

# CT16

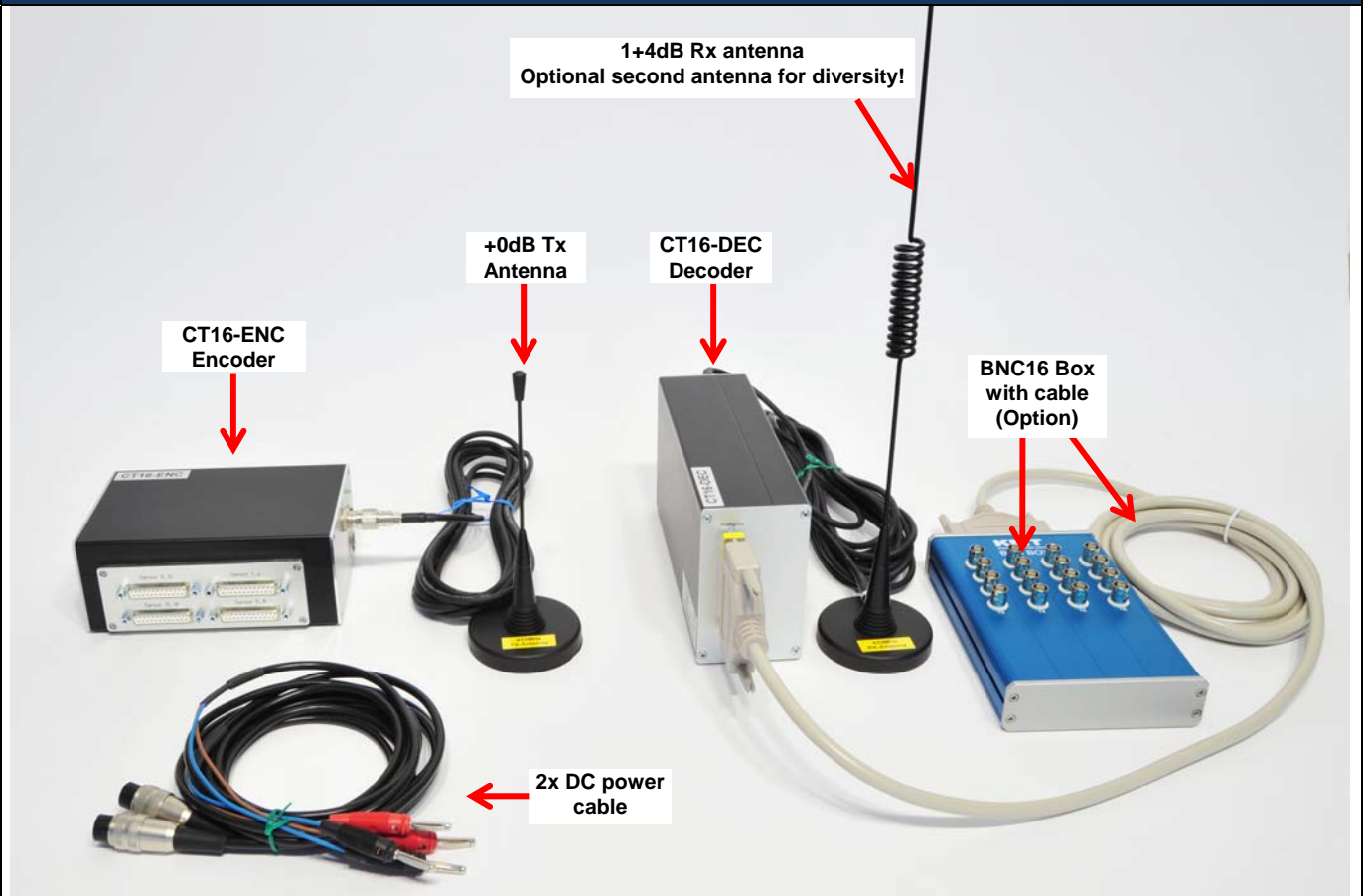
## User Manual



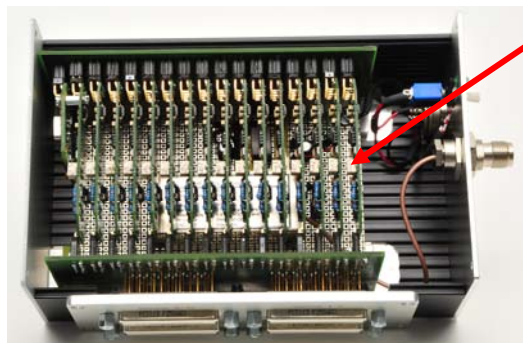
**16-channel telemetry system including signal conditioning for strain gage, thermo couples, Pt100, ICP, POT and high-level inputs**

**INSTRUCTIONS FOR QUALIFIED PERSONNEL ONLY!**

## General functions:



The CT16 Compact is a 16-channel telemetry system with integrated signal conditioning for sensors, wireless digital transmission and analog reproduction. The conditioned measured values are routed via anti-aliasing filter to a 12-bit A/D converter, simulate sampling of all channels, encoded in PCM format and transferred to the HF transmitter as modulation variables. Dynamic range is 72dB with a signal-to-noise ratio of approximately 70dB. Different carrier frequencies available with the Various configurations of different sensor modules are possible like signal conditioning for strain gages (STG), thermocouples type K (Th-K), thermo sensors Pt100, ICP sensors, potentiometer sensors (POT) and also Voltage inputs (+/-5 or +/-10V). Mixed configuration available.



Specify CT-xx modules at order!!

Frequency table	Cut off frequency from anit-aliasing filter (-3dB) and scanning rate (see red)
<b>Bit rate</b>	<b>16 CH.</b>
<b>1280kbit</b>	1500Hz (6530Hz)
<b>640kibt</b>	750Hz (3265Hz)
<b>320kbit</b>	375Hz (1632Hz)
<b>40kbit</b>	47Hz (204Hz)

## CT16-ENC (Encoder)



### Front side with the Sensor inputs

#### CT-STG V1:

Sensor:	strain gage, $\geq 350$ Ohms
Bridge completion:	full, half and quarter-bridge competition 350Ohm
Excitation:	4 VDC (fixed), short-circuit protection up to 20mA
Gain:	200 or 1000 - selectable by solder jumpers Optional Gain: 250-500-1000-2000 with new CT-STG V2 module
Offset	Zero adjustment by potentiometer or <u>optional</u> Auto-zero function (which is not lost by power-off), offset range up to 80% of full scale.

#### CT-TH-K-ISO:

Sensor:	thermo-couple, type K ( with cold junction compensation)
Temperature measuring range:	-50°C to +1000°C (other on request) with galvanic isolation

#### CT-PT100:

Sensor:	resistance temperature detectors (RTDs) with resistance of 100 ohm
Temperature measuring range:	-100°C to +500°C

#### CT-VOLT:

High-level inputs:	+/- 5 Volt or +/- 10 Volt (other ranges on request)
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#### CT-ICP:

Sensor:	For ICP® sensor inputs, Current exc. 4mA (fixed) Signal gain x 2, 4, 8, 16, 32 - Signal bandwidth 3 Hz up to 1500Hz (depended of transmitter)
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#### CT-POT:

Sensor:	Potentiometer Sensor >350 Ohms to 10kOhm
Excitation:	4 VDC (fixed)

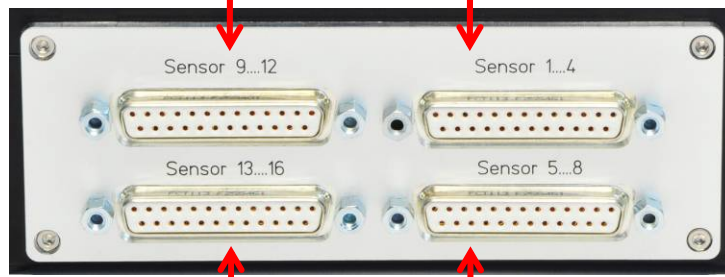
#### System Parameters:

Channels:	16
Resolution:	12 bit A/D converter with anti aliasing filter, simultaneous sampling of all channels
Line-of-sight distance:	500 m with 10mW transmitting power (433MHz Band, 40kbit, FSK modulation)
Powering:	10-30V DC
Power consumption:	400 mA (at 12V) using 16 STG sensors at 350 Ohms and 40kbit transmitter
Analog signal bandwidth:	*(-3dB cut-off frequency)

Dimensions:	165 x 105 x 65mm (without connectors)
Weight:	0.970 kg (without cables)
Transmission:	Digital PCM Miller format - FSK
Transmission Power:	10mW
Operating temperature:	- 20 ... +70°C
Housing:	Aluminum
Humidity:	20 ... 80% no condensing
Static acceleration:	100g in all directions
Shock:	200g in all directions

## CT16-ENC - Functions:

25-pole female Sub-D input for sensors



Auto Zero switch (Option)



Female TNC antenna connector

Power ON LED

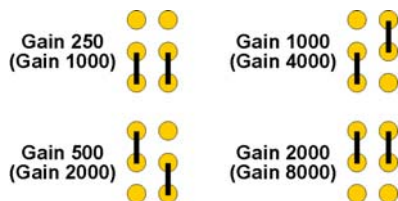
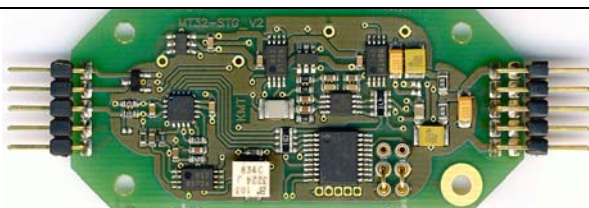
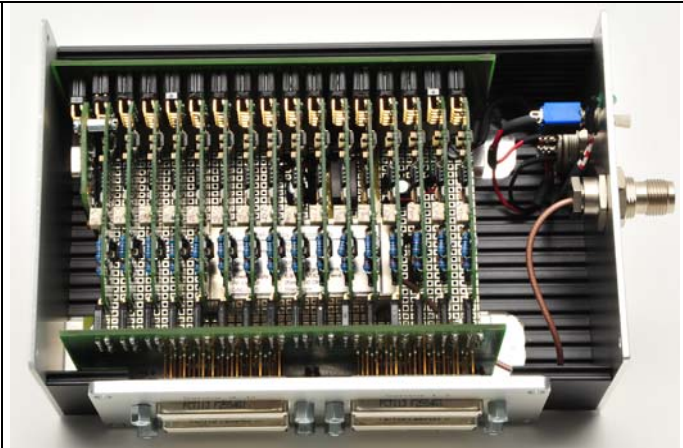
Power switch

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

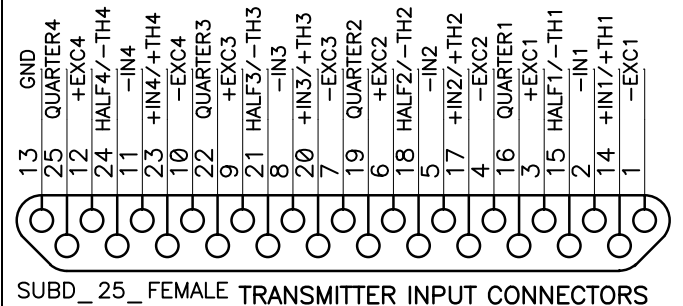
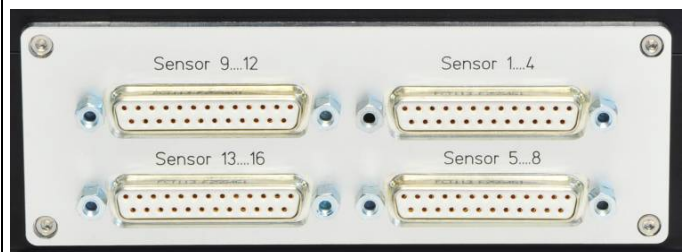


Gain 1000 ↑↑ Gain 200

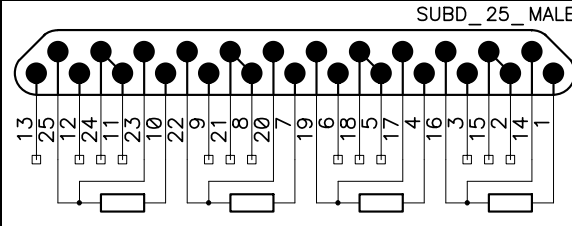
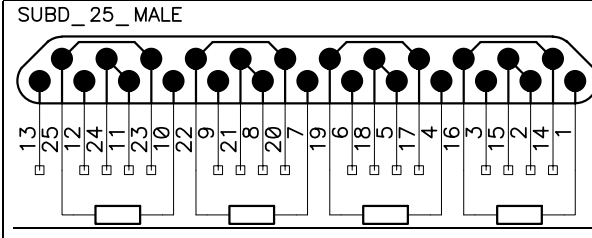
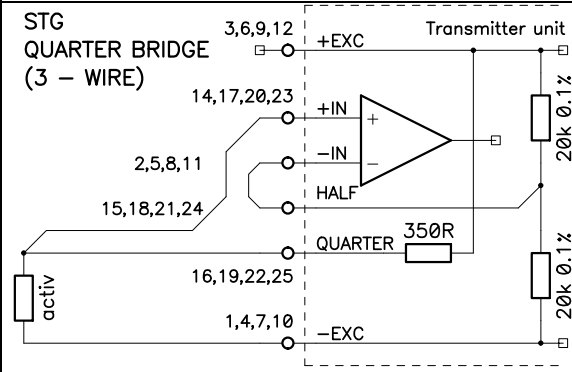
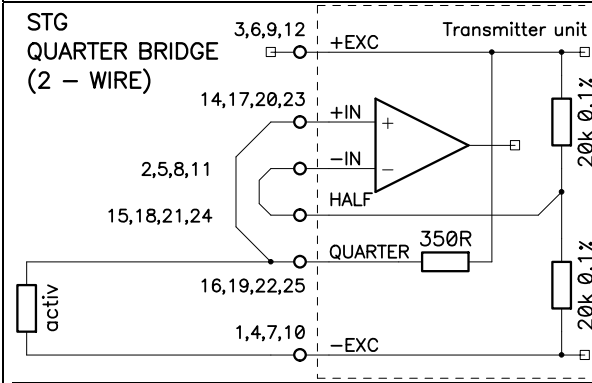
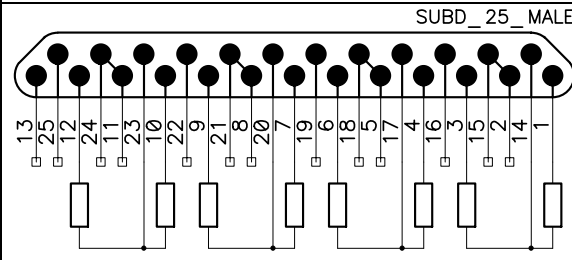
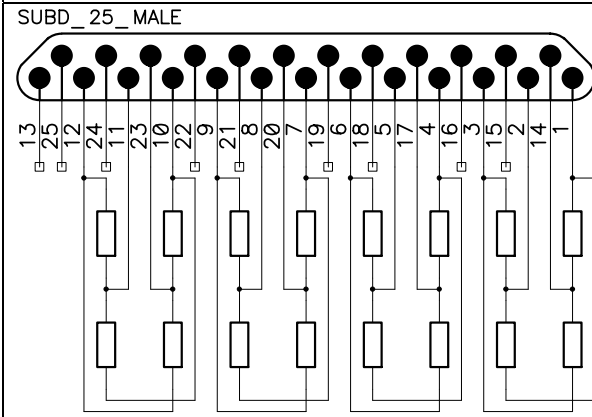
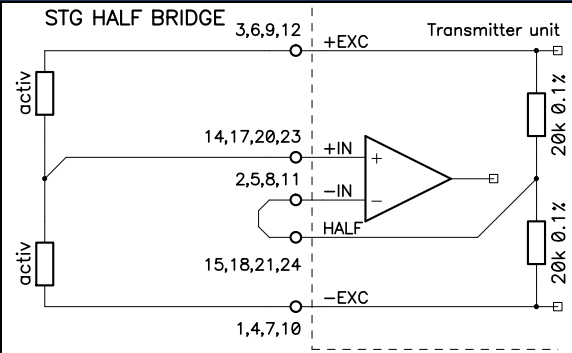
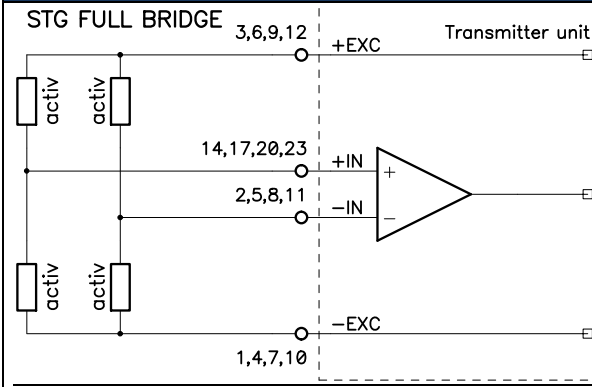
**CT-STG-V1 module**  
 Type: Strain gage >350 Ohms  
 Excitation: 4 VDC (fixed)  
 Gain: 200 or 1000 by solder bridge  
 Accuracy: +/- 0.25%



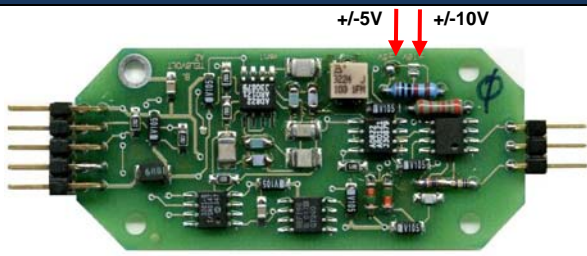
**CT-STG-V2 module**  
 Type: Strain gage >350 Ohms  
 Excitation: 4 VDC (fixed)  
 Gain: 250-500-1000 or 2000 by jumper or on request 1000-2000-4000-8000  
 Accuracy +/- 0.25%



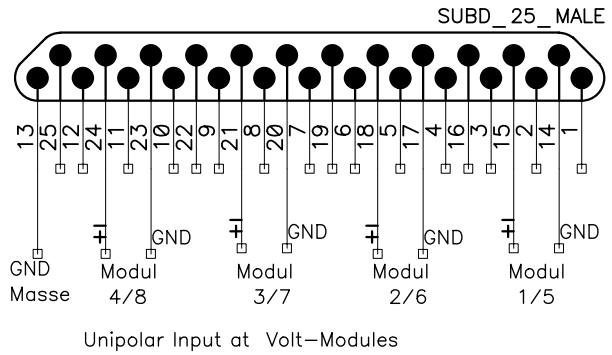
## Connection STG - Bridge



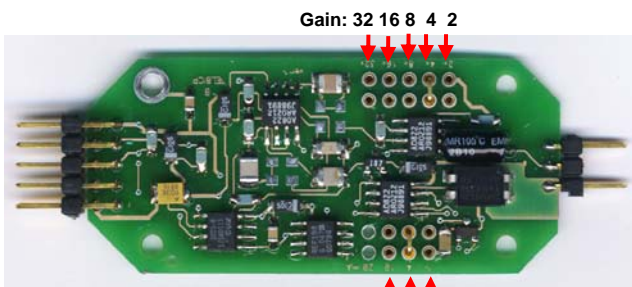
### Connection CT-Volt



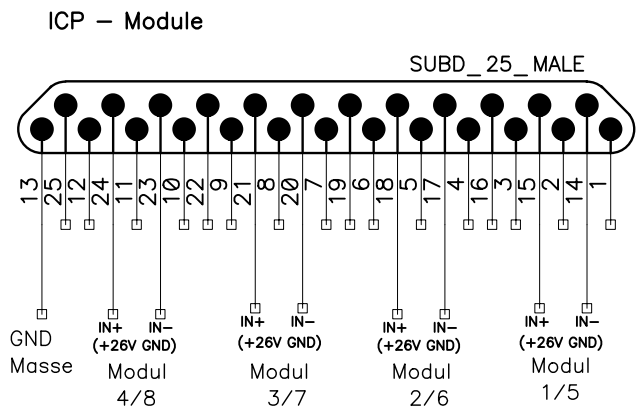
CT-Volt module  
 Type: Volt  
 Range: +/-5 or +/-10V  
 Accuracy: +/- 0.25%



### Connection CT-ICP



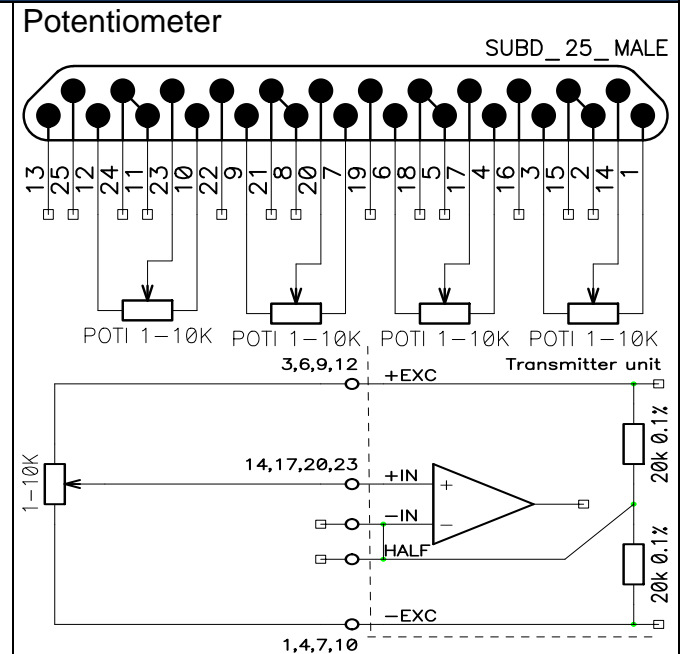
CT-ICP module  
 Type: ICP  
 Gain: 2x, 4x, 8x, 16x or 32x  
 Constant current: 1, 4 or 10mA  
 Accuracy: +/- 0.25%



### Connection CT-POT



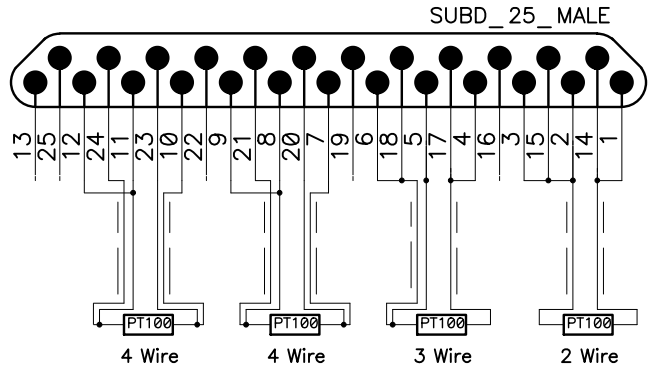
CT-POT module:  
 Sensor: Potentiometer Sensor >350 Ohms to 10kOhm  
 Excitation: 4 VDC (fixed)  
 Accuracy: +/- 0.25%



## Connection CT-Pt100



CT-Pt100  
 Type: RTD 100 ohm  
 Range: -100 to 500°C  
 Accuracy +/- 0.25%

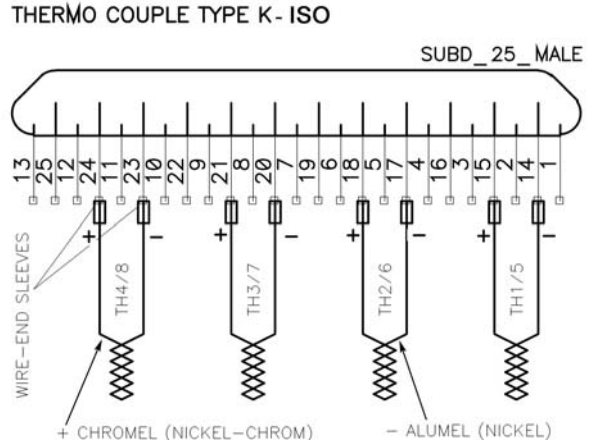


Temperature [°C]	Output [V]	Temperature [°C]	Output [V]	Temperature [°C]	Output [V]
-100	-0,997	150	1,500	400	4,004
-50	-0,497	200	2,001	450	4,498
0	0,001	250	2,501	500	4,999
50	0,499	300	3,001		
100	1,000	350	3,501		

## Connection CT-TH-K-ISO (with galvanic isolation!)



Thermo couple  
 Type: K  
 Range: -50°C – 1000°C  
 Bandwidth: 0-20Hz (more on request)  
 Accuracy +/- 1%



Temperature [°C]	Output [V]	Temperature [°C]	Output [V]	Temperature [°C]	Output [V]	Temperature [°C]	Output [V]
-50	-0.220	250	1.236	550	2.754	850	4.262
0	0.013	300	1.482	600	3.010	900	4.506
50	0.254	350	1.734	650	3.266	950	4.746
100	0.504	400	1.990	700	3.519	1000	4.980
150	0.752	450	2.242	750	3.700		
200	0.992	500	2.498	800	4.015		

# CT-DEC16 Receiver unit for max 16 Channels output via 37 pol. Sub D

## Front side view

Female 37 pole Sub-D for analog signal output, CH 1 to 16

## Rear side view

Auto Zero LED  
Bright on, if analog output is over 60mV

Out of function!

Power Switch

Transmission error LED  
Fuse of powering defect LED

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

PCM out for IP-LAN-Interface (Opt.)

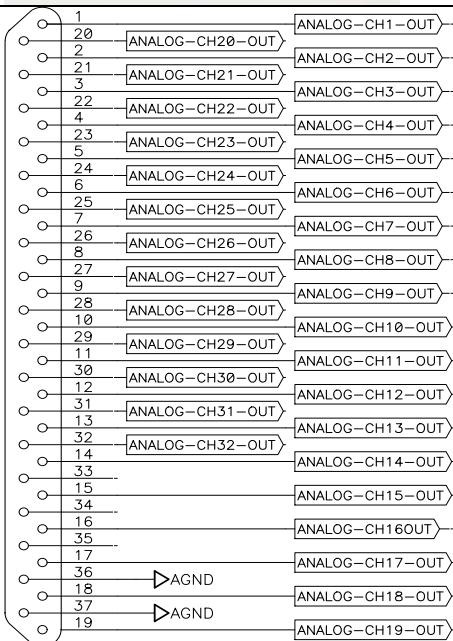
AZ 1-8 9-16

Level

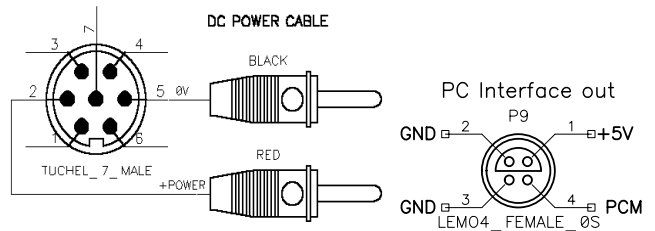
HF -Field strength display

Antenna

SMA antenna connector with active LED of antenna (diversity)



Plug-side



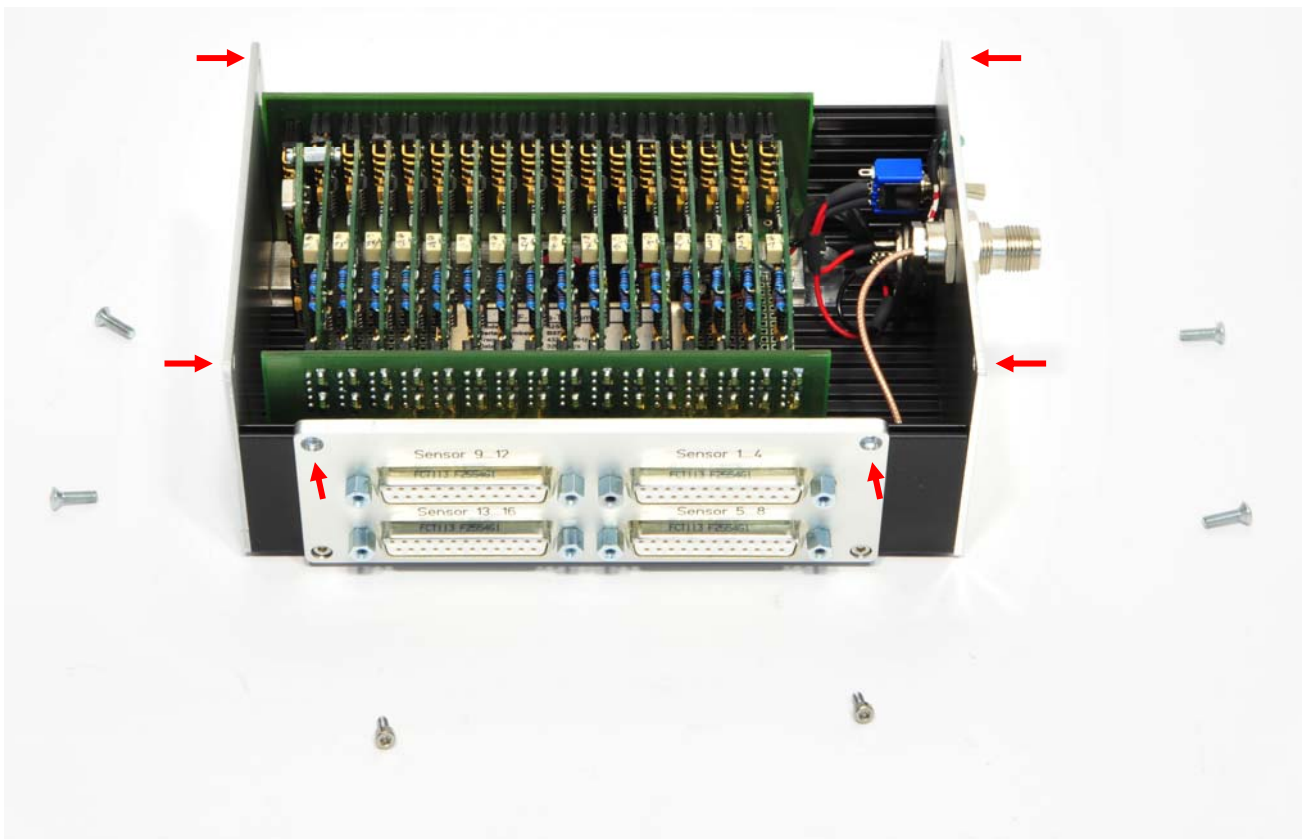
Optional BNC16 Box. Connect on 37pol Sub-D

## CT16- -DEC16 System Parameters:

Channel:	16x +/-5V (+/-10V Option) analog outputs via Sub-D male socket
Resolution:	12 bit D/A converter, with smoothing filter
Dynamic:	72dB
Power supply input:	10-30 VDC, power consumption 10 Watt
Current consumption:	300mA at 10V, 100mA at 30V
Transmission:	Digital PCM Miller Format – FSK, diversity receiver
Dimensions:	205 x 105 x 65mm
Weight:	1.25 kg without cables and antenna
Overall system accuracy between encoder input and decoder output:	+/-0.25% without sensor influences
Environmental	
Operating:	-20 ... +70°C
Humidity:	20 ... 80% not condensing
Vibration:	5g Mil Standard 810C, Curve C
Static acceleration:	10g in all directions
Shock:	100g in all directions



## How to open CT16-ENC



Open this 6 screws and remove the cover

CT16-ENC VOLT modules input +/-5 or +/-10V

Factory setting +/-5V

