

# Shoulder Load Cell

Type M53653A...

## Triaxial

Type M53653A... is designed to measure forces in the shoulder of the crash test dummy WorldSID-5 % (W5).

- Triaxial ( $F_x$ ,  $F_y$ ,  $F_z$ )
- 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	4	5	4
Bridge output voltage (typ.)	mV/V	2,4	1,3	2,4
Sensitivity (typ.)	$\mu\text{V}/\text{V}/\text{kN}$	580	255	580
Bridge resistance	$\Omega$	350	700	350
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	55		

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

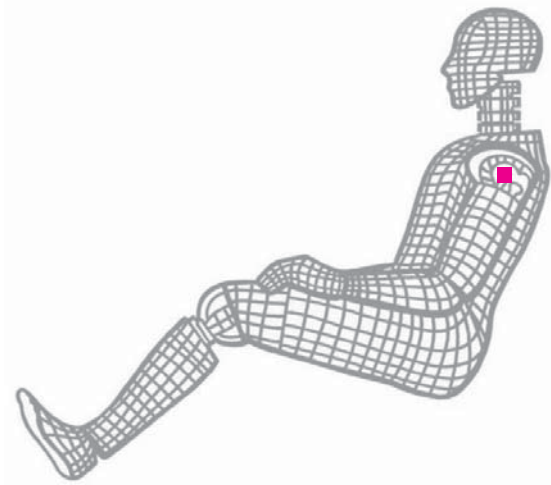


Fig. 1: Dummy application, location shoulder

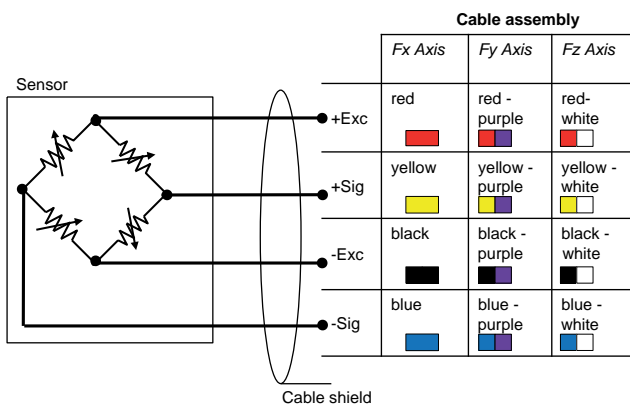


Fig. 2: Cable assembly

### 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  
M015KABID  
on request

### Ordering Key

Type M53653A

### Design

Left shoulder	4M
Right shoulder	5M

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

M53653A\_003-078e-02.16

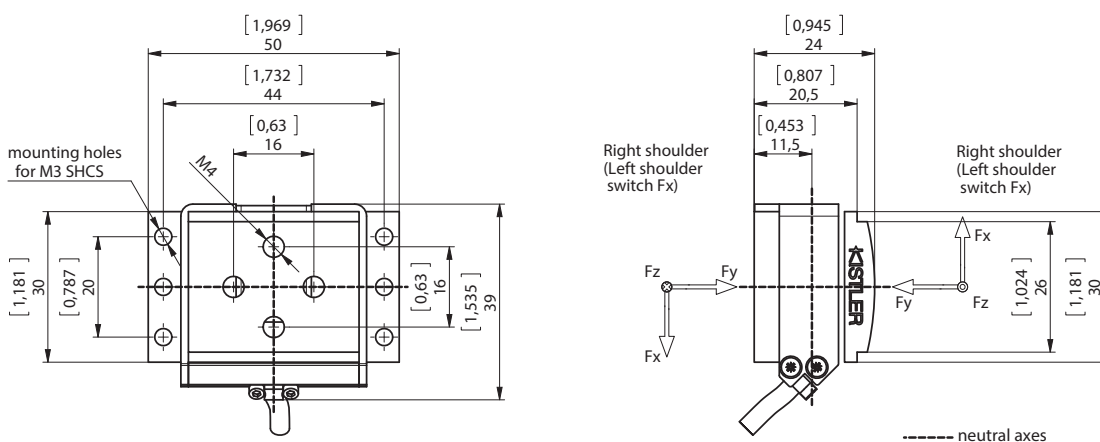


Fig. 3: Dimensions in mm and direction of action for right design