USER MANUAL

ULTRASONIC ANEMOMETER

PCE-WS US2

ENGLISH

User manuals in various languages (français, italiano, español, português, nederlands, türk, polski) can be found via our product search on:
www.pce-instruments.com

APPLICATIONS

PCE-WS US2 has been designed to be used in industrial applications. It measures the wind speed and direction and normally is connected to PLCs or similar devices.

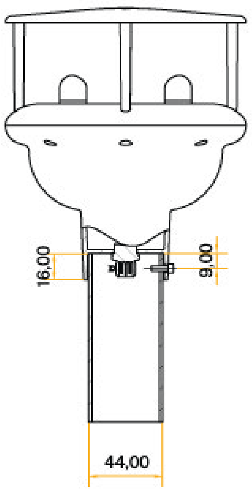
Application examples:
Irrigation control system, automation in greenhouses, solar trackers, ropeways at ski resorts, cranes, wind turbines, weather stations etc.
All those applications that contribute to a greater control and greater security.

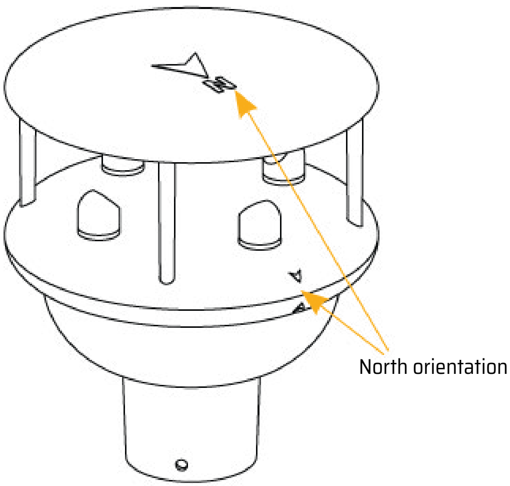
OPERATION

- Measures wind speed and direction up to 160 km/h.
- Survival speed: 200 km/h of wind speed.
- It gives a RS485 MODBUS signal output. (see modbus section).
- The PCE-WS US2 must be orientated north as shown in the mounting section to obtain a correct output.
- The unit must be fixed on a vertical position.

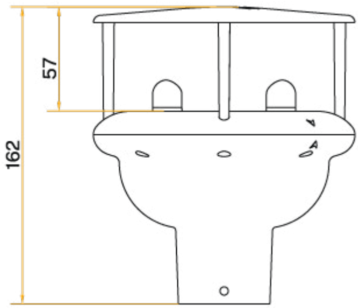
Maintenance:
Maintenance is not needed.

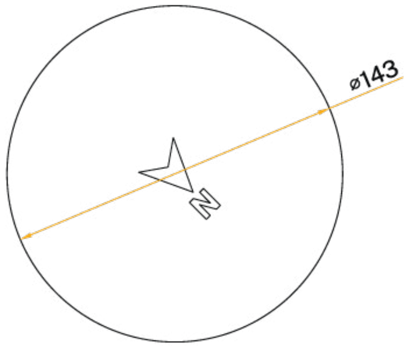
MOUNTING

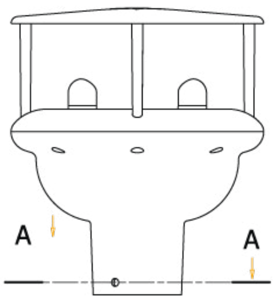




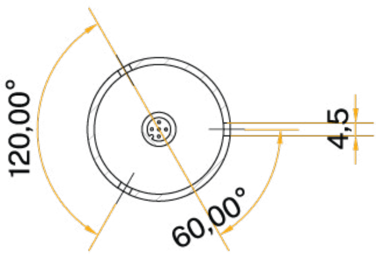
DIMENSIONES







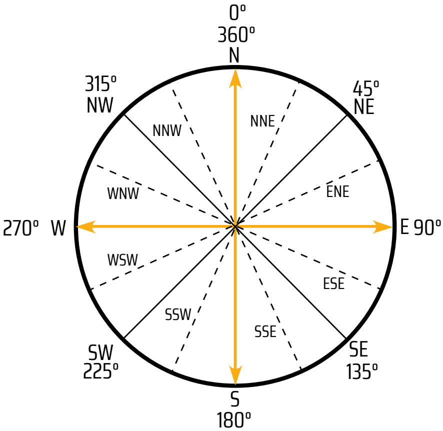
A-A



* Dimensions in mm.

WIND DIRECTION - OUTPUT RATIO TABLE

To orientate the vane north, the arrows shown at the mounting section must be oriented north.
Once the vane has been orientated north, the output signal will correspond to the angles and directions in the table.



Direction	Angle	RS485 output
North	0.0	00 00
North-northeast	22.5	00 16
Northeast	45.0	00 2D
East-northeast	67.5	00 43
East	90.0	00 5A
East-southeast	112.5	00 70
Southeast	135.0	00 87
South-southeast	157.5	00 9D
South	180.0	00 B4
South-southwest	202.5	00 CA
Southwest	225.0	00 E1
West-southwest	247.5	00 F7
West	270.0	01 0E
West-northwest	292.5	01 24
Northwest	315.0	01 3B
Northwest-North	337.5	01 51

PROTOCOL

PCE-WS US2 has a RS485 output with a Modbus RTU protocol.
This section describes protocol and adds petition and response examples.

Protocol features

Data format	1 start bit, 8 data bits and 1 stop bit 19200 baud (default) or 9600 baud Even parity (default) or None
Protocol type	MODBUS RTU
Version	1.2
PCE-WS US2 ID	0xF4 (Factory default)

MODBUS MAP

Register Access	Register Address	(msb.. lsb)	Type	Variable name	Variable description	Range	Unit
Read	30082	(15..0)	U16	Wind direction		0..359	º
Read	30083	(15..0)	U16	Wind speed (m/s x 100)		0..5000	m/s x 100
Read	30001	(15..0)	U16	Wind speed (km/h)		0..180	km/h
Read	30002	(15..0)	U16	Wind direction		0..359	º
Read	40001	(15..0)	U16	Wind speed (km/h)		0..180	km/h
Read	40002	(15..0)	U16	Wind direction		0..359	º
Read	40003	(15..0)	U16	Wind speed 15s average		0..180	km/h
Read	40004	(15..0)	U16	Wind direction 15s average		0..359	º
Read	40082	(15..0)	U16	Wind direction		0..359	º
Read	40083	(15..0)	U16	Wind speed (m/s x 100)		0..5000	m/s x 100
Read/ Write	40067	(15..0)	U16	Slave ID configu-ration	**244d (0xF4)**	1..255	
Read/ Write	40065	(15..0)	U16	Baudrate configu-ration	96d (0x60) = 9600 baud **192d (0xC0) = 19200 baud**	96 or 192	baud
Read/ Write	40066	(15..0)	U16	Parity configuration	0x00 = none parity **0x01 = even parity**	0..1	
Read/ Write	40068	(15..0)	U16	Apply configuration	0x01 must be written to apply configuration	0..1	

***Default values in bold**

COMMUNICATION EXAMPLES

1. Example reading registers 30082 and 30083
(Wind direction & speed m/s x 100):

F4	04	00	51	00	02	34	BF

Answer for 88º and 2.52m/s:

F4	04	04	00	58	00	FC	DF	19

2. Example reading registers 40082 and 40083
(Wind direction & speed m/s x 100):

F4	03	00	51	00	02	81	7F

Answer for 89º and 2.55 m/s:

F4	03	04	00	59	00	FF	CF	6F

3. Example reading registers 30001 and 30002
(Wind speed km/h & direction):

F4	04	00	00	00	02	65	6E

Answer for 9 km/h and 89:

F4	04	04	00	09	00	59	4E	B3

4. Example reading registers 40065 (baudrate),
40066 (Parity), and 40067 (SlaveID):

F4	03	00	40	00	03	10	BA

Answer for 19200baud, Even and SlaveID = 244:

F4	03	06	00	C0	00	01	00	F4	4A	77

5. Example change SlaveID from 244 to 2:

F4	06	00	42	00	02	BC	BA

Answer

F4	06	00	42	00	02	BC	BA

6. Plot to apply changes and save to EEPROM:

F4	06	00	43	00	01	AD	7B

Answer

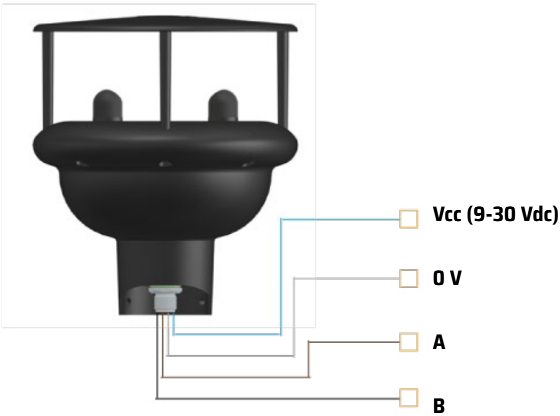
F4	06	00	43	00	01	AD	7B

CONNECTION

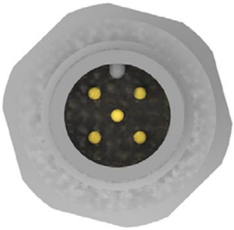
A 4-pin M12 connector is placed at the bottom. The unit is supplied with a 5 or 10-m long wire depending on version.

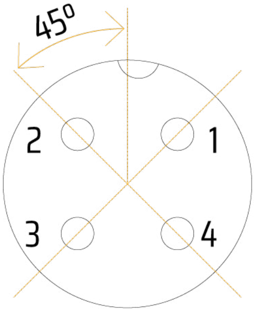
Colors function:
VCC: blue
0 V: white
A: brown
B: black

Termination Resistor (120 Ω) depending on version: RT/NO RT



M12 CONNECTOR:





PIN1 A
PIN2 0 V
PIN3 Vcc
PIN4 B

TECHNICAL FEATURES

Electric Features

Power supply	9-30 Vdc
Maximum current	10 mA
Output type	RS485. Contact IED for other options.
Start up time	<5 s

Measurement

Speed Range	0-160 km/h
Starting speed	0 km/h
Survival speed	200 km/h
Accuracy	0.5 km/h (0-15 km/h) 3% (15-120 km/h) 5% (120-160 km/h)
Speed resolution	0.01 m/s (depending on register, see modubs map)
Direction range	0-360º
Accuracy	±3º (wind speed >1 km/h)
Direction resolution	1 º

General

Enclosure material	PA + GF
Conexion type	M12-4 connector + Cable 4 x 0.65 mm² (Lenght depending on version.)
Weight (without cable)	400 g
Dimensions	143x162 mm
Storage temperature	-35 ºC ... 80 ºC
Working temperature	-20 ºC ... 70 ºC
EMC	EN IEC 61000-6-2:2019 EN 61000-6-3: 2007 EN 61000-6-3: 2007/A1:2011
IP Protection	IP65 (UNE 20324:1993)

DISPOSAL

For the disposal of batteries in the EU, the 2006/66/EC directive of the European Parliament applies. Due to the contained pollutants, batteries must not be disposed of as household waste. They must be given to collection points designed for that purpose. In order to comply with the EU directive 2012/19/EU we take our devices back. We either re-use them or give them to a recycling company which disposes of the devices in line with law. For countries outside the EU, batteries and devices should be disposed of in accordance with your local waste regulations. If you have any questions, please contact PCE Instruments.

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