OPERATION MANUAL

MULTIQUIP®

MQ ZERO TuffTruk

MODEL
TB800BAT

BATTERY-POWERED RIDE-ON POWER BUGGY

(24VDC X2, 1400W X2 ELECTRIC MOTORS)

Revision #0 (12/12/25)

To find the latest revision of this publication or associated parts manual, visit our website at:
www.multiquip.com

THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.

TB800BAT Power Buggy

DISCLAIMER:

Product features, descriptions, and specifications are based on published information at the time of publication and are subject to change at any time without notice. Multiquip Inc. and its affiliates reserve the right to change specifications, features, design, and descriptions of products at any time without notice.

DO NOT operate or service the equipment before reading the entire manual. Safety precautions should be followed at all times when operating this equipment. Failure to read and understand the safety messages and operating instructions could result in injury to yourself and others.

SAFETY MESSAGES

The four safety messages shown below will inform you about potential hazards that could injure you or others. The safety messages specifically address the level of exposure to the operator and are preceded by one of four words: **DANGER, WARNING, CAUTION** or **NOTICE.**

SAFETY SYMBOLS

DANGER

Indicates a hazardous situation which, if not avoided, **WILL** result in **DEATH** or **SERIOUS INJURY.**

WARNING

Indicates a hazardous situation which, if not avoided, **COULD** result in **DEATH** or **SERIOUS INJURY.**

CAUTION

Indicates a hazardous situation which, if not avoided, **COULD** result in **MINOR** or **MODERATE INJURY.**

NOTICE

Addresses practices not related to personal injury.

GENERAL SAFETY

CAUTION

- **NEVER** operate this equipment without proper protective clothing, shatterproof glasses, respiratory protection, hearing protection, steel-toed boots and other protective devices required by the job or city and state regulations.

- Avoid wearing jewelry or loose fitting clothes that may snag on the controls or moving parts as this can cause serious injury.
- **NEVER** operate this equipment when not feeling well due to fatigue, illness or when under medication.

- **NEVER** operate this equipment under the influence of drugs or alcohol.

- **ALWAYS** clear the work area of any debris, tools, etc. that would constitute a hazard while the equipment is in operation.
- No one other than the operator is to be in the working area when the equipment is in operation.
- **DO NOT** use the equipment for any purpose other than its intended purposes or applications.

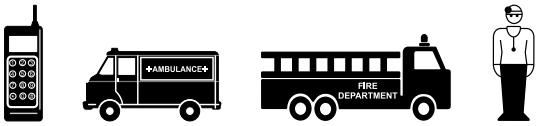
NOTICE

- This equipment should only be operated by trained and qualified personnel 18 years of age and older.
- Whenever necessary, replace nameplate, operation and safety decals when they become difficult read.
- Manufacturer does not assume responsibility for any accident due to equipment modifications. Unauthorized equipment modification will void all warranties.

- **NEVER** use accessories or attachments that are not recommended by Multiquip for this equipment. Damage to the equipment and/or injury to user may result.
- **ALWAYS** know the location of the nearest **fire extinguisher.**

- **ALWAYS** know the location of the nearest **first aid kit.**

- **ALWAYS** know the location of the nearest phone or **keep a phone on the job site.** Also, know the phone numbers of the nearest **ambulance, doctor** and **fire department.** This information will be invaluable in the case of an emergency.



TUFFTRUK SAFETY

⚠ DANGER

- **NEVER** operate the equipment in an explosive atmosphere or near combustible materials. An explosion or fire could result causing severe **bodily harm or even death.**

⚠ WARNING

- Accidental starting can cause severe injury or death. **ALWAYS** place the ON/OFF switch in the OFF position.
- **NEVER** disconnect any **emergency or safety devices.** These devices are intended for operator safety. Disconnection of these devices can cause severe injury, bodily harm or even death. Disconnection of any of these devices will void all warranties.
- **NEVER** approach power lines with any part of the TuffTruk unless all local, state/provincial and federal (OSHA) required safety precautions have been taken. Use extreme caution when approaching high voltage power lines.

⚠ CAUTION

- **ALWAYS** inspect the surface over which you will travel. Look for holes, drop-offs and obstacles. Look for rough and weak spots on docks, ramps or floor.
- **ALWAYS** Look for oil spills, wet spots and slippery surfaces. Look for soft soil, deep mud and standing water. Watch for anything that might make you lose control or cause the TuffTruk to tip over.
- **ALWAYS** clear away trash and debris. Pick up anything that might puncture the tires.
- **ALWAYS** make sure aisles, ramps, doorways and passages are clear.
- **ALWAYS** plan your work. Make sure you know where you will make your pickups, dumps and turns. Before you take a load, know where you will place it.
- **NEVER** travel down a slope with a ***full load***. The possibility exists of tipping.

- **DO NOT** operate the TuffTruk on unsafe haul roads, load areas, and dump areas.
- **DO NOT** operate TuffTruk on excessive slopes with a grade higher than 25° (45%), forward and backward.
- **DO NOT** operate TuffTruk on extremely uneven surfaces.
- **NEVER** allow people to ride inside the tub/bucket.
- **DO NOT** operate the TuffTruk at excessive speeds. Reckless operation may cause accidents and severe injury. Slow down when approaching people, wet areas, and going up and down grades. It is the responsibility of the operator to adjust speed, as necessary, depending on the conditions of the road or path.
- Forward travel speed should not exceed 4 mph (6.44 km/h). Reverse travel speed should not exceed 1.5 mph (2.42 km/h).
- **ALLOW** extra time to stop when operating the TuffTruk on wet surfaces or loosely graded materials.
- **DO NOT** dump materials from bucket/tub while the TuffTruk is moving.

NOTICE

- **ALWAYS** ensure TuffTruk is **securely** placed on appropriate blocks or jackstands when performing maintenance.
- When parking on a slope, position the TuffTruk at a right angle to a slope.
- When filling or dumping **DO NOT** exceed payload capacity of TuffTruk.
- **ALWAYS** be aware of traveling conditions. Reduce load if necessary.
- **DO NOT** activate dump mechanism (tub/bucket) if TuffTruk is facing a down hill slope.
- **DO NOT** stand in front or along side the TuffTruk when discharging a load.
- **ALWAYS** block the TuffTruk with appropriate blocks when leaving the TuffTruk parked on a slope.
- To prevent unexpected loss of control, **DO NOT** start engine on a sloping surface.
- Ensure that the speed control levers works freely and returns to the stop position. **DO NOT** start electric motor unless speed control linkage is working properly.
- Make sure that the tires are inflated to the manufacturer's recommended tire pressure.
- **NEVER** operate the TuffTruk with bad or worn tires. **ALWAYS** replace defective tires with new ones.
- Avoid sudden stops and starts and changes in direction. Operate the controls smoothly. **DO NOT** jerk the steering or any other controls.
- **NEVER** attempt to engage the controls except from the operator's position.
- **NEVER** operate or tow the TuffTruk in traffic or on public roads.
- **ALWAYS** keep the machine in proper running condition.
- Fix damage to machine and replace any broken parts immediately.
- The entire TuffTruk (tub, shroud, wheels, etc.) should be cleaned after every use. Make sure there is no buildup of concrete, grease, oil or debris on the machine.
- **ALWAYS** store equipment properly when it is not being used. Equipment should be stored in a clean, dry location out of the reach of children and unauthorized personnel.

BATTERY SAFETY

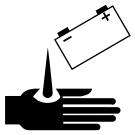
⚠ DANGER

- **DO NOT** drop the battery. There is a possibility that the battery will explode.
- **DO NOT** expose the battery to open flames, sparks, cigarettes, etc. The battery contains combustible gases and liquids. If these gases and liquids come into contact with a flame or spark, an explosion could occur.

⚠ WARNING

- **ALWAYS** wear safety glasses when handling the battery to avoid eye irritation. The battery contains acids that can cause injury to the eyes and skin.

- Use well-insulated gloves when picking up the battery.
- **ALWAYS** keep the battery charged. If the battery is not charged, combustible gas will build up.
- **DO NOT** charge battery if frozen. Battery can explode. When frozen, warm the battery to at least 61°F (16°C).
- **ALWAYS** recharge the battery in a well-ventilated environment to avoid the risk of a dangerous concentration of combustible gases.
- If the battery liquid (dilute sulfuric acid) comes into contact with **clothing or skin**, rinse skin or clothing immediately with plenty of water.



- If the battery liquid (dilute sulfuric acid) comes into contact with **eyes**, rinse eyes immediately with plenty of water and contact the nearest doctor or hospital to seek medical attention.

⚠ CAUTION

- **ALWAYS** disconnect the **NEGATIVE battery terminal** before performing service on the equipment.
- **ALWAYS** keep battery cables in good working condition. Repair or replace all worn cables.
- **ALWAYS** use proper lifting procedures when removing the batteries from the machine. Batteries are quite heavy. Bodily injury may result if proper lifting procedures are not employed.

LIFTING SAFETY

⚠ CAUTION

- **NEVER** allow any person or animal to stand underneath the equipment while lifting.

NOTICE

- When lifting of the TuffTruk is required, attach lifting straps or chains to designated lifting points only.
- Use lifting straps or chains of adequate lifting capacity.
- **DO NOT** lift machine to unnecessary heights.
- **NEVER** lift the equipment while the engine is running.
- **ALWAYS** use ramps capable of supporting the weight of the TuffTruk and the operator to load and unload the TuffTruk.

TRANSPORTING SAFETY

NOTICE

- **ALWAYS** shutdown unit before transporting.
- When transporting of the TuffTruk is required, place the TuffTruk on a flat bed truck or equivalent and tie down securely.
- **ALWAYS** make sure all tie-downs are in place and the tub/bucket is completely lowered in the flat (horizontal) position and securely latched.
- Secure articulating joint and lock latch bar.
- Place ***chock blocks*** underneath wheel to prevent rolling.
- **DO NOT** use the TuffTruk to transport people.
- When transporting the TuffTruk on a truck or trailer, know the overall height to avoid contacting overhead obstructions such as bridges and power lines. Check the truck and ramp capacities.

ENVIRONMENTAL SAFETY/DECOMMISSIONING

NOTICE

Decommissioning is a controlled process used to safely retire a piece of equipment that is no longer serviceable. If the equipment poses an unacceptable and unrepairable safety risk due to wear or damage or is no longer cost effective to maintain (beyond life-cycle reliability) and is to be decommissioned (demolition and dismantlement), be sure to follow rules below.

- Contact your country's Department of Public Works or recycling agency in your area and arrange for proper disposal of any electrical components, waste or oil associated with this equipment.

- When the life cycle of this equipment is over, remove battery (if equipped) and bring to appropriate facility for lead reclamation. Use safety precautions when handling batteries that contain sulfuric acid.
- When the life cycle of this equipment is over, it is recommended that the unit frame and all other metal parts be sent to a recycling center.

  Metal recycling involves the collection of metal from discarded products and its transformation into raw materials to use in manufacturing a new product.

  Recyclers and manufacturers alike promote the process of recycling metal. Using a metal recycling center promotes energy cost savings.

WORK SAFELY!

WARNING

Failure to comply with these lifting instructions may result in **lifting equipment failure** and **severe personal injury or death**.

Only **qualified personnel** with proper training should perform this procedure. Follow all rigging and lifting safety rules when performing this procedure.

LIFTING SAFETY

CAUTION

- **NEVER** allow any person to stand underneath the equipment while lifting.
- Power buggies are very heavy and awkward to move around. **ALWAYS** use proper heavy-lifting procedures.
- **NEVER** lift the equipment with the operator on the machine.

NOTICE

- **ALWAYS** make sure any lifting device has been properly secured to the lift loops of the buggy.
- **DO NOT** lift the equipment to unnecessary heights.
- **ALWAYS** shut down the machine before transporting.

LIFTING EQUIPMENT INSPECTION

ALWAYS perform a thorough inspection of lifting chains, hooks, or slings **before each use**. All lifting equipment and procedures must comply with **Occupational Safety and Health Administration (OSHA) Regulation 29 CFR Part 1926.251**.

Chain Inspection

The Occupational Safety and Health Administration (OSHA) Regulation 29 CFR Part 1926.251 (b)(5) — *Removal from service* requires that steel chains used for lifting be inspected prior to each use, and **removed from service immediately** whenever wear at any point of any chain link exceeds that shown in Table A.

Table A. Maximum Allowable Wear at Any Point of Chain Link

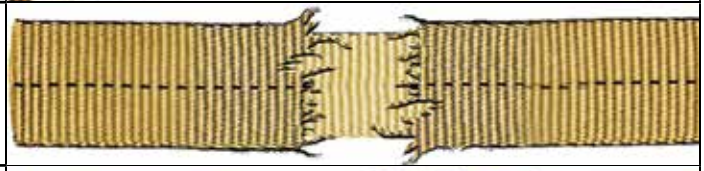
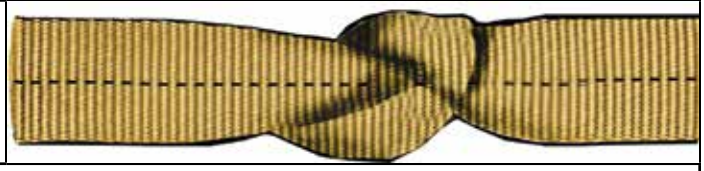
Chain Size (Inches)	Maximum Allowable Wear (Inch)
1/4	3/64
3/8	5/64
1/2	7/64
5/8	9/64
3/4	5/32
7/8	11/64
1	3/16
1 1/8	7/32
1 1/4	1/4
1 3/8	9/32
1 1/2	5/16
1 3/4	11/32

WARNING

ALWAYS check Rated Capacity tags on lifting chains before use. **DO NOT** use chains with missing or illegible Rated Capacity tags. **ALWAYS** make sure the rated capacity of the lifting equipment is sufficient for the load being lifted.

Sling Inspection

The Occupational Safety and Health Administration (OSHA) Regulation 29 CFR Part 1926.251 (e)(8) — *Removal from service* requires that lifting slings be inspected prior to each use, and **removed from service immediately** if any of the conditions listed in Table B are found.

Table B. Conditions for Removal of Lifting Slings from Service	
■ Holes, tears, cuts, or snags ■ Embedded particles ■ Abrasive wear that exposes core fibers	
■ Missing or unreadable Rated Capacity tags ■ Melting, charring, weld spatter, or chemical burns	
■ Broken or worn stitching that exposes the core fibers	
■ Knots	
■ Any other condition which may cause doubt as to the strength of the sling	

LIFTING PROCEDURE

Use the correct lifting slings or chains for the weight of your buggy in accordance with Occupational Safety and Health Administration (OSHA) Regulation 29 CFR Part 1926.251 — *Rigging equipment for material handling*.

⚠ WARNING

ALWAYS inspect the lifting equipment (slings, chains, etc.) **before each use**.

NOTICE

MAKE SURE the lifting device has adequate lifting capacity to lift the buggy.

1. Make sure the tub is completely empty. **DO NOT** lift while the tub is loaded.
2. Turn the engine **OFF**.
3. Always use the articulation pin to lock and stop any unwanted movement.
4. Attach chain or nylon sling to the lifting pointshown in Figure A. Make sure the chain or sling is rated for a minimum load capacity of 2,600 pounds (1,180 kg).
5. Adjust slack in the chains or straps so that the buggy will remain level when lifted.
6. Lift the buggy using an appropriate crane or equivalent lifting device capable of lifting a minimum of 2,600 pounds (1,180 kg).

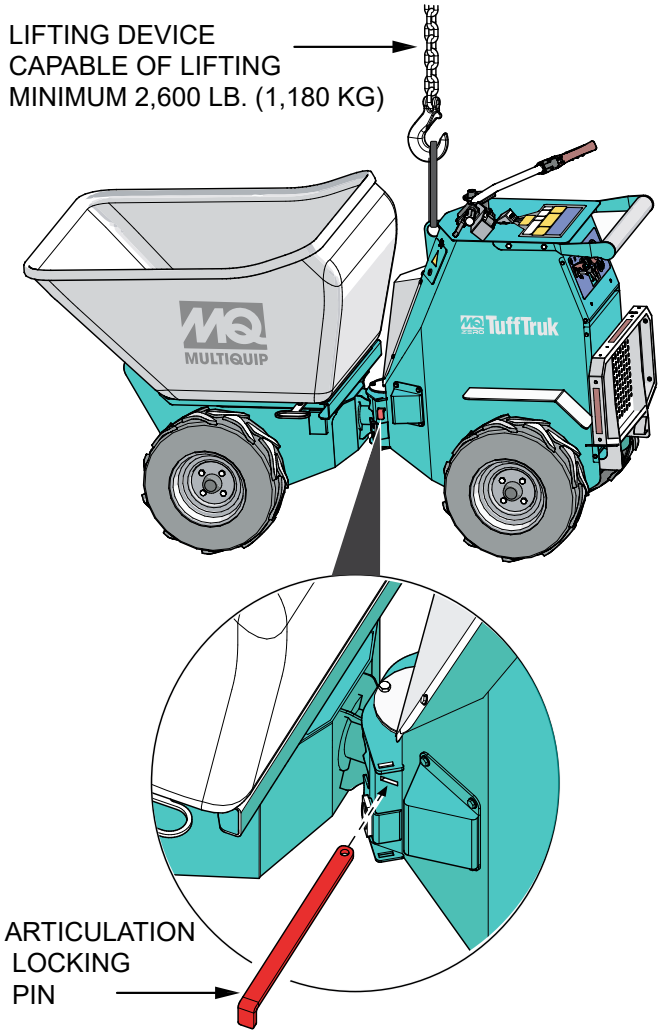


Figure A. Lifting Procedure

Table 1. Specifications (TuffTruk)	
Model	TB800BAT
Maximum Weight Capacity	1,212 lbs. (550 kg)
Maximum Payload (Sand)	800kg / 1800lbs / 15.5 ft^3 / 0.43m^3
Maximum Payload (Concrete)	720kg / 1600lbs / 12.5 ft^3 / 0.35m^3
Tub Material	Polyethylene
Drive	24 VDC Electric Motor
Speed Forward	Up to 3.8 mph. (6.2 km/h)
Speed Reverse	Up to 2.4 mph. (3.8 km/h)
Working Width.	35.2 in. (894.08mm)
Brake System	Electrically operated with fail-safe deadman handle, Regenerative braking
Dump Control	Hydraulic powered
Discharge Time	5 sec
Gradeability)	10°
Power Type	4 x 6 V AGM Batteries
Battery (LxWxH)	12.05 x 6.84 x 9.32 in. (306 x 174 x 237 mm)
Battery Weight	64 lbs (29 kg)
Pneumatic Tires	20 x 8 x 10 (508 x 203 x 254 mm)
Run Time/Charge Time	8 hours

Table 2. Electric Motor Specifications	
Model	**AMER**
Type	Permanent Magnet DC Electric Motor
Speed Control Method	Curtis 1228 Controller
Starting Method	Electric
Max RPM (No Load)	2900
Input Voltage	24 VDC
Wattage	1400 X 2 (2800W)
Poles	4
Protection Class	IP: 44
Insulation Class	F
IEC Duty Cycle	S3 15%
Dimension Approx. (L x W x H)	6.4 X 7.81 X 5.7 in. (164 X 200 X 145 mm)
Dry Net Weight Approx.	22 lbs. (10 kg)

Table 3. Noise and Vibration Emissions	
Model	TB800BAT
Guaranteed ISO 11201:2010 Based Sound Pressure Level at Operator Station in dB(A)[a]	***56***
Guaranteed ISO 3744:2010 Based Sound Power Level in dB(A)[b]	82
Hand-Arm Vibration Per ISO 5349-1:2001 in m/s^2 ∑A(8)	***2.5***

a. With an uncertainty factor K of 2.5 dB (A) included per Note 1 in section 7.2.1 of EN 12649::2008+A1:2011

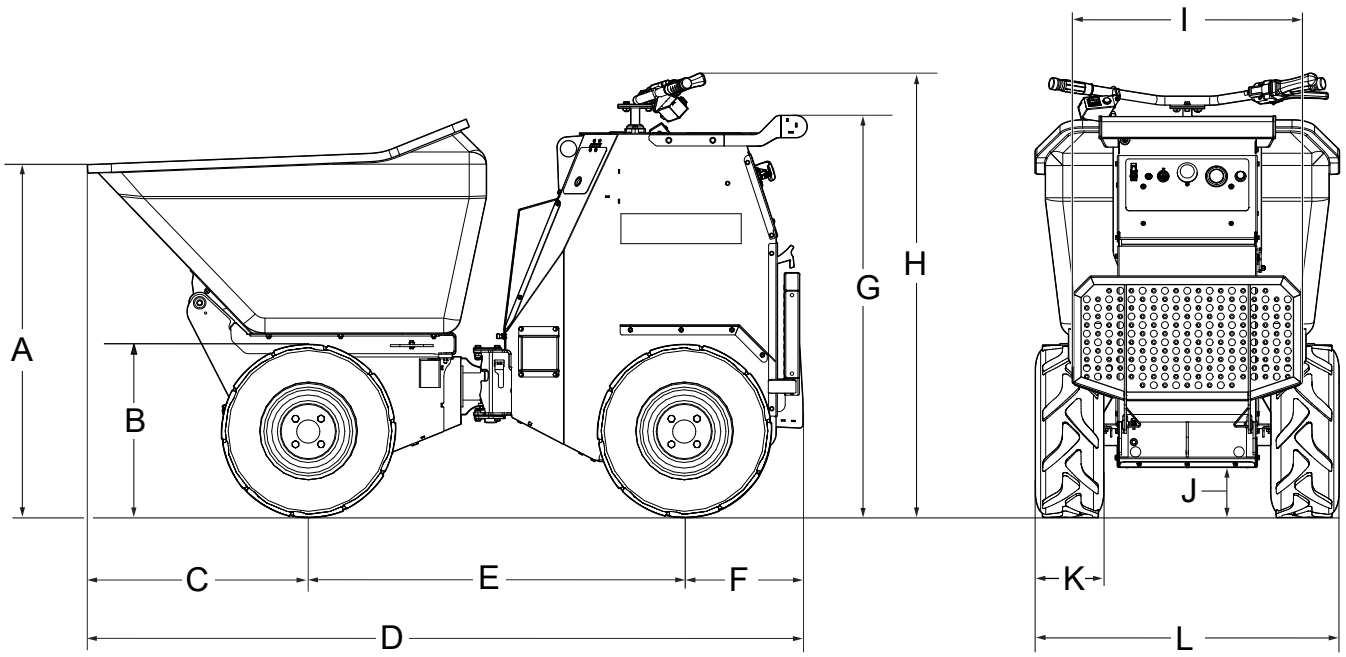
b. With an uncertainty factor K of 1.5 dB (A) included per Note 1 in section 7.2.1 of EN 12649::2008+A1:2011

NOTES:

1. Sound pressure and power levels are “A” weighted measures per ISO 3744:2010. They are measured with the operating condition of the machine which generates the most repeatable but highest values of the sound levels. Under normal circumstances, the sound level will vary depending on the condition of the material being worked upon.
2. The vibration level indicated is the vector sum of the RMS (root mean Ssquare) values of amplitudes on each axis, standardized to an 8-hour exposure period, and obtained using the operating condition of the machine that generates the most repeatable but highest values in accordance with the applicable standards for the machine.
3. Per EU Directive 2002/44/EC, the daily exposure action value for hand/arm vibration is 2.5 m/s^2 ∑A(8). The daily exposure limit value is 5 m/s^2 ∑A(8).

SIDE VIEW

REAR VIEW



TOP VIEW

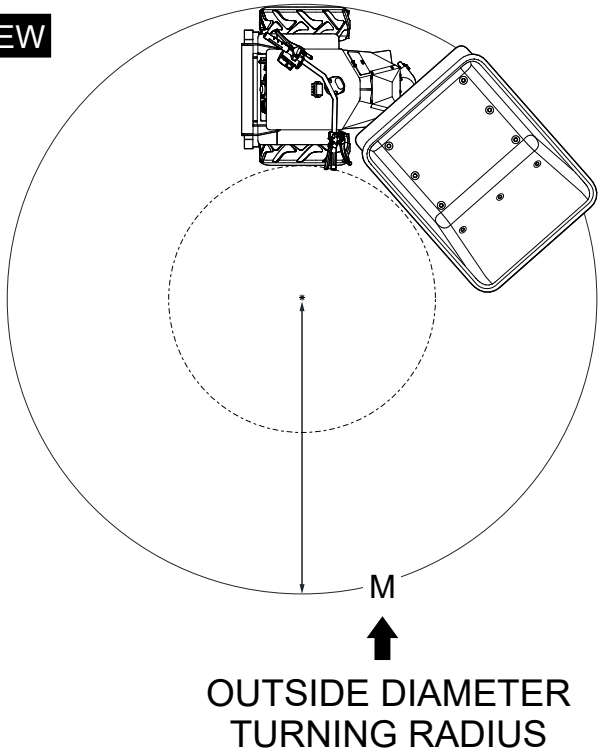


Table 4. Dimensions	
Reference Letter	Dimension in. (mm)
A	46.3 (1176)
B	20 (508)
C	25.7 (652)
D	83.2 (2114)
E	43.9 (1115)
F	13.7 (347)
G	46.8 (1188)
H	51.7 (1312)
I	26.3 (668)
J	6.6 (168)
K	7.9 (200)
L	34.8 (885)
M	74.2 (1884)

Figure 1. TB800BAT Dimensions

The Multiquip Ride-On TB800BAT ***electric power buggy*** is intended for job site cleanup and material transport.

The buggy is equipped with a 2.0 in. (50.8 mm) dump height which provides clearance and enables the operator to maneuver over any form height.

A low center of gravity has been incorporated into the design which provides added safety when maneuvering the buggy in tight areas.

The maximum ***forward*** speed of the ***electric*** driven buggy is rated at 3.8 mph. (6.2 km/h). Maximum ***reverse*** speed is 2.4 mph. (3.8 km/h).

For ease of dumping, a manual hand lever control is provided. Maximum weight capacity (payload) is 990 lbs. (450 kg). Multiple lift points have been provided to allow for easy access of a forklift when lifting is required.

ELECTRIC POWER PLANT

The buggy is equiped with four 6 VDC batteries. For additional information, reference Table 2.

MOTOR CONTROLLER

This buggy is equipped with a sealed heavy-duty permanent motor controller. This controller provides functional and directional control of the TuffTruk buggy. It allows the buggy to start and stop or move in a forward or reverse direction.

This controller can detect a wide variety of faults or error conditions. Diagnostic information can be obtained by interfacing with the Gauge Display. This gauge will display error codes as referenced in the maintenance section of this manual.

DIAGNOSTIC GAUGE

Both electric models are equipped with a diagnostic gauge. This gauge will display system error codes. Reference maintenance section in this manual for further details.

⚠ WARNING

All operators must have training before operating the TuffTruk buggy. For your safety, warnings are on the machine and in this manual. Failure to obey these warnings can cause severe injury or even death.

⚠ CAUTION

DO NOT attempt to operate the TuffTruk buggy until the Safety Information, General Information, and Inspection sections of this manual have been ***read and thoroughly understood.***

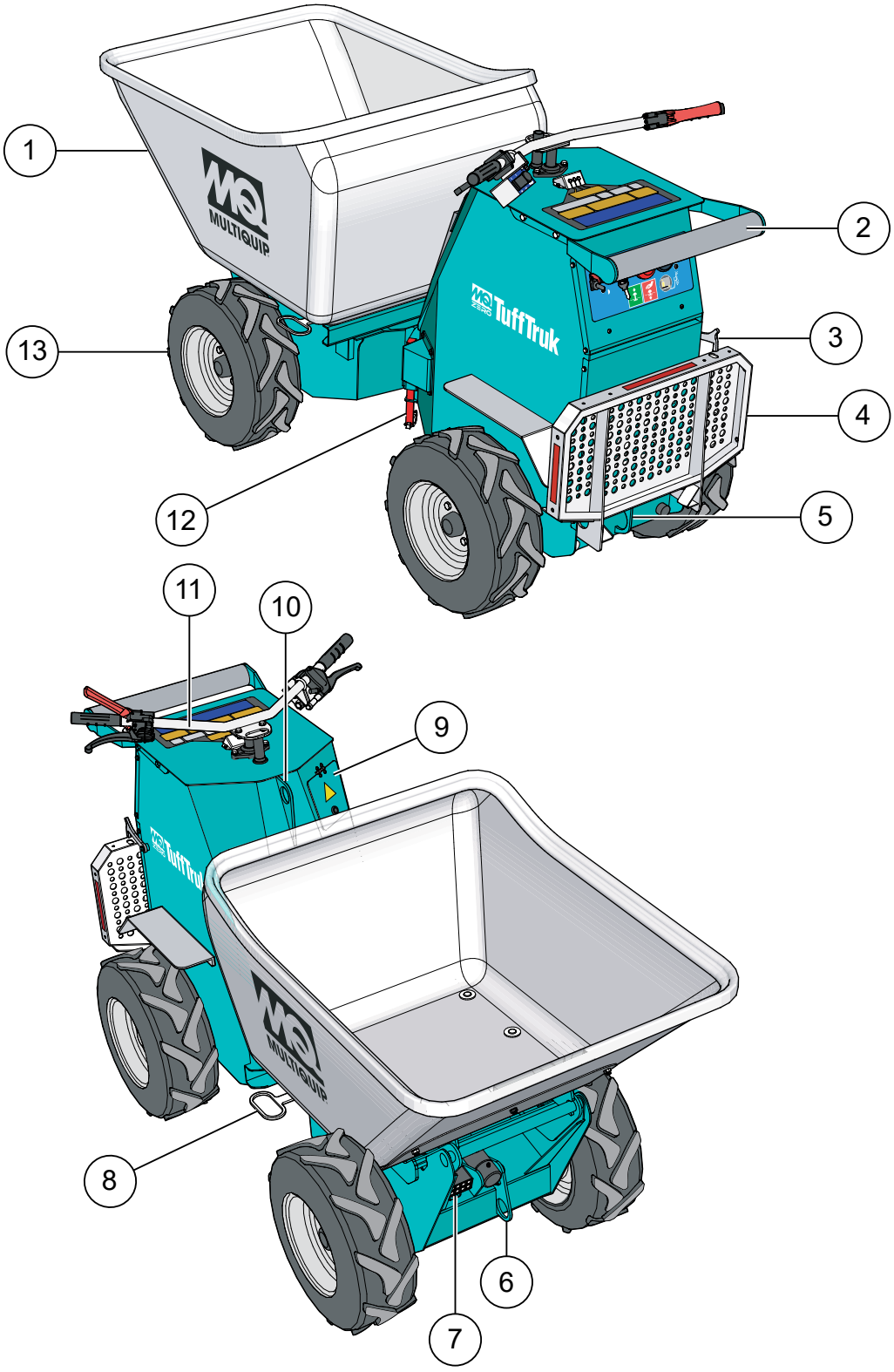


Figure 2. TuffTruk Walk-Behind Power Buggy Components

1. **Tub or Bucket** — Used for the transportation of material. Tub holds approximately 15.0 cubic feet (0.43 cubic meters) of sand.
2. **Support Bar** — Hold on to this bar to support body when climbing onto foot stand.
3. **Foot Stand Catch** — Secures the foot stand in place when in the stowed position.
4. **Foot Stand** — Operator should have both feet on stand when operating the buggy.
5. **Rear Tie Down Point** — Used to tie down buggy when transporting.
6. **Front Tie Down Point** — Used to tie down buggy when transporting.
7. **LED Light** — When necessary this light can be turned on to assist operator in navigating a well-lit path.
8. **Bucket Lock/Release Handle** — Holds the bucket securely in place.Pull out handle to release bucket.
9. **Charging Point** — Open to access charging cable for battery.
10. **Lifting Point** — Attach a suitable lifting strap to these points when lifting of the buggy is required. Used with the front and rear tie down point when transporting buggy.
11. **Handle Bar (Steering)** — This handle bar is used to steer the buggy. When steering the buggy, use both hands and hold onto both handle bar grips.
12. **Articulation Locking Pin** — Prevents from tub from swiveling and keeps it straight when lifting. See lifting instructions.
13. **Tires** — Unit uses pneumatic tires. Reference Table 1 for tire size.

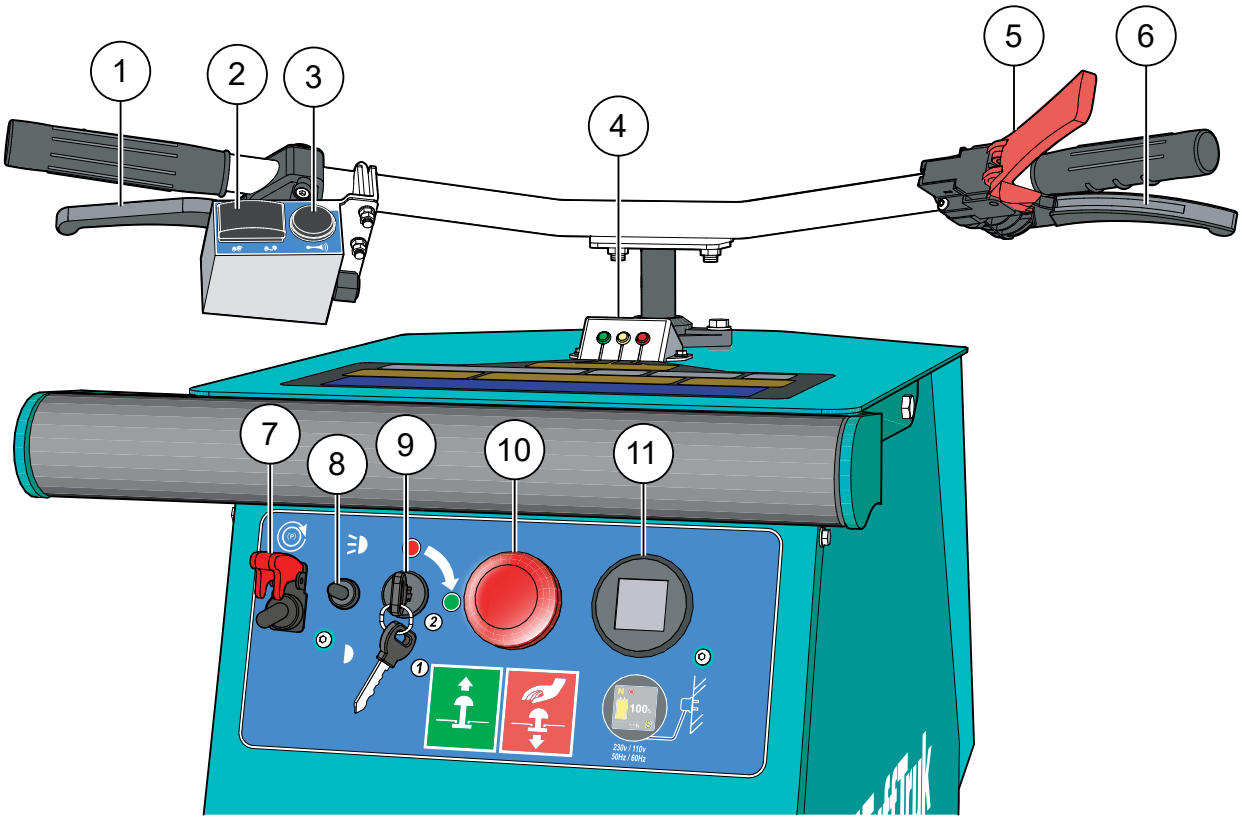


Figure 3. Control and Handle Components

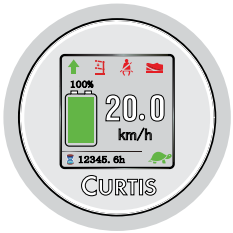
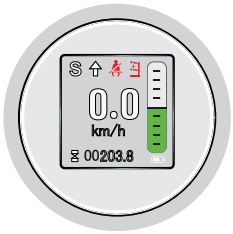
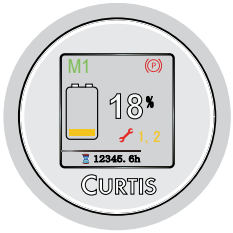
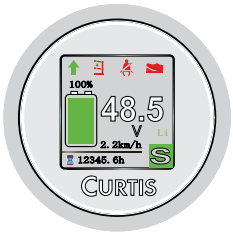
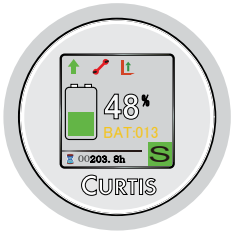
1. **Reverse Control Lever** — In combination with travel and deadman lever, moves the buggy in reverse direction.
2. **Dump Control Switch** — Press switch to start dumping load from the bucket.
3. **Horn Button** — Press button to sound horn to warn others of approach.
4. **Motor Amp Draw LED** — shows the different levels of amp draw from the motor with red LED lighting when overloaded with machine shutting down, Yellow LED light for full load and green LED light for regular load.
5. **Deadman Control Lever** — ***Red*** handle lever, when engaged (closed) allows the buggy to travel in either a forward or reverse direction. Works in conjunction with forward and reverse control levers. In addition, this lever, when engaged, releases the brake.
6. **Forward/Reverse Speed Control** — When the lever is pressed with the deadman lever, the buggy will travel in the forward direction.The harder travel lever is pressed, the faster the speed is (within the selected speed range).
7. **Brake Bypass Switch** —Momentary toggle switch. Allows the buggy to be moved with the electric motor brakes disengaged
8. **Light Switch** — Turns the front light on and off.
9. **Ignition/Key** — When activated allows the unit to be started.
10. **Emergency Stop Switch** — In the event of an emergency, ***push*** this button to shutdown the electric motor.
11. **Battery/Diagnostic Gauge** — Uses a Curtis Gauge Display Model 3150R. Displays battery voltage and fault codes.

The TB800BAT uses the Curtis Model 3150R Diagnostic Gauge (Figure 3, item 11). It displays the following:

- Icons that indicate states such as on/off. For example, icons indicate whether the seat belt is on or lift lockout is active.
- Indicators for the active speed mode and transmission state.
- Speedometer.
- Hour meter that indicates the running time of the 3150R, devices.
- Message center that broadcasts custom information.
- Battery discharge indicator (BDI) that shows the battery's state-of-charge.
- Fault codes - see Troubleshooting section for list and description.

USER INTERFACES

The diagnostic gauge hase five user interfaces called GUIs (Graphical User Interface). See chart below for description of each GUI.

User Interface	Example	Description
GUI 1		Displays all 3150R functions other than lithium battery voltage.
GUI 2		Displays all 3150R functions other than lithium battery voltage. Many of GUI 2's icons look differently than those for GUIs 1, 4 and 5.
GUI 3		Displays the following items for Curtis controllers that support the SCI: • Speed mode • Parking brake status • BDI status • Fault codes • Hour meter
GUI 4		Designed for applications that display lithium battery voltage. The difference between GUI 4 and GUI 1 is that GUI 4 displays the lithium battery voltage in the area where GUI 1 displays the speed. GUI 4 displays the speed below the battery voltage.
GUI 5		Designed for applications that prominently display the remaining battery charge. GUI 5 does not provide a speedometer and does not support faults for dual traction controllers, hydraulic pumps and steering controllers.

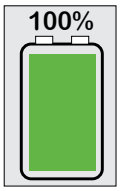
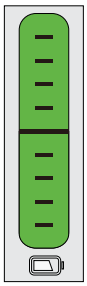
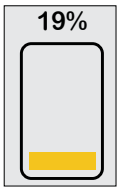
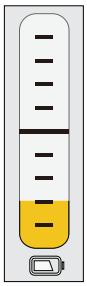
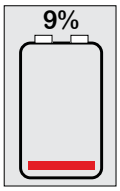
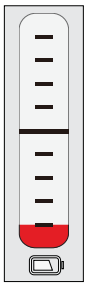
BATTERY DISCHARGE INDICATOR (BDI)

The BDI icon uses color to indicate the BDI percentage, which measures the amount of remaining battery charge. The color reflects whether the battery is sufficiently charged, is starting to get low, or is in urgent need of charging.

See chart below for BDI Status Information.

NOTICE:

For more details on the how the gauge functions, refer to the Curtis Model 3150R Manual.

BDI Status	GUIs 1, 3, 4 and 5	GUI 2	Comments
Okay			
Warning			When the BDI status is Warning, the low BDI alarm icon,  , flashes.
Low			When the BDI status is Low, the low BDI alarm icon flashes, the lift is locked and the lift lock icon,  , flashes.

BEFORE STARTING

CAUTION

NEVER disable or disconnect the **emergency stop switch**. It is provided for operator safety. Injury may result if it is disabled, disconnected or improperly maintained.

BATTERY

This unit is of negative ground **DO NOT** connect in reverse.

Check to see whether the battery cables are loose. Poor contact may result in poor starting or malfunctions.

ALWAYS keep the terminals firmly tightened and coat the terminals with an approved battery terminal treatment compound.

Replace battery with only recommended type battery. The battery type used in this power buggy is AGM (Absorbed Glass Mat), which refers to a type of advanced lead-acid battery. Instead of a liquid electrolyte, it uses a fine fiberglass mat to absorb and immobilize the electrolyte between the lead plates. This design makes AGM batteries spill-proof, maintenance-free, and more resistant to vibrations.

BATTERY CABLE INSTALLATION

ALWAYS be sure the battery cables (Figure 4) are properly connected to the battery terminals as shown below. The batteries are connected in series.

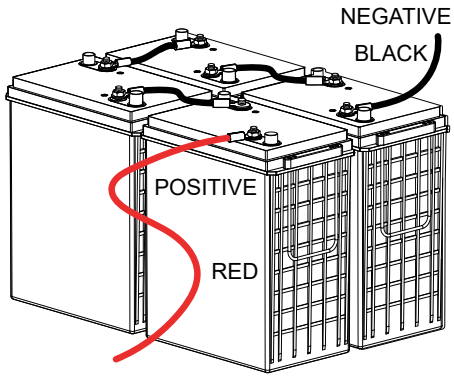


Figure 4. Battery Series Connections

When connecting battery do the following:

1. **NEVER** connect the battery cables to the battery terminals when the ignition is in the **ON** position (start).
2. Place a small amount of battery terminal treatment compound around both battery terminals. This will ensure a good connection and will help prevent corrosion around the battery terminals.

NOTICE

If the battery cable is connected incorrectly, electrical damage to the power buggy will occur. Pay close attention to the polarity of the battery when connecting the battery.

CAUTION

Inadequate battery connections may cause poor starting of the TuffTruk buggy, and create other malfunctions.

TIRE CHECK

Check for ***worn*** or ***defective*** tires (Figure 5). Replace any defective or worn tires immediately.

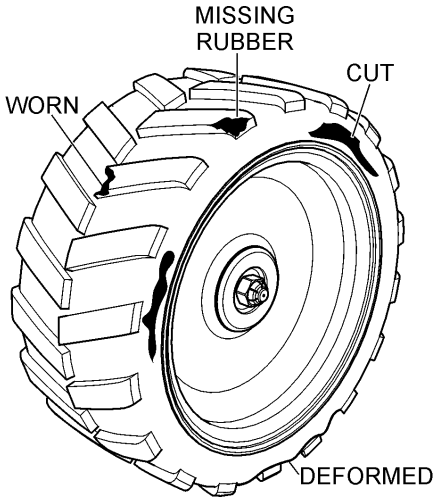


Figure 5. Tire Wear

The wheels and tires of the power buggy are very important in its effective operation.

1. Check the tires regularly to make certain the lug nuts are tight.
2. Make sure tires are inflated to manufacturer's suggested tire pressure. **DO NOT** operate the buggy with bad or worn tires.

LINKAGE CHECK

Check and make sure that ***all*** linkages within the TuffTruk buggy are functioning correctly.

STEERING CHECK

Check and make sure that the power buggy's steering turns freely and that there is no binding.

This section is intended to assist the operator with the initial start-up of the unit. It is extremely important that this section be read carefully before attempting to use the TuffTruk walk-behind power buggy in the field. **DO NOT** use your buggy until the General Information, and Inspection sections of this manual have been ***read and thoroughly understood***.

⚠ WARNING

Failure to understand the operation of the buggy could result in severe damage to the buggy or personal injury. Reference Figure 2 for the location of any components referenced in this manual.

STARTING THE BUGGY

1. Pull out the operator platform from the stowed position to the stand-on position (Figure 6).

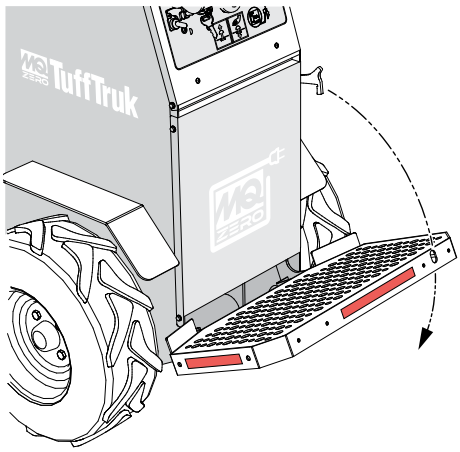


Figure 6. Lowering Operator Platform

2. Stand on the platform with both feet (Figure 7).

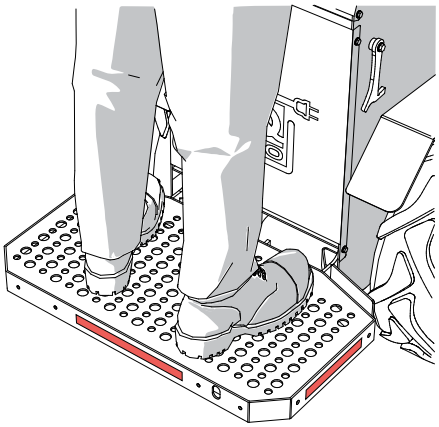


Figure 7. Standing on Platform

3. Locate the ***emergency stop*** switch on the control panel of the buggy (Figure 8). Pull this switch outward to start the electric motor.

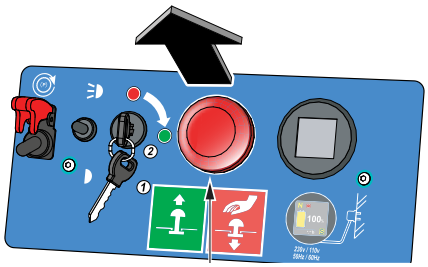


Figure 8. Emergency Stop Switch (Closed)

4. Place the ignition key (Figure 9) in the **START** position. Allow the controller to run its diagnostic checks.In addition, check battery voltage level. If low, recharge batteries.

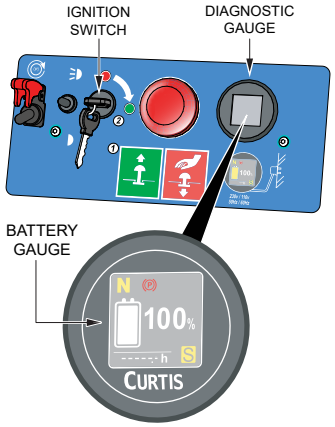


Figure 9. Ignition Key (Start)

5. With the electric motor running, fully squeeze the **RED** deadman lever (Figure 10) and hold down. When the lever is held down, a signal is sent to the motor controller to release the brake.

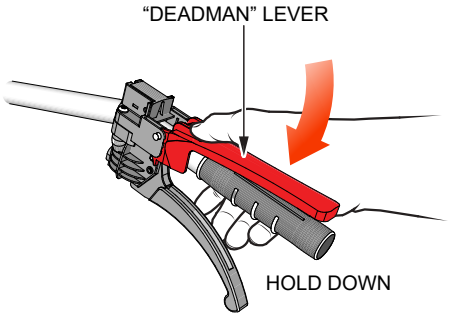


Figure 10. Deadman Lever

6. While keeping the deadman lever squeezed, slightly squeeze the ***forward*** control lever (Figure 11) until the buggy begins to move in a ***forward*** direction.

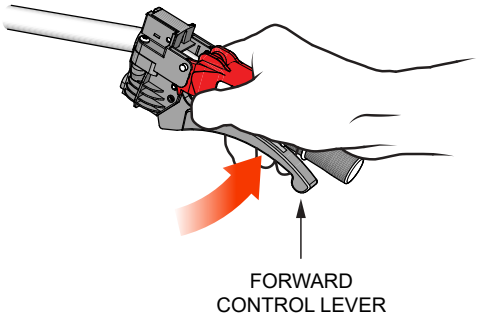


Figure 11. Forward Control Lever

7. On the opposite side of the handle bar is the ***reverse*** control lever. Squeeze the ***reverse*** control lever (Figure 12) and hold down.

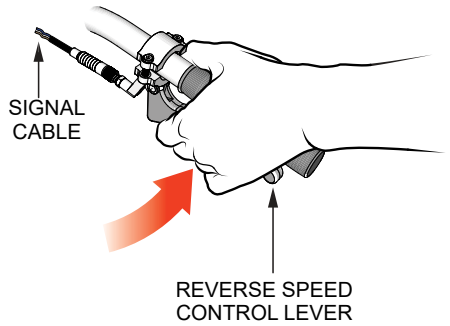


Figure 12. Reverse Control Lever Signal Cable

8. Slightly squeeze the ***forward*** control lever (Figure 11) until the buggy begins to move in a ***reverse*** direction.

⚠ CAUTION

Avoid sudden and quick turns. When steering, turn the handle bar slowly. **ALWAYS** face the controls when traveling.

9. The buggy is equipped with a motor amp draw LED to indicate the load on the motor (Figure 13)

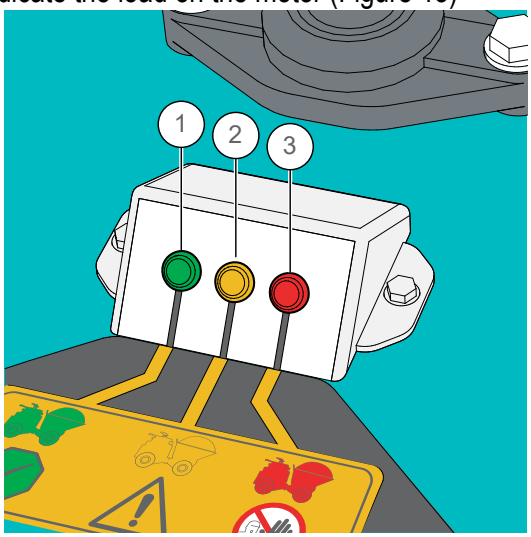


Figure 13. Motor Amp Draw LED

10. The LED indicates load on the motor as follows:

    1: Green - acceptable load

    2: Yellow - warning, load is about 80%

    3: Red - load is full; machine stops if motor is too hot.

11. If machine stops, let motor cool down and restart machine.

STEERING

To steer the buggy, use the handle bar in front of the unit.

1. To turn left (Figure 14) when traveling in the forward direction, turn the handle bar counterclockwise.

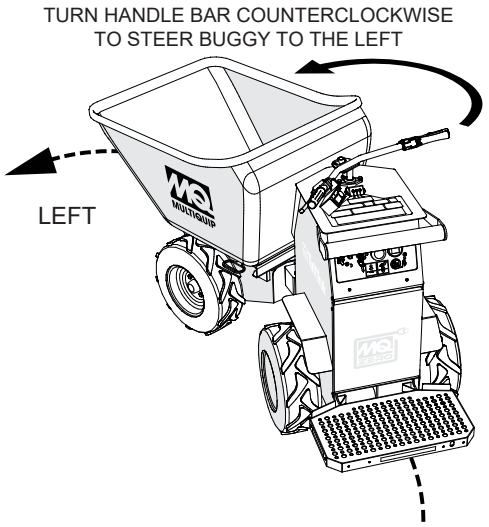


Figure 14. Steering the Buggy (CCW-Left)

2. To turn right (Figure 15) when traveling in the forward direction, turn the handle bar in the clockwise direction.

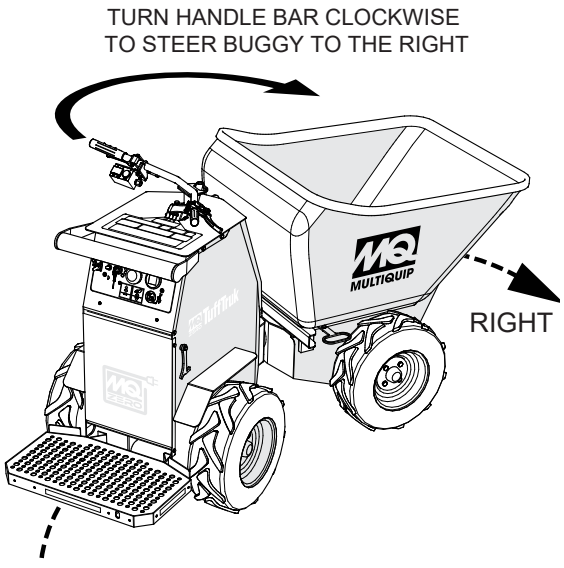


Figure 15. Steering the Buggy (CW-Right)

⚠ CAUTION

DO NOT steer the buggy left or right when traveling up or down on a grade. Travel in a straight path.

TRAVELING ON A SLOPE

1. When traveling on a slope, it is necessary to determine the grade of the path. The buggy can travel up or down slopes not exceeding 25° (Figure 16) . **DO NOT** travel on steeper slopes.

   To determine the % grade of your path of travel, use the formula and graph in Figure 16.

2. Lateral side to side travel cannot exceed 6°.

.

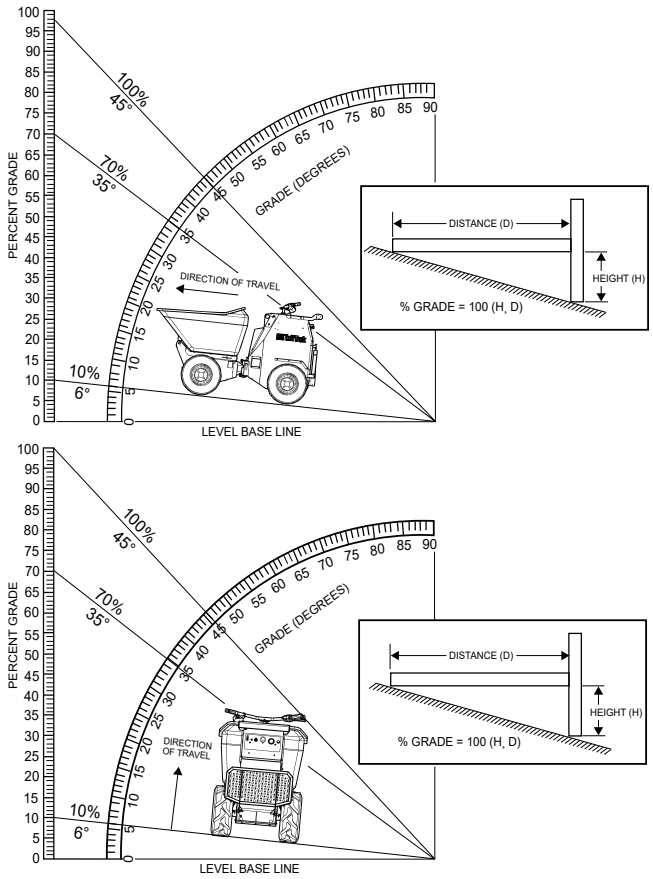


Figure 16. Determining Grade of Slope

NOTICE

The possibility of ***tipping*** (Figure 17**A**) exist when transporting heavy loads. **ALWAYS** transport heavy loads as shown in Figure 15**B**.

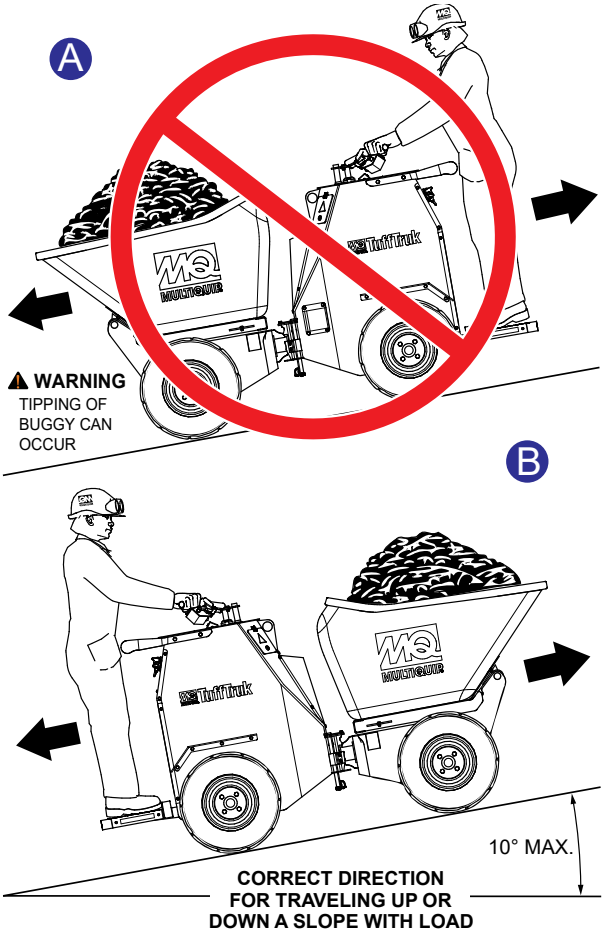


Figure 17. Slope Travel Direction

TUB (BUCKET) DUMPING

1. To place the tub in the dump position (Figure 18) press the dump switch to the right. The tub will move to the vertical position and dump its contents.

> ***NOTICE***
>
> If the buggy is on a incline, it might be necessary to slightly push the tub upward in a forward direction so the tub can be placed in the dump position.

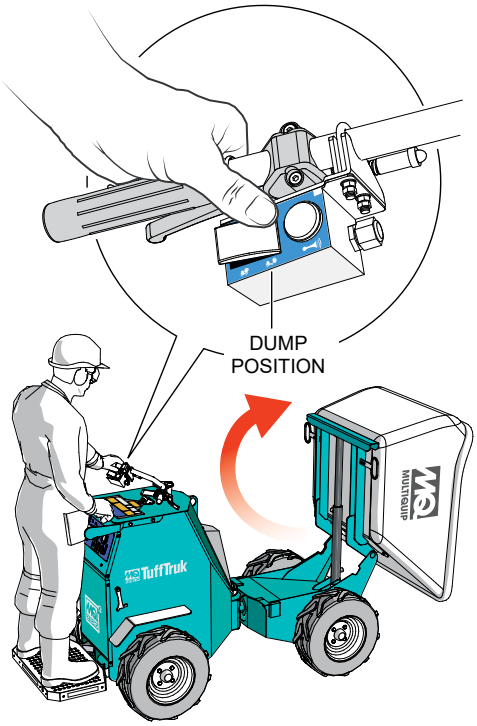


Figure 18. Tub Vertical Position

2. To return the tub back to the horizontal position, press the dump switch to the left and the tub will return to the horizontal position (Figure 19).

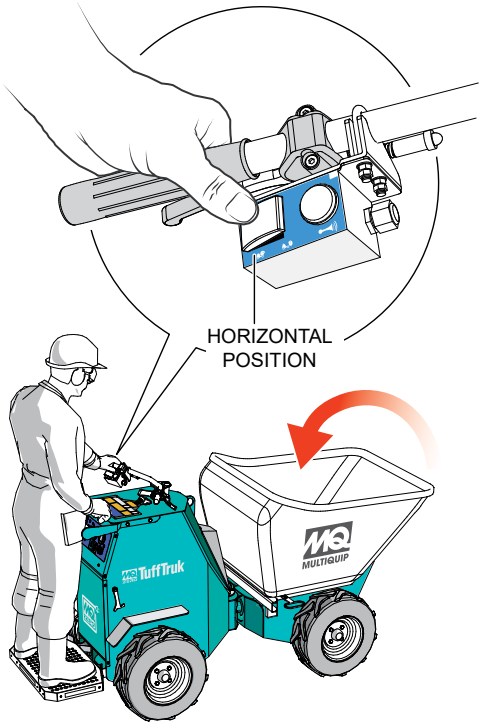


Figure 19. Tub Horizontal Position

NORMAL SHUTDOWN

1. Release the **RED** deadman lever and come to a complete stop. Brake is now set.
2. Place the ignition switch in the **OFF** position.
3. Block wheels if on a slope or incline.

EMERGENCY SHUTDOWN

1. Push the ***EMERGENCY STOP*** switch (Figure 20).

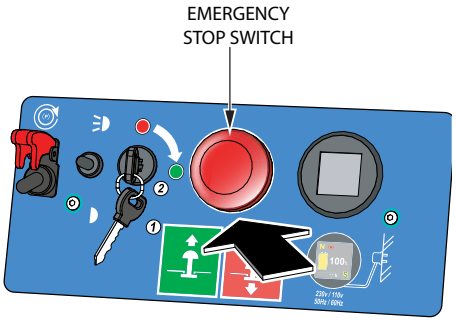


Figure 20. Emergency Stop Switch (Push)

Table 5. Power Buggy Maintenance Schedule						
Check Item	OPERATION	DAILY	Periodic Maintenance Interval			
			Every 25 Hrs	Every 50 Hrs	Every 100-125 Hrs	Every 200 Hrs
Tub	Clean	X			X	
Tub For Cracks/Deformations	Check			X		
Tires For Severe Cuts/Wear	Check	X				
Fastners	Check	X				

BATTERY CHARGER

The TB800BAT buggy has a built-in smart battery charger. When charging of the battery is required, perform the following:

> ***NOTICE***
>
> The battery charger installed is a Smart Charger, it can be left connected to the batteries after full charge (green light on) without harming batteries.
>
> The charger uses minimum power in this standby mode (battery fully-charged) and maintains the batteries at full charge and extends battery life.

1. Place the ignition switch key (Figure 21) on the **OFF** position.

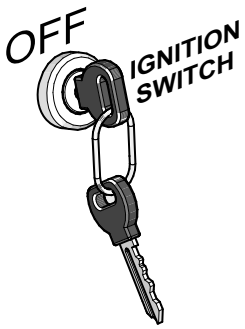


Figure 21. Ignition Switch (OFF)

2. Push the ***EMERGENCY STOP*** switch (Figure 22).

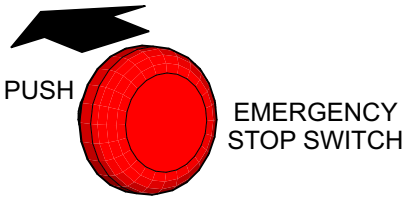


Figure 22. Emergency Stop Switch (Push)

3. Remove the battery charger power cable from the storage compartment as shown in Figure 23.
4. Next, connect the battery charger power cable to a 120 VAC power source.

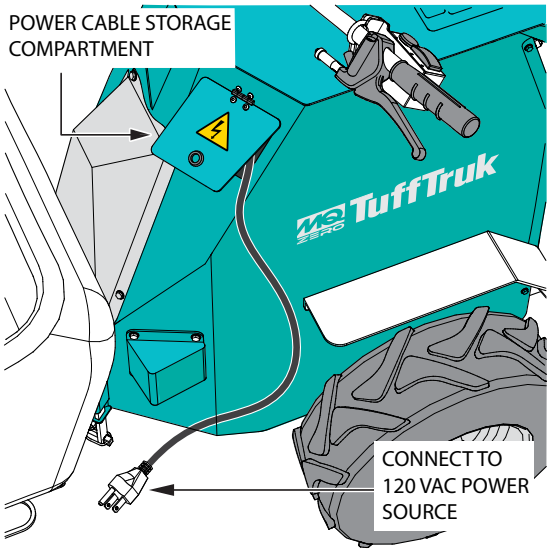


Figure 23. Battery Charger Power Cable

5. When charging is complete the battery gauge on the diagnostic display will indicate 100% (Figure 34)

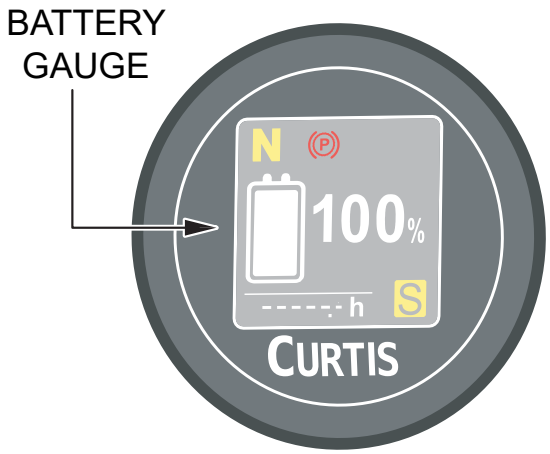


Figure 24. Battery Charge

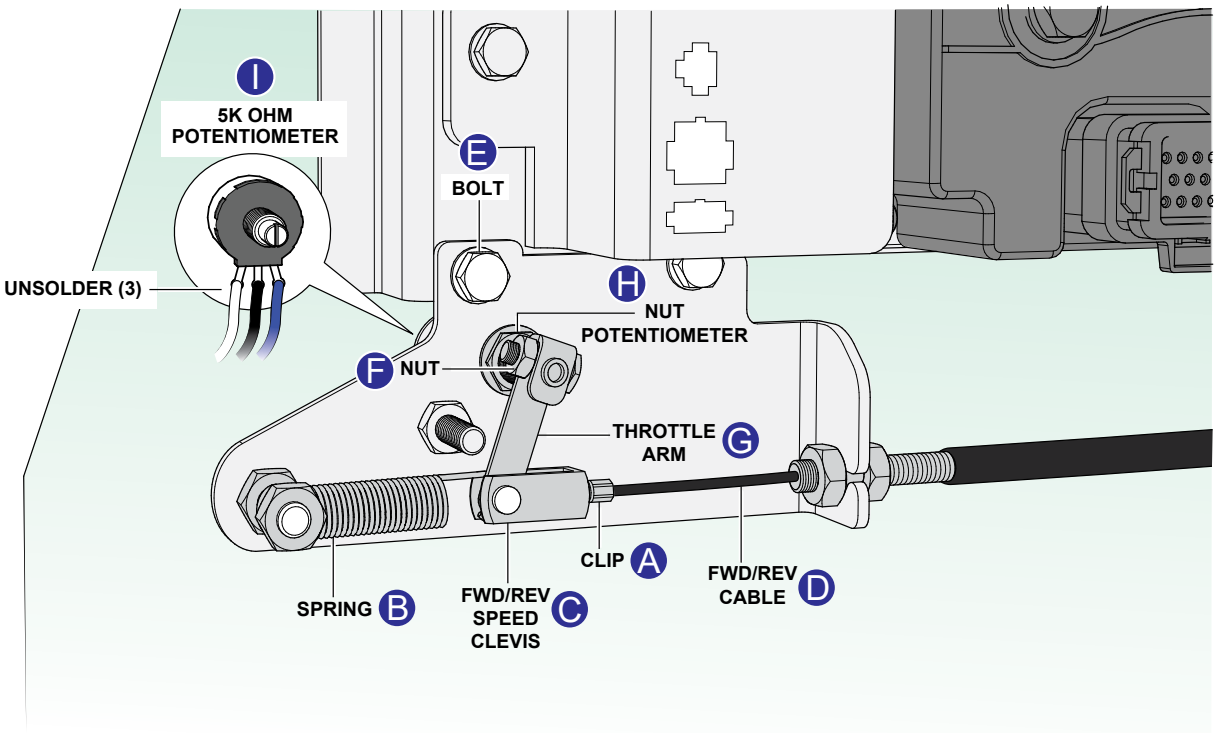


Figure 25. 5K Ohm Potentiometer Replacement

5K OHM POTENTIOMETER REPLACEMENT

The speed on the the electric buggy is controlled by a 5K ohm potentiometer. This potentiometer provides a 0~5 VDC input signal to the motor controller via pin-13. Reference wiring diagram.

Use the following procedure when installing a replacement potentiometer. Reference Figure 25.

1. Lift the buggy and place wooden blocks at the front and rear of the buggy. Place blocks so that the front and rear wheels can rotate freely just above the ground
2. Remove the four screws that secure the control panel to the frame.
3. Carefully set control panel down.
4. Unhook the clip attached to the FWD/REV speed clevis (Figure 25Figure 25**A**). Position the clip downward.
5. Next, remove the spring (Figure 25**B**) from the FWD/REV speed clevis.
6. Remove the FWD/REV speed clevis (Figure 25**C**) from the throttle arm.
7. Position the FWD/REV cable (Figure 25**D**) away from throttle bracket.
8. Remove the two bolts (Figure 25**E**) that secure the throttle bracket to the frame.
9. Loosen the nut (Figure 25**F**) that secures the potentiometer to the throttle arm.
10. Slide the throttle arm (Figure 25**G**) off the output shaft of the potentiometer.
11. Remove the nut that secures the potentiometer to the throttle bracket (Figure 25**H**).
12. Next, unsolder the **WHITE**, **BLACK** and **BLUE** wires connected to the potentiometer (Figure 25**I**). Mark orientation.
13. Solder the **WHITE**, **BLACK** and **BLUE** wires removed in step 12 back onto the 5K ohm replacement potentiometer in the same orientation.
14. Install new 5K ohm potentiometer back onto throttle bracket and secure with retaining nut.
15. Reinstall throttle arm back onto output shaft of potentiometer. Do not tighten retaining nut at this time.
16. Reconnect the FWD/REV speed cable and associated hardware back onto throttle bracket.

THROTTLE ADJUSTMENT

1. Using a small flat blade screw driver, rotate the shaft on the potentiometer ***fully*** counterclockwise.
2. Fully engage the deadman control lever, then fully squeeze the forward speed control lever.
3. Verify that a 4mm gap (Figure 26) exist between the throttle arm and the stop screw. Adjust if necessary.
4. With the deadman lever held down and the forward speed lever still fully engaged, turn the potentiometer adjustment screw slowly clockwise until the motor ***clicks***. Verify that the wheels rotate forward. slowly.
5. Tighten the nut (Figure 25**H**) that secures the output shaft of the potentiometer to the throttle arm.
6. Remove support blocks, and reinstall control panel.

> ***NOTICE***
>
> Ensure when the forward speed lever is released the motor dis-engages the drive before the potentiometer arm makes contact with the stop screw.

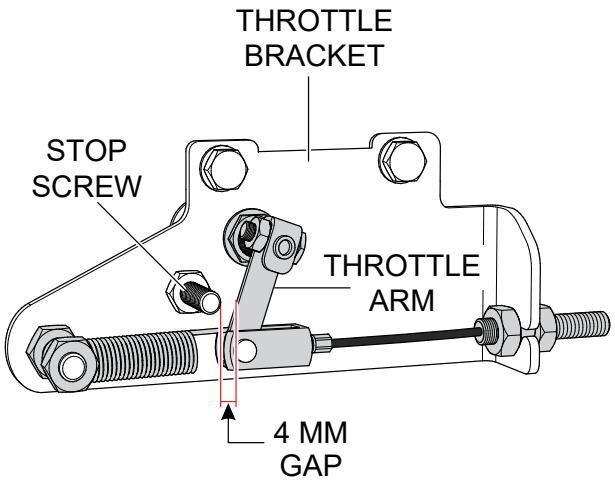


Figure 26. Throttle Arm Gap (4 MM)

FREE-WHEELING

> ***NOTICE***
>
> Battery must be ***sufficiently charged*** in order for the brake bypass switch to operate.

In the event the buggy needs to be moved with the electric motors **OFF** or not working**,** please follow the procedure below:

1. Turn ignition key to the **ON** position (Figure 27).
2. ***Push*** upwards and ***hold*** the brake bypass switch (Figure 27).

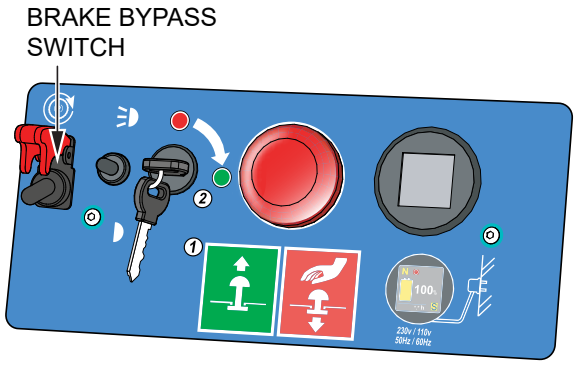


Figure 27. Brake Bypass Switch

3. The buggy can now be moved.

TIRES/WHEELS/LUG NUTS

Tires and wheels are very important and critical components of the buggy. When specifying or replacing the wheels, it is important that the wheels, tires, and axle are properly matched.

⚠ CAUTION

DO NOT attempt to repair or modify a wheel. If the rim is cracked, replace the rim immediately and inspect the tire for cuts, wear, and deformations.

TIRE WEAR

The tires (Figure 28) used on the power buggy are pnuematic. Proper inflation is 28 PSI (193 kPa). In addition, inspect the tires for cuts, wear and deformity.

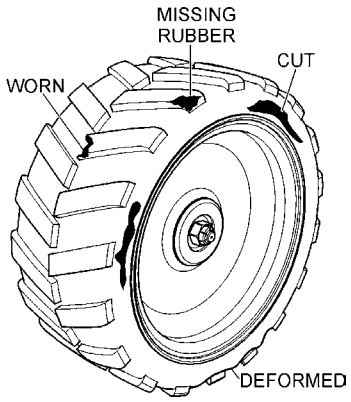


Figure 28. Tire Inspection

LUG NUT TORQUE REQUIREMENTS

It is extremely important to apply and maintain proper wheel mounting torque on the TuffTruk. Be sure to use only the fasteners matched to the cone angle of the wheel. Proper procedure for attachment of the wheels is as follows:

1. Start all wheel lug nuts by hand.
2. Torque all lug nuts (Figure 29) in sequence. **DO NOT** torque the wheel lug nuts all the way down. Tighten each lug nut in 3 separate passes as defined by Table 6.

Table 6. Tire Torque Requirements			
Wheel Size	First Pass FT-LBS	Second Pass FT-LBS	Third Pass FT-LBS
480 x 8 in.	20-25	35-40	50-65

3. After first road use, retorque all lug nuts in sequence Check all wheel lug nuts periodically.

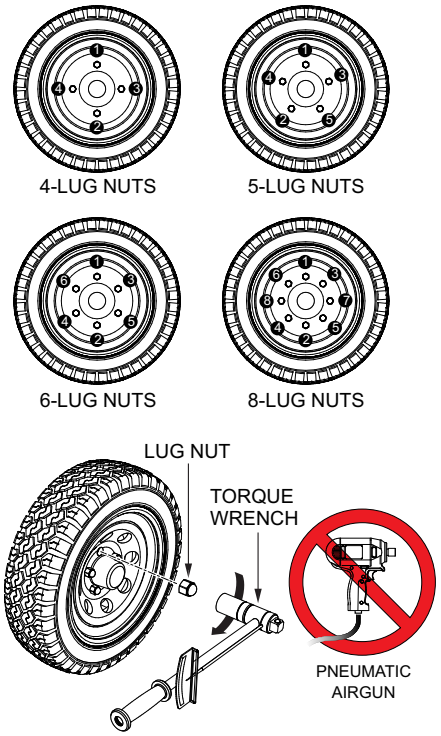


Figure 29. Lug Nut Torque Sequence

TUB REMOVAL/PLACEMENT

1. Pull out tub lock/release handle (Figure 30).

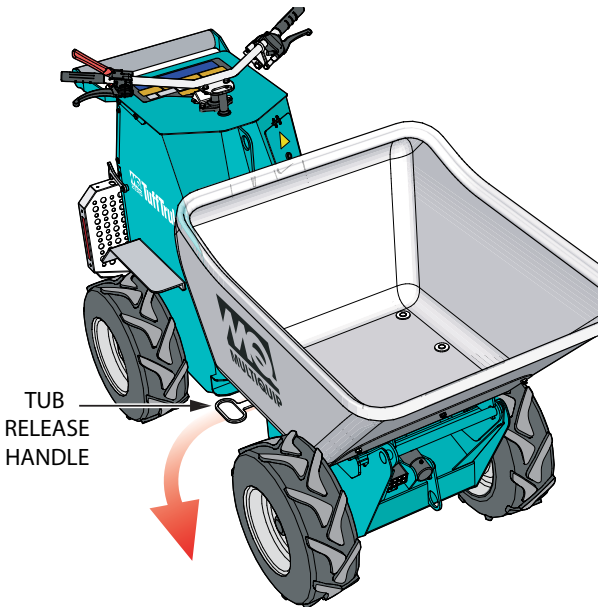


Figure 30. Releasing Tub (Unlock)

2. With ***two people***, lift and remove the tub (Figure 31). Place the tub onto its side away from the unit.

⚠ CAUTION

DO NOT attempt to lift or move the tub by yourself.

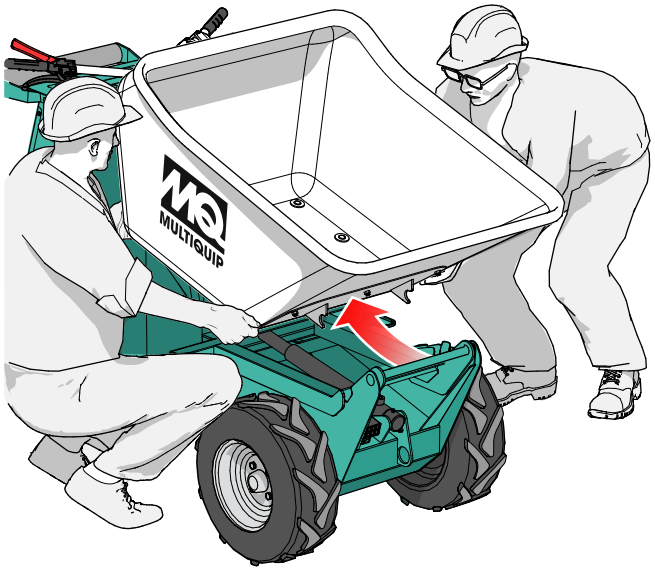


Figure 31. Tub Removal

3. With ***two people***, lift the tub onto the chassis (Figure 32). Make sure the tub sits securely on the chassis.

⚠ CAUTION

DO NOT attempt to lift or move the tub by yourself.

Figure 32. Tub Placement

4. Make sure that tub is locked in place.with the lock handle.

TUFFTRUK BUGGY STORAGE

For storage of the buggy for over 30 days, the following is recommended:

- Clean the entire buggy.
- Clean tub of all debris and foreign matter.
- Cover the buggy with a plastic sheet in a moisture and dust-free location out of direct sunlight.

AGM BATTERY CHARGING

To maximize the life of your AGM batteries (Figure 33), it is important that it is properly charged. As with all lead-acid batteries, both over- and under-charging an AGM battery will result in ***shortened service life***. The AGM batteries are sealed for life units and do not require any fluid top up.

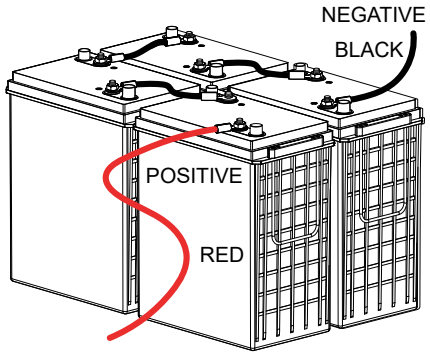


Figure 33. Battery Series Connections

The buggy is equipped with an on-board SMART charger (Figure 34) which maintains the battery full charge condition without resulting in over charging.

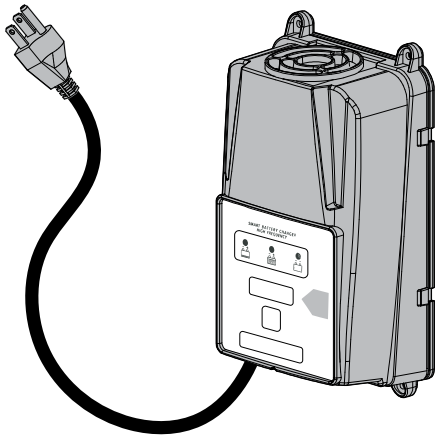


Figure 34. Battery Charger

Charging System Inspection

- The charger's AC power cord should be free of breaks or cuts and the wall plug socket should be clean and free from debris.
- The cable connectors from the on-board charger should be clean and properly mate with the battery terminals to ensure a sound connection.

Battery Inspection

- Check battery cables are not damaged.
- Connectors should be free of corrosion.
- Make sure battery cable post or eyelet connectors are tight to avoid arcing.

Charging Guidelines

- When the batteries have been discharged to ***¼ full*** as indicated on the battery gauge it is time to have the batteries fully charged. Plug the on-board battery charger power cord into a 120 VAC power outlet.

  Allow batteries to complete a full charge and do not disconnect until fully charged. Once fully charged, the diagnostic gauge display will indicate that the batteries are fully charged (100%).

- **DO NOT** charge batteries i.e. if the batteries have only discharged to ***¾ full*** as indicated on the battery gauge. There is no need to connect the battery charger power cable to the AC power outlet.
- It is recommended to use the buggy until the batteries have discharged to ***¼ full*** as indicated on the battery gauge, then place the batteries into a full charge cycle.
- **ALWAYS** charge batteries in a well ventilated area as gasses (fumes) may be released through the pressure relief valve if the batteries are excessively over-charged.
- **NEVER** charge a frozen battery.
- Ideal charging temperatures: 32°F to 104°F (0°C to 40°C)

ELECTRONIC POWER STEERING (EPS)

This system features steering assist consisting of an electric motor and sensors to provide the operator with smooth effortless steering.

EPS SYSTEM MAINTENANCE

Electric Power Steering (EPS) is a kind of system with high precision, sensitive function, energy saving, environmental protection and high performance. Correct use and maintenance can ensure optimum performance of the steering system and improve its service life. The following rules must be strictly observed:

1. Maintain good battery performance. Battery power loss will cause heavy steering and also affect the normal operation of other electronic control systems in the machine.
2. The connectors of the EPS system must be in good contact. The plug device should avoid humidity, high temperature, to ensure good conductivity.
3. The wiring harness should not be shared with other electric control systems in the vehicle, so as not to affect its power supply performance.
4. When the maximum steering angle is full, the steering system reaches the limit position and the power assistance current reaches the maximum. At this time, the motor and controller are prone to heating up. Drivers who use the EPS system, should make sure full steering is controlled within 3 seconds.Otherwise, thermal protection will be activated to protect excessive current from causing components damage.

FAULT DETECTION OF EPS SYSTEM

5. In case of failure, the Electric Power Steering (EPS) fault LED of wire harness will flash. Do not turn off the power at that moment, carefully observe the flash times of the fault LED located at the back side of the control panel (see Figure 35).

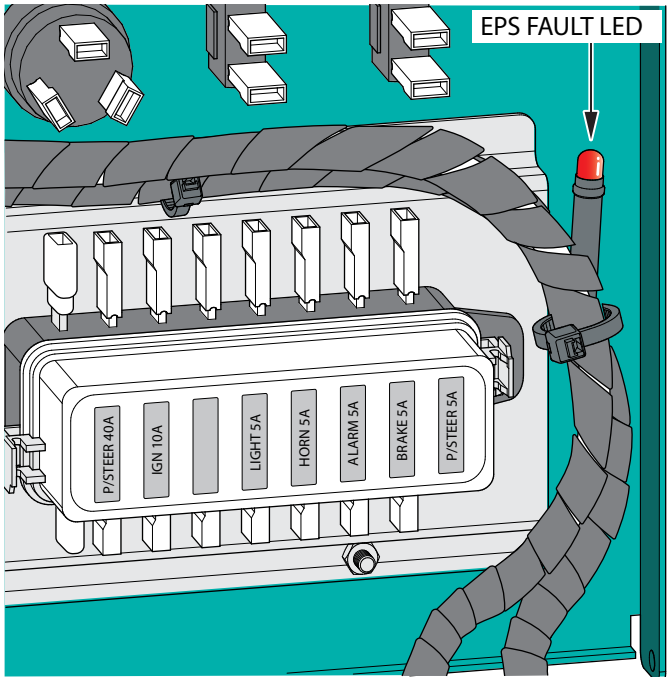


Figure 35. Location of EPS Fault LED

6. Record the flash sequence, and check with the diagnosis table for the code and corresponding diagnosis and solution.
7. Every fault code is composed of double digits.The digits are indicated by a series of long and short flashes of the LED. Each long flash represents a tens digit and is 2 seconds in length and each short flash represents a single digit and is I second in length .There will be a 3 seconds interval between the long and short flashes.

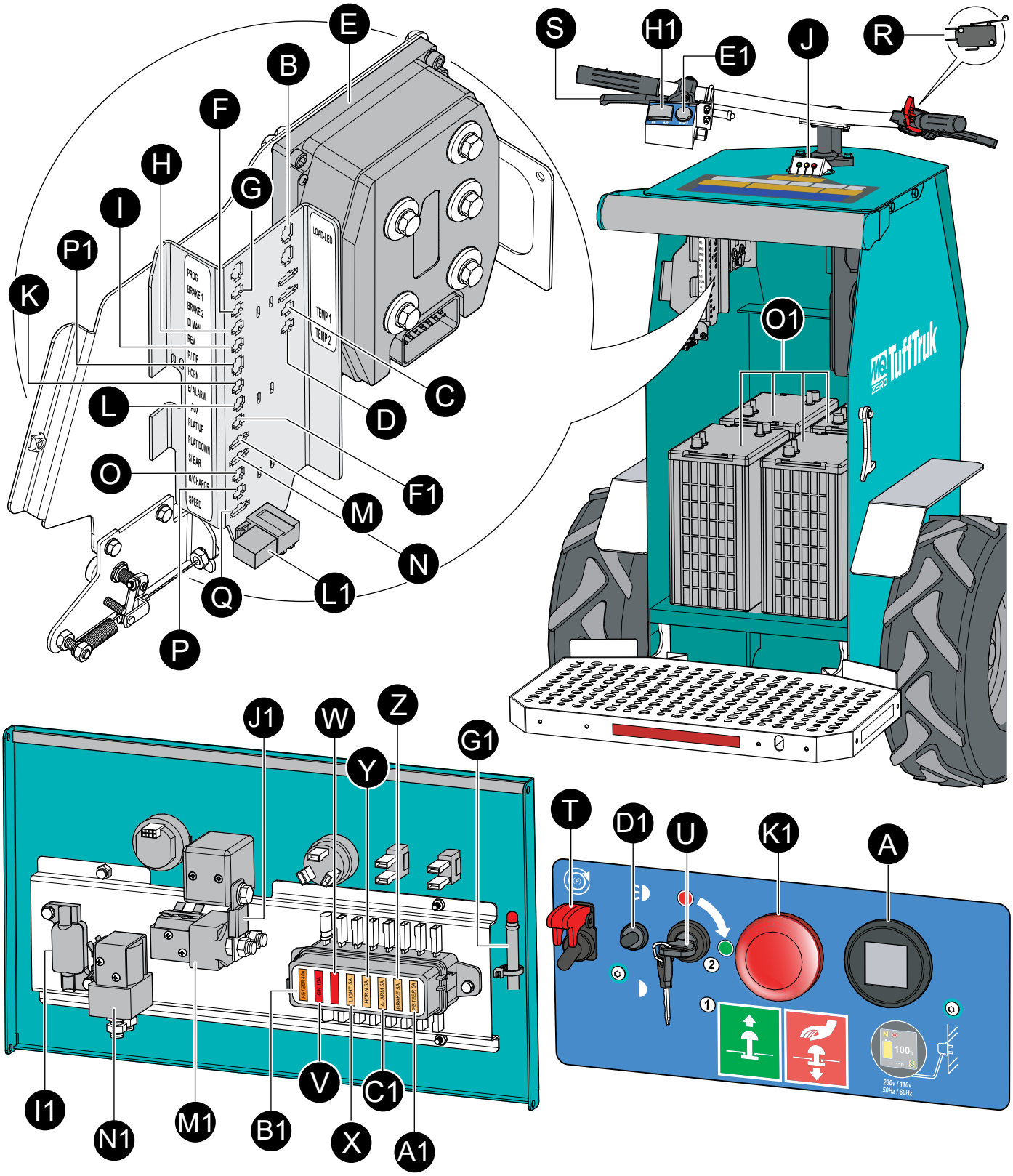
EPS Fault Diagnosis Codes		
FaultCode	**Diagnosis**	**Solution**
21	Main torque sensor disconnected.	Reconnect and insert the sensor wire harness. If still not working, replace the controller or the steering assembly.
22	Abnormal output of main torque sensor (over -high voltage)	Reconnect and insert the sensor wire harness. If still not working, replace the controller or the steering assembly.
23	Auxiliary torque sensor disconnected	Reconnect and insert the sensor wire harness. If still not working, replace the controller or the steering assembly.
24	Abnormal output of Auxiliary torque sensor (over-high voltage)	Reconnect and insert the sensor wire harness. If still not working, replace the controller or the steering assembly.
25	Too large differences between main and auxiliary torque sensors	Reconnect and insert the sensor wire harness. If still not working, replace the controller or the steering assembly.
26	Too large difference between the original torque signal and the controller signal	Reconnect and insert the sensor wire harness. If still not working, replace the controller or the steering assembly.
32	Motor with no power assistance	When the motor is disconnected or in poor contact; replug the motor connector to tighten the connection, or replace the motor, if the cable is disconnected. When MOSFET is burned out; replace controller.
33	Controller current exceeding limit	Replace the Controller.
37	Bus current signal abnormal	Replace the Controller.
67	Motor rotor Angle jump	Detect motor Angle sensor wiring harness.
68	Motor rotor Angle sensor is disconnected	Detect motor Angle sensor wiring harness.

Troubleshooting (Error Codes)

The machine controller detects a wide variety of faults or errors. Diagnostic information can be obtained on the 3100R fuel gauge display where an error code in the format "Err ##". The troubleshooting chart below describes the error code faults and their possible causes. Whenever a fault is encountered the first action should be to turn off the ignition and push in the E-stop button. Then pull out the E-stop button and turn the ignition back on to see if the fault clears. This is the RESET procedure: If the error code does not clear after the machine RESET, turn off the ignition switch and remove the 35-pin connector. Check the connector for correction or damage, clean it if necessary, and reinsert it. If the error is still seen then the wiring and connections on the machine should be checked for breakages or loose connections. The table below should be used as a reference once the above checks have been carried out.

Error Code	Fault Name	Possible Problem	Solution
1.2	Controller Overcurrent	External short of phase U,V, or W motor connections?	Ensure that there is no shorts present between the U, V, or W motor conections.
		Controller Defective?	Replace controller.
1.3	Current Sensor	Leakage to vehicle frame from phase U, V, W motor connections?	Ensure that there are no shorts between the motor terminals and the machine metal work.
		Controller Defective?	Replace controller.
1.5	Controller Severely Under Temperature	Controller is operating in an extreme enviroment. Heatsink temperature is below -40° C?	Bring the heatsink temperature above -40° C.
1.6	Controller Severely Over Ttemperature	Controller is operating in an extreme enviroment, +95° C?	Bring the heatsink below 95° C
		Excessive load on vehicle?	If vehicle is overloaded, remove load and allow cooling before resuming operation.
1.7	Severe B+/KSI Undervoltage	Non controller system drain on battery?	Ensure that there is no loads independent of the controller causing a voltage drop over the batteries.
		Battery cables damaged or terminals loose?	Check battery cables for damage and ensure that terminals are tight.
		Blown Fuse?	Check fuses.
1.8	Severe B+/KSI Overvoltage	Battery cables damaged or terminals loose?	Check battery cables for damage and ensure that terminals are tight.
2.2	Controller Overtemperature Cutback	Controller is operating in an extreme enviroment, heatsink temperature exceeded 85° C?	Reduce controller heatsink temperature to below 85 Degrees Celsius.
		Excessive load on vehicle?	Remove excess load and allow machine to cool before resuming operation.
2.3	Undervoltage Cutback	Batteries need recharging?	Ensure that batteries are charged before operation.
		Non-controller system-drain on battery?	Ensure that there is no loads independent of the controller causing a voltage drop over the batteries.
		Battery disconected while driving?	Ensure that battery leads are connected and that terminals are tight.
2.4	Overvoltage Cutback	Batteries disconnected with regen braking?	Ensure that battery leads are connected and that terminals are tight.
2.8	Motor Temp Hot Cutback	Motor temperature is above temperature limit, possibly due to operating in high ambient temperatures or overlading machine?	Ensure that machine is not overloaded.

Troubleshooting (Error Codes)			
3.1	Main Driver	Open or short on driver load?	Test the motors to see if there is a short circuit or an open circuit.
		Dirty connector pins at controller or contactor coil?	Ensure that the connector pins in the multiplug and the crimped terminals are clean, free of corrosion and make a good connection.
		Bad connector crimps or faulty wiring?	Inspect all motor wiring, checking all terminals are tight and cables are not damaged.
3.2	EM Brake Driver	Open or short on driver load?	Test the brakes to see if there is a short circuit or an open circuit.
		Dirty connector pins at controller or contactor coil?	Ensure that the connector pins in the multiplug and the crimped terminals are clean, free of corrosion and make a good connection.
		Bad connector crimps or faulty wiring?	Inspect all motor wiring, checking all terminals are tight and cables are not damaged.
3.7	Motor Open	Motor phase is open?	Check motor to ensure that there not an open circuit.
		Bad crimps or faulty wiring?	Ensure that the motor wiring is undamaged, the crimps are sound and that the terminals on the controller are tight.
3.8	Main Contactor Welded	Main contactor tips are welded closed?	The contactor is welded closed, audible click will not be heard when operating the deadman lever, contactor will need replacing.
3.9	Main Contactor Did Not Close	Main contactor tips are oxidized, burned or not making good contact?	Contactor will have to be replaced.
		Main contactor opened during operation?	Check wiring to contactor is good, ensure that all terminals are making good contact.
		Loose connections in wiring supplying contactor?	Check wiring to contactor is good, ensure that all terminals are making good contact.
		Defective contactor?	Contactor will have to be replaced.
4.7	HPD Sequencing	Incorrect sequence in application of Keyswitch, Interlock, Direction or Throttle?	Ensure that deadman is operated before forward lever.To clear fault, switch machine off then on.
5.2	User 2 Fault	Deadman or Throttle lever operated before machine is turned on?	Ensure that Deadman or Throttle levers are not operated before switching on machine.
5.4	Safety Bar Fault	Open circuit on Safety Bar Circuit?	Contact Multiquip for further assistance.
5.5	Platform Proximity Sensors	Open circuits on Proximity Sensor Circuit?	Contact Multiquip for further assistance.


E
B
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P1
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Q
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H1
E1
J
R
O1
TuffTruk
J1
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V
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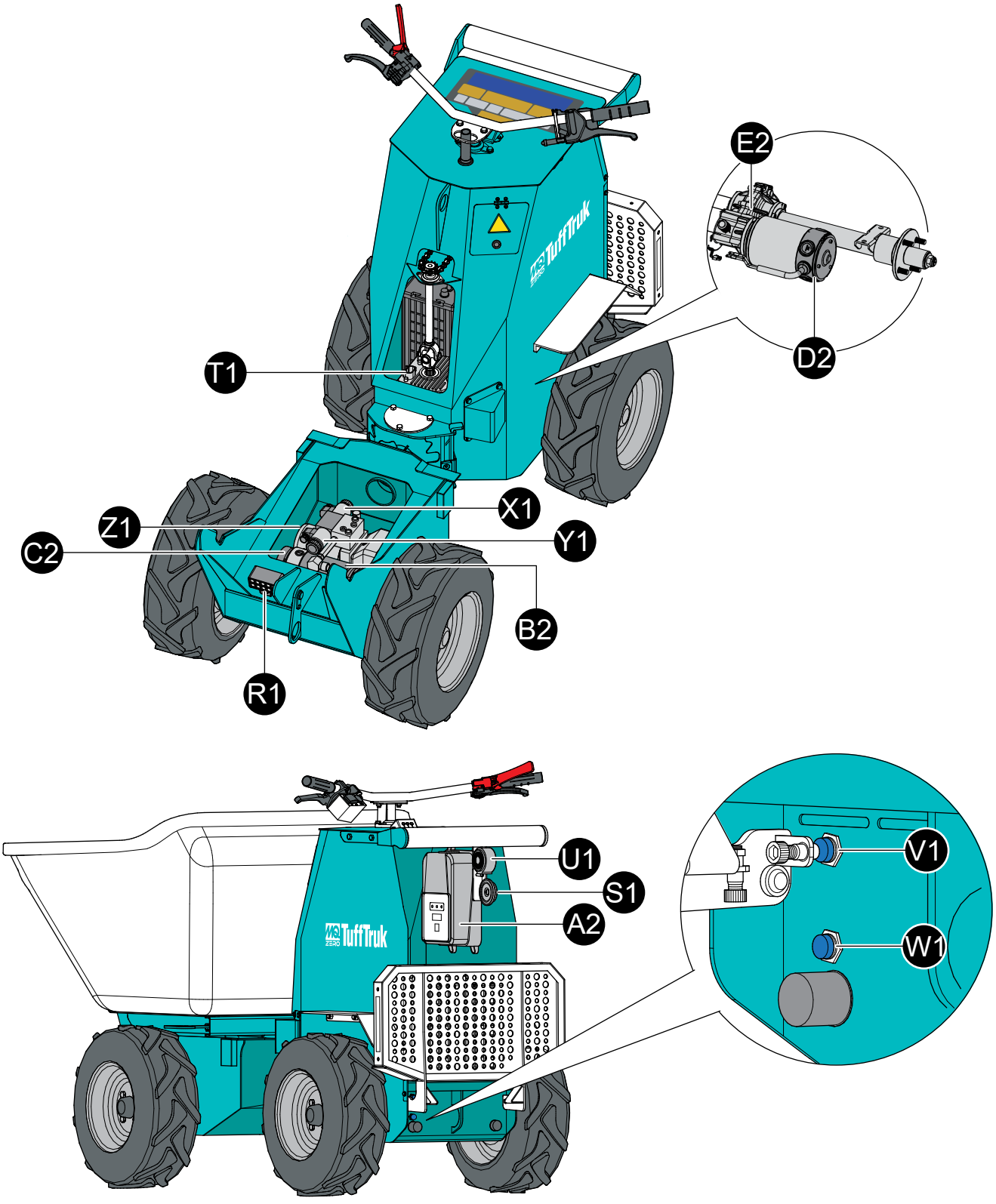
U
K1
A


E2
D2
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Z1
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C2
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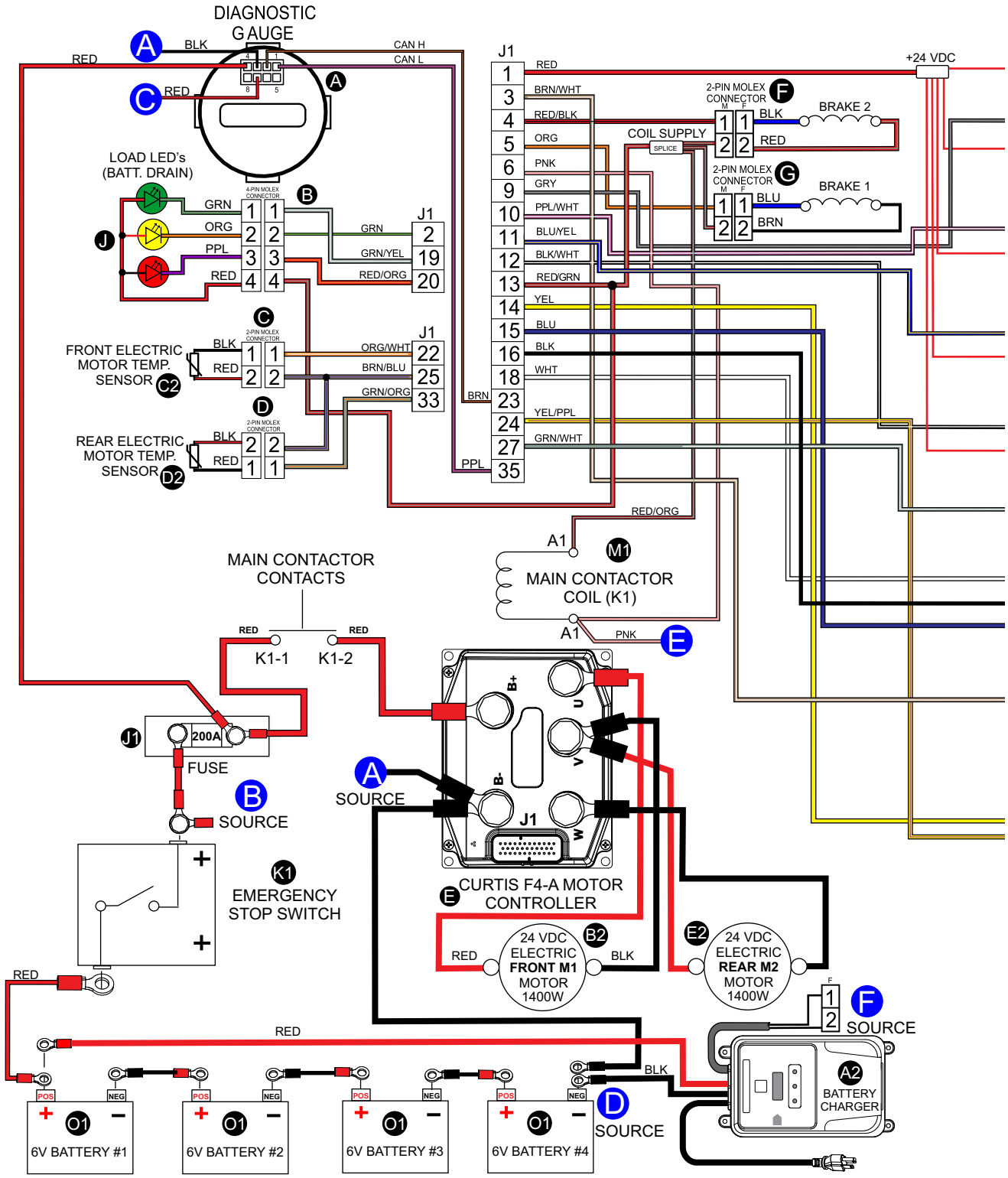
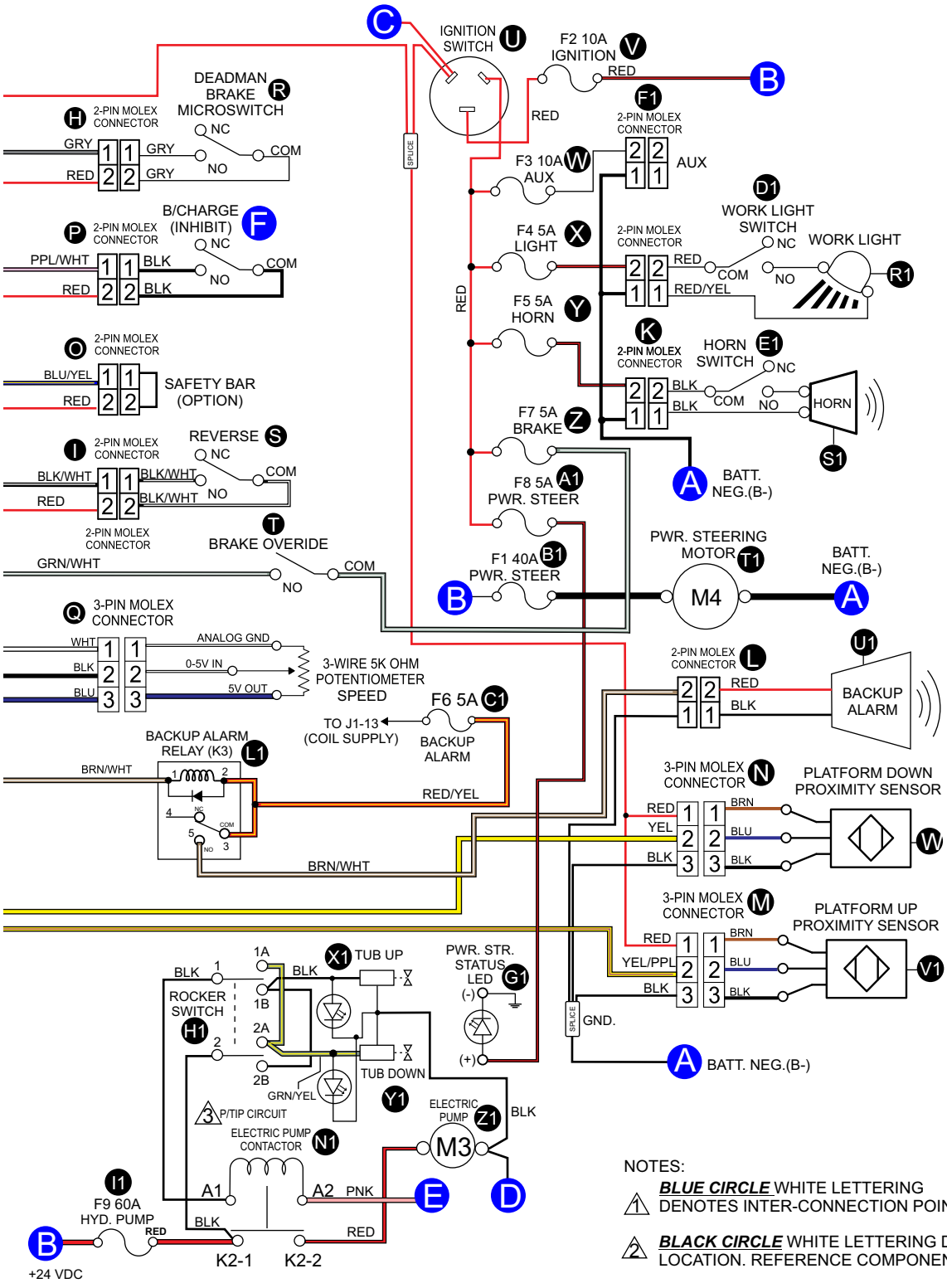
R1
U1
S1
A2
V1
W1


DIAGNOSTIC GAUGE
BLK
RED
CAN H
CAN L
LOAD LED's (BATT. DRAIN)
GRN
ORG
PPL
RED
FRONT ELECTRIC MOTOR TEMP. SENSOR C2
REAR ELECTRIC MOTOR TEMP. SENSOR D2
J1
+24 VDC
2-PIN MOLEX CONNECTOR
BRAKE 2
BRAKE 1
COIL SUPPLY
SPLICE
MAIN CONTACTOR CONTACTS
K1-1
K1-2
MAIN CONTACTOR COIL (K1)
A1
PNK
RED/ORG
200A
FUSE
SOURCE
EMERGENCY STOP SWITCH
CURTIS F4-A MOTOR CONTROLLER
24 VDC ELECTRIC FRONT M1 MOTOR 1400W
24 VDC ELECTRIC REAR M2 MOTOR 1400W
BATTERY CHARGER
6V BATTERY #1
6V BATTERY #2
6V BATTERY #3
6V BATTERY #4



NOTES:

1. ***BLUE CIRCLE*** WHITE LETTERING DENOTES INTER-CONNECTION POINTS.
2. ***BLACK CIRCLE*** WHITE LETTERING DENOTES COMPONENT LOCATION. REFERENCE COMPONENT LOCATOR PAGE.
3. FOR TROUBLESHOOTING P/TIP CIRCUIT, REFERENCE 4-PIN MOLEX CONNECTOR P1 (P/TIP) ON CONNECTOR RACK.

OPERATION MANUAL

HERE'S HOW TO GET HELP

PLEASE HAVE THE MODEL AND SERIAL NUMBER ON-HAND WHEN CALLING

HERE'S HOW TO GET HELP

PLEASE HAVE THE MODEL AND SERIAL NUMBER ON-HAND WHEN CALLING

UNITED STATES

Multiquip Inc.

(310) 537- 3700
6141 Katella Avenue Suite 200
Cypress, CA 90630
E-MAIL: mq@multiquip.com
WEBSITE: www.multiquip.com

CANADA

Multiquip

(450) 625-2244
4110 Industriel Boul.
Laval, Quebec, Canada H7L 6V3
E-MAIL: infocanada@multiquip.com

This manual MUST accompany the equipment at all times. This manual is considered a permanent part of the equipment and should remain with the unit if resold.

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