

Ultrasonic Anemometer 1D

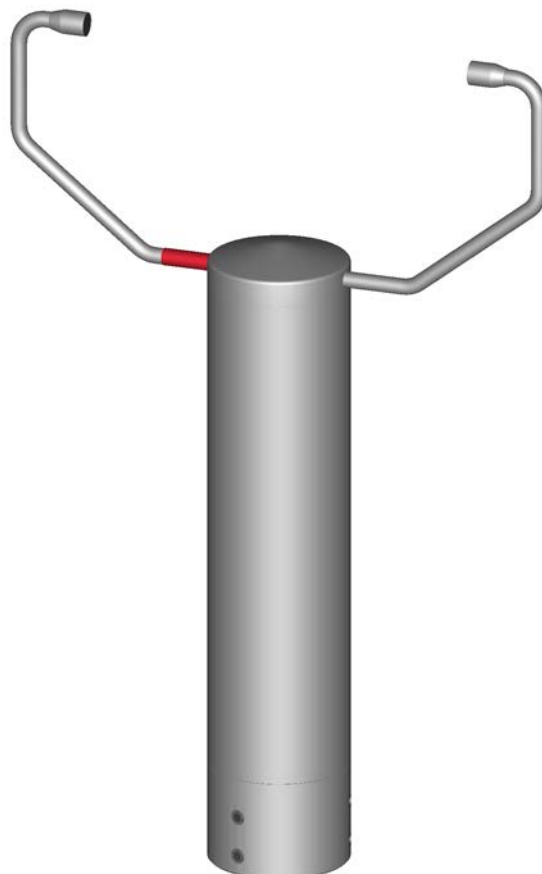
Instruction for Use

4.3865.xx.xxx

4.3866.xx.xxx

4.3867.xx.xxx

from software version V3.15



Dok. No. 022027/08/22

THE WORLD OF WEATHER DATA

Safety Instructions

- Before operating with or at the device/product, read through the operating instructions. This manual contains instructions which should be followed on mounting, start-up, and operation. A non-observance might cause:
 - failure of important functions
 - endangerment of persons by electrical or mechanical effect
 - damage to objects
- Mounting, electrical connection and wiring of the device/product must be carried out only by a qualified technician who is familiar with and observes the engineering regulations, provisions and standards applicable in each case.
- Repairs and maintenance may only be carried out by trained staff or **Adolf Thies GmbH & Co. KG**. Only components and spare parts supplied and/or recommended by **Adolf Thies GmbH & Co. KG** should be used for repairs.
- Electrical devices/products must be mounted and wired only in a voltage-free state.
- **Adolf Thies GmbH & Co KG** guarantees proper functioning of the device/products provided that no modifications have been made to the mechanics, electronics or software, and that the following points are observed:
- All information, warnings and instructions for use included in these operating instructions must be taken into account and observed as this is essential to ensure trouble-free operation and a safe condition of the measuring system / device / product.
- The device / product is designed for a specific application as described in these operating instructions.
- The device / product should be operated with the accessories and consumables supplied and/or recommended by **Adolf Thies GmbH & Co KG**.
- Recommendation: As it is possible that each measuring system / device / product may, under certain conditions, and in rare cases, may also output erroneous measuring values, it is recommended using redundant systems with plausibility checks for **security-relevant applications**.

Environment

- As a longstanding manufacturer of sensors Adolf Thies GmbH & Co KG is committed to the objectives of environmental protection and is therefore willing to take back all supplied products governed by the provisions of "ElektroG" (German Electrical and Electronic Equipment Act) and to perform environmentally compatible disposal and recycling. We are prepared to take back all Thies products concerned free of charge if returned to Thies by our customers carriage-paid.
- Make sure you retain packaging for storage or transport of products. Should packaging however no longer be required, please arrange for recycling as the packaging materials are designed to be recycled.



Documentation

- © Copyright **Adolf Thies GmbH & Co KG**, Göttingen / Germany
- Although these operating instruction has been drawn up with due care, **Adolf Thies GmbH & Co KG** can accept no liability whatsoever for any technical and typographical errors or omissions in this document that might remain.
- We can accept no liability whatsoever for any losses arising from the information contained in this document.
- Subject to modification in terms of content.
- The device / product should not be passed on without the/these operating instructions.

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Shipment

- 1 x Ultrasonic Anemometer
- 1 x Short instructions for use (the complete instructions for use is available for download)
- 1 x Supplementary Sheet: Factory Setting
- 1 x Factory certification

The instructions for use are available for download under the following link:

https://www.thiesclima.com/db/dnl/4.386x.xx.xxx_US-Anemometer-1D_e.pdf

Operating Instructions

These operating instructions describe all possible applications and settings of the instrument. **The Ultrasonic Anemometer 1D is factory-set.** Identification for the factory setting derives from the order No. and the respective "Factory Setting"

Order number and Setting see supplementary sheet "Factory Setting"

With these detailed operating instructions and via the serial interface of the Ultrasonic Anemometer 1D it is possible for the user to adapt the factory-settings to his own requirements.

1.1 Mechanical Mounting: US- Anemometer 4.3865.xx.xxx and 4.3866.xx.xxx

The appropriate mounting is done by means of an anemometer flange.
For boring dimensions please refer to the dimension drawing (chapter 13).

- Working position: user-defined

For measurement both sensor arms have to point lengthwise to the main wind direction (tunnel direction), see chapter 3.2. working direction.

1.2 Mechanical Mounting: US- Anemometer 4.3867.xx.xxx

The appropriate mounting of the ULTRASONIC anemometer is done onto a tube socket of R1½" (Ø 48,3mm) and ≥ 50 mm length. The inner diameter of the tube socket must be ≥ 40 mm, as the ULTRASONIC anemometer is electrically connected from below. See also dimension drawing chapter 13.

- Working position: vertical (Sensor arms: top).

After electrical connection (see chapter 3.5) the ULTRASONIC anemometer is fixed on the tube- resp. mast socket. The mechanical alignment of the instrument is carried out afterwards, see chapter 3.2 working direction.

The instrument must be fixed safely at the shaft by means of the four Allen keys (M8X12 NIRO V4A DIN 916).

- Acc. to manufacturer the screws have a max. torque of 10Nm.

When screwing, please take care that the material of the on-site pipe socket/mast does not deform.

Suitable tools:

- Allen key size 4 or
- Torque wrench with respective adaptation

1.3 Electrical Installation: US- Anemometer with Connector (4.3866... and 4.3867...)

The ultrasonic anemometer is equipped with a plug for electrical connection. A coupling socket (mating) is included in delivery. It is located in the lower part of the transport packing. A plastic fit-up aid for holding the bush insert while screwing it together with the coupling sleeve, is included in delivery.

- With model 4.3866.xx.xxx the plug is mounted on the housing side (see dimension drawing).
- With model 4.3867.xx.xxx the plug is installed in the anemometer base (see dimension drawing).

1.3.1 Connection, Cables, Cable preparation and Coupling Socket Installation

Connection:

For pin assignment please refer to supplement "factory settings".

(Examples see chapter 3.5.2)

Cables:

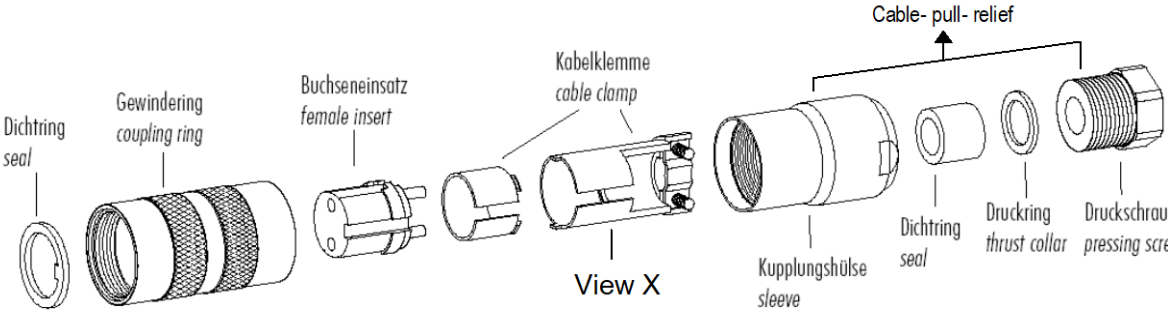
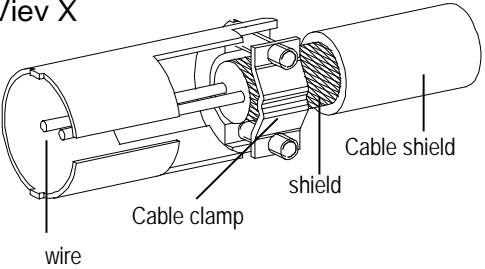
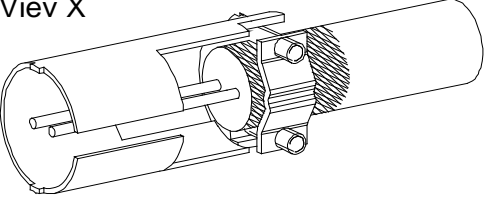
The cable must have the following properties:

8 cores; 0,5 to 0,75mm² core cross-section for supply; min. 0,14mm² core cross-section for data communications; 7- 8mm cable diameter, resistant to ultraviolet rays, overall shielding.

Remark:

Optionally, a completely converted connecting cable can be included in delivery for the ultrasonic-anemometer (see accessories).

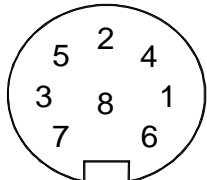
Cable preparation and Coupling socket Installation:

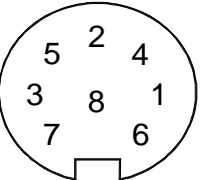
Coupling socket 211173 (or 507550) (Binder, Serial 423), EMC with cable clamp	
	
<ol style="list-style-type: none"> Stringing parts on cable acc. to plan given above. Stripping cable sheath 20mm Cutting uncovered shield 15mm Stripping wire 5mm. <p><i>Cable mounting 1</i> Putting shrink hose or insulating tape between wire and shield.</p> <p><i>Cable mounting 2</i> If cable diameter permits, put the shield backward on the cable sheath.</p> <ol style="list-style-type: none"> Soldering wire to the insert, positioning shield in cable clamp. Screwing-on cable clamp. Assembling remaining parts acc. to upper plan. Tightening pull-relief of cable by screw-wrench (SW16 und 17). 	<p><i>Cable mounting 1</i> View X</p>  <p><i>Cable mounting 2</i> View X</p> 

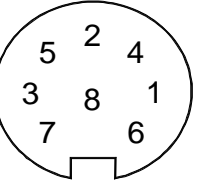
1.3.2 Connector Pin Assignment (Examples of Function)

Remark:

- For exact allocation of function please refer to supplement "Factory Settings"
- The pins 1 – 6 (incl.) are galvanically isolated from the supply voltage and from housing.

• Serial Interface, Full-duplex			View of solder terminal of coupling socket
Pin	Allocation	Function	
1	RXD-	Serial interface	
2	TXD-	Serial interface	
3	ADIO	Function not preset	
4	RXD+	Serial interface	
5	TXD+	Serial interface	
6	AGND	Analogue ground	
7	AC/DC	Supply, reverse-polarity protected	
8	AC/DC	Supply, reverse-polarity protected	
⏏	Shield		

• Serial Interface, half-duplex and analogue outputs			View of solder terminal of coupling socket
Pin	allocation	Function	
1	WG	Analogue output wind speed	
2	TXD- / RXD-	Serial interface	
3	ADIO	Function not preset	
4	WR	Analogue output wind direction	
5	TXD+ / RXD+	Serial interface	
6	AGND	Analogue ground	
7	AC/DC	Supply, reverse-polarity protected	
8	AC/DC	Supply, reverse-polarity protected	
⏏	Shield		

• Serial Interface, half-duplex and analogue inputs			View of solder terminal of coupling socket
Pin	Allocation	Function	
1	0-9,96V	Analogue input	
2	TXD- / RXD-	Serial interface	
3	0-9,96V	Analogue input	
4	0-9,96V	Analogue input	
5	TXD+ / RXD+	Serial interface	
6	AGND	Analogue ground	
7	AC/DC	Supply, reverse-polarity protected	
8	AC/DC	Supply, reverse-polarity protected	
⏏	Shield		


1.4 Electrical Installation: US- Anemometer with Cable (4.3865....)


The ultrasonic anemometer is equipped with a connected cable by means of a screwed cable gland. The cable end is open. The core ends are marked by means of cable rings.


1.4.1 Cable Pin Assignment (Examples of function)

Remark:

- For exact allocation of function please refer to supplement "Factory Settings"
- The pins 1 – 6 (incl.) are galvanically isolated from the supply voltage and from housing.

• Serial Interface, full-duplex			
Pin	Colour code	Allocation	Function
1	White	RXD-	Serial interface
2	Green	TXD-	Serial interface
3	Black 1	ADIO	Function not preset
4	Brown	RXD+	Serial interface
5	Yellow	TXD+	Serial interface
6	Black 2	AGND	Analogue-ground
7	Black 3	AC/DC	Supply, reverse-polarity protected
8	Black 4	AC/DC	Supply, reverse-polarity protected
	Green/yellow	shield	

• Serial Interface, half-duplex and analogue outputs			
Pin	Colour code	Allocation	Function
1	White	WG	Analogue output wind velocity
2	Green	TXD- / RXD-	Serial interface
3	Black 1	ADIO	Function not preset
4	Brown	WR	Analogue output wind direction
5	Yellow	TXD+ / RXD+	Serial interface
6	Black 2	AGND	Analogue ground
7	Black 3	AC/DC	Supply, reverse-polarity protected
8	Black 4	AC/DC	Supply, reverse-polarity protected
	Green/yellow	shield	

• Serial Interface, half-duplex and analogue inputs			
Pin	Colour code	Allocation	Function
1	White	0-10,0V	Analogue input
2	Green	TXD- / RXD-	Serial interface
3	Black 1	0-10,0V	Analogue input
4	Brown	0-10,0V	Analogue input
5	Yellow	TXD+ / RXD+	Serial interface
6	Black 2	AGND	Analogue ground
7	Black 3	AC/DC	Supply, reverse-polarity protected
8	Black 4	AC/DC	Supply, reverse-polarity protected
	Green/yellow	shield	

2. Maintenance

As the instrument does not have moving parts, i.e. is not subject to wear during operation, only minimal servicing is required. Cleaning can be carried out as required using non-aggressive cleaning agents in water and a soft cloth during routine checks.

Attention:

During storage, installation, de-installation, transport or maintenance of the anemometer it must be ensured that no water gets into the shaft and connector or cable gland of the anemometer.

Note:

We recommend the threads of the plugs with a suitable corrosion inhibitors to protect against corrosion.

3. Warranty

Damage caused by improper handling or external influences, e.g. lightning, do not fall under the warranty provisions. The warranty entitlement expires if the instrument is opened.

Important:

The ultrasonic anemometer must be returned in the original packaging as the warranty entitlement otherwise expires with mechanical damage, e.g. deformation of measuring arms.

12 Technical Data

Wind velocity	Measuring range	0...75m/s (Starting threshold: 0,01m/s) Scaling of analog output freely selectable	
	Accuracy	<= 5m/s:	± 0,1m/s (rms, mean over 360°)
		> 5m/s:	± 2% of meas. value (rms, mean over 360°)
	Resolution	0,1m/s:	In the telegrams: 00001 to 00005, 00008 to 00009 00011 to 00013
		<0,1m/s :	in the user-defined telegrams: (00006)
Wind direction (direction of flow)	Measuring range	1°; 181°	
Virtual temperature	Measuring range	- 50 + 70°C	
	Accuracy	± 0.5K to 35m/s	
	Resolution	0.1K (in the telegrams 00001 to 00005, 00008, 00009 00011 to 00013)	
Data output digital	Interface	RS 485 / RS 422	
	Baud rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800, 921600 adjustable	
	Output	Instantaneous values, wind velocity / direction and acoustic-virtual temp. Sliding mean values 0.5sec..100min freely selectable Standard deviation for wind velocity and acoustic-virtual temp. Predefined data telegrams or user-defined data telegram.	
	Output rate	1 per 1msec to 1 per 60 seconds adjustable	
	Status identification	Heating, failure of measurement path.	
Data output analogue	Electr. output	0 ...+ 20mA / 0... +10V or 4... +20mA / 2... +10V Wind velocity, wind direction and virt. temperature	
		Burden on current output maximum 400Ω	
		Burden on voltage output minimum 4000Ω	
	Output	Instantaneous values Sliding mean values 0.5sec..100min freely selectable	
	Output rate	Updating rate 1 per 100 msec	
	Resolution	16bit	
Analogue inputs	Number	Up to three analog inputs possible (3 x standard, 2 x add. Configurable after consulting manufacturer).	
	Resolution	16bit	
	Sampling rate	0,1Hz ... 100Hz per channel	
	Input range	0V to + 10,0V	
	Data processing	Output of measured values in user-specific telegram	
	Accuracy	±1,0% of meas. value in the range -40°C ... +70°C	
	Linearity integral Effective noise free bits	INL: typ. < 6 LSB Typ. 14bit* *with DC-supply for avoiding dynamic crosstalk in the connecting line	

General	Internal measuring rate	Up to 400 measurements per second at +20°C.
	Bus mode	Bus mode with up to 99 instruments possible.
	Program update	Program update possible in bus mode.
	Temperature range	Operating temperature – 50°C... + 80°C heated – 30°C... + 80°C unheated Storing – 50°C... + 80°C Measuring operation possible with heating up to -75°C
	Rel. humidity	0 ... 100% r.h.
Operating voltage	Supply electronics	8V.. to 42V DC typ. 1,5VA, max. 2,5VA 12V to 28V AC typ. 1,5VA, max. 2,5VA
	Supply heating	24V AC/DC +-15%: typ. 45VA, max. 60VA @ 24V
	Protection	IP 67
Operating voltage	Supply electronics - w/o heating operation	U: 8...78V DC or 12...55V AC, 45...65Hz P: typ. 1,5VA, max. 2,5VA
	Supply: electronics + heating - with heating operation of US-arms	U: 24V AC/DC ±15%, 45...65Hz P: typ. 40VA, max. 50 VA @ 24V
W/o US converter heating	Icing resistance	Acc. to THIES STD 012001
With US converter heating	Icing resistance	Acc. to THIES STD 012002
	Housing material	Stainless steel (V4A)
	Mounting type 4.3865.xx.xxx 4.3866.xx.xxx 4.3867.xx.xxx	Flange plate with boring Flange plate with boring Bottom for Mast tube
	Connection type 4.3865.xx.xxx 4.3866.xx.xxx 4.3867.xx.xxx	Screwed Cable Gland with 5m cable 8-pole plug 8-pole plug
Dimension		See Dimesion Drawing
	Protection	IP 67 (in case of conventional mounting and screwed and converted coupling socket (if necessary), see chapter "Preparation for operation").
	Weight	2.5kg

13 Dimension Drawing

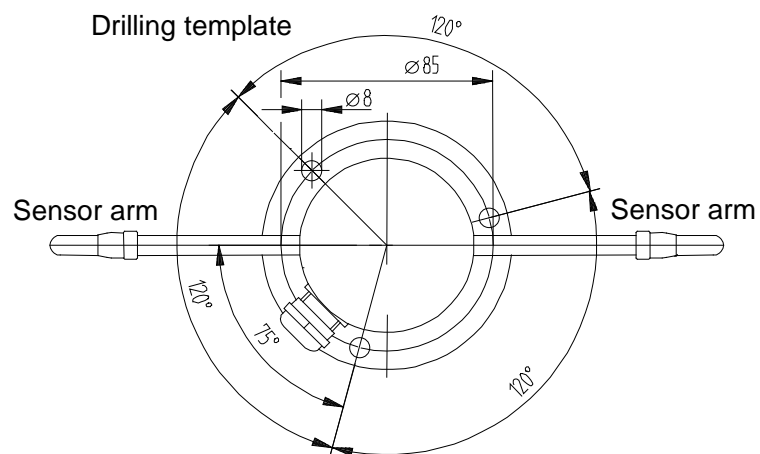
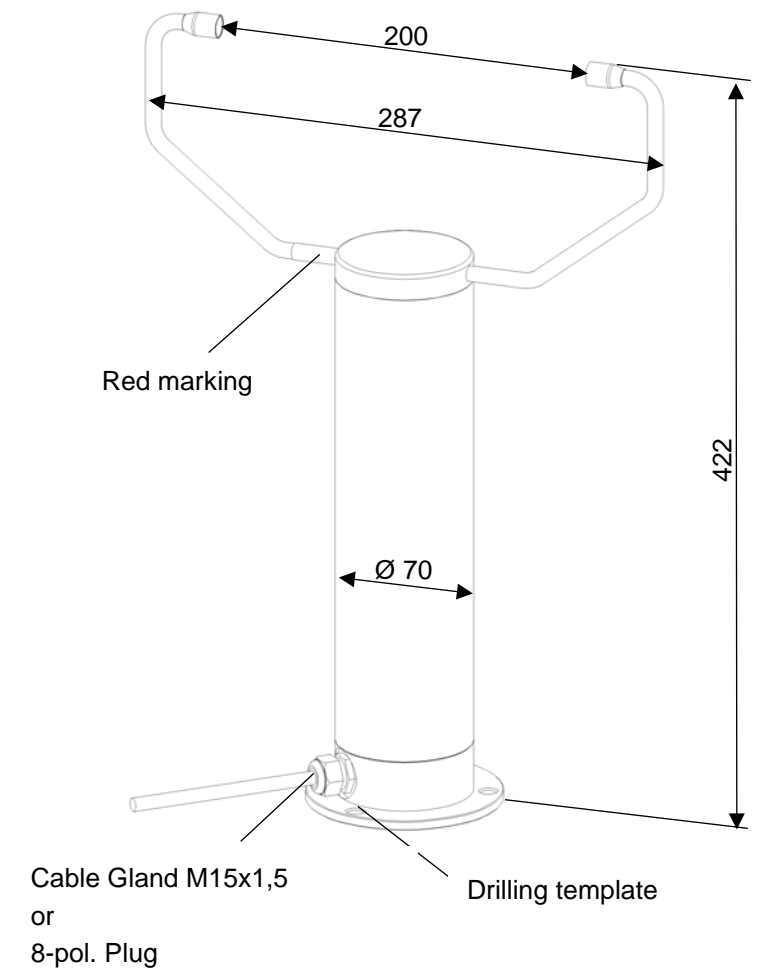


Figure 1: Dimension Drawing for 4.3865... and 3866...

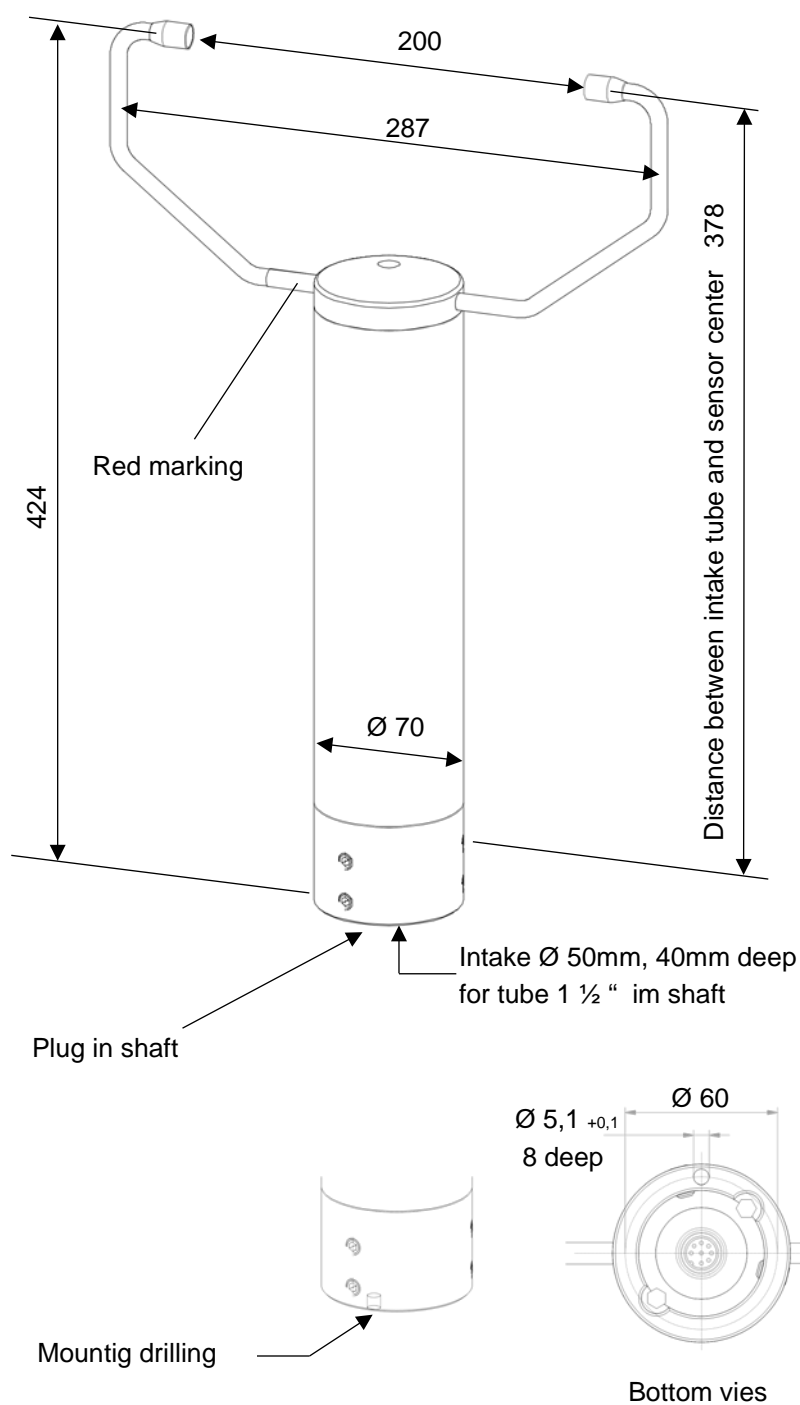


Figure 2: Dimension Drawing for 4.3867....

15 More Information / Documents as download

Further information can be found in the short instructions for use. These document and also the instruction for use are available for download under the following links.

Short instruction for use

https://www.thiesclima.com/db/dnl/https://www.thiesclima.com/db/dnl/4.386x.xx.xxx_US-Anemometer-1D_e_short.pdf

Instruction for use

https://www.thiesclima.com/db/dnl/4.386x.xx.xxx_US-Anemometer-1D_e.pdf

**Please contact us for your system requirements.
We advise you gladly.**

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