



SP Ultra

Technical Operations Manual



REV 1.0.0

For SP Ultra Ultrasonic
Air velocity Sensor

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The documentation found within this manual is to provide users of our products with technical information pertaining to the installation, maintenance and setup of the product.

It is forbidden to use any Accutron documentation for any other purpose which may be detrimental to the interests of Accutron Instruments INC.

PLEASE NOTE: The newest revision of this manual will be available online at accutroninstruments.com. If you require any assistance in configuring your new Accutron SP Ultra, please call our technicians at +1-705-628-0814 or email at info@accutroninstruments.com.

The Manual

Refer to this manual for proper installation, operation, setup and maintenance of the Accutron SP Ultra.

Special attention must be followed to warnings and notices highlighted from the rest of the text to ensure it will stand out.

Warning: Failure to oblige with the necessary precautions can result in death, serious injury, and/or considerable damage to the product.

Note: Important information about the product or that part of the manual, helpful hints, and or troubleshooting advice.

- These instructions do not claim to cover all details or variations in equipment, or to provide for every possible contingency that may arise during installation, operation, setup and maintenance.
- For further information or to resolve issues not covered in the manual, consult the Accutron Technical Service Team.
- The contents of the manual shall not become part of or modify any prior or existing agreement, commitment or relationship.
- The warranty contained in the contract between parties is the sole warranty of Accutron Instruments INC.

IMPORTANT: All specifications are subject to change without notice. Ensure your manual is up to date, the version number can be found on the front page of the manual. If you are unsure please consult the Accutron Technical Service Team.

Introduction

Thank you for choosing Accutron Instruments for your monitoring needs. This manual will review the setup and operating procedures of your SP Ultra air velocity sensor.

The SP Ultra is a single point directional airflow velocity sensor. It measures the instantaneous air velocity as well as direction of airflow with respect to the SP Ultra. The device communicates over Modbus RTU. The device may also be configured with a cross-sectional area to provide calculated airflow volume measurements.

If you have any suggestions on improvements of this product, please share it with us. We value your input. This product was designed to be user friendly, and we are actively looking on how we can improve our products to satisfy our customers.

Section 1: General Information

1.1 Safety Guidelines

This device should only be set up and operated in conjunction with this manual. Qualified personnel are only authorized to install and operate this equipment in accordance with established safety practices and standards.

1.2 Information about your Accutron SP Ultra

When you first receive your Accutron SP Ultra, ensure you record the following information shown below. If you need to contact Customer Service, this information will allow us to provide you more efficient service. This information is located on the label on the side of your SP Ultra.

TABLE 1: ACCUTRON SP ULTRA INFORMATION

| Accutron SP Ultra |
|-----------------------|
| Part Number: |
| Serial Number: |
| |

Section 2: Specifications

Input Power: 12 to 24 VDC
Interfaces: Modbus RTU, RS485
Enclosure: Nema 4X , IP65, ABS

Communication Defaults:

Modbus Address: 192
Baud Rate: 9600
Parity: None
Stop Bits: None

Temperature Range: -40°C to + 60°C

Wiring:

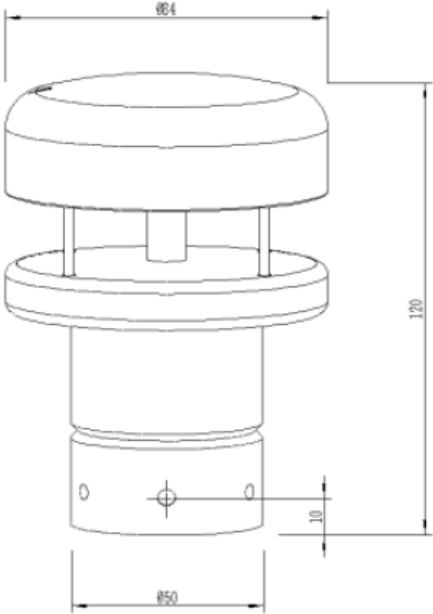
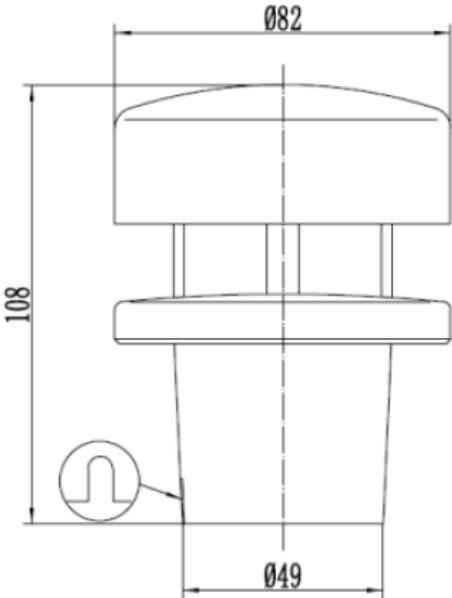
Red: V+
Black: Ground
Yellow: Data A
Green: Data B

Units:

Velocity: m/s, ft/s, ft/min
Volume: m³/s, CFM, KCFM

| | Measurement Range | Accuracy | Resolution |
|----------------|-------------------|-----------------|------------|
| Wind Speed | 0-40 m/s | +/- 3% (@25 °C) | 0.01 m/s |
| Wind Direction | 0-359° | +/- 3% (@25 °C) | 1° |

Section 3: Device Overview



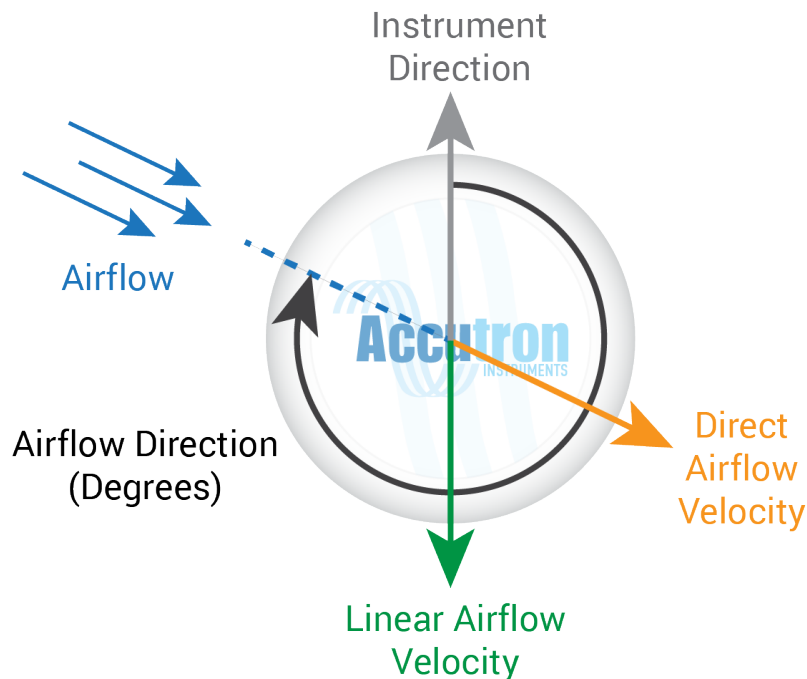
Section 4: Device Summary

Once powered up, the Accutron SP Ultra will begin reading airflow and communicating via Modbus. To test system activity, the Heartbeat register can be polled. This is a constantly increasing value that should change approximately every second.

The system monitors airflow velocity and direction. The Direct airflow register outputs the absolute air velocity independently from direction (shown with orange arrow in below image). The linear airflow velocity registers output the normalized air velocity recorded in the direction of the SP Ultra (green arrow). The direction of the instrument is indicated by the blue arrow at the top of the unit. When installing the SP Ultra, make sure the arrow is pointed into the intended direction of the airflow stream for best results.

Airflow angle outputs the direction of the airflow with respect to the SP Ultra, and is reported in degrees. It is measured clockwise from the forward facing direction of the unit (shown with black arrow in below image). If the unit is exposed to a head wind, with the airflow coming directly at the front of the unit, it will report a direction of 0 degrees. With the airflow coming from the back of the unit, a direction of 180 degrees will be reported.

Device user settings are configured over Modbus. Refer to the 'User Settings – holding registers' in the Modbus Registers map for user configurable parameters.



Section 5: Modbus Registers

| Address | Variable | Units | Description |
|-------------------------------------------------------|------------------------------|---------------------------------------------|-----------------------------------------------------------------------------------------|
| 16 Bit Int registers | | | |
| 40000 | Airflow Angle | ° | actual value from single point |
| 40001 | Direct airflow velocity x100 | m/s | actual value from single point |
| 40002 | Linear airflow velocity x100 | m/s | calculated from angle: $\text{airflow} \cdot \cos(\text{angle})$ |
| 40003 | Linear airflow velocity x100 | ft/s | calculated from angle |
| 40004 | Linear airflow velocity x1 | ft/min | calculated from angle |
| 40005 | Linear airflow volume x100 | m ³ /s | calculated from angle: $(\text{airflow} \cdot \cos(\text{angle})) \cdot \text{area}$ |
| 40006 | Linear airflow volume x1 | CFM | calculated from angle |
| 40007 | Linear airflow volume x100 | KCFM | calculated from angle |
| 40008 | Heartbeat register | Counter increases by 1 approx. every second | |
| 32 Bit float registers | | | |
| 40010 | Airflow Angle | ° | actual value from single point |
| 40012 | Direct airflow velocity raw | m/s | actual value from single point |
| 40014 | Linear airflow velocity | m/s | calculated |
| 40016 | Linear airflow velocity | ft/s | calculated |
| 40018 | Linear airflow velocity | ft/min | calculated |
| 40020 | Linear airflow volume | m ³ /s | calculated |
| 40022 | Linear airflow volume | CFM | calculated |
| 40024 | Linear airflow volume | KCFM | calculated |
| User Settings - holding registers (16bit ints) | | | |
| 40100 | K factor (x100) | | |
| 40101 | area in meters (x100) | | |
| 40102 | Modbus Address | 1 to 255 | default 192 |
| 40103 | Baud Rate | 0 = 4800 | default 9600 |
| | | 1 = 9600 | |
| | | 2 = 19200 | |
| | | 3 = 115200 | |
| 40104 | Parity | 0 = none | default none |
| | | 1 = odd | |
| | | 2 = even | |
| 40105 | stop bits | 0 = 1 stop bit | default one |
| | | 1 = 2 stop bit | |



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