KMT - Kraus Messtechnik GmbH

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TEL1-PCM-BATT

Operating Instructions

Digital Telemetry System for Strain Gage Applications on Rotating Shafts

"Gain and Auto Zero setting direct from Receiver Side!"

INSTRUCTIONS FOR QUALIFIED PERSONNEL ONLY!

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.

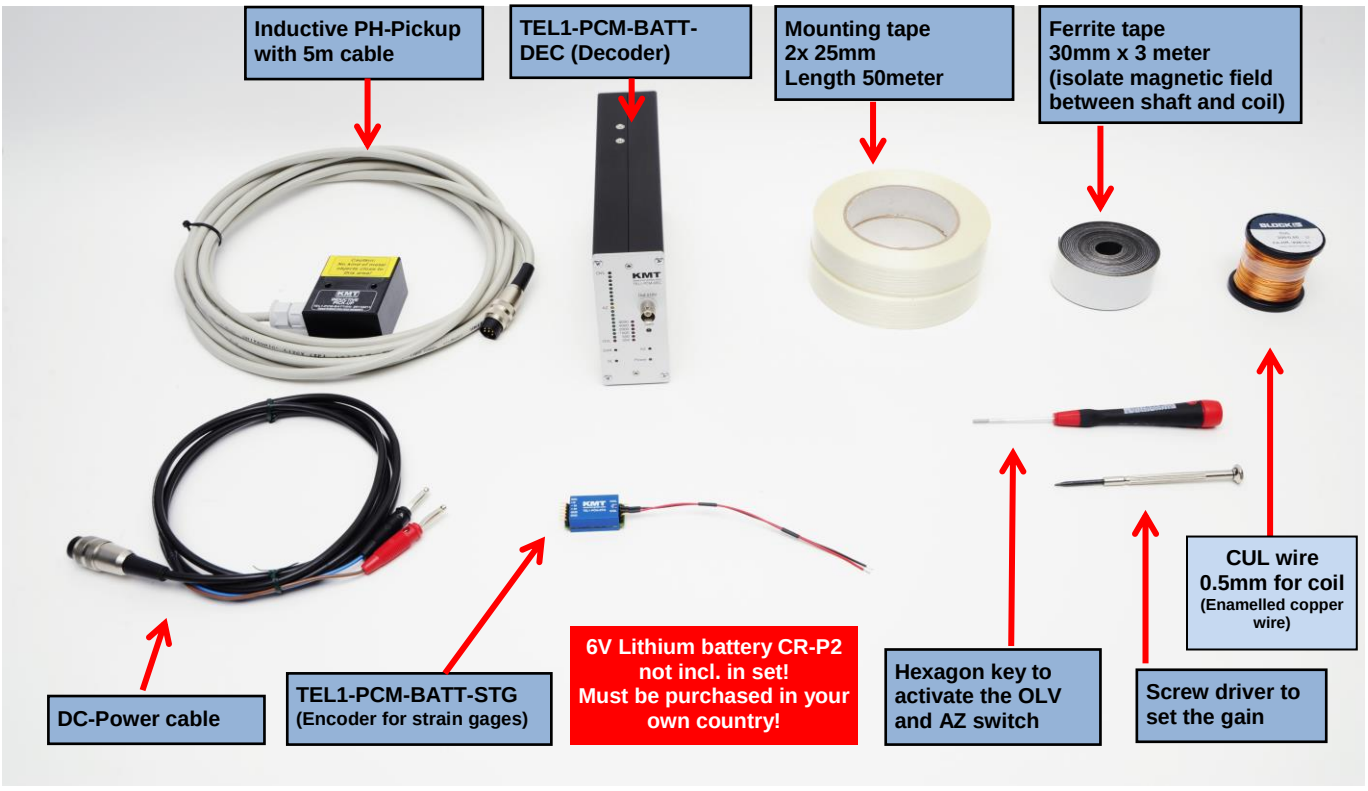
Functional Description

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

Straingage: 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
Sampling rate 6.944kHz
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

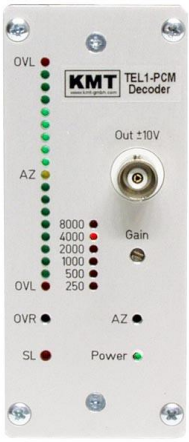
Analog signal bandwidth: 0 - 10 Hz (-3 dB)
Accuracy: +/-0.5 % (without sensor)
Operating temperature: - 10 to + 80 °C
Dimensions: 35 x 18 x 12mm (without th-connector)
Weight: each module 13 grams (with epoxy resin)
Static acceleration: up to 3000g
(housing not filled with epoxy resin)
Static acceleration: 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)

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)



Front side

Rear side

TEL1-PCM-DEC

Front side:

Analogue output: +/-10V via BNC (Optional 4-20mA)
(delay between analog IN/OUT 15mS constant!!)
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:

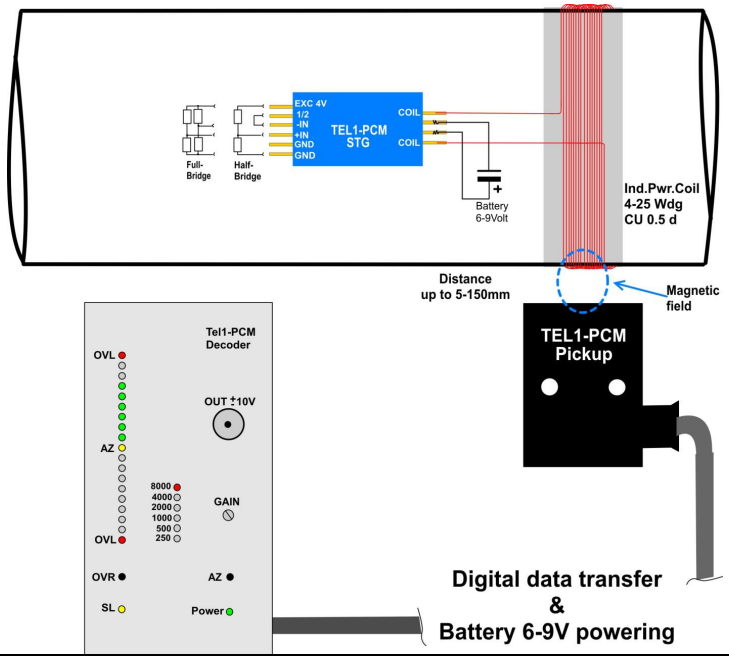
Output to Powerhead: via 6pol. Tuchel
Fuse LED: Flashing if fuse is defect
Powering: 10-30V DC (min. 24Watt), Input via 7pol. Tuchel
Switch: ON/OFF
Operating temperature: - 10 to + 70 °C
Dimensions: 200 x 105 x 44 (without connectors!)
Weight 950 grams
Static acceleration: upto 200g
System accuracy*: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

TEL1-PCM-Pickup

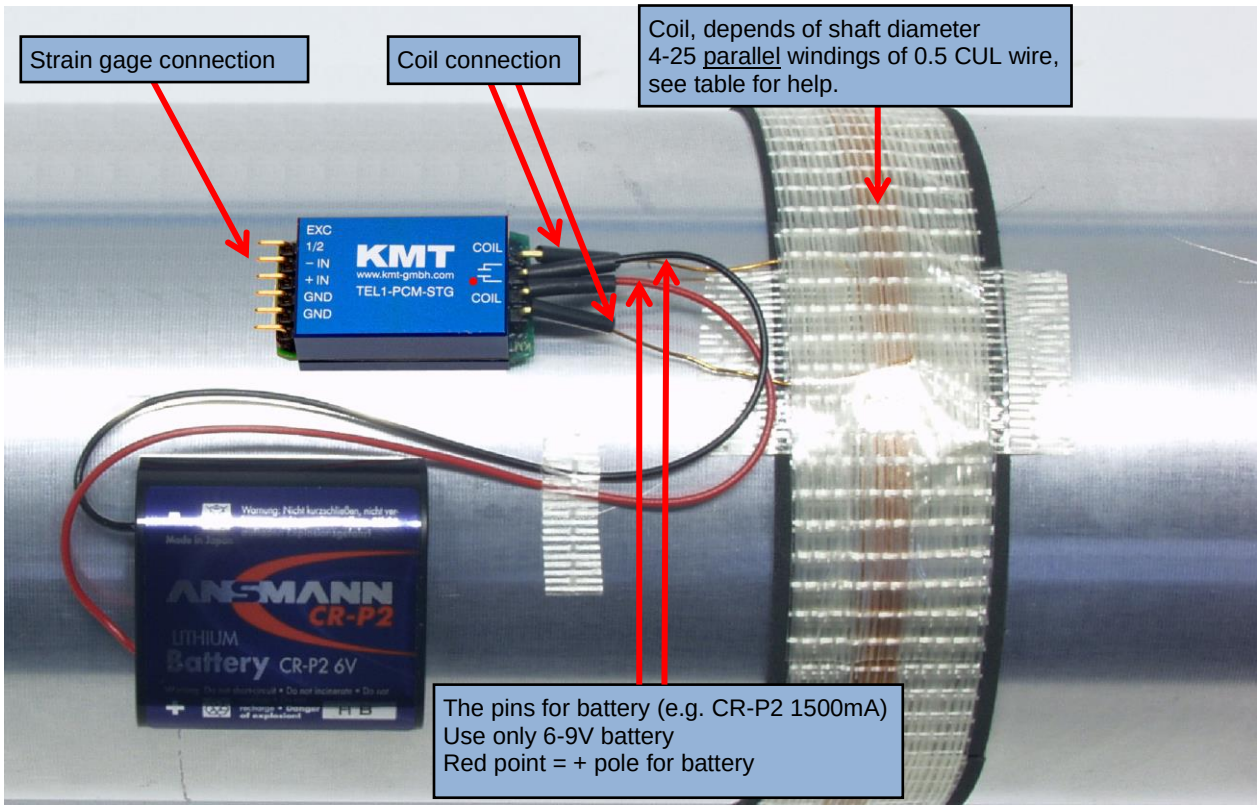
Function:

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

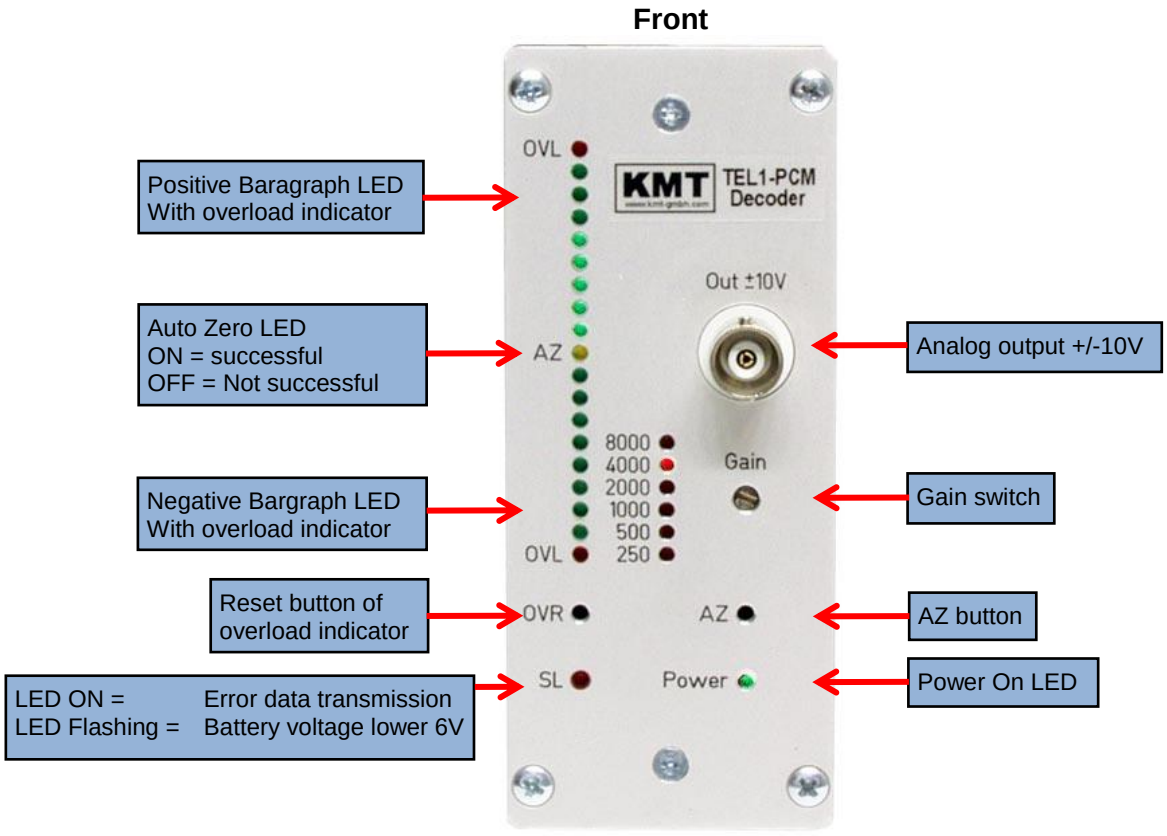


Transmitting Part:

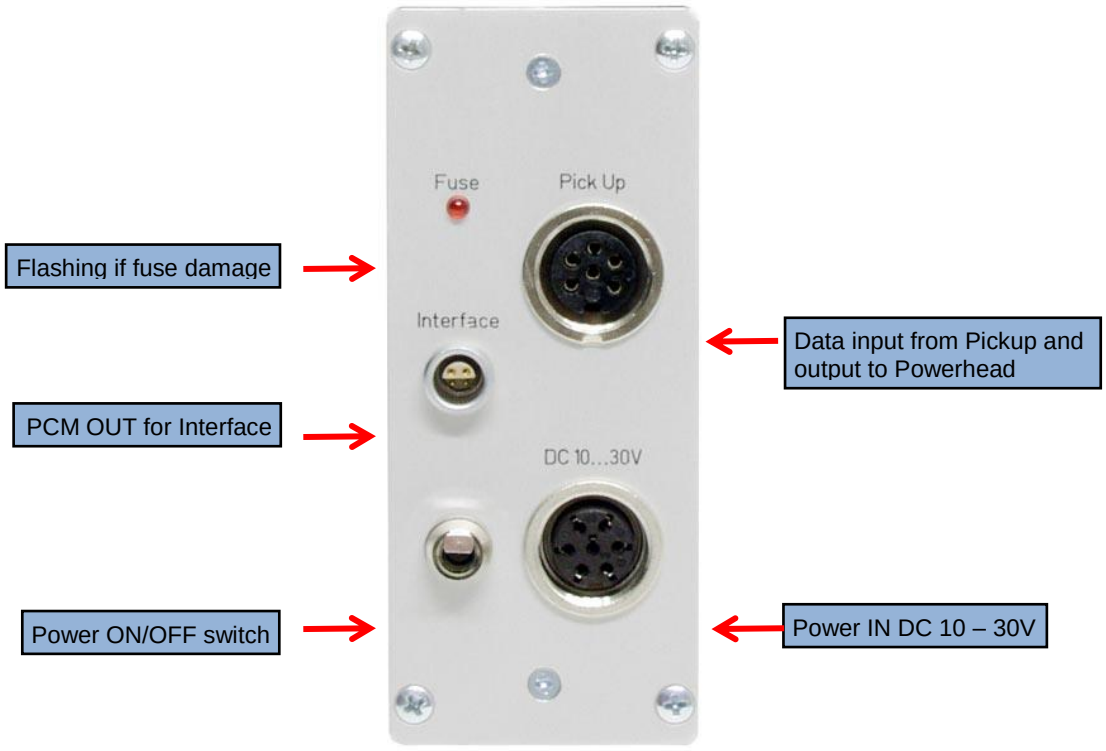


Receiving Part:

Front

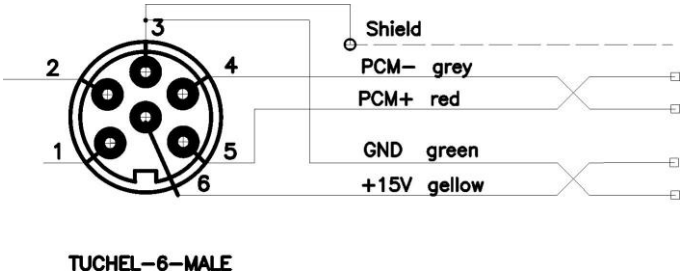


Rear

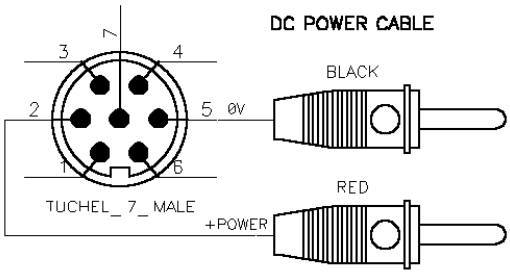


Pickup

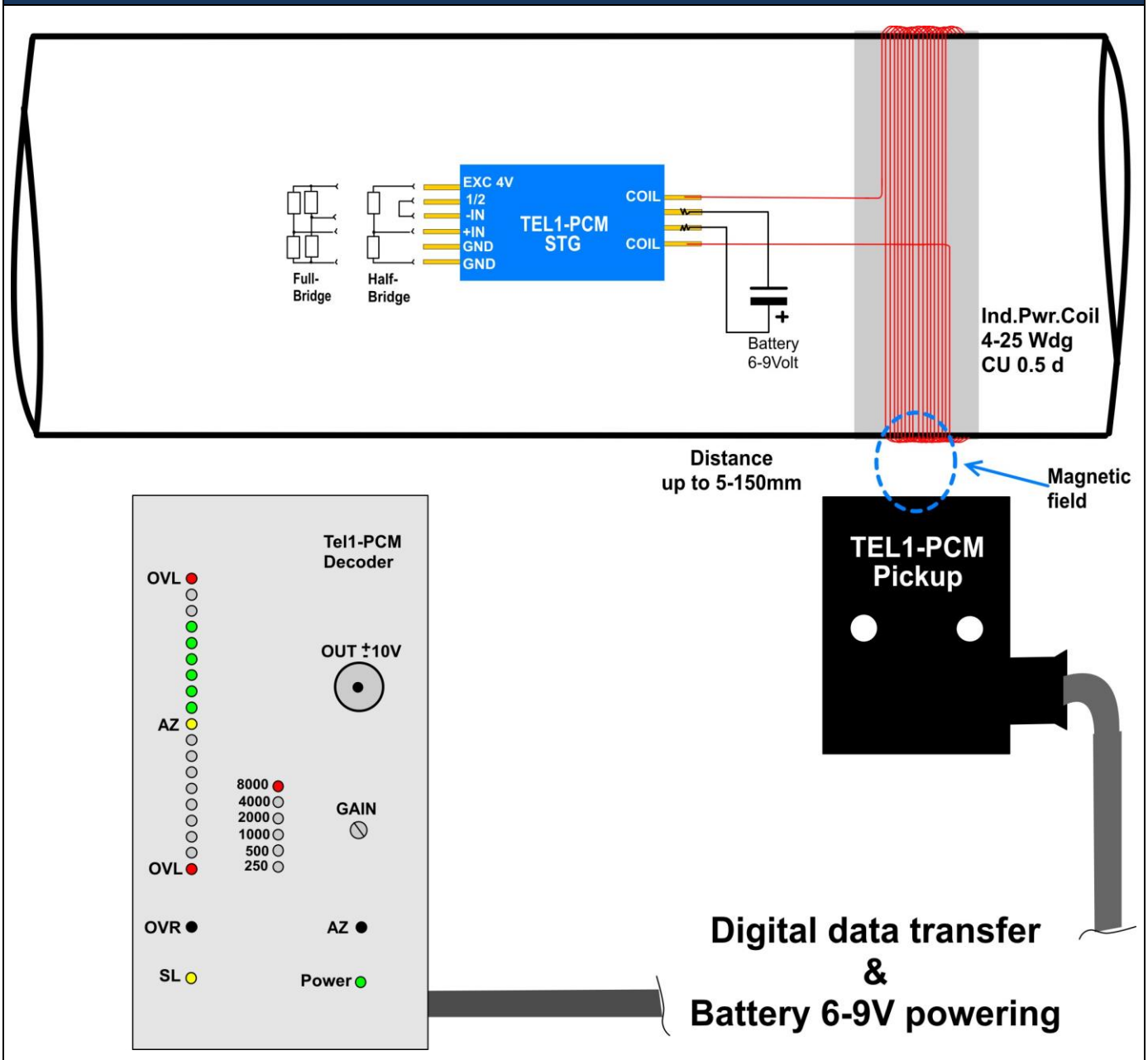
Distance of 5-150mm



DC-Power cable



Pin Connection:



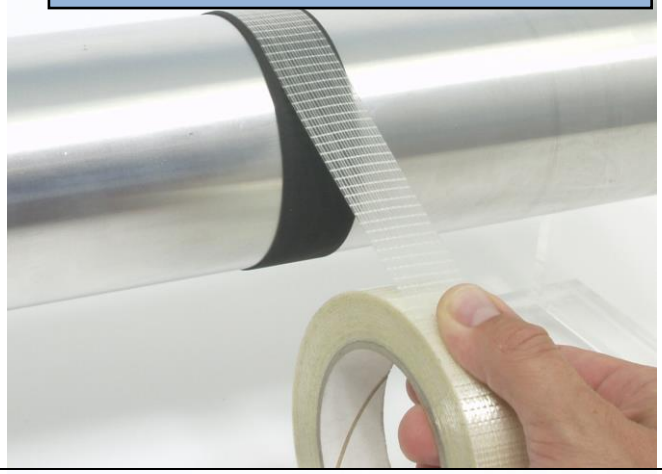
Note:

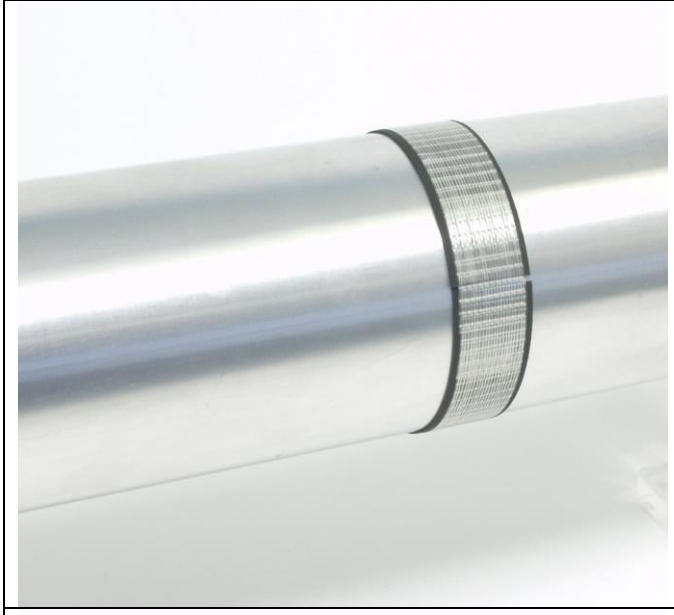
The Powerhead must be fixed in the middle of the coil in a distance from 5 to150 mm.

Shaft Installation

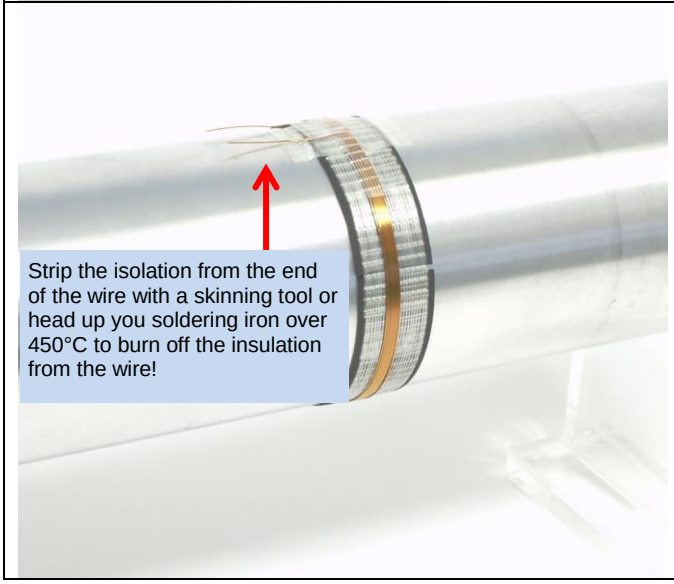
2 layers of the special ferrite tape around the shaft

Fix with 2 layers of mounting tape around the shaft



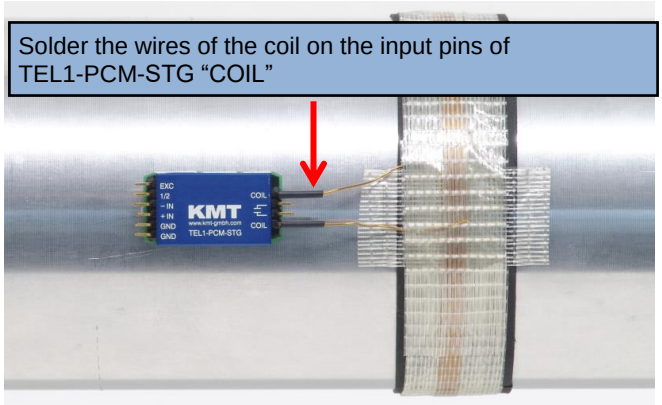


Coil, depends of shaft diameter 4-25 parallel windings of 0.5 CUL wires, see table for help.

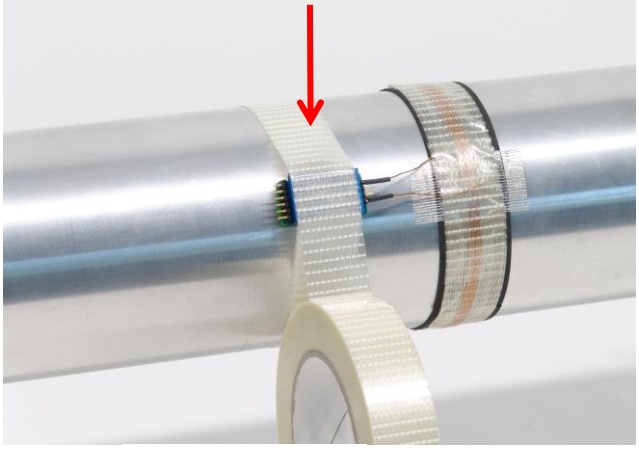


Strip the isolation from the end of the wire with a skinning tool or head up you soldering iron over 450°C to burn off the insulation from the wire!

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

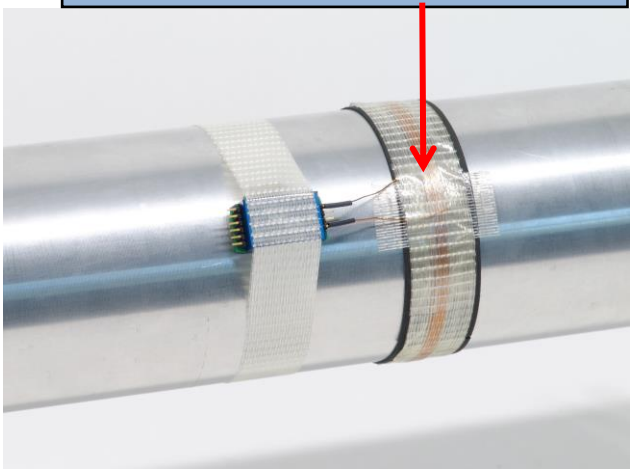


10 layers of the special mounting tape around the shaft.
We recommend aadditionally use of a **hose clamps** for final fixing of the transmitter unit!!



hose clamps

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



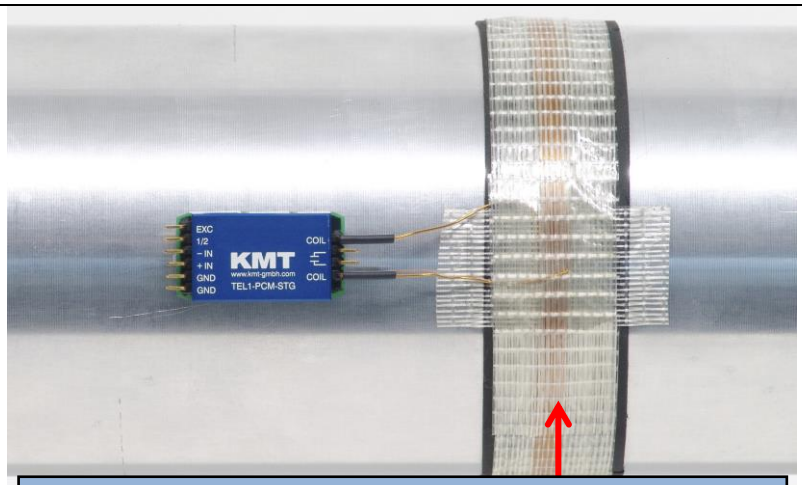
Caution:

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.

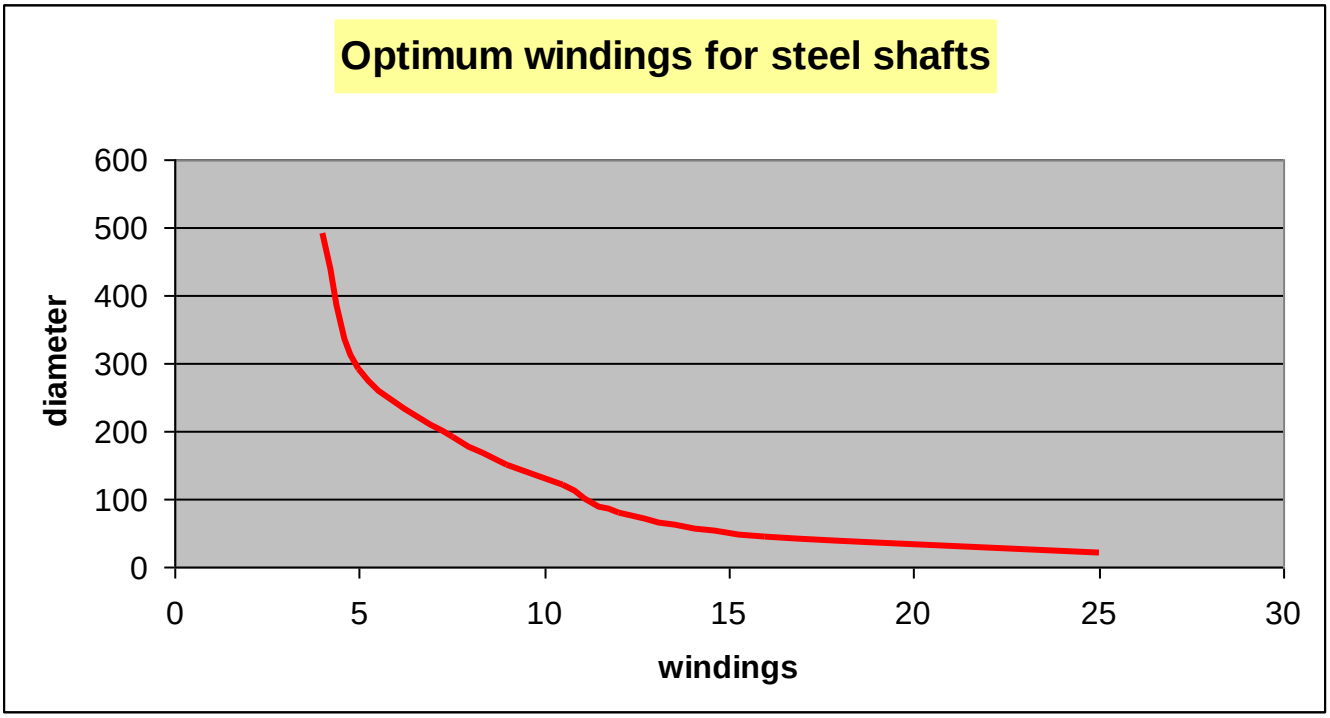
During the rotation test appropriate safety precautions should be taken.
The entire installation may be used only by authorized persons. By using tape for the attachment, it has to be used in the direction of rotation of the shaft and the end has to be secured. Only non-elastic tapes (**Fiberglas Tape)** 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 materiel 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 CUL wire



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

Attention

- Use only special lithium Battarys 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!!!

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Konformitätserklärung

Declaration of Conformity
Declaration de Conformité

Wir We Nous	**KMT - Kraus Messtechnik GmbH**
Anschrift Address Adress	**Gewerbering 9, D-83624 Otterfing, Germany**

erklären in alleiniger Verantwortung, daß das Produkt
declare under our sole responsibility, that the product
declarons sous notre seule responsibilité, que le produit

Bezeichnung Name Nom	**Messdatenübertragungssystem**
Typ,Modell,Artikel-Nr., Größe Type,Model, Article No.,Taille Type, Modèle, Mo.d'Article,Taille	**TEL1-PCM, TEL1-PCM-BATT**

mit den Anforderungen der Normen und Richtlinien
fulfills the requirements of the standard and regulations of the Directive
satisfait aux exigences des normes et directives

108/2004/EG	**Elektromagnetische Verträglichkeit EMV / EMC** DIN EN 61000-6-3 Ausgabe 2002-8 Elektromagnetische Verträglichkeit EMV Teil 6-3 Fachgrundnorm Störaussendung DIN EN 61000-6-1 Ausgabe 2002-8 Elektromagnetische Verträglichkeit EMV Teil 6-1 Fachgrundnorm Störfestigkeit

und den angezogenen Prüfberichten übereinstimmt und damit den Bestimmungen entspricht.
and the taken test reports und therefore corresponds to the regulations of the Directive
et les rapports d'essais notifiés et, ainsi, correspond aux règlement de la Directive.

Otterfing, 27.04.2006 **Martin Kraus**

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Ort und Datum der Ausstellung Place and Date of Issua Lieu et date d'établissement	Name und Unterschrift des Befugten Name and Signature of authorized person Nom et signature de la personne autorisée