

# SmartCrash<sup>®</sup> Corner Element R150

Type 9359B1

## With Digital Data Output

The piezoelectric SmartCrash<sup>®</sup> force measuring element with integrated electronics measures 3 orthogonal components  $F_x$ ,  $F_y$  and  $F_z$  of dynamic forces in any direction. It is predestinated for measuring high dynamic impact forces during crash test procedures. The force measuring elements with integrated data acquisition and storage are supplied with the preloaded piezoelectric force sensors factory calibrated.

- Wide measuring range
- High sensitivity
- Excellent linearity over total measuring range
- High rigidity/natural frequency
- Easily mounted and removed from front
- Integrated data preprocessing and data storage
- Digital data output
- D-Sub 9 pin connector
- TEDS functionality (calibration data and automatic sensor identification)

### Description

The SmartCrash corner element consists of a cover body with a radius of R150 and a base plate, the piezoelectric quartz sensors (4 units) preloaded by an expansion screw between base plate and top plate and an integrated electronics for data preprocessing. Each individual SmartCrash force measuring element measures the 3 orthogonal forces  $F_x$ ,  $F_y$  and  $F_z$  of the forces affecting during the crash. The piezoelectric sensors in the corner element generate a proportional charge on the force, which is summed, amplified and processed.

A unit for digitization of analog signals (DiMod module) is incorporated in each individual SmartCrash force measuring element. The charge signals are converted into a voltage signal, digitized by an A/D converter and stored in a central data recorder which simultaneously executes the parametrization and control. Before the actual measurement is performed, an automatic system check is carried out to check that the entire measuring chain is operating properly. Each individual force measuring element is connected by a corresponding connection cable to the data recorder via an RS-485 interface.



The SmartCrash force measuring element is supplied calibrated ready to be used for taking measurements immediately after being mounted. The power supply for a SmartCrash force measuring element is provided by the power unit/industrial PC (controller).

### Application

The SmartCrash corner unit is mainly used in vehicle development for instrumentation of crash barriers for tests according to the IIHS Small Overlap Test Protocol where high dynamic forces have to be detected quickly, easily and precisely.

## Technical Data

Measuring range Measuring ranges relate to the nominal sensor sensitivity	F <sub>x</sub>	kN	0 ... 300
	F <sub>y</sub>	kN	-100 ... 100
	F <sub>z</sub>	kN	-100 ... 100
Calibrated range	F <sub>x</sub>	kN	0 ... 250
	F <sub>y</sub>	kN	0 ... -50 <sup>1)</sup>
	F <sub>z</sub>	kN	0 ... 50 <sup>1)</sup>
Calibrated partial range	F <sub>x</sub>	kN	0 ... 100 <sup>1)</sup>
Bending moments	M <sub>y</sub>	kN·m	on request
	M <sub>z</sub>	kN·m	on request
Linearity (FSO)		%	≤±1,0
Crosstalk (FSO) – [typical values]	x → y, z	%	≤±2,0 [≤±1,0]
	z ↔ y	%	≤±3,5 [≤±1,0]
	y,z → x	%	≤±3,5 [≤±1,0]
Operating temperature range		°C	0 ... 40
Natural frequency of the crash force element alone	F <sub>x</sub>	Hz	>4 000 <sup>2)</sup>
	F <sub>y</sub> , F <sub>z</sub>	Hz	>4 000
Weight standard element	m	kg	12,1
Material standard element			1.2316+S
Protection (IEC)			IP65

<sup>1)</sup> Measuring ranges for determining the correction factors for crosstalk

<sup>2)</sup> Free air resonance

## Electronics

Selectable measuring ranges	F <sub>x</sub>	kN	20 ... 500
	F <sub>y</sub>	kN	4 ... 100
	F <sub>z</sub>	kN	4 ... 100
Self test signal		%FS	2 ... 50
Frequency range of charge amplifier (-3 dB)		kHz	>10
ADC resolution		Bit	16
Sampling rate (synchronous per channel)		kHz	20
Flash memory, per channel (150 s @20 kHz rate)		Samples	1 306 624
Data processing	RS-485 bus		
Data processing (external: host controller, TCP/IP)	Ethernet	100 BaseT	
Power supply (per element)		VDC	5,2 ... 6,0
		mA	≈50

## Functions

Reset/Operate	all channels simultaneously
Test signal ON/OFF	all channels simultaneously
Measuring range setting	individually selectable ranges

## Application Software (on Request)

- Preparation and execution software CrashDesigner
- Others on request

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CrashDesigner is a product of Kistler Holding AG.

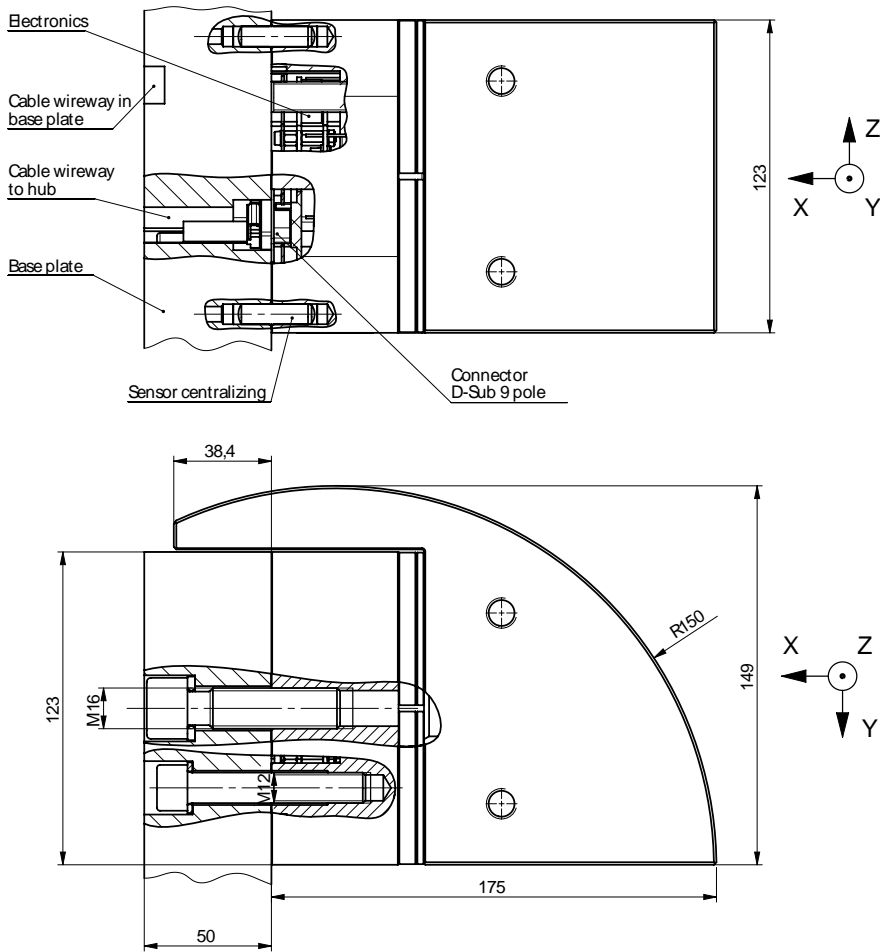


Fig. 1: SmartCrash® corner element R150

### Ordering Code

- SmartCrash Corner Element R150  
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