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User Manual

CTP4/8/16

4/8/16-channel sensor telemetry system with different sensor inputs. High transmitting rate up to 5Mbit

NEW

INSTRUCTIONS FOR QUALIFIED PERSONNEL ONLY!

- Inputs for STG, TH-K, ICP or VOLT
- Simultaneous sampling
- 16 bit resolution
- Software programmable
- Signal bandwidth up to 24kHz (4-CH)
- Powering 7-30V
- Radio telemetry transmission
- Output analog +/- 10V (Decoder)
- Digital data interface to PC (option)
- Waterproofed ENC housing (IP65)

General functions:

Picture show a 16 CH telemetry system (CTP16-ENC and CTP-DEC16 with accessories)

The CTP4/8/16 is a multi-channel sensor telemetry system for moving or point-to-point applications. The 2-channel plug-in acquisition modules from the encoder are easy to change and include signal condition, anti-aliasing-filter, A/D converter. All channels will simultaneous sampling. All acquisition modules are manage at CTP-Controller and encoded PCM output to the radio transmitter. Finally, PCM 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 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 (Decoder) provides 4, 8 or 16 +/-10V analog outputs via Sub-D male socket (option: digital PC interface). The analog signal bandwidth can reach up to 24kHz with 5Mbit transmitter in 4-channel mode. The measurement accuracy is <±0.2 % (without sensor). The CTP4/8/16 is specified for operational temperatures from -20° C to +70° C. The maximum distance between transmitter and receiving antenna is approx. 150 m – depending on the application and bitrate!

Signal bandwidth, sampling rates and delay time:

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

Delay Time from Analog In to Analog Out (theoretical, brown)

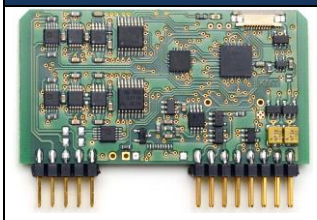
Bit rate	2 Channels	4 Channels	8 Channels	16 Channels
5000 kbit/s	------	24000 Hz max. (62500 Hz) 1,6 ms	12000 Hz (31250 Hz) 2,3 ms	6000 Hz (15625 Hz) 4,5 ms
2500 kbit/s	24000 Hz max. (62500 Hz) 1,6 ms	12000 Hz (31250 Hz) 2,3 ms	6000 Hz (15625 Hz) 4,5 ms	3000 Hz (7812.5 Hz) 8,9 ms
1250 kbit/s	12000 Hz (31250 Hz) 2,3 ms	6000 Hz (15625Hz) 4,7 ms	3000 Hz (7812.5 Hz) 9,1 ms	1500 Hz (3906.25 Hz) 17,9 ms
625 kbit/s	6000 Hz (15625Hz) 4,7 ms	3000 Hz (7812.5 Hz) 9,4 ms	1500 Hz (3906.25 Hz) 18,3 ms	750 Hz (1953.125 Hz) 35,7 ms
312,5 kbit/s	3000 Hz (7812.5 Hz) 9,4 ms	1500 Hz (3906.25 Hz) 19,1 ms	750 Hz (1953.125 Hz) 36,3 ms	375 Hz (976.56 Hz) 71,5 ms

CTP4/8/16 Encoder for 4-8 or 16 channels

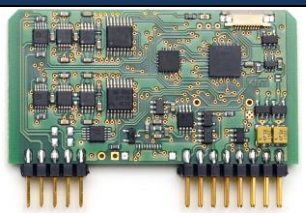
4,8 and 16-CH encoder in IP65 Aluminum housing

Encoder inside (e.g. 4-CH)

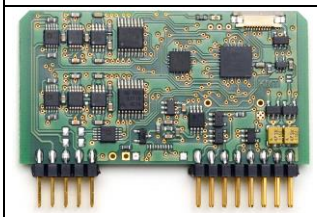
CTP acquisition modules



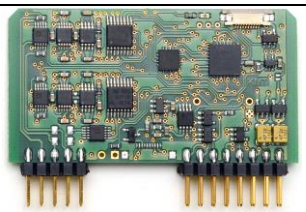
CTP-STG-V3
Acquisition module for 2 strain gages
Full, half and quarter bridge (≥350Ω)
Fixed excitation 4V DC
Offset calibration by auto zero
Manual offset shifting after auto zero
Gain: 125-250-500-1000-2000
Test shunt-cal step
Signal bandwidth 0Hz to 3000Hz*
Resolution 16bit
Accuracy <0.2%
Current consumption with full bridge 350 ohm 75mA



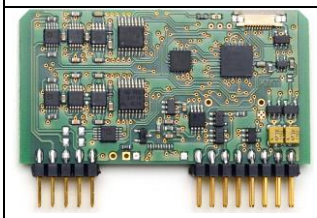
CTP-VOLT-V3
Acquisition module for 2x high level inputs
Range: ±0,625V, ± 1,25V, ±2,5V, ± 5V, ±10V
Signal bandwidth 0Hz to 3000Hz*
(*see table of cut-off-frequency)
Resolution 16bit
Accuracy <0.2%
Current consumption 60mA



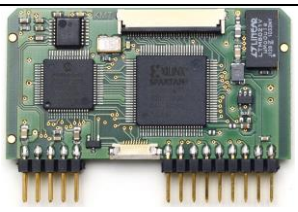
CTP-ICP®-V3
Acquisition module for 2 ICP sensors
Current EXC. 4mA
Gain: 1-2-4-8-16-32
Signal bandwidth 3 Hz to 3000Hz*
(*see table of cut-off-frequency)
Resolution 16bit
Accuracy <0.2%
Current consumption 100mA



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



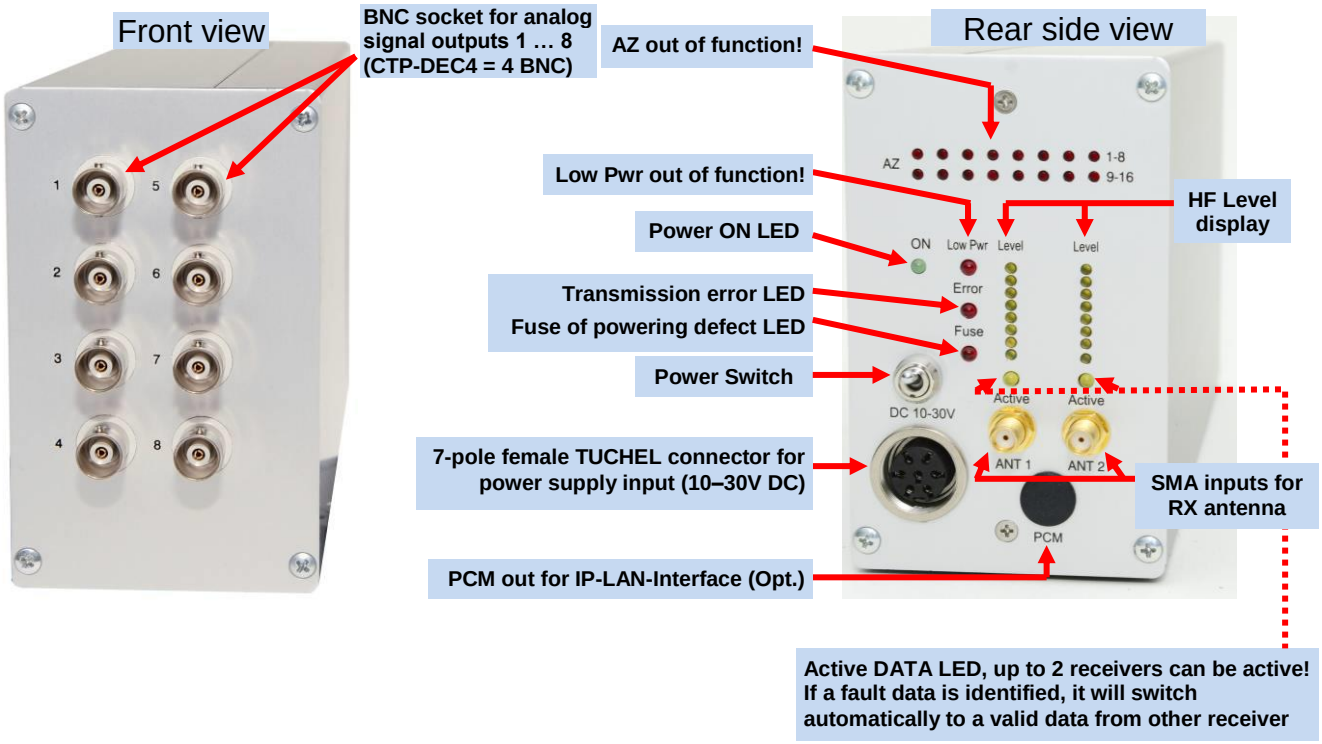
CTP-CONTROL-V3
Controller 1- 32 acquisition modules
Output: PCM
Programmable via LAN adapter
Current consumption 40mA, with LAN-adapter 140mA

System Parameters ENCODER:

Channels:	4,8 or 16
Resolution:	16 bit A/D converter with anti-aliasing filter, simultaneous sampling of all channels
Line-of-sight distance:	up to 150m (depends of application and bit rate) More range with special antennas on request!
Powering:	7-30V DC
Analog signal bandwidth:	See table
Transmission:	Digital PCM format
Transmission Power:	10mW!
Dimensions:	CT4= 90x90x52mm, CT8=90x125x52mm, CT16=90x185x52mm (L x W x H)
Weight:	CT4=450g, CT8=580g, CT16=820g
Operating temperature:	- 20 … +80°C
Housing:	Aluminum anodized, waterproofed (IP65)
Humidity:	20 ... 80% no condensing
Vibration:	5g
Static acceleration:	100g in all directions
Shock:	200g in all directions

Technical specifications are subject to change without notice!

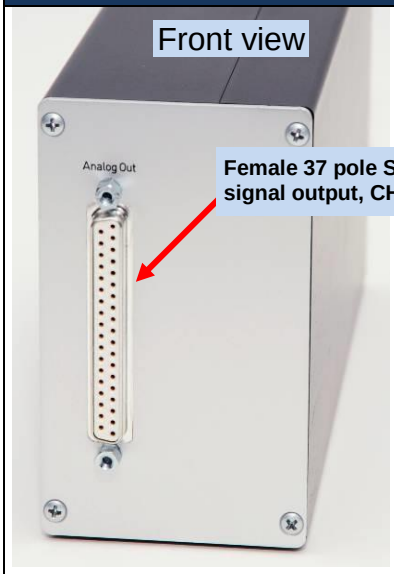
CTP-DEC8 (4) Receiver unit for max 8 (4) Channels output via BNC (radio transmission version with diversity (dual) receiver 312.5, 625 and 1250kbit)

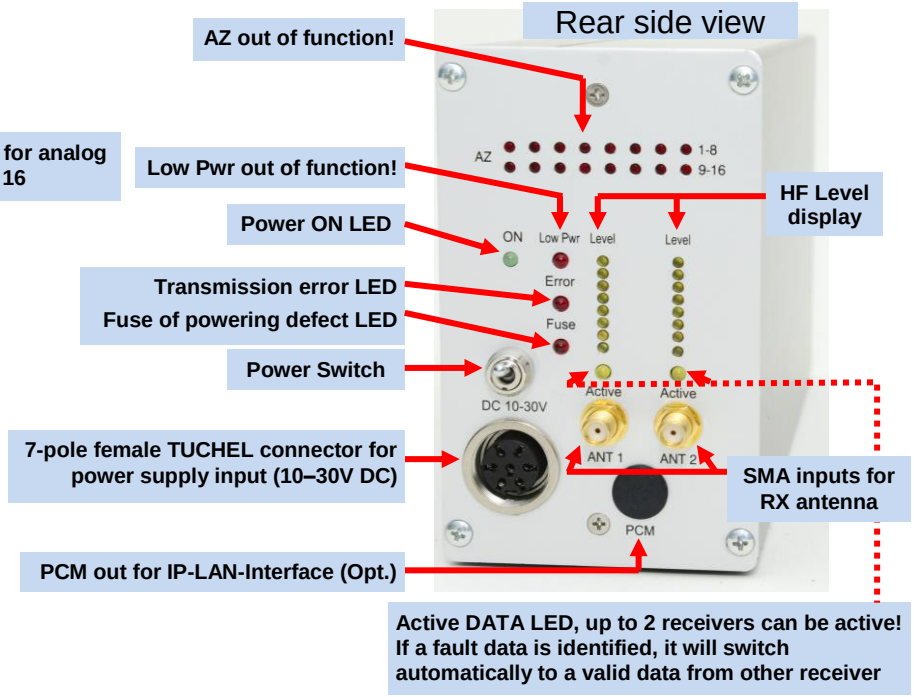


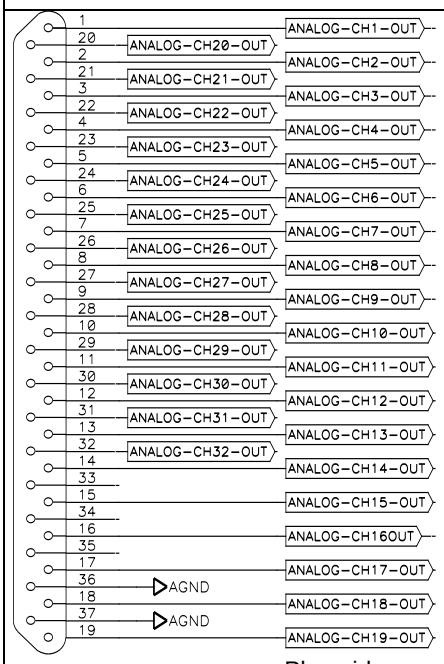
System Parameters:

Channels:	8 x +/-10V analog outputs via BNC or 4x BNC at CTP-DEC4
Resolution:	16 bit D/A converter, with smoothing filter
Power supply input:	10-30 VDC, power consumption <24 Watt
Analog signal bandwidth:	see frequency table
Transmission:	Digital PCM Format
Dimensions:	205 x 105 x 65mm
Weight:	1.25 kg without cables and antenna
Overall system accuracy between encoder input and decoder output:	+/-0.2% without sensor influences
Environmental	
Operating:	-20 … +70°C
Humidity:	20 ... 80% not condensing
Vibration:	5g
Static acceleration:	10g in all directions
Shock:	100g in all directions

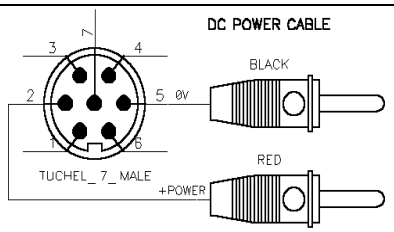
CTP-DEC16 Receiver unit for max 16 Channels output via 37 pol. Sub D (radio transmission version with diversity (dual) receiver 312.5, 625 and 1250kbit)







Plug-side

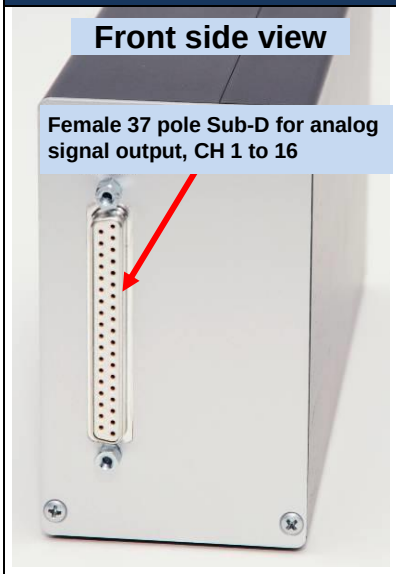


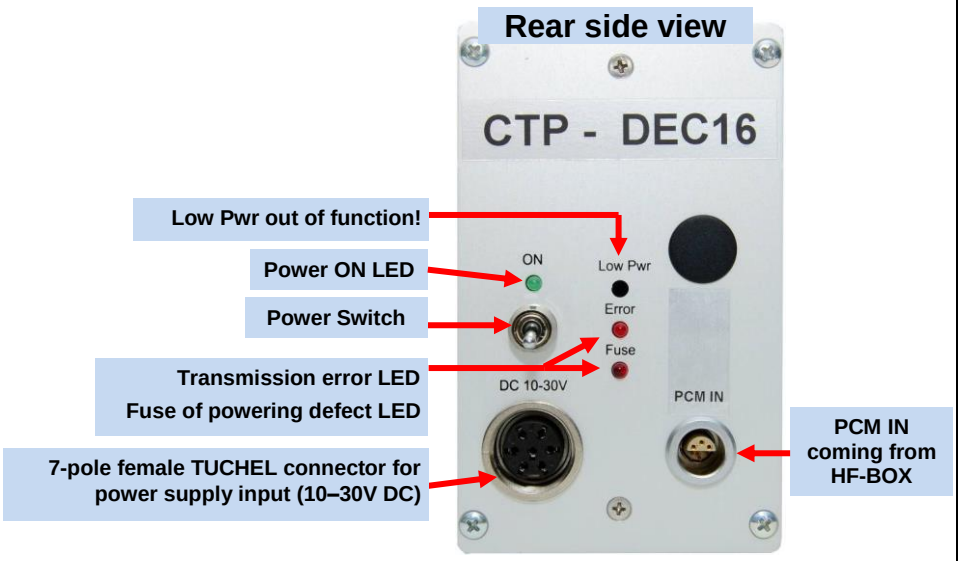
Optional BNC16Box. Connect on 37pol Sub-D

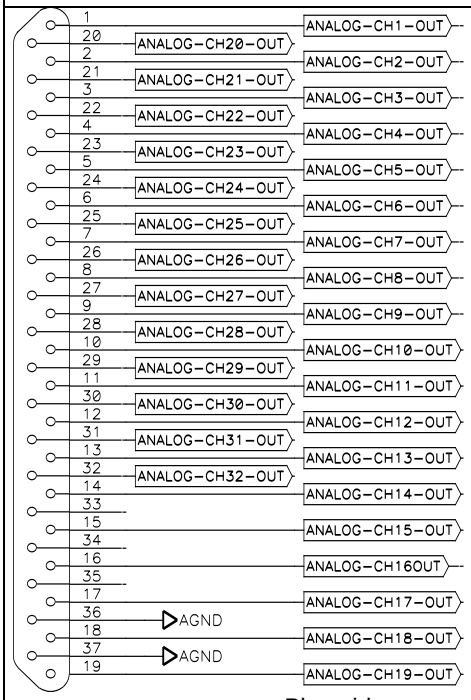
CTP –DEC16 System Parameters:

Channels:	16 x +/-10V analog outputs via Sub-D male socket
Resolution:	16 bit D/A converter, with smoothing filter
Power supply input:	10-30 VDC, power consumption <24 Watt
Analog signal bandwidth:	see frequency table
Transmission:	Digital PCM Format
Dimensions:	205 x 105 x 65mm
Weight:	1.25 kg without cables and antenna
Overall system accuracy between encoder input and decoder output:	+/-0.2% without sensor influences
Environmental	
Operating:	-20 … +70°C
Humidity:	20 ... 80% not condensing
Vibration:	5g
Static acceleration:	10g in all directions
Shock:	100g in all directions

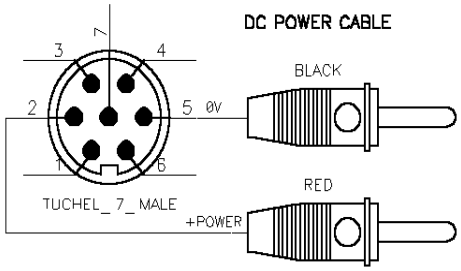
CTP-DEC16 Receiver unit for max 16 Channels output via 37 pol. Sub D (radio transmission version via quad receiver 1250, 2500 and 5000kbit)







Plug-side

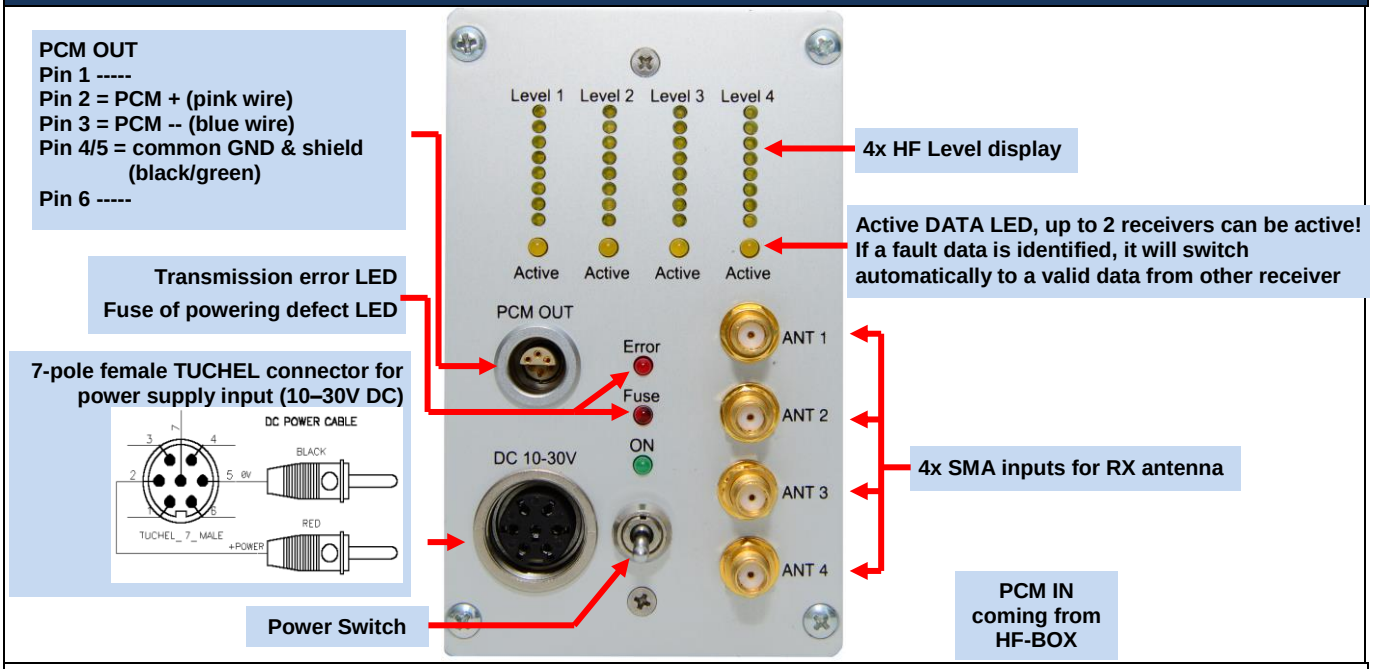


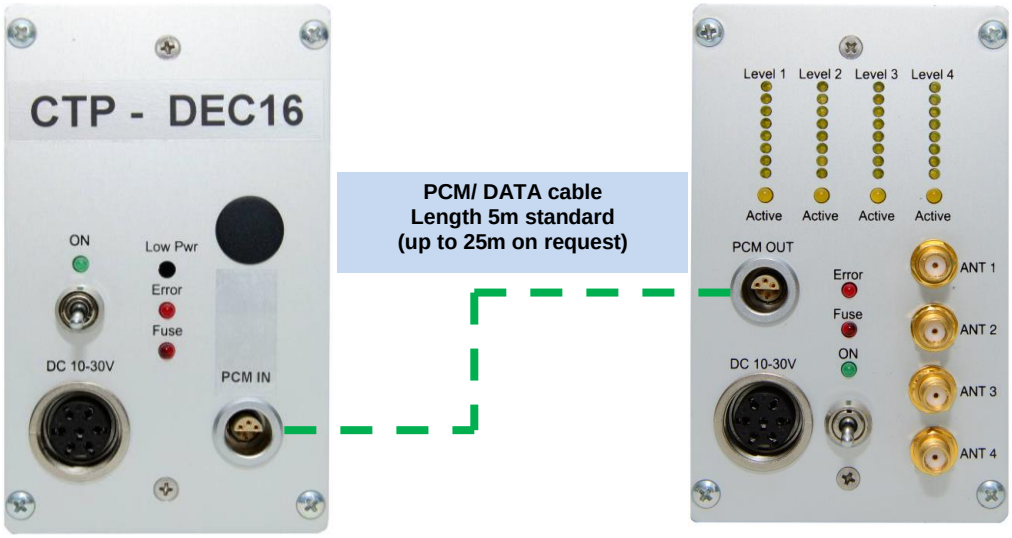
Optional BNC16Box. Connect on 37pol Sub-D

CTP –DEC16 System Parameters:

Channels:	16 x +/-10V analog outputs via Sub-D male socket
Resolution:	16 bit D/A converter, with smoothing filter
Power supply input:	10-30 VDC, power consumption <24 Watt
Analog signal bandwidth:	see frequency table
Transmission:	Digital PCM Format
Dimensions:	205 x 105 x 65mm
Weight:	1.00kg without cables and antenna
Overall system accuracy between encoder input and decoder output:	+/-0.2% without sensor influences
Environmental	
Operating:	-20 … +70°C
Humidity:	20 ... 80% not condensing
Vibration:	5g
Static acceleration:	10g in all directions
Shock:	100g in all directions

HF BOX Quad (receiver box with 4 receivers receiver 1250-5000kbit)

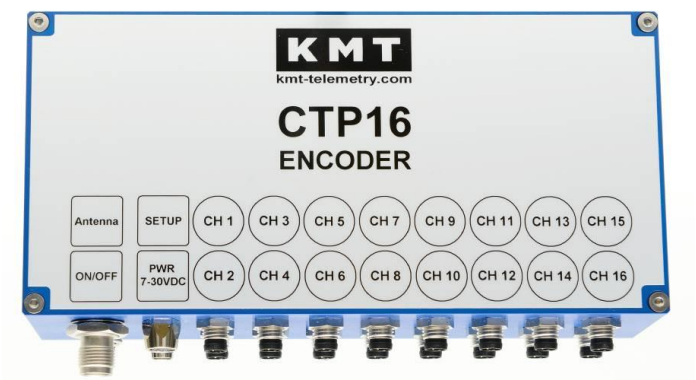


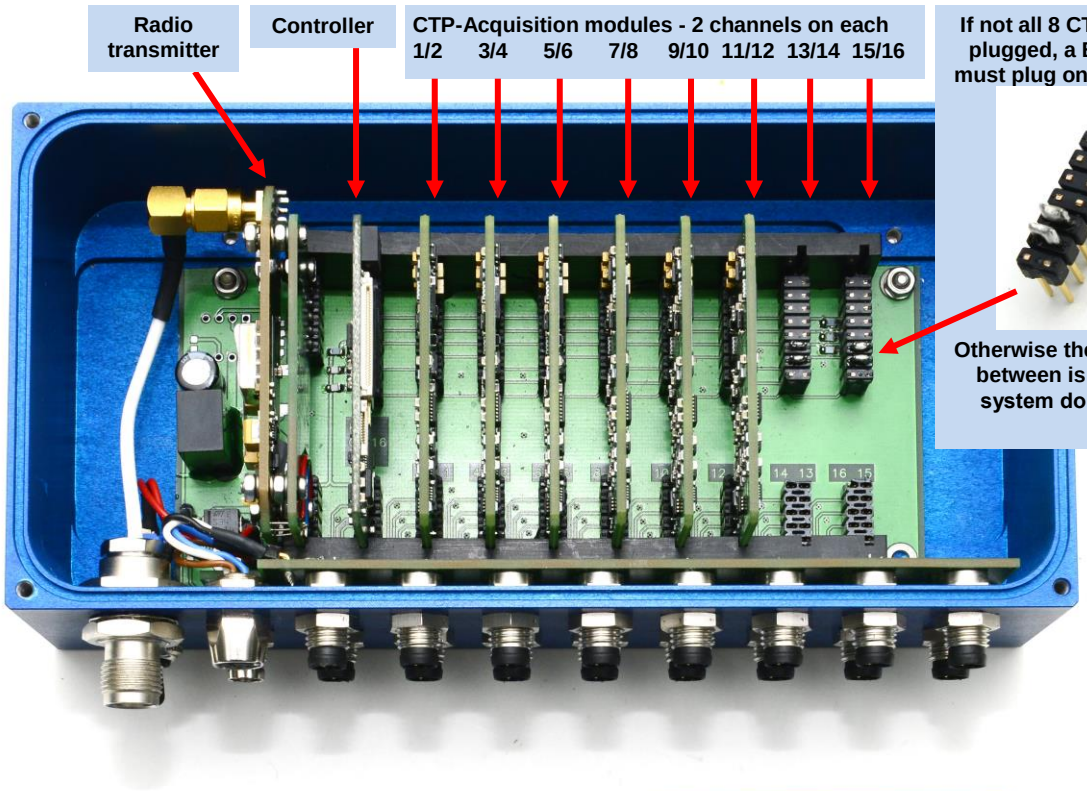


HF BOX Quad System Parameters:

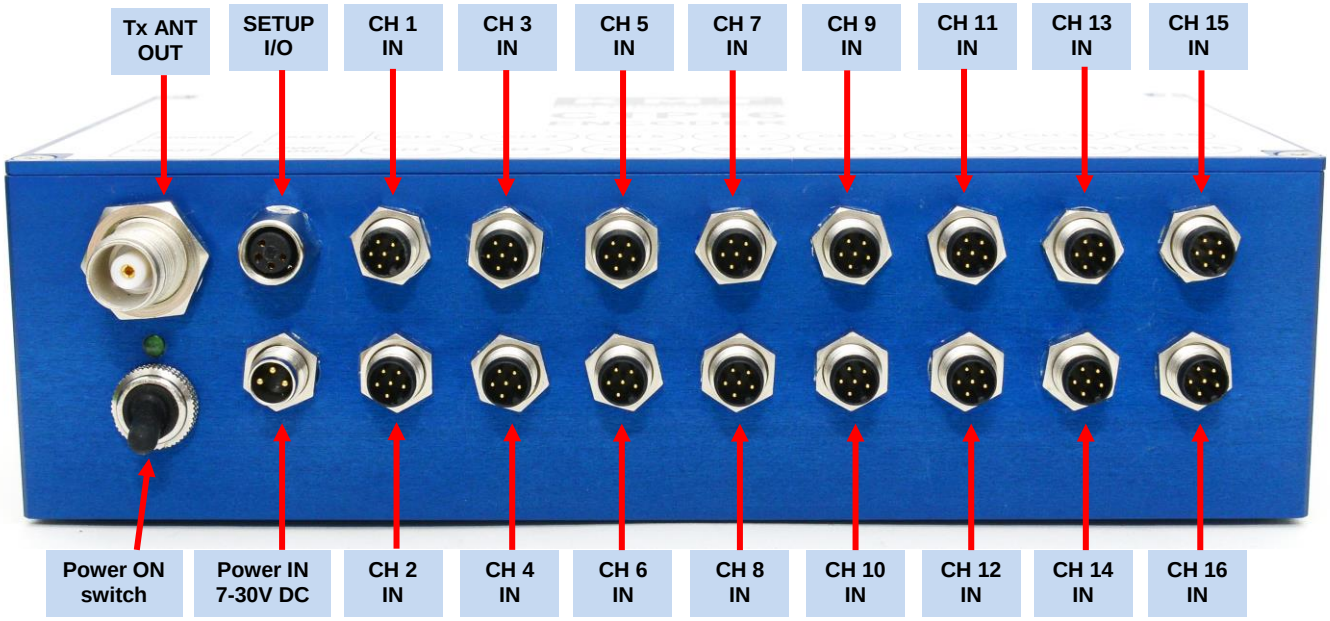
HF receivers	4
Antenna connection	SMA
Output	PCM
Power supply input:	10-30 VDC, power consumption <24 Watt
Dimensions:	205 x 105 x 65mm
Weight:	1.050 kg without cables and antenna
Environmental	
Operating:	-20 … +70°C
Humidity:	20 ... 80% not condensing
Vibration:	5g
Static acceleration:	10g in all directions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

CTP4/8/16 Encoder for 4, 8 or 16 channels – Modules

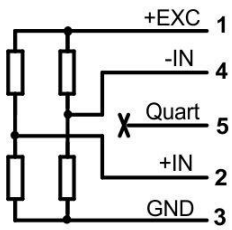


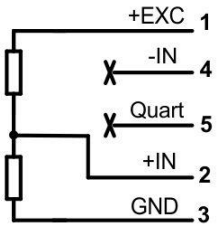


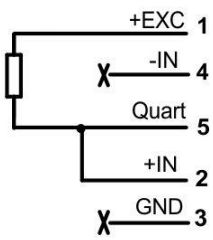
CTP4/8/16 Encoder for 4, 8 or 16 channels – Pin connection

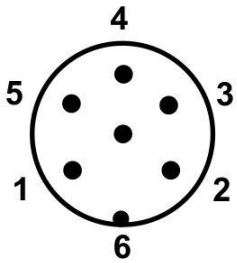


Strain gage connection





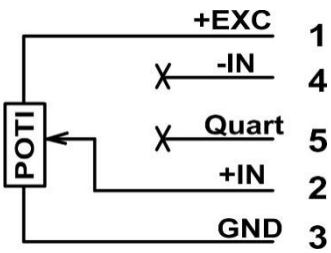


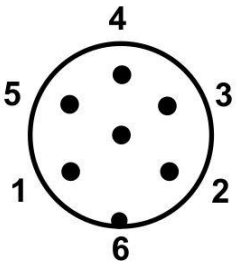


Cable colors:

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

Potentiometer

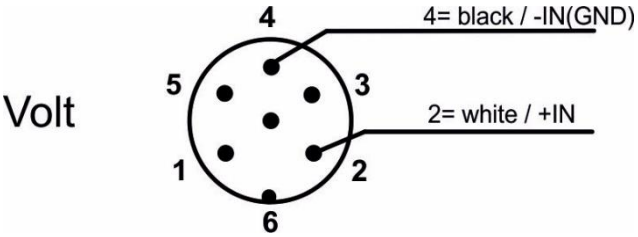




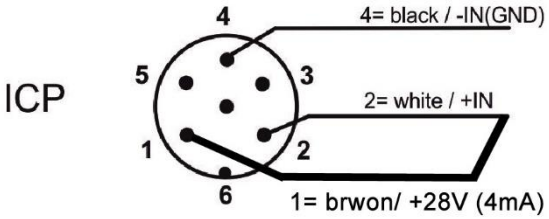
Cable colors:

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

VOLT connection

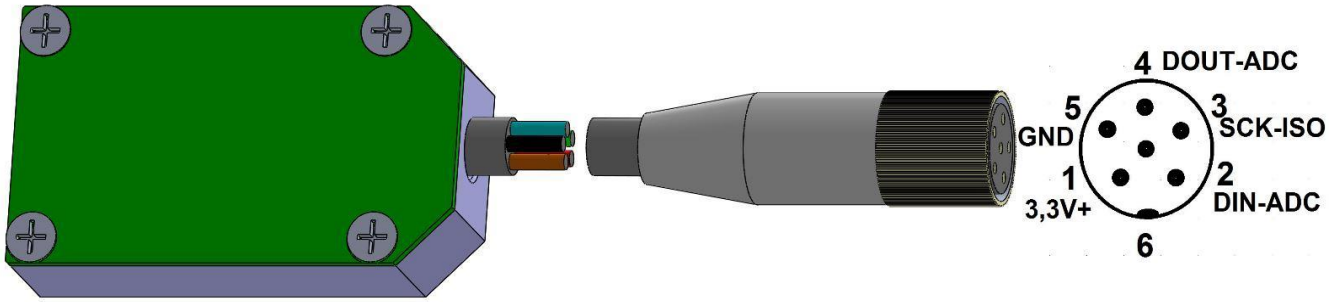


ICP connection

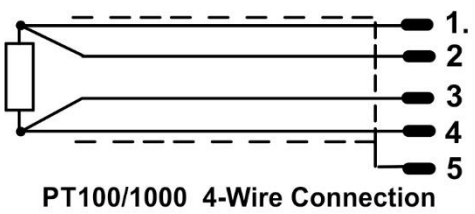


Pin 1+2 must connect together for ICP powering!

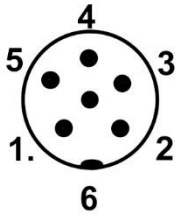
Th-K connection



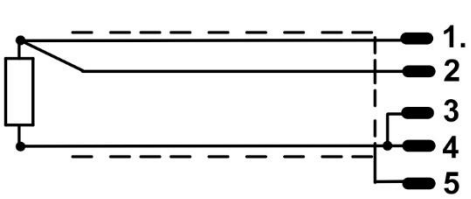
Pt100/1000



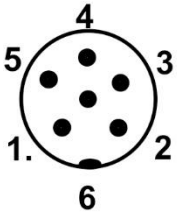
PT100/1000 4-Wire Connection



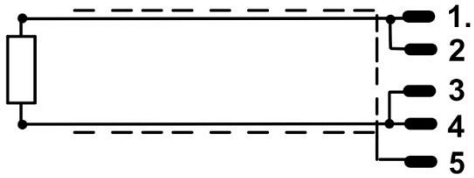
1= brown / +EXC
2= white / +IN
3= blue / -EXC
4= black / -IN
5= grey / Shield
6= pink / NU



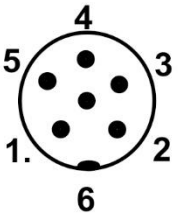
PT100/1000 3-Wire Connection



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

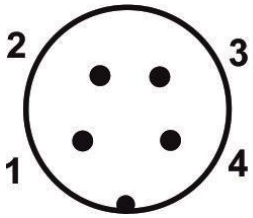


PT100/1000 2-Wire Connection



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

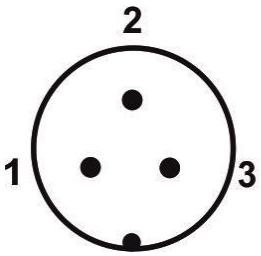
Setup connection



Cable colors:

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

PWR – Powering connection

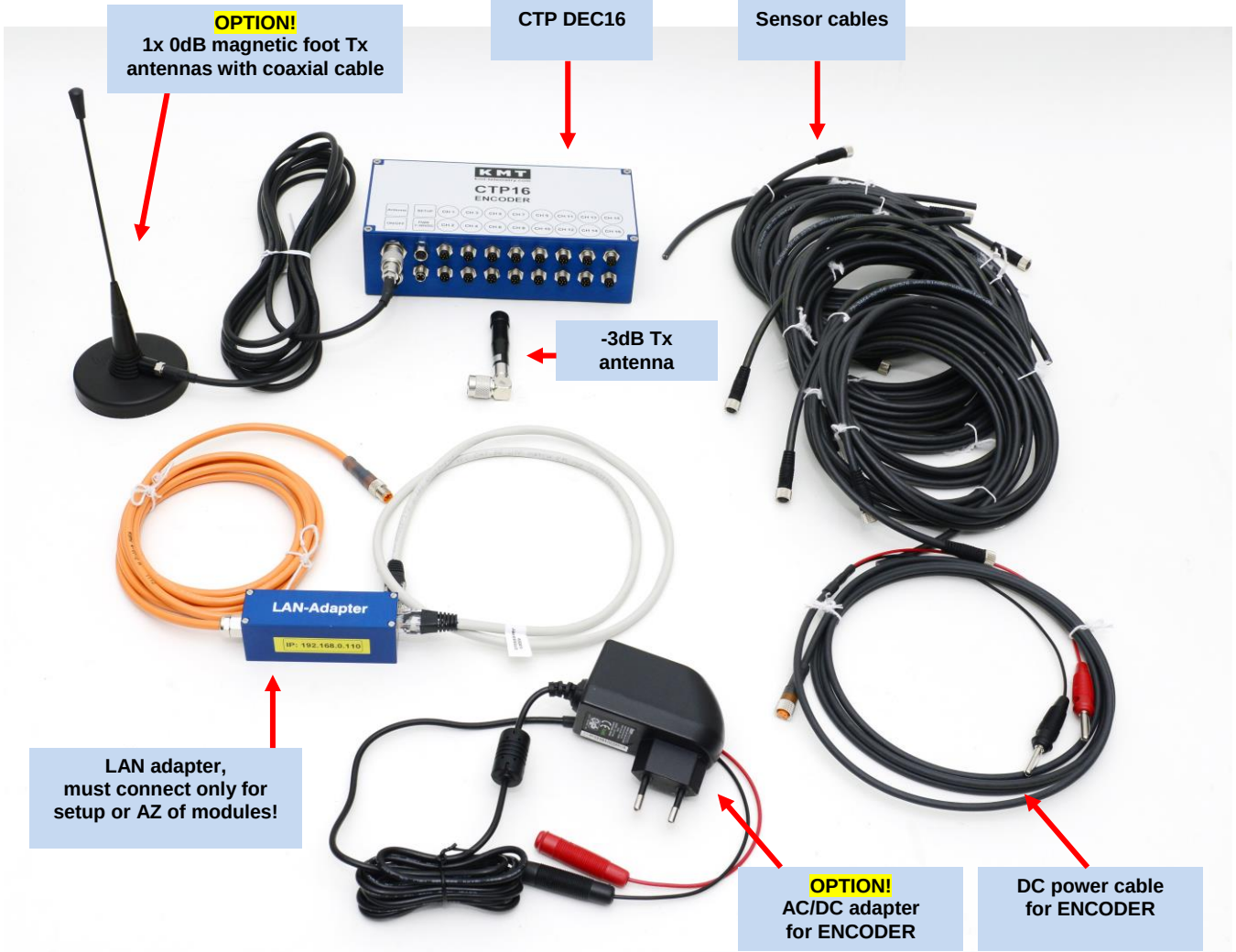


Cable colors:

1= brown / +Vin
2= black / GND
3= Blu / -----

Set of CTP-Decoder with external HF-Box (static part)

Set of CTP-ENCODER (moving part)

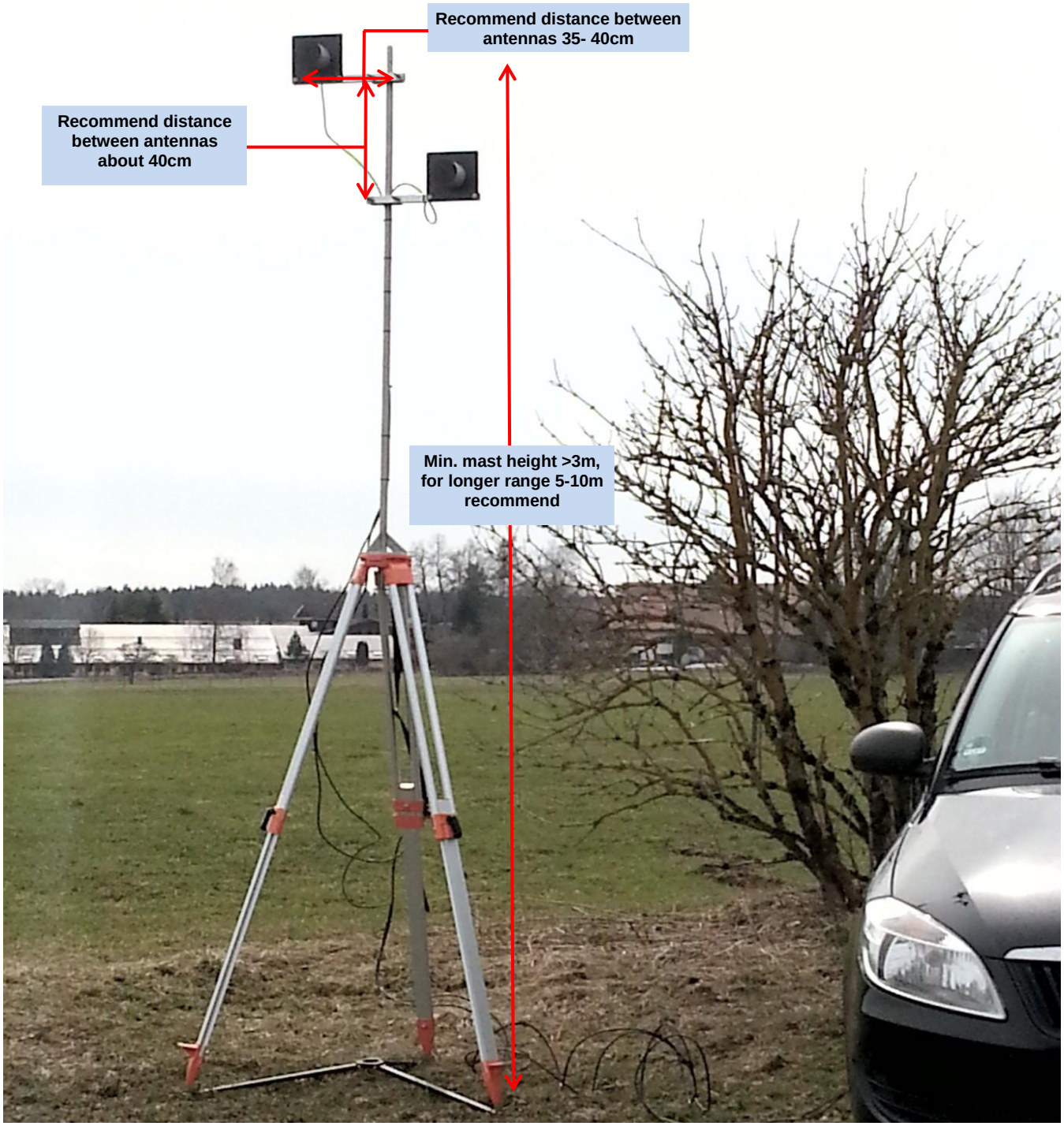


SET of a Point to Point system with special receiving helix antennas and omni-transmitting antenna

With transmitting booster ranges over 2km possible

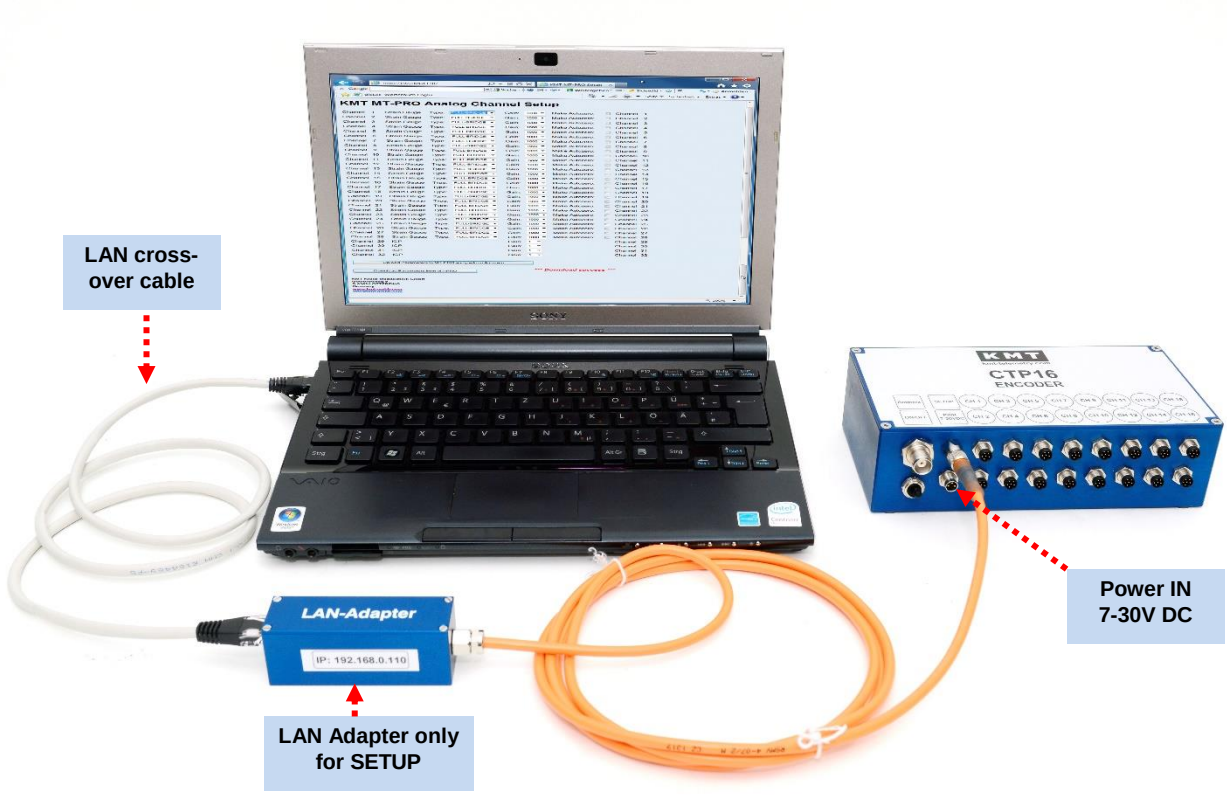
Point to Point system
omni-transmitting antenna mount on car roof

Point to Point system
receiving helix antennas on 4m masts



Min. mast height >3m, for longer range 5-10m recommend

CTP ENCODER
Software setup via LAN-Adapter and notebook



1) Power the CTP ENCODER with power 7-30 VDC

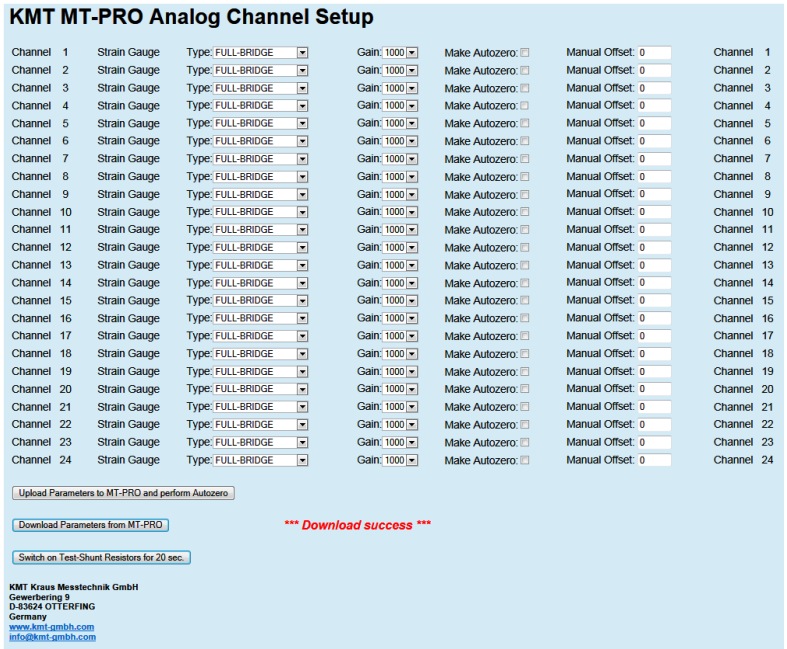
2) Connect the LAN-Adapter on the SETUP connector of CTP ENCODER

3) Adjust your notebook to manual on e.g. IP 192.168.0.20

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

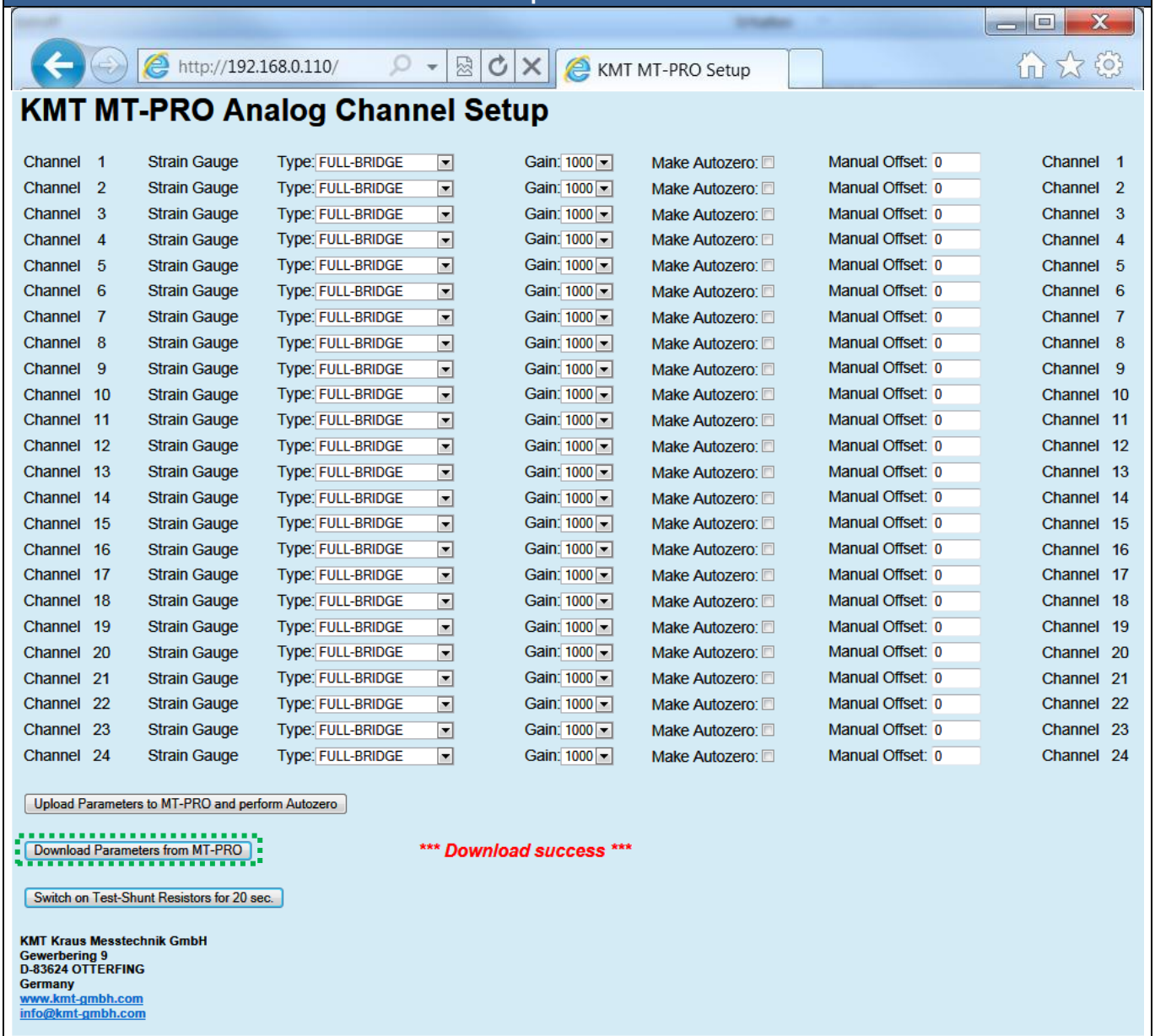
5) Open e.g. Internet Explorer Microsoft Internet Browser and enter IP address **192.168.0.110** of LAN-Adapter

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



MTP-CONTROL V3 - Software setup

DOWNLOAD parameters for device

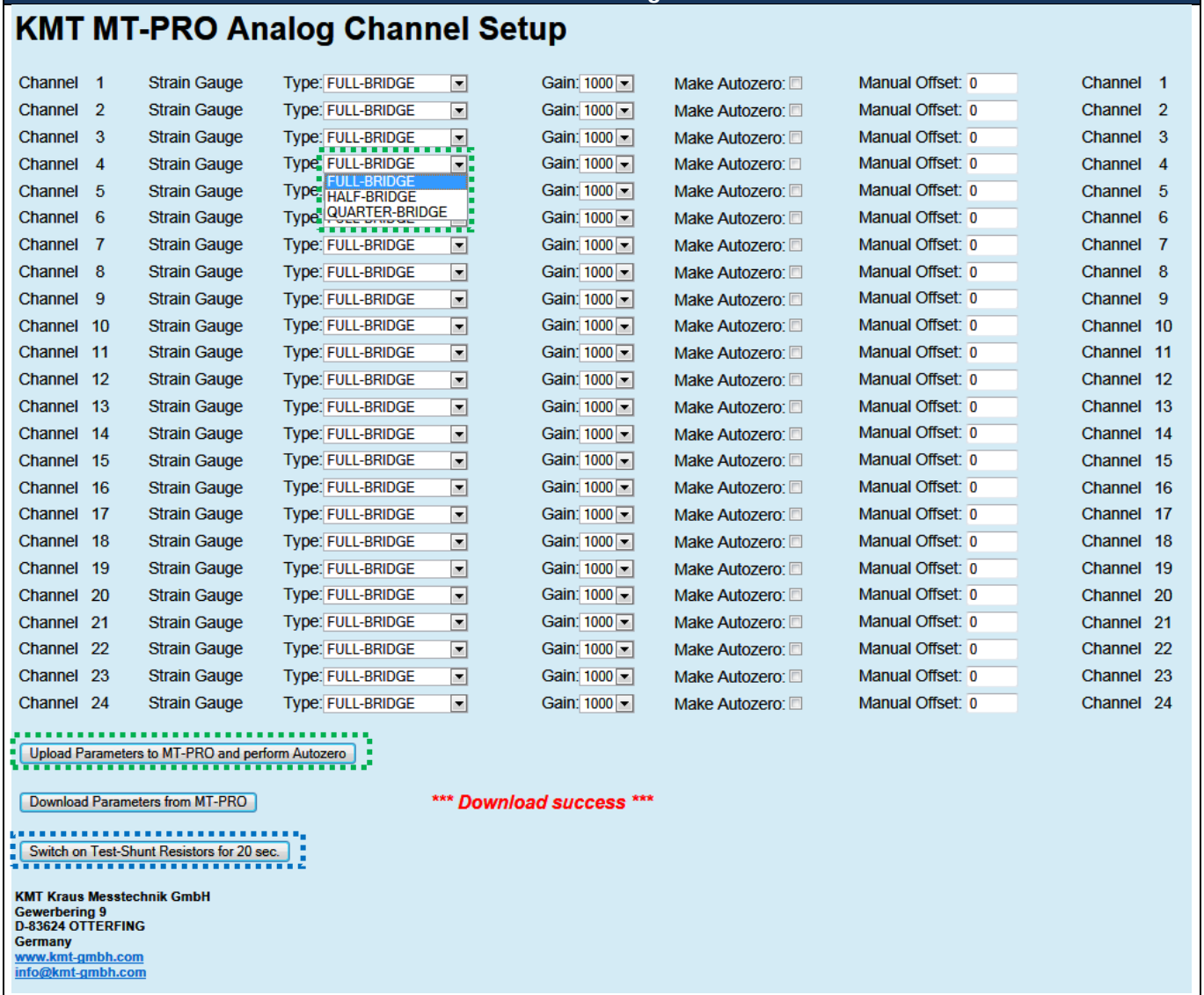


First you can download the stored parameters from the acquisition modules via LAN adapter from the controller module .
All connected acquisition modules will detect!

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

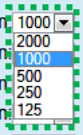
If you want test your bridge, you can execute the function Test-Shunt Resistor for 20 sec. button

In this case all STG channels get a shunt-cal step of about 80% of the from measuring range at GAIN 2000
In this case all STG channels get a shunt-cal step of about 40% of the from measuring range at GAIN 1000
In this case all STG channels get a shunt-cal step of about 20% of the from measuring range at GAIN 500
In this case all STG channels get a shunt-cal step of about 10% of the from measuring range at GAIN 250
In this case all STG channels get a shunt-cal step of about 5% of the from measuring range at GAIN 125

GAIN setting STG

KMT MT-PRO Analog Channel Setup

Channel	1	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 1
Channel	2	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 2
Channel	3	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 3
Channel	4	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 4
Channel	5	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 5
Channel	6	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 6
Channel	7	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 7
Channel	8	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 8
Channel	9	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 9
Channel	10	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 10
Channel	11	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 11
Channel	12	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 12
Channel	13	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 13
Channel	14	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 14
Channel	15	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 15
Channel	16	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 16
Channel	17	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 17
Channel	18	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 18
Channel	19	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 19
Channel	20	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 20
Channel	21	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 21
Channel	22	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 22
Channel	23	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 23
Channel	24	Strain Gauge	Type:	FULL-BRIDGE	Gain:	1000	Make Autozero:		Manual Offset:	0	Channel 24



Upload Parameters to MT-PRO and perform Autozero

Download Parameters from MT-PRO

*** Download success ***

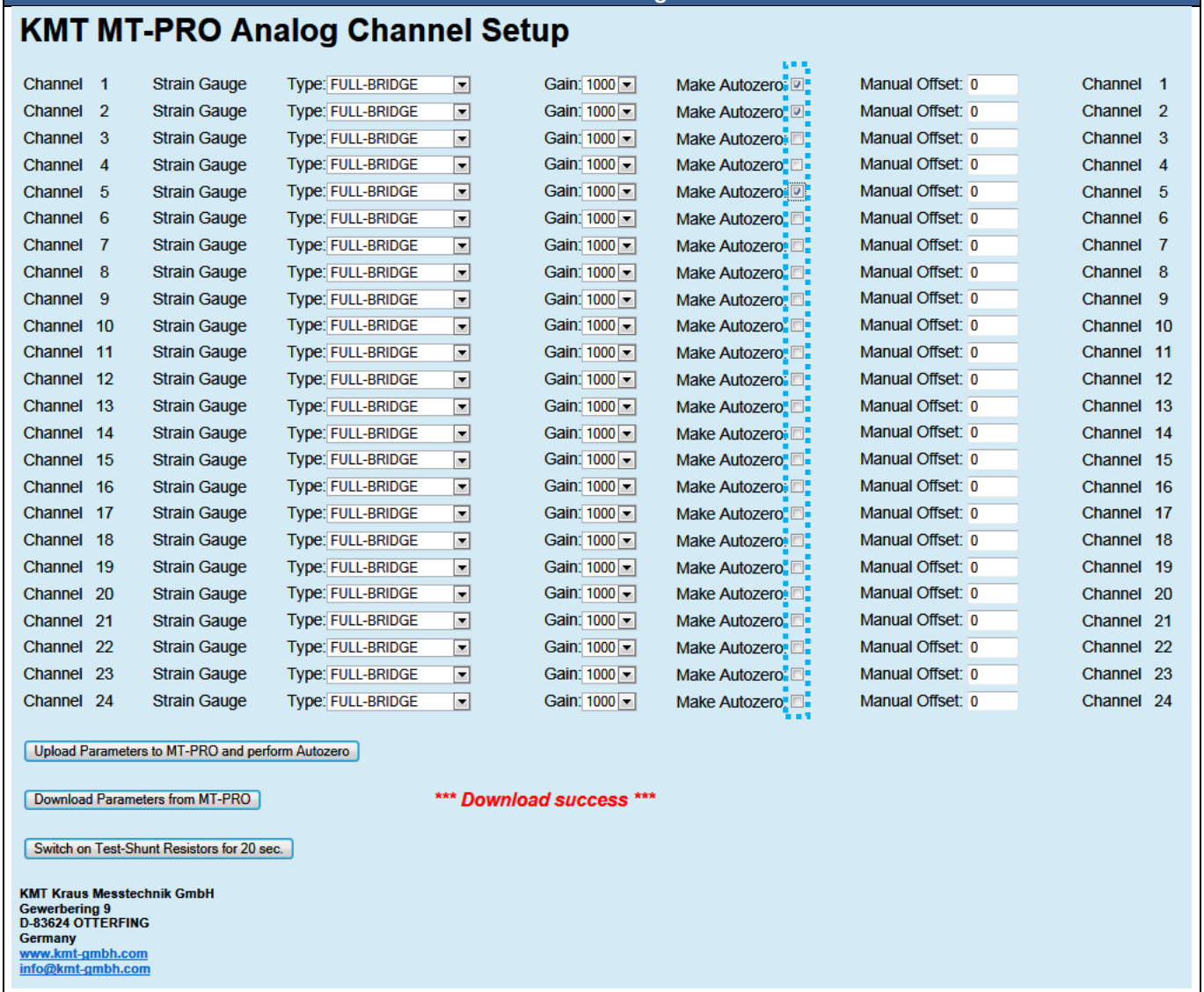
Switch on Test-Shunt Resistors for 20 sec.

KMT Kraus Messtechnik GmbH
Gewerbering 9
D-83624 OTTERFING
Germany
www.kmt-gmbh.com
info@kmt-gmbh.com

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

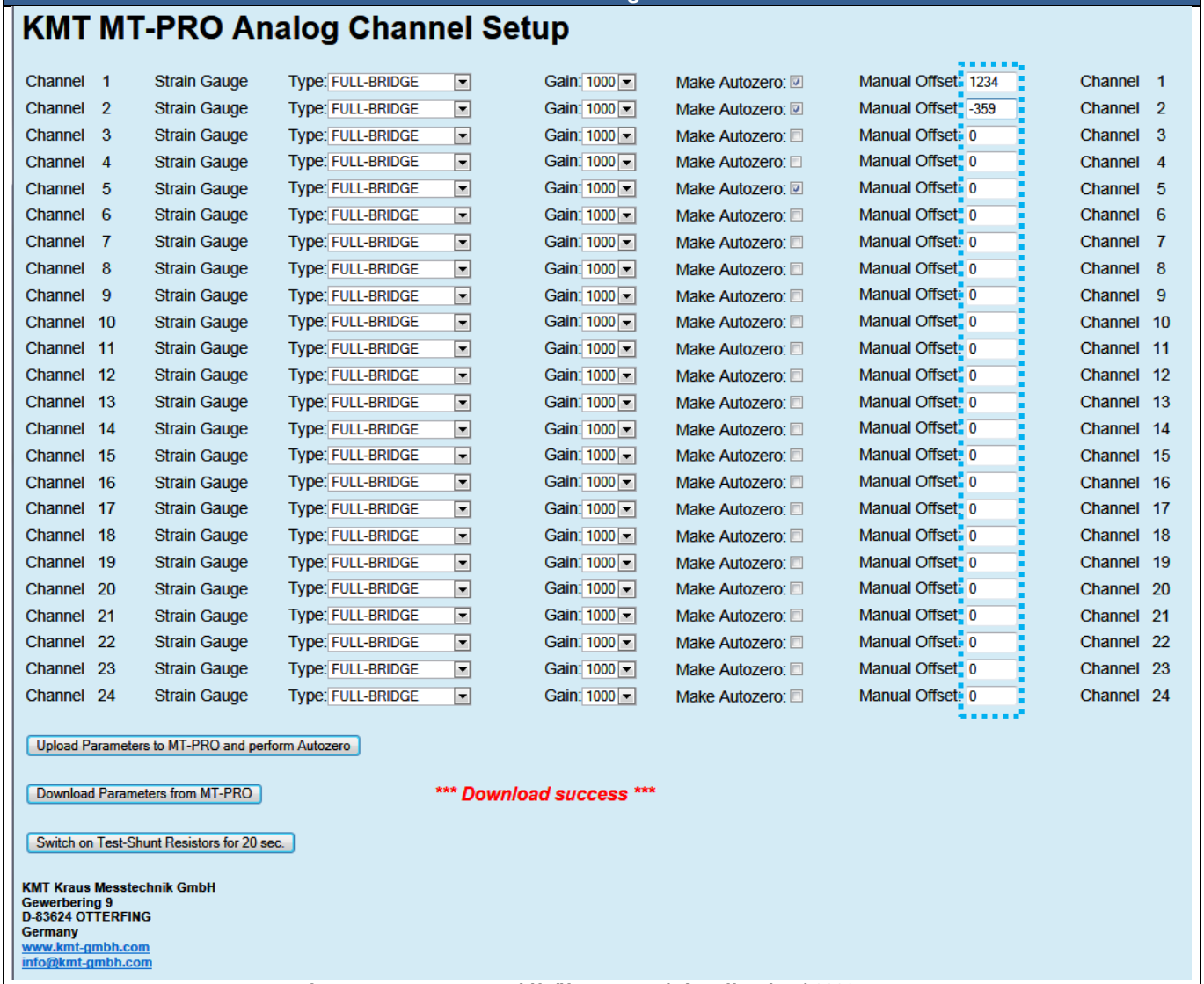
AutoZero setting STG



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

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

Manual Offset shifting after AutoZero



After AutoZero you can shift (if necessary) the offset in +/-2000 steps

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