

MS-260 POWERED LITHIUM



<p>OPERATOR AND MAINTENANCE MANUAL SPARE PARTS LISTS INCLUDED</p>
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Printed in Canada

MOTREC INTERNATIONAL LIMITED WARRANTY



EFFECTIVE ON ORDERS RECEIVED STARTING JANUARY 1st.

3-YEAR LIMITED WARRANTY ON AC PRODUCTS, STOCK CHASER AND TRAILERS 2-YEAR LIMITED WARRANTY ON DC PRODUCTS AND OTHER MOTREC PRODUCTS

Motrec warrants to the original purchaser that its products are free from defects in parts and workmanship.

STARTING DATE OF WARRANTY. The present terms and conditions of the Motrec Limited Warranty apply to new Motrec products only and do not replace any pre-existing warranty. The warranty period is effective from the date the purchaser registers the product, provided it is registered within thirty (30) days of reception and in conformity with Motrec's registration process.

REGISTRATION. IMPORTANT: AS A PURCHASER OF A MOTREC PRODUCT, IT IS IMPORTANT THAT YOUR PRODUCT BE REGISTERED UNDER YOUR NAME AS REQUIRED BY MOTREC'S PRODUCT REGISTRATION PROCEDURE. PLEASE ASK YOUR MOTREC DEALER TO REGISTER YOUR PRODUCT. MOTREC'S LIMITED WARRANTY WILL BECOME EFFECTIVE AT THE TIME OF PRODUCT REGISTRATION. IF YOU FAIL TO REGISTER YOUR PRODUCT WITHIN THE THIRTY (30) DAYS, THE WARRANTY WILL NOT BE APPLICABLE. IF YOU PURCHASED THE PRODUCT DIRECTLY FROM MOTREC AND NOT FROM A MOTREC DEALER, YOU MUST REGISTER YOUR PRODUCT FOLLOWING THE INSTRUCTIONS BELOW (CLAUSE 3)

<https://www.motrec.com/registration/>

DEFECTS. Subject to the terms and conditions described below, parts, components or accessories installed on the product by Motrec which fail under normal usage within the warranty period, and that are proven to be defective, will be repaired or replaced without charge for parts or labor unless stated otherwise herein. This is Motrec's sole liability under this Warranty. The warranty excludes items described in (Clause 6). Motrec reserves the right to require that all parts or components claimed to be defective be returned for inspection and verification of defect. The purchaser is responsible for any and all shipping fees of any and all parts or components that it alleges to be defective. In the event the part is still under warranty and confirmed defective after inspection by Motrec, freight would be credited.

WARRANTY SERVICES. All warranty services must be rendered by authorized Motrec distributors and approved in writing by Motrec prior to initiating any repairs or adjustments. Motrec parts must also be used when performing the warranty otherwise the warranty will be voided. All approved warranty services will be paid for based on standard rates established by Motrec. Rather than replace or repair parts or components, Motrec may, at its discretion, replace the product or refund a prorated amount of its purchase price (based on service time, wear and tear) upon return of the defective product.

AUTHORIZATION PROCESS. No product shall be returned to Motrec without its prior authorization. All warranty claims must be disclosed to Motrec or its authorized distributor as soon as the purchaser is aware of a suspected defect or any event susceptible to give rise to a claim under the Motrec Limited Warranty. All claims must be processed through an authorized Motrec distributor using the warranty claim procedure approved by Motrec.

THE ABOVE TERMS AND CONDITIONS REPRESENT THE ONLY REPRESENTATIONS MADE BY MOTREC IN RELATION TO ITS PRODUCTS. MOTREC DOES NOT PROVIDE ANY OTHER PARTICULAR WARRANTY TO THE USER OF ITS PRODUCTS. MOTREC DOES NOT MAKE ANY EXPRESS OR IMPLIED WARRANTIES OR REPRESENTATION WITH RESPECT TO ANY RESULT, PERFORMANCE OR DURABILITY EXPECTED FROM THE USE OF ANY OF ITS PRODUCTS. MOTREC EXCLUDES AND DECLINES ANY OTHER WARRANTY OF SUITABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, WOULD THEY BE PROVIDED BY LAW, BY CONTRACT OR OTHERWISE.

PRODUCT MODIFICATIONS ARE PROHIBITED. Motrec prohibits and disclaims any and all liability for any modification made to the product, including but not limited to, modifications that are susceptible to alter the weight distribution and stability of the product, increase its speed or affect its safety. Such modifications can cause serious personal injury or property damage for which Motrec disclaims and excludes any and all responsibility. It is the purchaser's responsibility to ensure that any technicians servicing the product are properly trained as required by OSHA (Occupational Safety and Health Administration: <https://www.osha.gov/>) and ANSI-B56 (American National Standards Institute: <https://webstore.ansi.org/default.aspx>). Service technicians shall read, understand and follow the instructions in the Motrec Owner's Manual before servicing the product. Only qualified and authorized personnel shall be permitted to maintain, repair, adjust and inspect the product.

TRAINING. It is the purchaser's responsibility to ensure that the driver or any person operating, using, maintaining or handling the product (or its accessories) is properly trained and instructed on the product's safety features and operation, including its stability. Operators shall read, understand and follow the safety and operating instructions in the Motrec Owner's Manual before driving the vehicle. Operators shall not be permitted to operate the product unless a complete and adequate training has been provided by the purchaser. Driving an electrical vehicle constitutes a hazard. The driver is responsible for the control of the product while driving and must always evaluate all unusual or particular situations that he or she may encounter while driving. The driver assumes the inherent hazards related to this activity. Motrec products are designed for off-road use only.

MOTREC INTERNATIONAL LIMITED WARRANTY



EFFECTIVE ON ORDERS RECEIVED STARTING JANUARY 1st.

EXCLUSION OF LIABILITY. Motrec disclaims any liability for incidental or consequential damages, including, but not limited to, personal injury or property damage arising from misuse of the product, lack of maintenance or any defect in the vehicle.

UNDER NO CIRCUMSTANCE WILL MOTREC BE LIABLE FOR ANY DAMAGE, WHETHER DIRECT, INDIRECT OR OTHERWISE, RESULTING FROM THE USE OF ITS PRODUCTS, EVEN IF MOTREC OR ONE OF ITS REPRESENTATIVES WAS AWARE OF THE POSSIBILITY OF SUCH DAMAGE. ANY LIABILITY FOR LATENT DEFECT IS LIMITED TO THE PRICE OF THE PRODUCT.

1. Definitions

“Product”: the complete vehicle manufactured and/or assembled by Motrec, including its parts, components and accessories installed by Motrec. **“Purchaser”:** The party in whose name the product is originally registered at the time of purchase pursuant to the product registration procedure maintained by Motrec at that time, either: (a) the party to whom Motrec sold the product, if that party purchased the product for its own use, or (b) the customer of a Motrec dealer, who bought the product directly from such dealer.

2. Warranty Period

Your Motrec product using the AC technology is covered by the Motrec Limited Warranty for a period of three (3) years or 3,000 hours of use, whichever comes first. This period of three (3) years starts on the date the product is registered, as mentioned hereinabove. This coverage does not apply to wearable parts, normal use or abusive usage of the product.

Your Motrec stock chaser is covered by the Motrec Limited Warranty for a period of three (3) years or 3,000 hours of use, whichever comes first. This period of three (3) years starts on the date the product is registered, as mentioned hereinabove. This coverage does not apply to wearable parts, normal use or abusive usage of the product.

Your Motrec trailer is covered by the Motrec Limited Warranty for a period of three (3) years. This period of three (3) years starts on the date the product is registered, as mentioned hereinabove. This coverage does not apply to wearable parts, normal use or abusive usage of the product.

Your Motrec product using DC or other technology is covered by the Motrec Limited Warranty for a period of two (2) years or 2,000 hours of use, whichever comes first. This period of two (2) years starts on the date the product is registered, as mentioned hereinabove. This coverage does not apply to wearable parts, normal use or abusive usage of the product.

3. Warranty Registration

The warranty registration must be completed within thirty (30) days of purchase of the product. If registration is not completed within this time, the warranty will be voided. If you purchased the product from a Motrec dealer, please make sure the dealer has completed the registration. If you purchased the product directly from Motrec, please make sure to go to this link (<https://www.motrec.com/registration/>) and register your vehicle. In case of registration problems, please contact your Motrec representative.

4. Maintenance

Motrec requires that scheduled maintenance be performed at the times shown in the Owner's Manual (Refer to the "Preventive Maintenance Schedule"). If this scheduled maintenance is not done and the product fails as a result of a failure to properly maintain it, repairs will not be covered under any warranty.

5. Warranty will be void if:

- The product has been modified in any manner not approved in writing by Motrec
- The product has been overloaded beyond its rated capacity
- The product's maximum speed has been increased
- The product's motor controller parameters have been tampered without Motrec's authorization
- The product has been used abusively (including, but not limited to: improper use; twisted, bent, misaligned front or rear axles; any signs of abusive use)
- The product has been involved in an accident
- The product has been transferred to a second owner without Motrec's authorization
- The product has been used in extreme environments (including, but not limited to: freezers, excessive moisture areas, corrosive environments, etc.)
- The product has had its serial number modified or altered
- The product has been repaired with non-Motrec parts without Motrec's authorization
- The preventive maintenance schedule was not followed as specified in the Motrec Owner's Manual

6. The following items are not covered by the Motrec limited warranty:

- Batteries, charger, wheels (which are covered by warranties from manufacturers)
- Internal combustion engines (which are covered by warranties from manufacturers)
- Wearable parts (diodes & fuses, filters & spark plugs, lubricants, seals, switch, horn, tires, wheel bearings, seats, brake pads and shoes)
- Tear and wear resulting from normal use
- Adjustments, including field set-up
- Damage or defects caused by using non-Motrec parts, components or accessories
- Shipping damage caused by the freight carrier
- Shipping fees for warranty parts (if proven not admissible, refer to Defects section)
- Travel fees for technical support and repair

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INSTRUCTIONS

SAFETY WARNINGS FOR OPERATORS

- FAILURE TO OBEY THE FOLLOWING SAFETY RULES MAY RESULT IN SEVERE INJURY.
- It is the responsibility of the owner of this vehicle to train operators to ensure that they understand the operating characteristics of this vehicle, including training in vehicle stability, and obey the following safety rules and guidelines. Owner shall comply with OSHA and ANSI/ITSDF B56.8 & B56.9 Standards for vehicle use, safety rules, operator training and certification. Do not drive this vehicle unless you are a qualified operator.
- Do not drive this vehicle under the influence of drugs or alcohol.
- Do not drive this vehicle on public roads and highways. This vehicle is designed to be driven in buildings.
- The electrical system of this vehicle will make sparks which can ignite inflammable materials. Never use the vehicle in hazardous areas where there are inflammable materials, explosive dust or fumes in the air.
- Have your vehicle inspected regularly by trained personnel, and cease operation if a malfunction occurs.
- Do not open battery compartment to prevent battery explosion, acid splashing, severe damage to eyes or skin.
- Do not open motor compartment. Keep clear from moving, rotating(wheels, sheaves, etc) or lifting parts.
- Never carry more passengers than number allowed for this vehicle. Wait until all occupants are seated and holding on before moving. Always keep all body parts inside vehicle. Keep both hands on steering wheel.
- Do not exceed the vehicle cargo load capacity and gross trailing weight capacity, rated for flat hard even surface. Different operating conditions such as loose terrain or ramps reduce vehicle capacity.
- Avoid loose, unbalanced or top-heavy loads to keep a good stability and prevent overturn. Do not load cargo that can fall off the vehicle. Do not carry cargo that is longer, wider or higher than this vehicle.
- Always depress slowly the accelerator for smooth acceleration. Avoid stunt driving or horseplay.
- Avoid sharp turns, always slow down before turning, to prevent vehicle overturn or trailer jack knife. Vehicle is more sensitive to overturn and jack knife when traveling on inclines or when carrying a heavy load.
- Always drive straight up and down the face of an incline, never across the face, to prevent overturn and trailer jack knife. Drive slower and start applying brakes sooner on inclines to adjust for longer stopping distance.
- Use extra care and drive slowly in reverse, in congested areas or on wet or slippery ground.
- Keep to the right under normal conditions. Maintain a safe distance from all objects.
- Slow down and sound the horn when approaching a corner or other blind intersections.
- Before leaving the vehicle, park on a level ground flat surface, turn off all switches, set the forward/reverse switch to neutral, set the parking brake, remove the key. Do not park the vehicle on an incline.
- Before battery charging, park the vehicle in a well ventilated area set for. Do not operate it when charging. To interrupt a charging cycle, disconnect the AC plug; disconnecting the DC plug or a battery terminal, or operating the vehicle, could damage the charger and produce a spark, battery explosion and acid splashing.
- Use another driver to steer this vehicle while it is towed. Be sure the driver uses brakes when you slow or stop the towing vehicle. Do not exceed 5 MPH or carry any passenger while towing this vehicle.

OPERATING INSTRUCTIONS

It is the responsibility of the owner of this vehicle to ensure that the operator understands the operating characteristics of this vehicle, and obeys the safety instructions in this manual and ANSI/ITSDF B56.8 & 9 Standards. Do not drive this vehicle unless you are a certified operator as required by OSHA.

BEFORE TURNING ON KEYSWITCH

Set to neutral, check treadle operation, check for visible damage.

AFTER TURNING ON KEYSWITCH

Check safety devices: foot switch, reverse alarm, motion beeper, strobe light, and all other safety devices.

BATTERIES & CHARGER

Never open the battery compartment unless you have received proper training for battery maintenance.

Batteries emit explosive hydrogen gas that can be ignited by a spark or loose terminal. Battery acid causes severe damage to eyes or skin. Flush the contaminated area immediately with water.

Park the vehicle in a well ventilated area for battery charging. Most battery chargers come with an electronic control that starts when the charger is plugged and stop when the battery is fully charged. To interrupt the charging cycle, disconnect the AC-plug, do not disconnect the DC plug.

BATTERY DISCHARGE INDICATOR

The green light moves from right to left as batteries are being discharged. When the green light is at the last left position, the batteries must be recharged. A flashing light warns the operator that further discharging will damage batteries.

EMERGENCY SAFETY DEVICE

The emergency push button or battery disconnect handle, when present, should only be used in case of emergency. Use the key switch for normal ON/OFF control.

KEYSWITCH

Turn the key switch clockwise for on position. Always turn off all switches, set the F/R selector in neutral, remove the key before leaving the vehicle.

LIGHTS

Depress the front portion of the rocker switch to turn on the lights.

HORN

Depress the horn button on the steering column or dash board.

F/R SWITCH

Three positions with neutral at center. Depress the front portion of the rocker switch for forward direction. Depress the rear portion of the rocker switch for reverse direction. Always set the switch to neutral, turn off all switches, remove the key before leaving the vehicle.

LEFT FOOTSWITCH (OPTION) & TREADLE

The treadle is used to control both the speed and brake. It is designed for right foot operation only. Before operation, make sure that you have a stable and safe position, with your left foot positioned on the left side of operator compartment. Depress slowly the front part of the treadle to speed the vehicle up and release it to slow down. Depress the rear part of the treadle with your right heel to stop. The left footswitch must be depressed before the key switch is turn on.

MAINTENANCE

SAFETY WARNINGS FOR SERVICE TECHNICIANS

FAILURE TO OBEY THE FOLLOWING SAFETY RULES MAIN RESULT IN SEVERE INJURY.

Owner shall comply with OSHA and ANSI/ITSDF B56.8 & B56.9 Standards for vehicle maintenance.

Only qualified and authorized personnel shall be permitted to maintain, repair, adjust and inspect carriers, vehicles, tractors, and batteries.

Before any maintenance work, park the vehicle on flat level surface, turn off all switches, remove key, lift wheels off the ground and secure with jack stands of adequate capacity. Don't connect charger.

Keep clear from moving parts such as tires, sheaves and motor.

Follow the maintenance instructions applicable to the type of repair, maintenance, or service.

Always wear a face shield and gloves when working around batteries.

Before opening the battery compartment, disconnect the charger, turn off all switches and remove the key. Batteries emit highly explosive gases which greatly increase when charging; do not disturb connections or produce sparks around batteries to avoid a battery explosion and acid splashing. Battery acid causes severe damage to eyes or skin. Flush contaminated area immediately with water.

Use insulated tools to avoid sparks that can cause battery explosion and acid splashing.

Use two counteracting tools, double-wrench technique, when disconnecting or tightening terminals on the battery and the speed controller to avoid cracking the terminal or battery post welds.

Before cleaning or replacing a battery, charger, speed controller, contactor, relay, diode, or any other component in the power circuit, always disconnect the charger, turn off all switches, remove the key, wear a face shield and gloves, identify battery polarity and disconnect battery leads, discharge the capacitor in the controller with a 10 ohms, 25 W resistor for a few seconds across B+ and B-.

After cleaning, the power must not be reapplied until terminal areas are thoroughly dry.

On EE-Rated vehicles make sure that the control box is sealed, the static strap makes good contact with the ground, the motor is sealed by bands, the cable protectors are properly installed.

Keep cables and wires clear from mechanical and rubbing action. Make sure that cable insulation is free from cutting or visible damage. Make sure that EE-Rated cable protectors are properly installed.

Before replacing a fuse or circuit breaker, identify the cause of failure and repair.

Programmable controllers must be programmed using the parameter settings in this service manual, before connecting the motor, to avoid sudden vehicle movement and accident.

Do not try to increase motor speed by changing parameter settings in the speed controller; it can cause accident and severe damage to the motor.

SEPEX speed controls are protected by a diode in the power circuit to filter inductive loads in the event of a sudden power interrupt. Some speed controllers require a diode to filter inductive loads on the KSI input. Removing the diodes will cause the speed control failure.

Before resuming maintenance operations, inspect safety warnings stickers and replace any if damage is found and part of the text can't be read.

Check decals and labels, see "DECAL AND LABELS" page.

DECALS AND LABELS

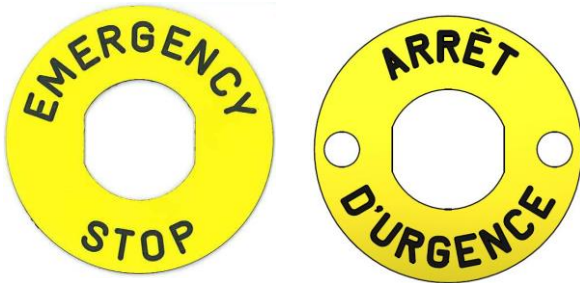
! CAUTION!

The images included in this section depict the decals/markings installed on the vehicle. It is of the utmost importance that these decals/markings remain unaltered and readable. Else, the sticker or the part bearing the marking must be replaced.

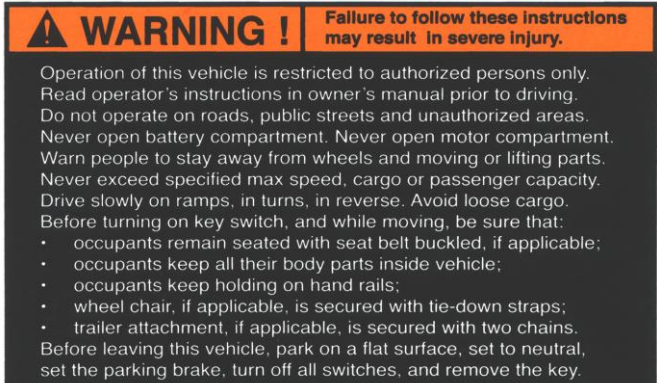
Dashboard security warning label:
5100000002



When an emergency push button is installed, this label is required
#3109000032 (ENGLISH VERSION)
#3109000033 (FRENCH VERSION)



General security warning label:
5100000001



When a disconnect handle is installed, this label is required (located in front of handle):
4800012J.

BATTERY DISCONNECT

PULL →

7248

Respectively from left to right, pictogram shows
FORWARD / REVERSE SWITCH DPDT (3109923010),
HEADLIGHT DPST ROCKER SWITCH (3109922020),
HORN SWITCH (3109922130),
INCHING OR HITCH SWITCH DPDT (3109923111),
HEATER SWITCH DPDT (3109923032),
WIPER SWITCH DPST (3109922031),
ROCKER SWITCH ON/OFF (3109922020).



PREVENTIVE MAINTENANCE SCHEDULE **FOR MODELS WITH AC DIRECT DRIVE**

! WARNING!

Maintenance operations must be made by properly trained service technicians.

- Keep clear from moving parts such as tires, sheaves and motor.
- Batteries contain Sulphur acid that can cause severe burns on skin or eyes.
- When working around batteries, wear acid proof protective equipment: face shield and gloves.
- Use electrically insulated tools to avoid sparks that can cause battery explosion.
- Before any maintenance work, park the vehicle on a flat level surface, turn off all switches, remove the key, lift the wheels off the ground and secure with jack stands of adequate capacity, identify and disconnect battery leads. Don't connect the charger.

<u>DESCRIPTION</u>	<u>PERIOD</u>	<u>ESTIMATED TIME (MINUTES)</u>				<u>CHECK</u>
		<u>SHIFT</u>	<u>500H</u>	<u>1000 H</u>	<u>2000 H</u>	
Check for visible damage		1				
Examine floor around and beneath unit for signs of differential and brake fluid leaks.		1				
Turn steering, check for hard steering, excessive free play, or unusual sound when turning.		1				
Check accelerator for free & smooth movement.		1				
Check reverse alarm, horn, strobe light.		1				
Check brake pedal travel and parking brake for secure hold. Start slowly and check service brake.		1				
Check tire pressure, see pressure rating on tire		1				
Check deadman switch and static strap (min 2`` contact with the floor)		1				
Check warning decal & marking			1			
Clean battery with water			1			
Check master cylinder fluid level (DOT 3)			1			
Check brake pedal travel		1				
Turn front wheels straight, check steering play		1				
Check parking brake, requires 30-40 lbs. force to apply		1				
Check brake lines for leaks		1				
Check drive for leaks		1				
Inspect steering suspension linkages		1				
Inspect the frame for damage		1				
Check pedal & master cylinder linkages for wear		1				

<u>DESCRIPTION</u>	<u>PERIOD</u>	<u>ESTIMATED TIME (MINUTES)</u>				<u>CHECK</u>
		<u>SHIFT</u>	<u>500H</u>	<u>1000 H</u>	<u>2000 H</u>	
Inspect rear wheel bearings for play			3			
Inspect front wheel bearings and kingpins for play			3			
Inspect rear brake lining for wear 1/16" (2 mm) minimum lining thickness.			3			
Check service brake linings and linkages for wear			12			
Check parking brake linings and linkages for wear			5			
Check power circuit connections			5			
Check motor brushes & commutator			5			
Check accelerator pot and switch adjustment -1/8" (3 mm) travel to activate micro-switch; -0 to 50 ohms when micro-switch activated; -4500 to 5500 ohms with pedal down.			10			
Lubricate the vehicle			5			
Change differential oil MOBILUBE 1 SHC 75W-90			15			
Check and tighten all electrical connections				15		
Lubricate motor spline using Monocal GP 1499 from Lubrication Engineers grease				15		
Tighten all nuts and bolts				15		
Clean & repack front Wheel Bearing				15		
Clean & repack Rear Wheel Bearing				90		
Flush the hydraulic brake system (DOT 3), if appl.					60	
Replace differential oil seals & wheel bearings.					90	
<u>TOTAL TIME (MINUTES)</u>		16	69	150	150	

Check & fill batteries (add distilled water to cover plates. Fill to recommended level after batteries have been fully charged.)	According to the battery manufacturer and the battery maintenance section of this manual.
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Date: _____ Hour Meter Reading: _____

Inspected By: _____ Unit Number: _____

Any deficiencies found during inspection must be corrected before the unit is returned to service.

ACCELERATOR

GEAR

- Remove the cover.
- Backlash between gears must be reduced to a minimum by sliding holder; use locktite 262 to lock the three screws.
- When the plastic gear is fully depressed a small backlash must remain between the gears.
- When the plastic gear is released its rear portion must not exceed the pedal case.

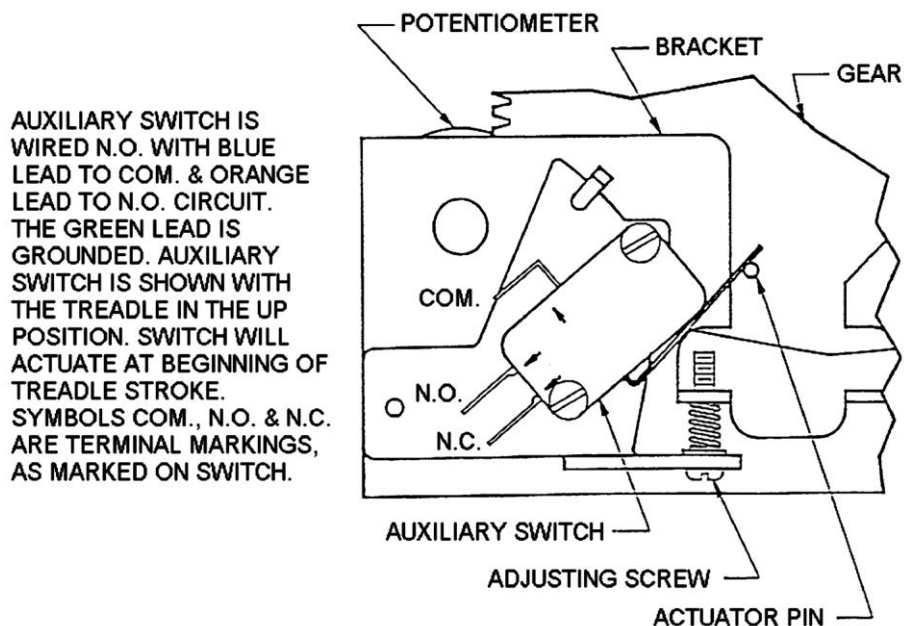
MICRO-SWITCH

The micro-switch must deactivate the on/off solenoid when the accelerator is released; turn the adjusting screw (shown on figure below) to adjust the micro-switch height.

POT

- Remove the terminals 2 and 3 on PMC to measure resistance signal.
- When the micro-switch is activated the signal must be less than 50 ohms. When the front portion of the pedal is fully depressed the signal must be more than 4600 ohms.
- To modify the resistance, turn the adjusting screw to change the micro-switch height (see figure below).

Proceed with the same verifications after the accelerator cover is on and then connect terminals 2 and 3.



FOOT PEDAL FP-6 MAINTENANCE GUIDELINES

FEATURES -

- FP 6 is designed for IP rating 64
 - It can work in dusty atmosphere.
 - It has sealing against splashing and spraying water from all side.
 - We do not recommend low pressure or high pressure washing.

SPECIFICATIONS -

- Pedal high point is pedal free condition
- 1st Microswitch Setting ;
 - a) First micro switch should operate at $3^\circ \pm 1^\circ$ (i.e. between 2° to 4°) from free condition
- Pot setting
 - a) Operate pedal slowly; find reading at which first Microswitch operates.
 - b) Pot resistance reading across pot low and wiper (i.e. black and white) must be within 100Ω to 400Ω.
- 2nd Micro switch setting
 - a) 2nd micro switch should operate between 4600 Ω and *pot max* resistance, across *pot low and wiper* (i.e. black and white)

INSTALLATION PROCEDURE

Terminology - "**Pot low**", "**wiper**" and "**pot high**" are pot terminals. (Black, white and red cables respectively) "**Pot max resistance**" is the resistance value across pot low and pot high. (Black and Red cables)

1. MICRO SWITCHES AND POT SETTING

For Foot Pedal FP-6, use pot low and wiper (black and white) for setting micro switches.

- Set Pedal at free condition.
- Adjust pedal at 3° deflection. Set first micro switch to operate about set deflection.
- Adjust pot resistance from high valve to get (100 to 400Ω) across *pot low and wiper* (i.e. black and white).
- Set 2nd micro switch between 4600 Ω and *pot max* resistance.

CHECK LIST / CAUTION

- Pedal angle must be within 30 +/- 3 degree. Check freeness of pedal.
- Select 'resistance' measurement range in as per requirement on the Multi meter.
Minimum resistance between pot low and wiper must be less than 10 ohms. Pot Max Resistance (between pot low and pot high) must be within 4500 to 5500 ohms.
- Confirm that micro switch settings are as per specifications.
- Measure the resistance between each of the seven wires and the housing of the Foot Pedal. It should measure "Infinity"
- Visually check the insulating sleeves are put around the soldered side of all seven cables, and that the sleeves are firmly in place.

YEARLY MAINTENANCE

- Remove cover of Pedal.
- Apply 3 to 5 drops oil on pedal return spring.
- Apply 2 drops oil in the slot of front bush.
- Do not apply oil on shaft from outside. It is of no use, due to sealing on the shaft.
 - i. Oil Specification
 - ii. 20W Motor Oil (Or 3 in one motor oil)
 - iii. 20 stand for weight of motor oil.
 - iv. W Stands for winter grade.

E-260/262/266 MECHANICAL DRUM BRAKES

REPLACING THE BRAKE SHOES

Raise the vehicle until the rear tires clear the floor and secure with two jack stands;

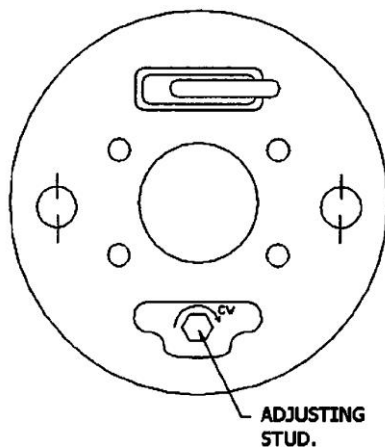
Remove wheels and drums. Check drums for visible damage. Check brake shoes for wear; if brake linings are thicker than 1/16" (2mm), reassemble drums and wheels; if not:

- remove shoes, springs, adjusting screw assembly;
- check brake lever for wear and replace if there is play in the pin;
- disassemble, clean, apply Hi-Temp grease and install the adjusting screw and brake lever;
- install new linings and new springs, install drums and wheels;
- for self-adjusting brakes, pump the brake pedal to automatically adjust the brake shoes;
- adjust pulling rods to have the rear portion of the treadle 1/4 inch lower than floor, fig C
- both pulling rods must have equal length;
- make a road test.

MANUALLY ADJUSTED DRUM BRAKES, Old Design.

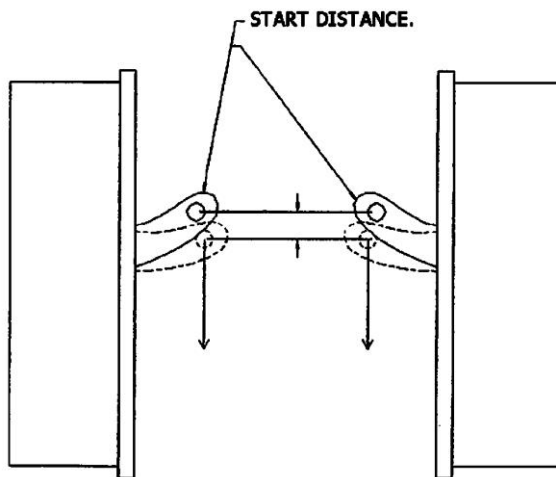
Before adjustment, check the brake levers on the inboard side of the brake backing plates. The brake levers must be equally pulled (see figure A). Adjust pulling rods if necessary. The brake shoes are adjusted by turning the stud (17mm key) located on the inboard side of the brake backing plate (see figure B). Turning the stud clockwise will reduce the drum to shoe clearance. Properly adjusted shoes will equally brake the rear wheels.

Figure B



Brake plate and adjusting screw

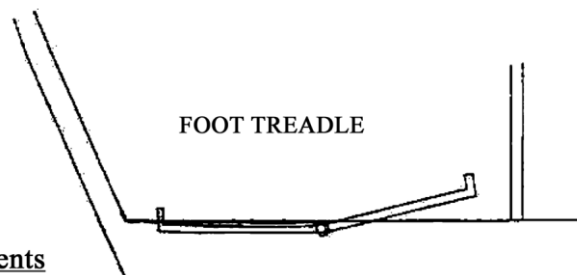
Figure A



Equal distance for brake levers

Figure C

Control treadle adjustments



BATTERY MAINTENANCE

! WARNING !

- It is the responsibility of the owner of this vehicle to ensure that the service technicians are properly trained, read and obey the safety rules and guidelines in this manual (ANSI B56).
- Maintenance operations must be made by properly trained service technicians only.
- Before any maintenance work, park the vehicle on a flat level surface, turn off all the switches, set to neutral, remove the key, lift the wheels off the ground and secure with jack stands of adequate capacity.
- Keep charger disconnected while doing any maintenance work.
- Always wear a face shield and scarf when working around batteries.
- Battery emits highly explosive gases; do not produce sparks to avoid battery explosion and acid splashing. Battery acid causes severe damage to eyes or skin. Flush contaminated area immediately with water.
- Use insulated tools to avoid sparks that can cause battery explosion and acid splashing.
- Use two counteracting tools, double-wrench technique, when disconnecting or tightening battery posts.
- Before cleaning or replacing a battery, discharge the capacitor in the controller with a 10 ohms, 25 W resistor for a few seconds across B+ and B-, identify battery polarity and disconnect battery leads.
- After cleaning, the power must not be reapplied until terminal areas are thoroughly dry.

BATTERY LEADS AND CONNECTORS

Check for loose connections, damaged cables, acid spill, loose terminal posts, quarterly.

BATTERY POST CORROSION

If corrosion is present on battery posts, remove the cable connectors, use a wire brush to remove particles, and then clean them with a cloth that has been moistened with ammonia.

ELECTROLYTE LEVEL

Does not apply to sealed battery.

- Disconnect battery connectors on roll-out or lift-out installations.
- Make sure the battery roll-out tray is provided with stops before rolling out.
- Fill with distilled water.
- Daily charged batteries normally require watering once a week. Under watering leads to a shortened battery life. Over watering leads to battery corrosion. Be careful not to overfill any cell to avoid electrolyte to be forced out while charging.
- Fill each cell to plate level with distilled or de-ionized water, before battery charging. When the battery is charged, the fluid expands and can seep out if overfilled. Refill each cell after full charge, when the fluid has expanded to its maximum level.
- Reinstall battery caps before charging.

BATTERY MOUNTING

A loose battery increases damaging effects of vibrations and is more prone to short out.

BATTERY DISCHARGE LIMIT

Discharging below a 20% state of charge cuts down the battery life and the number of cycles available. At 20% state of charge, specific gravity of 6V battery should be 1180; and 1220 for industrial battery.

CHARGING AREA

- Always charge battery in a well ventilated area set for and approved for charging.
- Never leave a charger connected for more than 20 hours.

FREQUENCY OF CHARGE

- When a battery is discharged to its 20% state of charge, it is best to charge immediately.
- Batteries require a low current equalization charge (min 4 hours) at least every week, to equalize battery cells, improve battery performance and life in number of cycles.
- Never leave a charger connected for more than 20 hours.

STORAGE

- Keep the battery from getting cold, it would lose its capacity.
- Let the battery warm up before charging.
- Charge batteries in “stored” vehicles every month.

DEFECTIVE BATTERY

Check specific gravity of each cell; if a cell is shorted, voltage drop may occur only when there is current.

BATTERY CHARGER

! WARNING !

Always unplug the AC and DC electrical cords before attempting any repairs to the charger.

CHARGER DOES NOT TURN ON:

- Dc cord of portable chargers must be disconnected from batteries after every charge to restart.
- Check dc fuse links;
- Check battery voltage at the battery connector;
- Check ac outlet and cord set;
- Replace electronic control;

RELAY CLOSSES AND TRANSFORMER HUMS BUT AMMETER DOES NOT REGISTER:

- Check dc fuse links;
- Check the continuity of the dc output cord, ammeter, diodes and all connections in the dc circuit;
- Check diodes;
- Check capacitor(rapidly increasing resistance);

SINGLE CHARGER FUSE BLOWS:

- Disconnect and check diodes;

BOTH FUSE LINKS BLOW:

- Check the battery pack and battery connector polarity;
- Disconnect and check diodes.

CHARGER OUTPUT IS LOW:

- Disconnect and check diodes;
- Can be caused by a transformer failure.

AMMETER READS 30 AMPS FOR MORE THAN 30 MINUTES:

- Check the battery pack;

CHARGER DOES NOT TURN OFF:

- Check specific gravity in each battery cell;
- As much as 16 hours may be required to properly charge heavily discharged new or cold batteries;
- Replace electronic control.

AC LINE FUSE OR CIRCUIT BREAKER BLOWS:

- Check ac cordset;
- Check ac line fuse rating;
- Replace electronic control;
- Can be caused by a transformer failure.

ELECTRICAL TROUBLESHOOTING

! WARNING !

Maintenance work must be performed by trained service technicians only.

It is the responsibility of the owner of this vehicle to ensure that the services technicians are properly trained, understand and obey the safety rules and guidelines (ANSI B56).

All service technicians must read and understand the maintenance warning section in this manual.

! WARNING !

Before any maintenance work, park the vehicle on a flat level surface, turn off all switches, remove the key, lift the wheels off the ground, secure with jack stands of adequate capacity, disconnect charger.

Always wear safety glasses.

Batteries emit highly explosive gases that can be ignited by a spark. Before disconnecting a high current terminal, turn off all switches, disconnect battery charger, disconnect batteries.

Keep clear from moving parts such as tires, sheaves and motor.

PMC SELF DIAGNOSTIC

If your PMC comes with a status led, use the flashing code to help troubleshooting.

BATTERY VOLTAGE

Make sure batteries are securely connected. Measure voltage between + and - terminals. We will call this value B+ or full battery voltage.

ACCESSORIES NOT WORKING

- Check the fuses on the batteries and the DC/DC converter.
- Check voltage across + and – terminals on the battery gage; if not B+, check wiring.
- Turn the key switch ON, check voltage between output terminal on the key switch and the - terminal on the battery gage; if not B+, replace the key switch.
- Check voltage across DC/DC converter output terminals; if not 12-Volt, replace the converter.
- Depress the accessory switch, check voltage across accessory terminals. If not 12-Volt, replace the switch. If 12-Volt, replace the accessory.

FORWARD ONLY

On a SEPEX motor control, check the reverse signal input on the controller.

On a series wound motor control, a bad reverse contactor is the most probable cause of the problem.

Switch to reverse and check voltage on the reverse control wire. If not B+, replace the F/R switch. If B+, turn off the key switch, disconnect batteries, disconnect power terminals on the F/R contactors, check the resistance across N.C. power terminals of the reverse contactor. If not 0 ohm, change the reverse contactor. If 0 ohms, switch to forward and check the resistance across the forward N.O. power terminals. If not 0 ohms, change the forward contactor.

REVERSE ONLY

On a SEPEX motor control, check the forward signal input on the controller.

On a series wound motor control, a bad forward contactor is the most probable cause of the problem. Switch to forward and check the voltage on the forward control wire. If not B+, replace the F/R switch. If B+, turn off the key switch, disconnect batteries, disconnect power terminals on the F/R contactors, check the resistance across N.C. power terminals of the forward contactor. If not 0 ohm, change the forward contactor. If 0 ohms, switch to reverse and check the resistance across the reverse N.O. power terminals. If not 0 ohms, change the reverse contactor.

TRAVEL AT REDUCED SPEED

Check batteries.

Turn off all switches and disconnect charger. Wear face shield and gloves. Do not disturb any battery connection to avoid sparks. Check the specific gravity of each cell. Cold batteries, highly discharged batteries or dead cells are the most frequent causes of reduced travel speed.

Check potentiometer.

Turn off the key switch, disconnect potentiometer terminals. Check the resistance between terminals.

Other causes of lower speed:

- dragging brakes;
- cold temperature (higher differential oil viscosity).

INTERMITTENT OPERATION

A bad potentiometer is the most probable cause of the following:

- acceleration is not constant;
- maximum speed is erratic;
- sudden stop after a bump or shock;
- erratic starts, requiring several pedal cycles.

A bad F/R contactor is also a probable cause of the following:

- sudden stop after a bump or shock;
- would not start to move at times.

Erratic starts could also be the cause of a misadjusted potentiometer or micro-switch; the pot signal must be less than 50 ohms when the micro-switch turns on.

PMC has an HPD safety feature that prevents the vehicle from moving if the accelerator pedal is depressed before the key switch is ON and seat switch is activated.

PMC may also have an SRO safety feature that prevents the vehicle from moving if the F/R switch is activated before turning on the key switch and activating the seat switch.

The vehicle stops on a steep and long ramp or while towing a heavy load: the circuit breaker has open to prevent motor overheating and will reset automatically after one minute. The PMC is also equipped with an internal thermal protection that cutback the current until the PMC has cooled down.

NO MOTION

Make sure that the PMC surface is clean and dry; check the terminal areas. Dust Particles or acid contamination, can create current leaks and cause a PMC malfunction.

Check F/R switch

Turn on the key switch and set to forward. Check voltage between the forward terminal and the – terminal on the battery gage, check voltage between the reverse terminal and the – terminal on the battery gage; if both B+, replace the F/R switch.

Check switches and wiring

Disconnect control terminals on the PMC and check all control signals. If a switch pin does not read B+, check wiring or replace the switch.

Check potentiometer

Turn the key switch to OFF, disconnect potentiometer terminals. Check the resistance across terminals: if not within the recommended limits, adjust or replace the potentiometer. Check for shorts between potentiometer wires and vehicle frame; resistance should read at least 1 megohm.

Check main contactor or solenoid

Check voltage across power terminals; if not B+, check circuit breaker or replace the solenoid.

Turn to on the key switch and activate the seat switch. Check voltage across the coil terminals; if not B+, check wiring and interlock switches. Check resistance across power terminals; if not 0 ohms, replace the solenoid.

Check circuit breaker and SEPEX DIODE

Before replacing the circuit breaker, check for shorts in the power circuit and check the SEPEX diode in the power circuit using a diode tester. If no such instrument is at hand, use an ohmmeter: the reading should be weak in one direction and strong in the other way.

Check the resistance across the circuit breaker. If not 0 ohms, replace the circuit breaker.

Check PMC

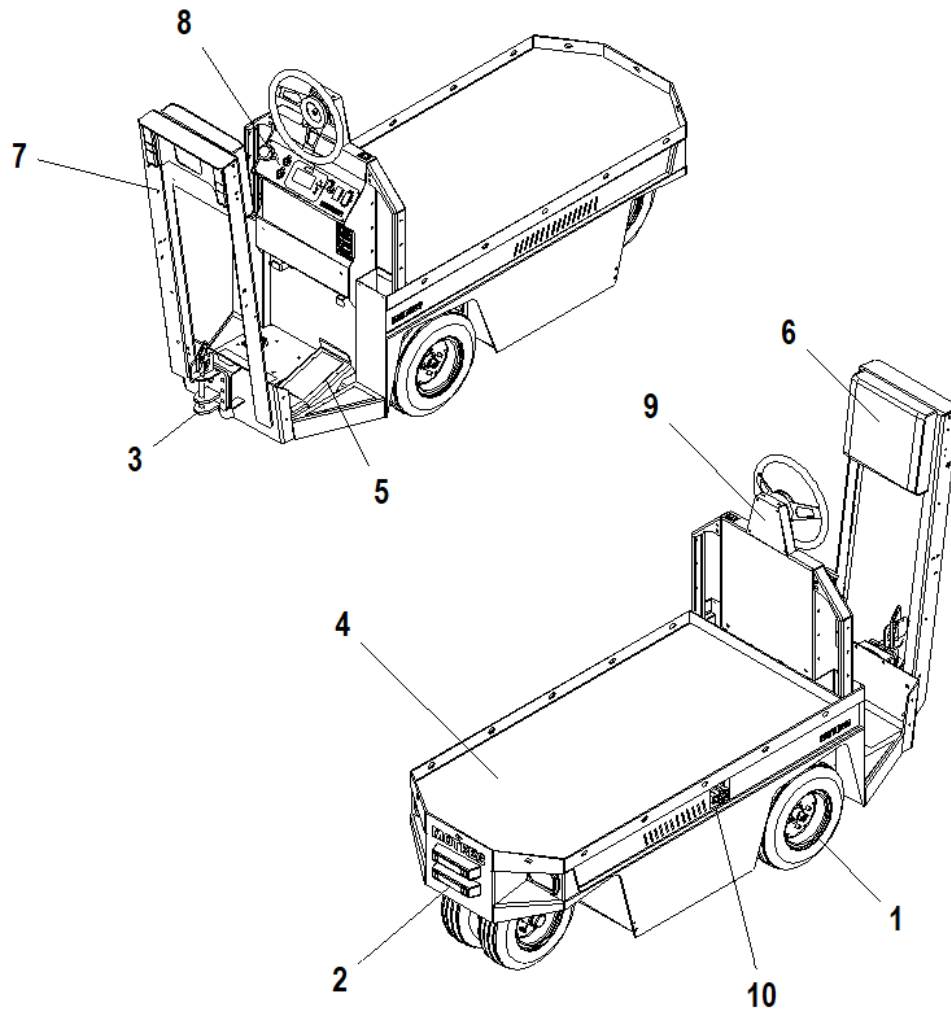
First disconnect battery B+ and B-, then PMC B+ and M-. Check the internal diode between B+ and M- terminals using a diode tester. If no such instrument is at hand, use an ohmmeter: the reading should be weak in one direction and strong in the other way. If the internal diode is defective, the PMC must be replaced.

Check the Motor

First disconnect battery B+ and B-, disconnect power terminals and check the motor armature and field for opens.

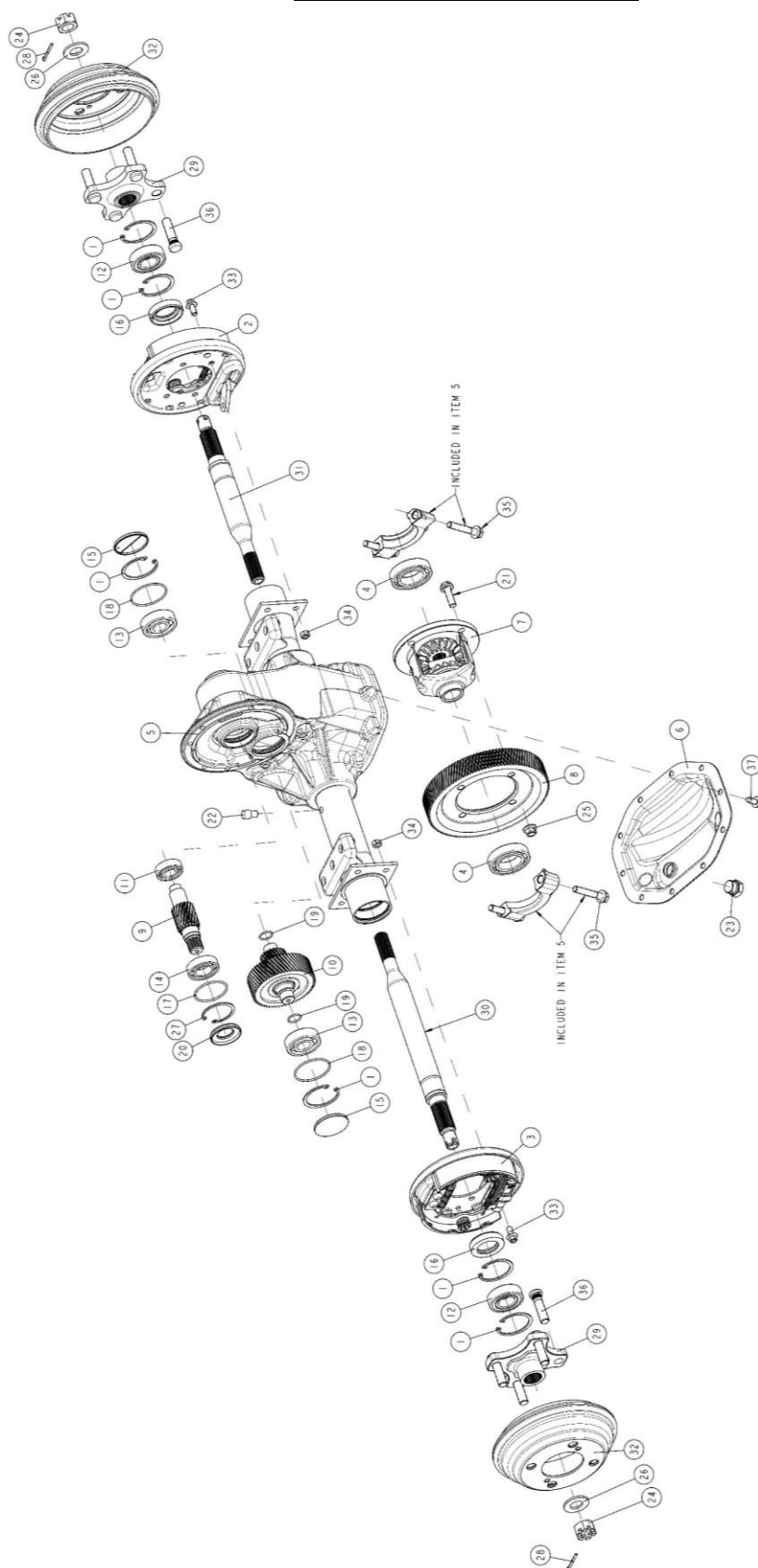
SPARE PARTS

BODY



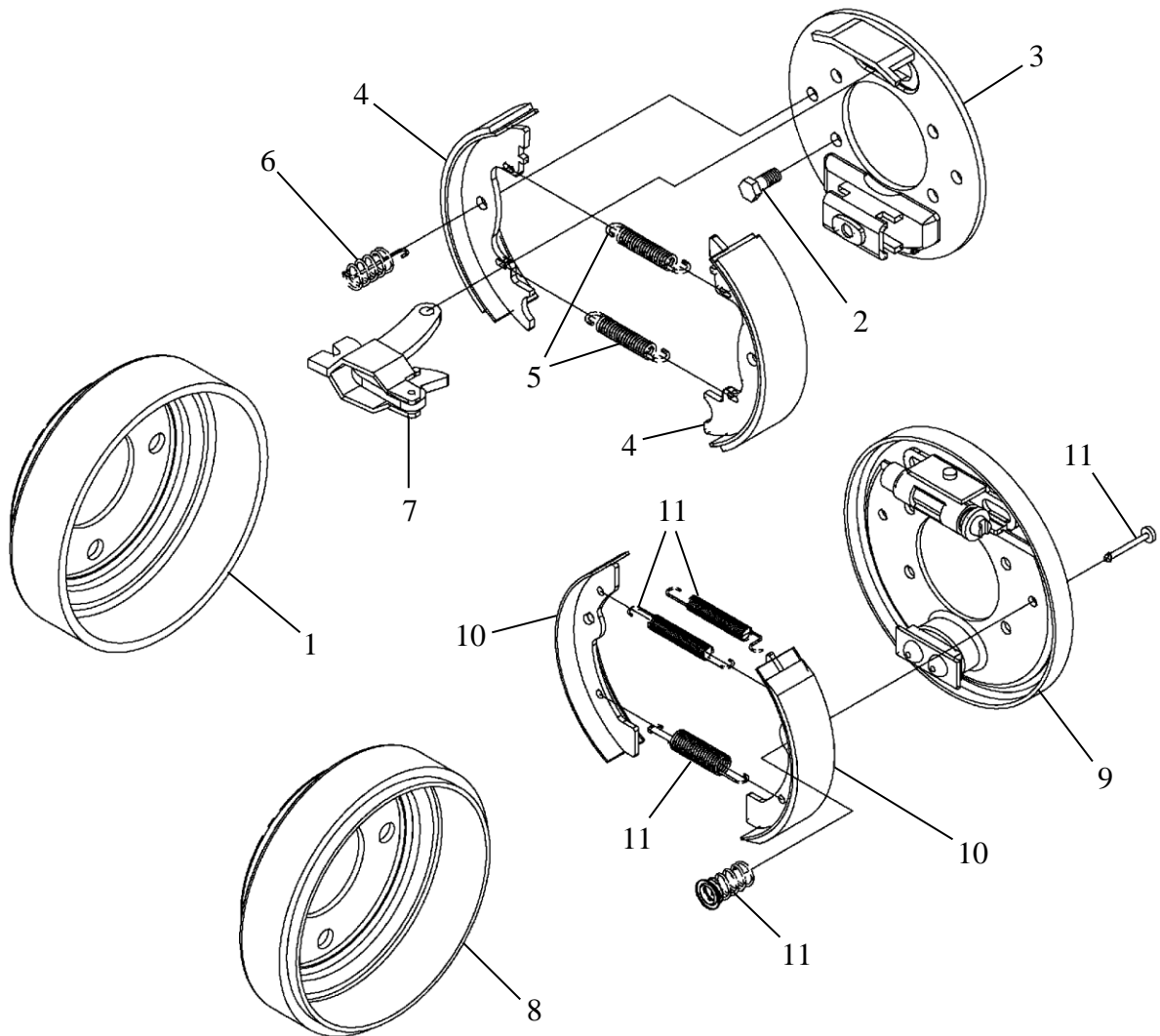
REF.	PART NO.	DESCRIPTION
1	2223240020	WHEEL
2	2300032	RUBBER BUMPER
3	2320000007	CLEVIS HITCH
4	2332262002	PLYWOOD DECK
5	2142260018	ACCELERATOR
6	2382260004	BACKREST CUSHION
7	2343260053	BACKREST FRAME (STD)
	2343260063	BACKREST FRAME (OPTIONAL)
8	2500262002	DASHBOARD PLATE
9	6390260043	COVER PLATE
10	6108262010	VEHICULE CHASSIS (LITHIUM OPTION)

DIFFERENTIAL DANA



REF.	PART NO.	QTY	DESCRIPTION
1	840293	6	RING, RETAINING, INTERNAL, 2.06 BORE
2	4171017	1	BRAKE ASSEMBLY, 160 MM X 30 MM, LEFT
3	4171018	1	BRAKE ASSEMBLY, 160 MM X 30 MM, RIGHT
4	002HD111	2	BEARING, BALL, SINGLE ROW, 6007
5	012CH427X	1	HOUSING, AXLE. SERVICE
6	012CV121-3	1	COVER, CARRIER, REAR, FINISH
7	2117300001	1	ASSEMBLY, DIFFERENTIAL CASE, HEAVY DUTY
8	012GS375	1	GEAR, HELICAL, OUTPUT, FINISH, 116T
9	2116300007	1	GEAR, INPUT, FINISH, 16.99 RATIO, ELECTRIC
10	012GZ155X	1	ASSEMBLY, SHAFT AND GEAR, INTERMEDIATE, FINISH
11	2102300002	1	BEARING, BALL, SINGLE ROW, 6203
12	012HD106	2	BEARING, BALL, SINGLE ROW, 6205-2RS
13	012HD155	2	BEARING, BALL, SINGLE ROW, 6304
14	012HD164	1	BEARING, BALL, SINGLE ROW, 6005
15	012HG157	2	PLUG, END CAP
16	012HH107	2	SEAL, OIL, 1.218 SHAFT, 2.000 BORE
17	2104300002	1	O-RING, 1.831 X 0.099
18	012HH149	2	O-RING, 2.05 X 0.098
19	012HH150	2	O-RING, 0.669 X 0.079
20	012HH153	1	SEAL, OIL, 0.948 SHAFT, 1.850 BORE
21	012HM129	4	BOLT, FLANGE HEAD, 3/8-24 X 1.25
22	2179000005	1	VENT
23	2179300005	1	PLUG, HEX HEAD, 3/4-16 STRAIGHT THREAD
24	012HN123	2	NUT, CASTLE, 3/4-16UNF
25	2179000004	4	NUT, FLANGE, LOCK, 3/8-24
26	012HN157	2	WASHER, HARDENED, 0.77 X 1.50 X 0.12
27	2179300002	1	RING, RETAINING, INTERNAL, 1.875 BORE
28	012HR138	2	PIN, COTTER, 1/8 X 1.25
29	012HU185X	2	ASSEMBLY, HUB, WHEEL
30	012SR189-11	1	SHAFT, AXLE, FINISHED
31	012SR-189-12	1	SHAFT, AXLE, FINISHED
32	012WA135	2	BRAKE DRUM, FINISH, HEAVY DUTY
33	2179242001	8	SCREW, FLANGE HEAD, M8-1.25 X 16MM
34	2179242002	8	NUT, LOCK, M8-1.25
35	2179300001	4	BOLT, HEX HEAD, 3/8-16 X 2.25
36	527A3-3	8	BOLT, WHEEL, 1/2-20 X 1.875
37	2179300006	10	SCREW, SELF-THREADING, 5/16-18 X 0.725

MECHANICAL DRUM BRAKES



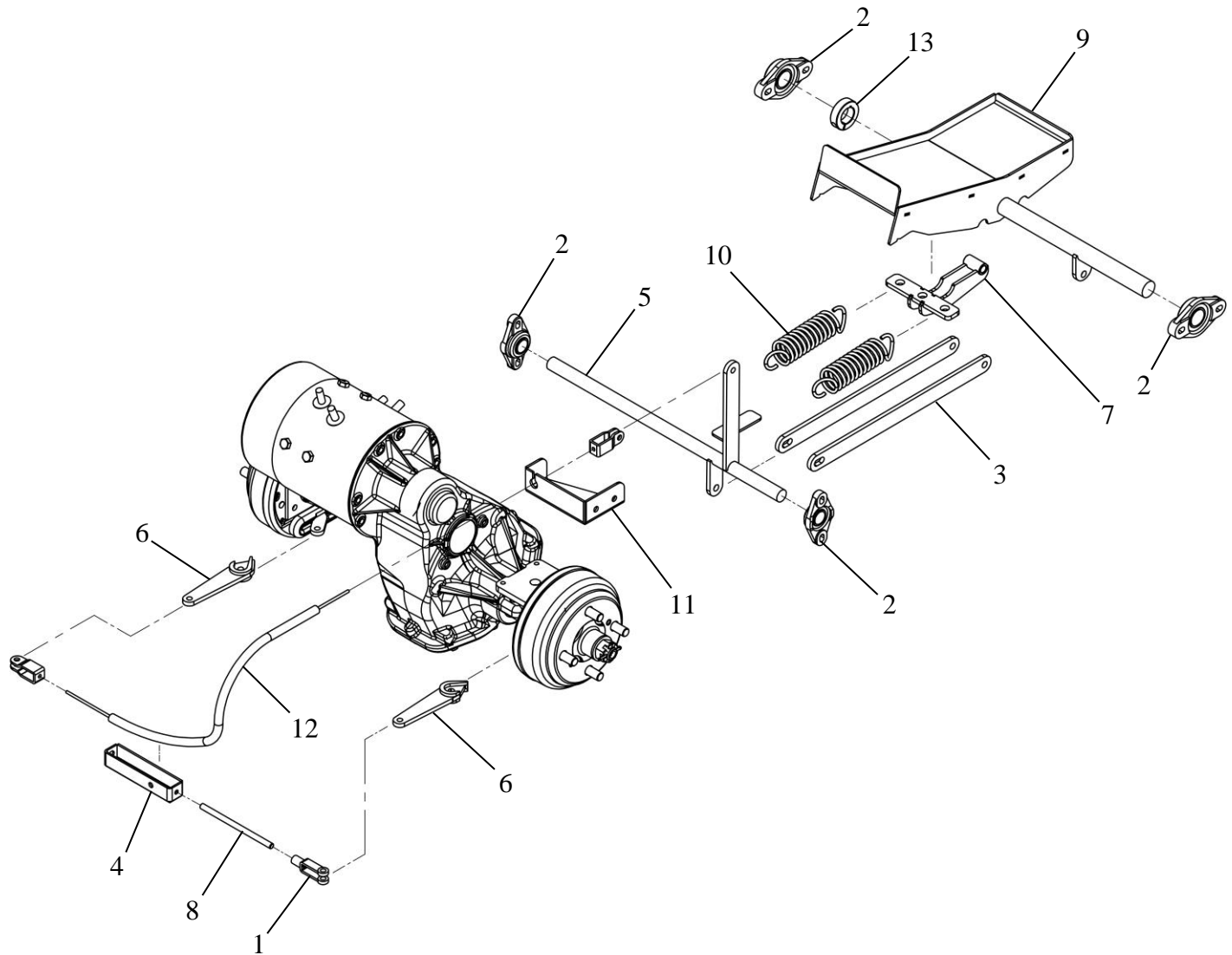
MANUAL ADJUSTEMENT, OLD

REF.	PART NO	DESCRIPTION
1	242051	DRUM
2		BOLT, 5/16-NC X 3/4
3	242841	BACK PLATE
4	242842	BRAKE SHOE
5	242844	EXT. SPRING
6	242845	HOLD SPRING
7	242846	LEVER

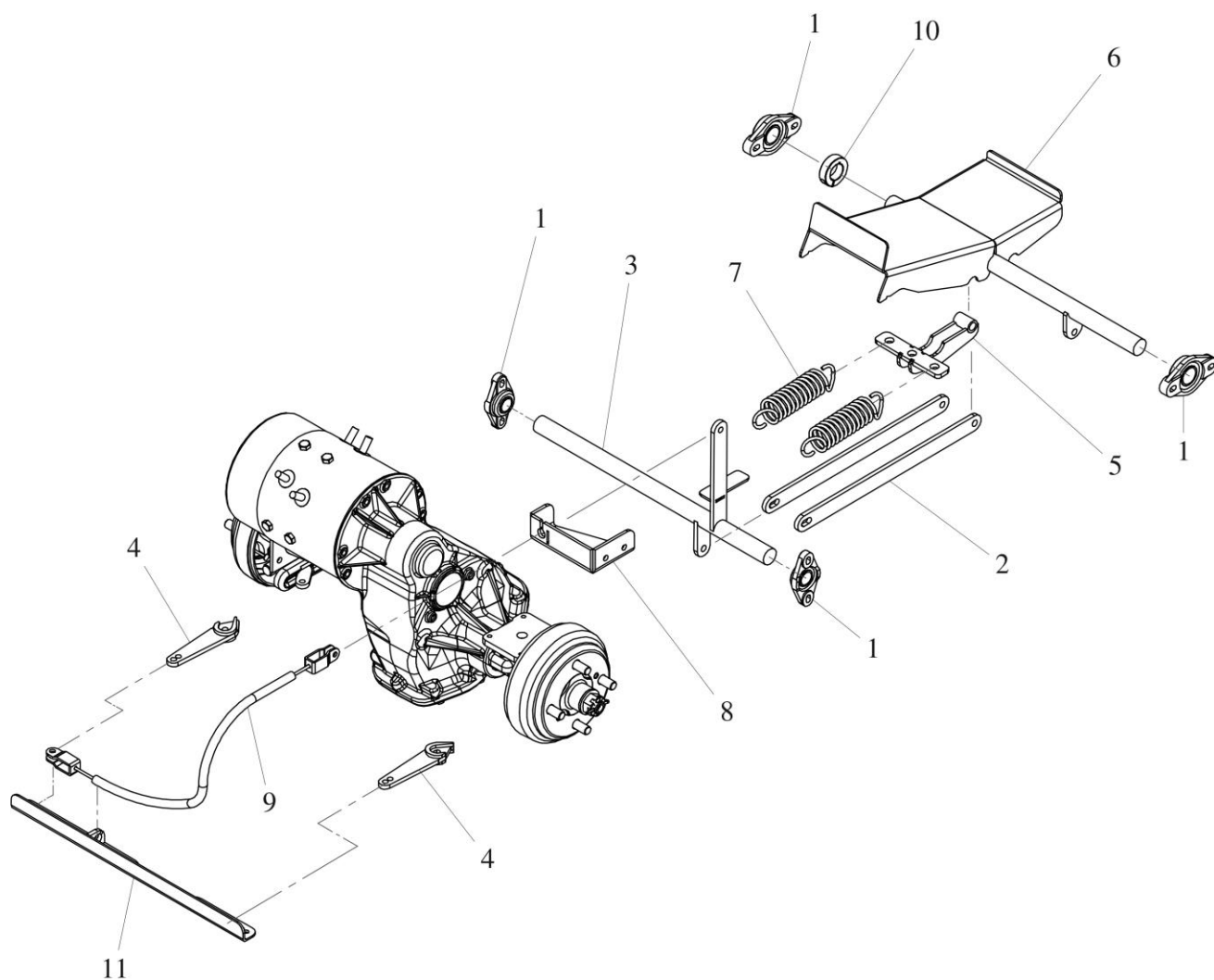
SELF ADJUSTEMENT, NEW SERIAL NUMBER 0707070 & +

REF.	PART NO	DESCRIPTION
8	2123242001	DRUM 4-BOLT
	2123240001	DRUM 5-BOLT
9	2413002	BACKING PLATE LH
	2413010	BACKING PLATE RH
10	2413003	BRAKE SHOE
11	2413004	SPRING KIT (5)

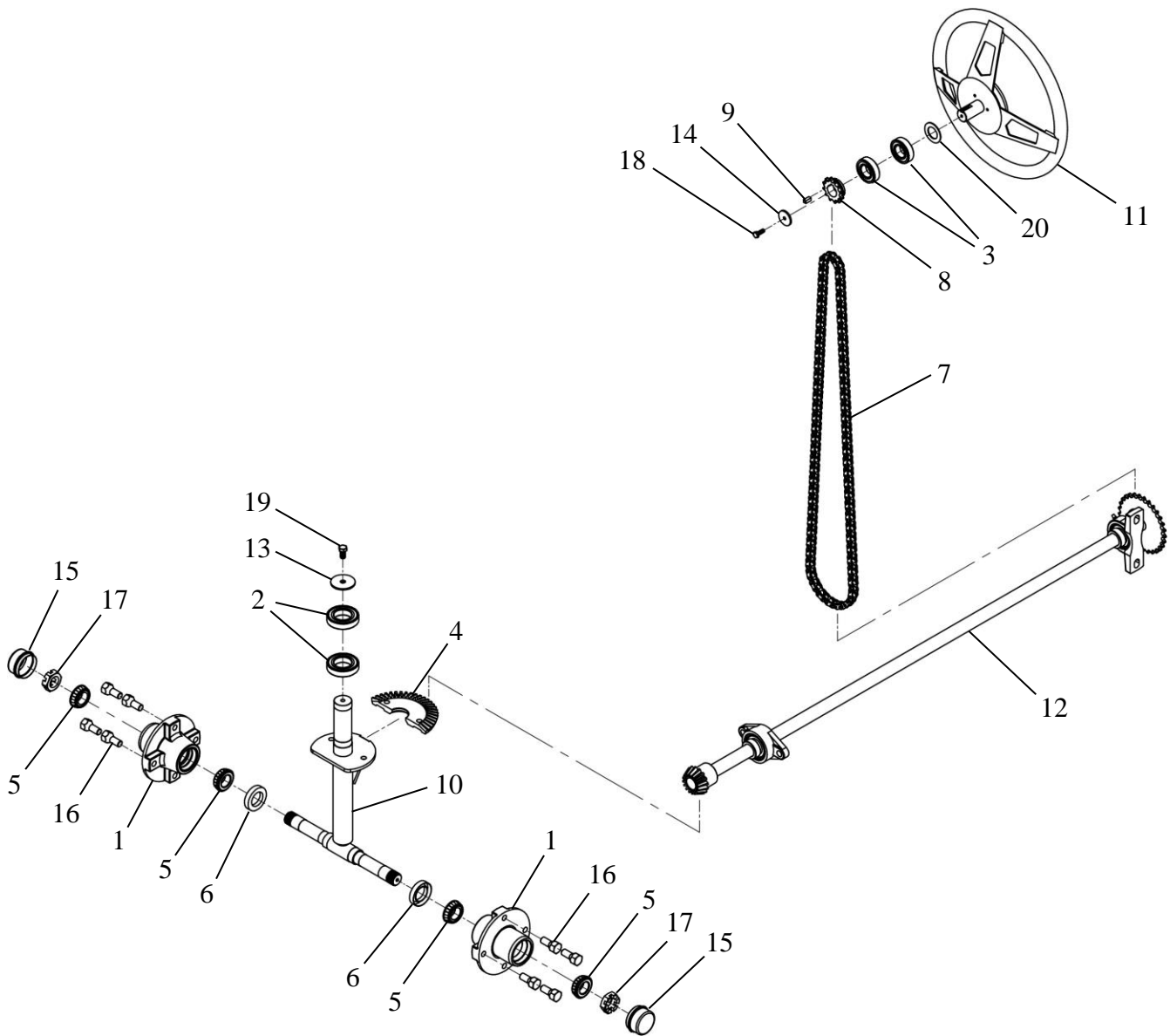
BRAKE CONTROLS



REF.	PART NO.	DESCRIPTION
1	2716005	5/16-NF YOKE
2	2106016001	PLASTIC FLANGE BEARING, 1 DIA
3	2130262010	DRAW BAR
4	2130800001	HANDBRAKE CABLE PULLER
5	2131262006	FRONT PIVOT
6	2131262008	BRAKE LEVER
7	2132262014	HOLDER, PEDAL SPRINGS
	2100060808-RF	RED BUSHING $\phi 1/2 \times 1/2$
8		THREADED ROD 5/16-NF
9	2142262018	TREADLE
10	2190000008	SPRING
11	2399262012	SUPPORT BRAKE CABLE
12	2129262003	BRAKE CABLE ASSEMBLY
13	2915016001	ONE PIECE CLAMP-ON SHAFT

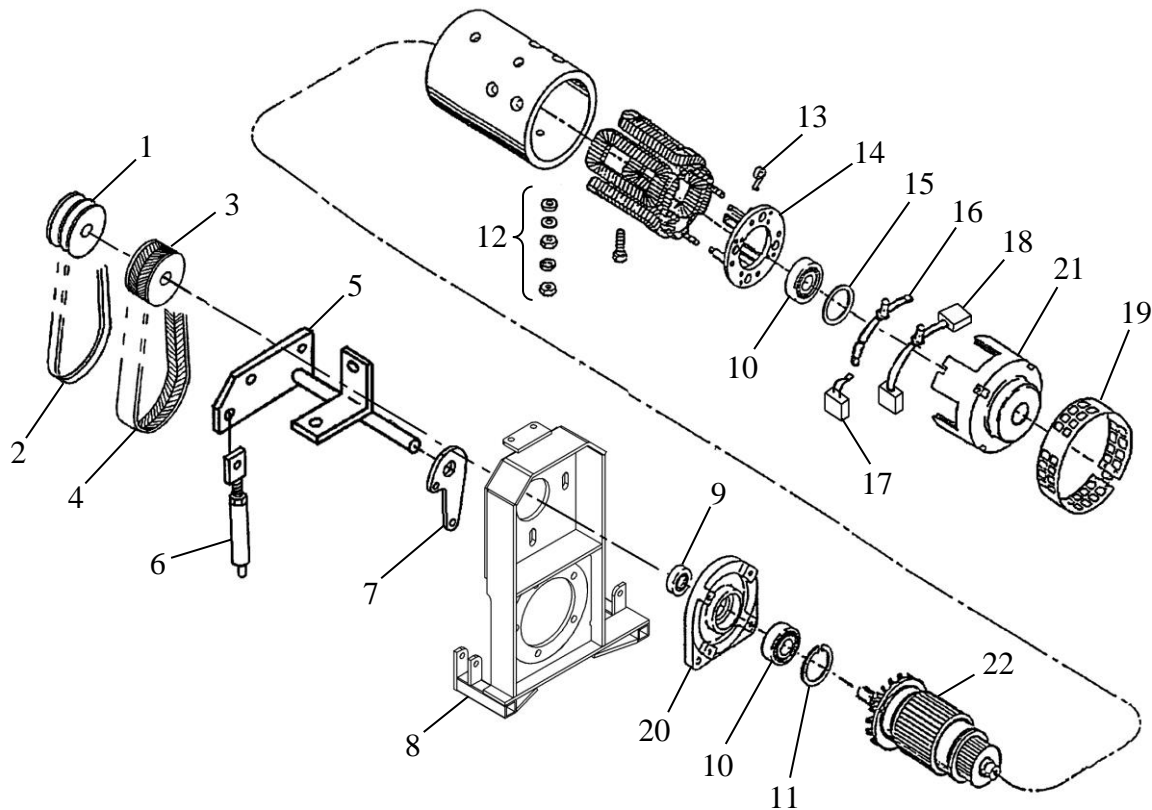


<i>REF.</i>	<i>PART NO.</i>	<i>DESCRIPTION</i>
1	2106016001	PLASTIC FLANGE BEARING, 1 DIA
2	2130262010	DRAW BAR
3	2131262012	FRONT PIVOT
4	2131262008	BRAKE LEVER
5	2132262014	HOLDER, PEDAL SPRINGS
	2100060808-RF	RED BUSHING $\phi 1/2 \times 1/2$
6	2142262018	TREADLE
7	2190000008	SPRING
8	2399262012	SUPPORT BRAKE CABLE
9	2129262003	BRAKE CABLE ASSEMBLY
10	2915016001	ONE PIECE CLAMP-ON SHAFT
11	2130260009	BRAKE SYSTEM

STEERING ASSEMBLY

REF.	PART NO.	DESCRIPTION
1	2224240003	HUB, 4 BOLT
2	241406	BALL BEARING
3	261403	BALL BEARING
4	261407	FRONT STEERING GEAR
5	2103300008	TAPER BEARING
6	2104300005	OIL SEAL
7	2110262001	CHAIN
8	2111260003	SPROCKET
9	2118360002	KEY 1/4
10	2203260012	SPINDLE

REF.	PART NO.	DESCRIPTION
11	2208260001	STEERING WHEEL
12	2209260001	SHAFT ASSEMBLY
13	2219260002	WASHER
14	2219260003	WASHER
15	2229300001	DUST CAP
16	2910000025	WHEEL BOLT
17	2910300002	CASTELLATED NUT
18	—	BOLT 1/4NC X 3/4
19	—	BOLT 3/8NC X 3/4
20	—	SHIM 1/16

MOTOR AND DRIVE**COMMON PARTS**

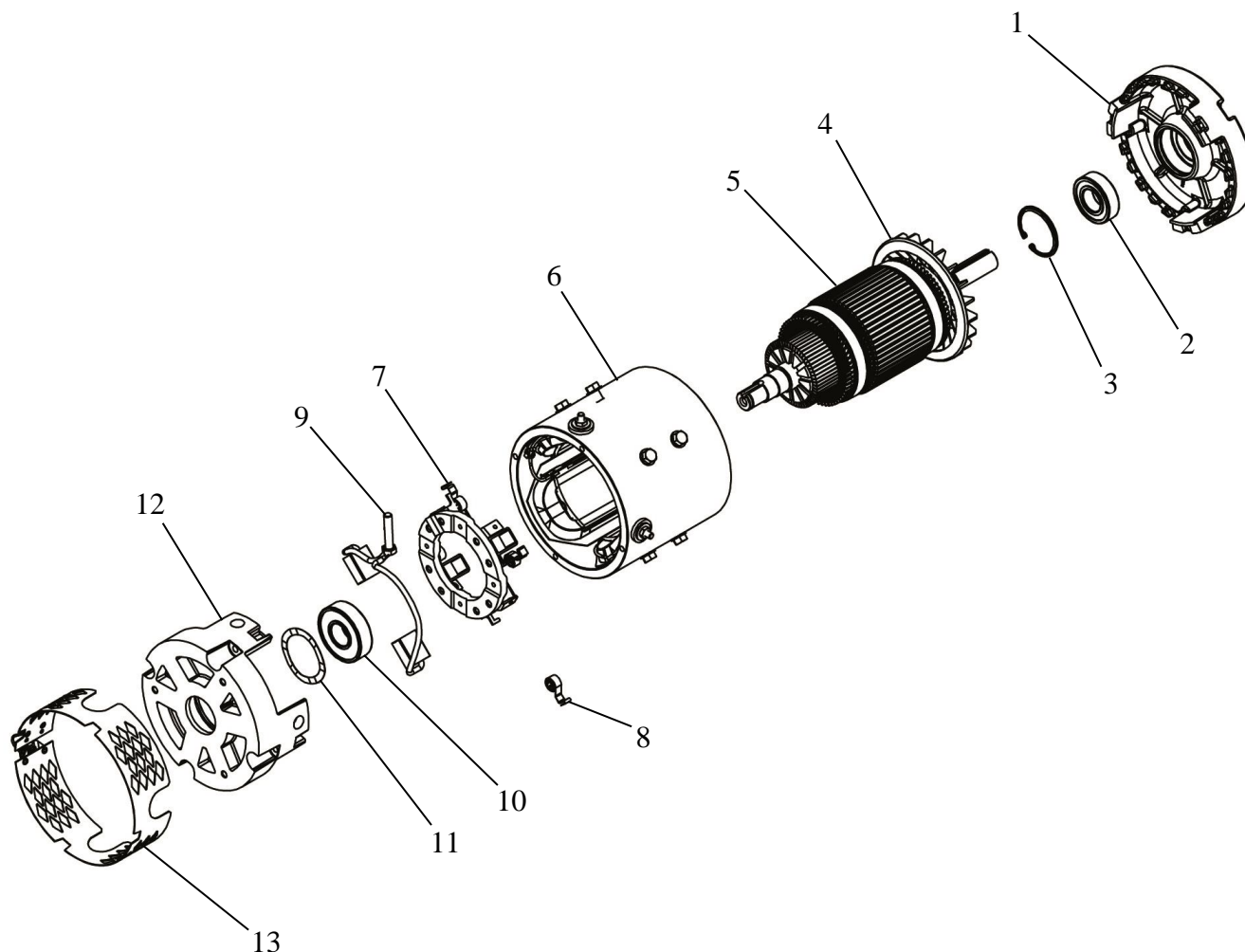
REF	DESCRIPTION	PART NO	REF	DESCRIPTION	PART NO
1	PULLEY	262424	8	MOTOR BASE, FORD	Contact manuf.
2	V BELT	242431		BELT TENSIONER	2156000012
3	PULLEY	3651001	9	SEAL	484001
4	BELT, EAGLE	3651002	10	BEARING	484003
5	MOTOR BASE, GM	Contact manuf.	11	SNAP RING	484004
6	BELT TENSIONER, LONG	2156000001	12	NUT WASHER PACK	484006
	BELT TENSIONER, SHORT	2156000007	15	WAVY WASHER	484013
7	PIVOT	2155000001	19	HEADBAND	484015
				EE HEADBAND KIT	A91-107A

SPECIFIC

REF	DESCRIPTION	A89	B98	A00	D00 SEPEX	DC3 SEPEX	DD4 SEPEX	D&D SEPEX
	MOTOR ASS'Y	484000	204050	2450002*	2450003*	3112210001*	3112230001	3112248001
13	BRUSH SPRING	484010	484010	2450006	2450006	2450006	2450006	
14	BRUSH PLATE	484011	484011	2450007	2450007	2450007	2450007	
16	LEAD ASSY.	484017	484017	N/A	N/A	N/A	N/A	
17	BRUSH	484009	484009	N/A	N/A	N/A	N/A	
18	LEAD AND BRUSH ASSY.	N/A	N/A	3112210004	3112210004	3112210004	3112210004	
20	DRIVE ENDHEAD	484002	484002	484002	484002	484002	N/A	
21	COMMUTATOR ENDHEAD	484014	484014	2450009	2450009	2450009	3112230003	
22	ARMATURE & FAN ASSY	484005	484005	2450004	2450004	3112210002	3112230002	
	FAN	484016	484016	484016	484016	484016	N/A	

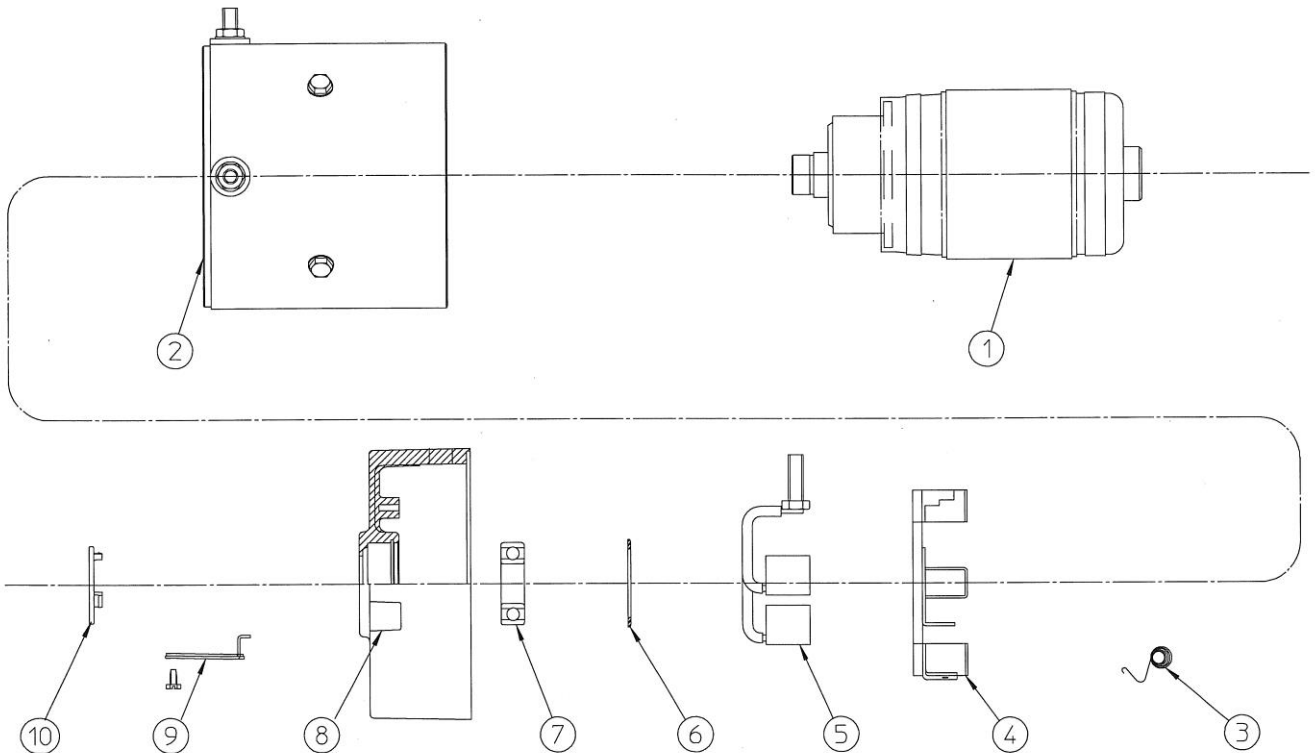
* WHEN EQUIPPED WITH ELECTROMAGNETIC BRAKE, PLEASE CONTACT THE MANUFACTURER.

SEPEX MOTOR DD3-4011A MAGNETIC BRAKE AND DRIVE



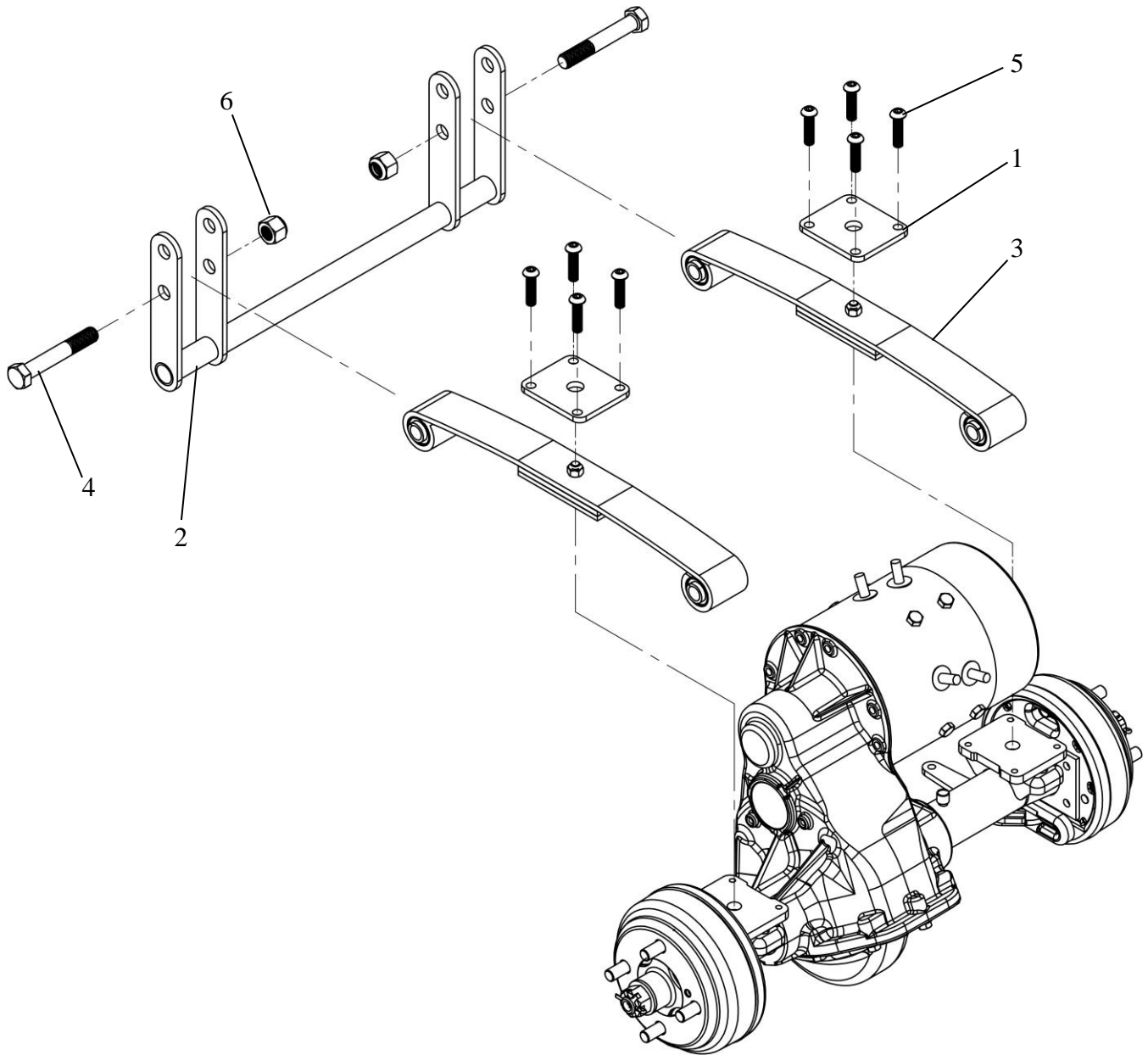
REF.	PART NO.	DESCRIPTION
1	484002	DRIVE END HEAD
2	484003	BEARING
3	484004	RETAINING RING
4	484016	FAN
5	3112236005	ARMATURE & FAN ASSEMBLY
6	3112236006	FRAME & FIELD ASSEMBLY
7	484011	BRUSH BOX ASSEMBLY (WITH SPRINGS)
8	484010	BRUSH SPRING
9	3112210004	BRUSH LEAD & TERMINAL SERVICE KIT
10	2102236001	BEARING
11	3112236008	WAVY WASHER
12	3112236009	COMMUTATOR END HEAD
13	484015	HEADBAND ASSEMBLY

SEPEX MOTOR DD4-4005, KIT No. 3112230001



ITEM No.	PART No.	DESCRIPTION
1	3112230002	ARMATURE
2	3112230004	FRAME & FIELD ASSEMBLY
3	2450006	BRUSH SPRING
4	2450007	BRUSH BOX ASSEMBLY
5	3112210004	BRUSH ASSEMBLY KIT
6	484004	RETAINING RING
7	484003	BEARING
8	3112230003	COMMUTATOR END HEAD
9	3112230005	COVER PLATE ASSEMBLY
10	2450010	HOLE PLUG

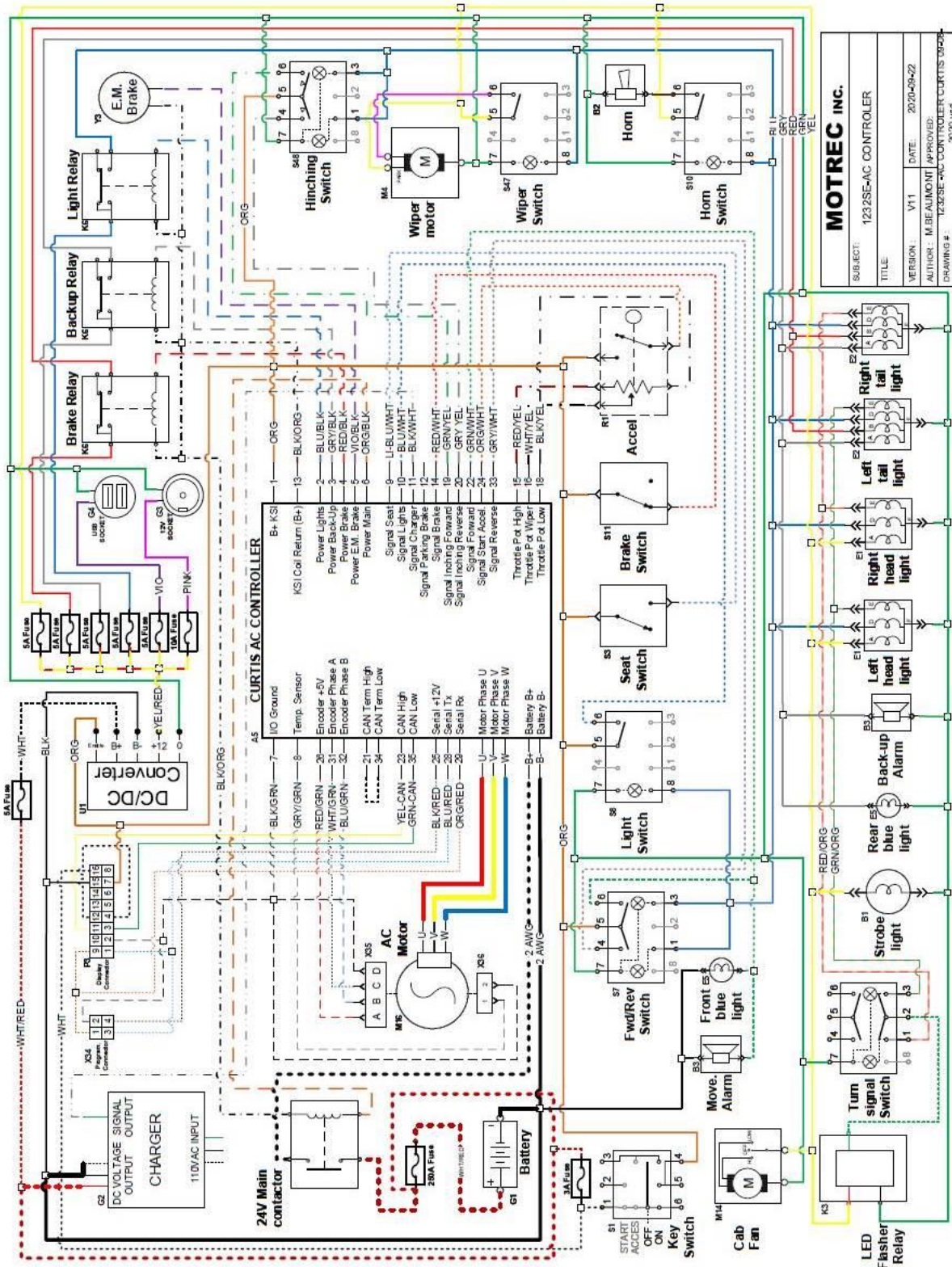
REAR SUSPENSION



REF.	PART NO.	DESCRIPTION
1	2185270001	PLATE
2	2189260001	STABILIZER BAR
3	2192270002	LEAF SPRING
4	—	BOLT 5/8-NC X 4
5	—	BUTTON HEAD 3/8NF X 1 1/2
6	—	NYLON NUT 5/8-NC

ELECTRICAL DIAGRAM – MAIN CIRCUIT

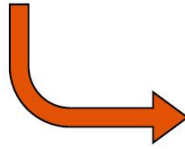
CURTIS 1232SE



AC CABLES

WIRE	LINE	WIRE # ON CONNECTOR	USAGE	GROUP
WHITE		36	Power B+ (24, 36, 48 ou 80V) (live fused)	High power
WHITE		36	Power B+ (24, 36, 48 ou 80V) (live fused)	High power
WHITE		36	Power B+ (24, 36, 48 ou 80V) (live fused)	High power
WHITE		36	Power B+ (24, 36, 48 ou 80V) (live fused)	High power
WHITE		36	Power B+ (24, 36, 48 ou 80V) (live fused)	High power
BLACK		37	Power B- (24, 36, 48 ou 80V)	High power
BLACK		37	Power B- (24, 36, 48 ou 80V)	High power
BLACK		37	Power B- (24, 36, 48 ou 80V)	High power
BLACK		37	Power B- (24, 36, 48 ou 80V)	High power
WHITE	RED	38	Power B+ (24, 36, 48 ou 80V) (live no fuse)	High power
BROWN		39	Horn	Power 12V
WHITE	BLUE	40	Spare cable	
YELLOW		41	DC/DC converter +12V	Power 12V
YELLOW		41	DC/DC converter +12V	Power 12V
YELLOW		41	DC/DC converter +12V	Power 12V
GREEN		42	DC/DC converter -	Power 12V
GREEN		42	DC/DC converter -	Power 12V
GREEN		42	DC/DC converter -	Power 12V
GREEN		42	DC/DC converter -	Power 12V
BLUE		43	Power lights (+12V)	Power 12V
BLUE		43	Power lights (+12V)	Power 12V
GRAY		44	Power reverse alarm & light (+12V)	Power 12V
RED		45	Power brake light (+12V)	Power 12V
VIOLET		46	USB socket	Power 12V
PINK		47	12V socket	Power 12V
YELLOW	RED	48	Right turn signal	Power 12V
YELLOW	GREEN	49	Left turn signal	Power 12V
ORANGE		1	Power B+ (24, 36 48 ou 80V) (key switch)	Low power
ORANGE		1	Power B+ (24, 36 48 ou 80V) (key switch)	Low power
ORANGE		1	Power B+ (24, 36 48 ou 80V) (key switch)	Low power
BLUE	BLACK	2	Power lights relay (negative 24V PWM)	Low power
GRIS	BLACK	3	Power reverse alarm and light relay (negative 24V PWM)	Low power
RED	BLACK	4	Power brake light relay (negative 24V PWM)	Low power
VIOLET	BLACK	5	Power E.M. brake (- battery)	Low power
ORANGE	BLACK	6	Power main contactor (- battery)	Low power
BLACK	GREEN	7	I/O ground	Sensors
GRAY	GREEN	8	Temperature sensor	Sensors
PALE BLUE	WHITE	9	Signal seat switch (+ voltage battery)	Signal
BLUE	WHITE	10	Signal lights (+ voltage battery)	Signal
BLACK	WHITE	11	Charger signal	Signal
YELLOW	WHITE	12	Signal parking brake (+ voltage battery)	Signal
BLACK	ORANGE	13	Power KSI coil return (+ battery PWM)	Low power
RED	WHITE	14	Signal brake (+ voltage battery)	Signal
WHITE	YELLOW	15	Throttle pot high	Throttle
BLACK	YELLOW	16	Throttle pot wiper	Throttle
RED	YELLOW	18	Throttle and brake pot low	Throttle
GREEN	YELLOW	19	Inching forward	Signal
GRAY	YELLOW	20	Inching reverse	Signal
WHITE	BLACK	21	CAN term high (21) and low (34) + display CAN term	Signal
GREEN	WHITE	22	Signal forward (+ voltage battery)	Signal
ORANGE	WHITE	24	Signal start accel (+ voltage battery)	Signal
BLACK	RED	25	Serial +12V	Communication
RED	GREEN	26	Encoder +5V	Sensors
BLUE	RED	28	Serial TX	Communication
ORANGE	RED	29	Serial RX	Communication
WHITE	GREEN	31	Encoder phase A	Sensors
BLUE	GREEN	32	Encoder phase B	Sensors
GRAY	WHITE	33	Signal reverse (+ voltage battery)	Signal

FAULT CODES SHOWN ON DISPLAY



MOST COMMON ERROR CODES

17	Severe Undervoltage <i>Reduced drive torque.</i>	<ol style="list-style-type: none"> 1. Battery Menu parameters are misadjusted. 2. Non-controller system drain on battery. 3. Battery resistance too high. 4. Battery disconnected while driving. 5. See Monitor menu » Battery: Capacitor Voltage. 6. Blown B+ fuse or main contactor did not close. 	<p>Low voltage on battery (recharge and erase code)</p> <p>36V battery in a 48V vehicle</p> <p>Bad connector</p> <p>Parameter has been changed</p>
18	Severe Overvoltage <i>ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake; ShutdownPump.</i>	<ol style="list-style-type: none"> 1. See Monitor menu » Battery: Capacitor Voltage. 2. Battery menu parameters are misadjusted. 3. Battery resistance too high for given regen current. 4. Battery disconnected while regen braking. 	<p>Battery is fully charged and too much regenerative braking .</p> <p>48V in 36V vehicle.</p>
23	Undervoltage Cutback <i>Reduced drive torque.</i>	<ol style="list-style-type: none"> 1. Normal operation. Fault shows that the batteries need recharging. Controller is performance limited at this voltage. 2. Battery parameters are misadjusted. 3. Non-controller system drain on battery. 4. Battery resistance too high. 5. Battery disconnected while driving. 6. See Monitor menu » Battery: Capacitor Voltage. 7. Blown B+ fuse or main contactor did not close. 	<p>Low voltage on battery (recharge and erase code)</p> <p>36V battery in a 48V vehicle</p> <p>Bad connector</p> <p>Parameter has been changed</p>
24	Overvoltage Cutback <i>Reduced brake torque.</i>	<ol style="list-style-type: none"> 1. Normal operation. Fault shows that regen braking currents elevated the battery voltage during regen braking. Controller is performance limited at this voltage. 2. Battery parameters are misadjusted. 3. Battery resistance too high for given regen current. 4. Battery disconnected while regen braking. 5. See Monitor menu » Battery: Capacitor Voltage. 	<p>Battery is fully charged and too much regenerative braking.</p> <p>48V in 36V vehicle.</p>

MOST COMMON ERROR CODES

28	Motor Temp Hot Cutback <i>Reduced drive torque.</i>	<ol style="list-style-type: none"> 1. Motor temperature is at or above the programmed Temperature Hot setting, and the requested current is being cut back. 2. Motor Temperature Control Menu parameters are mis-tuned. 3. See Monitor menu » Motor: Temperature and » Inputs: Analog2. 4. If the application doesn't use a motor thermistor, Temp Compensation and Temp Cutback should be programmed Off. 	<p>+145 C This is the temperature limit of the motor .</p> <p>+160 C The vehicle will stop.</p> <p>Bring temp back to normal <i>within range.</i></p>
29	Motor Temp Sensor Fault <i>MaxSpeed reduced (LOS, Limited Operating Strategy), and motor temperature cutback disabled.</i>	<ol style="list-style-type: none"> 1. Motor thermistor is not connected properly. 2. If the application doesn't use a motor thermistor, Motor Temp Sensor Enable should be programmed Off. 3. See Monitor menu » Motor: Temperature and » Inputs: Analog2. 	<p>Bad contact must check PIN 7 or PIN 8 on controller.</p> <p>Check connector sensor.</p>
31	Coil1 Driver Open/Short <i>ShutdownDriver1.</i>	<ol style="list-style-type: none"> 1. Open or short on driver load. 2. Dirty connector pins. 3. Bad crimps or faulty wiring. 	See Main Open/Short
31	Main Open/Short <i>ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake; ShutdownPump.</i>	<ol style="list-style-type: none"> 1. Open or short on driver load. 2. Dirty connector pins. 3. Bad crimps or faulty wiring. 	<p><i>Emergency button is activated.</i></p> <p><i>Wire is disconnected on emergency button .</i></p> <p><i>Bad contact on PIN13 or PIN 6.</i></p>
32	Coil2 Driver Open/Short <i>ShutdownDriver2.</i>	<ol style="list-style-type: none"> 1. Open or short on driver load. 2. Dirty connector pins. 3. Bad crimps or faulty wiring. 	Only when Em Brake is in fault. See below.
32	EMBrake Open/Short <i>ShutdownEMBrake; ShutdownThrottle; FullBrake.</i>	<ol style="list-style-type: none"> 1. Open or short on driver load. 2. Dirty connector pins. 3. Bad crimps or faulty wiring. 	Wire disconnect on Em Brake . Bad contact on PIN 13 or PIN 5.
33	Coil3 Driver Open/Short <i>ShutdownDriver3.</i>	<ol style="list-style-type: none"> 1. Open or short on driver load. 2. Dirty connector pins. 3. Bad crimps or faulty wiring. 	Brake light relay defect or disconnect. Check PIN 4 (wire Red/Black)
34	Coil4 Driver Open/Short <i>ShutdownDriver4.</i>	<ol style="list-style-type: none"> 1. Open or short on driver load. 2. Dirty connector pins. 3. Bad crimps or faulty wiring. 	Back-up light relay defect or disconnect. Check Pin 3 (wire gray/black)

MOST COMMON ERROR CODES

35	PD Open/Short <i>ShutdownPD.</i>	1. Open or short on driver load. 2. Dirty connector pins. 3. Bad crimps or faulty wiring.	Light Relay defect or disconnect . Check PIN 2 (wire blue/black)
36	Encoder Fault <i>ShutdownEMBrake.</i>	1. Motor encoder failure. 2. Bad crimps or faulty wiring. 3. See Monitor menu » Motor: Motor RPM.	Check 4 wire on the encoder. PIN 7 - 26- 31- 32
37	Motor Open <i>ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake; ShutdownPump.</i>	1. Motor phase is open. 2. Bad crimps or faulty wiring.	Check loose wire on the motor and on the controller.
39	Main Contactor Did Not Close <i>ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake; ShutdownPump.</i>	1. Main contactor did not close. 2. Main contactor tips are oxidized, burned, or not making good contact. 3. External load on capacitor bank (B+ connection terminal) that prevents capacitor bank from charging. 4. Blown B+ fuse.	The main contactor commanded is closed.
41	Throttle Wiper High <i>ShutdownThrottle.</i>	1. See Monitor menu » Inputs: Throttle Pot. 2. Throttle pot wiper voltage too high.	Bad contact or installation on accelerator pedal (wire white/yellow) Bad contact on PIN 15 or PIN 16.
42	Throttle Wiper Low <i>ShutdownThrottle.</i>	1. See Monitor menu » Inputs: Throttle Pot. 2. Throttle pot wiper voltage too low.	Bad contact or installation on accelerator pedal (wire red/yellow) Bad contact on PIN 16 or PIN 18.
45	Pot Low Overcurrent <i>ShutdownThrottle; FullBrake.</i>	1. See Monitor menu » Outputs: Pot Low. 2. Combined pot resistance connected to pot low is too low.	Bad contact with PIN 18 or wire
47	HPD/Sequencing Fault <i>ShutdownThrottle.</i>	1. KSI, interlock, direction, and throttle inputs applied in incorrect sequence. 2. Faulty wiring, crimps, or switches at KSI, interlock, direction, or throttle inputs. 3. See Monitor menu » Inputs.	Bad start sequence (seat/ neutral /do not touch accelerator)
49	Parameter Change Fault <i>ShutdownMotor; ShutdownMainContactor; ShutdownEMBrake; ShutdownThrottle; FullBrake; ShutdownPump.</i>	1. This is a safety fault caused by a change in certain parameter settings so that the vehicle will not operate until KSI is cycled. For example, if a user changes the Throttle Type this fault will appear and require cycling KSI before the vehicle can operate.	Parameter has been change
51-67	OEM Faults <i>(See OEM documentation.)</i>	1. These faults can be defined by the OEM and are implemented in the application-specific VCL code. See OEM documentation.	See last page for more detail .

MOST COMMON ERROR CODES

73	Stall Detected <i>ShutdownEMBrake; Control Mode changed to LOS (Limited Operating Strategy).</i>	<ol style="list-style-type: none"> 1. Stalled motor. 2. Motor encoder failure. 3. Bad crimps or faulty wiring. 4. Problems with power supply for the motor encoder. 5. See Monitor menu » Motor: Motor RPM. 	No movement, motor reach 350A and stall after 5 seconds.
92	EM Brake Failed to Set <i>ShutdownEMBrake; ShutdownThrottle.</i>	<ol style="list-style-type: none"> 1. Vehicle movement sensed after the EM Brake has been commanded to set. 2. EM Brake will not hold the motor from rotating. 	Knobs are screw into the motor, remove and clear code.

OEM CODE :

CODE 51 Can initialization : Check PIN 23 and PIN 35 (twisted wire green and yellow)

CODE 52 Can operational : Check PIN 23 and PIN 35 (twisted wire green and yellow)

CODE 53 Throttle Wiper : Check PIN 18

CODE 54 Maintenance is required

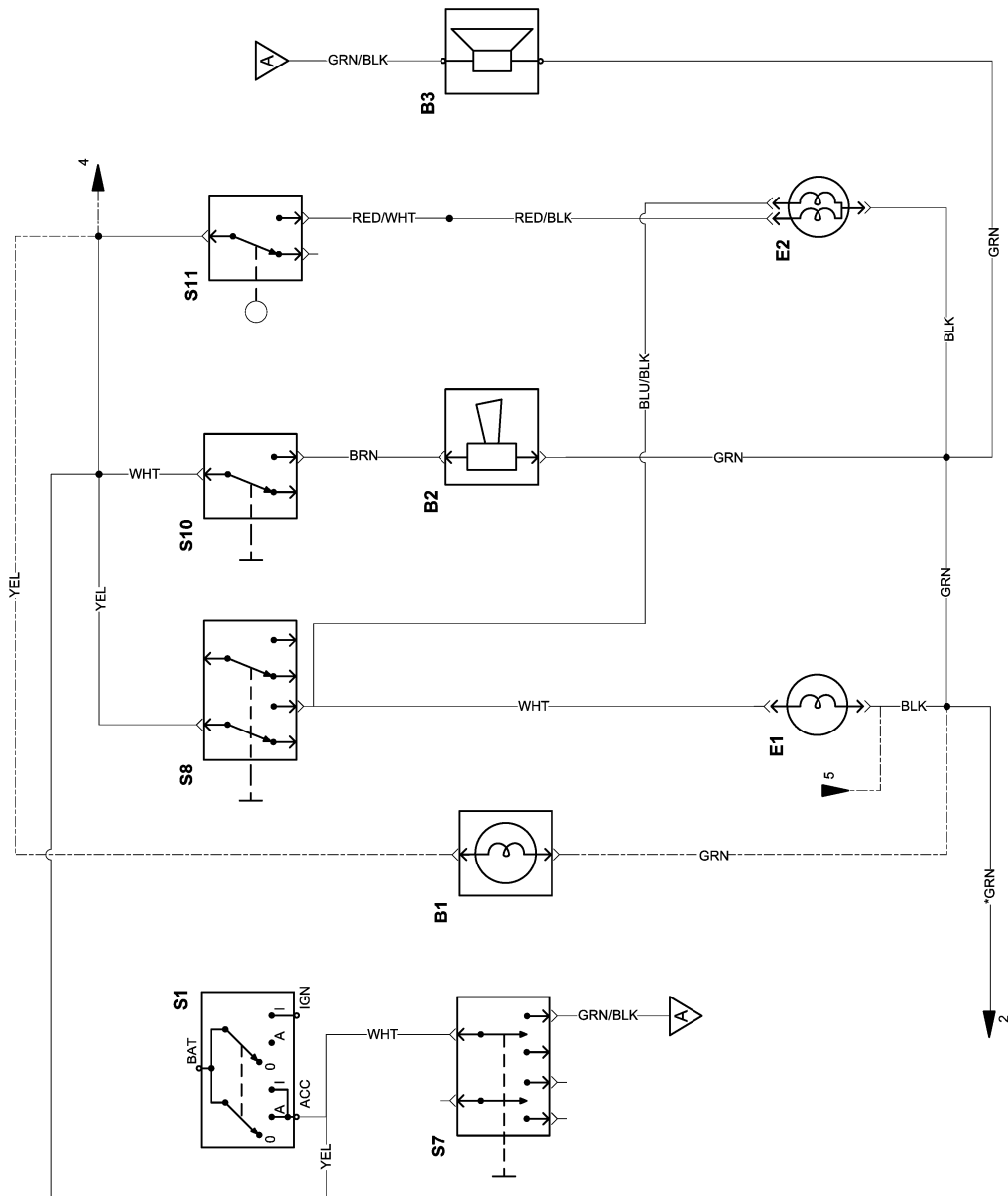
CODE 55 Throttle active before forward

CODE 56 Throttle active before reverse

CODE 57 FWD and REV active : Bad switch FWD/REV

CODE 58 Driver voltage exceeded : Max voltage for driver is 24V

ACCESSORIES – NO DC/DC CONVERTER
ACCESSOIRES – SANS CONVERTISSEUR DC/DC



MOTREC INC.	
SUBJECT:	ACCESSORIES - 1HL1TL1SL
TITLE:	ACCESSORIES
VERSION:	01
DATE:	2006-04-11
AUTHOR:	J. GAGNON
APPROVED:	
DRAWING #:	ACC - NO DC-DC - 1HL1TL1SL VSD

* Accessories ground is connected at an intermediate post relative to vehicle battery set positive post when DC-DC converter option is not taken.
The relative voltage is either 12V or 24V depending on accessories

PARTS LIST AC

NO	DESIGNATION	REF
A5	CURTIS AC CONTROL. 36-48V, 350A - 1234	3105236001
	CURTIS AC CONTROL. 36-48V, 350A – 1232SE	3105236008
	CURTIS AC CONTROL. CONNECTOR	3105800001-C
	CURTIS AC CONTROL. CONNECTOR PINS	3105800001-P
B1	STROBELIGHT	*
B2	HORN	*
B3	REVERSE / MOTION ALARM	*
E1	HEADLIGHT	*
E2	TAIL / BRAKE / TURN / BACKUP LIGHT	*
E5	SAFETY BLUE LIGHT	3111000063
F14	FUSE, ANN 250A	3118224001
	FUSE HOLDER BUSS 4164	3118224002
G1	BATTERY	CALL FACTORY
G2	BATTERY CHARGER	**
G3	USB CHARGER SOCKET	3119000083
G4	12V, 10A MAX SOCKET	3119000082
K3	FLASHER RELAY	3127000002
K6	RELAY 24VDC SPST 280 STYLE, FOR BRIC	3127024001
M4	WIPER MOTOR	*
M7	CAB HEATER	*
M14	CAB FAN	*
M16	AC MOTOR 36-48VAC FAN COOLED	3112248005
	AC MOTOR 36-48VAC ENCLOSED (EE)	3112248003
P3	LCD DISPLAY CURTIS	3108000006
	DISPLAY CONNECTOR	3119000062
	DISPLAY CONNECTOR PINS	3130000019
R1	ACCELERATOR, VERTICAL MOUNT	3062001C
S1	SEALED KEY SWITCH 2 POSITION	3109000046
	SEALED IGNITION SWITCH WITHOUT KEY 2 POS	3109000047
	KEY ONLY FOR SEALED KEY SWITCH	3109000046K
	AUTOMOTIVE CONNECTOR 6 PIN PLUD WEDGE	ASCAW6S
	AUTOMOTIVE CONNECTOR PLUG 6 WAYS	AT06-6S
	AUTOMOTIVE CONNECTOR TERMINAL 16-18	AT62-16-0122-L
S3	SEAT SWITCH, KIT	2392240003
	SEAT SWITCH, MICRO-SWITCH	3109100002
	SEAT SWITCH, SEAT MOUNTED (MICHIGAN)	3109000003
	CONNECTOR	3109000004
	SEAT SWITCH, SEAT MOUNTED (GRAMMER)	2205002SW
S6	FOOT SWITCH	1269003
S7	FORWARD/REVERSE SELECTOR, ROCKER TYPE	*
S8	LIGHT SWITCH, ROCKER TYPE	*
S10	HORN BUTTON	*
S11	BRAKE SWITCH	*
	HYDRAULIC BRAKE LIGHT SWITCH	2374001
S13	TURN SIGNAL SWITCH	*
S15	EMERGENCY PUSH BUTTON	3109800012
	EMERGENCY PUSH BUTTON, LABEL	3109800006
S16	UP/DOWN SWITCH	*
S25	WIPER SWITCH	*
S26	HEATER SWITCH	*
S44	MAGNETIC SWITCH FOR PARKING BRAKE LEVER	3109000037

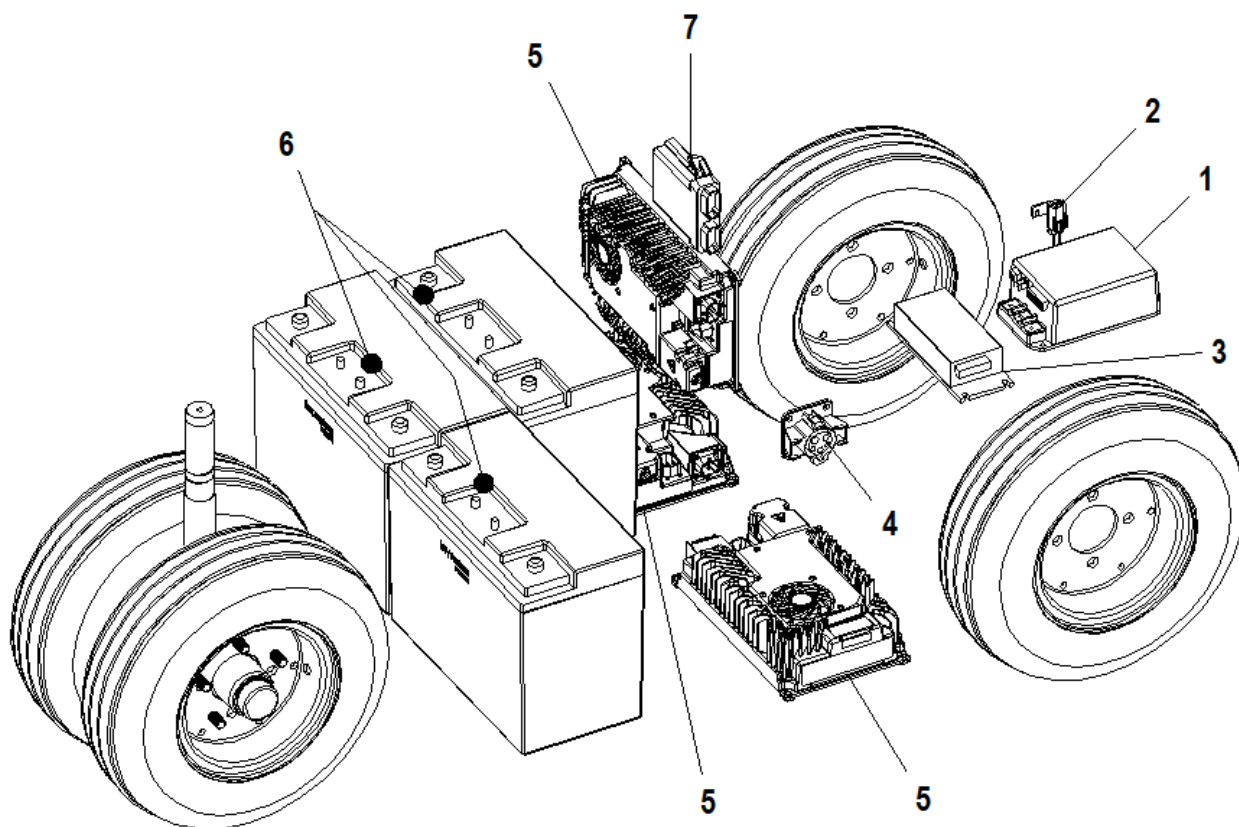
S45	COMBINED MAIN CONTACTOR AND MANUAL DISCONNECT SWITCH	3104224001
S46	INCHING SWITCH	*
U1	DC-DC CONVERTER	*
X34	PROGRAMMATION CONNECTOR	3119000063
	PROGRAMMATION CONNECTOR PINS	3130800001
X35	ENCODER CONNECTOR – VEHICLE PART	3119000048
	ENCODER CONNECTOR PINS – VEHICLE PART	3119000052
	ENCODER CONNECTOR – MOTOR PART	3119000049
	ENCODER CONNECTOR PINS – MOTOR PART	3119000053
	ENCODER CONNECTOR SEAL	3119000051
	ENCODER CONNECTOR LOCK	3119000050
X36	THERMAL SENSOR CONNECTOR – VEHICLE PART	3119000045
	THERMAL SENSOR CONNECTOR PINS – VEHICLE PART	3119000052
	THERMAL SENSOR CONNECTOR – MOTOR PART	3119000049
	THERMAL SENSOR CONNECTOR PINS – MOTOR PART	3119000053
	THERMAL SENSOR CONNECTOR SEAL	3119000051
	THERMAL SENSOR CONNECTOR LOCK	3119000047
Y3	ELECTROMAGNETIC BRAKE	3129000023

* Consult Motrec Illustrated parts

** Consult Motrec chargers

ELECTRICAL COMPONENTS

LITHIUM CONFIGURATION



<i>REF.</i>	<i>PART NO.</i>	<i>DESCRIPTION</i>
1	3105236008	AC CONTROLLER 36-48V
2	3118000012	IN-LINE FUSE HOLDER
	3119000084	MOLEX CONNECTOR
3	3124280003	36/48V CONVERTER
4	3120260007	HARNESS ASSY (SAE J1772 "J PLUG")
5	3102000101	ICL1200 48V STACKABLE CHARGER
6	3101480010	LITHIUM BATTERY 48V
7	3102000100	VEHICLE CHARGE INTERFACE MODULE

MOTREC ILLUSTRATED ACCESSORIES

 <p>Strobe light, pole mount Amber 12-80V: 3116000002 Red 12-80V: 2469001 Blue 12-80V: 3690008</p>	 <p>Red Tail/Brake light Grommet: 3269001 Plug: 246012A 12V : 2469021 24V : 2469022</p>	 <p>Red Tail/Turn LED light 12-24V: 3111000037</p>	 <p>Multi-LED Back-up Light: 3111000007 Strobe light: 3111000013 Grommet: 3111000008 Plug: 3119000009</p>
 <p>Strobe light, cab mount Amber 12-48V: 3116250001 Red 12-48V: 3069026 Blue 12-48V: 3069014 Amber 72-80V: 3116720001 Red 72-80V: 3116720002 Blue 72-80V: 3116720003</p>	 <p>Red Tail/Brake light ** Model EE ** Assembly: 3111000030 Housing: 3111000027 Plug: 3111000029 12V : 3111000028</p>	 <p>Clear lamp Incandescent 12V: 3111000039 Clear lamp LED 12V: 3111000042 Bulb incandescent 12V : 1269008 Bulb 12V LED: 3117000001</p>	 <p>Back-up lamp Grommet: 3269001 12V: 3669012 24V: 3669012A</p>
 <p>Amber turn lamp 12V: 3111000022 Bulb 12V: 3069021 Multi-LED amber turn lamp Round Light: 3111000010 Grommet: 3111000008 Plug: 3119000009</p>	 <p>Red Tail/Brake light Housing: 3111000041 Red Tail/Brake light Housing LED: 3111000044 Bulb 12V: 3117240001 Bulb 12V LED: 3117000010</p>	 <p>Oval lamp 12V: 3111330001</p>	 <p>Pedestal head lamp 12V: 3111240001 Bulb 12V: 2569001B Bulb 24V: 2169001B</p>
 <p>Amber turn lamp 2" 12V : 3111330002</p>	 <p>Multi-LED Red Tail/Brake Light: 3111000006 Grommet: 3111000008 Plug: 3119000009</p>	 <p>LED Headlight 12V: 3111000036</p>	 <p>Pedestal head lamp - LED 12-48V: 3111000034</p>
 <p>Amber turn lamp 2" LED white background 12V : 3111330003</p>	 <p>Red Tail/Brake light 12V: 386002</p>	 <p>Headlight Left: 3111480003 Right: 3111480004 Bulb H/L: 3111480006 Bulb Turn: 3111480008 Bulb Mark: 3111480007</p>	 <p>Headlamp 12V: 3111250007</p>
 <p>Red Tail/Turn/Rev light 12V: 3111000002</p>	 <p>Red Tail/Turn LED light 12-24V: 3111000037</p>	 <p>Headlight Left: 3111480003 Right: 3111480004 Bulb H/L: 3117480001 Bulb Turn: 3117480003 Bulb Mark: 3117480002</p>	 <p>Headlamp 12V: 3111300001 Bulb 12V: 3111300002</p>

 <p>Analog Voltmeter 12V : 3069007 24V : 2469002 36-48V : 3669002</p>	 <p>Wiper motor 12V: 3113000001 24V: 486211</p>	 <p>Cab heater 12V: 3103300001 36V: 3669008 48V: 4869020</p>	 <p>Horn 12V: 246003 24V: 246013</p>
 <p>HOBBS Gauge 24V: 2469026 36V: 3069038 48V: 4869037</p>	 <p>Wiper arm 2800000001</p>	 <p>12V Dome light 3669006</p>	 <p>Horn button VIP 2208224002</p>
 <p>DC-DC converter, 10A 12-48V: 3069019</p>	 <p>Wiper blade 14" Blade: 2800000002 18" Blade: 2800000003</p>	 <p>12V Fan 3669013</p>	 <p>Horn button, column mount 3109000011</p>
 <p>DC-DC Converter, 25A 12-48V: 3124000002 72-80V: 3124880001</p>	 <p>Pantograph wiper arm 246233A</p>	 <p>Back-up alarm or Motion beeper 12-48V : 3100000001 72-80V : 3105720001</p>	 <p>Horn button, dash mount 266210</p>
 <p>DC-DC Converter, 300W 24V: 3124224001 36-48V: 3124280001 72-80V: 3124880001</p>	 <p>Pantograph wiper blade 246233</p>	 <p>12-24V Adjustable ECCO: 3100000002</p>	 <p>Horn button 3109250001</p>
 <p>CONNECTOR:3124280002</p>	 <p>Limit switch 3109000029</p>	 <p>12-48V Adjustable PRECO: 3100000004</p>	 <p>Turn signal switch 246050</p>
		 <p>Red Pilot light 12V: 246212 Bulb 12V: 246212B</p>	

BATTERY DISCHARGE INDICATOR (HOBBS)

This indicator monitors :

- the residual capacity of batteries;
- operating hours;
- status of service down counter.

The residual capacity of the battery is monitored via an 8-LED bar display. When the left red LED lights, the batteries must be charged to avoid damage. The LED display starts flashing as a pre-warning signal. The lower voltage limit is adjustable via potentiometer “M” on the rear.

A	B	C	D	E	F	G	H	I	J	K
1,57	1,63	1,68	1,73	1,78	1,82	1,84	1,86	1,89	1,91	1,93

In order to activate a new adjustment, the unit has to be reset :

- 2.35V/cell reset voltage with battery remaining in vehicle;
- 2,09V/cell reset voltage after battery has been disconnected.

To maintain a good battery performance, it is recommended to limit the discharging to 80% of the battery capacity. The recommended setting for 6V batteries is F and the recommended setting for an industrial battery is K.

An internal relay can prevent overdischarging and damaging the batteries. The relay can be wired to cut off the reverse direction, or energize an N.C. relay and alarm.

Turning off and on the vehicle will override the protection for 30 sec.

The current status (remaining operating hours before maintenance) of the service down counter is indicated for a period of 5 seconds after the key switch is turned on. When it is down to 0, the display flashes. After the maintenance, reset the counter: depress the button “R” on the rear. The service counter is factory programmable only.

24V UNIT #: 2469026

36V UNIT #: 3069038

48V UNIT #: 4869037

2- Orange, key switch

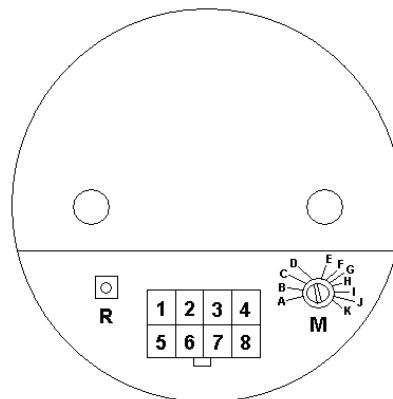
3- Relay +

4- Relay -

5- Black, battery –

6- Blue, hour counter

8- White, battery +



Addendum to the user manual for Lithium Powered MOTREC Vehicle

Information for final user and reseller

- The supply vehicle is currently in the validation stage of the MOTREC product development process. The supply vehicle should be considered as a prototype.
- The final user and the reseller of the vehicle should promptly inform MOTREC of any situation or event that do not belong to normal operating behavior of a MS-260 vehicle.

Lithium batteries maintenance

- The vehicle is powered by lithium type batteries (Nickel Cobalt Manganese cell chemistry).
- Lithium batteries are maintenance free.
- Final user and reseller shall not attempt to monitor battery voltage and current with external device.
- Final user and reseller shall not attempt to open or modify the battery enclosure.

Lithium batteries charging

- The batteries charging should be made with the supplied charging station (MOTREC # 3102000013).
- The vehicle is using a SAE J1772 (J plug) for charging the batteries.
- Charging should be monitored by the display on the charging station
- Battery charging is occurring when the charging station display is showing a current value higher than zero.
- The battery charging process begin approximately 30 s after the charging connector is plug into the vehicle charging port.
- The vehicle display screen also show the charging indicator light during battery charging.

Charging station installation

- The supplied charging station (MOTREC # 3102000013) shall be install as showed by Global Industries user guide. See EV ONE user guide.
- The charging station use a NEMA 14-50P plug type.
- The charging station shall be powered with 240 VAC.
- Rated current is 40 A.

Lithium powered vehicle utilisation and driving

- Lithium powered vehicle utilisation and driving is the same as lead-acid powered vehicle.
- Regenerative braking efficiency will be reduced when battery SOC is 100 %.
- Continuous fault display on the vehicle screen is not normal. MOTREC technical support should be contacted when this occurs.

EV ONE USER GUIDE



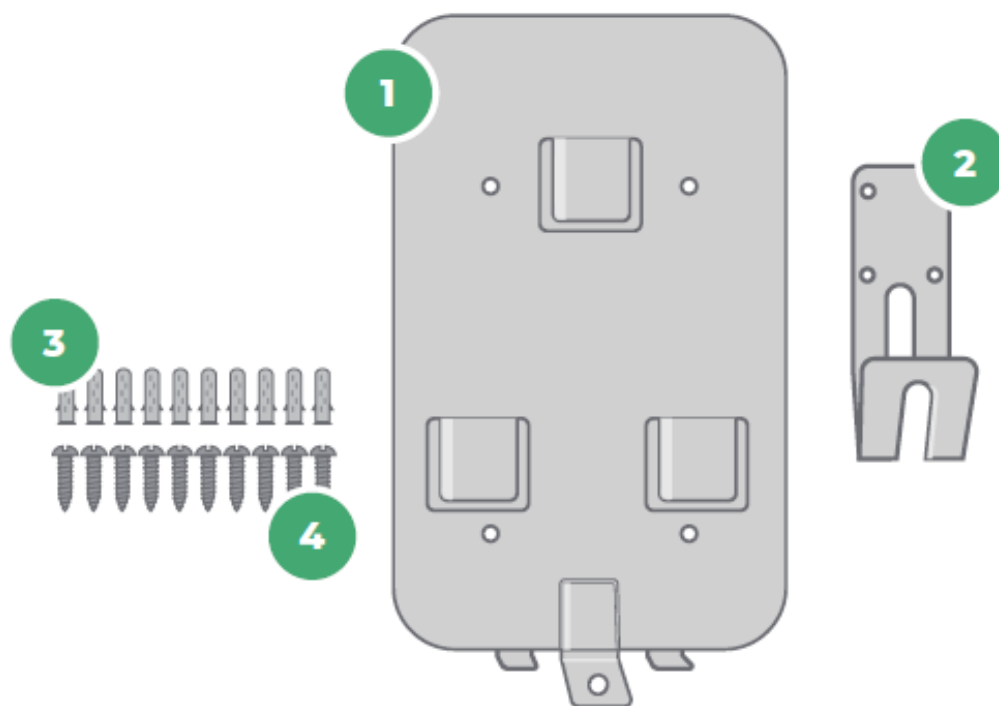
**USER
GUIDE**



Table of contents

- 03** Accessories included with the charging station.
- 04** Overview of the charging station
- 05** Technical specifications
- 06** Installation
- 07** Error messages
- 08** Changing the charge level

Accessories



1

1x Wall plate

2

1x Hook

3

10x Plastic bolts

4

10x Screws

Overview



Spécifications techniques

Installation method Wall / Pole

Charging port SAE J1772

Certificate TUV, CE, C CSA US

IP Degree IP66

Rated Voltage 240 VAC

Rated Current 32A or 40A

Single phase mode (32A) 7.7Kw
(Requires double 40A circuit breaker)

Single phase mode (40A) 9.6Kw
(Requires double 50A circuit breaker)

Not compatible with GFCI circuit breaker

NEMA 14-50P or 6-50P

Operating temperature -40°C to +40°C

Box size 295mm*195mm*70mm

Box weight 7Kg

Case materials ABS+PC alloy

Starting mode Button

Current Adjustable Optional

APP Function Optional

Security protection

Warning and display functions

Open circuit protection

Output overcurrent protection

Input under voltage protection

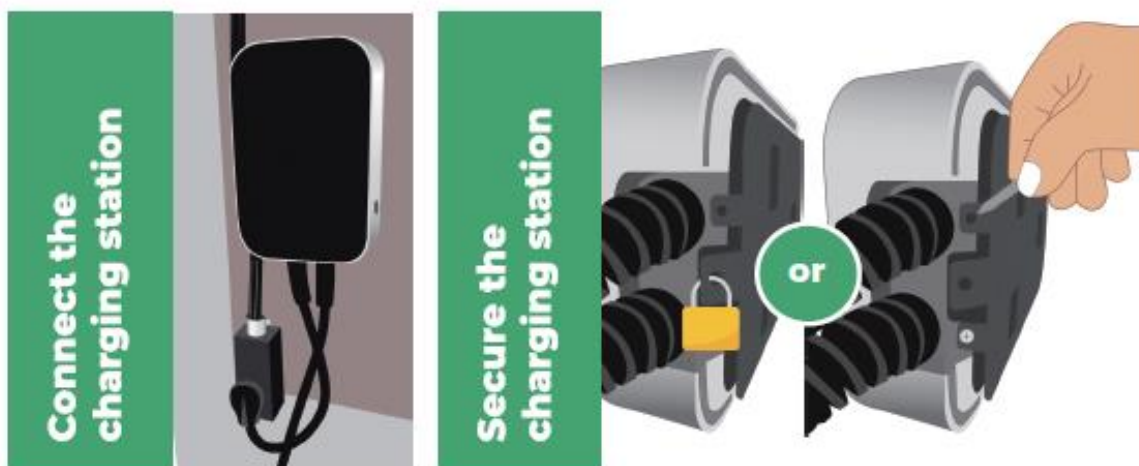
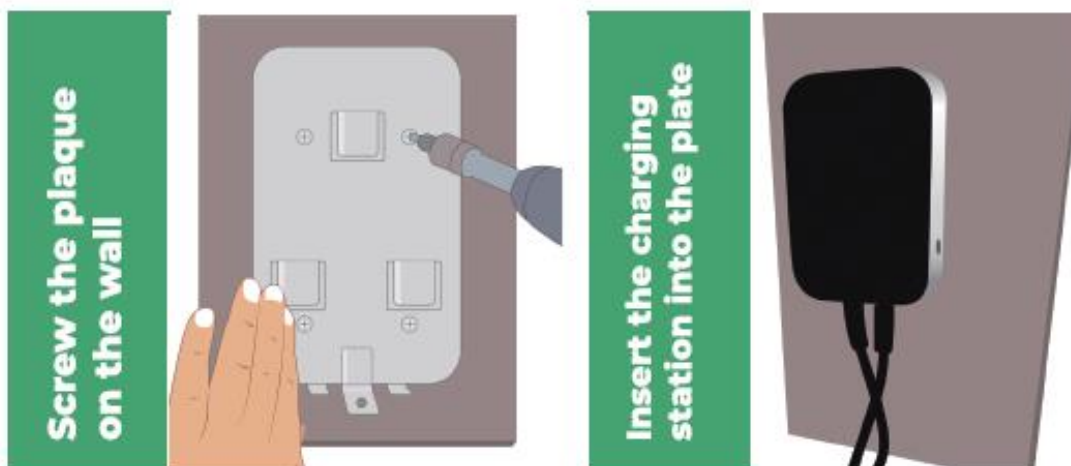
Over temperature protection

Ground protection

input overvoltage protection

Charge status détection

Installation



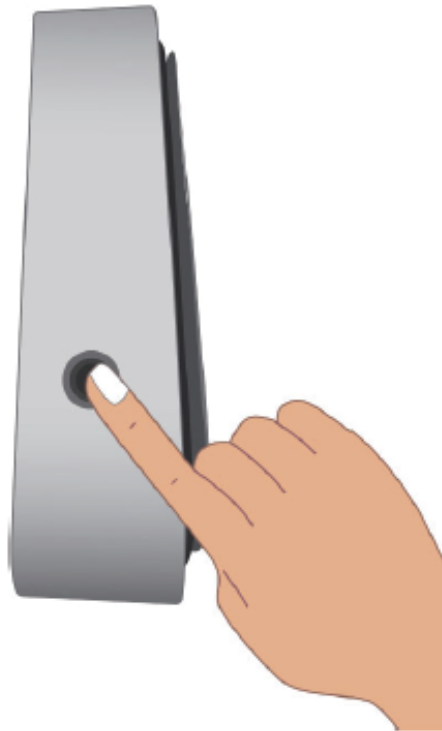
Important

The charging station must be installed at more than 4 feet from the ground

Error messages

Message	Description	Solution Suggestion
CP Error	<i>The Control Pilot (CP) connection is not reliable</i>	Check that your Control Pilot(CP) signal pin isn't shorted. Contact the Ev One provider if this problem persists.
Low voltage	<i>System voltage is lower than workable range</i>	Consult your electrician to ensure appropriate voltage on the circuit breaker that services the Ev One.
Over voltage	<i>System voltage is higher than workable range</i>	Consult your electrician to ensure appropriate voltage on the circuit breaker that services the Ev One.
Ungrounded	<i>The earth ground connection is not reliable</i>	Check if your circuit ground connection is established. If uncertain, consult your electrician to ensure proper grounding at your circuit breaker or power distribution box and that appropriate connections are made to the Ev One.
Over Current	<i>The output current is dangerously increasing</i>	Reduce the vehicle's charge current setting. If the problem persists, contact Ev One provider.
Short Current	<i>An excessive amount of current flowing into the circuit in a short time</i>	Possible causes include short circuits, excessive load, or a ground fault(see Ungrounded error). Check wiring or wiring connections, or contact Ev One provider.
Leakage protection	<i>A dangerous voltage is detected</i>	Consult your electrician
Over temperature	<i>The temperature is higher than workable range</i>	Make sure the connector is fully inserted into the charge inlet in the vehicle, and is not covered by anything, and no heat source is nearby. If the problem persists in normal ambient temperatures(under 50°C or 122°F), contact provider
Emergency stop	<i>The charger doesn't work immediately</i>	Stop using the Ev One and contact the Ev One provider

Changing the charge level



- 1** **Press the button for 5 seconds**
After 5 seconds release the button and the charge level options should appear. If nothing is displayed, you have not pressed long enough.
- 2** **Press the button to select the new charge level**
At each click the charge level changes.
- 3** **When you have selected the correct level of charge do not touch the button and the selection will be made at the next connection to the vehicle.**

Any questions?



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