

Autonics Temperature/Humidity Transducer THD SERIES

INSTRUCTION MANUAL



Thank you for choosing our Autonics product. Please read the following safety considerations before use.

Safety Considerations

- Please observe all safety considerations for safe and proper product operation to avoid hazards.
- Safety considerations are categorized as follows.
 - Warning** Failure to follow these instructions may result in serious injury or death.
 - Caution** Failure to follow these instructions may result in personal injury or product damage.
- The symbols used on the product and instruction manual represent the following
 - A symbol represents caution due to special circumstances in which hazards may occur.

Warning

- Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss.** (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crane/disaster prevention devices, etc.) Failure to follow this instruction may result in fire, personal injury, or economic loss.
- Do not connect, repair, or inspect the unit while connected to a power source.** Failure to follow this instruction may result in fire.
- Check 'Connections' before wiring.** Failure to follow this instruction may result in fire.
- Do not disassemble or modify the unit.** Failure to follow this instruction may result in fire.

Caution

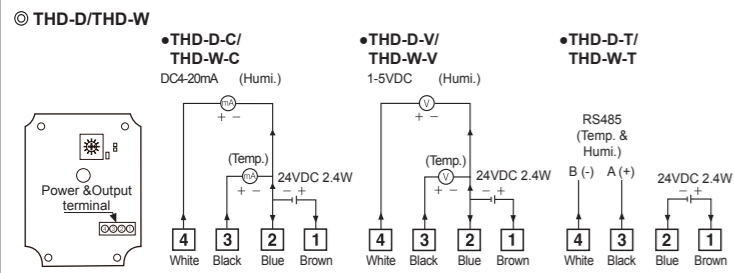
- Use the unit within the rated specifications.** Failure to follow this instruction may result in fire or product damage.
- Use dry cloth to clean the unit, and do not use water or organic solvent.** Failure to follow this instruction may result in fire.
- Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.** Failure to follow this instruction may result in fire or explosion.
- Keep metal chip, dust, and wire residue from flowing into the unit.** Failure to follow this instruction may result in fire or product damage.

Ordering Information

THD	D	D	1	C
Output	PT*	PT/C*	C	V
Length of sensor pole	No-mark*	1	2	
Display	No-mark	D		
Mounting	R	D	W	
Item	THD			

*It is only for THD-R.

Terminal Connection



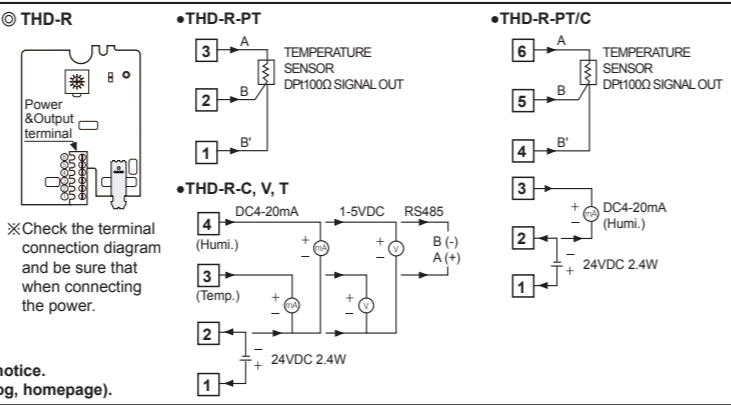
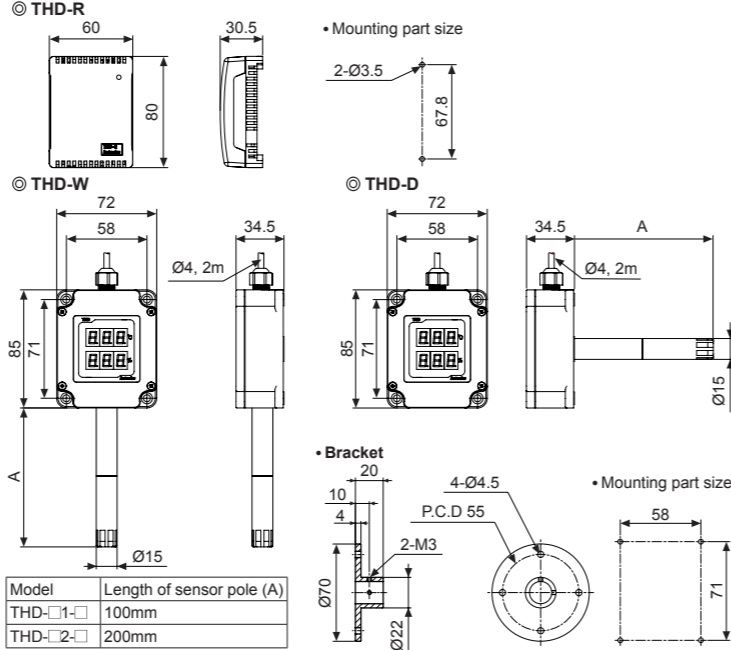
The above specifications are subject to change and some models may be discontinued without notice. Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage).

Specifications

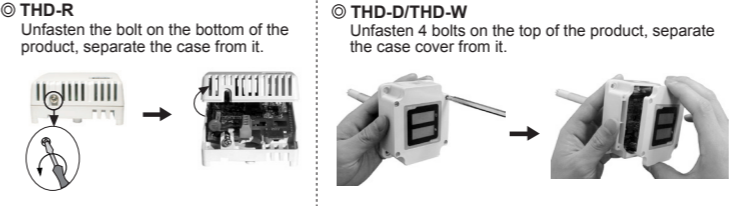
Model	THD-R-PT	THD-R-PT/C	THD-R-C THD-R-V THD-R-T	THD-D THD-W	THD-DD THD-WD
Power supply	24VDC=				
Permissible voltage range	90 to 110% of rated voltage				
Power consumption	Max. 2.4W				
Sensor type	Temperature sensor	Temperature/Humidity sensor			
Display type	Non-display	7Segment LED Display			
Display digit	—				Each 3 digits for temp./hum.
Character size	—				W6.2×H10.0mm
Measuring range	Temp. -19.9 to 60.0°C	0.0 to 99.9%RH (THD-R is required to attend for using over 90%RH)			
Accuracy	Temp. Max. ±0.8°C	±1°C (at room temp.)			
Humidity	±3%RH (30 to 70%RH, at room temp.), ±4%RH (10 to 90%RH)				Typ. ±2%RH (10 to 90%RH, at room temp.) Max. ±2.5%RH
Output	Temp. DP1100Ω resistance value (TCR: 3850ppm/°C)	DC4-20mA (allowable impedance: max. 600Ω), 1-5VDC=, RS485 communication (Modbus RTU)			
Humidity	—				
Resolution	1/1000				
Sampling period	0.5 sec				
Insulation resistance	Min. 100MΩ (at 500VDC megger)				
Dielectric strength	500VAC 50/60Hz for 1 minute				
Noise resistance	±0.3kV the square wave noise (pulse width: 1μs) by the noise simulator				
Vibration	Mechanical	0.75mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 1 hour			
Malfunction	0.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 10 minutes				
Shock	Mechanical	300m/s ² (approx. 30G) in each X, Y, Z direction for 3 times			
Malfunction	100m/s ² (approx. 10G) in each X, Y, Z direction for 3 times				
Protection	IP10		IP65 (except sensor part)		
Environment	Ambient temperature	-20 to 60°C, storage: -20 to 60°C			
Cable	—			Ø4mm, 4-wire, length: 2m (AWG22, Core diameter: 0.08mm, number of cores: 60, insulation out diameter: Ø1.25mm)	
Approval	CE (only for THD-R-T model)				
Weight	Approx. 98g (approx. 55g)		Approx. 415g (approx. 160g)		

- Room temperature is 23°C±5°C.
- It may cause degree of degradation when the unit is exposed to organic chemicals such as alcohol gas or sulfuric acid.
- It may cause degree of degradation for humidity when using the unit at high temperature/humidity environment for a long time.
- It may cause error of humidity value when the unit is used at high humidity environment (over 80%RH) for a long time.
- The weight includes packaging. The weight in parentheses is for unit only.
- Environment resistance is rated at no freezing or condensation.

Dimensions



Case Detachment



Current Output

It transmits current temperature/humidity to other devices (PC, recorder, etc.) and outputs DC4-20mA. It outputs DC4mA at -19.9°C of temperature and 0%RH of humidity, DC20mA at 60°C of temperature and 99.9%RH of humidity. The temperature and humidity output are separated and the resolution is divisible by 1,000.

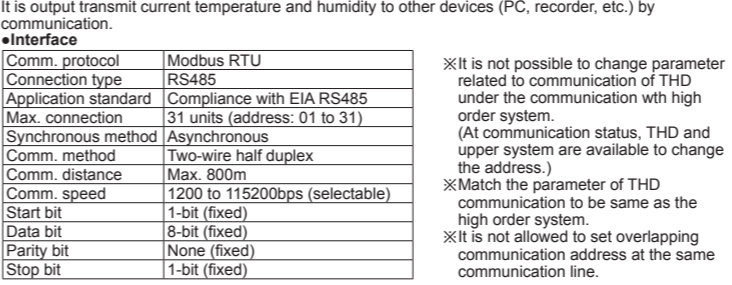
Voltage Output

It transmits current temperature/humidity to other devices (PC, recorder, etc.) and outputs 1-5VDC. It outputs 1VDC at -19.9°C of temperature and 0%RH of humidity, 5VDC at 60°C of temperature and 99.9%RH of humidity. The temperature and humidity output are separated and the resolution is divisible by 1,000.

DPt 100Ω Resistance Value Output

It transmits current temperature to other devices (recorder, thermometer, etc.). It outputs 100Ω at 0°C and 119.40Ω at 50°C. (Temperature coefficient (TCR)=3850ppm/°C)

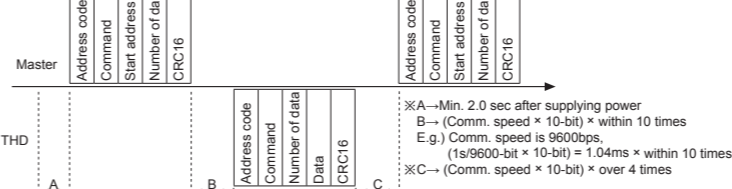
RS485 Communication Output



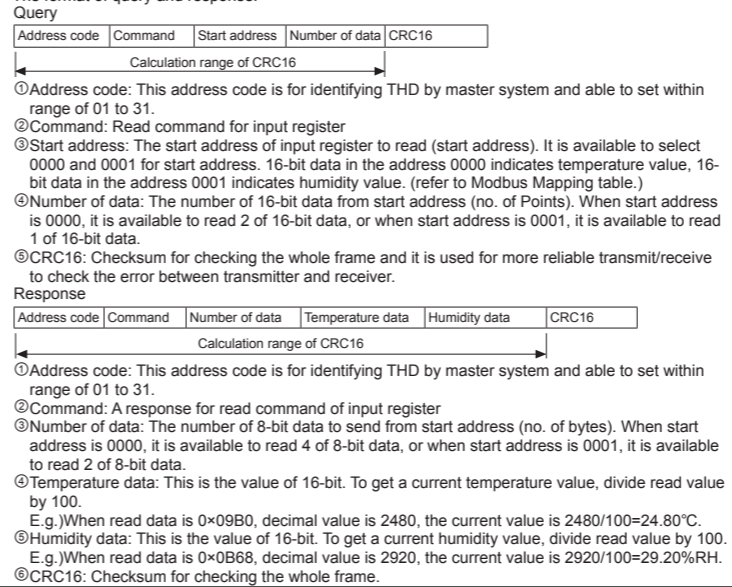
- It is not possible to change parameter related to communication of THD under the communication with high order system. (At communication status, THD and upper system are available to change the address.)
- Match the parameter of THD communication to be same as the high order system.
- It is not allowed to set overlapping communication address at the same communication line.

Ordering of communication control

- The communication method is Modbus RTU.
- After 2.0 sec being supplied the power into master system, it is able to start communication.
- The initial communication is started by master system. When a command comes out from the master system, THD will respond.



Communication command and block



Application for communication command

(Query): Address code (01), Start address (0000), The number of 16-bit data to read (2), CRC16 (0×71CB)

Address code	Command	Start address	Amount of data	CRC16
01	04	00	00	00
02	71	CB		

(Response): Address code (01), The number of 8-bit data to read (4), Temperature (0×09B0), Humidity (0×0B68), CRC16 (0×94DE)

Address code	Reponse command	Number of data	Temperature data	Humidity data	CRC16
01	04	04	09	B0	0B
05	68	94	DE		

Error processing (Slave → Master)

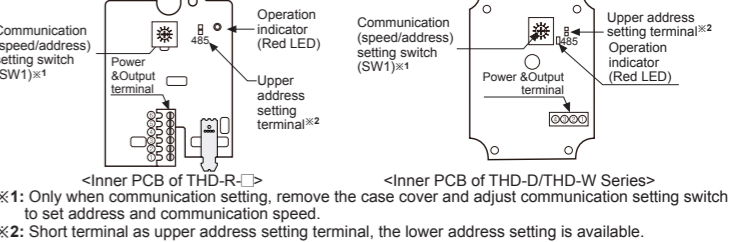
- Not supported command
- Set a received the highest bit and send it to response command and exception code 01.
- The start address of queried data is inconsistent with the transmittable address or the requested number of data is bigger than the transmittable address.

Setting communication speed

- Turn off the power of the unit.
 - Set SW1 to 0 and supply the power.
 - Operation indicator LED is flashing.
 - Set a communication speed after choosing SW1 within the range 1 to 8, and hold it for 3 sec.
 - After setting a communication speed, the LED will be ON. At the moment turn OFF the power.
- Factory default communication speed is 9600bps.

Setting communication address

- Set upper address setting terminal and setting switch (SW1) to the desired address and supply the power.
 - The communication address is changed automatically.
 - Factory default communication address is 01. (SW1: 1, Upper address setting terminal: OPEN)
- Setting table for address
- | Upper address setting terminal | SW1 | Address | Upper address setting terminal | SW1 | Address | Upper address setting terminal | SW1 | Address |
|--------------------------------|-----|---------|--------------------------------|-----|---------|--------------------------------|-----|---------|
| OPEN | 1 | 01 | OPEN | D | 13 | SHORT | 9 | 25 |
| OPEN | 2 | 02 | OPEN | E | 14 | SHORT | A | 26 |
| OPEN | 3 | 03 | OPEN | F | 15 | SHORT | B | 27 |
| OPEN | 4 | 04 | SHORT | 0 | 16 | SHORT | C | 28 |
| OPEN | 5 | 05 | SHORT | 1 | 17 | SHORT | D | 29 |
| OPEN | 6 | 06 | SHORT | 2 | 18 | SHORT | E | 30 |
| OPEN | 7 | 07 | SHORT | 3 | 19 | SHORT | F | 31 |
| OPEN | 8 | 08 | SHORT | 4 | 20 | | | |
| OPEN | 9 | 09 | SHORT | 5 | 21 | | | |
| OPEN | A | 10 | SHORT | 6 | 22 | | | |
| OPEN | B | 11 | SHORT | 7 | 23 | | | |
| OPEN | C | 12 | SHORT | 8 | 24 | | | |



Comprehensive Device Management Program [DAQMaster]

Item	Minimum specifications
System	IBM PC compatible computer with Pentium III or above
Operations	Windows 98/NT/XP/Vista/7/8/10
Memory	256MB+
Hard disk	1GB+ of available hard disk space
VGA	Resolution: 1024×768 or higher
Others	RS232C serial port (9-pin), USB port

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, It may cause unexpected accidents.
- Keep away from high voltage lines or power lines to prevent inductive noise.
- In case installing power line and input signal line closely, use line filter or varistor at power line and shielded wire at input signal line.
- Do not use near the equipment which generates strong magnetic force or high frequency noise.
- Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.
- 24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Do not overlapping communication line and power line.
- Use twisted pair wire for communication line and connect ferrite bead at each end of line to reduce the effect of external noise.
- Do not touch THD-W/D sensor part at the bottom of the sensor pole by hands. It may cause malfunction.
- THD-R must be installed on the wall. It may cause malfunction.
- Make a required space around the unit for radiation of heat.
- For accurate temperature measurement, warm up the unit over 20 min after turning on the power.
- Make sure that power supply voltage reaches to the rated voltage within 2 sec after supplying power.
- Do not wire to terminals which are not used.
- This unit may be used in the following environments.
 - Indoors (in the environment condition rated in 'Specifications')
 - Altitude max. 2,000m
 - Pollution degree 2

Major Products

Autonics Corporation
http://www.autonics.com

HEADQUARTERS:
18, Bansong-ro 513beon-gil, Haendae-gu, Busan, South Korea, 48002
TEL: 82-51-519-3232
E-mail: sales@autonics.com

DRW161011AB