

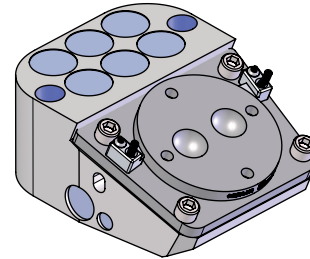
# Lumbar Spine Load Cell

## Six-axial

Type M56213A...  
M56216A...

Type M5621xA... is used in the crash test dummy HIII-95 % (HM) and HIII-50 % (H3) to measure forces and moments<sup>1)</sup> in the lumbar spine.

- Triaxial ( $F_x$ ,  $F_y$ ,  $F_z$ ), six-axial ( $F_x$ ,  $F_y$ ,  $F_z$ ,  $M_x$ ,  $M_y$ ,  $M_z$ )
- UPS module available
- Low linearity errors and hysteresis
- Kistler system cabling
- Polarities according to SAE J211/1



### Description

The load cell is made of elements on which forces and moments<sup>1)</sup> are transmitted. The mechanical deformation element, applied with strain gage, serves for mechanical electrical deformation. The forces and moments<sup>1)</sup> 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 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

Axial data		$F_x$	$F_y$	$F_z$	$M_x^{1)}$	$M_y^{1)}$	$M_z^{1)}$
Measuring range	kN	15	15	20			
	N·m				600	600	350
Bridge output voltage (typ.)	mV/V	1.9	1.9	1.1	1.8	1.8	1.6
Sensitivity (typ.)	$\mu\text{V/V/kN}$	127	127	55			
	$\mu\text{V/V/N·m}$				3.0	3.0	4.6
Bridge resistance	$\Omega$	350	350	700	700	700	350
Ultimate load, static	%	150	150	150	150	150	150

### General data

Supply voltage <sup>2)</sup>	VDC	2.5 ... 15
Insulation resistance <sup>3)</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	grams	7 200

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

<sup>1)</sup> Only in six-axial version

<sup>2)</sup> With UPS module 9 ... 12 VDC

<sup>3)</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.

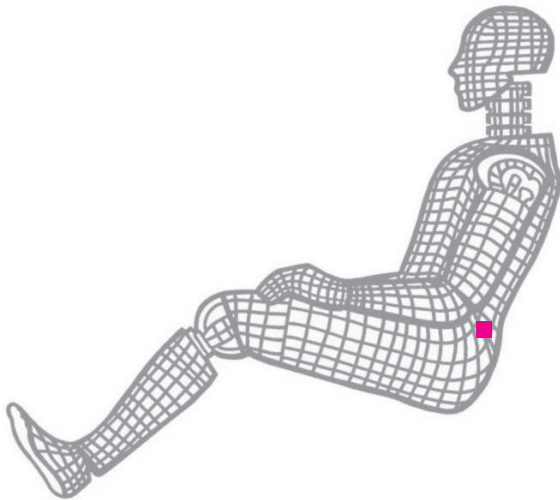


Fig. 1: Dummy application, location lumbar spine

**Included accessories**

- None

**Optional accessories**

- UPS module
- Add. shunt

**Art. no.**

on request  
on request

**Ordering key**

Type M5621

**Number of axes, design**

Triaxial, standard	3AIM
Six-axial, standard	6AIM

**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**

Conn. type, as per TP-600	#-
Conn. assignment, as per. TP-600	-#

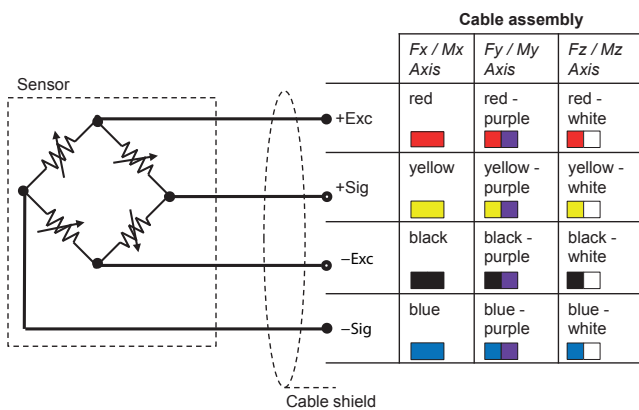


Fig. 2: Cable assembly

M5621xA\_000-837e-11.19

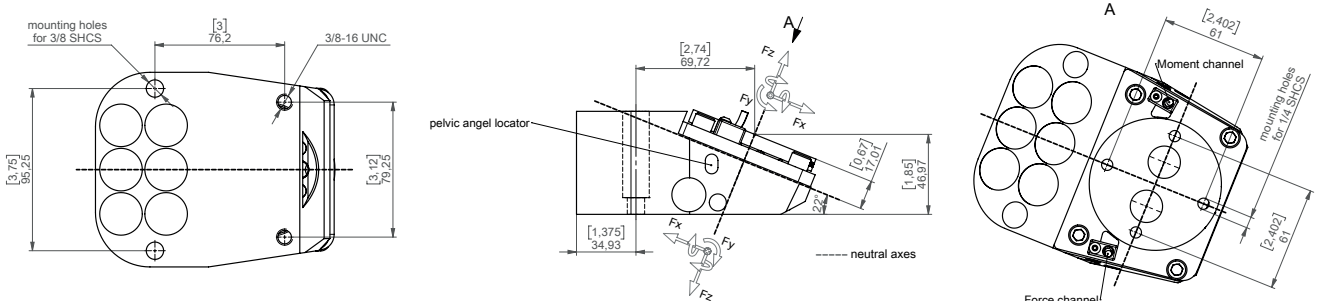


Fig. 3: Dimensions in mm