



S960 Sweeper

Each new model comes with this manual. This manual provides necessary machine operation and maintenance instructions.

Before operating or using this machine, please read and understand this manual carefully.

Each new model comes with complete spare parts illustrated manual, please replace parts with spare parts manual. To ensure timely delivery, please follow the instructions in the spare parts manual regarding the "parts ordering method".

This machine can provide high efficient services. According to the following points, the best results will be achieved at the lowest cost:

- Operate the machine carefully.
- Regularly maintain the machine according to the maintenance instructions provided in the operator manual.
- Use original factory made or equivalent parts for maintenance.

Parts and supplies can be ordered online, via phone, fax, or email.

Protect the environment



Please dispose of old machine components such as packaging materials, batteries and toxic liquids such as antifreeze and oil in accordance with your local waste disposal regulations, while maintaining environmental safety.



Please make sure to do a good job in recycling.

Machine data

Please fill in during installation for future reference. Model number-

Machine serial number-

Machine options- _____

Sales representative-

Sales representative phone number-

Customer ID- _____

Installation date- _____


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Safety prevention


This machine is a commercial product. It is specifically designed for cleaning hard indoor floors and cannot be used for other purposes. Please make sure to use the recommended edge brush and main brush.

The following safety warning symbols and the title "For safety reasons" are used throughout this manual. According to their instructions, their functions are:

 Warning: Used to warn of operations that may cause serious personal injury or death risks or unsafe conditions.

For safety reasons: point out the precautions that must be followed when using the machine safely.

The following safety symbols indicate situations that may pose potential hazards to operators or equipment. All operators must read, understand, and implement the following safety precautions.

 Warning: Fire or explosion danger

-Do not use flammable liquids; Do not operate the machine near or in areas with flammable liquids, gases, or combustible dust.

This machine is not equipped with an explosion-proof motor. During start-up and operation, the electric motor of this machine may generate sparks. If this machine is used in places with flammable gases, liquids, or dust, it may cause flash fire or explosion.


-Do not pick up flammable materials or reactive metals.

 Warning: Electric shock danger

-Before repairing the machine, it is necessary to unplug the battery wiring and charger plug.

-Do not use a damaged power cord to charge the battery. Do not modify the plug.

If the power cord of the charger is damaged or broken, it must be replaced by the manufacturer or their repair agent or similar qualified personnel to avoid danger.

 Warning: The rotating brush is running. Do not approach with your hands. Please turn off the power before repairing the machine.

For safety reasons:

1. Do not operate the machine if:

-When in contact with flammable liquids or close to flammable gases, it may cause explosions or flash fires.

-Unless trained and authorized.

-Unless you have read and understood the operation manual.

-Not meeting normal operating conditions.

2. Before starting the machine:

-Ensure that all safety devices are in place and functioning properly.

3. When using the machine:

-Start the machine and once it is working properly, remove the emergency stop switch key to manually press the emergency stop switch in case of an emergency.

-Please walk slowly when encountering slopes and slippery surfaces.

-Wear non slip shoes.

-Please slow down when turning.

-When the machine is damaged or malfunctioning, it should be reported immediately.

-Do not let children play on or near the machine.

-Follow the mixing ratio and handling instructions on the chemical container.

-Do not operate on slopes with a gradient of more than 2% Operation.

4. Before leaving or repairing the machine:

-Park the machine on a stable surface.

-Turn off the machine.

-Take out the key.

5. When repairing a machine:

-Do not move the parts. Please do not wear loose tops, shirts, or sleeves.

-Before operating the machine, please disconnect the battery connection.

-Please wear protective gloves and eye protection equipment when handling batteries or battery wiring.

-Do not use high-pressure spraying or water pipes to rinse this machine. This may cause electrical system malfunctions.

-Use replacement parts provided or approved by the manufacturer.

All maintenance operations must be carried out by qualified maintenance personnel.

-Do not modify the original design of the machine.

6. When using trucks or trailers to transport the machine:

-Drain the water tank before shipment.

-When loading and unloading machines from trucks or trailers, please use the recommended loading and unloading ramp.

-Before moving the machine, the battery must be removed first.

-Please move the machine with the assistance of others.

-Turn off the machine.

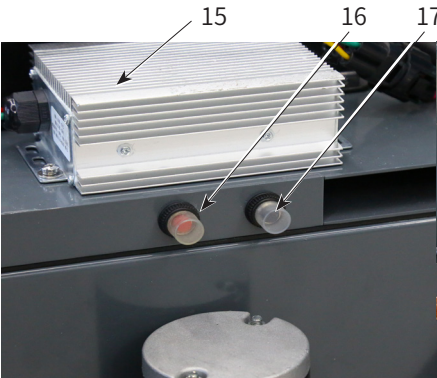
-Lower the brush plate motor to the lowered position.

-Use ropes to secure the machine.

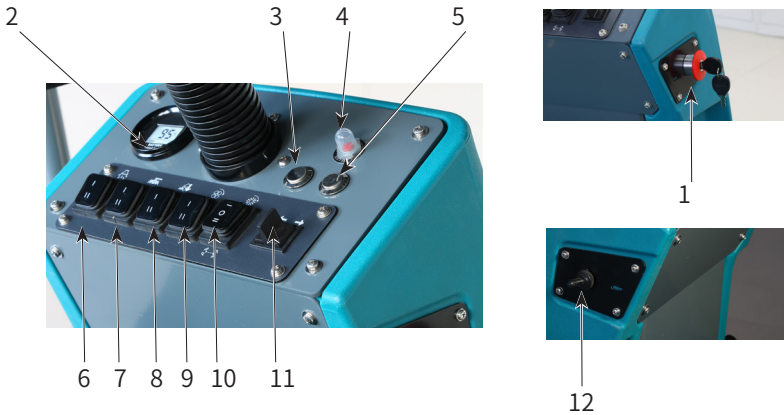
Machine components



1. Roof ceiling (optional)
2. Steering wheel
3. Seat
4. Warning lights
5. Pipe fitting water inlet
6. Bucket type water inlet
7. Charging port
8. Rear wheel
9. Cylindrical brush
10. Side brush
11. Front rubber pedal
12. Brake pedal
13. Drive pedal
14. Operation panel
15. DC power supply
16. Main brush reset insurance
17. Edge brush reset insurance
18. Hopper

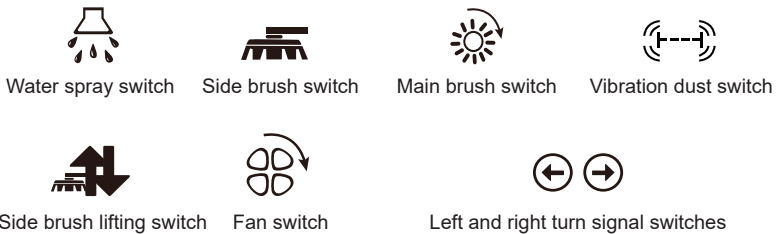


Control box instrument



- 1. Main power switch
- 2. Electricity meter
- 3. Headlight switch
- 4. Control circuit reset insurance
- 5. Horn button
- 6. Water pump switch
- 7. Side brush switch
- 8. Side brush lifting switch
- 9. Fan switch
- 10. Main brush/vibrating dust switch
- 11. Turn signal switch
- 12. Forward/backward switch

Control panel symbols



Machine working principle



The sweeping components of the machine are: a hopper, a cylindrical brush, and two side brushes.

The buttons on the control panel can control the sweeping function of the machine. First turn on the cylindrical brush switch, then turn on the fan switch, push rod switch, and side brush switch, and then press the pedal to start working.

There are two available side brushes and one cylindrical brush, with a diameter of 500mm side brush, a diameter of 320mm cylindrical brush and a length of 700mm cylindrical brush.

Sweeping method

Collect the garbage on both sides of the machine's travel path to the bottom through side brushes. When the machine moves forward, the garbage will enter the cylindrical brush box Sweep the garbage into the hopper at the back using a rotating cylindrical brush. The dust raised in the hopper will be sucked into the filter screen by the impeller and filtered out. At the end of cleaning, press the vibration switch to shake the dust collected by the filter into the hopper. Then take out the hopper and pour the garbage into the designated location.

Installation and replacement of accessories

Adjusting the rear drive chain

Open the buckle (as shown in Figure 1), open the upper box (as shown in Figure 2), loosen the fixing screws on both sides (as shown in Figure 3), and loosen the two symmetrical screws on the left and right to adjust the height of the shaft. Afterwards, according to the height change of the shaft, tighten the bolt on the screw (as shown in Figure 4), with a total of two screws symmetrically left and right, to ensure the support of the shaft



Figure 1



Figure 2



Figure 3

Note: Regularly inspect the drive chain. If any looseness is found, adjust the bolts at this point.

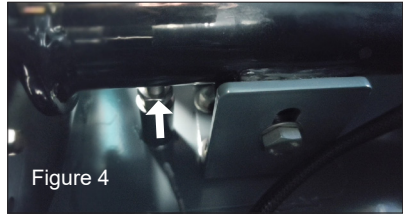


Figure 4

Adjusting the cylindrical brush motor belt

Unscrew the screws (as shown in Figure 5), open the side door, loosen the four screws on the motor bracket (as shown in Figure 6), and then loosen the nut and screw to adjust the tightness of the belt (as shown in Figure 7)



Figure 5

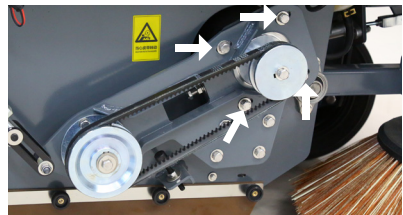


Figure 6

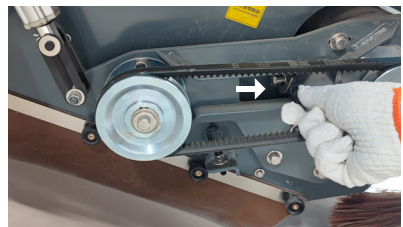


Figure 7

Adjusting the height of the main brush

Turn the nut to adjust the height of the main brush (as shown in Figure 8). When the main brush is in operation, the bristles are pressed down by 5-10mm,

As shown in Figure 8-1

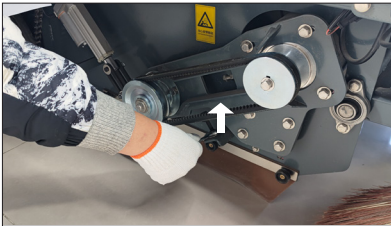


Figure 8



Figure 8-1

Installation and replacement of accessories

Replacing/installing the front side brush

1.Park the machine on a flat surface and ensure that the brush plate motor is in the raised position.

2.Turn off the machine key switch.

For safety reasons: When leaving or repairing the machine, park it on a level surface, turn off the machine, and remove the key.

3.Press the push button on the panel to lower the side brush, use a wrench to loosen the screws of the side brush, hold the brush plate and use inertia to rotate inward (Figure 9), and remove the brush plate.



Figure 9

4. Hold the brush plate, position the three screws into the brush buckle slot, and use inertia to rotate outward (as shown in Figure 10), tighten the screws. (Figure 11).



Figure 10

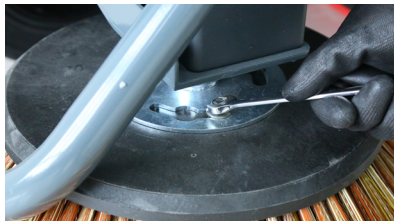


Figure 11

Replacing/installing the cylindrical brush

1. Park the machine on a flat surface and ensure that the machine comes to a stop.

Turn off the machine key switch.

For safety reasons: When leaving or repairing the machine, park it on a level surface, turn off the machine, and remove the key.

3. First, open the side door (Figure 12), unscrew the 6 knobs and bolts (Figure 13-14) on the active left fixed side plate, and remove the active left fixed plate and the main brush cover plate; Remove the main brush. (Figure 15).

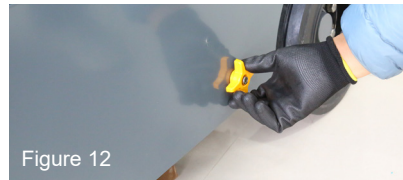


Figure 12



Figure 13

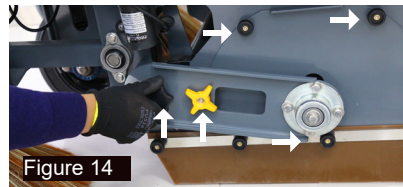


Figure 14



Figure 15

4. Place the cylindrical brush in the cylindrical brush chamber, clip it into the opposite drive buckle (Figure 16), smooth all the brush bristles into the chamber (Figure 17), cover the side plate, install the active left fixing plate, tighten the left fixing plate and 6 knobs of the cover plate, and cover the side door. (Figure 18).



Figure 16

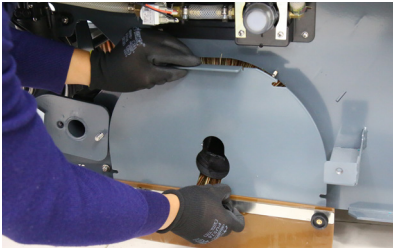


Figure 17

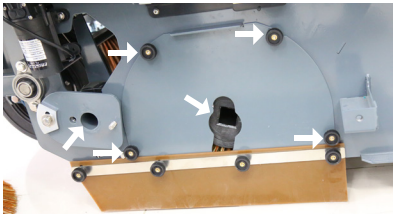


Figure 18

Replacing/installing the filter screen

1. Park the machine on a stable surface.

2. Please turn off the machine key switch.

For safety reasons: When leaving or repairing the machine, park it on a level surface, turn off the machine, and remove the key.

3. Open the dust box cover, unscrew the 6 hand nuts on the side, unplug the motor connection end, and take out the dust separator. (Figure 19)

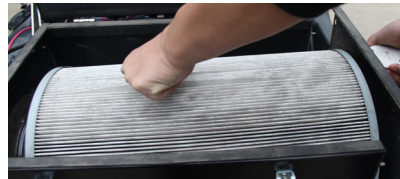
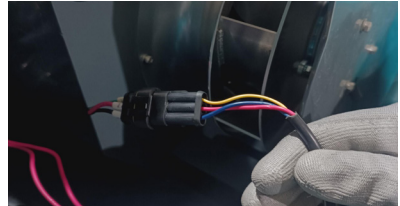
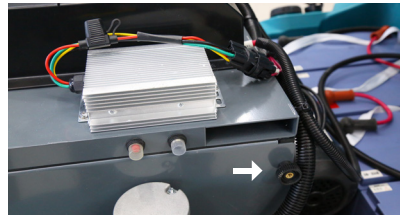


Figure 19

Remove the 6 screws and 1 nut that fix the dust separator, replace the old dust separator, tighten the screws and nuts again, fix the dust separator, reinstall it into the dust box, tighten the 6 hand nuts on the side panel, plug in the motor connection wire, cover the electrical installation board, and hang the buckle. (Figure 20).

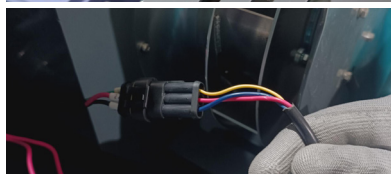
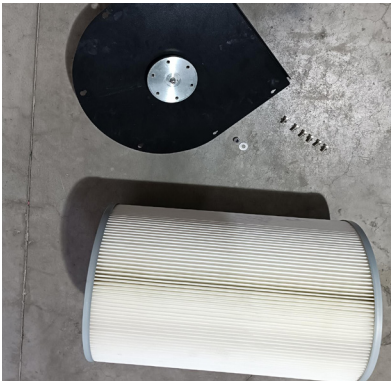


Figure 20

Replacing/installing the water filter screen

1. Park the machine on a flat surface and ensure that the machine comes to a stop.

2. Turn off the machine key switch.

For safety reasons: When leaving or repairing the machine, park it on a level surface, turn off the machine, and remove the key.

3. Unscrew the transparent cover counterclockwise, clean the filter, and install it clockwise (as shown in Figure 21).

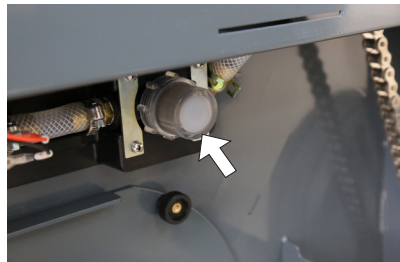


Figure 21

Machine operation

Pre-operation inspection

□ Check the machine for any dust leaks.

□ Check if the dust on the filter has been shaken off.

□ Check the condition of the brush. Remove any tangles, straps, wires, plastic packaging, or other debris around the brush.

□ Empty the hopper.

□ Check if the drive pedal and steering wheel can operate normally.

□ Check if the horn and work warning lights are functioning properly.

□ Check the repair records to determine whether machine maintenance is required.

Before operation

Before sweeping the floor, please remove large debris and remove any metal wires, tangles, or strings that may wrap around the brush.

Please plan the cleaning method in advance and make long-term planning arrangements as much as possible to minimize the number of shutdowns and starts.

Gravity induction of sweeper seats:

When the sweeper is turned on and the seat is empty without weight, even if the driving pedal is pressed, the machine cannot move forward. Only when the operator sits in the seat or adds pressure can the machine operate normally, providing safety protection and preventing accidents (Figure 22).



Figure 22

Sweeper parking function:

The machine is equipped with a temporary parking function to prevent accidental sliding. With the machine stopped, step on the brake pedal and turn it to the left to fix it in the slot, completing the parking operation (Figure 23).



Figure 23

Note: After starting the machine, first release the parking, then press the brake pedal and then the drive pedal, and the machine will run normally. If the power supply of the machine is not turned off during work, and the staff gets up and leaves the seat to work again, they should also press the brake pedal first, then press the drive pedal, and the machine will travel normally.

Adjustable seat:

After sitting in the seat, pull the right adjustment lever outward to move the seat position forward and backward. Release the adjustment lever after moving it into place. As shown in the (Figure 24).

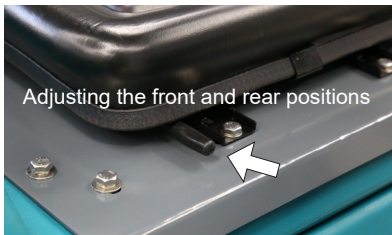


Figure 24

Note 2: When driving backwards, if the machine's forward and reverse switches are turned in the "reverse" direction (Figure 25), a work warning will sound to indicate the warning. Step on the drive pedal. As shown in (Figure 26).

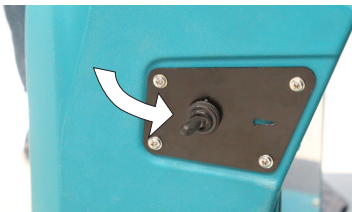


Figure 25



Figure 26

During machine operation

Please try to move forward in a straight line to avoid colliding with pillars or scraping both sides of the machine. Overlap the sweeping route by a few centimeters (inches).

When the machine is in motion, please avoid rotating the steering wheel significantly. The machine is very sensitive to the rotation of the steering wheel. Please avoid sharp turns unless in emergency situations.

When reaching the bottom of the aisle, please clean from the bottom towards the aisle opening.

Keep the machine moving continuously to avoid damaging the ground. If you find that the sweeping effect is not good, please stop cleaning Sweep and refer to machine troubleshooting.

Sweeping method

Adjust the height of the side brush and cylindrical brush according to the site to sweep the floor.

Please pay attention to the battery level indicator light to ensure there is sufficient power for machine operation.

Please remove the key before leaving the machine. After sweeping the floor, perform daily maintenance procedures (please refer to 'Machine Maintenance')

Driving the machine slowly on a slope: When going downhill, first adjust the speed control switch to slow down the machine speed, and then sweep the floor when the machine is going uphill instead

of downhill.

For safety reasons: When using the machine, walk slowly on slopes and smooth surfaces.

The maximum rated slope of the machine during operation is 12%, the maximum rated slope of the transport machine is 30%.

Battery level

The battery percentage displayed on the electricity meter screen shows that the battery level is 100% when the battery is fully charged.

When the battery reaches 5% and the display screen of the power meter flashes, the main brush and fan will stop working, but the driving function will be maintained. At this time, please immediately drive to the power position to charge.

Note: Do not charge the battery too frequently, please charge it when necessary; Overcharging can shorten the lifespan of the battery. Do not leave the battery in a low battery state (battery charge less than 5%), as this state can seriously affect the battery's lifespan. For long-term storage of machines, please check the battery level every 15 days.

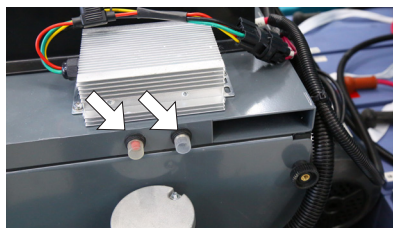


Reset insurance

This machine is equipped with a resettable reset insurance. The main brush reset insurance is located at the right rear end of the electrical cover plate, the side brush reset insurance is located at the right front end of the electrical cover plate, and the control circuit reset insurance is located on the panel.

When the reset insurance triggers a power trip, please determine the cause of the power trip and let the component experiencing the trip cool down, troubleshoot, and then manually press the overload reset switch button.

If the machine needs maintenance, please contact an authorized service center.



Timer

The timer will record the total number of hours the brush plate motor has been turned on and working. Please use a timer to determine when recommended maintenance procedures should be executed and record repair history.



Timer



Figure 27

**The filter screen can be regularly removed for dust treatment.*

Dealing with garbage and cleaning the hopper

1. When the sweeping work is completed, before handling the garbage, press the dust switch on the operation panel to let the accumulated dust on the filter fall off.

2. Turn off the machine, open the hopper by pulling the trigger, pay attention to safety when opening the trigger, prevent the hopper from slipping out, move the hopper and dispose of it. As shown in the figure (Figure 27).



High risk warning: Be sure to operate according to regulations, otherwise it may cause serious injury or life-threatening!

Machine troubleshooting

Problem	Solution
<p>The machine cannot travel after being powered on</p>	<p>After pressing the brake pedal and the drive pedal, the machine will run normally. If the power supply of the machine is not turned off during work, and the staff gets up and leaves the seat to work again, they should also press the brake pedal first, then press the drive pedal, and the machine will travel normally.</p>
	<p>Ensure that the drive pedal is not pressed during the startup process, and that the machine can only operate normally when the operator is sitting in the seat.</p>
<p>Poor sweeping effect</p>	<p>Empty the hopper</p>
	<p>Replace the side brush and cylindrical brush</p>
	<p>Check if the filter screen is blocked</p>
	<p>Check if the cylindrical brush is adjusted to the appropriate position</p>
	<p>Charge the battery until the charger is turned off</p>
	<p>Contact Tennant maintenance personnel</p>

Maintenance table

The following table indicates the responsible person for each program, O=operator
T=Personnel who have received specialized training

Interval period	Responsible person	Note	Procedure
Everyday	O	Cylindrical brush	Check the height of the cylindrical brush
	O	Side brush	Check the height of the side brush
	O	Filter screen	Check if the filter screen is damaged and clean
50 hours	O	Front sealing strip	Check for damage and wear
50 hours	O	Rear sealing strip	Check for damage and wear
50 hours	O	Side sealing strip	Check for damage and wear
100 hours	T	Hopper sealing ring	Check for damage and wear
200 hours	T	Maintenance-free battery electrodes and wiring	Check for loose wiring and clean the exterior of the battery
500 hours	T	Vacuum cleaner motor	Check the motor brush (check every 100 hours after the first 500 hours of operation)
	T	Side brush motor	Check the motor brush (check every 100 hours after the first 500 hours of operation)
	T	Drive assembly	Check the motor brush (check every 100 hours after the first 500 hours of operation)
	T	Drive belt	Check for damage and wear

Note: In extreme dusty conditions, more frequent maintenance may be necessary.

Battery charging

Important information: When charging, please ensure that the charger has been properly set according to the type of battery.

1. Push the machine onto a flat and dry ground.

Note: Please ensure that the ventilation in the area is good.

Turn off the machine key switch.

For safety reasons: When leaving or repairing the machine, park it on a level surface, turn off the machine, and remove the key.

4. Insert the charger connector into the battery charging connector. As shown in Figure 28.



Figure 28

Precautions for installation and use of batteries

1. Check each battery for presence before use to see if there is any damage, cleanliness, clear markings, and clean the battery surface with a dry cloth; Check the open circuit voltage of the battery,

whether the positive and negative poles are clearly marked, and whether there is reverse polarity.

2. Install the battery upright according to the drawing requirements and do not invert it. After installation, check the installation diagram requirements, check whether the positive and negative poles of each battery are correct, and then connect each battery as a whole with wires.

3. After all the batteries are installed, check for any looseness in the connecting parts, tighten the connections, and avoid excessive force that may damage the poles. Generally, the torque should not exceed 15N · M.

4. When installing the entire vehicle battery, the plugs between the batteries should be adjusted to ensure that the batteries are in a vertical position, and the batteries should be tightened to prevent shaking and collision.

5. Devices such as keys and safety seats that are prone to sparks must be isolated from the battery.

6. The battery is in a state of charge before leaving the factory, and users can usually directly load and use it on the vehicle. If it is left unused for a long time (exceeding 3 months), recharge according to the charging method before use.

Pushing, dragging, and transporting machines

Pushing or dragging machines

If the machine is turned off and the foot brake is released, you can push it forward or backward, but you cannot drag it from the front side.

For safety reasons: Do not operate the machine when releasing the foot brake.

The machine can only be pushed or dragged on a flat surface. Do not exceed 3.2k p/h (2mph), do not

try pushing or dragging the machine at high speed.

Transport machines

When using a truck or trailer to transport a machine, be sure to follow the following procedures:

1.Raise the cylindrical brush assembly.

For safety reasons: When loading or unloading a machine onto a truck or trailer, the hopper must be emptied before loading the machine.

2.Use the suggested device to load and unload the machine.

For safety reasons: When transporting machines, please use the recommended loading and unloading device to load and unload machines from trucks or trailers.

3.Place the front of the machine against the front of the truck or trailer.

4.Place obstacles behind each drive wheel to prevent the machine from sliding.

5.Tie the machine's shelves with ropes and then tie them to a trailer or truck to prevent the machine from tilting.

For safety reasons: When transporting the machine, use ropes to secure it to the machine board.

Storing machines

When storing the machine for a long time, please take the following steps.

- 1.Clean the filter screen and hopper, open the hopper for ventilation.
- 2.Park the machine in a cool and dry area, do not expose it to rain, and store it indoors.
- 3.Remove the battery or charge it every 3 months (be sure to fully charge it).

The LED light of the smart charger indicates the working status

Battery capacity	LED (red)	LED (yellow)	LED (green)
Standby	On	Off	Off
Charging below 50%	Flash (once every 1 second)	Off	Off
Charging 50% -75%	Off	Flash (once every 1 second)	Off
Charging 75% -100%	Off	Off	Flash (once every 1 second)
Full of 100%	Off	Off	On

General machine size/capacity

Project	Size/Capacity
Length x Width x Height (Standard)	1820x1380x1350mm
Length x Width x Height (Optional)	1820x1380x1890mm
Size of main brushes	φ320×L700
Size of side brushes	φ500×2
Sweeping width (with/without side brush)	1380mm/700mm
Filter screen area	7m ²
Hopper capacity	135L
Weight/including standard battery components	417.5kg
Weight/including standard battery components (with roof ceiling)	505kg
Water tank capacity	45L

Type

Type	Quantity	Voltage	Battery capacity	Weight
Battery (standard)	4	48V	100Ah	33Kg x 4

vibration acceleration	Sound pressure level LPA
ah ≤ 2.5 m/s ²	76dB

Type	Purpose	VDC	W
Electric motor	Main brush motor	48V	800
	Side brush motor	48V	90x2
	Water pump motor	48V	15
	Drive motor	48V	1500
	Fan motor	48V	250

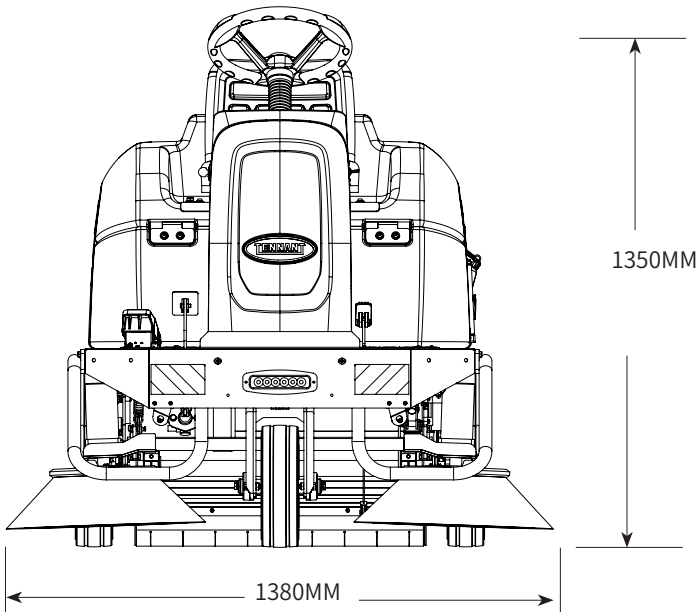
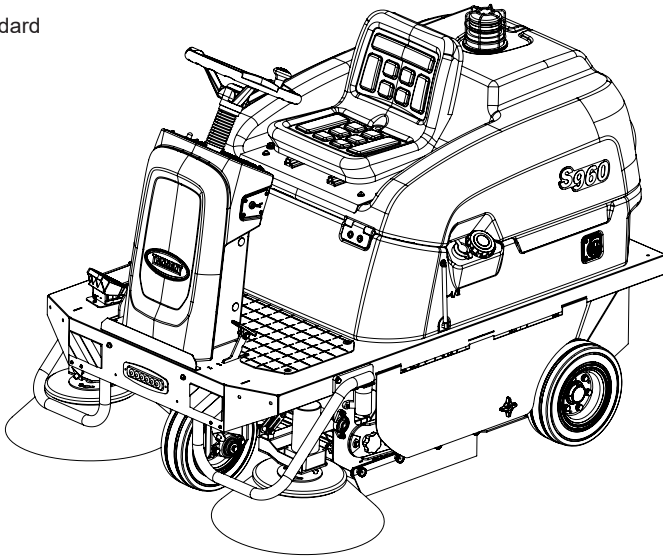
Type	Output voltage/VDC	Current/A	Input voltage/VAC	Frequency/Hz
Charger (intelligent type)	48	15	220/110	50/60

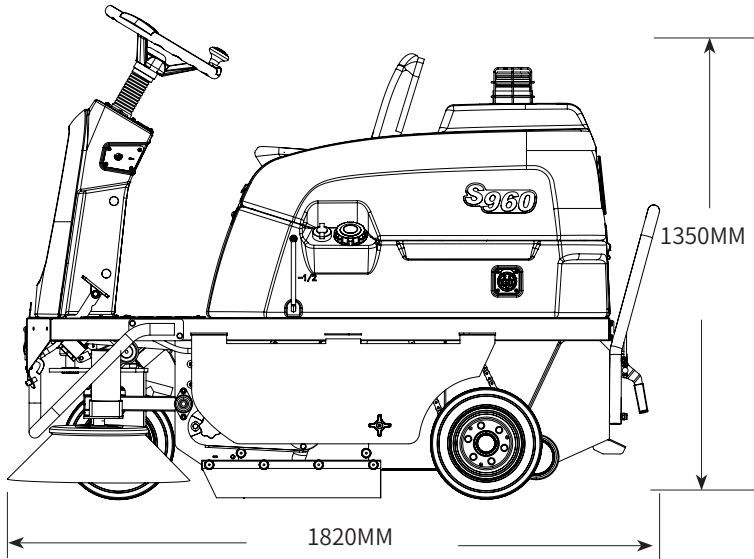
Tires

Position	Type	Size
Front wheel x1	Solid	300mm (0D) x 100mm wide
Rear wheel x2	Solid	300mm (0D) x 100mm wide

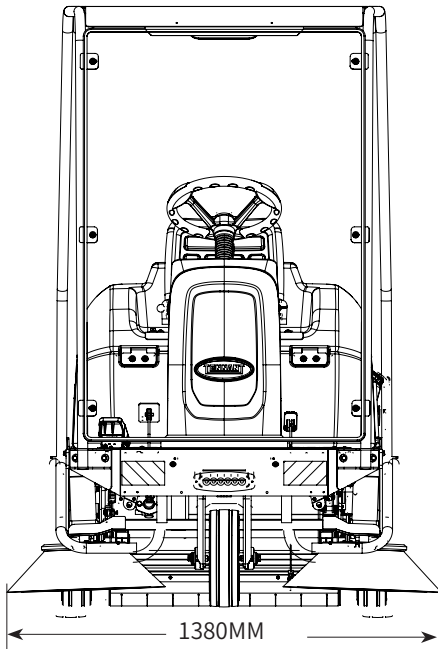
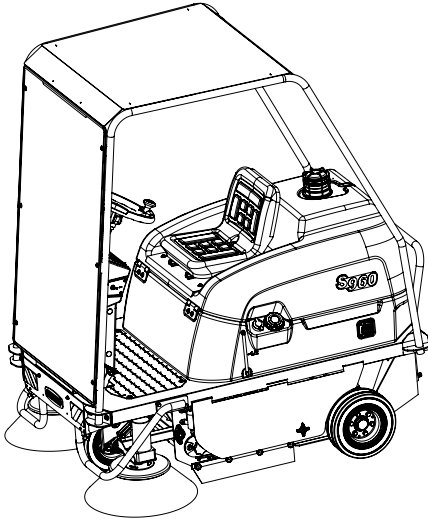
Machine size

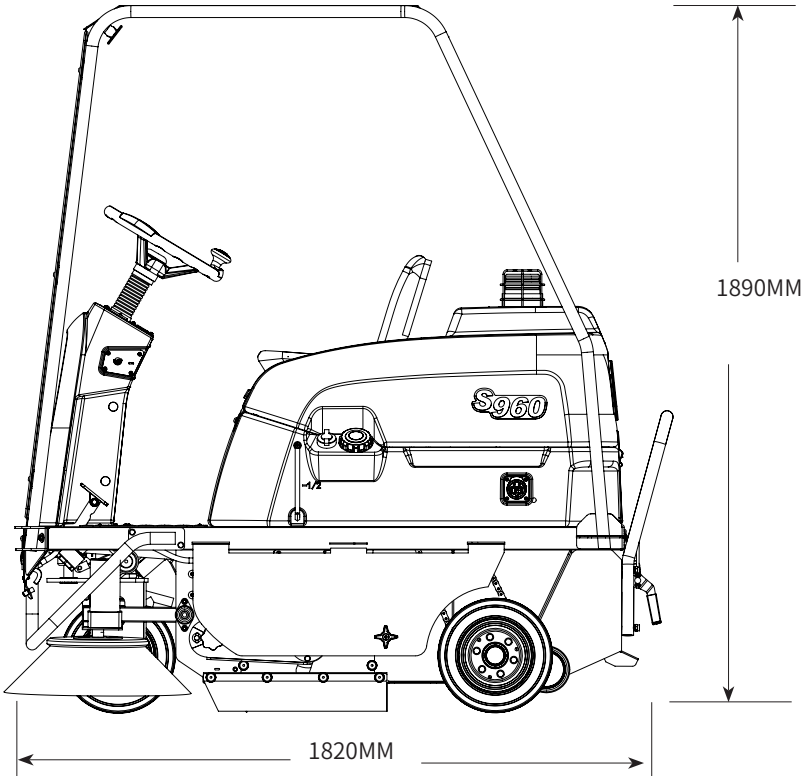
Standard





Optional





Tennant Product Warranty Certificate (Main Card)

(This warranty card is the main voucher for warranty services, please keep it properly)

Warranty regulations:

During the warranty period, any malfunctions that occur during normal use according to the user manual will be repaired free of charge. Please provide the warranty certificate and invoice for the repaired goods to the purchasing unit for free repair.

During the warranty period, if one of the following situations occurs, it must be repaired at a cost. Please understand.

1. We are unable to provide the original warranty certificate and valid invoice.
2. Malfunctions or damages resulting from incorrect use and improper repair or modification by oneself.
3. Malfunctions or damages caused by transportation, handling, or falling after purchase.
4. Faults or damage caused by the use of power sources other than specified (voltage, frequency, etc.) or abnormal voltages.
5. Machine appearance, dust separator, filter element, wires, and accessories such as hoses and steel pipes.

Within the warranty period specified above, free repairs shall be carried out in accordance with the agreed conditions. Any other losses caused by the malfunction shall not be held responsible.

User Name: _____

Address: _____

Invoice Number: _____

Purchase Date: _____

Seller: _____

Address: _____

Tennant Product Warranty Certificate (Secondary Card)

1. Product information:

Product model and name: _____

Factory number: _____

2. User information: _____

End user unit: _____ Telephone: _____

Address: _____ Fax: _____

E-mail: _____ Postal Code: _____

3. Sales unit information: _____

Sales unit name: (valid with seal)

Address: _____

Contacts: _____ Telephone: _____

Postal code: _____ Sales date: _____

In order to fulfill our service commitment and relieve users of their worries with excellent service, our company will establish user information files in the customer service computer system.

1. Please make sure to fill out the main and secondary warranty cards as soon as possible, and submit them to the company's customer service department for filing within one month after purchasing the machine. The mailing address is as follows:

**Address: Tennant Cleaning System Equipment (Shanghai) Co., Ltd., Hongqiao
Jiahui, Lane 928, Shenhong Road, Minhang District, Shanghai**

2. If the main warranty card or purchase voucher is lost, you can check our company's user information file to ensure that you receive the necessary service.