Operating Manual

BROSA Measuring block Type 0230

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Notes

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1 General information

Read the operating instructions and the product-specific documents carefully before commissioning the sensor.

Make sure that the sensor is fully suitable for the applications in question.

Improper use or any use other than intended may result in a malfunction of the sensor or undesirable effects in your application. For this reason, installation, electrical connection, commissioning and maintenance of the sensor may only be carried out by trained personnel authorized by the plant operator.

We also expressly point out that any liability is excluded if instructions in this documentation are disregarded.

Current certificates can be downloaded from the BROSA AG website.

Only the German version of this operating manual represents the original document.

1.1 Safety instructions – Explanation of symbols:

 WARNING! This symbol indicates dangers that can lead to personal injury and property damage!

2 Description of the BROSA measuring block

2.1 Structure and functionality

The BROSA measuring block type 0230 is used when two forces are introduced at the measuring point from different directions, but only the (resulting) component of a direction is to be measured. This force direction to be evaluated may be different from the two directions of force application. Figure 1 shows the typical construction:

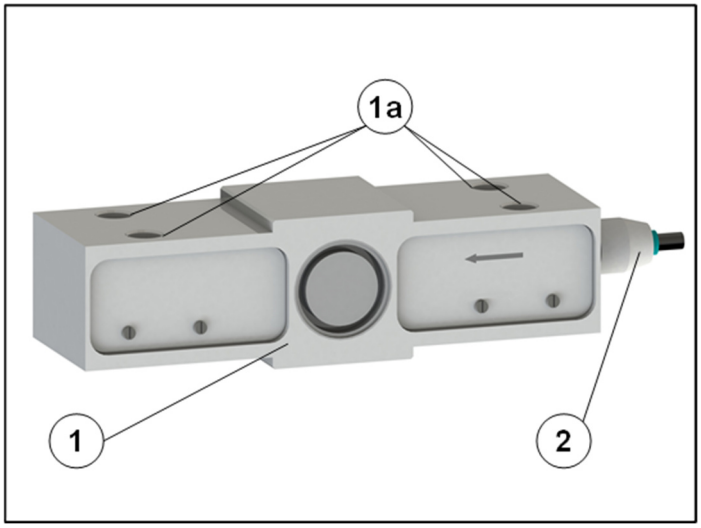

Figure 1: Structure of the measuring block

The measuring block consists of a block-shaped measuring body (1) which receives the load to be measured and which exhibits features for mounting (1a). If the measuring block is supplied with integrated evaluation electronics, it is - if it is not placed in the measuring body - in a connection board firmly con-nected to the measuring body (not shown in the pic-ture), on which - if they are not placed directly on the measuring body - the elements necessary for the electrical connection (plug or cable, 2) are mounted. Measuring body and, if necessary, connection board are made of stainless steel.

The use below the water surface is generally possible after testing and approval by BROSA, special requirements are the used materials, the tightness and the electrical connections. In addition, there is the possibility that the water pressure impacts the measurement result.

Figure 2 shows the typical installation conditions:

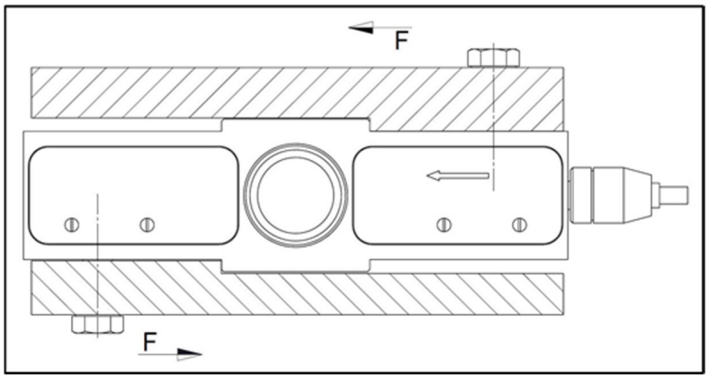

Figure 2: Installation conditions

The measuring block (1) is mounted on both ends on the console surfaces of the mounting structure (2); a screw connection is usual for fastening. The force F transmitted from the connection is applied in a plane on the measuring block, but not in a line; it is transmit-ted by the evaluation of the resulting deformation of the measuring body on the measurement electronics and outputted as an electric signal.

Designs are optionally available only for tension, only for pressure or for tension/pressure, with two measur-ing systems, combined with either the output signals on separate connectors/cables or in one connect-or/cable. More information can be found in the tech-nical data sheets, which may be obtained free from BROSA.

WARNING! An insufficiently rigid surrounding construction, inadequate force transmission or inadequate surface condition of the force-carrying surfaces affect the measurement result!

2.2 Labelling (rating plate, indication of the direction of measurement)

Each BROSA measuring block is provided with a rating plate containing the applicable information for each unit. It may be mounted, depending on the structural design, either on the side (Figure 3, 1a) or at the connection (Figure 3, 1b).

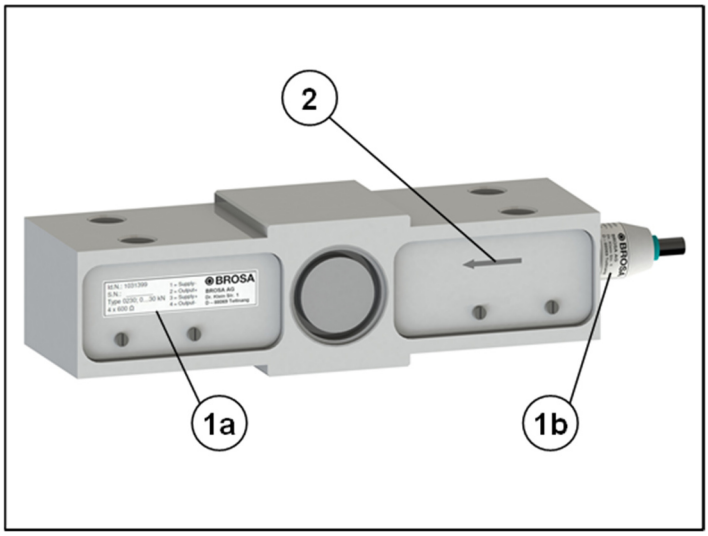

Figure 3: Labelling of the measuring block

The measuring direction is indicated by an arrow icon on the side (Figure 3, 2).
The arrow always indicates - regardless of design - the direction of the tension

3 Advice on the safe handling of BROSA measuring block

WARNING! Non-compliance with the following instructions can lead to sensor damage and/or impairment of measurement results. The analysis of an erroneous measurement can result in personal injury or material damage.

WARNING! Despite their robust design, BROSA measuring blocks may not be used for any use beyond the intended purpose (see section 1.1). In the case of non-intended use, hazards to life and limb of the user or third parties and/or damage to the device in which the measuring block is installed or to other material goods.

3.1 Handling

WARNING! BROSA sensors contain high-quality measurement electronics. Make sure they are handled carefully.

- BROSA measuring block are supplied in transport-safe packaging. We recommended that you remove the sensors from the package immediately prior to installation.
- The mass of the measuring block should be taken into account for the selection of handling and/or lifting devices; it is indicated on the nameplate.
- BROSA measuring block must be secured against falling. Do not throw sensors!
- Use as a tool (e.g., impact, slotting or lever tool) is not permitted; it can cause damage to the sensor and thus falsify the measurement results.

3.2 Installation and commissioning

3.2.1 General information

We recommended taking the following actions in the given order using the “four-eye principle”.

a) Inspecting the sensor - measuring point assignment: It must be ensured that the sensor to be installed is designed for use at the intended measuring point. For this purpose, check information on the nameplate, in particular the item or the identification number and the measuring range, against the data of the measuring point.

WARNING! A sensor not designed for the particular measuring point must not be installed.

b) Inspection of the sensor for intactness and function: It must be ensured that the sensor to be incorporated is free of damage of any kind.

WARNING! A damaged sensor must not be installed!

c) Installation of the sensor in the measuring point: The compression load cell is to be aligned on the intended contact surface according to the offer drawing.

⚠ WARNING! The rod end load cell must not be aligned using impact tools!

After alignment, the rod end load cell must be secured against movement and rotation using the elements provided for this purpose. Ensure that the measuring block is correctly aligned with the intended measuring direction (see marking on the face, see section 1.2)

⚠ WARNING! A misaligned sensor leads to erroneous measurement results!

d) Establishment of electrical connection: The elements on the sensor for the electrical connection are to be connected to the power supply, the earth connection if necessary, and the evaluation system of the device. In doing so, the information given on the nameplate for plug or cable assignment and, if applicable the installation guidelines of the cable, are to be observed.

⚠ WARNING! An incorrect or incomplete electrical connection impairs or prevents measurement.

e) Functional check: After completed mechanical (see c) and electric (see d) installation, load on the sensor is to be applied over the entire measuring range; the output measurement signals are to be subjected to a plausibility check.

⚠ WARNING! If due to unusual events (e.g., deformation or unusual noise), measurement results are considered implausible or there is suspicion that the sensor is malfunctioning for any other reason, it must not be put into operation.

3.3 Operation and maintenance

3.3.1 Operation

BROSA measuring block work independently, attaching tools is required for their operation. Direct manual intervention by the operator is not necessary; there are therefore no requirements for the operator to wear protective equipment during operation. However, the requirements towards the device in which the measuring block cell is installed must be observed.

BROSA measuring block emit neither noise nor non-ionizing radiation.

Operation of BROSA measuring block is permitted only within the parameters and properties given in the technical datasheets and on the nameplate. These are, among others:

- Measuring range
- Temperature range
- Permissible supply voltage
- Electrical protection class
- Material

It must be ensured that no parasitic influences such as forces or torques transverse to the direction of measurement are transmitted via the measuring block.

Inductive or capacitive coupling with the connection cable(s) of the sensor can distort the measurement result and must be avoided. Some examples of these kinds of couplings can be caused e.g., by unfavourable cable routing (parallel power lines, frequency converters, transformers, motors, incorrect grounding/shielding and the like).

When performing electric welding in the vicinity of the sensor, all connections must be disconnected and isolated. It must be ensured that no welding current is flowing through the sensor.


WARNING! Operation outside the specified parameters or contrary to existing properties or improper use can damage the sensor and cause it to fail or lead to faulty measuring results. If the sensor is overloaded, this can lead to the whole machine being equally overloaded and possibly endangering its stability.

3.3.2 Maintenance

As sensors, BROSA measuring blocks are basically maintenance-free. As load-transmitting elements, however, they are subject to mechanical stress, requiring regular inspections of the fault-free state of each rod end load cell. The intervals between inspections depend on the intensity of use and must be determined by the end-user.

An inspection includes the following points:

- Visual inspection for damage to the measuring body and wiring as well as contamination.
- Function test/plausibility check

The causes of existing errors are to be identified and remedied. If the test indicates an improper sensor state, it must be taken out of operation. If a malfunction or damage is detected on the sensor, it must be sent to the manufacturer's factory for diagnosis and, if necessary, repaired.

⚠ WARNING! The sensor may only be repaired at the factory. Intervention (e.g., opening, mechanical processing and the like) done by parties other than the manufacturer means the safe operation of the sensor is no longer ensured and voids the guarantee and warranty.

3.4 Disassembly

We recommend performing the following actions in the order given.

a) Ensuring freedom from loads at the measurement position: The rod end load cell should be unloaded before disassembly.

⚠ WARNING! The disassembly of a rod end load cell under load leads to high risks to the life and limb of bystanders and can cause severe material damage. This is therefore not permitted.

b) Undoing the electrical connection
c) Remove the mechanical securing elements
d) Disassembly of the measuring block

⚠ WARNING! If the rod end load cell is to be reused, it must not be removed using impact tools!

3.5 Disposal

If the end of the service life is reached, the rod end load cell is to be disposed of in an environmentally friendly way. Since the non-metallic components constitute a small part of the mass of the rod end load cell, the rod may be recycled as a whole as scrap steel. BROSA sensors are usually made of stainless steel and can be disposed of accordingly.

If the sensor is stored before final disposal, an appropriate storage location is to be selected which prevents harmful substances from entering the environment. If necessary, the sensor must be cleaned.

 WARNING! BROSA measuring block contain trace amounts of environmentally hazardous substances. This is also true of the impurities created during use. Contamination of the environment by these substances is to be prevented.

BROSA

Translation of the original

List of applied, harmonized standards

2006/42/EG	
EN ISO 13849-1:2008 +AC:2009	Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design
2014/30/EU	
EN 61000-6-2:2005 +AC:2005	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61000-6-3:2007 +A1:2011 +AC:2012	Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments
EN 61326-1:2013	Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements
EN 61326-2-3:2013	Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 2-3: Particular requirements – Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning
2014/34/EU	
EN 60079-0:2012 +A11:2013	Explosive atmospheres – Part 0: Equipment – General requirements
EN 60079-11:2012	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"

Person authorized to compile the technical files:

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End of EC Declaration of Conformity

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Translation of the original

EC/EU Declaration of Conformity

in terms of Directives
2006/42/EC, Annex II Part 1 A,
2014/30/EU, Annex IV and
2014/34/EU, Annex X

Manufacturer: **BROSA AG**
Dr.-Klein-Straße 1
D-88069 Tettnang

On our own responsibility we hereby declare the products according to design/type

Force measuring block type 0230
from serial number 16040001 onwards

to comply with the relevant regulations of the following directives:

2006/42/EC **Machinery Directive**
2014/30/EU **EMC Directive**

Products according to the mentioned design as an ATEX intrinsically safe version are marked as such and additionally comply with the relevant regulations of the following directive:

2014/34/EU **ATEX Directive**

The type examination related with the latter directive has been carried out by the following notified body:

DEKRA EXAM GmbH **BVS 03 ATEX E 241**
Dinnendahlstraße 9
D-44809 Bochum Notified Body No. 0158

The requirements for production and testing of the product are defined in a quality and environmental management system certified according to ISO 9001 and ISO 14001.

Page 2 of this Declaration contains the standards harmonized with the mentioned Directives and applied to the products according to the mentioned design/type.

Tettnang, April 20th, 2016

Martin Wagner
CEO

English translation of the original