

# Puritron<sup>®</sup>

SALT WATER CHLORINATOR

Natural,  
Environmentally Friendly,  
Healthy, Safe and  
Low cost  
Chlorine Production



# Salt Electrolysis

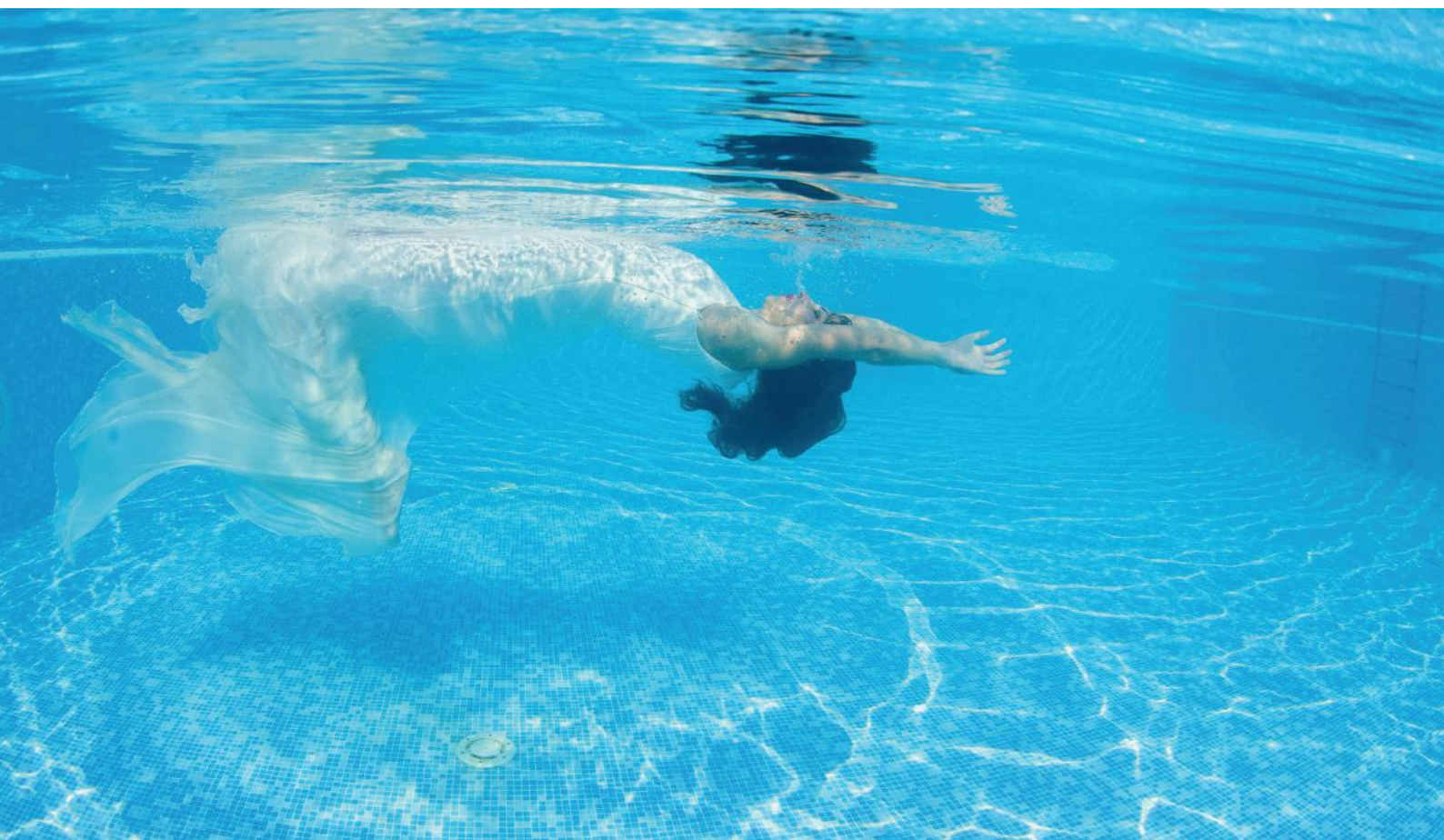
Salt water chlorination is a water treatment method whereby the disinfectant agent is directly generated from the water by means of an electrolytic process. This technique avoids the use of chemical compounds and is particularly well adapted to swimming pools. Salt water chlorination provides many advantages compared with traditional disinfection methods such as: water quality obtained treatment costs, health impact and easy automatic operation.

The shortness of storage time of the purchased hypo solutions in summer conditions, loss of concentration due to heat and abuse risks that malicious sellers can make in concentration; significantly increases the attractiveness of the system.

In addition, with the high oxidation effect of the produced oxygen radicals as well as chlorine in the process, an extremely bright and clear water quality can be achieved.

System; It works synchronously with the filtration system of the pool and makes the disinfection continuously. The convenience of the system in practice is at least as high as the superior water quality and hygiene it provides.

**“Luminous and Hygienic Pool Water Obtained by Process, Ease of Operation Provided, Big Savings in Operation Costs and Operational Safety”** are the main features that make the system indispensable.



# Working Principles

When an electrolytic process is generated in salt water, chloride ions coming from these dissolved salts are oxidized on the anode surface and combined to form gaseous chlorine which is immediately dissolved in the water.



This process, thus, provides a source of pure chlorine from the water dissolved salts. Once chlorine has been generated it triggers a powerful disinfection process under different chemical forms (hypochlorous acid, hypochlorite ion, etc.). These species neutralize microorganisms and oxidize organic matter and other contaminants. Once the disinfection cycle has ended, chlorine comes back to its original state as a dissolved salt.

This chlorine generation process requires a certain amount of dissolved salts in the water in order to provide a sufficient quantity of chloride ions. In a swimming pool this is easily achieved by adding table salt to the water until a concentration of a few grams per liter (usually 5 g/l) is reached. This small concentration provides, by itself, an antiseptic action and a very pleasant contact with the skin. The latter is one of the most appreciated qualities of a salt chlorinated swimming pool. It has to be said that the salt concentration required is much lower than sea concentration (35 g/l) and even lower than a physiological solution (9 g/l) commonly used in eye care.

Gemas Puritron systems generate chlorine in line with no need for tanks or dosing pumps and they are capable of generating from a few grams per hour for a private swimming pool to several kilograms per hour required in big installations.

In most cases, as it's been explained, added salt is a source of advantages. However there exist a number of situations (Olympic swimming pools, drinking water treatment, etc.) where salt concentration can't be altered. In these cases, it is still possible to obtain chlorine from the small amount of natural salts existing in the water. This requires a more sophisticated electrolytic system with much higher chemical performance. Ecochlor® fresh water system has been developed to effectively generate chlorine in such circumstances.



# Production Technology

## Advantages of Switch Mode Power Supplies

Puritron chlorinators use Switch Mode power supplies to polarize the electrode. This allows very precise control over the electrode's working point, which notably minimizes its wear and tear. Control of chlorine production is not executed by varying the power, as is the case with conventional chlorinator, but by interrupting polarization at a certain frequency. This has a direct effect over the duration of the electrodes and electrical consumption. The origin of Switch Mode feed sources is to be found in the IT industry, the same originally designed for reduced powers. They have had to be adapted to generation of electrolysis with the consequent design difficulties that this involves. Apart from the above-described advantages our chlorinators benefit from the scarce consumption, volume and weight of this type of source.

## Efficiency

Switch Mode power supplies operate more than 95% more efficiently than conventional linear AC-DC converters. For this reason, GEMAS SALT-CHLORINE GENERATORS produce MORE CHLORINE with less energy.

## Control

Switch Mode technology makes it possible to control the current values at the output very exact and precisely. Our electrodes always operate at the most optimal point of the power curve. This enables the charging time to be controlled consistently; it creates an advantage that cannot be mixed with traditional methods. Much more chlorine is produced in a much shorter time; electrode life is greatly extended.

## Heat Generation

Switch Mode power supplies produce less heat; allows device design in much narrower volumes. It eliminates the need of fan cooling.

## Dimensional Advantage

GEMAS SALT-CHLORINE devices are small and lightweight compared to many competitors for the reasons explained above, thus providing ease of assembly and cheap transportation.

## Ease of Service

Switch Mode power supplies used in our devices have IP67 protection class and are not affected by the humidity in the environment. The device is completely compact and has no mechanical components that will require service and may be affected by the environment.



# Bipolar Electrodes

Our electrolytic cells use a more advanced technique to obtain chlorine, which is denominated bipolar electrolysis. What is achieved with this technique is that one same electrode will behave like an anode over one face and like a cathode over the other, this in simultaneous fashion.

This produces unique distribution of the potential inside the electrolytic housing, allowing a reduction of its dimensions. It is particularly adapted for use as Switch Mode feed sources, with this technique notably reducing the intensity of the necessary current for production of chlorine, conferring extraordinary performance and resistance to the system.

All ours models use solid high-grade titanium plate for the cell's cathode and anode. The anode coating process is strictly controlled to assure a uniform lining of a few microns that will guarantee performance of the cell during many years.



# Advantages

## Effective

Chlorine disinfection is much more effective than in a conventional dosing system. Pure form of chlorine,  $Cl_2$ , is continuously generated in the cell. This led to the formation of high percentage of hypochlorous acid that has a much higher oxidant power than the hypochlorite ion coming from the commercial chlorine products (sodium or calcium hypochlorite). The high chlorine concentration existing in the cell is capable of destroying contaminants, such as chloramines or remains of body lotions, that commercial chlorine can't eliminate. An additional oxidizing effect is provided by the electromagnetic field existing in the cell. The result is a double and more powerful sanitizing effect. As the disinfection occurs continuously in the cell, an exceptional water quality can be obtained even without any residual chlorine level in the pool. Swimming pools treated with salt chlorination are known for their astonishing crystal-clear water.

## Healthy

The system avoids the use of chemical products and prevents from isocyanic preservatives exposure. Chlorine is obtained in a pure chemical form that minimizes the formation of toxic by-products. After completing its disinfection cycle, chlorine converts back to salt in the pool. Chemicals storage is no longer needed. The disinfectant power of the process is superior to conventional chlorination due to the strong oxidizing conditions in the cell. Chloraminated compounds, responsible of skin and ocular irritation and of the characteristic "chlorine odor" of conventional treated swimming pools, are destroyed in the cell. The small concentration of salt in the water acts as a natural antiseptic against algae and bacteria and provides.

## Comfortable

The salt concentration, close to the human tear salt concentration, provides a very pleasant isotonic sensation to the skin and eyes. The skin no longer swells or dehydrates, the hair does not get dry, and the eyes can be opened into the water without sting. There is no chlorine odor over the skin and no need to take a shower immediately after the bath. Besides, salt composition accelerates tanning.

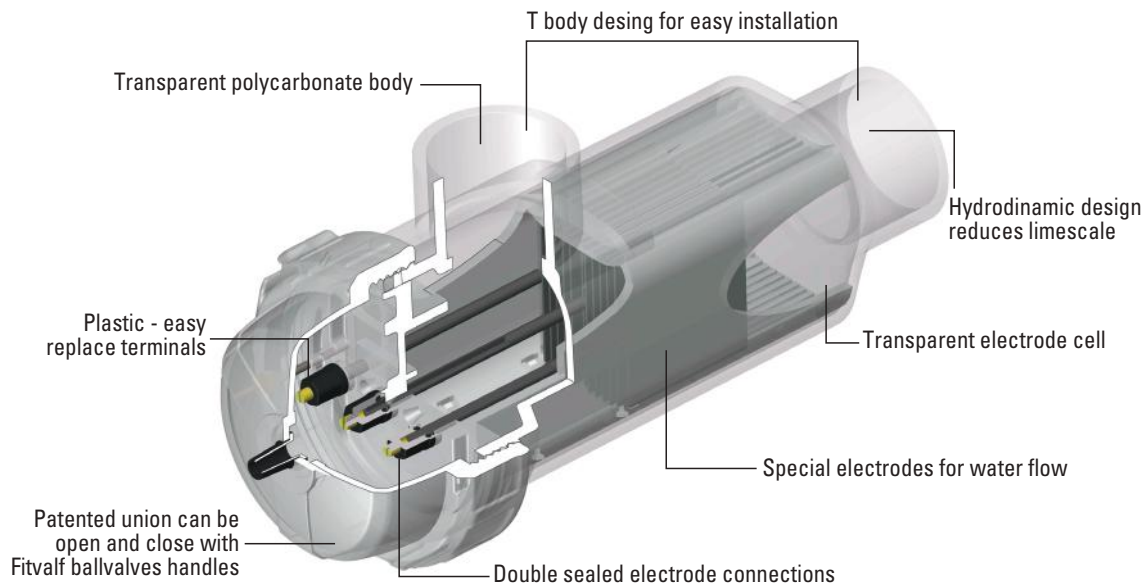
## Secure

Chlorine is produced and immediately dissolved in the water automatically. There is no manipulation or storage of chemical products and, therefore, no risk of fire or explosion. The system eliminates the corrosive ambient conditions in the filter rooms, providing better working conditions and longer equipment life span.

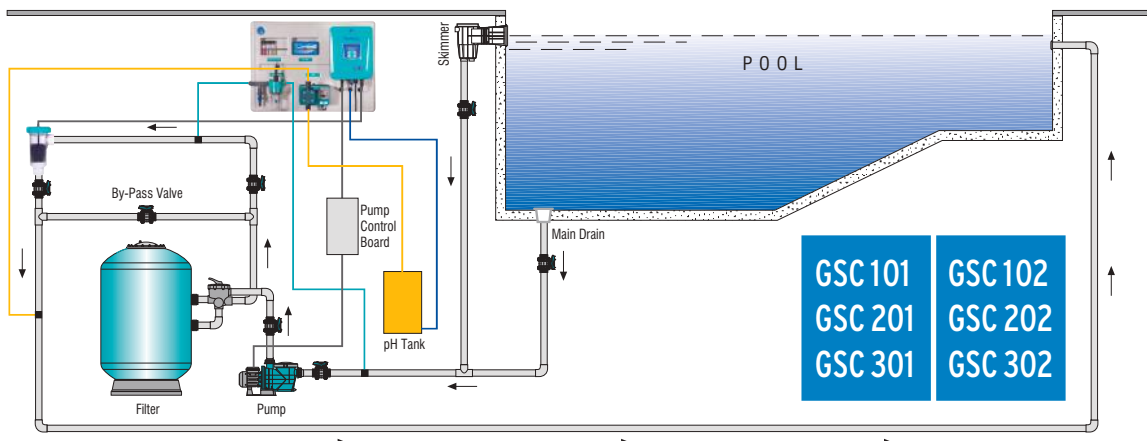
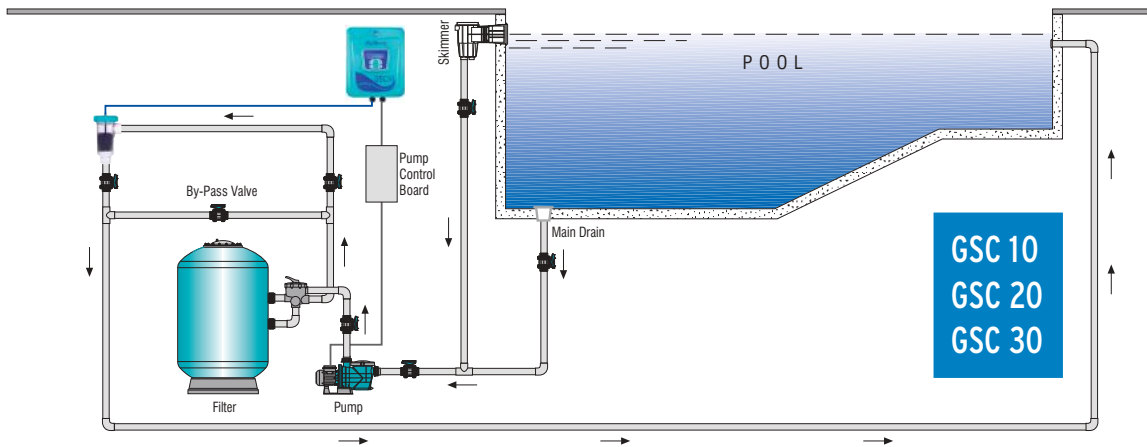
## Ecological

Chlorine is generated without preservatives from salt in a renewable process and it becomes salt again at the end of the disinfection cycle. Water is treated without adding any external compound to the water. The local chlorine production avoids  $CO_2$  and energy consumption due to transport as well as accidental toxic dumping.

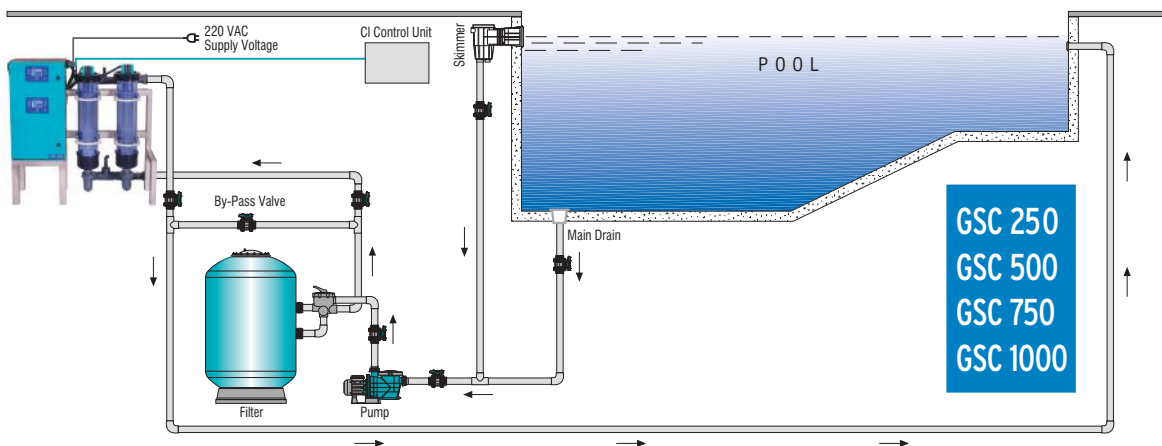
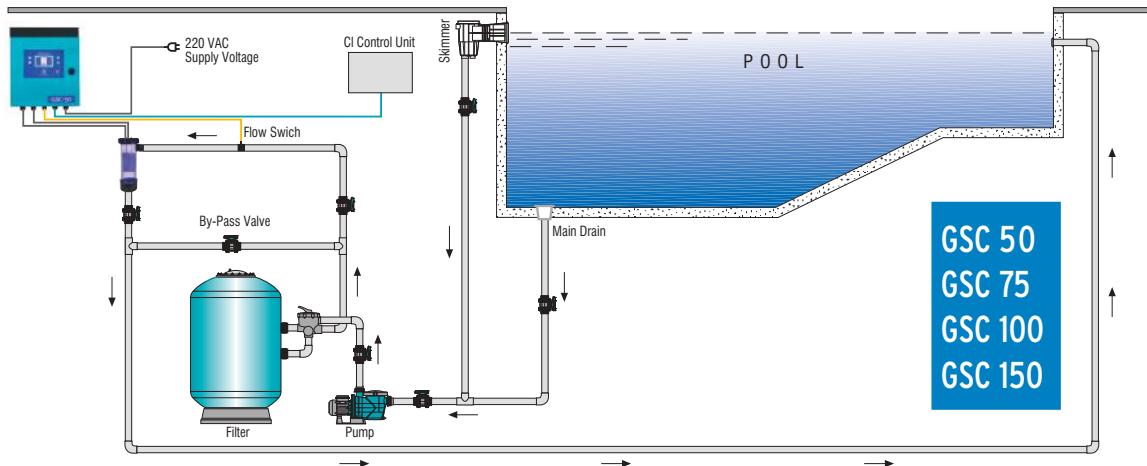
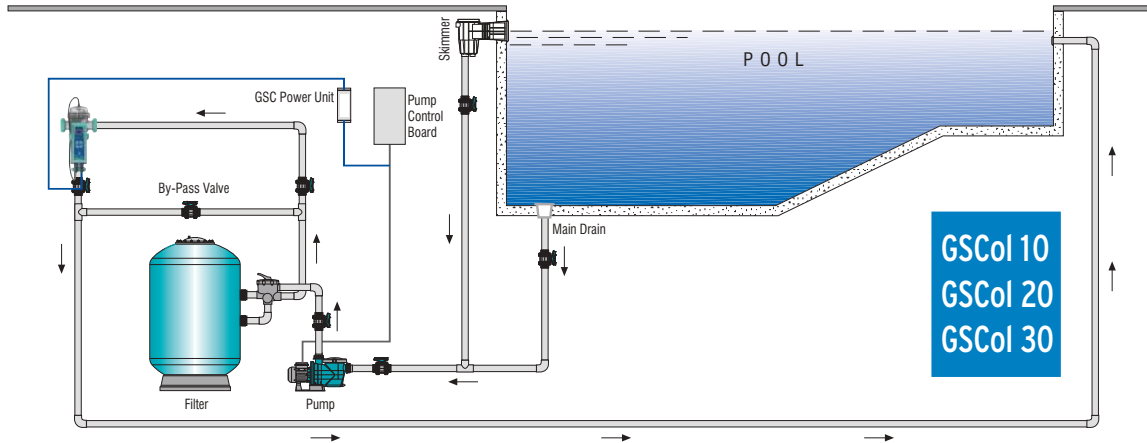
# Salt Electrochlorinisation



## Assembly and Installation Schemes



# Assembly and Installation Schemes





# How to Choose Correct Salt Chlorinator

To ensure a proper performance of our equipment in public swimming pools, we should not rely only on its volume as in the private pool, but we must consider other parameters such as the number of daily bathers and the hours of filtration. Serve as a guide the following table (these calculations are made only for outdoor pool) and we recommend that, if you have any questions, send us the form you will find on the following page so we can indicate the chlorinator needed for your installation.

## Daily Chlorine Requirement:

**1- Loss from Swimmers:** The number of swimmers should be determined or estimated. This number should be considered according to busiest day.

Daily lost per swimmer in Mediterranean Region is 10 g/day.

**2- Loss from Sun Light (The Destructive effects of UV light on chlorine):** This lost is on average 2,5 g per each pool m<sup>3</sup> in Mediterranean belt.

**Daily Chlorine Requirement (g) = The Number of Swimmers x 10 g + Pool Volume (m<sup>3</sup>) x 2,5 g**

### For example:

The Pool that 250 swimmer's daily use and 1000 m<sup>3</sup> pool volume.

Daily Chlorine Requirement = 250 x 10 g + 1000 m<sup>3</sup> x 2,5 g/m<sup>3</sup> = 5000 g

With 12 hours filtration = 5000 g/12h = 416 g/h ► GSC 500

With 24 hours filtration = 5000 g/24h = 200 g/h ► GSC 250

## Recommended Model for Commercial Pools

Bathers Per A Day	POOL WATER VOLUME ( m <sup>3</sup> )						
	100	200	400	500	750	1000	1500
50	GSC 75 GSC 50	GSC 100 GSC 75	GSC 150 GSC 150	GSC 150 GSC 150	GSC 250 GSC 250	GSC 300* GSC 300*	GSC 500 GSC 500
100	GSC 100 GSC 75	GSC 150 GSC 100	GSC 150 GSC 100	GSC 250 GSC 150	GSC 250 GSC 250		
200	GSC 150 GSC 100	GSC 250 GSC 150	GSC 250 GSC 150	GSC 300* GSC 250	GSC 250 GSC 250	GSC 500 GSC 500	
300			GSC 300* GSC 150		GSC 500 GSC 300*		GSC 750* GSC 500
400				GSC 500 GSC 250			
500						GSC 750* GSC 500	GSC 1000* GSC 500

Models recommended for 12 h filtration - Model recommended for 24 h filtration

\* GSC 300, GSC 750 and GSC 1000 models are produced after order.

During design, machine room conditions should be taken into consideration.

GSC 10  
GSC 20  
GSC 30

## Technical Features



- User friendly interface and menu system with multiple functions.
- Digital control and display system
- IP67 isolation class SWITCH MODE power supply. Completely protected in corrosive and high humidity conditions thanks to no forced ventilation IP67 power supply.
- Low maintenance compact bipolar cell.
- More efficient and accessible cell
- Electrode transparent housing for easy access.
- Water resistant cell connection without nuts.
- Leakage current protection
- Easy installation with independent mounting part
- Optional Wi-Fi connection
- Optional Flow switch
- Self-cleaning electrodes



MODEL		GSC 10	GSC 20	GSC 30
Chlorine production	g/h	10	20	30
Recommended pool volume	m <sup>3</sup>	0 - 40	30 - 90	80 - 150
Recommended salt level	gr/l	4	4	4
Cell duration	h	14.000	14.000	14.000
Max. flow	m <sup>3</sup> /h	27	27	27
Max. operation pressure	kpa	480	480	480
Cell housing pressure drop	kpa	2,5	5	5
Output voltage	VDC	24	24	24
Output Current	A	2	4	6
Input Voltage	VAC	220	220	220
Power consumption	W	50	100	150
Cell housing material		Polycarbonate	Polycarbonate	Polycarbonate
Cell material		Titanium grade 1	Titanium grade 1	Titanium grade 1
Polarity time		1 to 12 h	1 to 12 h	1 to 12 h
Plumbing	mm	50	50	50
Weight	kg	4,5	4,5	4,5
Packaging dimensions (L/M/H)	mm	600 x 350 x 150	600 x 350 x 150	600 x 350 x 150

GSC 101  
GSC 201  
GSC 301

## Technical Features



- User friendly interface and menu system with multiple functions.
- Digital control and display system on LCD screen.
- IP67 isolation class SWITCH MODE power supply.  
Completely protected in corrosive and high humidity conditions thanks to no forced ventilation IP67 power supply.
- Mounted on panel.
- Low maintenance compact bipolar cell.
- More efficient and accessible cell.
- Electrode transparent housing for easy access.
- Water resistant cell connection without nuts.
- Leakage current protection.
- Easy installation with independent mounting part.
- Optional Wi-Fi connection.
- Optional Flow switch connection.
- Optional pH control software and hardware.
- With 2 l/h design pump. Peristaltic and magnetic model dosing pump options.
- Self-cleaning electrodes.



MODEL		GSC 101	GSC 201	GSC 301
Chlorine production	g/h	10	20	30
Recommended pool volume	m <sup>3</sup>	0 - 40	30 - 90	80 - 150
Recommended salt level	gr/l	4	4	4
Cell duration	h	14.000	14.000	14.000
Max. flow	m <sup>3</sup> /h	27	27	27
Max. operation pressure	kpa	480	480	480
Cell housing pressure drop	kpa	2,5	5	5
Output voltage	VDC	24	24	24
Output Current	A	2	4	6
Input Voltage	VAC	220	220	220
Power consumption	W	50	100	150
Cell housing material		Polycarbonate	Polycarbonate	Polycarbonate
Cell material		Titanium grade 1	Titanium grade 1	Titanium grade 1
Polarity time		1 to 12 h	1 to 12 h	1 to 12 h
Plumbing	mm	50	50	50
Weight	kg	11,5	11,5	11,5
Packaging dimensions (L/M/H)	mm	810 x 600 x 240	810 x 600 x 240	810 x 600 x 240

# GSC 102    Technical Features

## GSC 202

## GSC 302

- It produces chlorine in the salt concentration in the same proportion as the tear salinity.
- It has a user-friendly interface that provides ease of use with an LCD screen.
- It has an automatic electrode cleaning feature against calcification.
- Thanks to the measurement and control feature between 0 - 14 pH, the pool always remains at the desired pH.
- It allows the pool to produce as much as for chlorine thanks to ORP measurement between 0 - 1000 mV.
- It has a long-lasting titanium electrode.
- It has an electrode life of 16.000 hours.
- It offers the opportunity to adjust to the optimum level by increasing or decreasing the pole change time for cleaning the electrodes.
- Thanks to the LCD screen, it provides the opportunity to display the current at the moment of operation.
- The device records the total working time.
- It can be easily applied to the existing pool.
- The minimum recommended salinity is 4.000 ppm (4kg/m<sup>3</sup>).
- The device can also be used in seawater with 35.000 ppm.



MODEL		GSC 102	GSC 202	GSC 302
Chlorine production	g/h	10	20	30
Recommended pool volume (Max.)	<b>Temperate</b> <b>Tropical</b>	m <sup>3</sup>	50	170
			35	110
pH measurement-control	pH	0 - 14	0 - 14	0 - 14
ORP measurement-control	mV	0 - 1000	0 - 1000	0 - 1000
Cell duration	h	16.000	16.000	16.000
Max. flow	m <sup>3</sup> /h	27	27	27
Max. operation pressure	kpa	320	320	320
Cell housing pressure drop	kpa	5	5	5
Output voltage	VDC	24	24	24
Output Current	A	2	4	6
Input Voltage	VAC	220	220	220
Power consumption	W	50	100	150
Salt concentration	gr/l	4 - 35	4 - 35	4 - 35
Cell housing material		PMMA	PMMA	PMMA
Cell material		Titanium grade 1	Titanium grade 1	Titanium grade 1
Polarity time		1 to 12 h	1 to 12 h	1 to 12 h
Weight	kg	11,5	11,5	11,5
Packaging dimensions (L/M/H)	mm	810 x 600 x 240	810 x 600 x 240	810 x 600 x 240

GSCol 10  
GSCol 20  
GSCol 30

## Technical Features

- User friendly interface and menu system with multiple functions.
- Digital control and display system
- IP67 isolation class SWITCH MODE power supply. Completely protected in corrosive and high humidity conditions thanks to no forced ventilation IP67 power supply.
- Low maintenance compact bipolar cell.
- More efficient and accessible cell
- Electrode transparent housing for easy access.
- Water resistant cell connection without nuts.
- Leakage current protection
- Easy installation with independent mounting part
- Optional Wi-Fi connection
- Optional Flow switch
- Self-cleaning electrodes



MODEL		GSCol 10	GSCol 20	GSCol 30
Chlorine production	g/h	10	20	30
Recommended pool volume (Max.)	<b>Temperate</b> <b>Tropical</b>	m <sup>3</sup>	50	170
			35	110
Recommended salt level	gr/l	4	4	4
Cell duration	h	16.000	16.000	16.000
Max. flow	m <sup>3</sup> /h	27	27	27
Max. operation pressure	kpa	320	320	320
Cell housing pressure drop	kpa	5	5	5
Output voltage	VDC	24	24	24
Output Current	A	2	4	6
Input Voltage	VAC	220	220	220
Power consumption	W	50	100	150
Cell housing material		PMMA	PMMA	PMMA
Cell material		Titanium grade 1	Titanium grade 1	Titanium grade 1
Polarity time		1 to 12 h	1 to 12 h	1 to 12 h
Plumbing	mm	50	50	50
Weight	kg	4,5	4,5	4,5
Packaging dimensions (L/M/H)	mm	410 x 250 x 180	410 x 250 x 180	410 x 250 x 180

GSC 50  
GSC 75  
GSC 100  
GSC 150

## Technical Features



- Designed for mid-size hotel and complex pools.
- IP67 isolation class SWITCH MODE power supply. Completely protected in corrosive and high humidity conditions thanks to no forced ventilation IP67 power supply.
- Titanium electrodes duration is 14.000 hours.
- Stainless steel body
- User friendly interface and menu system with multiple functions.
- Digital control and display system on LCD screen
- Self-cleaning electrodes
- Low maintenance compact bipolar cell.
- More efficient and accessible cell
- Water resistant cell connection without nuts.
- Software and hardware for automatic pH control. (with pH control options)
- Optional Wi-Fi connection
- Complete with flow switch.

MODEL		GSC 50	GSC 75	GSC 100	GSC 150
Chlorine production	g/h	50	75	100	150
Recommended pool volume	m <sup>3</sup>	150 - 200	200 - 250	250 - 300	300 - 350
Recommended salt level	gr/l	4	4	4	4
Cell duration	h	14.000	14.000	14.000	14.000
Max. flow	m <sup>3</sup> /h	27	27	27	27
Max. operation pressure	kpa	480	480	480	480
Cell housing pressure drop	kpa	2,5	5	5	5
Output voltage	VDC	24	24	24	24
Output Current	A	10	15	20	30
Input Voltage	VAC	220	220	220	220
Power consumption	W	250	375	500	750
Cell housing material		Polycarbonate	Polycarbonate	Polycarbonate	Polycarbonate
Cell material		Titanium grade 1	Titanium grade 1	Titanium grade 1	Titanium grade 1
Polarity time		1 to 12 h	1 to 12 h	1 to 12 h	1 to 12 h
Plumbing	mm	63	63	63	63
Weight	kg	13	15	20	25
Packaging dimensions (L/M/H)	mm	600 x 350 x 150	600 x 350 x 150	600 x 350 x 150	600 x 350 x 150

GSC 250  
GSC 500  
GSC 750  
GSC 1000

## Technical Features

- Designed for mid-size hotel and complex pools.
- IP67 isolation class SWITCH MODE power supply. Completely protected in corrosive and high humidity conditions thanks to no forced ventilation IP67 power supply.
- Titanium electrodes duration is 20.000 hours.
- User friendly interface and menu system with multiple functions.
- Digital control and display system on LCD screen
- Self-cleaning electrodes
- Low maintenance compact bipolar cell.
- High performance electro chlorinators for intensive commercial exploitation and high capacity - public installations.
- Electronics in good in insulated cabinet without external ventilation. IP65
- Electronic current control + Temperature and waterflow control.
- Extended salinity range: 500 - 35.000 ppm (sea water)
- Compact assembly design with integrated cell and housing.
- Transparent cell body to ease inspection.
- Reverse polarity cell easily accessible and of a low maintenance.
- Electrodes of a low current density and long life 20.000 hours.
- Includes a flow switch.



MODEL		GSC 250	GSC 500	GSC 750	GSC 1000
Chlorine production	g/h	250	500	750	1000
Recommended pool volume	m <sup>3</sup>	Calculation	Calculation	Calculation	Calculation
Recommended salt level	gr/l	4	4	4	4
Cell duration	h	14.000	14.000	14.000	14.000
Max. flow	m <sup>3</sup> /h	27	27	27	27
Max. operation pressure	kpa	480	480	480	480
Cell housing pressure drop	kpa	5	5	5	5
Output voltage	VDC	24	24	24	24
Output Current	A	50	100	150	200
Input Voltage	VAC	220	220	220	220
Power consumption	W	1200	2400	3600	4800
Cell housing material		Polycarbonate	Polycarbonate	Polycarbonate	Polycarbonate
Cell material		Titanium grade 1	Titanium grade 1	Titanium grade 1	Titanium grade 1
Polarity time		1 to 12 h	1 to 12 h	1 to 12 h	1 to 12 h
Plumbing	mm	63	63	63	63
Weight	kg	40	60	100	120
Packaging dimensions (L/M/H)	mm				



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