

Load Cells

Ring torsion load cells

SIWAREX WL280 RN-S SA

Load cell

Overview



The ring torsion load cell is particularly suitable for use in container, conveyor, platform and roller table scales.

Design

The measurement element is a ring torsion spring made of stainless steel. Two strain-gage spirals (DMS) are applied to the upper and lower faces of the ring respectively. The spring element is deformed by the load acting centrally in the measurement direction. This compresses the strain-gage of the upper face of the ring and extends the strain-gage on the lower face of the ring. This causes a change in the electrical resistance of the force-locked strain-gage, which is detected by means of a bridge circuit.

All load cells with a rated load of up to 13 t (12.79 tn. L.) are equipped with an integral overload protection.

Technical specifications

SIWAREX WL280 RN-S SA load cells

Possible applications	Container, conveyor, platform and roller table scales		
Model	Ring torsion load cell		
Rated load/maximum load E_{max}	<ul style="list-style-type: none"> • 60 kg (132.28 lb) • 130 kg (286.60 lb) • 280 kg (617.29 lb) 	<ul style="list-style-type: none"> • 0.5 t (0.49 tn. L.) • 1 t (0.98 tn. L.) • 2 t (1.97 tn. L.) • 3.5 t (3.45 tn. L.) • 5 t (4.92 tn. L.) • 10 t (9.84 tn. L.) 	<ul style="list-style-type: none"> • 13 t (12.80 tn. L.) • 28 t (27.56 tn. L.) • 60 t (59.05 tn. L.)
Accuracy class according to OIML R60	C3		
Max. load cell verification intervals n_{LC}	3 000		
Min. load cell verification intervals V_{min}	$E_{max}/16\ 000$	$E_{max}/17\ 500$	
Minimum application range $R_{min(LC)}$	19 %	17 %	
Combined error F_{comb}	$\leq \pm 0.023 \% C_n$		
Repeatability F_v	$\leq \pm 0.01 \% C_n$		
Return of zero signal	$\leq \pm 0.0167 \% C_n^{1)}$		
Creep error F_{cr}	$\leq \pm 0.0245 \% C_n^{1)}$		
• 30 min	$\leq \pm 0.0053 \% C_n^{1)}$		
• 20 ... 30 min			
Temperature coefficient			
• Zero signal T_{K0}	$\leq \pm 0.004 \% C_n/5K$		
• Characteristic value T_{Kc}	$\leq \pm 0.004 \% C_n/5K$		
Min. dead load E_{min}	$\geq \pm 0 \% E_{max}$		
Safe load limit L_u	200 % E_{max}	150 % E_{max}	
Ultimate load L_d	500 % E_{max}	300 % E_{max}	300 % E_{max}
Safe side load L_{Iq}	75 % E_{max}	100 % E_{max}	75 % E_{max}
Rated measuring path h_n at E_{max}	0.07 mm	0.1 ± 0.02 mm	0.11 ... 0.2 mm
Overload protection	Integrated	Integrated	Integrated at 13 t
Supply voltage U_{sr} (reference value)	15 V	10 V	15 V
Supply voltage (range)	5 ... 30 V+		
Rated characteristic value C_n	1 mV/V	2 mV/V	2 mV/V
Tolerance D_c of characteristic value	Up to 500 kg: 0.01 mV/V from 500 kg: 0.1 mV/V		

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Tolerance D_0 of zero signal	$\leq \pm 1.0 \% C_n$		
Input resistance R_e	60 kg: 1260 $\Omega \pm 100 \Omega$ 130 kg: 1260 $\Omega \pm 100 \Omega$ 280 kg: 1260 $\Omega \pm 250 \Omega$	1100 $\Omega \pm 100 \Omega$	13 t: 1200 $\Omega \pm 100 \Omega$ 28 t: 1075 $\Omega \pm 100 \Omega$ 60 t: 1350 $\Omega \pm 200 \Omega$
Output resistance R_a	1020 $\Omega \pm 0.5 \Omega$	1025 $\Omega \pm 25 \Omega$	13 t: 1000 $\Omega \pm 0.5 \Omega$ 28 t: 930 $\Omega \pm 0.5 \Omega$ 60 t: 1175 $\Omega \pm 0.5 \Omega$
Insulation resistance R_{is}	$\geq 5\,000\text{ M}\Omega$	$\geq 5\,000\text{ M}\Omega$	$\geq 5\,000\text{ M}\Omega$
Rated temperature range B_{rn}	-10 ... +40 °C (14 ... 104 °F)		
Operating temperature range B_{tu}	-35 ... +70 °C (-31 ... 158 °F)		
Storage temperature range B_{ts}	-50 ... +90 °C (-58 ... 194 °F)		
Sensor material (DIN)	Stainless steel, mat. no. 14542		
Degree of protection according to EN 60529; IEC 60529	IP66/68		
Recommended tightening torque of the fixing screws	8 Nm	14 Nm (0.5 ... 5 t) 10 Nm (10 t)	-
Current calibration ²⁾	Standard		
Ex protection to ATEX (optional)	II 1 G Ex ia IIC T4 Ga II 1 D Ex ia IIIC T73 °C Da II 3 G Ex ic IIC T4 Gc II 3 G Ex nA IIC T4 Gc II 3 G Ex tc IIIC T63 °C Dc		

Cable connection

Function	Color
• EXC +	pink
• EXC -	gray
• SIG +	brown
• SIG -	white
• Screening	transparent

Selection and ordering data

Article No.

SIWAREX WL280 RN-S SA load cell**7MH5113-**

Stainless steel, low mounting height, IP66/68 accuracy class C3 according to OIML R60

D 0

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Rated load**Cable length**

• 60 kg (132.28 lb)	3 m (9.84 ft)	2 Q
• 130 kg (286.60 lb)	3 m (9.84 ft)	3 D
• 280 kg (617.29 lb)	3 m (9.84 ft)	3 J
• 500 kg (1 102.31 lb)	3 m (9.84 ft)	3 P
• 1 t (0.98 tn. L.)	3 m (9.84 ft)	4 A
• 2 t (1.97 tn. L.)	6 m (19.68 ft)	4 G
• 3,5 t (3.44 tn. L.)	6 m (19.68 ft)	4 L
• 5 t (4.92 tn. L.)	6 m (19.68 ft)	4 P
• 10 t (9.84 tn. L.)	15 m (49.21 ft)	5 A
• 13 t (12.79 tn. L.)	15 m (49.21 ft)	5 D
• 28 t (27.56 tn. L.)	15 m (49.21 ft)	5 J
• 60 t (59.05 tn. L.)	15 m (49.21 ft)	5 Q

Explosion protection

None

0

Explosion protection for zones 1, 2, 20, 21, 22

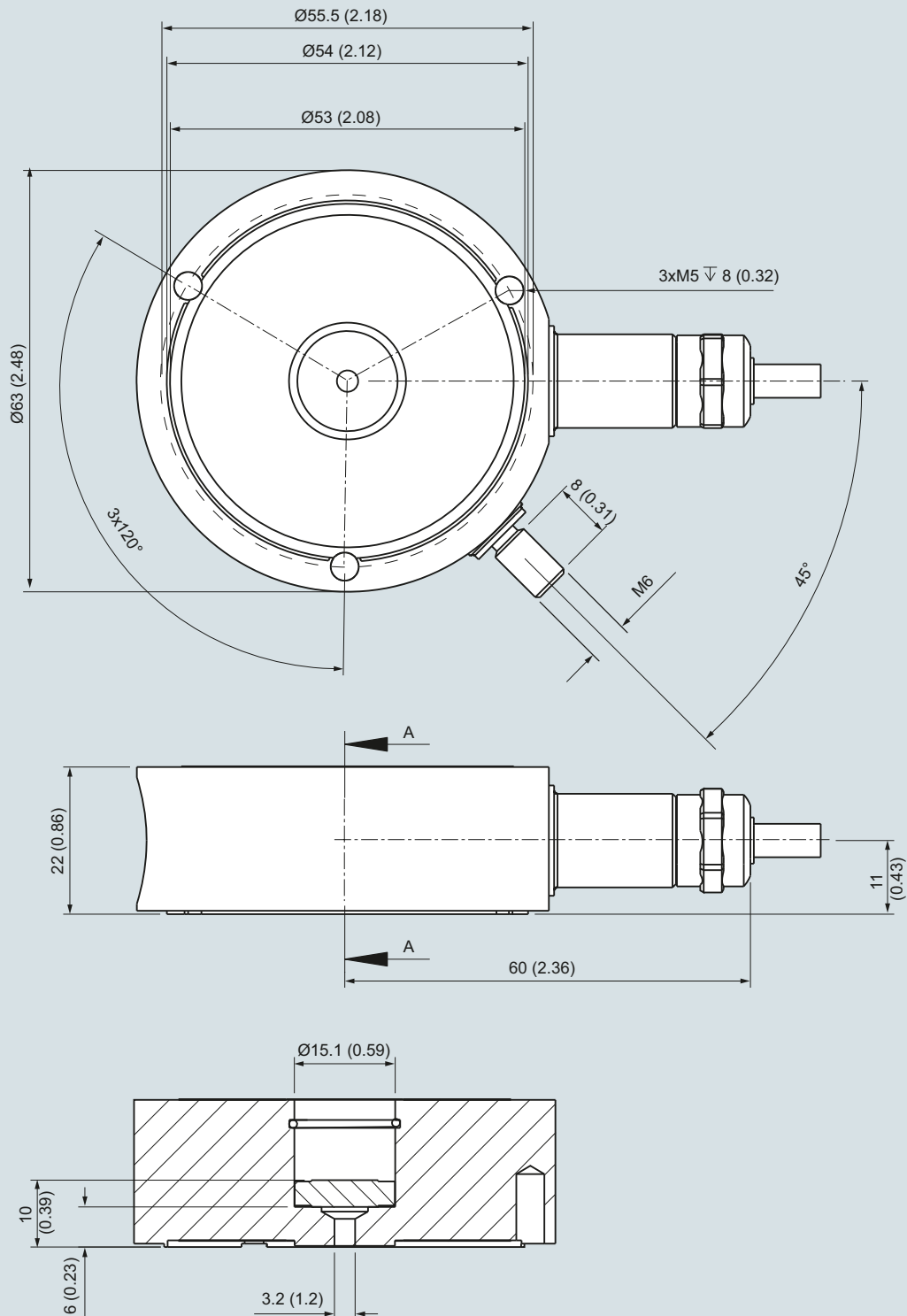
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¹⁾ For rated temperature -10 ... +40 °C (14 ... 104 °F)

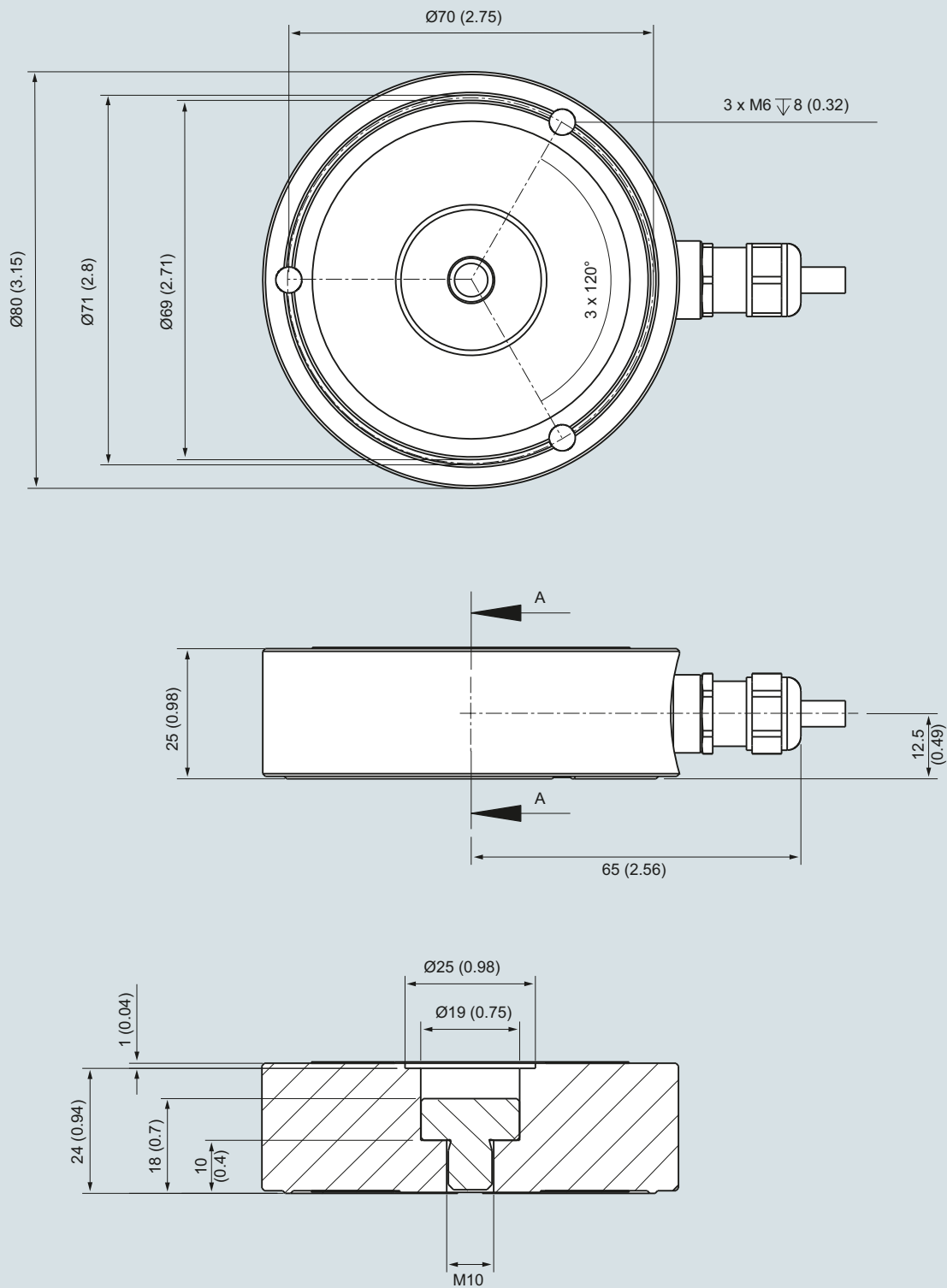
²⁾ Current calibration: rated characteristic value and output resistance are adjusted so that the output current is calibrated within 0.05 % of a reference value. This makes it easier to connect several load cells in parallel.

Load Cells

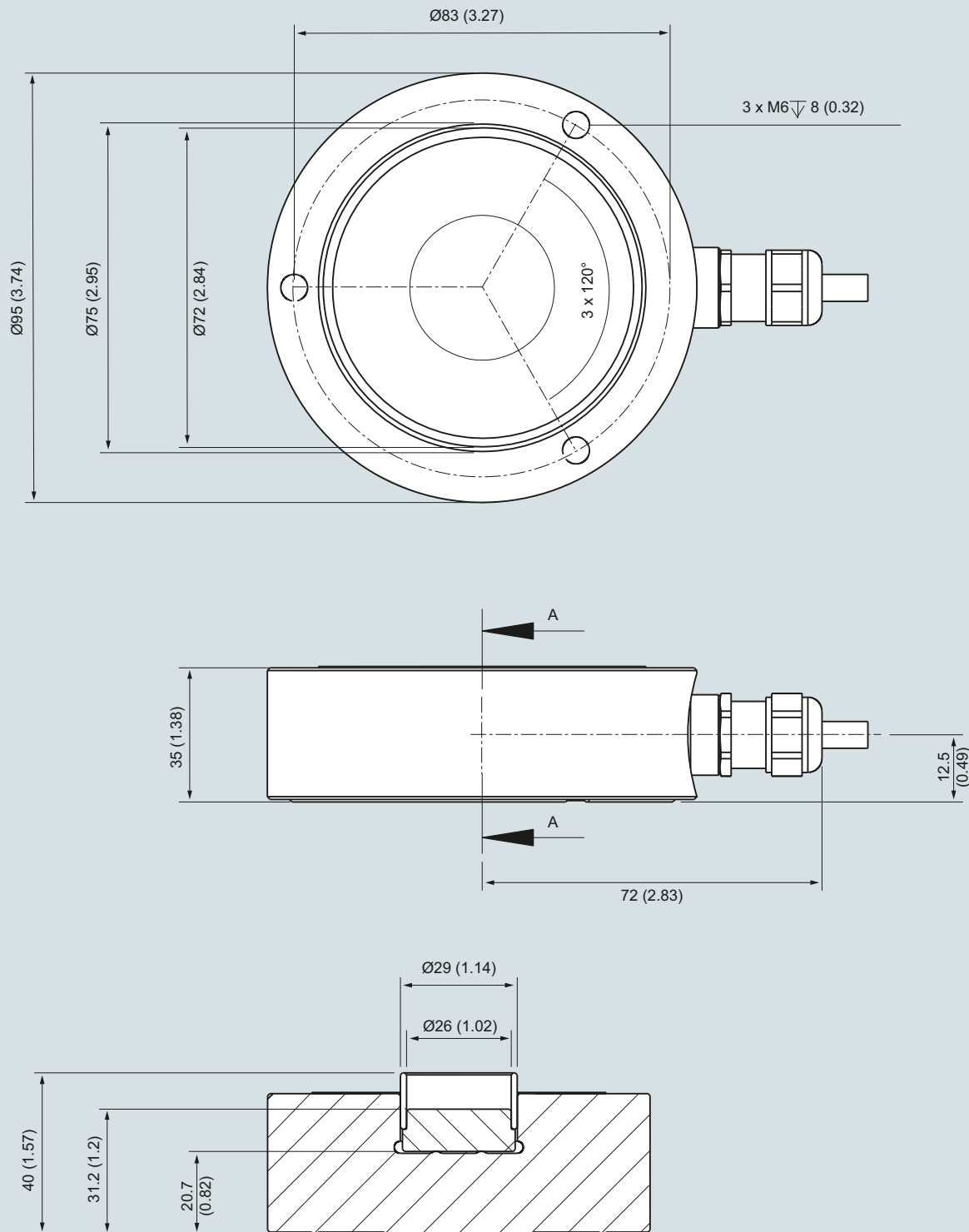
Ring torsion load cells
SIWAREX WL280 RN-S SA

Load cell**Dimensional drawings**

SIWAREX WL280 RN-S SA load cell (60 kg, 130 kg, 280 kg / 132.28, 286.60, 617.29 lb), dimensions in mm (inch)



SIWAREX WL280 RN-S SA load cell (0,5 t, 1 t / 0.49, 0.98 tn. L.), dimensions in mm (inch)

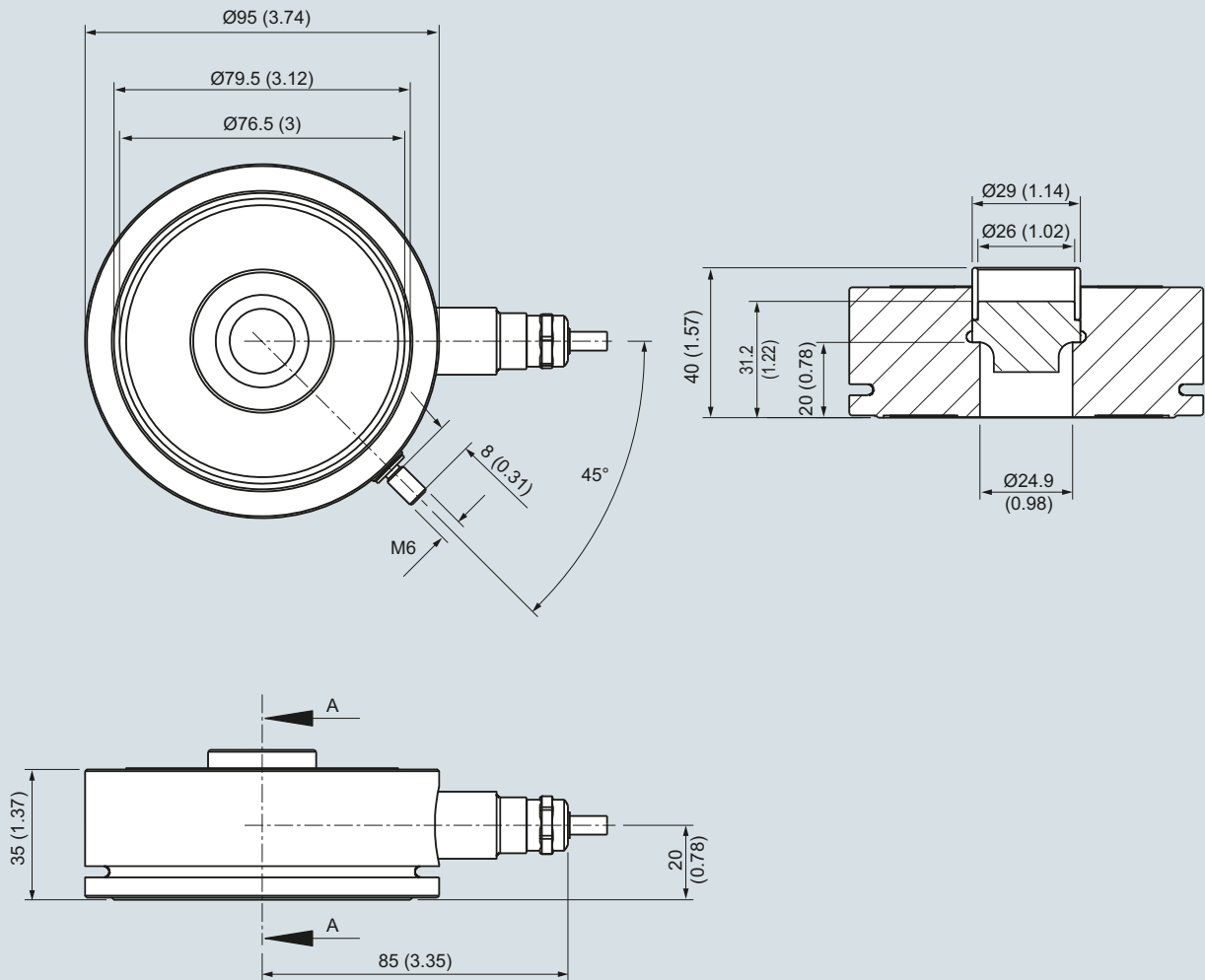


SIWAREX WL280 RN-S SA load cell (10 t / 9.84 tn. L.), dimensions in mm (inch)

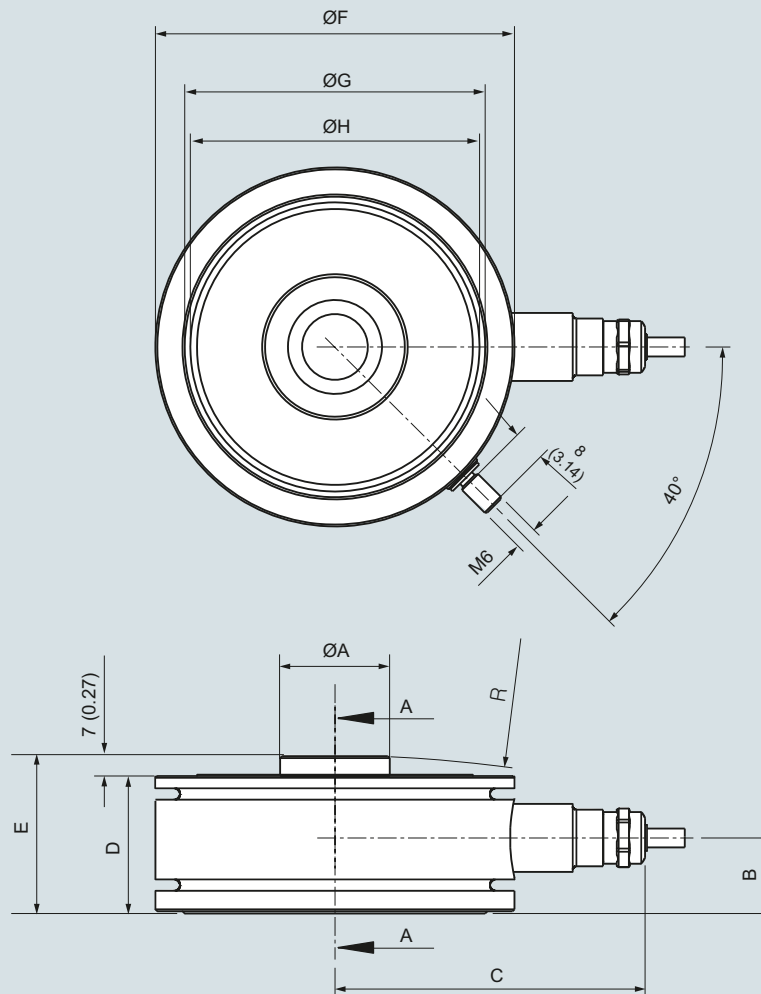
Load Cells

Ring torsion load cells

SIWAREX WL280 RN-S SA

Load cell

SIWAREX WL280 RN-S SA load cell (13 t / 12.79 tn. L.), dimensions in mm (inch)



Rated load [t]	ØA	B	C	D	E	ØF	ØG	ØH	R
28	35.9 (1.41)	25 (0.98)	94 (3.7)	46 (1.8)	53 (2.08)	120 (4.72)	102 (4)	98 (3.85)	R400
60	47.9 (1.88)	34 (1.33)	105 (4.13)	62 (2.44)	69 (2.71)	140 (5.5)	124 (4.88)	120 (4.72)	R600

SIWAREX WL280 RN-S SA load cell (28 t, 60 t / 27.56, 59.05 tn. L.), dimensions in mm (inch)

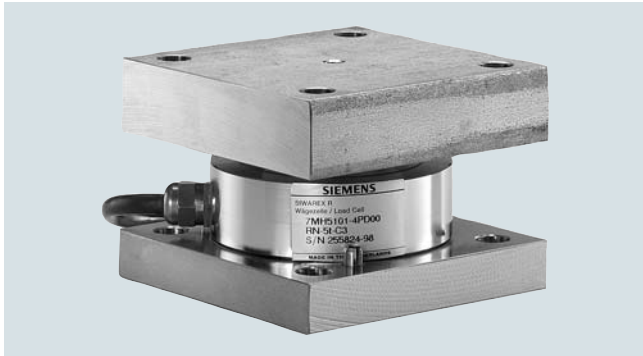
Load Cells

Ring torsion load cells

SIWAREX WL280 RN-S SA

Self-aligning bearing

Overview



The self-centering self-aligning bearing for SIWAREX WL280 RN-S SA load cells is particularly suitable for container and platform scales due to its low mounting height.

Design

The self-aligning bearing comprises a self-aligning bolt, a top plate (self-aligning bearing, top part) and a base plate (self-aligning bearing, base part).

The self-centering, self-aligning bolt allows the top plate, and thus the load support, to accommodate horizontal displacements (e.g. due to temperature fluctuations). The design of the self-aligning bolt creates a restoring force, which is dependent on the size of the displacement and the applied load.

The design of the load support must be such as to limit the lateral play (e.g. with limit stops), if the load support is displaced horizontally by the following values:

- > 4 mm (0.16") (up to 5 t (4.92 tn. l.) rated load)
- > 7 mm (0.28") (up to 13 t (12.80 tn. l.) rated load)
- > 10 mm (0.39") (up to 60 t (59.05 tn. l.) rated load)

Lifting of the load support must be prevented by suitable measures provided in the construction of the load bearing implement.

The load cell is not included in the scope of delivery of the self-aligning bearing.

Technical specifications

Self-aligning bearing for SIWAREX WL280 RN-S SA load cells

Rated load t (tn. L.)	0.06 ... 5 (0.06 ... 4.92)	10 ... 13 (9.84 ... 12.80)	28 ... 60 (27.56 ... 59.02)
Permissible lateral deflection in mm (inch)	± 4 (0.16)	± 7 (0.28)	± 10 (0.39)

Selection and ordering data

Article No.

Self-aligning bearing top part¹⁾²⁾

For SIWAREX WL280 RN-S SA load cells comprising: Top plate with seal holder and sealing ring, top plate pressure piece, self-aligning bolt, cell pressure piece (not for 28 t / 27.56 tn. l. and 60 t / 59.05 tn. l.)

Material: Stainless steel

For load cells with a rated load of

- 60, 130, 280 kg (132.28, 286.60, 617.29 lb)
- 0.5, 1 t (0.49, 0.98 tn. L.)
- 2, 3.5, 5 t (1.97, 3.45, 4.92 tn. L.)
- 10, 13 t (9.84, 12.80 tn. l.)
- 28 t (27.56 tn. l.)
- 60 t (59.05 tn. l.)

7MH4115-3DB11

7MH4132-4AK11

7MH4132-4KK11

7MH4115-5BB11

7MH4115-5DB11

7MH4115-5GB11

Self-aligning bearing base part¹⁾

For SIWAREX WL280 RN-S SA load cells comprising:

Base plate, 3 tension pins

Material: Stainless steel

For load cells with a rated load of

- 60, 130, 280 kg (132.28, 286.60, 617.29 lb)
- 0.5, 1, 2, 3.5, 5 t (0.49, 0.98, 1.97, 3.45, 4.92 tn. L.)
- 10, 13 t (9.84, 12.80 tn. L.)
- 28 t (27.56 tn. L.)
- 60 t (59.05 tn. L.)

7MH4115-3DC11

7MH4132-4AG11

7MH4115-5BC11

7MH4115-5DC11

7MH4115-5GC11

Accessories

Pressure piece set

For SIWAREX WL280 RN-S SA load cells. Comprising pressure piece and pendulum support. The pressure piece set enables customer-specific installation requirements to be implemented. Material: Stainless steel

for load cells with rated load of:

- 60, 130, 280 kg (132.28, 286.60, 617.29 lb)
- 0.5, 1 t (0.49, 0.98 tn. L.)

7MH5713-3JD00

7MH5713-4AD00

Shims (accessories)

For self-aligning bearing base parts

Material: Stainless steel

For load cells with a rated load of¹⁾

- 10 t, 13 t (9.84, 12.80 tn. L.)
Contents: 16 units, each 0.5 mm thick
- 28 t, 60 t (27.56, 59.05 tn. L.)
Contents: 4 units each 0.5 mm thick, 20 units each 1 mm thick

7MH5713-3JG00

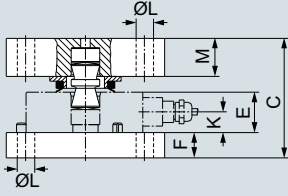
7MH5713-5DG00

¹⁾ The load cell is not included in the scope of delivery.

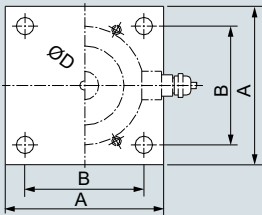
²⁾ The self-aligning bearing base part is not included in delivery.

Dimensional drawings

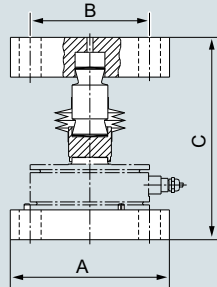
Front view
60 kg ... 13 t



Plan view
60 kg ... 13 t



Front view
28 t / 60 t



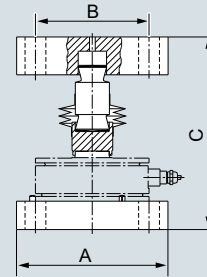
*s = permissible lateral deflection

Rated load	A	B	C	ØD	E	s*
60 ... 280 kg	80 (3.15)	60 (2.36)	52 (2.05)	63 (2.48)	22 (0.87)	4 (0.16)
0.5 t, 1 t	100 (3.94)	75 (2.95)	79 (3.11)	80 (3.15)	25 (0.98)	4 (0.16)
2 t, 3.5 t, 5 t	100 (3.94)	75 (2.95)	79 (3.11)	80 (3.15)	30 (1.18)	4 (0.16)
10 t, 13 t	120 (4.72)	90 (3.54)	121.2 (4.77)	95 (3.74)	35 (1.97)	7 (0.28)
28 t	160 (6.30)	120 (4.72)	203 (7.99)	40 (1.57)	46 (1.81)	10 (0.39)
60 t	200 (7.87)	140 (5.51)	254 (10.00)	50 (1.97)	62 (2.44)	10 (0.39)

Rated load	F	K	ØL	M
60 ... 280 kg	8 (0.31)	11 (0.43)	9 (0.35)	12 (0.47)
0.5 t, 1 t	15 (0.59)	10 (0.39)	11 (0.43)	25 (0.98)
2 t, 3.5 t, 5 t	15 (0.59)	8.5 (0.33)	11 (0.43)	25 (0.98)
10 t, 13 t	20 (0.79)	20 (0.79)	14 (0.55)	40 (1.57)
28 t	30 (1.18)	25 (0.98)	22 (0.87)	40 (1.57)
60 t	36 (1.42)	34 (1.34)	28 (1.10)	50 (1.97)

Self-aligning bearing for SIWAREX WL280 RN-S SA load cells, for 0.06 ... 13 t (0.07 ... 14.33 tn. L.), dimensions in mm (inch)

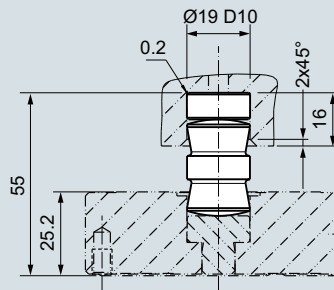
G_WT01_XX_10122



Rated load [t]	A	B	C	s
28	160 (6.30)	120 (4.72)	203 (7.99)	10 (0.39)
60	200 (7.87)	140 (5.51)	254 (10.00)	10 (0.39)

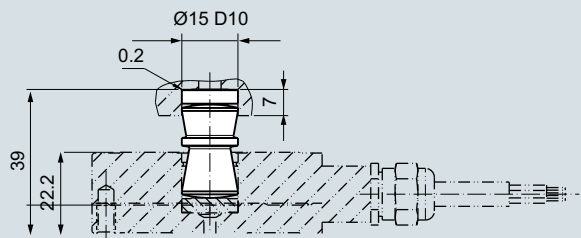
G_WT01_XX_10118

Self-aligning bearing for SIWAREX WL280 RN-S SA load cells, for 28 ... 60 t (27.56 ... 59.05 tn. L.), dimensions in mm (inch)



G_WT01_XX_10138

Self-aligning bearing for SIWAREX WL280 RN-S SA load cells, for 28 ... 60 t (27.56 ... 59.05 tn. L.), dimensions in mm (inch)



G_WT01_XX_10139

Pressure piece set WL280 RN-S SA for 60, 130, 280 kg (132.28, 286.60, 617.29 lb)

Load Cells

Ring torsion load cells

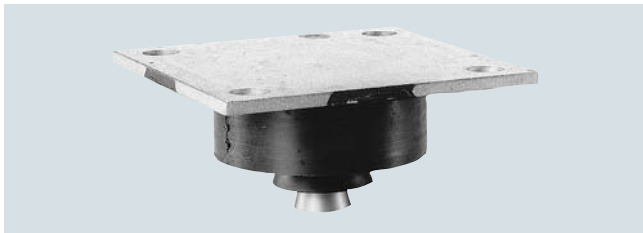
SIWAREX WL280 RN-S SA

Elastomer bearing

Overview



Elastomer bearing for SIWAREX WL280 RN-S SA load cells, 60 ... 280 kg (132.28 ... 617.29 lb)



Elastomer bearing for SIWAREX WL280 RN-S SA load cells, 0.5 ... 13 t (0.49 ... 12.80 lb)

Used in combination with the self-aligning bearing base part, the self-centering elastomer bearing for SIWAREX WL280 RN-S SA load cells is the ideal load introduction element for scales without guide elements. It is used in container, platform and roller table scales and dampens vibrations and shocks.

Design

Elastomer bearings are rubber-metal composites made of neoprene and stainless steel. They ensure large spring excursions (i.e. a high degree of damping) despite small dimensions.

If the load support is horizontally displaced by more than 4 mm (0.16") or 6 mm (0.24") for a rated load of 10 t (9.84 tn. L.) and 13 t (12.80 tn. L.), the design of the load support must include measures to restrict lateral play (e.g. limit stops). Lifting of the load support must be prevented by suitable measures provided in the construction of the load bearing implement.

The load cell and the self-aligning bearing bottom part are not included in the scope of delivery of the elastomer bearing.

Technical specifications

Elastomeric bearings for load cells of the SIWAREX WL280 RN-S SA series

Rated load t (tn. L.)	0.06 ... 5 (0.06 ... 4.92)	10 ... 13 (9.84 ... 12.80)
Permissible lateral deflection in mm (inch):	± 4 (0.16)	± 6 (0.24)

Selection and ordering data

Article No.

Elastomer bearings¹⁾

For SIWAREX WL280 RN-S SA load cells comprising: Elastomer package with fixing plate, force transfer, seal

Material: Stainless steel and neoprene

For load cells with a rated load of

- 60, 130, 280 kg (132.28, 286.60, 617.29 lb)
- 0.5, 1 t (0.49, 0.98 tn. L.)
- 2, 3.5, 5 t (1.97, 3.44, 4.92 tn. L.)
- 10, 13 t (9.84, 12.80 tn. L.)

7MH4130-3EE11

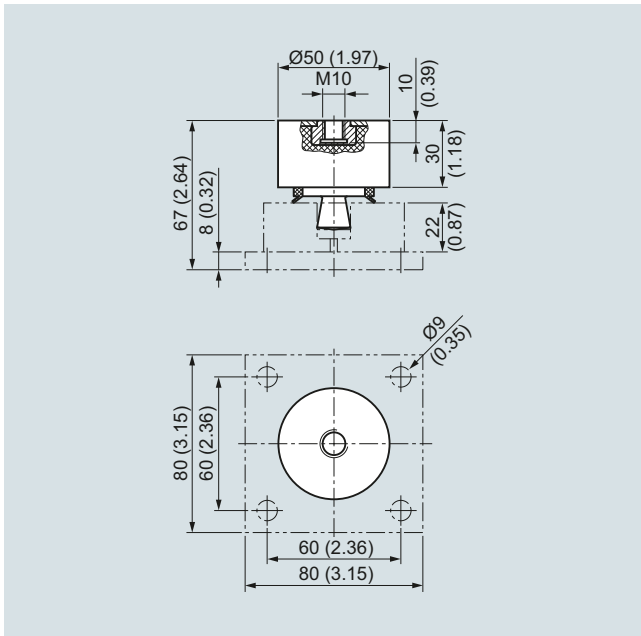
7MH4130-4AE11

7MH4130-4KE11

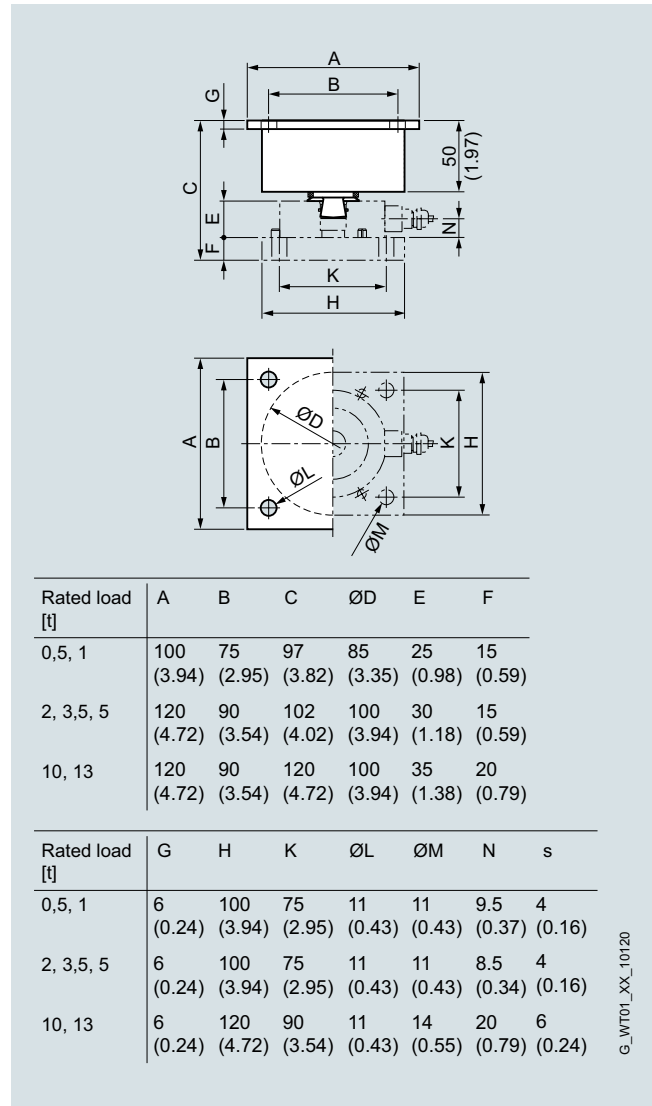
7MH4130-5CE11

¹⁾ The load cell and the self-aligning bearing bottom part are not included in the scope of delivery.

Dimensional drawings



Elastomer bearing for SIWAREX WL280 RN-S SA load cells, 60 ... 280 kg (132.28 ... 617.30 lb), dimensions in mm (inch)



Elastomer bearing for SIWAREX WL280 RN-S SA load cells, 0.5 ... 13 t (0.49 ... 12.80 tn. L.), dimensions in mm (inch)

Load Cells

Ring torsion load cells

SIWAREX WL280 RN-S SA

Mounting unit and guide element

Overview



SIWAREX WL280 RN-S SA mounting unit and guide element, front



SIWAREX WL280 RN-S SA mounting unit and guide element, rear

The mounting unit, together with the load cells of the SIWAREX WL280 RN-S SA series, form a self-centering unit. The guide elements prevent a container, for example, from moving sideways due to an external lateral force. The guide elements can be mounted on one or both sides of the mounting unit.

Design

The mounting unit comprises a base plate and a top plate, a thrust pad with a flat gasket and a pendulum support. A very flexible grounding cable between the top and base plate conducts any fault currents past the load cell. The top plate is connected to the base plate by means of two countersunk head screws. On both sides of the base and top plate there are threaded holes for the later flange-fitting of guide elements.

The top plate is fixed above the base plate by means of two countersunk head screws. This results in a single unit that is easily handled. The top plate must be precisely aligned above the base plate. The height of the top plate is set so that it is 2 millimeters (for the 60 ... 280 kg version) or 3 millimeters (for the 0.5 ... 13 t versions) above the installation height with load cell.

In this state the mounting unit serves as an installation aid and can be used as a dummy for lighter installation jobs.

The load cell, together with the pendulum support and the thrust pad, can be inserted into the mounting unit. Load cell and thrust pad are secured with clamping washers.

The load cell can be inserted in the scale before installing the mounting unit. In the same way, it is possible to insert the load cell after installation in the mounting unit.

The fixing holes of the mounting unit are 6 mm wider in diameter than the necessary fixing screws. This means that a greater tolerance error is permissible in the connection measurements. The mounting unit is clamped tightly using the washers supplied.

After the mounting units have been mounted in the scales, the load bearing element is ideally aligned. The load cells are not yet loaded. Finally, the load bearing implement is lowered by loosening the hexagonal bolts under the top plate. The weight now rests on the load cells.

In this state the load cell and the mounting unit together form a self-centering bearing unit. The mounting unit allows the top plate (and thus the load bearing implement) to be displaced up to two millimeters (for the 60 ... 280 kg version) or three millimeters (for the 0.5 ... 13 t versions) to the side in all directions. The countersunk head screws prevent the load bearing element from being lifted off or tipping up. The countersunk head screws secure the load bearing element against sharp lateral movement on the occurrence of sporadic transverse forces.

By using the mounting unit as an installation aid, the load cells are optimally aligned. This is absolutely essential for the best utilization of the load cells in terms of accuracy. In the event of maintenance or a fault, the load cell can be released again by undoing the hexagonal nuts. After loosening the clamping washers, the cell can then easily be replaced.

Guide elements are used if the lateral movement of a load bearing element is to be prevented. The lateral movements can be initiated by agitator start-up in a container, by braking or accelerating forces in a roller conveyor or through forces exerted by the wind on outdoor silos.

A guide element consists of two flanges and one clamping screw. The clamping screw is adjusted to the correct length. The guide element is attached to the operational mounting unit. A guide unit can be mounted on the front or rear of the mounting unit. If necessary, two guide elements can be used in parallel in order to double the transferrable lateral force.

In the case of scales with four load cells, only three mounting units may be equipped with guide units.

Shims are used to compensate for angular errors in the lugs. If more than three load cells are used, the shims are also used to adjust the height of the lugs.

Load Cells

Ring torsion load cells

SIWAREX WL280 RN-S SA

Mounting unit and guide element

Selection and ordering data

Article No.

Mounting units

For SIWAREX WL280 RN-S SA load cells

Material: Stainless steel

For load cells with a rated load of¹⁾

- 60 ... 280 kg (132.28 ... 617.29 lb) **7MH5713-3JA00**
- 0,5 ... 1 t (0.49 ... 0.98 tn. L.) **7MH5713-4AA00**
- 2 ... 5 t (1.97 ... 4.92 tn. L.) **7MH5713-4PA00**
- 10 ... 13 t (9.84 ... 12.80 tn. L.) **7MH5713-5DA00**

Guide elements (optional)

for mounting units of the SIWAREX WL280 RN-S SA series

Material: Stainless steel

For load cells with a rated load of

- 60 ... 280 kg (132.28 ... 617.29 lb); Permitted transverse force: 1,5 kN **7MH5713-3JE00**
- 0,5 ... 1 t (0.49 ... 0.98 tn. L.); Permitted transverse force: 2,5 kN **7MH5713-4AE00**
- 2 ... 5 t (1.97 ... 4.92 tn. L.); Permitted transverse force: 5 kN **7MH5713-4PE00**
- 10 ... 13 t (9.84 ... 12.80 tn. L.); Permitted transverse force: 10 kN **7MH5713-5DE00**

Shims (accessories)

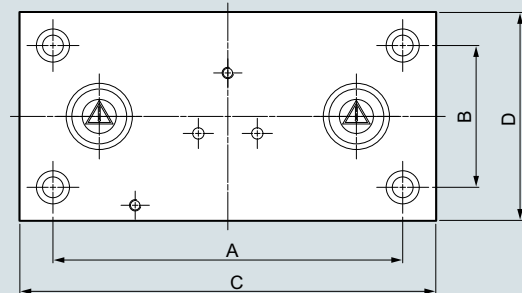
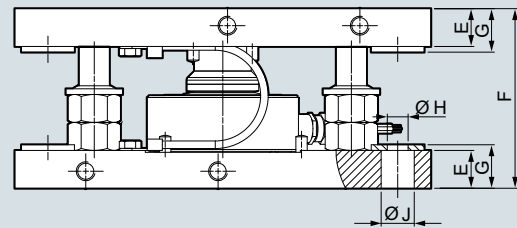
For mounting units of the SIWAREX WL280 RN-S SA series

Material: Stainless steel

For load cells with a rated load of¹⁾

- 60 ... 280 kg (132.28 ... 617.29 lb); Contents: 16 units, each 0.5 mm thick **7MH5713-3JG00**
- 0,5 ... 1 t (0.49 ... 0.98 tn. L.); Contents: 24 units, each 0.5 mm thick **7MH5713-4AG00**
- 2 ... 5 t (1.97 ... 4.92 tn. L.); Contents: 4 units each 0.5 mm thick, 16 units each 1 mm thick **7MH5713-4PG00**
- 10 ... 13 t (9.84 ... 12.80 tn. L.); Contents: 4 units each 0.5 mm thick, 20 units each 1 mm thick **7MH5713-5DG00**

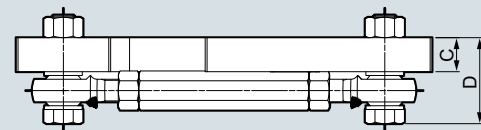
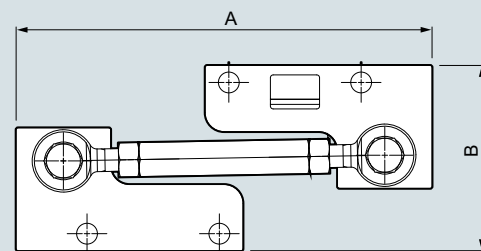
Dimensional drawings



	60 ... 280 kg	0,5 t / 1 t	2 t ... 5 t	10 t / 13 t
A	136	165	185	200
B	60	75	75	90
C	166	200	220	240
D	90	110	110	130
E	12	15	20	20
F	60	85	95	127.2
G	14.5	18	23	24
Ø H	9	11	11	13.5
Ø J	13.5	17.5	17.5	20

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WL280 mounting unit



	60 ... 280 kg	0,5 t / 1 t	2 t ... 5 t	10 t / 13 t
A	166	200	220	240
B	60	85	95	127.2
C	10	12	18	18
D	~30.5	~35	~45.5	~54.4

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WL280 guide element

¹⁾ The load cell and the compact mounting unit are not included in the scope of delivery.