

# INSTALLATION GUIDELINES

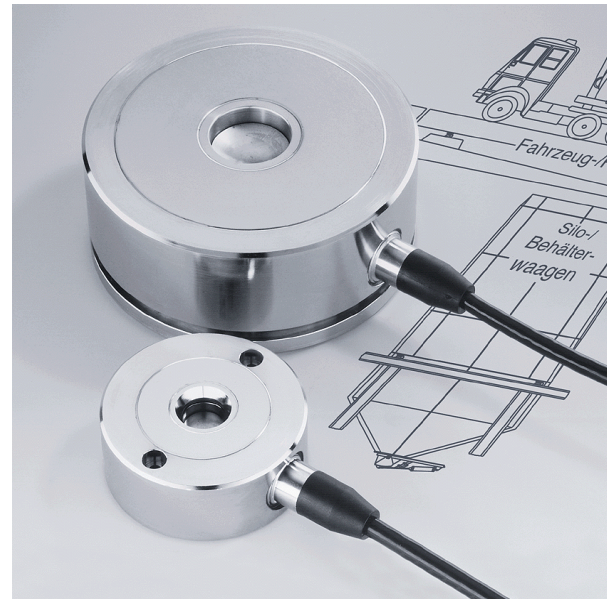
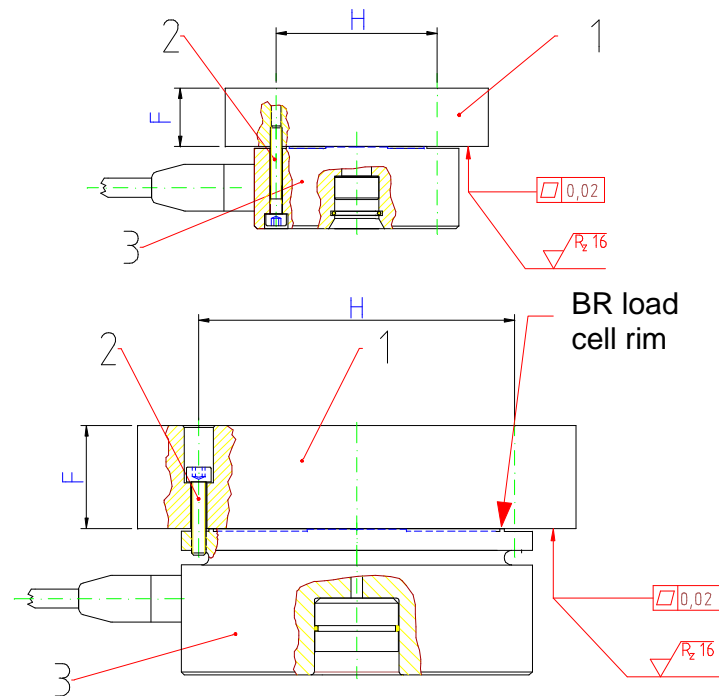
## Compression Ring Load Cells Type BR

### Installation of Compression Ring Load Cell

The EHP compression ring load cell [3] is a high accurate, low profile load cell which is highly insensitive against lateral forces.

To ensure an extreme high accuracy of individual BR load cell D1, C1, ... C4 it is necessary to attend some requirements for load introduction:

#### 1. BR Load Cell Base Plate



Capacity [t]	Compression pressure (*) [N/mm <sup>2</sup> ]	F [mm]	H [mm]	Screw [2] German Standard DIN 912
0,5 / 1	44 / 88	15	43	M4
2 / 3	132 / 198	30	55	M4
5	198	40	80	M4
10	218	40	80	M5
30	628	40	108	M5
50	710	60	120	M6

(\*) Compression pressure between BR load cell rim and base plate at nominal load

The surface of base plate [1] needs a planeness of 0.02mm with one rough deep of Rz16. Simultaneously this plane base plate realizes an effective load cell overload protection. At least thickness of base plate is important to ensure a planeness of 0.02mm, especially at critical installations.

It is allowed to reduce recommended base plate thickness by 15%, if base plate has a plane contact to the surface of weighbridge construction. Further dimensions of base plate [1] and fastening can be chosen freely.

#### Use steel for base plate:

Choose a base plate material which is suitable for the compression pressure (see table) between BR load cell rim and base plate. Otherwise it might be possible that BR load cell rim dig in the base plate's surface after several load cycles and affects load cell's specifications (e.g. sensitivity, linearity, hysteresis, zero-TC, span-TC etc.) as well as the function of load cell's overload protection.

Stainless steel SAE / AISI 304 (H) for capacities 0.5t to 3t or steel 1040 for 0.5t to 10t, steel 1045 for 30t and steel 1070 for 50t.

Non-stainless steel plates are to cover with galvanic zinc overglassing of 8micron.

For fastening screws (BR 0.5t to BR 5t): two threads in distance H in base plate [1]. For fastening screws (BR 10t to BR 50t): two gateway holes in base plate with a sinking for cylinder head screws.

Clean bottom side of BR load cell [3] and contact area of base plate [1] before installation. BR-load cell rim is to grease with acid-free grease!

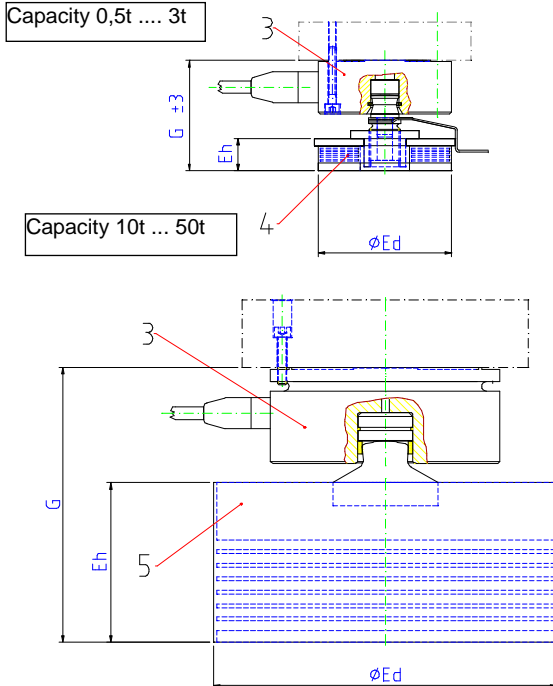
Tighten screws [2] - which connect BR-load cell with her base plate - till 'full contact' by hand. Turn them off (1 turn!) (BR-load cell should not be pulled with screws to base plate!).

Save fastening screws with a soluble anaerobic screw-adhesive (e.g. LOCITITE).

## 2. Load introduction parts for BR load cell

Two mounting aids, an Elastomer bearing and a Rocker Pin are available.

### a) Elastomer bearing



### Dimensions / Deflections / Restoring forces

Capacity [t]	$E_h$ [mm]	$E_d$ [mm]	G [mm]	$s_{max}$ [mm]	F vertical [kN/mm]	F lateral [N/mm]
0,5 / 1	17	70	57,5	2	50	500
2 / 3	17	70	57,5	2	50	500
10	59	125	114	6	119	320
30	83	180	143	10	165	800
50	83	180	152	12	216	1100

### ADVANTAGES OF ELASTOMER BEARINGS

- Self-aligning, independent of applied load.
- Ideally suitable for high-precision weighing, all known applications, and environments
- Maximal lateral deflection possible.
- Dustproof and watertight.
- Adjustable height applicable to capacities 0.5 to 3t.
- Impervious to bi-lateral movement of platform, and load mounts.
- Shock absorbing of vertical deflection.
- Easy to install and maintain.
- Very low profile.

### Elastomer Bearing Installation

The geometry of BR load cell pressure plate [3] and of elastomer bearing [4], [5] ensures that forces are defined introduced in load cell.

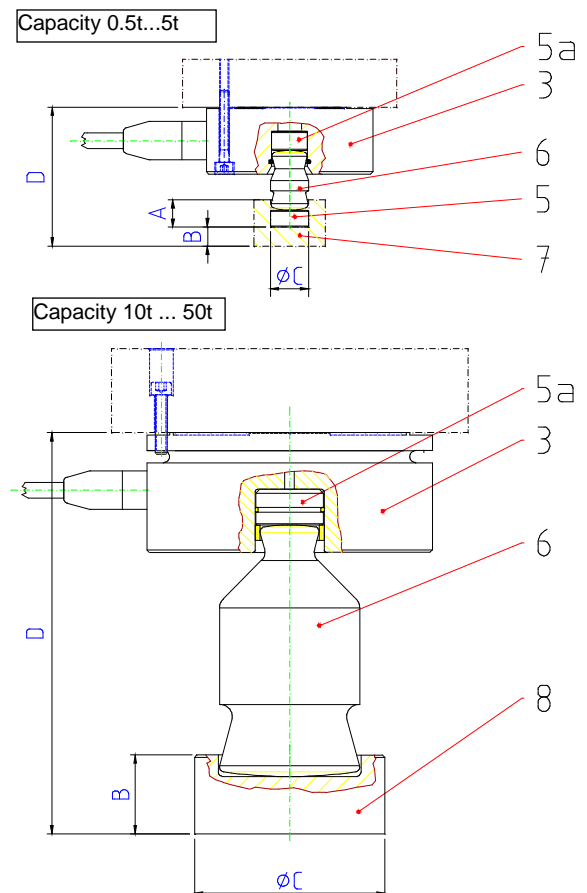
BR load cell [1] and elastomer bearing [4], [5] have to be secured against slipping laterally (e.g. with screws, holding metals, eccentric washers etc.).

Contact areas (base plate / adaptation part) must have to each other only a small inclination of 0.2 degree for 0.5t to 3t and 0.3 degree for 5t to 50t. Greater inclinations have to be compensated with underlying metals.

If lateral movements have to be expected, which exceed the maximal permitted deflection  $s_{max}$  (see table), so install suitable, if possible adjustable, ending stops.

### b) Rocker Pin (= Bearing + Pressure Plate)

The BR-bearing [6], pressure plate [5a] of BR load cell [3] and pressure plate [5] of head plate [7] are vacuum hardened (approx. 57HRC) and manufactured in steel German Standard No. 1.4112 (~ UNS S44025). Pressure plate [8] for capacities 10t to 50t is manufactured in steel German Standard No. 1.2713.



### Dimensions / Max.Deflections ( $s_{max}$ ) / Restoring Force ( $F_{rel}$ )

Capacity [t]	$A_{min}$ [mm]	$A_{max}$ [mm]	B [mm]	ØC [mm]	D [mm]	$s_{max}^{(*)}$ [mm]	$F_{rel}$ [%/mm]
0,5 / 1	8	10	6	10 H9	41,5	±2,5	4,9
2 / 3	10	13	8	16 H9	50	±3,0	3,9
5	11	14	11	18 H9	63	±4,3	2,8
10			26	55	121,5	±8,0	2,9
30			33	100	167,5	±11,0	1,9
50			47	100	188	±13,5	2,1

(\*) Max. permissible lateral displacement of load introduction

## Installation Notes (BR Rocker Pin)

The geometries of installation elements ensure the restoring function at deflections up to the maximal permissible displacement of load introduction  $s_{max}$ .

"Loose" pressure plate [5] is to be put in head plate's [7] sinking. The diameter ( $\varnothing C$ ) and deep of this sinking (dimensions A and B) are shown in table page 2.

BR base plate [1], BR head plate [7] and BR pressure plate [8] have to be fastened against lateral movement relatively to each other (e.g. with screws, metal frames, holding metals, eccentric washers etc.).

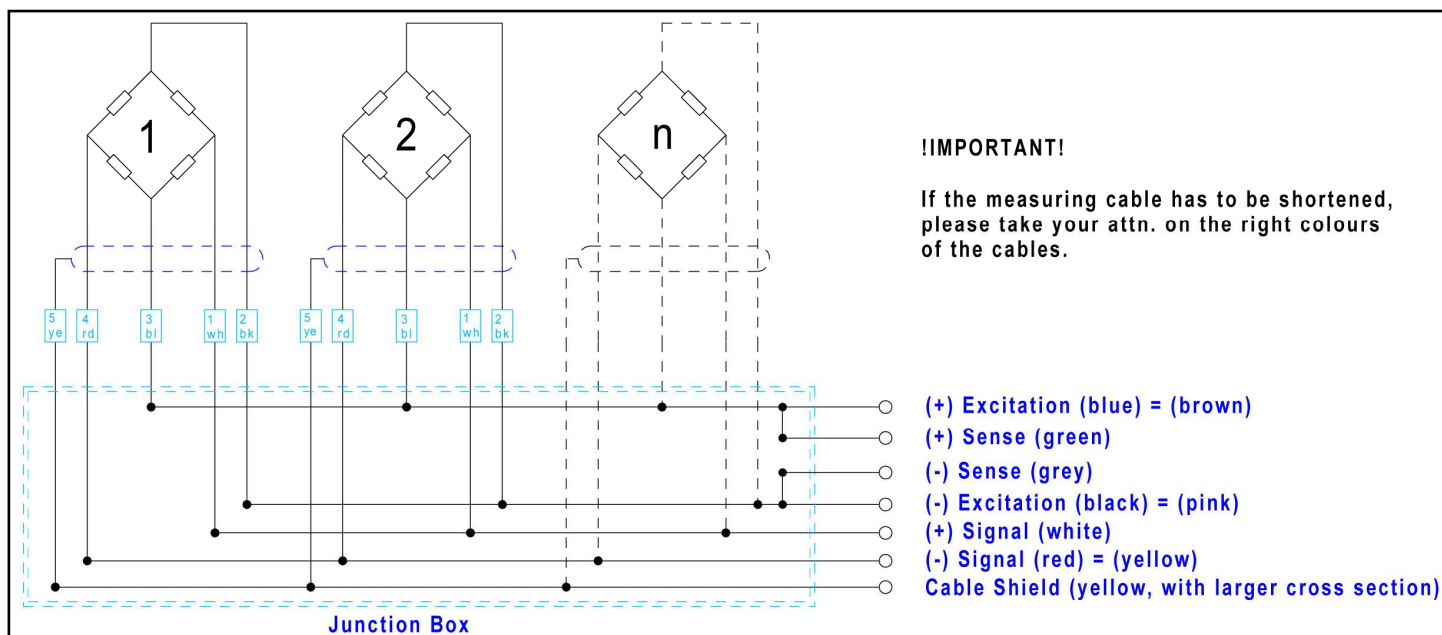
Lateral movability should be limited with suitable, if possible adjustable buffer stops, so that the maximal permissible displacement (see  $s_{max}$ ) of BR Rocker Pin is not exceeded.

## 3. Electrical Connection

BR load cell is equipped with a **6-wire**, shielded PUR-cable.

**Caution! BR cable is calibrated (part of load cells' measuring system) and should not be shortened! Should the measuring cable needed to be shortened, please take your attn. on the right colours from cables.**

Due to her electrical qualities (current calibration) several BR load cells can be connected together in parallel. Therefore no corner adjustment is fundamental required; in service case BR load cells can be easily replaced. The parallel connection is carried out by connecting load cell wires with same color.



It is **only** allowed to combine together **BR load cell with same capacity in one scale.**

Parallel connection of 'n'-pieces BR load cell in a scale:

The connections of load cell cables are intended exclusively in solder-solder connections inside a waterproof junction box corresponding (EEC protection class IP68). The same is valid if available measuring lines are prolonged.

Output voltages of the BR load cell are in  $\mu V$ -range; so humidity in junction box (wetness, sweating waters etc.) particularly influences extremely measurement results. The junction box should be installed at place, which is protected against environmental influences, rain and sun. It shall be used suitable cable glands. Electrical and magnetic fields can cause an induction of interfering voltages. Disturbances start out e.g. from power lines, lying to measuring lines parallel situated in proximity contactors, electro-motors or transformers. Interfering voltages also can get DC coupled.

### **Caution!**

- Do not lay BR load cell cables parallel to power current or control lines. If this isn't possible, then lay load cell cables in steel pipes.
- Do not bend BR load cell cable sharply, cable sheath could otherwise be damaged or even break. Bend radius = approx. 20 x cable diameter.
- Connect all cable shields with weight indicator's electronic, therefore use suitable clamp directly at the input of indicator housing.
- Connect all instruments of the measuring system (BR load cell, junction box, weight indicator) to the same protective conductor. (PE-conductor of power supply).

## **4. IMPORTANT REMARKS**

- Contact surface between load cell base plate and associated weighbridge construction should have a planeness of maximal 0.3 mm and should be manufactured in steel. Other materials for the contact surface (concrete, etc.) must resist the corresponding surface load of base plate [1] and of head plate [7] or of pressure plate [8] (Consider maximal permissible surface pressure, see table page1).
- Do install a flexible copper wire of minimal 50 square millimeter directly to every load cell [3] between top and bottom side of the mounting unit in order to realize a galvanic bypass for damaging overcurrents (e.g. lightning strokes).
- Weighbridge installation: Do set down slowly and carefully bridge on BR load cells. Preferably shall be worked with dummies.
- Do install mounting aids (Elastomer bearing and Rocker Pin) as vertically as possible (weighbridge without lateral forces and without displacement of Elastomer bearing or Rocker Pin out of zero position). Already existing deflections reduce the lateral weighbridge movability during operation!
- **Caution!** BR-Compression Ring Load Cells are precision instruments with extreme high accuracy and therefore carefully to handle. Never damage load cell membranes on top or bottom side.
- Avoid if possible to **weld after the installation of the BR load cells**. If you can not avoid welding at the weighbridge and if you cannot remove load cells from weighbridge, then disconnect cable connections between the load cells and the indicator electronics and the junction box. Do put the grounded electrode (of the electrical welding apparatus) in the immediate surroundings of the welding and but so, that the welding current cannot flow about BR load cell. Additionally check, that the flexible copper wires (which are able to protect BR load cells against damaging currents) are correctly installed at the BR load cells.
- Dirt, mud, etc. at the BR load cells and at the mounting aids should be removed from time to time.
- **The following points should be noticed at doubtful or wrong measurements.** Every single these points can have an extreme influence on the measurement!

Check, if...

- ⇒ weighbridge is 'free' and is not hindered by 'force shunts' (pipes, cables, mechanical parts, etc.).
  - ⇒ other external boundary conditions be present like heat radiation.
  - ⇒ installed BR load cell mounting aids are in correct installation arrangement and direction , and the restoring function is given.
  - ⇒ BR load cells are damaged, especially at the cable, cable introduction or membranes.
  - ⇒ water or humidity penetrated damagedly into the junction box or into the open cable endings.
- ⇒ To find a defective BR load cell in the weighbridge, or to locate the source of defect, a 'corner test' should be conducted.
- ⇒ If possible, unsolder in the junction box every BR load cell wire and measure the individual electrical data with a multimeter: input and output resistance, zero signal and load signal.
- No warranty**, if BR loadcell damages caused by...
- ⇒ unsuitable, no original mounting accessories.
  - ⇒ overvoltage or lightning stroke.
  - ⇒ improper treatment of connection cable, membranes, etc.