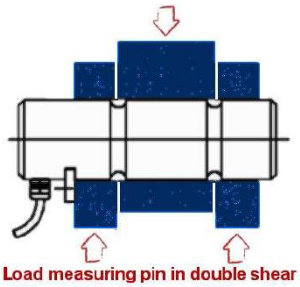
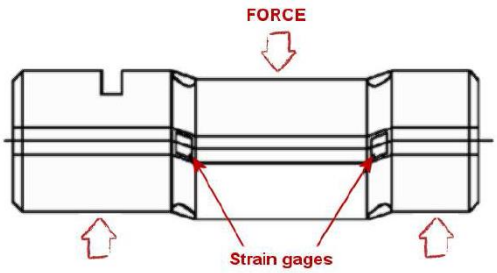
Principle

A load measuring pin senses the force applied across it, via strain gauges installed within a small bore through the centre of the pin. Two grooves are machined into the outer circumference of the pin to define the shear planes, which are located between the forces being measured.



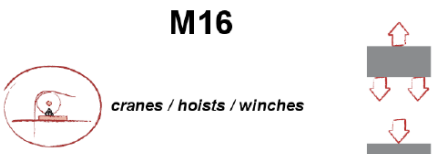


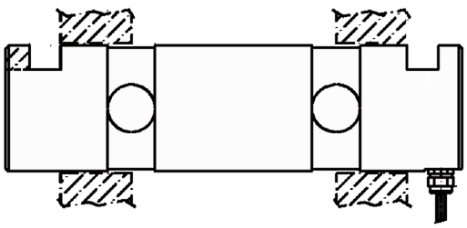
Load measuring pins are designed for many diverse applications as direct replacements for clevis or pivot pins. They have many advantages over other load sensors in that they do not normally require any change to the mechanical structure being monitored.

Usual capacities range from 20kg to 100t.

M16 load pin

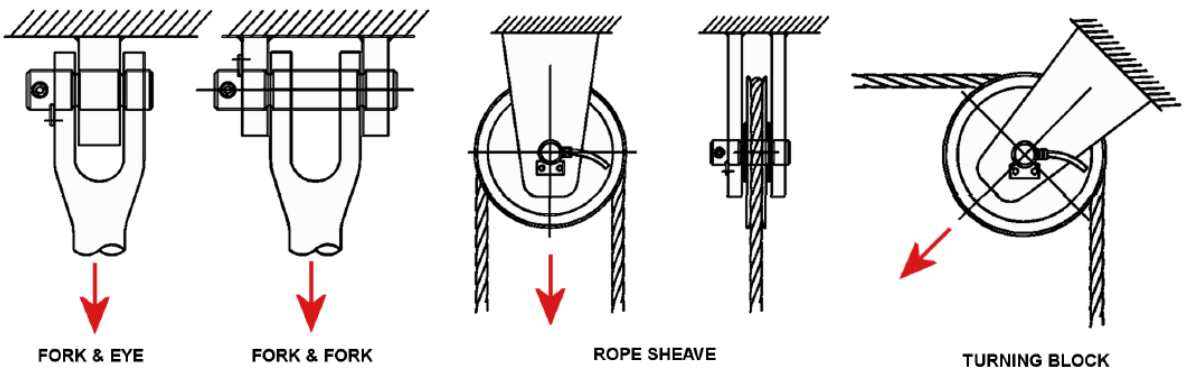
The most common type available is the M16, ideally suited for load measurement and overload protection on cranes, hoists, fork lift trucks and winches.





Typical locations

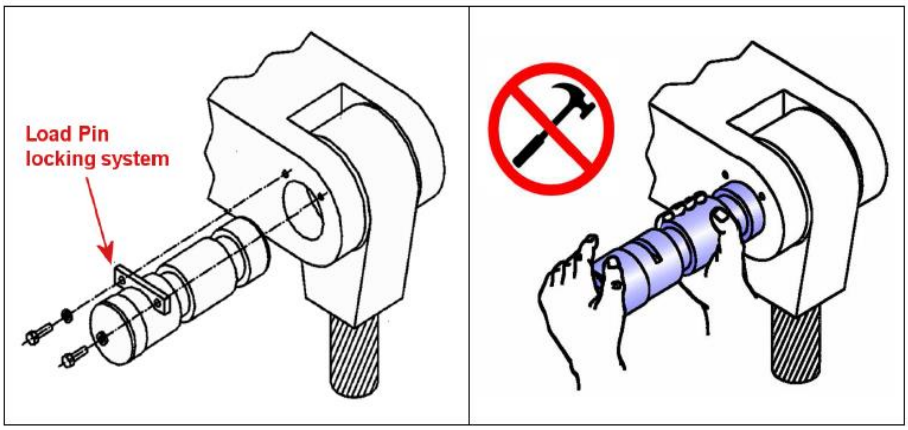
If a pin exists within a defined load path or can be fitted to experience a force, then an M16 Load Pin can be installed to monitor that load. The sketches below show typical locations for load pins



Load pin locking systems

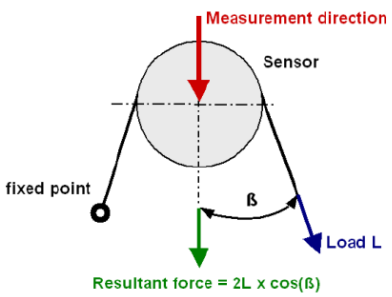
A load-measuring pin needs to be locked into position in order to fix its orientation. This needs to be fixed, both in the axial and rotation modes, to ensure accurate results are obtained from the in-built locking system.

Slide manually the load pin into its seat. Never use a hammer or other tool to insert it.



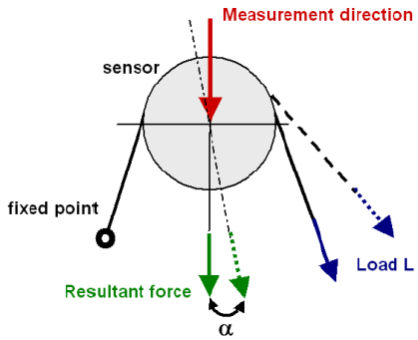
Measuring force calculation

A standard load pin is designed to sense the force in one direction only. Be careful with the load pin mounting position to avoid measurement errors.



Resultant force measured by the load pin

Beware of the resultant force measured by the load pins, which can be different from the load applied on the wire.
The resultant force can be multiplied or reduced according to the mounting.

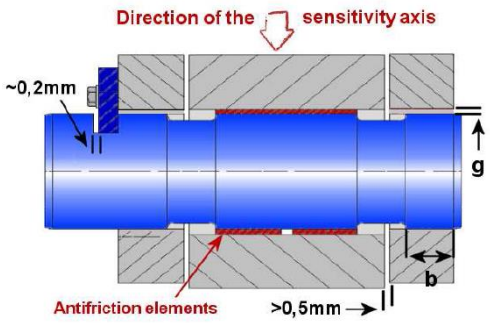


Error due to the change in load direction

The load pin measurement direction should be in the same direction than the resultant force, otherwise a measurement error (% of the applied load) could be calculated by :
error (%) = 100 (cos** a **–1)

Mounting considerations

The load pin must be free to bend over its support. For this, you need to check that:



- ***g ≥ 0.01 x b*** *(usually: g ≥ 0.2mm)*
- ***Leave a gap (~0,2mm) between the locking system and the load pin mortise. Thus no strain can be transmitted through locking system.***
- ***For a better accuracy, the sensor should bear no radial effort or torque.***
- ***to avoid any torque effects, the load must be free to rotate around the pin (use antifriction elements or bearings).***

Bron: *NT-Using Load cells-E-0110*

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Bienfait Waarderweg 54 2031 BP Haarlem Telefoon 023-5530316 E-mail weeg@bienfait.nl