Operating manual

Stator Antenna A3b_flex

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Disclaimer Documentation

The texts and examples were prepared with care. Mistakes can not be excluded. The enterprise Manner Sensortelemetrie will assume no liability for missing or incorrect information and resulting consequences, neither judicial nor otherwise.

Modifications

The enterprise Manner Sensortelemetrie GmbH may change or upgrade hardware and software – or parts of them - as well as the provided documents (operation instructions, start-up instructions, spare parts lists) – or parts of them – without notification.

We would be pleased for suggestion for improvement and notes about mistakes.

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1 Safety

1.1 Definition of Warnings

DANGER!
Hint for possible dangerous situation. Ignoring the security terms may cause death or serious injury.

WARNING!
Hint for possible dangerous situation.

Ignoring the security terms may cause injury.

CAUTION!
Hint for possible damage of property, if the corresponding protective measure were disregarded.

Further information

1.2 General Warnings

The system startup has to be carried out by trained qualified personnel, who is able to evaluate the potential risks. All chapters of this instruction manual had to be read and fully understood before startup.

On non-observance it's not possible to assert a claim for the incurred losses from the manufacturer. Any changes to the system, except those described in the instruction manual and customer documentation, will invalidate any warranty.

DANGER!
Risk of Injury by Incorrect Installation
Incorrect installation can cause injury to persons directly while the installation or during the subsequent startup

Note the Mounting Hint (see chapter 4, installation instruction)

The system startup has to be carried out by instructed qualified personnel that's familiar with

- the professional handling of security relevant components,
- the valid regulations for operational safety und rules for accident prevention.

DANGER!
Risk of Injury by Unintentional Startup
Rotating or moving of parts by inadvertent startup of the machine can cause injury .

During all mounting, demounting or repairing the system has to be powered-off. Note the mounting instructions.

DANGER!

Risk of Injury by Movable Parts

While normal operation, as well as inadvertent loosening of parts of the telemetry system during operation, present persons may be injured if protective equipment is absent.

Check the safety function of the protective equipment particularly

- before each startup
- after each replacement of a component
- after a longer standstill
- after each defect

Independent thereof the safety function of the protective equipment must be checked in suitable time intervals as part of the maintenance work!

WARNING!

Risk of Burn Injury

While operation the sensor signal amplifier and the stator antenna may become warm.

Avoid contact.

CAUTION!

Risk of Property Damage

If the connectors disconnected / connected while the system is powered on the telemetry system as well as the connected devices can be damaged.

Plug connectors must not be disconnected / connected when the system is powered on.

2 Conventional Usage

Sensor telemetry systems are used for contact-free data and power transfer from passive and active sensors (e.g. on rotating shafts).

DANGER!

Risk of Subsequent Damages caused by Malfunctions

If the telemetry system is used for controlling or regulating functions it is not conceive for, subsequent damages up to injury to persons can be caused.

The delivered system has to be used exclusively used for the purpose for which it was ordered.

The operator must take care of his health and safety.

The operator of the equipment must prevent subsequent errors following faulty measuring results. This is particularly necessary if the telemetry system is used in controlling or regulating functions.

The customer, as the builder of a system with an integrated sensor telemetry system, is responsible for the correct and conform operation and also assumes the responsibility for ensuring that the system at start-up complies with all provisions of Directives 2014/53/EU and 2014/35/EU.

Scope of Delivery

A telemetry system normally contains:

- Evaluation unit
- Stator antenna
- Rotor antenna
- Sensor signal amplifier
- HF cable

For the detailed purchased parts package of the delivered telemetry system mind the corresponding shipping ticket.

3 Technical Data

3.1 Measuring System

Technical Data Telemetry System

Term	Value
HF frequency	13.56 MHz
Number of channels	1
Bandwidth	0 to 1 kHz (-3dB)
Linearity	<0.1%

General Measuring Configuration

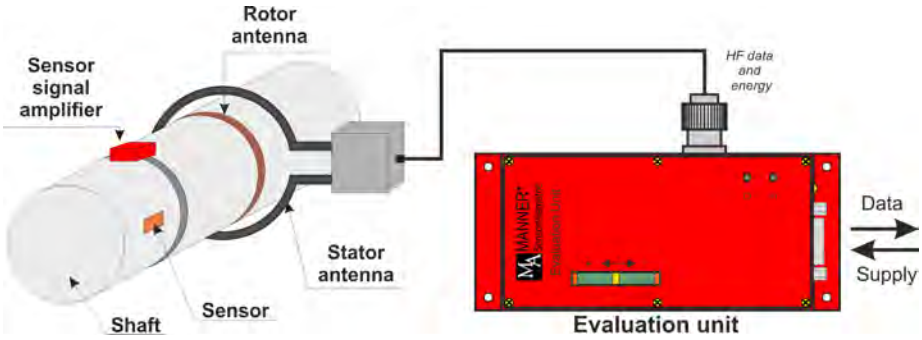


Fig. 1: General measuring configuration

Block Diagram

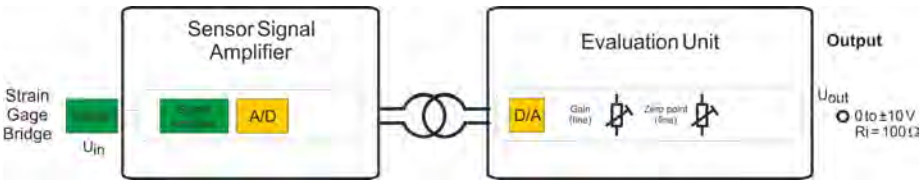


Fig. 2: Block diagram

Energy and Data Flow

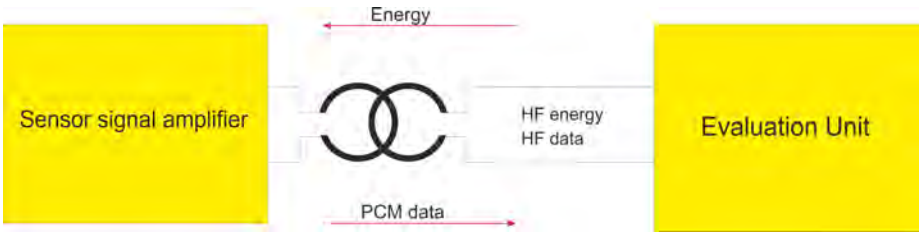


Fig. 3: Energy and data flow

3.2 Stator Antenna

Technical Data Stator Antenna

The connection between stator antenna and evaluation unit is realized by a coaxial cable.

Term	Value
Antenna type	**A3b_flex_PCM**
Coaxial cable	RG58, 4 m, BNC to BNC
Supply	By evaluation unit
HF frequency	13.56 MHz
Protection class	IP42
Temperature range	-10 to +85°C

Scale Drawing Stator Antenna

CAUTION!

Damaging of Stator Antenna

Because of the transfer of vibrations by the cable the stator antenna may be damaged mechanically.

Establish a professional strain relief of the cable while installation of the stator antenna.

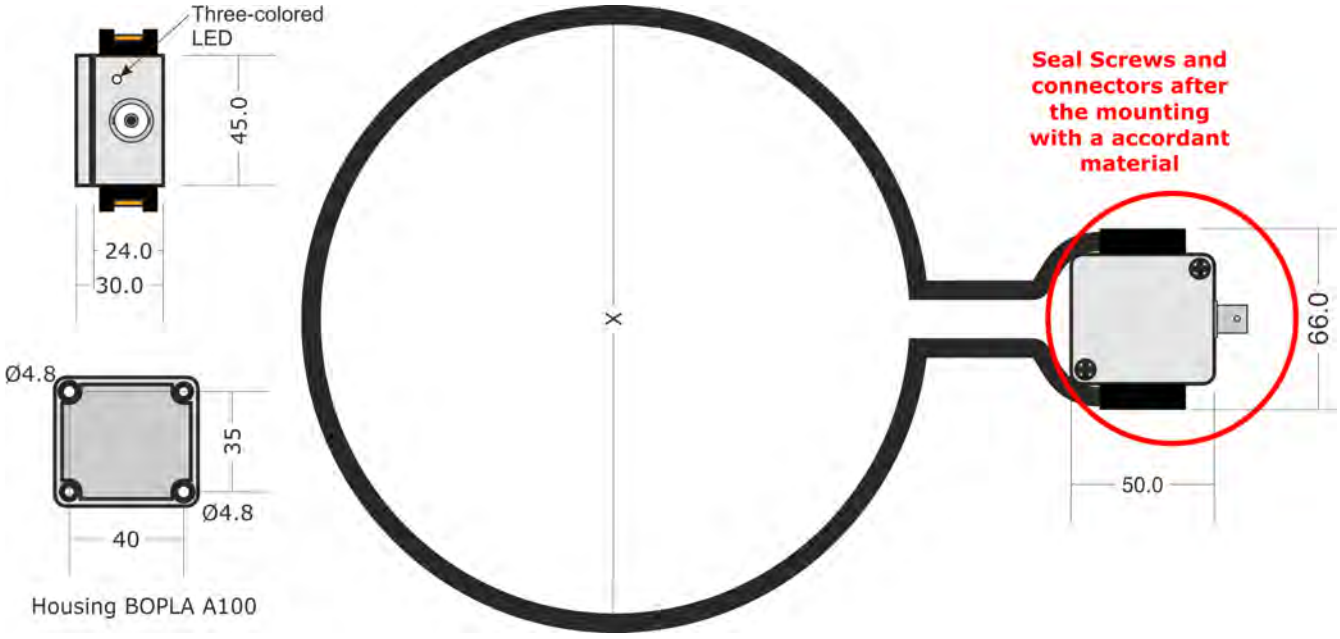


Fig. 4: Stator antenna A3b_flex_PCM

See *Chapter 4.1 "Mounting Instruction Stator Antenna Loop" on page 9*

4 Mounting / Starting

4.1 Mounting Instruction Stator Antenna Loop

Connection Note HF-GND stator antenna

NOTICE!

To prevent damage to the stator antenna by ground currents, must be observe while assembling:

- If the antenna is not connected to an evaluation unit, HF-GND of the connector and HF-GND of the self-tuning the antenna must not contact the car body (ground) concurrently.
- If the stator antenna connected is to the evaluation unit and concurrently is connected to the car body (ground), no open end of the stator antenna may touch the vehicle body (ground).

Fault

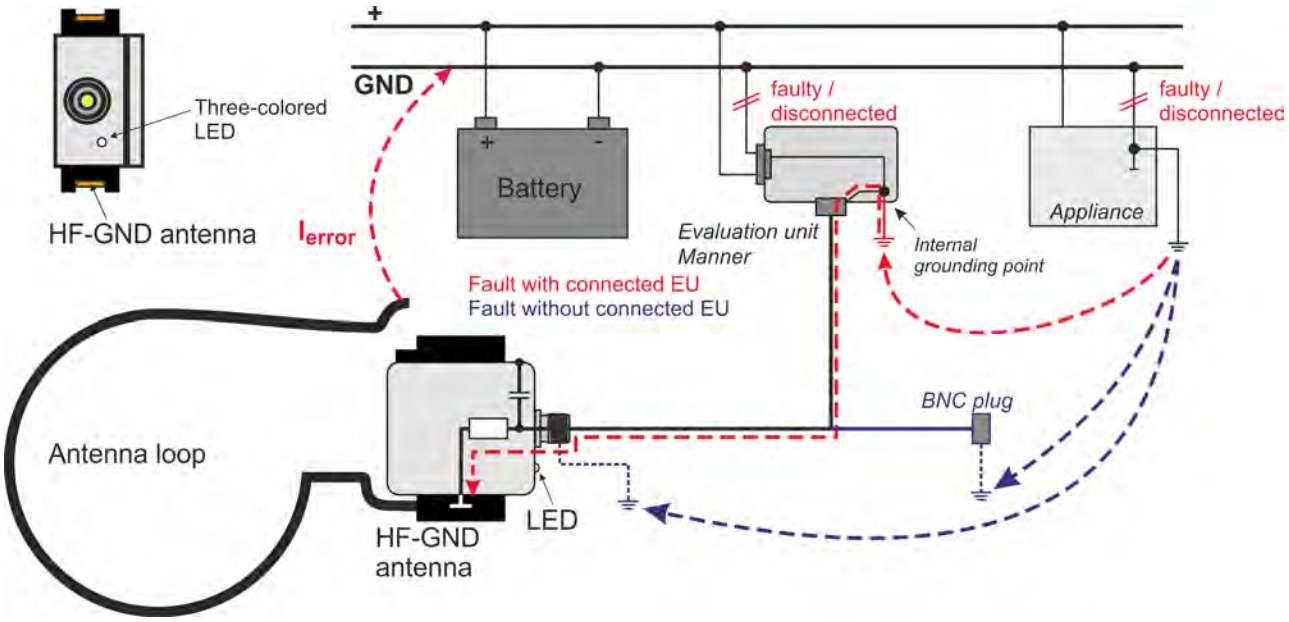


Fig. 5: A3b_Flex, I error

Assembling Stator Antenna

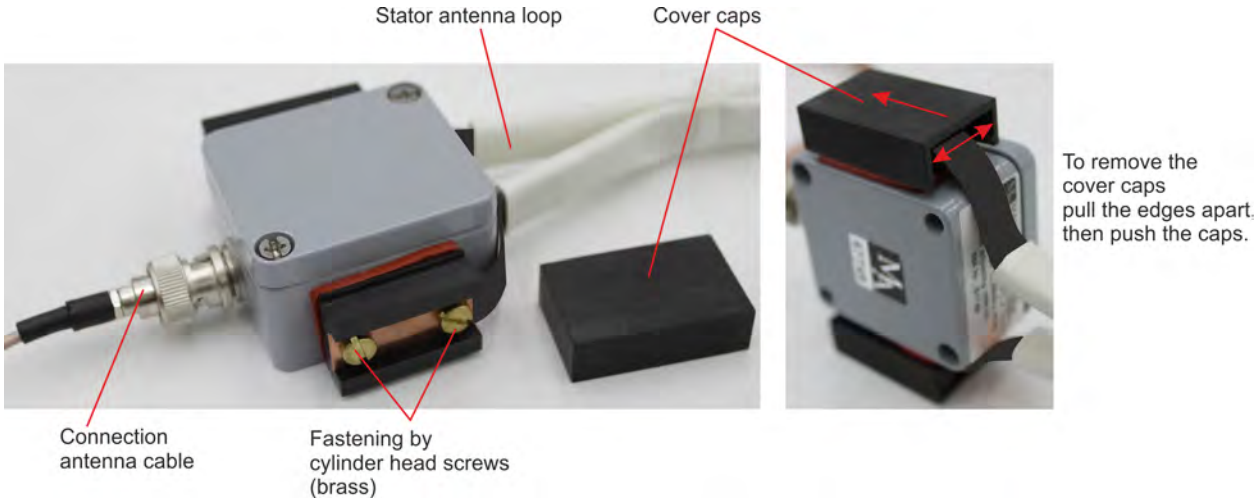
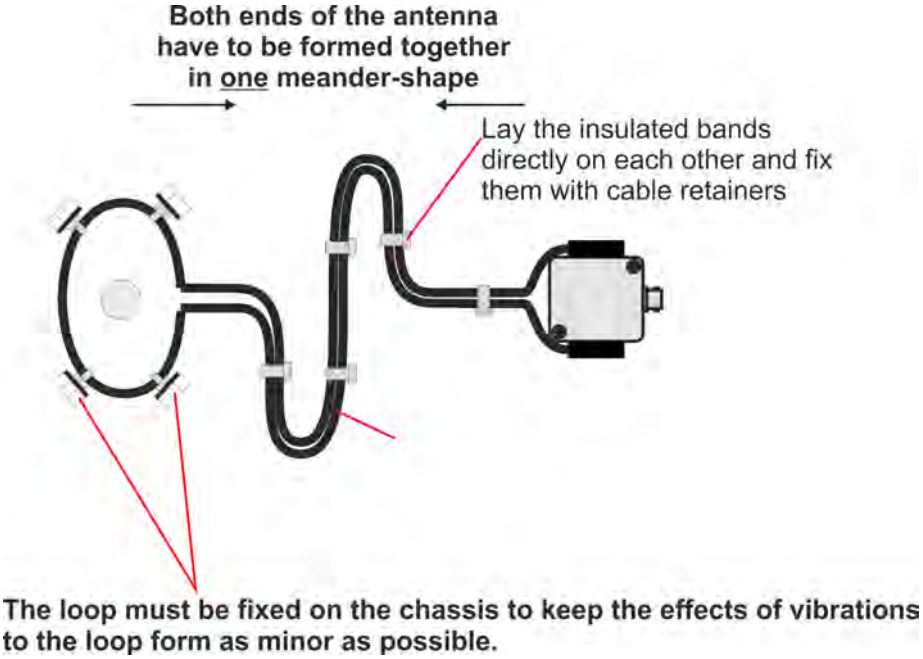
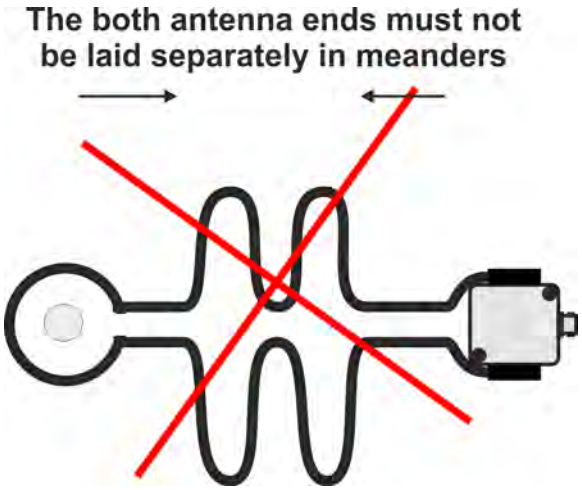


Fig. 6: Assembling stator antenna

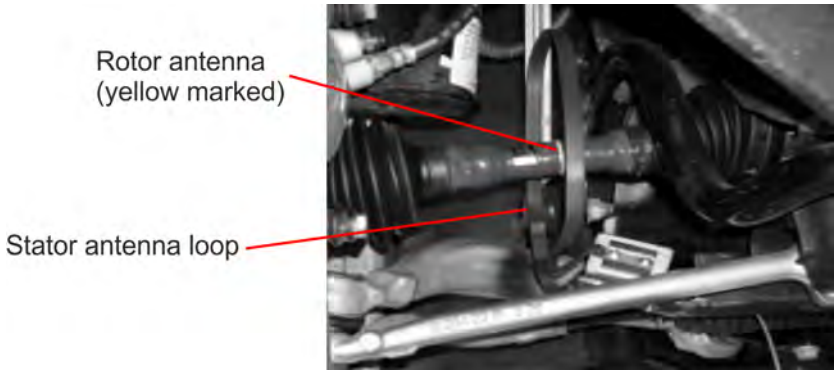
Hints for Loop Installation

- The loop size must not be wider as needed (electromagnetic field energy concentration).
- The shaft must not touch the loop.
- The loop can be formed individual. The form should mask the maximum moving range of the shaft.
- If the length of the flexible stator antenna must be shorten, mind following notes:

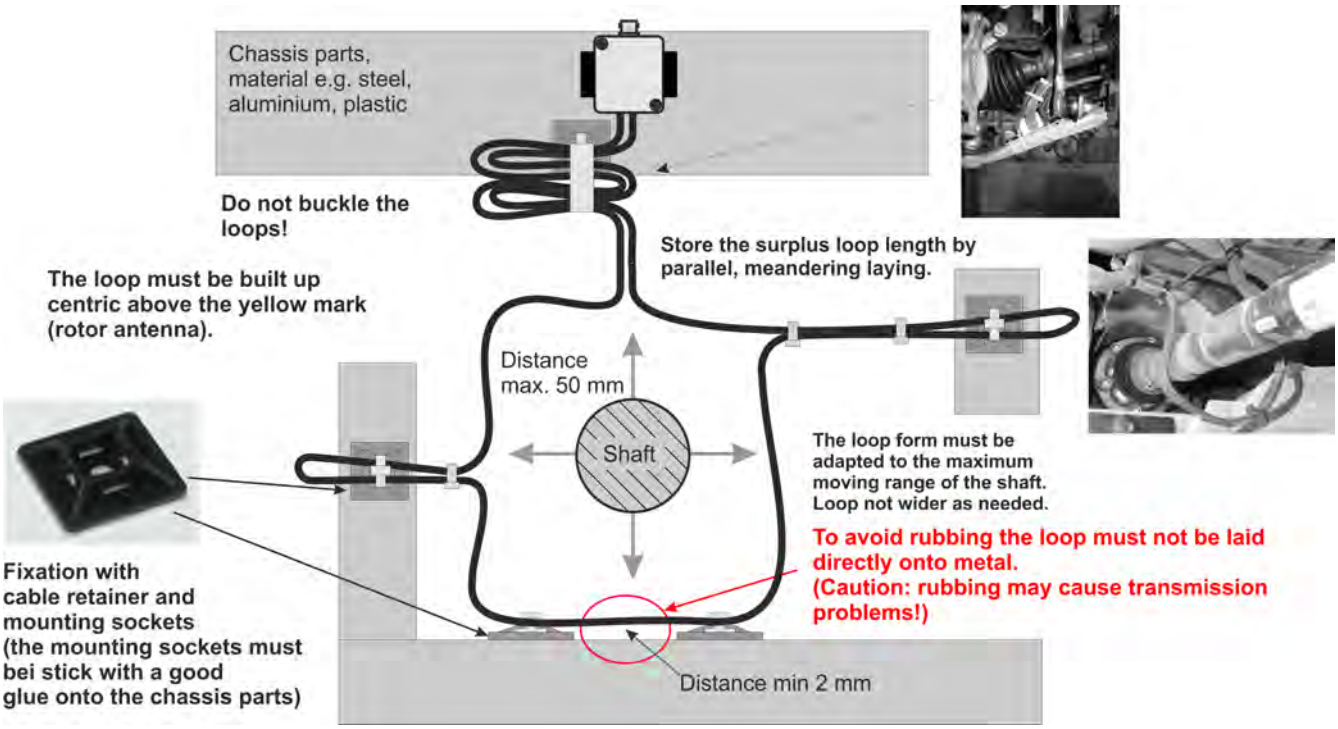




- The loop must be laid directly above the yellow marked position of the rotor antenna (loop surface parallel to the shaft's centreline)



Fixing examples



4.1.1 Selfadjusting Stator Antenna

Selfadjustment, Process

After each supply voltage return of the selfadjusting stator loop antenna the adjustments starts automatically.

The selfadjustment starts within 15 seconds after supply voltage return. **During the automatic adjustment and thereafter the geometry of the stator loop antenna must not be changed.**

Every change of geometry causes to a faulty adjustment and can only be cleared by a re-adjustment. A three-colored LED at the housing of the selfadjusting stator loop antenna signalizes the status or rather the result of the adjustment process (see). Within the first 15 seconds the automatic adjustment will be execute (LED glows blue respectively red). Afterward the status of the internal switches is signalized by blue and red flashing (duration ca. 25 seconds). Finally (after ca. 40 seconds) the result of the adjustment will be show (see result status/).

Definition of Status LED

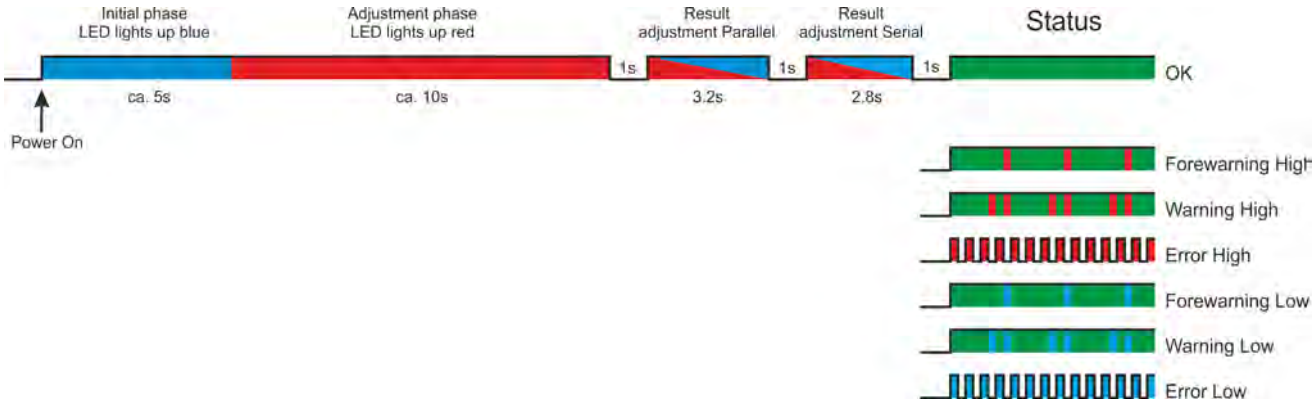


Fig. 7: Status LED

Explanation of Status

OK	Adjustment successful. Adjustment point found within the nominal range.
Forwarning High	Adjustment successful. Adjustment point found in upper 6% of the adjustment range. → Antenna diameter should be slightly increased.
Warning High	Adjustment successful. Adjustment point found in upper 3% of adjustment range. → Antenna diameter should be increased.
Error High	Incorrect adjustment. Adjustment point above the adjustment range. → Increase antenna diameter or use antenna matching with higher capacitance range.
Forewarning Low	Adjustment successful. Adjustment point found in lower 6% of the adjustment range. → Antenna diameter should be slightly reduced.

Warning Low	Adjustment successful. Adjustment point found in lower 3% of the adjustment range. → Antenna diameter should be reduced.
Error Low	Faulty adjustment. Adjustment point below the adjustment range. → Reduce antenna diameter or use antenna matching with lower capacitance range.

Result of Parallel and Serial Adjustment

Immediately after the adjustment the LED is switched off. The LED is then switched on again for a period of 2 seconds. The ratio between the blue and red display indicates the position of the calibration point.

If the light duration of blue and red is about the same, then the calibration point is in the middle of the capacitance range.

If the light duration of blue is longer than that of red, then the calibration point is at a rather small capacitance value.

If the light duration of blue is shorter than that of red, then the calibration point lies at a rather large capacitance value.

4.2 Coupling / Installation *(Example)*

Antenna Coupling

DANGER!

Risk of Faulty Measuring Data and Resulting Subsequent Errors, up to Injury to Persons

Damaging, modifications or disturbance of the coaxial cable(s) may falsify the measuring results and optionally cause subsequent errors according to operation purpose.

Do not buckle the coaxial cable!

Do not modify the coaxial cable!

Do not keep data cable and the coaxial cable together with energy- / high-power current cables!

The connectors of the HF energy and / or HF data coaxial cable must not have connection to the grounding of the machine!

Permissible bending radii for coaxial cables:

- RG58 → R_B = 25 mm
- RG400 → R_B = 30 mm static / 50 mm dynamic
- RG178 → R_B = 15 mm
- RG213 → R_B = 50 mm
- RG316 → R_B = 15 mm

The bending radii of the used coaxial cables must not be undercut

CAUTION!

Damaging of Antenna System

Contact between rotor antenna and stator antenna while operating may cause mechanical damages of the antennas

The stator antenna must not touch the rotor antenna.

CAUTION!

Risk of Damaging of Electronic, Faulty Measuring Data

While overheating of the evaluation unit the built-in electronics may be damaged

An overheated evaluation unit may cause faulty measuring values and respectively subsequent errors

The evaluation unit must be mounted onto a heat conductive base.

CAUTION!

Damaging of Evaluation Unit Caused by High Vibrancy

High Vibrancy of the evaluation unit may cause damaging

While mounting in environments with high vibrancy (e.g. in vehicles) the evaluation unit must be mounted vibration damped, e.g. by rubber buffer.

The stator antenna must be mounted directly opposite to the rotor antenna

The stator antenna must be mounted in the middle of the moving range of the rotor antenna

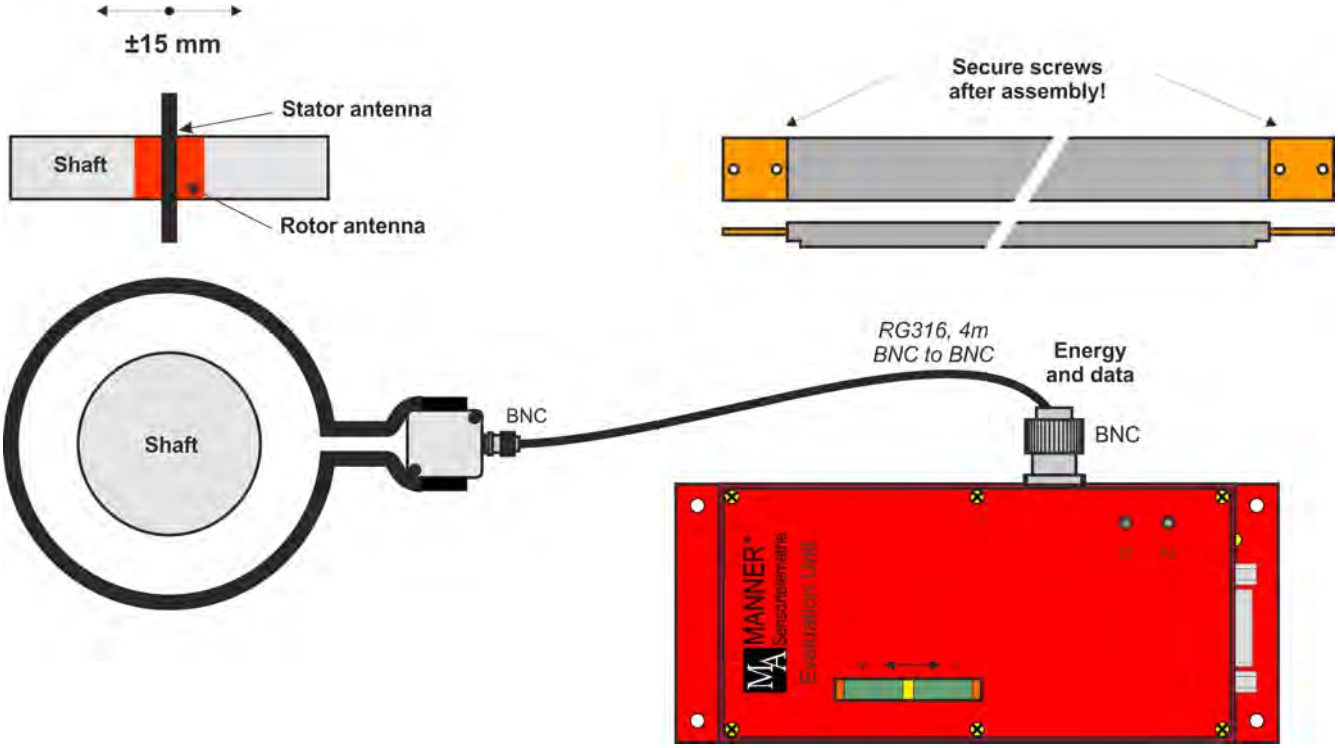


Fig. 8: Coupling

Startup

DANGER!

Risk of Injury

Incorrect installation can cause injury to persons directly while the installation or during the subsequent startup

Follow mandatory the rules for accident prevention!

1. Mount the sensor signal amplifier with rotor antenna
2. Position the stator antenna correct to the rotor antenna
3. Connect the stator antenna with the evaluation unit
4. Switch the system on
5. Release the measuring position complete
6. Adjust the output signal to 0.000 V by using the screw ‘0’
7. Load the measuring position with nominal load or set the Cal.signal permanently
8. Adjust the output signal to +10.000 V by using the screw 'G' and measuring the "Analog output signal' or adjust to the value noted in the calibration protocol.
9. Release the measuring position complete or remove Cal.signal
10. Check the output signal to zero. Repeat step 5 to 10, if necessary.

5 Options

Optionally available

- waterproof
- ATF oilproof

If you have any questions regarding customer-specific solutions, please contact our sales department.

6 Maintenance

The systems of Manner Sensortelemetrie are low-maintenance.

DANGER!

Risk of Injury Caused by Defects on System Built-Up

Particularly loose or damaged parts may endanger present persons

Carry out the maintenance regularly and assiduously.

Within a periodical repeating maintenance following operations have to be done:

- Clean the antenna system, vacuuming of dust deposit
- Check the antenna system for scrub marks or mechanical damages
- Check the fastening of the stator antenna for a fix seat and tighten of the screwed fastenings where necessary.
- Check the plug connections and cables

Document the completed annual maintenance

7 Contact

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