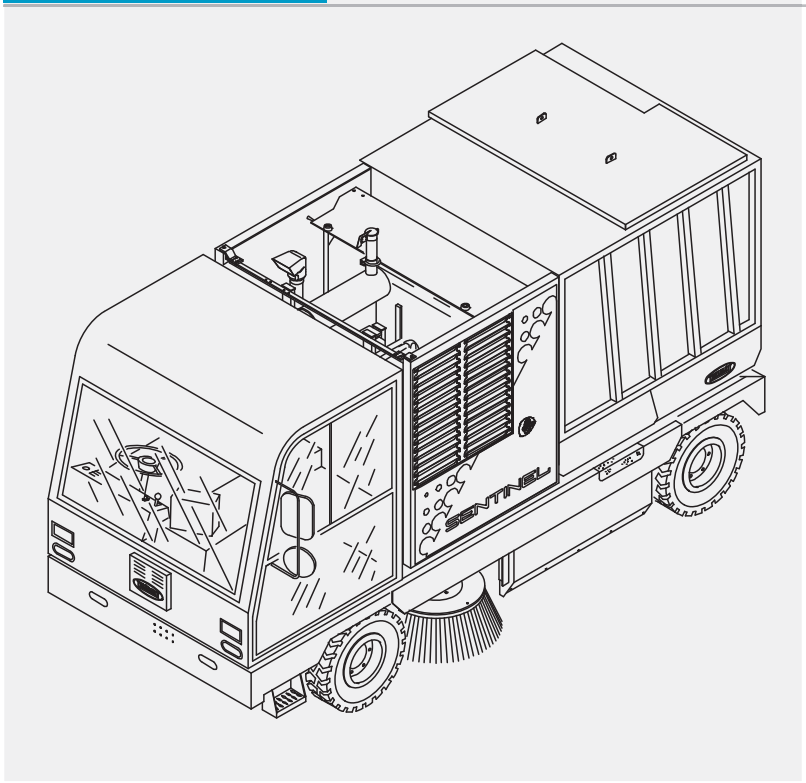
SENTINEL®
(Diesel)



Sweeper
Operator Manual

Machine Serial Number Range
(S/N 011000-)

Tennant True® Parts

North America / International

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9018513
Rev. 01 (02-2020)

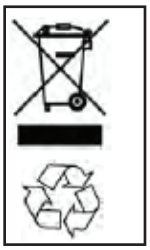
INTRODUCTION

This manual is furnished with each new model. It provides necessary operation and 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 machine maintenance instructions provided.
- The machine is maintained with manufacturer supplied or equivalent parts.



PROTECT THE ENVIRONMENT

Please dispose of packaging materials, used components such as batteries and fluids in an environmentally safe way according to local waste disposal regulations.

Always remember to recycle.

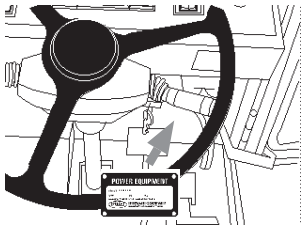
MACHINE DATA

Please fill out at time of installation for future reference.

Model No. - _____

Serial No. - _____

Installation Date - _____



INTENDED USE

The Sentinel is an industrial rider machine designed to sweep hard surfaces (concrete, asphalt, stone, synthetic, etc). Typical applications include industrial warehouses, manufacturing facilities, distribution facilities, stadiums, arenas, convention centers, parking facilities, transportation terminals, and construction sites. Do not use this machine on soil, grass, artificial turf, or carpeted surfaces. This machine can be used both indoors and outdoors, but ensure there is adequate ventilation if used indoors. Do not use this machine other than described in this Operator Manual.

Tennant Company
PO Box 1452
Minneapolis, MN 55440
Phone: (800) 553-8033
www.tennantco.com

CONTENTS

IMPORTANT SAFETY INSTRUCTIONS - SAVE THESE INSTRUCTIONS

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

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

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

The following information signals potentially dangerous conditions to the operator. Know when these conditions can exist. Locate all safety devices on the machine. Report machine damage or faulty operation immediately.

WARNING: Engine emits toxic gases. Severe respiratory damage or asphyxiation can result. Provide adequate ventilation. Consult with your regulatory agency for exposure limits. Keep engine properly tuned.

WARNING: High dump vertical clearance. Stay clear of overhead obstacles and power lines.

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

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

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

WARNING: Hopper door pinch point. Stay clear of hopper door.

WARNING: Brush linkage pinch point. Stay clear when linkage is moving.

WARNING: Side brush can move. Do not step on side brush.

WARNING: Conveyor throws debris. Conveyor pinch point. Stay clear when in operation.

WARNING: Machine nosy when using can wand. Hearing loss can result. Wear hearing protection.

WARNING: Flammable material can cause explosion or fire. Do not use flammable materials in tank. Only use water.

WARNING: Do not spray people or animals. Severe personal injury can result. Wear eye protection. Hold sprayer with two hands.

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

WARNING: This machine contains chemicals known to the state of California to cause cancer, birth defects, or other reproductive harm.

IRIS Telemetry - This machine may be equipped with technology that automatically communicates over the cellular network. If the machine will be operated where cell phone use is restricted because of concerns related to equipment interference, please contact a Tennant representative for information on how to disable the cellular communication functionality.

FOR SAFETY:

1. Do not operate machine:
   - Unless trained and authorized.
   - Unless operator manual is read and understood.
   - Unless mentally and physically capable of following machine instructions.
   - Under the influence of alcohol or drugs.
   - While using a cell phone or other types of electronic devices.
   - If not in proper operating condition.
   - With pads or accessories not supplied or approved by Tennant. The use of other pads may impair safety.
   - Without filters in place or with clogged filters.
   - In dusty environments without the vacuum fan on.
   - In areas where flammable vapors/liquids or combustible dusts are present.
   - In areas that are too dark to safely see the controls or operate the machine unless operating / headlights are turned on.
   - In flammable or explosive areas unless designed for use in those areas.
2. Before starting machine:
   - Check for fuel 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.
   - Check parking brake for proper operation.
   - Adjust seat and fasten seat belt.

3. Before starting machine:
   - Keep foot on brake and directional pedal in neutral

4. When using machine:
   - Use only as described in this manual.
   - Use brakes to stop machine.
   - Reduce speed when turning.
   - Go slow on inclines and slippery surfaces.
   - Do not pick up burning or smoking debris, such as cigarettes, matches or hot ashes.
   - Keep all parts of body inside operator station while machine is moving.
   - Always be aware of surroundings while operating machine.
   - Use care when reversing machine.
   - Move machine with care when hopper is raised.
   - Make sure adequate clearance is available before raising hopper.
   - Do not raise hopper when machine is on an incline.
   - Keep children and unauthorized persons away from machine.
   - Do not allow machine to be used as a toy.
   - Do not carry riders on machine.
   - Always follow safety and traffic rules.
   - Follow site safety guidelines when using machine.
   - Report machine damage or faulty operation immediately.

5. Before leaving or servicing machine:
   - Do not park near combustible materials, dust, gases, or liquids.
   - Stop on a level surface.
   - Set parking brake.
   - Turn off machine and remove key.

6. When servicing machine:
   - All work must be done with sufficient lighting and visibility.
   - Keep work area well ventilated.
   - Avoid moving parts. Do not wear loose clothing, jewelry and secure long hair.
   - Block machine tires before jacking machine up.
   - Jack machine up at designated locations only. Support machine with jack stands.
   - Use hoist or jack that will support the weight of the machine.
   - Do not push or tow the machine without an operator in the seat controlling the machine.
   - Do not power spray or hose off machine near electrical components.
   - Wear eye and ear protection when using pressurized air or water.
   - Disconnect battery connections before working on machine.
   - Keep all metal objects off batteries.
   - Avoid contact with battery acid.
   - Avoid contact with hot engine coolant.
   - Do not remove cap from radiator when engine is hot.
   - Allow engine to cool.
   - Keep flames and sparks away from fuel system service area. Keep area well ventilated.
   - Use cardboard to locate leaking hydraulic fluid under pressure.
   - All repairs must be performed by trained personnel.
   - Do not modify the machine from its original design.
   - Use Tennant supplied or approved replacement parts.
   - Wear personal protective equipment as needed and where recommended in this manual.

For Safety: wear hearing protection.

For Safety: wear protective gloves.

For Safety: wear eye protection.

For Safety: wear protective dust mask.

7. When loading/unloading machine onto/off truck or trailer:
   - Empty debris hopper before loading machine.
   - Drain tanks before loading machine
   - Use ramp, truck or trailer that will support the weight of the machine and operator.
   - Do not drive on a slippery ramp.
   - Use caution when operating on a ramp.
   - Do not load/unload on ramp inclines that exceed 11% grade.
   - Use winch. Do not drive the machine onto/off the truck or trailer unless the load height is 380 mm (15 in) or less from the ground.
   - Turn off machine and remove key.
   - Set parking brake after machine is loaded.
   - Turn off machine and remove key.
   - Block machine tires.
   - Tie machine down to truck or trailer.

The following safety labels are mounted on the machine in the locations indicated. Replace damaged / missing labels.

WARNING LABEL - Machine emits toxic gases. Serious injury or death can result. Provide adequate ventilation.

Located on upper console.

WARNING LABEL - High dump vertical distance. Stay clear of overhead obstructions and power lines.

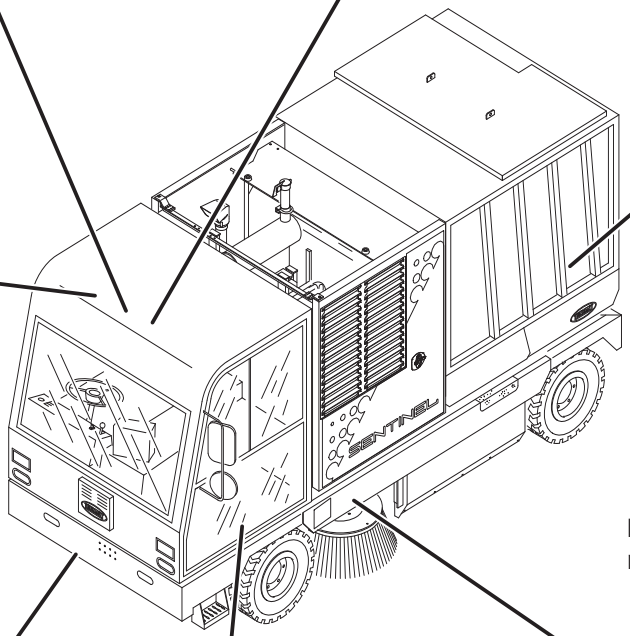
Located on upper console.

WARNING LABEL - Do not spray people or animals. Severe personal injury can result. Wear eye protection. Hold sprayer with two hands.

Located on frame of machine.

FOR SAFETY LABEL - Read manual before operating machine.

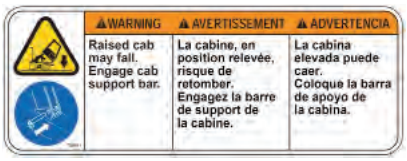
Located on upper console.



WARNING LABEL - Brush linkage pinch point. Stay clear when linkage is moving.

Located on front of machine.

WARNING LABEL - Raised cab may fall. Engage cab support bar.



Located below cab on frame.

WARNING LABEL - Side brush can move. Do not step on side brush.

Located above side brush(es).

WARNING LABEL - Raised hopper may fall. Engage hopper support pin.

Located on both sides of support pin. On low dump models, one is located on upper support cylinder. On high dump models, one is located on driver side of hopper lift.

WARNING LABEL - Conveyor throws debris. Conveyor pinch point. Stay clear when in operation.

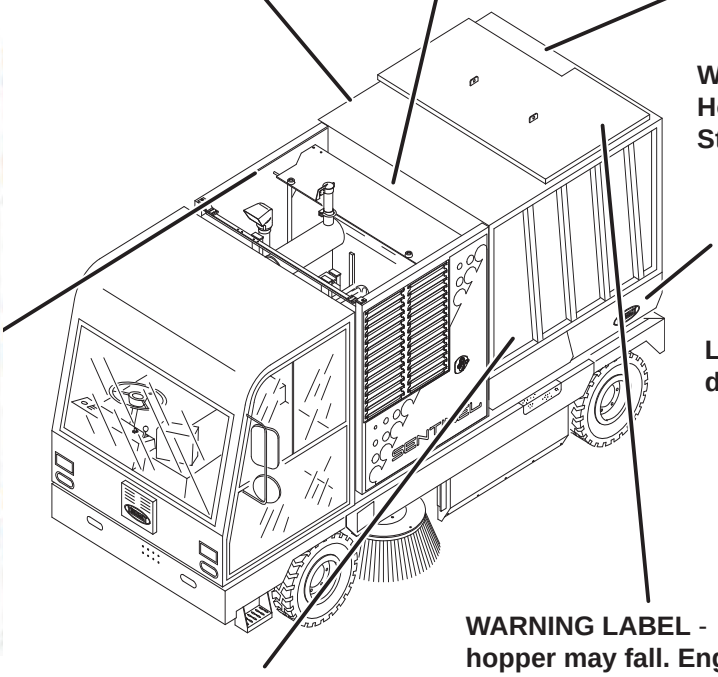
Located on back of conveyor.

WARNING LABEL - Machine noisy when using vac wand. Hearing loss can result. Wear hearing protection.

Located on vacuum wand.

WARNING LABEL - Flammable materials can cause explosion or fire. Do not use flammable materials in tank. Only use water.

Located on driver side below water fill spout.



WARNING LABEL - Hopper door pinch point. Stay clear of hopper door.

Located below hopper door.

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

Located on side of hopper lift (High Dump).

WARNING LABEL - Raised hopper may fall. Engage hopper support bar.

Located on both sides of support bar, on rear center of hopper lift, and on both sides of hopper lift (High Dump).

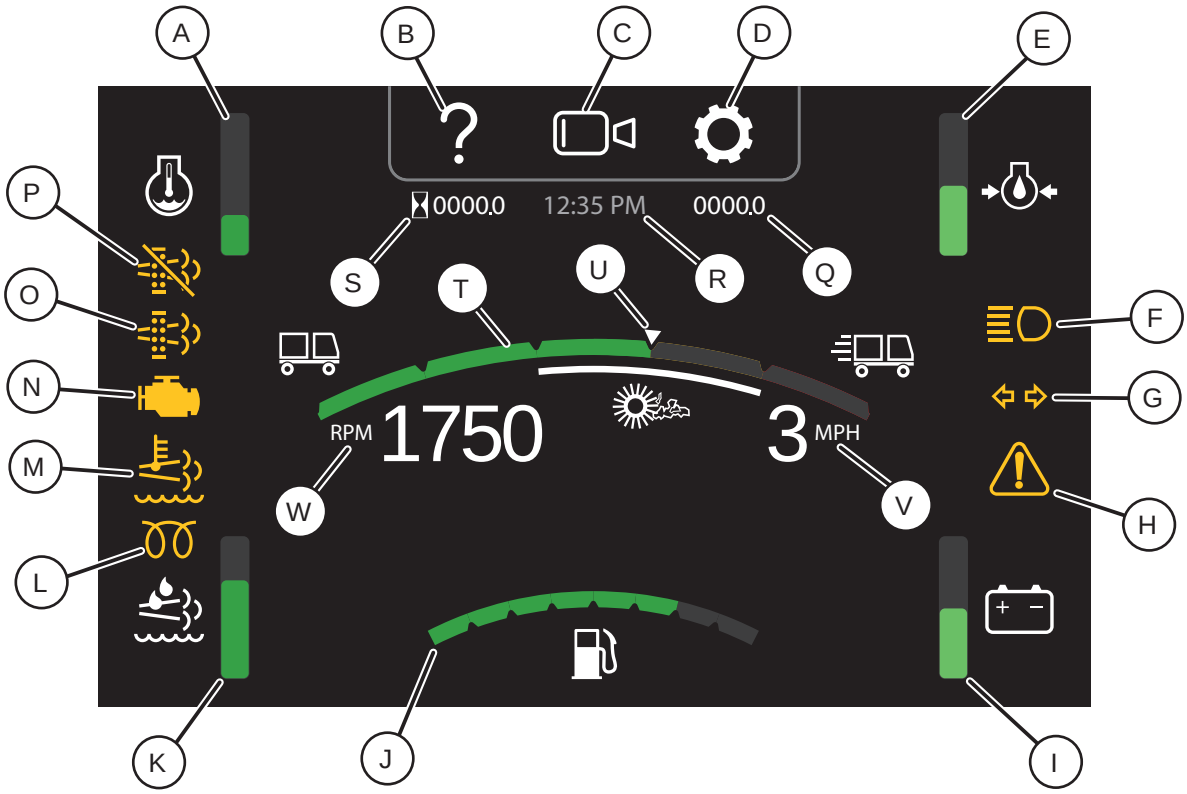
OPERATION

MACHINE COMPONENTS

A. Cab
B. Engine
C. Conveyor
D. Hopper
E. Dust Filter
F. Vacuum Fans
G. Hopper Door
H. Vacuum Wand (Option)
I. Hopper Lift
J. Main Brush
K. Side Brush(es)
L. Water Tank (right side)
M. Fuel Tank (right side)
N. Vario Sweeping Brush (Option)

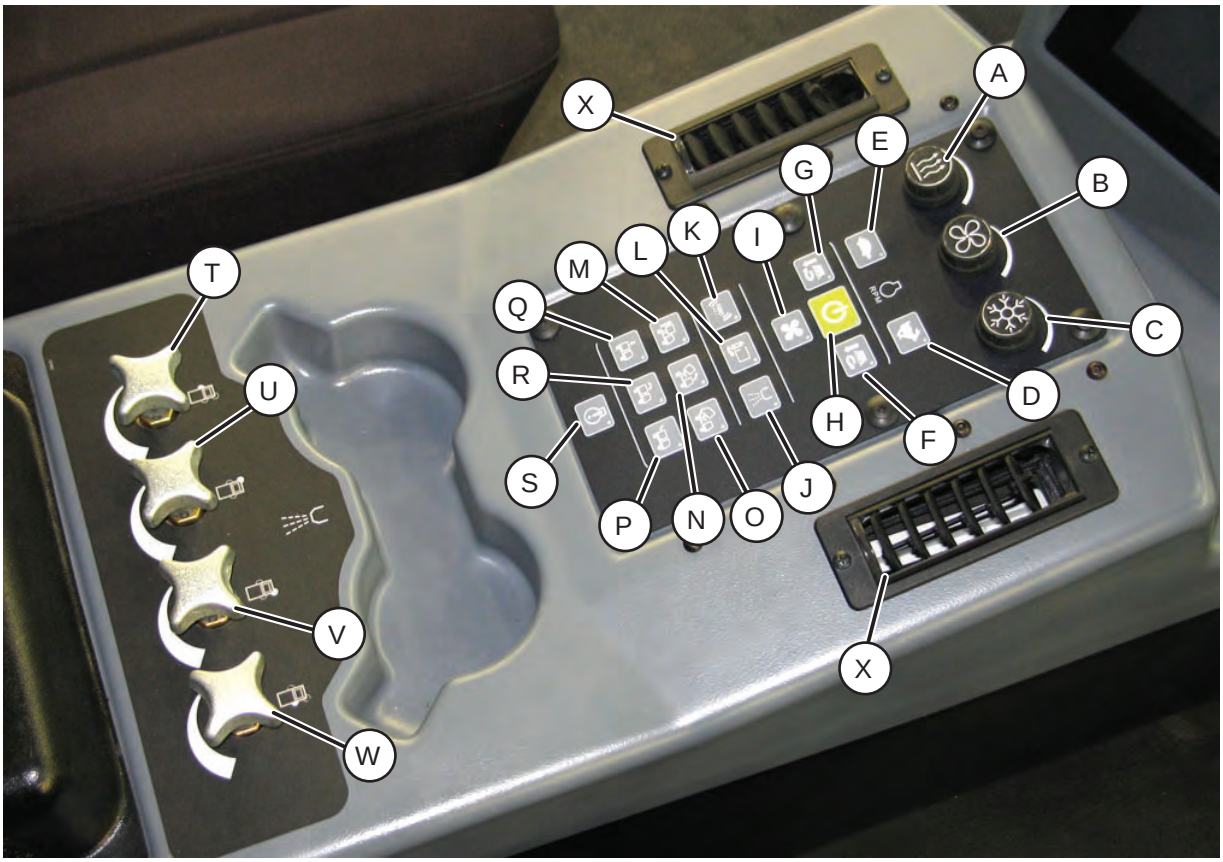
INSTRUMENTS AND CONTROLS

TOUCHSCREEN CONTROLS (OPERATOR SCREEN)



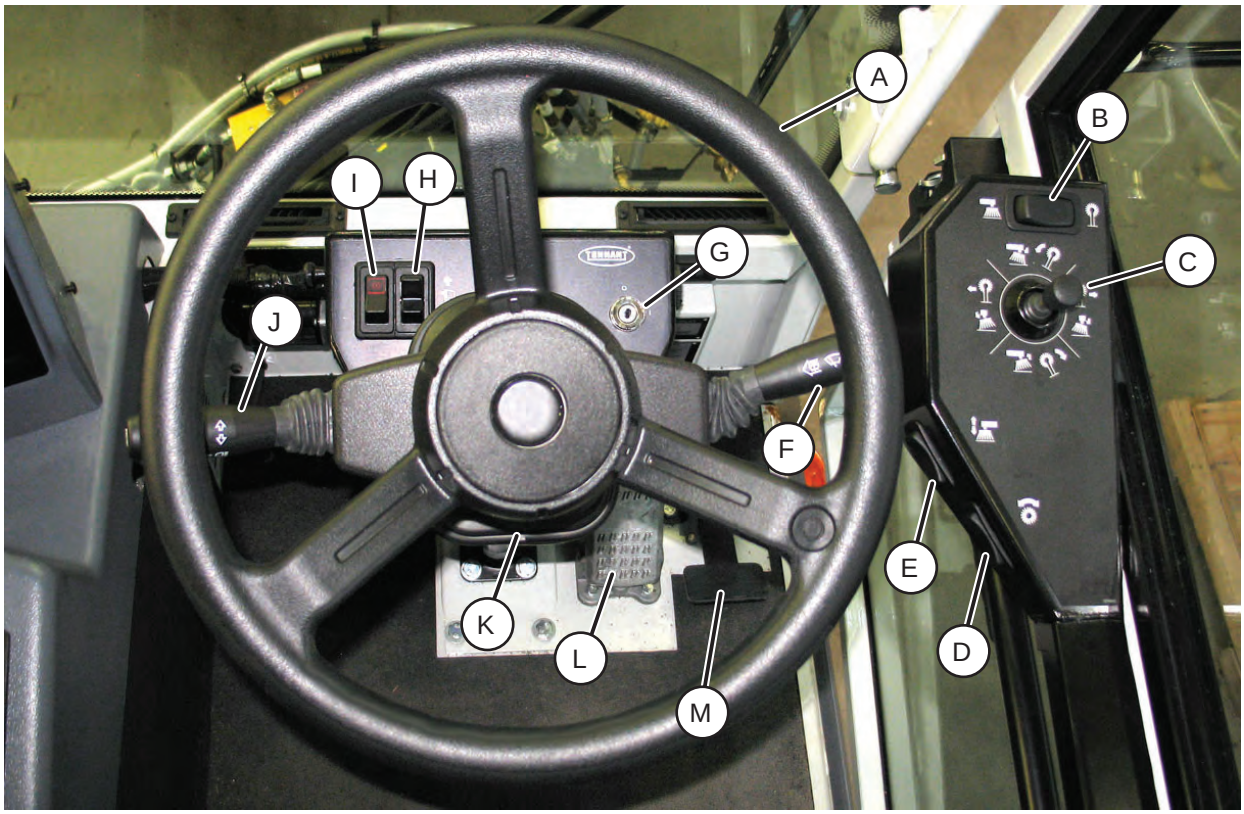
A. Engine temperature indicator
B. Help/information button
C. PerformanceView Camera button
D. Settings menu button
E. Oil pressure indicator
F. High beam indicator
G. Turn signal/4-way flasher indicator
H. Alert indicator/button
I. Battery charge indicator
J. Fuel level indicator
K. DEF (Diesel Exhaust Fluid) tank level indicator (Tier 4F Emissions Engine)
L. Engine pre-heat indicator
M. High exhaust system temperature Indicator (Tier 4F Emissions Engine)
N. Engine maintenance alert indicator
O. Exhaust system cleaning/regeneration button/indicator (Tier 4F Emissions Engine)
P. Auto regeneration enable/disable button/ indicator (Tier 4F Emissions Engine)
Q. Odometer
R. Clock
S. Engine runtime hour meter
T. Engine RPM indicator
U. Engine RPM command indicator
V. Speedometer/button (MPH/KPH)
W. Tachometer (RPM)

MAIN CONSOLE CONTROLS



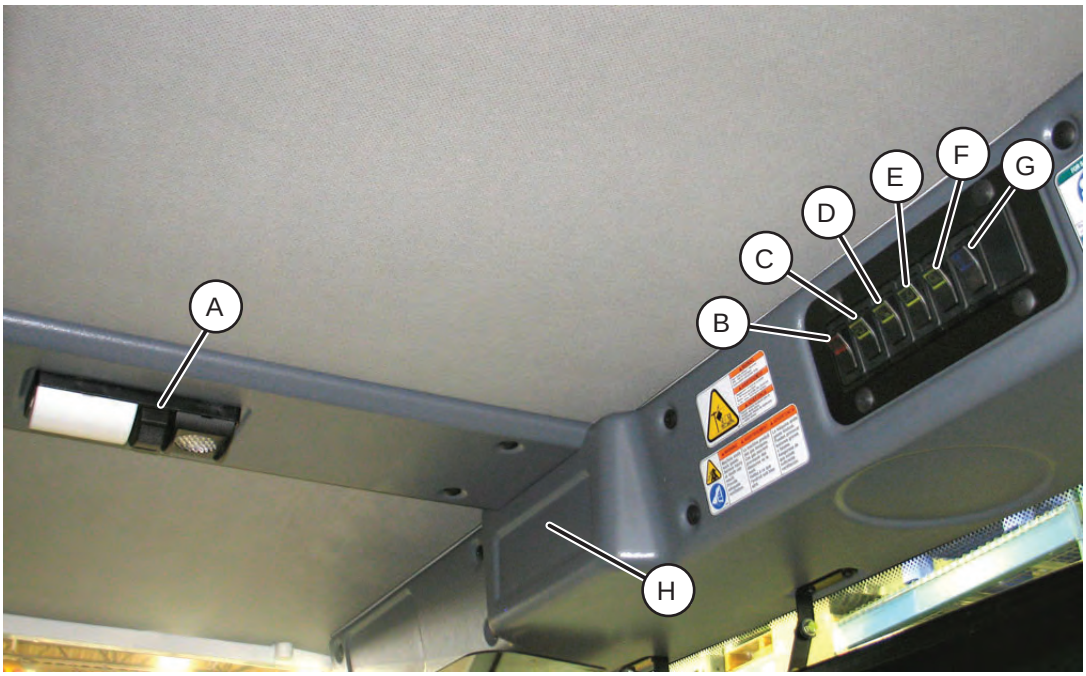
A. Heater knob
B. Fan knob
C. Air conditioner knob (Option)
D. Engine speed increase button (RPM)
E. Engine speed decrease button (RPM)
F. Right side brush button
G. Left side brush button
H. 1-Step button
I. Vacuum fan button
J. Wet dust control button (Option)
K. Filter shaker button
L. Conveyor reverse button
M. Hopper lift button (High Dump Model)
N. Hopper tilt back button
O. Hopper door open button
P. Hopper door close button
Q. Hopper lower button (High Dump Model)
R. Hopper tilt forward button
S. Engine shutdown override button
T. Left side brush wet dust control knob (Option)
U. Vario Sweeping Brush left wet dust control knob (Option)
V. Vario Sweeping Brush right wet dust control knob (Option)
W. Right side brush wet dust control knob (Option)
X. Air circulation vents

OPERATOR CONTROLS



A. Steering wheel
B. Vario Sweeping Brush tilt/arm switch (Option)
C. Vario Sweeping Brush joystick (Option)
D. Vario Sweeping Brush on/off switch (Option)
E. Vario Sweeping Brush raise/lower Switch (Option)
F. Windshield wiper and washer switch
G. Ignition switch
H. Directional switch
I. Parking brake switch
J. Parking lights, headlights, bright headlights, signal, and horn switch
K. Steering wheel tilt lever
L. Service brake pedal
M. Propel pedal

OVERHEAD CONTROLS



A. Dome/map light switch
B. 4-way warning lights switch
C. Hazard light switch
D. Side brush spot light(s) switch
E. Rear night sweeping light switch (Option)
F. Front night sweeping light switch (Option)
G. High pressure washer switch (Option)
H. Radio/compact disc player (Option) - Not Shown

MACHINE SYMBOLS.


Vario Sweeping Brush


Vario Sweeping Brush Arm


Vario Sweeping Brush Front Tilt Down


Vario Sweeping Brush Front Tilt Up


Vario Sweeping Brush Side Tilt Left


Vario Sweeping Brush Side Tilt Right


Vario Sweeping Brush Arm Slide Left


Vario Sweeping Brush Arm Slide Right


Vario Sweeping Brush Arm Swing Left


Vario Sweeping Brush Arm Swing Right


Vario Sweeping Brush Up−Down


Vario Sweeping Brush Rotation


Vario Sweeping Brush Left Water Valve Knob


Vario Sweeping Brush Right Water Valve Knob


Engine Speed Increase (RPM)


Engine Speed Decrease (RPM)


Filter Shaker

Parking Brake


Conveyor Reverse


Engine Shutdown Override


1-Step Button


Jack Point


Heater


Heater/Air Conditioner Fan


Air Conditioner


Flow Rate


Horn


Vacuum Fan


Hopper Door Open


Hopper Door Close


Wet Dust Control


Left Side Brush Button


Left Side Brush (Wet Dust Control)


Right Side Brush Button


Right Side Brush (Wet Dust Control)

Diesel Fuel Only


Hazard Light


Signal/4−Way Warning Lights


Rear Night Sweeping Light


Side Brush Spot Light


High Pressure Washer


Front Night Sweeping Light


Hopper Tilt Back


Hopper Tilt Forward


Hopper Lift


Hopper Lower


Forward/Reverse

TOUCHSCREEN ICONS

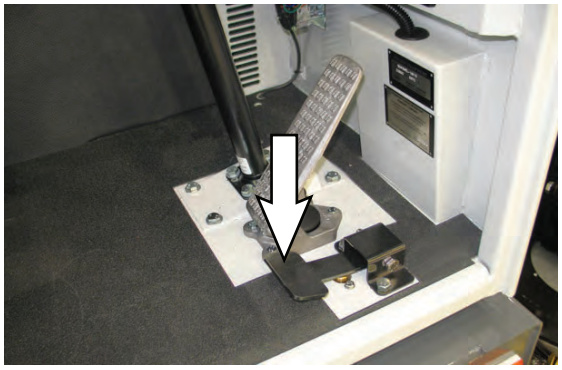
	Operator screen (Home)		Supervisor settings menu		Back arrow (previous screen)
	Forward arrow (next screen)		Scroll down		Scroll up
	Rear camera		Left side camera		Right side camera
	Parking brake		Video help		Operator
	Login		Operator settings menu		Supervisor
	Control help		Calibrate touch		Add profile
	Start-up video		Add/Edit profiles		Edit profile
	About (software version)		Date/Time		Copy profile
	Video menu		Enable login		Delete profile
	Video selection		Disable login		User login
	Video rotate view		Backspace		Enter
	Screen brightness		Disable automatic regeneration		Regeneration required
	Engine alert		High exhaust system temperature		Engine pre-heat
	Service alert		High beam		Turn signal/4-Way flasher
	Diesel Exhaust Fluid (DEF)		Engine temperature		Fuel level
	Engine oil pressure		Battery charge		Help/information

OPERATION OF CONTROLS

PROPEL PEDAL

Use the *propel pedal* to control the speed of the machine. The machine moves faster as more pressure is exerted onto the *propel pedal*. The machine slows as pressure is removed from the *propel pedal*. See the SPEEDOMETER section of this manual.

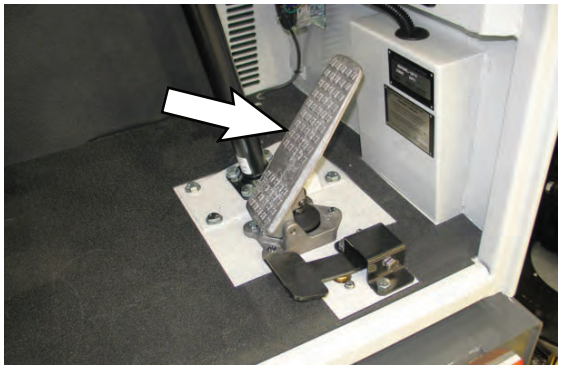
NOTE: Machine speed is limited to below 8 km/h (5 mph) when the hopper is raised or tilted.



SERVICE BRAKE PEDAL

Step on the *service brake pedal* to stop the machine.

NOTE: The hopper lift and tilt buttons will not operate unless the parking brake switch is set or the service brake pedal is applied.

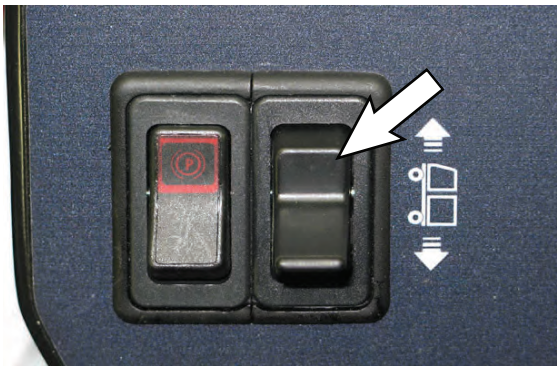


DIRECTIONAL SWITCH

Neutral: Place the switch in the middle, or neutral position.

Forward: Place the switch up into the forward position.

Reverse: Place the switch down into the reverse position.

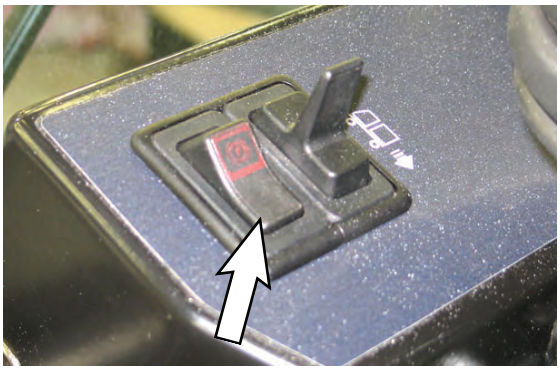


PARKING BRAKE SWITCH

The *parking brake switch* sets and releases the front axle as well as disables the propelling system.

Set parking brake: Press the top of the *parking brake switch*. The indicator light in the switch will illuminate.

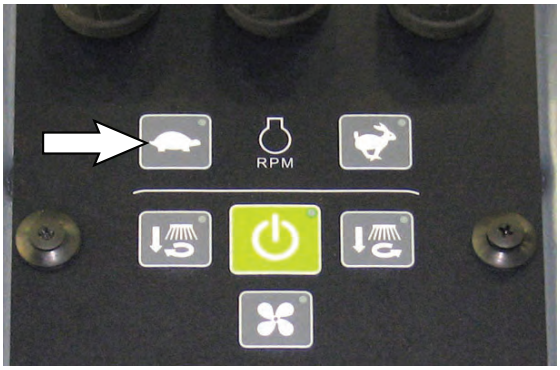
Release parking brake: Press the bottom of the *parking brake switch*. The indicator light in the switch will no longer be illuminated.



NOTE: If brake pressure drops too low, the parking brake will automatically set and will not release until brake pressure is restored. When this happens, this switch will NOT indicate that the parking brake is set.

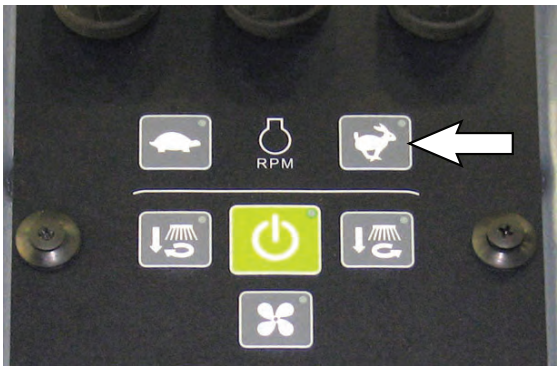
ENGINE SPEED DECREASE BUTTON (RPM)

Press the *engine speed decrease button* to lower the engine RPM.



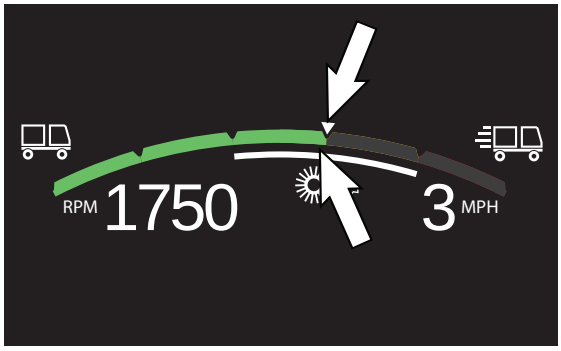
ENGINE SPEED INCREASE BUTTON (RPM)

Press the *engine speed increase button* to increase the engine RPM.

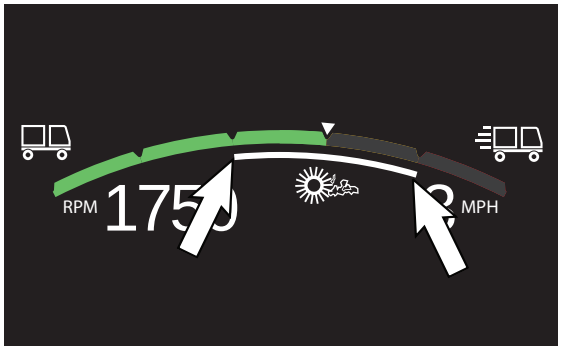


ENGINE SPEED DISPLAY/ENGINE SPEED INDICATOR

The *engine speed display* provides a visual display of the machine RPM setting range, from the idle setting (900 RPM), to the transport setting (2200 RPM). As either the *engine speed increase button* or the *engine speed decrease button* is pushed to adjust the engine speed, the *engine speed indicator* moves to the applicable setting on the *engine speed display*. The bars in the engine speed display the actual engine speed (RPM).



The *sweeping range indicator* located directly below the engine speed display shows exactly where the sweeping range is on the display. No sweeping is permitted if the engine RPM is above (1950 RPM) or below (1600 RPM) this range.

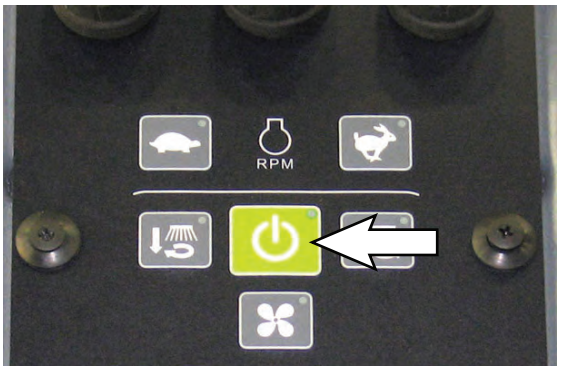


Engine RPM	Function
900 RPM	Low/Idle (no sweeping)
1600 RPM	Low Sweeping
1750 RPM	Medium Sweeping
1950 RPM	High Sweeping
2200 RPM	Transport (no sweeping)

NOTE: All engine speeds are +/- 50 RPM

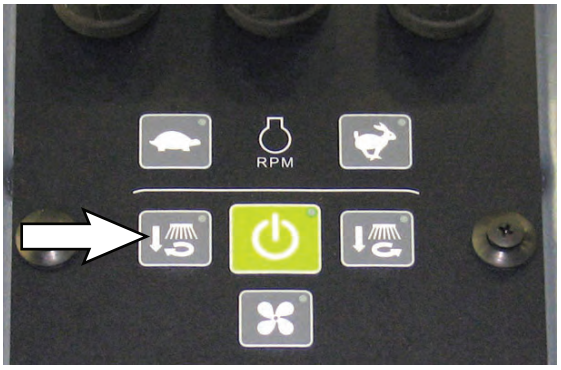
1-STEP BUTTON

Press the *1-Step button* to activate all selected sweeping functions. The light in the *1-Step button* is illuminated when the button is activated. Prior to the *1-Step button* being pushed, the lights in all selected sweeping functions will be illuminated but the selected functions will not function until the *1-Step button* is pressed. Press the *1-Step button* again when finished sweeping to stop all sweeping functions. The light in the *1-Step button* will go out.



LEFT SIDE BRUSH BUTTON (OPTION)

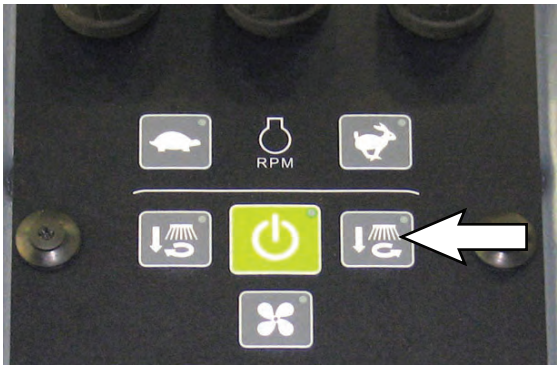
Press *left side brush button* to enable the left side brush. The light in the button will illuminate when the button is enabled. The left side brush will lower and sweep when the *1-Step button* is activated. Press the *left side brush button* to lift and turn off the left side brush. The light in the button will turn off.



NOTE: The side brushes will automatically turn on when the 1-Step button is activated if they were left on when the machine was previously used and last turned off.

RIGHT SIDE BRUSH BUTTON (OPTION)

Press the *right side brush button* to enable the right side brush. The light in the button will illuminate when the button is enabled. The right side brush will lower and sweep when the *1-Step button* is activated. Press the *right side brush button* to lift and turn off the right side brush. The light in the button will turn off.

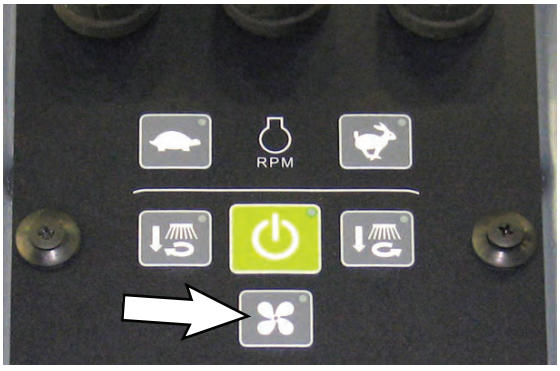


NOTE: The side brushes will automatically turn on when the 1-Step button is activated if they were left on when the machine was previously used and last turned off.

VACUUM FAN BUTTON

Press *vacuum fan button* to enable the vacuum fan. The light in the button will illuminate when the button is enabled. The vacuum fan will come on when the *1-Step button* is activated. Press the *vacuum fan button* to turn off the vacuum fan. The light in the button will turn off.

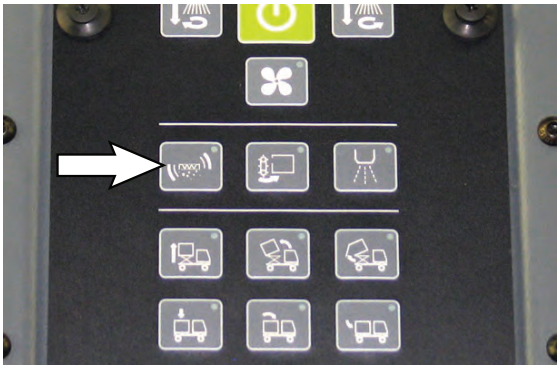
The vacuum fan can be controlled separately without the other sweeping functions. The vacuum fan can be turned on separately to operate the vacuum wand and can be turned off to operate the machine in wet conditions.



FILTER SHAKER BUTTON

Press the *filter shaker button* to activate the filter shaker. After a short delay, the filter shaker will operate for approximately 30 seconds.

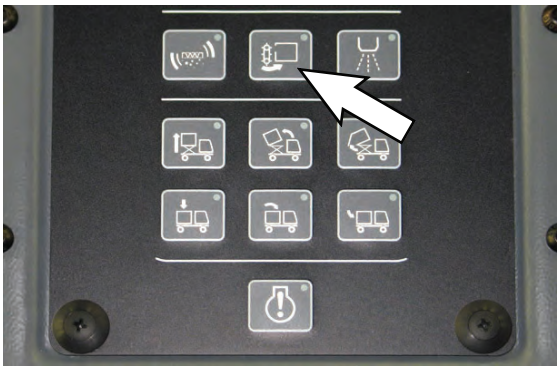
The light in the *filter shaker button* will illuminate while the filter shaker is operating. Press the *filter shaker button* again to stop the filter shaker.



Shake the dust filter before emptying the hopper and at the end of every shift. Shake the filter more frequently when sweeping in dusty conditions.

CONVEYOR REVERSE BUTTON

The *conveyor reverse button* controls the direction of the debris conveyor. Press the reverse direction to clear debris clogged in the conveyor and also for cleaning the conveyor.



Hopper down: Press and hold the button to reverse the direction of the conveyor. The light in the button will illuminate. Release the button to return the conveyor to the forward direction. The light in the button will turn off.

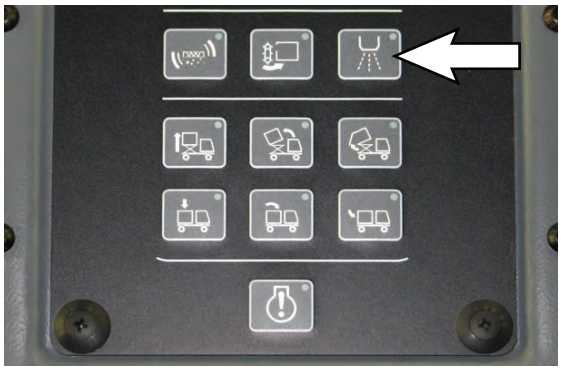
NOTE: The main sweep brush will also go into reverse when the conveyor is placed into reverse. Debris coming from the bottom of the hopper while the conveyor is in reverse will land behind the main sweeping brush, requiring the area to be swept again to pickup debris.

Hopper raised/tilted (for cleaning hopper): Press the button to reverse the direction of the conveyor. The light in the button will illuminate. Press the button to return the conveyor to the forward direction. The light in the button will turn off.

WARNING: Conveyor throws debris. Conveyor pinch point. Stay clear when in operation.

WET DUST CONTROL BUTTON (OPTION)

The *wet dust control button* controls the water pump for the wet dust control system. Press the button to activate the water pump. The light in the button will illuminate. Press the button to turn off the water pump. The light in the button will turn off.

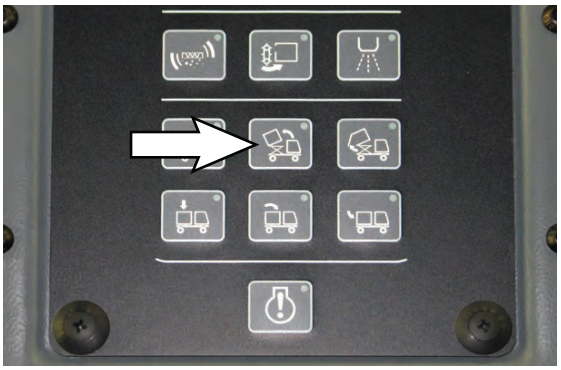


The water pump automatically shuts off when the water level in the water tank is low and a warning appears on the touchscreen. See WARNING AND FAULT INDICATORS.

NOTE: The water valve knobs must be turned open for the wet dust control system to function.

HOPPER TILT BACK BUTTON

The *hopper tilt back button* tilts the hopper back. All sweeping functions stop and the brushes raise when the *hopper tilt back button* is pushed. Machine speed is limited to below 8 km/h(5 mph) when the hopper is tilted.



NOTE: The hopper will not tilt unless the 1-Step button is off and either the parking brake switch is set or the service brake pedal is applied.

Press and hold the *hopper tilt back button* until the hopper is in the desired tilted position, and then release the switch. The hopper tilt back will automatically stop when the hopper is completely tilted back. The light in the button remains illuminated while the button is being pushed and an audible alarm sounds while the hopper is moving. The rear camera remains on while the hopper is tilted.

NOTE: Touch the center of the camera screen to turn off the rear camera if rear camera is not necessary while the hopper is tilted.

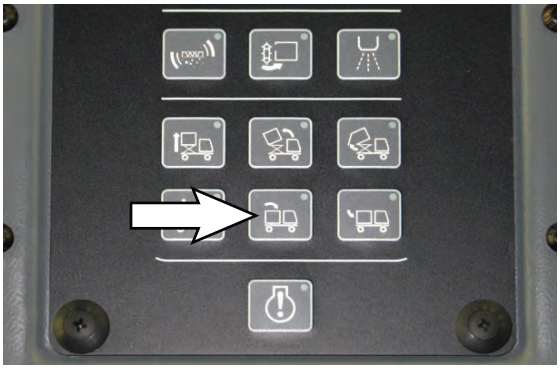
WARNING: Lift arm pinch point. Stay clear of hopper lift arms.

NOTE: The hopper will not tilt if the machine is either on an incline that is unsafe or the hopper is too heavy for tilting the hopper.

NOTE: The light in the button remains illuminated while the button is being pushed and an audible alarm sounds while the hopper is moving. The rear camera remains on while the hopper is moving/out of the home position (raised/tilted).

HOPPER TILT FORWARD BUTTON

The *hopper tilt forward button* tilts the hopper forward.



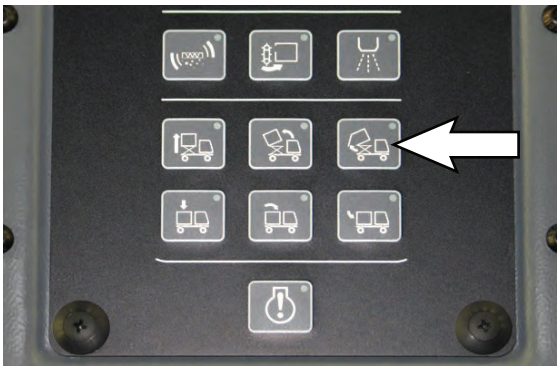
NOTE: The hopper will not tilt unless the parking brake switch is set or the service brake pedal is applied.

Press and hold the *hopper tilt forward button* until the hopper is completely tilted forward, and then release the switch. The hopper tilt forward will automatically stop when the hopper is completely tilted forward. The light in the button remains illuminated while the button is being pushed and an audible alarm sounds while the hopper is moving. The rear camera will turn off when the hopper is completely tilted forward.

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

HOPPER DOOR OPEN BUTTON

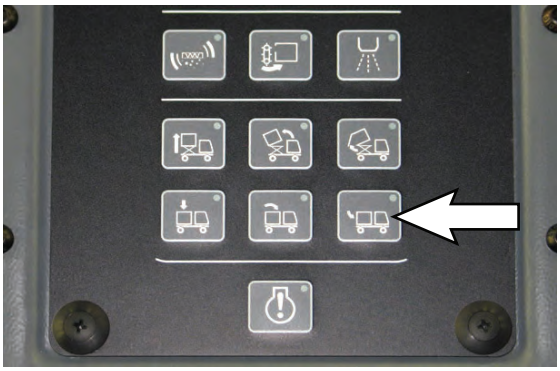
The *hopper door open button* unlatches the hopper door. With the hopper tilted, press and hold the button for 2-3 seconds. The hopper door will unlatch and open. The light in the button will illuminate only while the button is being pressed.



WARNING: Hopper door pinch point. Stay clear of hopper door.

HOPPER DOOR CLOSE BUTTON

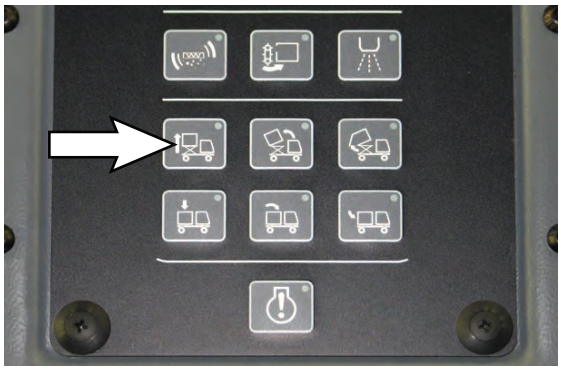
The *hopper door close button* latches the hopper door. With the hopper fully lowered, press and hold the button for 2-3 seconds. The hopper must be fully lowered for the door to latch. The light in the button will illuminate only while the button is being pressed.



WARNING: Hopper door pinch point. Stay clear of hopper door.

HOPPER LIFT BUTTON (High Dump Option)

The *hopper lift button* raises the hopper for high dumping. All sweeping functions stop and the brushes raise when the *hopper lift button* is pushed. Machine speed is limited to below 8 km/h(5 mph) when the hopper is raised.



NOTE: The hopper will not raise unless the 1-Step button is off and either the parking brake switch is set or the service brake pedal is applied.

NOTE: The minimum clearance height needed to high dump the hopper is 5060 mm (199 in).

WARNING: High dump vertical clearance. Stay clear of overhead obstructions and power lines.

Press and hold the button until the hopper is at the desired raised position, and then release the switch. The hopper lift will automatically stop when it is it is fully raised. The light in the button remains illuminated while the button is being pushed and an audible alarm sounds while the hopper is moving. The rear camera comes and remains on while the hopper is raised.

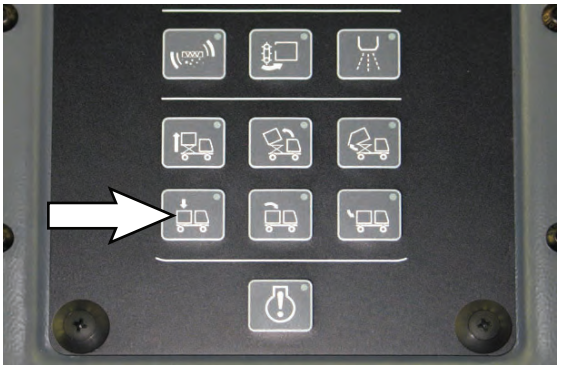
NOTE: Touch the center of the camera screen to turn off the rear camera if rear camera is not necessary while the hopper is raised.

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

NOTE: The hopper will not raise if the machine is either on an incline that is unsafe or the hopper is too heavy for high lifting the hopper.

HOPPER LOWER BUTTON (High Dump Option)

The *hopper lower button* lowers the hopper.



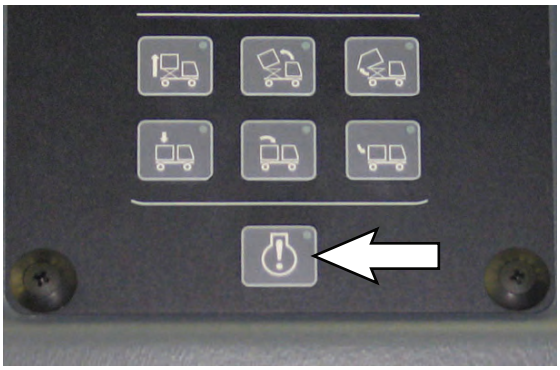
NOTE: The hopper will not tilt unless the parking brake switch is set or the service brake pedal is applied.

Press and hold the *hopper lower button* until the hopper is completely lowered, and then release the switch. The hopper lower will automatically stop when the hopper is completely lowered. The light in the button remains illuminated while the button is being pushed and an audible alarm sounds while the hopper is moving. The rear camera remains on until the hopper is completely lowered and tilted forward.

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

ENGINE SHUTDOWN OVERRIDE BUTTON

Press and release the *engine shutdown override button* to propel the machine to a safe location after the *engine maintenance alert indicator* starts flashing red on the touchscreen indicating an imminent engine shutdown is about to occur.



The *engine shutdown override button* permits the machine to be propelled for additional 30 seconds after the *engine maintenance alert indicator* starts flashing red. Use the *engine shutdown override button* only if the machine automatically shuts down in an unsafe location (in an intersection or traffic). Do NOT use this button to continue sweeping or operating the machine or damage to the engine could occur.

PARKING LIGHTS, HEADLIGHTS, BRIGHT HEADLIGHTS, SIGNAL, AND HORN SWITCH

Parking and Headlights On: Rotate the switch knob counterclockwise.

Parking Lights On: Turn the switch knob to the first click.

Headlights On: Turn the switch knob to the second click.

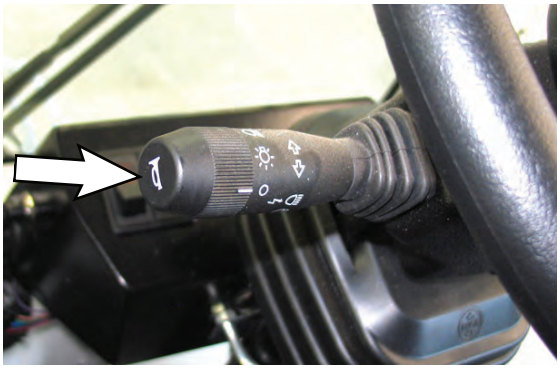
Bright Headlights On: Push the switch lever forward.

Bright Headlights Off: Pull the switch lever back.

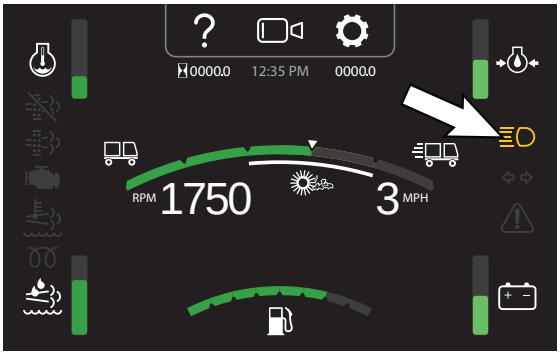
Flash Bright Headlights: Pull the switch lever up, then release.

Signals: Push the switch lever down for the right signal. Pull the switch lever up for the left signal.

Horn: Push the switch end towards the steering column.

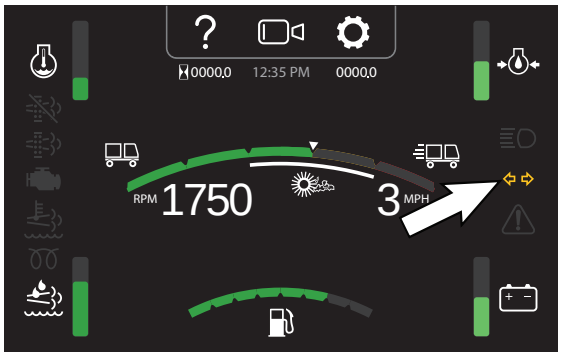


The *bright headlight high beam indicator* on the touchscreen will be illuminated when the headlight bright beams are activated.



The *turn signal/4-way flasher indicator* on the touchscreen will flash when the turn signal is activated.

NOTE: Both the left and right arrow will flash when either the right turn signal is activated or the left turn signal is activated.



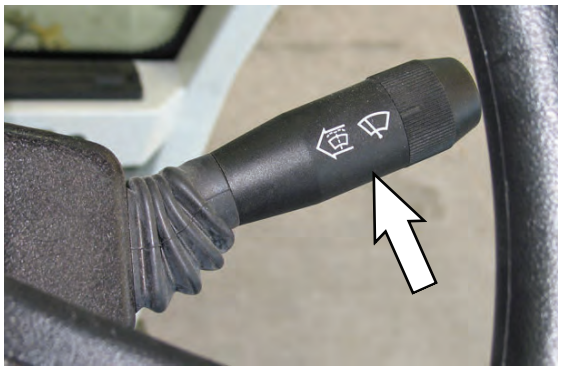
WINDSHIELD WIPER AND WASHER SWITCH

Windshield Wipers Off: Push the lever all the way down.

Windshield Wipers Slow Speed: Pull the switch lever to the first position.

Windshield Wipers Fast Speed: Pull the switch lever to the second position.

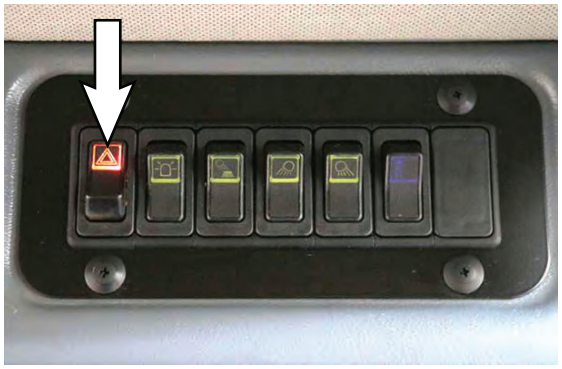
Windshield Washer Fluid Spray: Push the switch lever end in.



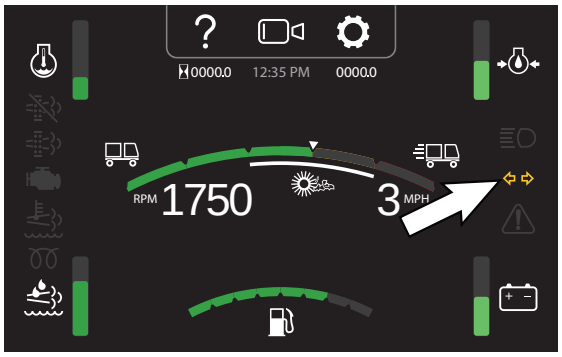
4-WAY WARNING LIGHTS SWITCH

On: Press the top of the *4-way warning lights switch* to activate the 4-way warning lights.

Off: Press the bottom of the *4-way warning lights switch* to turn off the 4-way warning lights.



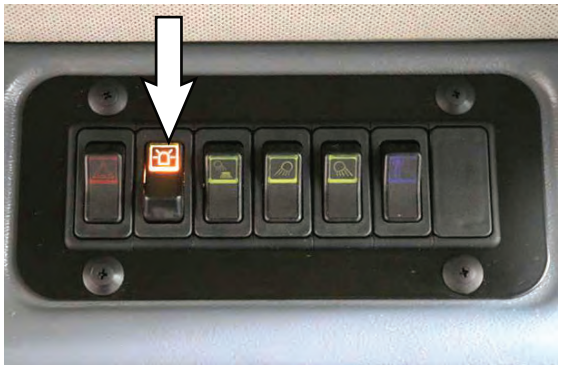
The *4-way warning lights indicator* on the touchscreen will flash when the 4-way warning lights are activated.



HAZARD LIGHT SWITCH

On: Press the top of the *hazard light switch* to turn the hazard light on.

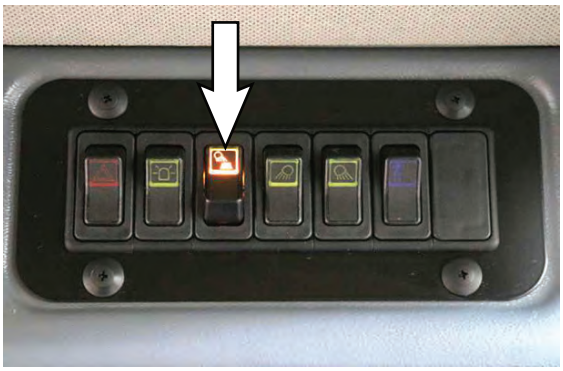
Off: Press the bottom of the *hazard light switch* to turn the hazard light off.



SIDE BRUSH SPOT LIGHT(S) SWITCH (OPTION)

On: Press the top of the *side brush spot light(s) switch* to turn the brush spot light(s) on.

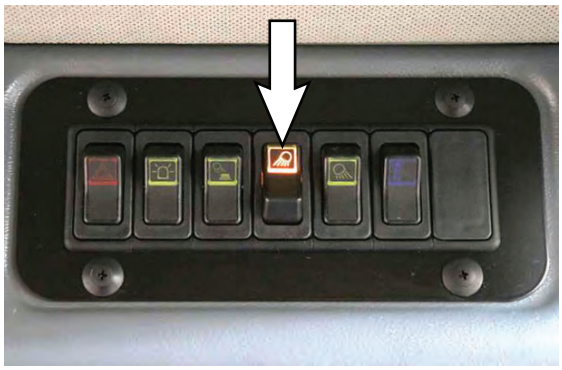
Off: Press the bottom of the *side brush spot light(s) switch* to turn the brush spot light(s) off.



REAR NIGHT SWEEPING LIGHT SWITCH (OPTION)

On: Press the top of the *rear night sweeping light switch* to turn the night sweeping light on.

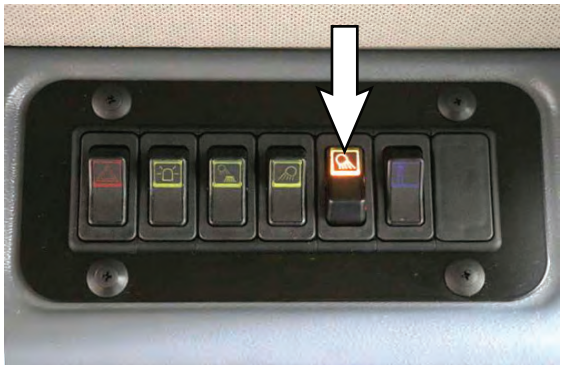
Off: Press the bottom of the *rear night sweeping light switch* to turn the night sweeping light off



FRONT NIGHT SWEEPING LIGHT SWITCH (OPTION)

On: Press the top of the *front night sweeping light switch* to turn the front night sweeping light on.

Off: Press the bottom of the *front night sweeping light switch* to turn the front night sweeping light off.

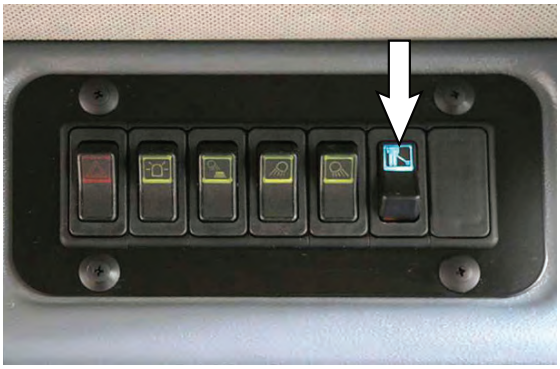


HIGH PRESSURE WASHER SWITCH (OPTION)

On: Press the top of the *high pressure washer switch* to activate the high pressure washer system.

NOTE: The high pressure washer option will not operate unless the parking brake switch is set, the cameras are off, and all faults/warnings cleared and/or deactivated.

Off: Press the bottom of the *high pressure washer switch* to turn the high pressure washer off.

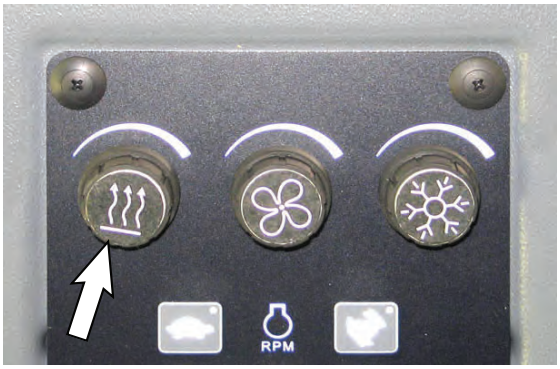


HEATER KNOB

The *heater knob* controls the cab heater temperature.

Raise temperature in the cab: Turn the knob clockwise.

Lower temperature in the cab: Turn the knob counter-clockwise.

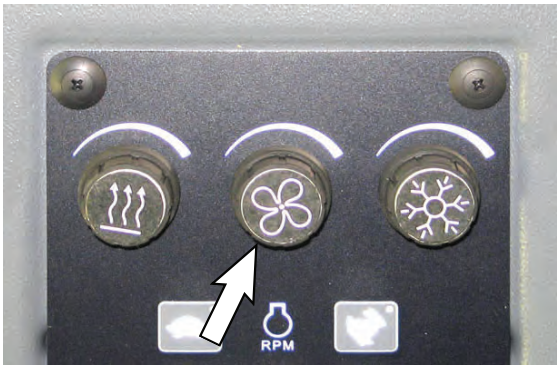


FAN KNOB

The *fan knob* controls the fan speed for the heater and air conditioner.

Increase fan speed: Turn the knob clockwise.

Decrease fan speed: Turn the knob counter-clockwise.



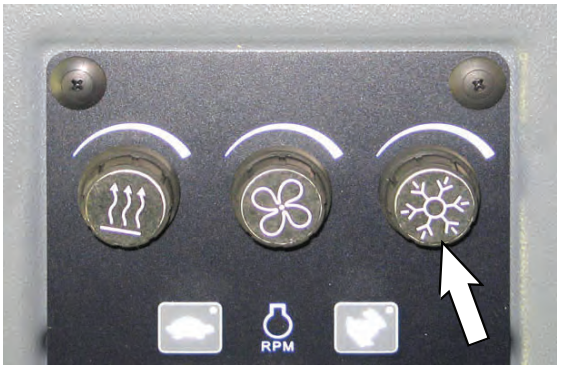
AIR CONDITIONER KNOB (OPTION)

The *air conditioner knob* controls the air conditioner temperature.

Lower temperature in the cab: Turn the knob clockwise.

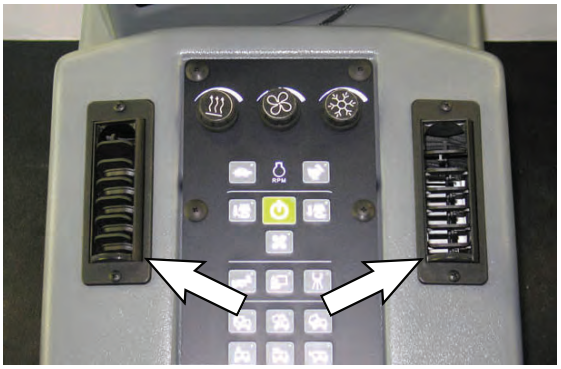
Raise temperature in the cab: Turn air conditioner the knob counter-clockwise.

NOTE: The air conditioner will NOT function unless the fan is turned on.



AIR CIRCULATION VENTS

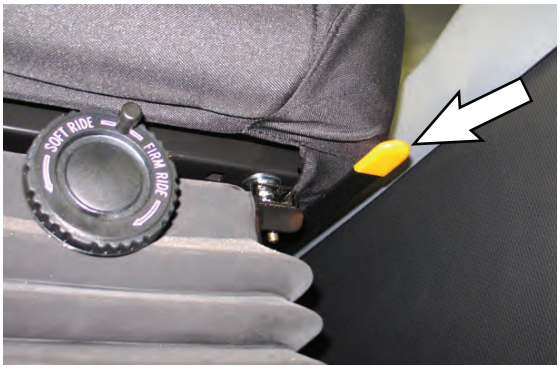
There are numerous *air circulation vents* in the operator cab. There is a set for both the passenger and the driver. If desired, the vents can be closed on the passenger side of the cab for more air flow to the driver side of the cab. The vents in front of the dash panel are for defrosting.



OPERATOR SEAT

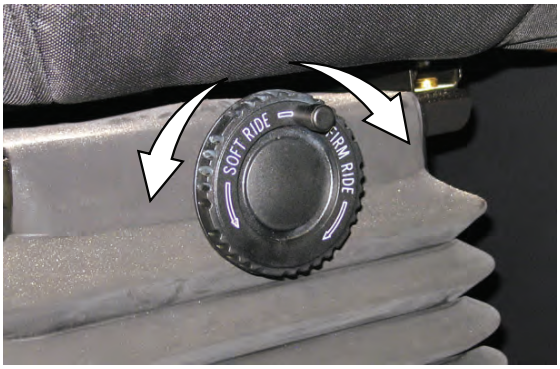
The *operator seat* has two adjustments: front to back and ride firmness.

The front-to-back adjustment lever adjusts the seat position.



Adjust: Push the lever to the left and slide the seat backward or forward to the desired position. Release the lever to lock the seat into place.

The weight adjustment knob controls the firmness of the operator seat.



Increase firmness: Turn the weight adjustment knob clockwise.

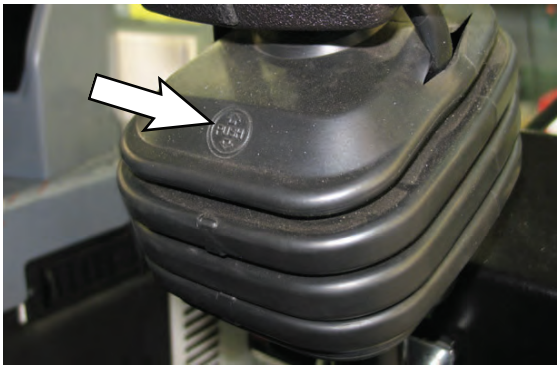
Decrease firmness: Turn the weight adjustment knob counterclockwise.

SEAT BELTS

FOR SAFETY: Before starting machine, adjust seat and fasten seat belt.

STEERING WHEEL TILT LEVER

The *steering wheel tilt lever* is located under the steering boot. To tilt the steering wheel, push straight in on lever and position the steering wheel at the desired position. Release the lever when finished positioning the steering wheel.

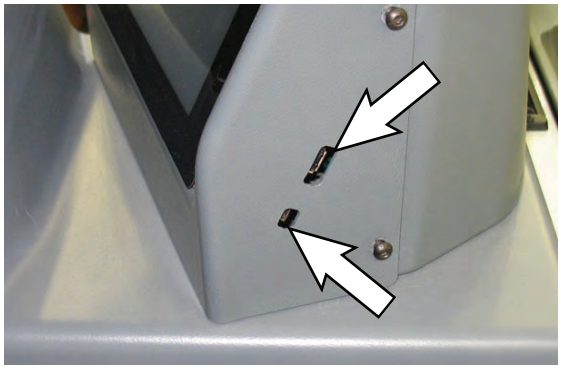


CENTER CONSOLE USB PORTS

There are two USB ports on the side of the center console.

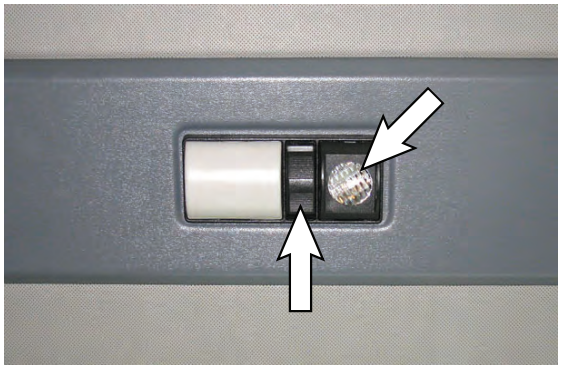
The upper USB port is for a supervisor to download completed operator checklists on machines with the optional operator checklists enabled. This port can also be used for charging electronic devices.

The lower micro-USB port is for service diagnostics and firmware updates.

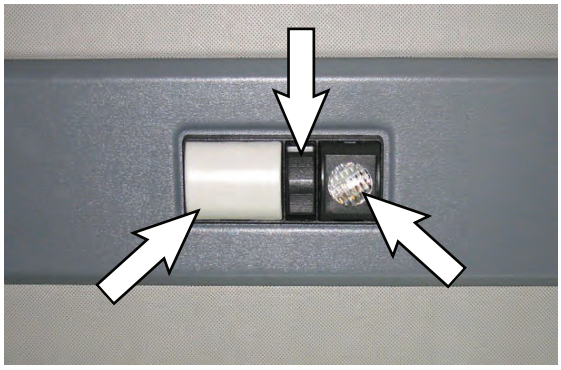


DOME AND MAP LIGHT SWITCH

Map Light On: Push the switch toward the passenger side of the cab.



Dome and Map Light On: Push the switch toward the operator side of the cab.

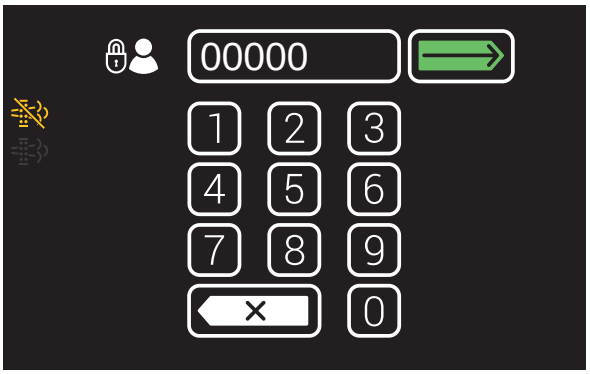


Off: Push the switch into the middle position.

OPERATION OF TOUCHSCREEN CONTROLS

LOGIN SCREEN

Use the *login screen* to enter password into the machine.



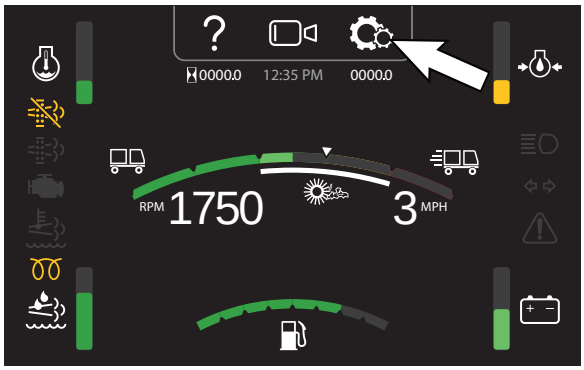
Use the keypad to enter the user login number into the display above the keypad.

Press the *enter button* to log into the machine.

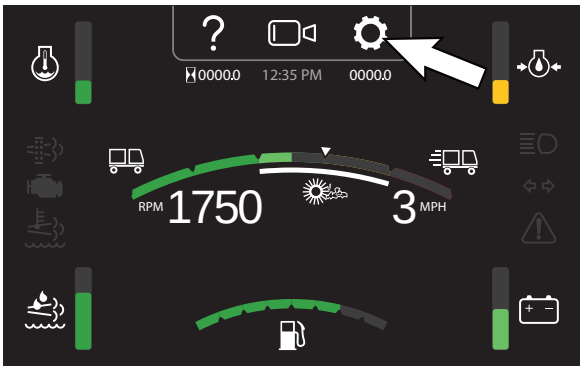
Press the backspace button if necessary to delete a number.

OPERATOR/SUPERVISOR SCREENS

When the machine is in the Supervisor Mode, a double-gear icon appears on the touchscreen.



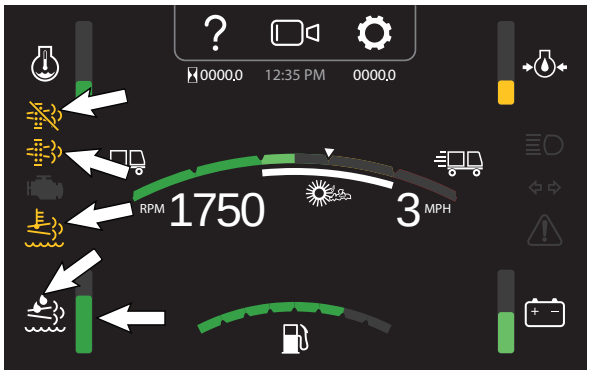
When the machine is in the Operator Mode, a single-gear icon appears on the touchscreen.



TOUCHSCREENS

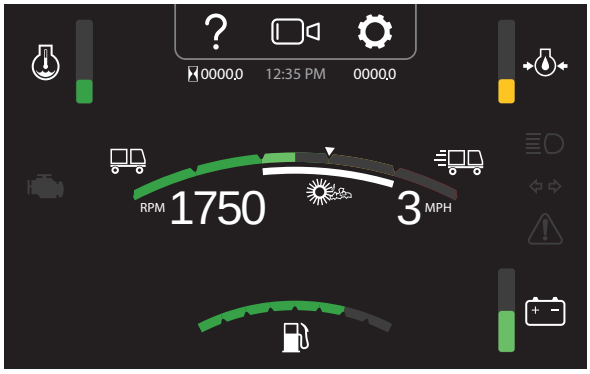
TIER 4F EMISSIONS ENGINE TOUCHSCREEN

Machines equipped with the Tier 4F emissions engine have a touchscreen with the Tier 4F emissions icons located on the left side and lower left corner of the touchscreen.



STAGE IIIA EMISSIONS ENGINE TOUCHSCREEN

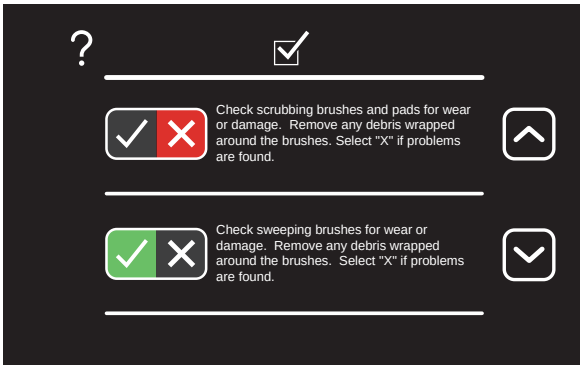
Machines equipped with the Stage IIIA emissions engine will not have the Tier 4F emissions icons since these machines are not equipped with Tier 4F emissions equipment.

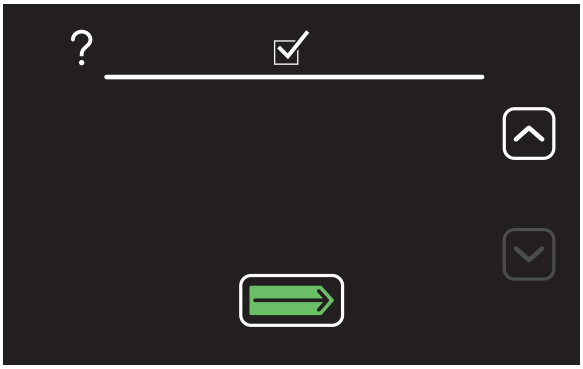


PRE-OPERATION CHECKLIST

Operator must complete the pre-operation checklist if the pre-operation checklist is enabled.

NOTE: The parking brake switch must be set before completing the pre-operation checklist. Completing the pre-operation checklist is inhibited until the parking brake switch is set.





Press the *down arrow button* to scroll down through checklist.

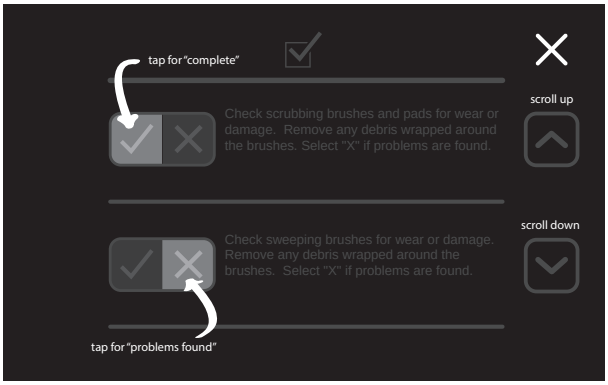
Press the *up arrow button* to scroll up through checklist.

Press the *complete (check mark) button* to confirm the checklist item was checked. Press the *problem found (X) button* if a problem is found and not corrected when checklist item is checked.

Press the *enter button* when ready to start using the machine after completing the checklist.

If the *enter button* is not green, the pre-operation checklist was not completed as required before machine operation. The operator is not allowed to access the operator screen or operate machine until the pre-operation checklist is completed. Complete any item(s) not checked on the checklist.

Press the *help button* to access the pre-operation checklist help screen.

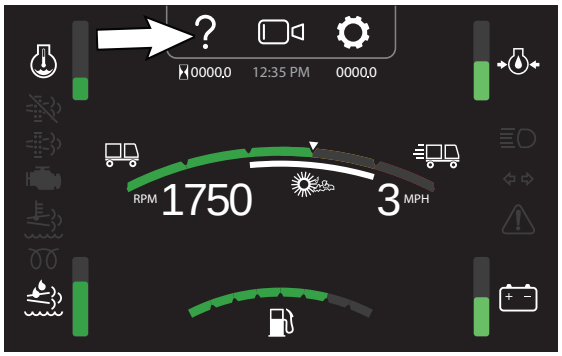


Press the *exit button* (X) to close the pre-operation checklist help screen.

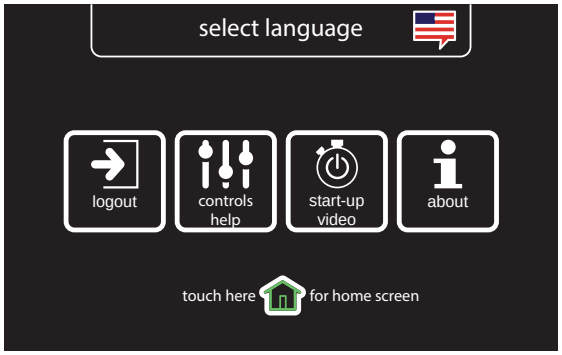
HELP/INFORMATION BUTTON

Press the *help/information button* to access the help/information screen.

NOTE: The parking brake switch must be set to access the help/information screen. Access to the help/information screen is inhibited until the parking brake switch is set.



Press the applicable button in the help/information screen for the topic needed.



Press the *select language button* to go to the language screen.

Press the *login/logout button* to log in/log out of the machine operating system.

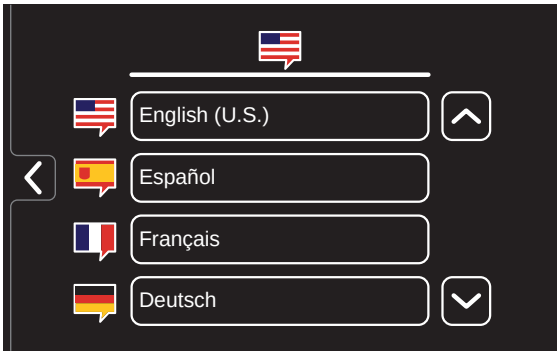
Press the *controls help button* to access the controls help screen.

Press the *start-up video button* to watch the start-up video.

Press the *about button* to access machine operating system information.

Press the *home button* to return to the operator screen.

Press the *select language button*. Select an applicable language from the list to change the machine operating system language. A flag designating the country language selected will appear at the top of the screen.



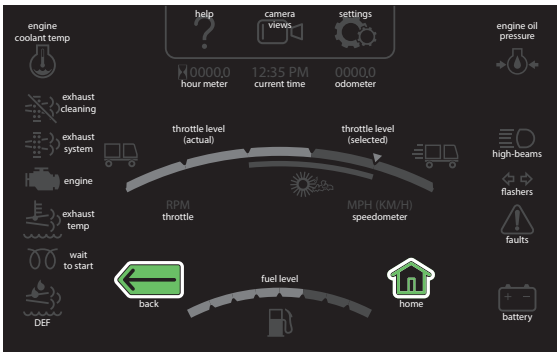
NOTE: The chosen language will remain the default language for the operator after having chosen a language at first login.

Press the *down arrow button* to scroll down through the language list.

Press the *up arrow button* to scroll up through the language list.

Press the *back arrow button* to return to the Help/Information screen.

Press the *controls help button* to access information about the touchscreen controls.



Press the *back button* to return to the help/information screen.

Press the *home button* to return to the operator screen.

Press the *start-up video button* to access the machine start-up video.

Press the *about button* to access information about the operating system software.

Press the *down arrow button* to scroll down through the about/information screen.

Press the *up arrow button* to scroll up through the about/information screen.

Press the *home button* to return to the operator screen.

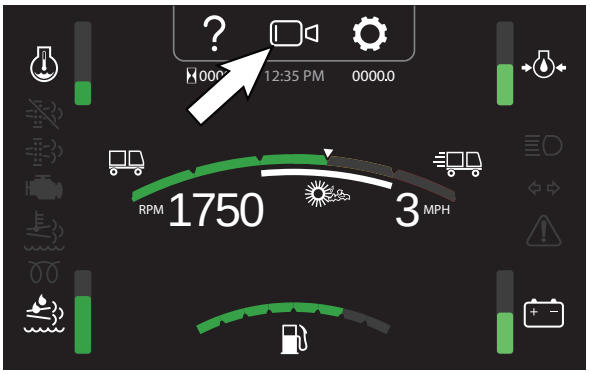
Press the *back arrow button* to return to the help/information screen.

Press the *forward arrow button* to access more information about the software.

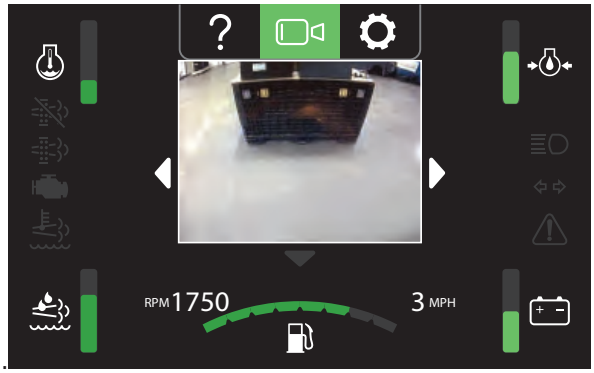
CAMERA BUTTON

Press the *camera button* to check cleaning performance. The camera will remain on indefinitely as long as the machine speed is below 11.3 km/h (7 mph). The camera will go off 15 seconds after the machine exceeds this speed. The operator screen returns to the control panel after the camera times out.

FOR SAFETY: When using machine, always be aware of your surroundings.



The camera automatically comes on when the *directional switch* is placed in the reverse position and remains on while the machine is in reverse. The rear camera also automatically comes on when the hopper is raised or tilted.



Press the *right arrow button* to go to the right camera view.

Press the *left arrow button* to go to the left camera view.

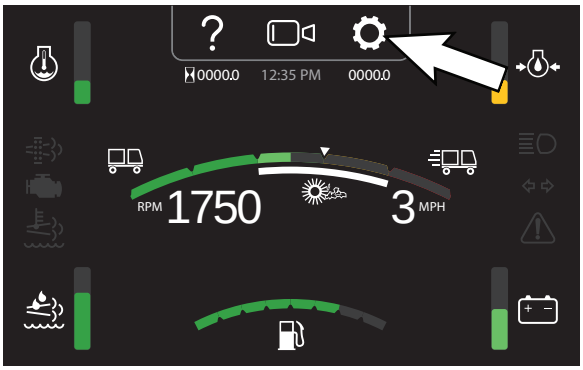
Press the *down arrow button* to go to the rear camera view.

Touch the center of the camera screen or the *green camera button* to exit the camera screen.

SETTINGS MENU BUTTON

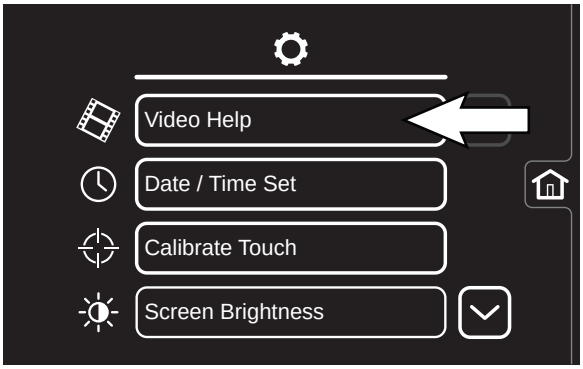
Press the *settings menu button* to open the settings menu screen and access the Video Help, Date/Time Set, Calibrate Touch, Screen Brightness, Disable Regen, and Enable Regen (if automatic regeneration was disabled) buttons.

NOTE: The parking brake switch must be set to access the settings menu screen. Access to the settings menu screen is inhibited until the parking brake switch is set.

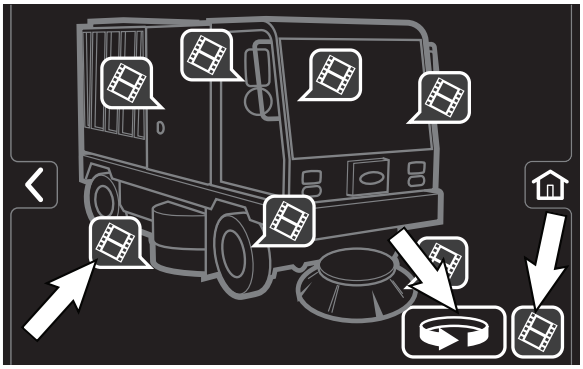


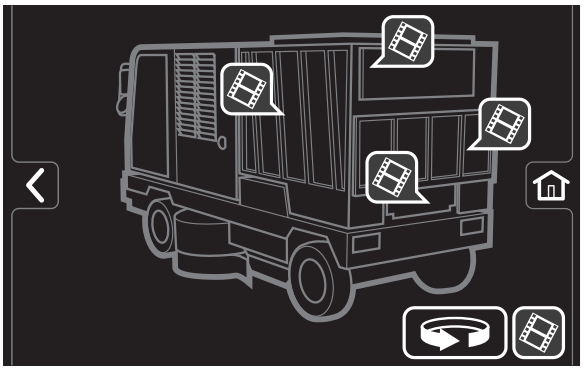
VIDEO HELP BUTTON

Press the *Video Help button* to access the video menu screen.



The video menu screen includes videos on how to perform specific operation and maintenance procedures. Press the video buttons to start videos. Press the *rotate button* for additional videos. Press the *lower right video button* for a list of all tutorial videos in a menu list.





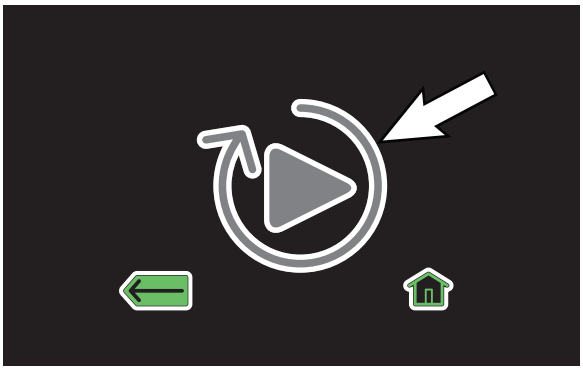
Touch anywhere on the screen to pause the video. A *play button, back button*, and *home button* will appear on the screen.

Press the *play button* to resume watching the video.

Press the *back button* to return to the video menu screen.

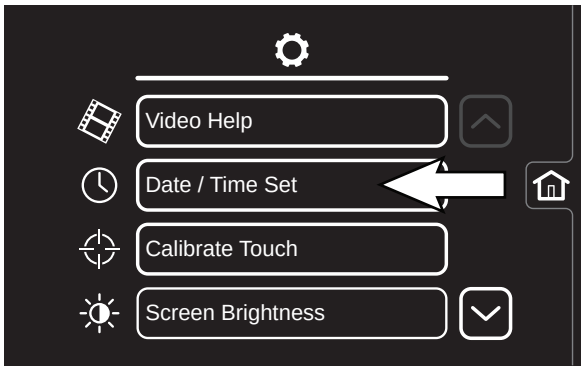
Press the *home button* to return to the operator screen.

If necessary, press the *video replay button* to replay the video.

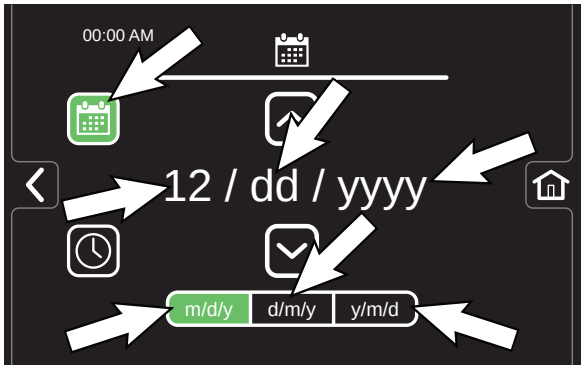


DATE/TIME SET BUTTON

Press the *Date/Time Set button* to access the screen to change the date and time settings.



Press the *month button (mm), day button (dd),* and the *year button (yyyy)* to select these items to be changed. The buttons blink when pressed. Press the *m/d/y button, d/m/y button*, or *y/m/d button* to change the calendar display.



Press the *time button* to select the time screen.

Press the *increase button* (up arrow) to advance the blinking date parameters.

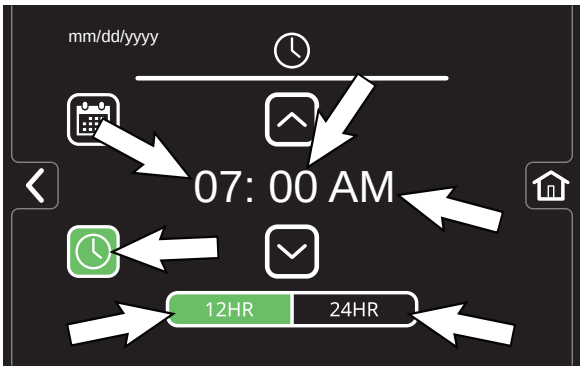
Press the *decrease button* (down arrow) to decrease the blinking date parameters.

Press the *home button* to save the date and navigate back to the operator screen.

Press the *back button* to save the date and navigate back to the previous screen.

Press the time button when finished changing the date to proceed to the time screen.

Press the *hour button* and *minute button* to select these items to be changed. The buttons blink when pressed. Press the *AM/PM button* to alternate between AM/PM settings. Press the *12HR button* to change the time display to the 12-hour clock. Press the *24HR button* to change the time display to the 24-hour clock.



Press the *date button* to select the system date.

Press the *increase button* (up arrow) to increase the blinking time parameters.

Press the *decrease button* (down arrow) to decrease the blinking time parameters.

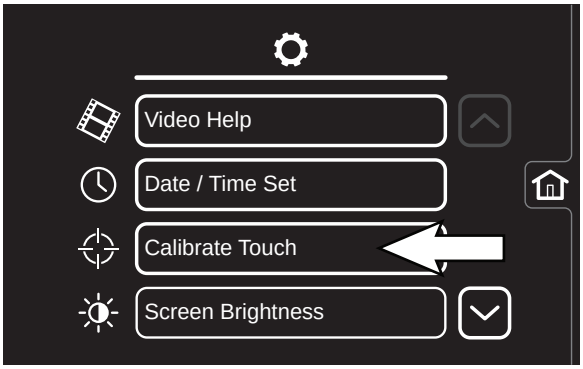
Press the *home button* to save the time and navigate back to the operator screen.

Press the *back button* to save the time and navigate back to the previous screen.

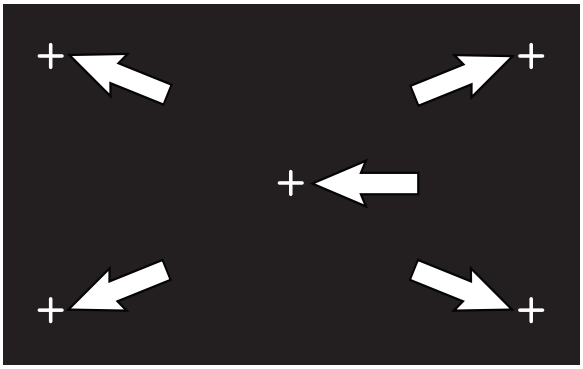
CALIBRATE TOUCH BUTTON

The touchscreen must be calibrated when the buttons are no longer properly aligned on the touchscreen. Calibration is necessary when there is no button or machine reaction when the button is pushed multiple times or the button or machine reacts only when the outer edges or areas outside the button are touched. All buttons should be centered on the touch point so they function when the center of the button is touched.

Press the *Calibrate Touch button* to access the calibration screen.



Carefully and quickly press each of the five “+” images on the touchscreen as they appear on the touchscreen display. Press each of the images only once. The touchscreen may not calibrate correctly if the image(s) are pressed for too long or more than once.

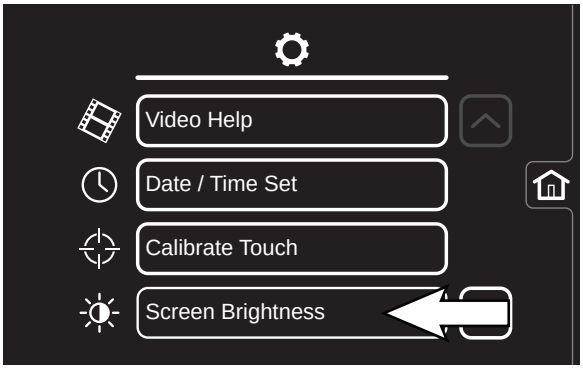


A screen asking **Restart? You must restart for the calibration to take affect. Restart now?** will appear. Select either the *Yes button* to restart the touchscreen or the *No button* to return to the settings menu.

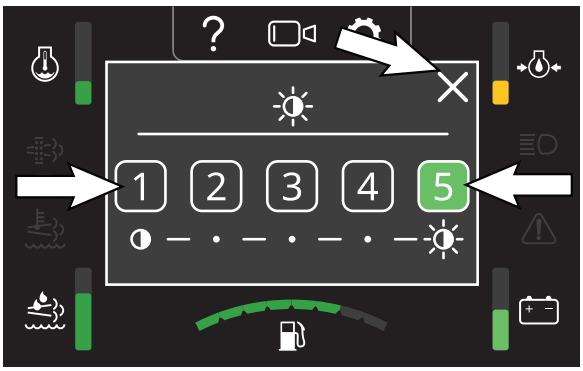
NOTE: Calibration will not take effect until the machine is turned off and restarted.

SCREEN BRIGHTNESS BUTTON

Press the *Screen Brightness button* to access the screen brightness settings screen.



Press the numbered buttons to change the touchscreen brightness. The 5 button is the brightest touchscreen setting and the 1 button is the darkest. The night default is 3 with headlights on. The day default is 5 with headlights off.



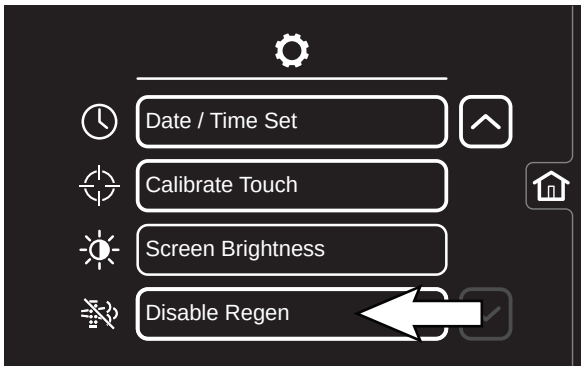
Press the *close button (X)* in upper right corner of the Screen Brightness box to save the new touchscreen brightness setting and return to the operator screen.

NOTE: The touchscreen brightness setting will remain at the new setting every time the same operator logs in to use the machine.

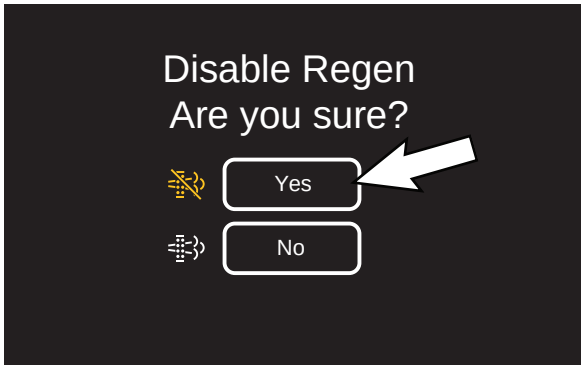
DISABLE/ENABLE REGEN BUTTON
(Tier 4F Emissions Engine Only)

To disable automatic regeneration:

Press the *Disable Regen button* to access the Disable Regen screen.



The **Disable Regen Are You Sure?** screen will appear. Press the *Yes button* to disable automatic regeneration and return to the settings menu.

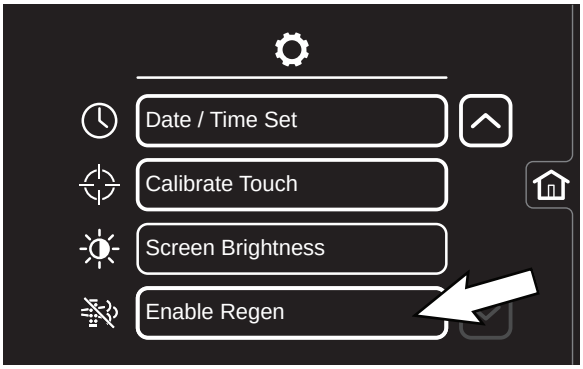


NOTE: It is not recommended that the engine automatic regeneration be disabled unless there is a safety issue (nearby combustible materials) requiring automatic regeneration be disabled.

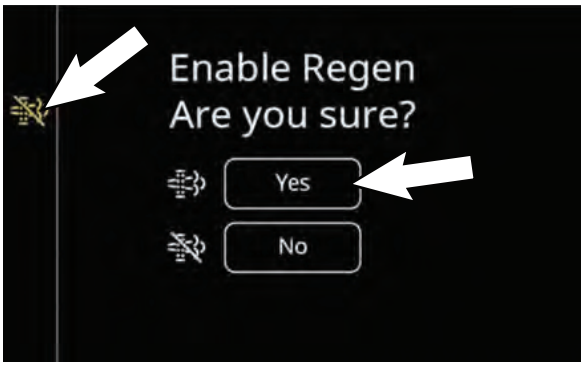
Press the *No button* if not disabling the automatic regeneration to return to the settings menu.

To enable automatic regeneration:

Press the *Enable Regen button* to access the Enable Regen screen.



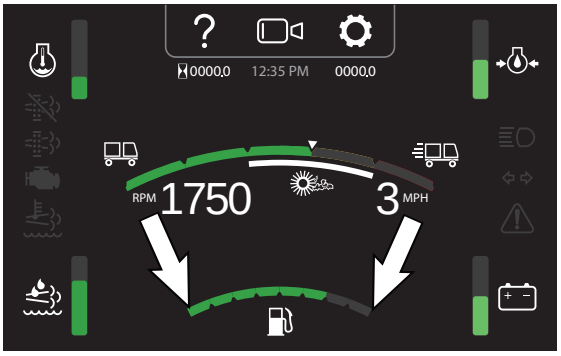
The **Enable Regen Are You Sure?** screen will appear. Press the *Yes button* to enable automatic regeneration and return to the settings menu.



Press the *No button* if not enabling automatic regeneration and to return to the settings menu.

FUEL LEVEL INDICATOR/GAUGE

The *fuel level indicator/gauge indicates* how much fuel is in the fuel tank. When the fuel tank is full there will be eight green bars on the gauge. As fuel is used, the bars will go out from right to left. When only three bars are remaining on the gauge, the bars will change from dark green to light green. The fuel tank should be refilled when there are two yellow bars. When there is only bar remaining, the bar will turn red and the pump indicator will flash. The fuel tank should be refilled at this time.



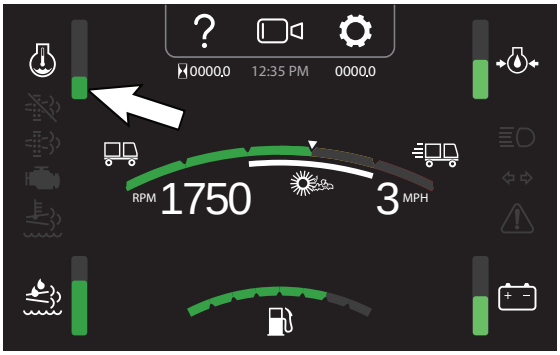
Tier 4F Emissions Engine: Use Ultra Low Sulfur Diesel (ULSD) or Biodiesel up to 20% (B20) fuel Only.

Stage IIIA Emissions Engine: Use Low Sulfur Diesel (LSD) or Biodiesel up to 20% (B20) fuel Only.

DO NOT add aftermarket additives to the fuel in this machine. Engine damage due to use of other fuels and aftermarket additives may not be covered under the machine warranty.

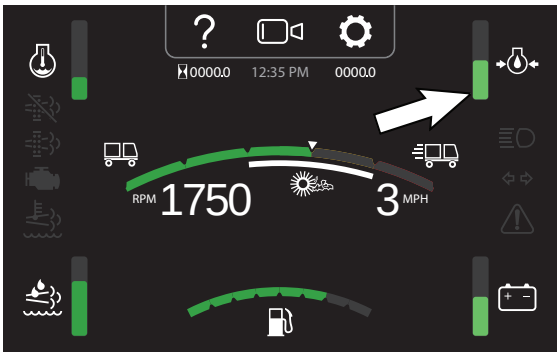
ENGINE COOLANT TEMPERATURE INDICATOR/GAUGE

The *engine coolant temperature indicator/gauge* displays the engine temperature. The engine is operating at normal temperatures when the bars in the gauge are green. The bars in the gauge turn yellow and the color moves higher in the gauge as the coolant temperature goes slightly above the normal operating range. All bars in the gauge will turn red, the color in the bars moves toward the top of the gauge, and the *engine temperature indicator flashes* when the coolant temperature is critically above the normal operating range. See WARNING AND FAULT INDICATORS.



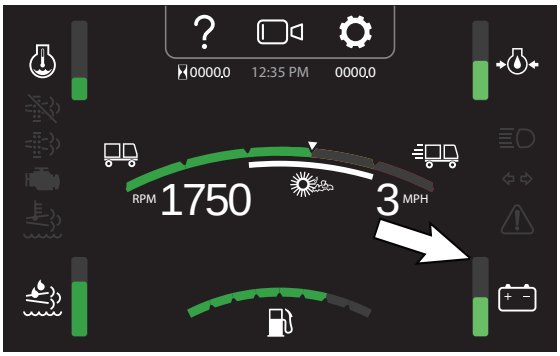
ENGINE OIL PRESSURE INDICATOR/GAUGE

The *engine oil pressure /indicator/gauge* displays the current engine operating oil pressure. The engine is operating at normal oil pressure when the bars in the gauge are dark green or light green. Two bars in the gauge turn yellow when the engine oil pressure is low. The bottom bar in the gauge turns red and the *engine oil pressure indicator* flashes when the oil pressure is critically outside the normal operating range. See WARNING AND FAULT INDICATORS.



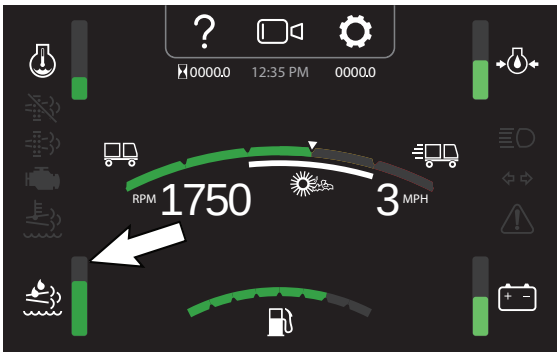
BATTERY INDICATOR/GAUGE

The *battery indicator/gauge* displays the battery charge level. The battery is charging normally when the bars in the gauge are dark green or light green. The bars in the gauge turn yellow if the battery state of charge is outside the normal range. The bars in the gauge turn red and the *battery indicator* flashes when the battery is discharged critically outside the normal operating range. See WARNING AND FAULT INDICATORS.



DIESEL EXHAUST FLUID (DEF) TANK INDICATOR/GAUGE (TIER 4F EMISSIONS ENGINE)

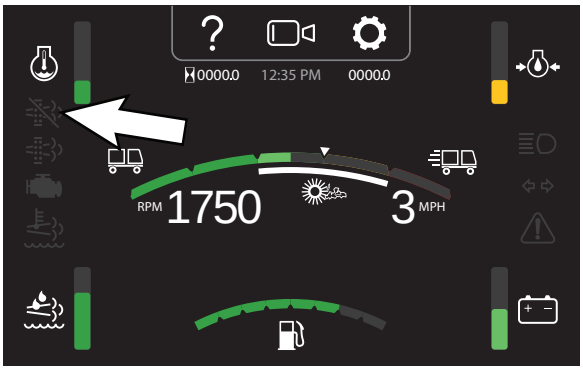
The *diesel exhaust fluid (DEF) indicator/gauge* displays the amount of DEF in the DEF tank. When there is adequate fluid in the DEF tank the bars in the gauge are dark green or light green. The bars in the gauge turn yellow when the level in the DEF tank is getting low. The bars in the gauge turn red when the level in the DEF tank nears being critically low. The indicator turns yellow when low and flashes yellow when the level in the DEF tank is critically low. See WARNING AND FAULT INDICATORS.



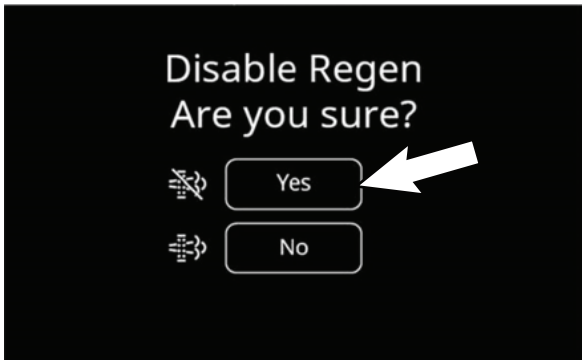
AUTOMATIC REGENERATION DISABLE BUTTON/INDICATOR (TIER 4F EMISSIONS ENGINE)

To disable automatic regeneration, press the *automatic regeneration disable button/indicator*.

NOTE: It is not recommended that automatic regeneration be disabled unless there is a safety issue (nearby combustible materials) requiring automatic regeneration be disabled.

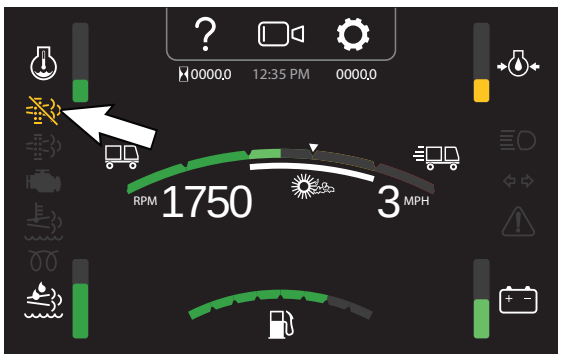


The **Disable Regen Are You Sure?** screen will appear. Press the *Yes button* to inhibit automatic regeneration and return to the operator screen. The button/indicator will illuminate when the engine automatic regeneration is disabled.

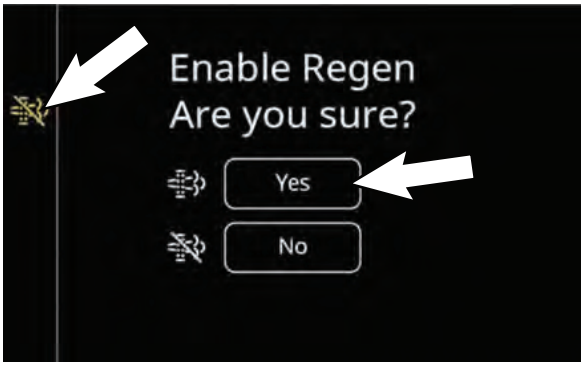


Press the *No button* to not inhibit automatic regeneration and return to the operator screen.

To enable automatic regeneration, press the illuminated *automatic regeneration disable button/indicator*.



The **Enable Regen Are You Sure?** screen will appear. Press the *Yes button* to enable automatic regeneration and return to the operator screen. The button/indicator will turn off when automatic regeneration is enabled.

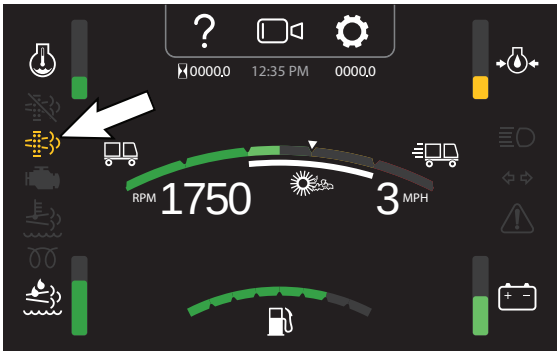


Press the *No button* to not enable automatic regeneration and return to the operator screen.

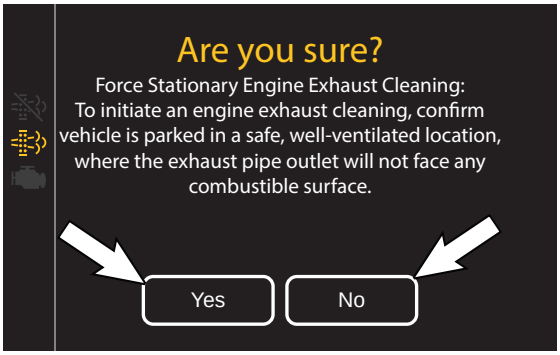
EXHAUST SYSTEM CLEANING/ REGENERATION BUTTON/INDICATOR (TIER 4F EMISSIONS ENGINE)

The *exhaust system cleaning/regeneration button/ indicator* allows the operator to force an engine regeneration. A forced engine regeneration is only allowed when the button/indicator is illuminated. No engine regeneration can occur if the indicator is not illuminated. The most likely event where a forced regeneration may be necessary is when the auto regeneration has been disabled and a regeneration is required.

When the *exhaust system cleaning/regeneration button/indicator* is yellow a forced engine regeneration will be required soon. When the *exhaust system cleaning/regeneration button/ indicator* is flashing yellow a forced regeneration is critical.



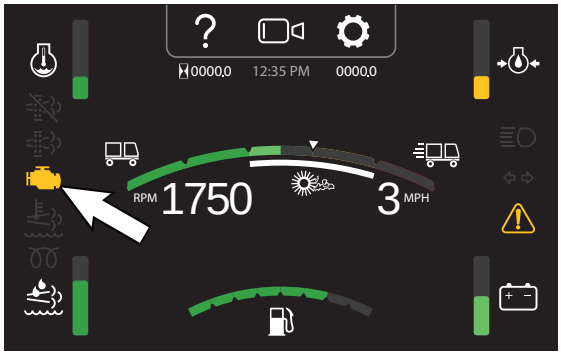
Be sure the machine is not near any combustible materials when stopping the machine and forcing an engine regeneration since the exhaust system can get very hot while the regeneration is in progress and could possibly cause a fire if near combustible materials.



The high exhaust system temperature indicator may illuminate during the forced regeneration. See HIGH EXHAUST SYSTEM TEMPERATURE INDICATOR (TIER 4F EMISSIONS ENGINE).

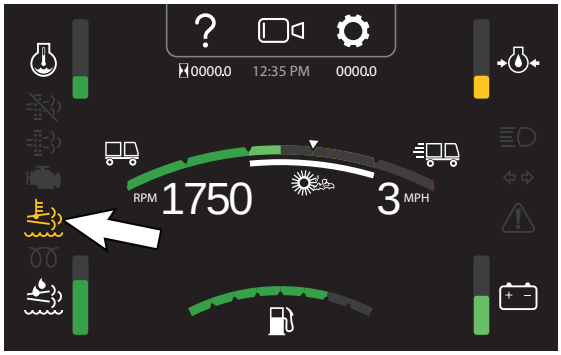
CHECK/STOP ENGINE INDICATOR

The *check/stop engine indicator* illuminates when there is an issue with the engine. When the *check/ stop engine indicator* is yellow have the engine issue checked after sweeping is completed. When the indicator flashes red there is a critical engine issue requiring immediate attention. It is recommended that the user stop using the machine immediately when the *check/stop engine indicator* is flashing red and have the engine issue investigated immediately. It is recommended the machine be towed to service when the indicator flashes red.

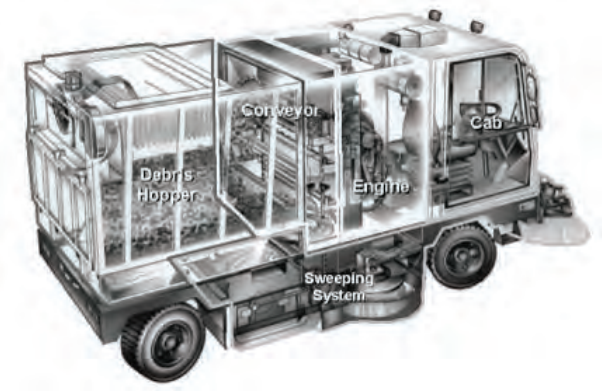


HIGH EXHAUST SYSTEM TEMPERATURE INDICATOR (TIER 4F EMISSIONS ENGINE)

The *high exhaust system temperature indicator* will illuminate yellow when the engine is very hot or regenerating. Be sure the machine is not near combustible materials when stopping the machine and forcing an engine regeneration since the exhaust system can get very hot while regeneration is in progress.



HOW THE MACHINE WORKS



The side brush(es) and Vario Sweeping Brush (option) sweep debris into the path of the main brush. The main brush sweeps debris from the surface onto the conveyer, which transfers the debris into the hopper. The vacuum system pulls dust and air through the hopper and the hopper dust filter. The clean air is then released into the atmosphere from the rear of the machine.

The machine can be equipped with a right side brush, left side brush, and Vario Sweeping Brush options. An optional wet dust control system or dry dust control system are also available.

BRUSH INFORMATION

For best results, use the appropriate brush for the cleaning application. Listed below are brushes and the applications for which each is best suited.

NOTE: The amount and type of soilage play an important role in determining the type of brush to use. Contact a Tennant representative for specific recommendations.

Polypropylene and Wire Side Brush − Recommended for moving heavy debris. Best bristle mix for moving large quantities of sand and heavier debris. The bristles fan out similar to the polypropylene brush. The wire bristles provide the ability to move heavier material.

Flat Wire Side Brush − Recommended for outdoor curb-side sweeping where dirt is heavy or compacted.

Polypropylene Side Brush − Recommended for general sweeping of light to medium debris.

WHILE OPERATING MACHINE

WARNING: Flammable materials or reactive metals can cause an explosion or fire. Do not pick up

Perform the Pre−Operation Procedures before each use (see MACHINE MAINTENANCE section of this manual).

Avoid bulky debris such as crates, boxes, tree branches, and heavy material. Avoid straps, twine, rope, etc., that could become entangled in the brushes.

Plan the sweeping in advance. Try to arrange long runs with minimum stopping and starting. Sweep as straight a path as possible. Overlap the brush paths. Use dust suppression in dusty conditions.

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.

If poor sweeping performance is observed, stop cleaning and refer to MACHINE TROUBLE-SHOOTING in this manual.

Drive the machine slowly on inclines. Use the brake pedal to control machine speed on descending inclines. Sweep with the machine up inclines rather than down inclines.

FOR SAFETY: When using machine, go slowly on inclines and slippery surfaces.

Do not operate machine in areas where the ambient temperature is above 51° C (124° F). Do not operate sweeping functions in areas where the ambient temperature is below −20° C (−4° F).

FOR SAFETY: When using machine, do not sweep on ramp inclines that exceed 20% grade or transport (GVWR) on ramp inclines that exceed 20% grade.

PRE-OPERATION CHECKLIST

Perform the following steps before operating the machine:

- ☐ Check engine air filter indicator status.
- ☐ Check engine oil level.
- ☐ Check the windshield washer fluid level.
- ☐ Check the hydraulic fluid level.
- ☐ Check the condition of the right skid and skirt.
- ☐ Check the main brush for debris and wear.
- ☐ Check the main brush pattern.
- ☐ Lubricate the right side conveyor and main brush linkage.
- ☐ Check for debris wrapped around the right side brush motor shaft and check the brush for wear.
- ☐ Check the tires for damage and proper inflation.
- ☐ Tilt the hopper back and check the condition of the hopper-to-conveyor seal.
- ☐ Check the condition of the hopper dust filter and filter seals.
- ☐ Check the condition of the conveyor paddle and chain.
- ☐ Clean and lubricate the conveyor chain o-rings.
- ☐ Check the condition of the left skid and skirt.
- ☐ Lubricate the left side conveyor and main brush linkage.
- ☐ Check for debris wrapped around the left side brush motor shaft and check the brush for wear (if equipped).
- ☐ Confirm engine coolant is visible in the level site gauge located at the top of the radiator.
- ☐ Confirm both the hydraulic cooler and the radiator fins are clean.
- ☐ Check the wet dust control systems and nozzles (if equipped).
- ☐ Confirm the water tank is full.
- ☐ Inspect vacuum wand hose (if equipped).
- ☐ Inspect the pressure washer hose (if equipped).
- ☐ Check the pressure washer wand (if equipped).
- ☐ Check brakes and steering for proper operation.
- ☐ Confirm the horn, headlights, taillights, safety lights, and backup alarm (if equipped) are operational.
- ☐ Empty debris from hopper.
- ☐ Check the service records to determine maintenance requirements.

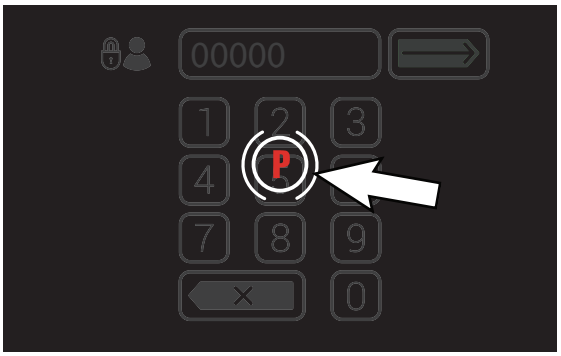
STARTING THE MACHINE

1. Sit in the operator seat and fasten the seat belt.

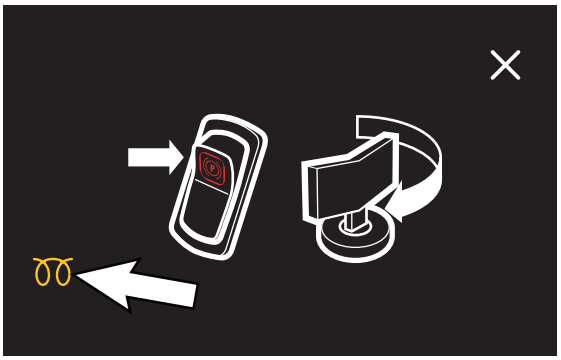
NOTE: The machine will not propel unless the operator is in the seat.

2. Press the *parking brake switch* to set the parking brake.

NOTE: The machine will not start unless parking brake switch is set. Set the parking brake switch. Access to the touchscreen login is inhibited until the parking brake switch is set.



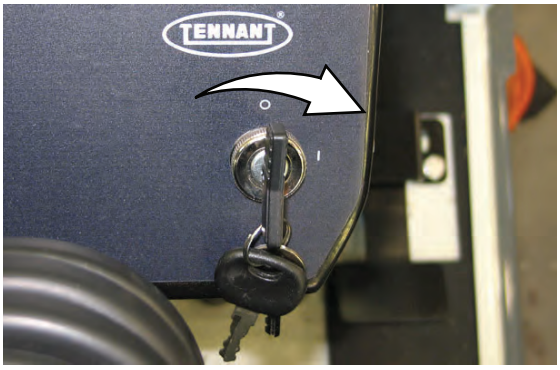
3. If machine is being operated in areas 10° C (50° F) or colder: Turn the ignition switch key clockwise approximately a 1/4 turn until the touchscreen illuminates (do not start the machine). Wait for the illuminated engine pre-heat light to go out.



NOTE: The preheat is not necessary if the temperature is above 10° C (50° F).

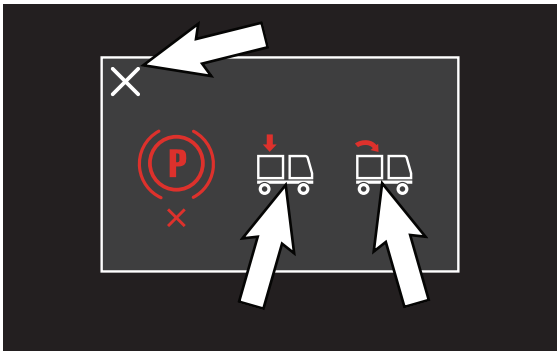
NOTE: The machine can be started without first pre-heating in temperatures below 10° C (50° F), but additional time will be required to allow the machine to warm up.

4. Turn the ignition switch key completely clockwise to start the machine.



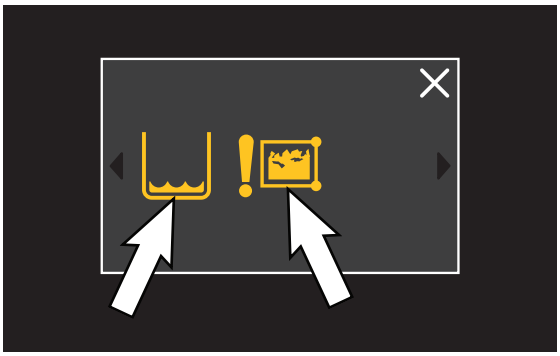
NOTE: Do not operate the starter motor for more than 10 seconds at a time or after the engine has started. Allow the starter to cool between starting attempts or damage to the starter motor may occur.

NOTE: If the hopper is not completely lowered at time of startup, an alert to lower hopper will appear. Lower the hopper. The machine cannot sweep if the hopper is raised or tilted. Touch the (X) button to close the alert window.

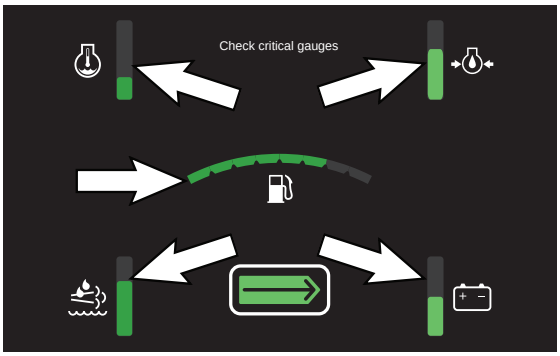


NOTE: Parking brake switch must be set before the hopper can be lowered. A green check mark (✓) appears under the parking brake image when the parking brake switch is set.

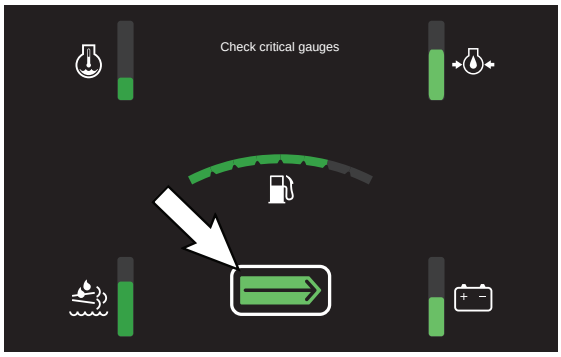
NOTE: A service indicator window displaying engine and other machine performance alerts may also appear before engine startup and log in. Touch the (X) button to close the alert window. See WARNINGS, FAULTS, AND INHIBITS for additional information about faults, causes, inhibits, and the remedies in the event of a warning, fault, or inhibit.



5. Allow the engine to operate for at least 30 seconds at low idle before increasing the idle.
6. Machines with operator login enabled: Login to the machine operating system. See LOGIN SCREEN.
7. Machines with operator pre-operation checklist enabled: Complete the operator pre-operation checklist. See COMPLETING THE PRE-OPERATION CHECKLIST.
8. The check gauges screen appears on the touchscreen.



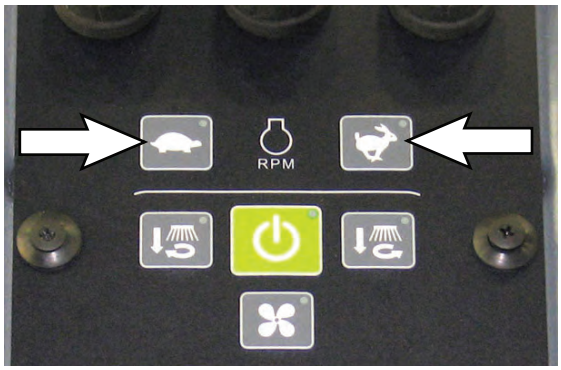
9. Observe the critical engine machine operating levels on the engine temperature indicator, oil pressure indicator, battery charge indicator, fuel level indicator, and DEF (Diesel Exhaust Fluid) tank indicator (Tier 4F emissions engine machines only). Take the necessary action(s) to correct the operating levels before operating the machine.
10. Press the green arrow to proceed to the operator screen.



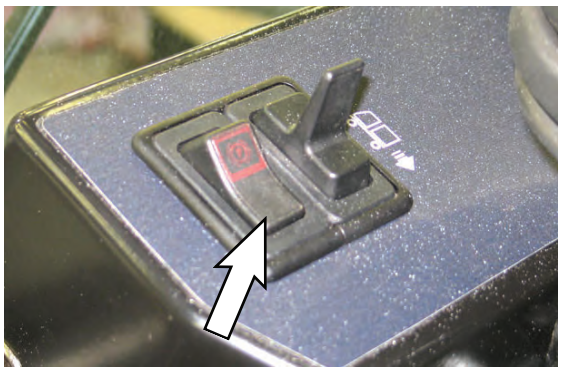
11. Allow the engine and hydraulic system to warm up for 3-5 minutes at low idle (900 RPM).

WARNING: Engine emits toxic gases. Severe respiratory damage or asphyxiation can result. Provide adequate ventilation. Consult with your regulatory agency for exposure limits. Keep engine properly tuned.

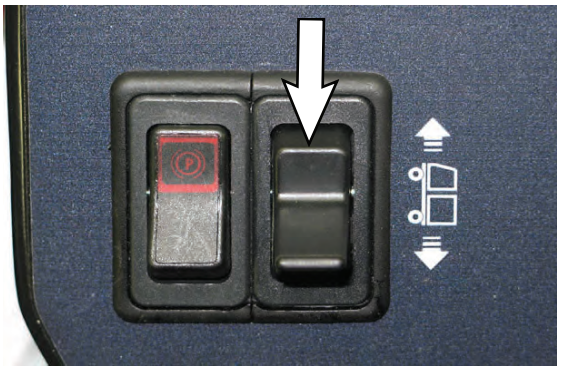
12. Adjust the idle to the desired engine speed.



13. Place foot on *brake pedal* and press the *parking brake switch* to release the parking brake.



14. Place the *directional switch* in the Forward or Reverse position.

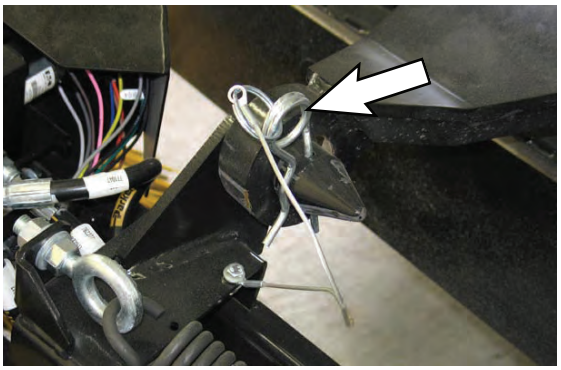


15. Release the *brake pedal* and press the *propel pedal* to transport the machine. The more foot pressure on the *propel pedal*, the faster the machine will travel.

NOTE: The machine will not propel unless the operator is in the seat and the parking brake switch is released.

16. Drive the machine to the area to be swept.

    Machines with Vario Sweeping Brush option: When transporting to the sweeping area, lock the brush into the travel support with the guide pin. See VARIO SWEEPING BRUSH (OPTION).

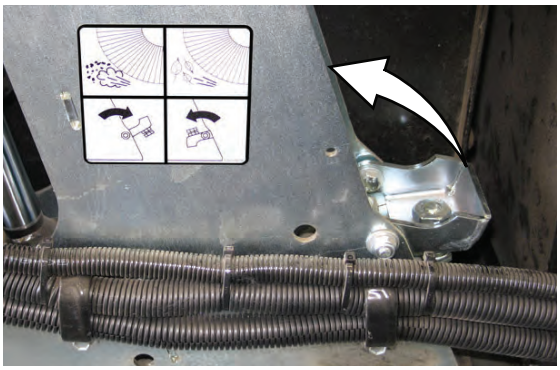


FOR SAFETY: When using machine, always follow safety and traffic rules.

SWEEPING

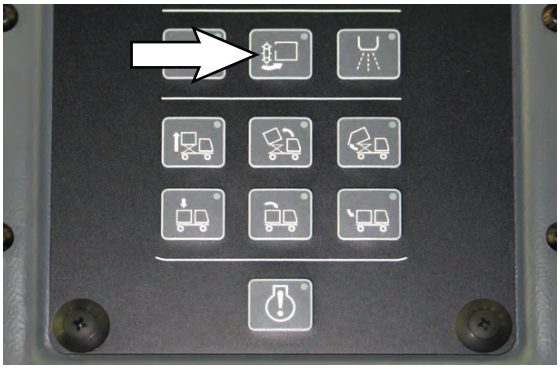
1. Machines with Vario Sweeping Brush option: Unlock the Vario Sweeping Brush assembly. See the VARIO SWEEPING BRUSH (OPTION).

2. When sweeping light litter (leaves or light trash) ensure the conveyor stop brackets are flipped back in position on both sides of the machine.



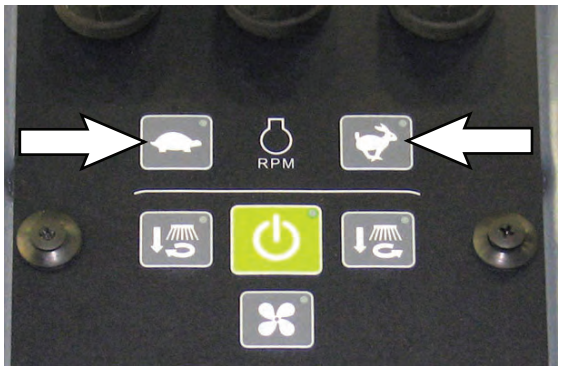
3. Ensure the hopper is in the fully lowered and tilted forward position with the hopper door closed before sweeping.

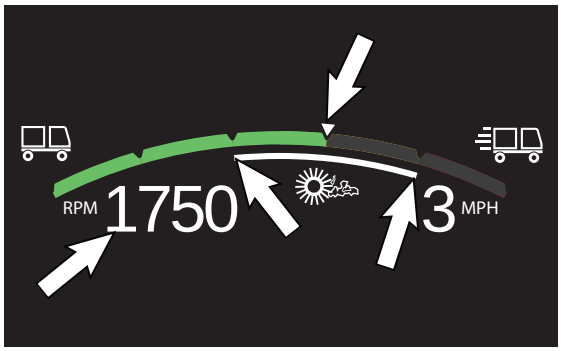
4. Ensure the *conveyor reverse button* is NOT illuminated. When the light is NOT illuminated the conveyor is in the forward sweeping direction.



5. Machines with Vario Sweeping Brush option: Start and adjust the Vario Sweeping Brush. See the VARIO SWEEPING BRUSH (OPTION).

6. Adjust the engine speed for the type of sweeping being done. Refer to the table below for recommended speeds for sweeping.

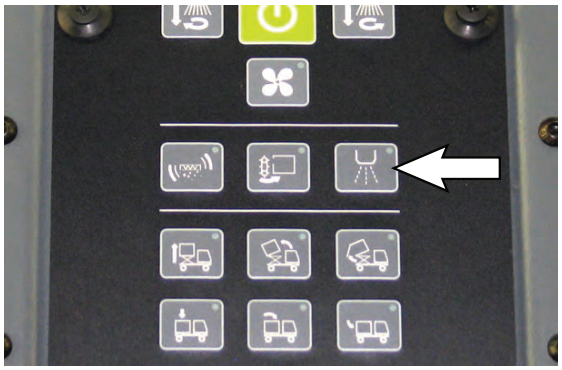


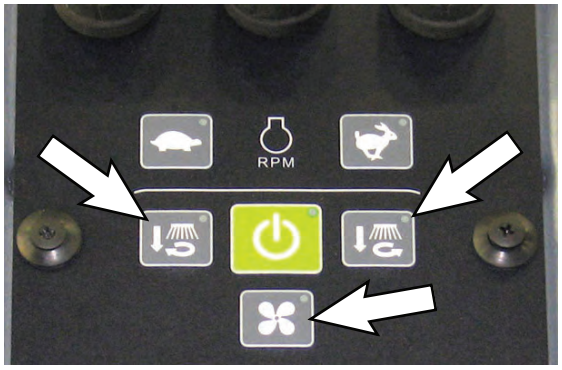


Debris	Recommended Engine RPM	Recommended Travel Speed
Fine Dust	1600 RPM	(5−8 kmh) 3−5 mph
General Debris	1750 RPM	(5−8 kmh) 3−5 mph
Light Debris (Leaves, grass) (Shake filter often)	1750 RPM	(5−8 kmh) 3−5 mph
Wet Sweeping	1950 RPM	(5−8 kmh) 3−5 mph
Heavy Debris	1950 RPM	(5−8 kmh) 3−5 mph
Vacuum Wand (Ear plugs mandatory)	2200 RPM	None

NOTE: Do NOT sweep with engine speed higher than 1950 RPM. If the engine speed is above 1950 RPM, the 1-Step button light will blink and main sweeping functions will lift and turn off after 30 seconds.

7. Press the applicable sweep function buttons required for the sweeping task to enable those functions.



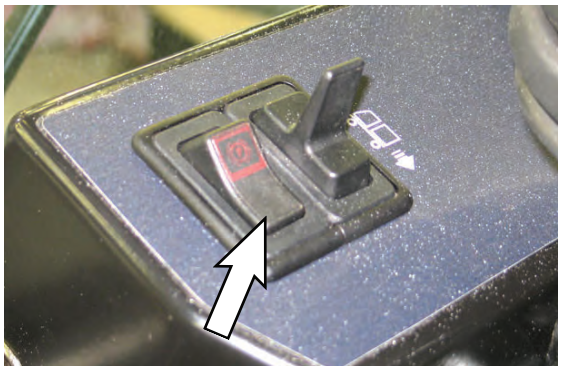


NOTE: All previously enabled sweeping functions will remain enabled if left enabled from the previous machine use. The sweeping function buttons must be pressed again to turn off the particular function.

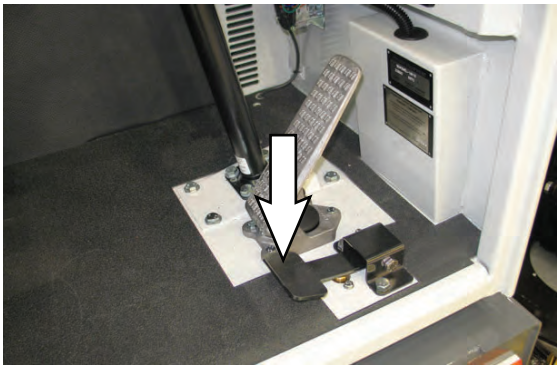
8. Press the *1-Step button* to activate all enabled sweeping functions.

NOTE: Enabled sweeping functions can be turned off while the 1-Step button is activated.

9. Press the *parking brake switch* to release the parking brake.



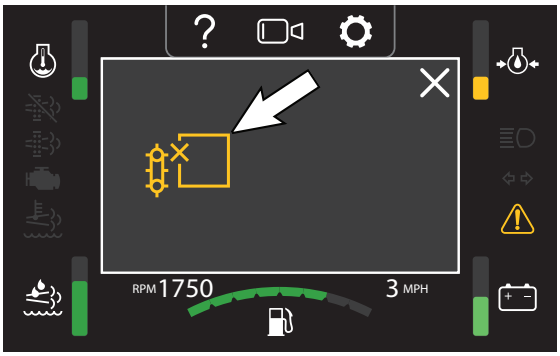
10. Press the *propel pedal* to start sweeping.



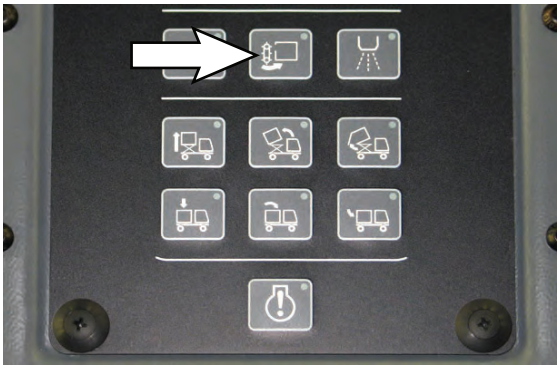
NOTE: In dusty conditions, periodically activate the hopper shaker to clean the hopper dust filter.

NOTE: Slow down sweeping speed if the conveyor overload alarm begins chirping.

11. Stop sweeping if the conveyor overload alarm sounds continuously. This alarm indicates a large object may be jammed in the conveyor, there may be too much heavy debris in the conveyor, or the hopper opening may be filled.



If a large object is jammed in the conveyor, the alarm will sound constantly even after the machine is stopped. To clear the jammed object, stop sweeping, reduce the engine speed, and press and hold the *conveyor reverse button* to place the conveyor in reverse. Release the *conveyor reverse button* to return the conveyor to forward direction. If necessary, press and hold the conveyor button multiple times to clear blockage from the conveyor.



If there is too much heavy debris in the conveyor, the alarm will sound constantly until the machine has stopped. Sweep at a slower travel speed.

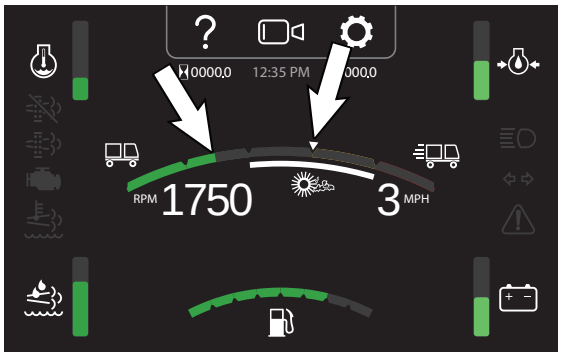
If the hopper opening is filled, the alarm will chirp intermittently. The opening can be cleared by redistributing the debris in the hopper. To clear debris from the hopper opening, stop sweeping, reduce the engine speed, and press and hold the *conveyor reverse button* to place the conveyor in reverse. Release the *conveyor reverse button* to return the conveyor to forward direction. If there is still debris in the hopper opening, stop sweeping and tilt the hopper back to clear the debris from the hopper opening. Return the hopper to the sweeping position and continue to sweep.

Sweep up any debris left due to reversing the conveyor.

SOUND LIMITING MODE (AUTOMATIC)

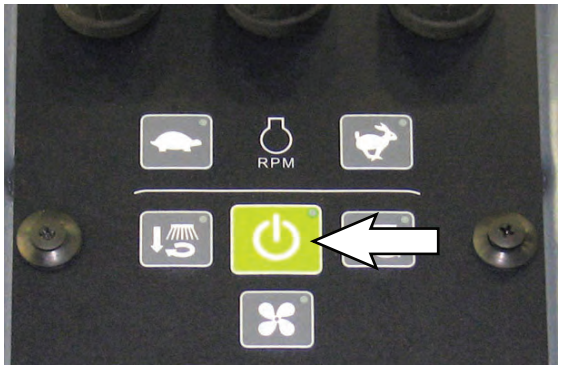
The sound limiting mode reduces the engine RPMs while the machine is stopped. Since the engine RPMs are lowered, the amount of sound made by the engine while in the higher settings will also be reduced. The sound limiting mode may also provide better fuel efficiency since fuel consumption will also be lower while the machine is in the sound limiting mode.

Once in the sound limiting mode, press the *propel pedal* or touch the *engine speed increase button* to return the machine to the RPM setting it was at before being stopped. The sound limiting mode does not activate initially when the machine is started. The machine must be propelled before the sound limiting mode activates. The sound limiting mode will also not activate after either the *propel pedal* is tapped or the speed control increase button is pressed until the machine is propelled and again stopped.

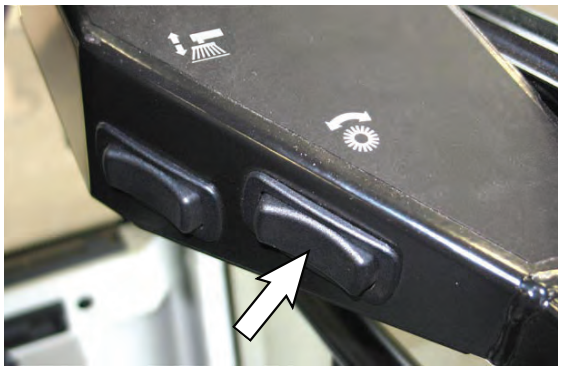


STOP SWEEPING.

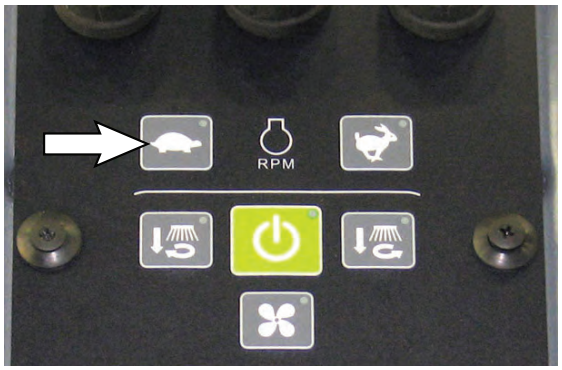
1. Press the *1-Step button* to stop all sweeping functions. The light in the *1-Step button* will go out. The lights in the enabled sweep function buttons will remain illuminated, indicating that the sweep functions are still enabled. These functions will be activated when the *1-Step button* is again activated.



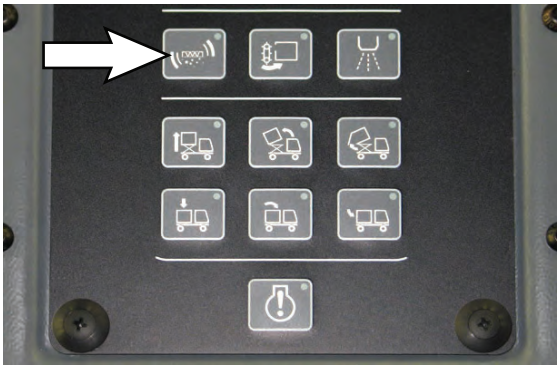
2. Machines with Vario Sweeping Brush option. Stop the Vario Sweeping Brush. See VARIO SWEEPING BRUSH (OPTION).



3. If necessary, press the *engine speed decrease button* to lower the engine to below 2200 RPMs.



4. Press the *filter shaker button* to clean the hopper filter. After a short delay, the filter shaker will operate for approximately 30 seconds. The light in the button will illuminate while the filter is shaking.



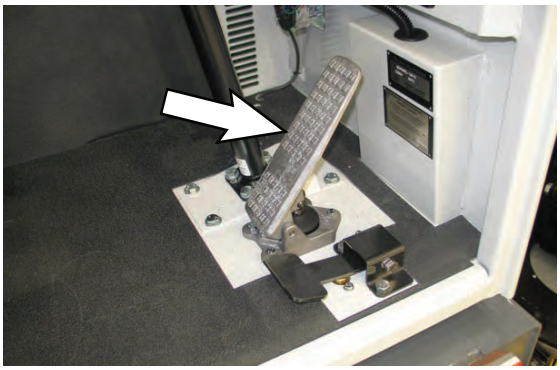
EMPTYING THE HOPPER

1. Drive the machine to the debris collection site or debris container.

2. Press the *filter shaker button*. The shaker operates for approximately 30 seconds. Press the *filter shaker button* again to stop the filter shaker.

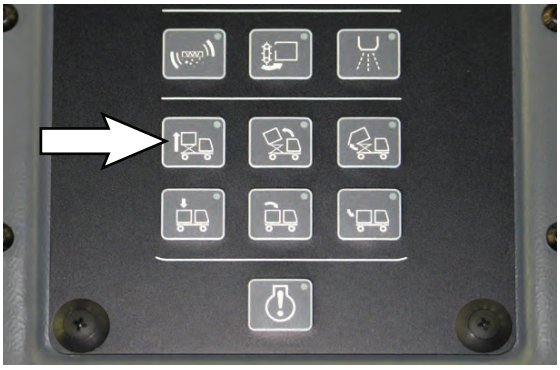
FOR SAFETY: When using machine, make sure adequate clearance is available before raising hopper. Do not raise hopper when machine is on an incline.

3. Press and hold the *service brake pedal* or set the *parking brake switch*.



NOTE: The hopper will not lift or tilt unless the parking brake switch is set or the service brake pedal is applied.

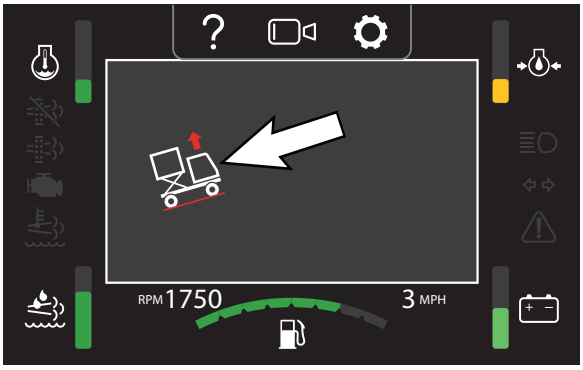
4. High Dump Machines: Press and hold the *hopper lift button* to raise the hopper to the desired height.



NOTE: The light in the button remains illuminated while the button is being pushed and an audible alarm sounds while the hopper is moving. The rear camera remains on while the hopper is moving/out of the home position (raised/tilted).

NOTE: Press the center of the camera image to turn off the rear camera while the hopper is raising.

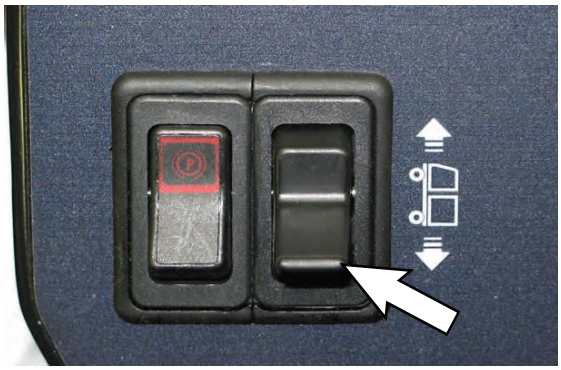
NOTE: The hopper will not raise or tilt on an unsafe incline for raising or tilting the hopper. An inhibit icon appears when the hopper raise button or hopper tilt button is pressed when the front to back incline is more than 20% and the side to side incline is more than 7%. See INHIBIT INDICATORS.



NOTE: The minimum clearance height needed to high dump the hopper is 5060 mm (199 in).

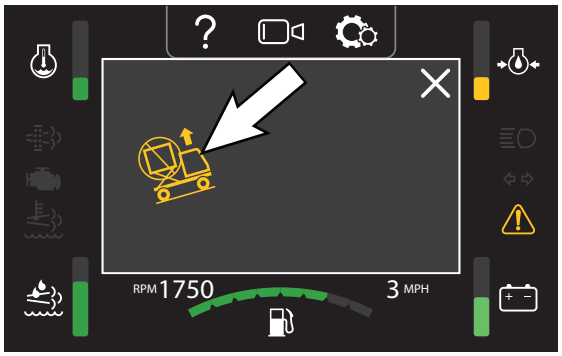
WARNING: High dump vertical clearance. Stay clear of overhead obstructions and power lines.

5. Place the *directional switch* in the reverse position, release the brake, and slowly back up to the debris site or container.

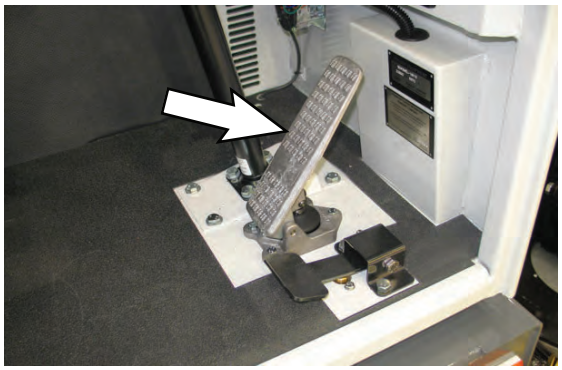


FOR SAFETY: When using machine, use care when reversing machine. Move machine with care when hopper is raised.

NOTE: Do not drive the machine onto an incline while the hopper is raised or tilted. A machine on incline icon appears if the machine is driven onto an unsafe incline while the hopper is raised or tilted. Completely lower the hopper and tilt hopper forward before moving the machine on an incline.

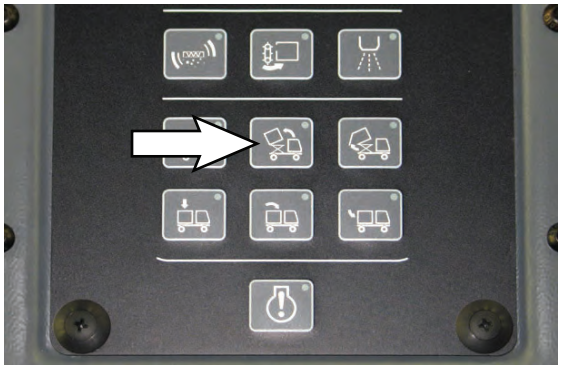


6. Press and hold the *service brake pedal* or set the *parking brake switch*.

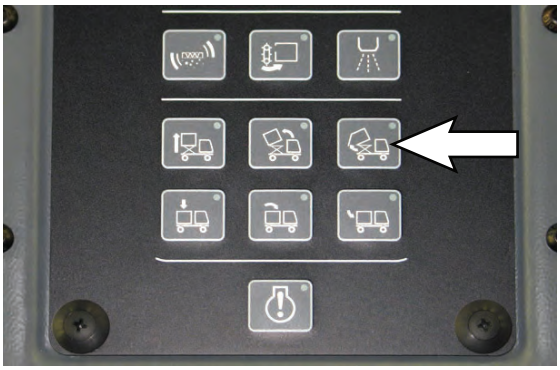


NOTE: The hopper will not lift or tilt unless the parking brake switch is set or the service brake pedal is applied.

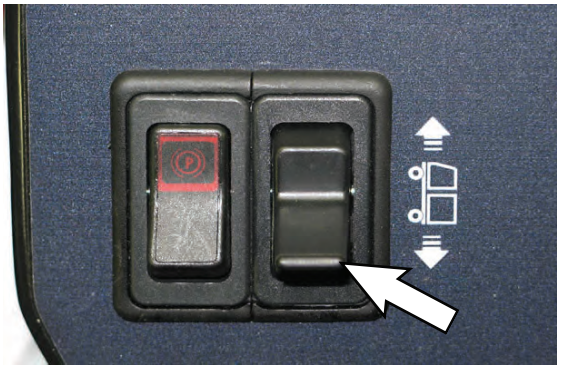
7. Press and hold the *hopper tilt back button* until the hopper is in the desired tilted position.



8. Press and hold the *hopper door open button* for 2−3 seconds to open the hopper door and empty the debris from the hopper.



9. Place the *directional switch* in the forward position, release the brake, and slowly drive the machine away from the debris site or container.

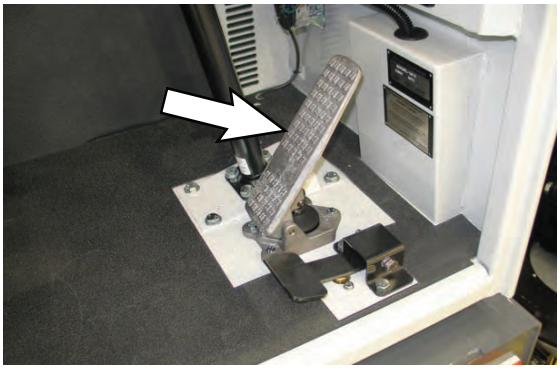


NOTE: Machine speed is limited to below 8 km/h (5 mph) when the hopper is raised or tilted.

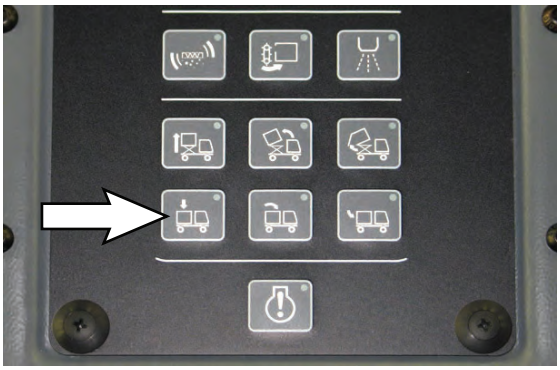
FOR SAFETY: Move machine with care when hopper is raised.

10. Press and hold the *service brake pedal* or set the *parking brake switch*.

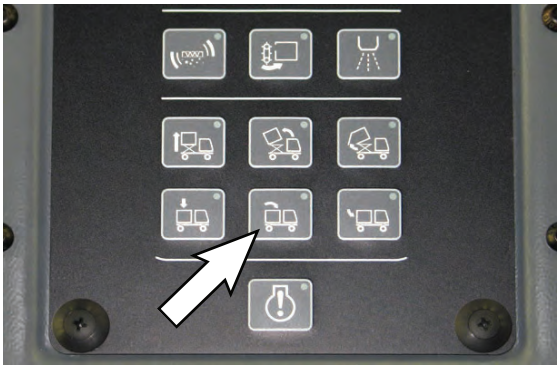
NOTE: The hopper will not lift or tilt unless the parking brake switch is set or the service brake pedal is applied.



11. High Dump Machines: Press and hold the *hopper lower button* until the hopper is completely lowered.



12. Press and hold the *hopper tilt forward button* until the hopper is completely tilted forward.

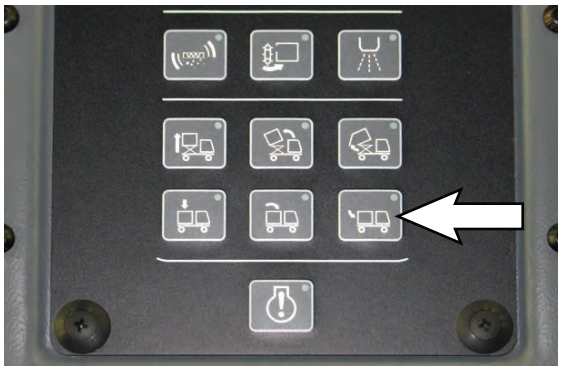


NOTE: The rear camera automatically turns off after the hopper is completely lowered and tilted forward if the directional switch is in either the neutral or forward positions. The rear camera will remain on if the directional switch is in the reverse position.

13. Press and hold the *hopper door close button* for 2−3 seconds. The hopper door will latch in the closed position.

NOTE: The hopper must be completely in the lowered/forward position to close the hopper door.

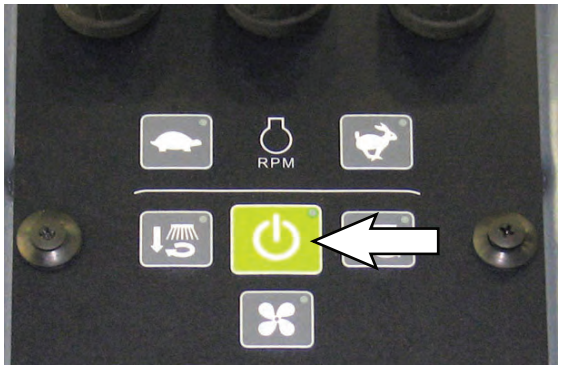
WARNING: Hopper door pinch point. Stay clear of hopper door.



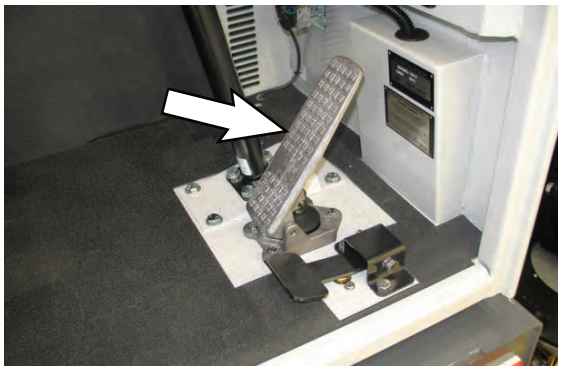
NOTE: The hopper must be completely lowered and in the completely forward position with the hopper door closed before sweeping again.

STOPPING THE MACHINE

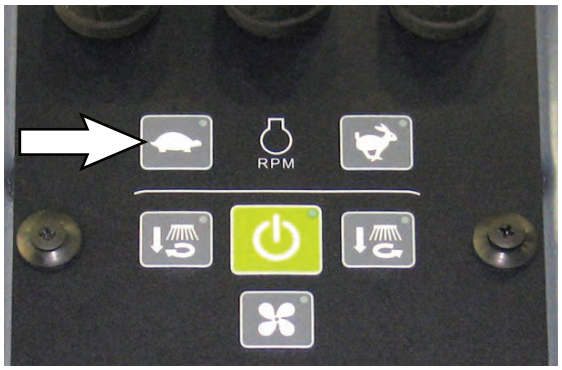
1. Press the *1-Step button* to stop sweeping. The light in the *1-Step button* will turn off.



2. Remove foot from the *propel pedal* and step on the *service brake pedal*.



3. Press the *engine speed decrease button* to lower the engine speed to idle.



4. Allow the engine to run for at least 3-5 minutes at low idle (900 RPM) before shutting the engine off to allow engine to adequately cool before shut down.

5. Press the *parking brake switch* to set the parking brake.

6. Turn the ignition switch key counterclockwise to turn off the engine. Remove the switch key.

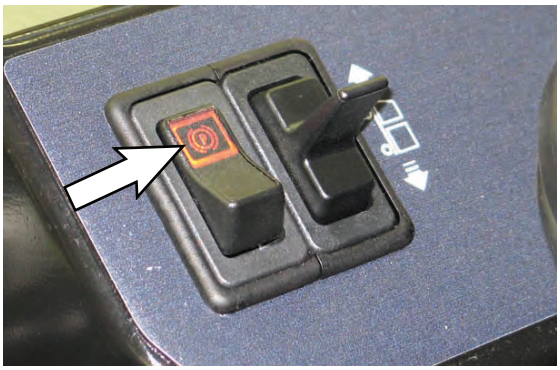
FOR SAFETY: Before leaving or servicing machine, stop on level surface, set parking brake, turn off machine, and remove key.

7. Turn off all accessories (lights, water valves, and the cab fan). Many of these accessories will remain on unless turned off, even with the machine turned off.

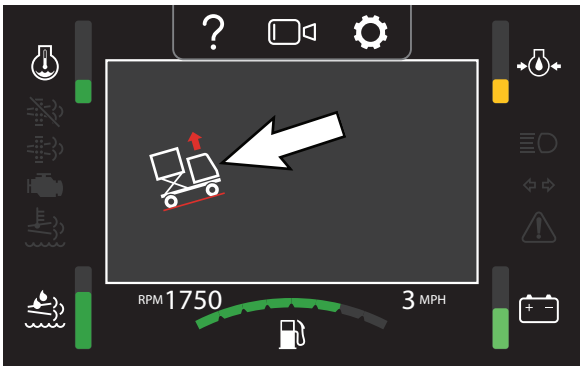
TILTING THE HOPPER BACK/ ENGAGING THE HOPPER SUPPORT PIN

1. Press the *parking brake switch* to set the parking brake.

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



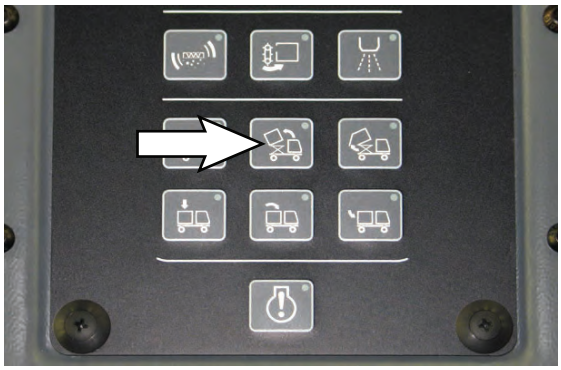
NOTE: The hopper will not raise or tilt on an unsafe incline for raising or tilting the hopper. An inhibit icon appears when the hopper raise button or hopper tilt button is pressed when the front to back incline is more than 20% and the side to side incline is more than 7%. See INHIBIT INDICATORS.



NOTE: The minimum clearance height needed to high dump the hopper is 5060 mm (199 in).

WARNING: High dump vertical clearance. Stay clear of overhead obstructions and power lines.

2. Press and hold the *hopper tilt back button* until the hopper is in the completely tilted position.



NOTE: The light in the button remains illuminated while the button is being pushed and an audible alarm sounds while the hopper is moving. The rear camera remains on while the hopper is moving/out of the home position (raised/tilted).

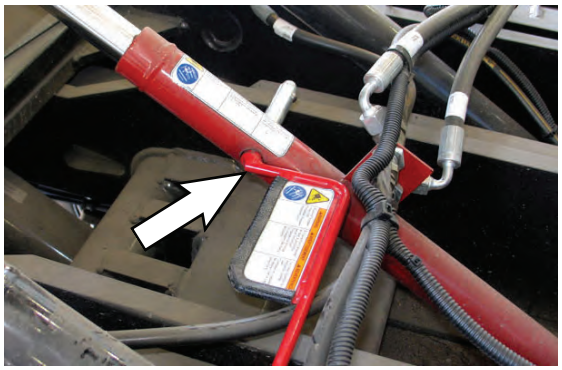
NOTE: The hopper will not lift or tilt unless the parking brake switch is set or the service brake pedal is applied.

3. Turn the ignition switch key counterclockwise to turn off the engine. Remove the switch key.

4. Remove the hopper support pin from the storage location on the right rear fender.

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

5. Insert the hopper support into the hole of the hopper support cylinder to secure the hopper in the tilted position.

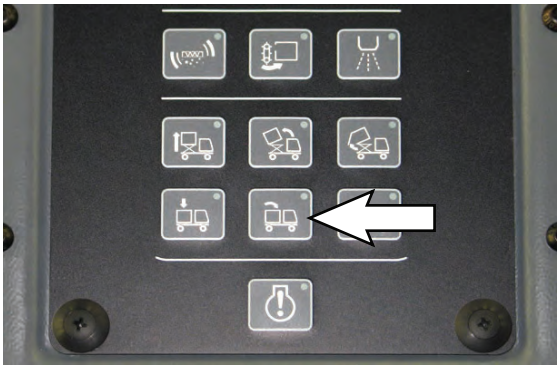


DISENGAGING THE HOPPER SUPPORT PIN/TILTING HOPPER FORWARD

1. Remove the hopper support pin from the hopper support cylinder and return the hopper support pin to the storage location on the right rear fender.

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

2. Press and hold the *hopper tilt forward button* until the hopper is completely forward.



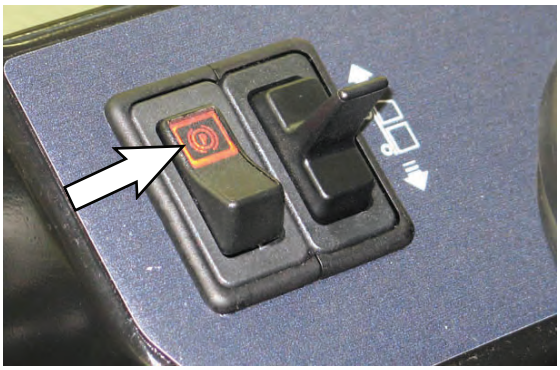
NOTE: The light in the button remains illuminated while the button is being pushed and an audible alarm sounds while the hopper is moving. The rear camera remains on while the hopper is moving/out of the home position (raised/tilted).

NOTE: The hopper will not lower or tilt unless the parking brake switch is set or the service brake pedal is applied.

3. Turn the ignition switch key counterclockwise to turn off the engine. Remove the switch key.

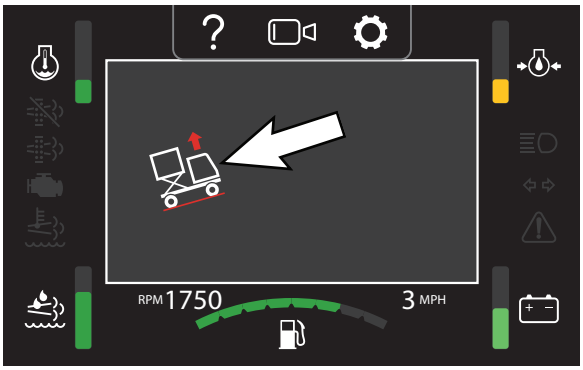
RAISING THE HOPPER/ENGAGING THE HOPPER SUPPORT BAR (High Dump Option)

1. Press the *parking brake switch* to set the parking brake.



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

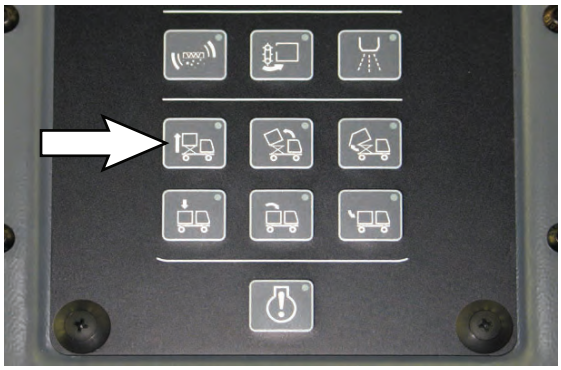
NOTE: The hopper will not raise or tilt on an unsafe incline for raising or tilting the hopper. An inhibit icon appears when the hopper raise button or hopper tilt button is pressed when the front to back incline is more than 20% and the side to side incline is more than 7%. See INHIBIT INDICATORS.



NOTE: The minimum clearance height needed to high dump the hopper is 5060 mm (199 in).

WARNING: High dump vertical clearance. Stay clear of overhead obstructions and power lines.

2. Press and hold the *hopper lift button* until the hopper is completely raised.



NOTE: The hopper will not lift or tilt unless the parking brake switch is set or the service brake pedal is applied.

3. Remove the hopper support bar from the storage location on the right side of the lift arms.

4. Place the support bar behind the horizontal bar of the lift arms.

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

5. Align the tabs of the support bar with the shaft of the lift arms. Orient the longer tabs toward the front of the machine.

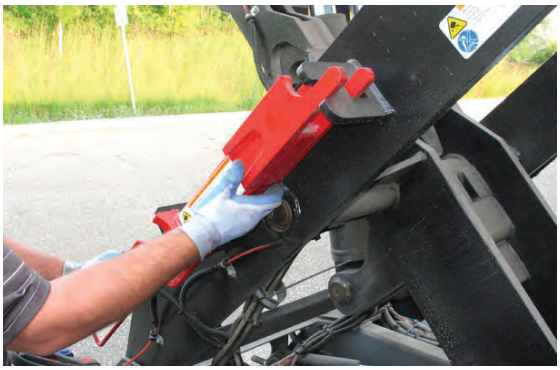
6. Place the base part of the support bar on top of the lift cylinders. Then release the bar.

7. Turn the ignition switch key counterclockwise to turn off the engine. Remove the switch key.

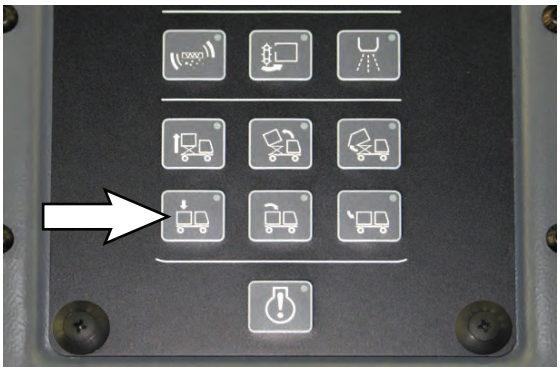
DISENGAGING THE HOPPER SUPPORT BAR/LOWERING THE HOPPER (High Dump Option)

1. Remove the support bar from lift arms and fasten it in the storage location on the right side of the lift arms.

NOTE: It may be necessary to lift the hopper if the hopper has lowered down onto the support bar while the hopper was raised.



2. Press and hold the *hopper lower button* until the hopper is completely lowered.



NOTE: The hopper will not lower or tilt unless the parking brake switch is set or the service brake pedal is applied.

3. Turn the ignition switch key counterclockwise to turn off the engine. Remove the switch key.

TILTING THE CAB (MANUALLY)

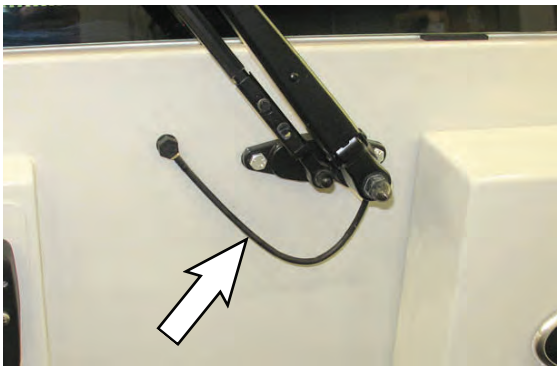
The cab can be manually tilted forward to access components under the cab.

CAUTION: Do not attempt to tilt the cab without the use of an overhead motorized trolly hoist.

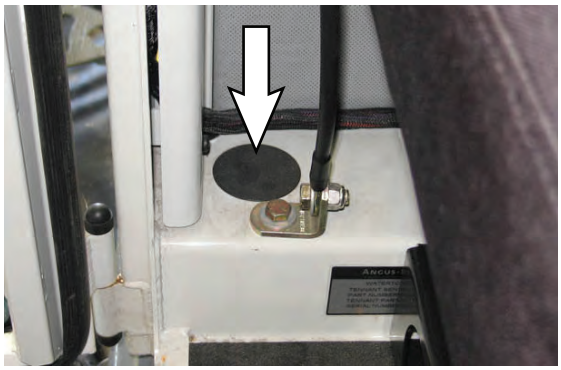
FOR SAFETY: Before leaving or servicing machine, stop on level surface, set parking brake, turn off machine, and remove key.

1. Secure or remove all loose items from inside the cab.
2. Disconnect both door springs from the back of the cab. The springs can remain attached to the engine access doors.

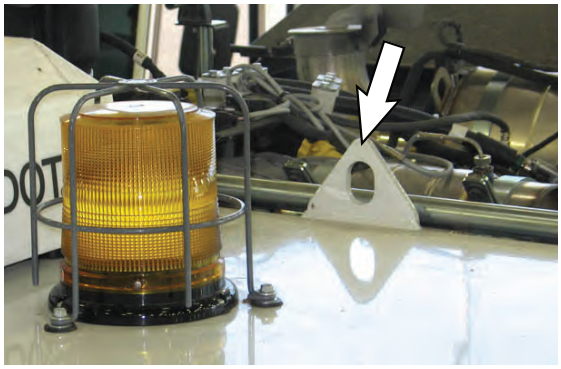
3. Pinch the windshield wiper hose with a small cable tie or clamp.



4. Remove the plug covering the access hole and remove the hardware securing the rear corners of the cab to the frame of the machine.

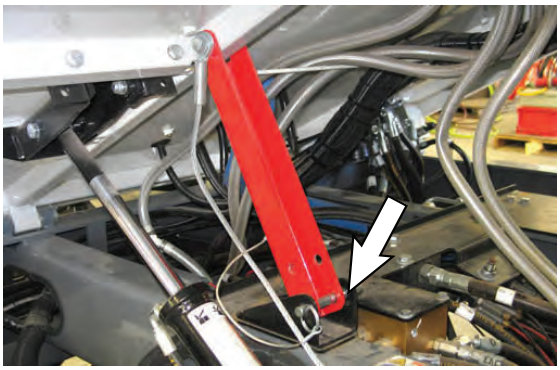


5. Attach a chain from the overhead hoist to the hook on the top rear part of the cab. Tilt the cab far enough to engage the cab support bar.



6. Align the lower hole of the support bar with the machine frame, then install the pin into lower hole to engage the cab support bar.

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



7. Keep the chain from the overhead hoist attached for added support.
8. To lower the cab, disengage the cab support and use the hoist to lower the cab.

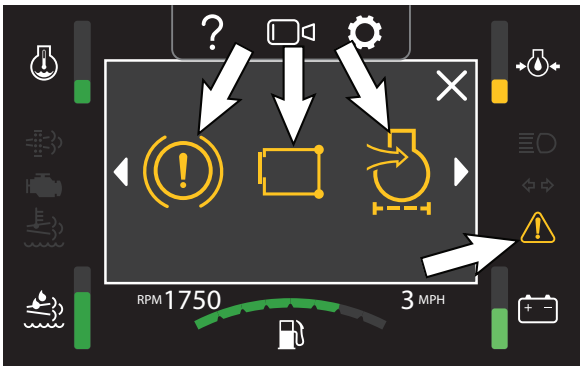
9. Reinstall the hardware to secure the cab, remove the cable tie/clamp from the windshield wiper fluid hose, and reinstall both door springs onto the back of the cab.

WARNINGS, FAULTS, AND INHIBITS

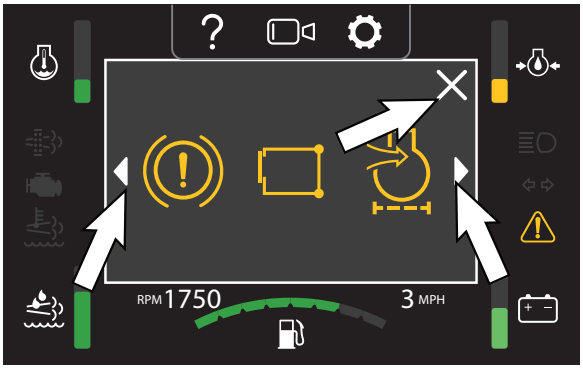
SERVICE INDICATOR/BUTTON

The *alert indicator/button* will illuminate yellow when a machine fault is active. Press the *alert indicator/button* to view the alert window.

NOTE: Faults appear on the alert window from the right to the left in order of occurrence, not severity of the fault.

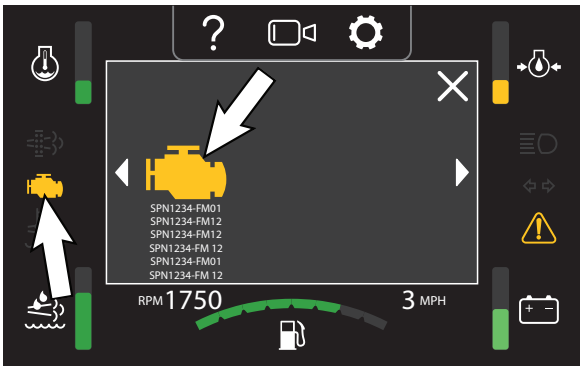


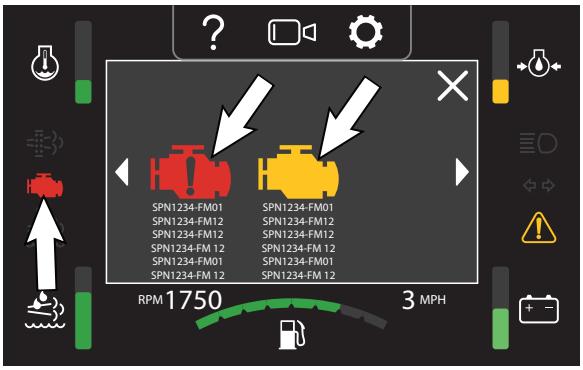
Press the right and left arrow button to view additional faults if there are more than three faults. Press the close window button (X) to close the alert window.



ENGINE MAINTENANCE ALERT INDICATOR

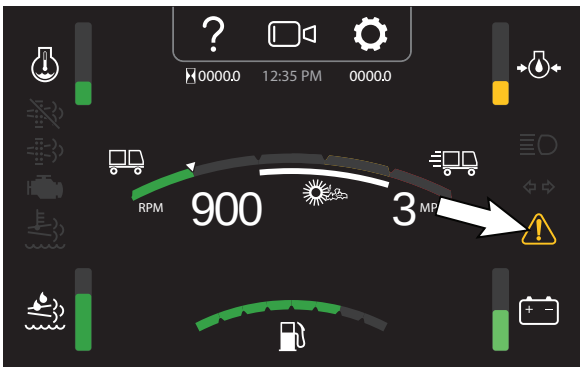
The *engine maintenance alert indicator* will appear yellow if the fault is a check engine fault or red if the fault is a stop engine fault. The *engine maintenance alert indicator* will flash red when automatic engine shut down is imminent. Either a yellow engine icon (check engine) with fault codes listed below or a red engine icon (stop engine) with fault codes listed below will appear in the alert window. For some engine faults both red engine icons and yellow engine icons will appear in the alert window. Multiple engine fault codes can appear under each icon.





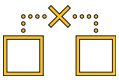
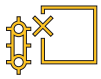
Press the *close button (X)* located in the upper right corner of the alert window to close the window.

Press the *alert indicator/button* to reopen the alert window after it has been closed.



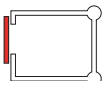
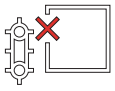
WARNING AND FAULT INDICATORS

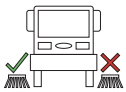
Fault indicators appear in response to a machine issue requiring operator attention. Refer to the following table for the corresponding cause(s) and solution(s) to the fault(s).

Icon	Fault	Cause	Solution
	Low brake pressure	Hydraulic fluid low	Add hydraulic fluid
	Clogged engine air filter	Engine air filter is clogged	Clean dust/debris from engine air filter
	Communication error	Communication issue between main board, control board, or engine	Call Tennant Service Representative
	Stop engine	Critical engine error where continued use could damage engine	Turn off machine as soon as it is safe to do so and correct engine error
	Check engine	Non-critical engine error. Continued use will not damage engine, but performance may be diminished	Correct engine error
	Call service	Machine maintenance issue	Call Tennant Service Representative
	Hopper full	Hopper is full	Empty hopper
	Water tank low (wet dust control/high pressure washer options only)	Wet dust control/high pressure washer tank is empty	Fill solution tank
	Hopper door open (when hopper is home)	The hopper door is open	Close hopper door
	Conveyor blocked	Debris blocking conveyor	Clear blockage from conveyor
	Machine on incline	Machine on unsafe incline for hopper raised	Do not continue to propel machine. Lower hopper immediately
	Hopper fire	Thermo-Sentry detects fire/excessive heat in hopper	Extinguish fire. Key off/key on machine
	Water pump	Water valve(s) are closed or a maintenance issue with dust control water pump	Ensure water valve(s) are open
	Call service	Machine repair issue	Turn off machine. Call Tennant Service Representative.

INHIBIT INDICATORS

Inhibit icons appear in response to a rejected attempt to activate a function (push a touchscreen button or membrane button) not allowed due to machine operating status. The cause to the inhibit must be corrected before the selected function can be used. Refer to the following table for the cause(s) and solution(s) of the inhibit(s).

Inhibit Icon	Inhibit	Cause	Solution
	Call service	Selected function will not operate due to machine issue	Call Tennant Service Representative
	Filter shaking	Selected function will not operate due to filter shaking	Wait for filter to stop shaking
	Machine not level	Selected function will not operate due to machine not on level surface for tilting/raising hopper	Move machine to a level surface to tilt/raise hopper
	Hopper door open	Selected function will not operate due to hopper door being open	Close hopper door
	Hopper home	Selected function will not operate due to hopper being completely lowered/tilted forward	Raise hopper/tilt hopper back
	Hopper not home	Selected function will not operate due to hopper not being completely lowered and tilted forward	Completely lower hopper/tilt hopper forward
	*1-Step button*	Selected function will not operate due to *1-Step button* being activated	Press *1-Step button* to deactivate 1-Step
	Machine in reverse	Selected function will not operate due to *directional switch* being in reverse	Place *directional switch* in either neutral or forward position
	Conveyor/Wand door closed	Selected function will not operate due to conveyor/wand door being closed	Open conveyor/wand door
	Hopper fire	Selected function will not operate due to Thermo-Sentry detecting fire/ excessive heat in hopper	Extinguish fire and key off/key on machine
	Blocked conveyor	Selected function will not operate due to debris blocking conveyor	Clear blockage from conveyor
	Low solution	Selected function will not operate due to low solution (machines with dust control/power wand option only)	Fill solution tank

Inhibit Icon	Inhibit	Cause	Solution
	RPM too low	Selected function will not operate due to engine RPM being too low	Raise engine RPM
	RPM too high	Selected function will not operate due to engine RPM being too high	Lower engine RPM
	No hopper lift	Selected function will not operate due to machine not being equipped with optional hopper high lift	Hopper high lift option unavailable. Button inactive
	No wet dust control	Selected function will not operate due to machine not being equipped with optional dust control	Wet dust control unavailable. Button inactive
	No hopper lower	Selected function will not operate due to machine not being equipped with optional hopper high lift	Hopper lower option unavailable. Button inactive
	Side brush not installed	Selected function will not operate due to machine not being equipped with optional side brush	Side brush option unavailable. Button inactive
	Parking brake switch is set	Selected function will not operate due to parking brake	Release parking brake switch

NOTE: Contact a Tennant Service representative for all other fault codes.

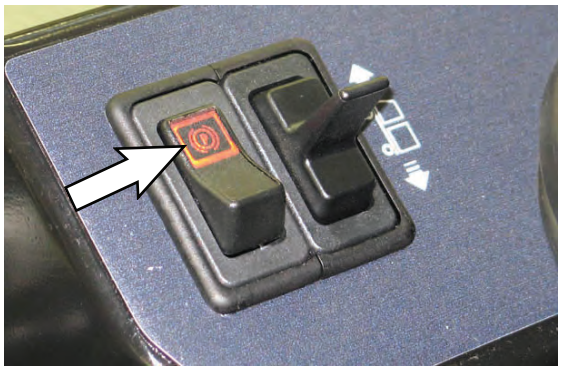
OPTIONS

HIGH PRESSURE WASHER (OPTION)

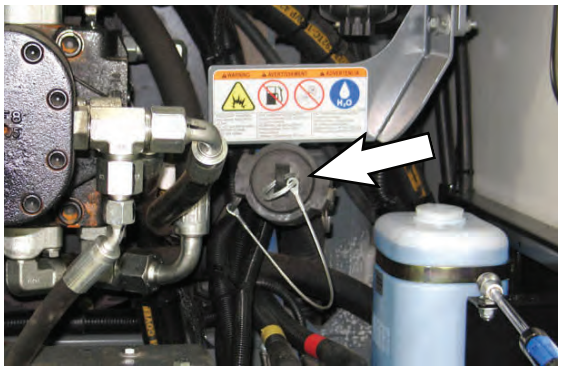
The high pressure washer can be used to clean the machine and clean areas the machine cannot access.

NOTE: Do NOT spray water on electrical components when using the high pressure washer to clean the machine.

1. Press the *parking brake switch* to set the parking brake.

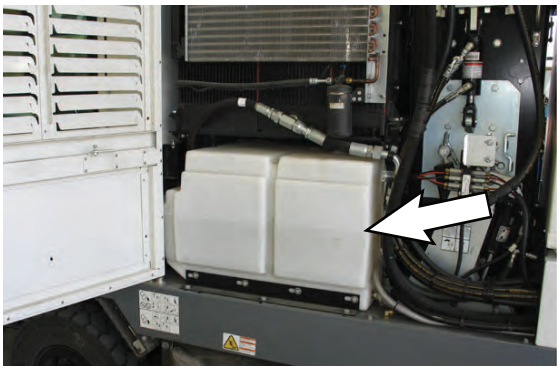


2. Ensure the high pressure washer/wet dust suppression water tank is filled Fill the tank if necessary. The fill spout is located behind the engine access door on the right side of the machine.

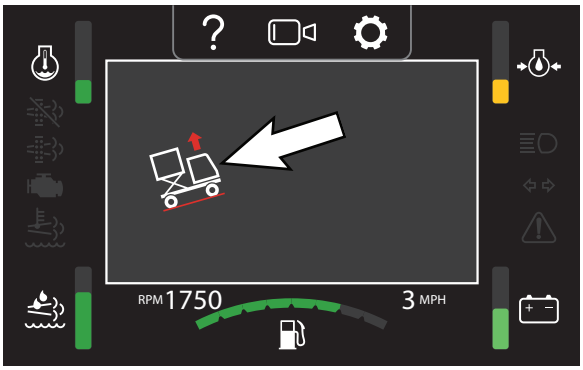


WARNING: Flammable materials can cause explosion or fire. Do not use flammable materials in tank. Only use water.

The water tank is located behind the access door on the left side of the machine. Check the water level on the side of the water tank.



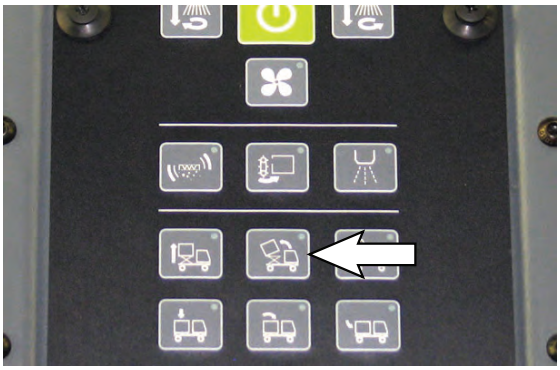
NOTE: The hopper will not raise or tilt on an unsafe incline for raising or tilting the hopper. An inhibit icon appears when the hopper raise button or hopper tilt button is pressed when the front to back incline is more than 20% and the side to side incline is more than 7%. See INHIBIT INDICATORS.



NOTE: The minimum clearance height needed to high dump the hopper is 5060 mm (199 in).

WARNING: High dump vertical clearance. Stay clear of overhead obstructions and power lines.

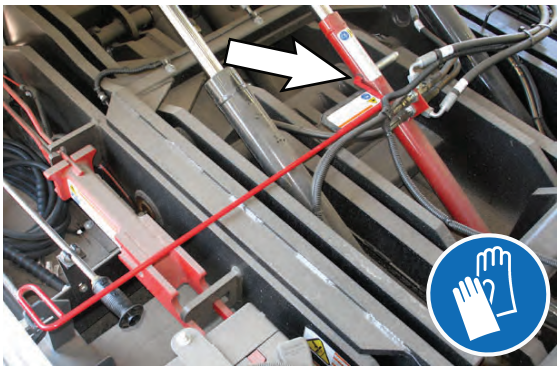
3. Press and hold the *hopper tilt back button* until the hopper is completely tilted back, allowing access to the high pressure washer hose and wand storage location.



NOTE: The hopper will not lift or tilt unless the parking brake switch is set or the service brake pedal is applied.

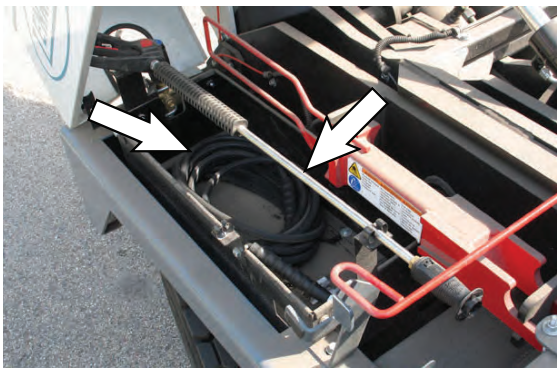
WARNING: Lift arm pinch point. Stay clear of hopper lift arms.

4. Engage the hopper support pin. See ENGAGING THE HOPPER SUPPORT PIN.



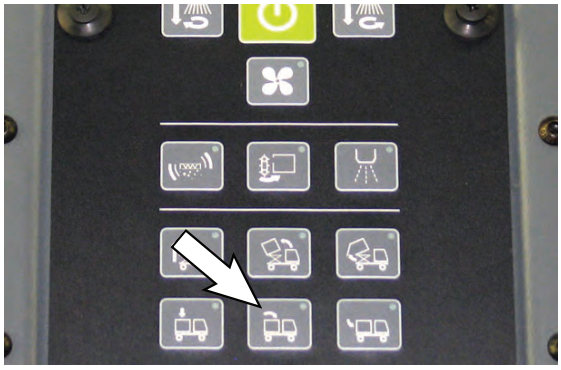
WARNING: Raised hopper may fall. Engage hopper support pin.

5. Remove the high pressure washer hose and wand from the storage location.



6. Remove the hopper support pin and return the hopper support pin to the storage location.

7. Press the *hopper tilt forward button* to tilt the hopper completely forward.



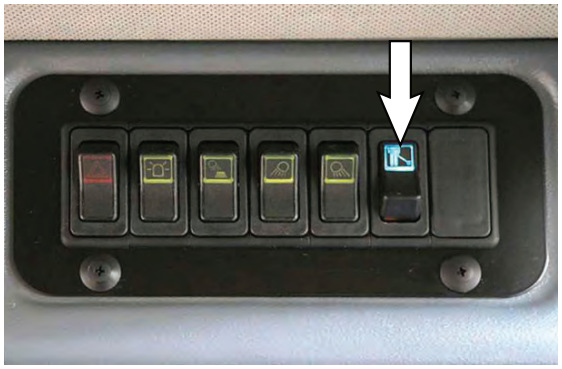
8. Connect the high pressure washer hose to the high pressure washer receptacle.

9. Connect the wand to the high pressure washer hose.

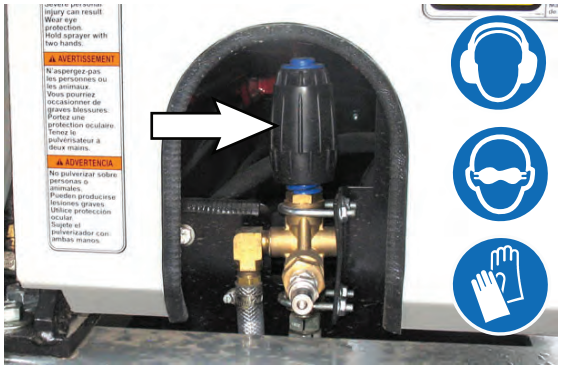
10. Ensure the operator screen is displayed on the touchscreen.

NOTE: The high pressure washer will not operate in any other screen other than the operator screen. If necessary, close other screens until only the operator screen is displayed on the touchscreen.

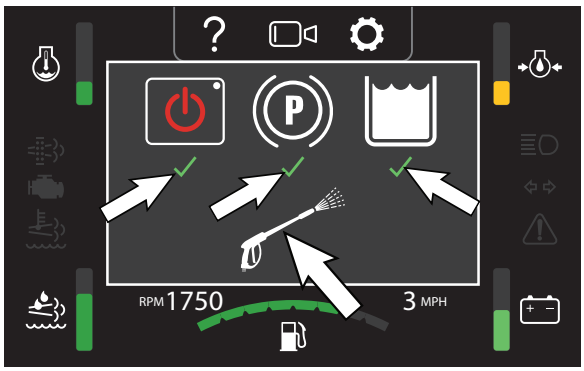
11. Press the top of the *high pressure washer switch* to enable the high pressure washer system. The machine will automatically go to correct RPM for high pressure washer operation.



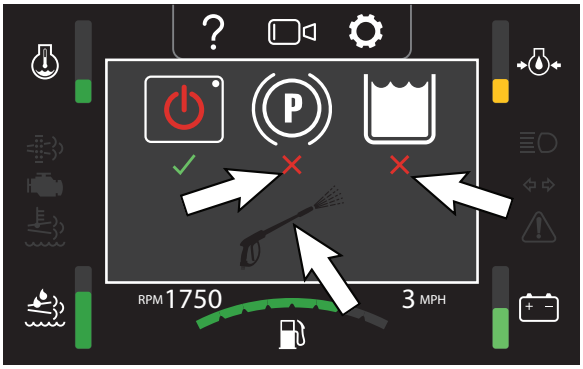
12. Adjust the high pressure washer pressure. Turn the high pressure washer pressure knob clockwise to increase the washer pressure and counterclockwise to decrease the washer pressure.



13. Observe the high pressure washer screen. There should be a check mark (√) under the *1-Step button*, parking brake, water tank icons and the high pressure washer icon should be white.



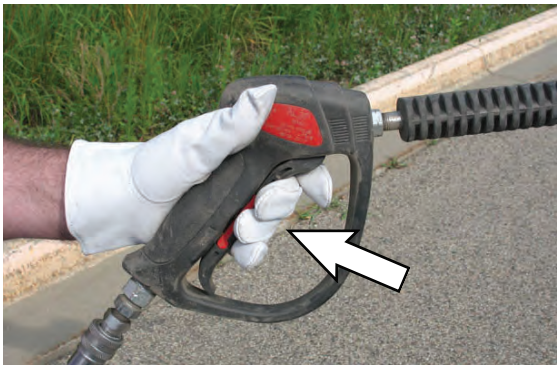
14. If there is an X under any of the icons and the high pressure washer icon is black, correct the problem(s) preventing the high pressure washer from operating. The high pressure washer will not operate until all errors are corrected.



NOTE: The high pressure washer will not operate if the camera screen or a fault, warning, or inhibit screen is on the touchscreen. Close the camera fault, warning, or inhibit screens before using the high pressure washer.

15. Point the high pressure washer wand in the direction of the area to be cleaned and squeeze the trigger to begin cleaning.

WARNING: Do not spray people or animals. Severe personal injury can result. Wear eye protection. Hold sprayer with two hands.



16. When finished using the high pressure washer, press the bottom of the high pressure washer button to turn off the high pressure washer system.

17. Point the high pressure washer wand in a safe direction and squeeze the trigger to relieve pressure from the system.

18. Disconnect the high pressure washer hose from the high pressure washer receptacle and disconnect the high pressure washer wand from the high pressure washer hose.

19. Press and hold the *hopper tilt back button* until the hopper is completely tilted back, allowing access to the high pressure washer hose and wand storage location.

20. Turn off the machine.

21. Engage the hopper support pin. See ENGAGING THE HOPPER SUPPORT PIN.

22. Return the hose and wand to the storage location.

23. Remove the hopper support pin from the hopper leg. See DISENGAGING THE HOPPER SUPPORT PIN.

24. Turn on the machine.

25. Press and hold the *hopper tilt forward button* until the hopper is completely tilted forward.

VARIO SWEEPING BRUSH (OPTION)

The Vario Sweeping Brush allows side brush sweeping on the left or right side of the machine. The brush arm moves along the front of the machine. The brush angle, movement, front and side tilt, and direction of rotation are adjusted for the right or left side.

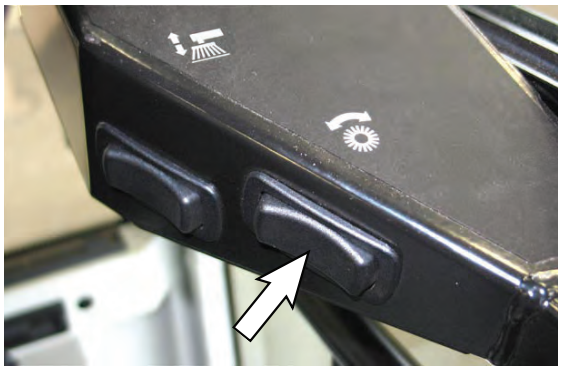
VARIO SWEEPING BRUSH ON-OFF SWITCH

The *Vario Sweeping Brush on-off switch* controls the power of the sweeping brush and the direction of brush rotation.

On (right sweep): Press the right side of the switch. The brush will turn on and rotate counterclockwise.

On (left sweep): Press the left side of the switch. The brush will turn on and rotate clockwise.

Off: Place the switch in the middle position. The brush will turn off.



VARIO SWEEPING BRUSH RAISE-LOWER SWITCH

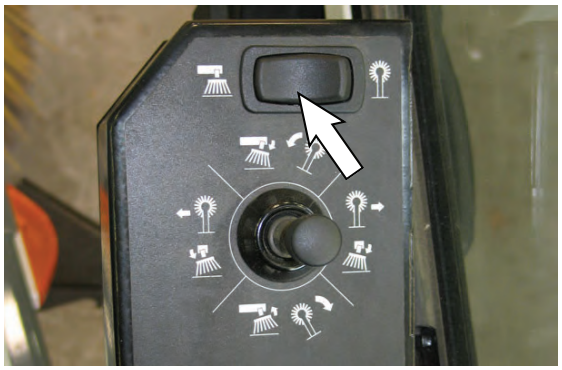
The *Vario Sweeping Brush raise-lower switch* controls the height of the sweeping brush.

Lower brush: Press the left side of the switch. The brush will lower to ground level in the free-floating position.

Raise brush: Press and hold the right side of the switch. Release the switch when the brush is raised to the desired height.

VARIO SWEEPING BRUSH TILT/ARM SWITCH

The *Vario Sweeping Brush tilt/arm switch* transfers the joystick control between the sweeping brush tilt controls and the sweeping brush arm movement controls.

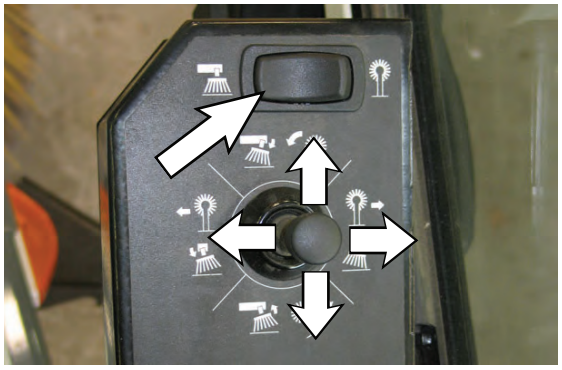


Brush Tilt: Press the left side of the switch to control the brush tilt with the joystick.

Brush Arm: Press the right side of the switch to control the brush arm movement with the joystick.

VARIO SWEEPING BRUSH JOYSTICK

The *Vario Sweeping Brush joystick* controls the Vario Sweeping Brush tilt and the Vario Sweeping Brush arm movement.



When the Vario Sweeping Brush tilt/arm switch is set to the brush tilt position, the Vario Sweeping Brush joystick will control the angle of the sweeping brush.

Tilt Brush Front Edge Down: Move and hold the lever forward until the brush has moved into the desired position.

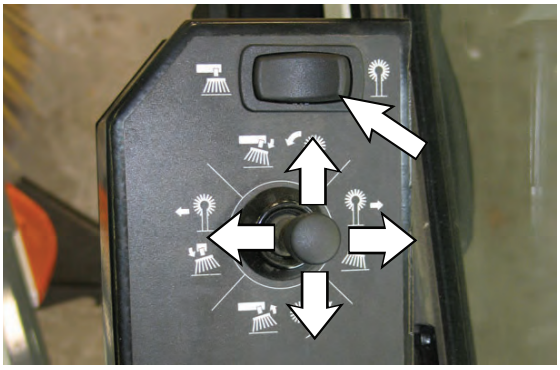
Tilt Brush Rear Edge Down: Move and hold the lever back until the brush has moved into the desired position.

Tilt Brush Left: Move and hold the lever to the left until the brush has moved into the desired position.

Tilt Brush Right: Move and hold the lever to the right until the brush has moved into the desired position.

WARNING: Brush linkage pinch points. Stay clear when linkage is moving.

When the *Vario Sweeping Brush tilt/arm switch* is set to the sweeping brush arm position, the *Vario Sweeping Brush joystick* will control the movement of the sweeping brush arm.



Swing Sweeping Brush Arm Left: Move and hold the lever forward until the arm swings into the desired position.

Swing Sweeping Brush Arm Right: Move and hold the lever back until the arm swings into the desired position.

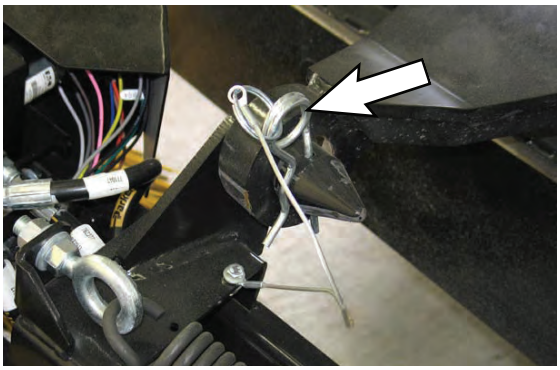
Slide Sweeping Brush Arm Left: Move and hold the lever to the left until the arm slides into the desired position.

Slide Sweeping Brush Arm Right: Move and hold the lever to the right until the arm slides into the desired position.

WARNING: Brush linkage pinch points. Stay clear when linkage is moving.

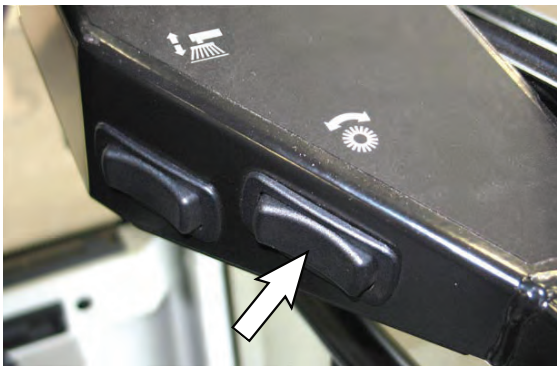
OPERATING THE VARIO SWEEPING BRUSH

NOTE: The brush arm is locked to the front of the machine during transport. Remove the cotter pin from the lock pin before operating the brush.

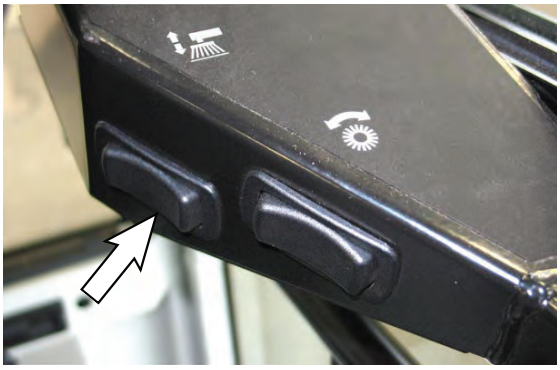


WARNING: Brush linkage pinch points. Stay clear when linkage is moving.

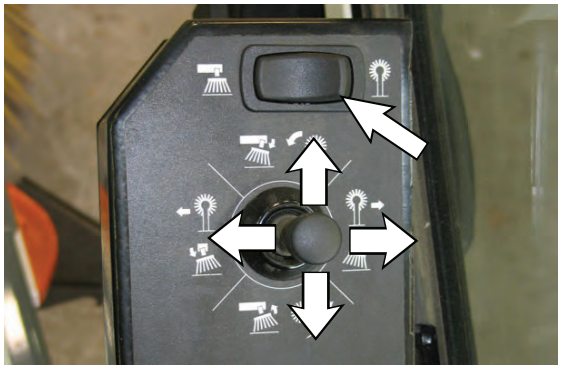
1. Press the *Vario Sweeping Brush on−off switch* to start the brush.



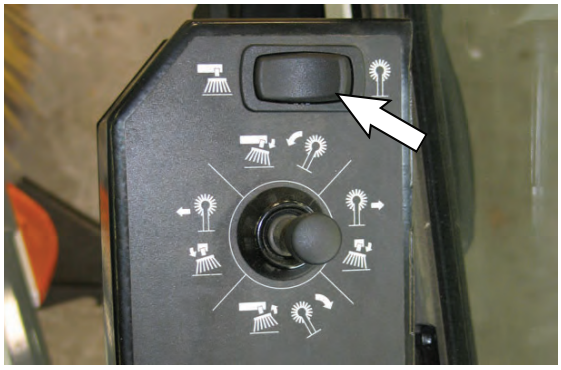
2. Press the *Vario Sweeping Brush raise/lower switch* to lower the Vario Sweeping Brush.



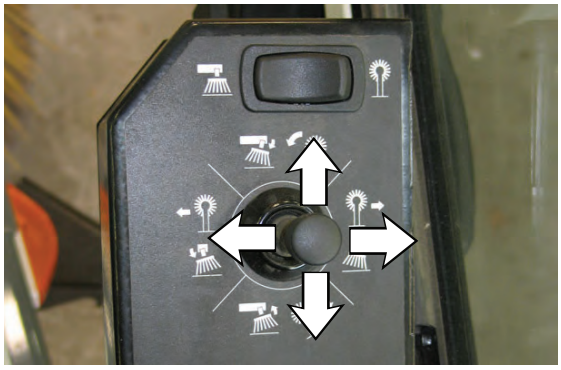
3. Use the *Vario Sweeping Brush joystick* to move the Vario Sweeping Brush from the storage position and use the *Vario Sweeping Brush tilt/arm switch* and the joystick to move the brush to the desired position.



4. Set the *Vario Sweeping Brush tilt/arm switch* to the sweeping brush arm position.

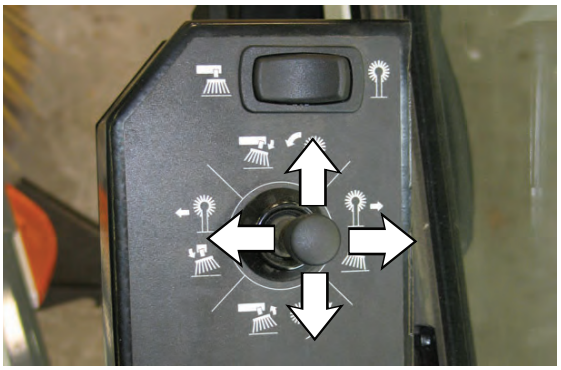


5. Use the *Vario Sweeping Brush joystick* to position the Vario Sweeping Brush to the right or left side of the machine.



6. Set the *Vario Sweeping Brush tilt/arm switch* to the brush tilt position.

7. Use the *Vario Sweeping Brush joystick* to adjust the brush front and side angle.



8. When finished using the Vario Sweeping Brush, use the *Vario Sweeping Brush tilt/arm switch* and *Vario Sweeping Brush joystick* to move the brush to the storage position.

9. Use the cotter pin to secure the Vario Sweeping Brush into the storage position.

WET DUST CONTROL SYSTEM (OPTION)

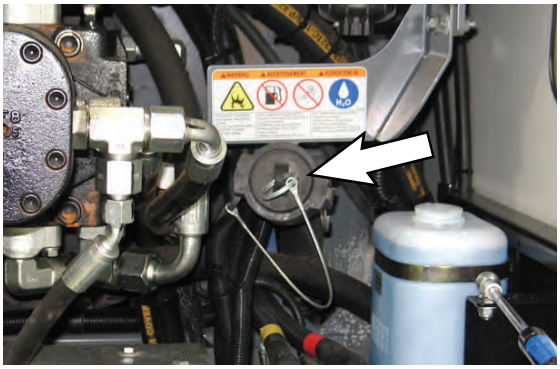
Use the wet dust control system in dusty conditions to control the dust created by the side brushes and Vario Sweeping Brush.

1. Press the *parking brake switch* to set the parking brake.

2. Turn off the machine.

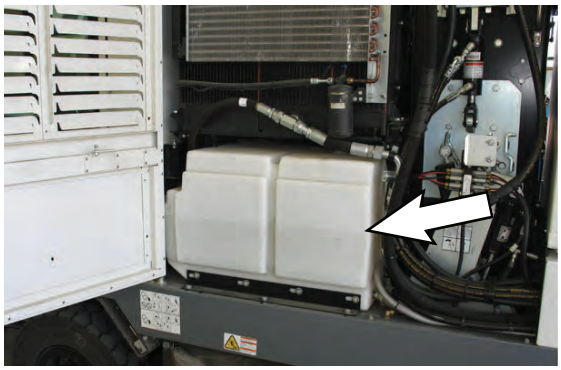
FOR SAFETY: Before leaving or servicing machine, stop on level surface, set parking brake, turn off machine, and remove key.

3. Fill the wet dust control water tank. The fill spout is located behind the engine access door on the right side of the machine.



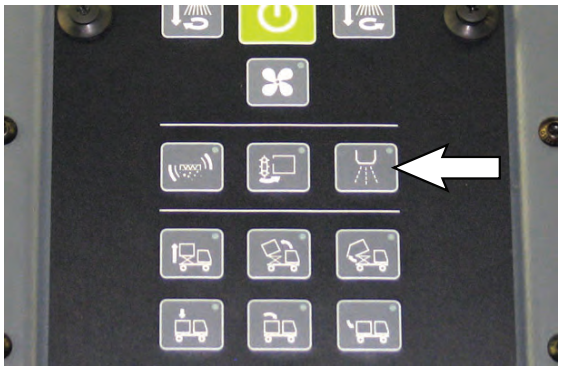
WARNING: Flammable materials can cause explosion or fire. Do not use flammable materials in tank. Only use water.

The water tank is located behind the access door on the left side of the machine. Check the water level on the side of the water tank.

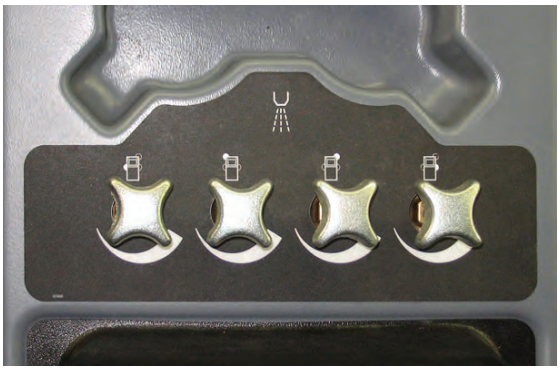


4. Turn on the machine.

5. Press the *wet dust control button* to enable the wet dust control system. The light in button will illuminate.



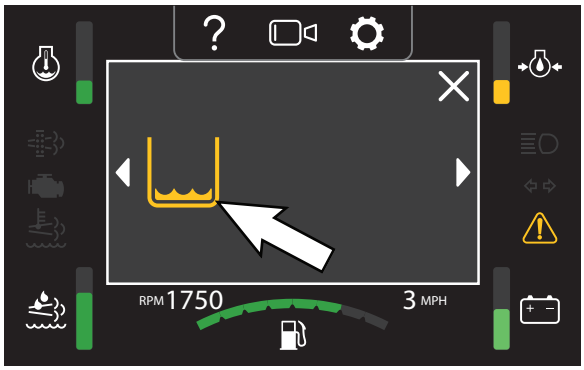
6. Turn the *water valve knobs* counterclockwise to open the water valves.



7. Press the *1-Step button* to activate the wet dust control system.

8. Use *water valve knobs* to adjust the amount of water spray to each brush(es). Turn the knobs counterclockwise to increase the water spray to the brushes and clockwise to decrease the water spray to the brushes.

9. The water tank low light icon will appear on the screen when the water level in the tank is low. The water pump shuts off soon after.



NOTE: Do not use the water system on wet roads. Turn off the water pump and water valves.

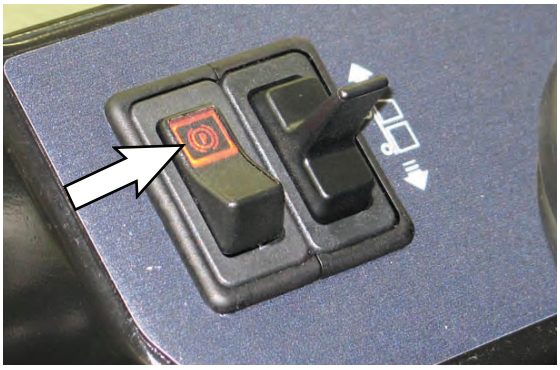
10. Press the *wet dust control button* to turn off the wet dust control system. The light in the button will turn off.

11. Turn the *water valve knobs* clockwise until they come to a complete stop to close the water supply when finished sweeping/using the wet dust control system. Water will continue to flow if the water supply is NOT closed, even when the machine is turned off.

VACUUM WAND (OPTION)

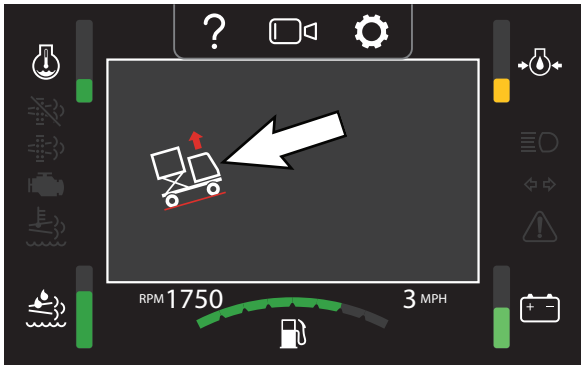
Use the vacuum wand to reach debris in areas that cannot be reached when sweeping.

1. Press the *parking brake switch* to set the parking brake.

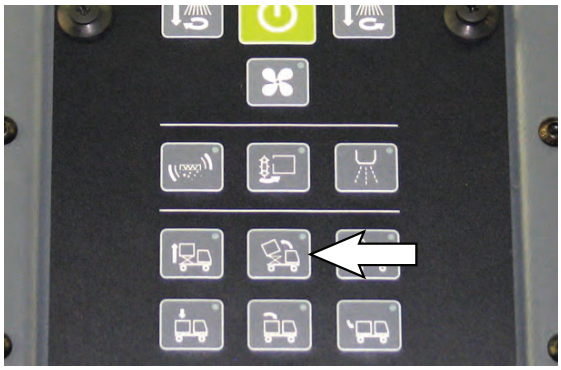


FOR SAFETY: Before leaving or servicing machine, stop on level surface, set parking brake, turn off machine, and remove key.

NOTE: The hopper will not raise or tilt on an unsafe incline for raising or tilting the hopper. An inhibit icon appears when the hopper raise button or hopper tilt button is pressed when the front to back incline is more than 20% and the side to side incline is more than 7%. See INHIBIT INDICATORS.



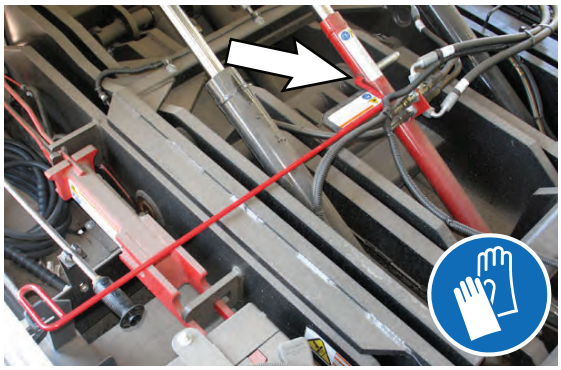
2. Press and hold the *hopper tilt back button* to tilt hopper back.



NOTE: The hopper will not lift or tilt unless the parking brake switch is set or the service brake pedal is applied.

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

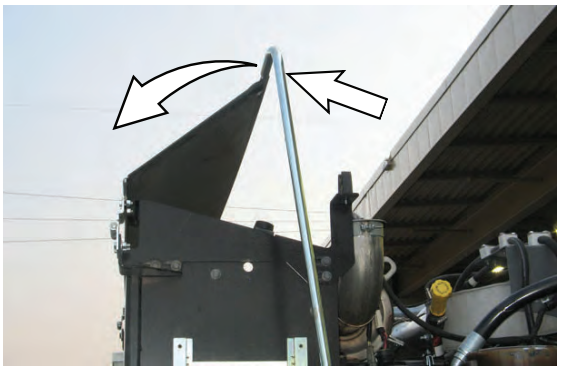
3. Engage the hopper support pin. See ENGAGING THE HOPPER SUPPORT PIN.

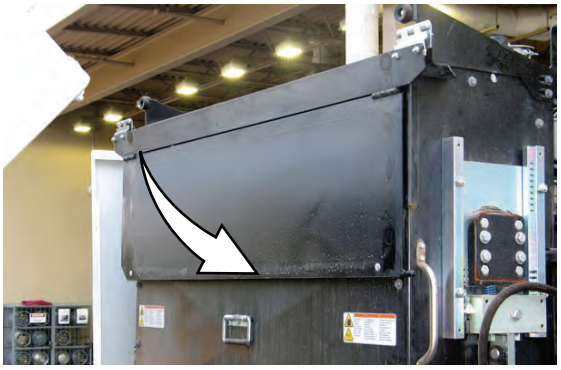


WARNING: Raised hopper may fall. Engage hopper support pin.

4. Remove the conveyor/vacuum door tool from the storage location on the side of the hydraulic tank.

5. Use the conveyor/vacuum door tool to lift the conveyor/vacuum door from the top of the conveyor and over the conveyor opening.





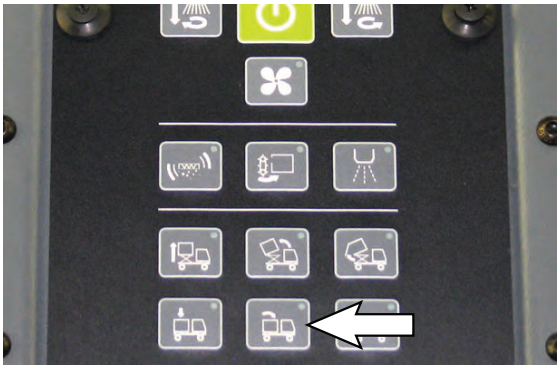
WARNING: Conveyor throws debris. Conveyor pinch point. Stay clear when in operation.

NOTE: Do not engage sweep mode while the conveyor/vacuum door is covering the conveyor opening. Damage to the machine can occur.

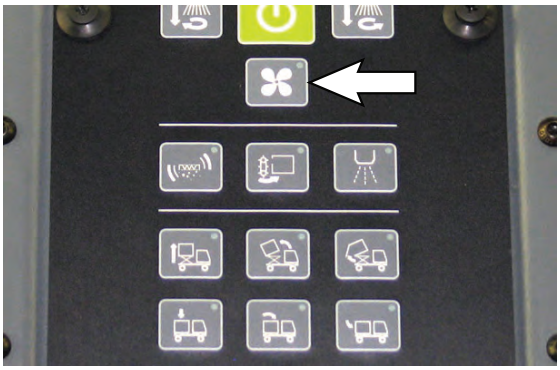
6. Return the conveyor/vacuum door tool to the storage location on the side of the hydraulic tank.

7. Remove the hopper support pin and return the hopper support pin to the storage location.

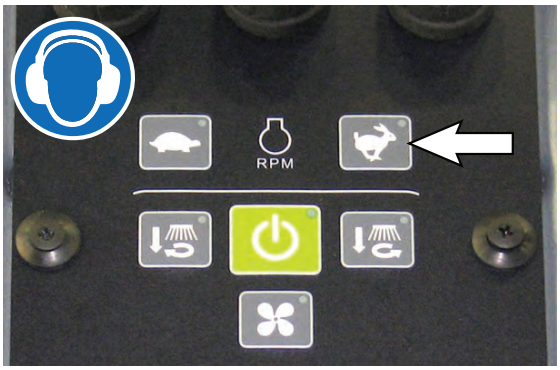
8. Press and hold the *hopper tilt forward button* until the hopper is completely forward.

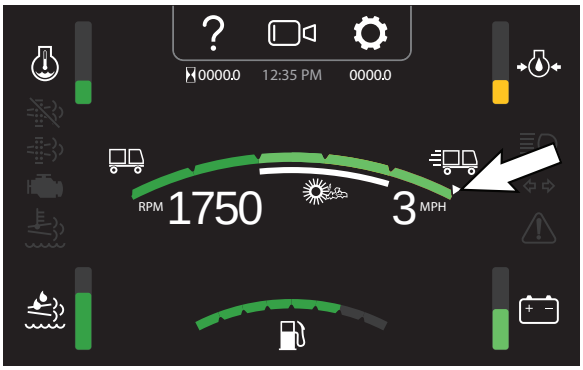


9. Press the *vacuum fan button* to turn on the vacuum fan. The light next to the button will be illuminated. The engine speed will raise to the correct level to operate the vacuum wand.



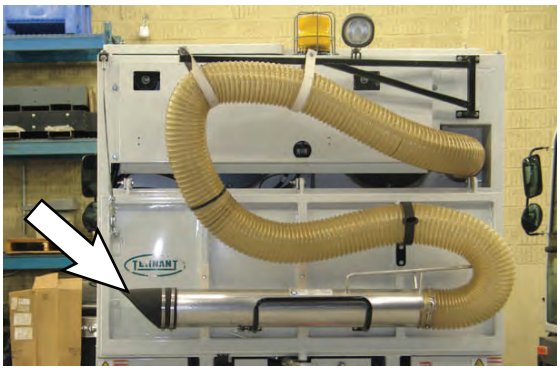
10. If necessary, press the *engine speed increase button* to raise the engine speed to 2200 RPM. Observe the engine speed display for the engine RPM.





WARNING: Machine can emit excessive noise. Consult with your regulatory agency for exposure limits. Hearing loss can result. Wear hearing protection.

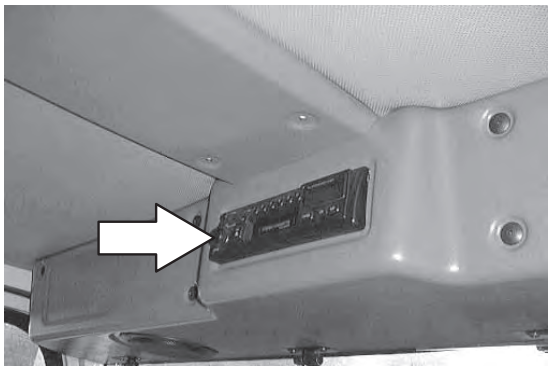
11. Remove the wand from the hopper door and vacuum as required.



12. Place the vacuum wand back on the hopper door when finished vacuuming debris.
13. Press the *vacuum fan button* to turn off the vacuum fan. The light next to the button will turn off.
14. Adjust the engine to the idle speed.
15. Tilt the hopper back.
16. Engage the hopper support pin. See ENGAGING THE HOPPER SUPPORT PIN.
17. Turn off machine.
18. Place the conveyor/vacuum door over the top of the conveyor and return the conveyor/vacuum door tool to the storage location on the side of the hydraulic tank.
19. Remove the hopper support pin from the hopper leg. See DISENGAGING THE HOPPER SUPPORT PIN.
20. Turn on the machine.
21. Press and hold the *hopper tilt forward button* until the hopper is completely tilted forward.

RADIO AND COMPACT DISC PLAYER (OPTION)

The radio and compact disk player is located above the operator. Refer to the radio/compact disk player manual for operation.



CAB JACK (OPTION)

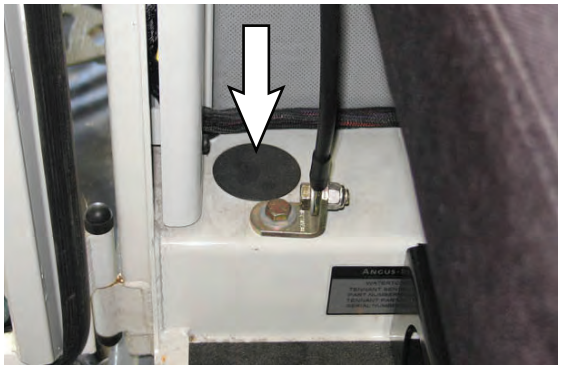
The cab jack allows the cab to be raised without an overhead hoist or crane.

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

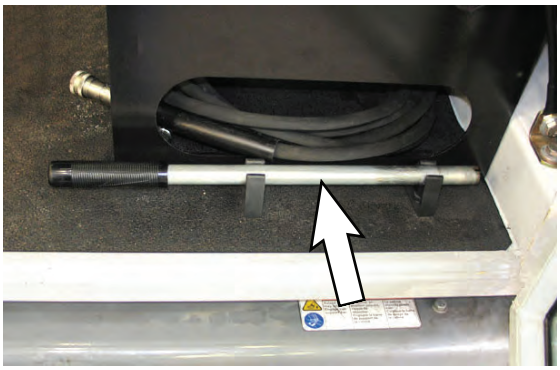
1. Secure or remove all loose items from inside the cab.
2. Disconnect both door springs from the back of the cab. The springs can remain attached to the engine access doors.

3. Pinch the windshield wiper hose with a small cable tie or clamp.

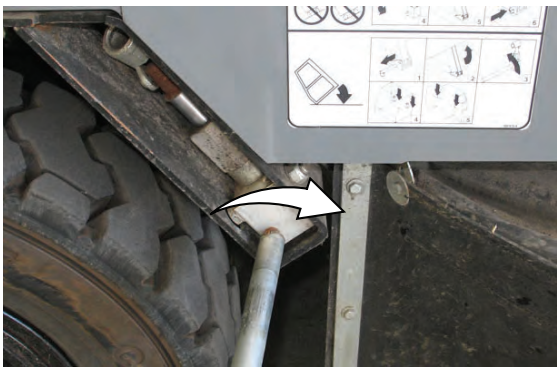
4. Remove the plug covering the access hole and then remove the hardware securing the rear corners of the cab to the frame of the machine.



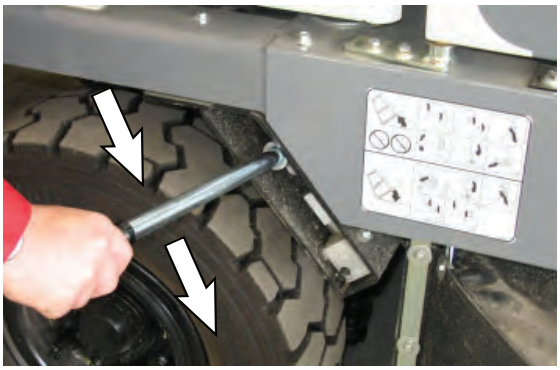
5. Remove the cab jack handle from storage location inside the cab of the machine.



6. Use the cab jack handle to tighten the cab jack valve. Twist the handle clockwise to tighten the valve.

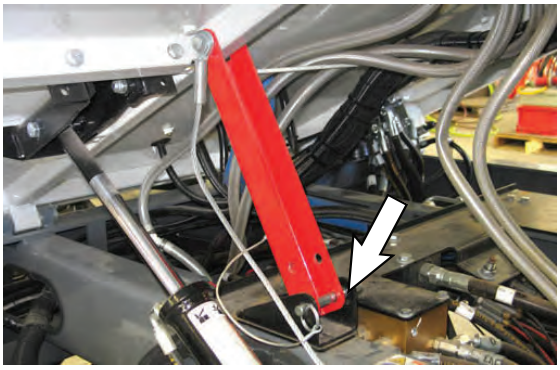


7. Pump the cab to the fully elevated position.

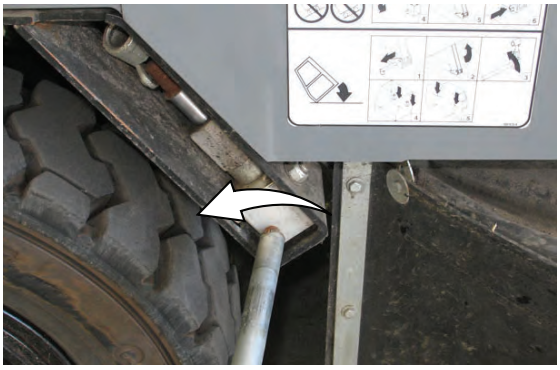


8. Align the lower hole of the support bar with the machine frame, then install the pin into lower hole to engage the cab support bar.

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



9. To lower the cab, disengage the cab support bar and use the handle to twist the cab jack valve counterclockwise to loosen the valve.



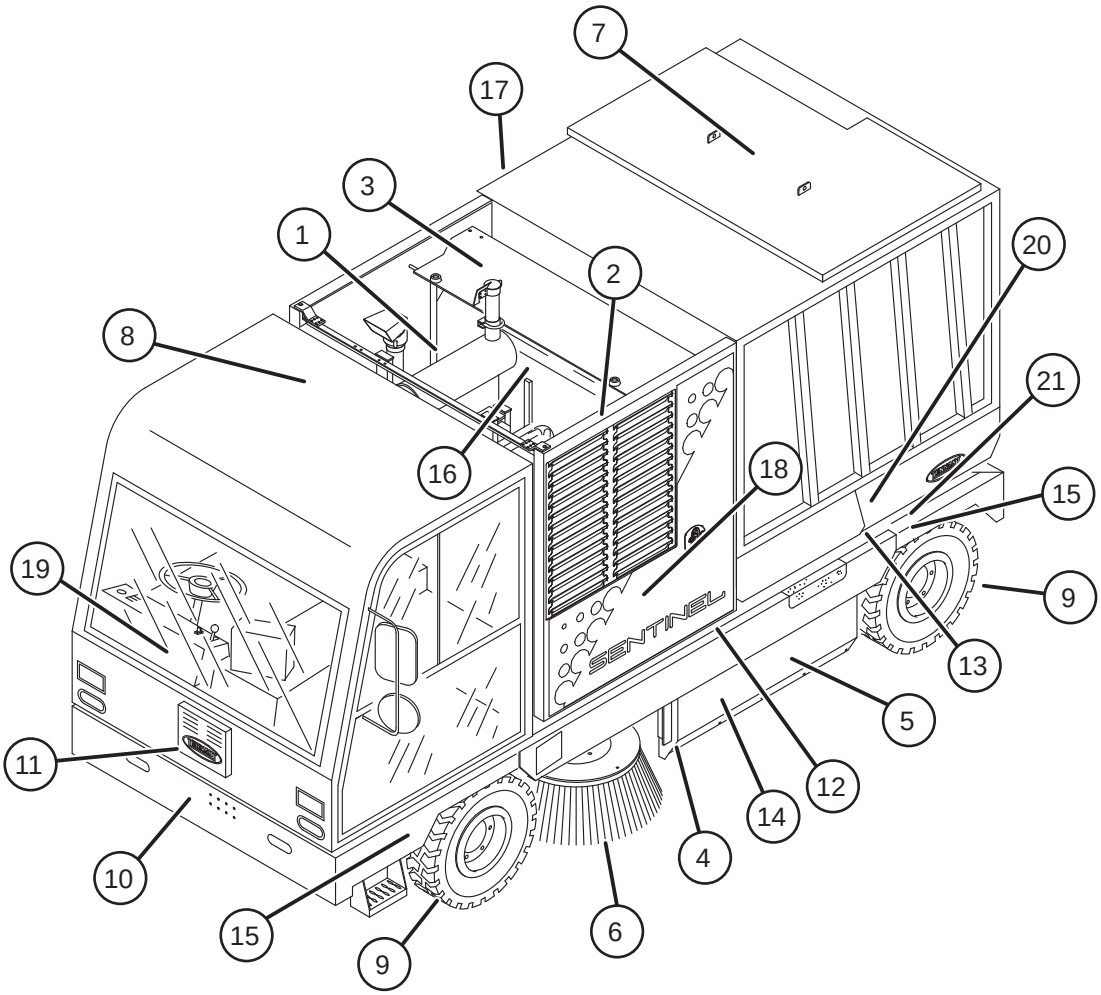
10. Reinstall the hardware to secure the cab, remove the cable tie/clamp from the windshield wiper fluid hose, and reinstall both door springs onto the back of the cab.

MACHINE TROUBLESHOOTING

Problem	Cause	Remedy
Machine does not start	Parking brake switch not set	Set parking brake switch
	Fuel tank empty	Fill fuel tank
	Engine oil pressure too low	Check engine oil level
	Engine temperature too high	Check coolant level
	Engine fault/warning prevents engine from starting	Investigate cause of fault/warning and correct issue causing fault/warning
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
	Hopper not completely down	Completely lower hopper
	Hopper rear door open	Ensure hopper is completely tilted forward. Close and latch hopper rear door
	Conveyor/vacuum door closed	Open conveyor/vacuum door
	Vacuum fan not on	Turn vacuum fan on
	Vacuum fan failure	Contact TENNANT service personnel
	Thermo-Sentry tripped	Allow Thermo-Sentry to cool/reset
	Water tank empty (Wet Dust Control Option)	Fill water tank
	Wet dust water pump or valves not turned on (Wet Dust Control Option)	Turn on the wet dust control water pump and valves
	Wet dust control filter clogged (Wet Dust Control Option)	Clean or replace filter
Sweeping functions keep raising and turning off	Engine speed too fast	Reduce engine speed
1-Step button will not activate	Hopper raised or not fully forward	Lower and move hopper fully forward
	Engine speed (RPM) too high	Decrease engine speed
Hopper will not lift or tilt	Machine on too steep of an incline	Move machine to a level surface
	Parking brake switch not set/ service brake pedal not applied	Set parking brake switch/apply service brake pedal
	Hopper overloaded	Remove debris from hopper
	Engine RPM too low	Increase engine RPM

Problem	Cause	Remedy
Machine will not propel	Operator not in seat	Sit in seat
	Parking brake switch engaged	Release parking brake switch
	Directional switch in neutral	Move *directional switch* in forward or reverse position
	Engine RPM is too low	Raise engine RPM
	Brake pressure too low	Contact service personnel
Poor sweeping performance	Brush bristles worn	Replace brushes
	Wrong sweeping brush	Contact TENNANT representative for recommendations
	Main, side, or Vario Sweeping brushes not properly adjusted	Contact TENNANT service personnel
	Main, side or Vario-Sweeping brush drive failure	Contact TENNANT service personnel
	Debris caught in main brush drive mechanism or conveyor	Reverse conveyor to remove debris from drive mechanism or conveyor
	Conveyor in reverse	Switch conveyor to forward direction
	Conveyor failure	Contact TENNANT service personnel
	Conveyor skirts worn or damaged	Replace conveyor skirts
	Hopper full	Empty hopper
	Hopper not completely down	Completely lower hopper
	Hopper rear door open	Close and latch hopper rear door
	Vacuum wand door closed	Open vacuum wand door
	Vacuum fan not on	Turn on vacuum fan
	Vacuum fan failure	Contact TENNANT service personnel
	Worn brush skids	Replace brush skids
	Brush skids not completely down	Check for obstruction and then completely lower skids

MAINTENANCE



MAINTENANCE CHART

The table below indicates the Person Responsible for each procedure.

O = Operator.
T = Trained Personnel.

Interval	Person Resp.	Key	Description	Procedure	Lubricant/ Fluid	No. of Service Points
Daily	O	1	Engine	Check oil level	EO	1
				Check water separator for water, drain	-	1
				Check cooling fan for damage		1
				Check crankcase breather tube for blockages and damage		1

Interval	Person Resp.	Key	Description	Procedure	Lubricant/ Fluid	No. of Service Points
Daily	O	1	Engine	Check air filter indicator	-	1
				Empty air filter dust cap	-	1
				Check air intake tubes for damage		All
	O	2	Radiator	Check coolant level in radiator	WG	1
				Check and clean core exterior	-	1
	O	2	Hydraulic fluid cooler	Check and clean cooler fins	-	1
	O	2	Turbo cooler	Check and clean cooler fins	-	1
	O	2	Hydraulic	Check fluid reservoir fluid level	HYDO	1
	O	3	Conveyor	Check chain and ratchet tips and pins	-	2
				Lubricate chain	GL	1
				Clean interior	-	1
				Lubricate bearings	WBG	2
	O	4	Brush compartment	Check skirts for damage and wear	-	3
	O	5	Main brush	Check for damage, wear, and adjustment	-	1
				Check brush pattern	-	1
				Lubricate support rod	GL	1
	O	6	Side brush(es)	Check for damage and wear	-	All
	O	7	Hopper dust filter	Shake	-	1
	O	8	Windshield washer reservoir	Check fluid level	WF	1
50 Hours	O	1	Engine	Check fuel lines and clamps for tightness and wear		All
	O	9	Tires	Check pressure		4
	O	11	Cab filters	Clean		1

NOTE: Also check procedures indicted (**) after the first 50-hours of operation, and procedures indicated (**) after the first 250 hours of operation.

LUBRICANT/FLUID

UTF Universal tractor fluid (Mobil 424)
EO Engine oil, API diesel classification 5W-40, CK-4, full synthetic
DEF Blue DEF fluid or equivalent API registered fluid, per ISO 22241-1
HYDO **Tennant*True*** premium hydraulic fluid or equivalent
WBG Waterproof bearing grease (TENNANT part no. 765819)
WG Distilled water, coolant conditioner (TENNANT part no. 770172) and permanent-type ethylene glycol anti-freeze, −34° C (−30° F)
WF Automotive-type windshield washer fluid
GL SAE 90 weight gear lubricant (Grade GL5)

NOTE: More frequent intervals may be required in extremely dusty conditions.

Interval	Person Resp.	Key	Description	Procedure	Lubricant/ Fluid	No. of Service Points
100 Hours	O	4	Brush compartment, conveyor and hopper seals, skid flap	Check for damage or wear	-	1
	T	1	Engine	Check tension of alternator/fan belt	-	1
	O	17	Battery	Check cables for damage and wear	-	
	T	13	Hopper tilt	Lubricate	WBG	8
	T	13	Hopper lift (option)	Lubricate	WBG	13
	T	10	Steering	Check wheel alignment	-	2
	T	9	Wheels	Check wheel nut torque	-	4
	O	14	Skids	Check for wear	-	2
	O	2	Radiator	Check hoses and clamps for tightness and wear	-	All
200 Hours	T	10	Steering	Lubricate steering cylinder	WBG	1
	T	15	Suspension	Lubricate leaf springs and pivots	WBG	16
	T		Vario sweeping brush (option)	Lubricate rotation and guides	WBG	2
	T	6	Side brush(es)	Lubricate pivot(s)	WBG	2
	T	9	Tires	Check wear and rotate	-	4
	T	17	Battery	**Clean and tighten battery cable connections	-	1
	T	18	Wet dust control system (option)	Clean water filter	-	1
	O	19	Windshield wiper blades	Check for wear	-	2
250 Hours	T	1	Engine	** Change crankcase oil and filter element	EO	1
				Replace fuel filter	-	1
	O	-	Air conditioner unit (option)- not shown	Check condenser fins for debris and damage	-	All
				Check evaporator fins for debris and damage	-	1
				Check exterior condenser tubes for wear and damage	-	1
400 Hours	T	20	Differential	Check oil level	-	1
	T	21	Service brakes	Check fluid level	-	4
500 Hours	T	1	Engine	Check alternator/fan belt tensioner for damage	-	
800 Hours	T	16	Hydraulic	Replace reservoir filler cap	-	1
	O	16	Hydraulic	Check hoses for wear and damage	-	All

Interval	Person Resp.	Key	Description	Procedure	Lubricant/ Fluid	No. of Service Points
1000 Hours	T	1	Engine	Check fan hub rotation	-	1
1200 Hours	T	16	Hydraulic	*Change fluid filter element	-	1
1600 Hours	T	20	Differential	Change gear lubricant	GL	1
	T	21	Service brakes	Change fluid	UTF	4
	T	2	Radiator	Flush cooling system	WG	1
2000 Hours	T	1	Engine	Replace fuel hoses and clamps	-	All
2400 Hours	T	16	Hydraulic	* Replace fluid reservoir suction strainer	-	1
				* Change hydraulic fluid	HYDO	1
4000 Hours	T	1	Engine	Check after treatment diesel exhaust fluid (DEF) dosing unit and filter for blockages and damage	-	1

NOTE: Also check procedures indicted (**) after the first 50 hours of operation, and procedures indicated (**) after the first 250 hours of operation.

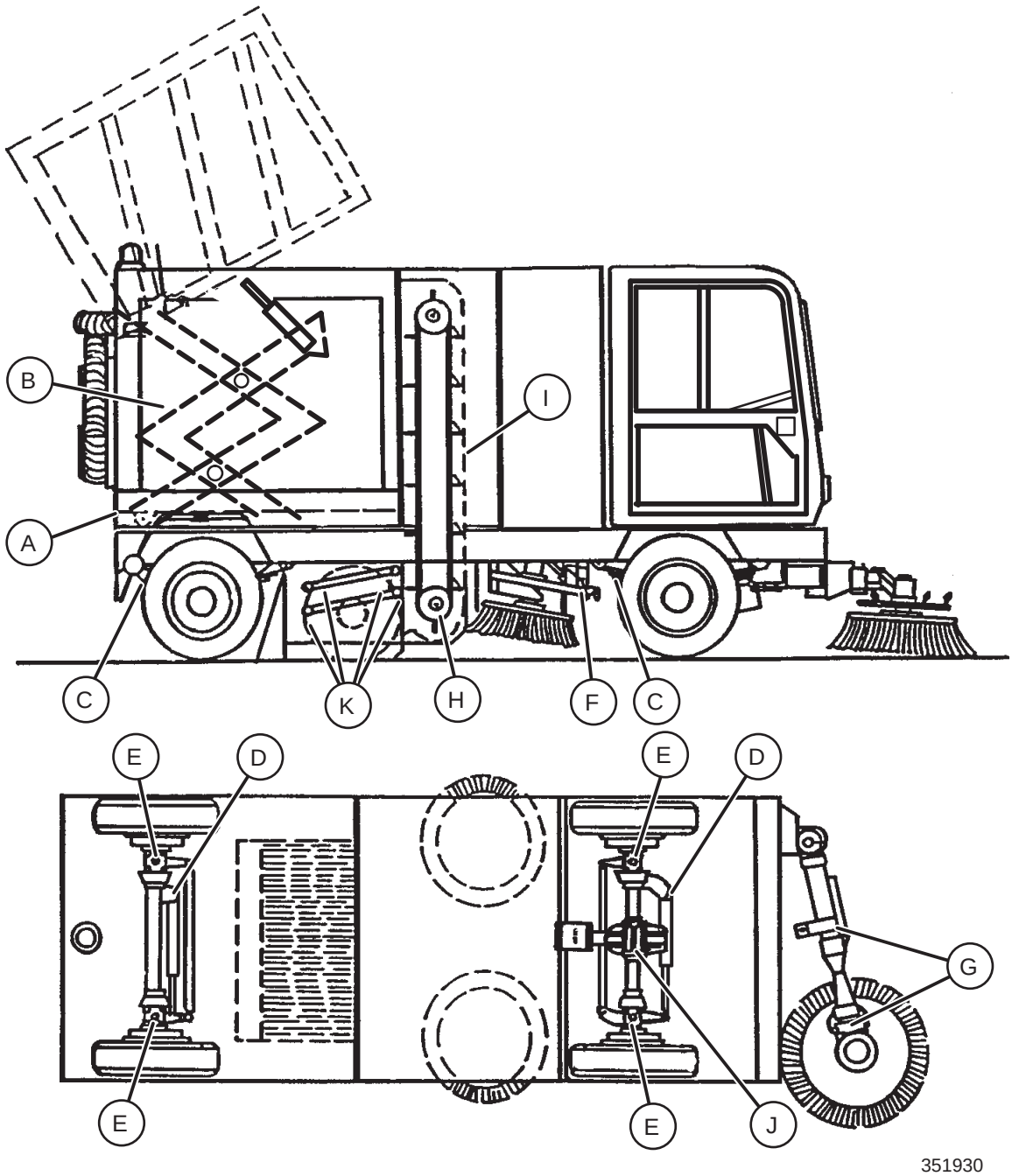
LUBRICANT/FLUID

UTF Universal tractor fluid (Mobil 424)
EO Engine oil, API diesel classification 5W-40, CK-4, full synthetic
DEF True-Blue DEF fluid or equivalent API registered fluid, per ISO 22241-1
HYDO **Tennant*True*** premium hydraulic fluid or equivalent
WBG Waterproof bearing grease (TENNANT part no. 765819)
WG Distilled water, coolant conditioner (TENNANT part no. 770172) and permanent-type ethylene glycol anti-freeze, −34° C (−30° F)
WF Automotive-type windshield washer fluid
GL SAE 90 weight gear lubricant (Grade GL5)

NOTE: More frequent intervals may be required in extremely dusty conditions.

*Change fluid filter element

LUBRICATION

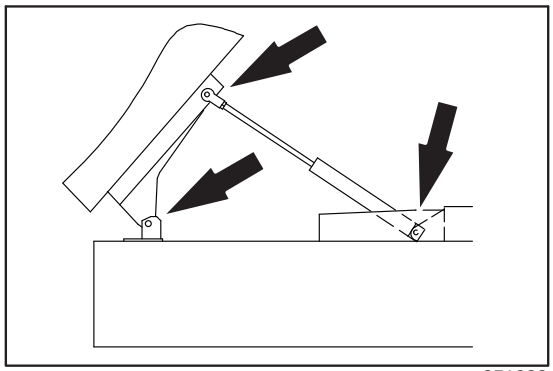


NOTE: Lettered references for lubrication section on following LUBRICATION section pages.

HOPPER TILT (Low Dump)

The hopper tilt (A) has eight grease fittings. Four grease fittings are located on the tilt cylinders, one on each end of the two cylinders. Two grease fittings are located on the hopper safety support cylinders (one at each end). Two grease fittings are located at the hopper tilt pivot (one on each side). Lubricate these fittings after every 100 hours of operation.

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



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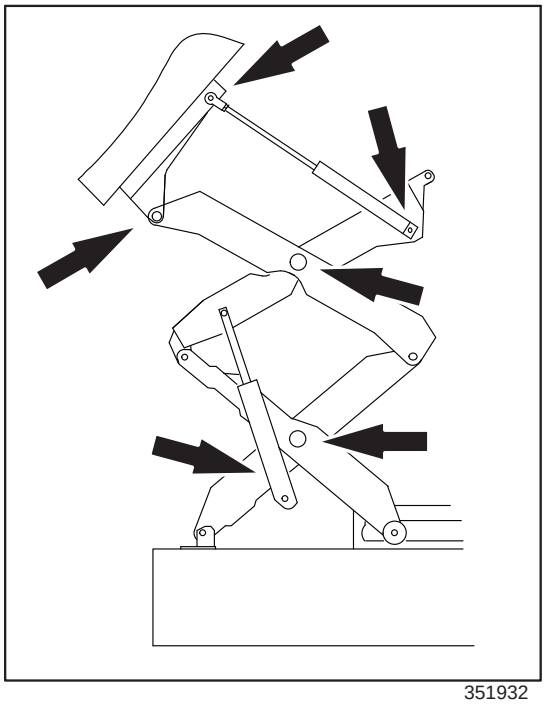
HOPPER LIFT/TILT (High Dump Option)

The high dump hopper lift (B) has thirteen grease fittings. Four grease fittings are located on the upper tilt cylinders (one on each end of both cylinders). Two grease fittings are located on the lower lift cylinders (one at each base). One grease fitting is located at the top of the hopper safety support cylinder. Two grease fittings are located at the hopper tilt pivot (one on each side). Four grease fittings are located on the cross shaft pivots of the hopper lift arms (one at each of the four pivots). Lubricate these fittings after every 100 hours of operation.



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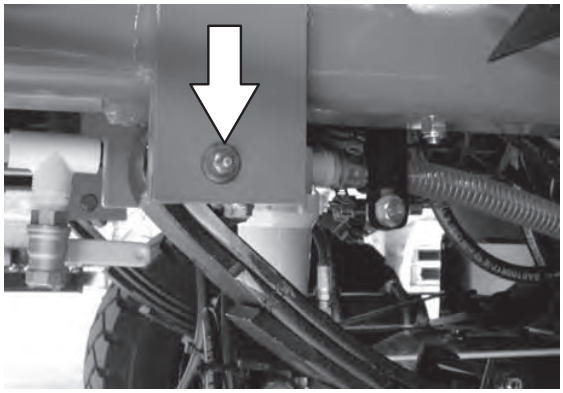
WARNING: Raised hopper may fall. Engage hopper support pin.

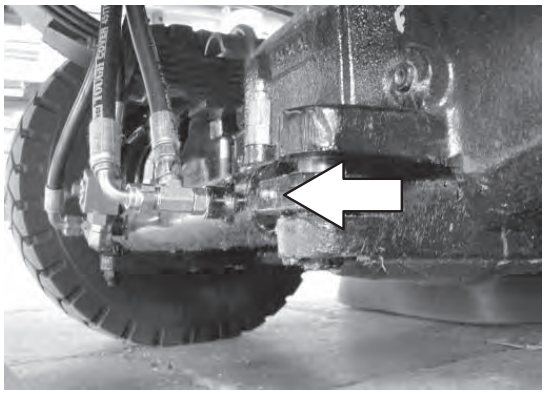
AXLE LEAF SPRINGS

The axle leaf springs (C) have twelve grease fittings. Lubricate the axle leaf springs after every 200 hours of operation.



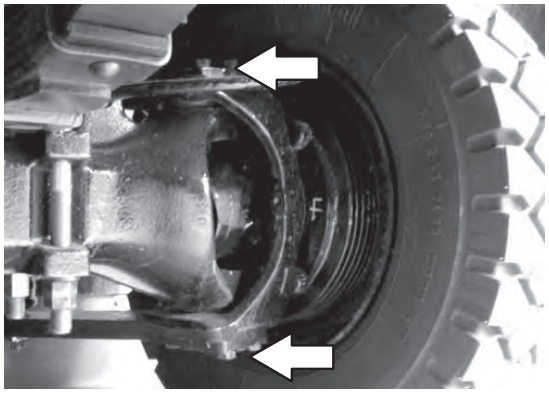
STEERING CYLINDER

Each steering cylinder (D) has one grease fitting. Lubricate the steering cylinders after every 200 hours of operation.



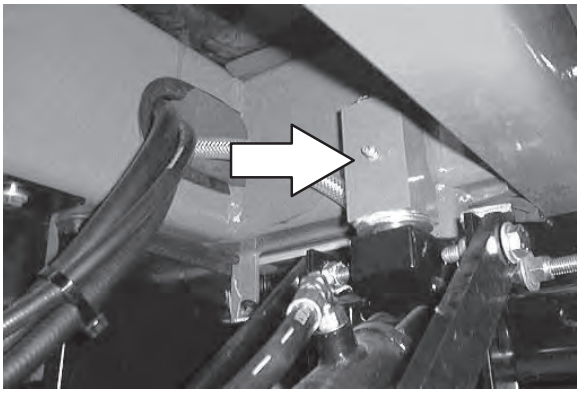
WHEEL PIVOT POINTS

The four wheel pivot points (E) each have two grease fittings. Lubricate the wheel pivot points after every 200 hours of operation.



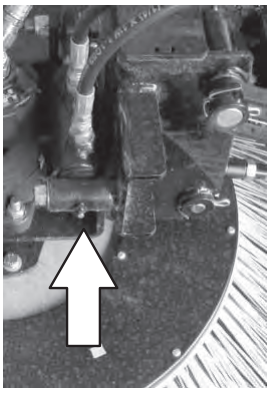
SIDE BRUSH PIVOT

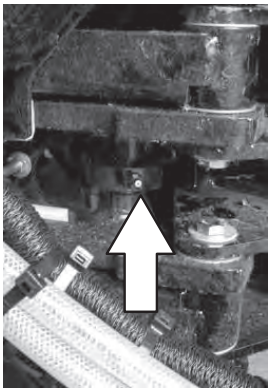
Each side brush pivot (F) has a grease fitting. Lubricate the side brush pivot(s) after every 200 hours of operation.



VARIO SWEEPING BRUSH (OPTION)

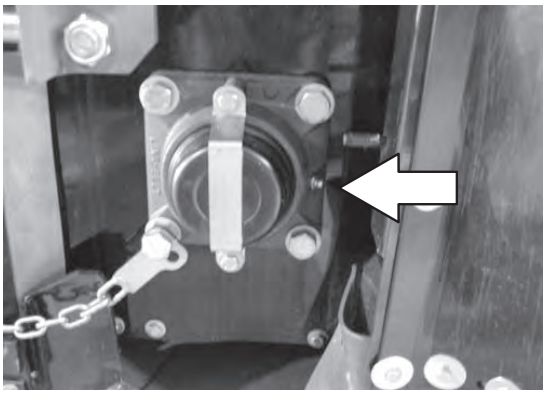
The brush pivot (G) has two grease fittings. Lubricate the Vario Sweeping Brush pivot after every 200 hours of operation.





CONVEYOR BEARINGS

Each conveyor (H) has a bearing grease fitting. Lubricate the conveyor bearing(s) daily.

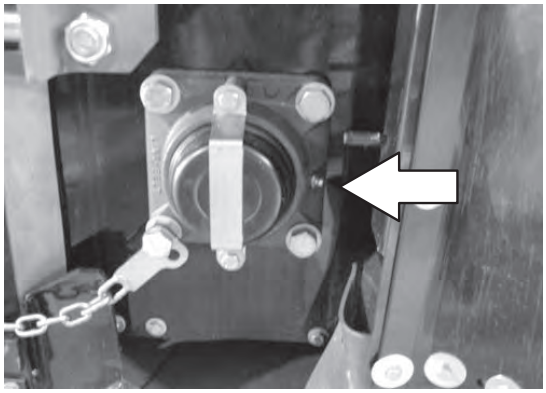


CONVEYOR CHAIN

Lubricate the conveyor chains (I) with engine oil daily.

Remove the access covers on the sides of the conveyor. Run the conveyor in reverse at idle. Oil the chain. Be sure to lubricate the o-rings on the chain. Put the access covers back on the sides of conveyor.

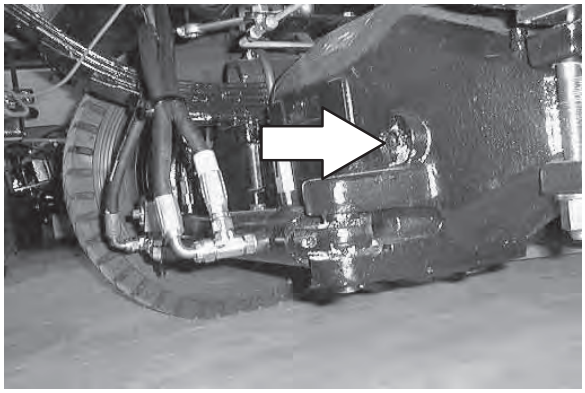
FOR SAFETY: When servicing machine, avoid moving parts. Do not wear loose jackets, shirts, or sleeves.



DIFFERENTIAL

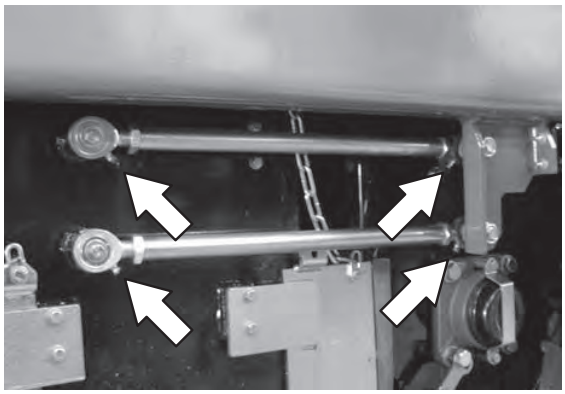
Check the lubricant level in the differential (J) after every 400 hours of operation by removing the filler plug.

Change the differential lubricant after every 1600 hours of operation. Use SAE 90 weight gear lubricant.



MAIN BRUSH SUPPORT RODS

The main brush support rods (K) have a total of eight grease fittings, four on each side. Lubricate the main brush support rods daily.



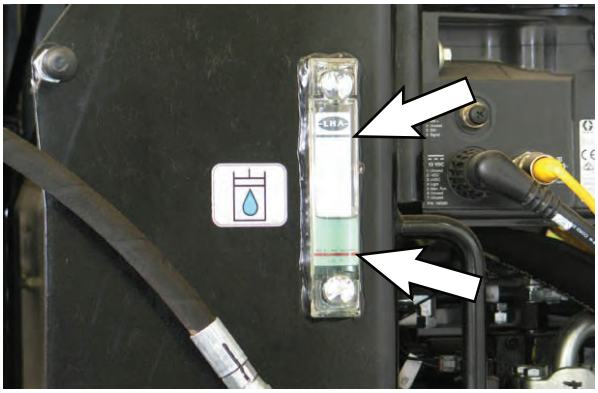
HYDRAULICS

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

HYDRAULIC FLUID RESERVOIR

The reservoir is located on the right side of the machine next to the engine.

Check the hydraulic fluid level at operating temperature daily. Make sure the hopper is down when checking hydraulic fluid level. The sight gauge is labeled with full (black line) and add (red line) levels to indicate the hydraulic fluid level in the reservoir.

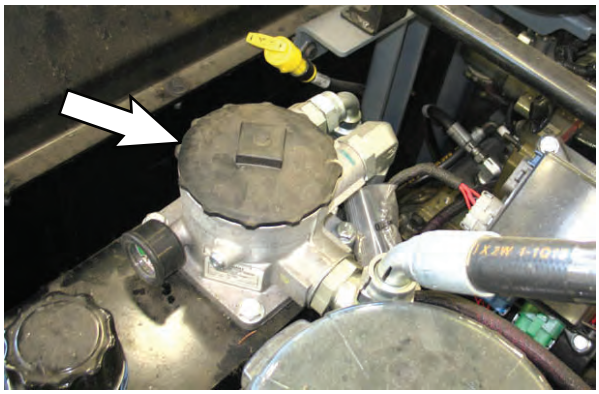


ATTENTION! Do not overfill the hydraulic fluid reservoir or operate the machine with a low level of hydraulic fluid in the reservoir. Damage to the machine hydraulic system may result.

A filler cap is located on top of the reservoir. The filler cap is equipped with a built-in breather. Replace the cap after every 800 hours of operation. Apply a light film of hydraulic fluid onto the filler cap gasket before installing the cap onto the reservoir.

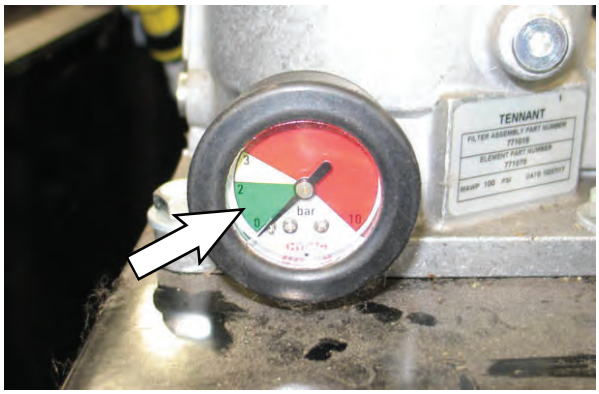
Drain and refill the hydraulic fluid reservoir with new TennantTrue premium hydraulic fluid after every 2400 hours of operation.

Replace the hydraulic fluid filter after every 1200 hours of operation or if the hydraulic reservoir gauge is in the yellow/red zone when the reservoir hydraulic fluid is approximately 32° C (90° F).



The reservoir has a built-in strainer outlet that filters hydraulic fluid before it enters the system. Replace the strainer after every 2400 hours of operation.

The hydraulic fluid filter gauge is located in front of the hydraulic filter, on top of the hydraulic reservoir. Make sure the fluid is at operating temperature and the machine is at 2000 RPM to ensure a proper reading.

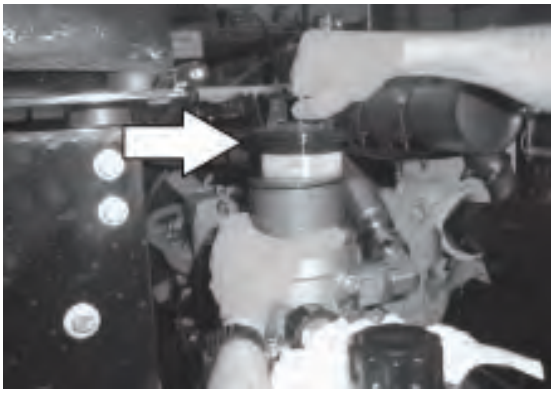


Replace the hydraulic fluid filter element after every 1200 hours of operation, or when the hydraulic filter gauge reads outside of the green area.

REPLACING THE HYDRAULIC FLUID FILTER

1. Loosen or remove the hydraulic reservoir breather cap.

2. Remove the hydraulic fluid reservoir filter cover.



3. Allow the oil to drain from the filter into the tank (Allow to drain for approximately 5 minutes).

4. Lift the filter and internal bowl out of the reservoir and place into an oil pan. Remove the top part of the filter element.

5. Pour any residual oil into the oil pan.

6. Remove and replace the filter element.

7. Reinstall the new filter element and internal bowl assembly into the hydraulic fluid reservoir.

8. Confirm the hydraulic fluid as at appropriate level. See HYDRAULIC FLUID RESERVOIR.

HYDRAULIC FLUID

There are several fluids available for different ambient air temperature ranges:

TennantTrue premium hydraulic fluid (Extended Life)			
Part Number	**Capacity**	**ISO Grade Viscosity Index (VI)**	**Ambient Air Temperature Ranges**
1069019	68.2 L (18 gal)	ISO 68 VI 155 or higher	7 to 43°C (45 to 110° F)
1069020	121.0 L (32 gal)		
1057707	68.2 L (18 gal)	ISO 32 VI 163 or higher	16° C (60° F) or lower
1057708	121.0 L (32 gal)		

If using a locally-available hydraulic fluid, be sure the specifications match Tennant hydraulic fluid specifications. Substitute fluids can cause premature failure of hydraulic components.

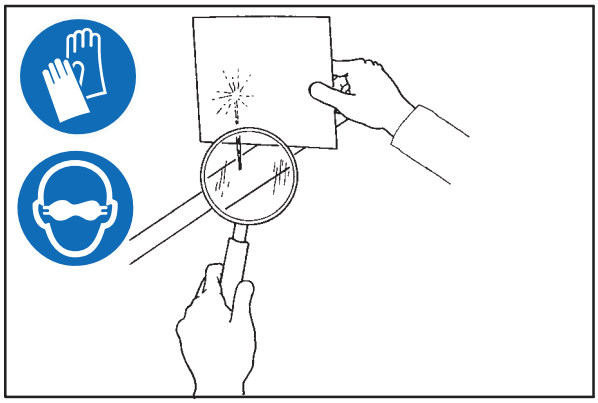
ATTENTION! Hydraulic components depend on system hydraulic fluid for internal lubrication. Malfunctions, accelerated wear, and damage will result if dirt or other contaminants enter the hydraulic system.

HYDRAULIC HOSES

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

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

High pressure fluid escaping from a very small hole can almost be invisible, and can cause serious injuries.



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Immediately consult a physician if injury results from escaping hydraulic fluid. Serious infection or reaction can occur if proper medical treatment is not given immediately.

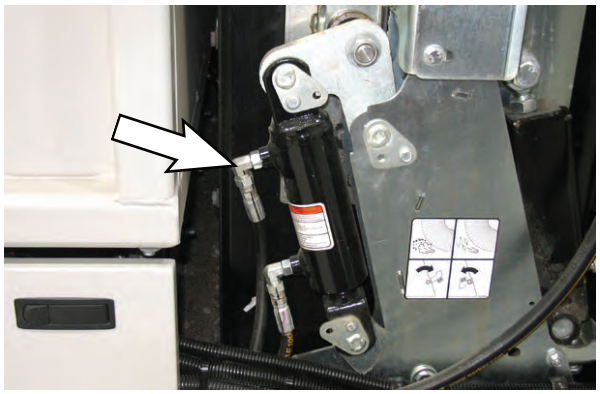
Contact a mechanic or supervisor if a leak is discovered.

PURGING AIR FROM THE HYDRAULIC CONVEYOR LIFT SYSTEM

If a hydraulic component in the lift system has been replaced, air will get into the hydraulic fluid. Purge air from the hydraulic system after a hydraulic component in the lift system has been replaced.

To purge air from the hydraulic system:

1. Set the *parking brake switch*.
2. Start the machine and press the *1-Step button* to lower the conveyor.
3. Leave the *1-Step button* activated and turn off the machine to collapse the lift cylinders.
4. Turn the ignition switch to ON, but do not start the engine.
5. Press the *1-Step button* to activate solenoid valve (SV31) on the control block, allowing hydraulic fluid to flow through the valve.
6. Disconnect the hydraulic hose from the top fitting of the right lift cylinder and drain the hydraulic fluid into a pan to purge air from the hose.



7. Reconnect the hose to the right lift cylinder.
8. Disconnect the hydraulic hose from the top fitting of the left lift cylinder and drain the hydraulic fluid into a pan to purge air from the hose.
9. Reconnect the hose to the left lift cylinder.
10. Start the engine and check hydraulic system for leaks.
11. Check the hydraulic fluid level at the site gauge. If necessary, replenish the hydraulic system with fresh hydraulic fluid.
12. Cycle the sweep mode and observe the conveyor lift for proper operation.

ENGINE

ENGINE OIL

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

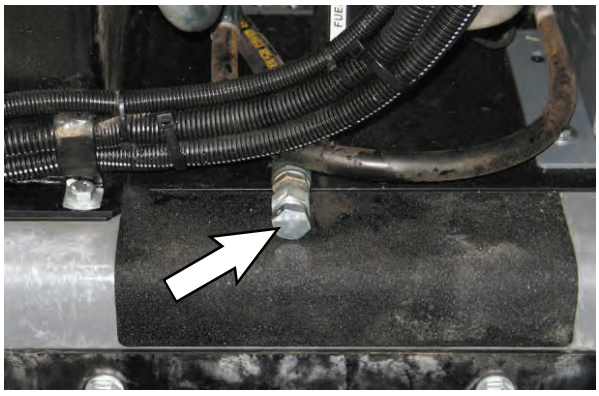
FOR SAFETY: When servicing machine, avoid moving parts. Do not wear loose clothing, jewelry, and secure long hair.

NOTE: All oil must be drained from the engine before a different brand of oil or a different viscosity oil is used. Do Not mix different brands of oil or different viscosity oil with the oil already in the engine.

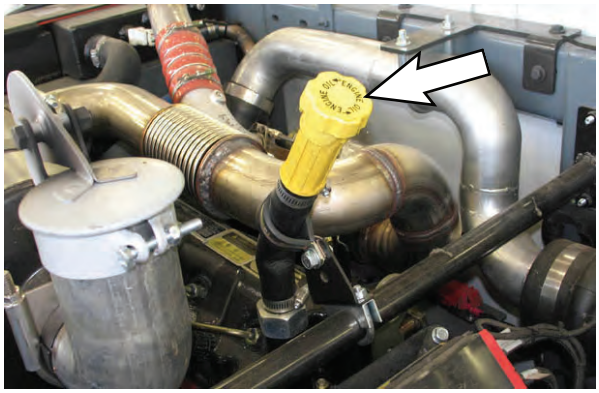
Check the engine oil level daily. The engine oil dipstick is located behind the right side engine access door.

Change the engine oil and oil filter after the first 50 hours of operation, then after every 250 hours of machine operation after the initial 50 hours.

The engine oil drain hose is located behind the right side door.



Fill the engine with oil to the level indicated on the oil dipstick. The engine oil capacity is 11.7 L (12.4 qt) including the oil filter.



DIESEL ENGINE FUEL

Tier 4F Emissions Engine: Use Ultra Low Sulfur Diesel (ULSD) or Biodiesel up to 20% (B20) fuel Only.

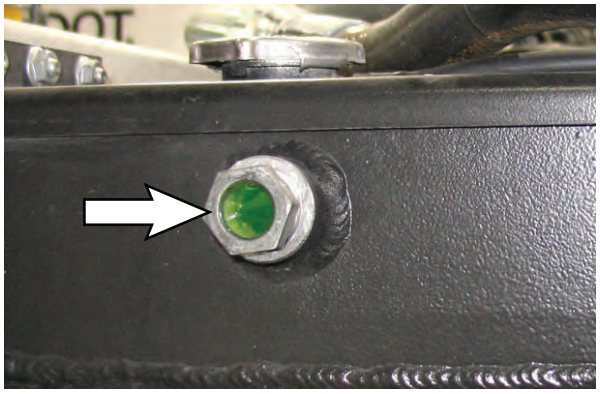
Stage IIIA Emissions Engine: Use Low Sulfur Diesel (LSD) or Biodiesel up to 20% (B20) fuel Only.

DO NOT add aftermarket additives to the fuel in this machine. Engine damage due to use of other fuels and aftermarket additives may not be covered under the machine warranty.

COOLING SYSTEM

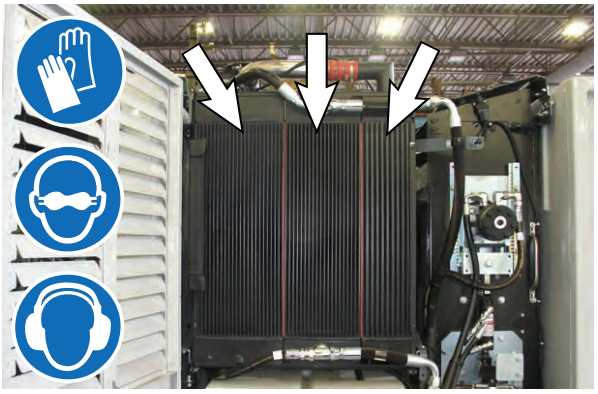
FOR SAFETY: When servicing machine, avoid contact with hot engine coolant. Do not remove cap from radiator when engine is hot. Allow engine to cool.

Check the radiator coolant level in the radiator site glass daily. The coolant level must be visible in the radiator site glass. Use distilled water mixed with a permanent-type, ethylene glycol antifreeze to a −34° C (−30° F) rating. Add coolant to the radiator. Add one pint of conditioner to each coolant change.



Check the radiator hoses and clamps every 100 hours of operation. Tighten loose clamps. Replace the hoses and clamps if the hoses are cracked, hardened, or swollen.

Check the radiator core exterior, hydraulic cooler, and turbo cooler fins for debris daily. Blow or rinse dust and debris collected on the radiator from the inside face (closest to the engine fan) of the grill and radiator fins and out to the exterior of the machine. Be careful to not bend the cooling fins when cleaning. Clean thoroughly to prevent the fins from becoming encrusted with dust. Clean the radiator and cooler only after they have cooled to avoid cracking.



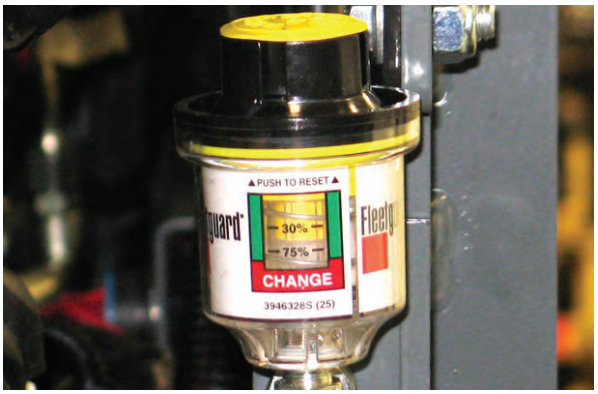
ATTENTION! Do not wash the fuel injection pump or turbocharger when the engine is running or warm. This could damage these components.

Flush the radiator and the cooling system every 1600 hours of operation, using a dependable cleaning compound. Add one pint of conditioner (TENNANT part no. 770172) to each coolant change.

AIR FILTER INDICATOR

Check the indicator daily. The indicator yellow disk will move as the air filter element fills with dirt. Do not replace the air filter element until the yellow disk reaches “CHANGE in the red level. The engine must be running to get an accurate air indicator reading.

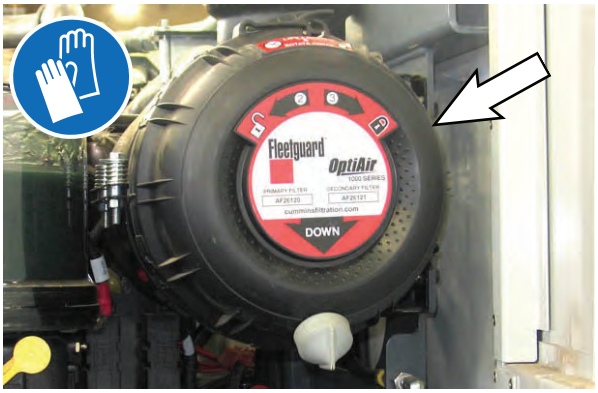
FOR SAFETY: When servicing machine, avoid moving parts. Do not wear loose clothing, jewelry, and secure long hair.



AIR FILTER

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

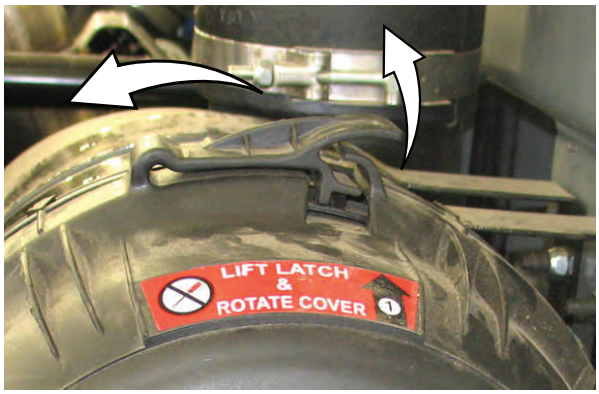
Empty the engine air filter dust cap daily. Replace the dust cap if it is worn or damaged.



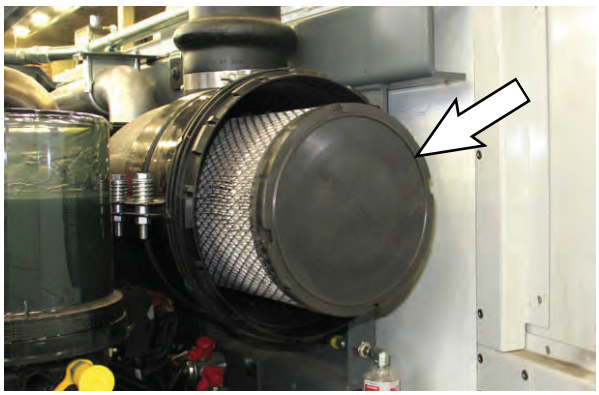
Clean the air filter element after every 250 hours of operation.

Replace the air filter element when the air filter indicator shows restriction in the air intake system or the filter element is damaged. Refer to AIR FILTER INDICATOR.

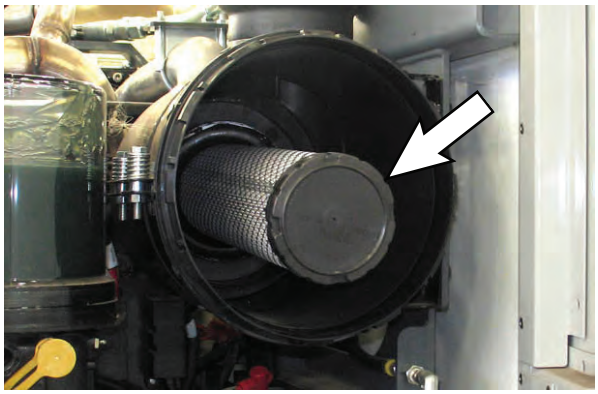
Lift the latch, twist the air filter dust cap counterclockwise, and carefully pull the air filter dust cap from the air filter assembly.



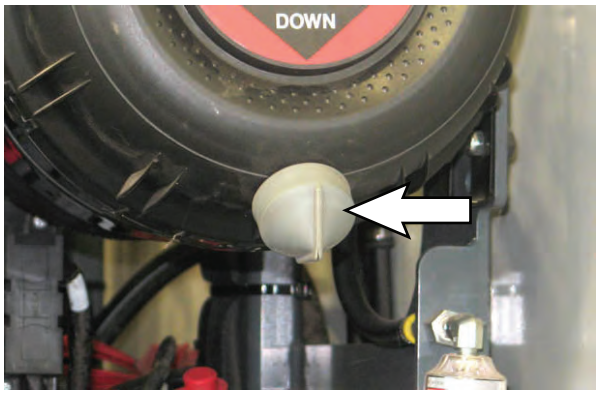
Remove the filter element. Carefully clean the end cap and the interior of the housing with a damp cloth. Clean the housing sealing surfaces.



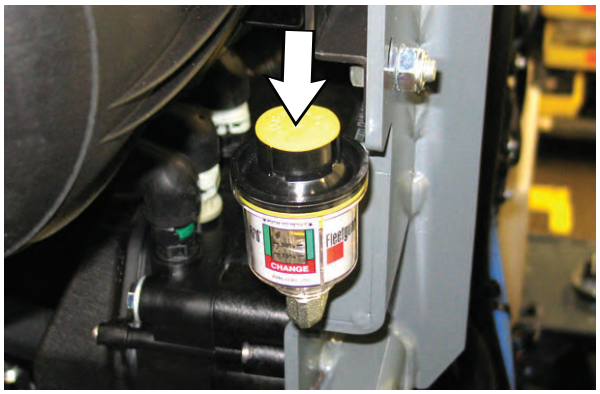
A safety element is located Inside the air filter element. Replace this element, do not clean it, after the regular element has been damaged or changed three times.



Install the filter element into the air filter housing and reinstall the dust cap with the water drain pointing down.



Push the *reset button* on the end of the indicator to reset the air filter indicator after replacing the air filter element.

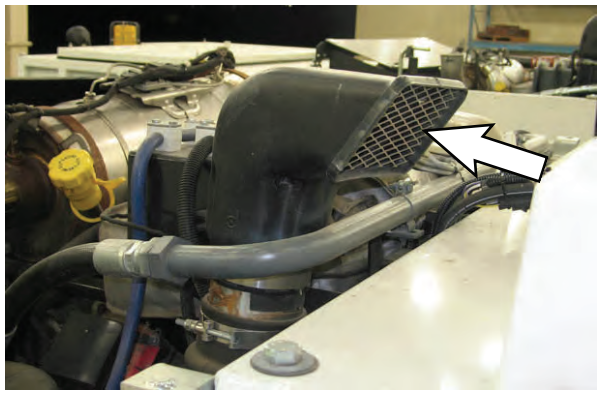


Start the engine and run the machine at idle RPM. Observe the air filter indicator to ensure no air restriction is shown on the indicator.

AIR INTAKE SCREEN

The air intake screen is located on top of the engine air cleaner.

Check the air intake screen for obstructions daily.



FUEL FILTER

The fuel filter element filters impurities from the diesel fuel. It is located on the conveyor side of the engine.

Replace the fuel filter element after every 250 hours of operation.

FOR SAFETY: Keep flames and sparks away from fuel system service area. Keep area well ventilated.

FUEL WATER SEPARATOR

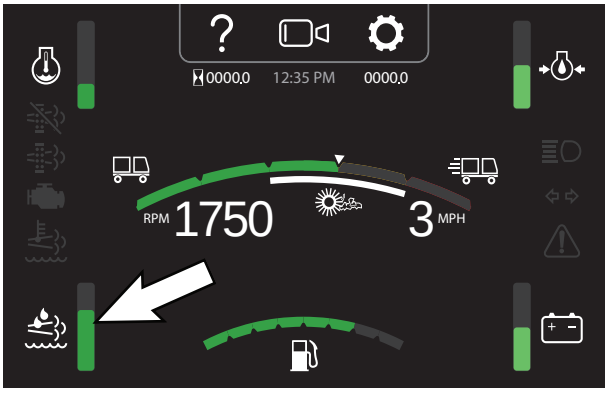
The fuel water separator separates water from the diesel fuel. It is located on the bottom of the fuel filter.

Open the separator daily to allow any accumulated water to drain out.

DIESEL EXHAUST FLUID (DEF) TANK (TIER 4F EMISSIONS ENGINE)

DEF breaks down the environmentally harmful elements from diesel exhaust into three non-environmentally harmful gases: nitrogen, water vapor, and carbon dioxide.

Fill the DEF tank when the low DEF level alert indicator illuminates on the touch screen.
See DIESEL EXHAUST FLUID (DEF) TANK INDICATOR/GAUGE (TIER 4F EMISSIONS ENGINE).



1. Remove the retainer pin from the DEF tank cap.

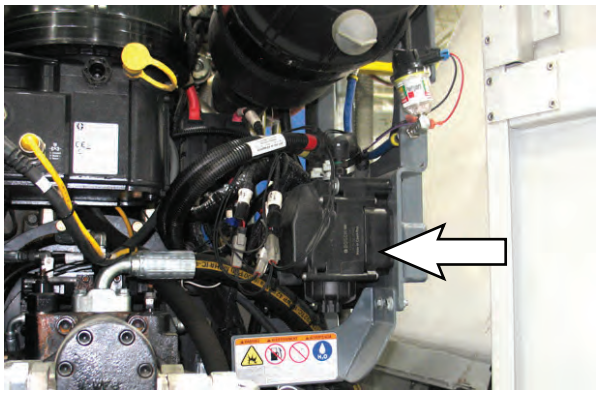
2. Lift DEF tank cap retainer away from the top of the cap.

3. Twist and remove the DEF tank cap from the DEF tank.

4. Fill the DEF tank with DEF. Do Not overfill the DEF tank.
5. Reinstall DEF tank cap/retainer pin onto the DEF tank.

DEF DOSING UNIT AND FILTER (TIER 4F EMISSIONS ENGINE)

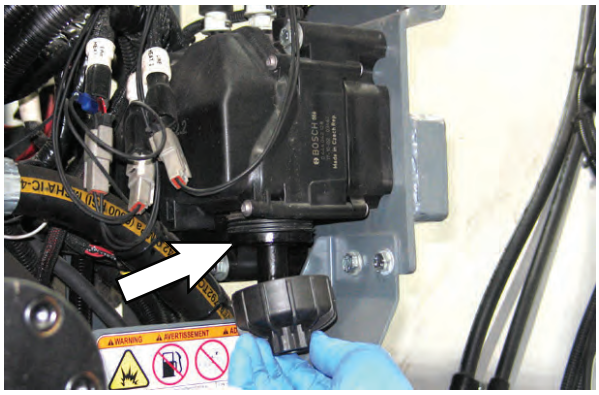
The DEF dosing unit is located directly below the air filter assembly.



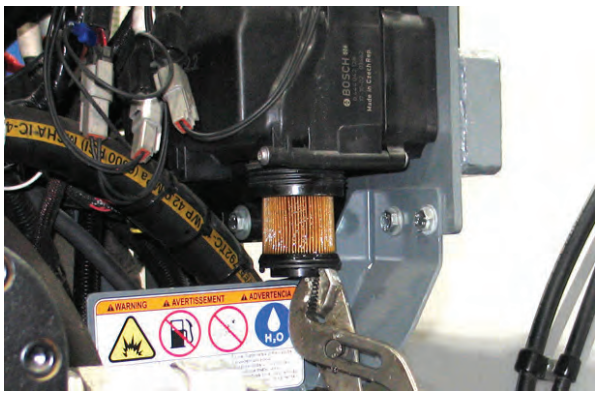
Check the DEF dosing filter for damage and obstructions after every 4000 hours of operation.

Check the DEF dosing unit cap for damage after every 4000 hours of operation.

Remove the DEF dosing unit cap and DEF filter equalizing element from the DEF dosing unit to access the DEF dosing filter.



Remove the DEF dosing filter from the DEF dosing unit.



Inspect the DEF doser filter for damage. Clean any debris from the filter.

Inspect the DEF dosing unit cap for damage. Ensure the threads on the DEF dosing unit and in the DEF dosing cap are not damaged.

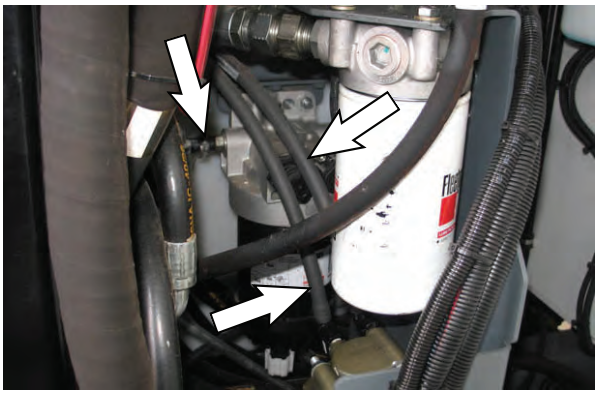
FUEL LINES

Check the fuel lines every 50 hours of operation. If the clamp band is loose, apply oil to the band screw, and securely tighten the band.

The fuel lines are made of rubber, and may become worn whether the machine has been used much or not. Replace the fuel lines and clamp bands after every 2000 hours of operation.

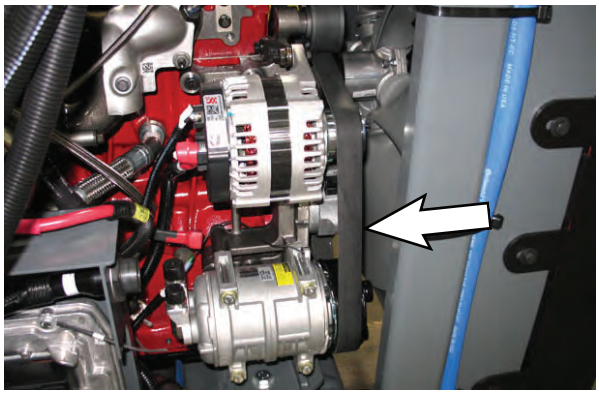
FOR SAFETY: Keep flames and sparks away from fuel system service area. Keep area well ventilated.

Replace or repair all worn or damaged fuel lines and clamp bands. Plug both ends with clean cloth or paper to prevent dirt from entering the lines when the fuel lines are not installed. Dirt in the fuel lines can cause fuel injection pump malfunction.



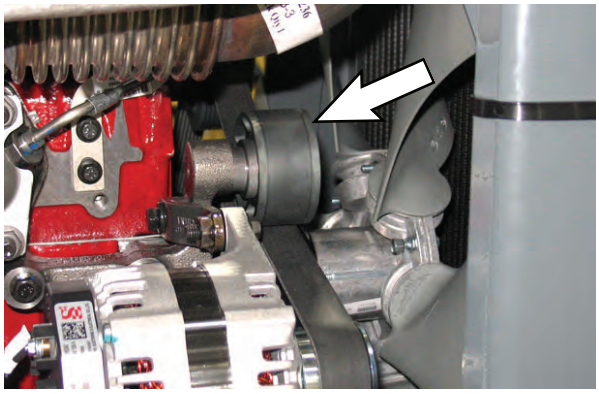
ALTERNATOR/FAN BELT AND TENSIONER

The engine crankshaft pulley drives the alternator/ fan belt pulley. Proper belt tension is 10 mm (0.40 in) from a force of 4 to 5 kg (9 to 11 lb) applied at the mid-point of the longest span.



Check and adjust the alternator/fan belt tension every 100 hours of operation.

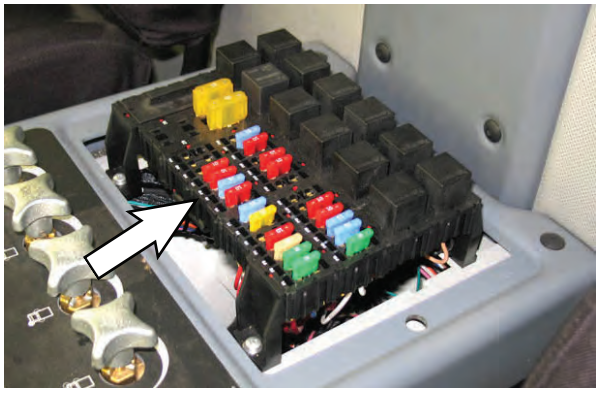
Check the alternator/fan belt tensioner for damage after every 500 hours of operation.



FOR SAFETY: When servicing machine, avoid moving parts. Do not wear loose jackets, shirts, or sleeves.

FUSES AND RELAYS

Remove the fuse/relay panel cover to access fuses and relays.



RELAYS

Relays switch the electrical power going to the machine electrical systems on/off.

Relay	Rating	Circuit Controlled
M1	12 VDC, 40 A	Horn
M2	12 VDC, 40 A	Start Lockout
M3	12 VDC, 40 A	Propel Interlock
M4	12 VDC, 40 A	Accessory
M5	12 VDC, 40 A	A/C Condenser Pump
M6	12 VDC, 40 A	High Beam
M7	12 VDC, 40 A	Low Beam
M8	12 VDC, 40 A	Fan Medium
M9	12 VDC, 40 A	Fan High
M10	12 VDC, 40 A	Hopper Moving
M11	12 VDC, 40 A	Seat Switch
M12	12 VDC, 40 A	Accessory #2

FUSES

Fuses are one-time protection devices designed to protect the wire harness by stopping the flow of current in the event of a circuit overload. This machine uses automotive ATO type fuses. **NEVER substitute higher value fuses than specified in the table below**.

Fuse	Rating	Circuit Protected
FU1	30A	Accessory
FU2	30A	Accessory #2
FU3	25A	Turn Signals
FU4	15A	Accessory Power Socket
FU5	25A	A/C Condenser Fan
FU6	20A	Headlights
FU7	15A	Taillight/Marker
FU8	15A	Water Pump/Pressure Washer
FU9	15A	Hopper Control
FU10	10A	Horn
FU11	10A	Dome Light/Radio
FU12		Open
FU13	20A	Traffic Advisor
FU14		Open
FU15	30A	Heater A/C
FU16	15A	Brush Control
FU17	15A	Main Brush/Conveyor/Vacuum Fan
FU18	10A	Logic Power
FU19	10A	User Interface/Sensors
FU20	10A	Key Switch Controlled Option
FU21	10A	Key Switch Controlled Option
FU22	10A	Arrow Stick Lamp Bar/Options
FU23	10A	Auto Lube (Option)
FU24	10A	Vario Brush (Option)
FU25	10A	Radio (Option)
FU26	10A	Wipers
FU27	10A	Start Lockout
FU28	10A	Daytime Running Lights
FU29		Open
FU30		Open
FU31	20A	Night Lights
FU32	20A	Side Brush/Beacon Lights

BATTERY

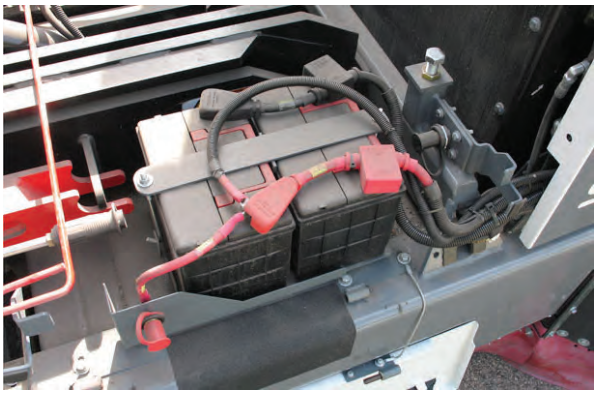
The battery is located on the right side of the machine, under the hopper. Tilt the hopper back to access the battery. See TILTING THE HOPPER BACK/ENGAGING THE HOPPER SUPPORT PIN.

Check the battery cables for damage and wear after 100 hours of operation.

After the first 50 hours of operation, and every 200 hours after that, clean and tighten the battery connections.

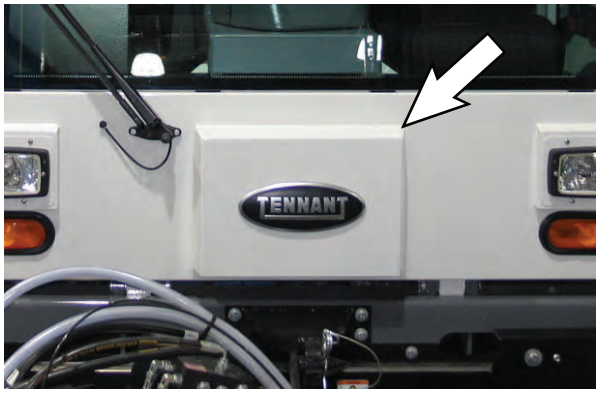
FOR SAFETY: When servicing machine, avoid contact with battery acid. Wear eye and ear protection.

NOTE: When the battery is disconnected, the parking brake will automatically engage.

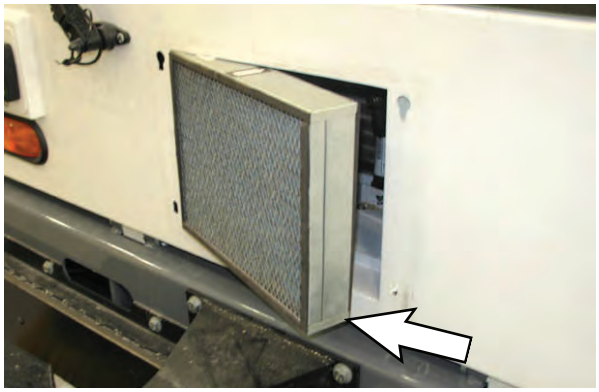


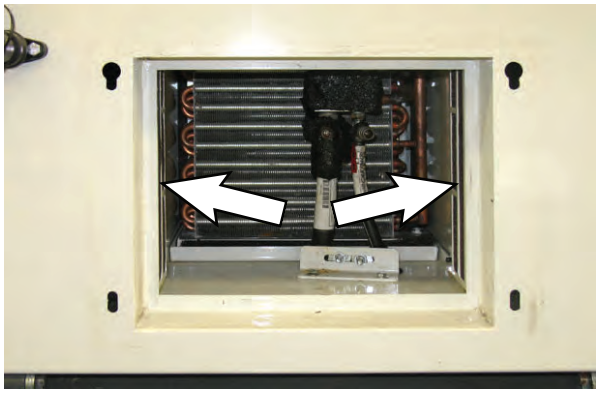
CAB FILTERS

The fresh air cab filters are located in the front of the cab.



Check and clean the cab filters after every 50 hours of operation. Clean cab filters with soap and water. Replace damaged or worn filters.





WINDSHIELD WIPER BLADES

Check the windshield wiper blades for wear and damage every 200 hours of operation. Replace when necessary.

WINDSHIELD WASHER FLUID

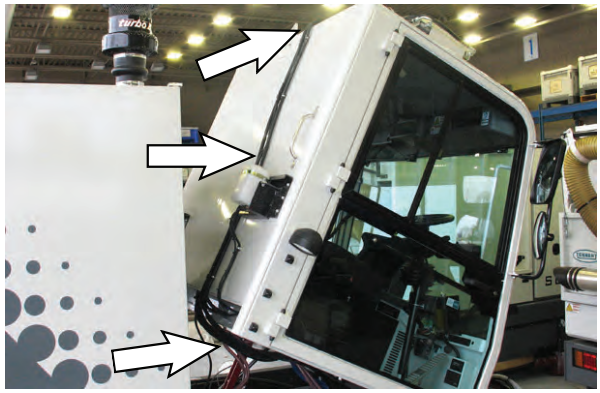
The windshield washer fluid is located behind the operator cab and can be accessed through the right engine access door. Check the windshield washer fluid level daily. Fill with automotive windshield washer fluid.

AIR CONDITIONING SYSTEM (OPTION)

Check the condenser fins for debris and damage after every 250 hours of operation. Blow all dust and debris from the fins. Be careful to not bend the condenser fins when cleaning. Clean thoroughly to prevent the fins from becoming encrusted with dust.

Check the evaporator fins for debris and damage after every 250 hours of operation. Blow all dust and debris from the fins. Be careful to not bend the evaporator fins when cleaning. Clean thoroughly to prevent the fins from becoming encrusted with dust.

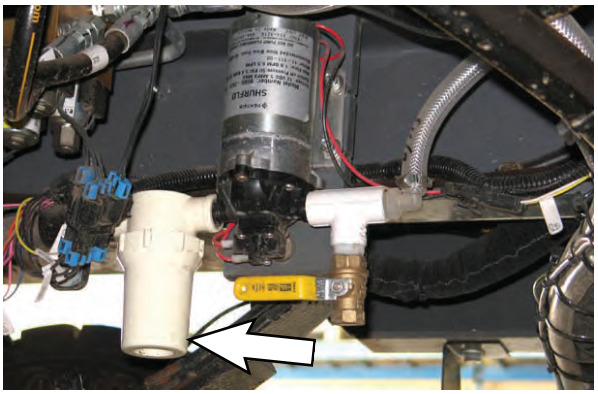
Check the condenser tubes for wear and damage after every 250 hours of operation. Replace damaged tubes.



WET DUST CONTROL FILTER (OPTION)

The wet dust control filter is located under the cab between the front wheels.

Clean the water filter every 200 hours of operation. Remove the water filter and flush it with clean water.

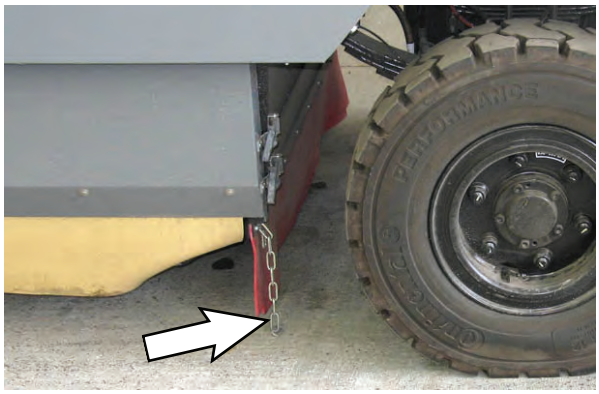


BELTS AND CHAINS

STATIC DRAG CHAIN

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

Ensure the chain is touching the floor at all times.

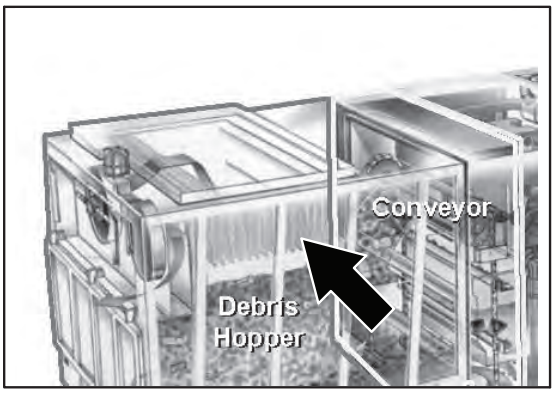


DEBRIS HOPPER

HOPPER DUST FILTER

The hopper dust filter filters the air pulled up from the hopper. The dust filter is equipped with a shaker to remove the accumulated dust particles. To clean the dust filter, with the engine at idle, press the filter shaker button.

Shake the dust filter before tilting or dumping the hopper and at the end of every work shift. When sweeping in dusty conditions, shake the filter more frequently.



Filters may become plugged with mud and heavy material when sweeping in wet conditions. Light fibrous material can also become imbedded in between the filter pleats.

CLEANING THE HOPPER DUST FILTER

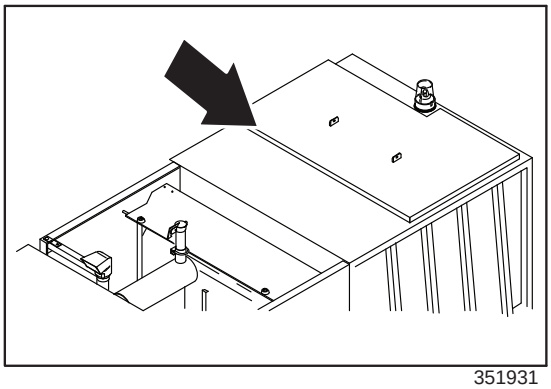
1. Turn on the engine and set the *parking brake switch*.
2. Press the *hopper tilt back button* to tilt the hopper back.
3. Press the *hopper door open button* to release the hopper door.
4. Secure the door with the door support cable.
5. Press the hopper tilt forward button to tilt the hopper forward.
6. Turn off the machine.
7. Use a garden hose or broom to clean the hopper filter from the inside the hopper.
8. Turn on the machine.
9. Press the *hopper tilt back button* to tilt the hopper back.
10. Remove door support cable from hopper door.
11. Press the *hopper tilt back button* to tilt the hopper completely forward.
12. Press the *hopper door close button* to latch the hopper door.

REMOVING OR REPLACING THE HOPPER DUST FILTER

1. Turn off the engine and set the *parking brake switch*.

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

2. Remove the top hopper cover.



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3. Remove the nuts holding the filter shaker frame in the hopper.
4. Pull the filter shaker frame and filter out from the hopper.
5. Drill out the rivets holding the filter to the shaker frame.
6. Put the new separators into the new filter bag pockets.
7. Remove the rods from the old filter, and install them in the new filter.
8. Install the filter into the shaker frame.
9. Stretch the filter over the edges of the shaker frame. Pull the drawstring tight.

10. Drill and rivet the filter to the shaker frame.

11. Install the filter shaker frame and filter into the hopper.

12. Install the retaining nuts for the filter shaker frame and tighten.

13. Check the seals on the top hopper cover and the hopper. Replace worn or damaged seals.

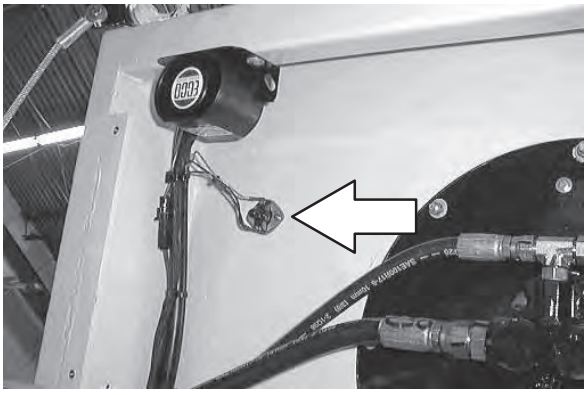
14. Reinstall the top hopper cover onto the hopper. Ensure the cover has a good seal before tightening the hardware.

NOTE: Assembled hopper dust filter/shaker frame systems are available.

THERMO-SENTRY

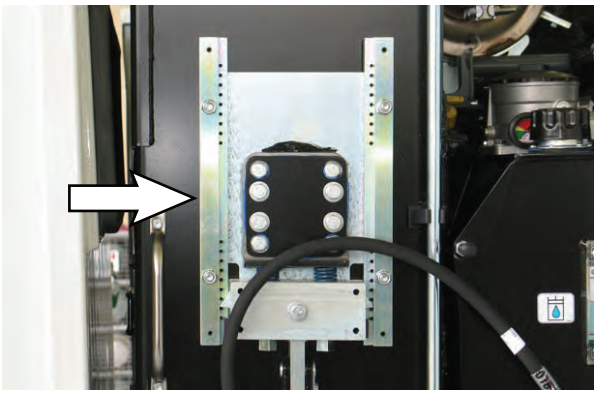
The Thermo-Sentry senses the temperature of the air pulled up from the hopper. The Thermo-Sentry is located at the rear of the hopper. If the air temperature in the hopper reaches 71° ± 3° C (160° ± 5° F), the Thermo-Sentry stops the vacuum fans and cuts off the air flow. Sweeping functions will stop, the brushes will raise, and a warning, fault or inhibit alert will appear on the touchscreen. See WARNINGS, FAULTS, AND INHIBITS.

The Thermo-Sentry automatically reset when the air temperature in the hopper falls below 60° ± 3° C (140° ± 5° F).



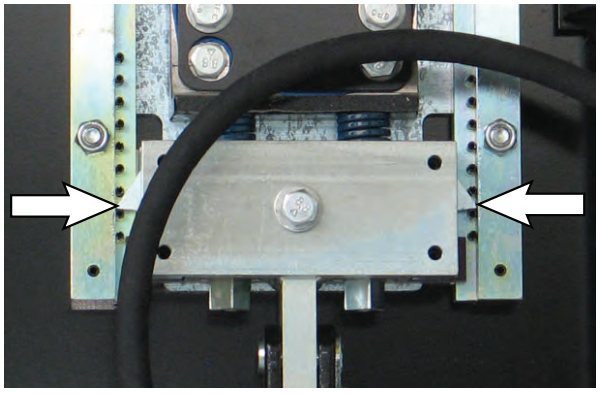
CONVEYOR

Check tension, clean, and lubricate the conveyor chain daily. To lubricate, refer to the CONVEYOR CHAIN in the LUBRICATION section of this manual.



The hydraulic cylinders apply tension to the conveyor chain while the machine is operating. When the sweeping system is turned off, the conveyor is equipped with a locking ratchet mechanism to keep the conveyor chain from disengaging the drive sprockets.

As the conveyor chain wears, the locking ratchet mechanism moves up the pins mounted on the slide rails on both sides of the machine. Clean the ratchet mechanisms daily. Check the ratchet tips and pins for damage and wear daily.



Check the conveyor skirts and paddles for damage and wear daily.

WARNING: Conveyor throws debris. Conveyor pinch point. Stay clear when in operation.

Clean the conveyor thoroughly with a garden hose daily.

Tilt the hopper back, engage the hopper tilt support bar, and turn the machine power off. Remove the top conveyor panel from rear of the conveyor to access the interior of the conveyor.

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

BRUSHES

MAIN BRUSH

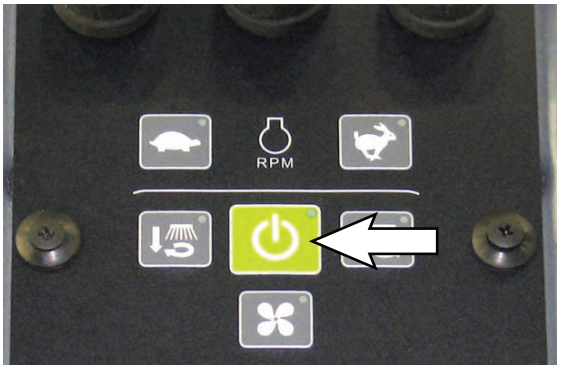
Check the brush daily for wear or damage. Remove any string or wire tangled on the main brush, main brush drive hub, or main brush idler hub.

Check the main brush pattern daily. See the CHECKING AND ADJUSTING THE MAIN BRUSH PATTERN section of the manual. The pattern should be 100 to 125 mm (4 to 5 in) wide.

Replace the brush when it no longer cleans effectively.

REPLACING THE MAIN BRUSH

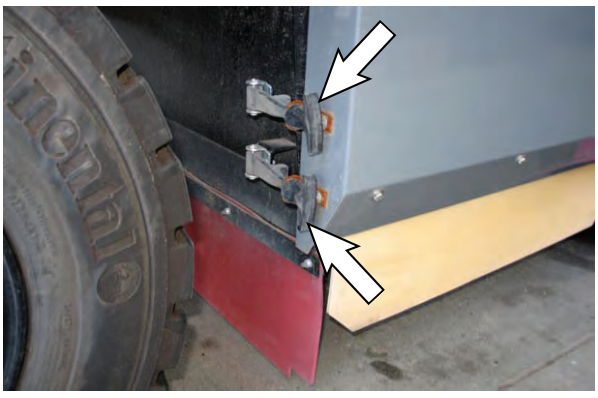
1. Park the machine on level ground and set the parking brake.
2. Press the *1-Step button* to lower the main brush.



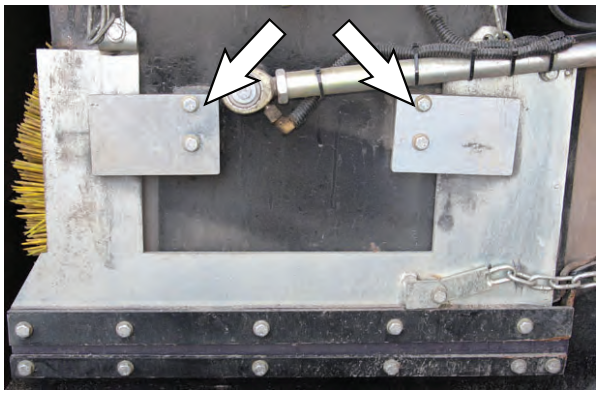
3. Turn off the engine.

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

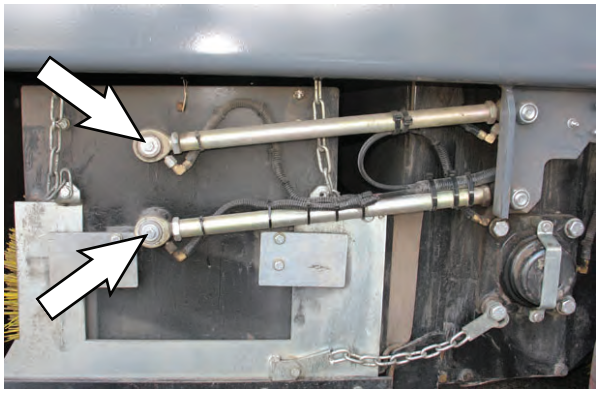
4. Unhook the t-handles from the right side main brush access door and remove the right side main brush access door.



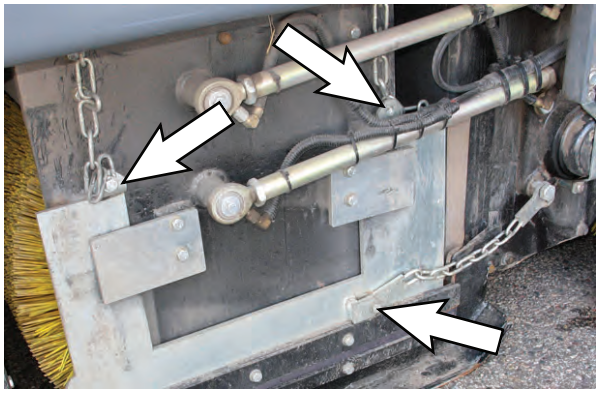
5. Remove the hardware holding the skid plates to the brush idler plate.



6. Remove the hardware holding the links to the brush idler plate.



7. Remove the brush chains and the skid chain.

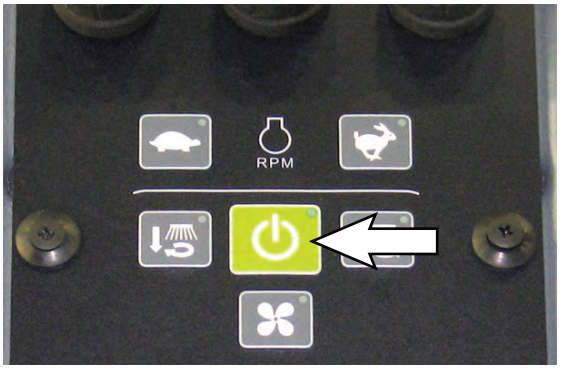


8. Remove the hardware holding the idler plate onto the machine.

9. Remove the brush idler plate.
10. Pull the main brush off the brush drive plug and out from the main brush compartment.
11. Position the new brush on the ground next to the access door.
12. Slide the main brush onto the drive plug. Rotate the brush until it engages the drive plug, and push it completely onto the plug.
13. Slide the main brush idler plate plug onto the main brush.
14. Reinstall the idler plate onto the machine.
15. Reinstall the brush chains and the skid chain.
16. Reinstall the links onto the idler plate.
17. Reinstall the skid plates to the idler plate.
18. Reinstall the right side main brush access door onto the machine.
19. Check and adjust the main brush pattern. See CHECKING AND ADJUSTING THE MAIN BRUSH PATTERN.

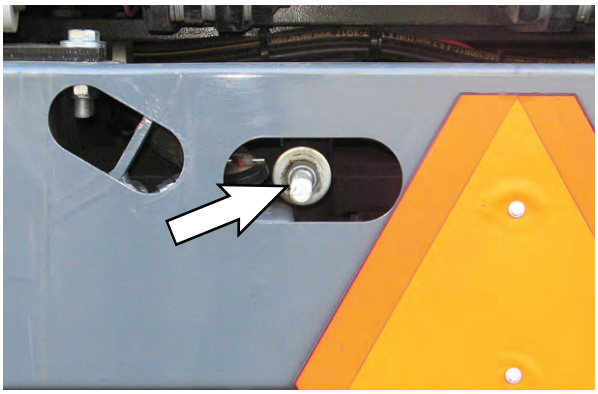
CHECKING AND ADJUSTING THE MAIN BRUSH PATTERN

1. Park the machine on level ground and set the *parking brake switch*.
2. Press the *1-Step button* to lower and start the main brush. Allow the brush to rotate in place for 2 minutes.



3. Press the *1-Step button* again to raise and stop the main brush.
4. Drive the machine off the test area.
5. Observe the width of the brush pattern. The proper brush pattern width is 100 to 125 mm (4 to 5 in) along the entire length of the brush pattern.
6. To increase the width of the main brush pattern, turn the main brush down pressure nut counter-clockwise.

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



SIDE 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.

The side brush pattern is set at the factory.

Replace the side brush when it no longer cleans effectively.

REPLACING THE SIDE BRUSH

1. Raise and stop the side brush.
2. Stop the engine and set the machine parking brake.

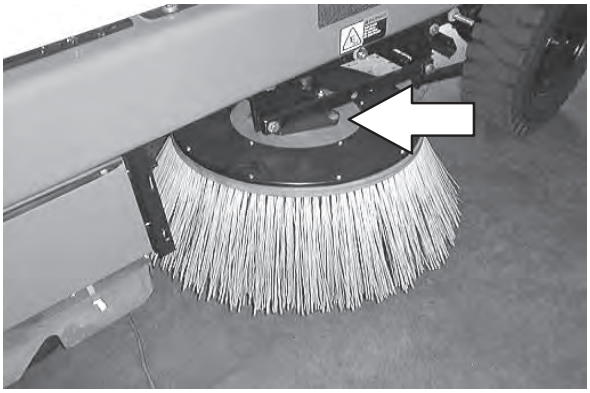
FOR SAFETY: Before leaving or servicing machine, stop on level surface, set parking brake, turn off machine and remove key.

3. Remove the dry dust control skirt assembly (option) if equipped.

4. Remove the hardware retaining the side brush to the drive hub.

WARNING: Side brush can move. Do not step on side brush.

5. Install the new side brush to the drive hub with the hardware removed earlier.
6. Check the side brush linkage for wear and loose hardware.

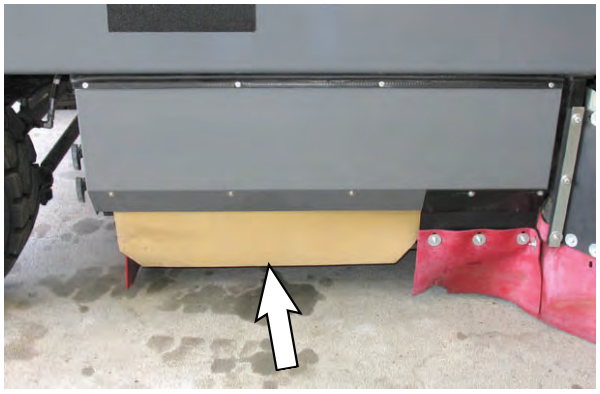


SKIRTS AND SEALS

BRUSH ACCESS DOOR SKIRTS

The brush access door skirts are located on the bottom and front of each of the two main brush access doors. The bottom skirts should touch the skid plates on either side of the machine.

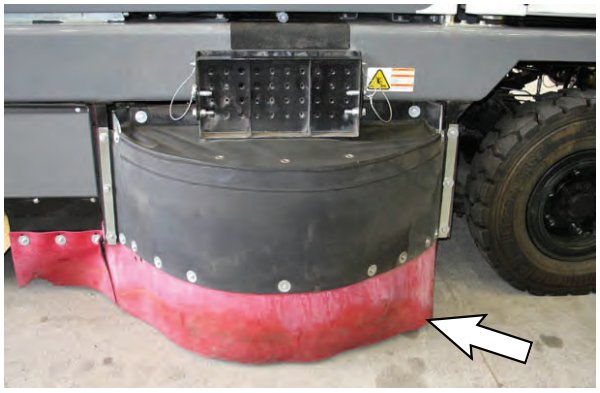
Check the skirts for wear or damage daily.



DRY DUST CONTROL SKIRTS (OPTION)

The dry dust control skirts are mounted over the side brushes on each side of the machine. The skirts should clear the ground by less than 3 mm (0.125 in).

Check the skirts for wear or damage daily.



BRUSH COMPARTMENT REAR SKIRT

The brush compartment skirt is located at the rear of the brush compartment. The skirt should clear the ground by 3 mm (0.125 in).

Check the skirt for wear or damage daily.

NOTE: Tire pressure and amount of debris in the hopper will affect skirt clearances.

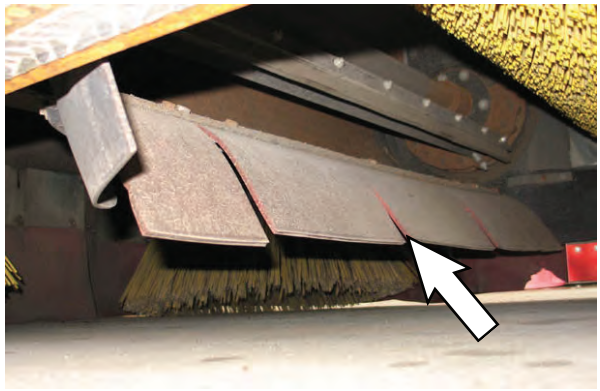
CONVEYOR SKIRTS

The conveyor has a lip skirt located at the bottom rear of the conveyor and two side skirts. The skirts should touch the ground when the conveyor is lowered into the sweeping position.

Check the skirts for wear or damage daily.

Replace the skirts when they no longer touch the ground.

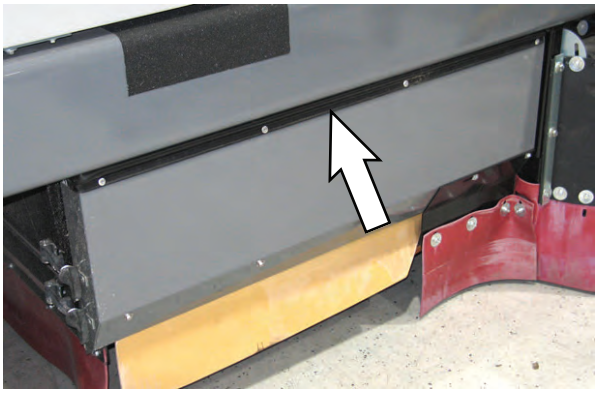
NOTE: Tire pressure and amount of debris in the hopper will affect skirt clearances.



BRUSH DOOR SEALS

The brush access doors are located along the door edges.

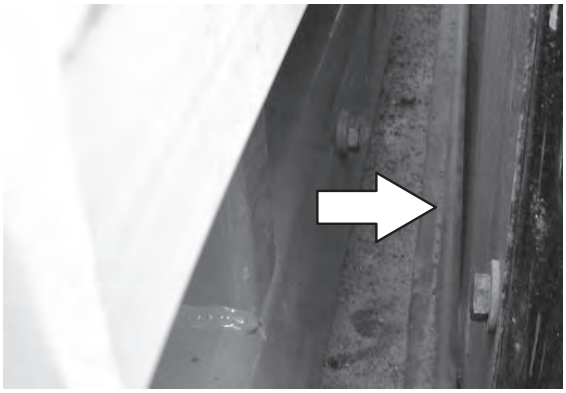
Check the seals for wear or damage every 100 hours of operation.



CONVEYOR SEALS

The conveyor seals are located on the machine frame where the conveyor makes contact with the frame.

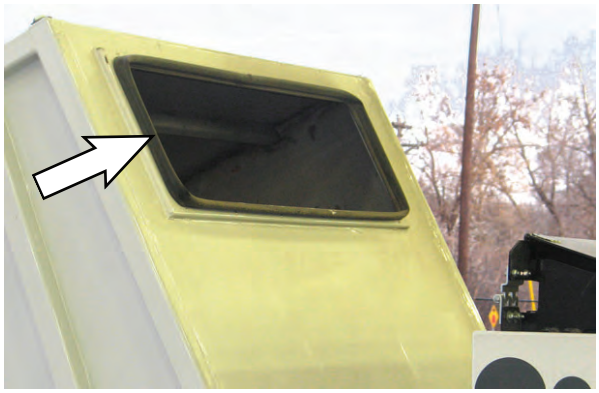
Check the seals for wear or damage every 100 hours of operation.



HOPPER SEALS

The hopper seals are located on the hopper door, the hopper filter cover, the dust filter, and the front opening of the hopper.

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



CAB DOOR SEALS

The cab doors have seals are located along the door edges.

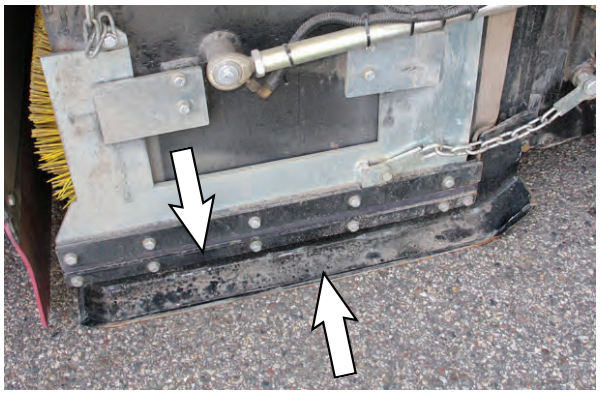
Check the seals for wear or damage every 100 hours of operation.

SKIDS

The skids are located on both sides of the brush compartment. They skim the ground when the conveyor is lowered into the sweeping position and are designed to contain debris between the main brush and the conveyor lip.

Check the skids for wear after every 100 hours of operation. The skids should be replaced when the thickness is less than 1 mm (0.04 in).

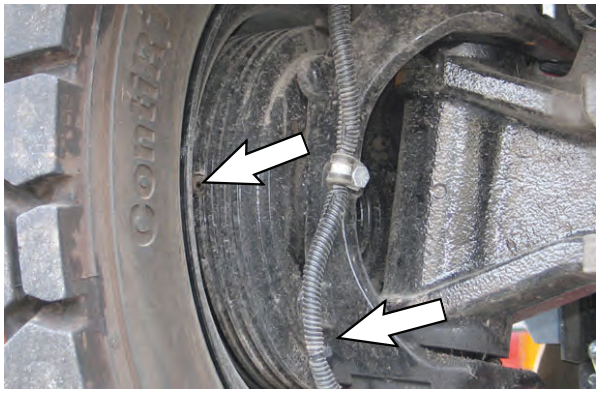
The skids are attached to the upper plate by means of a rubber gusset that absorbs shock. Check the rubber gussets every 100 hours of operation for damage or wear.



BRAKES AND TIRES

SERVICE BRAKES

The wet multi−disc service brakes are located on all four wheels. These brakes are filled with universal tractor fluid (Mobil 424). The fill/check ports are located on the side of the wheel hubs. The drain ports are located on the bottom of the wheel hubs. Check the fluid level after every 400 hours of operation. Change the fluid after every 1600 hours of operation.



TIRES

The machine tires are pneumatic. The wheels consist of a 3-piece rim, flap, tube, and tire.

Check the tire pressure every 50 hours of operation. The proper tire air pressure is:

Bias Ply Tire	930−1000 kPa (135−145 psi)
Radial Tire	930−1000 kPa (135−145 psi)

NOTE: The machine is equipped with 3-piece rims. If the tire pressure falls below 550 kPa (80 psi), the tire and wheel assembly should be brought to an industrial tire service center for repair and/or refilling.

Check the tires for wear and rotate every 200 hours of operation.

WHEEL ALIGNMENT

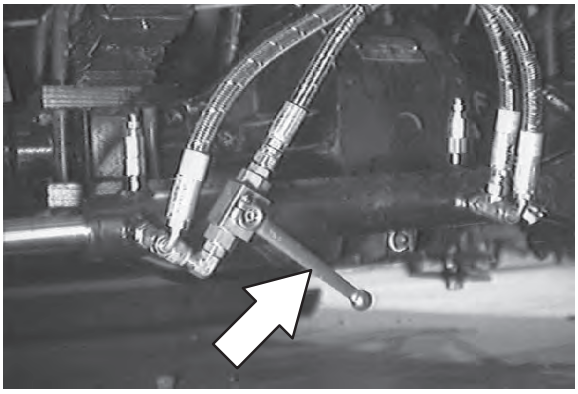
When the machine has been used for some time, a number of things (large temperature swings, continual turning in only one direction, and cylinder leakage) can prevent the steering system from tracking properly. The front axle is equipped with a hydraulic valve for aligning the wheels. Wheel alignment should be done after every 100 hours of operation or when the machine is not tracking properly.

To align the wheels:

1. Start the machine.
2. Slowly drive the machine forward and turn the steering wheel completely to the right while the machine is moving.

NOTE: It is important for the machine to be moving while turning so that there is no wind up on the side wall of the tires.

3. Stop the machine and set the *parking brake switch*.
4. Remove the red valve handle from the storage location inside the cab of the machine.
5. Place the red valve handle on the steering valve located on the front axle.



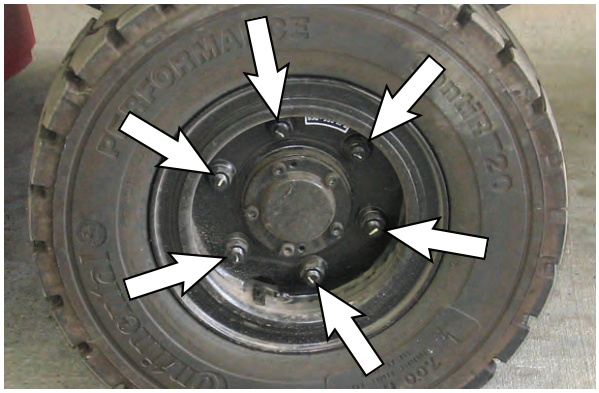
6. Turn the handle 90° counterclockwise to open the steering valve.
7. Release the *parking brake switch*.
8. Slowly drive the machine forward and turn the steering wheel completely to the left and then completely to the right while the machine is moving.

NOTE: It is important for the machine to be moving while turning so that there is no wind up on the side wall of the tires.

9. Stop the machine and set the *parking brake switch*.
10. Turn the handle 90° clockwise to close the steering valve.
11. Remove the red valve handle from the steering valve and return it to its storage location inside the cab of the machine.
12. Drive the machine straight forward 30.5-61.0 m (100−200 ft) to settle the system. Do not turn the steering wheel while driving forward.

WHEEL NUTS

Check the wheel nut torque on the four wheels every 100 hours of operation. The proper torque is 260−305 Nm (190−225 ft lb).



PUSHING, TOWING, AND TRANSPORTING THE MACHINE

PUSHING OR TOWING THE MACHINE

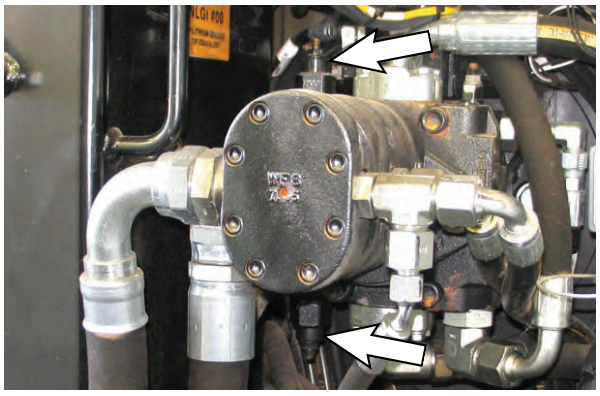
If the machine becomes disabled, it can be pushed from the rear or pulled from the front.

Use the bypass valves to prevent damage to the hydraulic system when the machine is being pushed or towed. The ignition switch must be turned to the on position to release the parking brake before pushing or towing. DO NOT exceed 1.6 kmh (1 mph). The bypass valves allow a disabled machine to be moved for a very short distance and at a speed to not exceed 1.6 kp/h (1 mph). The machine is NOT intended to be pushed or towed a long distance or at a high speed.

ATTENTION! Do not push or tow machine for a long distance and without using the bypass valve, or the machine hydraulic system may be damaged.

Before pushing or towing, loosen the nuts on the bypass valves with a 13 mm wrench. Turn in the set screws with a 4 mm Allen wrench until they are below the surface of the nut. Tighten the nuts.

When finished pushing or towing, loosen the nuts on the bypass valves with a 13 mm wrench. Turn out the set screws with a 4 mm Allen wrench until they top out. Tighten the nuts.



TRANSPORTING THE MACHINE

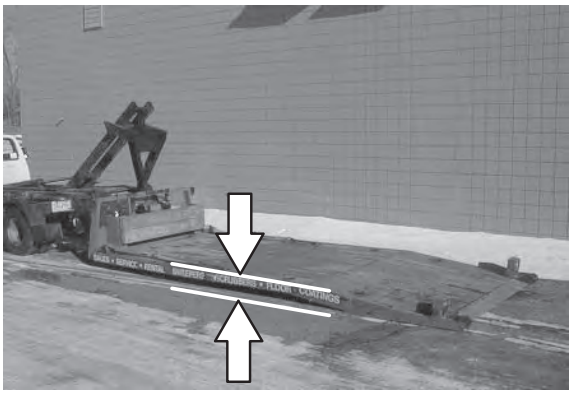
1. Position the front of the machine at the loading edge of the truck or trailer.

FOR SAFETY: When loading/unloading machine onto/off truck or trailer, empty debris hopper before loading machine. Drain tanks before loading machine.

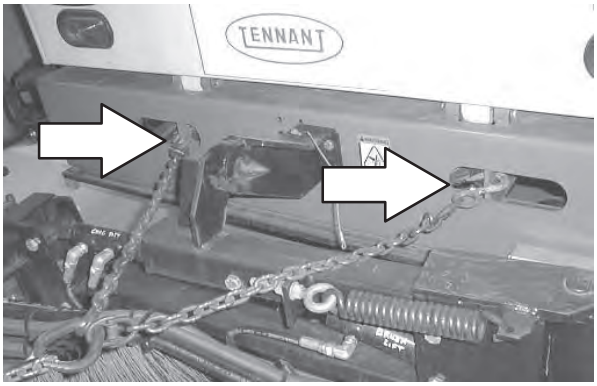
NOTE: Empty the hopper and water tank before transporting the machine.

2. Position the front of the machine at the loading edge of the truck or trailer.

3. If the loading surface is horizontal and 380 mm (15 in) or less from the ground, drive the machine onto the truck or trailer.

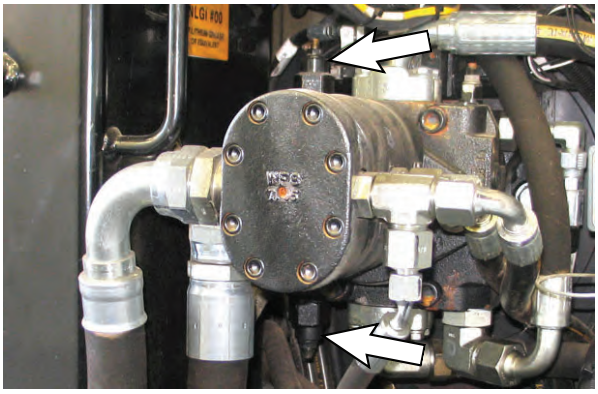


If the loading surface is not horizontal or is higher than 380 mm (15 in) from the ground, use a winch to load machine. To winch the machine onto the truck or trailer, attach the winching chains into the front channel of the machine frame.



FOR SAFETY: When loading machine onto truck or trailer, use winch. Do not drive the machine onto the truck or trailer unless the loading surface is horizontal AND is 380 mm (15 in) or less from the ground.

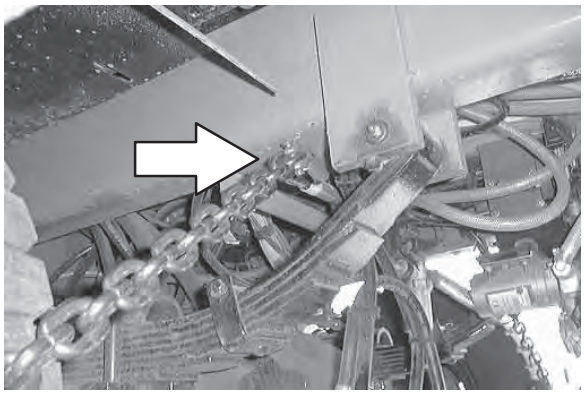
4. Open the bypass valves before winching the machine onto the truck or trailer. See PUSHING OR TOWING THE MACHINE section of this manual. Make sure the machine is centered.



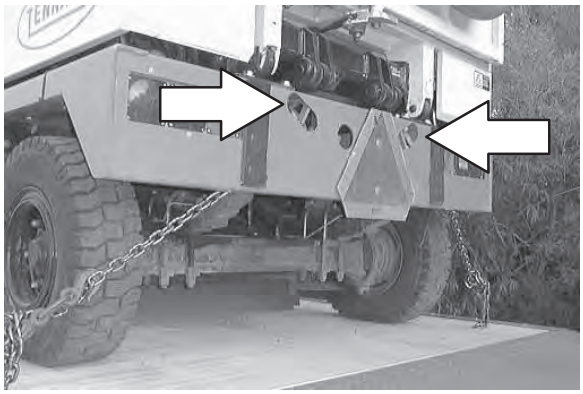
5. Position the machine as close to the front of the truck or trailer as possible. If the machine starts to veer off the center line of the truck or trailer, stop and turn the steering wheel to center the machine.

6. Set the *parking brake switch* and block the machine tires. Tie down the machine to the truck or trailer before transporting.

   The front tie-down locations are on the inside channels of the main frame.



   The rear tie-down locations are through the rear channels of the main frame.



7. If the loading surface is horizontal AND is 380 mm (15 in) or less from the ground, the machine may be driven off the truck or trailer.

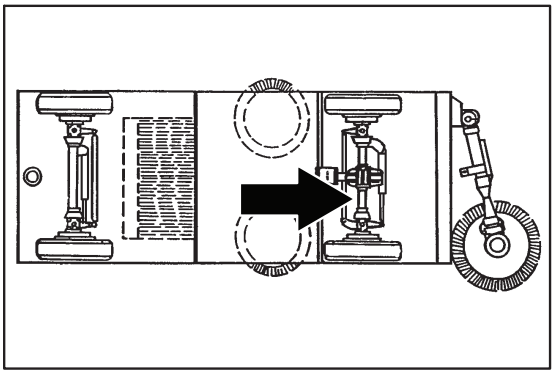
   If the loading surface is not horizontal or is higher than 380 mm (15 in) from the ground, use a winch to unload machine.

MACHINE JACKING

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

The machine can be jacked up at the designated locations. Use a hoist or jack that will support the weight of the machine; a 4-ton jack for empty hopper, and a 6-ton jack with full hopper. It is best to empty the hopper and water tank before jacking up the machine.

The front jacking locations are the front axle.



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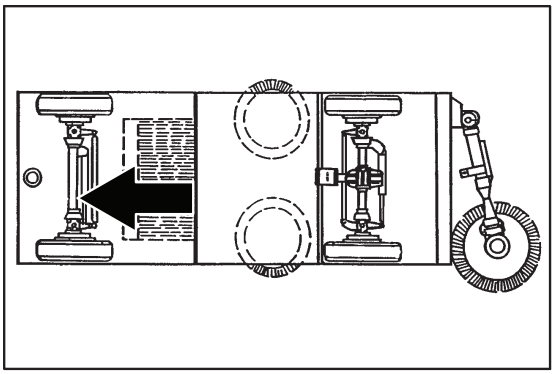
The rear jacking locations are the rear axle.



351930

FOR SAFETY: When servicing machine, block machine tires before jacking machine up. Use a hoist or jack that will support the weight of the machine. Jack machine up at designated locations only. Support machine with jack stands.

STORING THE MACHINE

The following steps should be taken when storing the machine for extended periods.

1. Charge the batteries before storing machine to prolong the life of the batteries. Recharge batteries once a month.
2. Disconnect batteries before storing.
3. Drain the water tank (if machine is equipped with dust control).
4. If storing machine in freezing temperatures, proceed to FREEZE PROTECTION.

NOTE: To prevent potential machine damage store machine in a rodent and insect free environment.

FREEZE PROTECTION FOR WET DUST CONTROL SYSTEM OPTION AND HIGH PRESSURE WASHER OPTION

1. Drain the water tank with the drain valve located under the tank.
2. Open the drain valve at the water pump under the cab to drain the water lines and pump.
3. Pour 3.8 L (1 gal) of Propylene Glycol Based/ Recreational Vehicle (RV) Antifreeze into the solution tank.
4. Machines equipped with high pressure washer option: Prepare the high pressure washer for use. See HIGH PRESSURE WASHER (OPTION) in the OPTIONS section in OPERATION for complete instruction for operating the high pressure washer.
5. Machines equipped with high pressure washer option: Point the high pressure washer wand in a safe direction and squeeze the trigger until RV Antifreeze solution is spraying from the nozzle.
6. Machines equipped with high pressure washer option: Turn off the high pressure washer system, point the pressure washer wand in a safe direction, and squeeze the trigger to relieve pressure from the system.
7. Machines equipped with high pressure washer option: Return high pressure washer components to storage area on the machine.
8. Open the water valve knobs on the dash panel to drain the lines.
9. Remove the water filter cap, located next to the water pump, and empty the water filter cap.
10. Leave the valves open if the machine is to be stored/not used for an extended period.

SPECIFICATIONS

GENERAL MACHINE DIMENSIONS/
CAPABILITIES

Item	Dimension / Capacity
Length	4445 mm (175 in)
Length with Vario Sweeping Brush	5230 mm (206 in)
Width	1780 mm (70 in)
Width (two side brushes)	2110 mm (87 in)
Height	2590 mm (102 in)
Weight (net base machine)	5715 kg (12600 lb)
Track	1510 mm (59.5 in)
Wheelbase	2970 mm (117 in)
Main brush diameter	610 mm (24 in)
Main brush length	1295 mm (51 in)
Side brush diameter	810 mm (32 in)
Vario Sweeping Brush diameter	965 mm (38 in)
Sweeping path width (main brush only)	1295 mm (51 in)
Sweeping path width (main brush/right side brush)	1750 mm (69 in)
Sweeping path width (main brush/dual side brushes)	2210 mm (87 in)
Sweeping path width (main brush/dual side brushes/Vario Sweeping Brush)	3200 mm (126 in)
Hopper weight capacity (low dump model)	3175 kg (7000 lb)
Hopper weight capacity (high dump model)	1815 kg (4000 lb)
Hopper volume capacity	2.6 m^3 (3.4 yd^3)
Dust filter area	21 m^2 (221 ft^2)
Wet dust control water tank (option)	356L (94 gal)
Gross Vehicle Weight Rating (GVWR)	9072 kg (20,000 lb)
Axle rating (front and rear)	5000 kg (11,000 lb)
Ceiling height minimum dumping clearance (low dump model)	3045 mm (120 in)
Ceiling height minimum dumping clearance (high dump model)	5060 mm (199 in)
Hopper dump height (low dump)	1015 mm (40 in)
Hopper dump height (high dump)	2895 mm (114 in)
Protection Grade	IPX3

Values determined as per IEC 60335-2-72	Measure
Sound pressure level LpA	N/A
Sound pressure uncertainty KpA	N/A
Sound power level LWA + Uncertainty KWA	N/A
Vibration - Hand-arm	2.5 m/s^2
Vibration - Whole body	0.5 m/s^2

GENERAL MACHINE PERFORMANCE

Item	Measure
Maximum forward speed	40.2 kmh (25 mph)
Maximum reverse speed	19.3 kmh (12 mph)
Minimum steering diameter	7.92 m (26 ft)
Minimum turning radius	4 m (13 ft)
Maximum rated climb and descent angle (empty hopper)	21%
Maximum rated climb and descent angle (full hopper)	14%
Maximum ramp incline for transporting (GVWR)	13%
Maximum ambient temperature for machine operation	43° C (110° F)
Minimum ambient temperature for machine operation	−20° C (−4° F)

HYDRAULIC SYSTEM

System	Capacity	Fluid Type
Hydraulic reservoir	68.2 L (18 gal)	ISO Grade 32 − below 7 C (45 F) ISO Grade 68 (Synthetic) − all temperatures
Hydraulic total	121 L (32 gal)	

POWER TYPE

Engine	Type	Ignition	Cycle	Aspiration	Cylinders	Bore	Stroke
Cummins Tier 4 Final, Stage IV	Piston	Diesel	4	Turbo	4	102 mm (4.02 in)	115 mm (4.53 in)
	Displacement		Tennant governed power			Gross intermittent power per SAE J1995	
	3.81 (231 cu. in.) Turbo		75.0 kW (100.6 hp) @2200 rpm			75.0 kW (100.6 hp) @2200 rpm	
	Fuel		Cooling system			Electrical system	
	Ultra low sulfur diesel (ULSD) or Biodiesel up to 20% (B20) Fuel tank: 90.9 L (24 gal)		Water/ethylene glycol antifreeze w/conditioner			12 V nominal	
			Total capacity: 17.8 L (4.7 gal)			135 A, 12 V alternator	
			Radiator capacity: 5.68 L (1.5 gal)			12V Battery − 1400 cca total (two 700 cca batteries)	
	Idle speed, no load		Governed speed, no load				
	900 RPM		2200 RPM				
	Engine lubricating oil with filter						
	10.6 L (11.2 qt) total capacity with filter 5-W40 API diesel classification CK-4						
	Air conditioner						
	Refrigerant R134a − total charge capacity, 0.74 kg (1 lb 10 oz)						
	PAG - Refrigerant oil, 59.148 ml (2 oz.)						
	DEF						
	19.0 L (5.0 gal) capacity True-Blue DEF (Diesel Exhaust Fluid) - per ISO 22241-1						

Engine	Type	Ignition	Cycle	Aspiration	Cylinders	Bore	Stroke
Cummins Stage IIIA	Piston	Diesel	4	Turbo	4	102 mm (4.02 in)	115 mm (4.53 in)
	Displacement		Tennant governed power			Gross intermittent power per SAE J1995	
	3.81 (231 cu. in.) Turbo		75.0 kW (100.6 hp) @2200 rpm			75.0 kW (100.6 hp) @2200 rpm	
	Fuel		Cooling system			Electrical system	
	Low sulfur diesel (LSD) or Biodiesel up to 20% (B20) Fuel tank: 90.9 L (24 gal)		Water/ethylene glycol antifreeze w/conditioner			12 V nominal	
			Total capacity: 17.8 L (4.7 gal)			135 A, 12 V alternator	
			Radiator capacity: 5.68 L (1.5 gal)			12V Battery − 1400 cca total (two 700 cca batteries)	
	Idle speed, no load		Governed speed, no load				
	900 RPM		2200 RPM				
	Engine lubricating oil with filter						
	10.6 L (11.2 qt) total capacity with filter 5-W40 API diesel classification CK-4						
	Air conditioner						
	Refrigerant R134a − total charge capacity, 0.74 kg (1 lb 10 oz)						
	PAG - Refrigerant oil, 59.148 ml (2 oz.)						

STEERING

Type	Power source
Front and rear wheels, hydraulic cylinder, steering rod, and rotary valve controlled	Hydraulic accessory pump

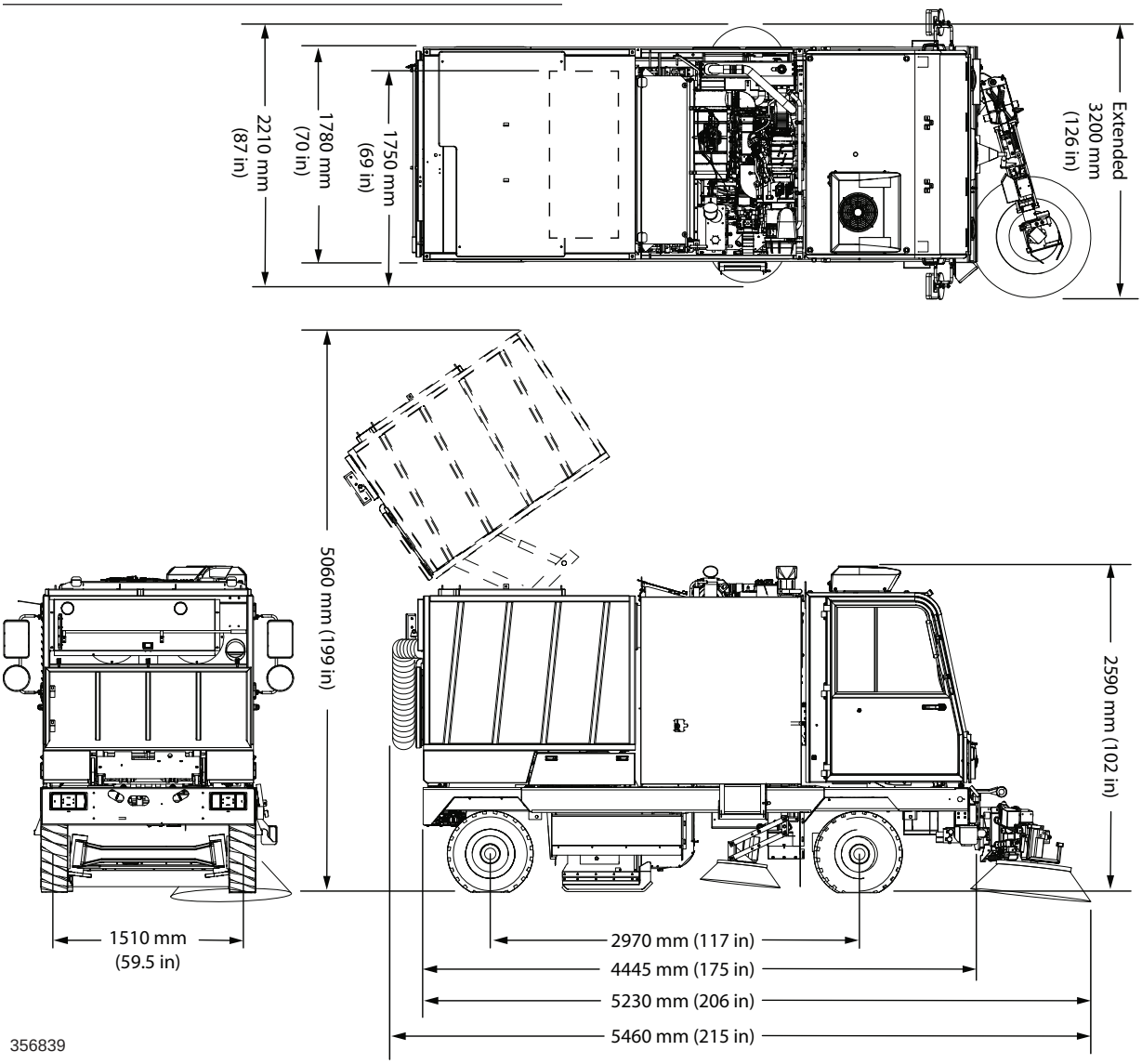
BRAKING SYSTEM

Type	Fluid	Operation
Service brakes	Universal tractor fluid (Mobil 424)	Hydraulic activated wet multi−disc on all four wheels
Parking brake	None	Spring activated dry multi−disc on front axle

TIRES

Location	Type	Size	Ply Rating	Pressure
Front and Rear (4)	Bias Ply Pneumatic	7 x 12 in	16	930−1000 kPa (135−145 psi)
Front and Rear (4)	Radial Pneumatic	7 x 12 in	16	930−1000 kPa (135−145 psi)

MACHINE DIMENSIONS



SUPERVISOR CONTROLS

The supervisor controls allow a supervisor to program the machine settings for operator use.

There are two types of controls that will interface with the operator home screen:

Operator Mode Controls - Capable of machine operation with permissions and restrictions controlled by the supervisor.

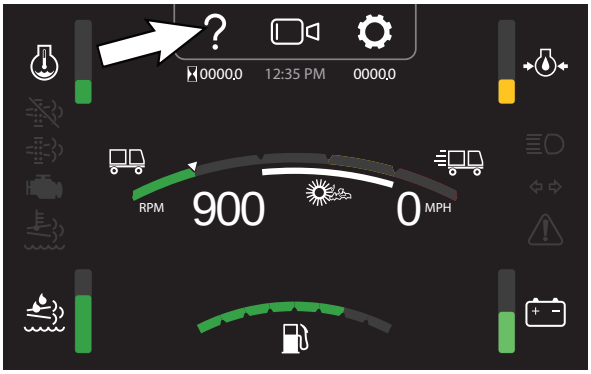
Supervisor Mode Controls - Capable of machine operation with full use of all controls and setting restrictions for the operator use.

A new machine automatically starts in the operator mode with a preassigned default operator profile. The default supervisor profile name and login number can be changed as described in this section. Contact Tennant service if the new assigned supervisor mode login number is forgotten.

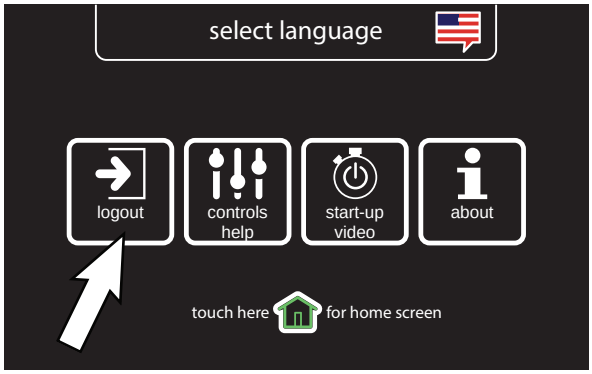
ENTERING THE SUPERVISOR MODE-FIRST TIME USE ONLY

1. Turn on the machine. The main operating screen will appear in the display.
2. Press the *help button* to access the help screen.

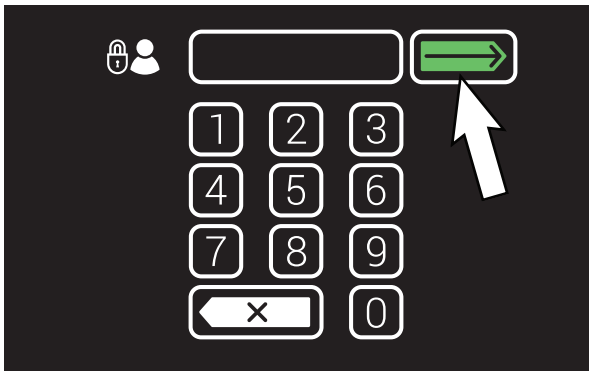
NOTE: The parking brake switch must be set to access the help screen. Access to the help screen is not permitted until the parking brake switch is set.



3. Press the *login button*.

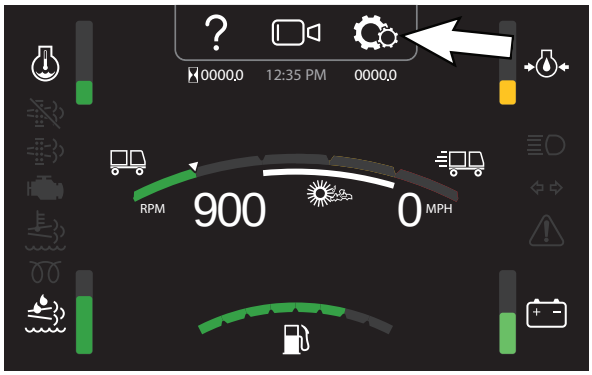


4. Use the login keypad to enter the factory assigned supervisor login number 1234 into the display above the keypad. Press the *enter button* when finished entering the supervisor login number.



Press the *backspace button* if necessary to delete and reenter a number.

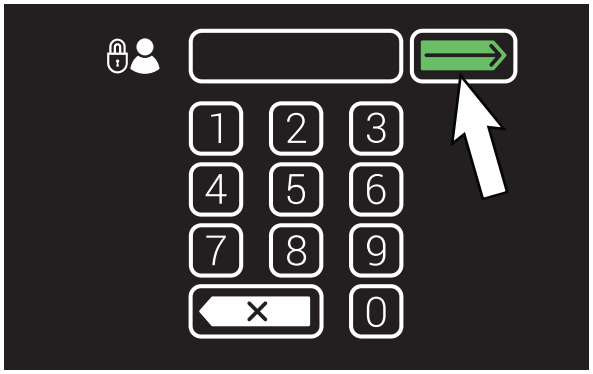
5. The supervisor operating screen should appear in the display. Press the *supervisor settings button* to access the supervisor settings screen.



ENTERING THE SUPERVISOR MODE

1. Turn on the machine. The login screen will appear on the display.

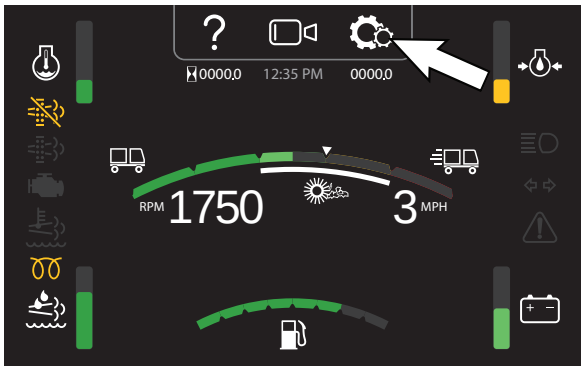
2. Use the login keypad to enter the supervisor login number into the display above the keypad. Press the *enter button* when finished entering the supervisor login number.



Press the *backspace button* if necessary to delete and reenter a number.

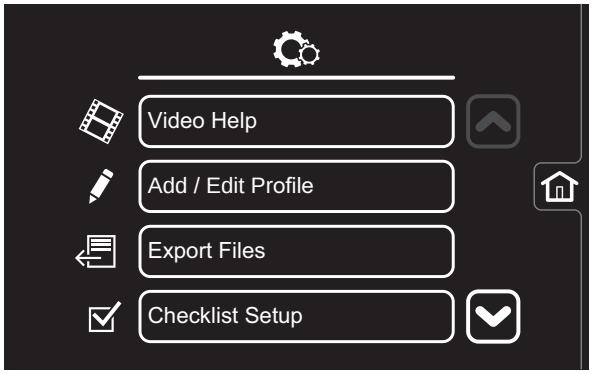
3. The supervisor machine operation screen should appear in the display. Press the *supervisor settings button* to access the supervisor settings screen.

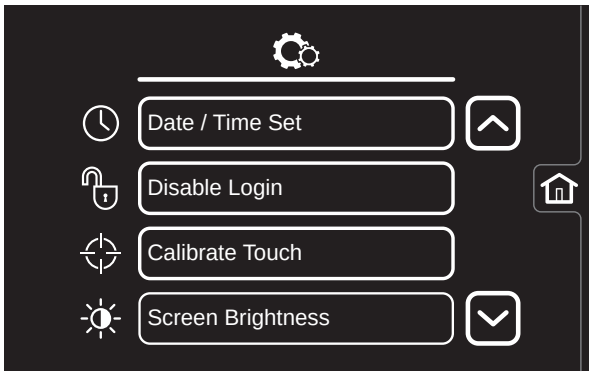
NOTE: The parking brake switch must be set to access the supervisor setting screen. Access to the supervisor setting screen is not permitted until the parking brake switch is set.

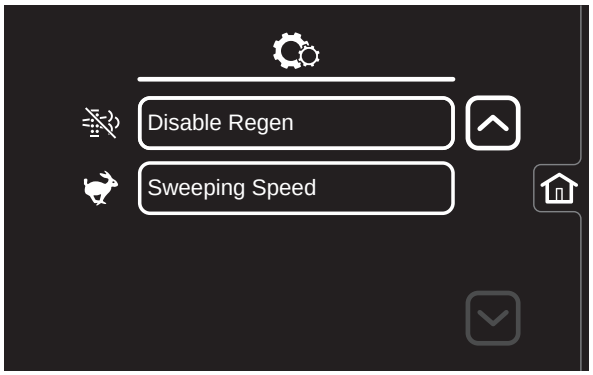


SUPERVISOR SETTING SCREEN/SCREEN ICONS

Use the supervisor maintenance screen to setup/change user passwords, user machine settings, and other machine setup items.







Press the *up arrow button* to navigate up through the menu items.

Press the *down arrow button* to navigate down through the menu items.

Press the *home button* to navigate back to the main operating screen.

Use the following menu buttons to access the various setup menus/screens.

Press the *Video Help button* to access the various machine help videos. See *ACCESSING VIDEO HELP*.

Press the *Add/Edit Profile button* to add, delete, edit, or copy machine operator and supervisor profiles. See *ADDING/EDITING PROFILES*.

Press the *Export Files button* to access the Export File menu. See *EXPORTING FILES*.

Press the *Checklist Setup* button to access the Checklist Setup menu. See *SETTING UP CHECKLISTS*.

Press the *Date/Time Set button* to access the date/time screen. See *CHANGING THE TIME AND DATE*.

Press the *Enable Login* button to activate a required login number at machine start up for all user profiles to operate machine. See ENABLING LOGIN.

Press the *Disable Login* button to deactivate a login number at machine start up for all user profiles to operate machine. See *DISABLING LOGIN.*

Press the *Calibrate Touch button* to calibrate the touchscreen controls. See *CALIBRATING TOUCH.*

Press the *Screen Brightness button* to change the touchscreen brightness. See *CHANGING THE SCREEN BRIGHTNESS*.

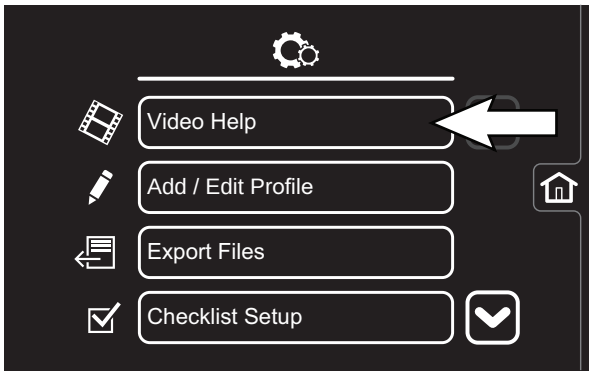
Press the *Disable Regen/Enable Regen button* to disable/enable automatic diesel engine regeneration. See *DISABLING/ENABLING AUTOMATIC DIESEL ENGINE REGENERATION*.

(OPTION) Press the *Sweeping Speed button* to access the sweeping speed screen. See CHANGING SWEEPING SPEED.

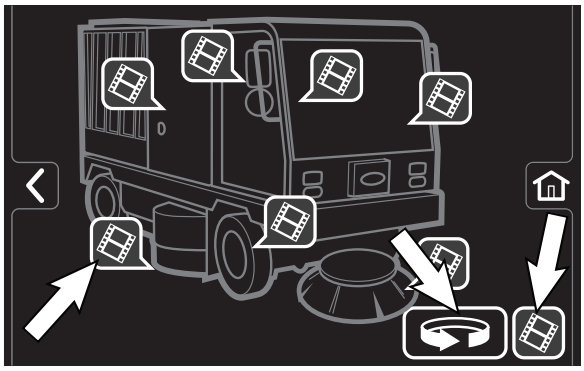
ACCESSING VIDEO HELP

Use the *Video Help button* to view the video menu screen and access videos.

1. Turn on the machine, log into the supervisor operating screen, and press the settings button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE.
2. Press the *Video Help button* to access the video menu screen.



3. The video menu screen includes videos on how to perform specific operation and maintenance procedures. Press the *video buttons* to start videos. Press the *rotate button* for additional videos. Press the *lower right video button* for a list of the tutorial videos in a menu format.



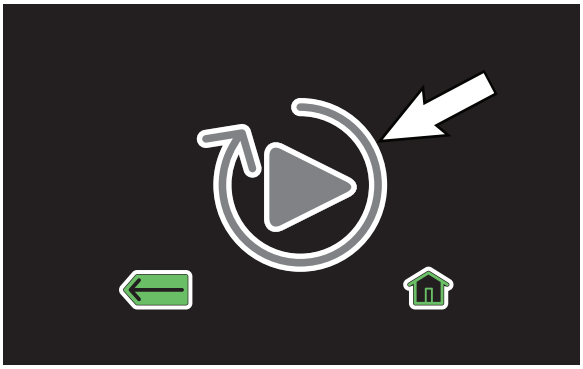
4. Touch anywhere on the screen to pause the video. A p*lay button, back button*, and *home button* will appear on the screen.

Press the *play button* to resume watching the video.

Press the *back button* to return to the video menu screen.

Press the *home button* to return to the main operator screen.

5. If necessary, press the *video replay button* to replay the video.

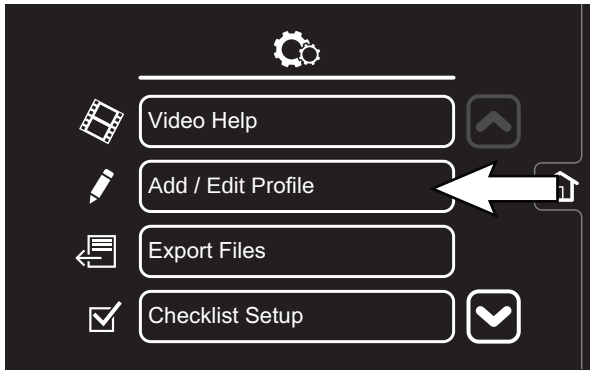


ADDING/EDITING PROFILES

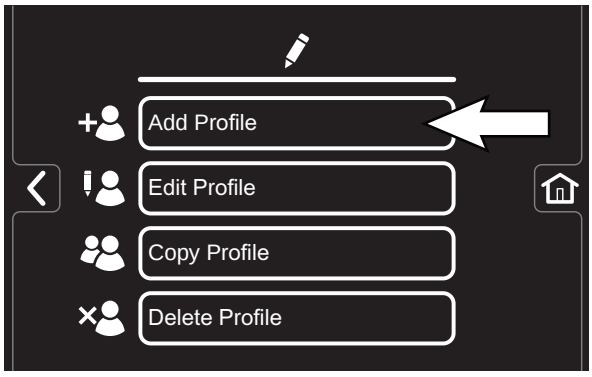
The *Add/Edit Profiles button* allows profiles to be added/edited/copied/deleted.

ADD PROFILE

1. Turn on the machine, log into the supervisor operating screen, and press the settings button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE.
2. Press the *Add/Edit Profiles button* to access the Add/Edit Profiles screen.



3. The Add/Edit/Copy/Delete Profile menu appears on the screen.



Press the *Add Profile button* to access the screens and menus to add a new profile.

Press the *Edit Profile button* to edit an existing profile.

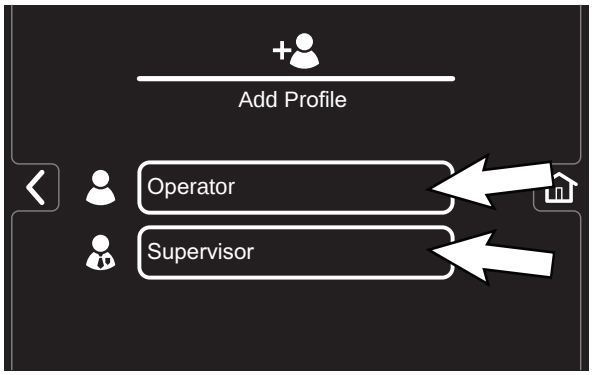
Press the *Copy Profile button* to copy an existing profile for a new user.

Press the *Delete Profile button* to delete an existing profile.

Press the *home button* to navigate back to the main operating screen.

Press the *back button* to navigate back to the previous screen.

4. Press the *Add Profile button* to access the Add Profile screen.
5. Press the applicable button to add either a new operator or supervisor.



NOTE: The default supervisor cannot be deleted from the profile list, but default supervisor profile should be changed. See EDIT PROFILE.

Press the *Operator button* to add an operator profile .

Press the *Supervisor button* to add a supervisor profile.

6. Use the keypad to enter the new user/ supervisor name. Press the *number button (#)* to go to the number key pad to add numbers to the user/supervisor name.

Press the *home button* to navigate back to the main operating screen.

Press the *back button* to navigate back to the previous screen.

Press the *enter button* to save the new profile name.

Press the *backspace button* if necessary to delete and reenter a number.

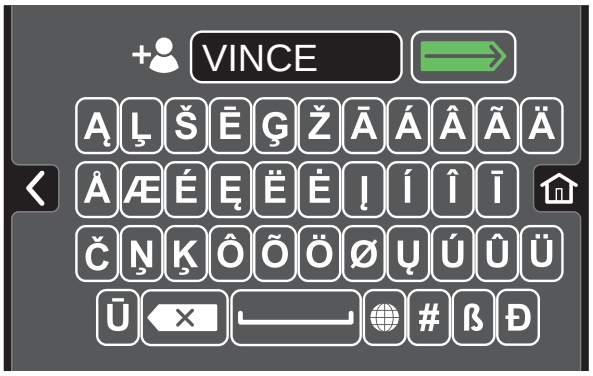
Press the *space button* to place space between letters/numbers.

Press the *number button* to toggle between the number keypad and the letter keypad.

Press the *ABC button* to return to the letter keyboard.

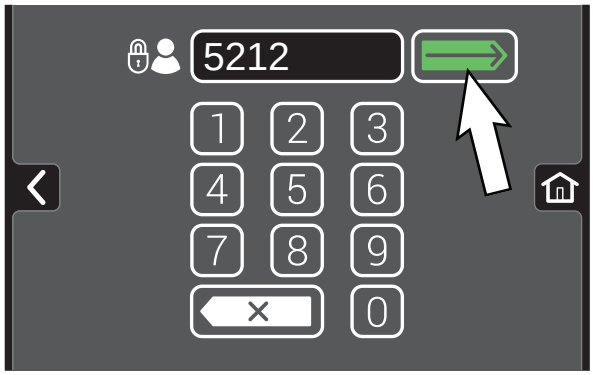
Press the *secondary world keyboard button* to access the world keyboard for the language selected.

Use the world keyboard to enter user names having letters not in the standard keyboard for the selected language. Press the *secondary world keyboard button* to return to the western alphabet keyboard.



7. Press the enter button to enter the new user name and proceed to the login number screen.

8. Use the keypad to assign the new user/ supervisor a login number. The new login number can be any combination of numbers ranging from 3 to 9 digits in length and must be unique for every user. Press the *enter button* when finished entering the login number.

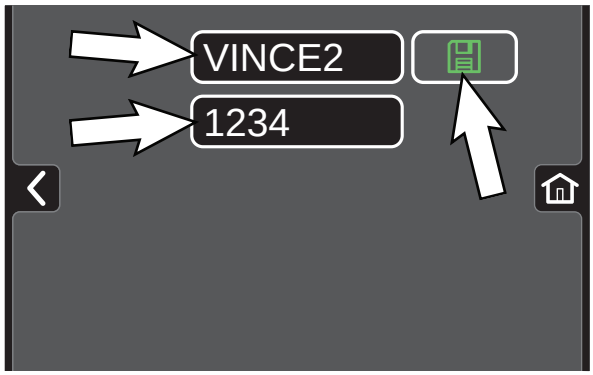


Press the *enter button* to enter the new login number.

Press the *backspace button* if necessary to delete and reenter a number.

9. A confirmation screen with the user name and user login should appear on the screen. Press the *save button* to save the user name and login number.

NOTE: If necessary, press the user name box to return directly to the keyboard for entering user name and the user login number box to return directly to the login key pad for entering the user login number.

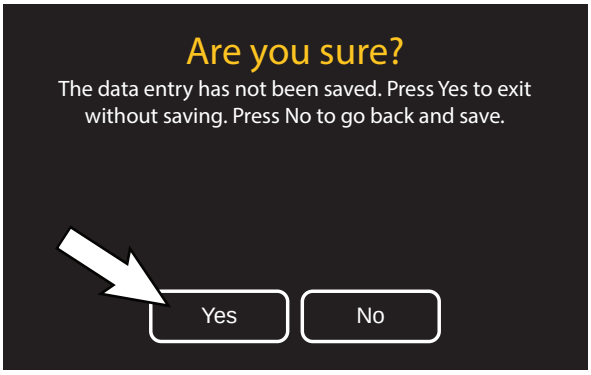


Press the *save button* to save the user name/user login number.

Press the *home button* to navigate back to the main operating screen without saving the new user or login.

Press the *back button* to navigate back to the previous screen without saving the new user or login.

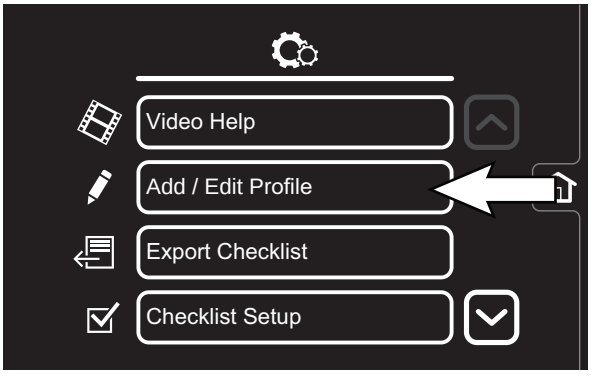
NOTE: A confirmation screen ***Are you sure? The data entry has not been saved. Press yes to exit without saving. Press no to go back and save.*** *will appear if either the home button or back button is pushed. The new profile must first be saved. Press the No button to return to the confirmation screen and save the new user and login number. Press the Yes button to exit profile without saving new operator/supervisor.*



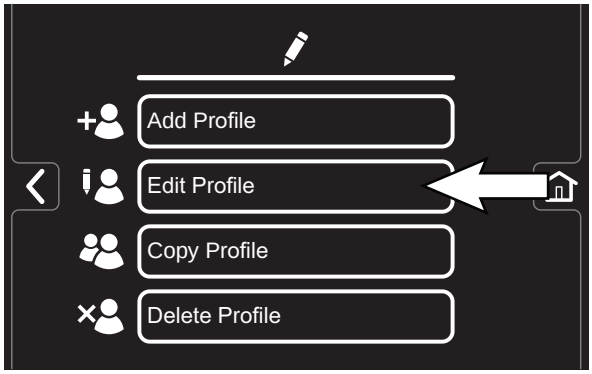
10. The new user profile is now saved to the operator profile list. Multiple operator and supervisor user profiles can be added.
11. Use the *Edit Profile button, Copy Profile button*, and *Delete Profile button* to manage current user profiles.
12. Proceed to ENABLING THE LOGIN to enable the login for the new operator(s)/supervisor(s).

EDIT PROFILE

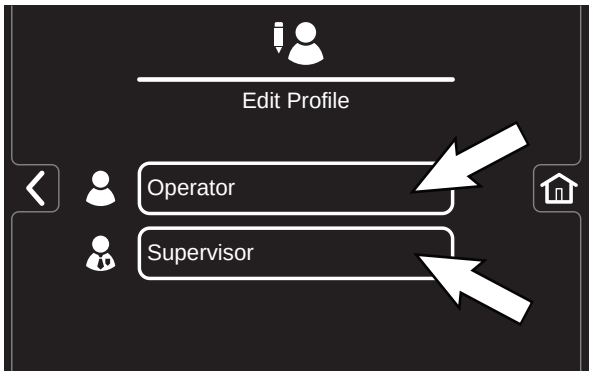
1. Turn on the machine, log into the supervisor operating screen, and press the settings button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE.
2. Press the *Add/Edit Profile button* to access the Add/Edit Profiles screen.



3. The Add/Edit/Copy/Delete Profile menu appears on the screen. Press the *Edit Profile button*.



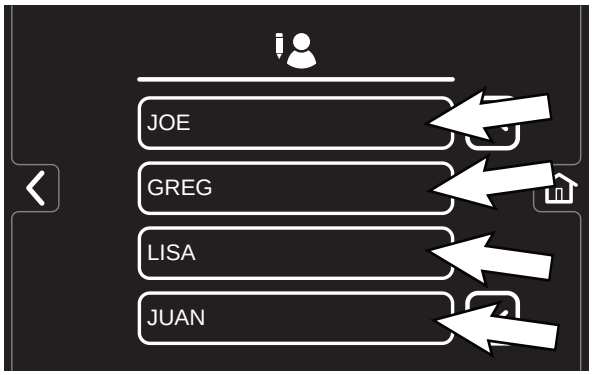
4. The Edit Profile menu appears on the screen. Press either the *Operator button* or *Supervisor button*.



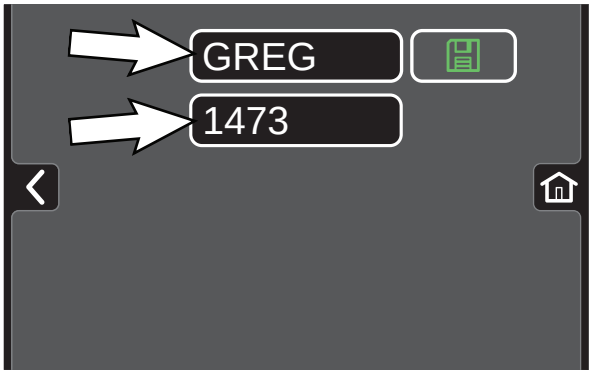
Press the *home button* to navigate back to the main operating screen.

Press the *back button* to navigate back to the previous screen.

5. A list of profiles will appear on the screen. Press the profile name button to be edited from the list.



6. A screen with the selected user name and user login will appear on the screen.



Press the *save button* to save the user name/user login number.

Press the *home button* to navigate back to the main operating screen without saving changes.

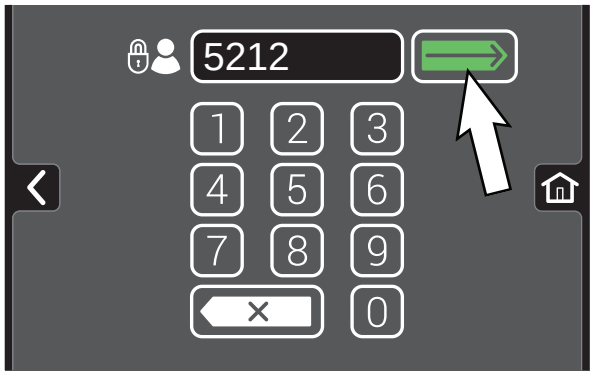
Press the *back button* to navigate back to the previous screen without saving changes.

7. Press the user name box to go to the keyboard to edit the user name and press the user login number box to go to the key pad to edit the user login number.

8. Use the keyboard to edit the user/supervisor name. Press the *number button (#)* to go to the number key pad to add numbers to the user/ supervisor name.

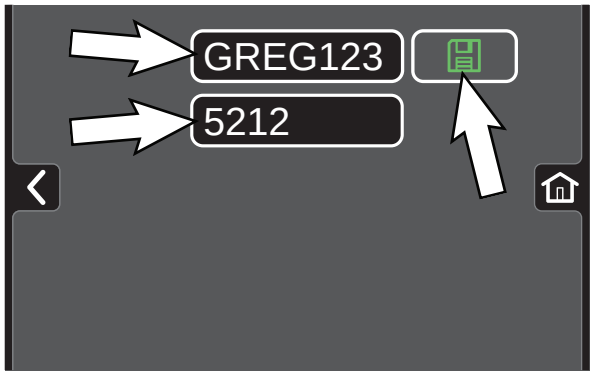
9. Press the *enter button* to enter the edited user name and proceed to the login number screen.

10. Use the login keypad to edit the user/ supervisor login number. The login number can be any combination of numbers ranging from 3 to 9 digits in length and must be unique for every user. Press the *enter button* when finished editing the login number.

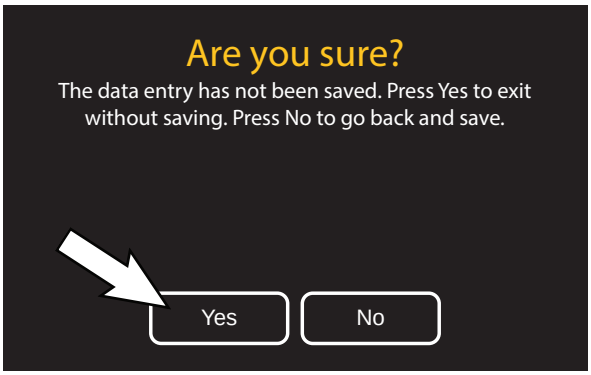


11. A confirmation screen with the user name and user login should appear on the screen. Press the *save button* to save the user name and login number.

NOTE: If necessary, press the user name box to return directly to the keyboard for entering user name and the user login number box to return directly to the login key pad for entering the user login number.



NOTE: A confirmation screen ***Are you sure? The data entry has not been saved. Press yes to exit without saving. Press no to go back and save.*** *will appear if either the home button or back button is pushed. The edited profile must first be saved. Press the No button to return to the confirmation screen and save the edited user and login number. Press the Yes button to exit profile without saving edited operator/supervisor.*

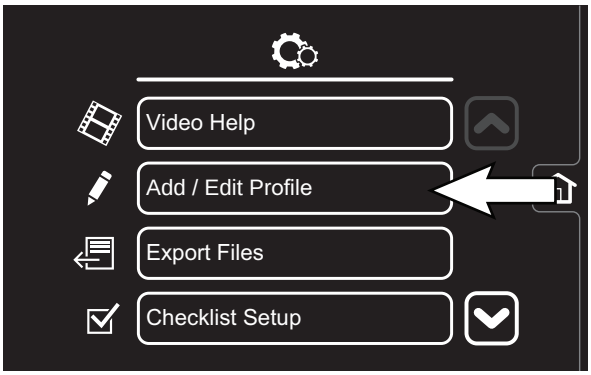


12. The edited user profile is now saved.

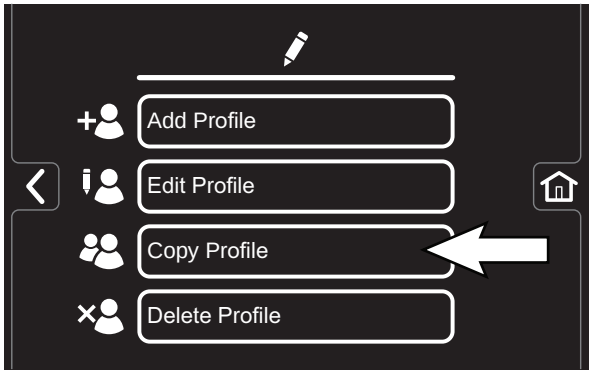
COPY PROFILE

1. Turn on the machine, log into the supervisor operating screen, and press the settings button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE..

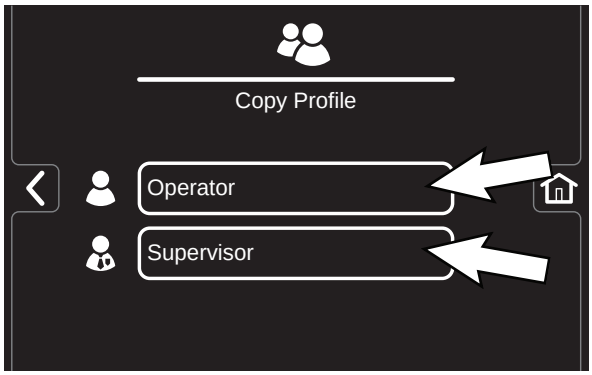
2. Press the *Add/Edit Profile button* to access the Add/Edit Profiles screen.



3. The Add/Edit/Copy/Delete Profile menu appears on the screen. Press the *Copy Profile button*.



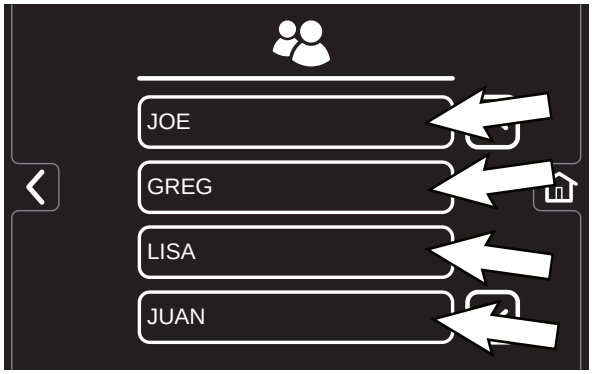
4. The Copy Profile menu appears on the screen. Press either the *Operator button* or *Supervisor button*.



Press the *home button* to navigate back to the main operating screen without copying the profile.

Press the *back button* to navigate back to the previous screen without copying the profile.

5. A list of profiles will appear on the screen. Press the profile name button to be copied from the list.



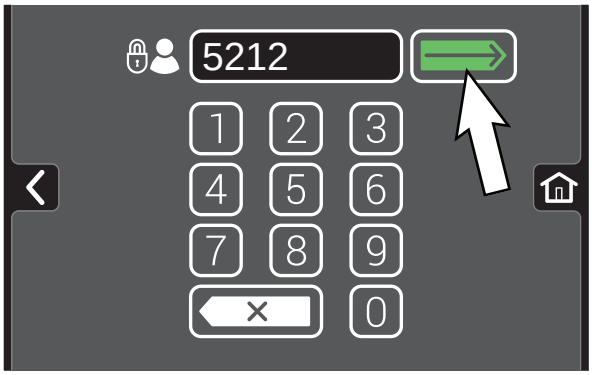
6. A keyboard screen with the selected user name and user login will appear on the display.

NOTE: The user name and user login must be changed if a profile is copied. There cannot be two users with the same user name or user login.

7. Use the keyboard to enter the user/supervisor name. Press the *number button (#)* to go to the number key pad to add numbers to the user/ supervisor name.

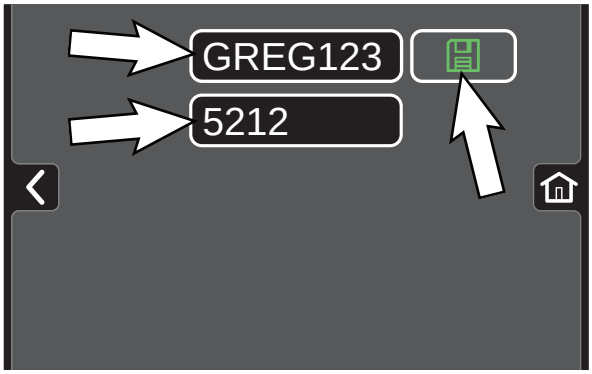
8. Press the *enter button* to enter the user name and proceed to the login number screen.

9. Use the keypad to change the copied user/ supervisor login number. The login number can be any combination of numbers ranging from 3 to 9 digits in length and must be unique for every user. Press the *enter button* when finished changing the login number.



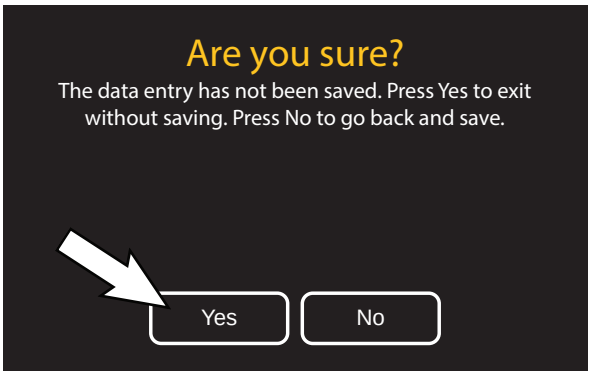
10. A confirmation screen with the user name and user login should appear on the screen. Press the *save button* to save the user name and login number.

NOTE: If necessary, press the user name box to return directly to the keyboard for entering user name and the user login number box to return directly to the login key pad for entering the user login number.



11. The edited user profile is now saved.

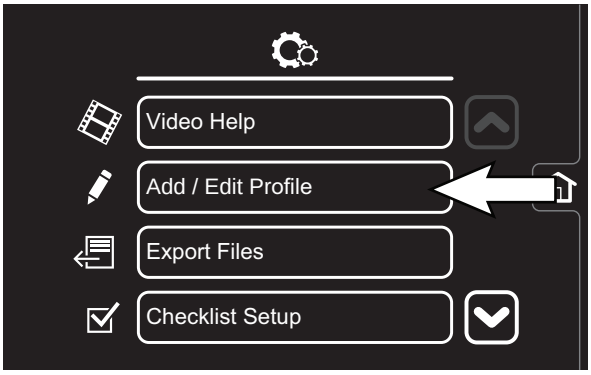
NOTE: A confirmation screen ***Are you sure? The data entry has not been saved. Press yes to exit without saving. Press no to go back and save.*** *will appear if either the home button or back button is pushed. The edited profile must first be saved. Press the No button to return to the confirmation screen and save the edited user and login number. Press the Yes button to exit profile without saving he revised user and login number.*



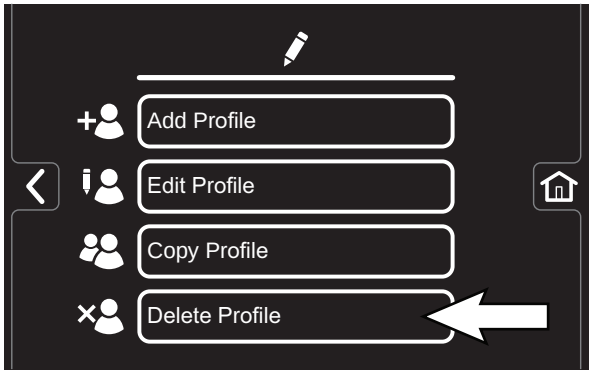
DELETE PROFILE

1. Turn on the machine, log into the supervisor operating screen, and press the settings button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE.

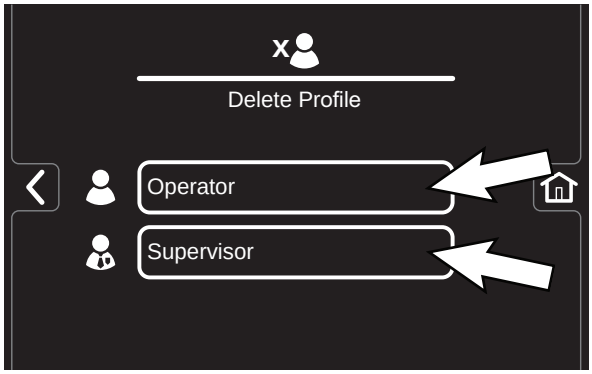
2. Press the *Add/Edit Profile button* to access the Add/Edit Profiles screen.



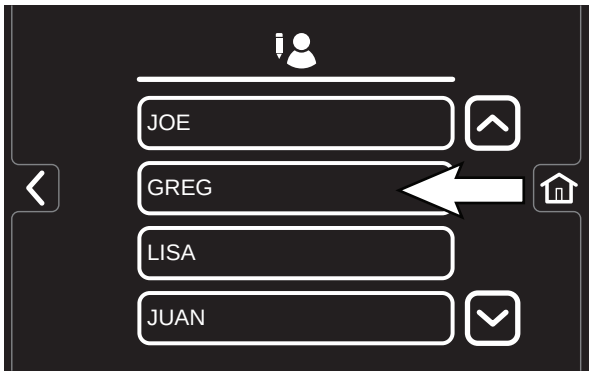
3. Press the *Delete Profile button* to access the Delete Profile screen.



4. Press either the *Operator button* or *Supervisor button* to delete either a user.



5. Select the user profile to be deleted.



6. A confirmation screen **Delete GREG Are you sure?** appears on the screen. Press either the *Yes button* to delete the user, or the *No button* to not delete the user.

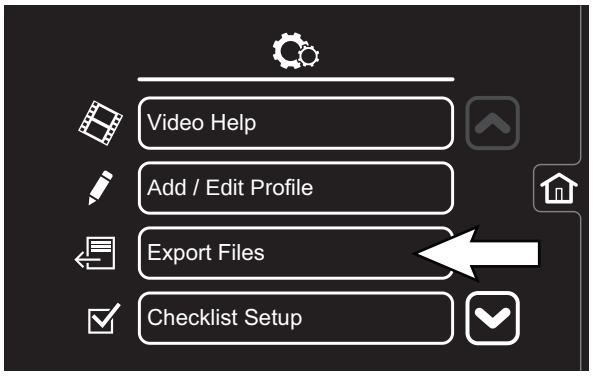
EXPORTING FILES

Exporting the checklists allows the checklists to be exported from the machine onto a flash drive.

1. Turn on the machine, log into the supervisor operating screen, and press the settings button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE.

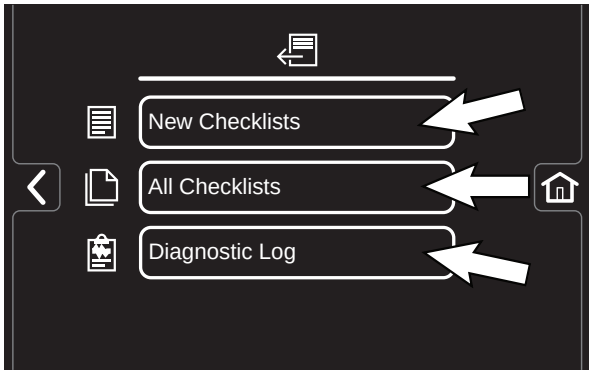
2. Plug the flash drive into the USB port.

3. Press the *Export Files button* to access the export screen.

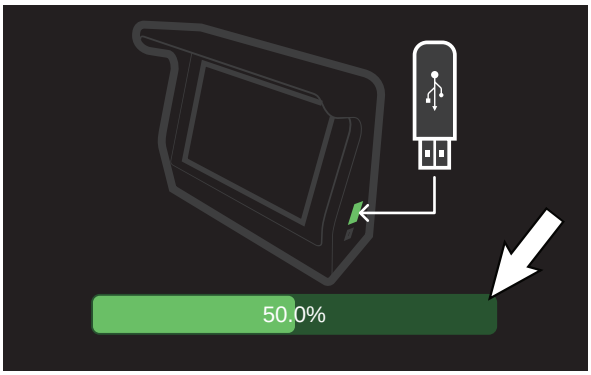


4. If exporting a new checklist or exporting all checklists, press either the *Export New button* or *Export All button* to export the Pre-Operation Checklist(s) from the machine to the flash drive.

   If downloading the diagnostic log, press the *Diagostic Log button* to download the diagnostic log from the machine to the flash drive.



   Wait for the status bar located at the bottom of the screen to reach 100% before removing the flash drive from the machine.



Press the *Export New button* to export newly completed not yet exported Pre-Operation Checklists from the machine.

Press the *Export All button* to export all completed Pre-Operation Checklists stored in the machine, including previously exported Pre-Operation Checklists.

Press the *Diagnostic Log button* to export to export the diagnostic log.

Press the *home button* to navigate back to the main operating screen.

Press the *back button* to navigate back to the previous screen.

5. Remove the flash drive from USB port and turn off the machine when export is complete.

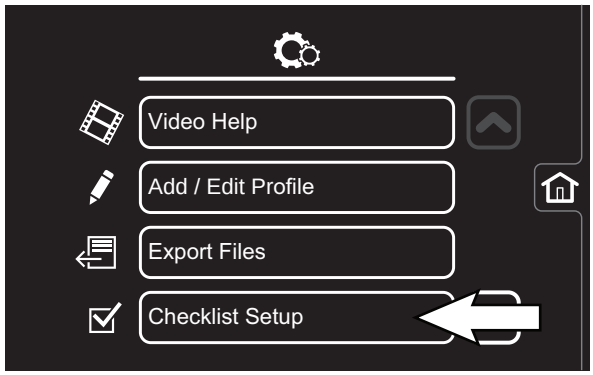
6. Plug the flash drive into a computer to view/ download checklist(s) or diagnostic log.

SETTING UP CHECKLISTS

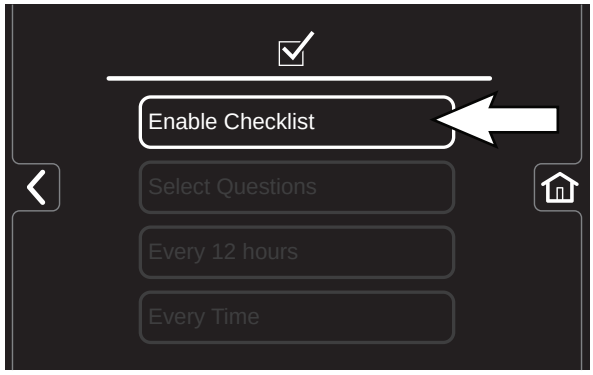
Checklist setup allows the checklist to be setup/ changed to meet machine usage demands.

1. Turn on the machine, log into the supervisor operating screen, and press the settings button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE.

2. Press the *Checklist Setup button* to access the Pre-Operation checklist setup screen.



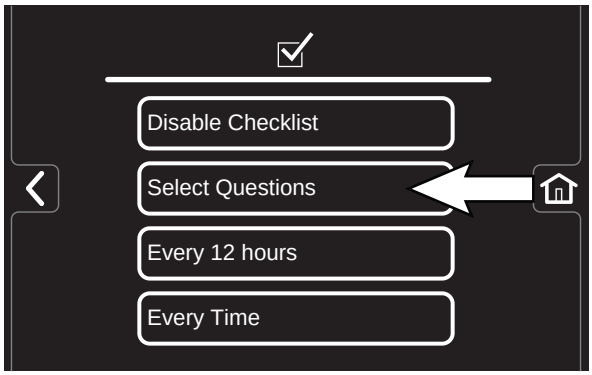
3. Press the *Enable Checklist* button to enable the Pre-Operation Checklist.

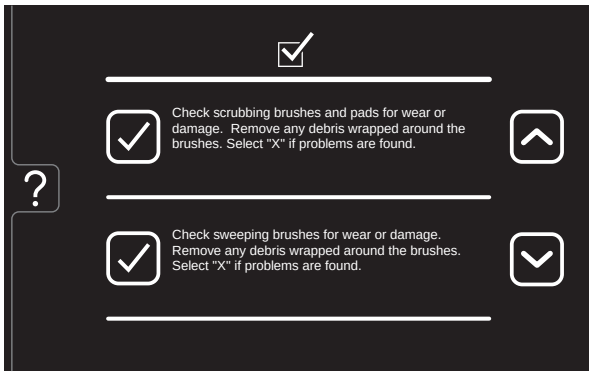


Press the *home button* to navigate back to the main operating screen.

Press the *back button* to navigate back to the previous screen.

4. Press the *Select Questions button* to access the Pre-Operation Checklist master list screen.





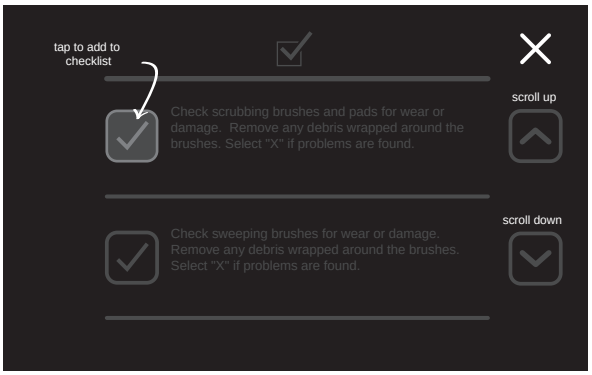
Press the *down arrow button* to scroll down through Pre-Operation Checklist items.

Press the *up arrow button* to scroll up through Pre-Operation Checklist items.

Press the *check box button* to select a new checklist item to add to the checklist. The check box is highlighted when selected. Press a highlighted check box to deselect the check box.

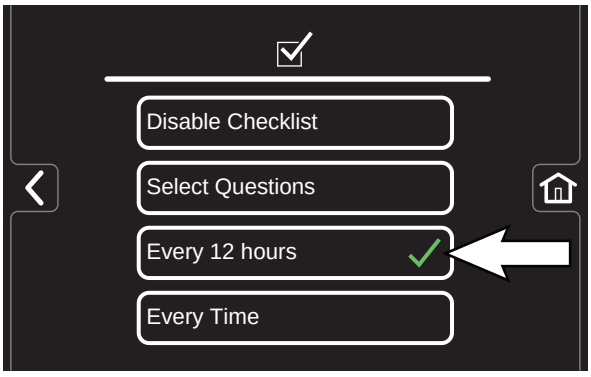
Press the *enter button* at the end of the list to add the selected Pre-Operation Checklist items(s) to the Pre-Operation Checklist.

Press the *help button* to access the Pre-Operation Checklist help screen.



Press the *exit button* (X) to close the Pre-Operation Master List screen.

5. Press the Every 12 hours button or the Every Time button to set the interval the operator must complete the Pre-Operation Checklist. A check mark appears in the chosen interval.



Press the *home button* to navigate back to the main operating screen.

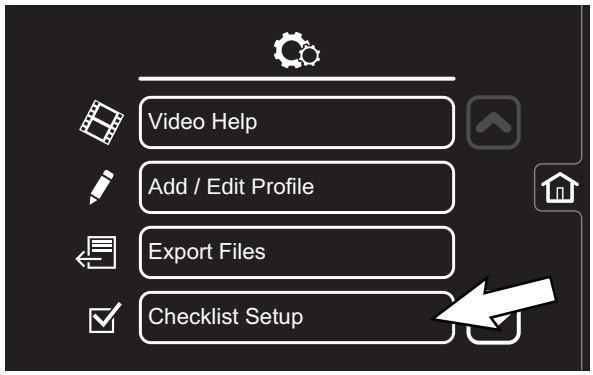
Press the *back button* to navigate back to the previous screen.

DISABLING/ENABLING PRE-OPERATION CHECKLIST

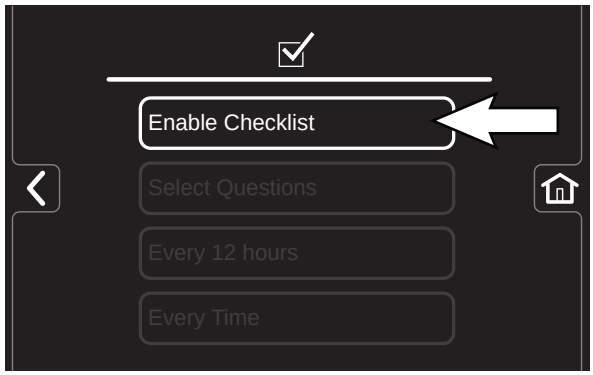
Disabling/enabling the Pre-Operation checklist allows the Pre-Operation checklist to be disabled if it is not necessary for all operators to complete the checklist prior to operating the machine or enabled if it is necessary for all operators to complete the checklist prior to operating the machine.

If enabling the Pre-Operation Checklist:

1. Turn on the machine, log into the supervisor operating screen, and press the settings button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE.
2. Press the *Checklist Setup button*.



3. Press the *Enable Checklist button* to enable the Pre-Operation Checklist.

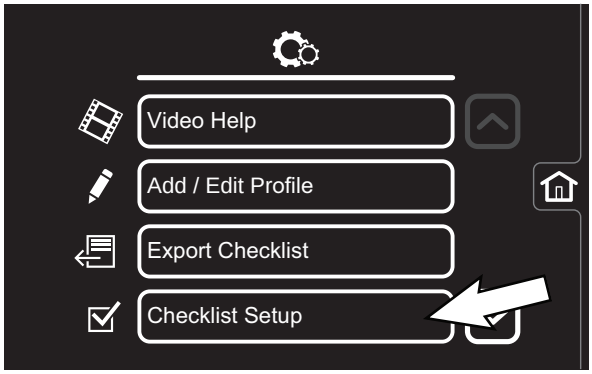


Press the *home button* to navigate back to the main operating screen.

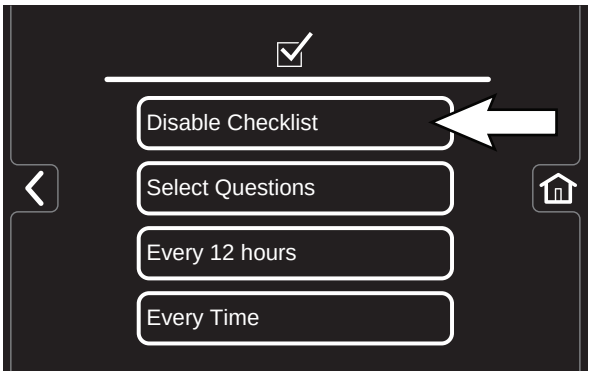
Press the *back button* to navigate back to the previous screen.

If disabling the Pre-Operation Checklist:

1. Turn on the machine, login to the main operation screen, and press the setting button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE.
2. Press the *Checklist Setup button*.



3. Press the *Disable Checklist button* to disable the Pre-Operation Checklist.



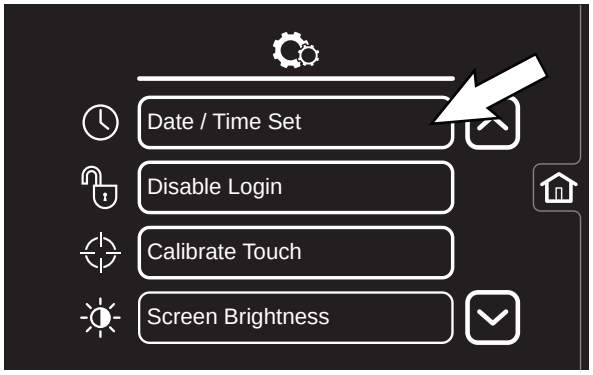
Press the *home button* to navigate back to the main operating screen.

Press the *back button* to navigate back to the previous screen.

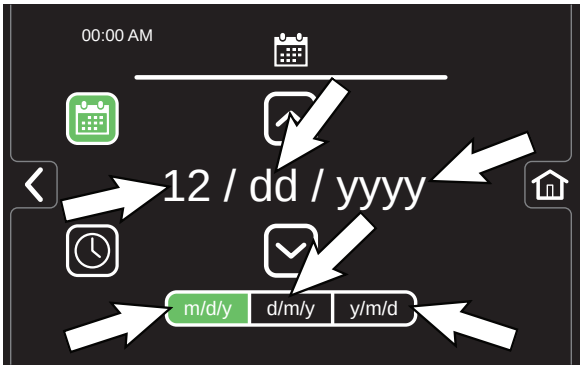
CHANGING THE DATE/TIME

The *Date/Time Set button* allows the system date and time to be changed.

1. Turn on the machine, log into the supervisor operating screen, and press the settings button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE.
2. Press the *Date/Time Set button* to access the date screen.



3. Press the *month button (mm), day button (dd)*, and the *year button (yyyy)* to select items to be changed. The buttons blink when pressed. Press the *m/d/y button, d/m/y button*, or *y/m/d button* to change the calendar display.



Press the *time button* to select the time screen.

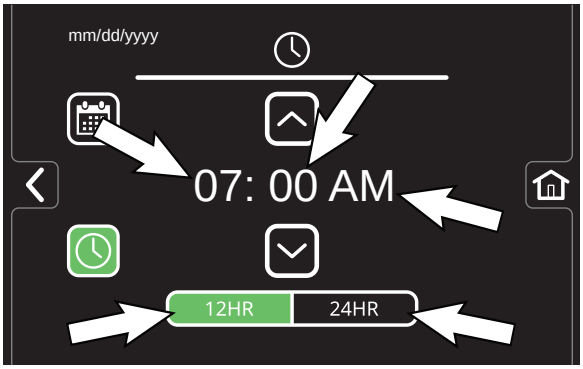
Press the *increase button* (up arrow) to advance the blinking date parameters.

Press the *decrease button* (down arrow) to decrease the blinking date parameters.

Press the *home button* to save the date and navigate back to the main operating screen.

Press the *back button* to save the date and navigate back to the previous screen.

4. Press the *time button* when finished changing the date to proceed to the time screen.
5. Press the *hour button* or *minute button* to select these items to be changed. The buttons blink after being pressed. Press the *AM/PM button* to alternate between AM/PM settings. Press the *12HR button* to change the time display to the 12-hour clock. Press the *24HR button* to change the time display to the 24-hour clock.



Press the *date button* to select the system date.

Press the *increase button* (up arrow) to increase the blinking time parameters.

Press the *decrease button* (down arrow) to decrease the blinking time parameters.

Press the *home button* to save the time and navigate back to the main operating screen.

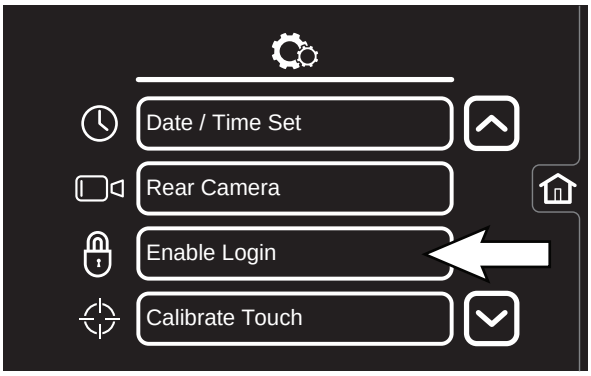
Press the *back button* to save the time and navigate back to the previous screen.

ENABLING LOGIN

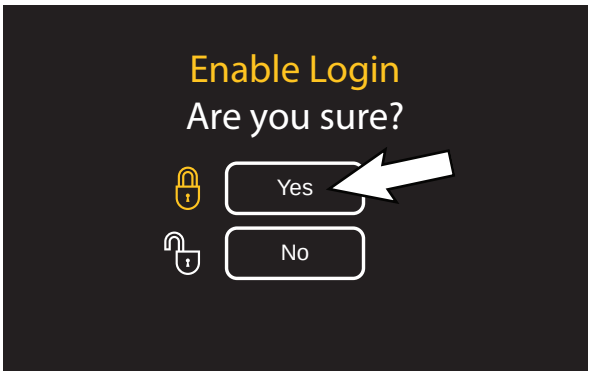
The *Enable Login button* allows user logins to be enabled for all users.

1. Turn on the machine, log into the supervisor operating screen, and press the settings button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE.

2. Press the *Enable Login button*.



3. The **Enable Login Are you sure?** screen will appear. Press the *Yes button* to enable login.



   Press the *No button* to return to the previous screen.

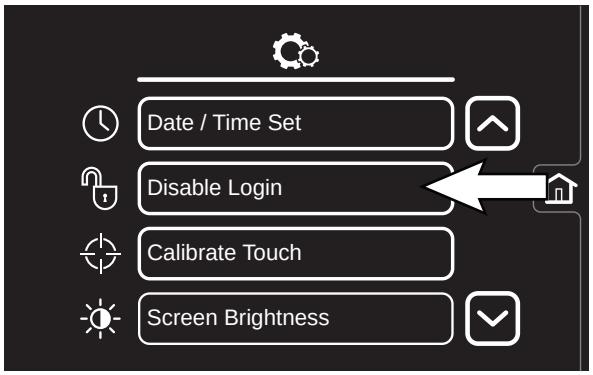
4. At machine start up, a login screen will display. The user(s) will need to enter the assigned login number to operate machine.

5. If the machine is to be left running when the user is done operating the machine, it is recommended the user log out by pressing the *help button*, and then pressing the *Logout button*. Turning the key to the off position is another way to also logout.

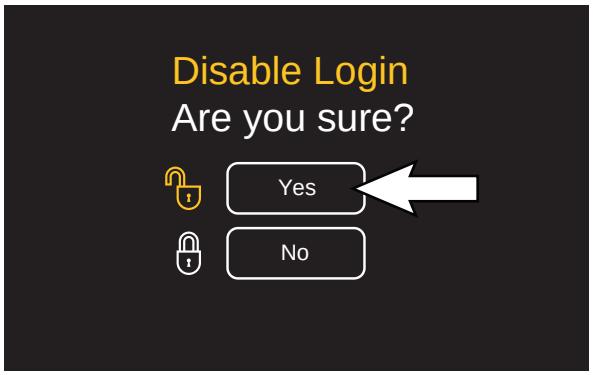
DISABLING LOGIN

The *Disable Login button* allows user logins to be disabled for all users.

1. Turn on the machine, log into the supervisor operating screen, and press the settings button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE.
2. Press the *Disable Login button*.

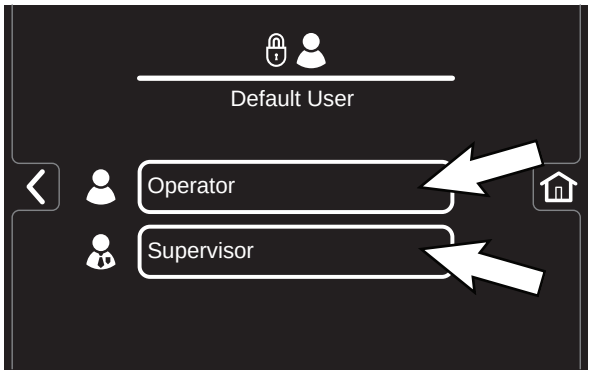


3. The **Disable Login Are you sure?** screen will appear. Press the *Yes button* to disable login.

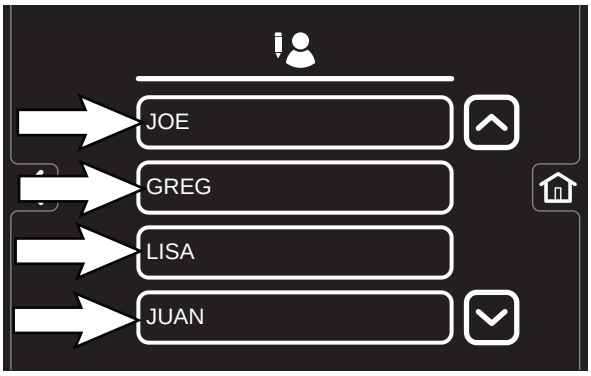


NOTE: A default user profile must be selected after the login is disabled. The selected default user profile will be used for all users without login.

4. The default user selection screen will appear. Press either the *Operator button* or *Supervisor button* to select the desired default user.



5. Select a pre-assigned user profile.



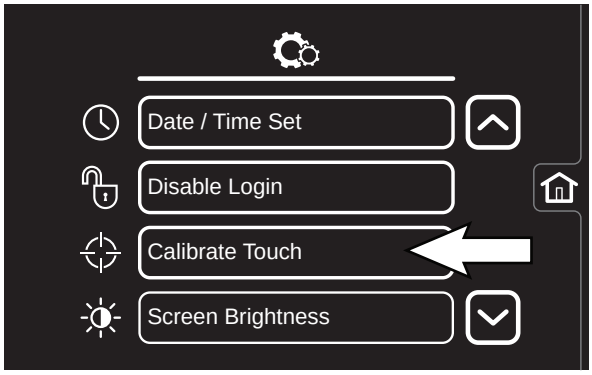
6. Turn off the machine to apply the setting.
7. At start up, the home screen is now set without a login requirement for the operator profile as the default.

CALIBRATING TOUCH

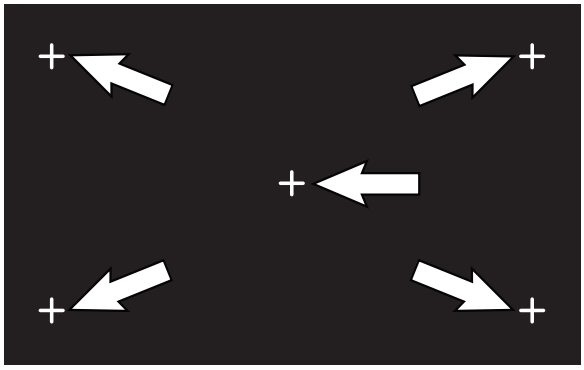
The touchscreen must be calibrated when the buttons are no longer properly aligned on the touchscreen. Calibration is necessary when there is no button or machine reaction when the button is pushed multiple times or the button or machine reacts only when the outer edges or areas outside the button are touched. All buttons should be centered on the touch point so they function when the center of the button is touched.

1. Turn on the machine, log into the supervisor operating screen, and press the settings button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE.

2. Press the *Calibrate Touch button* to access the calibration screen.



3. Press each of the five “+” images on the touchscreen as they appear on the touchscreen display. Press each of the images only once. The touchscreen may not calibrate correctly if the image(s) are pressed for too long or more than once.



4. A screen asking **Restart? You must restart for the calibration to take affect. Restart now?** will appear. Select either the *Yes button* to restart the touchscreen or the *No button* to return to the Supervisor menu.

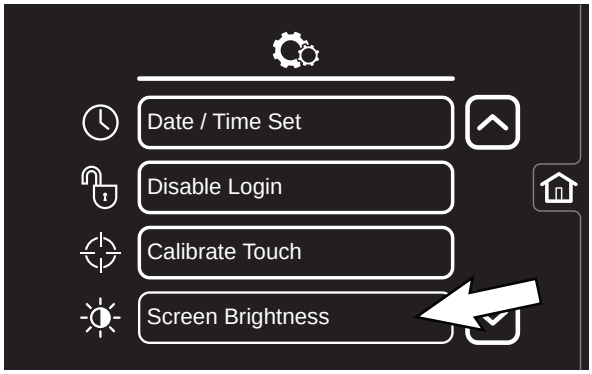
NOTE: Calibration will not take effect until the machine is turned off and restarted.

SCREEN BRIGHTNESS

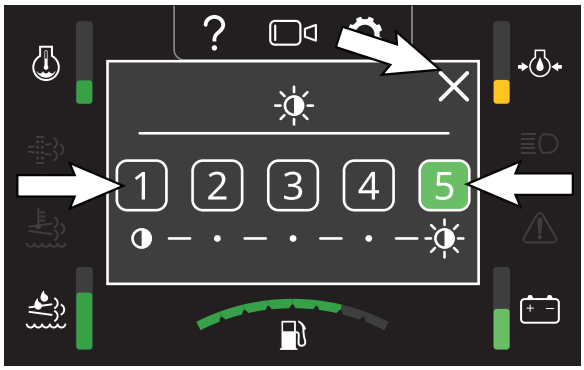
The *Screen Brightness button* allows the brightness on the touchscreen to be adjusted for light conditions.

1. Turn on the machine, log into the supervisor operating screen, and press the settings button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE.

2. Press the *Screen Brightness button* to access the screen brightness setting screen.



3. Press the numbered buttons to change the touchscreen brightness. The *5 button* is the brightest touchscreen setting and the *1 butto*n is the darkest. The night default is 3 with headlights on. The day default is 5 with headlights off.



4. Press the *close button (X)* in upper right corner of the screen brightness box to save the new touchscreen brightness setting and return to the main operating screen.

NOTE: The touchscreen brightness setting will remain at the new setting every time the same operator logs in to use the machine.

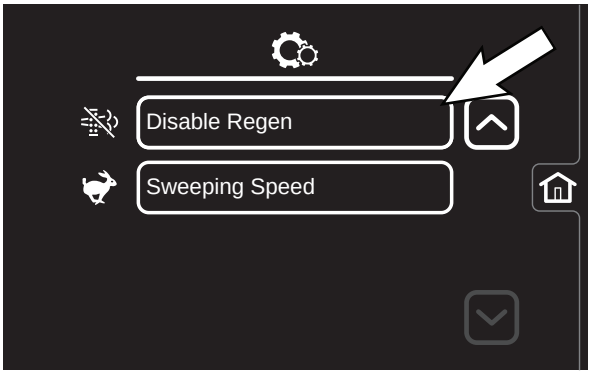
DISABLING/ENABLING AUTOMATIC DIESEL ENGINE REGENERATION (Tier 4F Emissions Engine)

The *Disable Regen button* allows the automatic diesel engine regeneration to be disabled. The *Enable Regen button* allows the automatic diesel engine regeneration to be enabled.

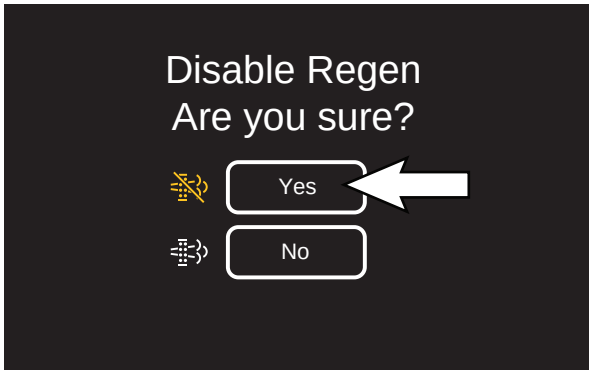
NOTE: It is not recommended that automatic regeneration be disabled unless there is a safety issue (nearby combustible materials) requiring automatic regeneration be disabled.

To disable automatic regeneration:

1. Turn on the machine, log into the supervisor operating screen, and press the settings button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE.
2. Press the *Disable Regen button* to access the Disable Regeneration screen.



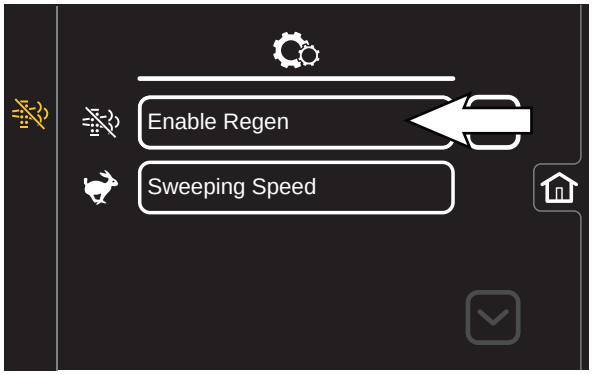
3. The **Disable Regen Are you sure?** screen will appear. Press the *Yes button* to disable the automatic regeneration and return to the settings screen.



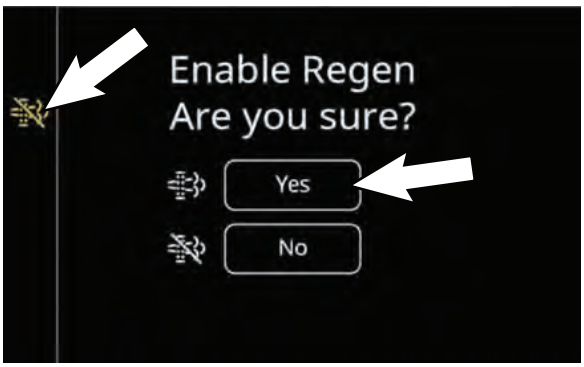
Press the *No button* if not disabling the automatic regeneration to return to the settings screen.

To enable automatic regeneration:

1. Turn on the machine, log into the supervisor operating screen, and press the settings button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE.
2. Press the *Enable Regen button* to access the Enable Regen screen.



3. The **Enable Regen Are you sure?** screen will appear. Press the *Yes button* to enable automatic regeneration and return to the settings screen.

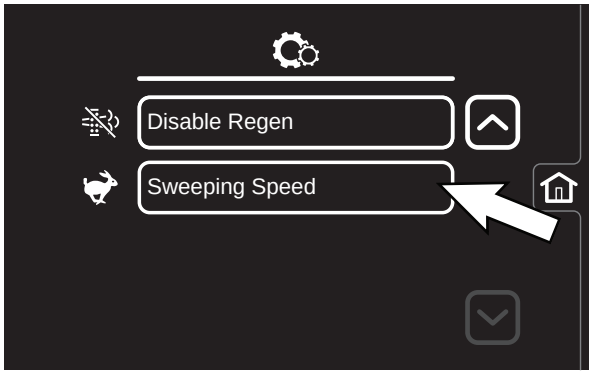


Press the *No button* if not enabling the automatic regeneration and to return to the settings screen.

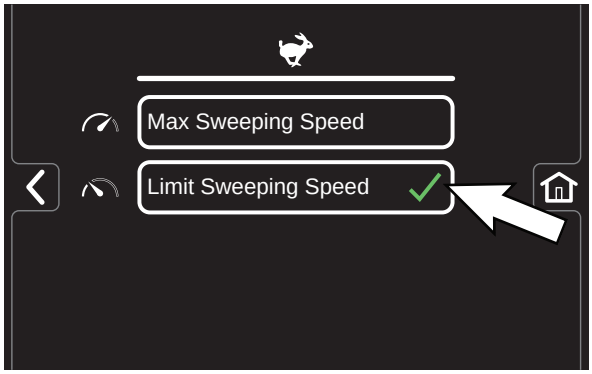
CHANGING SWEEPING PROPEL SPEED (OPTION)

The *Sweeping Speed button* allows the maximum sweeping speed to be increased.

1. Turn on the machine, log into the supervisor operating screen, and press the settings button to access the supervisor settings screen. See ENTERING THE SUPERVISOR MODE.
2. Press the *Sweeping Speed button* to access the sweeping speed screen.



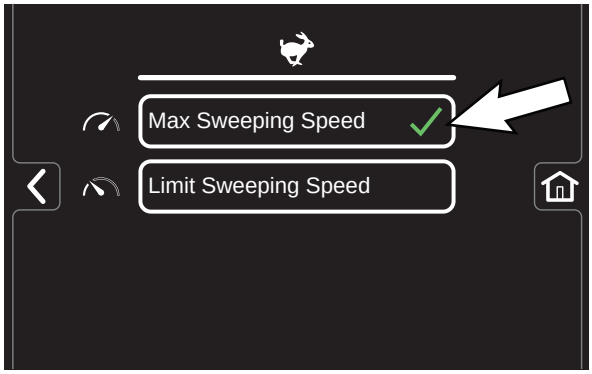
3. The Sweeping Speed screen appears with the default *Limit Sweeping Speed button* selected (a check mark appears in the button when selected).



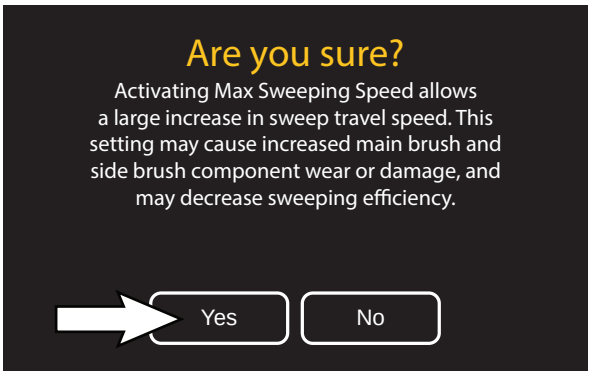
Press the *home button* to navigate back to the main operating screen.

Press the *back button* to navigate back to the settings screen.

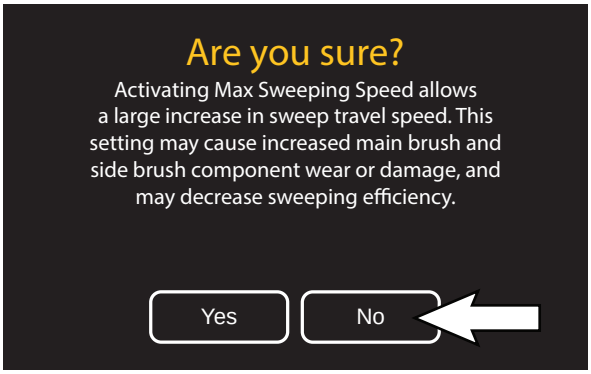
4. Press the *Max Sweeping Speed button* to set the machine to the maximum sweeping speed. A check mark appears in the *Max Sweeping Speed button* when selected.



5. A screen stating **Are you sure? Activating Max Sweeping Speed allows a large increase in the sweeping speed. This setting may cause increased main brush wear or damage, and may decrease sweeping efficiency.** will appear. Press the *Yes button* to set the machine to the maximum sweeping speed.



Press the *No button* to cancel setting the machine to the maximum sweeping speed and return to the Sweeping Speed screen.



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