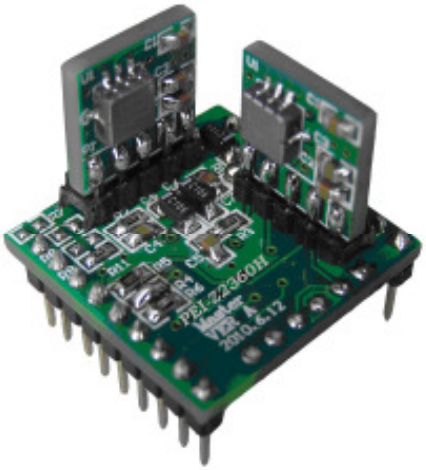
PEI-Z2360H Wide Range Inclinometer



DESCRIPTION

PEI-Z2360H is a 360°×360° dual axis inclinometer. This product performs calibrated pitch and roll angle measurement with digital serial outputs (SPI / UART).

FEATURES

- ±1 º accuracy – differential
- 0.1 º resolution – digital serial outputs
- High performance low cost
- Factory calibrated angle output
- MEMS technology

APPLICATIONS

- Platform and vehicle leveling
- Satellite dish and antenna alignment
- Machine control and monitoring
- Computer input, and mouse pointing

Specifications

Parameter	Conditions	Min	Typical	Max	Unit
Supply voltage		2.8	3	3.3	V
Supply current	3V Supply		12	15	mA
Operating Temp.		-40		85	℃
Measurement Range[1]			X(0~360°)-Y(0~360°)		°
Resolution			0.1		°
Offset temperature dependency	0-50℃		0.5	0.86	°
Size			25.4*25.4*16.8		mm

1）The product must be placed horizontally

Ordering Information:

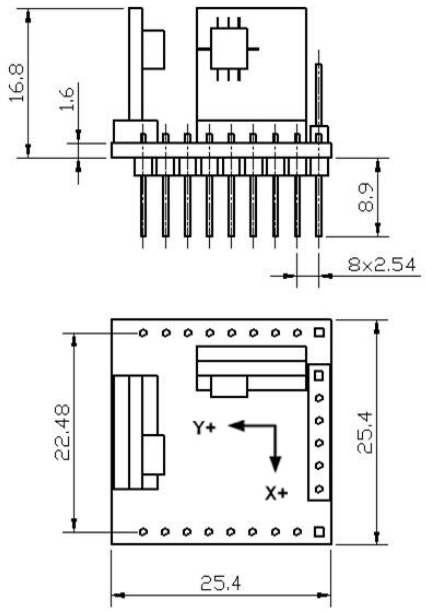
PEI-Z2360H-SPI-0 (SPI Interface)
PEI-Z2360H-TTL-0 (TTL Interface)

MEASUREMENT MODE:

TILT MODE

In Tilt Mode the X Tilt and Y Tilt angles are measured between gravity and the white arrows on the horizontal PCB.

Dimensions [mm]



PIN CONFIGURATION

PIN	SIGNAL	USAGE
1	NC	Solder to open circuit for mechanical stability. Do not connect to GND
2	NC	Solder to open circuit for mechanical stability. Do not connect to GND
3	NC	Solder to open circuit for mechanical stability. Do not connect to GND
4	UART Receive	Digital Input –UART receive line.
5	UART	Digital Output – UART transmit line.
6	CSB	chip select (low active)
7	SCK	Digital -SPI clock signal
8	MISO	Digital Input - SPI data out
9	MOSI	Digital Output -SPI data in
10	GND	Ground
11	$+V_{cc}$ Supply	+3V

12	NC	Solder to open circuit for mechanical stability. Do not connect to GND
13	NC	Solder to open circuit for mechanical stability. Do not connect to GND
14	NC	Solder to open circuit for mechanical stability. Do not connect to GND
15	NC	Solder to open circuit for mechanical stability. Do not connect to GND
16	NC	Solder to open circuit for mechanical stability. Do not connect to GND
17	NC	Solder to open circuit for mechanical stability. Do not connect to GND
18	NC	Solder to open circuit for mechanical stability. Do not connect to GND

SPI Serial Interface

A Serial Peripheral Interface (SPI) system consists of one master device and one or more slave devices. The master is defined as a micro controller providing the SPI clock and the slave as any integrated circuit receiving the SPI clock from the master. The products always operates as a slave device in master-slave operation mode.

The SPI has a 4-wire synchronous serial interface. Data communication is enabled by a low active Slave Select or Chip Select wire (CSB). Data is transmitted by a 3-wire interface consisting of wires for serial data input (MOSI), serial data output (MISO) and serial clock (SCK).

The SPI interface in products is designed to support any micro controller that uses SPI bus. Communication can be carried out by either a software or hardware based SPI.

4-wire interface:

MOSI	master out slave in	µP → SENSOR
MISO	master in slave out	SENSOR → µP
SCK	serial clock	µP → SENSOR
CSB	chip select (low active)	µP → SENSOR

Each transmission starts with a falling edge of CSB and ends with the rising edge. During transmission, commands and data are controlled by SCK and CSB according to the following rules:

• commands and data are shifted; MSB first, LSB last
• each output data/status bits are shifted out on the falling edge of SCK (MISO line)
• each bit is sampled on the rising edge of SCK (MOSI line)
• after the device is selected with the falling edge of CSB, an 8-bit command is received. The command defines the operations to be performed
• the rising edge of CSB ends all data transfer and resets internal counter and command register
• if an invalid command is received, no data is shifted into the chip and the MISO remains in high impedance state until the falling edge of CSB. This reinitializes the serial communication.
• data transfer to MOSI continues immediately after receiving the command in all cases where data is to be written to the sensor's internal registers
• data transfer out from MISO starts with the falling edge of SCK immediately after the last bit of the SPI command is sampled in on the rising edge of SCK

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•SPI command can be either an individual command or a combination of command and data. In the case of combined command and data, the input data follows uninterruptedly the SPI command and the output data is shifted out parallel with the input data. The SPI interface uses an 8-bit instruction (or command) register. The list of commands is given in Table below:

Command name	Command format	Description:
RWTR	00000001(0x01)	Read and write temperature data register
RDAX	00010000(0x10)	Read X-channel acceleration through SPI
RDAY	00010001(0x11)	Read Y-channel acceleration through SPI

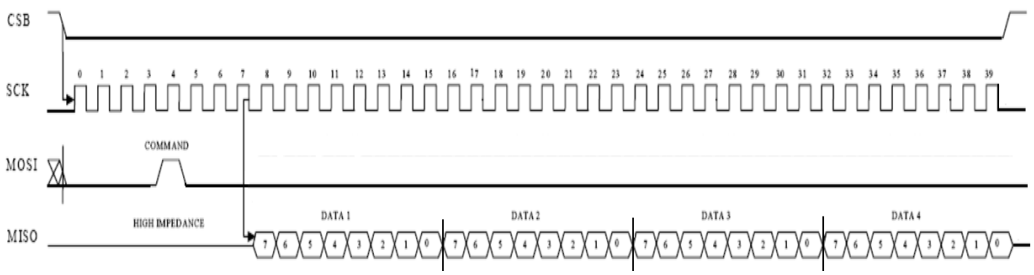

Figure . Command and 32 bit data transmission over the SPI

NOTES:

(1) The angle information of each channel is encoded in FOUR-BYTE HEX number. The angle can be obtained converting the HEX number to float number.

(2) The temperature information is encoded in FOUR-BYTE HEX number. The temperature (℃) can be obtained converting the HEX number to float number.

LIMITATIONS AND WARNINGS

LIFE SAFETY

This product is not designed for use in life support and/or safety equipment where malfunction of the product can reasonably be expected to result in personal injury or death. Buyer uses this product in such applications at Buyer's own risk and agrees to defend, indemnify, and hold harmless PEWATRON SA from any damages, claims, suits, or expenses resulting from such misuse.

DYNAMIC ENVIRONMENTS

The device is designed to be used to measure angles in a quasi-static environment where external vibrations and accelerations are kept to a minimum. Digital and analog signal processing methods are employed to reduce the effects of transient acceleration and small vibrations on the angle reading; however, under dynamic conditions where external accelerations or vibrations are present, the sensor's performance may be degraded.

VARIATIONS IN EARTH'S GRAVITY

This device is designed to be used near the earth's surface only. Substantial changes in gravity will degrade the performance of the sensor. This device is not intended or qualified to be used in aviation.

TESTING

The performance of each system is verified through build-time testing. Each system is tested before and after factory calibration to ensure reliable performance.

SYSTEM INTEGRATION TESTING

Thorough testing should be carried out prior to product release to ensure system integration has not introduced unforeseen problems. The system integrator assumes the ultimate responsibility for the safety of the target application.

data may be changed without notice.

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We are here for you. Addresses and Contacts

Sales Switzerland

Postcode 3000 – 9999
Liechtenstein

Matthias Rüegg
Ruhbergstrasse 32
CH-9230 Flawil

Phone + 41 44 877 35 18
Mobile + 41 76 491 66 66
Fax + 41 44 877 35 19

matthias.rueegg@pewatron.com

Postcode 1000 – 2999

Raffael Favaretto
Route d'Oron 124
CH-1673 Promasens

Phone + 41 44 877 35 22
Mobile + 41 76 444 63 14
Fax + 41 44 877 35 23

raffael.favaretto@pewatron.com

Sales Germany

Postcode 60000 – 79999

Dieter Hirthe
Mühlweg 23
D-71554 Weissach i.T.

Phone + 49 719 149 60 58
Mobile + 49 163 762 74 30
Fax + 49 719 193 31 88

dieter.hirthe@pewatron.com

Postcode 10000 – 59999
Postcode 80000 – 99999

Kurt Stritzelberger
Neumarkter Str. 86a
D-81673 Munich

Phone + 49 89 260 38 47
Mobile + 49 171 803 41 35
Fax + 49 89 43 10 91 91

kurt.stritzelberger@pewatron.com

Key Accounts
Aerospace and Defence

Claus Wübbena
Vogelkamp 26
D-26655 Westerstede

Phone + 49 4488 5204 614
Mobile + 49 173 9700 691
Fax + 49 4488 5204 616

claus.wuebbena@pewatron.com

Sales Austria

Kurt Stritzelberger
Neumarkter Str. 86a
D-81673 Munich

Phone + 49 89 260 38 47
Mobile + 49 17 18 03 41 35
Fax + 49 89 43 10 91 91

kurt.stritzelberger@pewatron.com

Sales Other Countries / Product Management

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Physical Sensors
Data Acquisition

Peter Felder
Phone + 41 44 877 35 05
peter.felder@pewatron.com

Geometrical Sensors

Eric Letsch
Phone + 41 44 877 35 14
eric.letsch@pewatron.com

Power Supplies

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Sebastiano Leggio
Phone + 41 44 877 35 06
sebastiano.leggio@pewatron.com

E-Components

Current Sensors
Man Machine Interface
Measurement Probes

Sebastiano Leggio
Phone + 41 44 877 35 06
sebastiano.leggio@pewatron.com

PEWATRON AG
Thurgauerstrasse 66
CH-8052 Zurich

Phone + 41 44 877 35 00
Fax + 41 44 877 35 25

www.pewatron.com
info@pewatron.com