# Autonics

Temperature/Humidity Transducer

# **THD SERIES**



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.

XSafety 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.

▲ symbol represents caution due to special circumstances in which hazards may occur.

## **⚠** Warning

- 1. Fail-safe device must be installed when using the unit with machinery that may cause . rain-sale tevice flust be misclained when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipmer ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster Prevention devices, etc.)
  Failure to follow this instruction may result in personal injury, fire, 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 electric shock.
- 3. Do not disassemble or modify the unit. Please contact us if necessary.
- Failure to follow this instruction may result in electric shock or fire.

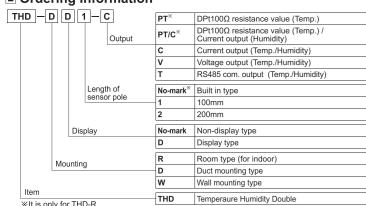
  4. Check input power specification and check power terminal polarity before connecting the
- **power source.**Failure to follow this instruction may result in fire.

#### **⚠** Caution

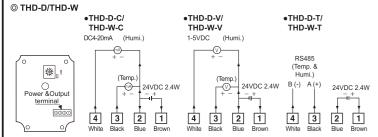
- 1. Do not use the unit outdoors.
- Failure to follow this instruction may result in shortening the life cycle of the unit, or electric shock. 2. Do not touch the temperature/humidity sensor by hands.
- 3. In case of THD-R- model, the unit must be mounted on wall
- Failure to follow this instruction may result in malfunction.

  4. Do not use water or oil-based detergent when cleaning the unit. Use dry cloth to clean the unit.
- Failure to follow this instruction may result in electric shock or fire.
- 5. Do not use the unit where flammable or explosive gas, direct sunlight, radiant heat, vibration, or impact may be present.
- Failure to follow this instruction may result in explosion or fire. 6. Keep dust and wire residue from flowing into the unit.
- Failure to follow this instruction may result in fire or mechanical problem 7. Do not unfasten the sensor pole except for Autonics engineers.
- Failure to follow this instruction may result in breakdown of sensor
- 8. This unit is approved and certified by KC (class A). Make proper applications for the unit.

## Ordering Information



#### Terminal Connection



\*The above specifications are subject to change and some models may be discontinued without notice.

\* &Output \_\_\_ XCheck the terminal connection diagram and be sure that when connecting the power

Specifications

Power supply
Permissible voltage range

Power consumption

Sensor type

Display type

Display digit

Output

Shock

ment

Cable

Approval

Character size

range Humidity

Sampling period

Dielectric strength

Noise resistance

Temp.

Humidity

Malfunction

Mechanical

Malfunction

Dimensions

72 58

田田田

888

Ø15

THD-□1-□ 100mm

THD-□2-□ 200mm

Model

⊚ THD-R

© THD-R

THD-R-C THD-R-V

THD-R-PT/C

Max. 2.4W

DC4-20mA

max. 600Ω)

0.5 sec

-20 to 60°C, storage: -20 to 60°C

C €, [ⓒ (only for THD-□-T model)

Approx. 98g (approx. 55g)

30.5

Ø4, 2m

Length of sensor pole (A)

90 to 110% of rated voltage

±3%RH (30 to 70%RH, at room

temp.), ±4%RH (10 to 90%RH)

Min. 100MΩ (at 500VDC megger)

500VAC 50/60Hz for 1 minute

\*1 • 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.

\*2: The weight includes packaging. The weight in parentheses is for unit only.

\*Environment resistance is rated at no freezing or condensation.

Mounting part size

2-Ø3.5

© THD-D

Bracket

58

田田田

4-Ø4.5

P.C.D 55

2-M3

Mounting part size

24VD0

-19.9 to 60.0°0

(TCR: 3850ppm/°C)

THD-D□-□

0.0 to 99.9%RH (THD-R is required to attend for using over 90%RH)

THD-DD□-□

7Segment LED

Each 3 digits for

W6.2×H10.0mr

Typ. ±2%RH (10 to 90%RH, at room temp.)

Ø4mm, 4-wire, length: 2m (AWG22, Core diameter: 0.08mr number of cores: 60, insulation

out diameter: Ø1.25mm)

Approx. 415g (approx. 160g)

\*Max. ±2.5%RH

DC4-20mA (allowable impedance: max. 600Ω),

RS485 communication (Modbus RTU)

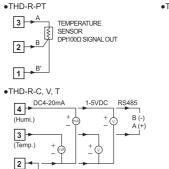
±0.3kV the square wave noise (pulse width: 1us) by the noise simulator

0.75mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 1 hour

0.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 10 minutes

300m/s² (approx. 30G) in each X, Y, Z direction for 3 times

100m/s<sup>2</sup> (approx. 10G) in each X, Y, Z direction for 3 times



\_ 24VDC 2.4W

•THD-R-PT/C 6 A TEMPERATURE SENSOR DPt100Ω SIGNAL OUT 4 B' 3→ + DC4-20mA 1 - 24VDC 2.4W

## ■ Case Detachment

#### © THD-R



⊚ THD-D/THD-W

Unfasten 4 bolts on the top of the product, separate



## Current Output

It transmits current temperature/humidity to other devices (PC, recorder, etc.) and outputs DC4-20mA It darbills Courte 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 distrible and 1000.

## ■ DPt 100Ω Resistance Value Output

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

## ■ RS485 Communication Output

It is output transmit current temperature and humidity to other devices (PC, recorder, etc.) by communication.

•	interra	ice
(	Comm.	proto

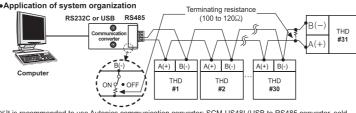
Modbus RTU
RS485
Compliance with EIA RS485
31 units (address: 01 to 31)
Asynchronous
Two-wire half duplex
Max. 800m
1200 to 115200bps (selectable)
1-bit (fixed)
8-bit (fixed)
None (fixed)
1-bit (fixed)

XIt is not possible to change paramete related to communication of THD under the communication wth 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. XIt is not allowed to set overlapping

communication address at the same communication line.



nded to use Autonics communication converter; SCM-US48I (USB to RS485 converter, sold separately). SCM-38I (RS232C to RS485 converter, sold separately).

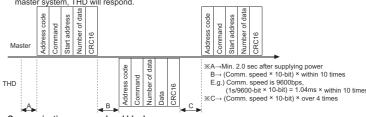
## Please use twisted pair wire for RS485 communication

Ordering of communication control

The communication method is Modbus RTU.

2. After 2.0 sec being supplied the power into master system, it is able to start communication.

3. The initial communication is started by master system. When a command comes out from the master system, THD will respond.



## Communication command and block

The format of query and response

Query					
Address code	Command	Start address	Number of data	CRC16	

①Address code: This address code is for identifying THD by master system and able to set within range of 01 to 31.

Start address: The start address of input register to read (start address). It is available to select 0000 and 0001 for start address. 16-bit data in the address 0000 indicates temperature value, 16bit data in the address 0001 indicates humidity value, (refer to Modbus Mapping table.)

Number of data: The number of 16-bit data from start address (no. of Points). When start address is 0000, it is available to read 2 of 16-bit data, or when start address is 0001, it is available to read

©CRC16: Checksum for checking the whole frame and it is used for more reliable transmit/receive

toponeo								
Address code	Command	Number of data	Temperature data	Humidity data	CRC16			
Calculation range of CRC16								

①Address code: This address code is for identifying THD by master system and able to set within

©Command: A response for read command of input register

Number of data: The number of 8-bit data to send from start address (no. of bytes). When start address is 0000, it is available to read 4 of 8-bit data, or when start address is 0001, it is available

Temperature data: This is the value of 16-bit. To get a current temperature value, divide read value Fig. When read data is 0×09B0, decimal value is 2480, the current value is 2480/100=24.80°C.

©Humidity data: This is the value of 16-bit. To get a current humidity value, divide read value by 100. E.g.)When read data is 0×0B68, decimal value is 2920, the current value is 2920/100=29.20%RH. ©CRC16: Checksum for checking the whole frame.

#### Application for communication command

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

01	0-	00	00	00	02	/ 1	OD
Address	Command	Start address		Amount of data		CRC16	
code	Command	High	Low	High	Low	High	Low

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

Humidity (0×0B68), CRC16 (0×94DE)								
01	04	04	09	B0	0B	68	94	DE
Address	Reponse	Number	Temperature data		Humidity data		CRC16	
code	command	of data	High	Low	High	Low	High	Low

#### Error processing (Slave → Master)

. Not supported command XX XX Exception code CRC16

(Set a received the highest bit and send it to response command and exception code 01. 2. The start address of queried data is inconsistent with the transmittable address or the requested

number of data is bigger than the transmittable address.

 01
 84
 02
 C2

 Address code
 Response command
 Exception code
 CRC16

## KSet a received the highest bit and send it to response command and exception code 02.

#### Modbus Mapping Table Remark

4. Set a communication speed after choosing SW1 within the range 1 to 8, and hold it for 3 sec.

5. After setting a communication speed, the LED will be ON.

30001 (0000) Temperature value Temperature value×0.01 30002 (0001) Humidity value Humidity value×0.01 Setting communication speed

<Setting table for

| Comm. | SW1 | Comm. | speed (bps) | 1200 | 5 | 19200 | 6 38400 8 115200 9600

## At the moment turn OFF the power. Factory default communication speed is 9600bps Setting communication address

Turn off the power of the unit.
Set SW1 to 0 and supply the power

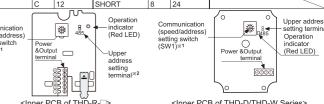
. Operation indicator LED is flashing.

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)

(3VV I. I, UPP	ei auu	iress setting	terrimai.	U
<setting for<="" table="" td=""><td>or addı</td><td>ress&gt;</td><td></td><td></td></setting>	or addı	ress>		
Upper address			I Innor add	ror

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	Α	26
OPEN	3	03	OPEN	F	15	SHORT	В	27
OPEN	4	04	SHORT	0	16	SHORT	С	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	Α	10	SHORT	6	22	_	_	
OPEN	В	11	SHORT	7	23			_
OPEN	С	12	SHORT	8	24	1		
·		, nr_	_				$\neg$	



<Inner PCB of THD-R-□> <Inner PCB of THD-D/THD-W Series> \*1: Only when communication setting, remove the case cover and adjust communication setting switch

to set address and communication speed.

\*2: Short terminal as upper address setting terminal, the lower address setting is available

## ■ Comprehensive Device Management Program

## [DAQMaster]

DAQMaster is comprehensive device management program. It is available for temperature and humidity

For more information, please refer to the DAQMater.

Visit our web site (www.autonics.com) to download DAQMaster program.

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

## ■ Caution During Use

When removing a packing box, do not store the unit at the high temperature/humidity environment.
 Do not use or storage the unit at over the 90%RH for a long time.
 If not, it may cause error of humidity value.
 Cautions for cleaning

Use dry towel.

②Do not use acid, chrome acid, solvent but alcohol.
③Turn off the power before cleaning the unit. After 30 min of cleaning, supply the power to the unit. Check power terminal polarity when wiring power cable.

Separate the unit cable from high voltage line, power line to avoid inductive noise

Avoid installing controllers adjacent to high frequency noise generating units including high frequency soldering machine, high frequency sewing machine, and high capacity SCR controllers.
 The switch or circuit-breaker should be installed near by users.

. Installation environment

①It shall be used indoor @Altitude Max 2 000m Failure to follow these instructions may result in product damage

# ■ Major Products

■ Photoelectric Sensors ■ Temperature Controllers ■ Fiber Optic Sensors ■ Temperature/Humidity Transducers

SSRs/Power Controllers

Area Sensors

Proximity Sensors ■ Panel Meters ■ Tachometers/Pulse (Rate) Meters
■ Display Units
■ Sensor Controllers ■ Pressure Sensors Rotary Encoders

Control Switches/Lamps/Buzzers ■ I/O Terminal Blocks & Cables

Stepper Motors/Drivers/Motion Controllers Graphic/Logic Panels
Field Network Devices
Laser Marking System (Fiber, Co<sub>2</sub>, Nd: YAG)
Laser Welding/Cutting System TEL: 82-32-610-2730 / FAX: 82-32-329-0728

OVERSEAS SALES: #402-303, Bucheon T

**Autonics** Corporation

DRW161011AA