



GHA360 Ethernet high-frequency Vibration sensor Product manual

V1.3-20260721

Technical Characteristics

- ❖ Measuring range $\pm 50g$;
- ❖ Power supply 12V;
- ❖ Operating temperature: $-10\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$;
- ❖ IP67 protection rating;
- ❖ Bandwidth DC~10kHz, low noise $35\mu g/\sqrt{\text{Hz}}$.



Product Introduction

GHA360 three-axis Ethernet high-frequency vibration sensor, integrated with X/Y/Z three-way transient acceleration synchronous acquisition capability, with a maximum single axis response frequency of 10 kHz, fully covering the fault characteristic frequency bands of mainstream industrial rotating machinery such as gear meshing frequency, bearing characteristic frequency, and blade passing frequency. Built in 20 bit high-resolution analog-to-digital conversion architecture, with fine sensitivity up to 0.095 mg/LSB, combining excellent linearity and the ability to pick up small vibration signals, ensuring accurate restoration of time-domain waveforms even under strong background noise. At the network communication level, it comes standard with a 10/100Mbps adaptive Ethernet interface **, which supports pushing raw waveform data directly to upper level servers in the form of data packets without the need for intermediate gateways or protocol conversion devices, achieving end-to-end low latency data transmission. The decentralized design concept is particularly suitable for online status monitoring and full lifecycle health quantification evaluation of key rotating components such as motors, water pumps, fans, reducers, gearboxes, etc. It can provide a high fidelity and high reliability data base for predictive maintenance.

Application Field

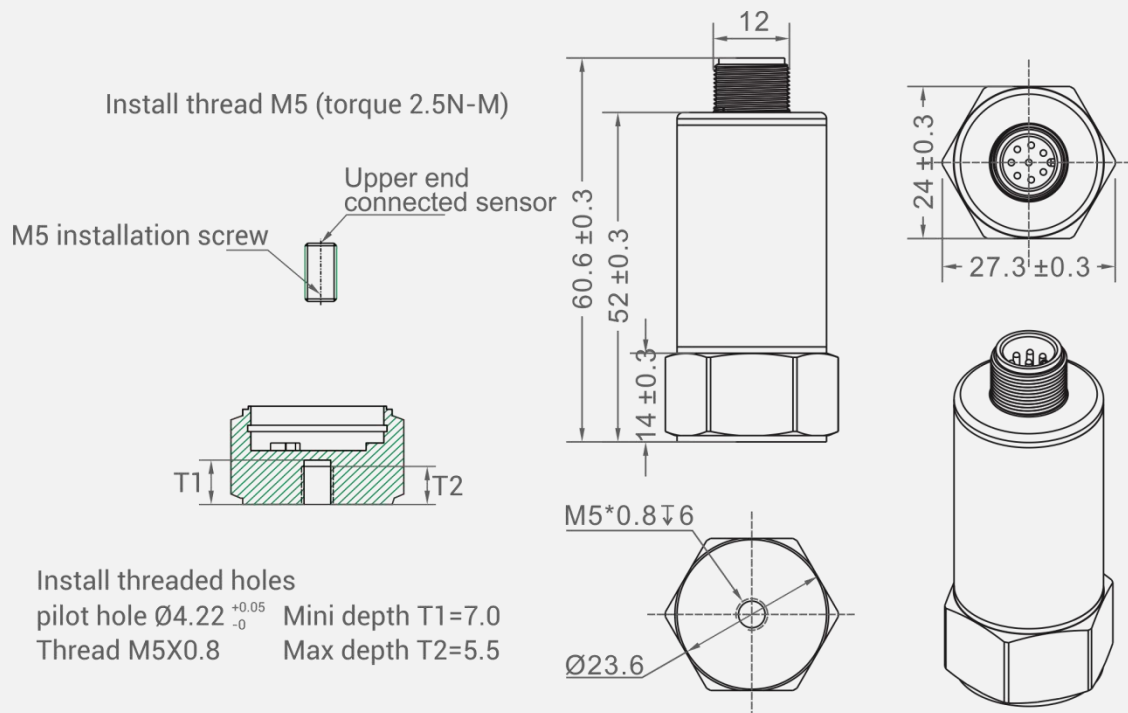
- ❖ Vibration monitoring of industrial equipment
- ❖ Monitoring of rotating machinery such as industrial pumps, motors, fans, air compressors, gas engines, generators, reducers, and gearboxes



Specifications

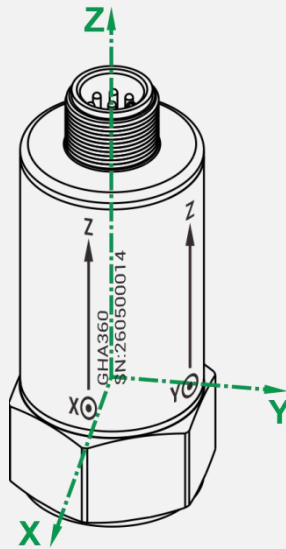
GHA360	Parameters
Measurement Range	±50g
Sensitivity	0.095 mg/LSB
Measuring Axis	X / Y / Z Axis
Response Frequency	DC~10 kHz
Sampling Frequency	80kHz
Transient Data	Transient data of X, Y, Z axes
Communication Interface	Ethernet
Default Server Address/Port	192.168.1.169/22009
Default Device Address	192.168.1.164
Device Address	The factory default address is "1"
Operating Ambient Temp	-40℃ ~ +85℃
Installation Method	Magnetic or double-ended screw mounting (bottom hole M5*6)
Protection Rating	IP67
Dimensions	Ø23.6×H60.6mm
Product Weight	≤105g

Product Dimensions



Shell size: Ø23.6×H60.6mm

Spatial Coordinate System



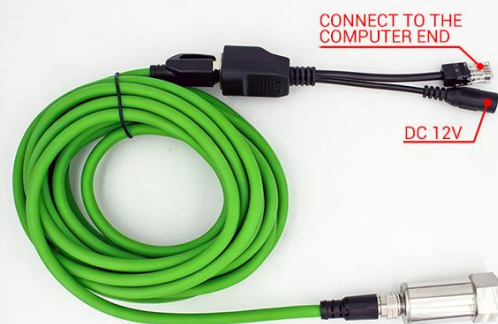
Installation Method

Magnetic type: The sensor is directly attached to the vibration measurement position of the equipment, and the measurement direction is adjusted.

Screw type: The M5×10mm double-ended screw or M5×6mm to M8×8mm double-ended screw on the bottom of the sensor is tightened to the measurement position of the equipment, and the measurement direction is adjusted. After evenly applying silicone grease to the bottom of the sensor, it is fixed to the test platform by tightening the double-ended screw.

Wiring diagram

The DC12V powered version of the sensor connects to the network power combiner via the included M12-8-pin aviation connector to an RJ45 adapter cable. Then, connect the network cable to the PC and connect the power supply to a DC 12V source, as shown in the figure on the right.



Schematic diagram of network cable power supply combiner connection.

Introduction to the host computer interface



For the initial connection, after connecting the sensor to the computer, change the computer's IP address to a static IP address, as shown in the image below.



Communication protocol format

Factory default connection parameters

Device address: "1";

IP address: 192.168.1.164;

Gateway: 192.168.1.1;

Server: 192.168.1.169, port number: 22009.

1. Specialized terms and abbreviations

Term	R	W	R/W	N/A	Char	Int32	Float
Description	Read-only	Write-only	Read-write	Not applicable	8-bit character	32-bit signed number	32-bit single-precision floating-point number

2. Communication Protocol

The triaxial vibration smart sensor communicates with the server (including the host computer) using the TCP protocol. The sensor acts as a TCP client, and the server acts as a TCP server. The sensor's TCP communication-related parameters can be modified via configuration software; however, the sensor needs to be restarted after parameter modifications.

3. Upload data packets

Send the currently acquired triaxial acceleration data (float type) to the TCP server. Once the server is ready, the sensor will continuously and actively send this message to the server after establishing a connection.

The upload data packet is defined as follows (UpDataPacket):

```
typedef struct UpDataPacket
```

```
{
```

```
char          IPackType[4];          //Packet type, ASCII characters "P" "U" "D" "T"
```

```
int32         IdeviceId              ; //Sensor ID
```

```
float         Fs;                    //Vibration signal sampling frequency
```

```
float         fTemp;                 //Sensor temperature (reserved, not started)
```

```
int32         pNum;                   //Packet count, increments by 1 for each packet sent,
counts again after restart
```

```
int32         ReservedInt32;          //Reserved 4 bytes
```

```
float         vData[116][3];          //3-axis vibration acceleration (g), in order of x/y/z, 116
groups in total
```

```
char          IPackEnd[4];             //Packet end, ASCII characters "P" "E" "N" "D"
```

```
}UPDATAPACKET;
```

PUDT
Sensor ID
Fs
fTemp
pNum
Reserved
X acceleration1
Y acceleration1
Z acceleration1
...
X acceleration116
Y acceleration116
Z acceleration116
PEND

The collected vibration data is sent to the server sequentially. Each data packet contains 116 sets of vibration data, each set including vibration acceleration values (expressed in g) along the x, y, and z axes. The server continuously splices these packets in sequence to generate continuous real-time acceleration signals for x, y, and z.

For example (a data packet message is as follows):

```
{  
  
50 55 44 54      ----Packet type, ASCII characters "P" "U" "D" "T"  
02 00 00 00      ----Sensor ID number      0002  
00 40 9C 47      ----Vibration signal sampling frequency      80000  
00 00 00 00      ----Sensor temperature acquisition not currently supported  
47 D2 00 00      ----Packet count  53831  
85 1A 00 00      ----Reserved 4 bytes  
95 81 B4 3C FC D0 64 3C 32 AF 8F BC .....85 11 30 3C 55 02 EB 3B 4C B7  
98 3B           -----3-axis vibration acceleration (g), in order of x/y/z, a total of 116 groups 50  
45 4E 44 -----End of packet, ASCII characters "P" "E" "N" "D" }
```