

# SUM

## Electro-fisher Manual



**Poland  
2014**

## WHAT IS ELECTROFISHING ?

Scientists use electrofishing to survey fishes and monitor the size of populations and determine the species in a community. Whether using a boat or a backpack electroshocker, the basic principle involves generating an electrical field in the water to stun fish. When fish are stunned, they often times float near the surface of the water and can be removed from the electrical field.

### How Do Fish Get Stunned?

When a fish swims into a weak electrical field, it may not be affected at all. There is a threshold of electrical charge that must be emitted into the water in order to affect the fish.

When the electrical charge in the water is sufficient to allow transport of the charge across the nerve cells in the body, then the fish's muscles will undergo involuntary contraction. The contractions will lead to increased exercise of the muscle and a build up of lactate in the blood stream. This process is very similar to what happens to the muscles of a runner or a swimmer who exerts a lot of exercise. The runner or swimmer may eventually get a cramp in the muscle and cannot move it effectively. When the fish cramps up, it floats to the surface and can be removed from the electrical field. The process to stun a fish is usually 5 - 10 seconds.

Once the fish is removed from the electric field, the Tidal Bass Survey team places the fish in a live well with good aeration. The aeration and cool temperatures are essential in the live well because the fish has an oxygen debt that needs to be paid. Like a runner or swimmer, the lactate in the blood

stream and cramping must be treated with rest and good oxygen supply. While this period of recovery may take a short time in humans, the recovery time for fish is generally a minimum of 4 hours and can range up to 12 hours.

## **Are you Stunning All the Fish?**

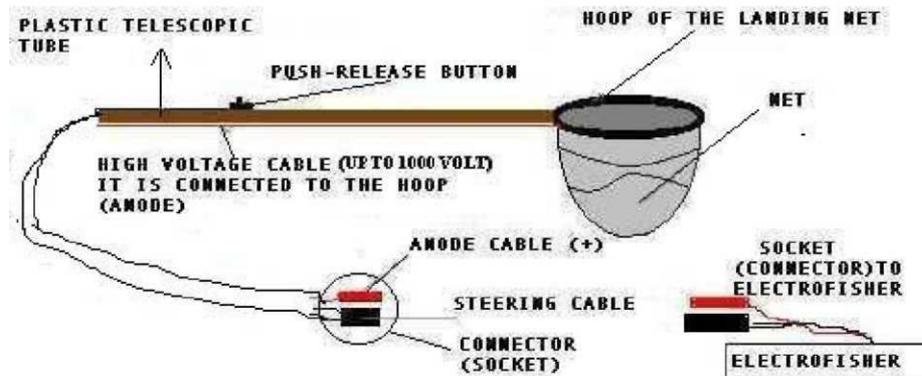
Electrofishing is a widespread tool used for surveying black bass because black bass are generally easily stunned by the electric field. When stunned, all black bass are removed from the water. However, not all black bass are likely stunned by the electrofish boat. The electric field quickly weakens with distance from the boat and with depth, so many fish in the area are never affected. Some fish that have been stunned may even build up a tolerance for the electric field. Many species also have evolutionary adaptations that help them avoid the boat, such as a keen lateral sensory system and eyesight. The black bass may be able to see the boat coming and swim out of the way of the electrical field. Many other species of fish, such as common carp or longnose gar, have especially thick scales that protect them from the electrical fields. Small fish, such as many minnows and killifishes, have such a small body area that the electrical field doesn't affect them.

## **What is the Recovery Time?**

Generally, fish recover almost immediately after they are stunned by an electrofisher. They become oriented in the upright position and begin swimming normally within 1 - 2 minutes. To fully recover from the electrofishing, it can take 4 - 12 hours, which depends on the amount of lactate in the blood (or the level of stress the fish experiences) and habitat

conditions. It may take also longer for the fish to recover during late summer when dissolved oxygen in the water is low.

## Connecting the electro-fisher



Sockets plus and minus (see photo) serve to install a loading of electrofisher. The socket "+" is connected with cable on the landing net. The socket "-" is connected with outer cable with metal wire at the end (mass/minus) which is thrown into water behind the boat or fisherman.

Cables of 12 Volt power supply are connected to the battery "+" to "+" and "-". When user connects electrofisher in wrong order - device will not work. User should correctly connect battery to use electrofisher.

Socket "START" designed to connect a cable of steering by the means of which the electrofisher is turned ON and OFF. Green indicator shows the presence of high voltage on the outer sockets of the electrofisher.

By the 2 knobs and display fisherman regulates and controls parameters of the electrofisher.

Knob F serve to increase or decrease frequency of going out impulses in accordance with clock direction.

Knob P serve to increase or decrease output power of going out impulses in accordance with clock direction.

The electrofishing is quite simple, however, it may seem to be very complicated at the first sight.

The most important is to meet all cable connections and the electrofishing device . To connect correctly device we should install first the button of steering on landing net and to connect the high voltage cable into the landing net. The button is the common PRESS-RELEASE button this means that in moment of pressing device switches ON and makes possible fishing and in moment of releasing the button the electrofisher switches OFF.

This button we install on landing net - we attach it with isolation to landing net in distances 30-50 cm from end so that we could easily operate the landing net and switch on the electrofisher.

This button is connected with cables of steering output power- if we press the button then the device switches ON- we release the button then device switches OFF.

High-voltage cable - (up to 1200 Volt) we can install directly to the hoop and to wind its rest on stick or what more comfortable to place into the centre of plastic telescopic tube ( handle of landing net).

To the socket OUT "+" of electrofisher we connect outer cable which goes to the landing net. This must be installed on the plastic landing net and the bare end of a cable must be

fixed to the metal (aluminium) ring of landing net. The other 2 cm bare end we place in the socket OUT"+".

To the outer socket OUT "-" we connect outer cable with metal wire at the end ( mass/minus) and the metal copper end place into the water in the back part of the boat or we throw it behind ourselves while electrofishing in brooks or streams. To the socket START we insert the steering cable to the maximum end.

When electrofisher is correctly connected we can start fishing dipping the landing net in water and pressing press-release button. The (-) minus cable with metal wire at the end must **ALSO** be dipped into the water. Fishing takes place by periodic/short pressing the button START on landing net while it is under water surface. The (-) minus cable with metal wire at the end and the cable (+) plus must be in the distance of 3 meters and in case of catfishing it can be greater even 20 meters. In this moment flow of electric current follows between electrodes and executes the fishing. You should hear silent noise and blinking green lamp on the device as well as display showing operating parameters.

In the course of electrofishing negative (-) electrode is placed in water "freely" and positive electrode (anode)(+) serves to active fishing. Intensity of current field is the greatest at positive electrode and quickly diminishes with the distance from it. In regard with this fishes become paralysed in the radius not greater than 2-5 metres from anode. Inertly flowing fishes we should pick up quickly because in the course of several seconds they recover equilibrium and escape at random.

When we catch wading in a river cathode cable we pull near behind so that space out between electrodes must be not greater than 2-3 metres.

Switching the device by pressing START should be no longer than for 10 seconds. If the consumed current is lower than 10 A you can hold on the START button longer and in case of 5 A you can keep it very long.

It is not advised to turn the electrofisher very often as fishes are shy, especially large, and will escape from big distance if they are outside of the catching zone. You should turn the device every 5-10 meters from last fishing place. Boating should be silent and careful in order not to frighten fish.

In the previous paragraph you set the optimum parameters, however, in most cases depending on special water conditions, weather, season of the year, conductivity of water it is necessary to correct these parameters to obtain higher efficiency and better effects. Each species of fish has its own properties and each species differently behave in the electric field.

Basic parameter which influences on smooth exit of fish from water is F- frequency. Low frequency ( 45-50 Hz) makes fish exit to the surface quick and from greater distance. . On the contrary, higher frequency causes smoother exit of fish on the surface. Taking into consideration this you should remember : increasing of frequency -slows down move of the fish, while decreasing of frequency speeds up. In the summer fish is very quick and frequency should be increased. In cool seasons fish is more lazy and frequency should be decreased. In the course of electrofishing in thick water flora it is advised to lower the frequency in order to enable the fish to overcome all barriers on its way towards the landing net.

Usually, frequency is set once and in the course of gaining experience and tries fisherman can adjust this value in desired direction. Then parameters will be corrected according to

changes of water properties and other factors which influence electrofishing.

You should also know a fact that changes in frequency make change in level of output power of electrofisher. Therefore, if you want keep the previous power level you should appropriately correct the duration of impulses increasing their length. This is done by the Power knob.

Power of output impulses influences exit of fish in lesser level than frequency. If the power is high the fish will start flowing up from deeper water and sinking afterwards. Too little power level will cause that fish will escape immediately if the electric field is not enough to shock them and if you press the button START for too short time. Between maximum and minimum there is an optimum level of power which allows, from the point of view of smooth exit of fish, to catch them as effectively as possible. However, this level should be closer to minimum than maximum to keep the battery work longer and cause less stress to fish.

During electrofishing it is possible to take two ways of fixing output power: medium power level and periodic pressing the button START ( no longer than 10 seconds); low power level and longer pressing the button START. In the shallow waters the power can easily be reduced to as low as 50.

## CATFISHING

The given model of electrofisher has an option for catching catfish especially designed for that species. This makes electrofishing catfish from large distance ( up to 30 meters) and deep water - more than 10 meters. Catfish electrofishing is being effected on very low frequency ( $F < 20$ ). The electrofisher automatically goes in the state of catfish option if the frequency is lower than 20 Hz. Due to that fact steering of electrofisher changes and optimum frequency sets between 10 and 15 Hz.

Catfishing by the means may take place in large aquatic environments and enables skillful fisherman to catch large quantities of catfish for commercial aims. It is advised to boat in the water where the big water holes are present and switching electrofisher for up to 10 minutes observing flowing up catfish in the distance of 15-20 meters.

After 3-4 fishing you will become experienced operators of that device. Try to find the best parameters for your waters as water properties differ in various regions.

High power level may only cause quick unloading even the high capacity battery. In electrofisher high power is required for ensuring high reliability only, in order to have greater reserve.

Great role in electrofishing plays knowledge of a given water area, places of fish stocking and fish customs.

## SAFETY ISSUES

SUM electrofisher is an absolutely safe and reliable electrofishing device if appropriate electric safety issues are known for a user. It is forbidden to switch the device and

electrofish in the close exposure to bathing people or drinking farm animals.

Watch integrity of isolation of wires of loading and a power supply. In case of infringement of a wire it is necessary to replace on similar on section with that that were complete with the device.

Periodically check reliability of contact of cable with anode ( landing net) as well as power supply cables with battery bolts.

Watch integrity of rubber band on micro-switcher of the steering cable and in case of damage change by the home means such as : finger of rubber glove or in the end condom.

We guarantee free reparation or replacement of the broken device. Our guarantee certificates are not distributed to devices with obvious or unauthorised mechanical damages.



## During normal work electro-fisher LCD shows

F	- Frequency	[Hz]
M	- Output power	[%]
U	- Output voltage	[V]
T	- Temperature inside	[°C]
I	- Battery current	[A]
A	- Battery voltage	[V]

Electro-fisher is equipped with three LEDs



Battery status

Green light - Connected battery is charged

Red light - Connected battery is discharged (voltage below 10,4 V)

## 1200V

Green LED indicates the presence of the high voltage on the output



Short circuit - red LED lights up when worked electro-fisher protection. The number of flashes indicates the type of failure (error that occurred). Detailed information about problem is visible on LCD.

Error no. 1	Anode and cathode short circuit type 1 (metallic no. 1)
Error no. 2	Temperature inside is above 90°C
Error no. 3	Sparks appears at battery clamp
Error no. 4	No High Voltage on output (contact service)
Error no. 5	Anode and cathode short circuit type 2 (during switch on)
Error no. 6	Anode and cathode short circuit type 3 (anode and cathode too close)
Error no. 7	Anode and cathode short circuit type 4 (metallic no. 2)
Error no. 8	Safety problem (High Voltage present on electro-fisher casing)
Error no. 9	Processor Hung-up
Error no. 10	Safety problem (Water inside electro-fisher)
Error no. 11	Input Voltage above 15V
Error no. 12	No impulses on MOSFET 1 (contact service)
Error no. 13	No impulses on MOSFET 2 (contact service)
Error no. 14	Weak battery or battery sulphated
Error no. 15	MOSFETs conduct (contact service)
Error no. 16	Thyristor Conduct (contact service)
Error no. 17	Comparator have got wrong voltage level (possible water inside)
Error no. 18	MOSFET gate 1 problem (contact service)
Error no. 19	MOSFET gate 2 problem (contact service)

Error no. 20	MOSFET gate 1 and 2 problem (contact service)
Error no. 21	Safety resistor corrupted
Error no. 22	Battery voltage below 9V
Error no. 23	Sparks at High Voltage output (check anode and cathode connectors)

### **LCD Backlight switch OFF**

Display in standard is illuminated. If you want to disable the backlight, press and hold the START button during connection of battery. By this you can fish in total darkness. If you want to return the display backlight disconnect the battery and reconnect it.

### **LANGUAGE CHANGE**

Message language can be easily change.

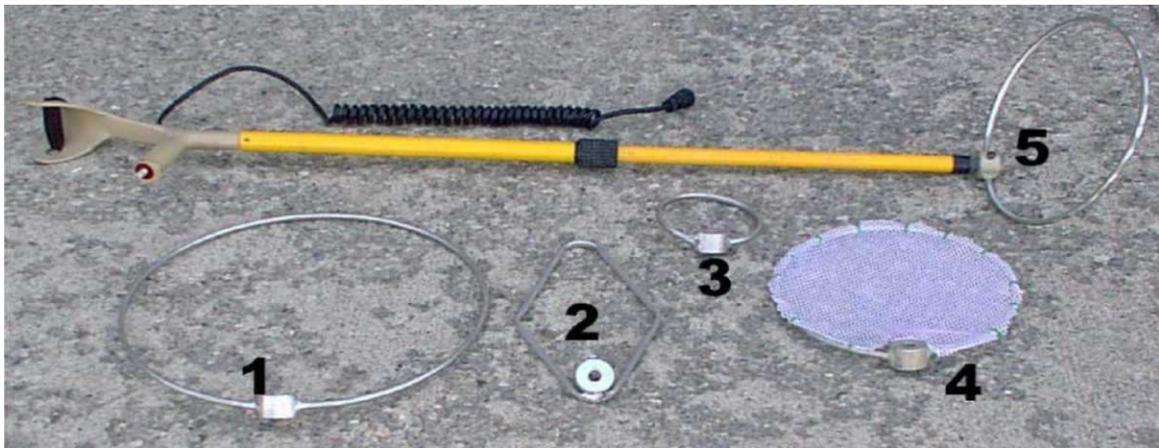
#### **For ENGLISH**

During connecting of battery - POWER REGULATION should be set at 0% level.

#### **For POLISH**

During connecting of battery - POWER REGULATION should be set at 100% level.

## ***Anode examples***



- 1 - Oversized Round Anode Ring
- 2 - Diamond Shaped Anode Ring
- 3 - Small Round Anode Ring
- 4 - Round Net Anode Ring
- 5 - Standard Round Anode Ring

## SUM electrofisher features

- Input voltage 12 VDC
- Output voltage 50V-1200V with stabilization
- Output power 15000W (peak)
- Output current 128 A (peak)
- Output frequency 2-100 Hz in 1 Hz step
- Overcurrent protection
- Overvoltage protection
- Electrofisher automatically is switched off when fall in to a water
- Catfish option
- Soft start function
- No passwords
- Battery saver function
- Automatic battery tester
- Thermal protection
- Battery sulfation detector
- Spark testing protection

ONE YEAR LIMITED WARRANTY

<b>Electrofisher</b>	
Model	SUM
Name	
Address	
Date of Purchase	