# Corrosion Control for Underwater Hull: Impressed Current Cathodic Protection System & Shaft Earthing system

50 YEARS PROVEN EXPERIENCE IN CATHODIC PROTECTION

JENNINGS ANODE

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Jennings Anodes

Marine ship undergoes corrosion in various aspects. To raise the level of corrosion suppression, impressed current cathodic protection (ICCP) system is considered to be an optimum solution —— fuel cost saving achieved by a smoother hull surface compared with sacrificial anode system.

The electrical potential is monitored by reference electrodes which are fitted at both port side and starboard side between the anodes and been reflected to the power supply unit. Thus the whole system could continuously defect the electrical potential at the hull/seawater interface and automatically adjust the protection level.

BEFORE

AFTER

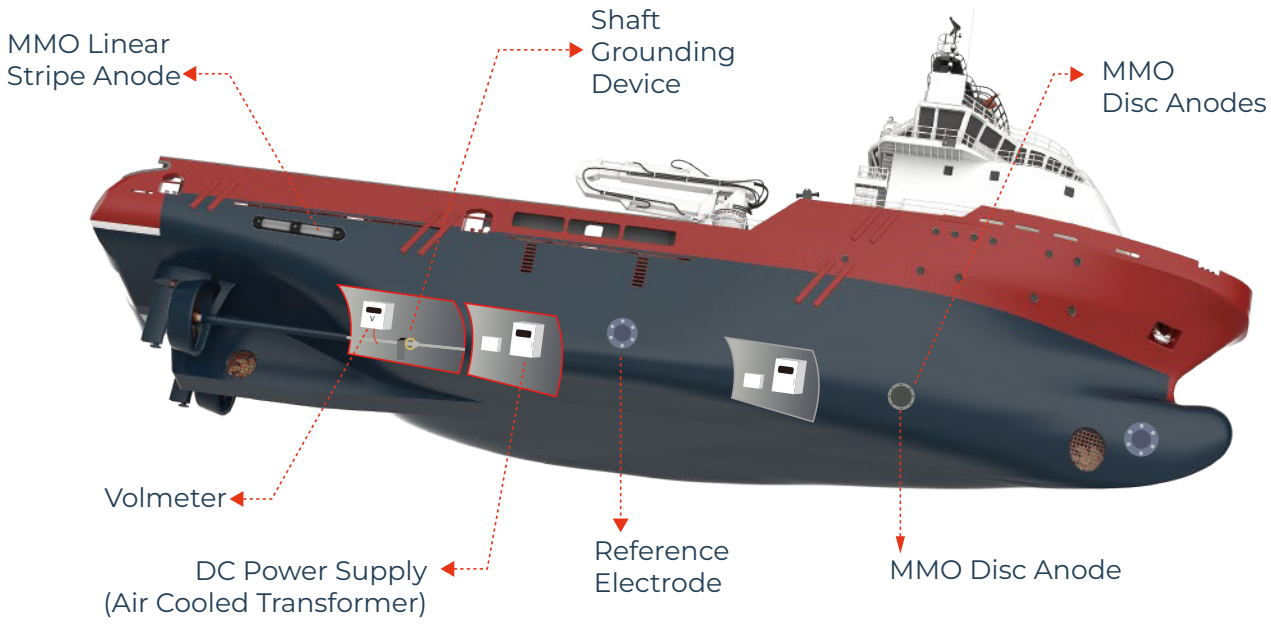
Fuel Saving

Longer Lifespan

Less Maintenance

Remote Monitoring

Automatic Adjustment



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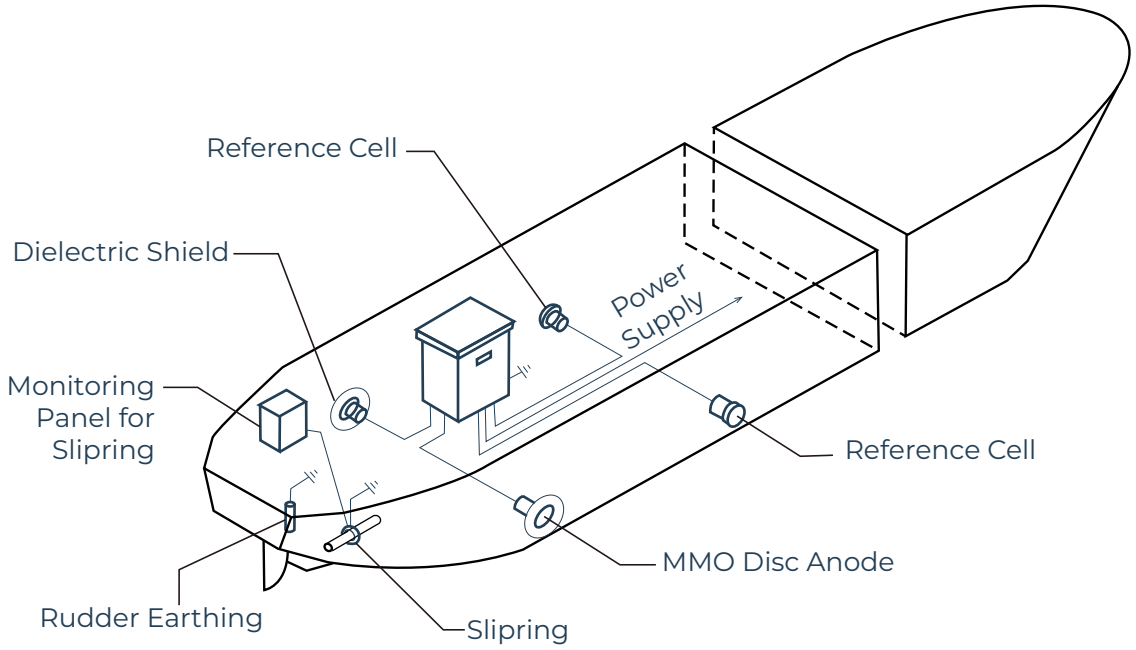
## INSTALLATION ILLUSTRATION




## MMO Disc Anodes

Shaped as a round/elliptical flat plate, this slim disc anode fits flush with the hull surface —— minimizing the water flow resistance and maintain the flow dynamics during voyages. Its low profile also avoids the problem of rubbing by anchor chains.

### Circular Shape

| Item No. | Diameter | Current (Nom./Max.) | Design Life |
|---|---|---|---|
| JA-MMO-VC500 | 196.9" (500 mm) | 118A / 195A | 25 yrs. |
| JA-MMO-VC400 | 157.8" (400 mm) | 75A / 125A | 25 yrs. |

### Oval Shape

| Item No. | Dimensions | Current (Nom./Max.) | Design Life |
|---|---|---|---|
| JA-MMO-VO430 | 169.3"x82.7" (430x210 mm) | 42.5A / 70A | 25 yrs. |

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## MMO Linear Stripe Anode

With a powerful output in relation to its surface area, the linear anode enables large vessels to be protected with fewer anodes. It may be installed on all types of vessels where anodes are positioned close to the engine room.

| Item No. | Dimensions | Current (Nom./Max.) | Design Life |
|---|---|---|---|
| JA-MMO-VL1510 | 594.5"x90.6" (1510x230 mm) | 60A / 100A | 25 yrs. |

## Recessed Type Zinc Reference Electrode

The reference cells are essential for measuring the electrical potential at the seawater/hull interface to provide an optimum degree of protection. The readings are fed back to the control panel, which automatically adjusts the current output to the anodes.

| Item No. | JA-ZRE-RT1 |
|---|---|
| Substrate | Zinc (Purity>99.996%) |
| Electrode Potential | -1.042V (vs. Saturated Calomel Electrode) |
| Potential Fluctuation | <0.015V |
| Insulation Properties | 180 MΩ |
| Water Tightness | withstand 196kPa water pressure > 15mins |

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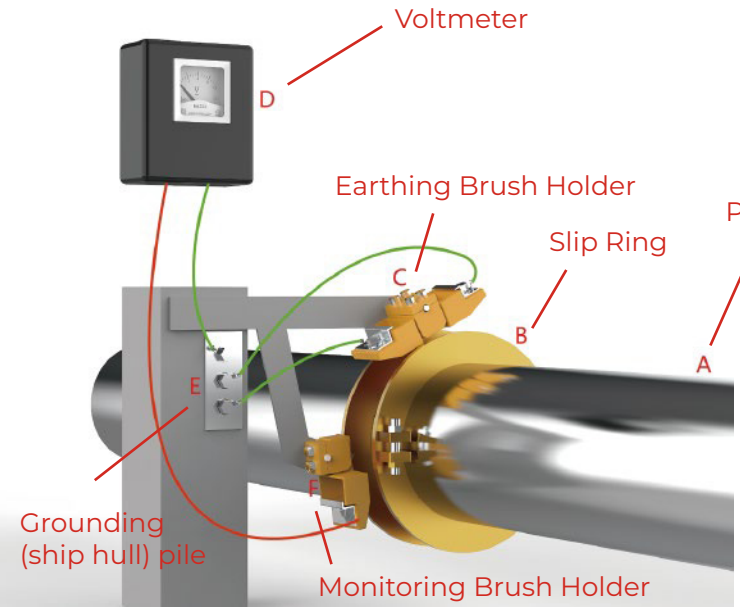
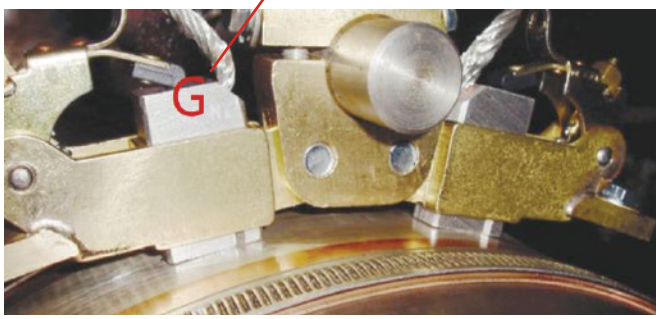
## Shaft Earthing Device

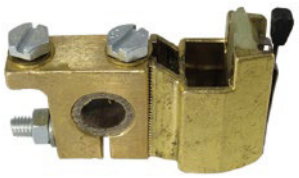
Earthing the propeller shaft to the ship's hull prevents corrosion and spark erosion in the shaft bearings and gearboxes. The earthing is provided by spring loaded silver graphite brushes, and monitored by a compact mV meter. The system consists of a slip ring, brush holder, silver brush and voltmeter.



### Slip Ring

Silver Content: >85%
Lifespan: >20 years



### Monitoring Brush Holder

Part of propeller shaft earthing monitoring set

### Silver Graphite Brush

Silver Content: >85%
Lifespan: >1 years

### Earthing Brush Holder

Double balancing earthing brush holder with pressure setting

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## Power Supply Unit

FUNCTIONS

- Auto/Manual switching
- Overload protection
- Alarm

| Item No. | JA-PSU-1 |
|---|---|
| Power Sources | AC 220V/110V(±10%), 50Hz(±5%) |
| Output Voltage | 0~24V |
| Output Current | 0~600A |
| Output Phase | Single |
| Ripple Coefficient | ≤5% |
| Designated Potential | -3000mV ~ 3000mV |
| Working Temperature | -15℃~45℃ |
| Fixed-potential Accuracy | ≤20mV |
| Fixed-current Accuracy | ≤1% |
| Working Efficiency | ≥80% |
| Insulation Resistance | >1MΩ |
| IP Level | IP44 |

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