

# Femoral Neck Load Cell

## Triaxial

Type M53923A...

Type M53923A... is designed to measure forces in the femur and femur neck of the crash test dummy WorldSID-5 % (W5).

- Triaxial ( $F_x$ ,  $F_y$ ,  $F_z$ )
- Bridge resistance 350/700  $\Omega$
- 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.

### 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.

### Technical Data

Axial Data		$F_x$	$F_y$	$F_z$
Measuring range	kN	10	25	10
Bridge output voltage (typ.)	mV/V	2,6	2,5	2,6
Sensitivity (typ.)	$\mu\text{V}/\text{V}/\text{kN}$	260	100	260
Bridge resistance	$\Omega$	350	350	700
Ultimate load, static	%	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)	grams	181		

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

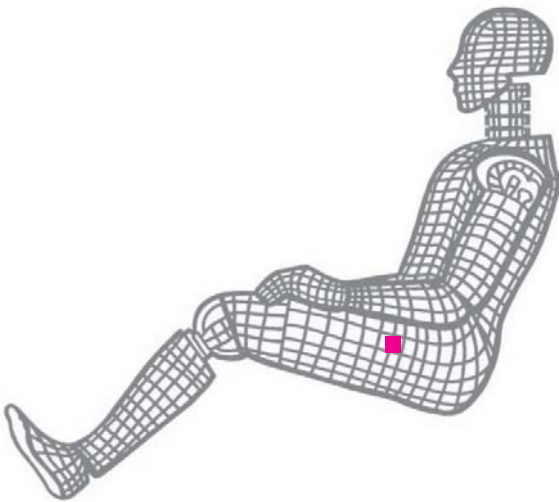


Fig. 1: Dummy application, location femur and femur neck

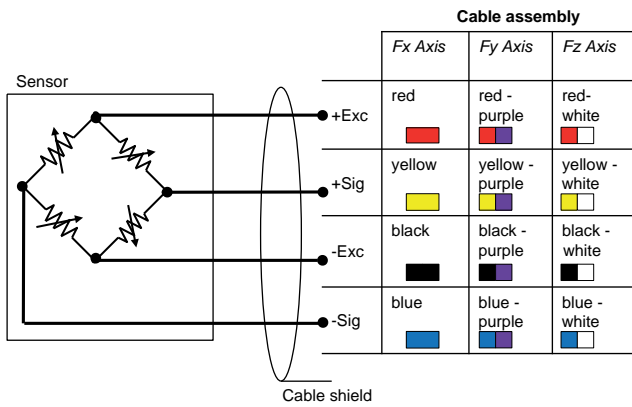


Fig. 2: Cable assembly

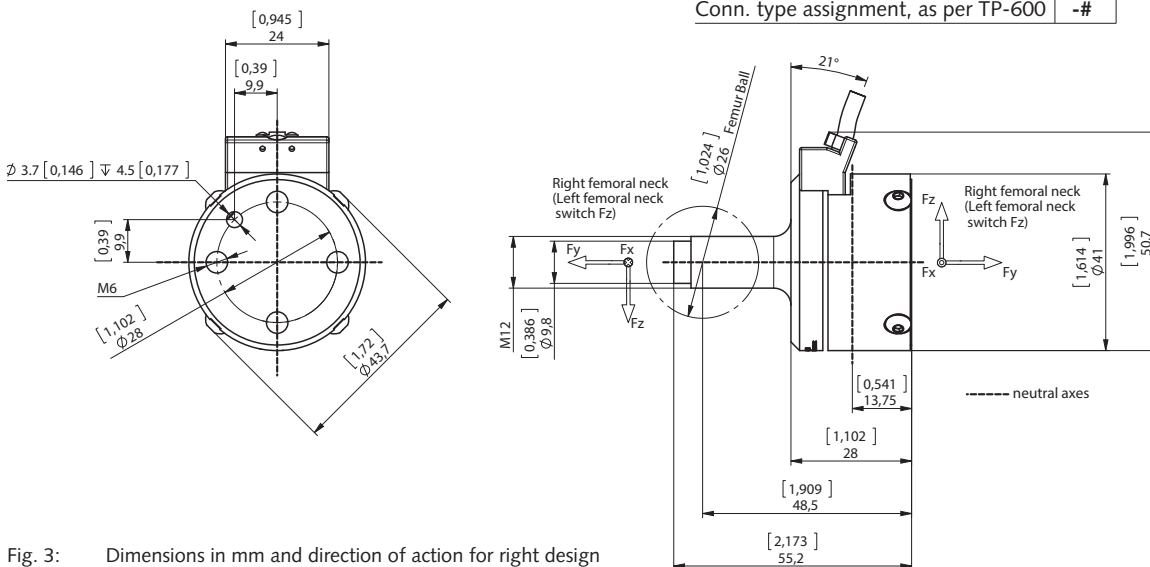


Fig. 3: Dimensions in mm and direction of action for right design

**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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on request

**Ordering Key**

Type M53923A

**Design**

Right femur	2M
Left femur	7M

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

M53923A\_003-079e-02.16