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User Manual
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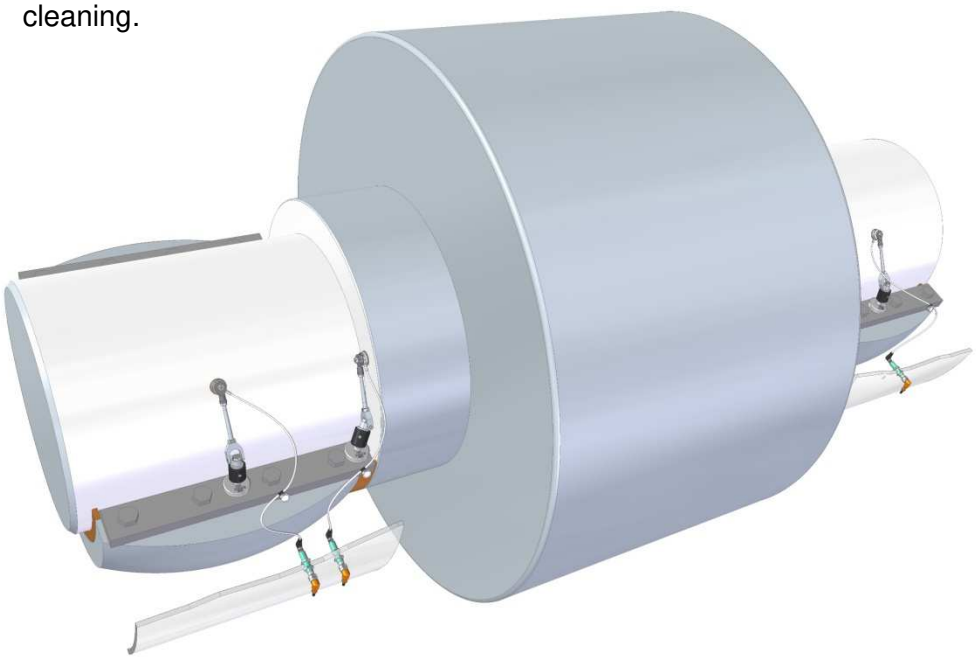
Shaft Temperature Sensor

1 INTRODUCTION

The Shaft Temperature Sensor is used to measure the shaft temperatures of kiln or dryer support rollers with a fast respond.
It is designed for permanent installation inside the bearing housings.
It provides reliable information about the bearing operation condition directly from the roller shaft or from the thrust collar.

The installation of the temperature probe is very easy and does not require drilling thanks to the adjustable stand which is equipped with a strong magnetic base.
The sensing side of the temperature probe is made of bronze and is sliding directly on the roller shaft. This brings the great advantage that possible problems in the bearings can be detected much faster than with traditional sensors who are placed in the bearing sleeves or who measure the oil temperature.
To have a proper heat conductivity with the roller shaft, the probe is equipped with magnets. They provide a constant and very light force in a way that no noticeable wear will occur on the probe.
The Shaft Temperature Sensor from TomTom-Tools has also the great advantage compared to infrared thermometers or thermal cameras, that it is not depending on emissivity factors nor being disturbed by the oil film and does not require periodical cleaning.



2 SAFETY

Rotary kilns and dryers, where this tool is typically used, are huge rotating equipment with many pinch points and hot surfaces which can cause serious injuries. Therefore, only specialized and trained personnel shall work close to these machines. For installation, follow strictly the local safety rules given by the respective plant / factory / local authorities and discuss the application with the safety engineer in charge.
The tools provided by TomTom-Tools GmbH have proven their functionality in various applications; nevertheless TomTom-Tools GmbH does not take any responsibility for the application on site regarding safety or machine damage. The plant is responsible for the safety, according to the local law, in a way that nobody can be hurt or injured. The application and safety instructions below are guidelines and not exhausted which include the experience from previous measurement campaigns and might need to be adapted to the local safety requirements.

Caution:

Pinch Points:
Do not put your hands nor any items close or into pinch points.
(e.g. girth gear / pinion, kiln tires / support rollers, …)
Keep safe distance to avoid getting caught by moving parts
(e.g. oil lifting scoops inside bearing housing)
Install the Shaft Temperature Sensor only when the equipment is stopped

Magnet Fields:
Be aware of the strong magnet field of the magnet stands.
Keep the tool away from people with pace makers or any other sensitive item as credit cards or magnetic data carrier.

Clamping:
Do not put fingers between the magnets and magnetic surface. There is the risk for clamping or pinching, due to the strong magnetic force.

Gloves:
Wear proper gloves to protect your hands from hot and rough surfaces and sharp edges.

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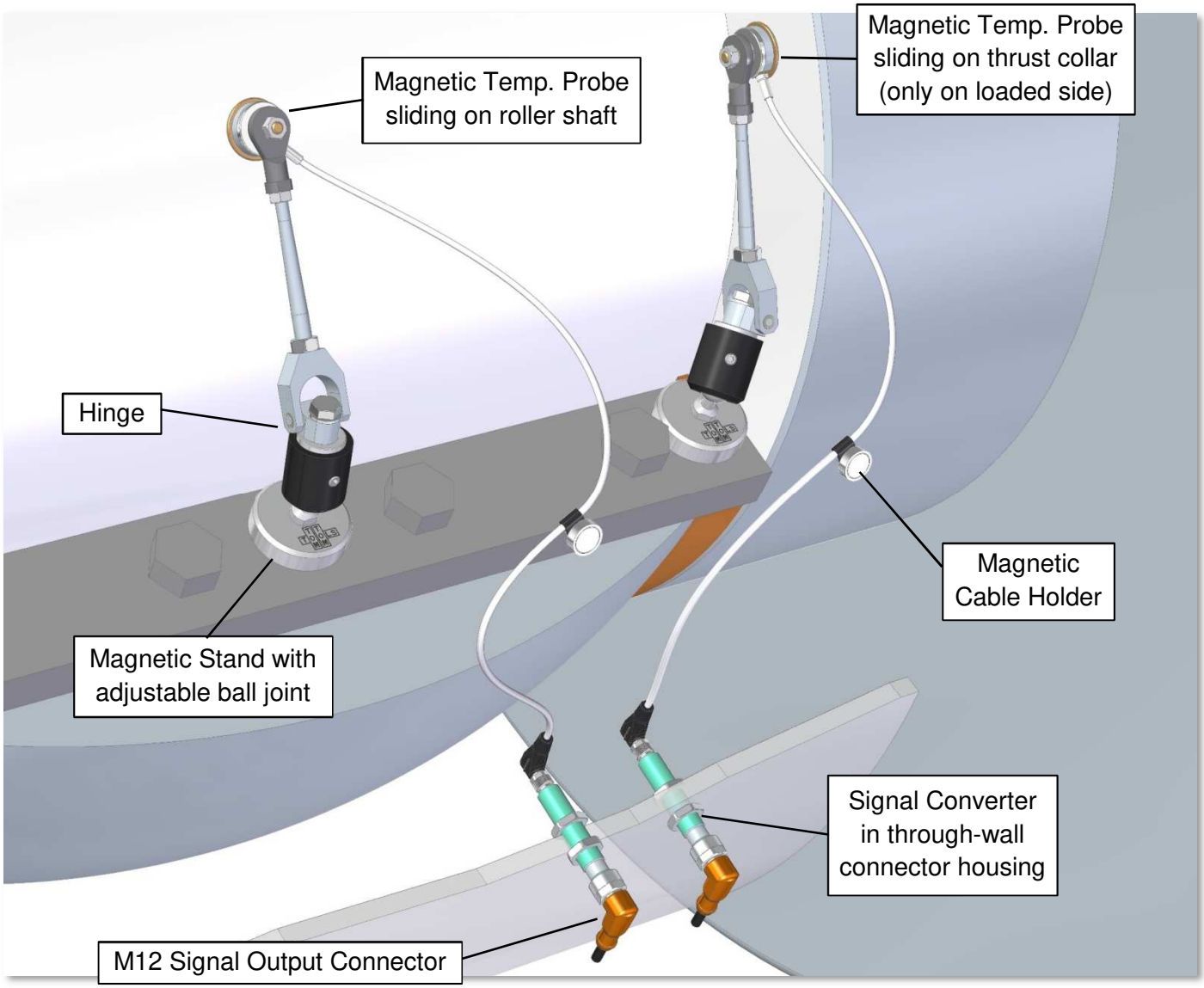
3 TYPICAL SETUP

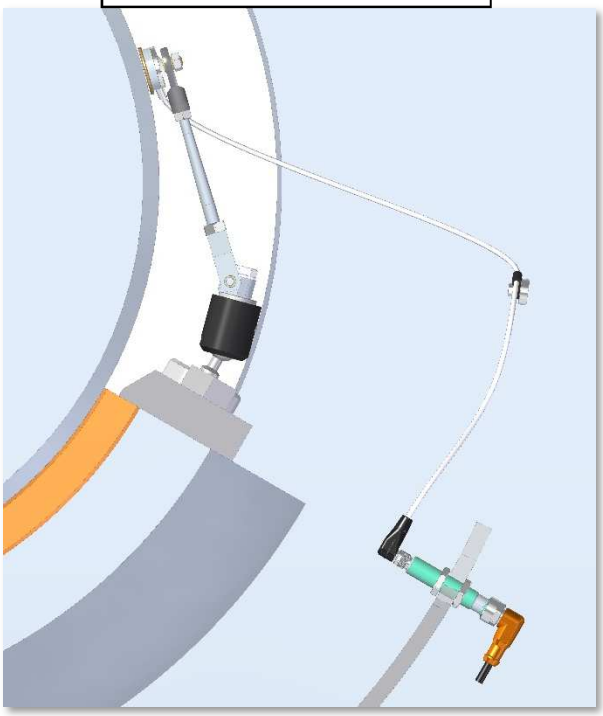


4 INSTALLATION

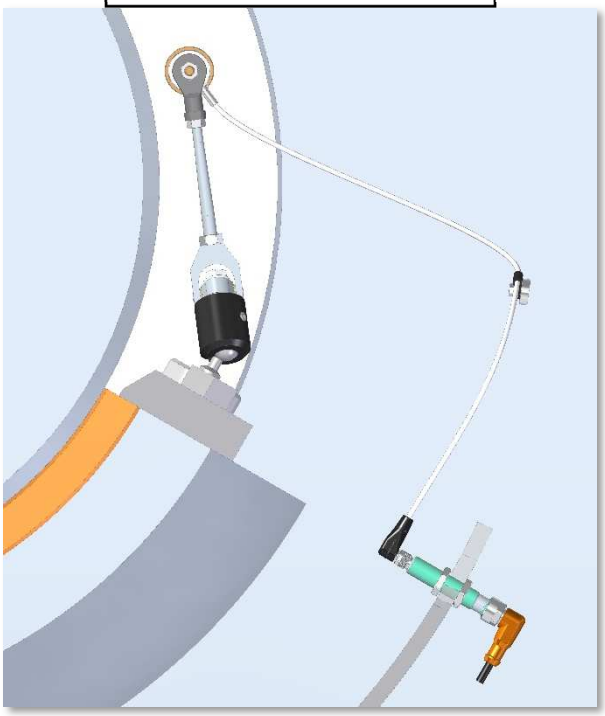
4.1 Magnetic Stand with Temperature Probe

a) Place the magnetic Stand onto a stable and flat steel surface in the area where the temperature has to be monitored
(typically in the middle of the shaft or on the thrust surface).
b) Make sure the magnet has a proper hold.
c) Adjust the ball swivel joint in a way that the probe is sitting flat onto the shaft surface.

Tangentially on roller shaft



Axially on thrust collar



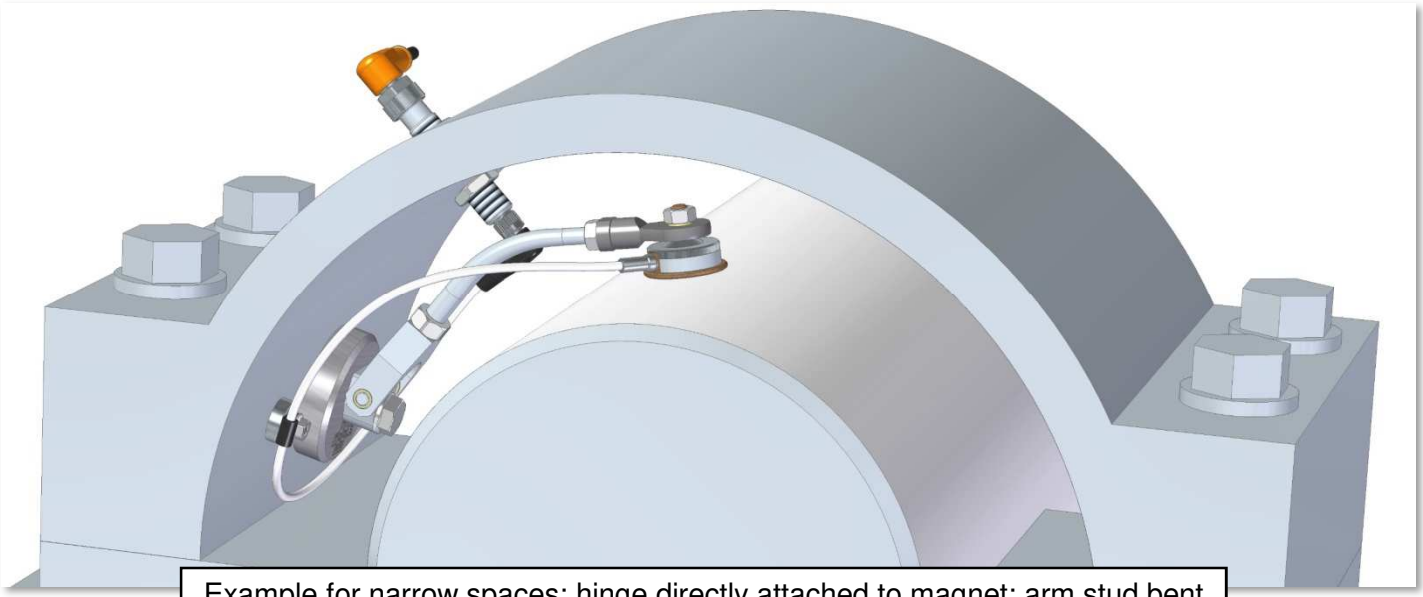
4.2 Through-Wall Signal Converter

d) Use existing plugs in the bearing housing to install the signal converter, e.g. by drilling a hole through a plug or cover
e) If no plugs are available, drill one hole per signal converter in the bearing housing (diameter 12.5…13mm)
f) Choose a place on the bearing housing where no oil can leak out, no rain water might get in and the wall thickness is low
g) **Attention**: Cover the area inside the bearing housing to avoid metal chips are falling into the bearing while drilling
h) Clean the bore hole with degreaser
i) Apply sealing compound onto the signal converter before inserting
j) Make sure the side with the larger connector (M12) is directed towards outside
k) Rotate the converter that the connector on the output cable is oriented correctly
l) Tighten the M12x1 Nuts
m) Connect the M8 connector from the probe to the signal converter
n) Fix the cable with the magnetic cable holder
Attention: make sure the cable is not touching any rotating part and cannot get caught by the oil lifter scoops

Temperature Sensors attached to the top of the bearing housing

Some bearing housing allow only access from the top through the inspection door. The magnetic stand can be attached from top as well.

In case the bearing housing is already equipped with threated wholes e.g. pipe threads, make usage of them, by using adapter fittings. Hence no additional drilling is required.

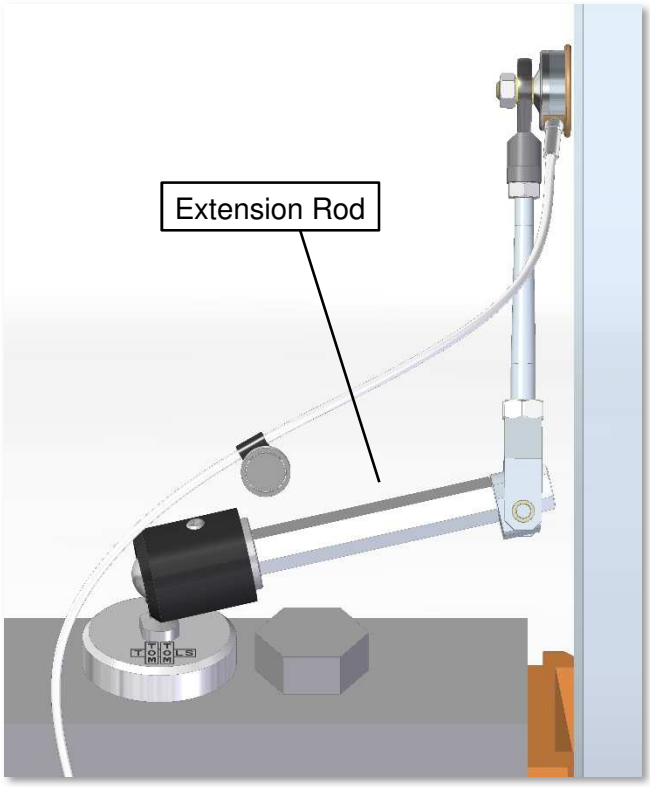


Example for narrow spaces: hinge directly attached to magnet; arm stud bent

4.3 Sensor Adjustment and Contact to Measured Surface

The contact to the surface is utmost important to ensure good heat transfer and avoid wear on probe.

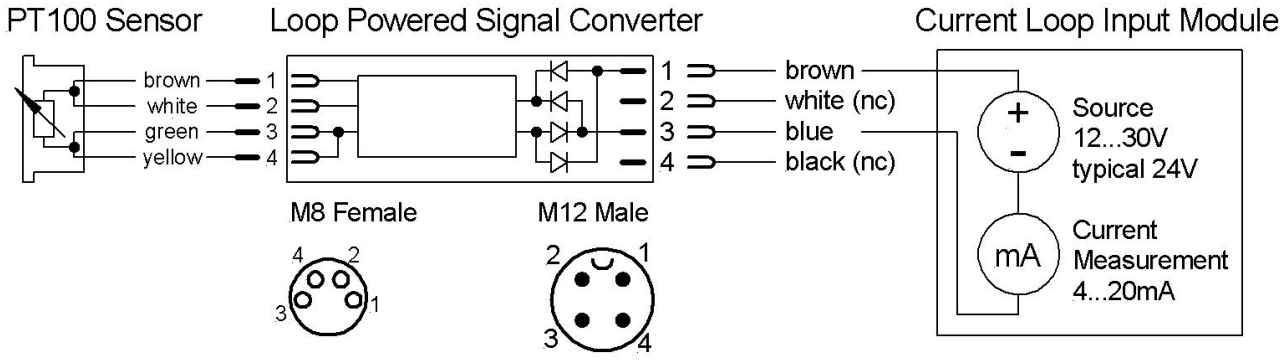
a) Make sure that the probe is sitting flat on the roller shaft or thrust collar
b) Make sure the swivel joint and the cable are freely moving and do not apply force to the probe
c) Preferable install the sensor on the side of the shaft, where it is not located directly in the fresh oil feed (cool oil might affect the measured temperature)
d) Extend the range if needed between the ball swivel and the hinge, as shown in this picture.
e) Be aware of possible axial travel of the roller and make sure the sensor can follow without tilting or lifting from the surface.
f) Secure bolted connections with adhesive (e.g. Loctite 243 or similar) to avoid any part falling off into the bearing (see details on page 8)



5 SIGNAL OUTPUT

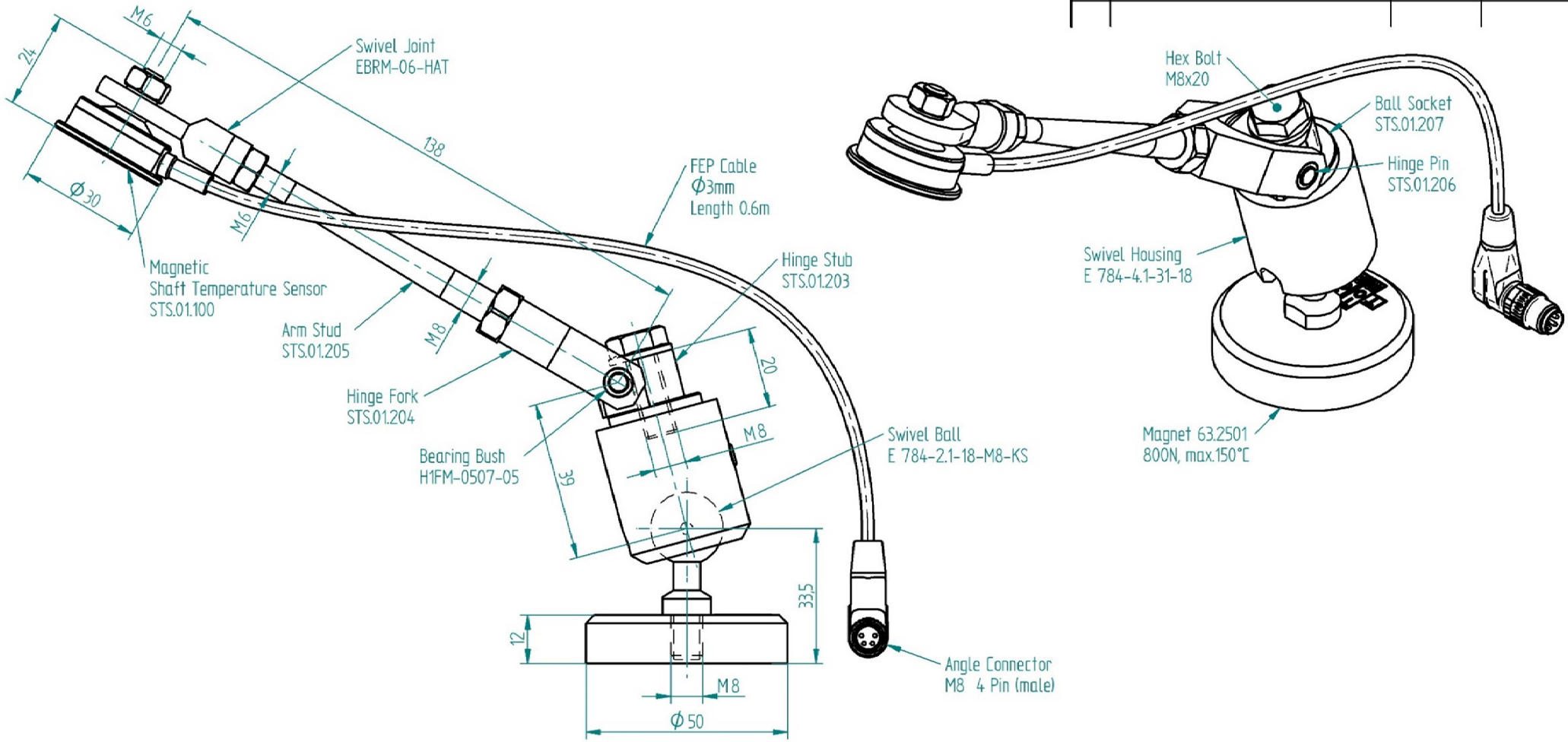
The temperature signal is provided as a 4…20mA signal in a current loop.
4mA are representing 0°C and 20mA are representing 160°C → 10°C/mA

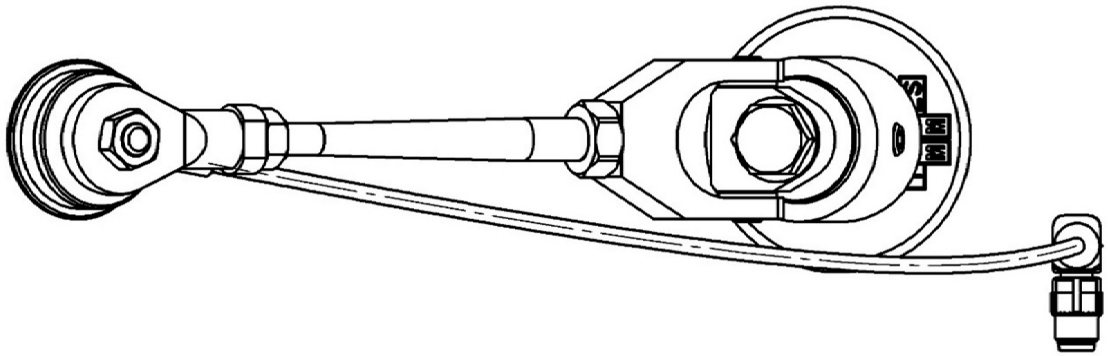
6 SCHEMATIC



Note: The resistance of the current loop has to be below the following values:
@12V: < 250 Ohm @24V: < 500 Ohm @30V: < 600 Ohm

REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED





	NAME	DATE
DRAWN	XYZ	11/01/19

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UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
DIMENSIONS ± 0.1 mm ANGLES ± 0.1°
TYPICAL EDGE CHAMFER 0.3x45°

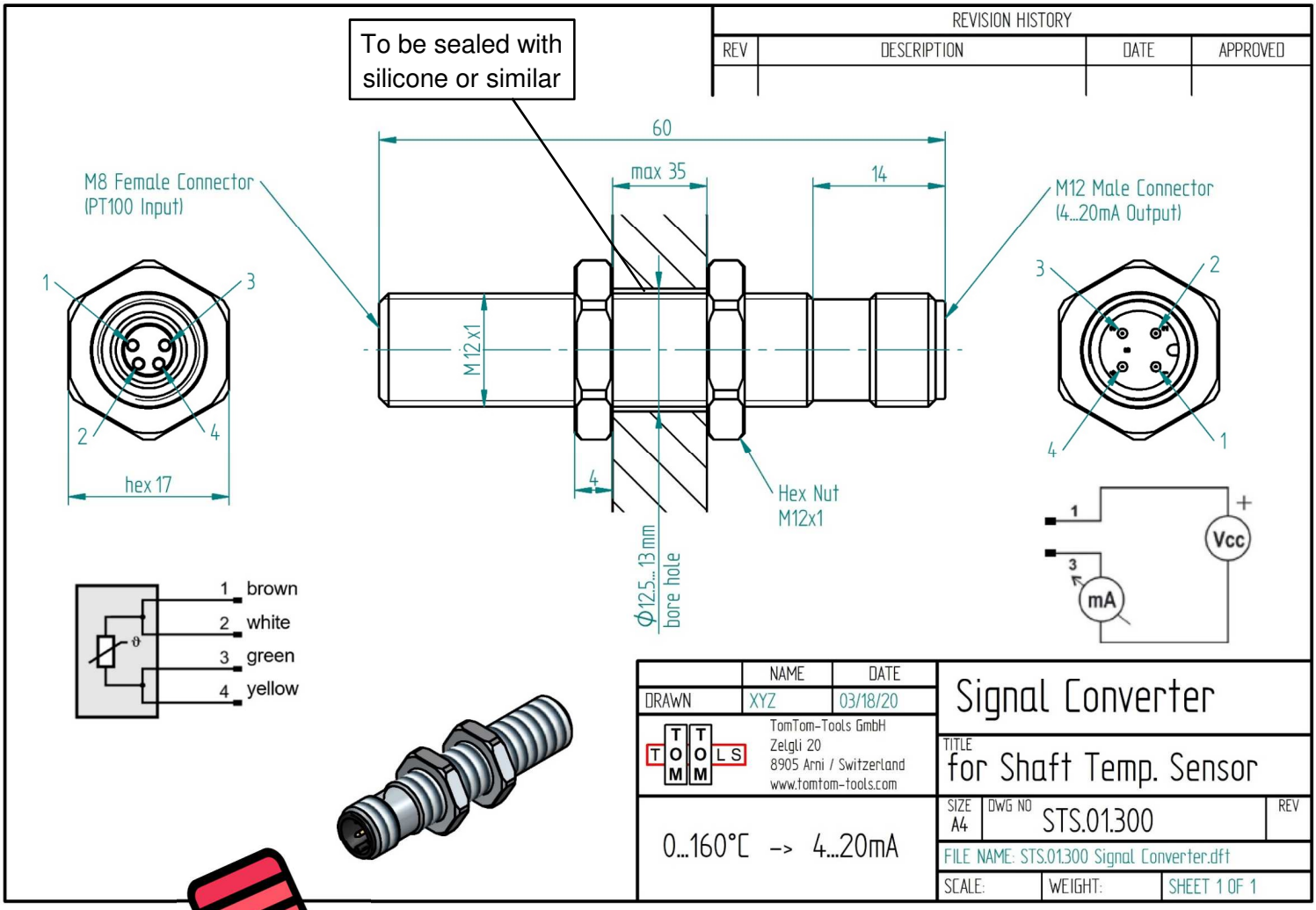
Magnetic Stand

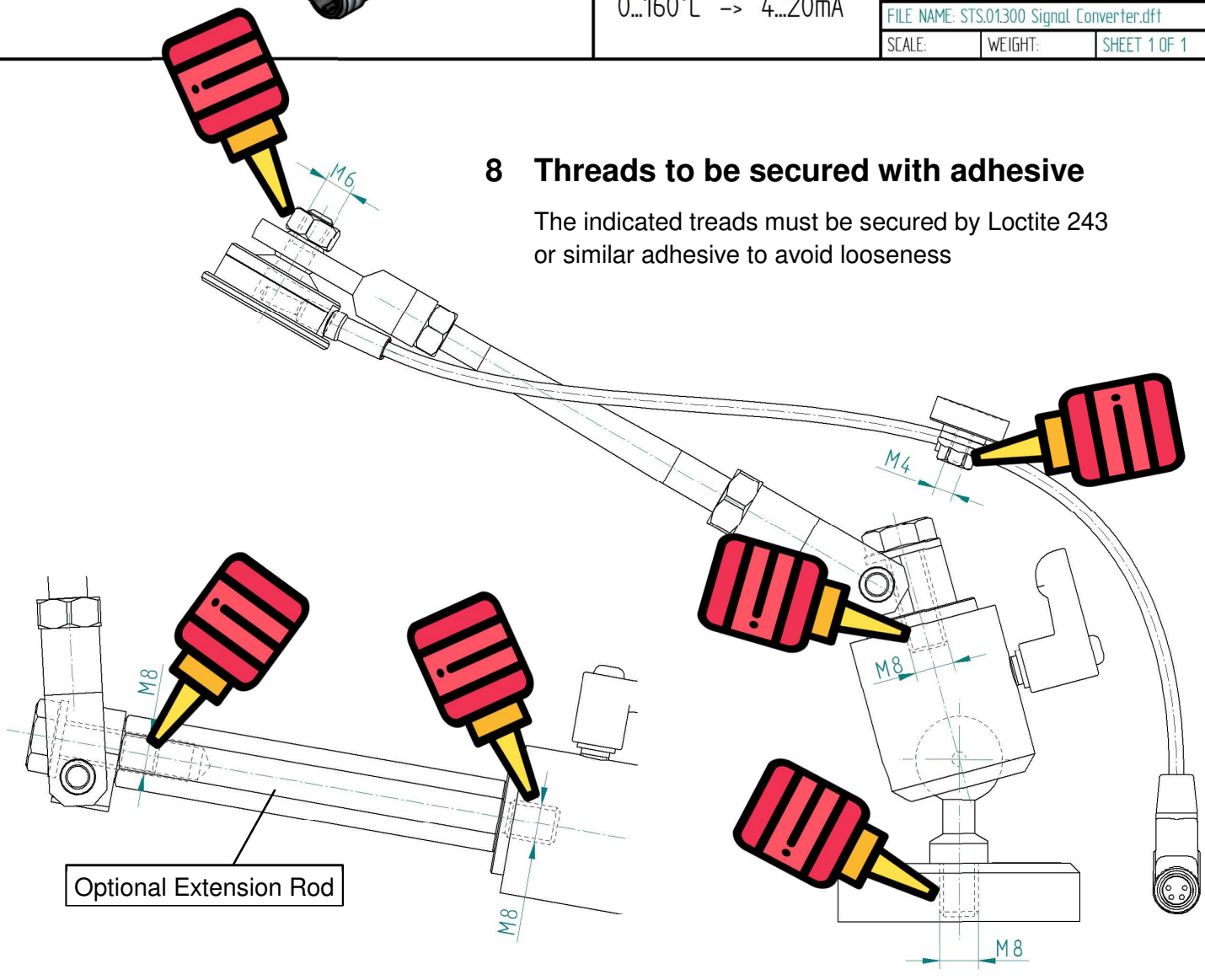
TITLE
for Shaft Temp. Sensor

SIZE	DWG NO	REV
A3	STS.01.200	

FILE NAME: STS.01.200 Magnetic Stand.dft

SCALE:	WEIGHT:	SHEET 1 OF 1





8 Threads to be secured with adhesive

The indicated treads must be secured by Loctite 243 or similar adhesive to avoid looseness