

T1-PCM-IND

Digital telemetry system for strain gage applications on rotating shafts

Operating Instructions



- Easy to assemble and operate
- Strain gage sensors (>350 Ohm)
- Full- and half bridge configuration
- Excitation fixed 4 Volt DC
- Auto-Zero adjustment
- Gain: 250-500-1000-2000 or 1000-2000-4000-8000
- 16 bit ADC
- Digital transmission realized inductively
- Distance up to 30mm (Range)
- Powering of transmitter part inductive
- No influence through radio frequency
- Many systems can operated at the same time
- Signal bandwidth 0...1200Hz (-3dB)
- Output +/-10V
- Output 4-20mA (Option)
- System accuracy <0.2%

General description

The T1-PCM-IND single-channel telemetry system offers the easiest handling for the wireless transmission of strain gage signals from rotating shafts. The encoder 35x24x14mm with a weight of 16g. The transmitter (encoder) part is simply mounted on the rotating shaft with a special fiber reinforced tape.

The data transfer between transmitter and receiver is digital. The powering of the transmission part by the T1-PCM-IND is **inductive!**

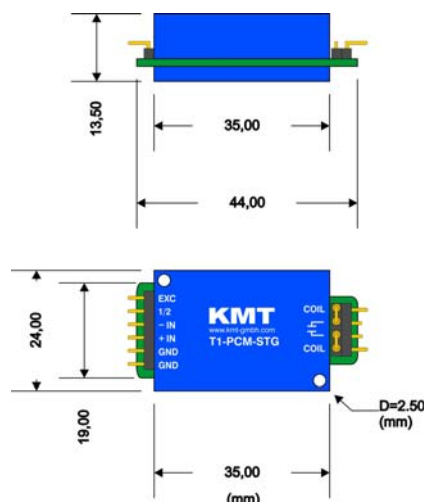
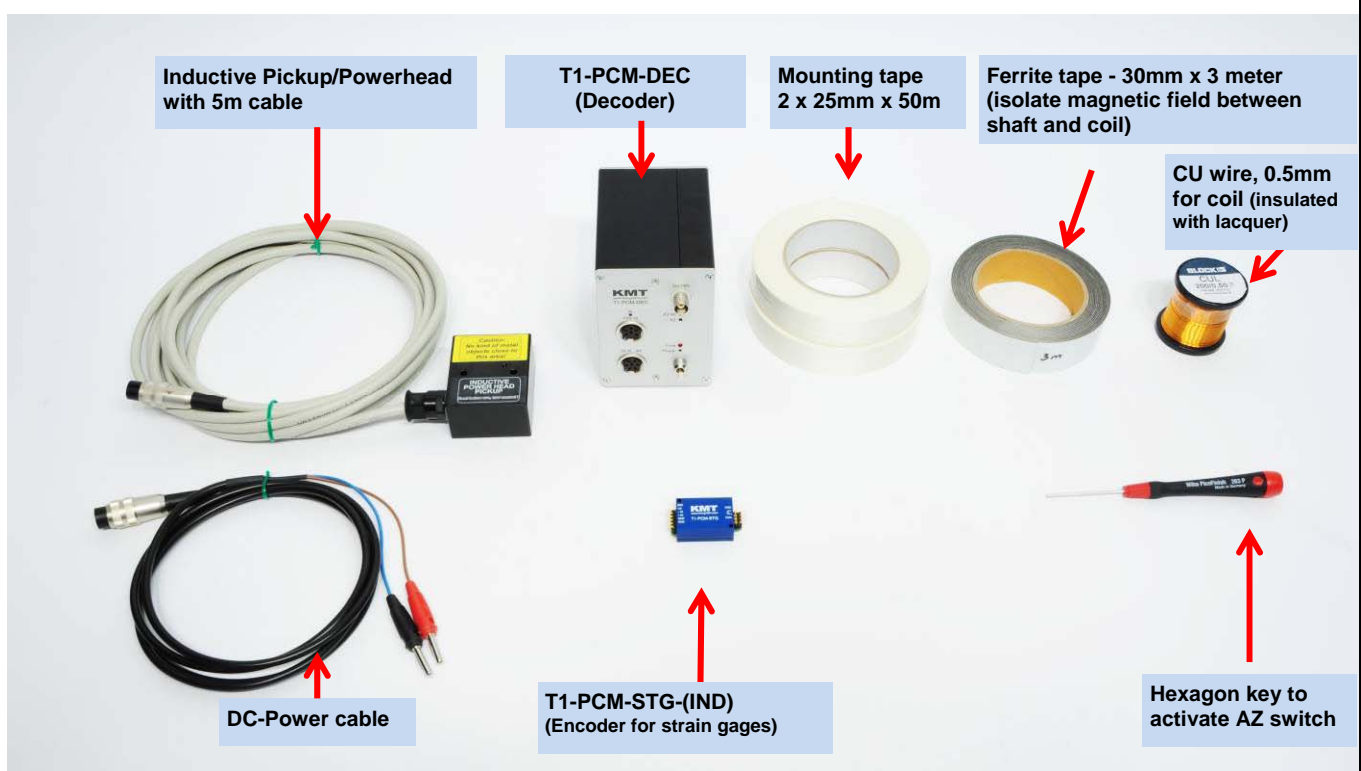
Functional description

The T1-PCM-IND transmitter provides a pulse code modulated signal (PCM) to an induction winding around the shaft. The magnetic field of this winding enables the inductive transmission of the signal from coil to pickup. From there the signal is transferred by cable (5 m) to the receiver. The maximum distance between the transmitter coil and the pickup/powerhead is 30mm.

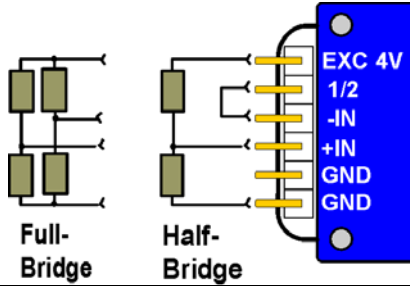
The receiver unit offers a BNC connector at the front panel with analog outputs ± 10 V and optional a current output of 4-20mA

Strain gage sensors (>350 Ohm) in full- and half- bridge configuration can be directly connected to the transmitter. The excitation is fixed to 4 Volt DC and the gain is set by plug-In bridge in 4 steps (250-500-1000-2000 or 1000-2000-4000-8000). An auto-zero (AZ) adjustment is executed by pressing the AZ button on the front side of the receiver. The successful AZ operation is indicated by a yellow LED. The yellow LED flashes as long as the AZ is in progress. When the AZ completes the LED continuously illuminates. The AZ setting is stored in a Flash-RAM and thus is not lost during power-off.

T1-PCM-IND set contains:



Technical data transmitting part:



T1-PCM-STG

Strain gage: Full and half bridge >350 Ohm,
 Excitation: 4 VDC (fixed)
 Gain: 250-500-1000-2000 standard
 1000-2000-4000-8000 **on request!**

Gain and Sensitivity

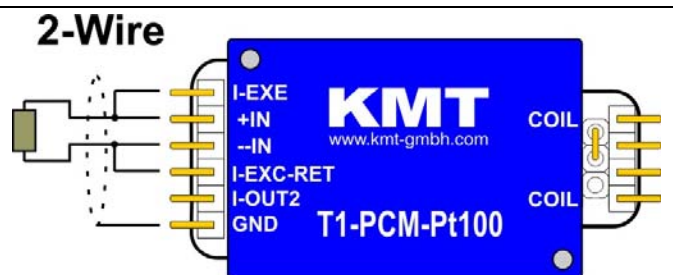
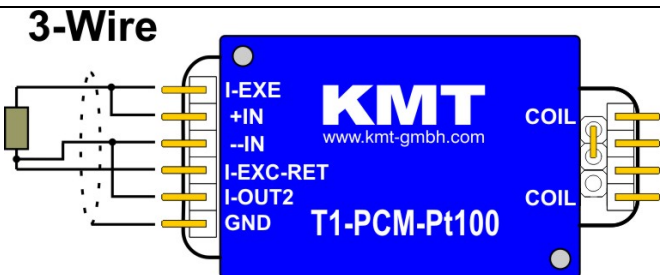
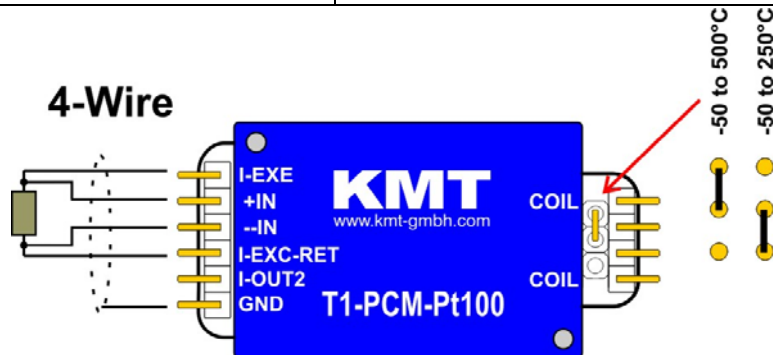
Gain 250 = +/-10mV/V	Gain 2000 = +/-1.250mV/V
Gain 500 = +/-5mV/V	Gain 4000 = +/-0.625mV/V
Gain 1000 = +/-2.5mV/V	Gain 8000 = +/-0.3125mV/V

AZ: Auto Zero calibration (via AZ button from receiver side)
 Analog signal bandwidth: 0 - 1200 Hz (-3 dB)
 Operating temperature: - 10 to + 80 °C
 Resolution 16bit
 Scanning rate 7.5kHz
 Static acceleration: up to 3000g
 Powering: inductive
 Dimensions: 35x24x14mm, weight 16g
 Housing: splash-water resistant IP65 (except the connector pins)

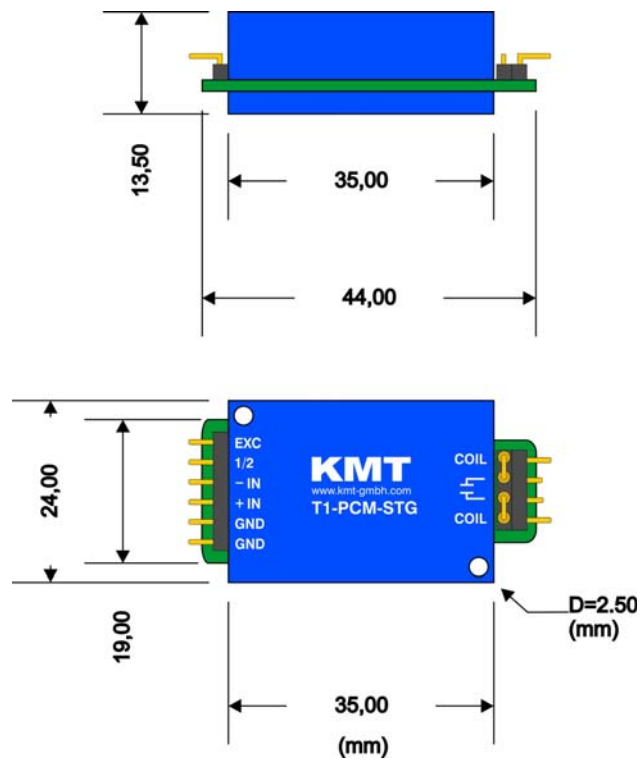


T1-PCM-Pt100

Pt100 thermo sensor
 Measurement range -50 to 250°C or -50 to 500°C (select by jumper)
 Analog signal bandwidth: 0 - 10 Hz (-3 dB)
 Operating temperature: - 10 to + 80 °C
 Resolution 16bit
 Scanning rate 7.5kHz
 Static acceleration: up to 3000g
 Powering: inductive
 Dimensions: 35x24x14mm, weight 16g
 Housing: splash-water resistant IP65 (except the connector pins)



Dimensions Encoder - T1-PCM-STG



Draw about 1:1

Weight 16 gram

Technical data receiving part



Front

Rear

Optional top-hat rail clip

T1-PCM-DEC

Analogue output: +/-10V via BNC output 1200Hz
Optional switchable add. 100Hz filter for the analog output
Optional add. 4-20mA output to the analog output

Auto Zero setting: via AZ button

Autozero LED:

Yellow ON- successful AZ

Yellow OFF- not successful AZ

if flashing, call support of KMT, error in EPROM

SL LED: Red ON = if error of data transmitting

SL LED: Red Flashing = distance to far

Power ON LED: Red ON = if power switch on

Output to Powerhead: via 6-pol. Tuchel

Fuse LED: Flashing if fuse is defect

Powering: 10-30V DC, Input via 7-pol. Tuchel

Switch: ON/OFF

Operating temperature: - 10 to +70 °C

Dimensions: 75 x 105 x 105 (without connectors!)

Weight 750 grams

Static acceleration: up to 200g

System accuracy*: +/- 0.2 %

*<*measure with gain 1000, 350ohm (0.1%) full bridge - test bridge!!>*

T1-PCM-Pickup/Powerhead (standard version)

Function: Receiving inductive PCM modulated data from the coil of the T1-PCM-STG unit

Distance between the transmitter coil and the pickup is 5-30*mm

Output to T1-PCM-Decoder: Via 6-pol. Tuchel plug incl. 5m cable

Operating temperature: - 10 to +80 °C

Dimensions: 53x66x30mm (without cable)

Weight: 200 grams (without cable!)

Housing: splash-water resistant IP65 (except connector).

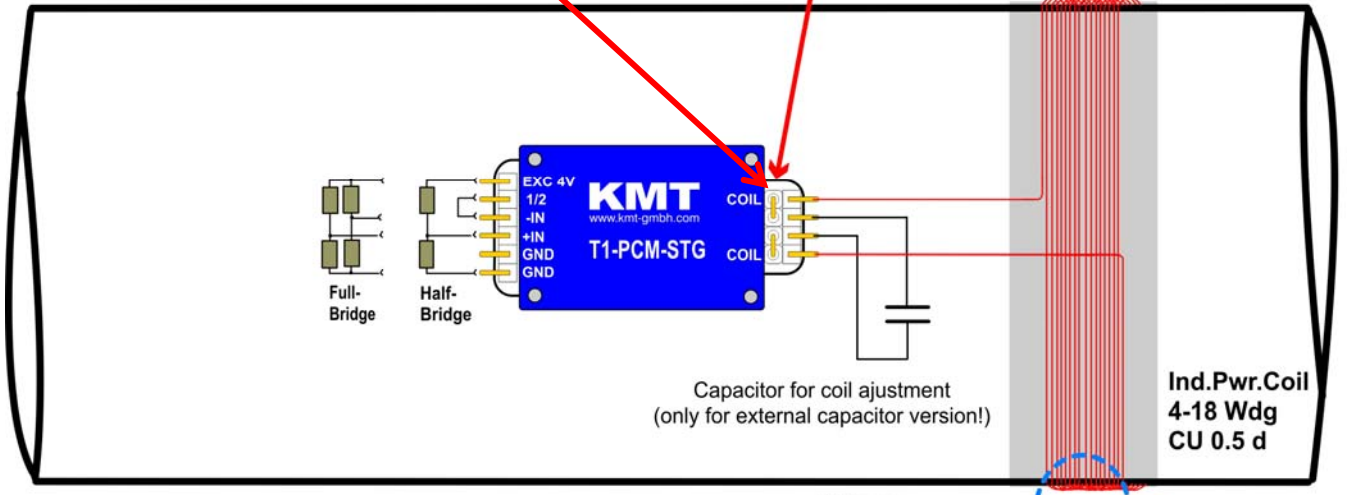
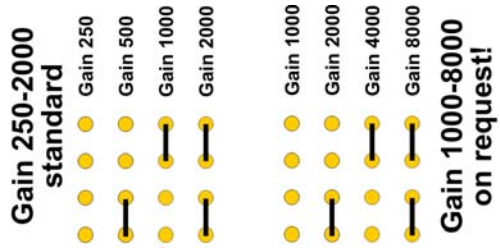
Cable length standard 5m! Optional 10 or 15m

**(depend of shaft diameter!)*



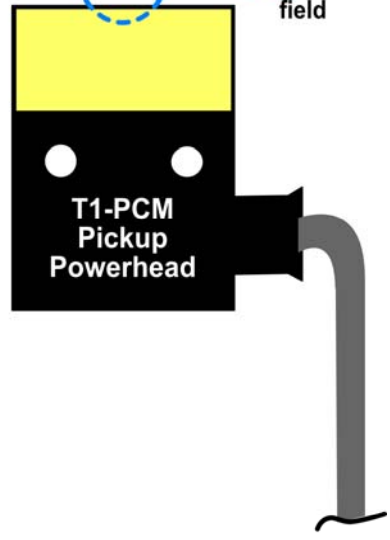
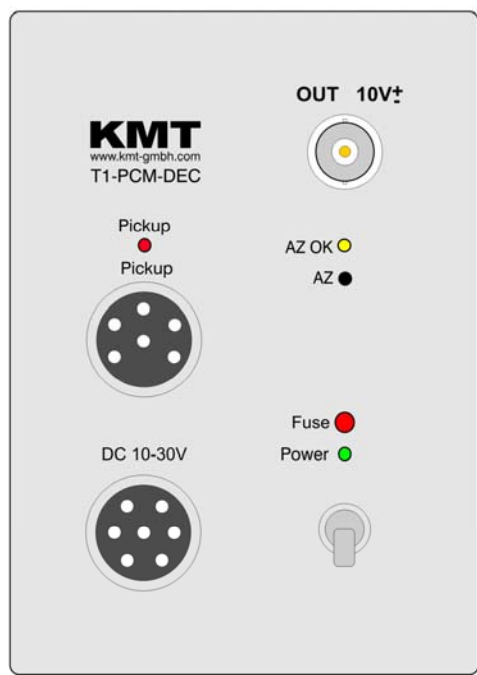
Pin connection & block diagram

At high RPM we recommend to solder the GAIN jumper!



Distance up to 5-30mm

Magnetic field

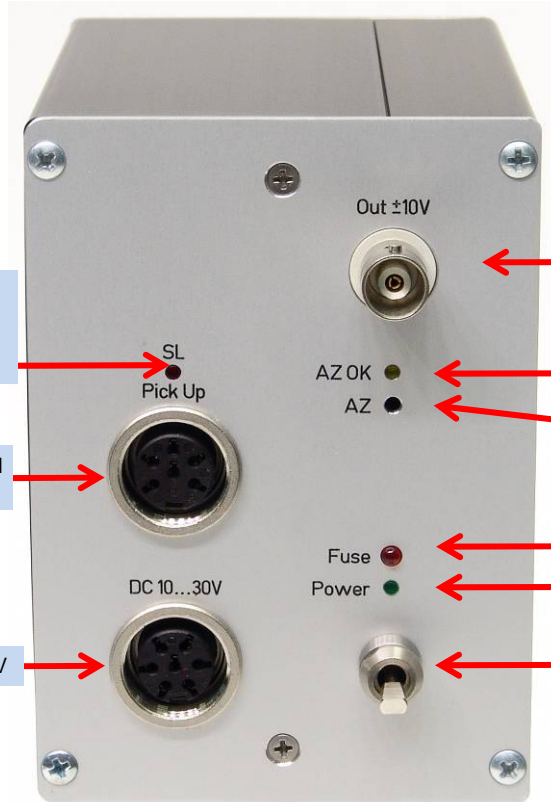


Digital data transfer

Note: The Pickup/Powerhead must be fixed in the middle of the coil in a distance from 5 to 30mm.

Receiving part:

Front



LED ON = Error data transmission
LED Flashing = Distance between Coil and Pickup is too far away

Data input from Pickup and output to Powerhead

Power IN DC 10 – 30V

Analog output +/-10V

Yellow ON- successful AZ
Yellow OFF- not successful AZ
If flashing, call support of KMT, error in EPROM

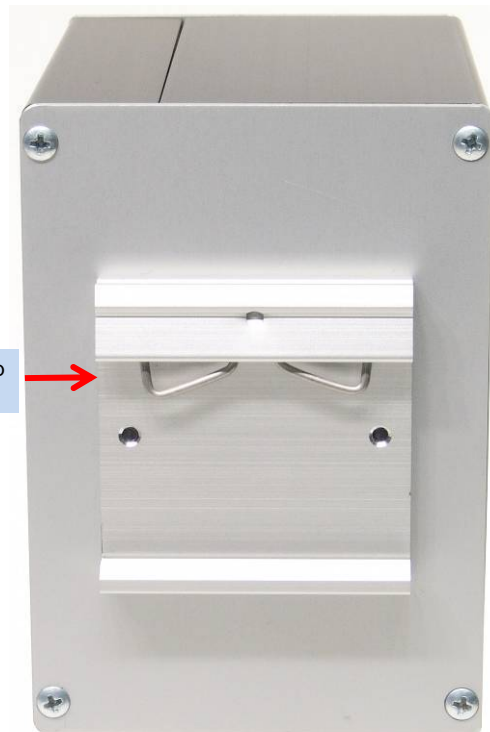
AZ button

Flashing if fuse damage

Power ON LED

Power ON/OFF switch

Rear

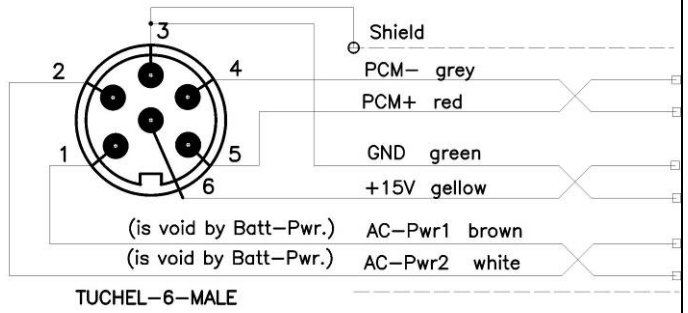


Top-hat rail mounting clip (Option!)

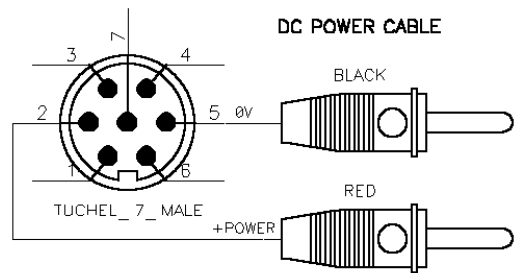
Pin connection cable:

Pickup / Powerhead

Standard version for distance of 5-30*mm
 *(depend of shaft diameter!)

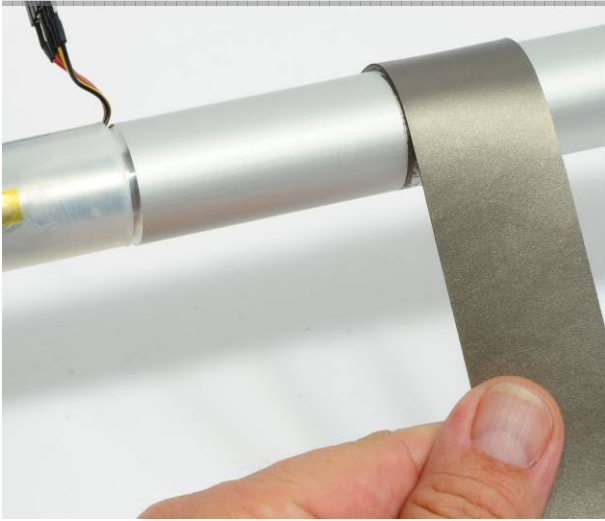


DC-Power cable

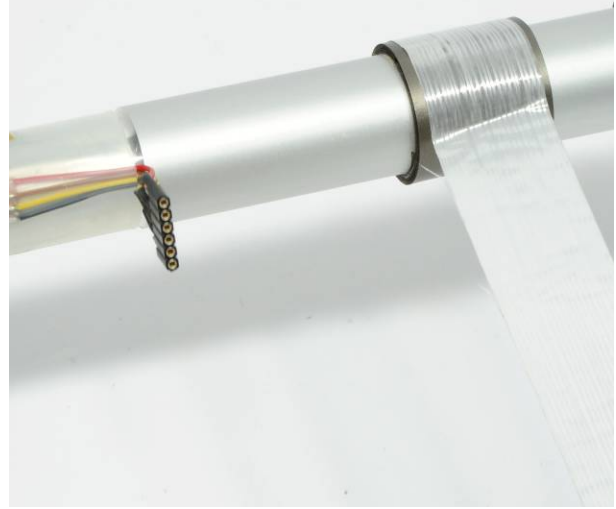


Shaft installation

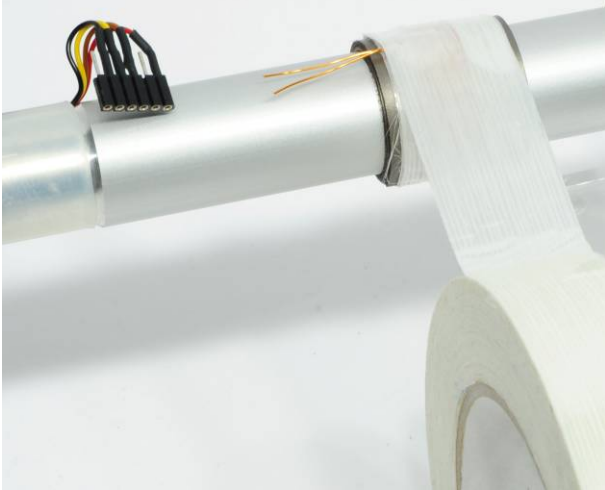
2 layers (layer by layer) of the special ferrite tape around the shaft



Fix with 2 layers of mounting tape around the shaft

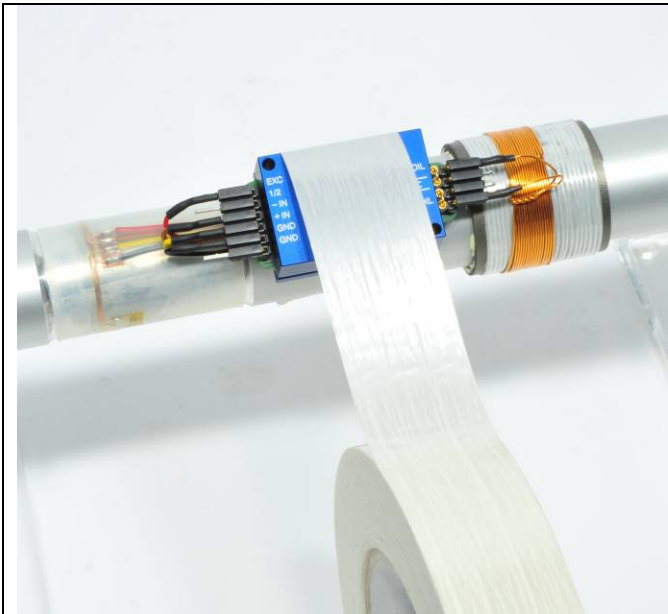


Coil, depends of shaft diameter 5-18 parallel windings of 0.5 CU wires, see table for help.



Fix with 2 layers of mounting tape around the coil

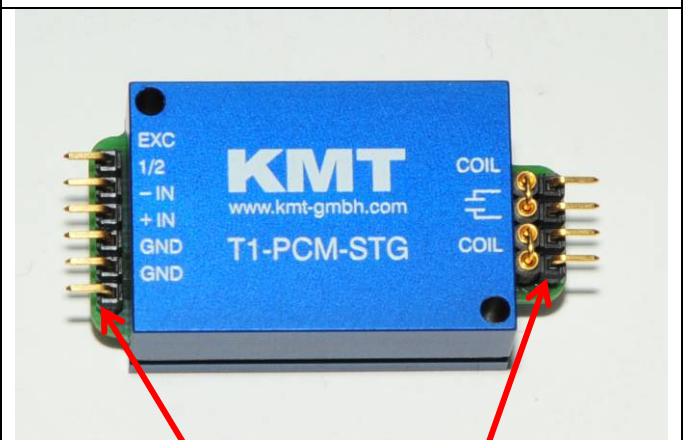




10 layers of the special mounting tape around the shaft.



We recommend add. use a steel hose clamps for final fixing!!



We recommend soldering all pins of the T1-PCM-STG!

Caution:

Fix T1-PCM-STG module with at least 10 layers of the special mounting tape around the shaft. Depending on the shafts RPM and diameter particular attention needs to be paid to the safe mounting of the components.

The manufacturer doesn't accept liability for damages, which results from insufficient attachment of the individual components.

The tape is only for test purposes, in order to test the electrical function of the units in the idle state of the shaft.

During the rotation test appropriate safety precautions should be taken.

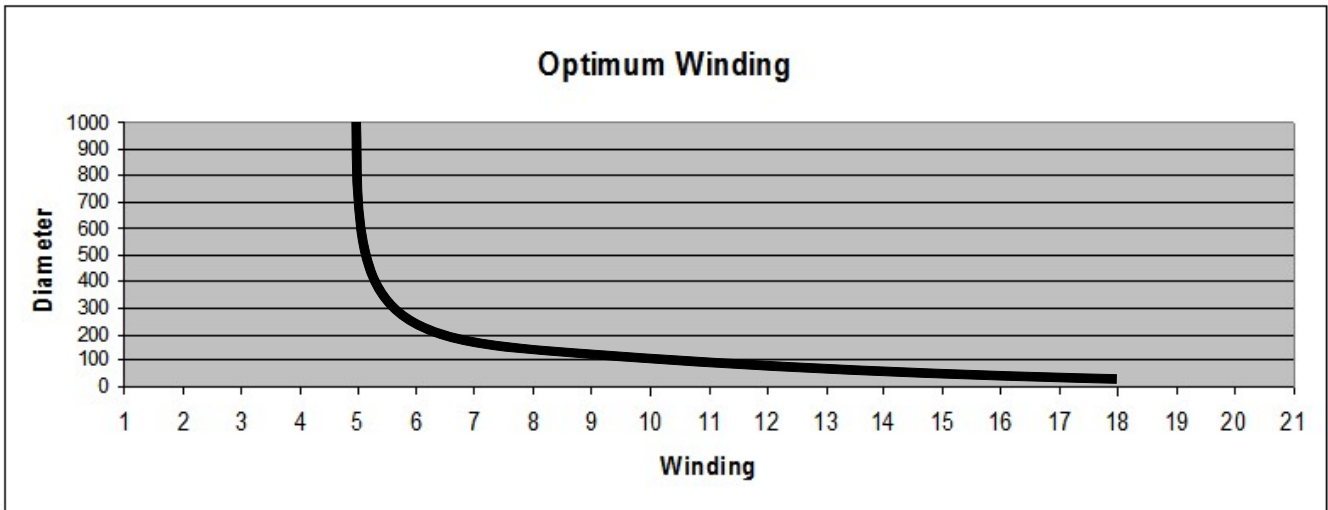
The entire installation may be used only by authorized persons. By using tape for the attachment, it has to be used in the direction of rotation of the shaft and the end has to be secured. Only non-elastic tapes with high tensile strength should be used for pre-fixing. Additionally, use hose clamps for final fixing!! The individual components are to be distributed in such a way on the shaft that imbalances are avoided.

Find the correct amount of windings

The number of windings depends on several factors. The most important influential factors are the diameter, the material of the shaft and the environment around the shaft. The table standing below will help you to find the right number windings for steel shafts. The table below is a help to estimate the number of windings fast. To optimize your results you can try one winding more or less.



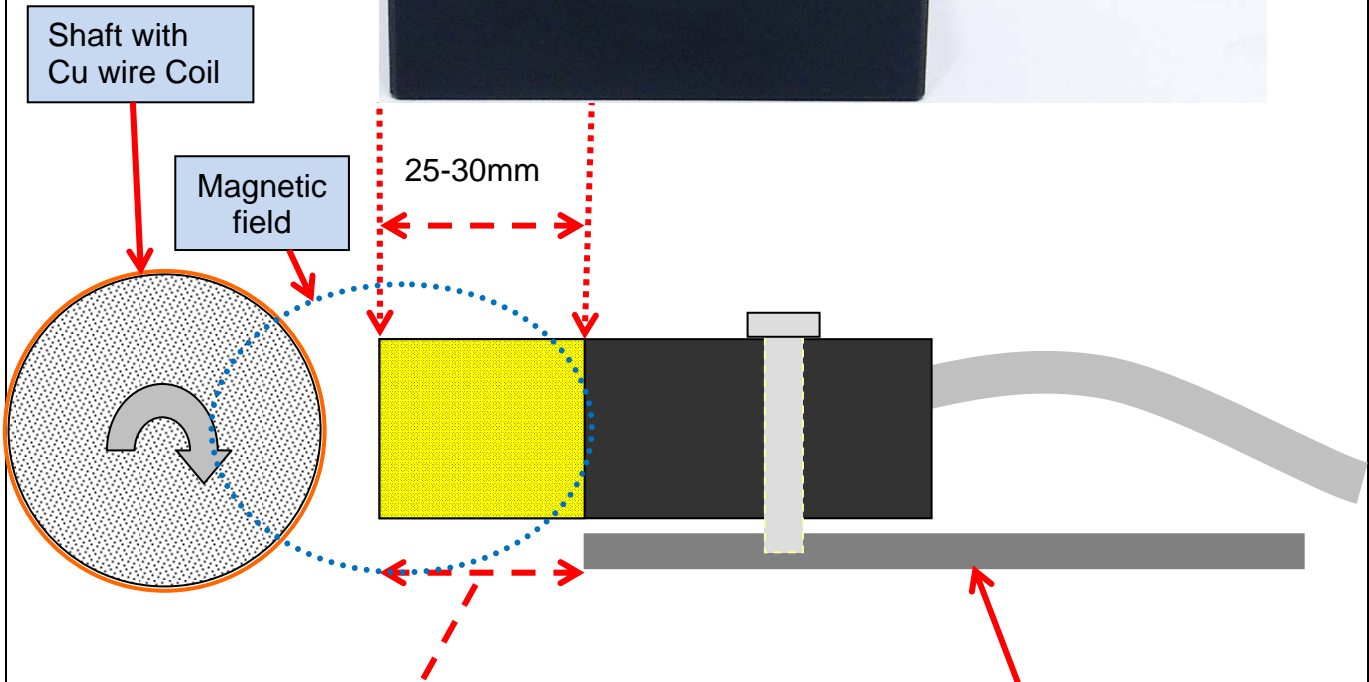
Coil, depends of shaft diameter 5-18 windings of 0.5 CU wire



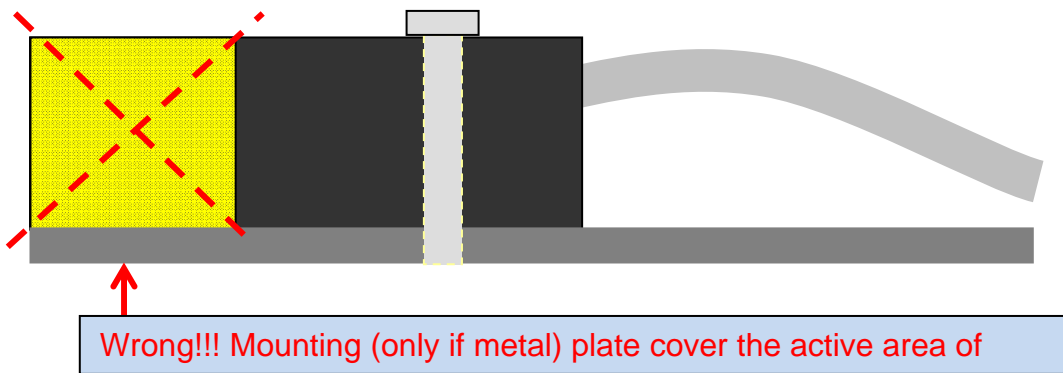
Diameter (mm)	Windings (+/-1)	max. distance with (30mm) Powerhead	Ferrite tape no. of layers	recommend capacitor (Type MKT or MKS 250V)
1000	5	10mm	2	without built-in 220nF, only with external 68nF (specify at order)
500	5	18mm	2	without built-in 220nF, only with external 100nF (specify at order)
500	3	5mm	2	with built-in 220nF (is standard in housing) Not recommend for large diameters!!!
300	5	22mm	2	with built-in 220nF (is standard in housing)
210	6	23mm	2	with built-in 220nF (is standard in housing)
160	7	23mm	2	with built-in 220nF (is standard in housing)
130	8	30mm	2	with built-in 220nF (is standard in housing)
90	11	30mm	2	with built-in 220nF (is standard in housing)
60	13	30mm	2	with built-in 220nF (is standard in housing)
30	14	30mm	2	with built-in 220nF (is standard in housing)
20	18	30mm	2	with built-in 220nF (is standard in housing)

T1-PCM-IND

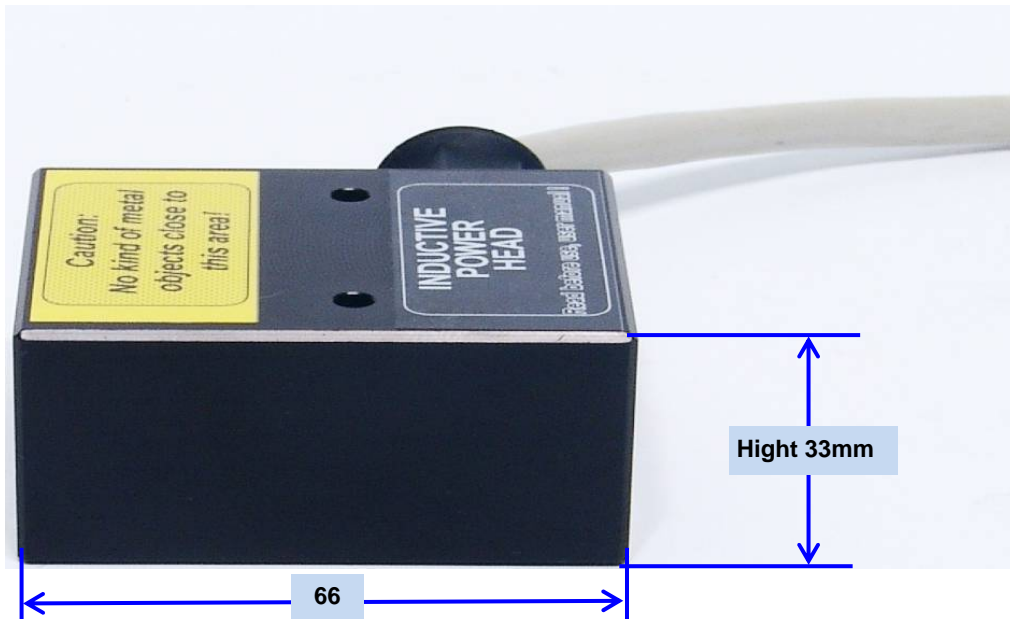
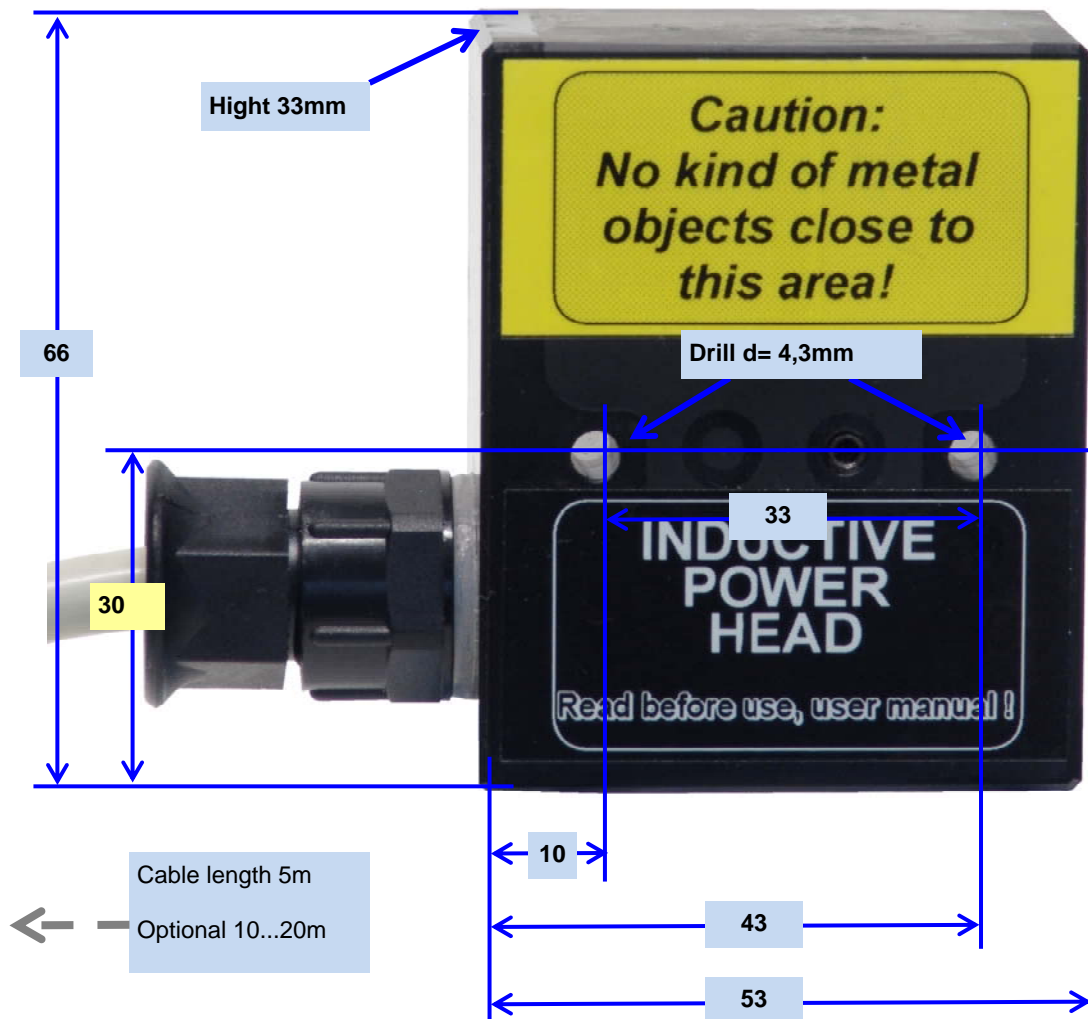
Following must be considered at the mounting of the inductive power head



Don't use for mounting any kind metal in this area (25-30mm)! Otherwise magnetic energy will flow in the metal and decrease the distance between power head and coil (on shaft)!



Dimensions Powerhead / Pickup



Attention

- Use only shielded sensor cable
- When used on rotating shafts, all connections must be soldered.
- Mounting of the modules on a shaft must be first fixed with mounting tape (only for prefixing) and then with a [hose clamps!!!](#)



Safety notes for inductive powering

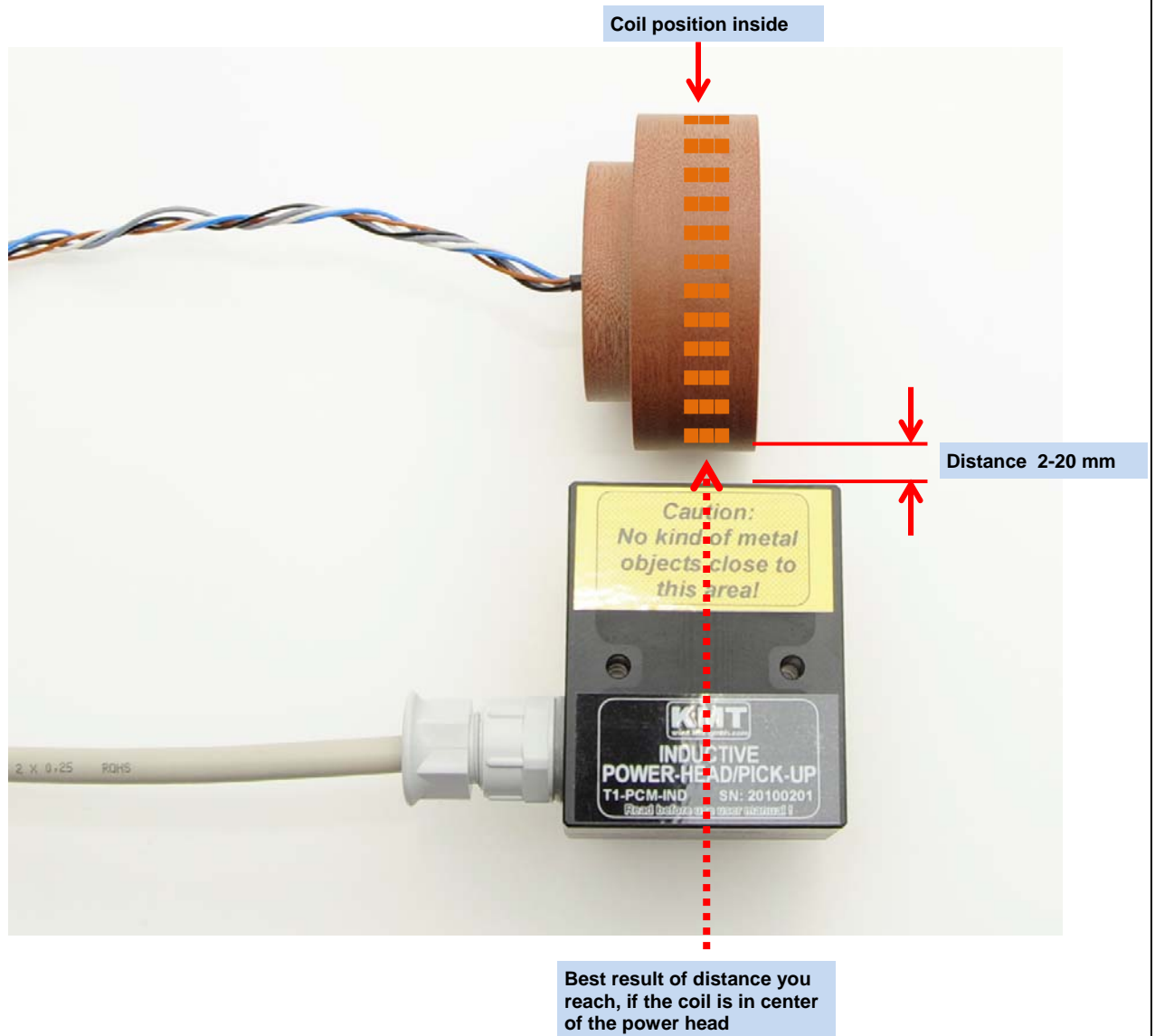
- The device should only be applied by instructed personnel.
- The power head emits strong magnetic radiation at 60 kHz to a distance of 20 cm. Therefore persons with cardiac **pacemakers** should **not work** with this device!
- Magnetic data storage media should be kept in a distance of at least 3m from the power head to avoid data loss. The same is valid for electromagnetic sensitive parts, devices and systems.
- Do **not place** the power head in the switched-on state **on metallic objects**, because this results in eddy currents, which could overload the device and strongly heat up small objects. In addition, the probe could be destroyed!
- No metallic objects, other than the disc-type coil, should be located in the air gap of the power head. The same applies to metallic parts within a radius of up to 15–20 mm in all directions.
- Do not use damaged or faulty cables!
- Never touch in the area between shaft and inductive head, the rotating shaft itself or rotor electronic contacts during operation!
- This is a “Class A” system suitable for operation in a laboratory or industrial environment. The system can cause electromagnetic interference when used in residential areas or environments. In this case the operator is responsible for establishing protective procedures.

Special housing for end of shaft mounting
Wire connection:



EXC	brown	4V bridge excitation
1/2	gray	1/2 bridge competition
-IN	black	Signal --
+IN	white	Signal +
GND	blue	Ground signal

Special housing for end of shaft mounting Head position



Optional special housing consists of two Half-Rings.
The T1-PCM-STG is integrated in the housing (embedded with epoxy resin)
For shaft diameters 15-150mm. Specify exact diameter at order!

