Specification Document

300 Tonne Offshore Powered Under Rollers

Model 3-585-23-17

General

The Torque Engineering under rollers have been designed to ABS rules and are suitable for laying offshore flexible lines from an appropriate vessel.

The unit employs a fully redundant pull down system on each side of the reel.

Lateral restraint of the reel is achieved with 2 x 60 tonne side rollers on each girder located close to the drive rollers. When the reel migrates to any side, before the reel rim engages with the lip of the drive roller, the side rollers make contact with the rim, and arrest further movement. In the event of a failure of the lateral rollers, the drive rollers have a 50mm lip which will contain the reel until the side rollers have been replaced.

Laying operations can take place by either manually paying out or using the preset render tension, which makes use the vessel motion to pull the flexible off the reel.

Recovery of flexibles is controlled manually, and will generally require a spooling device to ensure correct layering of the flexible onto the reel.

When operated in manual mode, the hydraulic system is pressure compensated, i.e. when recovering flexibles, as the load (pressure) increases, the speed (oil flow) will automatically decrease, keeping the power constant.

All the components of the system can be shipped in 2 x 40' standard flat rack or open top shipping containers.

Reel Drive Base Details

Base Dimensions	:	7750 x 6650 (see sketch)
Reel Mass	:	300 tonnes
Reel Diameter	:	Up to 12 meters
Reel Width	:	Adjustable
Mass of Components	:	28 tonnes (excluding reel)
Driving Rollers	:	4 x ø 600
Roller Drive Torque	:	23 kNm @ ΔP 235 bar each
Roller Brake Torque	:	30 kNm each
Drive Roller Speed	:	17 RPM (see charts)
Pull Down	:	4 Independent Cylinders
Pull Down Force	:	Variable 5 to 30 tonnes per cylinder

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Control Station Details

Dimensions	:	L=150cm B=100cm H=120cm
Mass	:	1 tonne
Pilot Joystick	:	Heave in / STOP (Render) / Pay Out
Lay Render Tension	:	Adjustable Pilot Relief Valve
Pull Down Force	:	5 to 30 tonnes / cylinder
Excursion from Reeler	:	10m from far girder connection plate
Excursion from HPU	:	5m

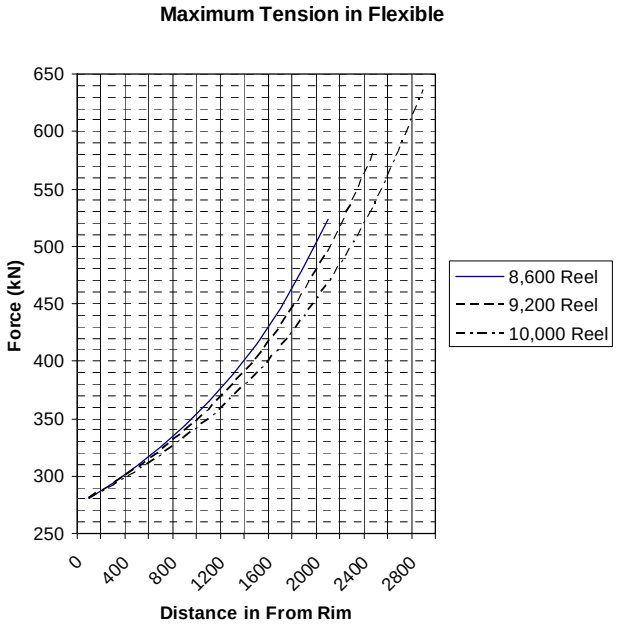
Hydraulic Power Unit Details

Dimensions	:	L=263cm B=175cm H=150cm
Mass	:	4 tonnes (with hydraulic Oil)
Lifting Pad-eyes	:	4
Electric Supply	:	440 Vac 60 Hz
Power	:	100 kW at 60 Hz
Approximate Current	:	120 Amps
Cooling Water Supply	:	220 liters / minute sea water
Pump Set 1	:	11 kW (60 Hz)
	:	Pull Down Cylinders 210 bar – 15 l/min
	:	Cooling Oil 30 bar – 142 l/min
Pump Set 2	:	86 kW (60 Hz)
	:	Drive Motors 250 bar – 473 l/min
	:	Brake Release 30 bar – 7 l/min
Alarms	:	High Oil Temperature Alarm
	:	High Oil Temperature Trip
	:	Low Oil Level Alarm
	:	Low Oil Level Trip / cut out
	:	Pressure Filter Clogged
	:	Main Return Filter Clogged
	:	Small Return Filter Clogged
Phase Connection Relay	:	Correct phase connection protection
Shut Down	:	Emergency Stop

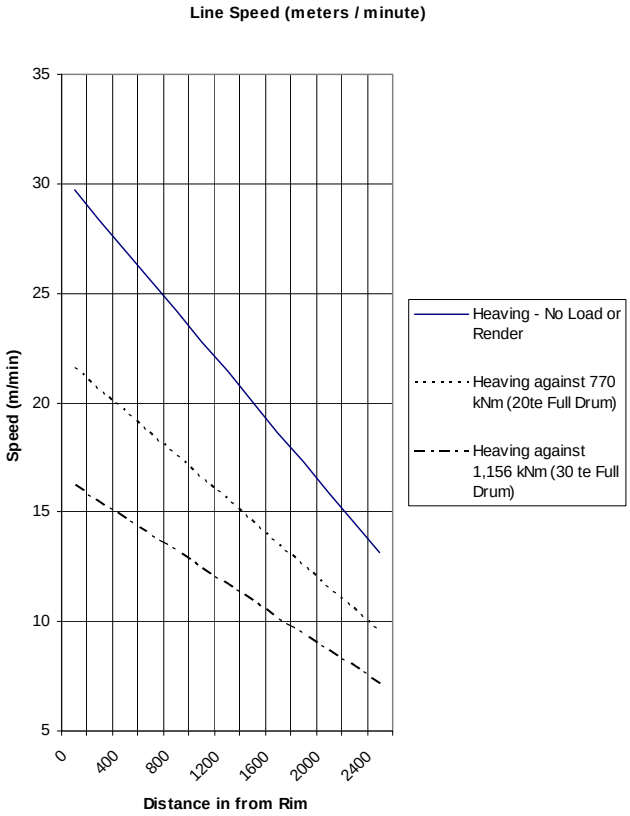
Spooling Device

In the case of recovering flexible, a spooling device will be required to ensure the flexible is wound to the outer limits of the reel, as well as lift the on coming flexible above the bearing mounts. A manually operated spooling device is available for this equipment.

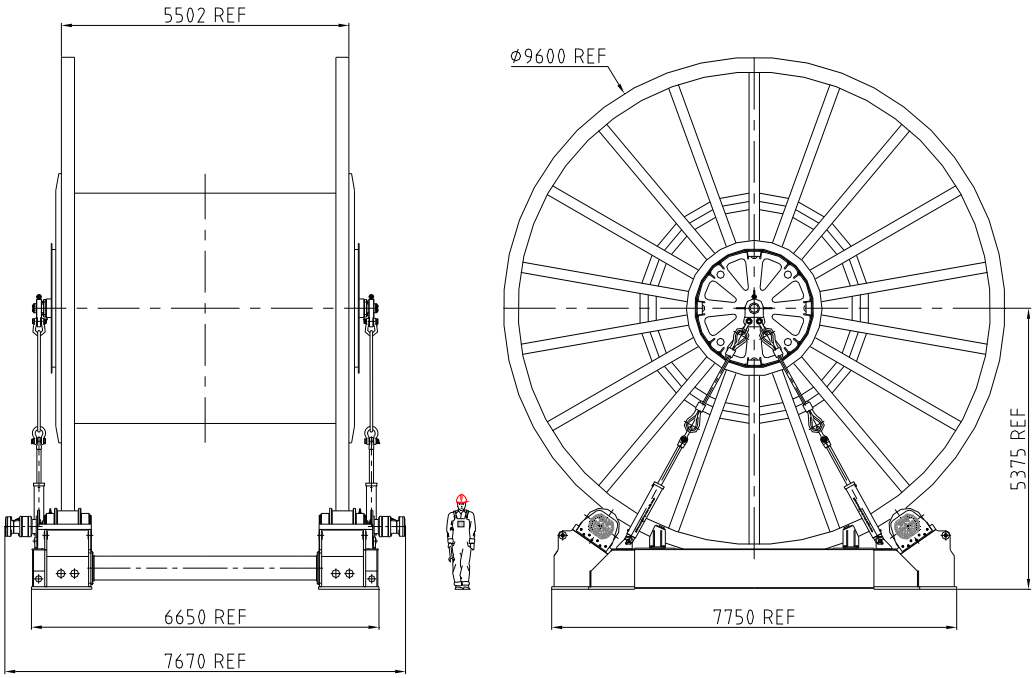
Performance –Maximum Pull Force (Approximate)



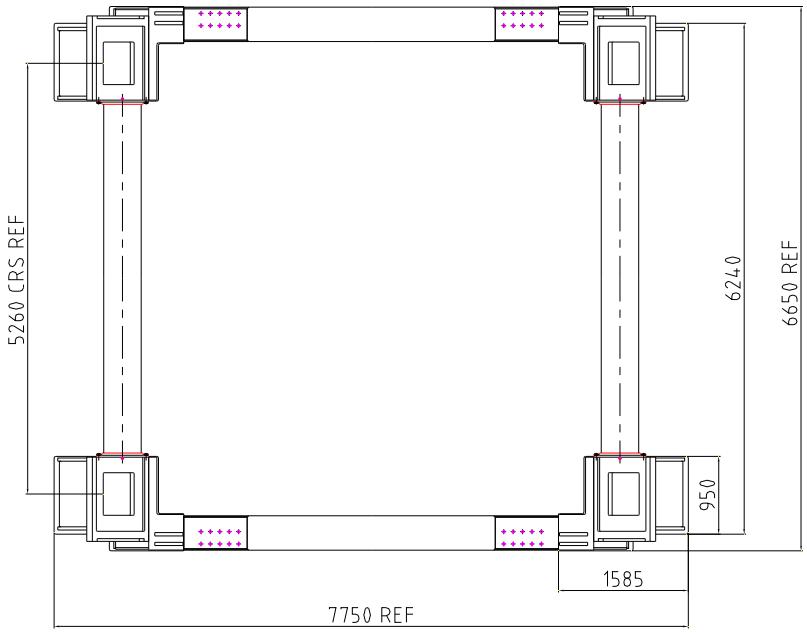
Performance – Approximate Speed (meters / minute with Ø 8600 reel)



Dimensions



Front & Side Elevation



Base Footprint

Constant Power Details

When recovering, the constant power performance of the system is limited by;

a) The maximum oil flow from the HPU = 430 liters / min

b) The maximum pressure of the HPU = 250 bar (Note back pressure of approximately 15 bar)

The table below shows the approximate performance of the equipment with a Ø 8600 reel

		Manually Heaving In		
Position	Item	Line Tension (kN)		
		100	200	300
Top Layer Drum Ø 7704	Drum Torque (kNm)	385.2	770.4	1155.6
	Motor Torque (Each kNm)	7	13	20
	Hydraulic Pressure (bar)	78	156	234
	Oil Flow / motor (l/min)	107	83	55
	Reel Speed (rpm)	1.16	0.89	0.60
	Line Speed (m/min)	28.1	21.6	14.4
Mean Layer Ø 6167	Drum Torque (kNm)	308	617	925
	Motor Torque (Each kNm)	5	11	16
	Hydraulic Pressure (bar)	62	125	187
	Oil Flow / Motor	107	103	69
	Reel Speed (rpm)	1.16	1.12	0.74
	Line Speed (m/min)	22.5	21.6	14.4
Bottom Layer Ø 4630	Drum Torque (kNm)	232	463	695
	Motor Torque (Each kNm)	4	8	12
	Hydraulic Pressure (bar)	47	94	141
	Oil Flow / Motor (l/min)	107	107	92
	Reel Speed (rpm)	1.16	1.16	0.99
	Line Speed (m/min)	16.9	16.9	14.4

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