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User Manual

CTP64-Rotate

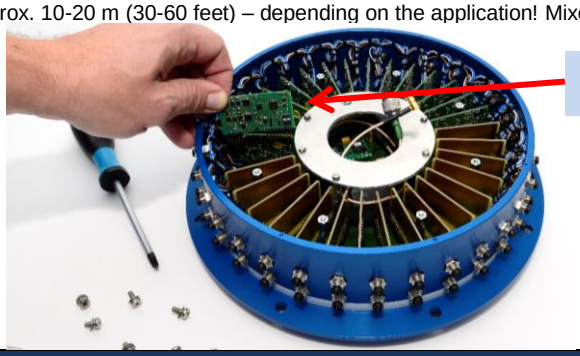
64 channel telemetry for rotating applications like wheels or rotors, high signal bandwidth, 16bit, software programmable

INSTRUCTIONS FOR QUALIFIED PERSONNEL ONLY!

- Inputs for **STG, POT, TH-K, ICP, VOLT ..**
- Simultaneous sampling
- 16 bit resolution
- Software programmable
- Signal bandwidth: 64 x 0-1500Hz
- Battery power up to 3h or inductive
- Radio telemetry transmission
- Output analog +/- 10V
- Digital data interface to PC (option)
- Waterproofed ENC housing (IP65)

General functions:

The CTP64-Rotate is a 64-channel telemetry system for rotating applications with integrated signal conditioning for sensor signals, wireless digital transmission and analog reproduction.
In the encoder/transmitter unit the sensor signals are conditioned, filtered (anti-aliasing) and digitized (16-bit). Simultaneous sampling is provided for all channels. Finally, the PCM encoded data is transmitted via radio frequencies to the receiver.
Various configurations of different sensor modules are available incl. signal conditioning for strain gages (STG), thermocouples type K (TH-K), ICP sensors, potentiometer sensors (POT) and also voltage inputs. Mixed configuration available (2-CH-steps).
All sensor modules are software programmable via LAN-Adapter. The LAN-Adapter has an integrated web interface and enables easy access!
The stationary receiver provides 64 +/-10V analog outputs via Sub-D male socket (option: digital PC interface).
The analog signal bandwidth is 0-190 Hz (320kbit) and up to 0-1500Hz (5000kbit) for 64 channels. The measurement accuracy is <±0.2 % (without sensor). The CTP64-Rotate is specified for operational temperatures from -20° C to +70° C. The maximum distance between transmitter and receiving antenna is approx. 10-20 m (30-60 feet) – depending on the application! Mixed configuration available (2-CH-steps).



Specify CTP-acquisition modules at order!!

Frequency table	Cut off frequency from anti-aliasing filter (-3dB) and sampling rate (see red)
Bit rate	**64 CH.**
5000kbit	1500 Hz (3906.25 Hz)
2500kbit	750 Hz (1953.125 Hz)
1250kbit	375 Hz (976.56 Hz)
625kibt	190 Hz (488.28 Hz)
312.5kbit	95 Hz (244.14 Hz)

CAR wheel	Truck wheel	Helicopter rotor
		

CTP64-Rotate Transmitting Unit Technical Data (Encoder)

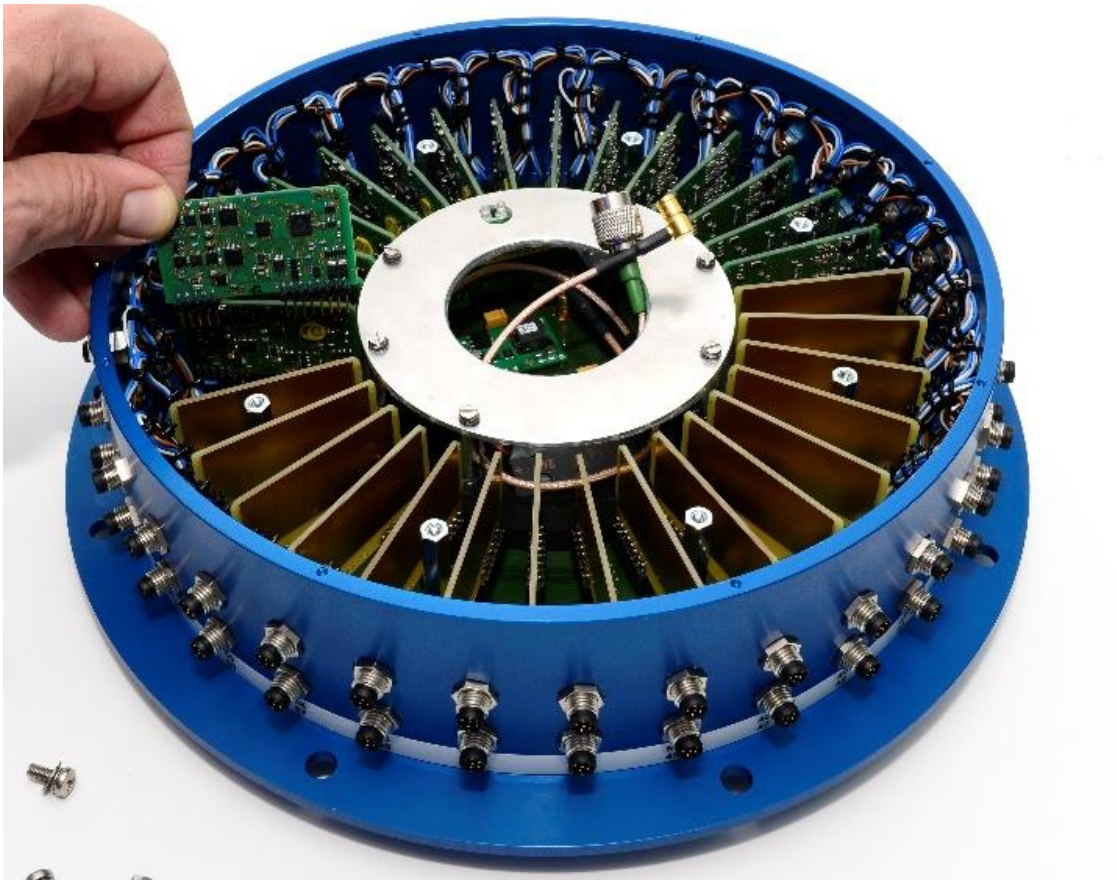
Encoder in IP65 Aluminum housing	Encoder inside

System Parameters ENCODER:

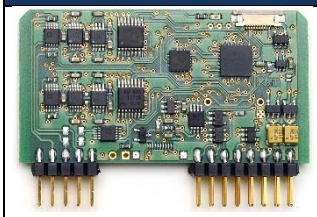
Channels:	64
Resolution:	16 bit A/D converter with anti-aliasing filter, simultaneous sampling of all channels
Line-of-sight distance:	up to 20m (depends of application and bit rate)
Powering:	Li-Ion battery 7.4V, 7800mA capacity up to 3 hours or option inductive
Power consumption:	about 2400mA using 64x STG full bridge sensors 350 Ohms
Analog signal bandwidth:	See table
Transmission:	Digital PCM Miller format - FSK
Transmission Power:	10mW
Opt. COM with remote radio	Optional Bluetooth remote access for setup CTP-modules under running system!
Dimensions:	Diameter 260mm, bottom plate diameter 300mm, height 77mm (without antenna), 160 with antenna!
Weight:	3.20 kg with external power or about 4 kg with battery power (without sensor cables)
Operating temperature:	- 20 … +70°C
Housing:	Aluminum anodized, waterproofed (IP65)
Humidity:	20 ... 80% no condensing
Vibration:	5g Mil Standard 810C, Curve C
Static acceleration:	100g in all directions, **1000 RPM**
Shock:	200g in all directions

Technical specifications are subject to change without notice!

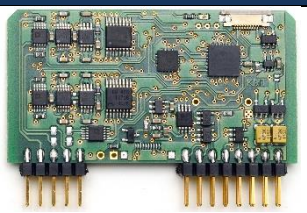
CTP64-Rotate Transmitting Unit Technical Data (Encoder)



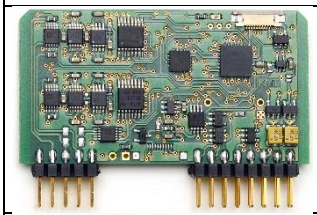
CTP acquisition modules (rotor side)



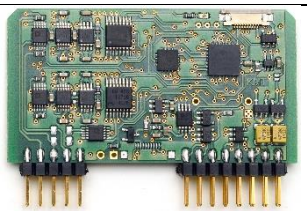
CTP-STG-V3
Acquisition module for 2 strain gages
Full, half and quarter bridge (≥350Ω)
Fixed excitation 4V DC
Offset calibration by auto zero
Manual offset shifting after auto zero
Gain: 125-250-500-1000-2000
Test shunt-cal step
Signal bandwidth 0Hz to 1500Hz*
(*see table of cut-off-frequency)
Resolution 16bit
Accuracy <0.2%
Current consumption with full bridge 350 ohm 75mA



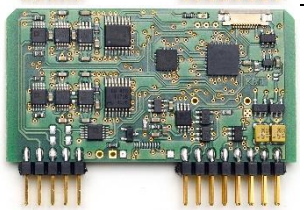
CTP-VOLT-V3
Acquisition module for 2x high level inputs
Range: ±0,625V, ± 1,25V, ±2,5V, ± 5V, ±10V
Signal bandwidth 0Hz to 1500Hz*
(*see table of cut-off-frequency)
Resolution 16bit
Accuracy <0.2%
Current consumption 60mA



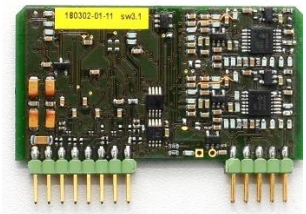
CTP-ICP®-V3
Acquisition module for 2 ICP sensors
Current EXC. 4mA, 28V
Gain: 1-2-4-8-16-32
Signal bandwidth 3 Hz to 1500Hz*
(*see table of cut-off-frequency)
Resolution 16bit
Accuracy <0.2%
Current consumption 100mA



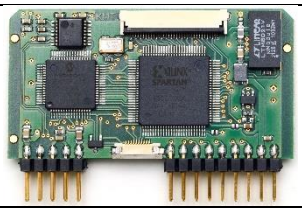
CTP-TH-K-V3
Acquisition module for 2x TH-K
Inputs galvanic isolated
Range -50 to 1000°C, -50 to 500°C
or -50 to 250°C
Cut-off filter 30Hz (more on request)
Resolution 16bit
Accuracy: 0.2% at 1000°C range
Current consumption 110mA



CTP-Pt100/1000 (RTD) V3
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. 1mA
Connection: 4-, 3- and 2 wire
Sensor break detection
Signal bandwidth 6Hz
Resolution 16bit
Accuracy <0.2%
Current consumption 60mA



CTP-LVDT-RVDT V3
Acquisition module for 2 LVDT
Fixed excitation 3Veff
Signal bandwidth 0Hz to 20Hz*
Resolution 16bit
Accuracy <0.2%
Powering: 6.5-9V DC
Current consumption 70mA
Vibration: 5g
Static acceleration: 3000g
Shock: 10000g



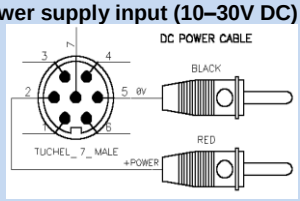
CTP-CONTROL-V3
Controller 1- 32 acquisition modules
Output: PCM
Programmable via LAN adapter
Current consumption 40mA, with LAN-adapter 140mA

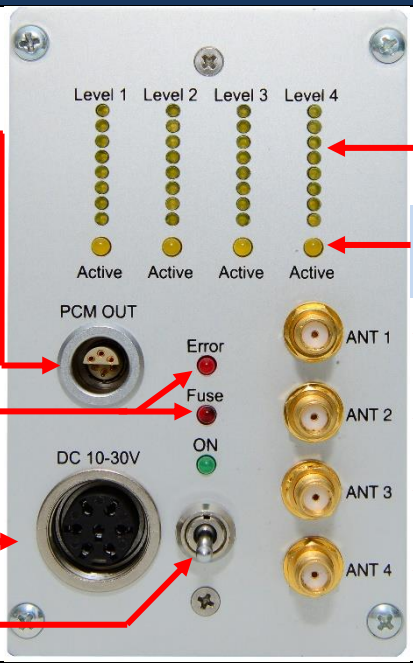
CTP-DEC HF-Receiver unit with external digital IP LAN interface (radio transmission version with HF BOX Quad with 4 receiver 1250-5000kbit)

PCM OUT
Pin 1 -----
Pin 2 = PCM + (pink wire)
Pin 3 = PCM -- (blue wire)
Pin 4/5 = common GND & shield (black/green)
Pin 6 -----

Transmission error LED
Fuse of powering defect LED

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





4x HF Level display

Active DATA LED, up to 2 receivers can be active! If a fault data is identified, it will switch automatically to a valid data from other receiver

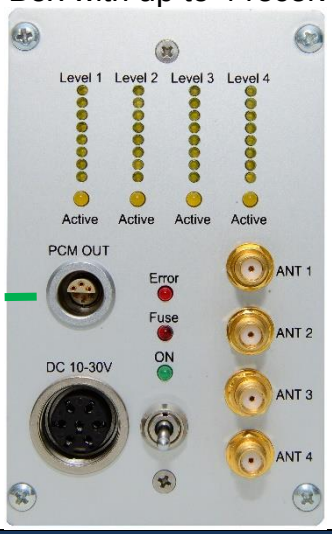
4x SMA inputs for RX antenna

Power Switch

IP LAN Interface

PCM/ DATA cable Length 0,5m standard (up to 25m on request)

HF-Box with up to 4 receivers



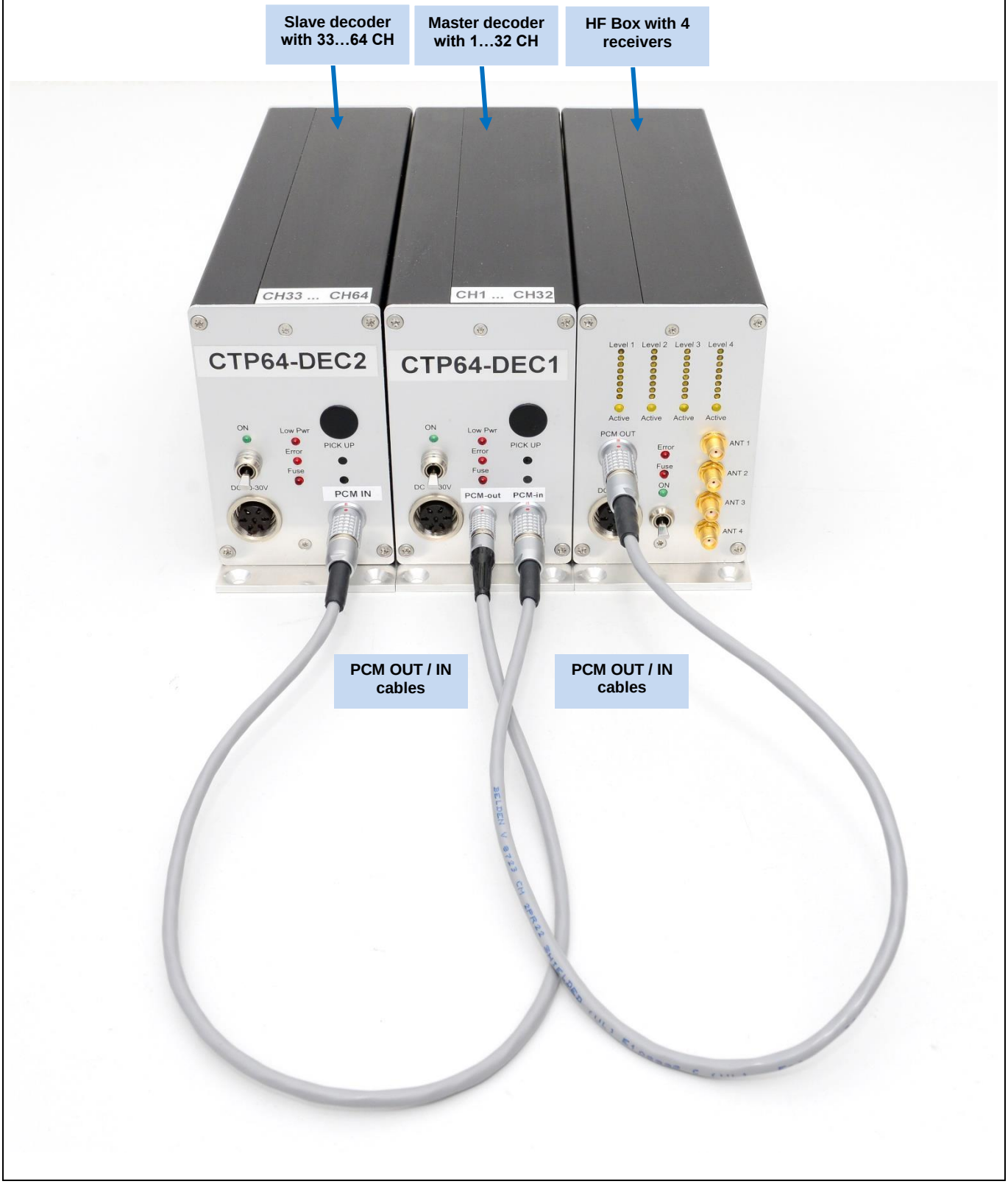
HF BOX Quad System Parameters:

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

SET of CTP64-Rotate
SET (without Yagi receiving antennas)

Set of CTP-Digital-decoder with accessories (static part)

Set of CTP-Analog-decoder with HF-Box (static part)



Set of CTP64-Rotate Encoder with accessories (static part)

CTP-ENCODER (rotating part with remote COM box)

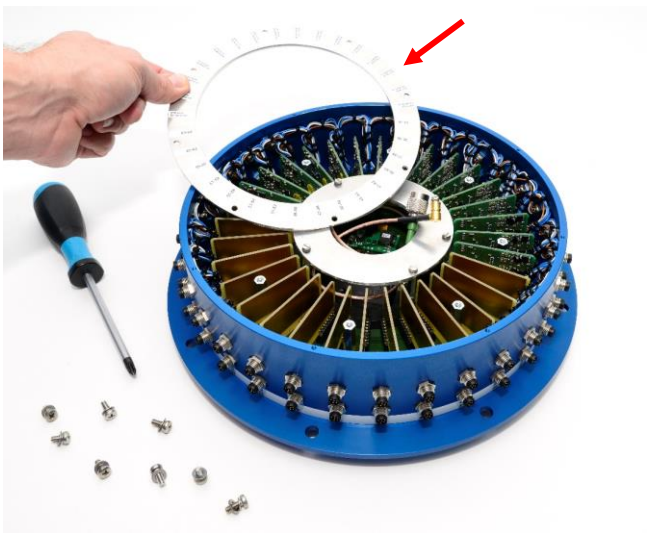
CTP64-Rotate Encoder – How to open device – Normal not necessary, only if you must change modules!

1. Open hexagon screw (2.5mm) with 2mm screw driver

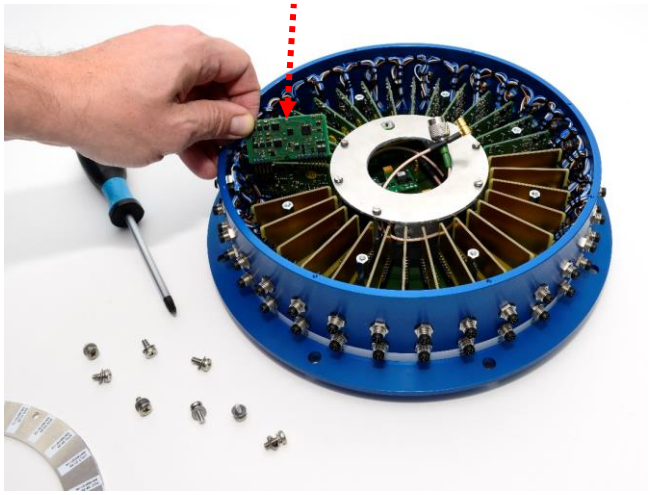
2. Use cover lifter to open the cover carefully

3. Disconnect remote and transmitting antenna carefully!

4. Open 8 screws from modules holder ring



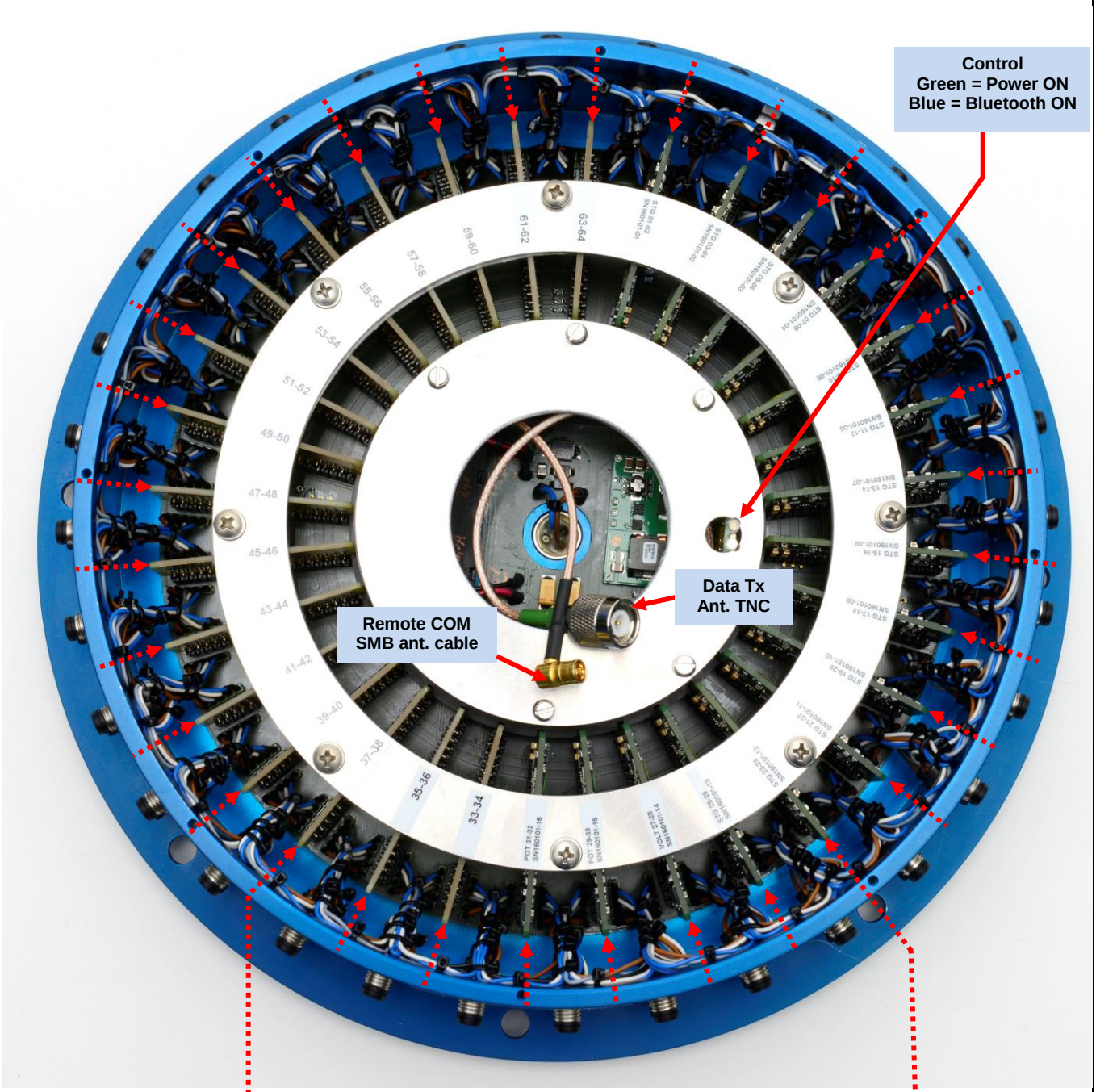
5. Remove holder ring



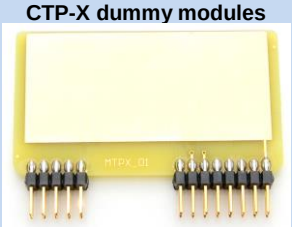
6. Now you can change CTP-Acquisition modules

Take care with connectors of modules. Be sure that all pins are in right in the connection!

CTP64-Rotate Encoder – Modules



CTP-X dummy modules

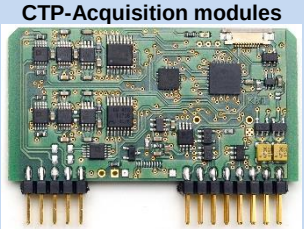


CH 33-64

CTP-X connect the data bus on the motherboard to the next module!

Caution: Avoid an empty slot on the motherboard, otherwise the data bus is interrupted!

CTP-Acquisition modules

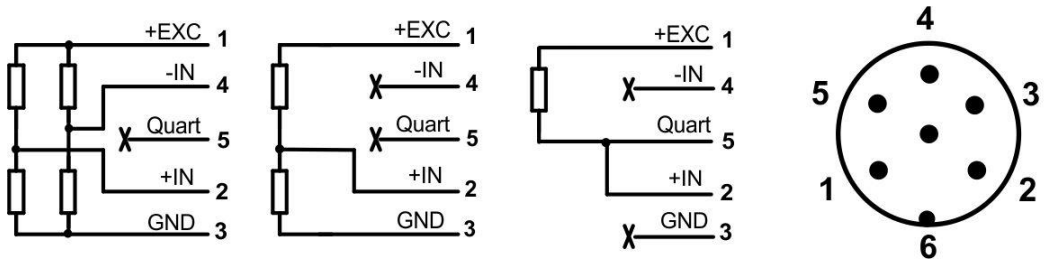


CH 1-32

CTP64-Rotate Encoder – Pin connection

CTP64-Rotate Encoder – Pin connection

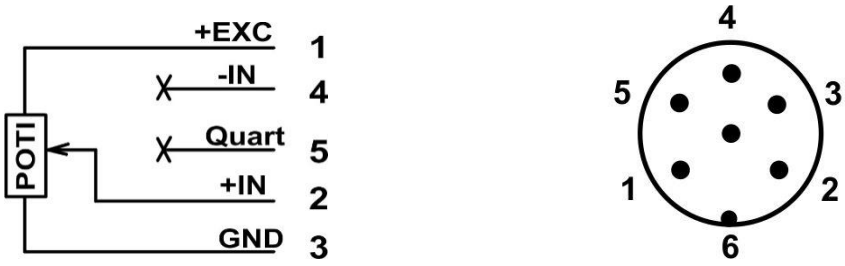
Strain gage connection



Cable colors:

1= brown / +EXC
2= white / +IN
3= blue / -EXC
4= black / -IN
5= grey / Quart
6= pink / -----

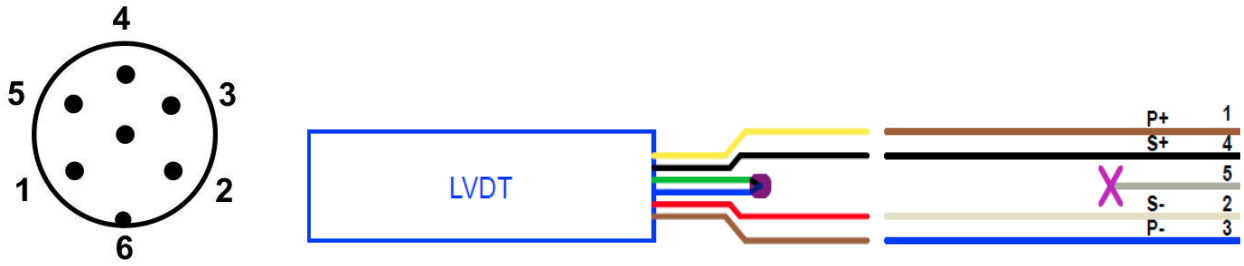
Potentiometer



Cable colors:

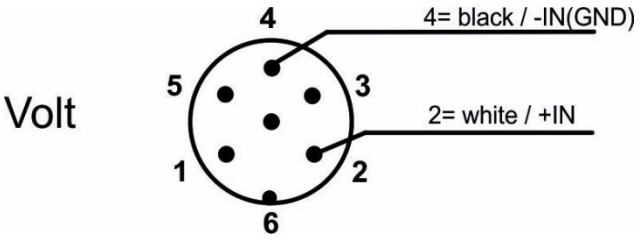
1= brown / +EXC
2= white / +IN
3= blue / -EXC
4= black / -IN
5= grey / Quart
6= pink / -----

LVDT / RVDT

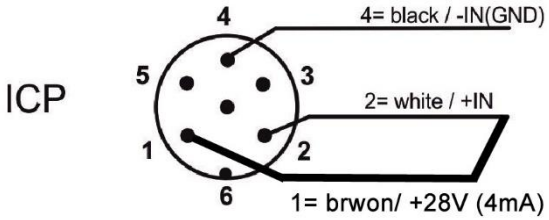


Yellow -> Brown (P+) 1
Black ->Black (S+) 4
Green+Blue (shortcut)
Red ->White (S-) 2
Brown -> Blue (P-) 3

VOLT connection

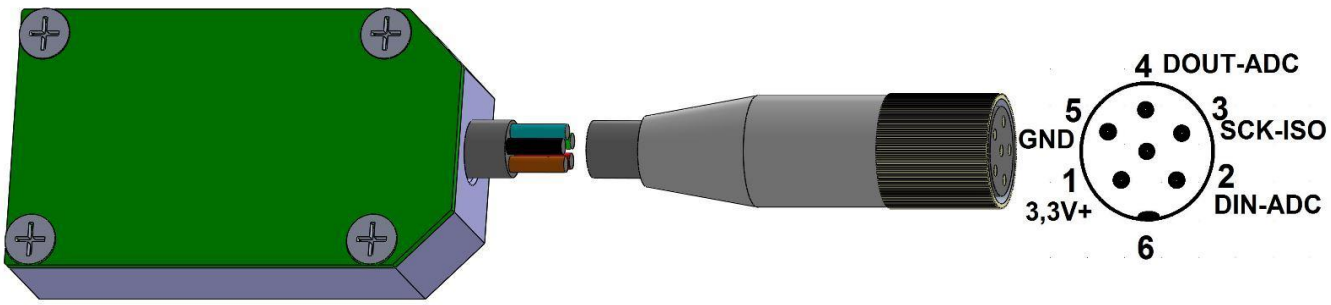


ICP connection



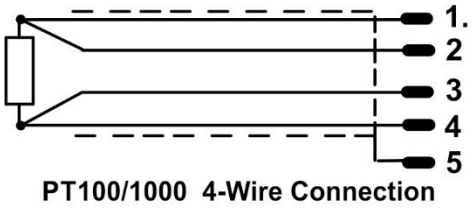
Pin 1+2 must connect together for ICP powering!

Th-K connection

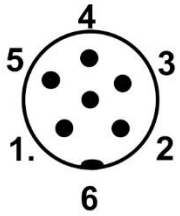


CTP64-Rotate Encoder – Pin connection

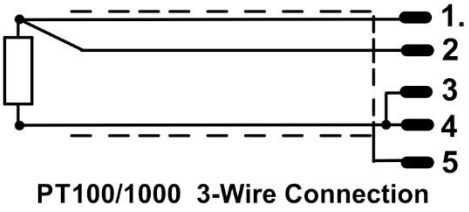
Pt100/1000



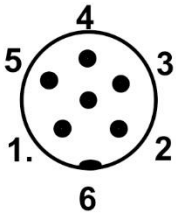
PT100/1000 4-Wire Connection



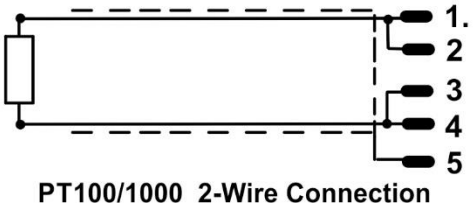
1= brown / +EXC
2= white / +IN
3= blue / -EXC
4= black / -IN
5= grey / Shield
6= pink / NU



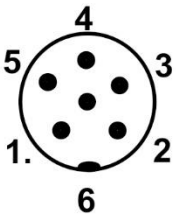
PT100/1000 3-Wire Connection



1= brown / +EXC
2= white / +IN
3= blue / -EXC
4= black / -IN
5= grey / Shield
6= pink / NU

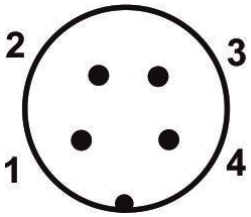


PT100/1000 2-Wire Connection



1= brown / +EXC
2= white / +IN
3= blue / -EXC
4= black / -IN
5= grey / Shield
6= pink / NU

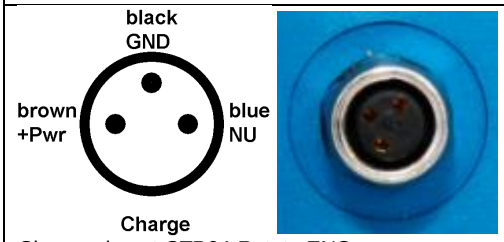
Setup LAN connection



Cable colors:

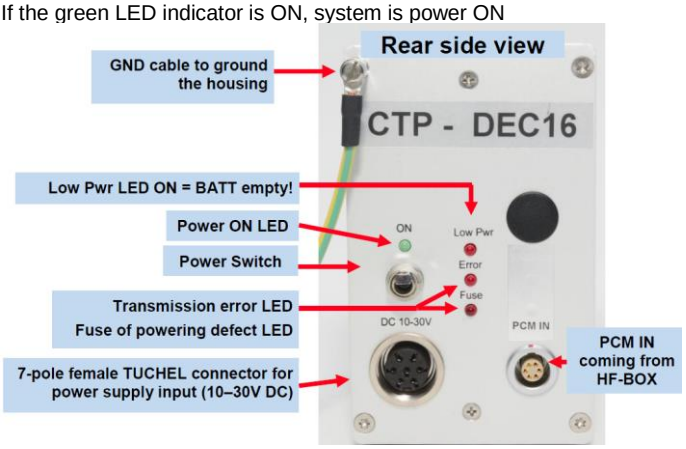
1= brown / +6,5V
2= black / RX
3= white / TX
4= blue / -----

Li Ion re-chargeable battery with charger unit for CTP16-Rotate – Version 2018



Charge plug at CTP64-Rotate ENC

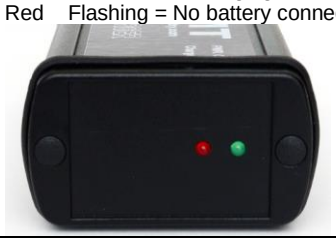
Attention:
Li Ion Accumulator 7.2V 7800mAh has a capacity for about 3-4.
If the green LED indicator is ON, system is power ON



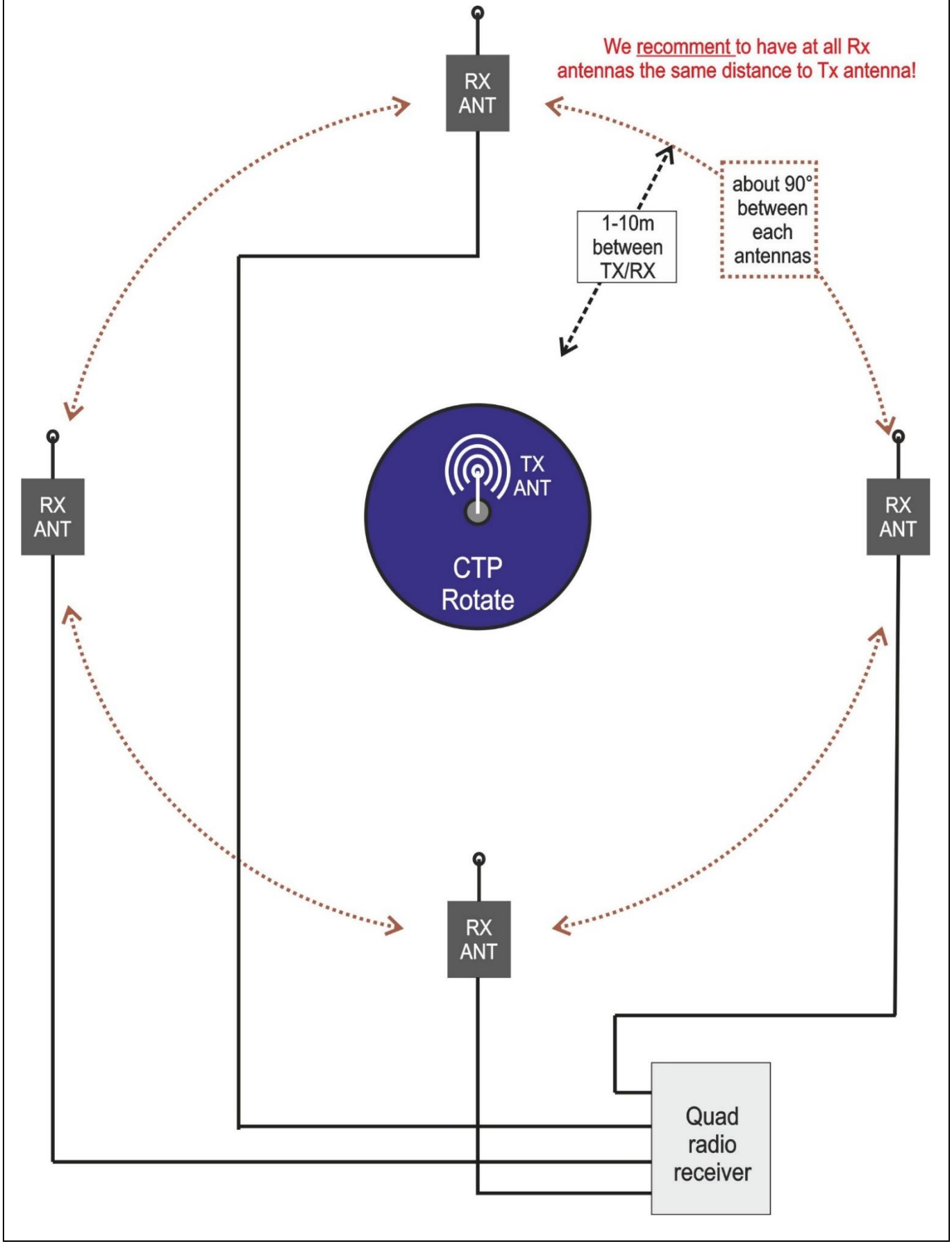
If the red LED indicator is ON, battery is about 90% discharged and the device will switch off after 20-30 minutes!

CT-CHARGER XL for CTP-Rotate

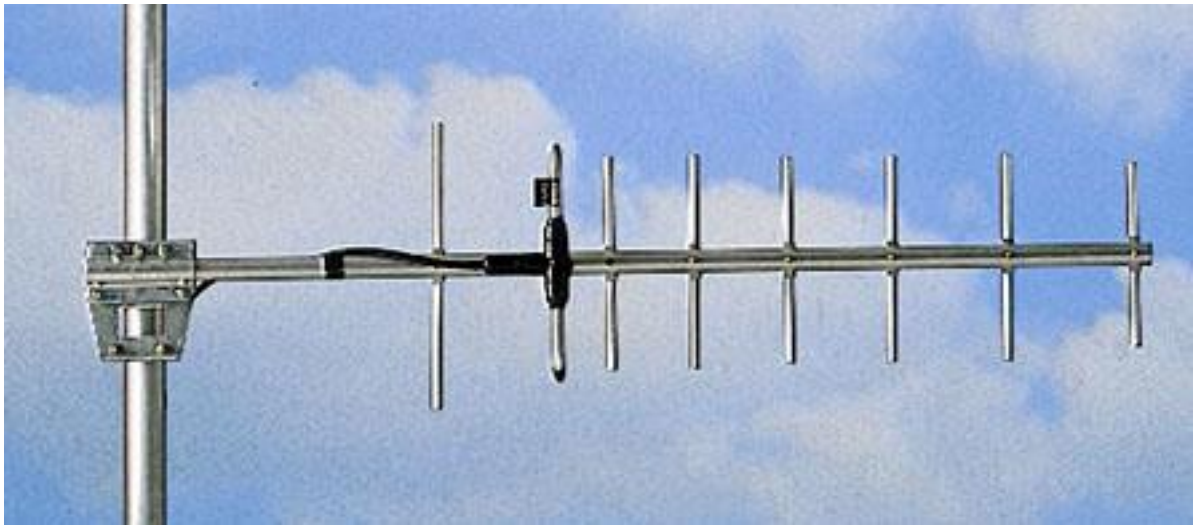
1. Plug the 3-pole socket (charger) in to the CTP-Rotate encoder.
   Switch off the CTP Rotate while charging the battery!
2. Plug banana plugs on to a battery or AC/DC power supply with a voltage range of **20-30V, 50 WATT**
3. Battery begins to charge until the red LED of OFF
   Green ON = Power ON
   Red ON = Charging
   Red OFF = No charging or finish charging
   Red Flashing = No battery connected



Recommend position of receiving standard magnetic foot antennas



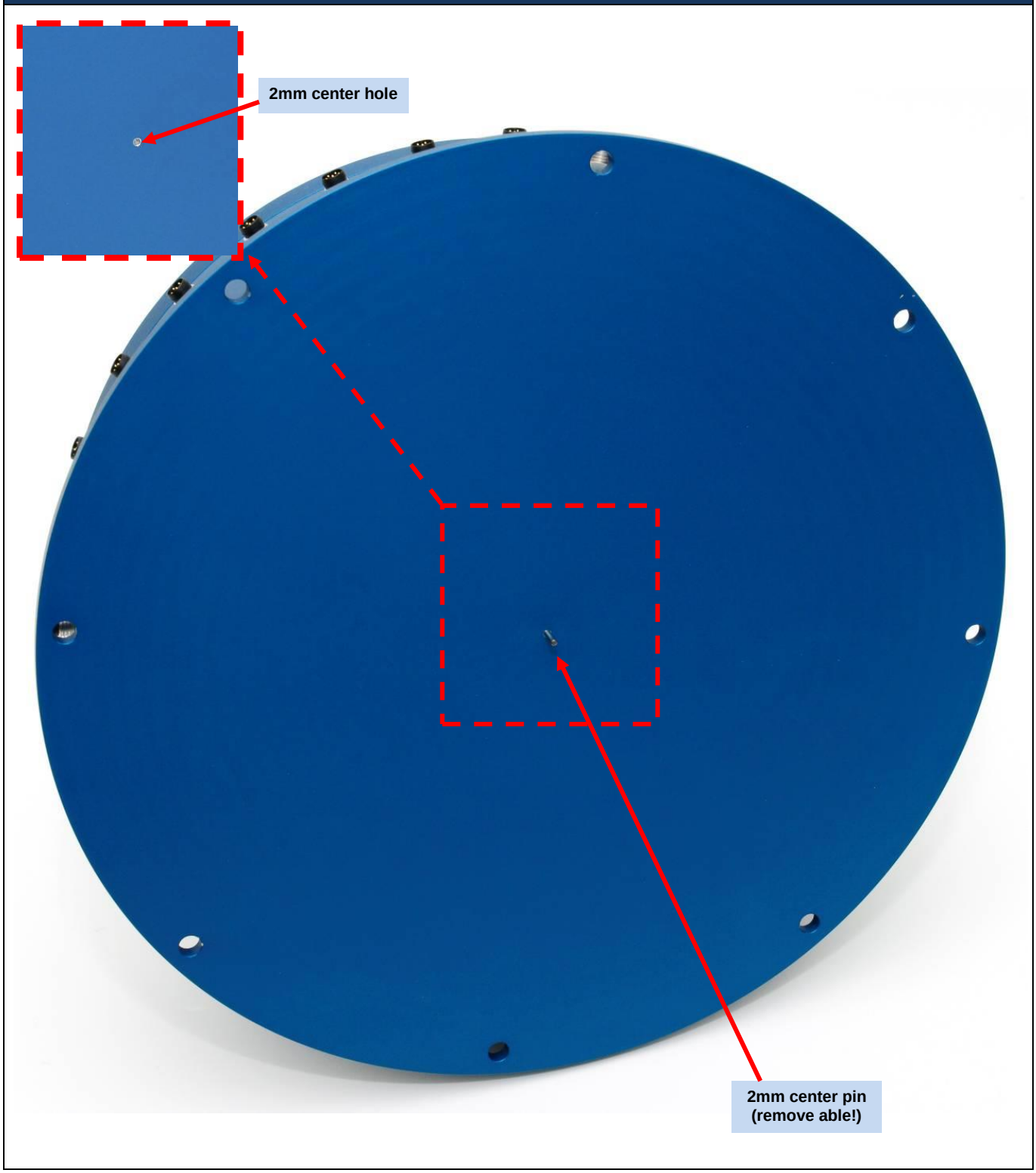
Special Yagi antenna polarization:



Vertical!

NOT horizontal

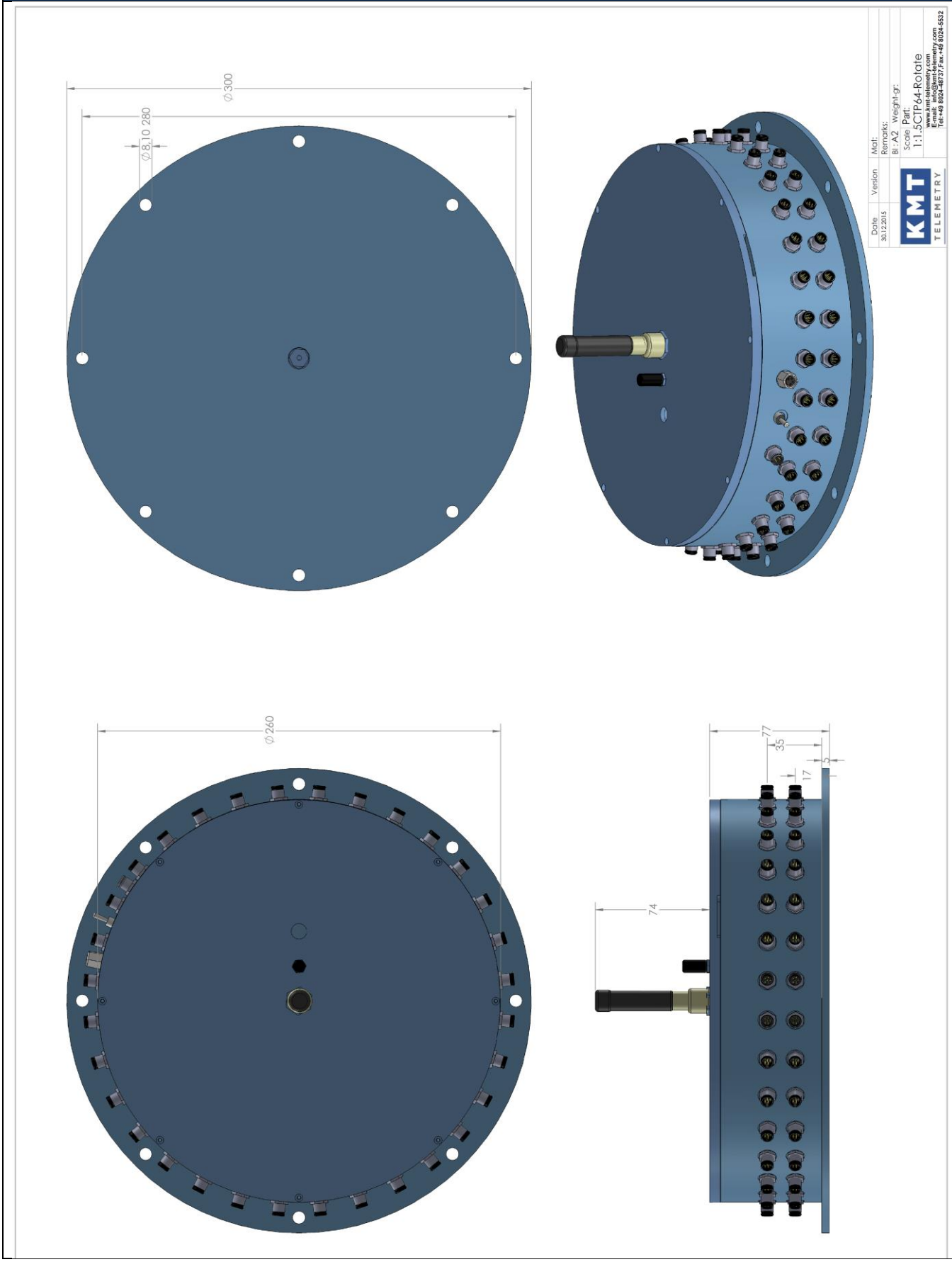
CTP64-Rotate-ENC – bottom side with 2mm center pin (Battery version)



CTP64-Rotate-ENC – bottom side with 4pol. connector (external power 24V version)
Powering is galvanic isolated!

DC power cable

Dimensions CTP64-Rotate-ENC



Settings CTP-Rotate-ENC	Programmable via web interface

Web interface address LAN adapter or remote COM1-Box:
e.g. IP 192.168.0.110 or 111, 112
(see current IP no. on LAN-Adapter or "remote COM box"!!)
Settings:

STG
Gain 125-250-500-1000-2000
Half- and full bridge
Make Auto Zero YES/NO

ICP
Gain 1-2-4-8-16

VOLT
Range ±0,625V, ± 1,25V, ±2,5V,
± 5V, ±10V

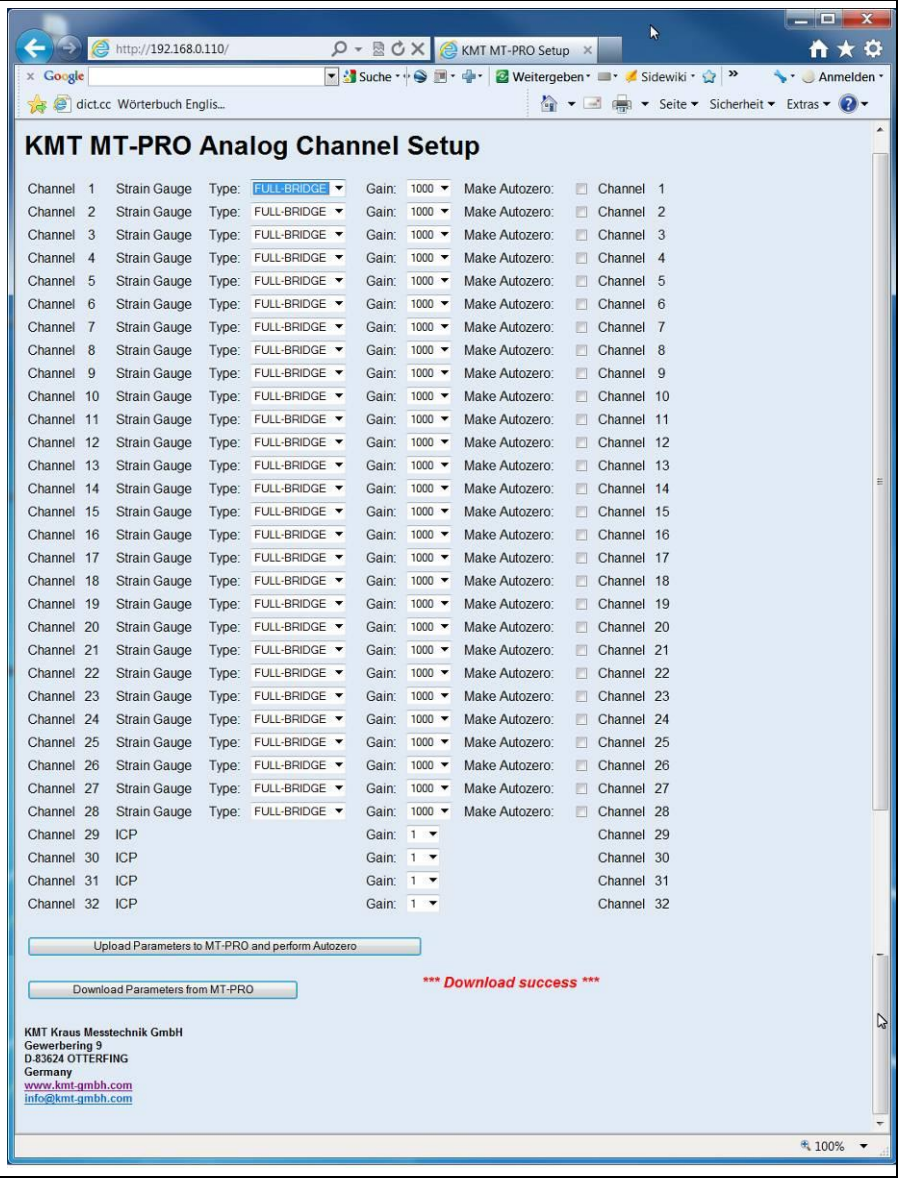
TH-K
Range -50 to 1000°C, -50 to 500°C
or -50 to 250°C

PT100/1000

Type:	PT100	4 Wire
	PT100	3 Wire
	PT100	2 Wire
	PT1000	4 Wire
	PT1000	3 Wire
	PT1000	2 Wire

Range: -25..150 °C
-50..300 °C
-100..600 °C

Selectable for each channel!



CTP ENCODER (standard with wire connection)
Software setup via LAN-Adapter and notebook

1) Power ON the CTP64-Rotate ENCODER

2) Connect the LAN-Adapter on the SETUP connector of CTP64-Rotate ENCODER

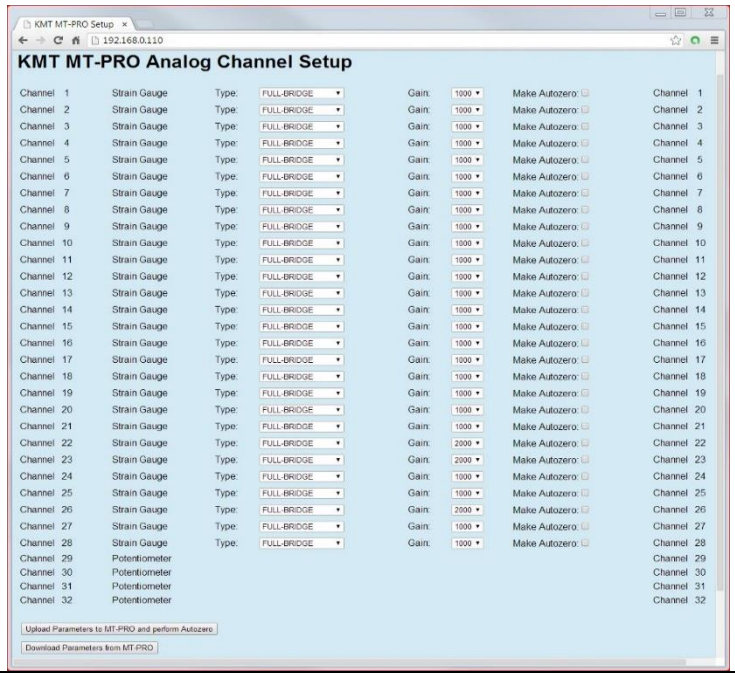
3) Adjust your notebook to manual on a free IP like e.g. 192.168.0.100

4) Connect LAN-Adapter with your notebook via cross-over LAN cable

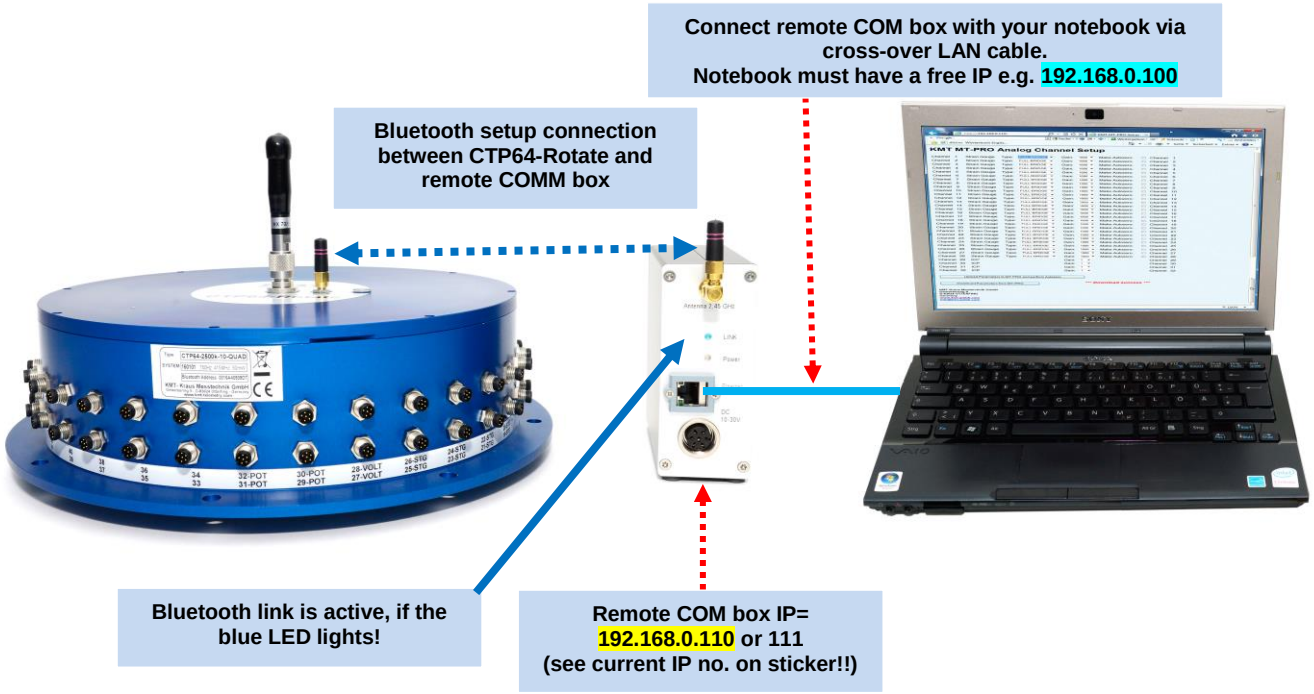
5) Open e.g. Microsoft Internet Browser and enter IP address **192.168.0.110**

   (see current IP no. of LAN adapter!!)

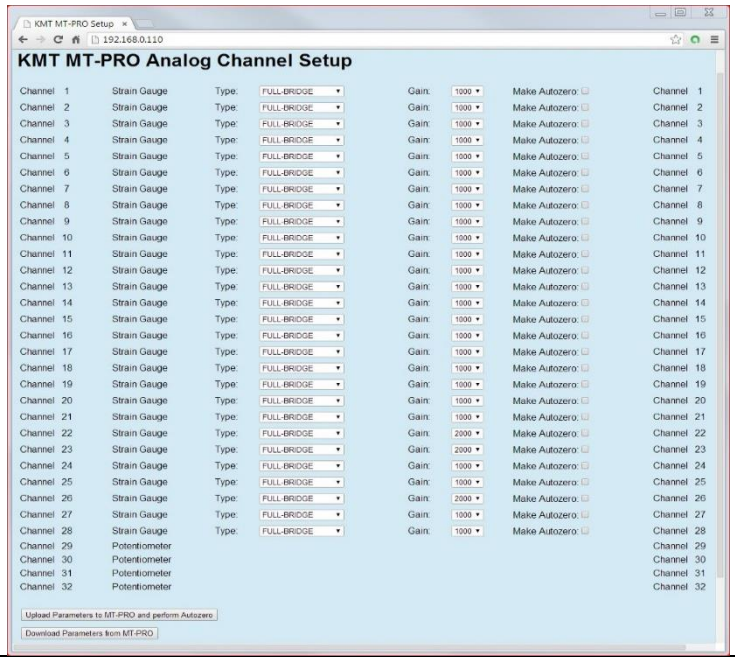
6) Now you get access on the web-interface and can adjust the CTP acquisition module



CTP ENCODER (connect via remote COMM box)
Software setup via remote COMM box and notebook



1) Power ON the CTP64-Rotate ENCODER
2) Connect the LAN-Adapter on the SETUP connector of CTP64-Rotate ENCODER
3) Adjust your notebook to manual on a free IP like e.g. 192.168.0.100
4) Connect LAN-Adapter with your notebook via cross-over LAN cable
5) Open e.g. Microsoft Internet Browser and enter IP address **192.168.0.110** of remote COM box (see current IP no. of Remote COM box!!)
6) Now you get access on the web-interface and can adjust the CTP acquisition module



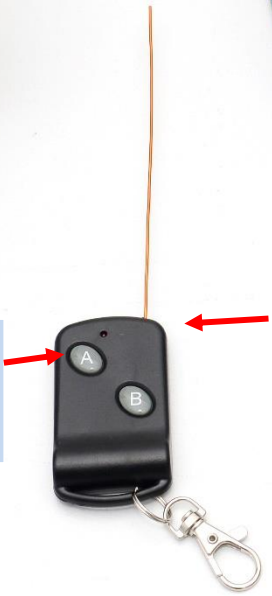
Settings of CTP-Rotate-ENC (picture sow CTP16-Rotate)
Programmable via web interface (COMM box-wireless setup via Bluetooth)

COMM box with integrated LAN Adapter. If the COMM box have an active LINK with the CTP-ENC, the power of the acquisition modules will switch ON. If not, the CTP-ENC is switch in sleep mode and save battery power.

Bluetooth - antenna

Bluetooth antenna

cross-over LAN cable for Notebook



Easy optional remote
A = ON
B = sleep mode
Range 3-5m

Easy remote for power ON/OFF = sleep mode, if the COMM box Bluetooth link is not active.

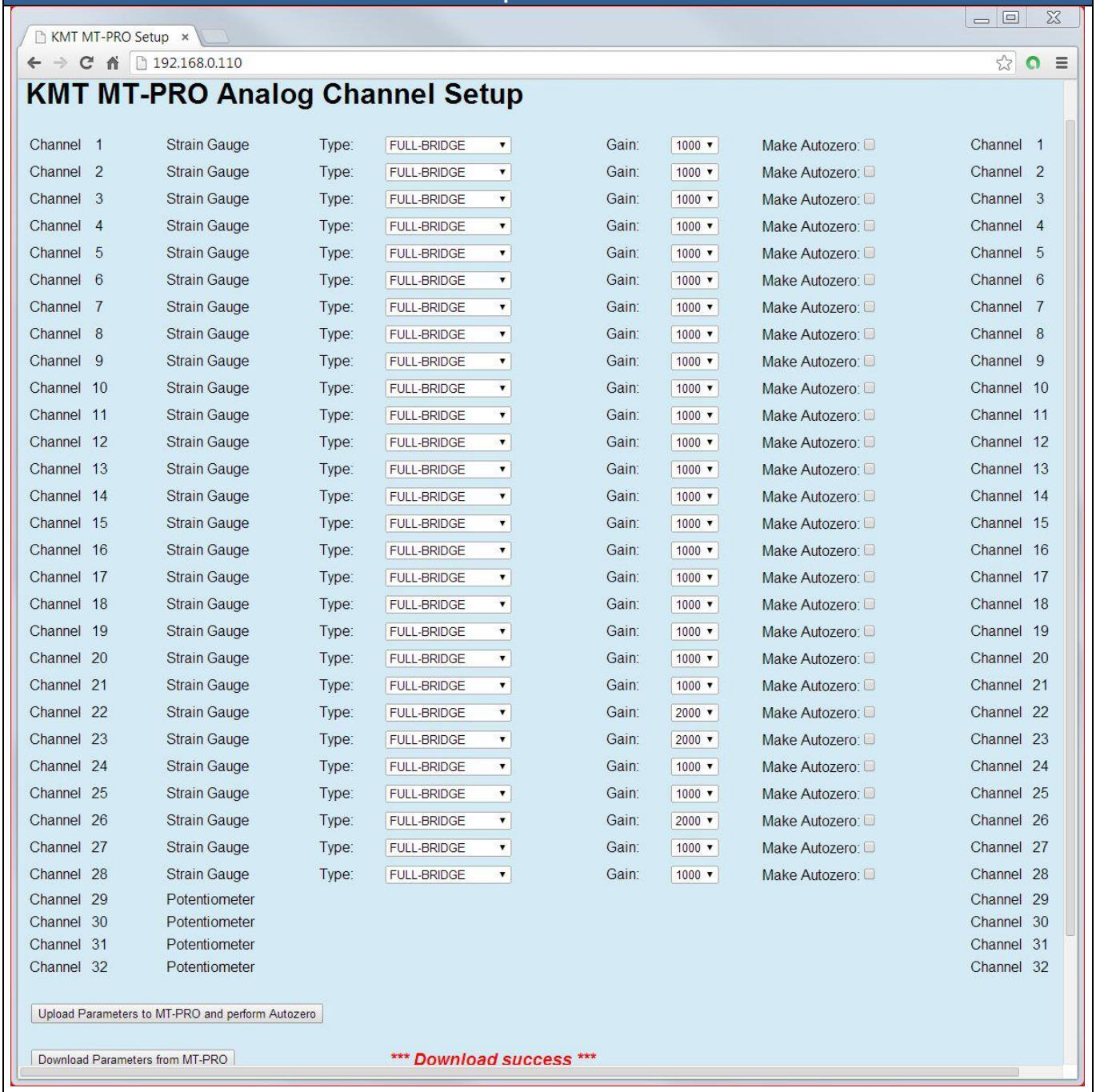
Switch must standing on COMM!

ON = Permanent power ON
OFF = Permanent power OFF
COMM = 1) power ON, if the Bluetooth LINK (blue LED) is active
2) power ON via Remote (A/B), if the Bluetooth LINK (blue LED is off) is not active. Easy way to power ON or go to sleep-mode if the COMM box is not in range.

1) Power ON the CTP-Rotate ENC
2) Connect the COMM box with the CTP-Rotate-Encoder. The Bluetooth link must be active!!
3) Adjust your notebook to manual on e.g. IP 192.168.0.100
4) Connect LAN-Adapter with your notebook via ***cross-over*** LAN cable
5) Open Microsoft Internet Browser and enter IP address **192.168.0.111** (see current IP no. of LAN-Adapter!!)
6) Now you get access on the web-interface and you can adjust the CTP-Rotate-Encoder

MTP-CONTROL V1 - Software setup

DOWNLOAD parameters for device



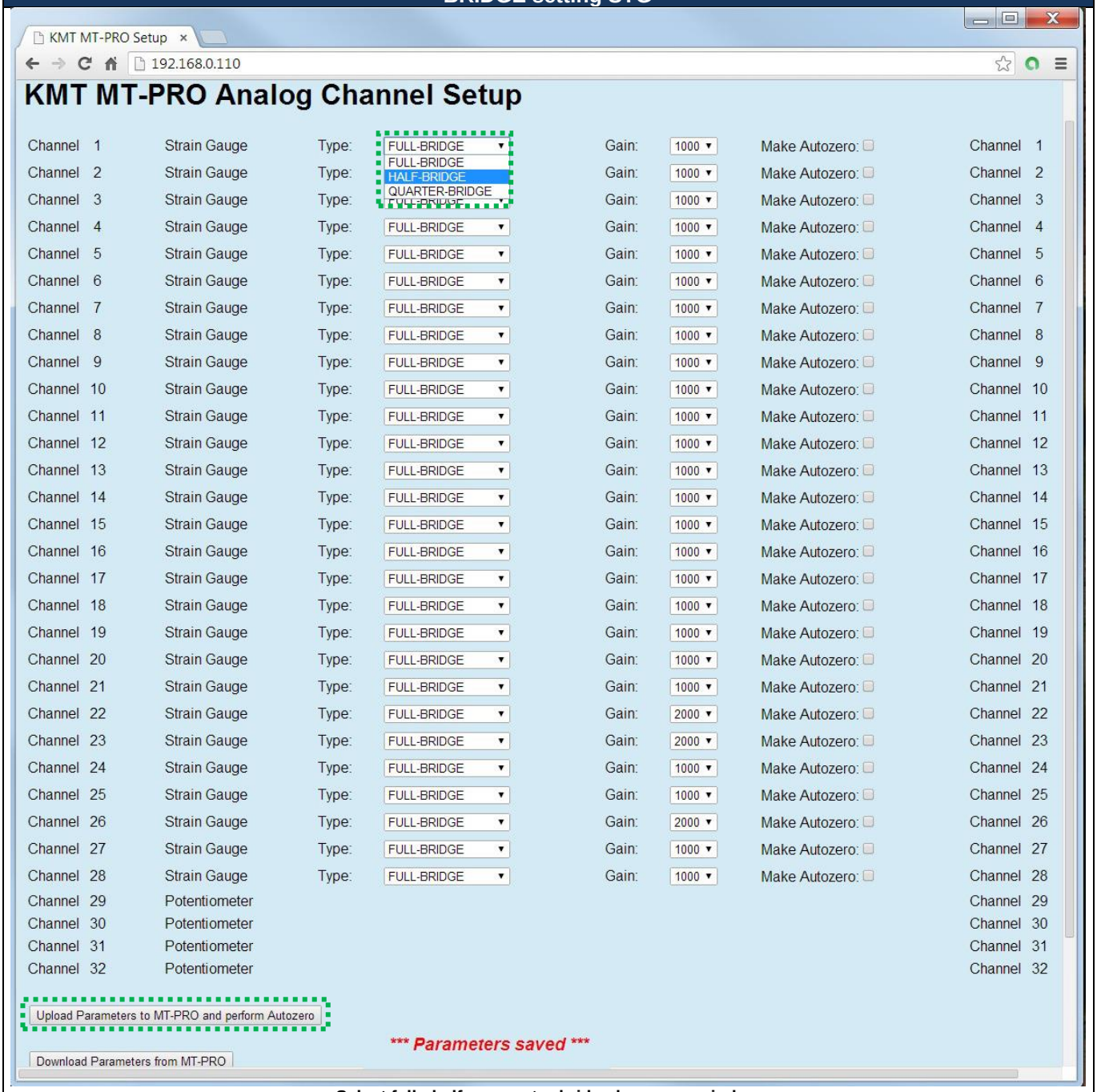
Channel 1	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 1
Channel 2	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 2
Channel 3	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 3
Channel 4	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 4
Channel 5	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 5
Channel 6	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 6
Channel 7	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 7
Channel 8	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 8
Channel 9	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 9
Channel 10	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 10
Channel 11	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 11
Channel 12	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 12
Channel 13	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 13
Channel 14	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 14
Channel 15	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 15
Channel 16	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 16
Channel 17	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 17
Channel 18	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 18
Channel 19	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 19
Channel 20	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 20
Channel 21	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 21
Channel 22	Strain Gauge	Type:	FULL-BRIDGE	Gain:	2000	Make Autozero:	Channel 22
Channel 23	Strain Gauge	Type:	FULL-BRIDGE	Gain:	2000	Make Autozero:	Channel 23
Channel 24	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 24
Channel 25	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 25
Channel 26	Strain Gauge	Type:	FULL-BRIDGE	Gain:	2000	Make Autozero:	Channel 26
Channel 27	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 27
Channel 28	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:	Channel 28
Channel 29	Potentiometer						Channel 29
Channel 30	Potentiometer						Channel 30
Channel 31	Potentiometer						Channel 31
Channel 32	Potentiometer						Channel 32

First you can download the stored parameters from the acquisition modules via LAN adapter from the controller module .
All connected acquisition modules will detect!

Caution:

Never use the refresh button on your browser; otherwise the parameters of you browser cash will upload to the MTP-STG!°

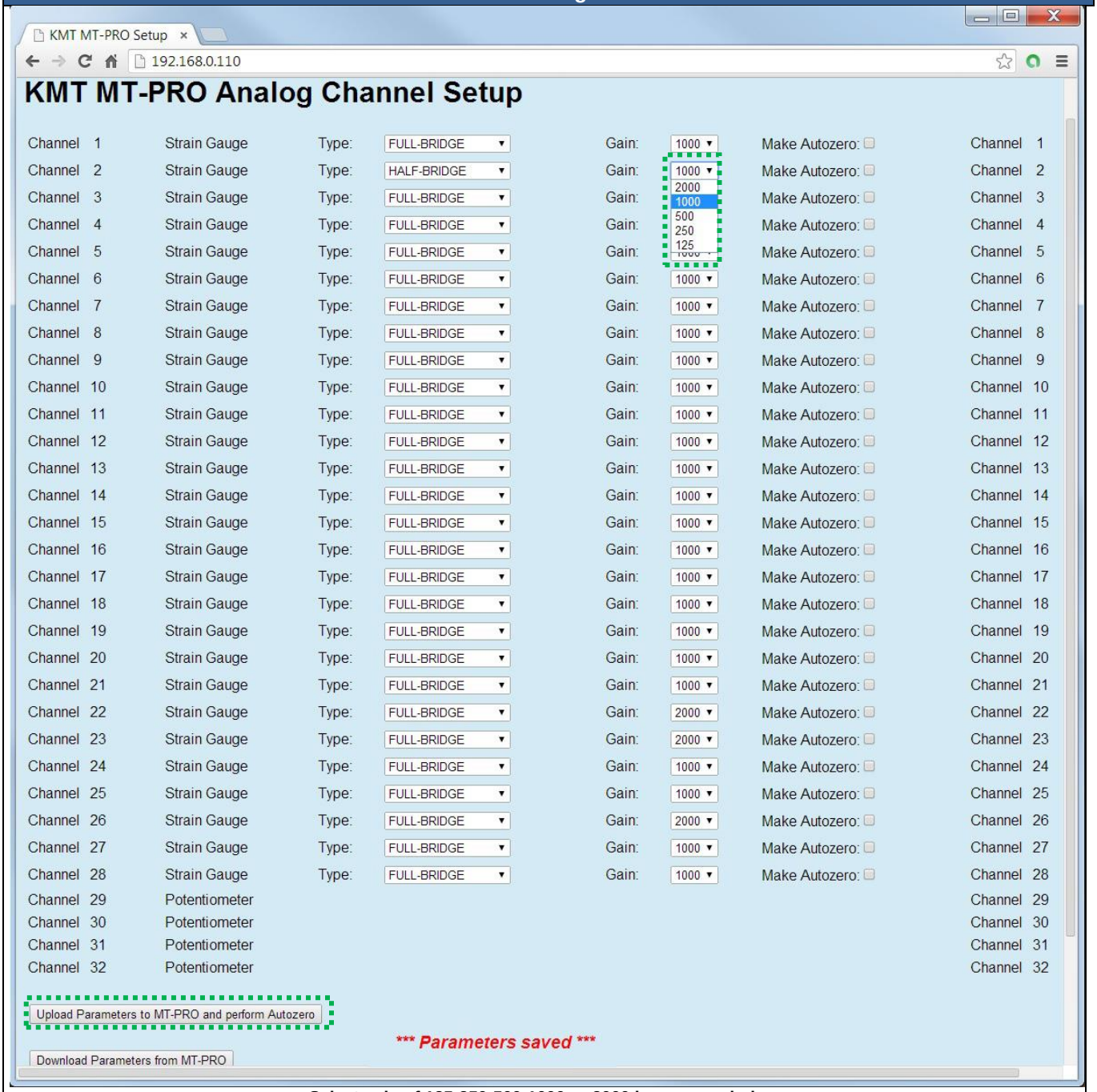
BRIDGE setting STG



Select full-, half- or quarter-bridge by popup window

Execute through "Upload Parameters to MT-PRO and perform Autozero" button

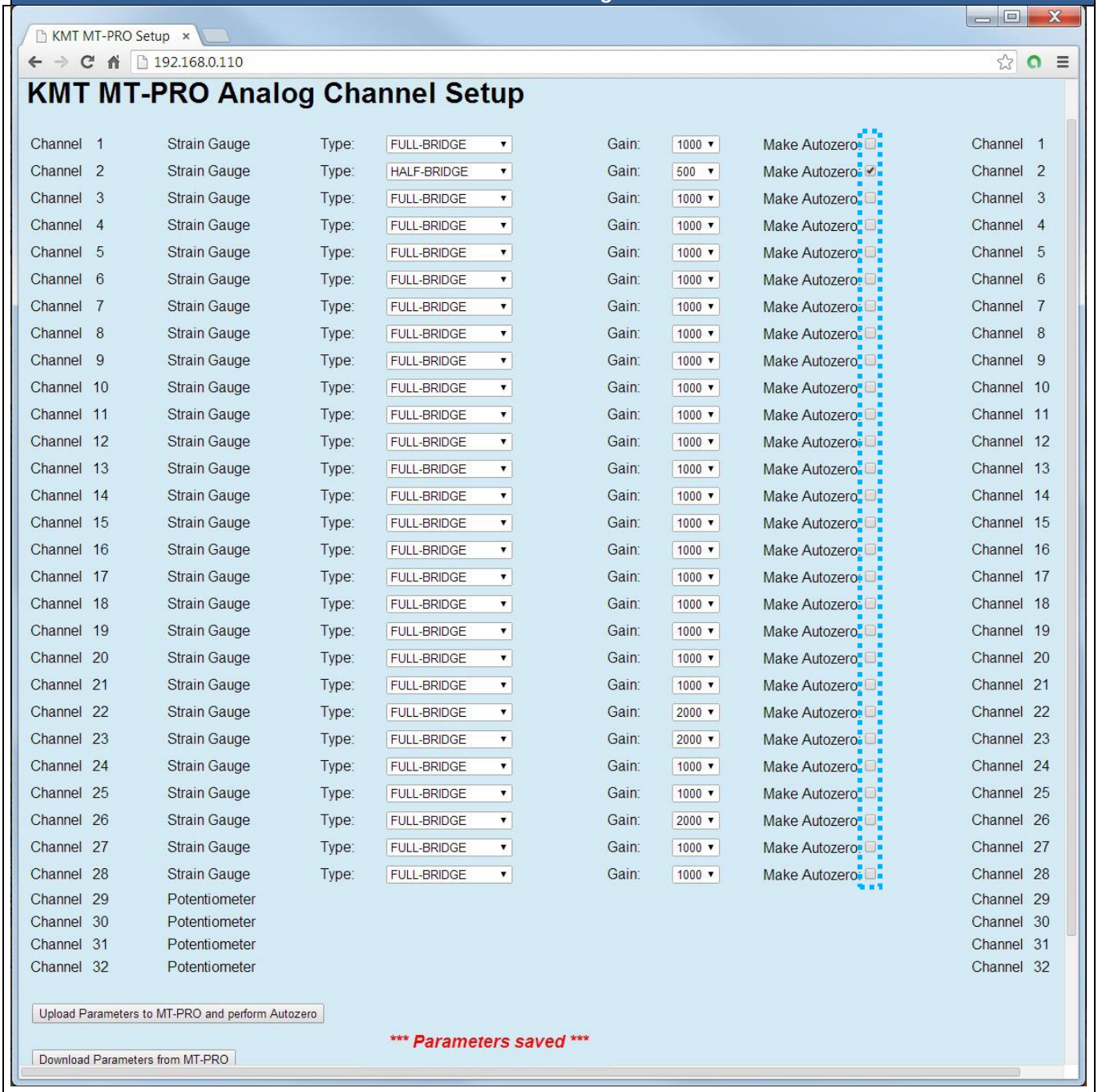
GAIN setting STG



Select gain of 125-250-500-1000 or 2000 by popup window
After change the gain you must make a new autozero!!

Execute through "Upload Parameters to MT-PRO and perform Autozero" button

AutoZero setting STG



Select Auto-Zero per channel. The Auto-Zero function will be executed only one time per upload the parameters to CTP-STG! It will be stored also after power off in the CTP-STG until you make a new Auto-Zero on this channel!

Execute through "Upload Parameters to MT-PRO and perform Autozero" button