HK INSTRUMENTS AVT Air Velocity Transmitter User Guide

Contents

1 HK INSTRUMENTS AVT Air Velocity Transmitter
2 Introduction
3 DESCRIPTION OF THE PRODUCT
3.1 OVERVIEW OF THE MAIN PARTS
3.2 TECHNICAL SPECIFICATIONS
3.3 DIMENSIONS
4 SAFETY PRECAUTIONS
5 COMMISSIONING
5.1 Wiring
5.2 LOCKING THE COVER
6 MODBUS
6.1 MODBUS REGISTERS
7 MAINTENANCE
8 WARRANTY POLICY
9 Documents / Resources
9.1 References
10 Related Posts

HK INSTRUMENTS

HK INSTRUMENTS AVT Air Velocity Transmitter

Specifications

- Intended Use: Commercial environments for measuring air velocity and temperature in ventilation ducts
- Compatibility: Dry air
- Not intended for use with flammable or corrosive gases
- Designed for connection to building automation systems in the HVAC/R industry

Description of the Product

The AVT Air Velocity Transmitter is a device used for measuring air velocity and temperature in commercial environments, specifically in ventilation ducts. It is designed to be compatible with dry air and is not intended for use with flammable or corrosive gases. The transmitter is meant to be connected to building automation systems in the HVAC/R industry.

Main Parts of the Product

- A – Display (-D models)
- B – Cable gland
- C – Cover locking screw (-R models)
- D – Probe
- E – Bolt and nut for locking the probe in position
- F – Holes for fixing screws
- G – Probe
- H – Probe
- I – Probe
- J – Probe
- K – Probe

Safety Precautions

Before using the AVT Air Velocity Transmitter, it is important to follow these safety precautions:

1. Ensure that the transmitter is used only in commercial environments.
2. Do not use the transmitter with flammable or corrosive gases.
3. Follow proper installation procedures to avoid electrical hazards.
4. Regularly check and maintain the transmitter to ensure accurate measurements and safe operation.

Commissioning

To commission the AVT Air Velocity Transmitter, follow these steps:

1. Ensure that the transmitter is properly mounted in the ventilation duct.
2. Connect the transmitter to the building automation system using the appropriate cables.
3. Configure the transmitter settings according to the requirements of the HVAC/R system.
4. Verify the accuracy of the measurements by comparing them with other reliable instruments.

Modbus

The AVT Air Velocity Transmitter supports Modbus communication protocol. It provides the following registers:

Input Registers

The input registers are used for reading data from the transmitter. They provide information such as:

- Air velocity
- Temperature
- Device status

Holding Registers

The holding registers are used for writing data to the transmitter. They allow you to configure settings such as:

- Measurement units
- Output scaling
- Calibration parameters

Maintenance

Regular maintenance is important to ensure optimal performance of the AVT Air Velocity Transmitter. Follow these steps to clean the probe and sensor element:

1. Disconnect the transmitter from the power source.
2. Gently remove the probe from the ventilation duct.
3. Clean the probe and sensor element using a soft cloth or brush.
4. Avoid using abrasive materials or cleaning agents that may damage the transmitter.
5. Reinstall the probe in the ventilation duct and reconnect the transmitter to the power source.

Disposal

When disposing of the AVT Air Velocity Transmitter, follow local regulations and guidelines for electronic waste disposal. Do not dispose of the transmitter in regular household waste.

Warranty Policy
The AVT Air Velocity Transmitter is covered by a warranty policy. For detailed information about the warranty terms and conditions, please refer to the warranty documentation provided with the product.

FAQ

Q: Can the AVT Air Velocity Transmitter be used with corrosive gases?
A: No, the transmitter is not intended for use with corrosive gases. It is designed to be used with dry air only.

Q: What communication protocol does the AVT Air Velocity Transmitter support?
A: The transmitter supports Modbus communication protocol.

Q: How often should I clean the probe and sensor element?
A: Regular cleaning is recommended to maintain accurate measurements. Clean the probe and sensor element at least once every 3 months or as needed based on environmental conditions.

Introduction

Thank you for choosing an AVT air velocity transmitter. It is an air velocity and temperature transmitter. The -MOD models have Modbus communication instead of analogue outputs. Other models have one analogue air velocity output and one analogue temperature output.
You can select the measurement range and the output mode for the analogue outputs on the field during commissioning.
The oponal display shows air velocity and temperature measurement values.
The -MOD models have an RS-485 connection for Modbus RTU communication.
The -R model includes a relay and a relay connector.

You can configure the device settings using:

- the device menu (-D models)
- Modbus communication (-MOD models)

About this user guide

This user guide contains important information about the installation, wiring, configuration and use of the product. Read this guide carefully before you install the product, connect the wires, or operate the product. Make sure that you fully understand all instructions before you start work. If you are not sure what the instructions mean, contact the seller or the manufacturer.
Follow all instructions in this user guide carefully. Always obey the applicable local rules and regulations.
The original instructions were written in English. If there are differences between the English instructions and the translations, refer to the English instructions.
If you find a mistake in the English instructions or in the translations, please send the details to the manufacturer.

INTENDED USE
The AVT air velocity transmitters are intended to be used in commercial environments for measuring air velocity and temperature in ventilation ducts. They are compatible with dry air. The AVT air velocity transmitters are not

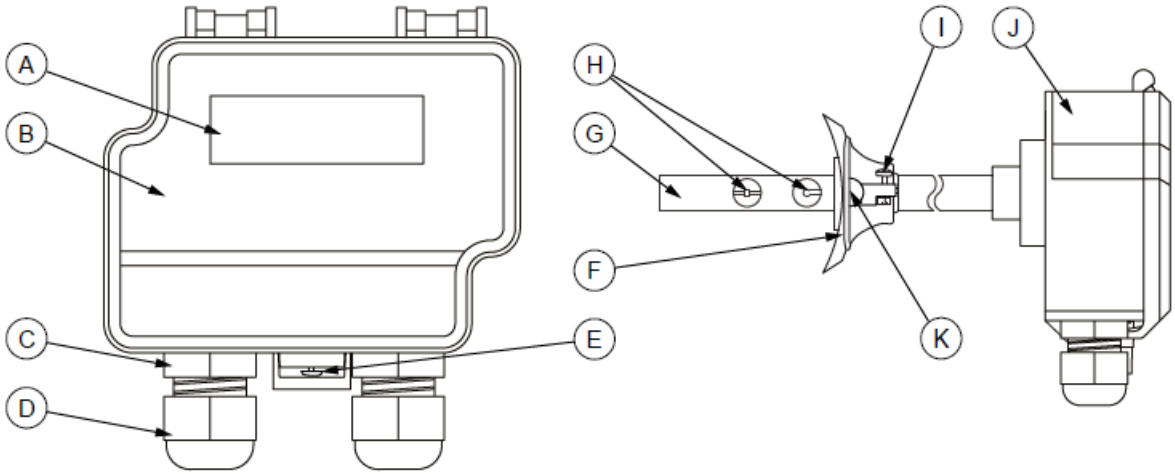
intended to be used with flammable or corrosive gases.

These transmitters are intended to be connected to building automation systems in the HVAC/R industry.

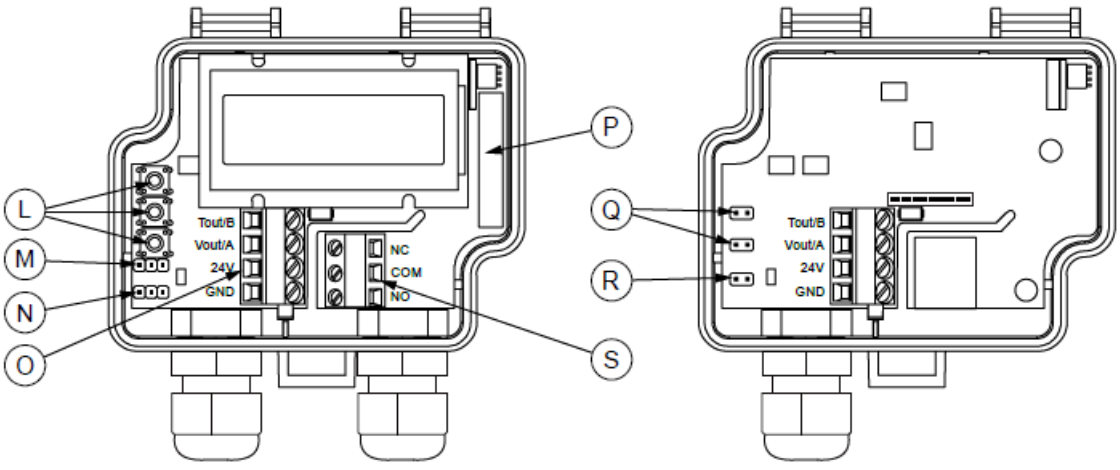
DESCRIPTION OF THE PRODUCT

This section introduces the main parts of the product and contains the technical specifications.

OVERVIEW OF THE MAIN PARTS



A	Display (-D models)	B	Cover
C	Cable gland	D	Strain relief
E	Cover locking screw (-R models)	F	Duct flange
G	Probe	H	Sensor element
I	Bolt and nut for locking the probe in position	J	Housing
K	Holes for fixing screws		



L	Menu buttons (-D models)	M	Jumper for temperature output signal selection (excluding -MOD models)
N	Jumper for air velocity output signal selection (excluding -MOD models)	O	Terminal block
P	Relay (-R models)	Q	Measurement range selection jumpers (excludi ng -D models)
R	Modbus termination jumper (-MOD models)	S	Relay connector (-R models)

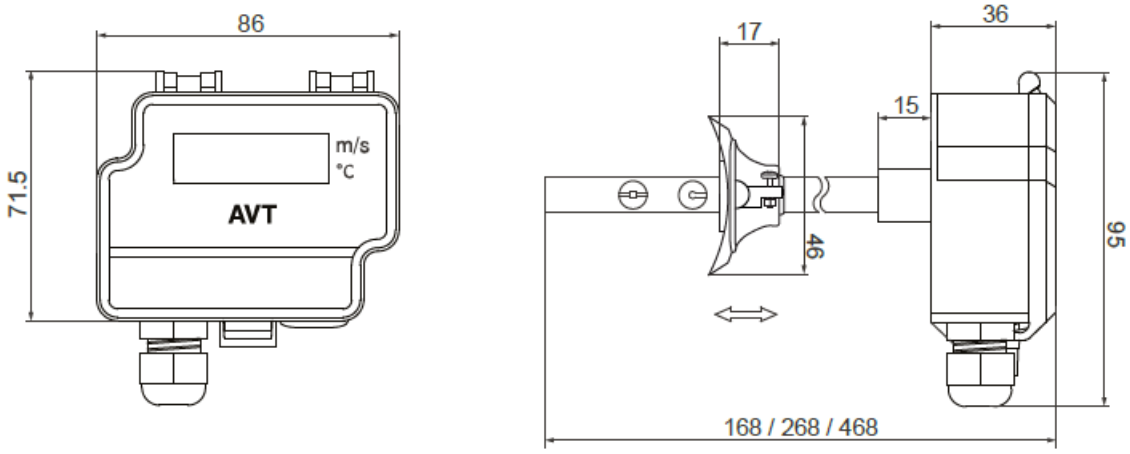
TECHNICAL SPECIFICATIONS

Property	Value
Supply	24 Vac/dc ± 10 %
Current consumption	max. 80 mA + 40 mA with mA output + 10 mA with relay option (DC supply voltage)
Relay (-R models)	250 Vac, 6 A res., adjustable operating direction, switching point and hysteresis
Air velocity measurement	
Measurement range	0...2 m/s, 0...10 m/s, 0...20 m/s, freely selectable
Accuracy (typ. at 25 °C)	v ≥ 0.15 m/s and ≤ 2 m/s (0.2 m/s + 2 % from reading) v > 2 m/s and ≤ 10 m/s (0.5 m/s + 3 % from reading) v > 10 m/s (1.0 m/s + 3 % from reading)
Temperature measurement	
Measurement range	-25...50 °C (probe)
Accuracy (25 °C)	±0.5 °C (air velocity > 0.5 m/s)
Warm-up time	15 seconds
Outputs	
Output signal 1 (T out [C])	0...10 Vdc, load > 1 kΩ 4...20 mA, load 20...400 Ω
Output signal 2 (v out [m/s])	0...10 Vdc, load > 1 kΩ 4...20 mA, load 20...400 Ω
Accuracy	Vout: ± 0.025 V at 25 °C Iout: typically ±0.04 mA at 25 °C, load 100 Ω max. ± 0.1 mA at 25 °C, load 20...400 Ω

Relay output (-R models)	3-screw terminal block (NC, COM, NO), potential free SPDT 30 Vdc 6 A / 230 Vac 6 A res. (IEC 60664-1 OVC II)	
Communication (MOD models)	Modbus RTU	
Display (-D models)	2-line display (12 characters/line), 46.0 x 14.5 mm Line 1: velocity / Line 2: temperature (default) Line 1: direction of control output (optional) Line 2: relay status (optional)	
Operating conditions		
Temperature	-25...50 °C (probe) 0...50 °C (transmitter housing)	
Humidity	0...95 %rH (non-condensing)	
IP protection class	IP54, cable downwards	
Wire	0.2...1.5 mm^2 (24...16 AWG)	
Cable gland	M16 (2 x M16: -R models)	
Mounting	with a duct flange, probe immersion length adjustable: 50...80 mm (probe length 100 mm) 50...180 mm (probe length 200 mm) 50...380 mm (probe length 400 mm)	
Materials		
Housing	ABS plastic	
Cover	PC plastic	
Probe	Stainless steel	
Duct flange	LLPDP	
Dimensions (w x h x d)	86 x 95 x 168 mm (probe length 100 mm) 86 x 95 x 268 mm (probe length 200 mm) 86 x 95 x 468 mm (probe length 400 mm)	
Weight	220 g	
Storage temperature	-20...70 °C	
Conformance	CE	UKCA
EMC	2014/30/EU	S.I. 2016 No. 1091
RoHS	2011/65/EU + (EU) 2015/863	S.I. 2012 No. 3032
WEEE	2012/19/EU	S.I. 2013 No. 3113
LVD	2014/35/EU	S.I. 2016 No. 1101

DIMENSIONS

All dimensions are in millimeters (mm).



SAFETY PRECAUTIONS

The product is developed, manufactured and tested according to high quality standards. However, instructions for safe use shall be taken account when installing, using or disposing the product or parts of product.
Read this user guide carefully before commissioning, using or servicing this device. To avoid any kind of damage to people or property, follow the instructions carefully. HK Instruments is not liable for any hazards or damages to people or property which are caused by ignoring the using or installation instructions.
To avoid electrical shock or damage to equipment, disconnect power before installing or servicing the product.
Use only a proper wiring rated for the full operating voltage and maximum current in the system even in the event of a fault.
To avoid potential fire and/or explosion, do not use the product in potentially flammable or explosive atmosphere.
The product condition must be checked before installation. Do not drop the product or use excessive force during installation. Do not use the product if any damages are visible.
After installation the product will be part of a system whose specifications and performance characteristics are not designed or controlled by HK Instruments. Refer to national and local authorities to ensure that the installation is functional and safe.
The product should only be used in professionally designed applications. Unauthorised modifications are not allowed.
The product must not be used in relation with any equipment that in case of a failure may threaten, directly or indirectly, human health or life or result in danger to human beings, animals or property.
In this document, there are different kind of warnings and notes. The warning and note types are defined in the following table.

Sign	Description
WARNING:	The warning symbol indicates a potentially hazardous situation which, if not avoide d, could result in death or serious injury.
CAUTION:	The caution symbol indicates a potentially hazardous situation which, if not avoided , could result in minor or moderate injury.
Important:	The important symbol indicates a potenally hazardous situation which, if not avoide d, could result in damage to the device or property.
Note:	The note symbol indicates a useful p or a recommended way to complete a task. T hese notes also provide information that is useful but not critical to the user.

COMMISSIONING

WARM-UP MODE
This device starts up in warm-up mode. The warm-up mode continues for 15 seconds after startup. During the warm- up time, the output signals are at the defined minimum values and the relay does not operate. If the device has a display, text Warming up is shown on the display. The device starts to operate correctly after the warm-up time.

MOUNTING THE PRODUCT

WARNING: Handle the product with care. Dropping the product may cause internal damage and unwanted functions in the connected system.

CAUTION: Place the product outside the reach of children and animals.

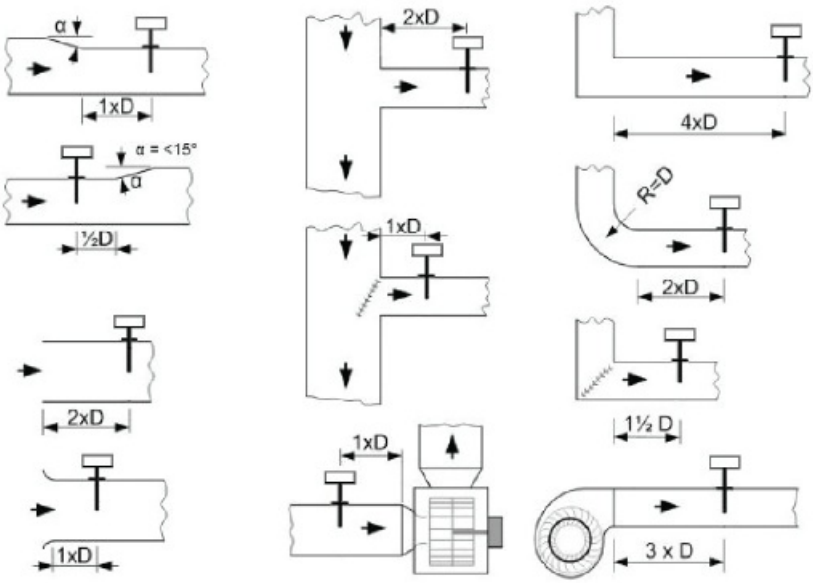
Important: The product may only be installed in a location where the ambient conditions meet the operating condition requirements.

Note: Remove the device from the air duct before cleaning the duct.

Operating conditions

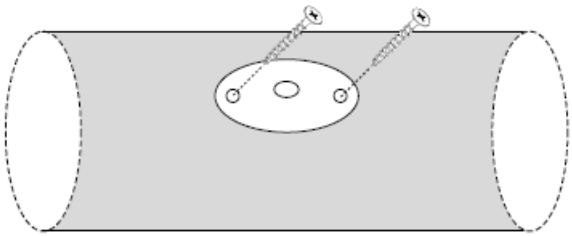
Temperature	-25...50 °C (probe) 0...50 °C (transmitter housing)
Humidity	0...95 %rH (non-condensing)

1. Check that the product is not damaged during transportation.
2. Select the mounting position on a straight duct.
   Measure the length of the straight duct to make sure that the probe is positioned correctly. See the figure below for the required minimum length of straight duct

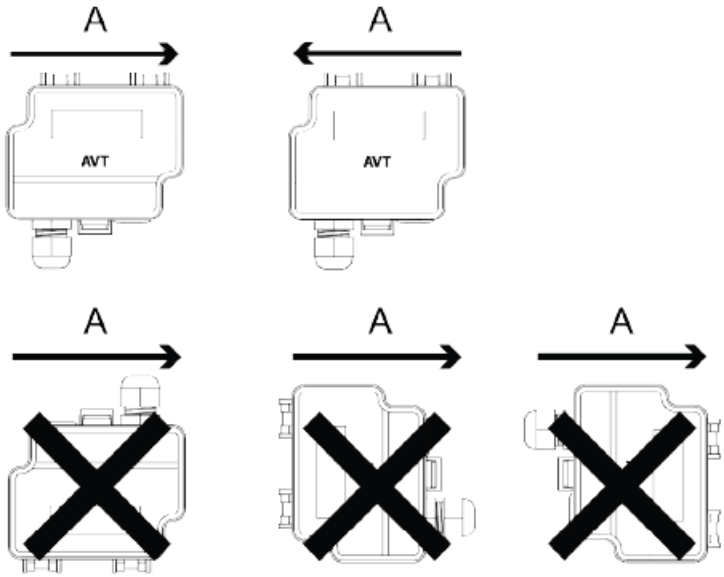


- Round ducts:
- D = duct diameter
- Rectangular ducts:
- If there is a horizontal curve or a change in the duct size: D = width of the duct
- If there is a vertical curve or a change in the duct size: D = height of the duct

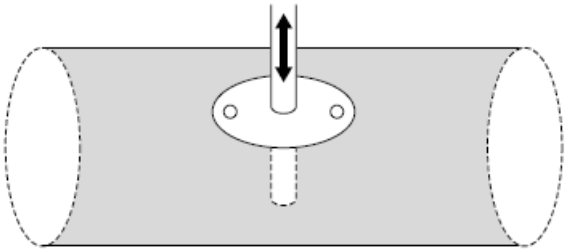
3. Use the duct flange as a template and mark the screw holes and the probe hole on the duct.
4. Drill the screw holes and the probe hole on the duct.
   The maximum screw diameter is 4 mm. The probe diameter is 10 mm.
5. Mount the duct flange on the duct with screws.



6. Push the transmitter probe into the duct through the hole on the flange.
   Make sure that the cable glands of the transmitter point down. See the figure below for the correct mounting orientation.



7. Adjust the probe to the correct depth.
   Make sure that the sensor element is in the middle of the duct.



8. Tighten the bolt and nut on the duct flange to hold the probe in position.

Wiring

WARNING: Device wiring and commissioning can only be carried out by qualified professionals. Always make the device wirings in de-energised electricity network.

TARA. The: lay eat ids pad 250c, A rA, 16 A) does not always limit the relay output load current

CORNING it in sta i so 2 2. The productes i hate a ra max 6 terey.

CAUTION: The product may only be connected to overvoltage category II electricity network according to IEC 60664-1.

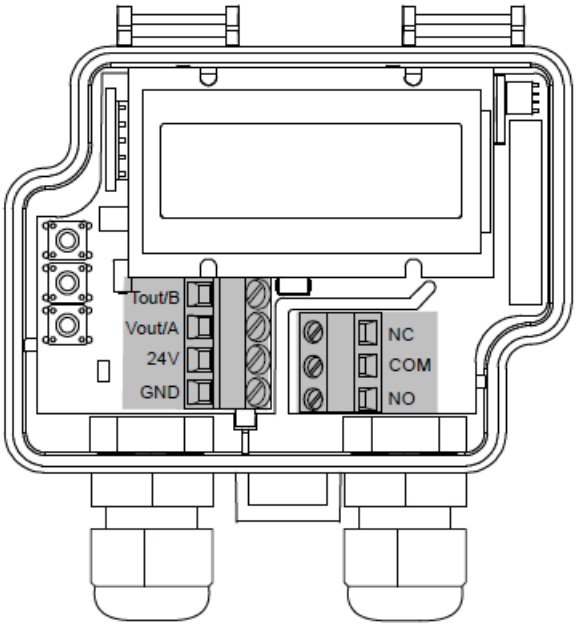
CAUTION: Use single stranded wires or use wire end sleeves if multi stranded wires are used.

For CE and UKCA compliance, a properly grounded shielding cable is required.
The relay models (-R) have two cable glands (the left and the right cable gland). Other models only have one cable gland (the left cable gland).

1. Open the cover.

   WARNING: Do not open the device cover when the relay mains supply voltage is connected. Always do the commissioning of the device in de-energised relay electricity network.
2. Unscrew the strain relief on the left cable gland and route the cables for power in and signal out through the cable gland.

   the cable gland.
3. For relay models (-R), unscrew the strain relief on the right cable gland and route the cable for the relay through the cable gland.
4. Connect the wires according to the table below.



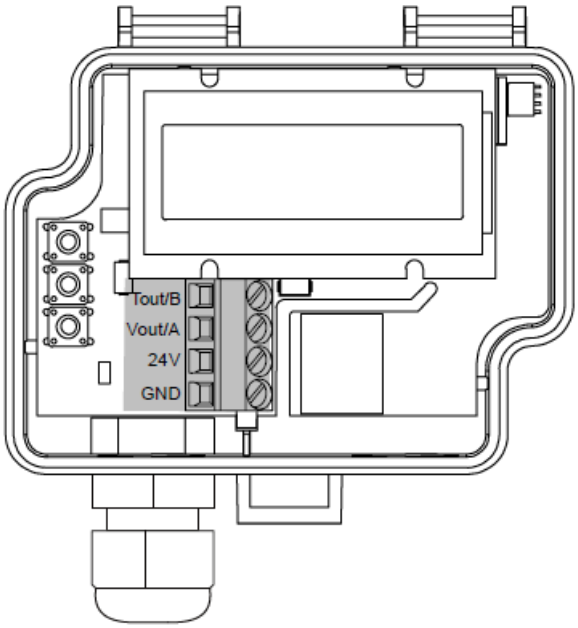
Tout/B	Temperature measurement output signal: 0…10 Vdc, load > 1 kΩ 4…20 mA, load 20…400 Ω
Vout/A	Air velocity measurement output signal: 0…10 Vdc, load > 1 kΩ 4…20 mA, load 20…400 Ω
24V	24 Vac/dc
GND	0 V
NC	Relay output on -R models: 30 Vdc 6 A / 230 Vac 6 A res.
COM	
NO	

5. Tighten the strain reliefs.

MODBUS MODELS (-MOD]

It is recommended to use shielded twisted pair cable for Modbus cabling. The cable shield must be earthed only in one point, usually at the end of the main cable.
For CE and UKCA compliance, a properly grounded shielding cable is required.

1. Open the cover.
2. Unscrew the strain relief.
3. Route the cables for power in and Modbus communication through the cable gland.
4. Connect the wires according to the table below.



Tout/B	Modbus RTU (RS-485)
Vout/A	
24V	24 Vac/dc
GND	0 V

5. Tighten the strain relief.

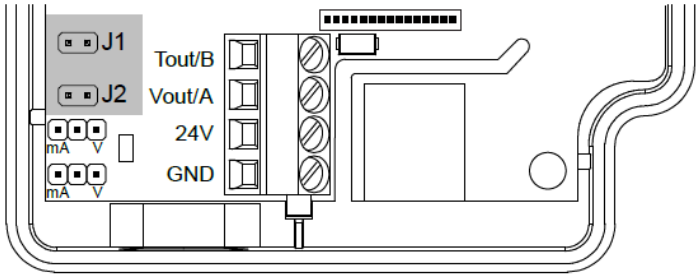
SELECTING THE MEASUREMENT RANGE

There are different methods for selecting the measurement range. The method used depends on the device options:

1. Devices that do not have a display: Select the measurement range by installing jumpers as shown in the table below.
2. Models with display (-D): Select the output signal mode with jumpers and then the measurement range via the device menu. See section Selecting the output mode on page 11

SELECTING THE MEASUREMENT RANGE WITH JUMPERS

Install the jumpers according to the table below to select the measurement range for devices that do not have a display.



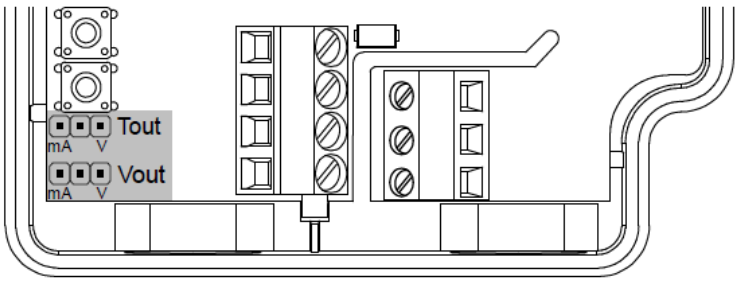
	0...2 m/s	0...10 m/s	0...20 m/s
J1	■	● ●	■
J2	● ●	■	■

SELECTING THE OUTPUT MODE

Models with analogue output signals have two jumpers for output signal mode selection on the circuit board. Select the voltage (0…10 V) or the current (4…20 mA) output signal mode based on the system requirements. The current output is not scalable. The voltage output is scalable.

You can configure the output signal separately for air velocity and temperature. Set the jumpers in the correct position to select the output signal mode (V/mA) for air velocity and temperature.

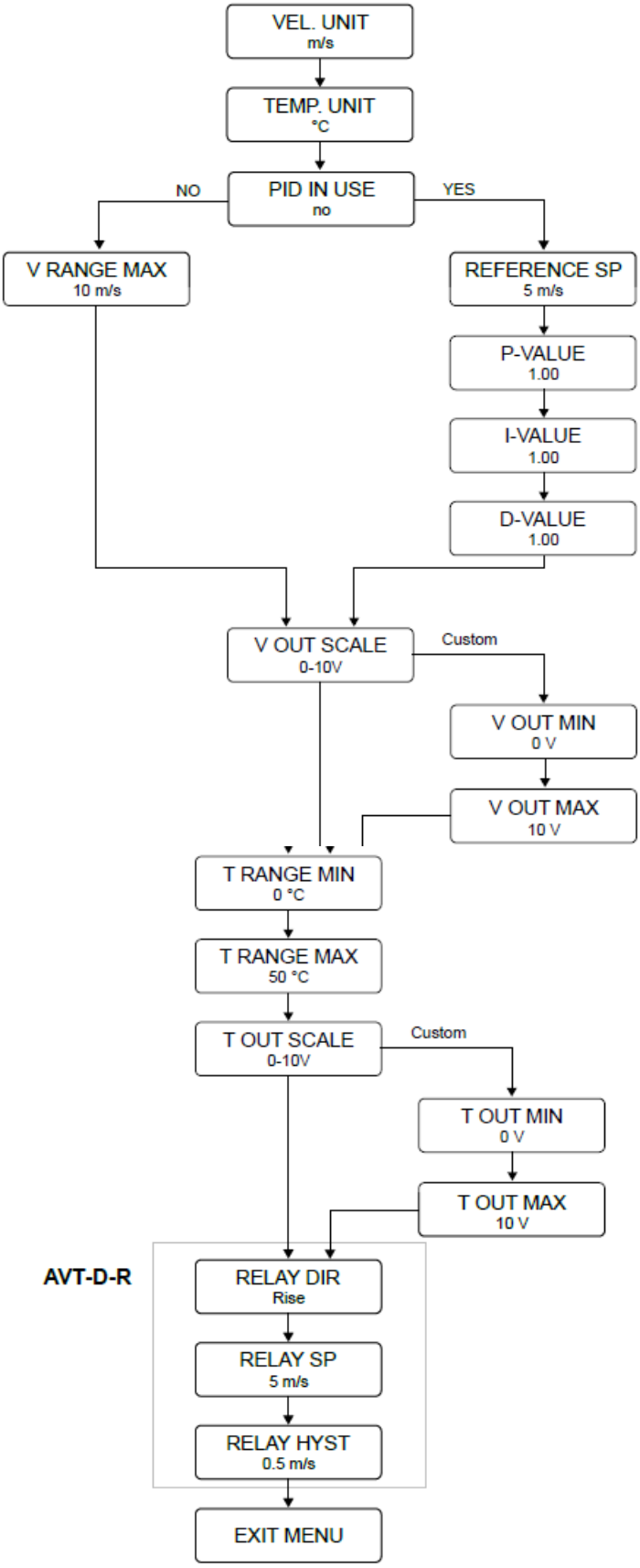
See the table below for the jumper settings.

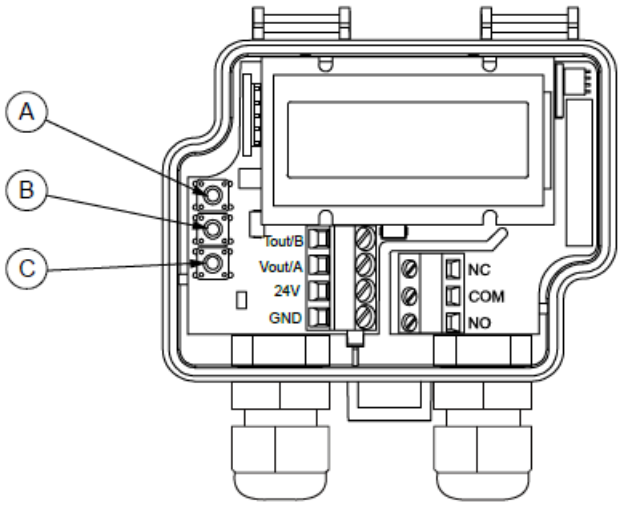


Output		■●	●■	■●	●■
Temperature output	*Tout*	Output signal mode: current (mA)	Output signal mode: voltage (V)	Output signal mode: current (mA)	Output signal mode: voltage (V)
Air velocity output	*Vout*	Output signal mode: current (mA)	Output signal mode: voltage (V)	Output signal mode: voltage (V)	Output signal mode: current (mA)

CONFIGURING SETTINGS VIA DEVICE MENU

See the figure below for the full menu structure for all models excluding the Modbus models (-MOD). For Modbus model menu structure, see section Available settings for Modbus on page 17.


VEL. UNIT
m/s
TEMP. UNIT
°C
PID IN USE
no
NO
YES
V RANGE MAX
10 m/s
REFERENCE SP
5 m/s
P-VALUE
1.00
I-VALUE
1.00
D-VALUE
1.00
V OUT SCALE
0-10V
Custom
V OUT MIN
0 V
V OUT MAX
10 V
T RANGE MIN
0 °C
T RANGE MAX
50 °C
T OUT SCALE
0-10V
Custom
T OUT MIN
0 V
T OUT MAX
10 V
AVT-D-R
RELAY DIR
Rise
RELAY SP
5 m/s
RELAY HYST
0.5 m/s
EXIT MENU



- A. SELECT button
- B. UP button
- C. DOWN button

1. Open the cover.

   WARNING: Do not open the device cover when the relay mains supply voltage is connected. Always do the commissioning of the device in de-energised relay electricity network.
2. Press the SELECT button for two seconds to activate the device menu.
3. Use the UP and DOWN buttons to navigate the menu.
4. Press the SELECT button to change the value of a menu item.
5. Press the UP or DOWN button to select a value.
6. Press the SELECT button to accept the new value and to return to menu navigation.
7. Navigate to the EXIT MENU view and press the SELECT button to save the settings and exit the menu.

AVAILABLE SETTINGS FOR VELOCITY AND TEMPERATURE

For Modbus model settings, see chapter Available settings for Modbus on page 17.

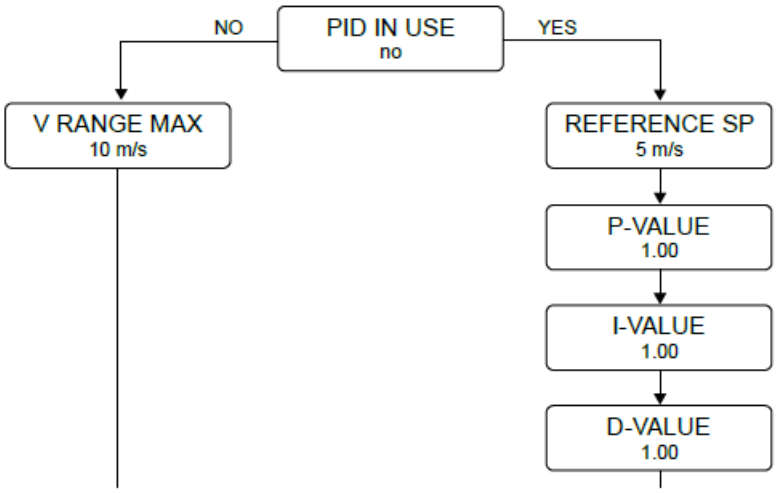
1. VEL. UNIT MENU

   You can select the velocity unit for the device display and the velocity output in the VEL. UNIT menu.

   The available velocity units are m/s and ft/min. The default value is m/s.
2. TEMP. UNIT MENU

   You can select the temperature unit for the device display and the temperature output in the TEMP. UNIT menu.

   The available temperature units are °C and °F. The default value is °C.
3. PID IN USE MENU



You can select the if PID is in use in the PID IN USE menu.

The available values are no and yes. The default value is no.

If you select no, the next menu item is V RANGE MAX.

If you select yes, the next menu items are REFERENCE SP, P-VALUE, I-VALUE and D-VALUE.

V RANGE MAX MENU

You can select the maximum value for air velocity measurement range in the V RANGE MAX menu.

You can select the maximum velocity measurement range between 1 m/s and 20 m/s. The default value is 10 m/s.

If you selected ft/min in the VEL. UNIT menu, you can select the maximum velocity measurement range between 200

ft/min and 4000 ft/min. You can adjust the value by 200 ft/min steps. The default value is 2000 ft/min.

REFERENCE SP MENU

You can select the reference setpoint for the PID controller in the REFERENCE SP menu. You can adjust the value by

0.1 m/s or 1 ft/min steps depending on the selected air velocity unit. The default value is 5 m/s or 1000 ft/min.

P-VALUE, I-VALUE AND D-VALUE MENUS

You can select the proportional gain in the P-value menu. You can adjust the value by 0.01 unit steps. The default value is 1.00.

You can select the integral gain in the I-value menu. You can adjust the value by 0.01 unit steps. The default value is 1.00.

You can select the derivative gain in the D-value menu. You can adjust the value by 0.01 unit steps. The default value is 1.00.

You can select the P-value, I-value and D-value between 0 and 99.99.

4. V OUT SCALE MENU

   You can select the air velocity output scale in the V OUT SCALE menu.

   The available values are 0-5 V, 0-10 V, 2-10 V and custom. The default value is 0-10 V.

   If you select custom, you can set the minimum and maximum values for the air velocity output scale.

   V OUT MIN MENU

   If you selected custom in the V OUT SCALE menu, you can select the minimum value for the air velocity output scale in the V OUT MIN menu.

   You can select a value between 0 V and 10 V. You can adjust the value by 1 V steps. The default value is 0 V.

   You can select a minimum value that is bigger than the maximum value to reverse the operating direction.

VOUT MAX MENU

If you selected custom in the V OUT SCALE menu, you can select the maximum value for the air velocity output scale in the V OUT MAX menu.

You can select a value between 0 V and 10 V. You can adjust the value by 1 V steps. The default value is 10 V.

You can select a maximum value that is smaller than the minimum value to reverse the operating direction.

5. TRANGE MIN MENU

   You can select the minimum value for temperature measurement range in the TRANGE MIN menu.

   You can select a value between -25 °C and 40 °C. You can adjust the value by 5 °C steps. The default value is 0 °C.

   If you selected °F in the TEMP. UNIT menu, you can select a value between -13 °F and 104 °F. You can adjust the value by 2 °F steps. The default value is 32 °F.

6. T RANGE MAX MENU

   You can select the maximum value for temperature measurement range in the T RANGE MAX menu.

   You can select a value between -15 °C and 50 °C. You can adjust the value by 5 °C steps. The default value is 50 °C.

   If you selected °F in the TEMP. UNIT menu, you can select a value between 5 °F and 122 °F. You can adjust the value by 2 °F steps. The default value is 122 °F.

7. T OUT SCALE MENU

   You can select the temperature output scale in the T OUT SCALE menu.

   The available values are 0-5 V, 0-10 V, 2-10 V and custom. The default value is 0-10 V.

   If you select custom, you can set the minimum and maximum values for the temperature output scale.

   TOUT MIN MENU

   If you selected custom in the T OUT SCALE menu, you can select the minimum value for the temperature output scale in the T OUT MIN menu.

   You can select a value between 0 V and 10 V. You can adjust the value by 1 V steps. The default value is 0 V.

   You can select a minimum value that is bigger than the maximum value to reverse the operating direction.

   TOUT MAX MENU

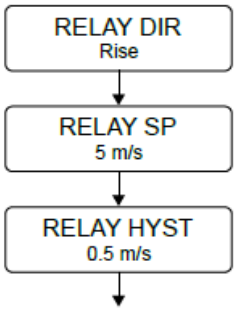
   If you selected custom in the T OUT SCALE menu, you can select the maximum value for the temperature output

   scale in the T OUT MAX menu.

   You can select a value between 0 V and 10 V. You can adjust the value by 1 V steps. The default value is 10 V.

   You can select a maximum value that is smaller than the minimum value to reverse the operating direction.

RELAY SETTINGS



1. RELAY SP MENU

This menu is shown only if the transmitter has a relay output (-R models).

You can set the velocity setpoint for the relay in the RELAY SP menu. You can set this value with an accuracy of two

decimals. The default value is 5 m/s or 1000 ft/min.

2. RELAY DIR MENU

   This menu is shown only if the transmitter has a relay output (-R models). Relay operating direction defines if the relay

   switches on or off when the air velocity is more than the setpoint value.

   Switches one it the is selecteatind dine air vei thy is more than the setinvail. Flatseed, the relay switches on when the air velocity is less than the setpoint value. The default value is Rise.

3. RELAY HYST MENU

   This menu is shown only if the transmitter has a relay output (-R models). This setting defines how much the air velocity

   must drop below the setpoint before the relay switches off if Rise is selected in the RELAY DIR menu. The function is

   opposite if Fall is selected in the RELAY DIR menu.

   You can set the hysteresis value for the relay in the RELAY HYST menu. You can select a value between 0.1 and 20.0

   m/s. You can adjust the value by 0.1 m/s steps. The default value is 0.5 m/s.

   If you selected ft/min in the VEL. UNIT menu, you can select a value between 20 ft/min and 4000 ft/min. You can

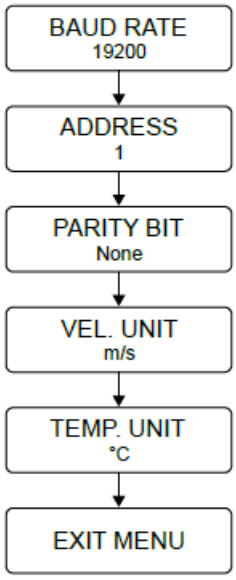
   adjust the value by 20 ft/min steps. The default value is 100 ft/min.

EXIT MENU VIEW

Navigate to the EXIT MENU view and press the SELECT button to save the settings and exit the menu.

AVAILABLE SETTINGS FOR MODBUS

The figure below shows the menu structure for the Modbus models (-MOD). These menu settings are only available in Modbus models (-MOD).



1. BAUD RATE MENU

   You can select the baud rate in the BAUD RATE menu.

The bus speed can be 9600, 19200 or 38400 bits/s. The default baud rate is 19200 bits/s.

2. 4.7.2 ADDRESS MENU

   You can select the Modbus address in the ADDRESS menu.

   Address range is 1…247. The default value is 1.

3. PARITY BIT MENU

   You can select Modbus parity in the PARITY BIT menu.

   The available values for bus parity are none, odd and even. The default setting is none.

4. VEL. UNIT MENU

   You can select the velocity unit for the device display and the velocity output in the VEL. UNIT menu.

   The available velocity units are m/s and ft/min. The default value is m/s.

5. TEMP. UNIT MENU

   You can select the temperature unit for the device display and the temperature output in the TEMP. UNIT menu.

   The available temperature units are °C and °F. The default value is °C.

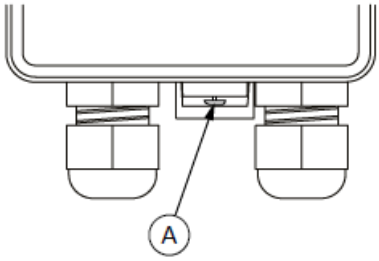
6. EXIT MENU VIEW

   Navigate to the EXIT MENU view and press the SELECT button to save the settings and exit the menu.

LOCKING THE COVER

WARNING: There is a hazardous voltage inside the R-model devices. Always lock the cover before the relay mains supply voltage is connected.

1. Close the cover.
2. Tighten the cover locking screw (-R models).



   A. Cover locking screw

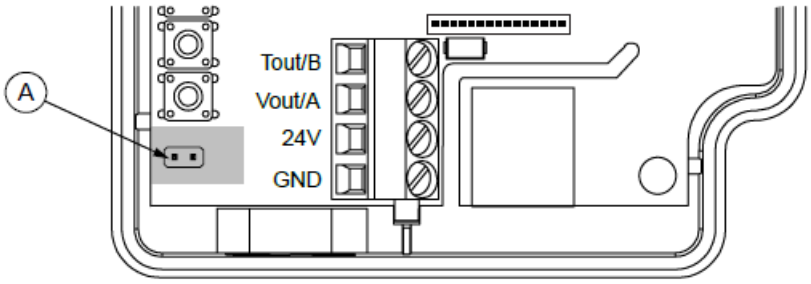
3. Make sure that the cover does not open without tools.

MODBUS

TERMINATING MODBUS

Insert the termination jumper in the last device of the network to terminate the Modbus network.

1. Disconnect the device supply voltage.
2. Open the cover.
3. Insert the termination jumper in position (A).



4. Close the cover.
5. Reconnect the device supply voltage.

MODBUS PROPERTIES
The Modbus communication is only available in -MOD models.
The parameter memory durability allows at least 1 000 writing cycles.

Note: The changes to the Modbus communication settings take effect after you restart the device.

Protocol	RS-485 Modbus RTU
Bus speed	9600/19200*/38400 bit/s
Data bits	8
Parity	none*/odd/even
Stop bits	1
Modbus ID	1*
Unit load	1/8 UL
	* factory setting

MODBUS FUNCTION CODES
The device supports the following Modbus function codes.

Decimal	Hexadecima	Function
3	0x03	Read Holding Registers
4	0x04	Read Input Registers
6	0x06	Write Single Register
16	0x10	Write Multiple Registers

MODBUS REGISTERS

INPUT REGISTERS

GENERAL

Register	Parameter description	Data type	Values	Range
0	Velocity m/s	U16	*0…2000*	0…20 m/s
1	Velocity /min	U16	*0…4000*	0…4000 /min
2	Temperature °C	S16	*-250…500*	-25.0…50.0 °C
3	Temperature °F	S16	*-130…1220*	-13.0…122.0 °F
4…99	Reserved for future use			

DEVICE MODEL DETAILS

Register	Parameter description	Data type	Values	Range
9800	Register count	U16	*0…99*	0…99
9801	Format version	U16	*0…65535*	0…65535
9802	Display	U16	*0…1*	0. no 1. yes
9803	Bu ons	U16	*0…1*	0. no 1. yes
9804	Number of relays	U16	*0…1*	0….1
9805	Analogue outputs	U16	*0…1*	0. no 1. yes
9806	Modbus	U16	*0…1*	0. no 1. yes
9807	MyTool Connector	U16	*0…1*	0. no 1. yes
9808	PID controller	U16	*0…1*	0. no 1. yes

DEVICE INFORMATION

Register	Parameter description	Data type	Values	Range
9900	Device type	U16	*0…65535*	0…65535
9901	Hardware version	U16	*0…65535*	0…65535
9902	Production number, MS word	U16	*0…65535*	0…65535
9903	Production number, LS word	U16	*0…65535*	0…65535
9904	Configuraon number, MS word	U16	*0…65535*	0…65535
9905	Configura on number, LS word	U16	*0…65535*	0…65535
9906…9908	Reserved for MyTool®	U16		
9909	Ethernet MAC address 1	U16	*0*	0
9910	Ethernet MAC address 2	U16	*0*	0
9911	Ethernet MAC address 3	U16	*0*	0
9912	Wireless MAC address 1	U16	*0*	0

9913	Wireless MAC address 2	U16	*0*	0
9914	Wireless MAC address 3	U16	*0*	0
9915	Memory state	U16	*0…9*	0. Idle 1. Loading latest confi guration 2. Saving latest config uration 3. Loading default con figuration 4. Saving default confi guraon 5. Loading calibration 6. Saving calibration 7. Saving application s tate 8. Chip erase in progr ess 9. Cloud configuration management
9916	Configura on compa bility number	U16	*0…65535*	0…65535
9917	Firmware ID, MS word	U16	*0…65535*	0…65535
9918	Firmware ID, LS word	U16	*0…65535*	0…65535
9919.	Firmware version (major, minor)	U16	*0…65535*	0…65535
9920	Firmware version (revision, build)	U16	*0…65535*	0…65535
9921…9923	Reserved for MyTool®	U16	*25*	25
9924	MyTool® compatibility number	U16	*0*	0. Compatibility number not assigned (feature is not in use)

HOLDING REGISTERS

MODBUS

Register	Parameter description	Data type	Values	Range	Default
0	Baud rate	U16	*0…2*	0. 9600 1. 19200 2. 38400	*1*
1	Address	U16	*1…247*	1…247	*1*
2	Parity bit	U16	*0…2*	0. none 1. even 2. odd	*0*
3	Velocity unit	U16	*0…1*	0. m/s 1. /min	*0*
4	Temperature unit	U16	*0…1*	0. Celsius 1. Fahrenheit	*0*
5…199	Reserved for future use				

MY TOOL

Register	Parameter description	Data type	Values	Range	Default
200	PID in use	U16	*0…1*	0. no 1. yes	*0*

201	Velocity range max. (m/s)	U16	*1…20*	1…20 m/s	*10*
202	Velocity range max. (/min)	U16	*2…40*	200…4000 /min	*20*
203	PID velocity setpoint (m/s)	U16	*1…2000*	0.01…20 m/s	*500*
204	PID velocity setpoint (/min)	U16	*2…4000*	2…4000 /min	*1000*
205	PID P factor	U16	*0…9999*	0…99.99	*100*
206	PID I factor	U16	*0…9999*	0…99.99	*100*
207	PID D factor	U16	*0…9999*	0…99.99	*100*
208	V / VPID out scale	U16	*0…3*	0. 0…5 V 1. 0…10 V 2. 2…10 V 3. Custom	*1*
209	V / VPID out scale custom mi n.	U16	*0…10*	0…10 V	*0*
210	V / VPID out scale custom m ax.	U16	*0…10*	0…10 V	*10*
211	Temperature range min. (°C)	U16	*-25…40*	-25…40 °C	*0*
212	Temperature range min. (°F)	U16	*-13…104*	-13…104 °F	*32*
213	Temperature range max. (°C)	U16	*-15…50*	-15…50 °C	*50*
214	Temperature range max (°F)	U16	*5…122*	5…122 °F	*122*
215	T out scale	U16	*0…3*	0. 0…5 V 1. 0…10 V 2. 2…10 V 3. Custom	*1*
216	T out scale custom min.	U16	*0…10*	0…10 V	*0*
217	T out scale custom max.	U16	*0…10*	0…10 V	*10*
218	Relay opera ng direc on	U16	*0…1*	0. Rise 1. Fall	*0*
219	Relay setpoint (m/s)	U16	*1…2000*	0.01…20 m/s	*500*
220	Relay setpoint (/min)	U16	*2…4000*	2…4000 /min	*1000*
221	Relay hysteresis (m/s)	U16	*1…2000*	0.01…20 m/s	*50*
222	Relay hysteresis (/min)	U16	*2…4000*	2…4000 /min	*100*

OTHER HOLDING REGISTERS

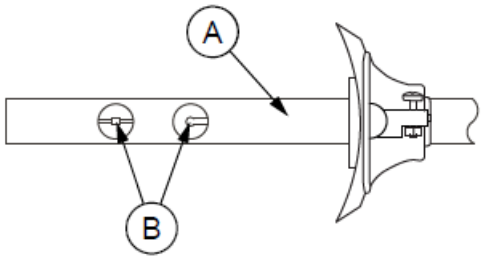
Register	Parameter description	Data type	Values	Range	Default
9900…9915	Device name 00…15	U16	*0…65535*	[0…255], [0…255]	*0*
9995…9998	Device control data	U16	*0…65535*	0…65535	*0*
9999	Device control header	U16	*0…65535*	0…65535	*0*
63000… 63999	Calibration (reserved)				
64000… 64999	Firmware update (reserved)				

MAINTENANCE

CLEANING THE PROBE AND THE SENSOR ELEMENT

Dut senses dete ditoe and me stes themen retry The eired deins the dependent acincy cleanliness.
Do not clean the sensor element with detergents or other chemicals.

1. Disconnect the device supply voltage. For the -R models, disconnect the device supply voltage and the relay mains supply voltage.
2. Clean the probe with a soft cloth.



A. Probe

B. Sensor element

3. Clean the sensor element with compressed air.

   Apply compressed air lighly to the sensor element to prevent damage.

Important: Do not use too high pressure, touch the sensor element or use other cleaning cause mechanical stress. Mechanical stress damages the sensor element and changes the accuracy of the sensors.

DISPOSAL

The device is considered as electrical and electronic equipment for disposal in terms of the applicable European Directive. At the end of life the product must enter the recycling system at an appropriate collection point.

- The device must be disposed through channels provided for this purpose.
- The disposal must be completed according to the local and currently applicable laws and regulations.

  Generally all metals can be recycled as material. Plastics and cardboard packaging material can be used in energy recovery. Printed circuit boards need selective treatment according to IEC 62635 guidelines. To aid recycling, plastic parts are marked with an appropriate identification code. Contact your local HK Instruments distributor for further information on environmental aspects and recycling instructions for professional recyclers.

WARRANTY POLICY

The seller is obligated to provide a warranty of five years for the delivered goods regarding material and manufacturing. The warranty period is considered to start on the delivery date of the product. If a defect in raw materials or a production flaw is found, the seller is obligated, when the product is sent to the seller without delay or before expiration of the warranty, to amend the mistake at his/her discretion either by repairing the defective product or by delivering free of charge to the buyer a new flawless product and sending it to the buyer. Delivery costs for the repair under warranty will be paid by the buyer and the return costs by the seller. The warranty does not comprise damages caused by accident, lightning, flood or other natural phenomenon, normal wear and tear, improper or careless handling, abnormal use, overloading, improper storage, incorrect care or reconstruction, or changes and installation work not done by the seller. The selection of materials for devices prone to corrosion is the buyer's responsibility, unless otherwise is legally agreed upon. Should the manufacturer alter the structure of the device, the seller is not obligated to make comparable changes to devices already purchased. Appealing for warranty requires that the buyer has correctly fulfilled his/her duties arisen from the delivery and stated in the contract. The seller will give a new warranty for goods that have been replaced or repaired within the warranty, however only to the expiration of the original product's warranty time. The warranty includes the repair of a defective part or device, or if needed, a new part or device, but not installation or exchange costs. Under no circumstance is the seller liable for damages compensation for indirect damage.

www.hkinstruments.fi
Information is subject to change without prior notice.

Documents / Resources

	**HK INSTRUMENTS AVT Air Velocity Transmitter** [pdf] User Guide AVT Air Velocity Transmitter, AVT, Air Velocity Transmitter, Velocity Transmitter, Transmitter

References

- **User Manual**