

TEL1-PCM-BATT

Operating Instructions

Digital Telemetry System for Strain Gage Applications on Rotating Shafts

“Gain and Auto Zero setting direct from Receiver Side!”



General Description

The TEL1-PCM single-channel telemetry system offers the easiest handling for the wireless transmission of strain gage signals from rotating shafts. The very small encoder 35 x 18 x 12 mm with a weight of 13g. 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 TEL1-PCM BATT is supplied by 6-9V battery.

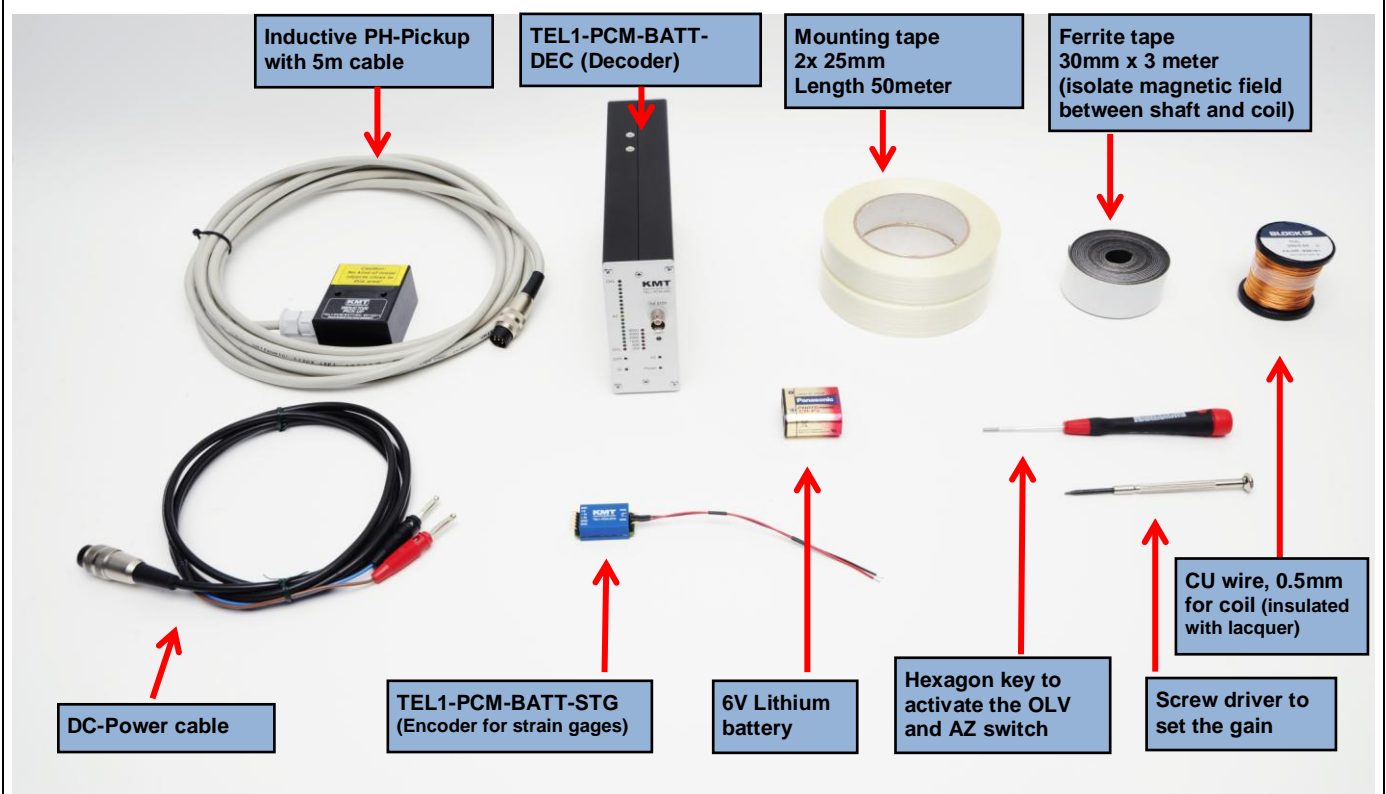
Functional Description

The TEL1-PCM-BATT 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 is 150mm.

The receiver unit offers a BNC connector at the front panel with analog outputs ± 10 V and a optional a digital output for PCM interface ECIA100 (for notebooks) or IF16 (PCI Desktop). An LED bar indicator shows the actual level and a successful Auto Zero calibration. Overload is indicated by the last LED's in pos. or neg. direction of the bar graph. These OVL-LED's operate in peak-hold mode and are reset by pressing the overload switch.

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 the gain switch on the receiver side. 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 in the middle of the LED bar indicator. The yellow LED flashes as long as the AZ is in progress. When the AZ completes the LED continuously illuminates. A continued flashing of the yellow LED indicates some error in the AZ electronics. In this case please contact the support of KMT. The AZ setting is stored in a Flash-RAM and thus is not lost during power-off. Use only shielded sensor cable.

TEL1-PCM-BATT Set Contains:



Technical Data



TEL1-PCM-STG-BATT

Strainage: Full and 1/2 bridge >350 Ohm,

Excitation: 4 VDC (fixed)

Gain: 250; 500; 1000; 2000; 4000; 8000 (select able from receiver side)

Gain	Resolution	Autozero range
250	12 bit	100%
500	12 bit	200%
1000	12 bit	400%
2000	12 bit	400%
4000	12 bit	400%
8000	11 bit	400%

Analog signal bandwidth: 0 - 1200 Hz (-3 dB)

Operating temperature: - 10 to + 80 °C

Scanning rate 7.5kHz

Dimensions: 35 x 18 x 12mm (without connectors)

Weight: 13 grams

Static acceleration: up to 1000g

TEL1 PCM BATT Powering: By battery 6-9V

Power consumption: 70mA

Housing: splash-water resistant (except the connector pins)



with female K type thermocouple connector

with solder pins for thermocouple

TEL1-PCM-TH-K - Select Gain 250!

At Gain 500 multiply the values x2, Gain 1000 with x4

Max. Voltage output at receiver is +10V!

°C	Calibrator out (mV)	Output at receiver (DEC)		
		Normal (V)	Min. (V)	Max. (V)
0	-1.203	0,06	0,01	0,11
50	0.820	0,50	0,45	0,55
100	2.893	1,00	0,95	1,05
150	4.935	1,50	1,45	1,55
200	6.935	1,98	1,93	2,03
250	8.950	2,46	2,41	2,51
300	11.005	2,98	2,93	3,03
350	13.090	3,45	3,40	3,50
400	15.194	3,95	3,90	4,00
450	17.313	4,46	4,41	4,51
500	19.441	4,96	4,91	5,01
550	21.573	5,47	5,42	5,52
600	23.702	5,99	5,94	6,04
650	25.822	6,49	6,44	6,54
700	27.926	6,99	6,94	7,04
750	30.010	7,49	7,44	7,54
800	32.072	7,99	7,94	8,04
850	34.110	8,46	8,41	8,51
900	36.123	8,94	8,89	8,99
950	38.110	9,42	9,37	9,47
1000	40.072	9,90	9,85	9,95

Calibrator OMEGA CA71S3, measure at a clamping point temperature of 30°C (after 30 min run time)

Analog signal bandwidth: 0 - 10 Hz (-3 dB)

Accuracy: +/-0.5 % (without sensor)

Operating temperature: - 10 to + 80 °C

Dimensions: 35 x 18 x 12mm (without th-connector)

Weight: each module 13 grams (with epoxy resin)

Static acceleration: up to 3000g

(housing not filled with epoxy resin)

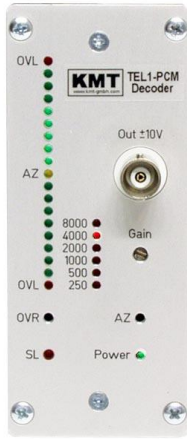
Static acceleration: up to 10000g

(housing filled with epoxy resin and without solder pins and external capacitor!)

Powering: Battery with 6-9V, Power consumption: 70mA

Housing: splash-water resistant IP65

(except the connector pins)



Front side



Rear side

TEL1-PCM-DEC

Front side:

Analogue output: +/-10V via BNC (Optional 4-20mA)
 Digital output for PCM Interface IF16 (ECIA100) OPTION
 Gain setting : via screw switch
 Auto Zero setting: via micro switch
 Overload LED's (Red ON) reset: via micro switch
 Green LED's: Bargraph +/-
 Autozero LED:
 Yellow ON- successful AZ
 Yellow OFF- not successful AZ
if flashing, call support of KMT, error in EPROM
 Green LED's: Bargraph +/-
 SL LED: Red ON = if error of data transmitting
 SL LED: Red Flashing = if the battery is empty
 Power ON LED: Red ON = if power switch on

Rear side:

Output to Powerhead: via 6pol. Tuchel
 Fuse LED: Flashing if fuse is defect
 Powering: 10-30V DC (min. 24Watt), Input via 7pol. Tuchel
 Switch: ON/OFF
 Operating temperature: - 10 to + 70 °C
 Dimensions: 200 x 105 x 44 (without connectors!)
 Weight 950 grams
 Static acceleration: upto 200g
 System accuracy*: +/- 0.2 %
 <*measure with gain 1000, 350ohm (0.1%) full bridge - test bridge!>

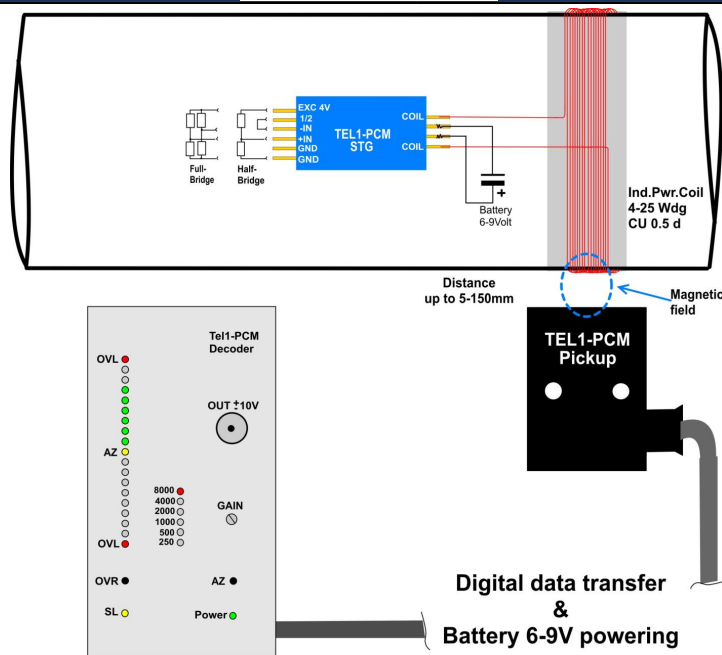


TEL1-PCM-Pickup

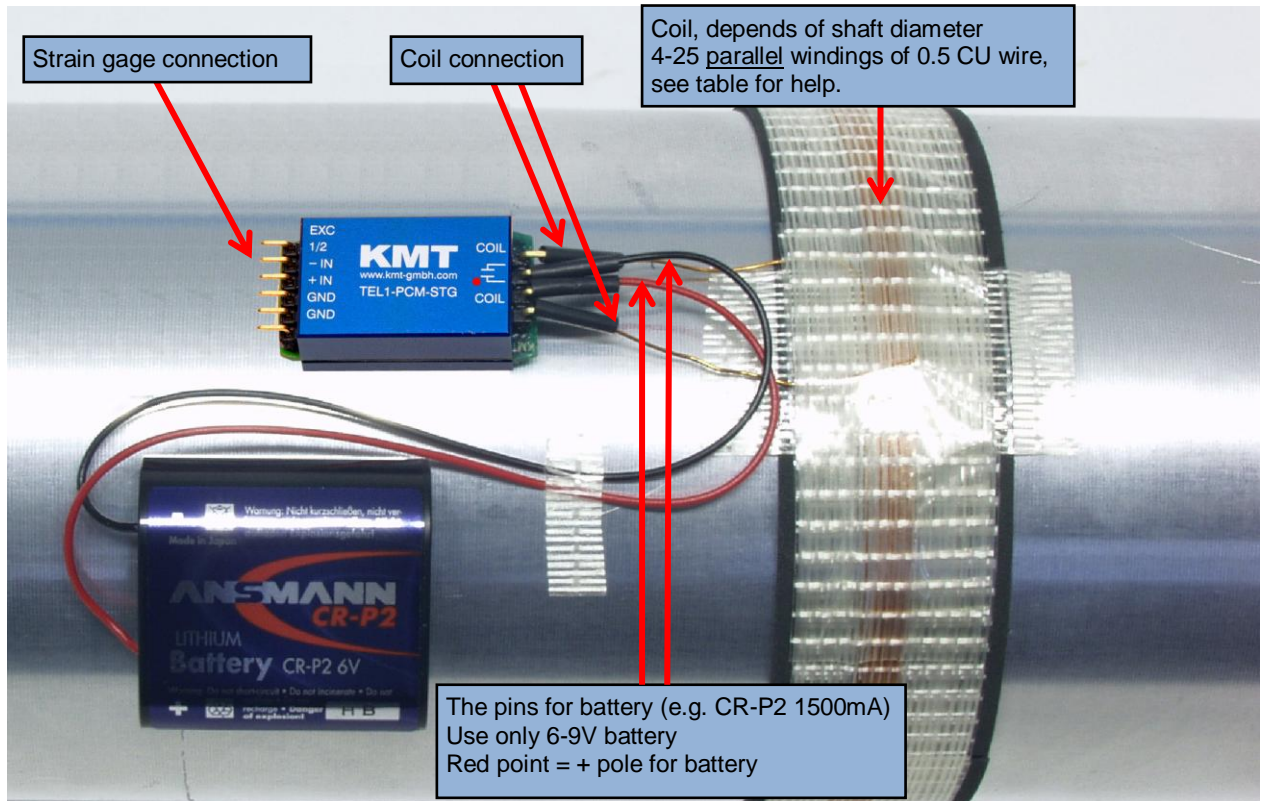
Function:

Receiving PCM magnetic field in PCM modulated code Distance between the transmitter coil and the pickup is 5-150mm
 Output to TEL1-PCM-Decoder: Via 6pol. 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! Longer on request, but max. 50m!

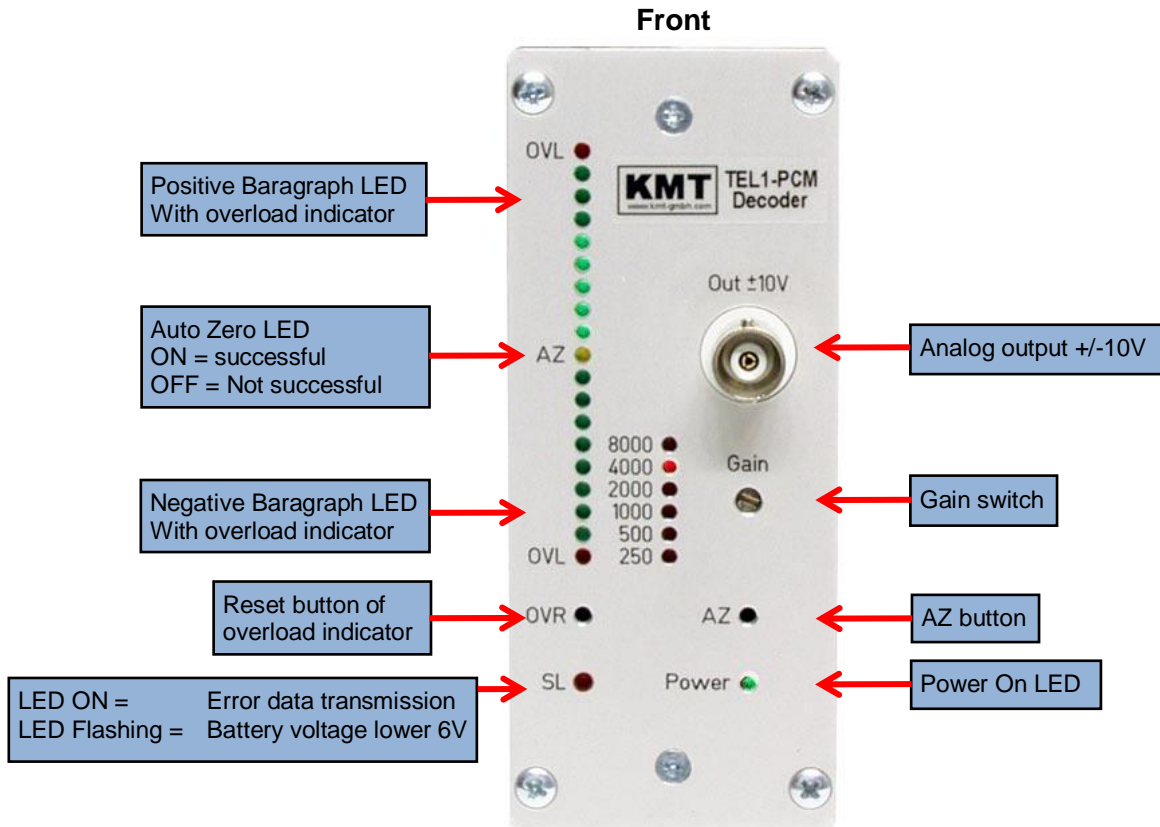
Block diagram

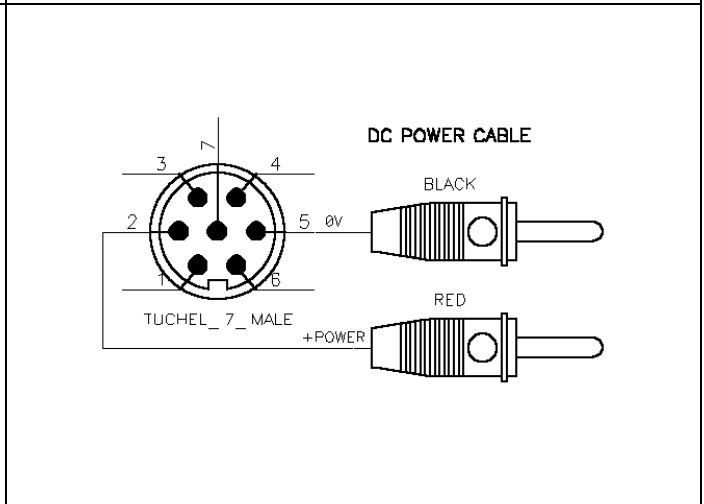
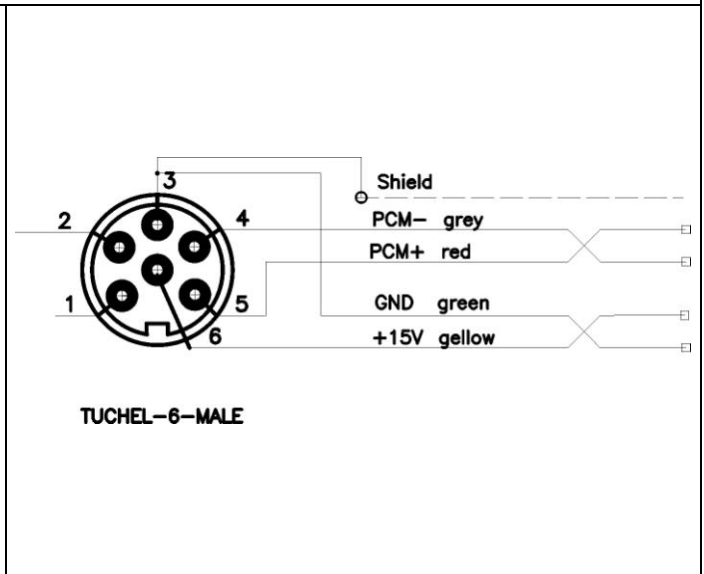
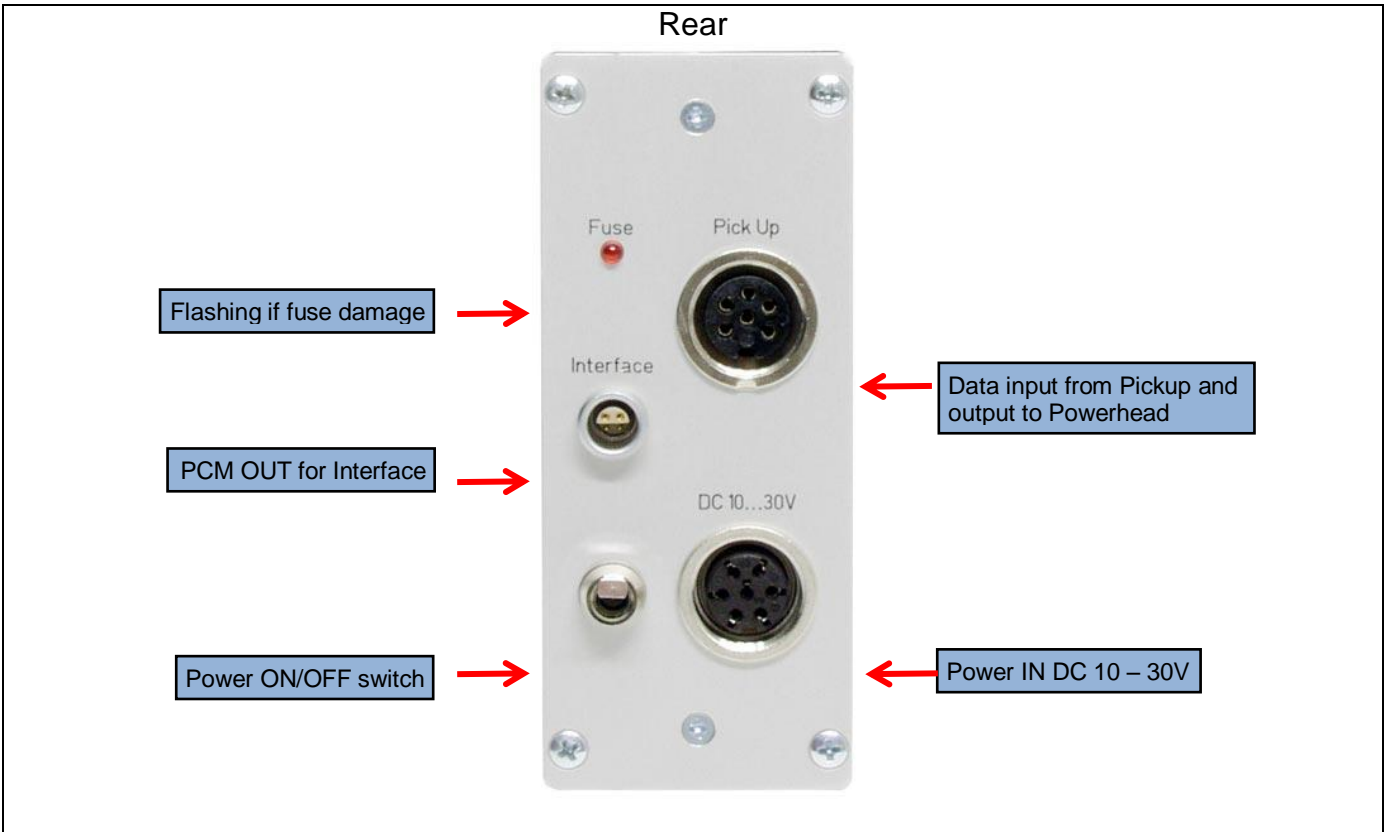


Transmitting Part:

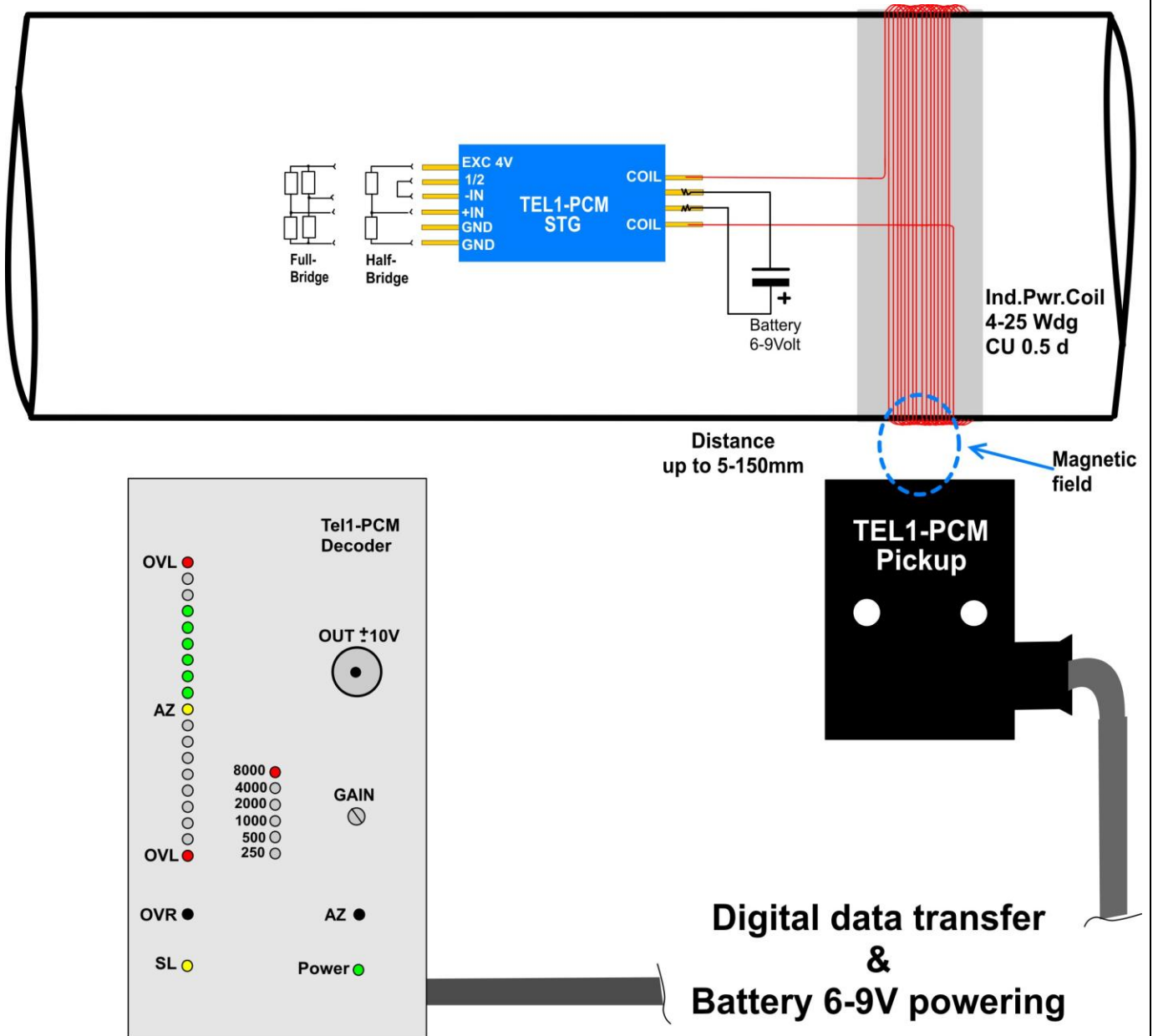


Receiving Part:





Pin Connection:



Note:

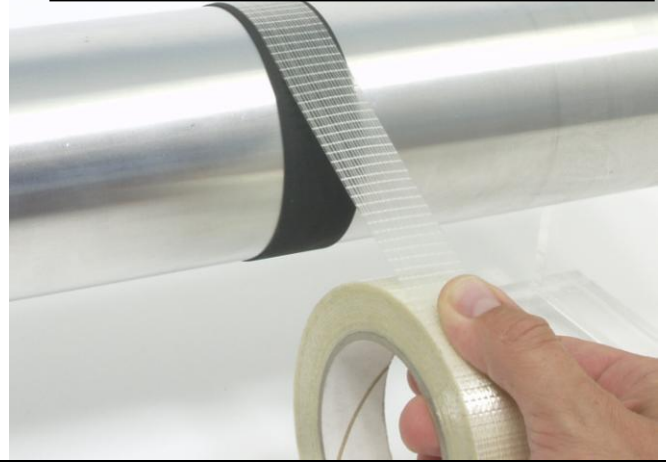
The Powerhead must be fixed in the middle of the coil in a distance from 5 to 150 mm.

Shaft Installation

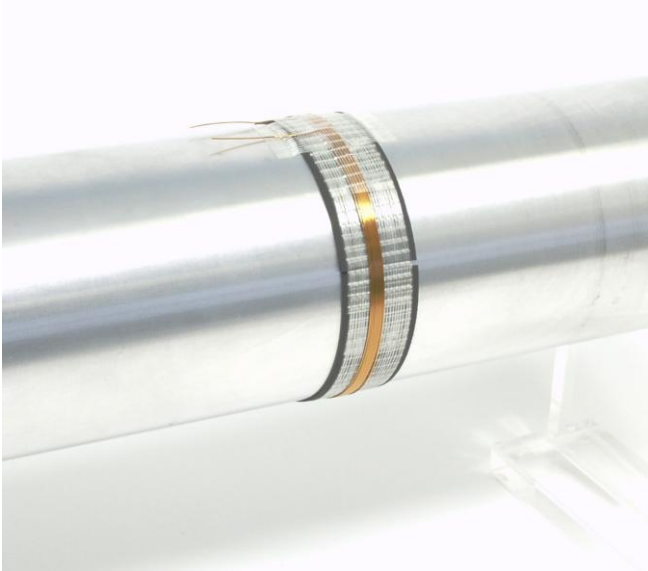
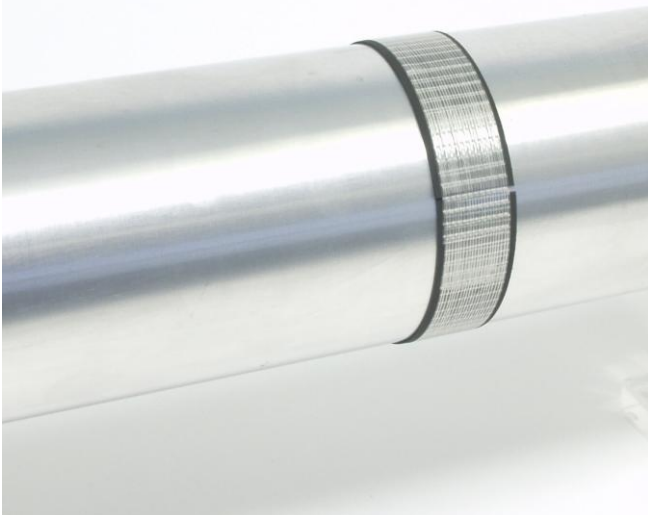
2 layers of the special ferrite tape around the shaft



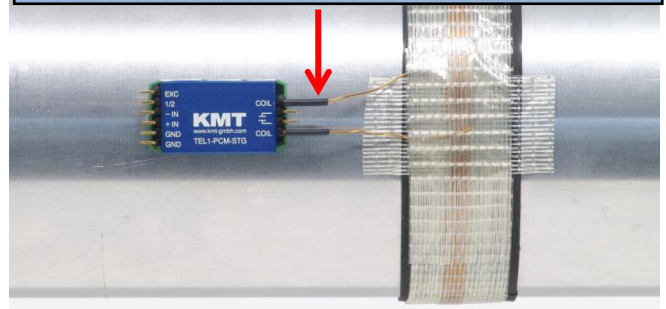
Fix with 2 layers of mounting tape around the shaft



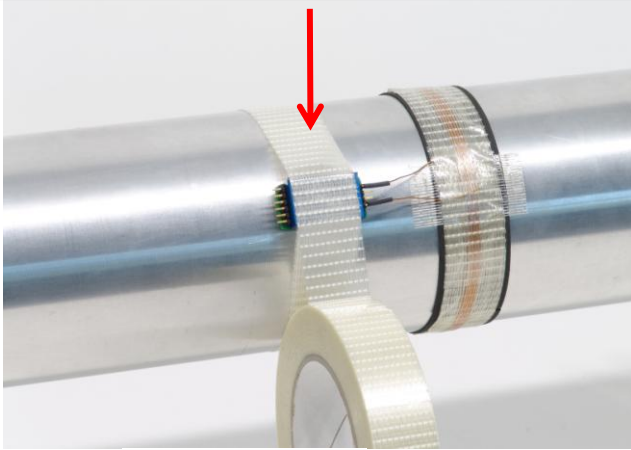
Coil, depends of shaft diameter 4-25 parallel windings of 0.5 CU wires, see table for help.



Solder the wires of the coil on the input pins of TEL1-PCM-STG "COIL"

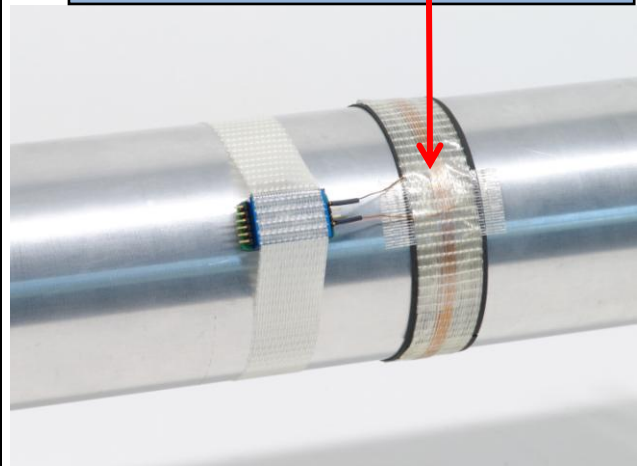


10 layers of the special mounting tape around the shaft. We recommend additionally use of a **hose clamps** for final fixing of the transmitter unit!!



hose clamps

Fix with 3 layers of mounting tape around the coil and cables



Caution:

Fix TEL1-PCM 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.

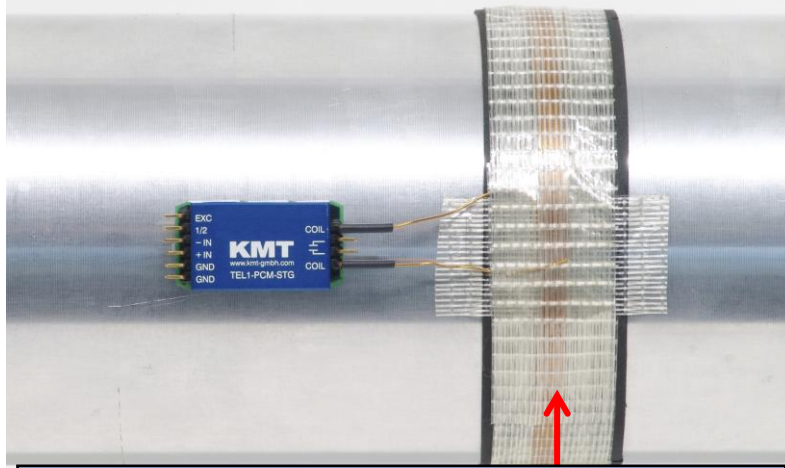
The tape is only for test purposes, in order to test the electrical function of the units in the idle state of the shaft.

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 (**Fiberglas Tape**) 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.

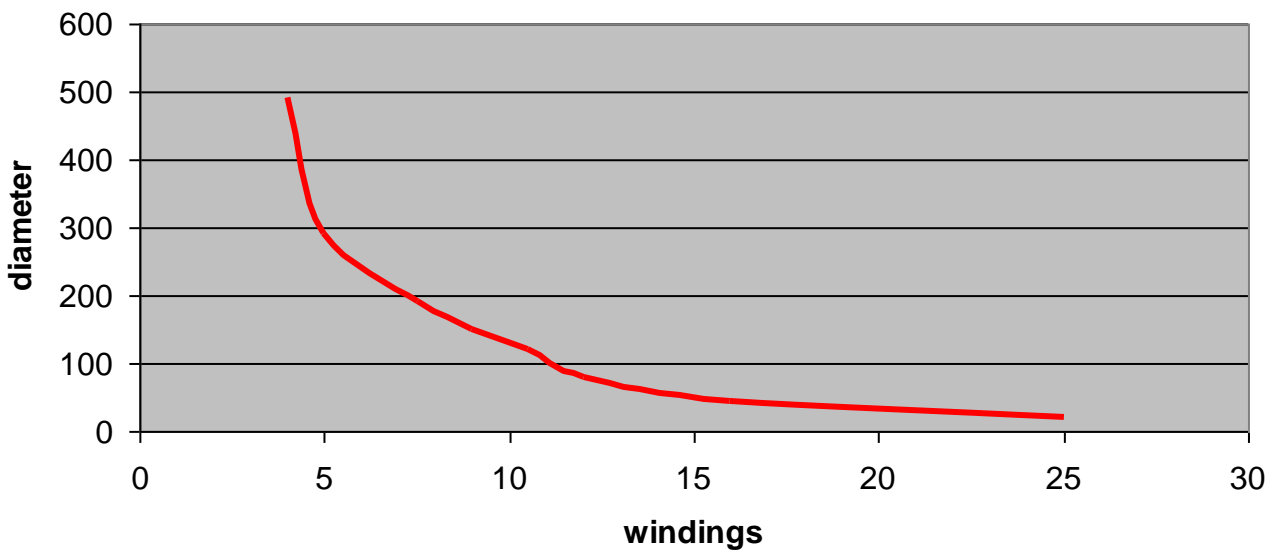
Find the correct amount of windings

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 4-25 parallel windings of 0.5 CU wire

Optimum windings for steel shafts



Diameter (mm)	Windings
490	4
290	5
190	7
150	9
120	10
80	12
45	16
20	25

Attention

- Use only special lithium Batterys for rotating applications
- 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 additional steel strip!!!

