



BW-VG425C Series

High-precision CAN dynamic Inclinometer

Technical Manual



BW-VG425C High-precision CAN Dynamic Inclinometer



Introduction

The VG425C is a high-precision attitude measurement device that can measure the inertial attitude parameters of moving carrier's roll and pitch, angle velocity and acceleration. The attitude deviation is estimated by the 6-state Kalman filter with appropriate gain, which is suitable for inclination measurement in motion or vibration state. VG425C uses high-quality and reliable MEMS accelerometers and gyroscopes, and ensure measurement accuracy with algorithm. At the same time, the sealing design and strict process ensure that it can accurately measure the carrier's attitude parameters in harsh environments. Through various compensations such as nonlinear compensation, quadrature compensation, temperature compensation and drift compensation, the error caused by interference can be greatly eliminated, and the product accuracy level can be improved. VG425C has a digital interface, which can be easily integrated into the user's system.

Feature

- Dynamic accuracy: 0.2°
- Static accuracy: 0.01°
- Non-linear compensation, quadrature compensation

• Special offset tracking algorithm to eliminate drift

- CAN interface output optional
- Wide temperature range: $-40^{\circ}C \sim +85^{\circ}C$
- High-performance Kalman filter algorithm
- Dimension: L60x W59 x H29 (mm)

Application

- Underwater unmanned boat
- Turbine sloshing monitoring
- Platform stability
- large ship

- Photoelectric pod
- Unmanned Drive
- Special Vehicles
- Unmanned Craft



Product Feature

Selectrical indicators

Voltage	9-36V DC
Working current	30mA (40mA Max)
Temperature in use	-40~85℃
Temperature in store	-55~100℃

🗙 Performance Index

	Dynamic accuracy	0.2°		
	Static accuracy	0.01°		
Attitude Parameter	Resolution	0.01°		
	Tilt margin	Pitch ± 90°, Roll ± 180°		
	Dimension	L60×W59×H29(mm)		
Physical properties	Weight (with cable)	280g		
	Weight (With packaging)	360g		
	Start delay	<50ms		
	Maximum sampling rate	500Hz		
Interface characteristics	frequency			
characteristics	Serial communication rate	2400 to 115200 baud rate		
	Digital output format	Binary High Performance		
		Protocol		
Trouble-free work on	≥ 30000 hours			
average				
EMC	According to GBT17626			
Insulation Resistance	≥ 100MΩ			
Surge suppression	2000g, 0.5ms, 3 Time,	/shaft		

Resolution: The measured minimum change value that the sensor can detect and resolve within the measurement range.

Accuracy: The error between the actual angle and the Root mean square(RMS) of the measured angle of the sensor(≥16 times).



🗭 Mechanical

Connector	Metal interface (Cable 1.5m)
Protection level	IP67
Shell material	Magnesium aluminum alloy oxidation
Installation	Four M4 screws

Package product size

Product Size: L60*W59*H29 (mm)



) PCB size

Product Size: L44*W35*H11mm, ±1mm error for length and width dimensions, please refer to actual product





Installation

The correct installation method can avoid measurement errors. When installing the

sensor, please do the following: First of all, make sure that the sensor mounting surface is completely close to the measured surface, and the measured surface should be as level as possible. There should be no included angles as shown in Figure A and Figure C. The correct installation method is shown in Figure B and Figure D.





Secondly, the bottom line of the sensor and the axis of the measured object cannot have an angle as shown in Figure E, and the bottom line of the sensor should be kept parallel or orthogonal to the axis of rotation of the measured object during installation. This product can be installed horizontally or vertically (vertical installation needs to be customized), and the correct installation method is shown in Figure F.



Finally, the mounting surface of the sensor and the surface to be measured must be tightly fixed, smooth in contact, and stable in rotation, and measurement errors due to acceleration and vibration must be avoided.



Electrical Interface



CAN bus wiring diagram



Testing software

Since there is usually a dedicated CAN receiving device for data communication with CAN interface products, the software is CAN.

The software that comes with the device is used in different ways, so there is no corresponding supporting software. Below is the CAN receiving module used by our company and take product communication as an example:



Configure CAN baud rate and parameters as follows:

Ť	青选择串	[] 号:	COM5	刷新列表	**	
串口波特率: 1			115200		关闭串口	-
ì	设备序列	号: 51	f-7306-6785-5	348-1025-2467		
CAN接	口配置	串口配置	t			
CAN总	线波特率	125	5000	配置波特率	恢复	
接收过	滤器配		自动重发 🗌	自动离线管理	」 、 恢复 出 厂 设	罟
序号	使能	格式	标识符	2	範码	^
1		标准	000	000		
2		标准	000	000		
3		扩展	1FFFFFFF	1FFFFFF	F	
4		扩展	1FFFFFFF	1FFFFFF	F	
5		扩展	1FFFFFFF	1FFFFFF	F	
6		扩展	1FFFFFFF	1FFFFFF	F S	
7		扩展	1FFFFFFF	1FFFFFF	E	
8		扩展	1FFFFFFF	1FFFFFF	F	
0						

EmbededConfig Designed by 郭盖华 gghyoo@qq.cor V1.0.0.0

The receiving and sending area is set as follows:

	り 操作		₩D(M	の设	置(X)	界面	显示(Y)	帮助	(Z)									×
发送区			-	1 1999		A.												
基本對	如据发送	波特	室															
选中	ID		Le	en D	ATAO	DATA1	DATA2	DATA	3 DATA	4 DAT	A5 DATA6	DATA7	Format	Type	发送控制			
	605		8	4	0	10	10	0	6	0	0	0	标准响	本行其				
S. Second	and development and		and the second second		No.		Interior	And and			1990	Reference of the second	- Contraction	Contraction of the				
															□ 定时!	友法		
															发送间隔	a 1000		ms
																-	112.224	
																	发送	
+ +	- 1		<											>				
妾收区	198																	
文本5	示 12	222																
	5示 12		Da1	Da2	Da3	Da4	Da5	Da6	Da7	Len	Fmt 1	YP						
		Da0									Fmt T Standard							-
	0x585	Da0 0x10	0x01	0x52	0348	0200	0x00	0x10	0x42	0x08	1 1010	i Data						-
	0x585	Da0 0x10 0x10	0x01 0x01	0x52 0x51	0x48 0x17	0x00	0x00 0x00	0x10 0x09	0x42 0x73	0x08 0x08	Standard	i Data i Data						
	0x585 0x585 0x585 0x585	Da0 0x10 0x10 0x10 0x10 0x10	0x01 0x01 0x01 0x01	0x52 0x51 0x49 0x49	0x48 0x17 0x79 0x07	0x00 0x00 0x00 0x00	0x00 0x00 0x00 0x00	0x10 0x09 0x09 0x09	0x42 0x73 0x08 0x21	0x08 0x08 0x08 0x08 0x08	Standard Standard Standard Standard	i Data i Data i Data i Data						
	0x585 0x585 0x585 0x585 0x585	Da0 0x10 0x10 0x10 0x10 0x10 0x10	0x01 0x01 0x01 0x01 0x01	0x52 0x51 0x49 0x49 0x47	0x48 0x17 0x79 0x07 0x07	0x00 0x00 0x00 0x00 0x00	0x00 0x00 0x00 0x00 0x00 0x00	0x10 0x09 0x09 0x08 0x08	0x42 0x73 0x08 0x21 0x08	80x0 80x0 80x0 80x0 80x0	Standard Standard Standard Standard Standard	i Data i Data i Data i Data i Data						
	0x585 0x585 0x585 0x585 0x585 0x585	Da0 0x10 0x10 0x10 0x10 0x10 0x10	0x01 0x01 0x01 0x01 0x01 0x01	0x52 0x51 0x49 0x49 0x47 0x47	0x48 0x17 0x79 0x07 0x07 0x90 0x16	0x00 0x00 0x00 0x00 0x00 0x00 0x00	0x00 0x00 0x00 0x00 0x00 0x00 0x00	0x10 0x09 0x09 0x08 0x07 0x05	0x42 0x73 0x08 0x21 0x08 0x83	0x08 0x08 0x08 0x08 0x08 0x08 0x08	Standard Standard Standard Standard Standard Standard	i Data i Data i Data i Data i Data i Data						
	0x585 0x585 0x585 0x585 0x585 0x585 0x585	Da0 0x10 0x10 0x10 0x10 0x10 0x10 0x10 0x	0x01 0x01 0x01 0x01 0x01 0x01 0x01	0x52 0x51 0x49 0x49 0x47 0x47 0x47	0x48 0x17 0x79 0x07 0x90 0x16 0x36	0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x0	0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x0	0x10 0x09 0x09 0x08 0x08 0x07 0x05 0x04	0x42 0x73 0x08 0x21 0x08 0x83 0x83 0x72	0x08 0x08 0x08 0x08 0x08 0x08 0x08	Standard Standard Standard Standard Standard Standard Standard	i Data i Data i Data i Data i Data i Data i Data						
	0x585 0x585 0x585 0x585 0x585 0x585 0x585	Da0 0x10 0x10 0x10 0x10 0x10 0x10 0x10 0x	0x01 0x01 0x01 0x01 0x01 0x01 0x01	0x52 0x51 0x49 0x49 0x47 0x47 0x47	0x48 0x17 0x79 0x07 0x90 0x16 0x36	0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x0	0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x0	0x10 0x09 0x09 0x08 0x08 0x07 0x05 0x04	0x42 0x73 0x08 0x21 0x08 0x83 0x83 0x72	0x08 0x08 0x08 0x08 0x08 0x08 0x08	Standard Standard Standard Standard Standard Standard	i Data i Data i Data i Data i Data i Data i Data					į	
文本5 ID	0x585 0x585 0x585 0x585 0x585 0x585 0x585	Da0 0x10 0x10 0x10 0x10 0x10 0x10 0x10 0x	0x01 0x01 0x01 0x01 0x01 0x01 0x01	0x52 0x51 0x49 0x49 0x47 0x47 0x47	0x48 0x17 0x79 0x07 0x90 0x16 0x36	0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x0	0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x0	0x10 0x09 0x09 0x08 0x08 0x07 0x05 0x04	0x42 0x73 0x08 0x21 0x08 0x83 0x83 0x72	0x08 0x08 0x08 0x08 0x08 0x08 0x08	Standard Standard Standard Standard Standard Standard Standard	i Data i Data i Data i Data i Data i Data i Data						



_	
Informati	

Model	Communication Mode	Package Situation
BW-VG425C	CAN	IP67/ Metal interface

Executive standard

- Specification for static calibration of dual-axis tilt sensors National Standard (draft)
- GB/T 191 SJ 20873-2003 General specification for inclinometer and level

BW-VG425C Series

High precision CAN Dynamic Inclinometer

Wuxi Bewis Sensing Technology LLC

Add: Building 30, NO. 58, Xiuxi Road, Binhu District, Wuxi City, Jiangsu Province, China Tel: +86 18921292620 Hot line: 400-618-0510 Mail: sales@bwsensing.com Web: www.bwsensing.com