TDU/TDF Universal Digital Room Sensor
For EVCB and EFCB Controllers

Models

Model #	Temp	RH	CO₂	Color
TDU10-100 TDF10-100	●			grey LCD, white enclosure
TDU10-101 TDF10-101	●	●		
TDU10-102 TDF10-102	●	●	●	
TDU10-103 TDF10-103	●		●	

Model #	Temp	RH	CO₂	Color
TDU40-100 TDF40-100	●			black LCD, black enclosure
TDU40-101 TDF40-101	●	●		
TDU40-102 TDF40-102	●	●	●	
TDU40-103 TDF40-103	●		●	

Model #	Temp	RH	CO₂	Color
TDU70-100 TDF70-100	●			black LCD, white enclosure
TDU70-101 TDF70-101	●	●		
TDU70-102 TDF70-102	●	●	●	
TDU70-103 TDF70-103	●		●	

TDU10 Series **TDF10 Series**

TDU40 Series **TDF40 Series**

TDU70 Series **TDF70 Series**

Features

Onboard Sensors

- Temperature sensor (°C/°F)
- Humidity sensor (%RH), select models
- Carbon dioxide sensor (CO_2), select models

Functions

- 90mm (3.5") LCD display
- Slim design
- Universal wall-mount design
- TDU series used to configure and operate the EVCB VAV controllers
- TDF series used to configure and operate the EFCB Fan Coil controllers
- Three wire connection between digital room sensor and controller
- Selectable Fahrenheit or Celsius scale
- Network service port via on-board mini USB connector
- Dimensions: 133mm x 95mm x 15mm
(5.24" x 3.74" x 0.6")

Technical Specifications

| Description	TDU10 / TDU40 / TDU70 / TDF10 / TDF40 / TDF70 Series
Temperature Sensor	
Setpoint Range	10ºC to 40ºC [50ºF to 104ºF]
Control Accuracy	Temperature: ±0.4ºC [0.8ºF]
Display Resolution	±0.1ºC [0.2ºF]
Humidity Sensor (select models)	
Setpoint Range (EFCB only)	10 to 65%RH
Control Accuracy (EFCB only)	±3.5% RH
Display Resolution	0.1%
CO₂ Sensor (select models)	
Operating Principle	Self-calibrating, Non-Dispersive Infrared (NDIR)
Sensor Range	400 to 2000 ppm
Accuracy	±30 ppm ±3% of reading (Accuracy is defined after minimum 3 weeks of continuous operation)
Response Time	2 minutes by 90%
Other	
Electrical connection	Three wires to EVCB/EFCB controller and two wires to BACnet/Modbus network 0.8 mm² [18 AWG] minimum
Network service port	Mini USB connector
Power supply	24Vac
Power consumption	1VA
Operating temperature	0ºC to 50ºC [32ºF to 122ºF]
Storage temperature	-30ºC to 50ºC [-22ºF to 122ºF]
Relative Humidity	5 to 95 % non-condensing
Degree of protection of housing	IP 30 (EN 60529)
Weight	120 g. [0.25 lb]
Dimensions: A = 5.24" | 133mm B = 2.87" | 73mm C = 3.74" | 95mm D = 1.22" | 31mm E = 0.75" | 19mm F = 2.00" | 51mm G = 2.18" | 55mm	

Interface
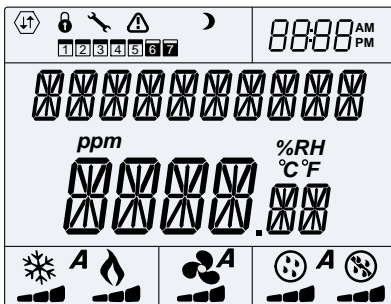
	Network Communication		User Lock		Programming Mode (Technician Setting)
	Alarm Status		Energy Saving Mode (NSB/OCC)	1 2 3 4 5 6 7	Schedule
	Time	ppm	Parts Per Million	°C °F %RH	ºC: Celsius Scale ºF: Fahrenheit Scale %RH: Humidity
A	Automatic Mode		Cooling		Heating
	Fan		Humidify (EFCB only)		De-humidify (EFCB only)

Wiring
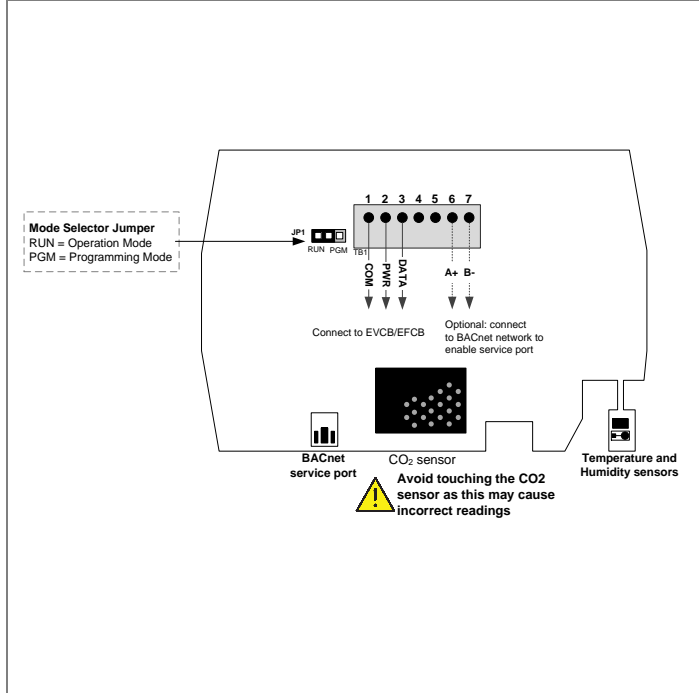
We strongly recommend that all Neptronic products be wired to a separate grounded transformer and that transformer shall service only Neptronic products. This precaution will prevent interference with, and/or possible damage to incompatible equipment.

Mode Selector Jumper
RUN = Operation Mode
PGM = Programming Mode

1 2 3 4 5 6 7
TB1
COM
PWR
DATA
A+ B-

Connect to EVCB/EFCB

Optional: connect to BACnet network to enable service port

BACnet service port

CO₂ sensor

⚠ **Avoid touching the CO2 sensor as this may cause incorrect readings**

Temperature and Humidity sensors

Mode Selection (JP1)

JP1 ☐ RUN ☐ PGM	**RUN:** Digital Room Sensor is in **Operation Mode**. Digital Room Sensor must be set in this mode to operate properly. If not locked, following setpoint and control mode options can be modified by the end user: • Heating and Cooling ON • Cooling only ON • Heating only ON • OFF (EFCB only) • Fan ON • Humidify and De-humidify ON • Humidify only ON • Dehumidify only ON
JP1 ☐ RUN ☐ PGM	**PGM:** Digital Room Sensor is set in **Programming Mode**.

Mounting Instructions

⚠ **CAUTION: Remove power to avoid a risk of malfunction.**

A. Remove the wall mounting plate (highlighted) from the back of the Digital Room Sensor.
B. Install the mounting plate on the gang box.
C. Pull the wires through the base hole and make the appropriate connections.
D. Mount the Digital Room Sensor onto the wall plate. To mount it correctly, place the top of the Digital Room Sensor on the mounting plate first and push it into the grooves to snap it into place.
E. Secure the Digital Room Sensor using the screw (supplied).

A	B	C	D	E
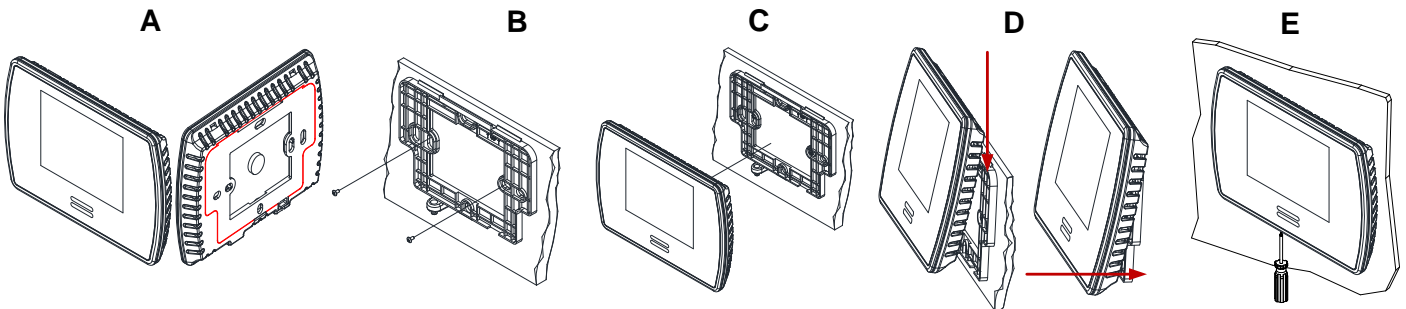
Access to Menus

The menus and options are the same for both the TDU and TDF Digital Room Sensors. However, the action button or the button used to access the menus and save changes is different for each Digital Room Sensor.
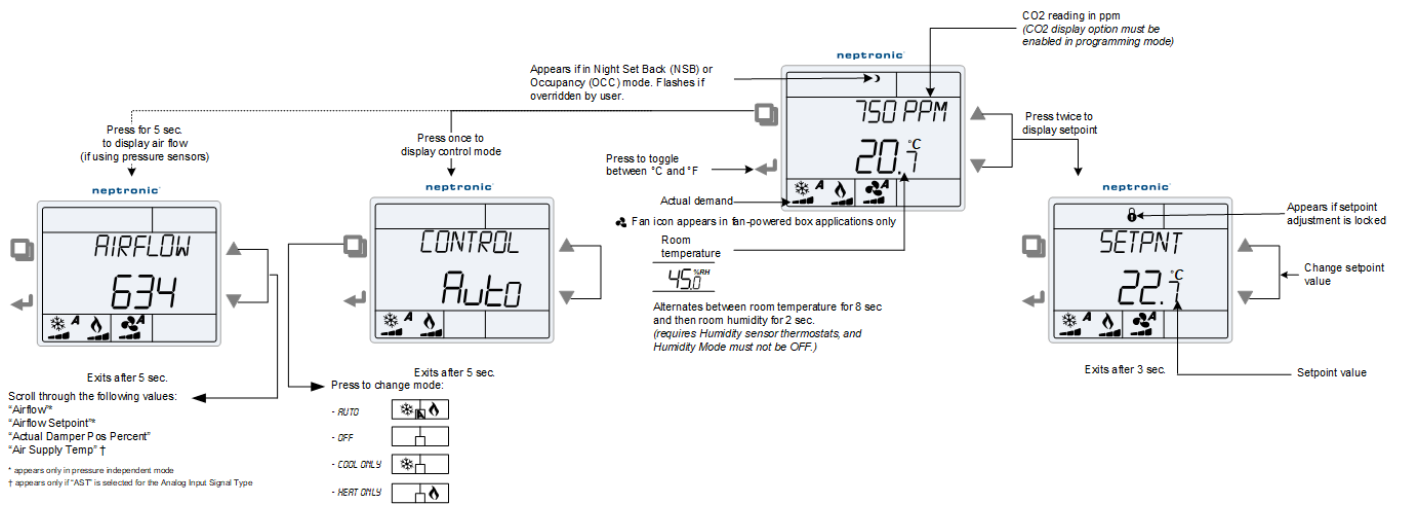
Action Buttons on Digital Room Sensor

Action Button	
TDU	**TDF**
▣	🌀
↵	❄\◊

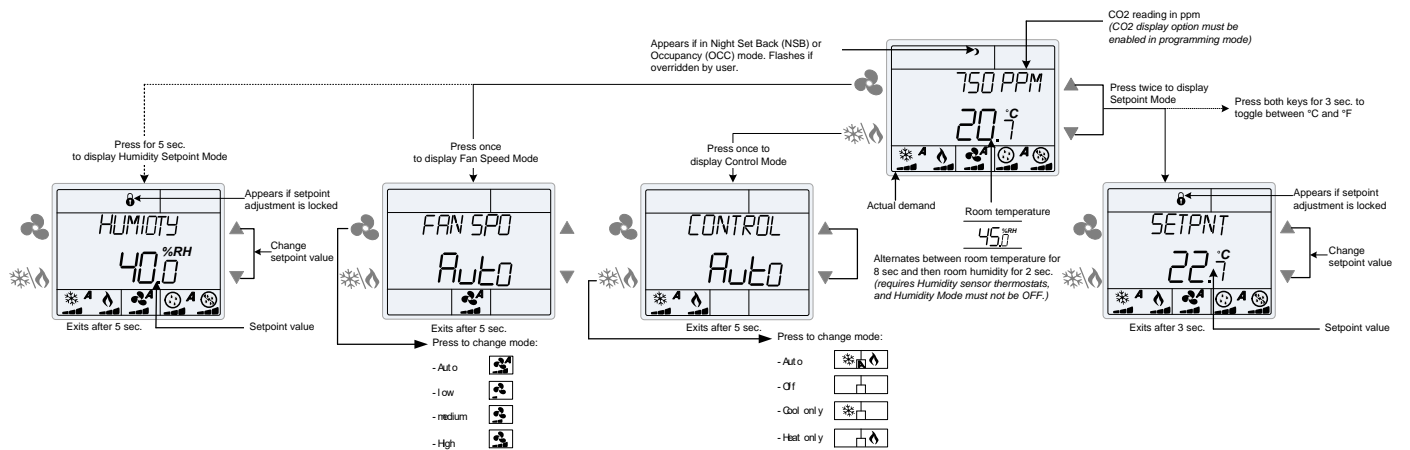# Operation Mode

The Mode Selector Jumper JP1 must be set to the RUN position (Operation Mode). Refer to the Wiring section on page 3.

EVCB

CO2 reading in ppm
(CO2 display option must be enabled in programming mode)

Appears if in Night Set Back (NSB) or Occupancy (OCC) mode. Flashes if overridden by user.

Press twice to display setpoint

Press for 5 sec. to display air flow (if using pressure sensors)

Press once to display control mode

Press to toggle between °C and °F

Actual demand

Fan icon appears in fan-powered box applications only

Room temperature

Alternates between room temperature for 8 sec and then room humidity for 2 sec.
(requires Humidity sensor thermostats, and Humidity Mode must not be OFF.)

neptronic
AIRFLOW
634

neptronic
CONTROL
Auto

neptronic
SETPNT
22.1 °C

Appears if setpoint adjustment is locked

Change setpoint value

Setpoint value

Exits after 3 sec.

Exits after 5 sec.

Scroll through the following values:
"Airflow"*
"Airflow Setpoint"*
"Actual Damper Pos Percent"
"Air Supply Temp" †

* appears only in pressure independent mode
† appears only if "AST" is selected for the Analog Input Signal Type

Exits after 5 sec.

Press to change mode:
- AUTO
- OFF
- COOL ONLY
- HEAT ONLY

EFCB

CO2 reading in ppm
(CO2 display option must be enabled in programming mode)

Appears if in Night Set Back (NSB) or Occupancy (OCC) mode. Flashes if overridden by user.

Press twice to display Setpoint Mode

Press both keys for 3 sec. to toggle between °C and °F

Press for 5 sec. to display Humidity Setpoint Mode

Press once to display Fan Speed Mode

Press once to display Control Mode

Actual demand

Room temperature

Alternates between room temperature for 8 sec and then room humidity for 2 sec.
(requires Humidity sensor thermostats, and Humidity Mode must not be OFF.)

HUMIDTY
40.0 %RH

FAN SPD
Auto

CONTROL
Auto

750 PPM
20.1 °C

SETPNT
22.1 °C

Appears if setpoint adjustment is locked

Change setpoint value

Setpoint value

Appears if setpoint adjustment is locked

Change setpoint value

Setpoint value

Exits after 5 sec.

Exits after 5 sec.

Exits after 3 sec.

Press to change mode:
- Auto
- low
- medium
- High

Press to change mode:
- Auto
- Off
- Cool only
- Heat only

Power Up

Upon power up, the LCD illuminates and all segments appear for 2 seconds. The Digital Room Sensor then displays its current version for 2 seconds followed by the current version of the controller for 2 seconds. Pressing any key on the Digital Room Sensor illuminates the LCD for 4 seconds.

Temperature Display and Setpoint

The Digital Room Sensor displays the temperature reading. If the sensor is disconnected or short circuited, the unit displays the sensor's limits. To toggle the temperature scale between ºC and ºF, press the ← key on the TDU or both the ▲ and ▼ keys for 3 seconds on the TDF.

To display the setpoint, press the ▲ or ▼ key twice. The setpoint appears for 5 seconds. To adjust the setpoint, press the arrow keys while the temperature is displayed. If the setpoint adjustment has been locked, the lock 🔒 symbol appears.

CO₂ (Digital Room Sensor with CO₂ Option)

If enabled via the configuration menu, the Digital Room Sensor displays the CO_2 reading on the first line above the temperature reading. If CO_2 display is enabled, the time will not be displayed.

Humidity Setpoint Display and Adjustment (Digital Room Sensor with Humidity Option)

If enabled via the configuration menu for the EVCB and in a humidity mode other than OFF for the EFCB, the Digital Room Sensor displays the temperature reading for 8 seconds and then displays the humidity reading for 2 seconds. If the sensor is disconnected or short circuited, then the unit displays the sensor's limit.

To access the humidity setpoint (EFCB only), press the 🌀 key for 5 seconds. The humidity setpoint will be displayed for 5 seconds. To adjust the setpoint press the ▲ and ▼ keys while the setpoint is displayed. The unit will return to normal mode if you do not press any key for 3 seconds. The changed values will be saved automatically.

Control Mode

To access the Control Mode, press the 🗔 key on the TDU or ❄\◊ on the TDF. The Control Mode appears for 5 seconds. Press the 🗔 (TDU) or ❄\◊ (TDF) key to scroll through the following control modes. These options can vary depending on the options configured by the installer.

- Auto (Automatic Cooling or Heating)
- Cooling only (on, with cooling symbol)
- Heating only (on, with heating symbol)
- OFF (if it is not disabled in Programming Mode)

Fan Speed Selection Mode (EFCB Only)

To access the Fan Speed selection mode, press the 🌀 key. The mode appears for 5 seconds. These options can vary depending on the fan speed signal and auto mode settings. If in No Occupancy mode, the 🌀 button now serves as the override button.

- Automatic speed. Available only if enabled by the installer.
- Low speed
- Medium speed
- High speed

Night Set Back (NSB)

This function is only available if enabled by your installer. If the appropriate digital input contact is triggered, the Digital Room Sensor enters NSB Mode (the ☽ symbol appears) and uses the NSB setpoints defined in program mode. Press any key to override NSB for the delay defined in program mode (default: 120 minutes). The ☽ symbol flashes to indicate that the NSB mode is overridden (during this time the standard setpoints are used). If the NSB Mode was set to OFF, all outputs will be off for the duration of the period and cannot be overridden.
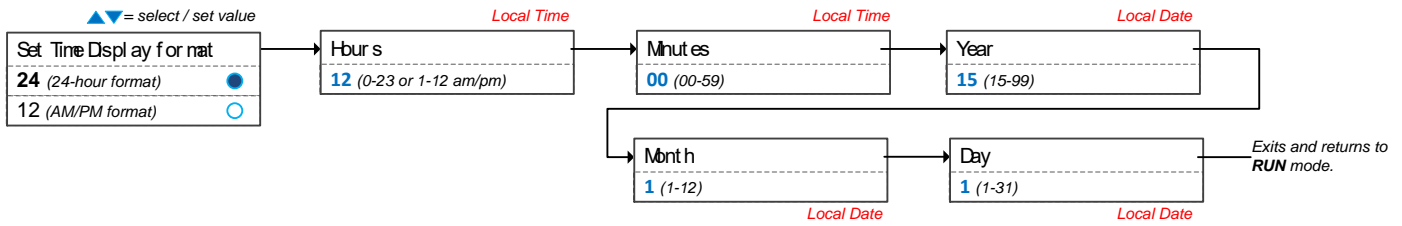
Occupancy Mode

This function is only available if enabled by your installer. If the appropriate digital input contact is triggered, the Digital Room Sensor enters Occupancy Mode (the ☽ symbol appears) and uses the NoOcc setpoints defined in program mode. If not locked, no occupancy mode can be overridden for a period by pressing the 🗔 (🌀) button. Each time you press the 🗔 (🌀) button, 15 minutes are added to the override (up to a maximum defined in program mode). Press the fan 🗔 (🌀) button until "0" is displayed to disable the override. The ☽ icon will flash and the remaining override time will be displayed in minutes.

Set Time and Date

1. Press and hold the ⏎ (❄\◊) button for 5 seconds.

2. Use the arrow keys to set the desired value. Press the ⧉ (🌀) button to save and go to the next step. Press the ⏎ (❄\◊) button to go to the previous step without saving.

▲▼ = select / set value			
Set Time Display format	**Hours** *Local Time*	**Minutes** *Local Time*	**Year** *Local Date*
24 *(24-hour format)* ●	**12** *(0-23 or 1-12 am/pm)*	**00** *(00-59)*	**15** *(15-99)*
12 *(AM/PM format)* ○			

	Month	**Day**	*Exits and returns to* ***RUN*** *mode.*
	1 *(1-12)*	**1** *(1-31)*	
	Local Date	*Local Date*	

Note: Time will only be displayed on the TDU/TDF when the Bacnet scheduler is active. In order to achieve this, set the proper BACnet Object present value to Yes (1): ***EFCB BV.91 – Cfg_ActiveSchedule*** *or* ***EVCB BV.70 – Cfg_ActiveSchedule***.

Airflow and Air Supply Temperature

Press and hold the ⧉ (🌀) button for 5 seconds and use the arrow keys to view the "airflow", "airflow Setpnt", "actual damper pos percent" and "air Supply Temp". After 5 seconds without any action, the Digital Room Sensor returns to operation mode. The air supply temperature appears only if analog input AI1 or AI2 are configured with the AST option.

Backlight and Contrast Level Adjustment

For models with the grey LCD screen, the backlight level can be adjusted. For models with the black LCD screen, the contrast level can be adjusted. Press and hold the ⧉ (🌀) and ▼ buttons for 5 seconds and enter the password **367** to gain access to the backlight and contrast level adjustment settings. Use the ▲ and ▼ keys to adjust the backlight or contrast level in three modes: User (digital room sensor is in operation), Occupancy (digital room sensor is idle and occupancy state is active) and No Occupancy (digital room sensor is idle and occupancy state is inactive). Press the ⧉ (🌀) key to save any changes.

Notes

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