NUOVACEVA AUTOMATION

WIND VANE
WV4403 RS485 MODBUS
WV4403 4-20mA

HEATED VERSIONS:
WV5H25 RS485 MODBUS
WV5H25 4-20mA

Wind direction sensor designed for different industries and sectors.

WV4403 detects the vane position by using magnetic sensors avoiding wear and tear. It generates a 4-20mA analogue output or RS485 MODBUS signal, depending on version. The heated versions works from -20 °C. When the temperature is higher than +6° C, the heater switches itself off automatically to reduce the consumption.

- **High resistance to radio frequency interference (RFI) and electromagnetic interference (EMI)**
- **RS485 MODBUS signal or 4-20mA passive analogue output**
- **Magnetic measuring principle, with no wear and tear or dead zones**
- **Stainless steel bearings**

APPLICATIONS

WV4403/5H25 has been designed to be used in industrial applications. Connected to devices such as dataloggers, PLCs, analogue signal displays (see our references WM44-EVO11, V10, V12, BS100/3 4-20mA), it measures the wind direction and/or activates predefined alarm values.

Application examples:
Irrigation control system, automation in greenhouses, solar trackers, ropeways at ski resorts, cranes, wind turbines, weather stations etc. All those applications that contribute to a greater control and greater security. Besides, WV5H25 has been designed for those applications that involve working with sub-zero temperatures.

OPERATING

Survival speed: 200 km/h of wind speed
It gives a RS485 MODBUS signal or 4-20 mA analogue output which depends on the wind direction. (see graphic)
The vane must be orientated north as shown in the orientation section.
RS485 version gives the wind direction in degrees. It calculates the average position in the last second. In static position it has 20 positions of 18° each one.
The heater works from -20°C up to +6°C. Above this temperature, it switches itself off automatically to reduce the consumption.
The wind vane must be fixed on a vertical position.

ACCESSORIES

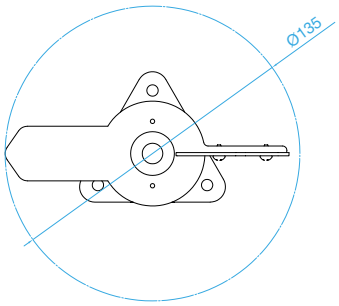
Clamps fixation

Steel clamps that can be fixed to irregular parts measuring up to 63 x 45 mm.

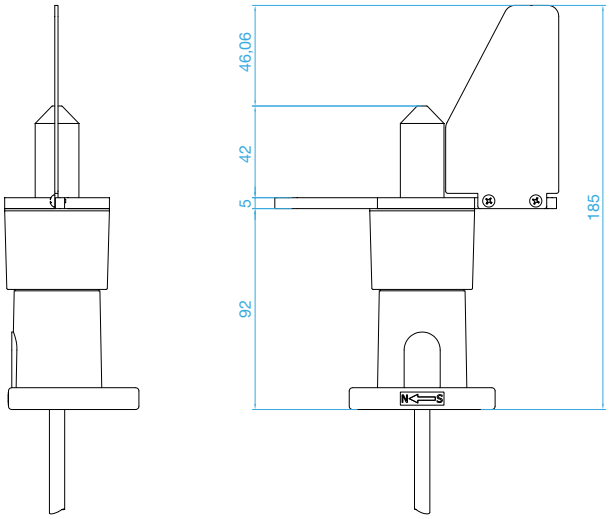
Magnets fixation

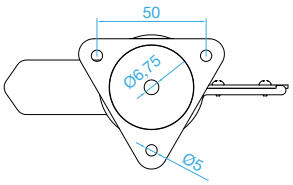
Magnets for flat ferromagnetic surfaces.
This fixation system can support up to 90 kg.

DIMENSIONS

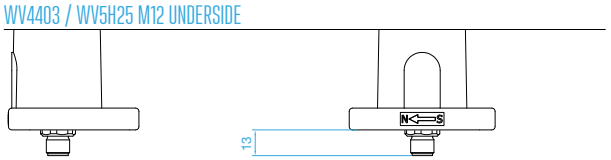


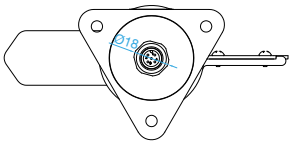
WV4403 CABLE / WV5H25 RS485





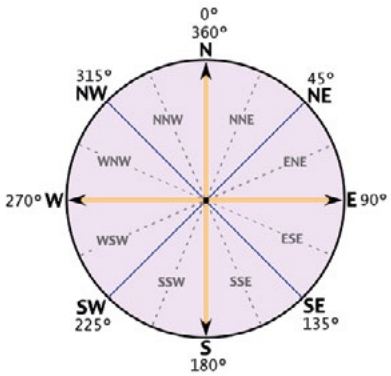
WV4403 / WV5H25 M12 UNDERSIDE





WIND DIRECTION - OUTPUT RATIO TABLE

Direction	Angle	Analogue output	RS485 output
North	0.0	4mA	00 00
North-northeast	22.5	5mA	00 16
Northeast	45.0	6mA	00 2D
East-northeast	67.5	7mA	00 43
East	90.0	8mA	00 5A
East-southeast	112.5	9mA	00 70
Southeast	135.0	10mA	00 87
South-southeast	157.5	11mA	00 9D
South	180.0	12mA	00 B4
South-southwest	202.5	13mA	00 CA
Southwest	225.0	14mA	00 E1
West-southwest	247.5	15mA	00 F7
West	270.0	16mA	01 0E
West-northwest	292.5	17mA	01 24
Northwest	315.0	18mA	01 3B
Northwest-North	337.5	19mA	01 51
Static wind	If the wind speed is below 3km/h, the angle will be uncertain		



NOTES:

- There is no version with both outputs (analogue and RS485).
- The output of the 1s AVERAGE versions when the vane is moving is a continuous analog output as result of the average of the last second. When the vane is static, the output has 20 positions of 18° each one.

PROTOCOL

Protocol features	
Data format	1 start bit, 8 data bits and 1 stop bit
	19200 baud
	Even parity
Protocol type	MODBUS RTU
Version	1.2
WV4403 ID	0xF3 (Factory default)

Frame example:

Addr	04	00	00	00	01	CRCH	CRCL

MODBUS map:

Direction	Field	Type	Values	Notes
30001	Wind direction value	Read	degrees	
40001	Wind direction value	Read	degrees	
40002	Slave ID configuration	Read/Write	1d (0x01) to 255d (0xFF)	Other values return error

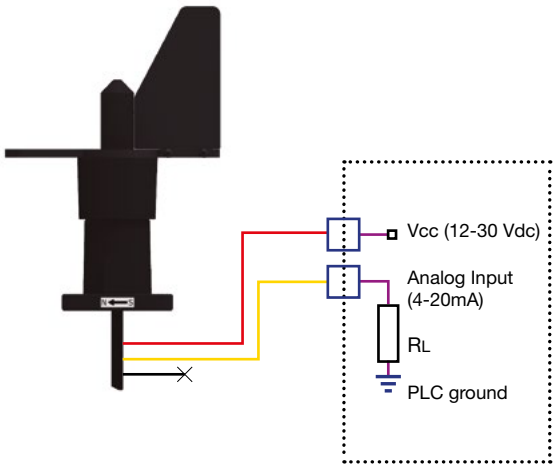
The wind direction is stored in 2 registers: @30001 y @40001. The user can read this value by using any of the 2 available functions (*Read Input Register* and *Read Holding Register*).

The WV4403 RS485 default adress is 243 <=> 0xF3. This value is stored in *Holding Register* @40002 and can be edited by the user. The user can configure any adress in the range 1 (0x01) to 255 (0xFF).

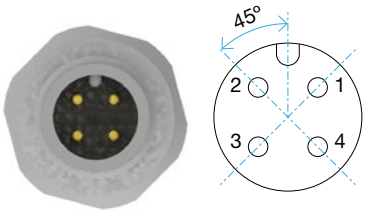
For more information, please, see WV4403 RF485 MODBUS Protocol annex.

CONNECTION

WV4403 4-20mA

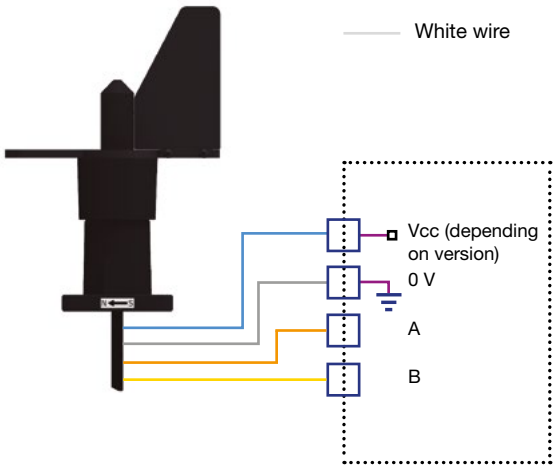


M12 CONNECTOR VERSION:



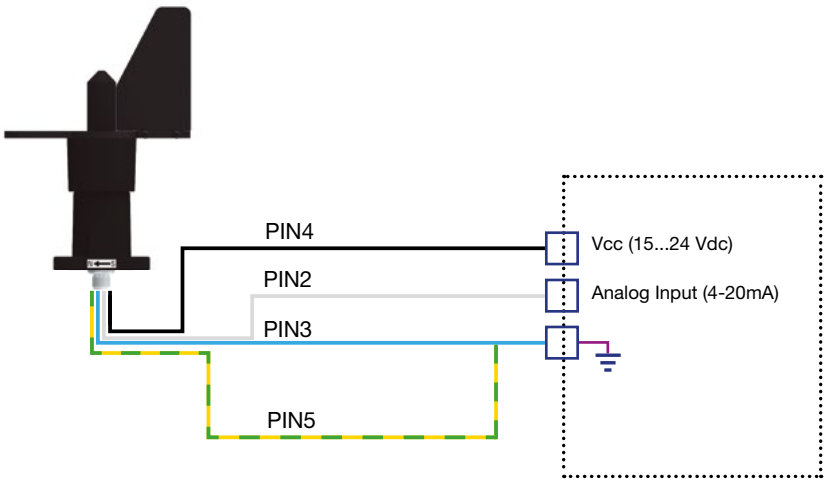
PIN1 Vcc
PIN2 4-20mA output
PIN3 Nc
PIN4 Nc

WV4403/ WV5H25 RS485 MODBUS



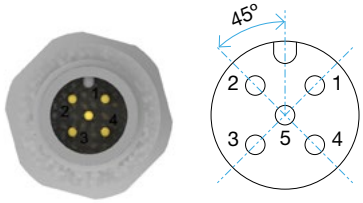
NOTE:
Without termination resistor

WV5H25 4-20mA



Cable not included in all versions.

WV5H25 MALE M12 CONNECTOR



PIN1 NC
PIN2 4-20mA output (+)
PIN3 4-20mA output (-)
PIN4 Heater (+)
PIN5 Heater (-)

TECHNICAL FEATURES

WV4403 4-20 mA Electrical features

Power supply	12...30 Vdc
Maximum current	20 mA
Output	Analogue (4-20 mA)
Maximum loop impedance	$R_L < \frac{V_{cc} - 8V}{0.02\ A}\ \Omega$

WV5h25 4-20 mA Electrical features

Power supply	15...24 Vdc
Consumption with heater t^a >6°C (+-3°C)	<0.5 W
Average consumption with heater t^a <6°C (+-3°C)	<17 W
Maximum current	1.2 A @ 15 V 1.8 A @ 24 V
Output	Analogue (4-20 mA)
Maximum loop impedance	$R_L < \frac{V_{cc} - 9V}{0.02\ A}\ \Omega$

General Features

Material	PA+FV / Aluminium
Bearings	Stainless steel X65Cr13
Weight (with no cable)	170 g WV4403 4-20mA 200 g WV5H25 4-20mA
Dimensions	129x190 mm
Storage temperature	-35°C +80°C
Operating temperature (ice free)	-20°C +60°C
EMC	EN 61000-6-2:2001 EN 55022:2001, Class B
Protection	IP65 (UNE 20324:1993)

WV4403 RS485 MODBUS Electrical features

Power supply	9...30 Vdc
Maximum current	50 mA
Output	RS485
Protocol	MODBUS RTU
Termination resistor	Not included

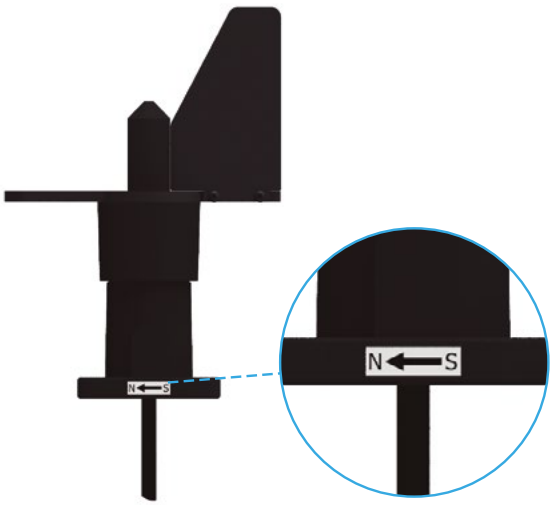
WV5h25 RS485 MODBUS Electrical features

Power supply	15...24 Vdc
Consumption with heater t^a >6°C (+-3°C)	<0.5 W
Average consumption with heater t^a <6°C (+-3°C)	<17 W
Maximum current	1.2 A @ 15 V 1.8 A @ 24 V
Output	RS485
Protocol	MODBUS RTU
Termination resistor	Not included

General Measurements

Range	0-360°
Starting speed	3 km/h
Survival speed	200 km/h
Resolution	All versions: 22.5° 1 second AVERAGE versions: Static position: 18° Non-static position: 1°
Accuracy	+/-3°

ORIENTATION VANE



To orientate the vane north, the vane edge must be orientated north as shown in the picture.

Once the vane has been orientated north, the output signal will correspond to the angles and directions in the table.

REFERENCES AND ACCESSORIES

4-20mA References

No heated

0103010711	WV4403 WIND VANE SENSOR 4-20mA OUTPUT M12 UNDERSIDE
0103010712	WV4403 WIND VANE SENSOR 4-20mA OUTPUT 2,5m CABLE
0103010713	WV4403 WIND VANE SENSOR 4-20mA OUTPUT 20m CABLE
0103010714	WV4403 WIND VANE SENSOR 4-20mA OUTPUT 8m CABLE M12 COD + FIXED BRACKET + HARDWARE
0103010715	WV4403 WIND VANE SENSOR 4-20mA 1s AVERAGE 2,5m CABLE

Heated

0103012101	WV5H25 4-20mA OUTPUT M12 UNDERSIDE NO FEMALE CONNECTOR
0103012102	WV5H25 4-20mA OUTPUT M12 UNDERSIDE
0103012103	WV5H25 4-20mA OUTPUT M12 UNDERSIDE 12m CABLE
0103012104	WV5H25 4-20mA OUTPUT M12 UNDERSIDE 25m CABLE

RS485 MODBUS RTU version

No heated

0103010716	WV4403 RS485 MODBUS OUTPUT 1s AVERAGE 10m CABLE

Heated

0103012701	WV5H25 RS485 MODBUS OUTPUT 1s AVERAGE 10m CABLE

4-20mA displays

0106030411	WM44-EVO11 V3 IP65 24Vdc
0106030412	WM44-EVO11 V3 IP65 230Vac

Accessories

0103010505	Stainless steel bracket AISI 304
0103010506[1]	Stainless steel bracket plus hardware for mounting the wind sensor on the backet
0103010507[1]	Magnets for flat ferromagnetic surfaces. This fixation system can support up to 90 kg
0103010508	2 steel clamps kit that can be fixed to irregular parts measuring up to 63 x 45 mm

[1] *10 unit minimum order. On sale exclusively with wind sensor.*

**For other references, please contact us.*

NUOVA CEVA AUTOMATION S.R.L.
via Don Signini 43 - 28010 - Briga Novarese - NO - ITALY
Phone +39 0322 93574
info@nuovaceva.it *www.nuovaceva.it*

All dimensions and sizes are approximate.
Specifications and prices are subject to change without notice.

PROTOCOL SPECIFICATIONS v1.2

PROTOCOL

Data format: **1 start bit, 8 data bits y 1 stop bit. Baud rate: 1920. Even parity.**

Protocol type: **MODBUS RTU**

Addr	04	00	00	00	01	CRCH	CRCL

The wind direction in degrees is stored in 2 registers: @30001 y @40001. The user can read this value by any of the 2 available functions (*Read Input Register* and *Read Holding Register*).

The WV4403/5H25 RS485 default adress is 243 <=> 0xF3. This value is stored in the *Holding Register* @40002 and can be edited by the user. The user can configure any adress in the range 1 (0x01) to 255 (0xFF).

Example: If Addr =3

READING. METHOD 1

Read request of wind direction from master by *Read Input Register* (function 0x04):

03	04	00	00	00	01	30	28

Slave's answer (WV4403/5H25 RS485 MODBUS RTU):

03	04	02	SH	SL	CRCH	CRCL

SHSL is the wind direction value in degrees.

Slave's answer example for 90° (0x005A):

03	04	02	00	5A	40	CB

READING. METHOD 2

Read request of wind direction from master by *Read Holding Register* (función 0x03):

03	03	00	00	00	01	85	E8

Slave's answer (WV4403/5H25 V3 RS485 MODBUS RTU):

03	03	02	SH	SL	CRCH	CRCL

SHSL is the wind direction value in degrees.

Slave's answer example for 90° (0x005A):

03	03	02	00	5A	41	BF

WRITING

Write request of *Address* by *Write Single Register* (función 0x06):

03	06	00	01	00	NEW_ADDR	CRCH	CRCL

Note: The unit adress (*Addr*) is stored in the *Holding Register* @40002

Slave's answer (WV4403/5H25 RS485 MODBUS RTU):

03	06	00	01	00	NEW_ADDR	CRCH	CRCL

NEW_ADDR is the new unit address. It must be in the range from 1 (0x01) to 255 (0xFF).

Example for NEW-ADDR 0x02:

Write request:

03	06	00	01	00	02	58	29

Slave's answer:

03	06	00	01	00	02	58	29

NOTE: the slave's address changes its value inmediately after the answer message.