HKM Messtechnik

Shear force transducer

SK 1.X, SK 2.X

For tension and compression loads
Measurement ranges from 2 kN to 100 kN
Design adaptation to customer specification

Load and force measurement
Test rigs
Dispensing systems

Designed, developed and made in Germany

The outstanding features of these shear force transducers are an exceptionally robust and compact design, and a high load capacity. The decisive advantage of the shear force measuring principle is its insensitivity to transverse forces.
Shear force transducers are especially suitable for applications in harsh weighing and industrial environments. In comparison with other types of sensor, they are economical to manufacture and simple to adapt to customers' installation requirements.
The standard types have three through holes for mounting. On request, we will be pleased to quote for alternative designs adapted to special force transmission requirements.

Measuring amplifiers can be integrated in all shear force transducers, ensuring that a broad bandwidth of output signals are at your disposal. Transducers are supplied with a cable as a standard feature or, alternatively, can be connected with an M12x1 plug connector.

Technical data

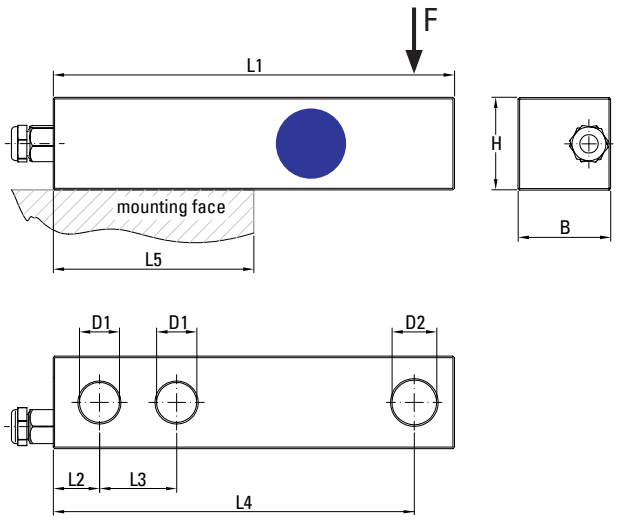
Type		SK 1.0	SK 1.1	SK 1.2	SK 1.3	SK 2.0	SK 2.1
Nominal load [kN]		2	5	10	20	50	100
Dimensions [mm]	H	30				48	
	B	30				48	
	L1	130				170	
	L2	15				19	
	L3	25				38	
	L4	117				152.4	
	D1	Ø 12.6				Ø 20.6	
	D2	Ø 12.6		Ø 14.5		Ø 20.6	
Length of mounting surface L5 [mm]		65				84	
Material		Aluminium		Steel		Steel	
Self-weight [kg]		0.3		0.7		2.3	
Maximum working load*		1.1 x nominal load					
Limit load*		1.5 x nominal load					
Breaking load*		> 3 x nominal load					
Accuracy		±0.25% f.s.** under tension *or* compression					
Reference temperature		20°C					
Nominal temperature range		–10°C to +50°C					
Working temperature range		–30°C to +80°C					
Temperature coefficient of gain		< 0.1% f.s.**/10K					
Temperature coefficient of zero		< 0.2% f.s.**/10K					
Nominal deflection		< 0.1 mm					
Degree of protection		IP 67					

* The sum of the dynamic and static load is decisive

** f.s. = full scale value

Dimensions

in mm

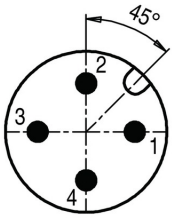


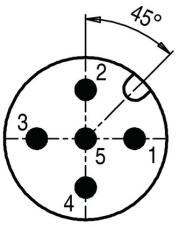
Output variants without measuring amplifiers / with integrated measuring amplifiers

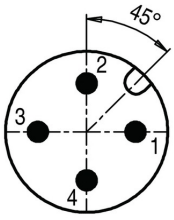
Version	Without measuring amplifier*	Measuring amplifier with current output		Measuring amplifier with voltage output			Measuring amplifier with RS 485 interface
		3-conductor	2-conductor				
Output signal Sig	≈ 2 mV/V	1…9 mA 4…20 mA 12 ± 8 mA	4…20 mA 12 ± 8 mA	0…5 V 2.5 ± 2.5 V	0…10 V 5 ± 5 V	±10 V	0...32767 digits
Supply U_b [V]	< 10	10…30	10…30	6…30	11…30	12…30	6...30
Resolution [bit]	–	11		11			14
Measuring rate	–	1000 (optional 30….2000) Hz					
Insulation resistance	> 1 GΩ	> 1 GΩ					
Load	–	< (U_b – 6V) / Sig_{max}	< (U_b – 8V) / Sig_{max}	> 10 000 Ω			–
Max. power consumption	40 mA	40 mA					
Electrical protection	Reverse voltage, overvoltage and short circuit protection			Reverse voltage and overvoltage protection			Reverse voltage, overvoltage and short circuit protection
Cable type (if provided)	FDCP plus, 4 x 0.25 mm², length 5 m						

Connection variants											
	Cable	M 12 x 1 4-pole	Cable	M 12 x 1 5-pole	Cable	M 12 x 1 5-pole	Cable	M 12 x 1 5-pole	Cable	M 12 x 1 4-pole
U_b	BN	1	BN	1	BN	1	BN	1	BN	1
$Sig_{(+)}$	GN	4	GN	4	BN	1	GN	4		
GND	WH	3	WH	3	WH	3	WH	3	WH	3
Sig_-	YE	2								
A									YE	4
B									GN	2
Shield	BK	Housing	BK	Housing	BK	Housing	BK	Housing	BK	Housing
not connected				2; 5		2; 4; 5		2;5		

Pole assignment







* Input bridge resistor ≈ 400 Ω | Output bridge resistor ≈ 350 Ω

Options

» Design adaptation to customer specification
» Accuracy ± 0.1 % f.s.
» Output available with test signal on request
» Integrated measuring amplifier
  › with ratiometric voltage input
  › with 2 switching outputs

Examples of design adaptations