FS (n)

Application Guide

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BACnet Programmable Thermostats

FlexStat[™]







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The contents and the product it describes are subject to change without notice.

General Information (All Output Configurations)





BAC-13xxxx and BAC-14xxxx FlexStat with CO₂ Sensor

Models with the extra number have three additional inputs and options for $\rm CO_2$ sensing and IP network connections

BAC-12xxxx/13xxxx/14xxxx Series FlexStat Data Sheet 4 BAC-10000 Series

FlexStats

ner

3





(Click for details.)

Overview and General Installation

Mounting Considerations

NOT



For general mounting and connection details, including network wiring, EOL termination, power connections, input/output connections, pull-up resistor switch set ings, see the relevant FlexStat Installation Guide.

For conf guration, operation, and troubleshooting information, see the FlexStat Operation Guide.

any

Wiring Considerations

be sure wiring is well

planned before installation of conduit!

A CAUTION

To avoid damage from ground loops and other communication issues in networked FlexStats, correct phasing on network and power connections on ALL the networked controllers is critically important.

use a conductor size that is adequate for the wiring length! Allow plenty of "cushion" to allow for transient peaks during startup.

Inputs and Outputs

Connecting Standard Inputs

Supported

Unsupported



10K active 0-12VDC

Be sure pull-up resistor switches are set correctly.

ALL

A single incorrect

switch position may af ect multiple inputs. All input switches must be latched in either 10K Ohm or 0-12VDC positions even if no input is connected! Input switch pairs must never have both switches set to the lef or both to the right—if one of the switch pairs is set to the lef, for example, the other must be set to the right (or vice versa).

Mapping Analog Inputs or Outputs as Binary on page 20



BAC-1xx63/1xxx63 Series (6 Relays and 3 Analog Outputs) on page 34 BAC-1xx36/1xxx36 Series (3 Relays and 6 Analog Outputs) on page 53 BAC-1xx30 Series (3 Relays and 0 Analog Outputs) on page 62

4–20 mA Current Input

4-20mA current input

external





BACstage - Registered to: KMC Controls ccess Device Objects Window System Help	
陰 監 😫 🎬 Z 🗇 🍰 🙃 ① 品 ② 豳 日 🖥 🗐 🗰	
Analog Input 3 Object	
Description Units Analog Input #3 Device Type Either Weights OUV Increments Filter Weights OUV Increments	
Image: Status Flags Image: Status Flags	
Monitor OK End Edit Cancel Flex_0D0003F1 [81112] BAC-10136C Edit Mode	

Calibrating a (Temperature) Sensor

To CHECK space temperature calibration:

wait at least a half hour af er initial power-up before checking or performing calibration of the INTERNAL temperature sensor!

NOTE: Mounting location can greatly af ect accuracy! *Mounting Considerations on page 4.*

FlexStat

Operation Guide

No Yes

No Yes

MAIN About Advanced	1ENU THE ADVANCED THE	
ALARM DATE/TIME DCV SCHEDULE SETPOINTS	LIMITS LOOPS RESTART/RESTORE SECURITY TREND LOGS TEST USER INTERFACE DISPLAY BLANKING: NO INACTIVITY (SECS): 60 ROTATION VALUES SHOW TEMP TENTHS: NO	
	USER INTERFACE MODE: STANDARD	

Sensor Calibration on page 22

To CALIBRATE the space sensor from the FlexStat MENU:

NOTE: For maximum accuracy af er an initial power-up, let the FlexStat warm up for at least a half hour before calibration.

Right



To CALIBRATE the space sensor using SOFTWARE (BACstage or TotalControl),

🔤 Analog Input 1 Object		
Name SPACE TEMP	Present Value	Out Of Service
Description	Units	
Integral space temperature sensor	°F	•
	Type II Thermistor	•
Filter Weight COV Increment Multiplier Offs	et Device Table	
Event State	4	
Status Flags		
🗖 in Alarm 🗖 Fault 🗖	Overridden 🔽 Ou	it of Service
Monitor OK	End E <u>d</u> it Car	ncel
FSQv1_3730 [2000] BAC-10063C Edit Mod	e	

right-dick in the Present Value f eld

Calibrate Present Value



Filter Weight (Input "Smoothing")

Introduction

Examples on page 11

Response Time

INPUTS 1: SPACE TEMP 2: DISCULOUD TEMP 3: MI SPACE TEMP SENSOR 4: OL VALUE: 74.0° F 5: SP CAL. OFFSET: 0.0 7: RE OUT-OF-SERVICE: FALSE 8: AI FILTER WEIGHT: 5

flter Median Filter on page 9

Inf nite Impulse Re-

median

sponse (IIR) flter

Infinite Impulse Response (IIR) Filter on page 10

Final Scaling on page 11

Median Filter

Median Filter Process on page 10



F S (n)



Infinite Impulse Response (IIR) Filter

Filter Weight			
Selected Value	Factor (a)	Percentage	
0	1	100	
1	1/2	50	
2	1/4	25	
3	1/8	12	
4	1/16	6.25	
5	1/32	3.125	
6 (D)	1/64	1.5625	
7	1/128	0.78125	

 $y_n = (1 - a)y_{n-1} + ax_n$



If a device table is not being used, the input's value depends on the input pull-up switch position:

= IIR = IIR

Final Scaling

If a device table is conf gured for the input,

Response Time Examples

Response to Door Opening and Closing on page 12

Response to FlexStat Reset and Rapid Random Signal Noise on page 12



Connecting Outputs

SC (Switched Common for relays) or GND (Ground for analog outputs)

Do not at ach a device that draws current exceeding the FlexStat's output capacity:

- Maximum output current ANALOG outputs is 20 mA @ 12VDC (each).
- Max. output current is 1 A for individual RELAYS @ 24 VAC/VDC or a total of 1.5 A per bank of 3 relays

REE-3211/3221/3213 relays would exceed the Flex-Stat's analog output capacity

Configuration Screens



- Enter
- Up Down
- Left Right
- Left

value f elds

entries

When prompted about a change (on any menu), press *Right/Left* to select the desired choice and then *Enter*.



A CAUTION

Relays are for Class-2 voltages (24 VAC) only. Do not connect line voltage to the relays!

A CAUTION

Do not mistakenly connect 24 VAC to an analog output ground. This is not the same as a relay's switched common. See the backplate's terminal label for the correct terminal.

HER COOL HERT SETBACK: 64° F

NOTE: If ** appear at the top of the screen (such as in the Main Menu), scroll up or down to see the rest of the menu's of - screen choices.

See the FlexStat Operation Guide for more conf guration and operation details.

Viewing the Control Basic Programs

NOTE: Be sure to CAREFULLY READ ALL of the following Custom Programming sections before at empting to custom programa FlexStat!

Customized programs are the responsibility of the user:

Control Basic

Programs Reference document

General

BACstage (ver. 24026 or later) or

TotalControl (ver. 205 or later)

Next Generation

See also the Reset ing the FlexStat

section in the FlexStat Operation Guide!

.ah.	CB Programs	.dh.	PROGRAM #1
PROG1:	RUNNING		
00000	BUNNING		
PRUG2:	KUNNING		OUTO,DUN, TOUS
00000	DUMMING		notowon: Inde
PRUGD:	RUMMING		CHONGE DEGNY
DDOCA.	DUNNING		GIIIIIOEI NEIIDI
PRU04:	RUMMIN		STATE: RUNNING
DONCS.	DUNNINC		
FRUGJ:	Rommo		HALT REASON: NORMAL
DDDCC.	HOITEN		
rn000.	IIIILILD		HALT DESC:
PPNG7.	INIF		
1 110011	I he ha he		OUT OF SERVICE: FALSE



Customized programs are the responsibility of the user:

Modifying the Standard Control Basic Programs

Programs 1 through 5 and 6 through 10

Control Basic programs 1 through 5 are used for built-in applications and can NOT be modif ed directly.

Because programs are executed sequentially, if a program is copied and modif ed, ALL of the following programs must also be copied (even if they are not modif ed)! For example, if program 2 is copied into program 6 and modif ed, then programs 3 through 5 (even if they contain no modif cations) must also be copied into programs 7 through 9 Then programs 2 through 5 are set to NOT autorun, programs 6 through 9 are set to autorun, and the FlexStat is restarted.

Program 1 Common Code and the User Interface

Program 1 interacts with the user interface (display and menus). If Program 1 is copied and replaced, ensure that the common code (up to the application branch code section) in Program 1 is running. Failure to do so may disable one or more user interface functions.

R1.308 and af er		
	63 ⁄	63
36/ 36		30
END_COMMON_CODE:		
END		

63 R1.304 and earlier

REM PERFORM APPROPRIATE SECTION OF CODE BASED ON FLEXSTAT CONFIGURATION

GOTO AHU_CODE ELSE IF APP_MAIN_TYPE = RTU THEN GOTO RTU_CODE ELSE IF APP_MAIN_TYPE = FCU THEN IF APP_SUB_TYPE = PIPE2 THEN GOTO FCU_2_PIPE_CODE IF APP_SUB_TYPE = PIPE4 THEN GOTO FCU_4_PIPE_CODE ELSE IF APP_MAIN_TYPE = HP THEN GOTO HP_CODE ENDIF

36 R1.304 and earlier,

REM PERFORM APPROPRIATE SECTION OF CODE BASED ON FLEXSTAT CONFIGURATION

IF APP MAIN TYPE = AHU THEN

IF APP MAIN TYPE = AHU THEN

- GOTO AHU CODE
- ELSE IF APP MAIN TYPE = FCU THEN

IF APP_SUB_TYPE = PIPE2 THEN GOTO FCU_2_PIPE_CODE
IF APP_SUB_TYPE = PIPE4 THEN GOTO FCU_4_PIPE_CODE
ENDIF

END

30 R1.304 and earlier

Customized programs are the responsibility of the user:

Custom Objects Restrictions/Recommendations

1-78 (KMC recommends reserving 1-80)
1–40 (KMC recommends reserving 1–50)
1-15 (KMC recommends reserving 1-20
1-6
1-5
1-3
1–5
1

start

with the highest numbered available object

NOTE: To see a list of objects and their usage in various applications, download and install the KMC Standard Applications package from the KMC web site and look at the relevant BAC-1xxxx Point Def nitions f le.

Viewing the Control Basic Programs on page 14.

Customized programs are the responsibility of the user:

Programs During Upgrades and Factory Restores

custom a restore to factory set ings is performed, all factory programs are restarted but all custom Control Basic programs are halted.

customand set toautorunf mware is updatedcustom) programs are halted.

custom but NOT set to autorun, whenever the f mware is updated, factory programs are restarted but any (manual) running custom programs are halted at restart.

> UPDATE MANAGER PROGRAM CONFIG ERROR

ENABLE FACTORY: NO ENABLE CUSTOM: NO EDIT CB PROGRAMS DONE

Sample Custom Applications

Adding a Remote Temperature Sensor to an Input

BAC-12xxxx/13xxxx/14xxxx

six external



AI1 = AI2

BAC-1xxxx

analog Input 1 Object	
Name SPACE TEMP	Present Value 73.23 Out Of Service
Description	Units TF Uevice Type Type II Thermistor
Filter Weight COV Increment Multiplier	Offset Device Table

three external

temperature sensor connected to another controller Using Sensors Connected to Other Controllers on page 20

Calibrating a (Temperature) Sensor

on page 7

Displaying the Current Setpoint

Method 1



Method 2



lower right of the Home screen is a feld

Name		Present Value	
UI VALUE 4		76	🗌 🗌 Out Of Serv
Description UI mapped value #4	, <setpoint> Setpoint</setpoint>	Relinquish Defa	ultPriority Array.
		Units *F	•
Event State Normal	COV Incre	ment	
Status Flags			
🔲 In Alarm	Fault	Cverridden	Out of Service

Current Setpoint

AV25 = AV27

HUM: xx% HUMIDITY

Method 3



web graphics pages

Custom Web Graphics on page 24

Displaying Outside Air Temperature on page 19 Displaying Other Objects on page 19

SETPOINT

Displaying Outside Air Temperature

~



Displaying Other Objects

Mixed



Firmware R2009 and later makes it easy to show and hide relevant rotation values from the Advanced > User Interface > Rotation Values menu. FlexStat Operation Guide

~

MAT Mixed Air Temp

MAT

Mixed Air Temp

AV25 = AI3

Air Temperature

🔤 Analog Value 23 Object	
Name UI VALUE 2	Present Value 92.43999 Out Of Service
Description UI mapped value #2, < DAT> outside air temp	Relinquish Default 0 Priority Array
	Units F
Event State COV Increment 1	
Status Flags	
🗖 In Alarm 🗖 Fault 🗖	Overridden 🔽 Out of Service
Monitor OK	End E <u>d</u> it Cancel
Mark 63 FlexStat [81113] BAC-11163C Edit Mo	de 🕒 ?

Analog Value 25 Object	
Name UI VALUE 4	Present Value O U O U O U O O U O U O U O O U U O U U O U U O U
Description UI mapped value #4, <mat> Mixed Air Temp</mat>	Relinquish Default Driority Array
Event State COV Increme Normal 1	ent
Status Flags	Cverridden Cut of Service
Monitor DK	End E <u>d</u> it Cancel
Mark 63 FlexStat [81113] BAC-11163C	Edit Mode 🔒 ?

Mapping Analog Inputs or Outputs as Binary	Using Sensors Connected to Other Controllers
IF AI2 < 0.5 THEN BV1 = 0 ELSE BV1 = 1	
OR IF AI2 < 0.5 THEN START BV1 ELSE STOP BV1	eitherone
IF BV3 THEN A07 = 12 ELSE A07 = 0	IF INTERVAL($0:01:00$) THEN AI4 = 2010.AI3
	ALIAS(2010, AI3, PV, OutsideAirTemp, 0:01:00, NONE)
Motion Sensor Applications	AI4 = OutsideAirTemp
LAST Customizing the Motion Sensor and Override on page 30 built-in	1
FIRST	
remoteAddingRemote Motion Sensors on page 32	Customized programs are the responsibility of the user:

CO₂ Sensors and **DCV** "Standard" **BAC-1xxxx** or BAC-13xxxx BAC-12xxxx and BAC-14xxxx FlexStat FlexStat with without CO₂ CO, Sensor Sensor • KINC KIVIC

Principles of Operation

FlexStat Operation Guide conf guration and use of DCV

sequences of operationDCV(Demand Controlled Ventilation) – General Information onpage 42

2

4

IN9 O-5VDC on that input will map to O-2000ppm (using the defaults). The output of the connected SAE-10xx must also be conf gured to match the FlexStat's input pull-up resistor O-12VDC

3

3 4 highest

demand control ventilation (DCV)

CO ₂ Sensor Calibration		
3	not	To calibrate the BAC-14xxxx models, a KMC HTO-1103 and a GE Te- laire 2075 (or equivalent) kit and gas are required:
applications where concentrations will drop to out tions (approximately 400ppm) at least three times i	in side ambient condi- in a 14 day period,	GE Telaire 2075 calibra- tion kit
		dockwise
4 option for applying gas to the sensor	calibration	adapter plate (with at ached power cable) for the BAC- 13xxxx/14xxxx FlexStat HTO-1103FlexStat Firmware Upgrade Kit (See the HTO-1103Installa- tion Guide for more information.)

over inside



Left

dislodge any wiring

while being careful not to pinch or

before

not

both

tools.org

www.earth-

FS (n)

App n 🕈, V

Custom Web Graphics



*(9) = Writing at priority level 8 will synchronize with the user interface (neither locks the other out *(9) = Writing (AV27 and BV2) at priority level 9 will synchronize with user interface programs.

Hospitality and Locked User Interface Modes Selecting UI Modes



R1.3011

Programming Custom Text for Hospitality Mode on page 28 Custom Programming on page 14

Right Enter Left permanent, change the Present Value AND the Relinquished Default to the desired value. Right Left Enter NOTE: Do not change the Present Values or Relinquished Defaults of any other MSVs 1-12 Doing so may make the FlexStat malfunction! Left Right Enter Up Down Multi-State Value 9 Object Present Value Name view-only UI MODE Description Relinguish Default Selects User Interface hebavior State Text 1 STANDARD 2 MODE 2 3 MODE 3 access and make changes in the "hidden" Main Menu Event State Norma Up Down **SECOND** Status Flags Enter 🔲 In Alam Fault C Overridden 🔲 Out of Service ΟK End Edit Monitor Mark 63 FlexStat [81113] BAC-11163C dit Mode

26

To revert to Standard mode

Via BACstage or TotalControl

To revert to Standard mode through BACstage or TotalControl:

NOTE: When the FlexStat is restarted, however, MSV9s Present

interface will revert to the previously selected mode.

9

Value will revert to the Relinquished Default and the user

Out Of Service

Priority Array...

Cancel

æ

Enter Right

Reverting UI Modes

Via the User Interface

through the user interface

To return to Standard mode, navigate to the Advanced > User Interface menu and select Standard (otherwise, the previously selected mode will continue).

Resetting Hospitality Mode Setpoints to Defaults

Hospitality Setpoint Principles

Custom Web Graphics on page 24

Custom Programming on page 14

Control Basic Programs

Schedule

```
REM Reset Hospitality Mode Setpoints to Schedule
Defaults
IF+ TIME > 23:59:00 THEN GOSUB RESET_SETPOINTS
REM 23:59:00 = 11:59 PM
```

END

RESET_SETPOINTS :

AV4@8 = 78 : REM UNOCC COOLING SETPT

```
AV4.RELINQUISH_DEFAULT = AV4
AV5@8 = 66 : REM UNOCC HEATING SETPT
AV5.RELINQUISH_DEFAULT = AV5
AV20@8 = 74 : REM OCC COOLING SETPT
AV20.RELINQUISH_DEFAULT = AV20
AV21@8 = 70 : REM OCC HEATING SETPT
AV21.RELINQUISH_DEFAULT = AV21
RETURN
```

Single Setpoint

REM Reset Hospitality Mode Setpoint to Schedule Default IF+ TIME > 23:59:00 THEN GOSUB RESET SETPOINT REM 23:59:00 = 11:59 PM REM AV27 = UI Setpoint; BV7 = Heat/Cool Mode END RESET SETPOINT : IF BV7 THEN REM COOLING MODE AV2708 = 74ELSE REM HEATING MODE AV2708 = 70ENDIF AV27.RELINQUISH DEFAULT = AV27 RETURN

Programming Custom Text for Hospitality Mode

When BV Present Value = 1, Corresponding Icon Animates

seven	ten				
Hospitality Mode Multi-State Variables					
Function	Variable	Comments	1		
n ∪ • (∪)	Ş 9	$(1 = S r \stackrel{\bullet}{\bullet} \stackrel{\bullet}{\bullet} \stackrel{\bullet}{\bullet})$ $2 = {}^{L} \rho \stackrel{\bullet}{\bullet} \stackrel{\bullet}$			
F [●] A(B n)	\$ 10	n, S n (B 28=1 An n)	1		
F [€] B(h B n)	Ş 11	n, S n (B 29=1 An n)			
F ♥C	Ş 12	P n, S n (B 30=1 An n)			





Motion/Occupancy Sensor Performance and Applications

be sure to install it where it will have an unobstructed view of the most typical traf c area. Do not install it behind curtains or other obstructions. Do not install it where it will be exposed to sunlight or heat sources! Do not install near a heating/cooling duct.

For some applications,

lack of detected motion may not truly mean "unoccupied."

The effective detection range is approximately 10 meters or 33 feet. Factors that may reduce the range

False detections temperature inside the detection range changing suddenly

sensor being directly exposed



During scheduled "of /unoccupied" times,

FIRST

	dh			MAIN MENU 🖤		
R	B	0	U	IT		
R	D	IV	R	INCED		
F		di.		ADVANCED 🖤		
L ¢	A	P	P	LICATION		
9	ſ			APPLICATION		
9	1	D	E	GREES SCALE: °F		
٦	1	R	P	P: FAN COIL		
	1	0	P	T: 4PIPE		
	-	A	D	DITIONAL SETUP		
l	-	ſ		ADDITIONAL SETUP		
			F	AN		
	l		Н	IUMIDITY		
			ř	10TION SENSOR		
				MOTION SENSOR		
			1	OCC OVERRIDE: ENABLE		
			ų	STATE: OCCUPIED		
				STANDBY: DISABLE		

		_	
.4	🖦 MAIN MENU 🖤	•	1.
RI	DVANCED		
RI	LARM		El
DI	ATE/TIME		τ·
5(CHEDULE		1.
51	ETPOINTS		
5	YSTEM		
T	END HIELIED		1
	INOCTIVITY (SECS), 60		I
	NISPLAY RIANKING. NO		
I			। हा
			S.
			R

LAST

```
REM MOTION SENSOR OCCUPANCY CONTROL OPERATION CODE
   ONLY
LOCALS MOTION SENSOR
LOCALS OVERRIDE_TIMER
OVERRIDE_TIMER = AV16
 F OVERRIDE TIMER <= 0 THEN
  GOTO SKIP_OCC_CONTROL
 NDIF
 F MODELNUMBER > 11000 THEN
  MOTION SENSOR = BI6
  IF MOTION SENSOR THEN
   START BV108
  ENDIF
 IF TIMEOFF( MOTION_SENSOR ) > ( OVERRIDE_TIMER *
   3600 ) THEN
   RLQ BV108
  ENDIF
 CNDIF
 SKIP OCC CONTROL:
 REM CONTINUE WITH ADDITIONAL CODE
```

not

built-in FIRST

NOTE: See important information about custom programming in Custom Programming on page 14.

Adding a Door Contact for Additional Control

Limits of Using Motion Sensors Alone

REM WAIT UNTIL VALUE OF BV1 IS DEFINITE TO SET OCC-MODE OCC_MODE = BV1

STANDBY: REM NO MOTION DURING OCC FOR 30 MINS=STANDBY, IF ENABLED

Open

Mapping Analog Inputs or Outputs as Binary on page 20 Closed 0.5

0.5

NOTE: Read carefully the important information about custom programming in *Custom Programming on page 14*!

Additional Code

REM MOTION SENSOR WITH DOOR CONTACT LOGIC CODE
REM All schedules must be deleted or set to OFF
REM Motion Sensor Occupancy Override must be enabled and Standby should be disabled
REM System Occupancy Override time should be reduced to 0.5 hours in menu
REM (Alternately reduce the time to less than 0.5 hours using BACstage or TotalControl to change AV16's present value and relinquish default)
REM For Hospitality Mode, Hospitality Options > Set- point Control must be set to Schedule
LOCALS DOOR_CONTACT : REM Normally Open switch con- tact connected to AI2
IF AI2 < 0.5 THEN DOOR_CONTACT = 1 ELSE DOOR_CONTACT = 0
<pre>IF TIMEON(DOOR_CONTACT) > 0:00:02 AND OCC_SNSR THEN START BV107</pre>
REM If any motion is detected while door is closed, go to and remain in Occupied Mode (until door opens)
IF NOT DOOR CONTACT THEN RLQ BV107
REM If door opens, relinquish default of BV107 (oc- cupancy mode)

Adding Remote Motion Sensors



Support

latest support f les

kmccontrols.com ht ps://partners.kmccontrols.com

Troubleshooting Motion Sensor Operation

Custom Programming on page 14.

NOTE: See important information about custom programming in

For operation, conf guration, troubleshooting and other information, see the FlexStat Operation Guide.

For specif cations, see the FlexStat Data Sheet.

Enabling/Disabling the Sensor and Override Time on page 30

Performance and Applications on page 29

Important Notices

page 32	Customizing the Motion Sensor and Override on	contents and the product it describes are subject to cha
page 32	Adding Remote Motion Sensors on	
page 31		
	Adding a Door Contact for Additional Control on	





WWW.



BAC-1xx63/1xxx63 Series (6 Relays and 3 Analog Outputs)

Model numbers with the additional digit234have three additional inputs and options for CO_2 sensingtions for CO_2 sensingand IP networkconnections4

FlexStat Catalog Supplement and Selection Guide (SP-091)



BAC-1 63

N



Bills of Materials (BAC-1xx63/1xxx63)

This section contains BOMs for the sample installation diagrams in the corresponding sections of the BAC-1xx63 and BAC-1xx63 installation guides. See those documents for detailed drawings and input/output connections as well as other important installation information.

AHU (Air Handling Unit)—Modulating Heat and Modulating Cool

BILL O	BILL OF MATERIALS: AHU, Modulating Heat and Modulating Cool					
REFERENCE	KMC PART #	PART DESCRIPTION				
FESA	BAC-1 63/ 1 63	BACE E SA, 6 EA & 3 A A UPUS				
1	EE-3211	A E C E A , 1.2; A				
C _r :	EB-43 BD	FA -SAFE C A E, / EP-5372 2-10 DC AC UA , 19 A				
F	, A, ES, C⊢	SE CAPAC / DE F , C DA A S⊢EE				
DA	S E-1402	DUC EL PEAUESES				
FS	CSE-1102	A DFFEE A PESSUES C⊢, 0.05-12" C				
A	S E-1416	12 DUCAEA E SES				
А	S E-1451	USDEE PEAUESES				
*	STE-6011	REMOTE TEMPERATURE SENSOR, TYPE II				
*	SAE-10xx	REMOTE CO ₂ SENSOR, SPACE OR DUCT				
1	EE-6311-075	A SF _ E , 120/240/277/480:24. AC, 75. A				
	C⊢ SE	EFEF ASFES:				
2	EE-6311-075	A SF E , 120/208/240/480:24. AC, 75. A				
2	2 EE-6311-100 A SF E , 120/240/277/480:24; AC, 96; A					
*The remote temperature and CO ₂ sensor options are not shown in the sample installation diagrams, and they are available only on BAC-12xxxx/13xxxx/14xxxx models.						

BILL OF MATERIALS: AHU, DAMPER ACTUATORS						
REFERE	NCE	MAX DAMPER AREA IN FT ²	KMC PART #		PART DESCRIPTIO	ON
AD	D	6.25	EP-5372	50	B FA -SAFE AC UA 19 A	, 2-10 DC,
AD	D	15	E₽-7252	120	B FA -SAFE AC ∪A 25: A	, 0-10 DC,
AD	D	22.5	EP-7552	180	B FA -SAFE AC UA 25: A	, 0-10 DC,
AD	D	40	EP-7852	320	B FA -SAFE AC UA 40 A	, 0-10 DC,

2

FlexStat Operation Guide

Sequence of Operation (BAC-1xx63/1xxx63) on page 38

analog

Connecting Outputs on page 13

HPU (Heat Pump Unit)—

RTU (Roof Top Unit)—1 or 2 Heat and 1 or 2 Cool

BILL OF M	BILL OF MATERIALS: HPU, 1/2 Compressors w/ Aux. & Emergency Heat					
REFERENCE	KMC PART #	PART DESCRIPTION				
FESA	BAC-1 63/ 1 63	BACE E SA, 6 EA & 3 A A U PU S				
DA	S E-1402	DUC E REAUESES				
FS	CSE-1102	A DFFE E A PESSUES C⊢, 0.05-12" C				
A	S E-1416	12 DUCAEA E SES				
A	S E-1451	USDEELPEAUESES				
*	STE-6011	REMOTE TEMPERATURE SENSOR, TYPE II				
*	SAE-10xx	REMOTE CO ₂ SENSOR, SPACE OR DUCT				
	C⊢ SE	EF EF ASF ES:				
2	EE-6311-075	A SF E , 120/208/240/480:24, AC, 75, A				
2	EE-6311-100	A SF E , 120/240/277/480:24, AC, 96, A				
*The remote diagrams, a	temperature and C nd they are availab	O_2 sensor options are not shown in the sample installation on BAC-12xxxx/13xxxx/14xxxx models.				

1	or	2	Com	pressors	w/	Aux.	&	Emergency	Heat
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B	BILL OF MATERIALS: RTU, 1 or 2 Heat and 1 or 2 Cool				
REFERENCE	KMC PART #	PART DESCRIPTION			
FESA	BAC-1 63/ 1 63	BACE E SA, 6 EA & 3 A A UPUS			
DA	S E-1402	DUC E PEAUESES			
FS	CSE-1102	A DFFE E A PESSUES C⊢, 0.05-12" C			
А	S E-1416	12 DUCAEA E SES			
А	S E-1451	USDE E PEAUESES			
*	STE-6011	REMOTE TEMPERATURE SENSOR, TYPE II			
*	SAE-10xx	REMOTE CO ₂ SENSOR, SPACE OR DUCT			
	C⊢ SE	EF⊢EF ASF_ES:			
2	EE-6311-075	A SF E , 120/208/240/480:24. AC, 75. A			
2	EE-6311-100	A SF E , 120/240/277/480:24: AC, 96: A			
*The remote	temperature and C ad they are availab	O_2 sensor options are not shown in the sample installation le only on BAC-12xxxx/13xxxx/14xxxx models			

	BILL OF MATERIALS: HPU, DAMPER ACTUATORS					
REFERE	NCE	MAX DAMPER AREA IN FT ²	KMC PART #		PART DESCRIPTIC	DN
AD	D	6.25	EP-5372	50	B FA -SAFE AC UA 19: A	, 2-10 DC,
AD	D	15	J E₽-7252	120	B FA -SAFE AC UA 25 A	, 0-10 DC,
AD	D	22.5	E₽-7552	180	B FA -SAFE AC UA 25 A	, 0-10 DC,
AD	D	40	EP-7852	320	B FA -SAFE AC UA 40 A	, 0-10 DC,

	BILL OF MATERIALS: RTU, DAMPER ACTUATORS					
REFERE	NCE	MAX DAMPER AREA IN FT ²	KMC PART #		PART DESCRIPTIC	DN
AD	D	6.25	J E₽-5372	50	B FA -SAFE AC UA 19: A	, 2-10 DC,
AD	D	15	J E.₽-7252	120	B FA -SAFE AC UA 25 A	, 0-10 DC,
AD	D	22.5	J E₽-7552	180	B FA -SAFE AC UA 25 A	, 0-10 DC,
AD	D	40	EP-7852	320	B FA -SAFE AC UA 40 A	, 0-10 DC,

NOTE: See the corresponding BAC-1xx63 or BAC-1xx63 Installation Guide section for detailed drawings and input/ output connections as well as other important installation information.

FlexStat Operation Guide

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FCU (Fan Coil Unit)—2 or 4 Pipe, Modulating or 2 Position

	BILL OF MATERIALS: FCU, 2-Pipe, 2-Position				
REFERENCE	KMC PART #	PART DESCRIPTION			
FESA	BAC-1 63/ 1 63	BACE E SA, 6 EA & 3 A A U PU S			
1, 2, 3	EE-3211	AEC EA, 1.2; A			
المو المو	, Е-4 В	FA -SAFE C , A, E, 24, AC, 14, A			
	F , A, E, C⊢	SE CAPAC / DE F C DA A SHEE			
DA	S E-1402	DUC E REAUESES			
FS	CSE-1102	A DFFE E A PESSUES C⊢, 0.05-12" C			
- 18	S E-1454/1455	2"SAP-EPEAUESES (//n)			
*	STE-6011	REMOTE TEMPERATURE SENSOR, TYPE II			
1	EE-6311-050	A SF E , 120/240/277/480:24. AC, 50. A			
*The remote	temperature senso	r option is not shown in the sample installation			

* The remote temperature sensor option is not shown in the sample installation diagrams, and it is available only on BAC-12xxxx/13xxxx/14xxxx models.

	BILL OF MATERIALS: FCU, 2-Pipe, Modulating				
REFERENCE	KMC PART #	PART DESCRIPTION			
FESA	BAC-1 63/ 1 63	BACE E SA, 6 EA & 3 A A U PU S			
1, 2, 3	EE-3211	A EC E A , 1.2; A			
1.1	EB-43 BC	C , A, E / EP-4002 0-10 AC UA , 4 A			
	F , A, E, C⊢	SE CAPAC / DE F C DA A SHEE			
DA	S E-1402	DUC ELEAUESES			
FS	CSE-1102	A DFFE E A PESSUES C⊢, 0.05-12" C			
- 1 -	S E-1454/1455	2"S AP- ELPEA∪ESES (//r))			
*	STE-6011	REMOTE TEMPERATURE SENSOR, TYPE II			
1	EE-6311-050	A SF E , 120/240/277/480:24; AC, 50; A			
*The remote diagrams, a	temperature senso nd it is available oi	r option is not shown in the sample installation nly on BAC-12xxxx/13xxxx/14xxxx models.			

	BILL OF MATERIALS: FCU, 4-Pipe, 2-Position					
REFERENCE	KMC PART #	PART DESCRIPTION				
FESA	BAC-1 63/ 1 63	BACE E SA, 6 EA & 3 A A U PU S				
1, 2, 3	EE-3211	AEC EA, 1.2; A ج ال				
C _r :	, Е-4 J В	FA -SAFE C A E, 24. AC, 14. A				
F , A, ES, C⊢		SE CAPAC / DE F C DA A S⊢EE				
DA	S E-1402	DUC ELLE AU ESE S				
*	STE-6011	REMOTE TEMPERATURE SENSOR, TYPE II				
	EE-6311-050	A SF E , 120/240/277/480:24; AC, 50; A				
*The remote diagrams, a	*The remote temperature sensor option is not shown in the sample installation diagrams, and it is available only on BAC-12xxxx/13xxxx/14xxxx models.					

	BILL OF MATERIALS: FCU, 4-Pipe, Modulating				
REFERENCE	KMC PART #	PART DESCRIPTION			
FESA	BAC-1 63/ 1 63	BACE E SA, 6 EA & 3 A A UPUS			
1, 2, 3	EE-3211	, U, , AEC EA, 1.2; A			
C _r :	EB-43 BC	C , A, E / EP-4002 0-10 AC UA , 4 A			
F , A, ES, C⊢		SE CAPAC / DE F , C DA A S⊢EE			
DA	S E-1402	DUC E PEAUESES			
FS	CSE-1102	A DFFEE A PESSUES C⊢, 0.05-12" C			
*	STE-6011	REMOTE TEMPERATURE SENSOR, TYPE II			
	EE-6311-050	A SF E , 120/240/277/480:24: AC, 50: A			
*The remote diagrams, a	*The remote temperature sensor option is not shown in the sample installation diagrams, and it is available only on BAC-12xxxx/13xxxx/14xxxx models.				

Sequence of Operation (BAC-1xx63/1xxx63) on page 38

NOTE: See the corresponding BAC-1xx63 or BAC-1xxx63 Installation Guide section for detailed drawings and input/ output connections as well as other important installation information.

analog Connecting Outputs on page 13

ferential

Sequence of Operation (BAC-1xx63/1xxx63)

NOTE: This information refects f mware version R20013 or later (but specif cations and sequences are subject to change and may vary according to model and options).

FlexStat (All Models) Common Features

Space Temperature Setpoints and Modes

four setpoints

four corresponding setpoint limiters

minimum setpoint dif-

tive heating setpoint and active cooling setpoint

Heating Proportional Band

Cooling Proportional Band

	(Colder 🗲 R	loom Temperatu	re -> Warmer)
	Hea Setr	ting Coc point Set	bling point
R2.0.0.x and Later Firmware	Heating Proportional Band	Minimum Setpoint Differential	Cooling Proportional Band
R1.4.0.1 and Earlier Firmware	Deadband	Min. Setpoint Differential	Deadband
Other Common	Setpoint Span	Deadband	Setpoint Span
Terms	Throttling Range		Throttling Range

System Mode

Occupancy Modes

In addition to temporarily placing the controller into the occupied mode occupancy override is used to temporarily override the space temperature

motion/occupancy sensor

• IF an outdoor air temperature sensor is installed (wired to AI4), and

Standby Mode

On units equipped with a motion/occupancy sensor

Fan Control

Economizer

outside air temperature OAT

Upon

fan alarm, all outputs other than the fan are de energized.

If a low limit alarm is present, all fan outputs are de energized.

OAT	Econ Loop "P" factor
65	15
53	15
50	15
45	22.5
40	30
30	30

DCV (Demand Controlled Ventilation)—General Information

CO2 Sensors and DCV on page 21

CO2Base

The three types of DCV conf gurations available are:

If at any time there

is a fan alarm, the outside air damper shall shut.

If the mixed air temp drops below the low limit alarm temp, a low limit alarm is generated and the outside air damper will close.

3 CA Title 24, Section 121(c) 2

component

DCV—Standard Configuration

maximum

See the data sheet for more information.

3

CA Title 24, Section 121(c) ASHRAE Standard 62.1-2010 Portland Energy Conservation, Inc. (PECI)

NOTE: See the FlexStat Operation Guide for more information about conf guring DCV.

DCV—Basic Configuration





DCV—Advanced Configuration



OA Area

Normal Ventilation

damper position

OA Full

Ventilation Startup



Ventilation Recovery

OA % Full OA % Area

Economizer Ventilation

Ventilation Override Mode

Standby Mode (Requires a Motion Sensor)

OA % Full OA % Area

Ventilation Pre-Purge

Unoccupied Off

Dehumidification

Night Flush

Humidification (BAC-1x136 and BAC-1xx136 Only)

BAC-1xx63/1xxx63 Applications

AHU (Air Handling Unit)

Fan Control

Stat (All Models) Common Features

Valve Control

• If the fan mode for a particular occupancy mode is set to constant or "On," the valves function in a modulating fashion.

• With the fan mode set to "Auto," the heating valve will open 100%

If at any time there is a low limit alarm, the cooling value is forced dosed and the heating value opens fully.

If at any time there is a fan failure alarm, the cooling and heating valves are both forced closed.

Staged Heating and Cooling Parameters

User Interface Display Backlight

Flex-

Reversing Valve

Dehumidification

ergized on a call for heating ("B")

en-

energized on a call

for cooling ("O")

Compressor Staging

conf gured for one compressor stage

HPU (Heat Pump Unit)

Fan Control

conf gured for two compressor stages

SystemMode EmerHt

If at any time there is a fan failure alarm or low limit alarm, all compressor stages are de-energized.

Auxiliary/Emergency Heat

Any time there is a fan failure alarm or low limit alarm, auxiliary and emergency heating are de energized.

Economizer Control

conf gured for auxiliary heat without compressor lock-

out

Dehumidification

FCU (Fan Coil Unit), 2-Pipe

Fan Control

Stat (All Models) Common Features

Flex-

opposite water timer

min eval timer

min eval timer opposite water timer

modulating valve conf guration

Water Valve Operation and H/C Water Available Determination

two-position valve conf guration

water evaluation mode

min eval timer

Any time there is a fan failure alarm, the valve will be fully closed.

FCU (Fan Coil Unit), 4-Pipe

Fan Control

Stat (All Models) Common Features

Valve Control

Flex-

• If the valves are configured for modulating action and the fan mode for a particular occupancy mode is set to constant or "On,"

• With the fan mode set to "Auto" or the valves are configured for two-position operation

If at any time there is a fan failure alarm, the cooling and heating valves are both forced closed.

Dehumidification

RTU (Roof Top Unit)

Fan Control

Stat (All Models) Common Features

Flex-

Heating/Cooling Staging In the heating mode If at any time there is a fan failure alarm or a low limit alarm, all stages of heating and cooling are stopped at priority 5, bypassing any minimum on times

Economizer Control

In the cooling mode

Dehumidification

BAC-1xx36/1xxx36 Series (3 Relays and 6 Analog Outputs)





BAC-1 36 n

FlexStat Catalog Supplement and Selection Guide (SP-091)



Bills of Materials (BAC-1xx36/1xxx36) AHU (Air Handling Unit)—Multiple H/C Options

	BILL OF MATERIALS: AHU, 1 Heat and 1 Cool				
REFERENCE	KMC PART #	PART DESCRIPTION			
FESA	BAC-1 36/ 1 36	BACE E SA, 6 EA & 3 A A UPUS			
1	EE-3211	AEC EA, 1.2; A C			
بر ا ل ۲	, EB-43 BD	FA -SAFE C , A, E, / EP-5372 2-10; DC AC UA , 19; A			
	F _: A_: E, C⊢	SE CAPAC / DE F , C DA A S⊢EE			
ي ۲	EE-3112	12/24: DC C E A , SPD			
DA	S E-1402	DUC E PEAUESES			
FS	CSE-1102	A DFFEE A PESSUES C⊢, 0.05-12" C			
A	S E-1416	12 DUCAEA E SES			
А	S E-1451	USDEEPEAUESES			
*	STE-6011	REMOTE TEMPERATURE SENSOR, TYPE II			
*	SAE-10xx	REMOTE CO ₂ SENSOR, SPACE OR DUCT			
1	EE-6311-050	A SF E , 120/240/277/480:24; AC, 50; A			
	C⊢ SE	EFEF ASFES:			
2	EE-6311-075	A SF E , 120/208/240/480:24. AC, 75. A			
2	EE-6311-100	A SF E , 120/240/277/480:24. AC, 96. A			
*The remote diagrams, a	temperature and C nd they are availab	O_2 sensor options are not shown in the sample installation on BAC-12xxxx/13xxxx/14xxxx models.			

	BILL OF MATERIALS: AHU, DAMPER ACTUATORS						
REFERENCE MAX DA		MAX DAMPER AREA IN FT ²	KMC PART #	PART DESCRIPTION			
AD	D	6.25	EP-5372	50	BFA -SAFEAC UA 19 A	, 2-10 DC,	
AD	D	15	EP-7252	120	BFA -SAFEAC ⊍A 25 A	, 0-10 DC,	
AD	D	22.5	EP-7552	180	BFA -SAFEAC ⊍A 25: A	, 0-10 DC,	
AD	D	40	EP-7852	320	BFA -SAFEAC ⊍A 40 A	, 0-10 DC,	

NOTE: See the corresponding BAC-1xx36 or BAC-1xxx36 Installation Guide section for detailed drawings and input/ output connections as well as other important installation information.

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FlexStat Operation Guide

Sequence of Operation (BAC-1xx36/1xxx36) on page 57

analog

Connecting Outputs on page 13

BILL	BILL OF MATERIALS: AHU, 1 or 2 Heat and Modulating Cool					
REFERENCE	KMC PART #	PART DESCRIPTION				
FESA	BAC-1 36/ 1 36	BACE E SA, 6 EA & 3 A A U PU S				
1	EE-3211	A EC E A , 1.2; A				
C,: Lui,	EB-43 BD	FA -SAFE C A. E, / J EP-5372 2-10; DC AC UA , 19; A				
F	, A, ES, C⊢	SE CAPAC / DE F , C DA A S⊢EE				
ارا ۲	EE-3112	12/24, DC C E A , SPD				
DA	S E-1402	DUC E PEAUESES				
FS	CSE-1102	A DFFEE A PESSUES C⊢, 0.05-12" C				
A	S E-1416	12 DUCAEA E SES				
A	S E-1451	USDEEL PEAUESES				
*	STE-6011	REMOTE TEMPERATURE SENSOR, TYPE II				
*	SAE-10xx	REMOTE CO ₂ SENSOR, SPACE OR DUCT				
1	EE-6311-050	A SF E , 120/240/277/480:24. AC, 50. A				
	C⊢ SE	EF-EF ASFES:				
2	EE-6311-075	A SF E , 120/208/240/480:24. AC, 75. A				
2	EE-6311-100	A SF E , 120/240/277/480:24, AC, 96, A				
*The remote diagrams, a	temperature and C nd they are availab	O_2 sensor options are not shown in the sample installation only on BAC-12xxxx/13xxxx/14xxxx models.				

BILL	BILL OF MATERIALS: AHU, Modulating Heat and 1 or 2 Cool						
REFERENCE	KMC PART #	PART DESCRIPTION					
FESA	BAC-1 36/ 1 36	BACE E SA, 6 EA & 3 A A U PU S					
1	EE-3211	A E C E A , 1.2; A					
	EB-43 BD	FA -SAFE C A. E, / J EP-5372 2-10; DC AC UA , 19; A					
F	, A, ES, C⊢	SE CAPAC / DE F C DA A SHEE					
ل ا	EE-3112	12/24: DC C E A , SPD					
DA	S E-1402	DUC E A U E SE S					
FS	CSE-1102	A DFFE E A PESSUES C⊢, 0.05-12" C					
А	S E-1416	12 DUCAEA E SES					
A	S E-1451	USDEE, PEAUESES					
*	STE-6011	REMOTE TEMPERATURE SENSOR, TYPE II					
*	SAE-10xx	REMOTE CO ₂ SENSOR, SPACE OR DUCT					
1	EE-6311-075	A SF E , 120/240/277/480:24. AC, 75. A					
	C⊢ SE	EF⊢EF ASF ES:					
2	EE-6311-075	A SF E , 120/208/240/480:24 AC, 75 A					
2	EE-6311-100	A SF E , 120/240/277/480:24 AC, 96 A					
*The remote diagrams, a	*The remote temperature and CO ₂ sensor options are not shown in the sample installation diagrams, and they are available only on BAC-12xxxx/13xxxx/14xxxx models.						

	BILL OF MATERIALS: AHU, DAMPER ACTUATORS					
REFERENCE MAX DAMPER AREA IN FT ²		KMC PART #		PART DESCRIPTION		
AD	D	6.25	EP-5372	50	B FA -SAFE AC UA 19 A	, 2-10 DC,
AD	D	15	EP-7252	120	B FA -SAFE AC ∪A 25 A	, 0-10 DC,
AD	D	22.5	EP-7552	180	B FA -SAFE AC ∪A 25 A	, 0-10 DC,
AD	D	40	EP-7852	320	BFA -SAFEAC ∪A 40 A	, 0-10 DC,

	BILL OF MATERIALS: AHU, DAMPER ACTUATORS						
REFERENCE		MAX DAMPER AREA IN FT ²	KMC PART #	PART DESCRIPTION			
AD	D	6.25	EP-5372	50	B FA -SAFE AC UA 19 A	, 2-10 DC,	
AD	D	15	EP-7252	120	B FA -SAFE AC UA 25 A	, 0-10 DC,	
AD	D	22.5	EP-7552	180	B FA -SAFE AC ∪A 25 A	, 0-10 DC,	
AD	D	40	EP-7852	320	B FA -SAFE AC UA 40 A	, 0-10 DC,	

BILL O	BILL OF MATERIALS: AHU, Modulating Heat and Modulating Cool					
REFERENCE	KMC PART #	PART DESCRIPTION				
FESA	BAC-1 36/ 1 36	BACE E SA, 6 EA & 3 A A U PU S				
1	EE-3211	AEC EA, 1.2; A				
C _r :	EB-43 BD	FA -SAFE C : A E, / EP-5372 2-10 DC AC ∪A , 19 A				
F	, A, ES, C⊢	SE CAPAC / DE F , C DA A S⊢EE				
ل ا	EE-3112	12/24. DC C E A , SPD				
DA	S E-1402	DUC E PEAUESES				
FS	CSE-1102	A DFFE E A PESSUES C⊢, 0.05-12" C				
A	S E-1416	12 DUCAEA E SES				
A	S E-1451	USDEEL PEAUESES				
*	STE-6011	REMOTE TEMPERATURE SENSOR, TYPE II				
*	SAE-10xx	REMOTE CO ₂ SENSOR, SPACE OR DUCT				
1	EE-6311-075	A SF E , 120/240/277/480:24. AC, 75. A				
	C⊢ SE	EF EF ASF ES:				
2	EE-6311-075	A SF E , 120/208/240/480:24. AC, 75. A				
2	EE-6311-100	A SF E , 120/240/277/480:24. AC, 96. A				
*The remote diagrams, a	temperature and C nd they are availab	O_2 sensor options are not shown in the sample installation only on BAC-12xxxx/13xxxx/14xxxx models.				

	BILL OF MATERIALS: AHU, DAMPER ACTUATORS						
REFERENCE MAX DAMPER AREA IN FT ²		KMC PART #		PART DESCRIPTIC	DN		
AD	D	6.25	EP-5372	50	B FA -SAFE AC UA 19 A	, 2-10 DC,	
AD	D	15	J E₽-7252	120	BFA -SAFEAC ⊍A 25 A	, 0-10 DC,	
AD	D	22.5	J E₽-7552	180	B FA -SAFE AC ∪A 25 A	, 0-10 DC,	
AD	D	40	EP-7852	320	B FA -SAFE AC UA 40 A	, 0-10 DC,	

FCU (Fan Coil Unit)—2 or 4 Pipe, Modulating

	BILL OF MATERIALS: FCU, 2-Pipe, Modulating					
REFERENCE	KMC PART #	PART DESCRIPTION				
FESA	BAC-1 36/ 1 36	BACE E SA, 6 EA & 3 A A U PU S				
1, 2, 3	EE-3211	, ∪, , AEC EA, 1.2; A				
11	, EB-43 BC	C , A, E / EP-4002 0-10 AC UA , 4 A				
F → A→ E, C⊢ SE CAPAC / DE F → C DA A S⊢EE						
DA	S E-1402	DUCE LESES				
FS	CSE-1102	A DFFE E A PESSUES C⊢, 0.05-12" C				
- 1 -	S E-1454/1455	2"S AP- ELPEA∪ESES (//r))				
*	STE-6011	REMOTE TEMPERATURE SENSOR, TYPE II				
	EE-6311-050	A SF E , 120/240/277/480:24; AC, 50; A				
*The remote diagrams, a	*The remote temperature sensor option is not shown in the sample installation diagrams, and it is available only on BAC-12xxxx/13xxxx/14xxxx models.					

	BILL OF MATERIALS: FCU, 4-Pipe, Modulating					
REFERENCE	KMC PART #	PART DESCRIPTION				
FESA	BAC-1 63/ 1 63	BACE E SA, 6 EA & 3 A A U PU S				
1, 2, 3	EE-3211	AEC EA, 1.2; A				
C _r :	EB-43 BC	C , A, E / EP-4002 0-10 AC UA , 4 A				
	EB-43 BD	FA -SAFE C A. E, / EP-5372 2-10, DC AC UA , 19, A				
F	, A, ES, C⊢	SE CAPAC / DE F CDA A S⊢EE				
	EE-3112	12/24: DC C E A , SPD				
DA	S E-1402	DUC E PEAUESES				
FS	CSE-1102	A DFFE E A PESSUES C⊢, 0.05-12" C				
*	STE-6011	REMOTE TEMPERATURE SENSOR, TYPE II				
	EE-6311-050	A SF E , 120/240/277/480:24 AC, 50 A				
*The remote diagrams, al	*The remote temperature sensor option is not shown in the sample installation diagrams, and it is available only on BAC-12xxxx/13xxxx/14xxxx models.					

Sequence of Operation (BAC-1xx36/1xxx36)

BAC-1xx36/1xxx36 Common Features FlexStat (All Models) Common Feature page 38 BAC-1xx36/1xxx36 Series Applications AHU (Air Handling Unit)	'es on
Fan Control Stat (All Models) Common Features	Flex-
Modulating/One Stage	
Two Stages	 Valve Control (If Configured) If the fan mode for a particular occupancy mode is set to constant or "On," the valves function in a modulating fashion.

Fan Speed Control

• With the fan mode set to "Auto," the heating valve will open 100%

Staged Cooling

If at any time there is a low limit alarm, the cooling value is forced dosed and the heating value opens fully.

If at any time there is a fan failure alarm, the cooling and heating valves are both forced closed.

Staged Heating and Cooling Parameters

One Cooling Stage

One Heating Stage

Two Cooling Stages

Two Heating Stages

Economizer Control

outside air temperature OAT

Dehumidification

FCU (Fan Coil Unit), 2-Pipe

Fan Control

Stat (All Models) Common Features

Flex-

opposite water timer

eval timer

min eval timer opposite water timer

• If the fan mode for a particular occupancy mode is set to constant or "On," the valve functions in a modulating fashion.

Water Valve Operation and H/C Water Available Determination

water evaluation mode

• With the fan mode set to "Auto," the valve operates in a "two-position" fashion.

min eval timer

Any time there is a fan failure alarm, the valve will be fully closed.

min

FCU (Fan Coil Unit), 4-Pipe

Fan Control

Stat (All Models) Common Features

occupancy mode is set to constant or "On," the valves function in a modulating fashion.

Flex-

• With the fan mode set to "Auto," the valves operate in a twoposition fashion.

If at any time there is a fan failure alarm, the cooling and heating valves are both forced closed.

Dehumidification

Valve Control

• The method of controlling the heating and cooling valves is based on the fan conf guration. If the fan mode for a particular

BAC-1xx30 Series (3 Relays and 0 Analog Outputs)

FlexStat Catalog Supplement and Selection Guide (SP-091)



Bills of Materials (BAC-1xx30)

AHU (Air Handling Unit)—1 Heat and 1 Cool

	BILL OF MATERIALS: AHU, 1 Heat and 1 Cool					
REFERENCE	KMC PART #	PART DESCRIPTION				
FESA	BAC-1 30	BACE E SA, 3 EAS				
DA	S E-1402	DUC E E A U E SE S				
FS	CSE-1102	A DFFEE A PESSUES C⊢, 0.05-12" C				
A	S E-1416	12 DUCAEA E SES				
A	S E-1451	USDEE PEAUESES				
	EE-6311-075	A SF E , 120/240/277/480:24 AC, 75 A				

HPU (Heat Pump Unit)—1 Compressor

BILL OF MATERIALS: HPU, 1 Compressor					
REFERENCE	KMC PART #	PART DESCRIPTION			
FESA	BAC-1 30	BACE - E SA, 3 EAS			
DA	S E-1402	DUC E REAUESES			
FS	CSE-1102	A DFFE E A PESSUES C⊢, 0.05-12" C			
	EE-6311-075	A SF _ E , 120/240/277/480:24; AC, 75; A			

Cooling Unit—1 Cool

BILL OF MATERIALS: Cooling Unit, 1 Cool							
REFERENCE	KMC PART #	PART DESCRIPTION					
FESA	BAC-1 30	BACE - E SA, 3 EAS					
DA	S E-1402	DUC E E A U E SE S					
FS	CSE-1102	A DFFE E A PESSUES C⊢, 0.05-12" C					
	EE-6311-075	A SF _ E , 120/240/277/480:24; AC, 75; A					

NOTE: See the BAC-1xx30Installation Guide section for detailed drawings and input/output connections as well as other important installation information.

Sequence of Operation (BAC-1xx30) on page 64

Heating Unit—1 Heat

BILL OF MATERIALS: Heating Unit, 1 Heat							
REFERENCE	KMC PART #	PART DESCRIPTION					
FESA	BAC-1 30	BACE FESA, 3 EAS					
DA	S E-1402	DUC E PEAUESES					
FS	CSE-1102	A DFFEE A PESSUES C⊢, 0.05-12" C					
	EE-6311-075	A SF E , 120/240/277/480:24, AC, 75, A					

A CAUTION

Relays are for Class-2 voltages (24 VAC) only. Do nw

Sequence of Operation (BAC-1xx30)

FlexStat (All Models) Common Features on

HPU (Heat Pump Unit)

on page 48

page 38

Sequence of Operation (BAC-1xx36/1xxx36) on page 57

BAC-1xxx53 (5 Relays, 1 Triac, & 3 Analog Outputs)

3 analog

Digital[™] compressor com

Copeland Scroll[®] www.EmersonClimate.

5 relay 1-triac



BAC-

The triac replaces Relay 6 and is used to modulate the compressor.

12xxxx/13xxxx/14xxxx Series FlexStat Data Sheet

BAC-1xx63/1xxx63 Series (6 Relays and 3 Analog Outputs) on page 34

NOTE: SC = Switched (relay) Common				(Optional) IP/Ethernet Network		
NOTE: IN1 and IN5-6 are		Э				
reserved for internal sen		isors		Outputs (HPU RTU)		
Inputs	IN9	Ø		Ø	Analog 9	
	(DTS) IN8	Ø	$\left(\begin{array}{c} \end{array} \right)$	Ø	GND 7–9	
	GND		ite)	$ \emptyset $	Analog 8	
(Remote Temp.) IN7		$ \emptyset $	(pla	$ \emptyset $	Analog 7	
(Optional) +B		0	act	Ø	Triac 6 (T T)	
MS/TP Ne	MS/TP Network –A		<u></u>	Ø	SC 4–6 (R R/RH)	
Inputs	Inputs IN4		out	Ø	Relay 5 (W W1)	
(Wiring is dependent IN3		$ \emptyset $	Out	Ø	Relay 4 (Y2 Y2)	
on applicat	^{ion)} GND	$ \emptyset $) ըլ	Ø	Relay 3 (Y1 Y1)	
(FST/DAT) IN2		$ \emptyset $	Viri	$ \emptyset $	SC 1–3 (R R/RC)	
	Common/-/C	$ \emptyset $		$ \emptyset $	Relay 2 (O/B W2)	
24 VAC	Phase/~/R	Ø	N/	Ø	Relay 1 (G∣G)	

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Symbols

2- r° p: 37, 50, 56, 60 2- r° n: 37 3 , 6 An p : 53 3 n 0° 0 An p : 62 4-20 A np : 6 4- r° p : 37, 51, 56, 61 5 , 1 , n 0° 3 An p : 65 6 , 3 An p : 34

Α

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BAC-1 30 S : BAC-1 36/1 36 S : BAC-1 63/1 63 S : BAC-1 53 S : B h, D p : BAC : 14, 18, 24, B n np : 20

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KMC Controls