

Load Cells



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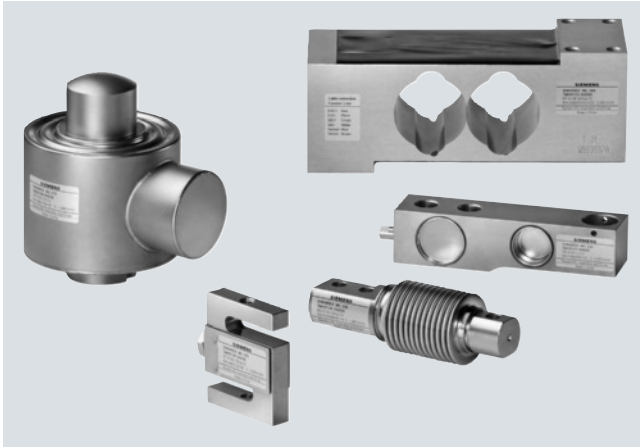
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Load Cells

Introduction

Introduction to load cells

Overview



Siemens offers two load cell series: SIWAREX R and SIWAREX WL200. Both series are equipped with strain gauges. They are used for static and dynamic weight measurements.

The different load cell series cover rated loads from 3 kg to 280 t.

The variety of modules available and their characteristics, including

- use of stainless steel to provide a high degree of corrosion protection (not with SIWAREX R series K, SIWAREX WL260 SP-S AA and SP-S AB)
- hermetically sealed housing for use even in harsh and aggressive environments (not with SIWAREX R series K)
- compact modules for easy installation

make SIWAREX load cells suitable for virtually all applications in industrial weighing, e.g. container and hopper scales, platform scales, vehicle scales, hybrid scales etc.

All series have been approved for use with Class III legal-for-trade commercial scales in accordance with EN 45501 and conform to OIML R60¹⁾.

Load cells can also be supplied for other rated loads, higher accuracy, and/or with EEx (i) approval.

1) This does not apply for SIWAREX R series K and SIWAREX WL270 CP-S SC. Approvals for the types SIWAREX WL230 BB-S SA 10 kg, SIWAREX WL230 SB-S SA 5t, SIWAREX WL260 SP-S AB and SIWAREX WL260 SP-S SA will be available soon.

Design	Platform						Bending beam			Shear beam		
Possible applications	Small platform scales Small conveyor scales						Container, conveyor and platform scales			Container, conveyor, overhead rail and platform scales		
Series	WL260 SP-S AA			R, SP	WL260 SP-S AB	WL260 SP-S SA	WL230 BB-S SA		R, BB	WL230 SB-S SA		R, SB
Rated load E_{max}	3, 5, 10 kg	20, 50 kg	100 kg	6 kg, 12 kg	50 ... 100 kg	5 ... 200 kg	10 ¹⁾ ... 100 kg	200 kg 500 kg	10 ... 350 kg	500 kg	1, 2, 5 ²⁾ t	0.5 ... 1 t
Accuracy class	C3				C3 ³⁾	C3 ³⁾						
Max. load cell verification intervals (n)	3 000											
Min. load cell verification intervals (V_{min})	$E_{max}/15\,000$	$E_{max}/7\,500$	$E_{max}/12\,000$	$E_{max}/12\,000$	$E_{max}/10\,000$	$E_{max}/7\,500$	$E_{max}/15\,000$	$E_{max}/6\,000$	$E_{max}/15\,000$	$E_{max}/10\,000$	$E_{max}/15\,000$	$E_{max}/10\,000$
Supply voltage (U_{sr})	5 ... 12 V			5 ... 15 V	5 ... 12 V		5 ... 10 V		5 ... 15 V	5 ... 12 V		5 ... 18 V
Rated characteristic value	2 mV/V											
Degree of protection	IP65			IP66/IP68	IP65	IP67	IP68			IP66/IP68		
Material	Aluminum			Stainless steel	Aluminum	Stainless steel						
Ex protection according to ATEX (optional)	-			4)	-	6)			4)	6)		4)

Design	Bending beam			S-Type			Compression cell						
Possible applications	Container, conveyor and platform scales			Tension and pressure applications, suspended scales, container weighers, hybrid scales			Container, hopper and vehicle scales						
Series	R, RN			WL250 ST-S SA			WL270 CP-S SA	WL270 CP-S SB	WL270 CP-S SC	R, CC		R, K	
Rated load E_{max}	60 ... 280 kg	0.5 ... 10 t	13 ... 60 t	50 ... 100 kg	0.25 ... 2.5 t	5 ... 10 t	10, 20, 50 t	100 t	200 t	10 ... 60 t	100 t	2.8 ... 280 t	
Accuracy class	C3								0,1 %	C3	C1	0,1 %	
Max. load cell verification intervals (n)	3 000										1 000	-	
Min. load cell verification intervals (V_{min})	$E_{max}/17\,500$	$E_{max}/10\,000$	$E_{max}/17\,500$	$E_{max}/7\,000$	$E_{max}/10\,000$	$E_{max}/12\,000$	$E_{max}/10\,000$	$E_{max}/12\,000$	$E_{max}/12\,000$	$E_{max}/12\,500$	$E_{max}/10\,000$	-	
Supply voltage (U_{sr})	5 ... 30 V			5 ... 12 V			5 ... 12 V			5 ... 25 V		6 ... 12 V	
Rated characteristic value	1 mV/V	2 mV/V		3 mV/V			2 mV/V					1.5 mV/V	
Degree of protection	IP66/IP68			IP67			IP68			IP66/IP68		IP65	
Material	Stainless steel											Steel, painted	
Ex protection according to ATEX (optional)	4)			6)					5)				-

¹⁾ OIML type approval for the type SIWAREX WL230 BB-S SA 10kg available soon

²⁾ OIML type approval for the type SIWAREX WL230 SB-S SA 5 t available soon

³⁾ OIML type approval for the types SIWAREX WL260 SP-S AB and SIWAREX WL260 SP-S SA available soon

⁴⁾ II 2 G EEx ib IIC T6/T4 II 3 G EEx nA/nL IIC T6/T4 II 1D/2D/3D T 70 °C

⁵⁾ II 2 G EEx ib IIC T6/T4 II 3 G EEx nA/nL IIC T6/T4 II 1D/2D/3D T 70 II 2 G EEx ib IIC T6/T4 II 3 G EEx nA/nL IIC T6/T4, II 1D/2D/3D T 70 °C

⁶⁾ II 1G Ex ia IIC T4 Ta= -20 °C ... +40 °C; II 3G Ex nL IIC T4 Ta= -20 °C ... +40 °C; II 1D Ex iaD 20 IP6x T73 °C

Load Cells

Introduction

Introduction to load cells

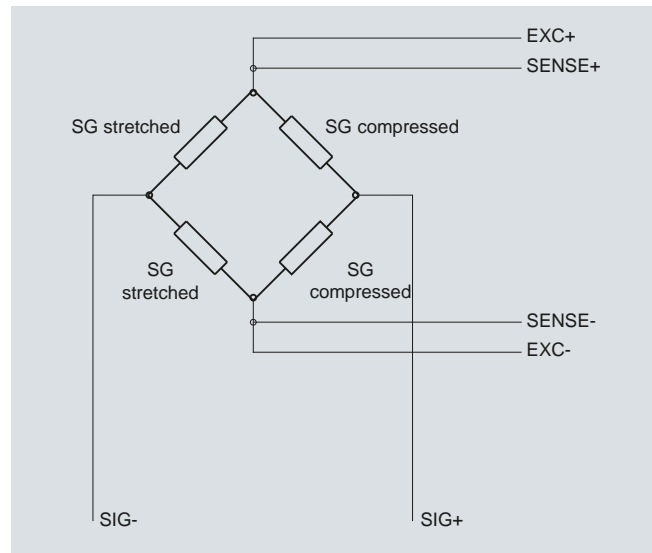
Design

Load cells are sensors that convert a mechanical variable (i.e. weight) into an electrical signal, usually a voltage.

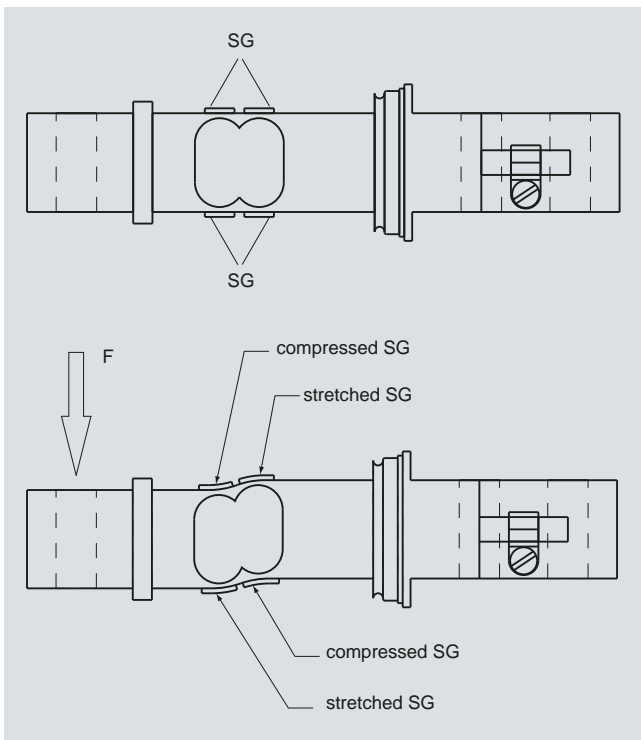
They work with different measuring principles. Siemens load cells in the SIWAREX WL200 and SIWAREX R series use so-called strain gauges. These are specially formed electrical conductors which are insulated by means of a suitable material. The strain gauges are attached to the basic element, a specially formed spring body, by friction locking.

Under the influence of a weight force F , the spring body is deformed (see schematic presentation) and as a result the strain gauge deforms elastically. Due to the change in the external shape of the strain gauge, the ohmic resistance of its conductor also changes. The top left and bottom right strain gauges are compressed, their resistance films are shortened and the ohmic resistance is reduced accordingly. The top right and bottom left strain gauges are stretched, their resistance films are extended and the ohmic resistance is increased.

For each load cell, at least 4 strain gauges are connected together to form a complete Wheatstone bridge. The stretched or compressed strain gauges are connected so that the positive or negative resistance changes are added together to form a total imbalance in the bridge.



Principle of a Wheatstone bridge



Principle of a bending load cell, unloaded and loaded

SIEMENS**Questionnaire SIWAREX**

Customer information

Contact: _____ E-mail: _____ Fax: () _____
 Company: _____ Prepared by: _____
 Address: _____ Date: _____
 City: _____ Country: _____ Notes on the Application: _____
 Zip/Postal Code: _____ Phone: () _____

Electronics

Application type

- | | | |
|--|--|--|
| <input type="checkbox"/> Non Automatic Weighing Instrument | <input type="checkbox"/> Truck/Wagon scale static | <input type="checkbox"/> Checkweigher |
| <input type="checkbox"/> Platform scale | <input type="checkbox"/> Automatic filling/Big Bag scale | <input type="checkbox"/> Solid flow meter |
| <input type="checkbox"/> Vessel/Silo/level measurement | <input type="checkbox"/> Dosing scale | <input type="checkbox"/> Weighfeeder |
| <input type="checkbox"/> Truck scale | <input type="checkbox"/> Belt scale | <input type="checkbox"/> Loss in weight dosing scale |
| <input type="checkbox"/> Force measurement | | |

Type of material: _____

Requested features

- | | | |
|---|--|---|
| <input type="checkbox"/> Basic weighing functions | <input type="checkbox"/> Error control and logging | <input type="checkbox"/> Fast weight value processing |
| <input type="checkbox"/> Recording of weighing sequence | <input type="checkbox"/> Preventive diagnostics | <input type="checkbox"/> Legal-for-trade |
| <input type="checkbox"/> With Ex approval | Zone type/number: _____ | |

SIMATIC integration

- | | | |
|--|-------------------------------------|-----------------------|
| <input type="checkbox"/> SIMATIC S7-200 directly | <input type="checkbox"/> WINCC flex | Version number: _____ |
| <input type="checkbox"/> SIMATIC S7-300 directly | <input type="checkbox"/> Other | Name: _____ |
| <input type="checkbox"/> SIMATIC S7-300/400 with bus | Type: _____ | |
| <input type="checkbox"/> SIMATIC PCS7 | Version number: _____ | |

Mechanic

Load cells

Total maximum weight: _____ Dead load: _____
 Load cells quantity: _____ Required precision: _____
 Vibration (Motor, Mixer, etc.) Guide elements required? Lift up protection

Special application requirements

- Pictures available Drawing available Retrofit of an old installation

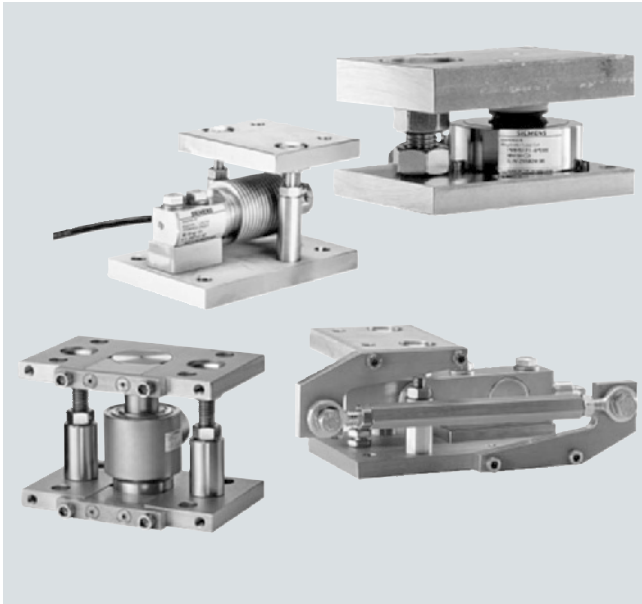
This questionnaire is only a guideline. For special configurations refer to your Siemens contact person.

Load Cells

Introduction

Introduction to mounting components

Overview

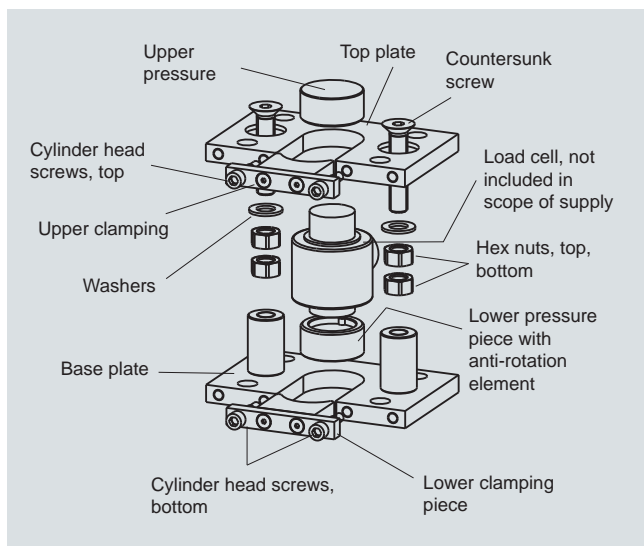


At the same time the mounting elements simplify the installation of the load cells and increase safety during installation work. The wide variety of mounting components permits implementation of all key applications used with industrial weighing technology. In addition to the mounting components listed below, a wide range of special accessories is available for special requirements.

Standardized SIWAREX WL200 and SIWAREX R mounting components are always precisely adapted to the requirements of the individual load cell series. This ensures that the force to be measured is directed to the load cells in the best possible way.

At the same time the mounting elements simplify the installation of the load cells and increase safety during installation work. The wide variety of mounting components permits implementation of all key applications used with industrial weighing technology. In addition to the mounting components listed below, a wide range of special accessories is available for special requirements.

SIWAREX WL270 CP-S SA compact mounting unit



The self-aligning compact mounting unit for SIWAREX WL270 CP-S SA load cells is particularly suitable for implementation in container, platform, vehicle and roller table scales.

Design

The compact mounting unit comprises a base plate and a top plate, two pressure pieces, two clamping pieces and two countersunk screws. There are threaded holes in the base plate and top plate for the subsequent flange-fitting of guide elements.

The top plate is aligned and fixed above the base plate with the two countersunk screws. This results in a stable unit. The height of the top plate is adjusted so that it is three millimeters above the installation height with load cell.

Two pressure pieces are used to mount the load cell. They are fastened flush with the head plate and base plate using the clamping pieces.

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

Prior to installation, the load cell is inserted into the compact mounting unit. Then the complete unit is installed in the scales. As the result, the load bearing implement and the mounting units are aligned. The load cells are not yet loaded.

Finally the load bearing implement is lowered by undoing two hex nuts under the top plate. The weight now rests on the load cells.

In this state the load cell and the pressure pieces together form a self-centering unit. The compact mounting unit permits side-ways displacement of the top plate, and hence of the load bearing implement, by up to three millimeters in all directions. The countersunk screws prevent the load bearing implement from being lifted off or toppling off.

Using the compact mounting unit as an installation aid results in optimum alignment of the load cells. This is essential for the load loads to perform at their best in terms of accuracy.

For maintenance or troubleshooting purposes the load cell can be relieved again by screwing up the hex nuts. Replacement of the load cell is then easy after the clamping pieces are released.

Introduction to mounting components

Self-aligning bearing for load cells, SIWAREX R RN series

Design

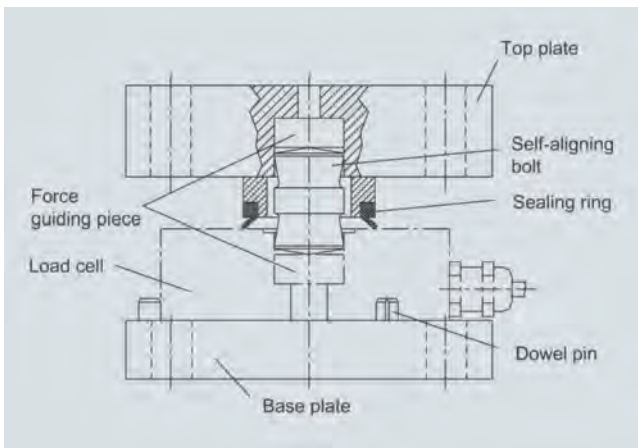
The self-aligning bearing consists of a self-aligning bolt, a top plate (top of the self-aligning bearing) and a base plate (bottom of the self-aligning bearing).

The self-centering, self-aligning bolt allows the top plate and thus the load carrier to follow horizontal displacements (e.g. due to temperature fluctuations).

The construction of the self-aligning bolt creates a restoring force which is dependent on the size of the displacement and the applied load.

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

Schematic diagram



Self-aligning bearing for load cells, RN series

Self-aligning bearing for load cells, SIWAREX R CC and K series

The self-aligning bearings for the CC and K series load cells are particularly suitable for installation in container, hopper and vehicle scales.

Design

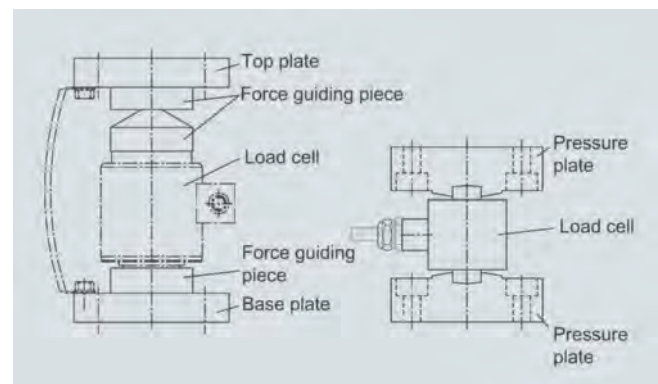
The self-aligning bearing for the CC series consists of three force guiding pieces, a base plate and a top plate.

The self-aligning bearing of the K series consists of two pressure plates.

These components, in combination with the load cell, form a complete self-centering unit. The top plate or top pressure plate and thus the load carrier is able to follow horizontal displacements (e.g. due to temperature fluctuations). The construction of the self-aligning bearing creates a restoring force which is dependent on the size of the displacement and the applied load.

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

Schematic diagram



Self-aligning bearing for CC and K series load cells

Load Cells

Introduction

Introduction to mounting components

External oscillation limitation/protective mechanism against raising up

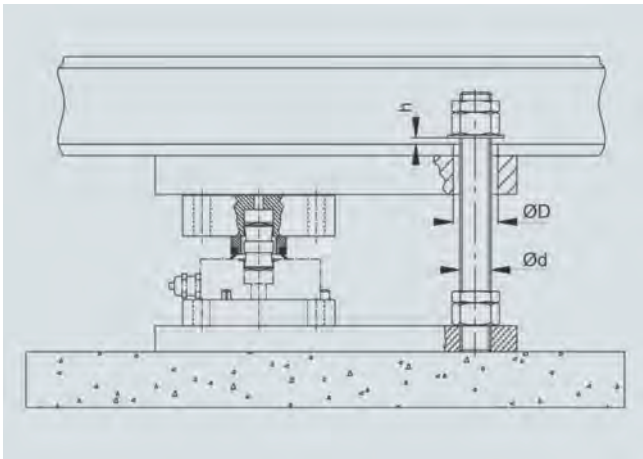
External oscillation limiters minimize horizontal displacement of the weighing system and can be installed separately in the load bearing implement unit by the customer.

Design

The oscillation limiter can be implemented with a bolt which is centered in a large drilled hole.

In the schematic diagram, a protective mechanism against raising up has also been integrated which limits raising up of the load carrier.

Schematic diagram



Schematic diagram of external oscillation limitation with lift-off protection

Combination mounting for load cells of the BB, SB and RN series

The function of the combination mounting unit corresponds to that of the self-aligning bearing. In addition, the functions for oscillation limitation and lift-off protection are directly integrated in the mounting unit.

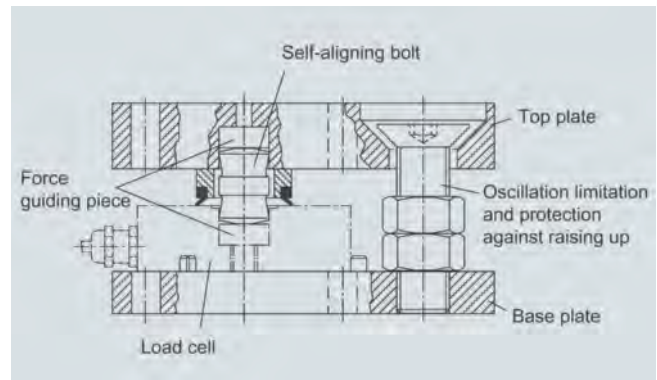
Design

The combination mounting unit consists of a self-aligning bolt, one or two countersunk screws as oscillation limit and protection against raising up, a top plate and a base plate.

The self-centering, self-aligning bolt allows the top plate and thus the load carrier to follow horizontal displacements (e.g. due to temperature fluctuations). The construction of the self-aligning bolt creates a restoring force which is dependent on the size of the displacement and the applied load. Oscillation limitation prevents the occurrence of excessive displacement and reliably protects the load cell from damage. The protection against raising up prevents lifting up of the load bearing implement.

The load cell is not included in the scope of delivery of the combination mounting unit.

Schematic diagram



Layout of the combination mounting unit using RN series load cell as an example

Introduction to mounting components

Base plate with overload protection for load cells of the BB and SB series

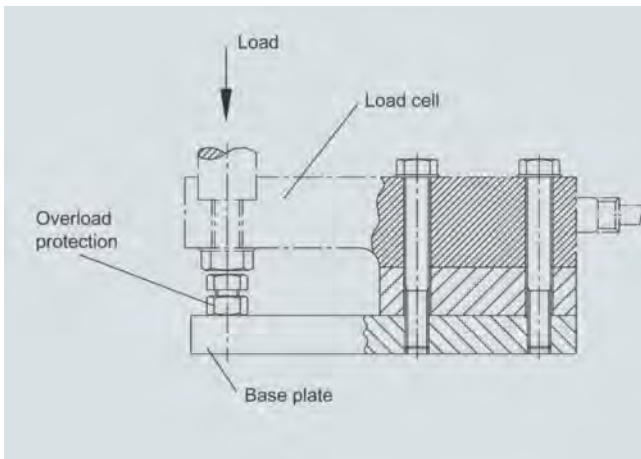
This mounting unit permits function-adapted and torque-adapted installation of these load cell series. The integral overload protection ensures that the load cell is not permanently damaged by static overload.

Design

The load cells can be installed on the base plate and aligned even before final installation of the scales. This ensures that the permissible spring excursion of the load cell is precisely set, up to contact with the overload protection.

The load cell is not included in the scope of delivery of the base plate with overload protection.

Schematic diagram



Layout of the base plate with overload protection using SB series load cell as an example

Elastomer bearing for load cells of the BB, SB and RN series

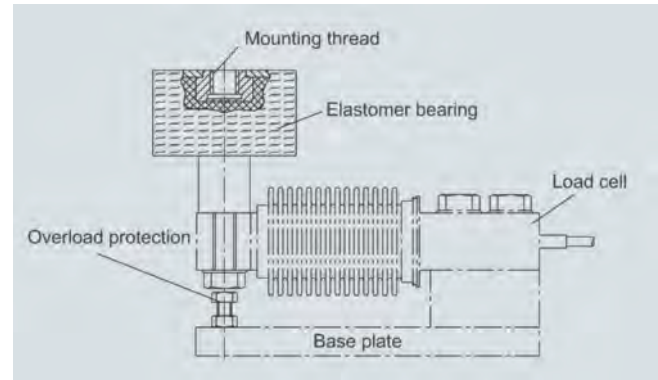
Self-centering elastomer bearings are ideal load transfer elements for scales without guiding elements. They are also used to damp oscillations and shocks.

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.

The load cell and the base plate are not included in the scope of delivery of the elastomer bearing.

Schematic representation



Layout of the elastomer bearing using BB series load cell as an example

Load Cells

Introduction

Introduction to mounting components

Guide element for SB and RN

Design

The guide element consists of two ball joint heads, a spacer and two flanges for installation on the combination mounting unit.

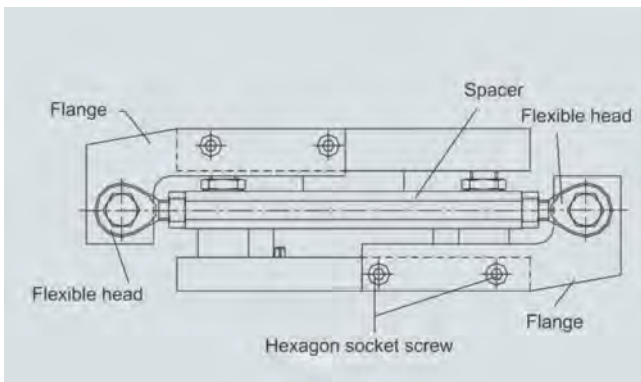
The additive guide element can also be retrofitted on combination mounting units if unexpected lateral forces occur during operation of the scales and the combination mounting unit was installed in accordance with the requirements (see "Guide elements").

The guide element diverts horizontal forces up to 1.7 kN to the foundation and therefore minimizes effects on the load cells and the mounting components. The load cell and combination mounting unit are not included in the scope of delivery of the guide element.

Horizontal forces occur e.g. during mixing operations with container scales or when the material to be weighed with roller table scales creates acceleration forces.

Depending on the individual requirements and mechanical design of the scales, other guide elements that are precisely matched to specific mounting conditions are available on request (e.g. round-head bolt guides).

Schematic diagram



Basic installation

Guide elements are used to maintain the position of the scales with reference to the foundation.

Guide elements are used when undesirable horizontal forces occur during the weighing process (e.g. due to mixing operations with container scales or acceleration of the material to be weighed with conveyor scales). Guide elements can be used to maintain precision and reliability of the load cells and mounting accessories despite the occurrence of undesirable lateral forces.

The guide elements must ensure total freedom of movement of the load carrier in the vertical direction for weight acquisition. At the same time, the lateral forces which may cause measurement errors or damage to the load cell must be absorbed. The guide elements must therefore absorb the maximum lateral forces in the horizontal direction.

The guide elements should be as long as possible because this reduces the frictional forces and the likelihood of reciprocal tension at the same time.

In general, a set of scales with three guide points is statically determined.

The position of the guide elements depends on the number of bearing points and the construction of the scales.

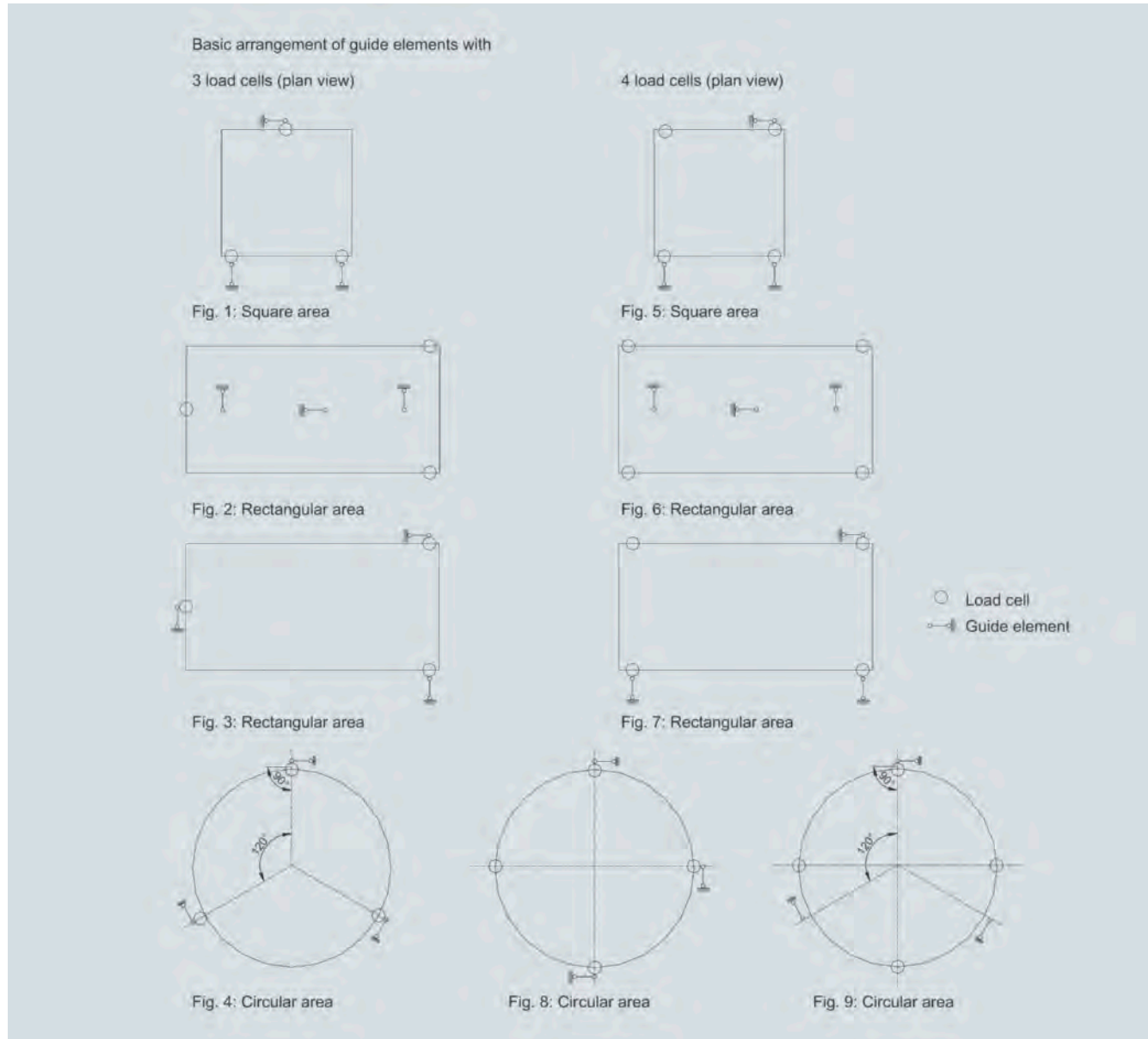
Introduction to mounting components

To prevent measurement errors, the following conditions always apply to the models listed:

- The guide elements must lie in the plane of load introduction into the load cell and on the same horizontal level
- The guide elements must be installed before adjustment of the scales
- It must be possible to move the ball joint heads or ball pins easily by hand at every filling level of the scales

- The guide elements must not transfer any forces in the measuring direction
- The guide elements must resist any lateral forces that arise.

Depending on requirements, various types of guide elements can be used (e.g. ball joint heads and round-head bolt guides).



Basic representation of force guidance with three- and four-point bearing position

Load Cells

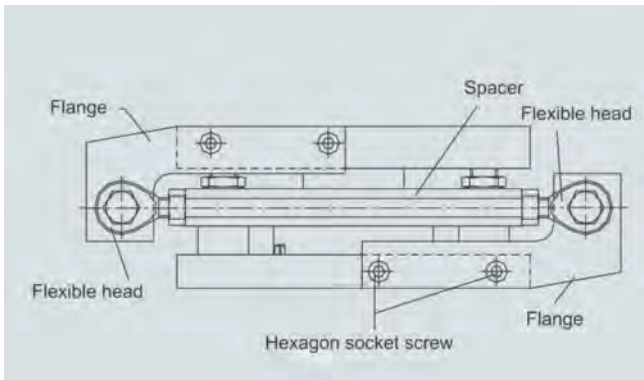
Introduction

Introduction to mounting components

Guide element

Guide elements consist of two ball joint heads which are linked via a connecting piece, and provide a very economical solution in comparison to round-head bolt guides.

Guide elements can be mounted as standard mounting components directly on the combination mounting units of load cells of the RN and SB series to divert horizontal forces up to 1.7 kN into the foundation.



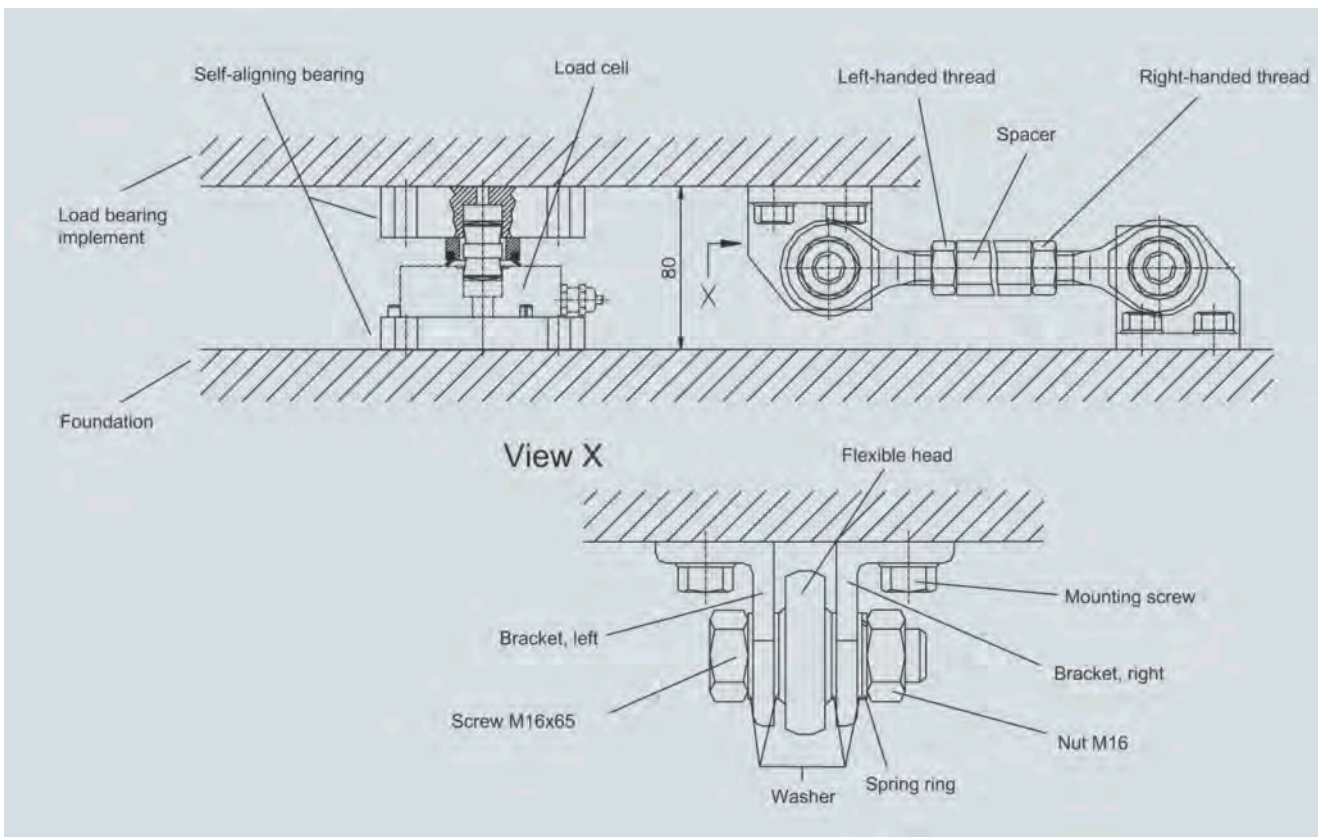
Additive guide element for combination mounting unit (only made of stainless steel)

Alternatively, guide elements can be mounted between the load bearing implement and the foundation with the mounting bracket.

Separate mounting of the guide element permits the layout to be individually adapted to on-site conditions.

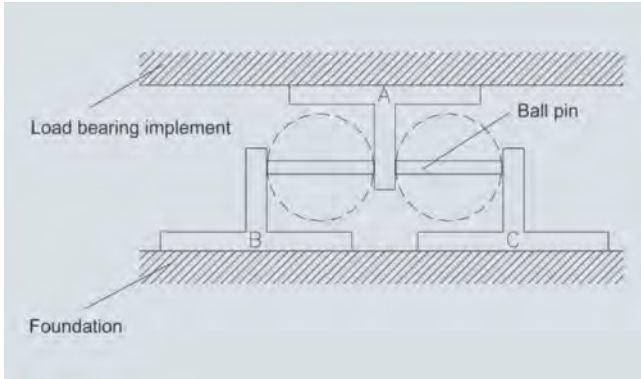
It is important to note the following on installation:

- The flexible head must be mounted before the scales are adjusted and a check run to ensure that it is fully flexible.
- The ball joint head must be easy to move at every fill level of the scales.

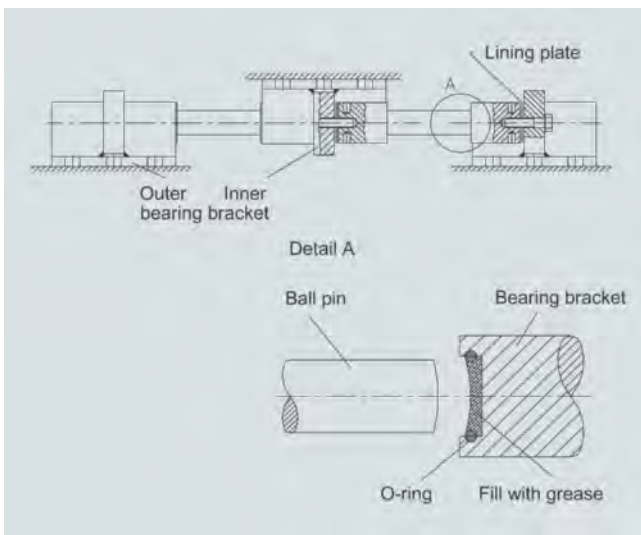


External guiding with swivel heads

Round-head bolt guide



Principle of the ball pin



Ball pin guide

Bearing A of the load bearing implement is supported by two ball pins, and the two opposing bearings (B and C) are supported by the foundation. This means that A is fixed in the direction of the opposing bearing but can roll away force-free in the vertical direction.

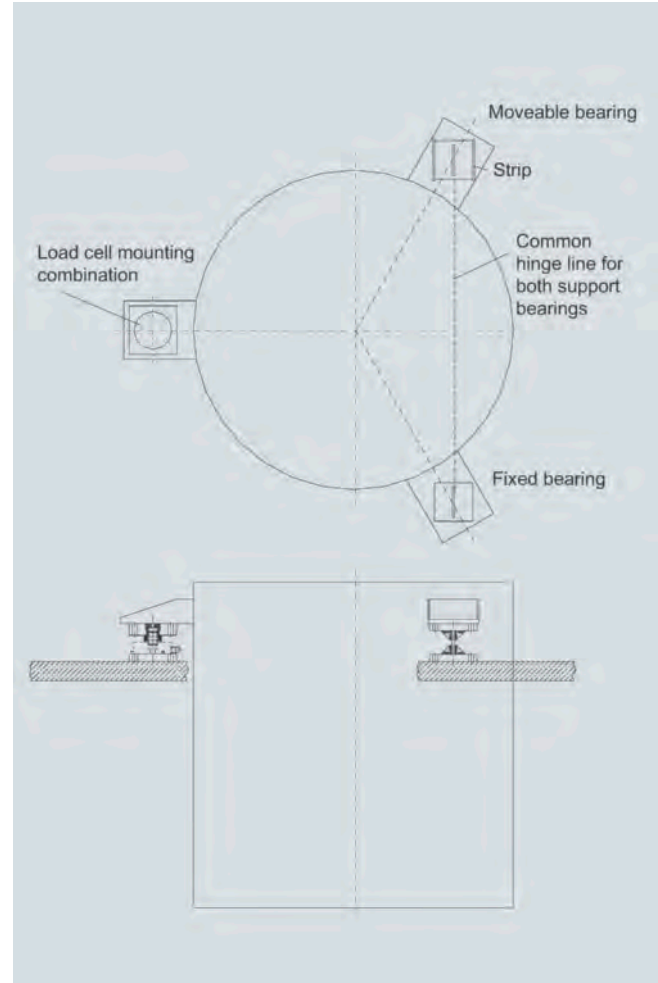
Round-head bolt guides have the following characteristics:

- The measuring result is only affected by the relatively small rolling friction
- Since the bearing is guided precisely in the vertical direction, it is able to allow relatively wide vertical movements without rotational movement of the load bearing implement
- Great lateral forces can be transferred despite extremely compact construction.

The following should be adhered to during configuration:

- The longitudinal axis of the round-head bolt guide should be located at the same height as the load introduction of the weighing cells and at the same horizontal level
- The internal and external bearing brackets must lie at right angles to the longitudinal axis.

Bending support points



Container weighing with two bending support points and one load cell

For scales with less stringent demands on precision (e.g. fill level weighing applications), only one load cell and two bending support points can be used for a three-point bearing instead of three load cells.

With a four-point bearing, two load cells and two bending support points can be used for fill level weighing.

The layout with bending support points is a particularly economical solution in which horizontal forces can be absorbed at the bearing level. This means that additional fixing is not necessary. If large horizontal forces occur outside the bearing plane (e.g. wind forces), additional precautions must be taken.

Under the following conditions, a set of scales that is equipped with bending support points can achieve an accuracy of between 1 % and 2 %:

- The container must be of symmetrical design
- Equal load distribution must be ensured even with a full container.
- No variations in the center of gravity are permitted (e.g. caused by heaped objects)
- The distance between the load cell and bending support point must be as great as possible
- The bending support points must be mounted so that a tilting line results. For example, two bending support points must lie with their arms on a common line or the surfaces of their arms must lie on a common surface.

Load Cells

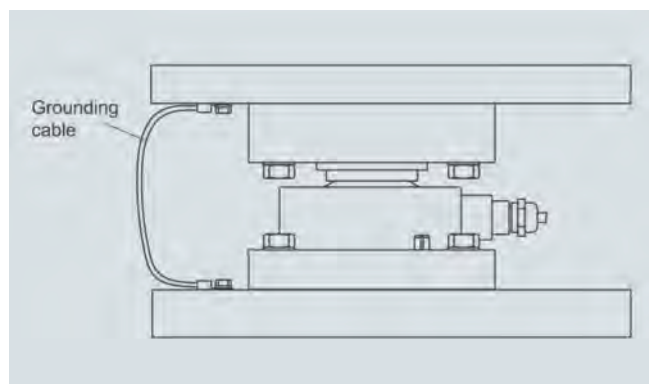
Introduction

Introduction to mounting components

If there are differences in temperature between the container and the foundation, the resulting differences in distance between the support points must be compensated by one fixed bearing and one moveable bearing. The fixed bearing and the moveable bearing have the same dimensions. The fixed bearing is bolted to both the foundation and the load carrier. The moveable bearing is only secured to the foundation or only to the load carrier. The contact surface which is not secured serves as a sliding surface. The direction of sliding is determined by two side guides that are mounted on the load carrier or foundation.

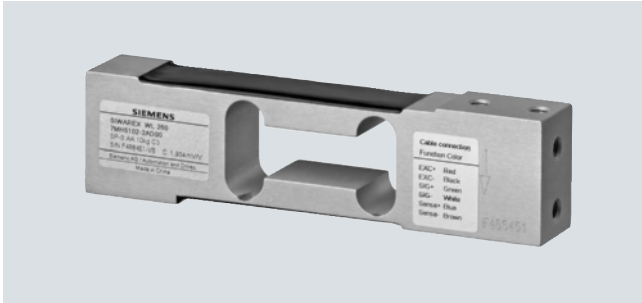
Grounding cable

The flexible grounding cable is used to discharge parasitic currents (e.g. created by welding or overvoltage).



Application example

Overview



The load cell is suitable for small platform scales with one load cell (max. platform size 400 x 400 mm) as well as for use in medium accuracy weighing machines of Class III with a max. load cell verification interval number $n_{\max} = 3000d$.

Design

The measuring element is hermetically sealed and has a calibrated output current.

Technical specifications

SIWAREX WL260 SP-S AA

Possible applications	Platform scales, small conveyor scales
Model	Platform load cell
Rated load E_{\max}	3, 5, 10, 20, 50, 100 kg
Accuracy class according to OIML R60	C3
Max. load cell verification interval n_{IC}	3 000
Min. load cell verification interval V_{\min}	
• $E_{\max} = 3, 5, 10 \text{ kg}$	$E_{\max}/15\ 000$
• $E_{\max} = 20, 50 \text{ kg}$	$E_{\max}/7\ 500$
• $E_{\max} = 100 \text{ kg}$	$E_{\max}/12\ 000$
Combined error F_{comb}	$\pm 0.02\ \% C_n$
Repeatability F_v	$\pm 0.017\ \% C_n$
Creep error F_{cr}	
• 30 min	$\pm 0.02\ \% C_n$
Temperature effect	
• Zero signal T_{K0}	$0.017\ \% C_n/5 \text{ K}$
• Characteristic value T_{Kc}	$0.014\ \% C_n/5 \text{ K}$
Min. dead load E_{\min}	0 kg
Safe load limit L_u	$150\ \% E_{\max}$
Ultimate load L_d	$300\ \% E_{\max}$
Safe side load L_{Iq}	$0.01\ \% E_{\max}$
Rated measuring path h_n at E_{\max}	$< 0.6 \text{ mm}$
Recommended supply voltage	5 ... 12 V DC
Rated characteristic value C_n	$2.0 \pm 0.2 \text{ mV/V}$
Tolerance D_0 of zero signal	$< \pm 2\ \% C_n$
Input resistance R_e	$409\ \Omega \pm 6\ \Omega$
Output resistance R_a	$350\ \Omega \pm 3\ \Omega$
Insulation resistance R_{is}	$5\ 000 \text{ M}\Omega$ at 50 V DC
Rated temperature range B_{In}	-10 ... +40 °C
Operating temperature range B_{Tu}	-35 ... +65 °C
Storage temperature range B_{Ts}	-35 ... +65 °C

Sensor material (DIN)	Aluminum
Degree of protection to EN 60529	IP65
Max. tightening torque of the fixing screws	15 ... 20 Nm
Cable connection	
Function	Color
• EXC + (supply +)	• Red
• EXC - (supply -)	• Black
• SIG + (measured signal +)	• Green
• SIG - (measured signal -)	• White
• Sense + (sensor line +)	• Blue
• Sense - (sensor line -)	• Brown
• Shield	• Transparent

Selection and Ordering data

Order No.

Load cell type WL260 SP-S AA

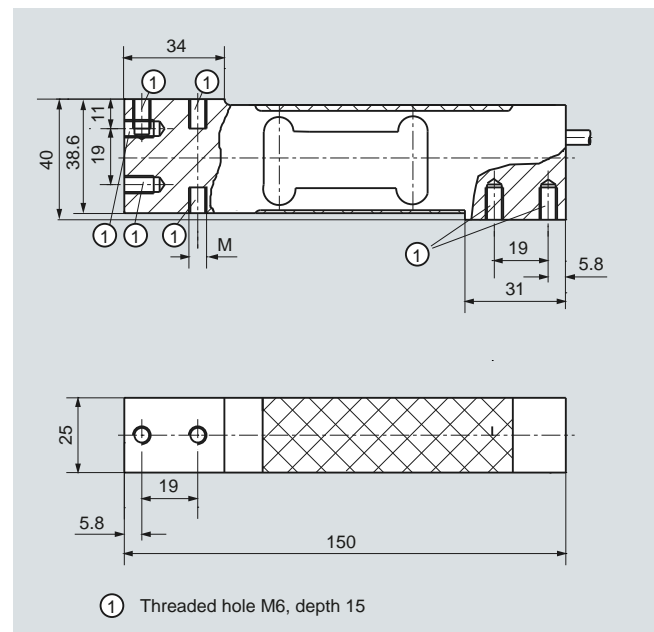
7MH5102 - D00

Legal-for-trade according to OIML R60 to 3000d, 3 m connection cable

Rated load

3 kg	1 K
5 kg	1 P
10 kg	2 A
20 kg	2 G
50 kg	2 P
100 kg	3 A

Dimensional drawings

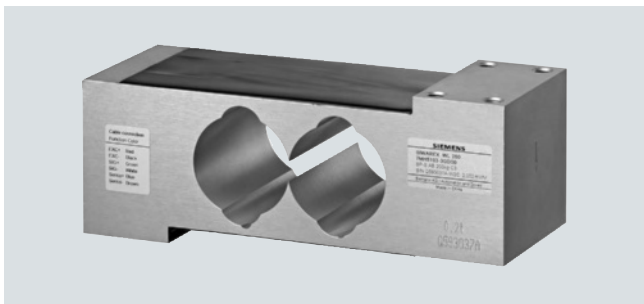


Load cell SIWAREX WL260 SP-S AA, dimensions in mm

Load Cells

SIWAREX WL260 SP-S AB

Overview



The load cell is suitable for small to medium platform scales with one load cell (max. platform size 600 x 600 mm) as well as for use in medium accuracy weighing machines of Class III with a max. load cell verification interval number $n_{\max} = 3000$ d.

Design

The measuring element is hermetically sealed and has a calibrated output current.

Technical specifications

SIWAREX WL260 SP-S AB

Possible applications	Platform scales, conveyor scales
Model	Platform load cell
Rated load E_{\max}	50, 100, 200, 500 kg
Accuracy class according to OIML R60	C3 ¹⁾
Max. load cell verification interval n_c	3 000
Min. load cell verification interval V_{\min}	$E_{\max}/10\,000$
Combined error F_{comb}	$\pm 0.02\% C_n$
Repeatability F_v	$\pm 0.017\% C_n$
Creep error F_{cr}	$\pm 0.02\% C_n$
• 30 min	
Temperature effect	
• Zero signal T_{K0}	$0.017\% C_n/5\text{ K}$
• Characteristic value T_{Kc}	$0.014\% C_n/5\text{ K}$
Min. dead load E_{\min}	0 kg
Safe load limit L_u	$150\% E_{\max}$
Ultimate load L_d	$300\% E_{\max}$
Safe side load L_{lq}	$100\% E_{\max}$
Rated measuring path h_n at E_{\max}	$< 1.22\text{ mm}$
Recommended supply voltage	5 ... 12 V DC
Rated characteristic value C_n	$2.0 \pm 0.2\text{ mV/V}$
Tolerance D_0 of zero signal	$< \pm 2\% C_n$
Input resistance R_E	$409\ \Omega \pm 6\ \Omega$
Output resistance R_a	$350\ \Omega \pm 3\ \Omega$
Insulation resistance R_{is}	5 000 M Ω at 50 V DC
Rated temperature range B_{in}	-10 ... +40 °C
Operating temperature range B_{tu}	-35 ... +65 °C
Storage temperature range B_{ts}	-35 ... +65 °C
Sensor material (DIN)	Aluminum
Degree of protection to EN 60529	IP65
Max. tightening torque of the fixing screws	35 ... 40 Nm

Cable connection

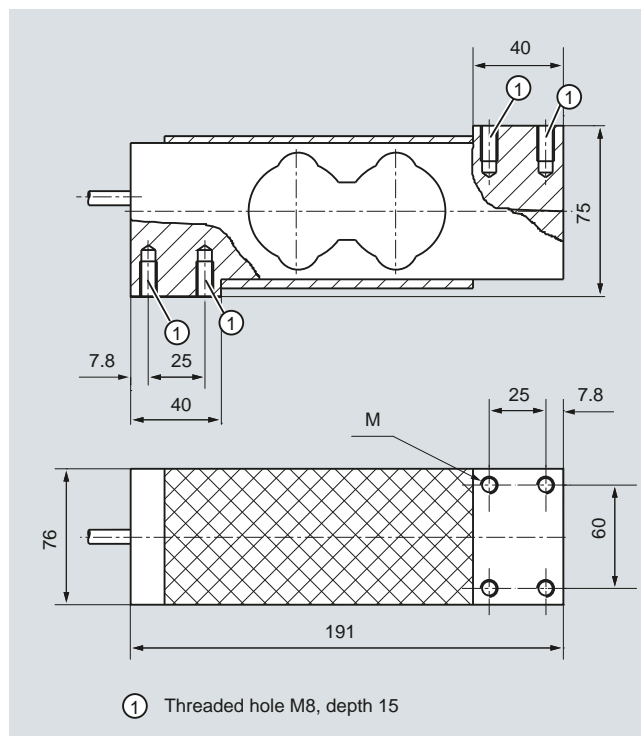
Function	Color
• EXC + (supply +)	• Red
• EXC - (supply -)	• Black
• SIG + (measured signal +)	• Green
• SIG - (measured signal -)	• White
• Sense + (sensor line +)	• Blue
• Sense - (sensor line -)	• Brown
• Shield	• Transparent

¹⁾ OIML type approval for SIWAREX WL260 SP-S AB available soon

Selection and Ordering data

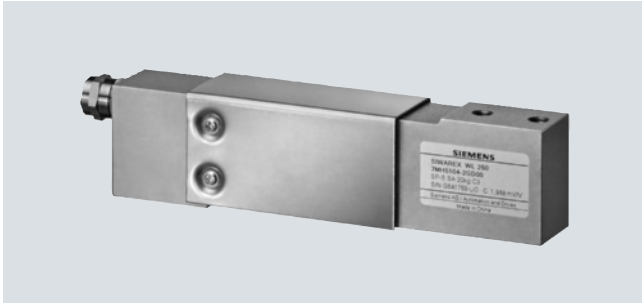
Load cell type WL260 SP-S AB	Order No.
Legal-for-trade according to OIML R60 to 3000d, 3 m connection cable	7MH5103 - D 0 0
Rated load	
50 kg	2 P
100 kg	3 A
200 kg	3 G
500 kg	3 P

Dimensional drawings



Load cell SIWAREX WL260 SP-S AB, dimensions in mm

Overview



The load cell is suitable for small to medium platform scales with one load cell (max. platform size 400 x 400 mm) as well as for use in medium accuracy weighing machines of Class III with a max. load cell verification interval number $n_{\max} = 3000d$.

It is made of stainless steel and therefore also suitable for use in harsh environments.

Design

The measuring element is hermetically sealed and has a calibrated output current.

Technical specifications

SIWAREX WL260 SP-S SA

Possible applications	Platform scales, conveyor scales
Model	Platform load cell
Rated load E_{\max}	5, 10, 20, 50, 100, 200 kg
Accuracy class according to OIML R60	C3 ¹⁾
Max. load cell verification interval n_c	3 000
Min. load cell verification interval V_{\min}	$E_{\max}/7 500$
Combined error F_{comb}	$\pm 0.02 \% C_n$
Repeatability F_v	$\pm 0.017 \% C_n$
Creep error F_{cr}	$\pm 0.02 \% C_n$
• 30 min	
Temperature effect	
• Zero signal T_{K0}	$0.017 \% C_n/5 K$
• Characteristic value T_{Kc}	$0.014 \% C_n/5 K$
Min. dead load E_{\min}	0 kg
Safe load limit L_u	$150 \% E_{\max}$
Ultimate load L_d	$300 \% E_{\max}$
Safe side load L_{lq}	$100 \% E_{\max}$
Rated measuring path h_n at E_{\max}	$0.27 \pm 0.05 \text{ mm}$
Recommended supply voltage	5 ... 12 V DC
Rated characteristic value C_n	$2.0 \pm 0.2 \text{ mV/V}$
Tolerance D_0 of zero signal	$< \pm 1.0 \% C_n$
Input resistance R_e	$383 \Omega \pm 4 \Omega$
Output resistance R_a	$351 \Omega \pm 2 \Omega$
Insulation resistance R_{is}	5 000 M Ω at 50 V DC
Rated temperature range B_{tn}	-10 ... +40 °C
Operating temperature range B_{tu}	-35 ... +65 °C
Storage temperature range B_{ts}	-40 ... +70 °C
Sensor material (DIN)	Stainless steel
Degree of protection to EN 60529	IP67

Max. tightening torque of the fixing screws

• $E_{\max} = 3, 5, 10, 20, 50, 100 \text{ kg}$	14 Nm
• $E_{\max} = 200 \text{ kg}$	16 Nm

Cable connection

Function	Color
• EXC + (supply +)	• Green
• EXC - (supply -)	• Black
• SIG + (measured signal +)	• White
• SIG - (measured signal -)	• Red
• Sense + (sensor line +)	• Yellow
• Sense - (sensor line -)	• Blue
• Shield	• Transparent

¹⁾ OIML type approval for SIWAREX WL260 SP-S SA available soon

Selection and Ordering data

Order No.

Load cells type WL260 SP-S SA

7MH5104- D 0

Legal-for-trade according to OIML R60 to 3000d, 1 m connecting cable

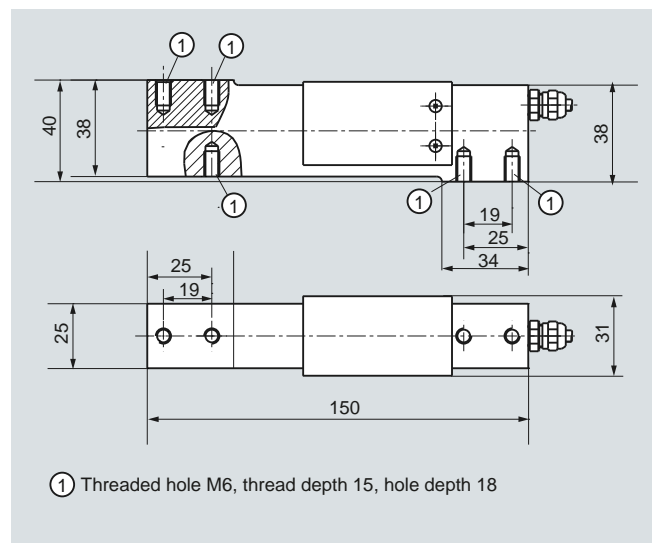
Rated load

5 kg	1 P
10 kg	2 A
20 kg	2 G
50 kg	2 P
100 kg	3 A
200 kg	3 G

Explosion protection

Without	0
Explosion protection for zones 0, 1, 2, 20, 21, 22	1

Dimensional drawings



Load cell SIWAREX WL260 SP-S SA, dimensions in mm

Load Cells

SIWAREX WL250 ST-S SA

Overview



The load cell is ideal for use in tank weighing, hybrid scales or suspended container weighing. It is made of stainless steel and therefore also suitable for use in harsh environments.

Design

The measuring element is hermetically sealed and has a calibrated output current.

Technical specifications

SIWAREX WL250 ST-S SA

Possible applications	Tension and pressure applications, suspended scales, container weighers, hybrid scales
Model	S-Type
Rated load E_{max}	50, 100, 250, 500 kg 1, 2.5, 5, 10 t
Accuracy class according to OIML R60	C3
Max. load cell verification interval n_c	3 000
Min. load cell verification interval V_{min}	
• $E_{max} = 50, 100$ kg	$E_{max}/7000$
• $E_{max} = 0.25, 0.5, 1, 2.5$ t	$E_{max}/10\ 000$
• $E_{max} = 5, 10$ t	$E_{max}/12\ 000$
Combined error F_{comb}	$\pm 0.02\ \% C_n$
Repeatability F_v	$\pm 0.02\ \% C_n$
Creep error F_{cr}	
• 30 min	$\pm 0.02\ \% C_n$
Temperature effect	
• Zero signal T_{K0}	$0.017\ \% C_n/5\ K$
• Characteristic value T_{KC}	$0.014\ \% C_n/5\ K$
Min. dead load E_{min}	0 kg
Safe load limit L_u	$150\ \% E_{max}$
Ultimate load L_d	$300\ \% E_{max}$
Safe side load L_{lq}	$100\ \% E_{max}$

Rated measuring path h_n	
• $E_{max} = 50, 100$ kg	0.18 mm
• $E_{max} = 250, 500$ kg	0.24 mm
• $E_{max} = 1$ t	0.37 mm
• $E_{max} = 2.5, 5$ t	0.8 mm
• $E_{max} = 10$ t	0.57 mm
Rated characteristic value C_n	3.0 ± 0.008 mV/V
Recommended supply voltage	DC 5 ... 12 V
Tolerance D_0 of zero signal	$\pm 1.0\ \% C_n$
Input resistance R_e	$430\ \Omega \pm 4\ \Omega$
Output resistance R_a	$350\ \Omega \pm 3.5\ \Omega$
Insulation resistance R_{is}	5 000 M Ω at 50 V DC
Rated temperature range B_{Tn}	-10 ... +40 °C
Operating temperature range B_{Tu}	-35 ... +65 °C
Storage temperature range B_{Ts}	-35 ... +65 °C
Sensor material (DIN)	Stainless steel
Degree of protection to EN 60529	IP67

Cable connection

Function	Color
• EXC + (supply +)	• Red
• EXC - (supply -)	• Black
• SIG + (measured signal +)	• Green
• SIG - (measured signal -)	• White
• Shield	• Transparent

Selection and Ordering data

Order No.

Load cells type WL250 ST-S SA

7MH5105- ■ ■ D 0 ■

Legal-for-trade according to OIML R60 to 3000d, 3 m connecting cable

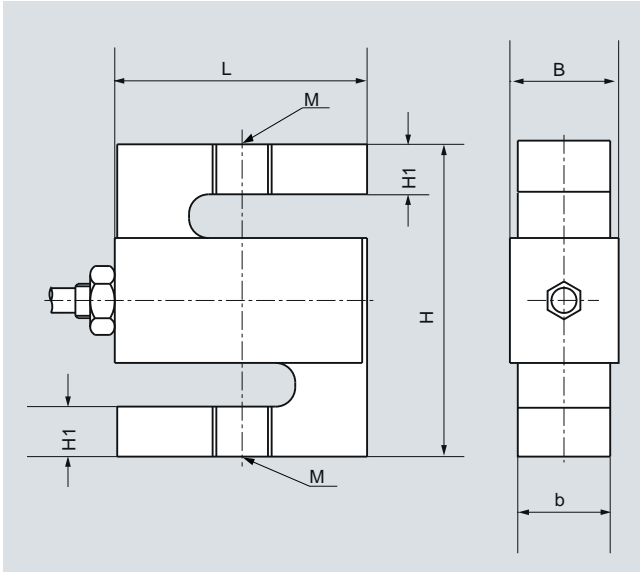
Rated load

50 kg	2 P
100 kg	3 A
250 kg	3 H
500 kg	3 P
1 t	4 A
2.5 t	4 H
5 t	4 P
10 t	5 A

Explosion protection

Without	0
Explosion protection for zones 0, 1, 2, 20, 21, 22	1

Dimensional drawings



Rated load [kg]	L [mm]	H [mm]	b [mm]	B [mm]	M [mm]	H1 [mm]
50 ... 100	50,8	63,5	12,7	16,08	M8	10,16
250 ... 500	50,8	63,5	19,05	22,43	M12	10,16

Rated load [t]	L [mm]	H [mm]	b [mm]	B [mm]	M [mm]	H1 [mm]
1	50,8	63,5	25,4	28,78	M12	10,16
2,5	50,8	101,6	25,4	28,78	M20 × 1,5	15,24
5,0	76,2	101,6	25,4	28,78	M20 × 1,5	20
10	127	177,8	50,8	54,18	M30 × 2	39,9

Load cell SIWAREX WL250 ST-S SA, dimensions in mm

Load Cells

SIWAREX WL230 BB-S SA

Load cell

Overview



The bending beam load cell is particularly suitable for use in small-scale container and platform scales.

Design

The measuring element is a double bending beam made of stainless steel to which 4 strain gauges are applied.

The strain gauges are arranged so that two are stretched and two are compressed.

Under the influence of the load acting in the measuring direction, the spring bodies and therefore the friction-locked strain gauges are elastically deformed. This generates a measuring signal voltage that is proportional to the load.

Technical specifications

SIWAREX WL230 BB-S SA

Possible applications	Container, conveyor and platform scales
Model	Bending beam
Rated load/maximum load E_{max}	10, 20, 50, 100, 200, 500 kg
Accuracy class according to OIML R60	C3 ¹⁾
Max. load cell verification interval n_{LC}	3 000
Min. load cell verification interval V_{min}	
• $E_{max} = 10^1$, 20, 50, 100 kg	$E_{max}/15\,000$
• $E_{max} = 200, 500$ kg	$E_{max}/6000$
Minimum application range $R_{min(LC)}$	
• $E_{max} = 10, 20, 50, 100$ kg	30 %
• $E_{max} = 200, 500$ kg	50 %
Combined error F_{comb}	$\leq 0.02 \% C_n$
Repeatability F_v	$\leq 0.017 \% C_n$
Return of zero signal	not applicable
Creep error F_{cr}	
• 30 min	$\leq \pm 0.02 \% C_n$
Temperature effect	
• Zero signal T_{K0}	$\leq \pm 0.017 \% C_n/5\text{ K}$
• Characteristic value T_{Kc}	$\leq \pm 0.014 \% C_n/5\text{ K}$
Min. dead load E_{min}	0 % E_{max} .
Safe load limit L_u	150 % E_{max} .
Ultimate load L_d	300 % E_{max} .
Safe side load L_{Iq}	100 % E_{max} .
Rated measuring path h_n at E_{max}	0.3 mm
Recommended supply voltage (range)	5 ... 10 V DC
Rated characteristic value C_n	$2.0 \pm 0.02 \% \text{ mV/V}$

Tolerance D_0 of zero signal	$< \pm 1.0 \% C_n$
Input resistance R_e	$460 \Omega \pm 50 \Omega$
Output resistance R_a	$350 \Omega \pm 3.5 \Omega$
Insulation resistance R_{is}	5 000 M Ω at 50 V DC
Rated temperature range B_{Tn}	-10 ... +40 °C
Operating temperature range B_{Tu}	-35 ... +65 °C
Storage temperature range B_{Ts}	-35 ... +65 °C
Sensor material (DIN)	Stainless steel
Degree of protection according to EN 60529; IEC 60529	IP68
Max. tightening torque of the fixing screws	
• $E_{max} = 10, 20, 50, 100, 200$ kg	23 Nm
• $E_{max} = 500$ kg	70 Nm
Current calibration	Standard

Cable connection

Function	Color
• EXC + (supply +)	• Green
• EXC - (supply -)	• Black
• SIG + (measured signal +)	• White
• SIG - (measured signal -)	• Red
• Screening	• Transparent

¹⁾ OIML type approval for SIWAREX WL230 BB-S SA 10 kg available soon

Selection and Ordering data

Load cells type WL230 BB-S SA

Legal-for-trade according to OIML R60 to 3000d, 3 m connecting cable

Rated load

10 kg
20 kg
50 kg
100 kg
200 kg
500 kg

2 A
2 G
2 P
3 A
3 G
3 P

Explosion protection

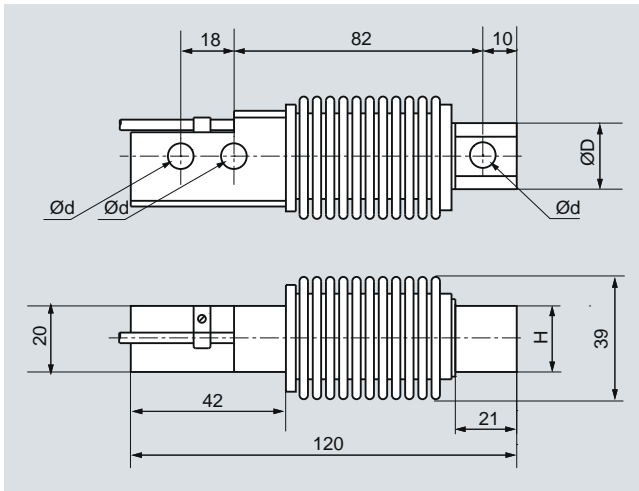
Without
Explosion protection for zones
0, 1, 2, 20, 21, 22

0
1

Order No.

7MH5106 - D 0

Dimensional drawings



Rated load in kg	Ød [mm]	ØD [mm]	ØH [mm]
10, 20, 50, 100, 200	8.2	23	20
500	10.3	24	19

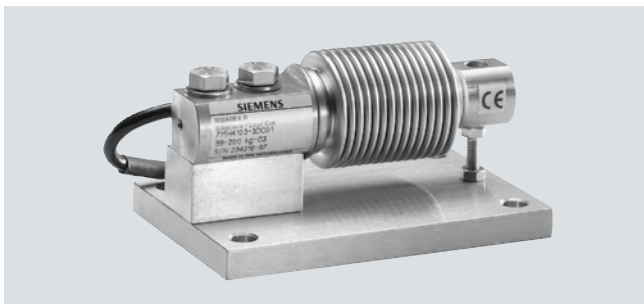
Load cell SIWAREX WL230 BB-S SA, dimensions in mm

Load Cells

SIWAREX WL230 BB-S SA

Base plate with overload protection

Overview



The base plate with integral overload protection for load cells of the SIWAREX WL230 BB-S SA series ensures easy, correct installation of the load cell.

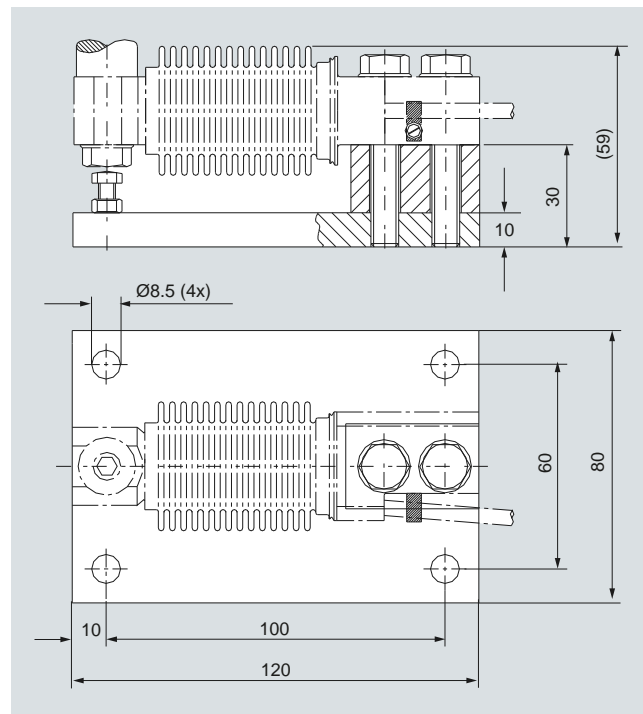
Design

The integrated overload protection ensures that the load cell is not damaged by static overloading with vertical forces of up to 5 kN.

The load cells can be installed on the base plate and aligned even before final installation of the scales. This ensures that the permissible spring excursion of the load cell is precisely set, up to contact with the overload protection.

The load cell is not included in the scope of delivery of the base plate with overload protection.

Dimensional drawings



Elastomer bearing and base plate with overload protection for SIWAREX WL230 BB-S SA load cells, 10 ... 200 kg, dimensions in mm

Selection and Ordering data	Order No.
Compact mounting units	
For load cells of the SIWAREX WL230 BB-S SA series	
Material: Stainless steel	
For load cells with a rated load of ¹⁾²⁾	
10 ... 200 kg	D) 7MH4133 - 3 DG1 1
500 kg	On request

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.

D) Subject to export regulations AL: N, ECCN: EAR99H.

Overview



The self-centering elastomer bearing for load cells of the SIWAREX WL230 BB-S SA series is the ideal load introduction element for scales without guide elements. It serves to damp vibrations and shocks.

Design

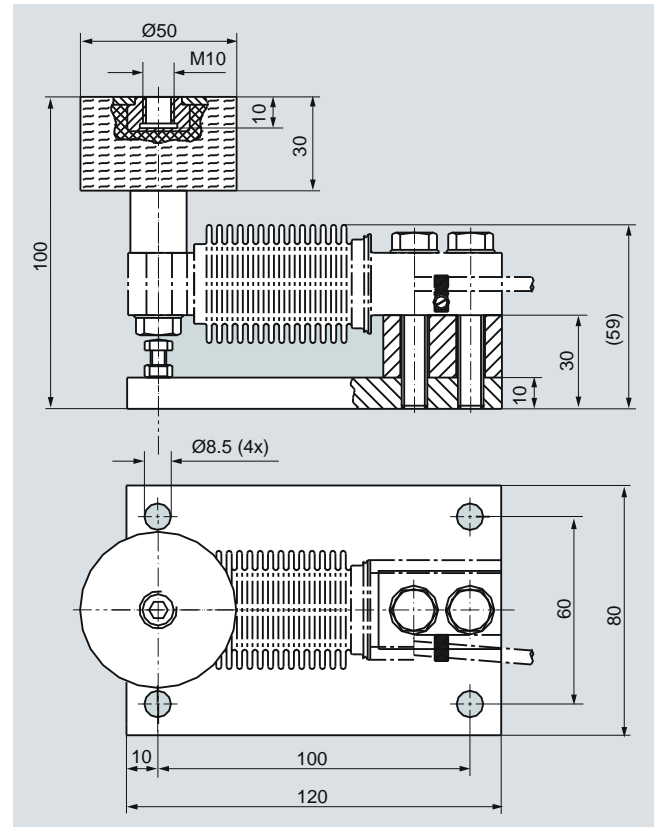
Elastomer bearings are rubber-metal composites made of neoprene and stainless steel. They ensure large spring excursions (i.e. a high degree of damping) despite small dimensions.

If the load support is displaced by more than 4 mm in the horizontal direction, measures for restricting sideways play (e.g. stops) must be provided in the construction of the load bearing implement.

In combination with the base plate and integral overload protection, it is ensured that the load cell is not damaged by static overloading with vertical forces of up to 5 kN.

The load cell and the base plate are not included in the scope of delivery of the elastomer bearing.

Dimensional drawings



Elastomer bearings for SIWAREX WL230 BB-S SA load cells, 10 kg to 200 kg, dimensions in mm

Selection and Ordering data

	Order No.
Elastomer bearings	D) 7MH4133 - E 1 1
For load cells of the SIWAREX WL230 BB-S SA series	
Material: Stainless steel	
For load cells with a rated load of ¹⁾²⁾	
10 ... 50 kg	2K
100 ... 200 kg	3D
500 kg	On request

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.

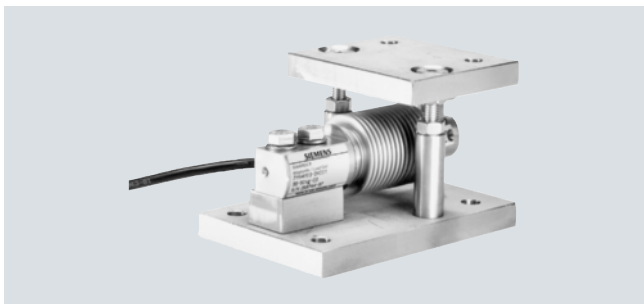
D) Subject to export regulations AL: N, ECCN: EAR99H.

Load Cells

SIWAREX WL230 BB-S SA

Compact mounting unit

Overview



The self-aligning compact mounting unit for SIWAREX WL230 BB-S SA load cells is particularly suitable for implementation in small-scale container, platform and roller table scales.

Design

The compact mounting unit comprises a base plate and a top plate, a self-aligning bolt, two countersunk screws and overload protection.

The top plate is aligned and fixed above the base plate with the two countersunk screws. This results in a stable unit. The height of the top plate can be adjusted so that it is two millimeters above the installation height with load cell.

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

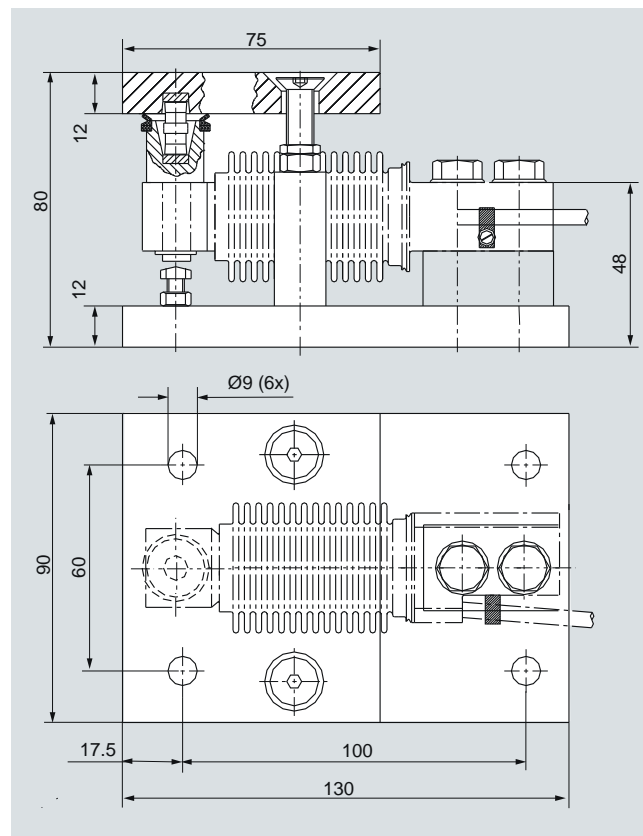
Prior to installation, the load cell is inserted with the self-aligning bolt into the compact mounting unit. Then the complete unit is installed in the scales. As the result, the load bearing implement and the mounting units are aligned. The load cells are not yet loaded.

Finally the load bearing implement is lowered by undoing two hex nuts under the top plate. The weight now rests on the load cells.

In this state the load cell and the pressure pieces together form a self-centering unit. The compact mounting unit permits side-ways displacement of the top plate, and hence of the load bearing implement, by up to 1.5 millimeters.

The overload protection is set so that the load cell cannot be loaded beyond the limit load.

Dimensional drawings



Compact mounting unit for SIWAREX WL230 BB-S SA load cells, dimensions in mm

Selection and Ordering data

Order No.

Compact mounting unit

For load cells of the SIWAREX WL230 BB-S SA series
Material: Stainless steel, neoprene
For load cells with a rated load of¹⁾²⁾

10 ... 200 kg

D) **7MH4133 - 3 DC1 1**

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.

D) Subject to export regulations AL: N, ECCN: EAR99H.

Overview



The shear beam load cell is particularly suitable for implementation in container, overhead rail conveyor and platform scales.

Design

The measuring element is a shear tension spring made of stainless steel to which strain gauges are applied. The strain gauges are arranged at 45° to the longitudinal axis on the side of the spring body and are therefore subject to shear forces. Under the influence of the load acting in the measuring direction, the spring bodies and therefore the friction-locked strain gauges are elastically deformed. This generates a measuring signal voltage that is proportional to the load.

Technical specifications

SIWAREX WL230 SB-S SA

Possible applications	Container, conveyor, overhead rail and platform scales
Model	Shear beam
Rated load/maximum load E_{max}	0.5, 1, 2, 5 t
Accuracy class according to OIML R60	C3 ¹⁾
Max. load cell verification interval n_{LC}	3 000
Min. load cell verification interval V_{min}	
• $E_{max} = 500$ kg	$E_{max}/10\ 000$
• $E_{max} = 1, 2, 5$ ¹⁾ t	$E_{max}/15\ 000$
Minimum application range $R_{min(LC)}$	
• $E_{max} = 500$ kg	30 %
• $E_{max} = 1, 2, 5$ t	20 %
Combined error F_{comb}	± 0.02 % C_n
Repeatability F_v	± 0.02 % C_n
Creep error F_{cr}	
• 30 min	$\leq \pm 0.02$ % C_n
Temperature effect	
• Zero signal T_{K0}	0.023 % $C_n/5$ K
• Characteristic value T_{Kc}	0.017 % $C_n/5$ K
Min. dead load E_{min}	0 kg
Safe load limit L_u	150 % E_{max}
Ultimate load L_d	300 % E_{max}
Safe side load L_{lq}	100 % E_{max}
Rated measuring path h_n at E_{max}	
• $E_{max} = 500$ kg	0.13 mm
• $E_{max} = 1$ t	0.21 mm
• $E_{max} = 2$ t	0.29 mm
• $E_{max} = 5$ t	0.38 mm

Supply voltage (range)	5 ... 12 V DC
Rated characteristic value C_n	2.0 \pm 0.002 mV/V
Tolerance D_o of zero signal	$\leq \pm 1.0$ % C_n
Input resistance R_e	1000 \pm 10 Ω
Output resistance R_a	1004 \pm 5 Ω
Insulation resistance R_{is}	5 000 M Ω at 50 V DC
Rated temperature range B_{Tn}	-10 ... +40 °C
Operating temperature range B_{Tu}	-35 ... +65 °C
Storage temperature range B_{Ts}	-35 ... +65 °C
Sensor material (DIN)	Stainless steel
Degree of protection according to EN 60529; IEC 60529	IP68
Recommended tightening torque of the fixing screws	
• $E_{max} = 0.5, 1, 2$ t	150 Nm
• $E_{max} = 5$ t	550 Nm

Cable connection

Function	Color
• EXC +	• Green
• EXC -	• Black
• SIG +	• White
• SIG -	• Red
• Shield	• Transparent

¹⁾ OIML type approval for SIWAREX WL230 SB-S SA 5 t available soon

Selection and Ordering data

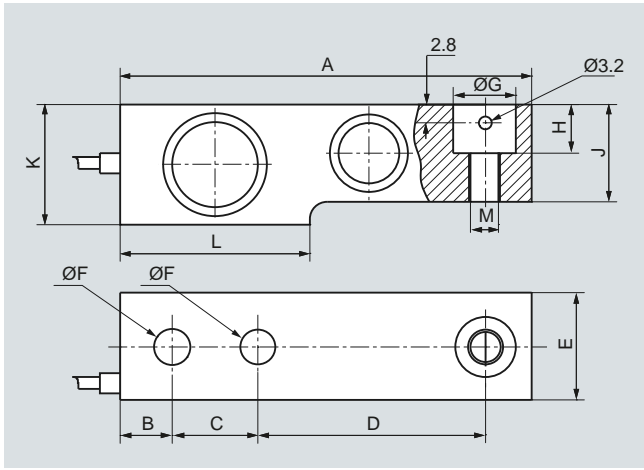
Load cells type WL230 SB-S SA	Order No.
Legal-for-trade according to OIML R60 to 3000d, 3 m connecting cable for 500 kg up to 1 t, 6 m connecting cable for 2 t up to 5 t	7MH5107 - D0
Rated load	
500 kg	3 P
1 t	4 A
2 t	4 G
5 t	4 P
Explosion protection	
Without	0
Explosion protection for zones 0, 1, 2, 20, 21, 22	1

Load Cells

SIWAREX WL230 SB-S SA

Load cell

Dimensional drawings

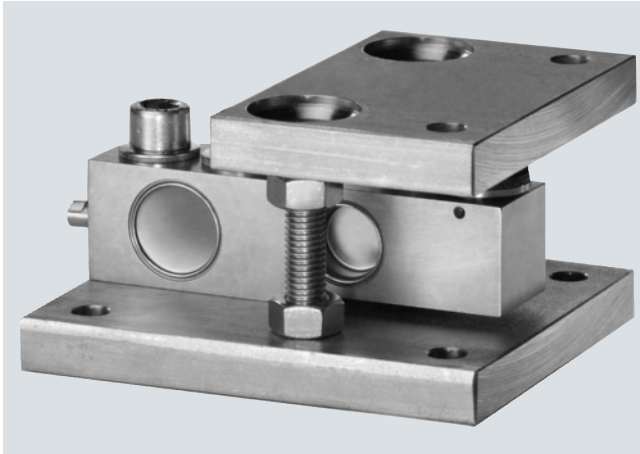


Rated load [t]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	ØF [mm]
0,5	130	16	25,4	76	32	13
1	130	16	25,4	76	32	13
2	130	16	25,4	76	32	13
5	172	19	38,1	95	38	20,5

Rated load [t]	ØG [mm]	H [mm]	J [mm]	K [mm]	L [mm]	M [mm]
0,5	20,5	14	26	32	57	M12
1	20,5	14	28	32	57	M12
2	20,5	14	32	36	57	M12
5	30,2	20	40	44	76	M20

Load cell SIWAREX WL230 SB-S SA, dimensions in mm

Overview



The self-aligning compact mounting unit for SIWAREX WL230 SB-S SA load cells is particularly suitable for implementation in container, platform and roller table scales.

Design

The compact mounting unit comprises a base plate and a top plate, a self-aligning bolt and two countersunk screws.

The top plate is aligned and fixed above the base plate with the two countersunk screws. This results in a stable unit. The height of the top plate is adjusted so that it is three millimeters above the installation height with load cell.

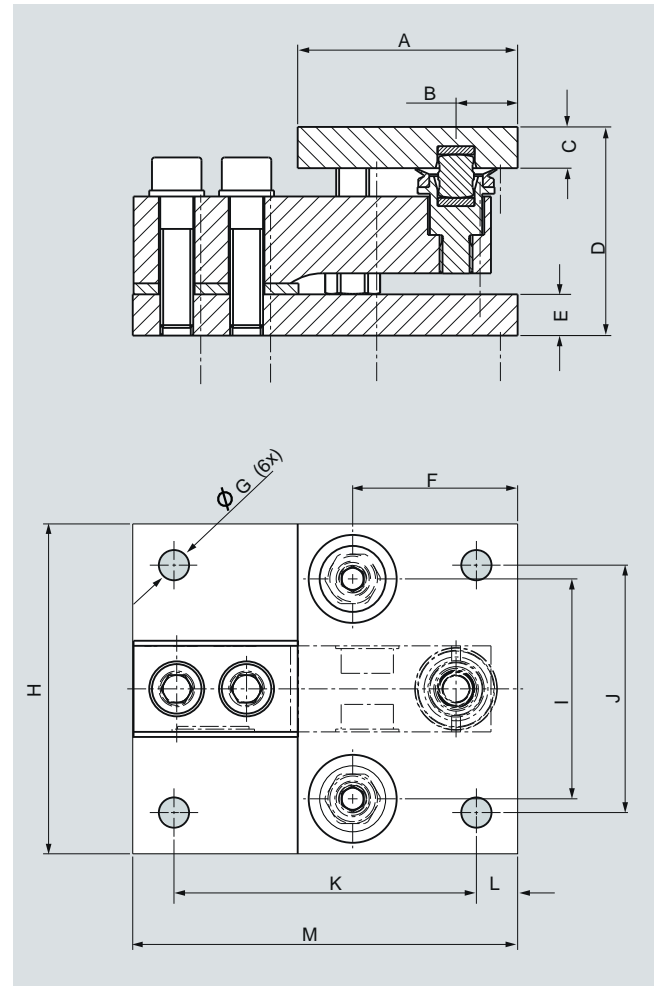
In this state the compact mounting unit serves as an installation aid and can be used as a dummy for light installation jobs.

Prior to installation, the load cell is inserted with the self-aligning bolt into the compact mounting unit. Then the complete unit is installed in the scales. As the result, the load bearing implement and the mounting units are aligned. The load cells are not yet loaded.

Finally the load bearing implement is lowered by undoing two hex nuts under the top plate. The weight now rests on the load cells.

In this state the load cell and the pressure pieces together form a self-centering unit. The compact mounting unit permits side-ways displacement of the top plate, and hence of the load bearing implement, by up to three millimeters.

Dimensional drawings



Rated load [t]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]
0,5 ... 2	80	22,4	15	76	15	60
5	105	31,6	20	111	25	80

Rated load [t]	ØG [mm]	H [mm]	I [mm]	J [mm]	K [mm]	L [mm]	M [mm]
0,5 ... 2	11	120	80	90	110	15	140
5	13,5	150	100	110	145	20	185

Compact mounting unit for SIWAREX WL230 SB-S SA load cells, dimensions in mm

Selection and Ordering data

Order No.

Compact mounting unit

7MH5707 - 4 A 0 0

load cells of the SIWAREX WL230 SB-S SA series and the rated load

Material: Stainless steel
for load cells with a rated load of¹⁾²⁾

Rated load

500 kg, 1 t
2 t
5 t

A
G
P

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.

Load Cells

SIWAREX WL270 CP-S SA

Load cell

Overview



The compression load cell is particularly suitable for implementation in container, hopper and vehicle scales.

Design

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

The load which acts centrally in the measuring direction causes the spring bodies and therefore the friction-locked strain gauges to be elastically deformed. This generates a measuring signal voltage that is proportional to the load.

Technical specifications

SIWAREX WL270 CP-S SA

Possible applications	Vehicle scales, overhead rail scales, container weighers
Model	Compression load cell
Rated load/maximum load E_{max}	10, 20, 30, 50 t
Accuracy class according to OIML R60	C3
Max. load cell verification interval n_{LC}	3 000
Min. load cell verification interval V_{min}	
• $E_{max} = 10, 20, 50 t$	$E_{max}/10\ 000$
Minimum application range $R_{min(LC)}$	30 %
Combined error F_{comb}	$\pm 0.02 \% C_n$
Repeatability F_v	Not applicable
Creep error F_{cr}	
• 30 min	$\pm 0.023 \% C_n$
Temperature effect	
• Zero signal T_{K0}	$0.023 \% C_n/5 K$
• Characteristic value T_{KC}	$0.017 \% C_n/5 K$
Min. dead load E_{min}	0 kg
Safe load limit L_u	150 % E_{max}
Ultimate load L_D	300 % E_{max}
Safe side load L_{Iq}	75 % E_{max}
Rated measuring path h_n at E_{max}	0.5 mm

Recommended supply voltage (range)	5 ... 12 V DC
Rated characteristic value C_n	$2.0 \pm 0.02 mV/V$
Tolerance D_0 of zero signal	$\leq \pm 1.0 \% C_n$
Input resistance R_e	$700 \Omega \pm 7 \Omega$
Output resistance R_a	$700 \Omega \pm 7 \Omega$
Insulation resistance R_{is}	5 000 M Ω at 50 V DC
Rated temperature range B_{tn}	-10 ... +40 °C
Operating temperature range B_{tu}	-35 ... +65 °C
Storage temperature range B_{ts}	-35 ... +65 °C
Sensor material	Stainless steel
Degree of protection according to EN 60529; IEC 60529	IP68

Cable connection

Function	Color
• EXC + (supply +)	• Red
• EXC - (supply -)	• Black
• SIG + (measured signal +)	• Green
• SIG - (measured signal -)	• White
• Shield	• Transparent

Selection and Ordering data

Order No.

Load cells type WL270 CP-S SA

7MH5108 - D0

Legal-for-trade according to OIML R60 to 3000d, 15 m connecting cable

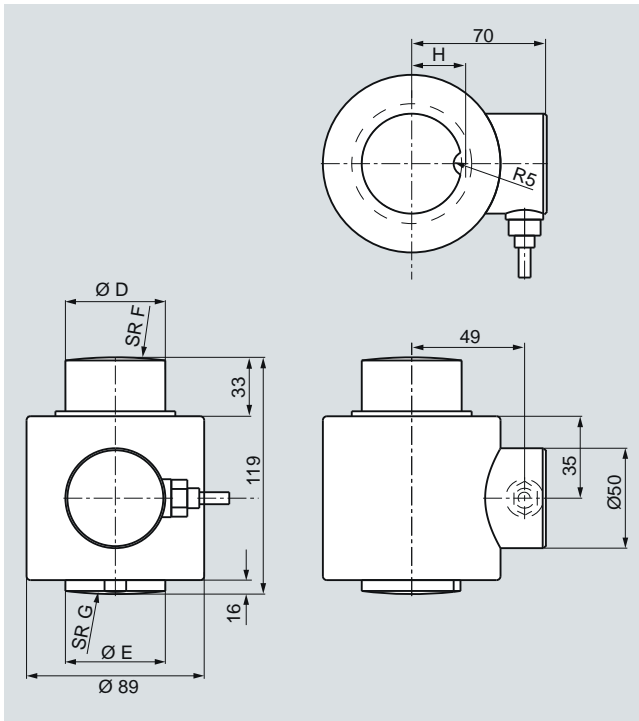
Rated load

10 t	5 A
20 t	5 G
30 t	5 K
50 t	5 P

Explosion protection

Without	0
Explosion protection for zones 0, 1, 2, 20, 21, 22	1

Dimensional drawings



Rated load [t]	D [mm]	E [mm]	F [mm]	L [mm]
10, 20, 30	40	37,5	150	22
50	50	200	200	27

Load cell SIWAREX WL270 CP-S SA, dimensions in mm

Load Cells

SIWAREX WL270 CP-S SA

Pressure piece set and adapter plate

Overview



In combination with a pressure piece set and adapter plate the SIWAREX WL270 CP-S SA produces a self-centering self-aligning bearing. This unit is particularly suitable for installation in container, hopper and vehicle scales.

Design

The pressure piece set consists of an upper and lower pressure piece. Together with the load cell the pressure piece set forms a self-centering unit with integrated torsion guard. Two adapter plates serve to hold the pressure pieces and round off the unit into a self-aligning bearing. The adapter plates can be bolted by means of the existing holes directly to the load bearing implement.

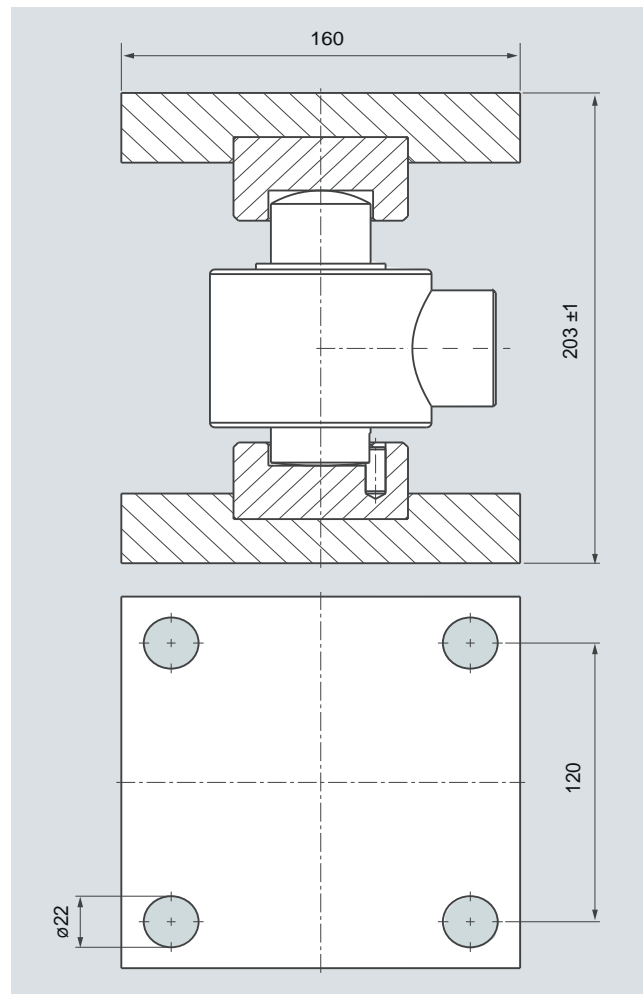
The self-centering, self-aligning bearing thus formed allows the load bearing implement to follow horizontal displacements (e.g. due to temperature fluctuations). In this case the construction of the self-aligning bearing creates a restoring force which is dependent on the size of the displacement and the applied load.

If the load bearing implement is displaced by more than 3 mm in the lateral direction, measures for restricting sideways play must be provided in the construction of the load bearing implement (e.g. stops or guide elements). Lifting of the load support must be prevented by suitable measures provided in the construction of the load bearing implement.

The load cell must be ordered separately.

The adapter plate package item consists of one unit.

Dimensional drawings



Pressure piece set and adapter plates for SIWAREX WL270 CP-S SA load cells (mounting condition), dimensions in mm

Selection and Ordering data

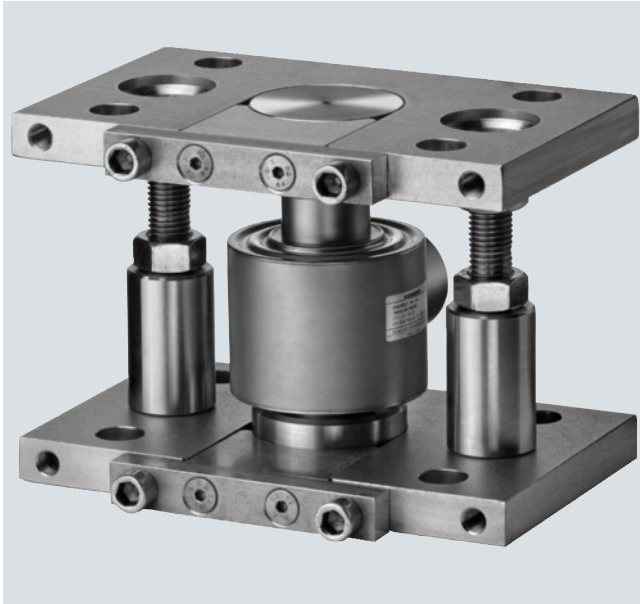
Selection and Ordering data	Order No.
Pressure piece set¹⁾	7MH5708 - 5 ■ D 0 0
For the individual installation of load cells from the SIWAREX WL270 CP-S SA series Material: Stainless steel For load cells with a rated load of ²⁾³⁾	
10, 20, 30 t	K
50 t	P
Adapter plates	7MH5708 - 5 ■ B 0 0
Adapter for SIWAREX WL270 CP-S SA The package item consists of one plate. Material: Stainless steel For load cells with a rated load of ²⁾³⁾	
10 ... 50 t	P

¹⁾ The principles of general mechanical engineering and safety must be observed.

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

³⁾ The load cell is not included in the scope of delivery.

Overview



The self-aligning compact mounting unit for SIWAREX WL270 CP-S SA load cells is particularly suitable for implementation in container, platform, vehicle and roller table scales.

Design

The compact mounting unit comprises a base plate and a top plate, two pressure pieces, two clamping pieces and two countersunk screws. There are threaded holes in the base plate and top plate for the subsequent flange-fitting of guide elements.

The top plate is aligned and fixed above the base plate with the two countersunk screws. This results in a stable unit. The height of the top plate is adjusted so that it is three millimeters above the installation height with load cell.

Two pressure pieces are used to mount the load cell. They are fastened flush with the head plate and base plate using the clamping pieces.

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

Prior to installation, the load cell is inserted into the compact mounting unit. Then the complete unit is installed in the scales. As the result, the load bearing implement and the mounting units are aligned. The load cells are not yet loaded.

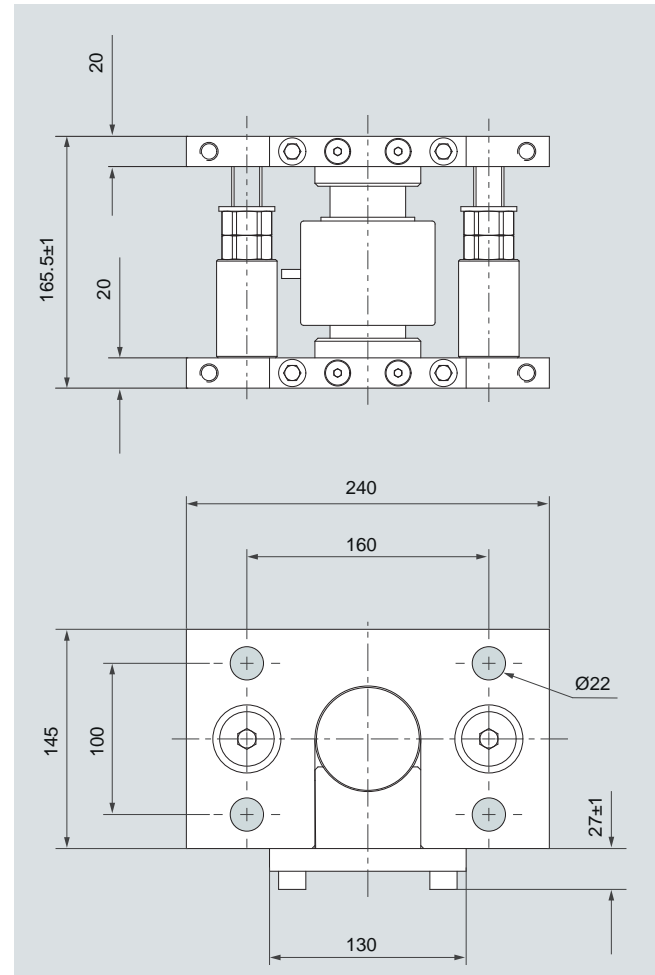
Finally the load bearing implement is lowered by undoing two hex nuts under the top plate. The weight now rests on the load cells.

In this state the load cell and the pressure pieces together form a self-centering unit. The compact mounting unit permits sideways displacement of the top plate, and hence of the load bearing implement, by up to three millimeters in all directions. The countersunk screws prevent the load bearing implement from being lifted off or toppling off.

Using the compact mounting unit as an installation aid results in optimum alignment of the load cells. This is essential for the load cells to perform at their best in terms of accuracy.

For maintenance or troubleshooting purposes the load cell can be relieved again by screwing up the hex nuts. Replacement of the load cell is then easy after the clamping pieces are released.

Dimensional drawings



Compact mounting unit for SIWAREX WL270 CP-S SA load cells, dimensions in mm

Selection and Ordering data

Compact mounting unit

For load cells of the SIWAREX WL270 CP-S SA series
Material: Stainless steel

For load cells with a rated load of¹⁾²⁾

10, 20, 30 t
50 t

Order No.

7MH5708 - 5 A 00

K
P

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.

Load Cells

SIWAREX WL270 CP-S SB

Load cell

Overview



The compression load cell is particularly suitable for implementation in container, hopper and vehicle scales.

Design

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

The load which acts centrally in the measuring direction causes the spring bodies and therefore the friction-locked strain gauges to be elastically deformed. This generates a measuring signal voltage that is proportional to the load.

Technical specifications

SIWAREX WL270 CP-S SB

Possible applications	Container weighers
Model	Compression load cell
Rated load/maximum load E_{max}	100 t
Accuracy class according to OIML R60	C3
Max. load cell verification interval n_{LC}	3 000
Min. load cell verification interval V_{min}	
• $E_{max} = 100$ t	$E_{max}/9\ 000$
Minimum application range $R_{min(LC)}$	33 %
Combined error F_{comb}	$\pm 0.02\ % C_n$
Repeatability F_v	$\pm 0.02\ % C_n$
Creep error F_{cr}	
• 30 min	$\pm 0.023\ % C_n$

Temperature effect	
• Zero signal T_{K0}	0.023 % $C_n/5$ K
• Characteristic value T_{KC}	0.017 % $C_n/5$ K
Min. dead load E_{min}	0 kg
Safe load limit L_U	150 % E_{max}
Ultimate load L_D	300 % E_{max}
Safe side load L_{Iq}	10 % E_{max}
Rated measuring path h_n at E_{max}	0.36 mm
Recommended supply voltage (range)	5 ... 12 V DC
Rated characteristic value C_n	2.0 \pm 0.02 mV/V
Tolerance D_0 of zero signal	$\leq \pm 1.0\ % C_n$
Input resistance R_e	700 $\Omega \pm 7\ \Omega$
Output resistance R_a	700 $\Omega \pm 7\ \Omega$
Insulation resistance R_{is}	5 000 M Ω at 50 V DC
Rated temperature range B_{tn}	-10 ... +40 °C
Operating temperature range B_{tu}	-35 ... +65 °C
Storage temperature range B_{ts}	-35 ... +65 °C
Sensor material	Stainless steel
Degree of protection according to EN 60529; IEC 60529	IP68

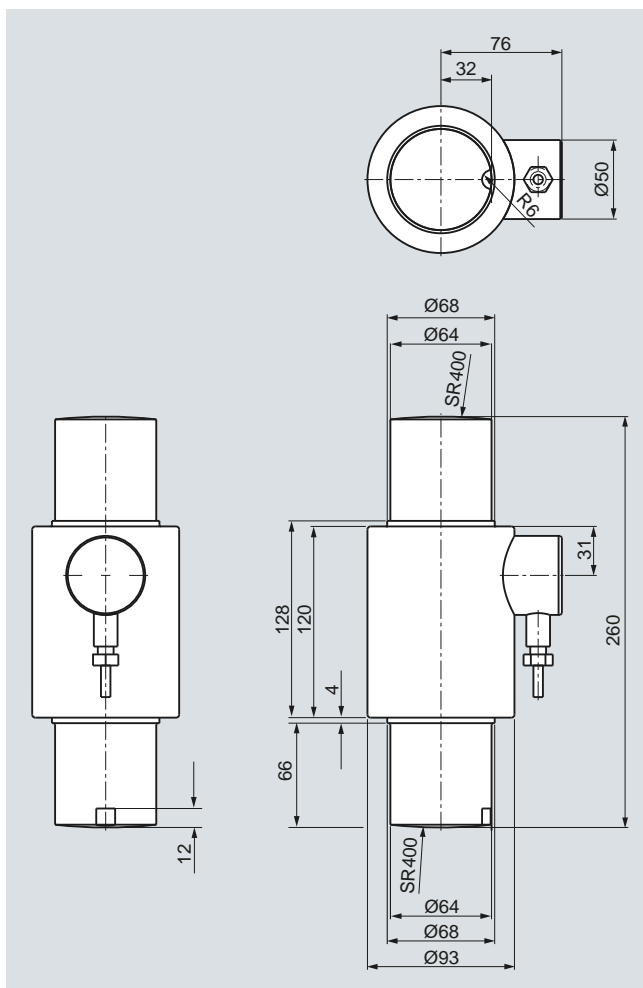
Cable connection

Function	Color
• EXC + (supply +)	• Green
• EXC - (supply -)	• Black
• SIG + (measured signal +)	• White
• SIG - (measured signal -)	• Red
• Sense + (sensor line +)	• Yellow
• Sense - (sensor line -)	• Blue
• Shield	• Transparent

Selection and Ordering data

	Order No.
Load cells type WL270 CP-S SB	7MH5110 - D 0
Legal-for-trade according to OIML R60 to 3000d, 20 m connecting cable	
Rated load	
100 t	6 A
Explosion protection	
Without	0
Explosion protection for zones 0, 1, 2, 20, 21, 22	1

Dimensional drawings



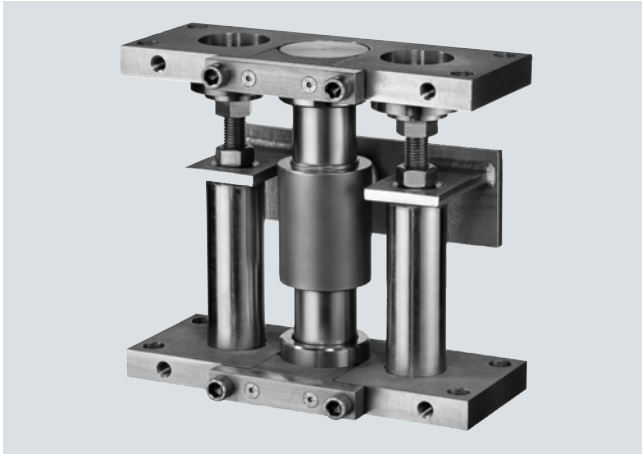
Load cell SIWAREX WL270 CP-S SB, dimensions in mm

Load Cells

SIWAREX WL270 CP-S SB

Compact mounting unit

Overview



The self-centering compact mounting unit for SIWAREX WL270 CP-S SB load cells is particularly suitable for implementation in container scales.

Design

The compact mounting unit comprises a base plate and a top plate, two pressure pieces, two clamping pieces and two centering sleeves. There are threaded holes in the base plate and top plate for the subsequent flange-fitting of guide elements.

The top plate is aligned and fixed above the base plate with the two centering sleeves. This results in a stable unit. The height of the top plate is adjusted so that it is five millimeters above the installation height with load cell.

Two pressure pieces are used to mount the load cell. They are fastened flush with the head plate and base plate using the clamping pieces.

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

Prior to installation, the load cell is inserted into the compact mounting unit. Then the complete unit is installed in the scales. As the result, the load bearing implement and the mounting units are aligned. The load cells are not yet loaded.

Finally the load bearing implement is lowered by undoing two hex nuts under the centering sleeves. The weight now rests on the load cells.

In this state the load cell and the pressure pieces together form a self-centering unit. The compact mounting unit permits side-ways displacement of the top plate, and hence of the load bearing implement, by up to eight millimeters in all directions. Two countersunk screws prevent the load bearing implement from being lifted off or toppling off.

Using the compact mounting unit as an installation aid results in optimum alignment of the load cells. This is essential for the load cells to perform at their best in terms of accuracy.

For maintenance or troubleshooting purposes the load cell can be relieved again by screwing up the hex nuts. Replacement of the load cell is then easy after the clamping pieces are released.

Selection and Ordering data

Order No.

Compact mounting unit

For load cells of the SIWAREX WL270 CP-S SB series

Material: Stainless steel
for load cells with a rated load of¹⁾ 2)

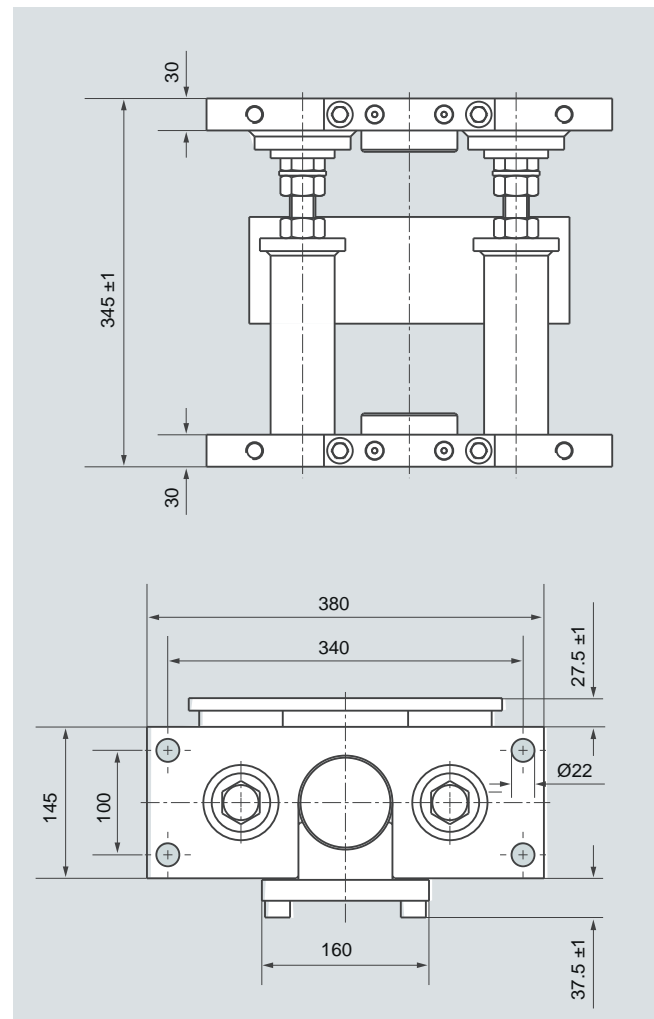
100 t

7MH5710 -6AA00

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.

Dimensional drawings



Compact mounting unit for SIWAREX WL270 CP-S SB load cells (mounting condition), dimensions in mm

Overview



The compression load cell is particularly suitable for implementation in container, hopper and vehicle scales.

Design

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

The load which acts centrally in the measuring direction causes the spring bodies and therefore the friction-locked strain gauges to be elastically deformed. This generates a measuring signal voltage that is proportional to the load.

Technical specifications

SIWAREX WL270 CP-S SC

Possible applications	Container weighers
Model	Compression load cell
Rated load/maximum load E_{max}	200 t
Accuracy class	0.1 %
Repeatability F_v	$\pm 0.017 \% C_n$
Creep error F_{cr}	$\pm 0.02 \% C_n$
• 30 min	
Temperature effect	
• Zero signal T_{K0}	$0.017 \% C_n / 5 K$
• Characteristic value T_{Kc}	$0.014 \% C_n / 5 K$
Min. dead load E_{min}	0 kg
Safe load limit L_u	$150 \% E_{max}$
Ultimate load L_D	$300 \% E_{max}$
Safe side load L_{Iq}	$10 \% E_{max}$
Rated measuring path h_n at E_{max}	0.36 mm
Recommended supply voltage (range)	5 ... 12 V DC
Rated characteristic value C_n	$2.0 \pm 0.02 mV/V$
Tolerance D_c of characteristic value	Not applicable
Tolerance D_0 of zero signal	$\leq \pm 1.0 \% C_n$
Input resistance R_e	$450 \Omega \pm 5 \Omega$
Output resistance R_a	$480 \Omega \pm 5 \Omega$
Insulation resistance R_{is}	5 000 M Ω at 50 V DC
Rated temperature range B_{in}	-10 ... +40 °C
Operating temperature range B_{tu}	-35 ... +65 °C
Storage temperature range B_{ts}	-35 ... +65 °C
Sensor material	Stainless steel

Degree of protection according to EN 60529; IEC 60529

IP68

Cable connection

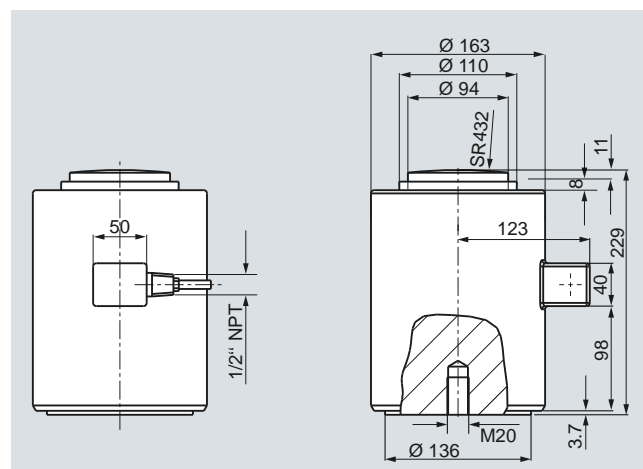
Function

- EXC + (supply +)
- EXC - (supply -)
- SIG + (measured signal +)
- SIG - (measured signal -)
- Shield

Color

- Green
- Black
- White
- Red
- Transparent

Dimensional drawings



Load cell SIWAREX WL270 CP-S SC, dimensions in mm

Selection and Ordering data

Order No.

Load cell type WL270 CP-S SC

Error of measurement 0.1 %, 20 m connection cable

Rated load

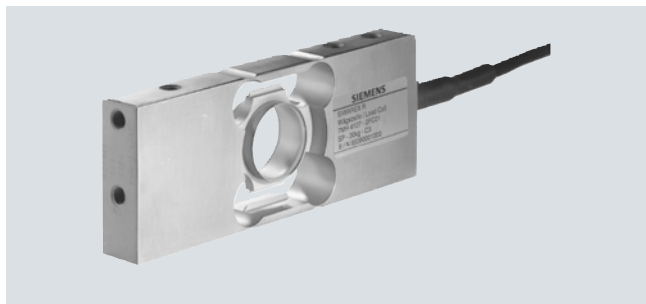
200 t

7MH5111 - 6 GA0 0

Load Cells

SIWAREX R - SP series

Overview



The load cell is suitable for small platform scales with one load cell (max. platform size 350 x 350 mm) as well as for use in medium accuracy weighing machines of Class III with a max. scale verification intervals $n_{\max} = 3\,000$ d.

Design

The measuring element is hermetically sealed and has a calibrated output current.

Technical specifications

SIWAREX R load cells, SP series

Possible applications	Smaller conveyor scales, small platform scales
Model	Single point
Rated load E_{\max}	6/12 kg
Accuracy class acc. to OIML R60	C3
Max. load cell verification intervals n_{lc}	3 000
Min. load cell verification intervals v_{\min}	$E_{\max}/12\,000$
Combined error F_{comb}	$\leq \pm 0.02\% C_n$
Repeatability F_v	$\leq \pm 0.01\% C_n$
Return of zero signal	$\leq \pm 0.0167\% C_n^{1)}$
Creep error F_{cr}	
• 30 min	$\leq \pm 0.0245\% C_n^{1)}$
• 20 ... 30 min	$\leq \pm 0.0053\% C_n^{1)}$
Temperature effect	
Zero signal T_{K0}	$\leq \pm 0.0058\% C_n/5\text{ K}$
Characteristic value T_{Kc}	$\leq \pm 0.0045\% C_n/5\text{ K}$
Min. dead load E_{\min}	$0\% E_{\max}$
Maximum working load L_u	$150\% E_{\max}$
Ultimate load L_d	$300\% E_{\max}$
Maximum lateral load L_{lq}	$100\% E_{\max}$
Rated measuring path h_n at E_{\max} 6 kg	$0.24 \pm 0.02\text{ mm}$
Rated measuring path h_n at E_{\max} 12 kg	$0.19 \pm 0.01\text{ mm}$
Supply voltage U_{sr} (reference value)	10 V
Supply voltage (range)	5 ... 15 V
Rated characteristic value C_n	2 mV/V
Tolerance D_c of characteristic value	$\pm 10\%$
Tolerance D_o of zero signal	$\leq \pm 1\% C_n$
Input resistance R_e	$410\ \Omega \pm 6\ \Omega$
Output resistance R_a	$350\ \Omega \pm 7\ \Omega$
Insulation resistance R_{is}	$\geq 5\,000\text{ M}\Omega$
Rated temperature range B_{tn}	-10 ... +40 °C

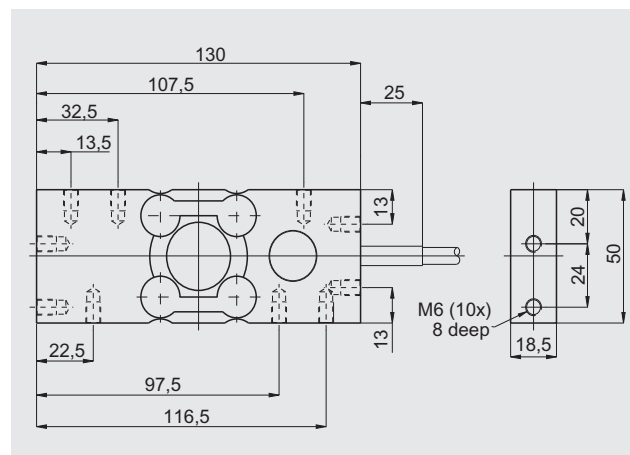
Operating temperature range B_{tu}	-40 ... +80 °C
Storage temperature range B_{ts}	-40 ... +90 °C
Sensor material (DIN)	Stainless steel, mat. no. 1.4542
Degree of protection to EN 60529	IP66/IP68
Maximum tightening torque of the fixing screws	6 Nm
Ex protection to ATEX (optional)	II 2 G EEx ib IIC T6/T4 II 3 G EEx nA/nL IIC T6/T4 II 1D/2D/3D T 70 °C

Cable connection

Function	Color
• EXC + (supply +)	• Green
• EXC - (supply -)	• Black
• SIG + (measured signal +)	• White
• SIG - (measured signal -)	• Red
• Sense + (sensor line +)	• Yellow
• Sense - (sensor line -)	• Blue
• Shield (not connected to housing)	• Transparent

¹⁾ For rated temperature -10 ... +40 °C.

Dimensional drawings



SIWAREX R load cell, SP series, dimensions in mm

Selection and Ordering data	Order No.
Load cells of the SP series	7MH4107 - C 1
Legal-for-trade acc. to OIML R60 to 3 000d, 7 m connection cable ¹⁾	
Rated load	
6 kg	1 L
12 kg	2 B
Explosion protection¹⁾	
Without	0
Explosion protection for zones 1, 2, 20, 21, 22	1

¹⁾ Length tolerance $\pm 100\text{ mm}$

Overview



The bending beam load cell is particularly suitable for use in small-scale container and platform scales.

Design

The measuring element is a double bending beam made of stainless steel to which 4 strain gauges are applied.

The strain gauges are arranged so that two are stretched and two are compressed.

Under the influence of the load acting in the measuring direction, the spring bodies and therefore the friction-locked strain gauges are elastically deformed. This generates a measuring signal voltage that is proportional to the load.

Technical specifications

SIWAREX R load cells, BB series

Possible applications	Container, conveyor and platform scales
Model	Bending beam
Rated load/maximum load E_{max}	10/20/50/100/200/350 kg
Accuracy class acc. to OIML R60	C3
Max. load cell verification intervals n_{LC}	3 000
Min. load cell verification intervals V_{min}	$E_{max}/15\ 000$
Minimum application range $R_{min(LC)}$	20 %
Combined error F_{comb}	$\leq \pm 0.02\ % C_n$
Repeatability F_v	$\leq \pm 0.01\ % C_n$
Return of zero signal	$\leq \pm 0.0167\ % C_n^{1)}$
Creep error F_{cr}	
• 30 min	$\leq \pm 0.0245\ % C_n^{1)}$
• 20 ... 30 min	$\leq \pm 0.0053\ % C_n^{1)}$
Temperature effect	
• Zero signal T_{K0}	$\leq \pm 0.0045\ % C_n/5K$
• Characteristic value T_{Kc}	$\leq \pm 0.0045\ % C_n/5K$
Min. dead load E_{min}	$\geq 0\ % E_{max}$
Safe load limit L_u	150 % E_{max}
Ultimate load L_d	300 % E_{max}
Safe side load L_{lq}	100 % E_{max}
Rated measuring path h_n at E_{max}	0.3 ± 0.03 mm
Supply voltage U_{sr} (reference value)	10 V
Supply voltage (range)	5 ... 15 V
Rated characteristic value C_n	2 mV/V
Tolerance D_c of characteristic value	± 1 %
Tolerance D_0 of zero signal	$\leq \pm 1.0\ % C_n$

Input resistance R_e	460 $\Omega \pm 50\ \Omega$
Output resistance R_a	350 $\Omega \pm 3.5\ \Omega$
Insulation resistance R_{is}	$\geq 5\ 000\ M\Omega$
Rated temperature range B_{Tn}	-10 ... +40 °C
Operating temperature range B_{Tu}	-40 ... +80 °C
Storage temperature range B_{Ts}	-40 ... +90 °C
Sensor material (DIN)	Stainless steel, mat. no. 1.4542
Degree of protection to EN 60529; IEC 60529	IP66/IP68
Max. tightening torque of the fixing screws	23 Nm
Current calibration ²⁾	Standard
Ex protection to ATEX (optional)	II 2 G EEx ib IIC T6/T4 II 3 G EEx nA/nL IIC T6/T4 II 1D/2D/3D T 70 °C

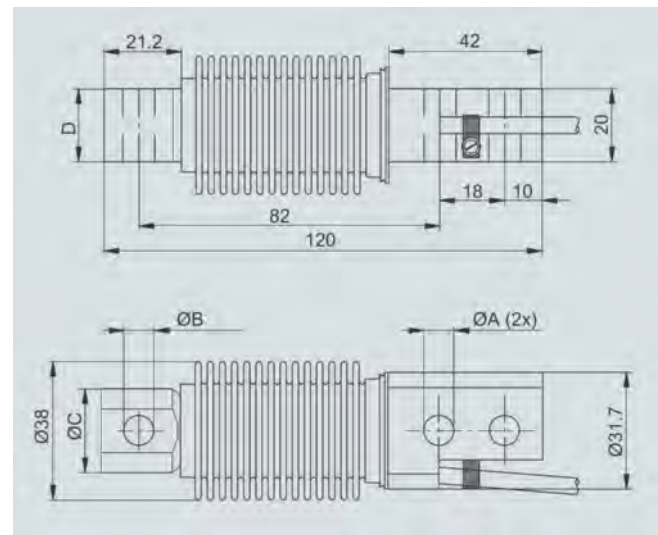
Cable connection

Function	Color
• EXC + (supply +)	• Green
• EXC - (supply -)	• Black
• SIG + (measured signal +)	• White
• SIG - (measured signal -)	• Red
• Screening	• Transparent

¹⁾ For rated temperature -10 ... +40 °C.

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.

Dimensional drawings



Rated load	ØA	ØB	ØC	D
10 ... 200 kg	8.2	8.2 ^{+0.1}	23	20
350 kg	10.3	10.3 ^{+0.1}	24	19

SIWAREX R load cell, BB series, dimensions in mm

Load Cells

SIWAREX R - BB series

Load cell

Selection and Ordering data	Order No.
Load cells of the BB series	7MH4103 - C 1
Legal-for-trade acc. to OIML R60 up to 3 000d, 3 m connection cable ¹⁾	
Rated load	
10 kg	2 A
20 kg	2 D
50 kg	2 K
100 kg	3 A
200 kg	3 D
350 kg ²⁾	3 G
Explosion protection	
Without	0
Ex protection for the zones 1, 2, 20, 21, 22	1

¹⁾ Length tolerance ± 100 mm.

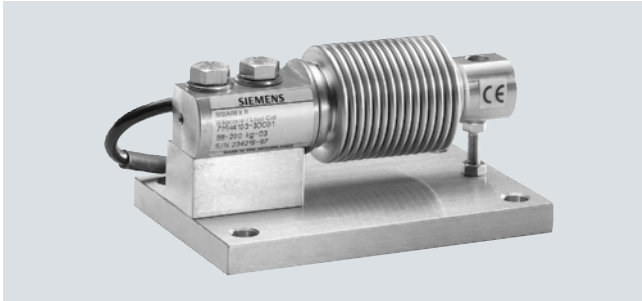
²⁾ Mounting accessories on request.

Load Cells

SIWAREX R - BB series

Base plate with overload protection

Overview



The base plate with integral overload protection for load cells of the BB series ensures easy, correct installation of the load cell.

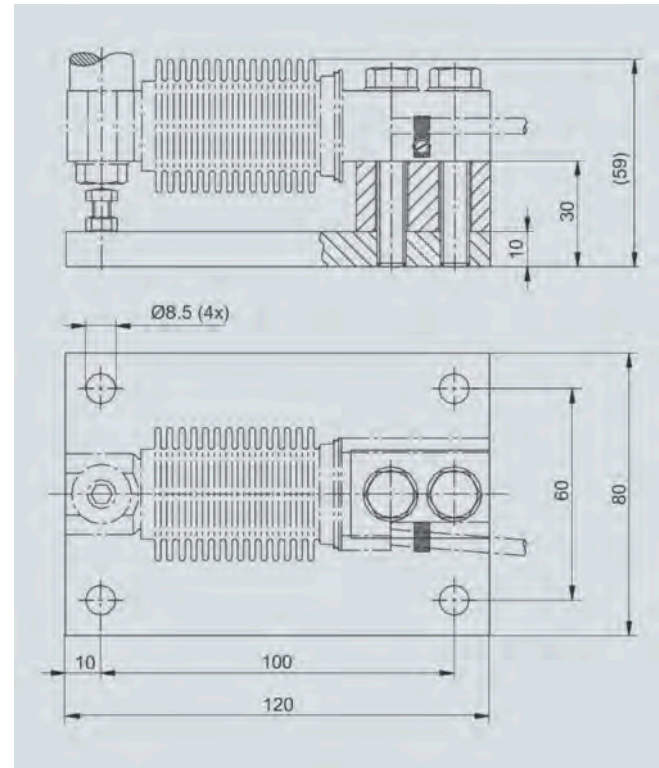
Design

The integral overload protection ensures that the load cell is not damaged by static overloading with vertical forces of up to 5 kN.

The load cells can be installed on the base plate and aligned even before final installation of the scales. This ensures that the permissible spring excursion of the load cell is precisely set, up to contact with the overload protection.

The load cell is not included in the scope of delivery of the base plate with overload protection.

Dimensional drawings



Base plate with overload protection for SIWAREX R load cells of the BB series, 10 ... 200 kg, dimensions in mm

Selection and Ordering data

Order No.

Base plates with overload protection

For load cells of the BB series¹⁾²⁾

Material: stainless steel

For load cells with a rated load of

10 ... 200 kg

D) **7MH4133-3DG11**

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.

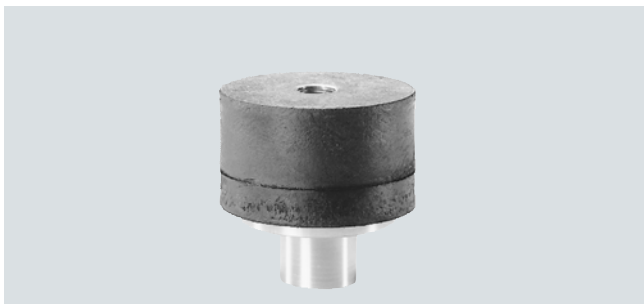
D) Subject to export regulations AL: N, ECCN: EAR99H.

Load Cells

SIWAREX R - BB series

Elastomer bearing

Overview



The self-centering elastomer bearing for load cells of the BB series is the ideal load introduction element for scales without guide elements and serves to damp vibrations and shocks.

3

Design

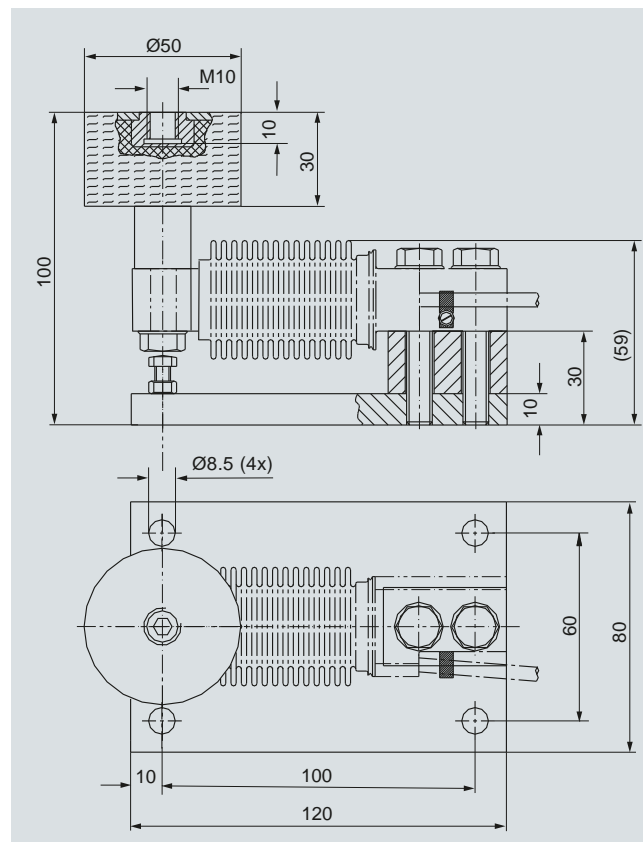
Elastomer bearings are rubber-metal composites made of neoprene and stainless steel. They ensure large spring excursions (i.e. a high degree of damping) despite small dimensions.

If the load support is displaced by more than 4 mm in the horizontal direction, measures for restricting sideways play (e.g. stops) must be implemented in the construction of the load bearing implement.

In combination with the base plate and integral overload protection, it is ensured that the load cell is not damaged by static overloading with vertical forces of up to 5 kN.

The load cell and base plate are not included in the scope of delivery of the elastomer bearing.

Dimensional drawings



Elastomer bearings for SIWAREX R load cells of the BB series, 10 to 200 kg, dimensions in mm

Selection and Ordering data

Order No.

Elastomer bearings

For load cells of the BB series¹⁾

Material: stainless steel

For load cells with a rated load of

10 ... 50 kg

D) **7MH4133-2KE11**

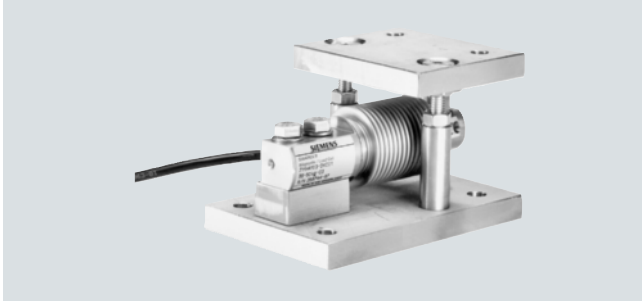
100 ... 200 kg

D) **7MH4133-3DE11**

¹⁾ The load cell and base plate are not included in the scope of delivery.

D) Subject to export regulations AL: N, ECCN: EAR99H.

Overview



The self-aligning combination mounting unit for load cells of the BB series is particularly suitable for implementation in small-scale container, platform and roller table scales.

Design

The combination mounting unit consists of a self-aligning bolt, oscillation limit, protection against raising up, a top plate and a base plate.

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

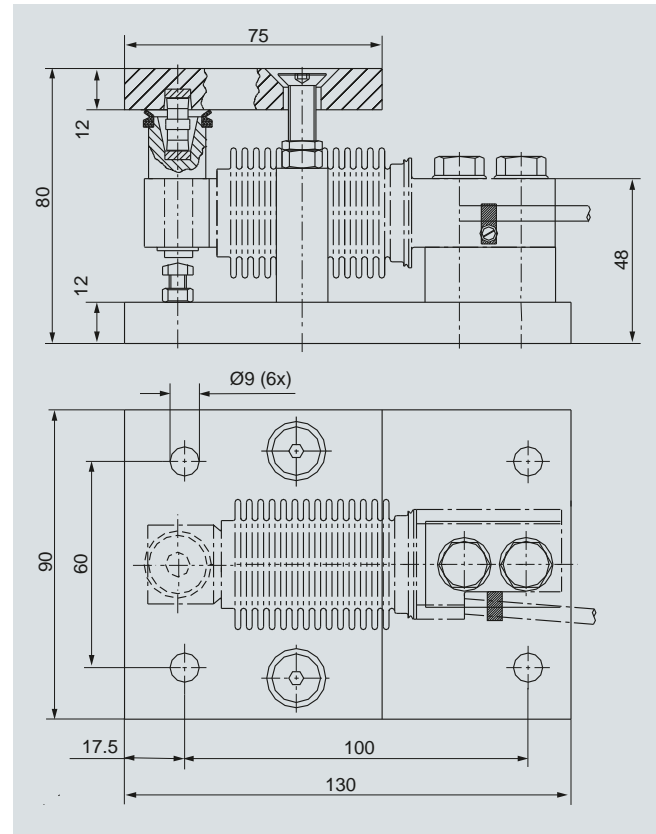
Oscillation limitation prevents the occurrence of excessive sideways displacement and reliably protects the load cell from damage. It can absorb a maximum horizontal force of $F_h = 5 \text{ kN}$. The max. sideways displacement is $\pm 1.5 \text{ mm}$

Protection against raising up prevents the load bearing implementation from raising up, up to a maximum vertical force of $F_v = 6 \text{ kN}$.

The integral overload protection ensures that the load cell is not damaged by static overloading with vertical forces of up to 5 kN.

The load cell is not included in the scope of delivery of the combination mounting unit.

Dimensional drawings



Combination mounting unit for SIWAREX R load cells of the BB series, 10 to 200 kg, dimensions in mm

Selection and Ordering data

Order No.

Combination mounting units

For load cells of the BB series¹⁾²⁾

Material: stainless steel

For load cells with a rated load of

10 ... 200 kg

D) **7MH4133-3DC11**

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.

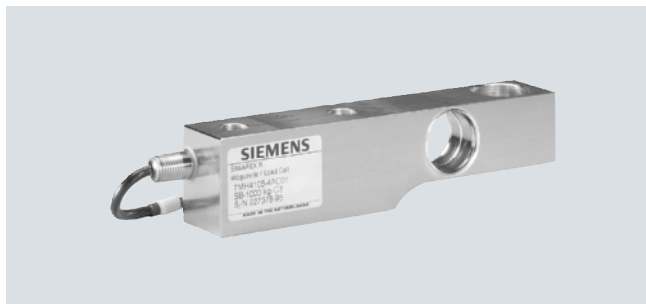
D) Subject to export regulations AL: N, ECCN: EAR99H.

Load Cells

SIWAREX R - SB series

Load cell

Overview



The shear beam load cell is particularly suitable for implementation in container, overhead rail conveyor and platform scales.

Design

The measuring element is a shear tension spring made of stainless steel to which strain gauges are applied. The strain gauges are arranged at 45° to the longitudinal axis on the side of the spring body and are therefore subject to shear forces. Under the influence of the load acting in the measuring direction, the spring bodies and therefore the friction-locked strain gauges are elastically deformed. This generates a measuring signal voltage that is proportional to the load.

Technical specifications

SIWAREX R load cells, SB series

Possible applications	Container, conveyor, overhead rail and platform scales
Model	Shear beam
Rated load/maximum load E_{max}	0.5/1/2/5 t
Accuracy class acc. to OIML R60	C3
Max. load cell verification intervals n_{LC}	3 000
Min. load cell verification intervals V_{min}	$E_{max}/10\ 000$
Minimum application range $R_{min(LC)}$	30 %
Combined error F_{comb}	$\leq \pm 0.02\ % C_n$
Repeatability F_v	$\leq \pm 0.01\ % C_n$
Return of zero signal	$\leq \pm 0.0167\ % C_n^{1)}$
Creep error F_{cr}	
• 30 min	$\leq \pm 0.0245\ % C_n^{1)}$
• 20 ... 30 min	$\leq \pm 0.0053\ % C_n^{1)}$
Temperature effect	
• Zero signal T_{K0}	$\leq \pm 0.007\ % C_n/5\ K$
• Characteristic value T_{Kc}	$\leq \pm 0.0045\ % C_n/5\ K$
Min. dead load E_{min}	$\geq 0\ % E_{max}$
Safe load limit L_u	150 % E_{max}
Ultimate load L_d	300 % E_{max}
Safe side load L_{lq}	100 % E_{max}
Rated measuring path h_n at E_{max}	$\leq 0.5\ mm$
Supply voltage U_{sr} (reference value)	10 V
Supply voltage (range)	5 ... 18 V
Rated characteristic value C_n	2 mV/V
Tolerance D_c of characteristic value	$\pm 1\ %$
Tolerance D_o of zero signal	$\leq \pm 1.0\ % C_n$
Input resistance R_e	$350\ \Omega \pm 3.5\ \Omega$
Output resistance R_a	$350\ \Omega \pm 3.5\ \Omega$

Insulation resistance R_{is}	$\geq 5\ 000\ M\Omega$
Rated temperature range B_{Tn}	-10 ... +40 °C
Operating temperature range B_{Tu}	-40 ... +80 °C
Storage temperature range B_{Ts}	-40 ... +90 °C
Sensor material (DIN)	Stainless steel, mat. no. 1.4542
Degree of protection to EN 60529; IEC 60529	IP66/IP68
Recommended tightening torque of the fixing screws	110 Nm (0.5 - 2 t) 540 Nm (5 t)
Current calibration ²⁾	Standard
Ex protection to ATEX (optional)	II 2 G EEx ib IIC T6/T4 II 3 G EEx nA/nL IIC T6/T4 II 1D/2D/3D T 70 °C

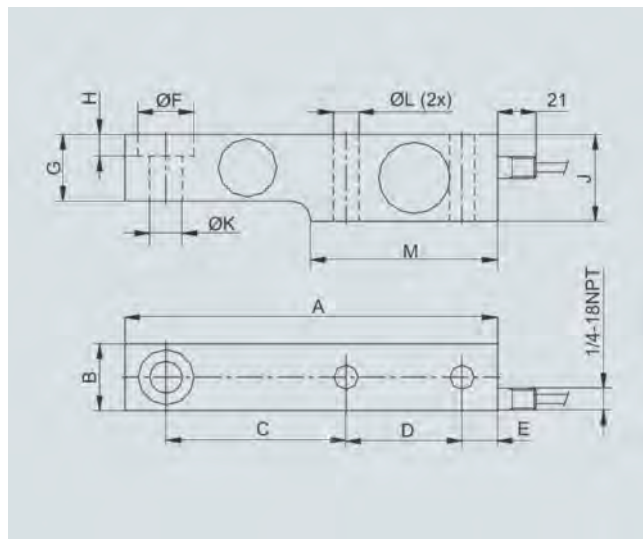
Cable connection

Function	Color
• EXC +	• Green
• EXC -	• Black
• SIG +	• White
• SIG -	• Red
• Screening	• Transparent

¹⁾ For rated temperature -10 ... +40 °C.

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.

Dimensional drawings



Rated load	A	B	C	D	I	ØF
0.5 ... 2 t	203.2	36.5	98.4	63.5	19.1	30.2 ^{+0.2}
5 t	235.0	47.5	123.8	66.7	20.6	41.3 ^{+0.2}
Rated load	G	H	J	ØK	ØL	M
0.5 ... 2 t	36.5	11.9	47.6	17.5 ^{H11}	14	101.6
5 t	47.6	15.8	69.9	25.5 ^{H11}	22	111.2

SIWAREX R load cell, SB series, dimensions in mm

Load Cells

SIWAREX R - SB series

Load cell

Selection and Ordering data	Order No.
Load cells of the SB series	7MH4105 - C 1
Legal-for-trade acc. to OIML R60 up to 3 000d, 5 m connection cable ¹⁾	
Rated load	
500 kg	3 K
1 t	4 A
2 t	4 D
5 t	4 K
Explosion protection	
Without	0
Ex protection for the zones 1, 2, 20, 21, 22	1

¹⁾ Length tolerance ± 100 mm.

3

Load Cells

SIWAREX R - SB series

Base plate with overload protection

Overview



The base plate with integral overload protection for load cells of the SB series ensures easy, correct installation of the load cell.

3

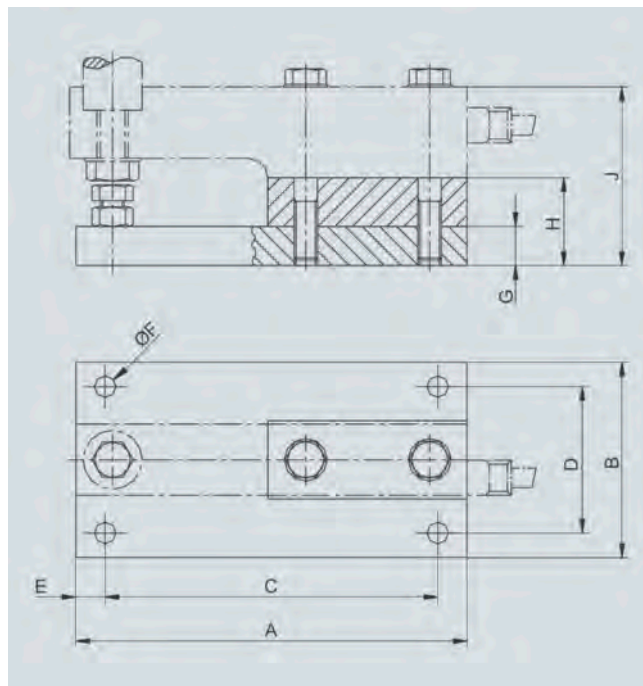
Design

The integral overload protection ensures that the load cell is not damaged by static overloading with vertical forces of up to 40 kN (for load cells with up to 2 t rated load) or 60 kN (for load cells with 5 t rated load).

The load cells can be installed on the base plate and aligned even before final installation of the scales. This ensures that the permissible spring excursion of the load cell is precisely set, up to contact with the overload screw.

The load cell is not included in the scope of delivery of the base plate with overload protection.

Dimensional drawings



Rated load	A	B	C	D	I	ØF	G	H	J
0.5 ... 2 t	200	100	170	75	15	11	20	45	92.6
5 t	235	120	205	90	15	14	20	40	109.8

Base plate with overload protection for SIWAREX R load cells of the SB series, dimensions in mm

Selection and Ordering data

Order No.

Base plates with overload protection

For load cells of the SB series ¹⁾²⁾

Material: stainless steel

For load cells with a rated load of

0.5 t, 1 t, 2 t

D) **7MH4135-4DG11**

5 t

D) **7MH4135-4KG11**

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.

D) Subject to AL export regulations: N, ECCN: EAR99H

Overview



The self-centering elastomer bearing for load cells of the SB series is the ideal load introduction element for scales without guide elements and serves to damp vibrations and shocks. It is used with container and platform scales.

Design

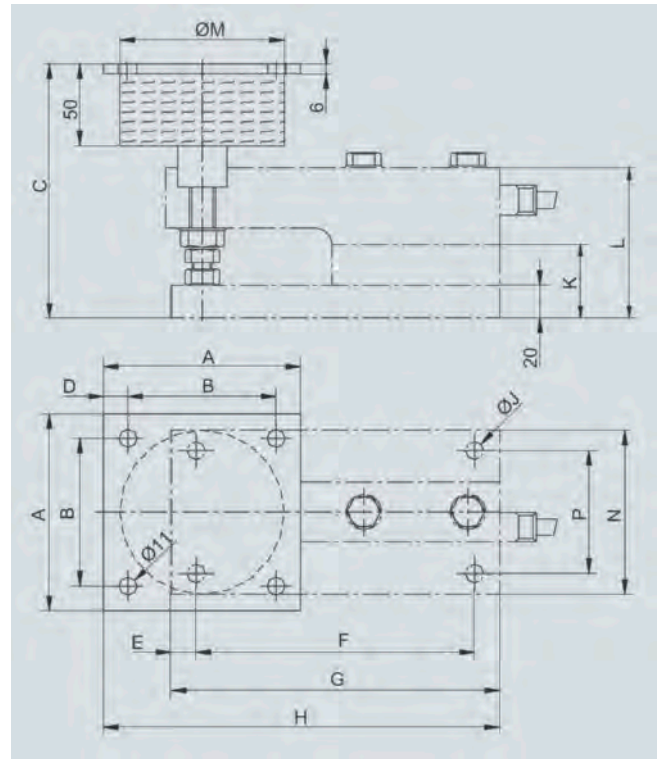
Elastomer bearings are rubber-metal composites made of neoprene and stainless steel. They ensure large spring excursions (i.e. a high degree of damping) despite small dimensions.

If the load carrier is displaced by more than 4 mm in the horizontal direction, measures for restricting sideways play (e.g. stops) must be implemented in the construction of the load bearing implement.

In combination with the base plate and integral overload protection, it is ensured that the load cell is not damaged by static overloading with vertical forces of up to 40 kN (for load cells with up to 2 t rated load) or 60 kN (for load cells with 5 t rated load).

The load cell and base plate are not included in the scope of delivery of the elastomer bearing.

Dimensional drawings



Rated load	A	B	C	D	I	F	G
0.5 t, 1 t	100	75	156	12.5	15	170	200
2 t	120	90	156	15	15	170	200
5 t	120	90	184	15	15	205	235

Rated load	H	ØJ	K	L	ØM	N	P
0.5 t, 1 t	231	11	45	92.6	85	100	75
2 t	241	11	45	92.6	100	100	75
5 t	271	14	40	109.8	100	120	90

Elastomer bearings for SIWAREX R load cells of the SB series, dimensions in mm

Selection and Ordering data

Order No.

Elastomer bearings

For load cells of the SB series¹⁾

Material: stainless steel

For load cells with a rated load of

500 kg, 1 t

D) **7MH4135-4AE11**

2 t

D) **7MH4135-4DE11**

5 t

D) **7MH4135-4KE11**

¹⁾ The load cell and base plate are not included in the scope of delivery.

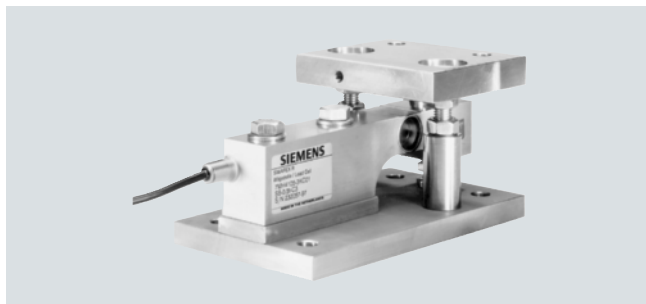
D) Subject to AL export regulations: N, ECCN: EAR99H.

Load Cells

SIWAREX R - SB series

Combination mounting unit

Overview



The self-aligning combination mounting unit for load cells of the SB series is particularly suitable for implementation in container, platform and roller table scales.

Design

The combination mounting unit consists of a self-aligning bolt, oscillation limit, protection against raising up, a top plate and a base plate.

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

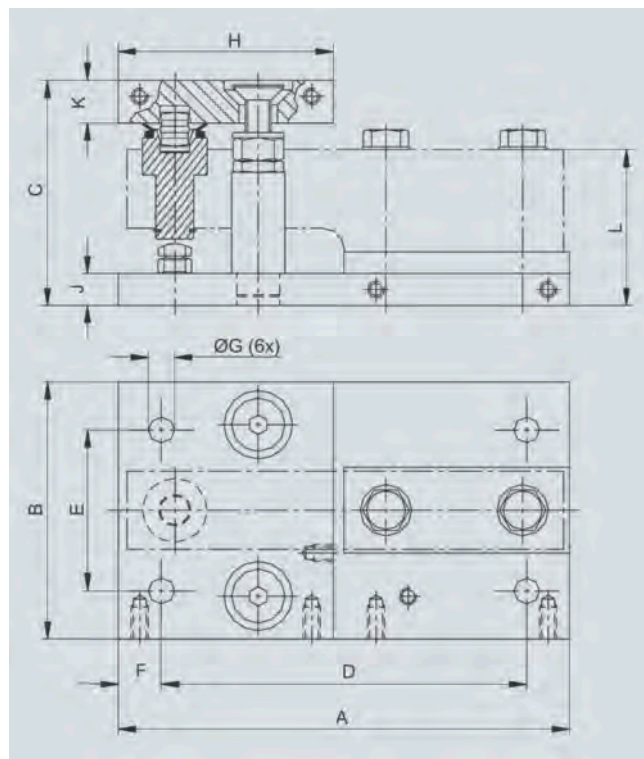
Oscillation limitation prevents the occurrence of excessive sideways displacement and reliably protects the load cell from damage. It can absorb a maximum horizontal force of $F_h = 10$ kN. The max. sideways displacement is ± 3 mm.

The protection against raising up prevents excessive lifting up of the load carrier. For load cells of up to 2 t rated load, protection against raising up can absorb a maximum vertical force of $F_v = 10$ kN and for load cells of 5 t rated load it can absorb $F_v = 25$ kN.

The integral overload protection ensures that the load cell is not damaged by static overloading with vertical forces of up to 40 kN (for load cells with up to 2 t rated load) or 60 kN (for load cells with 5 t rated load).

The load cell is not included in the scope of delivery of the combination mounting unit.

Dimensional drawings



Rated load	A	B	C	D	I	F	ØG	H	J	K	L
0.5 ... 2 t	210	120	105	170	75	20	12	100	15	20	72.6
5 t	250	150	140	205	90	25	14	120	20	20	94.9

Combination mounting unit for SIWAREX R load cells of the SB series, dimensions in mm

Selection and Ordering data

Order No.

Combination mounting units

For load cells of the SB series¹⁾²⁾

Material: stainless steel

For load cells with a rated load of

0.5 t, 1 t, 2 t

D) **7MH4135-4DC11**

5 t

D) **7MH4135-4KC11**

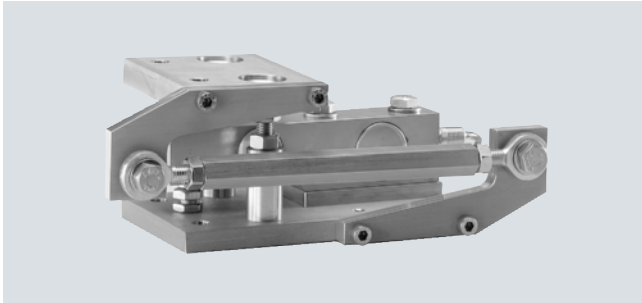
¹⁾ The load cell is not included in the scope of delivery.

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

D) Subject to AL export regulations:N, ECCN: EAR99H.

Guide element for combination mounting unit

Overview



The guide element can be implemented in addition to the combination mounting unit for load cells of the SB series. It is used when undesirable horizontal forces occur during the weighing process, e.g. due to mixing operations with container scales or acceleration of the material to be weighed with conveyor scales.

Design

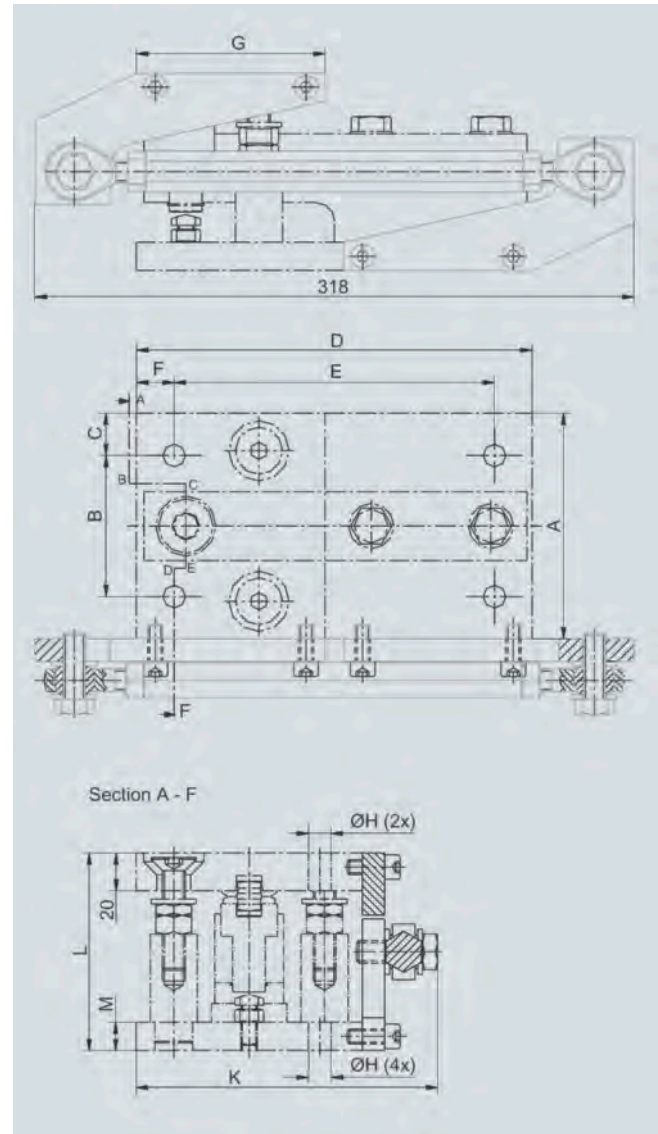
The guide element consists of two ball joint heads, a spacer and two flanges for installation on the combination mounting unit.

The additive guide element can also be retrofitted on combination mounting units if unexpected lateral forces occur during operation of the scales and the combination mounting unit was installed in accordance with the requirements (see "Guide elements").

The guide element diverts horizontal forces up to 1.7 kN to the foundation and therefore minimizes effects on the load cells and the mounting components.

The load cell and combination mounting unit are not included in the scope of delivery of the guide element.

Dimensional drawings



Rated load	A	B	C	D	I	F	G	ØH	K	L	M
0.5 t, 1 t, 2 t	120	75	22.5	210	170	20	100	12	160	105	15
5 t	150	90	30	250	205	25	120	14	190	140	20

SIWAREX R guide element for combination mounting unit for load cells of the SB series, dimensions in mm

Selection and Ordering data

Order No.

Guide elements for combination mounting unit

For load cells of the SB series¹⁾

Consisting of: 2 flanges, 2 pivots, 1 adapter, fixing elements

Material: stainless steel

For load cells with a rated load of

0.5 t, 1 t, 2 t

D) **7MH4135-4DQ12**

5 t

7MH4135-4KQ12

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

D) Subject to AL export regulations: N, ECCN: EAR99H.

Load Cells

SIWAREX R - RN series

Load cell

Overview



The bending beam load cell is particularly suitable for implementation in container, conveyor, platform and roller table scales.

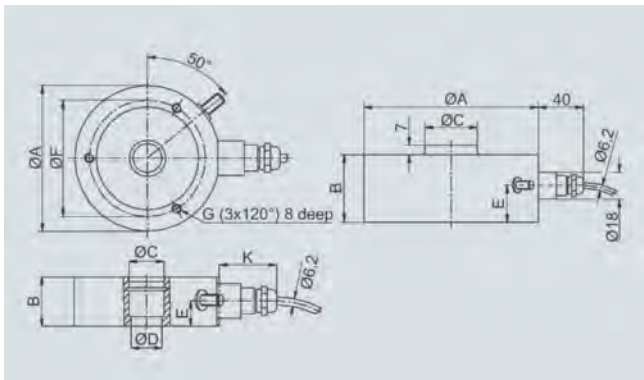
Design

The measuring element is a bending beam made of stainless steel. Two expansion measuring spirals are applied each to the upper and lower faces of the ring. Under the influence of the centrally acting load in the measuring direction, the bending beam is tilted, i.e. the diameter of the upper ring face is reduced and the diameter of the lower ring face is increased. This causes the bending beam (and the expansion measuring spirals installed with friction-locking) to be elastically deformed. This generates a measuring signal voltage that is proportional to the load.

Load cells with a rated load of up to 13 t are equipped with integral overload protection.

Dimensional drawings

Self-aligning bearing **0,06 ... 13 t (left)** Self-aligning bearing **28/60 t (right)**



Rated load	A	B	C	ØD	E	F	K	ØL	M
60 ... 280 kg	80	60	52	63	22	8	11	9	12
0,5 t, 1 t	100	75	79	80	25	15	10	11	25
2 t, 3,5 t, 5 t	100	75	79	80	30	15	8,5	11	25
10 t, 13 t	120	90	121, 2	95	35	20	20	14	40
28 t	160	120	203	120	53	30	25	22	40
60 t	200	140	254	140	69	36	34	26	50
60 ... 280 kg	80	60	52	63	22	8	11	9	12

SIWAREX R load cell, RN series, dimensions in mm

Selection and Ordering data

Order No.

Load cells of the RN series

7MH5101 - D 0

Legal-for-trade acc. to OIML R60 up to 3 000d,

3 m connection cable¹⁾

Rated load	Length	
60 kg	3 m	2 Q
130 kg	3 m	3 D
280 kg	3 m	3 J
500 kg	3 m	3 P
1 t	3 m	4 A
2 t	5 m	4 G
3.5 t	5 m	4 L
5 t	5 m	4 P
10 t	5 m	5 A
13 t	10 m	5 D
28 t	10 m	5 J
60 t	10 m	5 Q

Explosion protection

Without

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

0

1

¹⁾ Length tolerance ± 100 mm

Technical specifications

SIWAREX R load cell, RN series

Possible applications	Container, conveyor, platform and roller table scales		
Model	Bending beam		
Rated load/maximum load E_{max}	60/130/280 kg	0.5/1/2/3.5/5/10 t	13/28/60 t
Accuracy class acc. to OIML R60	C3	C3	C3
Max. load cell verification intervals n_{LC}	3 000	3 000	3 000
Min. load cell verification intervals V_{min}	$E_{max}/17 500$	$E_{max}/10 000$	$E_{max}/17 500$
Minimum application range $R_{min(LC)}$	17 %	30 %	17 %
Combined error F_{comb}	$\leq \pm 0.018 \% C_n$	$\leq \pm 0.023 \% C_n$	$\leq \pm 0.018 \% C_n$
Repeatability F_v	$\leq \pm 0.01 \% C_n$	$\leq \pm 0.01 \% C_n$	$\leq \pm 0.01 \% C_n$
Return of zero signal	$\leq \pm 0.0167 \% C_n^{1)}$	$\leq \pm 0.0167 \% C_n^{1)}$	$\leq \pm 0.0167 \% C_n^{1)}$
Creep error F_{Cr}			
• 30 min	$\leq \pm 0.0120 \% C_n^{1)}$	$\leq \pm 0.0245 \% C_n^{1)}$	$\leq \pm 0.0120 \% C_n^{1)}$
• 20 to 30 min	$\leq \pm 0.0053 \% C_n^{1)}$	$\leq \pm 0.0053 \% C_n^{1)}$	$\leq \pm 0.0053 \% C_n^{1)}$
Temperature effect			
• Zero signal T_{K0}	$\leq \pm 0.004 \% C_n/5K$	$\leq \pm 0.007 \% C_n/5K$	$\leq \pm 0.004 \% C_n/5K$
• Characteristic value T_{KC}	$\leq \pm 0.004 \% C_n/5K$	$\leq \pm 0.005 \% C_n/5K$	$\leq \pm 0.004 \% C_n/5K$
Min. dead load E_{min}	$\geq 0 \% E_{max}$	$\geq 0 \% E_{max}$	$\geq 0 \% E_{max}$
Safe load limit L_u	200 % E_{max}	150 % 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 for 13 t
Supply voltage U_{sr} (reference value)	15 V	10 V	15 V
Supply voltage (range)	5 ... 30 V	5 ... 30 V	5 ... 30 V
Rated characteristic value C_n	1 mV/V	2 mV/V	2 mV/V
Tolerance D_c of characteristic value	± 0.01 mV/V	± 0.1 mV/V	± 0.1 mV/V
Tolerance D_o of zero signal	$\leq \pm 1.0 \% C_n$	$\leq \pm 1.0 \% C_n$	$\leq \pm 1.0 \% C_n$
Input resistance R_e	60 kg: 1260 Ω ± 250 Ω 130 kg: 1260 Ω ± 250 Ω 280 kg: 1260 Ω ± 250 Ω	1110 ± 50 Ω	13 t: 1200 ± 100 Ω 28 t: 1075 ± 100 Ω 60 t: 1350 ± 100 Ω
Output resistance R_a	1020 ± 0.5 Ω	1025 ± 25 Ω	13 t: 1 000 ± 0.5 Ω 28 t: 930 ± 0.5 Ω 60 t: 1175 ± 0.5 Ω
Insulation resistance R_{is}	$\geq 20 M\Omega$	$\geq 5 000 M\Omega$	$\geq 20 M\Omega$
Rated temperature range B_{Tn}	-10 ... +40 °C	-10 ... +40 °C	-10 ... +40 °C
Operating temperature range B_{Tu}	-30 ... +85 °C	-30 ... +70 °C	-30 ... +85 °C
Storage temperature range B_{Ts}	-50 ... +95 °C	-50 ... +80 °C	-50 ... +95 °C
Sensor material (DIN)	Stainless steel, mat. no. 14542	Stainless steel, mat. no. 14542	Stainless steel, mat. no. 14542
Degree of prot. to EN 60529; IEC 60529	IP66/IP68	IP66/IP68	IP66/IP68
Rec. tightening torque of the fixing screws	8 Nm	14 Nm (0.5 ... 5 t)	–
Current calibration ²⁾	Standard	Standard	Standard
Ex protection to ATEX (optional)	II 2 G EEx ib IIC T6/T4 II 3 G EEx nA/nL IIC T6/T4 II 1D/2D/3D T 70 °C	II 2 G EEx ib IIC T6/T4 II 3 G EEx nA/nL IIC T6/T4 II 1D/2D/3D T 70 °C	II 2 G EEx ib IIC T6/T4 II 3 G EEx nA/nL IIC T6/T4 II 1D/2D/3D T 70 °C
Cable connection			
Function	Color		
• EXC +	Pink		
• EXC -	Gray		
• SIG +	Brown		
• SIG -	White		
• Screening	Transparent		

¹⁾ For rated temperature -10 ... +40 °C.

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

SIWAREX R - RN series

Self-aligning bearing

Overview



The self-aligning bearing for load cells of the RN series is especially suitable for installation in container and platform scales and is characterized by its low mounting height.

Design

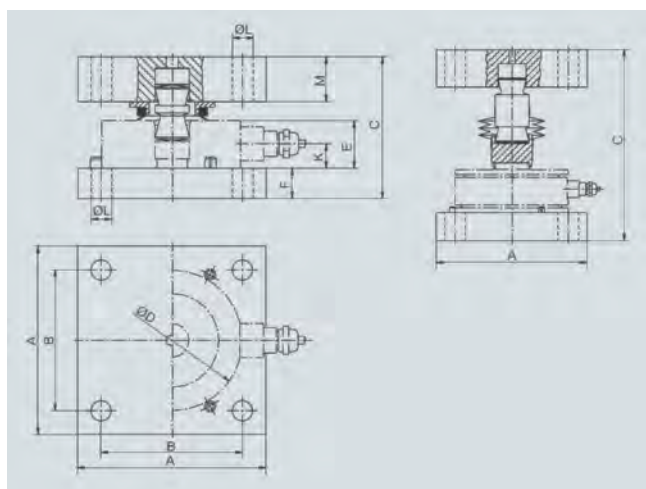
The self-aligning bearing consists of a self-aligning bolt, a top plate (top of the self-aligning bearing) and a base plate (bottom of the self-aligning bearing).

The self-centering, self-aligning bolt allows the top plate and thus the load carrier to follow horizontal displacements (e.g. due to temperature fluctuations). The construction of the self-aligning bolt creates a restoring force which is dependent on the size of the displacement and the applied load. If the load support is displaced by more than 4 mm (up to 5 t rated load), 7 mm (up to 13 t rated load) or 10 mm (up to 60 t rated load) in the horizontal direction, measures for restricting sideways play (e.g. stops) must be implemented in the construction of the load carrier. Suitable measures must be provided on the construction of the load carrier to prevent it from raising up.

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

Dimensional drawings

Self-aligning bearing 0.06 ... 13 t (left) Self-aligning bearing 28/60 t (right)



Rated load	A	B	C	ØD	I	F	K	ØL	M
60 ... 280 kg	80	60	52	63	22	8	11	9	12
0.5 t, 1 t	100	75	79	80	25	15	10	11	25
2 t, 3.5 t, 5 t	100	75	79	80	30	15	8.5	11	25
10 t, 13 t	120	90	121.2	95	35	20	20	14	40
28 t	160	120	203	120	53	30	25	22	40
60 t	200	140	254	140	69	36	34	26	50

Self-aligning bearings for SIWAREX R load cells of the RN series, dimensions in mm

Selection and Ordering data

Order No.

Self-aligning bearings top part¹⁾²⁾

For RN series load cells, consisting of: Top plate with seal holder and seal ring, top plate pressure piece, self-aligning pin, cell pressure piece (not for 28 t and 60 t)

Material: stainless steel

For load cells with a rated load of

60 kg, 130 kg, 280 kg	D)	7MH4115-3DB11
0.5 t, 1 t	D)	7MH4132-4AK11
2 t, 3.5 t, 5 t	D)	7MH4132-4KK11
10 t, 13 t	D)	7MH4115-5BB11
28 t	D)	7MH4115-5DB11
60 t	D)	7MH4115-5GB11

Self-aligning bearings bottom part¹⁾

For RN series load cells, consisting of: Base plate, 3 tension pins

Material: stainless steel

For load cells with a rated load of

60 kg, 130 kg, 280 kg	D)	7MH4115-3DC11
0.5 t, 1 t, 2 t, 3.5 t, 5 t	D)	7MH4132-4AG11
10 t, 13 t	D)	7MH4115-5BC11
28 t	D)	7MH4115-5DC11
60 t	D)	7MH4115-5GC11

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

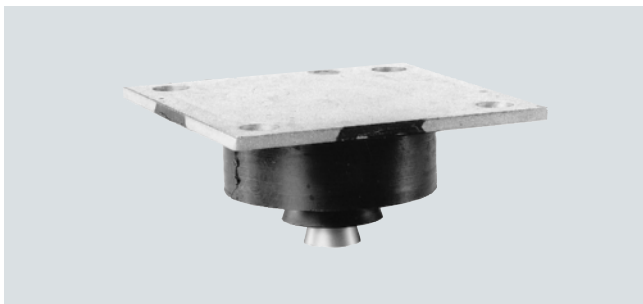
²⁾ The self-aligning bearing bottom part is not included in the scope of delivery.

D) Subject to AL export regulations:N, ECCN: EAR99H.

Overview



Elastomer bearings for SIWAREX R load cells of the RN series, 60 to 280 kg



Elastomer bearings for SIWAREX R load cells of the RN series, 0.5 ... 13 t

Together with the bottom part of the self-aligning bearing, the self-centering elastomer bearing for load cells of the RN series is the ideal load introduction element for scales without guide elements and serves to damp vibrations and shocks in container, platform and roller table scales.

Design

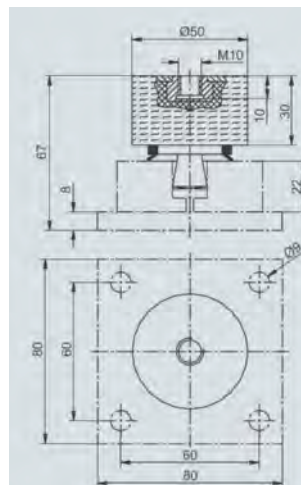
Elastomer bearings are rubber-metal composites made of neoprene and stainless steel. They ensure large spring excursions (i.e. a high degree of damping) despite small dimensions.

If the load support is displaced by more than 4 mm (6 mm for rated loads of between 10 t and 13 t) in the horizontal direction, measures for restricting sideways play (e.g. stops) must be implemented in the construction of the load carrier. Suitable measures must be provided on the construction of the load carrier to prevent it from raising up.

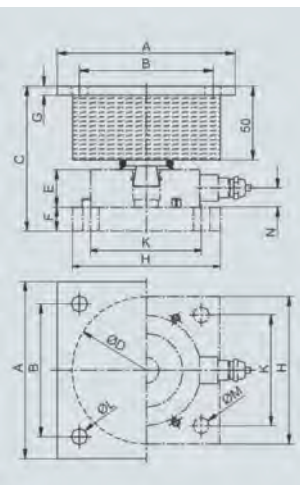
The load cell and the bottom part of the self-aligning bearing are not included in the scope of delivery of the elastomer bearing.

Dimensional drawings

Version 60 to 280 kg (left)



Version 0.5 to 13 t (right)



Rated load	A	B	C	ØD	I	F	G	H	K	ØL	ØM	N
0.5 t, 1 t	100	75	97	85	25	15	6	100	75	11	11	9.5
2 t, 3.5 t, 5 t	120	90	102	100	30	15	6	100	75	11	11	8.5
10 t, 13 t	120	90	120	100	35	20	6	120	90	11	14	20

Elastomer bearings for SIWAREX R load cells of the RN series, dimensions in mm

Selection and Ordering data

Order No.

Elastomer bearings¹⁾

For RN series load cells, consisting of: elastomer package with fixing plate, force transfer, seal

Material: Stainless steel, Neoprene

For load cells with a rated load of 60 kg, 130 kg, 280 kg

0.5 t, 1 t	D) 7MH4130-4AE11
2 t, 3.5 t, 5 t	D) 7MH4130-4KE11
10 t, 13 t	D) 7MH4130-5CE11

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

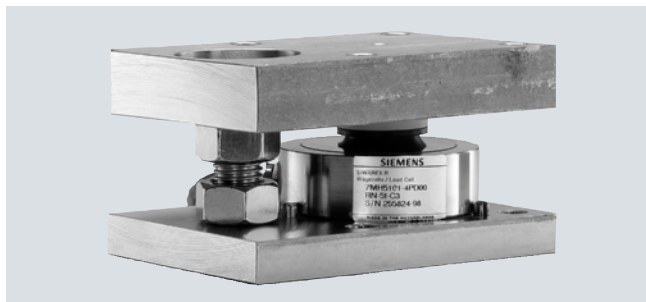
D) Subject to AL export regulations: N, ECCN: EAR99H.

Load Cells

SIWAREX R - RN series

Combination mounting unit

Overview



The self-aligning combination mounting unit for load cells of the RN series is particularly suitable for implementation in container, platform and roller table scales due to its low installation height.

Design

The combination mounting unit consists of a self-aligning bolt, one or two countersunk screws as oscillation limit and protection against raising up, a top plate and a base plate.

The self-centering, self-aligning bolt allows the top plate and thus the load carrier to follow horizontal displacements (e.g. due to temperature fluctuations). The construction of the self-aligning bolt creates a restoring force which is dependent on the size of the displacement and the applied load. Oscillation limitation prevents the occurrence of excessive sideways displacement and reliably protects the load cell from damage. It can absorb a maximum horizontal force of $F_H = 10 \text{ kN}$. The max. sideways displacement is $\pm 3 \text{ mm}$ (60 kg ... 5 t) or $\pm 4.5 \text{ mm}$ (10 t, 13 t).

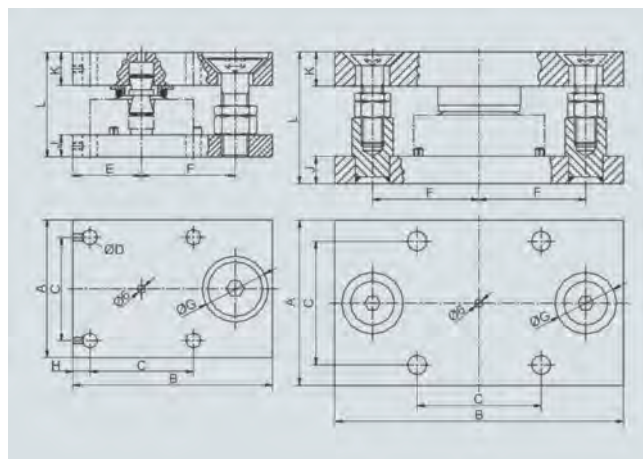
Protection against raising up prevents the load carrier from raising up, up to a maximum vertical force of $F_V = 25 \text{ kN}$.

The load cell is not included in the scope of delivery of the combination mounting unit.

Dimensional drawings

Version 0.06 ... 1 t (left)

Version 2 ... 13 t (right)



Rated load	A	B	C	ØD	I	F	ØG	H	J	K	L
60 kg, 130 kg, 280 kg	80	118	60	9	40	57	39	10	8	12	52
0.5 t, 1 t	100	145	75	11	50	68	48	12.5	15	25	79
2 t, 3.5 t, 5 t	100	190	75	11	-	68	48	-	15	25	79
10 t, 13 t	120	210	90	14	-	77.5	45	-	20	40	121.2

Combination mounting unit for SIWAREX R load cells of the RN series, dimensions in mm

Selection and Ordering data

Order No.

Combination mounting units¹⁾²⁾

For load cells of the RN series

Material: Stainless steel

For load cells with a rated load of

60 kg, 130 kg, 280 kg D) **7MH4125-3DA11**

0.5 t, 1 t D) **7MH4132-4AC11**

2 t, 3.5 t, 5 t **7MH4132-4KC11**

10 t, 13 t **7MH4125-5BA11**

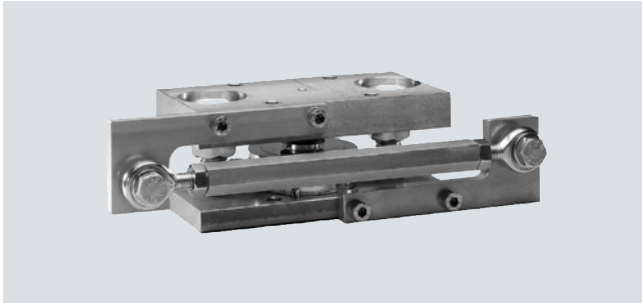
¹⁾ The load cell is not included in the scope of delivery.

²⁾ It is highly recommendable to use a grounding cable (7MH3 701-1AA1) in order to protect the load cell.

D) Subject to AL export regulations:N, ECCN: EAR99H.

Guide element for combination mounting unit

Overview



The guide element can be implemented in addition to the combination mounting unit for load cells of the RN series. It is used when undesirable horizontal forces occur during the weighing process, e.g. due to mixing operations with container scales or acceleration of the material to be weighed with conveyor scales.

Design

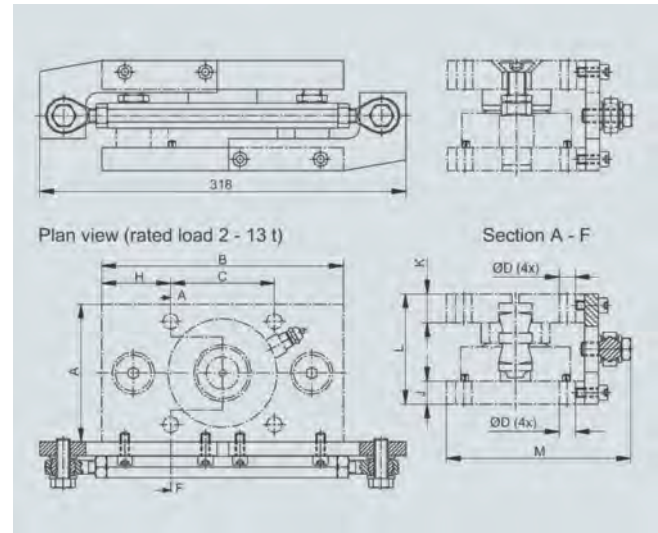
The guide element consists of two ball joint heads, a spacer and two flanges for installation on the combination mounting unit.

The additive guide element can also be retrofitted on combination mounting units if unexpected lateral forces occur during operation of the scales and the combination mounting unit was installed in accordance with the requirements (see "Guide elements").

The guide element diverts horizontal forces up to 1.7 kN to the foundation and therefore minimizes effects on the load cells and the mounting components.

The load cell and combination mounting unit are not included in the scope of delivery of the guide element.

Dimensional drawings



Rated load	A	B	C	ØD	H	J	K	L	M
0.5 t, 1 t	100	145	75	11	12.5	15	25	79	140
2 t, 3.5 t, 5 t	100	190	75	11	57.5	15	25	79	140
10 t, 13 t	120	210	90	14	60	20	40	121.2	160

SIWAREX R guide element for combination mounting unit for load cells of the RN series, dimensions in mm

Selection and Ordering data

Order No.

Guide elements for combination mounting unit¹⁾

For load cells of the RN series
Consisting of: 2 flanges, 2 pivots,
1 adapter, fixing elements
Material: stainless steel

For load cells with a rated load of

0.5 t, 1 t	D)	7MH4132-4AQ12
2 t, 3.5 t, 5 t	D)	7MH4132-4KQ12
10 t, 13 t	D)	7MH4134-5BQ12

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

D) Subject to AL export regulations:N, ECCN: EAR99H.

Load Cells

SIWAREX R - CC series

Load cells

Overview



The compression load cell is particularly suitable for implementation in container, hopper and vehicle scales.

Design

The measuring elements are four square posts made of stainless steel. Four strain gauges are fitted to each post.

The load which acts centrally in the measuring direction causes the spring bodies and therefore the friction-locked strain gauges to be elastically deformed. This generates a measuring signal voltage that is proportional to the load.

Technical specifications

SIWAREX R load cells, CC series

Possible applications:	Container, hopper and vehicle scales	
Rated load/maximum load E_{max}	10/25/40/60 t	100 t
Accuracy class acc. to OIML R60	C3	C1
Max. load cell verification intervals n_{LC}	3 000	1 000
Min. load cell verification intervals V_{min}	$E_{max}/12\,500$	$E_{max}/10\,000$
Minimum application range $R_{min(LC)}$	24 %	10 %
Combined error F_{comb}	$\leq \pm 0.02 \% C_n$	$\leq \pm 0.03 \% C_n$
Repeatability F_v	$\leq \pm 0.01 \% C_n$	$\leq \pm 0.02 \% C_n$
Return of zero signal	$\leq \pm 0.0167 \% C_n^{1)}$	$\leq \pm 0.05 \% C_n^{1)}$
Creep error F_{cr}		
• 30 min	$\leq \pm 0.0245 \% C_n^{1)}$	$\leq \pm 0.049 \% C_n^{1)}$
• 20 ... 30 min	$\leq \pm 0.0053 \% C_n^{1)}$	$\leq \pm 0.0105 \% C_n^{1)}$
Temperature coefficient		
• Zero signal T_{K0}	$\leq \pm 0.0056 \% C_n/5\,K$	$\leq \pm 0.007 \% C_n/5\,K$
• Characteristic value T_{Kc}	$\leq \pm 0.0045 \% C_n/5\,K$	$\leq \pm 0.0085 \% C_n/5\,K$
Min. dead load E_{min}	$\geq 0 \% E_{max}$	$\geq 0 \% E_{max}$
Safe load limit L_u	150 % E_{max}	150 % E_{max}
Ultimate load L_d	400 % E_{max}	400 % E_{max}
Safe side load L_{Iq}	10 % E_{max}	10 % E_{max}
Rated measuring path h_n at E_{max} .	Max. 0.36 mm	Max. 0.36 mm

Supply voltage U_{sr} (reference value)	10 V	10 V
Supply voltage (range)	5 ... 25 V	5 ... 25 V
Rated characteristic value C_n	2 mV/V	2 mV/V
Tolerance D_C of characteristic value	$\pm 1 \%$	$\pm 1 \%$
Tolerance D_o of zero signal	$\leq \pm 1.0 \% C_n$	$\leq \pm 1.0 \% C_n$
Input resistance R_e	$450 \Omega \pm 4.5 \Omega$	$450 \Omega \pm 4.5 \Omega$
Output resistance R_a	$480 \Omega \pm 4.8 \Omega$	$480 \Omega \pm 4.8 \Omega$
Insulation resistance R_{is}	$\geq 5\,000\,M\Omega$	$\geq 5\,000\,M\Omega$
Rated temperature range B_{Tn}	-10 ... +40 °C	-10 ... +40 °C
Operating temperature range B_{Tu}	-40 ... +80 °C	-40 ... +80 °C
Storage temperature range B_{Ts}	-40 ... +90 °C	-40 ... +90 °C
Sensor material (DIN)	Stainless steel, mat. no. 1.4542	Stainless steel, mat. no. 1.4542
Degree of protection to EN 60529; IEC 60529	IP66/IP68	IP66/IP68
Current calibration ²⁾	Standard	Standard
Ex protection to ATEX (optional)	II 2 G EEx ib IIC T6/T4 II 3 G EEx nA/nL IIC T6/T4 II 1D/2D/3D T 70 °C	II 2 G EEx ib IIC T6/T4 II 3 G EEx nA/nL IIC T6/T4 II 1D/2D/3D T 70 °C

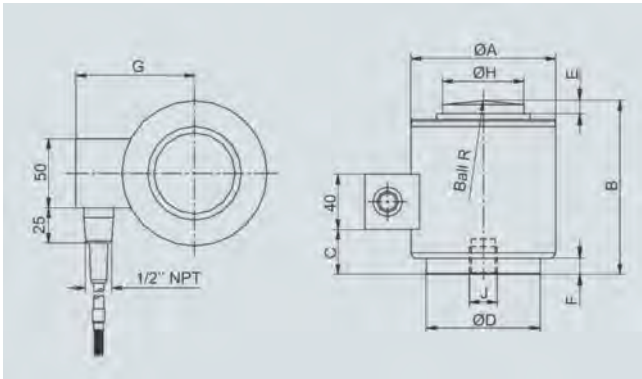
Cable connection

Function	Color
• EXC + (supply +)	• Green
• EXC - (supply -)	• Black
• SIG + (measured signal +)	• White
• SIG - (measured signal -)	• Red
• Screening	• Transparent

¹⁾ For rated temperature -10 ... +40 °C.

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.

Dimensional drawings



Rated load	ØA	B	C	ØD	E
10 t, 25 t	73.0	82.5	12.0	58.0	6.5
40 t, 60 t	105.0	127.0	34.0	82.5	8.0
100 t	152.4	184.2	72.3	123.8	23.6

Rated load	F	G	ØH	J	Ball R
10 t, 25 t	1.8	64.0	31.8	M12x1.75, 11 deep	152
40 t, 60 t	11.0	87.5	58.7	M20x2.5, 20 deep	152
100 t	21.8	108.2	79.2	M20x2.5, 20 deep	432

SIWAREX R load cell, CC series, dimensions in mm

Selection and Ordering data

Order No.

Load cells of the CC series

Legal-for-trade acc. to OIML R60 up to 3 000 d¹⁾, 10 m connection cable²⁾

7MH4106 - ■■■■ 1

Nominal load	Length	
10 t	10 m	5 AC
25 t	20 m	5 EC
40 t	20 m	5 HC
60 t	20 m	5 LC
100 t	20 m	6 AA

Explosion protection

Without	0
Ex protection for the zones 1, 2, 20, 21, 22	1

¹⁾ Nominal load 100 t up to 1 000 d.

²⁾ Length tolerance ± 100 mm, from 20 m cable length ± 300 mm.

Load Cells

SIWAREX R - CC series

Self-aligning bearing

Overview



The self-aligning bearing for the CC series load cells is particularly suitable for installation in container, hopper and vehicle scales.

Design

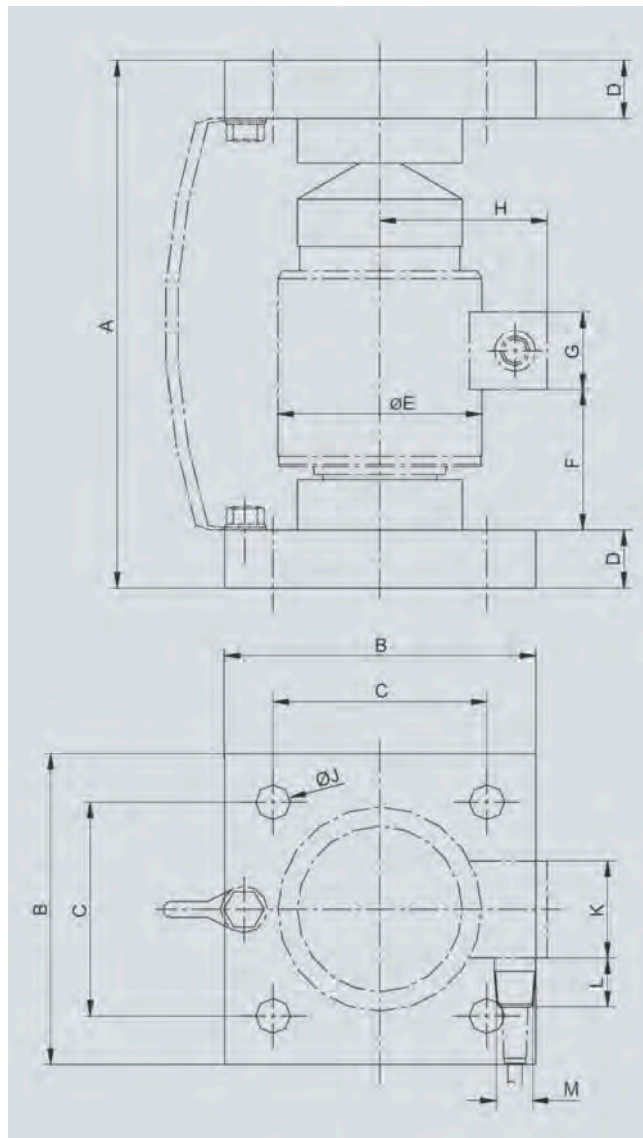
The self-aligning bearing consists of three force guiding pieces, a base plate and a top plate.

These components, in combination with the load cell, form a complete self-centering unit. This allows the top plate and thus the load carrier to follow horizontal displacements (e.g. due to temperature fluctuations). The construction 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 support is displaced by more than 8 mm in the horizontal direction, measures for restricting sideways play (e.g. stops) must be implemented in the construction of the load carrier. Suitable measures must be provided on the construction of the load carrier to prevent it from raising up.

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

Dimensional drawings



Rated load	A	B	C	D	ØE	F	G	H	ØJ	K	L	M
10 t, 25 t	190	120	90	20	73	32	40	64	14	50	25	1/2" NPT
40 t, 60 t	274	160	110	30	105	72	40	87	18	50	25	1/2" NPT
100 t	385	200	150	40	152	133	40	108	18	50	25	1/2" NPT

Self-aligning bearings for SIWAREX R load cells of the CC series, dimensions in mm

Selection and Ordering data	Order No.
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Self-aligning bearings¹⁾²⁾	
--	--

For CC series load cells, consisting of top plate, base plate and 3 pressure pieces	
---	--

Material: stainless steel ³⁾	
---	--

For load cells with a rated load of	
-------------------------------------	--

10 t, 25 t	7MH4136-5EA11
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40 t, 60 t	7MH4136-5LA11
------------	----------------------

100 t	7MH4136-6AA11
-------	----------------------

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

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

3) Pressure pieces made of tool steel

Load Cells

SIWAREX R - CC series

Combination mounting unit

Overview



The self-aligning combination mounting unit for load cells of the CC series is particularly suitable for implementation in container, platform and roller table scales.

Design

The combination mounting unit consists of three force-guiding pieces, two countersunk screws as oscillation limit and protection against raising up, a top plate and a base plate

These components, in combination with the load cell, form a complete self-centering unit. This allows the top plate and thus the load carrier to follow horizontal displacements (e.g. due to temperature fluctuations). The construction of the self-aligning bearing creates a restoring force which is dependent on the size of the displacement and the applied load.

Oscillation limitation prevents the occurrence of excessive sideways displacement and reliably protects the load cell from damage.

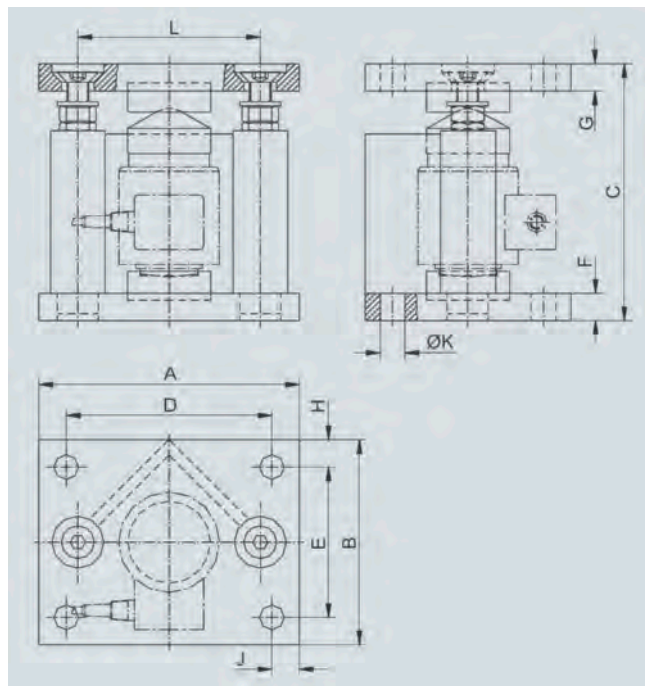
The max. sideways displacement is ± 4 mm.

The protection against raising up prevents lifting up of the load carrier.

Rated load	Max. horizontal force	Max. vertical force
10 t, 25 t	10 kN	20 kN
40 t, 60 t	15 kN	35 kN

The load cell is not included in the scope of delivery of the combination mounting unit.

Dimensional drawings



Rated load	A	B	C	D	I	F	G	H	J	ØK	L
10 t, 25 t	190	150	188	150	110	20	20	20	20	18	133
40 t, 60 t	250	200	273	190	150	30	30	25	30	22	182

Combination mounting unit for SIWAREX R load cells of the CC series, dimensions in mm

Selection and Ordering data

Order No.

Combination mounting units¹⁾

For CC series load cells, consisting of: top plate, base plate, 3 pressure pieces, lift-off protection and oscillation limitation
Material: stainless steel²⁾

For load cells with a rated load of

10 t, 25 t

7MH4136-5EC11

40 t, 60 t³⁾

7MH4136-5LC11

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

²⁾ Pressure pieces made of tool steel

³⁾ It is highly recommendable to use a grounding cable (7MH3 701-1AA1) in order to protect the load cell.

Overview



The compression load cell is particularly suitable for implementation in container and hopper scales.

Design

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

The load which acts centrally in the measuring direction causes the spring bodies and therefore the friction-locked strain gauges to be elastically deformed. This generates a measuring signal voltage that is proportional to the load.

The rated measuring path of the load cell is dependent on the rated load and lies between 0.23 and 2.67 mm.

Technical specifications

SIWAREX R load cell, K series

Possible applications	Container and hopper scales
Form	Pressure force
Rated load/maximum load E_{max}	2.8/6/13/28/60/130/280 t
Accuracy class	0.2 %
Combined error F_{comb}	< 0.2 % C_n
Temperature effect	
• Zero signal T_{K0}	$\leq \pm 0.025 \% C_n/5K$
• Characteristic value T_{Kc}	$\leq \pm 0.025 \% C_n/5K$
Min. dead load E_{min}	$\leq 0 \% E_{max}$
Safe load limit L_u	120 % E_{max}
Ultimate load L_d	300 % E_{max}
Safe side load L_{lq}	10 % E_{max}
Rated measuring path h_n at E_{max}	0.23 ... 2.67 mm
Overload protection	-
Supply voltage U_{sr} (reference value)	6 V
Supply voltage (range)	6 ... 12 V
Rated characteristic value C_n	1.5 mV/V
Tolerance D_c of characteristic value	$\pm 0.5 \%$
Tolerance D_o of zero signal	$\leq \pm 1.5 \% C_n$
Input resistance R_e	Approx. 275 Ω
Output resistance R_a	245 $\Omega \pm 0.2 \Omega$
Insulation resistance R_{is}	$\geq 20 M\Omega$
Rated temperature range B_{in}	-10 ... +60 °C
Operating temperature range B_{tu}	-20 ... +70 °C
Storage temperature range B_{ts}	-30 ... +80 °C
Sensor material (DIN)	Steel, painted
Degree of protection to EN 60529; IEC 60529	IP65

Cable connection

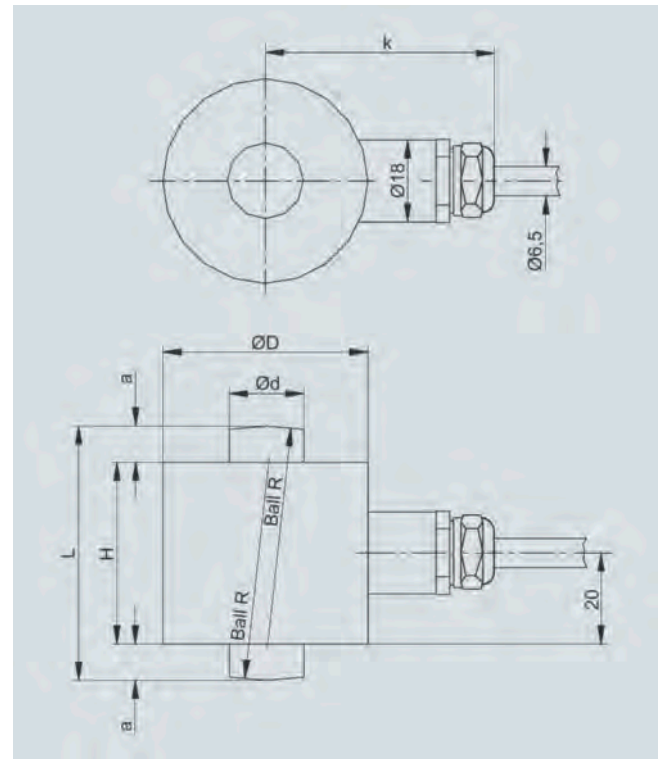
Function

- EXC +
- EXC -
- SIG +
- SIG -
- Screening

Color

- Red
- White
- Black
- Blue
- Transparent

Dimensional drawings



Rated load	a	Ød	ØD	H	k	L	R
2.8 t, 6 t	8	16.7	45	40	54	56	50
13 t	12	24.5	55	44	59	68	66
28 t	14	36	64	46	63.5	74	72
60 t	20	52.7	90	50	76.5	90	100
130 t	26	77.5	121	64	92	116	125
280 t	45	114	165	80	114	170	183

SIWAREX R load cell, K series, dimensions in mm

Load Cells

SIWAREX R - K series

Load cell

Selection and Ordering data

Order No.

Load cells of the K series

Accuracy class 0.2, without explosion protection, 5 m connection cable¹⁾²⁾

7MH3105- C0

Nominal load	Length	
2.8 t	5 m	2 A
6 t	5 m	3 A
13 t	10 m	1 B
28 t	10 m	2 B
60 t	10 m	3 B
130 t	10 m	1 C
280 t	10 m	2 C

1) Length tolerance ± 100 mm

2) Cable heat-resistant: -60 °C ... $+180$ °C

Overview



The self-aligning bearing for the K series load cells is particularly suitable for installation in container and hopper scales.

Design

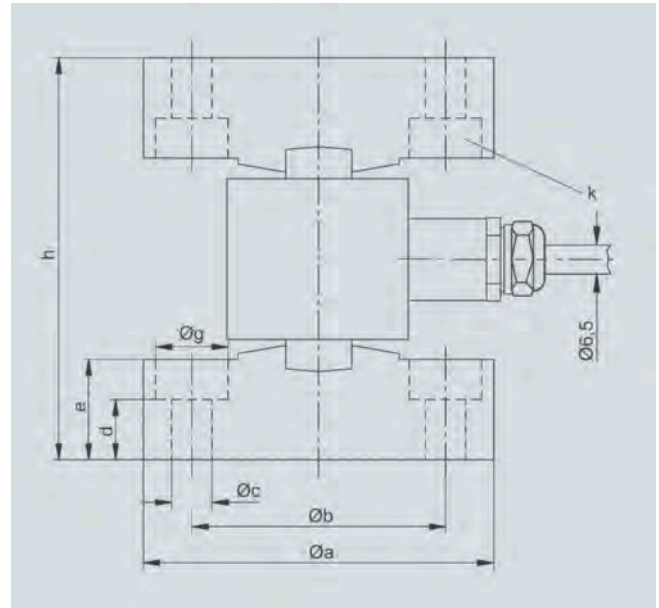
The self-aligning bearing consists of two pressure plates.

In combination with the load cell, the pressure plates form a self-centering unit. This allows the top plate and thus the load carrier to follow horizontal displacements (e.g. due to temperature fluctuations). The construction 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 carrier is displaced by more than the value s (see table in dimensional drawing) in the horizontal direction, measures for restricting sideways play (e.g. stops) must be implemented in the construction of the load carrier. Suitable measures must be provided on the construction of the load carrier to prevent it from raising up.

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

Dimensional drawings



Rated load	Øa	Øb ± 0.1	Øc	d	e
2.8 t, 6 t	87	63	11	14	25
13 t	97	73	11	21	32
28 t	108	84	11	-	28
60 t	137	112	11	-	42
130 t	176	148	11	-	52
280 t	226	190	14	-	65

Rated load	Øg	h1	k	s
2.8 t, 6 t	18	100 +0.5/-1	Two drilled holes 180°	2
13 t	18	120 +0.5/-1		2.5
28 t	-	136 +0.5/-1		2.5
60 t	-	174 +0.5/-1	Four drilled holes 90°	3
130 t	-	220 +0.5/-1		4
280 t	-	300 +0.6/-1.2		6

Self-aligning bearings for SIWAREX R load cells of the K series, dimensions in mm

Load Cells

SIWAREX R - K series

Self-aligning bearing

Selection and Ordering data Order No.

Pressure plates¹⁾²⁾

For K series load cells
2 pressure plates are required for
a self-aligning bearing, one
above and one below the load
cell.

Scope of delivery:

1 piece pressure plate

Material: steel, painted

For load cells with a rated load of

2.8 t, 6 t		7MH3115-3AA1
13 t	D)	7MH3115-1BA1
28 t	D)	7MH3115-2BA1
60 t	D)	7MH3115-3BA1
130 t	D)	7MH3115-1CA1
280 t	D)	7MH3115-2CA1

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

²⁾ It is highly recommendable to use a grounding cable (7MH3 701-1AA1) in order to protect the load cell.

D) Subject to AL export regulations:N, ECCN: EAR99H.

SIWAREX JB junction box, aluminum housing

Overview



The aluminium JB junction box is required for parallel connection of load cells. A maximum of 4 load cells can be connected in parallel in one junction box.

If more than 4 load cells are to be connected, a second junction box must be connected in parallel via a cross connection. The junction box can be used in potentially explosive areas (grounded, intrinsically-safe circuits).

Design

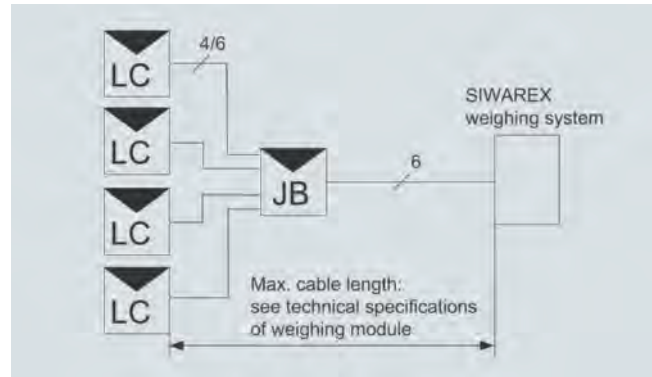
The junction box made of die-cast aluminum consists of a base section and a cover. The housing is sealed against penetration of dust and splashed water in accordance with IP66 degree of protection. The cables enter the casing via metric cable glands. In the housing, there are 28 terminals with spring-mounted contacts. The spring-mounted system results in vibration-resistant, maintenance-free connections.

The internal resistance, characteristic value and nominal load of all load cells connected in parallel must be identical. The values of these variables are not limited by the junction box. Load cells can be connected using a four-wire or six-wire system.

With the four-wire system, two jumpers must be set in addition.

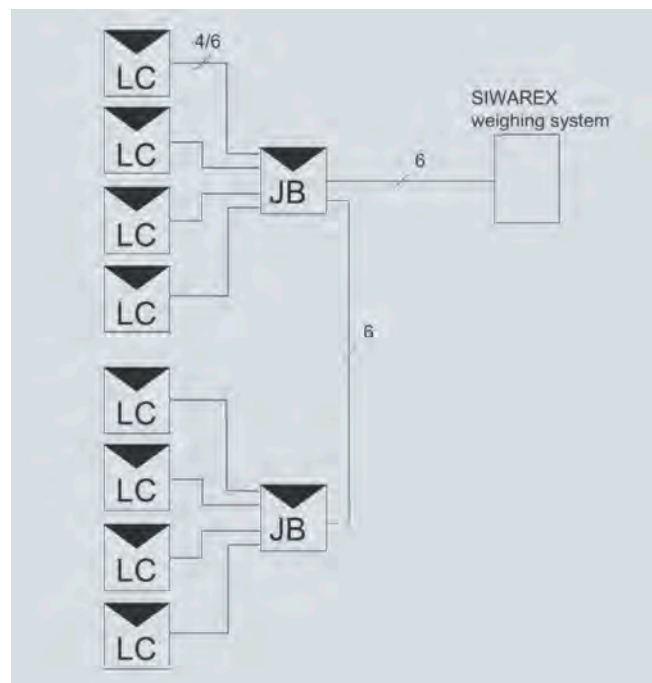
Connection examples

4 load cells



LC: load cell JB: aluminium junction box

8 load cells



LC: load cell JB: aluminium junction box

Technical specifications

SIWAREX JB junction box, aluminum housing

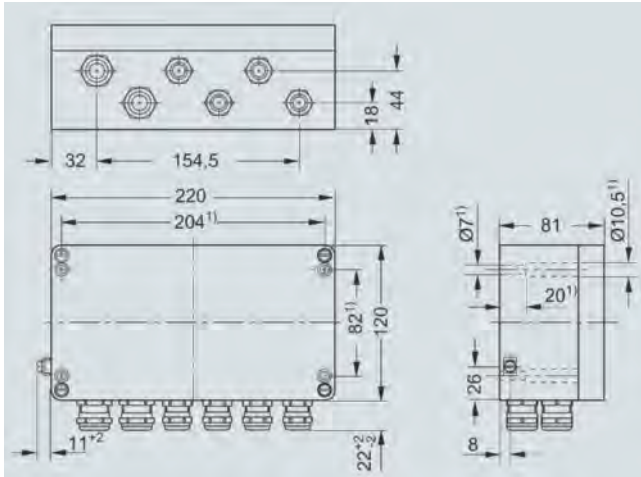
Cable glands	
• Load cells	4 x M16
• Electronics	2 x M20
Permissible ambient temperature	
• During operation	-30 ... +85 °C
• During operation for legal-for-trade medium accuracy weighing machine	-10 ... +40 °C
• During transportation and storage	-40 ... +90 °C
Degree of protection	IP66 to EN 60529
Vibration resistance of terminals to DIN VDE 0611 11/77	12 Hz and 50 Hz, amplitude 1 mm
Insulation resistance of terminals	≥ 10 ¹² Ω cm

Load Cells

Accessories

SIWAREX JB junction box, aluminum housing

Dimensional drawings



¹⁾ Drilled holes for mounting of housing

SIWAREX JB aluminium junction box (7MH4 710-1BA), dimensions in mm

Selection and Ordering data

Order No.

SIWAREX JB junction boxes, aluminium housing

7MH4710-1BA

For connecting up to 4 load cells in parallel, and for connecting several junction boxes

Cables (optional)

Cables Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath

7MH4702-8AG

To connect SIWAREX U, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JBs, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C

Cables Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath

7MH4702-8AF

To connect the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex-I), for fixed laying, occasional bending permitted, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C

SIWAREX JB junction box, stainless steel housing

Overview



The stainless steel JB junction box is required for parallel connection of load cells. A maximum of 4 load cells can be connected in parallel in one junction box.

The junction box can be used in potentially explosive areas (grounded, intrinsically-safe circuits).

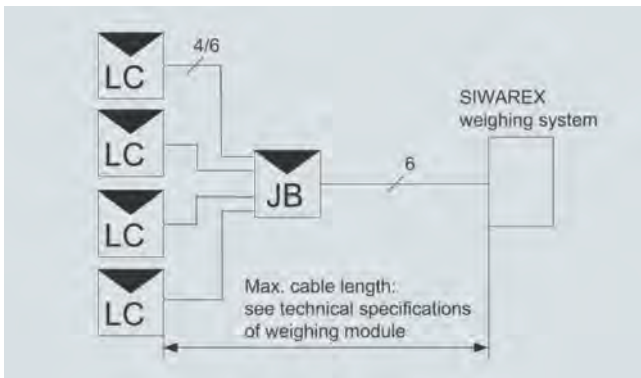
Design

The stainless steel junction box consists of a base section and a cover. The housing is sealed against penetration of dust and splashed water in accordance with IP66 degree of protection. The cables enter the casing via metric EMC cable glands (brass, nickel-plated). In the housing, there are 18 terminals with spring-mounted contacts. The spring-mounted system results in vibration-resistant, maintenance-free connections.

The internal resistance, characteristic value and nominal load of all load cells connected in parallel must be identical. The values of these variables are not limited by the junction box. Load cells can be connected using a four-wire or six-wire system.

With the four-wire system, two jumpers must be set in addition.

Connection example



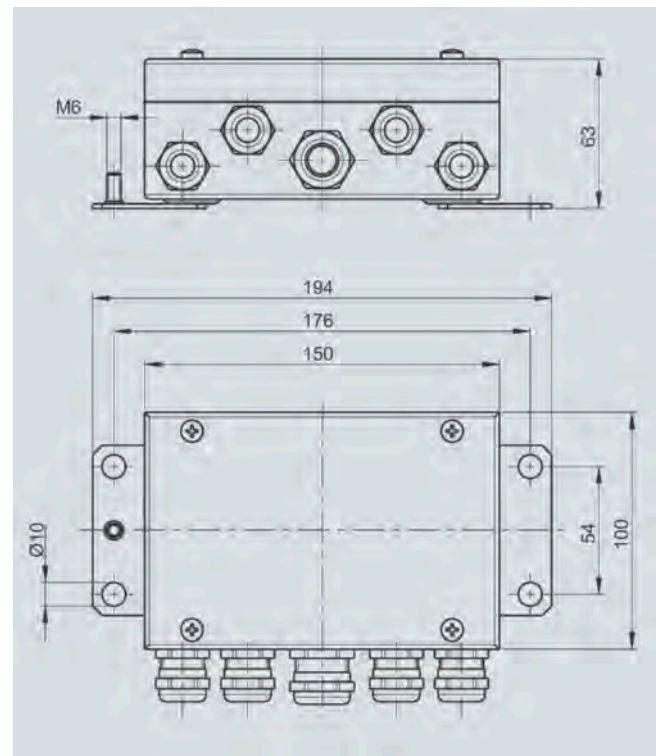
LC: load cell JB: stainless steel junction box

Technical specifications

SIWAREX JB junction box, stainless steel housing

Cable glands	
• Load cells	4 x M16
• Electronics	1 x M20
Permissible ambient temperature	
• During operation	-30 ... +85 °C
• During operation for legal-for-trade medium accuracy weighing machine	-10 ... +40 °C
• During transportation and storage	-40 ... +90 °C
Degree of protection	IP66 to EN 60529
Vibration resistance of terminals to DIN VDE 0611 11/77	12 Hz and 50 Hz, amplitude 1 mm
Insulation resistance of terminals	$\geq 10^{12} \Omega$

Dimensional drawings



SIWAREX JB stainless steel junction box (7MH4710-1EA), dimensions in mm

Load Cells

Accessories

SIWAREX JB junction box, stainless steel housing

Selection and Ordering data

Order No.

SIWAREX JB junction boxes, stainless steel housing

For connecting up to 4 load cells
in parallel

7MH4710-1EA

Cables (optional)

Cables Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath

To connect SIWAREX U, CS, MS,
FTA, FTC, M and CF to the junc-
tion box (JB), extension box (EB)
or Ex interface (Ex-I) or between
two JBs, for fixed laying, occa-
sional bending permitted, 10.8
mm outer diameter, for ambient
temperature -40 ...+80 °C

7MH4702-8AG

Cables Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath

To connect the junction box (JB)
or extension box (EB) in a poten-
tially explosive atmosphere to the
Ex interface (Ex-I), for fixed lay-
ing, occasional bending permit-
ted, blue PVC insulating sheath,
approx. 10.8 mm outer diameter,
for ambient temperature
-40 ... +80 °C

7MH4702-8AF

3

Overview



The extension box EB is used to lengthen the connection cable of load cells.

Load cells can be connected using 4-wire and 6-wire systems. The cable connection to the weighing module or to the junction box JB must always be made using a 6-wire system. The SIWAREX cable 7MH4 702-8AG or-8AF is recommended.

If load cell cables are extended to a junction box JB, the cable glands M16 x 1.5 must be replaced. The following are required per load cell:

- 1 EMC cable gland M20 x 1.5
- 1 extension M16 x 1.5 male thread to M20 x 1.5 female thread.

The extension box can be used in potentially explosive areas (grounded, intrinsically-safe circuits).

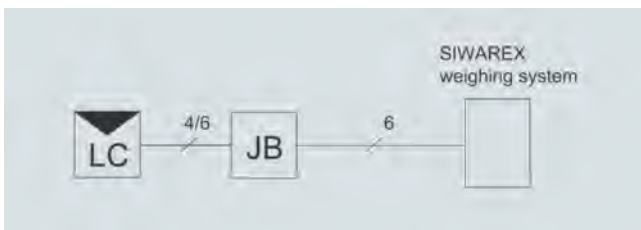
Design

The extension box EB has a housing made of die-cast aluminium. The housing is sealed against penetration of dust and splashed water in accordance with IP66. The cables enter the casing via metric EMC cable glands and are connected to spring-mounted terminals. The spring-mounted system results in vibration-resistant, maintenance-free connections.

When connecting load cells with a 4-wire system, two jumper elements are inserted for feedback of the sense signal.

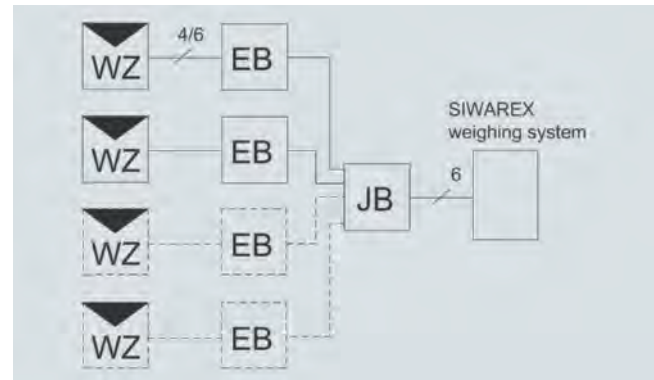
Connection examples

Connection of one load cell



LC: Load cell EB: Extension box

Connection of several load cells



LC: Load cell EB: Extension box JB: Junction box

Technical specifications

SIWAREX EB extension box

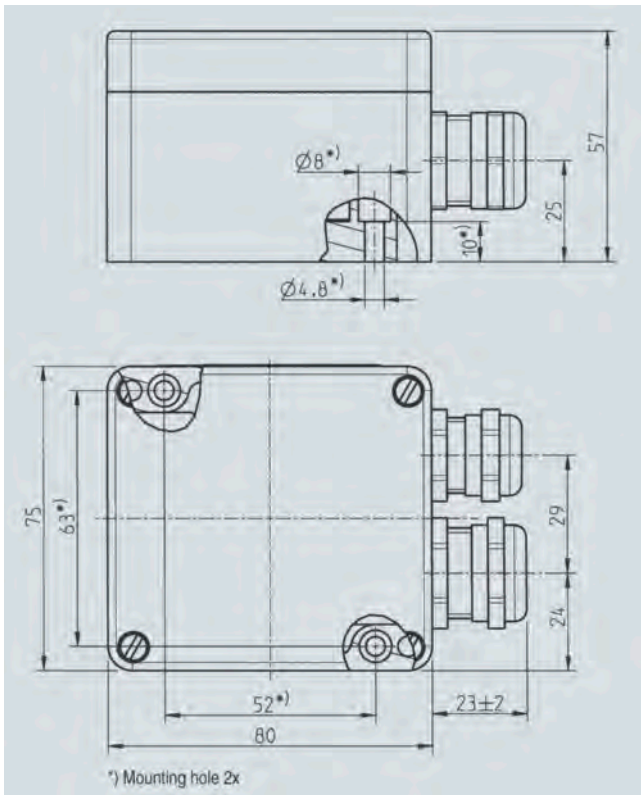
Cable glands	
• Of the load cell cable	M16 x 1.5
• Electronics	M20 x 1.5
Permissible ambient temperature	
• During operation	-30 ... +85 °C
• During operation for commercial scales with verification capability	-10 ... +40 °C
• During transportation and storage	-40 ... +90 °C
Degree of protection to EN 529	IP66
Vibration resistance of terminals to DIN VDE 0611 11/77	12 Hz and 50 Hz, amplitude 1 mm
Insulation resistance of terminals	$\geq 10^{12} \Omega$
Dimensions (H x W x D) in mm	80 x 75 x 57

Load Cells

Accessories

SIWAREX EB extension box

Dimensional drawings



SIWAREX EB extension box (7MH4 710-2AA), dimensions in mm

Selection and Ordering data

Order No.

SIWAREX EB extension boxes, aluminium housing

7MH4710-2AA

To extend the connection cables
of load cells

Cables (optional)

Cables Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath

7MH4702-8AG

To connect SIWAREX U, M, P,
FTA, FTC and CS to the junction
box (JB), extension box (EB) or
Ex interface (Ex-I) or between two
JBs, for fixed laying, occasional
bending is possible, 10.8 mm
outer diameter, for ambient tem-
perature -40 ... +80 °C

Cables Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath

7MH4702-8AF

To connect the junction box (JB)
or extension box (EB) in a poten-
tially explosive atmosphere to the
Ex interface (Ex-I), for fixed lay-
ing, occasional bending is possi-
ble, blue PVC insulating sheath,
approx. 10.8 mm outer diameter,
for ambient temperature
-40 ... +80 °C

Overview



The highly flexible grounding cable is used to discharge parasitic currents.

Design

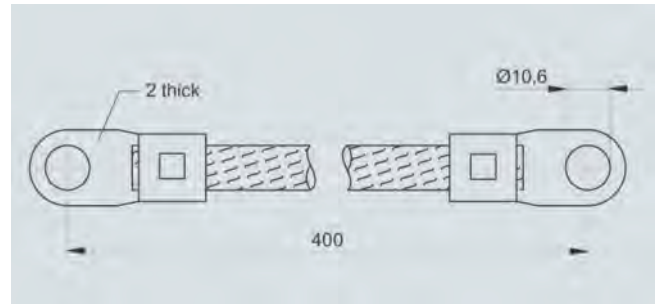
The grounding cable is 400 mm long and corresponds to an electrical bypass.

It protects the load cell from undesirable voltages which can occur e.g. when welding or as a result of lightning.

We recommend using one grounding cable for each load cell.

The load cell and/or other mounting elements are not included in the scope of delivery of the grounding cable.

Dimensional drawings



Grounding cable, dimensions in mm

Selection and Ordering data

Order No.

Grounding cables, copper

For discharging parasitic currents

400 mm long

7MH3701-1AA1

Load Cells

Configuration examples

Overview

Overview

Number of load cells

The three-point bearing is static and provides a stable setup for every application.

The three-point bearing should therefore be preferred to the four-point or multi-point bearing wherever possible.

If a four-point or multi-point bearing is used and settling of the foundation expected, and if the supported system (also under load) is resistant to bending and warping, it must be expected in extreme cases that only two load cells lying on the diagonal will support the entire load.

If settling of the foundation can be ruled out, weight distribution on the load cells must be examined when the four-point or multi-point bearing is used. If the load distribution is unequal, compensation can be achieved by under-loading the load cells that carry a less than equal share of the total load.

Force bypass

Force bypasses occur when part of the load is deflected away from the load cells into the foundation.

The reason for force bypasses can vary (e.g. support by foreign bodies, friction, strain, etc.).

Prevention of force bypasses is essential because they cause measurement errors.

Rated load of load cells

The rated load is selected at maximum loading taking into account the center of gravity and load distribution over the individual load cells. The rated load is selected based on the load cell with the maximum load. It must be investigated whether the static load of the load cells is superimposed by a dynamic force. In this case, the rated load for the load cell must be calculated as the sum of the static load and the maximum dynamic peak force.

Example (see also Configuration example 1 page 3/71)

Number of load cells:	4
Empty weight of container:	1.2 t
Maximum capacity:	1.8 t
Total load:	3 t

- For even load distribution, without dynamic interferences

Each of the 4 load cells is loaded with $3/4 t = 750 \text{ kg}$ since the load is distributed evenly.

When the load cells are rated and selected, the calculated rated load is increased by approximately 20 % for safety reasons. The required rated load for the load cells is therefore $750 \text{ kg} \times 1.2 = 900 \text{ kg}$.

The next higher rated load step of 1 t must therefore be selected.

Configuration example 1

Overview

Example 1: container weighing

The upright container has a total center of gravity S which lies above the level of the load cells.

It is supported on 4 brackets (specified by the container manufacturer), has an empty weight (i.e. dead load) of 1.2 t and a maximum capacity of 1.8 t. The load is evenly distributed over all 4 load cells.

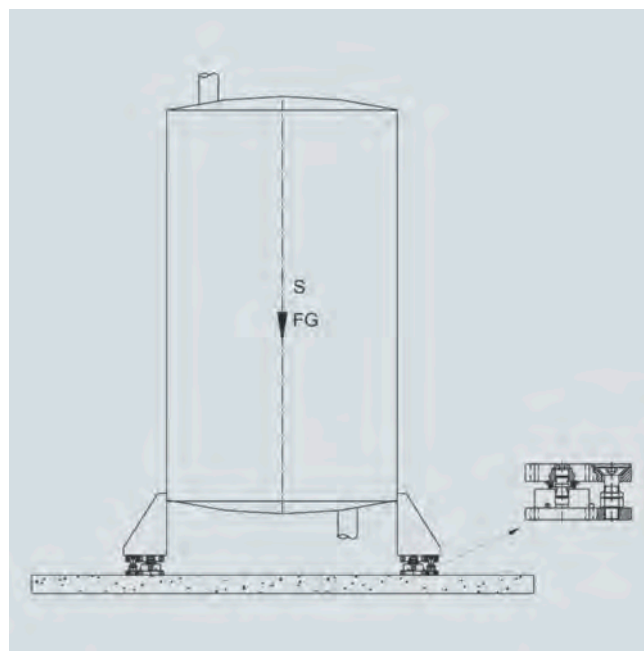
The scales are used in intrinsically-safe areas.

Note

A three-point bearing of the container is static and represents a stable state (see note in introduction page 3/70).

Selection of load cells and mounting components

The rated load is determined (as described in the introduction) as 1 t.



Container on RN series load cells and combination mounting unit

For the above example, four SIWAREX R load cells of the RN series with a rated load of 1 t were used because the high-quality precision RN load cell features an extremely low constructional height.

Self-aligning combination mounting units were used as the mounting components because, apart from the self-alignment function and oscillation limitation, they also provide protection against raising up. Protection against raising up can absorb a vertical force of up to 10 kN. If larger "raising up" forces occur (e.g. due to high winds), the container must also be equipped with an additional natural disaster protection system.

Configurator for container weighing (basic configuration)

Item	Description	Order No.	Selection criterion	Number in example
1	SIWAREX R RN series, rated load 1 t, C3, with EEx ib II C T6 protection rating	7MH5101-4AD01	High-quality ring-torsion load cell with low constructional height, ideal for container weighing	4
2	Combination mounting unit for load cells of the RN series, 1 t, made of stainless steel	7MH4132-4AC11	Provides the self-aligning function with oscillation limitation as well as protection against raising up	4
3	Grounding cable	7MH3701-1AA1	For discharging undesirable currents	4

Load Cells

Configuration examples

Configuration example 2

Overview

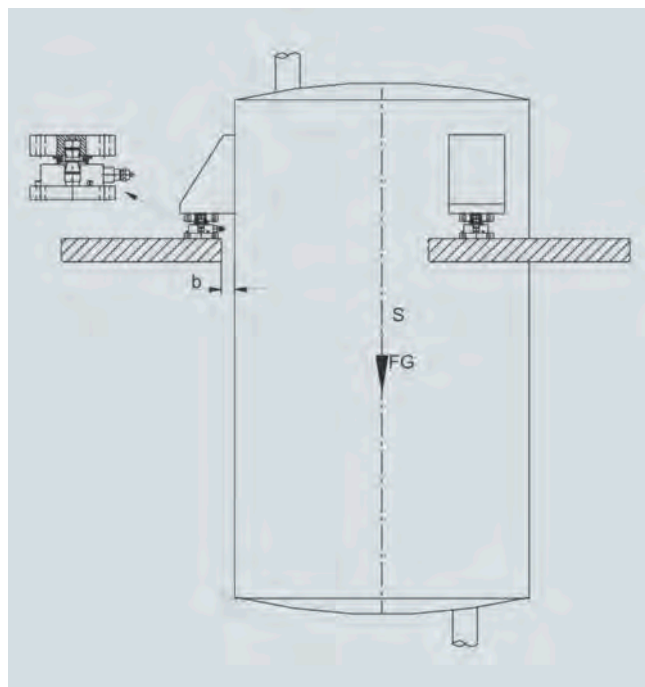
Example 2: container weighing

The suspended container has a total center of gravity S which lies below the level of the load cells.

It is supported on 3 brackets, has an empty weight (i.e. dead load) of 1.2 t and a maximum capacity of 1.8 t. The container has a diameter of 1 m. While the individual components are being weighed, a chemical reaction occurs which raises the temperature of the container and its contents from 18 °C to 55 °C.

Selection of load cells and mounting components

It is recommended that three SIWAREX R load cells of the RN series with a rated load of 2 t be used (rated load is determined as described in the introduction). The load cells of the RN series were selected due to their low constructional height.



Container weighing with RN series load cells and self-aligning bearing

Self-aligning bearings are used as the mounting components because the container is suspended and cannot raise up off the self-aligning bearing.

The container diameter will increase by 0.4 mm due to the temperature increase of 37 K.

Since the self-aligning bearing permits a maximum oscillating movement of ± 4 mm, it is able to absorb the temperature increase of the container.

Oscillation limitation is not necessary because there is a small gap of $b = 3$ mm in width between the container and the platform. In this case, the platform acts as the oscillation limitation.

If the width of the gap is larger in other applications, you must decide whether to use combination mounting units instead of the self-aligning bearing or whether an external means of oscillation limitation should be implemented (see configuration example 4 page 3/74).

Configurator for container weighing (basic configuration)

Item	Description	Order No.	Selection criterion	Number in example
1	SIWAREX R RN series, rated load 2 t, C3, without EEx	7MH5101-4GD00	High-quality ring-torsion load cell with low constructional height, ideal for container weighing	3
2	Self-aligning bearing bottom unit for load cells of the RN series, 2 t, made of stainless steel	7MH4132-4AG11 D)		3
3	Self-aligning bearing top unit for load cells of the RN series, 2 t, made of stainless steel	7MH4132-4KK11 D)	Allows temperature expansions to be followed without interfering reactional forces being directed into the load cell	3
4	Grounding cable	7MH3701-1AA1	For discharging undesirable currents	3

D) Subject to AL export regulations:N, ECCN: EAR99H.

Load Cells

Configuration examples

Configuration example 3

Overview

Example 3: mixer weighing

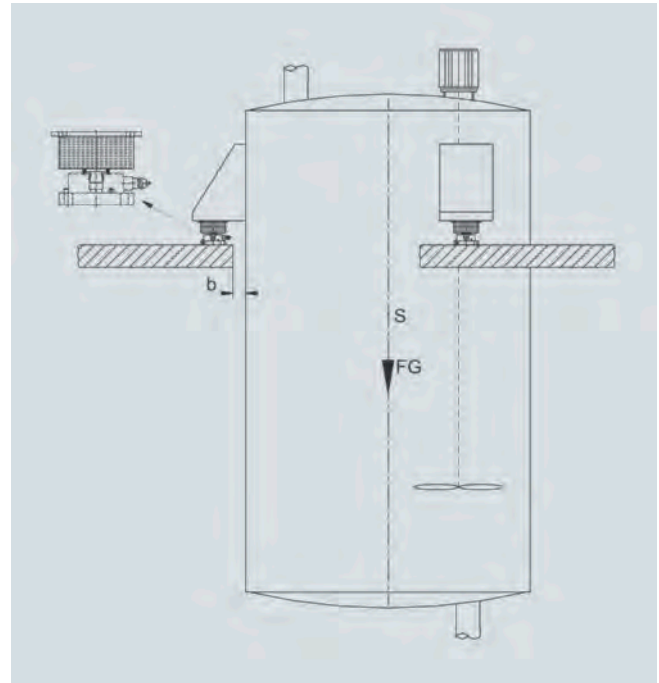
The suspended container has a total center of gravity S which lies below the level of the load cells.

It is supported on three brackets, has an empty weight (i.e. dead load) of 2.8 t and a maximum capacity of 4.5 t.

To improve mixing of the individual components, an agitator is mounted on the container which also operates during the weighing process.

Selection of load cells and mounting components

It is recommended that three SIWAREX R load cells of the RN series with a rated load of 3.5 t be used because the high-quality precision RN load cell has an extremely low constructional height (the rated load is determined as described in the introduction page 3/70).



Container with agitator on RN series load cell and elastomer bearing

Self-centering elastomer bearings are used as the mounting components to minimize vibrations caused by the mixer.

The elastomer bearing permits a maximum oscillation path of ± 4 mm.

Oscillation limitation is not necessary because there is a small gap of $b = 3$ mm in width between the container and the platform.

If the width of the gap is larger in other applications, stops or external oscillation limiters (see configuration example 4 page 3/74) must be provided.

Configurator for container weighing (basic configuration)

Item	Description	Order No.	Selection criterion	Number in example
1	SIWAREX R RN series, rated load 3.5 t, C3, without EEx	7MH5101-4LD00	High-quality ring-torsion load cell with low constructional height, ideal for container weighing	3
2	Self-aligning bearing bottom unit for load cells of the RN series, 2 t, made of stainless steel	7MH4132-4AG11 D)		3
3	Elastomer bearing for load cells of the RN series, 2 t, made of neoprene and stainless steel	7MH4130-4KE11 D)	For vibration damping to minimize the effects on the load cell	3
4	Grounding cable	7MH3701-1AA1	For discharging undesirable currents	3

D) Subject to AL export regulations:N, ECCN: EAR99H.

Load Cells

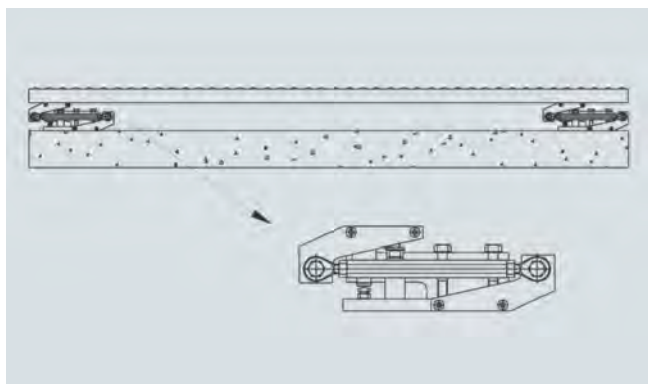
Configuration examples

Configuration example 4

Overview

Example 4: roller table weighing

The roller table is supported on 4 load cells (as specified by the equipment manufacturer), has a weight of 500 kg (i.e. dead load) and weighs containers of up to 1 000 kg.



Roller table weighing on SB series load cell and combination mounting unit with guide

The dead load is equally distributed over the 4 load cells. In a worst case scenario, the weight of the container is distributed over only 2 load cells.

For production reasons, the container cannot be halted on the conveyor for the weighing process.

Note

A three-point bearing of the roller table is static and represents a stable state (see note in introduction page 3/70).

Selection of load cells and mounting components

It is recommended that four SIWAREX R load cells of the SB series with a rated load of 1 t be used because the load cells of the SB series are capable of absorbing high lateral forces in the preferred direction (rated load is determined as described in the introduction page 3/70).

Self-aligning combination mounting units (only of stainless steel) with additive guide elements which transfer lateral forces of up to 1.7 kN are used as the mounting components.

The guide elements can deflect the lateral forces, caused when the container hits each roller, directly to the foundation. This protects the load cells from interference and the accuracy and reliability of the components are maintained.

The combination mounting unit also offers protection against raising up for vertical forces of up to 10 kN.

Configurator for container weighing (basic configuration)

Item	Description	Order No.	Selection criterion	Number in example
1	SIWAREX R SB series, rated load 1 t, C3, without EEx	7MH4105-4AC01	Rugged shear beam load cell, ideal for platform and conveyor scales	4
2	Combination mounting unit for load cells of the SB series, 1 t, made of stainless steel	7MH4135-4DC11 D)	Provides the self-aligning function with oscillation limitation as well as protection against raising up	4
3	Guide element for combination mounting unit for load cells of the SB series, 1 t, made of stainless steel	7MH4135-4DQ12 D)	Centers the scale in relation to the foundation when lateral forces occur continuously	4
4	Grounding cable	7MH3701-1AA1	For discharging undesirable currents	4

D) Subject to AL export regulations:N, ECCN: EAR99H.