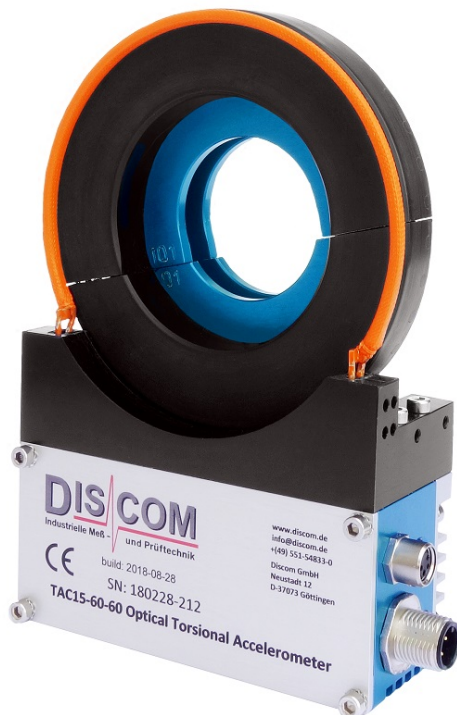


## TAC15



- ✓ Torsional acceleration for high correlation between test rig and vehicle data
- ✓ Contactless optical communication between stator and rotor
- ✓ Real-time data at all angles
- ✓ Optical data output for EMC safe communication.
- ✓ Up to 15000 rpm

## TAC15 – Technical Specification

The TAC torsional accelerometer is mounted directly onto a shaft and measures with high sensitivity smallest fluctuations of the rotational speed.

It consists of a fixed part (the stator) and a rotating ring (the rotor with the sensor) which is mounted onto the shaft. The power supply and data transfer are contactless.

The rotor is powered by induction from the stator's power generator. The wireless power transfer is within a free ISM-band (around 200 kHz).

The TAC rotor contains two accelerometers which are calibrated by Discom. Sensor data from the rotor to the stator is transmitted with infrared LEDs. The stator is connected to Discom's TAS front-end through an optical, EMC safe link.

The TAC15 Sensor is available in two standardized Versions, TAC15-60 and TAC15-90. These Versions can fit shaft sizes from 30 to 90 mm.

TAC Model	Compatible Shaft Diameter	Preferred Standard Sizes	
TAC15-60	30 to 60 mm	TAC15-60-40	shaft diameter: 40 mm
TAC15-90	60 to 90 mm	TAC15-90-75	shaft diameter: 75 mm

**Special versions for nearly any shaft diameter and test stand configuration are possible!**

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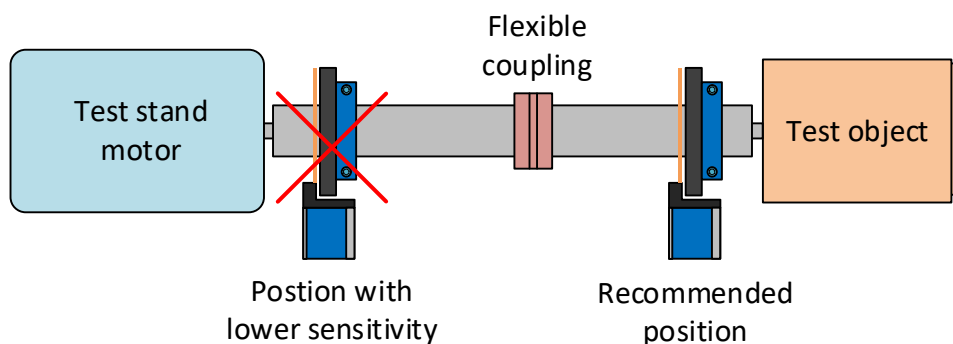
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## 1 General Design

The TAC15 Sensor consists of two parts, the TAC15 Stator and the TAC15 Rotor. The Stator is mounted in the testbed with a fixed distance to the rotating shaft. The Rotor is clamped on to the shaft and is powered through inductive coupling from the stator. Due to the split-design the Rotor can be mounted directly onto the shaft. The primary coil of the stator is detachable as well, so it is possible to integrate the TAC15 Sensor into existing test stands.

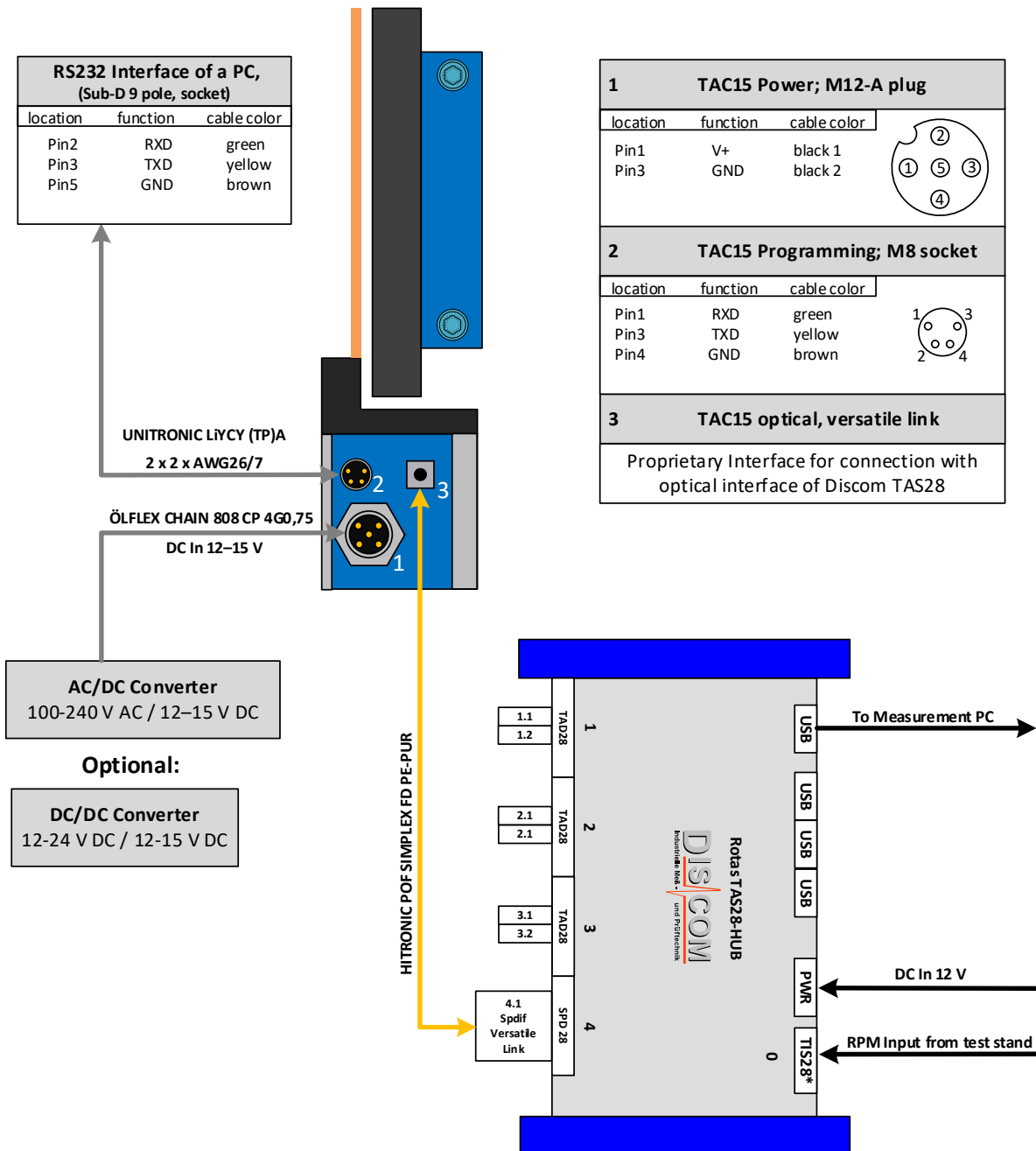


To achieve good measuring results, the TAC Sensor should be installed as close as possible to the test object. The mechanical coupling of the Rotor should be as direct as possible to the test object. A flexible coupling or a heavy shaft between the test object and the TAC Rotor will dampen the measurement signal significantly.



## 2 TAC15-60 / TAC15-90 Block Diagram

The TAC15 Stator is powered by a 12V DC power supply or an industrial DC/DC converter and is equipped with a versatile link interface for optical data transmission to the Discom TAS measurement front-end. The TAS front-end uses a special interface card (SPD28) for the time synchronous data acquisition of the optical signal from the TAC Sensor together with the RPM and analog inputs. The TAC15 Rotor is powered via induction from the Stator and will transmit the digitalized Sensor Signal to the Stator via Infra-Red LEDs. The TAC 15 Programming Interface is used to fine-tune the generator, it is only used during commissioning.



### 3 TAC15 Specification

#### 3.1 TAC15 – Environmental Specification & Dimensions

TAC15 System Specifications		
<b>Environment</b>		
Temperature	0 °C .. 45 °C - Operation -20 °C .. 70 °C - Storage	
Humidity	85 % rel. humidity - Operation 95 % rel. humidity - Storage	non-condensing at 20 °C non-condensing at 50 °C
<b>Mechanical</b>		
	TAC15-60	TAC15-90
Dimensions	152 mm x 120 mm x 40 mm	180 mm x 130 mm x 40 mm
<b>Electrical</b>		
Power Supply	12-15V DC, 1A	

#### 3.2 TAC15 Rotor - Electrical Specification

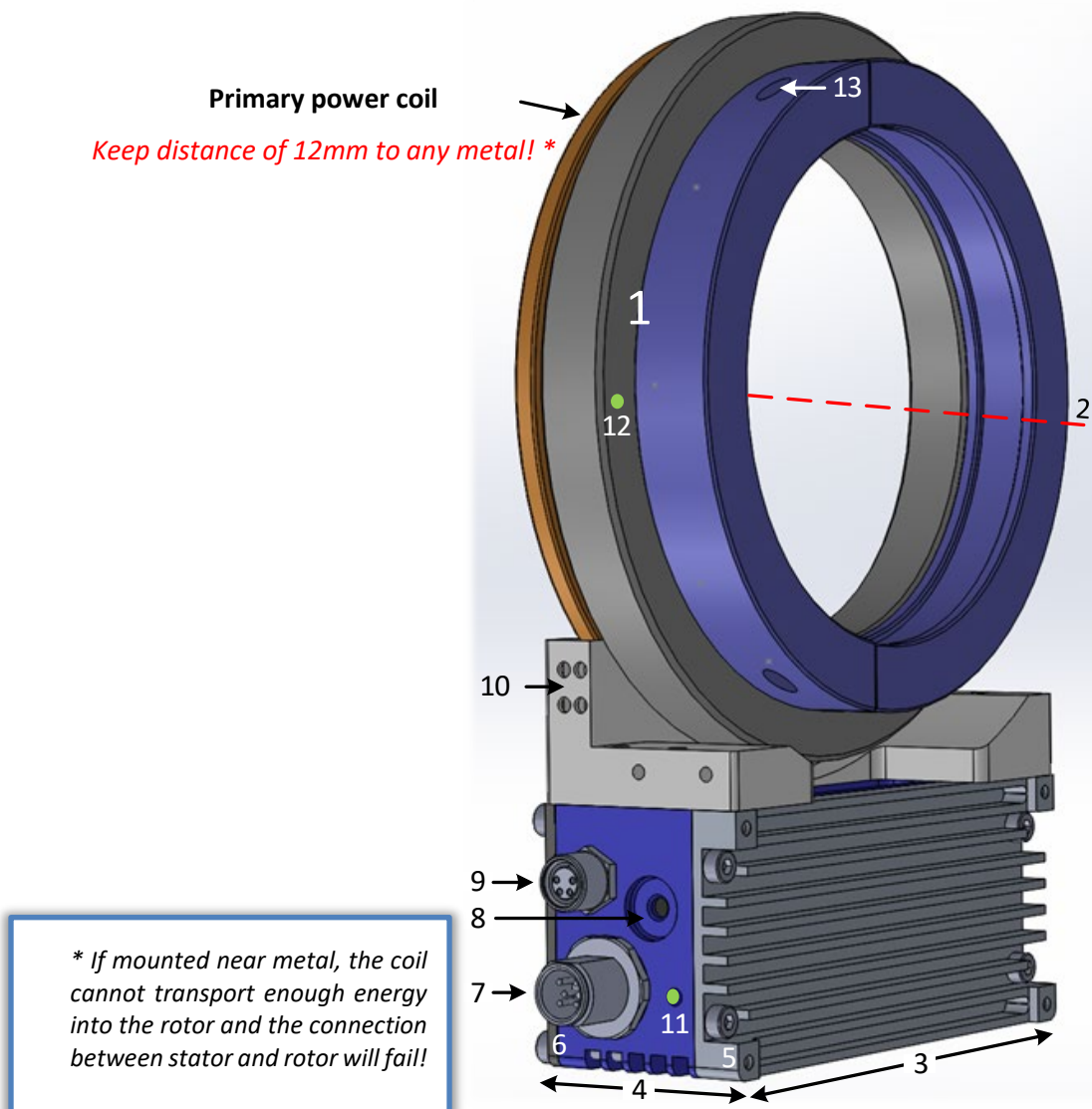
**TAC15\_Sensor** is the wireless *on-axis* torsional accelerometer's sensor component (also referred to as the **Rotor**). It works with inductive wireless power, data output is an optical LED real-time interface.

TAC15_Sensor Specifications		
<b>Sensor Characteristics</b>		
Sensors	2 piezoelectric accelerometers	180° opposite on axis
Sensor Frequency Range (±3dB)	0.32 Hz .. 10 kHz	
Sensor Resonant Frequency	> 30 kHz	
Sensor Sensitivity	11 mV/g (rms)	
Sensor Input Range max.	90 g peak	
Sensor Noise	0.003 g peak	
System Noise	0.003 g peak @ fs = 48 kHz 0.005 g peak @ fs = 96 kHz	incl. ADC & preamp
Dynamic Range (BW 10kHz)	≥ 86 dB	incl. ADC & preamp
<b>ADC Characteristics</b>		
Sampling Rates	48 kHz, 96 kHz	
ADC Resolution	24 bit	
ADC Group Delay	12 samples @ 48 kHz 9 samples @ 96 kHz	
<b>Data Interface</b>		
Data Output	optical, via LEDs to stator	
Eye Safety	exempt group, no risk	
<b>Calibration</b>	at production	recom. calibration interval: 2 years

### 3.3 TAC15 Stator - Electrical Specification

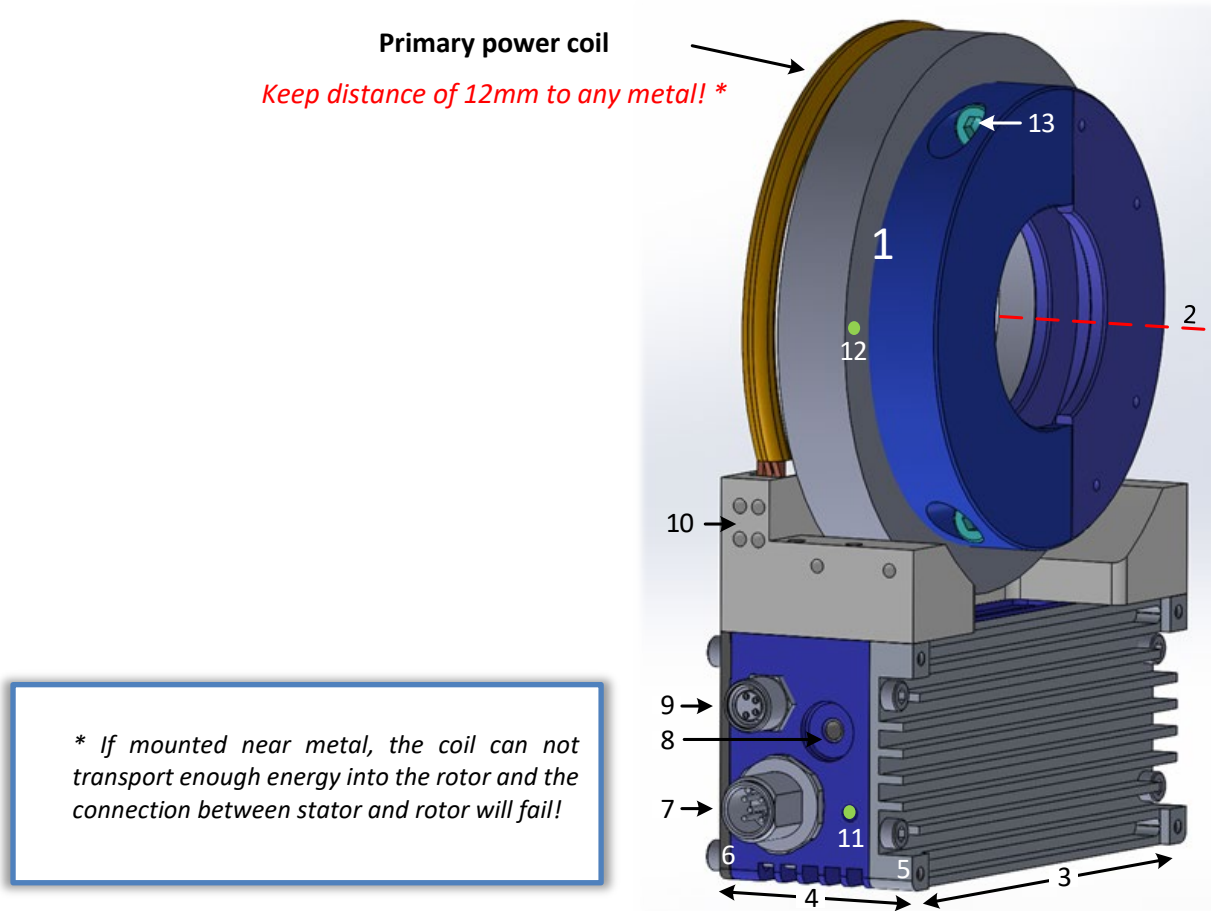
Specifications		
<b>Power Supply</b>		12 V DC (12 V..18 V DC)
Power Consumption	< 12 W @ 12 V DC input	Power Consumption
<b>Power generation for the rotor</b>		
Frequency Range	150 kHz .. 250 kHz	within free ISM band <15 W
Placement	<5 mm to receiving coil on TAC15_Sensor	avoid $\mu$ -metal areas; see installation guide
<b>Control Software</b>		
TasAlyzer Interface	Proprietary user interface	

## 4 TAC15-90 - Functional Overview and Dimensions



<b>TAC15-90</b>	<b>location</b>		
TAC15-90 Rotor	<b>1</b>	Rotor diameter: 133 mm	Max. Shaft diameter: 90 mm
TAC15-90	<b>2</b>	Centerline of shaft	
TAC15-90 Stator Dimensions	<b>3</b> <b>4</b>	depth : 100 mm; width : 40 mm ;	height: 115 mm from shaft centerline to bottom
TAC15-90 Stator Mounting	<b>5,6</b>	Position of mounting holes (x/y) 47 mm / -73 mm 47 mm / -112 mm -47 mm / -73 mm -47 mm / -112 mm	measured from shaft centerline, available on both sides of Stator
TAC15-90 Stator Mounting	<b>5</b> <b>6</b>	Thread M3x5mm Thread M3x8mm	Including cover plate
Power Supply	<b>7</b>	M12 connector 5 pole	12-15 V DC
Optical Output	<b>8</b>	Versatile Link connector	
Programming	<b>9</b>	M8 socket 4-pole	
Power Coil Mounting	<b>10</b>	8x Hexagon set screw M2x4 mm	Hex key size: 0,9 mm
Indicator LED Green	<b>11</b>	Data Stream	Green = OK
Indicator LED Green	<b>12</b>	Sensor Power	Green = OK
Rotor Bolt	<b>13</b>	2x Bolt M5x35 mm, 12.9	Tightening torque: 9,5 Nm
Max Rotational Speed		Standard: 6000 rpm	

## 5 TAC15-60 - Functional Overview and Dimensions

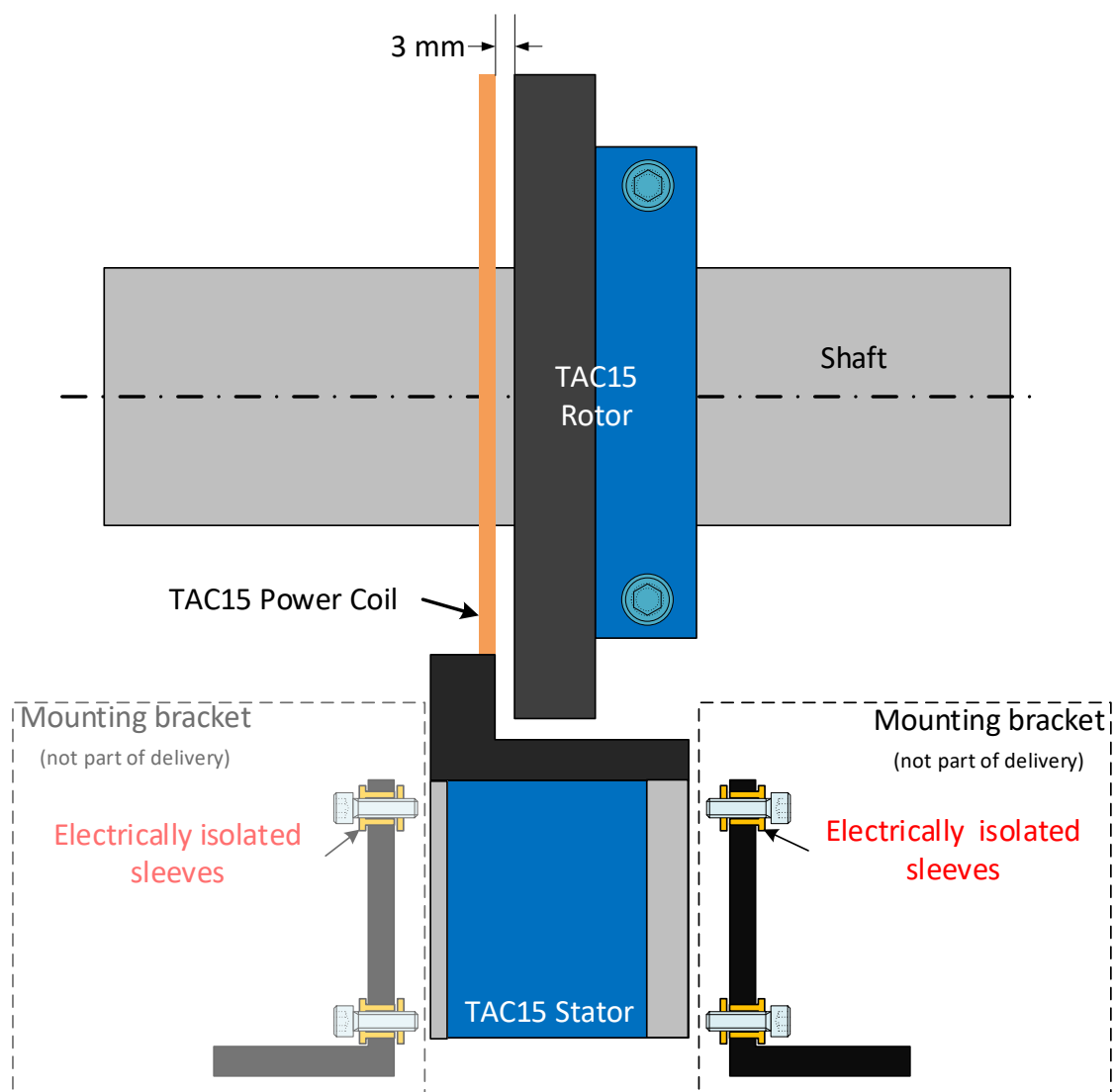


TAC15-60	location		
TAC15-60 Rotor	<b>1</b>	Rotor diameter: 103 mm	Max. Shaft diameter: 60 mm
TAC16-60	<b>2</b>	Centerline of shaft	
TAC15-60 Stator Dimensions	<b>3</b> <b>4</b>	depth : 100 mm, width : 40 mm ;	height: 100 mm from shaft centerline to bottom
TAC15-60 Stator Mounting	<b>5,6</b>	Position of mounting holes (x/y) 47 mm / -58 mm 47 mm / -97 mm -47 mm / -58 mm -47 mm / -97 mm	measured from shaft centerline, available on both sides of Stator
TAC15-60 Stator Mounting	<b>5</b> <b>6</b>	Thread M3x5 mm Thread M3x8 mm	Including cover plate
Power Supply	<b>7</b>	M12 connector 5 pole	12-15 V DC
Optical Output	<b>8</b>	Versatile Link connector	
Programming	<b>9</b>	M8 socket 4-pole	
Power Coil Mounting	<b>10</b>	8x Hexagon set screw M2x4	Hex size: 0,9 mm
Indicator LED Green	<b>11</b>	Data Stream	Green = OK
Indicator LED Green	<b>12</b>	Sensor Power	Green = OK
Rotor Bolt	<b>13</b>	2x Bolt M5x30 mm, 12.9	Tightening torque: 9,5Nm
Max Rotational Speed		Standard: 6000 rpm	HS Version: 15000 rpm

## 6 TAC15-60 / TAC15-90 Mounting

### 6.1 General Mounting Instructions

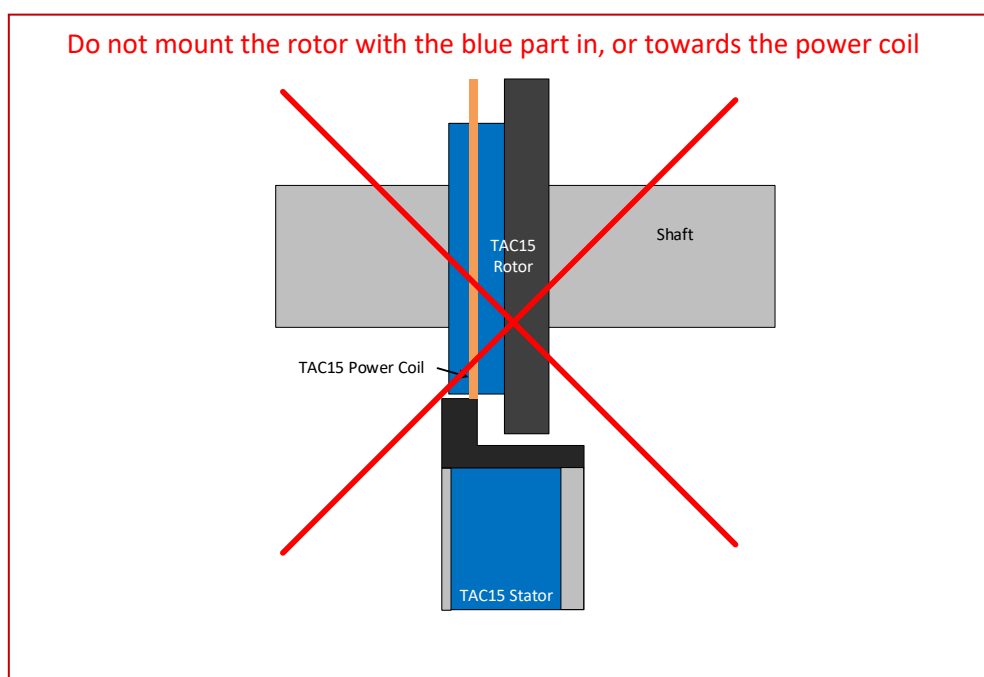
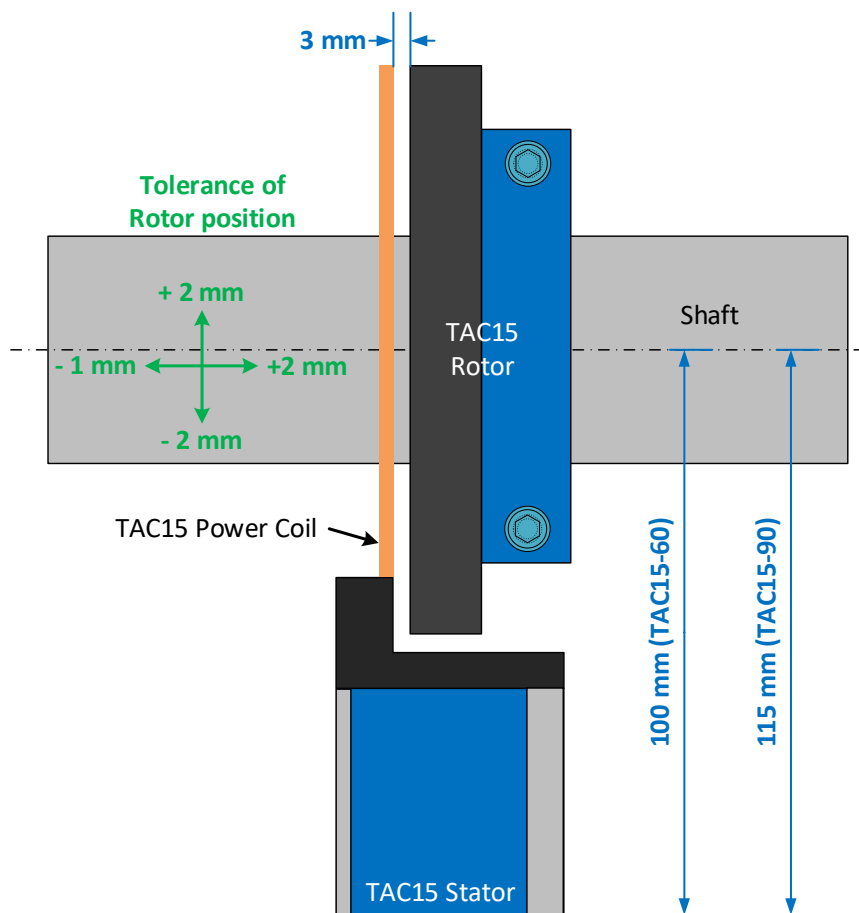
- Keep a distance of 3 mm between the Power Coil and the Rotor
- The Stator should be electrically isolated from the test stand. Without the isolation of the Stator the TAC15 System maybe disturbed by the EMI of the test stand
- Tighten the M5 Rotor bolts with 9,5 Nm of torque
- **Keep a distance of at least 12 mm from any metal to the Power Coil**





## 6.2 Movement of Rotor

- Mounting advice
- Allowed Movement of Rotor/Shaft when mounted according to advice



### 6.3 Angular Alignment

- maximum misalignment of 2 degrees between the Rotor/Shaft and the stator
- **Attention:** If maximum angular misalignment is used, no linear movement is allowed!

