E90 Coiled Tubing Downline System

Built upon Paradigm's all electric e-Winch® technology, the **E90 Coiled Tubing Downline System** is designed for efficient deployment and retrieval of coiled tubing from multi-service vessels and offshore facilities.

Featuring a compact footprint and full redundancy, this system comprises a matching pair of reel skids that can be operated simultaneously or independently. Each skid is equipped with an all-electric liquid-cooled drive system, planetary gearbox, and an internal spring applied, electric released, multi-disk brake, ensuring precise control and reliable performance. The integrated level-wind sheave is adaptable to various tubing sizes.

The system utilizes high-power inverters and permanent magnet motors, providing high torque and efficient operation. The integrated level-wind sheave has removable inserts to adapt to the tubing size, while a sheave-mounted encoder provides accurate digital measurement of the deployed pipe length. A level-wind mounted load pin delivers precise total weight measurements, and the software-assisted spooling feature ensures controlled coiled tubing deployment.

For ease of transport and installation, the skids feature a single-lift configuration, forklift pockets, and a twist lock interface with ISO corners.

Each reel operates independently with a local control panel, including a joystick, push buttons, switches, and a touch screen display for sensor visualization and system setup. Additionally, a handheld remote-control allows for flexible operation.

Applications

- Riserless Deepwater Intervention
- Subsea Pipeline Precommissioning
- Subsea Pipeline Decommissioning

Features

- Intuitive joystick & handheld remote control
- Electronic depth, tension and speed visualization
- Single lift 'Plug & Play' system

Benefits

- Compact footprint
- Minimized crew requirements
- Precise deployment/recovery speeds
- Energy efficient, no hydraulic system losses
- No emissions, low noise
- Low cost of operation
- High availability/uptime

Directives & Certifications

- DNVGL Offshore lifting
- Machinery directive 2006/42/EC
- Low voltage directive 2014/35/EU
- Electromagnetic compatibility 2014/30/EU

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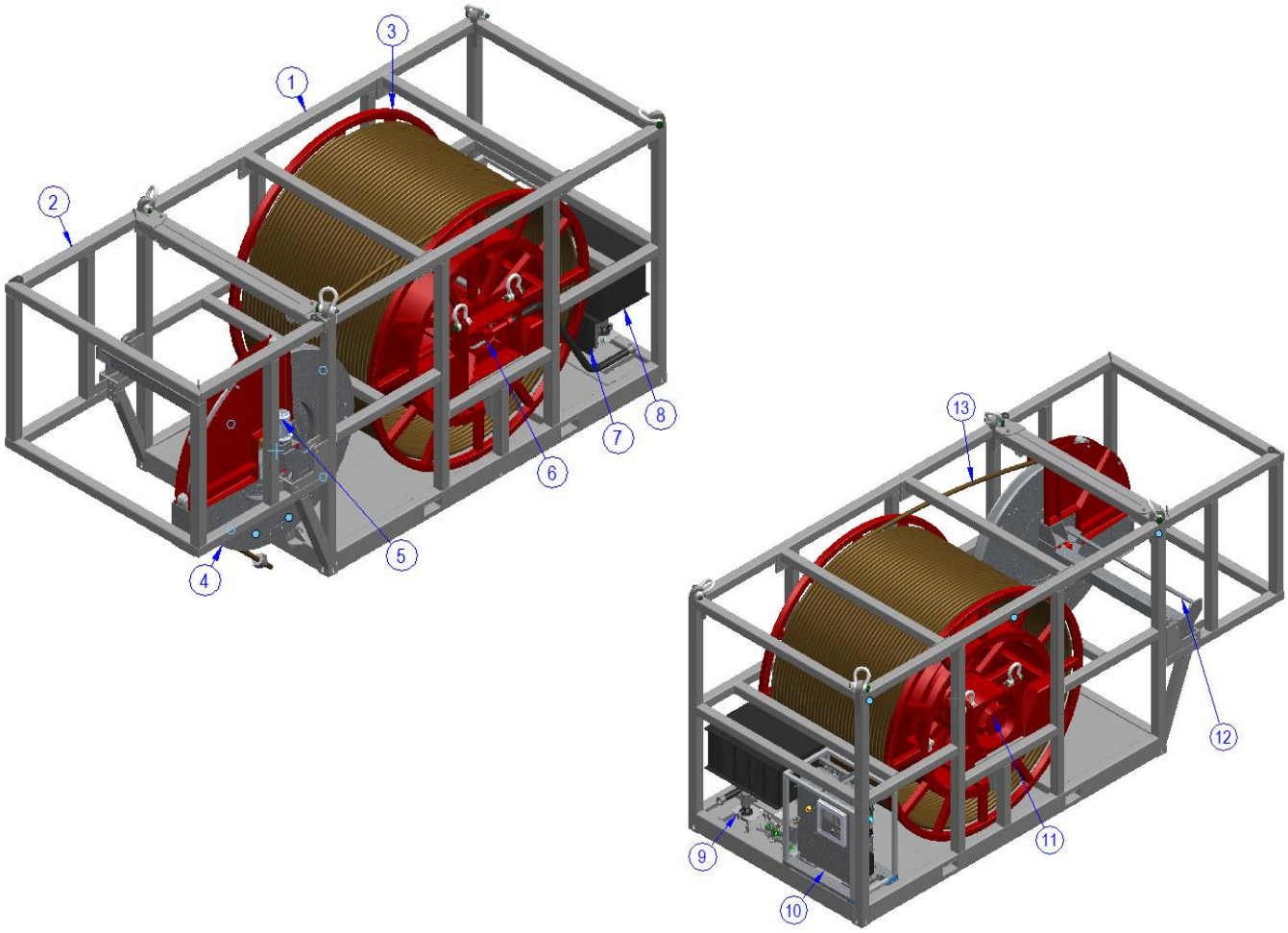
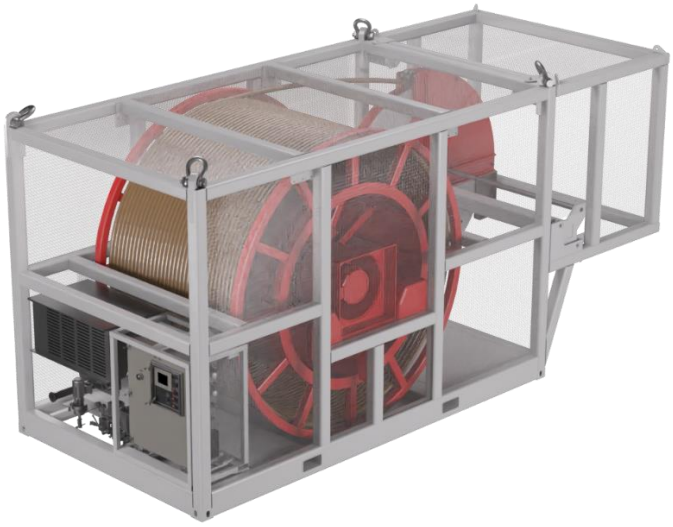


Main Components	
1	Main lifting frame
2	Removable protection frame
3	Coiled tubing reel
4	Sheave
5	Level wind drive motor
6	Reel swivel
7	Electronics cooling unit
8	Brake resistor
9	Electric supply, external signals, ethernet
10	Electric drive and control enclosure
11	Electric drive motor, gearbox and parking brake
12	Level wind assembly
13	Coiled tubing 2-3/8”

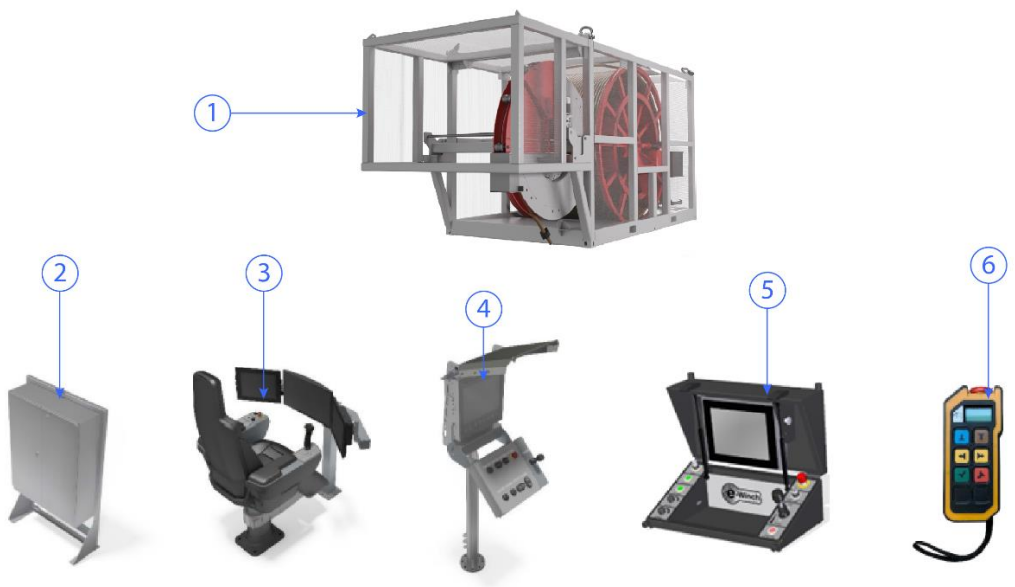
Nominal Specifications – E90 Coiled Tubing Downline System		
	Metric	**Imperial**
Reel Capacity		
2 3/8" OD 0.203" WT	2400 m	7874 ft
2" OD 0.203" WT	2600 m	8530 ft
Performance		
Maximum Tension (full reel)	5000 kg	11000 lb
Maximum Tension (empty reel)	20000 kg	45000 lb
Maximum Rotational Speed	4 rpm	
Maximum Pipe Speed (empty reel)	20 m/min	65.6 ft/min
Maximum Pipe Speed (full reel)	40 m/min	131.2 ft/min
Electrical Characteristics		
Rated Power	125 kW	
Electrical connection	380 – 480 V, 50 – 60 Hz, 180 A, 3 phases, 4 wires	
Enclosure Ratings	IP56	
Installed Drive Power	100 kW	
Mechanical Characteristics		
Structural design acc.	DNVGL-ST-E273 / Class R30	
Noise level	According to machinery directive	
Corrosion protection	ISO 8501-1 and ISO 12944-9 Corrosion Class CX	
Topcoat colour	Primary frame, sheave frame and components RAL9003 light grey. Reel, sheave and components RAL3022 red	
Over boarding Sheave	96" (2438mm) single groove with changeable inserts (2-3/8" as standard)	
Dimensions & Weights (Complete Unit)		
Length of Base	5620 mm	221"
Overall Length	8000 mm	315"
Overall Width	3200 mm	126"
Overall Heigh	3780 mm	149"
Reach	1625 mm	64"
Rated Maximum Gross Weight	37500 kg	82673 lb
Rated Tare Weight	17000 kg	37479 lb
Dimensions & Weights (Reel Only)		
Flange Diameter	3600 mm	148"
Core Diameter	2438 mm	96"
Width Between Flanges	2200 mm	87"
Freeboard	130 mm	5.1"
Maximum Reel Load (pipe + fluid)	23000 kg	50706 lb
Environmental Parameters		
Operating temperature range Standard	-20 to +50° C	-4 to +122° F
Humidity	100% at +50° C	100% at +122° F
All products, product specifications and data are subject to change without notice, to improve design, reliability, functionality or otherwise.		

The power supply can connect to the grid or a generator set and is capable of reduced power operation. A secondary supply connection is used for standstill heating and control. With a reduced power supply the system is still capable of reaching maximum tension at a reduced speed or the maximum speed at a reduced tension. The system can work with stable voltage ranges from 380 VAC up to 480 VAC at 50-60Hz, and depending on the available capacity it can be set between 32A and 180A.



Local controls on the unit come as standard and additional options from Paradigm's Control & Monitoring System are easily integrated with the E90 Coiled Tubing Downline System. These options range from a handheld remote control, deck mounted panels (away from the unit), or permanent control-room based installations with fibre-optic camera and control connectivity.

Control & Monitoring System



Main Components	
1	E90 Coiled Tubing Downline Unit - Local control
2	Central Distribution Box
3	Operator Control Chair
4	Local control station (Zone 1)
5	Operator Control Panel
6	Handheld Remote Control

Drive System - Technology Comparison		
	Hydraulic driven **Diesel**	e-Winch® **Electric**
Performance		
Installed power	72 kW	100 kW
Machine efficiency	65 %	85 %
Power at the drum	47 kW	85 kW
Energy supply efficiency	30 % (diesel engine)	60 % (grid supply)
Speed control	+/- 1 m/min	+/- 0.01 m/min
Noise (at the operator position)	<85 dB (A)	<80 dB (A)
Constant Speed with Cruise Control	✗	✓
Indoor Unventilated Operation (shop spooling)	✗	✓
Advanced Tamperproof Safety & Data Recording	✗	✓
Energy consumption on demand	✗	✓
Full Remote Control	✗	✓
Reduced CO_2 emissions	✗	✓
Reduced Daily Running Costs	✗	✓
Reduced Yearly Maintenance Costs	✗	✓
Guaranteed Zero Line Breakage	✗	✓
Increased Power at Drum	✗	✓
Improved Overall Efficiency	✗	✓
Lower Noise Pollution	✗	✓
Cost of Ownership (Maintenance)		
Fluid level checks	Daily	Daily
Exhaust gas cooler cleaning	Every 300 hours	Never
Exhaust flame arrester cleaning	Every 300 hours	Never
Exhaust spark arrester cleaning	Every 300 hours	Never
Air, fuel, oil filters change	Every 300 hours	Never
V-belt change	Yearly	Never
Air inlet safety valve service and calibration	Yearly	Never
Pneumatic air system service	Every 600 hours	Never
Diesel engine service (valves, fuel pump)	Every 600 hours	Never
System sensor calibration	Yearly	Yearly
Coolant pump service	Yearly	Yearly
Electrical System Check (CompEx or equivalent)	Yearly	Yearly
Yearly maintenance cost (Diesel engine, Zone 2 exhaust kit, hydraulic system)	$ 20.000,00	$ 0,00
Environmental Emissions & Impact[#]		
Direct machine exhaust CO_2 emissions (nominal)	20 kg/hr	0 kg/hr
Direct machine exhaust CO_2 emissions (per 8 year/5000 hour asset operating life)	100000 kg	0 kg
[#]Exhaust gas emissions		