北微传感
BEWIS SENSING

IMU VG AH MINS Series

Modbus Protocol

V4.0

Protocol

1 Command Overview

1.1 Data frame format:(8 data bits, 1 stop bit, no parity, default rate 9600)

Address code (1 byte)	Function code (1 byte)	High address Of register (1 byte)	Low address of register (1 byte)	High order of the number of registers (1 byte)	Low order of the number of registers (1 byte)	CRC check (2 byte)
0x01	0x03 (read) 0x06 (write)					

Data format: hexadecimal
Address code: The default is 01 (Note: the address cannot exceed FF)
Function code: 03 stands for reading register, 06 stands for setting register
Register address: the starting address of the register to be operated
Number of registers: the number of registers that need to be manipulated
CRC check: CRC check from address code to low order of the number of registers

1.2 List of register data storage

numbers	register address	typology
X-axis angle	00 01	R
Y-axis angle	00 02	R
Z-axis angle	00 03	R
Product Address	00 04	R
Zero-point type	00 05	R
Zero-point type setting	00 0A	W
Baud rate setting	00 0B	W
Address Settings	00 0D	W
save	00 0F	W
Gyro calibration	00 10	W
Automatic output interval setting	00 1B	W
Automatic output of starting address and quantity	00 1C	W
Clear heading angle(MINS)	00 1E	W
Relative angle setting (MINS)	00 1F	W

X-axis angle (floating point type)	00 22	R
Y-axis angle (floating point type)	00 24	R
Z-axis angle (floating point type)	00 26	R
Accelerometer X-axis (floating point type)	00 28	R
Accelerometer Y-axis (floating point type)	00 2A	R
Accelerometer Z-axis (floating point type)	00 2C	R
Gyro X-axis (floating point type)	00 2E	R
Gyro Y-axis (floating point type)	00 30	R
Gyro Z-axis (floating point type)	00 32	R
Magnetometer X-axis (floating point type)	00 34	R
Magnetometer Y-axis (floating point type)	00 36	R
Magnetometer Z-axis (floating point type)	00 38	R
Quaternion Q0	00 3A	R
Quaternion Q1	00 3C	R
Quaternion Q2	00 3E	R
Quaternion Q3	00 40	R

1.3 Description of data types

uint8_t	8-bit unsigned integer		int32_t	32-bit Signed Integer
int8_t	8-bit Signed Integer		float	single precision floating point number
uint16_t	16-bit Unsigned Integer		double	double precision floating point number
int16_t	16-bit Signed Integer		xxx[]	Arrays of type xxx
uint32_t	32-bit unsigned integer			

2 command format

2.1 Read X-axis angle Send command: 01 03 00 01 00 01 D5 CA

Address code (1 byte)	Function code (1 byte)	High address of register	Low address of register	High order of the number of registers	Low order of the number of registers	CRC check (2 byte)
0x01	0x03	0x00	0x01	0x00	0x01	0xD5CA

Answer command Send command: 01 03 02 4E 7D 4D C5

Address code (1 byte)	Function code (1 byte)	Byte number (1 byte)	Data field (2 byte)	CRC check (2 byte)
0x01	0x03	0x02	RD	

Data field

0-1		
RD		
name (of a thing)	data type	instructions
RD	Uint16_t	X-axis angle in ° (deg), high in front, low in back Angle = (RD-20000)/100 For example, if the data field is 4E 7D, the Angle = (0x4E7D-20000)/100 = 0.93°

2.2 Read X and Y axis angles Send command: 01 03 00 01 00 02 95 CB

Address code (1 byte)	Function code (1 byte)	High address of register	Low address of register	High order of the number of registers	Low order of the number of registers	CRC check (2 byte)
0x01	0x03	0x00	0x01	0x00	0x02	0x95CB

Answer command Send command: 01 03 04 50 A7 4C EE EE 5C

Address code (1 byte)	Function code (1 byte)	Byte number (1 byte)	Data field (4 byte)	CRC check (2 byte)
0x01	0x03	0x04		

Data field

0-1		2-3
RD_X		RD_Y
name (of a thing)	data type	instructions
RD_X	Uint16_t	X-axis angle in ° (deg), high in front, low in back Angle = (RD-20000)/100 For example, if the data field is 4E 7D, the Angle = (0x4E7D-20000)/100 = 0.93°
RD_Y	Uint16_t	Y-axis angle in ° (deg), the rest is the same as RD_X

2.3 Setting the baud rate (without saving) Send command: 01 06 00 0B 00 02 79 C9

Address code (1 byte)	Function code (1 byte)	High address of register	Low address of register	Data field (2 byte)	CRC check (2 byte)
0x01	0x06	0x00	0x0B	ST	

No answer command, direct effect, need to send save command.

Data field

0-1		
ST		
name (of a thing)	data type	instructions
ST	Uint16_t	Setting the baud rate 0x00 0x00 means 2400 0x00 0x01 means 4800 0x00 0x02 Indicates 9600 (default) 0x00 0x03 indicates 19200 0x00 0x04 Indicates 115200 0x00 0x05 indicates 38400 0x00 0x06 indicates 57600 0x00 0x07 denotes 460800 Other Indicates 9600

2.4 Save : 01 06 00 0F 00 00 00 B9 C9

Address code (1 byte)	Function code (1 byte)	High address of register	Low address of register	Data field (2 byte)	CRC check (2 byte)
0x01	0x06	0x00	0x0F	0x0000	

Answer : 01 06 00 0F 00 00 00 B9 C9

Address code (1 byte)	Function code (1 byte)	High address of register	Low address of register	Data field (2 byte)	CRC check (2 byte)
0x01	0x06	0x00	0x0F	0x0000	

2.5 Set relative/absolute zero point : 01 06 00 0A 00 00 A9 C8

Address code (1 byte)	Function code (1 byte)	High address of register	Low address of register	Data field (2 byte)	CRC check (2 byte)
0x01	0x06	0x00	0x0A	ST	

Data field

0-1		
ST		
name (of a thing)	data type	instructions
ST	Uint16_t	Setting the zero type 0x00 0x00 Indicates Absolute Zero 0x00 0x01 Indicates relative zero point

Answer command : 01 06 00 0A 00 00 A9 C8

Address code (1 byte)	Function code (1 byte)	High address of register	Low address of register	Data field (2 byte)	CRC check (2 byte)
0x01	0x06	0x00	0x0A	RS	

Data field

0-1		
RS		
name (of a thing)	data type	instructions
RS	Uint16_t	Same as ST

2.6 Query zero type : 01 03 00 05 00 01 94 0B

Address code (1 byte)	Function code (1 byte)	High address of register (1 byte)	Low address of register (1 byte)	High order of the number of registers (1 byte)	Low order of the number of registers (1 byte)	CRC check (2 byte)
0x01	0x03	0x00	0x05	0x00	0x01	0x940B

Answer command : 01 03 02 00 01 79 84

Address code (1 byte)	Function code (1 byte)	Byte count (1 byte)	Data field (2 byte)	CRC check (2 byte)
0x01	0x03	0x02	RS	

Data field

0-1		
RS		
name (of a thing)	data type	instructions
RS	Uint16_t	Zero Type 0x00 0x00 Absolute Zero 0x00 0x01 Relative Zero

2.7 SSet module address : 01 06 00 0D 00 03 58 08

Address code (1 byte)	Function code (1 byte)	High address of register (1 byte)	Low address of register (1 byte)	Data field (2 byte)	CRC check (2 byte)
0x01	0x06	0x00	0x0D	ST	

Data field

0-1		
ST		
name (of a thing)	data type	instructions
ST	Uint16_t	Setting the sensor node address 0x0000 ~ 0x00FF

Answer command : 03 06 00 0D 00 03 59 EA

Address code (1 byte)	Function code (1 byte)	High address of register (1 byte)	Low address of register (1 byte)	Data field (2 byte)	CRC check (2 byte)
New Addr	0x06	0x00	0x0D	RS	

Data field

0-1		
RS		
name (of a thing)	data type	instructions
RS	Uint16_t	Same as ST

2.8 Read three-axis acceleration : 01 03 00 28 00 06 45 C0

Address code (1 byte)	Function code (1 byte)	High address of register (1 byte)	Low address of register (1 byte)	High order of the number of registers (1 byte)	Low order of the number of registers (1 byte)	CRC check (2 byte)
0x01	0x03	0x00	0x28	0x00	0x06	0x45C0

Answer command : 01 03 0C DE E4 37 3C E1 7D D5 3C D9 93 7C 3F C0 2C

Address code (1 byte)	Function code (1 byte)	Byte count (1 byte)	Data field (12 byte)	CRC check (2 byte)
0x01	0x03	0x0C		

Data field

0-3	4-7	8-11
ACCX	ACCY	ACCZ

name (of a thing)	data type	instructions
ACCX	float	Accelerometer X-axis output in g low byte first, high byte second For example, DE E4 37 3C would represent 0.01122399978g
ACCY	float	Accelerometer Y-axis output in g Same as ACCX
ACCZ	float	Accelerometer Z-axis output in g Same as ACCX

2.9 Read three-axis angular velocity : 01 03 00 2E 00 06 A5 C1

Address code (1 byte)	Function code (1 byte)	High address of register (1 byte)	Low address of register (1 byte)	High order of the number of registers (1 byte)	Low order of the number of registers (1 byte)	CRC check (2 byte)
0x01	0x03	0x00	0x2E	0x00	0x06	0xA5C1

Answer command : 01 03 0C D7 88 80 3D CF 2F 0A BD F1 82 08 BC 46 18

Address code (1 byte)	Function code (1 byte)	Byte count (1 byte)	Data field (12 byte)	CRC check (2 byte)
0x01	0x03	0x0C		

Data field

0-3	4-7	8-11
GYROX	GYROY	GYROZ

name (of a thing)	data type	instructions
GYROX	float	Gyro X-axis output in °/s, low byte first, high byte second For example, D7 88 80 3D would represent 0.062761°/s
GYROY	float	Gyro Y-axis output in °/s, same as GYROX
GYROZ	float	Gyro Z-axis output in °/s, same as GYROX

2.10 Read quaternion : 01 03 00 3A 00 08 64 01

Address code (1 byte)	Function code (1 byte)	High address of register (1 byte)	Low address of register (1 byte)	High order of the number of registers (1 byte)	Low order of the number of registers (1 byte)	CRC check (2 byte)
0x01	0x03	0x00	0x3A	0x00	0x08	0x6401

Answer command : 01 03 10 21 E7 55 3F A5 A0 1B 3D 7A 1A 30 BD BD E0 0B BF 5C B4

Address code (1 byte)	Function code (1 byte)	Byte count (1 byte)	Data field (16 byte)	CRC check (2 byte)
0x01	0x03	0x10		

Data field

0-3	4-7	8-11	12-15
Q0	Q1	Q2	Q3

name (of a thing)	data type	instructions
Q0	float	Quaternion w, low byte first, high byte second For example, 21 E7 55 3F would represent 0.835557997
Q1	float	Quaternion x Same as Q0
Q2	float	Quaternion y Same as Q0
Q3	float	Quaternion z Same as Q0

2.11 Gyro calibration : 01 06 00 10 00 00 88 0F

Address code (1 byte)	Function code (1 byte)	High address of register (1 byte)	Low address of register (1 byte)	Data field (2 byte)	CRC check (2 byte)
0x01	0x06	0x00	0x10	0x0000	0x880F

Answer command：01 06 00 10 00 00 88 0F

Address code (1 byte)	Function code (1 byte)	High address of register (1 byte)	Low address of register (1 byte)	Data field (2 byte)	CRC check (2 byte)
01	0x06	0x00	0x10	RS	

Data field

0-1		
RS		
name (of a thing)	data type	instructions
RS	Uint16_t	Return Status 0x00 0x00 Command received, remain stationary, wait for clearing to complete 0x00 0x01 Clear complete

2.12 Setting the automatic output interval：01 06 00 1B 00 14 F9 C2

Address code (1 byte)	Function code (1 byte)	High address of register (1 byte)	Low address of register (1 byte)	Data field (2 byte)	CRC check (2 byte)
0x01	0x06	0x00	0x1B	ST	

Data field

0-1		
ST		
name (of a thing)	data type	instructions
ST	Uint16_t	Setting the sensor automatic output interval 0x0000 Disable automatic output (default) 0x000A ~ 0xFFFF Auto Output Interval (ms) For example, 0x0014, set the automatic output interval 20ms, i.e. 50Hz

Answer command：01 06 00 1B 00 14 F9 C2

Address code (1 byte)	Function code (1 byte)	High address of register (1 byte)	Low address of register (1 byte)	Data field (2 byte)	CRC check (2 byte)
0x01	0x06	0x00	0x1B	RS	

Data field

0-1		
RS		
name (of a thing)	data type	instructions
RS	Uint16_t	Same as ST

2.13 Set automatic output time interval (modbus) : 01 06 00 1C 01 04 48 5F

Address code (1 byte)	Function code (1 byte)	High address of register (1 byte)	Low address of register (1 byte)	Data field (2 byte)	CRC check (2 byte)
0x01	0x06	0x00	0x1C		

Data field

0		1
REG		CNT
name (of a thing)	data type	instructions
REG	uint8_t	Setting the register start address for sensor auto outputs Default start address is register 0x01
CNT	uint8_t	Setting the number of registers for automatic sensor output Default register count is 0x02

Answer command : 01 06 00 1C 01 04 48 5F

Address code (1 byte)	Function code (1 byte)	High address of register (1 byte)	Low address of register (1 byte)	Data field (2 byte)	CRC check (2 byte)
0x01	0x06	0x00	0x1C		

Data field

0		1
REG		CNT
name (of a thing)	data type	instructions
REG	uint8_t	co-send
CNT	uint8_t	co-send

IMU VG AH MINS Series

MODBUS Protocol

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