



## RETROCLAMP™ ELECTROMECHANICAL CLAMP INSTALLED BY DIVERS OR ROV

**RetroClamps can be installed by diver or ROV, making them useful for anode retrofits at any depth.**

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 for strength and versatility. Thousands of RetroClamps have been successfully installed by divers and ROVs for a wide variety of applications, including attachment to wellheads, vessels, and large-diameter tubular members.

The large majority of RetroClamps are still used for electrically connecting aluminum anodes to tubular platform members and pipelines, but Deepwater has begun using modified versions of the clamp for subsea cable runs and for attaching monitoring equipment to verify cathodic-protection system performance (see applications). This adaptability has made the use of RetroClamps widespread among Deepwater's cathodic protection and monitoring systems.

Versatility, low cost and ease of installation make the RetroClamp a potential solution to a host of other subsea-retrofit uses. For inquiries into additional applications where the RetroClamp might prove useful, please contact Deepwater.

### Fast and easy installation

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. The clamp can be configured with a range of contact tips that allow it 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 installation.

### Large anode retrofit projects

Connecting sacrificial anode arrays (Retropod, Retrosled, CP Mat) to offshore pipelines, platforms and subsea systems is quick and cost-effective with the RetroClamp. The clamp can be fitted to a partially-buried pipeline by exposing only 120 degrees of the pipe. A concrete drilling bit can be attached to the contact tip, so concrete weight coats are no problem for the ROV or diver to get through. For platforms, the clamp is usually attached to a diagonal member near the bottom. Pictured right is a standard pipeline anode retrofit with divers.

### Smaller anode retrofits

The RetroClamp can actually be a stand-alone local anode retrofit system, where one or two clamps support the anode material. This allows rapid and cost-effective deployment of additional cathodic protection to subsea structures. It's most effective as supplemental CP during routine ROV pipeline work.

### Subsea cable support

The weld-on topside suspension assembly can be attached to horizontal or vertical members, and the isolator can have links for protecting offshore risers. Links can be attached subsea using a modified hang-off. A new clamp-on support is also available, complete with I-Rod® Clips to prevent crevice corrosion.

More info at [www.stoprust.com](http://www.stoprust.com)



**ROV INSTALLATION**  
RetroClamp on a deep-water flowline, retrofitted by ROV.



**RED SEA**  
RetroClamp on a platform member, connecting RetroPod anode sleds.



**NORTH SEA**  
RetroClamp (with connection verification system) on a pipeline anode sled.

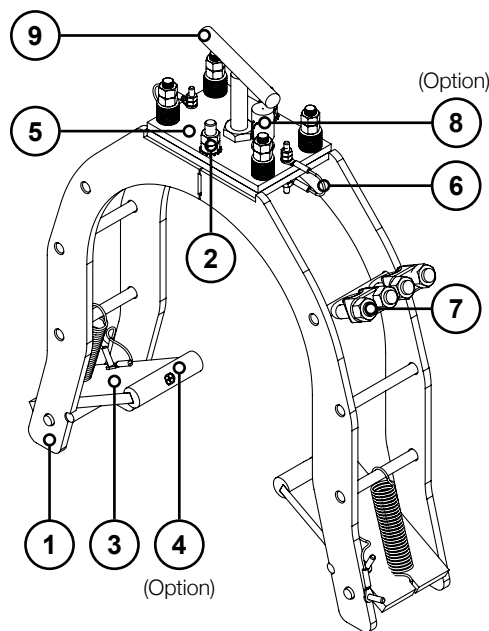


## Technical datasheet

# RetroClamp

### General

RetroClamp is designed to provide a constant-tension electromechanical connection to metallic subsea tubulars. It may be used to connect galvanic anodes, support monitoring instruments or establish electrical continuity between two subsea metallic entities. RetroClamp is designed to be installed by diver or ROV. RetroClamp is available for installation on all pipe diameters from 4" to 65" with custom sizes available upon request.



### Frame (Item 1)

Steel grade	ASTM A36 [ EN 10025 S355 ]
Steel thickness	3/8" [ 9.5 mm ] Plate
Fulcrums & spacers	Ø 1/2" Rod [ Ø 12.7 mm ]
Fasteners	SS316 and Zinc Plated Carbon Steel
Cable connection (Item 2)	2 x Ø 1/2" [ M12 ] Stud

### RetroClamp

ASTM A36 [ EN 10025 S355 ]
3/8" [ 9.5 mm ] Plate
Ø 1/2" Rod [ Ø 12.7 mm ]
SS316 and Zinc Plated Carbon Steel
2 x Ø 1/2" [ M12 ] Stud

### RetroClamp HD

ASTM A36 [ EN 10025 S355 ]
3/8" [ 9.5 mm ] Plate
Ø 3/4" Rod [ Ø 19 mm ]
SS316 and Zinc Plated Carbon Steel
2 x Ø 1/2" [ M12 ] Stud

### Features

#### Flappers (Item 3)

Tensioned by springs to allow easy installation onto tubular assets. In the event of snagging, flappers are designed to fail to prevent damage to asset. Can be fitted with pipeline protectors if required (Item 4).

#### Floating plate (Item 5)

Spring-tensioned by Belleville spring washers to ensure the low-resistance electrical contact is maintained under constant pressure.

#### Continuity (Item 6)

Electrical continuity throughout RetroClamp provided by SS316 bonding cable with swaged connector lug (4 required)

#### Cable grip (Item 7)

Provides strain relief and routing for the anode connection cables

#### Floating plate separation indicator (Item 8)

Indicates floating plate separation when visibility is obstructed (option)

#### Contact screw (Item 9)

The contact screw runs through the floating plate and establishes electrical continuity with the target member or pipeline; it is tensioned against the Belleville spring washers. The user interface for the contact screw is customised to suit the installation requirements, i.e. diver or ROV installation.

#### User interface options (Constructed from Stainless Steel 316)

Rigid tee handle (Diver or ROV installation)	Ø 3/4" [ Ø 19 mm ] Length to suit installation - 6" [ 152 mm ] long handle as standard
Fish handle (ROV installation)	3/4" [ 19 mm ] Plate
Hexagonal head (Diver installation)*	Ø 3/4" [ Ø 19 mm ] Length to suit installation

\*To drive the hexagonal head, removable handles with socket attachments are provided

### Contact tip options

The contact tip is selected based on the target structure and coating.

#### Target structure and coating

Target structure and coating	Contact tip
Structural connections (Bare steel or painted)	Ø 3/4"-10 Stainless Steel 316 45° point tip
Pipelines with thin film coatings (<6 mm) or Pipelines with Concrete Weight Coating (CWC) (Concrete pre-removed)	Ø 3/4"-10 Stainless Steel 316 Volcano tip with transverse slot
Pipelines with Concrete Weight Coating (CWC) (Diver only)	Ø 5/8"-18 Stainless Steel 316 driver Tungsten-Carbide concrete piercing masonry bit

#### Plate separator

Recommended Maximum

	6mm	10mm
	6mm	10mm
	8mm	10mm



## Technical datasheet

### Coating

Frame and flappers coated with submersion service epoxy - safety yellow

### Anode connection cables

4/0 AWG [ ~107 mm<sup>2</sup> ], EPDM insulated, heavy duty flexible cable  
 2 per RetroClamp  
 Supplied in standard cable lengths of 25' [ 7.5 m ] or 40' [ 12 m ]. Custom sizes available upon request.  
 Strain-relieved by 5/8" [ 16 mm ] galvanised malleable wire rope clips.

### Anode connection cables weight (dual cables)

Length	Weight (air)	Weight (water)
2 x 25' [ 2 x 7.5 m ]	50 lb [ 22.8 kg ]	38 lb [ 17.2 kg ]
2 x 40' [ 2 x 12 m ]	80 lb [ 36.4 kg ]	60 lb [ 27.6 kg ]

### Packaging

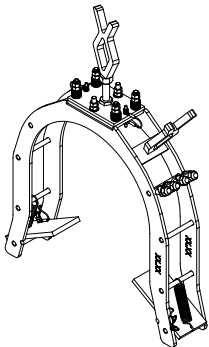
Each RetroClamp is hermetically sealed in a plastic inner envelope and packaged in a wooden crate (fumigated for international shipments).  
 May be packed in multiple quantities if required (bulk crating)  
 If RetroClamp is to be supplied on a returnable consignment, individual packing is required.

### Clamp weights and dimensions\*

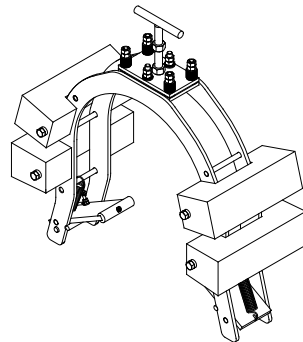
Pipe OD**	Weight (air)	Weight (water)
4"	28 lb [ 12.5 kg ]	24 lb [ 10.9 kg ]
6"	32 lb [ 14.3 kg ]	28 lb [ 12.5 kg ]
8"	35 lb [ 15.9 kg ]	31 lb [ 13.9 kg ]
10"	36 lb [ 16.6 kg ]	32 lb [ 14.5 kg ]
12"	38 lb [ 17.3 kg ]	33 lb [ 15.0 kg ]
14"	40 lb [ 18.0 kg ]	34 lb [ 15.6 kg ]
16"	41 lb [ 18.6 kg ]	40 lb [ 16.2 kg ]
18"	47 lb [ 21.1 kg ]	41 lb [ 18.4 kg ]
20"	48 lb [ 21.8 kg ]	42 lb [ 19.0 kg ]
22"	50 lb [ 22.7 kg ]	44 lb [ 19.8 kg ]
24"	52 lb [ 23.6 kg ]	45 lb [ 20.6 kg ]
26"	54 lb [ 24.5 kg ]	47 lb [ 21.4 kg ]
28"	57 lb [ 25.7 kg ]	49 lb [ 22.4 kg ]
30"	60 lb [ 27.2 kg ]	52 lb [ 23.8 kg ]
36"	75 lb [ 34.0 kg ]	65 lb [ 29.7 kg ]
46"	116 lb [ 52.7 kg ]	101 lb [ 45.9 kg ]

### RetroClamp variations and accessories

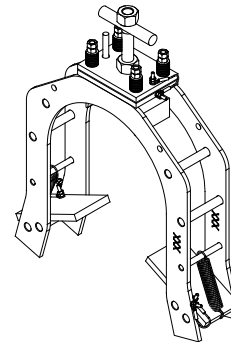
RetroClamp is available with a variety of accessories to suit many applications. Please contact Deepwater for further details on RetroClamp solutions.



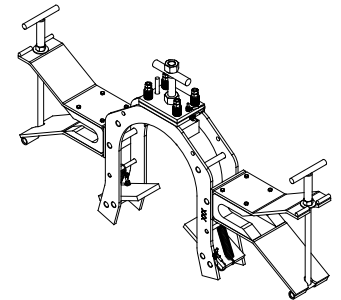
**RetroClamp with ROV Grab Handle**  
To aid ROV installations



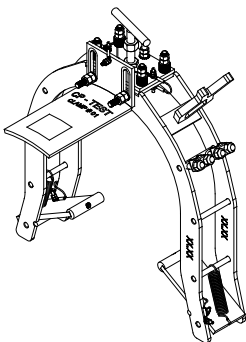
**RetroClamp CP**  
For fast, localised CP retrofits  
(See RetroClamp CP Technical Datasheet)



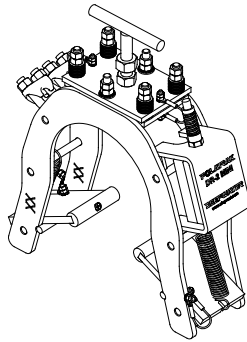
**RetroClamp HD**  
Suitable for heavy-duty applications



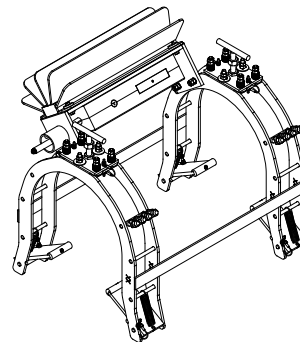
**RetroClamp HD with dual cable grips**  
For subsea cable routing



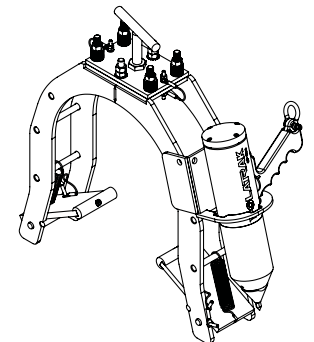
**RetroClamp with CP Stab Plate**  
For pipeline potential stab measurements and location markers



**RetroClamp with DR-2 Mini**  
For retrofit monitoring attachment  
(See DR-2 Mini Technical Datasheet)



**RetroClamp with DR-2 CD**  
For retrofit monitoring attachment  
(See DR-2 Technical Datasheet)



**RetroClamp with CP Gun**  
CP Gun interface used with CWC to verify pipe contact  
Diver installation only  
(See CWC installation procedure)