

# Lumbar Spine Load Cell

Typ M537A3A...

## Triaxial

Type M537A3A... measures forces and moments of the lumbar spine in the crash test dummies EuroSID-1 (E1) and EuroSID-2 (E2).

- Triaxial ( $F_y$ ,  $F_z$ ,  $M_x$ )
- UPS module available
- Low linearity error and hysteresis error
- Kistler system cabling
- Polarities according to SAE J211/1

### Description

The load cell is made of elements on which forces are transmitted. The mechanical deformation element, applied with strain gage, serves for mechanical electrical deformation. The effectiveness of the load cell resembles the behavior of a spiral spring.

The forces to be measured create mechanical stretches and buckling in the gaging member. In order to avoid linearity errors, the deformation paths are constructively held small (high rigidity). Thus a proportional behavior is realized. The force and moment proportional resistance variations are measured by a Wheatstone-type bridge circuit.

The load cell is available with UPS module which is integrated in an external housing in the wiring or in the connector. Customized cable lengths and connectors with specific pin assignments are optionally available.



### Technical Data

Axes		$F_y$	$F_z$	$M_x$
Measuring range	kN	13,5	13,5	
	N·m			550
Bridge output voltage (typ.)	mV/V	1,8	1,8	3,0
Sensitivity (typ.)	$\mu\text{V/V/kN}$	133	133	
	$\mu\text{V/V/N}\cdot\text{m}$			5,5
Bridge resistance	$\Omega$	700	350	350
Ultimate load	%	150	150	150
Supply voltage <sup>1)</sup>	VDC	2,5 ... 15		
Insulation resistance <sup>2)</sup>	G $\Omega$	>10		
Operating temperature range	$^{\circ}\text{C}$	-20 ... 80		
Storage temperature range	$^{\circ}\text{C}$	-30 ... 90		
Amplitude non-linearity (typ.)	%	<1		
Hysteresis (typ.)	%	<1		
Channel cross talk	%	<5		
Bridge zero output (typ. / max.)	mV/V	0,01 / 0,03		
Weight, without cable		662		

All specifications are typical at 25  $^{\circ}\text{C}$  and rated at 10 V sensor supply voltage, unless otherwise specified.

<sup>1)</sup> With UPS module 9 ... 12 VDC

<sup>2)</sup> All wires to load cell housing, measured with 500 VDC

### Application

The load cell is directly assembled at the designated location in the dummy and provides important information about the loads on the human body occurring during a crash test.

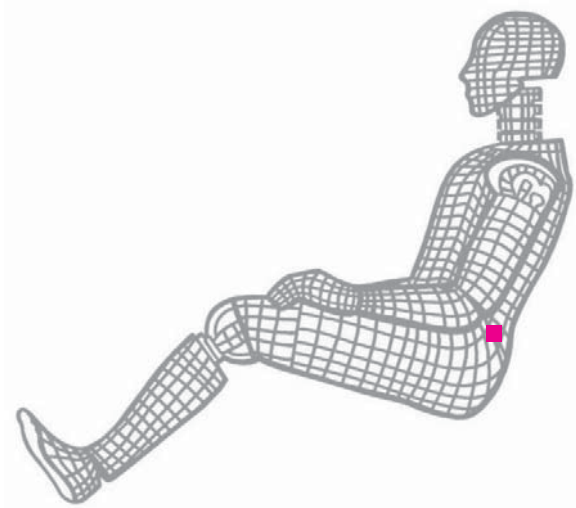


Fig. 1: Dummy application, location lumbar spine

### Ordering Key

Type M537A3A

#### Design

Standard	IM
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#### Cable Length before Electronics

0 cm	00
<10 cm (digit x 1 cm)	C#
10 cm ... 9,9 m (digit x 10 cm)	##
10 m ... 90 m (digit x 10 m)	D#

#### Additional Electronics

Sensor detail, as per type declaration force-moment TP-650-2	#
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#### Cable Length after Electronics

0 cm	00
<10 cm (digit x 1 cm)	C#
10 cm ... 9,9 m (digit x 10 cm)	##
10 m ... 90 m (digit x 10 m)	D#

#### Connector

Connector type, as per TP-600	#-
Connector assignment, as per TP-600	-#

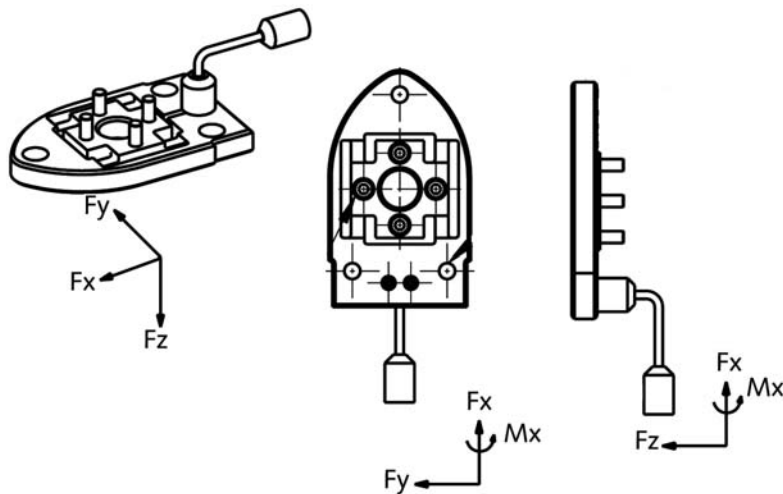


Fig. 2: Sketch

### Included Accessories

- None

### Optional Accessories

- Add. label with serial number, plug side
- UPS module
- Add. label with ID number at sensor
- Add. shunt

### Type No.

M015KABID  
on request  
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