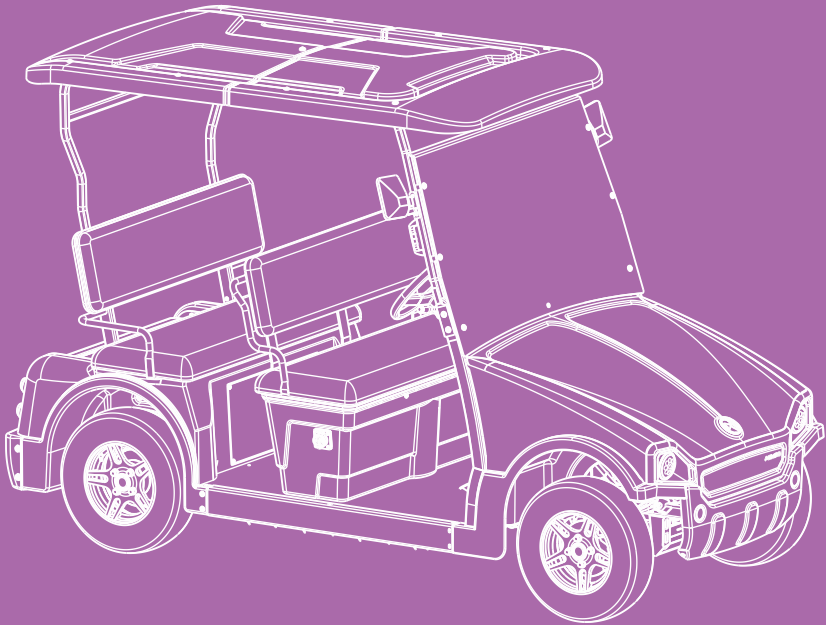




NAVEO

OWNER'S MANUAL



FOREWORD

Thank you for choosing Roots Naveo Electric Vehicle. Please protect your investment and ensure that your Roots EV provides years of reliable, superior performance by reading and following the maintenance instructions in the manual.

Your comfort and safety are important to us as well, so we urge you to read and follow the step by step operating and safety instructions in this manual. These instructions must be followed in order to avoid the risk of severe personal injury. If you rent or loan your vehicle to others, we recommend that they read this manual before operating.

Roots EV has a customer service designed to help the customer in the best way. For doubts about the manual, service and repairs contact your nearest Roots EV dealer.

This manual should be considered a permanent part of your Roots EV and should remain with the vehicle when you sell the vehicle.

NOTICE

It is important to note that some vital statements throughout this manual and on the stickers affixed to the vehicle are preceded by the words DANGER, WARNING or CAUTION. For your protection, we recommend that you take special notice of these safety precautions.

Throughout this manual and the safety stickers, the words “Naveo” and “vehicle” are used interchangeably.

If any of the operation or safety stickers on the vehicle become damaged, have been removed or cannot be easily read, they should be replaced immediately to avoid possible property damage, personal injury, or death. Contact your dealer.

Some information in this manual may not be applicable to your vehicle but will be for other versions.

⚠ DANGER

- A DANGER indicates an immediate hazard that will result in severe personal injury or death.

⚠ WARNING

- A WARNING indicates an immediate hazard that could result in severe personal injury or death.

⚠ CAUTION

- A CAUTION with safety alert symbol indicates a hazard or unsafe practice that could result in minor personal injury and property damage.

CAUTION

- A CAUTION without the safety alert symbol indicates a potentially hazardous situation that could result only in property damage.

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SAFETY INSTRUCTIONS

⚠ WARNING

- **Do not operate the vehicle before reading this manual.**
- **Follow the procedures exactly as stated in this manual and heed all DANGER, WARNING and CAUTION statements in this manual as well as those on the vehicle.**
- **Improper use of the vehicle or failure to properly maintain it could result in decreased vehicle performance, severe personal injury and death.**
- **The vehicle should not be modified in any way without consulting the service team, doing so could result in severe injury or death.**
- **Only trained technicians should repair or service the vehicle.**
- **If the vehicle is to be left unattended, remove the key.**
- **This vehicle is not road legal and thus should not be driven or towed in public.**
- **This vehicle is not designed for rain. Do not store or drive it in rain.**
- **Do not drive in waters deeper than 250mm.**
- **Place the vehicle in TOW mode, before pushing the vehicle or towing. (Refer chapter on Towing)**
- **Do not place more people or cargo than the payload limit. (Refer chapter on Seating)**
- **Do not let children drive the vehicle.**
- **The roof is not designed to take load. Do not place anything on the roof or drive under places where there is a chance of objects falling at you.**
- **Always charge the vehicle in a well ventilated area.**

⚠ CAUTION

- **Do not open the controller box, if there is any problem with it, contact your Naveo dealer.**

KNOW YOUR VEHICLE

The Naveo has multiple versions with two main classifications

- Size: 2 meter and 3 meter wheelbase.
- Payload type: Passenger and Cargo.

There are many optional features which creates several combinations resulting in several variants.

The main components of the vehicle are listed below and shown in **Figures 1 to 9**.



Figure 1: RT-G-A8

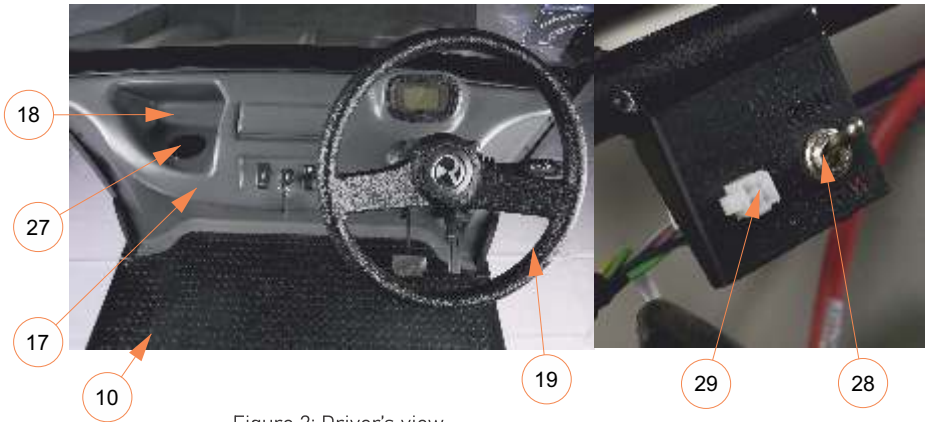


Figure 2: Driver's view
(Refer controls and indicators)

Figure 3: TOW/RUN switch



Figure 4: RT-G-A4+2 with a rear facing seat



Figure 5: Inside the seat cowl



Figure 6: Charger socket



Figure 7: Cargo space (only present in 3 Meter 3 Row version)

1. Front body
2. Front bumper
3. Rear bumper
4. Rear body
5. Wheel well
6. Head lamp
7. Front indicator lamp
8. Tail lamp
9. Rear indicator lamp
10. Floor mat
11. Windscreen
12. Roof
13. Side mirrors
14. Handle
15. Tyre
16. Rims
17. Dashboard
18. Dashboard storage
19. Steering wheel
20. Seat
21. Seat cowl
22. Arm rest
23. Battery Lead acid (160Ah) - 1/6
24. Charger
25. Foot rest
26. Grab rail
27. Brake-oil Grommet
28. TOW/RUN switch
29. Communication port
30. Battery cover



Figure 8: Controller box



Figure 9: Utility box

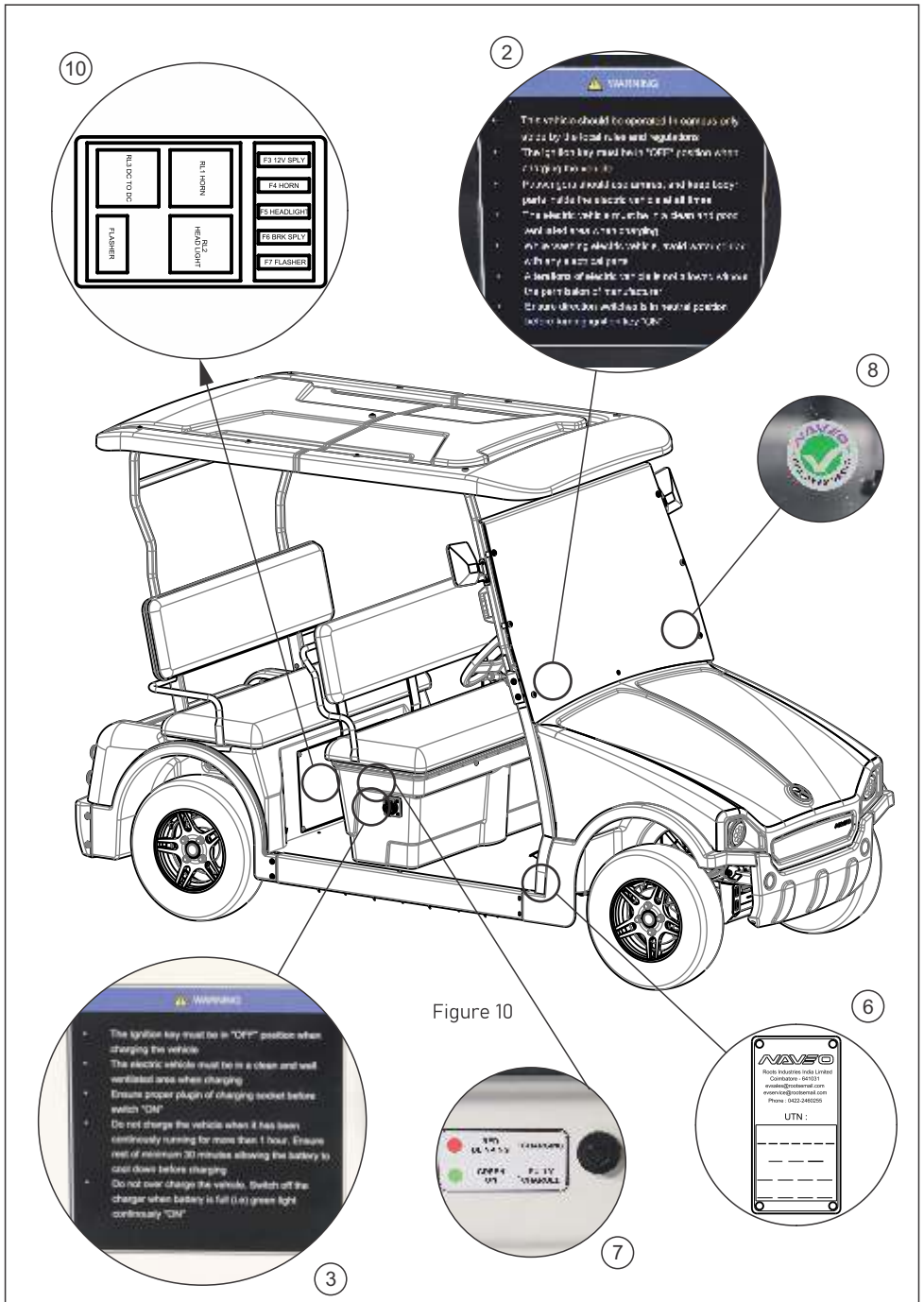
DECAL IDENTIFICATION

This is a list of all the stickers and plates on the vehicle

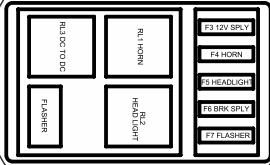
Please read all the stickers before operating the vehicle and follow the instructions in it.

Figure 10,11 & 12 show the stickers and their positions.

1	Tow switch sticker	It is located next to the TOW/RUN switch. It has important information regarding the usage of the TOW/RUN switch.
2	Vehicle instructions	It is located on the windshield on the driver's side. It has basic warnings regarding the vehicle and its operation.
3	Charging instructions	It is located next to the charging port. It has important instructions regarding charging.
4	Battery warnings	It is located opposite the TOW/RUN switch in the battery tray. It has important safety warnings regarding the battery and a pictographic representation of the battery pack. Sticker a is for Lithium-ion and b is for lead-acid
5	Tyre pressure sticker	It is located on the front upright member of the chassis on the passenger's side. It has the recommended tyre pressure for the front and back wheels.
6	Name plate	It is located on the front upright member of the chassis on the driver's side. It has the Unique Tracking Number (UTN) of your vehicle.
7	Charging indicator sticker	It is located above the charging port. It helps to read the charging indicator.
8	Quality Assurance sticker	It is located on the windshield on the passenger's side. Presence of the sticker means that your vehicle has been inspected for quality and that it is up to Roots standards.
9	Charger warnings	It is located on the side of the charger inside the seat cowl. It has safety warnings regarding the charger.
10	Fuse & relay sticker	It is located on the controller inner box. It has a pictographic representation of the Fuse&relay layout.



10



2



8



3



Figure 10



7

6



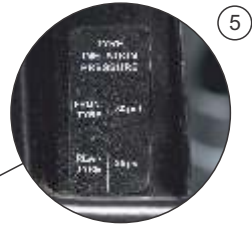
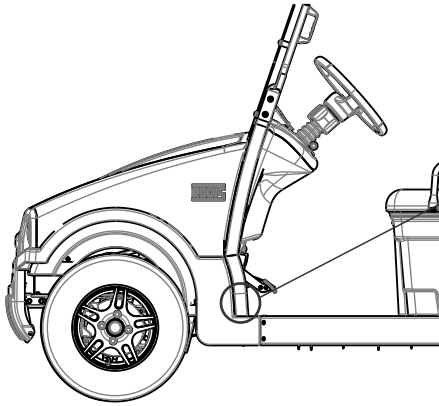


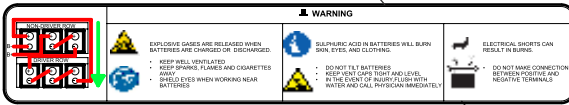
Figure 11



4a



9



4b



1

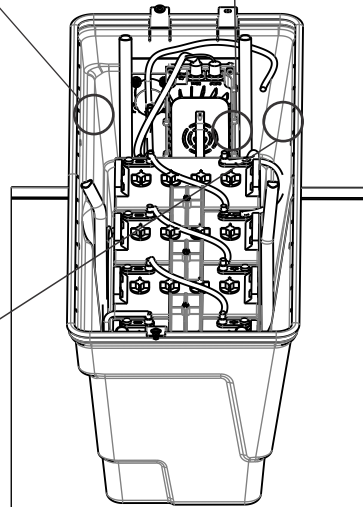


Figure 12

CONTROLS AND INDICATORS

KEY SWITCH

The key switch is mounted on the dashboard to the left of the steering column (**Figure 13**). It has two positions, ON and OFF.

***Note:** When the key is turned to the OFF position, the main vehicle systems are disabled. The key switch may be used as an emergency stop.*

The key can be removed only when the key switch is in the OFF position.

DIRECTION SWITCH

This switch is located to the right of the key switch (**Figure 13**). The **F** for FORWARD and **R** for REVERSE are clearly marked. The NEUTRAL is between these two directions. Putting vehicle in REVERSE will activate the reverse buzzer as a audible warning.



Figure 13: Key and Direction switches

ACCELERATOR PEDAL

The accelerator pedal is one on the right. Its function is to move the vehicle (**Figure 14**). The direction depends on the position of the FORWARD/REVERSE switch. Pressing the accelerator pedal will automatically release the parking brake and start moving the vehicle in the direction selected. The pedal will do nothing when the direction switch is in neutral. Releasing the pedal will take the vehicle into regenerative mode (**Refer chapter on Braking**).

BRAKE PEDAL

The brake pedal is the one on the left (**Figure 14**). Its function is to slow down or stop the vehicle.



Figure 14: Accelerator and brake pedal

TURN INDICATOR AND LIGHT SWITCHES

This switch is located on the right side of the steering column. It has the controls for all the lights and the horn (**Figure 15**).

The functions it provides are

- RIGHT/LEFT turn indicator: Press the switch down for R and up for L.
- PASS headlight function: Press the switch towards the driver for PASS.
- OFF/PARKING LAMP/HEADLAMP: Turn the knob to activate the desired function. HI-BEAM can only be activated when the HEADLAMP is ON.
- HORN: There is a switch at the end of the knob for the horn.



Figure 15: Lights and horn switches

Note: The high beam function will work only when the headlamp is already ON.

INSTRUMENT CLUSTER

The instrument cluster is located on the dashboard behind the steering wheel. It has different meters and indicators to help the user (**Figure 16**).

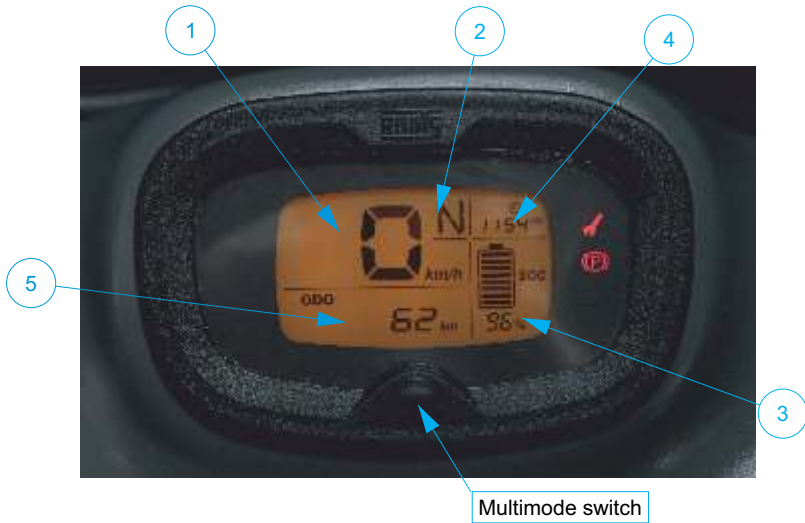


Figure 16: Instrument cluster

1. Speedometer: It shows the current travelling speed of the vehicle.
2. Drive indicator: It shows the direction of drive which is activated in the controller. F/N/R.
3. SoC% (State of Charge): It shows the current charge level in the batteries in terms of percentage.
4. Clock: It shows the time. To change or set the time, long press the switch when the display is in odometer.
5. Odometer: It displays the total distance travelled by the vehicle, it cannot be reset or altered.
6. Hour-meter: It displays the number of hours the EV has been operational since it was commissioned.
7. DTE (Distance To Empty): It calculates and shows how much distance the vehicle can travel using the remaining charge.
8. Tripmeter A & B: They display the distance travelled but unlike the odometer they can be reset whenever needed. To reset either tripmeter, long press the multimode switch.

The Odometer, Hour-meter, DTE and Tripmeters are all displayed on the same slot in the instrument cluster. To cycle between them, short press the multimode switch.

The instrument cluster also has various Tell-tales which are used to indicate the state of the vehicle to the user (**Figure 17**). The different Tell-tale details and their colours are shown below.










Tell tale detail		Symbol	Description
1	Turn left		It blinks when the left side indicator lights are on.
2	High beam		It is a solid light which indicates the high beam setting of the headlight.
3	High Temperature		When this tell-tale is on, stop running the vehicle until tell-tale goes off.
4	Low brake fluid		This tell-tale indicates when the brake fluid in the reservoir is low. To refill it refer chapter on braking .
5	Turn right		It blinks when the right side indicator lights are on
6	Service alert		When this tell-tale is on, contact your dealer or service representative.
7	Parking brake		It is a solid light that indicates when the parking brake is engaged.
8	Charger connected		It is a solid light that indicates when the charging plug is connected to the socket.
9	Low battery		<p>There is audible warning along with the visual warning for low SoC in the battery.</p> <ul style="list-style-type: none"> When the SoC is <20%, the beeping is at a 1 beep per second interval. When the SoC reduces to <5%, it becomes 2 beeps per second.



Figure 17: Instrument cluster tell-tales

TOW/RUN SWITCH

It is a switch which puts the vehicle into two modes (**Figure 18**). In the RUN mode as the name suggests the vehicle is operational and will accelerate, brake and the auto parking will always be engaged even when the vehicle is OFF. In TOW mode, the vehicle will not be operational and the vehicle will disengage the parking brake allowing vehicle to be moved or towed.

The switch is located under the driver set in all variants except the 3-Meter passenger ones.



Figure 18(a): RUN mode



Figure 18(b): TOW mode

USB PORT

It is a 5V DC 2.5A port. It is a smart USB charger which provides electricity to power and recharge portable devices. It does not transfer data (**Figure 13**).

CHARGING INDICATOR

It is located above the charging port, it indicates whether the battery is charging and fully charged (**Figure 19**).



Figure 19: Charging indicator

PRE-OPERATION AND DAILY SAFETY CHECKLIST

Each Naveo vehicle has been thoroughly inspected and adjusted at the factory; however upon receiving your new vehicle(s), you should inspect each vehicle to make sure its in proper working condition, using the following checklist as a guide.

This checklist must be used daily to ensure that the vehicle is in proper working condition and in conjunction with **performance inspection** and **periodic maintenance schedule**.

Any vehicle not functioning correctly should be removed from use until it is properly repaired. This will prevent further damage to the vehicle and avoid the possibility of injury due to unsafe conditions.

DAILY SAFETY CHECKLIST

- **Instrument cluster:** Check for tell-tale warnings, if any appear take the appropriate action (**Refer chapter on Controls & indicators**).
- **Tyres:** Visually inspect the tyres for wear, damage and proper inflation on a daily basis.

- **Brakes:** Check brake pedal for stiffness.
- **Lights:** Check if the headlights, tail lamps and indicators are working.
- **Battery:** Check the SoC in the instrument cluster.

The following additional items along with the daily safety checklist must be checked when you first receive the vehicle.

- **General:** All parts should be in place and properly installed. Be sure that all fasteners are tight (**Refer chapter on Know your vehicle**).
- **Safety and information decals:** Check to ensure that all the stickers and decals are in place (**Refer chapter on Decal identification**). Get them from your Roots dealer if any are missing.
- **Batteries-lead acid:** Check the electrolyte level and refill distilled water if it is low (**Refer chapter on Batteries**).
- **Charger cord:** Visually inspect for cracks, loose connections and frayed wiring.

It is recommended to remove the plastic covering on a new vehicle before use.

PERFORMANCE INSPECTION

After you have familiarized yourself with the vehicle controls and have read and understood the driving instructions take the vehicle for a test drive

- **Switches:** Check for proper operation of all switches (**Refer chapter on Controls & indicators**).
- **Brakes:** Functioning of brakes is very important. When brake pedal is pressed using moderate pressure, the vehicle should come to a smooth, straight stop. Moderate brake pressure should be able to lock the wheels, but using lesser pressure should also permit a slow gradual deceleration. If the vehicle swerves or fails to stop, or makes a grinding or squeaking noise, have the brake system checked and adjusted as required.
- **Auto parking brake:** When the vehicle comes to a stop the parking brake should be engaged automatically and the vehicle should not be able to move unless the accelerator is pressed again.
- **Reverse buzzer:** The reverse buzzer will sound as a warning when the direction switch is in REVERSE mode.
- **General:** Listen for any unusual noises such as squeaks or rattles. Check the vehicle's ride quality and performance.
- **Steering:** The steering should be easy to steer and not have any free play in it.

DRIVING INSTRUCTIONS

WARNING

- **The vehicle should be driven only in-campus, not on public roads.**
- **Do not drive it in the rain without the rain cover.**
- **Do not seat more than the recommended no. of people.** (Refer chapter on Seating)
- **Do not look at phones while driving.**
- **Operate the vehicle from only the driver seat.**
- **Do not drive under the influence of alcohol or drugs.**
- **Make sure everyone is seated before moving the vehicle.**
- **Make sure the doors of the cargo bay are closed.**
- **Make sure the items placed in the cargo bay are secured for transportation.**

START UP SEQUENCE

1. Complete the pre-operation and daily safety checklist.
2. Study and understand controls.
3. Position mirrors correctly.
4. Keep direction switch in neutral.
5. Insert key , turn on the vehicle.
6. Check for warnings in the instrument cluster.
7. Select the desired direction, FORWARD/REVERSE.
8. Press the accelerator to release the auto parking brake and to move the vehicle.

WARNING

- **Clear any obstacles in the way before moving the vehicle.**
- **Keep both hands on the steering wheel while driving.**
- **Pay attention to the road and surroundings.**

- **To help prevent the possibility of serious injury, keep your entire body inside the vehicle.**
- **To help prevent falls from the vehicle, remain seated in a moving vehicle and hold on to the grabrails and armrests.**

CAUTION

- **Do not drive the vehicle on slopes steeper than 20% grade.**
- **Do not brake suddenly unless its an emergency.**
- **Do not drive the vehicle in harsh road conditions.**
- **Do not go above 20kmph around curves or turns.**
- **Completely stop the vehicle before shifting from FORWARD to REVERSE and vice versa.**

***Note:** Anti-roll back feature: If the vehicle come to a stop on a slope, the auto parking brake engages and prevents the vehicle from rolling down hill.*

STOPPING THE VEHICLE

This vehicle has regenerative braking so the vehicle can be driven with only one pedal except for sudden stops, where the brake pedal is to be used.

To stop the vehicle, release the accelerator and press the brake till the vehicle comes to a complete stop.

When the vehicle comes to a stop, the auto parking brake will engage. Pressing the accelerator again will release it.

***Note:** If the direction switch is shifted into neutral position, power will cut off and motor will stop running.*

PARKING AND LEAVING THE VEHICLE

After driving park the vehicle. make sure all the lights are off and turn the key switch to OFF.

Connect the charging port to the vehicle, so the vehicle can be charged fully to be used the next time (**Refer chapter on Charging**).

Store the vehicle in a covered place or use the vehicle cover to protect the vehicle from the elements (**Refer chapter on Storage**).

BATTERIES

Naveo has two types of batteries, lithium-ion and lead acid. To find out which one your vehicle has, check the name plate.

Depending upon the type of battery, its usage and maintenance differs.

The batteries are all located under the seat and can be accessed by removing the seat. The seat is not fastened to the seat cowl but rather secured using catches. Thereby it can be easily removed by holding on the sides and lifting it.

⚠ DANGER

- **Do not expose a battery to temperatures above 60 °C (140 °F).**
- **In case of eye contact with fluid, do not rub eyes. Immediately flush eyes thoroughly with water for at least 15 minutes, lifting upper and lower lids, until no evidence of the fluid remains. Seek medical attention.**
- **In case of internal ingestion of battery fluid drink large quantities of milk or water followed with milk of magnesia or vegetable oil. Seek medical attention.**

⚠ WARNING

- **Do not disassemble, crush, or puncture a battery.**
- **Do not short the external contacts on a battery.**
- **Do not dispose of a battery in fire or water.**
- **Keep the battery away from children.**
- **Avoid exposing the battery to excessive shock or vibration.**
- **Do not use a damaged battery.**
- **If a battery pack has leaking fluids, do not touch any fluids. Dispose of a leaking battery pack.**
- **Use insulated tools when working near batteries or electrical connections. Use extreme caution to avoid shorting of components or wiring.**
- **If the battery becomes bulged, dispose of it and get a new battery.**

It is recommended to not let the batteries be fully drained before recharging. Try to charge them before they go less than 20%.

BATTERY PACK - LEAD-ACID

The lead acid battery pack consists of 6 batteries. Their connections are shown in a decal inside the seat cowl in the charging row (**Refer chapter on Decal identification**).

In the passenger variants the battery pack is separated and placed in the first two rows,

- In the 2-Meter passenger vehicles 4 batteries are in the first row and 2 in second row.
- In the 3-Meter passenger vehicles it is 3 per row.

In the cargo variants all the batteries are placed in the same battery tray under the driver's row.

The battery pack in the first row of 2-Meter vehicle is shown in **Figure 6**.

To access the second row of batteries in 2-Meter passenger vehicle, you have to remove the battery cover. If there is a third row of seat above the battery cover like in **Figure 20**, remove the third row seat and then remove the cover to access the battery pack.



Figure 20: 2-Meter 3-Row

BATTERY PACK - LITHIUM-ION

The lithium-ion batteries of all capacities are enclosed in a single battery pack. They are all located under the driver's row except for the 3-Meter passenger variants.

WARNING

- **Do not open the battery pack.**
- **Lithium-ion batteries are highly flammable, so don't expose them to temperature and generally store them in cool and ventilated areas.**

BATTERY MAINTENANCE - LEAD-ACID

The most important aspect of maintenance in lead-acid batteries is maintaining electrolyte level and if the level is low, it must be refilled with distilled water.

Check the level of electrolyte in all batteries every two weeks. All six batteries must be checked and refilled.

Note: Use only distilled water to refill the batteries.

Battery life can be improved by the following methods

- Charging 100% every time.
- When not in use battery should always be fully charged.
- Clean the battery with a wet cloth once a week. Batteries should be kept clean and free of dirt and corrosion at all times.
- Do not replace batteries individually in a battery pack.
- Vent caps should be correctly installed and tight at all times.

STEPS TO REFILL ELECTROLYTE LEVEL IN LEAD-ACID BATTERIES

1. Remove the seat or battery cover and place it in a safe place.
2. Make sure the battery is clean, if not clean the battery.
3. Open the vent cap (**Figure 21**), visually check the liquid level, if its low proceed to the next step.
4. Take distilled water and gently pour it into the vent using a funnel until its full (**Figure 22**).
5. Clean any that have been spilled and close the vent cap tightly.
6. Repeat these steps for all the vents of all batteries.

BATTERY MAINTENANCE - LITHIUM-ION

Lithium-ion batteries are low maintenance. Their battery life can be improved using the following methods.

- Use partial discharge cycles.
- Avoid charging to a 100%.
- Avoid very deep discharges.
- Limit battery temperature.

Consider replacing the battery with a new one if you note either of the following conditions:

- The battery run time drops below about 80% of the original run time.
- The battery charge time increases significantly.

Before storage, charge the battery to 50% and repeat it every 6 months.



vent cap

Figure 21

Figure 22

RECYCLING BATTERIES

Both types of batteries have toxic chemicals that can be harmful to the environment hence they cannot be disposed as municipal waste and must be collected separately. Responsibility for environmental protection must be shared, not only by the manufacturers of the batteries but by people who use the batteries as well. Please contact your Naveo dealer for information on how to properly recycle your batteries. If the below signs are on the battery, do not dispose of it in the regular garbage and recycle it.



CHARGING

Naveo has an onboard charger reducing the off board unit to just the cable, connector and plug (**Figure 23**). The charger differs according to the battery type and its capacity but the receptacle remain the same. The charger is located under the seat in the row that has the charging port (**Figures 6&7**).

Each type of battery must be charged differently to maintain its life (**Refer chapter on Batteries**). The vehicle can be charged in any normal power outlet.

STEPS TO CHARGE THE VEHICLE

1. Park the vehicle next to a power outlet in a well ventilated area.
2. Connect the plug to an outlet and the connector to the charging port.
3. Turn on the power and a red light will blink in the charging indicator.
4. When the battery is fully charged the indicator will have a constant green; after this turn off the power and remove the receptacle.

Use both hands to insert and remove the connector (**Figure 24&25**).

⚠WARNING

- **The EV must be in clean and good ventilated area while charging.**
- **The vehicle should not be covered while charging.**
- **Do not charge the vehicle immediately if it has been running continuously for more than one hour, ensure a rest of minimum 30 mins allowing the battery to cool down.**
- **Ensure proper plug in of the connector before switch ON.**
- **Do not overcharge the vehicle. Switch off the charger when battery is full.**
- **Do not expose to rain or liquid. Keep the charger dry.**
- **Have worn, cut or damaged power cords or wires replaced immediately.**
- **Do no cover the charger cooling fins. The fins dissipate heat and protect the charger from overheating.**

Note: The Charger socket is located in the second row only in the 3-Meter passenger versions.

CAUTION

- **On all vehicles, turn off all accessories before charging batteries.**
- **The charger should not be removed and any repairs on the charger should be done only by the Roots service team.**
- **Key must be OFF while charging.**

Read the safety warnings and instructions found on the side of the charger (Refer chapter on Decal identification).



Figure 24: Correct way to insert and remove the connector



Figure 25: Wrong way to remove the connector



Figure 23: Off-board charging unit

SEATING

The recommended seating are as follows (no. of people include the driver)

- 2 Metre chassis with 2 rows should seat only 5 passengers (only three in the second row).
- 2 Metre chassis with 3 rows should seat only 6 passengers (only two per row).

⚠ CAUTION

- **Do not attempt to seat 8 people in 3 rows in the 2 metre variant instead use the 3 metre 3 rows version.**

Note: The 2 metre passenger versions are designed for comfort which limits 2 people to a row unlike the 3 metre versions.

- 3 Metre chassis with 3 rows should seat only 8 (only three per row except driver row).
- 3 Metre chassis with 4 rows should seat only 11 (only three per row except driver row).
- Cargo variants with only one row of seating should seat driver plus one.

⚠ WARNING

- **Do not sit in the cargo bay.**
- **Do not sit on top of people.**
- **Sit only on the seats and not anywhere else on the vehicle.**

Note: Following the recommended seating will ensure comfort and maximum life of the vehicle.

WHEELS

The Naveo has alloy wheels and tubeless radial tyres (Refer chapter on Technical specifications).

⚠ WARNING

- **Do not drive with a worn out tyre.**
- **Make sure the vehicle is OFF and key removed before removing the wheels to prevent it from accidentally moving and causing severe injury.**
- **Make sure the wheel nuts are always tightened after changing a tyre.**
- **Do not drive with tyres that have less than 1.2mm tread depth.**

CHANGING TYRES

1. Loosen the wheel nuts.
2. Lift the vehicle using a jack.
3. Remove the wheel nuts and Replace the wheel.
4. Put the wheel nuts back on and release the jack.
5. Tighten the wheel nuts..

All 3-Meter variants have the same jack locations as do all 2-Meter variants (**Figure 26**).

Note: Loosen and tighten the lug nuts in a cross pattern.

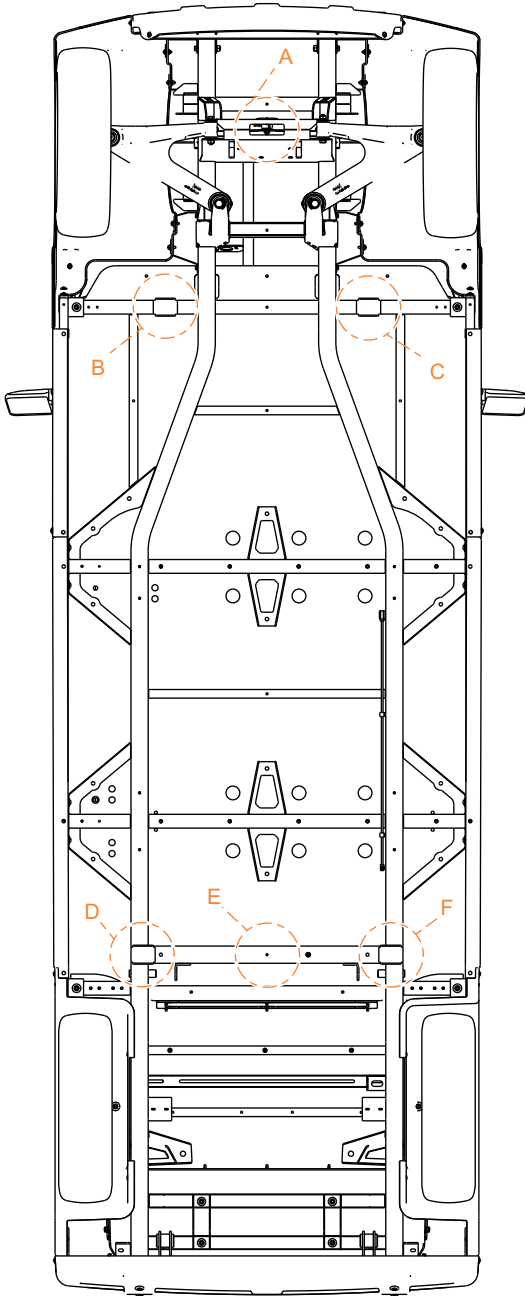
⚠ CAUTION

- **Air pressure should be checked when the tyres are cold you will get an incorrect reading.**
- **Never over-inflate or under-inflate the tyres.**

TYRE INSPECTION

Inspect your tyres periodically by performing the following checks

- Check that the depth of the tyre tread; to help you to check this, the tyres have moulded-in tread wear indicators in the grooves (**Figure 27**). When the tread height is the same as this indicator, the remaining depth of the tread is 1.6mm and the tyres should be replaced.



A - Front jack point
E - Rear jack point
B,C,D,F - Individual jack points for wheels

Figure 26: Jack locations

- Measure the air pressure with a tyre gauge. Adjust pressure if necessary.
- Check for abnormal wears, cracks and damage. Any tyres with cracks or other damage should be replaced. If your tyres show abnormal tyre wear contact Roots service.
- Check for loose lug nuts.
- Check that there are no nails, stones or other objects sticking into the tyres.

If the tyres are showing uneven tyre wear; check and see if all the tyres have the correct tyre pressure, if not set it. Check and see if the alignment of wheels are proper, if not fix it. If the issue is still not fixed contact Roots service. For recommended tyre pressure and toe-in refer **chapter on Technical specifications**.



Figure 27: Tyre wear indicator

BRAKING

The Naveo has an **automatic parking brake**. It eliminates the need to have a switch or lever to manually apply the parking brake.

The auto parking brake is applied in three seconds of the vehicle coming to a complete stop. Pressing the accelerator releases the parking brake and allows the vehicle to move.

The auto parking brake will be engaged at all times even when the vehicle is OFF. The parking brake will be disengaged only when electricity is supplied to it. This can be done two ways; one, pressing the accelerator pedal and two, selecting the TOW mode in the TOW/RUN switch.

The Naveo also has a **regenerative braking system**, which converts the excess kinetic energy wasted through braking into battery charge by using the motor as a generator. This acts as its own braking without the need for an external force to stop the wheels.

When the accelerator is let go, the vehicle automatically goes into this regenerative mode. Therefore the vehicle can be driven entirely with only the accelerator pedal except for sudden emergency stops. It also increases the range of the vehicle since the battery is charged every time braking occurs.

BRAKE MAINTENANCE

The brakes don't need any maintenance except topping of the brake oil in the reservoir if need be. The reservoir tank is located under the dashboard storage **(Figure 29)**. The grommet can be removed to access it **(Figure 28)**.

Periodically check the brake oil level, the brake oil level should be between the maximum and minimum lines. If the fluid level is below the minimum line, top it up with only DOT-3 brake oil.

Remove the brake-oil grommet to access the reservoir tank, open the cap and pour the brake oil into it.

***Note:** Low brake oil level will indicated via a tell tale in the instrument cluster (Refer Controls and indicators).*

CAUTION

- **Do not fill above Maximum level.**
- **Use only DOT-3 brake oil.**



Figure 28



Figure 29

ELECTRONICS

The inside of the controller box is shown in **Figure 30**. It contains the controller, DC-DC convertor, relays and fuses. The location of the controller box on the vehicle is shown in **Figure 9**.

FUSES & RELAYS

There are a total of 9 fuses and 4 Relays in the vehicle. These fuses have to be inspected once every three months and be replaced if necessary.

1. F1-Main Controller
2. F2-Inline supply
3. F3-12V supply
4. F4-Horn
5. F5-Headlight
6. F6-Brake supply
7. F7-Flasher
8. F8-Inline DC-DC convertor
9. R1-Horn
10. R2-Headlight
11. R3-DC-DC convertor
12. Flasher
13. Inline audio system fuse

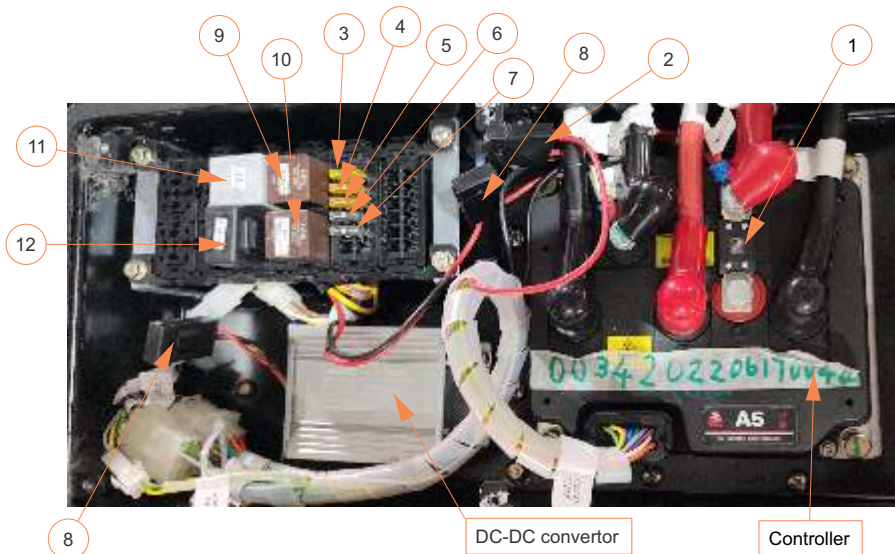


Figure 30: Controller box

There is a decal on the cover of this controller box which has a pictographic representation of the fuse and relay layout (**Refer chapter on Decal identification**).

TOWING

STEPS TO TOW THE VEHICLE,

1. Turn the key switch to ON and direction switch to neutral.
2. Remove the vehicle of all cargo and people.
3. Then set the TOW/RUN switch in TOW mode (the vehicle will not move when pushed or pulled in RUN mode since the parking brake will be engaged).
4. Fix a tow bar or attach a rope to the tow points of both vehicles. Given in figure
5. Gently tow the vehicle.

WARNING

- **Forcing the vehicle to move in Run mode will damage it.**
- **Do not allow people in the vehicle to be towed.**
- **Only tow the vehicle from the given tow points.**
- **Do not go more than 10 kmph while towing.**
- **Do not tow on public roads.**
- **Be gentle while towing, avoid sudden starts, stops and tight turns.**

Note: These instructions are for towing a Naveo in-campus. For transporting on public roads, refer transporting on a lorry or an trailer.

Leaving the vehicle in TOW mode will drain the battery.

CLEANING THE VEHICLE

The Roots Naveo vehicles are equipped with hand-washable front and rear bodies. Use only commercially available cleaners with a sponge or soft cloth for normal cleaning. A garden hose at normal residential water pressure is adequate.

The seats of the vehicle will last longer with proper cleaning. Occasionally remove loose dust from the floor, plastic parts and seat using a vacuum or a soft brush. For heavy soiling, difficult stains, scratches, blemishes or other body damage contact your service representative.

Whenever possible park or store the vehicle inside a shed or a garage. If it is to be stored outside, park it under a shady area or use a body cover.

Commercial care car chemicals like wash, dressers, scratch removers, wax and polish can be used.

PROCEDURE TO CLEAN THE VEHICLE

1. Wash dirt off with a wet sponge and plenty of water.
2. Use a hose with mild pressure to clean the dirty underbody of the car.
3. Clean the vehicle thoroughly using a mild soap or any car shampoo mixed with clean, lukewarm water.
4. Use a micro fibre cloth to clean the windshield to avoid scratches.
5. Wipe down the vehicle with a dry cloth to prevent water marks.
6. Use car wax or polish if needed (non-abrasive).

CAUTION

- **Do not pressure or steam wash the vehicle. It will result in moisture entering the controller box which will result in water damage and subsequent failure.**
- **Do not use strong household chemicals on painted parts.**
- **Do not use benzene, thinner, petrol, diesel or any similar chemical to clean.**
- **Battery acid, fertilizers, tree sap, tar, paint, squashed insects or chewing gum should be removed immediately.**

- **The accumulation of sand, dirt and water on the underside of the body will accelerate corrosion.**

Clean the batteries with only a wet cloth and do not use and detergent or cleaning solution.

STORAGE

The vehicle can be stored as it is without disassembly. Covering the vehicle during storage is recommended.

The controller takes a trickle charge even when the key switch is in OFF so the battery must be charged every 15 days to improve battery life.

CAUTION

- **Failing to charge the battery every 15 days will keep reducing its life until complete failure.**
- **Store it in cool ventilated area.**

For **long time storage**, charge the batteries and unplug them (**Refer Batteries**). For lead-acid batteries it is recommended to charge them to 100% once every 3 months. For li-ion it is recommended to charge them to 50% every 6 months. Following this will improve their life.

TRANSPORTING ON A TRUCK OR A TRAILER

The vehicle should be tied securely to the back of the truck or trailer.

The TOW/RUN switch should be in RUN mode so the parking brake will be engaged. The key switch should be in the OFF position and the direction switch in NEUTRAL.

WARNING

- **Do not allow people in the back of the truck/trailer or in the vehicle being towed.**
- **Do not tow the vehicle in public roads instead carry it in the back of a lorry.**
- **Avoid sudden starts, stops and tight turns when towing.**

TROUBLESHOOTING CHART

The section describes the various troubleshooting parameters for your vehicle.

PROBLEM	CAUSE	REMEDY
Vehicle is not moving when the accelerator is pressed.	Improper vehicle startup sequence. Direction switch must be in neutral before key ON.	Apply the correct startup sequence (Refer driving instructions).
	Brake switch ON due to brake pedal being jammed.	Manually bring the brake pedal to full release.
	TOW/RUN is in TOW mode.	Put it in RUN mode.
	Charger is still connected.	Remove the connector.
	Vehicle is overloaded.	Reduce the number of people and/or cargo.
Unusual noise or vibration.	Loose nuts or bolts, missing washer.	Tighten the nuts and bolts. Place washers.*
	Brake pad wear.	Inspect and replace.*
	Any object stuck between brake pads and disk.	Inspect and clean.*
	Rust formed on disc.	Inspect and clean.
	Foam tapes between the frame and chassis are damaged or missing.	Inspect and replace.*
	Electrical connector behind dashboard become unrestrained and are hitting the dashboard.	Fasten them securely.*
	Body parts are mounted with high tension.	Remove them and reassemble.*
Vehicle is not going up a slope.	Vehicle is overloaded.	Reduce the number of people and/or cargo.

PROBLEM	CAUSE	REMEDY
Indicator is not auto cancelling.	Loosening of screw in the Combination switch.	Tighten it.*
Steering play.	Loosening of bolts or nuts in steering assembly.	Tighten them.*

**To be done by Roots service technician.*

PERIODIC MAINTENANCE SCHEDULE

INTERVAL	PART	SERVICE
Daily service	Daily safety checklist	Refer Daily safety checklist on Page 17.
	Performance inspection	Refer Performance inspection on Page 18.
	Batteries	Charge batteries
Weekly or every 300kms	Wheel	Check tyre pressure and set it to correct value if necessary
	Batteries	Clean with a wet cloth. Use hot water if possible.
Every two weeks	Batteries	Check electrolyte level. Refill if required. Refer chapter on Batteries.
Three Months or 2000 kms	Suspension	Clean shock absorbers and springs.
	Knuckle	Knuckle casting nut adjustments.
	Controller	Check the fuses for signs of overheating or blown fuses. Replace if necessary.
5000 kms	Brakes	Brake pad inspection, replace if necessary.
		Brake oil inspection, refill if necessary.
Semiannual or 10,00kms	Wheel	Tyre thread depth check, replace if necessary. Refer chapter on Wheels.

INTERVAL	PART	SERVICE
Annual or 15,000	Wheel	Alignment check, adjust if necessary. Refer Technical specifications for tow-in.
Two year or 30,000	Brakes	Replace brake oil.

SCHEDULED SERVICE VISITS

1	30 days or 1000 kms
2	90 days or 4000 kms
3	180days or 8000 kms
4	300 days or 12000 kms

TECHNICAL SPECIFICATIONS

SPECIFICATIONS	RT-G-A4	RT-G-A4+2	RT-G-A4+C	RT-G-A8	RT-G-A8+3	RT-G-A8+C
POWER TRAIN						
Transaxle: Single speed direct drive motor	•	•	•	•	•	•
Drive motor: 5kW 3-phase AC induction motor	•	•	•	•	•	•
Controller: 48V - 350A	•	•	•	•	•	•
BODY/CHASSIS						
Frame/Chassis: Steel	•	•	•	•	•	•
Body: ABS	•	•	•	•	•	•
Body finish: Gloss plain	•	•	•	•	•	•
Cargo box: Steel			•			•
Rims: 12" Aluminium alloy rims	•	•	•	•	•	•
STEERING/SUSPENSION/BRAKES						
Steering: Rack and pinion manual steering box	•	•	•	•	•	•
Front suspension: Double wishbone dual rate mono shock	•	•	•	•	•	•
Rear suspension: Mono leaf with mono shock	•	•	•	•	•	•
Front brakes: Hydraulic disk brakes	•	•	•	•	•	•
Rear brakes: Hydraulic drum brakes, self adjusting carrier	•	•	•	•	•	•

SPECIFICATIONS	RT-G-A4	RT-G-A4+2	RT-G-A4+C	RT-G-A8	RT-G-A8+3	RT-G-A8+C
ELECTRONICS						
Instrument cluster	•	•	•	•	•	•
USB port	•	•	•	•	•	•
Head-lamps: LED	•	•	•	•	•	•
Tail-lamps:	•	•	•	•	•	•
Indicator lights	•	•	•	•	•	•
GENERAL						
Turning radius	3.5m			5m		
Max speed	25kmph					
Gradeability	20%					
WHEEL						
Tyre pressure: Front and rear	30 and 35psi					
Toe-in	3mm±1mm					
Wheel nut tightening torque	85Nm					
Front tyre	4ply	4ply	4ply	6ply	6ply	6ply
Rear tyre	4ply	4ply	4ply	6ply	6ply	6ply
LIQUID CAPACITIES						
Brake oil: DOT-3	400ml					
Transmission oil: 10W-30	650ml					

COMMISSIONING CHECK LIST

The items on the below checklist must be carried out before delivering the Naveo to the customer.

Sl.No		Task	Tick upon completion
1	General	Check the vehicle thoroughly for any damages, breakages and leakages. Rectify, if necessary.	
2		Wash the vehicle.	
3		Check and tighten if necessary, all nuts and bolts.	
4		Ensure that there are no unusual sounds like rattling or squeaking when the vehicle runs at normal speeds.	
5		All logos should be present and in the right position.	
6		Ensure all tools, accessories and documents are received with the vehicle.	
7		Test drive & conduct all necessary functional test & load test.	
8		Instruction manual handover to customer & explained. [Warranty book, owners manual, original invoice].	
9		Ensure there is no transit damage in the vehicle.	
10	Batteries	For lead acid batteries, check electrolyte level and top up with distilled water if necessary.	
11		For lead acid batteries check and ensure the tightness of interlink cables.	
12		Ensure the batteries are at full charge.	
13	Wheels	Check and set the correct tyre pressure.	

Sl.No		Task	Tick upon completion
14	Brakes	Check brake and accelerator pedals.	
15		Ensure the parking brake works properly.	
16		Check & ensure the aggressive stop test on slope & downhill areas with load condition.	
17		Check brake oil level and top up if necessary.	
18	Transmission	Check transmission oil level and top up if necessary.	
19	Steering	Check the steering wheel for tightness and/or free play.	
20		Check the alignment of the vehicle, fix if necessary.	
21	Charger	Check battery charger functions.	
22		Suggest an MCB cut-off switch [32A] to avoid the voltage interruptions.	
23		If Gen-set applications please advise to use with proper 2KVA stabilizer to avoid the voltage fluctuations.	
24	Electronics	Check all lights, switches and the instrument cluster.	
25		Check and ensure the TOW/RUN switch does its appropriate function.	
26	Operational training with safety procedures has been provided to operator / supervisor.		

Name of the Operator / Supervisor trained:

LIMITED WARRANTY TERMS AND CONDITIONS

ROOTS Industries India Ltd., hereby warrants that any new NAVEO Electric Vehicle purchased from Roots or an authorised dealer in India will be free from defects in material and workmanship for minimum One Year from date of purchase.

Exclusions from this warranty shall not apply to failure due to the following conditions:

1. Abnormal strain, neglect or abuse, including lack of proper maintenance such as preventive maintenance checks and use contrary to the owner's manual's instructions.
2. Accident or collision damage.
3. Improper installation, installation of parts or accessories that are not original equipment.
4. Fading, rust or deterioration due to exposure or ordinary wear and tear.
5. Any modifications or alterations that affect the vehicle's condition, operation, performance or durability, or which makes the vehicle serve a purpose other than intended.
6. Damage due to improper transportation and maintaining proper tyre pressure and alignment and loose wire connections as outlined in the owner's manual.
7. Improper charging of a vehicle due to the use of battery charger model not approved by Roots for use with the vehicle.
8. Abuse such as over charging, under charging, improper fluid levels, loose wiring fasteners or rusted and corroded hardwares.
9. Acts of god, i.e. lightning, hail damage, flooding, fire, etc. This limited warranty does not cover any parts replaced due to normal wear or routine maintenance; including oil, bearings, brake shoes and tyre wear.

This manual tries to be as sound and elaborate as possible in literal and figurative description as well as technical description on the basis of existent data. At the same time, our company reserves the right to alter the content of this manual and this manual is subject to change without prior notice; in addition, our company has the final say on the interpretation of this manual.

WARRANTY AND VEHICLE IDENTIFICATION

Sl.No	Vehicle identification details	Spec/Model	Serial No
1	CHASSIS PLATE NO		
2	BATTERY		
3	CONTROLLER ASSEMBLY		
4	DRIVE MOTOR		
5	CHARGER		
Employee Name, Signature & date:		Customer Name, Signature & date:	

CONTACT INFORMATION

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