LB 200 SERIES
LOAD MEASURING PINS

LB 200 Series - Load Measuring Pins can be used alone or as part of a complete measurement system. Magtrol offers a wide range of Load-Force-Weight Transducers in various executions and accuracy classes and our Load Monitoring Units (LMU 210 Series) constitute an ideal safe measurement system which continuously checks for overloads and short circuits.

FEATURES

- For overload detection and load measurement: Nominal Load: 2.5 kN ... 1 250 kN (0.28 ... 140.5 tf).
- Admissible Overload: 150 %.
- Overload at Rupture: up to 500 %.
- Insensitive to external mechanical and chemical effects.
- Ideal for use in hostile environments.
- Temperature-compensated transducers with strain gauges in full-bridge configuration. On request, available with double bridge redundant.
- Simple installation for cost-saving solutions to measurement problems.
- Many options may be added to the lower-cost standard load pin for greater flexibility.
- Can be designed with special dimensions for adaptation to various construction conditions with nominal load up to 3 300 kN (336.5 tf).
- High reliability for strict safety requirements.

Fig. 1: LB 210 & LB 217 | Load Measuring Pins

DESCRIPTION

MAGTROL Load Measuring Pins are used to measure load and force and provide overload protection. The pins are mounted into machines in place of normal shafts and fitted with strain gauges, allowing them to produce a signal proportional to the measured load. Manufactured in Switzerland, Magtrol's LB 200 Series Load Pins are rugged with high resistance stainless steel and tight construction, designed specifically for use in harsh industrial environments. Available in several standard ranges 2.5 kN ... 1 250 kN, these highly ergonomic pins can be used for either new or refitted installations and are adaptable to various conditions.

APPLICATIONS

When forces acting on mechanical constructions are measured, the additional equipment required can often be costly and difficult to install. Magtrol Load Measuring Pins offer an excellent solution since they act as a direct element in the assembly, replacing a non-instrumented pin or shaft. LB 200 Series Load Pins are used for load measuring devices and overload protection on cranes, hoisting gear, elevators and winches, and force measurement for regulation processes in industrial installations and machinery production. Moreover it is an idealy transducer to detect and measure forces in harsh, tropical, offshore, marine and harbor environments.

DESIGN

The Magtrol Load Pin has 2 circular grooves and an axial bore. Inside the central bore, adjacent to the external grooves, the strain gauges are mounted in a full-bridge configuration. The positioning and orientation of the strain gauges have been optimized by means of the finite element method (FEM). Any transverse or axial forces, even when acting on any part of the pin, have practically no influence on the measurement signal.

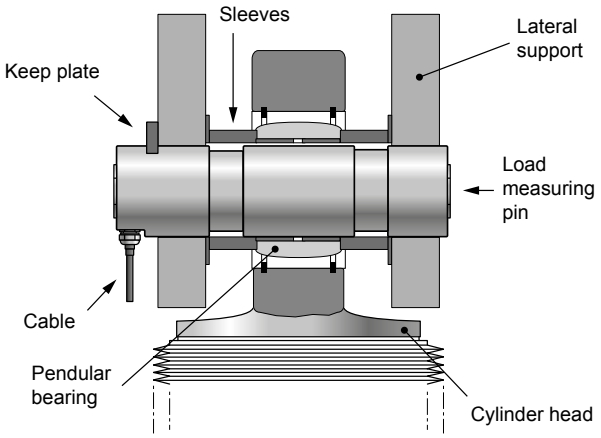


Fig. 2: Mounting example

OPERATING PRINCIPLE

When force is applied to the Load Measuring Pin along its sensitive axis, the effect on the strain gauge bridge results in an output signal proportional to the applied force. The powering of the strain gauge bridge, as well as the amplification of its output signal voltage, is performed by an external amplifier. Depending on the execution, this amplifier allows the monitoring of several levels.

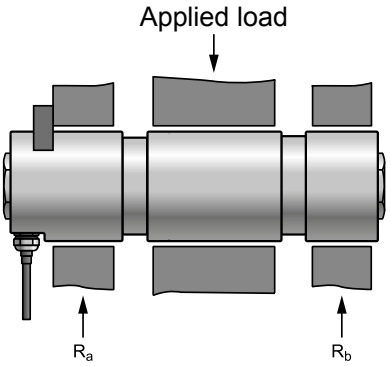
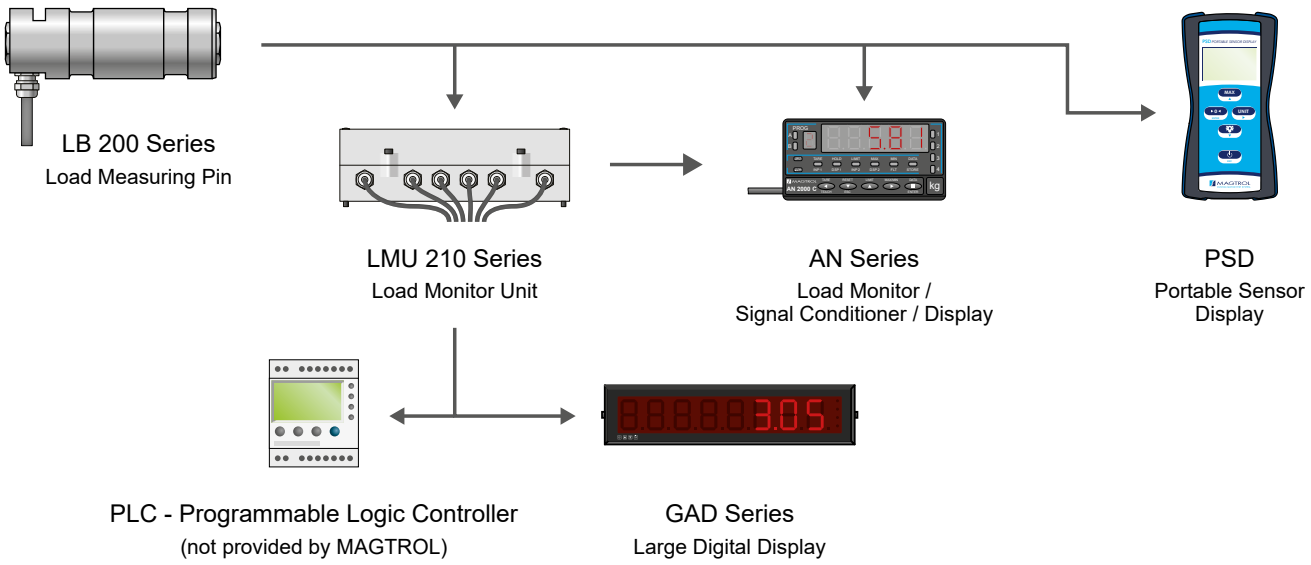
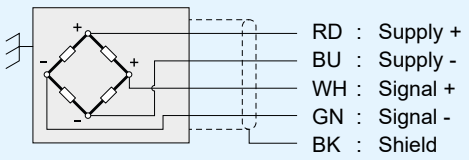


Fig. 3: R_a should equal R_b so that the force is evenly distributed

SYSTEM CONFIGURATION

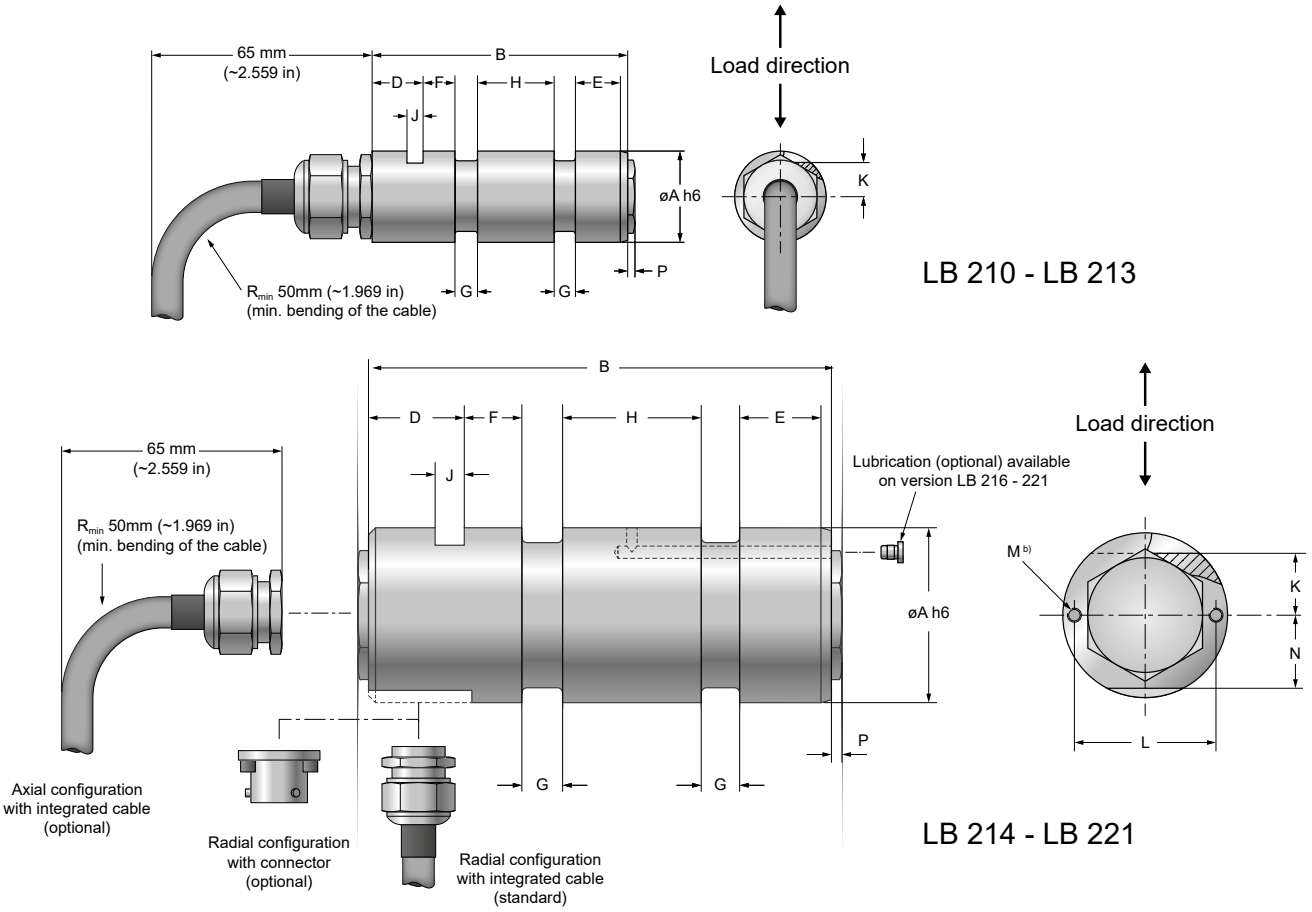


TECHNICAL DATA

STANDARD VERSION [a]	LB 210	LB 211	LB 212	LB 213	LB 214	LB 216	LB 217	LB 218	LB 220	LB 221
LOAD MEASUREMENT										
Nominal Load (NL) (Metric) [b]	2.5 kN	5 kN	10 kN	20 kN	50 kN	100 kN	200 kN	500 kN	1 000 kN	1 250 kN
Nominal Load (NL) (US) [b]	0.28 tf	0.56 tf	1.12 tf	2.25 tf	5.62 tf	11.24 tf	22.48 tf	56.2 tf	112.4 tf	140.5 tf
Overload Admissible (% of NL)	150 % (of nominal load without influence on measurement)									
Overload at Rupture (% of NL)	≥ 500 %							400 %	300 %	
Non-linearity Error [b]	< 0.25 %							< 0.5 %		
Non-linearity + Hysteresis Error [b]	< 0.5 %							< 0.8 %		
Repeatability [b]	± 0.1 %									
MECHANICAL CHARACTERISTICS & ENVIRONMENT										
Operating Principle	Full-bridge strain gauge									
Material	Stainless steel 1.4057									
Lubrication	Not available					Oiler ø4 DIN 3405 D or M10 DIN 3405 A				
Operating Temperature	- 25 °C ... + 80 °C									
Storage Temperature	- 55 °C ... + 125 °C									
Temperature Influence on Zero	± 0.02 % / K									
Temperature Influence on Sensitivity	± 0.02 % / K									
Fit	G7 / h6									
Angle influence on signal output [c]	According to the cosine function									
Protection Class	IP 66 according to DIN 60529									
ELECTRICAL CHARACTERISTICS & CONNECTIONS										
Bridge Impedance Input	400 Ω									
Bridge Impedance Output	350 Ω									
Power Supply	5 ... 12 V DC									
Zero Adjustment [b]	± 1 %									
Transducer Sensitivities	0.5 mV/V ± 3 %				1 mV/V ± 3 %				1.8 mV/V ± 3 %	
Output Connection	Integrated 3 m, 6 m, 12 m or 20 m polymer cable K-424 (standard) [e]									
Cable Glands	Axial, with heat-shrinkable sleeve				Radial, with heat-shrinkable sleeve (standard); Axial, with heat-shrinkable sleeve (optional)					
Wiring Diagram	 RD : Supply + BU : Supply - WH : Signal + GN : Signal - BK : Shield									
Output Connector (Optional)	Not available				Radial, connector: Souriau 851 02 E 10 6P50					
Cable Assembly (Optional)	Not available				3 m, 6 m, 12 m or 20 m cable with axial or 90° connector [d,e]					

a) Rating apply to standard load pins only, special models available on request.
b) Of full scale.
c) Variation of the measuring signal due to the angle positioning.
d) Axial connector: Souriau 851 06 JC 10 6S50, 90° connector: Souriau 851 08 EC 10 6S50.
e) Other longer cables lenghts avaible on request.

DIMENSIONS



NOTE: Original dimensions are in metric units. Dimensions converted to imperial units have been rounded up to 3 decimal places.

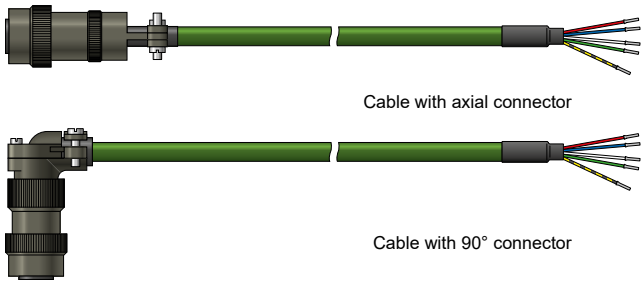
MODEL	units	ØA	B	D	E	F	G	H	J	K	L	M b)	N	Weight	
LB 210-213	mm	25 h6	84	18	16	10	7	24	5.2	9	N/A	N/A	N/A	0.2 kg	Not available
	in	0.984	3.307	0.709	0.63	0.394	0.276	0.945	0.205	0.354				0.441 lb	
LB 214	mm	35 h6	112	25	14	12	12	35	6.3	11.5			16	0.65 kg	
	in	1.378	4.409	0.984	0.551	0.472	0.472	1.378	0.248	0.453			0.630	1.433 lb	
LB 216	mm	50 h6	161	32	24	18	18	48	10.5	20			21.5	2.0 kg	Optional lubrication a)
	in	1.969	6.339	1.26	0.945	0.709	0.709	1.89	0.413	0.787			0.847	4.409 lb	
LB 217	mm	65 h6	196	32	26	20	25	65	10.5	22.5			28.5	4.4 kg	
	in	2.559	7.717	1.26	1.024	0.787	0.984	2.559	0.413	0.886			1.122	9.700 lb	
LB 218	mm	85 h6	258	34	39	35	28	89	10.5	28	64	M6	35	10.6 kg	
	in	3.347	10.158	1.339	1.535	1.378	1.102	3.504	0.413	1.102	2.520		1.378	23.369 lb	
LB 220	mm	100 h6	347	36	61	55	35	120	10.5	36	70	M8	45	19.2 kg	
	in	3.937	13.661	1.417	2.402	2.165	1.378	4.724	0.413	1.417	2.756		1.772	42.328 lb	
LB 221	mm	120 h6	347	36	61	55	35	120	12.5	40	70		45	28.4 kg	
	in	4.724	13.661	1.417	2.402	2.165	1.378	4.724	0.492	1.575	2.756		1.772	62.611 lb	

a) Oiler ø4 DIN 3405 D or M10 DIN 3405 A

b) The threaded holes are intended only for the extracting (removing) of the load measuring pin.

NOTE: 3D STEP files of most of our products are available on our website: www.magtrol.com ; other files are available on request.

CABLE ASSEMBLY



Cable with axial connector

Cable with 90° connector

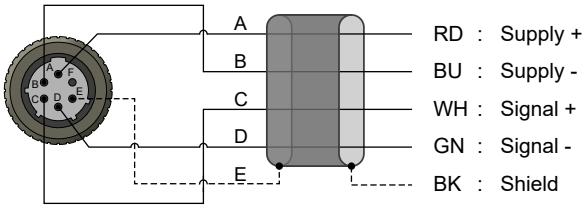
ORDERING NUMBER	EH 13	_	/ 0	_	X

8 : Axial connector
9 : 90° connector

1 : Cable length 3 m
2 : Cable length 6 m
3 : Cable length 12 m
4 : Cable length 20 m [a)]

a) Other longer cables lenghts avaible on request.

PIN CONFIGURATION



COUNTER CONNECTOR

Axial connector	PN 957-11-08-0030
90° connector	PN 957-11-08-0029

CUSTOMIZED LOAD PINS

Is your request outside our usual standards ? No worries, we are specialized in customized solutions! Whether it's an assembly with unique dimensions, a tailored solution involving specific technology, environmental and safety requirements, or simply a replacement, Magtrol has the experience to support your project. Our knowledgeable sales technicians are available to assist you, don't hesitate to reach out.

For more details, please visit the « Custom Load Pin » section on our website: **www.magtrol.com/custom-load-pin**

ORDERING INFORMATION

STANDARD MODEL	LB 2	_ _	- 011 / 00	_

10, 11, ..., 13 : Model (Connection: PG Axial)
14, 16, ..., 21 : Model (Connection: PG Radial)

0 : Connector (axial or radial)
1 : Cable length 3 m
2 : Cable length 6 m
3 : Cable length 12 m
4 : Cable length 20 m [a)]

a) Other longer cables lenghts avaible on request.

Example: LB 218 Load Measuring Pin (Optional Model) with lubrication, PG Axial and 6 m cable would be ordered as **LB 218-111/112**.
LB 212 Load Measuring Pin (Standard Model) with 3 m cable would be ordered as **LB 212-011/001**.

OPTIONAL MODEL	LB 2	_ _	- 111 /	_	_	_

14, 16, ..., 21 : Model (Connection: PG Radial)

0 : Without Lubrication (standard)
1 : With Lubrication (available only on LB 216 ... 221)

0 : PG Radial (standard)
1 : PG Axial
2 : Radial Connector

0 : Connector (axial or radial)
1 : Cable length 3 m
2 : Cable length 6 m
3 : Cable length 12 m
4 : Cable length 20 m [a)]

a) Other longer cables lenghts avaible on request.

SYSTEM OPTIONS & ACCESSORIES

PSD - PORTABLE SENSOR DISPLAY

Fig. 4: **PSD** | Portable Sensor Display

The PSD Portable Sensor Display from Magtrol is a very compact, light and easy to use device. This amplifier can process sensor strain gauge signals ±0.3 ... 5 mV/V. High measuring accuracy, paired with fast measuring rates allow an internal resolution of 22 bits at 2 mV/V. It also stores the adjustment data, sensor designation and physical unit. Functions, such as TARE, recall of min.-max. value,... are available during the measurement.

The device is powered by 3 AA batteries or via its USB Mini-B port. In order to increase its duration of use, the PSD integrates an automatic standby mode which is activated when the device is not used.

The PSD can be used with many sensors such as force sensors, load cells, torque sensors, anchor sensors or any other type of strain gauge transducers.

LMU 210 SERIES - LOAD MONITORING UNIT

Fig. 5: **LMU 216** - Load Monitoring Unit

Magtrol's Load Monitoring Units are used for measuring load, force and weight from signals generated by strain gauge transducers. Specifically designed for use with Magtrol's Load Measuring Pins and Load-Force-Weight Sensors, the LMU 210 Series provides excitation voltage while conditioning the bridge output signal.

Each unit contains DIP-switches and jumpers for greater flexibility and complete adaptability. User-defined alarm limits can be configured into the unit, which when combined with our sensors, provides a safe and rugged measurement system that continuously monitors for short-circuits and interrupted signal lines. Magtrol LMU 210 Series are specially designed for use in harsh environments and are suitable for crane security systems.

GAD SERIES - LARGE DIGITAL DISPLAYS

Fig. 6: **GAD 6** - digits height 102mm - Large Digital Display

These high quality, large character digital displays can be used for crane weight display, process weight display, and all other remote weighing applications. They use microprocessor based technology for high reliability and have a non-volatile memory to store all the calibration data.

Magtrol Large Digital Displays are used with Load Monitoring Units (LMU Series) or signal conditioners (AN Series), as part of a complete measurement system. Magtrol load measuring pins, which measure load and force to provide overload protection, are available for a wide range of Load-Force-Weight, and in various executions and accuracy classes. Combined, these products constitute an ideal safe measurement system for continuous overload monitoring.

AN SERIES - LOAD MONITOR DISPLAY WITH INTEGRATED SIGNAL CONDITIONER

Fig. 7: **AN Series** - Load Monitor Display with integrated signal conditioner

The AN Series Load Monitor are designed to process and display signals coming from various types of transducers (weight, load, pressure, torque, etc.) that use standard strain-gauge bridges.

The basic instrument is a soldered assembly composed of a main board, a tri-color programmable display and a power circuit. Standard features include the reading of the input variable as well as remote hold, reading and memorization of max and min values (peak / valley), tare and reset function.

Further information on accessories are available in their specific data sheets. Please, visite our website: **www.magtrol.com**.

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