

LCM4550, LCM4558, LCM4559 Dual Bridge Load Pins

Application

Pipe laying vessel tension monitoring system

Features

- 28 x 2500kN load pins (plus 2 spares)
- 4 x 450kN load pins (plus 1 spare)
- 1 x 3200kN load pin (plus 1 spare)
- All load pins dual bridge and manufactured from 17-4PH stainless steel
- Load pins sealed to IP67
- 33x Stainless steel enclosures, sealed to IP67 (plus 4 spares)
- SGA analogue amplifiers (2 per enclosure for dual redundancy) giving 4-20mA output

Design Brief

A global provider of offshore and subsea oil field solutions contacted us about a load pin requirement for a pipe laying vessel. The company operate a fleet of lay vessels worldwide, and needed some replacement load pins for a tension monitoring system

on a vessel fitted with an advanced Reel-lay system capable of both rigid and flexible pipelaying in up to 10,000 feet of water. The load pins they were looking to replace had previously been supplied by another company, but had become damaged due to a sub-standard adhesive being used to bond the strain gauges and poor water proofing. The customer was therefore looking for a new supplier that they could rely on to consistently provide quality load pins that offered long-term continuous operation.



28 x 2500kN dual bridge load pins for the Tensioner Track (with 2 spares). Each load pin was connected to a waterproof enclosure housing two amplifiers, to give dual redundancy. The amplifier supplied a 4-20mA output which allowed connection to the vessels PLC system, to provide a complete tension monitoring system.

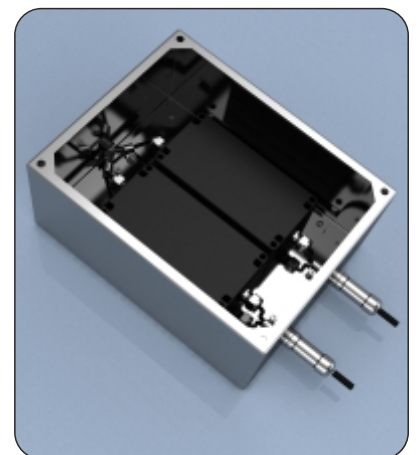
The pipe tension monitoring system allows pipe deformation to be controlled as it leaves the vessel through to installation on the sea bed, by keeping the pipe under tension as it moves through the various pay out equipment. The bending and axial stresses can then be kept within an acceptable range to stop excessive bending and kinking from damaging the pipe. By continuously monitoring the tension levels, the operator can make adjustments to the equipment as soon as a potential problem is identified, minimising any downtime.

Main Criteria

- Load pin dimensions must be identical to the pins they are replacing
- Each load pin must have a separate external amplifier housed in a stainless steel enclosure rated to IP67
- The output signal must be compatible with the vessel PLC system (4-20mA)
- Both load pins and amplifiers must have dual redundancy to protect the system in the event of any failure
- Complete system delivery required within 9 weeks
- Full material traceability required



The original enquiry was for 28 load pins, but a decision was later made to replace all load pins within the system. This comprised of 1 x 3200kN dual bridge load pin for the Aligner (with 1 spare), 4 x 450kN dual bridge load pins for the Straightener (with 1 spare) and

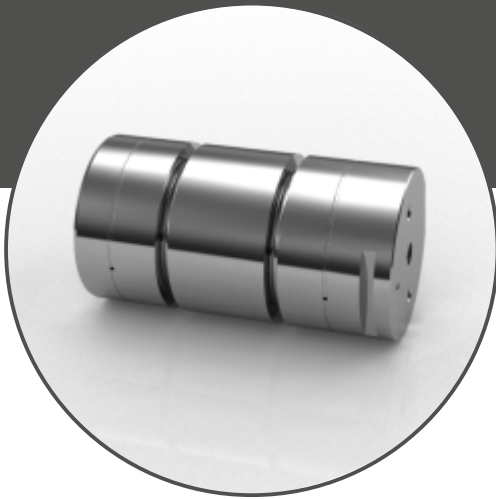


LCM Systems Ltd

Unit 15, Newport Business Park
Barry Way, Newport
Isle of Wight PO30 5GY UK
Tel: +44 (0)1983 249264
Fax: +44 (0)1983 249266
sales@lcmssystems.com
www.lcmssystems.com

APPLICATION NOTE

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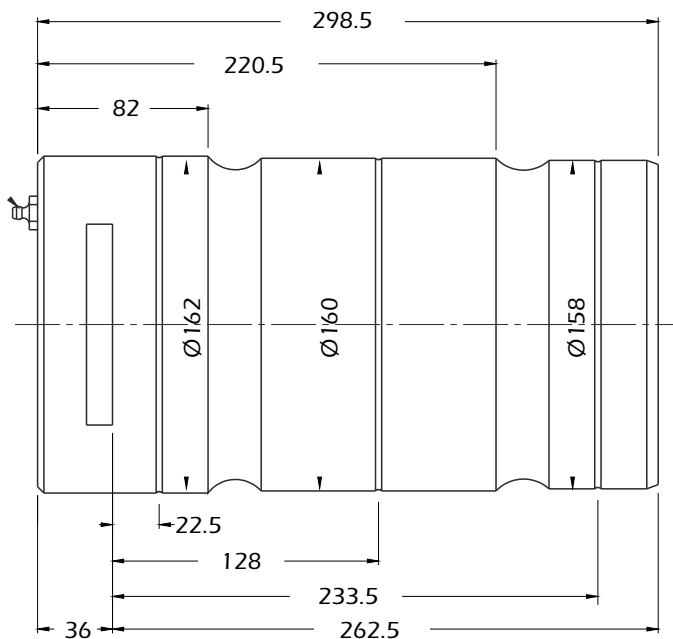


Specification

Rated load (tonnes)	450kN, 2500 kN & 3200kN
Proof load	150% of rated load
Ultimate breaking load	>500% of rated load
Output (two independent bridges)	450kN & 3200kN = 1.2mV/V, 2500kN = 2.2mV/V
Non-linearity	<±1% of rated load
Non-repeatability	<±0.1% of rated load
Excitation voltage	10 VDC Recommended (15 VDC Max)
Bridge resistance	350 Ohm
Insulation resistance	>500 MOhm @500 VDC
Operating temperature range	-20 to +70°C
Compensated temperature range	-10 to +50°C
Zero temperature coefficient	<±0.1% of rated load/°C
Span temperature coefficient	<±0.1% of rated load/°C
Environmental protection level	IP67 with connector mated

Dimensions (2500kN load pin shown)

All dimensions are in mm



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APPROVED

(unapproved if printed)