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HYPROLYSER iSEC 60
Chlorine Generator

Controls Bacteria and Algae in
Commercial Swimming Pool (Spa) Waters

A maximum of 260,000 L of water can be treated with one Hyprolyser iSEC 60 unit.
Maximum output of hypochlorous acid equivalent to 1.4 kg of free available chlorine per day

For swimming pools, a range of 1-3 ppm of free available chlorine must be maintained.
For spas, a range of 3-5 ppm of free available chlorine must be maintained.

READ THE LABEL AND OPERATING MANUAL BEFORE USING
KEEP OUT OF REACH OF CHILDREN
REGISTRATION NO. 33150 *PEST CONTROL PRODUCTS ACT*

WARNING: Operating a Hyprolyser iSEC 60 without water flow through the cell can cause a buildup of flammable gases which can result in FIRE OR EXPLOSION.

NOTICE TO USER: This pest control product is to be used only in accordance with the directions on the label. It is an offence under the *Pest Control Products Act* to use this product in a way that is inconsistent with the directions on the label.

Pinnacle Aquatic Group Inc.
5423 61 Ave SE Unit 140
Calgary AB T2C 5N7

HYPROLYSER iSEC 60
iSEC 60 Electrolyser Replacement Cell

Replacement cell for the Hyprolyser iSEC 60 chlorine generating device.
REGISTRATION NUMBER 33150, *PEST CONTROL PRODUCTS ACT*. This cell must only be used on this model of chlorine generating device.

Read the Label, the Installation Manual and Operation Manual of the Hyprolyser iSEC 60 chlorine generating device before using.

Pinnacle Aquatic Group Inc.
5423 61 Ave SE Unit 140
Calgary AB T2C 5N7

Hyprolyser[®]

iSEC 60

Electrolysis system for on-site hypochlorite generation



User Guide

EN

PINNACLE
AQUATIC GROUP Inc.

Read and refer to the Installation, operation and maintenance instructions before start-up!

To be held for further reference.

V1.0 01/17

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On-site Electrolytic Chlorination System, Hypolyser Model iSEC 30 / 60 / 90

HYPOCHLORITE GENERATION
CONTROLS BACTERIA AND ALGAE
in
Swimming Pool (and Spa) Waters

COMMERCIAL

For swimming pools, a range of 1.0 – 3.0 ppm of free chlorine
must be maintained.

For spas, a range of 3.0 – 5.0 ppm of free available chlorine
must be maintained.

KEEP OUT OF REACH OF CHILDREN

READ THE LABEL AND OPERATION MANUAL BEFORE USING

REGISTRATION NO. 33150 PEST CONTROL PRODUCT ACT

WARNING: Operating the *On-site Electrolytic Chlorination System, Hypolyser Model iSEC 30 / 60 / 90*, without water flow through the cell can cause a buildup of flammable gases which can result in FIRE OR EXPLOSION.

NOTICE TO USER: This pest control product is to be used only in accordance with the directions on the label. It is an offence under the *Pest Control Products Act*, to use this product in a way that is inconsistent with the directions on the label.

Pinnacle Aquatic Group Inc. 5423 61 Ave SE Unit 140, Calgary, Alberta, T2C 5N7, Canada.

Tel. 1 (403) 453-1944 Email: info@pinnacleaquaticgroup.com Web: www.pinnacleaquaticgroup.com

Introduction

This user manual provides significant assistance in the successful and smooth running of the iSEC electrolysis systems, also referred to, in short, as “system” in the following instructional text.

The operating manual for the iSEC electrolysis system must always be available where the system is located and has to be read and used by every person who is assigned to working on the system. This includes among other things:

- the installation
- the service and repair work
- the maintenance (maintenance, care, repair)
- the transport

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The operating manual is a significant component of the iSEC electrolysis system. The operator must ensure that the service personnel learn these guidelines.

The operating manual is to be supplemented by the operator regarding the operating instructions national regulations for Health and Safety at Work and Environmental Protection, including information on the responsibilities of supervision and the observance of operational specifics, e.g. concerning labor organizations, operational sequences and appointed personnel.

Besides the operating manual and the obligatory regulations for Health and Safety at Work applicable in the country of use, as well as in the place of use, the recognized specialist technical regulations for safe and professional work must also be observed.

The operator of the iSEC system may not make any changes, attach fittings or make alterations to the construction of the iSEC system that may impair security, without the written consent of Pinnacle Aquatic Group Inc. This also applies to the installation and setup of safety devices.

Any replacement parts to be used must correspond to the technical requirements specified by Pinnacle Aquatic Group Inc. This is always guaranteed in the case of original spare parts.

Safety Information

General Warnings

The following warnings are intended to help you to eliminate the dangers that can arise while handling the device. Risk prevention measures always apply regardless of any specific action. Safety instructions warning against risks arising from specific activities or situations can be found in this Operation Manual.

Hazards Due to Non-Compliance with the Safety Instructions

Failure to follow the safety instructions may endanger not only persons, but also the environment and the device:

- failure of important functions of the device and of the corresponding system
- failure of required maintenance and repair methods
- danger to persons

Working in a Safety-Conscious Manner

Besides the safety instructions specified in these operating instructions, further safety rules apply and must be followed:

- accident prevention regulations
- safety and operating provisions
- environmental protection provisions
- applicable standards and legislation

Personal Protective Equipment

Based on the degree of risk posed by the dosing medium and the type of work you are carrying out, you must use corresponding protective equipment. Although the dosing media produced by the iSEC system is classified non-hazardous, the following protective equipment is recommended when carrying out certain tasks:

- Commissioning
- Working on pressurized dosing devices
- Shutdown
- Maintenance
- Disposal

Personnel Qualification

Any personnel who work on the device must have appropriate knowledge and skills. Anyone who works on the product must meet the conditions below:

- attendance at all the training courses offered by the owner
- personal suitability for the respective activity
- sufficient qualification for the respective activity
- training in how to handle the device
- knowledge of safety equipment and the way this equipment functions
- knowledge of these operating instructions, particularly of safety instructions and sections relevant for the activity
- knowledge of fundamental regulations regarding health and safety and accident prevention.

All Persons Must Generally Have the Following Minimum Qualification:

- training as specialists to carry out work unsupervised on the device
- sufficient training that they can work on the device under the supervision and guidance of a trained specialist

Intended Use / Warranty Information

Notes on Product Warranty

Any non-designated use of the device can impair its function and the protection provided. This leads to invalidation of any warranty claims! Please note that liability is on the side of the user in the following cases:

- The device is operated in a manner that is not consistent with these operating instructions, particularly safety instructions, handling instructions and the section "Intended Use".
- Information on usage and environment is not adhered to.
- Personnel who operate the device, who are not adequately qualified to carry out their respective activities.
- Unauthorized spare parts or accessories of Pinnacle Aquatic Group Inc. are used.
- Unauthorized changes are made to the device.
- The user uses different salt quality than that indicated in this instruction manual.
- Maintenance and inspection intervals are not adhered to as required or not adhered to at all.
- The device is commissioned before it or the corresponding system has been correctly and completely installed.
- Safety equipment has been bridged, removed or made inoperative in any other way.

Intended Purpose

The iSEC on-site electrolytic chlorination system is intended for the following purpose: Generation of a <1% sodium hypochlorite solution using salt, water and electrical energy, with the resulting media to be used as a disinfection agent for the chlorination of drinking water and swimming pools. The concentration of the sodium hypochlorite solution produced is 0.6% (+/-0.1%) Cl₂ by weight.

Device Revision

This operating instruction manual applies to the following devices:

Device	Month /year of manufacture
iSEC-30, 60, 90	10/2016 onwards

Sodium Chloride Chemical Specification

The iSEC system is designed to be used with dry crystalline/granular/tabletised salt. Salt can be purchased in bulk/ pallet quantities to obtain best economy. When ordering salt from your supplier, always specify the brand or specific quality you require, so in the unlikely event of any shortage of stock, you will still receive an equivalent grade of salt. Use dry crystalline/granular salt that is pool quality grade.

Water Quality

Drinking water or water of a similar quality should be used. It should be free of solids and suspended matter. The temperature of the water entering the system must be in the range of 8-25°C

Standard Warranty Conditions

Equipment	Warranty Period
Electronic devices	2 years
Electrolyser	2 years
Wearable items	12 months

Product Description

Scope of Delivery

Prior to starting any installation operation, you are required to check the delivery against the packing list to ensure it is complete and has not been subject to transport damages in any way.

Do not operate any defective devices.

iSEC is assembled onto a panel together with the following assembly components:

- Control panel with display
- Electrolyser
- Electrolyser power supply
- Water & brine flow monitoring and control devices
- Front protective plastic cover

The standard delivery comprises:

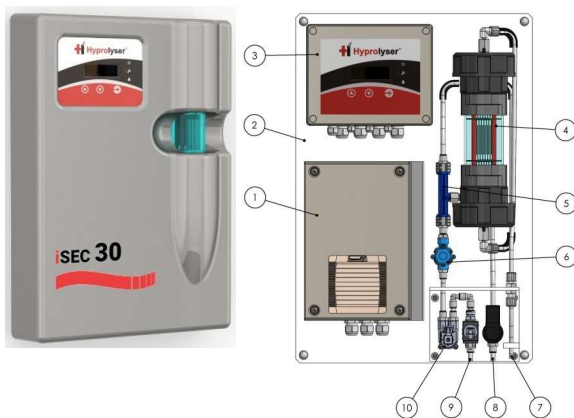
- iSEC system
- Hyprolyser® hydrogen gas detector
- Operating Instructions
- 8mmOD flexible softened water inlet tubing MDPE (blue) 2.5m
- 8mmOD flexible product outlet tubing PTFE (violet) 5m
- R $\frac{1}{2}$ " saturator float valve and D50mm brine well assembly with 8mm OD brine suction line MDPE (black) 2.5m
- R $\frac{1}{2}$ " product tank level switch assembly, 5m cable
- Product injection point fitting 20mm x 8mmOD
- R $\frac{1}{2}$ " Product tank inlet connection
- 15mmOD softened water sample point fitting
- Optional – saturator tank, product tank, air blower ventilation kit, dosing pump/s, accessories.

Design and Function

Structure of the Device

iSEC (front cover fitted)

iSEC (front cover removed)



Item	Description
1	Electrolyser DC power management unit
2	Rigid backboard
3	Control panel
4	Electrolyser
5	Brine injector
6	Water pressure regulator
7	Chlorine product outlet
8	Brine control valve
9	Softened water control valve
10	Volumetric water flow sensor

Function Description

iSEC is a fully automatic system for the preparation of dilute sodium hypochlorite solution containing 0.6% (± 0.1) Cl_2 from the raw materials of salt, softened water and electrical energy.

In normal operation, a batch process sequence commences: the water solenoid (9) opens and a set volume of water passes under pressure through the flow sensor (10), pressure regulator (6) and injector (5). Simultaneous to the water solenoid opening, the brine solenoid (8) opens for a pre-set time to allow the correct volume of brine to be drawn into the side suction point of the injector. The homogenized mixture of water and brine exiting the top of the injector continues to flow on through into the electrolyser (6) until the end of the set batch volume of solution is delivered as determined by the flow sensor (10). During this batch process, a DC current regulated by the DC power supply (1) is passed through the electrolyser generating a sodium hypochlorite solution within the electrolyser. As a result of the batching process, generated product is displaced from the electrolyser (4) and is transferred to the product tank or directly to the process, depending on application. This batch process cycle is indicated on the control panel (3) where "GENERATING" is displayed on screen and continues to do so until the external product tank level switch operates indicating tank full, or an external process signal input switches off (depending on the installation/application) at which point "STOPPED" is displayed.

As a result of the iSEC chlorine generation batch process, a small quantity of hydrogen gas is produced as a by-product of electrolysis. The gas is safely vented to an outdoor location as detailed in the installation guidance notes within this Operation Manual.

Technical Data

Output Data

iSEC				
Model:		30	60	90
Chlorine capacity	g/h	30	60	90
Chlorine concentration	g/l	6		
Liquid product output	l/h	5	10	15

Operating Conditions and Limits

iSEC				
Model:		30	60	90
Nominal water consumption	l/h	5	10	15
Nominal salt consumption	kg/h	0.1	0.2	0.3
Operating pressure	Bar	2 to 8		
Ambient temp	°C	+5 to + 45		
Water supply temp	°C	+8 to +25*		

* Water chiller required above 25°C.

Electrical Specifications

iSEC				
Model:		30	60	90
Power supply	Ø	1Ø, 115VAC		
Power consumption	kWh	0.15	0.3	0.45
Protection class	IP	54		

Connection Dimensions

Description	Size
Water connection (MUST be softened water!)	8mmOD push-fit tube
Brine feed/suction connection	8mmOD push-fit tube
Product/chlorine outlet connection	8mmOD push-on tube compression
Product/chlorine injection connection	8mmOD push-on tube compression
Product tank & vent Tee manifold	20mm uPVC solvent socket
Level switch cable assembly	M12, 4-pin
Control panel cable terminations	M20, max. 12mmOD 3 core cable, 1.0mm ²

Components in Contact with the Media

Description	Material
Electrolytic cell	PVC, titanium, PTFE, FPM.
Water transfer tube	MDPE
Product transfer tube	PTFE
Brine transfer tube	MDPE
Water/brine tube fittings	PP
Product tube fittings	PVDF
Product tank/vent Tee and tank top fittings	uPVC
Product tank level switch assembly	PVDF/PVC, FPM
Saturator float valve assembly	PP/Brass/NBR

Other Data

iSEC			
Model:	30	60	90
Net weight	16		
without cover	kg	<15	

	Swimming pool
Free available chlorine	1.0 - 3.0 ppm
pH	7.2 - 7.8
Total alkalinity	100 - 120 ppm
Calcium hardness	200 - 300 ppm

Installation

Installation Location

iSEC System

Precondition for action:

- ✓ A solid wall or suitable rigid frame must be available for the iSEC.
- ✓ A firm and level floor is available for any external product tank and salt saturator facility where applicable.
- ✓ The system must be accessible for operation and maintenance and with sufficient room lighting.
- ✓ Adequate natural room ventilation.

Perform the following steps:

1. Place the iSEC unit into position (wall/frame). The top of the backboard should be positioned at a height suitable for use by operation and maintenance personnel, typically no higher than 1650mm. Refer to Dimensions section for iSEC backboard hole center dimensions. A wall fixing kit containing wall plugs and studs is supplied. Ensure the minimum surface clearance is established when wall/surface mounting.
2. Install the hydrogen gas detector above the location of the iSEC system, preferably up against the underside of the room ceiling or at the highest point in the immediate room. The sensor head unit is supplied with a fixing bracket that must be used in order to facilitate quick and easy replacement of the sensor head at the time of future maintenance/replacement. A yellow M12 signal cable plug assembly is pre-wired to the iSEC ready to connect to the hydrogen gas detector as part of the wiring installation.
3. If the iSEC is intended to supply a chlorine product tank, the dual level switch kit (supplied) should be fitted to the top of the product tank by preparing a 22mm diameter hole in a flat horizontal level position on top of the tank. Always remember to remove any debris from inside the product tank!

- ✓ **Location of iSEC unit and standard ancillary items complete**

Water Supply

Precondition for action:

- ✓ A minimum cold water supply pressure of 2.0 bar is required.
- ✓ The equipment **must be supplied with clean softened water** of a quality similar to drinking water. Waters which are also high in magnesium content may reduce the life of the water softener resin. (A softener device may have been supplied within the scope of the system and will require correct installation.)
- ✓ A verifiable double check valve or pipe disconnecter in the drinking water supply is fitted upstream of the entire iSEC system and any ancillary softener equipment if the local regulations require it.
- ✓ A pressure reducing valve should be fitted to the water supply if the supply pressure is greater than 8 bar.
- ✓ **Site softened water supply connected**

Softened Water Supply

If softened water is freely available on-site, please proceed to chlorine product storage tank.

If no softened water is freely available on-site, the following options and instructions will need to be followed.

Filter Cartridge Softener Option

If a filter softener kit has been supplied within the scope of the system, please adhere to the following instructions.

Precondition for action:

- ✓ Suitable water supply available

Perform the following steps:

1. Install the filter kit immediately upstream of the iSEC unit and also upstream of the salt saturator within the cold water supply pipe work.
2. Fit inlet and outlet isolation valves pre and post filter in order to provide isolation function during filter maintenance.
3. A softened water sample tap should be fitted to enable testing of the water supply post softener filter and pre iSEC. A suitable 15mmOD push-fit sample tap Tee assembly is included in the standard scope of supply.
4. Connect softened water finally to the iSEC using the 15mm x 8mmOD tube adaptor supplied with the system. Use the blue colored flexible 8mmOD tubing (2.5m supplied) to connect to the 8mmOD water inlet fitting of the iSEC unit.

- ✓ **Filter softener equipment installed.**

Auto Regenerative Softener Option

If an automatic regenerative softener unit has been supplied within the scope of the system, please adhere to the follow instructions.

Precondition for action:

- ✓ Suitable water supply available

Perform the following steps:

1. Install the softener unit on a firm level base within easy reach of the iSEC system and near to a local waste water drain point.
2. Follow the general installation instructions. Ensure the softener is fitted with isolation valves on the inlet and outlet connections in order to carry out future maintenance of the unit.
3. A softened water sample tap should be fitted to enable testing of the water supply post-softened water and pre iSEC. A suitable 15mmOD push-fit sample tap Tee assembly is included in the standard scope of supply.
4. Connect the softened water outlet to the iSEC using the 15mm x 8mmOD tube adaptor supplied with the system. Use the blue colored flexible 8mmOD tubing (2.5m supplied) to connect to the 8mmOD water inlet fitting of the iSEC unit.

- ✓ **Softener equipment connected**

Chlorine Product Storage Tank

The iSEC can be installed and used to fill and maintain a product storage tank with a regulated volume of chlorine.

Precondition for action:

- ✓ Product tank in position

Perform the following steps:

1. Fit the 20mm uPVC product tank inlet connector (supplied) to the top of the product tank.
2. Fit a vertical length of 20mmuPVC pipe at least 1m in length into the tank inlet connector.
3. Fit the product injection 20mm T-assembly (supplied) to the top of the 20mm vertical tank inlet pipe (above). The top of the injection Tee assembly will be connected to the appropriate ventilation conduit. **IMPORTANT!**...Refer to section below for hydrogen ventilation details.
4. Use the violet coloured flexible 8mmOD PTFE tubing (5m supplied) to connect the iSEC product outlet to the product injection Tee assembly (supplied).
5. The product tank **MUST additionally** be naturally vented at the top side of the tank by using a 20mm plastic vent pipe/elbow fitting (not supplied).

- ✓ **Chlorine product tank piping installation complete**

Salt Saturator Standard Arrangement

The iSEC is supplied with a standard set of accessories to enable the use of a standard open top tank with (or without) tank top lid to create a salt saturator in order to establish the iSEC with a supply of saturated brine at all times.

Precondition for action:

- ✓ Suitable plastic saturator tank/lid
- ✓ iSEC saturator accessory kit: float valve and brine well assemblies/kits

Perform the following steps:

1. Drill a 22mm hole near the top side of the tank side wall and fit the float valve assembly.
2. Place the brine well assembly into the tank, align vertically at a 45 degree angle with the float valve. Permanently fix the brine well pipe using the plastic pipe bracket, fixing nut and bolt supplied. The location of the pipe bracket should be above the float valve (water line) to avoid any seepage of brine solution through the bracket fixing bolt when the saturator is in operation.
3. If the saturator is intended to be used with a lid/cover, then the lid will require a cut-out to accommodate either the 50mm grey PVC pipe or the 8mmOD black MDPE brine tubing.

- ✓ **Saturator installation/ configuration complete**

Hydrogen Ventilation

The iSEC requires the installation of a ventilation pipe duct between the unit and a suitable outside termination vent point (normally at high level >3m), in order to safely vent any hydrogen gas liberated from the electrolytic process.

The exterior vent pipe termination point must be installed so as to create an external safe zone around the opening of the vent. Refer below to “External Zoning 2 Requirement” for guidance.

Plan the pipe route as direct and as straight as possible and **always on an incline** from the vent discharge connection injection Tee assembly to a discharge point within 15 metres.

If the iSEC is installed in a room with poor natural ventilation, or where a vent pipe route of greater than 15m is unavoidable, an Air Blower Ventilation Kit option must be fitted!

If the external vent position is less than 3m high, or access to the zone exhaust position cannot be prevented, an Air Blower Kit option must be fitted!

For pipe runs longer than 15m, an Air Blower Kit P/No. 202-401 should be fitted and a 2”/63mm diameter duct pipe should be used so that the airflow volume can be maintained >40m³ per hour.

Use wide radius bends instead of elbows to reduce air friction. DO NOT install any unions or any disconnection points at any point along the vent pipe work.

To comply with Health & Safety requirements, the vent termination point on the external wall should not be located directly beneath any air intake and must be located at least 0.8m from any window or possible source of ignition. If the external vent pipe work is located in a public area, or there is a possibility of vandalism, it should be protected with a suitable steel cage/pipe capping.

External Zone 2 Requirement

The following External Zone 2 requirements are necessary at the point of the external vent as indicated.

System type	External vent Zone 2 radius
iSEC 30	120mm
iSEC 60	240mm
iSEC 90	360mm

If in doubt, contact your supplier for further advice.

Standard Hydrogen Ventilation (<15m)

Precondition for action:

- ✓ Suitable outside vent point provided
- ✓ Adequate natural air room ventilation

Perform the following steps:

1. Install a length of 1/2” / 20mm ventilation piping from the top of the vertical product injection Tee assembly and the exterior vent point. **Ensure the entire vent pipework is always at an incline toward the external vent point.**
2. Provide and fix appropriate signage at the vent point in accordance with local rules.

- ✓ **Standard ventilation installation complete.**

Air Blower Ventilation (ducting >15m length)

An air blower ventilation kit, part number 202-401 may have been supplied within the scope of the system. This equipment is intended to assist with the safe extraction of hydrogen from the iSEC unit; for example, in small rooms with poor ventilation, or pipe runs greater than 15m in length. Refer to section “Hydrogen Ventilation” for further understanding of the requirement to install an air blower kit.

Precondition for action:

- ✓ Suitable outside vent termination point provided.
- ✓ Suitable local wall/frame mounting of the air blower equipment adjacent to the iSEC unit.
- ✓ Refer to air blower.

Perform the following steps:

1. Mount the air blower enclosure box on to the wall/frame as close to the iSEC unit as possible and a minimum of 200mm above floor level.
2. Ensure the enclosure is not obstructed and retains full clearance of its air intake.
3. The 2”/63mm manifold should be braced with a pipe bracket where necessary.
4. Connect the iSEC product injection/tank vent 20mm uPVC Tee assembly with suitable piping up into the air blower ventilation 63mm uPVC Tee assembly.
5. Interconnect the 63mm Tee vent assembly outlet to the external vent pipe termination point with suitable piping.
6. The entire vent pipe circuit from tank to external termination point should always be on a slight incline without exception to avoid any condensates accumulating and obstructing/restricting ventilation. The vent pipe work must be a permanent fixed solvent cement pipe installation without any unions or quick release couplings so that the ventilation circuit cannot be inadvertently disconnected. In this way, any condensates safely drain back to the product tank.

- ✓ **Location of air blower equipment and ventilation pipe work complete**

Electrical Installation

iSEC – Standard Product Tank Arrangement

Precondition for action:

- ✓ Unit located correctly.
- ✓ Suitable electrical power supply which meets with the electrical requirement designated on the iSEC machine identification plate.
- ✓ Trained electrical personnel to carry out electrical tasks.

Perform the following working steps:

1. The iSEC is supplied with a plug lead ready for connection to a suitable electrical socket.

2. Ground the device in accordance with local regulations.
3. Interconnect the yellow M12 plug cable assembly from the iSEC control panel onto the M12 socket of the hydrogen gas detector.
4. Interconnect the product tank level switch 5m cable (product tank switch kit supplied) using the M12 level switch plug and connect to the M12 bulkhead socket on the underside of the iSEC control panel.
5. Interconnect any auxiliary wiring (for devices supplied outside the scope of the standard system) to the control panel using the spare cable glands provided. Take care not to obstruct the final locating of the iSEC external plastic cover.

✓ **iSEC wiring complete**

Auto Regenerative Softener Option

If a SIMPLEX automatic regenerative water softener is to be installed, then an interrupt signal switch circuit to the iSEC is necessary in order to stop the iSEC operating while the softener is in regeneration. The softener may also require an electrical power supply for its operation.

Precondition for action:

- ✓ The SIMPLEX water softener must be fitted with a regeneration cycle signal switch.

Perform the following steps:

1. Where applicable, connect a suitable power supply to the softener.
2. Connect the regeneration/backwash remote inhibit signal cable from the softener valve head to the iSEC control panel in accordance with the wiring connections.

✓ **SIMPLEX softener wiring complete**

A DUPLEX softener will not require any regeneration wiring signal interconnection with the iSEC as the duplex softener provides an uninterrupted softened water supply. The duplex softener may require an electrical power supply for its operation.

✓ **DUPLEX softener install complete**

Air Blower Ventilation Kit Option

Pre-condition for action:

- ✓ The device and vent pipe correctly located and installed.
- ✓ A suitable switched fused power supply is available within 2m of installed device.

Perform the following tasks:

1. Connect the air blower power lead to the switch fused power supply in accordance to local rules.
2. Connect the air flow sensor to the iSEC control panel, in accordance with the wiring diagram. A spare available M20 cable gland entry is provided on the control panel.

✓ **Air blower kit wiring complete.**

Start Up

Commissioning and Initial Start-Up

Precondition for action:

- ✓ The system is configured according to the factory setup.
- ✓ The system has been installed in accordance with the Installation instruction.
- ✓ The iSEC device is grounded.
- ✓ A softened water supply is connected and ready either via a regenerative softener or softener filter cartridge specifically supplied and installed with the iSEC system or via an existing soft water supply already available on site.
- ✓ The softened water supply should be confirmed by performing a water hardness YES/NO test. The sample will be a GREEN result for soft water and RED result for hard water. The result MUST BE GREEN, i.e. soft water. DO NOT PROCEED further until a reliable softened water supply is available.
- ✓ The salt saturator is filled with a pre-charge of the correct specification of salt and the water level has reached its full level governed by the float valve.
- ✓ The hydrogen gas sensor detection kit is correctly installed and electrically connected via the 4-pin plug/M12 cable assembly as per installation instruction.

Clock Setting

Perform the following working steps:

1. Switch on the power supply to the iSEC. Next, the start-up screen appears.
The iSEC system will perform a set countdown number of water and brine batch cycles from 10 through to 0 to initially charge the electrolytic cell with a minimum volume of brine solution prior to automatically starting normal generation/batch cycles.
2. During the above start up cycles, immediately place the iSEC into MANUAL INHIBIT mode by pressing and holding the scroll UP key for 5 seconds. The MANUAL INHIBIT screen will appear and stop the system.
 1. Press the ENTER button for 5 seconds to access the Service Menu.
 2. Using the UP/DOWN scroll keys enter the service code 2236. Each digit needs to be individually selected and entered.
 3. Scroll UP until Program 7 is revealed.
 4. Press ENTER and then scroll DOWN to adjust date and time accordingly. Pressing ENTER at the EXIT screen will revert to Service Menu.

Softener Cartridge Set-Up (if fitted)

Skip to step 10 if no softener cartridge is fitted.

5. Scroll UP until Program 9 is displayed and press ENTER.

6. Select type A, B or C softener cartridge size.

Cartridge ID	Calcium Hardness Capacity mg/l (CaCO ₃)
A	48,000
B	97,000
C	292,000

7. Press ENTER on selection.
8. Scroll UP to Program 10 "Water Hardness" and press ENTER.
9. Scroll UP/DOWN to select the Total Hardness value of the mains water supply, in CaCO₃ mg/l. **Note:** Add a safety of +50 to the entered value to allow for water variances. Press ENTER to store the value.

Exiting Program

10. Scroll UP until Program 1 / End Program Mode is reached. At this point press ENTER and the display will return to the MANUAL INHIBIT screen.
11. To restart the system press and hold the scroll UP key for 5 seconds.
12. iSEC system will now resume its countdown start-up sequence and then proceed to normal automatic operation indicated by "SYSTEM HEALTHY, GENERATING".
13. When the SYSTEM HEALTHY screen is visible, scroll DOWN to observe engineer display 1. The normal DC Volt reading should be in the range of between 10 and 13 volts.

*** The DC volt reading may take several hours to stabilize on initial commissioning owing to the water/brine solution strength stabilizing.**
14. Continue to scroll DOWN to observe Eng. Display 4 which provides a visual indication of the hydrogen threshold as a percentage. An acceptable level of <70% should always be the case. The hydrogen gas detect system is factory set and requires only an annual service inspection/test. **IMPORTANT! As soon as the hydrogen reading is stable from initial power up, enter this reading into the commissioning record.**

Changing Display Language

15. The control panel display language can be selected when the iSEC is in normal operation simply by scrolling down to Program 9 and repeatedly depress the ENTER key until the language of choice is displayed, from which then leave this screen by scrolling UP/DOWN back to normal operating screen display.

Adjustment of Regenerative Softener (if fitted)

16. If a digital flow metered auto regenerative softener is fitted to the system, the hardness setting of the softener control should be set to at least 50mg/l CaCO₃ above the hardness value of the source water.
17. If a time clock auto regenerative softener is fitted to the system, ensure that the regeneration cycle is frequent enough to accommodate the total liters capacity per day water flow through the iSEC.

In the case of a single SIMPLEX regenerative softener vessel unit, the iSEC **must not** operate during the regeneration cycle. When the softener is in regeneration, the iSEC should stop and the screen will display.

If the above screen is not displayed then this may be a result that the softener regeneration signal is not properly connected to the iSEC.

18. Complete a Commissioning record log sheet.
19. After 12 to 24 hours operation it is recommended to perform further checks:
 - a. Carry out a chlorine product strength test. The result should ideally be 0.6% +/- 0.1%.
 - b. Carry out a YES/NO hardness test of the softened water supply. The result should be YES i.e. a green color test sample result.
 - c. Adequate salt stock is available for the operator to maintain uninterrupted operation and that site management have a salt stock ordering process in place.

NO SALT = NO CHLORINE!

Hydrogen Gas Detector Check

20. While the iSEC is in normal operation, remove the signal cable attached to the hydrogen sensor by unscrewing the M12 connector plug directly attached to the black detector housing. Within a few seconds the iSEC will go into alarm and display.
21. Reconnect the M12 cable plug to the gas detector and press the ENTER button on the control panel to accept the alarm and resume normal operation.

Consult your technical supplier should there be any concerns whatsoever with the commissioning and operation of the iSEC system

- ✓ **System commissioning and start up completed.**

Normal Start-Up

Precondition for action:

- ✓ The iSEC has only been in short term shutdown and that all commissioning and initial startup procedures have previously been completed and no alterations to the iSEC equipment and configuration has not subsequently been altered.
- ✓ The softened water supply should be confirmed by performing a water hardness YES/NO test. The sample will be a GREEN result for soft water and RED result for hard water. The result **MUST BE GREEN**, i.e. soft water. **DO NOT PROCEED** further until a reliable softened water supply is available.
- ✓ The salt saturator is filled with a pre-charge of the correct specification of salt and the water level has reached its full level governed by the float valve.

Perform the following working steps:

1. Switch on the power supply to the iSEC. The start-up screen appears. The iSEC system will perform a set countdown number of water and brine batch cycles from 10 through to 0 to initially charge the electrolytic cell with a minimum volume of brine solution prior to automatically starting normal generation/batch cycles.
 2. When the countdown is complete the iSEC will resume normal operation and display "SYSTEM HEALTHY, GENERATING".
 3. When the SYSTEM HEALTHY screen is visible, scroll DOWN to observe engineer display 1. The normal DC volt reading should be in the range of between 10 and 13 volts.
- * The DC volt reading may take several hours to stabilize on initial commissioning owing to the water/brine solution strength stabilizing.
- ✓ **Startup complete.**

Operation

Automatic Operation

The iSEC system is automated. However, the salt saturator should be refilled with salt manually before allowing it to become empty. Avoid allowing the salt level to drop <25%. The saturator should have markers fitted to indicate "maximum" and "minimum" salt level!

On electrical power the iSEC always performs an initial purge of water and brine prior to normal operation. In normal operation, the electrolytic chlorine process will START and STOP automatically according to the level of the product storage tank facility.

Manual Inhibit

The automatic process may be interrupted by placing the control cycle in to MANUAL INHIBIT mode. This will STOP the automatic electrolytic process.

While the system is displaying SYSTEM STOPPED, the scroll UP key may be pressed for 5 seconds to place the system into MANUAL INHIBIT mode which halts the automatic operation.

Press the scroll UP key again for 5 seconds to resume automatic operation.

Remote Inhibit

The iSEC may be connected to an external switch intended to stop the system remotely. If the system is stopped remotely, the screen will display REMOTE INHIBIT. The system will not resume automatic operation until the remote inhibit function is released.

Softener Regeneration

Failure to provide a softened feed water supply for the normal operation of the system will most likely result in failure of the system and affect the warranty conditions.

If a SIMPLEX automatic regenerative softener has been fitted, the softener will automatically regenerate and while doing so should place the iSEC into STOP mode to prevent the iSEC from operating with softened water (signal switching between softener and iSEC).

The system will resume automatic operation once the regenerative process is complete.

Replace Water Softener Cartridge

If a softener cartridge filter has been fitted to the system, the softener cartridge will eventually become exhausted and require replacement.

The Hypolyser® control panel monitors the volume of water consumed in the generating process and will indicate on the display screen when the cartridge requires replacement. In addition, the amber warning lamp will illuminate while the cartridge is becoming exhausted in order to alert the operator that attention is required.

Failure to replace the cartridge when indicated may quickly lead to reduced system performance and unnecessary failure of the system due to calcification of the electrolyser.

Precondition for action:

- ✓ Place the system into MANUAL INHIBIT mode.
- ✓ The system water supply at the inlet and outlet of the filter cartridge has been isolated.

Perform the following working steps:

1. Relieve water pressure within the softener filter bowl by depressing the pressure release button on top of the filter housing (if fitted) or by briefly opening the filter outlet valve and then the softened water sample tap.
2. Remove the filter cartridge bowl using the filter spanner (normally supplied with the filter kit) taking care not to drop the filter bowl.
3. Dispose of the water contained in the filter bowl to a waste drain.
4. Dispose of the exhausted softener cartridge as commercial waste.
5. Fit the correct new replacement softener cartridge.
6. Open the filter inlet/outlet isolating valves. Take the system out of MANUAL INHIBIT to resume automatic operation.
7. Reset the cartridge filter volume counter on the control panel by repeatedly depressing the scroll DOWN key until Eng. Display 7 is displayed.
8. Press the ENTER key for 5 seconds and the "litres remaining" value will reset to the correct value.
9. Press the scroll DOWN key twice to return to the normal operating display.

- ✓ **The cartridge filter is now successfully replaced.**

Emergency Shutdown

In the event of an emergency, immediately disconnect the device from the main electrical supply.

If an auxiliary Emergency Stop device has been connected to the device, this can be activated to stop the system. If this is the case, the iSEC system will need to be reset on the panel by pressing the ENTER button once the Emergency Stop device has been released.

Record Log of Operation

In order to maintain and monitor the performance of the system and ensure the system is operated within manufacturer warranty conditions, the operator has the responsibility to complete an Operator Log.

- ✓ **Warranty compliance**

Maintenance and Cleaning

The Hyprolyser® iSEC units are manufactured to the highest quality standards and have a long service life. However, some parts are subject to operational wear. This means that regular visual inspections are necessary to ensure a long service life. Regular maintenance will protect the system from operational interruptions.

Maintenance Intervals

The system requires regular maintenance to prevent errors, poor performance and even failure. This table gives an overview of maintenance work and the intervals at which you must carry it out.

Interval	Level	Maintenance
On demand	Operator	■ Replace softener cartridge if fitted
Annual	Technician	■ Check all hydraulic fittings and connections are leak free and tubing in good condition ■ Check & test hydrogen gas sensor
2 yrs. (or >10,000 h)	Technician	■ Check, test & replace hydrogen gas sensor
5 yrs.	Technician	■ Major overhaul

Hydrogen Gas Detector Inspection

The hydrogen gas (H₂) detection system is very important to ensure a safely managed iSEC system. The H₂ detector should be routinely tested frequently and at least annually in order to verify a safe system of work.

Precondition for action:

✓ iSEC system in normal automatic operation.

Perform the following working steps:

1. The hydrogen level detected in the immediate atmosphere is displayed on the screen and should normally be below 70%. This reading can be displayed by scrolling DOWN at the Hyprolyser® panel to reveal Program 4.
2. Compare the displayed hydrogen level with the commissioned value as recorded at the time of initial commissioning/start-up. If the current reading displayed is >25% higher than commissioning reading it is recommended to replace the sensor.
3. Carry out check procedure.
4. Replace the hydrogen sensor if:
 - a. reading is above normal range >70%
 - b. sensor is known to have been damaged by water emersion or fire damage
 - c. sensor has been in operation >2 years

* When the sensor is functioning correctly and the display reads 100%, this is equivalent to a H₂ detection level in the atmosphere of less than 25% of the LEL threshold which is still extremely safe, however, the level is higher than normal and action should be taken to rectify the problem.

✓ The hydrogen gas detection system has been successfully checked/sensor replaced.

Remedial Maintenance

Precondition for action:

- ✓ Perform short-term shut down procedure.

iSEC Unit

1. Remove the iSEC plastic cover.
2. Observe closely all the liquid tube fittings and if there is any slight leakage this may be due to an adapter fitting requiring further tightening or the tube requiring pushing into the tube fitting.
3. Wipe away any solution residues from fittings taking care to wear rubber gloves and protective glasses in case of any presence of chlorine and/or salt residue that may cause irritation of the skin and eyes.
4. Check the electrolyser DC cables are tight at the top and bottom brass connection terminals. DO NOT overtighten!
5. Brush away any dust that may have gathered at the front ventilation grille on the electrolyser power supply enclosure.
6. Check and tighten any loose cable glands or electrical connection plugs attached to the sensors and control valves where necessary.
7. Replace the iSEC cover taking care to locate it properly.

Salt Saturator

8. Clean out the salt saturator if the salt has left dirty residues depending on the salt quality.
9. Check the black brine suction line and the non-return foot valve assembly at the end of the black suction line tube (positioned in base of brine well assembly) is clean. Replace if damaged or missing!
10. Replace the saturator tank water float valve if it is damaged.
11. Check the softened water supply equipment requires any maintenance by referring to the appropriate manual supplied with the equipment.
12. Check inside the product tank is clean and carefully remove any debris that may be floating on the surface of the product solution as it might entangle with the float switch assembly and cause failure of the iSEC system.
13. When all maintenance has been safely carried out place the iSEC back into operation.

- ✓ **Remedial maintenance complete**

Major Service

A major overhaul of the ISEC system is required every 5 years, regardless of operating hours. An approved iSEC service technician will be required to conduct this maintenance regime.

Control devices, the electrolytic cell, the salt saturator and all associated pipe work will require thorough inspection and cleaning and worn/defective parts replaced as necessary.

The water and brine solenoid valves will require replacement.

The electrolytic cell will require an acid clean and its two cell casing end cap O-rings and the two terminal O-rings replacing.

All flexible plastic tubing will require replacement.

The hydrogen gas detect sensor head will require replacement.

If an auto regenerative softener is fitted, the softener will require a full service.

All safety switches and safety devices to be fully tested.

Action to be taken:

c:> **Contact your iSEC service provider to arrange a major overhaul service.**

✓ **General overhaul will provide for future safe operation and continued reliable service.**

Electrolyser Cleaning

The electrolyser (electrolytic cell) may require acid cleaning periodically to remove the presence of water hardness scaling and also any metal deposition e.g. iron and manganese deposits.



One of the reasons the iSEC may alarm in "VOLTAGE HIGH" is due to the electrolyser becoming heavily scaled or fouled with other deposits.

Precondition for action:

✓ Perform Short-term shut down procedure.

Perform the following working steps:

1. Remove the iSEC outer cover.
2. Disconnect the violet tubing from the top and bottom cell connections.
3. Connect the acid wash cleaning system to the electrolyser in accordance with the operating instructions provided with the Hypolyser® acid washing kit and carry out the cleaning process as per its instruction.
4. After cell cleaning, wipe away any residual chemical solution from all fittings and apparatus.
5. Ensure the water supply is turned on to the system.
6. Perform "normal start-up".

✓ **Electrolyser acid wash carried out successfully and iSEC normal operation resumed.**

Finishing Maintenance

Perform the following working steps:

1. Make a note of the date and scope of the maintenance performed.

2. Complete any operational, service or commissioning log sheets associated with the ISEC system and as per any associated documents which are contained within this manual.
 3. Attach a sticker displaying the maintenance date to the system.
 4. To assure correct start-up procedures, refer to section “normal start-up”.
- ✓ **Maintenance completed.**