SPECIFICATIONS

Model：AKF392B

Description：MEMS digital output accelerometer

Production standard reference

●Appearance patent number: ZL 2018 3 0096101.2
●Enterprise quality system standards: ISO9001: 2018 standard (certification number: 128101)
●Inclination sensor production standard: GB/T 191 SJ 20873-2003 General specification for inclinometer and level
●Inclination sensor metering institute calibration standard: JJF1119-2004 electronic level calibration specification
●Gyro acceleration test standard: QJ 2318-92 gyro accelerometer test method
●Software development reference standard: GJB 2786A-2009 General requirements for military software development
●Product environmental test standard: GJB150
●Electromagnetic anti-interference test standard: GB/T 1762
●Version number: Ver.1.0
●Revised date: 2018.11.20

For pricing or any further information, please contact Omni Instruments Ltd.

Measurement and data acquisition solutions

Contact Details:
Tel: +44 845 9000 601
Fax: +44 845 9000 602
Local Tel: 01382 443000
Email: info@omni.uk.com

Mailing Address:
Suite E, East Kingsway Business Centre,
Mid Craigie Trading Estate, Mid Craigie Road,
Dundee, DD4 7RH, UK

AKF392B 3-Axis Digital Accelerometer

Product Introduce

AKF392B three-axis accelerometer is a widely used accelerometers produced by RION's with patented Swiss technology. It can be used in vibration testing, impact testing and other fields. The product adopts digital interface output, RS232/485/TTL, different address codes can be set, and multiple sensors are used together in long distance to facilitate multi-point measurement and data analysis. The AKF392B is a monocrystalline silicon capacitive sensor consisting of a micromachined silicon chip (a low-power ASIC for signal conditioning), a microprocessor for storing compensation values, and a temperature sensor. This product with low power consumption has been calibrated, and has a solid structure and stable output. The new electronic configuration provides solid-state power for reset, providing full protection for over-current. The long-term stability and typical deviation of the scale factor over the full-scale range is less than 0.1%. This series of products has the characteristics of strong structure, low power consumption and excellent deviation stability, which guarantees outstanding output reliability.

Product features

- ●three axis(X、Y、Z)
- ●power supply：9-36V
- ●excellent deviation stability
- ●weight：100g
- ●store temperature：-55°C to +100°C
- ●output interface：RS232；RS485；TTL
- ●anti-impact：2000G
- ●size：L50×W50×H38mm
- ●working temperature：-40°C to +85°C
- ●good performance in anti-impact, vibration and temperature

Application

- ●Crash record, fatigue monitoring and prediction
- ●Shipborne satellite tracking system
- ●Traffic system monitoring, roadbed analysis and high-speed railway fault detection
- ●Military and civil flight simulators
- ●Low frequency vibration and automatic monitoring

For pricing or any further information, please contact Omni Instruments Ltd.

Measurement and data acquisition solutions

Contact Details:
Tel: +44 845 9000 601
Fax: +44 845 9000 602
Local Tel: 01382 443000
Email: info@omni.uk.com

Mailing Address:
Suite E, East Kingsway Business Centre,
Mid Craigie Trading Estate, Mid Craigie Road,
Dundee, DD4 7RH, UK

AKF392B 3-Axis Digital Accelerometer

Specifications

Parameter	AKF392B	Unit
Range	±1	g
Deviation calibration	<1	mg
Measuring axis	X,Y,Z	axis
Power on/down repeatability	<2	mg (max value)
Deviation temperature coefficient [3]	0.05	mg/℃ typical value
Resolution / Threshold (@ 1Hz)	< 1	mg(max)
Nonlinearity	<3	% FS（max）
Bandwidth [4]	500	Hz
Resonance frequency	5	kHz
Output rate	5Hz、10Hz、25Hz、50Hz、100Hz、200Hz、500Hz、1000Hz, can be set	
Output Interface	RS232/RS485	
Communication protocol	RION's protocol and MODBUS RTU	
Reliability	MIL-HDBK-217， class 2	
Anti-impact	100g@11ms、Triaxial and identical (half sine wave)	
Restore time	<1ms (1000g, 1/2 sin 1ms, Impact on the i-axis)	
Vibration	20g rms,20~2000Hz (Random noise, o, p, i acting on each axis for 30 minutes)	
Input（VDD_VSS）	9-36 VDC	
Operating current consumption	<60mA @ 12 VDC	
Connector	Industry standard M12 connector	
Weight	73.5g	
Size	Magnetic adsorption installation size：34.3*34.3*43.2mm，Screw positioning installation size：34.3*34.3*38.5mm	

For pricing or any further information, please contact Omni Instruments Ltd.

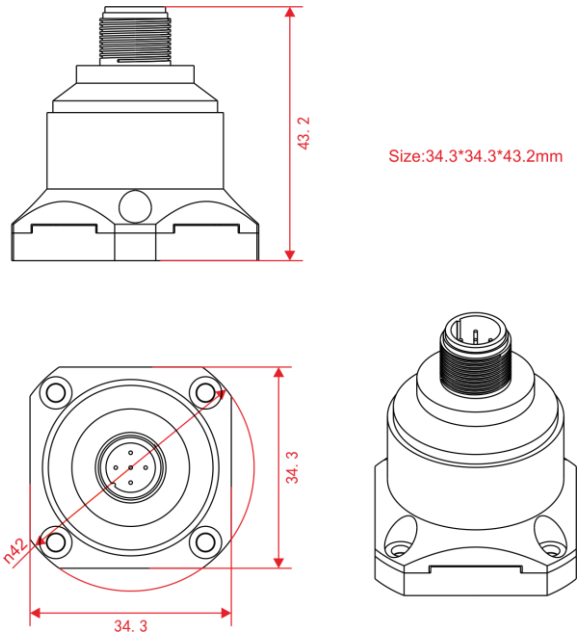
Measurement and data acquisition solutions

Contact Details:
Tel: +44 845 9000 601
Fax: +44 845 9000 602
Local Tel: 01382 443000
Email: info@omni.uk.com

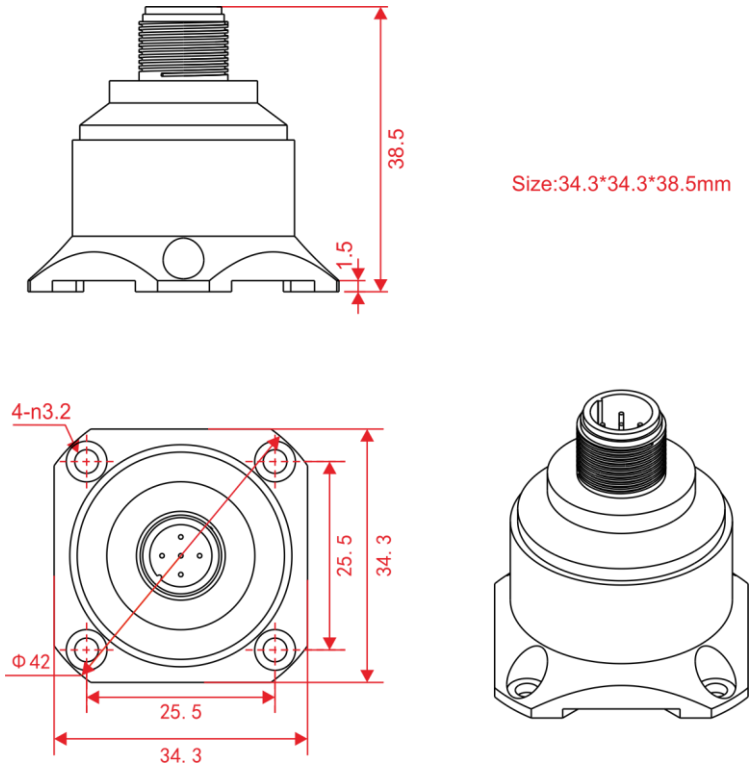
Mailing Address:
Suite E, East Kingsway Business Centre,
Mid Craigie Trading Estate, Mid Craigie Road,
Dundee, DD4 7RH, UK

Dimension

Magnetic adsorption installation dimension drawing



Screw positioning installation dimension drawing



For pricing or any further information, please contact Omni Instruments Ltd.

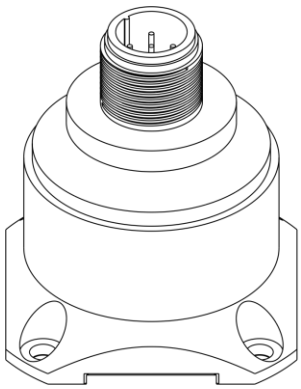
Measurement and data acquisition solutions

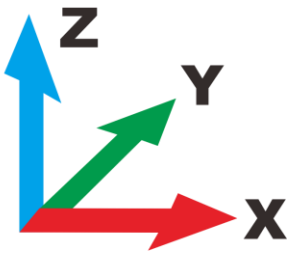
Contact Details:
Tel: +44 845 9000 601
Fax: +44 845 9000 602
Local Tel: 01382 443000
Email: info@omni.uk.com

Mailing Address:
Suite E, East Kingsway Business Centre,
Mid Craigie Trading Estate, Mid Craigie Road,
Dundee, DD4 7RH, UK

AKF392B 3-Axis Digital Accelerometer

Product measurement direction



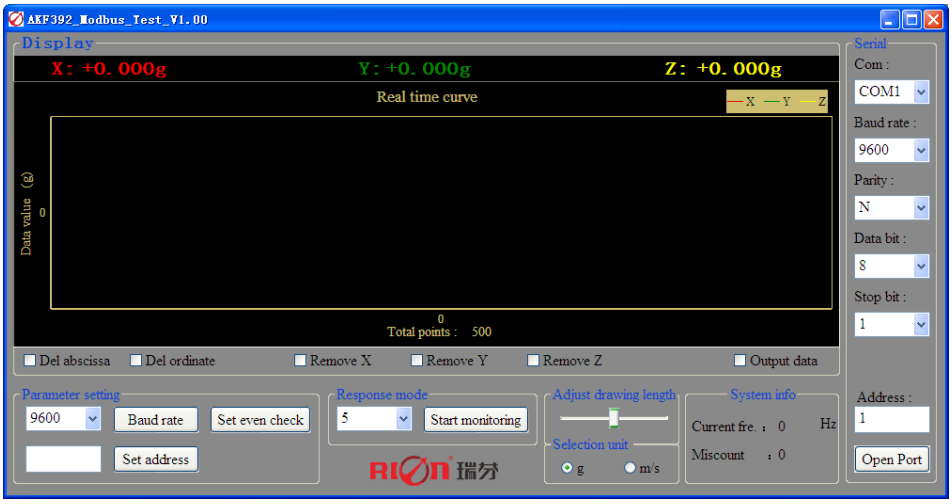


Electrical connection

Color	BLACK	WHITE	BLUE	BROWN	GRAY
Function	GND	RS232(RXD) Or RS485(D+)	RS232(TXD) Or RS485(D-)	Vcc 9～36V Power supply +	FACTORY use

Upper computer software

→Modbus protocol upper computer manual



For pricing or any further information, please contact Omni Instruments Ltd.

Measurement and data acquisition solutions

Contact Details:
Tel: +44 845 9000 601
Fax: +44 845 9000 602
Local Tel: 01382 443000
Email: info@omni.uk.com

Mailing Address:
Suite E, East Kingsway Business Centre,
Mid Craigie Trading Estate, Mid Craigie Road,
Dundee, DD4 7RH, UK

The overall view of the host computer interface is as follows, mainly consists of serial port setting area (Serial.), display area (Display), parameter setting area (Parameter setting), system information area (System info), setting drawing length (Adjust drawing length), unit The selection unit and the response mode are composed of seven sections.

Serial port setting area (Serial):

Set the correct port, baud rate, parity, data bits, stop bits, and device address in sequence.

Display area (Display):

① Visible red, green and yellow, and it corresponds to the curve color, and the X, Y and Z three-axis acceleration data respectively.

② Check Del abscissa and Del ordinate to delete the horizontal and vertical axis coordinates of the waveform interface.

③ Click the left mouse button and draw frame to zoom area. You can move the screen by right-clicking and scrolling the bar.

④ Check Remove X/Y/Z to delete the X, Y, Z three-axis acceleration data curve of the corresponding waveform interface.

⑤ Check Output Data to save the three-axis data after checking. The file is automatically saved in the directory where the program is located. Open the directory to find the CSV file with the product name +DATA+date. The file contents are count point value Count, X-Y-Z three-axis data and time.

Parameter Setting：

Select the drop-down box on the left side of the button, click the button to set the Baud rate, fill in the correct device address (1-255), and click the button (Set none/even check) to set the no or even parity. If the setting is successful, there will be a message to hint.

Adjust drawing length

Adjust the waveform display length for different output frequencies for easy observation.

Selection unit

gravity acceleration (g), acceleration (m / s2) two forms, optional.

System Info：

The current output frequency (Current fre.) and the accepted data error count value (Miscount) are shown.

Active Response Mode：

According to the current baud rate, select the appropriate inquiry frequency and click the button to confirm.

Product agreement

→MODBUS

Note, please read the following items carefully before use:

1) Since the MODBUS protocol stipulates that there should be at least 3.5 bytes of time between two data frames (for example, at 9600 baud rate, the time is 3.5 × (1/9600) × 11 = 0.004 s). However, in order to leave enough margin, the sensor increases this time to 10ms, so leave at least 10ms between each data frame.
The host sends the command -10ms idle - the slave reply command -10ms idle - the host sends the command.....

2) The MODBUS protocol specifies the content of the broadcast address ---0, and the sensor can also accept the broadcast address content, but will not reply. Therefore, the broadcast address 0 can be used for the following purposes, for reference only.
1. Set the addresses of all the tilt sensors of this model mounted on the bus to one address.
2. Set all the tilt sensors of this model mounted on the bus to relative/absolute zero.
3. Test the sensor on the entire bus, that is, the host sends a 0 address inquiry angle command to the bus, and the communication indicator can flash, that is, the communication is normal.

3) In order to improve the reliability of the system, set the address command and set the baud rate. Both commands must be sent twice in succession to be valid. "Continuously send twice" means that both are sent successfully (the slave has a reply every time), and the two questions and answers must be consecutive, that is, the host cannot insert other data frames in the middle of the two questions and answers. Otherwise, the command Will be locked until power is off, the setup process is as follows:
Send Set Address Command--Wait for the setup success command sent by the slave--(cannot appear other commands) Send the setup address command again--waiting the setup success command sent by the slave--Modified successfully

4) After power-on, the above two setting commands can only be set once. If you need to set it again, you need to power it on again.

5) When the normal communication has accumulated a certain number of times, the communication indicator will flash once.

一. Data frame format:

RTU mode

Communication parameters: baud rate 9600 bps (default)

Data frame: 1 start bit, 8 bits of data, even parity, 1 stop bit

二. Read angle value：

Modbus function code 03H

Host query command：		Salve response：		
Sensor address	01H	Sensor address	01H	
function code	03H	function code	03H	
Access register first address	00H	Data length 8 bytes	09H	
	02H	Data word 1 high 8 bits	50H	X axis data
Data length 4 bytes	00H	Data word 1 low 8 bits	46H	
	04H	Data word 2 high 8 bits	00H	
CRC	E5C9H	Data word 2 lower 8 bits	23H	Y axis data
		Data word 3 high 8 bits	20H	
		Data word 3 lower 8 bits	00H	
		Data word 4 high 8 bits	00H	Z axis data
		Data word 4 lower 8 bits	00H	
		Data word 5 high 8 bits	00H	
		CRC	B827H	

Read measurement data command example 1：								
Host send	01 H	03 H	00 H	02 H	00 H	04 H	E5H	C9H
Slave response								
01H	03H	08H	50H	46H	00H	23H	20H	00	00H	00H	B8H	27H

Note: The data field of the slave reply frame is 50H, 46H, 00H, 00H, 23H, 20H, 00H, 00H

The X axis is the 1-3th byte of the data field, the Y axis is the 4th to 6th byte of the data field, and the low byte is first. The representation of the angle is the point number representation. One point corresponds to 0.001° , and 0.001×(point-offset) is the angle. If the measurement range is +-8G, the total number of points is 16000 points.

Take the above data frame as an example: the angle conversion process is as follows:

1) Get the current angle points. Note that the low byte is first, the X axis is 004650H, the Y axis is 002023H, and the Z axis is 0.

Convert to decimal, X axis: 4650H → 18000, Y axis: 2023H → 8227, Z axis: 0.

2) Subtract the offset 90000 (note: the value is a fixed amount), X axis: 18000-90000 = -72000, Y axis: 8227-90000 = -891773, Z axis 0-90000 = -90000.

3) The final accelerometer is obtained, X-axis: -72000 x 0.001 = -72.000 G, Y-axis: -81773 x 0.001 = -81.773 G, Z-axis: -90,000 x 0.001 = -90 G.

三. Set the sensor address:

Set sensor address code command：		Slave response：	
Sensor address	01H	Sensor address	01H
function code	06H	function code	06H
Address	00H	Register address	00H
	11H		11H
Sensor's new address	00 H	Sensor's new address	00H
	04H		04H
CRC	D80C	CRC	D80C

Commands must be sent twice in succession to be valid

Set sensor address command example：								
Host sending	01H	06H	00H	11H	00H	04H	D8H	0CH
Slave reply								
01H	06H	00H	11H	00H	04H	D8 H	0CH	

Note: 0011H is the register address, which controls the sensor address. In the above example, the address of the sensor is changed to 0004H, and the last two bytes are the CRC checksum.

四． Set the sensor baud rate: (factory default is 9600bps)

Set sensor address code command：		Slave response：	
Sensor address	01H	Sensor address	01H
function code	06H	function code	06H
address	00H	Register address	00H
	12H		12H
Sensor baud rate	00H	Sensor baud rate	00H
	XX		XX
CRC	CRC LH	CRC	CRC LH

XX： A0H:4800 A1H:9600 A2H:19200 A3H:38400 A4H:115200

Set sensor address command example：								
Host sending	01H	06H	00H	12H	00H	A2H	A8H	76H
Slave reply								
01H	06H	00H	12 H	00 H	A2H	A8H	76H	

Note: 0012H is the register address, which controls the sensor baud rate. In the above example, the baud rate of the sensor is set to 19200, and the last two bytes are the CRC checksum.

五． Set the sensor communication character format: (factory default is even parity)

Set sensor address code command：		Slave response：	
Sensor address	01H	Sensor address	01H
function code	06H	function code	06H
address	00H	Register address	00H
	09H		09H
Sensor change communication character format	00 H	New format for sensors	00H
	01H		01H
CRC	9808	CRC	9808

For pricing or any further information, please contact Omni Instruments Ltd.

Measurement and data acquisition solutions

Contact Details:
Tel: +44 845 9000 601
Fax: +44 845 9000 602
Local Tel: 01382 443000
Email: info@omni.uk.com

Mailing Address:
Suite E, East Kingsway Business Centre,
Mid Craigie Trading Estate, Mid Craigie Road,
Dundee, DD4 7RH, UK