

MTP-NT

“Preliminary version”

**Sophisticated multi-channel telemetry system
for rotating application, fully software
programmable with 16 bit resolution**



INSTRUCTIONS FOR QUALIFIED PERSONNEL ONLY!

- 2 to 256 channels
- Signal bandwidth up to 24000 Hz
- Inputs: STG, IEPE, VOLT, THERMO
- Auto offset compensation (STG/VOLT)
- 4V Bridge excitation
- STG Input ranges ± 40 to ± 0.3 mV/V
- 16 bit ADC (internal 18 bit)
- Fully software programmable
- Inductive or battery powered
- Rugged housing, water protected
- Analog output +/- 10V
- Digital Ethernet output for PC


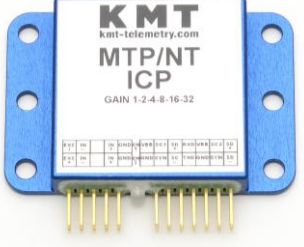
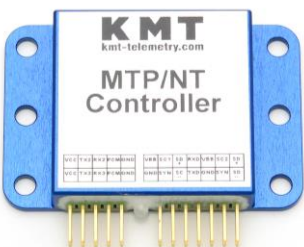
Safety notes

- The device should only be applied by instructed personnel.
- The power head emits strong magnetic radiation at 30-60 kHz to a distance of 300 mm. 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. Also 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 50 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 interferences when used in residential areas or environments. In this case the operator is responsible for establishing protective procedures.

Short description:

The MTP-NT telemetry is a miniaturized measurement system suitable for sophisticated industrial measurement tasks and rotating applications. Each 2-channel sensor module is equipped with signal conditioning, anti-aliasing filters, analog-to-digital converters (16 bit) and a digital communication bus connection. All these up to 128 modules (=256 channels) will be controlled by the MTP-NT-Controller module via a daisy-chain system bus (extendable to several meters). By this concept it's possible to install the acquisition modules close to the sensor to have short connections for the analog sensor lines. This avoids undesired interferences in noisy environments. The MTP-NT Controller outputs a PCM bit stream signal in NRZ format with data rates up to 5000 kbit/s. The inductive transmitter module transfers the signal over distances of up to 50 mm and the radio transmitter is able to cover ranges of 10m, depends of application.

MTP-NT acquisition modules (rotor side)

 <p style="text-align: center;">60 x 40 x 10 mm Weight 40 grams</p>	<p>MTP-NT-STG2 Acquisition module for 2 strain gauges Full, half and quarter bridge ($\geq 350 \Omega$) Full, half and quarter bridge (120 Ω) Fixed excitation 4 Vdc Offset compensation by auto zero Manual offset shifting after auto zero Input ranges ± 40 to ± 0.3 mV/V Shunt-calibration 100 kΩ 0.1% Signal bandwidth 0 Hz to 24000 Hz* (*see table of cut-off-frequencies) ADC Resolution 16 Bit Measurement uncertainty < 0.1% Power supply: 6 to 9 Vdc Current consumption (with two full bridges 350 Ohm) 100 mA</p>	 <p style="text-align: center;">60 x 40 x 10 mm Weight 40 grams</p>	<p>MTP-NT-IEPE2 Acquisition module for 2 IEPE/ICP® sensors Current EXC. 4mA Input ranges 20 to ± 0.3 Vpp Signal bandwidth 3 Hz to 24000Hz* (*see table of cut-off-frequency) ADC Resolution 16 Bit Measurement uncertainty < 0.1% Power supply: 6 to 9 Vdc Current consumption 140 mA</p>
Coming soon	<p>MTP-NT-VOLT Acquisition module for 2x high level inputs Input ranges ± 10 to ± 0.08 V Signal bandwidth 0 Hz to 24000 Hz* (*see table of cut-off-frequencies) +4 V sensor excitation max. 20 mA ADC Resolution 16 Bit Measurement uncertainty < 0.1% Power supply: 6 to 9 Vdc Current consumption 60 mA</p>	Coming soon	<p>MTP-NT-TH-K Acquisition module for 2x TH-K <u>Inputs galvanic isolated</u> Range -50 to 1000°C, -50 to 500°C or -50 to 250°C Cut-off filter 30 Hz (more on request)</p> <p>ADC Resolution 16 Bit Measurement uncertainty: 1 K Power supply: 6 to 9 Vdc Current consumption 90 mA</p>
Coming soon	<p>MTP-NT-Pt100/1000 (RTD) Acq. module for 2 RTD sensors Range -100 to 600°C, -50 to 300°C or -25 to 150°C Type Pt100 or Pt1000 Current EXC. 1 mA Connection: 4-, 3- and 2 wire Sensor break detection Signal bandwidth 6 Hz ADC Resolution 16 Bit Measurement uncertainty: 1 K Power supply: 6 to 9 Vdc Current consumption 120 mA</p>	 <p style="text-align: center;">60 x 40 x 10 mm Weight 40 grams</p>	<p>MTP-NT-CON-IND-Tx Controller 1- 128 acquisition modules Output: PCM <u>built-in inductive transmitter</u> Programmable via RS232/USB adapter and remote software Power supply: 6 to 9 Vdc Current consumption 150 mA</p>

Common characteristics / Environment

Vibration (random)	0.1 g ² /Hz (20 Hz to 2 kHz)	Operating temperature	-40 to +85°C
Vibration (sine)	20 g (20 Hz to 2 kHz)	optional	-40 to +125°C
Shock (½ sine)	10000 g peak (11 ms)	Storage temperature	-40 to +125°C
Static Acceleration	3000 g (depends of mounting!)	Humidity	100 %

Signal bandwidth and sampling rates MTP-NT

Cut off frequency from anti-aliasing filter (-3dB) and sampling rate (red)

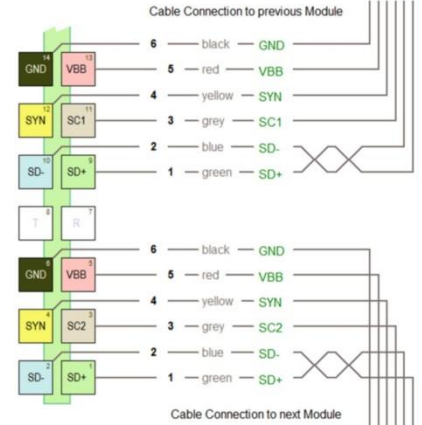
Bit rate	2 CH	4 CH	8 CH	16 CH	32 CH	64 CH	128 CH	256 CH
10000 kbit/s	-----	-----	24000 Hz max. (62500 Hz)	12000 Hz (31250 Hz)	6000 Hz (15625 Hz)	3000 Hz (7812.5 Hz)	1500 Hz (3906.25 Hz)	750 Hz (1953.125 Hz)
5000 kbit/s	-----	24000 Hz max. (62500 Hz)	12000 Hz (31250 Hz)	6000 Hz (15625 Hz)	3000 Hz (7812.5 Hz)	1500 Hz (3906.25 Hz)	750 Hz (1953.125 Hz)	375 Hz (976.56 Hz)
2500 kbit/s	24000 Hz max. (62500 Hz)	12000 Hz (31250 Hz)	6000 Hz (15625 Hz)	3000 Hz (7812.5 Hz)	1500 Hz (3906.25 Hz)	750 Hz (1953.125 Hz)	375 Hz (976.56 Hz)	190Hz (488.28 Hz)
1250 kbit/s	12000 Hz (31250 Hz)	6000 Hz (15625Hz)	3000 Hz (7812.5 Hz)	1500 Hz (3906.25 Hz)	750 Hz (1953.125 Hz)	375 Hz (976.56 Hz)	190Hz (488.28 Hz)	95 Hz (244.14 Hz)
625 kbit/s	6000 Hz (15625Hz)	3000 Hz (7812.5 Hz)	1500 Hz (3906.25 Hz)	750 Hz (1953.125 Hz)	375 Hz (976.56 Hz)	190Hz (488.28 Hz)	95 Hz (244.14 Hz)	-----
312,5 kbit/s	3000 Hz (7812.5 Hz)	1500 Hz (3906.25 Hz)	750 Hz (1953.125 Hz)	375 Hz (976.56 Hz)	190 Hz (488.28 Hz)	95 Hz (244.14 Hz)	-----	-----

MTP-NT connection overview

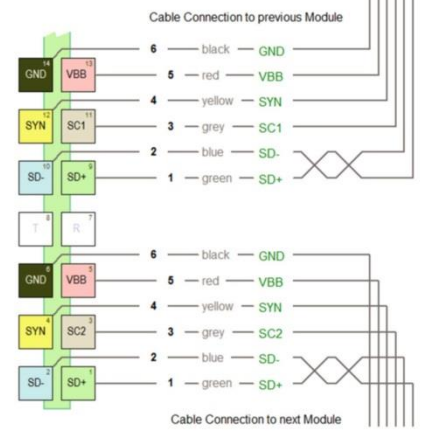
MTP-NT Connection Overview

Signal Description

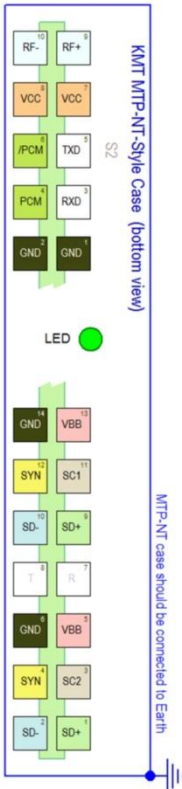
GND	common ground return
VBB	supply voltage +6.0 Vdc
SYN	synchronisation impulse
SC1	serial communication bus
SC2	serial communication bus
SD-	serial data bus (-)
SD+	serial data bus (+)
TXD	RS232 Tx/D (Output)
RXD	RS232 Rx/D (Input)
T/R	never connect this pins



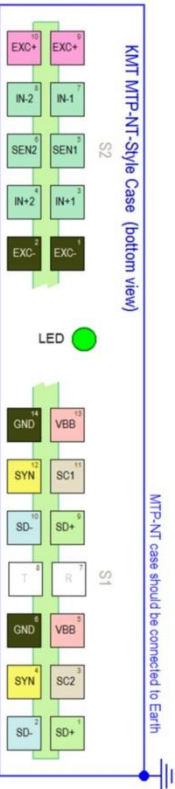
Recommended Wires
 GND + VBB = AWG22 0,34 mm² Ø=1.20mm (7x0.25mm);
 SYN ... SD+ = AWG24 0,22 mm² Ø=1.05mm (7x0.20mm);
 Isolation = mPPE/FRNC UL/CUL Style 11027;
 mPPE (modified polyphenyl ether);
 FRNC (flame retardant non corrosive); -40°C to +105°C.



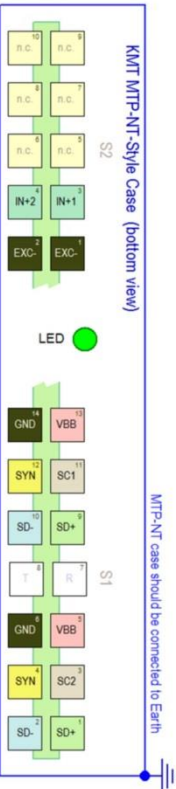
Controller



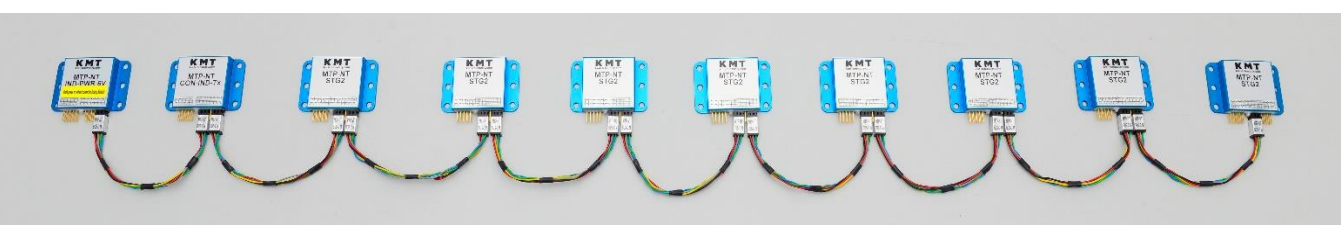
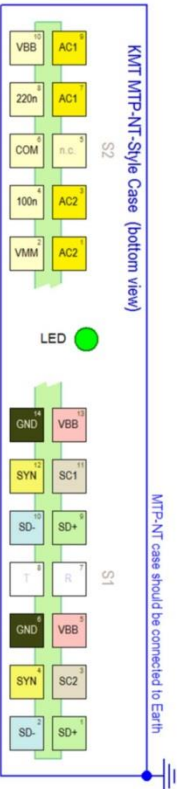
Analog



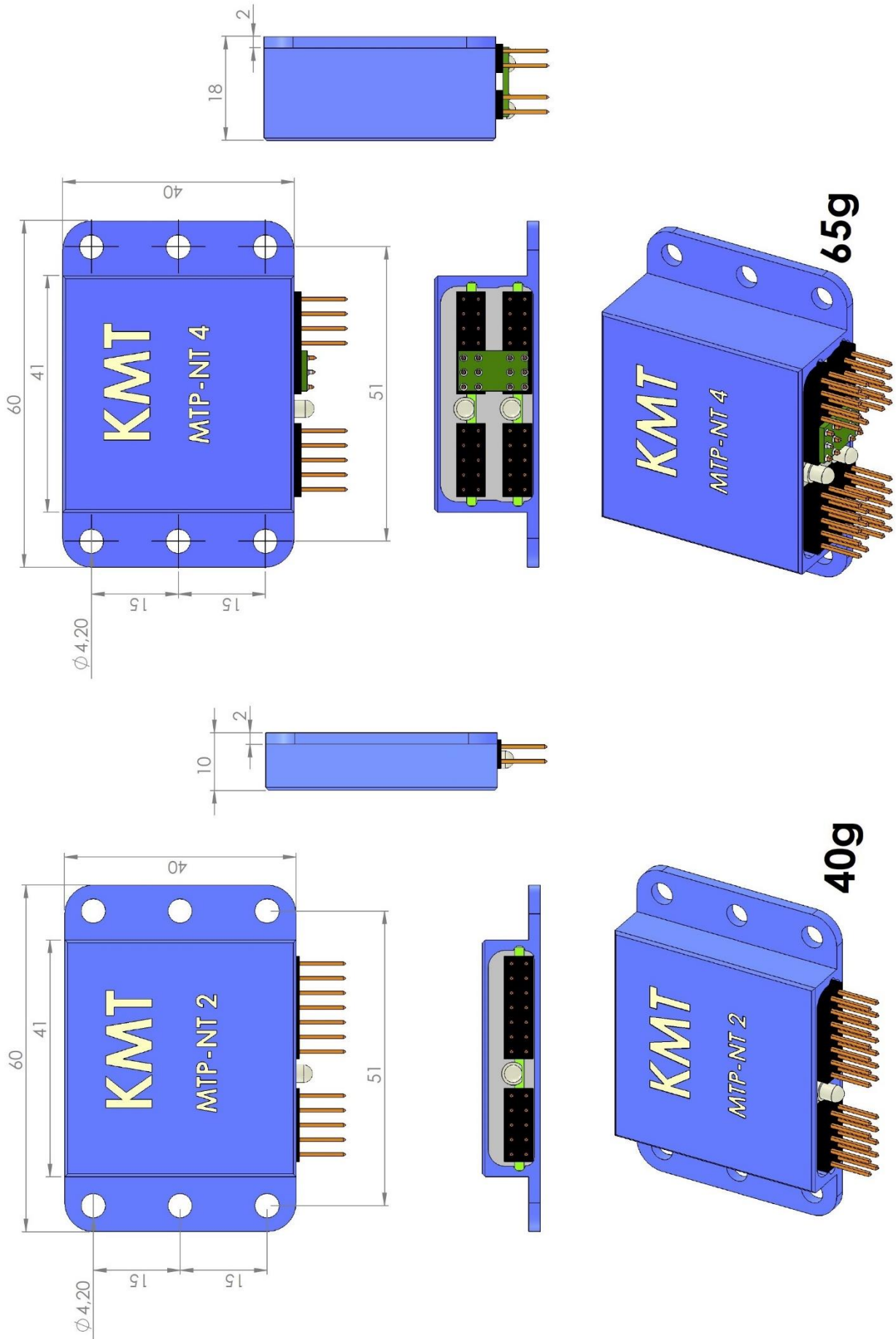
IEPE



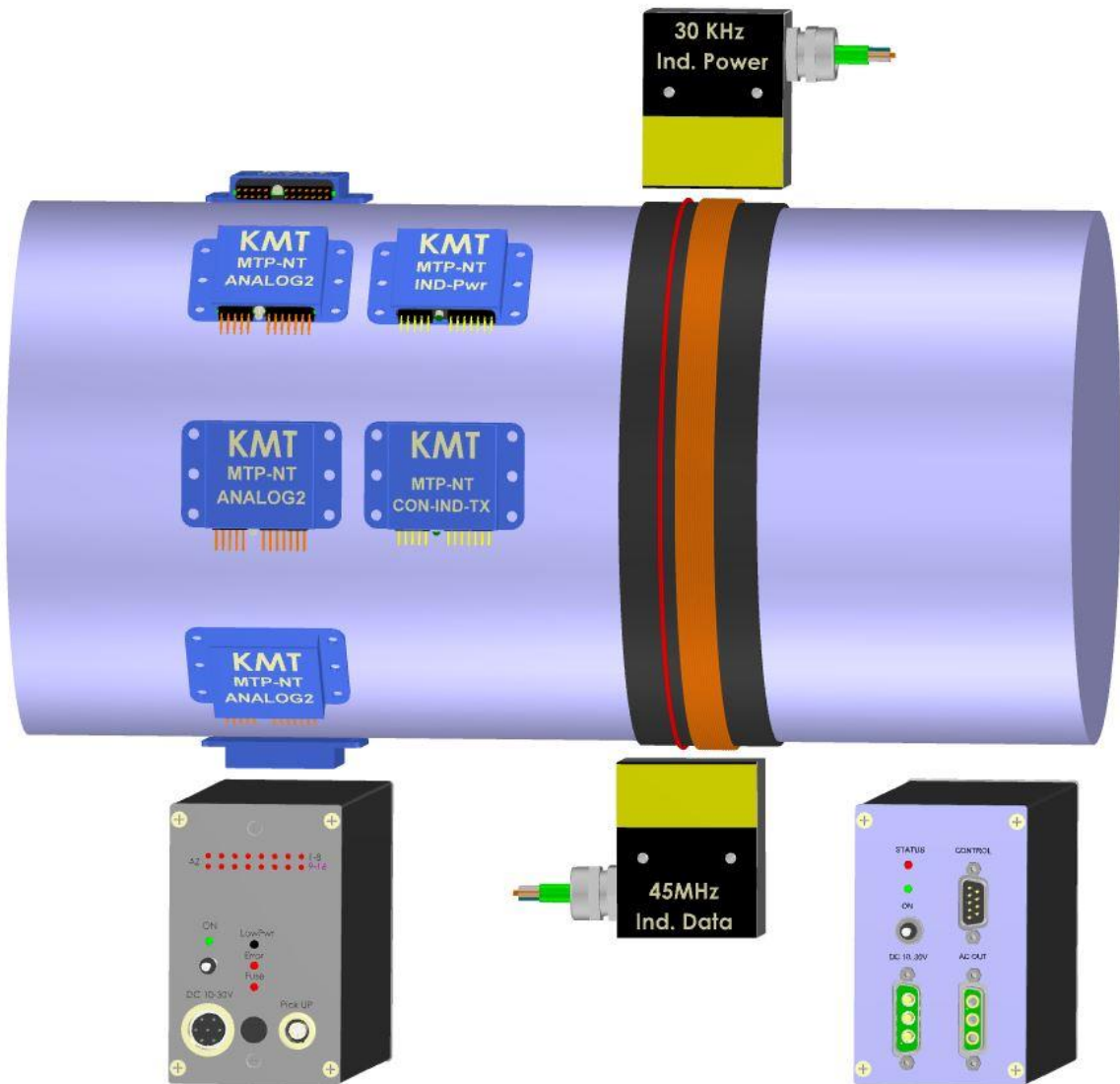
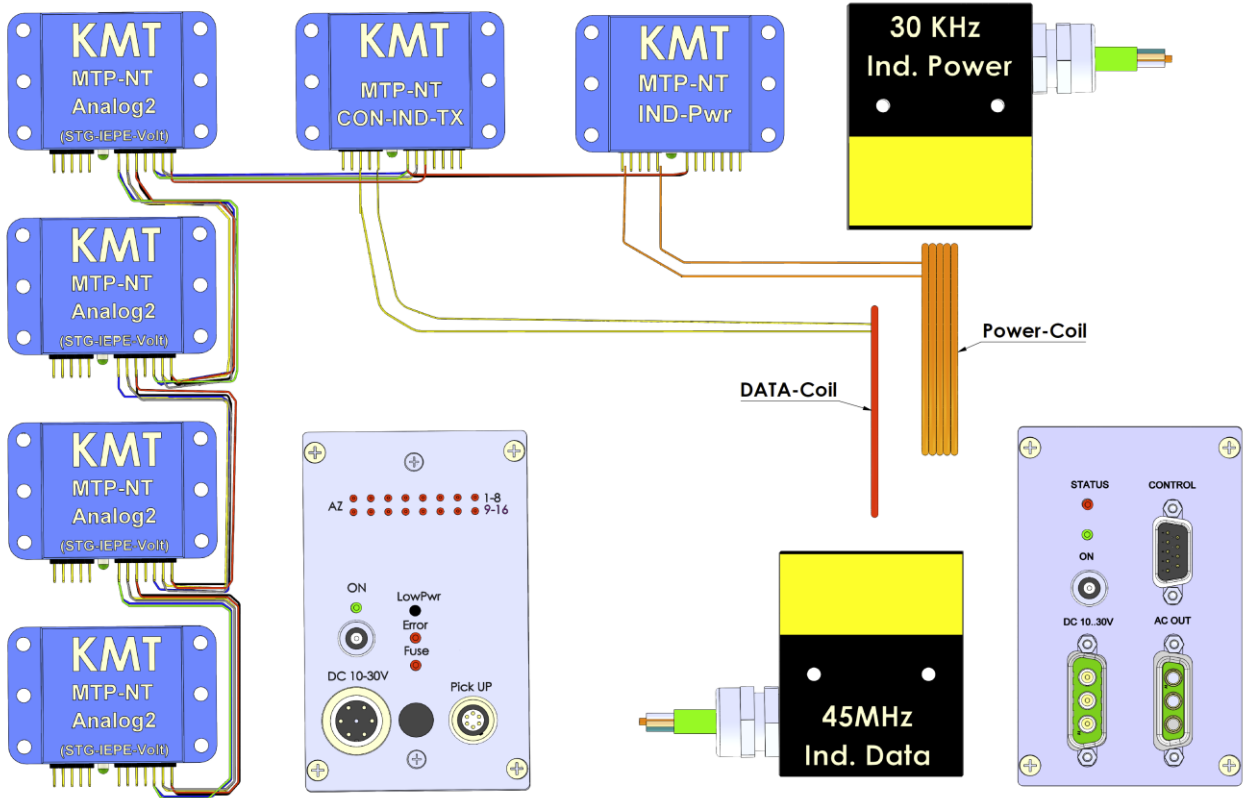
Power



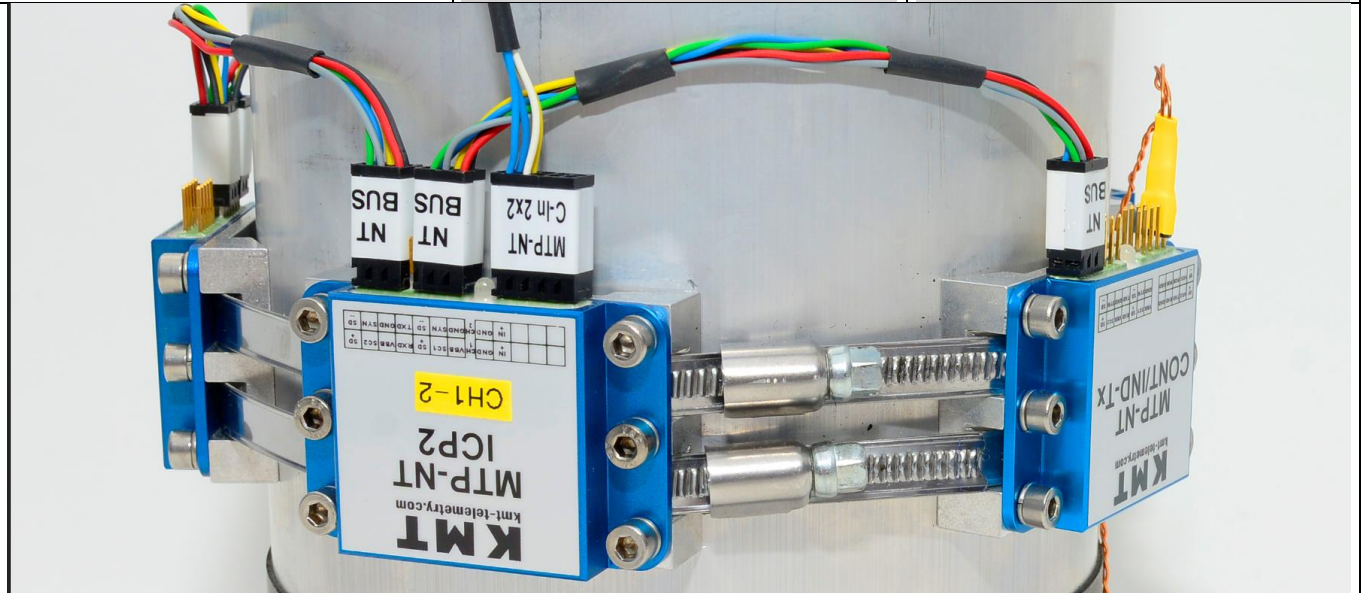
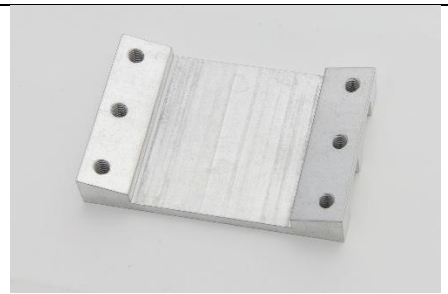
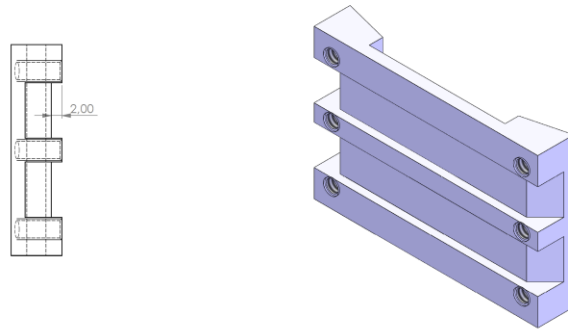
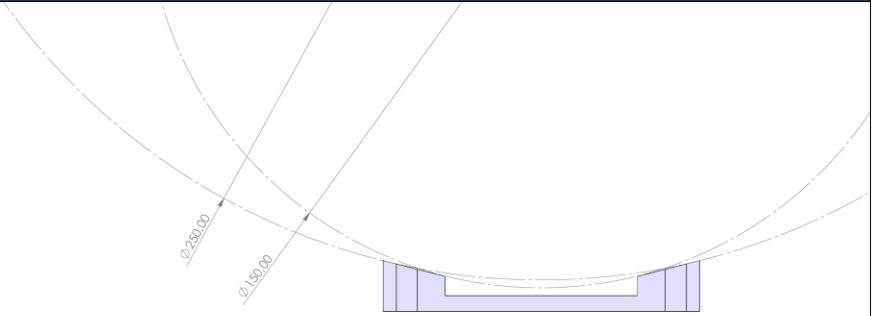
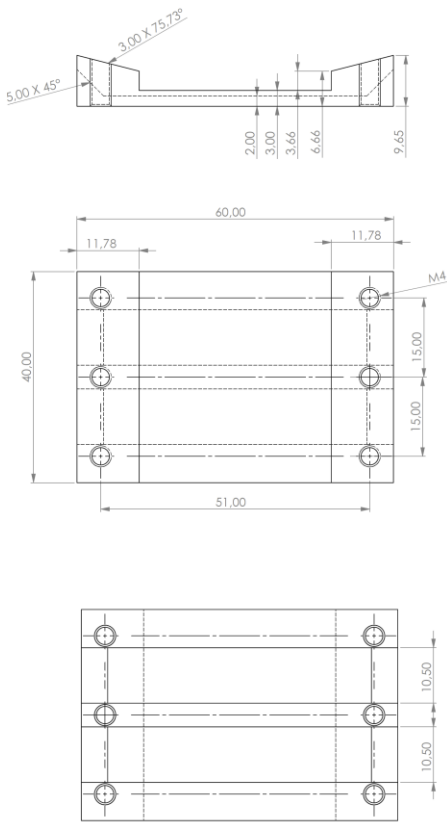
MTP-NT housing dimensions for 2- and 4-channels



MTP-NT Block diagram

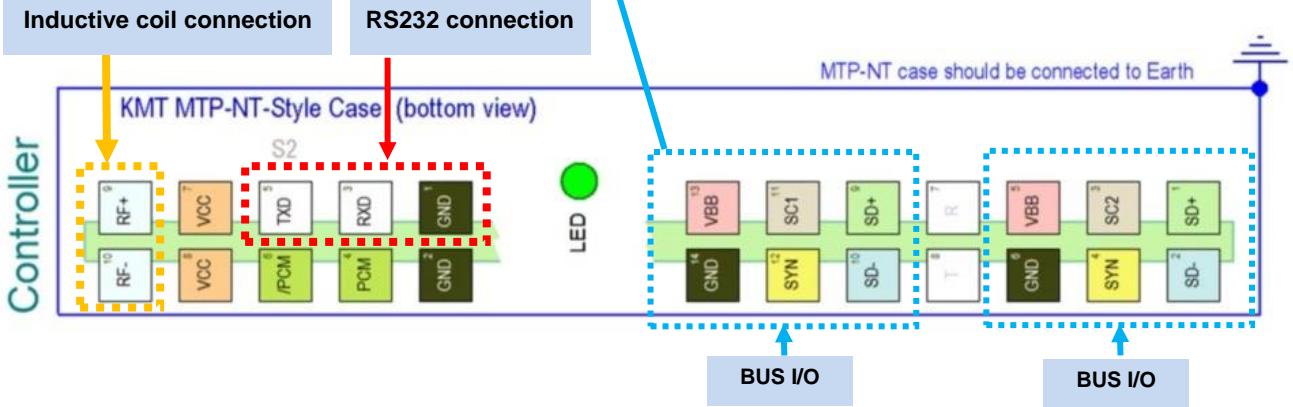
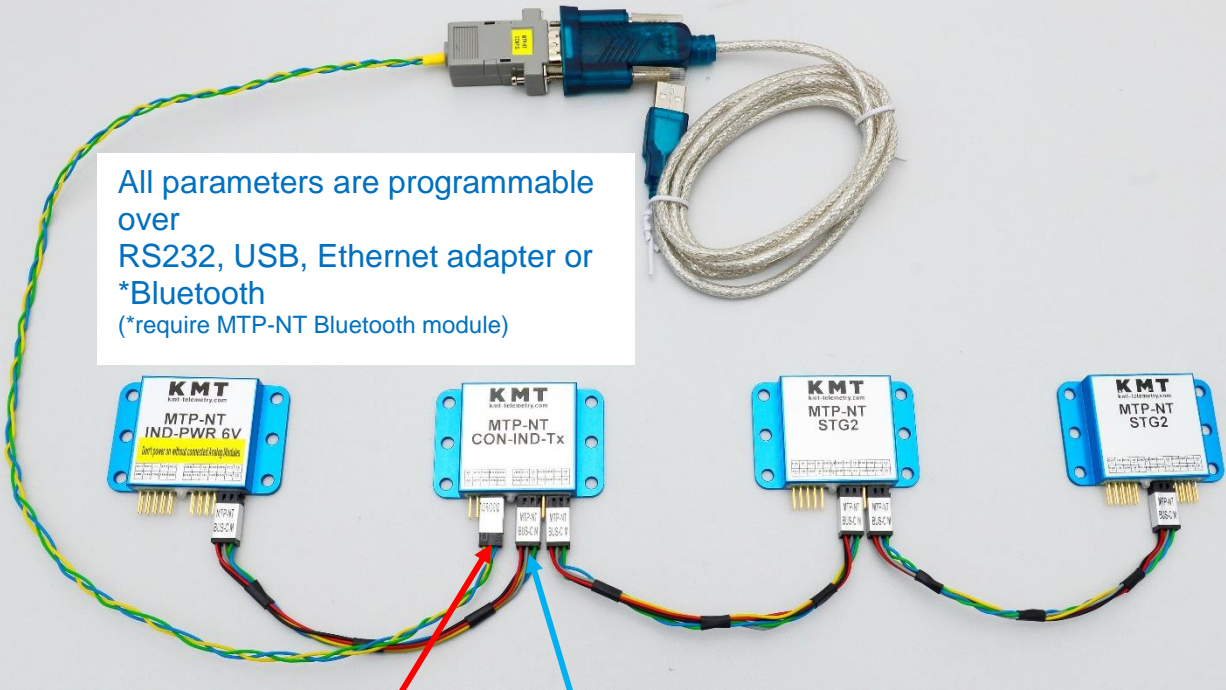


MTP-NT Modules mounting plate example for shaft diameters 100-200 or 150-250mm



MTP-NT – Setting of parameters or firmware update of all modules via RS232

All parameters are programmable over RS232, USB, Ethernet adapter or *Bluetooth (*require MTP-NT Bluetooth module)



MTP-NT-CON-IND-Tx pin connection

MTP-NT – Easy setting of parameters with Config-Control software

free download under: <http://x.kmt-telemetry.com/nt/>

NT
MTP-NT Configurator

File Connectivity

MTP-NT

System Setting

Modules: 4

Channels: 8

Powering Mode: inductive

Data Transmission: inductive

Bit Rate: 5000 kBit/s

Sampling Rate: 15625 Samples/s

Module	S/N	Module Status	Module	S/N	Module Status	Load	Inductive Power
C1	S/N 0002539	Voltage 6.18 V	P1	S/N 1.00	Voltage 6.18 V	0.00 W	0.0 V
	Controller	Temp. 39.5 °C		Power	Temp. 39.5 °C		
	Hardware	Selftest O.K.		Hardware	Selftest O.K.		
	Software 0.08.99 1.01.04			Software			

Module	S/N	Module Status	Channel	Range	µV	Filter Hz	Rev. Pol.	Level %
1	S/N 0002550	Voltage 6.18 V	1	0.3125		6000	<input type="checkbox"/>	
	IEPE/ICP®	Temp. 39.5 °C	2	10		6000	<input type="checkbox"/>	
	Hardware	Selftest O.K.						
	Software 0.08.99 1.01.04							

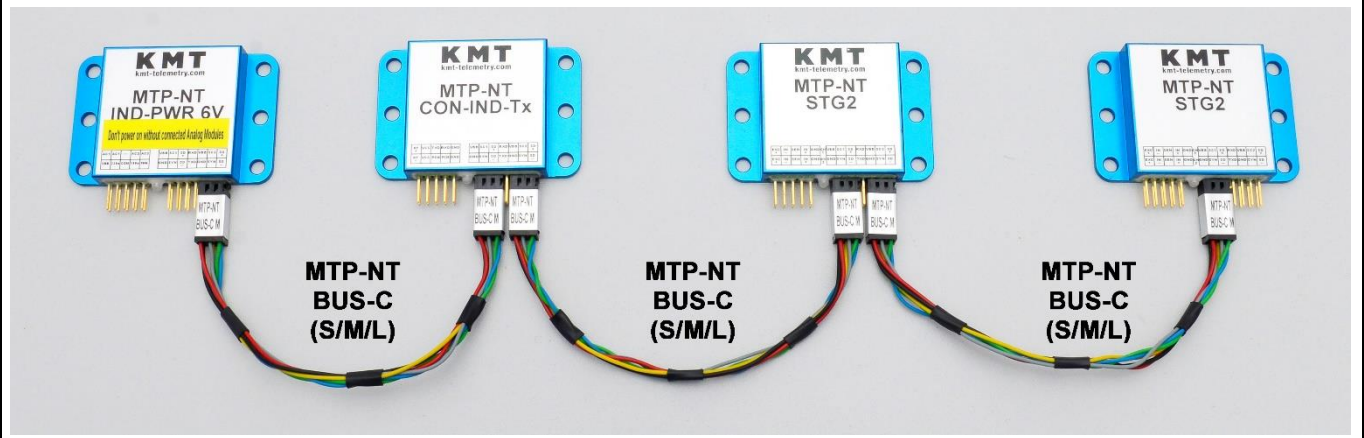
Module	S/N	Module Status	Channel	Range	µV	Filter Hz	Rev. Pol.	Level %
2	S/N 0002558	Voltage 6.18 V	3	10		6000	<input type="checkbox"/>	
	IEPE/ICP®	Temp. 39.5 °C	4	10		6000	<input type="checkbox"/>	
	Hardware	Selftest O.K.						
	Software 0.08.99 1.01.04							

Module	S/N	Module Status	Channel	Bridge Type	Ohm	Range	µmV/V	Shunt	Manual Offset	Filter Hz	Rev. Pol.	Level %
3	S/N 0002554	Voltage 6.18 V	5	Full		5		AUTO ZERO	<input type="checkbox"/>	6000	<input type="checkbox"/>	
	Strain Gauge	Temp. 39.5 °C	6	Full		5		AUTO ZERO	<input type="checkbox"/>	6000	<input type="checkbox"/>	
	Hardware	Selftest O.K.										
	Software 0.08.99 1.01.04											

Module	S/N	Module Status	Channel	Bridge Type	Ohm	Range	µmV/V	Shunt	Manual Offset	Filter Hz	Rev. Pol.	Level %
4	S/N 0002561	Voltage 6.18 V	7	Full		2.5		AUTO ZERO	<input type="checkbox"/>	6000	<input type="checkbox"/>	
	Strain Gauge	Temp. 39.5 °C	8	Full		2.5		AUTO ZERO	<input type="checkbox"/>	6000	<input type="checkbox"/>	
	Hardware	Selftest O.K.										
	Software 0.08.99 1.01.04											

COM Port opened: COM5

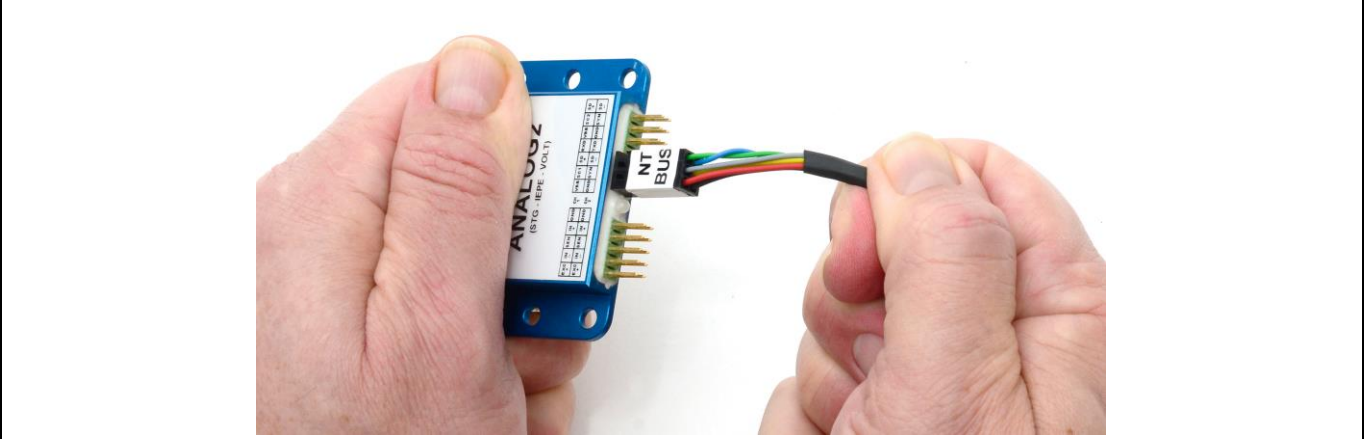
MTP-NT – Easy to connect with daisy-chain connection with the same MTP-NT-BUS-C cable



The bus is extendable to several meters!

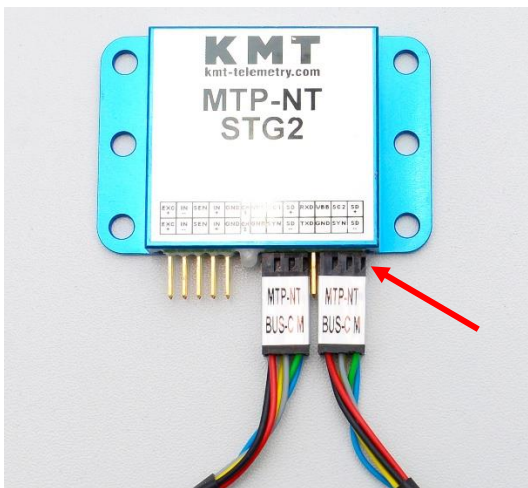


AMP "Locking-Clip" crimp connectors withstand ultra-harsh vibration and shock environment

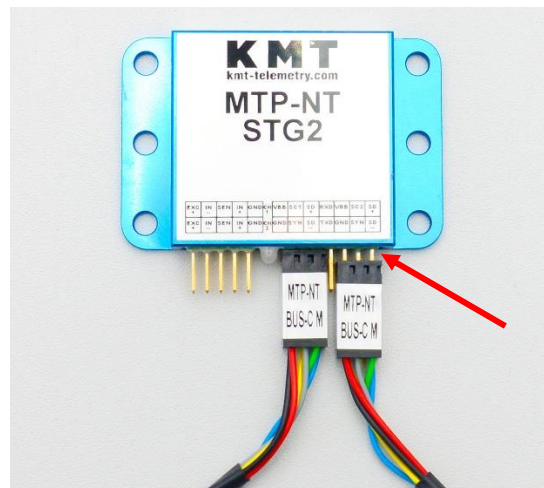


Caution: Locking-Clip must be complete connected!

GOOD 😊

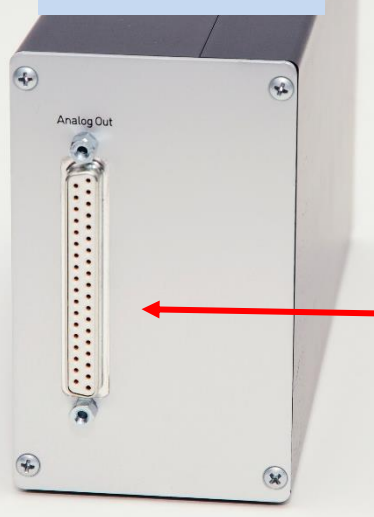


BAD 😞



MTP-NT-DEC8/16/24/32 Receiver unit for max 32 Channels output via 37 pol. D-sub Inductive transmission 45 MHz version up to 5000 Mbit (10000Mbit on special request!)

Front side view



Female 37 pole D-sub for analog signal output, CH 1 to 32

Power ON LED

Power Switch

Transmission error LED

7-pole female TUCHEL connector for power supply input (10-30V DC)

Rear side view



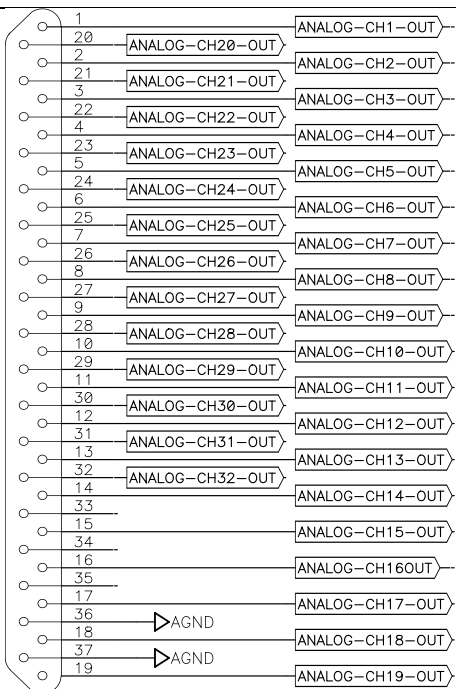
inductive power transmission status LED

IND-Pickup head #2 connection (diversity option)

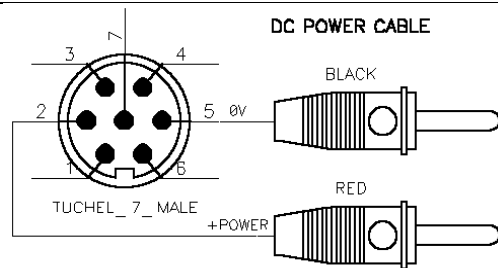
Active level LED of Pickup head

Active level LED of Pickup head

IND-Pickup head connection



Plug-side



Optional BNC16/32 Box. Connect on 37pol D-Sub

MTP-NT -DEC8/16/24/32 System Parameters:

Channels:	8,16,24 or 32x +/-10 V analog outputs via D-sub female socket
Resolution:	16 bit D/A converter, with smoothing filter
Power supply input:	10-30 Vdc, power consumption < 24 Watt
Dimensions:	205 x 105 x 65mm
Weight:	1.25 kg without cables and data pickup head
Overall measurement uncertainty (sensor input → decoder output):	< 0.1% without sensor influences
Environmental	
Operating:	-20°C to +70°C
Humidity:	+80% not condensing (@ +20°C)
Vibration:	5g
Static acceleration:	10g in all directions
Shock:	100g in all directions

Data frame:

For 4 Channels: 32 bit Barker Synch Code + 4x16 bit Data + 4x16 bit Data + 4x16 bit Data + 4x16 bit Data + 32 bit reserved

For 8 Channels: 32 bit Barker Synch Code + 8x16 bit Data + 8x16 bit Data + 32 bit reserved

For 16 Channels: 32 bit Barker Synch Code + 16x16 bit Data + 32 bit reserved

For 32 Channels: 32 bit Barker Synch Code + 16x16 bit Data + 32 bit reserved (Frame Nr.1 = CH1..Ch16) +
32 bit Barker Synch Code + 16x16 bit Data + 32 bit reserved (Frame Nr.2 = CH17..Ch32)

For 64 Channels: 32 bit Barker Synch Code + 16x16 bit Data + 32 bit reserved (Frame Nr.1 = CH1..Ch16) +
32 bit Barker Synch Code + 16x16 bit Data + 32 bit reserved (Frame Nr.2 = CH17..Ch32) +
32 bit Barker Synch Code + 16x16 bit Data + 32 bit reserved (Frame Nr.3 = CH33..Ch48) +
32 bit Barker Synch Code + 16x16 bit Data + 32 bit reserved (Frame Nr.4 = CH49..Ch64)

MTP-NT DEC4/8/16/24/32 with analog output via BNC (4/8) or Sub-D 16/24/32



4 CH



8 CH



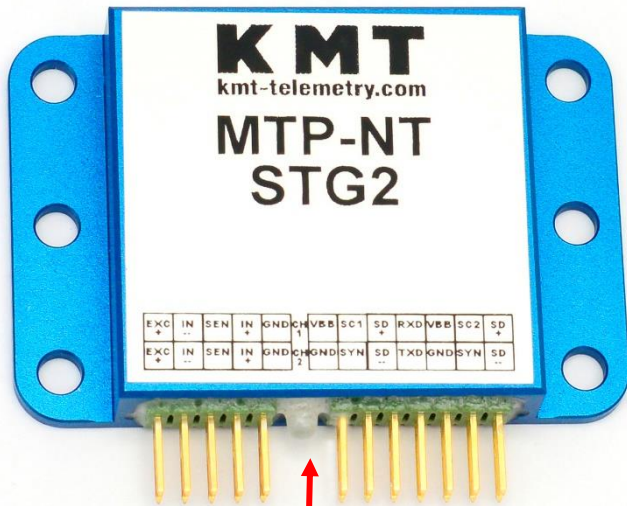
16/24/32 CH

MTP-NT-DIG-DEC with ethernet output via LAN



2-256 CH

MTP-NT STG - Acquisition module for 2 channels strain gages (STG)

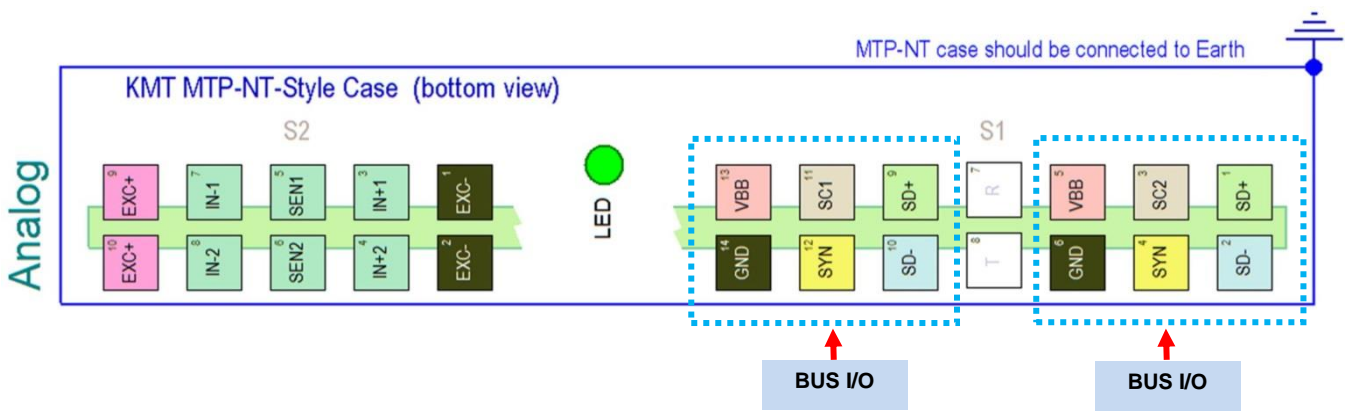


MTP-NT-STG2
 Acquisition module for 2 strain gauges
 Full, half and quarter bridge ($\geq 350 \Omega$)
 Full, half and quarter bridge (120Ω)
 Fixed excitation 4 Vdc
 Offset compensation by auto zero
 Manual offset shifting after auto zero
 Gain 62.5-8000 (40 to 0.3 mV/V)
 Shunt-calibration 100 k Ω 0.1%
 Signal bandwidth 0 Hz to 24000 Hz*
 (*see table of cut-off-frequencies)
 ADC Resolution 16 Bit
 Gain uncertainty < 0.1%
 Power supply: VBB = 6 to 9 Vdc
 Current consumption (with full bridge 350 Ohm) 90 mA

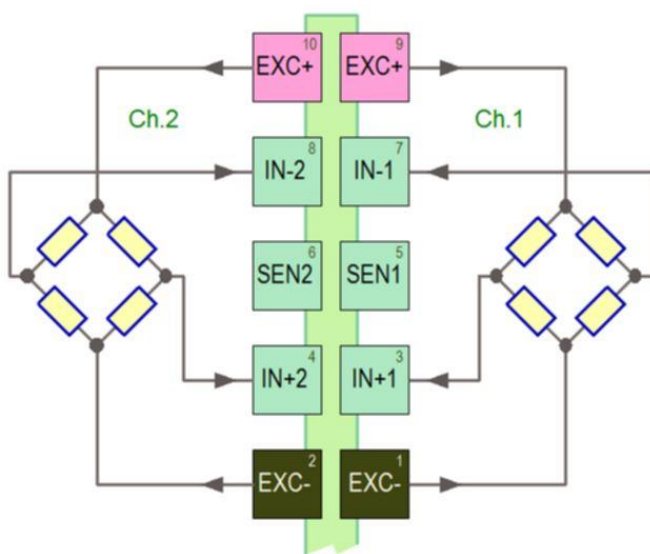
STG connection for 2 channels

Status LED ON = OK

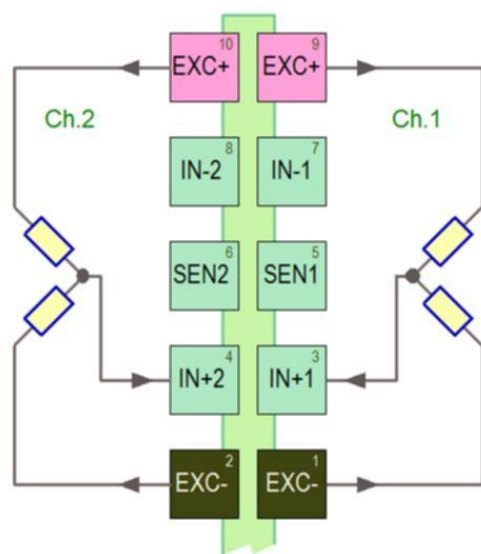
Powering and digital bus I/O



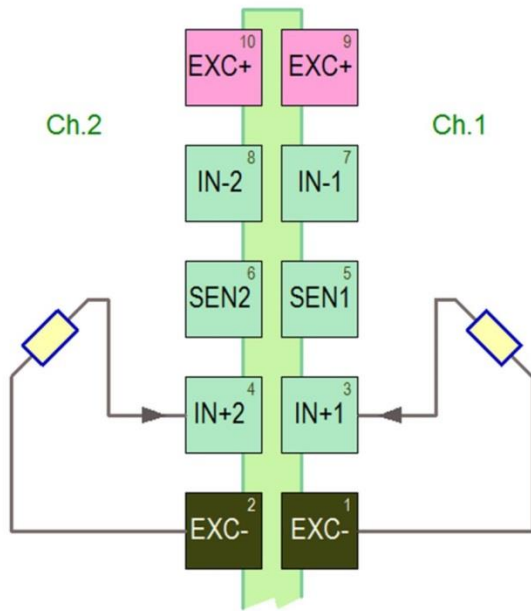
Full Bridge Connection



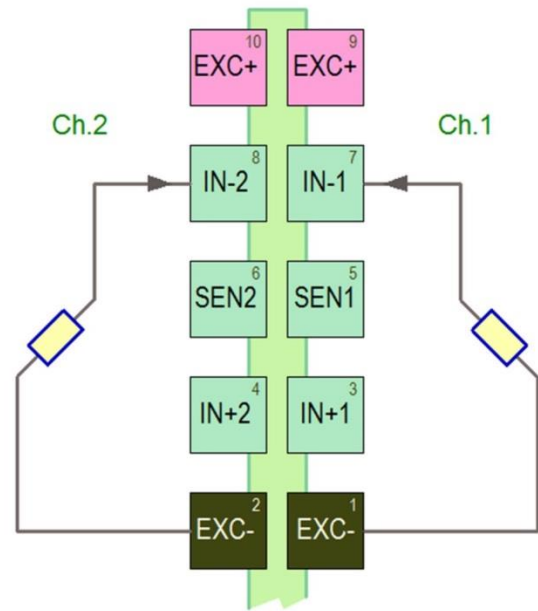
Half Bridge Connection



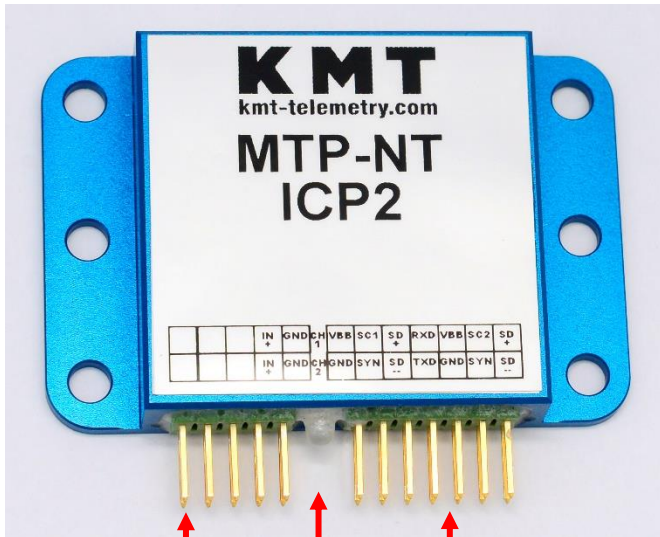
Quarter Bridge Connection 350 Ohm



Quarter Bridge Connection 120 Ohm



MTP-NT ICP - Acquisition module for 2 channels IEPE sensor



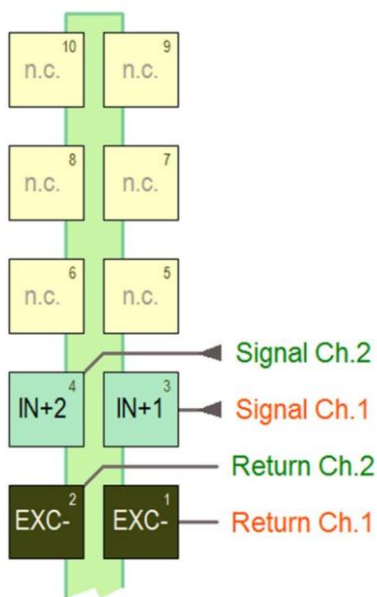
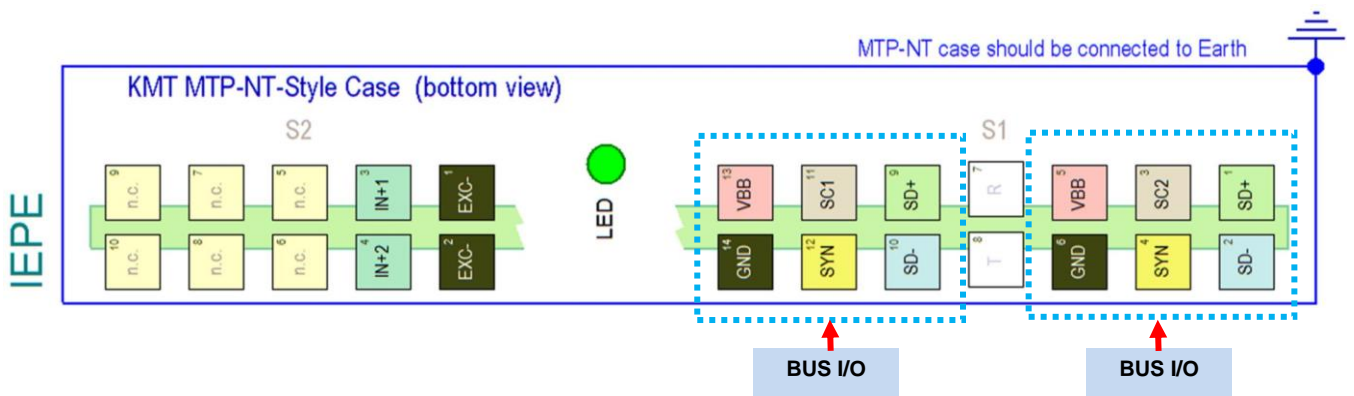
MTP-NT-IEPE2/ICP

Acquisition module for 2 IEPE/ICP® sensors
 Current EXC. 4mA
 Gain: 1-2-4-8-16-32
 Signal bandwidth 3 Hz to 24000Hz*
 (*see table of cut-off-frequency)
 ADC Resolution 16 Bit
 Gain uncertainty < 0.1%
 Power supply: 6 to 9 Vdc
 Current consumption 120 mA

ICP connection
for 2 channels

Status LED
ON = OK

Powering and
digital bus I/O

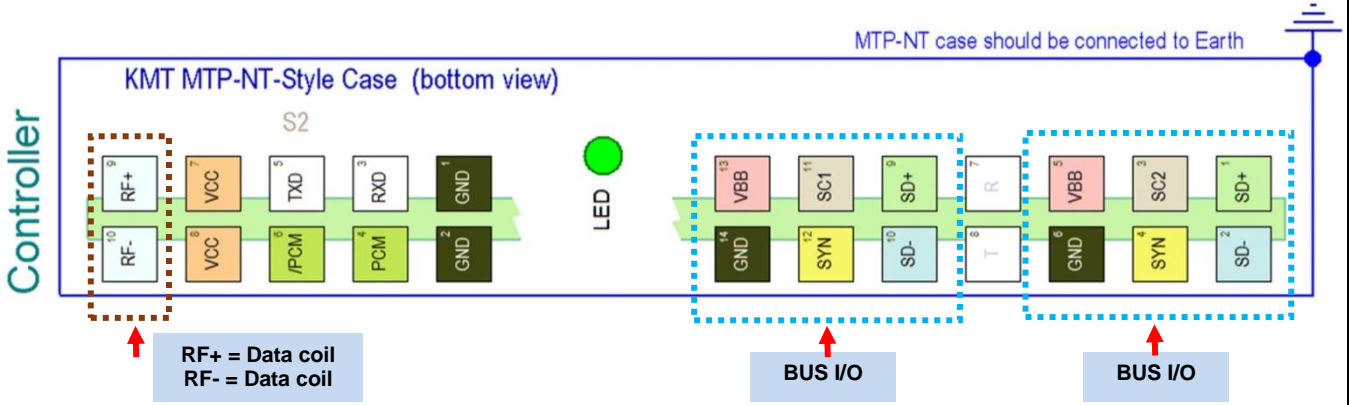


Shield for noisy environmental (Return = GND)

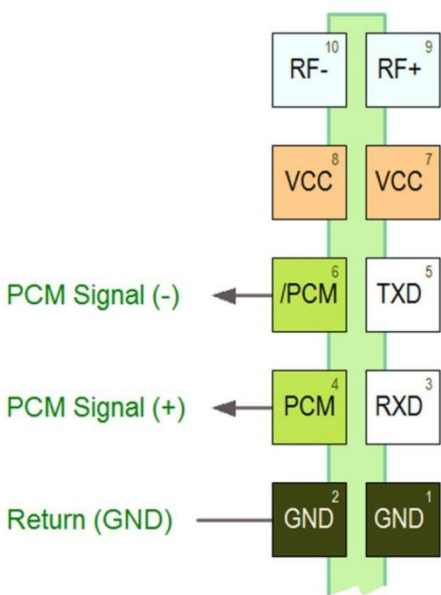
MTP-NT CON-IND-Tx - Controller for 256 channels with integrated IND-Tx



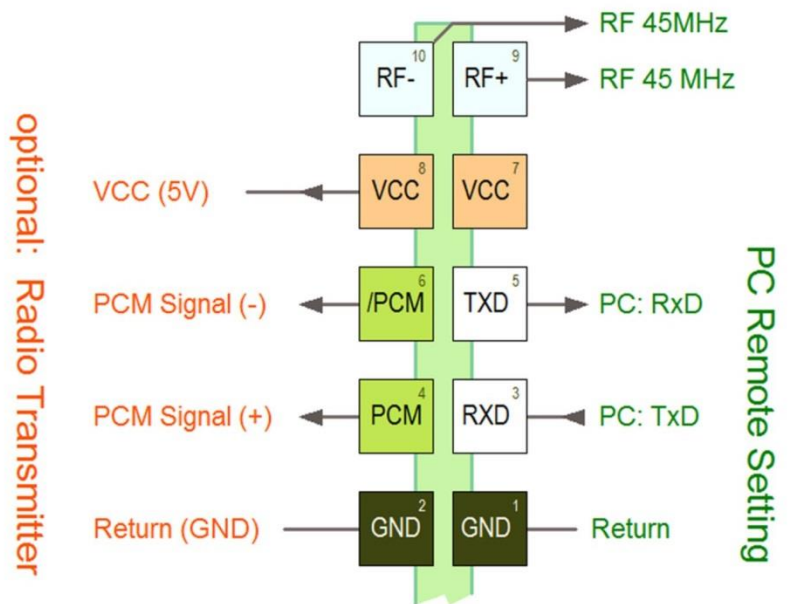
MTP-NT-CON-IND-Tx
 Controller 1- 128 acquisition modules = 256 channels
 Output: PCM
IND-Transmitter included
 Programmable via RS232/USB adapter and remote software
 Power supply: VBB= 6 to 9 Vdc
 Current consumption 150 mA



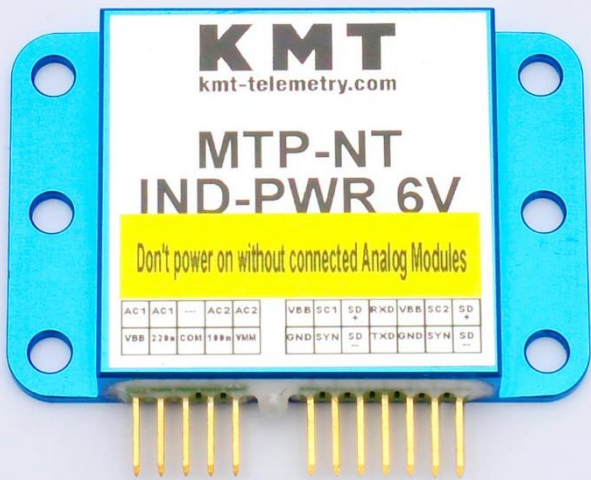
Controller Connection RS422



Controller Connection RF Signal & Remote Control



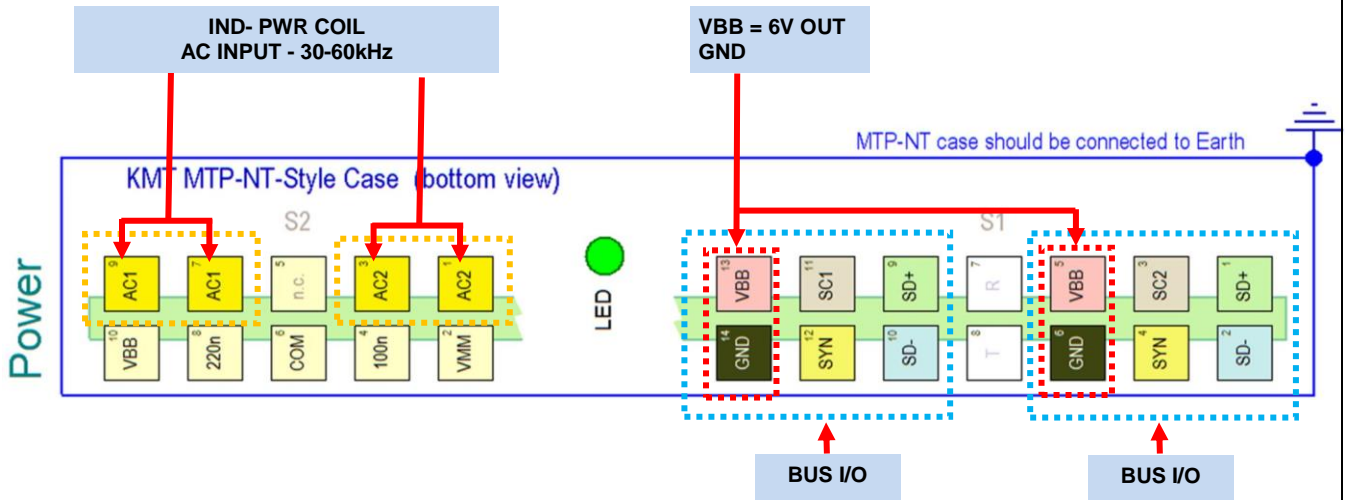
MTP-NT IND-PWR - AC/DC Module for inductive power transmission



MTP-NT IND-PWR 6V
 AC/DC Module for inductive power
 Input: 30-60 kHz 10-40V AC
 Output: 6.1 Vdc
 Current: up to 2400 mA (more on request)
 Weight: 40 grams
 Vibration: 5 g
 Shock: 3000 g

Don't power ON without connected Analog modules like MTP-NT-STG, ICP Otherwise you can damage it!!

Control pin assignment



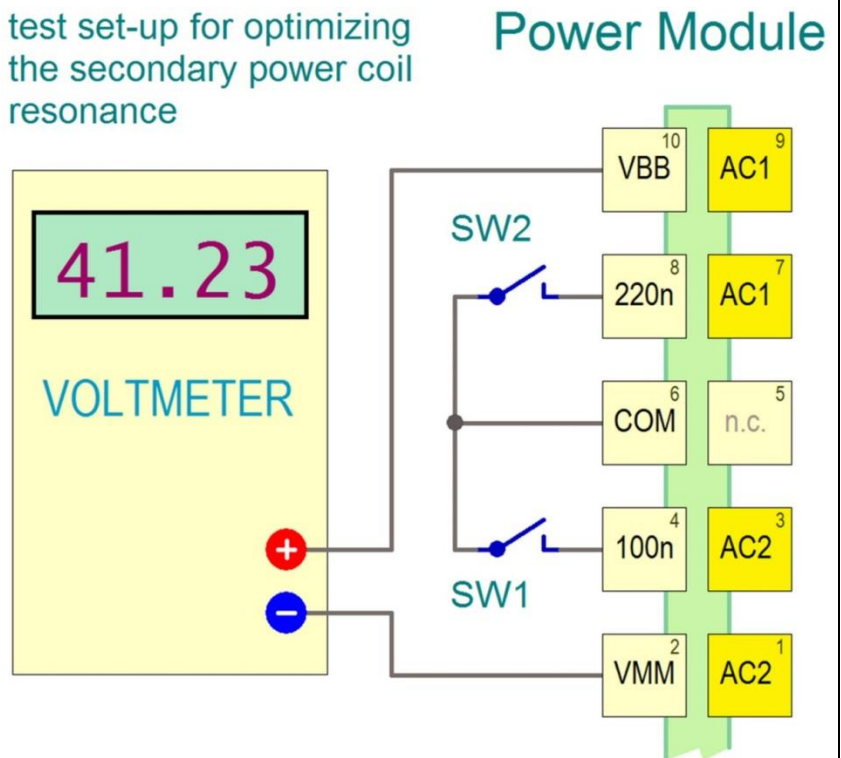
Instructions for adjusting the resonance

The secondary coil for power transmission creates a parallel resonant circuit with a capacitor, which must be tuned to the frequency of the power generator, so that the best possible efficiency is achieved. This (switchable) capacitor is installed in the power module; the capacity is variable between 150 nF and 470 nF. With the "test set-up" (see wiring diagram on the right) you can optimize the resonance.

If the lowest capacitance (both switches open) is still insufficient to provide a good coil-to-powerhead distance, the coil should be experimentally decreased by one turn.

If the largest capacity (both switches closed) is insufficient, the coil should be increased by one turn.

test set-up for optimizing the secondary power coil resonance



Allowed voltage range between VMM and VBB

This voltage is the (rectified) internal operating voltage of the power module.

The **absolute maximum value of this voltage is 60 volts DC**, and under no circumstances should it be exceeded. Therefore, during initial start-up, the power head should not be brought too close to the secondary coil, and then slowly approached to the coil while observing the voltmeter.

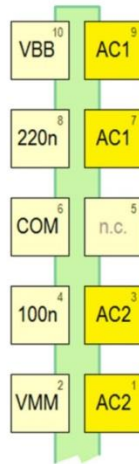
The minimum value is 18 volts DC [TBD]. Below this value, a function of the power module is no longer guaranteed.

The ideal voltage should be in the range of about 25 volts to 40 volts DC.

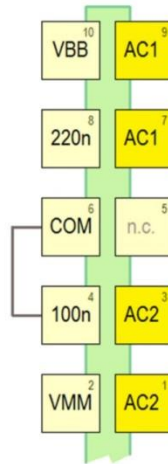
Relationship between switch setting and capacity

Once the optimal capacity has been found, the required connections can be fixed with a three-pin female connector. This socket connector must have solder bridges as shown in the wiring diagram on the right, and must be plugged on the middle three post pins (on the bottom row of posts). A socket connector with high insertion force must be used, so that it can't get loose in operation.

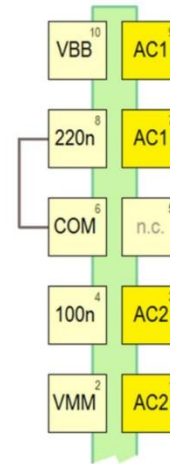
Tuning Capacitor
150nF



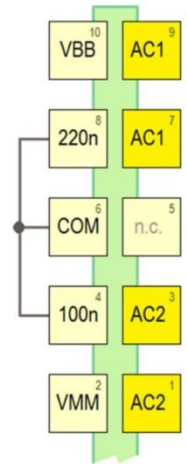
Tuning Capacitor
250nF



Tuning Capacitor
370nF



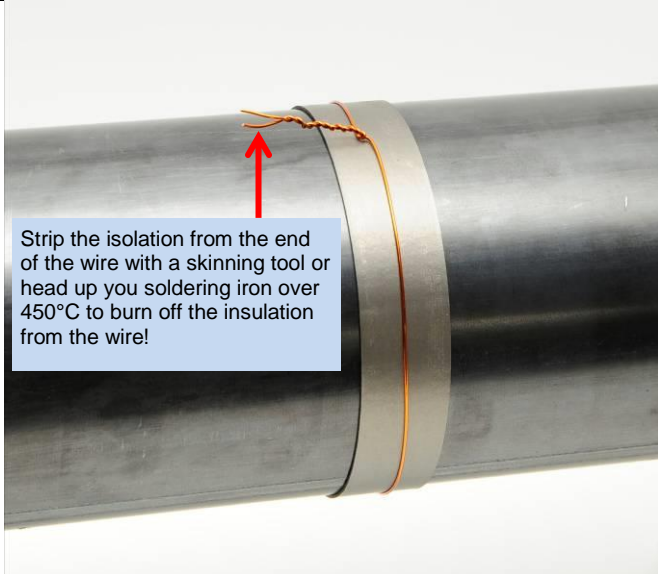
Tuning Capacitor
470nF



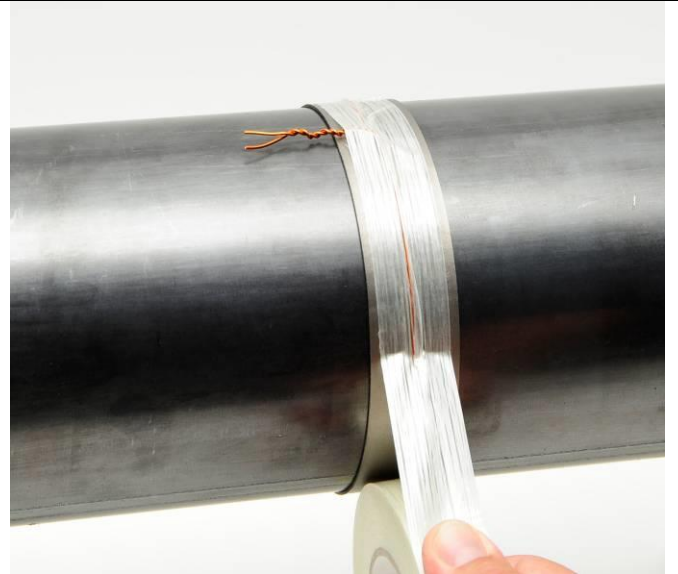
Inductive transmission (2500kbit) with MTP-NT-IND-TX-RX with 45MHz carrier!
With 45MHz carrier is only 1x winding necessary!



Attach for electromagnetic insulation "Ferrite Tape" **2 x one** layer around the shaft.

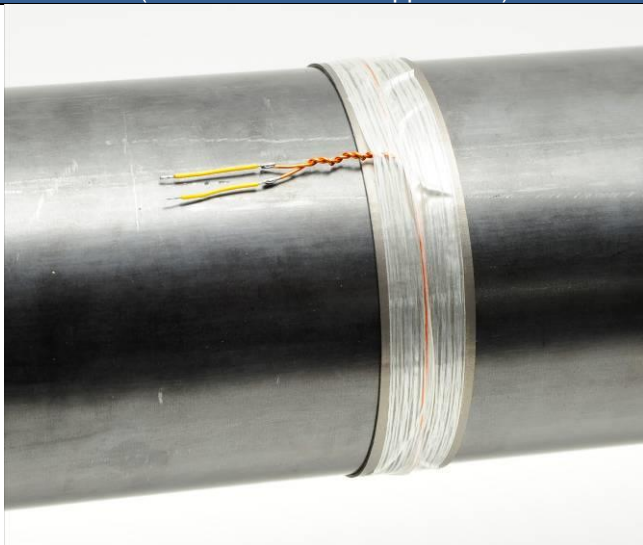


Strip the isolation from the end of the wire with a skinning tool or head up you soldering iron over 450°C to burn off the insulation from the wire!



Make transmitting coil with **1x winding** and twisted the end of wire. Use CUL 0.63-1.00mm wire (CUL = Enamelled copper wire)

Fixed it with 3 layers mounting tape

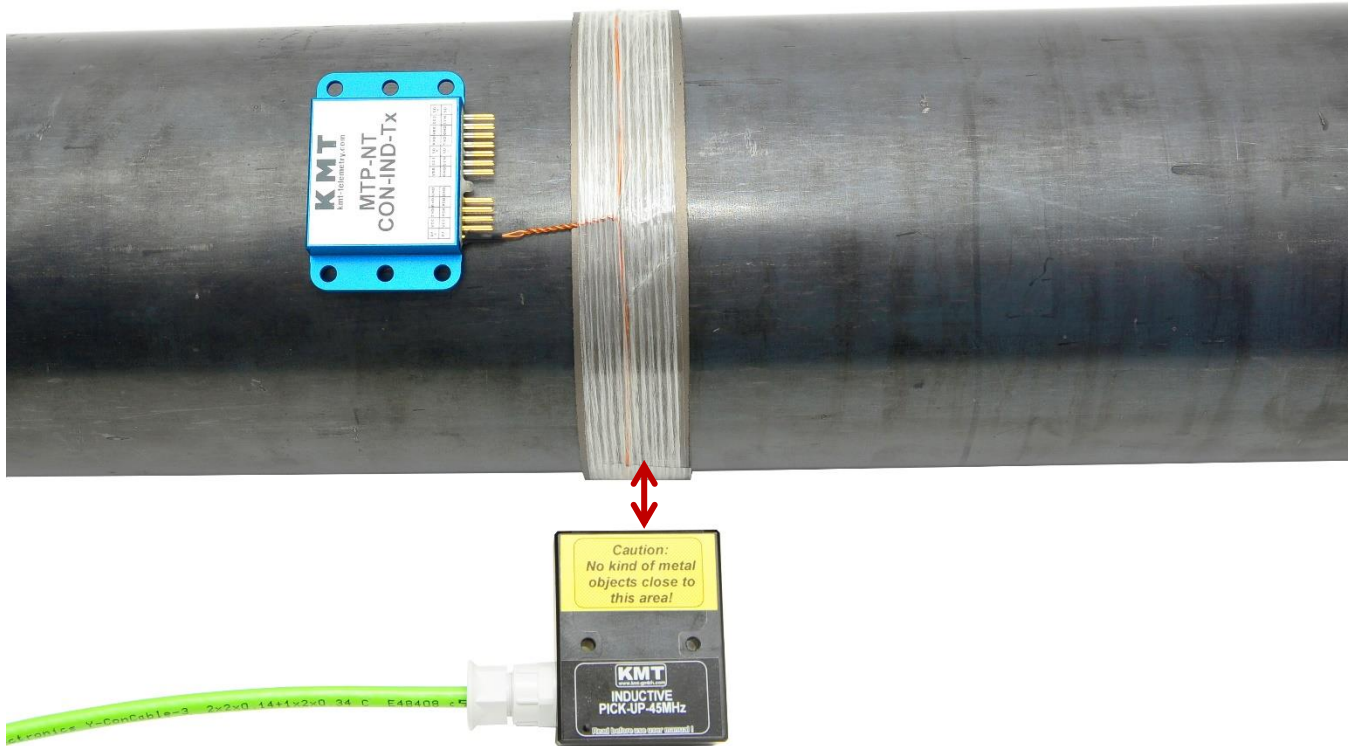


Extend the CUL wire flexible 0.14-0.25mm wire (to decouple the inflexible 1mm wire!, at 0.63 not necessary)



Twisted also the flexible wire and solder it on the MTP-NT IND-Tx (isolate all solder points with shrink tubing)

**MTP-NT CON-IND-TX with 45MHz carrier!
Pickup head (2500kbit)**



Inductive Pick-Up head mount in this position! Distance between head and Tx coil can be up to 100mm
Typical 50mm, distance deepens of application!!

CAUTION:

If you want to install also an inductive power coil close to the data coil, the minimal distance must be <5mm!
(distance between IND-PWR coil to IND-DATA coil)

Picture of IND-PICKUP-HEAD 45MHz

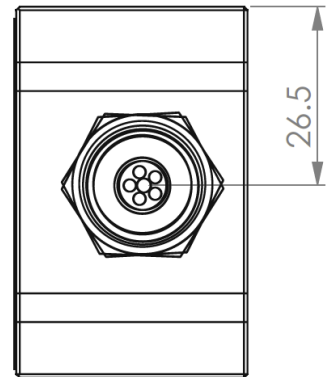
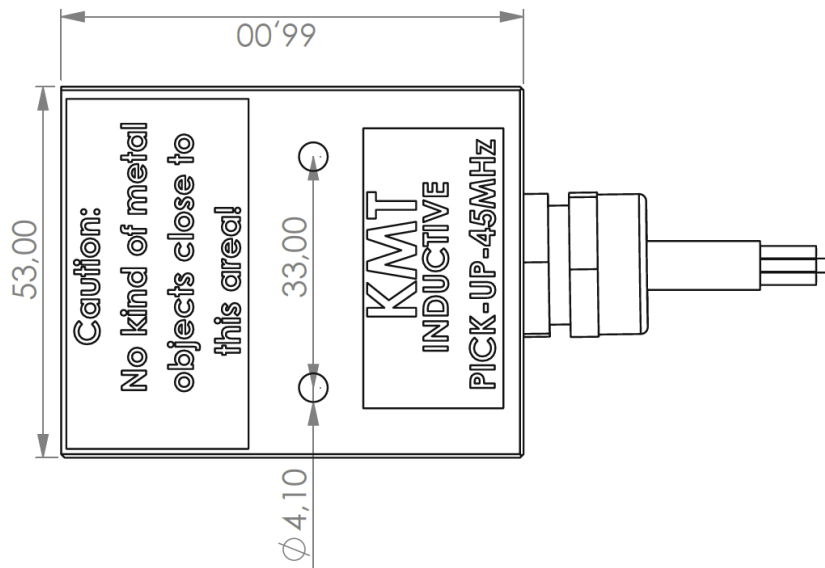
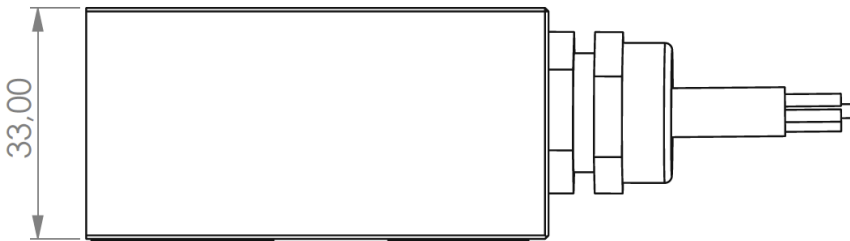
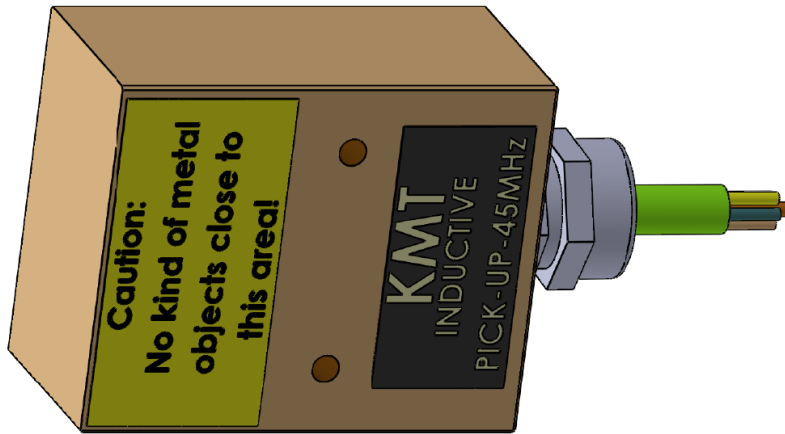


IND-PICKUP-HEAD 45MHz - cable rear side (radial to shaft)



IND-PICKUP-HEAD 45MHz - cable right side (axial to shaft)

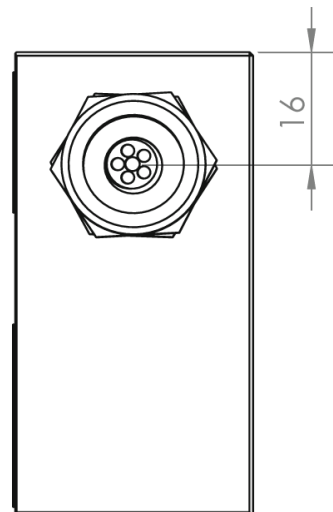
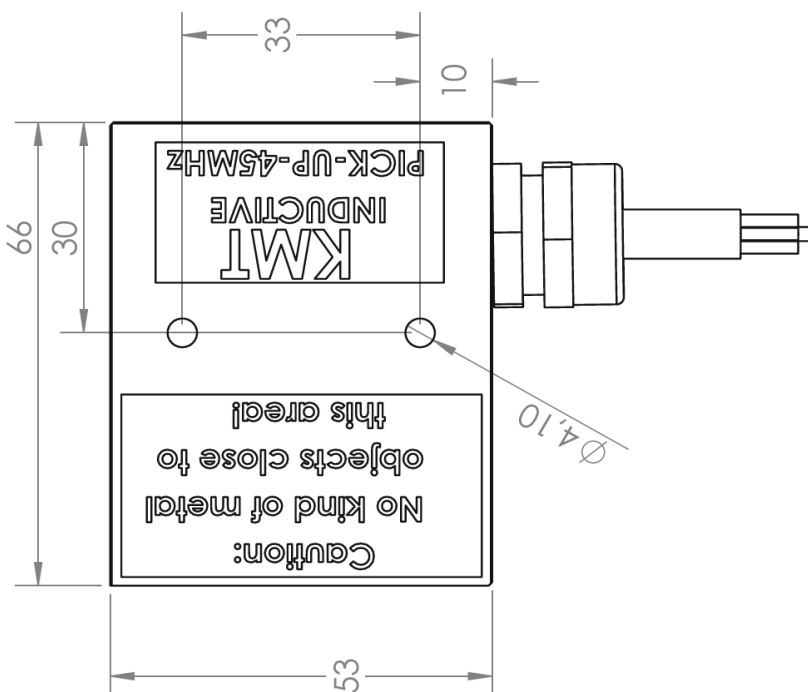
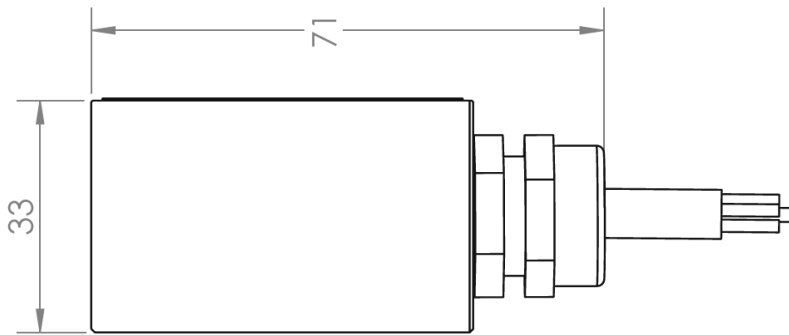
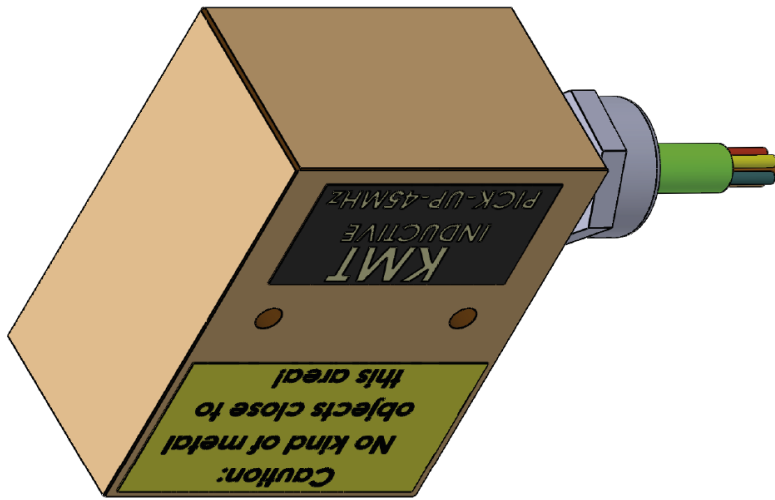
Dimensions of IND-PICKUP-HEAD 45MHz - cable rear side (radial to shaft)




Date	Version	Mat:
09.07.2018	rev1	
Remarks:		
BI : A4	Weight-gr:	152.34
Scale		Part:
1:1		PU-45MHz-rad-bg
www.kmt-telemetry.com		hu
E-mail: info@kmt-telemetry.com		
Tel: +49 8024-48737, Fax: +49 8024-5532		

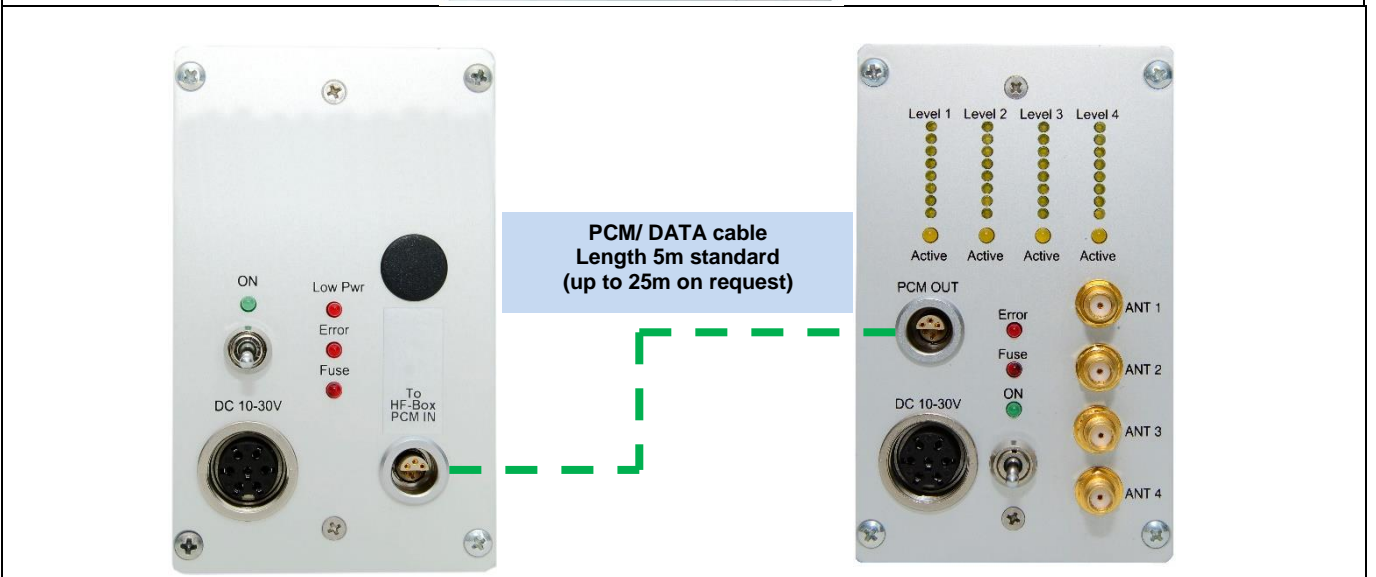
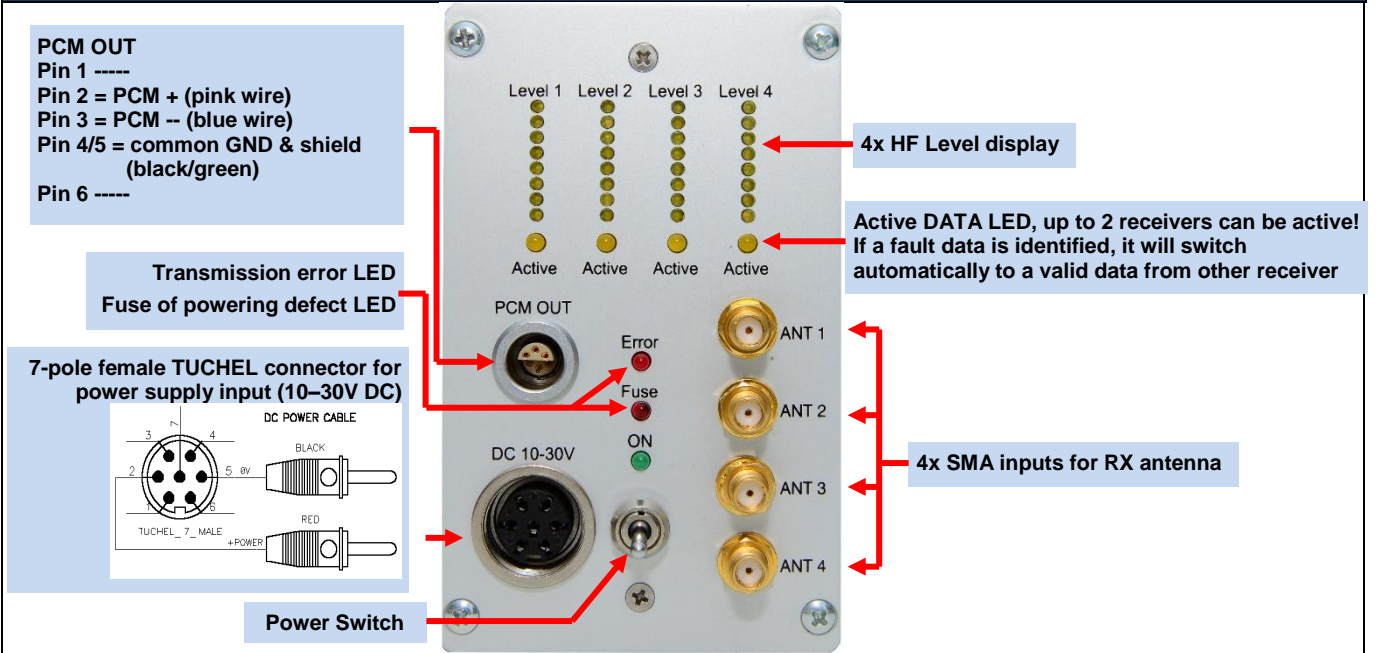


Dimensions of IND-PICKUP-HEAD 45MHz – cable right side (axial to shaft)



Date	09.07.2018	Version	rev1	Mat:		Remarks:	
				Bl : A4	Weight-gr:	151.37	
				Scale	1:1	Part:	PU-45MHz-cx-bg
				E-mail:	info@kmt-gmbh.com		
				Tel:	08024-48737, Fax: 08024-5532		
							hu

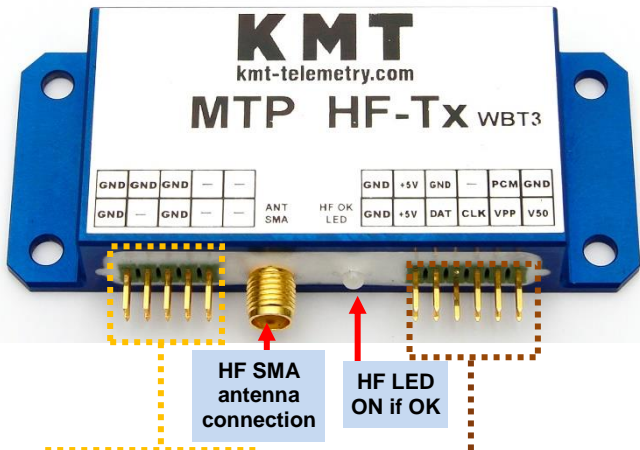
MTP-NT-DEC 8/16/32 Receiver unit for max 32 Channels output via 37 pol. Sub D
(radio transmission version with HF BOX Quad with 4 receiver 1250 ... 5000kbit)



HF BOX Quad System Parameters:

HF receivers	4
Antenna connection	SMA
Output	PCM
Power supply input:	10-30 VDC, power consumption <24 Watt
Dimensions:	205 x 105 x 65mm
Weight:	1.050 kg without cables and antenna
Environmental	
Operating:	-20 ... +70°C
Humidity:	20 ... 80% not condensing
Vibration:	5g
Static acceleration:	10g in all directions
Shock:	100g in all directions

HF-TX - Radio transmitter



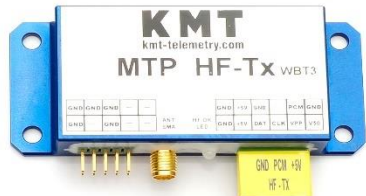
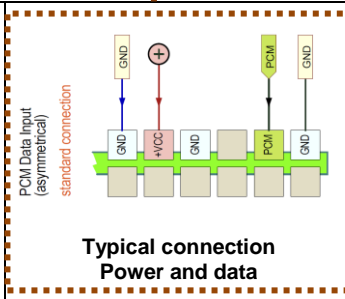
MTP-HF-TX (New version 2016) for MTP and MTP-NT

Radio data transmission transmitter
 Transmission rate 312.5, 625, 1250, 2500 and 5000kbit/s,
 Distance up to 1m (between wire antenna and receiving antenna)
 Consumption of current: 100mA
 Powering: 5V DC (powering comes via MTP-Controller)
 Vibration: 5g
 Static acceleration: 3000g
 Shock: 10000g
 Water protected, but not connectors!



Wire antenna for shaft application with SMA connector

Pins are for KMT internal use only!



MTP-NT-Control with MTP HF-Tx



MT32-IND-TX (Version until 2015) for MTP

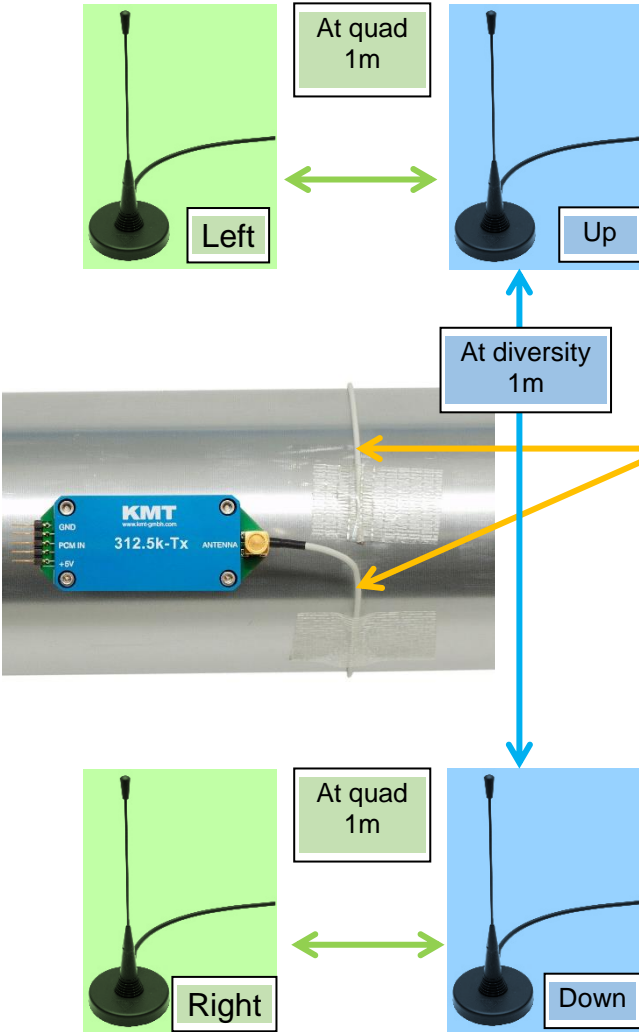
Inductive data transmission transmitter with 45MHz carrier
 Transmission rate 2500kbit/s
 Distance up to 100mm, typical 50mm (between coil and pickup)
 Consumption of current: 70mA
 Powering: 5V DC (powering comes via MTP-Controller)
 Vibration: 5g
 Static acceleration: 3000g
 Shock: 10000g
 Water **non-protected**

MTP 312.5 - 5000k Installation of the radio transmitter on a shaft
For rotating application we normal recommend an inductive transmission instead of radio transmission!



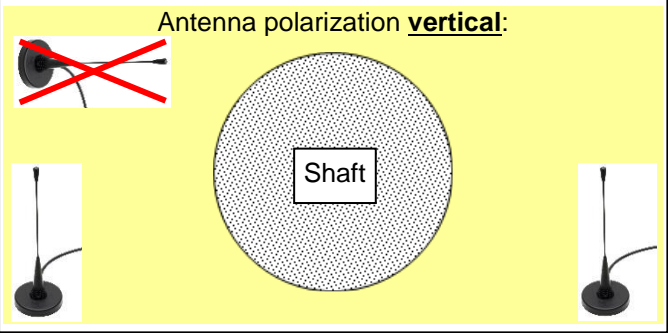
Cable Red = +5V
 Cable Black = GND (Ground)
 Cable Brown = PCM In
 Cable White = Wire antenna

All cable connections should be soldered.

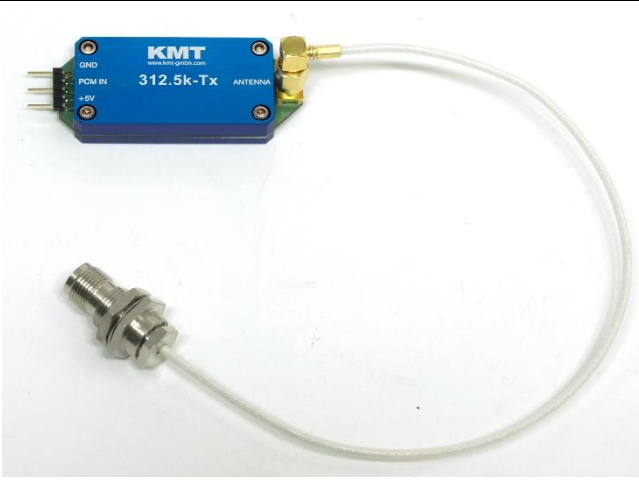


Installation of diversity antennas (2x):
 Install about 1m far from shaft,
 1x up and 1x down side

Mount the cable antenna exactly one winding around the shaft and fix all with 3 windings mounting tape – finish!
 The cable antenna can extend or shorten depending upon requires! (Isolate the solder connection, if you extend the wire antenna cable!)



Installation of quad antennas (4x):
 Install about 1m far from shaft,
 1x up and 1x down side and
 1x left and 1x right side
 About 1m distance to each other antenna

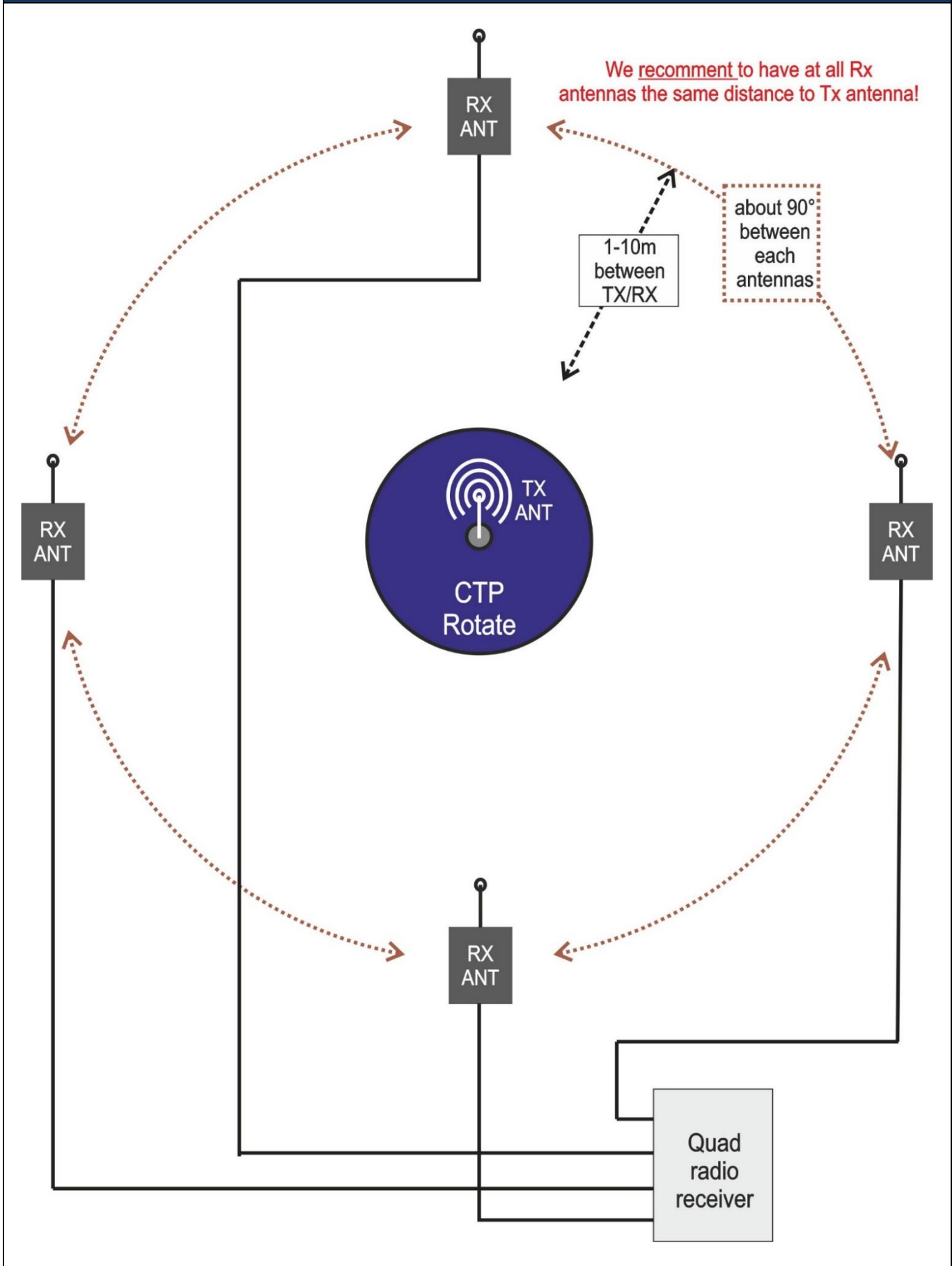


This coaxial adapter (**Tx-TNC-adapter**) makes it possible to connect an antenna with TNC connector for point to point applications. (option)

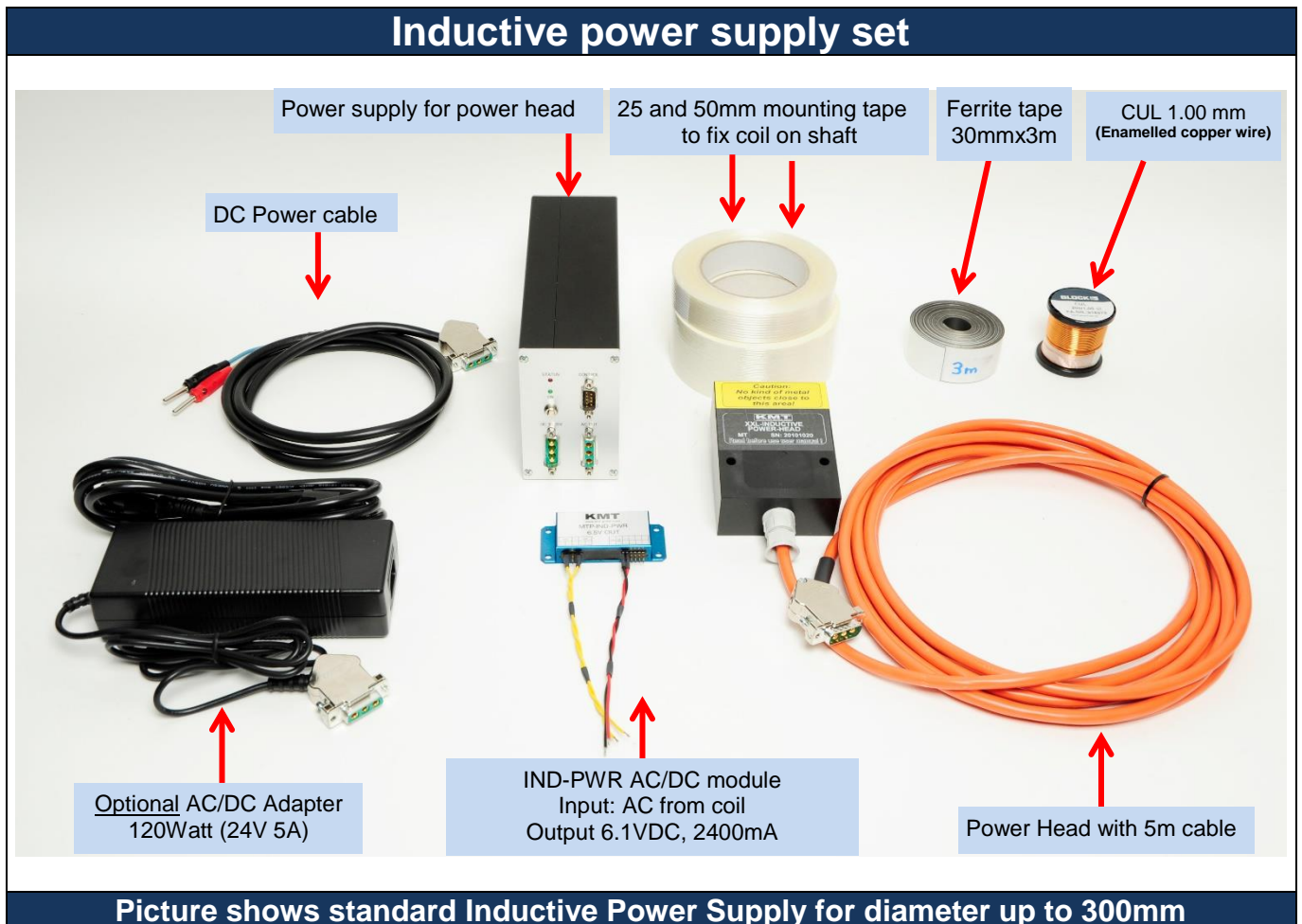


Transmitting antenna 0dB with magnetic foot (option)

Recommend position of receiving standard magnetic foot antennas if the radio transmitter antenna is mount on top of end of shaft



MTP-NT INDUCTIVE POWER XL, XXL and XXXL with flat COIL User Manual

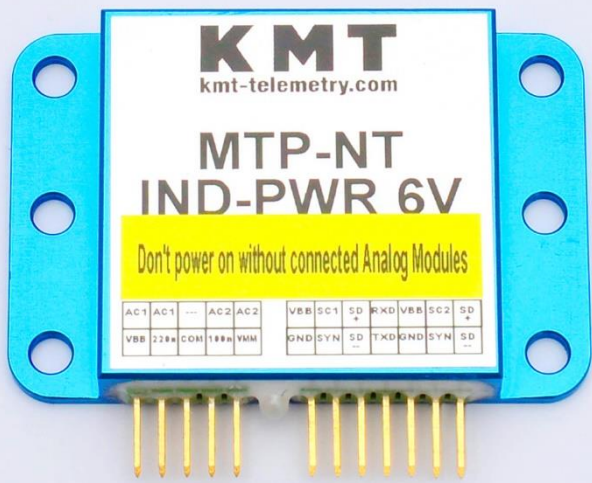


INSTRUCTIONS FOR QUALIFIED PERSONNEL ONLY!

Safety notes for inductive powering

- The device should only be applied by instructed personnel.
- The power head emits strong magnetic radiation at 30-60 kHz to a distance of 300 mm. 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. Also 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 50 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 interferences when used in residential areas or environments. In this case the operator is responsible for establishing protective procedures.

MTP-NT IND-PWR - AC/DC Module for inductive power transmission

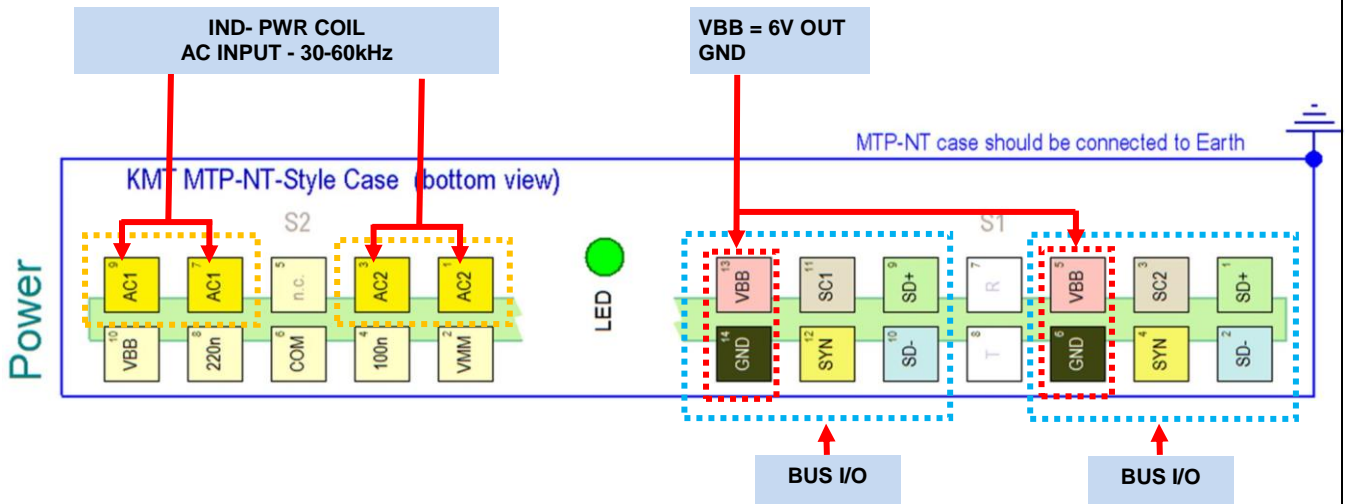


MTP-NT IND-PWR 6V

AC/DC Module for inductive power
 Input: 30-60 kHz 10-40V AC
 Output: 6.1 Vdc
 Current: up to 2400 mA (more on request)
 Weight: 40 grams
 Vibration: 5 g
 Shock: 3000 g

Don't power ON without connected Analog modules like MTP-NT-STG, ICP Otherwise you can damage it!!

Control pin assignment



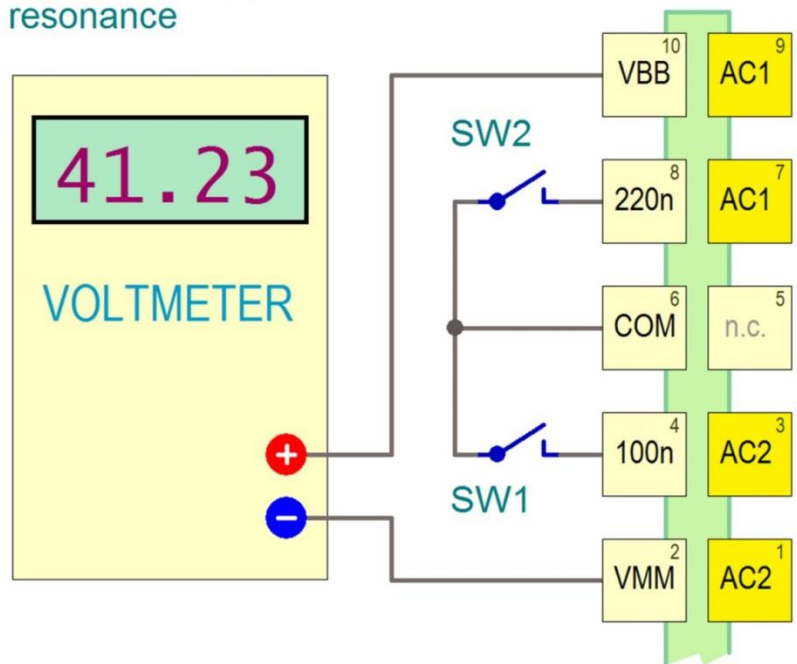
Instructions for adjusting the resonance

The secondary coil for power transmission creates a parallel resonant circuit with a capacitor, which must be tuned to the frequency of the power generator, so that the best possible efficiency is achieved. This (switchable) capacitor is installed in the power module; the capacity is variable between 150 nF and 470 nF. With the "test set-up" (see wiring diagram on the right) you can optimize the resonance.

If the lowest capacitance (both switches open) is still insufficient to provide a good coil-to-powerhead distance, the coil should be experimentally decreased by one turn.

If the largest capacity (both switches closed) is insufficient, the coil should be increased by one turn.

test set-up for optimizing the secondary power coil resonance



Allowed voltage range between VMM and VBB

This voltage is the (rectified) internal operating voltage of the power module.

The **absolute maximum value of this voltage is 60 volts DC**, and under no circumstances should it be exceeded. Therefore, during initial start-up, the power head should not be brought too close to the secondary coil, and then slowly approached to the coil while observing the voltmeter.

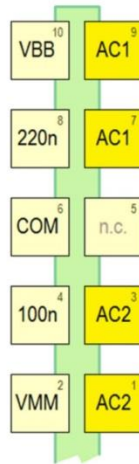
The minimum value is 18 volts DC [TBD]. Below this value, a function of the power module is no longer guaranteed.

The ideal voltage should be in the range of about 25 volts to 40 volts DC.

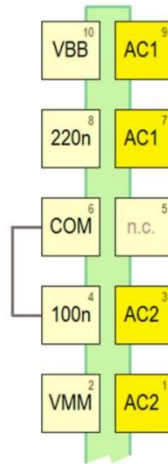
Relationship between switch setting and capacity

Once the optimal capacity has been found, the required connections can be fixed with a three-pin female connector. This socket connector must have solder bridges as shown in the wiring diagram on the right and must be plugged on the middle three post pins (on the bottom row of posts). A socket connector with high insertion force must be used, so that it can't get loose in operation.

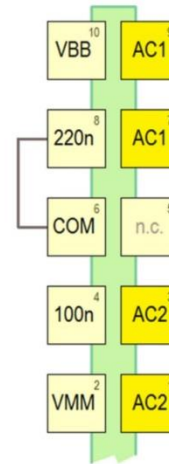
Tuning Capacitor
150nF



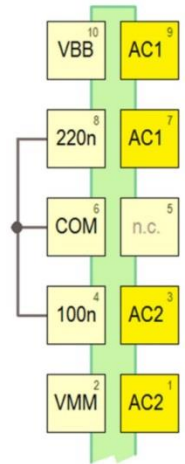
Tuning Capacitor
250nF



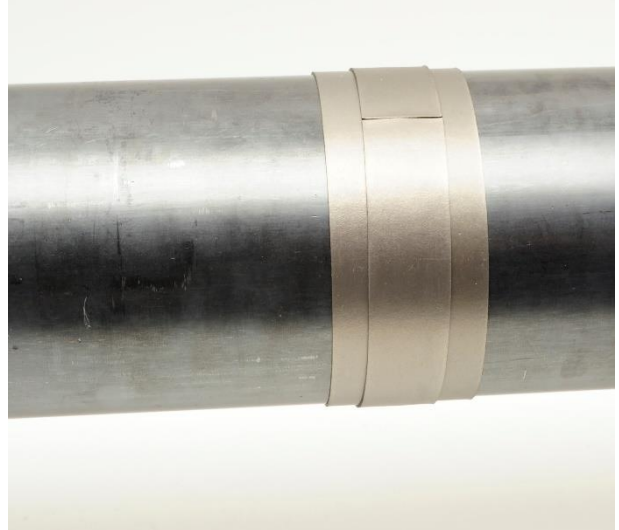
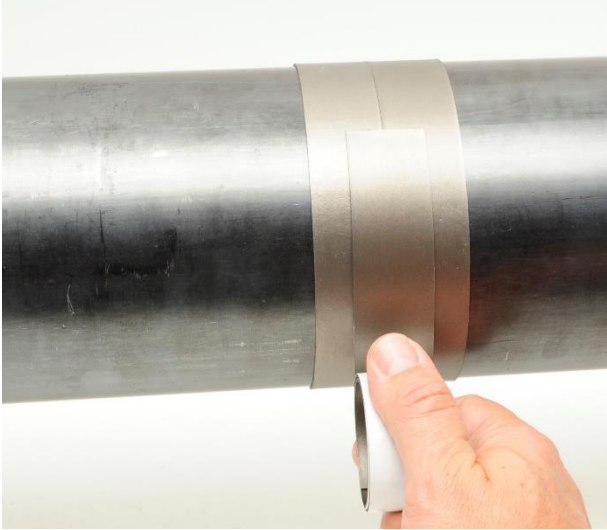
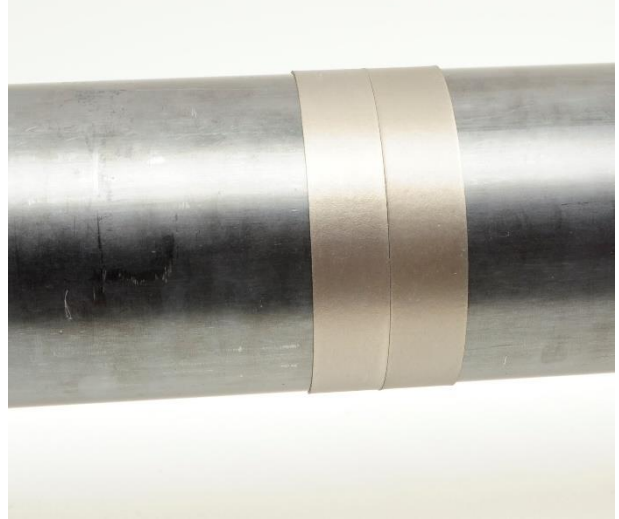
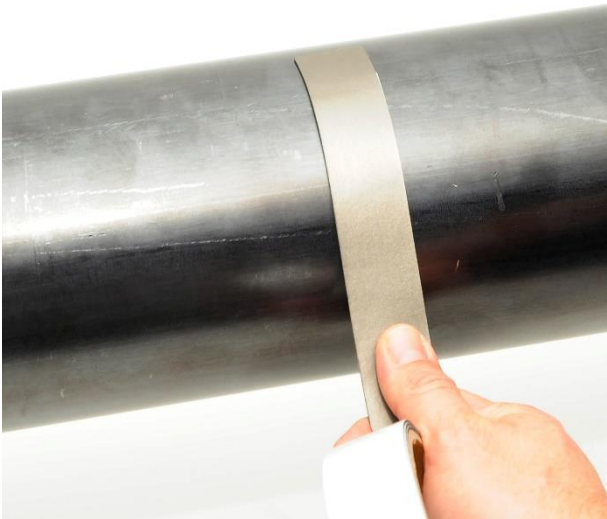
Tuning Capacitor
370nF



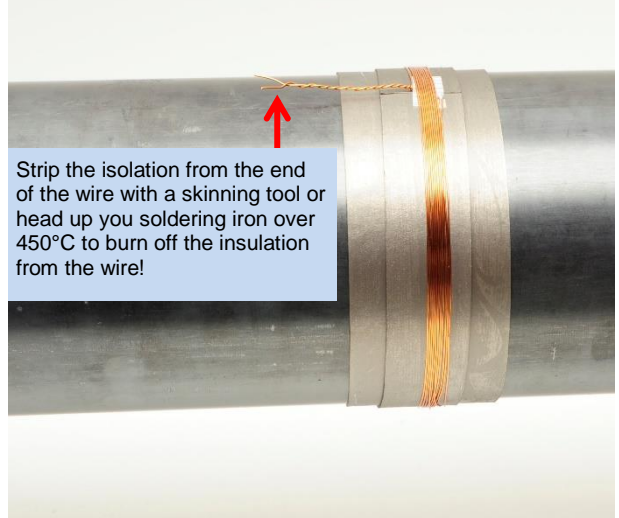
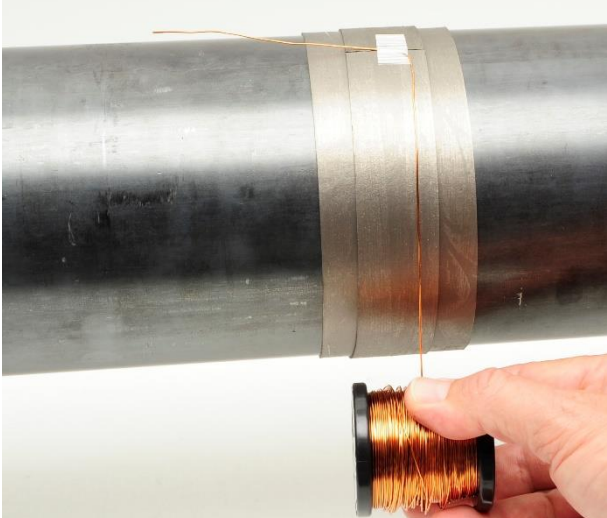
Tuning Capacitor
470nF



MTP-NT inductive power supply Installation of coil for inductive powering on shaft

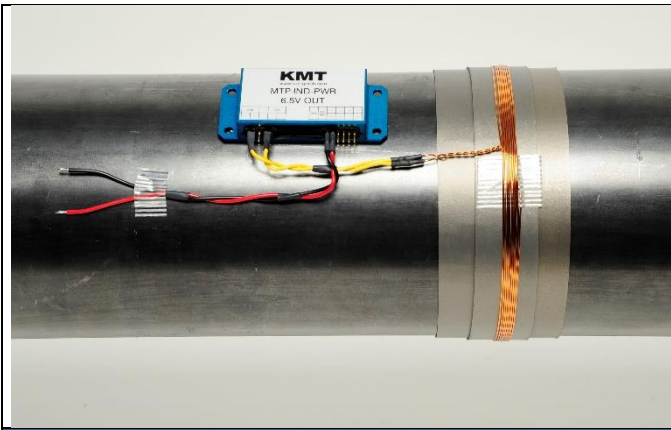


Attach for electromagnetic isolation "Ferrite Tape" 2x parallel and 1x in the middle over two layer around the shaft

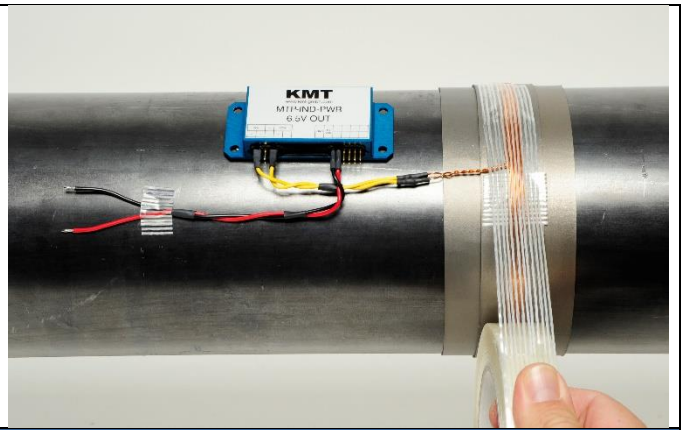


Strip the isolation from the end of the wire with a skinning tool or head up you soldering iron over 450°C to burn off the insulation from the wire!

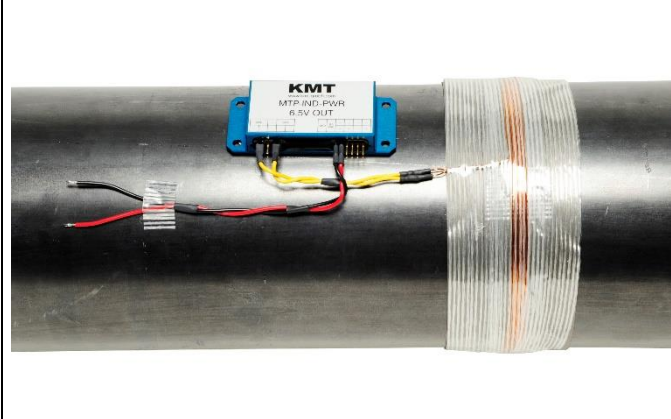
Make power coil with 3-18 windings for 1000-20mm diameter (see diagram) and twisted the end of wire.
Use 0.63...1.00 mm (1.00mm for diameter of 100-1000mm) CUL wire (Enamelled copper wire)



Solder the end of the wire on the AC IN of the IND-PWR module and isolate all solder points with shrink tubing.

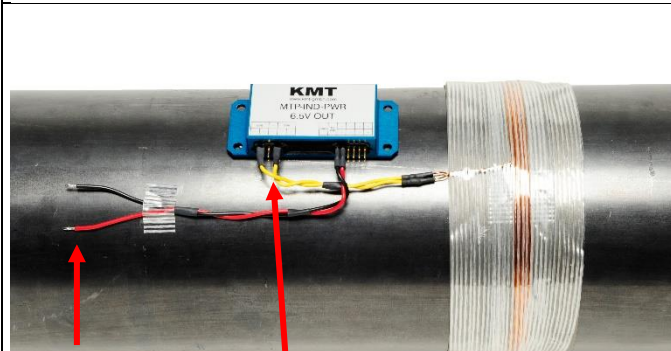


Fixed with 3 layers mounting tape



Note: "The inductive load of the MTP-NT IND-PWR and the capacitor in the Power Head must be in resonance to get the optimal transmission. The inductive load of the shaft depends of diameters, material and number of windings!

Control the output voltage and move the power-head in the max distance to the coil.
The output voltage must be 6.5 V!



6.5 DC OUT
max. 2400mA

AC IN



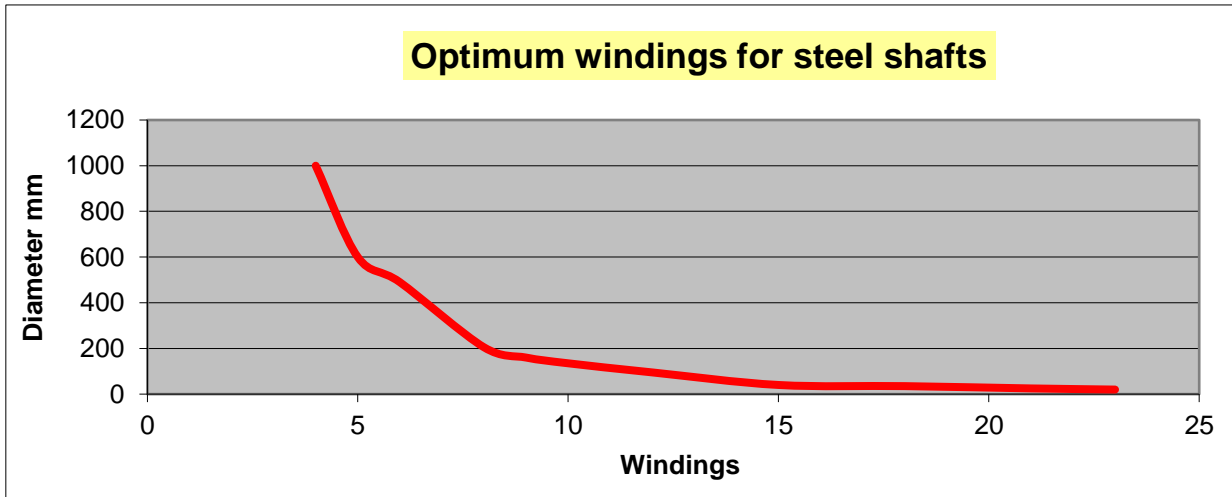
The pins "Coil" are the AC power input from the coil. On the pins "+6.5" and "GND" you get a stabilized output voltage of 6.5V DC.

The max. load current on the DC output is 2400mA. The IND-PWR converter will use instead battery pack!
Never use any battery together with the MTP-NT IndPwr!

You should mount the power head at a fixed location that it's as free as possible from vibration influences.

The center of the coil should be in the same horizontal position as the center of the power head. The distance is optimal in the range between 5 and 10mm. (depends of shaft and current consumption)

Find the correct amount of windings of inductive power coil



Missing turns occasionally can be compensated by increasing the tuning capacity from 150nF up to 470nF

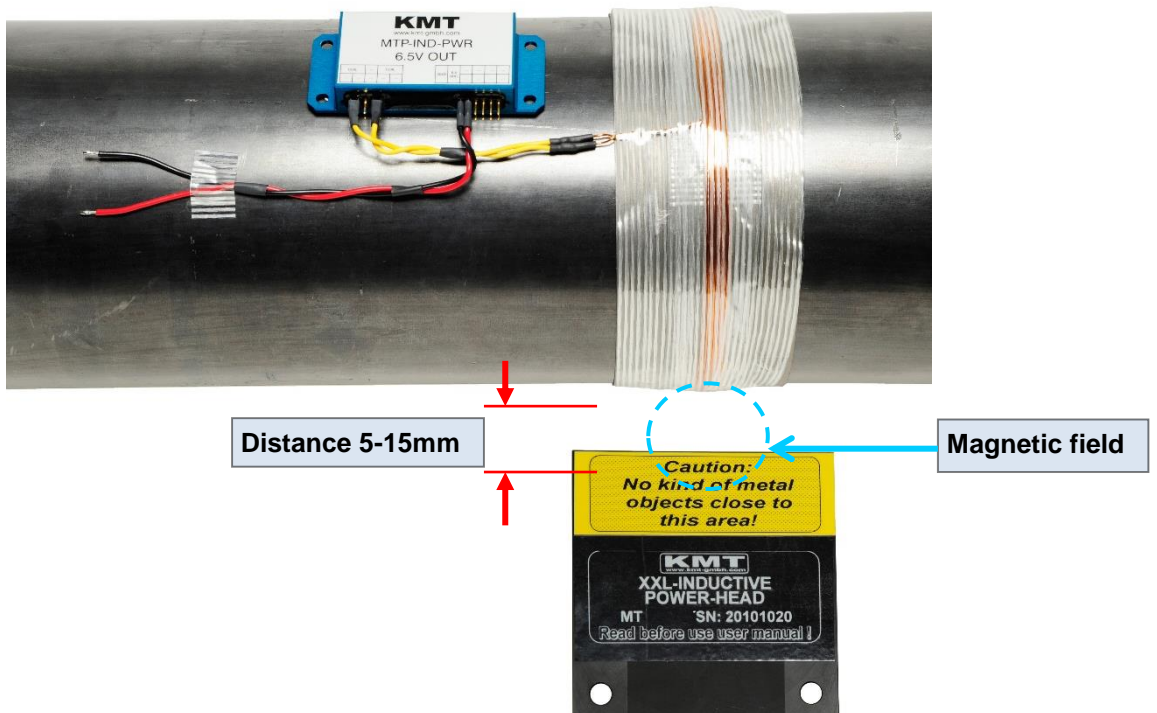
Windings (+/-1)	nF	Diameter (mm)
4	250nF	1000
5	150nF	600
6	150nF	490
8	150nF	205
9	150nF	160
10	150nF	135
12	150nF	95
15	150nF	40
18	150nF	35
21	150nF	25
23	150nF	20

Tuning Capacitor
150nF

Tuning Capacitor
250nF

Tuning Capacitor
370nF

Tuning Capacitor
470nF



Distance dependent of current consumption e.g. 2000mA at 5-10mm, 500mA at 10-15mm

Recommend power heads:

Diameter:	150mm	300mm	500mm	1000mm
4 - Channel	XL	XL	XL	XXL
8 - Channel	XL	XL	XXL	XXXL
16 - Channel	XL	XXL	XXXL	XXXL
32 - Channel	XXL	XXXL	XXXL	On request

IND-PWR-HEAD-XL and XXL

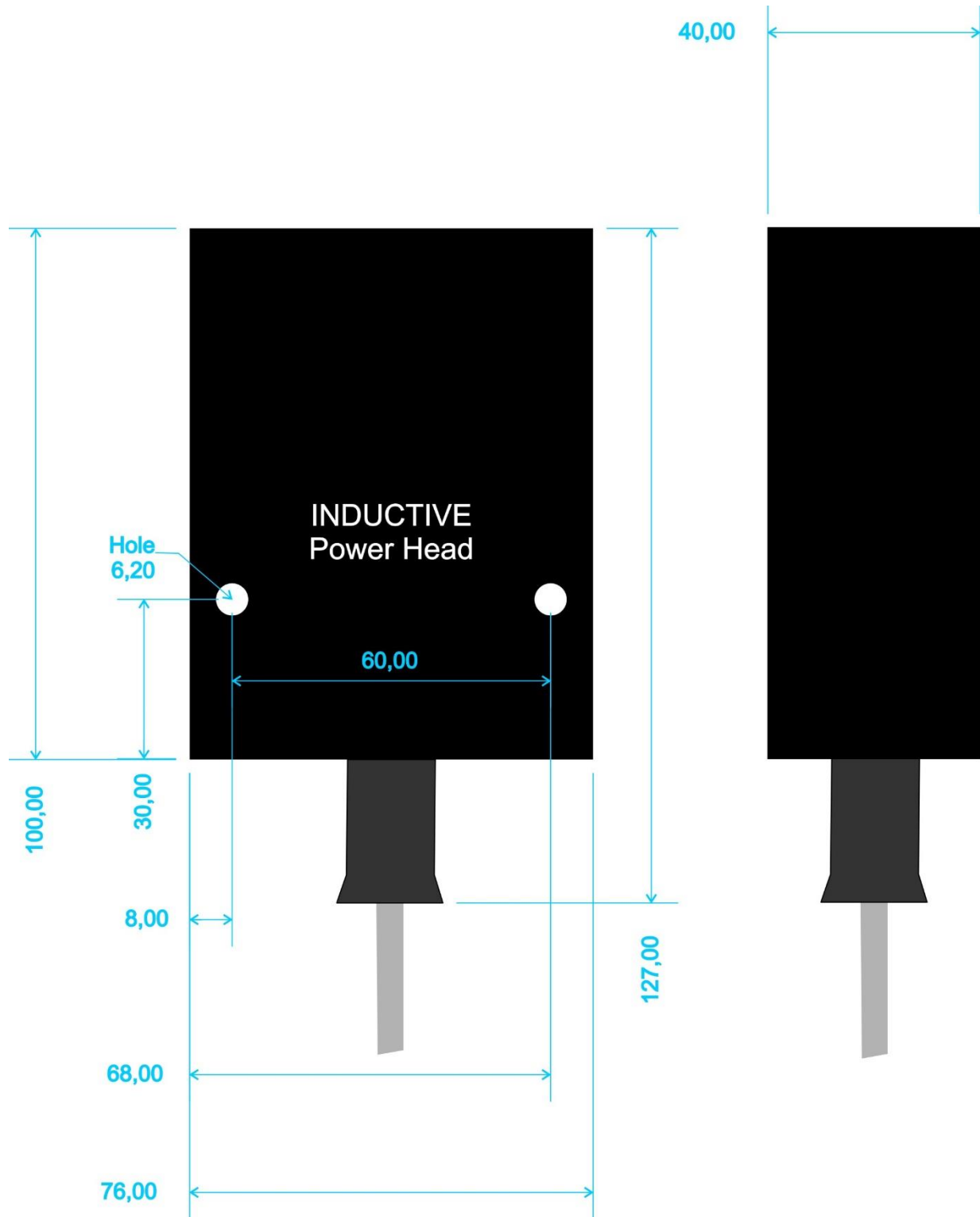


IND-PWR-HEAD-XXXL

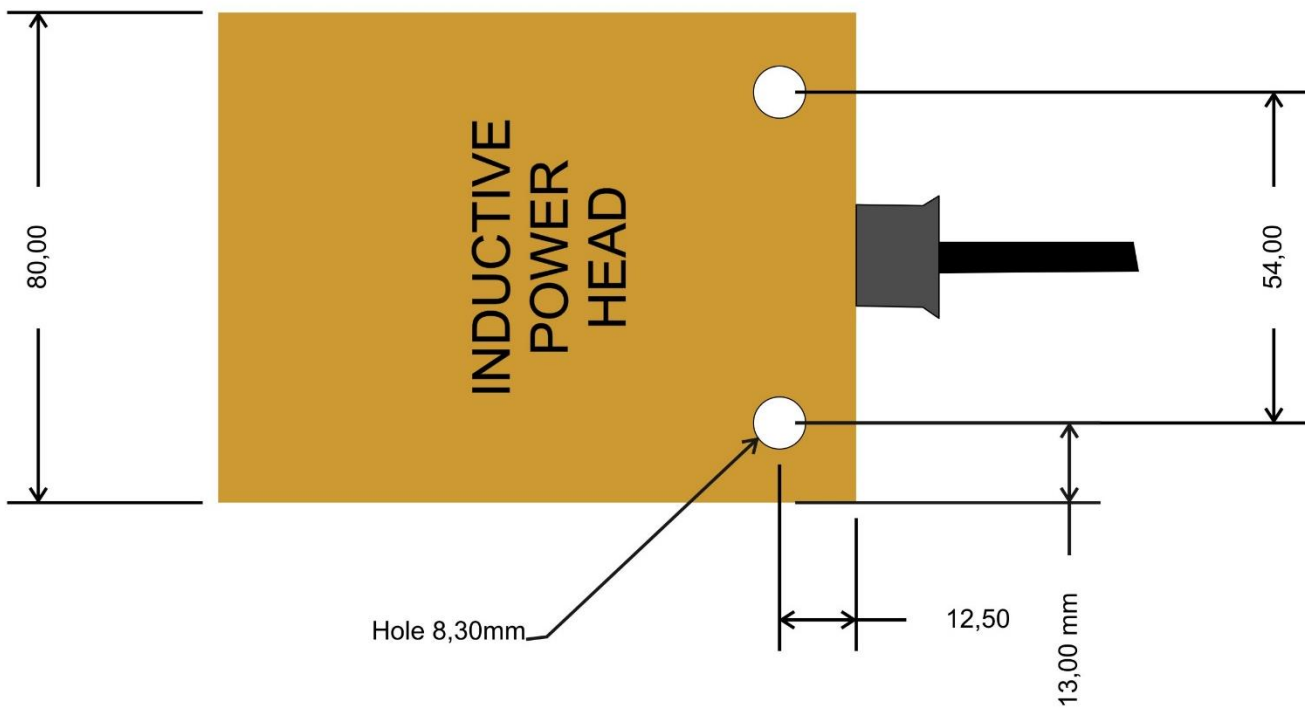
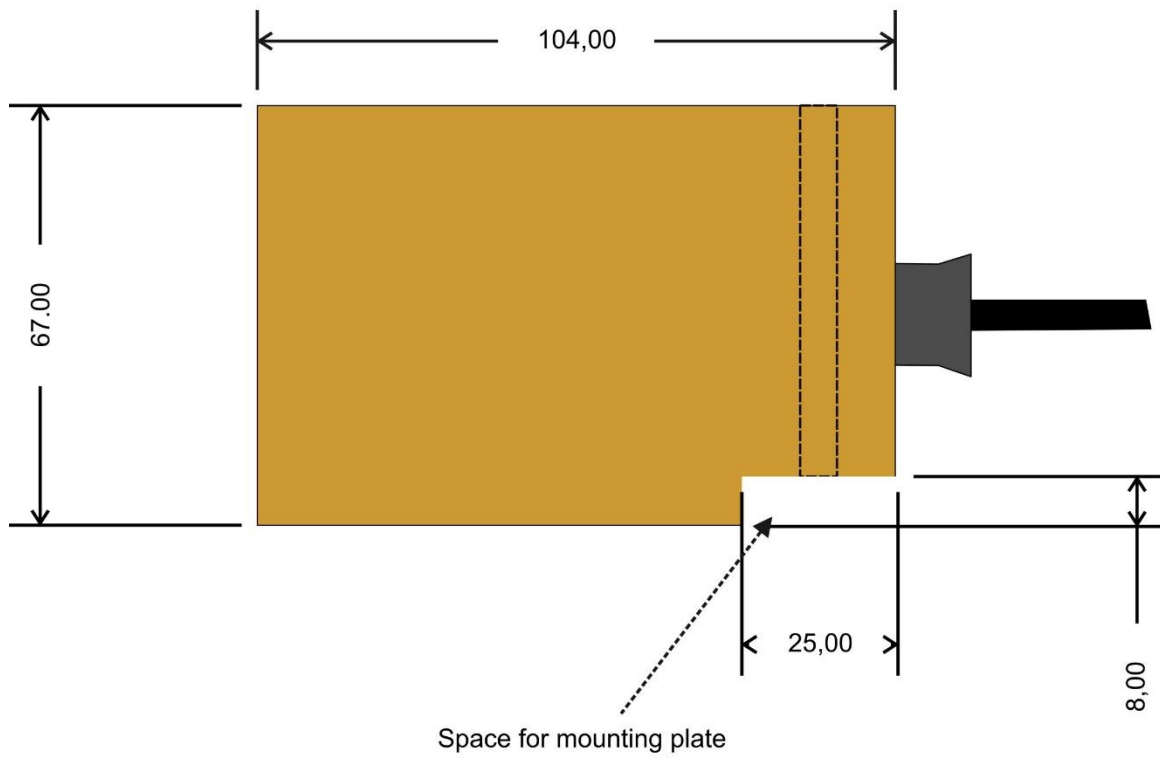


**Caution for use of XXL and XXXL power heads!
Cable must unrolled for use, otherwise it will warm up!**

Dimensions of IND-PWR-HEAD- XL and XXL

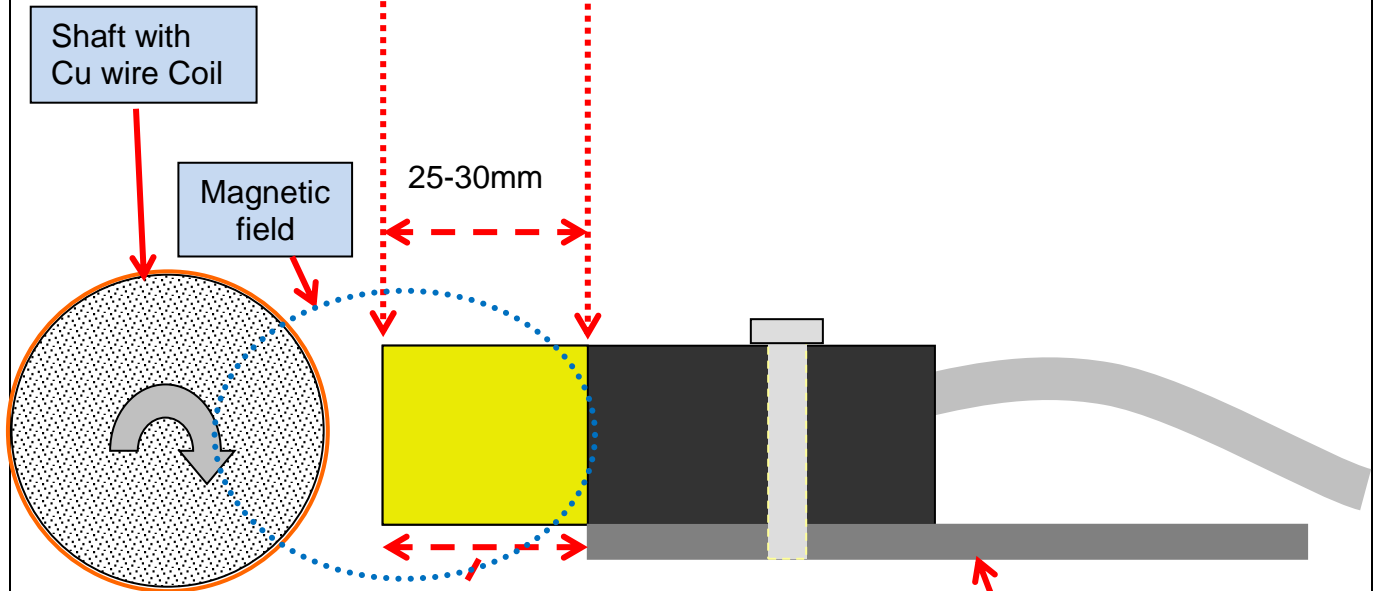


Dimensions of IND-PWR-HEAD-XXXL



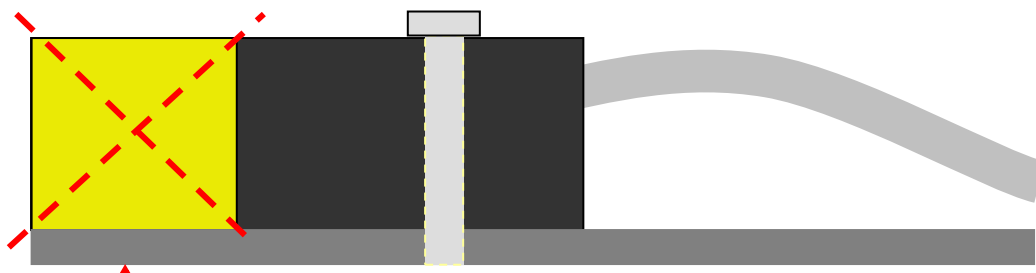
MTP-NT IND-PWR

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)!

Example of mounting



Wrong!!! Mounting (only if metal) plate cover the active area of

IND-Power generator for L, XL, XXL and XXXL Powerhead

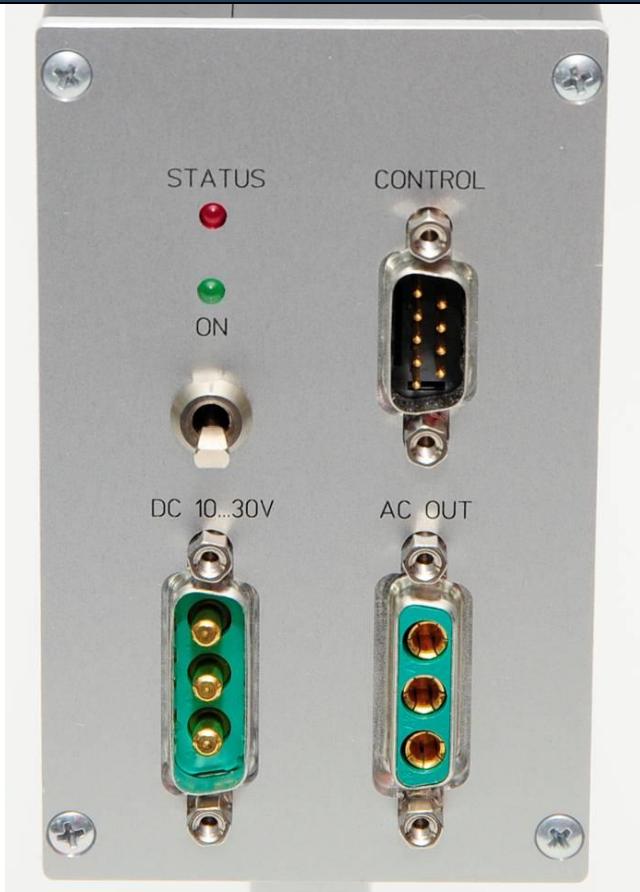
Technical data



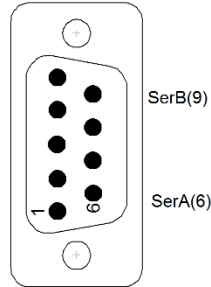
Power output:	AC 25-35kHz for power head L, XL, XXL and XXXL
Power input:	10-30 V DC, typical 24V
Power consumption	<100 Watt, deepens of power head
Dimensions:	205 x 105 x 65mm
Weight:	1.275 kg
Environmental	
Operating:	-20 ... +70°C
Humidity:	20 ... 80% not condensing
Vibration:	5g Mil Standard
Static acceleration:	10g in all directions
Shock:	50g in all directions

MTP-NT IND-PWR-XXL

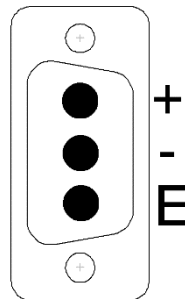
Pin connection



RS 485

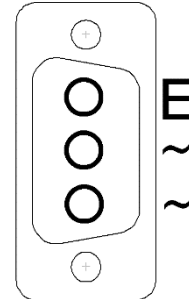


CONTROL - Not used!



DC 10-30V
typical 24V

(up to 100 WATT*)



AC 25-35kHz output
power head

* deepens of power head

E= have no function

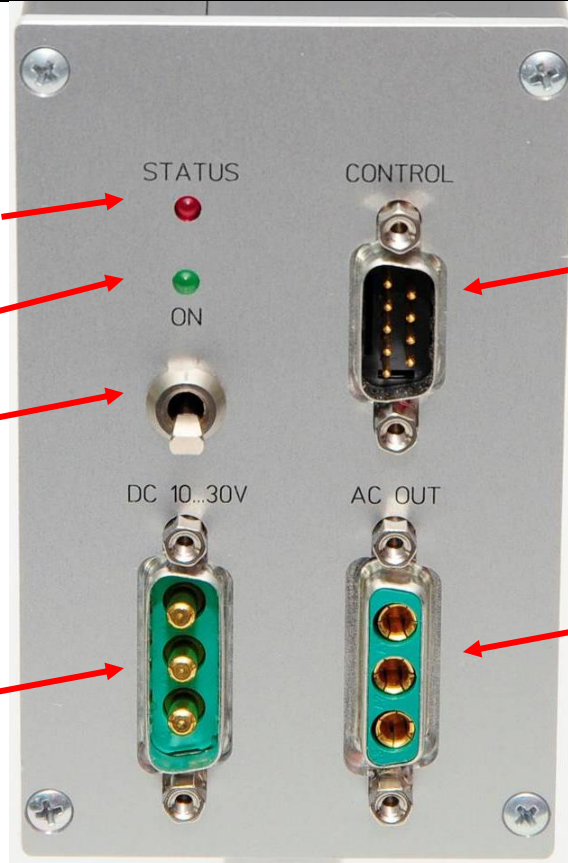
Powering and AC out

LED flashing = auto adjustment
LED ON = finish
ON= Inductive resonance freq.
of power head reached!
Can take up to 20sec.

Power control LED

Power Switch

Power INPUT
DC 10-30V
typical 24V
(up to 100WATT*)



Control out of function

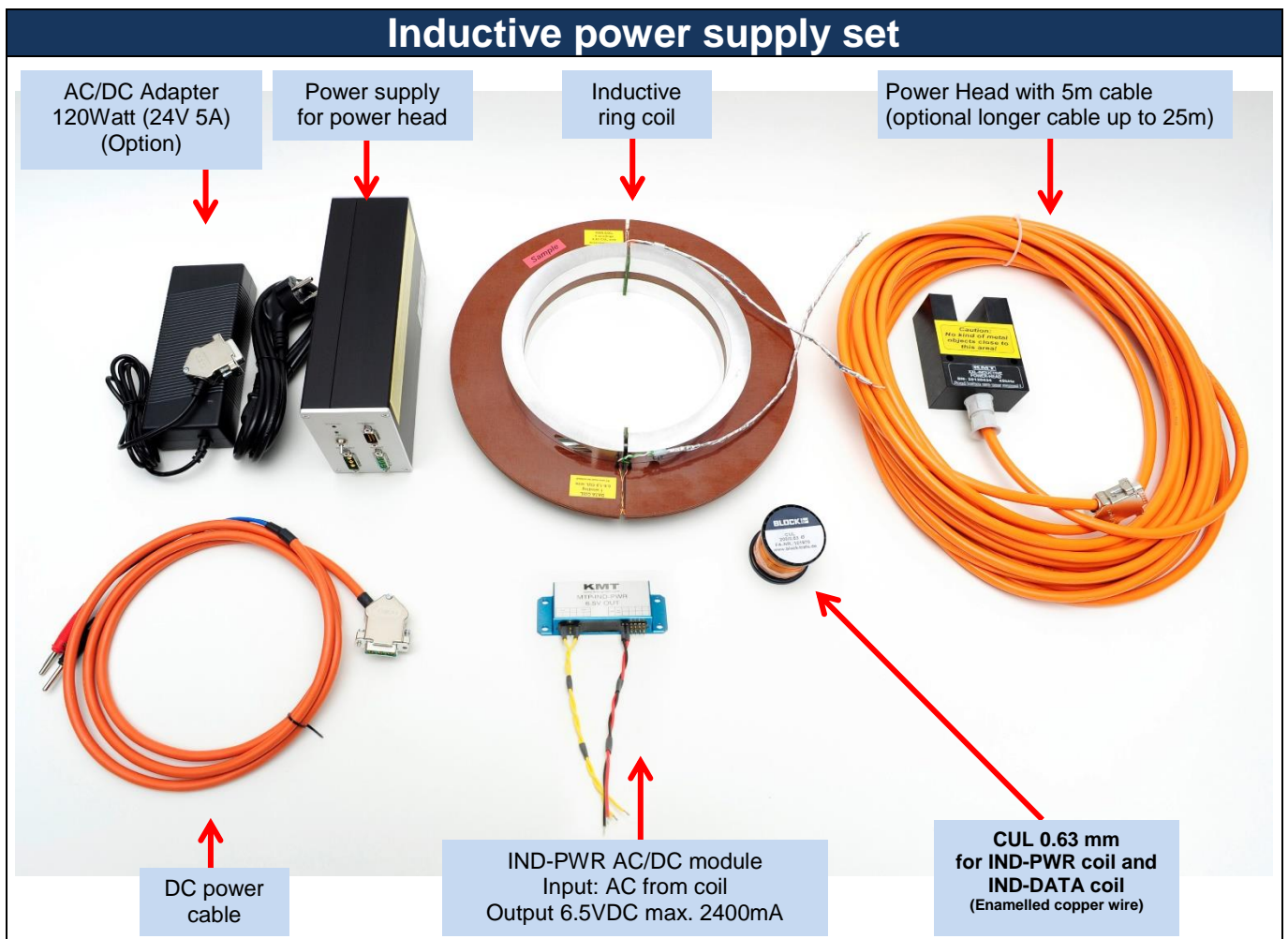
AC 25-35kHz output
for power head

MTP

INDUCTIVE POWER

with RING COIL

User Manual

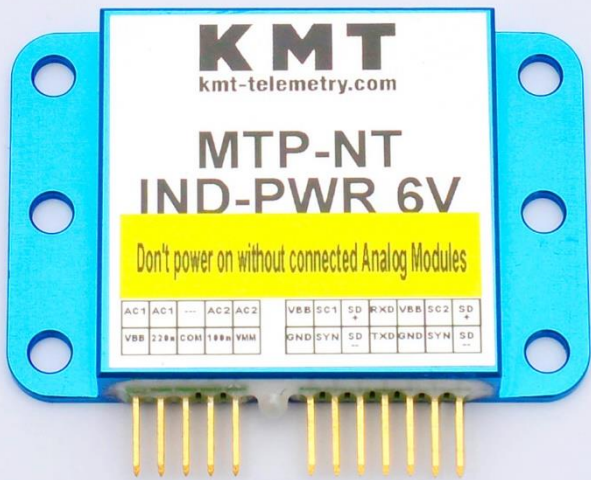


INSTRUCTIONS FOR QUALIFIED PERSONNEL ONLY!

Safety notes for inductive powering

- The device should only be applied by instructed personnel.
- The power head emits strong magnetic radiation at 30-60 kHz to a distance of 300 mm. 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. Also 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 50 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 interferences when used in residential areas or environments. In this case the operator is responsible for establishing protective procedures.

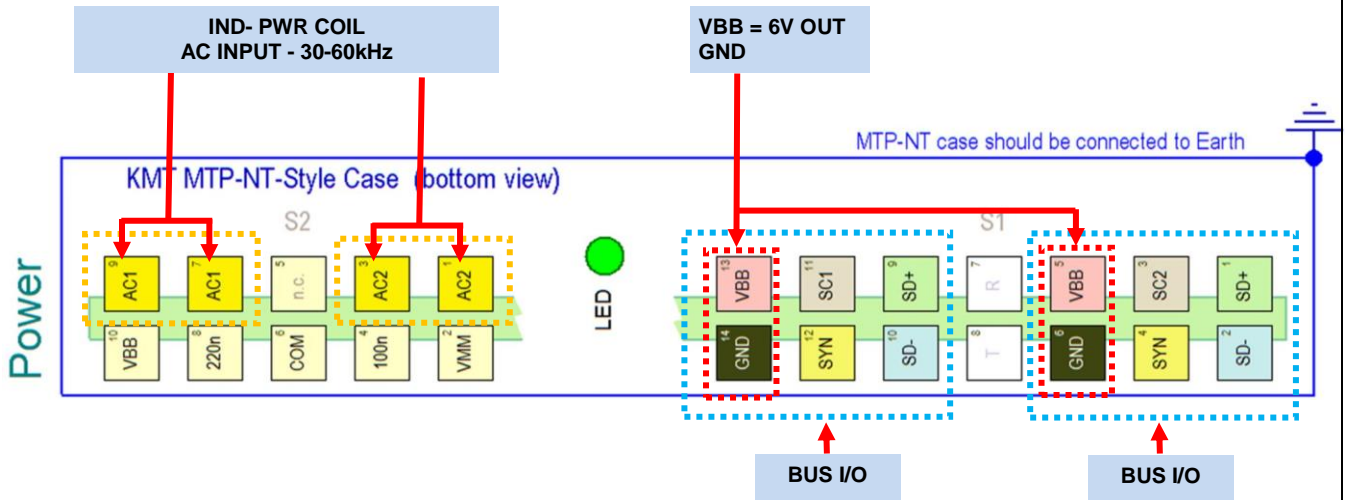
MTP-NT IND-PWR - AC/DC Module for inductive power transmission



MTP-NT IND-PWR 6V
 AC/DC Module for inductive power
 Input: 30-60 kHz 10-40V AC
 Output: 6.1 Vdc
 Current: up to 2400 mA (more on request)
 Weight: 40 grams
 Vibration: 5 g
 Shock: 3000 g

Don't power ON without connected Analog modules like MTP-NT-STG, ICP Otherwise you can damage it!!

Control pin assignment



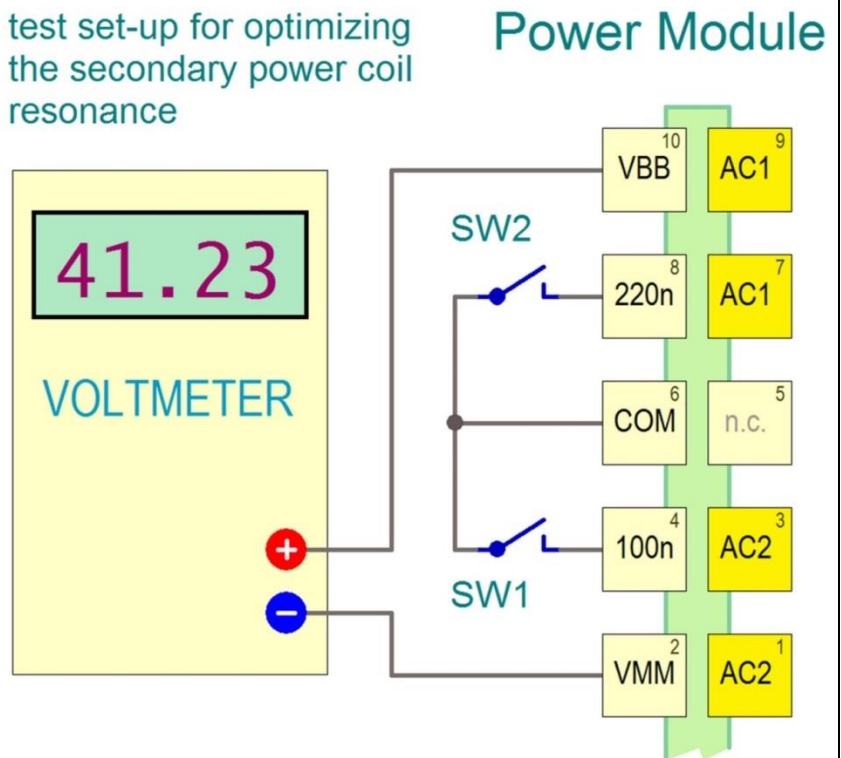
Instructions for adjusting the resonance

The secondary coil for power transmission creates a parallel resonant circuit with a capacitor, which must be tuned to the frequency of the power generator, so that the best possible efficiency is achieved. This (switchable) capacitor is installed in the power module; the capacity is variable between 150 nF and 470 nF. With the "test set-up" (see wiring diagram on the right) you can optimize the resonance.

If the lowest capacitance (both switches open) is still insufficient to provide a good coil-to-powerhead distance, the coil should be experimentally decreased by one turn.

If the largest capacity (both switches closed) is insufficient, the coil should be increased by one turn.

test set-up for optimizing the secondary power coil resonance



Allowed voltage range between VMM and VBB

This voltage is the (rectified) internal operating voltage of the power module.

The **absolute maximum value of this voltage is 60 volts DC**, and under no circumstances should it be exceeded. Therefore, during initial start-up, the power head should not be brought too close to the secondary coil, and then slowly approached to the coil while observing the voltmeter.

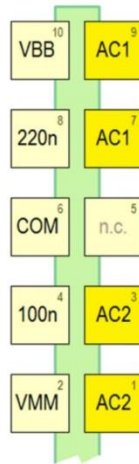
The minimum value is 18 volts DC [TBD]. Below this value, a function of the power module is no longer guaranteed.

The ideal voltage should be in the range of about 25 volts to 40 volts DC.

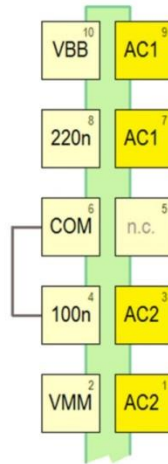
Relationship between switch setting and capacity

Once the optimal capacity has been found, the required connections can be fixed with a three-pin female connector. This socket connector must have solder bridges as shown in the wiring diagram on the right, and must be plugged on the middle three post pins (on the bottom row of posts). A socket connector with high insertion force must be used, so that it can't get loose in operation.

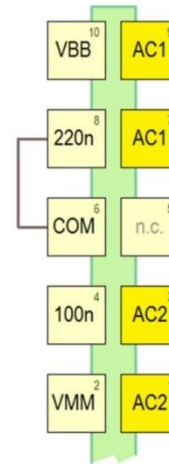
Tuning Capacitor
150nF



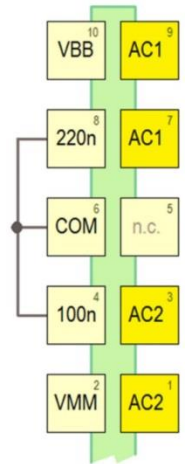
Tuning Capacitor
250nF



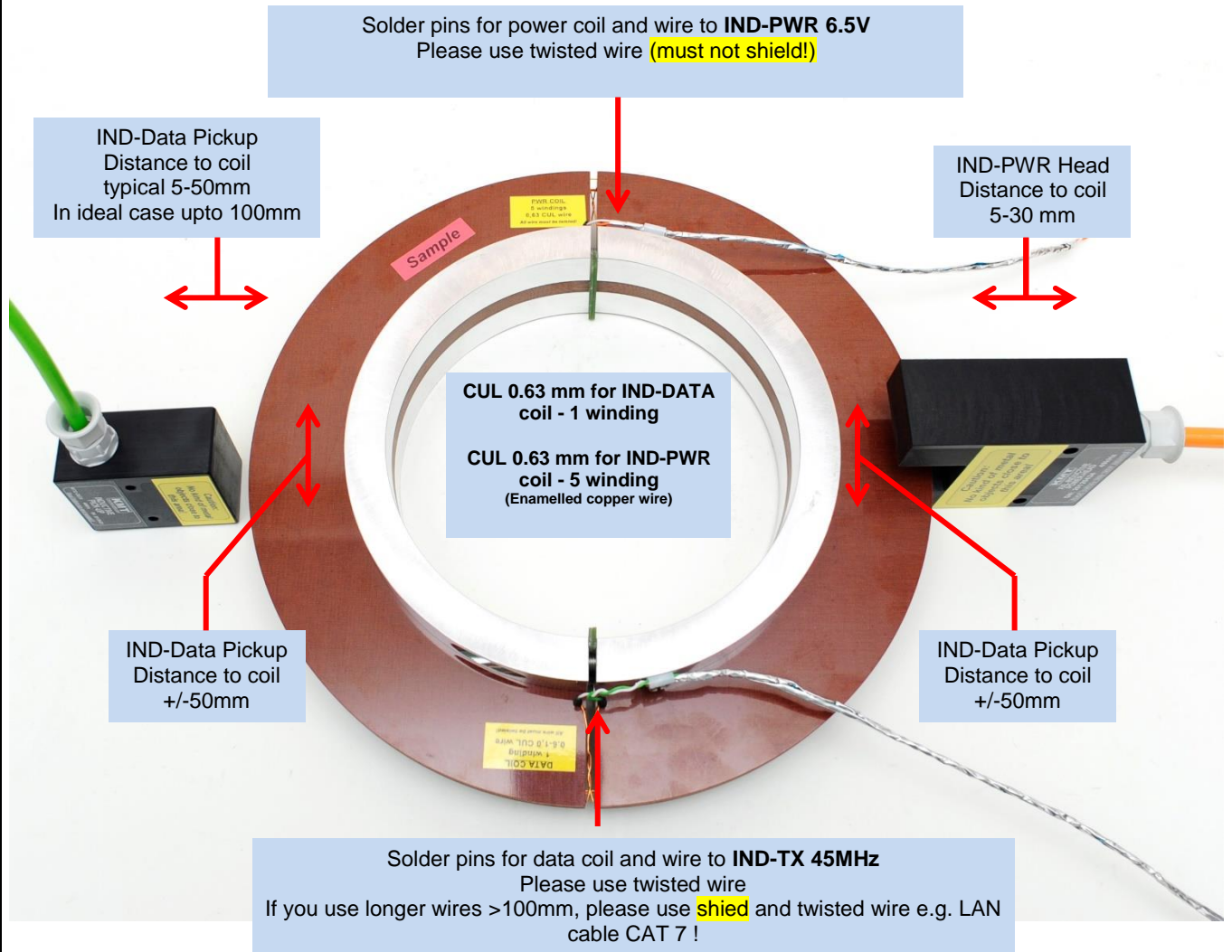
Tuning Capacitor
370nF



Tuning Capacitor
470nF

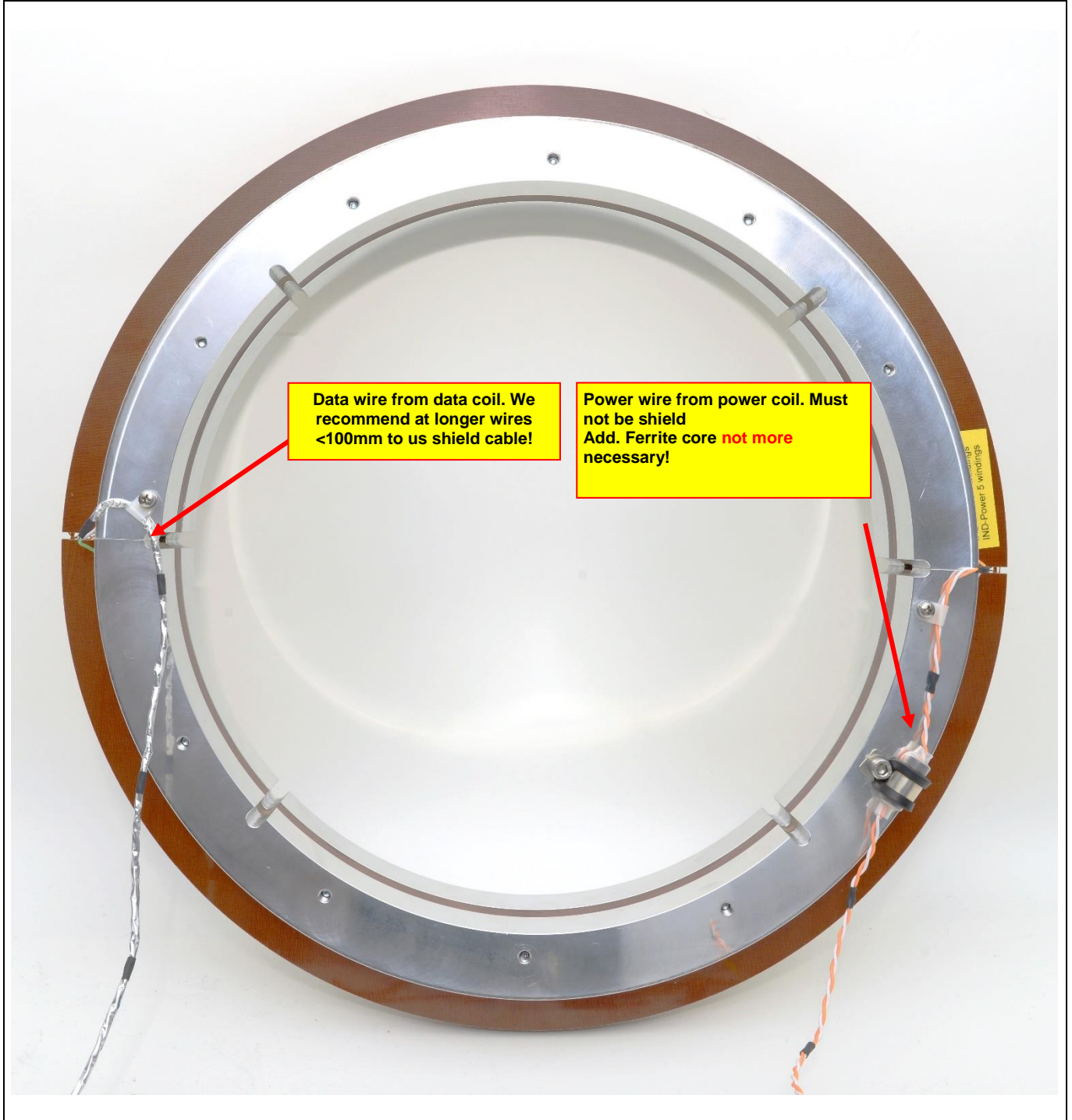


Inductive power supply RING COIL - Distance power head and pickup head

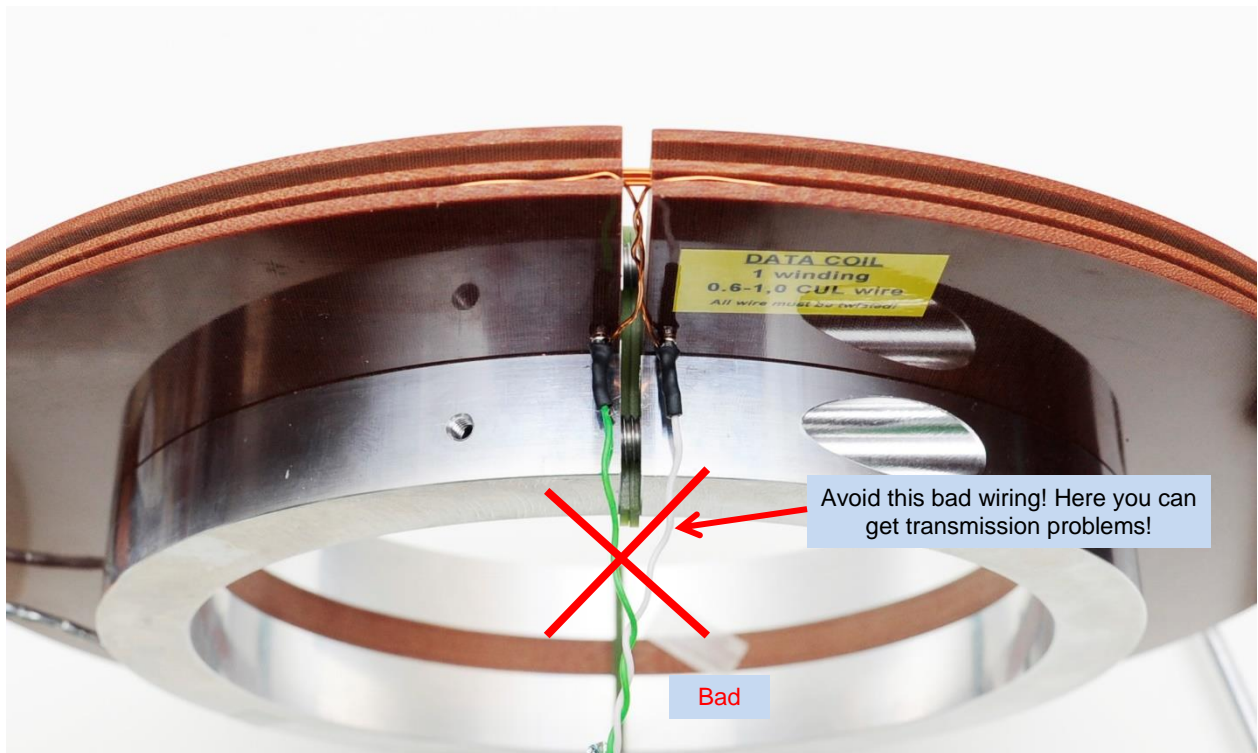
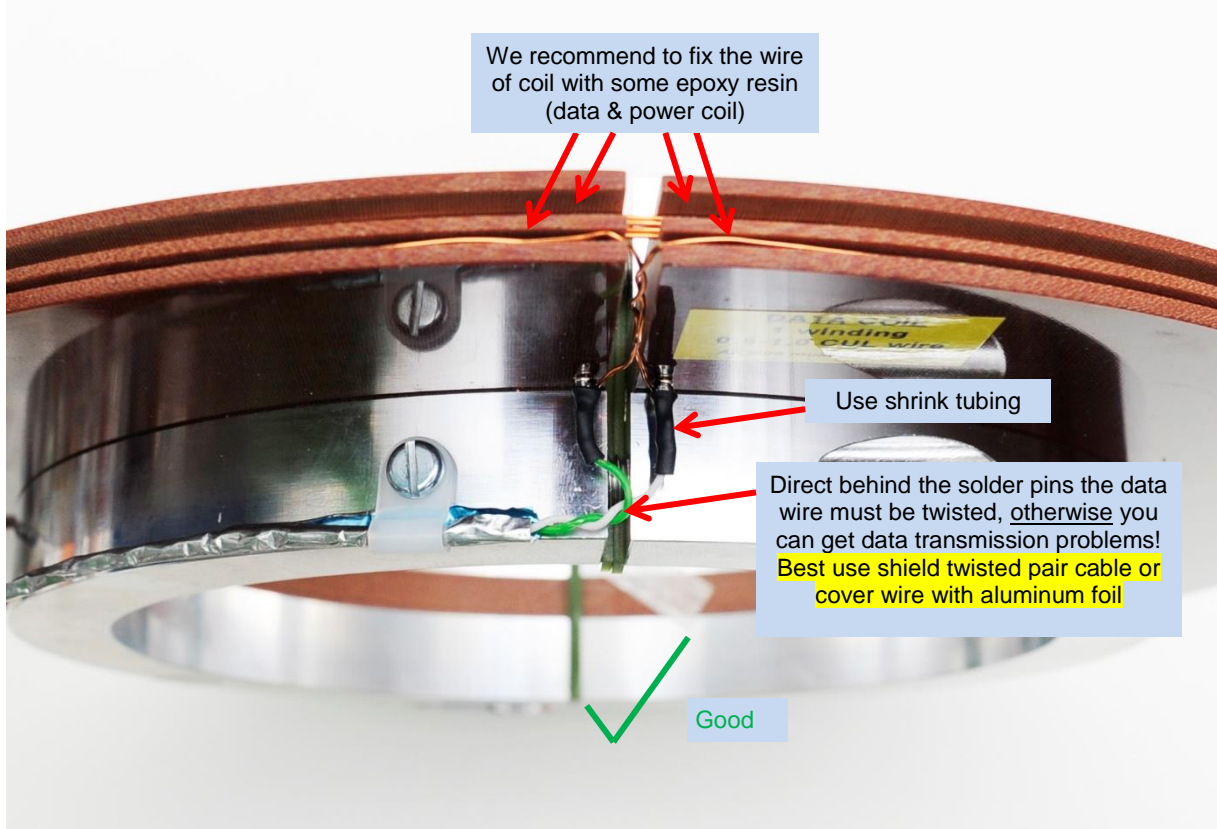


Data cable CAT. 7A S/FTP 4P AWG22 (= solid bare copper wire **0.64mm**-diameter) recommend
or
Data cable CAT. 7 S/FTP 4P AWG23 (= solid bare copper wire 0.55mm-diameter)

RING COIL – uncouple the 45MHz frequency from inductive data coil with ferrite core filter to reach better transmitting range!

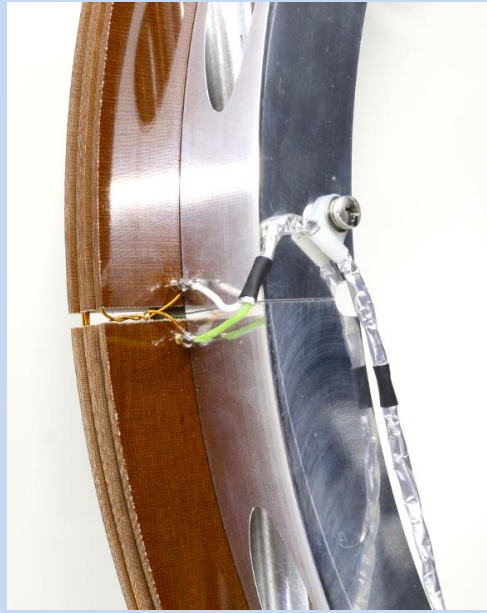


Inductive power supply RING COIL – wire connection



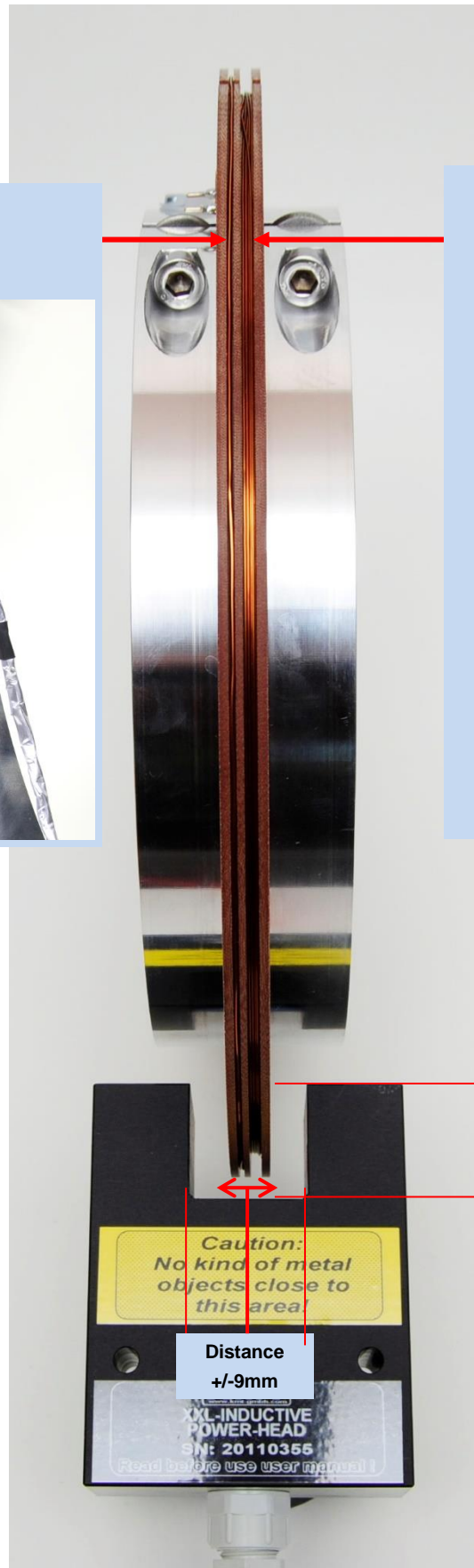
Inductive power supply RING COIL – Distance power head

DATA-COIL
1 winding with
CUL wire 0.63mm
(Enamelled copper wire)



PWR-COIL
5 winding with
CUL wire 0.63mm
(Enamelled copper wire)

Windings depends of diameter!!
See label on RING Coil



Distance 5-30mm

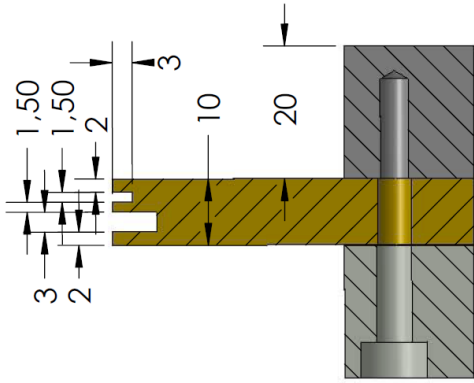
Distance
+/-9mm

Caution:
No kind of metal
objects close to
this area

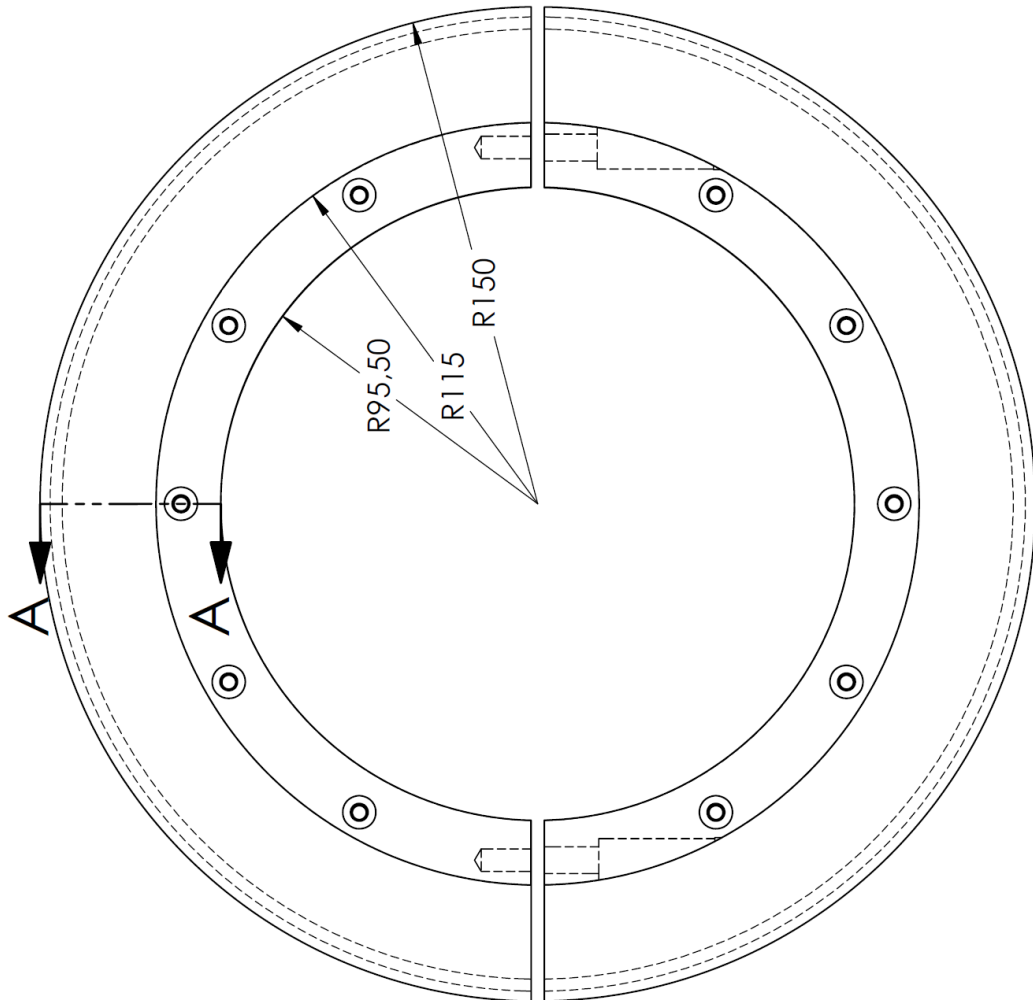
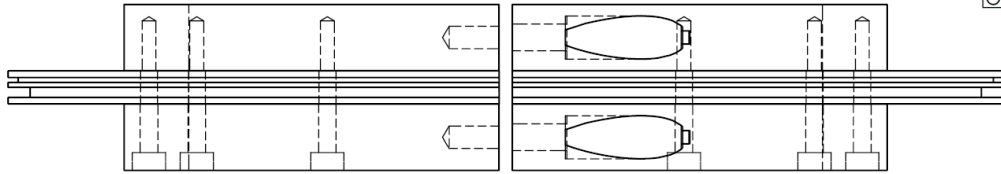
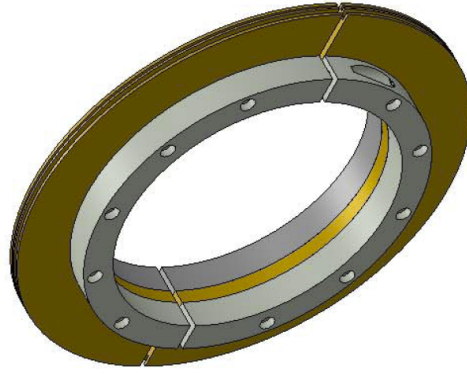
XXL-INDUCTIVE
POWER-HEAD
SN: 20110355
Read before use user manual !

Inductive power supply

Example of a RING COIL with inner diameter 191mm

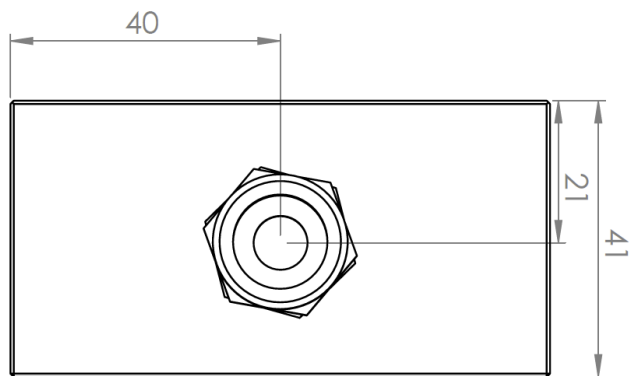
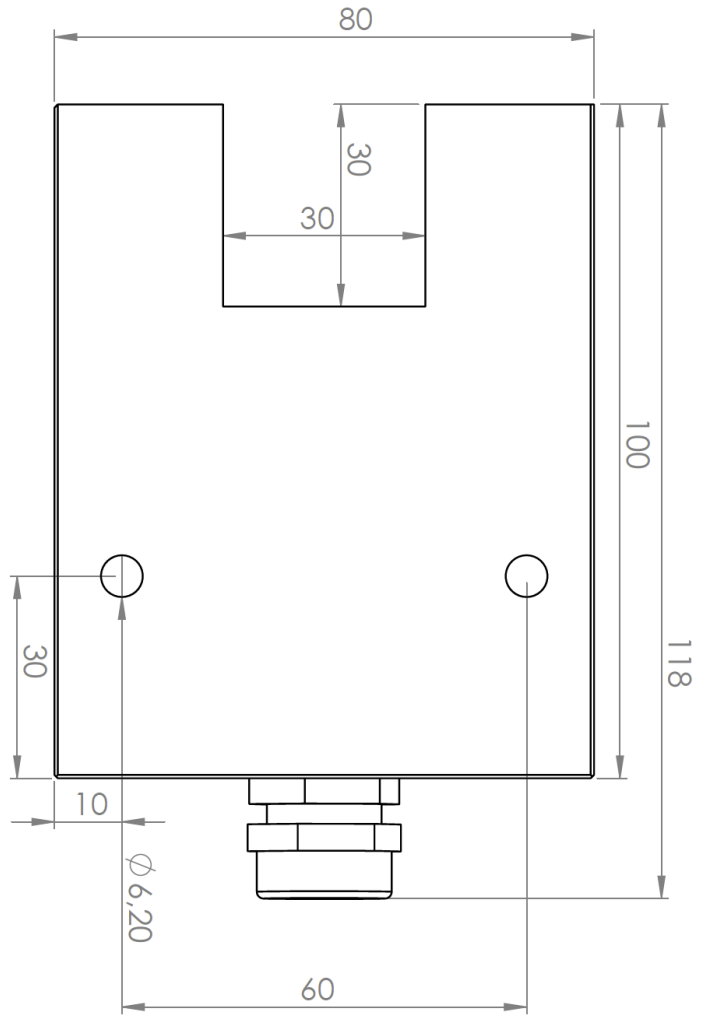
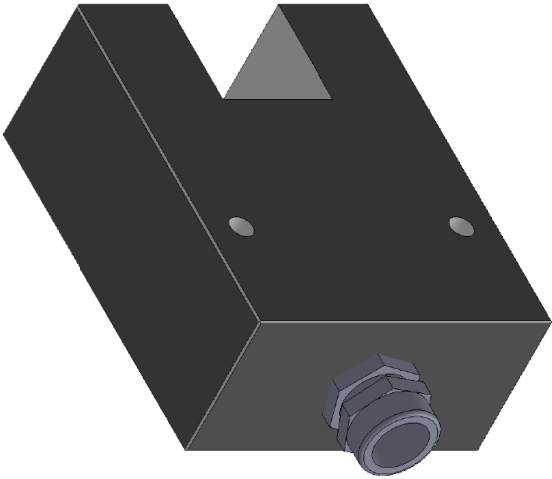



SCHNITT A-A
MAßSTAB 1 : 1



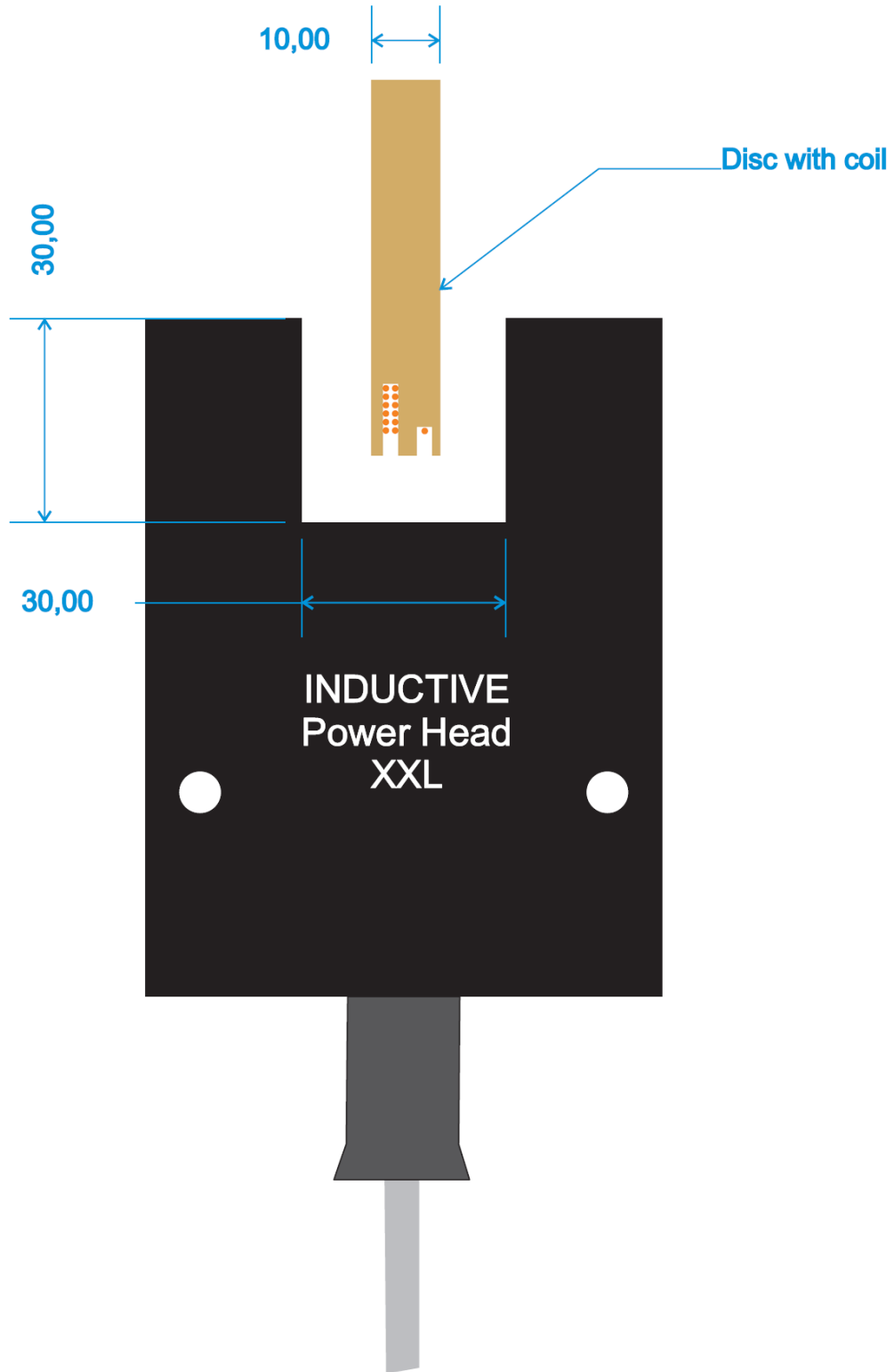
GRÖSSE ZEICHNUNGSNR.	ÄND.
A	Ring191B
MASSTAB: 1:5	BLATT 1 VON 1

Dimensions of IND-PWR-HEAD-XXL



Date	Version	Mat:
10.10.2016		Remarks:
		
BI : A4	Weight-gr: 376.66	Part:
Scale	1:1	PH-XXL-SchlitZ-bg
hu	E-mail: info@kmt-gmbh.com	Tel: 08024-48737, Fax: 08024-5532

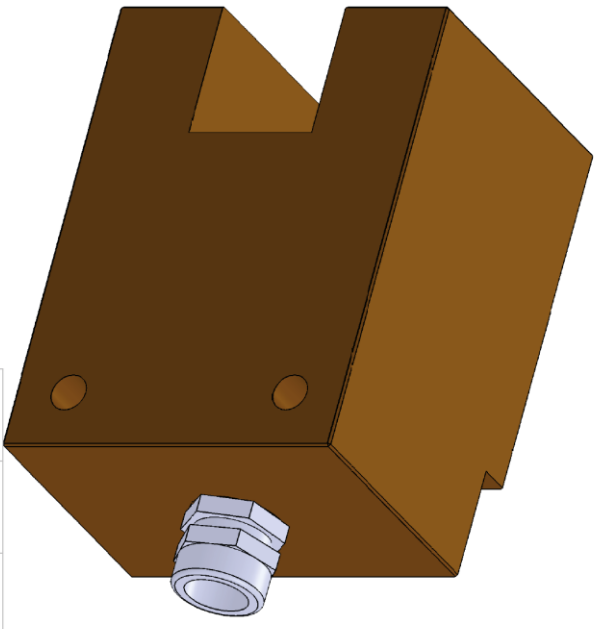
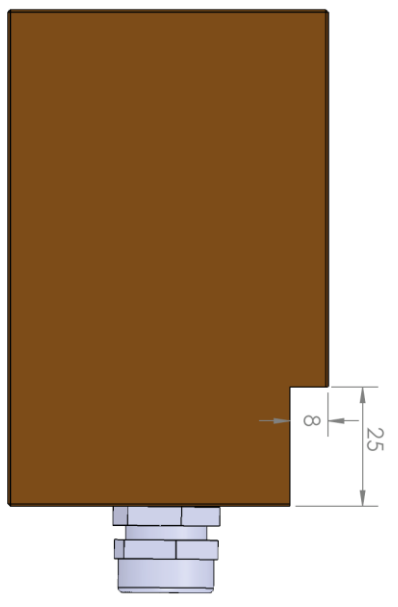
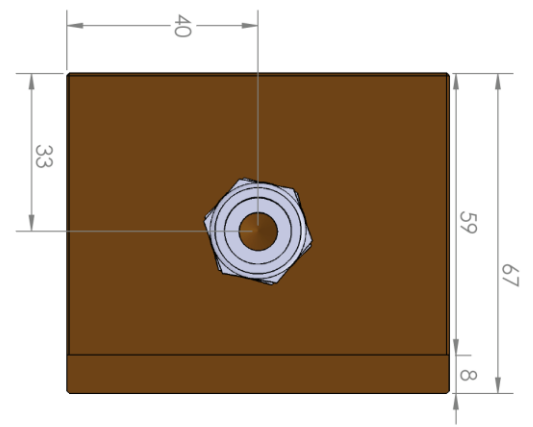
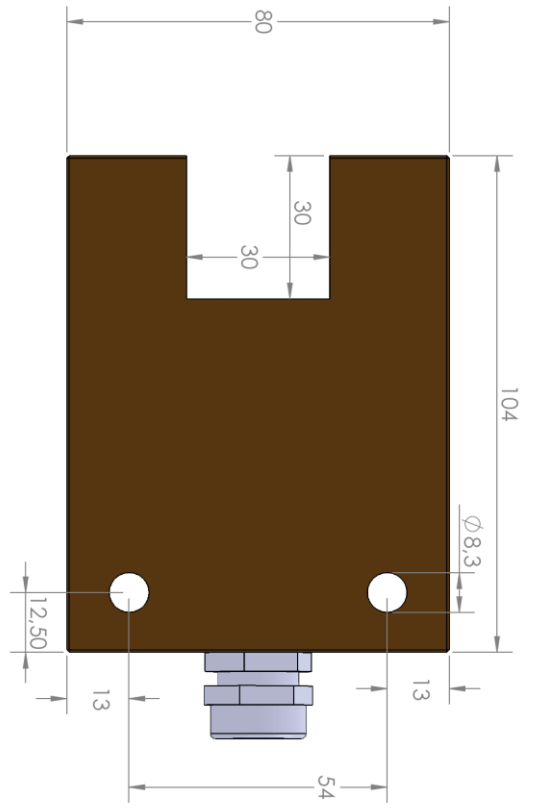
INDUCTIVE POWER HEAD XXL
Coil distances





**Caution for use of power heads!
Cable must unrolled for use, otherwise it will warm up!**

Dimensions of IND-PWR-HEAD-XXXL



Date	Version	Md:	Remarks:
07.09.2016			
Scale Part: 1:1 PU-Pwr-XXXL			
www.kmt-telemetry.com			
hu			
Tel: +46 802448737 Fax: +46 08024-5532			





**Caution for use of power heads!
Cable must unrolled for use, otherwise it will warm up!**