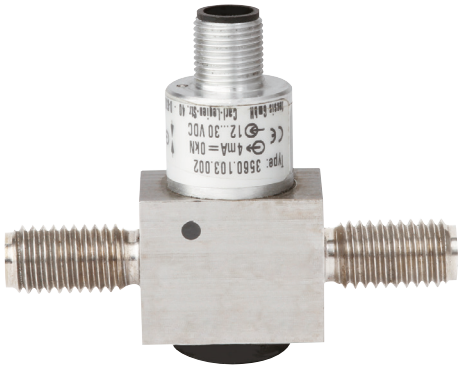
Tension/compression force transducer
With thin-film technology to 500 kN [112,404 lbf]
Models F2301 standard, F23C1 ATEX, F23S1 safety version

Applications

- Industrial weighing technology
- Machine building and plant construction, manufacturing automation
- Theatre and stage construction
- Chemical and petrochemical industries
- Crane systems and hoists

Special features

- Measuring ranges 0 ... 1 kN to 0 ... 500 kN [0 ... 224.8 lbf to 0 ... 112,404 lbf]
- Stainless steel version (corrosion-resistant)
- Integrated amplifier
- High long-term stability, high shock and vibration resistance
- Good reproducibility, easy installation



Tension/compression force transducer, model F2301

Description

The tension/compression force transducers are suitable for static and dynamic measuring requirements in the direct force flow. They serve for determining tension and / or compression forces in diverse application areas.

These force transducers are very often used in linear drives as well as in the areas of special machine construction, laboratory technology and stage construction. The force transducers are also perfectly suited for hoists and crane systems. The corresponding technical and regional approvals of these force transducers are, of course, available as options.

The force transducers are made of high-strength, corrosion resistant stainless steel 1.4542, whose properties are particularly suitable for the transducer's application area. As output signals, the common active current and voltage outputs are available (4 … 20 mA, 0 … 10 V). Redundant output signals and CAN protocols are possible.

The tension/compression force transducers 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:
Tension/compression force transd., swivel head; model F2303; data sheet FO 51.46
Tension/compression force transd. to 200 kN, model F2304; data sheet FO 51.47
Tension/compression force transd., s-type, model F2802; data sheet FO 51.48
Tension/compression force transd., male thread; model F2226; data sheet FO 51.51

Specifications per VDI/VDE/DKD 2638

Model	F2301	F23S1
Rated force F_{nom} kN	1, 2, 3, 5, 10, 20, 30, 50, 100, 200, 300, 500	3, 5, 10, 20, 30, 50, 100
Rated force F_{nom} lbf	225; 450; 674; 1,124; 2,248; 4,496; 6,744; 11,240; 22,481; 44,962; 67,443; 112,404	674; 1,124; 2,248; 4,496; 6,744; 11,240; 22,481
Relative linearity error d_{lin} [1)]	±0.5 % F_{nom}	
Relative reversibility error v	< 0.1 % F_{nom}	
Temperature effect on		
the characteristic value TK_c	0.2 % F_{nom} / 10 K	0.4 % F_{nom} / 10 K
the zero signal TK_0	0.2 % F_{nom} / 10 K	0.4 % F_{nom} / 10 K
Force limit F_L	150 % F_{nom}	
Breaking force F_B	300 % F_{nom}	
Permissible vibration loading F_{rb}	±50 % F_{nom} (in accordance with DIN 50100)	
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]	
Rated temperature range $B_{T; nom}$	-20 … +80 °C [-4 ... +176 °F]	
Operating temperature range $B_{T, G}$	■ -30 … +80 °C [-22 ... +176 °F] ■ -40 … +80 °C [-40 ... +176 °F] (optional)	-30 … +80 °C [-22 ... +176 °F]
Storage temperature range $B_{T, S}$	-40 … +85 °C [-40 ... +185 °F]	
Electrical connection	■ Circular connector M12 x 1, 5-pin ■ CANopen®, 5-pin	2-connector variant, 4-pin
Characteristic value range B_C (Output signal)	■ 4 … 20 mA, 2-wire ■ 4 … 20 mA, 3-wire ■ DC 0 … 10 V, 3-wire ■ Optional redundant signal ■ CANopen® Protocol in accordance with CiA 301, instrument profile 404, communication services LSS (CiA 305), configuration of the instrument address and baud rate Sync/Async, Node/Lifeguarding, heartbeat; zero point and span ±10 % adjustable 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.
Insulation resistance	> 2 GΩ	
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 ■ > 25 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
Ingress protection (per IEC/EN 60529)		IP67
Unplugged state	IP66, IP67	
Plugged-in state	IP68, IP69, IP69K	
Electrical protection	Reverse polarity protection, overvoltage and short-circuit resistance	
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 (optional EMC-strengthened versions)	
Options	Certificates, strength verifications, 3D/CAD files (STEP, IGES) on request	

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, instrument profile 404, communication service LSS (CiA 305).

CANopen® and CiA® are registered community trademarks of CAN in Automation e. V.

Specifications per VDI/VDE/DKD 2638

Model	F23C1 ATEX/IECEx EX ib [1]	F2301 Signal jump
Rated force F_{nom} kN	1, 2, 3, 5, 10, 20, 30, 50, 100	
Rated force F_{nom} lbf	225; 450; 674; 1,124; 2,248; 4,496; 6,744; 11,240; 22,481	
Relative linearity error d_{lin} [2]	±0.5 % F_{nom}	
Relative reversibility error v	< 0.1 % F_{nom}	
Temperature effect on		
the characteristic value TK_c	0.4 % F_{nom} / 10 K	0.2 % F_{nom} / 10 K
the zero signal TK_0	0.4 % F_{nom} / 10 K	0.2 % F_{nom} / 10 K
Force limit F_L	150 % F_{nom}	
Breaking force F_B	300 % F_{nom}	
Permissible vibration loading F_{rb}	±50 % F_{nom} (in accordance with DIN 50100)	
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]	
Rated temperature range $B_{T; nom}$	-20 … +80 °C [-4 ... +176 °F]	
Operating temperature range $B_{T, G}$	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 Ex I M2 Ex ib I Mb (only available with cable connection)	-30 … +80 °C [-22 ... +176 °F]
Storage temperature range $B_{T, S}$	-40 … +85 °C [-40 ... +185 °F]	
Electrical connection	Circular connector M12 x 1, 4-pin	
Characteristic value range B_C (Output signal)	4 … 20 mA, 2-wire	■ 4 … 16 mA, 2-wire [3] ■ DC 2 … 8 V, 3-wire [3]
Insulation resistance	> 2 GΩ	
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
Load	■ ≤ (UB–10 V)/0.024 A for current output ■ > 25 kΩ for voltage output	
Ingress protection (per IEC/EN 60529)	IP67	
Electrical protection	Reverse polarity protection, overvoltage and short-circuit resistance	
Vibration resistance	20 g, 100 h, 50 ... 150 Hz (per DIN EN 60068-2-6)	
Immunity	In accordance with DIN EN 61326-1/DIN EN 61326-2-3 (optional EMC-strengthened versions)	
Options	Certificates, strength verifications, 3D/CAD files (STEP, IGES) on request	

1) The force transducers with ignition protection type “ib” should only be powered using galvanically isolated power inserters.
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.

Approvals

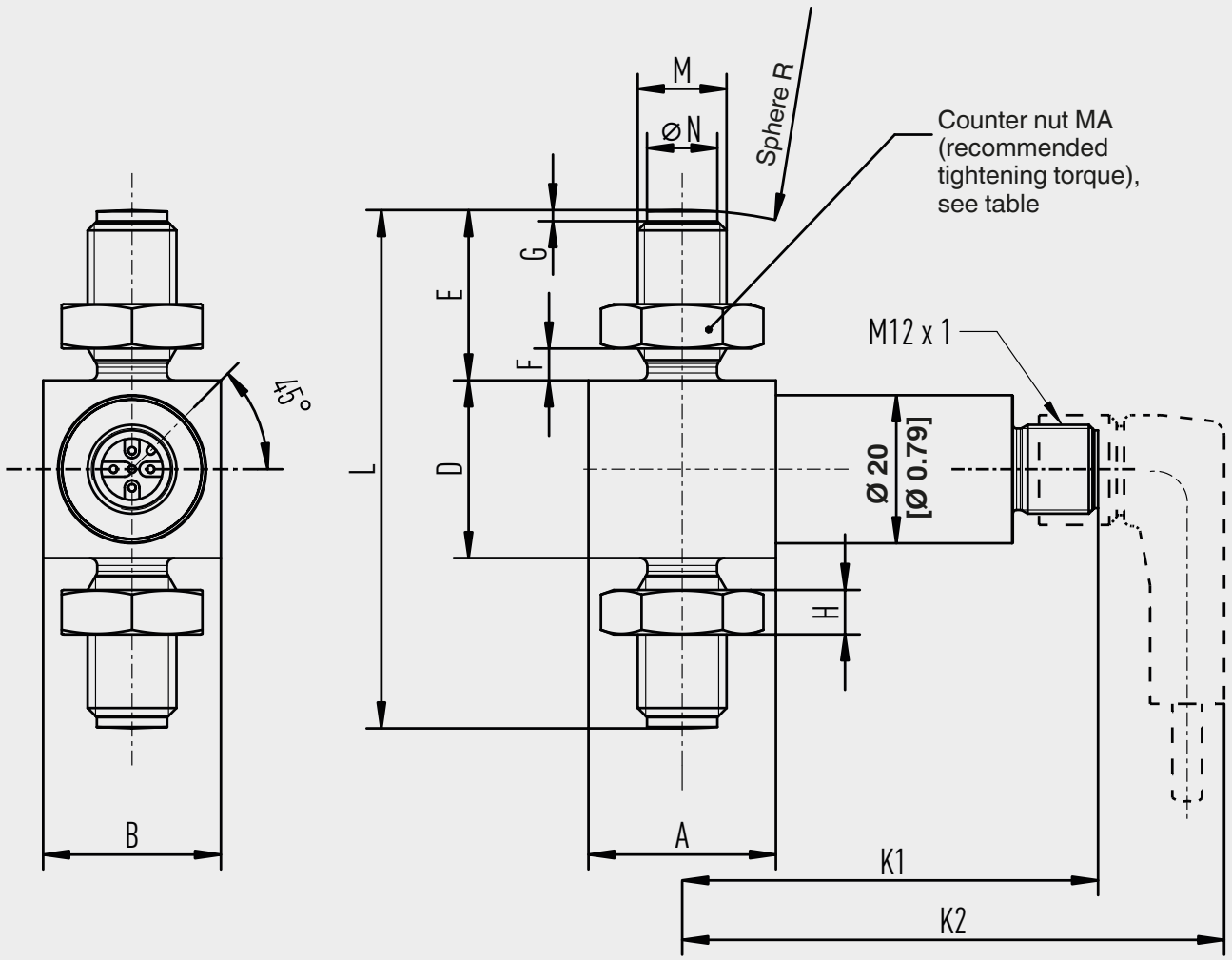
Logo	Description	Region
CE	**EU declaration of conformity** EMC directive	European Union
UKCA	**UKCA** EMC directive	United Kingdom

Optional approvals

Logo	Description	Region
Ex	**ATEX directive (option)** 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 (only available with cable connection)	European Union
IEC IECEx	**IECEx (Option)** 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 -25 °C < T_{amb} < +85 °C Ex ib IIC T4 Gb -40 °C < T_{amb} < +85 °C	International
c UL us	**UL** Component approval	USA and Canada
EAC	**EAC**	Eurasian Economic Community

Dimensions in mm [in]

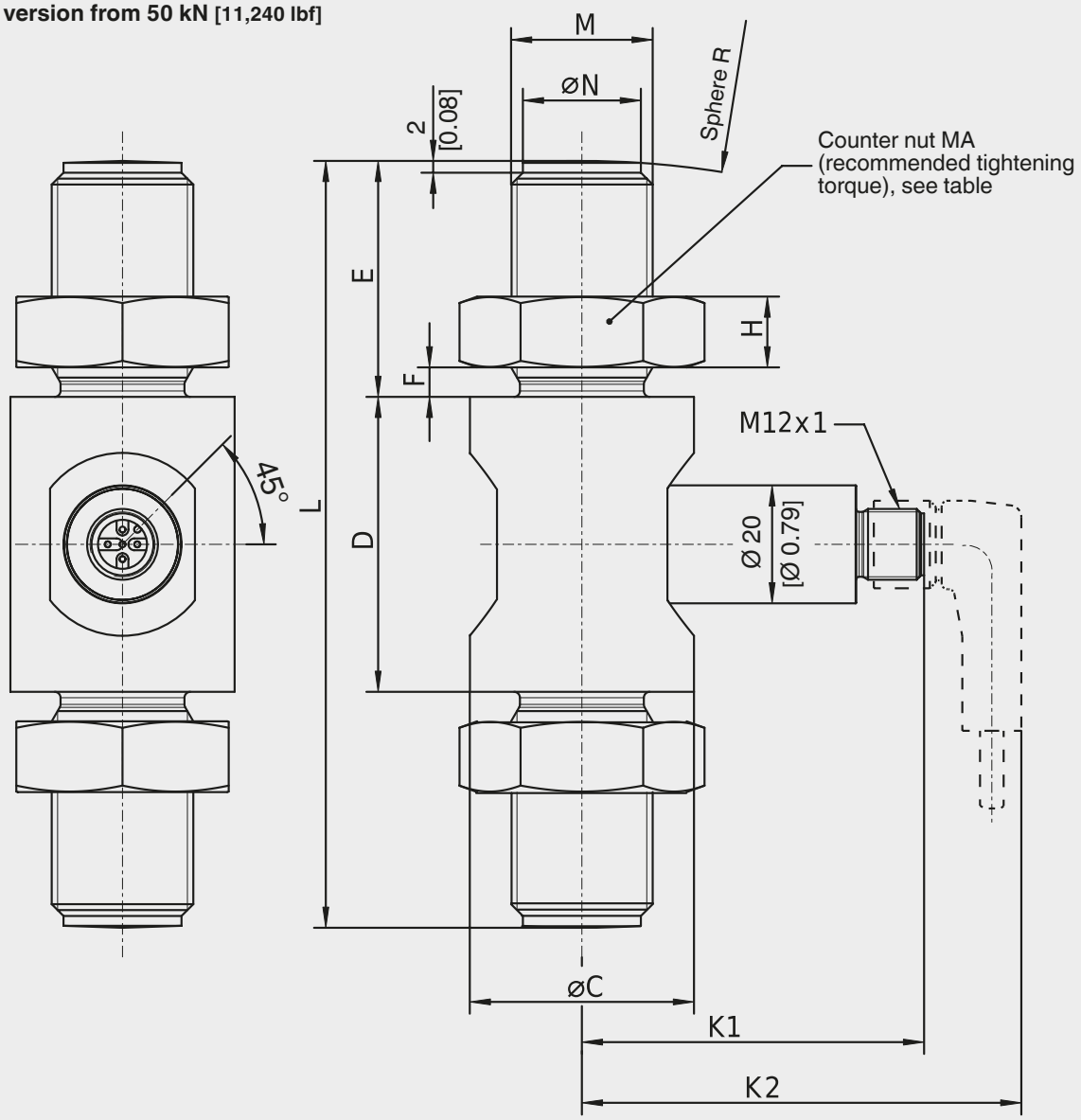
F2301 version to 30 kN [6,744 lbf]



Rated force in kN [lbf]	Dimensions in mm [in]														MA (Nm)
	A	B	D	E	F	G	H	K1	K2	L	M	ØN -0.1	Sphere R	Rated displacement	
1, 2, 3 [225], [450], [674]	25.3 [0.99]	24 [0.99]	24 [0.99]	23 [0.9]	4.3 [0.17]	1.5 [0.06]	6 [0.24]	56 [2.2]	76 [2.99]	70 [2.75]	M12	9.5 [0.37]	60 [2.36]	< 0.02 [0.00079]	15
5 [1,124]	25.3 [0.99]	24 [0.99]	24 [0.99]	23 [0.9]	4.3 [0.17]	1.5 [0.06]	6 [0.24]	56 [2.2]	76 [2.99]	70 [2.75]	M12	9.5 [0.37]	60 [2.36]	< 0.02 [0.00079]	15
10 [2,248]	25.3 [0.99]	24 [0.99]	31 [0.99]	23 [0.9]	4.3 [0.17]	1.5 [0.06]	6 [0.24]	56 [2.2]	76 [2.99]	77 [3.03]	M12	9.5 [0.37]	80 [3.15]	< 0.02 [0.00079]	15
20 [4,496]	25.3 [0.99]	26 [1]	35 [1.37]	34 [1.34]	3.8 [0.15]	2 [0.08]	10 [0.39]	56 [2.2]	76 [2.99]	103 [4.05]	M20 x 1.5	17 [0.67]	100 [3.94]	< 0.2 [0.0079]	60
30 [6,744]	26 [1.02]	27 [1.06]	44 [1.73]	34 [1.34]	3.8 [0.15]	2 [0.08]	10 [0.39]	56.5 [2.22]	76.5 [3.01]	112 [4.41]	M20 x 1.5	17 [0.67]	120 [4.72]	< 0.2 [0.0079]	60

Dimensions in mm [in]

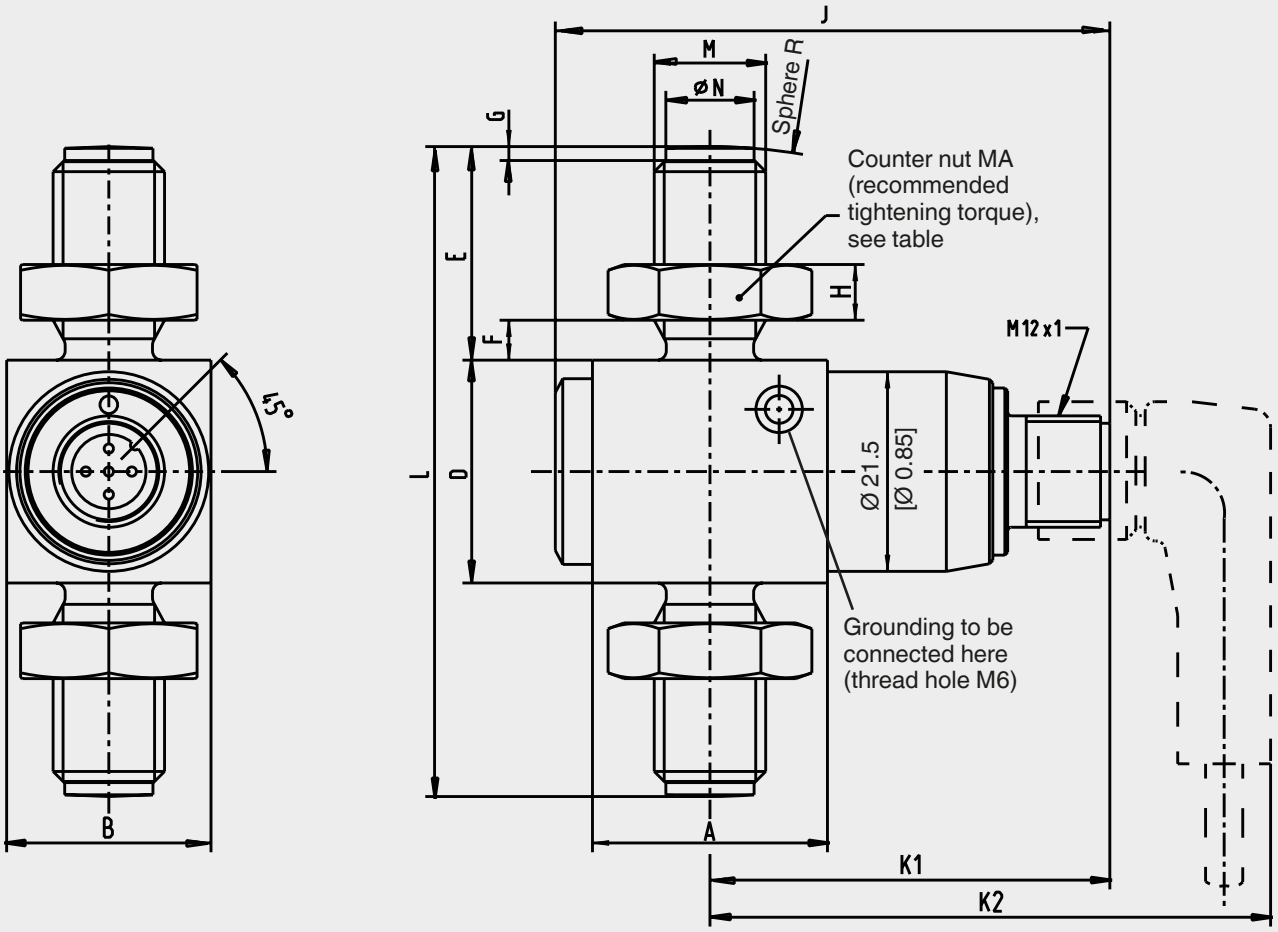
F2301 version from 50 kN [11,240 lbf]



Rated force in kN [lbf]	Dimensions in mm [in]													MA (Nm)
	ØC	D	E	F	G	H	K1	K2	L	M	ØN $_{-0.1}$	Sphere R	Rated dis-placement	
50 [11,240]	38 [1.5]	50 [1.97]	40 [1.57]	5 [0.2]	2 [0.08]	12 [0.47]	58 [2.28]	68 [2.68]	130 [5.12]	M24 x 2	20 [0.79]	150 [5.9]	< 0.2 [0.0079]	110
100 [22,481]	46 [1.81]	54 [2.16]	71 [2.8]	7.5 [0.3]	3 [0.12]	19.5 [0.76]	62.5 [2.46]	82.5 [3.25]	196 [7.72]	M39 x 3	34 [1.34]	200 [7.87]	< 0.2 [0.0079]	390
200 [44,962]	67 [2.64]	67 [2.64]	82 [3.23]	7.5 [0.3]	3 [0.12]	22.5 [0.88]	73 [2.87]	93 [3.66]	231 [9.09]	M45 x 3	40 [1.57]	250 [9.84]	< 0.2 [0.0079]	495
300 [67,443]	73 [2.87]	73 [2.87]	98 [3.86]	14 [0.55]	3 [0.12]	28 [1.1]	49 [1.93]	69 [2.72]	269 [10.6]	M56 x 4	50 [1.97]	300 [11.8]	< 0.2 [0.0079]	640
500 [112,404]	94 [3.7]	94 [3.7]	113 [4.45]	17 [0.67]	3 [0.12]	32 [1.26]	59 [2.32]	79 [3.11]	320 [12.6]	M64 x 4	58 [2.28]	400 [15.75]	< 0.2 [0.0079]	760

Dimensions in mm [in]

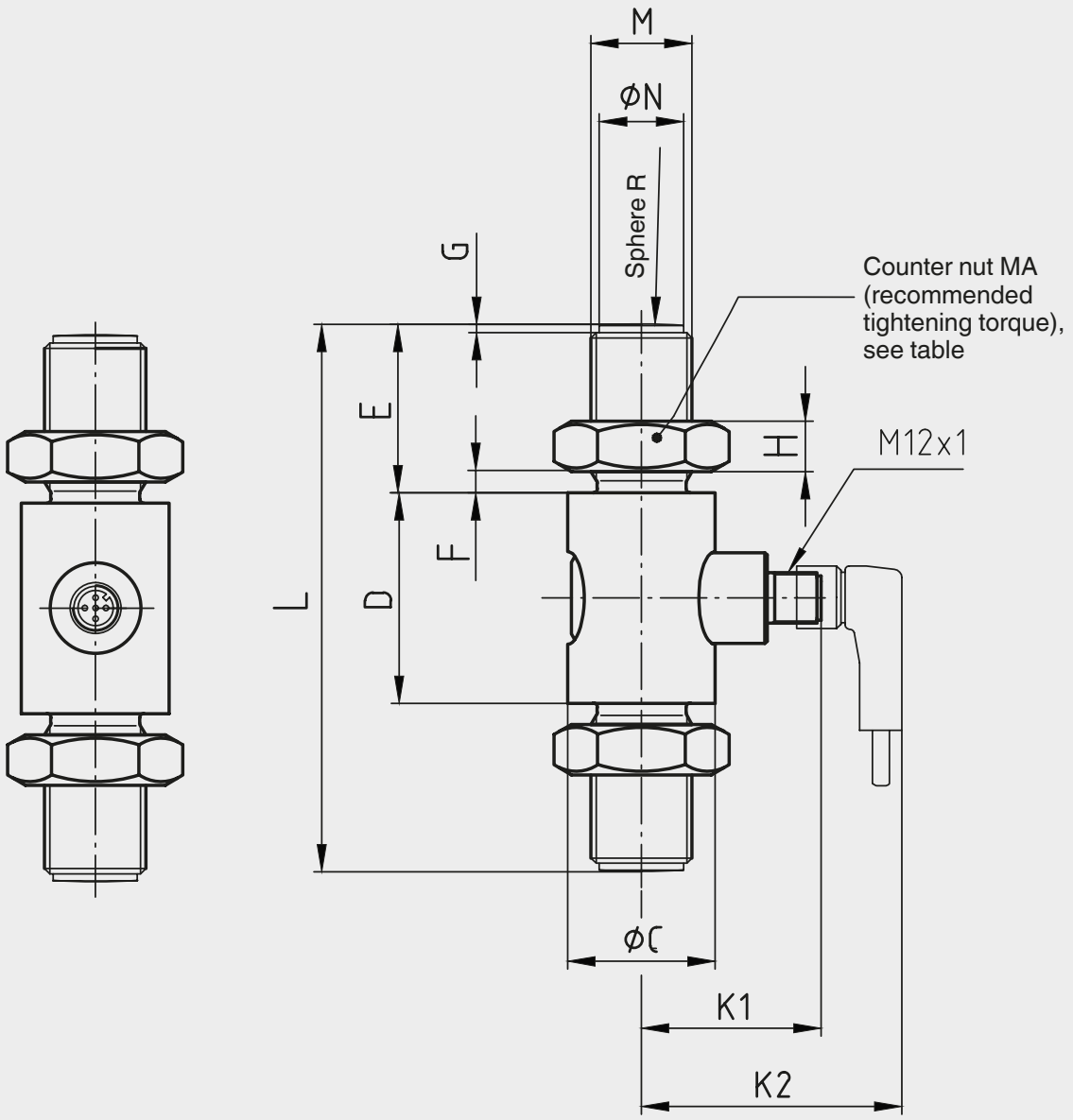
F23C1 version to 30 kN [6,744 lbf]



Rated force in kN [lbf]	Dimensions in mm [in]														MA (Nm)
	A	B	D	E	F	G	H	J	K1	K2	L	M	ØN -0.1	Sphere R	Rated displacement	
1, 2, 3 [225], [450] [674]	25.3 [0.99]	22 [0.87]	24 [0.99]	23 [0.9]	4.3 [0.17]	1.5 [0.06]	6 [0.24]	59.7 [2.35]	43 [1.7]	63 [2.48]	70 [2.75]	M12	9.5 [0.37]	60 [2.36]	< 0.02 [0.00079]	15
5 [1,124]	25.3 [0.99]	22 [0.87]	24 [0.99]	23 [0.9]	4.3 [0.17]	1.5 [0.06]	6 [0.24]	59.7 [2.35]	43 [1.7]	63 [2.48]	70 [2.75]	M12	9.5 [0.37]	60 [2.36]	< 0.02 [0.00079]	15
10 [2,248]	25.3 [0.99]	22 [0.87]	31 [0.99]	23 [0.9]	4.3 [0.17]	1.5 [0.06]	6 [0.24]	59.7 [2.35]	43 [1.7]	63 [2.48]	77 [3.03]	M12	9.5 [0.37]	80 [3.15]	< 0.02 [0.00079]	15
20 [4,496]	25.3 [0.99]	26 [1]	33 [1.3]	34 [1.34]	3.8 [0.15]	2 [0.08]	10 [0.39]	59.7 [2.35]	43 [1.7]	63 [2.48]	101 [3.98]	M20 x 1.5	17 [0.67]	100 [3.94]	< 0.2 [0.0079]	60
30 [6,744]	27.6 [1.09]	27.5 [1.08]	40 [1.57]	34 [1.34]	3.8 [0.15]	2 [0.08]	10 [0.39]	61.5 [2.42]	44 [1.73]	64 [2.52]	108 [4.25]	M20 x 1.5	17 [0.67]	120 [4.72]	< 0.2 [0.0079]	60

Dimensions in mm [in]

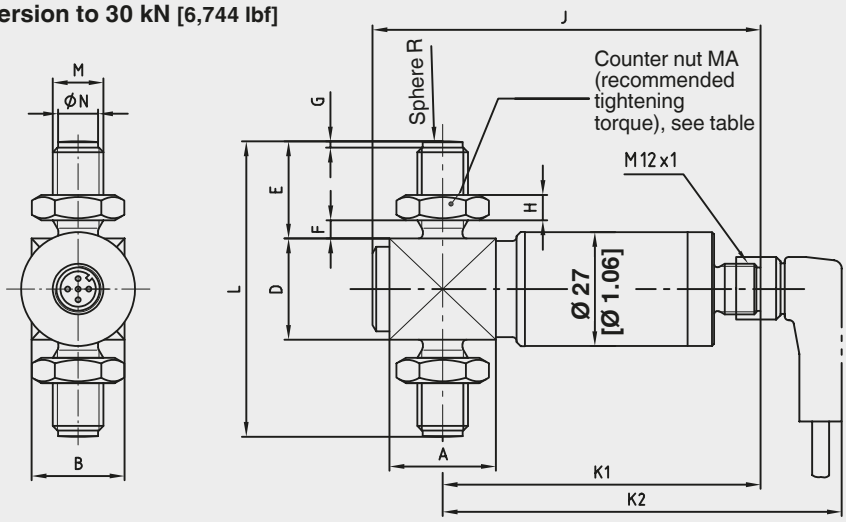
F23C1 version from 50 kN [11,240 lbf]



Rated force in kN [lbf]	Dimensions in mm [in]													MA (Nm)
	ØC	D	E	F	G	H	K1	K2	L	M	ØN $_{-0.1}$	Sphere R	Rated displacement	
50 [11,240]	35 [1.38]	50 [1.97]	40 [1.57]	5 [0.2]	2 [0.08]	12 [0.47]	43 [1.7]	62 [2.44]	130 [5.12]	M24 x 2	20 [0.79]	150 [5.9]	< 0.2 [0.0079]	110
100 [22,481]	54 [2.16]	54 [2.16]	68 [2.68]	10 [0.39]	3 [0.12]	19.5 [0.76]	44 [1.73]	64 [2.52]	190 [7.48]	M39 x 3	34 [1.34]	200 [7.87]	< 0.2 [0.0079]	390
200 [44,962]	67 [2.64]	67 [2.64]	82 [3.23]	12 [0.47]	3 [0.12]	22.5 [0.88]	45 [1.77]	65 [2.56]	231 [9.09]	M45 x 3	40 [1.57]	250 [9.84]	< 0.2 [0.0079]	495
300 [67,443]	73 [2.87]	73 [2.87]	98 [3.86]	14 [0.55]	3 [0.12]	28 [1.1]	49 [1.93]	69 [2.72]	269 [10.6]	M56 x 4	50 [1.97]	300 [11.8]	< 0.2 [0.0079]	640
500 [112,404]	94 [3.7]	94 [3.7]	113 [4.45]	17 [0.67]	3 [0.12]	32 [1.26]	59 [2.32]	79 [3.11]	320 [12.6]	M64 x 4	58 [2.28]	400 [15.75]	< 0.2 [0.0079]	760

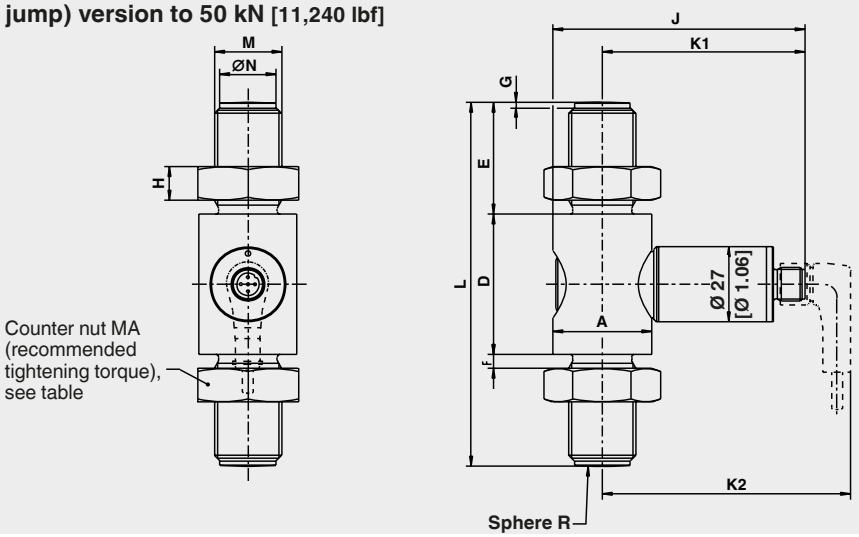
Dimensions in mm [in]

F2301 (signal jump) version to 30 kN [6,744 lbf]



Rated force in kN [lbf]	Dimensions in mm [in]														MA (Nm)
	A	B	D	E	F	G	H	J	K1	K2	L	M	N -0.1	Sphere R	
5 [1,124]	25.2 [0.99]	22 [0.87]	24 [0.94]	23 [0.9]	4.3 [0.17]	1.5 [0.06]	6 [0.24]	89 [3.5]	72 [2.83]	91.5 [3.6]	70 [2.75]	M12	9.5 [0.37]	60 [2.36	15
10 [2,248]	25.2 [0.99]	22 [0.87]	31 [1.22]	23 [0.9]	4.3 [0.17]	1.5 [0.06]	6 [0.24]	89 [3.5]	72 [2.83]	91.5 [3.6]	77 [3.03]	M12	9.5 [0.37]	80 [3.15]	15
20 [4,496]	25.2 [0.99]	26 [1.02]	33 [1.3]	34 [1.34]	3.8 [0.15]	2 [0.08]	10 [0.39]	91.5 [3.6]	73 [2.87]	91.5 [3.6]	101 [3.98]	M20 x 1.5	17 [0.67	100 [3.94]	60
30 [6,744]	27.5 [1.08]	27.5 [1.08]	40 [1.57]	34 [1.34]	3.8 [0.15]	2 [0.08]	10 [0.39]	91.5 [3.6]	73 [2.87]	92.5 [3.6]	108 [4.25]	M20 x 1.5	17 [0.67	120 [4.72]	60

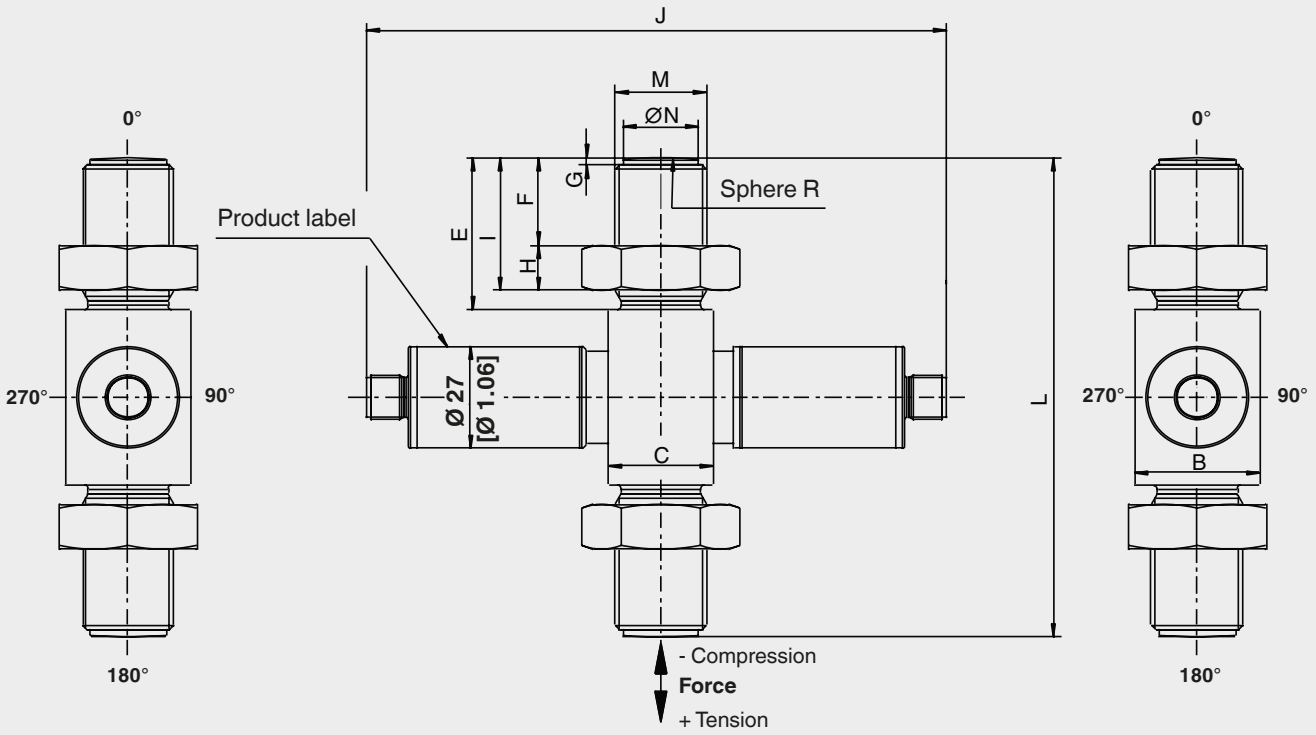
F2301 (signal jump) version to 50 kN [11,240 lbf]



Rated force in kN [lbf]	Dimensions in mm [in]													MA (Nm)
	ØA	D	E	F	G	H	J	K1	K2	L	M	Ø N -0.1	Sphere R	Rated dis-placement	
50 [11,240]	35 [1.38]	50 [1.97]	40 [1.57]	5 [0.2]	2 [0.08]	12 [0.47]	91.5 [3.6]	73 [2.87]	90.2 [3.55]	130 [5.12]	M24 x 2	20 [0.79]	150 [5.9]	< 0.2 [0.0079]	110
100 [22,481]	54 [2.16]	54 [2.16]	68 [2.68]	10 [0.39]	3.7 [0.15]	19.5 [0.76]	91.5 [3.6]	71 [2.79]	91 [3.58]	197 [7.75]	M39 x 3	34 [1.34]	200 [7.87]	< 0.2 [0.0079]	390

Dimensions in mm [in]

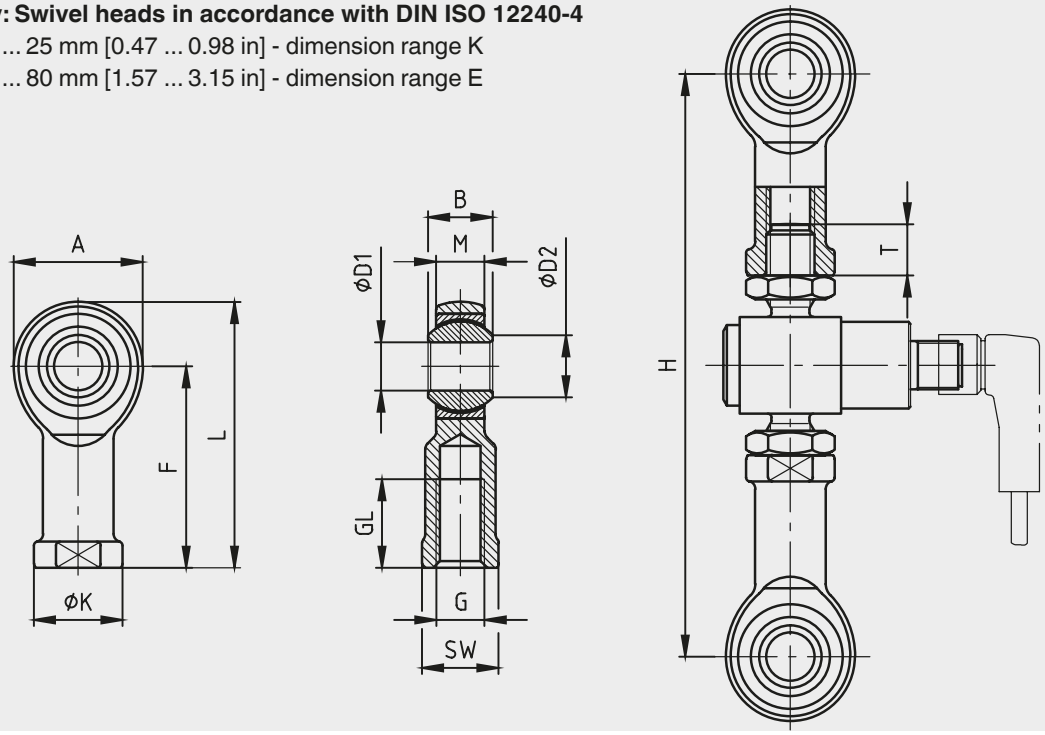
F23S1 version from 3 kN [674 lbf]



Rated force in kN [lbf]	Dimensions in mm [in]											
	B	C	E	F	G	H	I	J	L	M	Ø N -0.1	Sphere R
3-7 [674.48-1,574]	22 [0.87]	25.3 [0.99]	23 [0.9]	12.7 [0.5]	1.5 [0.06]	6 [0.27]	18.7 [0.736]	152.5 [6]	75 [2.95]	M12	9.5 [0.37]	60 [2.36]
6-13 [1,349-2,923]	25.3 [0.99]	25.3 [0.99]	26 [1]	13.5 [0.53]	1.5 [0.06]	8 [0.315]	21.5 [0.85]	152.5 [6]	85 [3.35]	M16 x 1.5	13 [0.51]	80 [3.15]
12-26 [2,698-5,845]	27.5 [1.08]	27.6 [1.09	34 [1.34]	20.2 [0.79]	2 [0.079]	10 [0.39]	30.2 [1.19]	152.5 [6]	108 [4.25]	M20 x 1.5	17 [0.67]	120 [4.72]
18-40 [4,047-8,992]	33 [1.3]	27.6 [1.09	40 [1.57]	23 [0.9]	2 [0.079]	12 [0.47]	35 [1.38]	152.5 [6]	126 [4.96]	M24 x 2	20 [0.79]	120 [4.72]
31-70 [6,969-15,737]	40 [1.57]	40 [1.57]	48 [1.89]	25 [0.98]	2 [0.079]	15 [0.59]	40 [1.57]	157.4 [6.2]	154 [6.06]	M30 x 2	26 [1.02]	150 [5.9]
67-151 [15,062-33,946]	60 [2.36]	60 [2.36]	78 [3.07]	47.8 [1.88]	3 [0.19]	19.7 [0.78]	67.5 [2.66]	177.4 [6.98]	223 [8.78]	M42 x 2	38 [1.5]	250 [9.84]

Dimensions in mm [in]

Accessory: Swivel heads in accordance with DIN ISO 12240-4
Ø -D1 = 12 ... 25 mm [0.47 ... 0.98 in] - dimension range K
Ø -D2 = 40 ... 80 mm [1.57 ... 3.15 in] - dimension range E

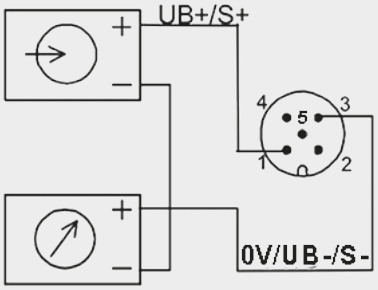


Rated force in kN [lbf]	Dimensions in mm [in]											Weight in kg [lbs]
	A	B	Ø D_1	Ø D_2	F	G	GL	ØK	L	M	SW	
1, 2, 3, 5, 10 [225], [450], [674], [1,124], [2,248]	32 [1.26]	16 [0.63]	12 H7 [0.47 H7]	15.4 [0.61]	50 [1.97]	M12	22 [0.87]	22 [0.87]	55 [2.16]	12 [0.47]	19 [0.75]	0.115 [0.254]
20, 30 [4,496], [6,744]	50 [1.97]	25 [0.98]	20 H7 [0.79 H7]	24.3 [0.96]	77 [3.03]	M20 x 1.5	33 [1.3]	34 [1.34]	102 [4.02]	18 [0.71]	32 [1.26]	0.415 [0.915]
50 [11,240]	60 [2.36]	31 [1.22]	25 H7 [0.98 H7]	29.6 [1.16]	94 [3.7]	M24 x 2	42 [1.65]	42 [1.65]	124 [4.88]	22 [0.87]	36 [1.42]	0.750 [1.653]
100 [22,481]	92 [3.62]	28 [1.10]	$40_{-0.012}$ [$1.57_{-0.0005}$]	45 [1.77]	142 [5.59]	M39 x 3	65 [2.56]	65 [2.56]	188 [7.4]	23 [0.9]	55 [2.16]	2 [4.41]
200 [44,962]	112 [4.41]	35 [1.38]	$50_{-0.012}$ [$1.97_{-0.0005}$]	56 [2.2]	160 [6.3]	M45 x 3	68 [2.68]	75 [2.95]	216 [8.5]	30 [1.18]	65 [2.56]	3.5 [7.72]
300 [67,443]	160 [6.3]	49 [1.93]	$70_{-0.015}$ [$2.75_{-0.0006}$]	77.9 [3.07]	200 [7.87]	M56 x 4	80 [3.15]	98 [3.86]	280 [11]	42 [1.65]	85 [3.35]	8.6 [18.96]
500 [112,404]	180 [7.09]	55 [2.16]	$80_{-0.015}$ [$3.15_{-0.0006}$]	89.4 [3.52]	230 [9.05]	M64 x 4	85 [3.35]	110 [4.33]	320 [12.6]	47 [1.85]	100 [3.94]	12 [26.45]

Rated force in		Dimensions in		Minimum thread depth	
kN	lbf	H [mm]	H [in]	T [mm]	T [in]
1. 2. 3. 5	**225; 450; 674. 1.124**	148 ± 3	5.83 ± 0.12	9.5	0.37
10	**2.248**	155 ± 3	6.10 ± 0.12	9.5	0.37
20	**4.496**	219 ± 4	8.62 ± 0.16	16	0.63
30	**6.744**	226 ± 4	8.88 ± 0.16	16	0.63
50	**11.240**	276 ± 4	10.87 ± 0.16	19.5	0.77
100	**22.481**	405 ± 7	15.94 ± 0.28	31	1.22
200	**44.962**	466 ± 13	18.35 ± 0.51	36	1.48
300	**67.443**	568 ± 11	22.36 ± 0.43	45	1.77
500	**112.404**	665 ± 13	26.18 ± 0.51	51	2.01

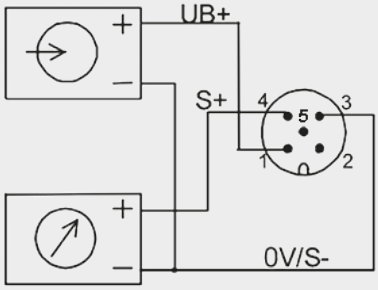
Pin assignment of analogue output

Output 4 ... 20 mA, 2-wire
Circular connector M12 x 1, 5-pin



Circular connector M12 x 1, 5-pin			
	4 ... 20 mA, 2-wire	4 ... 20 mA, 3-wire	0 ... 10 V, 3-wire
Supply UB+	1	1	1
Supply 0V/UB-	3	3	3
Signal S+	1	4	4
Signal S-	3	3	3
Shield ⏚	Case	Case	Case

Output 0 ... 10 V, 4 ... 20 mA, 3-wire
Circular connector M12 x 1, 5-pin



Cable assignment in combination with the circular connector M12 x 1, 5-pin		
Cable colour	**2-wire**	**3-wire**
Brown	UB+/S+	UB+
White	-	-
Blue	0V/S-	0V/S-
Black	-	S+

Only when using standard cable, e.g. 14259454

Pin assignment for ATEX/IECEx

Circular connector M12 x 1, 4-pin	
	ATEX Ex ib 4 ... 20 mA, 2-wire
Supply UB+	1
Supply 0V/UB-	3
Signal S+	1
Signal S-	3
Shield ⏚	Case

Cable assignment in combination with the circular connector M12 x 1, 4-pin	
Cable colour	**2-wire**
Brown	UB+/S+
White	-
Blue	0V/S-
Black	-

Only when using standard cable, e.g. 14259454

Pin assignment with signal jump

Circular connector M12 x 1, 4-pin			
	4 ... 20 mA, 2-wire	4 ... 20 mA, 3-wire	0 ... 10 V, 3-wire
Supply UB+	1	1	1
Supply 0V/UB-	3	3	3
Relay UR+	2	2	2
Relay UR-	4	3	3
Signal S+	1	4	4
Signal S-	3	3	3
Shield ⏚	Case	Case	Case

Cable assignment in combination with the circular connector M12 x 1, 4-pin		
Cable colour	**2-wire**	**3-wire**
Brown	UB+/S+	UB+
White	UR+	UR+
Blue	0V/S-	0V/S-/UR-
Black	UR-	S+

Only when using standard cable, e.g. 14259454

Pin assignment of analogue output, redundant

Circular connector M12 x 1, 5-pin	
	4 ... 20 mA, 2-wire
UB1+/S1+	1
UB2+/S2+	2
UB1-/S1-	3
UB2-/S2-	4
Shield ⏚	Case

Circular connector M12 x 1, 5-pin		
	4 ... 20 mA, 3-wire	0 … 10 V, 3-wire
Supply UB+	1	1
Supply 0V/S-	3	3
Signal S1+	4	4
Signal S2+	2	2
Shield ⏚	Case	Case

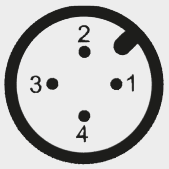
Cable assignment in combination with circular connector M12 x 1, 5-pin		
Cable colour	**2-wire**	**3-wire**
Brown	UB+/S+	UB+
White	-	-
Blue	0V/S-	0V/S-
Black	-	S+

Only when using standard cable, e.g. 14259454

Pin assignment of analogue output, redundant, opposing

Circular connector M12 x 1, 4-pin		
	4 ... 20 mA / 20 … 4 mA (redundant)	
	Connector 1	Connector 2
Supply UB+	1	1
Supply 0V/UB-	3	3
Signal of channel 1	4	-
Signal of channel 2	-	4
Shield ⏚	Case	Case

Circular connector M12 x 1, 4-pin

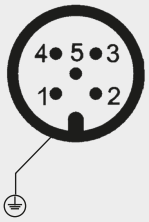


2-connector variant, e.g. in combination with ELMS1 overload protection (F23S1).
Version in accordance with requirements for functional safety per machinery directive 2006/42/EC.

Pin assignment for CANopen®

Circular connector M12 x 1, 5-pin	
Shield ⏚	1
Supply UB+ (CAN V+)	2
Supply UB- (CAN GND)	3
Bus signal, CAN high	4
Bus signal, CAN low	5

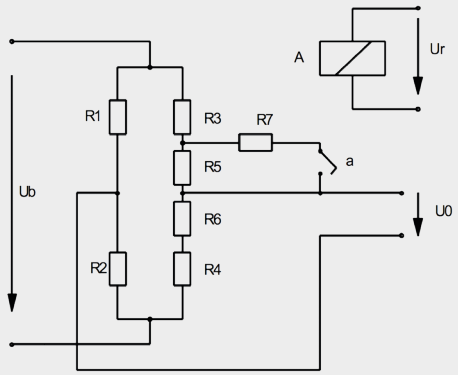
Circular connector M12 x 1, 5-pin



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 electronics 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.

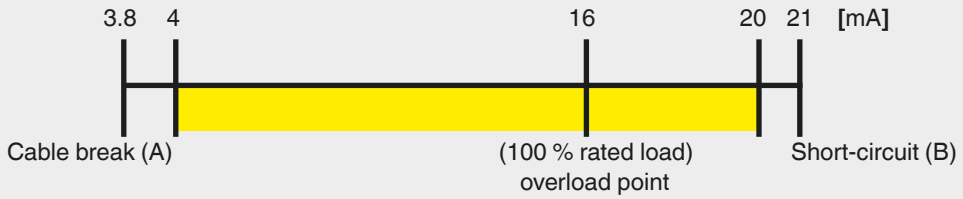
Compliance with functional safety

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.

Moreover, the measuring signal should be checked by the safety control for the min. (A) and max. (B) signal value to ensure that any cable break or short-circuit that has occurred is detected.

The default setting of the force transducer with current output 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.

WIKA Alexander Wiegand SE & Co. KG
Alexander-Wiegand-Straße 30
63911 Klingenberg/Germany
Tel. +49 9372 132-0
info@wika.de
www.wika.de