DEEPWATER

RetroBuoy Mk V

General

RetroBuoy Mk V is a modular impressed-current anode array rated at 600 A for 25 years. Anodes (12) are held within four (4) buoyant modules providing a current rating on each module of up to 150 A. Structure has been designed in accordance with DNV 2.7-3, classification R45-Subsea-SE.

Buoyancy module (Item 2)

Material	PE injection molded shell/vacuum filled syntactic foam
Buoyancy	36 lb/ft³ [576 kg/m³]
Depth rating	1000 ft [304 m]
Dimensions	Ø 12.75" x 72" long [Ø 324 x 1828 mm long]
Net buoyancy	132 lb [60 kg] per buoyancy module
Quantity	4

Tether system (Item 4)

Primary tether	1" Plasma 12 strand synthetic rope
Tensile strength	110,000 lb [500 kN]
Water absorption	0% Hygroscopic
Anchors	Top and bottom (Resin filled spelter)
Quantity	1 per buoyancy module
Upper tether plate	Anchors hose fittings attaches to inside recess in base of buoyancy module
Lower tether plate	Steel plate fastened inside frame leg

MMO Anode / cable connection

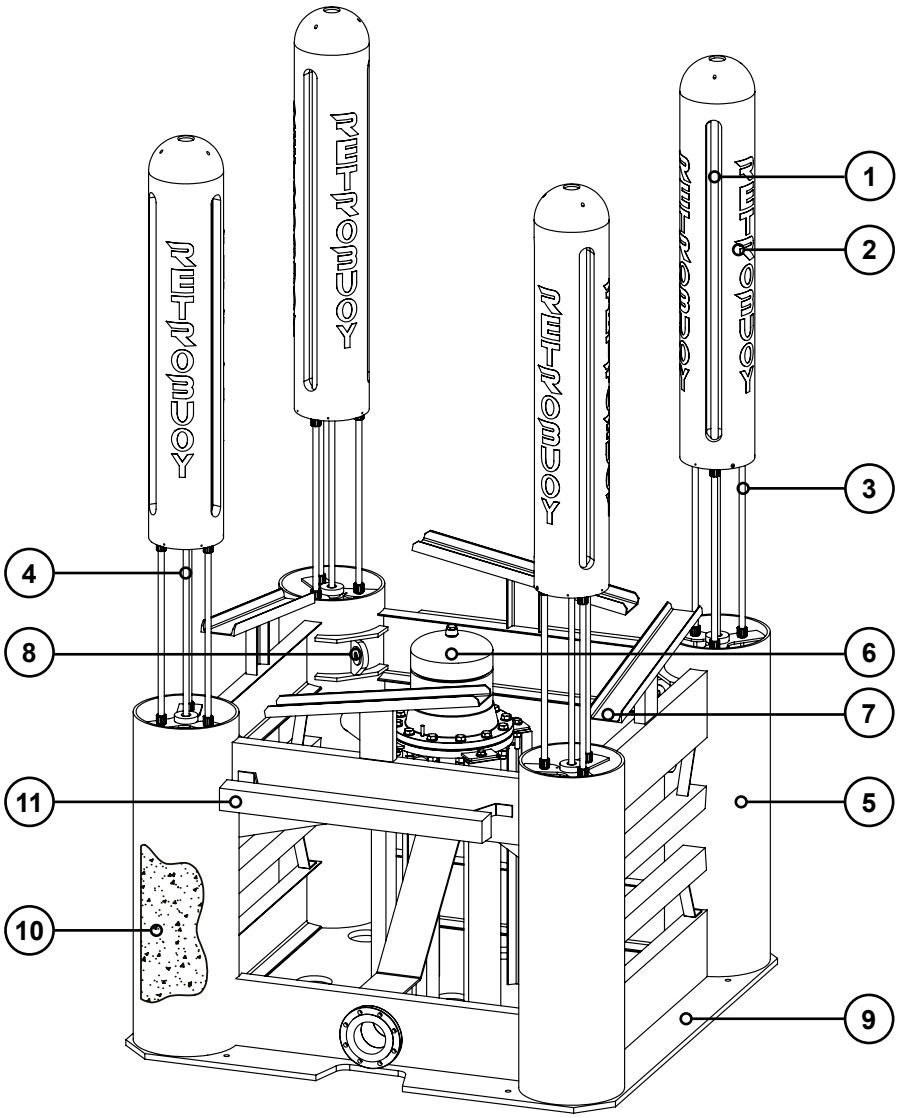
Method	Tin alloy expanding compression fitting (internal)
Sealing	Flexible resins (2 stage)
Testing	Helium leak test at 20 PSI [138 kPa]
Cable OD	0.423" [10.7 mm]
Weight (Air)	0.23 lb/ft [0.34 kg/m]
Cable length / anode	16' [5 m]

MMO Anode elements (Item 1)

Base material	Titanium tube – ASTM B338
Outside diameter	1.25" [31.8 mm]
Wall thickness	0.035" [0.9 mm]
Length	48" [1220 mm]
Coating	Mixed metal oxide activation coating consisting of Iridium dioxide / Tantalum pentoxide, proprietary application method.
Current density	265 mA/in² [40 mA/cm²] – Deepwater de-rating
Quantity	3 per buoyancy module (12 Total)

Anode cable (Item 3)

Type	2 AWG [35 mm²] Flexible cable 600/1000 V Grade marine power cable
Conductor	Soft annealed stranded tinned copper conductor to ASTM B33
Insulation	Type P XLPO
Ampacity	162 A @ 95°C
Cable conduits	Ø ¾" [20 mm] PVC, nylon core, flexible



RETROBUOY™

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Support frame / Gravity base (Item 5)

Steel grade	Primary - ASTM A529 / A500 / API 2H [S355] Secondary - ASTM A36 [S275]	
Welding	All welding conducted in accordance with Steel Structural Welding Code – AWS D1.1 [EEMUA 158]	
Coating	Shot blast SA2.5 (White Metal) 2 part epoxy paint system DFT 18 mils [450 Microns] Applied in accordance to N-1735	
Final color	White - code 0095 - N 9.5	
Features	Buoyancy module supports for deployment **(Item 7)** Lifting padeyes **(Item 8)** Conduit for anode cable routing Mud mat **(Item 9)**	
Column ballast **(Item 10)**	Ballast weights given are based on a typical concrete density of 150 lb/ft^3 [2400 kg/m^3] .	
	Weight (Air)	3000 lb [1360 kg]
	Weight (Water)	1780 lb [810 kg]
Cathodic protection **(Item 11)**	Anode type	Al-In-Zn alloy (sacrificial)
	Anode dimensions	4” x 4” x 48” [105 x 105 x 1220 mm]
	Anode core	2” x 0.25” [51 x 6 mm] flat bar
	Net weight	75 lb [35 kg]
	Gross weight	95 lb [43 kg]
	Capacity	1140 AHr/lb [2500 AHr/kg]
	OC potential (sw)	(-) 1.080 V vs Ag/AgCl.
	Quantity	6

Overall weights & dimensions*

Dimensions (W x D x H)	89” x 96” x 162” [2260 x 2450 x 4100 mm]
Packing dimensions	91” x 98” x 91” [2300 x 2500 x 2300 mm]
Weight (Air)	11 020 lb [5000 kg] fully ballasted
Weight (Water)	7500 lb [3400 kg] fully ballasted

**Excluding feeder cable*

Junction box (Item 6)

Dimensions	Ø14” Sch 40 x 19” [480 mm]
Steel grade	Body - ASTM A53 [ASTM A106] Cap - ASTM A234 [S275] Flange - ASTM A105
Base plate	14” 150# RF CS Blind flange with gasket Entries 1 @ 1½” NPT (Main feed cable) 12 @ ½” NPT (Anodes) 1 @ ½” NPT (Drain plug) 1 @ 2” NPT (Pressure compensation system)
Cable entry	Brass glands
Fill vent	1” NPT plug / Thread-O-Let
Pressure comp.	Black delrin machined piston assembly, nitrile O-Rings
Bus bar	Electrolytic copper - ASTM B187 [C110] Brass connection fasteners with double nuts
Lug type	Dual hole, copper, electro-tin plated
Isolator	CPVC pipe cap

Main feed cable entry

Bend limiter	Cable will enter through a segmented articulated polyurethane bend limiter suited to the cable. Attached to the armor termination assembly.
Armor termination	Provides entry of the main feed cable with armor removed. Attached via a 6” 150# flange welded to the side of the frame.
Junction box entry	Provides entry of the inner conductor and primary insulation only.

Main feed cable

~600 MCM [300 mm^2], HDPE insulated, contra-helical, double-galvanized steel wire armor package, HDPE overall jacket.

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