

# Model 12-A Backpack Manual

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# Model 12-A Backpack Electrofisher

## 1. Introduction

The Model 12-A POW Electrofisher is a rugged lightweight high energy backpack designed for medium sized waterways with low to medium conductivity water.

The electronics package incorporates solid state circuitry assuring the utmost in reliability and performance, with quiet operation. The circuits feature automatic tests that indicate problems with electrode wiring, switch failure and overloads. Audio output tone meter indicates battery loading. A sealed six-digit LCD electronic timer records true shocking time.

Complex waveforms and programed pulse patterns provide standard output. Programmable output waveforms (POW) add extra waveforms, producing a more flexible electrofishing system. POW reduces the chance of causing damage to sensitive fish species, and allows electrofishing in areas not possible before. By using pulse width and pulse frequency modulation POW is capable of generating virtually any waveform. The only limits are: minimum output pulse width 100 micro seconds; maximum burst rate 1,000 pps. AC waveforms are not supported. When new waveforms are effective they can be easily added.

The Model 12-A Electrofisher is gasket-sealed in a weatherproof case and mounted on a rugged molded frame. The Coleman backpack frame is of reinforced nylon, which provides excellent electrical insulation and is more durable than aluminum. The straps may be adjusted providing a comfortable fit for almost any size person. A quick-release is provided for emergencies. Just pull on two rings and the whole pack frame drops instantly.

Batteries are maintenance-free sealed deep-cycle type, and may be recharged up to 1,000 times. A battery charger BC-24-A is supplied with the electrofisher for optimum charging.

A lightweight fiberglass anode pole and pull-behind cathode are supplied with each unit. An optional second pole can be plugged into the cathode receptacle to probe on each side of brushy habitat for example.



Figure 1. The left control panel.

## 2. Controls and Features

The main control panel is on the left side of the box.

**Voltage Range Switch:** This switch is located at the bottom. The switch has 10 ranges. The 100 to 300 volt ranges are for high conductivity waters (400 to 1,600 microSiemens/cc). The 400 to 700 volt ranges are for medium conductivities (200 to 400 microSiemens/cc). The 800 to 1,000 volt ranges are for low conductivities (10 to 200 microSiemens/cc).

**Mode Switches:** These are located in the middle. One switch is labelled A–P and the other 1–16. Together they select one of the 256 available pulse waveforms from the table affixed to the electrofisher. See section B of this manual “Programmable Output Waveforms” for a more details.

**Output Voltage Indicator:** The audio indicator provides a strong tone to give positive indication to all crew members that there is an output voltage greater than 30 volts between the anode and cathode. This indicator also serves as an input current indicator. It begins to beep slowly at an input current of 4 amp, and beeps faster as the input current goes up.

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**Overload Indicator:** Overload conditions are indicated by a rapid beep rate of the audio tone. The LED indicator will also come on. The output is disabled when the current drawn from the battery exceeds 20A. The disable is reset by releasing the anode pole switch. Select a lower output voltage range before resuming.

**Low Battery Indicator:** When the battery voltage drops to 20V the LED indicator comes on, and the output is disabled. Switch the input power switch to off, and replace the battery. Caution: switch the input power switch off before connecting or disconnecting a battery or you may cause damage to the power connector.

**Self Test Indicator:** The LED indicator comes on to give positive indication that the electrode wiring and switches are all OK. If this indicator does not come on when the anode pole switch is pressed, then there is a problem with the anode or cathode.

The LED will flash when a Tilt Condition has occurred. The electrofisher will automatically resume proper operation when the backpack is no longer tilted and the anode pole switch has been released.

The LED will flash if the mode switches are changed whilst the output is on.

**Timer:** The six-digit timer totals shocking time. It accumulates time in fractional seconds to give a more accurate indication. A view window is located at the top of the left side of the instrument case. The timer can be reset by placing a magnet over the word "Reset" next to the timer. The magnet is found on its keeper on the left side of the shocker near the battery box. Alternately use the anode pole switch magnet to reset the counter.

**Input Power Connector:** The input power connector is a rugged quick-twist positive locking connector, with index tabs for proper polarization of the connector halves.

**Input Power Switch:** The input power switch is a 25A toggle circuit breaker switch that protects the Model 12-A from excessive input currents.



Figure 2. The right control panel

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## 3. Using the Electrofisher

A. Make sure the power switch is in the off position. Place the battery in the battery box and connect the input power plug to the battery.

B. Plug the anode pole and cathode into their respective connectors on the bottom of the instrument case. Located inside the pole is a sealed, magnetically operated reed switch. The reed switch is activated by a magnet within the rubber flapper. By simply pressing the flapper forward against the pole, the reed switch will close and the output is activated. Release the rubber flapper, and the reed switch will open and the output will be deactivated.

C. Select the desired voltage and frequency ranges. When water conductivity is unknown set the voltage range to 100V and select mode settings of I and 5. Place both electrodes in the water and press the anode pole switch. The audio tone and the self-test indicator should both come on. Observe the reaction of the fish. If this setting is not satisfactory then release the anode pole switch and increase the voltage range. Press the anode pole switch, and again observe the reaction. Repeat until satisfactory results are obtained.

D. Never change voltage range or mode settings while the anode pole switch is pressed, doing so may damage the electrofisher.

E. Caution. If you have been shocking small fish, reduce the voltage range two or three positions before shocking large fish. Large fish are more sensitive to being shocked than small fish. In general, low frequencies are more effective for large fish, and high frequencies more effective for small fish.

See section C of this manual for more details

## 4. In Case of Difficulty

A. Check the input power switch and the battery connector. If the power switch turns off by itself, either the switch is defective or there is a short circuit within the electrofisher.

B. Check the overload indicator. If the overload light comes on when the output is activated, reduce the voltage selector until the overload light no longer comes on. The overload is automatically reset each time the anode pole switch is released.

C. Check the low battery indicator. If the low battery indicator is on, the battery is discharged and should be replaced with a fresh battery. The low battery indicator resets when the power switch is turned off.

D. Check the self-test indicator. The light should turn on when the anode pole switch is activated. If the light fails to turn on, check the anode and cathode connectors on the box, to be sure that they are properly seated. If you are sure that the connectors are hooked together properly and the self-test indicator still doesn't turn on, check the switch circuit on the anode and cathode with an ohm meter. Pin B to pin C should read approximately zero ohms when the anode pole switch is activated. The rat-tail cathode should measure zero ohms at all times. If it doesn't measure zero ohms there is either a broken wire or a bad switch in the electrode.

E. A safety switch renders the electrofisher inoperable if the unit is tipped beyond most normal operating positions. The normal operating position for the electrofisher is vertical.

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## 5. Battery Charger

The BC-24PS battery charger is supplied to charge the 24 volt battery pack.

### 5.1 CONNECTORS AND INDICATORS

**Input power cord:** The input power plug is standard 120VAC three-pin with ground.

**Output cord and connector:** The connector on the end of the cord is wired to plug directly into the quick-disconnect connector on the battery pack.

**Front panel indicators:** The two front panel indicator lamps are labeled “charging” and “charged”. The “charging” indicator will glow when the battery is taking a charge. When the battery is fully charged the “charged” lamp will turn on and the “charging” lamp will turn off.

### 5.2 CHARGER OPERATION

1. The battery pack should be recharged as soon as practical after discharging.
2. Connect the charger's power plug to an 110 volt 3 pin outlet.
3. Connect the quick disconnect plug to the battery.
4. The “charging” lamp should turn on. The battery is now taking a charge.
5. The battery pack will be fully charged after approximately 3 to 6 hours.

## 6. Batteries

The Model 12-A uses a 24 volt sealed deep cycle battery. Understanding the proper care of this battery will reduce problems in the field.

**Batteries should never be allowed to remain in a discharged state and should be recharged as soon as possible after use.**

Batteries should be charged until the green lamp on the charger comes on.

**Charging Problems:** Some older batteries may not charge within 24 hours. Do not continue to charge these batteries as this may cause drying of the electrolyte and damage the battery. Check the battery on an electrofisher

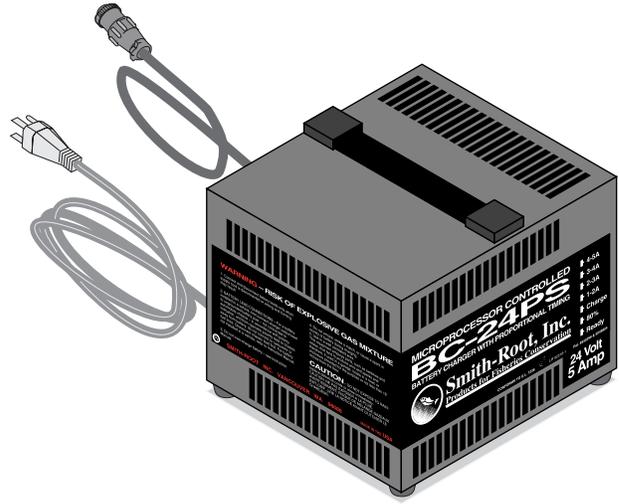


Figure 3. The BC-24PS battery charger.

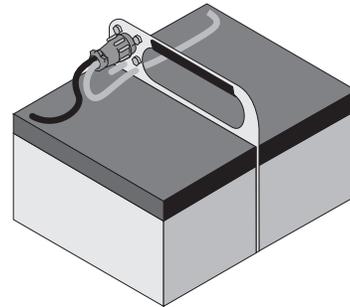


Figure 4. The 24V sealed deep-cycle battery

to determine how much field time may be expected from it. If the discharge time is sufficient for your use, mark the battery so that it doesn't get left on a charger for more than 24 hours, otherwise discard the battery.

If a battery has been left in a discharged condition for a while, it may not take a charge. If you suspect that the battery has been left discharged, charge it for 24 hours and then discharge it with the electrofisher. If the battery is not taking a charge it will not operate the electrofisher for very long. Sometimes by cycling the battery a few times it will start taking a charge again.

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## 6.1 BATTERY SPECIFICATIONS

**Rating:** Batteries are rated at the current which will reduce the voltage per cell to 1.67 volts in 20 hours. The Model 12-A standard battery has a 12 amp hour rating. However it's life at 100 watt continuous would be only 150 minutes. As the discharge current is increased the efficiency and relative capacity decrease.

**Battery Life:** Each time you cycle a battery it loses some of its ability to take a charge. Deep cycle batteries are capable of being charged and discharged from 100 up to 1,000 times, depending on the depth of the discharge and the type of charger used. Service life and shelf life are both adversely affected by warmer temperatures.

**Battery Storage:** Batteries stored at room temperature will self-discharge at 3% to 6% per month. Storage temperature above 20°C should be avoided. Shelf life can

Life	Load	Capacity
20 hr	0.60 A	12.0 Ah
10 hr	1.05 A	10.5 Ah
5 hr	1.95 A	9.7 Ah
1 hr	7.20 A	7.2 Ah
30 min	12.00 A	6.0 Ah
15 min	20.00 A	5.0 Ah

Figure 5. Relative capacity of 12Ah deep cycle battery.

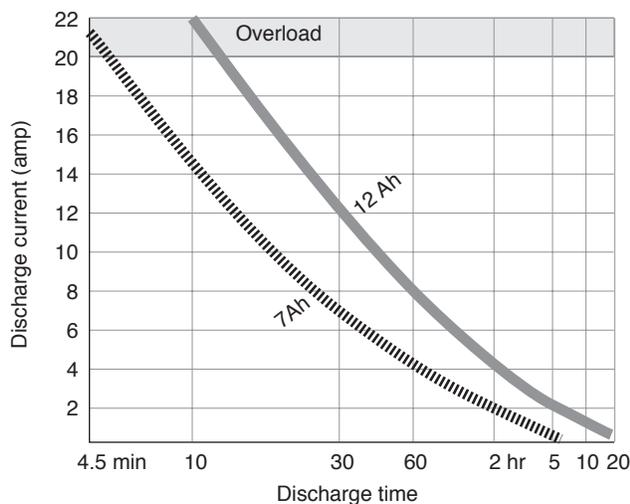


Figure 6. Discharge curves for 12Ah and 7Ah batteries.

be increased by storing at lower temperatures, but store at above -30°C to prevent freezing. Batteries should be fully charged before storing, and should be recharged every four months.

**Effects of Temperature:** The temperature at which a battery is used also affects the relative capacity of the battery. Figures 7 and 8 show that in cold weather the shocking time will be less and the battery will have less capacity.

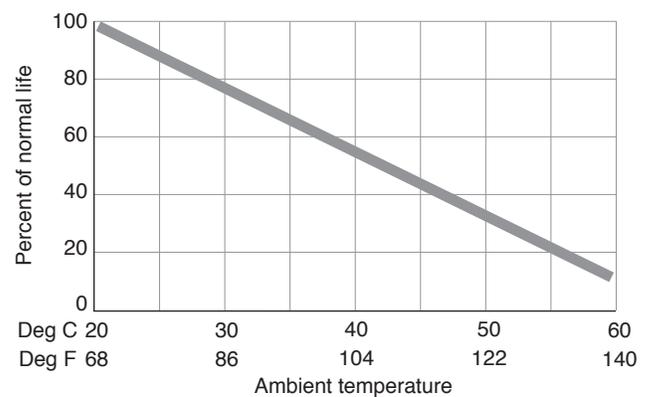


Figure 7. Effect of temperature on battery life.

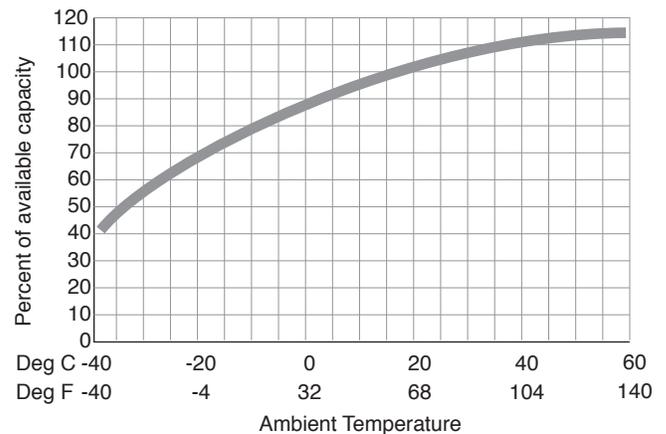


Figure 8. Effect of temperature on capacity.

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## 7. Model 12-A Specifications

Conductivity range ... 10–1,600 microSiemens/cc  
 Output voltage..... 100–1,000 VDC in 100 volt steps  
 Output current ..... 40 amp peak on 1,000 volt range  
 4 amp average on 100 volt range  
 Output pulse..... 256 stored waveforms: Pulse width  
 and frequency modulation, Gated  
 Bursts, Pulsed DC, Smooth DC.  
 Pulse duration ..... >100 microseconds  
 Pulse frequency..... 1Hz to 120Hz, 250 pulses/sec.  
 Output protection .... Output disabled by overload.  
 Automatic reset by releasing anode  
 pole switch. Overload indication LED.  
 Output indicator ..... Audio tone indicates  $\geq 30$  VDC.  
 Electrode test ..... Continuity of anode and cathode wires  
 and switches indicated by LED.  
 Safety devices ..... Tilt switch automatic shutoff. Quick  
 release backpack harness  
 Input current..... Audio tone indicates  $\geq 4$  amp.  
 Low battery ..... Unit automatic output shutoff.  
 Indicated by LED.  
 Timer ..... Sealed 6 digit LCD display, capacity  
 9,999 sec. Magnetic reset.  
 Construction..... Sealed water-resistant case.  
 Weight ..... 30 pounds, incl. standard battery.

## 8. Standard equipment

Anode pole ..... 6 foot, 1" dia. fiberglass  
 Curl-cord ..... Extends from 12" to 72"  
 Anode ..... 11" diameter aluminum ring.  
 Cathode..... 10 foot long rat-tail.  
 Battery ..... 24 volt 12Ah sealed deep-cycle.  
 Battery weight ..... 18.5 pounds.  
 Pack frame ..... Coleman® reinforced nylon with  
 straps  
 and battery-holder.  
 Battery charger..... BC-24PS

Specifications subject to change without notice

## 9. Optional Equipment

Metering package..... Input and output, current and voltage  
 Alternative anodes.... 6" ring, 11" diamond, or cat's whisker  
 Anode poles ..... two-piece poles, 6' or 9'  
 Lightweight battery... 12.5 pounds, 7Ah  
 Featherweight batty.. 5.0 pounds, 2Ah  
 Electrical gloves ..... 10kV rated. S, M, or L.  
 Heavy-duty charger.. Charges up to 4 batteries at once.  
 Conductivity meter ... Measures up to 1900 microSiemens/  
 cc  
 Electric Field Probe .. Measures up to 5V/in. or 1.97V/cm  
 Carry-case..... 39" x 18" x 15", aluminum  
 Extension cables ..... 25' up to 100', with or without floats  
 Extension cable ..... "Y" configuration for two anodes  
 Dip nets ..... 12" up to 31" wide  
 Dip net meshes ..... 1/8", 1/4", 1/2", 1 7/8" meshes

See section E of this manual, "Parts Identification" for full  
 details and order numbers of Optional Equipment

Specifications subject to change without notice

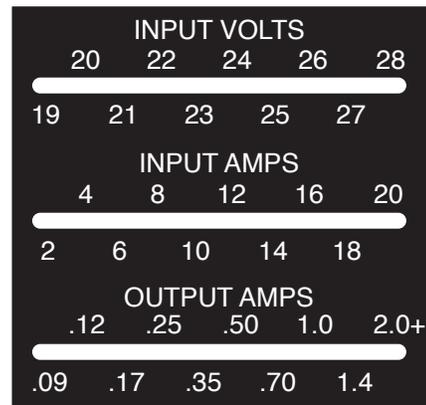


Figure 9. Optional digital metering