

MOVECAT LoCo LCS Active Load-Measuring Sensors (Shackle Implementation)



The LoCo LCS Load-Measuring Sensors (Shackle Implementation) are available in three versions – each with two rated loads. These are commercially available load shackles in which the standard load pins have been replaced by a special load-measuring pin made from special high-quality steel with an active measuring system. Highly developed sensory elements are integrated into the load-measuring bolts that are capable of determining the inflowing forces of the attached loads and transmitting the data to measuring electronics that are also integrated.

The rated loads of models LCS 3.25 and LCS 4.75 are 3.25 and 4.75 metric tons respectively, the safety factor being 5:1 (shackle and load-measuring pins) throughout. The integration of the sensor elements involves no damage to the external structure of the pin or mechanical weakening of the external structure of the bearing assembly of the kind normally encountered with load-measuring or shear pins. The Movecat procedure therefore allows markedly higher safety factors (industry standard = 300% / Movecat = 500%). LCS shackle sensors can therefore, like standard shackles, be used as

load-bearing elements whilst fulfilling the additional fully dynamic function of determining, evaluating and reporting the loads applied to the hoist.

The load-measuring pins and other steel parts are made from special stainless steel of the finest quality; the black powder-coated shackles are manufactured in the EC and come with an EC factory certificate. The knurled nut is further secured in stationary use by a cotter pin and in mobile use by a spring retaining pin.

Furthermore, in all models the tried-and-tested Movecat test and calibration system has been integrated. This, in combination with a Movecat LoCo, LMS or MPC-1 controller, provides for and tests the proper functioning of the unit at each start-up.

The LCS-AX models, based on the same technology as the tried-and-tested LMS-M series, represent the simplest implementation. These are fully maintenance-free systems with industry-standard (4-20 mA) analogue signal transmission. The LCS-AX models are robust enough to stand up to rough treatment and are equipped with an integrated C4CM plug as well as offering an outstanding price/performance ratio

whilst meeting the highest safety standards.

The LCS-DX models are equipped with digital and 4-20 mA analogue outputs and in digital mode up to 24 cells can be daisy-chained.

The LCS-RF models can be operated in radio or digital cable mode according to choice. The bidirectional transceiver radio module operates in the 868 MHz ISM band with EU authorization (registration and payment free). The Wake-On-Radio functionality makes remote launching from sleep mode possible, which is a particularly attractive feature whenever sustained stand-alone operation is contemplated. In digital mode, up to 24 cells can also here be daisy-chained – even in mixed operation with DX models.

The special features of the DX and RF models are their integrated storage battery, which in combination with the Wake-On command allows up to 30 days' stand-alone operation, and their 8-character LCD with RGB backlighting (active status display). The display is clearly legible even in bright environments and is also capable, if this is desired, of indicating system statuses through background colours, employing the Movecat traffic-light principle. Beneath the display, there are four input buttons by means of which the sensors as well as their functions and IP addresses can be operated using a simple menu structure. Alternatively, in Remote Mode central control from a LoCo controller is also possible.

Thanks to the integrated storage battery and an independent micro-controller with output displays, the DX and RF models can also be operated without an external controller, as the loads and statuses are displayed directly in real time in plain language as well as being represented

visually by colours. ~

The comprehensive software functions, such as individually programmable overload and underload threshold values, tare and IP settings as well as informative parameters such as minimum and maximum values of the measuring session, operating hours, battery capacity and transmitter power are useful aids in professional applications.

All models are equipped with a test and calibration system. Every time the unit is started up, this checks to make sure that it is functioning correctly, doing so directly in the case of the DX and RF models, and in the case of the AX models, in combination with a Movecat controller.

A further important advantage of self-testing is the fact that the load does not have to be unhooked but is recognized by the system and has no effect whatsoever on the test process. Any error in the system is detected and displayed by the controller and, depending upon the controller and its settings, leads to the shutting down either of the drive or of the connected load group.

In connection with the Movecat I-Series and LMS LRC controllers, the load values can be determined in real time. In connection with the I-Series controllers, underload and overload conditions can be defined and monitored.

Any overloading of the drives, suspension points or load-bearing structures being monitored is therefore effectively avoided.

The LCS systems are recommended for professional load monitoring and rigging applications in the trade fair, events, theatre, studio and touring sectors.

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MODELS:

- **LCS 3,25-AX**
3.25 t rated load, safety factor 5:1
C4MC Out (LMS-compatible)
- **LCS 4,75-AX**
4.75 t rated load, safety factor 5:1
C4MC Out (LMS-compatible)
- **LCS 3,25-DX**
3.25 t rated load, safety factor 5:1
C4MC Out (LMS-compatible)
C5MC and C5FC, OUT/IN – DIG-Link
(daisy chain max. 24)
- **LCS 4,75-DX**
4.75 t rated load, safety factor 5:1
C4MC Out (LMS-compatible)
C5MC und C5FC, OUT/IN – DIG-Link
(daisy chain max. 24)
- **LCS 3,25-RF**
3.25 t rated load, safety factor 5:1
C5MC and C5FC, OUT/IN – DIG-Link
(daisy chain max. 24)
ISM radio module, internal antenna
- **LCS 4,75-RF**
4.75 t rated load, safety factor 5:1
C5MC und C5FC, OUT/IN – DIG-Link
(daisy chain max. 24)
ISM radio module, internal antenna

*The functions listed depend upon the actual hoist/drive configuration

Options / Accessories:

- LoCo R2 and R3 – Load Controllers
- LMS LRC1 1-channel manual controller with computer interface
- LMS LC4/8B 4/8-channel controllers MPC 4ID8- and 4IC1 controllers with LMS input card transport cases

Technical data:

- Measuring range: 0 to 100 % of nominal load
- Overload: max. 150 % of rated load
- Collapse load (calc.): 500 % of rated load
- Calibration tolerance: < 1.0 % of FS
- Non-linearity: < 1.0 % of FS
- Hysteresis: < 0.5 % of FS
- Temp. error: < 0.1 % of FS/K < 0.1 % of reference value/K
- Operating conditions: -10° to +50° C

The values depend upon the application and the transmission of force They were achieved under favourable conditions in accordance with the user manual. FS = rated load

Technical features:

- Shackle EU-made with works certificate, black powder-coated load-measuring pin made from special, high-quality, stainless steel with active measuring system
- State-of-the-art strain-gauge technology: strain-gauge full bridges measure the lengthening of the shackle pins produced by tensile and shear forces. An integrated amplifier sends the measurement signal to the controller for analysis and further processing. An integrated calibration and test system provides readiness for operation with Movecat LoCo R series, LMS and MPC I series* controllers.
- AX models with integrated amplifier with test function and 4-20 mA, C4MC output (LMS-compatible)
- DX models with integrated storage battery, microcontroller, 8-character LCD with RGB backlighting (active status display) with digital and 4-20 mA analogue output, up to 24 cells linkable (Dig-Link)
- RF models with integrated storage battery, microcontroller, 8-character LCD with RGB backlighting (active status display) with digital output, up to 24 cells linkable (Dig-Link) and radio module, 868 MHz ISM band with registration- and payment-free EU authorization and Wake-On-Radio functionality