

Contactless MEMS Tilt Angle Sensor

MIDORI THD2000Z-R



General

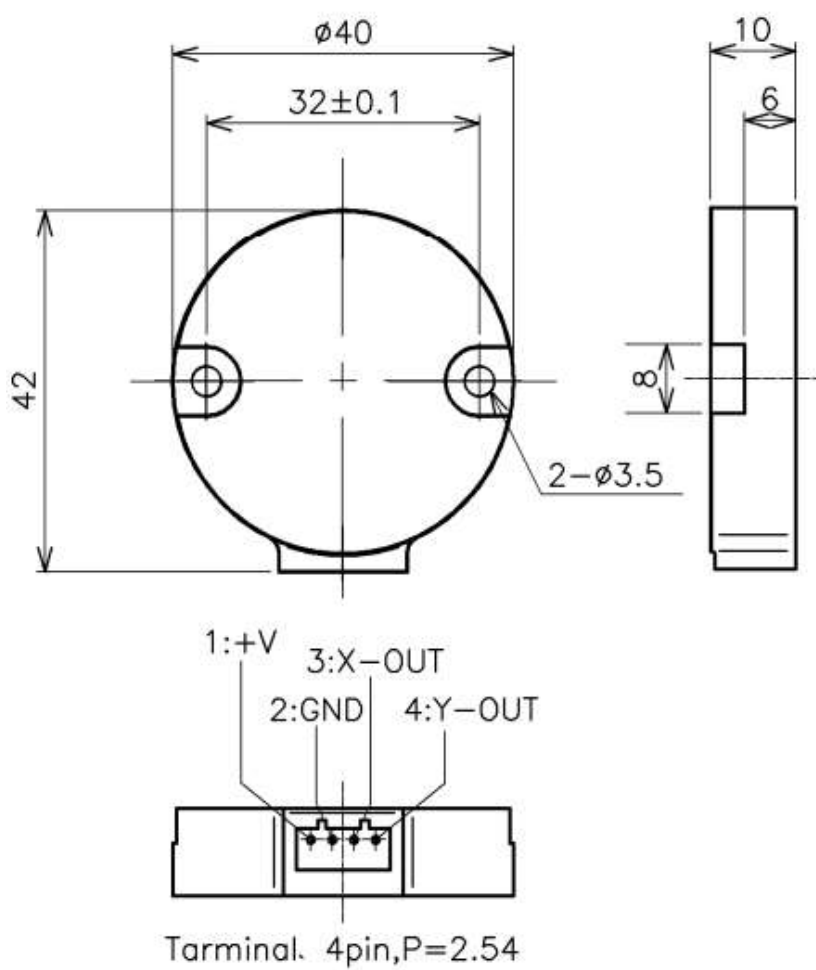
- Dual Axis Tilt Angle Sensor using MEMS Technology
- Effective Electrical Tilt Angle: $\pm 10^\circ$ (THD2010Z-R-)
- $\pm 20^\circ$ (THD2020Z-R-)
- $\pm 30^\circ$ (THD2030Z-R-)
- $\pm 45^\circ$ (THD2045Z-R-)
- $\pm 60^\circ$ (THD2060Z-R-)
- Absolut Linearity: $\pm 1\%FS$
- Analog Output (Voltage Ratio Output 10~90%Vin)

- Stable Temperature Characteristic
- Built-in Connector
- Index Point Resetting Function (Option)
- Digital Damping Control Function (Option)

Material

Housing: PBT

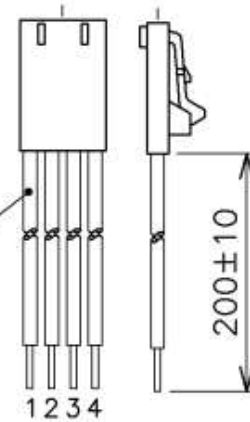
Dimension (mm)



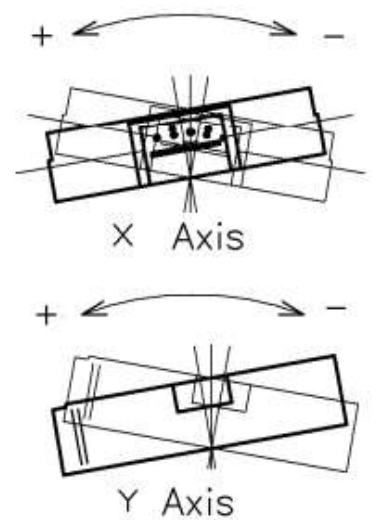
Connector
TE 104257-3
(Tyco Electronics AMP)

Wire
4-0.3mm²
1: +V
2: GND
3: X-Out
4: Y-Out

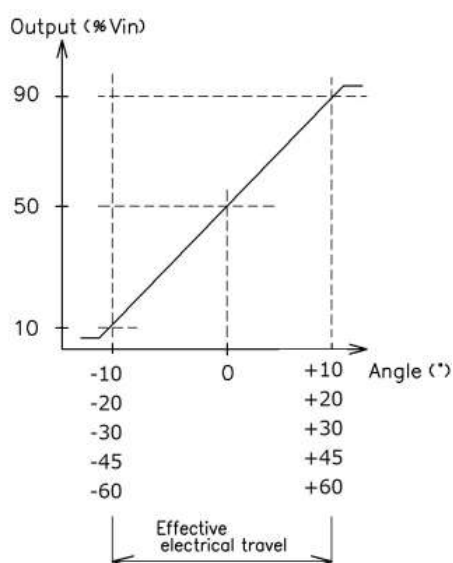
Red
Black
White
Blue



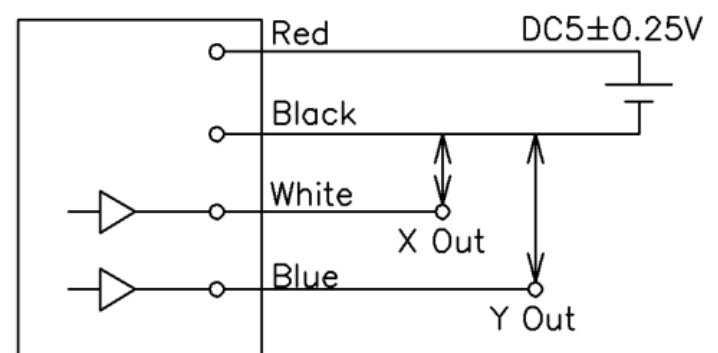
Measuring Direction



Output Characteristics



Schematic



- Red, black, white and blue indicate wire colors.

Specifications

THD2000Z-R (Voltage Ratio Output)	
Effective Electrical Tilt Angle	$\pm 10^\circ$, $\pm 20^\circ$, $\pm 30^\circ$, $\pm 45^\circ$, $\pm 60^\circ$ (Option: Separate tilt angle setting X and Y axis)
Absolute Linearity	$\pm 1\%FS$
Input Voltage	DC5 \pm 0.25V
Current Consumption	Steady-state: 20mA
Output Range	10~90%Vin
Output Resolution	12bit equivalent
Supply Current	10mA MAX.
Response Time	Step Response (Time Constant): 443ms (standard) Selectable time constant during 70ms~900ms in 16 steps (Option)
Temp. Characteristics -20~80°C (Ref. Temp.+25°C)	0° Position: $\pm 0.2^\circ$
	Tilt Angle
	@ $\pm 10^\circ$: $\pm 0.7^\circ$
	@ $\pm 20^\circ$: $\pm 1.2^\circ$
	@ $\pm 30^\circ$: $\pm 2.1^\circ$
@ $\pm 45^\circ$: $\pm 3.6^\circ$	
@ $\pm 60^\circ$: $\pm 6.0^\circ$	
EMS	IEC61000-4-3: Level 3 (10V/m)
EMI	IEC61000-4-6: CISPR22_A_10m
ESD	IEC61000-4-2: $\pm 16kV$
Operating Temp. Range	-30~85°C
Vibration	70m/S ² 5~500Hz (10min.) 2hours
Shock	1000m/S ² , Half sine wave 6ms
IP Level	IP40
Index Point($\pm 0^\circ$) Setting (OPTION)	Configurable within horizontal $\pm 5^\circ$ range

Accessories

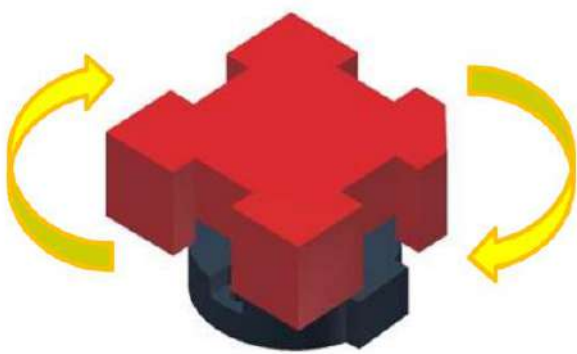
Connector: TE104257-3 (Tyco Electronics AMP) 1pc each

Special Functions

1. Index Point Resetting Function (Reconfiguring the Zero dig. Position)

User-Configurable Adjustment Card* *Sold separately

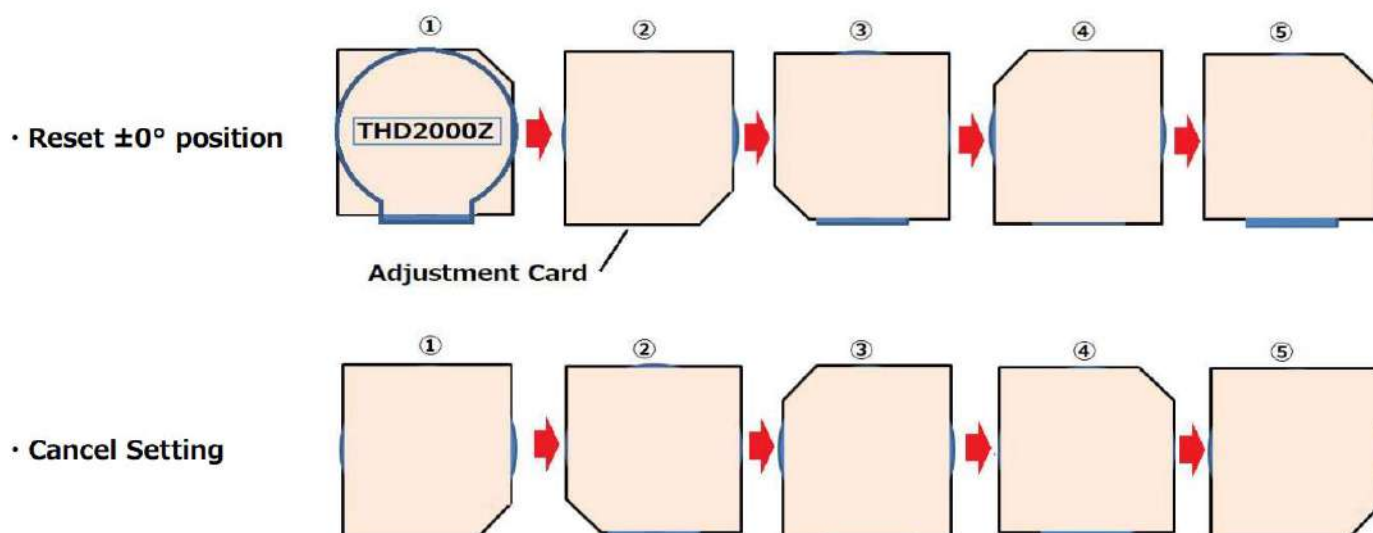
Reset to 0° position easily by using the User-Configurable Adjustment Card.



Placing the adjustment card on the THD2000Z for approx. one second and rotate it clockwise by 90degrees.

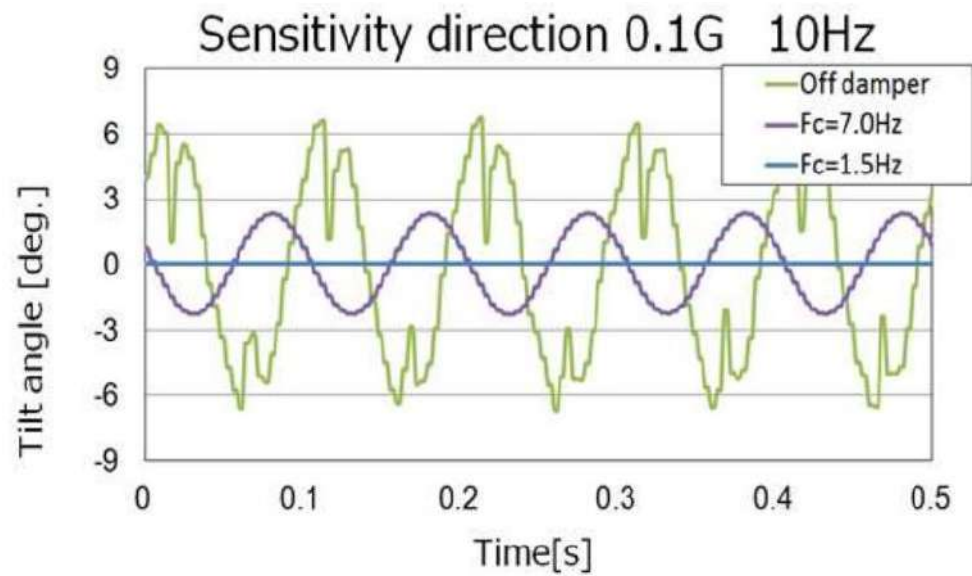
By repeating above manner 5 times, THD2000Z resets the current level as the $\pm 0^\circ$ position.

NOTE: Configurable range is within $\pm 5^\circ$ range from horizontal.



2. Digital Damping Control Function

THD2000Z can apply a digital filter that removes external noise. You can select from 16 available setting.

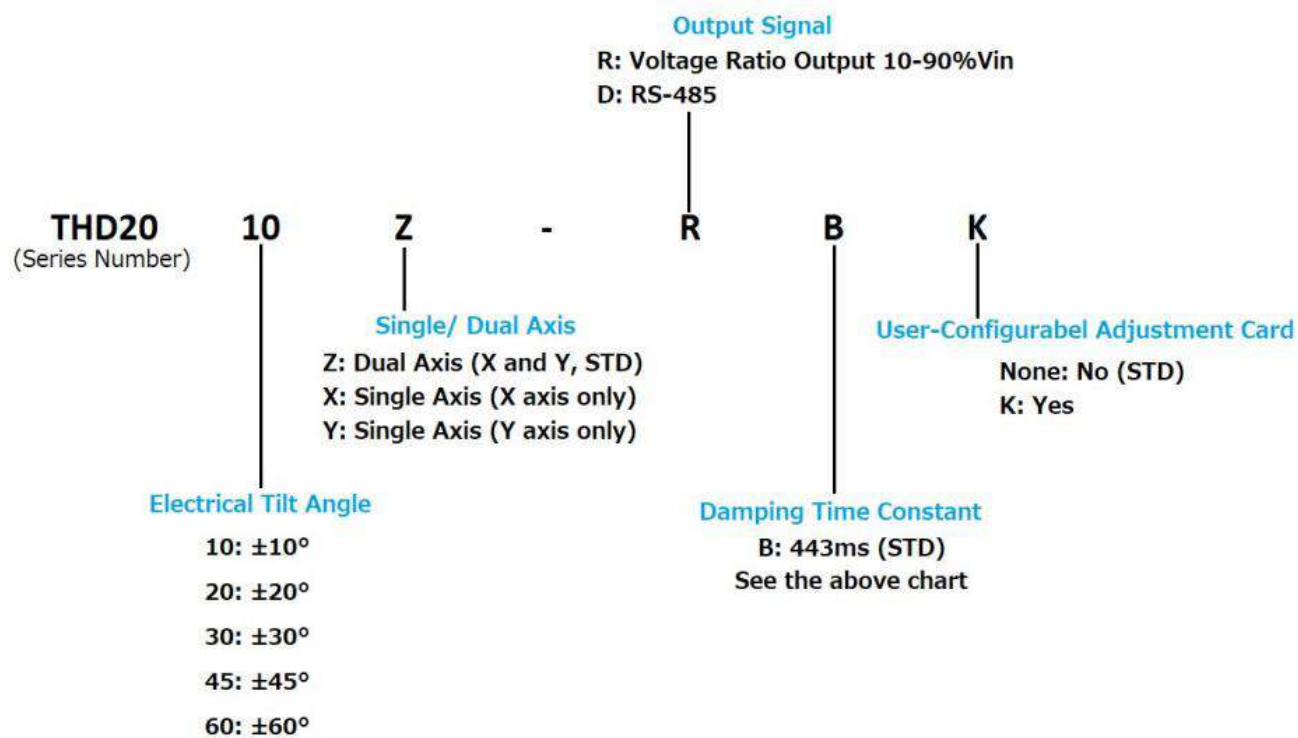


Digital Damping Control Setting Value and Cut-off Frequency

Figures (Model#)	Digital Damping Level	Cut-off frequency (Hz)	Time constant (ms)
0	0	11.2Hz	60ms
1	1	9.27Hz	114ms
2	2	7.65Hz	126ms
3	3	6.32Hz	140ms
4	4	5.21Hz	156ms
5	5	4.30Hz	181ms
6	6	3.55Hz	205ms
7	7	2.93Hz	246ms
8	8	2.42Hz	277ms
9	9	2.00Hz	321ms
A	10	1.65Hz	378ms
B	11	1.36Hz	443ms(Standard)
C	12	1.21Hz	532ms
D	13	0.92Hz	627ms
E	14	0.76Hz	749ms
F	15	0.62Hz	900ms

NOTE: Configuring of the digital filter is enabled only at our factory.
Please contact us for selection method of the digital filter level.

Model Number Designation



Handling Instruction

- This product can not be used for measurement of resistance value.
- Use this product in an environment protected from ESD.
- Depending on the state of the vibration environment, the product may not be able to measure the tilt angle accurately even if the digital filter is selected.