



BOTTOM BRACKET SENSORS FOR E-BIKES

S-BB-RT

S-BB-R

S-BB-RP

PREMIUM QUALITY

MADE IN GERMANY



NCTE AG
Raiffeisenallee 3, 82041 Oberhaching
28.01.2022
Revision 4.0



Technical data

- Rated torque 200 Nm, unidirectional and bidirectional (S-BB-RT only)
- Service temperature: -20 °C to +70 °C
- Protection class according to EN 60653: IP64
- Output signal torque: 0-5 V
- Integrated angle sensor for detecting speed and direction of rotation
- Suitable for frames with BSA 68 and BSA 73 (other options on request)
- Compliant with DIN EN 15194:2018-11 for city and trekking bike applications

Short description

The bottom bracket sensors S-BB-R, S-BB-RP and S-BB-RT are bottom brackets with integrated sensor technology. The sensors are our long-standing and successful solution for detecting speed and direction of rotation. The S-BB-RT sensor can additionally measure the torque on the crankshaft.

The measuring principle for torque measurement is based on magnetostriction and is completely without contact. The robust design of all sensor types is specially developed for demanding use in e-bikes. Our many years of experience show that our sensors are up to any requirements and do not need to be recalibrated even after years of use. Our sensors have also proven their performance and durability in the laboratory. They meet the requirements of DIN EN 15194:2018-11 for the city and trekking sector, as well as the 96-hour salt-water spray test according to DIN EN 60068-2-252:2018.

Our torque sensor ensures that your e-bike rides the way your customers expect it to: dynamic, harmonious and easy on the battery.

We are happy to supply our sensors for your small, medium and large series. Corresponding samples are shortly available at any time.

Your benefits at a glance:

- Completely non-contact measuring system
- No recalibration necessary
- Easy and intuitive mounting
- Made in Germany

Technical characteristics – S-BB-RT/S-BB-R/S-BB-RP

Sensor version	S-BB-RT	S-BB-R	S-BB-RP
Pulse generator (impulse/revolution)	32	32	72
Torque signal output bandwidth	250 Hz	-	-
Measuring range: Torque	±200 Nm	-	-
Signal quality: Torque	±2,5% FS bezogen auf Linearität	-	-
Torque error signal output	Dauerhaft ca. 2,5 V ¹	-	-
Characteristic value of the signal output	10 mV/Nm (+/- 2,5%FS)	-	-
Supply voltage	+7 ... 16 V DC	+3 ... 18 V DC	+4,8 ... 16 V DC
Signal output bandwidth angle sensor	4 kHz		
Power consumption in operation	20 mA		
Bearing	2x 61902-16-2RS		
Shaft surface	Zinc-plated		
Certification according to DIN ISO 15194:2017	Yes ²		
Sleeve	TECHNOMELT®		
Thread	BSA 1,375x24		
Protection class	IP 64 ³		
Salt water spray test according to DIN EN 60068-2-252:2018	Test duration 96 hours passed ⁴		
Dynamic test according to DIN EN 15194:2018-11	Test for city and trekking passed		



Do not use magnets or magnetized tools during assembly, as this may change the magnetic field of the shaft.

In this case, the bottom bracket can become permanently non-functional!
Any changes to the product will void the warranty.

¹ With constant signal output during operation

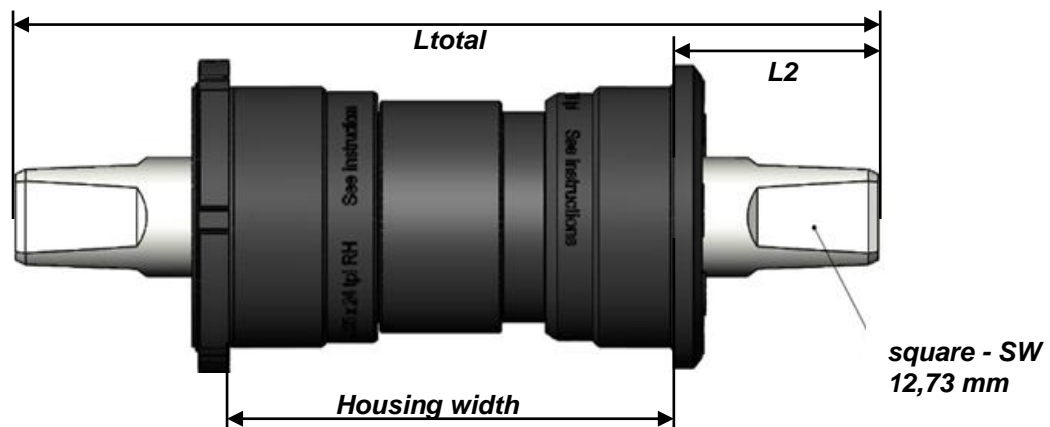
² The configuration of the test setup for product release can be obtained from NCTE on request.

³ In installed condition

⁴ In installed condition

Dimensions

Housing width	Version	L2 ±0,5 mm	Ltotal ±1,0 mm
68 mm	120 K	24,20	120,00
68 mm	120 L	26,20	120,00
68 mm /73 mm	128 K	28,20	128,00
68 mm /73 mm	128 L	30,20	128,00
68 mm /73 mm	133,6 K	29,20	133,60
68 mm /73 mm	133,6 L	34,85	133,60
68 mm /73 mm	136 K	28,20	136,00
68 mm /73 mm	136 L	38,20	136,00

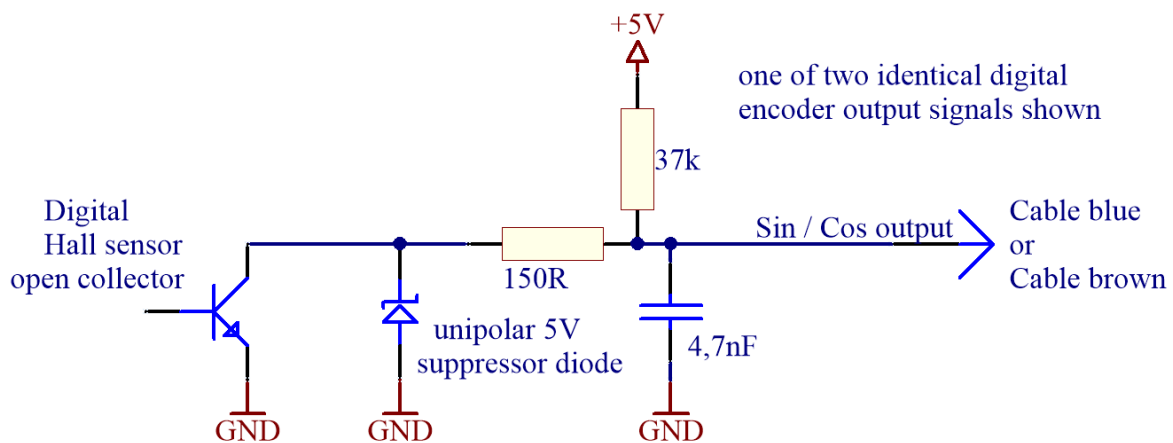


For further information on other variants or dimensions, please contact our customer support:
sales@ncte.de.

Signal output and connection diagram for S-BB-RT

Description	Signal	Cable color	Note
Supply voltage	+7 ... 16 V DC	White	-
GND	0 V	Black	-
Chanel A	0 V / Open collector	Blue	16 CPR
Chanel B	0 V / Open collector	Brown	16 CPR
Torque	Offset 2,5 V at 0 Nm	Grey	10 mV/Nm

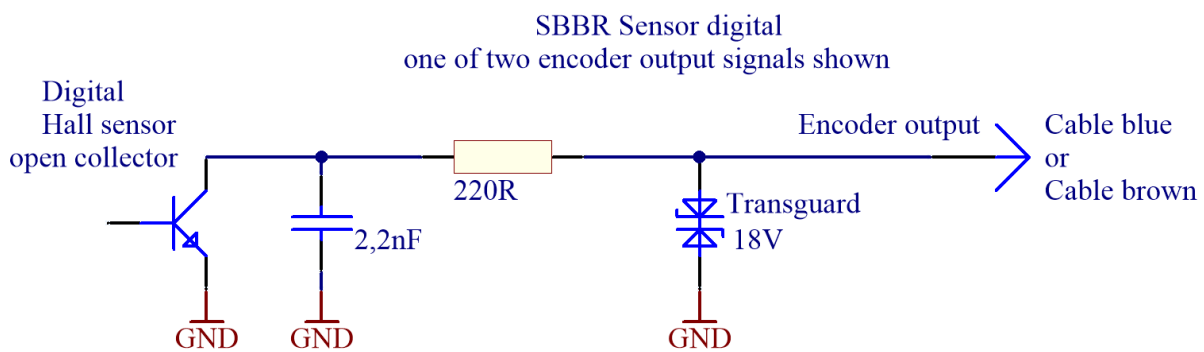
Output for hall sensors: Open collector with internal pull-up resistor 37 kOhm to +5 V.



Signal output and connection diagram for S-BB-R

Description	Signal	Cable color	Note
Supply voltage	+3 ... 18 V DC	White	-
GND	0 V	Black	-
Chanel A	0 V / Open collector	Blue	16 CPR
Chanel B	0 V / Open collector	Brown	16 CPR
No output	No signal	Grey	-

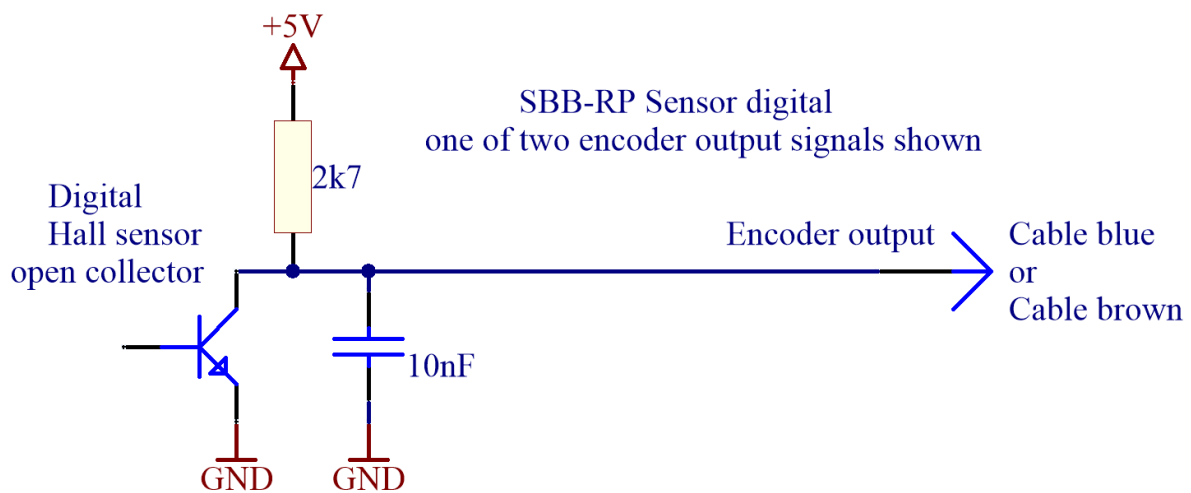
Output for hall sensors: Open collector without pull-up resistor



Signal output and connection diagram for S-BB-RP

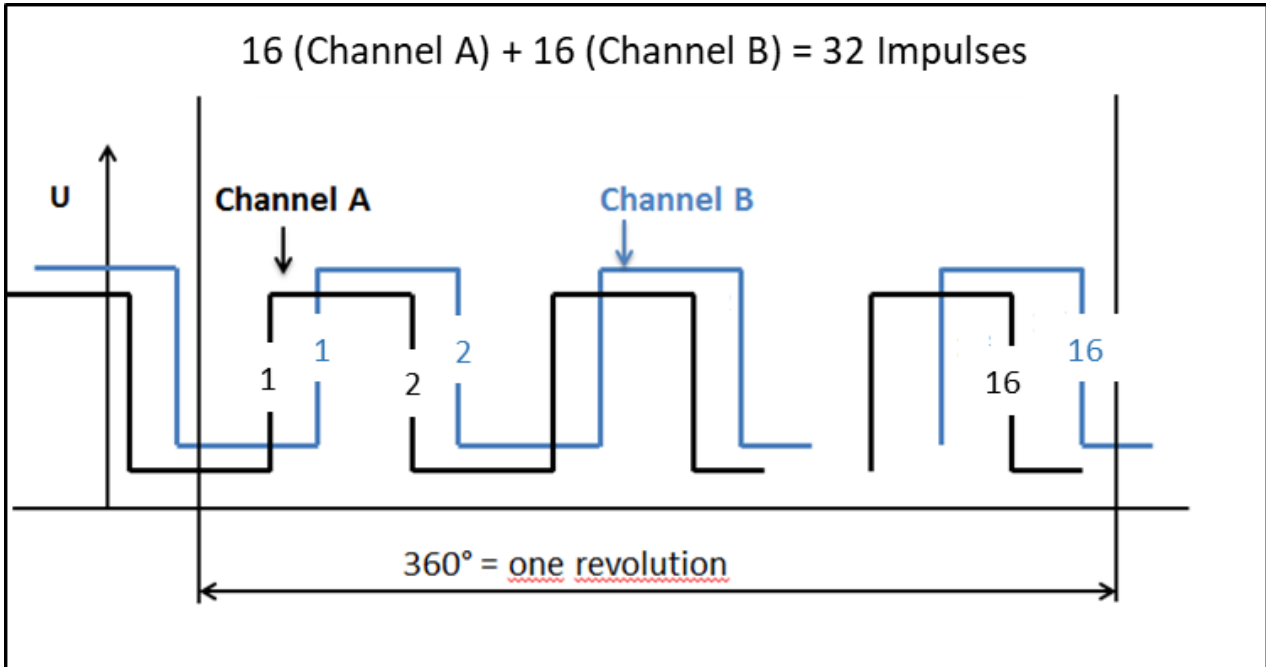
Description	Signal	Cable color	Note
Supply voltage	+4,8 ... 16 V DC	White	-
GND	0 V	Black	-
Chanel A	0 V / Open collector	Blue	36 CPR
Chanel B	0 V / Open collector	Brown	36 CPR
No output	No signal	Grey	

Output for hall sensors: Open collector with internal pull-up resistor 2.7 kOhm to +5 V.

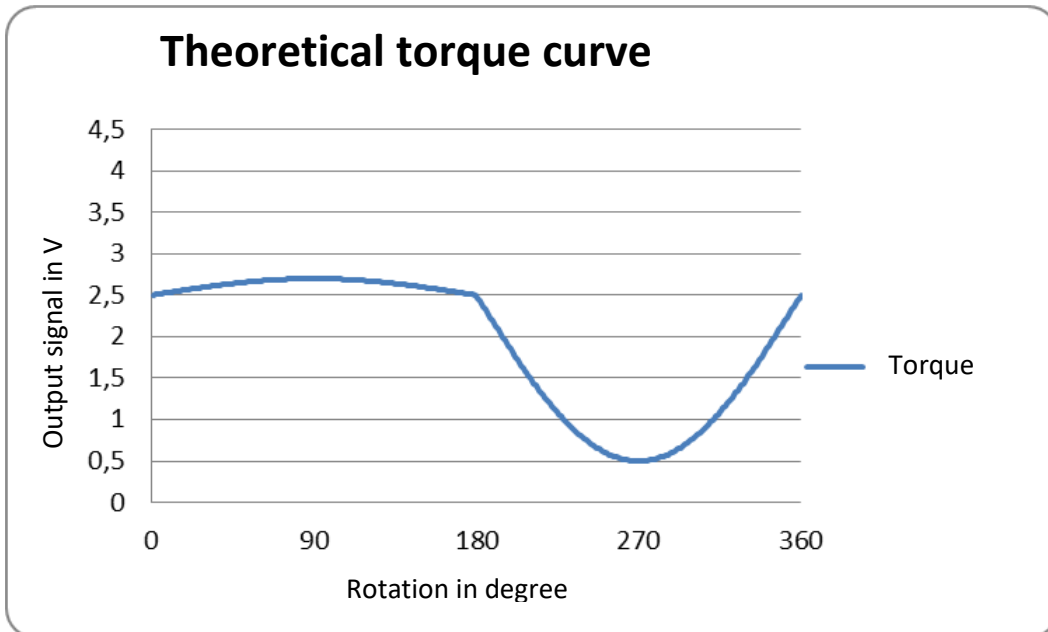
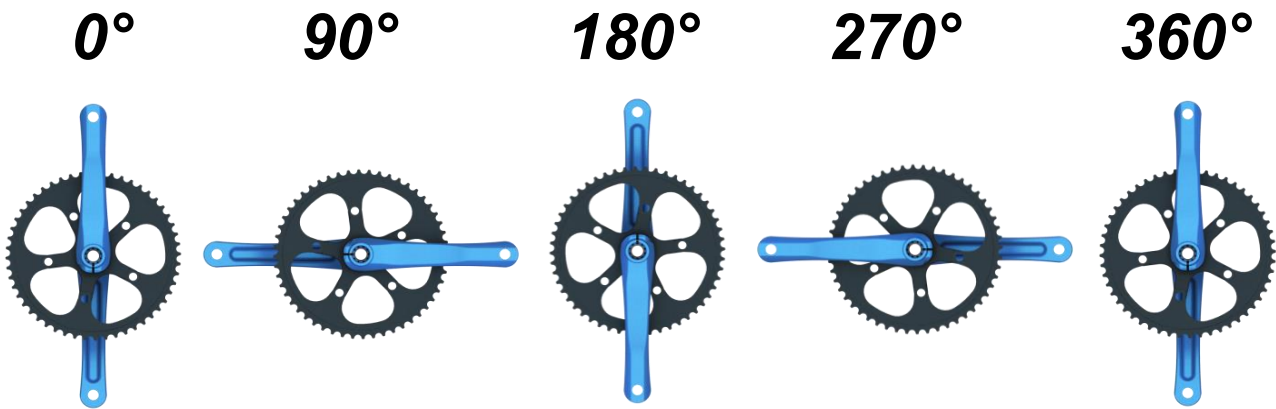


Angle sensor

Angle sensor with 32 (72 for S-BB-RP) pulses for precise determination of speed and direction of rotation.



Torque curve



Instruction manual

Application

The bottom bracket sensors are used in all types of e-bikes. From city- to trekking- and cargo bikes. They provide the necessary signals for a harmonious and individual riding experience with battery-saving motor support. S-pedelecs can also be equipped with these sensors.

General

Please read this data sheet including the assembly instructions (at the end of this document) carefully before first use and only use the product accordingly. Keep this for future reference to avoid any misuse. For correct installation, please proceed according to the installation instructions. For more information, please contact our customer service at sales@ncte.de.

Explanation and operating instructions refer only to the sensor in the condition in which it was placed on the market. Parts subsequently attached by the end user and/or interventions subsequently made are not taken into account.

Manufacturer

The manufacturer of the S-BB-R, S-BB-RP and S-BB-RT series sensors is:

NCTE AG
Raiffeisenallee 3
82041 Oberhaching
Germany
Phone: + 49 (0) 89 665 619-0

Intended use and installation range

The sensor is intended for use in bicycles with electric drive (pedelec, e-bike and electric bicycle) within the meaning of Section 39 (7) of the German road traffic regulations. Use the product only in bicycle frames with a BSA threaded bottom bracket and a frame width of 68 mm or 73 mm. Crank arms must be mounted on the square shaft ends. The sensor S-BB-RT measures the torque applied by pedal and crankshaft at the left crank. All sensors record speed and direction of rotation. For safety reasons, the motor support may only be activated if both speed outputs provide several correct and plausible signal sequences.

For this purpose, the direction of rotation and the speed must be determined from both signals and checked for sensible limit values.

Any other use is considered improper and may result in property damage or even personal injury. The manufacturer accepts no liability for damage resulting from improper or incorrect use.

Possible error cases

In case of an unexpected defect of the electronics, it outputs a constant value of approx. 2.5 V, the value corresponds to a torque of 0 Nm.

If the sensor is blocked, please contact the manufacturer immediately and do not continue to use the product.

Scope of delivery

The sensor system consists of a calibrated sensor, including a connection cable (corresponding to the configuration) and a loose adapter. In case of the BSA 73 mm variant, an additional spacer is included in the right bearing shell. The signal recording and processing is integrated in the housing.

Handling and transport

During handling, storage and transport make sure the sensor is not exposed to magnetic fields (e.g. demagnetizing coils or permanent magnets). It must also be ensured that no magnetic tools are used during mounting.

Important technical safety instructions

- Opening the sensor is not permitted.
- The sensor must not be subjected to any mechanical loads when not installed (drops, knocks, vibrations, etc.).
- To prevent damage caused by a short circuit on the connecting cable, a suitable back-up fuse (approx. 1 A nominal current) must limit the current supply to the sensor.
- The sensor may only be operated within the permitted load limits. These can be found accordingly in the standard DIN 15194:2018-11 and ISO 4210:2018. Cycles Safety requirements for bicycles part 2: Requirements for city bicycles chapter 4.13: Pedals and pedal/crank drive system
- Reverse polarity or overvoltage on the connecting leads can damage the sensor.
- Routing the wires outside the bike frame can cause interference with the sensor. NCTE recommends routing the connection and data lines inside the frame. If internal routing is not possible for technical reasons, the irradiance sensitivity must be re-evaluated accordingly by the EPAC manufacturer.

Disposal

Dispose of the article and all associated components via an authorized disposal company. Observe the currently applicable regulations. If in doubt, contact your waste disposal facility to find out about environmentally compatible disposal.

Service

Contact

Phone: +49 89 66 56 19 0

E-Mail: sales@ncte.de

Cleaning

The sensor can be wiped with a dry cloth. In case of heavy soiling, the sensor can alternatively be wiped damp with a solution of lukewarm water with a little dishwashing detergent.

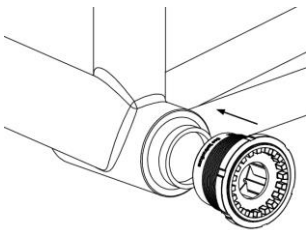
Cleaning with a high-pressure cleaner can damage the ball bearings.

Contact or cleaning of the sensor with liquids containing solvents is not permitted

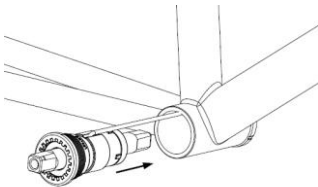
EC conformity

The product meets the requirements of the European Union and has a corresponding CE certificate. For further information, please contact our customer support: sales@ncte.de

Montage



1. The threads of the adapter shells and the frame must be clean before mounting. Possible dirt and burrs must be removed before mounting. The threads must not be greased. The left adapter shell is tightened with a bottom bracket tool with a torque of 30 Nm. For a bottom bracket width of 73 mm, it must be ensured that the spacer ring is located in the adapter shell.



2. The sensor cable is fed through the bottom bracket into the frame. When inserting the sensor, the cable must not be kinked or pinched. The sensor is secured against rotation by inserting it into the left adapter shell. The right adapter shell is then also tightened with the bottom bracket tool to a torque of 30 Nm.



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