RION RION TECH

V1.7

MEMS DIGITAL ACCELEROMETER

RION AKG392

Technical Manual

RION QUALIFICATION CERTIFICATION

○Quality management system certification: GB/T19001-2016 idt ISO19001:2015 standard (certificate No.: 128101)

○ High-tech Enterprise (Certificate No.: GR201844204379)

○ CE certification: AT18250EC101483

○ Appearance Patent No.: ZL 201830752896.8

○ Revision date: 2022-4-12

Note: Product functions, parameters, appearance, etc. will be adjusted as technology upgrades. Please contact our sales to confirm when purchasing.

AKG392 MEMS DIGITAL ACCELEROMETER

AKG SERIES ACCELEROMETER

▶ INTRODUCTION

The AKG392 triaxial accelerometer is a new accelerometer independently developed and produced by Rion Technology applied in wide range of applications, which covers many fields such as vibration testing and impact testing. The product adopts digital interface output with options as RS232/485/TTL. Different address codes can be set, multiple accelerometers can be installed in series for long distance, which is convenient for multi-point measurement and data analysis. Internal FFT processing can directly output the object vibration frequency and speed and displacement, convenient for users to analyze data.
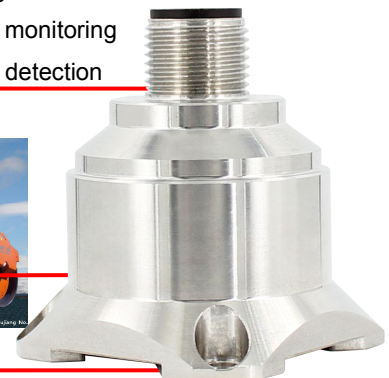
The users can change the sampling frequency according to the actual frequency of the object to improve the frequency measurement accuracy. AKG392 is a single crystal silicon capacitive sensor, which consists of a silicon chip processed by micro-machines, a low-power ASIC for signal adjustment, a microprocessor for storing compensation values, and a temperature sensor. This product has low power consumption, calibration, sturdy structure, and stable output. The new electronic configuration provides solid-state power for reset and protection from over-voltage. The long-term stability and deviation of the scale factor in the full-scale range are typically less than 0.1%. This series of products have the characteristics of sturdy structure, low power consumption, and excellent deviation stability, ensuring stable output reliability.

▶ MAIN FEATURE

★ Three axes (X, Y, Z)
★ Power supply voltage: 9~36V
★ Working temperature: -40°C ~ +85°C
★ Size: L34.3×W34.3×H38.5mm
★ Output signal: RS232; RS485; TTL
★ Impact resistance: 2000G
★ Storage temperature: -40°C ~ +85°C
★ Excellent deviation stability, good environmental performance (shock, vibration and temperature)

▶ APPLICATION

★ Medical equipment
★ Automobile
★ Crash records, fatigue monitoring and prediction
★ Large machinery, engines
★ Bridge
★ Road roller
★ Wind power generation
★ Low-frequency vibration and automatic monitoring
★ Traffic system monitoring, roadbed analysis and high-speed railway fault detection

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▶ PERFORMANCE

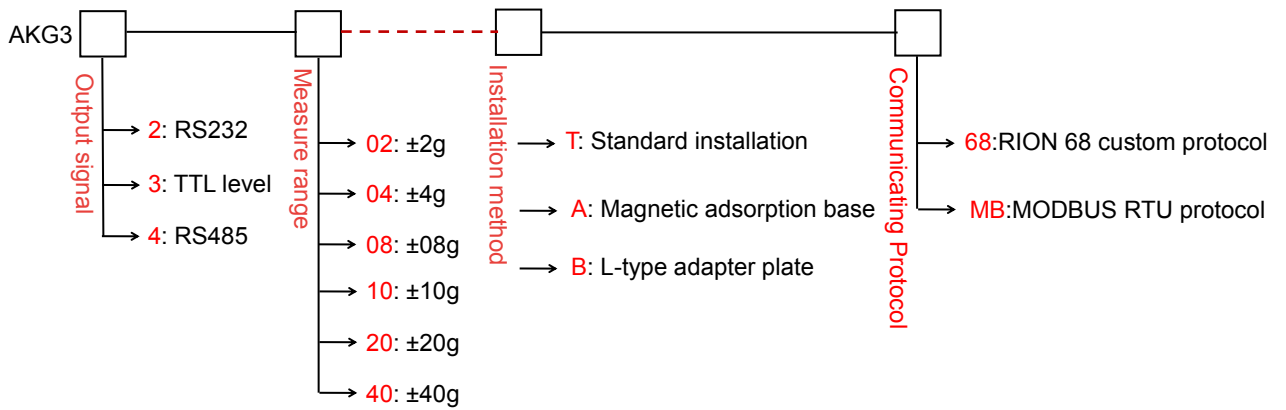| AKG392	PARAMETERS						UNIT
Range	±2	±4	±8	±10	±20	±40	g
Bias calibration	<1	<1	<1	<1	<1	<1	mg
Measure axis	X,Y,Z	X,Y,Z	X,Y,Z	X,Y,Z	X,Y,Z	X,Y,Z	axis
Power on/off repeatability	<2	<2	<2	<2	<2	<2	mg(max)
Bias temperature coefficient	0.15	0.15	0.15	0.75	0.75	0.75	%/℃(typical)
Resolution/threshold (@ 1Hz)	< 1	< 1	< 1	< 1	< 1	< 1	mg(max)
Non-linearity	<0.5	<0.8	<1	<1	<1	<1	% FS(max)
Bandwidth (3DB)	500	500	500	500	500	500	Hz
Cross axis sensitivity	1	1	1	2	2	2	%
Transverse vibration sensitivity ratio	1	1	2	5	5	5	%
Resonance frequency	2.4	2.4	2.4	5.5	5.5	5.5	kHz
Output rate	5Hz、10Hz、25Hz、50Hz、100Hz、200Hz、500Hz、1000Hz						
Output Interface	RS232/RS485/TTL						
Protocol	RION 68 protocol and MODBUS RTU protocol						
Reliability	MIL-HDBK-217，Grade 2						
Impact resistance	100g@11ms, 3 Axial Direction (Half Sinusoid)						
Recovery Time	<1ms(1000g, 1/2 sin 1ms, Impact on the i-axis)						
Vibration	20g rms,20~2000Hz (Random noise, o, p, i acts on each axis for 30 minutes)						
Input（VDD_VSS）	9~36 VDC						
Operating current consumption	<60mA @ 12 VDC						
Connector	Industry standard M12 connector						
Weight	Product net weight: 82g, Magnetic base: 48g, L-shaped adapter plate 20g						
Size	Product size: 34.3*34.3*38.5mm Magnetic adsorption base size: 34.23*34.23*6mm L-shaped adapter plate size: 36*44*15mm						

▶ VIBRATION PARAMETER INDEX

The product's vibration frequency, speed, and displacement are derived from data analysis, where frequency is the main frequency of the current object vibration frequency, speed is the maximum vibration speed, and displacement is the maximum amplitude value of the object vibration. Because of the irregularity of the object vibration, the data is only used reference.

INDEX	VALUE	UNIT
Acceleration	2,4,8,10,20,40	g
Speed	Vibration speed	m/s
Amplitude	Vibration amplitude value	m
Frequency	0~500	Hz
Frequency resolution	4	Hz

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▶ **ORDER INSTRUCTION**

AKG3

Output signal
- → 2: RS232
- → 3: TTL level
- → 4: RS485

Measure range
- → 02: ±2g
- → 04: ±4g
- → 08: ±08g
- → 10: ±10g
- → 20: ±20g
- → 40: ±40g

Installation method
- → T: Standard installation
- → A: Magnetic adsorption base
- → B: L-type adapter plate

Commnicating Protocol
- → 68: RION 68 custom protocol
- → MB: MODBUS RTU protocol
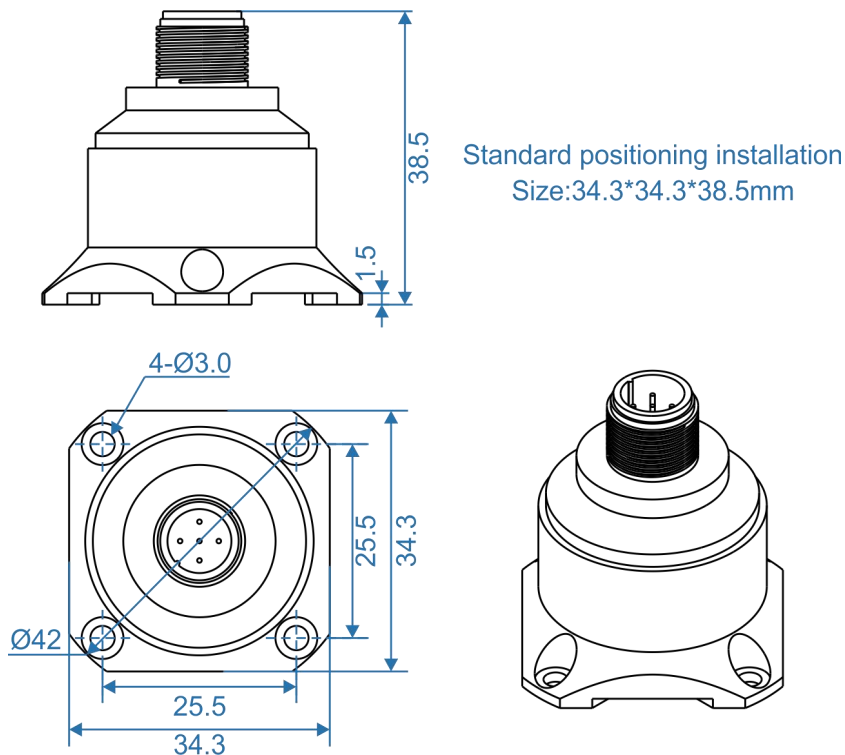
E.g: AKG392-02-T-68: RS232 output / ±2g measure range / standard installation / RION 68 protocol.

▶ **MEASURE DIRECTION**

▶ **SIZE**

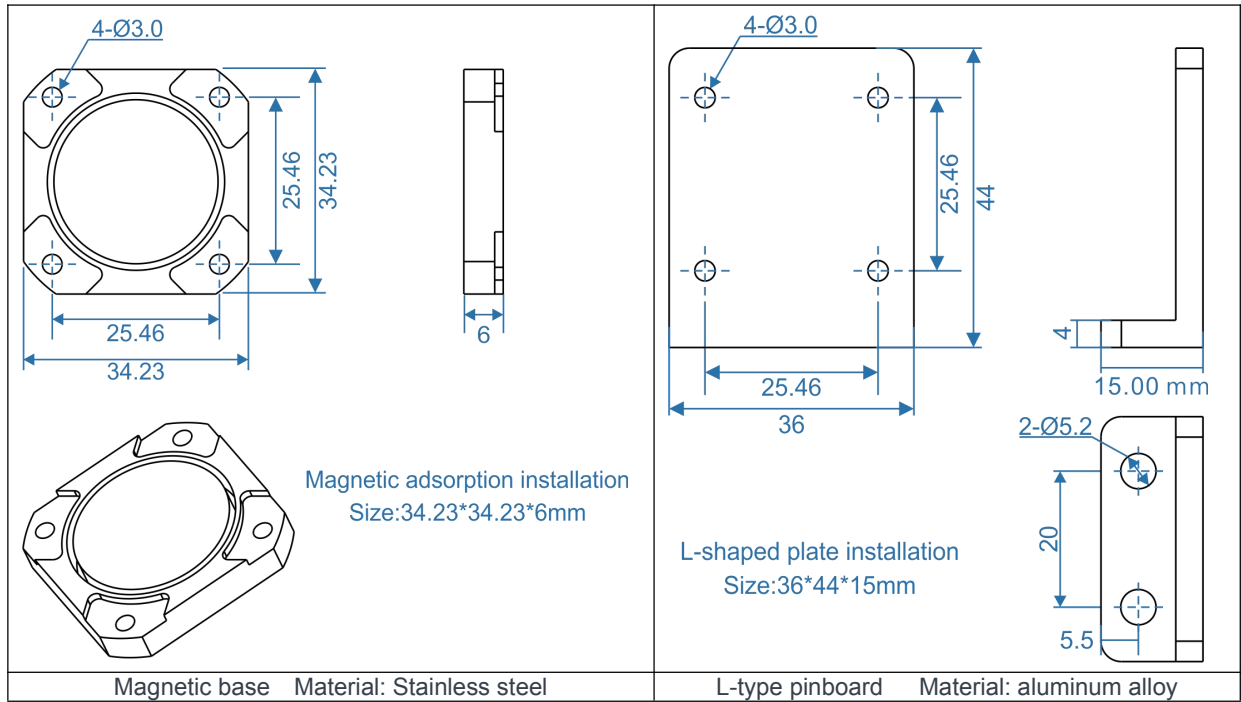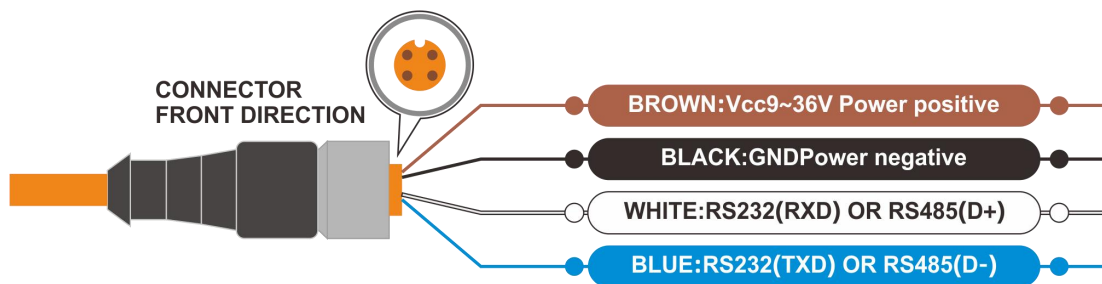Standard positioning installation
Size:34.3*34.3*38.5mm

38.5

1.5

4-Ø3.0

25.5

34.3

Ø42

25.5

34.3

○Inclinometer ○Digital Compass ○Digital Inclinometer ○Accelerometer ○Gyro ○North Finder ○INS&IMU
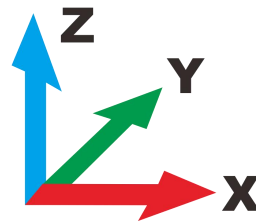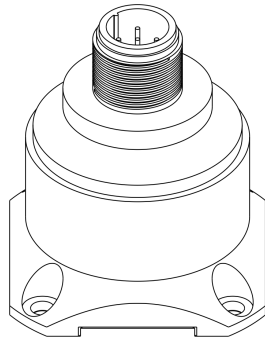
▶ **MOUNTING ACCESSORIES SIZE**

4-Ø3.0

25.46
34.23
25.46
34.23
6

Magnetic adsorption installation
Size:34.23*34.23*6mm

4-Ø3.0

25.46
44
25.46
36
4
15.00 mm

2-Ø5.2
20
5.5

L-shaped plate installation
Size:36*44*15mm

Magnetic base Material: Stainless steel	L-type pinboard Material: aluminum alloy

▶ **CONNECTION**

FUNCTION COLOR THREAD	BLACK	WHITE	BLUE	BROWN
	GND	RS232(RXD)/ RS485(D+)	RS232(TXD)/ RS485(D-)	Vcc 9 ~ 36V

CONNECTOR FRONT DIRECTION

BROWN:Vcc9~36V Power positive
BLACK:GNDPower negative
WHITE:RS232(RXD) OR RS485(D+)
BLUE:RS232(TXD) OR RS485(D-)

▶ **SENSITIVITY AMPLITUDE-FREQUENCY RESPONSE CHARACTERISTIC CURVE**

(reference conditions: f=20.000Hz，a=2.000G)
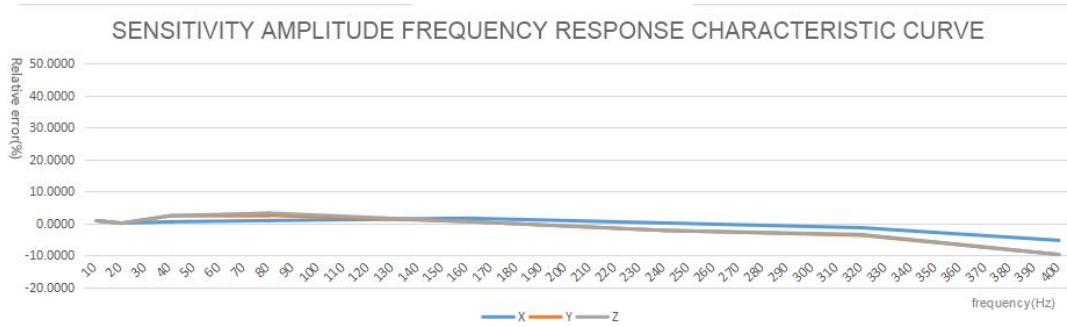
Reference diagram of measuring range ±8G

▶ **SENSITIVITY LINEARITY GRAPH**

▶ **COMMUNICATION PROTOCOL**

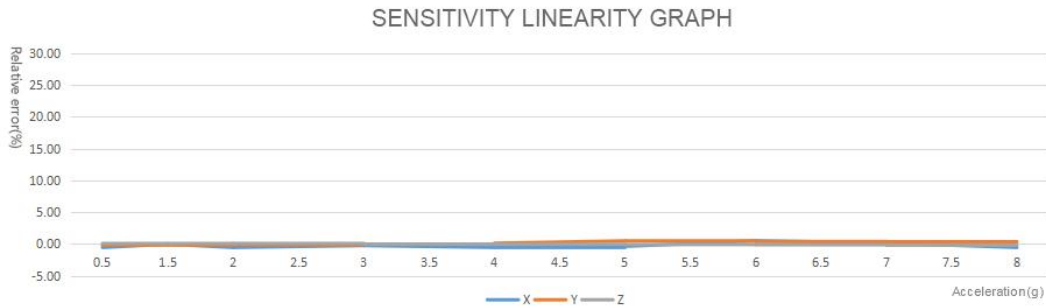The product includes 68 protocol and MODBUS RTU two protocols. The default configuration parameters of the protocol are as follows:

PROTOCOL	RION 68 PROTOCOL	MODBUS-RTU
Address code	0	1
Broadcast address	255	0
Serial port baud rate	9600	9600
Parity bit	No parity	Even parity
Serial port start bit	1 bit	1 bit
Serial port data length	8 bits	8 bits
Serial port stop bit	1 bit	1 bit
Output mode	Question and answer	Question and answer
Data Format	Data format	Data format
Data check method	Checksum	CRC16

RION 68 protocol and MODBUS protocol mutual switching method:

Open the serial port debugging assistant, select the baud rate 115200, no parity, stop bit 1, the connection port number, make the host computer send hexadecimal 0xAA regularly for every 10ms. Power on the product and reply "RION" or "MRTU" to indicate that the change to the corresponding protocol is successful. After the switch is successful, the parameters are all the above default parameters.

▶ AUTOMATICALLY OUTPUT DATA

This output is related to the automatic output mode command. When the corresponding BIT bit is set, it will be output. The lower the BIT, the higher the data content. That is, all content output is sorted from left to right as: acceleration|frequency|speed|amplitude|temperature. for example:

68 protocol: the automatic output item is 1011H, then the automatic output data is: acceleration|frequency|amplitude;

Modbus protocol: the automatic output item is 9001H, then the automatic output data is: acceleration|amplitude|temperature.

BIT0	BIT1	BIT2	BIT3
Accelerometer	-	-	-
BIT4	BIT5	BIT6	BIT7
frequency	-	-	-
BIT8	BIT9	BIT10	BIT11
Speed	-	-	-
BIT12	BIT13	BIT14	BIT15
Amplitude	-	-	Temperature

The following table describes the relationship between output rate, data content and baud rate, please calculate and set reasonably according to the parameters.

Fre（HZ）	0	5	10	25	50	100	200	500	1000	300	400
Remark	Auto output is valid						Auto output is invalid, only the acceleration data is output, high baud 115200/230400 is recommended to use				

▶ RION 68 COMMUNICATION PROTOCOL (DEFAULT PROTOCOL)

Note: Please read the following items carefully before use:

1) All setting operations will not be saved after power off, and the setting of the command issued will be effective immediately. If it needs to be saved, a save command needs to be issued. The operation is: send the setting command -> return successfully, the setting takes effect -> send the save command -> return successfully, the setting is saved.

2) Please note that the auto output rate of the product is affected by the data length and baud rate, please calculate and set a reasonable baud rate by yourself.

3) The 68 protocol specifies the broadcast address----255. The sensor can also accept the content of the broadcast address, but will never reply. Therefore, the broadcast address 255 can be used for the following purposes, for reference only.

1. Set the addresses of all the acceleration sensors of this model mounted on the bus to a certain address.

2. Set all the acceleration sensors of this model mounted on the bus to relative/absolute zero point.

3. Test the sensor of this type on the entire bus, that is, the host sends a 0 address to the bus to inquire about the acceleration command, and the communication indicator can flash, that is, the communication is normal.

4) Flashes once every 1 second when normal communication.

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1.DATA FRAME FORMAT: (8 bits date , 1 bit stop , No check , Default baud rate 9600)

Identifier (1byte)	Date Length (1byte)	Address code (1byte)	Command word(1byte)	Date domain	Check sum (1byte)
0x68					

Default communication parameters: address 0, baud rate 9600, 1 start bit, 8 data, no parity, 1 stop bit;
Effective setting address: 0~254;
Identifier: fixed as 0x68;
Data length: the length from data length to checksum (including checksum);
Data field: according to the different content and length of the command word changes accordingly;
Checksum: The sum of data length, address code, command word and data field, regardless of carry, that is, Sum&0xFF.

2.command word analysis

Command	Meaning/Example	Description
0X01	**Read X axis acceleration command.** E.g.: *68 04 00 01 05*	Data field (0byte) No data field command
0X02	**Read Y axis acceleration command.** E.g.: *68 04 00 02 06*	Data field (0byte) No data field command
0X03	**Read Z axis acceleration command.** E.g.: *68 04 00 03 07*	Data field (0byte) No data field command
0X04	**Read all 3 axes acceleration command.** E.g.: *68 04 00 04 08*	Data field (0byte) No data field command
0X84	Sensor reply E.g.: **68 0D 00 84 00 20 10 10 40 00 05 05 00 1B**	Data field (9byte) AA AB BB CC CD DD EE EF FF AA AB BB: 3 characters represent the X axis. CC CD DD: 3 characters represent the Y axis. EE EF FF: 3 characters represent the Z axis. Acceleration format is the same analytical method as X/Y/Z axis. In the example on the left, the acceleration is: X axis 02.010g, Y axis -04.000g, Z axis: +50.500g. **00 20 10** The red three bytes are the X-axis return acceleration value, which is the compressed BCD code. The high bit **0** of the first byte is the sign bit (0 is positive, 1 is negative) **02** is a two-digit integer value, and **010** is a three-digit decimal value. The analysis method for other axis data is the same, and the acceleration is analyzed as +02.010g. **10 40 00** The three blue bytes are the return angle value of Y axis, and the analysis method is the same as that of X axis. **05 05 00** The three green bytes are the Z-axis acceleration, and the analysis method is the same as the X-axis acceleration. 1B: Checksum, the hexadecimal sum of all data, without prefix 68.
0X15	**Read 3 axes vibration frequency data** E.g.: **68 04 00 15 19**	Data field (0byte) No data field command
0x95	**68 0A 00 95 00 04 00 00 00 02 A5**	Data field (6byte) Signed 16-bit integer , big endian , coefficient 0.1 E.g : X axis : 0004H = 4*0.1 = 0.4HZ
0X16	**Read 3 axes vibration speed data** E.g.: **68 04 00 16 1A**	Data field (0byte) No data field command
0x96	**68 10 00 96 00 06 3F 85 00 05 5C F8 00 00 00 00 C9**	Data field (6byte) Signed 32-bit integer , big endian , coefficient 0.000001 E.g : X axis : 00063F85H = 409,477*0. 000001 = 0.409,477m/s

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0X17	Read triaxial vibration amplitude data E.g.: *68 04 00 17 1B*	Data field (0byte) No data field command
0x97	68 10 00 97 00 02 CF 1A 00 01 CC 67 00 2E 04 32 2A	Data field (6byte) Signed 32-bit integer , big endian , coefficient 0.0000001 E.g : X axis : 0002CF1A H = 184,090 *0. 0000001 = 0. 0184,090m
0X18	Read acceleration, vibration frequency, vibration speed, Vibration amplitude, temperature data E.g.: *68 04 00 18 1C*	Data field (0byte) No data field command
0X98	Sensor reply E.g.: 68 2D 00 98 10 00 83 00 00 17 00 09 04 00 29 00 24 00 29 00 09 3A 8C 00 03 AD A7 00 04 99 6E 00 03 89 F7 00 01 99 3D 00 01 C3 82 0D BC 8C	Data field (39byte) **Blue** is X, Y, Z acceleration data in sequence, the unit is g, the data analysis is consistent with the 04H command analysis method **Green** is X, Y, Z frequency data in sequence, the unit is Hz, the data analysis method is consistent with the 15H command analysis method **Orange** is X, Y, Z speed data in sequence, the unit is m/s, the data analysis method is consistent with the 16H command analysis method **Red** is X, Y, Z amplitude data in sequence, the unit is m, the data analysis method is consistent with the 17H command analysis method **Purple** is the temperature data, the unit is °C, and the coefficient is 0.01. The data analysis method is consistent with the 15H command analysis method.
0X0B	**Set communication rate** **E.g.: 68 05 00 0B 03 13**	Data field (1byte) Baud rate: Default value: 9600 00 means 2400 01 means 4800 02 means 9600 03 means 19200 04 means 38400 05 means 115200 06 means 230400
0X8B	Sensor reply command E.g.: **68 05 00 8B 00 90**	Data field (1byte) The number in the data field indicates the result of the sensor response: 00 Success FF Failure
0X0C	**Set sensor output mode.** Q&A mode: The host computer needs to send a read acceleration command before the sensor responds to the relative acceleration. Automatic output mode: After the sensor is powered on, it will automatically output X, Y, Z acceleration, and the output frequency is based on the set value. If high frequency output is required, please set the baud rate to 115200. (This function can be memory when power off) E.g.: **68 05 00 0C 00 11**	Data field (1byte) factory default value: 00 00 response system 01 5Hz automatic output mode 02 10Hz automatic output mode 03 25Hz automatic output mode 04 50Hz automatic output mode 05 100Hz automatic output mode 06 200Hz automatic output mode 07 500Hz automatic output mode (the baud rate is 115200, 230400) 08 1000Hz automatic output mode (230400 baud rate) 09 300Hz automatic output mode 10 400Hz automatic output mode
0X8C	Sensor reply command E.g.: **68 05 00 8C 00 91**	Data field (1byte) The number in the data field indicates the result of the sensor response: 00 Success FF Failure
0X1B	**Set the sampling frequency** E.g: *68 06 00 1B 00 01 12*	Data field (1byte) , default 00 00 4000HZ Q&A mode 01 2000HZ Auto-output mode 02 1000HZ Auto-output mode 03 500HZ Auto-output mode

		04 250HZ Auto-output mode 05 125HZ Auto-output mode
0X0B	Sensor reply command E.g: **68 05 00 8B 00 90**	The number in the data field indicates the result of the sensor response: 00 Success FF Failure
0X0F	**Set address command** The default address of the sensor is 00, 1. If multiple sensors are connected to a group of buses at the same time, for example RS485: each sensor needs to be set to a different address to achieve separate control and response acceleration. 2. If the new address is successfully changed, the address code in all subsequent commands and response packets must be changed to the new address code after the change to be effective, or the sensor will not respond to the command. E.g.: 68 05 00 0F 01 15 Set the address as 01. 68 05 FF 0F 00 13 Use the general address to reset the address to 00	Data field (1byte) XX address, the address ranges from 00 to EF; Note: All products have a common address: **FF**
0X8F	Sensor reply command E.g.: 68 05 00 8F 00 94	Data field (1byte) , The number in the data field indicates the result of the sensor response: 00 Success FF Failure
0X53	Set save instruction 68 04 00 53 57	
0XD3	Set save command reply 68 05 00 D3 00 57	Data field (0 BYTE) The number in the data field indicates the result of the sensor response 00 Success FF Failure
0X1F	Read software version number instruction 68 04 00 1F 03	
	Read the software version reply 68 14 00 9F 41 4B 47 33 39 32 54 5F 56 32 31 30 37 30 38 41 A0	Data field (BYTE) The number in the data field indicates the result of the sensor response AKG392T_V210708A

Setting instructions and procedures

All setting operations are not saved when the power is turned off. The setting is effective immediately once comand sent. If you need to save setting command after power off, you need to issue a save command. The operation is:Issue the setting command -> return success, the setting takes effect -> issue the save command -> return success, the setting is saved.

▶ MODBUS PROTOCOL

MODBUS uses RTU mode, 'big-Endian' represents addresses and data items, adopts CRC16 check data, standard error code. Support 0x03 to read holding registers and 0x06 to write single registers.

Note: please read the following items carefully before use:

1) Because the MODBUS protocol stipulates that the time between two data frames should be at least 3.5 bytes (for example, at a baud rate of 9600, the time is 3.5×(1/9600)×11=0.004s). But in order to leave enough margin, this sensor increases the time to 10ms, so please leave at least 10ms time interval between each data frame. Please note that the automatic output of the product does not consider the T3.5 time.

The host sends a command-10ms idle-the slave responds to the command-10ms idle-the host sends a command...

2) The MODBUS protocol stipulates the relevant content of the broadcast address ---- 0. This sensor can also accept the content of the broadcast address, but it will not reply. So broadcast address 0 can be used for the following purposes, for reference only.

1. Set the addresses of all accelerometers of this model mounted on the bus to a certain address.

2. Set all the accelerometers of this model mounted on the bus to relative/absolute zero.

3. Test the sensor of this model on the entire bus, that is, the host sends a 0 address query acceleration command to the bus, and the communication indicator can flash if the communication is normal.

3) In order to improve the reliability of the system, setting the address command and setting the baud rate, these two commands must be sent twice in a row to be effective. "Send twice in a row" means that the two transmissions are successful (the slave responds every time), and the two questions and answers must be consecutive before and after. The setting process is as follows:

Send the setting address command-Waiting for the successful setting command sent by the slave-(No other commands can appear) Send the setting address command again-Waiting for the successful setting command sent by the slave-Successful modification

1.Data frame format:

Default communication parameters: address 1, baud rate 9600, 1 start bit, 8 data, even parity, 1 stop bit;

Effective setting address: 1~247;

CRC check: The range is the check of all bytes before the CRC field, using 16-bit CRC check.

2.Data types:

Type	Description
short	Unsigned 16-bit integer
ushort	Unsigned 32-bit integer
int	Signed 16-bit integer
uint	Signed 32-bit integer
R	Read only

3.Register address table:

Register address	Data content	Data type	Accuracy	Unit
40002	Temperature	short (R)	0.001	℃
40003	X acceleration	int (R)	0.001	g
40005	Y acceleration	int (R)	0.001	g
40007	Z acceleration	int (R)	0.001	g
40010	X vibration frequency	short (R)	0. 1	hz
40011	Y vibration frequency	short (R)	0. 1	hz
40012	Z vibration frequency	short (R)	0. 1	hz
40013	X vibration speed	int (R)	0.000001	m/s
40015	Y vibration speed	int (R)	0.000001	m/s
40017	Z vibration speed	int (R)	0.000001	m/s
40019	X vibration amplitude	int (R)	0. 0000001	m
40021	Y vibration amplitude	int (R)	0. 0000001	m
40023	Z vibration amplitude	int (R)	0. 0000001	m

Data analysis method: data value = register data * coefficient.

4.Example : Read X axis data, Modbus function code 03H

Host query command		Slave response		
Sensor address	01H	Sensor address	01H	
Function code	03H	Function code	03H	
Register address	00H	Data length	0CH	
	02H	Data word 1-4 bytes	00H	X acceleration
Register length	00H		00H	
	06H		00H	
CRC	6408H		24H	
		Data word 5-8 bytes	FFH	Y vibration speed
			FFH	
			FFH	
			F0H	
		Data word 9-12 bytes	00H	Z vibration speed
			00H	
			03H	
			E8H	
		CRC_L	2CH	
		CRC_H	DEH	

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

1) Get the current data, X-axis acceleration is 00000002H, Y-axis acceleration is FFFFFFFD H, Z-axis acceleration is 000003E8H. Then convert the above data to decimal.

2) Multiply by the accuracy to get the data X-axis acceleration is 2*0.001=0.002g, Y-axis acceleration is -15*0.001=-0.015g, Z-axis acceleration is 1000*0.001=1g.

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5.Set 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 new address	00H	Sensor new address	00H
	04H		04H
CRC	D80C	CRC	D80C

Commands must be sent twice consecutively to be effective.

Example of setting sensor address command							
Host send		01H	06H	00H	11H	00H	04H	D8H	0CH
Slave response								
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 has been changed to 0004H, and the last two bytes are the CRC checksum.

6.Set the baud rate of the sensor: (The factory default is 9600bps)

Set sensor baud rate 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   A4H:230400

Example of sensor baud rate setting:							
Host send		01H	06H	00H	12H	00H	A2H	A8H	76H
Slave response								
01H	06H	00H	12 H	00 H	A2H	A8H	76H

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

7.Set the parity bit of the sensor serial port: (factory default is even parity)

Set parity bit command		Slave response	
Sensor address	01H	Sensor address	01H
Function code	06H	Function code	06H
Register address	00H	Register address	00H
	09H		09H
Sensor change parity bit	00H	Sensor change parity bit	00H
	01H		01H
CRC	9808	CRC	9808

Application example of setting zero command:								
Host send		01 H	06 H	00 H	09 H	00 H	01H	98H	08H
Slave response								
01 H	06 H	00 H	09 H	00 H	01H	98 H	08H

The above example is to set the byte format to: a start bit + 8 data bits no parity + 1 stop bit

Valid after re-powering on. The factory default is one start bit + 8 data bits even parity + 1 stop bit

Note: 0009 is the register address, this register controls the character format of sensor communication.

0000H: a start bit + 8 data bits even parity + 1 stop bit

0001H: A start bit + 8 data bits without parity + 1 stop bit

8．Set sensor output mode: (factory default 0HZ)

Set sensor output mode command:		Slave response:	
Sensor address	01H	Sensor address	01H
function code	06H	function code	06H
address	00H	register address	00H
	13H		13H
The output rate of the sensor	00H	The output rate of the sensor	00H
	XX		XX
CRC	CRC LH	CRC	CRC LH

The following table shows the valid values of data field XX ：

frequency（HZ）	0	5	10	25	50	100	200	500	1000	300	400
XX	00H	01H	02H	03H	04H	05H	06H	07H	08H	09H	0AH

Application example of set sensor address command ：								
Host send		01H	06H	00H	13H	00H	A2H	A8H	76H
Slave response								
01H	06H	00H	13H	00H	02H	A8H	76H

Note: 0013H is the register address, this register controls the sensor output mode. In the above example, the output rate of the sensor is set to 10HZ, the last two bytes are the CRC checksum, and the automatic output is three-axis acceleration data.

9.Set sensor auto-output data command :

Set the sensor to automatically output the data item command:		Slave response:	
Sensor address	01H	Sensor address	01H
function code	06H	function code	06H
address	00H	register address	00H
	00H		00H
Automatic outputs from sensors	91H	Automatic outputs from sensors	91H
	11H		11H
CRC	CRC LH	CRC	CRC LH

The command must be sent twice in a row to be effective

Application example of set sensor address command :								
Host send		01H	06H	00H	00H	91H	11H	D8H	0CH
Slave response								
01H	06H	00H	11H	00H	04H	D8 H	0CH

Note: 0000H is the register address, which controls the sensor to automatically output data items. In the above example, the output item of the sensor is set to 9111H, and the last two bytes are the CRC checksum.

10.Read sensor automatic output data command:

The command to read the sensor automatic output data item:		Slave response:	
Sensor address	01H	Sensor address	01H
function code	03H	function code	03H
register address	00H	length	02H
	00H		91H
register length	00H	register data	11H
	01H		
CRC	CRC LH	CRC	CRC LH

The command must be sent twice in a row to be effective

Application example of set sensor address command :								
Host send		01H	03H	00H	00H	00H	01H	84H	0AH
Slave response								
01H	03H	02H	91H	11H	15H		D8

Note: 0000H is the register address, which controls the sensor to automatically output data items. In the above example, the output item of the read sensor is 9111H, and the last two bytes are the CRC checksum.

11. Set sensor sampling frequency:

Set sensor auto-output data command: :		Slave response:	
Sensor address	01H	Sensor address	01H
Function code	06H	Function code	06H
address	00H	register address	00H
	14H		14H
Sensor sampling frequency :	00H	Sensor sampling frequency :	00H
	XXH		XXH
CRC	CRC LH	CRC	CRC LH

The following table shows the valid values of data field XX :

sampling（HZ）	4000	2000	1000	500	250	125
XX	0	1	2	3	4	5

The command must be sent twice in a row to be effective

Application example of set sensor address command:									
Host send			01H	06H	00H	14H	00H	01H	08H	04H
Slave response									
01H	06H	00H	14H	00H	01H	08H	04H

Note: 0014H is the register address, this register controls the sampling frequency of the sensor .

In the above example, set the sampling frequency of the sensor: 2000HZ, and the last two bytes are the CRC checksum.

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