



**ELGRESSY**  
ENGINEERING SERVICES LTD.



# S.C.P User Manual

Electrochemical System for Scale Crystallization  
Prevention  
Motor Version

**Headquarters:**

CTG House, En Vered, POB 73, Tel Mond 40600, ISRAEL | **T** +972.9.796.9791 | **F** +972.9.796.9792  
info@ctgholding.com | www.ctgholding.com

## About This Document

The Elgressy SCP unit is electrolysis equipment involving the chemical decomposition of salts by electrical current. The unit has been designed and manufactured for safe operation by the user.

**This user guide is intended for service technicians of the SCP system.  
It must be read carefully before installing and operating the unit.**

### Revision Control

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## 1. How to Use This Document

This document consists of four parts. The following list provides general guidelines as to how this document is organized as well as the procedures you are expected to encounter throughout your handling of the SCP system.

### **Part 1: Getting to Know the SCP System and Its Environment (chapters 2-4)**

Chapter שגיאה! מקור ההפניה לא נמצא.

Chapter שגיאה! מקור ההפניה לא נמצא.

### **Part 2: Installation (chapter 5)**

Step 1: Preparing the Installation Site

Step 2: Unpacking and Positioning the System

Installation שגיאה! מקור ההפניה לא נמצא.

Step 4: Connecting the System to Water

Step 5: Setup Electrical Connections

### **Part 3: Operation (chapters 6)**

Understanding the Operating Principle

Operating, monitoring and controls of the SCP system.

Shut Down procedure.

### **Part 4: Maintenance and Trouble shooting (chapter 7 - 8)**

## Safety Warning

The SCP is electrolysis equipment involving the chemical electrode dissolution in water by electrical current. The unit has been designed and manufactured for safe operation by the user.

This document discusses only the SCP system. Any handling of the electrical system, the panel, electrical connection and other items connected to electricity must be done by a registered authorized electrician.

For a safe and long lasting operation, please follow all instructions detailed in this manual.

Throughout the installation, operating or maintenance procedures, if in doubt, please contact the manufacturer or service company.

## 2. The SCP System: An Overview

The SCP system has two major uses. It provides supplementary treatment to the main EST treatment for cooling tower water and it also provides treatment for hot water systems. It is basically an electrolysis system releasing small controlled quantities of ions that help prevent scaling and solids settlement.

The SCP system was developed to inhibit the crystallization of scale. It contains a sacrificial electrode that releases metal ions into the water in a very controlled manner according to the amount of water incoming to the protected system.

When used in conjunction with EST, the SCP electrolytic reaction chamber is hydraulically connected to the cooling tower make up water line, and electrically controlled from the flow meter on this line. The ions released into the water perform as anti-scalant thus facilitating a more effective treatment of scale precipitation and prevention of calcium and silica crystallization in water systems.

The SCP electrolytic system consists of a vessel acting as Cathode with a specially composed anode of materials that interrupt the scale crystallization.

### 3. Technical Specifications

#### Tank

Design Pressure	6 bar (88psi)
Operating Pressure	Maximum of 6 bar (88 psi)
Material	Carbon steel, epoxy painted on external side.

#### Tank Internals and Accessories

Electrodes	Proprietary and patented metallurgy.
Valves	Drain – 2", air operated, double acting, Connections – threaded to BSP.
Flow meter	When installed with EST unit, Arad Dalia equipped with pulse reading switch. (common to SCP and EST). When installed as SCP stand alone systems – turbine low meter from FIP.

#### Electrical and Control Systems

Operation	110V; 60Hz for the USA. 220V; 50Hz for Europe/China/Far East.
Control	<b>Lambda</b> , 24V DC. 3.1A.
Electrolysis Power Supply	<b>TDK Lambda</b> , 20V 10Amp
Electricity connection required	1ph, 220V 16Amp. For USA – 1ph, 110V 16Amp

## 4. Peripheral Systems (when used with EST)

When used in treating cooling tower water, the SCP is part of a more complex system. This system includes:

- EST electrolysis system
- Pump for pumping water into the EST system.
- Optionally – pump to pump water to the SCP.

For pump sizing, please contact the supplier.

- Piping system to connect all equipment – must be supplied by the user according to the supplier instruction.
- Additional instruments may include: conductivity meter, deposit monitor, and Electrode for the pH meter. The meter is supplied with the unit. These are good to have but not essential.

## 5. Installation Procedure

### Step 1: Preparing the Installation Site

No special preparation is required for installing the SCP units, as the SCP unit can be installed on a concrete floor or any other flat surface. However, it is recommended to elevate the SCP on small concrete blocks to raise it above the floor.

It is highly recommended to shelter the SCP from the weather. If the SCP system cannot be located indoors, ensure it is placed under a water-proof cover to shelter it from rain. Also protect the system from freezing

#### **Important!**

Make sure that the SCP is installed in a ventilated area.

### Step 2: Unpacking and Positioning the System

The system is packed in a wooden box and is shipped in a horizontal position.

To unpack the system:

1. Remove the top cover of the wooden case. The SCP top side is indicated on the wooden box.
2. Remove any loose parts, if any, and set them aside.
3. Turn the box vertically, in order to remove the unit from it. Place the legs of the unit securely on the floor.
4. Remove the rest of the parts if any. When doing so, be aware of the following:
  - The electrodes are usually sent mounted on the EST lid but may occasionally be sent loose

#### **Important!**

On occasion specific instructions are shipped with the system, which must be followed in addition to instructions detailed in this user guide.

### Step 3: Installation

#### **Tip:**

You will need to prepare a supporting element, approximately 15cm (6 inches) thick, to keep the lid above the tank's flange. Keep this element, as it will be required every time you open or close the SCP unit.

1. If you have not yet done so, position the unit(s) in their designated location. There is no need to secure the base to the floor by bolts, however, it is highly recommended that each unit be lifted about 10cm (4 inches) above the floor on small concrete blocks so that the unit's legs will not be damaged by possible dripping or water accumulation on the floor.

#### **Note:**

Where more than one unit is supplied for a single application, connect the SCP units in parallel



2. Check whether the electrodes are loose (if they are, they would be packed separately in the box). If they are loose you must mount them on the lid now. See Electrode Replacement instructions in chapter 7 below.
3. Fasten the lid

#### **Step 4: Connecting the System to Water**

When used for cooling tower water treatment, the SCP must be connected to the cooling tower make-up water line after the flow measurement point. The measurement of the incoming water flow is crucial for the effectiveness of the treatment.

Connect the flow meter electrically to the SCP control. The connection point is marked on the SCP panel. See instructions below.

Make sure to connect the feed to the SCP correctly. It is not necessary that all the water coming to the cooling tower will be connected to the SCP. You can connect only a branch providing the water leaving the SCP will arrive at the cooling tower basin.

Connect the drain valve to the drainage system. It is recommended to allow for a sample point at this location in order to monitor the drained water.

#### **Note:**

If more than one unit is supplied for a single application, the units should be connected in parallel.

#### **Important!**

The return pipe from the system to the cooling tower basin has to be above the surface of the water in the tower basin in order to provide an air gap. It is recommended to connect the SCP outlet pipe to the EST outlet pipe where possible.

#### **Important!**

When connecting the SCP to a pressurized line, be sure to add a relief valve as may be required by local regulations. The relief pressure rating should be 6 bar.

#### **Step 5: Setup Electrical Connections**

When performing this step it is recommended that you refer to the electrical panel drawing. This drawing can be found in a designated pocket on the inside of the panel.

1. Normally the electrodes are installed in the tank and connected. If not, connect the electrode(s) to the power supply using the wires supplied with the unit. Note that the (-) side of the power supply unit is already connected to the tank. Refer to panel drawing supplied with the unit.

#### **Important!**

Prior to any electrical connection make sure that the unit is disconnected from electricity.

2. Connect the electricity
3. Connect the signal from the flow meter to the designated point according to the panel drawing. Refer to the panel drawing supplied with the panel.

The controls are factory set and locked.

## 6. Operation

### Operating Principle

The SCP unit operates using the electrolysis principle. Water flows through the tank continuously as electrical current flows between the cathode (the tank) and the anode (electrodes inserted in the tank) and causes the dissociation of the salts in the water into ions. The cations are attracted to the tank wall, while the anions are attracted to the anodes.

In cooling tower treatment the major treatment is done by the EST. The Calcium ion present in the water tends to settle on the wall of the cooling tower basin, piping and any other surface present in the water system such as heat exchangers. Although the main treatment in cooling water is done by the EST system, in some cases supplement treatment is required. In these cases, SCP must be added to enhance the EST effect. The SCP electrolysis unit releases controlled metal ions into the water. These ions affect the scale in such a way that settlement of it will be prevented.

It is highly important to release only the designed amount of ions from the electrode. To do this the flow of fresh water into the cooling tower system must be measured and the information fed to the SCP controller. The amount of electricity is automatically controlled as a function of the flow rate of the water. When water does not flow into the cooling tower, the electricity to the SCP is shut down.

It should be noted that the electrode is gradually dissolving, releasing the material from which it is made into the water. Thus it has a limited life span and must be replaced when runs out of material. The life time of the electrode depends on its initial weight and the amount consumed. The supplier will give an indication on a case to case basis.

### Operating monitoring and control facilities

The SCP unit is controlled automatically by a small electronic card. The unit is factory set for standard operation. It is possible to monitor the machine operation by watching the lights on the panel.

### Power Supply Panel

The power supply panel contains indicator lights as follows:

- Green light - Indicates that the system is operating and all parameters are according to the design.
- The red light indicates failure.

A volt/amper meter can be found on the panel. To activate it one must press the V/A button on the controller.

It is recommended to check that these are live once a day.

To start the SCP it must simply be connected to electricity. It is factory set and starts operating immediately as it is connected.

## Shutdown Procedure and Electrode replacement

Typically, you would not need to shut down the system, other than for replacing the electrode.

1. Switch off the power to the SCP.
2. Drain the tank using the drain valve. If an automatic drain valve is connected, you can operate the solenoid valve manually.

## Opening the SCP Unit

Opening the tank is required for either cleaning or replacing electrodes with a diameter bigger than that of the electrodes opening.

### Tip:

You will need to use a supporting element to keep the lid approximately 15cm (6 inches) above the tank's flange. You may have already prepared one when you installed the system. Keep this element, as it will be required any time you open or close the SCP unit.

1. Disconnect the SCP unit from its power source.
2. (a) Open the lid bolts.  
(b) Lift the lid carefully and place it on the supporting element.
3. Dismantle the electrodes. To do this you must open the lid. If the electrodes have been consumed, you can simply lift the lid and put it aside. If the electrodes are still there, and your free board above the tank is limited, you will have to release them before lifting the lid.  
(a) Slide your hand into the tank just under the lid and unscrew them from the lid. Place them carefully inside the tank.  
(b) Remove the lid, while leaving the electrodes in the tank.  
(c) Take the electrodes or the remaining of them out of the tank and put aside.

## Replacing Electrodes

Make sure you have the new electrodes ready before opening the SCP tank.

Place the electrodes in the tank.

## Closing the SCP Unit

### Tip:

You will need to use a supporting element to keep the lid approximately 15cm (6 inches) above the tank's flange. You may have already prepared one when you installed the system. Keep this element, as it will be required any time you open or close the SCP unit.

1. Verify the unit is disconnected from power source.
2. Mount the electrodes:
  - (a) According to the type of electrode, place the electrode gaskets in their place correctly to prevent water leaking through the electrodes' connection. Double check that they are indeed in place.

### Tip:

Every time you dismantle the electrodes, you must replace the gaskets.

- (b) Lift the lid and place the electrode(s) inside the tank, with the bolt (tightening screw) facing up.
  - (c) Place the lid back but support it, using the element you have prepared, about 15cm (6 inches) above the SCP's flange. When doing so, ensure that the notch on the lid faces the notch on the tank flange so that the screws will enter properly.
  - (c) Slide your hand into the tank and take hold of an electrode. Insert each electrode into the designated hole on the lid until it stops. The connecting screw should transverse the lid and come out on its other side.
  - (d) Tighten the electrode(s) with the supplied counter screw.
  - (e) Double check that the gaskets are indeed in place and that the bolts holding the electrodes are closed tightly.
3. Fasten the lid:
  - (a) Remove the supporting element from under the lid.
  - (b) Insert the screws in their designated holes and fasten them tightly.

## 7. Maintenance

The SCP requires only ONE maintenance operations:

- As the anode of the SCP is a sacrificial anode, dissolving slowly into the water, you must verify with the manufacturer the life span of the anode. Be sure to replace the anode in time. A "Fault" indicating red light on the panel gives pre-warning of the anode being close to it end.

## 8. Troubleshooting the SCP

### SCP Red Light On

The red light is activated when the system or part of it fails.

The most likely problem indicated by the red light is high voltage due to the end of the electrode life.

The system must be opened and electrode replaced.

Another reason for the red light to be activated is a failure in any one of the power supply units. If this happens, the power supply unit must be replaced.

## 9. Drawings

Drawing 1 – Parts of the SCP.

Drawing 2 – SCP water connections