Line Tension Load Pin
LT-LP

Exclusive technology developed by and exclusive to DLM the Line Tension Load Pin is specifically designed to be mounted as the centre axle of a sheave wheel which then measures the line tension of the cable running over the wheel.

It uses DLM's intelligent Sirius amplifier mounted internally in the pin to process signals from the strain gauges in order to determine both the resultant force and the wrap angle. The amplifier uses this to calculate the line tension and outputs this via a 4-20mA signal.

Normally a standard single direction load pin is required to be fitted so that the load is applied in one plane on the pin, and will not produce accurate load readings if load is applied outside this plane, thus when fitting into a sheave they are only able to measure the resultant force and not the line tension. If the angle of wrap changes the resultant force on the pin will change and therefore would not give a true value for line tension.

However, with the DLM Line Tension Load Pin the change in wrap angle and resultant load is sensed and used to calculate the line tension all within the Load Cell. Therefore giving a 4-20mA signal out relating to line tension.

The Line Tension Load Pin is currently designed to work with wrap angles varying from 40° to 130°, see fig 2. However, larger angle spans can be achieved depending on the design and size of the load pin.

Features:

- DLM proprietary design
- Accurate line tension measurement direct from load pin
- No requirement for additional sensors to determine wrap angles
- 90˚ operational range
- 4-20mA scaled output

Applications:

- Launch and recovery systems (LARS)
- Sheave blocks
- Crane line tension monitoring

The load pin must be placed in a fixed position and it is critical that the wrap angle only varies from one side of the sheave. The load pin requires a fixed datum point from which to measure and therefore requires a fixed cable entry onto the sheave from one side. It is not yet possible to have the wrap angle varying from both sides of the sheave. See fig 3 for a graphical representation.

Dimensional Data

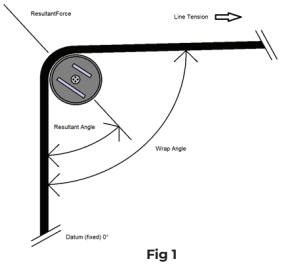


Fig 1

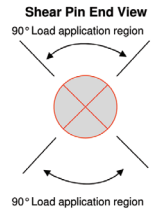


Fig 2

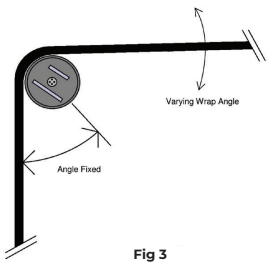


Fig 3

Specification

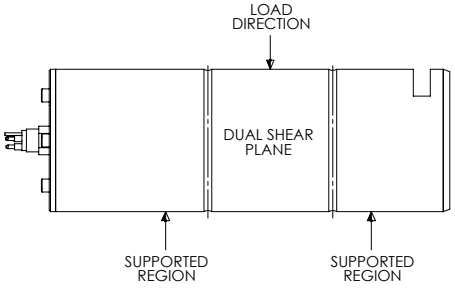
Pin Material:	17-4PH H1150 + 1150 stainless steel
Accuracy:	<1% FS across combined angles
Load ratings:	Up to 1500t and above
Operating Temperature:	-20 to +60 °C
Internal Amplifier:	DLM designed Sirius 4-20mA 3 wire amplifier or RS485 MODBUS enabled with line tension technology
Input Voltage:	12-30VDC for internal amplifier
Degree of Protection:	Subsea with piston and face O-Ring seals and subsea connector / IP67 with face O-Ring seals and cable gland signal entry
Connection options (client specific):	Subsea connector / IP67 Cable gland and cable / Customer specified connector
Certification:	Supplied with calibration, proof load and test certificates to BS EN ISO 7500-1:2018 and material certification to 3.1 or 3.2 upon request
Pressure test:	Up to 300Bar (subsea version only)
Output Type:	4-20mA scaled to WLL / RS485 MODBUS / RS485 ASCII

Note: Line Tension technology can only work with certain size load pins. Contact DLM to discuss feasibility of load pin design.

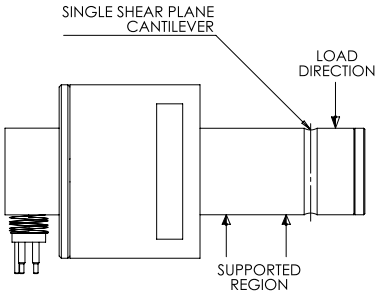
Custom Load Pin Design Options

Custom Load Pin design options

1. Dual shear plane type

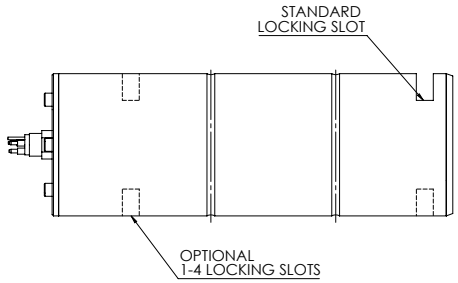


2. Single shear plane cantilever pin

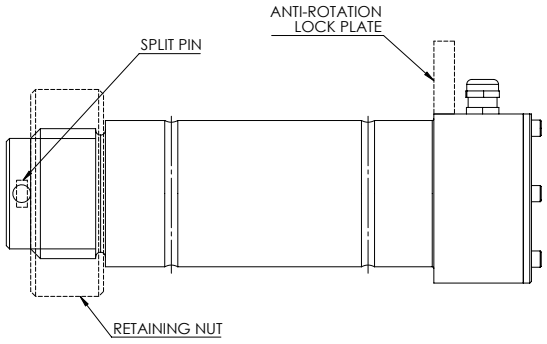


Locking options

1. Lock plate (1 to 4 locking slots)

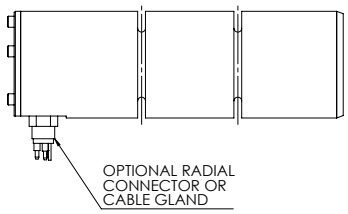


2. Anti-Rotation – thread and nut split pin

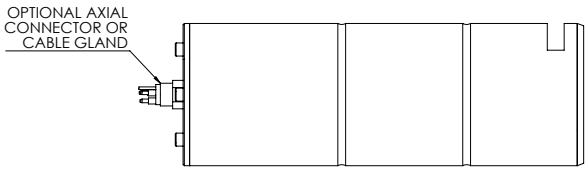


Cable entry options

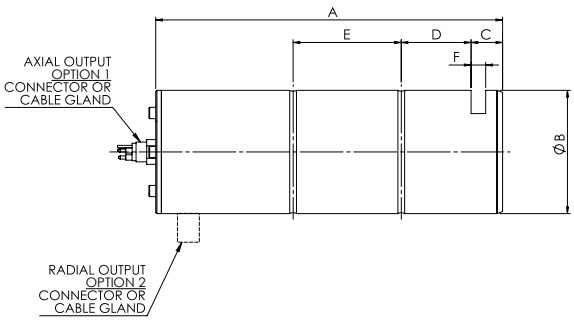
1. Radial – connector or cable gland



2. Axial – connector or cable gland



Dimensional Data



Features:

- Stainless steel construction
- FEA verified designs
- Down hole gauged for high protection
- IP67/IP68 ratings and robust construction
- Removable end caps for easy serviceability and excellent sealing