Senticon
SENTIENT CONTROL SOLUTIONS

PS2.20 TDR20/QDR20 Touchscreen and SlimLine Touchscreen Room Display Interfaces (°C/°F, rH, VOC, CO2, PIR)





The TDR20/QDR20 Touchscreen and SlimLine Touchscreen Room Displays and Interfaces are used together with the TCR80 series ceiling mounted room controllers. The room interfaces have colour touchscreen and integrated temperature measurement. The colour touchscreen can be used for the setpoint adjustment, changing the controller operating mode and fan speed. Configurable boost button also available. The touchscreen room displays can also have optional CO2, VOC, humidity and occupancy monitoring.

The TDR20/QDR20 Series Touchscreen interfaces has also optional buttons to integrate the room operations to the display. This buttons include Clean My Room, Do Not Disturb, Bell/Panic Alarm, Lights and Blinds. The xDR20 Series button status can be automatically transmitted to the CDI Corridor Interfaces.

In addition the BMS can send through the TCR80 series controllers additional information such as energy or water consumption figures, or outside air temperature readings.

Features

- 2.4" Colour Touchscreen Room Interface with Built-In Temperature Measurement.
- Wall surface mounting or Wall junction box mounting
- Slimline 14mm Models for compact installations
- Setpoint, Fan Speed and Operating Mode Adjustment.
- Boost Button option overriding the space to Occupied Mode.
- Clean My Room, Do Not Disturb, Panic Alarm Buttons for Corridor Interface Integration.
- Lights and Blinds Buttons.
- Touchscreen is Customisable to the User Requirements.
- Optional CO2 Measurement and Indication.
- Optional Relative Humidity Measurement and Indication.
- Optional VOC (Volatile Organic Compound) Air Quality Monitoring.
- WELL Building Standard® and RESET® Air compliant TVOC Air Quality Calculation

- Option for PIR Occupancy Sensor.
- Fast and Efficient RS485 over USB-C cable connection to the TCR80 Ceiling Controllers (Power & Communications)
- Rising Cage Screw Terminals for optional retrofit wiring
- Configuration wirelessly through Smart Config Windows Software or SmartPhone App (using Bluetooth Dongle).
- Available in both White and Black. The display has number of different skin colour options for customisation.
- User display language customisable using the language packs.

Technical Specifications

Power Supply:	Power:	5Vdc via USB-C Cable or Wiring Terminals
Measurements:	Temperature:	
	Range:	0..50° (32..122°F)
	Accuracy:	+/-0.5°C
	CO2 (QDR Models)	
	Range:	0..10,000ppm
	Accuracy:	+/-30ppm + 3% of the reading (400ppm to 5000ppm)
	Humidity (Option)	
	Range:	0..100%rH
	Accuracy:	+/-2%rH (within 20 to 80%rH)
	TVOC (Volatile Organic Compound) (Option)	
	Range:	0..500 (Air Quality Index) TVOC Mølhave (WELL Building Standard®): 23..6621 ug/m^3 / 5..1326 ppb TVOC Isobutylene (RESET® Standard): 21..5482 ug/m^3 / 9..2389 ppb
	PIR Movement (Option)	
	Type/Range:	Passive Infrared Movement Detection, Range up to 5m
Communication (Sensor Bus):	Physical Interface	RSRS485 driver with Modbus Connection (over USB-C cable or standard wiring cables)
	Protocol:	Modbus RTU
	Addressing:	Via PC Device Configuration Tool, via SmartPhone Tool, or via Display (Default Address 1)
Display:	Touchscreen:	2.4" Full Colour Touchscreen Display with Glass Overlay, 240 x 320px
Mechanical:	Wiring Terminals:	USB-C Connector Rising Cage Screw Terminals, 0.2 to 1.31mm^2 (16AWG to 30AWG)
	Enclosure:	ABS ULV0 Plastics - White or Black
	Protection Class:	IP30 (when mounted on a wall or a junction box)
	Mounting:	Wall or Junction Box Mounting (60mm screw distance)
	Dimensions	Standard: W86 x H86 x D24mm SlimLine: W86 x H86 x D14mm (Surface Part) W86 x H86 x D39mm (Total)
Country of Origin:		United Kingdom

Model Selection

Refer to the below table to select the required model. The part number offers descriptive method for the product and options selection, and the SKU# number provides unique reference number. It is possible to order products using either.

Part Number		SKU# Number					
Example	TDR20-MOD-TS-RH-W	2000	1	02	01	00	02
Product Name		Product Code		Product Options			
TDR20	Touchscreen Room Display, Temperature Measurement	2000					
QDR20	Touchscreen Room Display, Temperature and CO2 Measurement	2100					
Serial Communication							
MOD	Modbus RS485		1				
User Interface							
	No Display			00			
TS	Colour Capacitive Touchscreen			02			
Measurement Options							
	No Extra Measurements				00		
RH	Relative Humidity				01		
RH-VOC	Volatile Organic Compound and Humidity				02		
OE	Passive Infrared Movement (PIR)				03		
RH-OE	Relative Humidity and Movement (PIR)				04		
RH-VOC-OE	VOC, Relative Humidity and Movement (PIR)				05		
Mounting Options							
	Standard Wall Surface or Junction Box					00	
F	SlimLine Flush Mounting on Junction Box					30	
Colour Options							
B	Black						01
W	White						02

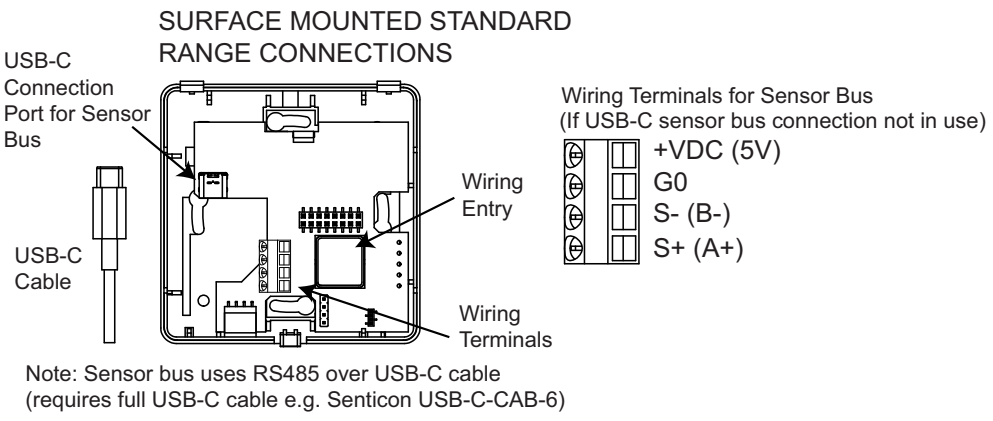
Part Number	Description	SKU# Number
Accessories		
USB-C-CAB-6	6m USB-C Male to USB-C Male for Room Interface Units, Black	8510 0 00 0005 01
USB-C-EXT-6	5m USB-C Female to USB-C Male Extension Cable, Black	8520 0 00 0006 01

Wiring Connections

The diagram below illustrates USB-C connection to the Room Display Interfaces. Bring the USB-C cable through the Wiring Entry hole.

Alternatively, TDR20/QDR20 can be wired with 4-core cable (5V, 0V, Sensor Bus-, Sensor Bus+).

STANDARD SURFACE MODEL WIRING

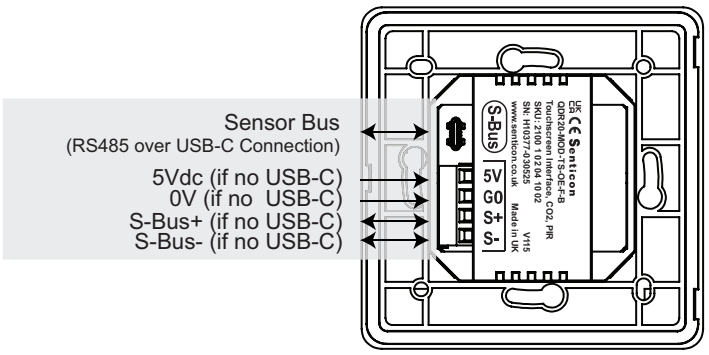


Note: Sensor bus uses RS485 over USB-C cable
(requires full USB-C cable e.g. Senticon USB-C-CAB-6)

SLIMLINE FLUSH MOUNTING WIRING

SlimLine models are mounted to standard junction boxes and are suitable to wide range of boxes.

SLIMLINE SERIES CONNECTIONS



Device Configuration and Communications

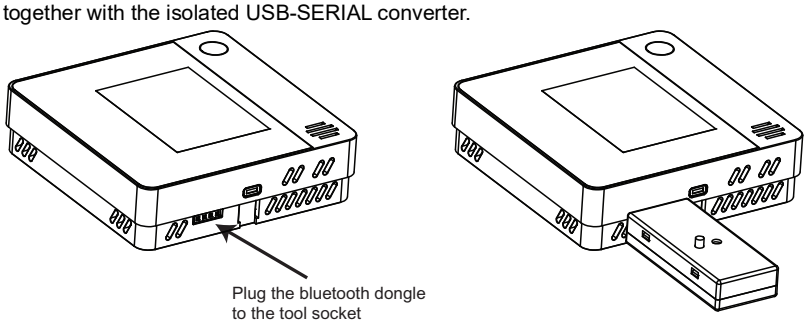
The devices come with Modbus RTU communication available through the USB-C cable connection. The Modbus communication is used between the TCR80 series controllers and TDR/QDR20 Room Display Interfaces. The TDR20/QDR20 device address is a default set 1, allowing plug-and-play connection for the Zone 1 of TCR80 Series controllers.

The following display functions have been activated in default configuration:-

- Room Temperature Setpoint (All Models)
- Room Temperature (TDR20)
- CO2 Measurement (QDR20)
- Humidity Measurement (with RH option)
- Operating Mode (Unoccupied/Occupied/Off) Button
- Heating/Cooling Status Icon, Condensation and Temperature limitation Icons

The displays can be configured locally using via PC Based Smart Config Tool, or via Smart Phone Application. Using these methods the device settings can be altered to suit the site requirements.

The Windows Smart Config Tool and SmartPhone Application (iOS) are connected to the device using Bluetooth dongle set (BLE-TOOLSET, connection to the device illustrated below). The PC Device Configuration tool can also be used together with the isolated USB-SERIAL converter.



To connect the TDR/QDR20 to Zone 2 change the device address to 2 using the above mentioned tools, or through the display menu.

Measurements

TEMPERATURE MEASUREMENT

The TDR/QDR room displays have built-in temperature measurement. The measurement can be displayed on the touchscreen.

NOTE: For accurate temperature measurement it is important that correct installation instructions are followed - see Dimensions and Installation Chapter.

CO2 (CARBON DIOXIDE) MEASUREMENT (QDR MODELS)

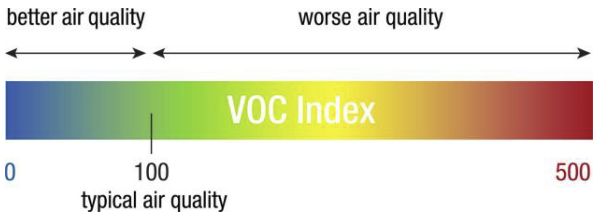
The QDR room displays have built-in CO2 measurement. The QDR CO2 sensor provides Automatic Self Calibration logic keeping measurement accurate over the time. The Automatic calibration can be disabled and the sensor can be manually calibrated (see Calibration Settings). The measurement is as default displayed on the touchscreen (can be hidden).

HUMIDITY MEASUREMENT (RH OPTION)

With TDR and QDR Displays can be fitted optional humidity sensor that provides 2% accurate relative humidity measurement. The measurement is displayed as default on the touchscreen (can be hidden).

RH-VOC VOLATILE ORGANIC COMPOUND MEASUREMENT (RH-VOC OPTION)

The VOC sensor option measures Volatile Organic Compounds with automatic humidity compensation providing relative indoor air quality index signal (see below diagram). The measurement can be displayed on the screen.



Measured air pollutants include harmful gases (acetone from paints and glues, toluene from furniture, mattresses and building products), other gases (ethanol from alcohol, perfumes and cleaners), odours (hydrogen sulphide and volatile sulphuric compounds from rotten food and farts; ammonia and amines from pet urine), smoke (benzene and nitrosamines from cigarette smoke).

WELL Building Standard ® Compliant TVOC Concentration

According to the Performance Guidebook v.2 of the WELL Building Standard®, performance of an IAQ monitor can be assessed by using ethanol as calibration gas and the Mølhave gas mixture to convert the ethanol concentration into the Mølhave equivalent of TVOC or $TVOC_{Mølhave.}$ The xDR20 interfaces can calculate and display $TVOC_{Mølhave}$ by selecting *587 VOC Measurement Mode = TVOC Mølhave* from the *Calibration and VOC Mode Settings* Menu. The maximum value is or 5482 ug/m^3.

Now Parameter *403 VOC Sensor (index)* shows the TVOC concentration based on the $TVOC_{Mølhave}$ index. .

RESET® Air compliant TVOC concentration

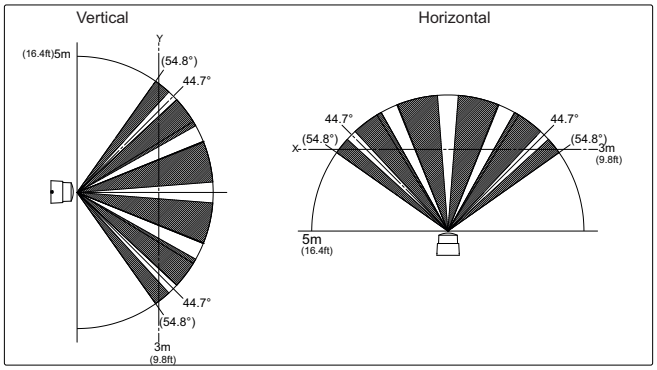
The xDR20 interfaces can calculate and display $TVOC_{Isobutylene}$ by selecting *587 VOC Measurement Mode*/*TVOC Isobutylene* from the *Calibration and VOC Mode Settings* Menu. $TVOC_{Isobutylene}$ setting provides RESET® Air compliant TVOC concentration. The maximum value is 5482 ug/m^3.

Parameter	Description	Value Range / Enumerations
VOC Mode	VOC Measurements Mode	0 = VOC Index 1 = TVOC Mølhave, ug/m3 2 = TVOC Isobutylene, ug/m3
VOC Learning Time Offset	VOC Learning Time Offset, set to 12 for Index mode, and 720 Building Standards Mode (Reset/Well)	1..1000 hours (Default 12)

NOTE: The *588 VOC Learning Time Offset* parameter defines over what time span the VOC algorithm builds and updates its internal baseline (offset) from recent sensor history. Set to 720 for Building Standards.

MOVEMENT DETECTION AND CONTROL (OE OPTION)

The displays can be fitted with an optional pyroelectric infrared motion sensor for the movement and occupancy detection. The sensor element is designed for optimal usability and reliability with low power consumption, better sensitivity and signal-to-noise ratio reducing the false detections. The diagram illustrates the detection area.



The movement will override the operating mode between Occupied - Unoccupied/Off modes on the xDR20 series and this status is automatically reflected on the TCR80 series controllers.

The PIR movement sensor *Delay Off Timer* (10..28,800 seconds) parameter sets the time that the status latches ON after detection of movement.

NOTE: Any new detected movement resets the timer. The movement sensor has 30 seconds warm-up delay on power up.

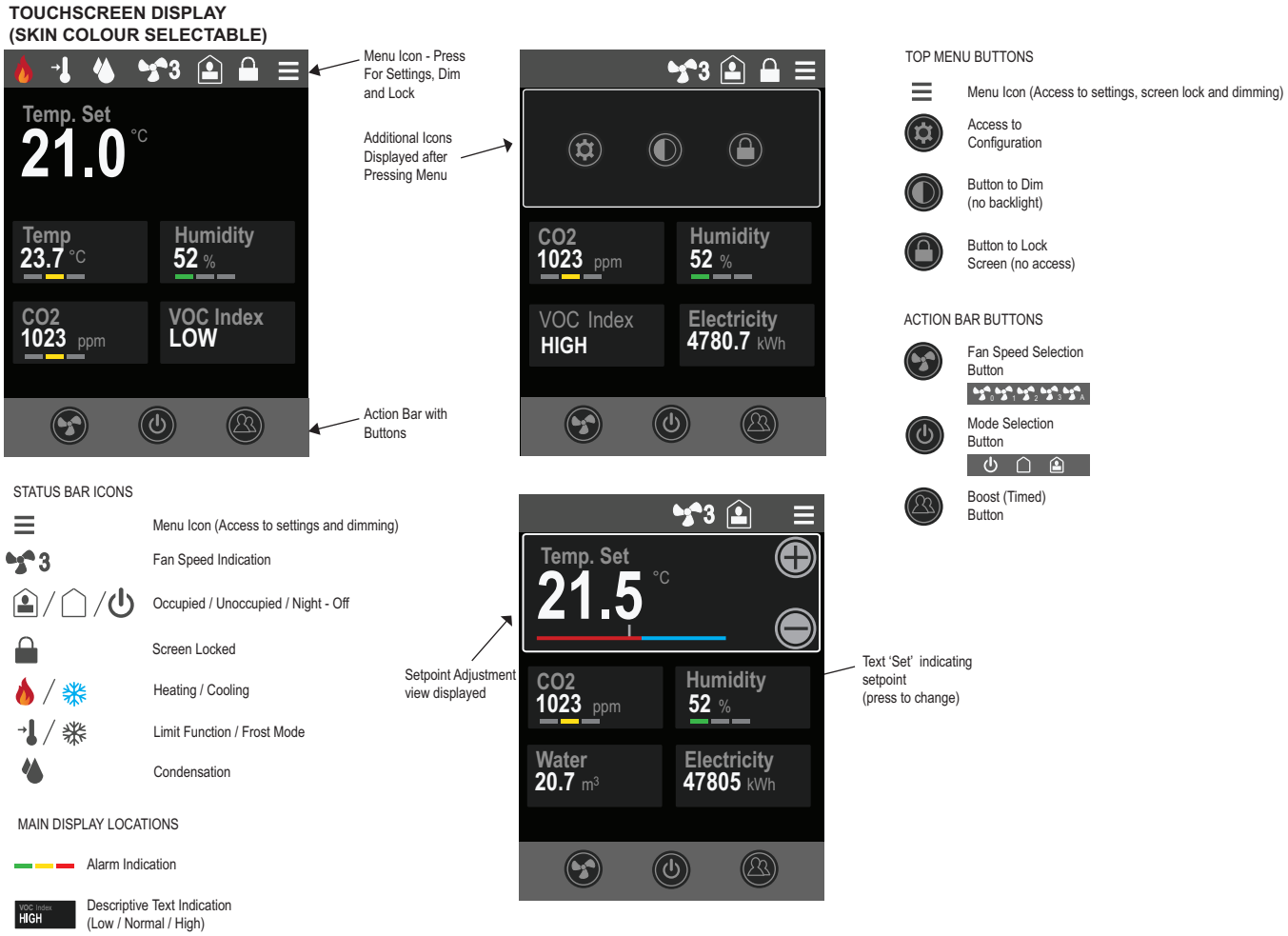
MULTI-TRIGGER MODE

The PIR mode can be changed to multi-trigger mode. In this mode during the *Trigger Period* the number of movement detections must reach the *PIR Trigger Count* amount for the controller to activate the Occupied Mode. If within the *Trigger Period* the trigger count is not reached, it is reset to 0. After each movement detection, there is delay of 10 seconds until further movement is registered to the trigger count. This feature can be used, for example, prevent the system to switch on if a person enters temporarily to the room space. Available settings are shows in the table below.

Parameter	Description	Value Range / Enumerations
PIR Trigger Mode	Selects the Mode of the PIR Sensor	0 - Standard (default) 1 - Multi-Trigger
PIR Trigger Count	Trigger Count in Multi-Trigger Mode	1..10 (default 3)
Trigger Period	Trigger Period for monitoring Trigger Count	30.1,800 seconds (default 300 secs)
PIR Off Delay	Delay Off Timer for the PIR Movement/Occupancy sensor	10..28,800 seconds (default 600 secs)
Operating Mode Off Action	Operating Mode when the PIR (OE-option) does not detect movement.	0 = Unoccupied Mode (Default) 1 = Off Mode

Colour Touchscreen

The xDR20 Series Touchscreen is used to show the TCR80 series controller status information and built-in measurements. The touchscreen also provides the user interface for changing the TCR80 controller settings. The touchscreen display elements can be tailored to the site specific requirements.



The touchscreen is divided to three different main elements; Status Bar, Measurement/Setpoint Display Locations and Buttons (accessible on the Action Bar on the bottom or via the Menu Icon on the top).

The Status Bar Indicates the controller status.

- Heating / Cooling Mode (enable/disable)
- Limit Function / Frost Mode
- Unoccupied / Occupied / Off (enable/disable)
- Fan Speed (enable/disable)
- Lock Icon
- Condensation Icon
- Menu

The TDR20/QDR20 displays have up to 5 different Measurement/Display Locations that can be tailored to show different measurements and show/hide the room temperature setpoint.

The display locations can also show alarm indications and additional information (energy, water usage) from the network. It is also possible to configure actual measurements to be in 'Descriptive Text' mode that makes the measurement information descriptive.

Each of the five display locations can be configured to show

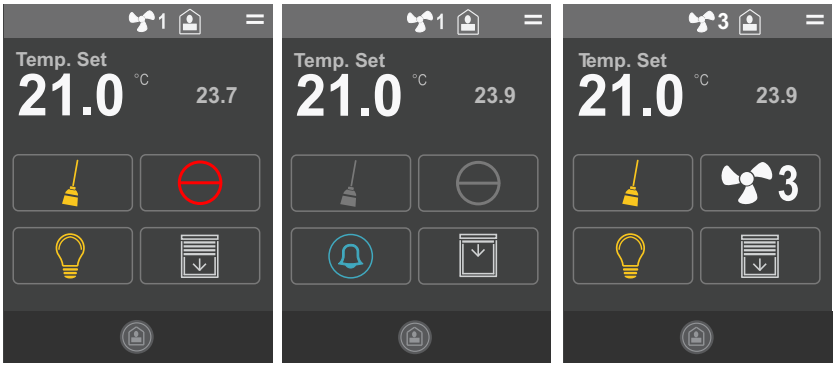
- Zone Temperature Loop Setpoint
- CO2, VOC, Temperature, or Humidity Measurement
- Network Signals (e.g. Energy, Water Consumption, Pressure)
- Alarm Conditions of the Measurements (Green, Amber, Red)

- Descriptive Text instead of Measurement Value (Low / Normal / High)
- The description and units of each location can be customised

Location 1 can also be configured to show combination of the setpoint and temperature or in reverse. The first value is displayed in big font and the second in small (from Fw1.20).

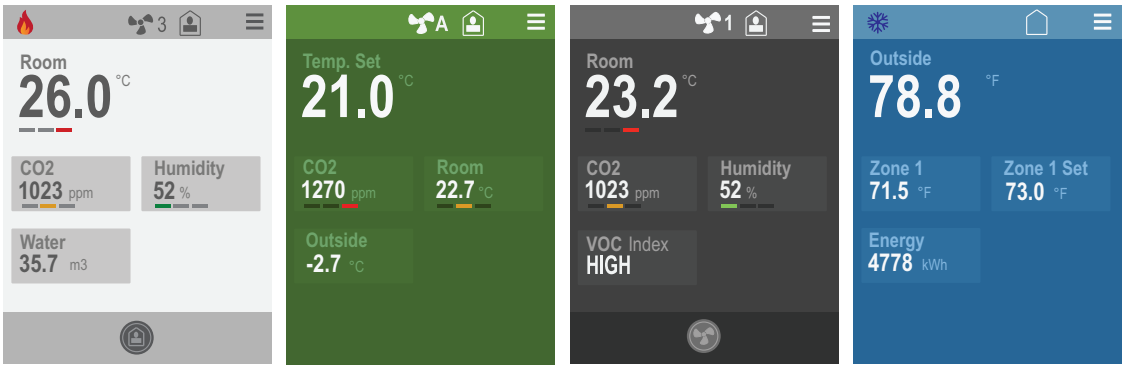
In addition Locations 2-5 can be configured to display buttons with on/off states (from Fw1.20). These buttons include

- Fan Button (alternative way to show/change the fan speed - when this is selected the Fan button on the bottom action bar is disabled)
- Clean Button (Clean My Room Button); the status available from TCR80 or displayed on the corridor unit (typically mounted next to hotel room door outside on the corridor)
- Do Not Disturb Button; the status available from TCR80 or displayed on the corridor unit typically mounted next to hotel room door outside on the corridor)
- Bell Button / Panic Alarm (CDI20); the status available from the TCR80. Can be used e.g. as help/alarm function in hotel room. If CDI Corridor Interface is used the Bell button can activate panic alarm displayed in the corridor interface.
- Lights Button; on/off lighting status
- Blinds Button; on/off status of the blinds



Generic options to customise the display include:-

- Using Language Pack it is possible to change the text language
- The skin colour of the display can changed according to the preference; White, Blue, Green, Grey and Black
- Brightness of the display can be adjusted
- Action Bar can have Boost button with an adjustable timer (overrides the controller output as configured), Fan speed adjustment option (A - 0 - 1 - 2 - 3), and/or Mode Button (selecting between Occupied / Unoccupied and Night Off modes)
- The display can be dimmed through the Menu button
- The display can be locked from unauthorised access through the Menu button
- Menu Button provides access to the Configuration Menu (network settings)



OPERATING MODE

The TDR20/QDR20 Room Display Interfaces are used to control the operating mode on the TCR80 Series controllers. The operating mode states are:-

- Occupied (Comfort)
- Unoccupied (Relaxed)
- Off (Night)

The operating mode is changed via the touchscreen, via PIR Occupancy Sensor (-OE option), or by the TCR80 controller over the USB-C network connection.

NOTE: The PIR movement sensor (-OE option) changes the controller mode both with On and Off transitions.

NOTE: On power up the display starts in Occupied (Comfort) mode (once the communication between the TCR80 and TDR/QDR20 is established, the TCR80 will automatically transmit current state to the display). If OE-option is fitted the xDR20 starts in unoccupied/off mode.



Press Mode Button to Change Mode

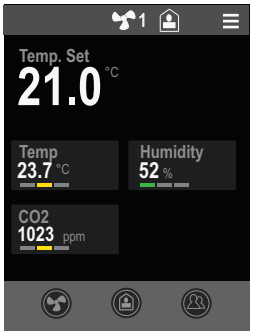
Select Operating Mode - Off, Unoccupied, Occupied

Note: Available options depend on the configuration.

SETPOINT ADJUSTMENT

The display is as default configured to show the temperature setpoint. This shows the current calculated setpoint used by the TCR80 series controllers. The setpoint can be adjusted through the plus and minus buttons within the minimum and maximum adjustment limits, or by using the slider. Pressing the plus or minus button continuously repeats the change with accelerating pace.

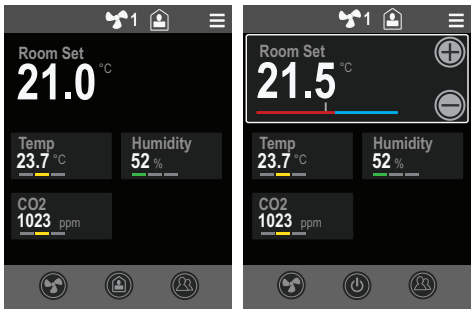
The adjustment steps (resolution) can also be controlled.



It is also possible to show the setpoint adjustment overlay on the main screen, by setting the parameter *618 Setpoint Slider Screen : 0 = Disabled*.

NOTE: With TCR80 Series firmware 1.32 later the user adjustment minimum and maximum settings are automatically transmitted from the TCR80 series controller (limits are adjusted on the TCR80 series).

ALTERNATIVE SETPOINT VIEW



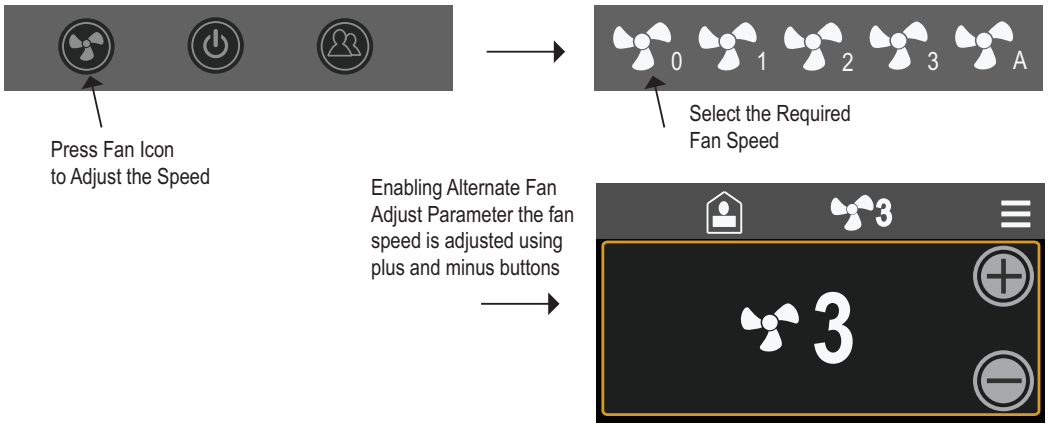
Alternative Setpoint Adjustment View displayed on the main screen (Set parameter 618 Setpoint Slider Screen = 0: Disabled to activate)

FAN SPEED DISPLAY / ADJUSTMENT

The current fan speed can be displayed and adjusted through the TDR20/QDR20 touchscreen. The fan speed display / adjustment has the following options:-

- Disabled (no fan speed is shows).
- Display Only (the fan speed is displayed on the status bar on top).
- Touch-0-1-A (fan speed adjustable between off, speed 1 and auto). In auto the fan speed is determined by the TCR80 series control logic demand.
- Touch-0-1-2-A (fan speed adjustable between off, speed 1, speed 2 and auto).
- Touch-0-1-2-3-A (fan speed adjustable between off, speed 1, speed 2, speed 3 and auto).

With the Touch configuration options by pressing the Fan button the fan speed adjustment is displayed on the screen. If *Alternate Fan Adjust* parameter is disabled the fan speed is selected by from the bottom action bar. If *609:Alternate Fan Adjust* parameter is enabled, the fan speed is adjusted using plus and minus buttons



NOTE: If *690: Alternate Fan Speed* is activated the display shows 1-2-3-4-A instead of 0-1-2-3-A. In this mode the fan rotation is also disabled. Typical use case would be e.g. for setting the ventilation damper positions. (From Fw1.20)

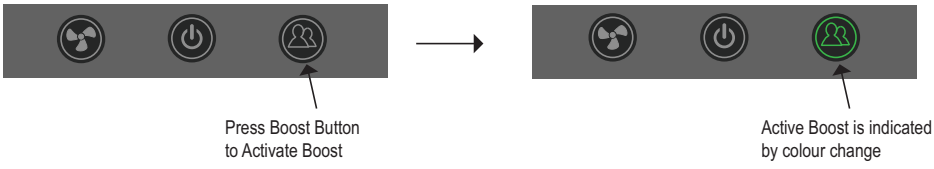
FAN BUTTON (from Fw1.20)

It is possible to activate the Fan button in locations 2-5. If this is activated, the fan button on the bottom is hidden. By pressing the Fan button the fan speed can be change. If *609:Alternate Fan Adjust* is enabled the fan speed adjustment window is brought up.

BOOST BUTTON (TIMED)

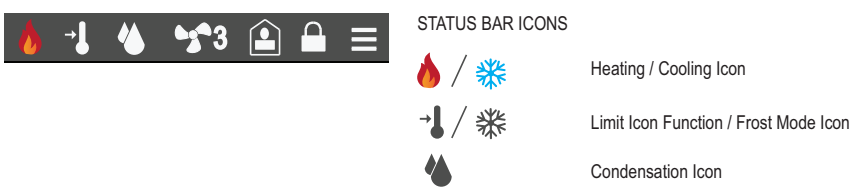
It is possible to activate the Boost button on the display via *Enable Boost Button* parameter. By pressing the Boost Button the TDR20/QDR20 activates the Occupied Mode which the transmitted to the TCR80 series controllers. When the Boost is active the Button Colour Changes. The boost button has adjustable timer between 0..28,800 seconds. By setting boost time to 0 seconds, the Boost is permanent. The boost can be cancelled by pressing the boost button again.

When the Boost is cancelled (by pressing the button or on timeout), the TDR20 returns to the Operating Mode prior to the Boost.



DISPLAY STATUS ICONS

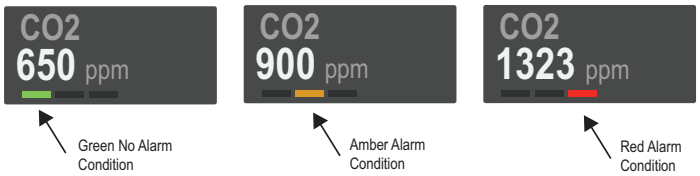
The TDR/QDR20 room display interfaces show the TCR80 Series controller status information to the user on the status bar. These icons are activated/deactivated automatically by the TCR80 series controllers.



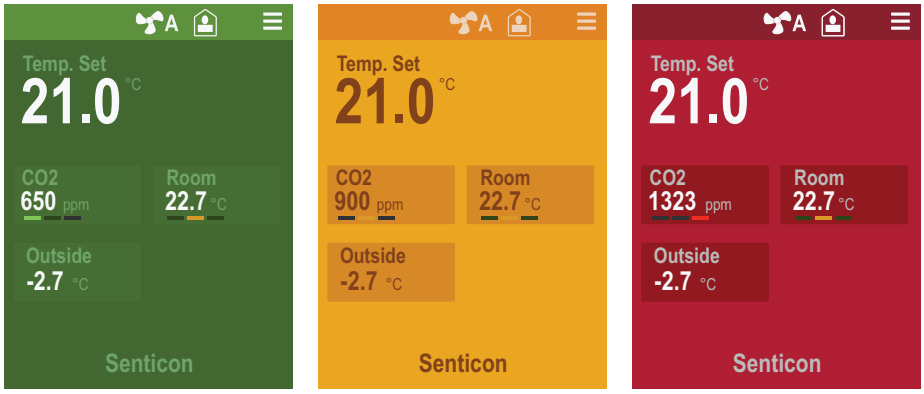
TRAFFIC LIGHT ALARM FUNCTION

Each of the 5 locations can be activated to display alarm condition based on the Amber and Red Limits. When measurement is above the Amber Limit, the location goes to Amber alarm (amber bar icon, or amber skin colour). When measurement is above the Red Limit, the location goes to Red Alarm (red bar icon or red skin colour).

ALARMING USING BAR DISPLAY



ALARMING USING SKIN COLOUR



Green No Alarm Condition (Set display colour to green)

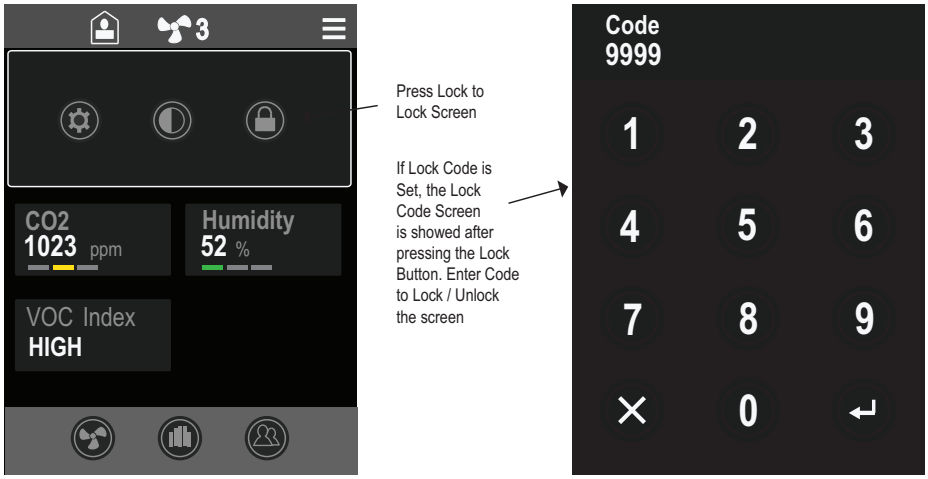
Amber Alarm Condition

Red Alarm Condition

SCREEN LOCK

By selecting the Lock icon from the menu bar the screen is locked (buttons disabled, except menu and lock icons). If the Lock code is 0000, no code is required to lock and unlock the screen. By setting the lock code to any other value, the user needs to enter the code to lock and unlock the screen.

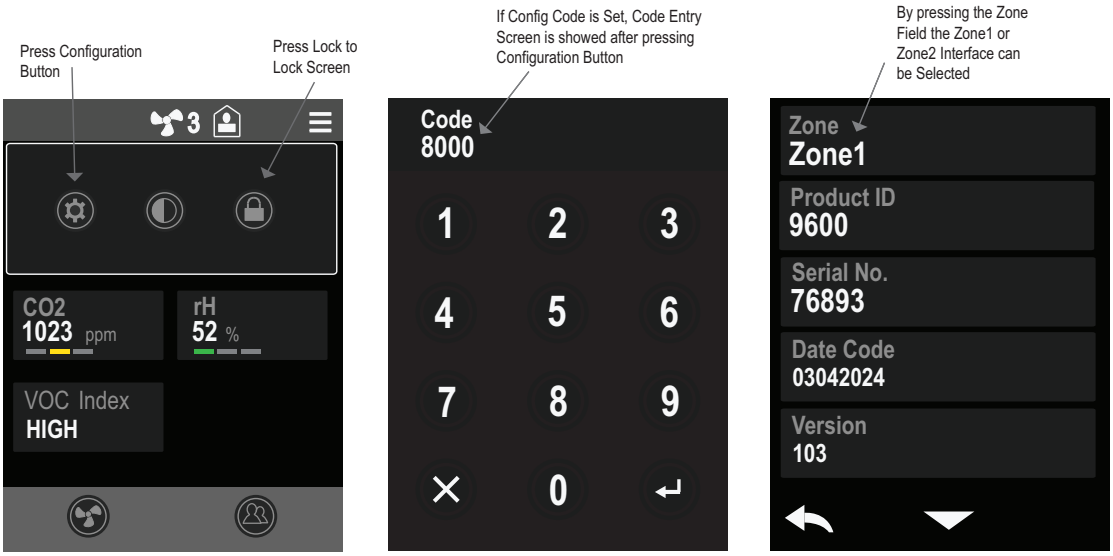
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CONFIGURATION SCREEN

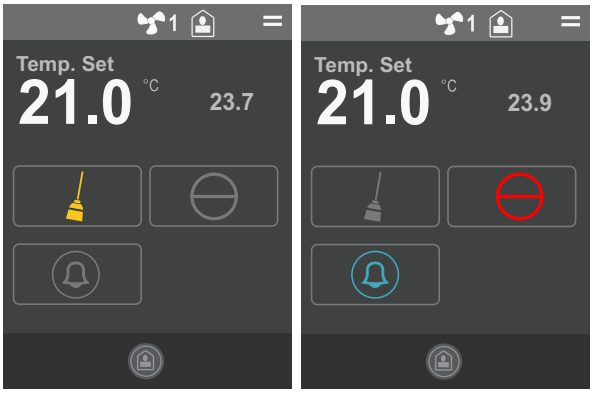
To access the Configuration Screen (for network settings), Press the Configuration Icon. If the configuration code is set, default 8000, the Configuration Menu is displayed where the Sensor Zone can be selected. If the code is set to 0000 then no passcode is required. To store the new configuration settings in the Non Volatile memory press the back arrow to return to the main screen.

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CORRIDOR UNIT INTEGRATION (FW1.20)

The xDR20 has Clean My Room, Do Not Disturb and Panic Alarm (Bell) buttons that can automatically control the Corridor Unit (CDI) display. By activating these buttons, the Corridor Unit outside the (hotel) room indicates when room cleaning is required, if the occupant is not to be disturbed or if silent panic alarm has been activated (amber/red/flashing red display options on the CDI).



Device Parameters (Modbus Registers)

The following tables explain the device configuration parameters available.

LIVE DATA						
		MODBUS INPUT REGISTERS - FUNCTION CODE 04 MODBUS HOLDING REGISTER - FUNCTION CODES 03, (06), 16				
Parameter	**Description**	**Reg**	**Type**	**Data Range (multiplier)**	**Value Range / Enumerations**	**R/W**
Temperature Sensor	Displays current temperature measurement reading (built-in sensor) Note: Value depends on the temperature unit °C/°F selection	**400**	int16	-400..2480 (x10)	-40.0..120.0°C / -40.0..248.0°F	R
Humidity Sensor	Displays current humidity measurement reading (With RH option)	**401**	int16	0..1000 (x10)	0..100%rH	R
CO2 Sensor	Displays current measurement CO2 reading (QDR20)	**402**	int16	0..10,000 (x1)	0..10,000ppm	R
VOC Sensor	Display current VOC (Volatile Organic Compound) Index Value	**403**	int16	0..500 (x1)	0..500 index	R
Fan Level	Current Fan Level (Range depends on the fan mode configuration). The fan level can be set from touchscreen or from TCR80 series.	**417**	unit16	0..4	0 = Off 1 = Speed 1 2 = Speed 2 3 = Speed 3 4 = Automatic	R/W
Calculated Setpoint	Calculated Setpoint (Nominal Network Setpoint + User Adjustment)	**418**	uint16	-32000..32000 (x10)	-3200.0..3200.0	R
Min Setpoint Adjustment	Minimum Setpoint Adjustment Limit for Setpoint	**671**	int16	-5000..0 (x1/x10)	-500.0..0 (default -3.0)	R
Max Setpoint Adjustment	Maximum Setpoint Adjustment Limit for Setpoint	**672**	int16	0..+5000 (x1/x10)	0..500.0 (default +3.0)	R
Occupancy Status	Reports Current Control Mode Status	**424**	int16	0..2 (x1)	0 = Occupied 1 = Unoccupied 2 = Off	R
		DISCRETE INPUTS - FUNCTION CODE 02				
Boost Status	Boost Button Status - Shows if Boost Button has been activated by the user.	**204**		0..1	0 = No Boost 1 = Boost	R
Screen Lock Status	Screen Lock Status	**205**		0..1	0 = Not Locked 1 = Locked	R

CALIBRATION AND TVOC MODE SETTINGS						
		Modbus Register	**MODBUS HOLDING REGISTER - FUNCTION CODES 03, 06, 16**			
Parameter	**Description**		**Type**	**Data Range (multiplier)**	**Value Range / Enumerations**	**R/W**
Temperature Offset	Built-In Temperature Single Point Sensor Calibration Offset	**580**	int16	-100..100 (x10)	-10.0..+10.0deg (Default 0)	R/W
Humidity Offset	Humidity Single Point Calibration Offset	**581**	int16	-100..100 (x10)	-10.0..+10.0%rH (Default 0)	R/W
CO2 Offset	CO2 Single Point Calibration Offset (adjusts CO2 reading the specified amount)	**582**	int16	-500..500 (x1)	-500..+500ppm (Default 0)	R/W
CO2 Auto-Calibration	Shows if the auto-calibration of the CO2 has been Activated	**583**	uint16	0..1	0 = Disabled 1 = Enabled (Default)	R/W
CO2 Calibration Value	Single Point Calibration Value for the CO2 Sensor. Note: Writing this value will reset the calibration settings of the sensor to the value set. Only recommended for advanced users.	**584**	uint16	350..3,000 (x1)	350..3,000ppm	R/W
Force CO2 Calibration	Forces CO2 Calibration to the CO2 Calibration Value. Use when CO2 level known e.g with calibration gas or outside air.	**585**	uint16	0..1	0 = None 1 = Force Calibration	R/W
Store CO2 Calibration	Store CO2 Calibration Settings in the Permanent Memory	**586**	uint16	0..1	0 = None 1 = Save Data	R/W

VOC Measurement Mode	VOC Measurement Mode Selection (Index, Well Standard, Reset Air Standard)	**587**	uint16	0..2	0 = VOC Index 1 = TVOC Mølhave, ug/m3 (Well) 2 = TVOC Isobutylene, ug/m3 (Reset)	R/W
VOC Learning Time Offset	VOC Learning Time Offset. Set to 12 for Index mode and 720 for Building Standards Mode	**588**	uint16	1..1,000 (x1)	1..1,000hours (Default 12)	R/W

DISPLAY SETTINGS						
		Modbus Register	**MODBUS HOLDING REGISTER - FUNCTION CODES 03, 06, 16**			
Parameter	**Description**		**Type**	**Data Range (multiplier)**	**Value Range / Enumerations**	**R/W**
GENERAL						
Display Colour	Sets the display colour (display skin).	**600**	uint16	0..4	0 = White 1 = Green 2 = Blue 3 = Grey (default) 4 = Black	R/W
Display Brightness	Controls display brightness. By setting to Off, the display switches off after the timeout. Display wakes up when it is touched (TS models only)	**601**	uint16	0..6	0 = Off 1 = 5% 2 = 10% 3 = 25% 4 = 50% (default) 5 = 75% 6 = 100%	R/W
Temperature Units	Selects between Celsius and Fahrenheit Note: The display and network measurements will automatically reflect reading in the selected units.	**522**	unit16	0..1 (x1)	0 = Celsius (Default) 1 = Fahrenheit	R/W
Temperature Display Resolution	Sets temperature display resolution (for built-in sensor only)	**602**	uint16	0..2 (x1)	0 = Fine (0.1°C/F) 1 = Normal (0.5°C/F) 2 = Coarse (1°C/F)	R/W
Mode Icon Display	Activates Mode Icon display on the top status bar (Occupied / Unoccupied / Off).	**603**	uint16	0..1	0 = Disabled (default) 1 = Enabled	R/W
Enable Fan Display	Enables Fan Speed Display and/or Fan Speed Button for touchscreen models.	**605**	uint16	0..4	0 = Disabled (default) 1 = Display Only 2 = Touch-0-1-A 3 = Touch-0-1-2-A 4 = Touch-0-1-2-3-A	R/W
Alternate Fan Adjust	Alternative Fan Speed Adjustment setting. Uses the temperature setpoint adjustment location with +/- buttons	**609**	unit16	0..1 (x1)	0 = Disabled (Default) 1 = Enabled	R/W
Alternate Fan Speed	Alternative Fan Speed display. By activating this the display shows 1-2-3-4-A instead of 0-1-2-3-A. Note: TCR80 fan speed always reports 0-1-2-3-4.	**690**	unit16	0..1 (x1)	0 = Disabled (Default) 1 = Enabled	R/W
Enable Mode Button	Enables the Mode Button on the action bar.	**607**	uint16	0..3	0 = Disabled 1 = Occupied / Unoccupied 2 = Occupied / Unocc/ Off (default) 3 = Occupied / Off	R/W
Enable Boost Button	Enables Boost Button on the bottom action bar	**608**	uint16	0..1	0 = Disabled (default) 1 = Enabled	R/W
Enable Heat/Cool Icon	Enables Heat/Cool Icon Display on the status bar (from Fw1.18)	**619**	uint16	0..1	0 = Disabled 1 = Enabled (default)	R/W
Lock Code	Screen Lock Code - 0000 = User requires no code to lock the screen	**613**	unit16	0..9,999 (x1)	0..9,999 (Default 0000)	R/W
Screen Lock Override	Overrides the Current State of the Screen Lock	**614**	unit16	0..2 (x1)	0 = No Override 1 = Unlock Screen 2 = Lock Screen	R/W
Configuration Code	Code to Enter Configuration Screen, Set to 0000 to bypass the requirement to enter the code.	**615**	unit16	0..9,999 (x1)	0..9,999 (Default 8000)	R/W

DISPLAY LOCATION 1 to 5 SETTINGS						
		Modbus Register	**MODBUS HOLDING REGISTER - FUNCTION CODES 03, 06, 16**			
Parameter	**Description**		**Type**	**Data Range (multiplier)**	**Value Range / Enumerations**	**R/W**
DISPLAY LOCATION 1 (PRIMARY DISPLAY LOCATION)						
Location 1 Display	Location 1 Display Source. Sets what is displayed in Location 1. Options 8 and 9 show the first value with a large font and the second as a small number (from Fw1.20).	**620**	uint16	0..9	0 = None 1 = Network Decimal Value 2 = Network Integer Value 3 = Temperature 4 = Humidity 5 = CO2 6 = VOC Index 7 = Temp Setpoint (Default) 8 = Temp and Setpoint 9 = Setpoint and Temp	R/W
Location 1 Description	Location 1 Description. Sets description for Location 1.	**621**	uint16	0..24	0 = None 1 = Temperature 2 = Humidity 3 = CO2 4 = VOC 5 = Light Level 6 = Pressure 7 = Room 8 = Outside 9 = Fan 10 = Energy 11 = Water 12 = Electricity 13 = Heating 14 = Cooling 15 = Zone 1 16 = Zone 2 17 = Temp. Set (Default) 18 = Room Set 19 = Zone 1 Set 20 = Zone 2 Set 21 = Windows 22 = Blinds 23 = TVOC 24 = Flow	R/W
Location 1 Unit	Location 1 Unit. Sets unit for Location 1.	**622**	uint16	0..14	0 = None 1 = °C (Default) 2 = °F 3 = ppm 4 = Lux 5 = Pa 6 = kWh 7 = m3 8 = % 9 = index (air quality index) 10 = l/s 11 = m3/h 12 = cfm 13 = ppb 14 = ug/m3	R/W
Location 1 Alarm	Activates Location 1 Alarm Bar, Alarm Skin Colour or Descriptive Text indication. Using 1=Bar activates Green, Amber, Red alarm icon indication underneath the current displayed parameter. Using 3=Text activates LOW, MEDIUM HIGH text indication instead of the measurement. Using 3= Skin activates the skin colour changing based on alarm condition.	**623**	uint16	0..3	0 = Disabled 1 = Bar 2 = Text 3 = Skin	R/W
Location 1 Red Alarm Limit	Red Limit for Alarm 1 / High Limit for Descriptive Display	**624**	uint16	0..10,000 (x1)	0..10,000 (default 30)	R/W
Location 1 Amber Alarm Limit	Amber Limit for Alarm 1 / Medium Limit for Descriptive Displays	**625**	uint16	0..10,000 (x1)	0..10,000 (default 25)	R/W
Location 1 Hysteresis	Hysteresis for Alarm 1 / Low Limit for Descriptive Displays	**626**	uint16	0..10,000 (x1)	0..10,000 (default 1)	R/W

Location 1 Read Only	Sets the location 1 to be Read Only or Read/Write. In Read Only mode touch functions are disabled for this location.	**655**	uint16	0..1	0 = Read-Write (default) 1 = Read Only	R/W

		Modbus Register	**MODBUS HOLDING REGISTER - FUNCTION CODES 03, 06, 16**			
Parameter	**Description**		**Type**	**Data Range (multiplier)**	**Value Range / Enumerations**	**R/W**
DISPLAY LOCATION 2						
Location 2 Display	Location 2 Display Source. Sets what is displayed in Location 2. Options 8 and 9 show the first value in the location and when it is pressed the setpoint adjustment window is displayed (from Fw1.20). Options 10-15 are action buttons (from Fw1.20)	**627**	uint16	0..15	0 = None 1 = Network Decimal Value 2 = Network Integer Value 3 = Temperature (Default) 4 = Humidity 5 = CO2 6 = VOC Index 7 = Temp Setpoint 8 = Temp and Setpoint 9 = Setpoint and Temp 10 = Fan 11 = Clean 12 = Do Not Disturb 13 = Bell/Panic Alarm 14 = Lights 15 = Blinds	R/W
Location 2 Description	Location 2 Description	**628**	uint16	0..24	0 = None 1 = Temperature (Default) 2 = Humidity 3 = CO2 4 = VOC 5 = Light Level 6 = Pressure 7 = Room 8 = Outside 9 = Fan 10 = Energy 11 = Water 12 = Electricity 13 = Heating 14 = Cooling 15 = Zone 1 16 = Zone 2 17 = Temp. Set 18 = Room Set 19 = Zone 1 Set 20 = Zone 2 Set 21 = Windows 22 = Blinds 23 = TVOC 24 = Flow	R/W
Location 2 Unit	Location 2 Unit	**629**	uint16	0..14	0 = None 1 = °C (Default) 2 = °F 3 = ppm 4 = Lux 5 = Pa 6 = kWh 7 = m3 8 = % 9 = index (air quality index) 10 = l/s 11 = m3/h 12 = cfm 13 = ppb 14 = ug/m3	R/W
Location 2 Alarm	Activates Location 1 Alarm Bar, Alarm Skin Colour or Descriptive Text indication. Using 1=Bar activates Green, Amber, Red alarm icon indication underneath the current displayed parameter. Using 3=Text activates LOW, MEDIUM HIGH text indication instead of the measurement. Using 3= Skin activates the skin colour changing based on alarm condition.	**630**	uint16	0..3	0 = Disabled (default) 1 = Bar 2 = Text 3 = Skin	R/W

Location 2 Red Alarm Limit	Red Limit for Alarm 2 / High Limit for Descriptive Display	**631**	uint16	0..10,000 (x1)	0..10,000 (default 30)	R/W
Location 2 Amber Alarm Limit	Amber Limit for Alarm 2 / Medium Limit for Descriptive Displays	**632**	uint16	0..10,000 (x1)	0..10,000 (default 25)	R/W
Location 2 Hysteresis	Hysteresis for Alarm 2 / Low Limit for Descriptive Displays	**633**	uint16	0..10,000 (x1)	0..10,000 (default 1)	R/W
Location 2 Read Only	Sets the location 2 to be Read Only or Read/Write. In Read Only mode touch functions are disabled for this location.	**656**	uint16	0..1	0 = Read-Write (default) 1 = Read Only	R/W

		Modbus Register	**MODBUS HOLDING REGISTER - FUNCTION CODES 03, 06, 16**			
Parameter	**Description**		**Type**	**Data Range (multiplier)**	**Value Range / Enumerations**	**R/W**
DISPLAY LOCATION 3						
Location 3 Display	Location 3 Display Source. Sets what is displayed in Location 3. Options 8 and 9 show the first value in the location and when it is pressed the setpoint adjustment window is displayed (from Fw1.20). Options 10-15 are action buttons (from Fw1.20)	**634**	uint16	0..15	0 = None 1 = Network Decimal Value 2 = Network Integer Value 3 = Temperature 4 = Humidity 5 = CO2 (Default) 6 = VOC Index 7 = Temp Setpoint) 8 = Temp and Setpoint 9 = Setpoint and Temp 10 = Fan 11 = Clean 12 = Do Not Disturb 13 = Bell/Panic Alarm 14 = Lights 15 = Blinds	R/W
Location 3 Description	Location 3 Description	**635**	uint16	0..24	0 = None 1 = Temperature 2 = Humidity 3 = CO2 (Default) 4 = VOC 5 = Light Level 6 = Pressure 7 = Room 8 = Outside 9 = Fan 10 = Energy 11 = Water 12 = Electricity 13 = Heating 14 = Cooling 15 = Zone 1 16 = Zone 2 17 = Temp. Set 18 = Room Set 19 = Zone 1 Set 20 = Zone 2 Set 21 = Windows 22 = Blinds 23 = TVOC 24 = Flow	R/W

Location 3 Unit	Location 3 Unit	**636**	uint16	0..14	0 = None 1 = °C 2 = °F 3 = ppm (Default) 4 = Lux 5 = Pa 6 = kWh 7 = m3 8 = % 9 = index (air quality index) 10 = l/s 11 = m3/h 12 = cfm 13 = ppb 14 = ug/m3	R/W
Location 3 Alarm	Activates Location 1 Alarm Bar, Alarm Skin Colour or Descriptive Text indication. Using 1=Bar activates Green, Amber, Red alarm icon indication underneath the current displayed parameter. Using 3=Text activates LOW, MEDIUM HIGH text indication instead of the measurement. Using 3= Skin activates the skin colour changing based on alarm condition.	**637**	uint16	0..3	0 = Disabled (default) 1 = Bar 2 = Text 3 = Skin	R/W
Location 3 Red Alarm Limit	Red Limit for Alarm 3 / High Limit for Descriptive Display	**638**	uint16	0..10,000 (x1)	0..10,000 (default 1250)	R/W
Location 3 Amber Alarm Limit	Amber Limit for Alarm 3 / Medium Limit for Descriptive Displays	**639**	uint16	0..10,000 (x1)	0..10,000 (default 750)	R/W
Location 3 Hysteresis	Hysteresis for Alarm 3 / Low Limit for Descriptive Displays	**640**	uint16	0..10,000 (x1)	0..10,000 (default 100)	R/W
Location 3 Read Only	Sets the location 3 to be Read Only or Read/Write. In Read Only mode touch functions are disabled for this location.	**657**	uint16	0..1	0 = Read-Write (default) 1 = Read Only	R/W

		Modbus Register	**MODBUS HOLDING REGISTER - FUNCTION CODES 03, 06, 16**			
Parameter	**Description**		**Type**	**Data Range (multiplier)**	**Value Range / Enumerations**	**R/W**
DISPLAY LOCATION 4						
Location 4 Display	Location 4 Display Source. Sets what is displayed in Location 4. Options 8 and 9 show the first value in the location and when it is pressed the setpoint adjustment window is displayed (from Fw1.20). Options 10-15 are action buttons (from Fw1.20)	**641**	uint16	0.15	0 = None 1 = Network Decimal Value 2 = Network Integer Value 3 = Temperature 4 = Humidity (Default) 5 = CO2 6 = VOC Index 7 = Temp Setpoint 8 = Temp and Setpoint 9 = Setpoint and Temp 10 = Fan 11 = Clean 12 = Do Not Disturb 13 = Bell/Panic Alarm 14 = Lights 15 = Blinds	R/W

Location 4 Description	Location 4 Description	**642**	uint16	0..24	0 = None 1 = Temperature 2 = Humidity (Default) 3 = CO2 4 = VOC 5 = Light Level 6 = Pressure 7 = Room 8 = Outside 9 = Fan 10 = Energy 11 = Water 12 = Electricity 13 = Heating 14 = Cooling 15 = Zone 1 16 = Zone 2 17 = Temp. Set 18 = Room Set 19 = Zone 1 Set 20 = Zone 2 Set 21 = Windows 22 = Blinds 23 = TVOC 24 = Flow	R/W
Location 4 Unit	Location 4 Unit	**643**	uint16	0..14	0 = None 1 = °C 2 = °F 3 = ppm 4 = Lux 5 = Pa 6 = kWh 7 = m3 8 = % (Default) 9 = index 10 = l/s 11 = m3/h 12 = cfm 13 = ppb 14 = ug/m3	R/W
Location 4 Alarm	Activates Location 1 Alarm Bar, Alarm Skin Colour or Descriptive Text indication. Using 1=Bar activates Green, Amber, Red alarm icon indication underneath the current displayed parameter. Using 3=Text activates LOW, MEDIUM HIGH text indication instead of the measurement. Using 3= Skin activates the skin colour changing based on alarm condition.	**644**	uint16	0..3	0 = Disabled (default) 1 = Bar 2 = Text 3 = Skin	R/W
Location 4 Red Alarm Limit	Red Limit for Alarm 4 / High Limit for Descriptive Display	**645**	uint16	0..10,000 (x1)	0..10,000 (default 80)	R/W
Location 4 Amber Alarm Limit	Amber Limit for Alarm 4 / Medium Limit for Descriptive Displays	**646**	uint16	0..10,000 (x1)	0..10,000 (default 60)	R/W
Location 4 Hysteresis	Hysteresis for Alarm 4 / Low Limit for Descriptive Displays	**647**	uint16	0..10,000 (x1)	0..10,000 (default 1)	R/W
Location 4 Read Only	Sets the location 4 to be Read Only or Read/Write. In Read Only mode touch functions are disabled for this location.	**658**	uint16	0..1	0 = Read-Write (default) 1 = Read Only	R/W

		Modbus Register	MODBUS HOLDING REGISTER - FUNCTION CODES 03, 06, 16			
Parameter	**Description**		**Type**	**Data Range (multiplier)**	**Value Range / Enumerations**	**R/W**
DISPLAY LOCATION 5						
Location 5 Display	Location 5 Display Source. Sets what is displayed in Location 4. Options 8 and 9 show the first value in the location and when it is pressed the setpoint adjustment window is displayed (from Fw1.20). Options 10-15 are action buttons (from Fw1.20)	**648**	uint16	0.15	0 = None 1 = Network Decimal Value 2 = Network Integer Value 3 = Temperature 4 = Humidity 5 = CO2 6 = VOC Index (Default) 7 = Temp Setpoint 8 = Temp and Setpoint 9 = Setpoint and Temp 10 = Fan 11 = Clean 12 = Do Not Disturb 13 = Bell/Panic Alarm 14 = Lights 15 = Blinds	R/W
Location 5 Description	Location 5 Description	**649**	uint16	0..24	0 = None 1 = Temperature 2 = Humidity 3 = CO2 4 = VOC (Default) 5 = Light Level 6 = Pressure 7 = Room 8 = Outside 9 = Fan 10 = Energy 11 = Water 12 = Electricity 13 = Heating 14 = Cooling 15 = Zone 1 16 = Zone 2 17 = Temp. Set 18 = Room Set 19 = Zone 1 Set 20 = Zone 2 Set 21 = Windows 22 = Blinds 23 = TVOC 24 = Flow	R/W
Location 5 Unit	Location 5 Unit	**650**	uint16	0..14	0 = None 1 = °C 2 = °F 3 = ppm 4 = Lux 5 = Pa 6 = kWh 7 = m3 8 = % 9 = index (Default) 10 = l/s 11 = m3/h 12 = cfm 13 = ppb 14 = ug/m3	R/W
Location 5 Alarm	Activates Location 1 Alarm Bar, Alarm Skin Colour or Descriptive Text indication. Using 1=Bar activates Green, Amber, Red alarm icon indication underneath the current displayed parameter. Using 3=Text activates LOW, MEDIUM HIGH text indication instead of the measurement. Using 3= Skin activates the skin colour changing based on alarm condition.	**651**	uint16	0..3	0 = Disabled (default) 1 = Bar 2 = Text 3 = Skin	R/W
Location 5 Red Alarm Limit	Red Limit for Alarm 5 / High Limit for Descriptive Display	**652**	uint16	0..10,000 (x1)	0..10,000 (default 150)	R/W

Location 5 Amber Alarm Limit	Amber Limit for Alarm 5 / Medium Limit for Descriptive Displays	**653**	uint16	0..10,000 (x1)	0..10,000 (default 110)	R/W
Location 5 Hysteresis	Hysteresis for Alarm 5 / Low Limit for Descriptive Displays	**654**	uint16	0..10,000 (x1)	0..10,000 (default 10)	R/W
Location 5 Read Only	Sets the location 5 to be Read Only or Read/Write. In Read Only mode touch functions are disabled for this location.	**659**	uint16	0..1	0 = Read-Write (default) 1 = Read Only	R/W

CONTROL SETTINGS AND OVERRIDES						
		Modbus Register / BACnet Property	**MODBUS HOLDING REGISTER - FUNCTION CODES 03, 06, 16**			
Parameter	**Description**		**Type**	**Data Range (multiplier)**	**Value Range / Enumerations**	**R/W**
SETPOINT SETTINGS						
Nominal Setpoint	Current Nominal Setpoint (transmitted fro the TCR80 series)	**670**	uint16	0..32000 (x10)	0.0..3200.0, Default 21.0	R/W
Setpoint Increment Adjustment	Setpoint Increment Adjustment	**673**	uint16	1..100 (x1/x10)	0.1..10.0 (default 0.1)	R/W
Setpoint Mode	Sets the setpoint user adjustment limits to use relative or absolute min/max settings.	**669**	unint16	0..1	0 = Relative - Default 1 = Absolute	R/W
Setpoint Reset	Resets the user setpoint adjustments (multi-stage, aux and humidity loops) when operating mode transitions away from the Occupied mode.	**675**	uint16	0..1	0 = Off (Default) 1 = On	R/W
Setpoint Slider Screen	When enabled shows the Setpoint Slider Screen when adjusting setpoint. Disabled shows setpoint on the main screen.	**618**	unit16	0..1 (x1)	0 = Disabled 1 = Enabled (Default)	R/W
PIR MOVEMENT SENSOR SETTINGS						
PIR Tigger Mode	Selects the Mode of the PIR Sensor	**681**	uint16	0..1 (x1)	0 - Standard (default) 1 - Multi-Trigger	R/W
PIR Trigger Count	Trigger Count in Multi-Trigger Mode	**682**	uint16	1..10 (x1)	1..10 (default 3)	R/W
Trigger Period	Trigger Period for monitoring Trigger Count	**683**	uint16	30..1,800 (x1)	30.1,800 seconds (default 300 secs)	R/W
PIR Off Delay	Delay Off Timer for the PIR Movement/Occupancy sensor	**684**	uint16	10..28,800 (x1)	10..28,800 seconds (default 600 secs)	R/W
Operating Mode Off Action	Display Operating Mode when the PIR (OE-option) does not detect movement.	**680**	uint16	0..1	0 = Unoccupied Mode (Default) 1 = Off Mode	R/W
Boost Time	Delay Off Timer for the Boost Button	**689**	uint16	0..28,800 (x1)	0..28,800 seconds 0 = Timer disabled, toggle functionality (default)	R/W

SYSTEM AND COMMUNICATION SETTINGS						
		Modbus Register	**MODBUS HOLDING REGISTER - FUNCTION CODES 03, 06, 16**			
Parameter	**Description**		**Type**	**Data Range (multiplier)**	**Value Range / Enumerations**	**R/W**
Zone	Sets the Sensor Zone	**800**	uint16	1.2 (x1)	1..2	R/W
Force Reset	Forces Device Reset	**810**	uint16	0..1	0 = Normal 1 = Reset	R/W
Persist	Persist (Store Parameters in Non-Volatile Memory)	**811**	uint16	0..1	0 = Normal 1 = Persist	R/W
Factory Defaults	Reload Defaults (NOTE: Resets all settings to factory defaults)	**812**	uint16	0..1	0 = Normal 1 = Factory Defaults	R/W
Language Pack Enable	Enables the Language Pack (using language pack it is possible to change the user text entries on the screen)	**814**	uint16	0..1	0 = English 1 = Language Pack Enabled	R/W
Logo Timer	Time after which the Logo is displayed on the Display after background level is activated. Set to 0 to disable the logo.	**815**	uint16	0..255 (x1)	1..255 seconds 0 = Logo Disabled	R/W
Firmware Version	Firmware Version	**820**	uint16	N/A	N/A	R
Serial Number	Serial Number	**821**	uint16	N/A	N/A	R
Date Code	Date Code	**822**	uint16	N/A	N/A	R
Product ID	Product ID	**823**	uint16	N/A	N/A	R

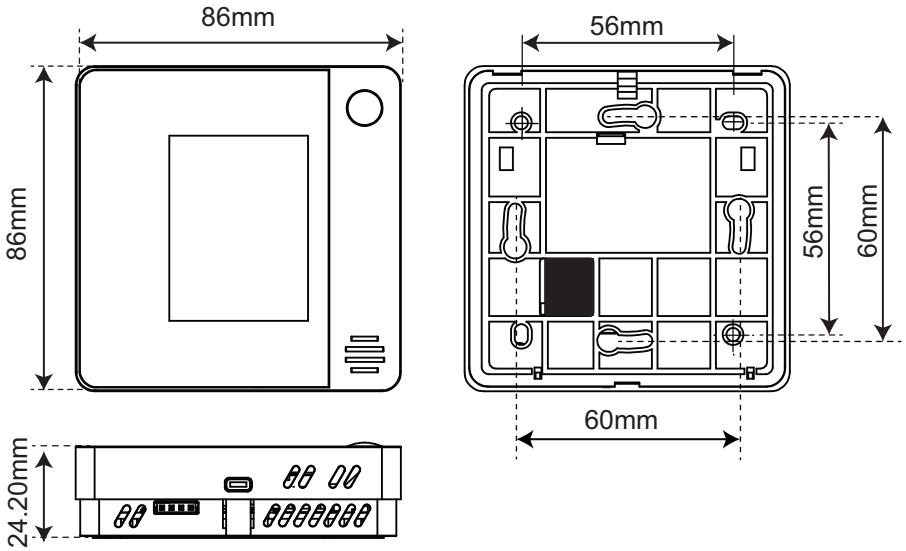
Dimensions and Installation

The devices typically mounted on the flat wall surfaces or on the junction boxes. The enclosure has 56/60mm screw distance for standard mounting boxes.

Installation Notes:

- Follow the diagram below to open the enclosure to access the mounting holes and the wiring terminals.
- Install the sensors away from the sources of heat and cool e.g. from direct sunlight or cold external walls.
- Install the sensors at 120-150 cm height for optimal performance.
- For correct movement (PIR) sensor operation consider the location of the sensor carefully.
- Make sure that the cable entries and junction boxes are sealed from air flows. This is the most common reason for inaccuracies in temperature measurement.
- Bring the cables through the dedicated hole (black area) marked on the dimensions drawing.
- If surface mounted cable is required to be used, the top of the enclosure (center) has a thin wall section that can be cut.

DIMENSIONS



DIMENSIONS (SLIMLINE SERIES)

