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measure. analyze. innovate.

Upper Tibia Load Cell

Four-axial, Five-axial

**Type M55214A...,
M55214B...,
M55215A...,
M55215B...**

Type M5521... is designed to measure forces and moments in the upper tibia of the crash test dummies HIII-5 % (HF), HIII-50 % (H3), HIII-95 % (HM) and SID-IIs (S2). The sensor is available with four or five axes.

- Axes: four (F_x, F_z, M_x, M_y) or five (F_x, F_y, F_z, M_x, M_y)
- UPS module available
- MICRODAU® available
- Low linearity errors and hysteresis errors
- Kistler system cabling
- Polarities according to SAE J211/1

Type M55214A...

Type M55214B...

Description

The load cell is made of elements on which forces and moments are trans-mitted. The mechanical deformation element, applied with strain gage, serves for mechanical electrical deformation. The forces and moments 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

Axial Data		F_x	F_y[1)]	F_z	M_x	M_y
Measuring range	kN	11	11	11		
	N·m				400	400
Bridge output voltage (typ.)	mV/V	2,0	2,0	1,0	2,8	2,8
Sensitivity (typ.)	µV/V/kN	180	180	90		
	µV/V/N·m				7,0	7,0
Bridge resistance	Ω	700[2)]	700[2)]	700	350	350
Ultimate load, static	%	150	150	150	150	150

General Data		
Supply voltage[3)]	VDC	2,5 ... 15
Insulation resistance[4)]	GΩ	>10
Operating temperature range	°C	–20 ... 80
Storage temperature range	°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	450

All specifications are typical at 25 °C and rated at 10 V sensor supply voltage, unless otherwise specified.

1) Only five-axial version
2) Five-axial LC: up to serial number 0004606001 (up to year of construction 2015) the bridge resistance of the load cells is 350 Ω (F_x, F_y). Please mind the first calibration!
Four-axial LC: up to serial number 0004640201 (up to year of construction 2015) the bridge resistance of the load cells is 350 Ω (F_x). Please mind the first calibration!
3) With UPS module 9 ... 12 VDC
4) All wires to load cell housing, measured with 500 VDC

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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. The measuring location uppter tibia is typically used together with the measuring location lower tibia (Type M55204...). If tibia load cells are mounted in a dummy both the tibia bone and the knee of the dummy must be replaced. The items are:

	Type
Tibia bone	M55000ASM00Q0001
Knee as bone	M55110AJM00Q0001
Knee as load cell	M55112AJM...

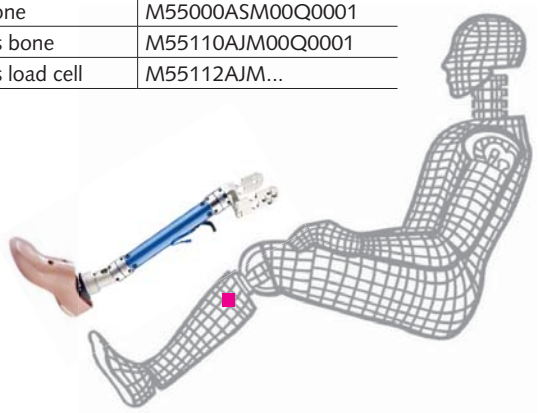

Fig. 1: Instrumented leg, dummy application

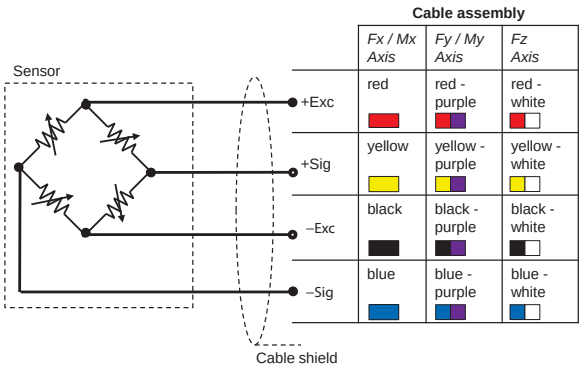

Fig. 2: Cable assembly

Included Accessories

	Type No.
• Mounting screws, imperial 1/4-28 UNF, 4 units	on request

Optional Accessories

	Type No.
• Add. label, customized	M015KABID
• UPS module	on request
• Add. shunt	on request

Ordering Key

Type M5521 ☐☐☐☐☐☐

Design

Four axes:	
Standard	**4ASM**
Mech. prepared for MICRODAU®	**4BSM**
Five axes:	
Standard	**5ASM**
Mech. prepared for MICRODAU®	**5BSM**

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	**#**

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	**-#**

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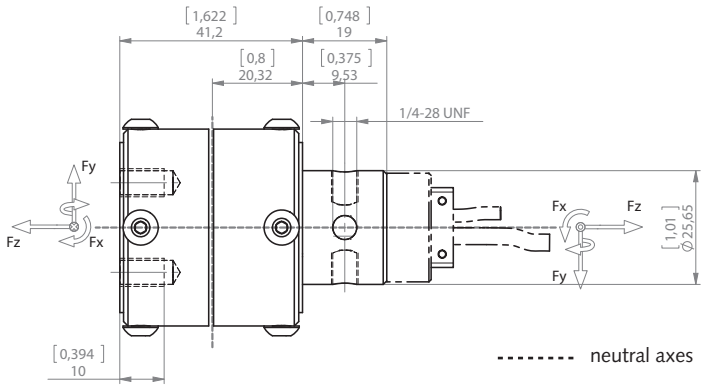

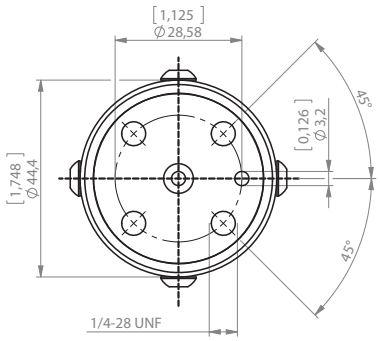

Fig. 3: Dimensions in mm

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