

## 1. Description of the BROSA measuring block

### 1.1 Design and operation

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:

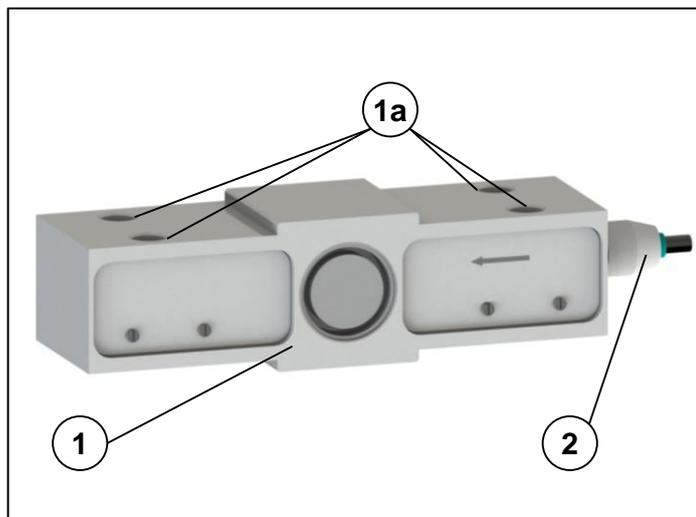


Figure 1: Construction of the measuring block

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 connected to the measuring body (not shown in the picture), 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.

Figure 2 shows the typical installation conditions:

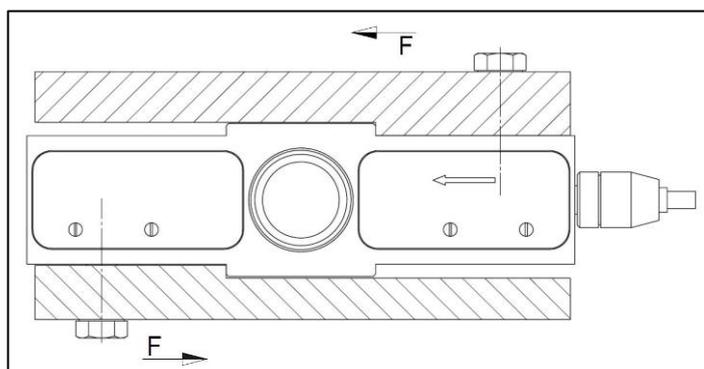


Figure 2: Installation conditions

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 transmitted 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 measuring systems, combined with either the output signals on separate connectors/cables or in one connector/cable. More information can be found in the technical data sheets, which may be obtained free from BROSA.

### 1.2 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).

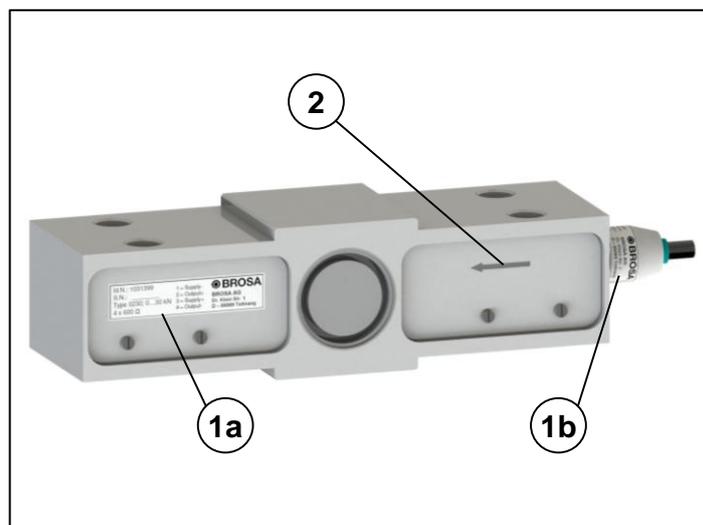


Figure 3: Labelling of the measuring block

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.

## 2. Advice on safe handling of BROSA measuring blocks

 **CAUTION!** Ignoring the following instructions can lead to damage of the sensor and/or impaired measurement results. The evaluation of an erroneous measurement can result in injury or damage.

 **CAUTION!** BROSA measuring blocks may not be used for purposes other than their intended purpose despite their robust design (see Section 1.1). If not used properly, there are potential risks to life and limb of the user or third parties and/or impairment of the device in which the measuring block is implemented, or to other property.

### 2.1 Handling

 **CAUTION!** BROSA Sensors include high quality measurement electronics! Careful handling is important!

- BROSA measuring blocks are supplied in transport-safe packaging. It is recommended that you only remove the sensors from the packaging immediately prior to installation.
- For the choice of appropriate handling equipment and / or lifting gear, the mass of the measuring block is to be noted; this is indicated on the rating plate.
- BROSA measuring blocks are to be secured against falling. Do not throw sensors!
- Usage as a tool (e.g. as a striking, slotting or lifting tool) is not permitted; it can cause damage to the sensor and thus falsify the measurement result.

### 2.2 Installation and commissioning

It is recommended to perform the following actions in the given order using the four-eye principle.

- a) Check the allocation sensor – measuring point: It must be ensured that the sensor to be installed is intended for use at the selected measuring point. For this purpose, the information on the rating plate, in particular the article or the identification number and the measuring range, are to be compared to the data of the measuring point.

 **CAUTION!** A sensor that is not intended for the respective measuring point may not be installed!

- b) Check the sensor for damage and function: It must be ensured that the sensor to be installed is free of damage of any kind.

 **CAUTION!** A damaged sensor may not be installed!

- c) Installation of the sensor in the measuring point: The force measuring pin is to be used in the connection structure.

 **CAUTION!** The measuring block must not be installed and/or aligned with the help of striking tools!

After insertion the measuring block is to be fixed with the appropriate elements. Attention must be paid to the correct alignment of the measuring block to the intended direction of measurement (see side marking, cf. Section 1.2.)

 **CAUTION!** A misaligned sensor leads to erroneous measurement results!

- d) Manufacturing of electric connection: the elements for electrical connection which are present on the sensor are to be connected to the power supply and with the evaluation system of the device. Here, the information that is provided on the rating plate regarding the plug or cable assignment and, where appropriate, the cable laying regulations must be observed.

 **CAUTION!** An incorrect or incomplete electrical connection prevents or impairs the measurement.

- e) Functional check: After the mechanical (see c)) and electrical (see d)) installation, the sensor must be loaded if possible over the entire measuring range provided; the output measured signals are to be subjected to a plausibility check.

 **CAUTION!** If there is a suspicion, due to extraordinary observations (e.g. deformation or unusual noise development), implausibility of the measurement results or any other reason, that a malfunction of the sensor exists, it may not be put into operation.

## 2.3 Operation and maintenance

### 2.3.1 Operation

BROSA measuring blocks operate automatically, the attachment of tools is not required for operation. A direct manual intervention of the operator is not necessary, therefore there are no requirements for the protective equipment of the operator when in use. However, the relevant requirements for the device, in which the measuring block is implemented, are to be observed.

BROSA measuring blocks emit neither air noise emissions nor non-ionizing radiation.

Operation of BROSA measuring blocks is only permitted within the framework of the parameters and properties described in the technical data sheets and provided on the rating plate. Among others, these are:

- Measurement range
- Temperature range
- Approved power supply
- Electrical protection type
- Material

It must be ensured that no parasitic influences such as forces that are transverse to the measuring direction or torques are routed over the measuring block.

Inductive or capacitive couplings to the connection cable(s) of the sensor can affect the measurement result and must therefore be avoided. Couplings of this type may occur, for example, through unfavourably laid cable (high voltage power lines running in parallel, frequency converters, transformers, motors, incorrect grounding/shielding etc.).

In the case of electric arc welding work in the vicinity of the sensor, all connections are to be disconnected and insulated. It is to be ensured that no welding current flows over the sensor.

 **CAUTION!** Operation outside the specified parameters or contrary to existing properties or inappropriate use may damage the sensor and lead to failure or faulty measurement results. If the sensor is overloaded, this can lead to an equally overloaded whole machine and possibly jeopardize its stability.

### 2.3.2 Maintenance

In its capacity as sensor BROSA measuring blocks are maintenance-free. However, as load-transmitting elements they are subject to mechanical stress, so each measuring block is to be regularly checked for flawless condition. The intervals between inspections depend on the intensity of use and must be defined by the end user.

An inspection includes the following points:

- Visual inspection for damage to the measuring body and wiring as well as for dirt
- Functional testing/plausibility check

The causes of any errors are to be identified and removed. If the inspection reveals evidence of an improper condition of the sensor, it must not remain in operation. If a malfunction or damage is detected on the sensor, it is to be sent to the manufacturer for diagnosis and possibly repair.

 **CAUTION!** The sensor may only be repaired at the factory. For a procedure which is carried out by entities other than the manufacturer's plant (e.g., opening, mechanical reworking, etc.), the safe operation of the sensor is no longer assured and the warranty will be voided.

### 2.4 Removal

It is recommended to perform the following actions in the given order.

- a) Removal of loads in the measuring point: all tensions are to be released from the measuring block before removing.

 **CAUTION!** The removal of a loaded measuring block entails serious risks to life and limb of bystanders and can cause major damage to property. Therefore it is not permitted.

- b) Detachment of the electrical connection
- c) Removal of the mechanical securing elements
- d) Removal of the measuring block

 **CAUTION!** If the measuring block is to be re-used, it must not be removed by means of striking tools!

### 2.5 Disposal

If the end of service life has been reached, the measuring block is to be disposed of in an environmentally responsible manner. Since the non-metallic components represent a low mass fraction of the measuring block, it can be recycled in its entirety as steel scrap. An classification as stainless steel scrap is preferable.

If the sensor is stored before final disposal, a suitable storage location must be selected which prevents harmful substances from being released into the environment. If necessary, the sensor is to be cleaned.

 **CAUTION!** BROSA measuring blocks contain traces of environmentally hazardous substances. This applies equally to contaminations caused by its use. Contamination of the environment by these substances must be prevented.

## 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 20<sup>th</sup>, 2016

  
**Martin Wagner**  
CEO

## List of applied, harmonized standards

<b>2006/42/EG</b> EN ISO 13849-1:2008 +AC:2009	Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design
<b>2014/30/EU</b> EN 61000-6-2:2005 +AC:2005 EN 61000-6-3:2007 +A1:2011 +AC:2012 EN 61326-1:2013	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments 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
<b>2014/34/EU</b> EN 60079-0:2012 +A11:2013 EN 60079-11:2012	Explosive atmospheres – Part 0: Equipment – General requirements 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