

FRESH AIR VENTILATION CONTROL

Model: FAVC (Generation 2)



ITEMS INCLUDED:

- 1 – Fresh Air Ventilation Controller
- 1 – Mounting Hole Template
- 1 – Instruction and Installation Manual
- 1 – Mounting Packet containing two (2) Sheet Metal Screws
- 1 – ODT Sensor Packet containing temperature sensor, sheet metal screw and two (2) wire nuts

The Field Controls Fresh Air Ventilation Control™ (FAVC) is designed to provide fresh air ventilation year-round, keeping energy conservation, indoor air quality and comfort in mind. The FAVC delivers ventilation along with many additional features:

- Meets the requirements of the ASHRAE 62.2 standard for ventilation.
- Supplied with an outdoor temperature sensor which mounts in the fresh air duct.
- Has three selectable Climate Zones with unique ventilation inhibit parameters for the selected climate.
- Monitors up to four exhaust appliances within your home to adjust ventilation needs based on total appliance operation.
- Can provide Make-Up air in response to an exhausting appliance.
- Can utilize an exhaust fan to drive ventilation independent of the central HVAC fan to save energy.
- Continuously monitors indoor Relative Humidity:
 - Lower excess indoor humidity during hot muggy days by reducing ventilation during these periods to prevent discomfort and mold growth in the home.
 - Reduce condensation and corrosion of the heat exchanger.

READ THESE INSTRUCTIONS CAREFULLY AND COMPLETELY BEFORE PROCEEDING WITH THE INSTALLATION.

This device **MUST** be installed by a qualified agency in accordance with the manufacturer's installation instructions. The definition of a qualified agency is: any individual, firm, corporation or company which either in person or through a representative is engaged in, and is responsible for, the installation and operation of HVAC appliances, who is experienced in such work, familiar with all the precautions required, and has complied with all the requirements of the authority having jurisdiction.

Please retain these instructions after installation.

Installed By: _____ Phone: _____ Installation Date: _____



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P/N 780100700 07/21 Rev J

PRODUCT OVERVIEW

Field Controls FAVC is an intelligent ventilation control. Ventilation is extremely important for having a healthy home. It is also important to efficiently manage ventilation to avoid unnecessary expense.

The FAVC continuously monitors conditions of your home to provide healthy and efficient ventilation. During the monitoring process, the multi-color light emitting diode (LED) indicator can change color frequently. The LED indicator can be observed illuminating solid or blinking as the control fluently appraises incoming air temperature and indoor conditions.

The FAVC control may reduce some ventilation when the outdoor air is too Hot or Cold. The purpose is to avoid unnecessary energy use of conditioning incoming ventilation air.

The control will also reduce ventilation when your home is too humid. This action allows your HVAC system to better manage the indoor conditions for maintaining comfort.

Note: When the FAVC is blinking, be assured it is thinking. The internal micro-processor is monitoring inputs and calculating on how to best manage the conditions for ventilation and efficiency.

The LED may be a solid color or blinking as the control fluently appraises inputs from each sensor.



GREEN

The Green-light LED indicates all conditions are good for full ventilation.



BLUE

The Blue-light LED indicates conditions may be too cool or cold for full ventilation.



RED

The Red-light LED indicates conditions may be too warm, hot, or humid for full ventilation.



DARK

The LED is off, this would indicate there is no power or there is a fault in the sensor or sensor wire connection. The LED may be off for first 15 seconds after power is applied to FAVC.

**For more information refer to page 30 of 40 - 8Biv.

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Thank you for purchasing the Fresh Air Ventilation Control™ (FAVC) by Field Controls. This ventilation controller is compatible with any HVAC system having accessible 24VAC R, C, W, Y, G terminals.



DANGER

- To prevent serious injury from electrical shock, this product must be installed by a qualified agency.
- 120 VAC can cause serious injury from electric shock. Some installations may require electrical connections to line voltage sources.
- Before installing the FAVC, turn off all power to your HVAC system.
- When servicing FAVC system or components attached to FAVC system, turn off all power to these items.



CAUTIONS

- Read entire manual and follow all instructions carefully.
- Follow all local electrical codes during installation.
- All wiring must conform to local and national electrical codes.
- Use caution when mounting components to surfaces that may have concealed wiring beneath the surface.
- Do not mount the FAVC controller on the supply plenum or supply ductwork.
- Do not mount the FAVC controller immediately downstream from any fresh air intake port, humidifier or bypass outlet. False humidity conditions will cause the FAVC controller to operate incorrectly.
- Do not use the ventilation system for removal of flammable fumes or gases.
- Do not install ventilation controller in an outdoor location and/or wet location.
- Do not obstruct or cover the fresh air intake or air outlet of the ventilation system.
- Provisions should be made for make-up air requirements based on recommendations set forth by governing agency to meet applicable building codes and ventilation standards.



WARNING

- Sharp metal edges (ductwork) can cause serious injury from cuts.
- Wear appropriate gloves when cutting, drilling and grinding plenum openings and handling ductwork.
- Wear appropriate eye protection when drilling, grinding and/or cutting ductwork.

FAVC SPECIFICATION: Power Requirements (Class 2 Appliance)

Input Voltage	20-30 VAC
Minimum VA Required	1.7 VA @ 24 VAC (full load current at nominal 24 VAC) Supplied by the HVAC power source
Wiring Requirements	18-22 AWG, 24 VAC (Min)
Operating Temperature Range	10°F to 160°F
Operating Humidity Range	5 to 95% RH (non-condensing)
Outputs	Maximum Load
Fan Output GF (Maximum Load Current):	3A inductive @24VAC (thermostat fan signal)
Vent (V, V) (Maximum Load Current):	3A inductive @24VAC (unsourced and isolated)
Exhaust (E, E) (Maximum Load Current):	3A inductive @24VAC (unsourced and isolated)
Inputs	
Fan Input GT (Monitor Circuit Current):	5mA @24VAC (sourced from thermostat fan signal)
Heat Input W (Monitor Circuit Current):	5mA @24VAC (sourced from thermostat W signal)
Heat/Cool W,Y (Monitor Circuit):	5mA @24VAC (sourced from fan & thermostat W and Y signal)
Isolated Inputs (Monitoring)	
Appliances #1 - 4 (A1, A2, A3, A4, A1C, A2C, A3C, A4C):	5mA @24VAC, TVS protected (requires common connection)

1. FAVC LAYOUT - OVERVIEW

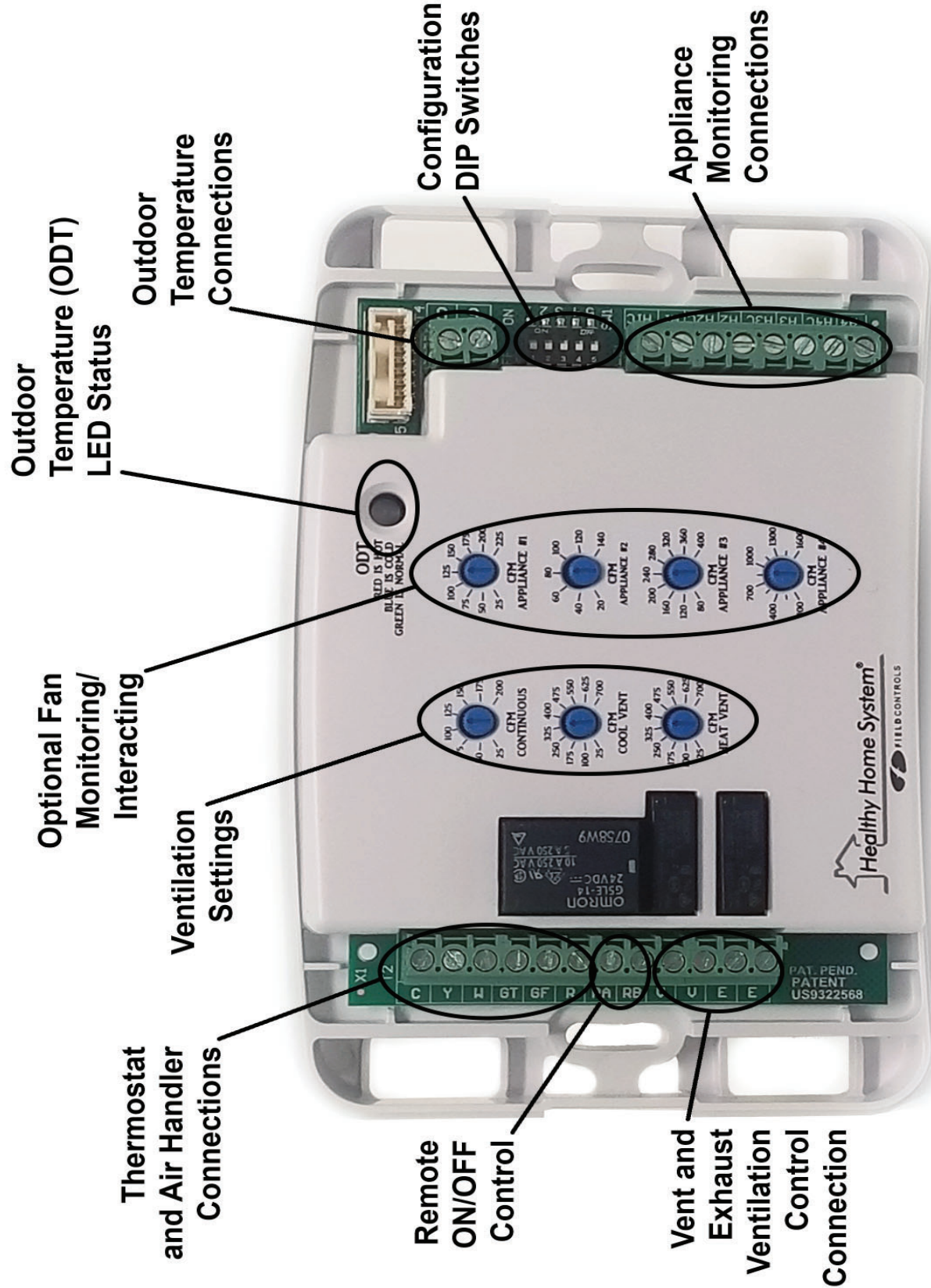


FIGURE 1: FAVC Functional Product Layout (shown with cover removed)

2. GATHER INFORMATION/RECORD/SET CONTROL

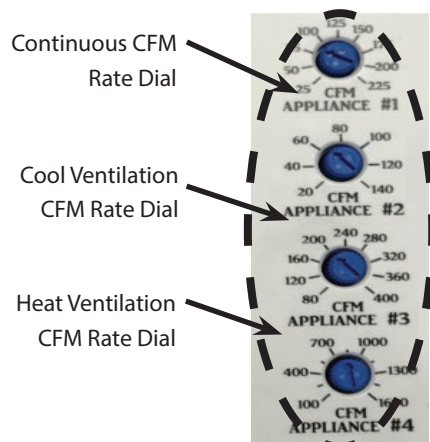


FIGURE 2: VENTILATION ONLY DIAL SETTINGS

CFM	Settings		
	Minimum	Maximum	Factory
CONTINUOUS	25	200	100
COOL VENT	25	700	400
HEAT VENT	25	700	400

TABLE 1: Air Flow Dial Ranges and Factory Settings

To Turn OFF or Deactivate Ventilation of the FAVC:

Method 1 – Adjust Dials

1. Before turning off, mark the current heat and cool vent settings with a permanent marker, or write the value on the inner cover for reference in the event the manual has been lost.
2. Set both heat vent and cool vent to lowest possible setting by turning the dial all the way in a counter clockwise rotation until it stops turning.
3. The FAVC will shut down within 20 seconds and remain inactive.

Method 2 – DIP Switch Position 5 Set to OFF (*not available on Product Generation 1 Models*)

1. Locate the multi-position DIP Switch (SW1) on the right side of FAVC after removing the outer cover
2. Turn 5th position DIP Switch to OFF position (see Figure 14 on page 18)

To Turn ON or Reactivate Ventilation of the FAVC:

Based on Method 1 – Adjust Dials

1. Turn the dials of the heat vent and cool vent back to the desired value as marked or noted previously.
2. The FAVC will begin to ventilate on a cycle per the settings.

Method 2 – DIP Switch Position 5 Set to OFF (*not available on Product Generation 1 Models*)

1. Locate the multi-position DIP Switch (SW1) on the right side of FAVC after removing the outer cover
2. Turn 5th position DIP Switch to ON position (see Figure 14 on page 18)

2A. DETERMINE THE REQUIRED CFM CONTINUOUS RESIDENTIAL VENTILATION

1. How many square feet of condition space will be ventilated with this appliance?
 - A. Make sure to include the following: basements, and/or bonus rooms within the buildings thermal envelope.
 - B. Determine the number of bedrooms.
2. Select the appropriate ASHRAE 62.2 Residential Ventilation Standard that's been adopted by your state or by the local authority having jurisdiction.
3. Use the appropriate ventilation table 2A or 2B.
4. Select the building square footage equal or closes to your application.
5. Select the number of bedrooms associated with your application.
6. Locate where the square footage row and bedroom column intersect. This determines the CFM continuous ventilation dial setting.
7. Record and save the continuous volume determined for your application.

2A	Number of Bedrooms					
Sq Ft	1	2	3	4	5	6
500	20	28	35	43	50	58
600	21	29	36	44	51	59
700	22	30	37	45	52	60
800	23	31	38	46	53	61
900	24	32	39	47	54	62
1000	25	33	40	48	55	63
1100	26	34	41	49	56	64
1200	27	35	42	50	57	65
1300	28	36	43	51	58	66
1400	29	37	44	52	59	67
1500	30	38	45	53	60	68
1600	31	39	46	54	61	69
1700	32	40	47	55	62	70
1800	33	41	48	56	63	71
1900	34	42	49	57	64	72
2000	35	43	50	58	65	73
2100	36	44	51	59	66	74
2200	37	45	52	60	67	75
2300	38	46	53	61	68	76
2400	39	47	54	62	69	77
2500	40	48	55	63	70	78
2600	41	49	56	64	71	79
2700	42	50	57	65	72	80
2800	43	51	58	66	73	81
2900	44	52	59	67	74	82
3000	45	53	60	68	75	83
3100	46	54	61	69	76	84
3200	47	55	62	70	77	85
3300	48	56	63	71	78	86
3400	49	57	64	72	79	87
3500	50	58	65	73	80	88

Table 2A: Continuous Ventilation Rate in CFM
per ASHRAE 62.2-2010 Standard

2B	Number of Bedrooms					
Sq Ft	1	2	3	4	5	6
500	30	38	45	53	60	68
600	33	41	48	56	63	71
700	36	44	51	59	66	74
800	39	47	54	62	69	77
900	42	50	57	65	72	80
1000	45	53	60	68	75	83
1100	48	56	63	71	78	86
1200	51	59	66	74	81	89
1300	54	62	69	77	84	92
1400	57	65	72	80	87	95
1500	60	68	75	83	90	98
1600	63	71	78	86	93	101
1700	66	74	81	89	96	104
1800	69	77	84	92	99	107
1900	72	80	87	95	102	110
2000	75	83	90	98	105	113
2100	78	86	93	101	108	116
2200	81	89	96	104	111	119
2300	84	92	99	107	114	122
2400	87	95	102	110	117	125
2500	90	98	105	113	120	128
2600	93	101	108	116	123	131
2700	96	104	111	119	126	134
2800	99	107	114	122	129	137
2900	102	110	117	125	132	140
3000	105	113	120	128	135	143
3100	108	116	123	131	138	146
3200	111	119	126	134	141	149
3300	114	122	129	137	144	152
3400	117	125	132	140	147	155
3500	120	128	135	143	150	158

Table 2B: Continuous Ventilation Rate in CFM per
ASHRAE 62.2-2013/2016 Standard

Continuous Calculation

2B. DETERMINE FRESH AIR INTAKE

Flow Hood Anemometer Method

1. Use a flow hood or handheld rotary blade anemometer. Follow the instruments recommend procedures for obtaining an accurate measurement.
2. During a Heating and Cooling cycle take a measurement and record the CFM volume through the outdoor fresh air intake.

Heat

Cool

Static Pressure Method

1. Locate where the fresh air intake and return air duct connect.
2. Use a monometer following the instruments recommended procedure for obtaining an accurate static pressure measurement. Take measurements in the fresh air intake duct approximately one foot from the return air and fresh air intake connection.
3. Record the average static pressure measurement for a heating and cooling cycle.
4. Determine the fresh air intake internal round duct size and type. If square or rectangular duct convert free area to the nearest round duct size.
5. Determine the fresh air intake systems total equivalent feet.
How many elbows, reducers and straight pipe used in construction of the fresh air intake duct.
For additional details see section 10.
6. Using table 3
 - a) Select your damper and air intake hood size.
 - b) Moving to the right select your systems total equivalent feet
 - c) From the top locate your systems Cooling or Heating cycle measured negative static pressure.
 - d) Select your systems duct type Smooth or Flex
 - e) Drop down your selected duct type column to where it intersects with your predetermined equivalent feet row.
 - f) Your estimated Cooling CFM has been determined. Record and save.
 - g) Repeat the process if Heating cycle static pressure is different.
Note: If Cooling and Heating cycle static pressure is the same continue.

		Damper Air Flow in CFM based on Negative Static Pressure Measurement							
Negative Return Air Static Pressure ("WC)		0.05		0.10		0.15		0.20	
Damper & Intake Hood	Equivalent Feet of Duct Length	Smooth	Flex	Smooth	Flex	Smooth	Flex	Smooth	Flex
4 Inch	10	40	32	57	45	70	56	80	64
	30	33	26	47	37	57	46	66	53
	50	29	23	41	33	50	40	58	46
5 Inch	10	67	54	95	73	117	94	135	108
	30	56	45	80	64	97	78	113	90
	50	49	39	70	56	85	68	99	79
6 Inch	10	90	72	128	102	157	126	181	145
	30	79	63	111	89	136	109	157	126
	50	71	57	100	80	122	98	141	113
7 Inch	10	154	123	218	174	266	213	308	246
	30	129	103	183	146	224	179	258	207
	50	113	91	160	128	196	157	227	181
8 Inch	10	174	139	246	197	301	241	348	278
	30	154	123	218	174	267	214	308	246
	50	140	112	197	158	242	194	279	223
10 Inch	10	262	210	371	297	454	363	525	420
	30	239	191	338	270	414	331	478	382
	50	221	177	312	250	383	306	442	354
12 Inch	10	428	342	581	464	785	628	861	688
	30	376	300	528	422	647	517	713	570
	50	362	289	476	381	610	488	671	537

Table 3: Fresh Air Damper Sizing Air Flow (CFM) Table

Static (Heat Mode)	Static (Cool Mode)	Equiv. Ft.	Determine Heat CFM	Determine Cool CFM
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

If Static and Duct Design are Known Use Table 3

1. Enter Intake Design Static Pressure
2. Enter Intake Duct Equivalent Feet
3. Type of Intake Duct - Smooth or Flex
4. Enter Diameter of Intake Pipe
5. Determine CFM from Table 3

Control Setup

1. Set CFM Continuous Dial - Carefully adjust the CFM continuous dial. Use the recorded volume that was determined from table 2A or 2B and recorded in Section 2A.

Note: Locate arrow on the dial stem. Align to the desired continuous volume.

2. Set CFM Cool Vent Dial - Carefully adjust the CFM Cool Vent dial. Use the recorded volume that was determined from using one of the previous methods and Recorded in Section 2B.

Note: Locate arrow on the dial stem. Align to the desired volume.

3. Set CFM Heat Vent Dial - Carefully adjust CFM Heat Vent dial to volume determined from using one of the predetermined methods and recorded in Section 2B.

Note: Locate arrow on the dial stem. Align to the desired volume.

3. SET-UP - DIP SWITCHES 1 & 2

3A. CLIMATE ZONE INHIBIT OPTIONS

The FAVC is equipped with a 5 position DIP switch to configure climate settings, fan control with appliance #3 and/or turn ON/OFF function. To enable or disable energy saving mode select remote control. The FAVC is factory shipped with DIP switches 1, 2 & 5 set to ON (Enabled) position and DIP switches 3 & 4 OFF (Disabled) position.

The 4 modes for CLIMATE SETTINGS are: Disabled, Cold, Hot or Normal as controlled by DIP Switch 1 and 2 shown in Figure 3. Refer to Figure 4 to configure FAVC for Normal, Cold, Hot or to Disable climate modes. The various climate operational tables are shown in Figures 6 (Normal Climate), 7 (Cold Climate) and 8 (Hot Climate). The FAVC is shipped from the factory: Normal (DIP Switches 1 & 2 in ON position). If you do NOT want to use humidity control function, change climate setting to disabled.

For the three active climate modes (HOT, Cold and Normal) the monitored indoor relative humidity will directly affect how the FVAC ventilates during the summer months and will also be affected due to the outside air temperature.

For measured indoor relative humidity at 50% or below: when outdoor temperatures are above 85°F and less than 90°F, ventilation will be prevented until the HVAC system becomes active. When the outdoor temperature is above 90°F but below 100°F the ventilation provided will be reduced to 25% of the calculated time for required ventilation. When outside temperature rises above 100°F, ventilation will be limited to once every 4 hours at 25% of the calculated time for required ventilation.

For measured indoor relative humidity between 50% and 52.5%: Ventilation will be prevented until the HVAC system becomes active and the ventilation provided will be reduced to 75% of the calculated time required for ventilation. When the outdoor temperature is above 90°F but below 100°F, the ventilation provided will be reduced to 25% of the calculated time for required ventilation. When outside temperature rises above 100°F, ventilation will be limited to once every 4 hours at 25% of the calculated time for required ventilation.

For measured indoor relative humidity between 52.5% and 55%: Ventilation will be prevented until the HVAC system becomes active and the ventilation provided will be reduced to 50% of the calculated time required for ventilation. When the outdoor temperature is above 90°F but below 100°F, the ventilation provided will be reduced to 25% of the calculated time for required ventilation. When outside temperature rises above 100°F, ventilation will be limited to once every 4 hours at 25% of the calculated time for required ventilation.

For measured indoor relative humidity between 55% and 57.5%: Ventilation will be prevented until the HVAC system becomes active and the ventilation provided will be reduced to 25% of the calculated time required for ventilation. When the outdoor temperature is above 90°F but below 100°F, the ventilation provided will be reduced to 25% of the calculated time for required ventilation. When outside temperature rises above 100°F, ventilation will be limited to once every 4 hours at 25% of the calculated time for required ventilation.

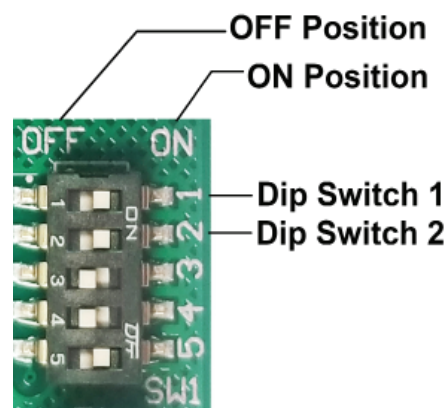


FIGURE 3: DIP Switches 1 and 2

CLIMATE SETTING		
DIP 1	DIP 2	FUNCTION
ON	ON	NORMAL
OFF	ON	COLD
ON	OFF	HOT
OFF	OFF	DISABLED

FIGURE 4:
DIP Switch Positions for Climate Setting

For measured indoor relative humidity is at 57.5% and above, ventilation will be limited to once every 4 hours at 25% of the calculated time required for ventilation. Ventilation will be prevented until the HVAC system becomes active.

In Climate Mode: DISABLED, the FAVC will operate with two temperature limits for hot and cold temperature extremes. The high temperature limit is fixed at 100°F and low temperature limit is fixed at 0°F. Change in indoor Relative Humidity will have no effect on ventilation. Plenum protection will remain active.

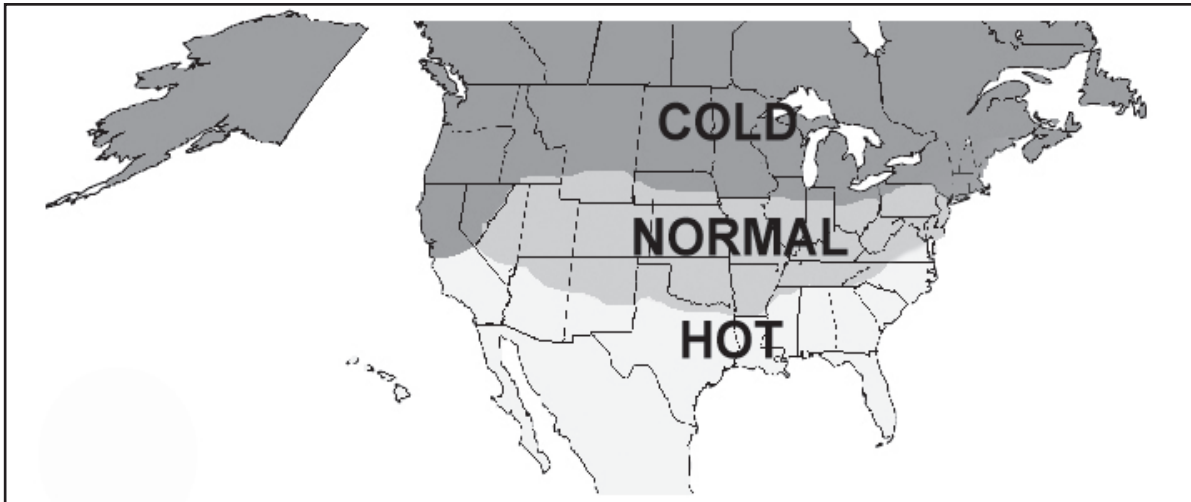


FIGURE 5: Suggested Climate Zone Setting Based on North America Region

For all climate modes, the FAVC incorporates a hysteresis algorithm program designed to limit ventilation control based on the relationship between outdoor temperature and relative humidity level changes within the home.

3B. NORMAL CLIMATE ZONE

In Climate Mode: NORMAL The FAVC will provide fresh outside ventilation if the outside temperature is between 100°F and 17°F depending on if the HVAC system is in heating or cooling mode and depending on indoor relative humidity change during the ventilation cycle. During the heating season, when outdoor temperatures fall below 40°F, ventilation will be prevented until the HVAC system is active in heating. When the outside air temperature falls below 34°F, the ventilation will be restricted to 25% of the calculated time required for ventilation. When outside air temperature drops below 17°F, ventilation will be prohibited. When measured indoor relative humidity is above 50%, and the outside air temperature is at 40°F or below, ventilation will be permitted as long as the trend of relative humidity is dropping. Ventilation will be prohibited on rise in relative humidity and will not be enabled until indoor relative humidity falls below 50%. During the cooling season the relative humidity relationships change. When outside air temperature is above 85°F, ventilation will not be permitted until the HVAC system is active. Other conditions that will require the HVAC system to be active is when the measured indoor relative humidity is above 50%. When measured indoor relative humidity is between 50% and 52.5%, ventilation time will be reduced to 75% of the calculated time required for ventilation. When measured indoor relative humidity is between 52.5% and 55%, the ventilation time will be reduced to 50% of the calculated time required for ventilation. When measured indoor relative humidity is between 55% and 57.5%, the ventilation time will be reduced to 25% of the calculated time required for ventilation. When measured indoor relative humidity rises above 57.5%, the ventilation will be restricted to 25% of the calculated required ventilation time and will only occur every 4 hours as long as the humidity levels remain above 57.5%. When outside air temperature is above 90°F but below 100°F, the ventilation time will be reduced to 25% of the calculated time required for ventilation. When outside air temperature is at 100°F or above, the ventilation will be restricted to 25% of the calculated required time required and will only occur once every 4 hours until the outside air temperature remains above 100°F.

ODT	NORMAL CLIMATE							
100	LIMITED VENTILATION TO 25% ONCE EVERY 4 HOURS							COOLING
90	25% VENTILATION	25%	25%	25%	LIMIT 25% 4 HR			
85	COOLING REQUIRED FOR VENTILATION	75%	50%	25%				
70	NO RESTRICTIONS	75%	50%	25%				
68		VENTILATION PERMITTED, LIMIT ON RISE OF RH						
50								
40								
39		HEATING REQUIRED FOR VENTILATION	HEATING REQUIRED FOR VENTILATION, LIMIT ON RISE OF HR					HEATING
34								
32	HEATING REQUIRED,	HEATING REQUIRED FOR VENTILATION,						
18	VENTILATION REDUCED TO 25%	REDUCED TO 25%,LIMIT ON RISE OF RH						
17	PROHIBIT							
0								
-10								
	15%	25%	50%	52.5%	55%	57.5%	60%	
RELATIVE HUMIDITY								

FIGURE 6: Normal Climate Operation

3C. COLD CLIMATE ZONE

In Climate Mode: COLD The FAVC will provide fresh outside ventilation if the outside temperature is between 100°F and 0°F depending on if the HVAC system is in heating or cooling mode and depending on indoor relative humidity change during the ventilation cycle. During the heating season, when outdoor temperatures fall below 40°F, ventilation will be prevented until the HVAC system is active in heating. When the outside air temperature falls below 25°F, the ventilation will be restricted to 25% of the calculated time required for ventilation. When outside air temperature drops below 0°F, ventilation will be prohibited. When measured indoor relative humidity is above 50%, and the outside air temperature is at 40°F or below, ventilation will be permitted as long as the trend of relative humidity is dropping. Ventilation will be prohibited on rise in relative humidity and will not be enabled until indoor relative humidity falls below 50%.

During the cooling season the relative humidity relationships change. When outside air temperature is above 85°F, ventilation will not be permitted until the HVAC system is active. Other conditions that will require the HVAC system to be active is when the measured indoor relative humidity is above 50%. When measured indoor relative humidity is between 50% and 52.5%, ventilation time will be reduced to 75% of the calculated time required for ventilation. When measured indoor relative humidity is between 52.5% and 55%, the ventilation time will be reduced to 50% of the calculated time required for ventilation. When measured indoor relative humidity is between 55% and 57.5%, the ventilation time will be reduced to 25% of the calculated time required for ventilation. When measured indoor relative humidity rises above 57.5%, the ventilation will be restricted to 25% of the calculated required ventilation time and will only occur every 4 hours as long as the humidity levels remain above 57.5%. When outside air temperature is above 90°F but below 100°F, the ventilation time will be reduced to 25% of the calculated time required for ventilation. When outside air temperature is at 100°F or above, the ventilation will be restricted to 25% of the calculated required time required and will only occur once every 4 hours until the outside air temperature remains above 100°F.

ODT	COLD CLIMATE							
100	LIMITED VENTILATION TO 25% ONCE EVERY 4 HOURS							COOLING
90	25% VENTILATION	25%	25%	25%	LIMIT 25% 4 HR			
85	COOLING REQUIRED FOR VENTILATION	75%	50%	25%				
70	NO RESTRICTIONS	75%	50%	25%				
68		VENTING PERMITTED, LIMIT ON RISE OF RH						
50								
40								
39	HEATING REQUIRED FOR VENTILATION	HEATING REQUIRED FOR VENTING, LIMIT ON RISE OF HR					HEATING	
25								
24	HEATING REQUIRED, VENTING REDUCED TO 25%	HEATING REQUIRED FOR VENTING, REDUCED TO 25%,LIMIT ON RISE OF RH						
1								
0	PROHIBIT							
-10								
	15%	25%	50%	52.5%	55%	57.5%	60%	
RELATIVE HUMIDITY								

FIGURE 7: Cold Climate Operation

3D. HOT CLIMATE ZONE

In Climate Mode: HOT The FAVC will provide fresh outside ventilation if the outside temperature is between 100°F and 25°F depending on if the HVAC system is in heating or cooling mode and depending on indoor relative humidity change during the ventilation cycle. During the heating season, when outdoor temperatures fall below 40°F, ventilation will be prevented until the HVAC system is active in heating. When the outside air temperature falls below 34°F, the ventilation will be restricted to 25% of the calculated time required for ventilation. When outside air temperature drops below 25°F, ventilation will be prohibited. When measured indoor relative humidity is above 50%, and the outside air temperature is at 40°F or below, ventilation will be permitted as long as the trend of relative humidity is dropping. Ventilation will be prohibited on rise in relative humidity and will not be enabled until indoor relative humidity falls below 50%.

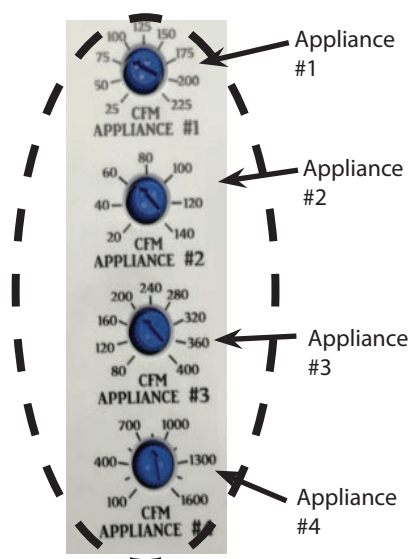
During the cooling season the relative humidity relationships change. When outside air temperature is above 85°F, ventilation will not be permitted until the HVAC system is active. Other conditions that will require the HVAC system to be active is when the measured indoor relative humidity is above 50%. When measured indoor relative humidity is between 50% and 52.5%, ventilation time will be reduced to 75% of the calculated time required for ventilation. When measured indoor relative humidity is between 52.5% and 55%, the ventilation time will be reduced to 50% of the calculated time required for ventilation. When measured indoor relative humidity is between 55% and 57.5%, the ventilation time will be reduced to 25% of the calculated time required for ventilation. When measured indoor relative humidity rises above 57.5%, the ventilation will be restricted to 25% of the calculated required ventilation time and will only occur every 4 hours as long as the humidity levels remain above 57.5%. When outside air temperature is above 90°F but below 100°F, the ventilation time will be reduced to 25% of the calculated time required for ventilation. When outside air temperature is at 100°F or above, the ventilation will be restricted to 25% of the calculated required time required and will only occur once every 4 hours until the outside air temperature remains above 100°F.

ODT	HOT CLIMATE							
100	LIMITED VENTILATION TO 25% ONCE EVERY 4 HOURS							COOLING
90	25% VENTILATION		25%	25%	25%	LIMIT 25% 4 HR		
85	COOLING REQUIRED FOR VENTILATION		75%	50%	25%			
70	NO RESTRICTIONS		75%	50%	25%			
68			VENTILATION PERMITTED, LIMIT ON RISE OF RH					
50								
40								
39	HEATING REQUIRED FOR VENTILATION		HEATING REQUIRED FOR VENTILATION. LIMIT ON RISE OF RH					HEATING
33	HEATING REQUIRED, VENTILATION REDUCED TO 25%		HEATING REQUIRED VENTILATION REDUCED TO 25%, LIMIT ON RISE IN RH					
32								
25								
24	PROHIBIT							
0								
-10								
	15%	25%	50%	52.5%	55%	57.5%	60%	
RELATIVE HUMIDITY								

FIGURE 8: Hot Climate Operation

4. OPTIONAL APPLIANCE MONITORING

The FAVC provides 4 optional monitors to optimize energy usage and ventilation efficiency based on activity of connected venting appliances. Refer to Figure 9 for optional appliance dial display and Table 4 for Appliance dial ranges and factory settings.



CFM	Type of Appliance	Settings		
		Factory	Minimum	Maximum
APPLIANCE #1	HRV/ERV or Bathroom Fan	75	25	225
APPLIANCE #2	Bathroom Fan	75	20	140
APPLIANCE #3	Clothes Dryer	200	80	400
APPLIANCE #4	Kitchen Range Hood or Draft Assisted Gas Log Fireplace	850	100	1600

TABLE 4: Appliance Dial Ranges and Factory Settings

FIGURE 9: OPTIONAL FAN MONITORING SETTINGS

The appliance monitoring connection terminal block (See Figure 1, on page 4) is used for connecting up to four (4) separate optional appliances (multiple bathroom exhaust fans, clothes dryer, range hood, etc.) for monitoring or interacting with exhaust operations. Please note any appliance can be monitored if its air flow is within the appliance dial setting range. When appliances are active, the length of time in operation and flow rate of the device are used to credit against the ventilation requirements. Dwell time for appliance #1 and 2 is 2 hours maximum. Dwell time for appliance #3 and 4 is 4 hours maximum. The appliance monitoring features are based on the following equipment devices:

- Appliance #1 – HRV/ERV or Bathroom Fan or Exhaust Fan Appliance
- Appliance #2 – Bathroom Fan
- Appliance #3 – Clothes Dryer or Central Vacuum
- Appliance #4 – Kitchen Range Hood or Draft Assisted Gas Log Fireplaces

The four optional terminal input pairs are intended for a 24VAC signal (must have a common feed). Each input pair is electrically isolated from the other pairs. Unused input pairs should be left unconnected. The associated control setting does not matter if the input is not used. The optional inputs are not required for FAVC to operate properly. Refer to Table 5 for additional information regarding normal and optional operational conditions for Appliances 1 through 4.

CONNECTION	Type	NORMAL Operation	OPTIONAL Operation
APPLIANCE #1	Bath Fan or HRV/ERV	Monitoring: (DIP 4 OFF) Contributes to ventilation whenever appliance #1 runs.	Energy Saving Mode: (DIP 4 ON) Drives Appliance #1 Fan when additional ventilation is required in lieu of Central Fan
APPLIANCE #2	Bath Fan	Monitoring	None
APPLIANCE #3	Clothes Dryer or Range Hood	Passive Make-UP Air: (DIP 3 OFF) Opens Damper whenever Appliance #3 is on. Monitoring	Active Make-UP Air (DIP 3 ON) Turns on central fan & opens damper whenever appliance #3 runs.
APPLIANCE #4	Commercial Range Hood or Gas Fireplace	Active Make-UP Air: Will run central fan with damper open when Appliance #4 is on. Monitoring	None

TABLE 5: Appliance Connection Type and Operational Condition

Appliance #1 input monitoring terminals are designated as A1 and A1C. The A1C terminal should be connected to common 24VAC power. The control setting represents the air flow rate of the appliance that is being monitored (set the CFM Appliance #1 air flow dial setting to match appliance air flow rating or measured air flow rating). If the FAVC is set to energy saving mode, the control setting represents the flow rate of exhaust appliance that is controlled by the FAVC "E" terminals (set the CFM Appliance #1 air flow dial setting to match the exhaust fan, bathroom fan or HRV/ERV device measured air flow rating). When FAVC is set to energy saving mode, the FAVC will not control the central fan on the air handler unit but will power the "E" terminals to operate a remote relay to turn ON/OFF the exhaust fan, bathroom fan or HRV/ERV devices. The air flow range for appliance #1 is 25 to 225 CFM and is initially factory set at 75 CFM.

Appliance #2 input monitoring terminals are designated as A2 and A2C. The A2C terminal should be connected to common 24VAC power. This input is typically used to monitor a bathroom fan or other suitable exhaust fan appliance. The control setting represents the air flow rate of the appliance that is being monitored (set the CFM Appliance #2 air flow dial setting to match appliance air flow rating or measured air flow rating). The Appliance #2 monitor setting will only take effect if the signal to the A2, A2C terminals is active. This will be an additional exhaust flow monitored and be added to the Appliance #1 air flow usage if present when the energy conservation mode is enabled. If energy saving mode is disabled (OFF), the total air flow usage that is monitored from appliance #1 and #2 will be credited against required ventilation based on the continuous CFM setting. The air flow range for appliance #2 is 20 to 140 CFM and is factory set at 75 CFM.

Appliance #3 input monitoring terminals are designated as A3 and A3C. The A3C terminal should be connected to common 24VAC power. This input is typically used to monitor a clothes dryer or other medium CFM suitable exhaust fan appliance. The control setting represents the air flow rate of the appliance that is being monitored (set the CFM Appliance #3 air flow dial setting to match appliance rating or measured air flow rating). The air flow range for appliance #3 is 80 to 400 CFM and is factory set at 200 CFM. The input signal for appliance #3 is used for ventilation control by the FAVC in two different modes depending on DIP Switch 3 position. This feature is shipped OFF (DISABLED) from the factory. If the DIP Switch 3 is set to:

- ON - The FAVC will directly control the central fan whenever appliance #3 input terminal is energized. When active, appliance #3 will override the temperature and humidity limits.

- OFF - The FAVC will accumulate run time of exhausting appliance whenever appliance #3 input terminal is energized based on dial setting for CFM Appliance #3 and use this information to decide if minimum ventilation requirements have been met or adjust ventilation time-on duration on the next ventilation cycle.

Appliance #4 input monitoring terminals are designated as A4 and A4C. The A4C terminal should be connected to common 24VAC power. This input is typically used to monitor a kitchen range hood, draft assisted gas log fireplaces or other large CFM suitable exhaust fan appliance. The control setting represents the air flow rate of the appliance that is being monitored (set the CFM Appliance #4 air flow dial setting to match appliance rating or measured air flow rating). The air flow range for appliance #4 is 100 to 1600 CFM and is factory set at 850 CFM. Whenever appliance #4 input terminal is energized, the FAVC "V" (ventilation device) and "E" (exhaust fan device) output terminals are energized and the central fan is turned on. This will force fresh air ventilation and air recirculation for as long as appliance #4 is active. The FAVC will calculate a dwell time based on Appliance #4 CFM rate and length of operation of Appliance #4. When active, appliance #4 will override the temperature and humidity limits.

5. MAKE-UP AIR OPTIONS - DIP Switch 3

The FAVC is equipped with two make-up air features for use with high flow exhaust appliances such as kitchen range hoods, clothes dryers, and draft assisted gas log fire places. The primary make-up air function is associated with appliance #4. When a signal is present on appliance #4 terminals, (A4 and A4C), the fresh air damper will open and the central fan will run. The secondary make-up air function is associated with appliance #3. This feature is configurable with dip switch 3. With the dip switch 3 set to off (default), will set the appliance #3 in a passive ventilation mode, such that only the fresh air damper will open when the appliance #3 is active. To select the make-up air mode for appliance #3, set dip switch #3 to on. When appliance #3 is active, the fresh air damper will open and the central fan will run. Refer to Figure 10 and 11 to set dip switch 3.

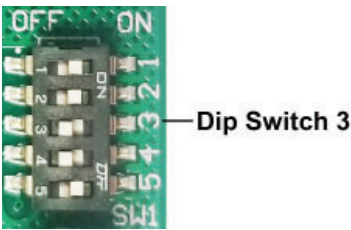


FIGURE 10: DIP Switch3

DIP 3	FUNCTION
ON	FAN CYCLES WITH APPLIANCE #3 INPUT
OFF	FAN DOES NOT CYCLE WITH APPLIANCE #3 INPUT

FIGURE 11: DIP Switch 3 FanActivity with Appliance #3

6. ENERGY SAVING OPTION - DIP Switch 4

Energy Saving Mode is a configurable feature designed to allow the FAVC to control or not to control the central fan during a call for ventilation when the thermostat is not in a heating or cooling mode condition. If energy saving mode is ON (ENABLED) and the thermostat requires a heating or cooling action, the CFM Heat Vent and CFM Cool Vent dial rates for heating and cooling modes are used in combination with CFM continuous dial rate to determine if the HVAC has operated long enough to meet the ventilation requirement. If the heat or cooling run time driven by the thermostat does not meet the required ventilation run time for the heat/cooling event, the FAVC will keep the fresh air damper open and activate the auxiliary exhaust device once the central fan has shut down due to the thermostat control call. In specific terms, the vent (V) and auxiliary fan (E) terminals of the FAVC will remain active based on the required time to meet ventilation requirements using the Appliance #1 flow rate setting.

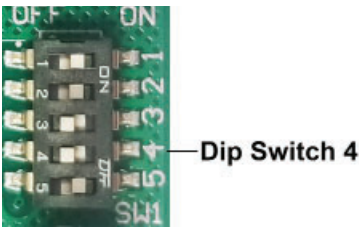


FIGURE 12:
Energy Saving DIP Switch 4

ENERGY SAVING MODE	
DIP 4	FUNCTION
ON	ENERGY SAVINGS MODE, EXHAUST FAN CONTROL
OFF	DISABLED

FIGURE 13: DIP Switch 4
Energy Saving Mode

To ENABLE Energy Saving Mode, set DIP Switch 4 to ON (ENABLE) to allow the FAVC to not control the central fan during a call for ventilation. In the ENABLE mode, the FAVC will independently energize the vent (V) and auxiliary fan (E) terminals when fresh air ventilation is required; and the HVAC system is not running. Refer to Figure 12 and Figure 13 for DIP Switch 4 setting to configure FAVC central fan control during a call for ventilation function.

This is ideal for use with an ERV/HRV system or to remote control a bathroom fan or exhaust fan. The FAVC will operate the central fan of the air handler under specific conditions, regardless if energy saving mode is ON or OFF:

- Condition 1 If the thermostat has had no calls for heat or cooling with in a 4-hour time period, the FAVC will cycle the central fan for one ventilation time period,
- Condition 2 If appliance #3 has input monitoring event and DIP Switch 3 is set to ON, the central fan will operate whenever the appliance #3 is turned on, or
- Condition 3 If appliance #4 has an input monitoring event, the central fan will operate whenever appliance #4 is turned on.

With the Energy Saving Mode OFF (DISABLED), the FAVC will turn ON the central fan and activate the vent (V) terminal for all ventilation requirements even if the thermostat is idle or off.

7. REMOTE CONTROL - Dip Switch 5 (ON-OFF Feature)

7A. REMOTE ON/OFF FEATURE

The FAVC control can be turned off by using one of two methods.

TWO DIAL METHOD:

The first method will require you to write down the cool vent and heat vent settings and then set both controls to their lowest setting (all the way counterclockwise). The FAVC may take up to 15 to 20 seconds to shut down. The outdoor temperature status LED will turn off when the FAVC has been disabled. Note that if appliance #4 is used and a signal is present on its terminals, the FAVC will permit the makeup air function as this is a required function.

MANUAL SWITCH METHOD:

The second method that is only available on the Generation 2 models which are equipped with a 5 position dip switch and the additional RA and RB terminals is an on-off function. This will eliminate the need to change the cool vent and heat vent settings as they can remain as is. The FAVC can be turned off by setting SW1 position 5 to the off position. To turn the FAVC back to on, or to bypass the remote on-off feature, set SW1 position 5 to on.

REMOTE ON-OFF FUNCTION WITH MANUAL SWITCH METHOD:

This method will allow the means to turn off the FAVC from a switch mounted at a convenient location. Place the SW1 position 5 switch to the off position. Connect a pair of wires, one to the RA and the other to the RB terminals. The other end of the wires can be connected to a wall mounted switch (note that this is a low voltage 24VAC signal at 5mA current, do not run this with line voltage wiring). The Remote on-off feature is ideal if the FAVC control is mounted in the attic or in a difficult to reach location. The FAVC will take up to 10 seconds before it will turn off. When the FAVC is off, the outdoor temperature LED will turn off. Note: if the appliance #4 is used, any signal applied to the appliance 4 terminals will permit makeup air to be active such that the damper will open, and the central fan will turn on).

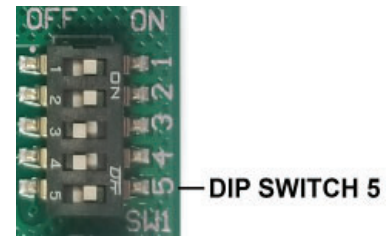


FIGURE 14:
DIP Switch 5

7B. LED OUTDOOR TEMPERATURE STATUS (COLOR CHANGES FLASHES)

The LED indicates several conditions. When the LED is green in color it indicates that the outdoor temperature is suitable for ventilation without the need of heating or cooling to be active and if the indoor humidity is at or below 50%. If the humidity is above 50% the LED will flash from green to red or green to blue depending on the outdoor temperature.

The LED when off may indicate several conditions. No power to the control, the outdoor temperature sensor is not connected properly or that the FAVC has been turned off by one of two methods described above. When turning on the FAVC when it has been turned off by remote or SW1 position 5 is changed from off to on, there will be a delay before the LED turns on (approximately 10 -15 seconds)

8. INSTALLATION

8A. INSTALLATION LOCATIONS

8Ai. FAVC location

The Fresh Air Ventilation Controller (FAVC) has been designed to install directly to the return air plenum of your HVAC system, refer to Figures 15 and 16 for additional installation information. The FAVC can be installed on the wall in the return air stream as close to the return air vent of HVAC system when the small room is designed to act as a return air plenum using the optional FAVC mounting bracket (Field Controls P/N: 602600150), refer to Figure 17 for return air closet installation information.

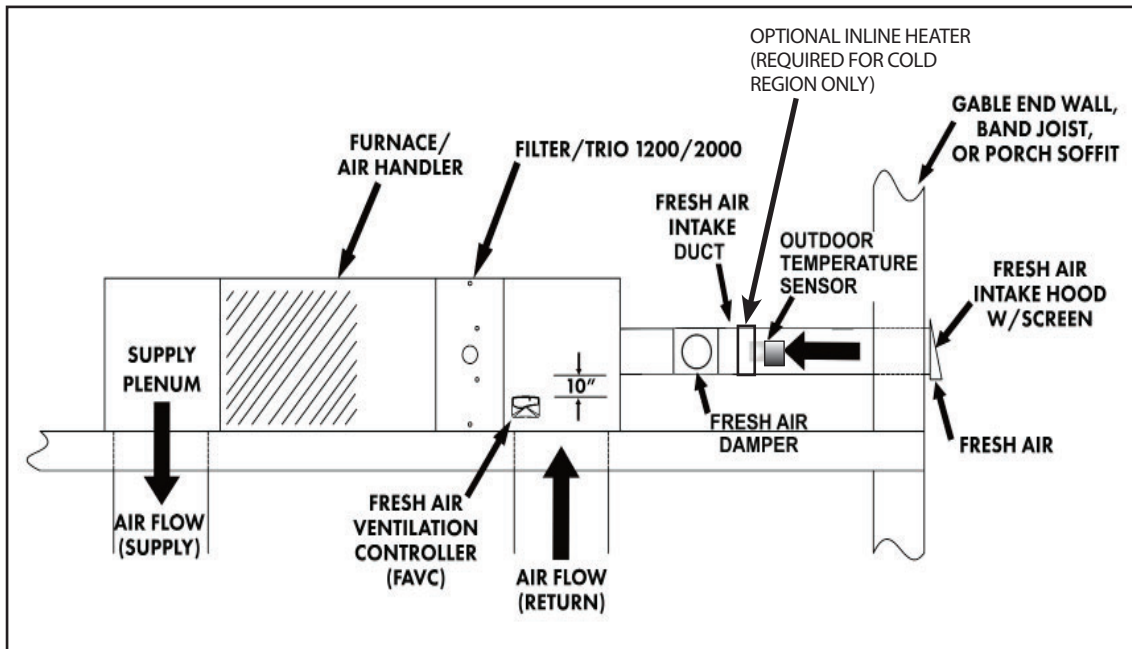


FIGURE 15 - Attic/Horizontal Air Handler Installation

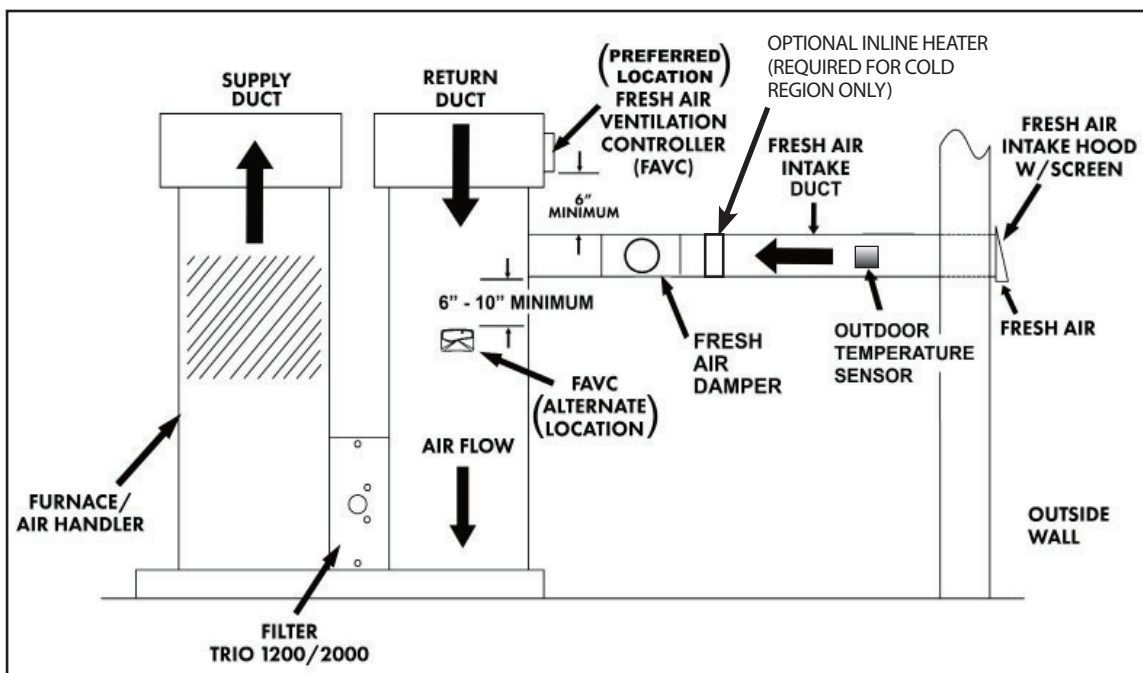


FIGURE 15 - Basement/Vertical Air Handler Installation

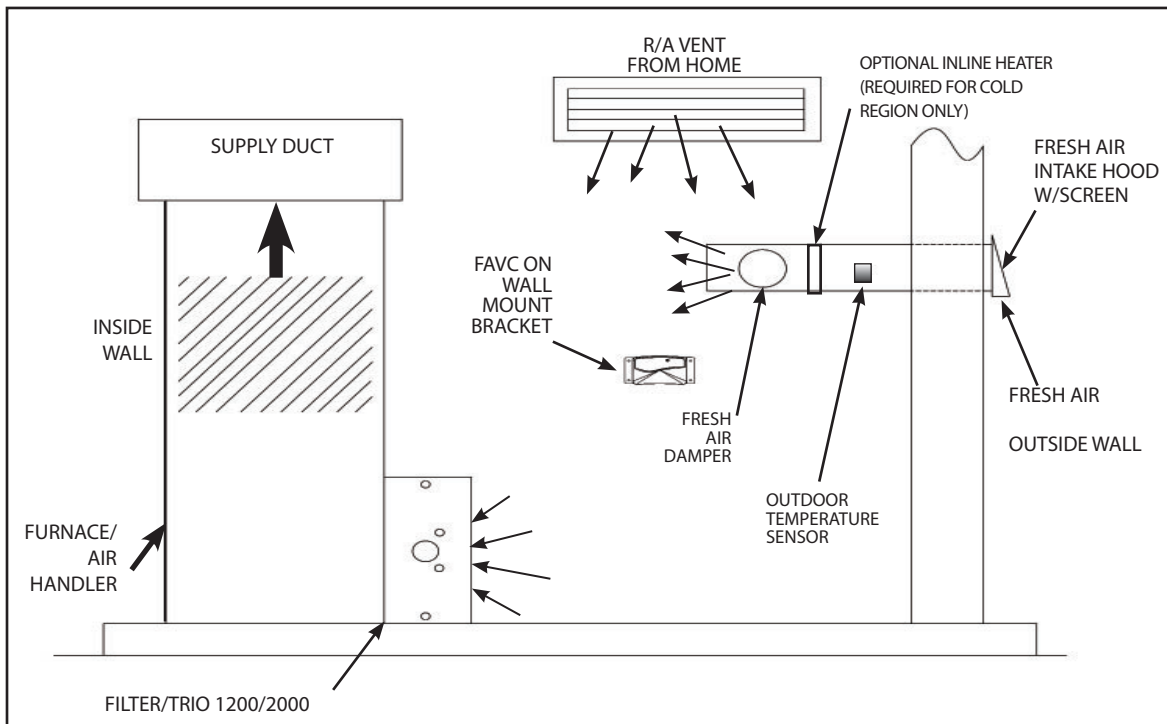


FIGURE 17 - Return Air Closet Installation

8Aii. FAVC Mounting

After a mounting location for controller has been selected, affix the hole template provided with FAVC installation kit, Figure 18 (dwg: 780101300) to return air plenum and mark the locations for two mounting holes and sensor hole. Drill two 0.136" diameter holes in metal ductwork for securing the controller with two #8 sheet metal screws. Drill a 1-1/2 inch diameter hole (or penetrate the ductwork and cut a 1-1/2 inch square hole) in ductwork to allow the controller's Humidity/Temperature Sensor to sense actual return air duct environmental conditions. The Humidity/Temperature sensor extends out from the back of the controller plastic case. Refer to Figure 18 for exploded view of FAVC unit mounting to ductwork.

! WARNING: The controller is provided with pre-installed gasket material around the sensor. Do not install controller without gasket seal material installed.

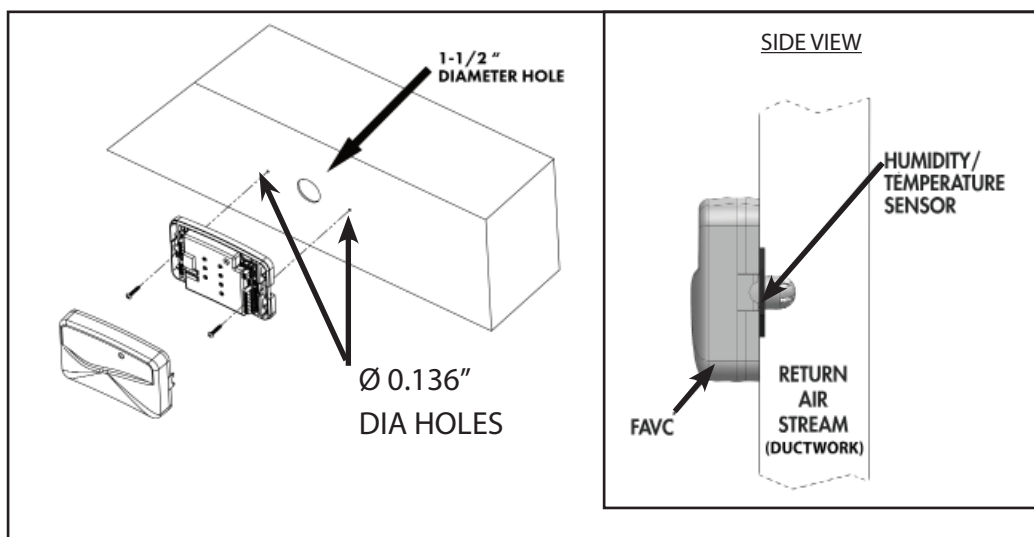


Figure 18: FAVC Mounted Directly to Ductwork

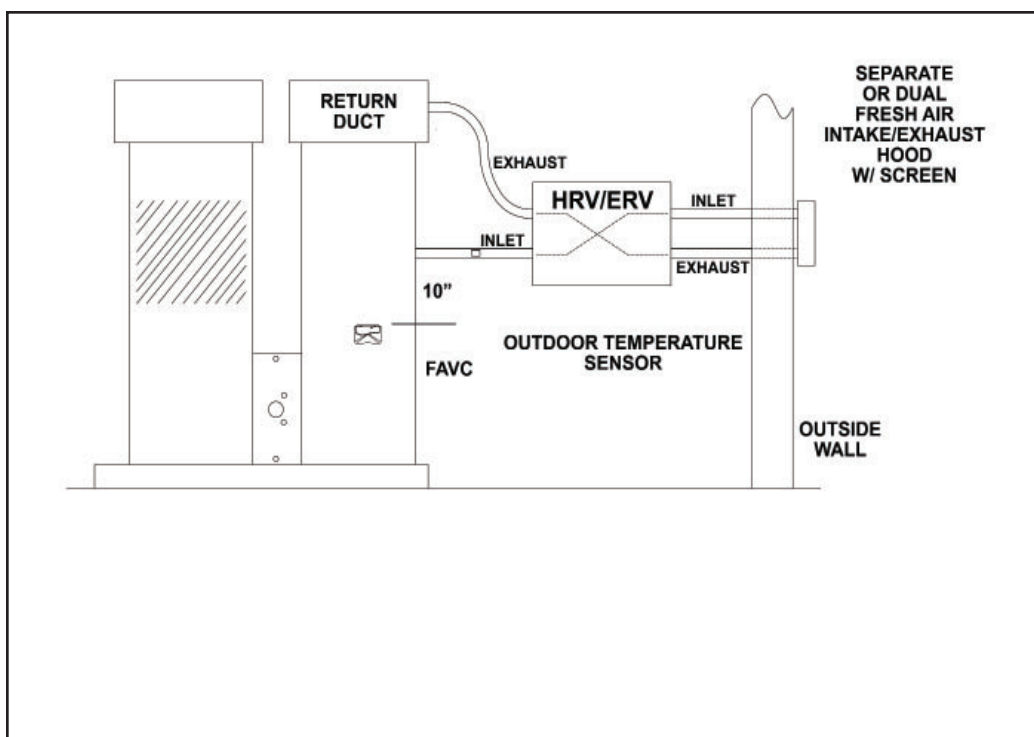


FIGURE 19 - Example of Template for FAVC Mounting (NOT TO SCALE)

8Aiii. Intake Air Connection and Duct Installation

ASHRAE recommends that the fresh air intake be located at least 10 feet from any source of pollutants such as auto exhaust, dryer exhaust, exhaust from any fuel-burning appliance, etc. Avoid installation near odor sources such as garbage bins or barbecue grills. A minimum of 3 foot above ground is recommended to avoid ingress of leaf litter, grass clippings, etc. Do not use a crawl space, basement or attic as a source of intake air. Always be sure to comply with local building code requirements regarding fresh air inlets.

Ductwork Specification

- All flexible ducts must meet UL safety standards for Class I air ducts and connectors.
- All ducting must be installed according to HVAC codes and standards.
- All duct connections should be sealed with UL181 foil tape or mastic to prevent leakage.
- Insulated duct of at least R-4 insulating value with a continuous vapor barrier must be used for the intake duct. The vapor barrier must be sealed at both ends.
- Exterior intake should be installed above snow line or a minimum of 18" above ground level, whichever is greater.
- Exterior intake hood must be weather resistant and must have a screen (1/4" openings) to prevent debris, animals and insects from entering ductwork.

8Aiv. Fresh Air Damper (FAD) or HRV/ERV location

The fresh air damper (FAD) can be located anywhere in the fresh air inlet duct. Minimize the length of the inlet duct to improve airflow and improve system efficiency. It is recommended that the damper be as close to the return air plenum as possible, and that the inlet duct connect to the return plenum upstream of the system filter, and downstream of any duct-mounted sensors. The HRV/ERV unit should be installed in an area where the air is tempered to avoid freezing of the condensate line. The contractor should install the unit in an area that is very accessible to allow the homeowner easy access for maintenance.

It is very important to install an electric receptacle (115V) near the HVR/ERV, a separate circuit breaker is also recommended. You should have access to a condensate drain near the HRV/ERV to avoid the use of condensate pump.

As a minimum, double the continuous ventilation flow rate for sizing the HRV/ERV product. Use the HRV/ERV air flow rate as the CFM HEAT and CFM COOL dial setting on the FAVC unit.

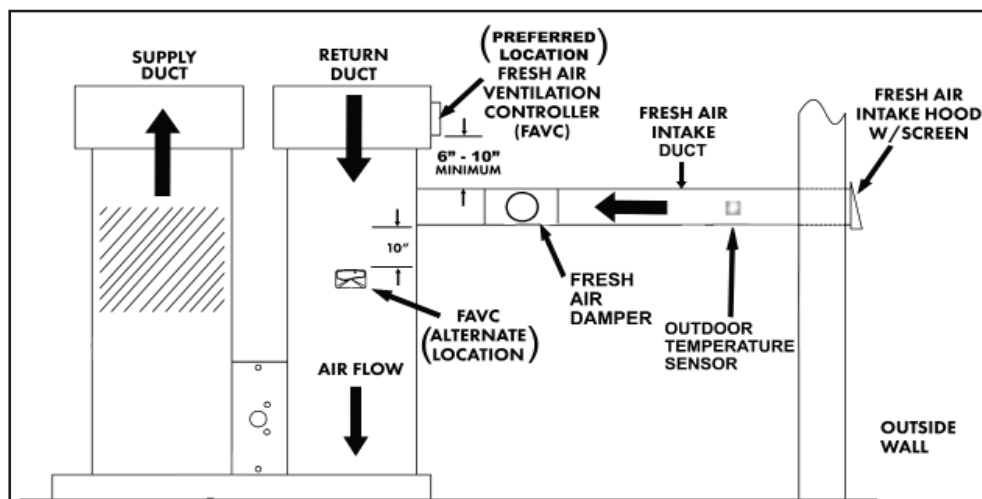


FIGURE 20 - Fresh Air Damper (FAD) and Fresh Air Intake location

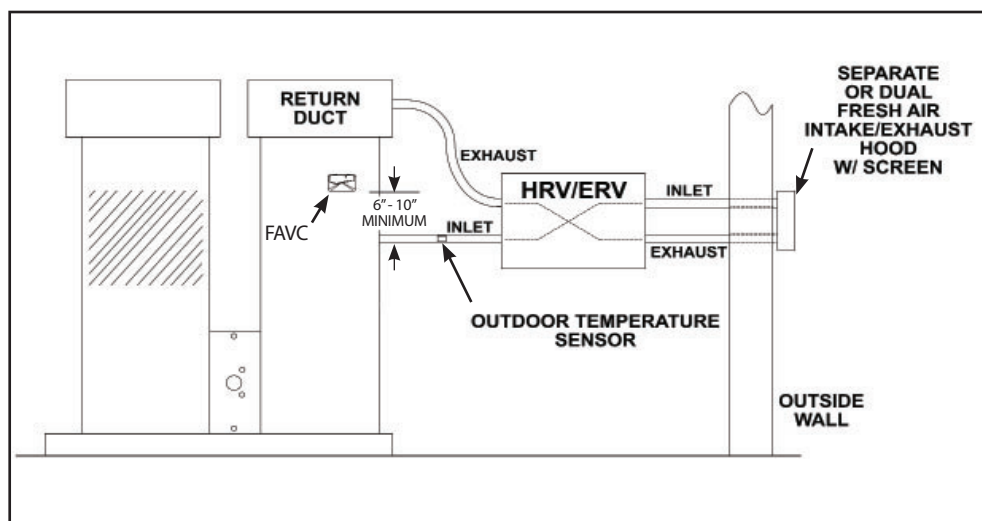


FIGURE 21 - ERV/HRV and Fresh Air Intake location

8B. WIRING AND CONNECTIONS

This area is used to fine tune actual operating conditions by manually setting DIALS to match actual appliance or operational condition to provide fresh air ventilation all year round to meet ASHRAE 62.2 Ventilation Standards while providing energy conservation, better indoor air quality and keeping comfort in mind. Refer to TABLE 1 for Air Flow Dial ranges and Factory Settings.

The first three dial settings (CFM Continuous, CFM Cool Vent and CFM Heat Vent) on the FAVC are used for computing the continuous ventilation run time and dwell time based on ASHRAE 62.2 Standard. The cycle rate is fixed at 30 minutes. Refer to Figure 2 for ventilation only required dials.

Adjust the setting on the FAVC for the CFM Continuous dial to match the continuous ventilation rate for your dwelling per VENTILATION SETTINGS section, starting on page 5. The CFM Continuous rate is initially factory set at 100 CFM.

The Cool Vent and Heat Vent dial settings allows for two different settings if the air handler is equipped with an ECM blower that may operate at different fan speeds for cooling and for heating modes. If the system is a heat pump, the FAVC will automatically detect if the system is operating in cooling or heating based on the outdoor air temperature and the return air temperature. Each heating and cooling cycle is monitored on the Y terminal; minimum and maximum temperatures are also recorded to anticipate the next call for heating or cooling. Conventional systems or heat pumps with auxiliary heat, the W terminal will indicate if the system is in heating mode of operation. The CFM Cool Vent and CFM Heat Vent rates are initially factory set at 400 CFM each.

For basic ventilation wiring requirements using Fresh Air Damper (FAD) or HRV/ERV devices, refer to Wiring Diagram 1 for Conventional Heat and Cool Systems with FAD, Diagrams 2A & 2B for Single or Dual Heat Pump systems with FAD, Diagram 3 for Conventional Heat and Cool System with HRV/ERV. Refer to Diagrams 4 & 5 when adding optional appliance monitoring and/or control features.

8Bi. Ventilation Control Connectors

The FAVC has two isolated outputs for control of a fresh air damper and a remote relay to control an exhaust fan (auxiliary fan for balanced ventilation or a bath fan). The Vent and Exhaust Fan terminal block is in the VENT AND EXHAUST VENTILATION CONTROL CONNECTION area of the FAVC as shown in Figure 1 and Figure 22. The terminals for the ventilation damper are labeled with a V; and the terminals for the exhaust fan are labeled with an E. Both sets of terminals are compatible with all types of ERV/HRV systems that use dry contact or DC signals. The V terminals can be used to activate an ERV/HRV unit if placed into intermittent fan operation. Some ERV/HRV units can be configured to operate as two speed where the low speed will run continuously and the high speed is activated by dry contacts. If the flow rate of the low speed operation is measured, it can be subtracted from the required continuous cfm rate on the primary control. The high-speed rating can be used for both Cool and Heat vent CFM values if a fresh air damper is not used. Both, the V and E terminals are isolated from the 24 VAC supply (dry contact form), one terminal of the pair must be connected to the R (24VAC) power side of the supply transformer to control the fresh air damper or the remote relay to operate a fan. Both V and E terminals will be active during ventilation calls.



FIGURE 22: Vent and Exhaust Control Connections (Rotated 90°)



WARNING: Under no circumstances shall line voltage be wired to these terminals. This product is rated for Class 2 low voltage use. Ratings: 24VAC (3A max load). Dry contact compliant, and suitable for up to 24VDC (3A max load).

8Bii. Thermostat and Air Handler Connections

The FAVC has 5 terminals to interface between the thermostat and air handler. The Thermostat and Air Handler terminal block is in the THERMOSTAT AND AIR HANDLER CONNECTION region of the FAVC as shown in Figure 1 and Figure 23. The terminal designations are as follows:

- C is the common
- Y is the compressor signal from the thermostat
- W is the heat signal from the thermostat
- GT is the fan signal from the thermostat
- GF is the fan signal to the Furnace or air handler
- R is the 24VAC hot

The FAVC will require connections to the Y terminal in order to optimize ventilation usage as this signal is used to allow ventilation if cooling is required or heating is required (Heat Pump ONLY). If your system is a dual fuel heat pump, the W terminal may be used to monitor heating. Conventional heat/cool units will require both Y and W terminals to be connected. The GT signal may be used to invoke a ventilation cycle only if humidity or outdoor temperatures are adequate for ventilation in the compressor or heating is not active.



FIGURE 23:
Thermostat and Air Handler
Terminal on FAVC (Rotated 90°)

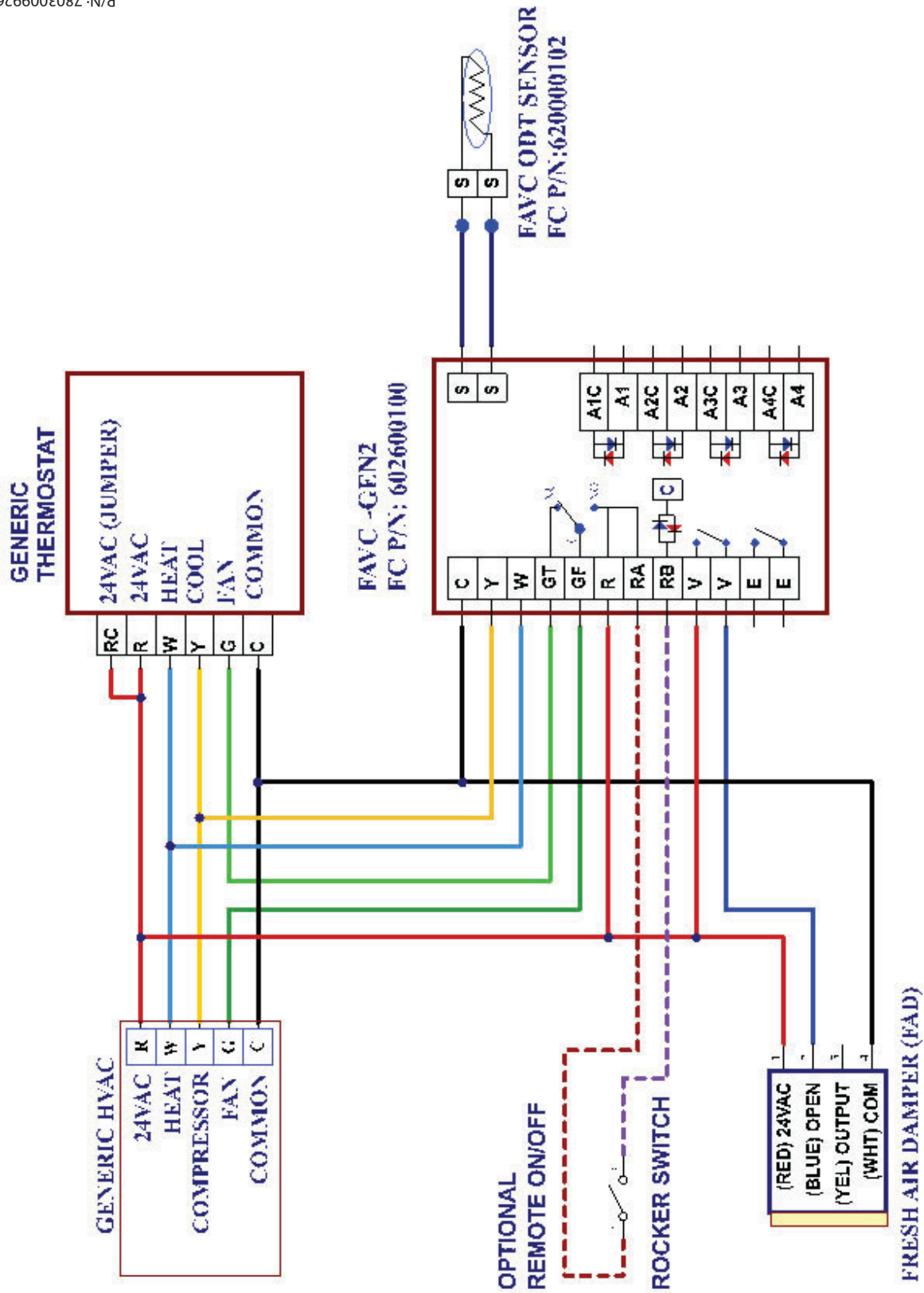


DIAGRAM 1: CONVENTIONAL HEAT AND COOL Wiring Diagram
(Thermostat, Air Handler, FAVC, ODT Sensor and Fresh Air Damper)

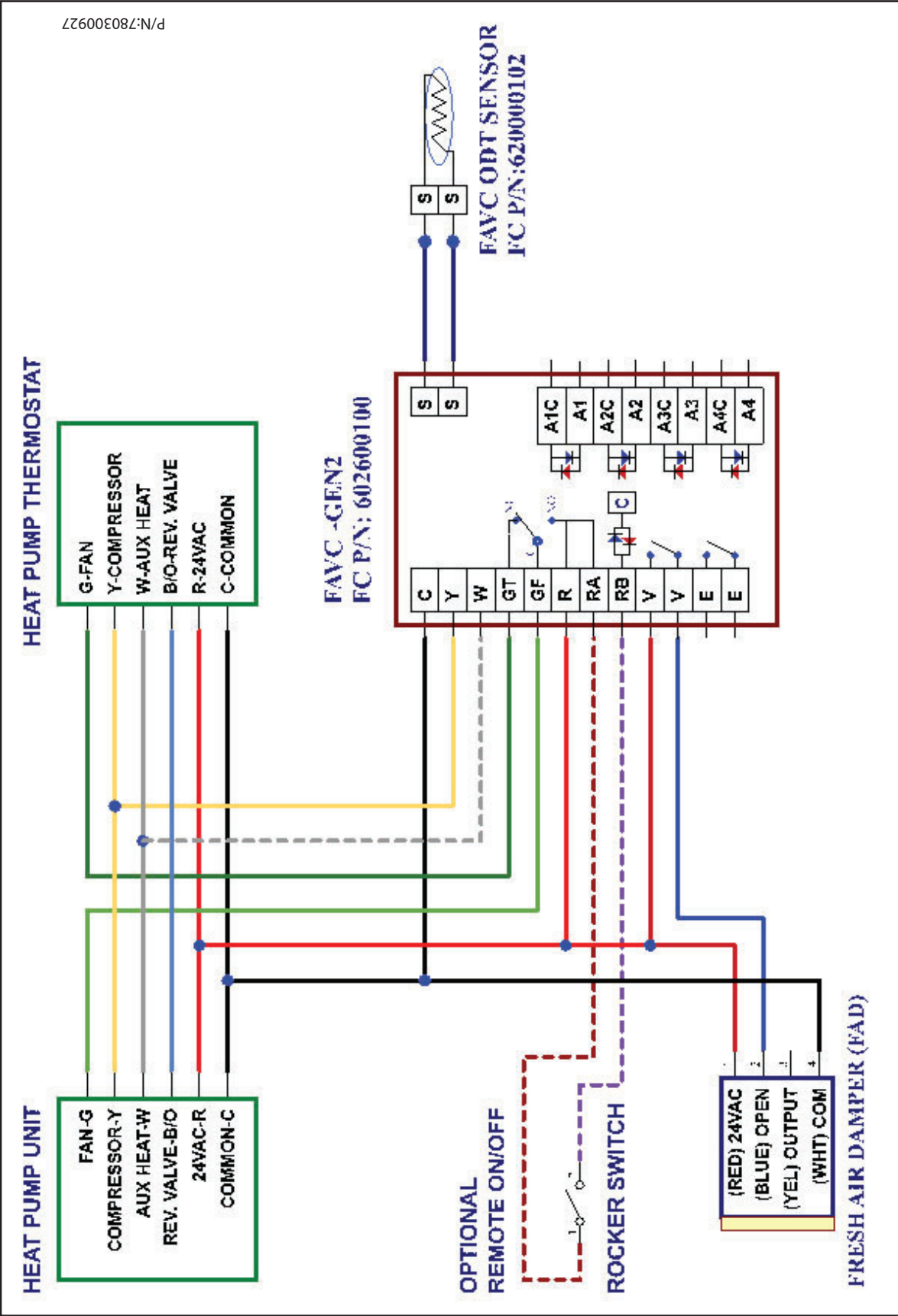
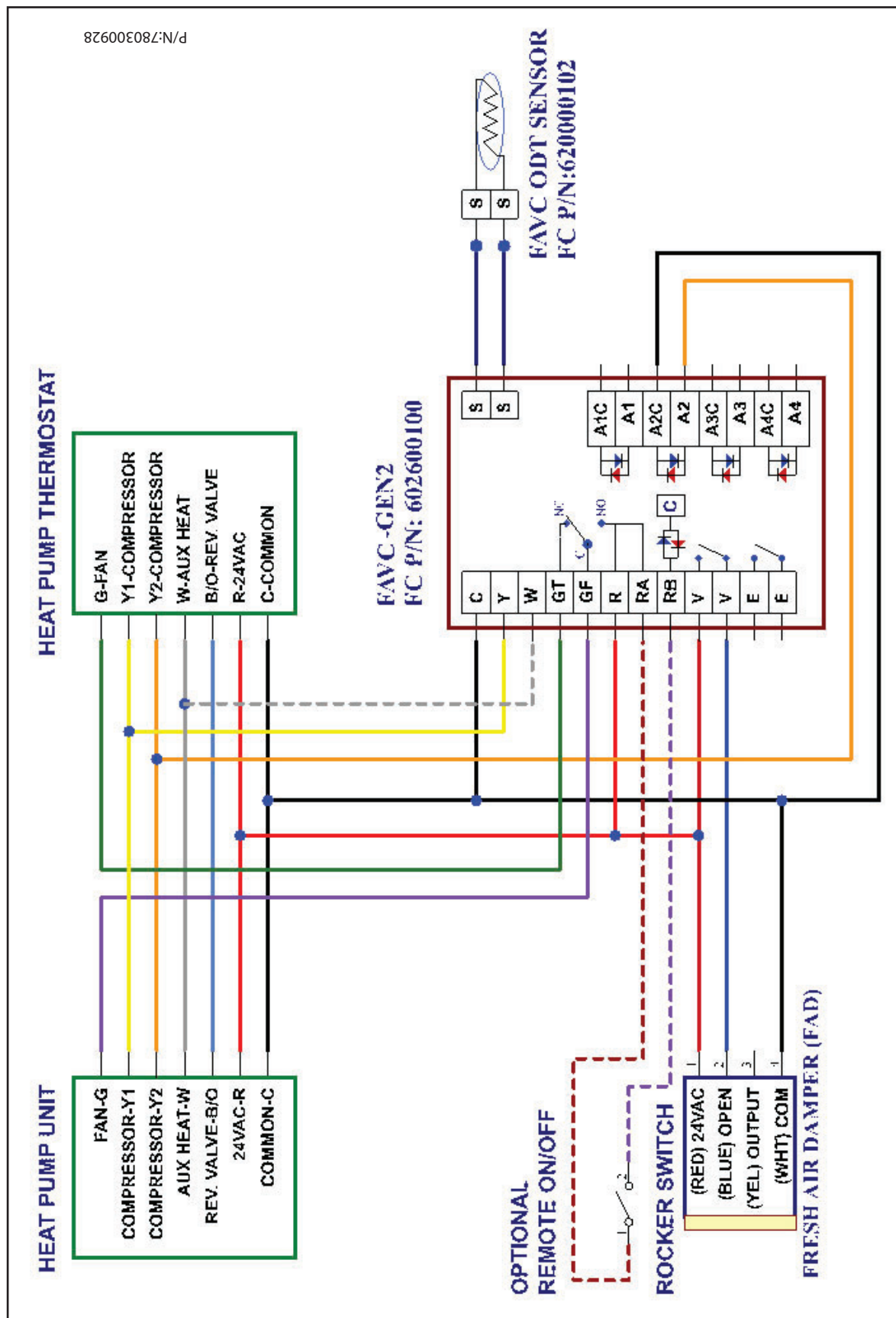
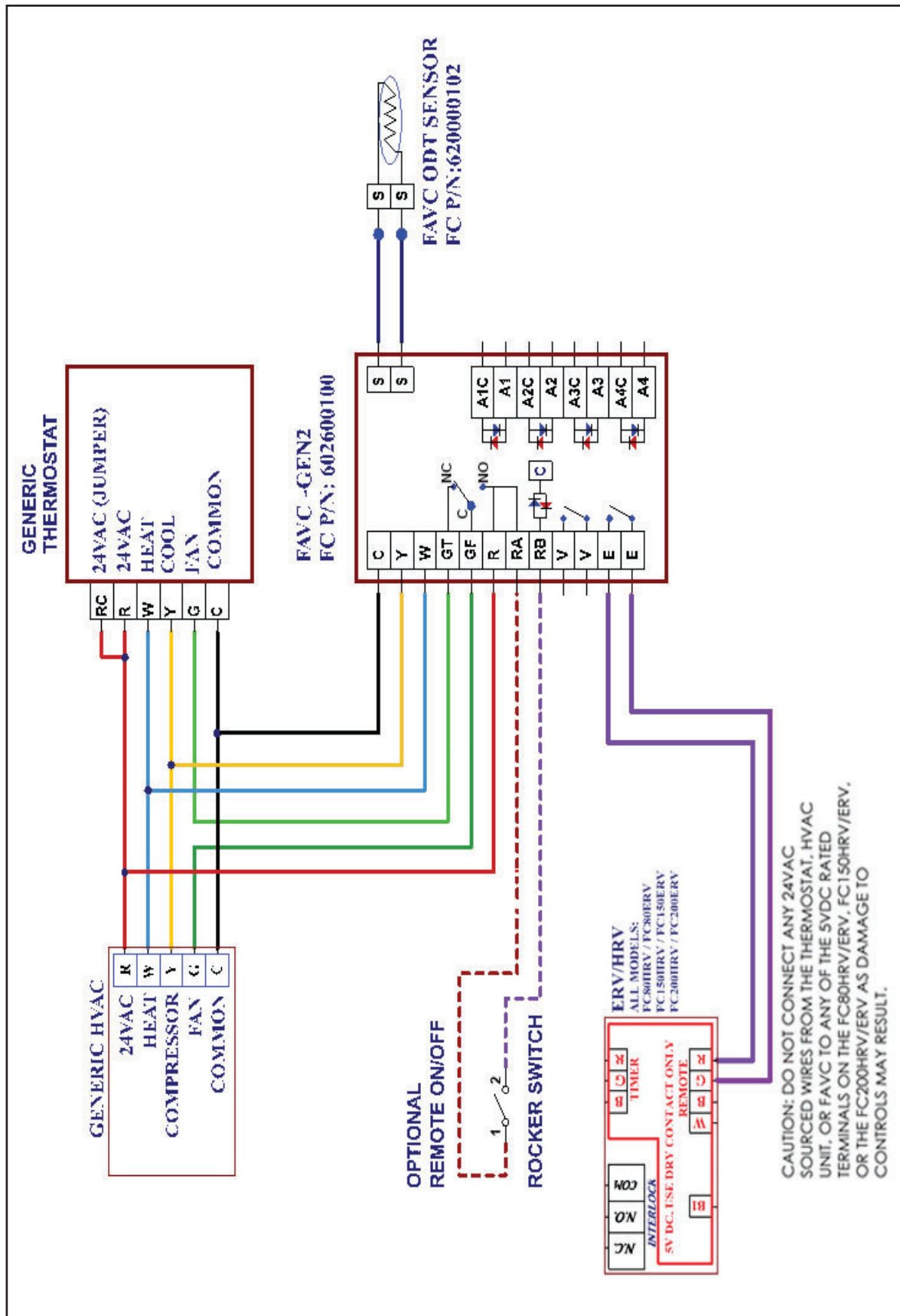


DIAGRAM 2A: SINGLE STAGE HEAT PUMP Wiring Diagram
(Thermostat, Air Handler, FAVC, ODT Sensor and Fresh Air Damper)



P/N: 780300928

DIAGRAM 2B: 2 STAGE HEAT PUMP Wiring Diagram
(Thermostat, Air Handler, FAVC, ODT Sensor and Fresh Air Damper)



8Biii. Outdoor Temperature Sensor (ODT) Connection

The FAVC uses an Outdoor Temperature (ODT) Sensor to monitor ventilation temperatures passing into the ventilation duct from the outside of the dwelling. The Outdoor Temperature Sensor terminal block is in the OUTDOOR TEMPERATURE SENSOR CONNECTION area of the FAVC as shown in Figure 1 and Figure 23. Terminals are marked with an "S". The ODT sensor is supplied with the FAVC and **MUST BE INSTALLED** for the FAVC to operate properly. The best location to mount the ODT sensor is next to the fresh air damper on the side wall of the duct. Location on duct should be between the fresh air damper and the outside vent hood or between inline duct heater and outside vent hood in cold region applications (Refer to Figures 14, 15 and 16). Refer to Figure 20 with HRV/ERV equipment for ODT sensor location. Drill a 1/4 inch diameter hole and insert the sensor probe into the vent duct and seal with metal duct tape. The ODT sensor is not polarized therefore, it does not matter which wire is connected to either "S" terminals.

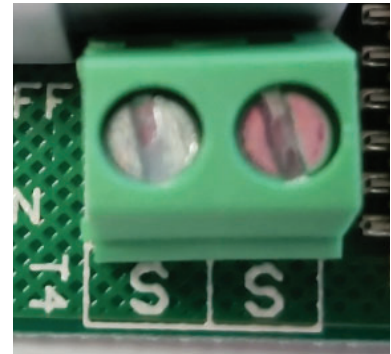


FIGURE 23:
Outdoor Temperature
Sensor Connection
(Rotated 90°)

8Biv. Outdoor Temperature Sensor LED Status

The FAVC will provide status via a three color (Red, Green or Blue) LED to indicate outside air temperature meets ventilation requirements or if ventilation will be limited due to temperature or humidity levels. Refer to FIGURE 24, Green indicates outside air meets ventilation requirements without restrictions. Red indicates the outside temperature is greater than or equal to 90°F, too hot for ventilation and may be restricted to 25% or prohibited when outside temperature reaches 100°F. Blue indicates the outside air temperature is less than 40°F, is too cold for ventilation and may require heating to be active, restricted or prohibited. The LED may turn blue in color if the plenum low temperature is reached. If the LED is off, this would indicate there is no power or there is a fault in the sensor or sensor wire connection. The LED may be off for first 15 seconds after power is applied to FAVC.



FIGURE 24: Outdoor
Temperature (ODT) LED

8Bv. Appliance Monitoring Connections

Optional Control Functions

The FAVC can combine an optional control function to activate multiple exhausting fan devices which are monitored for ventilation accumulation runtime across Appliances #1 and 2 terminals. The optional output control terminals are designated as pairs and are intended for a 24VAC signal (must have a common feed). For device control purposes, always use the exhaust device terminals (E,E) for wire connections and install a separate 120/24VAC transformer to supply isolated 24VAC control power. A separate 24VAC relay (AUBE RC840) should be used in the power circuit (120 VAC) to drive the exhausting fan device.

Refer to section 4 for the settings for Appliance Monitoring

The terminal block is used for connecting up to four (4) separate optional appliances (multiple bathroom exhaust fans, clothes dryer, range hood, etc.) for either tracking or monitoring of exhaust operations. Please note any appliance can be monitored if its air flow is within the appliance dial setting range. The appliance monitoring features are based on the following equipment devices:

Appliance #1 – HRV/ERV or Bathroom Fan or Exhaust Fan Appliance

Appliance #2 – Bathroom Fan

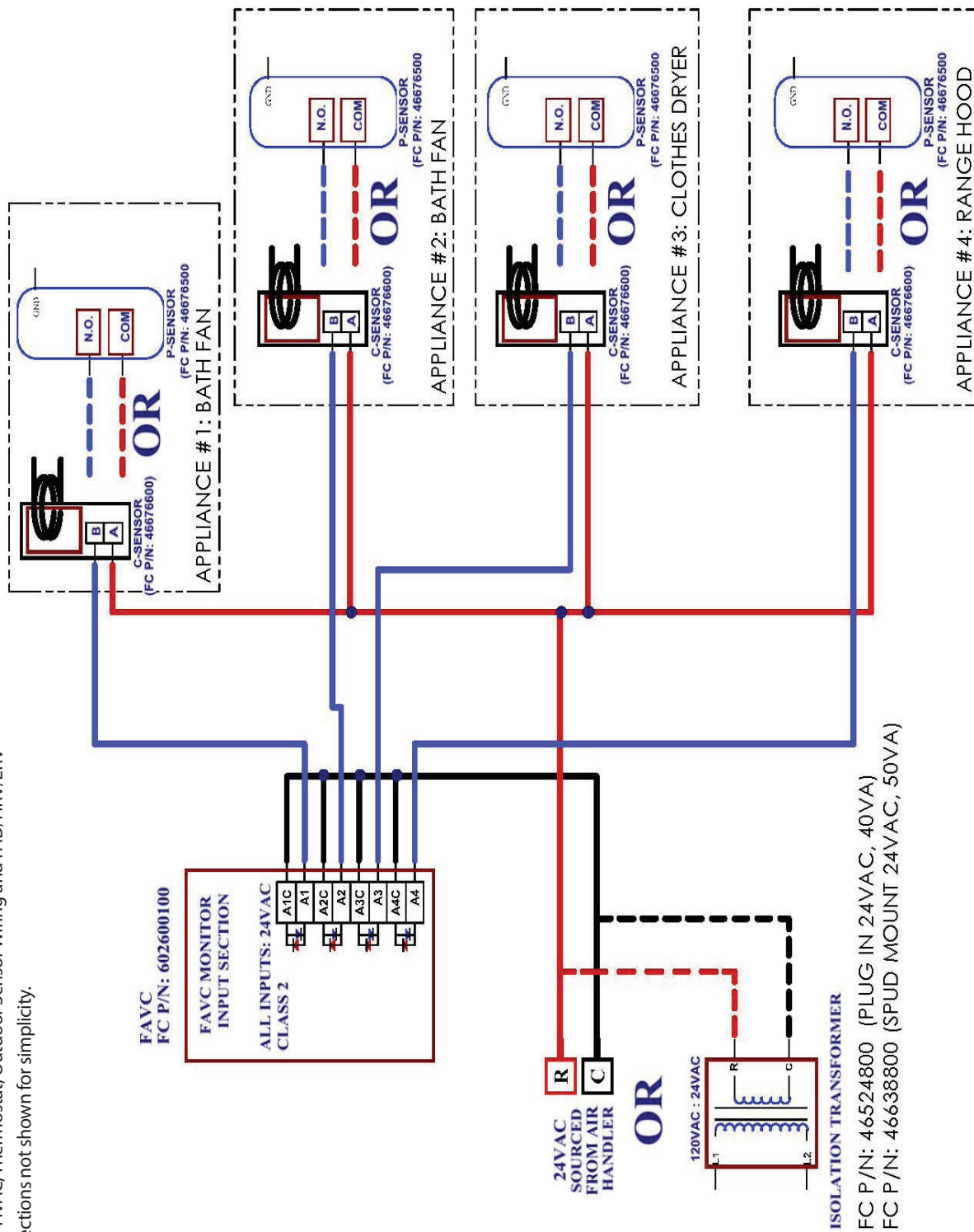
Appliance #3 – Clothes Dryer or Central Vacuum

Appliance #4 – Kitchen Range Hood or Draft Assisted Gas Log Fireplaces

The FAVC can combine an optional control function to activate multiple exhausting fan devices which are monitored for ventilation accumulation runtime across Appliances #1 and 2 terminals. The optional output control terminals are designated as pairs and are intended for a 24VAC signal (must have a common feed). For device control purposes, always use the exhaust device terminals (E,E) for wire connections and install a separate 120/24VAC transformer to supply isolated 24VAC control power. A separate 24VAC relay (AUBE RC840) should be used in the power circuit (120 VAC) to drive the exhausting fan device.

Refer to sections 5 & 6 for more information about Make Up Air and Energy Saving options. Additional features may be engaged using Dip Switches 3 & 4 as referenced in sections 5 & 6.

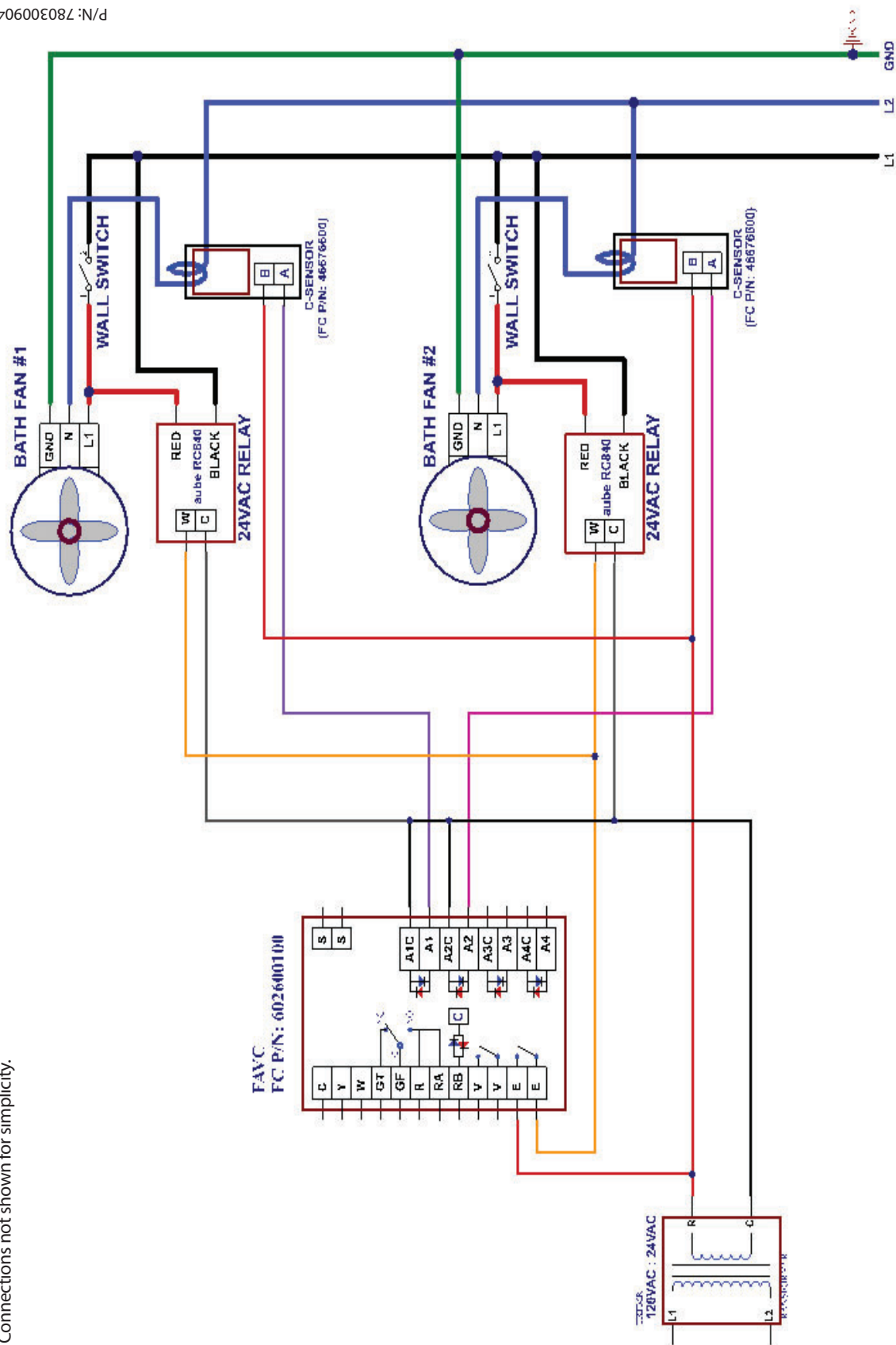
NOTE: HVAC, Thermostat, Outdoor Sensor Wiring and FAD/HRV/ERV Connections not shown for simplicity.



P/N: 780300903

DIAGRAM 4 Appliances 1 thru 4 Monitoring Connections using Current or Pressure Sensors

NOTE: HVAC, Thermostat, Outdoor Sensor Wiring and FAD/HRV/ERV Connections not shown for simplicity.



P/N: 780300904G2

DIAGRAM 5: Control and Monitoring Appliances using Current or Pressure Sensors and External Aube Relay

9. MAINTENANCE AND TROUBLESHOOTING

Follow individual exhaust fan device manufacturer's troubleshooting and maintenance information.

There is no routine maintenance required for the FAVC (controller) other than making sure the wires connected to the FAVC terminals are secure and the screws holding the unit to ductwork is tight.

Field Controls Technical Support is available Monday-Friday from 8:00 am to 5:00 pm (EST) at 800.742.8368 or by email at fieldtec@fieldcontrols.com for further assistance. To reprint a copy of the latest revision of this manual, visit www.fieldcontrols.com to download.

SYMPTOM		TROUBLESHOOTING PROCEDURE
Central fan turns on unexpectedly		If ventilation requirement has not been met, the FAVC will activate the central fan. This is normal operation.
The fresh air damper does not open during call for ventilation.		<ul style="list-style-type: none"> • Damper is not plugged in or properly wired. Check connector and wiring connections. • Outdoor temperature is outside the operating limit temperatures for fresh air ventilation • Indoor RH is above humidity limits for fresh air ventilation
FAVC controller LED is: Green		Green LED indicates outside air meets ventilation requirements without restrictions. This is normal, system will function normally.
Blue		Blue LED indicates the outside air temperature or return air plenum air temperature is less than 40°F. In this condition, fresh air ventilation is prohibited.
Red		Red LED indicates the outdoor air temperature is greater or equal to 90°F and may restrict ventilation to 25%. If temperature rises to 100°F, fresh air ventilation is prohibited.
No Color		No color LED indicates no power 24VAC power or common from HVAC system or faulty ODT sensor:
<u>ODT Sensor</u>	<u>OHM Measurement</u>	1. Check 24VAC power from HVAC/thermostat. 2. Check wire connections to/from HVAC/Thermostat to FAVC at terminals. 3. ODT Sensor - Check wire terminal connections. Check wire nut connections. Disconnect ODT wires from S terminals and perform ohmmeter check on based on temperature vs ohm readings. (Chart to left) If ohm readings do not match temperature scale, replace ODT1 sensor.
100°F	5861	
80°F	9116	
60°F	13926	
40°F	26207	
20°F	46673	
Central fan does not turn on during fresh air damper ventilation and appliance operation		The FAVC DIP Switch 4 is set to ON (Energy Saving Mode). The controller will turn on/off appliances and fresh air damper to meet ventilation requirements. This is normal.

10. SPARE PARTS AND OPTIONAL ACCESSORIES

MODEL	DESCRIPTION	FC P/N
FAD-4	4" FRESH AIR DAMPER	46590504
FAD-5	5" FRESH AIR DAMPER	46590505
FAD-6	6" FRESH AIR DAMPER	46590506
FAD-7	6" FRESH AIR DAMPER	46590507
FAD-8	8" FRESH AIR DAMPER	46590508
FAD-10	10" FRESH AIR DAMPER	46590510
FAD-12	12" FRESH AIR DAMPER	46590512
R2-VH4	4" OUTDOOR VENT HOOD FOR HRV/ERV	60510010070
R2-VH5	5" OUTDOOR VENT HOOD FOR HRV/ERV	60510010071
R2-VH6	6" OUTDOOR VENT HOOD FOR HRV/ERV	60510010072
IAH-4	INTAKE AIR HOOD 4" FOR FAD	46292000
IAH-6	INTAKE AIR HOOD 6" FOR FAD	46293000
ODT1	OUTDOOR TEMPERATURE SENSOR	620000102
C-SENSOR	CURRENT SENSOR, 24VAC	46676600
P-SENSOR	PRESSURE SENSOR, 24VAC	46679400
40XFMR	TRANSFORMER, UV-24 PLUG-IN	46524800
50XFMR	TRANSFORMER, 24VAC 50VA, SPUD MOUNT	46638800
24VAC RELAY	AUBE RC840, 24VAC RELAY	5109000200
FC80HRV	FC80 HRV - HEAT RECOVERY VENTILATOR	60510004080
FC150HRV	FC150 HRV - HEAT RECOVERY VENTILATOR	60510004150
FC200HRV	FC200 HRV - HEAT RECOVERY VENTILATOR	60510004200
FC80ERV	FC80 ERV - ENERGY RECOVERY VENTILATOR	60510005080
FC150ERV	FC150 ERV - ENERGY RECOVERY VENTILATOR	60510005150
FC200ERV	FC200 ERV - ENERGY RECOVERY VENTILATOR	60510005200
FWMB	ASSY, FAVC WALL MOUNT BRACKET	602600150

11. SIZING OF FRESH AIR DAMPER AND HRV/ERV

11A. HOW TO SIZE A FRESH AIR DAMPER

Select the size of the Fresh Air Damper (FAD) based on the continuous ventilation CFM requirement multiplied by 3 and adjusted for the actual fresh air ductwork installation parameters to allow the FAVC system operate 10 minutes on every 30 minutes.

There are two methods available to Size the Fresh Air Duct: Estimated and Design.

Estimated Method for FAD Sizing: Use Tables 6A and 6B to select fresh air damper air flow rate in CFM. Table 6A shows estimated FAD air flow rates based on smooth wall fresh air pipe ductwork at various lengths. Table 6B shows estimated FAD air flow rates based on Flex Duct fresh air pipe ductwork at various lengths. Short Run Length section is for short simple installations with no elbows or reducing fittings installed with a total of 10 foot equivalent duct length or less. Medium Run Length section is for 8-19 foot duct runs with 1 or less elbows or reducing fittings installed with a total of 30 foot equivalent duct length or less. Long Run Length section is for 15-28 foot duct runs with 2 or less elbows or reducing fittings installed with a total of 30 foot equivalent duct length or less.

Damper Diameter (Inches)	Damper Air Flow in CFM for Smooth Wall Pipe Design at Various Equivalent Duct Feet											
	Short Run (≥ 10 Equiv Ft Fresh Air Pipe)				Medium Run (≥30 Equiv Ft Fresh Air Pipe)				Long Run (≥50 Equiv Ft Fresh Air Pipe)			
	2 Ft	5 Ft	7 Ft	10 Ft	8 Ft	12 Ft	15 Ft	19 Ft	15 Ft	20 Ft	24 Ft	28 Ft
4	80	70	57	40	66	57	47	33	58	50	41	29
5	135	117	95	67	113	97	80	56	99	85	70	49
6	181	157	128	90	157	136	111	79	141	122	100	71
7	308	266	218	154	258	224	183	129	227	196	160	113
8	348	301	246	174	308	267	218	154	279	242	197	140
10	525	454	371	262	478	414	338	239	442	383	312	221
12	861	785	581	428	713	647	528	376	671	610	476	362

Table 6A: FAD Damper Size Air Flow in CFM for Smooth Wall Pipe

Damper Diameter (Inches)	Damper Air Flow in CFM for Flexible Duct Design at Various Equivalent Duct Feet											
	Short Run (≥ 10 Equiv Ft Fresh Air Pipe)				Medium Run (≥30 Equiv Ft Fresh Air Pipe)				Long Run (≥50 Equiv Ft Fresh Air Pipe)			
	2 Ft	5 Ft	7 Ft	10 Ft	8 Ft	12 Ft	15 Ft	19 Ft	15 Ft	20 Ft	24 Ft	28 Ft
4	64	56	46	32	53	46	38	26	46	40	33	23
5	108	94	76	54	90	78	64	45	79	68	56	39
6	145	126	102	72	126	109	89	63	113	98	80	57
7	246	213	174	123	206	179	146	103	182	157	128	90
8	278	241	197	139	246	214	174	123	223	194	158	112
10	420	363	297	210	382	331	270	191	354	306	250	177
12	688	628	464	342	570	517	422	300	537	488	381	289

Table 6B: FAD Damper Size Air Flow in CFM based on Flex Wall Duct

Design Method for FAD Sizing: The design method uses the combination of equivalent duct length based on actual ducting design and static pressure measurement at inlet side of fresh air ducting with air handler running in cooling and/or heating modes. Figure 15, on page 15, shows a typical FAD installation in a basement configuration. Tables 2A and 2B are used to select the continuous ventilation CFM requirement according to size of home (in square foot), number of bedrooms and applicable ASHRAE62.2 code year. Tables 7A and 7B are used to calculate equivalent feet for vent piping and reducer/increaser fittings. Table 8 is used to verify your fresh air damper air flow selection based on actual negative return air static pressure (inches WC) measurement taken at the intake of fresh air ductwork.

Design Method:

- Step 1:** Select the continuous ventilation CFM figure according to size of home (in square feet), number of bedrooms and applicable ASHRAE62.2 code year using Tables 2A and 2B on page 6.
- Step 2:** Measure static pressure at the return intake (in Inches WC).
- Step 3:** Calculate equivalent feet of duct between fresh air inlet and the central fan.
- Determine the total equivalent feet for each type of fitting used in the system from Tables 7A and 7B.
 - Calculate the total feet for the straight lengths of pipe.
 - Add the equivalent feet of the fittings to the total amount of straight feet pipe. This figure becomes the total equivalent feet of duct length.
- Step 4:** Use Table 8 to select fresh air damper size based on measuring static pressure at the return intake, multiple the continuous ventilation CFM value by 3 for fresh air damper CFM and calculated total equivalent duct length. Find the static pressure column, match the FAD CFM rate equal to or greater than 3 times the continuous ventilation rate required. The correct damper and intake hood size is listed to the left on Table 8. When in doubt, use the next larger damper.

Vent Pipe Fittings	Vent Pipe Diameter (in inches)							
	3	4	5	6	7	8	9	10
Tee	19	25	31	38	44	50	56	63
Y-Connection	10	13	16	20	23	26	29	32
90° Elbow	5	7	9	11	12	14	16	18
45° Elbow	3	4	4	5	6	7	8	9

Table 7A: Equivalent Feet for Vent Pipe Fittings

Reducer / Incraser		Small Pipe Size (in Inches)							
		3	4	5	6	7	8	9	10
Large Pipe Size (in Inches)	3	0							
	4	2	0						
	5	4	2	0					
	6	5	4	2	0				
	7	6	5	4	1	0			
	8	7	7	6	3	2	0		
	9	7	8	7	5	4	2	0	
	10	8	8	8	6	6	4	4	0
	12	8	10	10	8	9	8	8	4

Table 7B: Equivalent Feet for a Reducer/Incraser Pipe Fitting

It is recommended that the damper be as close to the return air plenum and the FAVC as possible while maintaining the minimum separate distance of 20 inches, and that the inlet duct connection to the return air plenum upstream of the system filter and downstream of any duct-mounted sensors.

		Damper Air Flow in CFM based on Negative Static Pressure Measurement							
Negative Return Air Static Pressure ("WC)		0.05		0.10		0.15		0.20	
Damper & Intake Hood	Equivalent Feet of Duct Length	Smooth	Flex	Smooth	Flex	Smooth	Flex	Smooth	Flex
4 Inch	10	40	32	57	45	70	56	80	64
	30	33	26	47	37	57	46	66	53
	50	29	23	41	33	50	40	58	46
5 Inch	10	67	54	95	73	117	94	135	108
	30	56	45	80	64	97	78	113	90
	50	49	39	70	56	85	68	99	79
6 Inch	10	90	72	128	102	157	126	181	145
	30	79	63	111	89	136	109	157	126
	50	71	57	100	80	122	98	141	113
7 Inch	10	154	123	218	174	266	213	308	246
	30	129	103	183	146	224	179	258	207
	50	113	91	160	128	196	157	227	181
8 Inch	10	174	139	246	197	301	241	348	278
	30	154	123	218	174	267	214	308	246
	50	140	112	197	158	242	194	279	223
10 Inch	10	262	210	371	297	454	363	525	420
	30	239	191	338	270	414	331	478	382
	50	221	177	312	250	383	306	442	354
12 Inch	10	428	342	581	464	785	628	861	688
	30	376	300	528	422	647	517	713	570
	50	362	289	476	381	610	488	671	537

Table 8: Fresh Air Damper Sizing Chart

Example of Fresh Air Damper Sizing using the Design Method:

- Step 1: 1500 sq. ft. home, 3 bedrooms, ASHRAE62.2-2010 standard. From Table 2A, continuous ventilation required is 45 CFM. For damper sizing multiply continuous ventilation value by 3 equates to 135 CFM for fresh air damper size.
- Step 2: Static pressure in the return is 0.15 inches WC (measured).
- Step 3: Ductwork system design consists of:
- Two 6" diameter 45° Elbow (10 equivalent feet),
 - 10 feet of straight 6" smooth diameter ductwork (10 equivalent feet).
 - The system has 20 equivalent feet of smooth duct (10 + 10 = 20)
- Step 4: The 6 inch Fresh Air Damper delivers 136 CFM in smooth duct at 30 equivalent feet and would be the appropriate damper for this system.

Refer to Field Controls Ventilation Reference Guide for additional information on proper sizing of Fresh Air Damper and ductwork.

11B. HOW TO SIZE AN HRV/ERV

As a minimum, double the continuous ventilation flow rate for sizing the HRV/ERV product. Use the HRV/ERV air flow rate as the CFM HEAT and CFM COOL dial setting on the FAVC unit.

INSTALLATION NOTES

FILL-IN CUSTOM SETTINGS

FACTORY SETTINGS

CFM Continuous Ventilation Rate: _____ CFM	100
CFM Cool Vent: _____ CFM	400
CFM Heat Vent: _____ CFM	400
CFM Appliance #1: _____ CFM	75
CFM Appliance #2: _____ CFM	75
CFM Appliance #3: _____ CFM	200
CFM Appliance #4: _____ CFM	850
<p>Fresh Damper Size: _____ Inches or</p> <p>HRV Model: _____ CFM: _____ or</p> <p>ERV Model: _____ CFM: _____</p>	
<p><u>DIP Switch (SW1) Settings (Circle Setting)</u></p> <p>Climate Setting (Switches 1 & 2): Normal, Cold, Hot or Disabled</p> <p>Fan Activity w/ Appliance #3 (Switch 3): ON or OFF</p> <p>Energy Save (Switch 4): ON or OFF</p> <p>Remote ON/OFF FUNCTION (Switch 5): On or Off</p>	
	<p>NORMAL</p> <p>OFF</p> <p>OFF</p> <p>ON</p>

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