Anemometer AM706

Operation & Installation Manual

＊＊＊ Quick Operating Guide ＊＊＊

➢ ［Mode］：Relative speed/direction + True speed/direction mode and Relative speed/direction + Max speed + Average speed mode

➢ ［MENU］：Set Wind Alarm, Speed Unit, Avg Time, Input Show, Language, Back Color and Dig Color.

➢ Calibration：After finishing the main unit AM706E installation and power on, hold the wind vane to the direction of the bow line, then push the button in the junction box.

Contents

Introduction

The Marine Anemometer AM706 is a combined instrument for wind speed and direction. It can measure relative wind speed (accuracy ±5%, min 0.1m/s), relative wind direction (digital display accuracy 1 °, analog display accuracy 10 ° and output accuracy ± 1 °). GYRO (HDT) , SPEEDLOG (VBW) or GPS (RMC/VTG) data user can select relative wind mode and true wind mode.

Main unit AM706E can be installed by the table, hanging and flush mounting methods. Sensor AM706S should be installed in the place with free wind in the ship.

System Composition

Main Unit   AM706E

Direction Display：Analog and digital display of relative (to the bow) and true wind direction

Speed Display：Digital display of relative, true, max and average wind speed.

Sensor unit   AM706S

Wind speed sensor：Wind speed sensor has a rotor with three wind cups.

Wind direction sensor：Wind direction sensor has a wind vane to drive an absolute angle sensor unit.

Holder：Used to install wind speed sensor and direction sensor for fixation of junction box

Junction box：Consist of waterproof junction box and sensor unit transmitter.

Introduction

Principle of Measurement

The wind speed sensor has a rotor with three wind cups which spins as the wind moves past the boat. The Wind speed sensor measures how fast the rotor is spinning to calculate the wind speed. The wind direction sensor has a wind vane which points in the direction that the wind is coming from. The wind direction sensor electronically senses the direction the wind vane is pointing. With inputting GYRO (HDT) , SPEEDLOG (VBW) or GPS (RMC/VTG) data, calculate and display the true wind speed and direction（relative to north pole）.

Function and Operation

Display Layout

Wind Speed Digital Display

Wind Direction Analog Display

Wind Direction Digital Display

Operation Keyboard

Power on/off   Menu   OK   Mode

Brightness   Arrow keys   Day/Night Mode
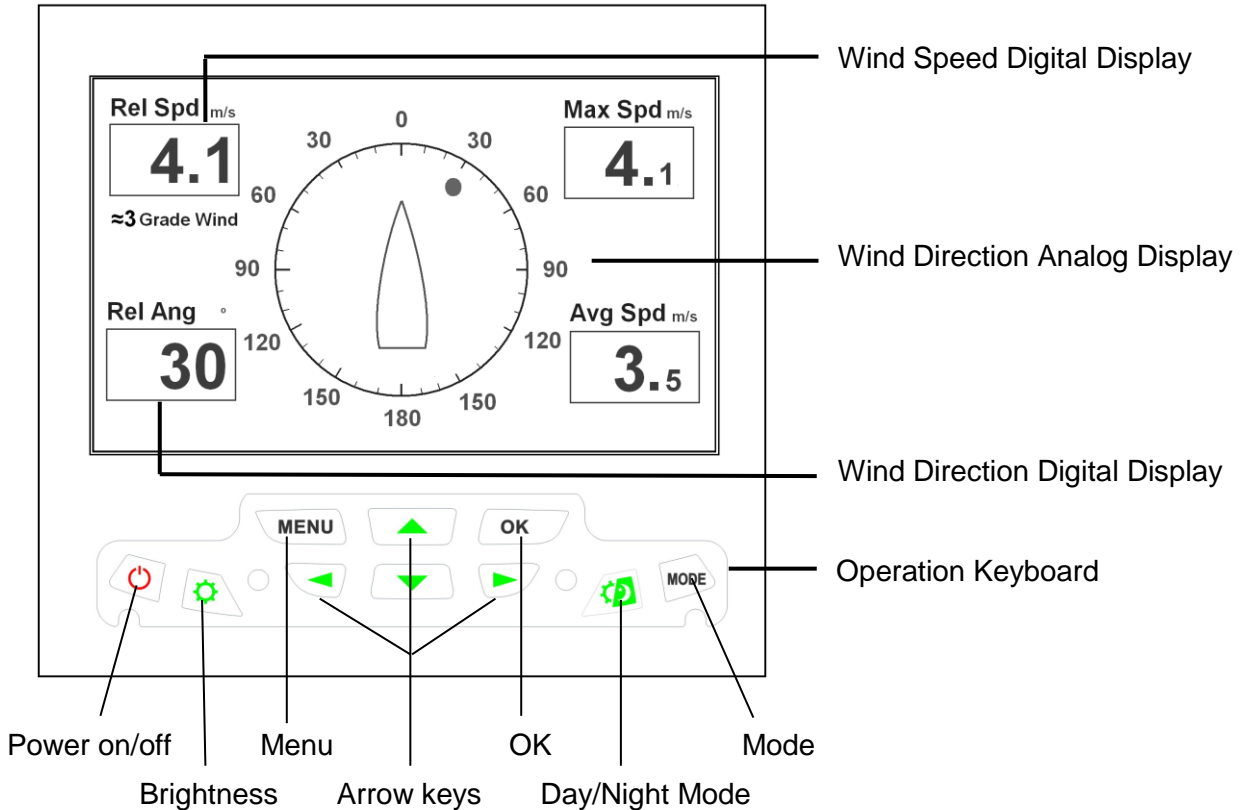
Function

Power on/off

Press the on-off key to turn on /off the system.

Brightness

In Day/Night mode, press the brightness key to adjust the screen brightness.
There are 9 levels for selection.

Function and Operation

OK

Press [OK] key to save the settings in the menu and return to the main screen.

Day/Night Mode

Press the Day/Night mode key to switch the day mode and night mode.

MODE

Press [MODE] key to select Relative Mode（relative speed + relative angle + max speed + average speed）and True Mode（relative speed + relative angle + true speed + true Angle）.
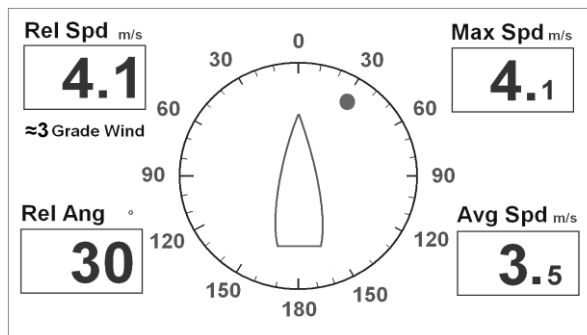
| Relative Mode | True Mode |

Note：The wind grade （see Appendix） can only be shown in relative mode.

The ship speed and heading can be only shown in true mode.

Function and Operation

Arrow Keys

In the menu mode, press up/down arrow keys to select the setting items and press left/right arrow keys to select the setting values.

MENU

Menu Explanation

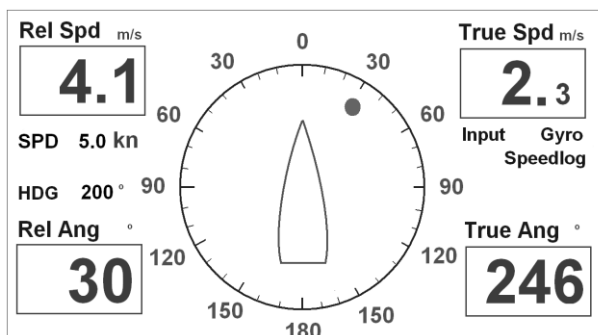| Item	Range	Default
Wind Alarm	[Off　1~60m/s]	Off
Speed Unit	[m/s　km/h　knots]	m/s
Avg Time	[1 min　2 min　5 min　10 min]	10 min
Input Show	[Off　On]	Off
Language	[English　中文]	English
Back Color	[Light-Blue　Blue　Black]	Light-Blue
Dig Color	[Yellow in Blue　Green in Black　White in Black]	Yellow in Blue
Default	[Off　Reset]	Off
Send Ture	[Yes　No]	No

Wind Alarm

Set the relative wind speed alarm values. When the relative wind speed is larger than the relative wind alarm value, the system will give the alarm signal after 30s with beep and speed numbers become red color and flash. Press any key to mute the beep but the relative speed numbers are still in red color and flash. When the relative wind speed is less than the relative wind alarm

Function and Operation

value, the relative speed numbers return to white color and not flash. Then the system will be working normally.

Press up/down arrow keys to select the item 'Wind Alarm' and press left/right arrow keys to set the wind alarm values.

Setting Range is 1~60m/s and default is Off

Speed Unit

Set the wind speed unit. Press up/down arrow keys to select the item 'Speed Unit' and press left/right arrow keys to select speed unit.

1~60m/s and default is Off

Setting Range is m/s, km/h and knots and default is m/s.

Avg Time

Set the computing period of the max speed and average speed. Press up/down arrow keys to select the item 'Avg Time' and press left/right arrow keys to set the period.

Setting Range is 1 min, 2 min, 5 min and 10 min and default is 10 min.

Input Show

Set the input display of Gyro, Speedlog and GPS. Press up/down arrow keys to select the item 'Input Show' and press left/right arrow keys to select on and off.

Setting Range is Off and On and default is Off.

Function and Operation

Language

Set the system language. Press up/down arrow keys to select the item 'Language' and press left/right arrow keys to select English and Chinese. Setting Range is English and 中文 and default is English.

Back Color

Set the background color. Press up/down arrow keys to select the item 'Back Color' and press left/right arrow keys to select the colors.
Setting Range is Light-Blue, Blue and Black and default is Light-Blue.

Dig Color

Set the window and number colors. Press up/down arrow keys to select the item 'Dig Color' and press left/right arrow keys to select the colors.
Setting Range is Yellow in Blue, Green in Black and White in Black and default is Yellow in Blue.

Default

Reset the system. Setting Range is Off and Reset, and default is Off.

Send Ture

Set the transmitted relative or true sentence. Yes is to transmit relatvie and true sentence and No is to transmit relative sentence.

Function and Operation

Data transmission for NMEA0183

Main Unit Output --MWV

$--MWV, <u>x.x</u> , <u>a</u> , <u>x.x</u> , <u>a</u> , <u>A</u>*<u>hh</u><CR><LF>

       1   2   3   4 5 6

1) Wind angle, 0 to 359 degrees

2) Reference, R = Relative, T = Ture

3) Wind Speed

4) Wind Speed Units, K=km/h / M=m/s / N=knots

5) Status, A = Data Valid, V = Data invalid

6) Checksum

GPS Data Input--RMC

$--RMC, <u>hhmmss.ss</u>,<u>A</u>,<u>llll.ll</u>,<u>a</u>,<u>yyyyy.yy</u>,<u>a</u>,<u>x.x</u>,<u>x.x</u>,<u>xxxxxx</u>,<u>x.x</u>,<u>a</u>,<u>a</u>*<u>hh</u><CR><LF>

          1   2   3   4   5 6   7   8 9 10

1) UTC Time

2) Status, A=Data valid, V = Navigation receiver warning

3) Latitude，N or S

4) Longitude，E or W

5) Speed over ground, knots

6) Course Over Ground, degrees true

7) Date：ddmmyy

8) Magnetic Variation, degrees，E or W

9) Mode Indicator

10) Checksum

Function and Operation

GPS Data Input--VTG

$--VTG, <u>x.x,T</u> , <u>x.x,M</u> , <u>x.x,N</u> , <u>x.x,K</u> , <u>a</u>*<u>hh</u><CR><LF>

             1   2   3   4   5 6

(1)   Course over ground, degree true
(2)   Course over ground, degree magnetic
(3)   Speed over ground, knots
(4)   Speed over ground, km/h
(5)   Mode indicator，   A=Autonomous mode
                                D=Differential mode
                                E=Estimated（dead reckoning）mode
                                M=Manual input mode
                                S=Simulator mode
                                N=Data not valid
(6)   Checksum value

Speedlog Data Input--VBW

$--VBW, <u>x.x</u> , <u>x.x</u> , <u>A</u> , <u>x.x</u> , <u>x.x</u> , <u>A</u> , <u>x.x</u> , <u>A</u> , <u>x.x</u> , <u>A</u>*<u>hh</u><CR><LF>

            1   2   3   4   5   6   7   8   9 10 11

(1)   Longitudinal water speed, Knots
(2)   Transverse water speed, Knots
(3)   Status：water speed, A=data valid, V=data invalid
(4)   Longitudinal ground speed, Knots
(5)   Transverse ground speed, Knots
(6)   Status：ground speed, A=data valid, V=data invalid
(7)   Stern transverse water speed, Knots
(8)   Status：stern water speed, A=data valid, V=data invalid
(9)   Stern transverse ground speed, Knots
(10) Status：stern ground speed, A=data valid, V=data invalid
(11) Checksum value

Function and Operation

Speedlog Data Input--VHW

$--VHW, x.x,T , x.x,M , x.x,N , x.x,K*hh<CR><LF>
          1   **2**   **3**   **4**

(1)   Heading, degrees True
(2)   Heading, degrees Magnetic
(3)   Speed, knots
(4)   Speed, km/hr

Gyro Data Input--HDT

$--HDT, x.x , T * hh<CR><LF>
        1 **2**   **3**

(1) Heading, degree true
(2) T = true
(3) Checksum value

Specification

Basic Specification

Main Unit Dimension（AM706E）：W188mm   H166mm   D65 mm

Weight：   Main Unit 2kg   Sensor 10kg

Power Supply：   Main Unit   DC24V (DC20-32V)

                             Sensor   DC11-36V (0.15A@DC24V)

Power through adapter：   110/220V 50/60Hz AC

Power：   < 5W (24V DC)

NMEA Input Baud Rate：   4800bps (9600 bps for GPS data input)

Wind Output Baud Rate：   4800bps

Data Input：   RS422 and NMEA0183 Standard

Sensor Dimension（AM706S）： H838mm   Activity Radius 550 mm

Environmental Conditions

Working Temperature：   Main Unit   -20°C～+55°C

                          Sensor   -20°C～+85°C

Storage Temperature：   Main Unit   -20°C～+70°C

                          Sensor   -20°C～+85°C

Humidity：   Main Unit   10%～90% RH

                          Sensor   10%～100%RH

Protection：   IP 23

Specification

Technical Specification

Wind Speed Range：   0～60m/s

Wind Speed Accuracy：   ±5%（min0.1m/s）

Wind Direction Range：   0～359°

Wind Direction Accuracy：   ±1°

Min Start Speed：   ≤1.2m/s

Maintenance

Main Unit

The main unit is maintenance-free.

If doing the cleaning, use soft cloth and mild detergent, and avoid water drop.

Sensor Part

When there is ice or dirt on sensor to disturb the normal work, please clear in time.

Regularly check external mounting bolts to avoid looseness and the abrasion and ageing of cables

When the equipment breaks down, please contact our engineers of after-sale service department in time. Please do not do the service by yourself.
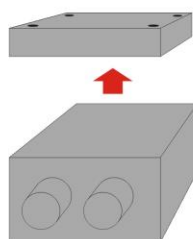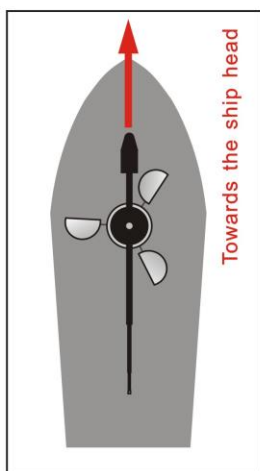
Calibration

Calibration of AM706 wind vane after finishing the installation.

Wind Direction Calibration
风向校准

① Press POWER key to turn power on.
按主机上的开关键开机

Towards the ship head

② Assistant goes up to hold the vane towards the ship head (Fore direction). And open the waterproof junction box.

请助手爬上桅杆将风向标箭头扶正指向船头(正前方),并打开防水接线盒。

③ Press button inside the waterproof junction box, the relative direction towards ship head.
Close the box in the end.

风向标指向船头的同时,按下防水接线盒的按钮。
最后关上防水接线盒。

Installation

Installation of Main Unit AM706E

The Main unit AM706E has three mounting methods, table, hanging and flush mounting.

The holder supplied by original factory setting is used in table and hung mounting.

For flushing mounting, embed the main unit into the bridge control panel (the dimension is shown below) and tighten the rotary knob to fix the main unit.
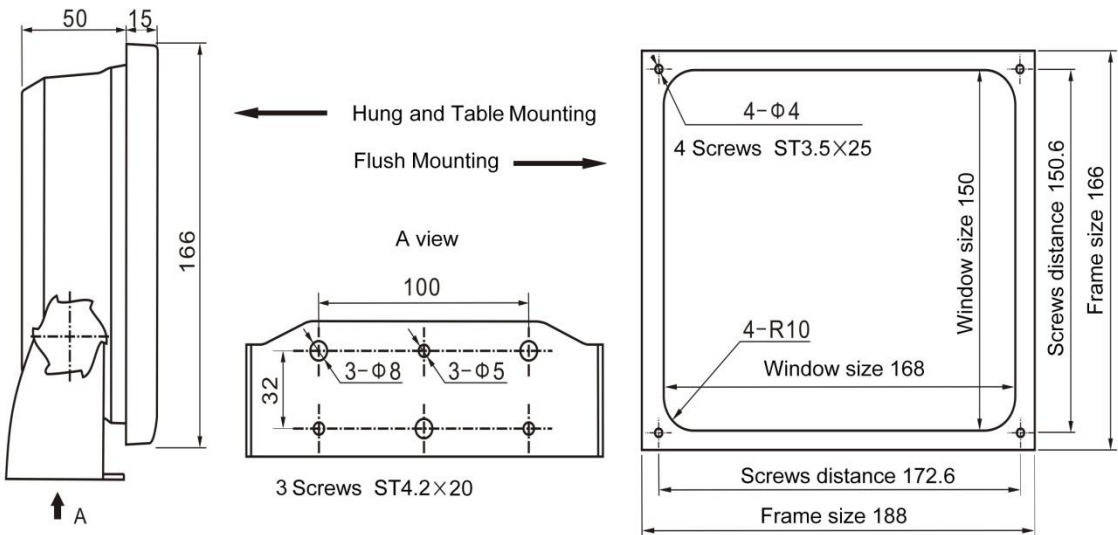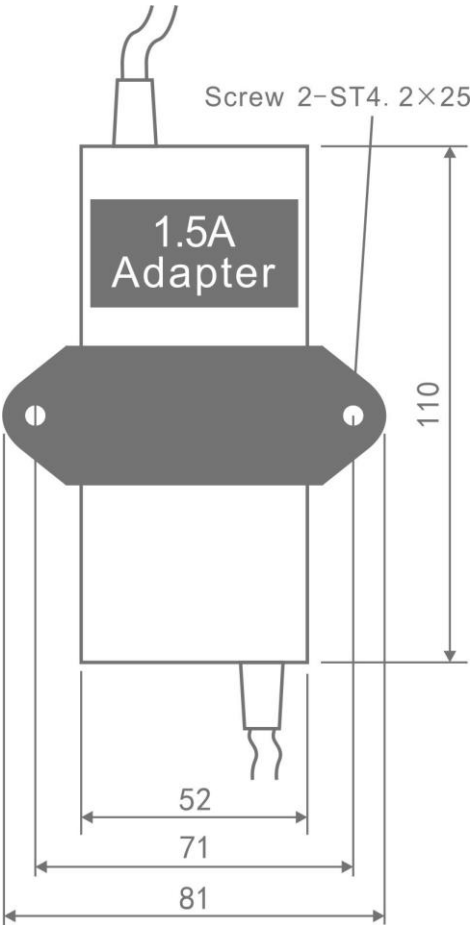
Installation

Power Adapter Installation

Power adapter（GA-240150）， AC220/110V to DC24V， adapter holder and screws. Weight: 2.4kg.

Unit：mm

Installation

Installation of Wind sensor AM706S

Wind Vane and Wind Cup Installation

[Wind Vane] Wind vane is installed on the top of sensor holder, successively into black seal ring, plane washer, spring washer and 2 screw nuts. The two screw nuts should be tightened and then insert the cotter.

[Wind Cup] Wind cup is installed on the bottom of sensor holder, successively into plane washer, spring washer and 2 screw nuts. The two screw nuts should be tightened and then insert the cotter.
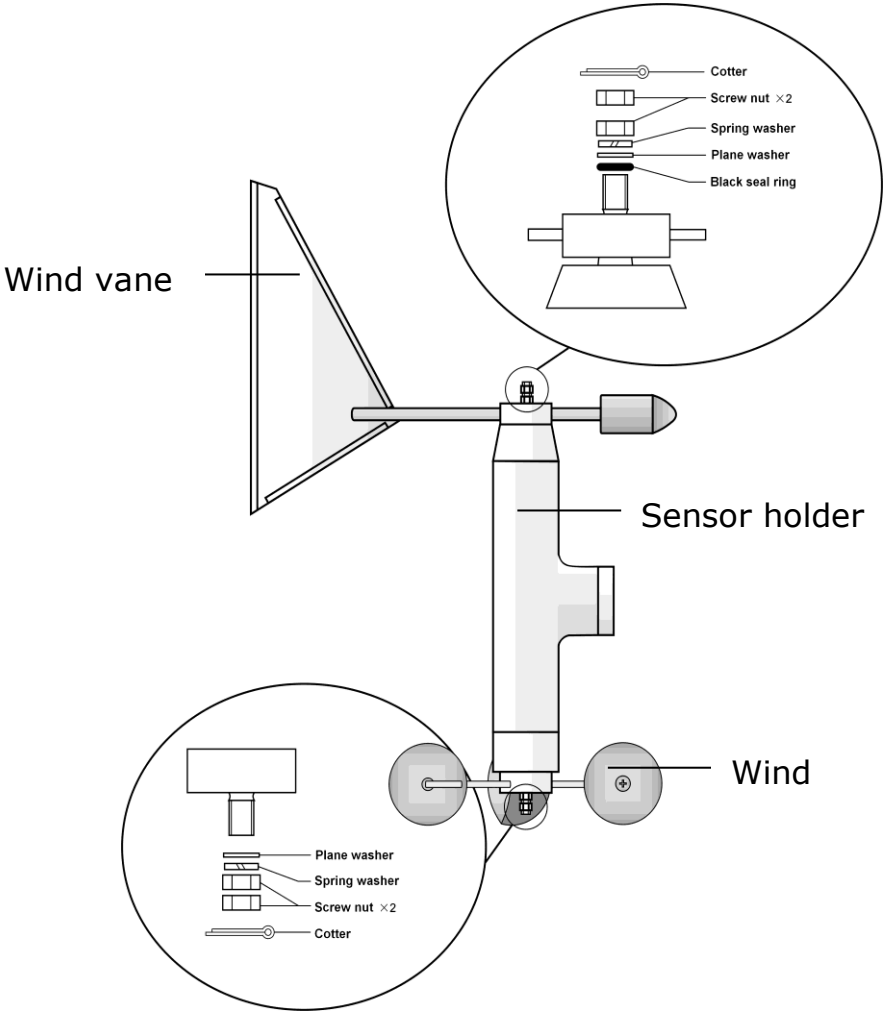
Installation

Integral Installation

[Space and location] The total height of wind sensor is 838mm. It should be horizontally installed on the ventilated place of ship and the action radius of wind indicator and wind cup is over 550mm.
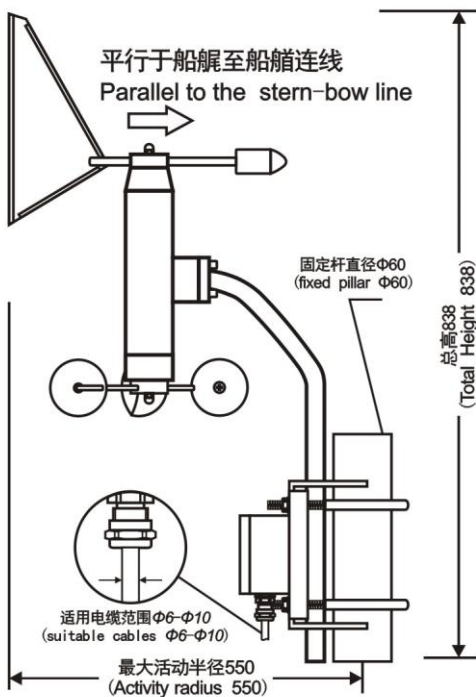
⚠️ **Please note, big Radar antenna rotation can disturb the wind measurement. Find a location away from Radar.**

[Integral fixation] Use U-bolt in the accessory to fix wind sensor and the best option of supporting tube diameter is 60mm.

[Wiring] 4-core screened cable with external diameter 4mm~6mm is connected with 4 terminals +、-、B、A through glands of junction box. Please pay attention on wire colors and sequence in order to correctly connect the wiring terminals of back cover, 1+ 2- 3B 4A.

[Calibration] After the installation of main unit of wind sensor, do the calibration of wind direction based on Calibration.

平行于船艉至船艏连线
Parallel to the stern-bow line

固定杆直径Φ60
(fixed pillar Φ60)

总高838
(Total Height 838)

适用电缆范围Φ6-Φ10
(suitable cables Φ6-Φ10)

最大活动半径550
(Activity radius 550)

AM706S junction box terminals

+ - B A

DC　　NMEA
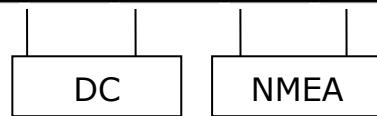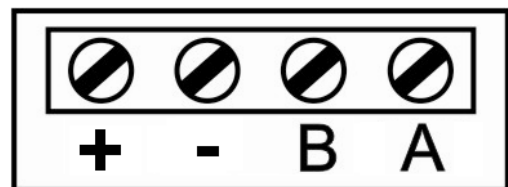
AM706D back cover terminals

WIND SENSOR

1 : +　　　　3 : B
2 : —　　　　4 : A

Wiring Explanation

System View

GPS

GPS 输入
GPS Input
NMEA0183（RMC）
AVVR 2×0.3mm²

罗经
Gyro

罗经输入
Gyro Input
NMEA0183(HDT)

DS99计程仪
DS99 SpeedLog

计程仪速度输入
Speedlog Input
NMEA0183（VBW）

VDR、电子海图
VDR、ECS

风速/风向输出
Speed & Direction Output
NMEA0183(MWV)
AVVR 2×0.3mm²

IR761风速风向复显仪
IR761 Anemometer Repeater

风速/风向输出
Speed & Direction Output
NMEA0183（MWV）
AVVR 2×0.3mm²

风向传感器
Wind Direction Sensor

传感器部件
Sensor Components

安装支架
Mounting Bracket

风速传感器
Wind Speed Sensor

接线盒
Junction Box

+ − B A   输出

两对双绞线
(twisted pair cable)
(2×AVVR2×0.75mm²)

主机部分
Main Unit

电源
Power

AC220V/110V

AVVR 0.75mm²

交流适配器
AC Adapter

标准配置
Standard Configuration

Wiring Explanation

Wiring Diagram of AM706E Back Cover

ANEMOMETER

MODEL（产品型号）： AM706　风向风速仪
SN（产品序列号）：
SUPPLY VOLTAGE（电源电压）： DC24V

REMOTE DIMMER
遥控调光

NMEA0183 IN
NMEA0183输入

1: DIM +
2: DIM −
3: DIMKEY
6: NMEA IN1 A
7: NMEA IN1 B
8: NMEA IN2 A
9: NMEA IN2 B

NMEA0183 OUT
NMEA0183输出

1: NMEA OUT1 A
2: NMEA OUT1 B
3: NMEA OUT2 A
4: NMEA OUT2 B

WIND SENSOR
风传感器

1: SENSOR +
2: SENSOR −
3: SENSOR B
4: SENSOR A

POWER
电源

1: DC24V +
2: DC24V −
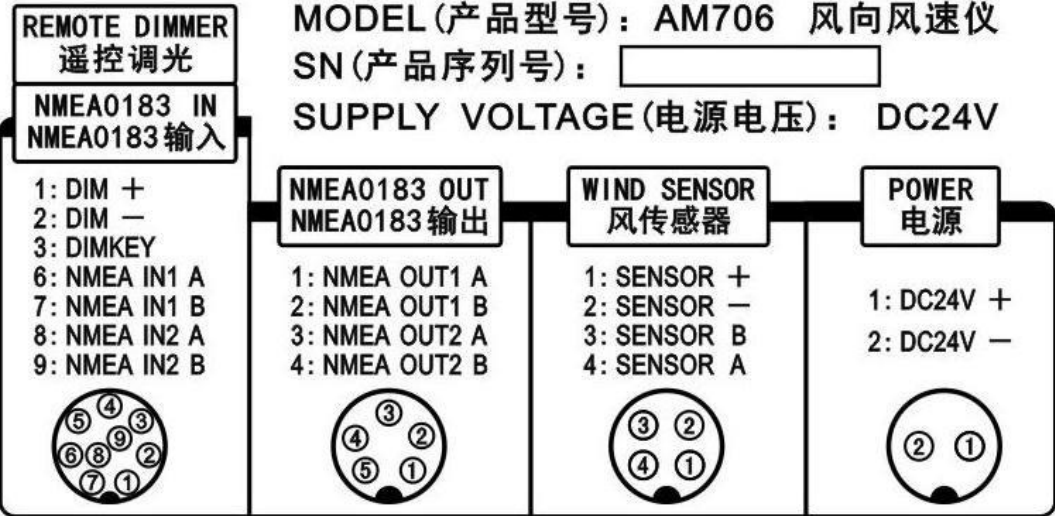
Wiring Explanation

System External Wiring Diagram

AM706E Main Unit Wiring Diagram

电源 Power DC24V — 电源 Power
① MP1　② MP2

传感器 Sensor — 传感器接线盒 Junction Box
① WS1　② WS2　③ WS3　④ WS4
DC+　DC−　B　A

0183输出 Output — 其他设备 Other Equipments
① WC1　② WC2　③ WC3　④ WC4

亮度遥控 Dimmer — 亮度遥控 30DIM
0183 Input / 0183 Input — GPS/Gyro/Speedlog
① WC5　② WC6　③ WC7　⑥ WC8　⑦ WC9　⑧ WC10　⑨ WC11
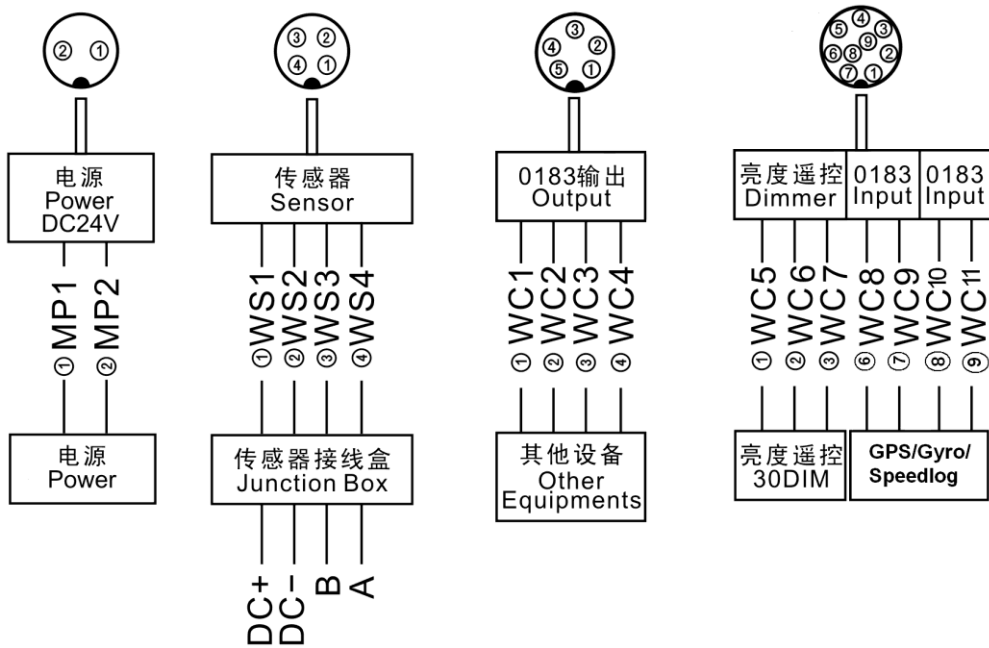
名称 Name	内容 Content	名称 Name	内容 Content
MP1	电源 ＋ Power ＋	WC1	NMEA 0183输出 1 A NMEA 0183 Output 1 A
MP2	电源 － Power －	WC2	NMEA 0183输出 1 B NMEA 0183 Output 1 B
WS1	传感器电源输出 ＋ Sensor power output ＋	WC3	NMEA 0183输出 2 A NMEA 0183 Output 2 A
WS2	传感器电源输出 － Sensor power output －	WC4	NMEA 0183输出 2 B NMEA 0183 Output 2 B
WS3	传感器数据输入 B Sensor data input B	WC5	亮度 ＋ DIM ＋
WS4	传感器数据输入 A Sensor data input A	WC6	亮度 － DIM －
		WC7	亮度公共线 DIMKEY
		WC8	NMEA 0183输入 1 A NMEA 0183 Input 1 A
		WC9	NMEA 0183输入 1 B NMEA 0183 Input 1 B
		WC10	NMEA 0183输入 2 A NMEA 0183 Input 2 A
		WC11	NMEA 0183输入 2 B NMEA 0183 Input 2 B

Appendix

Wind Grade Table

Grade	Speed（m/s）	Speed（km/h）	Grade	Speed（m/s）	Speed（km/h）
0	0.0~0.2	<1	10	24.5~28.4	89~102
1	0.3~1.5	1~5	11	28.5~32.6	103~117
2	1.6~3.3	6~11	12	32.7~36.9	118~133
3	3.4~5.4	12~19	13	37.0~41.4	134~149
4	5.5~7.9	20~28	14	41.5~46.1	150~166
5	8.0~10.7	29~38	15	46.2~50.9	167~183
6	10.8~13.8	39~49	16	51.0~56.0	184~20
7	13.9~17.1	50~61	17	56.1~61.2	202~220
8	17.2~20.7	62~74	>17	≥61.3	≥221
9	20.8~24.4	75~88			