

Load Cells

Compression load cells

SIWAREX WL270 K-S CA Load cell

Overview



This compression load cell is particularly suitable for use in hopper scales and bin weighing equipment.

Design

The measuring element is a cylinder made of steel to which 4 strain gauges are applied.

The load which acts centrally in the measuring direction elastically deforms the spring body and thus the force-fitted strain gauges.

This generates a measuring signal voltage that is proportional to the load. The load cell's rated displacement path depends on the rated load and is between 0.23 and 3.11 mm (0.01 and 0.12 in).

An enclosure made from painted steel protects the strain gauge from environmental influences. The load cell is fitted with a heat-resistant cable as standard.

Heavy load versions

Heavy load versions with a rated load of 350 and 500 t (344.47 and 492.10 tn. l.) are available for extreme requirements.

Option: Two measuring circuits for your plant safety

In especially sensitive applications such as cranes, enhanced safety is required. This is also true of measurement plants. Using double bridges in load cells achieves the equivalent of a redundant configuration. Both measuring bridges supply consistent measured values. If one bridge fails, the other takes over.

This option can be ordered for all load classes from 13 t (12.79 tn. l.).

Selection and ordering data

SIWAREX WL270 K-S CA load cell Accuracy class 0.1% Heat-resistant connecting cable ¹⁾		Article No. 7MH5114- ● ● L ● ●	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Rated load	Cable length		
• 2.8 t (2.76 tn. l.)	6 m (19.68 ft)	4	J
• 6 t (5.91 tn. l.)	6 m (19.68 ft)	4	Q
• 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
• 130 t (127.95 tn. l.)	20 m (65.62 ft)	6	D
• 280 t (275.58 tn. l.)	20 m (65.62 ft)	6	J
• 350 t (244.47 tn. l.)	25 m (82.02 ft)	6	L
• 500 t (492.10 tn. l.)	25 m (82.02 ft)	6	P
Explosion protection			
• Without			0 0
• Explosion protection for zones 2, 22			0 1
Options			
Double bridge²⁾ Load cell, redundant design, without explosion protection		6	0
High temperature²⁾ Temperature range -30 °C ... +250 °C (-22 °F ... +482 °F), accuracy varies over temperature range, cables and components designed for temperature range, without explosion protection.		7	0
Double bridge and high temperature²⁾ Redundant design load cell, temperature range -30 °C ... +250 °C (-22 °F ... +482 °F), accuracy varies over temperature range, cables and components designed for temperature range, without explosion protection.		8	0

1) Heat-resistant cable: -60 ... +180 °C (-76 ... +356 °F) The cable for high temperatures versions is heat resistant to 250 °C (238 °F).

2) Can be ordered from 13 t (12.79 tn. l.).

Technical specifications

SIWAREX WL270 K-S CA	
Possible applications	<ul style="list-style-type: none"> Hopper scales Bin weighing equipment
Type of construction	Compression load cell
Loads	
Rated load E_{max}	<ul style="list-style-type: none"> 2.8 t (2.76 tn. l.) 6 t (5.91 tn. l.) 13 t (12.79 tn. l.) 28 t (27.56 tn. l.) 60 t (59.05 tn. l.) 130 t (127.95 tn. l.) 280 t (275.58 tn. l.) 350 t (344.47 tn. l.) 500 t (492.10 tn. l.)
Minimum initial loading E_{min}	0% E_{max}
Maximum working load L_u	120% E_{max}
Breaking load L_d	300% E_{max}
Safe side load L_{lq}	10% E_{max}
Measurement characteristic values	
Rated displacement h_n at E_{max}	
• 2.8 t (2.76 tn. l.)	0.23 mm (0.009 inch)
• 6 t (5.91 tn. l.)	0.38 mm (0.015 inch)
• 13 t (12.79 tn. l.)	0.54 mm (0.02 inch)
• 28 t (27.56 tn. l.)	0.82 mm (0.03 inch)
• 60 t (59.05 tn. l.)	1.19 mm (0.05 inch)

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Technical specifications (Continued)

SIWAREX WL270 K-S CA	
• 130 t (127.95 tn. l.)	1.81 mm (0.07 inch)
• 280 t (275.58 tn. l.)	2.66 mm (0.10 inch)
• 350 t (344.47 tn. l.)	2.73 mm (0.11 inch)
• 500 t (492.10 tn. l.)	3.11 mm (0.12 inch)
Rated characteristic value C_n	1.5 mV/V
Tolerance D_0 of zero signal	$\leq \pm 1.5\% C_n$
Tolerance D_c of characteristic value	$\pm 0.5\%$
Combined error F_{comb}	$\leq \pm 0.1\%$
Repeatability F_v	$\leq \pm 0.1\%$
Creep error F_{CR}	
30 min	$\leq \pm 0.06\%$
Temperature coefficient	
• Zero signal T_{K0}	$\leq \pm 0.25\% C_n/5 K$
• Characteristic value T_{Kc}	$\leq \pm 0.25\% C_n/5 K$
Electrical characteristic values	
Recommended reference voltage U_{ref}	6 ... 12 V DC
Supply voltage U_{sr} (reference value)	6 V
Input resistance R_e	
• 2.8, 6, 13, 28, 60, 130, 280 t (2.76, 5.91, 12.79, 27.56, 59.05, 127.95, 275.58 tn. l.)	275 $\Omega \pm 50 \Omega$
• 350, 500 t (344.47, 492.10 tn. l.)	840 $\Omega \pm 30 \Omega$
Output resistance R_a	
• 2.8, 6, 13, 28, 60, 130, 280 t (2.76, 5.91, 12.79, 27.56, 59.05, 127.95, 275.58 tn. l.)	245 $\Omega \pm 0.2 \Omega$
• 350, 500 t (344.47, 492.10 tn. l.)	703 $\Omega \pm 5 \Omega$
Insulation resistance R_{is}	$\geq 5\,000 M\Omega$
Connection and environmental conditions	
Sensor material (DIN)	Steel, painted
Function	Color
• EXC + (supply +)	Red
• EXC - (supply -)	White
• SIG + (measured signal +)	Black
• SIG - (measured signal -)	Blue
• Shield (not connected to the load cell body)	Transparent
Rated temperature range B_{tn}	-10 ... +40 °C (+14 ... +104 °F)
Operating temperature range B_{tu}	-20 ... +70 °C (-4 ... +158 °F)
Storage temperature range B_{ts}	-30 ... +70 °C (-22 ... +158 °F)
Degree of protection according to EN 60529; IEC 60529	IP66
Accuracy class	0.1%

High temperature versions

Some technical data of the high temperature versions change according to the temperature range. For this reason, values are given for three different temperature ranges.

SIWAREX WL270 K-S CA, high temperature versions	-30 ... +150 °C (-22 ... +238 °F)	150 ... 180 °C (238 ... 356 °F)	180 ... 250 °C (356 ... 482 °F)
Rated characteristic value C_n			
• 2.8 ... 13; 130 ... 500 t (2.76 ... 12.79; 127.95 ... 492.10 tn. l.)	1.5 \pm 0.02 mV/V	1.5 \pm 0.1 mV/V	1.5 \pm 0.1 mV/V
• 28 t (27.56 tn. l.)	1.9 \pm 0.02 mV/V	1.9 \pm 0.2 mV/V	1.9 \pm 0.2 mV/V
• 60 t (59.05 tn. l.)	1.8 \pm 0.02 mV/V	1.8 \pm 0.2 mV/V	1.8 \pm 0.2 mV/V
Tolerance D_0 of zero signal	$\leq \pm 1.0\% C_n$	$\leq \pm 1.5\% C_n$	$\leq \pm 3\% C_n$

Technical specifications (Continued)

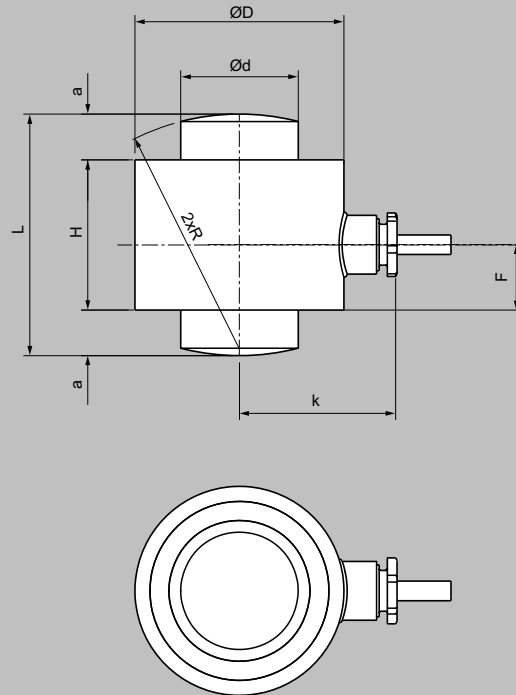
SIWAREX WL270 K-S CA, high temperature versions	-30 ... +150 °C (-22 ... +238 °F)	150 ... 180 °C (238 ... 356 °F)	180 ... 250 °C (356 ... 482 °F)
Measurement characteristic values			
Combined error F_{comb}	$\leq \pm 0.3\%$	$\leq \pm 0.5\%$	$\leq \pm 5\%$
Repeatability F_v	$\leq \pm 0.3\%$	$\leq \pm 0.5\%$	$\leq \pm 5\%$
Creep error F_{CR} 30 min	$\leq \pm 0.3\%$	$\leq \pm 0.4\%$	$\leq \pm 4\%$
Temperature coefficient			
• Zero signal T_{K0}	$\leq \pm 0.25\% C_n/5 K$	$\leq \pm 0.25\% C_n/5 K$	$\leq \pm 0.5\% C_n/5 K$
• Characteristic value T_{Kc}	$\leq \pm 0.25\% C_n/5 K$	$\leq \pm 0.5\% C_n/5 K$	$\leq \pm 0.5\% C_n/5 K$
Electrical characteristic values			
Input resistance R_e			
• 2.8, 6, 13, 28, 60, 130, 280 t (2.76, 5.91, 12.79, 27.56, 59.05, 127.95, 275.58 tn. l.)	275 $\Omega \pm 7 \Omega$	275 $\Omega \pm 15 \Omega$	275 $\Omega \pm 15 \Omega$
• 350, 500 t (344.47, 492.10 tn. l.)	840 $\Omega \pm 30 \Omega$	840 $\Omega \pm 30 \Omega$	840 $\Omega \pm 30 \Omega$
Output resistance R_a			
• 2.8, 6, 13, 28, 60, 130, 280 t (2.76, 5.91, 12.79, 27.56, 59.05, 127.95, 275.58 tn. l.)	245 $\Omega \pm 0.5 \Omega$	245 $\Omega \pm 1 \Omega$	245 $\Omega \pm 1 \Omega$
• 350, 500 t (344.47, 492.10 tn. l.)	703 $\Omega \pm 5 \Omega$	703 $\Omega \pm 5 \Omega$	703 $\Omega \pm 5 \Omega$
Insulation resistance R_{is}	$\geq 5\,000 M\Omega$		
Connection and environmental conditions			
Rated temperature range B_{tr}	-30 ... +180 °C (-22 ... +356 °F)		
Operating temperature range B_{tu}	-30 ... +250 °C (-22 ... +482 °F)		
Storage temperature range B_{ts}	-30 ... +250 °C (-22 ... +482 °F)		

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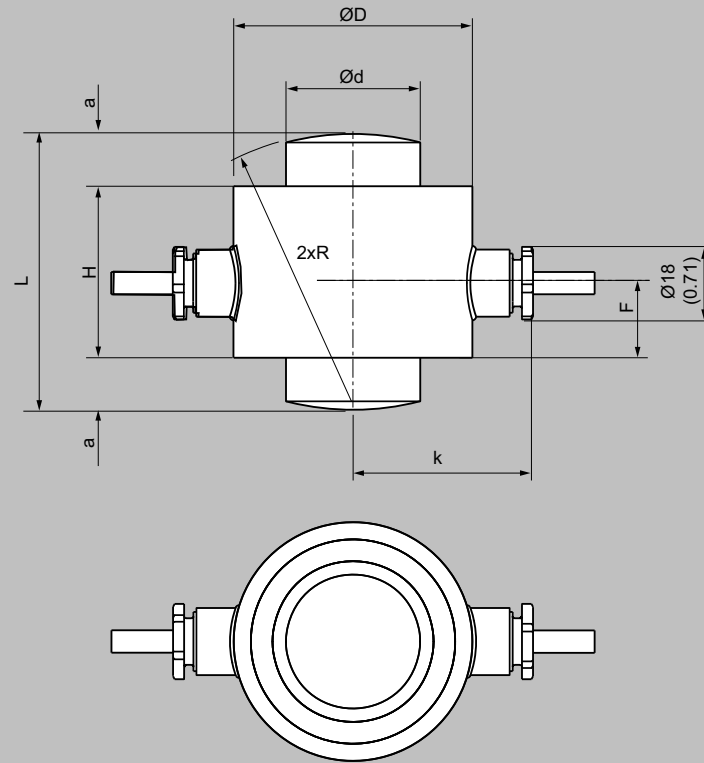
SIWAREX WL270 K-S CA Load cell

Dimensional drawings



Rated load [t (tn. L.)]	a	$\varnothing d$	$\varnothing D$	F	H	k	L	R
2,8, 6 (2.76, 5.91)	8 (0.31)	16,7 (0.65)	45 (1.77)	20 (0.59)	40 (1.57)	40,5 (1.59)	56 (2.2)	50 (1.96)
13 (12.79)	12 (0.47)	24,5 (0.96)	55 (2.16)	20 (0.59)	44 (1.73)	45,5 (1.79)	68 (2.67)	66 (2.6)
28 (27.56)	14 (0.55)	36 (1.41)	64 (2.51)	20 (0.59)	46 (1.81)	50 (1.89)	74 (2.91)	72 (2.83)
60 (59.05)	20 (0.78)	52,7 (2.07)	90 (3.54)	20 (0.59)	50 (1.96)	63 (2.48)	90 (3.54)	100 (3.93)
130 (127.95)	26 (1.02)	77,5 (3.05)	121 (4.76)	20 (0.59)	64 (2.51)	78,5 (3.09)	116 (4.56)	125 (4.92)
280 (275.58)	45 (1.77)	114 (4.48)	165 (6.5)	20 (0.59)	90 (3.14)	100,5 (3.96)	170 (6.7)	183 (7.2)
350 (344.47)	40 (1.58)	132 (5.20)	192 (7.95)	50.5 (1.97)	139 (6.30)	124 (5.00)	240 (9.45)	325 (12.80)
500 (492.10)	47 (1.85)	155 (6.10)	236 (9.29)	99.5 (1.97)	164 (7.13)	146 (5.67)	275 (10.83)	450 (17.72)

Dimensional drawings (Continued)



Rated load [t (tn.L.)]	a	Ød	ØD	F	H	k	L	R
13 (12.79)	12 (0.47)	24,5 (0.96)	55 (2.16)	20 (0.79)	44 (1.73)	45,5 (1.79)	68 (2.67)	66 (2.6)
28 (27.56)	14 (0.55)	36 (1.41)	64 (2.51)	20 (0.79)	46 (1.81)	50 (1.88)	74 (2.91)	72 (2.83)
60 (59.05)	20 (0.78)	52,7 (2.07)	90 (3.54)	20 (0.79)	50 (1.96)	63 (2.48)	90 (3.54)	100 (3.93)
130 (127.95)	26 (1.02)	77,5 (3.05)	121 (4.76)	20 (0.79)	64 (2.51)	78,5 (3.09)	116 (4.56)	125 (4.92)
280 (275.58)	45 (1.77)	114 (4.48)	165 (6.5)	20 (0.79)	90 (3.14)	100.5 (3.96)	170 (6.7)	183 (7.2)
350 (344.47)	40 (1.58)	132 (5.20)	192 (7.95)	50.5 (1.97)	139 (6.30)	124 (5.00)	240 (9.45)	325 (12.80)
500 (492.10)	47 (1.85)	155 (6.10)	236 (9.29)	99.5 (1.97)	164 (7.13)	146 (5.67)	275 (10.83)	450 (17.72)

Load Cells

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SIWAREX WL270 K-S CA Self-centering bearing unit

Overview



The self-centering self-aligning bearing for SIWAREX WL270 K-S CA load cells is particularly suitable for use hopper scales and bin weighing equipment.

Design

The self-aligning bearing comprises two pressure plates. Together with the load cell, the pressure plates form a self-centering unit. This allows the top plate, and thus the load bearing implement, to accommodate horizontal displacements (e.g. due to temperature fluctuations). The design of the self-aligning bearing creates a restoring force which is dependent on the size of the displacement and the applied load.

If the load bearing implement is displaced by more than value s (see dimensional drawing table) in the horizontal direction, measures for restricting sideways play (e.g. stops) must be provided in the construction of the load bearing implement. Lifting of the load bearing implement 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.

Heavy load versions

Suitable mounting units are also available for heavy load cells with 350 and 500 t (344.47 and 492.10 tn. l.) rated loads. These are also designed as self-centering, self-aligning bearings.

Selection and ordering data

	Article No.
Pressure plate¹⁾²⁾ For SIWAREX WL270 K-S CA load cells For constructing a self-aligning bearing, each load cell requires two pressure plates, one at the top and one at the bottom. The Article No. includes one pressure plate. Material: Steel, painted	
For load cells with a rated load of	
• 2.8 ... 6 t (2.76 ... 5.91 tn. l.)	7MH3115-3AA1
• 13 t (12.79 tn. l.)	7MH3115-1BA1
• 28 t (27.56 tn. l.)	7MH3115-2BA1
• 60 t (59.05 tn. l.)	7MH3115-3BA1
• 130 t (127.95 tn. l.)	7MH3115-1CA1
• 280 t (275.58 tn. l.)	7MH3115-2CA1
• 350 t (344.47 tn. l.)	7MH5714-6LD10
• 500 t (492.10 tn. l.)	7MH5714-6PD10

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

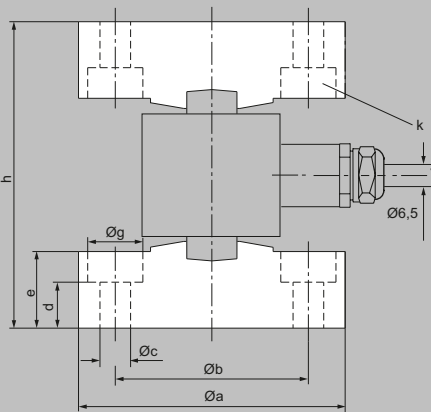
²⁾ It is highly recommendable to use a grounding cable (7MH3701-1AA1) in order to protect the load cell.

Technical specifications

Pressure plate for load cell type SIWAREX WL270 K-S CA

Rated load t (tn. l.)	2.8 (2.76)	6 (5.91)	13 (12.80)	28 (27.56)	60 (59.10)	130 (127.95)	280 (275.88)
Permissible lateral deflection in mm (inch):	2 (0.08)	2 (0.08)	2.5 (0.10)	2.5 (0.10)	3 (0.12)	4 (0.16)	6 (0.24)
Rated displacement h_n at E_{max} mm (inch)	0.23 (0.009)	0.35 (0.014)	0.53 (0.021)	0.80 (0.032)	1.22 (0.048)	1.85 (0.073)	2.67 (0.11)

Dimensional drawings



Rated load [t]	øa	øb	øc	d	e
2,8, 6	87 (3.43)	63 (2.48)	11 (0.43)	14 (0.55)	25 (0.98)
13	97 (3.82)	73 (2.87)	11 (0.43)	21 (0.83)	32 (1.26)
28	108 (4.25)	84 (3.31)	11 (0.43)	-	28 (1.10)
60	137 (5.39)	112 (4.41)	11 (0.43)	-	42 (1.65)
130	176 (6.93)	148 (5.83)	11 (0.43)	-	52 (2.05)
280	226 (8.90)	190 (7.48)	14 (0.55)	-	65 (2.56)
350	240 (9.45)	200 (7.87)	26 (1.02)	-	30 (1.18)
500	280 (11.02)	240 (9.45)	26 (1.02)	-	45 (1.77)

Rated load [t]	øg	h	k	s (allowed sideways displacement)
2,8, 6	18 (0.71)	100 ± 0,5/-1	2 x 180°	2 (0.08)
13	18 (0.71)	120 ± 0,5/-1	2 x 180°	2.5 (0.98)
28	-	136 ± 0,5/-1	2 x 180°	2.5 (0.98)
60	-	174 ± 0,5/-1	4 x 90°	3 (0.12)
130	-	220 ± 0,5/-1	4 x 90°	4 (0.16)
280	-	300 ± 0,6/-1,2	2 x 180°	6 (0.24)
350	-	390 (15.35)	2 x 180°	6 (0.24)
500	-	490 (19.29)	2 x 180°	6 (0.24)

Self-aligning bearing for SIWAREX WL270 K-S CA load cells, dimensions in mm (")