

Some RetroClamp Applications



ROV Clamp

This is the "standard" RetroClamp, fitted with a fish-tail handle for the ROV to manipulate. Connection cables not shown. RetroClamp can be connected to any form of anode sled (RetroPod and RetroClamp pictured below).



Diver Clamp

Fitted with a T-Handle (shown) or a standard hex head, the RetroClamp is easily applied by divers to platform members or pipelines to replace sacrificial anode material. Once attached to the member, the diver rotates the T-Handle until electrical contact is made. Connection cable shown.



SmartStation

This double-clamp is used to mount long-term monitoring instruments (DR-2 dual reference electrode shown) as a part of a larger monitoring system, or to mount spot anodes to bottom-laid or buried pipelines. Double clamps provide a reliable and redundant pipe connection system.



SmartClamp

The SmartClamp is a self-contained CP monitoring unit. The RetroClamp is fitted with a V-String zinc reference, as well as a SunStation readout. Easily ROV-installed on any tubular or flowline, the SmartClamp provides CP readings to the ROV, which interrogates it.



V-String

The RetroClamp shown here is fitted with a V-String zinc reference electrode, which is to be hard-wired to the surface as part of a permanent monitoring system on an offshore platform, to be interrogated from the surface.

Contact Details

Deepwater Corrosion Services Inc.

10851 Train Court, Houston, TX 77041

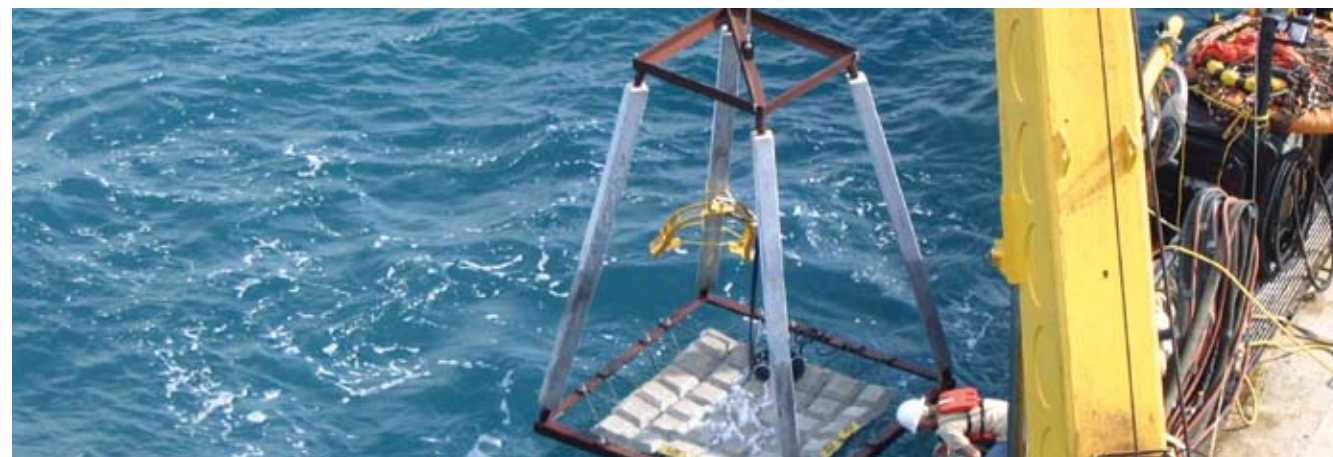
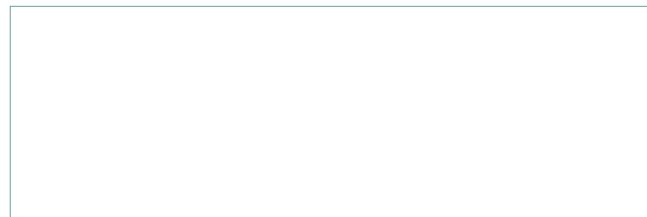
Telephone +1 713 983 7117

Fax +1 713 983 8858

Email sales@stoprust.com

www.stoprust.com

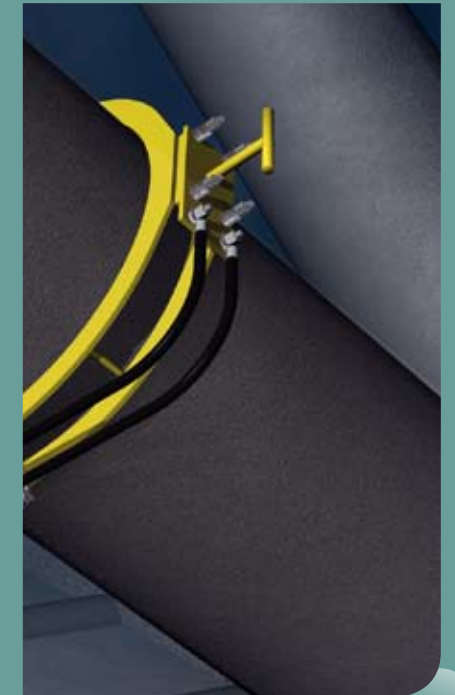
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Deepwater Corrosion Services Inc.

Subsea ROV-Installed Clamping System for Tubulars and Pipelines

RETROCLAMP



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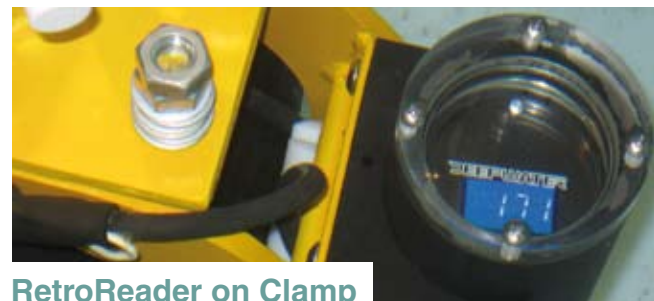
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Overview

The RetroClamp was originally designed to facilitate ROV attachment of retrofitted cathodic protection anode sleds to offshore pipelines. The first clamps were built and deployed in 2000 and since that time the clamp has been adapted and improved significantly, both for strength and versatility. Thousands of RetroClamps have been successfully installed by divers and ROV's for a wide variety of applications, including attachment to wellheads, vessels, and large diameter members.

The large majority of RetroClamps are still used for electrically connecting anodes to tubular platform members and pipelines, but Deepwater has begun using a modified version of the clamp for attaching our Polatrak brand of CP monitoring equipment (see applications). The RetroClamp has also proven incredibly useful for securing subsea cable runs; It is essentially this adaptability that has made the RetroClamp so prolific among Deepwater's cathodic protection and monitoring systems.

The versatility, low cost and ease of installation make the RetroClamp a potential solution to a host of other subsea retrofitted applications. For inquiries into additional application in which the RetroClamp might prove useful, please contact Deepwater.



RetroReader on Clamp



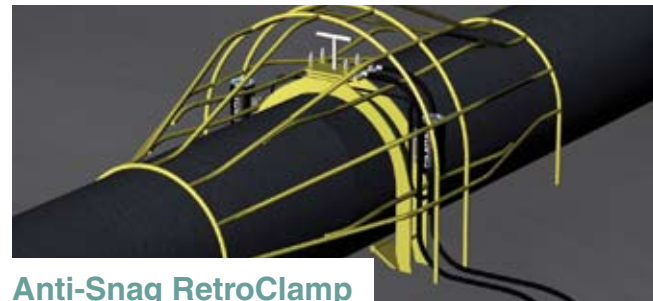
Packaging

Key design points

1. The simple push and twist installation means that the clamp is usually installed in minutes; the unique design of the spring tensioned floating plate ensures that the low resistance electrical contact is maintained under constant tension.
2. The open bottom configuration ensures that the clamp will pull off a pipeline if snagged without inflicting damage to the pipeline.
3. The clamp can be configured with a range of contact tips that allow the clamp to be attached without cleaning or coatings removal in most cases, even concrete weight coatings can be penetrated, saving a significant amount of time and effort during pipeline life extensions.

The available RetroReader system allows instant verification that the desired electrical contact has been established, this is particularly useful when working on coated pipelines. The voltage readout is temporarily attached to the clamp, and a small magnesium button provides the voltage shift needed for instant contact verification.

The rugged airtight packaging for each clamp allows us to send multiple sizes offshore when specific target member diameters are not known. We can accept un-opened packages back for a full credit.



Anti-Snag RetroClamp



Applications

1. Connecting sacrificial anode arrays (RetroPod, RetroSled, CP Mat) to offshore pipelines, platforms and subsea systems. (RetroPod pictured)
2. As a stand alone local anode retrofit system, where one or two clamps actually support the anode material, allowing rapid and cost effective deployment of additional cathodic protection to subsea structures
3. As a support for retrofitted cathodic protection monitoring instruments (POLATRAK V-String, DR-2, DR-2 CD) which may be self contained as in the SmartClamp, or hard wired to a remote location as in the SmartStation offshore pipeline test point. (DR-2, SmartClamp and V-String pictured).
4. To retrofit potential test station (permanent reference electrode) to wetland pipelines, this can usually be accomplished from the surface without diver intervention or the need for expensive cofferdams. (not pictured)
5. To establish electrical continuity across isolated subsea components for the purpose of cathodic protection. (not pictured)
6. As a retrofitted cable support system where cables have to be routed subsea in a controlled fashion. (not pictured)



Additional Information

Clamps are easily customized to fit any diameter from 4" thru 60".

Designs are available to fit most structural shapes and configurations including, plate or beam edge, square tubing etc.

Anti-Snag designs are available in areas with extensive fishing activity (pictures on opposite page).

Various contact tips are available to accommodate a variety of situations:

Standard Pointed Tip – Use on structural or non stressed areas where a small indentation is not a problem.

Slotted Volcano Tip – Use on pressurized structures or pipelines with thin film coatings, or where coating removal is anticipated.

Masonry Cutting Tip – Use to cut through concrete weight coatings with RetroReader, to verify connection.

Drift Awl Tip – Use for thick film multi-layered coatings or thermally insulating elastomeric or synactic coatings (also for use with the RetroReader).

Isolated Plug Tip – Use to electrically isolate the clamp.

