

LCM1791 Load Pin for Sub-sea Mooring Line Tension Monitoring

Application

Single point mooring buoy mooring line tension measurement

Features

- 250te load pin manufactured from 17-4PH stainless steel
- Supplied with stainless steel cage to protect the cable
- Supplied with custom designed anti rotation arm
- Suitable for use sub-sea at depths of up to 200m
- 2.2mV/V output

Design Brief

One of our regular customers, a supplier of safety systems for the oil and gas sector, required a custom designed load measuring pin to replace an existing shackle pin. The load shackle was for sub-sea use to monitor the mooring tension of a single point mooring buoy to protect its mooring line by alerting operators to any instances of approaching overload. Any such occurrence could cause the mooring line to break, potentially allowing the tanker to drift. This is particularly critical during oil transfer operations due to the increased risk of oil spillage.

Rated to 250 tonnes, the load pin was designed to include a cage assembly to protect the cable from damage and was supplied with a sub-sea 4 way connector. This made the load pin suitable for long term use in water depths of up to 200m. A bespoke anti



rotation arm was also designed to fit the specific shackle model specified by the customer. Because it would be used in an oil and gas application, ABS witnessing of proof load and calibration was required, along with a certificate of conformity, 3.1 materials certificate and manufacturers certificate of origin.

The customer free issued an Intrinsically Safe amplifier for calibration with the load pin, as the larger system they were supplying had to be approved for hazardous area use. This gave a 4-20mA output for simple integration into the PLC.

Our customer was very happy with the load pin performance, and have subsequently placed orders for many more high capacity submersible load shackle pins.

Main Criteria

- Load pin must be suitable for offshore use in water depths of up to 200m
- Dimensionally the load pin must be a direct replacement for customer specified load shackle pin
- Load pin proof test and calibration to be witnessed by ABS
- 3.1 material certificate required
- Certificate of conformity required
- Certificate of origin required
- Load pin to be calibrated with customer supplied Intrinsically Safe amplifier to provide 4-20mA output



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APPLICATION NOTE

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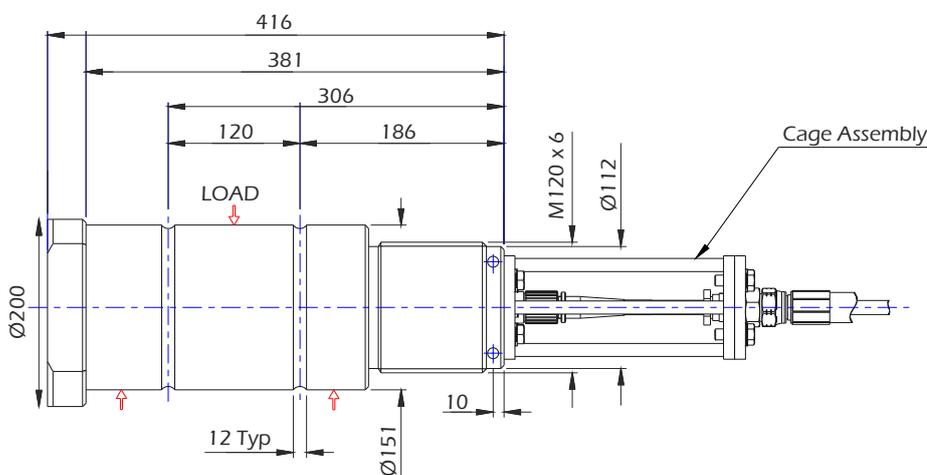


Specification

Rated load (kN)	250 tonnes
Proof load	375 tonnes
Ultimate breaking load	860 tonnes
Output	2.2mV/V
Accuracy	<±4% of rated load
Excitation voltage	10Vdc (15Vdc max)
Bridge resistance	350 Ohm
Insulation resistance	>500 MOhm @ 500 VDC
Operating temperature range	-20 to +70°C
Storage temperature range	-10 to +70°C
Zero temperature coefficient	<±0.01% of rated load/°C
Span temperature coefficient	<±0.01% of rated load/°C
Environmental protection level	IP68 with connector mated to 200m

Dimensions

All dimensions are in mm



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APPROVED

(unapproved if printed)