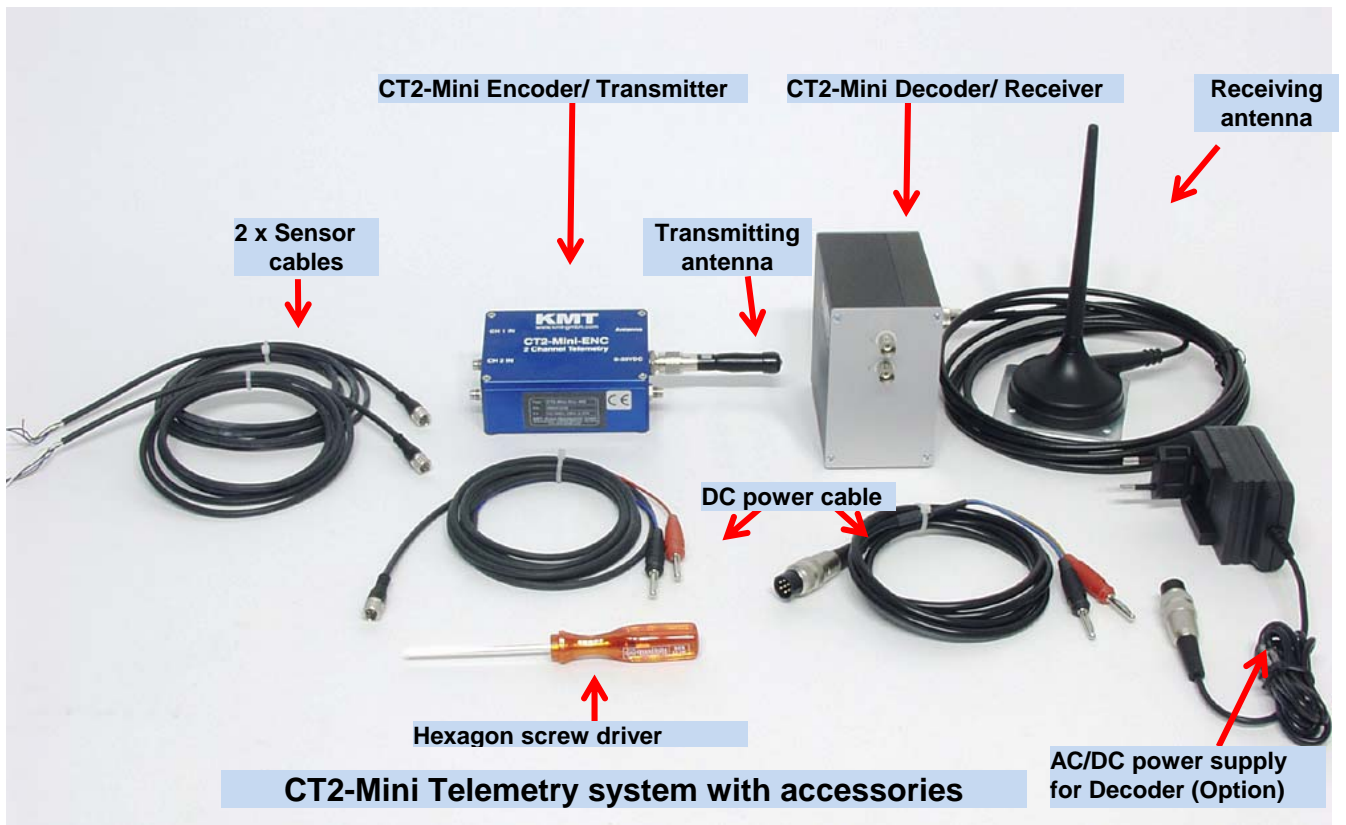


CT2-Mini

User manual



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 1000°C, ICP, potentiometers sensors 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.

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 +/-0.25 % (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)

CT2-Mini Diversity Receiver



CT2-Mini Telemetry system with diversity receiver (two receiver antennas)

CT2 Mini Transmitting Unit Technical Data (Encoder)



CT-STG-V1:

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 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.
Signal bandwidth:	0...375 Hz -3dB (<u>optional</u> 0-3000Hz)

CT-ICP:

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

CT-POT:

Sensor:	Potentiometer Sensor >350 Ohms to 10kOhms
Excitation:	4 VDC (fixed)
Signal bandwidth:	0...375 Hz -3dB (<u>optional</u> 0-3000Hz)

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, Accuracy 1%
Signal bandwidth:	0...10 Hz -3dB

CT-PT100:

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

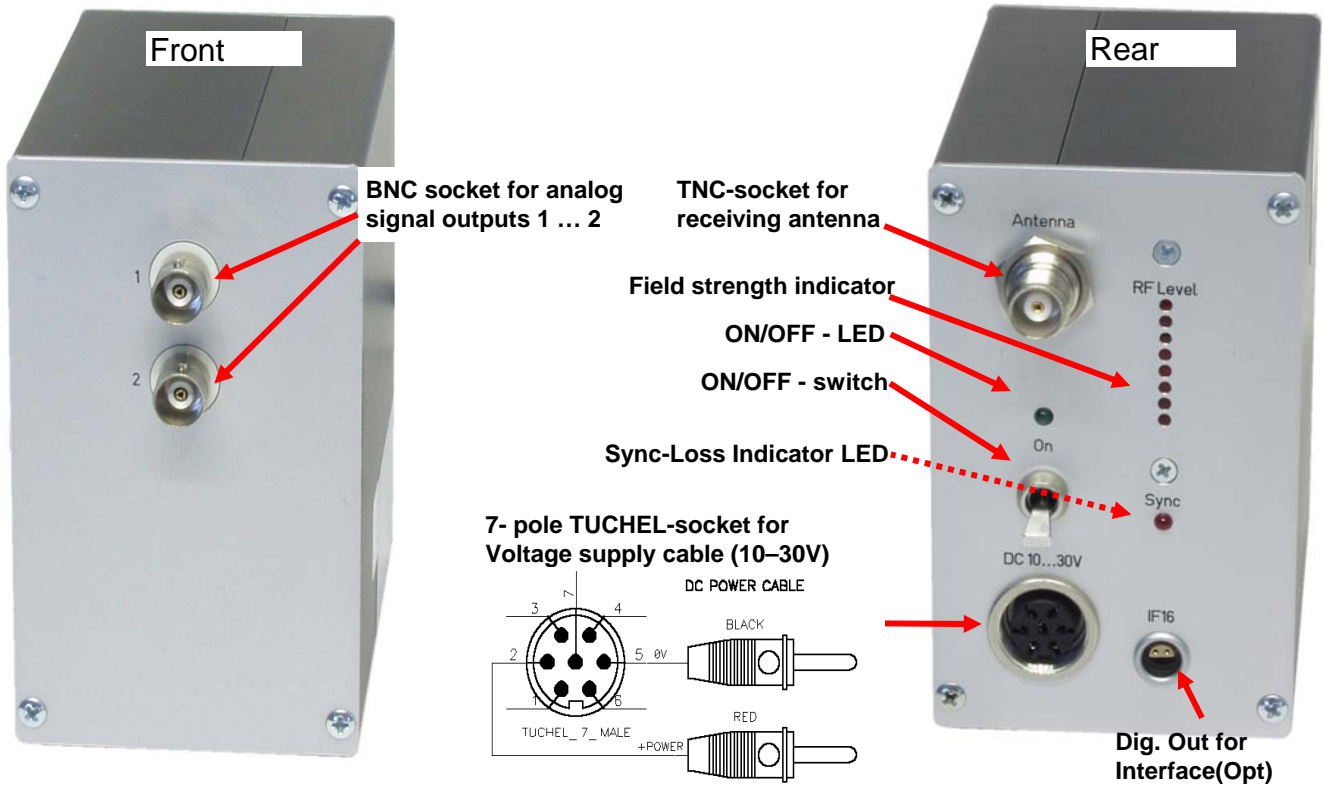
CT-VOLT:

High-level inputs:	+/- 5 Volt or +/- 10 Volt
Signal bandwidth:	0...375 Hz -3dB (<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 (-3dB cut-off frequency at receiver side) 2 x 0... 3000Hz with 320kbit/s transmitter (-3dB cut-off frequency at receiver side) Option
Transmitter carrier frequency:	433MHz, CH1-4; 868MHZ, CH1-4 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
Dimensions:	102 x 68 x 41 mm (without connectors)
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 data: Receiving Unit CT2-Mini DEC (Decoder)



System Parameters:

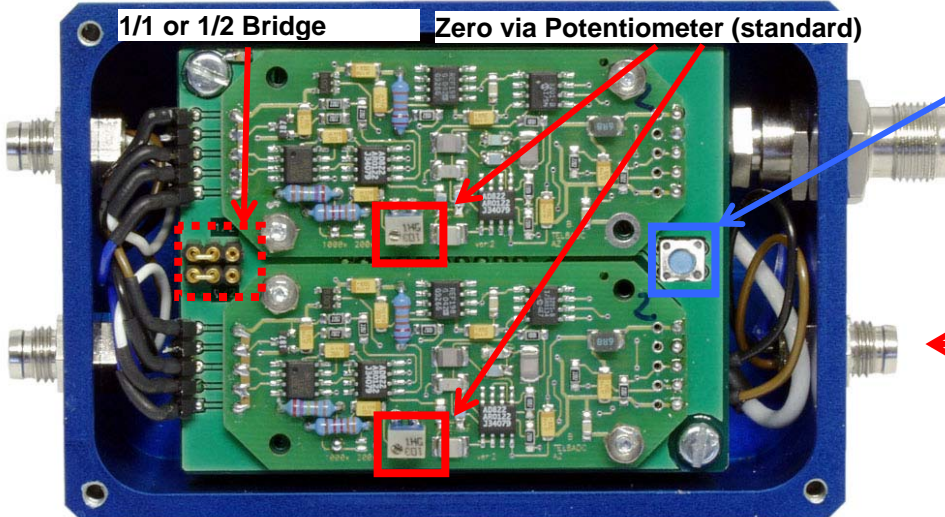
Channel:	2 analog outputs via (BNC) +/-5V
Resolution:	12 bit D/A converter, with smoothing filter
Dynamic:	72dB
Power supply input:	10-30 VDC
Current consumption:	300mA at 10V, 100mA at 30V
Carrier frequencies:	433MHz, CH1-4; 868MHz, CH1-4 with 40 kbit/s transmitting rate FSK modulation 433.3 MHz with 320kbit transmitting rate FSK modulation (Option)
Dimensions:	105 x 105 x 65mm
Weight:	0.60 kg without cables and antenna
Overall system accuracy between encoder input and decoder output:	+/-0.25% 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

Cut off frequency from anit-aliasing filter & scanning rate (see red)

Bit rate	per channel
40 kbit/s	375 Hz (-3dB) (1428 Hz)
320 kbit/s	3000 Hz (-3dB) (11428 Hz)
640 kbit/s	6000 Hz (-3dB) (22875 Hz)
1280 kbit/s	12000 Hz (-3dB) (45714 Hz)

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

 <p>Sensor cable</p>	<p>Black = IN - White = IN + Brown = EXC + Blue = EXC -</p>	 <p>Sensor socket</p>	<p>STG module</p> <p>Type: Strain gage >350 Ohms Excitation: 4 VDC (fixed) Gain: 200 or 1000 Accuracy +/- 0.25%</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;">  </div> <div style="text-align: center;"> <p>-- IN (Black)</p> <p>-- EXC (Blue)</p> </div> </div> <p>Sensor plug CT2-Mini ENC</p> 
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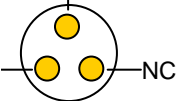
1/1 or 1/2 Bridge

Zero via Potentiometer (standard)


Auto Zero Switch (option) Only for STG

Antenna OUT (TNC)

Powering
GND (Black)
10-30VDC (Brown) NC

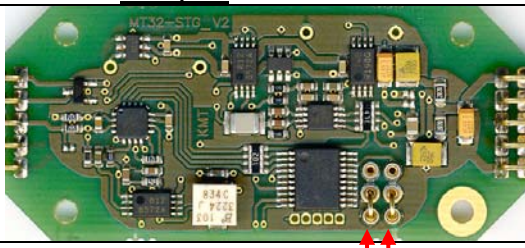


CT-STG-Version V1 Gain 200 or 1000 by solder bridge




Gain 1000 ↑ ↑ Gain 200


CT-STG-Version V2 Gain 250-500-1000 or 2000 by jumper or on request 1000-2000-4000-8000




Gain 250
(Gain 1000)




Gain 1000
(Gain 4000)



Gain 500
(Gain 2000)

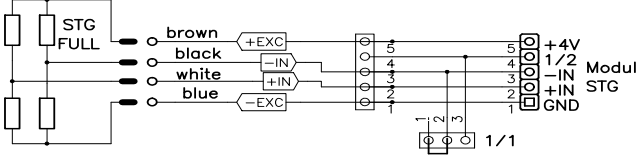


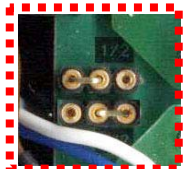
Gain 2000
(Gain 8000)



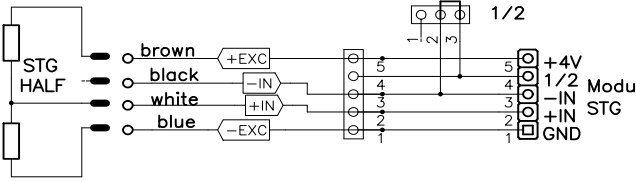
Gain 1000-2000-4000-8000 on request!

STG FULL



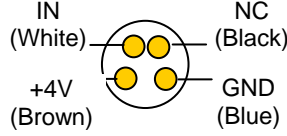



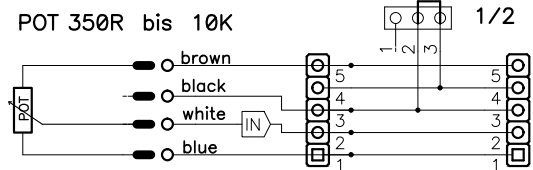






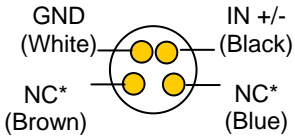


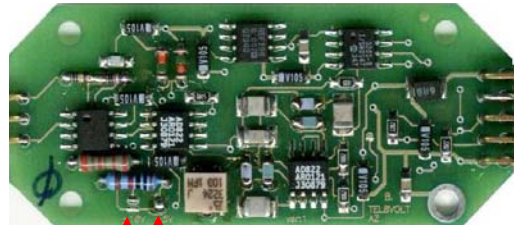
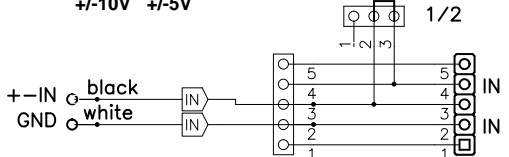
STG HALF





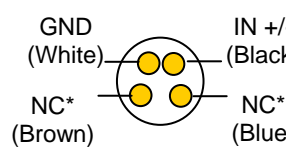


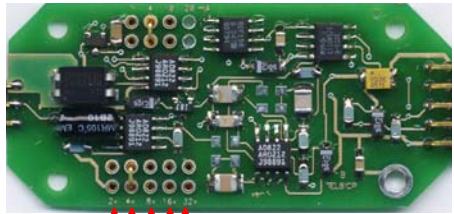
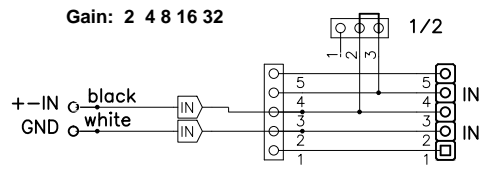
Connection CT-POT:

 <p>Sensor cable</p>	<p>Black = NC* Blue = GND Brown = +4V White = IN</p> <p>*NC= not connected</p>	 <p>Sensor socket</p>	<p>CT-POT module for potentiometer sensors</p> <div style="display: flex; align-items: center; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>Sensor plug CT2-Mini ENC</p>  </div> </div> <p style="text-align: center; color: red; font-weight: bold;">➔</p>
<p>CT-POT (=special type off STG) Type: Potentiometer >350Ohm to 10kOhm Excitation: 4 VDC (fixed) Accuracy +/- 0.25%</p> <p><u>Attention:</u> The POT modules must be configured as a Half Bridge Unit. <u>Don't change offset and gain!!</u></p>		 <p>Half bridge setting</p>	 <div style="text-align: center;"> <p>POT 350R bis 10K</p>  </div>



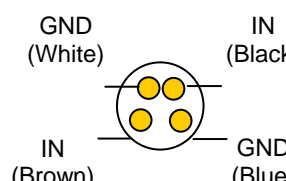



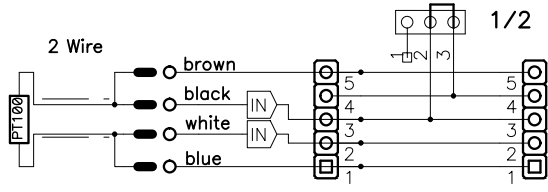
Connection CT-Volt module

 <p>Sensor cable</p>	<p>Black = IN +/- White = GND Brown = NC* Blue = NC*</p> <p>*NC= not connected</p>	 <p>Sensor socket</p>	<p>CT-Volt module</p> <div style="display: flex; align-items: center; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>Sensor plug CT2-Mini ENC</p>  </div> </div> <p style="text-align: center; color: red; font-weight: bold;">➔</p>
<p>CT-Volt Type: Volt Range: +/-5 or +/-10V Accuracy +/- 0.25%</p> <p><u>Attentions:</u> At Volt modules must plug the plug bridge on Half Bridge Unit. <u>Don't change offset!!</u></p>		 <p>Half bridge setting</p>	 <div style="text-align: center;"> <p>+/-10V +/-5V</p>  </div>

Connection CT-ICP module



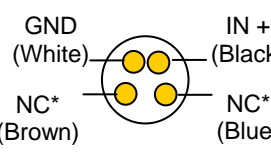


 <p style="text-align: center;">Sensor cable</p>	<p>Black = IN +/- White = GND Brown = NC* Blue = NC*</p> <p><small>*NC= not connected</small></p>	 <p style="text-align: center;">Sensor socket</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>Sensor plug CT2-Mini ENC</p>  </div> </div>
<p>CT-ICP Type: ICP Gain: 2x, 4x, 8x, 16x or 32x Constant current: 1, 4 or 10mA Accuracy +/- 0.25%</p> <p><u>Attentions:</u> At ICP modules must plug the plugbridge on Half Bridge Unit.</p>		 <p style="text-align: center;">Half bridge setting</p>	<p>Current: 1 4 10</p>  <p style="text-align: center;">Gain: 2 4 8 16 32</p> 



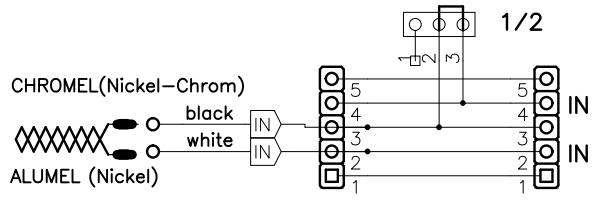
Connection CT-Pt100 module (RTDs)

	<p>Black = IN Connected with brown</p> <p>White = GND Connected with Blue</p>		<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>
<p>CT-Pt100 Type: RTD 100 ohm Range: -100 to 500°C Accuracy +/- 0.25%</p> <p><u>Attentions:</u> At Pt100 modules must plug the plug bridge on Half Bridge Unit.</p>		 <p style="text-align: center;">Half bridge setting</p>	 

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 TH-K ISO Thermo couple

 <p style="text-align: center;">Sensor cable</p>	<p>Black = IN +/- White = GND Brown = NC* Blue = NC*</p> <p style="font-size: small;">*NC= not connected</p>	 <p style="text-align: center;">Sensor socket</p>	<div style="display: flex; align-items: center; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>Sensor plug CT2-Mini ENC</p>  </div> <div style="text-align: center;">  </div> </div>
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<p>CT-THK-ISO - Galvanic isolated!</p> <p>Type: K Range: -50°C – 1000°C Bandwidth: 0-20Hz (more on request) Accuracy +/-1%</p> <p><u>Attentions:</u> At Thermo couple must plug the plug bridge on Half Bridge Unit.</p>	 <p style="text-align: center;">Half bridge setting</p>	<div style="display: flex; align-items: center; justify-content: center;">  </div> <div style="text-align: center; margin-top: 10px;">  </div>
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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		

Dimensions of CT2-MINI-ENC

