

# INNOVATION IN CORROSION & LIMESCALE CONTROL



**STOPCOR<sup>®</sup> Ltd**

• CATHODIC PROTECTION SYSTEMS •



02

**About us**  
**STOPCOR® Ltd**

04

**Electrochemical corrosion**  
What causes electrochemical corrosion  
**STOPCOR®** method | Technical info

06

**Limescale control**  
What is Limescale  
**STOPCOR®** reduces Limescale | Benefits

08

**Domestic line**  
**STOPCOR®** Heater Pro 1 & 2 | Fitting instructions

10

**Commercial line**  
**STOPCOR®** Commercial Line | Fitting instructions

12

**Industrial line**  
Impressed current ICCP systems

14

**Boat line**  
**STOPCOR®** Boat | Fitting instructions

16

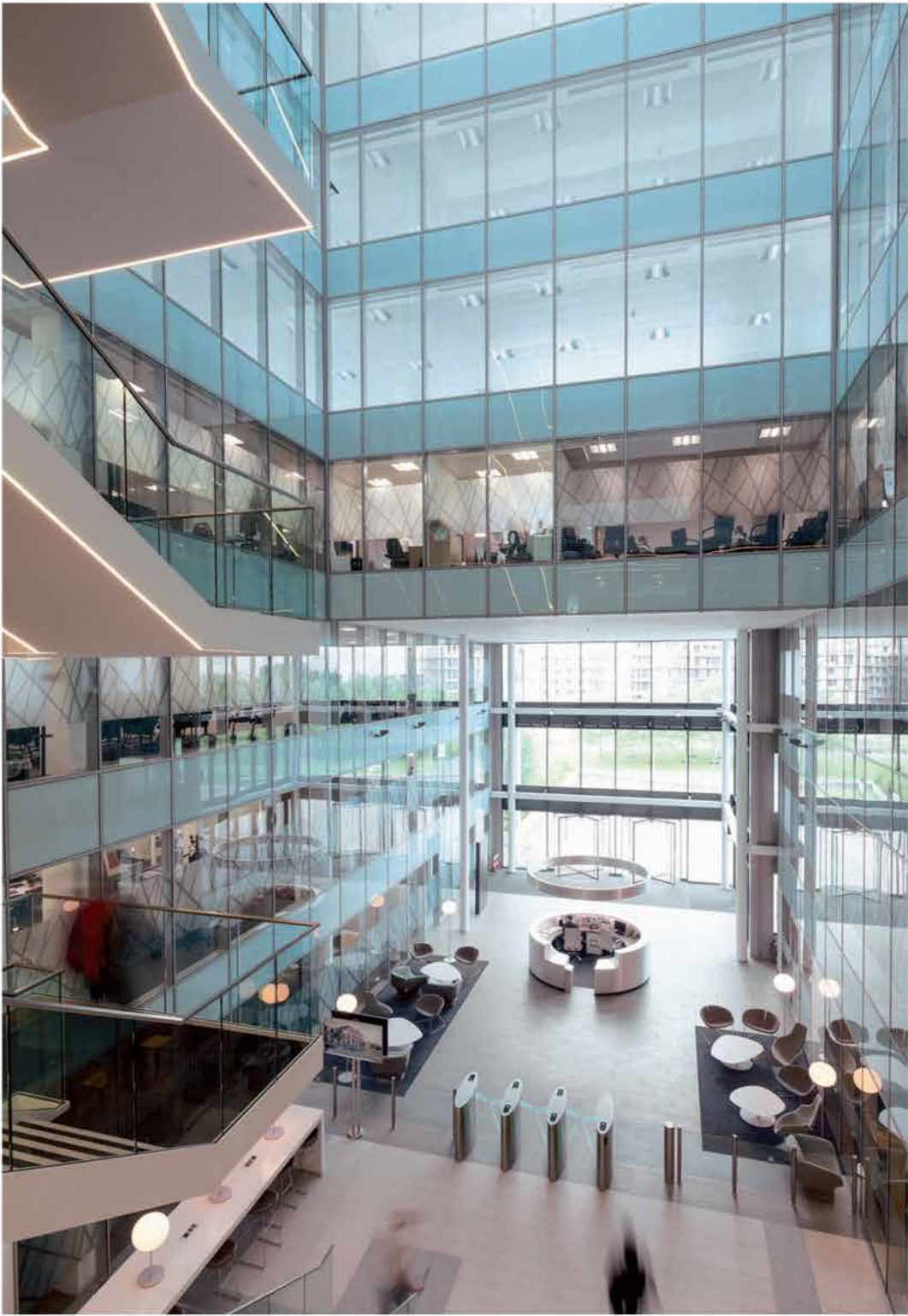
**Maritime**  
Maritime anodes

18

**Solar heater**  
**STOPCOR®** Solar

19

**Selection guide**





# STOPCOR® Ltd

We initially began operations in 1968, providing proven **Cathodic Protection** solutions to Electrochemical Corrosion issues in the maritime and the industrial sectors. Building on the pioneering vision of its founder, **Mr Nikitas Kounadinis**, the company has gained unrivalled reputation as a source of unmatched expertise regarding corrosion prevention, manufacturing sacrificial anodes and Impressed Current systems (ICCP).

**STOPCOR® Ltd** is a company comprised of scientists, chemical engineers and highly motivated professionals. It is based in London, United Kingdom with industrial facilities in Athens, Greece. Utilizing our extensive experience in conjunction with our investment in Research & Development, we have invented the **STOPCOR®** product line.

**STOPCOR®** is an innovative product, designed to meet the particular demands of every domestic or commercial installation requiring protection from electrochemical corrosion and limescale. **STOPCOR®** is an **Internationally Patented method including Europe, the United States of America, Canada, the United Arab Emirates and other countries:**

**WO 2018/011608 / EP3485064 / US11,091,841 B2**

The entire product range has been available through Professional Plumbers' Associations as well as merchants specializing in plumbing and heating equipment worldwide.

Today, **STOPCOR® Ltd** is in a state of constant improvement. Our dedicated personnel and our resolute determination to uphold our quality standards is the foundation on which we will keep moving forward.

**Thank you for your unwavering support!**



**Nikitas Kounadinis**  
FOUNDER



**Sofia Kounadini**  
DIRECTOR



**Joanna Kounadini**  
DIRECTOR



## What causes electrochemical corrosion?

Electrochemical corrosion occurs when two dissimilar metals are immersed in a conductive solution and are electrically connected or found in the same environment. One metal (the cathode) is protected, while the other (the anode) is corroded. The rate of attack on the anode is accelerated as ions flow from negatively charged metals to positively charged ones.

For instance, if aluminium and carbon steel are connected and immersed in seawater, the aluminium will corrode more quickly, while the steel will receive protection. The resulting electromotive force appears as voltage. This voltage is proportional to the flow of the ions and its increase directly affects the intensity of the electrolytic phenomenon.

The naturally occurring phenomenon of electrochemical corrosion can seriously undermine the structural integrity and expected service life of expensive equipment such as all kinds of metal structures (bridges, storage tanks, plumbing installations, household heating systems, industrial machinery, engine components, etc.)



01 Corrosion | 02 Copper Pipe | 03 Plastic Liner | 04 Dielectric Union | 05 Galvanized Pipe



# STOPCOR®

## method

**STOPCOR®** is an advanced impressed current system which provides cathodic protection without the need of an external power source or batteries. The protective current is naturally generated through a sacrificial magnesium anode and can be over -1V. **STOPCOR®** patented technology is an innovation in corrosion control, ideal for all kinds of metallic surfaces, such as plumbing, heating and cooling for both domestic and commercial equipment. Moreover, it has the ability to protect industrial facilities, pipelines, bridges and large scale building structures.



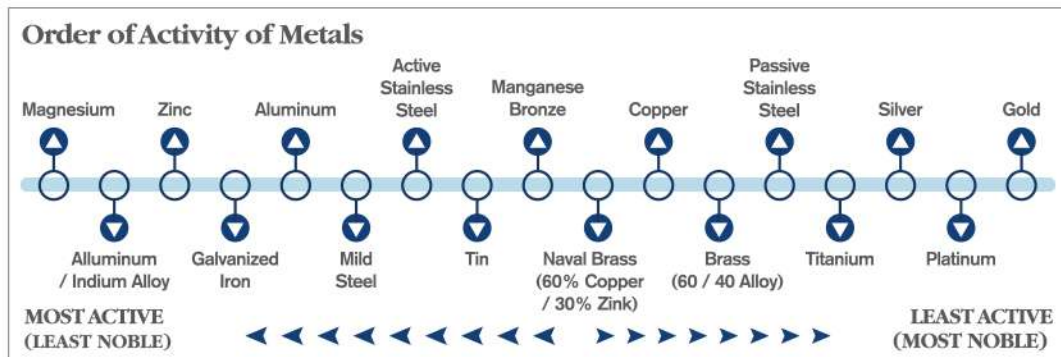
## Technical info

Cathodic protection is the most effective method of controlling corrosion. It is essentially an electrochemical process which halts the natural reaction (corrosion) of metals in a particular environment by superimposing an electrochemical cell more powerful than the corrosion cell.

The **STOPCOR®** method utilizes the impressed current generated by the sacrificial magnesium anode in the self-contained device. The impressed current covers and protects wide metal surfaces with much less sacrificed mass of active metal (anode). The current is direct (DC) and compatible with other metals since it is naturally generated. The negative charging of the protected metals is completely satisfactory, resulting in the surface which used to be an anode of galvanic element (i.e. negative oxidizing pole) becoming a cathode of an electrolytic cell (i.e. negative reducing pole). The protected surface remains negatively charged but its action is reversed and is now inclined to undergo reduction instead of oxidation. The impressed current must be over -0.8 volt but it must not exceed 10mA.

### Performance Index for Magnesium Alloy Metals High Potential

Aluminium	0.05 max
Zinc	0.3
Copper	0.02
Silicon	0,05 max
Manganese	0.5 – 1.5
Iron	0.03 max
Nickel	0.002 max
Magnesium	Remainder
Others (each)	0.03 max
Solution Potential	1.7 V
Output capacity amp hrs/per kg	1230



## What is Limescale?

The principal reason behind limescale deposits is the build-up of calcium and magnesium minerals in hard water. The formation of hard water takes place when rainwater filters through rocks like chalk, absorbing hard mineral substances in the process.

Essentially, limescale is a substance comprised of calcium and magnesium which is the residue of hard water evaporation. The end result is a hard, chalky deposit accumulating in high temperature or stagnant water. Not surprisingly, it is a common occurrence in equipment associated with hot water – for example in kitchen appliances such as kettles and also evident on faucets and shower heads.

Moreover, another point worth mentioning is that limescale deposits can be found within household plumbing installations including the inner surfaces of water supply pipes, in heating radiators, washing machines and dishwashers. In these cases where the problem is not visible, preventive action against limescale becomes a priority.





# STOPCOR® Reduces Limescale

**STOPCOR®** uses a technology that has been successfully applied in both domestic and commercial settings for over 20 years.

In their formal state scale crystals form in a complex structure and stick together. **STOPCOR®** imposes a direct current over  $-1V$  without the need of an external power source that changes the crystal form of limescale to a simple structure. It creates a magnetic field, thereby activating the Brownian movement in water which is the random movement of particles. The end result is that limescale loses its ability to stick and no longer forms deposits. It is simply washed away with water. The natural crystallization process builds up scale deposits which are simultaneously taken away by carbonic acid in the water. However, the problem lies in the fact that the rate of scale building up is faster than its removal by the carbonic acid.

**STOPCOR®** changes the balance of limescale and carbonic acid, thereby removing already existing deposits faster than they build up. This way the piping network gets cleaned and the plumbing and heating equipment is protected by the damaging effects of limescale accumulation.

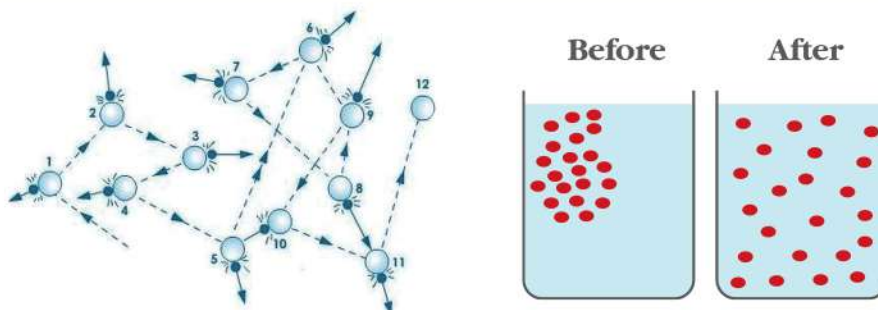
In addition, the water treated by **STOPCOR®** does not lose minerals, such as calcium and magnesium. The natural composition of the elements in the water remains the same. However, due to a change of the water surface tension, all plumbing parts such as taps and shower heads are scale free and the feeling on the skin is remarkably softer while taking a shower or even simply washing your hands.

Most importantly, limescale loses its adhesive property.  
**STOPCOR®** is an innovative and advanced water conditioner.

## Benefits

- 01 Easy external application 
- 02 No water contact 
- 03 No external power source 
- 04 Imposes current over  $-1.5V$  
- 05 Water treatment 
- 06 Eco friendly 

### Brownian Motion





## STOPCOR® Heater Pro 1 & 2

### Corrosion Control & Water Conditioner



**STOPCOR® Heater Pro** is an **All in One** product that has been meticulously engineered to control corrosion and reduce limescale. An innovation that can be easily installed in any existing plumbing or heating system. It has no water contact and does not require any external power source or batteries. It uses the scientifically proven method of cathodic protection, imposing protective current over  $-1V$  through a sacrificial magnesium anode.

**STOPCOR® Heater Pro** also functions as a water conditioner that can be installed on the water main supply and can cover the entire house. There are 2 different sizes for domestic use, **Pro1 & Pro2**. It can also be installed directly on the heating boiler to provide the ultimate protection of the heating system.

**STOPCOR®** deals with the root of the problem and eliminates all the effects such as leaks, sludge and limescale. There is a remarkable difference in water quality that is visible on the shower heads and in all plumbing equipment. Rest assured knowing that your property is safely protected against corrosion and limescale. Suitable for the drinking water pipes.

#### **All in One Protection for:**

Plumbing | Heating | Boilers | Cylinders | Gas Equipment | Pipes | Radiators  
Under floor Heating | Pipes | Shower heads | Taps



# Fitting Instructions

## STEP ONE:

Fit the **STOPCOR**<sup>®</sup> device inside the supplied mounting bracket and using the provided screws, securely fix it on a stable point on the wall near the main water supply or the heating boiler.

## STEP TWO:

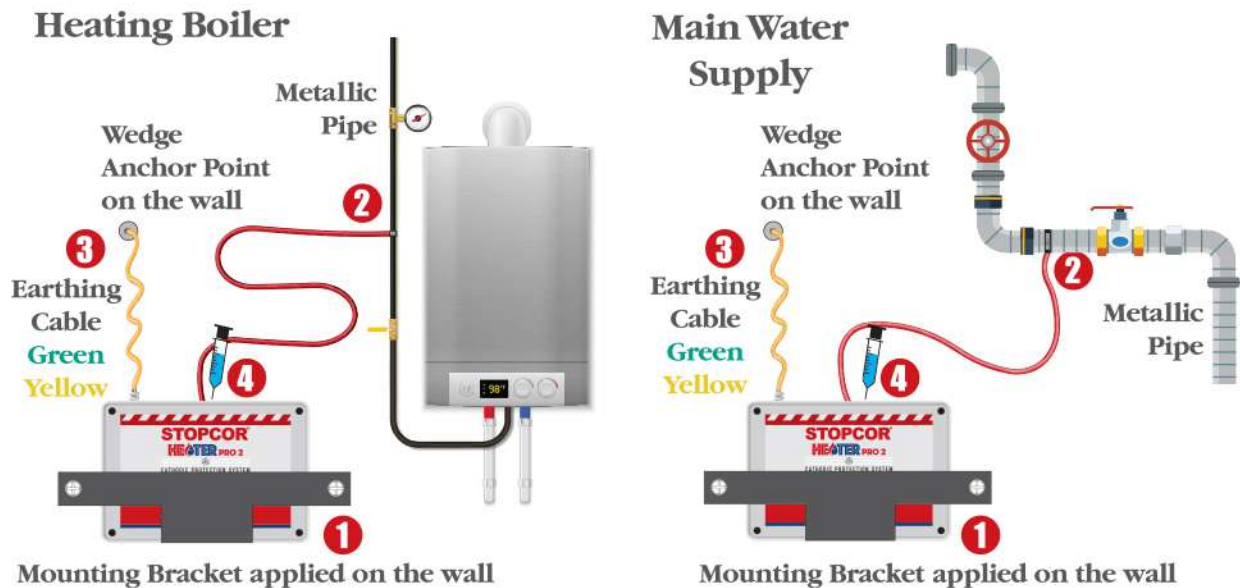
Connect the red cable on the upper side of the device (having exposed the copper wiring inside the cable) on a clean metal point of the pipe on the equipment using the jubilee clip provided, ensuring electrical conductivity.

## STEP THREE:

Using drilling tools, carefully drill a hole on the wall. This is meant to be the earthing point where the wedge anchor is secured. Connect the yellow/green cable attaching one end to the terminal pin on the **STOPCOR**<sup>®</sup> device and the other end to the wedge anchor on the wall.

## STEP FOUR:

Activate the device by adding **10 ml for Heater PRO 1** or **20 ml for Heater PRO 2** of tap water with the syringe into the hole on the top of the device.



## Maintenance

### STEP ONE:

Add 20 ml of water on the annual check.

### STEP TWO:

Test it with a voltmeter. It must be over -1V.

### STEP THREE:

Replace it after 3 years.

Following the above steps ensures the successful installation of the **STOPCOR**<sup>®</sup> Heater PRO 1 & 2 products.







## STOPCOR® Commercial Line

The innate complexity of large scale piping networks represents an entirely different challenge for the engineers. Electrochemical corrosion and limescale cause damage to all kinds of metallic equipment such as commercial plumbing and heating, gas pipes, stainless steel tanks, etc. The answer lies in utilizing the unique **STOPCOR® Commercial Line** patented technology while maximizing the protective potential of the sacrificial magnesium anode.

The **STOPCOR® Commercial Line** meets the varying demands of commercial facilities. There are 3 sizes available, **C5, C7, C9** depending on the equipment. **STOPCOR®** is an advanced impressed current system which provides cathodic protection through a sacrificial magnesium anode, without the need of an external power source and with no water contact. It imposes current over -1V which covers and protects wide metal surfaces with much less sacrificed mass of active metal (anode). The method has been tested for decades by cathodic protection professionals worldwide with excellent results in all cases.

**STOPCOR® C-Line** can be easily installed on the main water supply or directly on the equipment under protection. It is suitable for commercial buildings such as factories, hotels, schools, colleges, temples, houses over 6 bedrooms, commercial washing machines, water tanks, etc.



# Fitting Instructions

## STEP ONE:

Place the **STOPCOR®** device near the main water supply or the equipment under protection.

## STEPTWO:

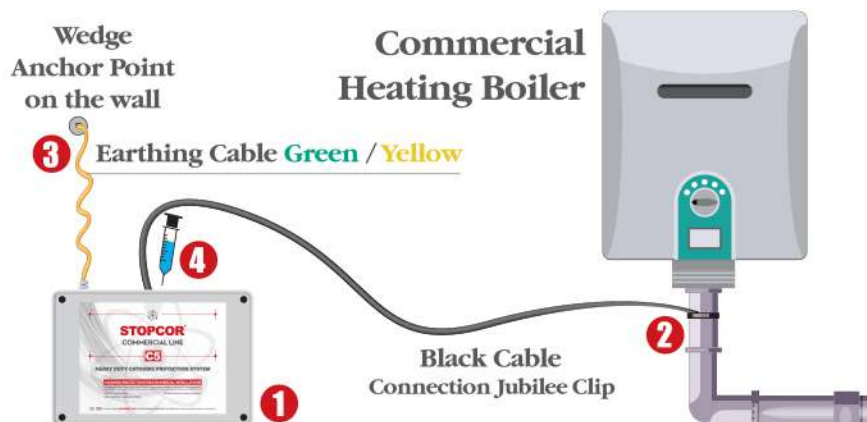
Connect the black cable on the upper side of the device (having exposed the copper wiring inside the cable on a clean metal point of the pipe on the equipment using the jubilee clip provided, ensuring electrical conductivity.

## STEP THREE:

Using drilling tools, carefully drill a hole on the wall. This is meant to be the earthing point where the wedge anchor is secured. Connect the yellow/green cable attaching one end to the terminal pin on the upper side of the **STOPCOR®** device and the other end to the wedge anchor on the wall.

## STEP FOUR:

Activate the device by adding tap water with the syringe into the hole on the top of the device as described in the instructions.



## Maintenance

### STEP ONE:

Add 30 ml water for C5,  
50 ml for C7 & 100 ml for C9,  
on the annual check.

### STEPTWO:

Test it with a voltmeter.  
It must be over -1V.

### STEP THREE:

Replace it  
after 3 years.

Following the above steps ensures the successful installation  
of the **STOPCOR® Commercial Line** products.







## Impressed current ICCP systems

Impressed current cathodic protection (ICCP) is a corrosion protection system comprised of sacrificial anodes connected to an external power source. The external DC power supply provides the current necessary to drive the electrochemical reaction required for cathodic protection to occur.

Using an arrangement of anodes-reference cells connected to a control panel, the system produces a more powerful external current to suppress the natural electro-chemical activity causing the dissolution-corrosion of metal.

ICCP systems utilize an external DC power source, a transformer rectifier, as well as a feedback control system. They can be self-regulating or manually adjusted. The objective is to ensure that the potential of the structure as measured by the Reference Electrodes is as close to the desired protection potential as possible.

Our extensive experience in manufacturing ICCP solutions for a wide range of large scale structures (i.e. pipelines, storage tanks, industrial installations) has allowed us the necessary expertise in order to create custom made ICCP systems tailored to the clients' individual requirements.

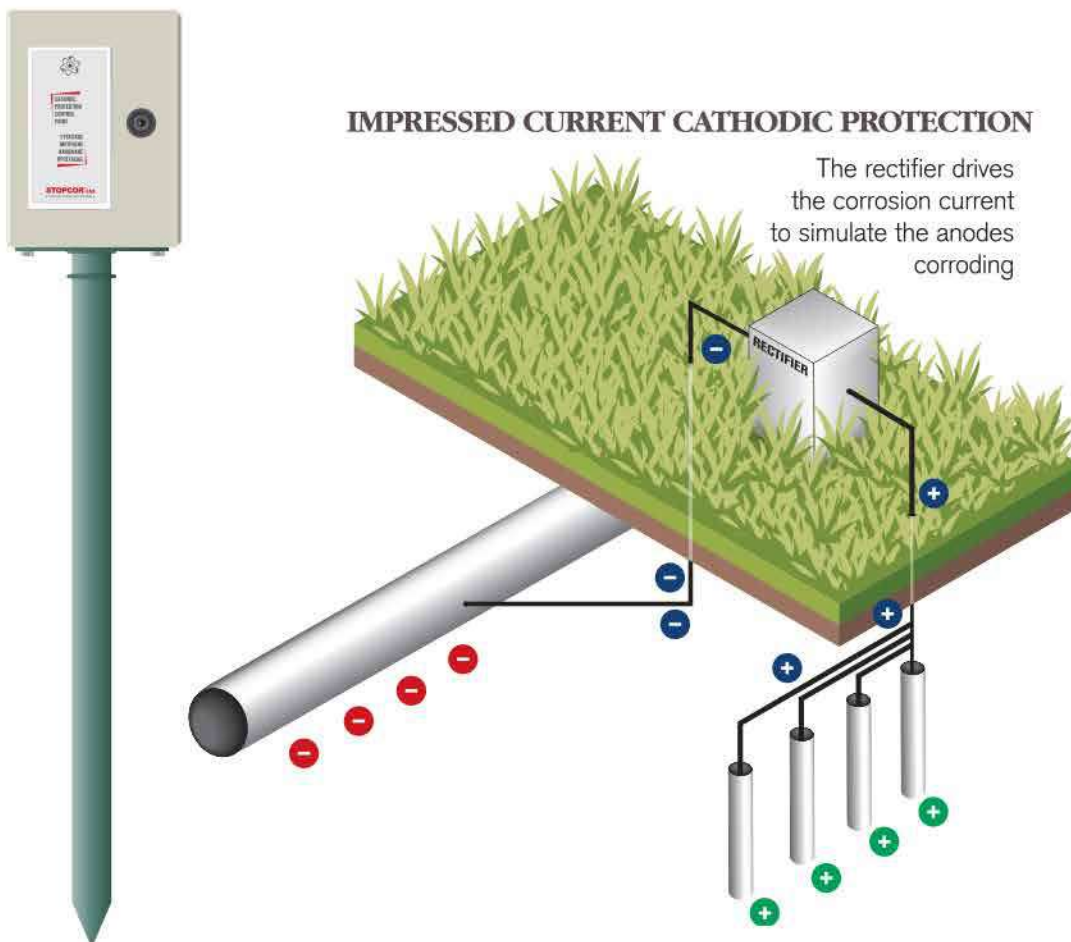




The benefit of utilizing an external power supply enables engineers to protect any given structure, through a combination of long-lasting anodes and electrical components with the appropriate specifications. The result is an ICCP (Impressed Current Cathodic Protection) unit purpose designed to safeguard an operator's investment against corrosion with an expected timeframe of protection of up to 20 years.

## Features

- 01 Fully automatic or manually adjusted power units
- 02 Reference electrodes of all types
- 03 Permanent titanium or niobium platinum-plated anodes
- 04 Insulating components / Welding systems





## STOPCOR<sup>®</sup> Boat

The **STOPCOR<sup>®</sup>** concept is based on the scientific method of impressing current through a sacrificial magnesium anode, adhering to the universal rules of cathodic protection.

**STOPCOR<sup>®</sup>** is an innovation because it naturally generates voltage over -1V and does not require mains or battery support.

The impressed current is DC, covering and protecting large metal surfaces with a much smaller sacrificial mass of active metal (anode). It negatively charges the metals through electron transfer, and while the surface was an anode of a galvanic cell, ie. a negative oxidative pole, it becomes a cathodic electrolytic cell, ie a negative reducing pole. The protected surface is still negatively charged but its action is reversed and it is predisposed to reduction rather than oxidation.

The **STOPCOR<sup>®</sup>** impressed current method creates a magnetic field and activates the Brownian Motion which prevents the accumulation of scale/sludge both inside and outside the piping.

# Fitting Instructions

## STEP ONE:

Position the **STOPCOR®** device on a fixed point (using the included mounting bracket) near the protected equipment.

## STEP TWO:

Connect the red cable (having revealed the copper wiring) to a clean metal point of the equipment pipe using the jubilee clip provided, ensuring electrical conductivity.

## STEP THREE:

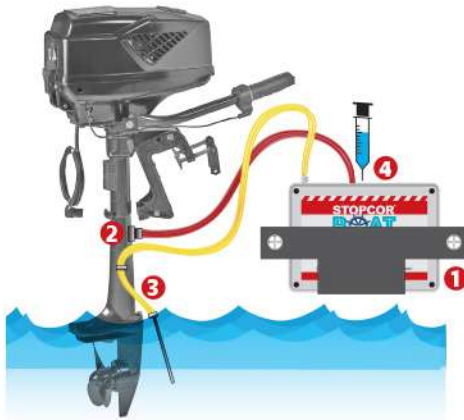
Connect the earthing cable, securing one end to the pin of the **STOPCOR®** device and the other to the threaded screw plug. Make sure the embedded titanium electrode is run by sea water, so that the circuit is closed.

In the case of outboard motors, the earthing electrode is a titanium rod being submerged in sea water and fitted at the stern of the boat.

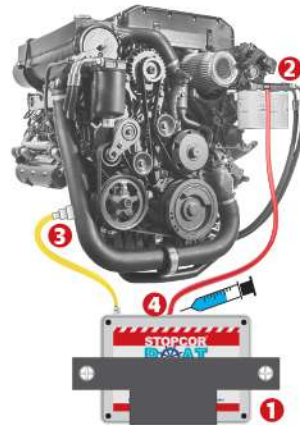
## STEP FOUR:

Activate the device by adding tap water with the syringe into the hole on the top of the device as described in the instructions.

### Outboard Engine



### Inboard Engine



## Maintenance

### STEP ONE:

Add 20 ml -100 ml of water on the annual check.

### STEP TWO:

Test it with a voltmeter. It must be over -1V.

### STEP THREE:

Replace it after 3 years.

Following the above steps ensures the successful installation of the **STOPCOR® Boat** products.







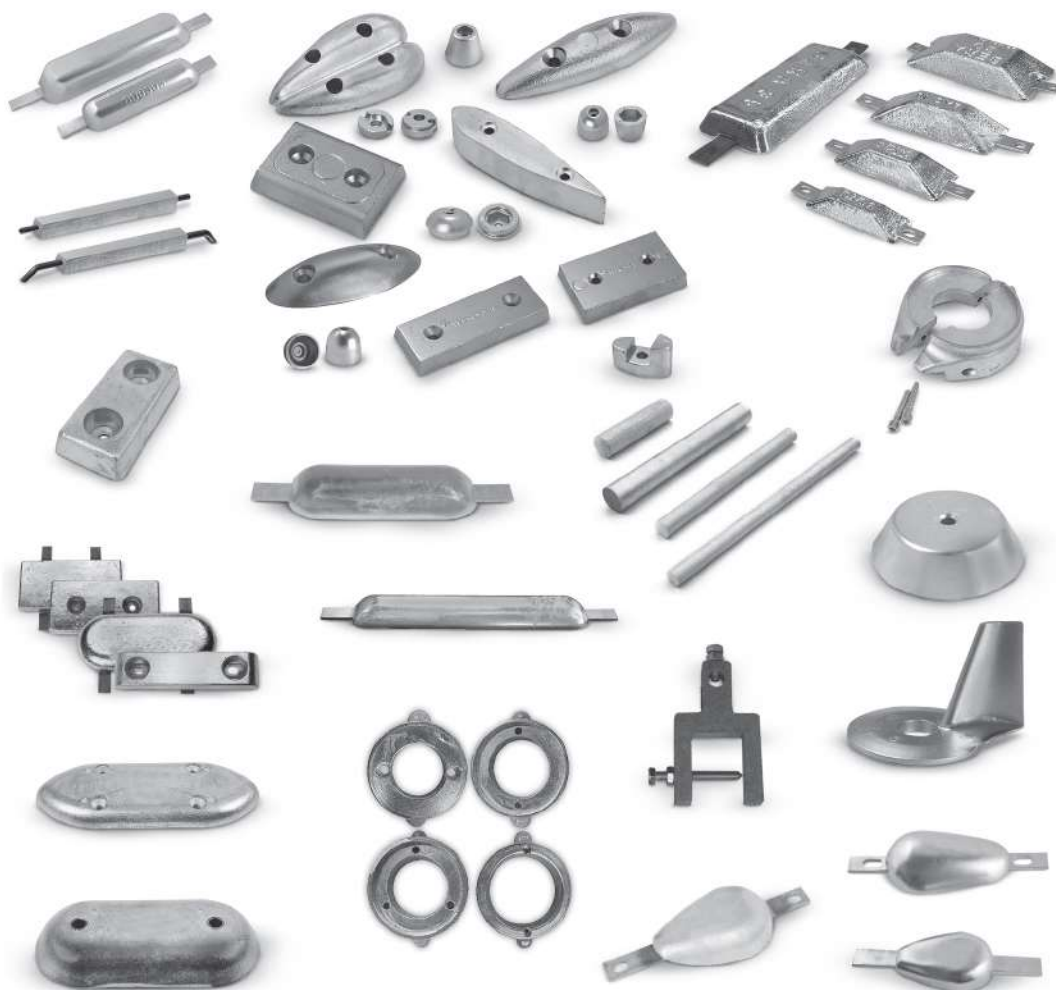
# Maritime Anodes

In order to avoid sustaining damages to the ships it is imperative that cathodic protection be applied, which is achieved by placing a mass of active metal in the same environment where corrosion takes place. The primary and most cost effective active metals are zinc, aluminium and magnesium.

All vessels operating in fresh, salt or brackish water are at risk from corrosion effects, necessitating the use of anodes manufactured to the strictest quality standards.

**STOPCOR®** maritime anodes are cast according to the US Military Alloy Specifications and are guaranteed to mitigate the corrosive effects on shipping components.

Corrosion is often identified as localized pitting to the hull plate (even below the paint coating), rudders or weld seams. This can ultimately lead to the complete penetration of the hull below the waterline, incurring expensive maintenance works.







## **STOPCOR<sup>®</sup>** Solar

### Corrosion Control and Protection

The life of a solar water heater may be seriously affected by electrochemical corrosion. The various types of metal and their constant exposure to harsh atmospheric conditions such as moisture and chlorides can cause serious structural failures in racking and mounting components, as well as the boiler itself.

**STOPCOR<sup>®</sup> Solar** is the most effective way to cease the corrosion process altogether. Utilizing a specifically designed Cathodic Protection device, the system is externally installed with no water contact, while being easily and instantly replaceable when the service life of the anode expires after 2 years.





Domestic Product Line	Specification of KW & Sqft
Heater Pro 1	20+ KW Boiler - 1-2 bedroom
Heater Pro 2	40+ KW Boiler - 3-5 bedroom



Commercial Product Line	Specification of KW & Sqft
COMMERCIAL C5	80 KW - 500lt - 2000 Sqft
COMMERCIAL C7	100 KW - 1000lt - 3500 Sqft
COMMERCIAL C9	280 KW - 2000lt - 5000 Sqft



Boat Engine & Parts Protection	Boat size (feet) or hp
STOPCOR BOAT A1	16Ft – 20Ft / 1 – 70 hp
STOPCOR BOAT A3	20Ft – 25Ft / 1 – 150 hp
STOPCOR BOAT A5	25Ft – 30Ft / 1 – 250 hp
STOPCOR BOAT A7	30Ft – 38Ft / 1 – 400 hp
STOPCOR BOAT A9	38Ft + / 400hp +



**Solar Water Heater Protection**

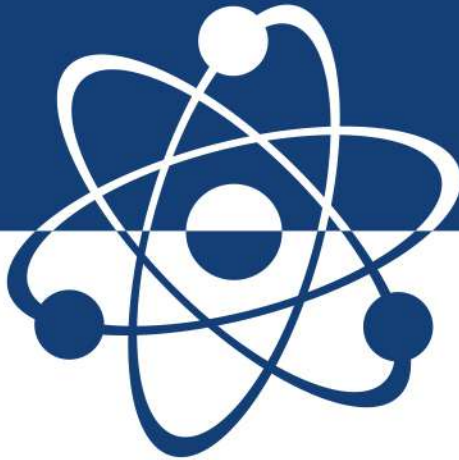
**STOPCOR SOLAR**











# STOPCOR<sup>®</sup> Ltd

• CATHODIC PROTECTION SYSTEMS •



6th floor, First Central 200, 2 Lakeside Drive, Park Royal  
London, NW10 7FQ, United Kingdom



0044 20 3697 4059



[www.stopcor.co.uk](http://www.stopcor.co.uk)



[info@stopcor.co.uk](mailto:info@stopcor.co.uk)