

# Webbing Load Cell

## Uniaxial, resistive

Type M51111...

Type M51111... is designed to serve the measurement of the forces at the safety belt during a crash test, with a negligible impact on the belt's performance.

- Light-weight
- Low interpolation deviation
- Easy replaceable cable solution
- Sensitivity typ. 130  $\mu\text{V/V/kN}$
- Measuring range 16 kN
- UPS module inside load cell optionally available
- Calibration conforming to ISO/TS 17242 (third degree polynomial)

### Description

This sensor is comprised of a main body and two removeable bars. The main body is equipped with strain gages. Due to its superior design the safety belt force transmission into the main body is ideal. The acting force mechanically extends the main body. The built-in strain gages, implemented as a Wheatstone-type full bridge, will change their resistance, which is proportional to the acting force.

The sensor supports three essential targets for webbing load cells: An ultra-light weight, due to its Titanium design, good technical specifications and an easy handling, including a quick replaceable cable system. Due to its low weight it supports the demand to use more than one load cell simultaneously at the webbing.

The replaceable cable solution allows the user to quickly exchange a defect, sheared-off cable in just a few minutes. The cable is plugged-in with a miniature connector inside the housing and is protected against external loads.

The load cell is deliverable with two different cable outlet designs: Type M51111A... right-angled, Type M51111B... straight. Customized cable lengths, ID modules and connectors with specific pin assignments are optionally available for both variants.



### Technical data

Measuring range	kN	16
Sensitivity (typ.)	$\mu\text{V/V/kN}$	130
Bridge resistance	$\Omega$	350
Limit	%	150
Supply voltage <sup>1)</sup>	VDC	5 ... 15
Current consumption <sup>2)</sup> (typ.)	mA	30
Insulation resistance <sup>3)</sup>	G $\Omega$	>10
Operating temperature range	$^{\circ}\text{C}$	-20 ... 80
Storage temperature range	$^{\circ}\text{C}$	-30 ... 90
Interpolation deviation <sup>4)</sup> (typ.)	%	$\pm 0.5$
Hysteresis <sup>4)</sup> (typ.)	%	<2.4
Zero measurand output, typ. / max.	mV	1 / 3
Weight, without cable		
Type M51111A...	grams	76
Type M51111B...	grams	70
Sensor material		Titanium
Webbing thickness	mm	1.3
Webbing width	mm	50
Dimensions	mm	65x35x16.5

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 modul 9 ... 12 VDC

<sup>2)</sup> With UPS modul 40 mA

<sup>3)</sup> All wires measured to load cell housing

<sup>4)</sup> Calibration with new standard belt (Berger 90029/5/047)

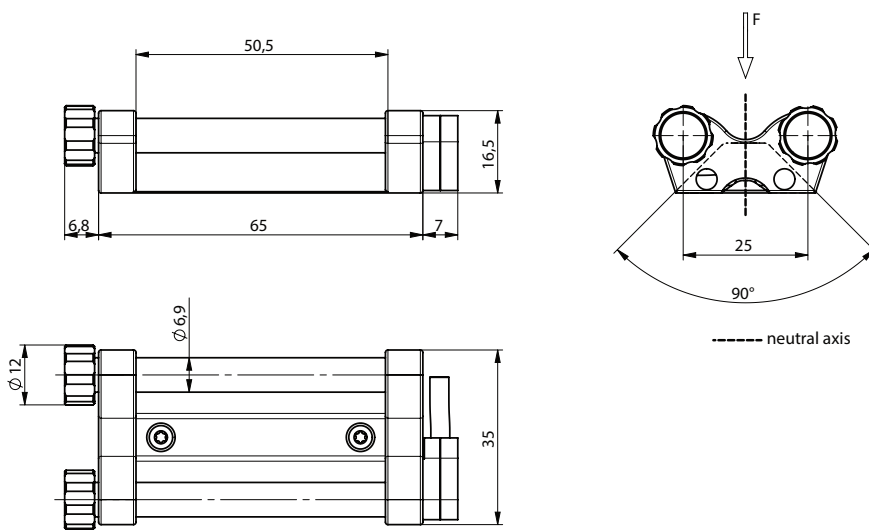


Fig. 1: Dimensions in mm

### Application

Type M51111... is designed to serve the measurement of the forces at the safety belt during a crash test, with a negligible impact on the belt's performance. The load cell is fixed with just a few turns at the webbing. In order to mount the device, the two retaining bars are completely removeable from the body. After the mounting is done, the load cell system is ready to measure.

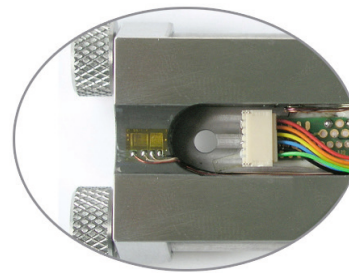


Fig. 3: Miniature connector inside load cell body

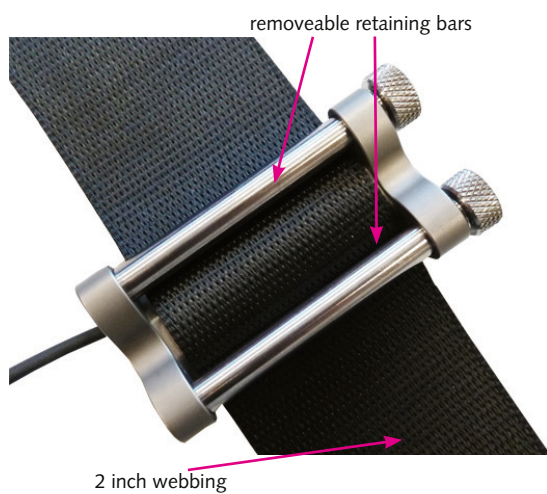


Fig. 2: Application sample (image similar to Type M51111B...)

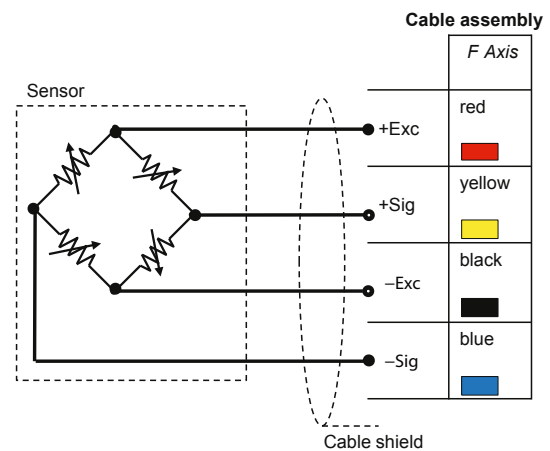


Fig. 4: Schematic diagram

- Included accessories

  - 6 m replacement cable with mini connector and open end
  - 1 pair removeable retaining bars, material Titanium
- Type no.

on request
- Optional accessories

  - Cable length up to 10 m
  - Customized connector
  - Add. label, customized
  - Add. shunt
  - UPS module
- Type no.

on request

on request

M015KABID

on request

on request

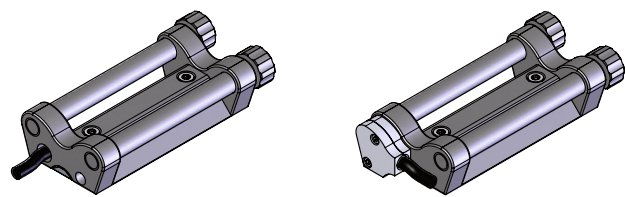


Fig. 5: Cable outlet straight (left) and right-angled (right)

Ordering key

Type M51111

Design

Right-angled cable outlet	AN#
Straight cable outlet	BN#

Electronics<sup>1)2)</sup>

ID– to Ex–	##E
ID– to screen	##G
without electronics	##M

Cable length before electronics

<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

<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	-#

<sup>1)</sup> Standard: Dallas assembled in housing  
<sup>2)</sup> With option M use cable length before electronics / with option E or G use cable length after electronics