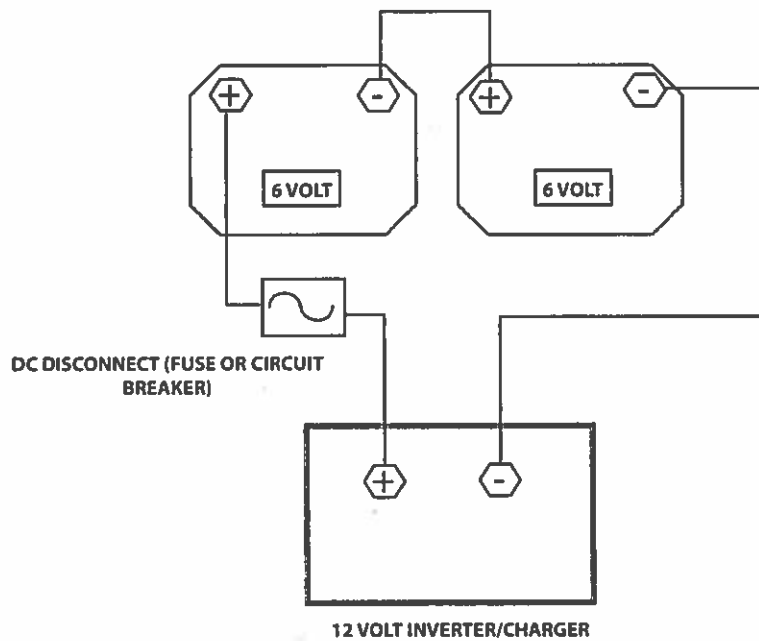
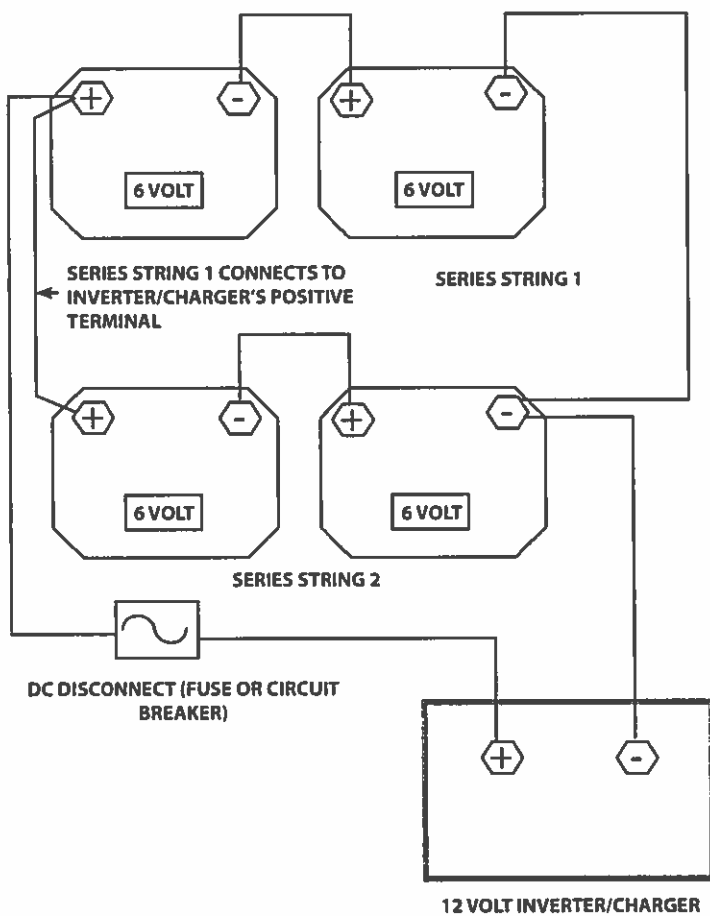


6V Battery Wiring Examples

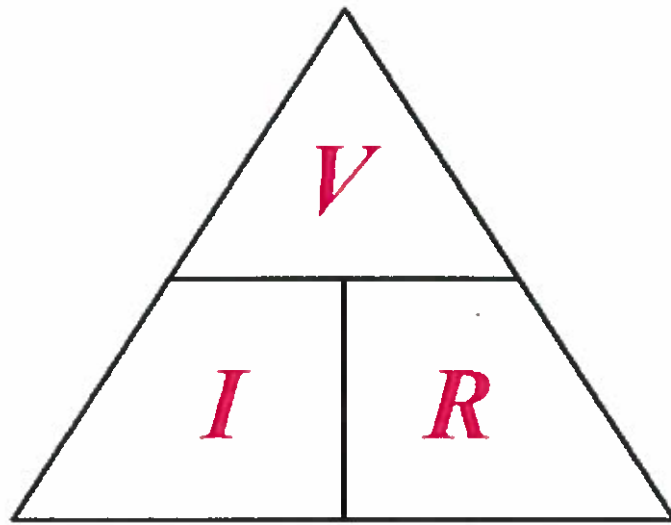


SERIES/12 VOLT FX



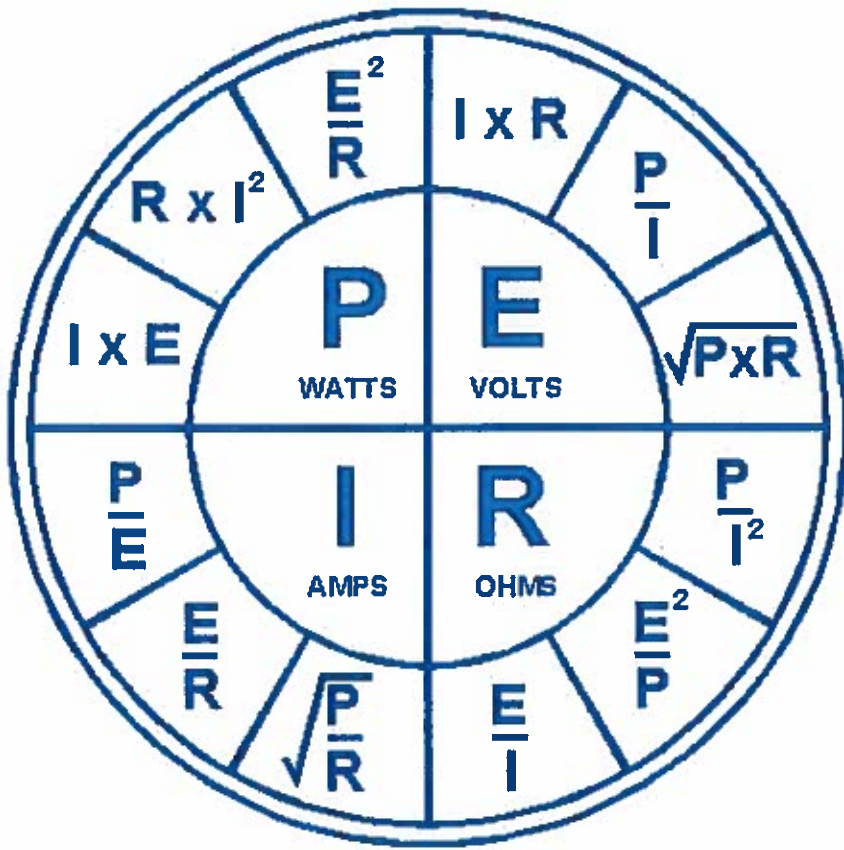
SERIES/PARALLEL/12 VOLT FX

$$V = IR$$

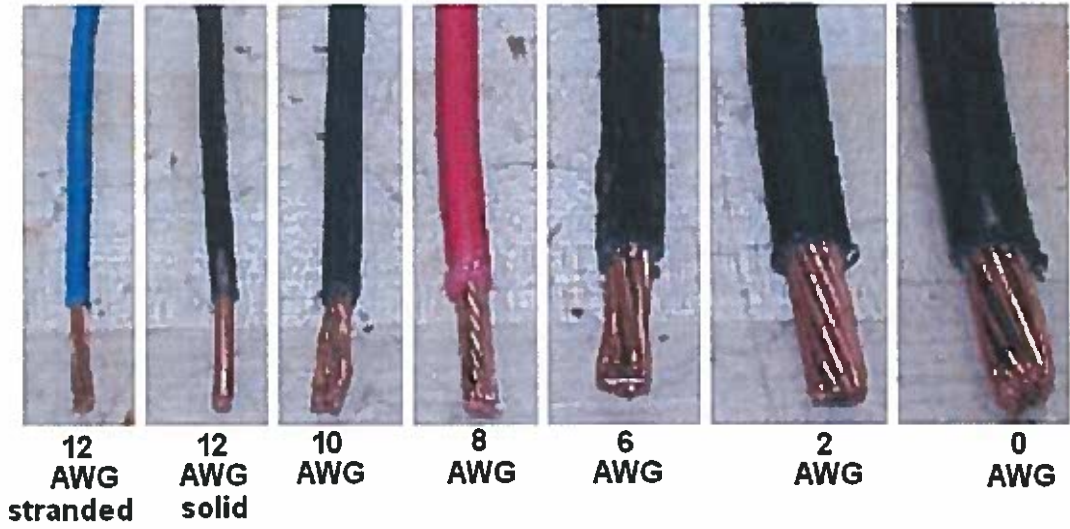
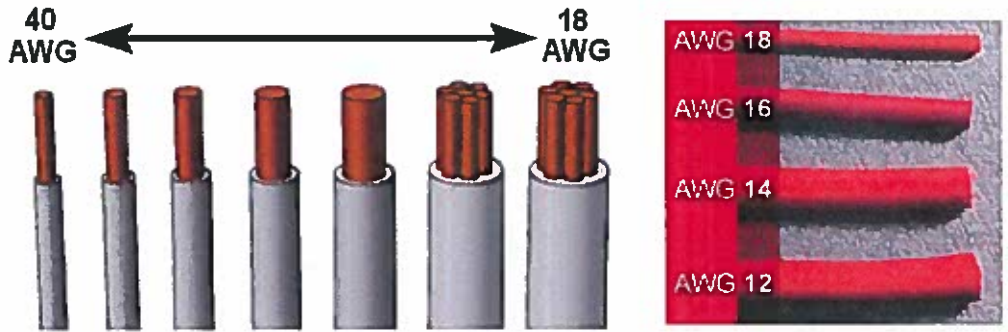


$$I = \frac{V}{R}$$

$$R = \frac{V}{I}$$

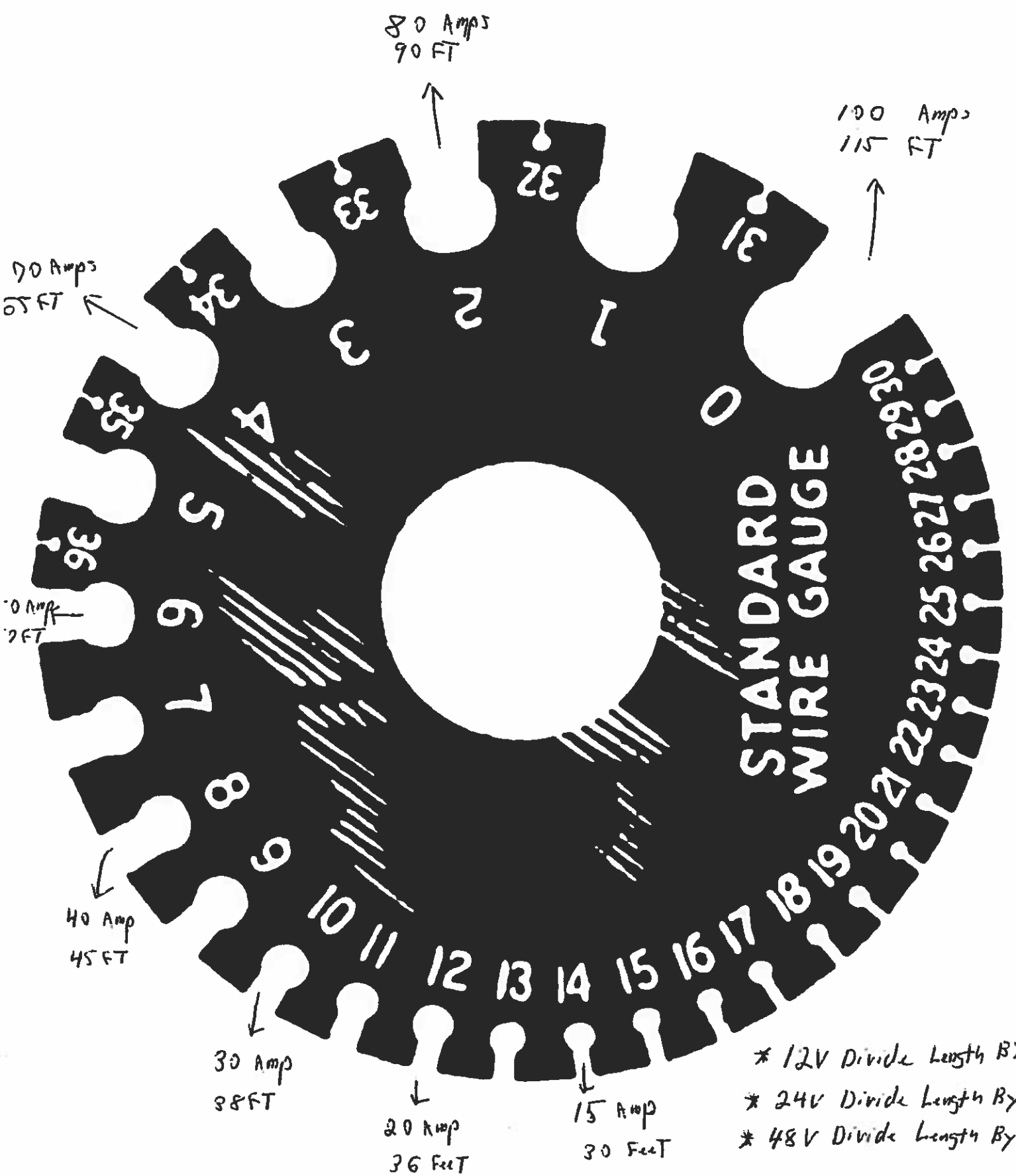


AWG Cables / Wire Sizes



AWG gauge	Conductor Diameter Inches	Ohms per 1000 ft.
0000	0.46	0.049
000	0.4096	0.0618
00	0.3648	0.0779
0	0.3249	0.0983
1	0.2893	0.1239
2	0.2576	0.1563
3	0.2294	0.197
4	0.2043	0.2485
5	0.1819	0.3133
6	0.162	0.3951
7	0.1443	0.4982
8	0.1285	0.6282
9	0.1144	0.7921
10	0.1019	0.9989
11	0.0907	1.26
12	0.0808	1.588
13	0.072	2.003
14	0.0641	2.525
15	0.0571	3.184
16	0.0508	4.016

26 max voltage drop at 120 volts





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Signature Line Flooded

The Signature Line of deep-cycle flooded batteries is the flagship of Trojan's product portfolio.

Engineered to provide rugged durability and outstanding performance, Trojan's Signature Line is perfectly suited for use in renewable energy systems where lowest life-cycle cost is the key consideration. An all-around power house, the Signature Line features Trojan's historically-proven engineering with T2 Technology™, an advanced battery technology for maximum sustained performance, longer life and increased total energy.

- **Trojan's Grid Technology** is a lead antimony alloy grid mixture formulated for use with Trojan's Alpha Plus® Paste with T2 Technology. The overall grid configuration is optimized to enhance current flow through the grid network providing exceptional battery performance, reducing downtime and lowering overall maintenance costs.
- Trojan's **Maxguard T2** separator features a multi-rib geometry which keeps acid channels open longer enhancing electrochemical processing while reducing the risk of stratification. Trojan's Maxguard T2 advanced separator sustains performance providing exceptionally longer battery life and significantly lowering your operating costs.
- **Alpha Plus® Paste with T2 Technology** is a proprietary, high-density paste formulation precisely engineered to deliver outstanding battery performance. Together Alpha Plus Paste with T2 Technology increases both sustained capacity and total overall ampere-hours resulting in more operating power for your application. It's a key reason why Trojan batteries consistently outperform the competition.

There are many things we take for granted about electricity, but on Isla Bella Vista, for people to have a television running in their own house, it is incredible.

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BCI GROUP SIZE	TYPE	CAPACITY * Amp-Hours (AH)				KLOWATT (kWh)	VOLTAGE	DIMENSIONS * inches (mm)			WEIGHT lbs. (kg)
		5-Hr Rate	20-Hr Rate	100-Hr Rate	100-Hr Rate			Length	Width	Height ^c	
SIGNATURE LINE FLOODED BATTERIES – 600 CYCLES @ 50% DOD											
24	24TMX	70	85	94	1.13	12 VOLT	10.92 (277)	8.82 (188)	9.25 (235)	47 (21)	
27	27TMX	85	105	117	1.40	12 VOLT	12.72 (323)	8.80 (188)	9.24 (235)	55 (25)	
27	27TMH	95	115	128	1.54	12 VOLT	12.72 (323)	8.80 (188)	9.24 (235)	61 (28)	
30H	30XHS	105	130	144	1.73	12 VOLT	13.94 (354)	8.75 (171)	10.09 (256)	66 (30)	
SIGNATURE LINE FLOODED BATTERIES – 1,200 CYCLES @ 50% DOD											
N/A	J150	120	150	166	1.99	12 VOLT	13.70 (348)	7.13 (181)	11.13 (283)	84 (38)	
921	J185P-AC*	168	205	226	2.71	12 VOLT	14.97 (380)	8.91 (178)	14.71 (374)	114 (58)	

N/A	T-1275	120	150	166	1.99	12 VOLT	12.96 (329)	7.13 (181)	11.13 (283)	82 (37)
921	J185H-AC*	185	225	249	2.99	12 VOLT	14.97 (380)	8.91 (178)	14.71 (374)	128 (58)
GC2	T-60S	175	210	232	1.39	6 VOLT	10.30 (262)	7.11 (181)	11.07 (281)	62 (28)
GC2	T-10S	185	225	250	1.50	6 VOLT	10.30 (262)	7.11 (181)	11.07 (281)	62 (28)
GC2	T-12S	195	240	268	1.60	6 VOLT	10.30 (262)	7.11 (181)	11.07 (281)	68 (30)
DIN	TE3S	201	245	270	1.83	6 VOLT	9.60 (244)	7.50 (191)	10.80 (289)	68 (31)
GC2H	T-14S	215	260	287	1.72	6 VOLT	10.30 (262)	7.11 (181)	11.90 (302)	72 (33)
902	J30SP-AC*	271	330	367	2.20	6 VOLT	11.68 (296)	6.94 (178)	14.42 (366)	98 (44)
902	J30SH-AC*	295	380	400	2.40	6 VOLT	11.68 (296)	6.94 (178)	14.42 (366)	98 (45)
903	L16P*	344	420	467	2.80	6 VOLT	11.66 (295)	6.94 (178)	17.55 (448)	114 (52)
903	L16H*	357	435	483	2.89	6 VOLT	11.66 (296)	6.94 (178)	17.55 (446)	125 (57)

- A. The number of minutes a battery can deliver when discharged at a constant rate at 80°F (27°C) and maintain a voltage above 1.75 V/cell. Capacities are based on peak performance.
- B. Dimensions are based on nominal size. Dimensions may vary depending on type of handle or terminal. Batteries to be mounted with .5 inches (12.7 mm) spacing minimum.
- C. Dimensions taken from bottom of the battery to the highest point on the battery. Heights may vary depending on type of terminal.
- * Polyon™ Case

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Trojan's **HydroLink™**



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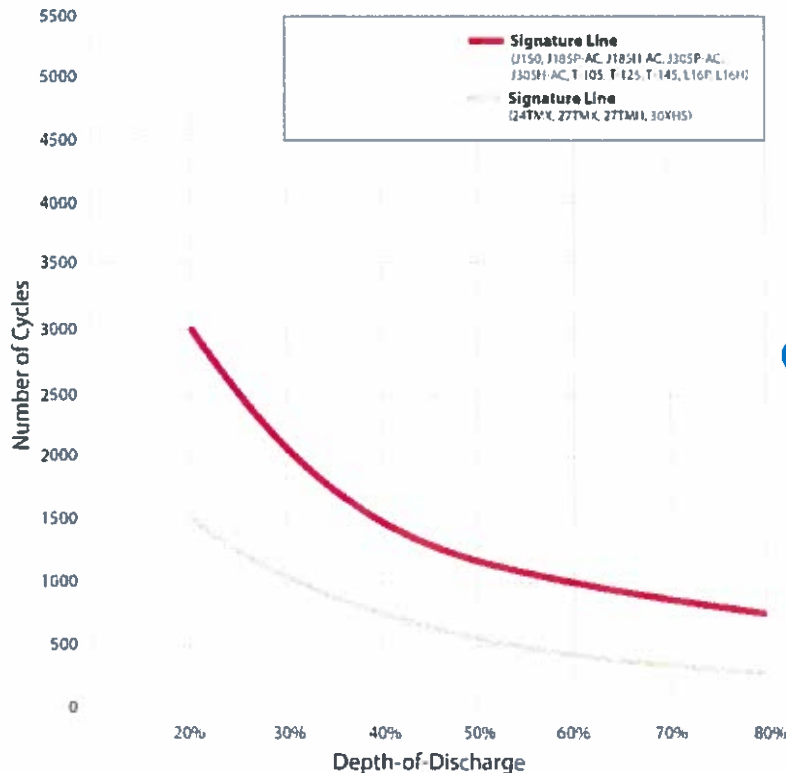
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Deep-Cycle Reliant AGM

Trojan's Reliant™ Line of U.S.-made Absorbed Glass Mat (AGM) batteries feature design elements that offer a new direction in AGM technology. As the only true deep-cycle AGM battery on the market today, Reliant is engineered with an advanced technology feature set that provides outstanding sustained performance and total energy output, delivering the exceptional quality and reliability Trojan batteries are known for.

Trojan's Reliant AGM is specifically engineered for deep-cycling applications, unlike most AGM batteries on the market today which are designed for dual-purpose or standby applications, such as UPS backup.



Reliant AGM Provides True Deep-Cycle Performance and Maximum Total Energy

C-Max Technology Delivers the Maximum Total Energy Output in AGM Technology

Manufactured in Sandersville, Georgia to the Exacting Standard. Trojan Battery is Known for

Dave Godber
Trojan Battery's Executive VP of Sales and Marketing

Reliant

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As the world's leading manufacturer of deep-cycle batteries for more than 85 years, Trojan has developed Reliant™ AGM with C-Max Technology™ for a wide range of applications which will benefit from its true deep-cycle design, including aerial work platform, floor cleaning, golf, inverter, material handling, oil and gas, recreation, remote telecom, and renewable energy. Reliant AGM is also designed to power equipment used in locations where regulatory mandates require use of non-spillable batteries such as airports, healthcare facilities, shopping centers, educational institutions, etc.

Reliant AGM batteries are designed specifically for deep-cycle performance by Trojan's engineering team, which boasts more than 200 years of combined expertise in deep-cycle battery technology. Built in the USA at our state-of-the-art manufacturing facility in Sandersville, Georgia, Reliant AGM features premium

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components and superior manufacturing techniques. Reliant AGM is also supported by Trojan's technical support and Master Distributor network worldwide

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Deep-Cycle AGM

Trojan's deep-cycle Absorbed Glass Mat (AGM) maintenance-free batteries feature a number of design elements to provide optimum performance. Robust plates and separators extend the life-cycle of Trojan's deep-cycle AGM batteries while a computer-generated grid design is optimized for high-power density. Trojan's deep-cycle AGM batteries are low temperature tolerant, shock and vibration resistant and have a low internal resistance for higher discharge current and higher charging efficiency.

BCI GROUP SIZE	TYPE	CAPACITY ^A Minutes			CRANKING Performance		CAPACITY ^B Amp-Hours(AH)				ENERGY (kWh)	DIMENSIONS ^C Inches (mm)			WEIGHT lbs. (kg)
		@25 Amps	@50 Amps	@75 Amps	C.C.A. ^D @0° F	C.A. ^E @32°F	5-Hr Rate	10-Hr Rate	20-Hr Rate	100-Hr Rate		Length	Width	Height ^F	
6 VOLT RELIANT™ DEEP-CYCLE AGM BATTERIES WITH C-MAX TECHNOLOGY™															
GC2	T105-AGM	440	--	115	--	--	171	187	217	230	--	10.30 (262)	7.08 (179)	10.73 (273)	88 (31)
GC2	Z395-AGM	870	--	189	--	--	250	273	310	329	--	11.65 (296)	8.94 (178)	14.09 (358)	97 (44)
GC3	L16-AGM	817	--	215	--	--	290	323	370	382	--	11.00 (280)	8.94 (178)	10.41 (417)	119 (52)
8 VOLT RELIANT™ DEEP-CYCLE AGM BATTERY WITH C-MAX TECHNOLOGY™															
GC8	T875-AGM	320	118	--	--	--	130	142	160	170	--	10.30 (262)	7.08 (179)	10.73 (273)	70 (32)
12 VOLT RELIANT™ DEEP-CYCLE AGM BATTERIES WITH C-MAX TECHNOLOGY™															
GC12	T1275-AGM	270	132	--	--	--	112	127	140	148	--	12.96 (329)	7.08 (179)	10.06 (278)	81 (37)
GC1	J195-AGM	380	--	110	--	--	157	171	200	212	--	14.07 (360)	8.94 (178)	14.45 (367)	125 (57)
6V DUAL PURPOSE AGM BATTERIES															
GC2	6V-AGM	385	--	--	1100	1400	154	184	200	221	1.33	10.28 (261)	7.08 (180)	10.74 (273)	89 (29)
DN	7E34-AGM	474	--	--	973	--	198	222	243	270	--	9.81 (244)	7.40 (188)	10.83 (275)	72 (33)
12 DUAL PURPOSE AGM BATTERIES															
DN	80AH-12V	128	--	--	420	--	81	88	74	83	--	10.98 (279)	8.80 (179)	7.48 (190)	40 (21)
DN	85HP-AGM	283	--	--	800	--	138	143	168	184	--	13.39 (340)	8.81 (173)	11.26 (286)	95 (43)
BD	80-AGM	480	--	--	1450	1850	179	210	230	254	3.05	20.47 (520)	10.84 (275)	9.38 (231)	181 (73)
12 VOLT DEEP-CYCLE AGM BATTERIES															
U1	U1-AGM	42	--	--	240	300	29	31	33	34	0.41	7.78 (198)	8.20 (132)	8.79 (171)	27 (12)
GC12	12-AGM	280	--	--	825	900	112	127	140	144	1.72	13.54 (344)	8.78 (172)	10.88 (278)	100 (45)
22	22-AGM	79	--	--	280	336	43	47	50	52	0.62	8.90 (228)	8.42 (139)	8.04 (204)	40 (18)
24	24-AGM	137	--	--	500	600	67	70	76	84	1.01	10.77 (274)	8.84 (174)	8.82 (219)	54 (24)
27	27-AGM	158	--	--	550	660	77	82	89	99	1.19	12.05 (306)	8.84 (174)	9.32 (237)	64 (29)
31	31-AGM	177	--	--	600	720	82	82	100	111	1.33	13.42 (341)	8.81 (173)	9.18 (233)	69 (31)
31	OverDrive AGM 31™	180	--	--	730	875	84	93	102	112	1.34	13.42 (341)	8.81 (173)	9.21 (234)	69 (31)

- A The number of minutes a battery can deliver when discharged at a constant rate at 80°F (27°C) and maintain a voltage above 1.75 V/cell. Capacities are based on peak performance.
- B The amount of amp-hours (AH) a battery can deliver when discharged at a constant rate at 80°F (27°C) for the 20-Hour rate and 88°F (30°C) for the 5-Hour rate and maintain a voltage above 1.75 V/cell. Capacities are based on peak performance.
- C Dimensions are based on nominal size. Dimensions may vary depending on type of handle or terminal. Batteries to be mounted with .5 inches (12.7mm) spacing minimum.
- D C C A (Cold Cranking Amps) – the discharge load in amperes which a new fully charged battery can maintain for 30 seconds at 0°F at a voltage above 1.2 V/cell.
- E C A (Cranking Amps) – the discharge load in amperes which a new fully charged battery can maintain for 30 seconds at 32°F at a voltage above 1.2 V/cell. This is sometimes referred to as marine cranking amps @ 32°F or M C A @ 32°F.
- F Dimensions taken from bottom of the battery to the highest point on the battery. Heights may vary depending on type of terminal.

Reliant™ AGM Video



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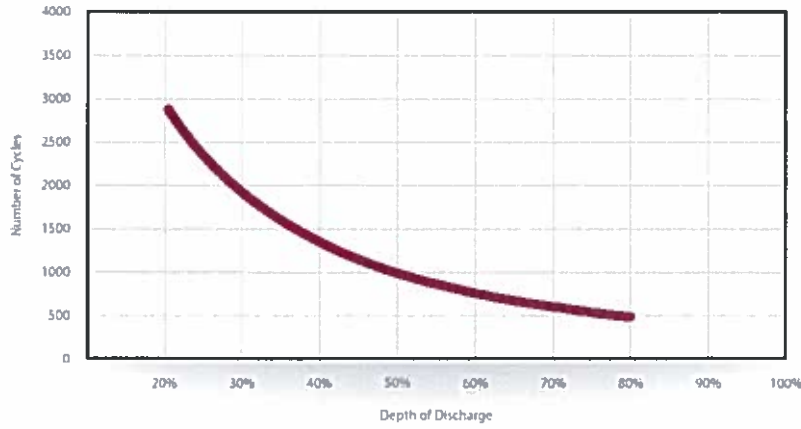
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Cycle Life Chart



Deep-Cycle AGM Batteries

Please select the battery voltage.

6V Batteries

8V Batteries

12V Batteries



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Battery Maintenance

Trojan Battery Company has been manufacturing deep-cycle, flooded batteries for more than three generations.

Our experience has shown that the key factor to achieving optimum performance and long battery life is to follow a regular care and maintenance program.

While reviewing our battery maintenance tips, please keep in mind that all battery systems are unique. Battery type, charger technology, equipment loads, cable size, climate, and other factors can all vary. Slight or significant, these differences will require battery maintenance to be adjusted accordingly. These are only guidelines to follow for proper battery care. Each particular system will always require a degree of customized attention.



Before Getting Started

Achieving Optimum Performance and Long Battery Life

Before Getting Started

- Make sure you know your system voltage, battery compartment size (length, width and height) and your energy needs.
- Determine whether you want to use a deep-cycle flooded, AGM or gel battery.

Step 1: Determine Your Battery Voltage And How Many Batteries To Use

- 1-1 Based on your system voltage, you must first decide which battery is needed and how many to use in order to meet your requirements. For example, you may connect a series of eight 6V batteries, six 8V batteries or four 12V batteries for a 48-volt system. The size of your battery compartment, your performance requirements and costs may limit your options.
- 1-2 Make sure there is enough space between batteries to allow for minor battery expansion that occurs during use and to allow proper airflow to keep battery temperature down in hot environments.

TIP

Connecting batteries in series does not increase the capacity of the batteries; it simply increases the overall voltage to meet your system requirements. Once your voltage requirements are met, and if space allows, you can double the batteries in a parallel connection — thereby doubling your battery capacity. See diagrams below.

Series Connect



To increase voltage, connect batteries in series. This will not increase the system capacity.

Example
Two T-105, 6V Batteries rated at 225AH Connected in Series

System Voltage
6V + 6V = 12V System Capacity = 225AH

Parallel Connect



To increase capacity, connect batteries in parallel. This will not increase the system voltage.

Example
Two T-105, 6V Batteries rated at 225AH Connected in Parallel

System Voltage
6V System Capacity = 225AH + 225AH = 450AH

Series/Parallel Connect



To increase both voltage and capacity, connect additional batteries in series and parallel.

Example
Four T-105, 6V Batteries rated at 225AH Connected in Series/Parallel

System Voltage
6V + 6V = 12V System Capacity = 225AH + 225AH = 450AH

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Charging

Charging batteries properly requires administering the right amount of current at the right voltage. Most charging equipment automatically regulates these values. Some chargers allow the user to set these values. Both automatic and manual equipment can present difficulties in charging. Tables 2 & 3 list most of the necessary voltage settings one might need to program a charger. In either case the original instructions for your charging equipment should also be referenced for proper charging. Here is list of helpful items to remember when charging.

1. Become familiar with and follow the instructions issued by the charger manufacturer.
2. Batteries should be charged after each period of use.
3. Lead acid batteries do not develop a memory and do need not be fully discharged before recharging.
4. Charge only in well-ventilated areas. Keep sparks or flames away from a charging battery.
5. Verify charger voltage settings are correct (Table 2).
6. Correct the charging voltage to compensate for temperatures above and below 80° F (26.6°C). (Add .028 volt per cell for every 10° below 80° F (26.6°C) and subtract 0.028 volt per cell for every 10° F (12.2°C) above 80° F (26.6°C)).
7. Check water level (see the Watering section).
8. Tighten all vent caps before charging.
9. Prevent overcharging the batteries. Overcharging causes excessive gassing (water breakdown), heat buildup, and battery aging.
10. Prevent undercharging the batteries. Undercharging causes stratification which can lead to premature battery failure.
11. Do not charge a frozen battery.
12. Avoid charging at temperatures above 120° F (48.8° C).

Table 2

Charger Voltage Settings for Flooded Batteries	System Voltage				
	6v	12v	24v	36v	48v
Daily Charge	7.4	14.8	29.6	44.4	59.2
Float	6.6	13.2	25.4	39.6	52.8
Equalize	7.8	15.5	31.0	46.5	62.0

Table 3

Charger Voltage Settings for VRLA Batteries	System Voltage			
	12v	24v	36v	48v
Daily Charge	13.8-14.4	27.6-28.2	41.4-42.3	55.2-56.4
Float	13.5	26.4	39.6	52.8

Additional VRLA Charging Instructions:

1. Become familiar with and follow the instructions issued by the charger manufacturer.
2. Verify charger has necessary VRLA setting.
3. Set charger to VRLA voltage settings (Table 3).
4. Do not overcharge VRLA batteries. Overcharging will dry out the electrolyte and damage battery.

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Equalizing

FLOODED BATTERIES ONLY

Equalizing is an overcharge performed on flooded lead acid batteries after they have been fully charged.

It reverses the buildup of negative chemical effects like stratification, a condition where acid concentration is greater at the bottom of the battery than at the top. Equalizing also helps to remove sulfate crystals that might have built up on the plates. If left unchecked, this condition, called sulfation, will reduce the overall capacity of the battery.

Many experts recommend that batteries be equalized periodically, ranging anywhere from once a month to once or twice per year. However, Trojan only recommends equalizing when low or wide ranging specific gravity (+/- .015) are detected after fully charging a battery.

Step-By-Step Equalizing

1. Verify the battery(s) are flooded type.
2. Remove all loads from the batteries.
3. Connect battery charger.
4. Set charger for the equalizing voltage (See Table 2 in the Charging section). If your charger doesn't have an equalization mode, you can unplug the charger and re-plug it back in. This also will conduct the equalization charge.
5. Start charging batteries.
6. Batteries will begin gassing and bubbling vigorously.
7. Take specific gravity readings every hour.
8. Equalization is complete when specific gravity values no longer rise during the gassing stage.

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Discharging

Discharging batteries is entirely a function of your particular application.

However, below is list of helpful items:

1. Shallow discharges will result in a longer battery life.
2. 50% (or less) discharges are recommended.
3. 80% discharge is the maximum safe discharge.
4. Do not fully discharge flooded batteries (80% or more). This will damage (or kill) the battery.
5. Many experts recommend operating batteries only between the 50% to 85% of full charge range. A periodic equalization charge is a must when using this practice.
6. Do not leave batteries deeply discharged for any length of time.
7. Lead acid batteries do not develop a memory and do not need to be fully discharged before recharging.
8. Batteries should be charged after each period of use.
9. Batteries that charge up but cannot support a load are most likely bad and should be tested. Refer to the Testing section for proper procedure.

% Discharged					
100	80	60	40	20	0
0	20	40	60	80	100

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Watering Diagram

Flooded batteries need water.

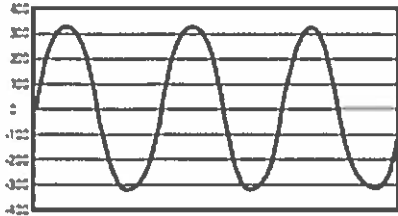
But more importantly, watering must be done at the right time and in the right amount or the battery's performance and longevity suffers.

General Watering Instructions:

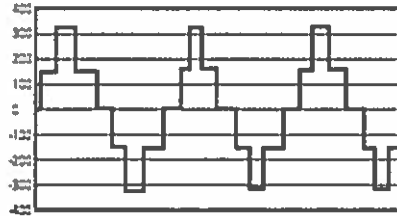
- Add water, never acid, to cells (*distilled water recommended*)
- **DO NOT OVERWATER**
- For fully charged standard deep-cycle batteries, add water to the level of 1/8 below bottom of vent well (*see diagram A below*)
- For fully charged Plus Series batteries, add water to the maximum water level indicator (*see diagram B below*)
- If the batteries are discharged, only add water if the plates are exposed. Add just enough water to cover the plates, then charge the batteries. Once fully charged, add water to the proper level indicated above.
- After watering, secure vent caps on batteries.

Diagram A

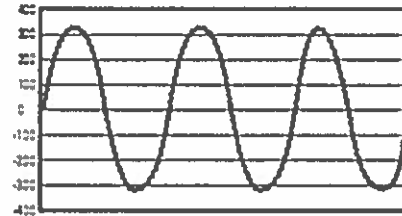
Diagram B



MAINS POWER (SINE WAVE)



MODIFIED SINE WAVE



TRUE SINE WAVE

