Honeywell

P8000
Pressure Transmitter

PRODUCT DATA

GENERAL

The model P8000 HVAC pressure transmitters are ideal for sorts of general HVAC applications when considering performance, reliability, stability and compact size.
The output signal of the sensing bridge is in converted to be a standardized current/voltage signal through surface mount technology circuit board. This high level signal output with considerably low noise system is packaged in a rugged stainless steel housing to resist the harsh and critical conditions. Each transmitter is inspected and calibrated 100% to ensure its quality.

APPLICATIONS

- HVAC Systems
- Hydraulic Systems
- Pneumatic Systems
- Compressor & Pump control
- Medical care appliance

FEATURES

- Applicable in gas & liquid media
- High accuracy
- Thermal compensation
- Compact construction
- Full Mis-wire protection between all signal and power lines
- Stainless steel Wetted part

SPECIFICATION

Performance and Characteristics

Accuracy	≤±0.25%FS*
Zero Tolerance：	±0.5%FS
Span Tolerance：	±0.5%FS
Long term Stability	±0.2%FS/Year
Thermal Effect	0.015%FS/℃

Environment Characteristics

Media Temp. Range	-40~+105℃
Storage Temp. Range	-40~+105℃
Compensated Range	-40~+105℃
Weatherproof Rating	IP65

Physical Characteristics

Fitting Material	304 Stainless steel
Sensing Element	17-4PH Stainless steel
Pressure Fitting	G1/4 male
(Connection)	1/4-18NPT Male
Electrical Connector	DIN 9.4mm (P8000A/B)
	DIN43650A(P8000AD/BD)

Note:

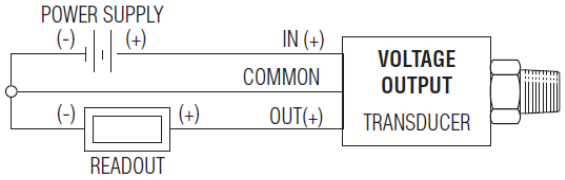
***:** *includes Non-linearity, Hysteresis & Repeatability*

All wetted parts including fitting & sensor will be contacted with the media directly.

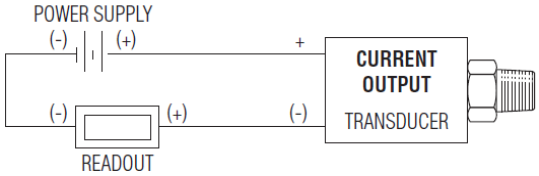
Electrical Data

Output Signal	4-20mA / 0-10VDC
Power Requirement	14-30VDC（0-10VDC）
	8-24VDC（4-20mA）
Loop Current	Max 5.5mA （No load is ok on Voltage output）
Load Resistance	（Current output） (Supply voltage-8V)*50 Ohms

Voltage Wiring Diagram

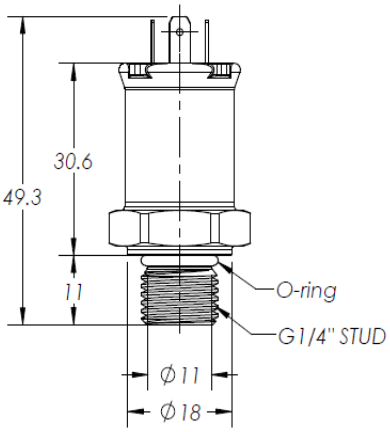


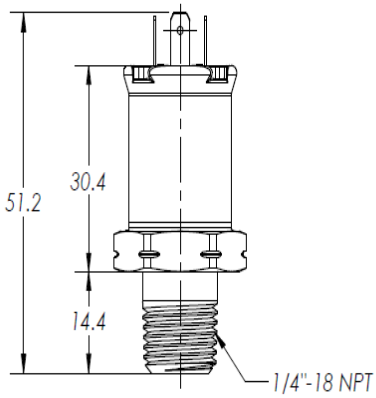
Current Wiring Diagram



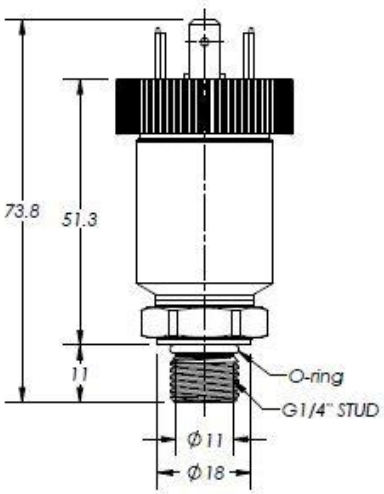
Dimension (mm)

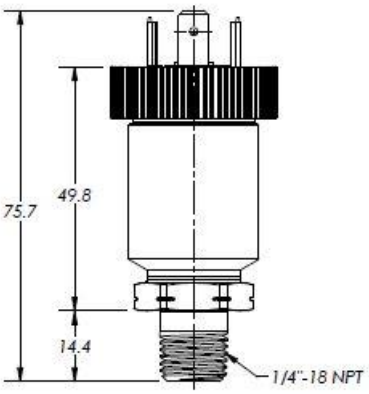
P8000A/P8000B





P8000AD/P8000BD





Ordering & Selection Information

OS No.		Pressure Range	Proof Pressure (bar)		Burst Pressure (bar)		Pressure Fitting	Output Type
DIN9.4mm	DIN43650A							
P8000A0007G	P8000AD0007G	0…7 bar	3xFS	21	40xFS	280	G ¼ Male	4-20mA
P8000A0010G	P8000AD0010G	0…10 bar	3xFS	30	40xFS	400		
P8000A0016G	P8000AD0016G	0…16 bar	3xFS	48	40xFS	640		
P8000A0020G	P8000AD0020G	0…20 bar	3xFS	60	40xFS	800		
P8000A0025G	P8000AD0025G	0…25 bar	3xFS	75	40xFS	1000		
P8000B0007G	P8000BD0007G	0…7 bar	3xFS	21	40xFS	280		0-10V
P8000B0010G	P8000BD0010G	0…10 bar	3xFS	30	40xFS	400		
P8000B0016G	P8000BD0016G	0…16 bar	3xFS	48	40xFS	640		
P8000B0020G	P8000BD0020G	0…20 bar	3xFS	60	40xFS	800		
P8000B0025G	P8000BD0025G	0…25 bar	3xFS	75	40xFS	1000		
P8000A0007T	P8000AD0007T	0…7 bar	3xFS	21	40xFS	280	1/4-18 NPT	4-20mA
P8000A0010T	P8000AD0010T	0…10 bar	3xFS	30	40xFS	400		
P8000A0016T	P8000AD0016T	0…16 bar	3xFS	48	40xFS	640		
P8000A0020T	P8000AD0020T	0…20 bar	3xFS	60	40xFS	800		
P8000A0025T	P8000AD0025T	0…25 bar	3xFS	75	40xFS	1000		
P8000B0007T	P8000BD0007T	0…7 bar	3xFS	21	40xFS	280		0-10V
P8000B0010T	P8000BD0010T	0…10 bar	3xFS	30	40xFS	400		
P8000B0016T	P8000BD0016T	0…16 bar	3xFS	48	40xFS	640		
P8000B0020T	P8000BD0020T	0…20 bar	3xFS	60	40xFS	800		
P8000B0025T	P8000BD0025T	0…25 bar	3xFS	75	40xFS	1000		

Wiring Diagram

OS No.	P8000A/P8000B			P8000AD/P8000BD		
Pin No.	Voltage	Current	Photo	Voltage	Current	Photo
1	Vout	N/A		VSupply	Vsupply	
2	Vsupply	Vsupply		GND	Return	
3	N/A	N/A		Vout	N/A	
4	GND	Return		N/A	N/A	

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Honeywell

VFF Series

IMMERSION TEMPERATURE SENSOR

PRODUCT DATA

GENERAL

The VFF Immersion Temperature Sensor is used in heating, cooling or domestic hot water applications requiring fast response temperature measurement.

TYPES

OS no.	Sensor element / sensor length	Sensing range
VFF00-75P65	PT1000 / 75 mm	-20...+140 °C (-4...+284 °F)
VFF00-220P65	PT1000 / 220 mm	
VFF00-300P65	PT1000 / 300 mm	
VFF10-75P65	NTC10kΩ / 75 mm	-20...+110 °C (-4...+230 °F)
VFF10-220P65	NTC10kΩ / 220 mm	
VFF10-300P65	NTC10kΩ / 300 mm	
VFF20-75P65	NTC20kΩ / 75 mm	-20...+140 °C (-4...+284 °F)
VFF20-220P65	NTC20kΩ / 220 mm	
VFF20-300P65	NTC20kΩ / 300mm	

FEATURES

- **Fast response time**
- **Operating range of -20...+140 °C (with NTC10kΩ: -20… +110 °C)**
- **Easy installation**
- **Adjustable well length**
- **Stainless steel body material**

SPECIFICATIONS

Nominal value

VFF00 (PT1000)	1000 Ω at 0 °C
VFF10 (NTC10kΩ)	10 kΩ at 25 °C
VFF20 (NTC20kΩ)	20 kΩ at 25 °C

Accuracy

VFF00 (PT1000)	IEC751 Class B ±0.3 °C at 0 °C (32 °F)
VFF10 (NTC10kΩ)	±0.2 °C at 25 °C (77 °F)
VFF20 (NTC20kΩ)	±0.2 °C at 25 °C (77 °F)

Sensitivity

VFF00 (PT1000)	≈ 3.85 Ω / K
VFF10 (NTC10kΩ)	≈ -440 Ω / K at 25 °C (non-linear)
VFF20 (NTC20kΩ)	≈ -934.5 Ω / K at 25 °C (non-linear)

Response time τ_{63} < 2.5 seconds (using brass / stainless steel well)

Well

Pressure rating: PN16 (nominal)

Max. flow rate in water at 16 bar and < 140°C (VFF10: <110 °C)

75 mm length	8 m/s
220 mm length	1.5 m/s
300 mm length	0.5 m/s

Medium Mineral and synthetic oil, glycol-water mixture, domestic hot water, swimming pool water

Material Stainless steel, 1.4571

Dimensions ø 4 mm, length ~ 75/220/300 mm

Outlet size R1/2“

Tightening torque 10 ±2 Nm, 13-mm wrench

Cable

Length: 2.5 m

Protection class IP 65

ELECTRICAL CONNECTION

The wiring of the temperature sensor must be in accordance with the overall wiring circuit diagram. The terminals are not polarized; thus, even if the wires are connected in reverse, no malfunction will occur.

DIMENSIONS

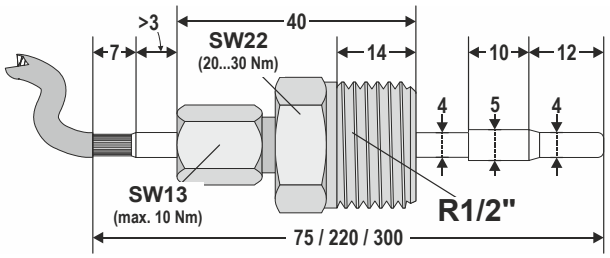

Fig. 1. Dimensions (in mm)

MOUNTING

NOTE: Do not dismount the device by pulling the connection cable – which is sheathed with silicone and therefore easily damaged by mechanical stress.

Screw the device into place with a max. torque of 10 ±2 Nm. The device should be inserted so that the tip is well past the laminar flow at the inner wall of the pipe (min. 25 mm) – ideally at the middle of the pipe, though this may result in excessive mechanical stress of the well in the event of high flow rates. See also Fig. 2 through Fig. 4.

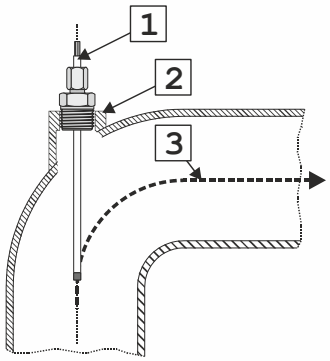

Fig. 2. ≤ DN50, elbow pipe

1. Temperature sensor (max. torque = 10 ±2 Nm)
2. Weld junction with the screw thread
3. Direction of flow

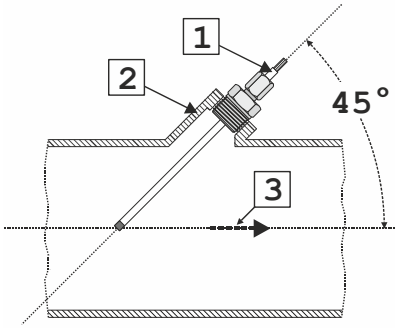

Fig. 3. ≤ DN50, straight pipe

1. Temperature sensor (max. torque = 10 ±2 Nm)
2. Weld junction with the screw thread
3. Direction of flow

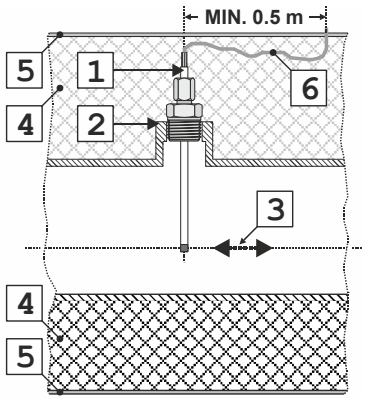

Fig. 4. DN65…150, coldwater application

1. Temperature sensor (max. torque = 10 ±2 Nm)
2. Weld junction with the screw thread
3. Flow in either direction
4. Insulation material
5. Water vapor barrier
6. Minimum 0.5 meter through insulation material before exit.

Honeywell

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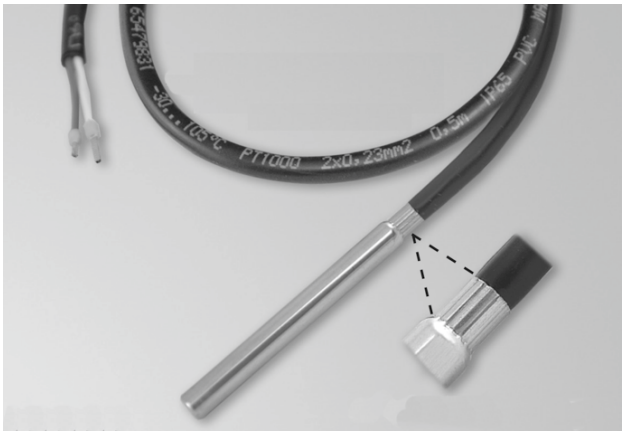
Honeywell

KTFxx

CABLE-TYPE BULB TEMPERATURE SENSORS

PRODUCT DATA



GENERAL

The KTFxx cable-type bulb temperature sensors can be used as strap-on sensors or immersion sensors.

The sensors can be employed for hot and cold water installations in systems using Pt1000, NTC 10k, or NTC 20k temperature sensing elements.

NOTE: Immersion well not included. For information on immersion well options, see VF Immersion Temperature Sensors – Product Data (Product Literature No.: EN0B-0724GE51).

FEATURES

- **Pt1000, NTC 10k, or NTC 20k temperature sensing element**
- **Stainless steel probes, IP65 rating**
- **High accuracy**

Models

OS no.	sensor type	description	temperature range
KTF00-65-2M	Pt1000	2-meter cable	-30…+105 °C (-22…+221 °F)
KTF10-65-2M	NTC 10k	2-meter cable	
KTF20-65-2M	NTC 20k	2-meter cable	
KTF10-65-2M-B	NTC 10k	2-meter cable, pack of 50	
KTF20-65-2M-B	NTC 20k	pack of 50 KTF20-65-2M	
KTF20-65-5M-B	NTC 20k	5-meter cable, pack of 50	
KTF00-65-2M-300	Pt1000	2-meter cable	-20…+260 °C (-4…+500 °F)

Accessory

When securing new sensors into old-style VFxx immersion wells, order the accessory VF-SPRING.

SPECIFICATION

Nominal value

Pt1000	1000 Ω at 0 °C (32 °F)
NTC 10k	10 kΩ at 25 °C (77 °F)
NTC 20k	20 kΩ at 25 °C (77 °F)

Accuracy

Pt1000 (IEC751 Class B)	±0.3 C at 0 °C (32 °F)
NTC 10k	±0.2 C at 25 °C (77 °F)
NTC 20k	±0.2 C at 25 °C (77 °F)

Sensitivity

Pt1000	≈ 3.85 Ω / K
NTC 10k	-440 Ω / K at 25 °C (non-linear)
NTC 20k	≈ -934.5 Ω / K at 25 °C (non-lin.)

Time constant

Immersion well appl.	< 30 sec

Sensor sleeve material	stainless steel (1.4571)
Cable sheath material	PVC (excepting the KTF00-65-2M-300, which has PTFE)
Electrical connection	2-m or 5-m cable, 2x0.22 mm^2
Ambient Limits (wiring box)	
Storage temperature	-30...+70 °C (-22…+158 °F)
Humidity	5…95% rh, non-condensing
Safety	IP65 as per EN 60529
Dimensions	see Fig. 1 on page 2

DIMENSIONS

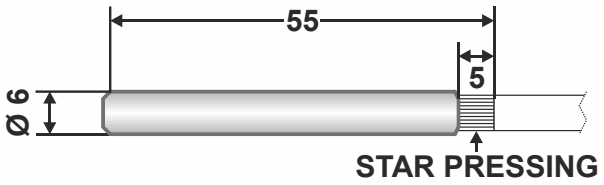


Fig. 1. Dimensions of the cable-type bulb sensor in mm

WIRING

wiring run	max. length
sensor to controller	200 m (660 ft)

Offset due to wire resistance per 10 m of distance from sensor to controller, when using the KTF00-65-2M (Pt1000):

type of wire	temperature offset Pt1000
0.5 mm^2 (AWG20)	0.18 °C (0.324 °F)
1.0 mm^2 (AWG17)	0.09 °C (0.162 °F)
1.5 mm^2 (AWG15)	0.06 °C (0.108 °F)

INSTALLATION

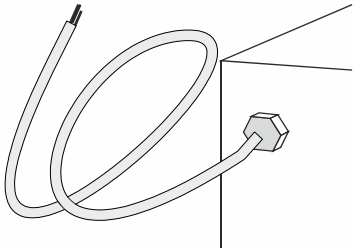


Fig. 2. Mounting into the immersion well

NOTE: Use shielded wiring in areas with high EMI. Keep 15 cm (5.9'') minimum distance between sensor lines and 230 Vac power lines.

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Honeywell

SF00, SF10, SF20

STRAP-ON TEMPERATURE SENSORS

PRODUCT DATA

GENERAL

The SF00, SF10, and SF20 Strap-On Temperature Sensors are used for temperature measurement on warm/hot water pipes or solar collectors.

The sensors are suitable for use in systems using Pt 1000, NTC 10k, or NTC 20k temperature sensing elements.

FEATURES

- **Pt 1000, NTC 10k, or NTC 20k temperature sensing element**
- **Wide sensing range**
- **High accuracy**

SPECIFICATION

Nominal value	
Pt 1000	1000 Ω at 0 °C (32 °F)
NTC 10k	10 kΩ at 25 °C (77 °F)
NTC 20k	20 kΩ at 25 °C (77 °F)
Accuracy	
Pt 1000 (IEC751 Class B)	±0.3 K at 0 °C (32 °F)
NTC 10k, NTC 20k	±0.2 K at 25 °C (77 °F)
Sensitivity	
Pt 1000	≈ 3.85 Ω / K
NTC 10k	-440 Ω / K at 25 °C (non-linear)
NTC 20k	≈ -934.5 Ω / K at 25 °C (non-linear)
Time constant	< 30 s
Electrical connection	
SF00/SF10/SF20	terminals for 2 x 1.5 mm² cable
Ambient limits (housing)	
Storage temperature	-30...+70 °C (-22…+158 °F)
Humidity	5…95% rh, non-condensing
Safety (terminal box)	
Protection class	IP54 / IP65 as per EN 60529
Flame retardant	UL94-V0 rated plastic enclosure T_{max} = 120 °C (enclosure)
Dimensions	See Fig. 1 on pg. 2

DIMENSIONS

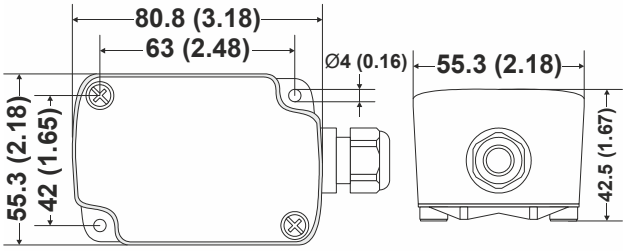

Fig. 1. Housing, dimensions in mm (inches)

MODELS

part	sensor type	operating temp.	IP rating
SF00-B54	Pt 1000	-30 … +110 °C (-22 … +230 °F)	IP54
SF00-B65	Pt 1000		IP65
SF10-B54	NTC 10kΩ		IP54
SF10-B65	NTC 10kΩ		IP65
SF20-B54	NTC 20kΩ		IP54
SF20-B65	NTC 20kΩ		IP65

INSTALLATION

wiring run	max. length
sensor to controller	200 m (660 ft)

Offset due to wire resistance per 10 m of distance from sensor to controller, when using the SF00-Bxx (Pt 1000):

type of wire	temperature offset Pt 1000
0.5 mm^2 (AWG20)	0.18 °C (0.324 °F)
1.0 mm^2 (AWG17)	0.09 °C (0.162 °F)
1.5 mm^2 (AWG15)	0.06 °C (0.108 °F)

NOTE: Use shielded wiring in areas with high EMI. Keep 15 cm (5.9'') minimum distance between sensor lines and 230 Vac power lines.

ELECTRICAL CONNECTION

The wiring of the temperature sensor must be in accordance with the overall wiring circuit diagram.

The terminals are not polarized. Thus, connecting the wires in reverse will not result in any malfunction.

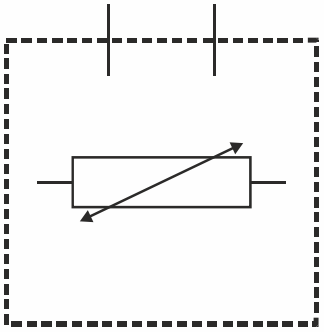

Fig. 2. SF00, SF10, SF20 wiring

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HSL-LS Series
Liquid Level Switch

Honeywell HSL-LS series liquid level switches are mainly used for water level control. Float ball level switch Built-in micro switch. Float ball generally is hanged above the water, when the liquid level rises and the float ball is immersed by the liquid and tilts, triggering the microswitch will trigger and send control signals.

Basic Parameters

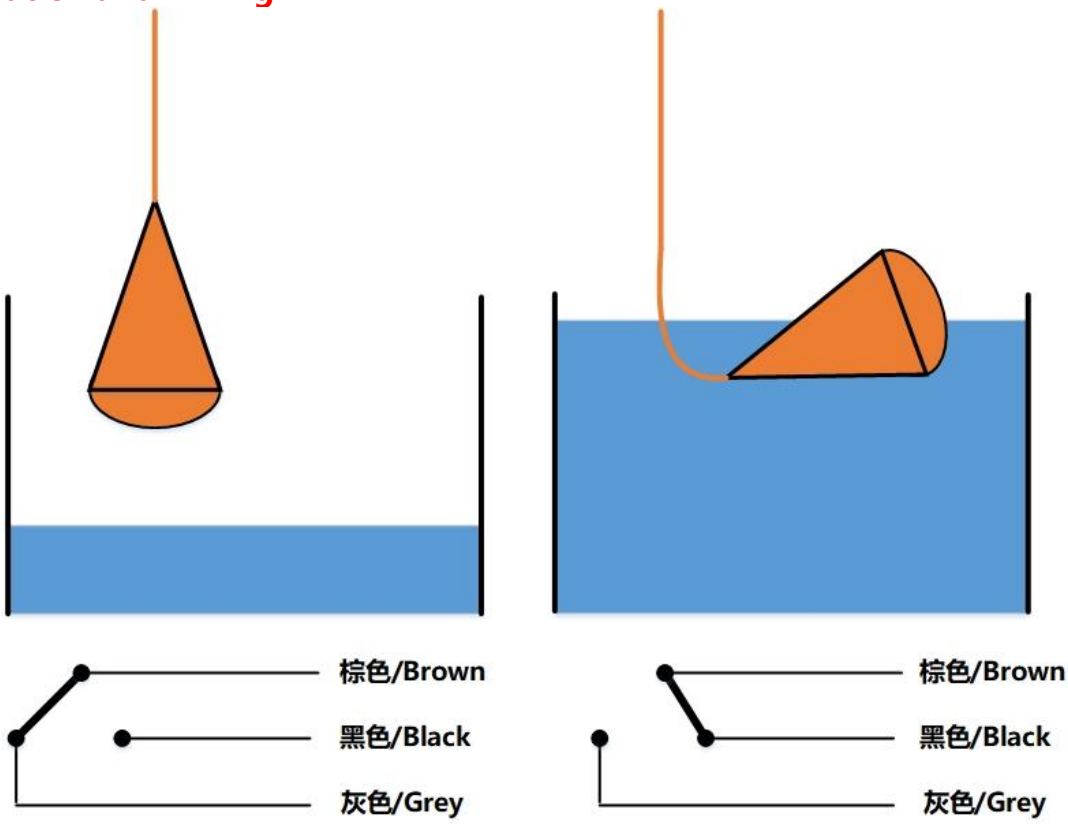
Medium type	Sewage, wastewater, liquid containing solid impurities, etc.
Medium temp.	Max 80℃
Medium density	950~1050 kg/m^3
IP rated	IP68
Switch capability	5 (3) A, 250V 5A for the resistive load; 3A for the inductive load
Storage temp.	0 ~ 40 ℃
Cable protective cover material	PVC
Cable gauge	3x0.5mm^2
Housing material	Polypropylene

Order Information and Technical Specification

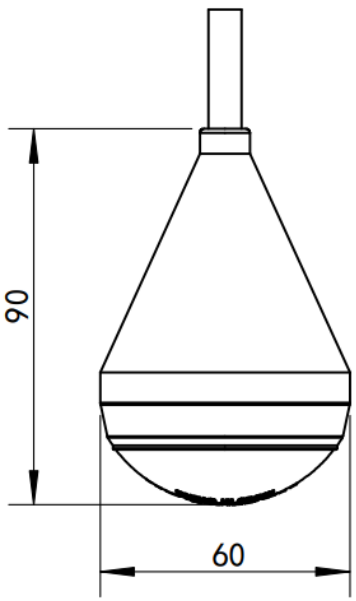
SKU	Cable length	Weight* (kg)
HSL-LS05	5m	0.34
HSL-LS10	10m	0.56
HSL-LS20	20m	1.00

* The real weight may be slightly different; table data is for reference only.

Installation and Wiring



Dimension (mm)



THE FUTURE IS WHAT WE MAKE IT

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Honeywell

HSCM Series
Carbon Monoxide Sensors

Honeywell HSCM series carbon monoxide sensors are mainly used to detect carbon monoxide concentration in indoor air where carbon monoxide is generated in parking lots and other places. The sensors can output analog signals and switching signals. and can also transmit detection data through the Modbus RTU protocol for ventilation control.

Features

- Use eco-friendly electrochemical carbon monoxide sensor.
- Optional display function, LCD digital display shows clearly.
- Optional alarm relay output, and the alarm concentration value can be set by dip switches.
- Multiple software and hardware protection design ensures high stability.
- Integrated RS485 terminal resistor to facilitate on-site debugging (Modbus models only).
- RS485 isolation design can isolate high voltage and enhance immunity to ground loops and common-mode signal interference (Modbus models only).

Order Information and Technical Specification

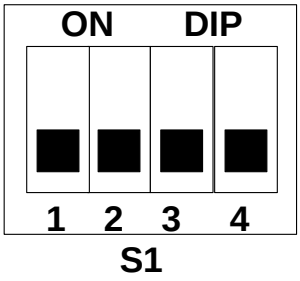
SKU	Measuring Range	Analog Output or Protocol	Display	Alarm Relay Output
HSCM-R100U	0-100PPM	0-10V/2-10V//4-20mA	NO	NO
HSCM-R100UL	0-100PPM	0-10V/2-10V//4-20mA	YES	NO
HSCM-R100US	0-100PPM	0-10V/2-10V//4-20mA	NO	YES
HSCM-R100ULS	0-100PPM	0-10V/2-10V//4-20mA	YES	YES
HSCM-R100M	0-100PPM	Modbus RTU	NO	NO
HSCM-R100ML	0-100PPM	Modbus RTU	YES	NO
HSCM-R400U	0-400PPM	0-10V/2-10V//4-20mA	NO	NO
HSCM-R400UL	0-400PPM	0-10V/2-10V//4-20mA	YES	NO
HSCM-R400US	0-400PPM	0-10V/2-10V//4-20mA	NO	YES
HSCM-R400ULS	0-400PPM	0-10V/2-10V//4-20mA	YES	YES
HSCM-R400M	0-400PPM	Modbus RTU	NO	NO
HSCM-R400ML	0-400PPM	Modbus RTU	YES	NO

Basic Parameters

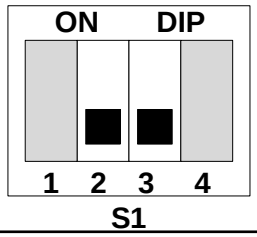
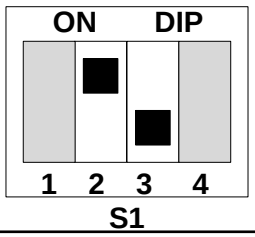
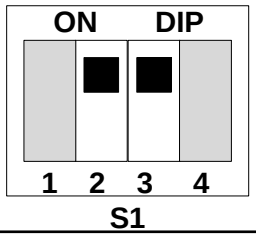
Sensing element	Eco-friendly electrochemical carbon monoxide sensor
Measuring Range	0 to 100PPM or 0 to 400PPM
Accuracy @ 25℃	±5PPM or ±5% of measuring value greater
Repeatability	±2%
Stability	≤ 5% / Year Signal attenuation
Zero Point Drift (Based on temperature)	≤±10PPM @ 0℃ to 50℃
Display Resolution	1PPM
Responding Time（T90）	No more than 45 Seconds
Power Supply	24VDC ±20%； 24VAC ± 20%， 50/60Hz Class 2/ SELV
Power Consumption	1VA MAX
Analog Output	0-10V, 2-10V, 4-20mA, select by DIP Setting
Analog Output Load	4-20mA： ≤500 Ω，Current Consumption≤ 20mA 0-10V/2-10V：≥5 KΩ，Current Consumption≤1mA
Analog Output Resolution	Modbus：1 PPM 0-10V/2-10V：25 mV 4-20mA：0.04mA
Alarm relay output settings	0-100PPM：25PPM，60PPM or 80PPM by DIP setting 0-400PPM：25PPM，60PPM or 150PPM by DIP setting The relay alarm output is off by default, and a DIP switch needs to be set to activate the relay alarm.. After the alarm is generated, the alarm will be cleared when the carbon monoxide concentration value is 9PPM (maximum value) or 3% below the set value.
Relay Specification	1x SPDT, 2A / 30 VDC，0.5A/125VAC Resistive load
Number of connected Modbus RTU devices	A maximum of 64 devices can be connected to a single network segment
Operation Environment	-20℃ to 50℃， 15% to 90% RH (Non-condensing)
Operation Atmospheric Pressure	0.9 to 1.1 times standard atmospheric pressure
Storage Environment	-20℃ to 50 ℃， 15% to 95% RH (Non-condensing)
Protection Standard	IP30 （GB4208/IEC60529）
Maximum Service Life	More than 7 years
Housing Materials	PC （UL94-V0）
Certification	CE（EN IEC 61326-1:2021); China RoHS

Function & DIP Setting

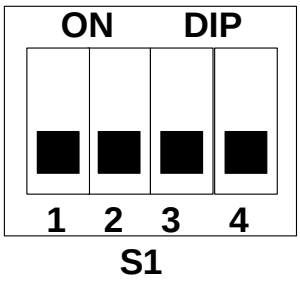
A. Analog Output Type



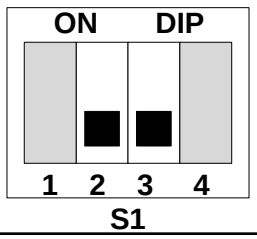
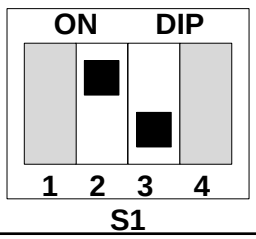
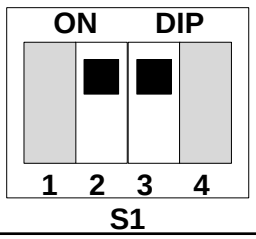
DIP No.	No. S1-1	Do.S1-2 & Do. S1-3	No. S1-4
Function	Calibration （Only for production process）	Analog output option	Reserved

Select analog output signal type: DIP No. S1-2 and No. S1-3			
DIPs Position			
Analog Output	4-20mA（Default）	0-10V	2-10V

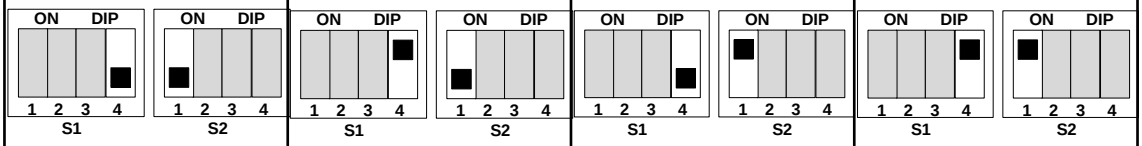
B. Analog and Alarm Relay Output Type



DIP No.	No. S1-1	Do.S1-2 & Do. S1-3	No. S1-4 & No. S2-1	No. S2-2 to No. S2-4
Function	Calibration (Only for production process)	Analog output option	Set carbon monoxide concentration alarm value	Reserved

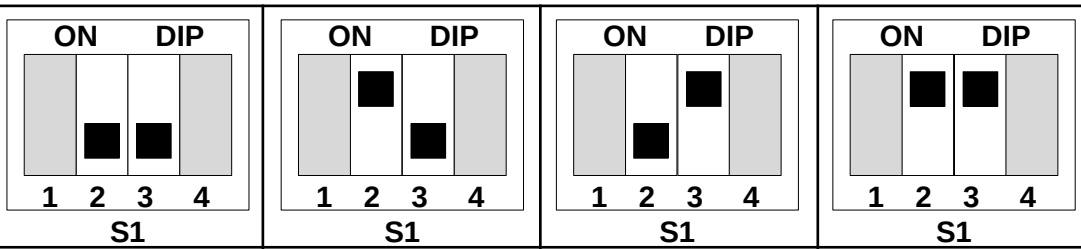
Select analog output signal type: DIP No. S1-2 and No. S1-3			
DIPs Position			
Analog Output	4-20mA（Default）	0-10V	2-10V

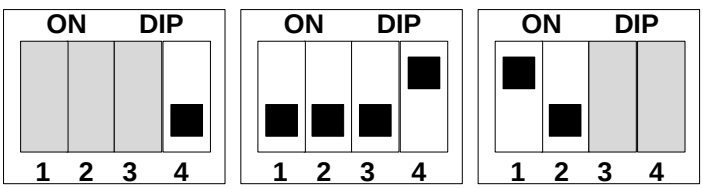
Function & DIP Setting

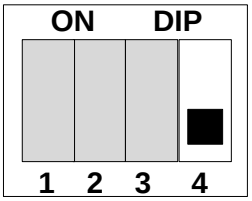
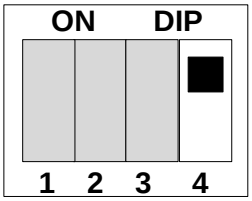
Set carbon monoxide concentration alarm value：DIP NO. S1-4 and No. S2-1				
DIP Position				
0 to 100PPM	Disable（Default）	25PPM	60PPM	80PPM
0 to 400PPM	Disable（Default）	25PPM	60PPM	150PPM

C. Modbus Communication Type

DIP No.	No. S1-1	No. S1-2 & No. S1-3	No. S1-4 to No.S3-2	No. S3-3	No. S3-4
Function	Calibration (Only for production process)	Modbus Baud Rate	Modbus Address	Reserved	RS485 Terminal Resistor

Set Modbus Baud Rate：DIP No.S1-2 and No. S1-3				
DIPs Position				
Baud Rate	9600（Default）	4800	19200	38400

Set Modbus address: DIP No. S1-4 to No. S3-2	
DIPs Position	
How to set Modbus address	1. DIPs No. S1-4 to No. S3-2 represent 1, 2, 4, 8, 16, 32 and 64 respectively. 2. DIPs up to indicate selected number 3. The sum of the selected numbers is the Modbus address code. As shown in the picture above: DIP No. S2-4 and No. S3-1 are selected, 16+32=48, so the address code setting value is 48.

Set the mode of RS485 terminal resistor: DIP No.S3-4		
DIP Position		
Mode	Enable (Default)	Disable

Modbus RTU Protocol

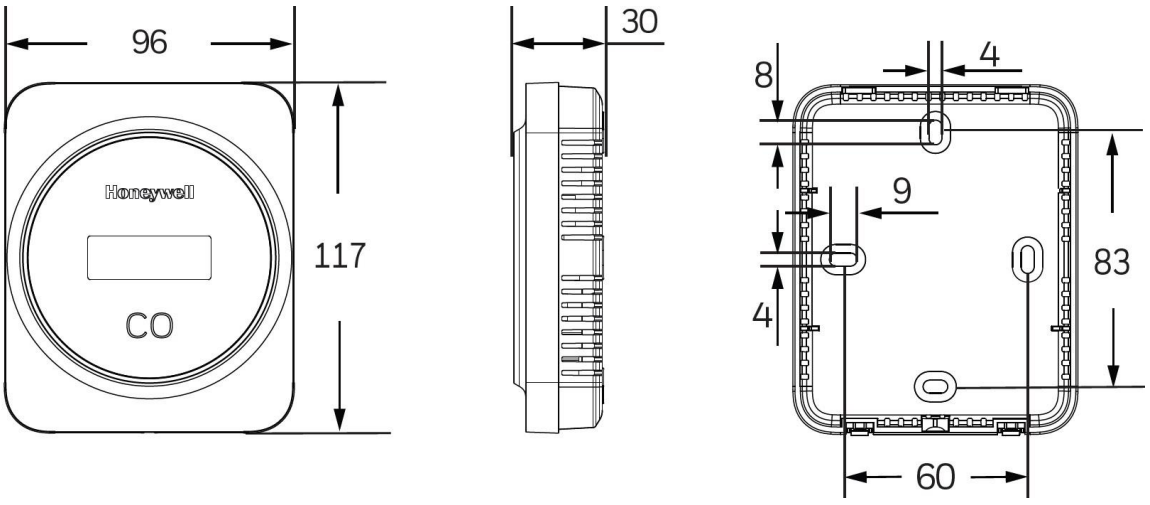
Register Address Information

ID	ID function	Function	Qty.	Readable（R）/Writable（W）	Data Type
0x01	Gas Concentration	Current gas concentration Unit: PPM	1	R	short
0x02	Reserved		1	R	short
0x03	Reserved		1	R	short
0x04	Reserved		1	R	short
0x05	Reserved		1	R	short
0x06	Reserved		1	R	short
0x07	Reserved		1	R	short
0x08	Running time	Unit: day	1	R	short
0x09	Error Code	0=Normal； 2=System Error	1	R	short

Function Code Information

Code	Function	Error Code	Exception Code
0x03	Read holding register	0x83	01 or 02 or 03
0x06	Write single register	0x86	01 or 02 or 03
0x10	Write Multiple Registers	0x90	01 or 02 or 03

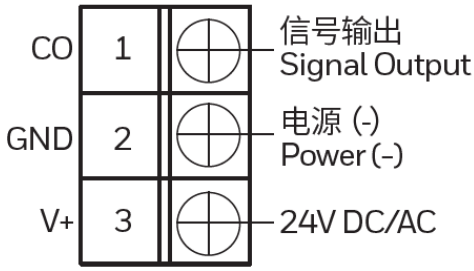
Dimension (mm)



Wiring diagrams and instructions

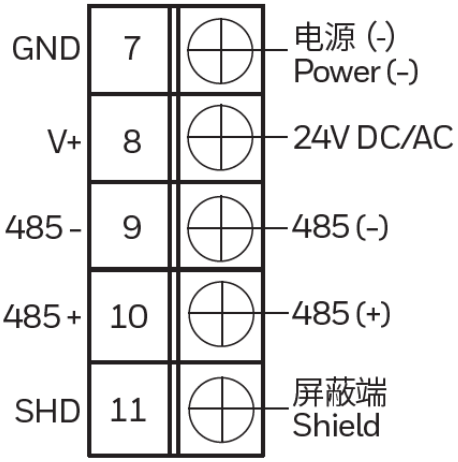
0-10V/2-10/4-20mA Analog Output Type

SKU
HSCM-R100U
HSCM-R100UL
HSCM-R400U
HSCM-R400UL



Modbus Communication Type

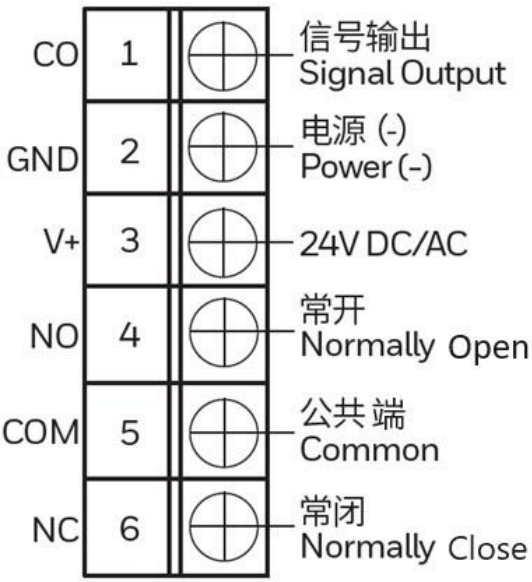
SKU
HSCM-R100M
HSCM-R100ML
HSCM-R400M
HSCM-R400ML



Analog and Alarm Relay Output Type

SKU
HSCM-R100US
HSCM-R100ULS
HSCM-R400US
HSCM-R400ULS

Tip： When the alarm is output, the NO point is turned on.



Tips:
1. The terminals support AWG15 to AWG22 line types.
2. The maximum lengths of different conductors are as follows.

Line Type	AWG15	AWG16	AWG17	AWG18	AWG20	AWG22
Max length	300 Meters	300 Meters	150 Meters	150 Meters	150 Meters	50 Meters

3. RS485 wiring requires a shielded cable with a maximum allowable length of 1200 meters.

Installation, Application and Responsibility Statement

1. Please read the sensor installation instructions carefully before installing and commissioning the device. Operation and application not in accordance with installation instructions may result in product failure and damage. Please comply with local laws, health and safety regulations, technical standards and regulations.
2. It is prohibited to be used in explosive or hazardous environments, prohibited to be used in flammable or flammable gas environments, and prohibited to be used as a safety or emergency stop device. Improper application may cause personal injury and loss.
3. Pay attention to anti-static during installation.
4. Carbon monoxide sensors should be installed at a reasonable height and meet relevant regulatory requirements. Do not install the sensor near doors, windows, air outlets or other known air disturbances. Avoid areas with vibration or rapid temperature changes.
5. RS485 communication lines need to be shielded wires. Do not place communication lines and cables in the same pipe. Please disconnect the power supply before making any connections to prevent electrical faults, electric shock or equipment damage. Make all connections in accordance with national and local codes.
6. When connecting multiple devices, pay attention to the polarity of the power supply to avoid damage to the devices.
7. The sensor is a precision device. If the transportation conditions are poor or the installation is improper, the sensor components may be permanently damaged and the accuracy cannot be guaranteed.
8. For applications that require higher sensor accuracy, be sure to calibrate regularly. It is recommended to recalibrate every 6 to 12 months.
9. For use beyond the technical specifications marked on this product, please consult Honeywell. Honeywell assumes no liability for damages resulting from incorrect application of its products.
10. The carbon monoxide sensor will be interfered by the gas below and affect the measurement accuracy, so it needs to be paid attention to in the application.

interfering gas	Test concentration（PPM)	Equivalent reading value
Carbon monoxide	100	100
Hydrogen	500	200
Methane	5000	0
Iso-butane	2500	0
Carbon dioxide	5000	0
Carbon di-sulfide	25	0
Hydrogen sulfide	10	0
Nitric oxide	30	0
Nitrogen dioxide	30	<30
Ammonia	100	0
Ethyl acetate	200	0
Heptane	500	0
Ethanol	2000	<30 （Exposure time is 30 minutes）
Hexa-methyl di-siloxan	10	0 (Exposure time is 40 minutes）

Honeywell Building Technologies
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THE FUTURE IS WHAT WE MAKE IT

Honeywell

HSH-E series

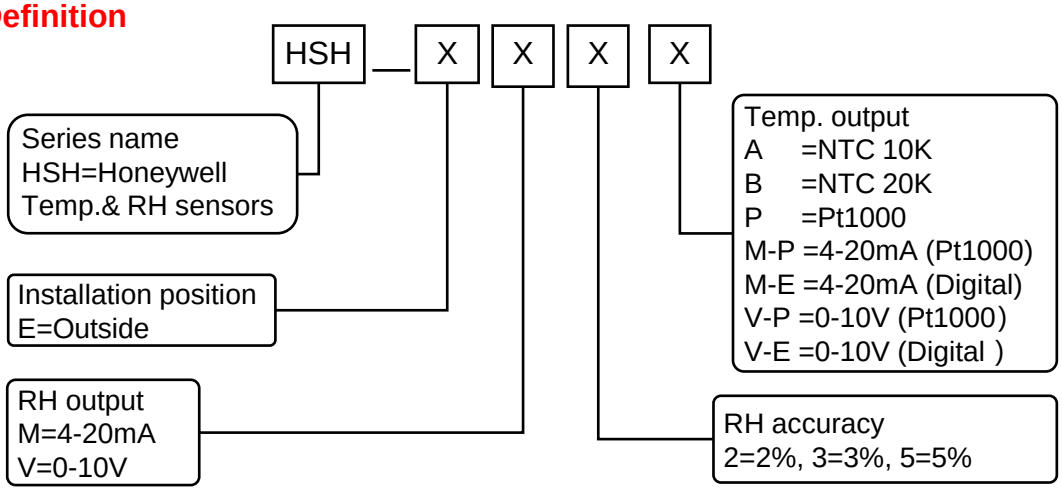
Outside Temp. & Relative Humidity Sensors

Honeywell HSH-E series Outside temperature & relative humidity sensors are applied to measure the outside air temperature and relative humidity. The HSH-E series outside temperature & relative humidity sensors have a variety of control signal outputs and can be compatible with a variety of automatic control systems.

Basic Parameters

Measuring Temp. Range		-40 ~ 60 ℃
Working Environment		-40~60℃, 0~95%RH (Non condensation)
Humidity Accuracy @ 25℃ and 24VDC	2%	20~80%：±2%； 0-95%：±3%
	3%	20~80%：±3%；0-95%：±5%
	5%	20~80%：±5%； 0-95%：±9%
Power Supply	0-10V	24 VDC/24VAC±20%
	4-20mA	24 VDC ±20%
IP Rated		IP65
Wire conduct Diameter		0.33~1.65mm^2
Storage Temp.		-40 ~ 70 ℃
Housing Material		PC （Fire rating：UL94-V0)
Certification		EN IEC 61000-6-3:2021, EN IEC 61000-6-2:2019 EN IEC 60730-1:2016+A1, EN IEC 60730-2-9:2019+A1

Definition



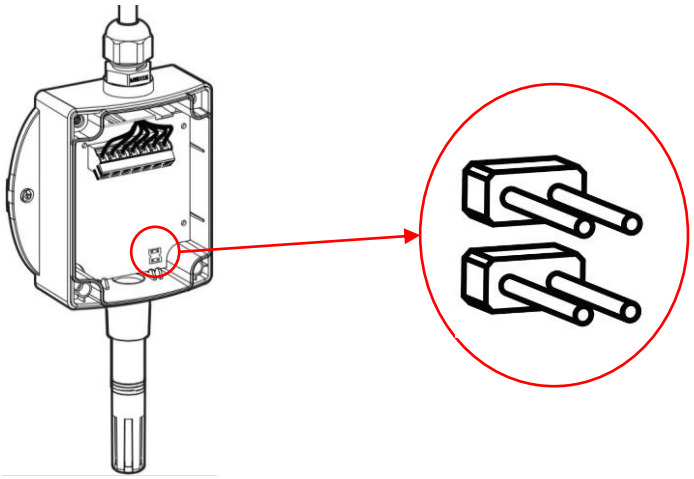
Order information and Technical Specification

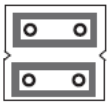
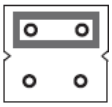
SKU	RH Output	RH accuracy	Temp. Output	Temp. sensor element type	Temp. Accuracy*
HSH-EM2A	4~20mA	2%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-EM2B	4~20mA	2%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-EM2P	4~20mA	2%	Resistance Value	PT1000	0.2K @ 0℃
HSH-EM2M-P	4~20mA	2%	4~20mA	PT1000	0.3K @ 25℃
HSH-EM2M-E	4~20mA	2%	4~20mA	Digital**	0.3K @ 25℃
HSH-EM3A	4~20mA	3%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-EM3B	4~20mA	3%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-EM3P	4~20mA	3%	Resistance Value	PT1000	0.2K @ 0℃
HSH-EM3M-P	4~20mA	3%	4~20mA	PT1000	0.3K @ 25℃
HSH-EM3M-E	4~20mA	3%	4~20mA	Digital	0.3K @ 25℃
HSH-EM5A	4~20mA	5%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-EM5B	4~20mA	5%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-EM5P	4~20mA	5%	Resistance Value	PT1000	0.2K @ 0℃
HSH-EM5M-P	4~20mA	5%	4~20mA	PT1000	0.3K @ 25℃
HSH-EM5M-E	4~20mA	5%	4~20mA	Digital	0.3K @ 25℃
HSH-EV2A	0~10V	2%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-EV2B	0~10V	2%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-EV2P	0~10V	2%	Resistance Value	PT1000	0.2K @ 0℃
HSH-EV2V-P	0~10V	2%	0-10V	PT1000	0.3K @ 25℃
HSH-EV2V-E	0~10V	2%	0-10V	Digital	0.3K @ 25℃
HSH-EV3A	0~10V	3%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-EV3B	0~10V	3%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-EV3P	0~10V	3%	Resistance Value	PT1000	0.2K @ 0℃
HSH-EV3V-P	0~10V	3%	0-10V	PT1000	0.3K @ 25℃
HSH-EV3V-E	0~10V	3%	0-10V	Digital	0.3K @ 25℃
HSH-EV5A	0~10V	5%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-EV5B	0~10V	5%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-EV5P	0~10V	5%	Resistance Value	PT1000	0.2K @ 0℃
HSH-EV5V-P	0~10V	5%	0-10V	PT1000	0.3K @ 25℃
HSH-EV5V-E	0~10V	5%	0-10V	Digital	0.3K @ 25℃

* 1. For the passive output type sensors, the temperature accuracy is the sensing element temperature accuracy. For the current and voltage signal output type sensors, the temperature accuracy is the transmitter accuracy when the power supply is 24VDC.
* 2. The temperature accuracy in the table above is the accuracy of the specified temperature point.
** Temperature sensor element type is **Digital** refers to the sensor type is PN junction type digital temperature sensing element, **Digita**l is for short.

Temperature range setting and Wiring diagrams

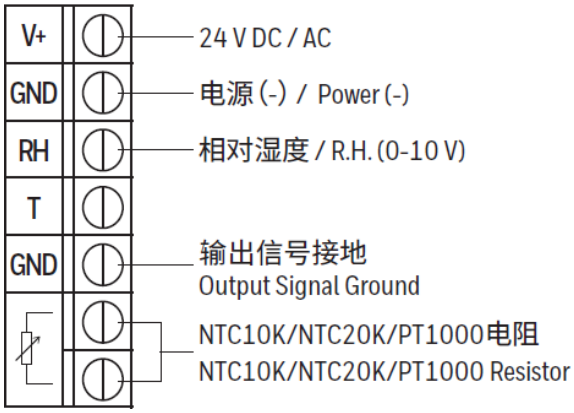
1. Measure Temperature range setting (only for 0-10V and 4-20mA output)



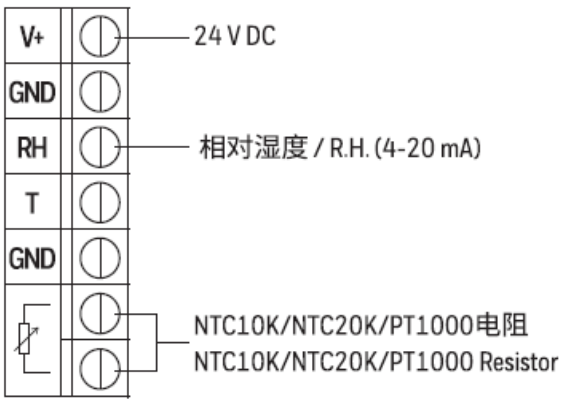
Jumper	Temp. Range
	-40℃ ~ 60 ℃ (default)
	-20℃ ~ 50 ℃
	0℃ ~ 50 ℃

2. Wiring Diagrams: Wiring according to the wiring diagram corresponding to the model.

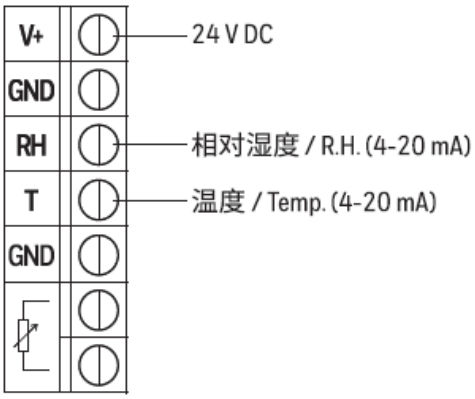
SKU
HSH-EV2A
HSH-EV2B
HSH-EV2P
HSH-EV3A
HSH-EV3B
HSH-EV3P
HSH-EV5A
HSH-EV5B
HSH-EV5P



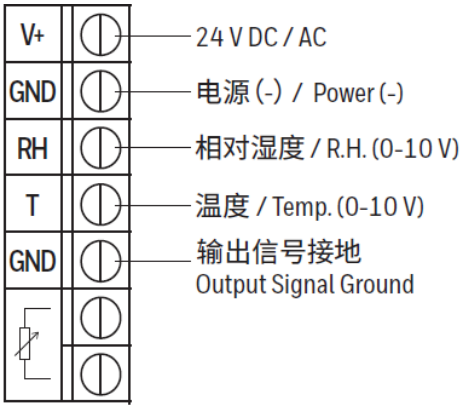
SKU
HSH-EM2A
HSH-EM2B
HSH-EM2P
HSH-EM3A
HSH-EM3B
HSH-EM3P
HSH-EM5A
HSH-EM5B
HSH-EM5P



SKU
HSH-EM2M-X
HSH-EM3M-X
HSH-EM5M-X



SKU
HSH-EV2V-X
HSH-EV3V-X
HSH-EV5V-X

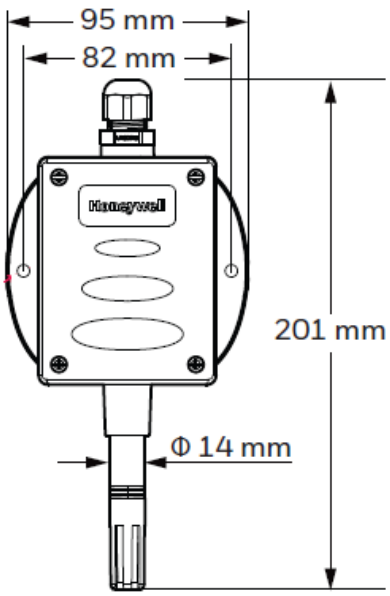


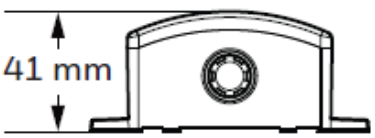
Tips:

1. Connection terminals are suitable for AWG15~22.
2. Due to the influence of wire resistance, the length of the cable between the sensor and the controller will cause the temperature drift. The details are as follows.

Wire gauge	permissible cable length	PT1000 Temp. drift every 10 meters cable	NTC10K / NTC20K Temperature shift
AWG 22	50m	0.272K	Negligible
AWG 20	150m	0.173K	
AWG 18	150m	0.109K	
AWG 17	150m	0.086K	
AWG 16	300m	0.069K	
AWG 15	300m	0.054K	

Dimension





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Service Hotline: 400-842-8487

THE FUTURE IS WHAT WE MAKE IT

Honeywell

HSDP-W Series

Liquid Differential Pressure Transmitters

Honeywell HSDP-W Series Liquid Differential Pressure Transmitters are mainly used for the measurement of liquid pressure. The sensitive element of the liquid differential pressure transmitters is a solid piezoresistive sensitive chip, and the part in contact with the measured liquid is the corrugated diaphragm on both sides of the transmitters, and the space between the sensitive chip and the corrugated diaphragm is filled with silicone oil. The measured differential pressure acts on the corrugated diaphragm and is transmitted to the sensitive chip through silicone oil. Using the piezoresistive effect of semiconductor silicon materials, the conversion of differential pressure and electrical signals is realized. Since the output signal of the Wheatstone bridge on the sensitive chip has a good linear relationship with the differential pressure, accurate measurement of the measured differential pressure can be realized.

Features

- Using temperature compensation and high temperature screening to achieve stable and reliable performance.
- Fully sealed structure by laser welding.
- Various control signal outputs (0-10V, 4-20mA, Modbus RTU)
- 1-meter extension cable for easy wiring

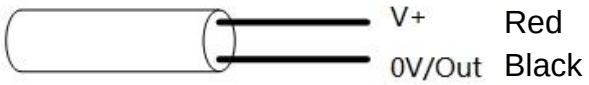
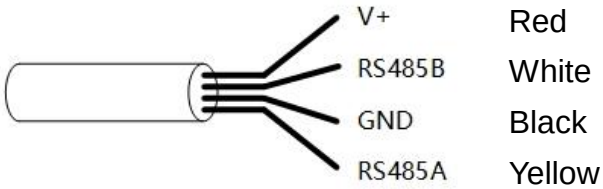
Basic Parameters

SKU Group	HSDP-WxxxxA HSDP-WxxxxV	HSDP-WxxxxM	HSDP-WxxxxAL
Output Signal /Protocol	HSDP-WxxxxA:4-20mA HSDP-WxxxxV:0-10V	Modbus RTU	4-20mA
Sensor Type	Piezoresistive Differential Pressure Sensor		
Operation mode	**Only Positive sensing is allowed** (positive sensing means high pressure side pressure is greater than low pressure side pressure) **Negative sensing is not allowed** (Negative sensing means high pressure side pressure lower than low pressure side pressure)		
Accuracy	Full Scale(FS) > 200 kPa: ±0.25%FS Full Scale(FS) ≤ 200 kPa: ±0.5%FS （This accuracy is met within the compensation temperature）		
Stability	±0.2%F.S / Year （Full Scale > 200 kPa） ±0.5%F.S / Year （Full Scale ≤ 200 kPa）		
Compensation Temperature Range	-10℃ to 60 ℃	-10℃ to 70 ℃	-10℃ to 60 ℃
Reaction Time	50ms	200ms	50ms
Overload Pressure	Positive sensing: ≤ 2 x FS Negative sensing is not allowed		
Rupture Pressure	Positive sensing: ≤ 3 x FS Negative sensing: < 200kPa		
Single side Max Static Pressure	≤20MPa		
Static Pressure Impact	± 0.05% F.S / 100kPa		
Applicable Medium	Cold & Hot water or glycol solution with a maximum concentration of 50%, incombustible gas		
Medium Temp.	-20℃ to 70℃	-20℃ to 70℃	-20℃ to 80℃
Operation Temp.	-20℃ to 70℃	-20℃ to 70℃	-20℃ to 80℃
Storage Temp.	-20℃ to 85℃	-20℃ to 85℃	-20℃ to 85℃
Power Supply	12V to 28V DC(4-20mA) 15V to 28V DC(0-10VDC)	3.6V to 28VDC	16V to 28V DC
Connection	Female thread G1/4		
Protection standard	IP68 (EN 60529)	IP68 (EN 60529)	IP65 (EN 60529)
Wiring	Lead Wire:1m (Φ7.4mm cable)	Lead Wire:1m (Φ7.4mm cable)	Hersman Joint With 1 meter cable (Φ6mm cable)
Certification	CE (EN 61000-6-2: 2005, EN 61000-6-4: 2007+A1: 2011) RoHS		
Materials	Housing : SS304 Sensing diaphragm : 316L Cable : PEC O-ring sealing : FPM		Housing : SS304 Sensing diaphragm : 316L Cable : PUR O-ring sealing : FPM LED housing : ABS

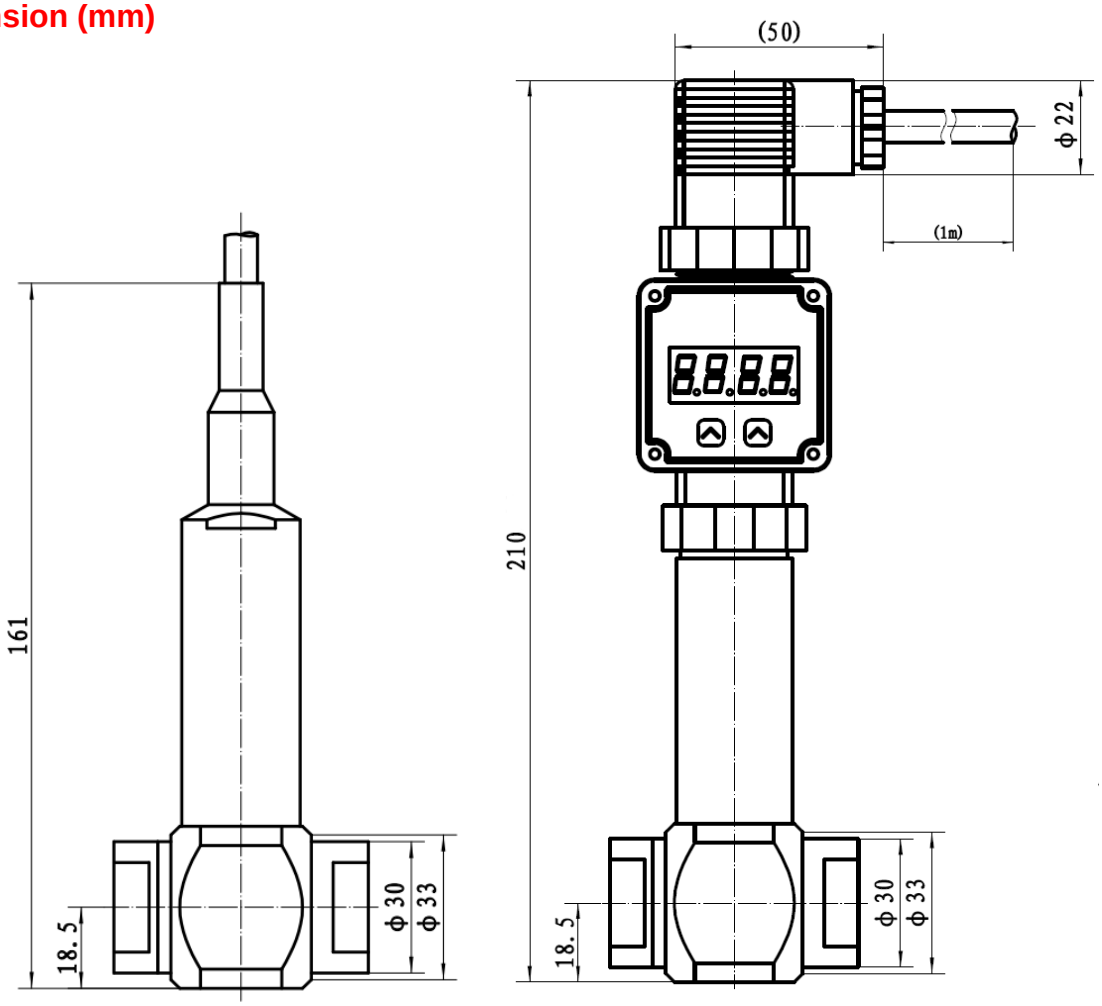
Order Information and Technical Specification

SKU	Full Scale	Output Signal /Protocol	Display Option
HSDP-W0035A	0 to 35kPa	4-20mA	NO
HSDP-W0070A	0 to 70kPa	4-20mA	NO
HSDP-W0100A	0 to 100kPa	4-20mA	NO
HSDP-W0200A	0 to 200kPa	4-20mA	NO
HSDP-W0350A	0 to 350kPa	4-20mA	NO
HSDP-W0700A	0 to 700kPa	4-20mA	NO
HSDP-W1000A	0 to 1000kPa	4-20mA	NO
HSDP-W2000A	0 to 2000kPa	4-20mA	NO
HSDP-W3500A	0 to 3500kPa	4-20mA	NO
HSDP-W0035V	0 to 35kPa	0-10V	NO
HSDP-W0070V	0 to 70kPa	0-10V	NO
HSDP-W0100V	0 to 100kPa	0-10V	NO
HSDP-W0200V	0 to 200kPa	0-10V	NO
HSDP-W0350V	0 to 350kPa	0-10V	NO
HSDP-W0700V	0 to 700kPa	0-10V	NO
HSDP-W1000V	0 to 1000kPa	0-10V	NO
HSDP-W2000V	0 to 2000kPa	0-10V	NO
HSDP-W3500V	0 to 3500kPa	0-10V	NO
HSDP-W0035AL	0 to 35kPa	4-20mA	YES
HSDP-W0070AL	0 to 70kPa	4-20mA	YES
HSDP-W0100AL	0 to 100kPa	4-20mA	YES
HSDP-W0200AL	0 to 200kPa	4-20mA	YES
HSDP-W0350AL	0 to 350kPa	4-20mA	YES
HSDP-W0700AL	0 to 700kPa	4-20mA	YES
HSDP-W1000AL	0 to 1000kPa	4-20mA	YES
HSDP-W2000AL	0 to 2000kPa	4-20mA	YES
HSDP-W3500AL	0 to 3500kPa	4-20mA	YES
HSDP-W0035M	0 to 35kPa	Modbus	NO
HSDP-W0070M	0 to 70kPa	Modbus	NO
HSDP-W0100M	0 to 100kPa	Modbus	NO
HSDP-W0200M	0 to 200kPa	Modbus	NO
HSDP-W0350M	0 to 350kPa	Modbus	NO
HSDP-W0700M	0 to 700kPa	Modbus	NO
HSDP-W1000M	0 to 1000kPa	Modbus	NO
HSDP-W2000M	0 to 2000kPa	Modbus	NO
HSDP-W3500M	0 to 3500kPa	Modbus	NO

Wiring

Output Signal/Protocol	Wiring diagrams
4-20mA	
0-10V	
Modbus RTU	

Dimension (mm)



THE FUTURE IS WHAT WE MAKE IT

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HSFT Series

Frost Protection Thermostat

Honeywell HSFT series frost protection thermostat consists of a gas-filled temperature sensing bulb with long coil and function body of setting and controlling. When the temperature detected by the temperature sensing is higher (or lower) than the set temperature, the body outputs a on/off control signal. The on/off control signal can be used to control switch equipment, including solenoid valves, electric valves, audible and visual alarm equipment, etc. .

Features

- High control accuracy and small minimum temperature difference;
- Long mechanical life and strong vibration resistance;
- Wide operating environment temperature for various applications;
- Easy operation and easy installation.

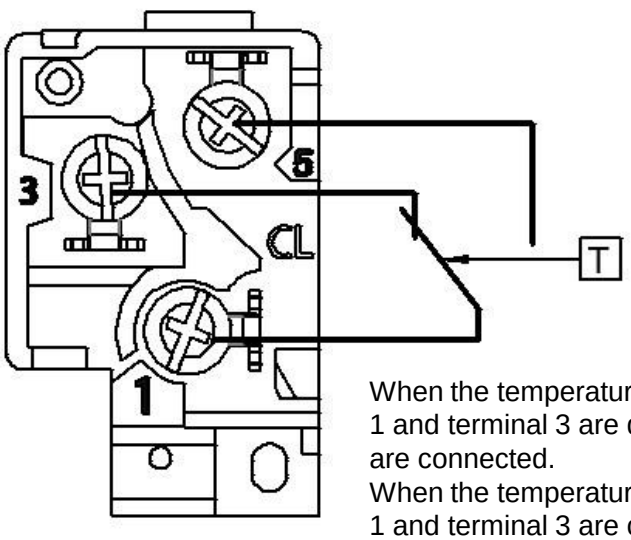
Order Information and Technical Specification

SKU	Length of coil	Weight
HSFT-180A	1.8 meters	630g
HSFT-300A	3.0 meters	673g
HSFT-600A	6.0 meters	778g

Basic Parameters

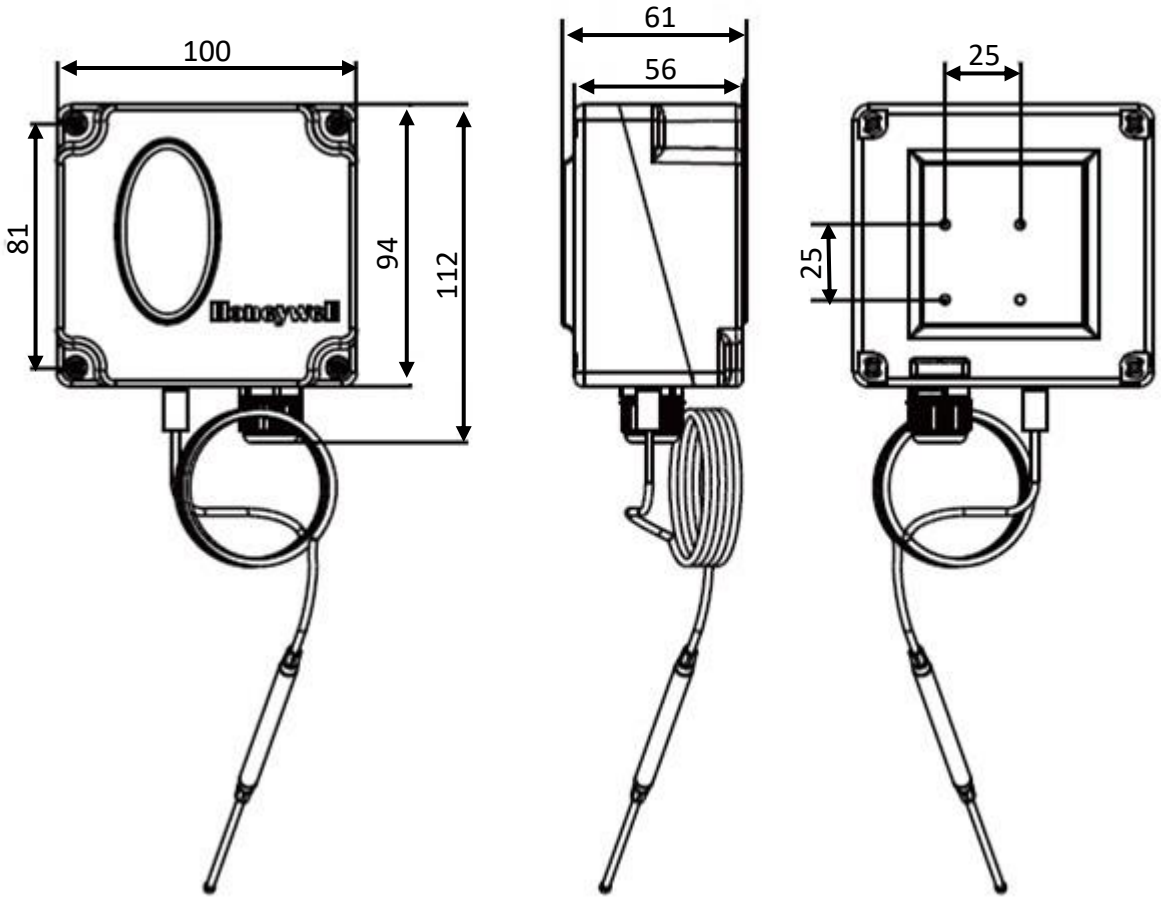
Reset	Automatic
Switch Type	SPDT
Switch Capacity	5VAC to 240VAC， 16A
Set Temp. Range	-10 ℃ to 10 ℃
Min Temp. Set Scale	1 K
Temp. Differential	2 K
Repetitive Error	1.5 K
Operation Environment	- 30℃ to 55 ℃， 0 to 95% RH （Noncondensing）
Max Overload Temp	120℃ （Up to an hour）
Storage Environment	- 30℃ to 60 ℃， 0 to 95% RH （Noncondensing）
Protection Standard	IP65
Housing Material	ABS（UL94-V0）
Wiring Terminal	Screw terminals for cables of less than 2.5mm²
Wiring Hole	M16x1.5 for three-core cable of ф 5 to ф10 mm

Wiring diagrams and instructions



When the temperature drops to the set low temperature, terminal 1 and terminal 3 are disconnected, and terminal 1 and terminal 5 are connected.
When the temperature rises to the set high temperature, terminal 1 and terminal 3 are connected, and terminal 1 and terminal 5 are disconnected.

Dimension (mm)



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AQS-KAM-xx, AQS 71-KAM-T, AQS-KAM-RH-V

CO2 TEMPERATURE HUMIDITY TRANSMITTERS

PRODUCT DATA & INSTALLATION INSTRUCTIONS

FEATURES

- **Calibration-free technology**
- **Outstanding long-term stability**
- **Maintenance free**
- **universal mounting flange**

GENERAL

The AQS Temperature Transmitters set new standards in CO_2 measurements in HVAC applications. Operation is based on the infrared principle. A calibration-free procedure compensates for aging of the infrared source and ensures outstanding long-term stability. The AQS provide 0…10 V analog output for CO_2 and temperature and are designed for HVAC applications (contact Honeywell for special applications). They are suitable for direct wiring with universal and voltage-controlled inputs. Additionally, the AQS-KAM-xx Temperature Transmitters feature a built-in passive temperature sensor. The AQS-KAM-RH-V Temperature Sensor is equipped with a relative humidity sensor. See also following table.

Table 1. List of devices

OS number	CO2 + temp. output	temp. output (passive)	rel. humidity output
AQS-KAM-00	0…10 V	Pt1000	--
AQS-KAM-01		Ni1000	--
AQS-KAM-10		NTC10kΩ	--
AQS-KAM-20		NTC20kΩ	--
AQS 71-KAM-T		--	--
AQS-KAM-RH-V		--	0…10 V

NOTE: Avoid strong mechanical stress and improper handling. The cable gland and housing cover must be screwed tightly against gas penetration, to avoid incorrect measurements.

SPECIFICATION

Power supply	24 Vac, ±20% (SELV) 15…35 Vdc
Power consumption	0.6 W
Max. current consumption	0.35 A (0.3 sec / 15 sec)
Ambient Limits	
Operating temperature	-20...+60 °C (-4...+140 °F)
Transport and storage	-20...+60 °C (-4...+140 °F)
Humidity	0...95% rh, non-condensing
Safety	
Protection class	III as per EN 60730-1
Protection standard	Housing IP65 as per EN60529 Probe IP20
Housing material	Flame retardant V0 as per UL94
Housing	plastic (PC)
Dimensions	see Fig. 1 on page 3
Mounting	duct, M16x1,5 cable inlet
CO_2 Sensor	
Output signal	0…10 V
Output current	-1 mA < I_L < 1 mA
Output scaling	0…10 V = 0…2000 ppm CO_2
Accuracy (CO_2 at 25°C [77°F], 1013 mbar)	0…2000 ppm < ± (50 ppm +2% of measured value)
Temperature stability:	typ. ± (1 + CO_2 conc. [ppm] / 1000) ppm / K (-20 … +45 °C)
Response time	τ_{63} < 100 sec at 3 m/s
Warm-up time	< 5 min
Temperature	
Output signal	0…10 V
Output Current	-1 mA < I_L < 1 mA
Output scaling	0…10 V = 0…50 °C
Accuracy (20 °C [68 °F])	± 0.3 K
Response time	τ_{63} < 50 sec. at 3 m/s
AQS-KAM-RH-V	τ_{63} < 60 sec. at 3 m/s

Table 2. Troubleshooting

Error	Possible cause	Remedies
Unrealistic results	Skewed installation	Air inlet and probe tip must be perpendicular to air flow.
	Low air velocity	Air velocity must be > 1 m/sec (200 ft/min).
	Housing not tight	Seal cover and gland tightly.
Long response time	Contamination of sensor or probe	Check sensor and probe for soiling and clean, as necessary.

Passive Temp. Sensors (AQS-KAM-xx)

Output	2-wire
Wire resistance (typ.)	0.4 Ω (terminal-sensor)

NTC10kΩ

Nominal value	10kΩ ±0.5% at 25 °C
Accuracy	±0.2 °C at 25 °C
Response time (typ.)	t_{63} < 120 s at 3 m/s air velocity
Sensitivity (typ.)	-440 Ω / K at 25 °C (non-linear)

NTC20kΩ

Nominal value	20kΩ ±0.5% at 25 °C
Accuracy	±0.2 °C at 25 °C
Characteristic	NTC20kΩ (see EN0B-0476GE51)
Response time (typ.)	t_{63} < 120 s at 3 m/s air velocity
Sensitivity (typ.)	≈ -934.5 Ω / K at 25 °C (non-linear)

Ni1000

Nominal value	1000 Ω at 0 °C
Accuracy	±0.4 °C at 0 °C
Characteristic	DIN 43760
Sensitivity (typ.)	≈ 6.18 Ω / K

Pt1000

Nominal value	1000 Ω at 0 °C
Accuracy (IEC751 Cl. B)	0.3 + 0.005*|t| at 0 °C
Characteristic	see EN0B-0476GE51
Sensitivity (typ.)	≈ 3.85 Ω / K

Relative humidity (AQS-KAM-RH-V)

Working range	0…95% RH, non-condensing
Output	0…10 V prop. to 0…100% RH
Accuracy at 20 °C	typ. ±2% RH, max. ±3% RH in range of 20…80% RH

NOTE: Temperature / relative humidity / CO_2 accuracy may differ, depending on various environmental conditions (e.g., air velocity or temperature difference between the air temperature and the ambient temperature).

WIRING

wiring run	maximum length
sensor to controller	200 m (660 ft)

NOTE: Installation of the sensor near high EMI-emitting devices may lead to faulty measurements.
Use shielded wiring in areas with high EMI.
Keep 15 cm (5.9") min. distance between sensor lines and 230 Vac power lines.
Use two transformers: one for sensors and actuators and one for the controller.

DIMENSIONS

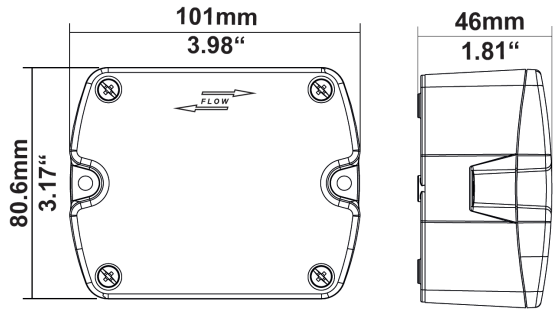
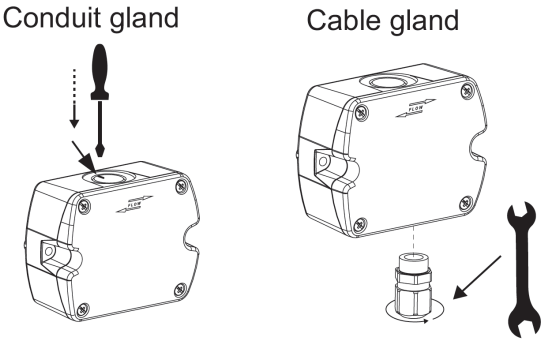


Fig. 1. Housing dimensions (mm)

MOUNTING



Screw with torque of 1.5 Nm for break-through. Recommended tightening torque: 3.5 Nm.

Fig. 2. Assembly of conduit / cable gland

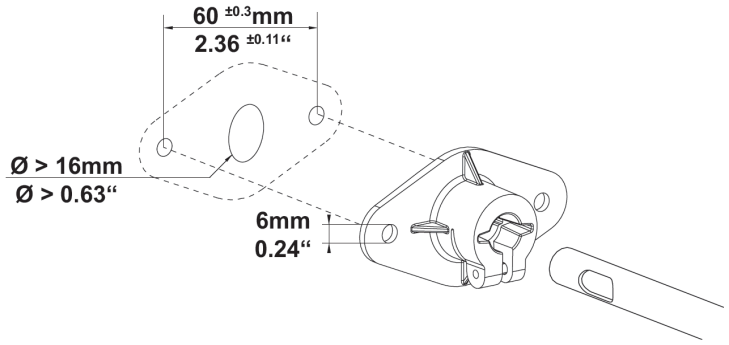


Fig 3. Flange mounting on duct

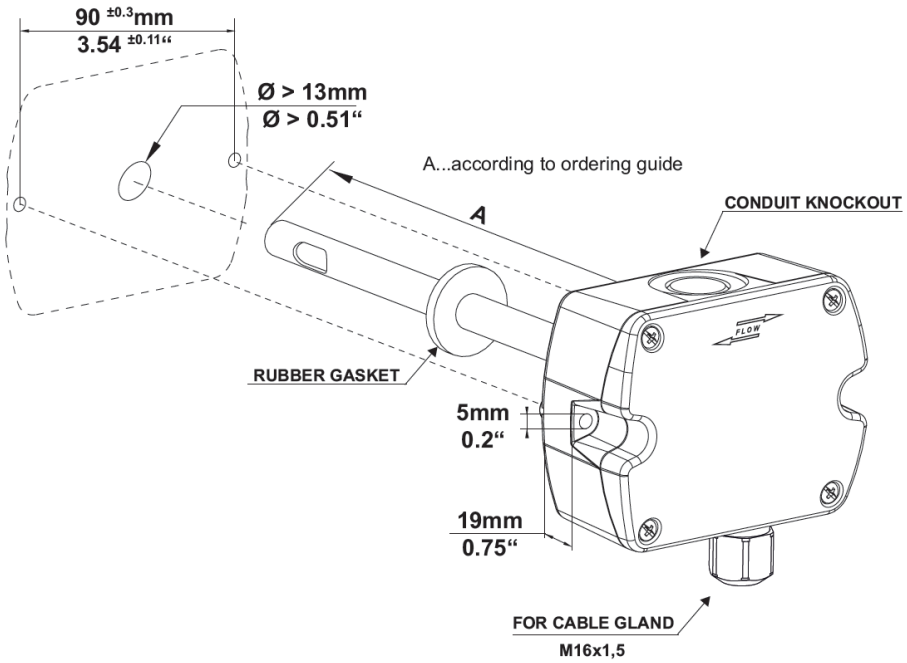


Fig. 4. Direct mounting on duct (probe length A = 200 mm)

WIRING

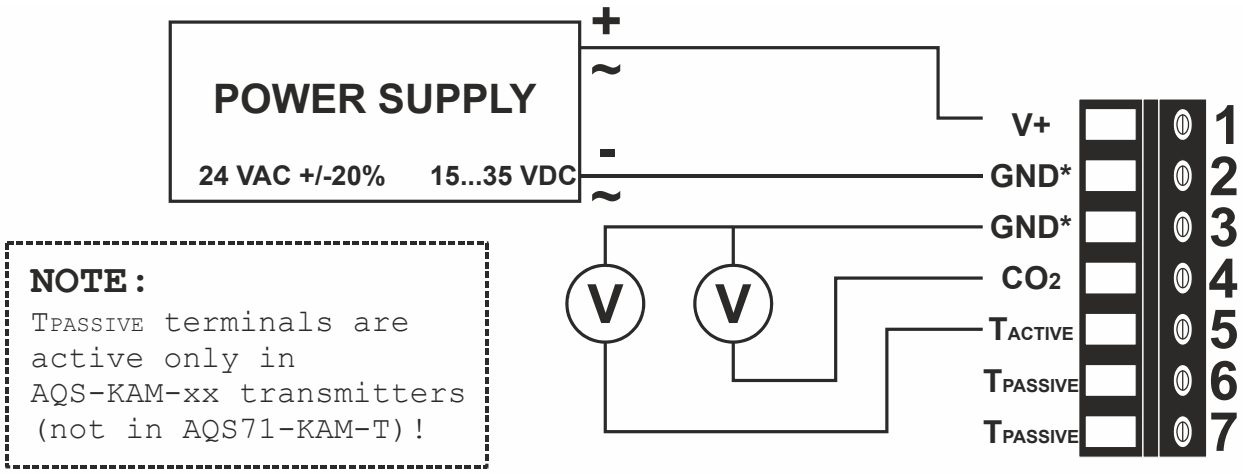


Fig. 5. Wiring diagram for AQS-KAM-xx and AQS71-KAM-T (not AQS-KAM-RH-V)

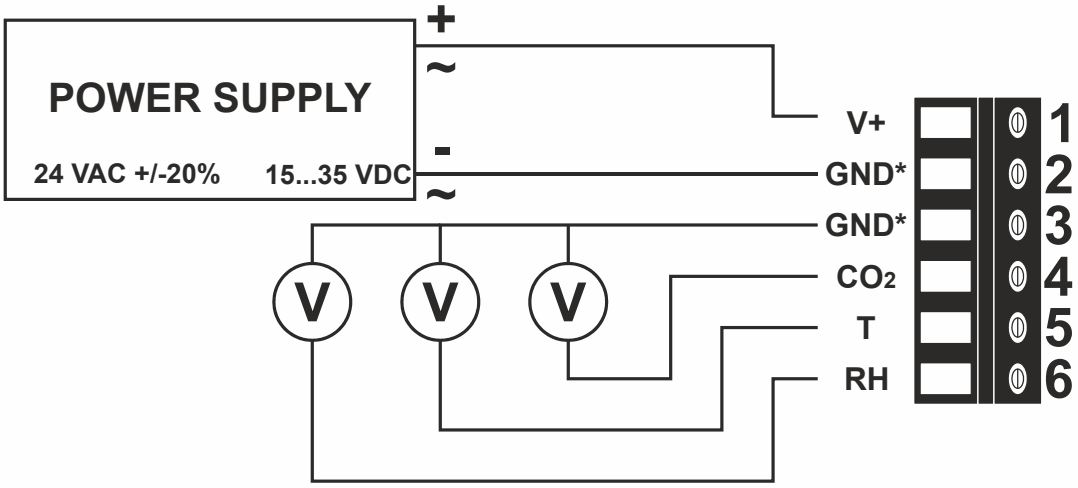


Fig. 5. Wiring diagram for AQS-KAM-RH-V

IMPORTANT

For failure-free operation and performance according to specifications, it is essential that the supply GND and the measurement GND be wired separately!

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AV-D-10 and AV-R-10

AIR VELOCITY TRANSMITTERS

PRODUCT DATA

GENERAL

The AV-D-10 Duct-Mounted and AV-R-10 Remote Air Velocity Transmitters are designed for highly accurate measurement of air velocity up to 20 m/s (2000 ft/min). They feature a thin-film sensor which operates according to the hot-film anemometer principle. The mounting flange permits a continuous adjustment of immersion depth at the duct. The output signal, measuring range, and response time can be adjusted by shifting a jumper on the circuit board.
These air velocity transmitters are suitable for use in all systems capable of accepting 0…10 VDC inputs and are ideal for accurate and reliable measurement in building automation and ventilation applications. For special applications, please contact Honeywell.

ACCURACY

The anemometer is temperature-compensated. The measurement principle establishes a relationship between the flow and the heat capacity of air. Thus, at lower air pressure, the actual flow speed is higher than the indicated flow speed. This is expressed by the following equation:

$V_{actual} = V_{indicated} * 1013 \text{ mbar} / \text{Pressure}_{real}$ (in mbar)

MOUNTING

NOTE: The accurate and reliable determination of air velocity depends on the correct positioning of the probe. Accurate measurements are possible only if the probe is installed in a location with low-turbulence flow. Extreme mechanical and unspecified strain and corrosive environments and condensation must be avoided.
See also AV-R-10 and AV-D-10 – Mounting Instructions (MU1B-0620GE51).

FEATURES

- **Highly accurate measurement of air velocities of up to 20 m/s (2000 ft/min).**
- **Mounting flange permits continuous adjustment of immersion depth at duct.**
- **Response time (t_{90}), measuring range, and output signal (0…10 V / 4…20 mA) can all be independently reset by shifting jumpers on the circuit board.**
- **Self-compensation for changes in air temperature.**

SPECIFICATION

Measuring range	
Working range	2…10 m/s (6…2000 ft/min) 2…15 m/s (6…3000 ft/min) 2…20 m/s (6…4000 ft/min)
Accuracy	±(0.2 m/s + 3% of m.v.) at 20 °C (68 °F), 45% r.H., 1013 hPa
Response time T_{90}	typ. 4 s (default) or 1 s (constant temperature)
General	
Power supply	24 VAC/DC ±20% (SELV)
Output	0…10 V, 4…20 mA (default); -1 mA < I_L < 1 mA R_L < 500 Ω (linear, 3 wires)
Current consumption	max. 170 mA (AC), max. 70 mA (DC)
Electrical connection	screw terminals, max. 1.5 mm^2 (AWG 16)
Cable gland	M16x1.5
Approvals	CE
Housing material	Polycarbonate, UL94V-0 approved
Protection class	Enclosure IP65 / NEMA 4, remote probe IP20
Storage temperature	-30…+60 °C (-22…+140 °F)
Working temp. probe	-25…+50 °C (-13…+122 °F)
Working temp. electronics	-10…+50 °C (+14…+122 °F)
Working humidity	5…95% r.H. (non-condensing)
Dimensions	see Fig. 1 on page 2

MODELS

Order no.	Cable length	Immersion depth
AV-D-10	--	50…200 mm
AV-R-10	1 meter	50…300 mm

DIMENSIONS

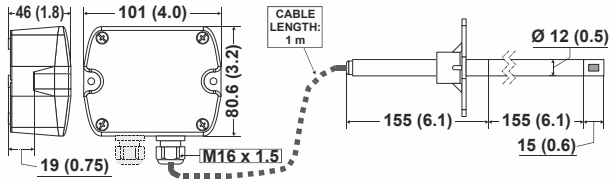

Fig. 1. Dimensions, AV-R-10, in mm (inches)

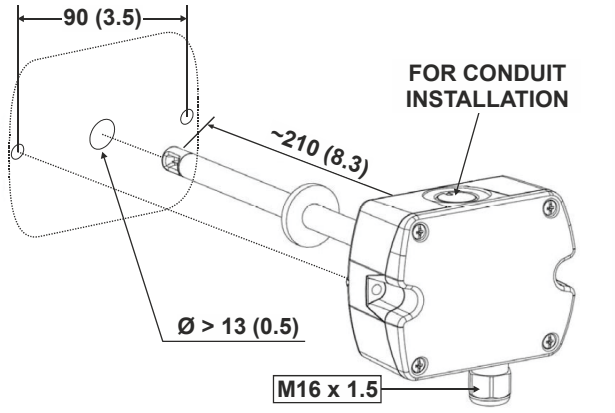

Fig. 2. Dimensions, AV-D-10, in mm (inches)

WIRING

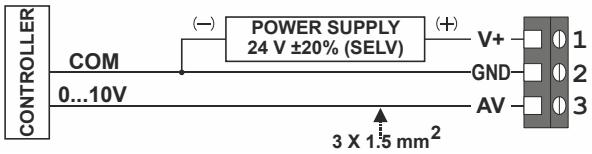

Fig. 3. Wiring

NOTE: Use shielded wiring in areas with high EMI. Keep 15 cm (5.9'') minimum distance between sensor lines and 230 VAC power lines.

SETTINGS

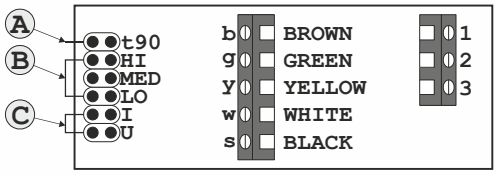

Fig. 4. Jumpers (A = response time; B = measuring range; C = output signal)

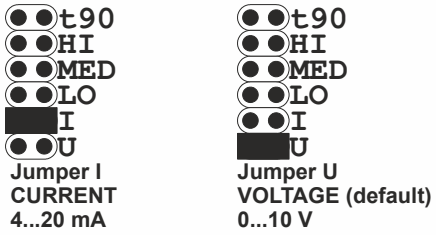

Fig. 5. Selection of output signal

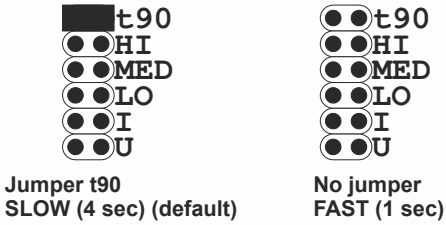

Fig. 6. Selection of response time

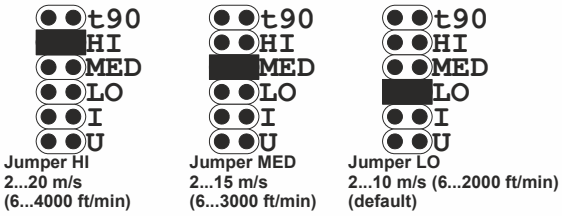

Fig. 7. Selection of measuring range

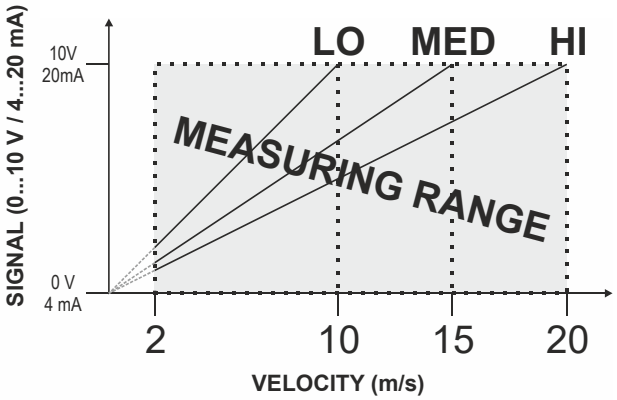

Fig. 8. Signal when jumper set to LO, MED, and HI

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HSDP2-A Series

Air Differential Pressure Transmitter

Honeywell HSDP2-A series Air Differential Pressure Transmitters are mainly used to measure air differential pressure or gauge pressure. They are applied to air pressure control of central air-conditioning air system, VAV and fan control, environmental pollution control, pressure difference control of clean room, smoke hood control, oven pressurization and boiler ventilation control, etc.

Features

- High-precision MEMS micro-pressure core body.
- Wide temperature range compensation and sensitive pressure response.
- Manual zero pressure value correction can be performed on site.
- Screwless clamshell buckle design for easy wiring and setting.

Order Information and Technical Specification

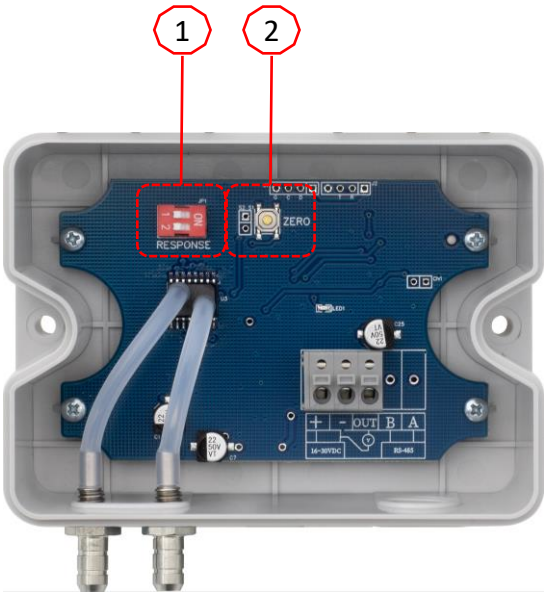
SKU	Max measuring range (Pa)	Output signal
HSDP2-A500A1	0 to 500	4-20mA
HSDP2-A500V1	0 to 500	0-10V
HSDP2-A500A2	-500 to 500	4-20mA
HSDP2-A500V2	-500 to 500	0-10V
HSDP2-A1000A1	0 to 1000	4-20mA
HSDP2-A1000V1	0 to 1000	0-10V
HSDP2-A1000A2	-1000 to 1000	4-20mA
HSDP2-A1000V2	-1000 to 1000	0-10V

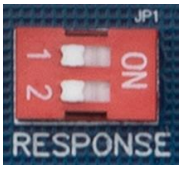
Basic Parameters

Accuracy	0-500Pa： ±1.0%FS* @ 25℃
	Others：±1.0%FS （within Compensation Temperature Range）
Stability	Typical value：0.1%FS / Year，Max value：0.2%FS / Year
Compensation Temperature Range	-10℃ to +60℃
Applicable Medium	Air and Neutral Gas
Medium Temp. Range	-20℃ to +70℃
Operation Environment	-20℃ to +70℃， 0 to95%RH （Non-condensing）
Storage Environment	-40℃ to +70℃， 0 to95%RH （Non-condensing）
Power Supply	0-10V ： 16 to 30VDC 4-20mA： 10 to 30VDC
Power Consumption	≤1.5W
Operation Current	0-10V ： < 20mA 4-20mA： 4-20mA
Max Circuit Load	4-20mA：≤[(U-10V)/0.02A] Ω； 0-10V：≥10kΩ
Reaction Time	0.5S, 1S, 2S, 4S (DIP setting)
Overload Pressure	Maximum 15 times the rated pressure or 10KPa, subject to the above minimum pressure
Protection Standard	IP65（EN 60529）
Housing Material	Housing： PC Core sealing ring: Silicone Rubber
Accessory	2 meters PVC hose
Certification	CE（EN IEC 61000-6-1: 2019; EN IEC 61000-6-3:2021); RoHS

*** FS is the abbreviation of Full scale.**

Functions and Parameter Settings



#	Function	Large picture
1	Reaction time setting	
2	Manual Zero Reset	

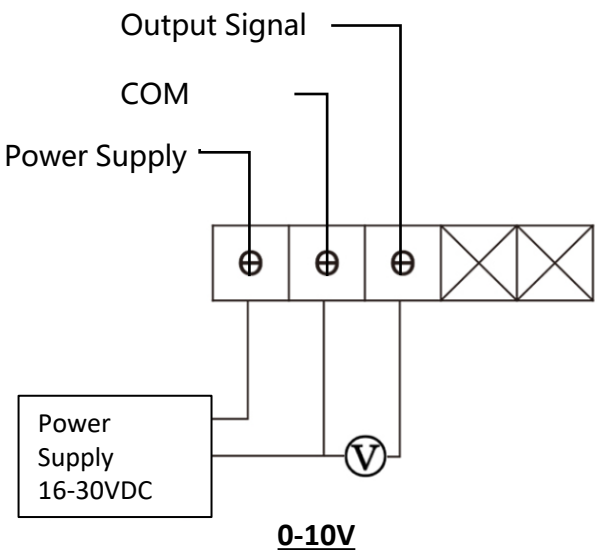
Manual Zero Reset

When the pressure difference between the positive and negative pressure inlets is zero, use this reset button to calibrate the zero pressure value. When the reset button is pressed, the LED lights up at the same time.

Reaction Time Setting

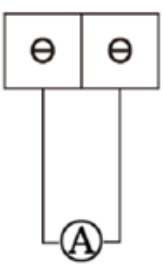
DIP Switch	0.5s	1s	2s	4s
1				
2				

Wiring



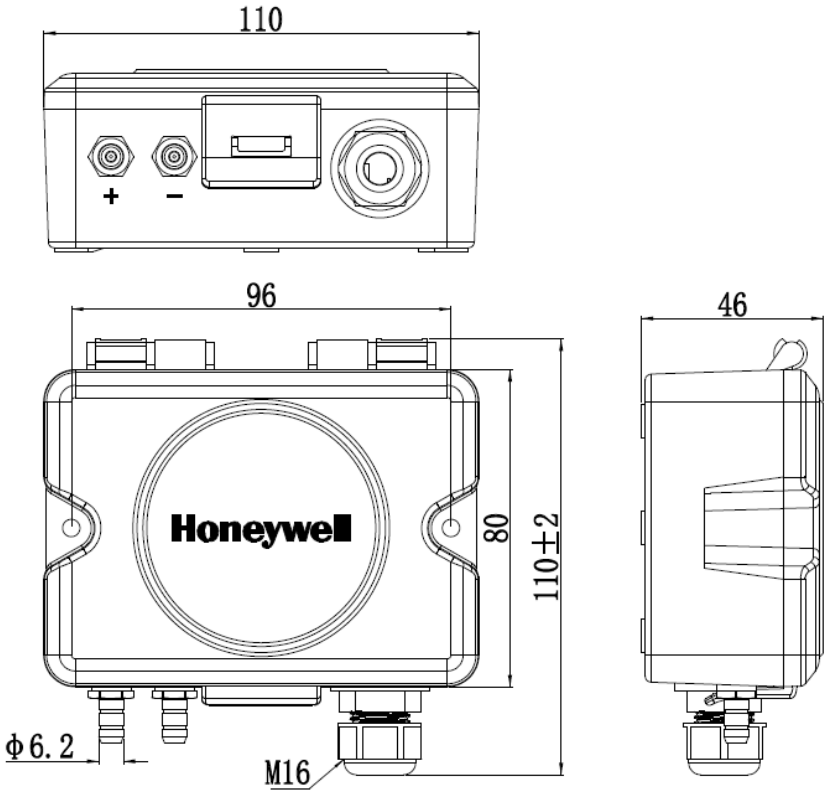
0-10V

The two connection terminals of 4-20mA output are non-polar, and the power input and signal output terminals are not defined.



4-20mA

Dimension (mm)



Honeywell Building Technologies
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THE FUTURE IS WHAT WE MAKE IT

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HSDP-A Series

Air Differential Pressure Transmitter

Honeywell HSDP-A series Air Differential Pressure Transmitters are mainly used to measure air differential pressure or gauge pressure. They are applied to air pressure control of central air-conditioning air system, VAV and fan control, environmental pollution control, pressure difference control of clean room, smoke hood control, oven pressurization and boiler ventilation control, etc.

Features

- High-precision MEMS micro-pressure core body.
- Wide temperature range compensation and sensitive pressure response.
- A variety of functional parameters can be set by DIP switches, and the product has a wide range of applications.
- Optional display function, 5-digit LCD digital display shows clearly.
- Manual zero pressure value correction can be performed on site.
- Screwless clamshell buckle design for easy wiring and setting.

Order Information and Technical Specification

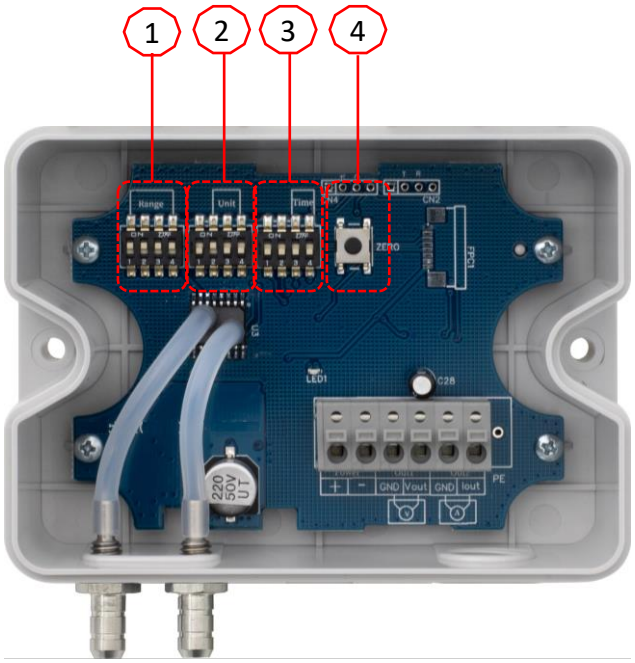
SKU	Max measuring range (Pa)	Output signal or Communication Protocol	Display Option
HSDP-A100U	-100 to 100	0-10V and 4-20mA	NO
HSDP-A1000U	-1000 to 1000	0-10V and 4-20mA	NO
HSDP-A10000U	-10000 to 10000	0-10V and 4-20mA	NO
HSDP-A100UL	-100 to 100	0-10V and 4-20mA	YES
HSDP-A1000UL	-1000 to 1000	0-10V and 4-20mA	YES
HSDP-A10000UL	-10000 to 10000	0-10V and 4-20mA	YES
HSDP-A100M	-100 to 100	Modbus RTU	NO
HSDP-A1000M	-1000 to 1000	Modbus RTU	NO
HSDP-A10000M	-10000 to 10000	Modbus RTU	NO
HSDP-A100ML	-100 to 100	Modbus RTU	YES
HSDP-A1000ML	-1000 to 1000	Modbus RTU	YES
HSDP-A10000ML	-10000 to 10000	Modbus RTU	YES

Basic Parameters

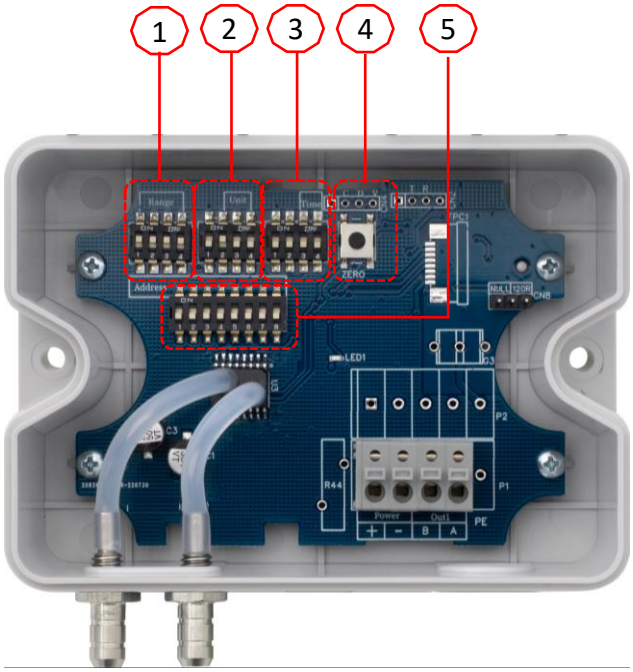
Accuracy	HSDP-A100xx	±1.0%FS* @ 25℃
	HSDP-A1000xx HSDP-A10000xx	±1.0%FS （within Compensation Temperature Range）
Stability	HSDP-A100xx	±2%FS / Year
	HSDP-A1000xx HSDP-A10000xx	±0.25%FS / Year
Compensation Temperature Range	-10℃ to +60℃	
Applicable Medium	Air and Neutral Gas	
Medium Temp. Range	-20℃ to +70℃	
Operation Environment	-20℃ to +70℃， 0 to95%RH （Non-condensing）	
Storage Environment	-40℃ to +70℃， 0 to95%RH （Non-condensing）	
Power Supply	0-10V and 4-20mA：12 to 30VDC/24VAC±20% Modbus：9 to 30VDC	
Power Consumption	≤1.5W	
Operation Current	0-10V and 4-20mA：≤30mA RS485: < 20mA	
Max Circuit Load	4-20mA：≤ 250Ω； 0-10V：≥10kΩ	
Reaction Time	0.5S, 1S, 2S, 4S (DIP setting)	
Connection number for RS485 RTU devices	A maximum of 64 devices can be connected to a single network segment	
Overload Pressure	HSDP-A100xx	5KPa
	HSDP-A1000xx	10KPa
	HSDP-A10000xx	80KPa
Protection standard	IP65（EN 60529）	
Housing Material	Housing： PC Core sealing ring: Silicone Rubber	
Accessory	2 meters PVC hose	
Certification	CE（EN IEC 61000-6-1: 2019; EN IEC 61000-6-3:2021); RoHS	

*** FS is the abbreviation of Full scale.**

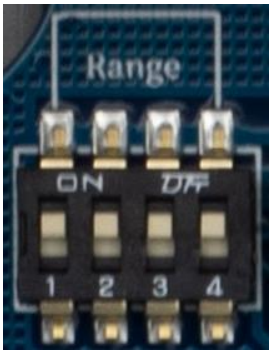
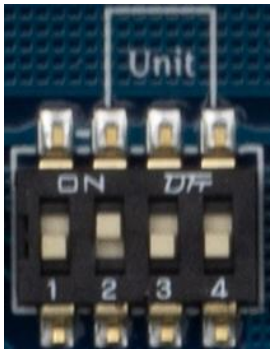
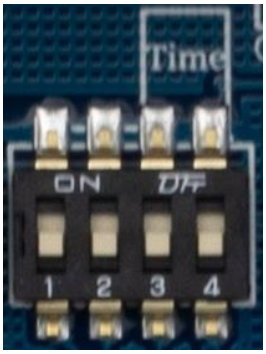
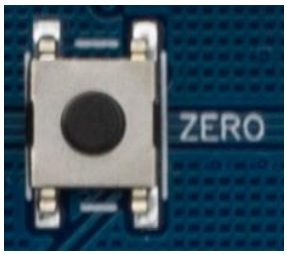
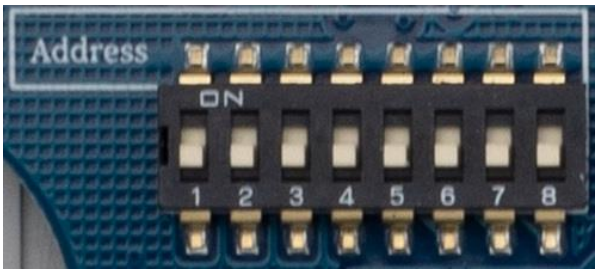
Functions and Parameter Settings



0-10V and 4-20mA output models

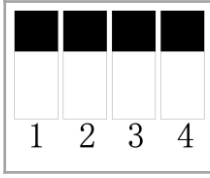


Modbus communication models

DIP zone	1	2	3
Enlarged picture of DIPs			
Function	Measuring range setting	DIP1: Auto-zero setting DIP 2, 3 and 4: range unit setting	DIP 2: Baud rate setting (Modbus model only) DIP 3 and 4: Reaction time setting
DIP zone	4	5	
Enlarged picture of DIPs			
function	Manual Zero reset button	Modbus address code setting (Modbus model only)	

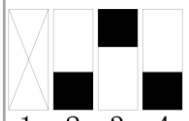
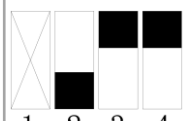
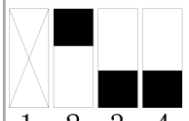
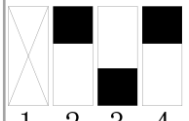
Measuring Range Setting

1. Default DIP switches position and Measuring range

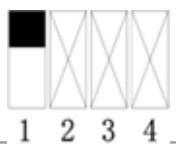
DIP switches position	SKU	Pa	mmH2O	mbar	inH2O	mmHG	kPa
	HSDP-A100xx	±100.0	±10.00	±1.000	/	/	/
	HSDP-A1000XX	±1000.0	±100.0	±10.0	±4.00	±7.50	±1.000
	HSDP-A10000xx	±10000.0	±1000.0	±100.00	±40.00	±75.00	±10.000

"±" in above sheet means bidirectional range, for example: ±100Pa means the range is -100 Pa to 100 Pa.

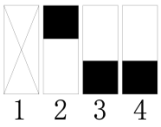
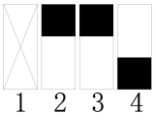
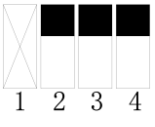
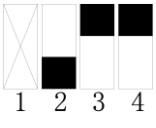
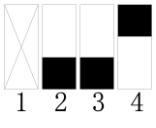
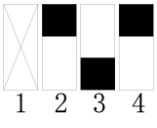
2. Measuring Range Setting: Set No.2 to No.4 DIP switch

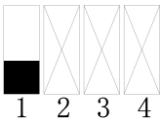
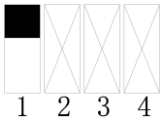
DIP switches position	SKU	Pa	mmH2O	mBar	inH2O	mmHg	kPa
	HSDP-A100XX	10.0	1.00	0.100	/	/	/
	HSDP-A1000XX	100	10.0	1.00	0.40	0.75	0.100
	HSDP-A10000XX	1,000	100.0	10.00	4.00	7.50	1.000
	HSDP-A100XX	25.0	2.50	0.250	/	/	/
	HSDP-A1000XX	250	25.0	2.50	1.00	1.87	0.250
	HSDP-A10000XX	2,500	250.0	25.00	10.00	18.75	2.500
	HSDP-A100XX	50.0	5.00	0.500	/	/	/
	HSDP-A1000XX	500	50.0	5.00	2.00	3.750	0.500
	HSDP-A10000XX	5,000	500.0	50.00	20.00	37.50	5.000
	HSDP-A100XX	75.0	7.50	0.750	/	/	/
	HSDP-A1000XX	750	75.0	7.50	3.00	5.62	0.750
	HSDP-A10000XX	7,500	750.0	75.00	30.00	56.20	7.500
	HSDP-A100XX	100.0	10.00	1.000	/	/	/
	HSDP-A1000XX	1,000	100.0	10.0	4.00	7.50	1.000
	HSDP-A10000XX	10,000	1,000.00	100.00	40.00	75.00	10.000

3. Unidirectional or bidirectional range setting: set No.1 DIP switch

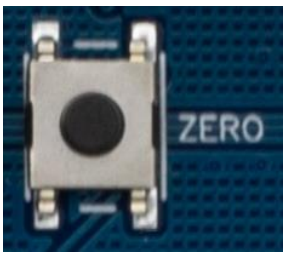
DIP switches position	Introductions
	The range remains unidirectional: 0 is the minimum value, and the range value set by the DIP No.2 to No.4 is the maximum value. For example: HSDP-A1000XX, the range value set by DIP No.2 to No. 4 is 1000Pa, and the range is unidirectional (positive), then the actual range is 0-1000Pa.
	The range becomes bidirectional: from negative to positive with zero in the middle. For example: HSDP-A1000XX, the range value set by DIP No.2 to No.4 is 1000Pa, after the range is set to bidirectional, the zero point is in the middle, and the actual range becomes -500Pa to 500Pa.

Measuring Range Units and Auto-zero Settings

Unit Setting	**Pa**	mmH2O	mBar	inH2O	mmHg	kPa
Set DIP No.2 to No.4						

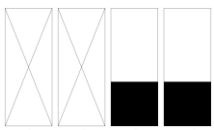
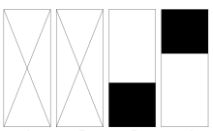
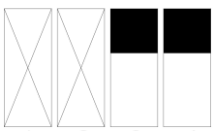
Auto-zero Setting Set DIP No.1		
	Do not start Auto-zero reset at boot (default)	Start Auto-zero reset at boot

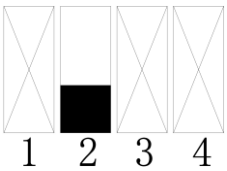
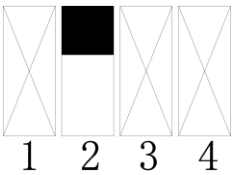
Automatic and Manual Zero reset



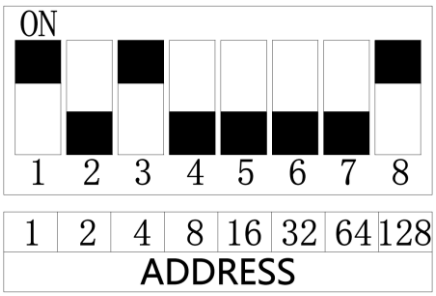
1.When the automatic zero reset is turned on, please ensure that there is no differential pressure between the positive and negative air inlets when power on, and the auto-zero reset data will not be saved.
2. If you choose not to start auto-zero reset after power on, you can manually reset it through the manual zero reset button. Open the panel and short press the manual reset button to reset, please keep the positive and negative air inlets without differential pressure to reset manually.

Reaction time and baud rate (Modbus models) settings

Reaction time	0.5s	1s	2s	4s
Set DIP No.3 and No.4				

Set Baud rate Set DIP No.2 Only Modbus models		
	Baud rate：9600	Baud rate：19200

Modbus ID Address Code Setting



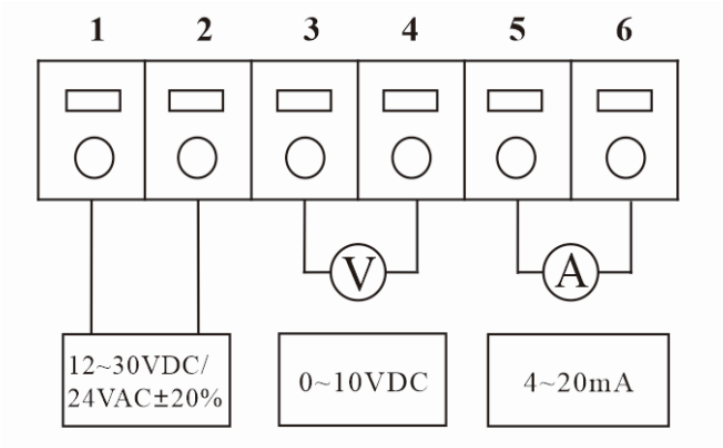
Dial to the ON side, add the corresponding numbers on the “ADDRESS ” zone to get the address code.

Example for left picture: 1+4+128=133（0X85H）

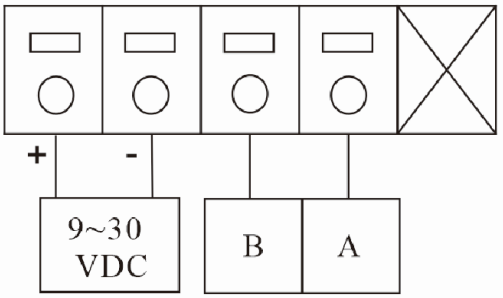
Note: Only when the DIP address is 0, the device ID address can be modified by software. For details about the Modbus setting method, please refer to the product installation manual.

Wiring

0-10V and 4-20mA output models



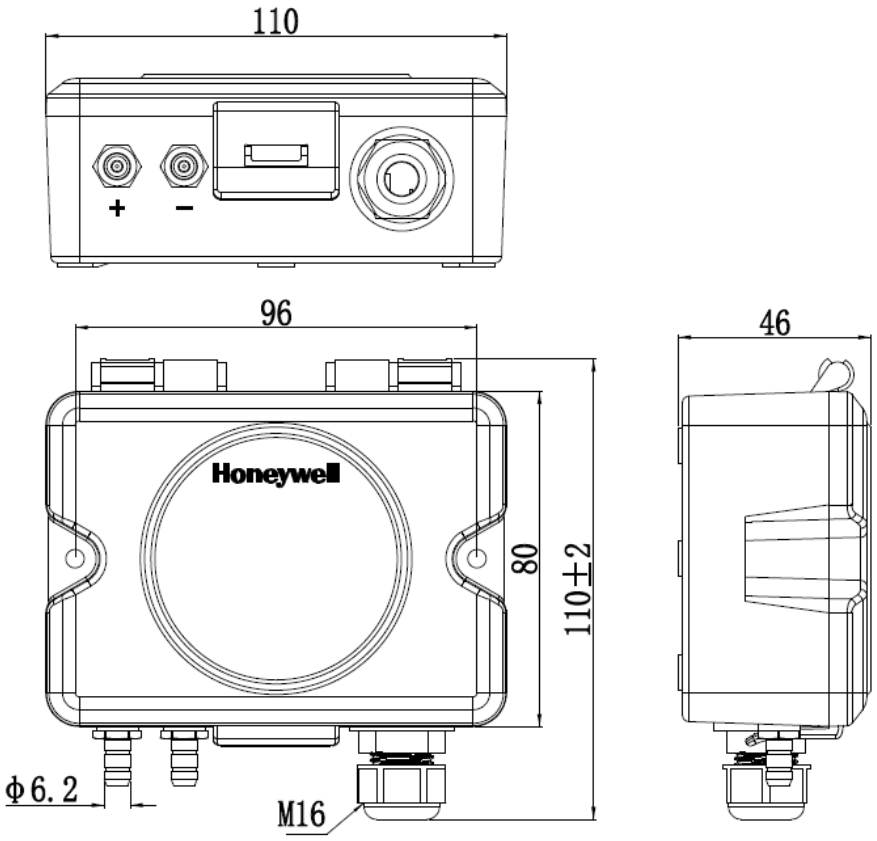
Modbus communication models



Power Supply RS485 Wiring

1 Power supply Positive 2 Power supply Negative
3 Output signal ground 4 Output 0-10V
5 Output signal ground 6 Output 4-20mA

Dimension (mm)



THE FUTURE IS WHAT WE MAKE IT

Honeywell

Honeywell

LF20, PF20
DUCT TEMPERATURE SENSORS

PRODUCT DATA

GENERAL

The LF20 and PF20 Duct Temperature Sensors are used in ventilating and air conditioning systems to measure discharge, return, or outside air temperature. They are designed for duct mounting.

The sensors are suitable for use in systems using NTC 20k temperature sensing elements.

FEATURES

- **NTC 20k temperature sensing element**
- **Wide sensing range**
- **High accuracy**

Models

OS no.	sensor type	IP rating	probe length, in mm (in.)	sensing range
LF20-1P65-5M	NTC 20k	65	157 (6.18)	-30…+80 °C (-22…+176 °F)
LF20-3P65-5M	NTC 20k	65	307 mm (12.07)	
PF20-65-2M	NTC 20k	65	2-m cable	-30...+70 °C (-22…+158 °F)
PF20-65-5M	NTC 20k	65	5-m cable	
LF-MF	mounting flange; bulk pack of 10 flanges			

SPECIFICATION

Nominal value
NTC 20k — 20 kΩ at 25 °C (77 °F)

Accuracy
NTC 20k — ±0.2 C at 25 °C (77 °F)

Sensitivity
NTC 20k — ≈ -934.5 Ω / K at 25 °C (non-linear)

Time constant — < 30 s

Sensor sleeve material — stainless steel (1.4571)

Cable sheath material — PVC

Electrical connection — 2-m or 5-m cable, 2x0.22 mm^2

Ambient Limits (wiring box)
Storage temperature — -30...+70 °C (-22…+158 °F)
Humidity — 5…95% rh, non-condensing

Protection class — IP54 / IP65 as per EN 60529

Dimensions — See below.

DIMENSIONS

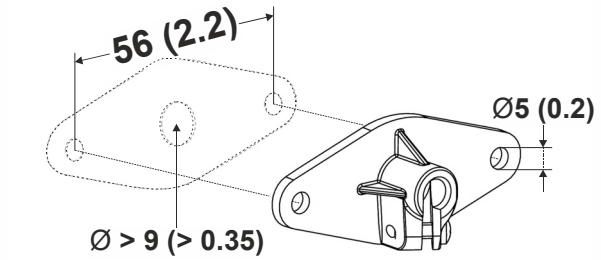


Fig. 1. Mounting flange LF-MF, dimensions in mm (inches)

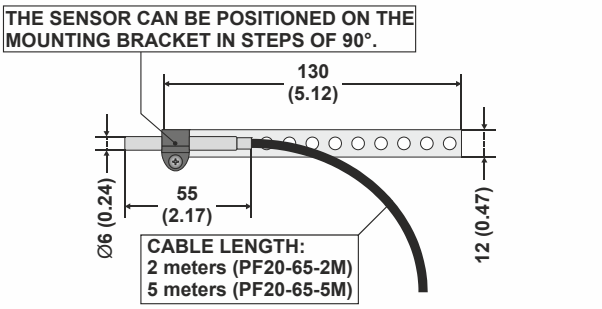


Fig. 2. Dimensions of the PF20 duct sensor in mm (inches)

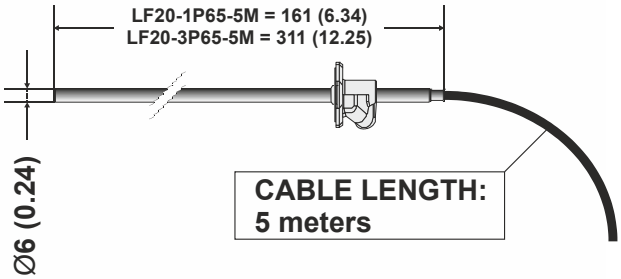


Fig. 3. Dimensions of the LF20-xP65-5M duct sensor in mm (inches)

WIRING

wiring run	max. length
sensor to controller	200 m (660 ft)

NOTE: Use shielded wiring in areas with high EMI. Keep 15 cm (5.9'') minimum distance between sensor lines and 230 Vac power lines.

Honeywell

Manufactured for and on behalf of the Connected Building Division of Honeywell Technologies Sàrl, Rolle, Z.A. La Pièce 16, Switzerland by its Authorized Representative:

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Honeywell

H7080B

Temperature/Humidity Duct Sensor

SPECIFICATION DATA

Application

H7080B series duct mounting humidity and temperature sensors are designed for environmental monitoring and control applications in industrial, commercial and general building.
These sensors can be used for discharge, or return air control.

Features

- 4~20mA/ 0~10VDC or resistance output for temperature
- 4~20mA/ 0~10VDC output for humidity
- Duct mounted
- Excellent linearity
- Good long term stability
- High reliability
- Wide sensing range
- Easy installation

Specifications

Relative Humidity

Measurement Range:	0~100%RH
Output:	4~20mA or 0~10VDC
Accuracy:	2%, 3%, 5%RH (25℃, 20~80%RH) 5%, 9%RH (25℃, 0%~20% and 80%~100%RH)
Long Term Stability:	1%RH per year

Temperature

Temperature Sensor:	NTC10K, NTC20K, Pt1000
Measurement Range:	0~50℃ (resistance output) -10~40℃ or 0~70℃ (transducer)
Output:	4~20mA or 0~10VDC NTC10K, NTC20K, Pt1000
Accuracy:	±0.2K at 25℃ for NTC10K sensor ±0.2K at 25℃ for NTC20K sensor ±0.3K at 0℃ for Pt1000 sensor ±0.5℃ (-10~40℃ or 0~70℃) for transducer
Power Supply:	24 VAC ±15% /24 VDC ±10%
Current Output Load:	500 Ohms Max
Voltage Output Load:	10K Ohms Min
Current Consumption:	DC 70mA Max, AC 190mA Max
Working Temperature:	-30℃~+70℃
Transport and Storage Temperature:	-40℃~+70℃
Housing Material:	Plastic (PC-ABS) Flame retardant acc. with UL94-V0
Protection Standard:	IP54
EMC Conformity:	EN 61000-6-1 EN 61000-6-3 EN 61000-3-2 EN 61000-3-3

CE

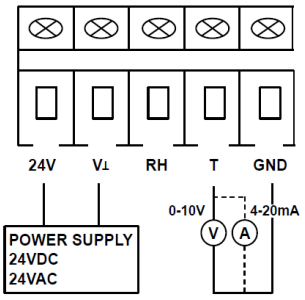
50045209-001 Rev. A

Models

OS Number	Humidity Output	Humidity Accuracy	Temperature Output Type	Temperature Range
C7080A3240	NA	NA	4~20mA/0-10V	-10℃~40℃
C7080A3270	NA	NA	4~20mA/0-10V	0℃~70℃
H7080B3102	4~20mA/0-10V	±2%	Pt1000	0℃~50℃
H7080B3242	4~20mA/0-10V	±2%	4~20mA/0-10V	-10℃~40℃
H7080B3272	4~20mA/0-10V	±2%	4~20mA/0-10V	0℃~70℃
H7080B2103	4~20mA/0-10V	±3%	NTC20K	0℃~50℃
H7080B1103	4~20mA/0-10V	±3%	NTC10K	0℃~50℃
H7080B3103	4~20mA/0-10V	±3%	Pt1000	0℃~50℃
H7080B3243	4~20mA/0-10V	±3%	4~20mA/0-10V	-10℃~40℃
H7080B3273	4~20mA/0-10V	±3%	4~20mA/0-10V	0℃~70℃
H7080B2105	4~20mA/0-10V	±5%	NTC20K	0℃~50℃
H7080B1105	4~20mA/0-10V	±5%	NTC10K	0℃~50℃
H7080B3105	4~20mA/0-10V	±5%	Pt1000	0℃~50℃

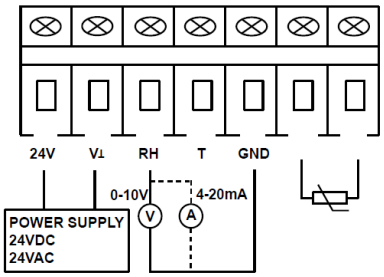
Wiring

● For temperature output model:



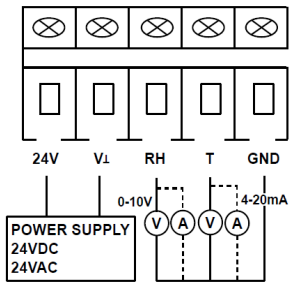
C7080A3240
C7080A3270

● For temperature sensor & humidity output:



H7080B3102 H7080B2103
H7080B1103 H7080B3103
H7080B2105 H7080B1105
H7080B3105

● For temperature & humidity output model:



H7080B3242
H7080B3272
H7080B3243
H7080B3273

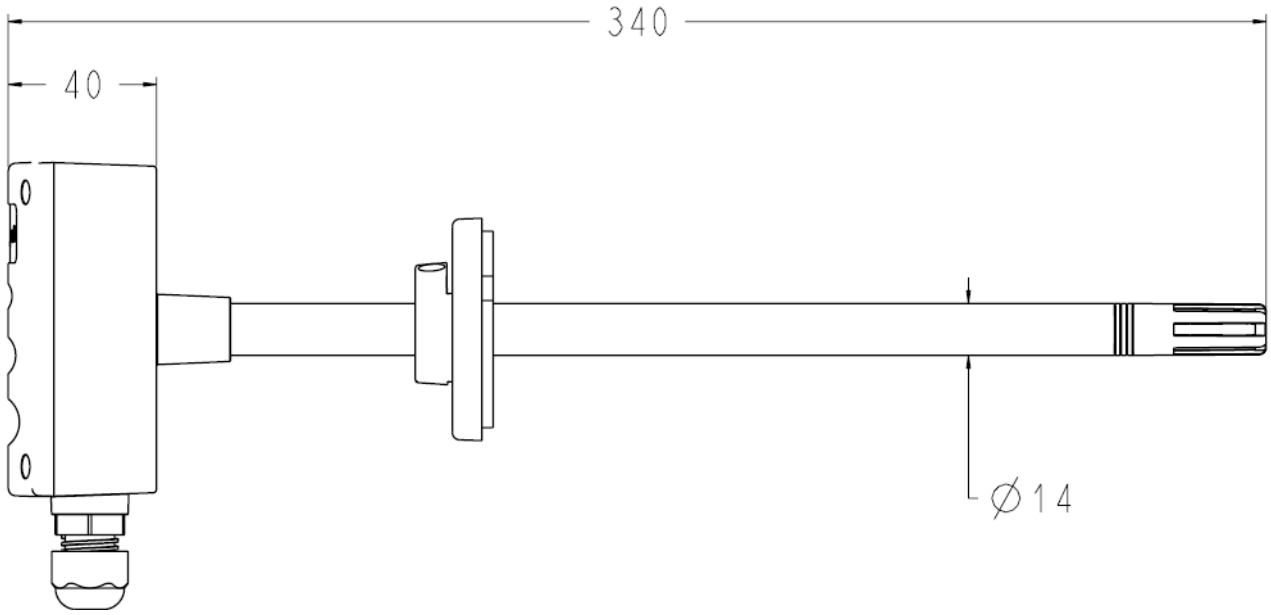
Note：

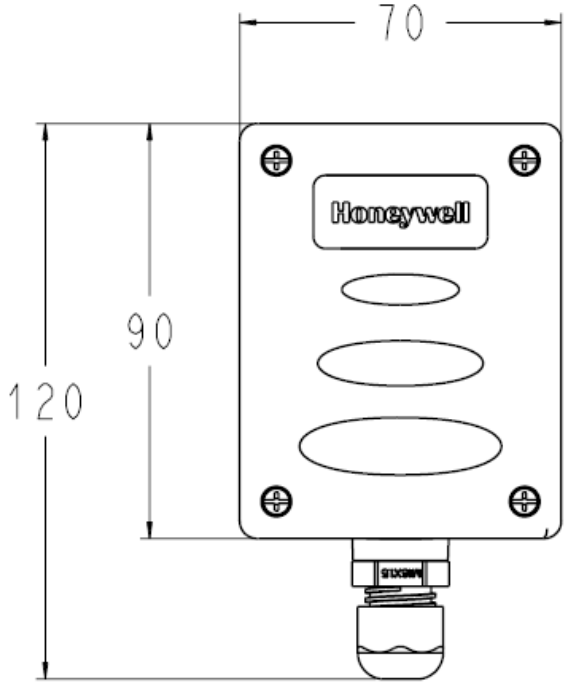
1. Output is voltage mode (0-10V) when load resistance is over 10kΩ.
2. Output is current mode (4-20mA) when load resistance is less than 500Ω. 500Ω is recommended.
3. Power on again after load resistor switch.
4. Field wiring AWG 18 to 24 connects to a terminal block on the PCB.
5. Maximum length 200m (current output recommended).
6. Offset for temperature sensor due to wire resistance per 10m distance from sensor to controller:

Wiring of Type	Pt1000	NTC
1.0mm^2 (Awg18)	0.11K	negligible
0.5mm^2 (Awg20)	0.18K	
0.34mm^2 (Awg22)	0.28K	

Dimension

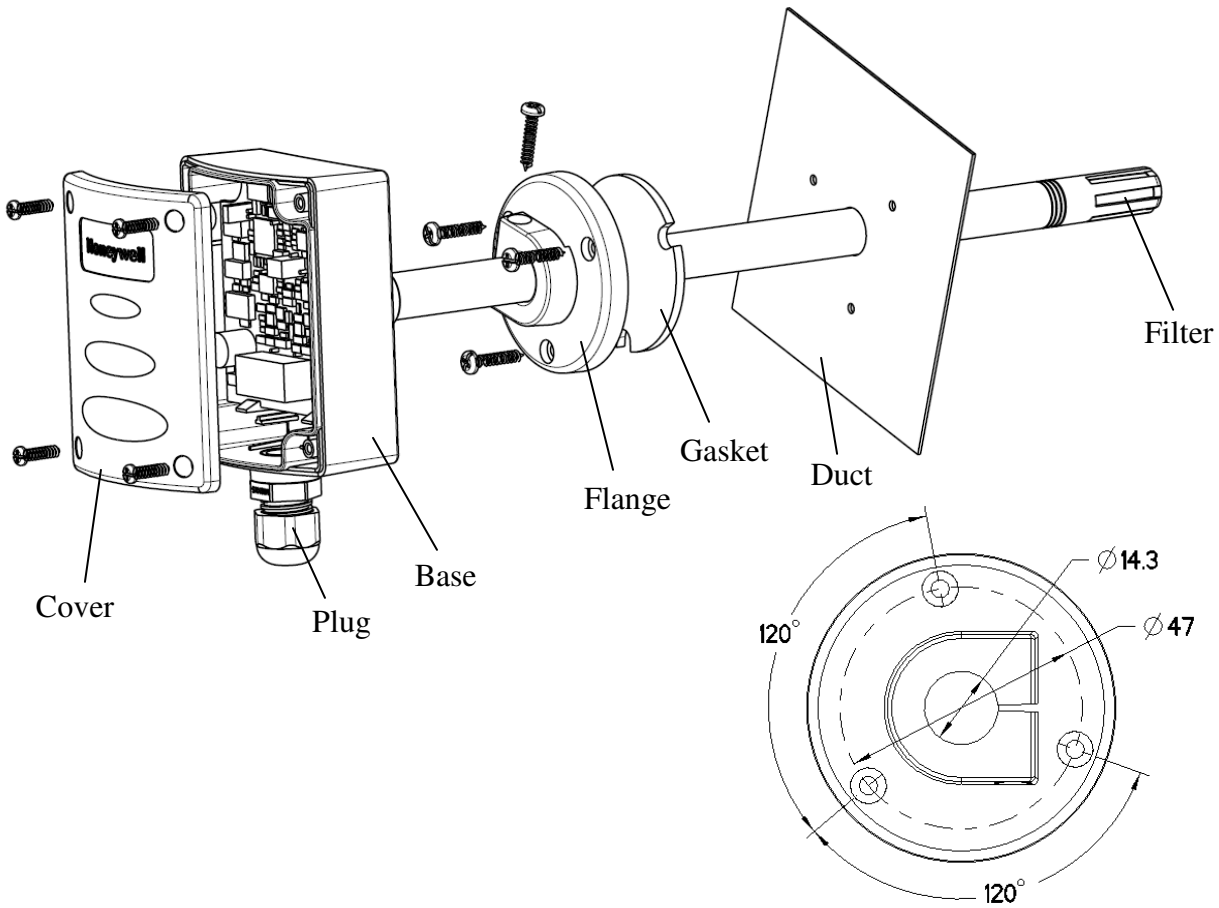
Dimension in mm





Installation

Dimension in mm



INSTALLATION:

- Drilling a mounting hole on the duct near measuring point.
- Use enclosed screws to install the flange with gasket on the duct. Insert the probe pipe into flange and duct.
- Fix the probe pipe on the flange by enclosed screw. (Note: Plug face to the bottom direction)
- Unscrew & open the front cover of the product.
- Lead wire from DDC or PLC panel through plug. Using screw driver to connect each wire to the terminals of the transducer module according to field wiring diagram.
- Tighten the waterproof plug around the wires.
- Put front cover back and tighten front cover by screws.

ATTENTION:

Absolutely avoid extreme mechanical and unspecified strain.

When using a 24 VAC transformer, use an isolated Transformer (Class II). If sharing the transformer with your controller, valve, actuator, or any other device, be sure to connect all of the devices with the proper polarity, since most controllers are earth grounded. Failure to do so may result in damage to the transducer, your controller, or any other devices that are attached due to a ground loop problem.

The product is equipped with stainless steel filter: since the sensor is an ESD-sensitive device, you should avoid touching the sensor cap during operation.
For maintenance purposes it is recommended, that you observe the valid ESD-safety precautions!

Please don't use in corrosive environment.

Honeywell

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HST-P series

Immersion Temperature sensor

Honeywell HST-P Series Immersion Temperature Sensors are designed for liquid temperature measurement in pipe system of HVAC. Sensors are available in a variety of length probes and wells for a variety of pipe diameters.

The HST-P series immersion temperature sensors have a variety of control signal outputs and can be compatible with a variety of automatic control systems.

Basic parameter

Standard Resistance	NTC 10K	10 kΩ @ 25 ℃
	NTC 20K	20 kΩ @ 25 ℃
	PT1000	1000 Ω @ 0℃
Temperature Element Accuracy	NTC 10K	0.3K @ 25℃
	NTC 20K	0.3K @ 25℃
	PT1000	0.2K @ 0℃
	0-10V	0.2K @ 0℃ (Temp. element is PT1000)
	4-20mA	0.2K @ 0℃ (Temp. element is PT1000)
Sensitivity	NTC 10K	≥420Ω@25℃ Non-linear
	NTC 20K	≥912Ω@25℃ Non-linear
	PT1000	≥3.9Ω/℃
Measuring Temp. Range		-40 ~ 150 ℃
Working environment		-40~70℃，0~95%RH (Non condensation)
Time constant		≤35S
Power Supply	0-10V	15~35VDC/24VAC±20%
	4-20mA	18.5~35VDC (RL=500Ω) 8.5~35VDC (RL=0Ω)
IP rated		IP65
Wiring		0.8~1.5mm^2
Storage Temp.		-30 ~ 70 ℃
Well connection		G1/2-14
Material	Housing	PC （Fire rating： UL94-V0， Cable entry gland UL94-V2）
	Probe and well	SS304

Order information and Parameters

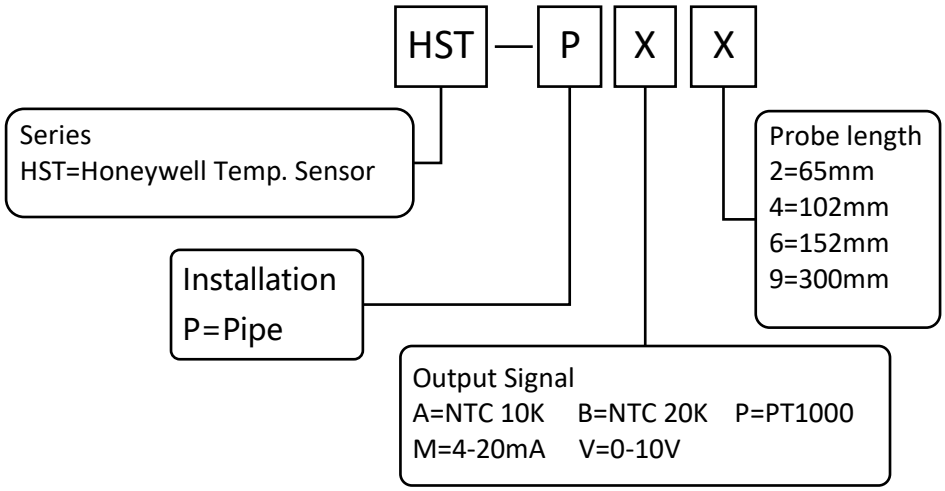
SKU	Output Signal	Probe Length	Well*	Well SKU**
HST-PA2	NTC 10K	65mm	Containing	HST-P102
HST-PA4	NTC 10K	102mm	Containing	HST-P104
HST-PA6	NTC 10K	152mm	Containing	HST-P106
HST-PA9	NTC 10K	300mm	Containing	HST-P109
HST-PB2	NTC 20K	65mm	Containing	HST-P102
HST-PB4	NTC 20K	102mm	Containing	HST-P104
HST-PB6	NTC 20K	152mm	Containing	HST-P106
HST-PB9	NTC 20K	300mm	Containing	HST-P109
HST-PP2	PT1000	65mm	Containing	HST-P102
HST-PP4	PT1000	102mm	Containing	HST-P104
HST-PP6	PT1000	152mm	Containing	HST-P106
HST-PP9	PT1000	300mm	Containing	HST-P109
HST-PM2	4-20mA	65mm	Containing	HST-P102
HST-PM4	4-20mA	102mm	Containing	HST-P104
HST-PM6	4-20mA	152mm	Containing	HST-P106
HST-PM9	4-20mA	300mm	Containing	HST-P109
HST-PV2	0-10V	65mm	Containing	HST-P102
HST-PV4	0-10V	102mm	Containing	HST-P104
HST-PV6	0-10V	152mm	Containing	HST-P106
HST-PV9	0-10V	300mm	Containing	HST-P109

* One sensor SKU contains sensor and well.

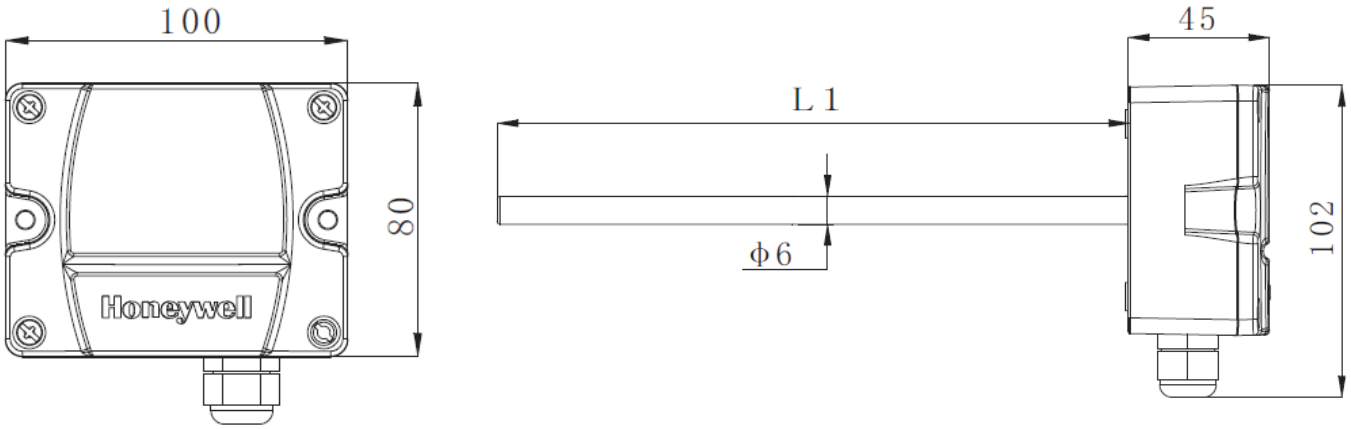
** Well can be purchased separately as an accessory.

Accessory: HST-PS (Installation Seat)

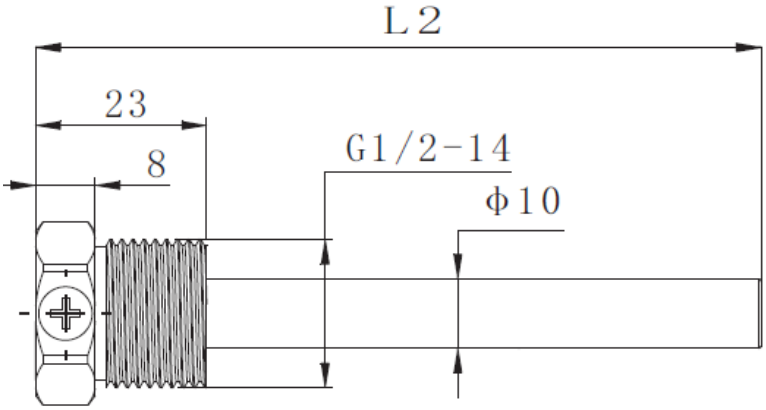
Definition



Dimension

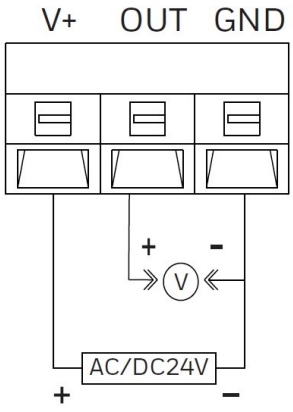


Probe Nominal length	L1	Well SKU	Well length L2
65mm	65mm	HST-P102	65mm
102mm	102mm	HST-P104	102mm
152mm	152mm	HST-P106	152mm
300mm	300mm	HST-P109	300mm

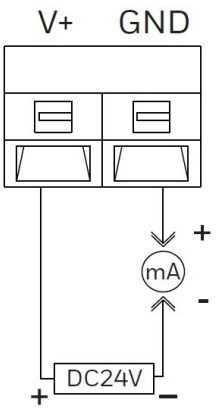


Wiring

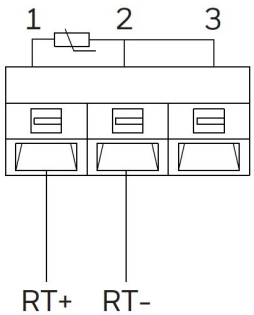
0-10V



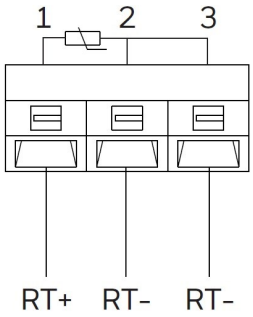
4-20mA



NTC10K/NTC20K/PT1000
Two-wire Circuit



NTC10K/NTC20K/PT1000
Three-wire Circuit



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THE FUTURE IS WHAT WE MAKE IT

Honeywell

Data Sheet

LLO
Outside Light Level Sensor

Outside Light Level Sensor

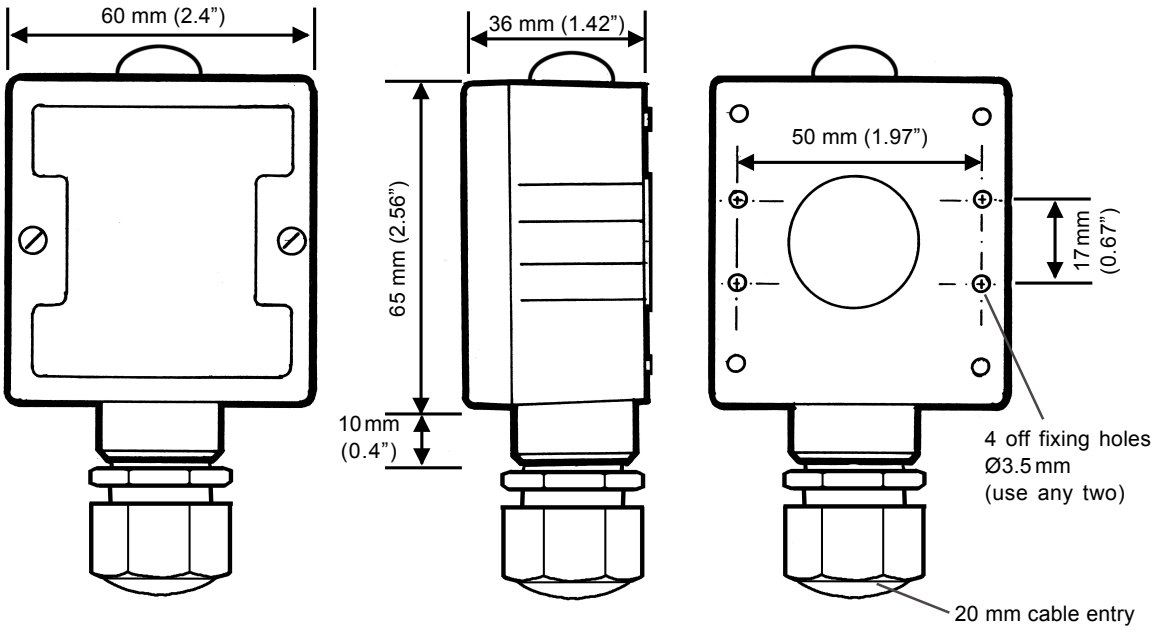
Description

The Outside Light Level Sensor is an accurate lux calibrated light level sensor which can be used for monitoring and control applications. The enclosure is IP65 rated complete with M20 cable gland making it ideal for external use. The signal output is 4 to 20 mA loop powered and the lux range is selectable at installation from the following: 0 to 1000, 0 to 2000, 0 to 4000, 0 to 8000, or 0 to 20000 lux.

Features

- multi-range, site selectable
- 4 to 20 mA output
- IP65 housing
- Ideal for outside light level measurement

Physical



FUNCTIONALITY

The sensor is mounted into a IP65 housing providing a polarity independent, loop powered 4 to 20mA signal proportional to the light level (lux) range selected.

OPERATIONAL DATA

Typical Daylight Conditions

illuminance (lux)	Description
15 to 20	dusk
2000	reasonable daylight
20000+	bright sunlight

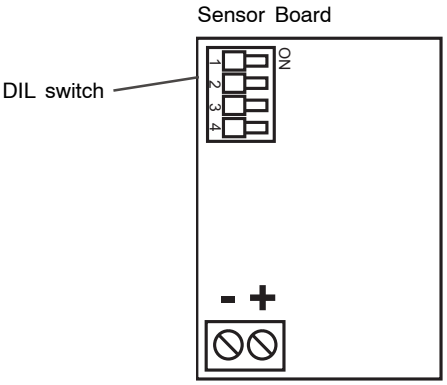
Recommended Service Illuminations

illuminance (lux)	Description
20	minimum service illuminance in outside circulation areas
30	outdoor stores, stockyards
50	exterior walkways, and car parks
75	docks and quays
150	circulation areas in industry, stores, and stockrooms
200	minimum service illuminance on task
500	general office and retail sales areas
1500	fine bench and machine work, and precision assembly

Note:- Hand held meters generally have ±10 % error

Switch Settings

Inside the sensor is a 4way DIL switch which can be used to select the lux range.



sw1	sw2	sw3	sw4	Range (lux)
On	On	On	On	1000
Off	On	On	On	2000
Off	Off	On	On	4000
Off	Off	Off	On	8000
Off	Off	Off	Off	20000

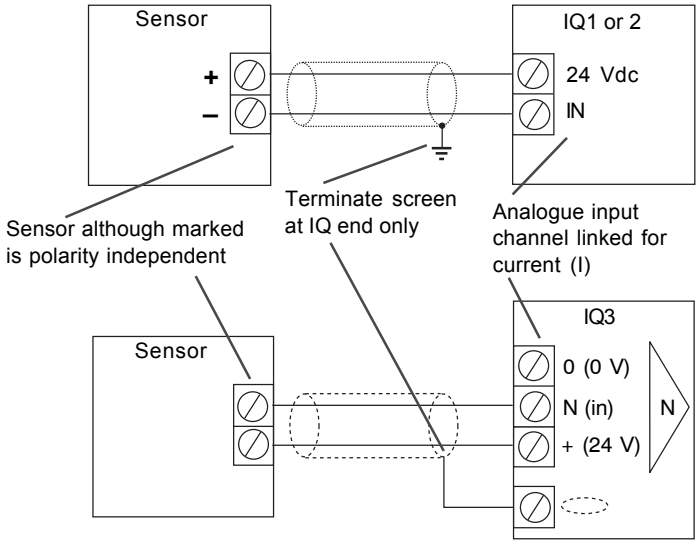
Default settings are for 2000 Lux

INSTALLATION

The sensor should be located on a north facing wall, out of direct sunlight. It should not be close to a light source such as street lighting.

The installation involves:
Choose location
Remove lid and mount sensor through the 2 mounting holes (do not drill the sensor box)
Route cable through cable gland
Select required range (see table above)
Connect to IQ controller
Set up strategy
Test

CONNECTIONS



PRODUCT CODE

LLO

DISPOSAL

WEEE Directive :

At the end of their useful life the packaging and product should be disposed of via a suitable recycling centre.
Do not dispose of with normal household waste.
Do not burn.

SPECIFICATION

Range :Selectable see table
Output :4 to 20 mA
Accuracy :±5 % (of selected range)
Power supply :12 to 33 V
Spectral range :330 nm to 720 nm
Cosine response :Typically ±50°
Ambient Limits
temperature :-25 to +70 °C (-13 ° to +158°F)
humidity :0 to 95 %RH
Connections :1.5 mm² cross sectional area cable (16 AWG) maximum
Dimensions :60 mm w x 75 mm h x 36 mm d (2.4" x 2.95" x 1.42")
Weight :90 gms (2.93 ozs)
Enclosure :Flame retardant polycarbonate
Environmental protection :IP65 (NEMA 4)

Input channels and sensor scaling
For IQ controllers link input channel for current, I, and set up the sensor type scaling; the recommended method of setting up the sensor type scaling is to use SET.

For all IQ2 series controllers with firmware of version 2.1 or greater, or IQ3 series controllers, one of the following SET Unique Sensor References should be used:

Light I 1k (1000 lux)
Light I 2k (2000 lux)
Light I 4k (4000 lux)
Light I 8k (8000 lux)
Light I 20k (20000 lux)

Alternatively, or for the other lux ranges, set scaling mode to 5 (characterise) and enter the scaling manually as defined in the table below. Note that for IQ3 the scaling mode and exponent (E) do not need to be set up.

Range (lux)		1000	2000	4000	8000	20000
Y	input type	2 (current mA)				
E	Exponent	4	4	5	5	5
U	Upper	1000	2000	4000	8000	20000
L	Lower	0	0	0	0	0
P	Points	2				
x	lx	Ox				
1	4	0	0	0	0	0
2	20	1000	2000	4000	8000	20000

System Accuracy (including controller):
1000 :± 50 lux
2000 :± 100.5 lux
4000 :± 201 lux
8000 :± 402 lux
20000 :± 1005 lux

For all other IQ controllers see the Sensor Scaling Reference Card TB100521A.

Please send any comments about this or any other Trend technical publication to techpubs@trendcontrols.com

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HSH-D series

Duct Temp. & Relative Humidity Sensors

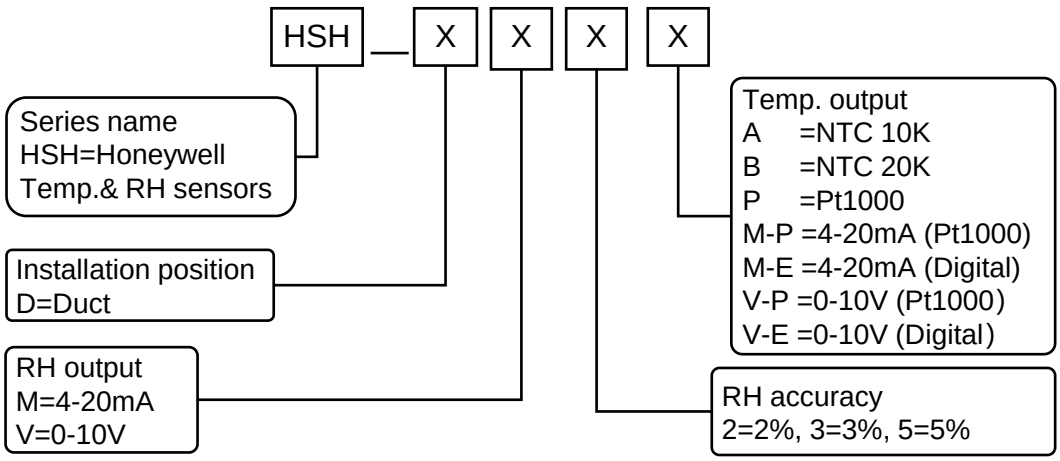
Honeywell HSH-D series duct temperature & relative humidity sensors are applied to measure the HVAC duct air temperature and relative humidity.

The HSH-D series duct temperature & relative humidity sensors have a variety of control signal outputs and can be compatible with a variety of automatic control systems

Basic Parameters

Measuring Temp. Range		-40 ~ 60 ℃
Working Environment		-40~60℃, 0~95%RH (Non condensation)
Humidity Accuracy @ 25℃ and 24VDC	2%	20~80%：±2%； 0-95%：±3%
	3%	20~80%：±3%；0-95%：±5%
	5%	20~80%：±5%； 0-95%：±9%
Power Supply	0-10V	24 VDC/24VAC±20%
	4-20mA	24 VDC ±20%
IP Rated		IP65
Wire conduct Diameter		0.33~1.65mm^2
Storage Temp.		-40 ~ 70 ℃
Housing Material		PC （Fire rating：UL94-V0)
Certification		EN IEC 61000-6-3:2021, EN IEC 61000-6-2:2019 EN IEC 60730-1:2016+A1, EN IEC 60730-2-9:2019+A1

Definition



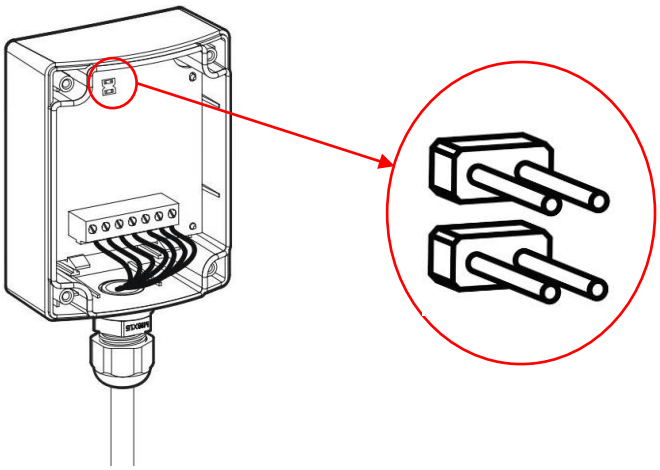
Order information and Technical Specification

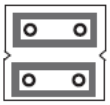
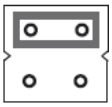
SKU	RH Output	RH accuracy	Temp. Output	Temp. sensor element type	Temp. Accuracy*
HSH-DM2A	4~20mA	2%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-DM2B	4~20mA	2%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-DM2P	4~20mA	2%	Resistance Value	PT1000	0.2K @ 0℃
HSH-DM2M-P	4~20mA	2%	4~20mA	PT1000	0.3K @ 25℃
HSH-DM2M-E	4~20mA	2%	4~20mA	Digital**	0.3K @ 25℃
HSH-DM3A	4~20mA	3%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-DM3B	4~20mA	3%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-DM3P	4~20mA	3%	Resistance Value	PT1000	0.2K @ 0℃
HSH-DM3M-P	4~20mA	3%	4~20mA	PT1000	0.3K @ 25℃
HSH-DM3M-E	4~20mA	3%	4~20mA	Digital	0.3K @ 25℃
HSH-DM5A	4~20mA	5%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-DM5B	4~20mA	5%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-DM5P	4~20mA	5%	Resistance Value	PT1000	0.2K @ 0℃
HSH-DM5M-P	4~20mA	5%	4~20mA	PT1000	0.3K @ 25℃
HSH-DM5M-E	4~20mA	5%	4~20mA	Digital	0.3K @ 25℃
HSH-DV2A	0~10V	2%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-DV2B	0~10V	2%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-DV2P	0~10V	2%	Resistance Value	PT1000	0.2K @ 0℃
HSH-DV2V-P	0~10V	2%	0-10V	PT1000	0.3K @ 25℃
HSH-DV2V-E	0~10V	2%	0-10V	Digital	0.3K @ 25℃
HSH-DV3A	0~10V	3%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-DV3B	0~10V	3%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-DV3P	0~10V	3%	Resistance Value	PT1000	0.2K @ 0℃
HSH-DV3V-P	0~10V	3%	0-10V	PT1000	0.3K @ 25℃
HSH-DV3V-E	0~10V	3%	0-10V	Digital	0.3K @ 25℃
HSH-DV5A	0~10V	5%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-DV5B	0~10V	5%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-DV5P	0~10V	5%	Resistance Value	PT1000	0.2K @ 0℃
HSH-DV5V-P	0~10V	5%	0-10V	PT1000	0.3K @ 25℃
HSH-DV5V-E	0~10V	5%	0-10V	Digital	0.3K @ 25℃

* 1. For the passive output type sensors, the temperature accuracy is the sensing element temperature accuracy. For the current and voltage signal output type sensors, the temperature accuracy is the transmitter accuracy when the power supply is 24VDC.
* 2. The temperature accuracy in the table above is the accuracy of the specified temperature point.
** Temperature sensor element type is **Digital** refers to the sensor type is PN junction type digital temperature sensing element, **Digita**l is for short.

Temperature range setting and Wiring diagrams

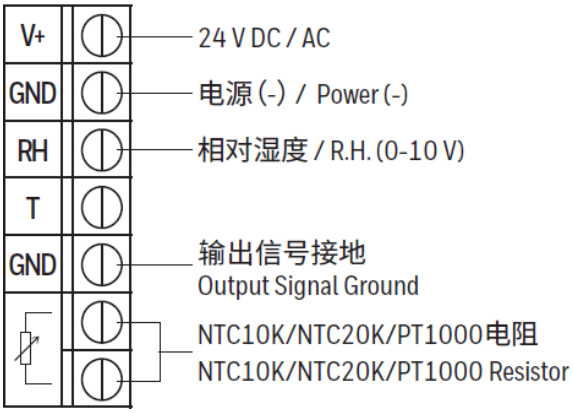
1. Measure Temperature range setting (only for 0-10V and 4-20mA output)



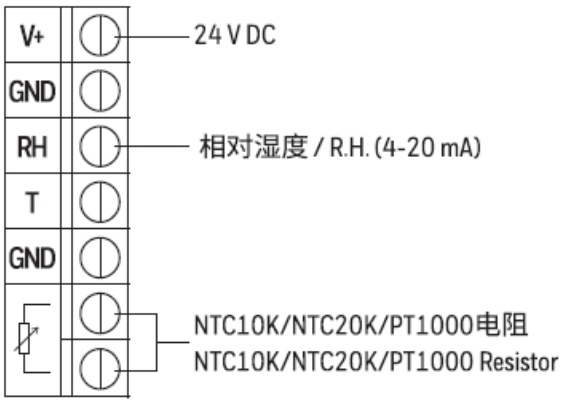
Jumper	Temp. Range
	-40℃ ~ 60 ℃ (default)
	-20℃ ~ 50 ℃
	0℃ ~ 50 ℃

2. Wiring Diagrams: Wiring according to the wiring diagram corresponding to the model.

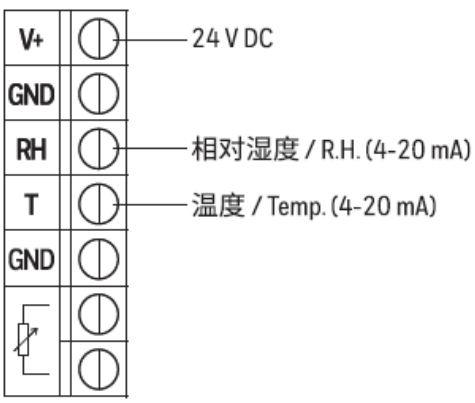
SKU
HSH-DV2A
HSH-DV2B
HSH-DV2P
HSH-DV3A
HSH-DV3B
HSH-DV3P
HSH-DV5A
HSH-DV5B
HSH-DV5P



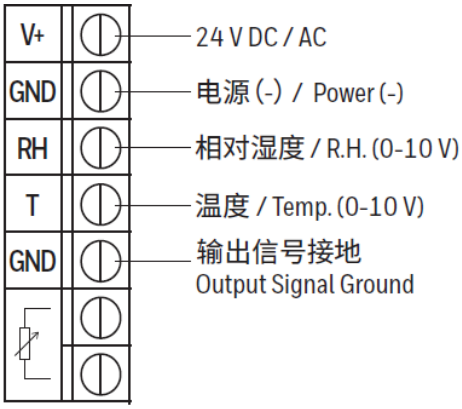
SKU
HSH-DM2A
HSH-DM2B
HSH-DM2P
HSH-DM3A
HSH-DM3B
HSH-DM3P
HSH-DM5A
HSH-DM5B
HSH-DM5P



SKU
HSH-DM2M-X
HSH-DM3M-X
HSH-DM5M-X



SKU
HSH-DV2V-X
HSH-DV3V-X
HSH-DV5V-X



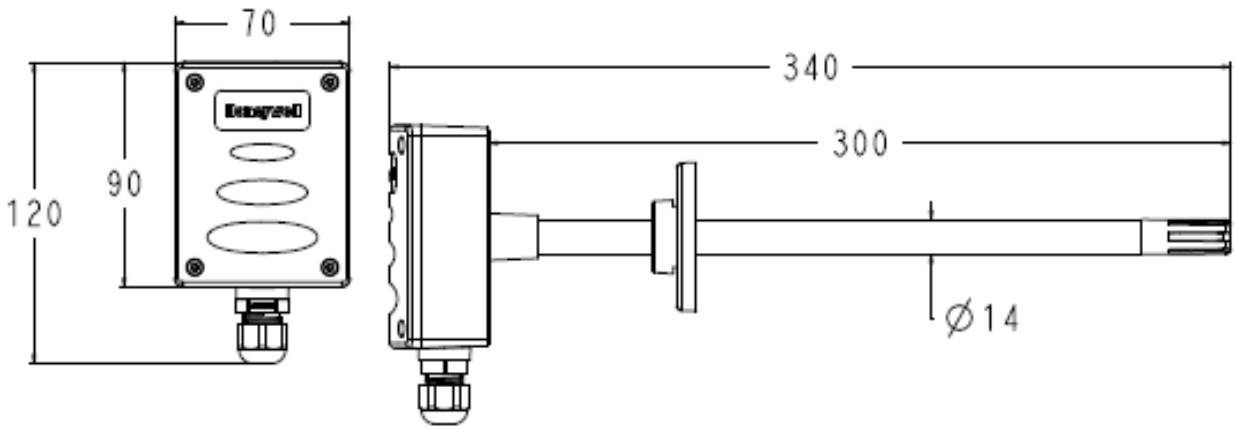
Tips:

1. Connection terminals are suitable for AWG15~22.
2. Due to the influence of wire resistance, the length of the cable between the sensor and the controller will cause the temperature drift. The details are as follows.

Wire gauge	permissible cable length	PT1000 Temp. drift every 10 meters cable	NTC10K / NTC20K Temperature shift
AWG 22	50m	0.272K	Negligible
AWG 20	150m	0.173K	
AWG 18	150m	0.109K	
AWG 17	150m	0.086K	
AWG 16	300m	0.069K	
AWG 15	300m	0.054K	

Dimension

Unit: mm



THE FUTURE IS WHAT WE MAKE IT

Honeywell Building Technologies
Greater China Building Business
Website: www.honeywell.com.cn
Service Hotline: 400-842-8487

Honeywell

HSH-E series

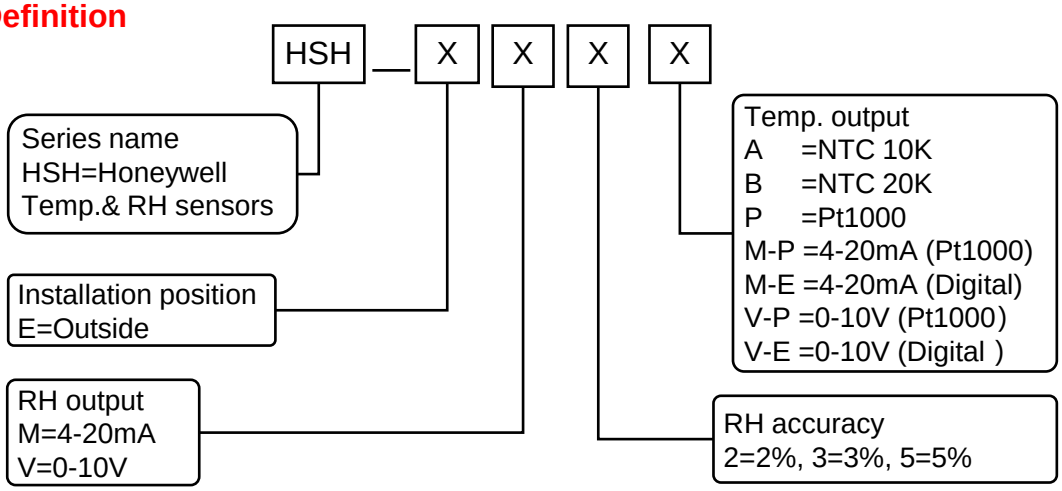
Outside Temp. & Relative Humidity Sensors

Honeywell HSH-E series Outside temperature & relative humidity sensors are applied to measure the outside air temperature and relative humidity. The HSH-E series outside temperature & relative humidity sensors have a variety of control signal outputs and can be compatible with a variety of automatic control systems.

Basic Parameters

Measuring Temp. Range		-40 ~ 60 ℃
Working Environment		-40~60℃, 0~95%RH (Non condensation)
Humidity Accuracy @ 25℃ and 24VDC	2%	20~80%：±2%； 0-95%：±3%
	3%	20~80%：±3%；0-95%：±5%
	5%	20~80%：±5%； 0-95%：±9%
Power Supply	0-10V	24 VDC/24VAC±20%
	4-20mA	24 VDC ±20%
IP Rated		IP65
Wire conduct Diameter		0.33~1.65mm^2
Storage Temp.		-40 ~ 70 ℃
Housing Material		PC （Fire rating：UL94-V0)
Certification		EN IEC 61000-6-3:2021, EN IEC 61000-6-2:2019 EN IEC 60730-1:2016+A1, EN IEC 60730-2-9:2019+A1

Definition



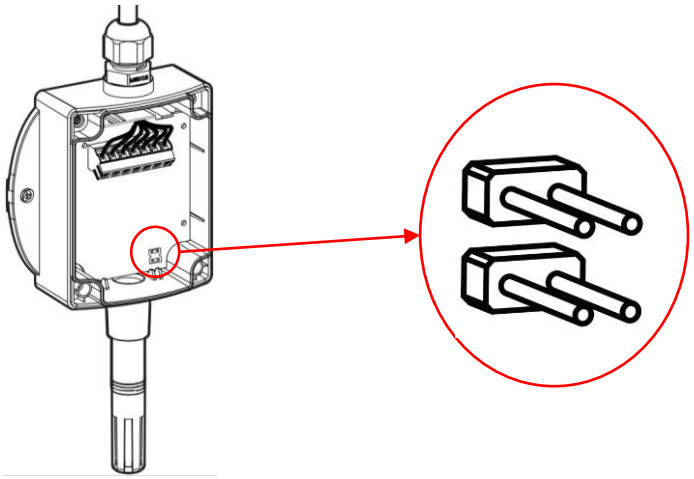
Order information and Technical Specification

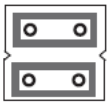
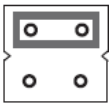
SKU	RH Output	RH accuracy	Temp. Output	Temp. sensor element type	Temp. Accuracy*
HSH-EM2A	4~20mA	2%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-EM2B	4~20mA	2%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-EM2P	4~20mA	2%	Resistance Value	PT1000	0.2K @ 0℃
HSH-EM2M-P	4~20mA	2%	4~20mA	PT1000	0.3K @ 25℃
HSH-EM2M-E	4~20mA	2%	4~20mA	Digital**	0.3K @ 25℃
HSH-EM3A	4~20mA	3%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-EM3B	4~20mA	3%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-EM3P	4~20mA	3%	Resistance Value	PT1000	0.2K @ 0℃
HSH-EM3M-P	4~20mA	3%	4~20mA	PT1000	0.3K @ 25℃
HSH-EM3M-E	4~20mA	3%	4~20mA	Digital	0.3K @ 25℃
HSH-EM5A	4~20mA	5%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-EM5B	4~20mA	5%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-EM5P	4~20mA	5%	Resistance Value	PT1000	0.2K @ 0℃
HSH-EM5M-P	4~20mA	5%	4~20mA	PT1000	0.3K @ 25℃
HSH-EM5M-E	4~20mA	5%	4~20mA	Digital	0.3K @ 25℃
HSH-EV2A	0~10V	2%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-EV2B	0~10V	2%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-EV2P	0~10V	2%	Resistance Value	PT1000	0.2K @ 0℃
HSH-EV2V-P	0~10V	2%	0-10V	PT1000	0.3K @ 25℃
HSH-EV2V-E	0~10V	2%	0-10V	Digital	0.3K @ 25℃
HSH-EV3A	0~10V	3%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-EV3B	0~10V	3%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-EV3P	0~10V	3%	Resistance Value	PT1000	0.2K @ 0℃
HSH-EV3V-P	0~10V	3%	0-10V	PT1000	0.3K @ 25℃
HSH-EV3V-E	0~10V	3%	0-10V	Digital	0.3K @ 25℃
HSH-EV5A	0~10V	5%	Resistance Value	10K NTC	0.3K @ 25℃
HSH-EV5B	0~10V	5%	Resistance Value	20K NTC	0.3K @ 25℃
HSH-EV5P	0~10V	5%	Resistance Value	PT1000	0.2K @ 0℃
HSH-EV5V-P	0~10V	5%	0-10V	PT1000	0.3K @ 25℃
HSH-EV5V-E	0~10V	5%	0-10V	Digital	0.3K @ 25℃

* 1. For the passive output type sensors, the temperature accuracy is the sensing element temperature accuracy. For the current and voltage signal output type sensors, the temperature accuracy is the transmitter accuracy when the power supply is 24VDC.
* 2. The temperature accuracy in the table above is the accuracy of the specified temperature point.
** Temperature sensor element type is **Digital** refers to the sensor type is PN junction type digital temperature sensing element, **Digita**l is for short.

Temperature range setting and Wiring diagrams

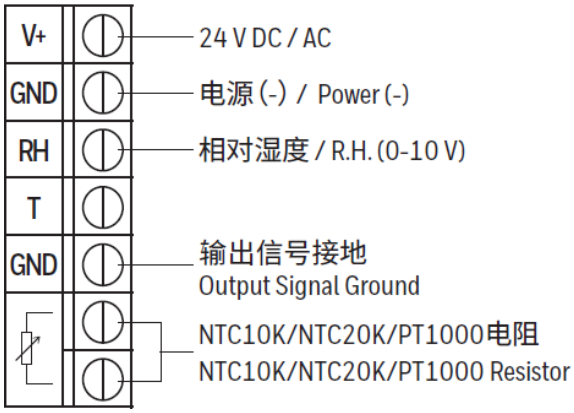
1. Measure Temperature range setting (only for 0-10V and 4-20mA output)



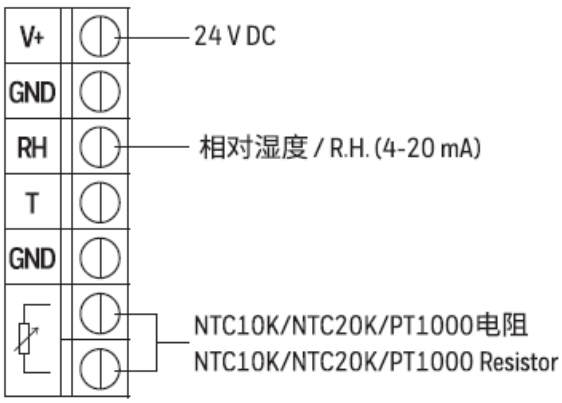
Jumper	Temp. Range
	-40℃ ~ 60 ℃ (default)
	-20℃ ~ 50 ℃
	0℃ ~ 50 ℃

2. Wiring Diagrams: Wiring according to the wiring diagram corresponding to the model.

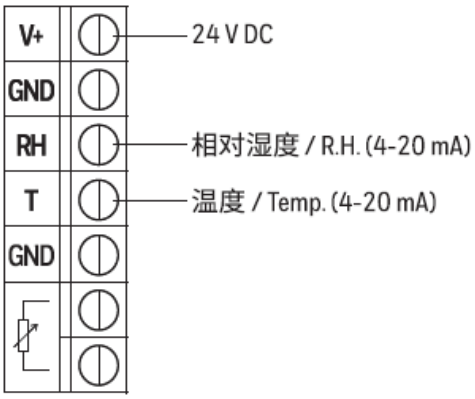
SKU
HSH-EV2A
HSH-EV2B
HSH-EV2P
HSH-EV3A
HSH-EV3B
HSH-EV3P
HSH-EV5A
HSH-EV5B
HSH-EV5P



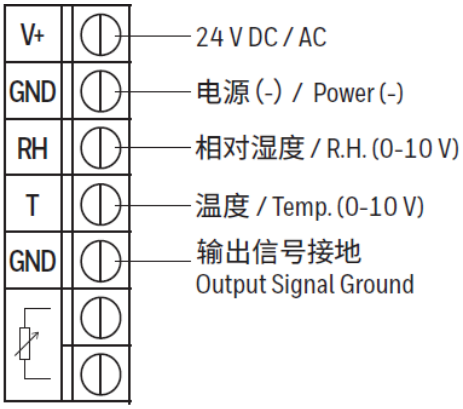
SKU
HSH-EM2A
HSH-EM2B
HSH-EM2P
HSH-EM3A
HSH-EM3B
HSH-EM3P
HSH-EM5A
HSH-EM5B
HSH-EM5P



SKU
HSH-EM2M-X
HSH-EM3M-X
HSH-EM5M-X



SKU
HSH-EV2V-X
HSH-EV3V-X
HSH-EV5V-X

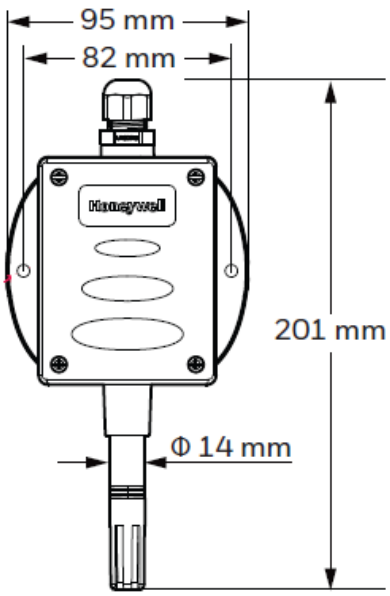


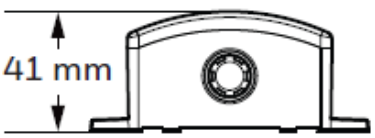
Tips:

1. Connection terminals are suitable for AWG15~22.
2. Due to the influence of wire resistance, the length of the cable between the sensor and the controller will cause the temperature drift. The details are as follows.

Wire gauge	permissible cable length	PT1000 Temp. drift every 10 meters cable	NTC10K / NTC20K Temperature shift
AWG 22	50m	0.272K	Negligible
AWG 20	150m	0.173K	
AWG 18	150m	0.109K	
AWG 17	150m	0.086K	
AWG 16	300m	0.069K	
AWG 15	300m	0.054K	

Dimension





Honeywell Building Technologies
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Website: www.honeywell.com.cn
Service Hotline: 400-842-8487

THE FUTURE IS WHAT WE MAKE IT

Honeywell

TB3 SERIES COMMUNICATING THERMOSTATS

For 2-pipe and 4-pipe Fan Coil Units

Features

- Manual or automatic 3-speed fan control
- On/Off (TB3140) and Modulating (TB3240) Valves Control
- Auto, Heat, Cool and Ventilation modes
- Manual or automatic heating/cooling changeover
- Universal input for external sensor or windows/energy saving contact etc.
- Automatic heating/cooling changeover via changeover sensor
- User setpoint limitation
- Clock and time schedule functions
- Partial/Full keypad lock
- Configurable user parameters
- BACnet MS/TP communication
- Modern styling and capacitive touch buttons
- Blue backlight LCD
- Different colour options; black and white
- EU box flush-mount

Applications

TB3 Series Fan Coil Thermostats used in individual rooms or zones in buildings. It is designed for two and four pipe fan coil units. TB3 Series has one universal input as external sensor or open/close contact input, three relay fan outputs, two relay valve outputs (TB3140), two analogue valve outputs (TB3240) and one EIA-485 (BACnet MS/TP). It controls the fan coil unit depending on the internal room sensor or external return sensor temperature.

Notes on Usage

Please, read this datasheet carefully. TB3 Series thermostat safety rules in accordance with the latest technological developments designed and manufactured. To avoid injury and property damage safety warnings must be observed.

Security Advice-Caution

Assembly, maintenance, diagnostic and repair must be done by authorized service. The power supply of the device is 220VAC (TB3140) and 24V AC/DC (TB3240) and it has no internal fuse. External protection with max C10A (TB3140), C5A (TB3240) circuit breaker required in all cases. Disconnect from power supply before separating front plate.

Honeywell

Ordering Information

SPECIFICATIONS				
PRODUCT CODE	**DESCRIPTION**	**COLOUR**	**POWER**	**COMMUNICATION**
TB3240B/U	3 Digital Outputs (Relay) Fan Control 2 Analog Outputs (0-10V) Valve Control 1 Universal Input	Black	24 V AC/DC 50/60Hz	EIA-485(BACnet MS/TP)
TB3240W/U	3 Digital Outputs (Relay) Fan Control 2 Analog Outputs (0-10V) Valve Control 1 Universal Input	White	24 V AC/DC 50/60Hz	EIA-485(BACnet MS/TP)
TB3140B/U	3 Digital Outputs (Relay) Fan Control 2 Relay Outputs Valve Control 1 Universal Input	Black	220 VAC, 50/60Hz	EIA-485(BACnet MS/TP)
TB3140W/U	3 Digital Outputs (Relay) Fan Control 2 Relay Outputs Valve Control 1 Universal Input	White	220 VAC, 50/60Hz	EIA-485(BACnet MS/TP)

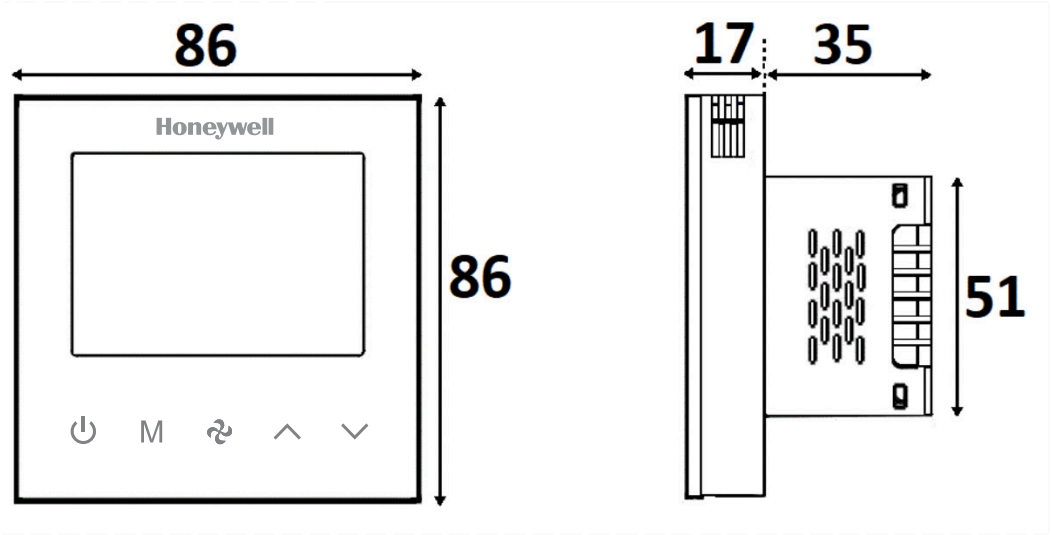
TECHNICAL SPECIFICATION	
FEATURE	**RECOMMENDED**
Power Supply	24V AC/DC 50/60Hz (for TB3240B/TB3240W) 100~220VAC 50/60Hz (for TB3140B/TB3140W)
Power Consumption	Max ~3.0 VA
Electrical Connection	Terminal Connectors
Battery for Real Time Clock (RTC)	Lithium CR1220 3.3V
UI Input Measuring Range	-10°C ... +100°C (+14°F ... +212°F)
Displayed Resolution	0.1°C (1°F)
Inputs	1 Universal Input (NTC 10K or Dry Contact)
Outputs	3 Digital Outputs (3 x 5(2) A Relay) 2 Relay Valve Outputs (2 x 5(2) A Relay)(TB3140) 2 Analog Outputs (2 x 0-10V)(TB3240)
Temperature Accuracy	0.3 deg C
Operating Temperature Range	10-55 deg C
Communication	1 x EIA-485(BACnet MS/TP)
Temperature Setting	5°C ... 40°C (Adjustable) (41°F ... 104°F (Adjustable)
Dimensions	86 x 86 x 52 mm
Mounting	Flush Mounted (Standard EU box)

Mounting Location

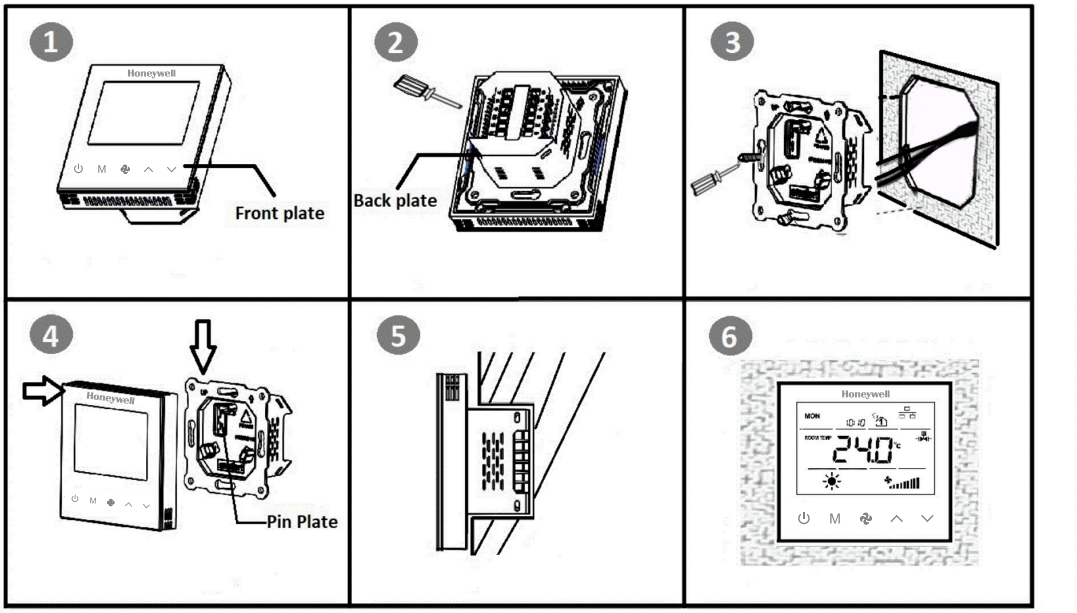
Thermostat is suggested to be installed indoor, a place with around 1.5m height above the floor where represents the average room temperature. It should be away from direct sunlight, any cover or any heat source, to avoid false signal for temperature control.

CAUTION: Power off supply at circuit breaker or fuse before installation to avoid fire, shock or death!

Dimension (mm)



Mounting Location



Note : This Communicating thermostat is suitable for mounting on Standard 75 * 75 * 47 mm Honeywell recommended back box as per BS4662:2006 + A1:2009 standard or equivalent

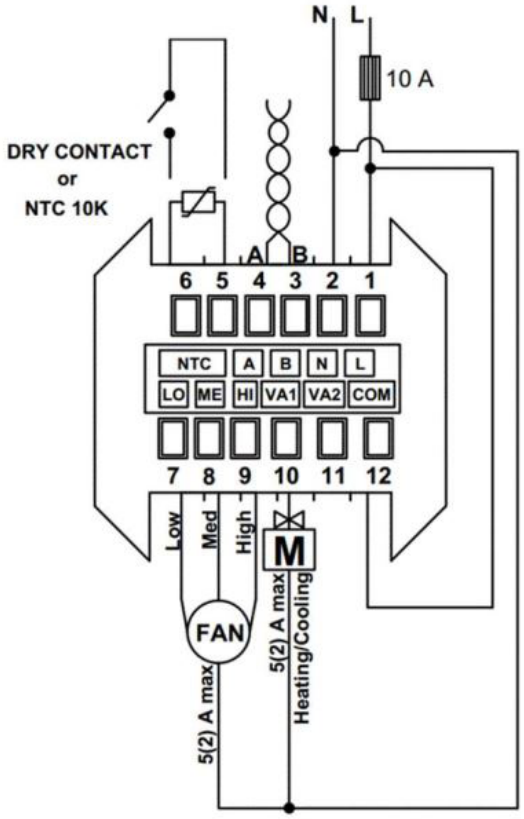
Please follow below instructions during mounting.

Step 1: Take the thermostat out from the package. Get the datasheet inside the package.
Step 2: Connect the wires well according to the wiring diagram below.
Step 3: Separate the front plate and the back plate, and then use screwdriver to fix the back plate into the electric box with 4 screws.
Step 4: Attach the front plate to the back plate, making sure the pin plates on each side are well matched.
Step 5: Refer to the picture after installation.
Step 6: Power on the thermostat to work.

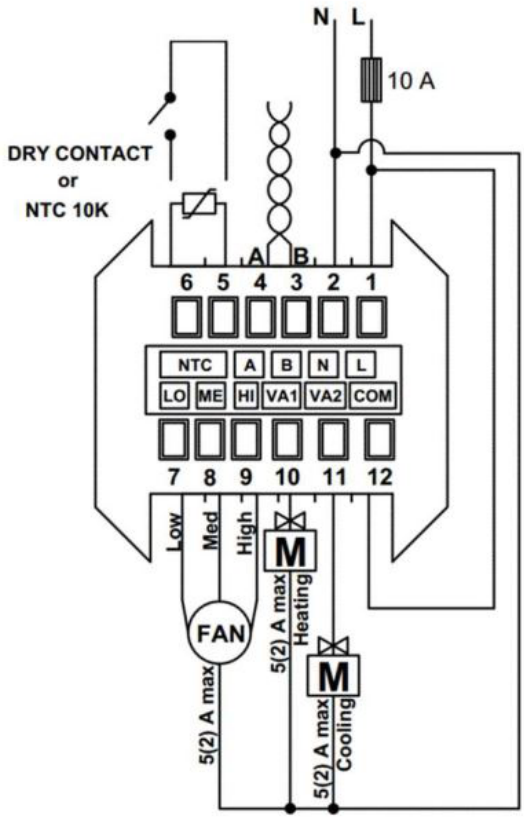
Connection Diagrams

For TB3140 on/off connection diagram

Connection Diagram for 2-Pipe Fan Coil

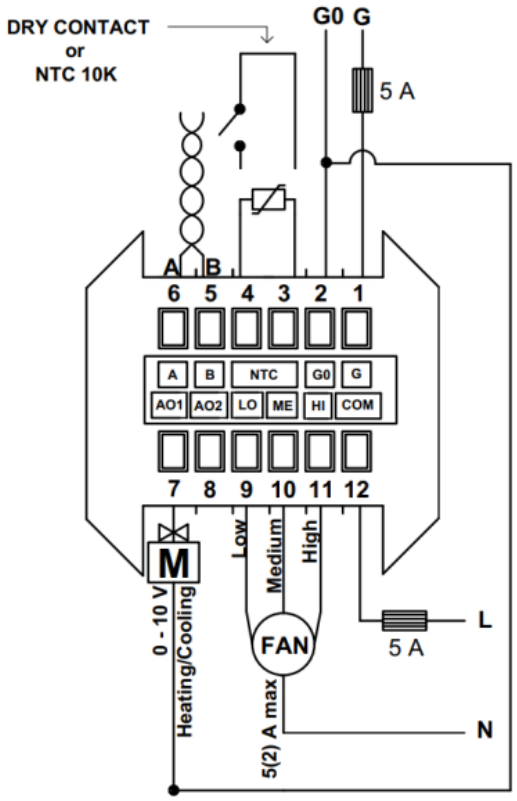


Connection Diagram for 4-Pipe Fan Coil

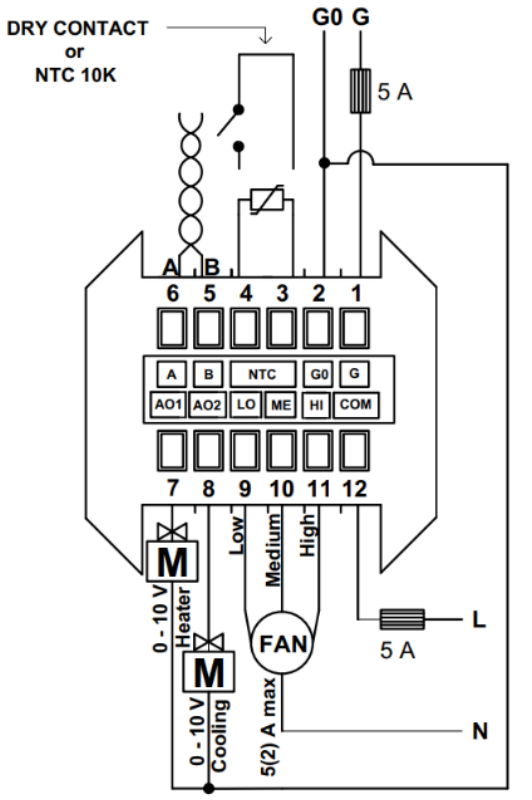


For TB3240 Modulating connection diagram

Connection Diagram for 2-Pipe Fan Coil



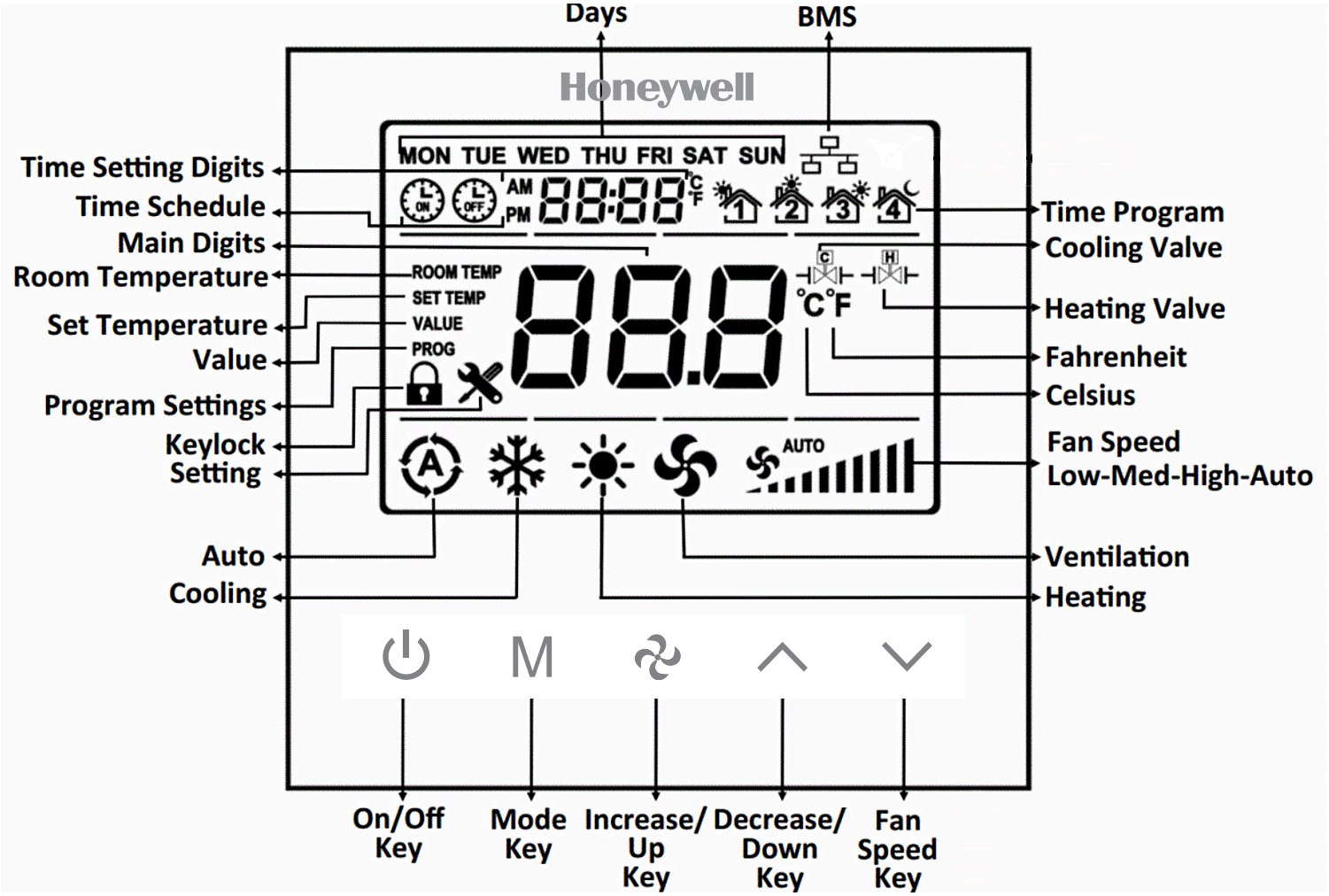
Connection Diagram for 4-Pipe Fan Coil



NOTE: Thermostat has no internal fuse. External protection with max C 5 A circuit breaker required in all cases. Isolate the cables of NTC-dry contact from 230 V(TB3140), 24V AC/DC(TB3240) power supply.

- 5A Fuse not included in Product supply

Display and Operations



User Settings

• **Mode Selection:** When the **"M"** key is pressed, the mode change for 2-Pipe Systems is in the form of Cooling, Heating and Ventilation; Auto, Cooling, Heating and Ventilation for 4-Pipe Systems.

• **Fan Selection:** When the **"** ✤ **"** key is pressed, fan speed can be changed as Low, Med, High, Auto.

• **Time Setting:** When pressing the **"M"** key for 3 seconds, year digits flashes on the panel. **"M"** key is pressing once again, month digit flashes on the panel. **"M"** key is pressing once again, day digit flashes on the panel. **"M"** key is pressing once again, hour digit flashes on the panel. **"M"** key is pressing once again, minute digit flashes on the panel. **"M"** key is pressing once again, day of week digit flashes on the panel. Year, month, day, hour, minute, day of week can be changed by **"▲"** and **"▼"** keys.
Order: Year -> Month -> Day -> Hour -> Minute -> Day Of Week

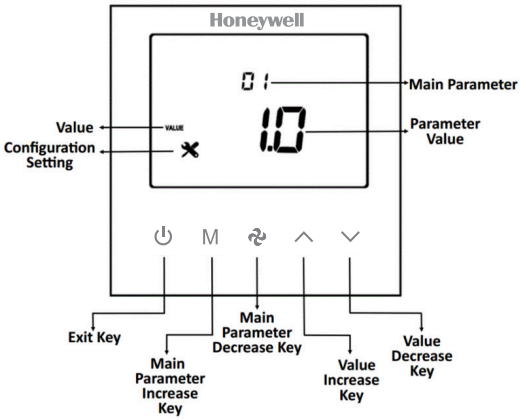
• **Schedule Operations:** Be sure to set clock setting, before making schedule operation. After setting day, to enter the Schedule menu, press the **"M"** key one time. While in the Schedule menu, **"Monday opening time hour digit"** can be flashed. **"M"** key is pressing once again, **"Monday opening time minute digit"** flashes on the panel. Press the **"M"** key to enter the "Monday closing time hour digit" can be flashed. "M" key is pressing once again, **"Monday closing time minute digit"** flashes on the panel. While the digits flashing, hour and minute can be changed by **"▲"** and **"▼"**keys. Press the **"M"** key (one or more times) to select the other day of week.

• **Key Lock Operation:** When pressing **"M"** and **"▲"** key, key lock digit displays on the panel. The panel locked. When the panel is locked, press the **"M"** and **"▲"** keys to unlock panel. **"Key Lock"** options can be changed via parameter P6.
To lock two or more buttons at the same time; sum the numbers of the buttons. To lock mode key and on/off key, 1 (on/off) and 2 (mode) should be added and written 3. To lock setpoint and fan speed, 4 (setpoint) and 8 (fan speed) should be added and written 12.

Configuration

Configuration Menu Description

When the device on or off position, press together "Main Parameter Increase Key" **"M"** and Value Decrease Key **"▼"** for 3 seconds, to enter the Configuration Menu. You can exit the Configuration Menu by pressing Exit Key. Parameter setting screen will return to main screen without any action in 30 seconds. All parameters are stored within an EEPROM ensuring no data loss if the Thermostat is powered off.



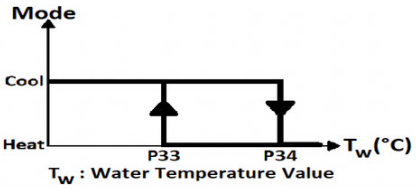
Universal Input (Parameter P32 or via BACnet)

External Sensor for room (parameter P32 = 1)

The device operates according to external temperature sensor value read from universal input.

• External Sensor (parameter P32 = 2)
The device operates according to internal temperature sensor value. The temperature read from the universal input can be monitored from **P36**.

• Changeover sensor (parameter P32 = 3)
If "Universal Input" value is selected as changeover, "dead zone" cannot be used.
Changeover sensor only valid when "Fan Coil Type" is set to 2.
When the water temperature is above **P34** the thermostat changes over to heating mode.
It stays in heating mode until the temperature falls below **P33**.
When the water temperature is below **P33**, the thermostat changes over to cooling mode.
It stays in cooling mode until the temperature rises above **P34**.

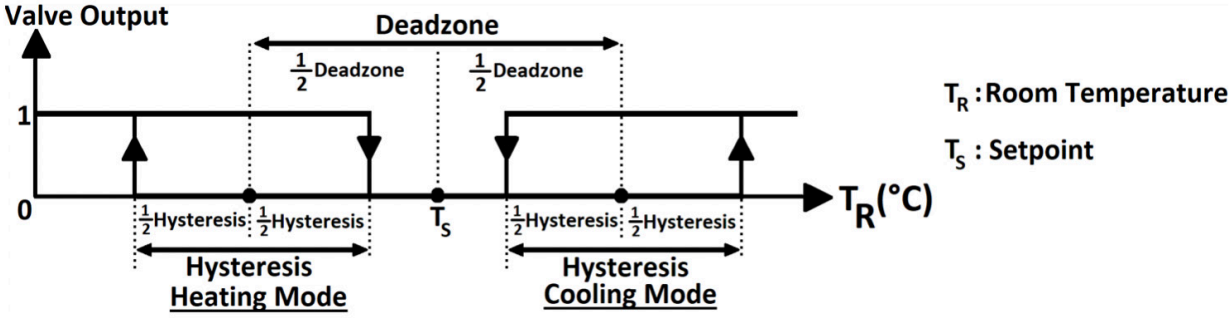


• Windows contact/Energy saving-On/Off (NC Contact) (parameter P32 = 4)
When this contact is closed, the device is in the "ON" position. When this condition is not met, the device shows "OPEN" on the panel and the outputs of the device are passive.

• Windows contact/Energy saving-Off/On (NO Contact) (parameter P32 = 5)
When this contact is opened, the device is in the "ON" position. When this condition is not met, the device shows "OPEN" on the panel and the outputs of the device are passive.

Hysteresis (Parameter P40 or via BACnet)

The output diagram of the valve according to the relation between TS and TR is given below.



Fan/Valve Control Selection (Parameter P41 or via BACnet)

In valve independent mode, the fan operates according to manual fan selection or automatic fan control. When valve is closed, the fan will go on to operate.
In valve dependent mode, the fan will be closed when the valve is closed. If the valve is open, the fan will operate according to manual fan selection or automatic fan control.

Restore Factory Setting (Parameter P45 or via BACnet)

The device can load the factory setting parameters via parameter P45, by changing the value to "1", and pressing button "Exit Key" (⏻). The display shows top and bottom lines loaded step by step during reload process approximately 3 seconds.

Alarms

Alarm Code will appear on the screen, during alarm. If there is more than one alarm, alarms are shown alternately.

- Onboard Sensor Alarm

If the onboard sensor is broken down from the device displayed "**AL01**" on the panel and "Err" on the Main Digits. During the alarm, device outputs will be closed. During the alarm, If the "Universal Input" is selected to "External Sensor", the device continues normal operation.

- External Sensor Alarm

If the "Universal Input" is selected to "External Sensor" also the sensor is broken down, displayed "**AL02**" on the panel and "Err" on the Main Digits. During the alarm, device outputs will be closed. "Universal Input" is set to "Not Used" to eliminate the alarm.

- Changeover Sensor Alarm

If the "Universal Input" is selected to "Changeover Sensor" also the sensor is broken down, displayed "**AL03**" on the panel and "Err" on the Main Digits. During the alarm, device outputs will be closed. "Universal Input" is set to "Not Used" to eliminate the alarm.

Configuration Menu Parameters

NO	NAME OF PARAMETER	PARAMETER DEFINITION	FACTORY DEFAULT
P1	Hardware Version	Device hardware version	1.8
P2	Firmware Version	Device firmware version	1.0
P3	Setpoint High Limit	Range: 5°C ... 40°C (Range: 41°F ... 104°F)	30°C (86°F)
P4	Setpoint Low Limit	Range: 5°C ... 40°C (Range: 41°F ... 104°F)	5°C (41°F)
P5	Main Screen	0 = Room temperature 1 = Setpoint temperature 2 = Swap Room Temperature and Setpoint Temperature	0

P6	Key Lock	0 = Unlocked 1 = Lock On/Off 2 = Lock Mode 4 = Lock Setpoint 8 = Lock Fan Speed 16 = Lock Time Settings 32 = Lock Time Schedule Settings 63 = Locked All (*) To lock two or more buttons at the same time; sum the numbers of the buttons. To lock setpoint and fan speed, 4 (Setpoint) and 8 (Fan Speed) should be added and written 12.	0
P7	Celsius or Fahrenheit	0 = Celsius 1 = Fahrenheit	0
P8	Time Format	0 = 24 hours clock 1 = 12 hours clock (AM/PM) (*) The system Time Format is 24 hours clock. This parameter adjusts how to clock format on the panel/screen will shows.	1
P9	Time Schedule Enable	0 = Disable 1 = Enable	1
P10	Screen Saver	0 = Screen Saver Disabled 1 = Display On 2 = Display Off 3 = Only Room Temperature 4 = Room Temperature and Clock 5 = Swap Room Temperature and Setpoint with Clock	4
P11	Screen Saver Mode Delay	Range: 10 ... 150 seconds	60 sec.
P12	LCD Brightness	Range: 1 ... 5 stage	5
P13	Buzzer Stage	Range: 0 ... 5 stage	3
P14	Power Failure	This parameter adjusts the condition that the device will continue when the power failure. 0 = Device starts off 1 = Device starts on 2 = Keep State Before Power Failure	2
P15	Screen Off State Status	0: Screen off 1: Room Temperature 2: Room Temperature and Off 3: Room Temperature and Clock	1
P16 (*)	Valve Proportional Band	This parameter determines proportionally the output value of the valve depending on the difference between Room Temperature and Set Point. Range: 1 ... 100 => 0.1°C ... 10°C	20
P17 .... P29	Reserved	-	-
P30	Fan Coil Type	2 = 2 pipe system 4 = 4 pipe system	4
P31	Internal Temperature Sensor Calibration	Range: -10°C ... 10°C and 0.1°C steps (Range: -18°F ... 18°F and 1°F steps)	0°C (0°F)
P32	Universal Input	0 = Not used 1 = External Temperature sensor for room (NTC 10K) 2 = External Temperature sensor (NTC 10K) 3 = Changeover sensor (NTC 10K) 4 = Windows contact/Energy saving-On/Off (NC Contact) 5 = Windows contact/Energy saving-Off/On (NO Contact)	0
P33	Changeover Temperature for Cooling	Range: 10°C ... 25°C. Only valid when P32 is set to 3 (Range: 50°F ... 77°F. Only valid when P32 is set to 3)	16°C (60°F)
P34	Changeover Temperature for Heating	Range: 26°C ... 45°C. Only valid when P32 is set to 3 (Range: 78°F ... 113°F. Only valid when P32 is set to 3)	28°C (82°F)
P35	Mode Change Delay	Range: 0 ... 255 minutes	3 min.
P36	Universal Input Temperature	If P32 is "1", "2" or "3", this parameter shows the sensor temperature.	0°C (0°F)
P37	Universal Input Temperature Calibration	Range: -10°C ... 10°C and 0.1°C steps (Range: -18°F ... 18°F and 1°F steps)	0°C (0°F)
P38	Auto Mode Enable	0 = Disable (Only valid when P30 is set to 4) 1 = Enable	1

P39	Dead Zone	Range: 0°C ... 15°C. Only valid when P38 is set to 1 (Range: 0°F ... 27°F. Only valid when P38 is set to 1)	2°C (3°F)
P40	Hysteresis	Range: 0°C ... 15°C (Range: 0°F ... 27°F)	1°C (1°F)
P41	Fan/Valve Control Selection	0 = Valve independent 1 = Valve dependent	1
P42	Fan Stage Change Delay	Range: 0 ... 5 seconds	2 sec.
P43	Fan Off Delay	Range: 0 ... 60 seconds	0 sec.
P44	BMS Icon Enable	0 = Disable 1 = Enable	1
P45	Restore Factory Setting	0 = Factory Setting Disable 1 = Factory Setting Started	0
P46	Baudrate	1 = 9600bps 3 = 38400bps 2 = 19200bps 4 = 76800bps	4
P47	MAC Address	Range: 001 ... 127	1

(*): Only valid for TB3240x model.

BACnet Parameters

8, n, 1

MAC Address: 1 ... 127. **Default 1**

Baudrate : 9600, 19200, 38400, 76800. **Default 76800**

Note 1: The MAC address can be changed via configuration menu.

Note 2: Device Instance Number (Device ID) is automatically calculated as below;

Device ID = 17 * 1000 + MAC

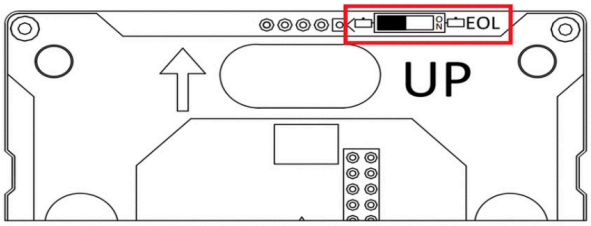
For example: Mac: 1 => Device ID = 17 * 1000 + 1 = 17001

When the MAC address is changed via configuration menu, the Device ID is automatically recalculated to avoid network ID conflict.

As a property of Device Object, Device ID value is writable via BACnet between 0 and 4194302. Once the Device ID is changed via BACnet, Device ID automatic calculation mentioned above is ineffective.

Note 3: MAC address and baudrate changings will become effective after power off and power on.

End Of Line (EOL) Resistor



Flip the TB Series thermostat front plate, you will see the EOL resistor DIP Switch at the top right corner. The default is **OFF** position (Left). If you would like to enable EOL (120 Ohm) resistor, change it to **ON** Position (Right).

OFF Position

ON Position

TB3240 Series BACnet Registers

NO	OBJECT	VALUE	OBJECT NAME	FUNCTION	DEFAULT	READ (R)/ WRITE (W)

Analog Inputs

1	Analog Input #1	-9.9°C ... 99.9°C (14.1°F ... 211.8°F)	Room Temperature	This parameter shows the room temperature value.	-	R
2	Analog Input #2	-9.9°C ... 99.9°C (14.1°F ... 211.8°F)	Universal Input Temperature	If "Universal Input" is "1", "2" or "3", this parameter shows the sensor temperature.	-	R

Analog Values for TB3140x

1	Analog Value #1	0 ... 3	Mode	0 = Fan Only 1 = Heat 2 = Cool 3 = Auto	3	R/W
2	Analog Value #2	1 ... 4	Fan Speed	1 = Stage 1 2 = Stage 2 3 = Stage 3 4 = Auto	1	R/W
3	Analog Value #3	Set Point Low Limit ... Set Point High Limit	Set Point	This parameter is the desired room temperature value.	21°C (69.8°F)	R/W
4	Analog Value #4	5°C ... 40°C (41°F ... 104°F)	Set Point High Limit	This parameter adjusts the high limit for desired room temperature.	30°C (86°F)	R/W
5	Analog Value #5	5°C ... 40°C (41°F ... 104°F)	Set Point Low Limit	This parameter adjusts the low limit for desired room temperature.	5°C (41°F)	R/W
6	Analog Value #6	0 ... 63	Key Lock	0 = Unlocked 1 = Lock On/Off 2 = Lock Mode 4 = Lock Setpoint 8 = Lock Fan Speed 16 = Lock Time Settings 32 = Lock Time Schedule Settings 63 = Locked All (*) To lock two or more buttons at the same time; sum the numbers of the buttons. To lock setpoint and fan speed, 4 (Setpoint) and 8 (Fan Speed) should be added and written 12.	0	R/W
7	Analog Value #7	0 ... 2	Power Failure	This parameter adjusts the condition that the device will continue when the power failure. 0 = Device starts off 1 = Device starts on 2 = Keep State Before Power Failure	2	R/W
8	Analog Value #8	2 ... 4	Fan Coil Type	2 = 2 Pipe System 4 = 4 Pipe System	4	R/W
9	Analog Value #9	-10°C ... 10°C (-18°F ... 18°F)	Internal Temperature Sensor Calibration		0°C (0°F)	R/W
10	Analog Value #10	0 ... 5	Universal Input	0 = Not Used 1=External temperature sensor for room (NTC 10K) 2 = External temperature sensor (NTC 10K) 3 = Changeover sensor (NTC 10K) 4 = Windows contact/Energy saving-On/Off (NC Contact) 5 = Windows contact/Energy saving-Off/On (NO Contact)	0	R/W
11	Analog Value #11	10°C ... 25°C (50°F ... 77°F)	Changeover Temperature for Cooling	If "Universal Input" is set to "3", this parameter adjusts changeover temperature for cooling mode.	16°C (60.8°F)	R/W
12	Analog Value #12	26°C ... 45°C (78.8°F ... 113°F)	Changeover Temperature for Heating	If "Universal Input" is set to "3", this parameter adjusts changeover temperature for heating mode.	28°C (82.4°F)	R/W
13	Analog Value #13	0 min. ... 255 min.	Mode Change Delay	This parameter adjusts delay time between heat and cool modes.	3 min.	R/W
14	Analog Value #14	-10°C ... 10°C (-18°F ... 18°F)	Universal Input Temperature Calibration		0°C (0°F)	R/W
15	Analog Value #15	0°C ... 15°C (0°F ... 27°F)	Dead Zone	If "Mode" is set to "Auto", this parameter adjusts dead zone.	2°C (3.6°F)	R/W
16	Analog Value #16	0°C ... 15°C (0°F ... 27°F)	Hysteresis	This parameter adjusts hysteresis.	1°C (1.8°F)	R/W
17	Analog Value #17	0 sec. ... 5 sec.	Fan Stage Change Delay	This parameter adjusts delay of the changing range the fan.	2 sec.	R/W
18	Analog Value #18	0 sec. ... 60 sec.	Fan Off Delay	This parameter adjusts delay of the closing time the fan.	0 sec.	R/W

19	Analog Value #19	0 ... 3	Fan Status	0 = Off 2 = Med 1 = Low 3 = High	0	R
20	Analog Value #20	0 ... 3	Alarm	This parameter indicates the alarm state. 0 = No alarm 1 = Onboard Sensor Alarm 2 = External Sensor Alarm 3 = Changeover Sensor Alarm	0	R
21	Analog Value #21	2017 ... 2099	Current Year	This parameter adjusts the current year.	2020	R/W
22	Analog Value #22	1 ... 12	Current Month	This parameter adjusts the current month.	-	R/W
23	Analog Value #23	1 ... 31	Current Day	This parameter adjusts the current day.	-	R/W
24	Analog Value #24	00 ... 23	Current Hour	This parameter adjusts the current hour.	-	R/W
25	Analog Value #25	00 ... 59	Current Minute	This parameter adjusts the current minute.	-	R/W
26	Analog Value #26	1 ... 4	Baudrate	1 = 9600bps 2 = 19200bps 3 = 38400bps 4 = 76800bps	4	R/W

Analog Values for TB3240x

1	Analog Value #1	0 ... 3	Mode	0 = Fan Only 1 = Heat 2 = Cool 3 = Auto	3	R/W
2	Analog Value #2	1 ... 4	Fan Speed	1 = Stage 1 2 = Stage 2 3 = Stage 3 4 = Auto	1	R/W
3	Analog Value #3	Set Point Low Limit ... Set Point High Limit	Set Point	This parameter is the desired room temperature value.	21°C (69.8°F)	R/W
4	Analog Value #4	5°C ... 40°C (41°F ... 104°F)	Set Point High Limit	This parameter adjusts the high limit for desired room temperature.	30°C (86°F)	R/W
5	Analog Value #5	5°C ... 40°C (41°F ... 104°F)	Set Point Low Limit	This parameter adjusts the low limit for desired room temperature.	5°C (41°F)	R/W
6	Analog Value #6	0 ... 63	Key Lock	0 = Unlocked 1 = Lock On/Off 2 = Lock Mode 4 = Lock Setpoint 8 = Lock Fan Speed 16 = Lock Time Settings 32 = Lock Time Schedule Settings 63 = Locked All (*) To lock two or more buttons at the same time; sum the numbers of the buttons. To lock setpoint and fan speed, 4 (Setpoint) and 8 (Fan Speed) should be added and written 12.	0	R/W
7	Analog Value #7	0 ... 2	Power Failure	This parameter adjusts the condition that the device will continue when the power failure. 0 = Device starts off 1 = Device starts on 2 = Keep State Before Power Failure	2	R/W
8	Analog Value #8	2 ... 4	Fan Coil Type	2 = 2 Pipe System 4 = 4 Pipe System	4	R/W
9	Analog Value #9	-10°C ... 10°C (-18°F ... 18°F)	Internal Temperature Sensor Calibration		0°C (0°F)	R/W

10	Analog Value #10	0 ... 5	Universal Input	0 = Not Used 1=External temperature sensor for room (NTC 10K) 2 = External sensor for room (NTC 10K) 3 = Changeover sensor (NTC 10K) 4 = Windows contact/Energy saving-On/Off (NC Contact) 5 = Windows contact/Energy saving-Off/On (NO Contact)	0	R/W
11	Analog Value #11	10°C ... 25°C (50°F ... 77°F)	Changeover Temperature for Cooling	If "Universal Input" is set to "3", this parameter adjusts changeover temperature for cooling mode.	16°C (60.8°F)	R/W
12	Analog Value #12	26°C ... 45°C (78.8°F ... 113°F)	Changeover Temperature for Heating	If "Universal Input" is set to "3", this parameter adjusts changeover temperature for heating mode.	28°C (82.4°F)	R/W
13	Analog Value #13	0 min. ... 255 min.	Mode Change Delay	This parameter adjusts delay time between heat and cool modes.	3 min.	R/W
14	Analog Value #14	-10°C ... 10°C (-18°F ... 18°F)	Universal Input Temperature Calibration		0°C (0°F)	R/W
15	Analog Value #15	0°C ... 15°C (0°F ... 27°F)	Dead Zone	If "Mode" is set to "Auto", this parameter adjusts dead zone.	2°C (3.6°F)	R/W
16	Analog Value #16	0°C ... 15°C (0°F ... 27°F)	Hysteresis	This parameter adjusts hysteresis.	1°C (1.8°F)	R/W
17	Analog Value #17	0 sec. ... 5 sec.	Fan Stage Change Delay	This parameter adjusts delay of the changing range the fan.	2 sec.	R/W
18	Analog Value #18	0 sec. ... 60 sec.	Fan Off Delay	This parameter adjusts delay of the closing time the fan.	0 sec.	R/W
19	Analog Value #19	0 ... 3	Fan Status	0 = Off 2 = Med 1 = Low 3 = High	0	R
20	Analog Value #20	1 ... 100	Valve Proportional Band	This parameter determines proportionally the output value of the fan depending on the difference between Room Temperature and Set Point. Range: 0.1°C ... 10°C	20	R/W
21	Analog Value #21	0 ... 100	VA1 State	0V.. 10V	0	0
22	Analog Value #22	0 ... 100	VA2 State	0V.. 10V	0	0
23	Analog Value #23	0 ... 3	Alarm	This parameter indicates the alarm state. 0 = No alarm 1 = Onboard Sensor Alarm 2 = External Sensor Alarm 3 = Changeover Sensor Alarm	0	R
24	Analog Value #24	2017 ... 2099	Current Year	This parameter adjusts the current year..	2020	R/W
25	Analog Value #25	1 ... 12	Current Month	This parameter adjusts the current month.	-	R/W
26	Analog Value #26	1 ... 31	Current Day	This parameter adjusts the current day.	-	R/W
27	Analog Value #27	00 ... 23	Current Hour	This parameter adjusts the current hour.	-	R/W
28	Analog Value #28	00 ... 59	Current Minute	This parameter adjusts the current minute.	-	R/W
29	Analog Value #29	1 ... 4	Baudrate	1 = 9600bps 2 = 19200bps 3 = 38400bps 4 = 76800bps	4	R/W

Binary Inputs

1	Binary Input #1	0 ... 1	Universal Input Digital Input Value	0 = Off 1 = On	-	R

Binary Values for TB3140x

1	Binary Value #1	0 ... 1	Start/Stop	0 = Stop 1 = Start	1	R/W
2	Binary Value #2	0 ... 1	Celsius or Fahrenheit	0 = Celsius 1 = Fahrenheit	0	R/W
3	Binary Value #3	0 ... 1	Auto Mode Enable	0 = Disable 1 = Enable	1	R/W
4	Binary Value #4	0 ... 1	Fan/Valve Control Selection	0 = Valve Independent 1 = Valve Dependent	1	R/W
5	Binary Value #5	0 ... 1	VA1 Status	0 = Valve Closed 1 = Valve Opened	-	R
6	Binary Value #6	0 ... 1	VA2 Status	0 = Valve Closed 1 = Valve Opened	-	R
7	Binary Value #7	0 ... 1	Restore Factory Setting	0 = Factory Setting Disable 1 = Factory Setting Started	0	R/W

Binary Values for TB3240x

1	Binary Value #1	0 ... 1	Start/Stop	0 = Stop 1 = Start	1	R/W
2	Binary Value #2	0 ... 1	Celsius or Fahrenheit	0 = Celsius 1 = Fahrenheit	0	R/W
3	Binary Value #3	0 ... 1	Auto Mode Enable	0 = Disable 1 = Enable	1	R/W
4	Binary Value #4	0 ... 1	Fan/Valve Control Selection	0 = Valve Independent 1 = Valve Dependent	1	R/W
5	Binary Value #5	0 ... 1	Restore Factory Setting	0 = Factory Setting Disable 1 = Factory Setting Started	0	R/W

For more information

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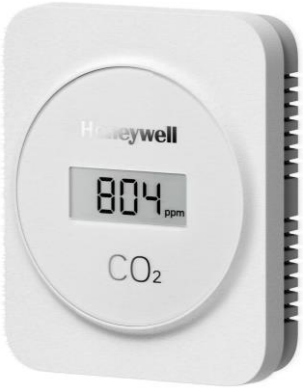
THE
FUTURE
IS
WHAT
WE
MAKE IT

Honeywell

HSCD Series

Carbon Dioxide Sensor

Honeywell HSCD series carbon dioxide (CO_2) sensors include two types: indoor installation and duct installation. They are mainly used for detecting carbon dioxide concentration in air of indoor and duct.



Features

- Use high-precision single/dual-wavelength NDIR sensors.
- Optional display function, LCD digital display shows clearly.
- CO_2 sensing component module can be replaced on site.
- Multiple software and hardware protection design ensures high stability.
- CO_2 sensors can be manually calibrated on site.
- The air duct type adopts a screw-free clamshell snap-on design, making wiring and commissioning easy.
- Integrated RS485 matching resistor to facilitate on-site commissioning(Modbus models only).
- RS485 isolation design can isolate high voltage and enhance immunity to ground loops and common-mode signal interference (Modbus models only).

Order Information and Technical Specification

SKU	Installation	Sensing component	Output signal or Protocol	Display
HSCD-R1U	Room	Single wavelength NDIR	0-10V/2-10V//4-20mA	NO
HSCD-R1UL	Room	Single wavelength NDIR	0-10V/2-10V//4-20mA	YES
HSCD-R2U	Room	Dual wavelength NDIR	0-10V/2-10V//4-20mA	NO
HSCD-R2UL	Room	Dual wavelength NDIR	0-10V/2-10V//4-20mA	YES
HSCD-R2M	Room	Dual wavelength NDIR	Modbus RTU	NO
HSCD-R2ML	Room	Dual wavelength NDIR	Modbus RTU	YES
HSCD-D1U	Duct	Single wavelength NDIR	0-10V/2-10V//4-20mA	NO
HSCD-D1UL	Duct	Single wavelength NDIR	0-10V/2-10V//4-20mA	YES
HSCD-D2U	Duct	Dual wavelength NDIR	0-10V/2-10V//4-20mA	NO
HSCD-D2UL	Duct	Dual wavelength NDIR	0-10V/2-10V//4-20mA	YES
HSCD-D2M	Duct	Dual wavelength NDIR	Modbus RTU	NO
HSCD-D2ML	Duct	Dual wavelength NDIR	Modbus RTU	YES

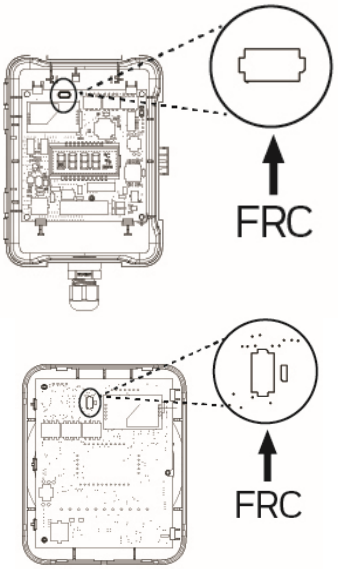
Basic Parameters

CO_2 Measurement principle	Single Wavelength NDIR: Single Wavelength non-dispersive infrared Dual Wavelength NDIR: Dual Wavelength non-dispersive infrared
Sensor Accuracy* （@ 25℃）	Single Wavelength NDIR：±40PPM ±3% of measuring value Dual Wavelength NDIR：±30PPM ±3% of measuring value
Repeatability	±20PPM ± 1% of measuring value
Temperature Dependence	± 2.5 PPM / K (Dual Wavelength NDIR)
Display Resolution	1 PPM
Responding Time（T63）	**A. Sensing Module Responding Time：** Single Wavelength NDIR: ≤30S Dual Wavelength NDIR: ≤20S **B. Whole Unit Responding Time (Typically):** Room Installation Type Single Wavelength NDIR: ≤75S Dual Wavelength NDIR: ≤45S Duct Installation type (air flowrate=4 m/s) Single Wavelength NDIR: ≤60S Dual Wavelength NDIR: ≤50S
Warm-up Time	Single Wavelength NDIR: ≤ 60 S Dual Wavelength NDIR： ≤ 120 S
Power Supply	19.2~35VDC SELV；24VAC ± 20% 50/60Hz Class 2
Power Consumption	≤ 3VA
Analog Output Load	0-10V / 2-10V : Min 5 KΩ 4-20mA： Max 500 Ω
Analog Output Resolution	0-10V / 2-10V ： 10mV 4-20mA： 0.02mA
Analog Output Conversion Accuracy	0-10V / 2-10V : ± （20mV+2% Output Value） 4-20mA: ±（0.3mA+2% Output Value）
Measuring Range	0 to 9999 PPM
Measurement Range with Guaranteed Accuracy	400 to 2000 PPM
Analog Output Range	0 to 2000 PPM
Number of connected Modbus RTU devices	A maximum of 64 devices can be connected to a single network segment
Operation Environment	Single Wavelength NDIR：0 ℃ to 50 °C , 0 to 85 %RH (Non-condensing) Dual Wavelength NDIR：0℃ to 50 °C， 0 to 95 %RH (Non-condensing)
Storage Environment	Single Wavelength NDIR：-20 ℃ to 50 °C , 0 to 85 %RH (Non-condensing) Dual Wavelength NDIR：-20 ℃ to 50 °C， 0 to 95 %RH (Non-condensing)
Protection Standard (GB4208/IEC60529)	Duct Installation type: IP65/NEMA 4；IP20 for probe Room Installation Type: IP30
Automatic Self-Calibration Function	Available （On by default）
Calibration-free Service Life	10 Years （ACS function enabled）
Housing Materials	PC （UL94-V0）
Certification	CE （EN IEC 61326-1:2021); China RoHS

* 1. The carbon dioxide sensor is an optical sensor based on the infrared detection principle, so the accuracy of the sensor will deviate under continuous vibration.
2. The carbon dioxide sensor is a precision device. After handling, transportation and installation, the sensing accuracy may deviate. It will return to normal after being powered on for at least 7 days.

Function & Setting

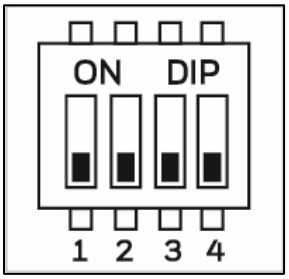
1. User manual forced re-calibration (FRC) operation



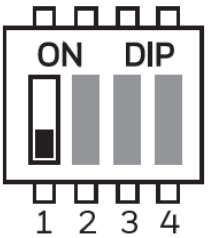
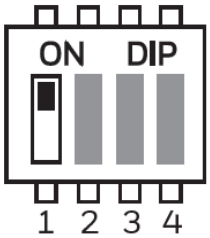
1) Power on the Sensor product and place it in an outdoor atmospheric environment or a 400PPM carbon dioxide standard gas environment. The product needs to be covered to avoid sunlight and strong winds;
2) Anti-static measures need to be taken, long press the button (FRC) on the PCB board for 4 seconds;
3) For products without an LCD version, the LED will flash slowly, on for 2 seconds and off for 2 seconds (indicating that it is being calibrated); for products with an LCD version, "CALI" will be displayed as shown on the right.
4) The stability of the ambient carbon dioxide concentration must be maintained during the calibration process. The calibration ends automatically after 11 minutes and the product returns to normal operation.

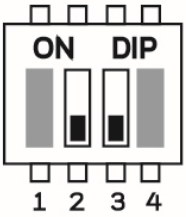
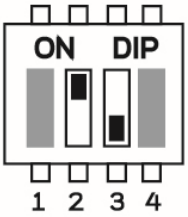
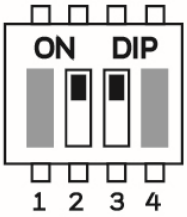
2. DIP setting

A. Analog output type

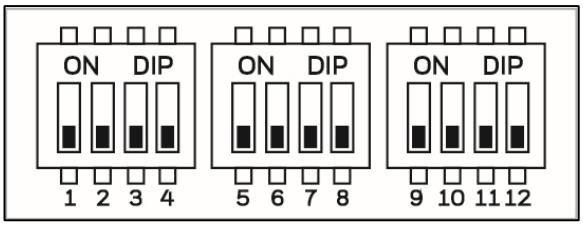


DIP No.	No. 1	No.2 & No.3
Function	Automatic Self-Calibration（ASC）	Analog output option

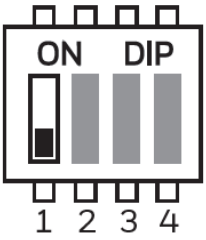
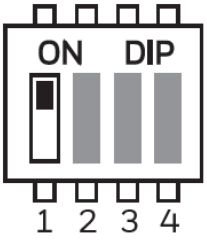
Set status of ASC: DIP NO.1		
DIP Position		
Automatic Self-Calibration （ASC）	Enable (Default)	Disable

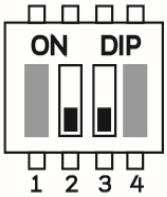
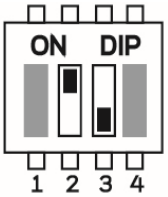
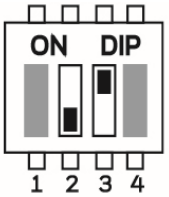
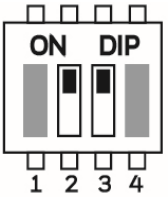
Select analog output signal type: DIP No.2 and No.3			
DIPs position			
Analog output	4-20mA (Default)	0-10V	2-10V

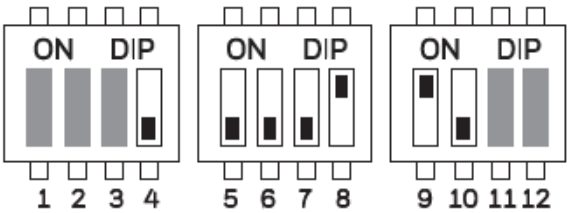
B . Modbus Communication Type

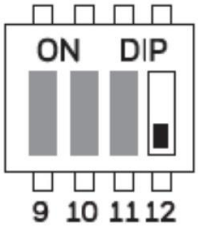
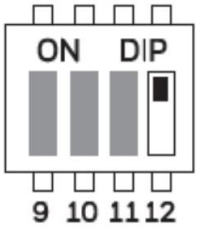


DIP No.	No. 1	No.2 & No.3	No.4 to No.10	No.11	No.12
Function	ASC	Modbus Baud Rate	Modbus Address	Reserved	RS485 Terminal Resistor

Set the mode of ASC: DIP NO.1		
DIP Position		
Automatic Self-Calibration （ASC）	Enable (Default)	Disable

Set Modbus baud rate: DIP No.2 and No.3				
DIPs Position				
Baud rate	9600 (Default)	4800	19200	38400

Set Modbus address: DIP No.4 to No.10	
DIPs Position	
How to set Modbus address	1. DIPs No.4 to No.10 represent 1, 2, 4, 8, 16, 32 and 64 respectively. 2. DIPs up to indicate selected number 3. The sum of the selected numbers is the Modbus address code. As shown in the picture above: DIP No.8 and No.9 are selected, 16+32=48, so the address code setting value is 48.

Set the mode of RS485 terminal resistor: DIP No.12		
DIP Position		
Mode	Enable (Default)	Disable

Modbus RTU Protocol

Register Address Information

ID	ID function	Function	Qty.	Readable（R）/Writable（W）	Data Type
0x01	Gas Concentration	Current gas concentration Unit: PPM	1	R	short
0x02	Reserved		1	R	short
0x03	Reserved		1	R	short
0x04	ASC Status	ASC status, 0-Disable; 1-Enable	1	R	short
0x05	FRC Target Value	FRC Target Value Unit: PPM 400ppm) Modify FRC Value by writing to this ID (Rang is 400 to 1000ppm)	1	R/W	short
0x06	Reserved		1	R	short
0x07	Reserved		1	R	short
0x08	Reserved		1	R	short
0x09	Error Code	0=Normal; 1=Sensor Error; 2=System Error	1	R	short

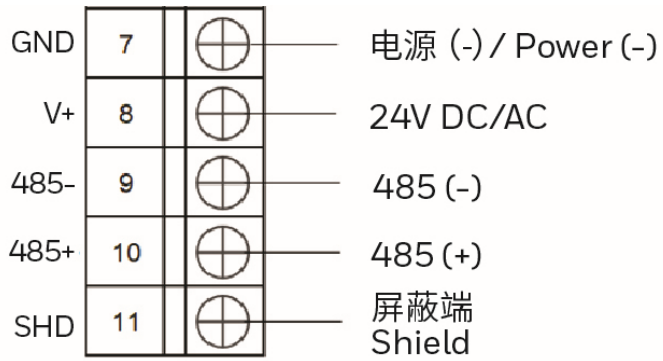
Function Code Information

Code	Function	Error Code	Exception Code
0x03	Read holding register	0x83	01 or 02 or 03
0x06	Write single register	0x86	01 or 02 or 03
0x10	Write Multiple Registers	0x90	01 or 02 or 03

Wiring diagrams and instructions

0-10V/2-10/4-20mA Analog Output Type

Modbus Communication Type



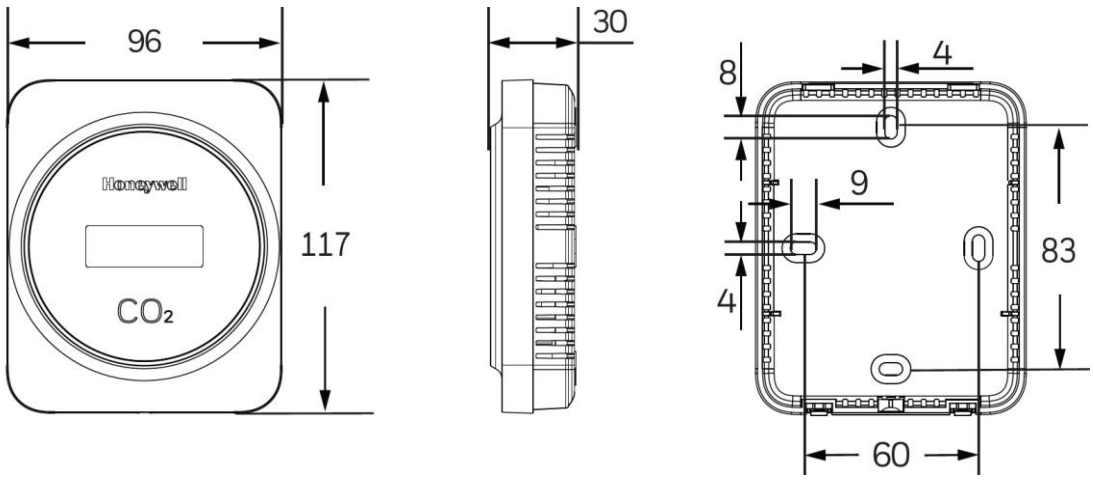
Tips:
1. The terminals support AWG15 to AWG22 line types.
2. The maximum lengths of different conductors are as follows.

Line Type	AWG15	AWG16	AWG17	AWG18	AWG20	AWG22
Max length	300 Meters	300 Meters	150 Meters	150 Meters	150 Meters	50 Meters

3. RS485 wiring requires a shielded cable with a maximum allowable length of 1200 meters.

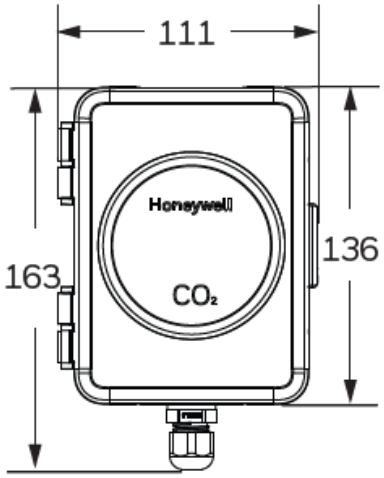
Dimension (mm)

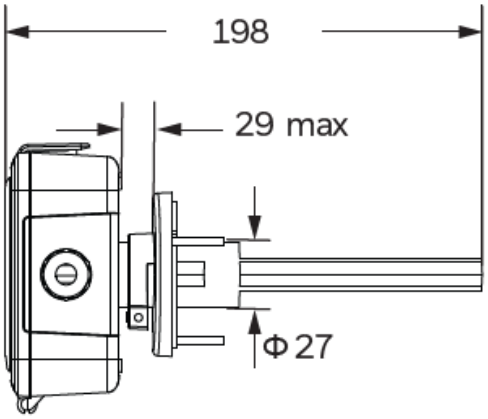
Room Installation Type



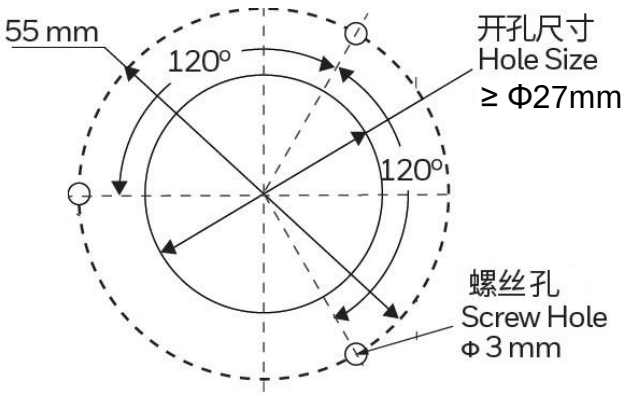
Dimension (mm)

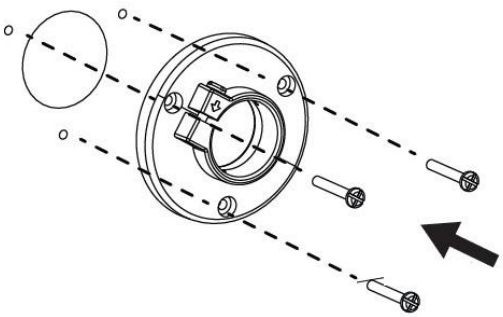
Duct Installation Type





Fixed flange and conduit mounting hole





Honeywell Building Technologies
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THE FUTURE IS WHAT WE MAKE IT

Honeywell

INDOOR AIR QUALITY SENSOR TR50

The Honeywell TR50 IAQ Sensor is an advanced, configurable device for commercial buildings. This sensor monitors:

- Temperature (T)
- Relative Humidity (RH)
- Carbon Dioxide (CO_2)
- Particulate Matter (PM1.0, PM2.5, PM10)
- Total Volatile Organic Compound (TVOC)

Flexible building automation system integration via BACnet MS/TP, Modbus, Sylk™ Bus (coming soon) protocols. Customizable display and sensor thresholds with stable long-term accuracy for minimal maintenance or recalibration.

FEATURES AND BENEFITS

MULTI-SENSOR

You spend 90% of your time indoors. Know more about the air in your building.

Easy integration with third party controllers or Honeywell Optimizer controllers, with the added option for utilizing the Healthy Buildings Dashboard or the Intelligent Building Optimizer to help ensure that ventilation and filtrations are always optimized for the best productivity, and energy outcomes.

BUILT TO LAST

Long Term Stability is ensured by us accurate and resilient sensors that come pre-calibrated from the factory and do not need to be re-calibrated in the field.

The ability for over the wire firmware updates ensures time savings when upgrades are available, useful to enhance existing features, and any bug fixes.

BUILT FOR FLEXIBILITY

The LED ring light changes colors from green to yellow to red based on the parameter levels detected.

The colored LED can also be switched to a neutral mode with only white light.

Show the users why parameters are important by locking certain ones so they are always visible and hiding the ones, you do not want to see.

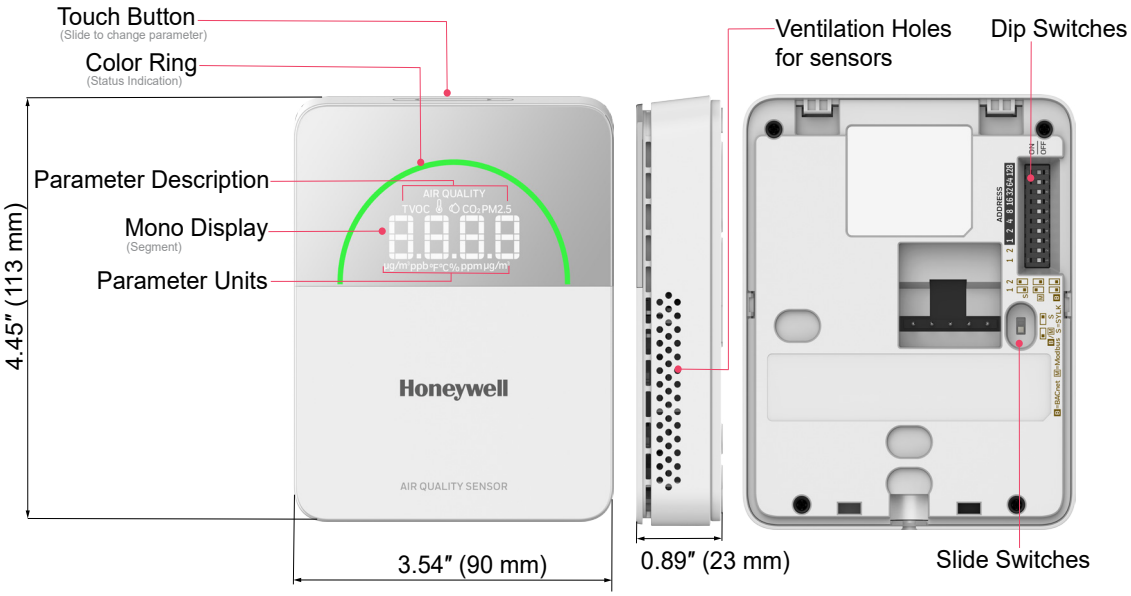
AIR QUALITY SCORE

With a novel sixth output that the sensor provides - users in the space and facility managers, too, can see a simple numerical score out of one hundred that shows them how good the air quality is.

This Air Quality index is calculated based on CO2, PM2.5, and TVOC detected for the TR50-5D and only CO_2 for the TR50-3D.

Honeywell

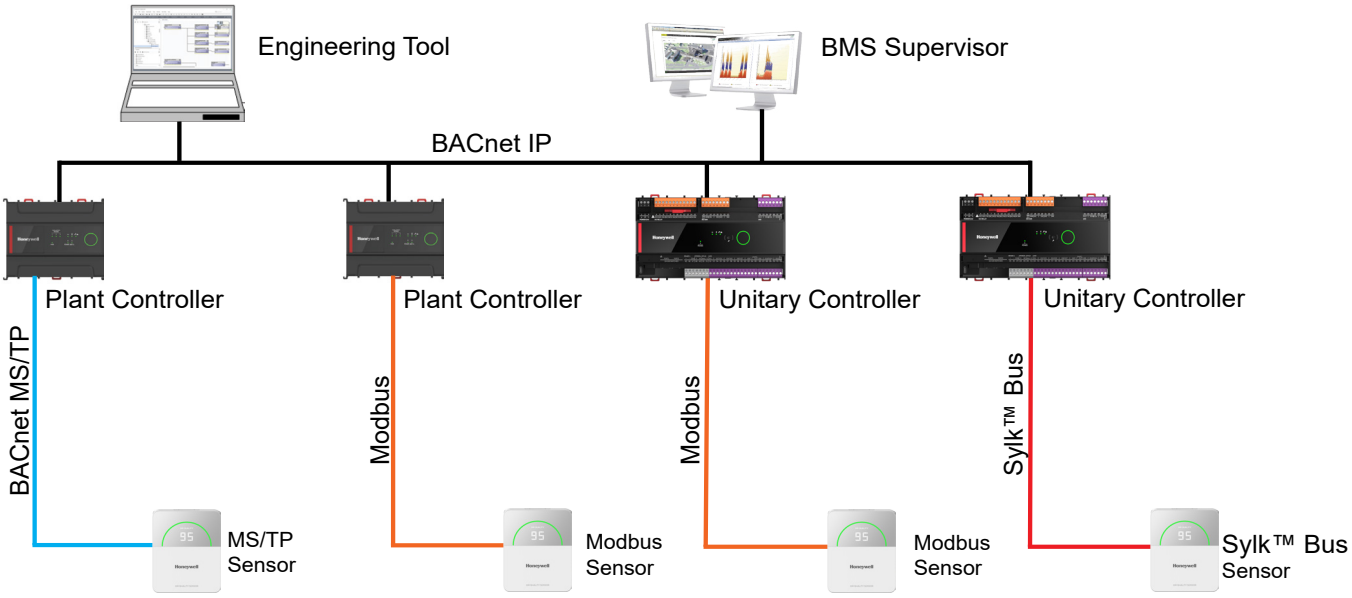
OVERVIEW AND DIMENSIONS



All the dimensions are in inches (mm).

SYSTEM ARCHITECTURE

There are many flexible ways a TR50 can be integrated into a BMS as shown below.



ORDERING INFORMATION

PART NUMBER	SENSORS	COMMUNICATION PROTOCOL	DISPLAY	POWER
TR50-5D	Temperature, Humidity, CO_2, PM2.5 and TVOC	BACnet, Modbus, *Sylk™	Yes	24 VAC/VDC
TR50-5N	Temperature, Humidity, CO_2, PM2.5 and TVOC	BACnet, Modbus, *Sylk™	No	24 VAC/VDC
TR50-3D	Temperature, Humidity and CO_2	BACnet, Modbus, *Sylk™	Yes	24 VAC/VDC or Sylk™
TR50-3N	Temperature, Humidity and CO_2	BACnet, Modbus, *Sylk™	No	24 VAC/VDC or Sylk™

"*" indicates 3-in-1 sensors can be used with Sylk™ as an emulated TR40, full Sylk™ compatibility with the Optimizer controllers is coming soon.

PRODUCT SPECIFICATION

GENERAL

PARAMETER	SPECIFICATION
Detection Parameters	- Temperature (T) - Relative Humidity (RH) - Carbon Dioxide (CO_2) - Particular Matter (PM1, PM2.5 and PM10) - Total Volatile Organic Compound (TVOC)
Display	Mono segment display
Power Supply	**Direct :** 24 VAC/VDC ± 20 % **Sylk™ :** Honeywell Sylk™ Bus Technology
Power Consumption	**TR50-5D:** 24 VAC, 3.8 VA, 24 VDC, 1.5 W **TR50-5N:** 24 VAC, 3.8 VA, 24 VDC, 1.4 W **TR50-3D:** 24 VAC, 3.2 VA, 24 VDC Sylk™ Bus, 0.9 W **TR50-3N:** 24 VAC, 3.2 VA, 24 VDC Sylk™ Bus, 0.8 W
Operating Temperature	32 - 122 °F (0 - 50 °C)
Operating Humidity	0-95 % RH, non-condensing
Storage Temperature	-40 to 150 °F (-40 to 65.5 °C)
Communication	BACnet MS/TP, Modbus over RS-485, or Sylk™ Bus
Net weight	0.42 lbs. (189 grams)
Enclosure	Polycarbonate
IP protection level	IP20
Junction Box compatibility	US single vertical, BS single, ME single, EUR single
Surface mount	The device can be mounted on drywall,stone, etc. in retrofit cases.
Touch Button	Use to switch screens from one parameter to another.

USER INTERFACE

PARAMETER	SPECIFICATION			
The LED light behavior can be configured into two modes. It shows LED behavior, air quality, sensor reading level or sensor health.				
Color Mode	**LED Behavior**	**Air Quality Level**	**Sensor Reading Level**	**Sensor Health**
	Green	Good	Good	
	Yellow	Medium	Medium	
	Red	Poor	Poor (For CO_2, PM2.5 and TVOC)	Sensor Failure
Neutral Mode	White On	Good	Good	
	White Breath	Medium	Medium	
	White Blink	Poor	Poor (For CO_2, PM2.5 and TVOC)	Sensor Failure

SENSING

PARAMETER	DETAIL		SPECIFICATION
Temperature	Measuring range		32 - 122 °F (0 - 50 °C)
	Sensor output resolution		0.1 °F (0.1 °C)
	Accuracy		± 1.8 °F (± 1 °C)
Humidity	Measuring range		0 - 100 % RH
	Sensor output resolution		0.1 % RH
	Accuracy		±3 % RH @ 20 - 80 % RH in Room Temperature
CO_2	Measuring range		0-9999 ppm
	Sensor output resolution		1 ppm
	Accuracy		± 75 ppm @ 400- 1000 ppm. ± 40 ppm ± 5 % reading @ 1001-2000 ppm
PM1.0 PM2.5 PM10	Measuring Range		0 - 5000 µg/m³
	Sensor output resolution		1 µg/m³
	Accuracy (According to GRIMM Technology)	PM1.0	± 10 µg/m³, 0-100 µg/m³ 101-500 µg/m³, ± 10 % reading
		PM2.5	± 10 µg/m³, 0-100 µg/m³ 101-500 µg/m³, ± 10 % reading
		PM10	± 25 µg/m³ 0-100 µg/m³ 101-500 µg/m³, ± 25 % reading
TVOC	Measuring range		0-9999 ppb
	Sensor output resolution		0.1 ppb
	Accuracy (According to Alcohol Volatilization)		± 25 % reading

DISPLAY OPTIONS*

PARAMETER	SPECIFICATION
Air Quality	Indoor Air Quality
Sensor Reading	Temerature, Humidity, CO_2
	PM2.5, TVOC (TR50-5D only)
Error Code	In case of sensor failure, the display will show the sensor name and **Err**. For example, in the case of PM2.5 sensor failure, the display will show the error code as **Err**$^{PM2.5}$. If more than one sensor fails, the display will switch among those failure sensors.

"*"Only available in TR50-5D and TR50-3D models.

SCALABILITY

The TR50 IAQ Sensors are open protocol and can connect to any controller using BACnet and Modbus. The Sylk-Bus™ connectivity is compatible with the Honeywell Optimizer Suite controllers and has limited compatibility with the Honeywell Spyder Classic models.

PRODUCT SPECIFICATION

ELECTRICAL CHARACTERISTICS

Purpose of Control	Operating Control
Construction of Control	Independently Mounted Control
Type of Action	Type 1
Pollution Degree	2
Rated Impulse Voltage	500 V

STANDARDS AND COMPLIANCES

RoHS	IEC63000
CE	EN 60730-1 EN 60730-2-9
FCC	CFR 47 Part 15 Subpart B
UL	UL 60730-1 UL 60730-2-9
ISED	ICES - 003 issue 7

CALIBRATION

The devices come pre-calibrated out of the box and do not need to be recalibrated before installation. Our high precision sensors ensure that the devices do not need to be recalibrated regularly over their lifetime either.

If the device readings start to drift or you see anomalous data, you can recalibrate the sensor by providing an offset with a new sensor reading (more details in the User Guide).

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Atlanta, GA 30308
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Narborough, Leicester LE19 3EQ.

EU Importer Address
Honeywell GmbH
Strahlenberger Str. 110-112
63067 Offenbach am Main
Germany

31-00565ENG-01 | Rev.03-23

Honeywell

HAQ61 Series

Integrated Room Air Sensor

Honeywell HAQ61 series room air quality sensor is an integrated air sensor which can simultaneously detect five air parameters: air Temperature & Relative humidity, CO_2 concentration, PM2.5 concentration and formaldehyde (HCHO) concentration, and calculate and display the concentration of Total Volatile Organic Compound (TVOC).

With a built-in Modbus protocol, Honeywell HAQ61 series air quality sensor can be connected with the control compatible with Modbus protocol to upload the air parameters.

There are two versions available: with display and without display. The version with display can display 6 types of air quality parameters on a split screen, and display the air quality with a face symbol according to the PM2.5 data.

Product Features

- Compact and sleek design
- Built-in high-precision sensors can accurately, stably and continuously measure various air parameters.
- Built-in Modbus protocol (RS485 communication) can achieve real-time data transmission.
- TFT screen (version with screen) for wide field of view and clear display with data display on split screen.
- Displaying the indoor air quality data according to PM2.5, and displaying the air quality level, PM1.0 and PM10 data at the same time.
- 86 junction box in-wall mounting for easy installation.

Order information

SKU	description
HAQ61L	Integrated room air sensor with LCD, black panel
HAQ61B	Integrated room air sensor without LCD, black panel
HAQ61BW	Integrated room air sensor without LCD, white panel

Technical Specifications

Communication Interface	Modbus, RS485
Power supply	110~240VAC， 50/60Hz, ≤100mA
IP Rating	IP40
Operation environment	RH≤95%（non-condensing ）
Temperature Measurement Range	-10 ~ 55℃（±1℃)
Humidity Measurement Range	0 ~ 99%RH, ±5%RH
PM2.5	0 ~ 999 ug/m^3 0~100ug/m³: ±15ug/m³; >100ug/m³: ±15%
CO_2	400~2000 PPM, ±（50PPM+5% of reading)
HCHO TVOC	0 ~ 999ppb 0 ~ 100ppb: ±20ppb; 100~999ppb: ±20% reading
Display	TFT
Housing Material	PC+ABS
Dimensions	86*86*60mm
Storage Conditions	-25℃~55℃， RH≤93%

Interface & Installation Instructions

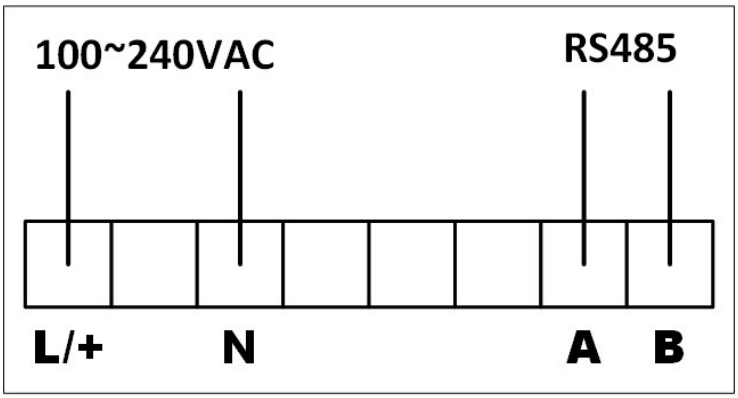
Key Instructions （LCD type)

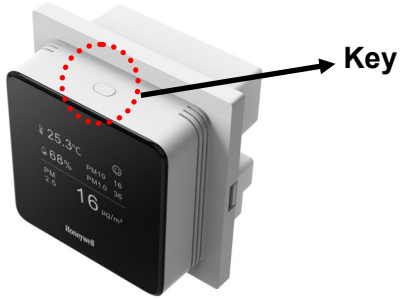
Pressing method	Function
Short pressing (< 1 s)	Switching on or off the screen
Short pressing (> 1 s)	Displaying the current 485 communication address code
Long pressing (> 10 s)	Reset the 485 communication address as 1 （without LCD type only has this function）

Air Quality Level Reference （LCD type)

Face symbol	PM2.5	Corresponding to national standard air quality level
☺	0~75	Superior to good
😐	76~115	Mild contamination
☹	⩾116	Medium contamination to severe contamination

Wiring diagram

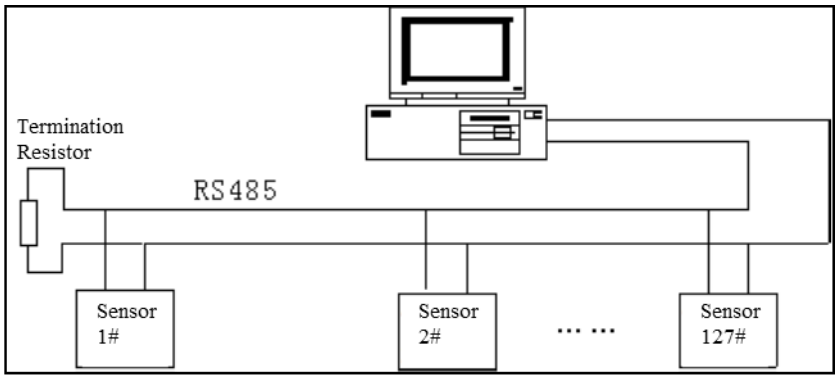




Modbus Protocol Instruction

1. Network Structure and Wiring

The standard MODBUS communication network for multi-function air sensor is a bus-type network structure and supports networking of 1 to 127 multi-function air sensor(s) (the specific number is determined by Modbus gateway or controller parameters). The farthest sensor in the network shall be usually connected to a 120 Ohm matched resistor in parallel at both terminals of the communication line. The standard communication connection medium is shielded twisted pair.



2. RTU Frame Format of Modbus Protocol

The master-slave communication method is adopted for MODBUS protocol. Each communication is initiated by the master station, and the slave station responds to the master station command to send back data.

Word Format

Address Range: 1~254, configurable;

Baud Rate: 38400, configurable;

Check: No parity, not configurable

Data Bits: 8 bits, not configurable; start bit: 1 bit, not configurable; stop bit: 1 bit, not configurable;

Default Factory Parameters of RS485

Name	Address	Baud rate	Parity check	Data bit	Start bit	Stop bit
Factory default	1	38400	No parity check	8 Bits	1 Bit	1 Bit

Frame Format

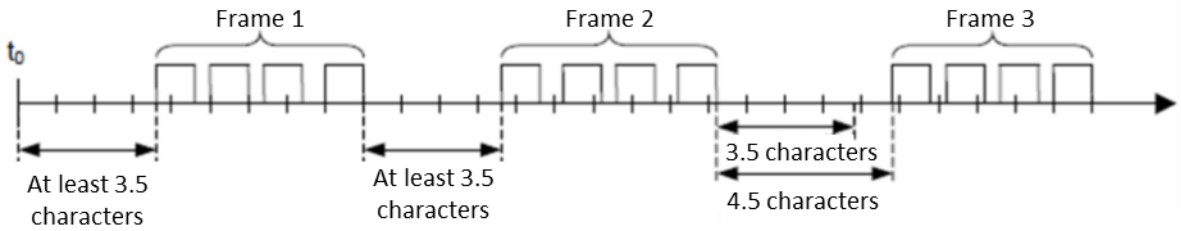
The MODBUS RTU format (hexadecimal format) is adopted for the multifunctional air sensor, and its frame structure is as shown in the table below.

Master station RTU message frame					
Device address	Function code	Register address	Register length	CRC check	
8 Bits	8 Bits	16 Bits	16 Bits	CRCH	CRCL

Slave station RTU message frame				
Device address	Function code	Data	CRC check	
8 Bits	8 Bits	n sets of 8Bits	CRCH	CRCL

Notes:

(1) The MODBUS protocol specifies that the start or end of the frame is realized by 3.5char time of delay between frames, as shown in the figure below.



(2) Device address: The communication address of the sensor is unique in the communication network: The factory default is 0x01

(3) Function code: The function code specified by the Modbus protocol.

Function code	Description of function
03H	Reading the register data (i.e., reading the measurement data)
10H	Setting the register (i.e., setting the address)

(4) Register address and register length: The parameters in the master station command are registered starting from the register address, and the reading length is N registers of the register length.

(5) Slave station response data: Number of bytes and N-digit-bit data.

(6) Error check code (CRC check): This protocol uses CRC16 (cyclic redundancy check), including 2 bits, i.e., 16-bit binary number. The CRC code is calculated by the sending device and placed at the tail of the sending information frame. The device receiving the information recalculates the CRC of the received information, and compares whether the calculated CRC is consistent with the received one. If not, it indicates an error and the erroneous data will be discarded (whether it is sent or received).

In the CRC calculation, only 8 data bits, the start bit and the stop bit are used. If there is a parity check bit, it also includes a parity check bit, which is not involve d in the CRC calculation.

Instruction: Calculation method of CRC check code:

a. Set a 16-bit register as 1 wholly;

b. Store the low eight bits of the high byte XOR register of the message data into the register;

c. Shift the register to the right (the highest position is 0) and store the lower bit shifted out at the flag bit;

d. If the flag bit is 1, the XOR register of 1010000000000001 shall be used; if the flag bit is 0, continue to perform step c;

e. Repeat steps c and d until shift for eight times;

f. XOR next-bit byte and register;

g. Repeat steps c to e, until the XOR and shift of all message data and register for 8 times;

h. At this moment, the CRC check code is in the register, and the high bit is sent first.

3.List of Communication Address and Descriptions

Address	Type	Contents description	Unit	Number of registers
0x0001	R/W	Device address	/	
0x0002	W	Baud Rate	/	
0x000a	R	Temperature (int type); temperature value/10 is the actual temperature value	℃	
0x000b	R	Humidity (int type)	%RH	
0x000c	R	PM1.0 (uint type)	ug/m^3	
0x000d	R	PM2.5 (uint type)	ug/m^3	
0x000e	R	PM10 (uint type)	ug/m^3	
0x000f	R	CO_2 concentration value (uint type)	ppm	
0x001a	R	Formaldehyde concentration value (uint type)	mg/m^3	
0x001b	R	VOC concentration value (uint type)	mg/m^3	

Data format description:

The data occupies 1 register and includes 2 bits in total. Lower 8 bits are transmitted before higher 8 bits

Example: If 015E is the CO_2 concentration value, 01 is the high byte, 5E is the low byte and two bytes form the CO_2 concentration value. When 015E is converted into a decimal number 350, it means that the CO_2 concentration value currently acquired is 350ppm.

4. Communication demonstrations

（1) PM2.5 Reading

The return frame format of the device: 01 03 02 xx xx crcH crcL;
the sending frame format of the master station: 01 03 00 0D 00 01 15 C9

Master device sending	Number of bytes	Sending content	Description
Slave device address	1	01H	Sending to the slave device with the address of 01
Function code	1	03H	Read register
Initial address	2	000DH	Initial address of data
Data length	2	0001H	Reading 1 register
CRC check code	2	15C9H	CRC code calculated by the master device

Slave device response	Number of bytes	Sending content	Description
Slave device address	1	01H	From the salve device with the address of 01
Function code	1	03H	Read register
Number of bytes	1	02H	
Register data	2	xxxxH	The contents of memory at address 001D
CRC code	2	CRC	CRC code calculated by the slave device

2) Set the device address as 0x16 (device address 1-254)

the sending frame format of the master station: ： 01 06 00 01 00 16 59 C4

Master device sending	Number of bytes	Sending content	Description
Slave device address	1	01H	Sending to the slave device with the address of 01
Function code	1	06H	Write register
Register address	2	0001H	The address is 0001H
Save data	2	0016H	Data 0016
CRC code	2	59C4H	CRC code calculated by the master device

The return frame format of the device：01 06 00 01 00 16 59 C4

Slave device response	Number of bytes	Sending content	Description
Slave device address	1	01H	Sending to the slave device with the address of 01
Function code	1	06H	Writing singe register
Register address	2	0001H	Register address
Data	2	00016H	Data
CRC code	2	59C4H	CRC code calculated by the master device

Note: The modified address takes effect immediately, and the device does not need to be powered on again. After the address is modified, the new address shall be used for communication.

5. Baud Rate Setting

Master station sending frame format: 01 10 00 02 00 01 02 00 60 A7 9A

Master device sending	Number of bytes	Sending content	Description
Slave device address	1	01H	Sending to the slave device with the address of 01
Function code	1	10H	Function code
Register address	2	0002H	Address: 0002
Number of registers	2	0001	Number of register: 1
Number of bytes	2	02	Number of bytes: 2
Baud rate	2	00 60H	Refer to the baud rate table for the set baud rate
CRC check code	2	xxxxH	CRC code acquired by the master device

Device return frame format: 01 10 00 02 00 01 A0 09

Slave device response	Number of bytes	Sending content	Description
Slave device address	1	01H	Sending to the slave device with the address of 01
Function code	1	10H	Function code
Register address	2	0002H	Address: 0002
Number of registers	2	0001H	Refer to the baud rate table for the set baud rate
CRC check code	2	xxxxH	CRC code acquired by the master device

Reference Baud Rate

Numerical Value	Baud Rate
00 0C	**1200**
00 18	**2400**
00 30	**4800**
00 60	**9600**
00 C0	**19200**
01 80	**38400**
02 40	**56700**
04 80	**115200**
05 00	**128000**
0A 00	**256000**

Note: The modified baud rate takes effect immediately, and the device does not need to be powered on again. After the baud rate is modified, the new baud rate shall be used for communication.

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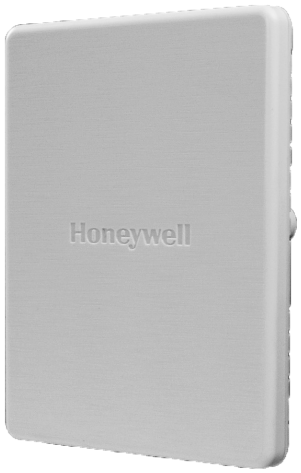
HBT-FDA-SS01-JAN-2021-V01-EN

Honeywell

C6000A001

CO Transmitter

SPECIFICATION



Feature

- 4~20 mA / 2~10 VDC output
- High reliability & accuracy
- Wide sensing range
- Rapid response

Specification

CO Sensor	Electrochemical
Measurement Range	0~250ppm
Signal Output	4~20mA / 2~10VDC
Accuracy	±5% @25C. 50% RH（0~100 ppm）
	±10% @25C. 50%RH (100~250 ppm)
Coverage area	465m^2(Recommended)
Reaction time	<45 second to 90% of final value
Power Supply	24 VAC/VDC (12~36V)
Current Output Load	500Ω Max.
Calibration	Factory calibrated
Electrical Connection	Terminals for 2x1.5 mm² cable

Ambient Limits (Housing)	
Storage Temperature	-10~+50 °C (-14~122°F)
Humidity	5…95% rh, non-condensing
Safety (Terminal box)	
Protection class	IP30 as per EN 60529
Flame retardant	UL94-V0 rated plastic enclosure
	T_{max}=120ºC (enclosure)
Certification	CE

Application

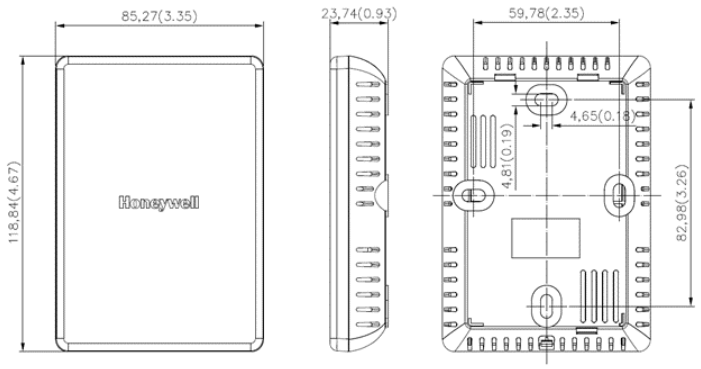
CO transmitter can be used in HVAC system, hospitals , greenhouse. .
.

CE

Order Information

Model	IP	Output	Temperature Range
C6000A001	IP30	4~20mA /2~10VDC	-10..+50 °C

Size mm (inch)



Terminal Definition

Voltage Output，3-wire

1.	G+	AC/DC 24V
2.	G0	Ground
3.	OUT	2~10V

Current Output， 2-wire

1.	G+	DC 24V
2.	OUT	4~20 mA

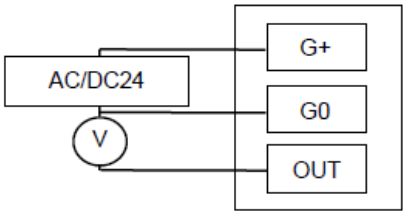
Current Output， 3-wire

1.	G+	AC/DC 24V
2.	G0	Ground
3.	OUT	4~20 mA

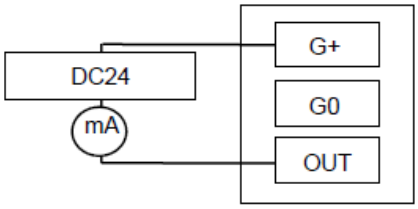
Wiring

.

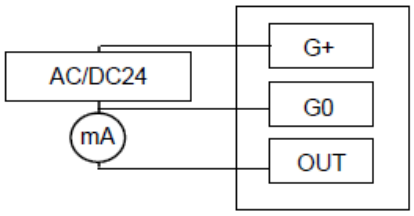
Voltage Output (RL> 2.5KΩ at 24V DC)



Current Output (RL< 500Ω at 24V DC)



2-wire



3-wire

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Subject to change without notice.

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C7110A1010

ROOM AIR QUALITY SENSOR

SPECIFICATION DATA & INSTALLATION INSTRUCTIONS

GENERAL

The C7110A1010 Room Air Quality Sensor is suitable for measuring air quality in rooms, offices, and production bays.

This mixed gas sensor can be used to control ventilation plants. It detects unpleasant odors, tobacco smoke, and vapors emitted by such materials as furniture, carpets, paint, glue, etc. As proven in practice, this device detects those substances typically present in air having a poor quality, some of which may otherwise go undetected by room occupants, themselves. This sensor has proven itself in numerous applications over many years.

NOTE: The mixed gas sensor does not measure or indicate the concentration of individual gases, and thus cannot be used for the monitoring or control of specific substances.

Models

order no.	description	output signal
C7110A1010	Room Air Quality Sensor	0...10 Vdc

FEATURES

- **Measurement of a variety of air quality factors**
- **Output signal: 0...10 Vdc, indicated by yellow status LED on front cover**
- **Trimming potentiometer to adjust output signal**
- **Easy installation and wiring connection**

SPECIFICATION

Supply voltage	15...30 Vdc / 24 Vac (+/-20%)
Power consumption	< 1 W
Output signal	0...10 Vdc (increases as air quality worsens); adjustable via trimming potentiometer
Min. impedance of load	5 kOhm (at output)
Weight /Dimensions	approx. 125 g / see page 3
Electrical connection	Screw terminal block for conductors up to 1.5 mm²
Air Quality Sensor	
Sensitivity/Linearity	see Fig. 1 on page 2
Dynamic behavior	see Fig. 6 on page 4
Ambient Limits	
Transport/storage temp.	-30...+60 °C (-22...+140 °F)
Operating temperature	0...+50 °C (+32...+122 °F)
Humidity	5...95%rh, non-condensing
Safety	
Protection class	III as per EN60730-1
Protection standard	IP30 as per EN60529
Flame retardant	Plastic ABS, V0 as per UL94
EMC environments	residential, commercial, light industrial, and industrial

CE

FUNCTION

The device contains a heated tin dioxide semiconductor sensor, the electrical conductivity of which varies in proportion to the concentration of reducing agents in the ambient air. This leads to a voltage at the measuring element which is amplified to an output voltage of 0 to 10 Vdc.

The following particles and gases can be detected: cigarette smoke, hydrogen, carbon monoxide, ethanol, ammonia, etc.

In contrast to CO_2 sensors, which selectively measure the concentration of only one type of gas, the C7110A1010 is a mixed gas sensor and as such functions as a broadband detector, i.e. the sensor signal does not indicate the type of gas or its concentration in ppm (parts per million). The complex and constantly changing composition of room air makes it necessary to perform broadband air quality measurement using such a broadband detector.

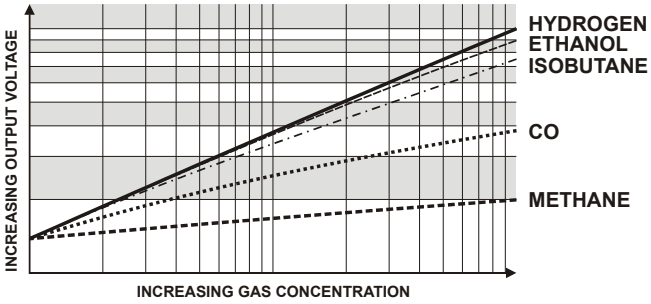

Fig. 1. Output voltage as a function of gas concentration

INSTALLATION

Wiring

All wiring must comply with local electrical codes and ordinances or as specified on installation wiring diagrams.

Wall module wiring can be sized from 16 to 22 AWG (1.5 to 0.34 mm^2), depending on the application. The maximum length of wire from a device to a wall module is 1000 ft (305 m). Twisted pair wire is recommended for wire runs longer than 100 ft (30.5 m).

Keep wiring at least one ft (305 mm) away from large inductive loads such as motors, line starters, lighting ballast, and large power distribution panels.

Run wall module wiring separately from 50 Vac or greater power wiring.

⚠ CAUTION

Low Voltage Equipment.

Risk of equipment damage.

The 24 Vac power source for this product must be a safety isolating transformer. A transformer that is CE certified and meets the Low Voltage Device (LVD) requirements must be used in Europe for all installations of this product.

Positioning

To avoid falsifying the measuring results, the device should be installed at sites at which typical air quality prevails.

Direct exposure to sunlight and drafts should be avoided.

If the device is mounted on a standard flush box, the end of the installation tube in the flush box must be sealed so to avoid any draft in the tube falsifying the measuring result.

Maintain a mounting clearance of approx. 4 in. (10 cm) to the right-hand side of the module in order to allow free airflow to the air quality sensor.

Mounting

1. The cover of the air quality sensor is fixed by a tab on the underside of the unit; to disassemble the cover and the sub-base, see Fig. 2. To access all of the mounting holes, pull off the perforated cover, bend down slightly the tab to release the printed circuit board, and leverage the printed circuit board out (see Fig. 3).

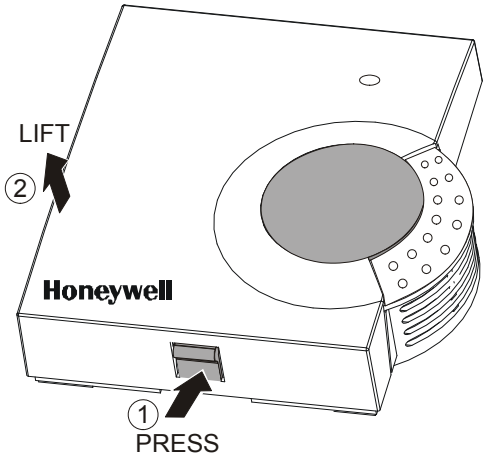

Fig. 2. Cover disassembly

2. **a)** Mount the sensor onto the wall outlet box, or
   b) bore wall holes as specified in Fig. 3 and mount the wall module with appropriate screws.

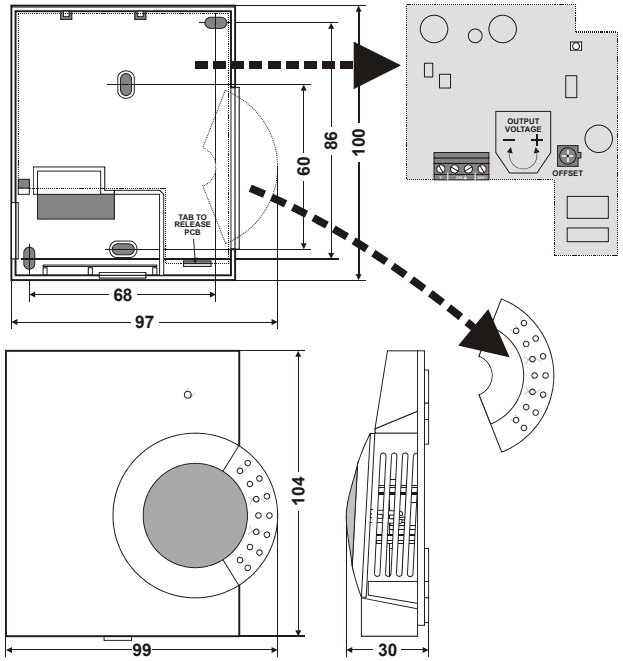

Fig. 3. Dimensions and mounting holes (mm)

IMPORTANT

Screw-type terminal blocks are designed to accept no more than one 16 AWG (1.5 mm²) conductor.

3. After re-inserting the printed circuit board and the perforated plate, connect the wires to the terminal block as follows:
   a) Strip 3/16 in. (5 mm) of insulation from the conductor.
   b) Insert the wire in the required terminal location (see Fig. 5) and tighten the screw to complete the termination.

4. Adjust the trimming potentiometer (see section "Adjusting the Offset Signal").

5. Remount the cover as shown in Fig. 4 and make sure that the tab on the underside engages.

6. The sensor is now operational. When the air quality deteriorates, the voltage of the output signal will rise.

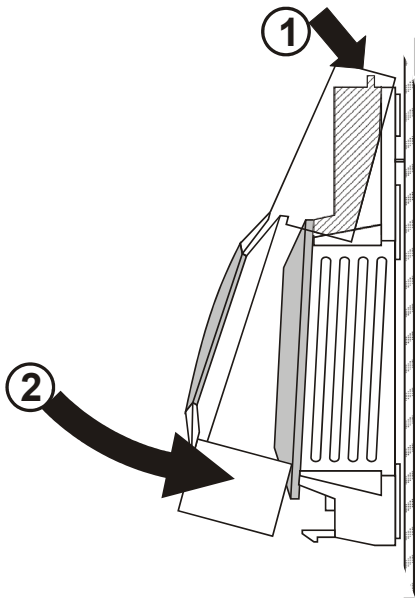

Fig. 4. Cover assembly

Adjusting the Offset Signal

After mounting the device, the output signal should be adjusted in accordance with expected ambient conditions and individual preferences.

The output signal is adjusted using the trimming potentiometer located on the sensor board (see Fig. 5).

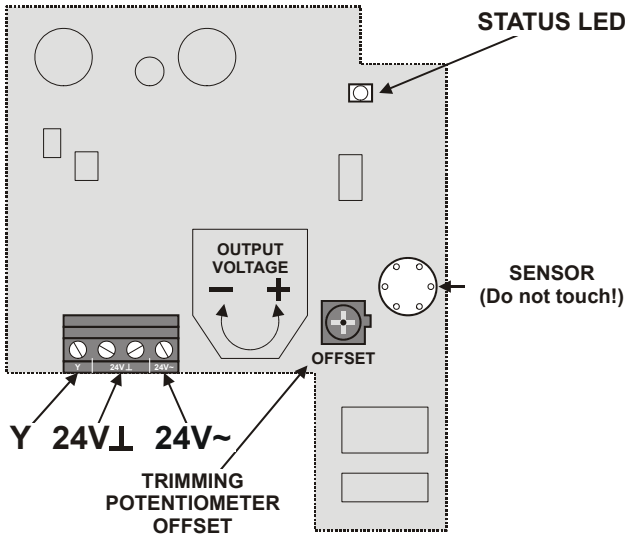

Fig. 5. Wiring Connection and Trimming Potentiometer

The offset of the output signal is increased or lowered by means of this potentiometer. The yellow status LED (see Fig. 5) indicates the corresponding signal strength:

- Turning the trimming potentiometer clockwise (CW) decreases the output signal (minimum brightness is reached at an output signal of 1.5 V)
- Turning the trimming potentiometer counterclockwise (CCW) increases the output signal (maximum brightness is reached at an output signal of 9 V).

The sensor cannot distinguish pleasant from unpleasant smells. The final determination of whether air quality is satisfactory or not must be made by the persons living or working in the room. Moreover, various air compositions are occurring in different rooms.

Thus, the default (factory) setting of the setpoint is provisional, only. The setpoint must be optimized to correspond to the subjective feelings of the room occupants.

Adjustment Procedure:

1. Connect sensor and switch operating voltage on.

2. Ensure good air conditions close to the sensor (by means of ventilation, etc.).

3. After approx. 30 minutes of operation, verify the output signal. The voltage level should lie in the range 1…3 V. Correct an excessively high or excessively low voltage level using the trimming potentiometer: The trimming potentiometer should be turned clockwise (CW) until the yellow status LED is almost extinguished. The output signal will then amount to approx. 1.5 V (max. brightness is reached at 9 V).

NOTE: When first operating the device or after the device has been powered down for more than 4 weeks (e.g., during storage), the output signal may vary during the first 48 hours of operation. In this case, you should verify the output signal after 48 hours of operation.

EXAMPLE OF DYNAMIC BEHAVIOR

Fig. 6 shows the dynamic characteristics of the C7110A1010, monitored during test measurements in a sample room. This voltage diagram as a function of different occupancy conditions is only an example and must be proven for other ambient conditions.

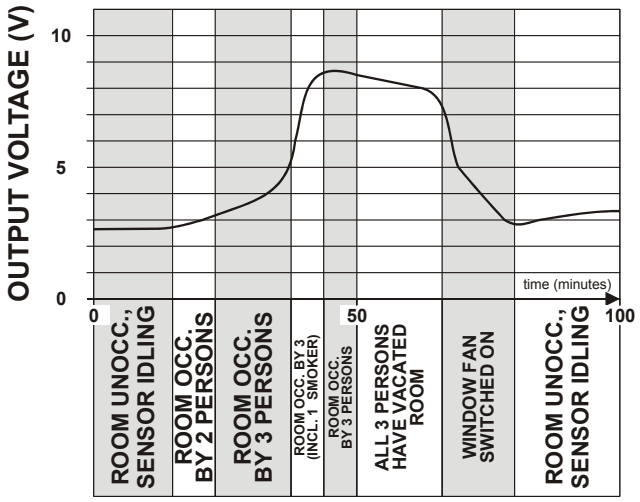

Fig. 6. Dynamic behavior of the C7110A1010

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