TDC-BH-U Duct-Humidistat

Features



- Control for binary humidifiers and dehumidifiers with or without fan support.
- Low power energy consumption: < 1W per unit
- Relays switching for outputs each up to 300W
- Cost saving option with Economy functionality and set point limitations
- External sensor input for setpoint setback based on outdoor temperature
- Password protected programmable user and control parameters
    - Setpoint range limitation
    - Access control for setpoints and mode change
    - Access control for clock and time programs
    - Select your display contents
    - Selectable behavior after return from power failure
- Temperature display of external input in Celsius or Fahrenheit

Deluxe Version:

- Clock and time schedule functions
- Blue backlight for LCD

Applications

- Humidifiers:
    - On / Off type humidifiers
    - On / Off type humidifiers with single speed fan support
- Dehumidifiers:
    - On / Off type dehumidifiers
    - On / Off type dehumidifiers with single speed fan support
- Combination humidifiers and dehumidifiers without fan support

General description

The TDC-BH-U is a stand-alone electronic binary humidity stat. The TDC-BH-U features one internal humidity sensor, one external NTC temperature sensor input and two binary outputs (Relays).

A detailed parameterization is possible with the use of a simple configuration routine. The TDC-BH-U can be configured using the standard operation terminal. No special tools or software is required.

Ordering

Product Name	Product No.	Variant	Features
TDC-BH-U-W20 TDC-BH-U-W24 TDC-BH-U-W25	40-10 0059-20 40-10 0059-24 40-10 0059-25	standard humidifying de-humidifying	Binary controller with: 1 Internal humidity input 1 external temperature input (For set point shift) 1 DO (Relay) for humidifier or dehumidifier 1 DO (Relay) for fan (optional) -U = Conduit connector NPT 1/2 -W24 = Humidifying, US units/time pre-configured -W25 = De-humidifying, US units/time pre-configured -D = 7-day programmable
TDC-BH-U-D-W20 TDC-BH-U-D-W24 TDC-BH-U-D-W25	40-10 0060-20 40-10 0060-24 40-10 0060-25	deluxe humidifying de-humidifying	
Accessories			
SOD-Tn10-1	40-20 0108		Outdoor sensor
AES3-HT-A5	40-50 0104		Replacement humidity sensor 5% accuracy

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Technical specification

Caution! This device is intended to be used for comfort applications. Where a device failure endangers human life and/or property, it is the responsibility of the owner, designer and installer to add additional safety devices to prevent or detect a system failure caused by such a device failure. Vector Controls or its affiliates cannot be held liable for any damage caused by such a failure. Failure to follow specifications and local regulations may endanger life, cause equipment damage and void warranty.

Power supply	Operating voltage	24 V AC/DC ± 10 %, 50…60 Hz
	Power consumption	Max. 1.5 VA
	Electrical connection	Terminal Connectors, wire 0.34…2.5 mm^2 (AWG 24…12)
	Deluxe type only: Power backup for real time clock	 Min 48h if charged for 24h
Signal inputs	Humidity input: Range Accuracy Hysteresis	Element: Polymer-Based Capacity Sensor 0…100 % r.H. 10%...90% r.H. ± 5.0 % 0…10% and 90…100% ± 7.0 % ±1% r.H.
	Temperature input Range Accuracy	External NTC (Sxx-Tn10 sensor): -40…70 °C (-40…158 °F) -40…0 °C (-40…32 °F): 0.5 K 0…50 °C (32…122 °F): 0.2 K 50…70 °C (122…158 °F): 0.5 K
Signal outputs	Digital switching outputs Switching type AC Switching power	DO1…DO2 Relays 2(1.2) A, 250VAC (max fan power 300W)
Environment	Operation Climatic conditions Temperature Humidity	To IEC 721-3-3 class 3 K5 0°C …50°C (32°F…122°F) <95% R.H. non-condensing
	Transport & storage Climatic conditions Temperature Humidity Mechanical conditions	To IEC 721-3-2 and IEC 721-3-1 class 3 K3 and class 1 K3 -25°C…70°C (-13°F…158°F) <95% R.H. non-condensing class 2M2
Standards	CE conform according to EMC Standard 89/336/EEC EMEI Standard 73/23/EEC	 EN 61 000-6-1/ EN 61 000-6-3
	Product standards Automatic electrical controls for household and similar use Special requirement on humidity dependent controls	 EN 60 730 –1 EN 60 730 – 2 - 9
	Degree of protection	IP52 to EN 60 529
	Safety class	III (IEC 60536)
Housing	Cover, back part Filter material	Polycarbonate PC (UL94 class V-0) PTFE coated 1µm pores
General	Dimensions (H x W x D): Transmitter case: Probe:	 91 x 68 x 47mm (3.7” x 2.7” x 1.9”) ∅14 x 77 mm (∅ 0.55 x 3”)
	Weight (including package)	220g (7.8 oz)

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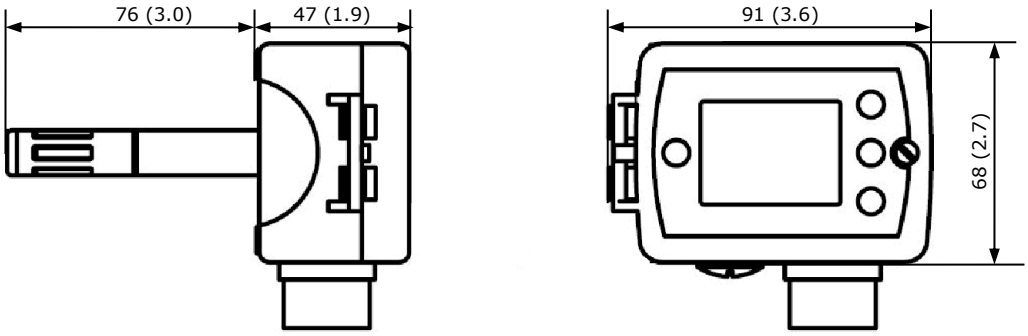
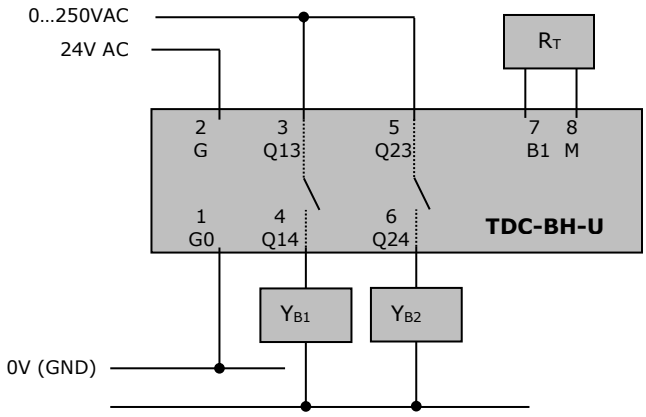
Dimensions mm (inch)



Wiring diagram



Description:

Connections depend on parameter CP10 and CP11!

CP10	YB1 DO1	YB2 DO2	RT
CP10 = 0	Humidify	Dehumidify	Temperature input for setback NTC 10kΩ @ 25°C (77°F)
CP10 = 1	Humidify	CP11 = ON: FAN	
CP10 = 2	If CP11 = ON: FAN	Dehumidify	

Selection of devices and sensors

External temperature sensors: Use only our approved NTC sensors to achieve maximum accuracy. Recommended is SDB-Tn10-15 as duct sensor and SOA-Tn10 as outdoor sensor.

Binary auxiliary devices: E.g. humidifiers, de-humidifiers and fans. Do not directly connect devices that exceed 2(1.2)A. Observe startup current on inductive loads!

Mounting and installation

Install the controller on the duct where the air stream is well mixed: for supply air two to three meters (6 to 10 ft) downstream from the nearest fan and coil, for return air close to the air inlet but downstream from a return fan if one is present.

Mount and connect the controller as shown in the installation sheet supplied with the device, and wire it according to the wiring diagram above.

Warning about storage, packaging and usage environment

The sensing part is a polymer, which measures the humidity in the ambient air. For proper sensor operation some mandatory precautions need to be taken during storage, packaging and usage.

The transmitter and its sensing element should not be packaged, stored or used in out-gassing plastic materials, which could cause sensor contamination. In particular, it is recommended not to use any glue or adhesive tapes (Sellotape, Scotch-Tape, Tesa-Film, etc.) within the package or close proximity of the sensor. Foamed materials often cause contamination problems and should not be used to package the transmitter. Best packaging material is a simple cardboard box or a deep-drawn plastic case in a cardboard box.

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Display and operation



Mode
Display of operation mode

Large digits
Display of input or parameter value.

Up
Increment SET POINT
(Parameter setting: SCROLL menu options and parameters)

Left (POWER)
Press < 2 sec.: Toggle STANDBY-COMFORT mode or switch from OFF to ON
Press > 2 sec.: Turn unit OFF. Text OFF displayed with current time (deluxe) temperature (standard)
(Parameter setting: ENTER to select menu option, accept parameter change)

Vertical bar
Scrolls up = humidifying
Scrolls down = dehumidifying

Right (OPTION)
Press < 3 sec.: Switch display
Press > 3 sec.: Access time programs, change time.
(Parameter setting: ENTER to select menu option, accept parameter change)

Indicators
1 Temperature setback error

Down
Decrement SET POINT
(Parameter setting: SCROLL menu options and parameters)

Small digits
Display of setpoint, clock or parameter number.

Operation mode and state indication		
	Comfort (occupied)	All control functions operating per set points.
	Economy (unoccupied):	Set points shifted according to Parameter CP04. Economy mode and setpoint shift may be disabled with UP04
OFF	Energy Hold Off	Outputs are off, inputs monitored for alarm condition
	Fan active	Fan is running
	Temperature setback	Temperature setback is active and shifts setpoint

Power failure

All the parameters and set points are memorized and don't need to be reentered. Depending on Parameter UP03 the unit will remain switched off, switch on automatically or return to the operation mode it was in before the power failure.
The deluxe version includes a real time clock with a 48h backup battery powered through a super capacitor. The time does not need to be re-entered after a power failure.

Error messages

The TDC-BH-U may display the following error condition:

Err1: Humidity sensor faulty. The humidity sensor is damaged or removed. Verify if sensing element!
Err2: External input for temperature setback missing or damaged.

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Advanced user setup menu

To enter the advanced user setup menu, activate the controller by pressing the POWER button. Press the ENTER key for 3 sec until SEL is shown in the large digits. The menu can be left by pressing the POWER / ESC button or by not pressing a button for more than 5 minutes.

Temperature Unit setup (°C/°F)

Start the advanced menu as described above. Select C-F with the UP/DOWN buttons.

Press the ENTER key to change the temperature unit (°C or °F).
Press the POWER button to exit the advanced user setup menu.

Sensor calibration

Start the advanced menu as described above. Select CALH or CALt with the UP/DOWN buttons.

Small digits show CALH (internal humidity sensor calibration) and CALt (temperature setback sensor calibration). The current calibration value is displayed. Press ENTER and then change the value with the UP/DOWN buttons, and save it with the ENTER button.

Clock setup (for deluxe versions only)

A blinking clock indicates that the time needs to be set. Time programs will not operate if the time is not defined.

- Start advanced menu as described above and select the clock display by pressing the UP or DOWN keys.
- The current time is now displayed in the small digits. Press the ENTER button to enter the clock setup. The minute digits start to blink and can be changed with the UP/DOWN buttons.
- Pressing ENTER saves minutes and steps to hours. The hour digits blink now and can be changed with the UP/DOWN buttons.
- Press ENTER again to step to the day setting. DAY1-7 is displayed. Day 1 stands for Monday, Day 2 for Tuesday and so forth. Select the day according to current weekday.
- Pressing ENTER again saves the settings and moves back to the SELECT menu. To leave the setup mode press the POWER button.

Time schedules (for deluxe versions only)

Four individual time programs (Pro1, Pro2, Pro3, Pro4), each with four switching events, are available. A switching event changes the controller from one operation mode to another.

Time schedules and their switching events can be individually enabled. Make sure that undefined time schedules and switching events are disabled.

Enter the advanced menu as described above and select PRO by pressing UP or DOWN buttons. Press the ENTER key.

Pro1 is now shown in the large digits, while the number 1 is blinking. Select time schedule Pro1-Pro4 by using UP/DOWN keys and pressing the ENTER key.

1) Enable or disable the Pro1 time schedule. Choose ON or OFF with the UP/DOWN keys. The following steps will only be accessible if ON is selected. OFF disables this time schedule and its switching events.
2) Select day(s) with UP/DOWN. Day 1 stands for Monday, day 2 for Tuesday and so forth. Options are d1-7, d1-6, d1-5, d6-7, day1, day2, day3, day4, day5, day6, day7. This time schedule will be active during the selected day or days. Press ENTER to continue.
3) Select desired operation mode below with UP/DOWN, press ENTER to continue

Name on display	Function	Override reset
no	Switching event not used	
OFF	Operation mode changes to off mode	Reset is active
ECO	Operation mode changes to economy mode	Reset is active
ON	Operation mode changes to comfort mode	Reset is not active
UNI	Operation mode does not change	Reset is not active

4) Select switching time 00:00 to 23:45 in 15-minute steps with UP/DOWN.
5) Press ENTER to continue and repeat step 3 and 4 for each switching event.

UNI: University mode: This switching mode is used for rooms such as lecture rooms and auditoriums that might be occupied during a certain time. During this time the reset is not active. The unit will not start itself when UNI mode is active. It still needs to be manually activated. This is to avoid unnecessary heating or cooling of such rooms while they are not occupied.

Override reset function: The override reset applies when the unit is manually switched on, while in scheduled off or ECO mode. The unit will return to the scheduled mode when the reset time defined in UP08 expires.
Setting UP08 to 0 disables the override reset.

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Example

From Monday to Friday the controller shall be in Comfort mode between 08:00 in the morning and 18:00 in the evening. Between 18:00 and 08:00 it shall be in OFF mode. One time schedule with two switching events is required to achieve this time schedule:

Setting procedure:

- Select the desired time schedule (Pro1) with UP/DOWN key,
- Press enter, select ON to activate Pro1 with UP/DOWN keys, Press enter,
- Select d1-5 (Monday – Friday) with UP/DOWN keys and confirm with ENTER key
- Select ON mode with UP / DOWN key and confirm with ENTER
- Select the time of the first desired switching event for Pro1 (ON mode) to 08:00 with the UP/DOWN keys;
- Press ENTER to conclude this switching event (first of 4 available).

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