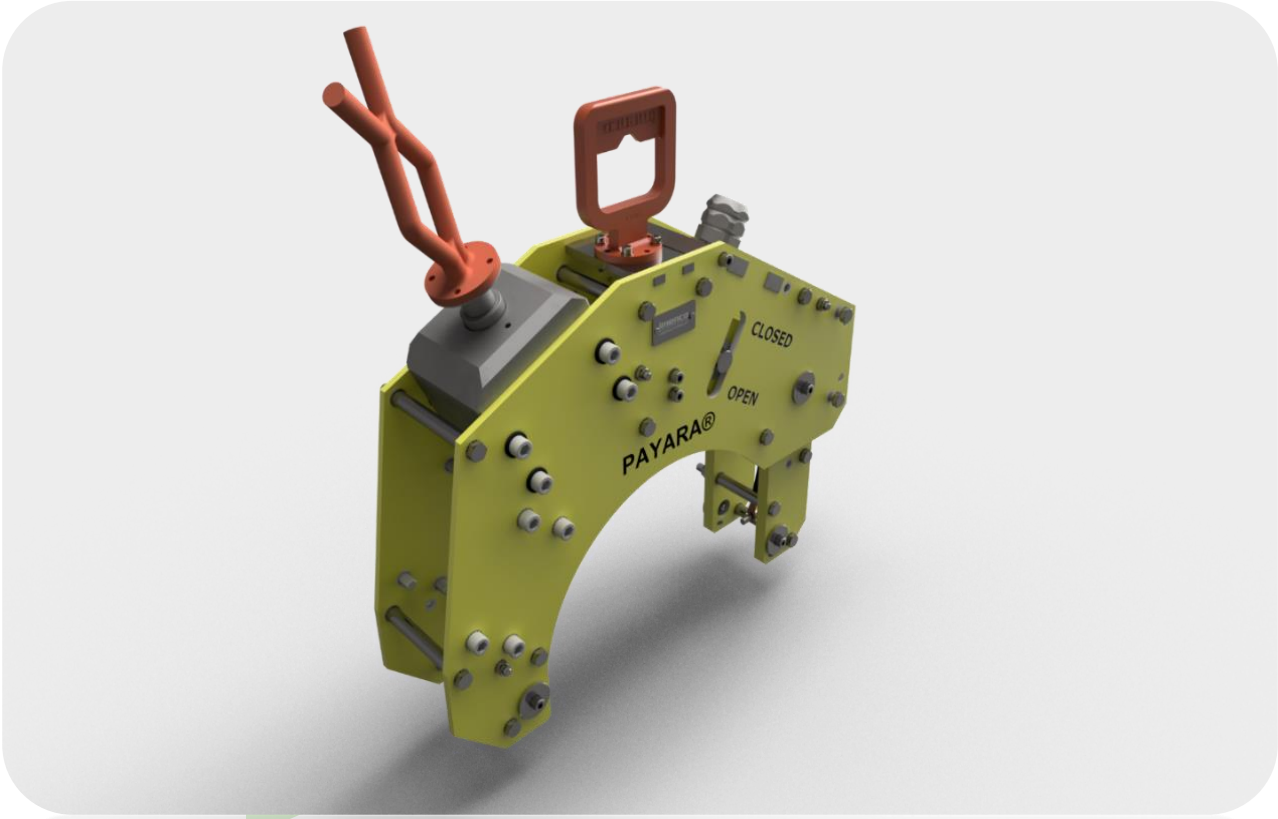
RETROFIT ANODE
PAYARA® PIPELINE CLAMP



Payara® CP Retrofit Electrical Continuity Clamp provides a strong mechanical grip and very low resistance electrical connection between a subsea pipeline/tubular and sacrificial anodes. Payara® clamp can also be used for attaching monitoring sensors to a pipeline.

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Intelligence built in

Payara® literally bites into the steel through marine growth and coated surfaces. Standardized Payara clamp with Jaws can be used on bare pipelines or pipelines coated with Epoxy based anti-corrosion paints of thickness up to 1 to 3 mm. For thick coated (insulated with polypropylene or polyethylene and concrete weight coated) pipelines, we include a contact box for establishing an electrical connection. When installed with contact box, clamp provides mechanical connection and a screw bolt in the contact box provides electrical connection.

With flexibility in mind, Payara® supports electrical continuity cables from 16-240 mm2 for connecting anode banks/anode sleds to offshore pipelines. When needed, the cables can be fitted with a bend stiffener to protect the cable termination on the Payara® from cyclic loads. For smaller systems, Payara® can have anodes directly attached, providing a complete cathodic protection system as one small unit.

Payara® is designed to bite onto a pipeline, it will grip just above 180 degrees to ensure good electrical contact and to avoid unnecessary excavations of the seabed.

With an active cathodic protection system, Payara® is designed to last for minimum of 30 years. The clamp is guided into place by a ROV/Diver and tensioned with a torque tool to ensure a reliable and fast installation. Sacrificial Anodes may be attached directly to the clamp, or by an earthing cable to an anode sled.

Features

- Compact design and easy to handle and install
- Very low resistance electrical connection
- Excellent mechanical grip to withstand harsh subsea environment.
- Designed for a variety of pipeline sizes and coating conditions.
- Integrated digital device for real-time onsite installation verification.
- Minimum design life of 30 years.

Advantages

- Very fast installation by ROV/Diver
- Anode attachment flexibility
- Sensor attachment flexibility
- Can be easily removed
- Provides long lasting electrical connection.
- Water depths up to 6000 m.

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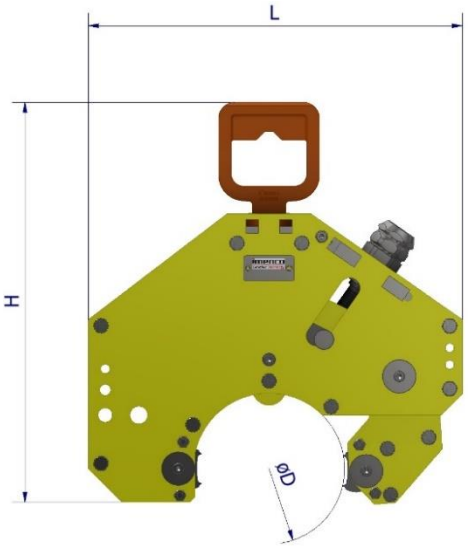
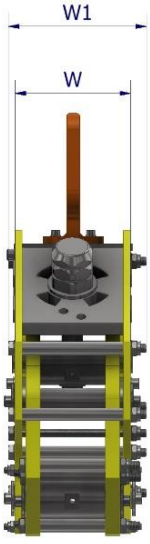
Payara® can be custom designed for any pipeline/tubular sizes. Some design examples:

Clamp Type	Pipe Size"	Clamp Dimensions (mm)				
		H	L	W	W1	øD
Payara®	6"	TBA	TBA	TBA	TBA	152,4
Payara®	8"	TBA	TBA	TBA	TBA	203,2
Payara®	10"	TBA	TBA	TBA	TBA	254
Payara®	12"	TBA	TBA	TBA	TBA	304,8
Payara®	14"	TBA	TBA	TBA	TBA	355,6
Payara®	16"	TBA	TBA	TBA	TBA	406,4
Payara®	18"	TBA	TBA	TBA	TBA	457,2
Payara®	20"	TBA	TBA	TBA	TBA	508
Payara®	22"	TBA	TBA	TBA	TBA	558,8
Payara®	24"	TBA	TBA	TBA	TBA	609,9





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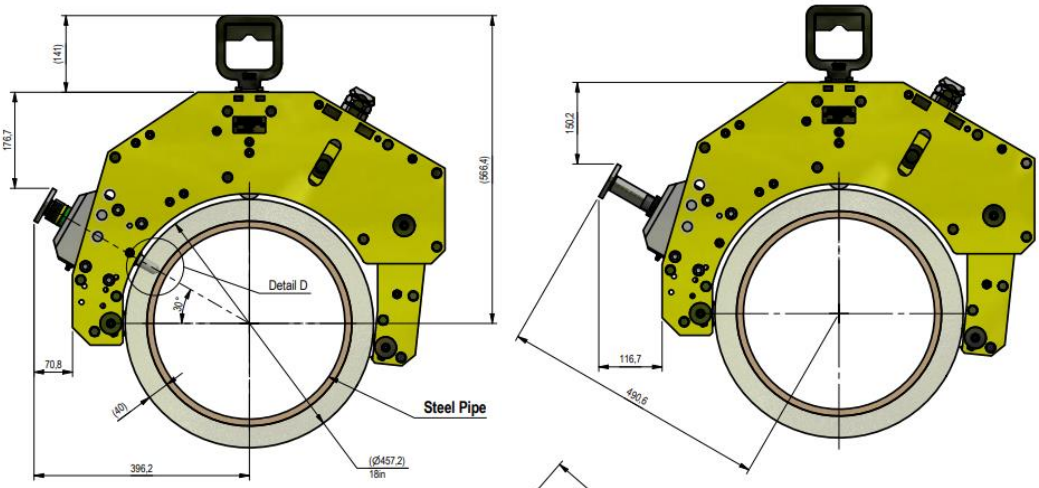
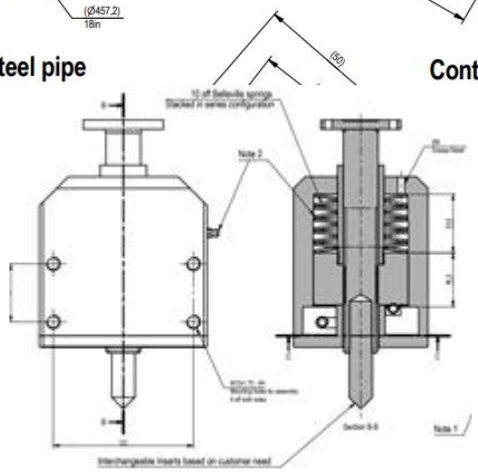
Separate contact box integrated into Payara Clamp: (Optional)

For thicker coatings (concrete, bitumen, insulation etc. we have developed a separate optional contact box with a range of possible contact tips adapted to the specific coating type and dimensions.

This contact box is equipped with a ROV handle (T-handle, D-handle or fish-tail handle) in accordance with client's preference. It is operated by the ROV's rotation function on the manipulator. The contact box contains a series of Bellville springs. The springs push against a square sliding nut, and the force between the contact tip and the pipe is directly proportional to the compression of the springs and with a given compression – it will stay constant.

The contact box is equipped with a color-coded indicator that will give a clear visual indication of compression and thereby force. The springs are located inside a small compartment filled with marine grease that prevents any corrosion of the springs and thereby ensures that the pressure is kept constant as long as it is installed.





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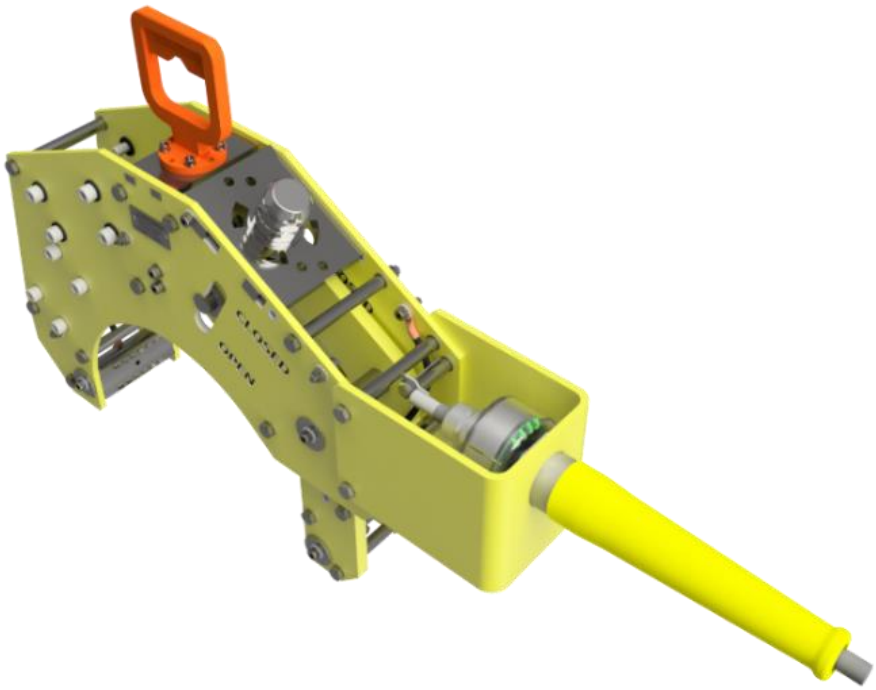
Installation Verification Device

Imenco Clamp Installation Verification Device is integrated into clamp at the clamp/cable interface to confirm that electrical connection is established between the clamp and the subject material/pipe. This works with measuring the electrical current (amps) running through the cable from anode sled/anode bank or rectifier unit. Once the clamp has established electrical connection (closed circuit) between the anodes and subject material, this will cause electrical current to run through the cable.

Using Hall Effect technology to sense current without physical contact. The device activates automatically upon seawater immersion. A three-LED indicator system provides real-time status feedback during the installation operation.

- LED 1 (Power/Submerged): Illuminates upon activation to confirm device power and submersion.
- LED 2 (Current Detection): Activates when a minimal threshold current is detected flowing from the anodes to the clamp.
- LED 3 (Continuity Verification): Illuminates upon establishment of electrical continuity, confirming a complete circuit between the pipeline and the anodes.

Illustration below showing the setup on a Payara pipe clamp.



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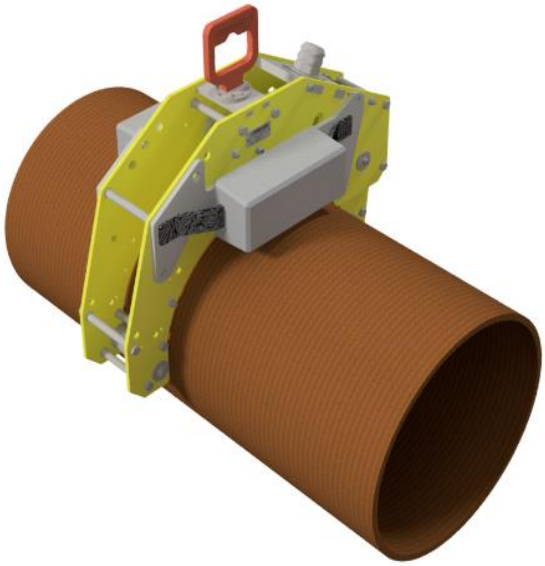
Use-Case

Clamping on pipe

Payara® is designed to bite onto a pipeline, it will grip just above 180 degrees to ensure good electrical contact and to avoid unnecessary excavations of the seabed. With flexibility in mind, the Payara® supports earthing cables from 16-240 mm2. When needed, the cables can be fitted with a bend stiffener to protect the termination on the Payara®.

Clamping on pipe with anodes

For smaller systems, the Payara® can have anodes directly attached, providing a complete cathodic protection system as one small unit.



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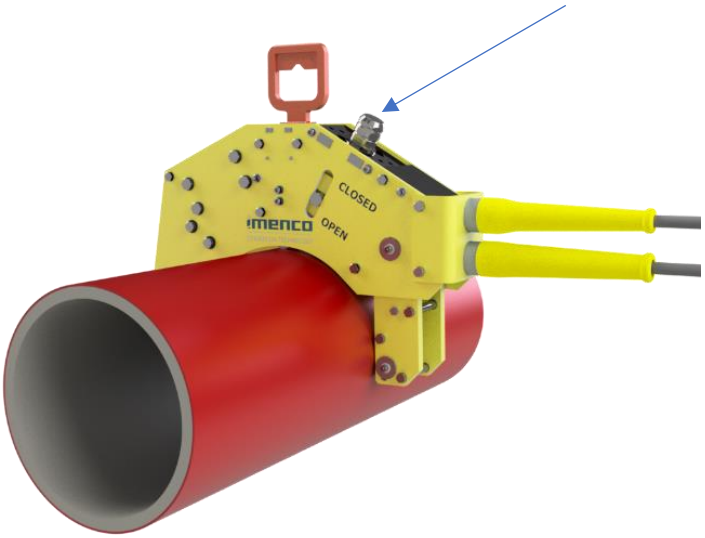
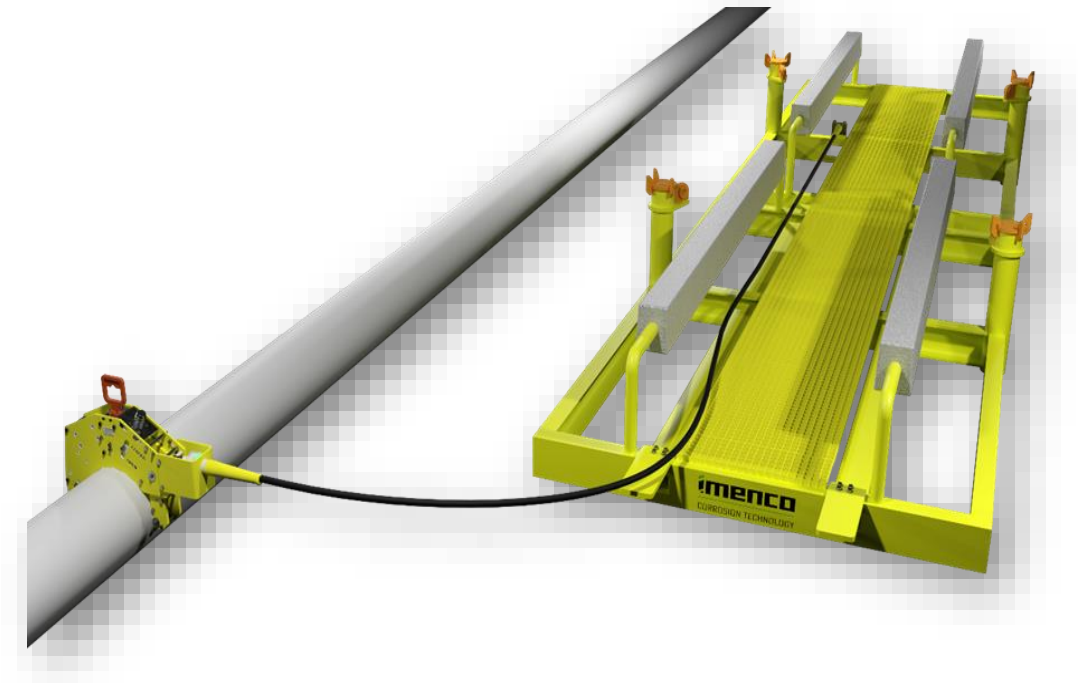
Bend stiffener for extra termination protection

When needed, the cables can be fitted with a bend stiffener to protect the termination on Payara®.



Clamping connected to anode-bank

Projects that require large quantities of anodes, the most efficient method to provide this is via an anode bank, often referred to as anode sleds, anode pods, anode cages, anode towers etc. The anode bank is connected to the protected structure via Payara® and a cable.



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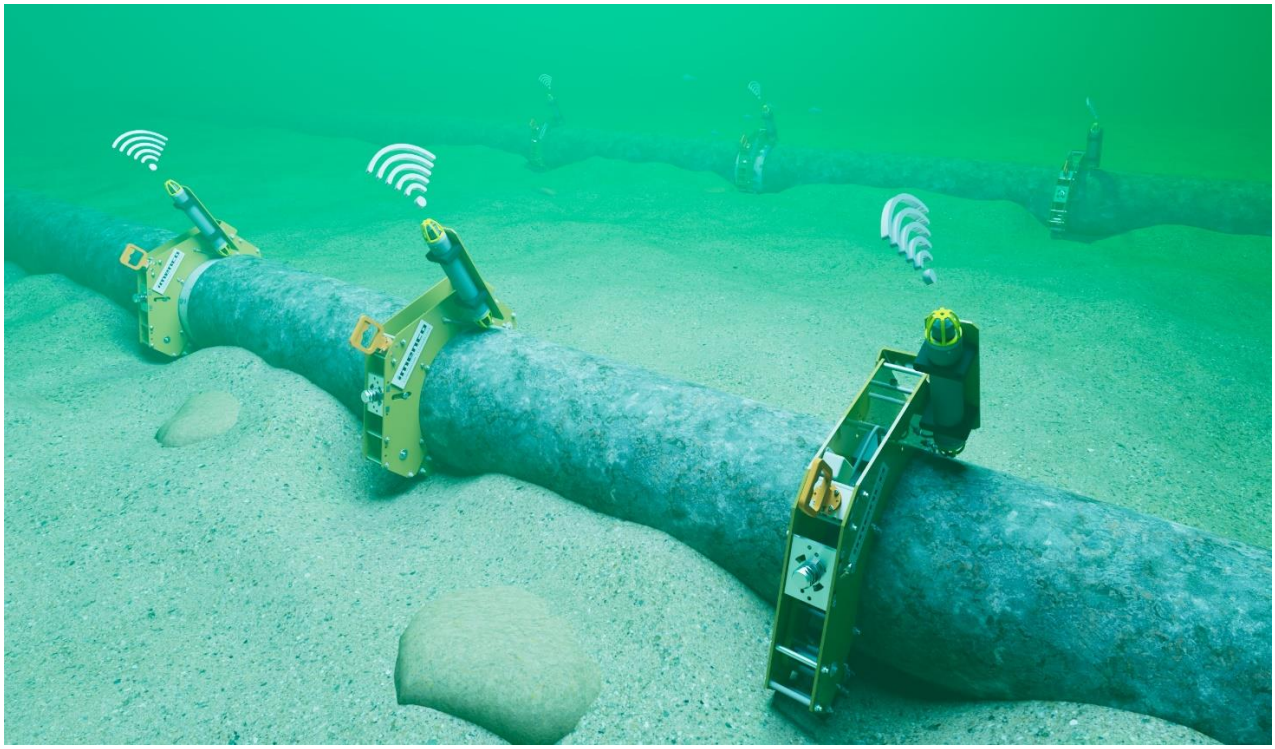
As a sensor-platform

Payara® Clamp is also designed with flexibility in mind to have various sensors fitted directly to the clamp. Imenco has a sensor for CP Wireless Monitoring, measuring the surface potential of a subsea steel structure that the clamp is connected to and transferring this data to top side via digital acoustic communication.

The Payara® Clamp can also be fitted with advanced UT sensors and data processing systems providing high resolution wall thickness data. This innovative non-intrusive device monitors changes in pipeline wall thickness due to corrosion and erosion, process the scanned data locally and transmit the processed wall thickness data to topside control room wirelessly using subsea acoustic technology.



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