

# 50Te electric tensioner

## SPECIFICATION SUMMARY

Max pull force outboard from idler end	50Te SWL
Max pull force outboard from gearbox end	25Te SWL
Number of tracks	4
Coefficient of friction	0.072
Max total grip force	696Te
Max grip per track	174Te/track
Product crush force	42.4Te/m/track
Track contact length	4.1m
Max speed	900m/hour
Height to track centre line	2280mm
Track opening	700mm*
Product size range	50mm to 610mm*
Operating pressure max	260bar
Operating angle(s)	Vertical (-90°) / horizontal (0°) / inclined (45°)

## MODES OF OPERATION

Pay-out variable speed
Pay-in variable speed
Tension holdback
Tension pull in

## TENSIONER DISPLAY INFORMATION

Product distance
Product speed
Product grip
Product tension

\*Track pad dependent



Power unit container.

## IDEAL FOR

- Flexible / rigid lay & spooling, pipe in pipe
- Oil & gas, offshore wind, decommissioning

## BENEFITS

- Top load for ease of loading
- Vertical Lay System (VLS) compatible
- 2-track mode capable for smaller products
- Remote dial-in
- Very accurate speed and tension control
- Provides record of data – data logging
- Synchronisation with third party equipment.

**DELIVERY ASSURED**

## TENSIONER

The tensioner has four track units, each driven through a gearbox and 54kW electric motor. Low resistance 'Berco' rollers and lubricated 'Berco' track chains are employed on to which 'V' profile, polyurethane track pads are bolted. The track pads can be interchanged for alternative profiles.

The tracks are hydraulically positioned to suit the product diameter using linear encoders to ensure accurate positioning. Two tracks provide grip whilst two tracks provide reaction via four hydraulic cylinders. The control system allows the reaction tracks to be positioned to the product radius, ensuring that the product is loaded in a central position. The two grip tracks can then be positioned to the product radius and the desired grip applied. Pressure sensors are used to monitor and control the applied grip. Hydraulic accumulators ensure the grip load is continuously applied. This allows the Hydraulic Power Unit (HPU) to be switched off once a grip upper threshold is achieved. The HPU will switch back on to 'top up' the grip when a lower threshold is achieved.

To allow the product to be removed from the tensioner in mid line, or where end terminations are too large to pass through the tensioner, the top track pivots open by hinging to one side.

## EPU

### Container

The Electrical Power Unit (EPU) is housed in a 20ft x 8ft container and incorporates the safety circuits, electrical drives, Programmable Logic Controllers (PLCs), communication devices and HPU. In addition there is a Heating Ventilation and Air Conditioning (HVAC) system.

### Electrical drives

Track speed and line tension are controlled using Siemens SINAMICS electric motor drive technology. This provides a high level of speed and torque control, including fast response and fine adjustment that is superior to that of hydraulic motors. The required load is calculated (including compensation for mechanical losses) and evenly distributed between motors. The drive system uses feed forward control to achieve 75% of the tension set point. The final 25% is achieved using feedback from the load cells, to a Proportional Integral Derivative (PID) controller, allowing the system to achieve and control around the desired set point. The PID controller is used to limit the line tension (within safe limits) when operating in speed mode.

The advantage of the feed forward system is that the tensioner can still operate safely in the event of losing feedback from the load cells. In the event of track failure the control system can use redundancy to isolate a track and redistribute the load to the remaining motors.

## PLC

Siemens S7-1500 PLC components are used to control the non-drive related tensioner functions. System alarms and warnings are monitored and displayed on the operators Human Machine Interface (HMI) display. The PLC monitors the complete system including track position settings, pivot locking cylinder open/close, grip pressure, HPU oil levels and temperatures etc. The PLC may inhibit the system operation if an unsafe condition exists.

### Communications

Tensioner operation can be logged using the RS232 communications interface. This provides time stamped data recordings of system speed, grip and line tension. The data is saved to a text file and may be uploaded to a spreadsheet for data analysis.

An ethernet port facilitates the connection of a remote monitor which can be located on the customer's network and display the tensioner operation. A remote access hub provides an optional secure Virtual Private Network (VPN) connection that allows Sparrows to access the control system and provide technical support from remote locations (without the need for on-site visits).

## HPU

The HPU powers the tensioner grip circuit and ancillary functions. A 15kW electric motor drives a pressure compensated pump set. There is also a gearbox cooling system which utilises a cooling water supply.

## RCU

The Remote Control Unit (RCU) is connected to the EPU with a deck cable and is the main operator interface. It contains the HMI, speed set point potentiometer, direction switch and E-stop switch.

The HMI has user friendly screens that allow the operator to monitor and control the operation of the tensioner.



Performance can be monitored via a remote laptop.

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