



VANMAR
EQUIPMENT CO

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VMS22T
VANMAR EQUIPMENT WALK-BEHIND AUTOMATIC
FLOOR SCRUBBER



INTRODUCTION

This manual is furnished with each new model. It provides necessary operation and maintenance instructions.

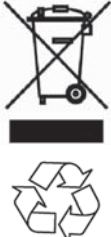


Read this manual completely and understand the machine before operating or servicing it.

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.

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	<p>PROTECT THE ENVIRONMENT</p> <p>Please dispose of packaging materials, used components such as batteries and fluids in an environmentally safe way according to local waste disposal regulations.</p> <p>Always remember to recycle.</p>	<p>MACHINE DATA</p> <p>Please fill this form at the time of installation for future references.</p> <p>Model No.- _____</p> <p>Serial No.- _____</p> <p>Installation Date- _____</p>
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INTENDED USE

The VMS22T is a commercial autoscrubber machine designed to wet scrub both rough and smooth hard surfaces (concrete, tile, stone, synthetic, etc). Typical applications include schools, hospitals / health care facilities, office buildings, and retail centers. Do not use this machine on soil, grass, artificial turf, or carpeted surfaces. This machine is intended for indoor use only. This machine is not intended for use on public roadways. Do not use this machine other than described in this Operator Manual.

VANMAR EQUIPMENT CO.

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SAFETY PRECAUTIONS

IMPORTANT SAFETY INSTRUCTIONS - SAVE THESE INSTRUCTIONS

The following symbols are used throughout this manual as indicated in the 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: Flammable materials can cause an explosion or fire. Do not use flammable materials in tank(s).



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

FOR SAFETY:

1. Do not operate machine:
 - Unless trained and authorized.
 - Unless operator manual is read and understood.
 - Under the influence of alcohol or drugs
 - While using a cell phone or other types of electronic devices
 - Unless mentally and physically capable of following machine instructions.
 - With brake disabled.
 - If it is not in proper operating condition.
 - 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.
 - In areas with possible falling objects unless equipped with overhead guard.
2. Before operating the machine:
 - Check machine for fluid leaks.
 - Make sure all safety devices are in place and operate properly.
 - Check brakes and steering for proper operation.
3. When using machine:
 - Use only as described in this manual.
 - Use brakes (if equipped) to stop machine.
 - Go slowly on inclines and slippery surfaces.
 - Reduce speed when turning.
 - Keep all parts of body inside operator station while machine is moving.



- Use care when reversing machine.
 - Never allow children to play on or around machine.
 - Do not carry passengers on machine.
 - Always follow safety and traffic rules.
 - Report machine damage or faulty operation immediately.
 - Follow mixing, handling and disposal instructions on chemical containers.
 - Follow site safety guidelines concerning wet floors.
4. Before leaving or servicing machine:
- Stop on level surface.
 - Turn off machine and remove key.
5. When servicing machine:
- All work must be done with sufficient lighting and visibility.
 - Avoid moving parts. Do not wear loose clothing or 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 on inclines with the brake disabled.
 - Do not power spray or hose off machine near electrical components.
 - Disconnect battery connections before working on machine.
 - Avoid contact with battery acid.
 - Battery installation must be done by trained personnel.
 - All repairs must be performed by a trained service mechanic.
 - Do not modify the machine from its original design.
 - Use VANMAR supplied or approved replacement parts.
 - Wear personal protective equipment as needed and where recommended in this manual.
6. When loading/unloading machine onto/off truck or trailer.
- Drain tanks before loading machine.
 - Lower scrub head and squeegee before strapping down machine.
 - Turn off machine and remove key.
 - Use ramp, truck or trailer that will support the weight of the machine and operator.
 - Do not push the machine onto/off the truck or trailer unless the load height is 15" or less from the ground.
 - Block machine tires.
 - Strap machine down to truck or trailer.



For Safety: wear hearing protection.



For Safety: wear protective gloves.



For Safety: wear eye protection.



For Safety: wear protective dust mask.

SAFETY LABELS

Safety labels are marked on appropriate surfaces according to their contents. Please replace the labels in case they are missing, damaged or difficult to recognize.

Caution Label is located on the cover of recovery tank.



Charging label is on the bottom of recovery tank

Revolving brush label is on the top of brush head
Warning: Revolving brush - DO NOT TOUCH.
Switch off the machine before servicing.



WARRANTY

VANMAR Equipments full line of commercial cleaning equipment has been manufactured, tested and inspected in accordance with specific engineering requirements. These machines are warranted to be free from defects in workmanship and materials for periods as follows from the date of purchase.

- 7 Years Roto molded components
- 3 Years Parts (excluding wear items)
- 1 Year Labor
- 1 Year AGM Batteries

Travel time for warranty repair is authorized for a period of ninety (90) days following the date of sale to the end user, with a maximum of three (3) hours per claim.

This warranty extends to the original user/purchaser and only when used, operated and maintained in accordance with VANMAREquipments Operating and Maintenance instructions.

This warranty does not apply to certain wear parts and accessories of the machine such as carbon motor brushes, floor brushes or pad drivers, belts, hoses, squeegee blades, etc., nor does it apply to damage or failure caused by improper use, abuse or neglect. Warranty credit or replacement of return parts including motors, switches, etc., is subject to incoming inspection of those items.

To secure repair under this warranty, the following procedure should be taken:

1. After the expiration of the ninety (90) day travel time warranty period, the customer is responsible for warranty travel payment or the inoperative machine or warranted parts must be delivered to the authorized dealer with shipping and delivery charges prepaid. If unable to locate the Dealer, you may contact VANMAR Equipment at the address listed herein for the location of the nearest VANMAR Equipment repair center or agent or for other instructions pertaining to your warranty difficulty.
2. Upon compliance with the above warranty procedure, all warranted repairs will be completed at no additional charge or cost to the user.
3. Only VANMAR Equipment or its authorized dealers and agents may make no charge warranty repairs on this product. All others do so at their own risk.

This warranty limits VANMAR Equipment liability to the repair of the product and/or warranted parts replacement and does not include incidental or consequential damages arising from the use of a VANMAR Equipment machine whether defective or not.

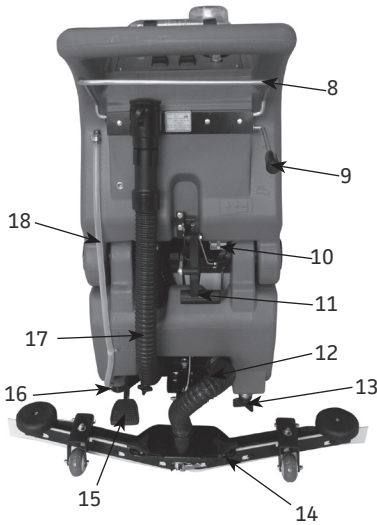
BATTERY WARRANTY In addition to the terms above, any original equipment VANMAR Equipment Battery which becomes unserviceable under normal use within a period of 1 year from date of sale to the original user will be repaired or replaced with one of equal specification at our option, F.O.B. any authorized VANMAR Equipment repair center, with no charge to user, except transportation costs. This warranty is in lieu of all other expressed or implied warranties and is extended to the original purchaser/user.

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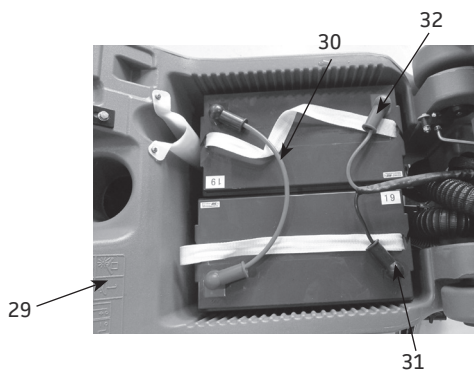
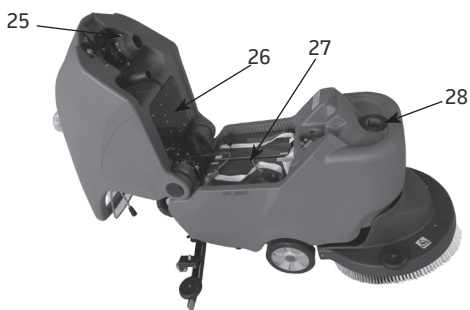
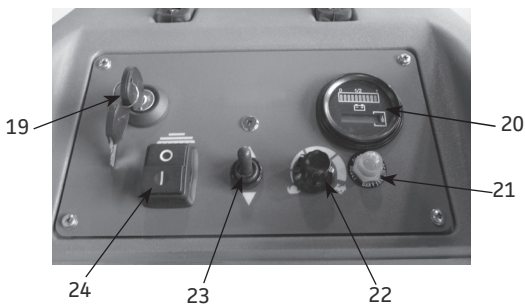
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Components Of Model VMS22T



1. Recovery tank cover
2. Main handle
3. Solution tank opening
4. Brush cover
5. Brush
6. Traction wheel
7. Wall roller
8. Drive handle
9. Solution adjustment
10. Anderson connector
11. Squeegee lifting handle
12. Vacuum hose
13. Solution tank filter
14. Squeegee assembly
15. Foot pedal/scrub deck
16. Solution tank drain outlet
17. Discharge hose/recovery tank
18. Water level tube



- 19. Key switch
- 20. Battery meter
- 21. Overload protector
- 22. Speed control switch
- 23. Forward/reverse switch
- 24. Brush motor switch
- 25. Vacuum motor
- 26. Control panel
- 27. Battery
- 28. Solution tank filter
- 29. Battery connection diagram
- 30. Battery connection cables
- 31. Battery cathode line (black)
- 32. Battery anode line (red)



Symbols on Control Panel



Main power switch



Overload protector



Speed control



Forward/backward switch

Machine Installation

Unpacking the machine

1. Remove the outer packing.
2. The machine is fastened to the pallet with tie down brackets. Remove
3. the brackets with a Phillips tip with a cordless screwdriver.
4. Remove the steel fixed block prior to removing from pallet.
5. Using a ramp, push the machine backwards down from the pallet.
6. Keep the pallet and brackets for any future transport needs.

Supplied parts:

- 2 12V batteries
- 220V, 15A intelligent charger
- Battery installation cables
- Covers and hardware for battery connection
- Squeegee assembly
- 1 malish brush and 1 malish pad holder

Battery Installation

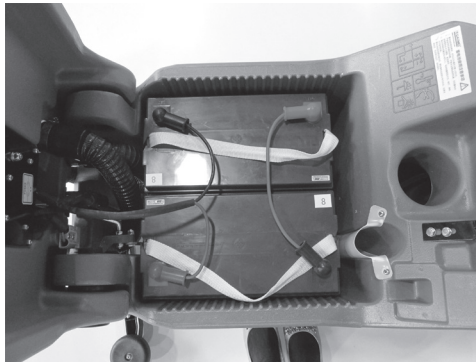
FOR SAFETY: Wear safety gloves and eye protection before working on the batteries or battery connection.

Suggested specifications of batteries:

Two sets of 12V, 100Ah Chil-Wee maintenance free batteries.

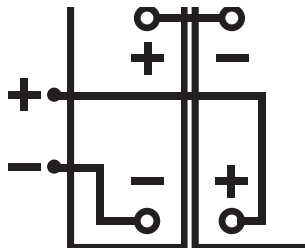
Maximum size of battery: 176mm×332mm× 214 mm (w×l×h).

1. Stop the machine on a level surface, turn off all the power switches and remove the key.
2. Lift the recovery tank so that battery compartment is accessible. (Figure 1).



(Figure 1)

3. Fix the batteries into the compartment, and place battery connecting parts following the diagram below (Figure 2).
4. Connect battery cables to battery posts following the diagram below (Figure 2) with red cable to the anode post (+) and black cable to cathode post (-).



(Figure 2)

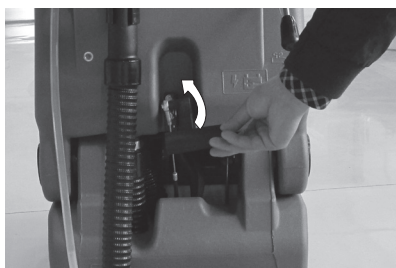


Cleaning Brush and Pads

- Use appropriate brushes for optimal cleaning.
- Specifications of recommended brushes and pads are given as follows:
- Pad holder: 21" Malish pad holder
- Brush: 21" Malish Brush

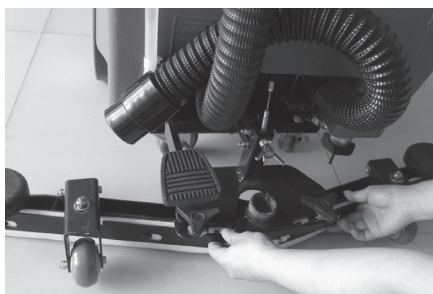
Machine Installation

1. Stop the machine on a level surface, turn off all the power switches and remove the key.
2. Pull the squeegee lifting rod upwards (Figure 3).



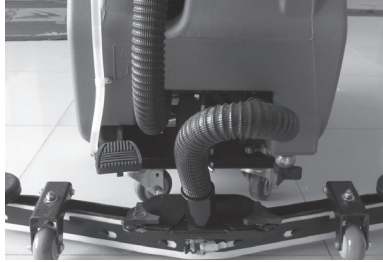
(Figure 3)

3. Fix the squeegee assembly to squeegee installation bracket following the diagram below (Figure 4). Place the fastening knob into the socket completely before tightening.



(Figure 4)

4. Connect vacuum hose to the squeegee assembly as is shown below (Figure 5)



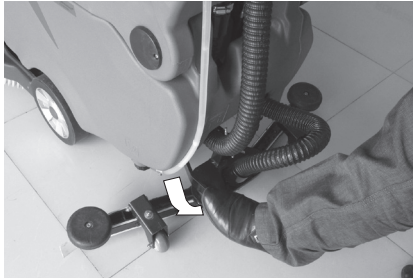
(Figure 5)

5. Check squeegee blade and make proper adjustment if necessary (please refer to “Squeegee Blade Adjustment” in page 31).



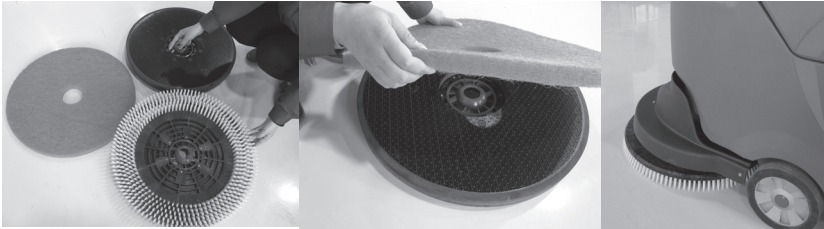
Install Brush/Pads

1. Stop the machine on a level surface, turn off all the power switches and remove the key.
2. Push the foot pedal down while moving it to the right (as indicated by the arrow) to lift the brush head (Figure 6).



(Figure 6)

3. Place the pad on pad holder before installing onto machine (Figure 7).



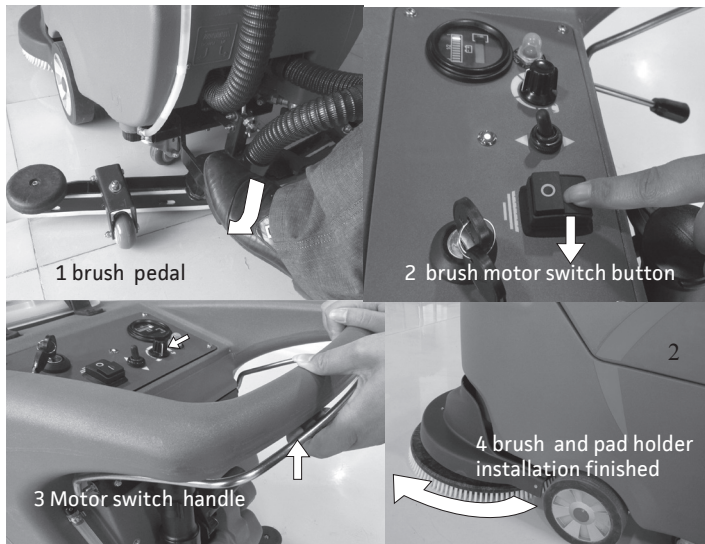
(Figure 7)

4. Center the pad holder/brush on brush motor/head (Figure 8).



(Figure 8)

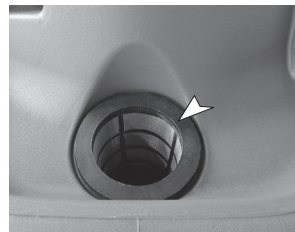
5. Push the lifting pedal down while moving it to the left (as indicated by the arrow), press brush motor switch button to the 'on' position and hold drive handle to finish installing the brush or pad holder (Figure 9).



(Figure 9)

Fill The Solution Tank

Use the solution tank fill-port in the front of the machine to fill solution tank (Figure 10).



(Figure 10)

Scrubbing method: Pour the suggested amount of your chosen cleaning detergent/liquid and water into solution tank, according to instructions on the cleaning detergent/liquid container.

NOTE: When filling the solution tank with a bucket, make sure that it is clean. DO NOT use the same bucket for filling and draining the machine.

ATTENTION: For conventional scrubbing, only use recommended cleaning detergents. Improper detergents (such as washing powder) can cause damage and will void the manufacturer's warranty.

Warning: DO NOT use flammable liquids in case of fire or explosion. FOR SAFETY: Follow the mixing and handling instructions on chemical/solution containers.



Machine Operation

FOR SAFETY: DO NOT operate the machine before fully reading and understanding this operator manual.

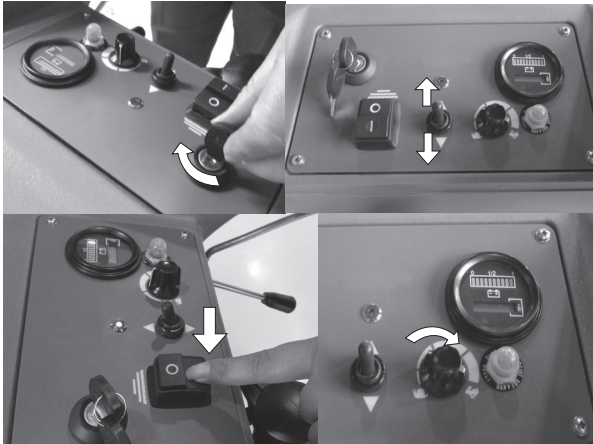
Warning: DO NOT operate the machine near or in places with inflammable liquids, gas, or combustible dust in case of fire or explosion.

Pre-operational Checklist

- Sweep entire floor to remove all loose debris.
- Check battery power indicator (please refer to "Battery Meter" on page 21).
- Check for abrasions of pads/brush.
- Check for the abrasion of squeegee blade and make appropriate adjustment.
- Make sure the recovery tank is empty, and that the screen filter has been installed and is clean.

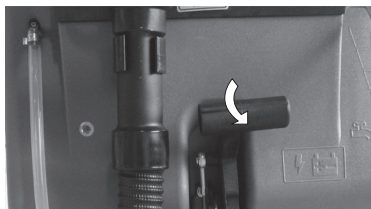
Start the Machine

1. Turn the main power switch on, adjust the forward/reverse switch on the forward position.
2. Press brush motor button and adjust the proper speed (Figure 11).



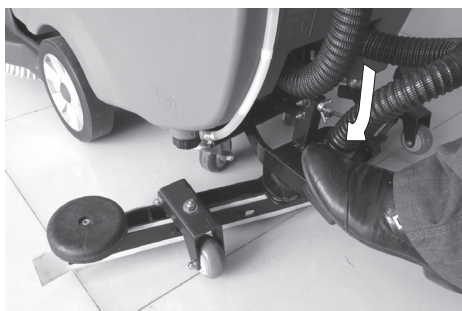
(Figure 11)

3. Push brush foot pedal down while moving it to the left (as indicated by the arrow) to lay the brush head down to the floor (Figure 12).



(Figure 12)

4. Lower squeegee assembly down with handle - vacuum motor will start.



(Figure 13)

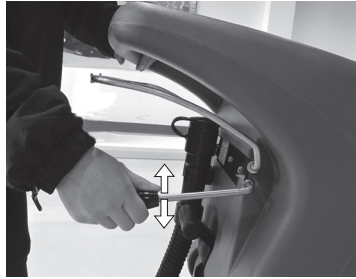
5. Life drive motor switch handle upwards to start scrubbing (Figure 14).



(Figure 14)



6. Adjust water flow by lifting solution valve upward or downward to fit different scrubbing requirements (Figure 15).



(Figure 15)

7. When stopping, turn off the brush motor as well as the main power switch and lift the brush and squeegee assembly.

During Operation

Warning: DO NOT pick up any flammable materials or reactive metal in case of fire or explosion.

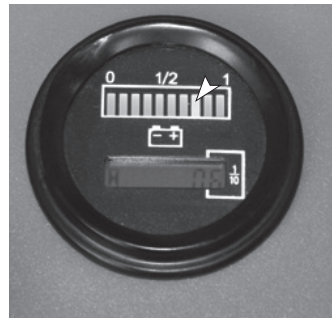
FOR SAFETY: Go slowly on inclines and slippery surfaces and wear non-slip shoes.

1. Keep the machine operating to avoid damages to the floor surface.
2. Clean the scrubbing area in advance to avoid scuff marks; if any, clean the squeegee blade to remove any debris on it.
3. DO NOT operate the machine on inclines exceeding 5% .
4. Add a moderate quantity of defoamer to recovery tank to remove additional foam.
NOTE: Keep the foam away from sewage screen filter in the recovery tank in case of motor failure.
5. A dual cleaning method is recommended when scrubbing heavily soiled area.

Battery Meter

Battery meter displays battery capacity. When the battery is fully charged, all the indicators will be on and then go out in sequence from right to left.

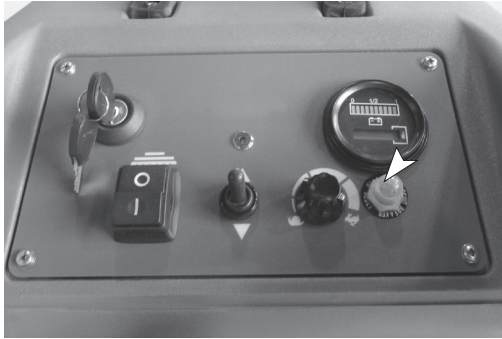
NOTE: To prolong battery life, charge them after every use. It is best to stop scrubbing and charge the battery cells when the left light is blinking. Scrubbing operation will automatically shut off to prevent the battery cells from running out. If this happens, charge the battery cells immediately (Figure 16).



(Figure 16)

Overload Protector

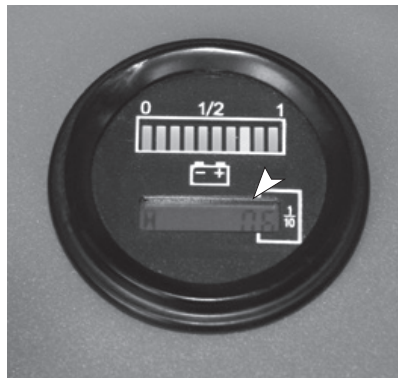
This model is equipped with a restorable overload protector with a button located on the control panel (Figure 17) to avoid damages to brush motor. When the overload protector is activated and triggers black-out, please check the reason, then press the overload protector button manually after the motor cools down. Contact an authorized service center for machine maintenance if it continues.



(Figure 17)

Timer

The timer is used to count the total working hours of the machine. Refer to the timer to judge when to carry out recommended maintenance procedures and record maintenance history (Figure 18).



(Figure 18)



Drain The Tanks

Drain and clean the recovery tank after each use.

FOR SAFETY: Stop the machine on a level surface when leaving or servicing it, turn it off and remove the key.

Drain Recovery Tank

1. Carry the machine to a place for drainage and turn the power off.
2. Hold the drain pipe upward, remove its cap and lower the hose down for drainage (Figure 19).



(Figure 19)

NOTE: DO NOT use the same bucket for filling and draining the machine.

3. Remove and rinse the screen filter within recovery tank (Figure 20).



(Figure 20)

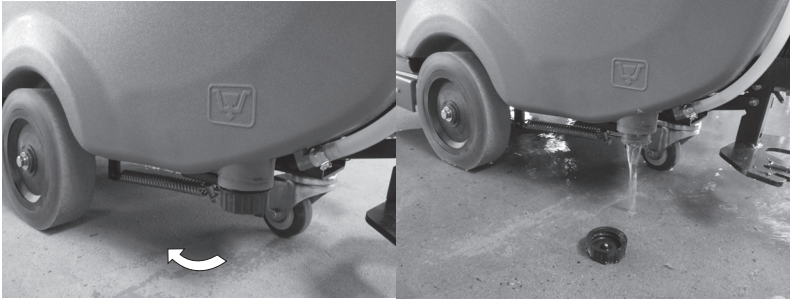
4. When cleaning the recovery tank, be mindful of the filter; DO NOT allow any water to go in (Figure 21).



(Figure 21)

Drain The Solution Tank

Remove solution tank drain-pipe cap to drain the rest of water (Figure 22).



(Figure 22)

Battery Charge

The charger attached to this machine conforms to the charge instructions below.

NOTE: To prolong battery life, charge them after each use.

Specifications for charger

- Charger type:Automated intelligent charger Chil-Wee maintenance free battery
- Output voltage--24V
- Output current--100Ah

Use of Charger

Please refer to the charger operation manual attached to the machine for detail information of charger operation.

1. Stop the machine in a well ventilated place.
2. Stop the machine on a level and dry surface. Lift squeegee and brush; turn off all power switches and remove the key.
3. Plug the charger's AC power cable into a well-grounded power socket.
4. Connect the charger's DC cable to the battery charging port on the back of the machine (Figure 23).

NOTE: The machine stops working once the charger is connected to batteries.



(Figure 23)

NOTE: DO NOT disconnect the DC cable with the charging port during the charging period to avoid arc strike. Unplug the AC power cable in case of forced charging disable.

Precautions for Battery Installation and Use

1. Check each battery for damages, cleanliness, and corrosion before using. Clean battery surface with a piece of dry cloth; check the battery cells for open-circuit voltage, whether anode/cathode is marked clearly and whether they are connected reversely.
2. Make sure each battery is fixed uprightly without inversion in accordance with drawings; interval between two neighboring battery cells should be at least 5mm. Check whether the anode/cathode is correct according to the drawings after installation, then connect the battery cells with cables.
3. Check each part of all the battery cells for looseness after installation. DO NOT tighten the joints with excessive force.
4. When fixing the whole set of battery cells to the machine, adjust the chocks between two neighboring battery cells to make sure all the battery cells stand uprightly. Tighten the battery to avoid shock or movement.
5. Isolate the components that generate sparks such as main switch, fuse holder, etc from the battery cells.
6. The battery cells can be fixed to the machine directly since they are at the state of charge before delivery; when out of service for a long period (more than 2 months), please recharge the battery cells before use.
7. Keep batteries away from fire, heat, or direct sunlight. Keep the battery cells from being bumped violently or short-circuited.
8. Battery capacity is measured at an environment temperature of 25°C . The capacity will drop by 1% every 1°C the temperature declines. So take the impact temperature variation into consideration during use. **DO NOT** use batteries when the temperature declines below -10°C .
9. Waste batteries must be recycled. To avoid pollution to the environment, do not dispose of them in a standard trash receptacle.
10. Be aware of battery temperature when charging in case of danger and damages caused to batteries caused by excessive heat.
11. **DO NOT** use batteries at insufficient voltage. Charge the batteries (using only the intelligent charger) to full capacity before using.
12. Do not charge the machine with insufficient voltage for an extended period of time. This can damage the battery and will void the manufacturer's warranty.

Intelligent Charger LED Indicator

LED Indicator	Indication Status	Working Status
LED1, LED2	Blink, fan stops	Pre-charge status [Charging time: 3h]
LED1, LED2	Turn RED, fan running	Constant current status [Charging time: 7-8h]
LED1, LED2	Turn RED, fan running	Constant voltage status [Charging time: 4.5 h]
LED1, LED2	LED1 turns RED, LED2 turns GREEN, Fan stops	Float charging status [Charging time: 4.5h]
LED1, LED2	LED1 goes out, LED2 turns GREEN, fan stops	Charge complete
Note		
Situations when LED2 turns RED	1. Load Short-circuit	
	2. Reversed connection	
	3. Battery cable short-circuit	
	4. Over-heat—LED2 turns ORANGE	



Machine Maintenance

Regularly follow the daily, weekly and monthly maintenance procedures to keep the machine working maximum capacity.

Warning: disconnect the battery connection before machine maintenance to avoid electricity shock hazard.

Daily Maintenance (after each time of use)

1. Drain and rinse the recovery tank (Figure 24).



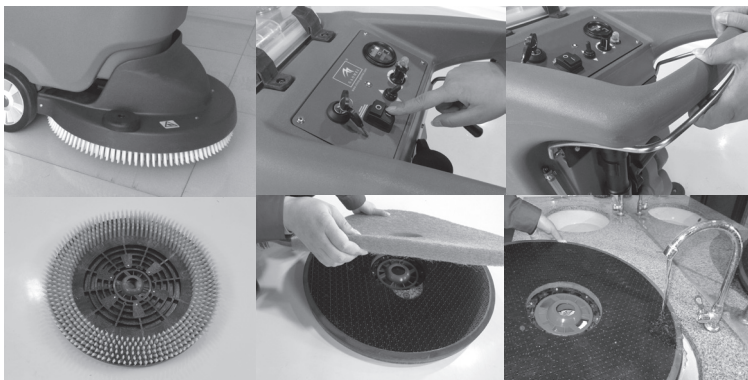
(Figure 24)

2. Remove and rinse the screen filter within recovery tank (Figure 25).



(Figure 25)

3. Make sure that the brush motor is able to rotate when it is lifted and brush motor button is pressed. Remove the pad or brush for cleaning. Rotate the pad or replace if the pad is worn (Figure 26).



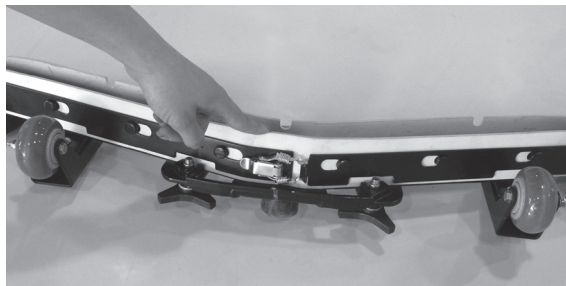
(Figure 26)

4. Cleaning squeegee blade (Figure 27). Lift the squeegee assembly to avoid damage to the blade.



(Figure 27)

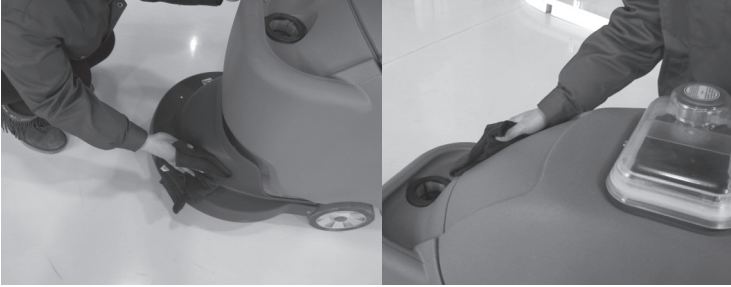
5. Check for wear at the edge of squeegee blade (Figure 28). If any, rotate its direction (refer to "Squeegee Blade Replacement" on page 30).



(Figure 28)



6. Clean the machine with multipurpose detergent and wet cloth (Figure 29). **FOR SAFETY: DO NOT** power spray or hose off the machine. Electrical malfunction may occur and will void the manufacturer warranty.



(Figure 29)

Monthly Maintenance

1. Remove the screen filter from solution tank and clean it (Figure 31). Ensure the solution tank is empty prior to removal.



(Figure 31)

2. Clean the battery surface to avoid electrode corrosion, and check the battery connection for slack (Figure 32).



(Figure 32)

Half-yearly Maintenance: Check the circuit system of machine

Maintenance Form

The following form specifies the person in charge of each procedure.

O=Operator

T=Personnel with specialized training

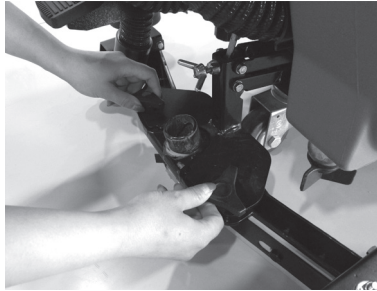
Intervals	Person in charge	Descriptions	Procedures
Daily	O	Brush/pad holder/ cleaning pad	Check the height of brush/pad holder
	O	Recovery tank	Check for damages, abrasion or debris
200 h	T	Maintenance free battery electrode and wiring	Check and clean
500h	T	Vacuum motor	Check the motor brush (Check it every 100 operating hours after 500-hour initial operation and examination)
	T	Brush motor	Check the motor brush (Check it every 100 operating hours after 500-hour initial operation and examination)
	T	Driving motor	Check the motor brush (Check it every 100 operating hours after 500-hour initial operation and examination)
	T	Duty caster	Check damages or abrasion



Squeegee Blade Replacement

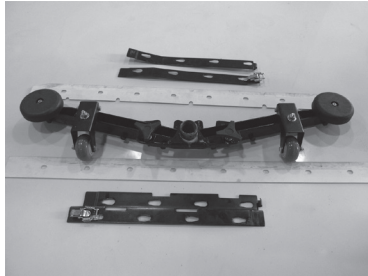
Every squeegee blade has four sides. Exchange its direction if half of the blade is worn out or replace for a new blade if all the four sides are worn out.

1. Remove squeegee assembly from the machine (Figure 33).



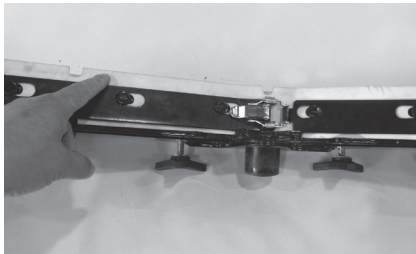
(Figure 33)

2. Release blade clamp and remove the black blade (Figure 34).



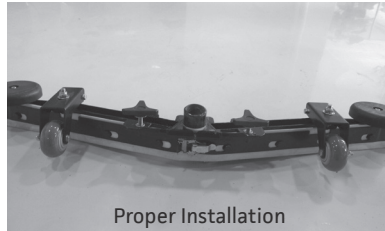
(Figure 34)

3. Rotate the existing blade to the new edge, and install the rotated blade to squeegee assembly. Ensure the holes in the squeegee blade are completely slid down (Figure 35).



(Figure 35)

ATTENTION: Comparison between proper and improper installation of squeegee and blade clamp.

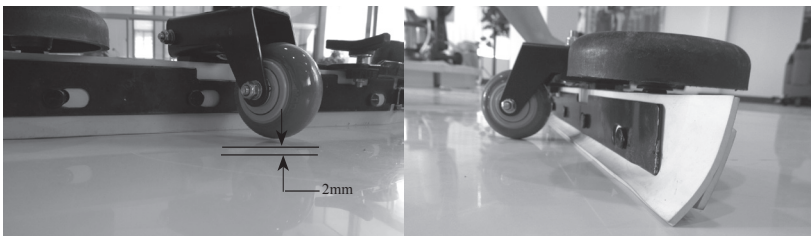


Squeegee Blade Adjustment

Squeegee blade has been tuned before delivery. It needs adjustment only when its position deviates.

To obtain optimal effect, squeegee assembly caster must be adjusted to a certain height and inclination following the instructions below.

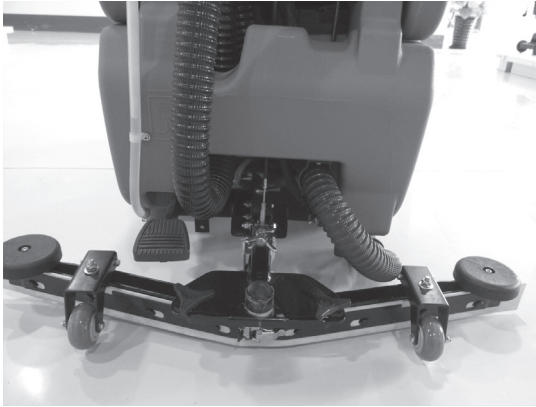
1. Check whether squeegee blade totally contacts with floor surface; make sure the distance between wheel and ground is about 2mm. After squeegee is adjusted properly, squeegee blade should bend as is shown below (Figure 36).



(Figure 36)

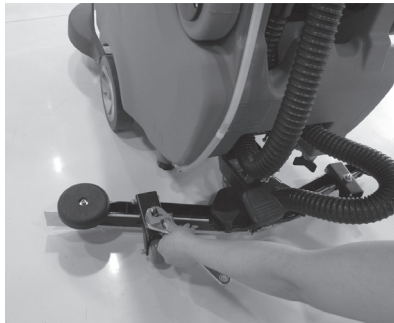


2. Adjust the regulating nut as indicated by arrow 2 in the following diagram if squeegee blade does not contact the ground or there is a small gap between them. Rotate the regulating nut clockwise to lift the squeegee blade; and counterclockwise to lower the squeegee blade. Adjust the squeegee blade to an optimal position according to actual demands (Figure 37).



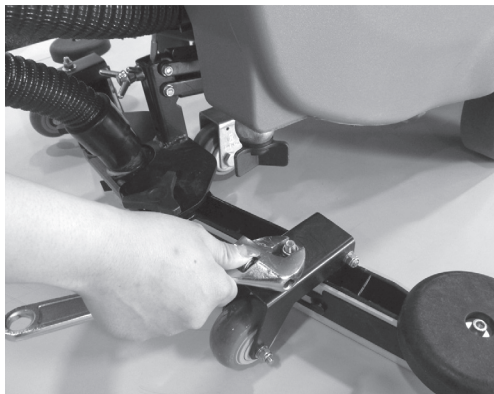
(Figure 37)

3. Adjust the regulation nut as indicated by arrow 1 in the following diagram if the middle of squeegee blade contacts the ground well but there is a small gap between left side of blade and the ground. Rotate the regulating nut clockwise to lift the left squeegee blade; rotate the regulating nut counterclockwise to lower the left squeegee blade. Adjust the squeegee blade to an optimal position according to actual demands (Figure 38).



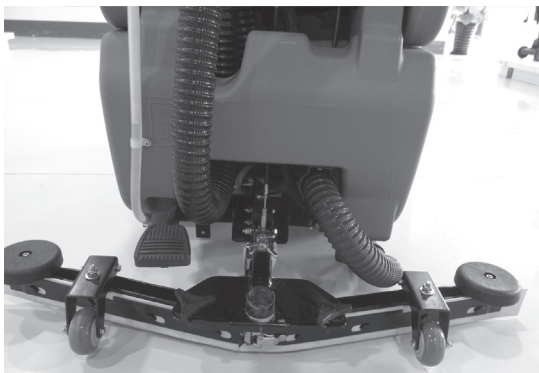
(Figure 38)

4. Adjust the regulating nut as indicated by arrow 3 in the following diagram if the middle of squeegee blade contacts the ground well but there is a small gap between the right side of blade and the ground. Rotate the regulating nut clockwise to lift the right squeegee blade; rotate it counterclockwise to lower the right squeegee blade. Adjust the squeegee blade to an optimal position according to actual demands (Figure 39).



(Figure 39)

5. Rotate the regulating nut counterclockwise following diagram if both sides of squeegee blade contact the ground well but there is a small gap between middle of blade and the ground. Be sure the blade contacts the ground well or it forms an angle of 45° with the ground (Figure 40). Adjust the squeegee blade following step 3 or 4 if either side of blade needs adjusting.



(Figure 40)

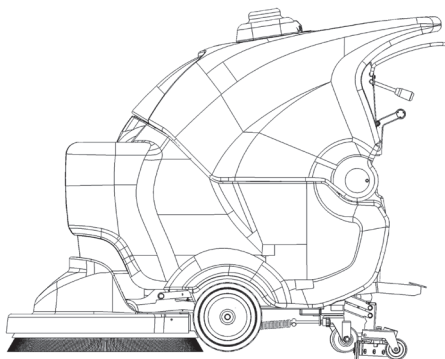


Push, Tow and Transport The Machine

Be certain to follow the procedures below when transporting the machine by trailer or truck:

1. Lift the squeegee and brush head.
2. Load/unload the machine using recommended cargo handling apron.
3. Fix the front of the machine close to the front position of truck or trailer. Lower the brush head and squeegee after the machine is fixed tight.
4. Place a block behind each driving wheel to avoid machine sliding.
5. Fasten the rack of machine with straps to avoid movement. A bracket must be installed on the floor of truck or trailer.

FOR SAFETY: Use the recommended cargo handling apron to load and unload the machine onto and off the truck or trailer. Fasten the machine to the truck or trailer with straps.



Machine Storage

1. Charge the batteries before storage. DO NOT store the machine with battery exhausted. For long-term storage, be sure the batteries are charged every 2-3 months to avoid battery damages due to insufficient voltage.
2. Drain and clean the solution tank and recovery tank.
3. Store the machine at a dry area, keep the squeegee and brush lifted.
4. Open the recovery tank for ventilation. **ATTENTION:** Keep the machine away from rain, store it indoor.
5. Follow the frost protection instructions below if the machine is stored at a freezing temperature.

Frost Protection

1. Add 1 gallons (4L) recreational vehicle (RV) anti-freezing agent to the solution tank without dilution.

FOR SAFETY: Wear goggles to avoid contact with eyes.

ATTENTION: Before operating the machine next time, rinse the solution tank thoroughly to remove the anti-freeze agent.

Troubleshooting

Trouble	Cause	Solution
Machine inoperable	Switch off or switch damaged	Turn switch on or replace it
	Brush motor button off or damaged	Turn switch on or replace it
	Vacuum motor button off or damaged	Turn switch on or replace it
	Motor switch handle failure	Replace the micro-switch
	Battery exhausted or damaged	Charge or replace batteries
	Overload protector activated	Solve short circuit fault and press overload protector
Charger failure	Plug disconnected with power	Check for plug connection
	False connection of battery terminals	Connect terminals properly
	Charger breakdown	Refer to charger fault code
Brush motor failure	Brush lifted above ground or its button damaged	Replace brush motor micro-switch
	Motor switch damaged	Replace motor micro-switch
	Overload protector activated	Solve short circuit fault and press overload protector
	Brush motor connector loosens	Re-fix the connector
	Brush motor damaged	Replace the motor
Machine won't move	Universal wheel damaged	Replace the universal wheel
	Duty caster damaged	Replace duty caster
	Brush adjustment nut loosens	Readjust brush adjustment nut
Vacuum motor failure	Vacuum motor handle micro-switch damaged	Replace micro-switch
	Micro-switch disconnected	Re-plug the joint
	Motor micro-button damaged	Replace micro-switch
	Vacuum motor damaged	Replace vacuum motor
	Recovery tank full	Drain the sewage
Little or no solution flow in brush	Solution tank screen filter blocked	Clean solution tank screen filter
	Water valve switch damaged	Replace water valve switch
	Solenoid valve damaged	Replace solenoid valve



Troubleshooting—Continued

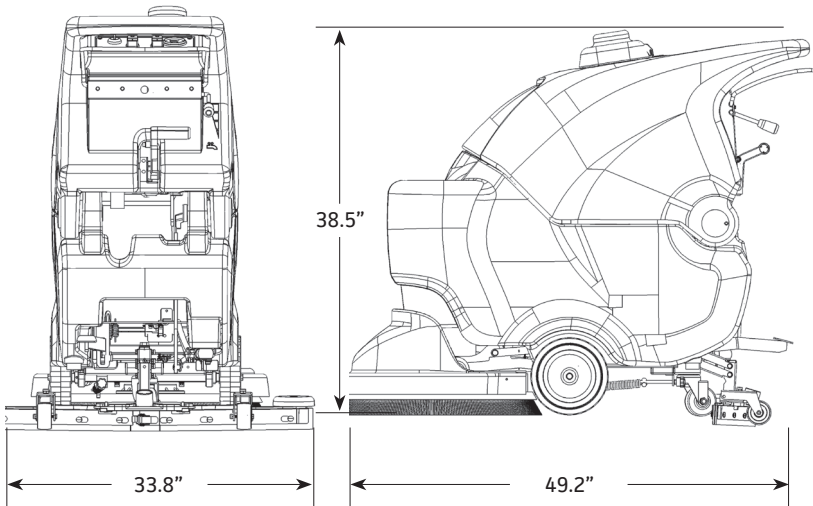
Inadequate suction	Recovery tank full or vacuum hose damaged	Drain recovery tank or replace a vacuum hose
	Blow-off hose cap not sealed	Re-cover the cap
	Recovery tank screen filter clogged	Clean screen filter
	Debris at the seal of sewage cap	Remove debris and re-cover the cap
	Squeegee blade worn out	Replace or rotate the direction of squeegee blade
	Squeegee blade cannot bend	Adjust the height of blade
	Vacuum motor damaged	Replace vacuum motor
	Debris on sewage guide housing	Remove the debris
	Insufficient voltage of batteries	Charge the batteries
Running time shortened	Insufficient voltage of batteries	Get the batteries fully charged
	Battery failure	Replace batteries
	Batteries need maintenance	Refer to "Battery Maintenance"
	Battery charger failure	Repair or replace the charger

Fault Codes of Charger

Code	Fault	Solution
LED2 turns GREEN and blink	Battery voltage <22V	Charge the battery with 24V, 15-25Ah mode, then continue normal charging with intelligent charger.
	Battery voltage cannot reach 22.4V	
LED2 turns RED	Battery voltage<12V	Battery terminals are not well connected; battery connection failure.
Note	<p>1. Charger for liquid-adding batteries mustn't adapt to maintenance-free batteries to avoid charger burning-out</p> <p>2. Charger for maintenance-free batteries adapts to liquid-adding batteries. But the battery cannot be fully charged</p> <p>3. If battery voltage is lower than 22V, the intelligent charger won't work</p> <p>4. Voltage lower than 23V will activate an alarm to warn for timely charge</p> <p>5. Faults above are only practical for new batteries. In terms old batteries, please replace or maintain them</p> <p>6. In general, the operation interface will raise the alarm in the event of insufficient voltage. In this case, please get the batteries charged time, otherwise faults above will occur.</p>	

Technical Specification:

Model	VMS22T
Batteries	24V (2 x 12V Batteries)
Batteries Type	AGM
Drive System Brush Motor	560w
Vacuum Motor	450w (AMETEK)
Solution Tank	13 gallons
Recovery Tank	13 gallons
Cleaning Path	22"
Squeegee Width	32"
Number Of Brushes	1
Propelling Motor	350w
Productivity Per Hour	27,125 sq ft
Dimension	48 x 23 x 38
Net Weight w/o Batteries	316 lbs





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