



Motorized U-Boat Owner's Manual

Important Startup Instructions

1. Read the Owners Manual thoroughly before first use.
2. Charge the Motorized U-Boat for six hours before using it for the first time. If the battery completely discharges, recharging may take up to 18 hours. See pages 5-6 for battery and charging information.

Serial #: _____

Date of Purchase: _____

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Warranty

Magliner products have a one (1) year warranty unless otherwise specified from the date of purchase against defects in workmanship or material. Any part or component, except items covered by warranties of other manufacturers, returned to the factory or service center freight prepaid by the owner, found upon examination by Magline, Inc. to be defective or the result of improper workmanship by the factory will be repaired or replaced without charge and returned to the owner freight prepaid by Magline, Inc.

Alterations of Magliner products void any warranty or liability on the part of Magline, Inc.

Magline, Inc. does not guarantee product capacity if alterations are made.



Thank you for your purchase! If you have any questions regarding your new Magliner product please call our customer service department at 1-800-MAGLINE (624-5463) or (989) 512-1000. Please read this manual thoroughly to become familiar with the safe operation and maintenance of your new Motorized U-Boat.

General Safety Instructions

- Inspect before each use for damaged and loose fasteners/connections.
- Inspect the unit for cracks, wear or damage. Replace damaged components immediately.
- Keep hands and feet away from all moving parts.
- When unattended, leave the power switch in the off position.
- Operate at a safe speed; go only as fast as safety considerations allow.
- Do not use this product to transport people.
- Do not drive off curbs or ledges higher than one inch. An aluminum walk ramp must be used to overcome obstacles over one inch.
- Never use on a moving vehicle.
- Always stand beside the machine walking forward while operating in reverse. Never walk backwards with machine.
- Never exceed rated capacity, especially on ramps or hills. Damage to the U-boat and personal injury could result.
- Do not operate when the battery charger is plugged in.
- Never attempt to open the battery. If the battery is cracked or leaking, do not recharge it - it must be replaced.
- Always use a Magliner battery charger to charge your battery.

General Machine Care

- Charge the machine in a dry place, preferably at 50 degrees F or warmer.
- Charge machine daily.
- Wash machine with warm soapy water. Do not use pressure washers.
- Do not drive machine through more than 2" of water, and never submerge drive system or battery box.
- Drive system is lubricated for life, so no maintenance is required for drive system.

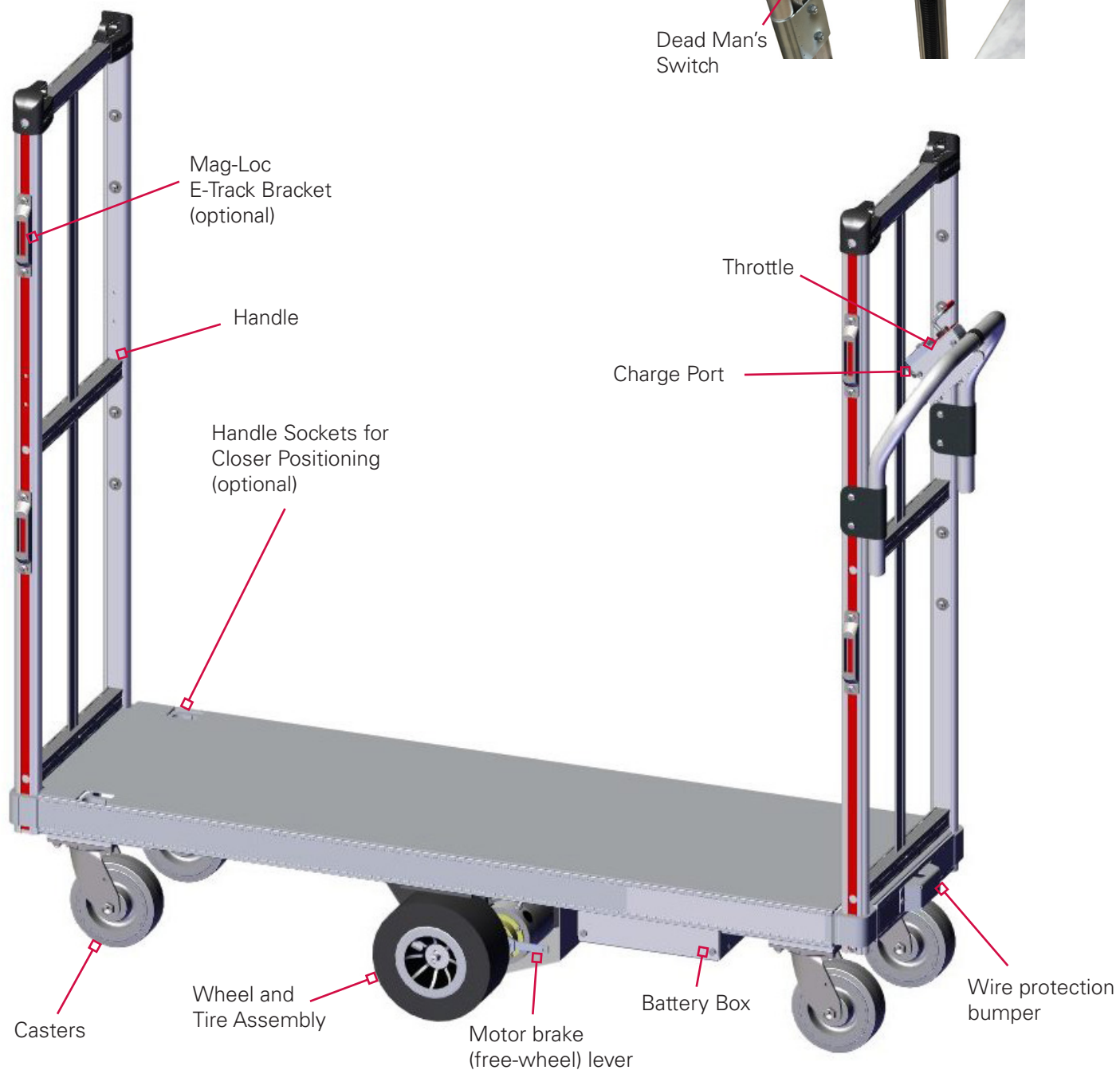
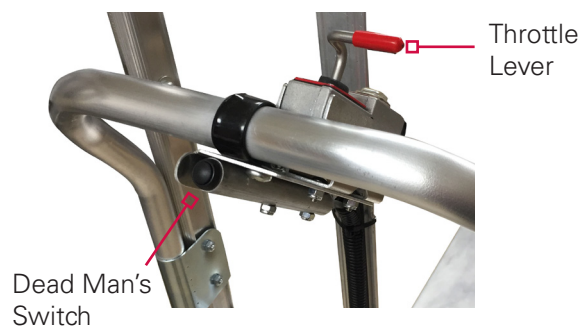
Startup Instructions

Tools Needed:

#3 Phillips Screwdriver
7/16" wrench

1. Fully charge battery before first use, and charge the battery after each use to prevent total battery discharge.
2. Insert the handles into the deck. Optional: Install longer screws and two lock nuts to the throttle handle's lower holes, located below the deck with the handle is inserted.
3. Connect the wiring harnesses below the deck - one is for the throttle and one is for the Motorized transaxle.
4. Install throttle wire protection bumper with shorter screws and lock nuts.

Motorized U-Boat



Battery

The battery must be charged for six hours before using it the first time. If the battery completely discharges, recharging may take up to 18 hours. When not in use, it is recommended to keep the battery plugged in to maintain a maximum charge and extend the battery life. The charger will not overcharge the batteries.

General Battery Warnings

- Do not connect accessories to the battery; this will cause premature battery failure.
- Unauthorized modification could create a hazardous condition and result in serious injury.
- Batteries contain sulfuric acid, which can burn eyes, skin, clothes, etc. Use caution! Always wear gloves when working with batteries. If contact occurs, flush immediately with water and get medical attention. Protect surfaces from battery damage by placing batteries on rubber or plastic surfaces.
- Never place a battery near an open flame or heat - it could explode.
- To prevent electrical shock, do not touch non-insulated parts of the charger output connectors, battery connectors or battery terminals. Do not use connectors that are cracked, corroded, or do not make adequate electrical contact. Use of damaged or defective connectors could result in fire or electrical shock.
- Keep sparks, flame and smoking materials away from batteries.
- Batteries can supply a large amount of current. Do not wear jewelry or watches when working on the batteries as an accidental shorting could occur and cause severe burning.

General Charging Warnings

- Use only the Magliner 24V charger designated for use with the Motorized U-Boat. Charge using a grounded 110V electrical outlet.
- Do not operate the unit when the battery charger is plugged in.
- Do not expose charger to rain or snow.
- Store the charger in a dry, clean place.
- To prevent risk of fire, use the charger only in a dry, well ventilated room without flammable fluids or explosive gases.
- Make sure the cord is located such that it will not be a trip hazard or otherwise subject to damage or stress.
- Do not operate a charger with a damaged cord or plug – replace immediately.
- To reduce risk of electrical shock, unplug the charging unit from the AC power supply source before attempting any maintenance or cleaning.
- Always use battery chargers supplied by Magline, Inc. Other battery charging units could cause damage to your batteries or personal injury.
- To avoid damage to battery charger connectors and cords, disconnect by grasping the plug body and pulling it straight out of the outlet or receptacle. DO NOT pull on the cord. DO NOT twist, rock, or pull the connector sideways.
- The metal tip on the end of the plug may be hot when it is first unplugged.

Battery Life

The Motorized U-Boat is Motorized by two 12V, 12Ah AGM lead acid non-spillable batteries.* A fully-charged battery will last at least one typical route delivery shift; however, extreme temperature ranges and extreme loads can have an effect on the amount of power available during one charging cycle. You will know that your batteries need replacing when you notice diminished range or operational time.

*Battery has a warranty of six (6) months

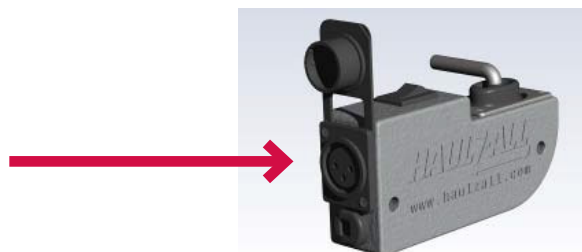
Battery Care

- Store and charge the Motorized U-Boat at temperatures between 50 and 100 degrees F.
- Always keep the machine on charge. Batteries stored for long periods of time will self-discharge and may get so low, that the charger will not recharge them.
- Keep the terminals clean and tight.
- Handle the batteries with care – do not drop them.
- The batteries will require 4-10 charge/discharge cycles until batteries charge up to their full potential.
- DEEP DISCHARGE ON A CONTINUAL BASIS WILL SHORTEN THE SERVICE LIFE OF THE BATTERIES.
- Always disconnect the battery power connector when storing the batteries.
- Battery performance may be reduced when operating in temperatures less than 40 degrees F. You may expect only half the range when operating at temperatures below 32 degrees F.

Charging the Battery

The Motorized U-Boat is provided with an off-board 24V charger. To charge the machine, plug one end of the charger into a 110V wall outlet, and the other end into charger port. An LED light on the charger will blink (or turn amber or red) while the unit is charging. When the unit is completely charged, the light will turn solid green. For optimum performance, charge in temperatures from 50-100 degrees F.

It is essential that the Motorized U-Boat be kept on a charger whenever it is not in use; the batteries will not overcharge. Before use, unplug the charger from the Motorized U-Boat by carefully pulling the connector out of the charger port in the throttle. Install the dust cover boot over the plug connector on throttle to keep the charger port clean.



Motorized U-Boat Drive System

Automatic Electronic Braking

The drive system features regenerative braking by which the electronic controller uses the motor to slow down the machine in both forward and reverse directions. To slow down the machine, reduce throttle input, or release the throttle lever, and the machine will brake to a stop.

While driving downhill, this feature allows direct control over the speed of the machine, as long as the load on the machine does not exceed the design parameters. In addition, the drive system is equipped with an electromechanical park brake, which is automatically engaged when throttle input is zero. This locks the machine in place, until throttle input is increased, or the operator manually overrides it.

Manual Mode (Free Wheeling)

The drive system is equipped with a lever that overrides the electromechanical brake for manually pushing the Motorized U-Boat. This option should only be used if the batteries are too low to drive the system, or if the drive system becomes inoperable. To disengage the brake, push the lever down until it clicks into the disengaged position.

With the brake in the disengaged position, the power switch **MUST** be turned off, or the drive system will not move freely. The controller **WILL NOT** operate the motor when the brake is disengaged. This is a safety lock-out that prevents the operation of the machine when the electromechanical brake on the transaxle has been manually released.

NOTE: A safety feature called “push too fast” will aggressively slow the machine down if the machine begins to move too quickly with the brake released and the power switch off. Its purpose is to avoid a run- away situation if the operator forgets to re-engage the brake.

For this reason, it is strongly recommended that the cart be pulled (rather than pushed) in the manual mode. Pushing the cart in manual mode, especially when fully loaded, could result in injury to the operator if the cart suddenly decelerates as intended.



Slopes and Inclines

The Motorized U-Boat can carry up to 1,000 lbs. max under propulsion up to an 8 degree incline or decline. If the degree of incline is steeper than 8 degrees under full load, you can simply assist the climb with a slight push to assist the drive system.

Use extra caution when moving loads on ramps or inclines. When approaching a ramp or leaving the ramp, the center wheels will lose contact with the ground surface. At this time the user may need to steer the load and may need to push or pull the load for a short moment until the drive wheels reengage the surface.

While the drive wheels are in the air, be careful not to over-accelerate the propulsion system, or stop the propulsion system, as this may cause load instability or damage to the unit when the wheels reengage with the ground surface.



Pre-Trip Inspection

1. Before each use, check for damaged or missing components. Replace damaged or missing components immediately with Magliner replacement parts.
2. Check all fasteners, and make sure to tighten or replace loose or missing hardware.
3. Check welds and material near welds for cracking or damage.
4. Make sure that the tires are properly inflated to 50 psi.
5. If you are using Mag-Loc e-track containment straps, ensure there are no cuts or tears in the strap. Check to see that the e-track bracket components move freely and lock securely into the Mag-Loc e-track anchors.
6. Unplug the charger from the Motorized U-Boat by carefully pulling the connector out of the charger port in the throttle. Install the dust cover boot over the plug connector on throttle to keep the charger port clean. Store the charger in a dry, clean place.
7. Always check that the propulsion system is functioning properly before beginning the day.
8. Test the On/Off switch to be sure the unit will turn on and off as intended.
9. With the unit turned off, release the park brake and push or pull the U-Boat to make sure it is functioning properly in manual mode. Then reengage the transaxle.
10. With the unit On and Dead Man's switch engaged, test that the unit moves forward and backward with propulsion.
11. Test the Dead Man's switch functionality by moving the unit forward and releasing the switch – the unit should stop once the Dead Man's switch is released even if the throttle lever is pulled back. Test the same way but in reverse direction.

Using the Motorized U-Boat

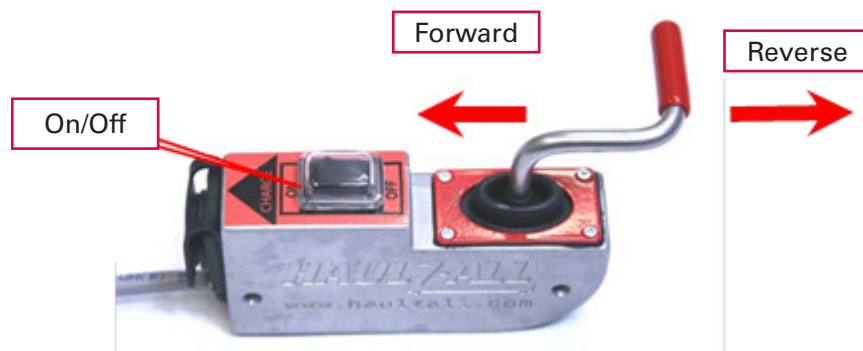
On/Off Switch

1. Turn the rocker switch to ON to engage the Motorized transaxle.
2. If the switch is left on for approximately 20 minutes without use, the controller goes into a power save mode (sleep mode).
3. To wake the controller, cycle the rocker switch to the off position for 2 seconds, and then back to the on position.

Variable Speed Control

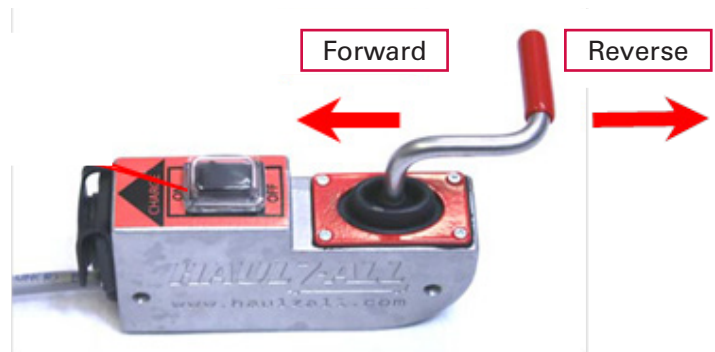
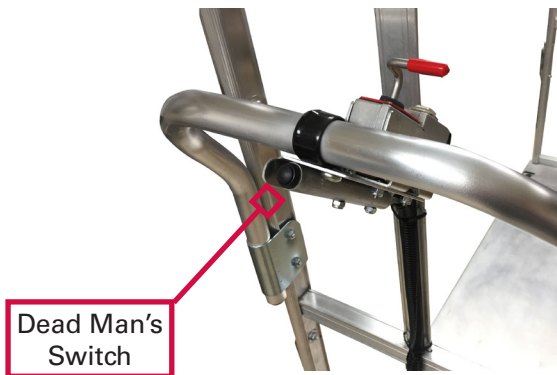
Moving the throttle lever increases speed in proportion to how far you pull or push it – the further you move away from home position, the faster you go forward or reverse. The maximum speed is approximately 3.0 mph.

Releasing the lever will automatically return it to zero, commanding the controller to slow down and stop the machine, locking it in place.



Moving with Propulsion

1. To use propulsion, be sure that the motor's brake lever is in the up position to engage the transaxle.
2. Turn the unit On. Check to be sure surroundings are clear.
3. Press and hold the Dead Man's switch located on the handle, then move the throttle lever to begin movement. Push the throttle away from you to move forward; pull the throttle toward you to move backward.
4. To move with propulsion, the Dead Man's switch must be depressed the entire time you use the throttle lever. This ensures that propulsion cannot be accidentally or unintentionally engaged.
5. To increase the speed, push or pull the throttle lever further away from home position.
6. To slow the unit, move the throttle lever closer to home position.
7. When you release the Dead Man's switch or the throttle lever, the unit will slowly come to a complete stop and the park brake will engage.
8. The Motorized U-Boat will slow to a stop and park in place even on an incline, as long as the load on the U-boat does not exceed capacity.



Considerations When Using Propulsion

- Always operate the Motorized U-Boat only as fast as safety considerations allow.
- When turning tight corners, keep the unit close to the turn in the direction of travel; for example, when turning right, keep the unit close to the turn on the right. When turning left, keep the unit close to the turn on the left.
- Use extra caution when moving loads on ramps or moving loads in reverse as described on page 8.
- While unattended, turn the unit off.
- Do not drive the Motorized U-Boat through more than 2 inches of water, and never submerge the drive system or battery box.
- Do not drive off curbs or ledges higher than one inch. An aluminum walk ramp must be used to overcome obstacles over one inch.
- When the Motorized U-Boat is loaded or empty, it should be stored in the back of the trailer with the transaxle engaged and the power turned OFF. This will keep the park brake engaged during transit.
- Load bars or containment straps can provide additional containment in the trailer if desired.

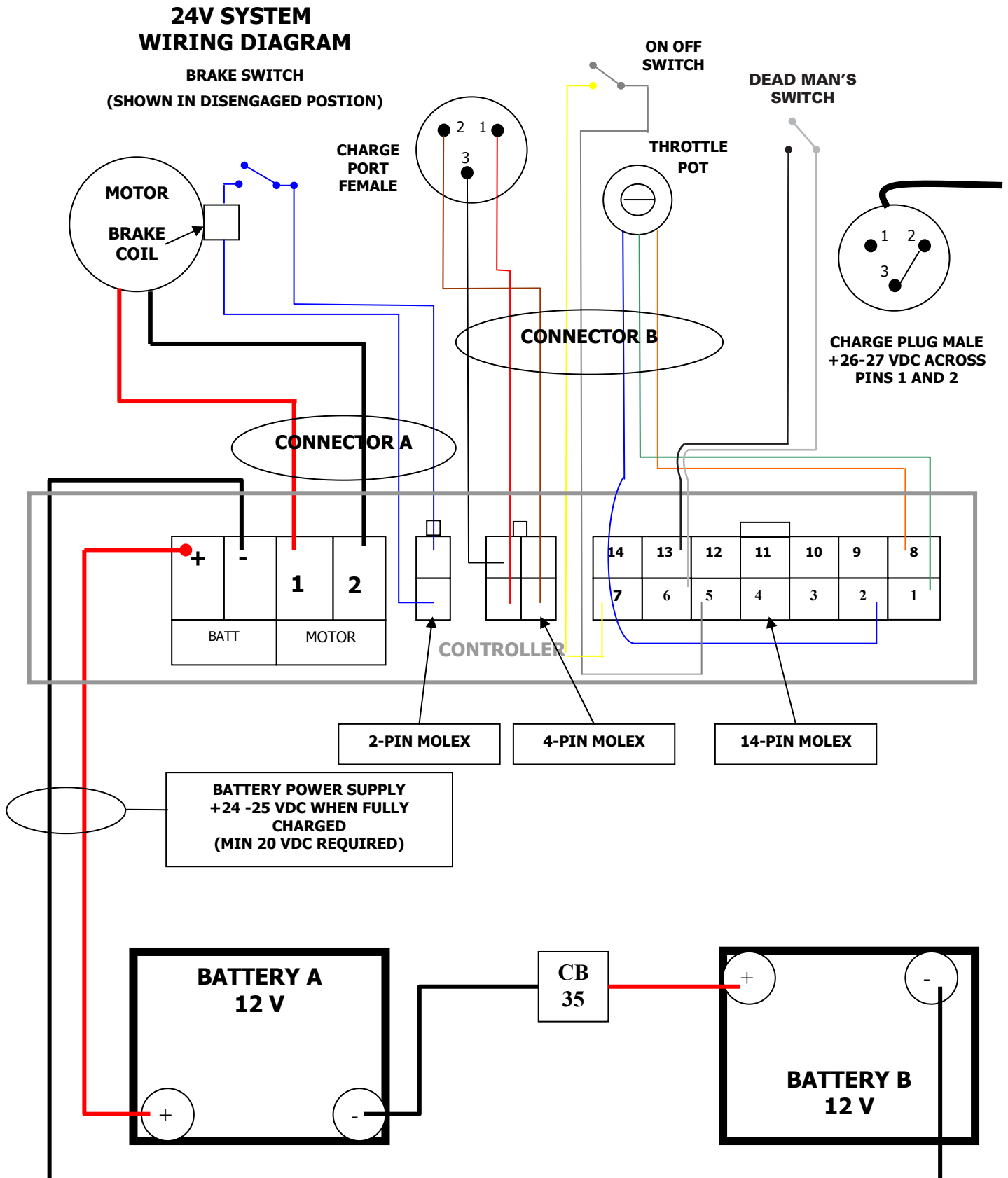
At the End of the Day

1. The Motorized U-Boat when batteries are installed should be stored and charged indoors and in a dry environment. To maximize battery life and minimize charge time, temperatures should be between 50 to 100 degrees Fahrenheit.
2. Charge the batteries as soon as possible upon returning with the U-Boat from use. Charge daily or after every use in a dry, well ventilated area away from sparks, heat and flames. Do not use an extension cord if possible, and do not use the charger if the cord is damaged.
3. While unattended, turn the unit Off.

Preventative Maintenance

Area	Inspection Frequency	Procedure/Normal Condition
Drive Wheels	Daily	Inspect wheels and tires for wear and cracks. Keep tires inflated to 50 psi.
Fasteners	Daily	Tighten any loose hardware.
Battery Charging	Daily	Red, amber or green charging light should turn on when charging.
Casters	Daily	Inspect for wear; clean dirt and debris.
Transaxle	Daily	Transaxle should be kept free and clear of debris. When stored, the transaxle lever should be kept in Motorized mode with the power OFF to keep unit from rolling freely.

Wiring Diagram - 24V System



Troubleshooting

Problem	Possible Causes	Remedy
Motor does not run	Power switch in OFF position Controller in sleep mode Batteries are drained Motor brake lever released on drive system Electrical fault	Turn switch to ON position Cycle switch, OFF 2 sec, then ON Recharge batteries Re-engage motor brake on drive system Unplug, then plug in both motor and throttle connectors
Motor shuts off during use	Circuit breaker has tripped Controller trip due to thermal overload (weight and/or climb angle may exceed controller capacity)	Push circuit breaker to reset Release throttle, allow controller to cool down at least 30 seconds. Unload some weight, cycle power switch, operate machine again.
Insufficient range	Hilly or soft terrain Batteries not "broken in" Cold batteries Battery not fully charged Damaged, old batteries	Push to assist drive system Charge and discharge 4-10 times before optimum range Keep batteries warm ALWAYS keep machine on charge when not in use Replace batteries
Machine abruptly stops	Broken motor wire or connector	Check motor wires to make sure none are broken, and also check connector to make sure wires are secure in connector
Machine slows down aggressively while in manual release mode	"Push too fast" safety feature	Do not push machine so fast while in manual release mode



NOTES



MAGLINE® INC.
1205 West Cedar Street
Standish, Michigan 48658
1-800-MAGLINE (624-5463)
Email: customerservice@magliner.com
www.magliner.com