

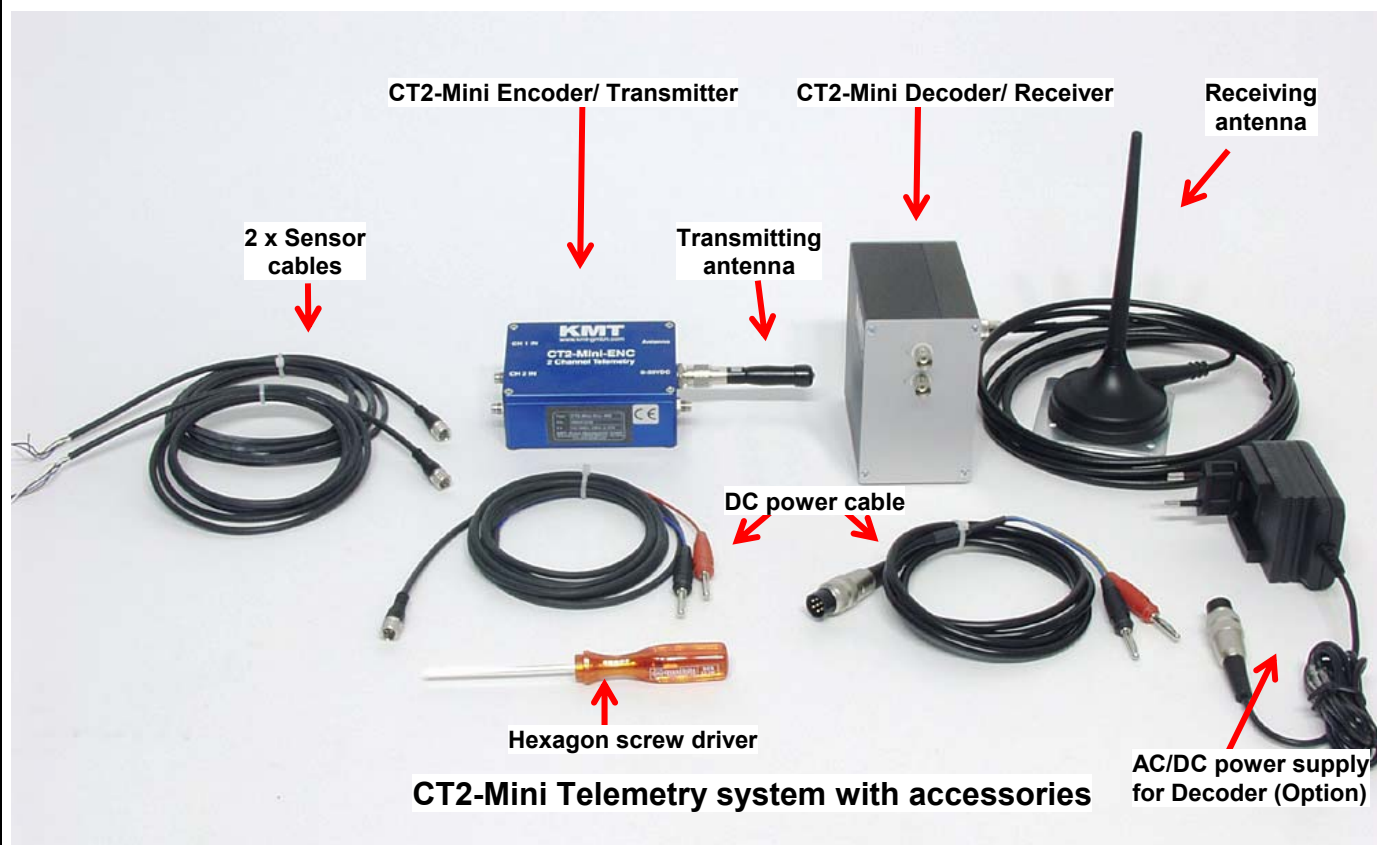
CT2-Mini

User manual

Version 1.7-2005



General functions:



CT2-Mini is a 2-channel telemetry system designed for easy mounting onto rotating and moving parts to provide non-contact transmission of measured parameters such as pressure, force, temperature, acceleration and voltage. Also for point to point application like bridge or buildings testing, you can install CT2 Mini instead long cables from the sensor to the Computer.

Sensors inputs are connected via screw on, waterproof connectors. Measured values are prepared in analog format, digitized and transmitted via radio frequencies. Four different carrier frequencies are provided, this allows up to four systems (e.g. for four wheels) to operate in parallel. The complete transmitter assembly is waterproofed to IP65 specifications.

The following sensors can be connected to the system: (STG) Strain gages sensors in full-, and half- bridge configuration (350 ohm or greater), Type K Thermocouples to 900°C, ICP and capacitive sensors. Voltage inputs of +/-5V and +/-10V are available.

The measured values are processed and output as +/-5V analog signals at the BNC sockets (optional digital output for special PCM interface into a PC) on the stationary receiver located in a vehicle or helicopter cabin.

Resolution of 12 bits is standard; this enables an amplitude dynamic of 72 dB. The analog signal bandwidth is 2 x 0-375 Hz. The measurement accuracy is +/-0.5 % (without sensor). The CT2-Mini is suited for operation at ambient temperatures of -20 to +70°C. The transmission distance between transmitter and receiving antenna is of the order of 250 m (10mW transmitting power) (750 feet) or up to 5km with optional power booster (250mW transmitting power) and special power antennas (polarization antenna +10dB on transmitting and receiving side) .

Cut off frequency from anti-aliasing filter (-6dB) & scanning rate (see red)

Bit rate	per channel
40 kbit/s	375 Hz (1428 Hz)
320 kbit/s	3000 Hz (11428 Hz)

CT2 Mini Transmitting Unit Technical Data (Encoder)



SC Module STG:

Sensor:	strain gage, > 350 Ohms
Bridge completion:	full and half bridge
Excitation:	4 VDC (fixed), short-circuit protection up to 20mA
Gain:	200 or 1000 - selectable by solder jumpers (5mV/V or 1mV/V)
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.
Signal bandwidth:	<u>0...375 Hz -6dB</u> (<u>optional</u> 0-3000Hz)

SC Module ICP:

Constant current:	1, 4, or 10mA
Gain:	2x, 4x, 8x, 16x or 32x
Signal bandwidth:	3...375 Hz -6dB (<u>optional</u> 3-3000Hz)

SC Module POT:

Sensor:	Potentiometer Sensor >350 Ohms
Excitation:	4 VDC (fixed)
Signal bandwidth:	0...375 Hz -6dB (<u>optional</u> 0-3000Hz)

SC Module TH-K:

Sensor:	thermo-couple, type K (with cold junction compensation)
Temperature measuring range:	0°C to +900°C (other on request)

SC Module VOLT:

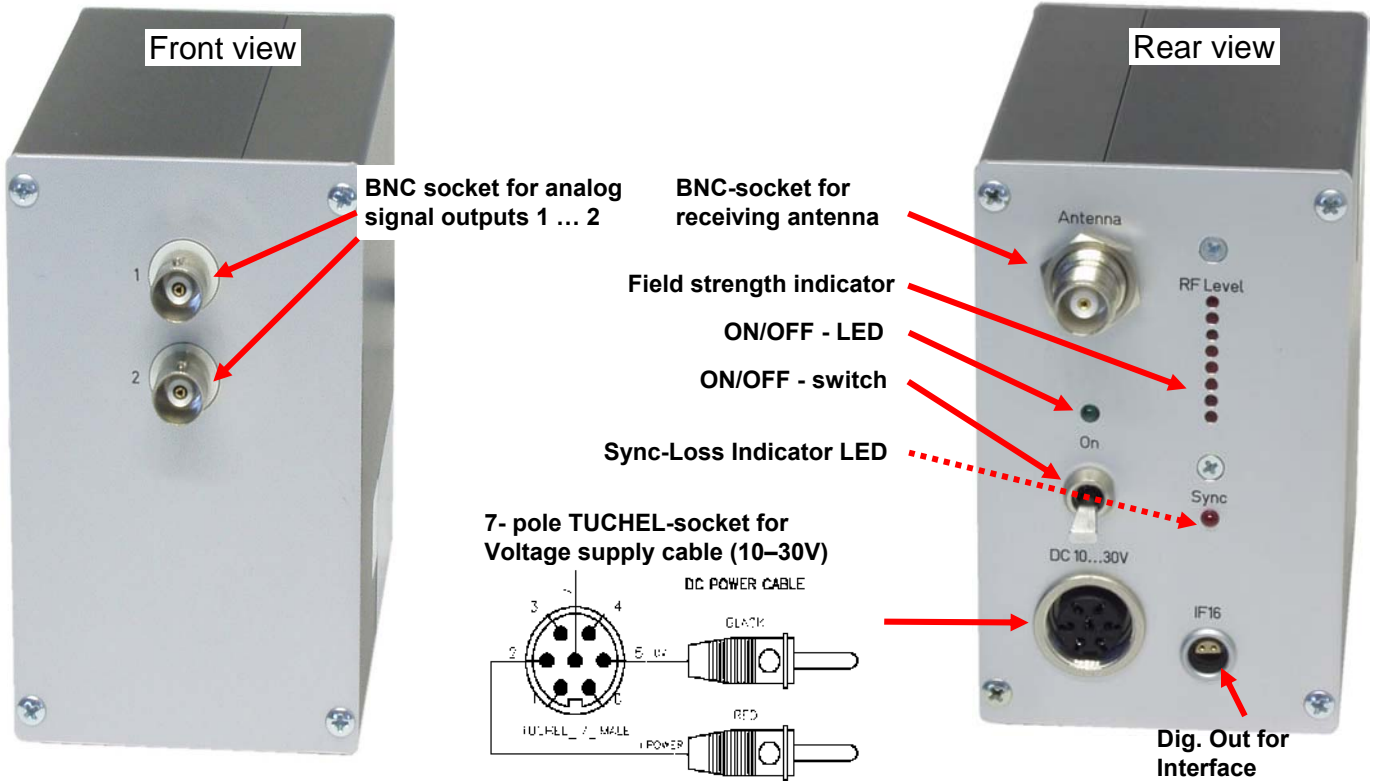
High-level inputs:	+/- 5 Volt or +/- 10 Volt
Signal bandwidth:	0...375 Hz -6dB (<u>optional</u> 0-3000Hz)

System Parameters:

Channels:	2
Resolution:	12 bit A/D converter with anti aliasing filter, simultaneous sampling of all channels
Line-of-sight distance:	250 m with 10mW transmitting power, (433MHz Band, FSK modulation) 5 km with 250mW booster transmitting power and special 10dB antennas (option)
Powering:	6-30 V DC
Power consumption:	100 mA at 12V using 2 STG sensors at 350 Ohms
Analog signal bandwidth:	2 x 0 ... 375Hz with 40 kbit/s transmitter (-6dB cut-off frequency at receiver side) 2 x 0... 3000Hz with 320kbit/s transmitter (-6dB cut-off frequency at receiver side) Option
Transmitter carrier frequency:	433.3, 433.7, 434.1 or 434.5MHz with 40 kbit/s, 10mW or 1x 433MHz 320 kbit/s, 10mW
Transmission:	Digital PCM Miller format - FSK
Transmission Power:	10mW (enable a range up to 250m) or optional 250mW booster (only 40kb) transmitting power
Weight:	0.45 kg without 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
Shock:	200g in all directions

Technical specifications are subject to change without notice!

Technical data:
Receiving Unit CT2-Mini DEC (Decoder)



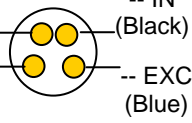



System Parameters:


Channel:	2 analog outputs via (BNC) +/-5V
Resolution:	12 bit D/A converter, with smoothing filter
Dynamic:	72dB
Power supply input:	10-30 VDC
Current consumption:	300mA at 10V, 100mA at 30V
Carrier frequencies:	433.3, 433.7, 434.1 and 434.5 MHz with 40 kbit/s transmitting rate FSK modulation 433.3 MHz with 320kbit transmitting rate FSK modulation (Option)
Dimensions:	205 x 105 x 65mm
Weight:	1.25 kg without cables and antenna
Overall system accuracy between encoder input and decoder output:	+/-0.5% without sensor influences
<u>Environmental</u>	
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

Technical specifications are subject to change without notice!


Connection, STG bridge configuration: CT2-Mini ENC (encoder)

 <p style="text-align: center;">Sensor cable</p>	<p>Black = IN - White = IN + Brown = EXC + Blue = EXC -</p>	 <p style="text-align: center;">Sensor socket</p>	<p>STG module</p> <p>Type: Strain gage >350 Ohms Excitation: 4 VDC (fixed) Gain: 200 or 1000</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>+ IN (White)</p>  <p>+ EXC (Brown)</p> </div> <div style="text-align: center;"> <p>-- IN (Black)</p> <p>-- EXC (Blue)</p> </div> </div> <p style="text-align: right;">Sensor plug CT2-Mini ENC ➔</p> 
---	---	--	--


1/1 or 1/2 Bridge




Zero via Potentiometer (standard)



Auto Zero Switch

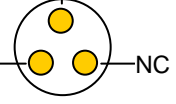


Antenna OUT

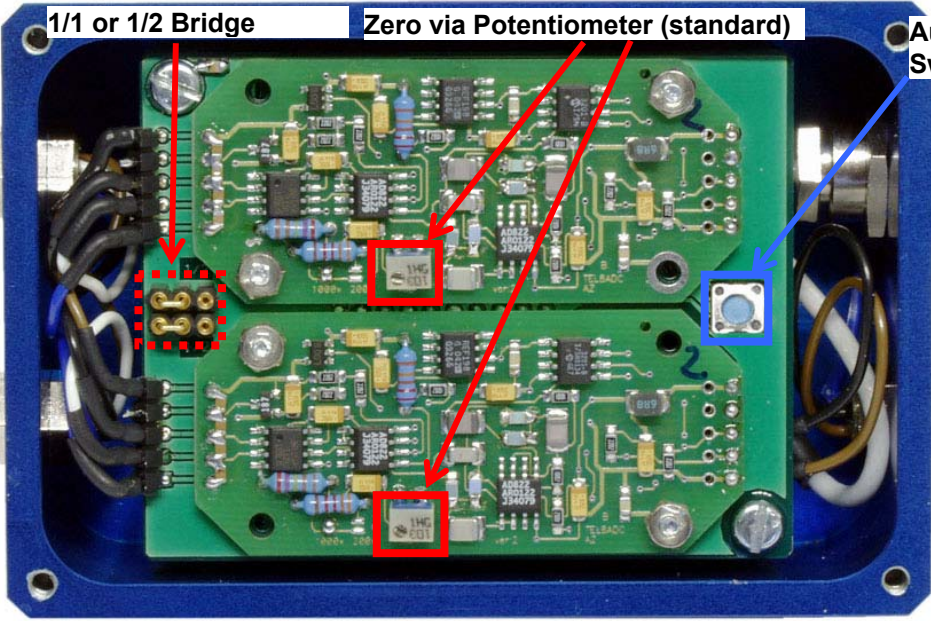


Powerin

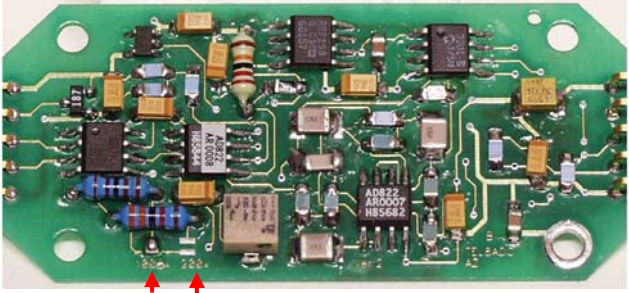
GND (Black)




10-30VDC (Brown)




Gain 200 or 1000 by solder bridge



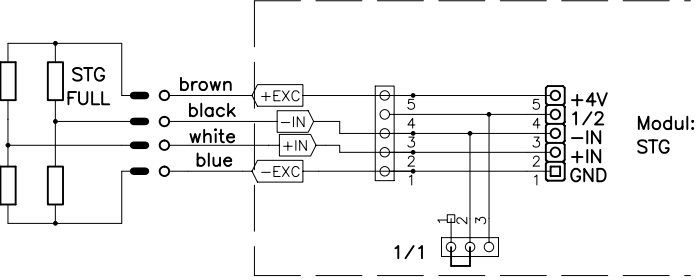
Gain 1000



Gain 200

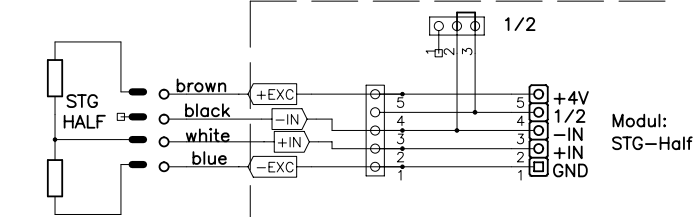


Modul: STG

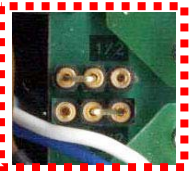


1/1



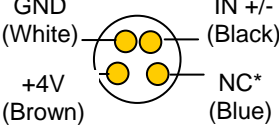

Modul: STG-Half



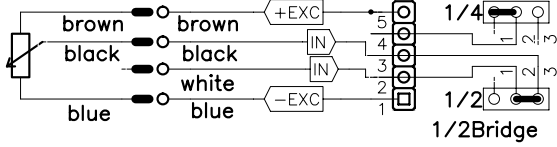


1/2

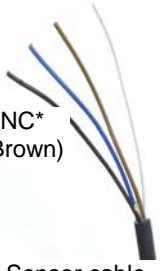

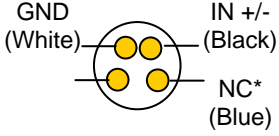



Connection POT:


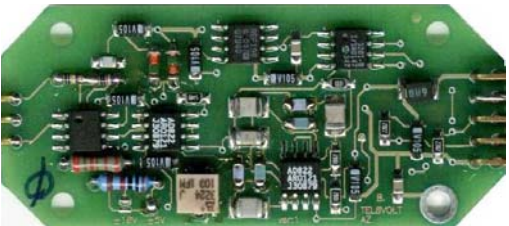
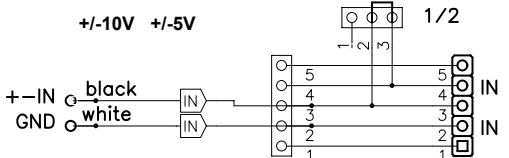
 <p>Sensor cable</p>	<p>Black = IN +/- White = GND Brown = +4V Blue = NC*</p> <p>*NC= not connected</p>	 <p>Sensor socket</p>	<p>POT module</p>  <p>Sensor plug CT2-Mini ENC</p> 
---	--	--	---

<p>POT module (=special type off STG) Type: Potentiometer >350 Ohms Excitation: 4 VDC (fixed)</p> <p><u>Attention:</u> The POT modules must be configured as a Half Bridge Unit.</p> <p><u>Don't change offset and gain!!</u></p>	 <p>Half bridge setting</p>	 
--	--	---

Connection Volt, ICP, TH-K module

 <p>NC* (Brown)</p> <p>Sensor cable</p>	<p>Black = IN +/- White = GND Brown = NC* Blue = NC*</p> <p>*NC= not connected</p>	 <p>Sensor socket</p>	<p>Volt module</p>  <p>Sensor plug CT2-Mini ENC</p> 
---	--	---	---

Connection Volt

<p>Volt module Type: Volt Range: +/-5 or +/-10V</p> <p><u>Attentions:</u> At Volt modules must plug the plug bridge on Half Bridge Unit.</p> <p><u>Don't change offset!!</u></p>	 <p>Half bridge setting</p>	 
--	--	---

Connection ICP

ICP module

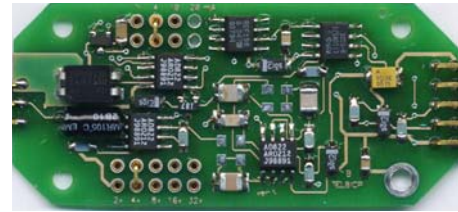
Type: ICP
 Gain: 2x, 4x, 8x, 16x or 32x
 Constant current: 1, 4 or 10mA

Attentions:
 At **ICP modules** must plug the plug bridge on **Half Bridge Unit**.

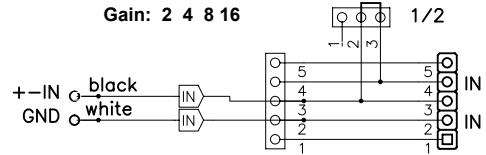


Half bridge setting

Current: 1 4 10



Gain: 2 4 8 16



Connection Th K

Thermo couple

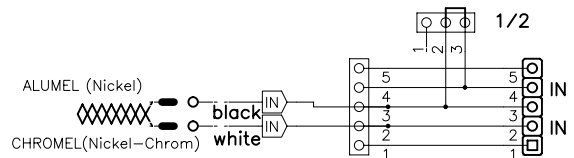
Type: K
 Range: 0 – 1000°C

Attentions:
 At **Thermo couple** must plug the plug bridge on **Half Bridge Unit**.

Don't change offset!!



Half bridge setting



Temperature [°C]	Output [V]	Temperature [°C]	Output [V]	Temperature [°C]	Output [V]	Temperature [°C]	Output [V]
0	-5,003	250	-2,546	500	0,002	750	2,558
50	-4,515	300	-2,044	550	0,515	800	3,061
100	-4,009	350	-1,538	600	1,031	850	3,550
150	-3,516	400	-1,029	650	1,542	900	4,035
200	-3,031	450	-0,515	700	2,052	1000	5,000



Declaration of Conformity

Herewith we declare that our product:

”CT2-Mini Telemetry System”

corresponds to our Technical Construction Files and Test Reports and is conform to all relevant essential requirements of the R&TTE-Directive 1999/5/EC, issued March 9, 1999. According to Annex III of the R&TTE Directive the following harmonized standards and essential radio test suites, published in the "Official Journal" of the European communities, have been used to demonstrate the conformity of the product:

Radio and Spectrum engineering parameters: EN 300 220-3
Electromagnetic Compatibility EMC: EN 301 489-01 and EN 301 489-03
Electrical safety (without application of voltage limits according to Art. 3 (1) (a) of R&TTE Directive): EN 60 950

The device was tested in a typical situation.

Otterfing, 30.10.2003

KMT Kraus Messtechnik GmbH

Martin Kraus

Email: martin.kraus@kmt-gmbh.com



Kraus Messtechnik GmbH
Gewerbering 9
D-83624 Otterfing - Germany
Tel. 08024-48737 - Fax 08024-5532
www.kmt-gmbh.com



EN 50419

