

TROLLING Thunder™

THE EXTREME DUAL PURPOSE BATTERY



OWNER'S MANUAL

INTRODUCTION

The battery technology that has supplied telecommunication, medical, emergency lighting, and military applications with dependable, long lasting, and reliable power is now available to you. Whether you are a seasoned professional or a weekend angler, TROLLING THUNDER™ batteries are truly dual purpose for your deep cycle, starting or other recreational needs.

6 REASONS WHY YOU SHOULD BE USING TROLLING THUNDER BATTERIES:

1. SAVE TIME AND MONEY

The TROLLING THUNDER range of batteries have a service life of 3 - 5 years which means no more annual battery replacements and the cost of ownership is much lower. They truly are a maintenance free battery.

2. FAST RECHARGE

A 100% recharge in 4 - 6 hours gives the TROLLING THUNDER range the highest recharge efficiency of any sealed lead battery on the market.

3. INCREASED POWER WITH LONGER LIFE

Compared with conventional deep cycle batteries, the TROLLING THUNDER range has a 70% longer cycle life. They also provide high stable voltage for longer periods of time and high purity lead/tin grid means less corrosion and longer life.

4. RUGGED CONSTRUCTION

The TROLLING THUNDER range is designed for high impact shock and mechanical vibration. This, together with operating temperatures from -40°F, makes them ideal for outdoor application and abusive elements. In fact, you can leave them on the boat all year round! The batteries can be mounted on any side (except inverted).

5. KEEPING CUSTOMERS SAFE

The TROLLING THUNDER range of batteries are completely sealed and cannot leak, even if upside down. There are no more acid spills or acid burns because they use a totally dry system. The US Department of Transportation has classified the TROLLING THUNDER range as non-spillable.

6. WARRANTY - THE ULTIMATE TEST

All of our TROLLING THUNDER batteries come with a limited 2 year full replacement warranty. There are no Pro Rata ratings and they have a shelf life of up to 2 years. We put our money where your trust is... in your equipment.

INSTALLATION

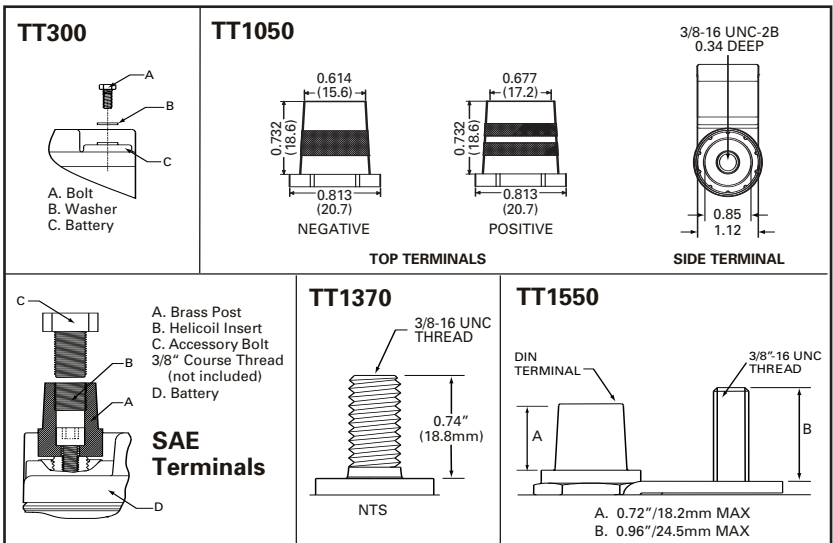
Your TROLLING THUNDER is normally ready to install right out of the box! Measure the battery voltage; if it is 12.65 volts or greater, install; if less, then refer to the charging section. For optimum reliability, a boost charge prior to installation is recommended, regardless of the battery's open circuit voltage (OCV).

ANY OF THE FOLLOWING WILL VOID YOUR WARRANTY:

- EXPOSING BATTERY TO GASOLINE OR DIESEL FUEL
- REMOVING THE LABELED COVER
- REMOVING OR DESTROYING THE BATTERY'S DATE CODE

DO NOT SHORT CIRCUIT YOUR TROLLING THUNDER'S TERMINALS!

Remove any metallic items such as watches, bracelets and other personal jewelry to ensure safe installation.



1. Using proper procedures as recommended by the boat manufacturer, carefully disconnect the cables from your old battery and remove it from the boat. Return the spent battery to the battery dealer for proper recycling.
2. Inspect existing battery cables for corrosion, acid damage or insulation deterioration. Replace if deterioration is present.
3. Position your TROLLING THUNDER in the battery holder and fasten firmly to the boat.
4. Connect the positive cable from your ignition to the Positive (+) terminal.
5. Connect the negative cable from your engine or chassis to the Negative (-) terminal.
6. Torque the bolt, screw or nut per the specification noted in table. If you're using the Accessory Bolt (C), hold the Brass Post (A) with vise grips and counter torque.

NOTE: This is a valve regulated sealed battery and never needs to have water or electrolyte (acid) added. **Warranty will be void if opened!**

Model	MCA	CCA	Length Inches (mm)	Width Inches (mm)	Height Inches (mm)	Weight lbs (kg)	Torque Spec In-lbs (Nm Max)	Internal Resistance (mΩ)	Short Circuit Current	Nominal Constant Current Capacity to 1.67Vpc @ 25°C/77°F - Ah						
										20- Hour	10-Hour	8-Hour	5-Hour	2-Hour	1-Hour	30-Min.
TT300	300	220	7.27 (184.7)	3.11 (79.0)	6.67 (169.4)	15.4 (7.0)	50 (5.6)	7	1800A	17	16	16	15	14	13	12
TT500	500	380	6.64 (168.6)	7.05 (179.0)	5.04 (128.0)	26.0 (11.8)	60 (6.8)	5	2400A	28	27	26	25	23	22	20
TT725	725	550	7.87 (199.9)	6.66 (168.1)	6.80 (172.7)	38.2 (17.4)	60 (6.8)	4.5	2600A	44	40	40	39	35	32	28
TT1060	1050	825	10.85 (275.6)	6.99 (177.5)	7.82 (198.6)	53.0 (24.0)	TOP 60 (6.8) SIDE 70 (7.9)	2.5	3100A	68	62	60	57	51	47	42
TT1175	1175	875	13.02 (330.7)	6.62 (168.2)	6.93 (176.0)	60.9 (27.6)	60 (6.8)	3.5	3500A	68	65	64	62	58	54	48
TT1370	1370	1090	13.00 (330.2)	6.80 (172.7)	9.41 (239.0)	75.0 (34.1)	150-200 (16.9-22.6)	2.2	5000A	100	92	90	85	80	73	60
TT1550	1550	1225	11.26 (286.0)	10.59 (269.0)	8.19 (208.0)	86.0 (39.0)	100 (11.0) For 3/8" Stud only	2.1	5000A	126	114	110	103	90	80	69

Constant voltage portable charger parameters:

- (A) Standby, per 12V battery 13.5-13.8V no current limit required
- (B) Cyclic, per 12V battery (16-hour recharge) 14.4-14.8V no current limit required
- Typical deep-cycle life at 25°C/77°F at a 5-hour rate 400 cycles at 80% DOD
- Typical service life at 25°C/77°F Medium to heavy duty usage -5+ years
- Light duty usage -5-8+ years

Design characteristics

- Battery type Sealed dry cell valve regulated lead acid (VRLA) gas recombination technology
- Plate Design High purity lead/tin grid, starved electrolyte
- Electrolyte/specific gravity Sulfuric acid: 1.310 ±0.005 at 25°C/77°F, fully charged
- Safety Vent Self-sealing Bunsen valve per cell

PULSE DISCHARGE CAPABILITIES

Table 1 shows the 5, 10, 20 and 30-second pulse discharge numbers for these batteries to 7.2V at 25°C (77°F). Sufficient time must be given between successive discharges to allow the terminals to cool down. Also, fully charged batteries will meet these specifications.

Battery	Pulse discharge in amps to 7.2V			
	5 sec.	10 sec.	20 sec.	30 sec.
TT300	680	595	525	400
TT500	925	870	765	675
TT725	1,200	1,090	900	825
TT1050	1,500	1,280	1,100	975
TT1175	1,700	1,540	1,355	1,195
TT1370	2,150	1,985	1,750	1,600
TT1550	2,250	2,075	1,775	1,675

Table 1: Pulse discharge of TROLLING THUNDER batteries

TROLLING THUNDER STORAGE AND DEEP DISCHARGE RECOVERY

Figure 2 shows the relationship between open circuit voltage (OCV) and state of charge (SOC) for the TROLLING THUNDER battery.

(A) How do I know the state of charge (SOC) of the battery?

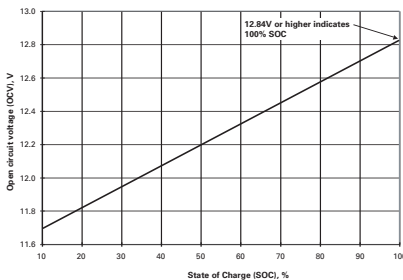


Figure 2: TROLLING THUNDER OCV vs. state of charge

As long as the battery has not been charged or discharged for 6 or more hours, Figure 2 can be used to determine the SOC of the TROLLING THUNDER battery. Use a high quality digital voltmeter to measure its open circuit voltage (OCV). The graph shows that a healthy, fully charged TROLLING THUNDER battery will have an OCV of 12.84V or higher at 25°C.

(B) How long can the battery be stored?

Refer to Figure 3 below. At 25°C (77°F), these batteries can be stored for up to 2 years. The lower the temperature, the longer the storage time. The battery must be charged before storage.

Roughly every 10°C (18°F) increase in temperature cuts storage time in half. If the temperature rises to 35°C (95°F) the battery may be stored for only 1 year before a recharge becomes necessary. Figure 3 will apply only if the battery is fully charged before storage.

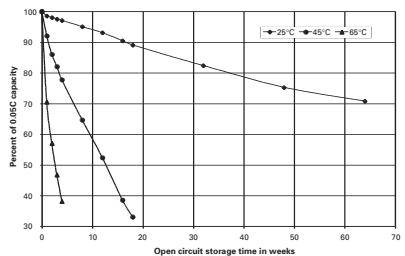


Figure 3: TROLLING THUNDER storage time at temperatures

MAINTENANCE

TROLLING THUNDER is very different from standard liquid-acid batteries that are openly vented. TROLLING THUNDER is and operates as a sealed battery, recycling nearly all gases internally. There is no corrosion of the positive terminal or corrosion to the surrounding area. TROLLING THUNDER is shipped fully charged from the factory, but prior to installation, check the battery's voltage to see if it is 12.65 volts or greater. If not, recharge it using the procedure below.

Note: Do not charge in an air tight compartment.

Never attempt to remove the top decal cover, as it will cause the battery to fail.

CHARGING

The state of charge in an TROLLING THUNDER battery can be determined from the following chart:

Voltmeter Reading	State of Charge
12.84 Volts or higher	100%
12.50 Volts	75%
12.18 Volts	50%
11.88 Volts	25%

To get long life from the TROLLING THUNDER battery, it is important that the battery is kept near full charge, approximately 12.8 volts. If there are electrical loads during storage, then the negative battery cable should be disconnected or an independent float charger used. Low power 2.0 amp chargers for storage charge will keep a fully charged battery fully charged but cannot recharge if TROLLING THUNDER becomes discharged.

Special chargers as listed on www.trollingthunderfactory.com specifically designed for TROLLING THUNDER and ODYSSEY batteries are required for routine deep discharge applications. They provide the 105-108% recharge and then switch to storage charge.

To fully charge a TT1370, 20 amps minimum constant voltage is required with charger voltage within the range of 14.1V to 14.7V. It is imperative not to exceed 15.0V as this will cause the pressure valves to open and out-gas hydrogen, oxygen and water from inside the battery. This will shorten the life of the battery and cause premature failure. Some portable chargers exceed 15.0V, especially two-wheel garage chargers, so charging voltages should be verified by measuring the charging voltage during the time when the charging amperage is reducing from full output. The deep cycle charging voltage must be within 14.1V minimum to 14.7V maximum.

If a standard automotive charger is used to boost charge a discharged battery because of an accessory left on, it is important to make sure the charging voltage does not exceed 15 volts during charge. A hand held voltmeter can be used to monitor this periodically. The following chart provides recharge times under this type of boost charging to an 80-95% recharge and then allows the vehicle/boat charging system to complete the charge.

TROLLING THUNDER	Charge time for 100% discharged battery (11.5 volts)		
	Model	10-amp charger	20-amp charger
	TT300	2 hours	1 hour
	TT500	2 ¹ / ₂ hours	1 ¹ / ₄ hours
	TT725	4 hours	2 hours
	TT1050	5 hours	2 ¹ / ₂ hours
	TT1175	7 hours	3 ¹ / ₂ hours
	TT1370	10 hours	5 hours
	TT1550	12 hours	6 hours

WINTER STORAGE

TROLLING THUNDER does not lose its charged energy during cold storage temperatures, so there is no need to trickle or float charge during winter months. To store off-season, measure the battery voltage to make sure it is fully charged, 12.84 volts or greater; recharge if necessary. Disconnect the negative battery cable to prevent any applied electrical load during storage. TROLLING THUNDER will not freeze down to -40°C or -40°F so it can be left in the vehicle. It can be stored for 2 years or more below 77°F.

A 12V, 3 amp trickle charger can also be left connected to the battery if it is kept in storage for extended periods or if the battery is subject to parasitic loads during storage. Information on two such chargers we recommend, including where to buy them, can be found on our website at www.trollingthunderfactory.com

WARRANTY:

EnerSys Energy Products Inc. ("Manufacturer") warrants its TROLLING THUNDER™ batteries to be free of defects in material and workmanship for the earlier of (a) the Applicable Warranty Period or (b) within 400 cycles to 80% depth of discharge, whichever occurs first. The Applicable Warranty Period is two (2) years in all applications from the date of purchase with original receipt, or, if no receipt is available, from Manufacturer's shipping date. Within the warranty period, the battery will be replaced free of charge if adjustment is necessary due to defect in material or workmanship (not merely discharged). Simply return the battery to any authorized TROLLING THUNDER dealer with the original receipt for a replacement. This warranty may vary from country to country; contact your authorized TROLLING THUNDER wholesaler or dealer for the applicable warranty.

GENERAL PROVISIONS

Manufacturer has no obligation under the limited warranty set forth above in the event the battery is damaged or destroyed as a result of one or more of the following:

- Willful abuse or neglect or if the top decorative cover has been removed.
- Natural forces such as wind, lightning, hail; damage due to fire, collision, explosion, vandalism, theft, penetration or opening of the battery case in any manner.
- Overcharging, undercharging, charging or installing in reverse polarity, improper maintenance, allowing the battery to be deeply discharged via a parasitic load or mishandling of the battery such as but not limited to using the terminals for lifting or carrying the battery.
- Failure to properly install the battery or lack of metal jacket for high temperature or vibration applications.
- Normal deterioration in the electrical qualities or the acceleration of such deterioration due to conditions that accelerate such deterioration.
- If the battery is used for an application that requires higher cranking power or a greater reserve rating than the battery is designed to deliver, or the battery capacity is less than the battery capacity specified by the vehicle manufacturer, or the battery is otherwise used in applications for which it was not designed.

To obtain warranty service:

Return the battery to any authorized TROLLING THUNDER wholesaler or dealer. If the battery is determined to be defective for material or workmanship under terms of this limited warranty, it will be replaced.

THIS LIMITED WARRANTY IS IN LIEU OF, AND MANUFACTURER DISCLAIMS AND EXCLUDES, ALL OTHER WARRANTIES, STATUTORY, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. MANUFACTURER'S EXCLUSIVE LIABILITY FOR BREACH OF WARRANTY SHALL BE TO REPLACE THE BATTERY WITHIN THE EFFECTIVE WARRANTY PERIOD. IN NO EVENT SHALL MANUFACTURER BE LIABLE FOR ANY LOSS OR DAMAGES OF ANY OTHER KIND, WHETHER DIRECT, INCIDENTAL, CONSEQUENTIAL, EXEMPLARY, SPECIAL OR OTHERWISE. NOR SHALL MANUFACTURER BE LIABLE FOR ANY REMOVAL OR INSTALLATION EXPENSE, OR THE LOSS OF TIME OR PROFITS.

Some countries and/or states do not allow limitation on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to you. This warranty gives you specific legal rights which may vary from country to country and/or state to state.

Keep your receipt. Receipt is required for longest Warranty Protection.

For your convenience, this space is provided for attaching your original receipt.

Always properly recycle your lead acid battery by returning to an authorized recycling center or automotive dealer.



NEVER PLACE USED BATTERIES IN YOUR REGULAR TRASH!

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