Shear beam
With thin-film technology up to 100 kN
Models F3301 standard, F33C1 ATEX, F33S1 safety version

For further approvals
see page 4

Applications

- Industrial weighing technology
- Machine building and plant construction, manufacturing automation
- Theatre and stage construction
- Chemical and petrochemical industries
- Weighing in safety applications

Special features

- Measuring ranges 0 ... 2 kN to 0 ... 100 kN [0 ... 449.6 lbf to 0 ... 22,481 lbf]
- Corrosion-resistant stainless steel version
- Integrated amplifier
- High long-term stability, high shock and vibration resistance
- Good reproducibility, easy installation

Shear beam, model F3301

Description

The models F33x1 shear beams are suitable for static and dynamic measuring requirements. They serve for determining shear forces in diverse fields of application.

The shear beams are very often used in industrial weighing technology as well as in the areas of special machinery construction, production automation and stage construction. They are also used in laboratory technology and the process industry to determine torque.

The corresponding technical and regional approvals of these force transducers are, of course, available as options.

The models F33x1 shear beams are made of high-strength, corrosion-resistant 1.4542 stainless steel, the properties of which are particularly well-suited to the areas of application of the shear beams.

As output signals, the common active current and voltage outputs are available (4 … 20 mA, 0 … 10 V).
Redundant output signals and CANopen® protocols are possible.

The shear beams can be integrated into a certified WIKA overload protection with model ELMS1 (DIN EN ISO 13849-1 with PL d/Cat. 3).

Data sheets showing similar products:
Shear beam; up to 2,000 kg; model F3201; see data sheet FO 51.72
Bending beam; up to 500 kg; model F3203; see data sheet FO 51.73
Shear beam; up to 10 t; model F3831; see data sheet FO 51.21
Bending beam; up to 500 kg; model F3833; see data sheet FO 51.22

Specifications per VDI/VDE/DKD 2638

Model	F3301 and F33C1 with UL			F33S1		
Rated force F_{nom} kN	2	10	20	30	50	100
Rated force F_{nom} lbf	449.6	2,248	4,496	6,744	11,240	22,481
Relative linearity error d_{lin} [1)]	±1 % F_{nom}					
Relative reversibility error v	< 0.1 % F_{nom}					
Relative creep	0.05 % F_{nom}					
Temperature effect on						
the characteristic value TK_c	0.2 % F_{nom} / 10 K					
the zero signal TK_0	0.2 % F_{nom} / 10 K					
Force limit F_L	150 % F_{nom}					
Breaking force F_B						
2 kN / 20 kN ... 100 kN [449.6 lbf kN / 4,496 lbf ... 22,481 lbf]	300 % F_{nom}					
10 kN [2,248 lbf]	270 % F_{nom}					
Permissible vibration loading F_{rb}	±50 % F_{nom}					
Rated displacement (typical) s_{nom}						
< 10 kN [2,248 lbf]	< 0.02 mm [< 0.00079 in]					
< 100 kN [22,481 lbf]	< 0.2 mm [< 0.0079 in]					
< 1,000 kN [224,809 lbf]	< 0.5 mm [< 0.02 in]					
Material of the measuring body	■ Corrosion-resistant stainless steel, 1.4542, ultrasound-tested 3.1 material ■ Version with 3.2 material available					
Rated temperature $B_{T, nom}$	-20 … +80 °C [-4 ... +176 °F]					
Operating temperature $B_{T, G}$	■ -30 … +80 °C [-22 ... +176 °F] ■ -40 … +80 °C [-40 ... +176 °F]			-30 … +80 °C [-22 ... +176 °F]		
Storage temperature $B_{T, S}$	-40 … +85 °C [-40 ... +185 °F]					
Electrical connection	■ Circular connector M12 x 1, 4- or 5-pin ■ CANopen®, 5-pin			2-connector version M12 x 1, 4-pin		
Output signal (rated characteristic value) C_{nom}	■ 4 … 20 mA, 2-wire ■ 4 … 20 mA, 3-wire ■ 2 x 4 … 20 mA redundant ■ DC 0 … 10 V, 3-wire ■ 2 x DC 0 … 10 V redundant ■ CANopen® Protocol in accordance with CiA® 301, device profile CiA® 404, communication services LSS (CiA® 305), configuration of the instrument address and baud rate Sync/Async, Node/ Lifeguarding, heartbeat; zero point and span adjustable by ±10 % via entries in the object directory [2)]			Redundant, opposing 4 … 20 mA / 20 … 4 mA Version in accordance with requirements for functional safety per machinery directive 2006/42/EC.		
Current/power consumption	■ Current output 4 … 20 mA 2-wire: Signal current ■ Current output 4 … 20 mA 3-wire: < 8 mA ■ Voltage output: < 8 mA ■ CANopen®: <1 W			Current output 4 … 20 mA: Signal current		
Supply voltage UB	■ DC 9 ... 36 V for current output ■ DC 13 ... 36 V for voltage output ■ DC 9 ... 36 V for CANopen®			DC 10 … 30 V for current output		
Load	■ ≤ (UB – 10 V) / 0.024 A for current output ■ > 10 kΩ for voltage output			■ ≤ (UB – 10 V) / 0.020 A (channel 1) for current output ■ ≤ (UB – 7 V) / 0.020 A (channel 2) for current output		
Response time	≤ 2 ms (within 10 ... 90 % F_{nom}) [3)]					

Model	F3301 and F33C1 with UL	F33S1
Ingress protection (per IEC/EN 60529)		
Unplugged state	IP66, IP67	IP67
Plugged-in state	IP68, IP69, IP69K	
Electrical protection	Reverse polarity, overvoltage and short-circuit protection	
Vibration resistance	20 g, 100 h, 50 ... 150 Hz per DIN EN 60068-2-6	
Shock resistance	DIN EN 60068-2-27	
Immunity	■ In accordance with DIN EN 61326-1/DIN EN 61326-2-3 ■ EMC-strengthened versions	

1) Relative linearity error is specified in accordance with Directive VDI/VDE/DKD 2638 chapter 3.2.6.
2) Protocol in accordance with CiA® 301, device profile CiA® 404, communication service LSS (CiA® 305).
3) Other response times possible on request.
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Model	F33C1 ATEX/IECEx EX ib 1)			F3301 Signal jump		
Rated force F_{nom} kN	2	10	20	30	50	100
Rated force F_{nom} lbf	449.6	2,248	4,496	6,744	11,240	22,481
Relative linearity error d_{lin} 2)	±1 % F_{nom}					
Relative reversibility error v	< 0.1 % F_{nom}					
Relative creep	0.05 % F_{nom}					
Temperature effect on						
the characteristic value TK_c	0.2 % F_{nom} / 10 K					
the zero signal TK_0	0.2 % F_{nom} / 10 K					
Force limit F_L	150 % F_{nom}					
Breaking force F_B						
2 kN / 20 kN ... 100 kN [449.6 lbf kN / 4,496 lbf ... 22,481 lbf]	300 % F_{nom}					
10 kN [2,248 lbf]	270 % F_{nom}					
Permissible vibration loading F_{rb}	±50 % F_{nom}					
Rated displacement (typical) s_{nom}						
< 10 kN [2,248 lbf]	< 0.02 mm [< 0.00079 in]					
< 100 kN [22,481 lbf]	< 0.2 mm [< 0.0079 in]					
< 1,000 kN [224,809 lbf]	< 0.5 mm [< 0.02 in]					
Material of the measuring body	■ Corrosion-resistant stainless steel, 1.4542, ultrasound-tested 3.1 material ■ Version with 3.2 material available					
Rated temperature $B_{T, nom}$	-20 … +80 °C [-4 ... +176 °F]					
Operating temperature $B_{T, G}$	Ex II 2G Ex ib IIC T4 Gb -25 °C < Tamb < +85 °C Ex II 2G Ex ib IIC T3 Gb -25 °C < Tamb < +100 °C Ex I M2 Ex ib I Mb -25 °C < Tamb < +85 °C Ex II 2G Ex ib IIC T4 Gb -40 °C < Tamb < +85 °C Ex I M2 Ex ib I Mb			-30 … +80 °C [-22 ... +176 °F]		
Storage temperature $B_{T, S}$	-40 … +85 °C [-40 ... +185 °F]					
Electrical connection	■ Circular connector M12 x 1, 4-pin ■ Cable gland					
Output signal (rated characteristic value) C_{nom}	4 … 20 mA, 2-wire			■ 4 … 16 mA, 2-wire 3) ■ DC 2 … 8 V, 3-wire 3)		
Current/power consumption	Current output 4 … 20 mA 2-wire: Signal current			■ Current output 4 … 20 mA 2-wire: signal current ■ Current output 4 … 20 mA 3-wire: < 8 mA ■ Voltage output: < 8 mA		
Supply voltage UB	DC 10 ... 30 V for current output			■ DC 10 … 30 V for current output ■ DC 14 ... 30 V for voltage output		

Model	F33C1 ATEX/IECEx EX ib [1]	F3301 Signal jump
Load	■ ≤ (UB – 10 V) / 0.024 A for current output ■ > 10 kΩ for voltage output	
Response time	≤ 2 ms (within 10 ... 90 % F_{nom}) [4]	
Ingress protection (per IEC/EN 60529)	IP67	
Electrical protection	Reverse polarity, overvoltage and short-circuit protection	
Vibration resistance	20 g, 100 h, 50 ... 150 Hz per DIN EN 60068-2-6	
Shock resistance	DIN EN 60068-2-27	
Immunity	■ In accordance with DIN EN 61326-1/DIN EN 61326-2-3 ■ EMC-strengthened versions	

1) The shear beam with ignition protection type “ib” should only be powered using galvanically isolated repeater power supplies.
2) Relative linearity error is specified in accordance with Directive VDI/VDE/DKD 2638 chapter 3.2.6.
3) Other signal jumps are realisable on request.
4) Other response times possible on request.

Approvals

Logo	Description	Region
CE	**EU declaration of conformity** EMC directive	European Union

Optional approvals

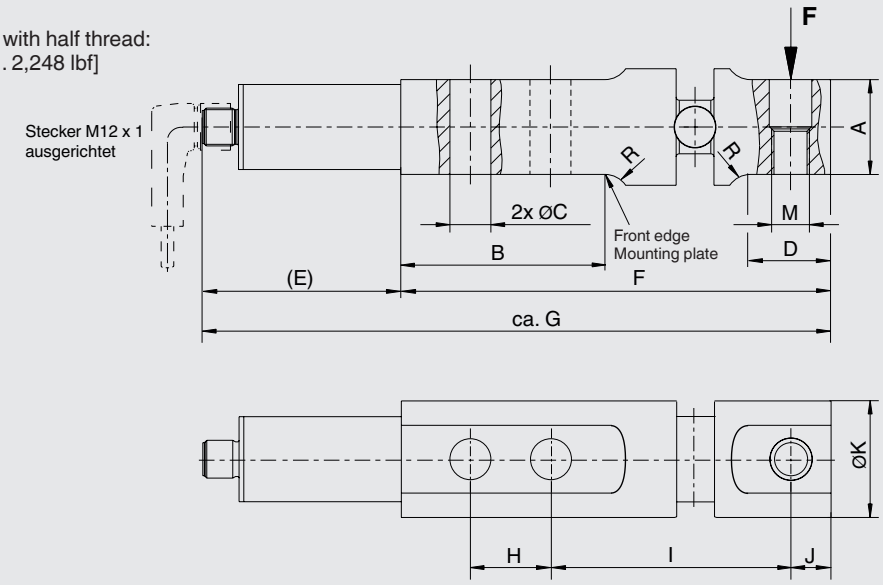
Logo	Description	Country
Ex	**ATEX directive [1]** per EN 60079-0:2012 and EN 60079-11:2012 (Ex ib) Hazardous areas Ex ib Ex II 2G Ex ib IIC T4 Gb -25 °C < T_{amb} < +85 °C Ex II 2G Ex ib IIC T3 Gb -25 °C < T_{amb} < +100 °C Ex I M2 Ex ib I Mb -25 °C < T_{amb} < +85 °C Ex II 2G Ex ib IIC T4 Gb -40 °C < T_{amb} < +85 °C I M2 Ex ib I Mb [2]	European Union
IEC IECEx	**IECEx [1]** per IEC 60079-0:2011 (Ed. 6) and IEC 60079-11:2011 (Ed. 6) (Ex ib) Hazardous areas Ex ib Ex ib IIC T4/T3 Gb -25 °C < T_{amb} < +85 °C Ex ib IIC T4 Gb -25 °C < T_{amb} < +100 °C Ex ib I Mb [2] -25 °C < T_{amb} < +85 °C Ex ib IIC T4 Gb -40 °C < T_{amb} < +85 °C	International
c UL us	**UL [1]** per UL 61010-1 and CSA C22.2 NO. 61010-1 Component approval	USA and Canada
EAC	**EAC** EMC directive	Eurasian Economic Community
EAC Ex	**EAC Ex [1]** Hazardous areas Ex ib Ex ib IIC T3 Gb -40 °C < T_{amb} < +100 °C Ex ib IIC T3 Gb -45 °C < T_{amb} < +100 °C Ex ib IIC T4 Gb -40 °C < T_{amb} < +85 °C Ex ib IIC T4 Gb -45 °C < T_{amb} < +100 °C	Eurasian Economic Community

1) Only with model F33C1.
2) Only possible with cable gland.

→ For approvals and certificates, see website.

Dimensions in mm [in]

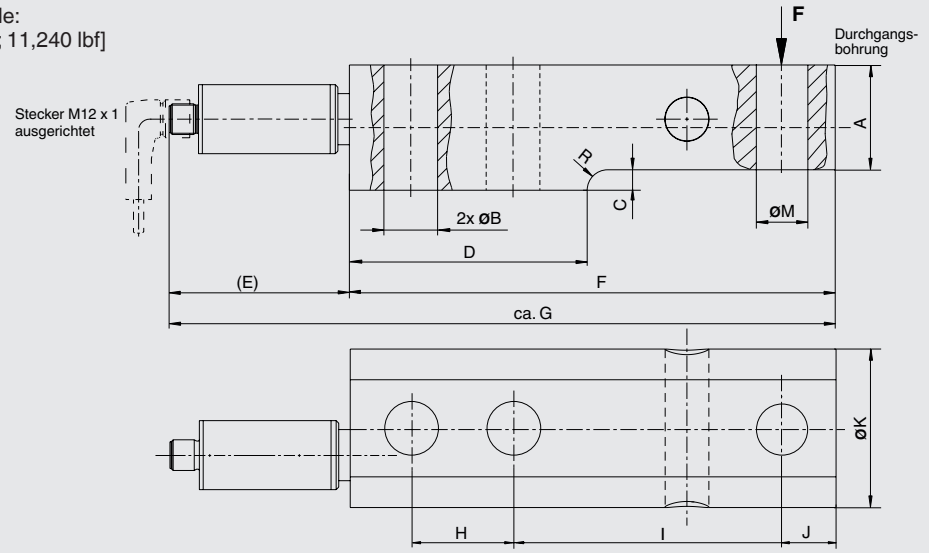
F3301 and F33C1;
Variant with through hole with half thread:
2 kN ... 20 kN [449.5 lbf ... 2,248 lbf]



Rated force in kN	Dimensions in mm												
	$A_{-0.1}$	B	ØC	D	E	F	approx. G	H	I	J	ØK	M	R
2; 10; 20	30.1	64.8	13	25.4	63	136.4	199	25.4	76.2	12.7	37	M12	8

Rated force in lbf	Dimensions in inch												
	$A_{-0.04}$	B	ØC	D	E	F	approx. G	H	I	J	ØK	M	R
449.6; 1,124; **2,248**	1.185	2.55	0.51	1	2.48	5.37	7.83	1	3	0.5	1.456	M12	0.315

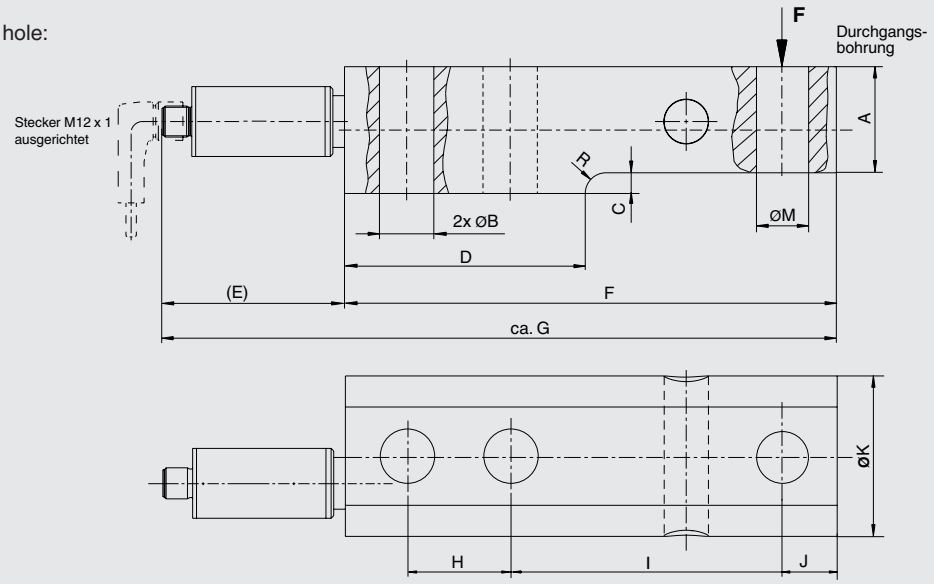
F3301 and F33C1;
Variant with through hole:
30 kN; 50 kN [6,744 lbf; 11,240 lbf]



Rated force in kN	Dimensions in mm												
	A	ØB	C	D	(E)	F	approx. G	H	I	J	ØK	ØM	R
30; 50	41	21	8	93	70.5	190	261	40	105	21	62	20	8

Rated force in lbf	Dimensions in inch												
	A	ØB	C	D	(E)	F	approx. G	H	I	J	ØK	ØM	R
6,744; 11,240	1.614	0.826	0.315	3.66	2.77	7.48	10.27	1.57	4.13	0.826	2.44	0.79	0.315

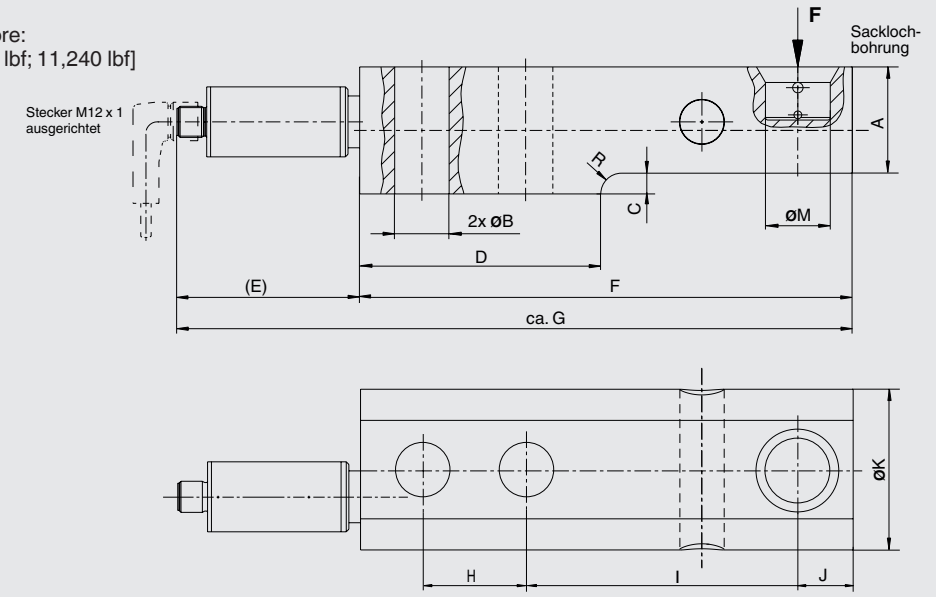
F3301 and F33C1;
Variant with through hole:
100 kN [22,481 lbf]



Rated force in kN	Dimensions in mm												
	A	ØB	C	D	(E)	F	approx. G	H	I	J	ØK	ØM	R
30; 50	60.5	27	12.5	120	(70.5)	245	316	50	135	30	86	20	8

Rated force in lbf	Dimensions in inch												
	A	ØB	C	D	(E)	G	approx. H	H	I	J	ØK	ØM	R
6,744; 11,240	2.38	1.06	0.492	4.72	2.77	9.65	12.44	1.97	5.314	1.18	3.385	0.79	0.315

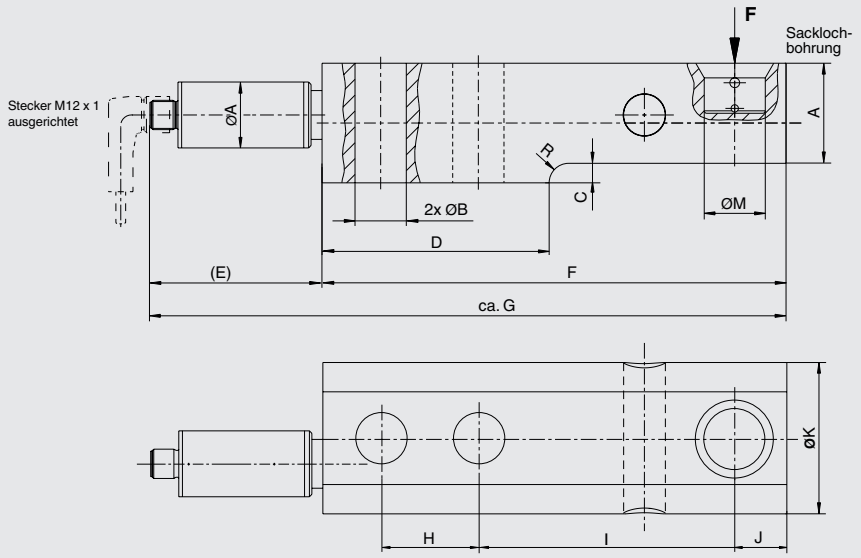
F3301 and F33C1;
Variant with blind bore:
30 kN; 50 kN [6,744 lbf; 11,240 lbf]



Rated force in kN	Dimensions in mm												
	A	ØB	C	D	(E)	F	approx. G	H	I	J	ØK	$ØM_{\pm 0.1}$	R
30; 50	41	21	8	93	70.5	190	261	40	105	21	62	25	8

Rated force in lbf	Dimensions in inch												
	A	ØB	C	D	(E)	F	approx. G	H	I	J	ØK	$ØM_{\pm 0.04}$	R
6,744; 11,240	1.614	0.826	0.315	3.66	2.77	7.48	10.27	1.57	4.13	0.826	2.44	0.79	0.315

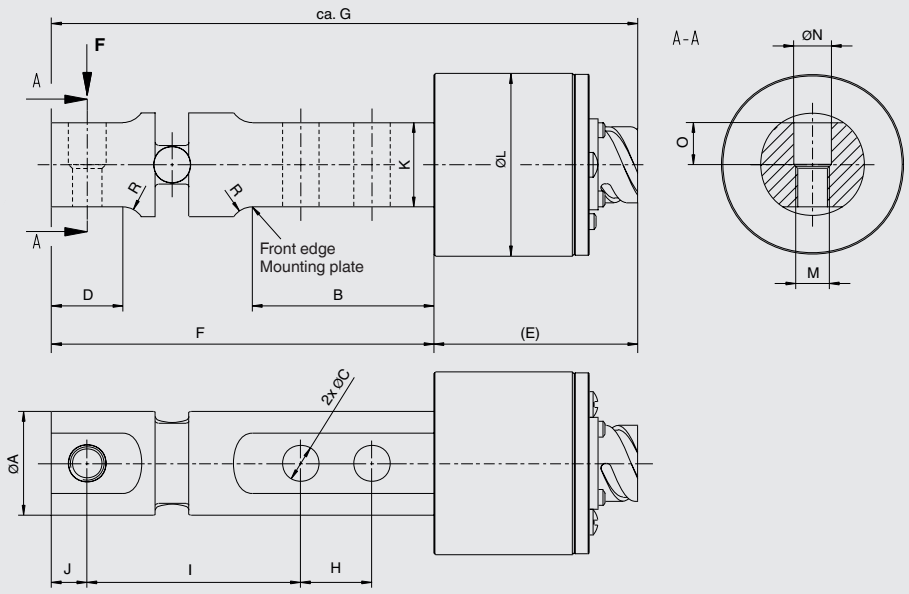
F3301 and F33C1;
Variant with blind bore:
100 kN [22,481 lbf]



Rated force in kN	Dimensions in mm												
	A	ØB	C	D	(E)	F	approx. G	H	I	J	ØK	ØM±0.1	R
30; 50	60.5	27	12.5	120	(70.5)	245	316	50	135	30	86	30	8

Rated force in lbf	Dimensions in inch												
	A	ØB	C	D	(E)	F	approx. G	H	I	J	ØK	ØM±0.04	R
6,744; 11,240	2.38	1.06	0.492	4.72	2.77	9.65	12.44	1.97	5.314	1.18	3.385	1.18	0.315

F33S1;
Safety variant



Dimensions in mm														
ØA	B	ØC	D	(E)	F	approx. G	H	I	J	K	ØL	M	ØN	O	R
37	64.8	13	25.4	72.7	136.4	209	25.4	76.2	12.7	30.1	65	M12	13.5	15	8

Dimensions in inch														
ØA	B	ØC	D	(E)	F	approx. G	H	I	J	K	ØL	M	ØN	O	R
1.456	2.55	0.512	1	2.86	5.37	8.23	1	3	0.5	1.185	2.56	M12	0.53	0.59	0.315

Mounting screws tightening torque in Nm

Rated force in kN	Mounting screws	Standard	Tightening torque [Nm]
2; 10	M12	8.8	90
20	M12	10.9	120
30; 50	M20	8.8	400
100	M24	8.8	700

Rated force in lbf	Mounting screws	Standard	Tightening torque [Nm]
449.6; 2,248	M12	8.8	90
4,496	M12	10.9	120
6,744; 11,240	M20	8.8	400
22,481	M24	8.8	700

Pin assignment, analogue output

Abbreviations, definitions

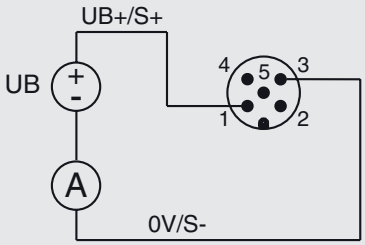
Signal	Description
UB	Voltage source for the sensor
UB+	Sensor voltage supply (+)
UB-	Sensor voltage supply (-)
S+	Output signal (+)
S-	Output signal (-)
0V	0V potential

Signal	Description
Ⓐ	Ammeter
Ⓥ	Voltmeter
⊕⊖	Voltage source
⌐–	Switch
⏚	Shield [ground]

For models F3301 and F33C1 with UL

Output 4 ... 20 mA, 2-wire

Circular connector M12 x 1, 5-pin

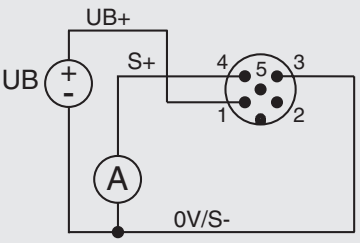


Signal	4 ... 20 mA, 2-wire	Cable colour
UB+/S+	1	Brown
0V/S-	3	Black
Shield ⏚	Case / Connector	--

Cable colours are only valid when using the standard WIKA cable, e.g. order number: 14259454

Output 4 ... 20 mA, 3-wire

Circular connector M12 x 1, 5-pin

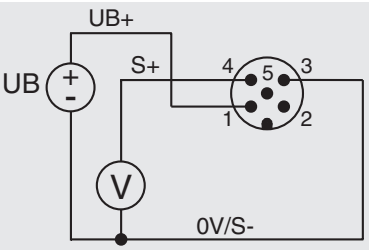


Signal	4 ... 20 mA, 3-wire	Cable colour
UB+	1	Brown
S+	4	Black
0V/S-	3	Blue
Shield ⏚	Case / Connector	--

Cable colours are only valid when using the standard WIKA cable, e.g. order number: 14259454

Output 0 ... 10 V, 3-wire

Circular connector M12 x 1, 5-pin



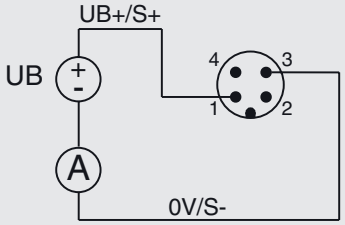
Signal	0 ... 10 V, 3-wire	Cable colour
UB+	1	Brown
S+	4	Black
0V/S-	3	Blue
Shield ⏚	Case / Connector	--

Cable colours are only valid when using the standard WIKA cable, e.g. order number: 14259454

For model F33C1 for ATEX

Output 4 ... 20 mA, 2-wire for ATEX Ex ib

Circular connector M12 x 1, 4-pin



Signal	ATEX/IECEx Ex ib 4 ... 20 mA, 2-wire	Cable colour
UB+/S+	1	Brown
0V/S-	3	Blue
Shield ⏚	Case / Connector	--

Cable colours are only valid when using the standard WIKA cable, e.g. order number: 14259454

Pin assignment with signal jump

Abbreviations, definitions

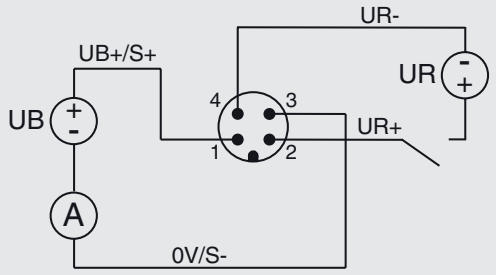
Signal	Description
UB	Voltage source for the sensor
UB+	Sensor voltage supply (+)
UB-	Sensor voltage supply (-)
UR	Voltage source for the signal jump
UR+	Signal jump supply voltage (+)
UR-	Signal jump supply voltage (-)
S+	Output signal (+)
S-	Output signal (-)
0V	0V potential

Signal	Description
Ⓐ	Ammeter
Ⓥ	Voltmeter
⊕	Voltage source
⌐–	Switch
⏚	Shield [ground]

For model F3301 with signal jump

Output 4 ... 20 mA, 2-wire with signal jump

Circular connector M12 x 1, 4-pin

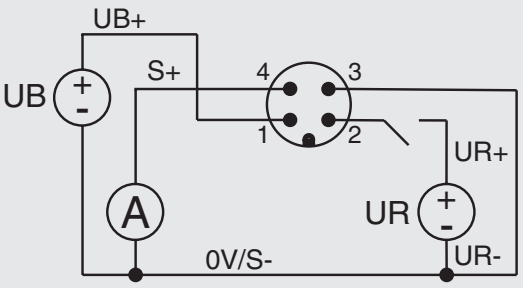


Signal	4 ... 20 mA, 2-wire	Cable colour
UB+/S+	1	Brown
0V/S-	3	Blue
UR+	2	White
UR-	4	Black
Shield ⏚	Case / Connector	--

Cable colours are only valid when using the standard WIKA cable, e.g. order number: 14259454

Output 4 ... 20 mA, 3-wire with signal jump

Circular connector M12 x 1, 4-pin

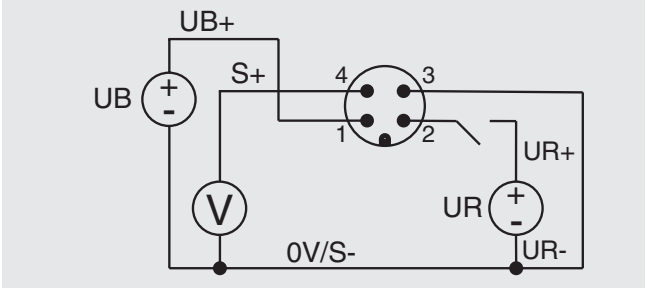


Signal	4 ... 20 mA, 3-wire	Cable colour
UB+	1	Brown
0V/S-	3	Blue
UR+	2	White
UR-	3	Blue
S+	4	Black
Shield ⏚	Case / Connector	--

Cable colours are only valid when using the standard WIKA cable, e.g. order number: 14259454

Output 0 ... 10 V, 3-wire with signal jump

Circular connector M12 x 1, 4-pin



Signal	0 ... 10 V, 3-wire	Cable colour
UB+	1	Brown
0V/S-	3	Blue
UR+	2	White
UR-	3	Blue
S+	4	Black
Shield ⏚	Case / Connector	--

Cable colours are only valid when using the standard WIKA cable, e.g. order number: 14259454

Redundant pin assignment with 1 x connector

Abbreviations, definitions

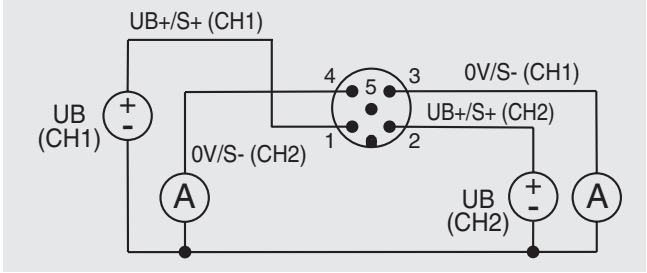
Signal	Description
UB	Voltage source for the sensor
UB+	Sensor voltage supply (+)
UB-	Sensor voltage supply (-)
S+	Output signal (+)
S-	Output signal (-)
CH1	Channel 1
CH2	Channel 2
CH1+2	Channel 1 and channel 2
0V	0V potential

Signal	Description
Ⓐ	Ammeter
Ⓥ	Voltmeter
⊕⊖	Voltage source
⌐–	Switch
⏚	Shield [ground]

For models F3301 and F33C1 with UL

Output 4 ... 20 mA, 2-wire redundant with 1 x connecter

Circular connector M12 x 1, 5-pin

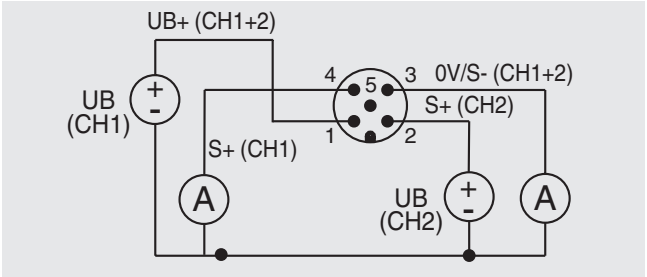


Signal	4 ... 20 mA, 2-wire	Cable colour
UB+/S+ (CH1)	1	Brown
UB+/S+ (CH2)	2	White
0V/S- (CH1)	3	Blue
0V/S- (CH2)	4	Black
Shield ⏚	Case / Connector	--

Cable colours are only valid when using the standard WIKA cable, e.g. order number: 14259454

Output 4 ... 20 mA, 3-wire redundant with 1 x connecter

Circular connector M12 x 1, 5-pin

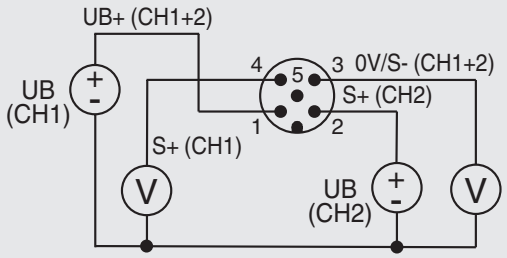


Signal	4 ... 20 mA, 3-wire	Cable colour
UB+ (CH1+2)	1	Brown
0V/S- (CH1+2)	3	Blue
S+ (CH1)	4	Black
S+ (CH2)	2	White
Shield ⏚	Case / Connector	--

Cable colours are only valid when using the standard WIKA cable, e.g. order number: 14259454

Output 0 ... 10 V, 3-wire redundant with 1 x connecter

Circular connector M12 x 1, 5-pin



Signal	0 ... 10 V, 3-wire	Cable colour
UB+ (CH1+2)	1	Brown
0V/S- (CH1+2)	3	Blue
S+ (CH1)	4	Black
S+ (CH2)	2	White
Shield ⏚	Case / Connector	--

Cable colours are only valid when using the standard WIKA cable, e.g. order number: 14259454

Redundant pin assignment, opposing, with 2 x connector

Abbreviations, definitions

Signal	Description
UB	Voltage source for the sensor
UB+	Sensor voltage supply (+)
UB-	Sensor voltage supply (-)
S+	Output signal (+)
S-	Output signal (-)
CH1	Channel 1
CH2	Channel 2
CH1+2	Channel 1 and channel 2
0V	0V potential

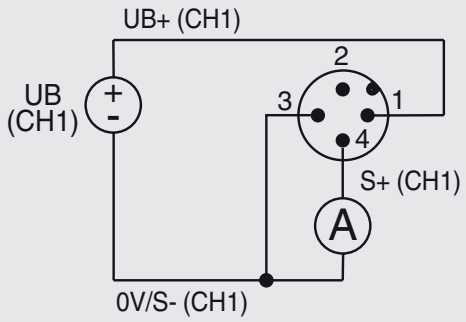
Signal	Description
Ⓐ	Ammeter
Ⓥ	Voltmeter
⊕⊖	Voltage source
⌐–	Switch
⏚	Shield [ground]

For model F33S1

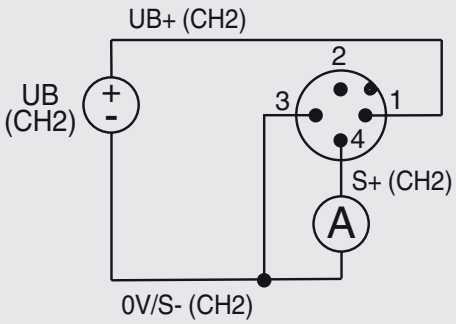
Output 4 ... 20 mA, 3-wire redundant with, opposing, 2 x connecter

Circular connector M12 x 1, 4-pin

Connector channel 1



Connector channel 2



Circular connector M12 x 1, 4-pin

4 ... 20 mA, 3-wire redundant opposing			
Signal	**Connector channel 1**	**Connector channel 2**	**Cable colour**
UB+	1	1	Brown
0V/S-	3	3	Blue
S+	4	4	Black
Shield ⏚	Case / Connector	Case / Connector	--

Cable colours are only valid when using the standard WIKA cable, e.g. order number: 14259454

2-connector variant, e.g. in combination with ELMS1 overload protection (F33S1).
Version in accordance with requirements for functional safety in accordance with the Machinery Directive 2006/42/EC.

Pin assignment for CANopen® in accordance with CiA®303-1

Abbreviations, definitions

Signal	Description
CAN-SHLD, shield ⏚	CAN shield
CAN-V+	CAN external positive voltage supply for the supply of the sensor
CAN-GND	CAN external 0 V potential for the supply of the sensor
CAN-High	CAN_H bus line (dominant high)
CAN-Low	CAN_L bus line (dominant low)

For models F3301 and F33C1 with UL

CANopen® output
Circular connector M12 x 1, 5-pin

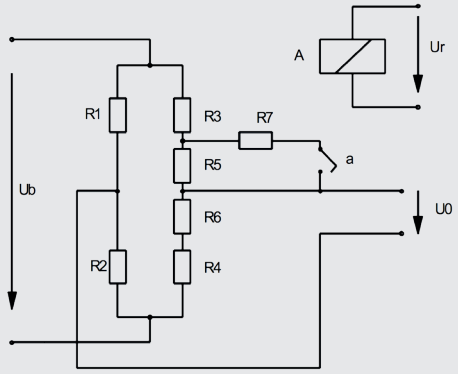
Signal	Pin	Cable colour
CAN-SHLD, shield ⏚	1 / case / connector	Brown
CAN-V+	2	Blue
CAN-GND	3	White
CAN-High	4	Blue
CAN-Low	5	Black

Cable colours are only valid when using the standard WIKA cable, e.g. order number: 14259454

Connect the cable shield to the case of the force transducer.
In the cables of the accessories, the cable shield is connected by means of the knurled nut, thus connecting it to the case of the force transducer.
When using extensions, only shielded and low-capacitance cables should be used.
The permitted maximum and minimum lengths of cable are defined in ISO 11898-2. Care should also be taken with the shielding to ensure a high-quality connection.

Short description of the signal jump electronics

Amplifier 4 ... 20 mA or 0 ... 10 V for signal jump applications with 2-channel computer control.



Circuit diagram of the signal jump electronics

With these force transducers, four variable resistors (R1 ... R4) are connected together to form a Wheatstone bridge. When the measuring body deforms, the opposing resistors are stretched or compressed in the same way. This leads to a detuning of the bridge and a diagonal voltage U0.

The test resistor R7 is now important in connection with checking the subsequent amplifier circuit and the subsequent signal paths. This is switched parallel to the resistor R5 via the relay contact (a) as soon as the excitation voltage Ur of the relay A is present. The connection of the resistor R7 causes a defined, always constant, detuning of the zero point (diagonal voltage) of the Wheatstone bridge.

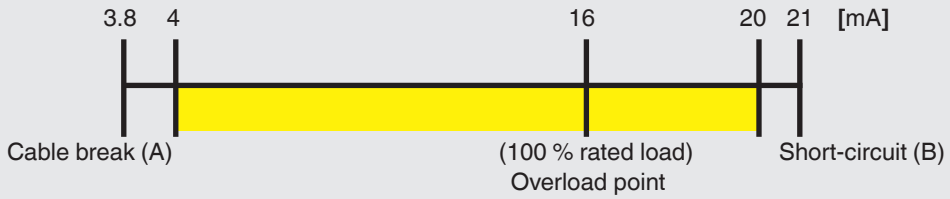
Compliance with functional safety

An external safety control system independent of the force transducer must monitor the safe functioning of the force transducer. The functional test with a signal jump of 4 mA / 2 V is executed at an interval of 24 hours. The safety control system activates the relay A, thus changing the output signal of the force transducer in a defined manner.

If the expected change in the output signal occurs, it can be assumed that the entire signal path from the Wheatstone bridge via the amplifier through to the output is functioning correctly. If this does not occur, then it can be concluded that there is a error in the signal path.

Furthermore, the measuring signal should be checked by the safety controller for min. (A) and max. (B) signal values in order to detect any cable breaks or short circuits that may occur.

The default setting of the force transducers with a current output of 4 ... 20 mA for overload detection is, for example:



Signals of the signal jump electronics

With a fixed signal jump of, for example, 4 mA, the test cycle can then be triggered, in any operating state, by activating the test relay.

The upper measuring range limit of 20 mA will never be reached and thus the checking of the signal jump is enabled.

Accessories

Model EZE53 connector with moulded cable					
Model	**Description**	**Temperature range**	**Cable diameter**	**Cable length**	**Order number**
	Straight version, cut to length, 4-pin, PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	Ø 4.75 mm - Ø 5.7 mm [Ø 0.18 in - Ø 0.22 in]	2 m [6.6 ft]	14259451
				5 m [16.4 ft]	14259453
				10 m [32.8 ft]	14259454
	Straight version, cut to length, 5-pin, PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	Ø 4.75 mm - Ø 5.7 mm [Ø 0.18 in - Ø 0.22 in]	2 m [6.6 ft]	14259458
				5 m [16.4 ft]	79100672
				10 m [32.8 ft]	14259472
	Angled version, cut to length, 4-pin, PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	Ø 5.05 mm - Ø 6 mm [Ø 0.2 in - Ø 0.24 in]	2 m [6.6 ft]	14259452
				5 m [16.4 ft]	14293481
				10 m [32.8 ft]	14259455
	Angled version, cut to length, 5-pin, PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	Ø 5.05 mm - Ø 6 mm [Ø 0.2 in - Ø 0.24 in]	2 m [6.6 ft]	79101493
				5 m [16.4 ft]	79100686
				10 m [32.8 ft]	On request

Other cable lengths and cable types are available on request.

Ordering information

Model / Rated force / Relative linearity error / Temperature range / Output signal / Electrical connection / Approvals / Optional approvals, certificates / Pin assignment / Accessories

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