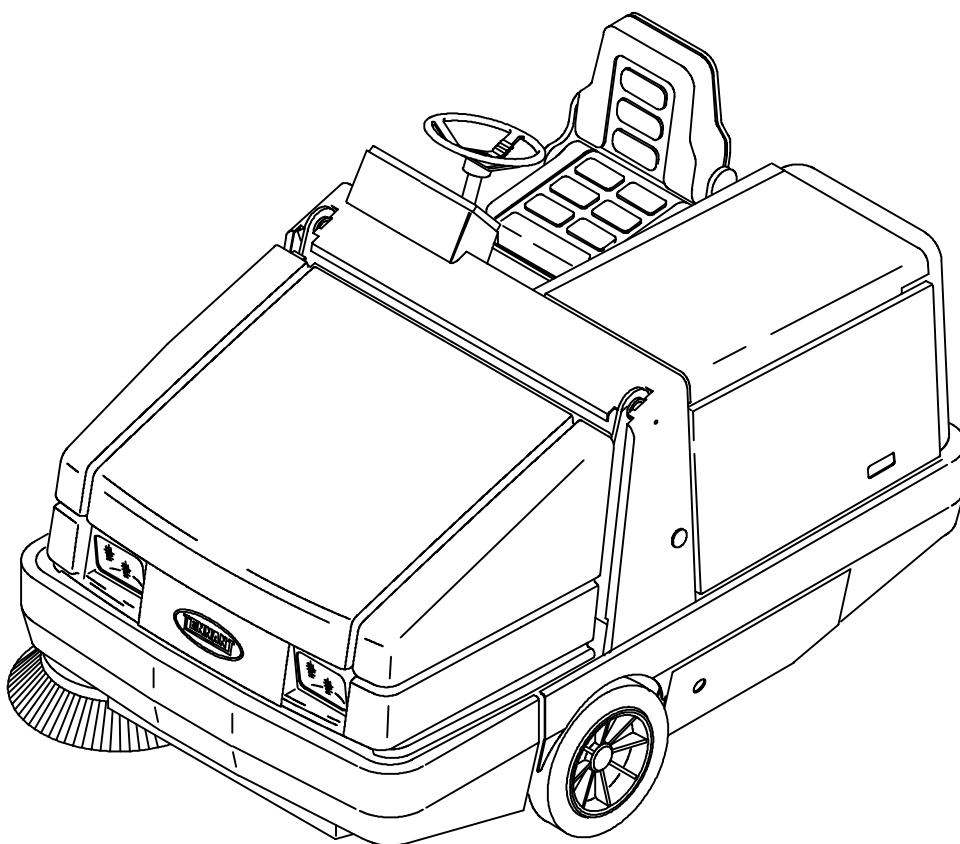




355E

Operator Manual



MM306



This manual is furnished with each new TENNANT Model 355E. It provides necessary operating and preventive maintenance instructions. Read this manual completely and understand the machine before operating or servicing it.

This machine will provide excellent service. However, the best results will be obtained at minimum costs if:

- The machine is operated with reasonable care.

- The machine is maintained regularly – per the maintenance instructions provided.

- The machine is maintained with TENNANT supplied or approved parts.

Manual Number – MM306

Revision: 08

Published:3-97

CONTENTS

	Page		Page
SAFETY PRECAUTIONS	3	ENGAGING HOPPER SUPPORT BAR ..	37
OPERATION	5	DISENGAGING HOPPER SUPPORT BAR	38
OPERATOR RESPONSIBILITY	5	OPERATION ON INCLINES	39
MACHINE COMPONENTS	6	OPTIONS	40
CONTROL PANEL SYMBOLS	7	TIE-DOWNS	40
CONTROLS AND INSTRUMENTS	9	MACHINE TROUBLESHOOTING	41
OPERATION OF CONTROLS	10	MAINTENANCE	42
DIRECTIONAL PEDAL	10	MAINTENANCE CHART	42
DIRECTIONAL PEDAL TOE ANGLE		LUBRICATION	44
(OPTION)	11	PROPELLING GEARBOX	44
BRAKE PEDAL	11	REAR WHEEL SUPPORT BEARING .	44
PARKING BRAKE LEVER	11	STEERING LINK	44
HORN BUTTON	12	FRONT WHEEL BEARINGS	45
BRUSH PRESSURE GAUGE	12	HYDRAULICS	45
MAIN BRUSH AND SIDE BRUSH		HYDRAULIC FLUID RESERVOIR	45
LEVER	13	HYDRAULIC FLUID	46
HOPPER DOOR LEVER	14	HYDRAULIC HOSES	47
HOPPER LIFT LEVER	15	BATTERIES	47
MAIN BRUSH POSITION LEVER	16	CHARGING THE BATTERIES	48
MAIN BRUSH DOWN PRESSURE		BELTS AND CHAINS	50
KNOB	17	VACUUM FAN DRIVE BELT	50
POWER KILL SWITCH	17	STATIC DRAG CHAIN	50
HOPPER TEMPERATURE LIGHT –		DEBRIS HOPPER	51
THERMO SENTRY	18	HOPPER DUST FILTER	51
HOPPER DOOR LIGHT	18	TO REPLACE HOPPER DUST	
CLOGGED FILTER LIGHT	18	FILTER	52
MAIN BRUSH SHUT DOWN LIGHT ..	18	THERMO SENTRY	53
BATTERY DISCHARGE INDICATOR .	19	BRUSHES	54
HOURMETER	19	MAIN BRUSH	54
HAZARD LIGHT SWITCH (OPTION) ..	19	TO REPLACE MAIN BRUSH	54
OPERATING LIGHTS SWITCH	19	TO CHECK AND ADJUST MAIN	
VACUUM FAN SWITCH	20	BRUSH PATTERN	55
FILTER SHAKER SWITCH	20	SIDE BRUSH	57
STEERING WHEEL	20	TO REPLACE SIDE BRUSH	58
SIDE BRUSH POSITION LEVER	21	SIDE BRUSH GUARD	58
ON-OFF SWITCH	22	SKIRTS AND SEALS	59
SIDE BRUSH DOWN PRESSURE		HOPPER LIP SKIRTS	59
KNOB	23	HOPPER SIDE SKIRT	59
STEERING COLUMN TILT LEVER ...	23	BRUSH DOOR SKIRTS	59
CIRCUIT BREAKERS	24	REAR SKIRTS	60
LATCHES	24	BRUSH DOOR SEALS	60
OPERATOR SEAT	25	HOPPER SEALS	60
HOPPER SUPPORT BAR	26	HOPPER INSPECTION DOOR SEAL .	60
HOW THE MACHINE WORKS	27	HOPPER DOOR SEALS	61
PRE-OPERATION CHECKLIST	27	HOPPER COVER SEAL	61
STARTING THE MACHINE	28	HOPPER DUST SEAL	61
SWEEPING AND BRUSH INFORMATION	29	HOPPER VACUUM FAN SEAL	61
SWEEPING	30	BRAKES AND TIRES	62
STOP SWEEPING	32	SERVICE BRAKES	62
EMPTYING THE HOPPER	33	PARKING BRAKE	62
STOP THE MACHINE	35	TIRES	62
POST-OPERATION CHECKLIST	36	REAR WHEEL	62

CONTENTS

	Page
PUSHING OR TOWING MACHINE	62
MACHINE JACKING	63
ELECTRIC MOTORS	63
STORING MACHINE	63
SPECIFICATIONS	64
GENERAL MACHINE PERFORMANCE ..	64
POWER TYPE	65
STEERING	65
HYDRAULIC SYSTEM	65
BRAKING SYSTEM	65
TIRES	65
INDEX	66

SAFETY PRECAUTIONS

The following precautions are used throughout this manual as indicated in their description:



WARNING: To warn of hazards or unsafe practices which could result in severe personal injury or death.

FOR SAFETY: To identify actions which must be followed for safe operation of equipment.

The machine is suited to sweep disposable debris. Do not use the machine other than described in this Operator Manual. The machine is not designed for use on public roads.

The following information signals potentially dangerous conditions to the operator or equipment:

FOR SAFETY:

1. **Do not operate machine:**
 - Unless trained and authorized.
 - Unless operator manual is read and understood.
 - If it is not in proper operating condition.
 - In flammable or explosive areas unless designed for use in those areas.
 - In areas with possible falling objects unless equipped with overhead guard.
2. **Before starting machine:**
 - Check for fuel, oil, and liquid leaks.
 - Keep sparks and open flame away from refueling area.
 - Make sure all safety devices are in place and operate properly.
 - Check brakes and steering for proper operation.
3. **When starting machine:**
 - Keep foot on brake and directional pedal in neutral.
4. **When using machine:**
 - Use brakes to stop machine.
 - Go slow on inclines and slippery surfaces.
 - Use care when reversing machine.
 - Move machine with care when hopper is raised.
 - Make sure adequate clearance is available before raising hopper.

- Do not carry passengers on machine.
- Always follow safety and traffic rules.
- Report machine damage or faulty operation immediately.

5. **Before leaving or servicing machine:**
 - Stop on level surface.
 - Set parking brake.
 - Turn off machine and remove key.

6. **When servicing machine:**
 - Avoid moving parts. Do not wear loose jackets, shirts, or sleeves.
 - Block machine tires before jacking machine up.
 - Jack machine up at designated locations only. Block machine up with jack stands.
 - Use hoist or jack of adequate capacity to lift machine.
 - Wear eye and ear protection when using pressurized air or water.
 - Disconnect battery connections before working on machine.
 - Avoid contact with battery acid.
 - Use cardboard to locate leaking hydraulic fluid under pressure.
 - Use TENNANT supplied or approved replacement parts.



WARNING: Batteries emit hydrogen gas. Explosion or fire can result. Keep sparks and open flame away. Keep covers open when charging.



WARNING: Hazardous voltage. Shock can result. Disconnect batteries before working on machine. Only qualified personnel should work inside panel.



WARNING: Raised hopper may fall. Engage hopper support bar.



WARNING: Lift arm pinch point. Stay clear of hopper lift arms.

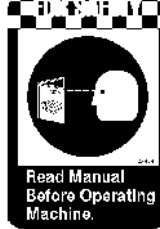
SAFETY PRECAUTIONS

The following safety labels are mounted on the machine in the locations indicated. If these or any label becomes damaged or illegible, install a new label in its place.

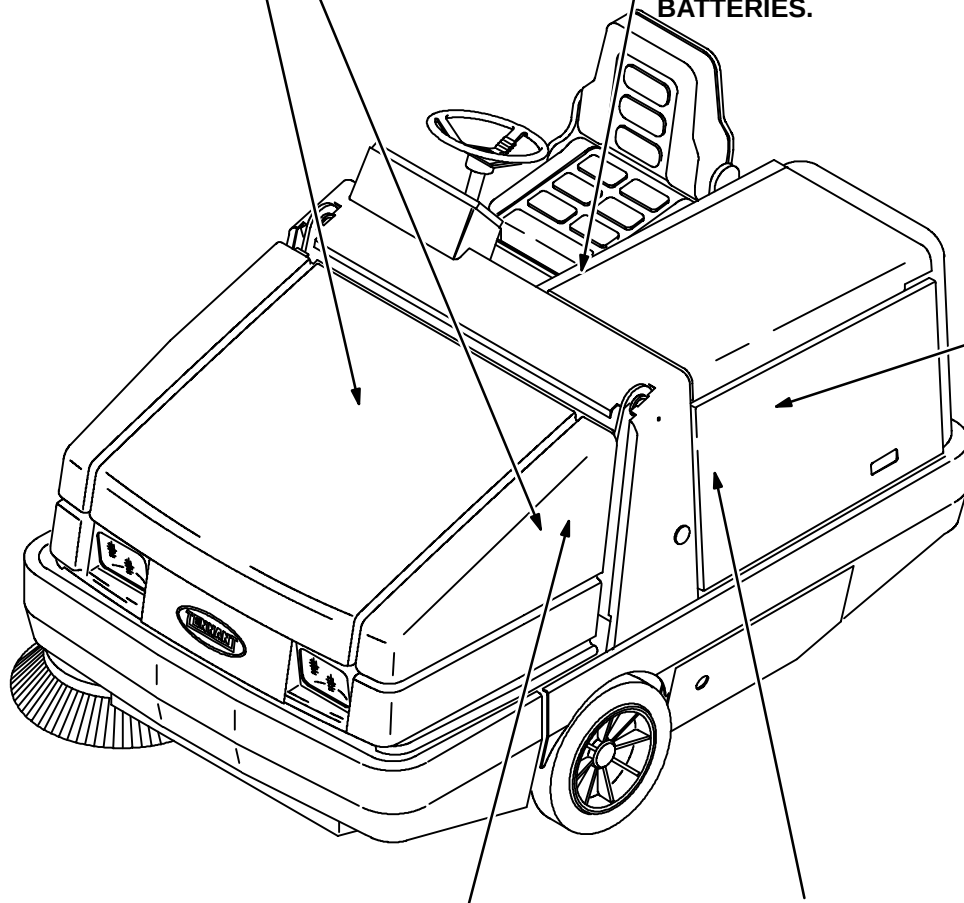
HOPPER SUPPORT BAR LABEL – LOCATED ON THE HOPPER SUPPORT BAR AND ON BOTH HOPPER LIFT ARMS.



FOR SAFETY LABEL – LOCATED ON THE SIDE PANEL OF THE OPERATOR COMPARTMENT.



BATTERY CHARGING LABEL – LOCATED ON THE RELAY PANEL NEXT TO THE BATTERIES.



HOPPER LIFT ARMS LABEL – LOCATED ON BOTH HOPPER LIFT ARMS.



HARARDOUS VOLTAGE LABEL – LOCATED ON THE ELECTRICAL COMPONENTS BOX COVER.

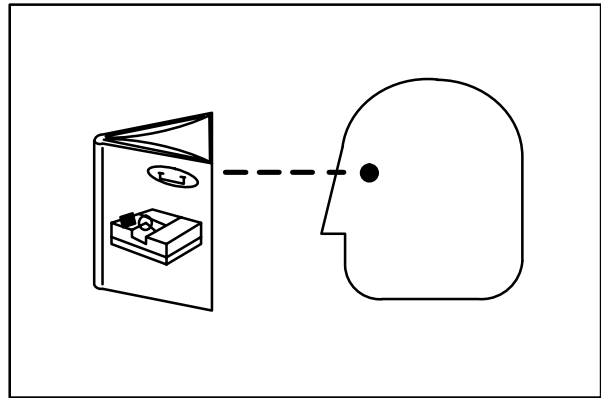
07985

OPERATION

OPERATOR RESPONSIBILITY

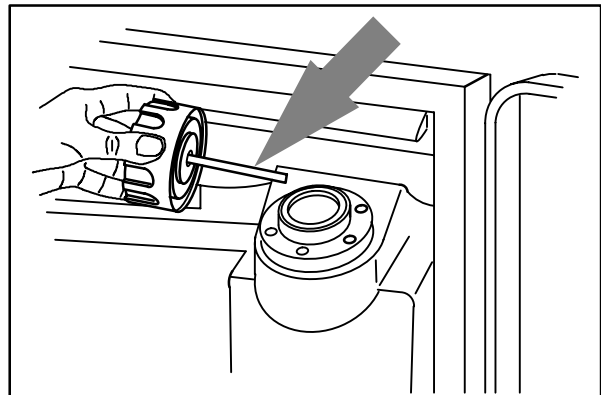
- ☐ The operator's responsibility is to take care of the daily maintenance and checkups of the machine to keep it in good working condition. The operator must inform the service mechanic or supervisor when the required maintenance intervals occur as stated in the *MAINTENANCE* section of this manual.
- ☐ Read this manual carefully before operating this machine.

FOR SAFETY: Do not operate machine, unless operation manual is read and understood.



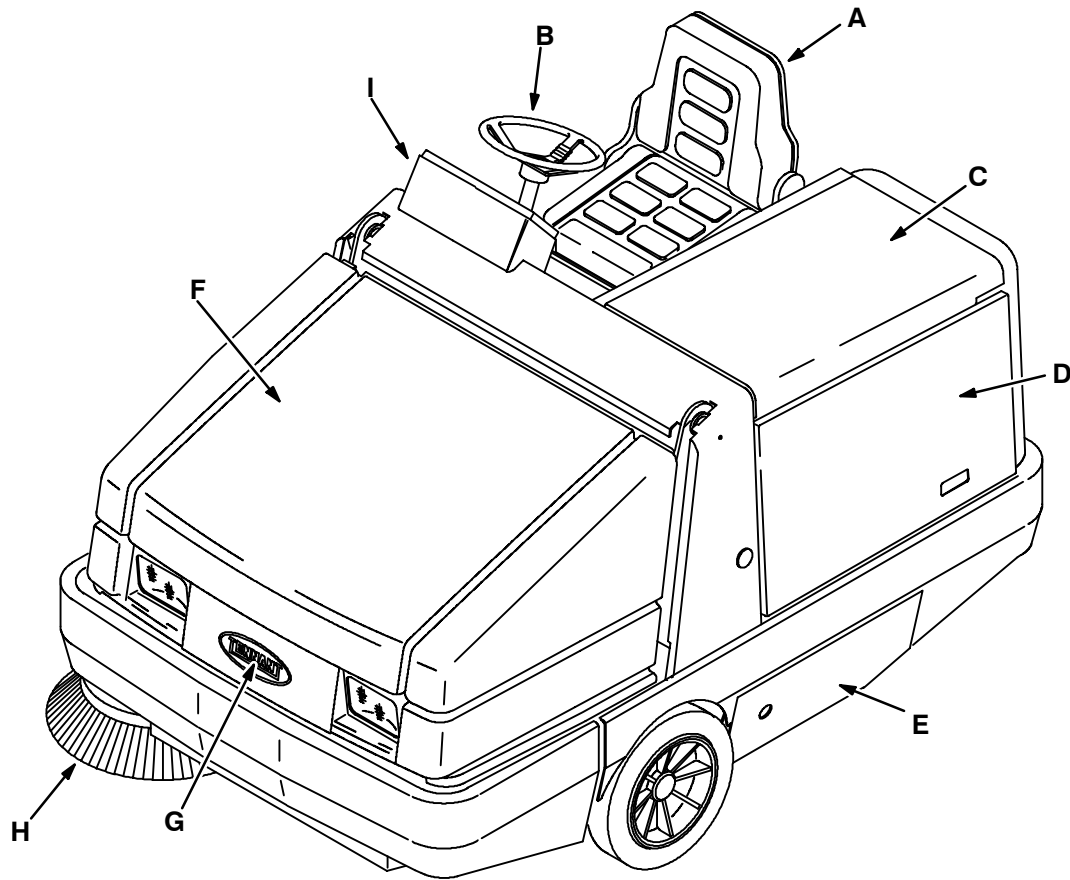
07324

- ☐ Check the machine for shipping damage. Check to make sure machine is complete per shipping instructions.
- ☐ Check the hydraulic fluid level in the hydraulic reservoir.
- ☐ After the first 50 hours of operation, follow the recommended procedures stated in the *MAINTENANCE CHART*.
- ☐ Keep your machine regularly maintained by following the maintenance information in this manual. We recommend taking advantage of a regularly scheduled service contract from your TENNANT representative.
- ☐ Order parts and supplies directly from your authorized TENNANT representative. Use the parts manual provided when ordering parts.



08218

MACHINE COMPONENTS



- A. Operator Seat
- B. Steering Wheel
- C. Battery Cover
- D. Side Door
- E. Main Brush Access Door

- F. Hopper Cover
- G. Hopper Access Cover
- H. Side Brush
- I. Instrument Panel

07985

CONTROL PANEL SYMBOLS

These symbols identify controls and displays on the machine:



Main and Side Brushes On



Main Brush On



Hopper Door Open



Hopper Door Close



Hopper Down



Hopper Up



Horn



Main Brush Down Pressure Light



Main Brush Down Pressure Heavy



Main Brush Down



Main Brush Up



Side Brush Down Pressure Light



Side Brush Down Pressure Heavy



Main Brush Down Force



Hopper Temperature – Thermo Sentry



Filter Clogged



Hopper Door Closed



Battery



Hourmeter



Hazard Light



Filter Shaker



Operating Lights



Fan



Side Brush Down



Side Brush Up



Circuit Breaker 1



Circuit Breaker 2



Circuit Breaker 3



Circuit Breaker 4



Circuit Breaker 5



Circuit Breaker 6

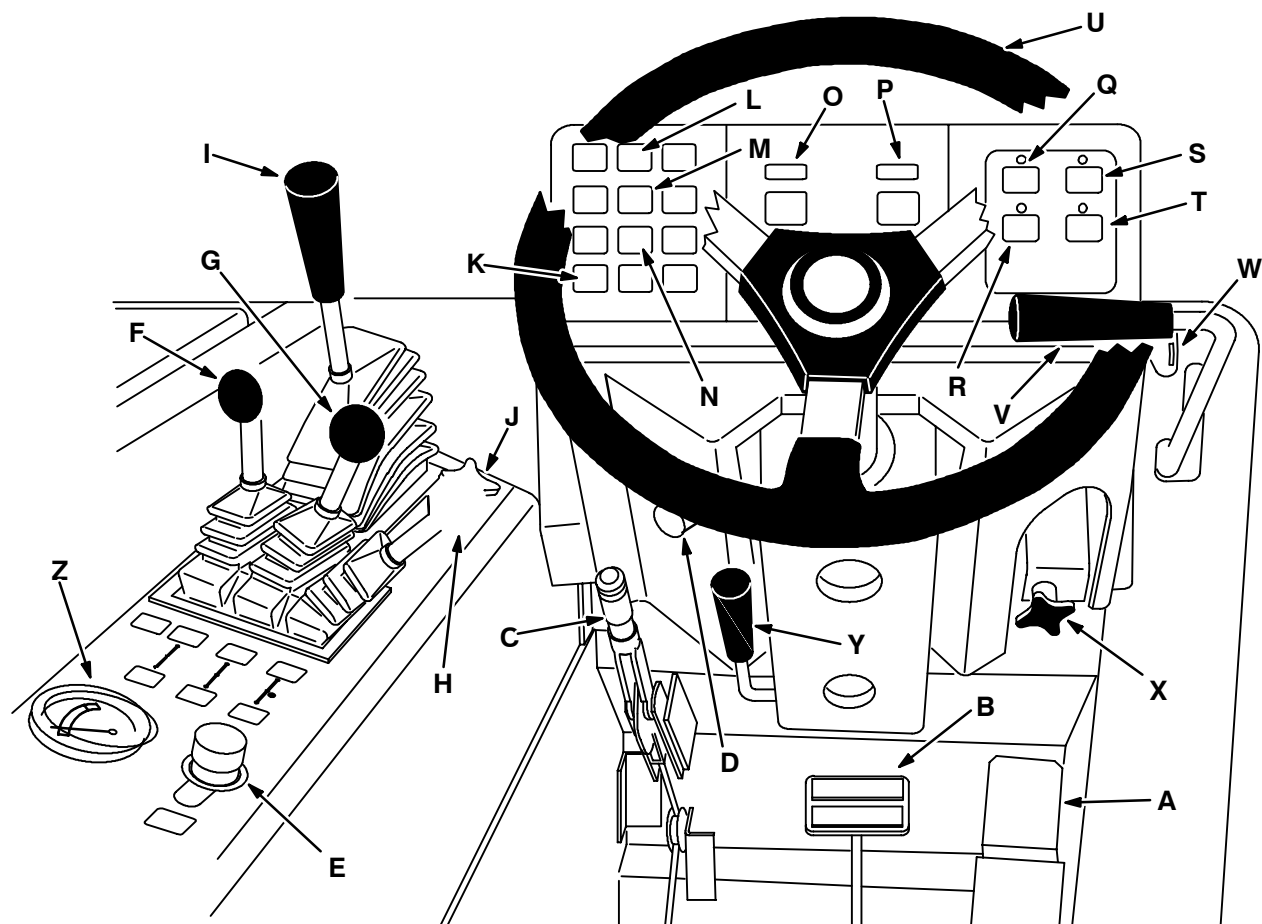


Circuit Breaker 7



Circuit Breaker 8

CONTROLS AND INSTRUMENTS



08219

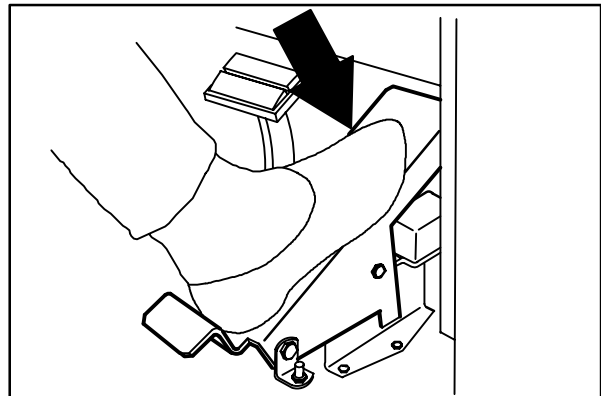
- | | |
|--|----------------------------------|
| A. Directional Pedal | N. Hopper Door Light |
| B. Brake Pedal | O. Battery Discharge Indicator |
| C. Parking Brake Lever | P. Hourmeter |
| D. Power Kill Switch | Q. Hazard Light Switch (Option) |
| E. Horn Button | R. Filter Shaker Switch |
| F. Main Brush And Side Brush Lever | S. Operating Light Switch |
| G. Hopper Door Lever | T. Vacuum Fan Switch |
| H. Hopper Lift Lever | U. Steering Wheel |
| I. Main Brush Position Lever | V. Side Brush Position Lever |
| J. Main Brush Down Pressure Knob | W. On-Off Switch |
| K. Hopper Temperature Light --
Thermo Sentry™ | X. Side Brush Down Pressure Knob |
| L. Main Brush Shut Down Light | Y. Steering Column Tilt Lever |
| M. Clogged Filter Light | Z. Brush Pressure Gauge |

OPERATION OF CONTROLS

DIRECTIONAL PEDAL

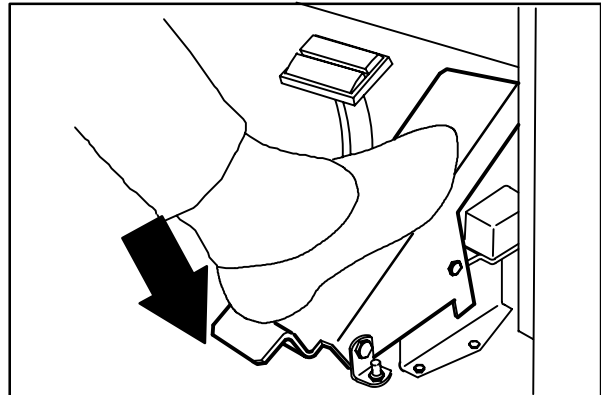
The directional pedal controls direction of travel and the propelling speed of the machine. You change the speed of the machine with the pressure of your foot; the harder you press the faster the machine travels.

Forward: Press the top of the directional pedal with the toe of your foot.



08225

Reverse: Press the bottom of the directional pedal with the heel of your foot.

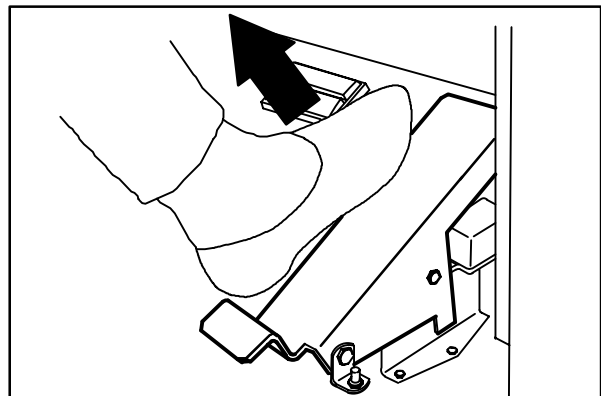


08226

Neutral: Take your foot off the directional pedal and it will return to the neutral position.

NOTE: When changing direction from forward to reverse using the directional pedal, the machine will move a short distance forward before changing direction. Use the brakes to stop the machine.

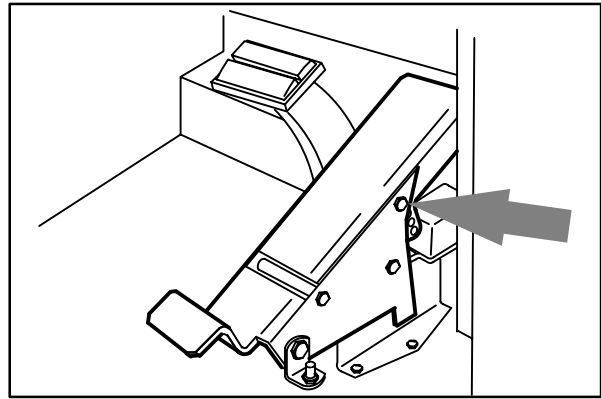
FOR SAFETY: When using machine, use brakes to stop machine.



08227

DIRECTIONAL PEDAL TOE ANGLE (OPTION)

The directional pedal toe angle allows you to adjust of the pedal toe angle. Remove the clevis pin, move the top of the pedal to the angle needed, and slide the clevis pin through the adjustment holes.

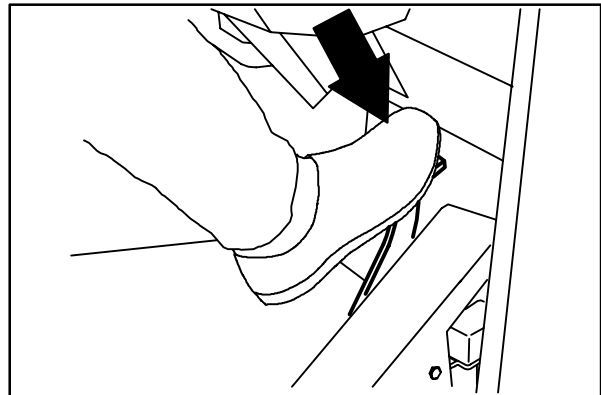


08292

BRAKE PEDAL

The brake pedal stops the machine.

Stop: Take your foot off the directional pedal and let it return to the neutral position. Step on the brake pedal.



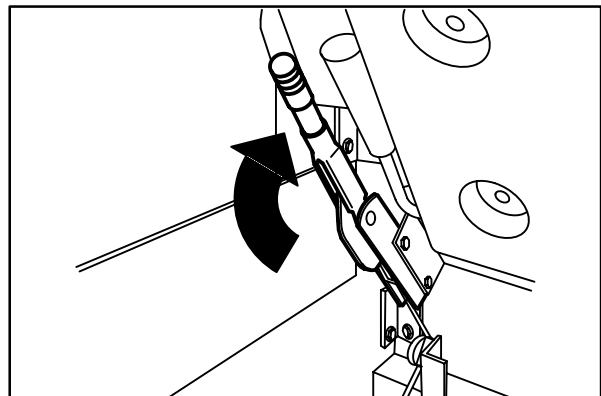
08234

PARKING BRAKE LEVER

The parking brake lever sets and releases the front wheel brakes.

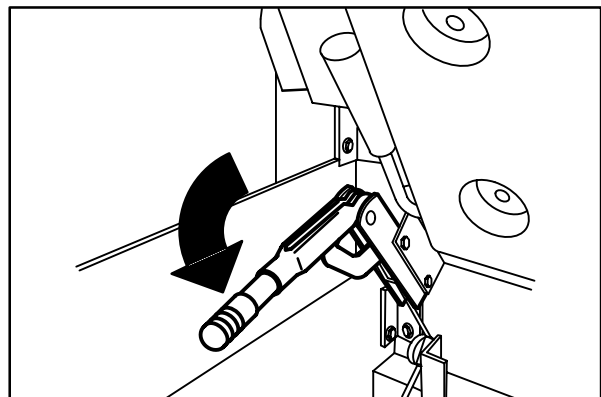
Set: Pull the parking brake lever up.

FOR SAFETY: Before leaving or servicing machine; stop on level surface, set parking brake, turn off machine and remove key.



08224

Release: Push the parking brake lever down.



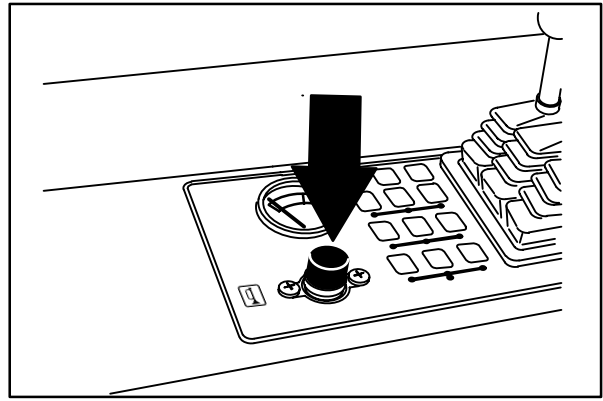
08223

OPERATION

HORN BUTTON

The horn button operates the horn.

Sound: Press the button.

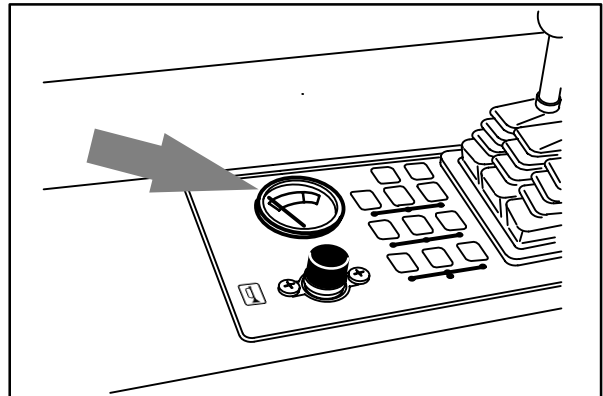


08220

BRUSH PRESSURE GAUGE

The brush pressure gauge shows the pressure of the main brush against the floor. The needle should be in the green zone. If the needle is in the red zone, reduce the main brush pressure with the main brush pressure knob.

NOTE: The brush pattern should be 50 to 75 mm (2.0 to 3.0 in).

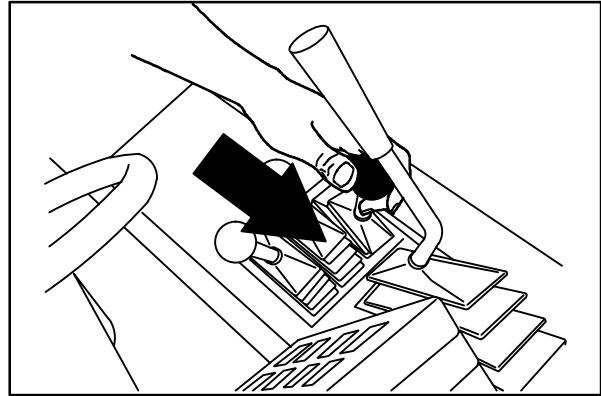


08221

MAIN BRUSH AND SIDE BRUSH LEVER

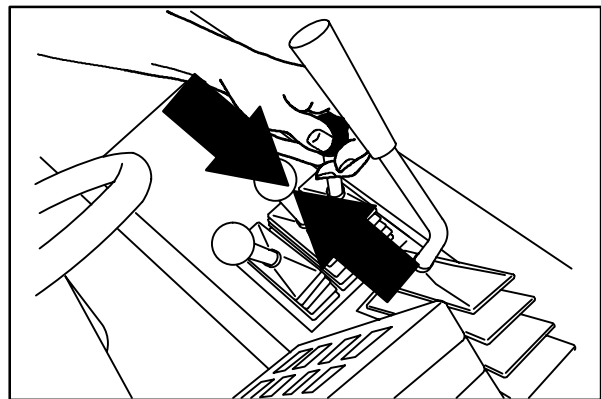
The main brush and side brush lever controls the main brush and side brush rotation.

Main Brush and Side Brush On: Push the main brush and side brush lever into the **On** position.



07773

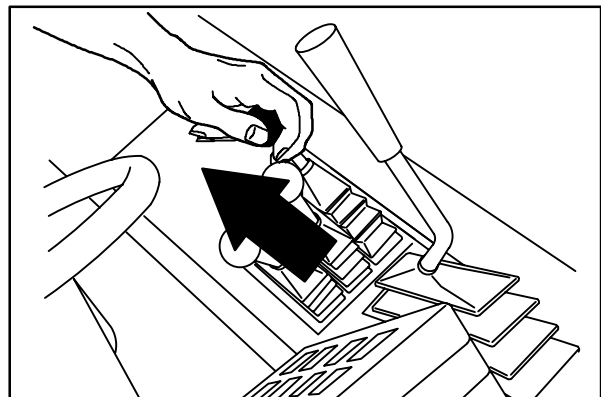
Main Brush and Side Brush Off: Pull the main brush and side brush lever into the middle position.



07774

Main Brush On: Pull the main brush and side brush lever into the **On** position.

NOTE: Always raise the main brush when the machine is not being operated for some time. This prevents the main brush from getting a flat spot.



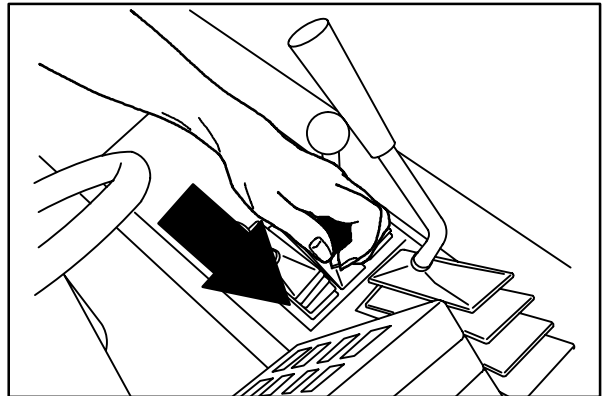
07775

OPERATION

HOPPER DOOR LEVER

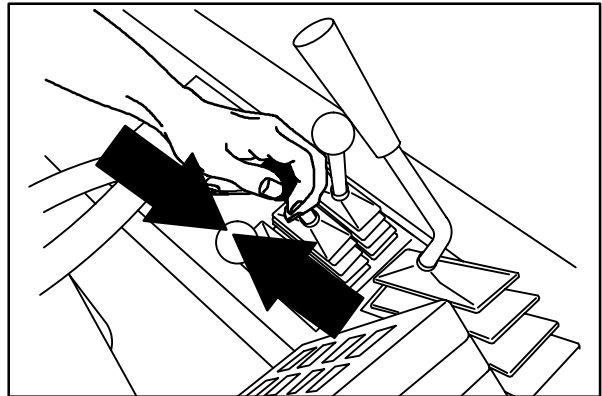
The hopper door lever opens and closes the hopper door. Open the hopper door when sweeping. Close the hopper door when emptying the hopper to control debris and dust.

Open: Push the hopper door lever into the **Open** position and leave it there.



07776

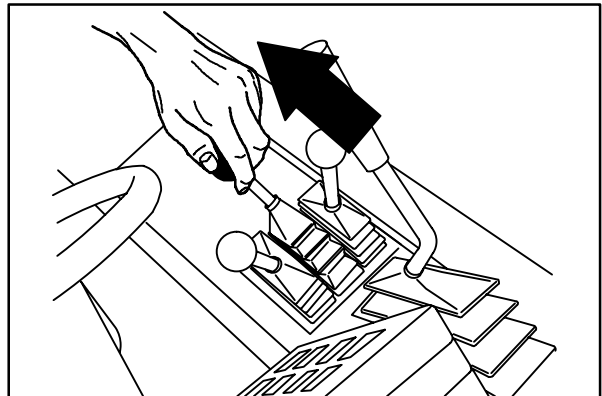
Hold: Release the hopper door lever into the middle position.



07777

Close: Pull and hold the hopper door lever into the **Close** position.

NOTE: The hopper door will not close if the main brush and side brush are operating.



07778

HOPPER LIFT LEVER

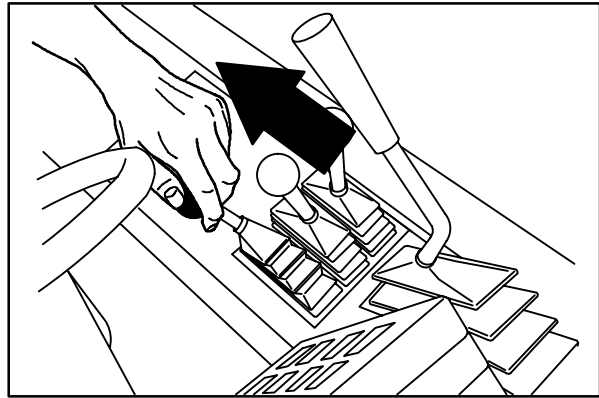
The hopper lift lever raises and lowers the hopper.

Up: Pull and hold the hopper lift lever into the **Up** position.



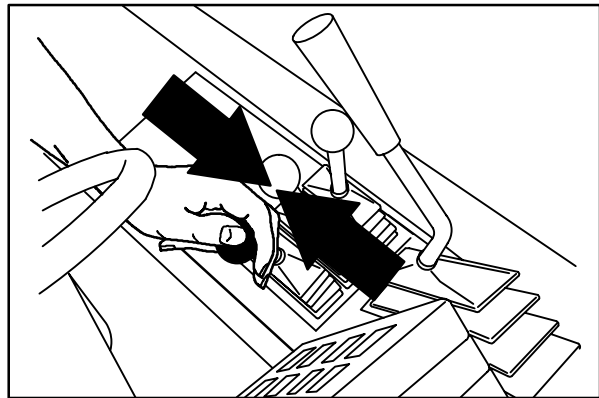
**WARNING: Raised hopper may fall.
Engage hopper support bar.**

NOTE: The hopper will not raise if the main brush and side brush are operating.



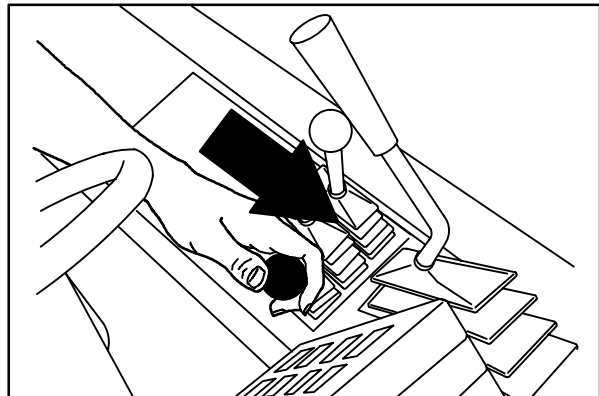
07779

Hold: Release the hopper lift lever up and into the middle position.



07780

Down: Push and hold the hopper lift lever into the **Down** position.



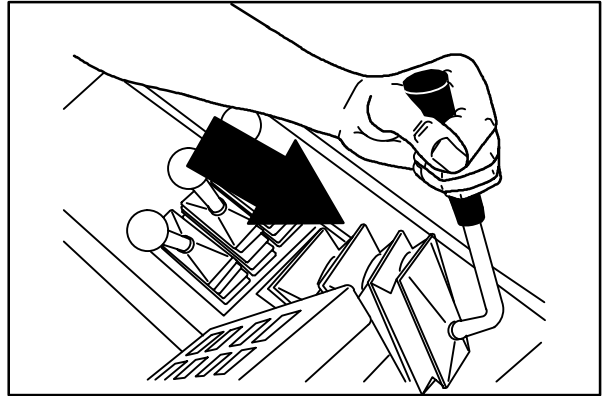
07781

OPERATION

MAIN BRUSH POSITION LEVER

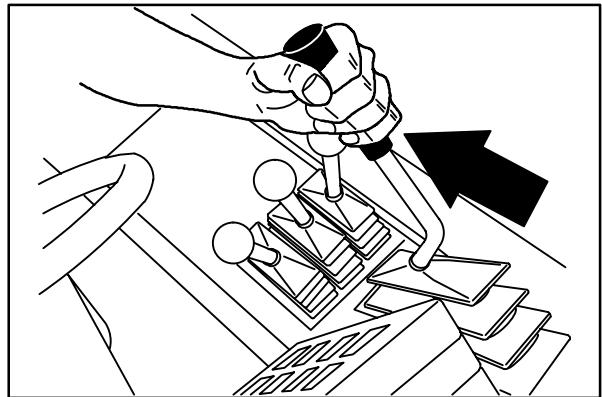
The main brush position lever lowers and raises the main brush.

Down: Pull the main brush position lever back and to the left into the **Down** position.



07782

Up: Pull the main brush position lever all the way back and to the right into the **Up** position.

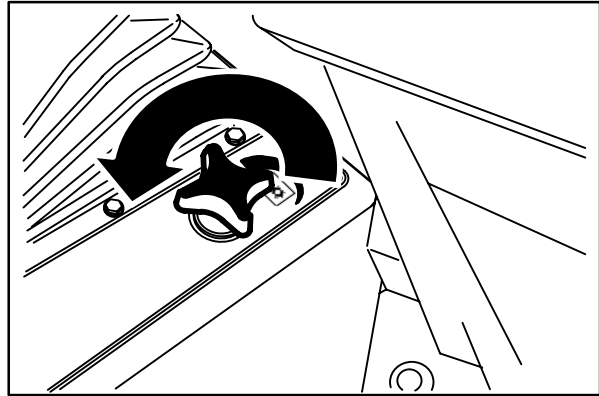


07784

MAIN BRUSH DOWN PRESSURE KNOB

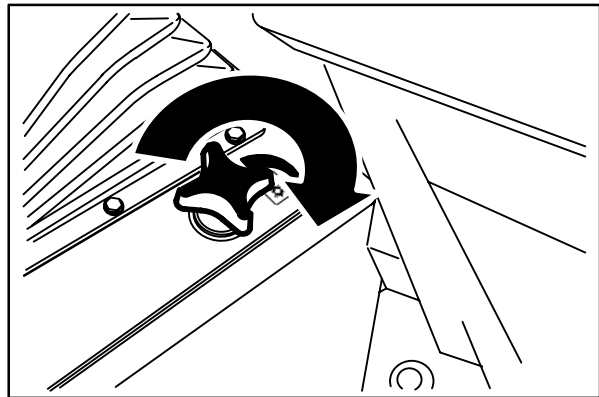
The main brush down pressure knob changes the main brush contact with the sweeping surface.

Heavy: Turn the main brush down pressure knob counter-clockwise.



07787

Light: Turn the main brush down pressure knob clockwise.



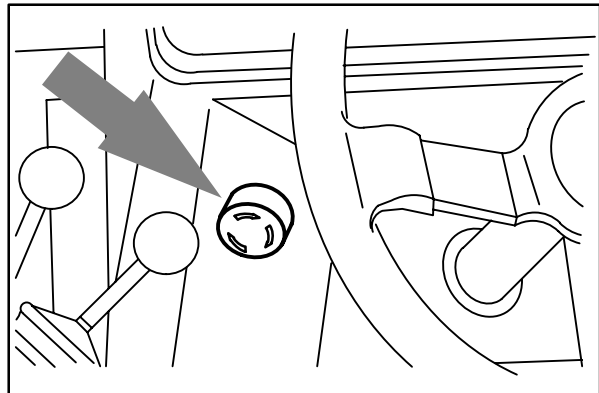
07788

POWER KILL SWITCH

The power kill switch halts all power to the machine.

Halt: Hit the power kill switch.

Restart: Turn the power kill switch to the right to release the switch. Turn the on-off switch key fully clockwise, then release the switch key.

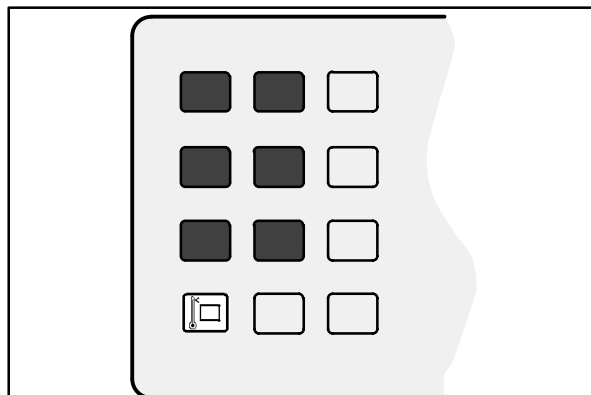


08237

HOPPER TEMPERATURE LIGHT – THERMO SENTRY

The hopper temperature light comes on when there is too much heat in the hopper, possibly from a fire. The Thermo Sentry will stop the vacuum fan.

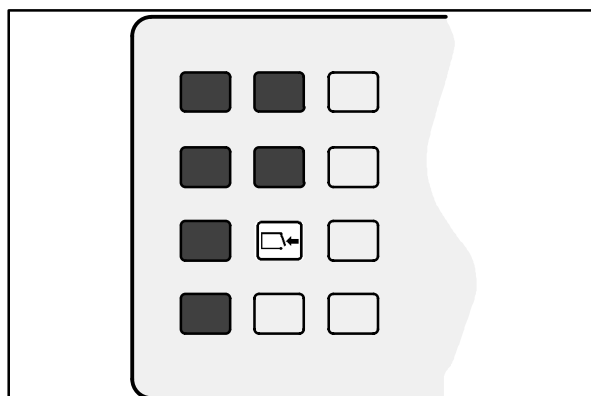
The Thermo Sentry has to be reset manually, see *THERMO SENTRY* in *MAINTENANCE*.



07760

HOPPER DOOR LIGHT

The hopper door light comes on when the hopper door is closed. Make sure the hopper door is open and the hopper door light is off, before sweeping with the machine.

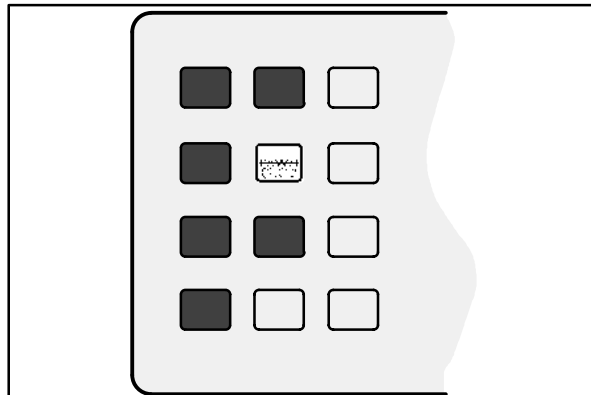


07763

CLOGGED FILTER LIGHT

The clogged filter light comes on when the hopper dust filter is clogged.

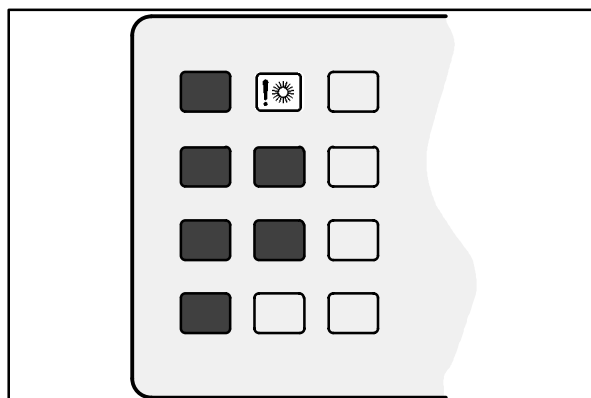
To clean the filter, press the filter shaker switch. If the clogged filter light remains lit, manually clean the hopper dust filter. See *HOPPER DUST FILTER* in *MAINTENANCE*.



07762

MAIN BRUSH SHUT DOWN LIGHT

The main brush shut down light  comes on when there is excessive down pressure for the main brush, or there is a problem with the main and side brush hydraulic motor circuit. The brush pressures can be reduced with the main brush and side brush pressure knobs.



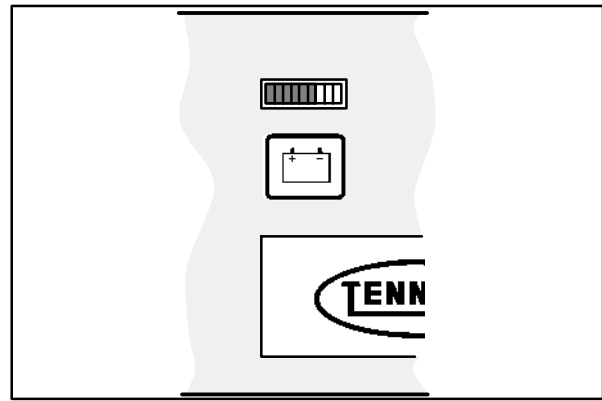
07761

BATTERY DISCHARGE INDICATOR

The battery discharge indicator shows the charge level of the batteries with a segmented LED light. When the batteries are fully charged, all of the segments are lit. As the batteries discharge, the segments shut off.

Recharge the batteries when the last two segments are flashing.

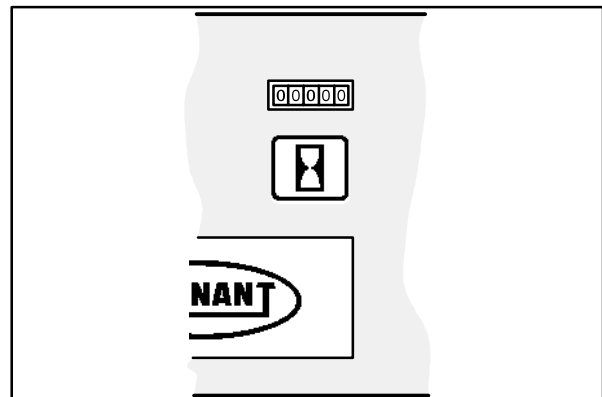
NOTE: The reading of the battery discharge indicator is not accurate when the machine is first powered on. Operate the machine a few minutes before reading the charge level of the batteries.



08233

HOURLMETER

The hourmeter records the number of hours the machine has been operated. Use this information to determine machine maintenance intervals.



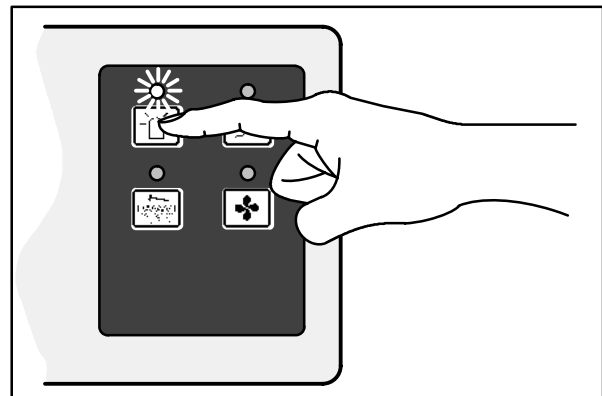
07765

HAZARD LIGHT SWITCH (OPTION)

The hazard light switch powers on and off the hazard light.

On: Press the hazard light switch. The indicator light above the switch will come on.

Off: Press the hazard light switch. The indicator light above the switch will go off.



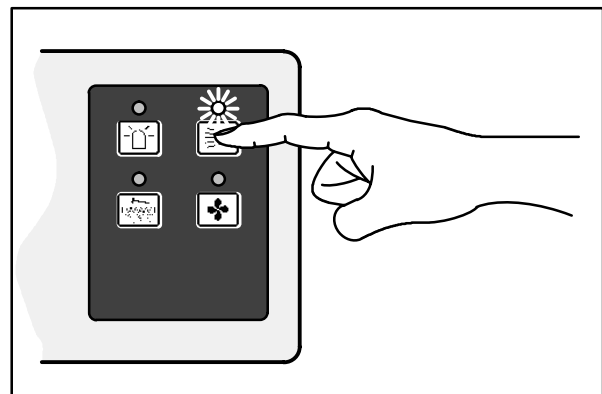
08228

OPERATING LIGHTS SWITCH

The operating lights switch powers on and off the headlights and taillights.

On: Press the operating lights switch. The indicator light above the switch will come on.

Off: Press the operating lights switch. The indicator light above the switch will go off.



08230

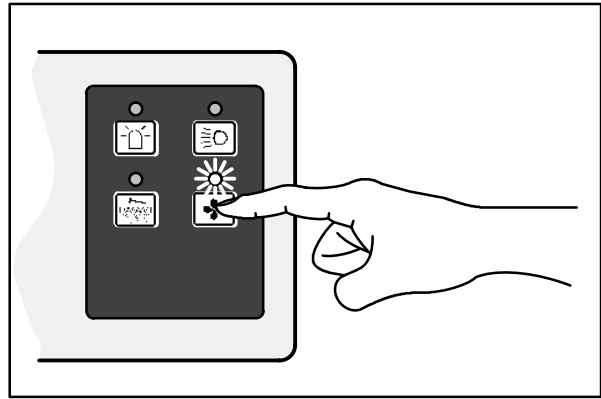
OPERATION

VACUUM FAN SWITCH

The vacuum fan switch starts and stops the vacuum fan.

Start: Press the vacuum fan switch. The indicator light above the switch will come on.

Stop: Press the vacuum fan switch. The indicator light above the switch will go off.



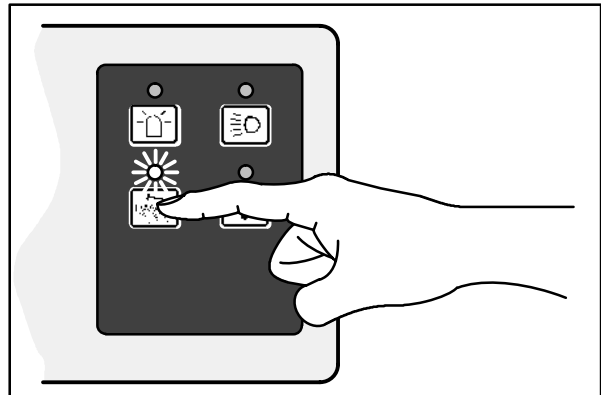
08231

FILTER SHAKER SWITCH

The filter shaker switch starts the hopper dust filter shaker. The shaker automatically operates for 40 seconds.

Start: Press the filter shaker switch. The indicator light will remain on while the filter shaker is operating.

NOTE: The vacuum fan shuts off while the filter shaker is operating.



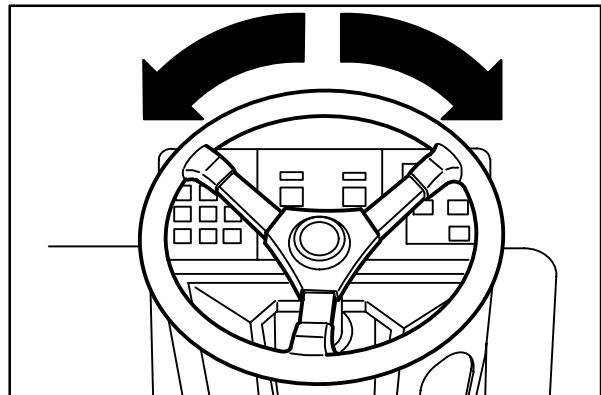
08229

STEERING WHEEL

The steering wheel controls the machine's direction. The machine is very responsive to the steering wheel movements.

Left: Turn the steering wheel to the left.

Right: Turn the steering wheel to the right.

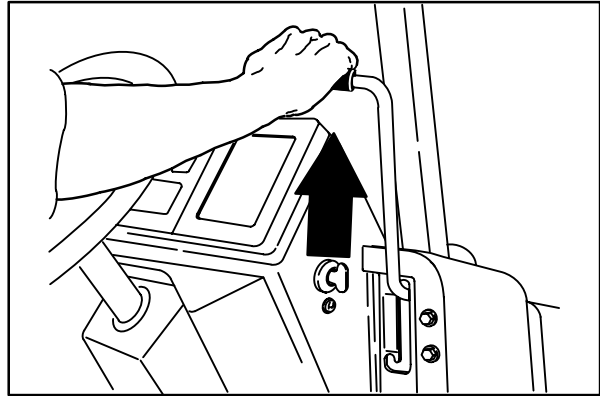


07801

SIDE BRUSH POSITION LEVER

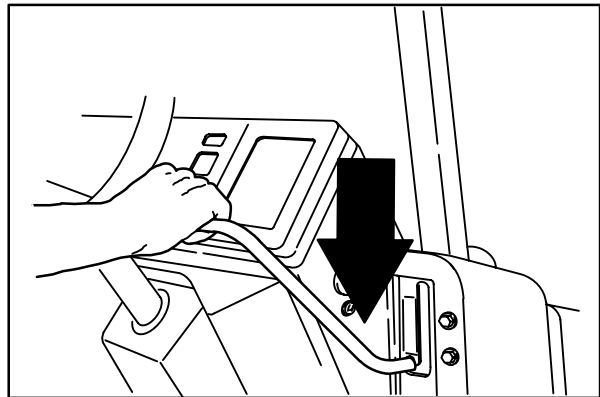
The side brush position lever lowers and raises the side brush.

Down: Pull the side brush position lever back and to the right into the **Down** slot.



07785

Up: Pull the side brush position lever back and to the left into the **Up** slot.



07786

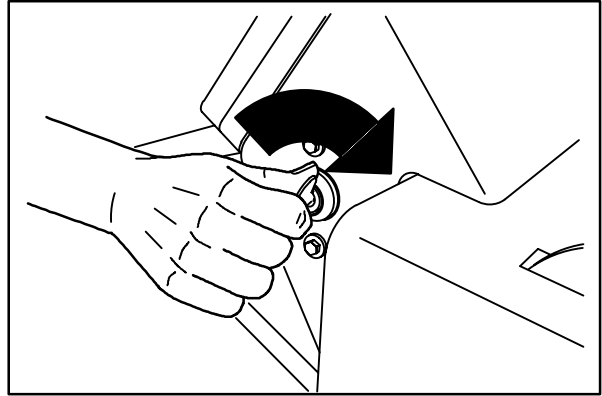
OPERATION

ON-OFF SWITCH

The on-off switch controls the machine power with a key.

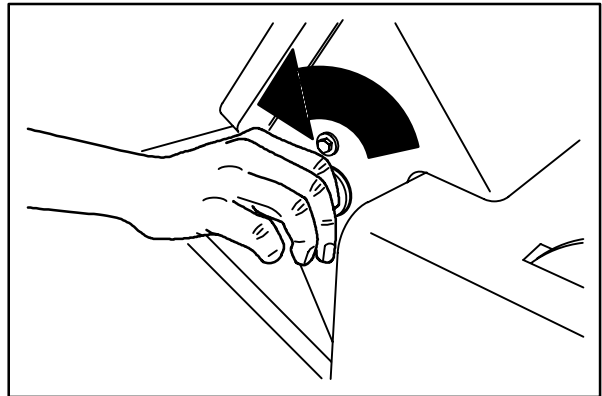
**For Safety: When Starting Machine,
Keep Foot On Brake And Directional
Pedal In Neutral.**

Start: Turn the key all the way clockwise, then release the switch key.



07804

Stop: Turn the key counter-clockwise.



07805

SIDE BRUSH DOWN PRESSURE KNOB

The side brush down pressure knob changes the side brush contact with the sweeping surface.

Heavy: Turn the side brush down pressure knob counter-clockwise.



07799

Light: Turn the side brush down pressure knob clockwise.

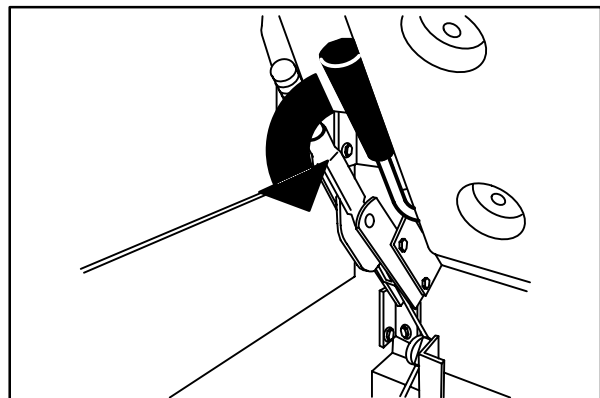


07800

STEERING COLUMN TILT LEVER

The steering column tilt lever controls the angle of the steering column.

Adjust: Pull down on the tilt lever, move the column up or down, and release the tilt lever.



08222

OPERATION

CIRCUIT BREAKERS

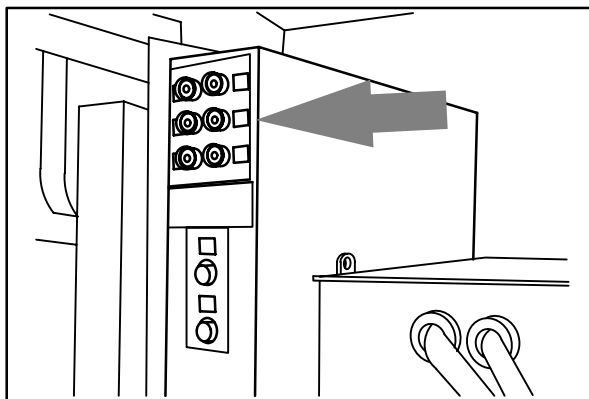
The circuit breakers are resettable electrical circuit protection devices. Their design stops the flow of current in the event of a circuit overload. Once a circuit breaker is tripped, it must be reset manually. Press the reset button after the breaker has cooled down.

If the overload that caused the circuit breaker to trip is still there, the circuit breaker will continue to stop current flow until the problem is corrected.

The circuit breakers are located next to the batteries.

The chart lists the circuit breakers and the electrical components they protect.

Circuit Breaker	Rating	Circuit Protected
CB-1	5 A	Instrument panel, power supply, speed control
CB-2	10 A	Filter shaker
CB-3	10 A	Operating lights
CB-4	10 A	Hazard light, back-up alarm
CB-5	10 A	Horn
CB-6	10 A	Open slot
CB-7	40 A	Vacuum fan motor
CB-8	80 A	Hydraulic pump motor



08238

LATCHES

The side doors, rear doors, battery cover, and hopper cover are secured with latches.

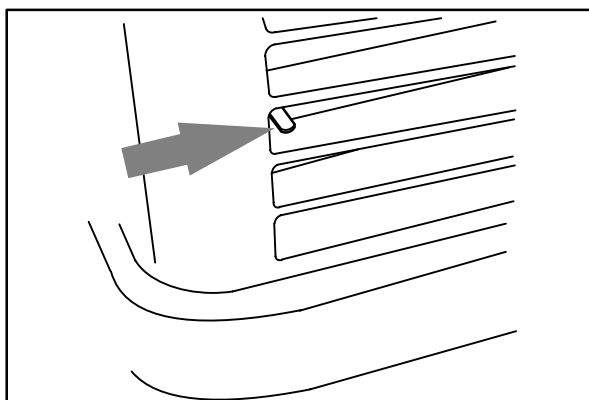
Open the Main Brush Side Doors: Push down on the door latch.

Open the Side Door: Pull up on the door latch.

Open the Grille Doors: Push down on the door latch.

Open the Battery Cover: Push in on the cover latch.

Open the Hopper Cover: Push the cover latch to the right and pull up on the hopper cover.



08149

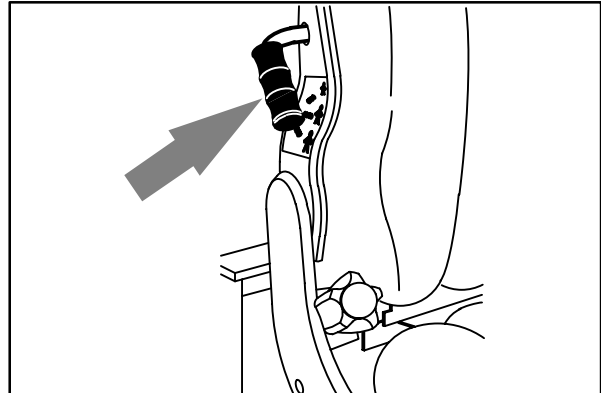
OPERATOR SEAT

The operator seat has three adjustments. The adjustments are for the operator's weight, backrest angle, and the front-to-rear seat position.

NOTE: The operator seat contains a safety switch. The operator has to be in the operator seat to start the machine. If the switch is deactivated while the machine is propelling, power is interrupted. The directional pedal has to be cycled through neutral before turning on machine power.

The operator's weight adjustment is controlled with the weight adjustment lever. The lever has three positions; light-weight, middle-weight, and heavy-weight.

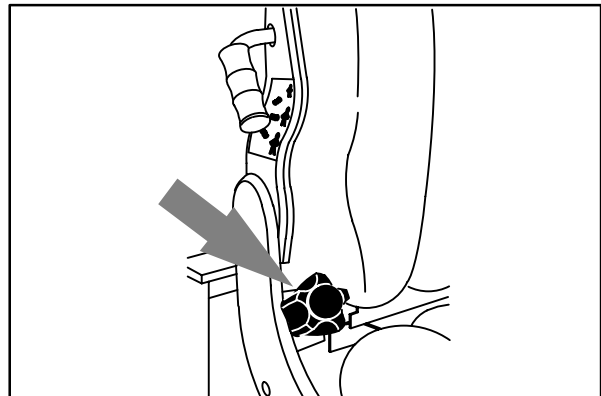
Adjust: Pull the lever up for the light-weight position, move the lever to the middle position for middle-weight, and push the lever down for the heavy-weight position.



07795

The backrest angle is adjusted using the angle knob.

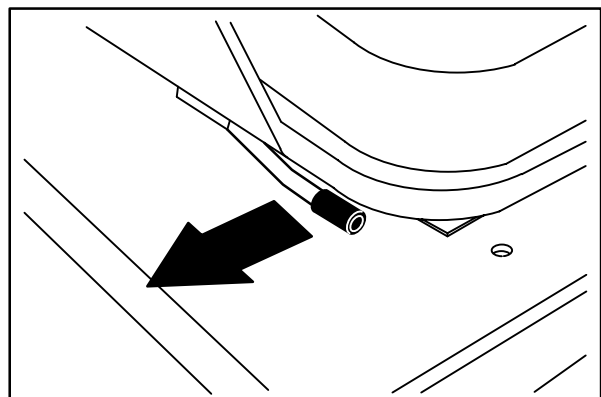
Adjust: Turn the angle knob clockwise to decrease the angle of the backrest. Turn the knob counter-clockwise to increase the angle of the backrest.



07796

The seat front-to-rear position is adjusted by the seat position lever.

Adjust: Pull the lever out, slide the seat backward or forward to the desired position and release the lever.

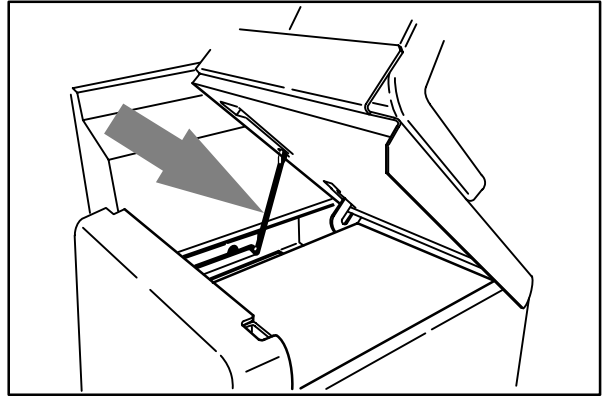


07797

OPERATION

Lift: Pull up on the seat mounting plate until the seat mount locks up.

Lower: Pull on the release lever and lower the seat mounting plate.



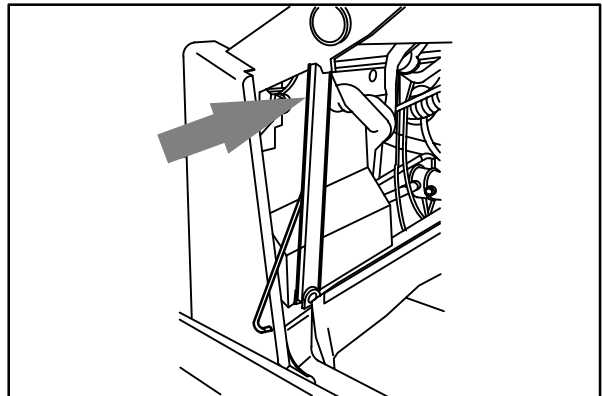
08232

HOPPER SUPPORT BAR

The hopper support bar is located on the operator's side of the hopper. The hopper support bar holds the hopper in the raised position to allow work under the hopper. DO NOT rely on the machine hydraulic system to keep the hopper raised.



**WARNING: Raised hopper may fall.
Engage hopper support bar.**



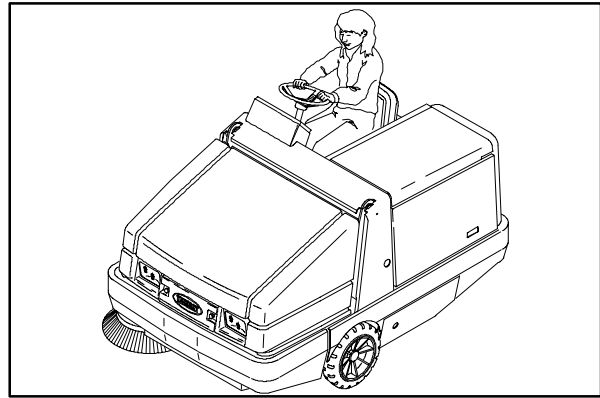
07803

HOW THE MACHINE WORKS

The steering wheel controls the direction of machine travel. The directional pedal controls the speed and forward/reverse direction. The brake pedal slows and stops the machine.

The side brush sweeps debris into the path of the main brush. The main brush sweeps debris from the floor into the hopper. The vacuum system pulls dust and air through the hopper and the hopper dust filter.

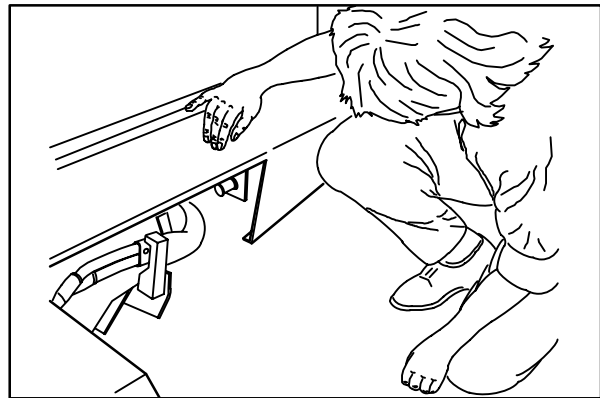
When sweeping is finished, clean the hopper dust filter and empty the hopper.



07816

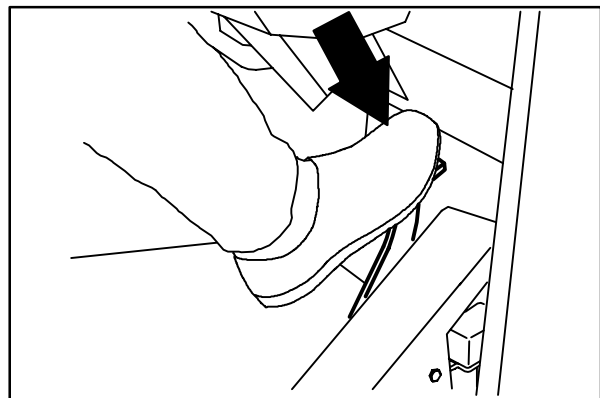
PRE-OPERATION CHECKLIST

☐ Check under the machine for leaks (oil).



07807

☐ Check the brakes and steering for proper operation.

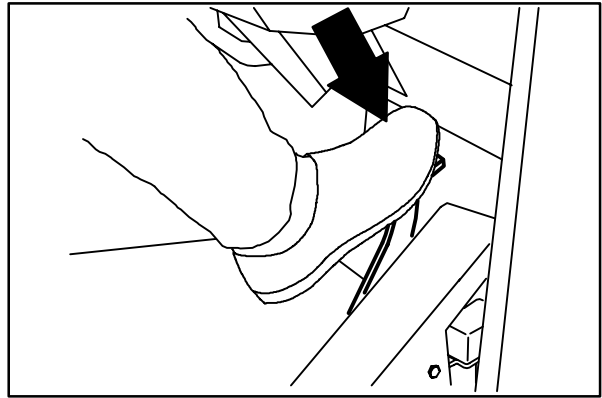


08234

STARTING THE MACHINE

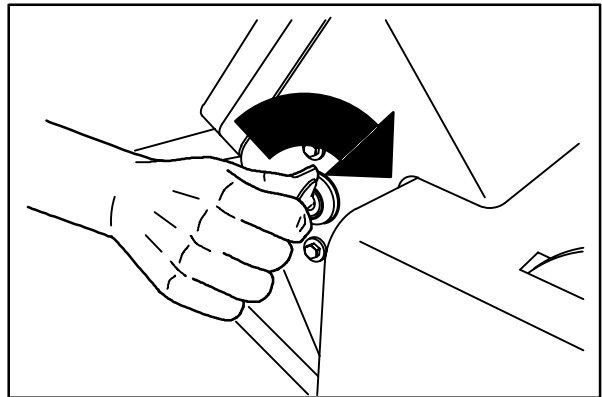
1. You must be in the operator's seat with the directional pedal in neutral, and your foot on the brake pedal or with the parking brake set.

For Safety: When starting machine, keep foot on brake and directional pedal in neutral.



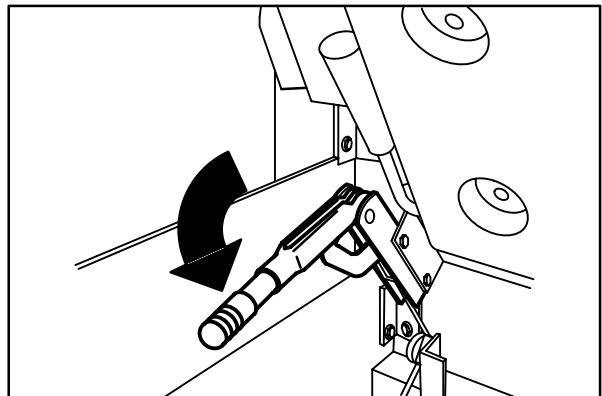
08234

2. Turn the on-off switch key fully clockwise to start the machine power, then release the switch key.



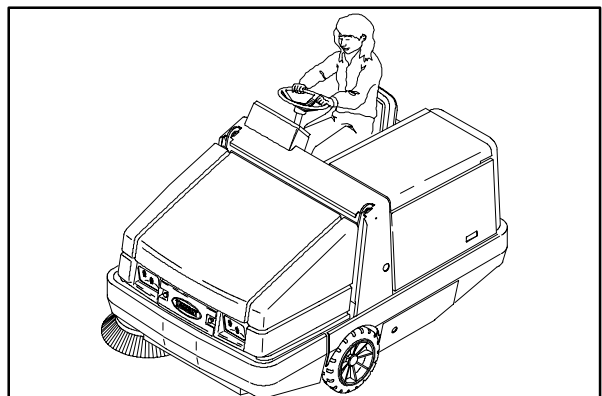
07804

3. Release the machine parking brake.



08223

4. Drive the machine to the area being swept.



07816

SWEEPING AND BRUSH INFORMATION

Pick up oversized debris before sweeping. Flatten or remove bulky cartons from aisles before sweeping. Pick up pieces of wire, twine, string, etc., which could become entangled in brush or brush plugs.

Plan the sweeping in advance. Try to arrange long runs with minimum stopping and starting. Sweep debris from very narrow aisles into main aisles ahead of time. Do an entire floor or section at one time. Sweep as straight a path as possible. Avoid bumping into posts or scraping the sides of the sweeper. Overlap the brush paths.

Avoid turning the steering wheel too sharply when the machine is in motion. The machine is very responsive to the movement of the steering wheel. Avoid sudden turns, except in emergencies.

Check the brush daily for wear or damage. Remove any string or wire tangled on the main brush, main brush drive hub, or main brush idler hub.

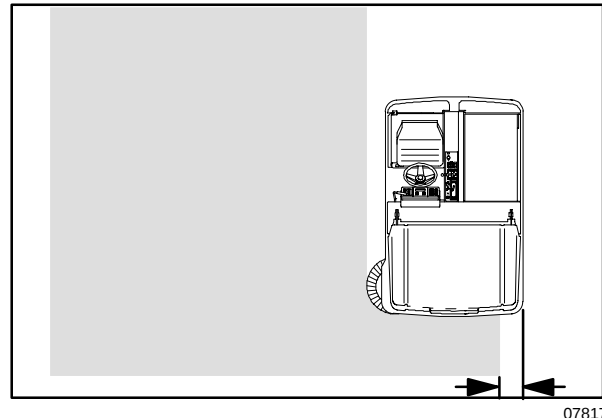
Check the main brush pattern daily. The pattern should be 50 to 75 mm (2.0 to 3.0 in) wide with the main brush in the **Down** position. Adjust the main brush pattern by turning the main brush pressure knob located next to the brush position lever.

For best results, use the correct brush type for your sweeping application. The following are recommendations for main and side brush applications.

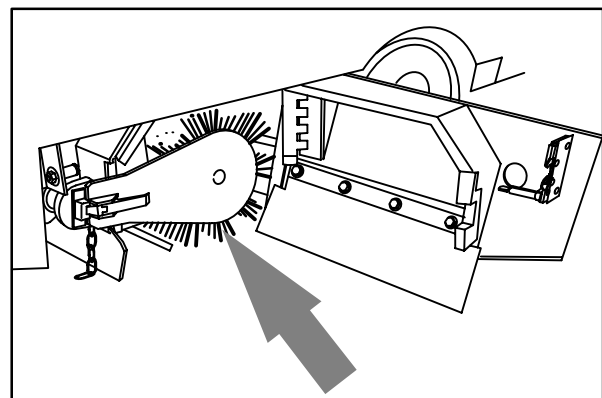
Nylon 8-double Row Main Brush –

Recommended for general sweeping and has good hopper loading. Nylon has the longest life then any bristle types, use this brush for sweeping rough or irregular surfaces.

Polypropylene and Wire 8-double Row Main Brush – The wire bristles loosen slightly packed soilage and heavier debris. The polypropylene bristles sweep up the debris with excellent hopper loading.



07817



08002

OPERATION

Crinkle Wire 8-double Row Main Brush – The stiff wire bristles cut through compacted grime, hard to sweep dirt, and dirt mixed with oil, grease, or mud. This brush is recommended for foundry sweeping where heat may melt synthetic bristles. The brush has good hopper loading ability, but is not recommended for dusty applications.

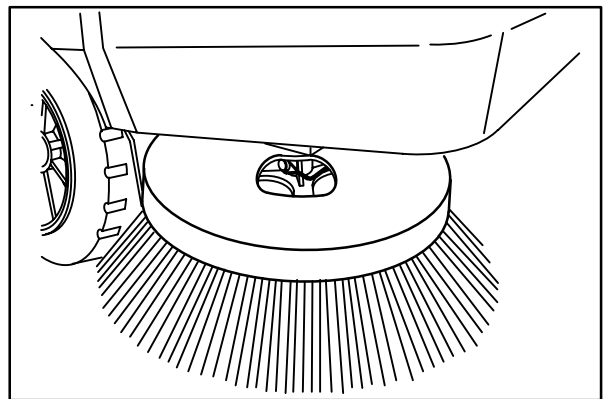
Nylon 24-row Main Brush – Recommended for severe dust conditions on rough surfaces. This brush has excellent pickup and long life.

Fiber and Wire 24-row Main Brush – Offers good sweeping action and pickup in heavy dust concentrations. This brush is recommended where soilage is slightly encrusted. The brush is not recommended for heavy buildup or hard packed soilage.

Polypropylene Side Brush – A good general purpose brush for sweeping of light to medium debris in both indoor and outdoor applications. This brush is recommended when bristles may get wet.

Nylon Side Brush – A longer life, general purpose brush that is recommended for rough surfaces.

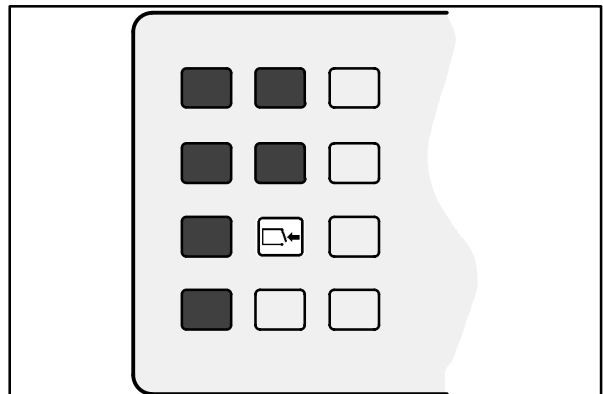
Flat Wire Side Brush – Recommended for outside and curbside sweeping where soilage is heavy or compacted. The stiff wire bristles dig out soilage. This brush is also recommended for foundry sweeping where heat may melt synthetic bristles.



08046

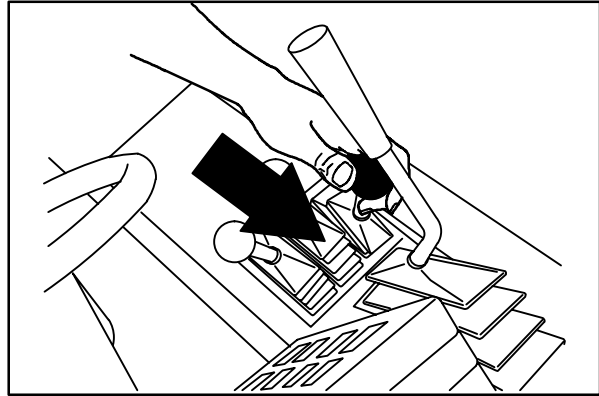
SWEEPING

1. Make sure the hopper door light is off. If the hopper door light is on, open the hopper door.



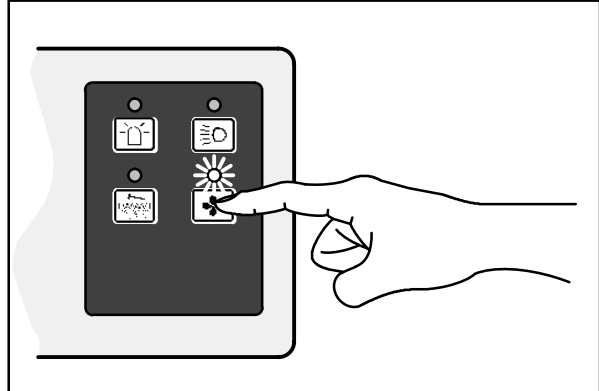
07763

2. Push the main brush and side brush lever into the **On** position or the **On** position.



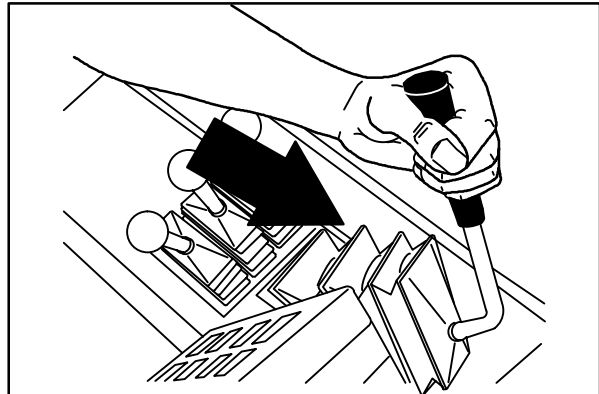
07773

3. Press the vacuum fan switch to start the vacuum.



08231

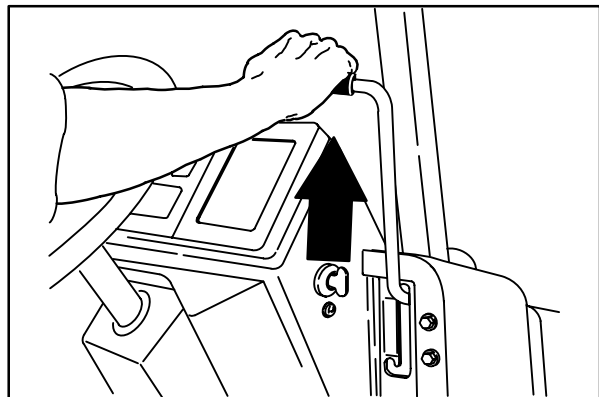
4. Pull the main brush position lever back and to the left into the **Down** position.



07782

5. Pull the side brush position lever back and to the right into the **Down** slot.

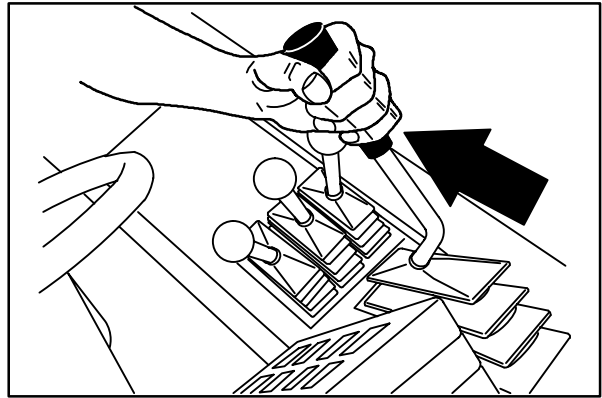
6. Sweep as needed.



07785

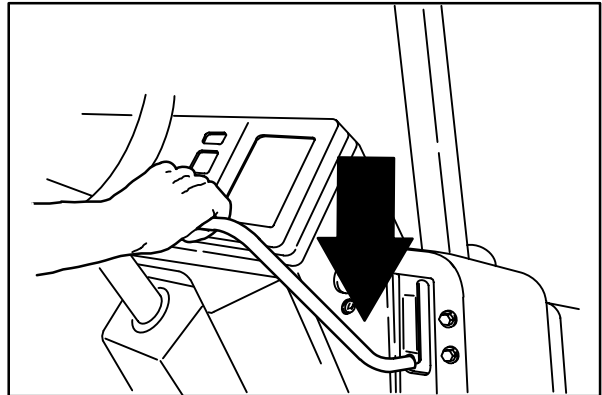
STOP SWEEPING

1. Pull the main brush position lever all the way back and to the right into the **Up** position.



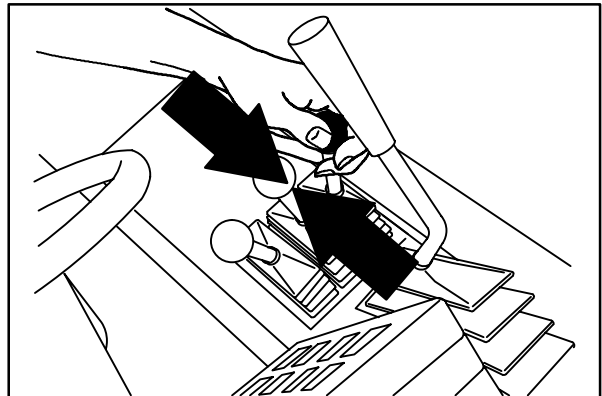
07784

2. Pull the side brush position lever back and to the left into the **Up** slot.



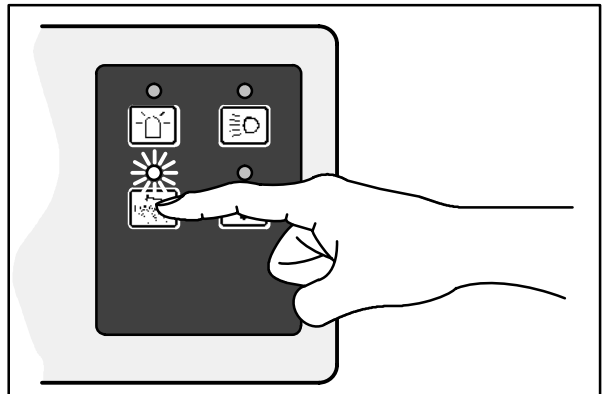
07786

3. Pull the main brush and side brush lever into the middle (Off) position.



07774

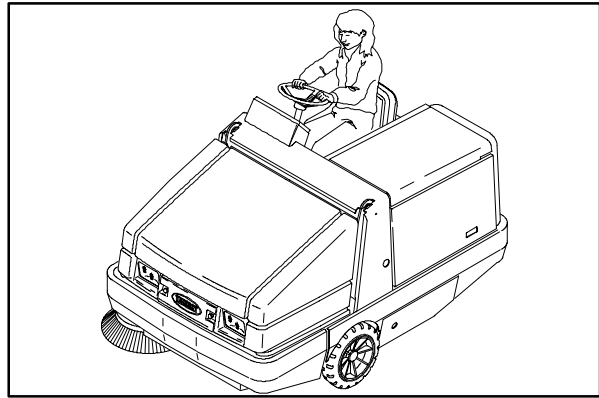
4. Press the filter shaker switch to shake the hopper dust filter.



08229

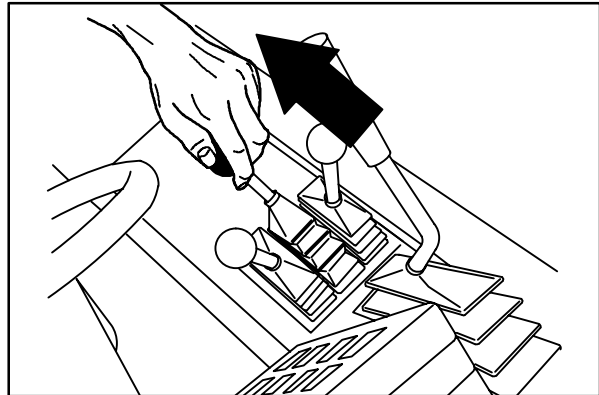
EMPTYING THE HOPPER

1. Slowly drive the machine to the debris site or debris container.



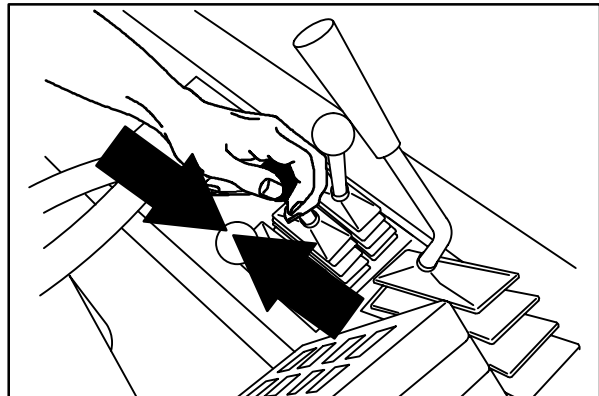
07816

2. Pull the hopper door lever into the **Close** position until the hopper door light comes on.



07778

3. Release the hopper door lever into the middle (Hold) position.

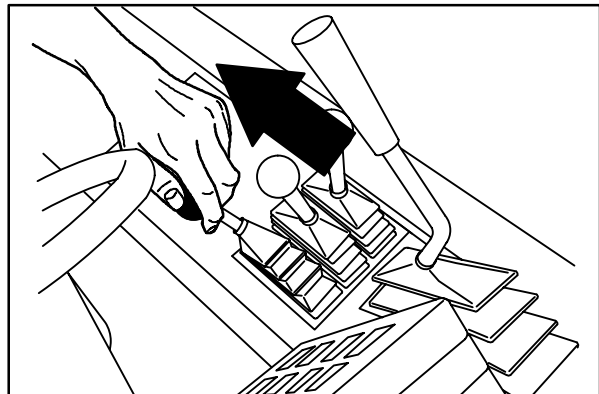


07777

4. Pull the hopper lift lever into the **Up** position and raise the hopper to the desired height.

FOR SAFETY: When using machine, make sure adequate clearance is available before raising hopper.

NOTE: Be aware that the minimum ceiling height needed to high dump the hopper is 2745 mm (9 ft).



07779

OPERATION

5. Release the hopper lift lever up and into the middle (Hold) position.

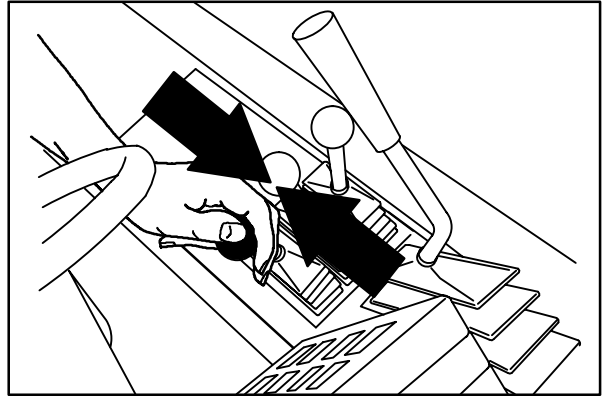
FOR SAFETY: When using machine, move machine with care when hopper is raised.

6. Drive the machine up to the debris container.
7. Lower the hopper into the debris container to control dust.
8. Push the hopper door lever into the **Open** position and leave it there.
9. Raise the hopper enough and/or close the hopper door to clear the top of the debris container.

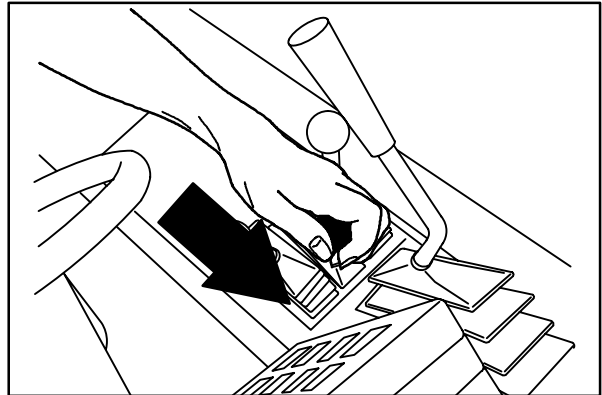
10. Slowly back the machine away from the debris site or debris container.

For Safety: When using machine, use care when reversing machine.

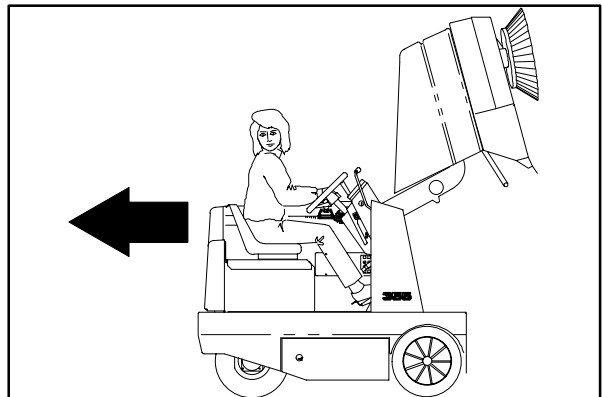
11. Push the hopper lift lever into the **Down** position.



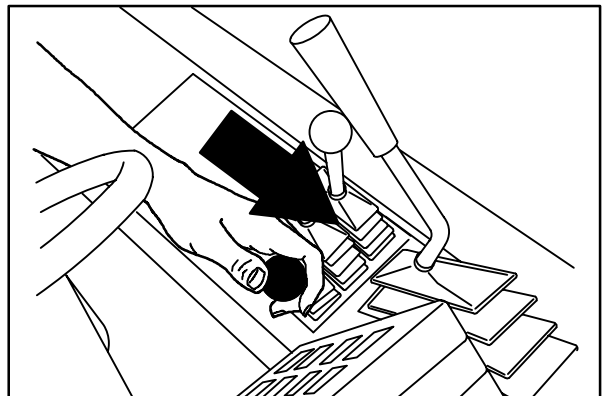
07780



07776



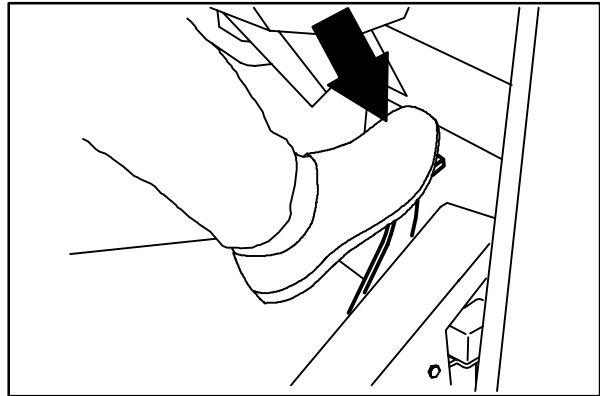
07999



07781

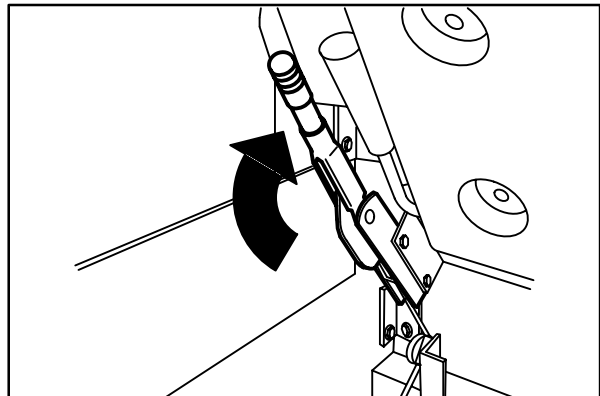
STOP THE MACHINE

1. Stop sweeping.
2. Take your foot off the directional pedal. Step on the brake pedal.



08234

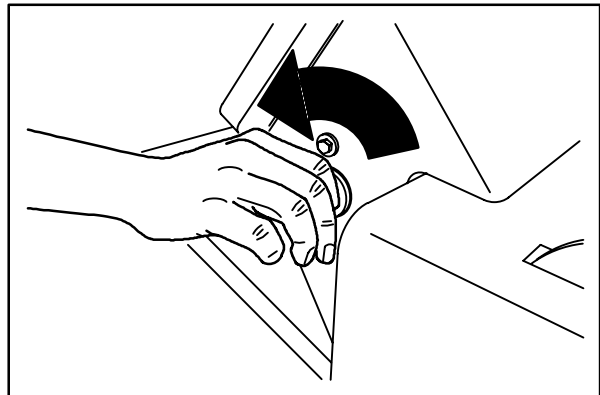
3. Set the machine parking brake.



08224

4. Turn the on-off switch key counter-clockwise to stop the machine power. Remove the switch key.

FOR SAFETY: Before leaving or servicing machine; stop on level surface, set parking brake, turn off machine and remove key.



07805

POST-OPERATION CHECKLIST

Check this list of items after you have finished sweeping with the machine with the machine powered on:

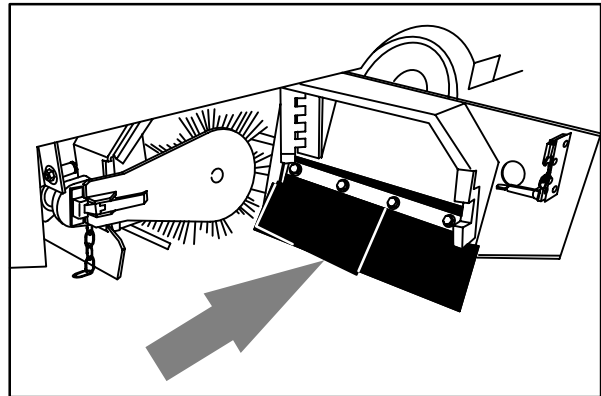
- ☐ Check the battery charge level.

NOTE: The reading on the battery discharge indicator is not accurate when the machine is first powered on. Operate the machine a few minutes before reading the charge level of the batteries.

- ☐ Check the brushes adjustment. See *TO CHECK AND ADJUST MAIN BRUSH PATTERN* and *SIDE BRUSH* in *MAINTENANCE*.

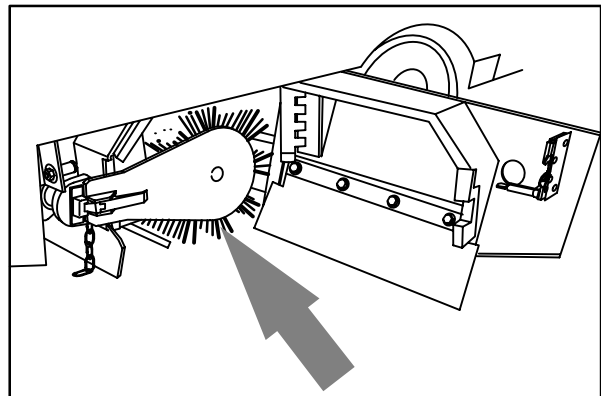
Check this list of items with the machine powered off:

- ☐ Check the brush skirts for damage, wear, and adjustment.



08001

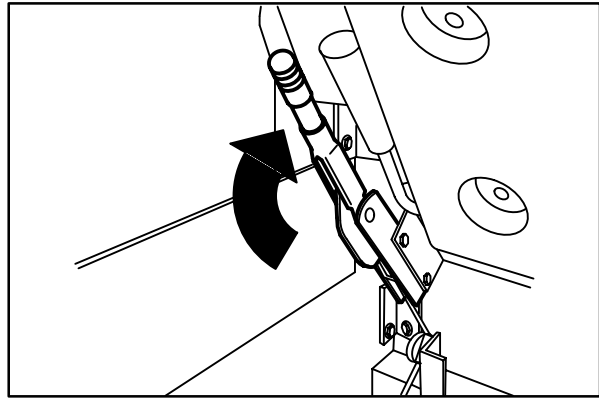
- ☐ Check for wire or string tangled on the main and side brushes
- ☐ Check under the machine for leak spots (oil).
- ☐ Check the service records to determine maintenance requirements.



08002

ENGAGING HOPPER SUPPORT BAR

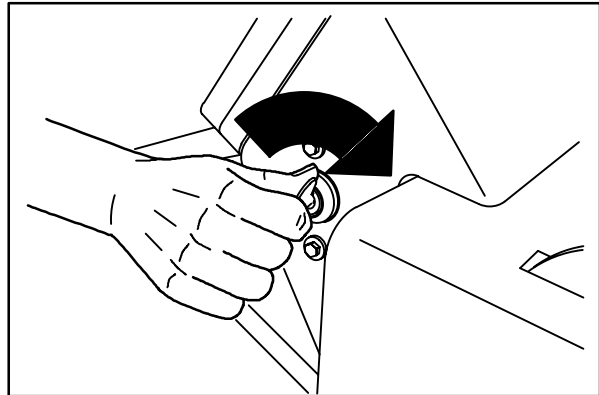
1. Set the machine parking brake.



08224

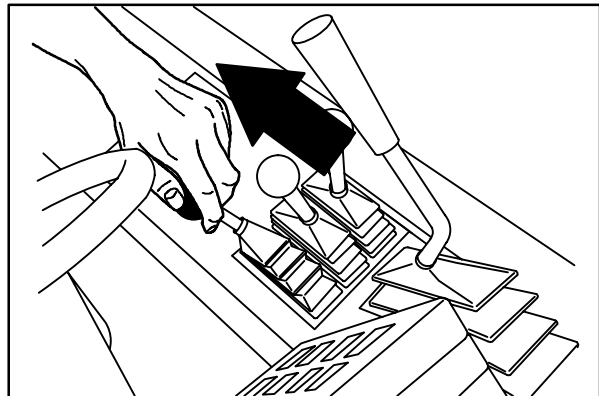
2. Turn the machine power on.

For Safety: When starting machine, keep foot on brake and directional pedal in neutral.



07804

3. Raise the hopper all the way up.

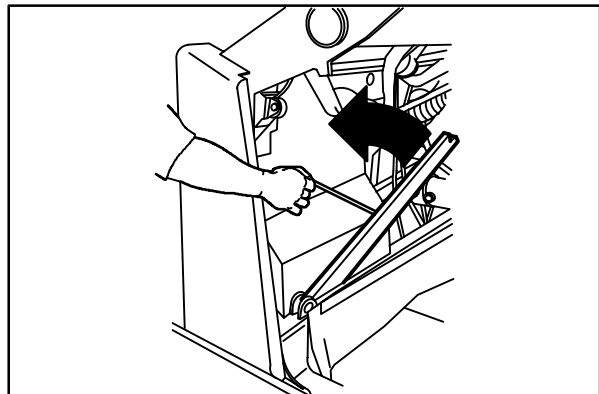


07779

4. Lift and position the hopper support bar under the hopper lift arm.



WARNING: Raised hopper may fall. Engage hopper support bar.



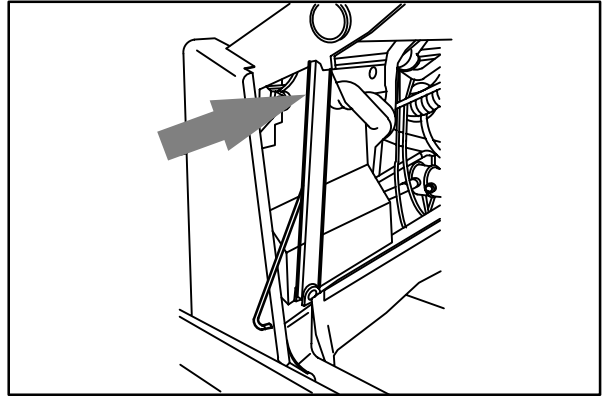
08003

OPERATION

5. Slowly lower the hopper so the lift arm rests on the support bar.

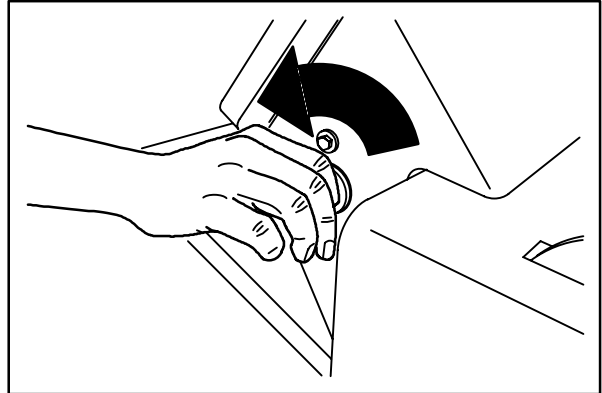


WARNING: Lift arm pinch point. Stay clear of hopper lift arms.



07803

6. Turn the machine power off.

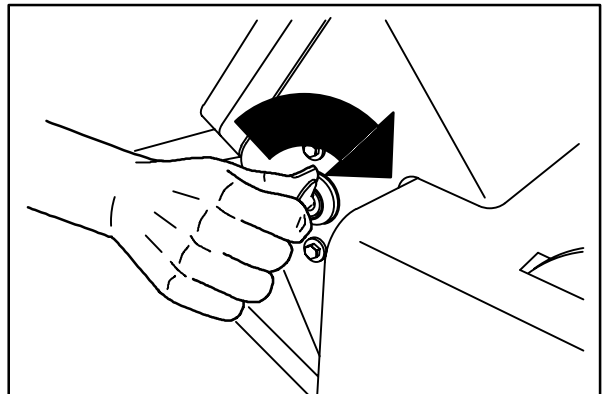


07805

DISENGAGING HOPPER SUPPORT BAR

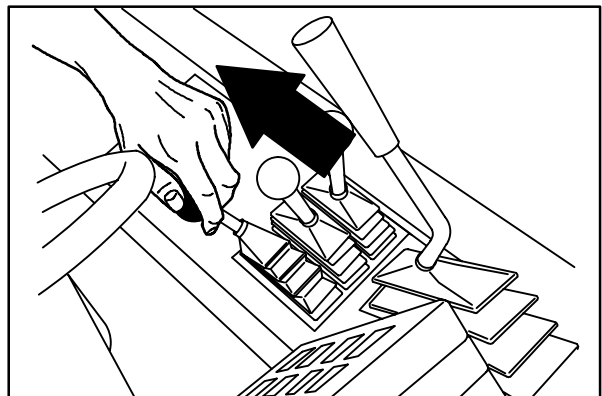
1. Turn the machine power on.

For Safety: When starting machine, keep foot on brake and directional pedal in neutral.



07804

2. Raise the hopper slightly to release the hopper support bar.

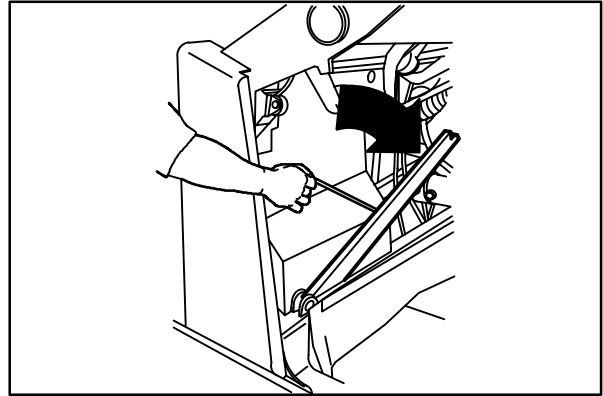


07779

- Put the support bar in its storage position.

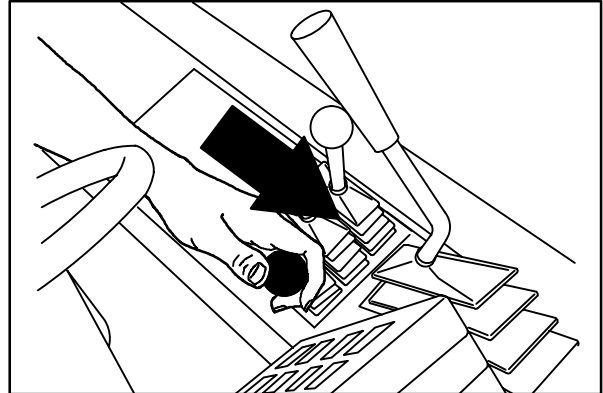


WARNING: Lift arm pinch point. Stay clear of hopper lift arms.



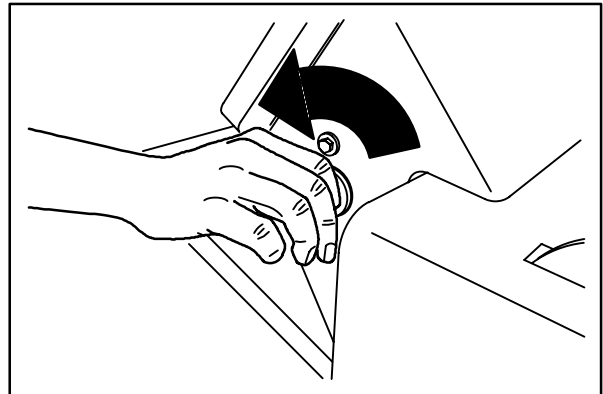
08004

- Lower the hopper.



07781

- Turn the machine power off.



07805

OPERATION ON INCLINES

Drive the machine slowly on inclines. Use the brake pedal to control machine speed on descending inclines.

The maximum rated incline is 6°.

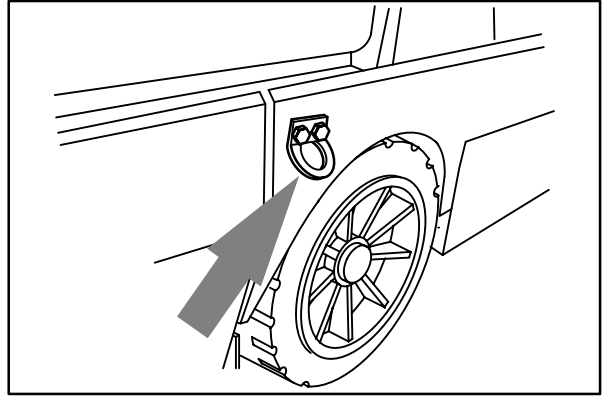
For Safety: When using machine, go slow on inclines.

OPTIONS

TIE-DOWNS

The machine can be tied down for transport using the tie-down brackets at the front and rear of the machine.

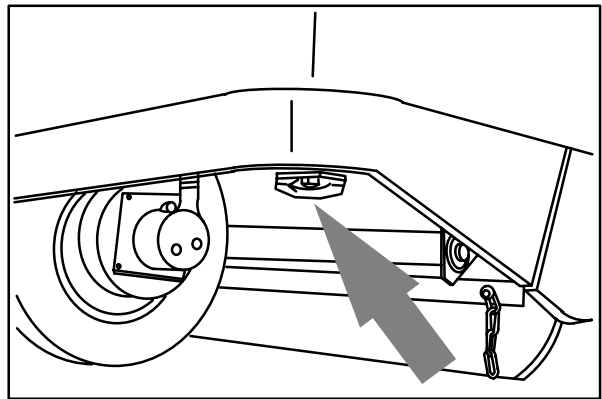
The front tie-down bracket is above the front tires.



08152

The rear tie down is located on each corner of the rear bumper.

When transporting the machine on a trailer or in a truck, be sure to set the parking brake and block the tires to prevent the machine from rolling.

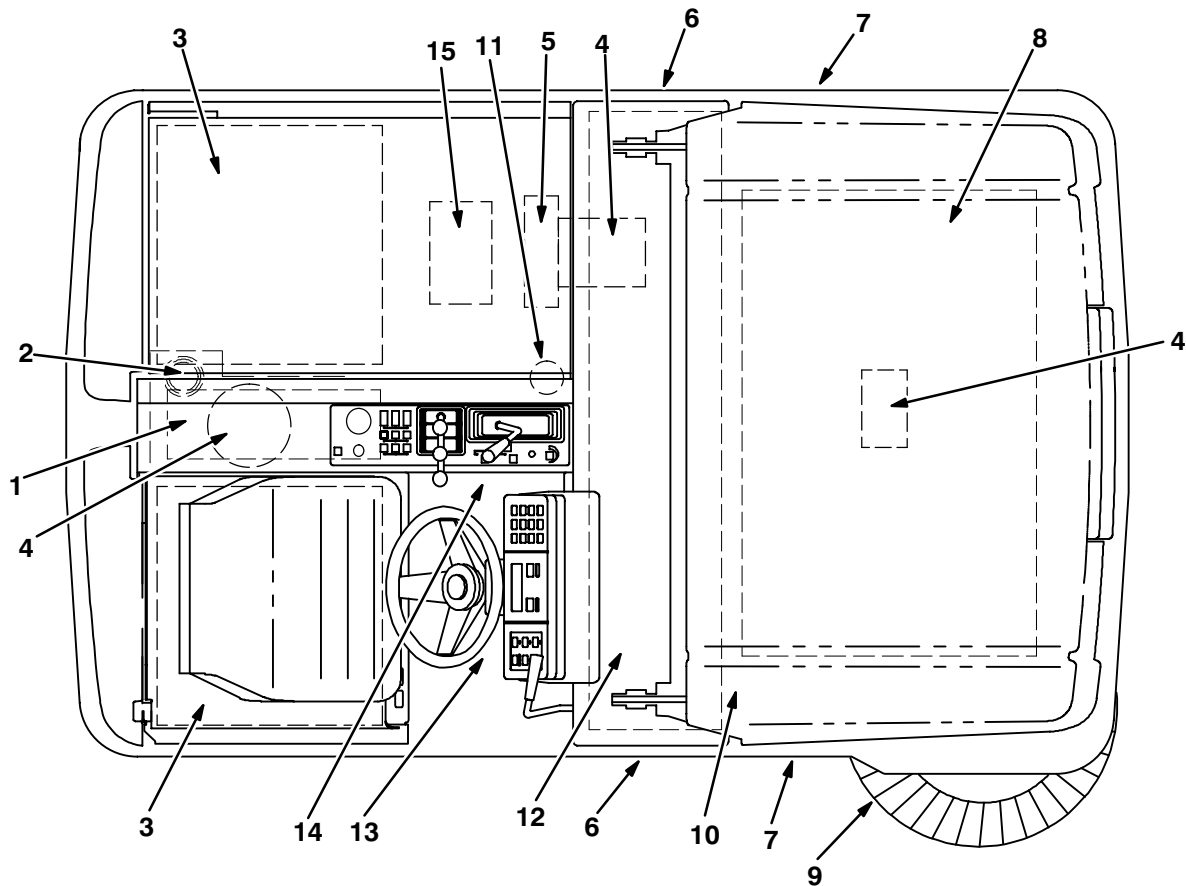


08151

MACHINE TROUBLESHOOTING

Problem	Cause	Remedy
Excessive dusting	Brush skirts and dust seals worn, damaged, out of adjustment	Replace or adjust brush skirts or dust seals
	Hopper dust filter clogged	Shake and/or clean or replace dust filter
	Vacuum hose damaged	Replace vacuum hose
	Vacuum fan failure	Contact TENNANT service personnel
	Hopper door partially or completely closed	Open the hopper door
	Thermo Sentry tripped	Reset Thermo Sentry
Poor sweeping performance	Brush bristles worn	Replace brushes
	Main and side brushes not adjusted properly	Adjust main and side brushes
	Debris caught in main brush drive mechanism	Free drive mechanism of debris
	Main brush drive failure	Contact TENNANT service personnel
	Side brush drive failure	Contact TENNANT service personnel
	Hopper full	Empty hopper
	Hopper lip skirts worn or damaged	Replace lip skirts
	Hopper door partially or completely closed	Open the hopper door
	Wrong sweeping brush	Contact TENNANT representative for recommendations

MAINTENANCE



08246

MAINTENANCE CHART

Interval	Key	Description	Procedure	Lubricant/ Fluid	No. of Service Points
Daily	6	Brush compartment skirts	Check for damage, wear and adjust	—	5
	10	Hopper lip skirts	Check for damage, wear and adjust	—	3
	12	Main brush	Check for damage, wear, and adjust	—	1
			Check brush pattern	—	1
	9	Side brush	Check for damage, wear, and adjust	—	1
			Check brush pattern	—	1

Interval	Key	Description	Procedure	Lubricant/ Fluid	No. of Service Points
50 Hours	12	Main brush	Rotate end-for-end	—	1
		Batteries	Check electrolyte level	—	2
100 Hours	8	Hopper dust filter	Check for damage, clean or re- place	—	1
	2	Hydraulic fluid reservoir	Check fluid level	HYDO	1
	6	Main brush and hopper seals	Check for damage or wear	—	8
	1	Propelling gearbox	Check lubricant level	—	1
	1	Tires	Check for wear and damage	—	3
200 Hours	14	Parking brake	Check adjustment	—	1
	13	Brake pedal	Check and adjust travel	—	1
	1	Rear wheel support bear- ing	Lubricate	SPL	1
	1	Steering link	Lubricate	SPL	1
	5	Vacuum fan drive belt	Check for wear	—	1
	9	Side brush guard	Rotate 90	—	1
400 Hours	7	Front wheel bearings	Check, lubricate, and adjust	SPL	2
	15	Electric accessory motor	Check carbon brushes	—	4
800 Hours	2	Hydraulic fluid reservoir	Replace filler cap	—	1
			Replace suction strainer	—	1
			Change hydraulic fluid	HYDO	1
	11	Hydraulic fluid filter	Change filter element	—	1
	2	Hydraulic hoses	Check for wear and damage	—	21
	3	Batteries	*Clean and tighten battery cable connections	—	2
	1	Propelling gearbox	*Change gear lubricant	GL	1
			*Change fill-level plug seals	—	1
	4	Electric propelling motors	Check carbon brushes	—	4

LUBRICANT/FLUID

HYDO . Tennant Company or approved hydraulic fluid, SHP 5/20

SPL . . . Special lubricant, Lubriplate EMB grease (TENNANT part no. 01433–1)

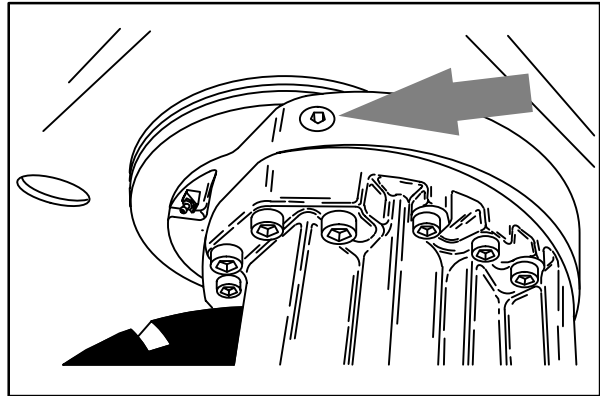
GL SAE 90 Gear weight lubricant

NOTE: Also check procedures indicted () after the first 50-hours of operation.*

LUBRICATION

PROPELLING GEARBOX

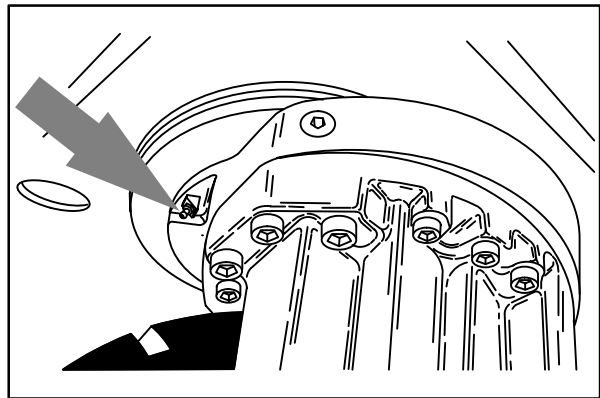
Check the lubricant level in the propelling gearbox every 100 hours of operation. Change the gear lubricant, and the drain and fill-level plug seals after the first 50 hours of operation, and then every 800 hours of operation. Use SAE 90 weight gear lubricant.



08244

REAR WHEEL SUPPORT BEARING

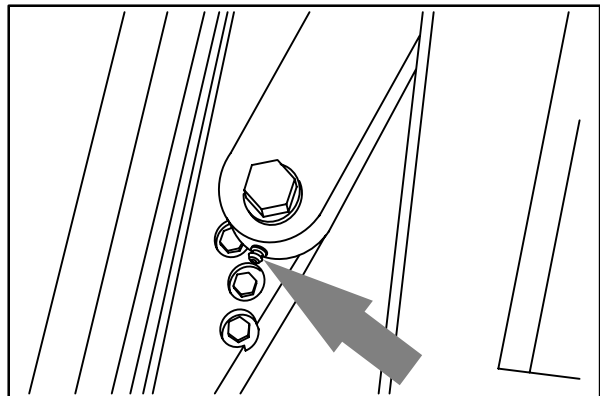
The rear wheel support has two grease fittings for the bearing. Raise the machine so the rear wheel support assembly is off the floor. Fill one of the grease fittings while rotating the gearbox from stop to stop. Fill the second grease fitting while rotating the gearbox back to the original position. The bearing cavity is full when grease comes out of the fittings or out of the top seal. Lubricate with Lubriplate EMB grease (TENNANT part no. 01433-1) every 200 hours of operation or after steam cleaning the gearbox area.



08245

STEERING LINK

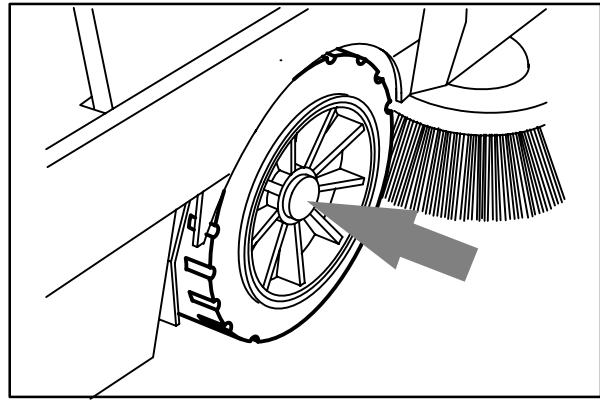
The steering link has a grease fitting located on the end of the link. Lubricate with Lubriplate EMB grease (TENNANT part no. 01433-1) every 200 hours of operation.



08291

FRONT WHEEL BEARINGS

Inspect the front wheel bearings for seal damage, and repack and adjust every 400 hours of operation. Use Lubriplate EMB grease (TENNANT part no. 01433-1).



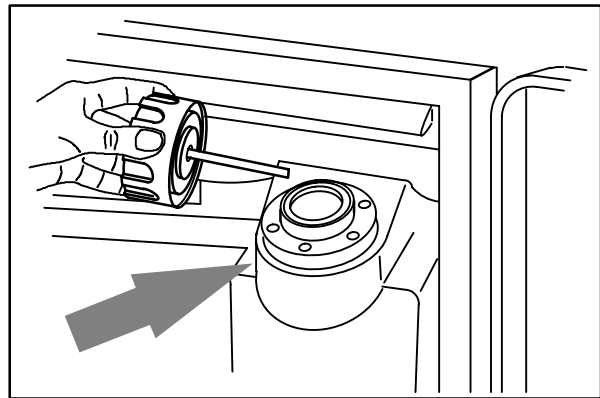
08006

HYDRAULICS

HYDRAULIC FLUID RESERVOIR

The reservoir is located in battery compartment above the battery.

Mounted on top of the reservoir is a filler cap with a built-in breather and fluid level dipstick. Replace the cap every 800 hours of operation.



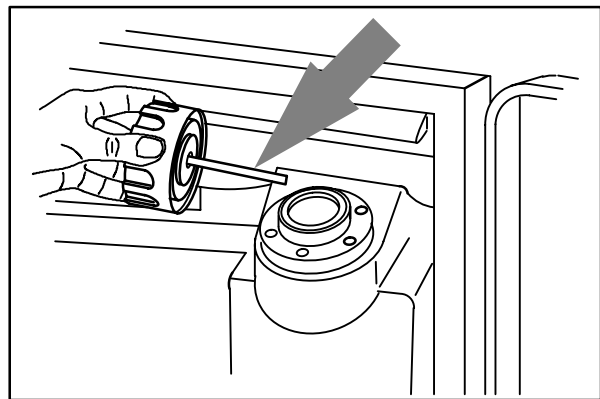
08241

Check the hydraulic fluid level at operating temperature every 100 hours of operation. Make sure the hopper is down when checking hydraulic fluid level. The end of the dipstick is marked with FULL and ADD levels to indicate the level of hydraulic fluid in the reservoir.

Lubricate the filler cap gasket with a film of hydraulic fluid before putting the cap back on the reservoir.

ATTENTION! Do not overfill the hydraulic fluid reservoir or operate the machine with a low level of hydraulic fluid in the reservoir. Damage to the machine hydraulic system may result.

Drain and refill the hydraulic fluid reservoir with new hydraulic fluid every 800 hours of operation.

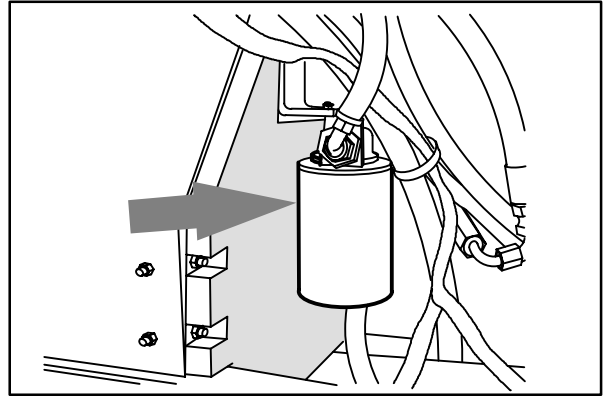


08218

MAINTENANCE

The hydraulic fluid filter is located behind the vacuum fan and hopper lift cylinder. Replace the filter element every 800 hours of operation.

The reservoir has a built-in strainer outlet that filters hydraulic fluid before it enters the system. Replace the strainer every 800 hours of operation.



08217

HYDRAULIC FLUID

The quality and condition of the hydraulic fluid play a very important role in how well the machine operates. TENNANT's hydraulic fluid is specially selected to meet the needs of TENNANT machines.

TENNANT's hydraulic fluids provide a longer life for the hydraulic components. There is one recommended fluid.

TENNANT part no.	Fluid Weight
65870	SHP 5/20

If a locally-available hydraulic fluid is used, make sure the specifications match TENNANT hydraulic fluid specifications. Using substitute fluids can cause premature failure of hydraulic components.

European manufactured machines are filled with locally available hydraulic fluids. Check the label on the hydraulic fluid reservoir.

ATTENTION! Hydraulic components depend on system hydraulic fluid for internal lubrication. Malfunctions, accelerated wear, and damage will result if dirt or other contaminants enter the hydraulic system.

HYDRAULIC HOSES

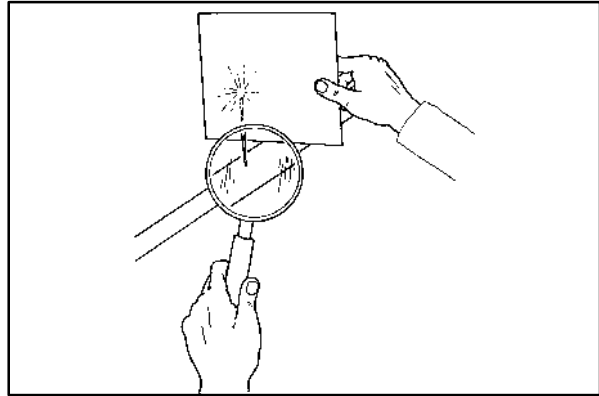
Check the hydraulic hoses every 800 hours of operation for wear or damage.

Fluid escaping at high pressure from a very small hole can be almost invisible, and can cause serious injuries.

See a doctor at once if injury results from escaping hydraulic fluid. Serious infection or reaction can develop if proper medical treatment is not given immediately.

FOR SAFETY: When servicing machine, use cardboard to locate leaking hydraulic fluid under pressure.

If you discover a fluid leak, contact your mechanic/supervisor.



00002

BATTERIES

The batteries are unique in that they hold their power for long periods of time. The lifetime of the batteries is limited by the number of charges the batteries receive. To get the most life from the batteries, charge them when the battery discharge indicator flashes.

Periodically clean the top surface of the batteries and the terminals, and check for loose connections. Use a strong solution of baking soda and water. Brush the solution sparingly over the battery tops, terminals, and cable clamps.

Use a wire brush to clean the terminal posts and the cable connectors. After cleaning, apply a coating of clear battery post protectant to the terminals and the cable connectors.

Keep the tops of the batteries clean and dry. Keep all metallic objects off the top of the batteries, which may cause a short circuit. Replace any worn or damaged wires.

Check the electrolyte level in each battery after charging and every 50 hours of operation. Never add acid to the batteries, only distilled water. Keep the battery caps on the batteries at all times except when adding water or taking hydrometer readings.

MAINTENANCE

Measuring the specific gravity using a hydrometer is a way to determine the charge level and condition of the batteries. If one or more of the battery cells reads lower than the other battery cells (0.050 or more), the cell is damaged, shorted, or is about to fail.

NOTE: Do not take readings immediately after adding distilled water. If the water and acid are not thoroughly mixed, the readings may not be accurate. Check the hydrometer readings against the following chart to determine the remaining battery charge level:

Specific Gravity at 27 °C (80 °F)	Battery Condition
1.315	100% charged
1.264	75% charged
1.213	50% charged
1.162	25% charged
1.110	Discharged

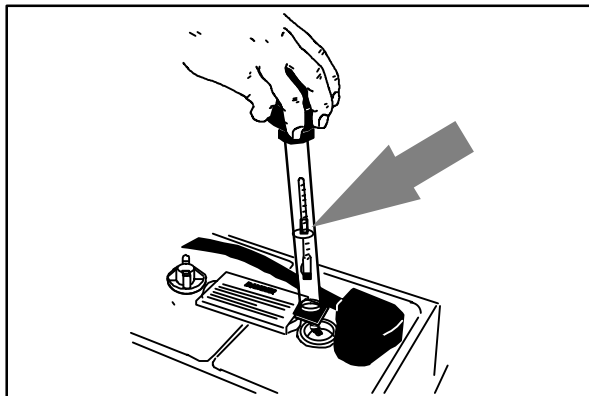
NOTE: If the readings are taken when the battery electrolyte is any temperature other than 27 °C (80 °F), the reading must be temperature corrected. Add or subtract to the specific gravity reading 0.004, 4 points, for each 6 °C (10 °F) above or below 27 °C (80 °F).

CHARGING THE BATTERIES

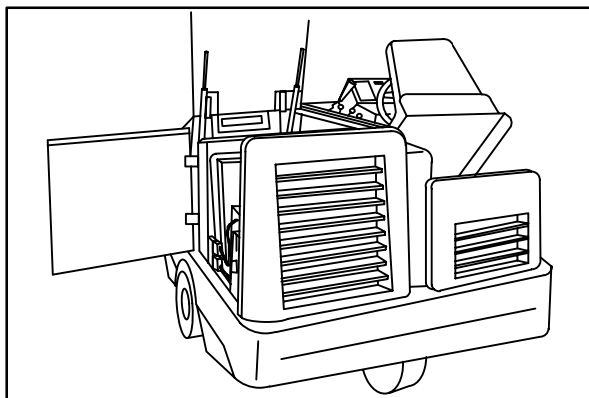
1. Drive the machine to a flat, dry surface in a well ventilated area.
2. Turn the machine power off and set the machine parking brake.

FOR SAFETY: Before leaving or servicing machine; stop on level surface, set parking brake, turn off machine and remove key.

3. Open the side door, battery cover, and lift the seat to get access to the batteries.



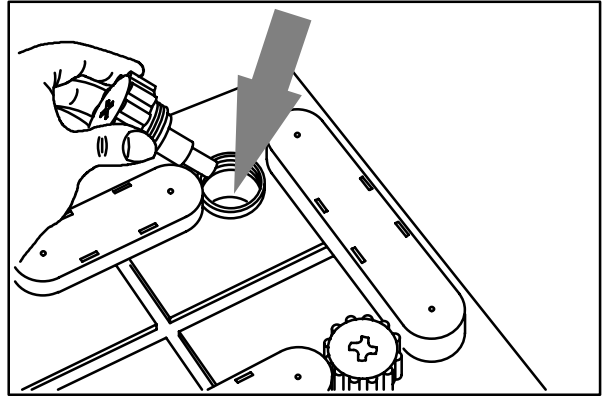
08248



08236

4. Check the water level in all the battery cells. If the level is low, add just enough distilled water to cover the plates. **DO NOT OVERFILL.** The batteries can overflow during charging due to expansion.

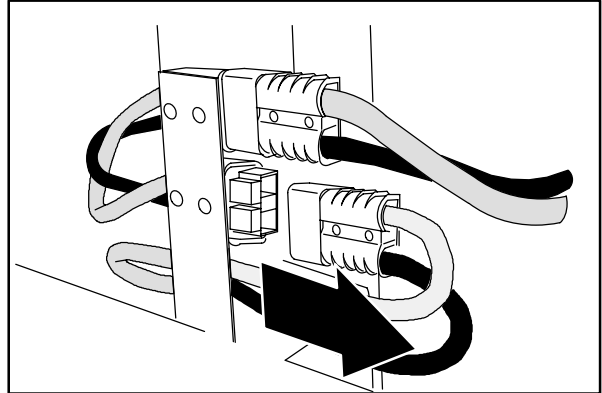
NOTE: Make sure the battery caps are in place while charging.



08247

5. Unplug the machine connector from the bottom connector.

NOTE: Leave the top connector in place.

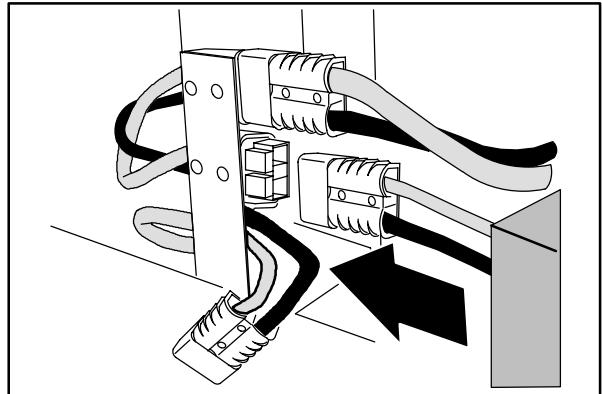


08242

6. Plug the charger connector into the bottom connector.



WARNING: Batteries emit hydrogen gas. Explosion or fire can result. Keep sparks and open flame away. Keep covers open when charging.

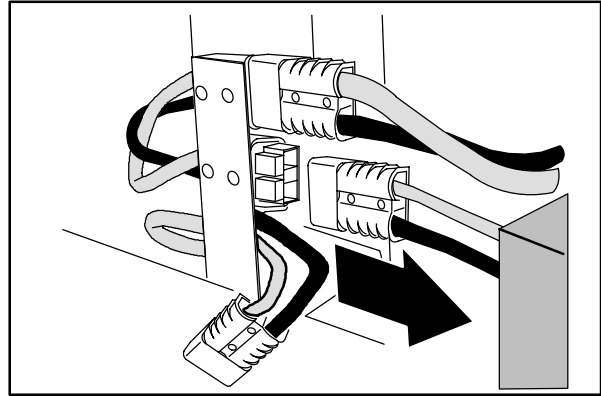


08239

7. The TENNANT charger will start automatically. When the batteries are fully charged, the TENNANT charger will automatically turn off.

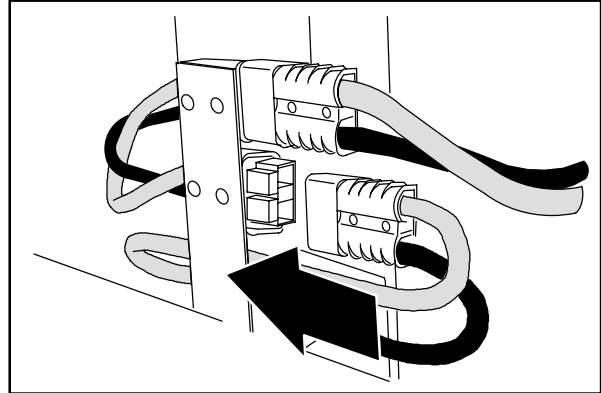
MAINTENANCE

8. Unplug the charger connector from the bottom connector on the machine.
9. Check the electrolyte level in each battery cell. Add just enough distilled water to bring the electrolyte level up to the fill rings.



08240

10. Plug the machine connector into the bottom connector.
11. Close the side door, battery cover, and lower the seat.

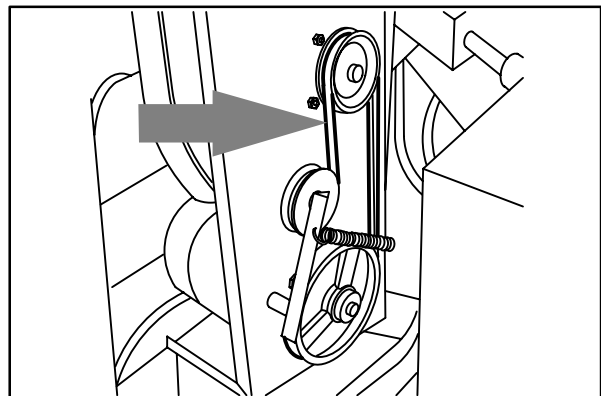


10957

BELTS AND CHAINS

VACUUM FAN DRIVE BELT

Check the vacuum fan belt every 200 hours for wear. The spring idler keeps tension on the belt.

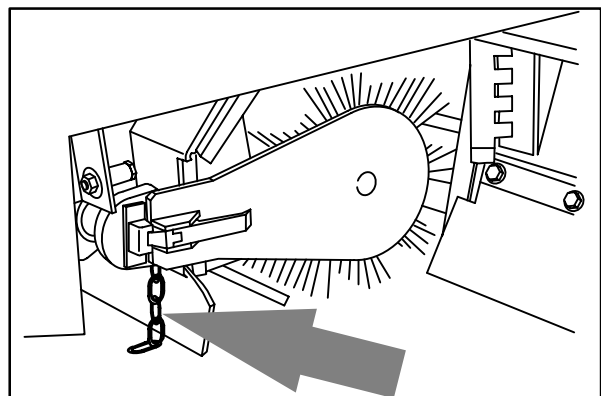


08290

STATIC DRAG CHAIN

A static drag chain prevents the buildup of static electricity in the machine. The chain is attached to the machine by a rear main brush skirt retaining bolt.

Make sure the chain is touching the floor at all times.



08009

DEBRIS HOPPER

HOPPER DUST FILTER

The dust filter filters the air pulled up from the hopper. The dust filter is equipped with a shaker to remove the accumulated dust particles. The dust filter shaker is operated by the filter shaker switch.

Shake the dust filter before emptying the hopper and at the end of every work shift. Check and clean or replace the dust filter every 100 hours of operation.

To clean the dust filter, use one of the following methods:

SHAKING – Press the filter shaker switch.

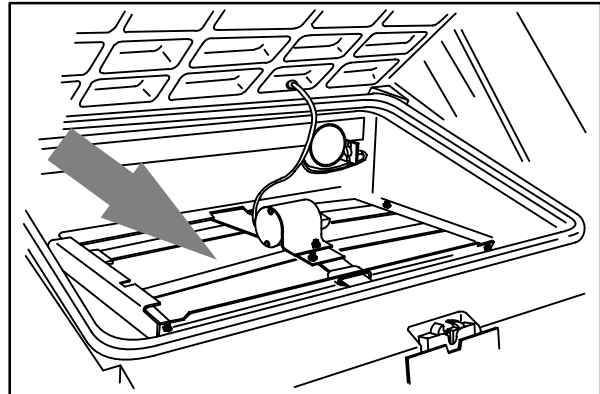
TAPPING – Tap the filter gently on a flat surface with the dirty side down. Do not damage the edges of the filter element or the filter will not seat properly in the filter frame.

AIR – Blow air through the dust filter opposite the direction of the arrows. This may be done with the dust filter in the machine. Always wear eye protection when using compressed air.

FOR SAFETY: When servicing machine, wear eye and ear protection when using pressurized air or water.

WATER – Soak the dust filter in a water and mild detergent solution. Rinse the dust filter until it is clean. Air dry the wet dust filter; do not use compressed air.

NOTE: Be sure the dust filter is dry before reinstalling it in the machine.



08010

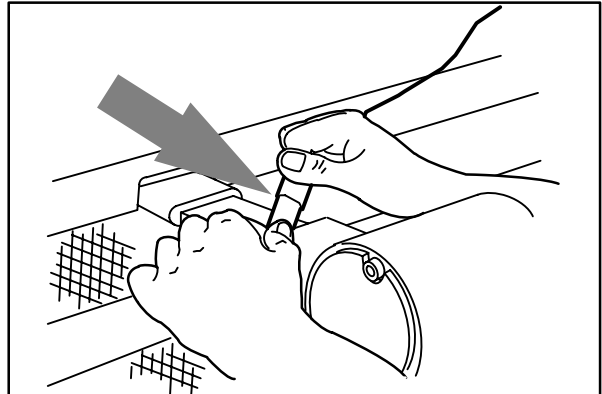
MAINTENANCE

TO REPLACE HOPPER DUST FILTER

1. Turn the machine power off and set the machine parking brake.

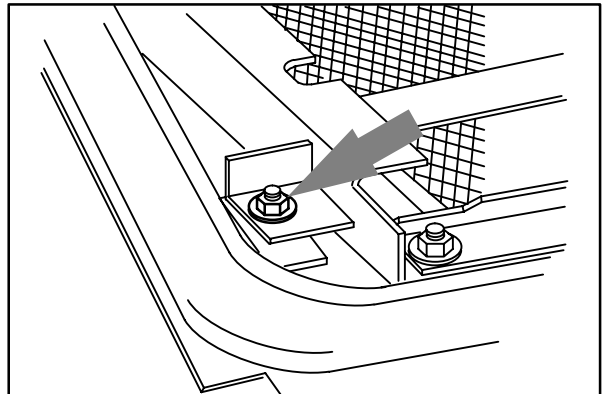
FOR SAFETY: Before leaving or servicing machine; stop on level surface, set parking brake, turn off machine and remove key.

2. Open the hopper cover.
3. Disconnect the shaker motor wire connectors.



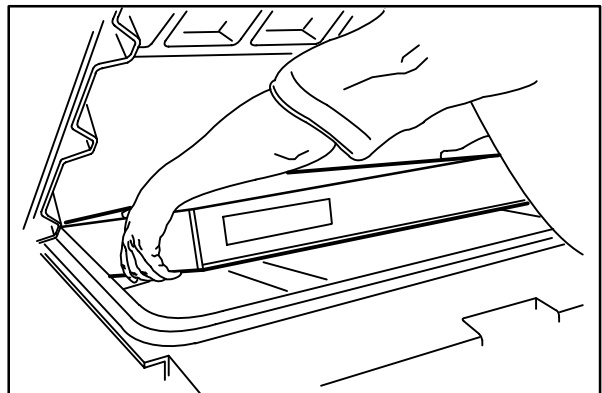
08011

4. Remove the four retaining nuts from the filter shaker frame.
5. Pull the filter shaker frame out of the hopper.



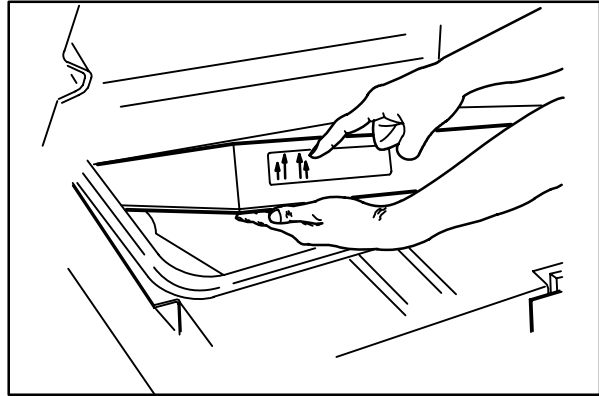
08014

6. Lift the dust filter element out of the hopper insert.
7. Clean or discard the dust filter as required.



08012

8. Put the cleaned or new dust filter in the hopper insert with the arrows pointing up.
9. Put the shaker frame on top of the panel filter.
10. Install the four retaining nuts and tighten.
11. Connect the shaker motor wire connectors.

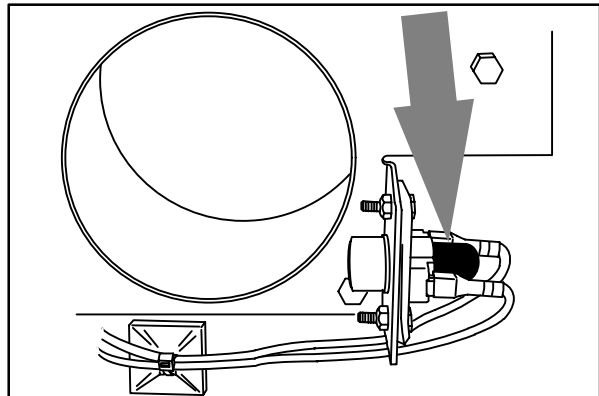


08013

THERMO SENTRY

The Thermo Sentry senses the temperature of the air pulled up from the hopper. If there is a fire in the hopper, the Thermo Sentry stops the vacuum fan and cuts off the air flow.

Reset the Thermo Sentry by pushing in its reset button.



08015

BRUSHES

MAIN BRUSH

The main brush is cylindrical and spans the width of the machine, sweeping debris into the hopper.

Check the brush daily for wear or damage. Remove any string or wire tangled on the main brush, main brush drive hub, or main brush idler hub.

Check the main brush pattern daily. The pattern should be 50 to 75 mm (2.0 to 3.0 in) wide with the main brush in the **Down** position. Adjust the main brush pattern by turning the main brush pressure knob located next to the brush position lever.

Rotate the main brush end-for-end every 50 hours of operation for maximum brush life and best sweeping performance.

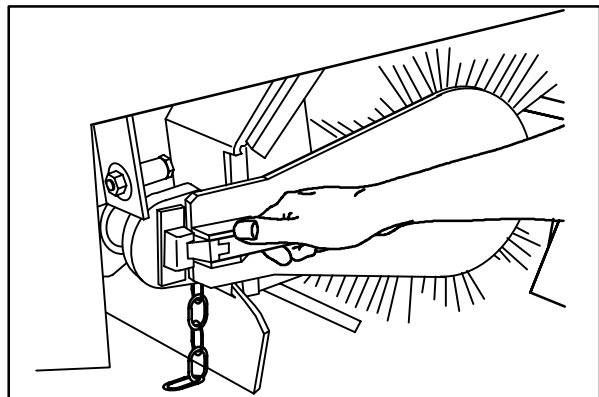
Replace the main brush when the remaining bristles measure 30 mm (1.25 in) in length.

TO REPLACE MAIN BRUSH

1. Turn the machine power off and set the machine parking brake.

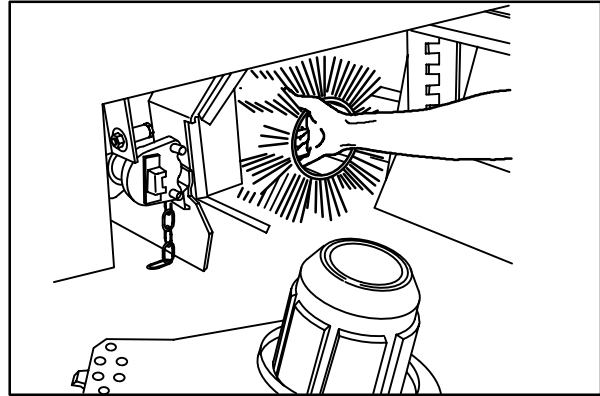
FOR SAFETY: Before leaving or servicing machine; stop on level surface, set parking brake, turn off machine and remove key.

2. Raise the main brush.
3. Open the right side main brush access door.
4. Unlatch and remove the brush idler plate.

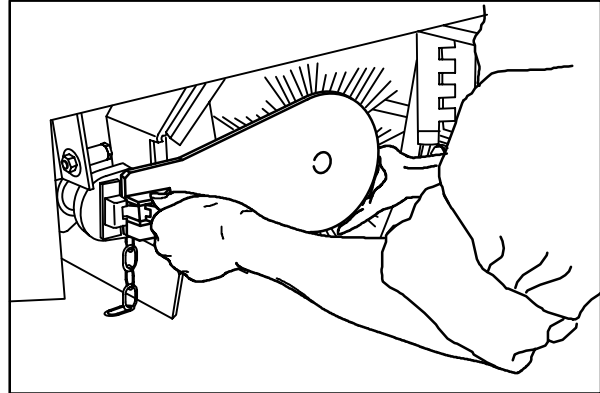


08016

5. Grasp the main brush; pull it off the brush drive plug and out of the main brush compartment.
6. Put the new or rotated end-for-end main brush on the floor next to the access door.
7. Slide the main brush onto the drive plug. Rotate the brush until it engages the drive plug, and push it all the way onto the plug.
8. Slide the main brush idler plate plug onto the main brush.
9. Latch the idler plate onto the machine frame.
10. Close the right side main brush access door.



08017



08018

TO CHECK AND ADJUST MAIN BRUSH PATTERN

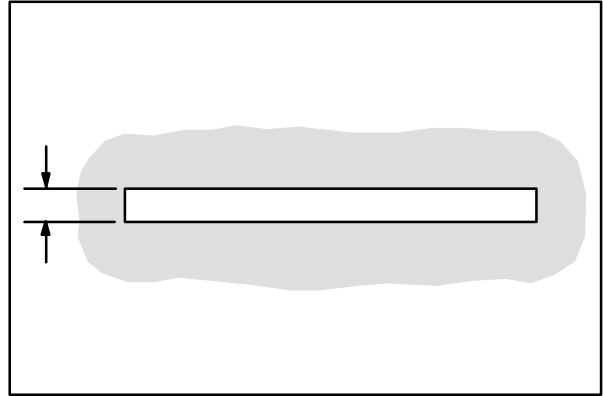
1. Apply chalk, or some other material that will not blow away easily, to a smooth, level floor.
2. Raise the side brush and main brush and position the main brush over the chalked area.
3. Start the main brush.
4. Lower the main brush for 15 to 20 seconds while keeping a foot on the brakes to keep the machine from moving. This will lower the rotating main brush.

NOTE: If chalk or other material is not available, allow the brushes to spin on the floor for two minutes. A polish mark will remain on the floor.

5. Raise the main brush.
6. Stop the main brush.
7. Drive the machine off the test area.

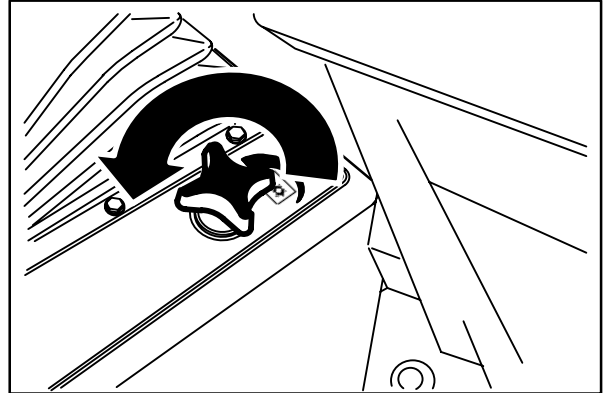
MAINTENANCE

8. Observe the width of the brush pattern. The proper brush pattern width is 50 to 75 mm (2.0 to 3.0 in).



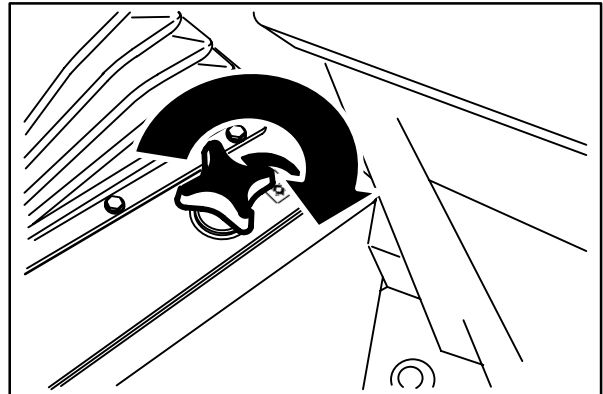
00582

9. To increase the width of the main brush pattern, turn the main brush down pressure knob counter-clockwise.



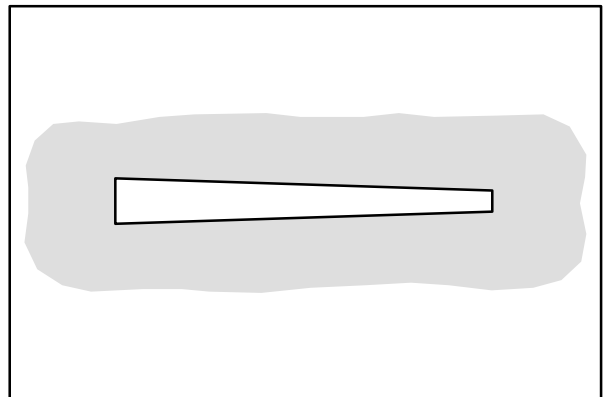
07787

To decrease the width of the main brush pattern, turn the main brush down pressure knob clockwise.



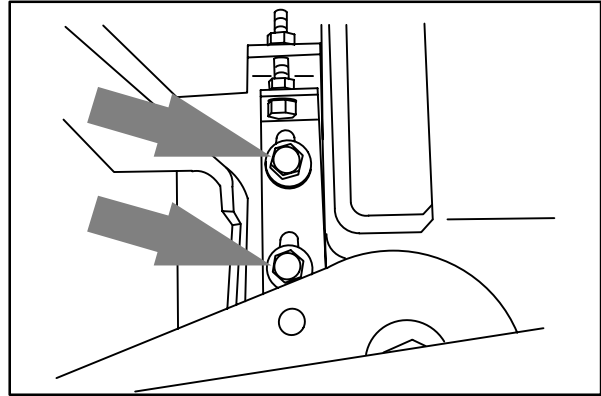
07788

If the main brush pattern is tapered, more than 15 mm (0.5 in) on one end than the other, adjust the taper with the taper adjustment bracket at the drive end of the brush.



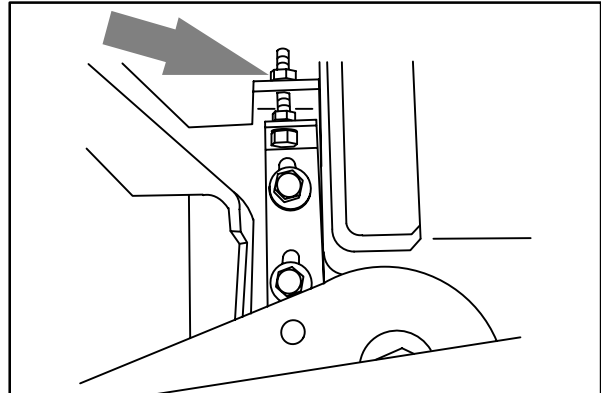
00601

- A. Loosen the bracket mounting bolts.



08216

- B. Turn the taper adjustment nut counter-clockwise to increase the pattern width at the brush drive end, and clockwise to decrease the pattern width at the brush drive end. Tighten the mounting bolts.
- C. Check the main brush pattern and readjust as necessary. Then adjust the width of the main brush pattern.



08215

SIDE BRUSH

The side brush sweeps debris along edges into the path of the main brush.

Check the brush daily for wear or damage. Remove any string or wire found tangled on the side brush or side brush drive hub.

Check the side brush pattern daily. One-half of the side brush bristles should contact the floor when the brush is in motion. Adjust the side brush pattern by the side brush down pressure knob. Turn the knob counter-clockwise to increase the brush contact with the sweeping surface, and clockwise to decrease the brush contact with the sweeping surface.

The side brush should be replaced when it no longer sweeps effectively for your application. A guideline length is when the remaining bristles measure 50 mm (2 in) in length. You may change the side brush sooner if you are sweeping light litter, or wear the bristles shorter if you are sweeping heavy debris.

MAINTENANCE

TO REPLACE SIDE BRUSH

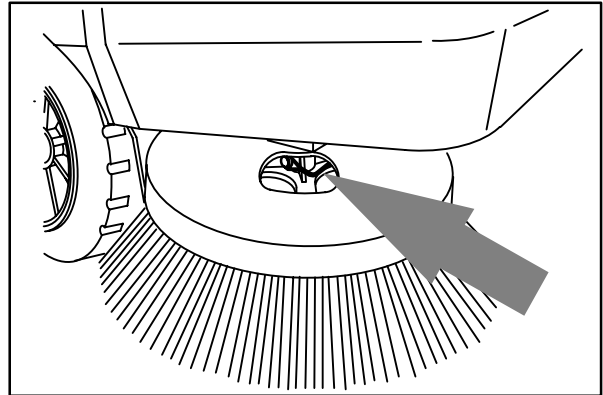
1. Empty the debris hopper.
2. Set the machine parking brake.
3. Turn the machine power off.

FOR SAFETY: Before leaving or servicing machine; stop on level surface, set parking brake, turn off machine and remove key.

4. Raise the side brush.
5. Remove the side brush retaining pin from the side brush drive shaft by pulling the pin keeper off over the end of the pin.
6. Slide the side brush off the side brush drive shaft.

NOTE: Remove the drive hub and put it on the new brush if one is not installed.

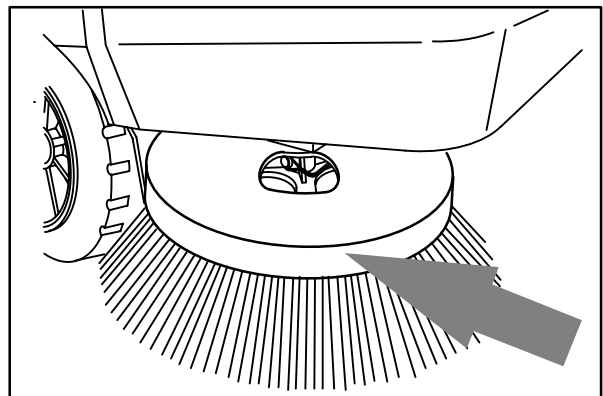
7. Slide the new side brush onto the side brush drive shaft.
8. Insert the side brush retaining pin through the side brush hub and shaft.
9. Secure the pin by clipping the pin keeper over the end of the pin.
10. Disengage the hopper support bar and lower the hopper.
11. Adjust the side brush pattern with the side brush down pressure knob.



08019

SIDE BRUSH GUARD

Rotate the side brush guard 90° every 200 hours of operation. Replace the brush guard after all four sides have been used.



08049

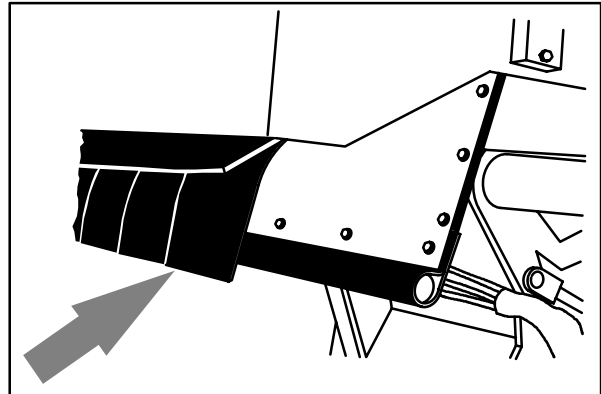
SKIRTS AND SEALS

HOPPER LIP SKIRTS

The hopper lip skirts are located on the bottom rear of the hopper. The skirts float over debris and help deflect that debris into the hopper. The hopper lip skirts consist of five bottom lip segments and two additional side lip segments.

Check the hopper lip skirts for wear or damage daily.

Replace the hopper lip skirts when they no longer touch the floor.

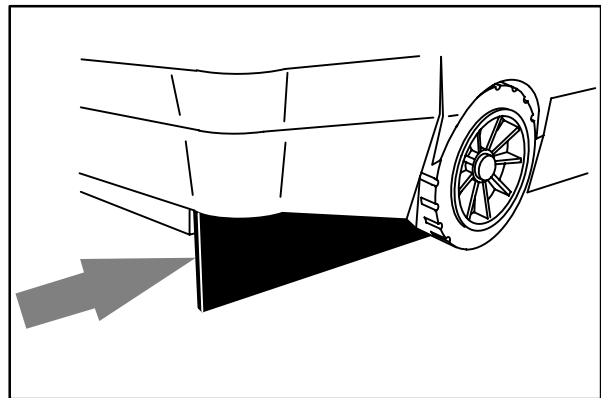


08020

HOPPER SIDE SKIRT

The hopper side skirt is located on the left side of the hopper.

Check the hopper lip skirts for wear or damage daily.



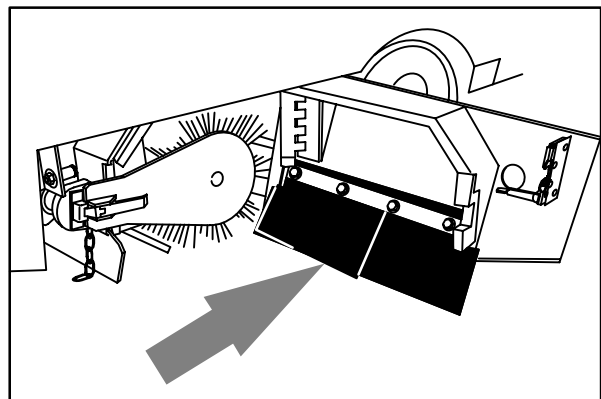
08214

BRUSH DOOR SKIRTS

The brush door skirts are located on the bottom of each of the two main brush doors. The long skirt should clear the floor by 3 to 6 mm (0.12 to 0.25 in). The inner skirt should be angled so that the rear corner touches the floor, and the front corner is 6 mm (0.25 in) above the corner of the long skirt.

Check the skirts for wear or damage and adjustment daily.

NOTE: The brush door skirts have slotted holes to allow for a ground clearance adjustment. The door must be closed for proper adjustment.



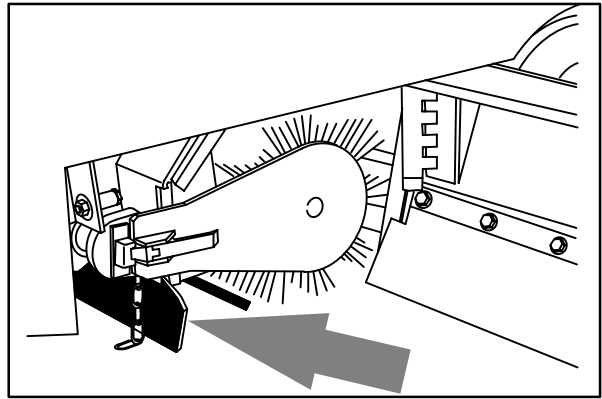
08001

MAINTENANCE

REAR SKIRTS

The two rear skirts are located on the bottom rear of the main brush compartment. The vertical skirt should clear the floor up to 5 mm (0.25 in) in dusty conditions, and touch the floor otherwise. The recirculation skirt is self-adjusting.

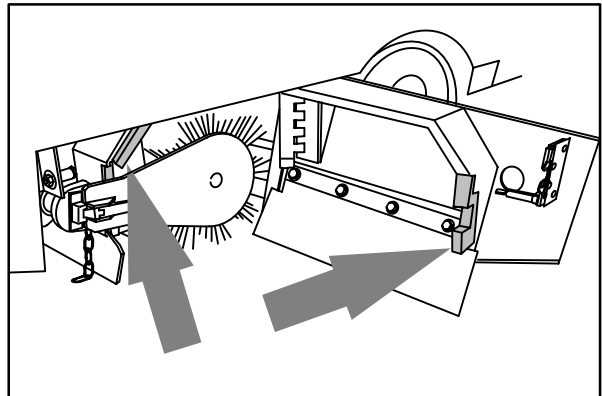
Check the skirts for wear or damage and adjustment daily.



BRUSH DOOR SEALS

The brush door seals are located on both main brush doors and on corresponding portions of the main frame.

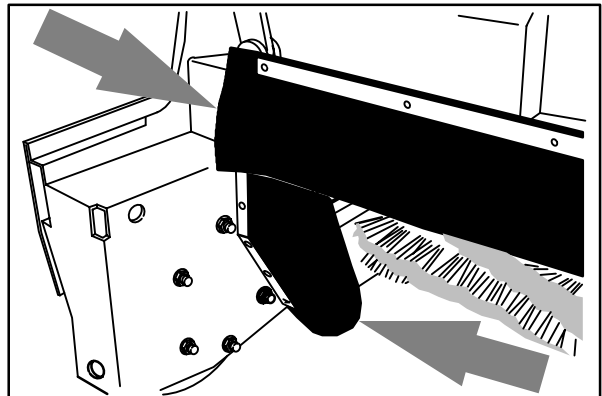
Check the seals for wear or damage every 100 hours of operation.



HOPPER SEALS

The hopper seals are located on the top and side portions of the machine frame that contact the hopper.

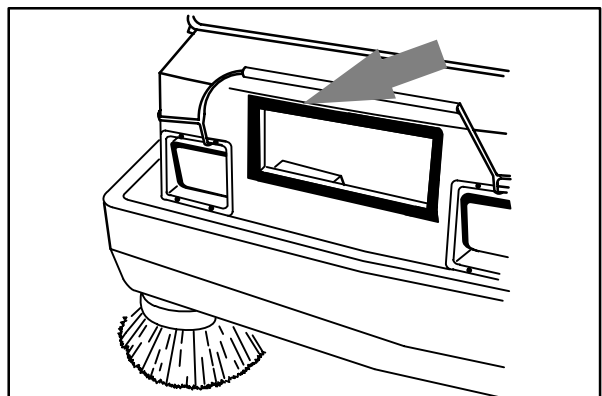
Check the seals for wear or damage every 100 hours of operation.



HOPPER INSPECTION DOOR SEAL

The hopper inspection door seal is located on the hopper and seals the front of the debris hopper.

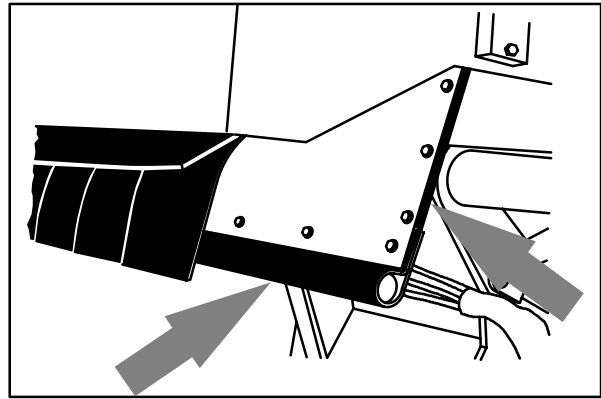
Check the seal for wear or damage every 100 hours of operation.



HOPPER DOOR SEALS

The hopper door seals are located on the hopper door. They seal the hopper when the hopper door is closed.

Check the seals for wear or damage every 100 hours of operation.

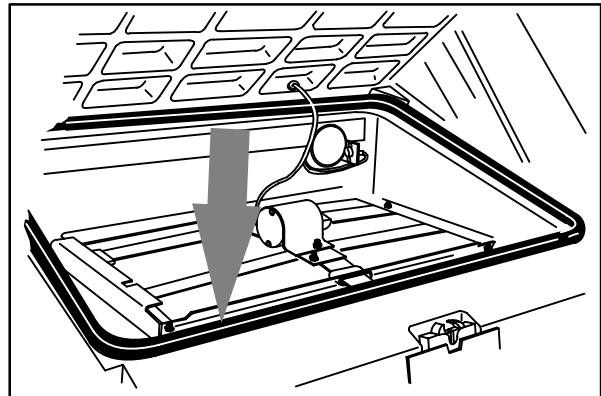


08025

HOPPER COVER SEAL

The hopper cover seal is located on the top edges of the hopper insert. It seals the hopper filter compartment.

Check the seal for wear or damage every 100 hours of operation.

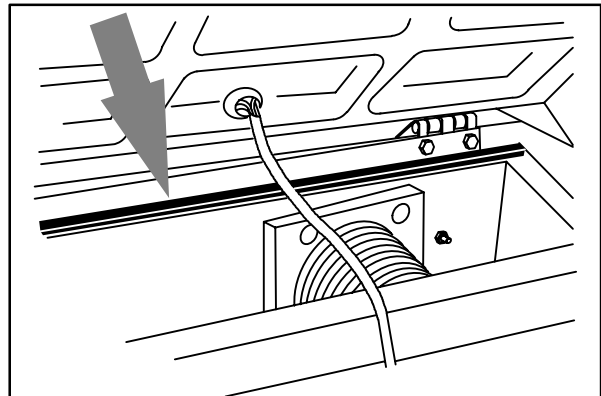


08026

HOPPER DUST SEAL

The hopper dust seal is located under the hopper insert along the top of the hopper.

Check the seal for wear or damage every 100 hours of operation. You can reach the seal by removing the hopper insert.

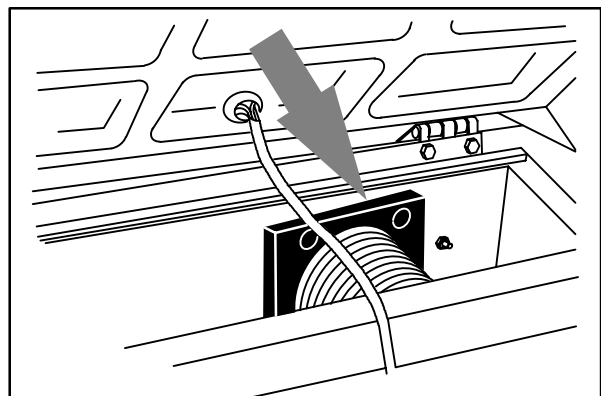


08153

HOPPER VACUUM FAN SEAL

The hopper vacuum fan seal is mounted on the inside of the hopper around the vacuum fan inlet.

Check the seal for wear or damage every 100 hours of operation. You can reach the seal by removing the hopper insert.



08150

BRAKES AND TIRES

SERVICE BRAKES

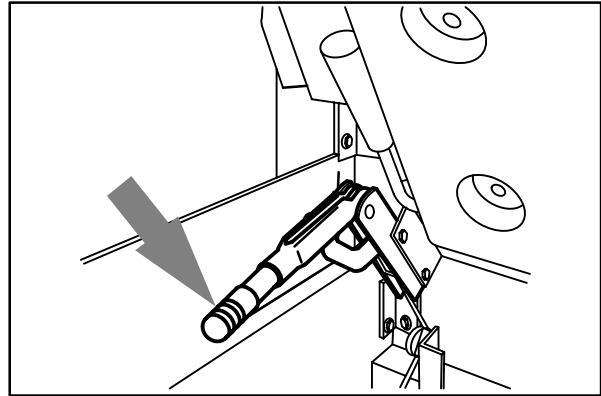
The mechanical service brakes are located on the front wheels. The brakes are operated by the foot brake pedal and connecting cables.

Check the brake adjustment every 200 hours of operation. The brake pedal should not travel more than 25 mm (1 in) to fully engage the brakes.

PARKING BRAKE

The parking brake is set with the parking brake lever that activates the service brakes.

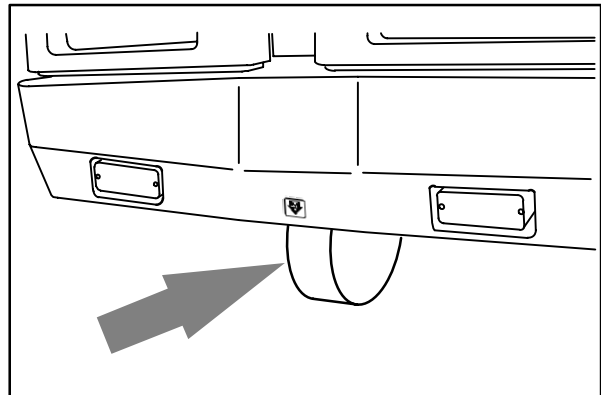
Adjust the parking brake whenever it becomes very easy to set the parking brake, when the machine rolls after setting the parking brake, and every 200 hours of operation. The parking brake may be tightened by turning the knurled knob on the end of the parking brake clockwise.



08924

TIRES

All the tires on the machine are solid. The tires should be inspected for wear and damage every 100 hours of operation.



08235

REAR WHEEL

If replacing the rear wheel, torque the rear wheel nuts in a star pattern to 122 to 150 Nm (90 to 110 ft lb).

PUSHING OR TOWING MACHINE

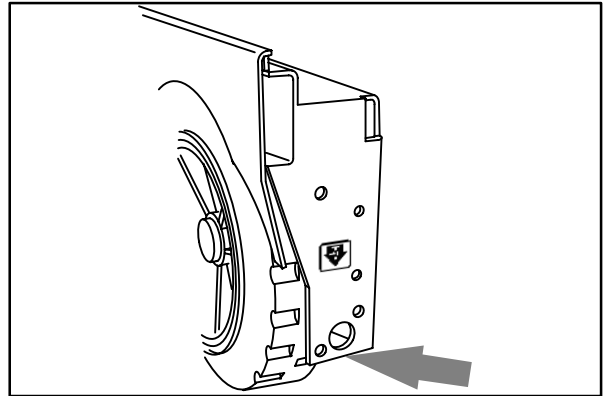
You can push the machine from the front or rear, and tow it only from the rear with a dolly placed under the rear wheel.

ATTENTION! Do not push or tow the machine without placing the rear wheel on a dolly or the machine propelling system may be damaged.

MACHINE JACKING

You can jack up the machine for service at the designated locations. Use a jack of adequate capacity and good working condition. Always stop the machine on a flat, level surface and block the tires before jacking the machine up.

The front jacking locations are on the flat bottom edge of the front of the machine frame next to the front tires.

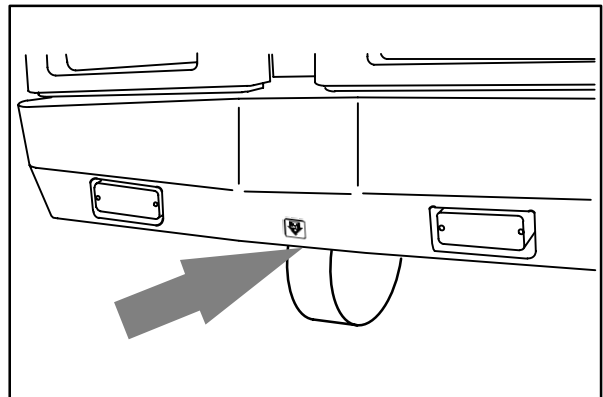


08029

The rear jacking location is the middle flat bottom edge of the rear bumper between the taillights.

FOR SAFETY: When servicing machine, block machine tires before jacking machine up.

FOR SAFETY: When servicing machine, jack machine up at designated locations only. Block machine up with jack stands.



08243

ELECTRIC MOTORS

The carbon brushes on the electric accessory motor should be inspected after every 400 hours of machine operation. The carbon brushes on the electric propelling motor should be inspected after every 800 hours of machine operation.

STORING MACHINE

Before storing the machine for an extended period of time, the machine needs to be prepped to lessen the chance of rust, sludge, and other undesirable deposits from forming. Contact TENNANT service personnel.

SPECIFICATIONS**GENERAL MACHINE DIMENSIONS/CAPACITIES**

Item	Dimension/capacity
Length	2360 mm (93 in)
Width	1590 mm (62.5 in)
Height	1475 mm (58 in)
Height with overhead guard	2080 mm (82 in)
Height with overhead guard and hazard light	2270 mm (89.5 in)
Track	1345 mm (53 in)
Wheelbase	1135 mm (44.75 in)
Main brush diameter	355 mm (14 in)
Main brush length	1145 mm (45 in)
Side brush diameter	585 mm (23 in)
Sweeping path width	1145 mm (45 in)
Sweeping path width with side brush	1525 mm (60 in)
Main brush pattern width	50 to 75 mm (2.0 to 3.0 in)
Hopper weight capacity	545 kg (1200 lb)
Hopper volume capacity	396 L (14 cu ft)
Dust filter area	6.9 m ² (74 sq ft)
GVWR	2812 kg (6200 lb)
Ceiling height minimum dumping clearance	2745 mm (9 ft)

GENERAL MACHINE PERFORMANCE

Item	Measure
Maximum forward speed	8.5 kmh (5.3 mph)
Maximum reverse speed	4.8 kmh (3.0 mph)
Minimum aisle turn width, left	2870 mm (113 in)
Minimum aisle turn width, right	4725 mm (186 in)
Maximum rated climb and descent angle	6°

POWER TYPE

Type	Quantity	Volts	Ah Rating	Weight
Batteries	2	18	600 @ 6 hr rate	375 kg (830 lb)

Type	VDC	Amp	Hz	Phase	VAC
Chargers	36	120	60	1	480
	36	120	60	3	480
	36	120	50	1	220
	36	120	50	3	480

STEERING

Type	Power source	Emergency steering
Rear wheel, hydraulic cylinder and rotary valve controlled	Hydraulic accessory pump	Manual

HYDRAULIC SYSTEM

System	Capacity	Fluid Type
Hydraulic reservoir	26.5 L (7 gal)	TENNANT part no. 65870
Hydraulic total	34 L (9 gal)	
Propelling gearbox	2.6 L (2.7 qt)	SAE 90 Gear weight lubricant

BRAKING SYSTEM

Type	Operation
Service brakes	Mechanical drum brakes (2), one per front wheel, cable actuated
Parking brake	Utilize service brakes, cable actuated

TIRES

Location	Type	Size
Front (2)	Solid	5 x 18 in
Rear (1)	Solid	6 x 19 in

INDEX

A

Aisle turn 64

B

Batteries 47
 Charger specifications 65
 Charging 48–51
 Check charge level 36
 Discharge indicator 19
 Specifications 65
 Battery, Cover latch 24
 Battery discharge indicator 19
 Bearings
 Front wheel 45
 Rear wheel support 44
 Belts 50
 Vacuum fan drive 50
 Brake pedal 11
 Brakes 62
 Parking, Adjustment 62
 Service 62
 System specifications 65
 Brush pressure gauge 12
 Brushes 29–31, 36, 54–59
 Adjusting main brush taper 56–58
 Checking main brush pattern 55–58
 Checking side brush pattern 57
 Door latch 24
 Door seals 60
 Door skirts 59
 Main brush 54
 Main brush bristle length 54
 Replacing main brush 54–56
 Replacing side brush 58
 Side brush 57–59
 Side brush bristle length 57
 Button, Horn 12

C

Capacities 64
 Chains 50
 Static drag 50
 Circuit breakers 24
 Clogged filter light 18

Control panel 18–21
 Clogged filter light 18
 Filter shaker switch 20
 Hazard light switch 19
 Hopper door light 18
 Hopper temperature light 18
 Hourmeter 19
 Main brush shut down light 18
 Operating lights switch 19
 Vacuum fan switch 20

Controls 9–27
 Brake pedal 11
 Circuit breakers 24
 Clogged filter light 18
 Directional pedal 10
 Filter shaker switch 20
 Hazard light switch 19
 Hopper door lever 14
 Hopper door light 18
 Hopper lift lever 15
 Hopper temperature light 18
 Horn button 12
 Hourmeter 19
 Latches 24
 Main brush and side brush lever 13
 Main brush down pressure knob 17
 Main brush position lever 16
 Main brush shut down light 18
 On-off switch 22
 Operating lights switch 19
 Operation 10–26
 Parking brake lever 11
 Power kill switch 17
 Side brush down pressure knob 23
 Side brush position lever 21
 Steering column tilt lever 23
 Steering wheel 20
 Symbols 7–9
 Vacuum fan switch 20

Covers
 Battery, Latch 24
 Hopper
 Latch 24
 Seals 61

D		
Debris hopper	51–54	
Dimensions	64	
Directional pedal	10	
Disengaging hopper support bar	38–40	
Doors		
Brush		
Latch	24	
Seals	60	
Skirts	59	
Grille, Latch	24	
Hopper, Seals	61	
Hopper Inspection, Seal	60	
Side, Latch	24	
Dust filter	51	
Changing	52	
Cleaning	51	
E		
Electric motors	63	
Electrical		
Circuit breakers	24	
On-off switch	22	
Emptying the hopper	33–35	
Engaging hopper support bar	37–39	
F		
Filter shaker switch	20	
G		
Gauge, Brush pressure	12	
Grease fittings		
Rear wheel support bearing	44	
Steering link	44	
H		
Hazard light switch	19	
Hopper	51–54	
Changing dust filter	52	
Clogged filter, Light	18	
Cover latch	24	
Cover seal	61	
Disengaging hopper support bar	38–40	
Door lever	14	
Door light	18	
Door seals	61	
Dust filter	51	
Dust seal	61	
Engaging hopper support bar	37–39	
Filter cleaning	51	
Filter shaker	20	
Inspection door seal	60	
Lift	15	
Lip skirts	59	
Seals	60	
Side skirt	59	
Support bar	26	
Temperature, Light	18	
Thermo-Sentry	53	
Thermo-sentry	18	
Vacuum fan seal	61	
Hopper door, Operate	14	
Hopper door lever	14	
Hopper door light	18	
Hopper lift lever	15	
Hopper support bar	26	
Hopper temperature light	18	
Horn button	12	
Hourmeter	19	
How the machine works	27	
Hydraulic fluid	46	
Hydraulic fluid reservoir	45	
Hydraulic hoses	47	
Hydraulics	45–47	
Fluid	46–48	
Fluid filter	46	
Fluid level	5, 45	
Hoses	47	
Reservoir	45	
System specifications	65	
I		
Indicator, Battery discharge	19	
J		
Jack points	63–65	
K		
Knobs		
Main brush down pressure	17	
Side brush down pressure	23	

L

Latches	24
Battery cover	24
Grille doors	24
Hopper cover	24
Main brush doors	24
Side door	24
Levers	
Hopper door	14
Hopper lift	15
Main brush and side brush	13
Main brush position	16
Parking brake	11
Side brush position	21
Steering column tilt	23
Lights	
Clogged filter	18
Hazard light switch	19
Hopper door	18
Hopper temperature	18
Main brush shut down	18
Operating lights switch	19
Lubrication	44
Front wheel bearings	45
Propelling gearbox	44
Rear wheel support bearing	44
Steering link	44

M

Machine components	6
Machine jacking	63–65
Machine leaks	27, 36
Main brush	29–31, 54–58
Adjust brush taper	56–58
Bristle length	54
Checking brush pattern	55–58
Door latch	24
Door seals	60
Door skirts	59
Down pressure	17
Lever	13
Maintenance	29, 54
Position	16
Replacing	54–56
Main brush and side brush lever	13
Main brush down pressure knob	17
Main brush position lever	16
Main brush shut down light	18

Maintenance	42–63
Intervals	42–44
Recommended	5
Maintenance chart	42–44
Motors, Electric	63

O

On-off switch	22
Operating lights switch	19
Operation on inclines	39
Operator Responsibility	5
Operator seat	25
Options	40–48
Directional pedal angle	11
Hazard light switch	19
Power kill switch	17
Tie-downs	40

P

Parking brake	62
Adjustment	62
Parking brake lever	11
Pedals	
Brake	11
Directional	10
Toe angle	11
Post-operation checklist	36
Power kill switch	17
Pre-operation checklist	27
Propelling gearbox, Lubrication	44
Pushing machine	62

R

Rear Wheel	62
------------------	----

S

Safety	
Disengaging hopper support bar	38–40
Engaging hopper support bar	37–39
Hopper support bar	26
Labels	4
Precautions	3
Seals	59–63
Brush doors	60
Hopper	60
Hopper cover	61
Hopper door	61
Hopper dust	61
Hopper inspection door	60
Hopper vacuum fan seal	61
Seat	25
Adjustments	25
Lift	26
Service records	36
Side brush	30, 57–59
Bristle length	57
Checking brush pattern	57
Down pressure	23
Lever	13
Position	21
Replacing	58
Side brush down pressure knob	23
Side brush guard	58
Side brush position lever	21
Skirts	36, 59–61
Brush doors	59
Hopper Lip	59
Hopper side	59
Rear	60
Specifications	64–66
Braking system	65
Hydraulic system	65
Machine capacities	64
Machine dimensions	64
Machine performance	64
Power type	65
Propelling gearbox	65
Steering	65
Tires	65
Starting the machine	28–30
Static drag chain	50

Steering, Specifications	65
Steering column tilt lever	23
Steering wheel	20
Stop sweeping	32
Stop the machine	35–37
Storing machine	63
Sweeping	30–32
Sweeping and brush information	29–31
Switches	
Filter shaker	20
Hazard light	19
On-off	22
Operating lights	19
Power kill	17
Vacuum fan	20

T

Thermo-Sentry™	53
Thermo-Sentry™	18
Tie-downs	40
Tires	62–64
Specifications	65
Towing machine	62
Transporting machine, Tie-downs	40
Travel speed	64
Troubleshooting	41

V

Vacuum fan, Belt	50
Vacuum fan switch	20

W

Wheel, Rear	62
-------------	----

