CBT-STAT and CBT-STAT-H

USER GUIDE

Cylon

SMART ENERGY CONTROL

CBT-STAT and CBT-STAT-H (MAN0120US rev 16)

www.cylon.com
www.cylon-automatrix.com

Style conventions used in this document:

UI Text: Text that represents elemets of the UI such as button names, menu options etc is presented with a grey background and border, in Tahoma font which is traditionally used in Windows UIs. For example:

Ok

Standard Terms (Jargon): Text that is not English Language but instead refers to industry standard concepts such s Strategy, BACnet, or Analog Input is represents in slightly condensed font. For example:

BACnet

Code: Text that represents File paths, Code snippets or text file configuration settings is presented in fixed-width font, with a grey background and border. For example:

```
$config_file = c:\CYLON\settings\config.txt
```

Parameter values: Text that represents values to be entered into UI fields, or displayed in dialogs is represented in fixed-width font with a shaded background. For example

10°C

Product Names: Text that represents a product name is represented in bold coloured text. For example

CBX-8R8-H

PC Keyboard keys: Text representing an instruction to press a particular key on the keyboard is enclosed in square brackets and in bold folt. For example:

[Ctrl]+[1]

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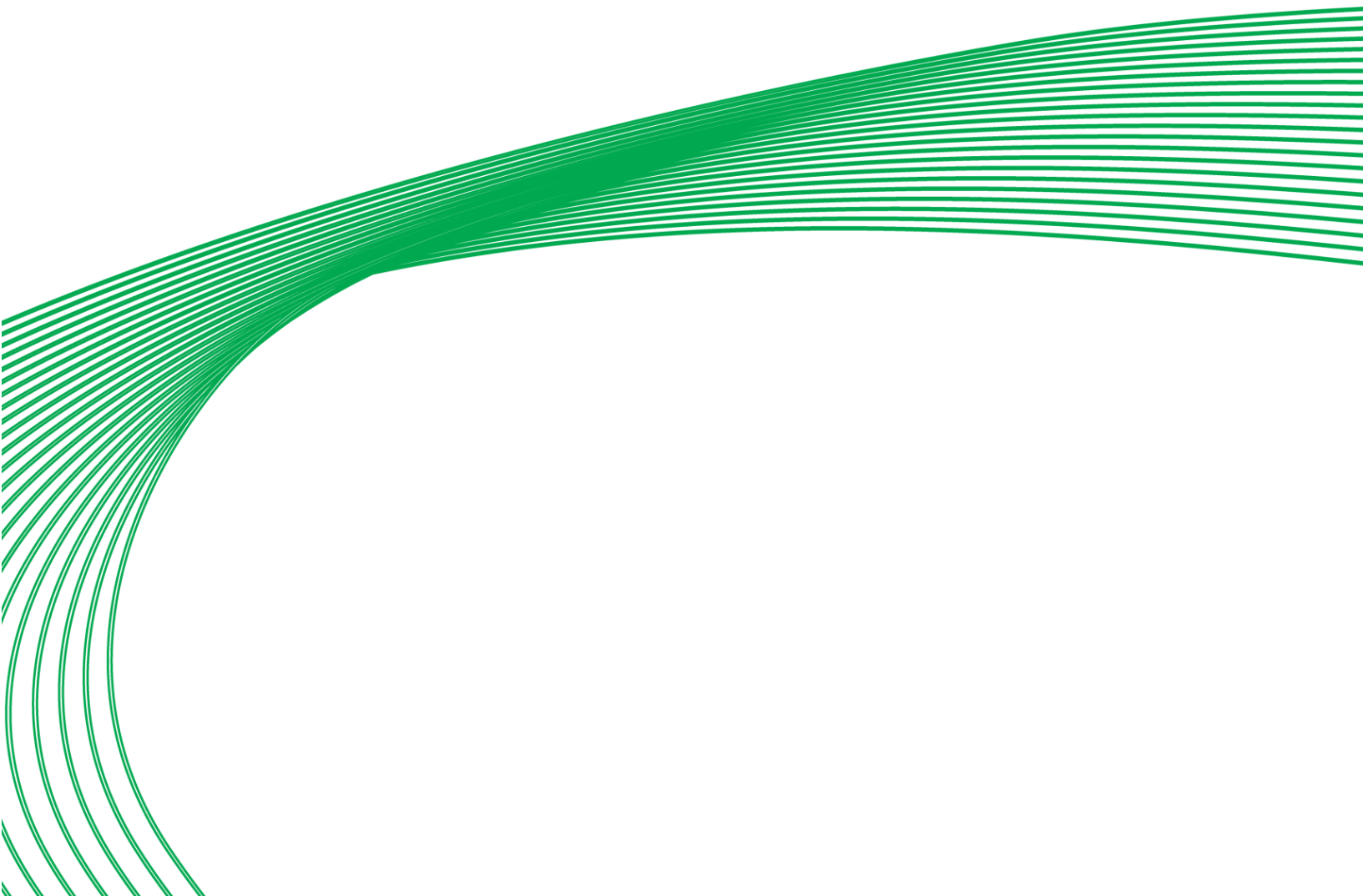
SECTION 1 : INTRODUCTION



WHAT ARE CBT-STAT AND CBT-STAT-H?

The **CBT-STAT** and **CBT-STAT-H** provide dedicated, visually appealing Room Control displays for use with **CBV** and **CBT** Unitary Controllers.

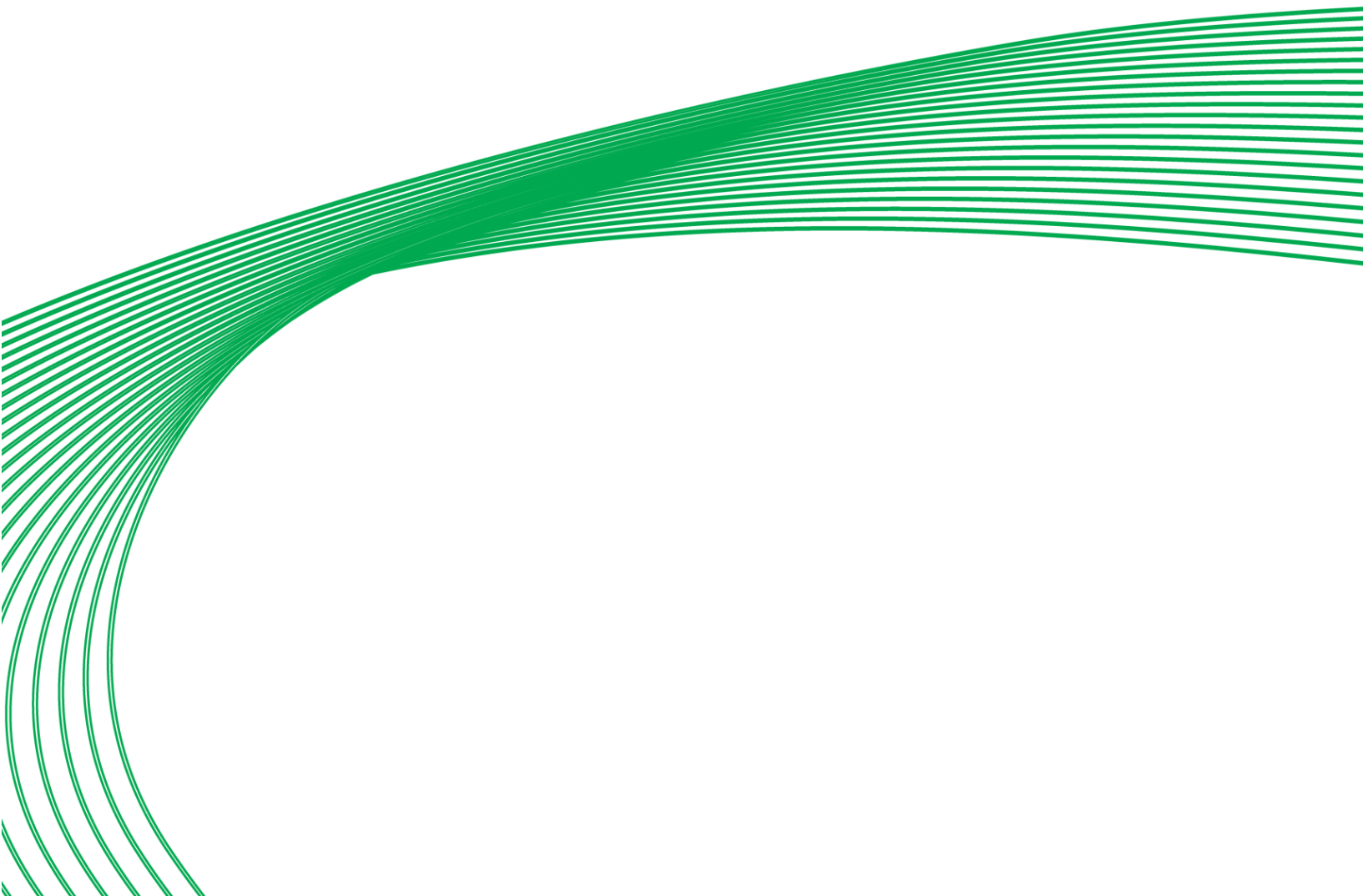
Both displays allow the user to view and adjust selected 7parameters within the controller to which they are connected, and each has an integrated temperature sensor. The **CBT-STAT-H** also has an integrated humidity sensor.

While the display can be used for local control, the **CBT12iVAV** and **CBT14** Unitary Controllers can be easily integrated into the Cylon Controls BACnet system architecture.

By default the **CBT-STAT** and **CBT-STAT-H** operate in User mode – see *User Mode* on page 8 for details.

The **CBT-STAT** or **CBT-STAT-H** can be put into Engineering Mode, allowing the display to be used as a commissioning tool, adjusting preset points in the Unitary Controller's default strategy. See *Engineering Mode* on page 12.

SECTION 2 : USER MODE

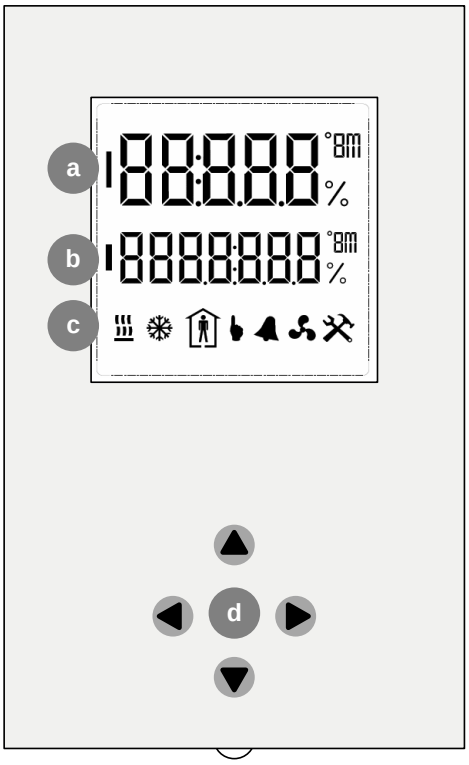


USER MODE

User mode is the default behavior for the **CBT-STAT** and **CBT-STAT-H** keypads.

Keypad and Display

a	1st line (large digits)
b	2nd line (small digits)
c	Operation Mode indicators
d	**Keypad**
◀	Left button No function.
▲	Up button Increase setpoint.
▶	Right button Toggle occupancy override (if Permit Occupancy Override is enabled).
▼	Down button Decrease setpoint.



Temperature

In User mode, the 1st line (large digits) a on the display shows the current Temperature Sensor reading.

Humidity

On the **CBT-STAT-H**, the 2nd line (small digits) b shows the current Humidity Sensor reading.

Temperature Setpoint

On the **CBT-STAT**, the 2nd line (small digits) b shows the current value of the Temperature Setpoint.

On the **CBT-STAT-H**, pressing any of the buttons ◀ ▲ ▶ or ▼ changes the 2nd line (small digits) b to show the Temperature setpoint.

How to adjust the Temperature Setpoint

If the Controller's Strategy has been configured to permit it, the user can adjust the Temperature setpoint or occupancy status.

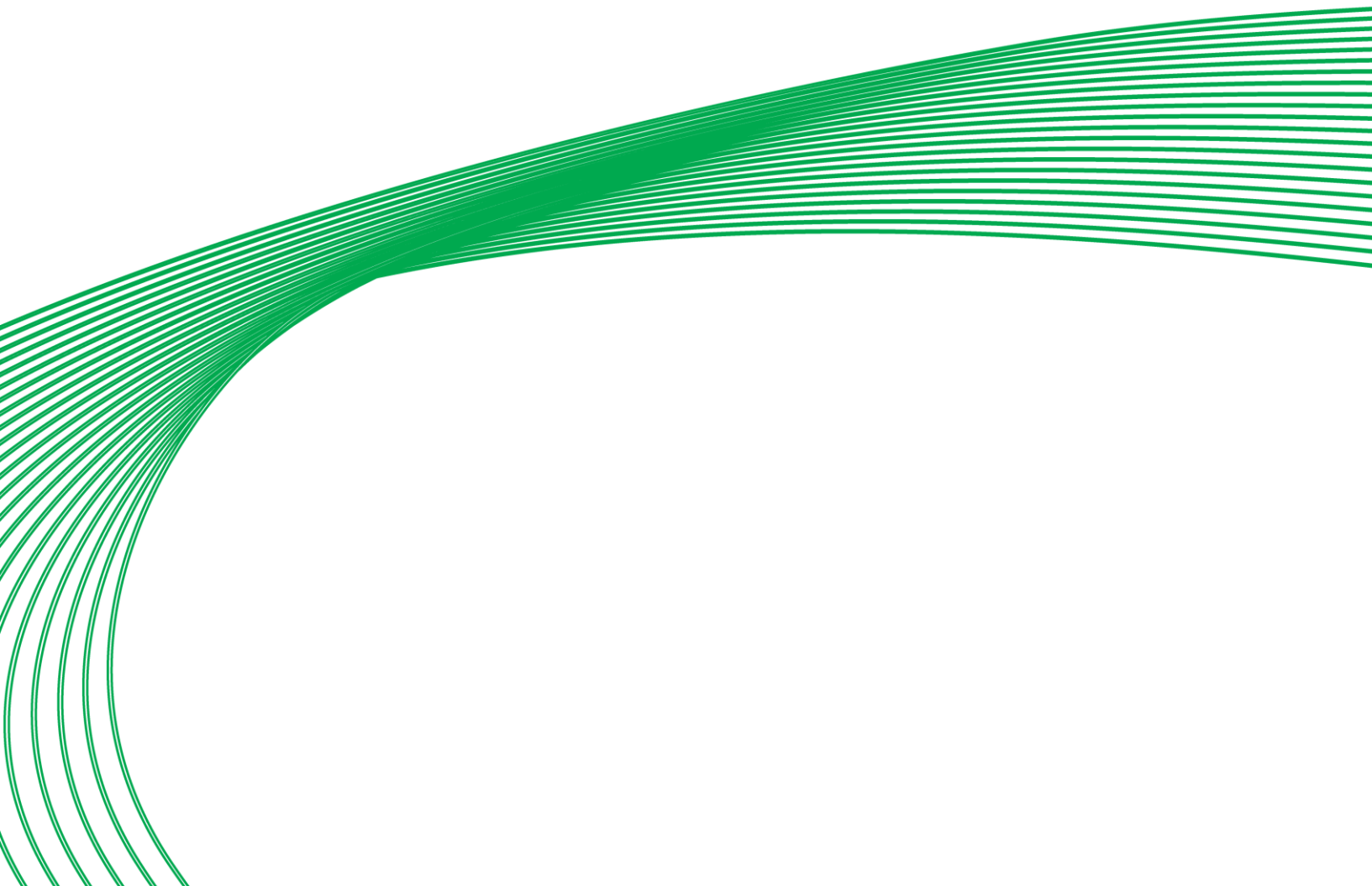
- Press any button so that the temperature setpoint is displayed on the second line, with a flashing unit symbol.
- Press the up button ▲ or down button ▼ to adjust the setpoint value by the span defined in the Controller's configuration, until the desired temperature setpoint is displayed.
- The right button ▶ can also be used to request the Strategy to override the schedule and force occupancy mode. *Permit Occupancy Override* must be enabled in the controller configuration.

Operation Mode

At the bottom of the display there is a line of icons c that give information about the current operation of the CBT12iVAV or CBT14 Unitary Controller's Strategy:

	Indicates that the controller is operating in 'heating' mode.
	Indicates that the controller is operating in 'cooling' mode.
	Indicates that the controller strategy is currently operating in 'occupancy' mode.
	Indicates that functions of the Controller Strategy are in manual override mode.
	Indicates that an alarm state is detected in the controller strategy.
	Indicates that the fan is operating.
	Indicates that the keypad is operating in Engineering mode.

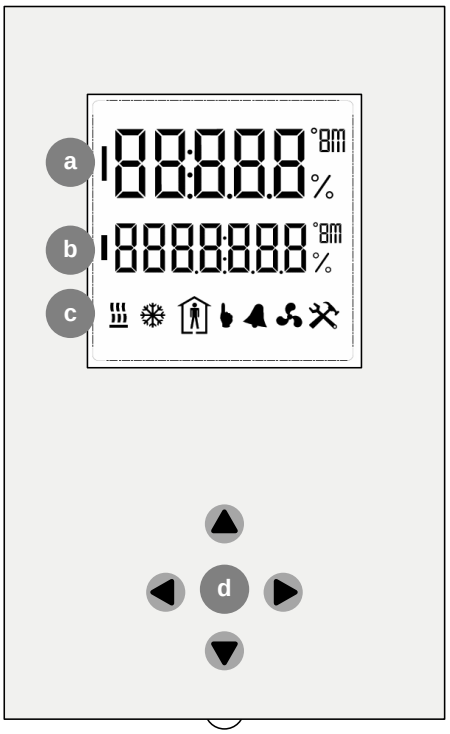
SECTION 3 : ENGINEERING MODE



ENGINEERING MODE

Keypad and Display

a	1st line (large digits)
b	2nd line (small digits)
c	Operation Mode indicators
d	**Keypad**
◀	Left button Change menu page.
▲	Up button Change menu line, Increase value.
▶	Right button Change menu page, Start parameter editing, Accept changes.
▼	Down button Change menu line, Decrease value.



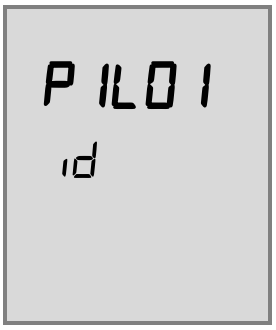
How to enter Engineering Mode

1. Press and hold ("long-press") both the Up button ▲ and Down button ▼ together for at least 3 seconds until the 1st line (a) (large digits) displays the text PASS and the 2nd line (b) displays 5555 with the right-most digit flashing.
2. Enter the Engineering Mode password by changing the number on the 2nd line (b) as follows:
   - Press the up ▲ button or down ▼ button to change the value of the flashing digit.
   - Use the left ◀ and right ▶ buttons to move between digits.
   - The default password is 9999_ which can be changed over the network.
   - To reset the entered password to the default, press and hold the left button ◀
3. When the correct password is displayed, press and hold ("long-press") the right button ▶ to accept it and to open the first menu page.

How to exit the Engineering Mode

- If you wish to exit Engineering mode at any point without entering the password, press and hold ("long-press") both the up ▲ and down ▼ buttons together.

When the correct password is entered, the Engineering Menu page 1 line 01 will be displayed. This is indicated in the display as follows:



The 1st line (large digits) a shows the Page number and Line number of the commissioning parameters (see *Available parameters* on page 14).

The 2nd line (small digits) b shows the label for the parameter addressed by the current line.

Navigating through the Engineering Menus

To scroll through the lines on the current page, use the the up ▲ and down ▼ buttons (short press).

To navigate to a different page, use the right ▶ and left ◀ buttons (short press).

Editing a parameter

To view or edit the value of the parameter on the current line, press and hold ("long-press") the right button ▶ .

The 2nd line (small digits) b will change to show the current value for that parameter, with either the right-most character (when the value is a number) or the whole text (when the value is an option label) flashing.

- Press the up button ▲ or down button ▼ to change the value of the flashing digit or label.

Note: In the case of digits, this is not a simple change to the digit itself, but an addition or subtraction (from the full parameter value) of the value represented by that specific digit.

For example, if the value is +127, then the left-most digit ("1") represents 100. If that digit is selected, then the down ▼ button will first change it to +027 (subtract 100 from 127), then another press of the Down button will change it to -073 (subtract 100 from 27).

- Use the left and right buttons to move between digits
- To reset the parameter to its default value, press and hold the left button ◀
- To apply the edited value, press and hold the right button ▶

AVAILABLE PARAMETERS

The parameters that can be adjusted are defined by setpoints in the CBT12iVAV or CBT14 Unitary Controller's strategy, with the exception of the device parameters on Menu Page 1.

This section lists all of the editable parameters by Menu Page, which can be accessed as detailed in *Using the Engineering Mode menus* on page 13.

Refer to *MAN0113US CBT12iVAV User Guide, MAN0139US CBV-2U4-3T & CBV-2U4-2T-N, MAN0128US_CBTCBT-3T6-5R_HeatPump* or *MAN0130US_CBT-3T6-5R_RoofTopUnit* for a detailed explanation of the Unitary Controller setup and sequencing.

Menu Page 1: Device Setup

Line	Display	Parameter	Range
01	P1L01 id	Device Instance	0-4194303
02	P1L02 mAC	MSTP Station	0 127
03	P1L03 bAUd	Baud Rate	0 = 9,600 baud, 1 = 19,200 baud 2 = 38,400 baud 3 = 76,800 baud

Menu Page 2: Configuration

Line	Display		Parameter	Range
01	P2L01	InC A	InputConfigA	-128 to +128
02	P2L02	InC b	InputConfigB	-128 to +128
03	P2L03	OUC A	OutputConfigA	-128 to +128
04	P2L04	OUC b	OutputConfigB	-128 to +128
05	P2L05	OUC c	OutputConfigC_Bsbd	-128 to +128
06	P2L06	OUC d	AOConfigD	-128 to +128

Menu Page 3: Setpoints

Line	Display		Parameter	Range
01	P3L01	OcCOOL	ZoneOccCoolStpt	0- 100_0
02	P3L02	OcHEAt	ZoneOccHeatStpt	0- 100_0
03	P3L03	UnOcCoL	ZoneUnoccCoolStpt	0- 100_0
04	P3L04	UnHEAt	ZoneUnoccHeatStpt	0- 100_0
05	P3L05	SPAn	SetptSliderSpan	0- 10_0
06	P3L06	Pr iA ir^	TABPriAirMAXStpt	0-9999
07	P3L07	Pr iA ird	TABPriDbandStpt	0-9999
08	P3L08	Pr iA irA	TABPriAirMaxHgtStpt	0-9999
10	P3L 10	FAnd	TABFanDbandStpt	0-9999
11	P3L 11	FAn^	TABFanMaxStpt	0-9999
12	P3L 12	FAnA	TABFanHtgMaxStpt	0-9999
13	P3L 13	FAnSb	TABFanStandbyStpt	0-9999
14	P3L 14	FAn d iS	TABParallelDisableFanSP	0-9999
15	P3L 15	FAnLco	SeriesFanStartLckOutSP	0-9999

Menu Page 4: Primary Balancing

Line	Display		Parameter	Range
01	P4L01	dA CL	DampClosedMan	on oFF
02	P4L02	dA rE	DamperReverse	F'd rEu ("FWD" "REV")
03	P4L03	A ir0	TABPriAirZero	on oFF
04	P4L04	dud iA	TABPriDuctDia (round equivalent) [CBT12iVAV only]	0 100
05	P4L05	H P ic	KFactorOut [CBV-2U4-3T(-N) only)] TABPriPickupK [CBT12iVAV only]	0 10_000
06	P4L06	A irFC	PriAirFlowCV	0-9999
07	P4L07	A irFE	EffPriAirFlowSTPt	0-9999
08	P4L08	H FAc	TABPRiKFactor [CBT12iVAV only]	1 10_00
09	P4L09	A ir	KFactorSelect [CBV-2U4-3T(-N) only)] TABPRiAirManMode [CBT12iVAV only]	on oFF
10	P4L 10	SEt	MeasuredFlow/K [CBV-2U4-3T(-N) only)] TABPRiManStPt [CBT12iVAV only]	0-9999
11	P4L 11	Hood	TABPriHoodAtMax [CBT12iVAV only]	0-9999
12	P4L 12	CAL	TABAutoCalKFactor [CBT12iVAV only]	on oFF
13	P4L 13	d n	DampMaxMan	on oFF
14	P4L 14	d u	DampMinMan	on oFF
15	P4L 15	d o	DampOpenMan	on oFF

Menu Page 5: Fan Configuration

Line	Display		Parameter	Range
01	PSL01	dA Au	DampAuxMan	AUto MAn
02	PSL02	H tSt	ElecHeatCFMTestStpt	0 100
03	PSL03	H MAn	EnableManualHeatCmd	AUto MAn
04	PSL04	HEAt	ManualSlaveHeatCmd	0 100
05	PSL05	FAn	FanCmdAnimation	AUto MAn
06	PSL06	FAnSP	EffFanSpeedCmd	0 100
07	PSL07	C MAn	EnableManualCoolCmd	AUto MAn
08	PSL08	CooL	ManualSlaveCoolCmd	0 100

Zeroing Airflow sensor

The **CBV-2U4-3T(-N)** comes from the factory with the airflow sensor zeroed. To compensate for possible air leakage around the damper, users are able to zero the airflow sensor in the field. To zero the airflow sensor, users will need to do the following:

1. Drive damper to the closed position by enabling *DampCloseMan* (P4L01).
2. After damper has fully shut, set *TABPriAirZero* (P4L03) to on.

After 10 seconds the T*ABPriAirZero* (P4L03) will be automatically set back to off and the airflow sensor will now be zeroed.

Be sure to disable *DampCloseMan* (P4L01) when finished with this step.

Airflow Calibration Procedure

This section provides information on the Airflow sensor calibration procedure of the **CBV-2U4-3T** airflow sensor using both Flow/K and K select in the VAV Flow Calculation firmware block

Using Flow/K

1. Set *KfactSelect* (P4L09) to TRUE.
2. Set Max cfm flow at *TABPriAirMaxStpt* (P3L06).
3. Set to *DamperMaxMan* (P4L13) to TRUE.
4. Allow airflow *PriAirFlowCV* (P4L06) to reach *TABPriAirMaxStpt* (P3L06). Let damper modulate until airflow balances out.
5. Enter balancers airflow reading in CFM in *MeasuredFlow/K* (P4L10) FactorSelect.
6. Again, allow airflow *PriAirFlowCV* (P4L06) to reach *TABPriAirMaxStpt* (P3L06). Let damper modulate until airflow balances.
7. Repeat as necessary.
8. Calculated K factor can be read at *KFactorOut*(P4L05)
9. Set *DampMaxMan* (P4L13) to FALSE when complete.

2 point balancing with minimum flow can also be achieved by doing the following:

10. After balancing system to the maximum air flow, Set min cfm flow at *TABPriDbandStpt* (P3L07)
11. Set *DampMinMan* (P4L14) to TRUE
12. Allow airflow *PriAirFlowCV* (P4L06) to reach *TABPriDbandStpt* (P3L07)
13. Enter balancers airflow reading in CFM in *MeasuredFlow/K* (P4L10)
14. Again, allow airflow *PriAirFlowCV* (P4L06) to reach *TABPriDbandStpt* (P3L07)
15. Calculated K factor can be read at *KFactorOut* (P4L05)
16. Set *DampMinMan* (P4L14) to FALSE when complete.

Using K Select

1. Set *KfactSelect* (P4L09) to FALSE.
2. Set *MeasuredFlow/K* (P4L10) to unit manufacturer K-FACTOR
3. Calculated flow can be read at *PriAirFLowCV* (P4L06)

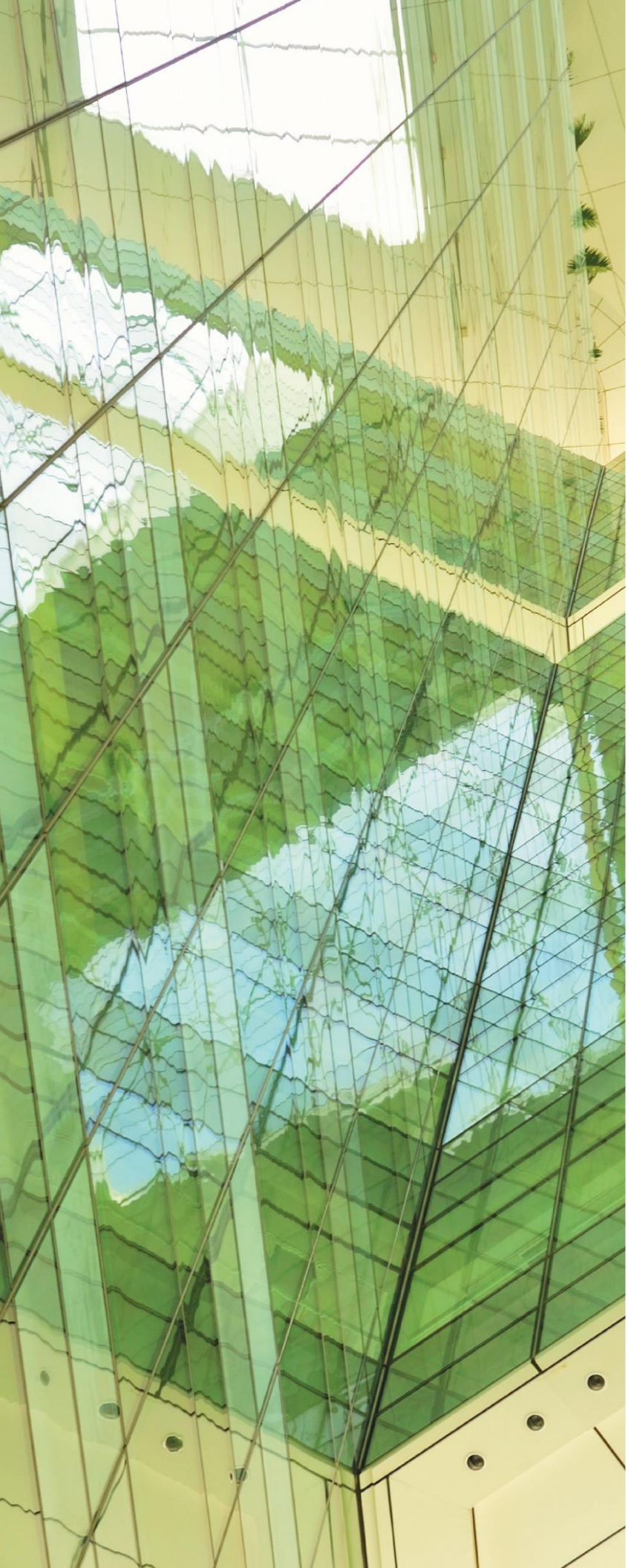
This method will auto-calculate and set the K factor P4L08 *TABPriKFactor* (A214).

To utilize this feature, perform the following steps on Menu Page 4: Primary Balancing.

Note: Each parameter is shown below with its Menu page and line number, its *Parameter Name* and the associated (Setpoint Number)

1. After determining what the maximum CFM setpoint is going to be for the VAV box, set P4L09 *TABPriAirManMode* (D204) to ON.
2. Note the value in P4L 10 *TABPriManStpt* (A218).
3. Wait for the value of P4L06 *PriAirFlowCV* (A194) to stabilize, then:
   - If the value of P4L06 *PriAirFlowCV* (A194) reaches the value noted in step 2, get a hood reading at the diffusers to get the actual CFM of the VAV box.
   - If the value of P4L06 *PriAirFlowCV* (A194) doesn't reach the value noted in step 2, set P4L 10 *TABPriManStpt* (A218) to a value below the value reached by P4L06 *PriAirFlowCV* (A194) as a reference point.
4. Set the P4L 11 *TABPriHoodAtMax* (A245) to the actual CFM reading that was recorded utilizing the hood.
5. Set the P4L 12 *TABAutoCalKfactor* (D151) to ON. It will stay ON for 4 seconds then automatically be set back to OFF. This will automatically set the P4L08 *TABPriKFactor* (A214) internally, through the Strategy calculating the required K factor. It will also set the P4L09 *TABPriAirManMode* (D204) to OFF, and the calculated P4L07 *EffPriAirFlowStpt* (A197) will go back to normal operation.

Note: When setting the P4L09 *TABPriAirManMode* (D204) to ON, it will stay on until the time entered on point *TABPriAirManModeTimer* (A217) has expired, unless P4L 12 *TABAutoCalKfactor* (D151) is set to ON. The default for *TABPriAirManModeTimer* (A217) is 600 seconds or 10 minutes.



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