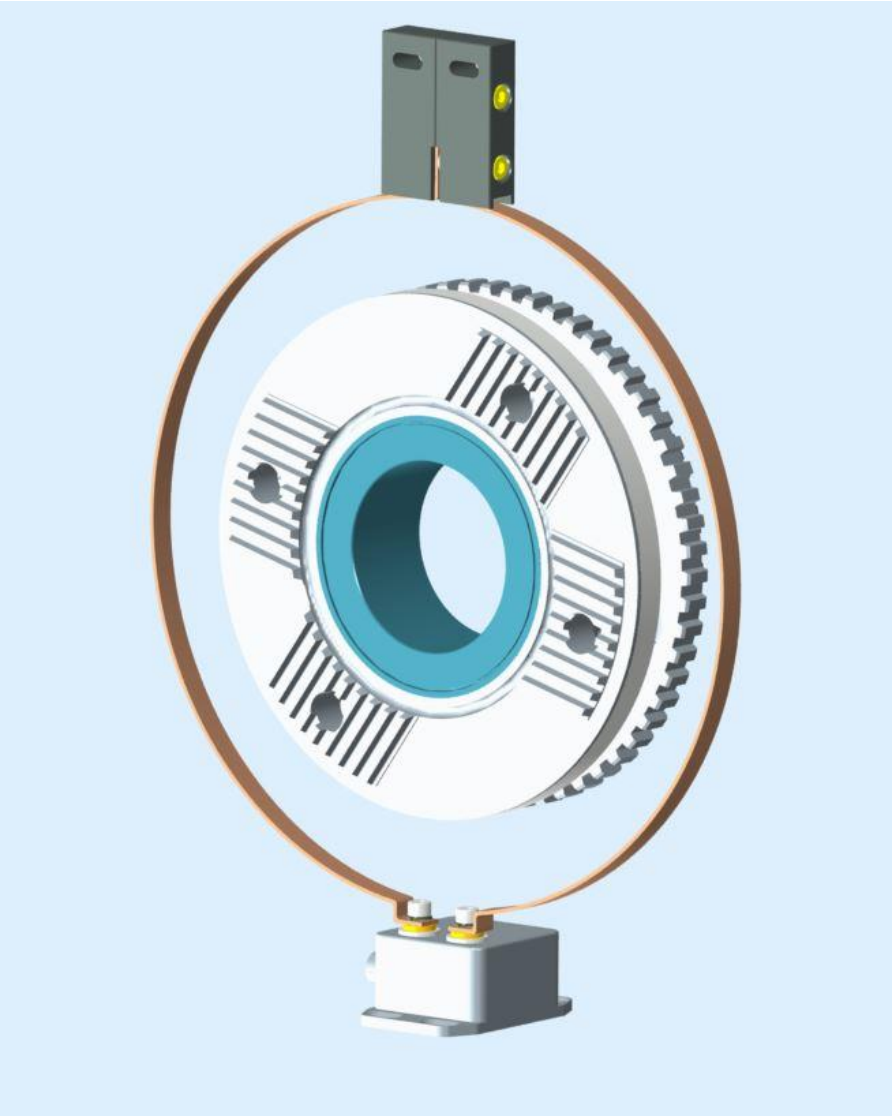
Mounting instructions

Torque transducer KV180-nfz

TCA-S5 (MPZ1605016)



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Directory

1 Safety Instructions

FCC Compliance & Advisory Statement

Important

Any changes or modification not expressly approved in writing by by the party responsible for compliance could void the user's authority to operate the device. Where specified additional components or accessories elsewhere defined to be used with the installation of the product, they must be used in order to ensure compliance with FCC regulations.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

Model	**Measuring range**	**FCC ID**	**IC**
TCA	30 kN·m	2ADAT-TCAS5	12438A-TCAS5

Label example with FCC ID.

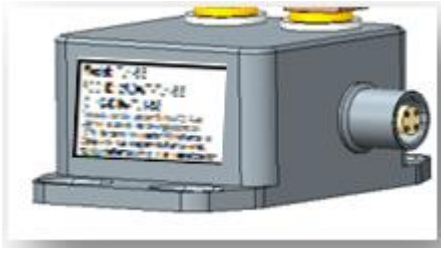


Fig 1.1: Location of the label on the stator of the device

Model: TCA-S5
FCC ID: 2ADAT-TCAS5
This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received,
including interference that may cause undesired operation.

Fig. 1.2 Example of the label

Appropriate use

The torque transducer is used exclusively for torque, angle of rotation and power measurement tasks within the load limits stipulated in the specifications. Any other use is not the designated use.

Stator operation is only permitted when the rotor and stator antenna are coupled.

The torque flange may only be installed by qualified personnel in compliance with the specifications and with the safety requirements and regulations of these mounting instructions. It is also essential to observe the applicable legal and safety regulations for the application concerned. The same applies to the use of accessories.

The torque flange is not intended for use as a safety component. Please also refer to the section: “Additional safety precautions". Proper and safe operation requires proper transportation, correct storage, siting and mounting, and careful operation.

Loading capacity limits

The data in the technical data sheets must be complied with when using the torque flange. In particular, the respective maximum loads specified must never be exceeded. The values stated in the specifications-must not be exceeded, for example, for

- limit torque,
- longitudinal limit force, lateral limit force or limit bending moment,
- torque oscillation width,
- breaking torque,
- temperature limits,
- the limits of the electrical loading capacity.

Use as a machine element

The torque flange can be used as a machine element. When used in this manner, it must be noted that, to favor greater sensitivity, the transducer is not designed with the safety factors usual in mechanical engineering. Please refer here to the section “Loading capacity limits", and to the specifications.

Accident prevention

According to the prevailing accident prevention regulations, once the transducers have been mounted, a covering agent or cladding has to be fitted as follows:

- The covering agent or cladding must not be free to rotate.
- The covering agent or cladding should prevent squeezing or shearing and provide protection against parts that might come loose.
- Covering agents and cladding must be positioned at a suitable distance or be so arranged that there is no access to any moving parts within.
- Covering agents and cladding must still be attached even if the moving parts of the torque flange are installed outside people's movement and working range.

The only permitted exceptions to the above requirements are if the torque flange is already fully protected by the design of the machine or by existing safety precautions.

Additional safety precautions

The torque flange cannot (as a passive transducer) implement any (safety-rel evant) cutoffs. This requires additional components and constructive measures for which the installer and operator of the plant is responsible. The layout of the electronics conditioning the measurement signal should be such that measurement signal failure does not cause damage.

The scope of supply and performance of the transducer covers only a small area of torque measurement technology. In addition, equipment planners, installers and operators should plan, implement and respond to safety engineering considerations in such a way as to minimize residual dangers. Pertinent national and local regulations must be complied with.

General dangers of failing to follow the safety instructions

The torque flange corresponds to the state of the art and is failsafe. Transducers can give rise to residual dangers if they are incorrectly operated or inappropriately mounted, installed and operated by untrained personnel. Every person involved with siting, starting-up, operating or repairing a torque flange must have read and understood the mounting instructions and in particular the technical safety instructions. The transducers can be damaged or destroyed by non-designated use of the transducer or by non-compliance with the mounting and operating instructions, these safety instructions or any other

applicable safety regulations (safety and accident prevention regulations), when using the transducers. Transducers can break, particularly in the case of overloading. The breakage of a transducer can also cause damage to property or injury to persons in the vicinity of the transducer.

If the torque flange is not used according to the designated use, or if the safety instructions or specifications in the mounting and operating instructions are ignored, it is also possible that the transducer may fail or malfunction, with the result that persons or property may be adversely affected (due to the torques acting on or being monitored by the torque flange).

Conversions and modifications

The transducer must not be modified from the design or safety engineering point of view except with our express agreement. Any modification shall exclude all liability on our part for any damage resulting therefrom.

Selling on

If the torque flange is sold on, these mounting instructions must be included with the torque flange.

Qualified personnel

Qualified personnel means persons entrusted with siting, mounting, starting up and operating the product, who possess the appropriate qualifications for their function.

This includes people who meet at least one of the three following requirements:

- Knowledge of the safety concepts of automation technology is a requirement and as project personnel, you must be familiar with these concepts.
- As automation plant operating personnel, you have been instructed how to handle the machinery. You are familiar with the operation of the equipment and technologies described in this documentation.
- As commissioning engineers or service engineers, you have successfully completed the training to qualify you to repair the automation systems. You are also authorized to activate, ground and label circuits and equipment in accordance with safety engineering standards.

2 Markings used

2.1 Symbols on the transducer

Label example

Model: TCAS5
FCC ID : 2ADAT-TCAS5
IC:12438A-TCAS5
This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received,
including interference that may cause undesired operation.

Label example with FCC ID number,

Location of label on the stator unit.

2.2 The markings used in this document

Important instructions for your safety are specifically identified. It is essential to follow these instructions in order to prevent accidents and damage the property.

Symbol	Meaning
⚠ WARNING	This marking warns of a *potentially* dangerous situation in which failure to comply with safety requirements *can* result in death or serious physical injury.
⚠ CAUTION	This marking warns of a *potentially* dangerous situation in which failure to comply with safety requirements *can* result in slight or moderate physical injury.
NOTE	This marking draws your attention to a situation in which failure to comply with safety requirements *can* lead to damage to property.
Important	This marking draws your attention to *important* information about the product or about handling the product.
Tip	This marking indicates application tips or other information that is useful to you.
	This marking draws your attention to information about the product or about handling the product.
Emphasis	Italics are used to emphasize and highlight texts.

3 Application

This transducer is designed only for Daimler Trucks USA

4 Structure and mode of operation

The torque flange consists of two separate parts: the rotor and the stator. The rotor comprises the measuring body and the signal transmission elements.

Strain gauges (SGs) are installed on the measuring body. The rotor electronics for transmitting the bridge excitation voltage and the measurement signal are located centrally in the flange. The transmitter coils for contactless transmission of excitation voltage and measurement signal are located on the measuring body's outer circumference. The signals are sent and received by a separable antenna ring. The antenna ring is mounted on a housing that contains the electronics for the automatic self-tuning function of the antenna.

The connection cable connects the stator housing with the evaluation unit which contains the electronics for voltage adaptation and the signal conditioning.

Connectors and screw terminals for the torque signal and the voltage supply are located on the evaluation unit. The stator antenna ring should be mounted more or less concentrically with some gap to the rotor antenna (see Chapter 5).

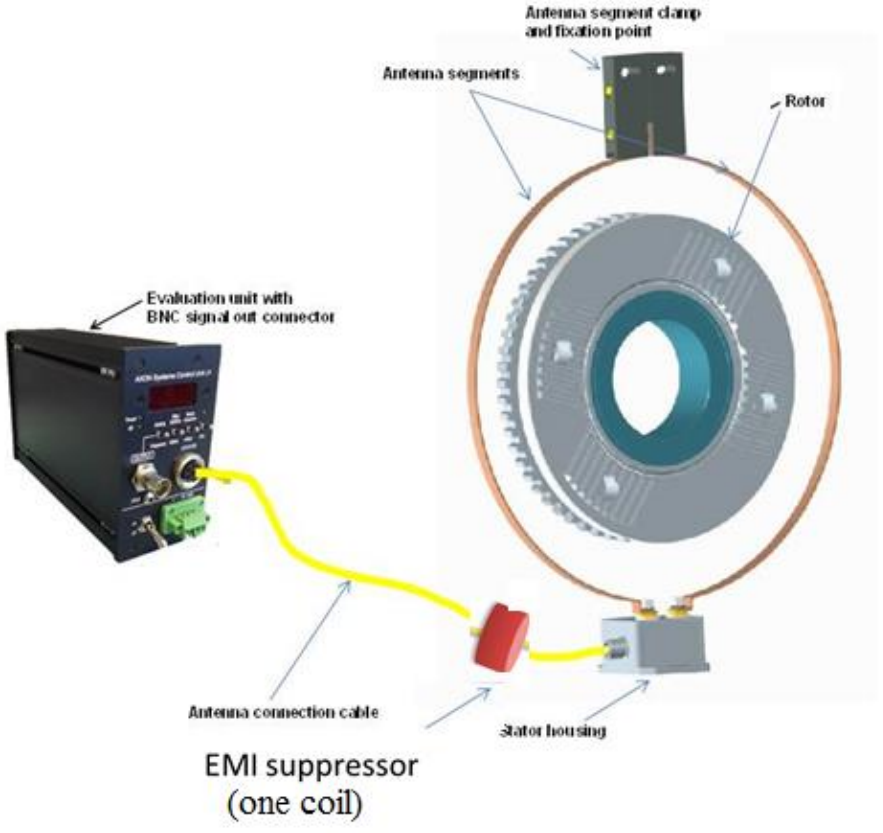


Fig. 4.1: Transducer with stator antenna and evaluation unit

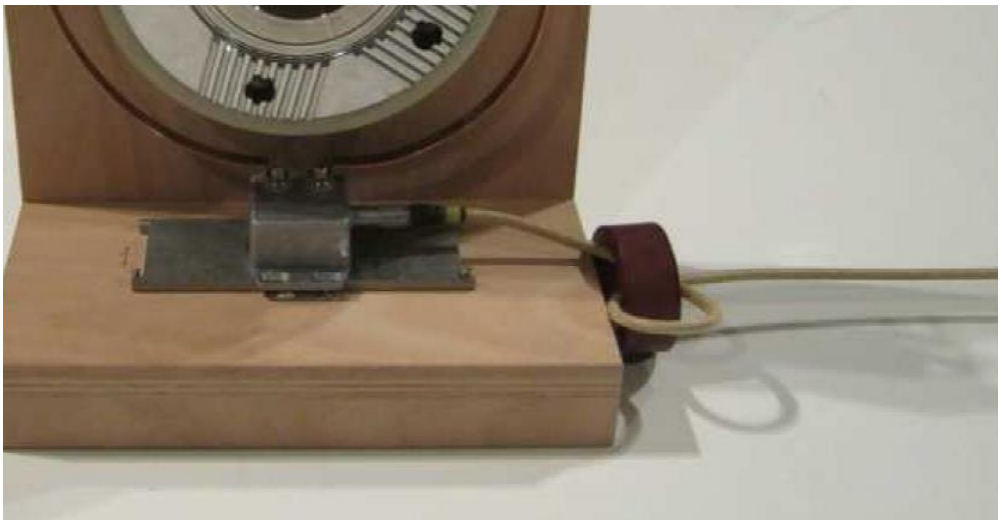


Fig. 4.2: EMI suppressor

Important

The use of the shielding plates is important to ensure compliance with FCC regulations. If the shielding plates has to be removed for any purpose (e.g. installation or maintenance), they must be replaced in the original position before the product is used.

5 Mechanical installation

5.1 Important precautions during installation

Note

A torque flange is a precision measurement element and therefore needs careful handling. Dropping or knocking the transducer may cause permanent damage. Make sure that the transducer cannot be overloaded, including while it is being mounted.

- Handle the transducer with care.
- Check the effect of bending moments, critical rotational speeds and natural torsional oscillations, to prevent the transducer being overloaded by resonance sharpness
- Make sure that the transducer cannot be overloaded.

WARNING

There is a danger of the transducer breaking if it is overloaded. This can cause danger for the operating personnel of the system in which the transducer is installed.
Implement appropriate safety measures to avoid overloads and to protect against resulting dangers.

- Use a Use a thread locker (medium strength, e.g. LOCTITE) to glue the screws into the counter thread to exclude prestressing loss due to screw slackening, in the event of alternating loads.
- Comply with the mounting dimensions to enable correct operation.

An appropriate shaft flange enables the special torque flange to be mounted directly. It is also possible to mount a joint shaft or relevant compensating element directly on the rotor (using an intermediate flange when required). Under no circumstances should the permissible limits specified for bending moments, lateral and longitudinal forces be exceeded. Due to the torque flange's high torsional stiffness, dynamic shaft train changes are kept to a minimum.

Important

Even if the unit is installed correctly, the zero point adjustment made at the factory can shift by up to approx. 0.5% of the characteristic value. If this value is exceeded, we advise you to check the mounting conditions. If the residual zero offset when the unit is removed is greater than 1% of the sensitivity, please send the transducer back to the Darmstadt factory for testing.

5.2 Conditions on site

The special torque flange must be protected against coarse dirt particles, dust, oil, solvents and humidity.

There is wide ranging compensation for the effects of temperature on the output and zero signals of the transducer (see Chapter 13, "Specifications"). If there are no static temperature ratios, for example, because of the temperature differences between the measuring body and the flange, the values given in the specifications can be exceeded. In this case, ensure static temperature ratios by cooling or heating, depending on the application. As an alternative, check if thermal decoupling is possible, e.g. by means of heat radiating elements such as multiple disc couplings.

5.3 Installation orientation

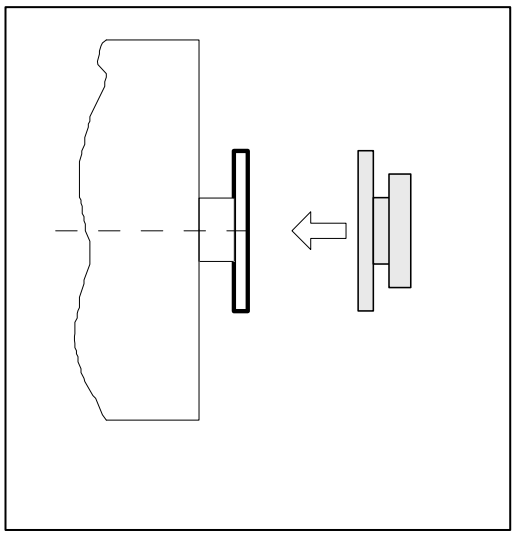
The torque flange can be installed with any orientation**.**

With clockwise torque, when using the voltage output mode a positive output signal (0 V…+10 V) or when using the frequency output mode an output frequency of 10 kHz … 15 kHz is present on the output (corresponding zero to nominal torque load).

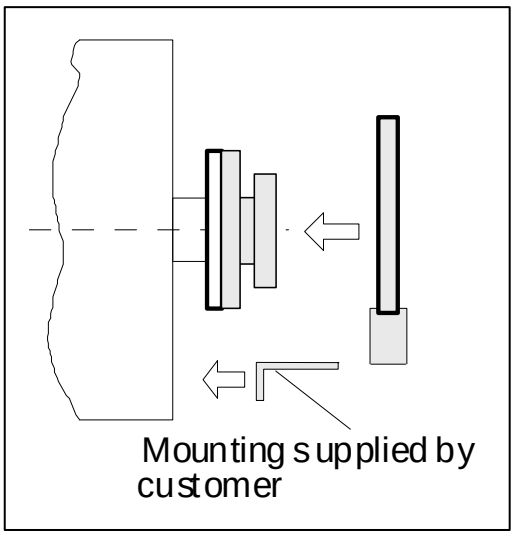
5.4 Installation options

There are basically two options for mounting the special torque flange: with or without dismantling the antenna ring. We recommend mounting as described in Chapter 5.4.1.
If mounting in accordance with Chapter 5.4.1 is not possible (e.g. in the case of subsequent stator replacement), you will have to dismantle the antenna ring. It is essential in this case to comply with the notes on assembling the antenna segments (see Chapter 5.4.2).

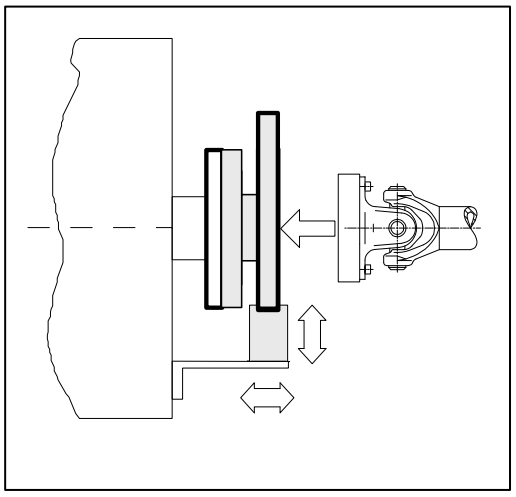
5.4.1 Installation without dismantling the antenna ring



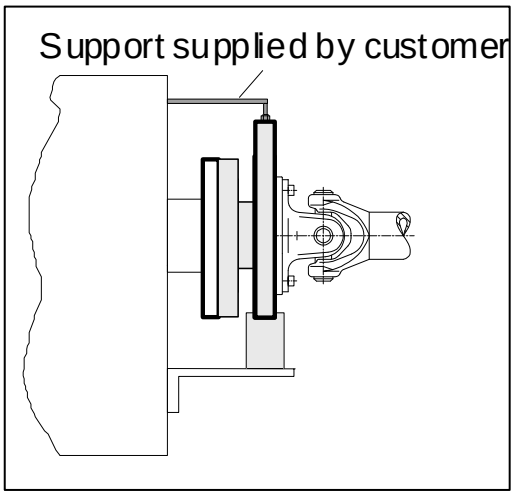
1. Install rotor



2. Install stator

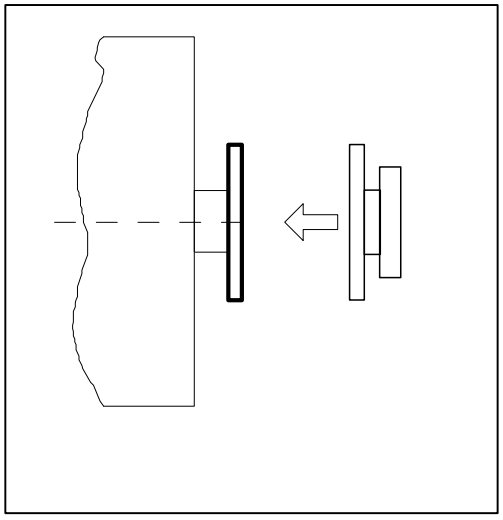


3. Finish shaft train installation

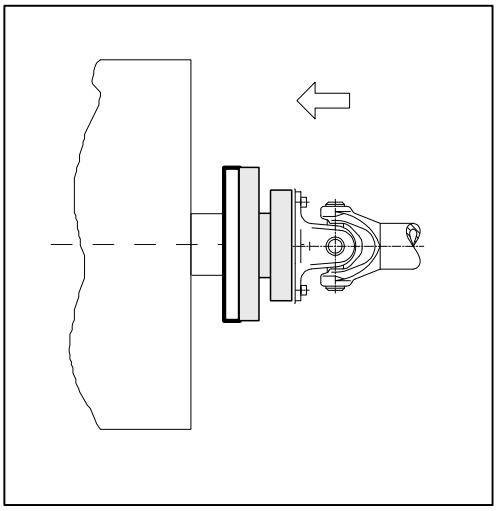


4. Fit support

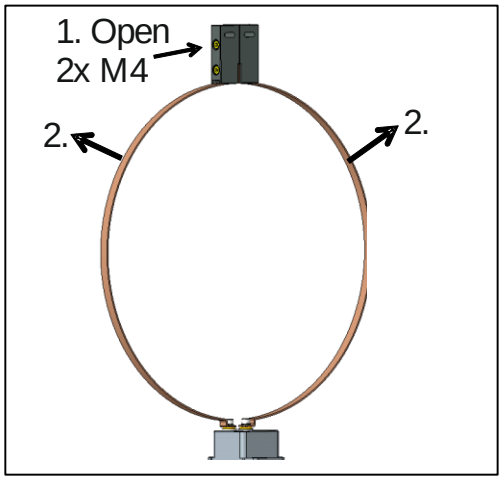
5.4.2 Installation with subsequent stator mounting



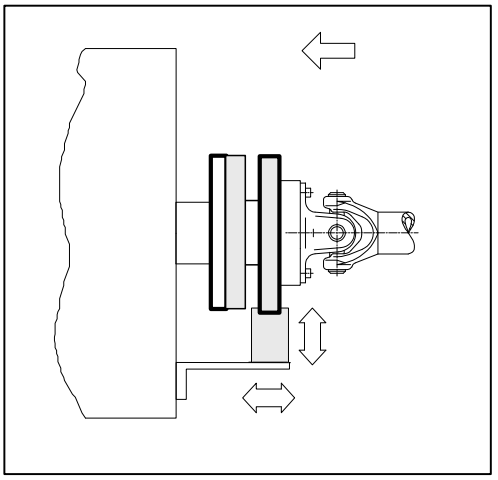
1. Install rotor



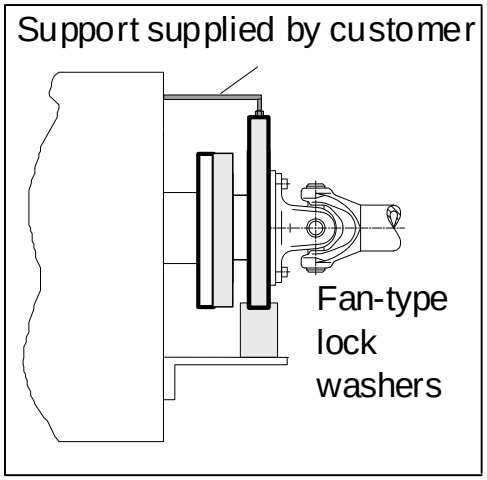
2. Install shaft train



3. Dismantle antenna segment



4. Install antenna segment



5. Fit support

5.5 Preparing for the rotor mounting (exemplary)

⚠ CAUTION

The rotor is heavy
Use a crane or other suitable lifting equipment to lift it out of its packaging and install it.

Use flexible eye bolts as transport and mounting aids. Hook the lifting equipment to these eye bolts as this ensures that the rotor is lifted horizontally out of the packaging (see Fig 4.1).

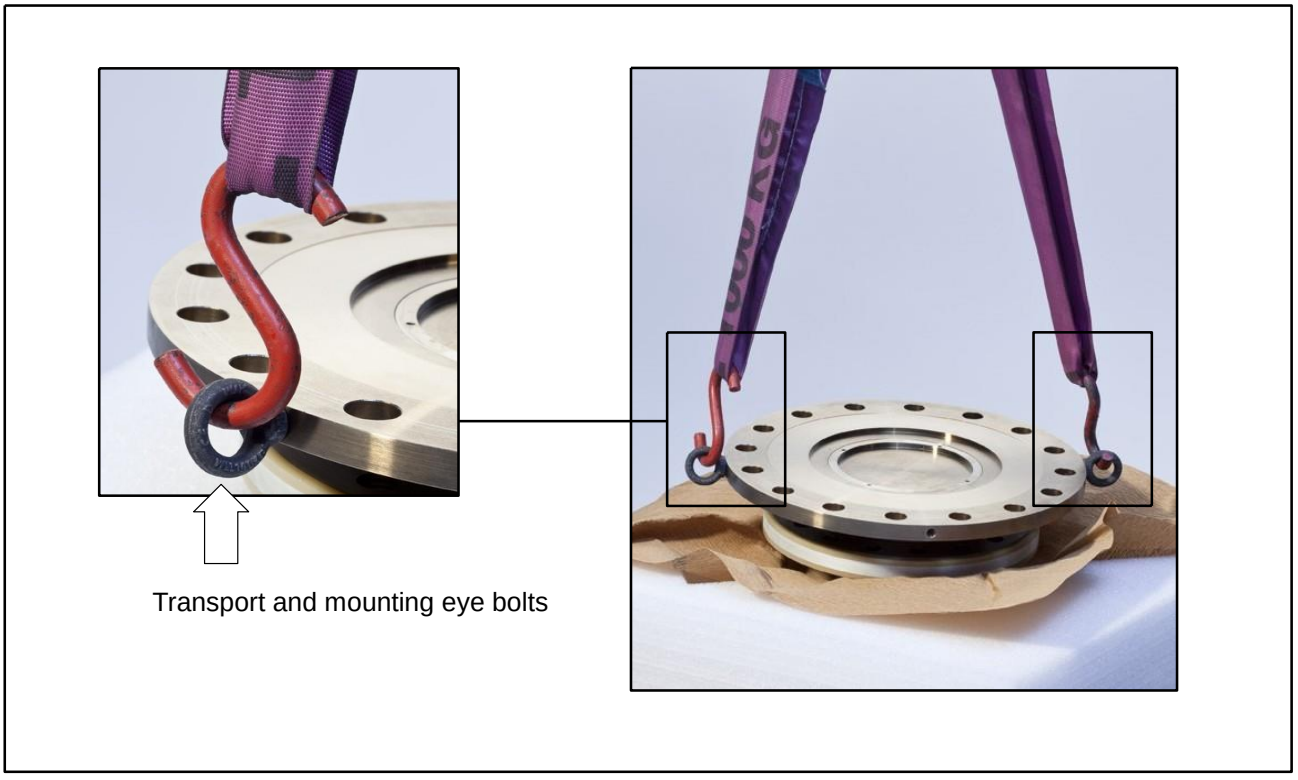


Fig 5.1: Transport and mounting eye bolts on the rotor

1. Lift the rotor out of the packaging, rotate horizontally by 180°, so that the bigger flange is pointing upwards (see exemplary Fig 5.1).

Fig 5.2: Rotating the rotor

2. Place the rotor carefully onto a clean and stable table.
3. If the rotor is to be installed horizontally as shown in Fig 5.3, remove *one* mounting eye bolt. Both mounting eye bolts can initially remain in the flange for vertical installation.

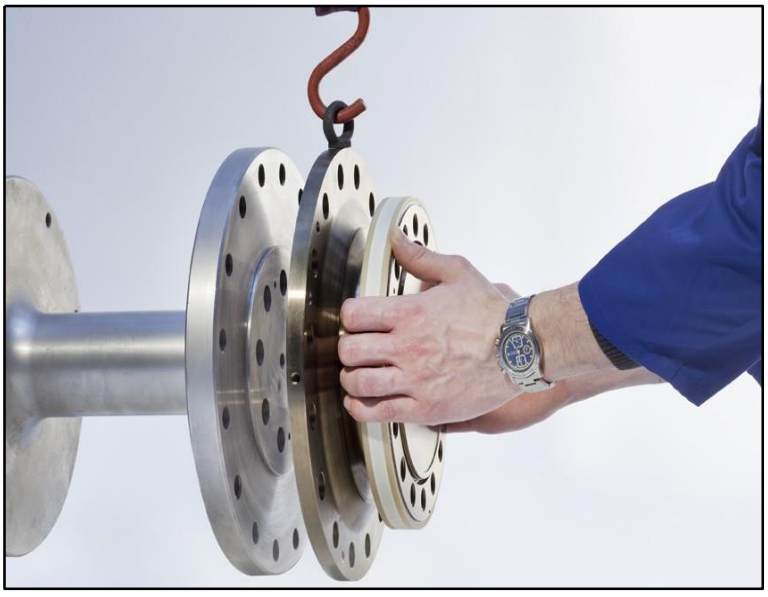


Fig 5.3: Rotor installation (horizontal)

4. Clean the plane surfaces of the transducer flange and the counter flange.
   For safe torque transfer, the faces must be clean and free from grease. Use a piece of cloth or paper soaked in solvent. Make sure that no solvent drips into the inside of the transducer and that the transmitter coils are not damaged during cleaning.
5. Fasten the lifting equipment to the mounting eye bolt(s).
6. Carefully lift up the rotor and move it to the mounting position (see Fig 5.1).

5.6 Mounting the rotor

Tip

Usually the rotor identification plate is no longer visible after installation. This is why we include with the rotor additional stickers with the important characteristics, which you can attach to the stator or any other relevant test-bench components. You can then refer to them whenever there is anything you wish to know, such as the shunt signal. To explicitly assign the data, the identification number and the size are engraved on the rotor flange, where they can be seen from outside.

Note

Make sure during installation that you do not damage the measuring zone marked in Fig. 5.4 by using it to support tools or knocking tools against it when tightening screws, for example. This can damage the transducer and produce measurement errors, or even destroy the transducer.

1. Prior to installation, clean the plane surfaces of the transducer flange and the counter flange.
   For safe torque transfer, the surfaces must be clean and free from grease. Use a piece of cloth or paper soaked in solvent. When cleaning, make sure that you do not damage the transmitter winding.

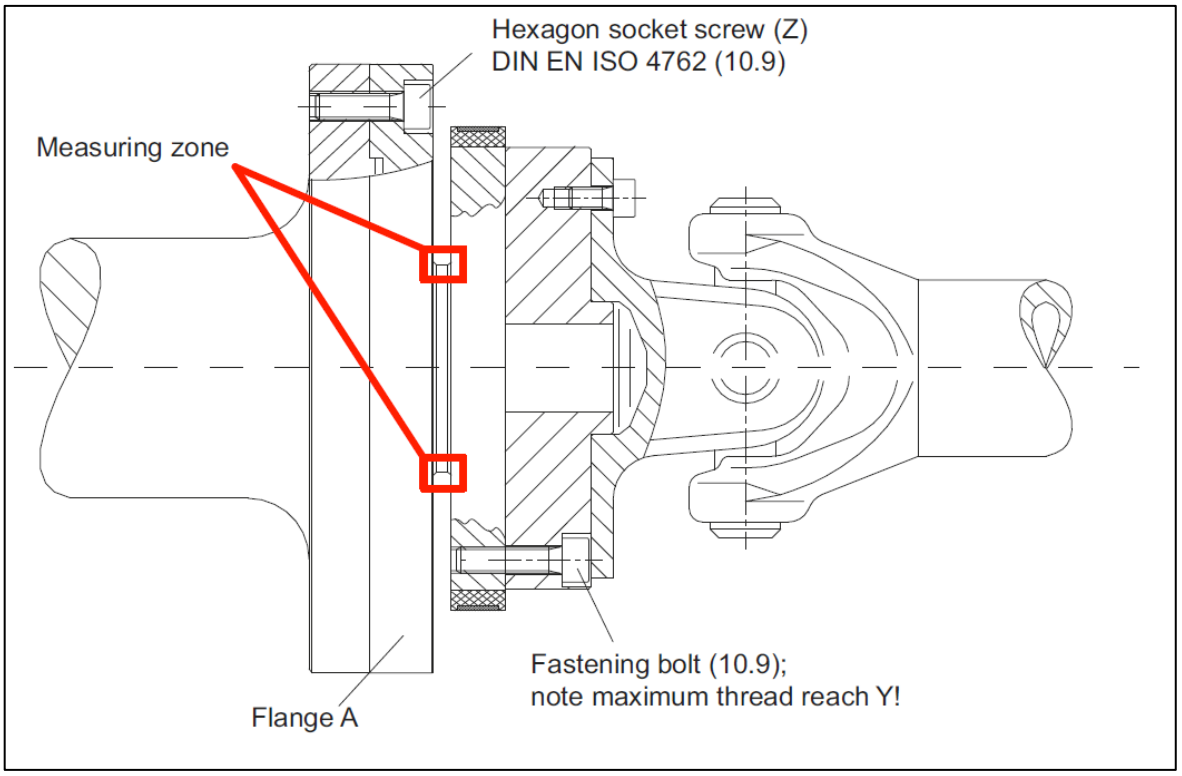


Fig. 5.4: Bolted rotor connection

2. For the connection of flange A (see Fig. 5.4), use DIN EN ISO 4762 property class 10.9 hexagon socket screws of a suitable length (dependent on the connection geometry, see Tab. 5.1).
   We recommend fillister head screws DIN EN ISO 4762, blackened, smooth headed, permitted size and shape variance in accordance with DIN ISO 4759, Part 1, product class A.

3. Fasten all screws with the specified torque (Table 5.1).

4. Now remove the eye bolt(s) used for transportation and mounting.

Important

Keep them in a safe place for future dismounting.

5. There are relevant tapped holes on flange B for continuing the shaft train mounting. Again use screws of property class 10.9 and tighten them with the pre scribed torque, as specified in Tab. 5.1.

Important

Use a threadlocker (medium strength, e.g. LOCTITE) to glue the screws into the counter thread to exclude prestressing loss due to screw slackening, in the event of alternating loads.

Note

Comply with the maximum screw-in depth as per Tab. 5.1. Otherwise significant measurement errors may result from torque shunt, or the transducer may be damaged.

Important

Dry screw connections can result in different and higher friction factors (see VDI 2230, for example). This means a change to the required tightening moments.
The required tightening moments can also change if you use screws with a surface or property class other than that specified in Tab. 5.1, as this affects the friction factor

5. There are relevant tapped holes on flange B for continuing the shaft train mounting. Again use screws of property class 10.9 and tighten them with the pre scribed torque, as specified in Tab. 5.1.

5.7 Installing the stator

On delivery, the stator has already been installed and is ready for operation. If necessary, the antenna segments can be divided from the antenna segment clamp for maintenance or to facilitate stator mounting.

Important

We recommend to use the stator ring as it is and to only open if absolutely necessary.
When the flexible antenna segments are bent, they easily deviate from circularity.
Prevent the antenna segments from a large deformation while bending.
While opening the stator ring, bend the antenna segments only as wide as necessary to slip them over a thin part of the shaft nearby.

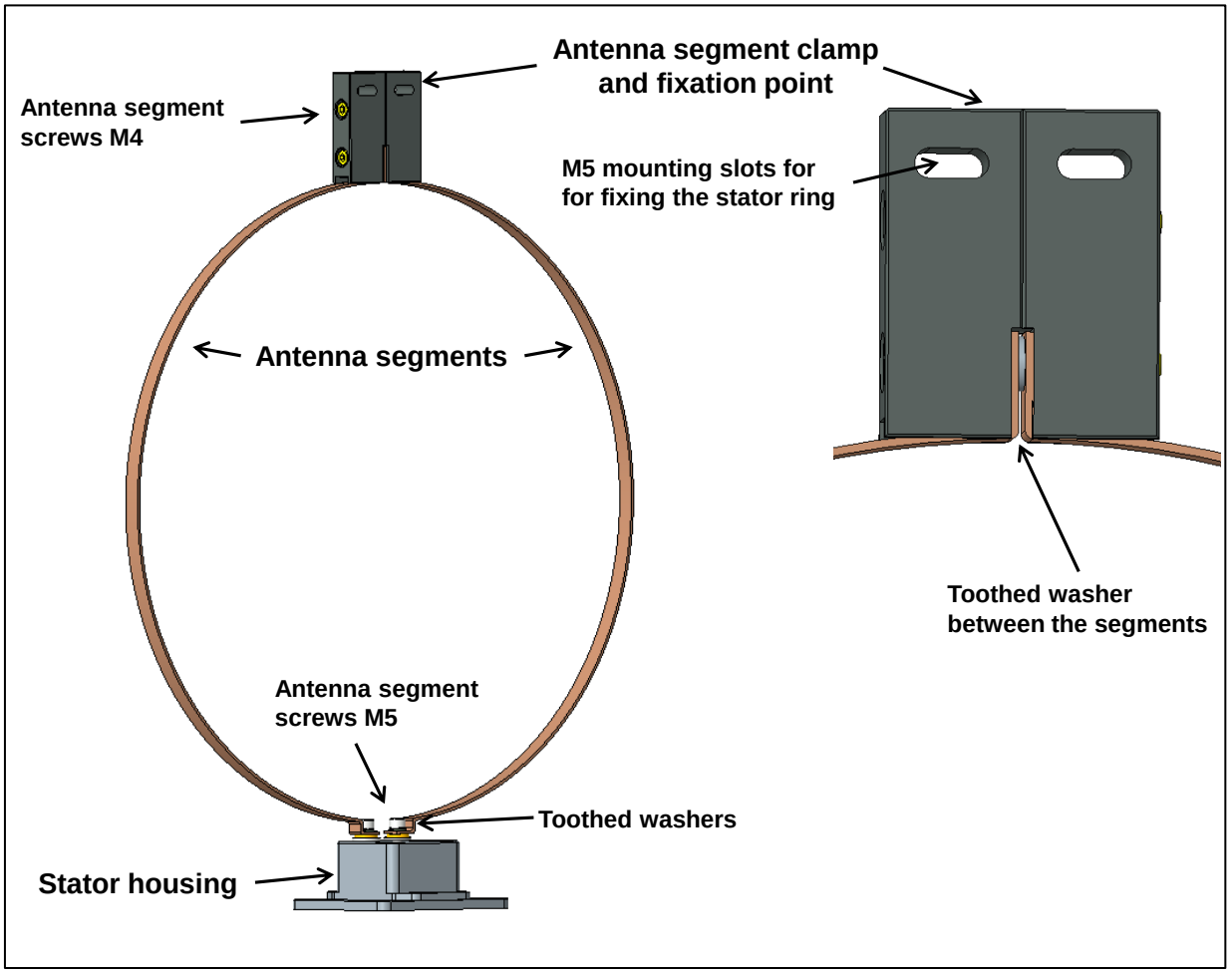


Fig. 5.5: Bolted connection of the antenna segments on the stator

1. Undo and remove the bolted connections (M4) on the Antenna segment clamp.
   There are fan type lock washers (or toothed washers) between the antenna segments: Make sure that they do not get lost.

2. Careful bend the antenna segments to the necessary amount of gap and slip the antenna ring over the thinnest part of the shaft nearby.
3. Use an appropriate mounting base to install the stator housing in the shaft train so that there is sufficient opportunity for horizontal and vertical adjustments. Do not fully tighten the bolts yet.
4. Now use two hexagon socket screws to mount the antenna segment clamp removed in Point 1.
   Make sure that the fan type lock washer is inserted between the antenna segments (these ensure that there is a defined contact resistance)!

Important

To make sure that they function perfectly, the fan-type lock washers (A5.3-FST DIN 6798 ZN/galvanized) must be replaced after the bolted antenna connection has been loosened three times.

5. Now tighten all antenna-segment bolted connections with a tightening torque of 5 Nm.

6. Then align the antenna to the rotor in such a way that the antenna encloses the rotor more or less coaxially and the antenna ring in the axial direction shows the position and the center of the transmitter winding on the rotor (on flange B).

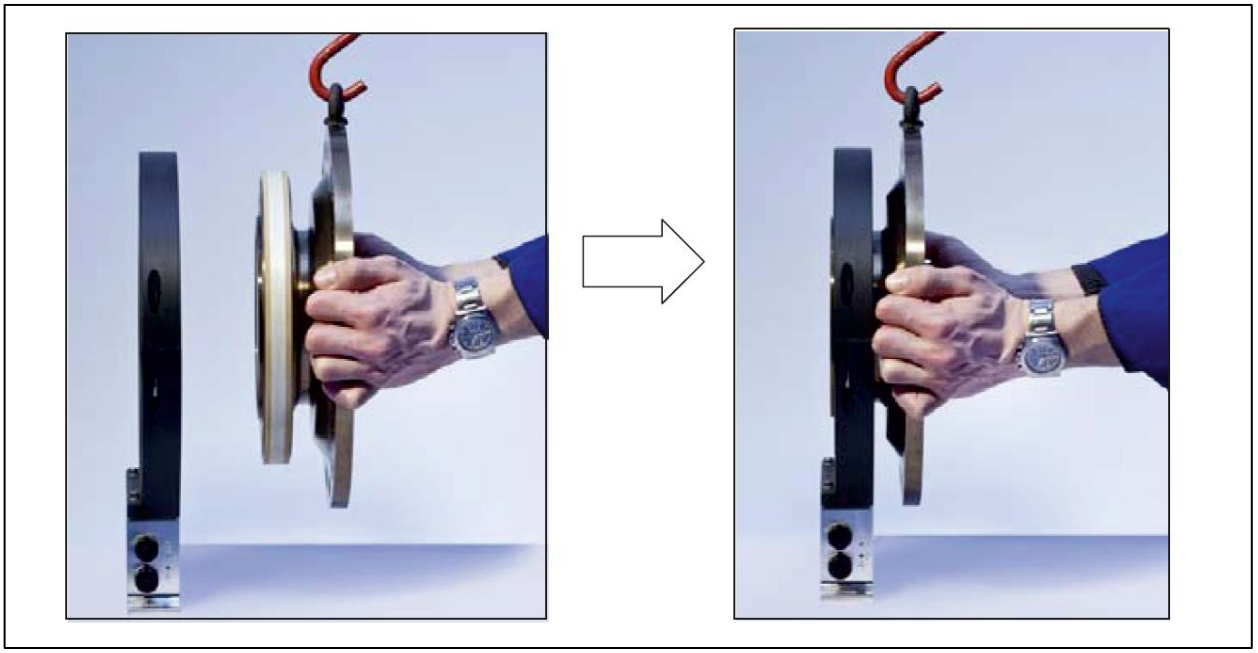


Fig. 5.6: Bolted connection of the antenna segments on the stator

6. Now fully tighten the bolted stator housing connection.

Prevention of stator axial oscillation

Depending on the operating conditions, the stator may be excited to vibrate.

This effect is dependent on:

- The rotational speed,
- The antenna diameter,
- The design of the machine base.

Important

To prevent this axial oscillation, the antenna ring requires additional support by the customer. There are two mounting slots on the upper antenna segment clamp (with an inner diameter of 5.5mm), which can be used to incorporate a clamping device .The cable plug also requires support in this case, a construction example is shown in Fig. 5.7

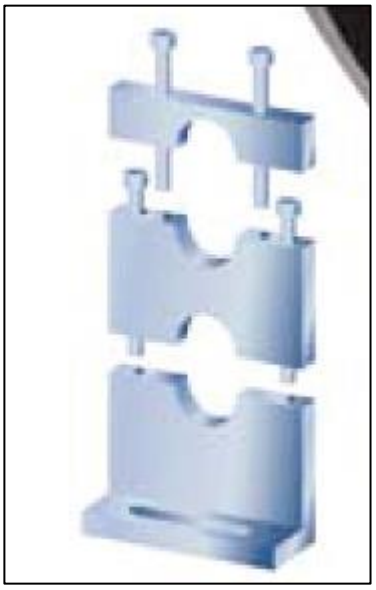


Fig. 5.7: Construction example for connector cables (here for two plugs, needs adjustment to MPZ1604008 to only one plug)

6 General information

- With extension cables, make sure that there is a proper connection with minimum contact resistance and good insulation.
- All cable connectors or swivel nuts must be fully tightened.

6.2 EMC protection

The product offered is a special assembly for stationary systems that is not available on the general market or a transducer for installation by system integrators and plant manufacturers. According to EMVG[1] §12 paragraph 2 and Directive 2004/1008/EC article 13 paragraph 1 this product does not require an EC declaration of conformity nor the CE marking.

This product is intended exclusively for subsequent processing by companies or persons that are experts in the field of electromagnetic compatibility (EMC). Relevant EMC protection requirements relating to the product offered are met when the following ***Installation notes*** are observed and implemented.

Installation notes

Please note the following points during installation and use:

- It is essential to observe the specifications and notes provided in the operating manual and the data sheet
- Connecting cables, in particular the measuring and control cables, need to be shielded
- Make sure that the transducer and shielding are connected extensively to ground.
- Ensure an interference-free environment, avoid radiation interference
- Devices connected to this product need to comply with protection requirements per EMVG (Gesetz über die elektromagnetische Verträglichkeit von Geräten / law on electromagnetic compatibility of instruments).

Important

You have to install the shield of the connection cable at the shielded housing of the electronics, to achieve the EMC-protection of the measuring chain. Make sure that the transducer and shielding are connected extensively to ground.

Electrical and magnetic fields often induce interference voltages in the measuring circuit. Therefore:

- Use shielded, low-capacitance measurement cables only
- **Only use plugs that meet EMC guidelines**.
- Do not route the measurement cables parallel to power lines and control circuits.
  If this is not possible, protect the measurement cable with e.g. steel conduit.
- Avoid stray fields from transformers, motors and contact switches.
- Do not ground the transducer, amplifier and indicator more than once.
- Connect all devices in the measurement chain to the same grounded conductor.
- In the case of interference due to potential differences (compensating currents), supply voltage zero and housing ground must be disconnected on the amplifier and a potential equalization line established between the evaluation unit and the amplifier housing (copper conductor, minimum 10 mm² wire cross-section).
- Should differences in potential between the machine rotor and stator, because of unchecked leakage, for example, cause interference, this can usually be overcome by connecting the rotor definitively to ground, e.g. with a wire loop. The stator must be connected to the same (ground) potential.

6.3 Evaluation unit

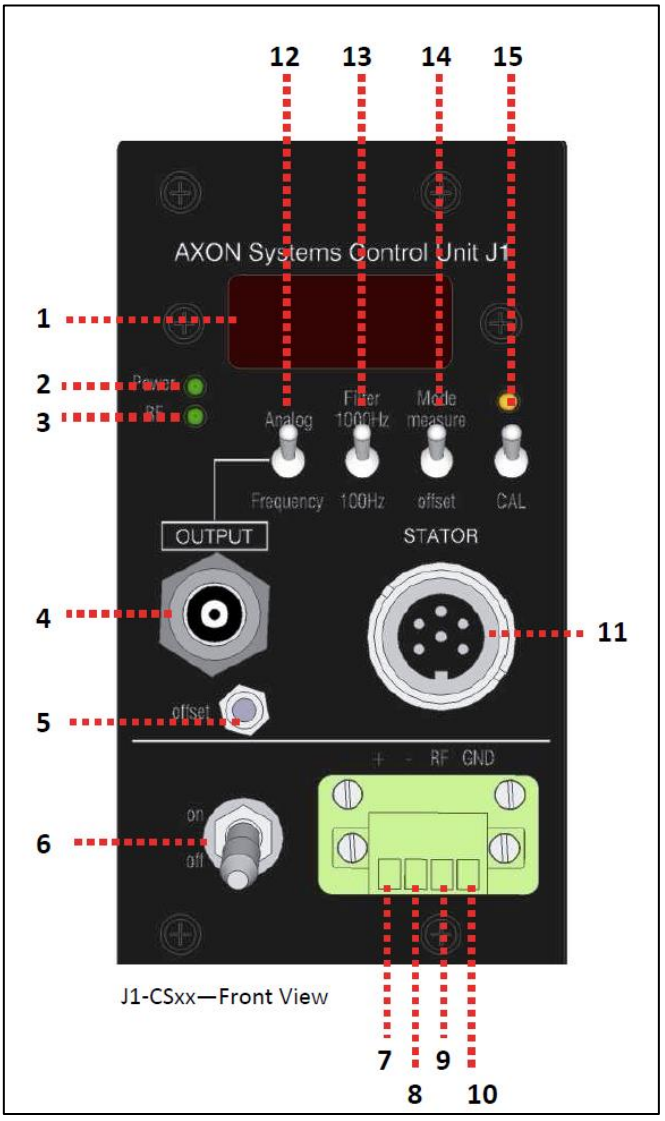


Fig. 6.1: Front view of the evaluation unit

Functional overview of the evaluation unit (See fig. 5.8)

Item	Function description
1	**Display** Shows analog output voltage. For monitoring only - accurate measurement values to be read out on the output BNC connector
2	**LED power** The LED indicates the on/off status of the device
3	**LED RF-level** The LED indicates an acceptable RF signal strength from the transmitter
4	**BNC output** Voltage ±10V / frequency 10kHz±5kHz (select with switch no. 12)
5	**Potentiometer „offset“** Potentiometer for offset correction within the range of ±1V
6	**Main switch** On / off switch (self-locking, pull to switch)
7	**Supply voltage (+)** 9 V….36 V DC
8	**Supply voltage** GND
9	**RF output (+)** Analog output correla1ng to the strength of the received RF-Signal. Acceptable RF-Level is received, when voltage is above 3,4V
10	**RF output GND** Ground connec1on of the telemetry system. Connect with main ground of vehicle / test field
11	**Stator-connection** Female connector for cable to stator unit
12	**“Analog / frequency” output switch** Switch for setting the output format of the measurement signal. Analog: ±10V, frequency: 10kHz ±5kHz TTL
13	**Filter switch** Changes the filter frequency on output between 1.000Hz and 100Hz (-3dB). For slow signals set on 100 Hz to get extra low noise signals.
14	**Mode switch „measure / offset“** Switch up to „measure“: Normal measuring mode. The offset can be adjusted with the potentiometer Switch down to „offset“: The Control Unit generates internally an exact 0V output signal which is only affected by the offset potentiometer. So the offset value can be precisely determined and re-adjusted by setting any desired value.
15	**Shunt cal-function on (push button)** Push button to release shunt cal-function. Cal-function will be released for app. 5 seconds (the orange LED above the button is activated for this time span).

Table 6.1: Functions of the evaluation unit

Technical details

Supply voltage	9…36 VDC
Max. power consumption	30 VA
Signal bandwidth	Switchable 1000 Hz / 100Hz
Voltage output	±10 V
Frequency output	5 … 15 kHz TTL
Signal-to-noise ratio	63dB (1000Hz) / 83dB (100Hz)
Signal transit time	450µs
Wireless shunt calibration	Key button at control unit
Protection class	IP40
Weight	700 grams
Temperature range	-10 … +70 °C

Table 6.2: Technical details of the evaluation unit

Dimensions of the evaluation unit

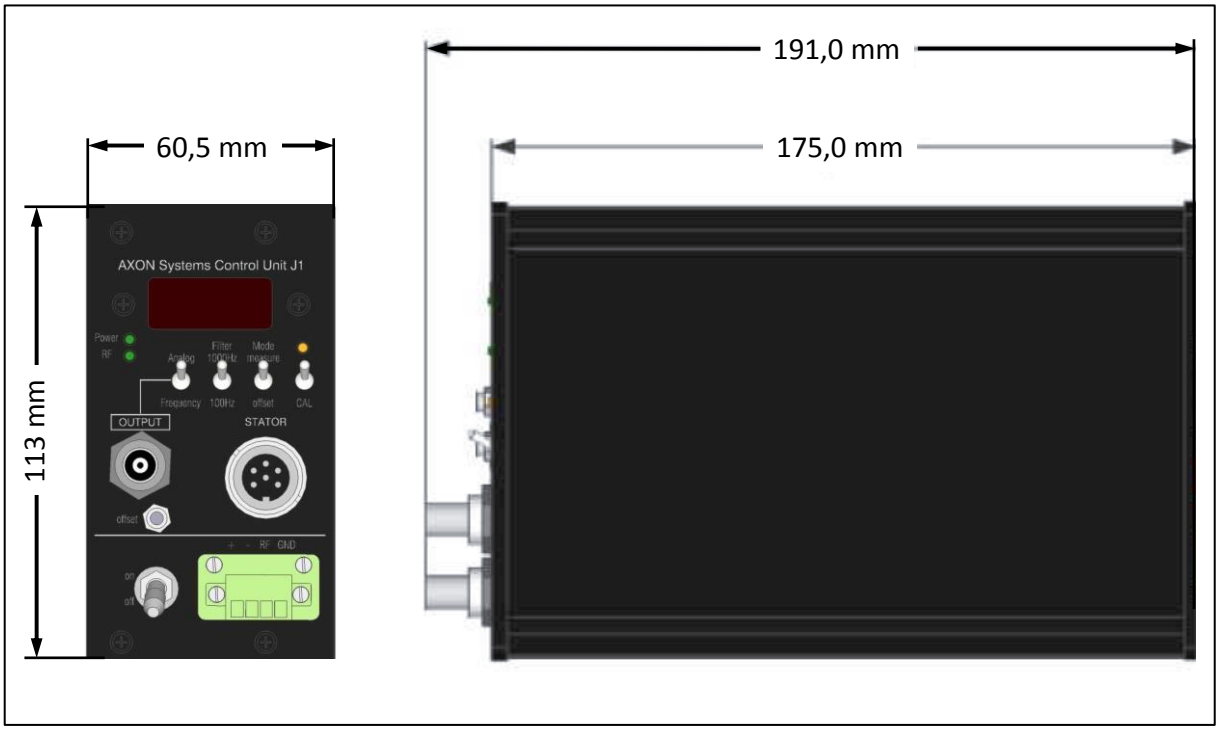


Fig. 6.2: Main dimensions of the evaluation unit

6.4 Supply voltage

The transducer must be operated with a separated extra low voltage (supply voltage
9 … 36 VDC). You can supply one or more torque flanges within a test bench at the same time. Should the device be operated on a DC voltage network[1)], additional precautions must be taken to discharge excess voltages.

The information in this Chapter relates to the self-contained operation of the special torque transducer without HBM system solutions.
The supply voltage is electrically isolated from signal out puts and shunt signal inputs. Connect a separated extra low voltage of 9 V … 36 V DC to bracket 7 (+) and bracket 8 (-) of the evaluation unit.
The cable can be up to 50m long for voltages ≥24V, otherwise it can be up to 20m long.

[1)] Distribution system for electrical energy with greater physical expansion (over several test benches, for example) that may possibly also supply consumers with high nominal (rated) currents

Important

At the instant of power-up, a current of up to 4 A may flow, which could switch off power packs with electronic current limiters.

6.5 Use of EMI suppressor

To suppress high frequencies a EMI suppressor on the cable between rotor and stator has to be used. Use at least 1 loops of the cable.

Fastening must be done in an area not subject to mechanical loads (i.e. no unwanted vibrations, etc.) using cable ties fit for the specific application.

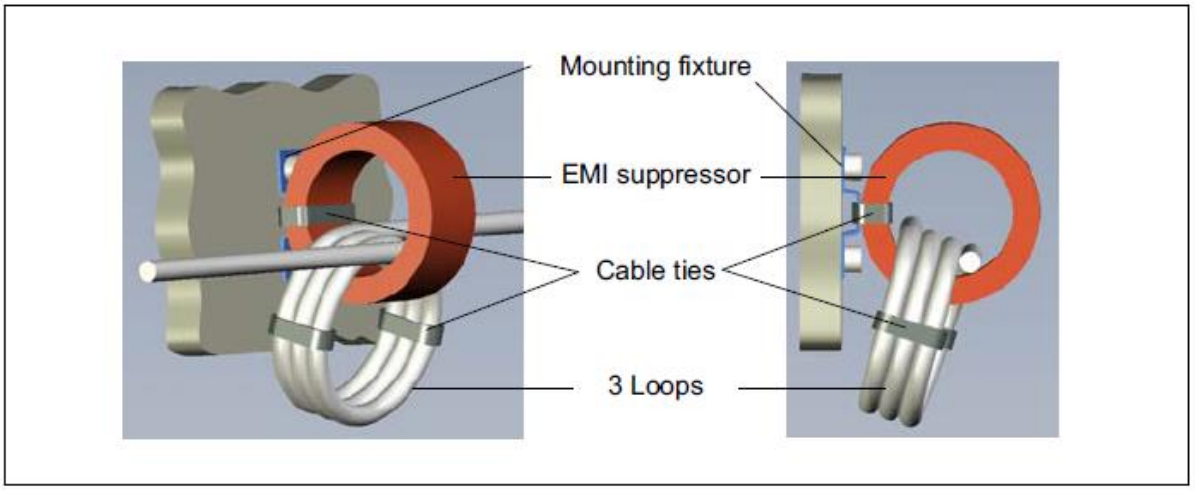


Fig 6.1: Installation example EMI suppressor

Information

Consider longer cable of approximately 40cm due to the installation of the EMI suppressor. The max. distance of EMI suppressor to connector is 500mm.

If the EMI suppressor has to be removed for any purpose (e.g. for maintenance), it must be replaced on the cable. Use only EMI suppressor of the correct type.

Type: Vitroperm R

Model No.: T60006-22063W517

Size: external diameter x internal diameter x height = 63 x 50 x 25

Important

The use of the EMI suppressor on the power cable is mandatory to ensure compliance with FCC regulations.

7 Shunt signal

The special torque flange delivers an electrical shunt signal that can be activated from the evaluation unit for measuring chains with HBM components. The transducer generates a shunt signal of about 50% of the nominal (rated) torque; the precise value is specified on the type plate.
After activation of push button no. 15 (see Fig. 6.1), the shunt signal is activated for a time span of 5s. Adjust the amplifier output signal to the shunt signal supplied by the connected transducer to adapt the amplifier to the transducer.

Information

The transducer should not be under load when the shunt signal is being measured, as the shunt signal is mixed additively.

Triggering the shunt signal

Push button no. 15 (see Fig. 6.1) on the evaluation unit to activate the shunt signal for a time span of 5s.

8 Functionality testing

You can check the functionality of the rotor and the stator from the LEDs on the evaluation unit.

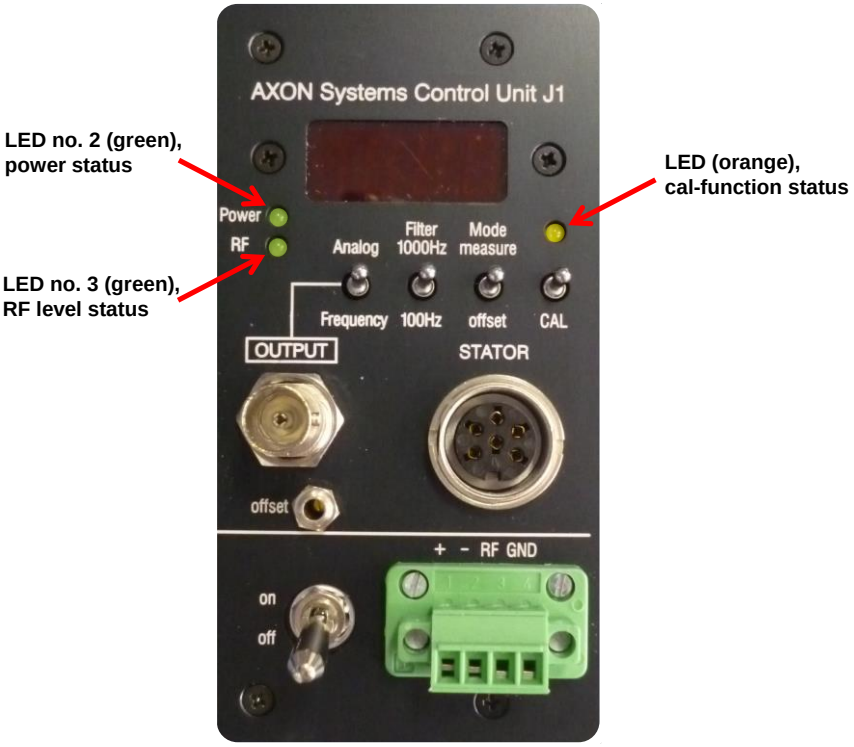


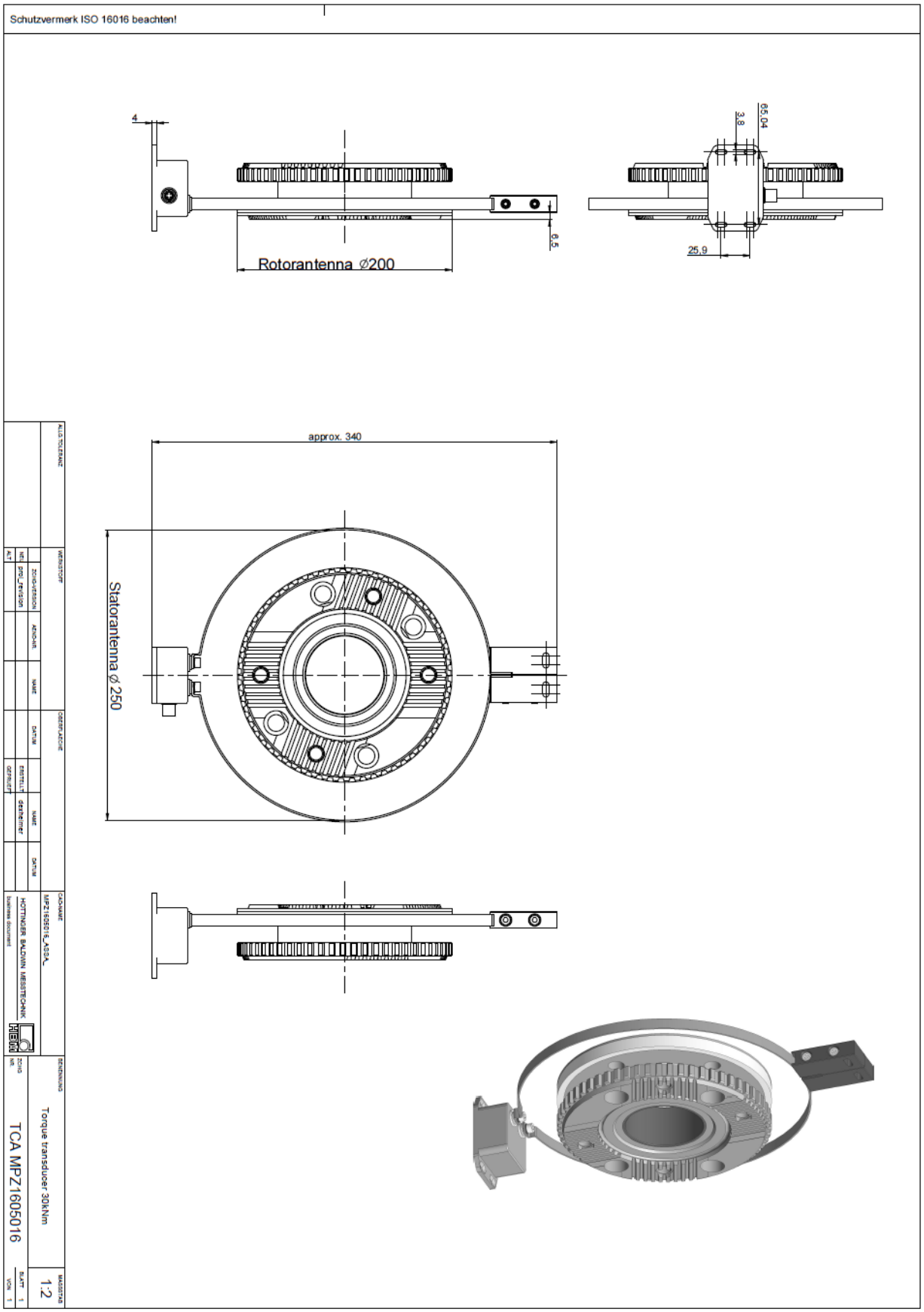
Fig. 8.1: LEDs on the evaluation unit

LED	Color	Significance
LED no. 2 (power status)	Green (permanently lit) *normal operation* Off (not lit)	The main switch (no. 6 in Fig. 6.1) is on and the evaluation unit is under power The main power is off
LED no. 3 (RF level status)	Green (permanently lit) *normal operation* Off (not lit)	The LED indicates an acceptable RF signal strength The RF signal strength is too low, the transmission between rotor and stator is broken. Check rotor / stator alignment
LED (cal-function status)	Off (not lit) *normal operation* Orange (permanently lit)	The shunt signal is not active. The shunt signal is active as long as the LED is lit.

9 Maintenance

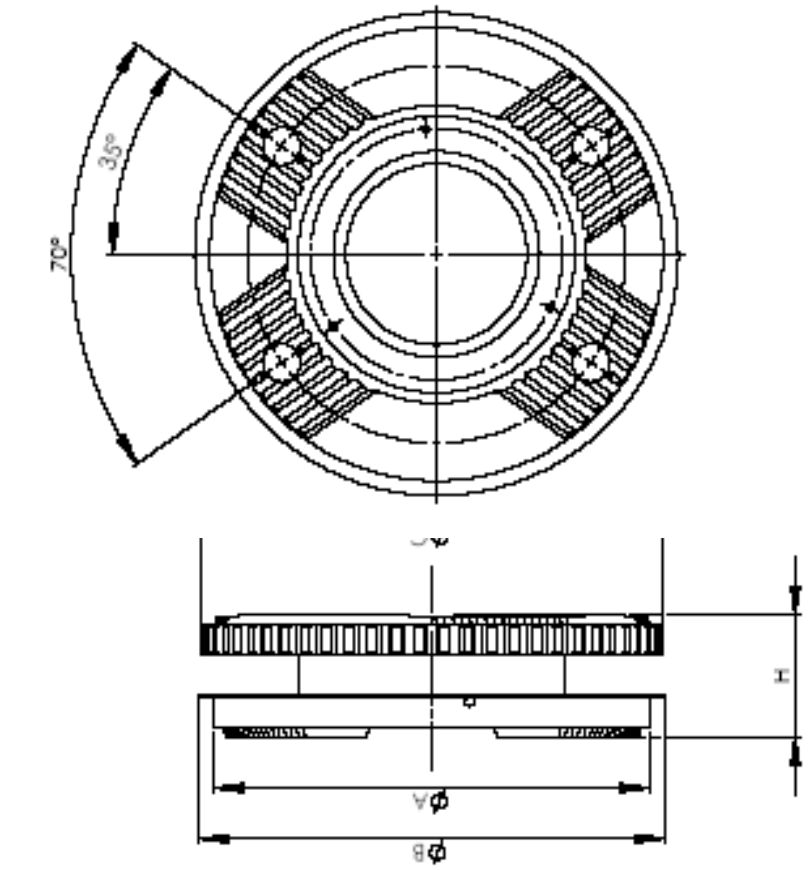
The torque transducer is maintenance-free.

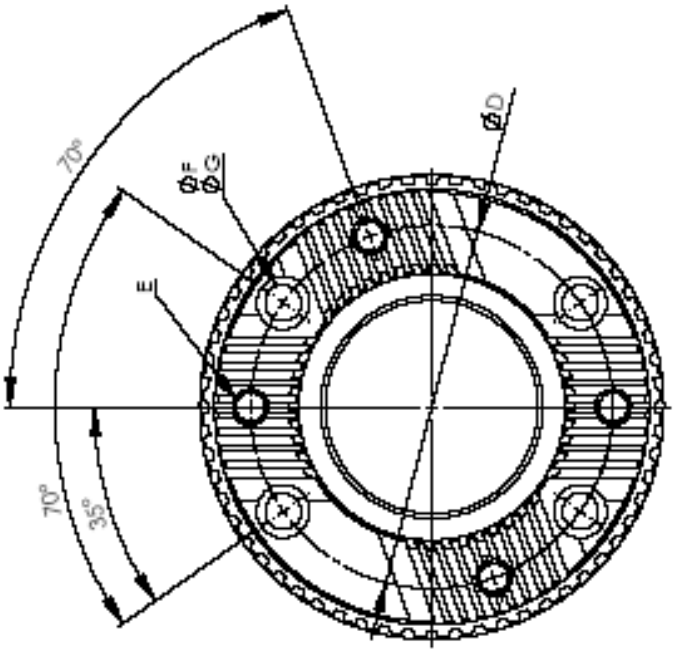
10 Dimensions of the rotor and stator antenna



11 Dimensions

11.1 Rotor- 30kN·m





Typ ***X-Toothing according to ISO 12667***		**KV180**
Φ A	mm	180 h7
Φ B	mm	200
Φ C	mm	192 h7
Φ D	mm	150
E	mm	M14
Φ F	mm	15
Φ G	mm	22
H	mm	50
Φ N	mm	200

12 Specifications

Type		TCA MPZ1605016
Accuracy class		0.3
Torque measuring system		
Nominal (rated) torque M_{nom}	kN·m	30
Nominal (rated) sensitivity (spread between torque = zero and nominal (rated) torque)		
Freq. output 10 kHz	kHz	5
Voltage output	V	10
Sensitivity tolerance (deviation of the actual output quantity at M_{nom} from the nominal (rated) sensitivity)		
All outputs	%	<±0.3
Output signal at torque = zero		
Frequency output	kHz	10
Voltage output	V	0
Nominal output signal		
Frequency output		
at positive nominal (rated) torque	kHz	15 (TTL)
at negative nominal (rated) torque	kHz	5 (TTL)
Voltage output		
at positive nominal (rated) torque	V	+10
at negative nominal (rated) torque	V	-10
Low-pass filter		
Low-pass filter LP1	Hz	100
Low-pass filter LP2	Hz	1000
Measurement frequency range, -3 dB	Hz	0 … 1000
Temperature influence per 10 K in the nominal temperature range		
on the output signal, related to the actual value of the signal span (TKC)		
Frequency output	%	<±0.1
Voltage output	%	<±0.1
on the zero signal, related to the nominal (rated) sensitivity (TK0)		
Frequency output	%	<±0.1
Voltage output	%	<±0.1
Maximum level control range		
Frequency output	kHz	4.5 ... 15.5
Voltage output	V	-11 … +11
Energy supply		
Nominal (rated) supply voltage (separated extra low DC voltage)	V	9 - 36
Maximum power consumption	W	30
Maximum cable length	m	50

Linearity deviation, including hysteresis, relative to nominal (rated) sensitivity		
Frequency output	%	<±0.3
Voltage output	%	<±0.3
Rel. Standard deviation of repeatability as per DIN 1319, relative to the variation of the output signal		
Frequency output	%	<±0.1
Voltage output	%	<±0.1
Shunt signal	%	approx. 50 % of M_{nom}

General information		
Nominal (rated) torque M_{nom}	kN·m	30
Reference temperature	°C	2
Nominal (rated) temperature range	°C	3
Operating temperature range	°C	-
Storage temperature range	°C	1
Mechanical shock as per EN-60068-2-27 1)		
Quantity	n	1000
Duration	ms	3
Acceleration (half sine)	m/s^2	650
Vibrational stress in 3 directions as per EN-60068-2-6 1)		
Frequency range	Hz	10 … 2000
Duration	h	2.5
Acceleration (amplitude)	m/s^2	200
Nominal (rated) speed	rpm	8000
Load limits 2)		
Limit torque	kN·m	45
Breaking torque (static)	kN·m	>90
Longitudinal limit force (static)	kN	100
Lateral limit force (static)	kN	12
Limit bending moment (static)	N·m	1800

1) The antenna ring and connection plug must be fixed.

2) Each type of irregular stress (bending moment, lateral or longitudinal force, exceeding nominal (rated) torque) can only be permitted up to its specified limit, provided none of the others can occur at the same time. If this condition is not met, the limit values must be reduced. If 30% of the limit bending moment and lateral limit force occur at the same time, only 40% of the longitudinal limit force is permissible and the nominal (rated) torque must not be exceeded. The effects of permissible bending moments, longitudinal and lateral forces on the measurement result are ≤±1% of the nominal (rated) torque. The load limits only apply for the nominal (rated) temperature range. At temperatures <10°C, the load limits must be reduced by approx. 30% (strength reduction).

3) The data refer to static loading of the measuring body; note the bolted connection!

4) The nominal (rated) torque must not be exceeded.

Mechanical values		
Permissible eccentricity of the rotor (radially) to the center point of the stator	mm	±10
Permissible axial displacement between rotor and stator	mm	±10
Weight Rotor Stator	 kg kg	 3,8 <1

13 Declaration of conformity

Hottinger Baldwin Messtechnik GmbH.
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