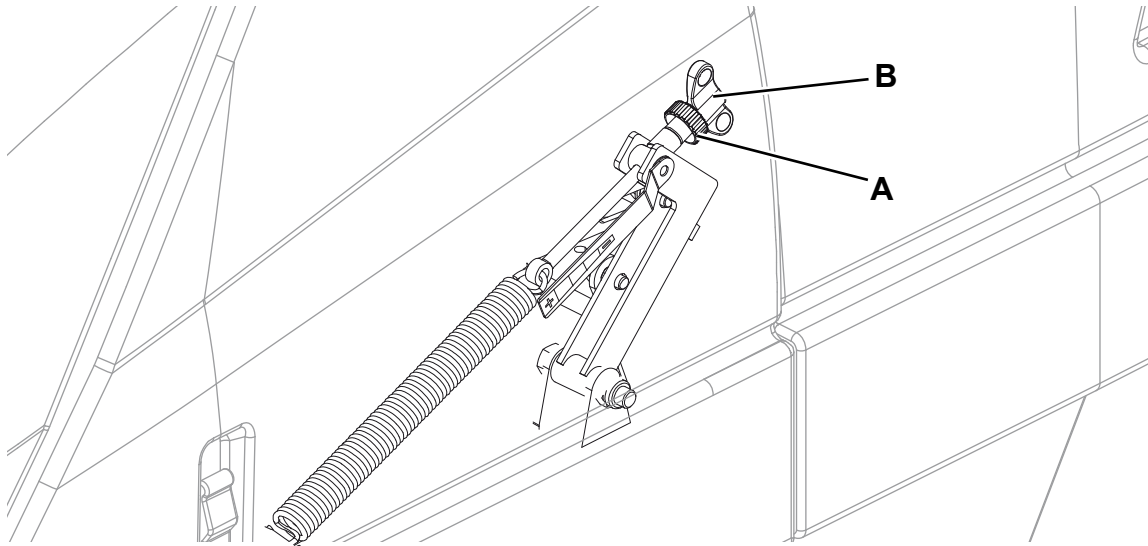


Figure 3

P100322

SIDE BROOM MAINTENANCE

Side broom adjustment



NOTE

*Brooms with harder or softer bristles are available.
This procedure is applicable to all types of brooms.*

1. Drive the machine on a level floor.
2. Engage the parking brake.
3. Turn the ignition key (66) and start the machine.
4. Lower the side broom with the lever (52) and let it run for 1 minute.
5. When lowered, the side brooms (9) (15, equipped on SR 1601 MAXI) should be contacting the floor as shown in the figure (A and B, Fig. 4).
6. To adjust, loosen the knob (A, Fig. 5) and operate on the side broom adjuster (B) by considering the following:
 - When turning clockwise, the side broom pressure is decreased.
 - When turning counter-clockwise, the side broom pressure is increased.
 After adjusting, lock the adjuster with the knob (A).
7. Repeat steps 1-5 to check the proper adjustment of the side broom height.
8. When the broom is too worn to be adjusted, replace it as shown in the next paragraph.



NOTE

The side brooms (9) (15, equipped on SR 1601 MAXI) should be replaced when the bristles are worn to a length of 3 in (75 mm). When replacing the side brooms, adjust the height.

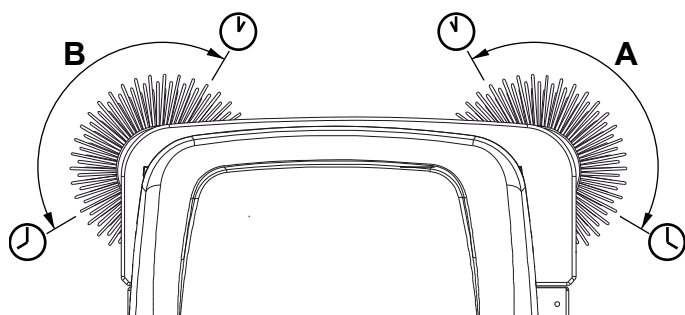


Figure 4

P100323

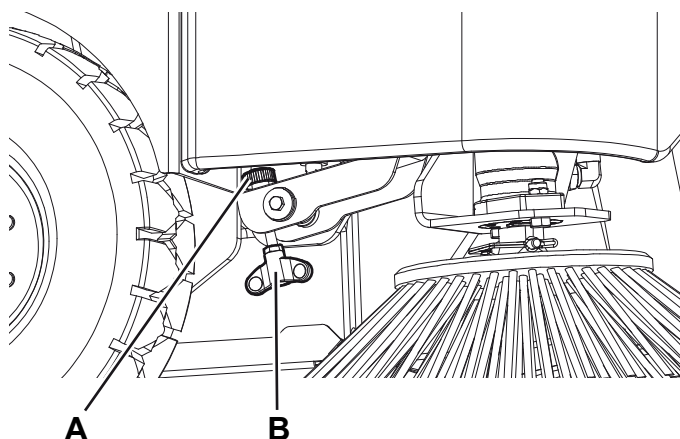


Figure 5

P100324

Side broom replacement

**WARNING!**

It is advisable to wear protective gloves when replacing the side broom because there can be sharp debris between the bristles.

1. Lift the hopper until the side broom is approximately at chest height.
2. Release the spring to remove the mounting pin (A, Fig. 6) and remove the side broom (B) from the motor shaft.
3. Install the new broom on the motor shaft, align the hole with the mounting pin and engage the mounting pin (A).

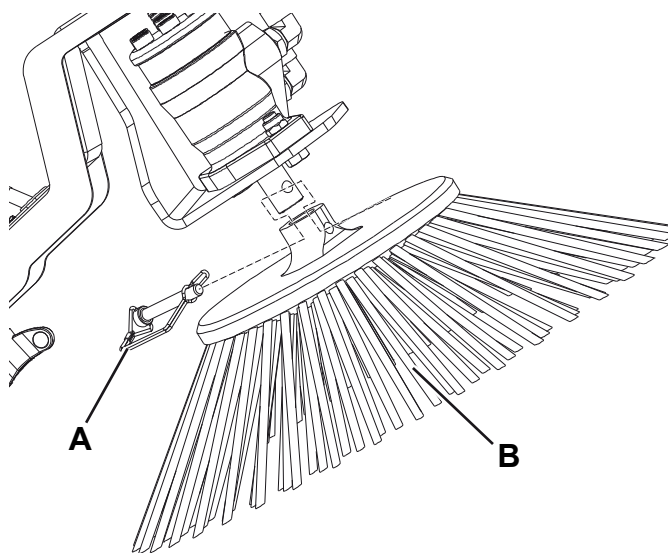


Figure 6

P100325

DUST FILTER MAINTENANCE (PANEL FILTER)

The hopper dust filter must be cleaned regularly to maintain the efficiency of the vacuum system. Follow the recommended filter service intervals for the longest filter life.



WARNING!

- ***Wear safety glasses when cleaning the filter.***
- ***Do not puncture the filter.***
- ***Clean the filter in a well-ventilated area.***
- ***Wear appropriate dust mask to avoid breathing in dust.***

1. Drive the machine on a level floor, engage the parking brake and turn the ignition key (66) to "0".
2. Open the latches (6), lift the hopper hood (16) and ensure that the support rod (17) is in place.
3. Inspect the dust filter upper part (12) for damage. A large amount of dust on top of the filter is usually caused by a hole in the filter or a damaged filter gasket.
4. Unscrew the filter shaker assembly mounting knobs (13). Lift the filter shaker assembly (11) to access the filter panel.
5. Lift the dust filter (12) and remove it from the machine.
6. Clean the filter using one of the methods below:

Method "A"

Vacuum loose dust from the filter. Then gently tap the filter against a flat surface (with the dirty side down) to remove loose dust and dirt.



NOTE

Take care not to damage the metal lip which extends past the gasket.

Method "B"

Vacuum loose dust from the filter. Then blow compressed air (maximum pressure 6 Bar) into the clean side of the filter (in the opposite direction of the airflow).

Method "C"

Vacuum loose dust from the filter. Then soak the filter in warm water for 15 minutes, then rinse it under a gentle stream of water (maximum pressure 2.5 Bar). Let the filter dry completely before installing it back into the machine.



NOTE

For proper drying, lay the filter horizontally on two spacers to allow the air to flow under the filter.



NOTE

For a better cleaning, it is allowed to wash the filter with water and non-lathering detergents. This provides better quality cleaning but reduces the life of the filter, which will have to be replaced more frequently. The use of inadequate detergents can damage the filter.

7. Install the filter in the reverse order of removal and note the following:
 - Install the filter with the wire gauze up.
 - If the filter gasket is damaged or missing, it must be replaced.



NOTE

Before replacing filter clear debris from dust plate located under filter. Check that the debris skirt at the rear of the dust plate swings freely.

DUST FILTER MAINTENANCE (CLOSED POCKET FILTER)

The closed pocket filter is basically maintenance free. The only periodic maintenance required is to run the filter shaker on a daily basis by pressing the lower part of the switch (69).



NOTE

The filter shaker should only be run when the hopper is lowered.

SKIRT MAINTENANCE

Preliminary operations

1. Empty the hopper as shown in the relevant paragraph to avoid that the weight of the debris affects the skirt height check.
2. Drive the machine on a level floor, suitable to check the skirt height.
3. Turn the ignition key (66) to "0".
4. Engage the parking brake.

Skirt check

5. Open the right (18) and left door (2).
6. Remove the main broom as shown in the relevant paragraph.
7. Check the front and rear skirt of the main broom housing too. Replace or adjust the skirts when damaged or worn so much that their distance from the ground is lower than 0.2 in (6 mm) (see the procedure in the Service Manual).

DUST GUARD SYSTEM WATER FILTER CLEANING (OPTIONAL)

1. Drive the machine on a level floor, engage the parking brake and turn the ignition key (66) to "0".
2. Disengage the quick coupling (A, Fig. 7) from the tank hoses.
3. Remove the left panel (2) to reach the water filter (30).
4. Remove the transparent cover (B) with the gasket (C), then remove the filter strainer (D). Clean and install them on the support (E).



NOTE

Install the gasket (C) and the filter strainer (D) in the housings of the cover and the support (E).

5. Assemble in the reverse order of disassembly.

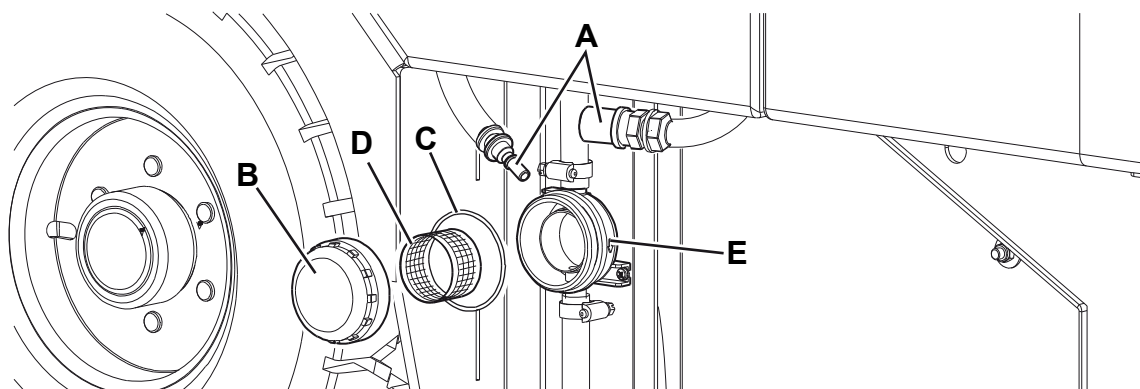


Figure 7

P100331

HYDRAULIC OIL



WARNING!

Do not touch hot components.

Let the motor and hydraulic system cool down.

1. Drive the machine on a level floor, engage the parking brake and turn the ignition key (66) to "0".
2. Open the engine compartment hood (1) by using the unlocking push-button (25).
3. Remove the left side hood (4) by using the latch, if necessary remove the water filter hose (30, optional).
4. Check the hydraulic oil level by means of the indicator on the tank (19).

The hydraulic oil level should be half way up the indicator. If it is below this level, unscrew the plug (20) and add AGIP Arnica 46 oil.

Change the oil if major contamination from a mechanical failure occurs (see the procedure in the Service Manual).

ENGINE OIL



WARNING!

Do not touch hot components.

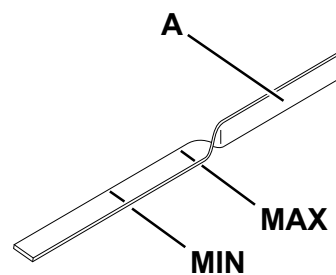
Let the engine cool down.

1. Drive the machine on a level floor, engage the parking brake and turn the ignition key (66) to "0".
2. Open the engine compartment hood (1) by using the unlocking push-button (25).
3. Check the engine oil level with the dipstick (A, Fig. 8-9-10) before each use of the machine.
If necessary, open the plug (B, Fig. 9-10) and top up. (See the procedure in the engine relevant Manual)
4. Change the engine oil after the first 50 hours of operation, and then after 150 hours.

The oil filter (C) should be replaced with every oil change (see the procedure in the Service Manual).

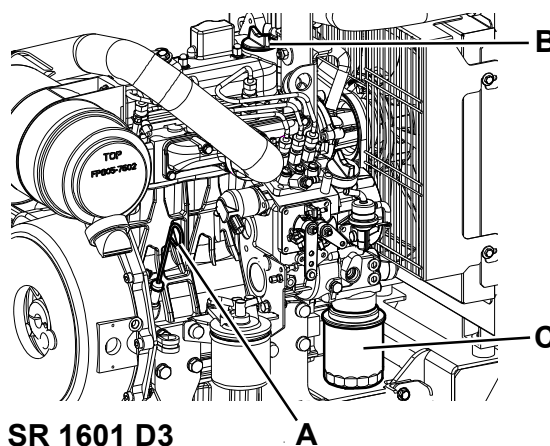
According to the air temperature, use the type of oil indicated below:

TEMPERATURE RANGE	TYPE OF OIL
Above 60°F (15°C)	SAE 10W-30
Below 60°F (15°C)	SAE 5W-30



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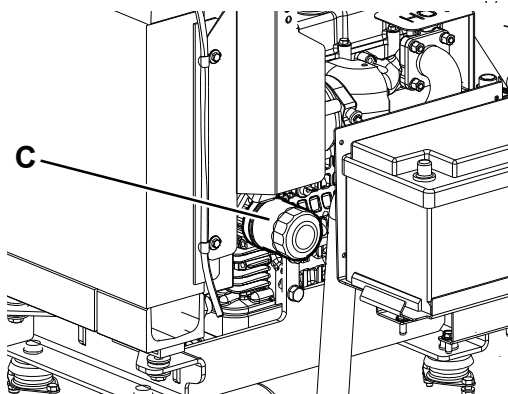
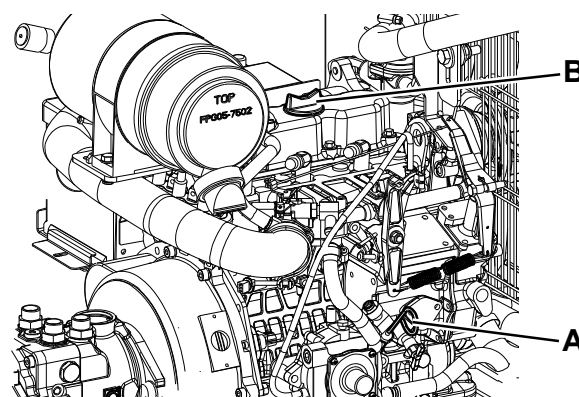
Figure 8



SR 1601 D3

P100329D3

Figure 9



SR 1601 LPG3 - SR 1601 P3

P100329P3

Figure 10

ENGINE AIR FILTER CLEANING

1. Drive the machine on a level floor, engage the parking brake and turn the ignition key (66) to "0".
2. Open the engine compartment hood (1) by using the unlocking push-button (25).
3. Check the engine air filter service indicator (27) before each use of the machine.



NOTE

After cleaning or replacing the engine air filter, the service indicator can be reset by pressing the end of the indicator.



WARNING!

When servicing the engine air filter elements, use extreme care to prevent loose dust from entering the engine. Dust can severely damage the engine.

4. Open the engine oil filter cover (24) and remove the paper pre-filter and synthetic filter.
5. Clean the engine air filters and/or perform maintenance of the engine air filter element (24) as shown in the Engine Manual.

ENGINE COOLANT



WARNING!

Do not remove the radiator cap (23) when the engine is hot.

1. Drive the machine on a level floor, engage the parking brake and turn the ignition key (66) to "0".
2. Open the engine compartment hood (1) by using the unlocking push-button (25).
3. Let the engine and engine coolant cool down, then open the radiator cap (23) with great care, to release the pressure.
4. Remove the radiator cap (23) and check the coolant.
If the level is low, add a mixture of half water and half automotive type anti-freeze, as shown in the Engine Manual.

FUSE CHECK/REPLACEMENT/RESET

Circuit breaker check

1. Drive the machine on a level floor.
2. Engage the parking brake.
3. Turn the ignition key (66) to "0" and remove it.
4. On the panel (38), check for deactivation of one of the following fuses (Fig. 11):
 - (A): F1 (30 A), dust vacuuming
 - (B): F2 (16 A), filter shaker
 - (C): F4 (30 A), ignition key
 - (D): F5 (16 A), engine accessories
 - (E): F3 (10 A), dust guard system (if equipped)
 - (F): F6 (10 A), working lights (optional)
 - (G): F7, light system (optional)
 - (H): F8, cab blower (optional)

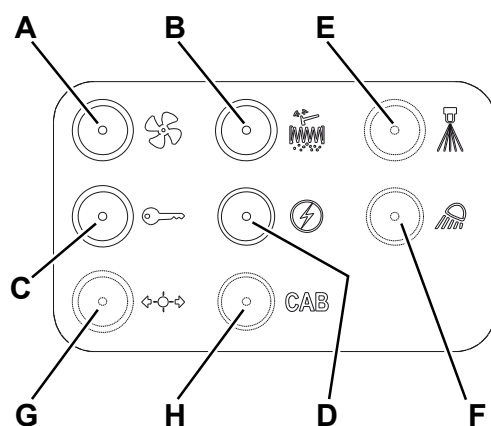
Reset any deactivated fuse, when the component that caused deactivation has fully cooled down.

Fuse check/replacement

1. Drive the machine on a level floor.
2. Engage the parking brake.
3. Turn the ignition key (66) to "0" and remove it.
4. Open the engine compartment hood (1) by using the unlocking push-button (25).
5. In the driver's seat area, remove the covers and check the following fuses for integrity (Fig. 12-13):
 - (I): F9 (50 A), pre-heating glow plug (only for SR 1601 D3)
 - (J): F10 (50 A), alternator
 - (K): F11 (1 A), hood inner light (optional)

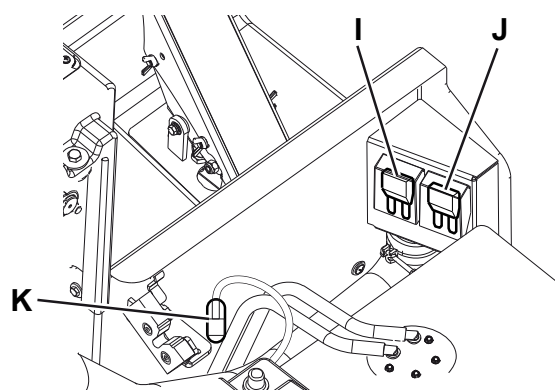
Replace any open fuse. Install the cover.

6. Close the engine compartment hood (1).



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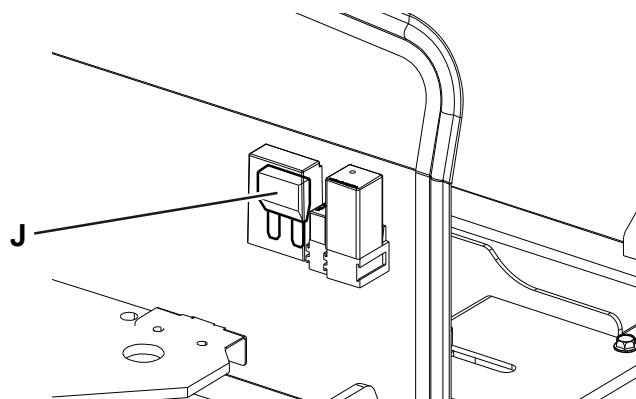
Figure 11



SR 1601 D3 - SR 1601 P3

P100327

Figure 12



SR 1601 LPG3

P100327LPG

Figure 13

TROUBLESHOOTING

Trouble	Possible Cause	Remedy
The machine does not move	The battery is disconnected	Connect the battery
	The machine has run out of fuel	Refuel
	The fuses are tripped	Reset any tripped fuse
	The parking brake is engaged	Disengage
	The unlocking screw is not in a proper position	Turn it properly
The main broom does not turn	The main broom is lifted	Lower the main broom with the lever
	Debris wrapped around the broom drive	Remove debris
	The hopper is not fully lowered	Fully lower the hopper
The machine collects little debris/dust	The vacuum system is off	Turn on the vacuum system with the switch
	The dust filter is clogged	Clean the dust filter
	The hopper is full	Empty the hopper
	The skirts are damaged or misadjusted	Check the skirt for integrity and proper adjustment (*)
	The main broom height is incorrect	Adjust the main broom height
	The fuses are tripped	Reset any tripped fuse
The side broom does not operate	The side broom is lifted	Lower the side broom with the lever
	Debris wrapped around the broom drive	Remove debris
	The hopper is not fully lowered	Fully lower the hopper
The hopper dumping door does not close	The dumping door is jammed by debris	Remove debris and clean edges of dirt chamber
The filter shaker motor does not work	The filter shaker motor connector is not properly connected	Connect it properly
	The fuse is tripped	Reset the tripped fuse
The dust guard system (optional) does not work	The switch is faulty	Replace the switch (*)
	The nozzles or the water filter are clogged	Clean
	The pump is faulty	Replace
	The fuse is tripped	Reset the tripped fuse

(*) Procedure to be performed by Nilfisk Service Center.

For further information contact a Nilfisk Service Center, where it is possible to consult the Service Manual.

SCRAPPING

Have the machine scrapped by a qualified scrapper.

Before scrapping the machine, remove and separate the following materials, which must be disposed of properly according to the Law in force:

- Batteries
- Polyester dust filter
- Main and side brooms
- Engine oil
- Hydraulic system oil
- Hydraulic system oil filter
- Plastic hoses and components
- Electrical and electronic components (*)

(*) Refer to the nearest Nilfisk Center especially when scrapping electrical and electronic components.