Bypass Economizer

Supplemental Manual for Options

HE-Series

HE10RTV with Bypass Economizer shown

⚠ WARNING

Arc flash and electric shock hazard. Disconnect all electric power supplies and wear protective equipment per NFPA 70E before working within electric enclosure. Lock and tag the disconnect switch or breaker to prevent accidental re-connection of electric power while performing service or maintenance operations. Failure to comply can cause serious injury or death. Customer must provide earth ground to unit, per NEC, CEC and local codes, as applicable. Before proceeding with installation, read all instructions, verify that all parts are included and check the nameplate to verify the voltage matches available utility power. The line side of the disconnect switch on the front of the unit contains live high-voltage. The only way to ensure there is NO voltage inside the unit is to install and open all local and remote disconnect switches and then verify that power is off with a voltmeter. Refer to unit electrical schematic. Follow all local codes.

⚠ CAUTION

Risk of damage to the enthalpic core. Improper maintenance procedures may lead to damage of the enthalpic core.

When performing maintenance of the ERV or the core bypass, organic solvents are not to be used within the enclosure. In addition, high pressure air is not to be applied to the enthalpic core.

⚠ CAUTION

RISK OF DAMAGE TO THE CORE BYPASS CONTROLS.

Whenever a control device is connected to or disconnected from the controls circuits, the power supply to the ERV must be disconnected. Lock and tag the disconnect switch or circuit breaker to prevent accidental reconnection of electric power.

IMPORTANT

This equipment is only for use in completed structures. Use of this equipment prior to completion of building construction will void the warranty. Do not use this equipment for temporary conditioning of the air.

IMPORTANT

This equipment is to be installed by following Industry Best Practices and all applicable codes. Any damage to components, assemblies, subassemblies or the cabinet which is caused by improper installation practices will void the warranty.

UNIT INFORMATION

Record information as shown below. A permanent record should be maintained so that damper stop and controls settings can be verified at a later date. In the unlikely event that factory assistance is ever required, this information will also be needed.

Locate the RenewAire unit label, to be found on either the left or right side of the unit. Record the following:

> NOTE: This page and the following page are to be completed by the installing contractor. The completed document is to be turned over to the owner after start-up.

Option Code:

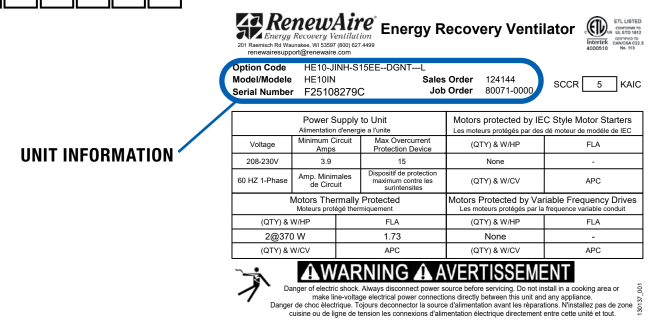
☐☐☐☐☐☐☐☐☐ - ☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Serial Number:

☐☐☐☐☐☐☐☐

SO #:

☐☐☐☐☐☐



RenewAire Energy Recovery Ventilation — Energy Recovery Ventilator

201 Raemisch Rd Waunakee, WI 53597 (800) 627.4499
renewairesupport@renewaire.com

ETL LISTED — Intertek 4000510 — CONFORMS TO UL STD 1812 — CERTIFIED TO CAN/CSA C22.2 No. 113

Option Code HE10-JINH-S15EE--DGNT---L
Model/Modele HE10IN — Sales Order 124144
Serial Number F25108279C — Job Order 80071-0000

SCCR 5 KAIC

Power Supply to Unit Alimentation d'energie a l'unite			Motors protected by IEC Style Motor Starters Les moteurs protégés par des dé moteur de modéle de IEC	
Voltage	Minimum Circuit Amps	Max Overcurrent Protection Device	(QTY) & W/HP	FLA
208-230V	3.9	15	None	-
60 HZ 1-Phase	Amp. Minimales de Circuit	Dispositif de protection maximum contre les surintensites	(QTY) & W/CV	APC

Motors Thermally Protected Moteurs protégé thermiquement		Motors Protected by Variable Frequency Drives Les moteurs protégés par la frequence variable conduit	
(QTY) & W/HP	FLA	(QTY) & W/HP	FLA
2@370 W	1.73	None	-
(QTY) & W/CV	APC	(QTY) & W/CV	APC

WARNING AVERTISSEMENT

Danger of electric shock. Always disconnect power source before servicing. Do not install in a cooking area or make line-voltage electrical power connections directly between this unit and any appliance.
Danger de choc èlectrique. Tojours deconnector la source d'alimentation avant les rèparations. N'installez pas de zone cuisine ou de ligne de tension les connexions d'alimentation électrique directement entre cette unité et tout.

130137_001

TYPICAL UNIT LABEL (FOUND ON EITHER LEFT SIDE OR RIGHT SIDE OF THE UNIT)

Type of Bypass Controls: (check one) ☐ Dry Bulb ☐ Enthalpic

If controls are dry bulb, record the following:

Low Limit
(setting at time of start-up) ☐ (Low Limit Factory Setting: 53˚)

Show any changes to Low Limit setting (include date and reason for change)

☐

High Limit
(setting at time of start-up) ☐ (High Limit Factory Setting: 75˚)

Show any changes to High Limit setting (include date and reason for change)

☐

If controls are enthalpic, record the following:

Low Limit
(setting at time of start-up) ☐ (Low Limit Factory Setting: 53˚)

Show any changes to Low Limit setting (include date and reason for change)

☐

NOTE: This unit is an Energy Recovery Ventilator, or ERV. It is commonly referred to throughout this manual as an ERV.

RENEWAIRE ERV OPTION CODE

Certain RenewAire ERVs can be ordered with the Bypass Economizer Option. Every ERV has a unit label that shows the exact model with its options, as ordered. In the ERV Option Code, units with the bypass economizer option will have a number in place of a letter for character 18. The individual number indicates which type of bypass controls are installed and whether any isolation dampers are installed. See Page 3 for instructions on how to locate the ERV Option Code on the unit label.

MODEL NUMBER	H	E	1	0	-	J	I	N	H	-	S	1	5	E	E	-	-	1	G	N	T	-	-	-	L
DIGIT NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

Digit 18:	Flow Control* (see Restrictions 21, 22, 38, & 39)
"-" = No Isolation Dampers (with no Bypass)	
"D" = Motorized Damper both Airstreams (with no Bypass)	
"E" = Motorized Damper EA or RA Airstream (with no Bypass)	
"F" = Motorized Damper SA or OA Airstream (with no Bypass)	
"J" = Internal Bypass, Dry Bulb, No Motorized Isolation Dampers	
"K" = Internal Bypass, Dry Bulb, Both Motorized Isolation Dampers	
"L" = Internal Bypass, Enthalpy, No Motorized Isolation Dampers	
"M" = Internal Bypass, Enthalpy, Both Motorized Isolation Dampers	
"0" = External Bypass, Dry Bulb, Face and Bypass Dampers only	
"1" = External Bypass, Dry Bulb, Motorized Dampers all Airstreams	
"5" = External Bypass, Enthalpy, Face and Bypass Dampers only	
"6" = External Bypass, Enthalpy, Motorized Dampers all Airstreams	

Restrictions:

- For units with the External Bypass Option, the face damper also acts as an isolation damper in the EA airstream or RA airstream.
- Bypass only available in indoor units on models HE-3X, HE-4X, HE-6X, HE-7X, & HE-8X.
- Flow Control Codes “J”, “K”, “L”, & “M” only available in models HE10- and HE15- with Location Code “IN”.
- Flow Control Codes “0”, “1”, “5”, & “6” not available in models HE10-, HE15-, or HE20- with Location Code “IN”.

IMPORTANT

It is important to understand and use the equipment airstream terminology as it is used in this manual. The airstreams are defined as:

- OUTSIDE AIR (OA): Air taken from the external atmosphere and, therefore, not previously circulated through the system.
- SUPPLY AIR (SA): Air that is downstream of the enthalpic cores and is ready for conditioning or for return to the Occupied Space.
- RETURN AIR (RA): Air that is returned to the ERV from a conditioned space.
- EXHAUST AIR (EA): Air that is removed from a heating or cooling appliance or from the Occupied Space and discharged.

TABLE OF ILLUSTRATIONS

1.0 OVERVIEW

1.1 DESCRIPTION

The ERV Bypass Economizer Option is a system that provides energy conservation during operation of an ERV. It accomplishes this by sensing ambient conditions and it then allows the RA or OA airstream to move through an alternate duct or exhaust outlet, bypassing the ERV enthalpic core. This avoids unnecessary tempering of SA.

The Bypass Economizer Option consists of one extra duct or exhaust outlet, two electrically actuated dampers and a control system. For indoor units with external bypass, the bypass duct is field-supplied, fabricated and installed. See illustrations on pages 9–11. There are two variations of the control system, one of which uses a single outdoor air dry bulb controller and sensor, and the second variation which uses a RA enthalpy sensor in conjunction with an OA enthalpy controller and a dry bulb temperature controller.

> NOTE: The default condition of the core bypass is "OFF". When ambient conditions fall within the user-applied presets, the dampers will actuate and cause the RA to be diverted through the bypass duct.

1.1.1 Dry Bulb Control

The first control scheme has one thermistor to sense outdoor air temperature. The controller itself has two user-adjusted setting dials. The adjustable Low Limit setting is the temperature below which the ERV will operate without the core bypass (normal operation). The adjustable High Limit setting is the temperature above which the ERV will again go into normal operation without bypassing the core. In other words, there is a temperature band when the bypass is enabled and should be actuated and these two settings determine the upper and lower limits of that temperature band.

> NOTE: For ERVs with Enhanced or Premium controls, the following control schemes and sensors do not apply. See *Enhanced Controls Supplement* or *Premium Controls Supplement*.

FIGURE 1.1.0 DRY BULB CONTROLLER

1.1.2 Enthalpy Control

The second control scheme incorporates a more sophisticated level of bypass control. In addition to the dry bulb controller, this control option measures enthalpy in both the OA and RA airstreams to account for both sensible and latent loads to decide whether to enable bypass mode. See Section 6.2 for detailed controls information.

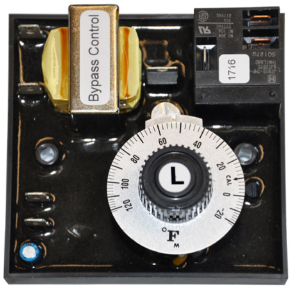


FIGURE 1.1.1 LOW LIMIT DRY BULB CONTROLLER

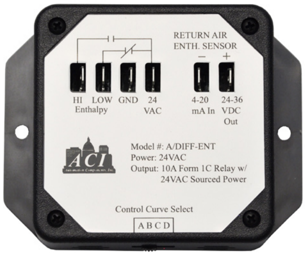


FIGURE 1.1.2 OUTDOOR AIR ENTHALPY CONTROLLER

FIGURE 1.1.3 RA ENTHALPY TRANSMITTER

1.1.3 Dampers

For units with external bypass, dampers are used to move the RA airstream through the bypass duct or exhaust outlet instead of through the enthalpic core (bypass "ON") and also to return the airstream to normal operation (bypass "OFF"). They are also used to balance the airstream during bypass operation by means of setting the stops on the actuators.

For indoor units with external bypass, the ERV bypasses energy recovery by opening a damper that routes the RA around the energy recovery core through a bypass duct (field supplied). For indoor units with internal bypass, the ERV bypasses energy recovery by opening a damper that routes the Outside Air around the energy recovery core through a bypass tunnel inside the ERV (factory installed). For rooftop units, the ERV bypasses energy recovery by opening a damper that routes the RA directly out the back wall of the ERV, before it will encounter the energy recovery core. The rooftop unit bypass damper is located in a third weather hood on the back of the ERV (factory installed).

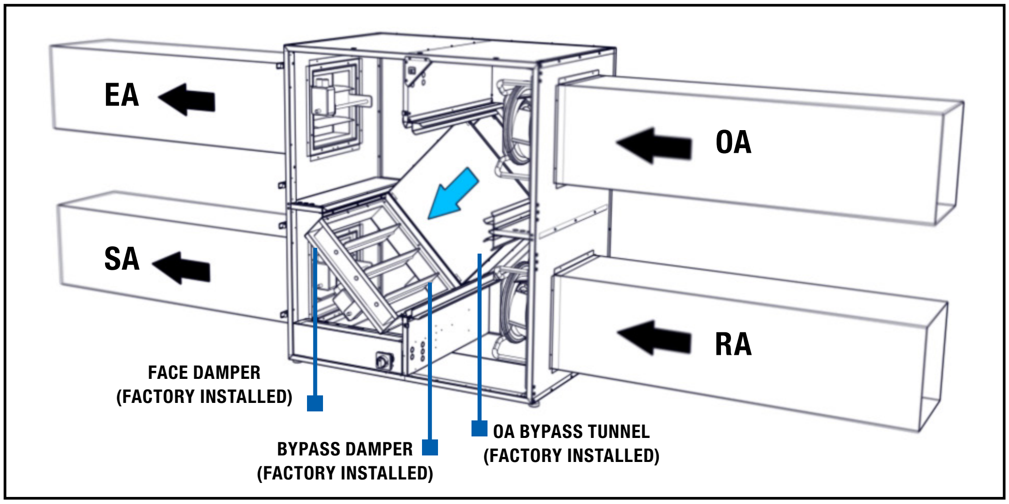


FIGURE 1.1.4 TYPICAL ERV WITH INTERNAL CORE BYPASS

NOTE: Rooftop ERVs are not ducted differently for unit with or without Bypass.

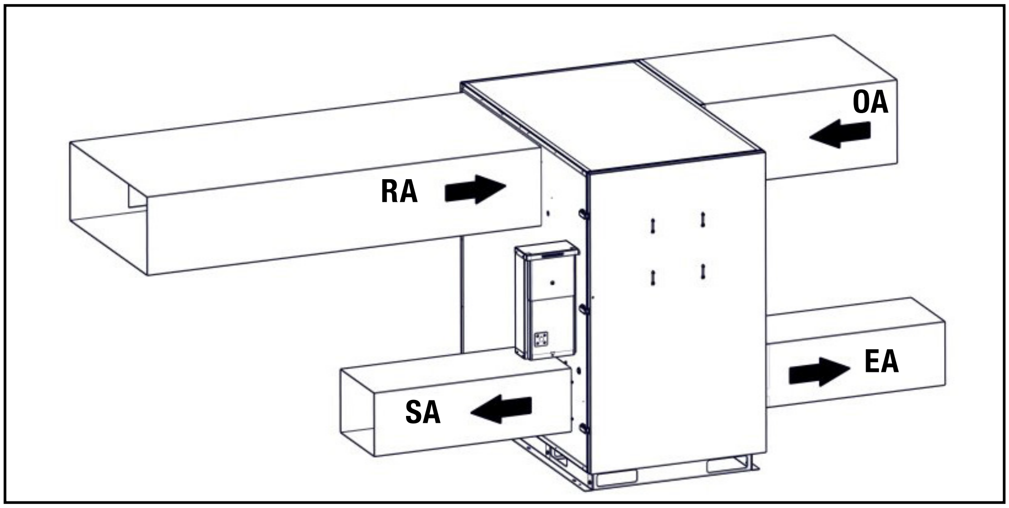


FIGURE 1.1.5 TYPICAL ERV WITHOUT CORE BYPASS

RenewAire Energy Recovery Ventilation

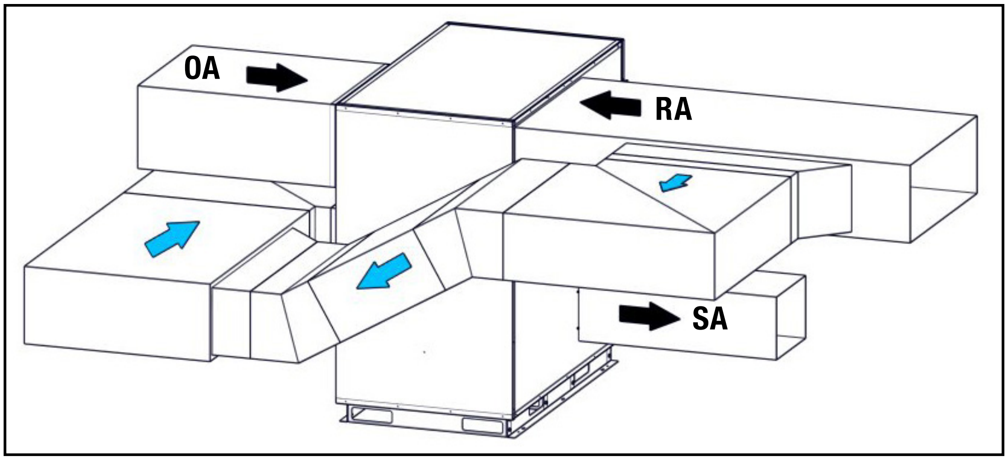
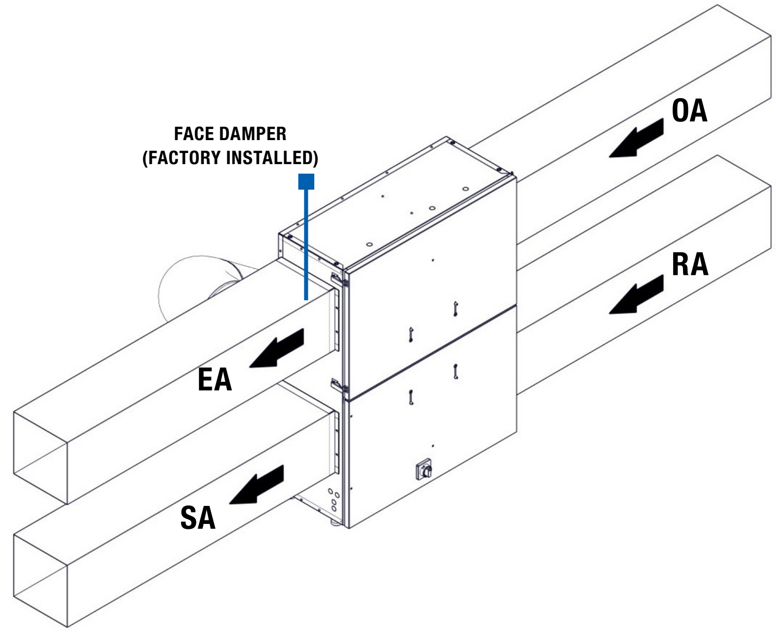


FIGURE 1.1.6 TYPICAL ERV WITH EXTERNAL CORE BYPASS

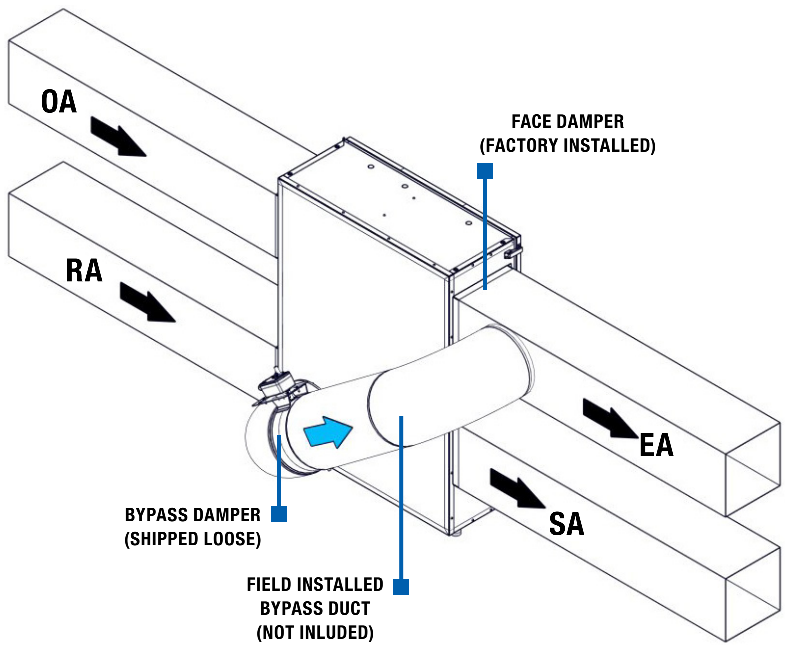
2.0 LAYOUT RECOMMENDATIONS

NOTE: All duct installations must conform to SMACNA guidelines.

NOTE: All duct layouts depicted in this manual are suggested and may be modified to accommodate field conditions.

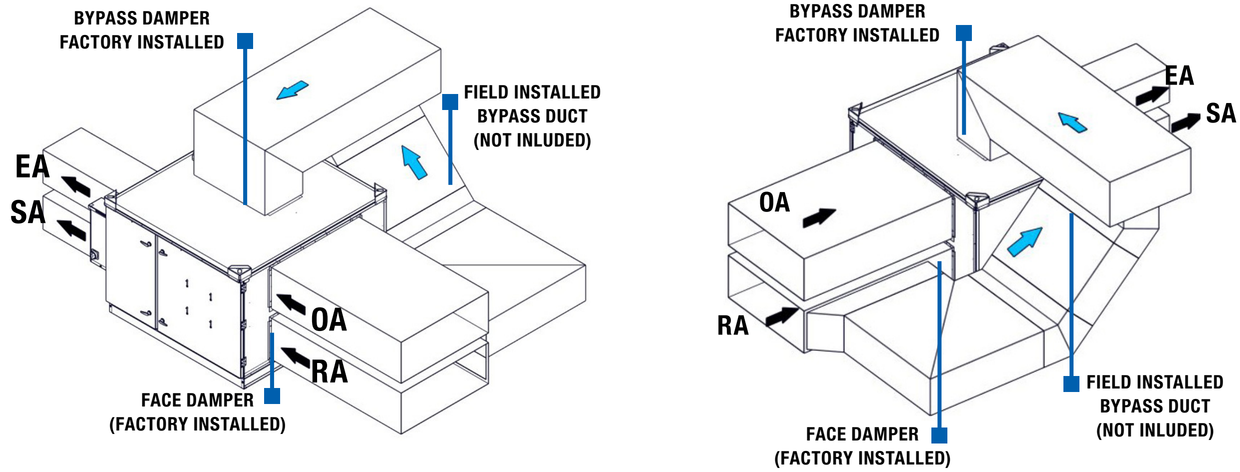


HE07INH SUGGESTED DUCT LAYOUT—FRONT



HE07INH SUGGESTED DUCT LAYOUT—BACK

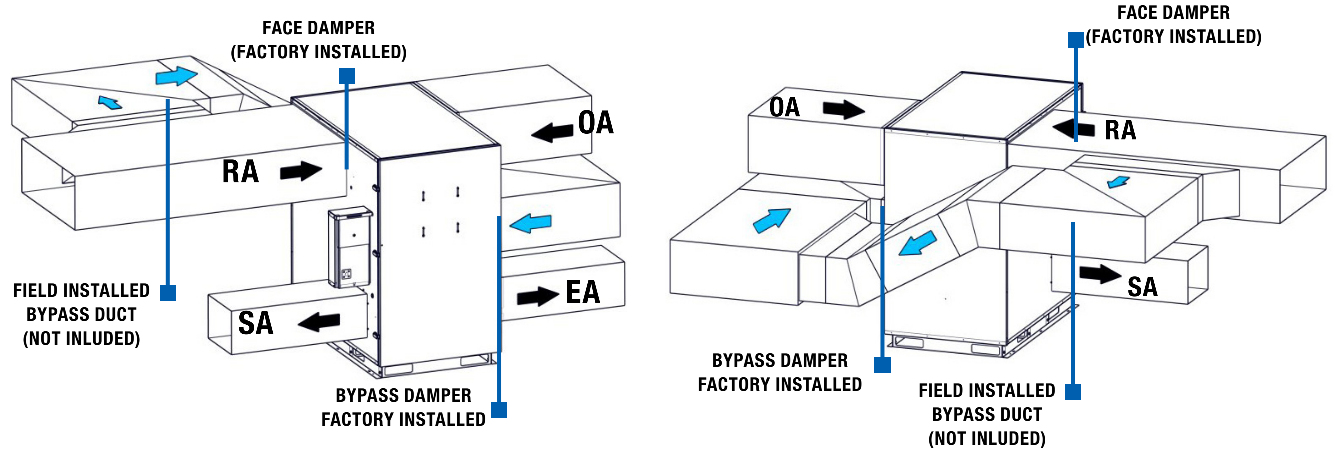
FIGURE 2.0.0 HE07INH DUCT LAYOUT



HE3XINH SUGGESTED DUCT LAYOUT—FRONT
ROUTING SAME FOR HE4XINH (DUCT SIZE CHANGES)

HE3XINH SUGGESTED DUCT LAYOUT—BACK
ROUTING SAME FOR HE4XINH (DUCT SIZE CHANGES)

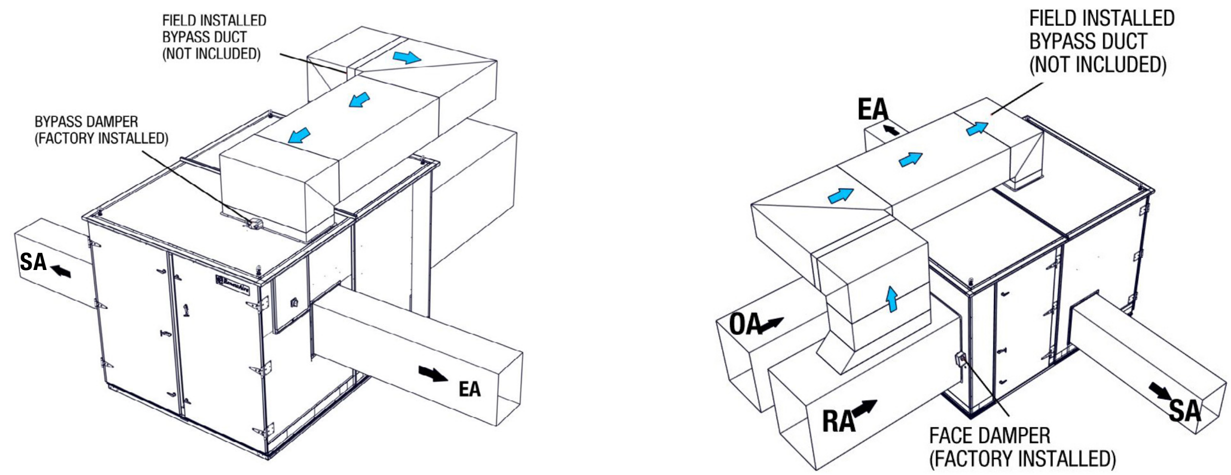
FIGURE 2.0.1 HE3X–4XINH DUCT LAYOUT



HE3XINV SUGGESTED DUCT LAYOUT—FRONT
ROUTING SAME FOR HE4XINV (DUCT SIZE CHANGES)

HE3XINV SUGGESTED DUCT LAYOUT—BACK
ROUTING SAME FOR HE4XINV (DUCT SIZE CHANGES)

FIGURE 2.0.2 HE3X–4XINV DUCT LAYOUT



HE6XIN, HE7XIN, &HE8XIN SUGGESTED DUCT LAYOUT—FRONT

HE6XIN,HE7XIN, & HE8XIN SUGGESTED DUCT LAYOUT—BACK

FIGURE 2.0.3 HE6XIN–HE8XIN DUCT LAYOUT

3.0 PERFORMANCE DATA

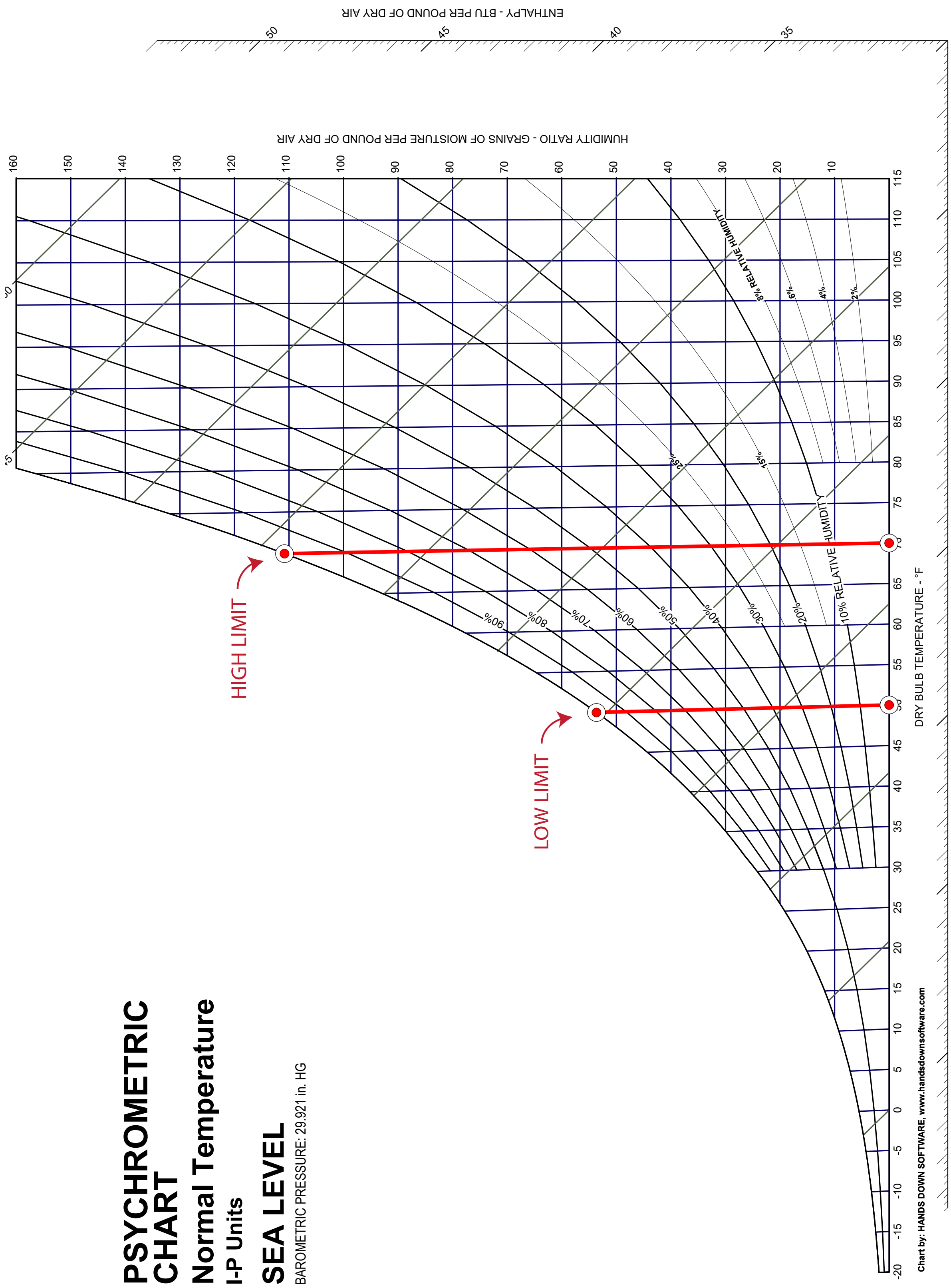


FIGURE 3.0.0 PSYCHOMETRIC CHART (DRY BULB CONTROL)

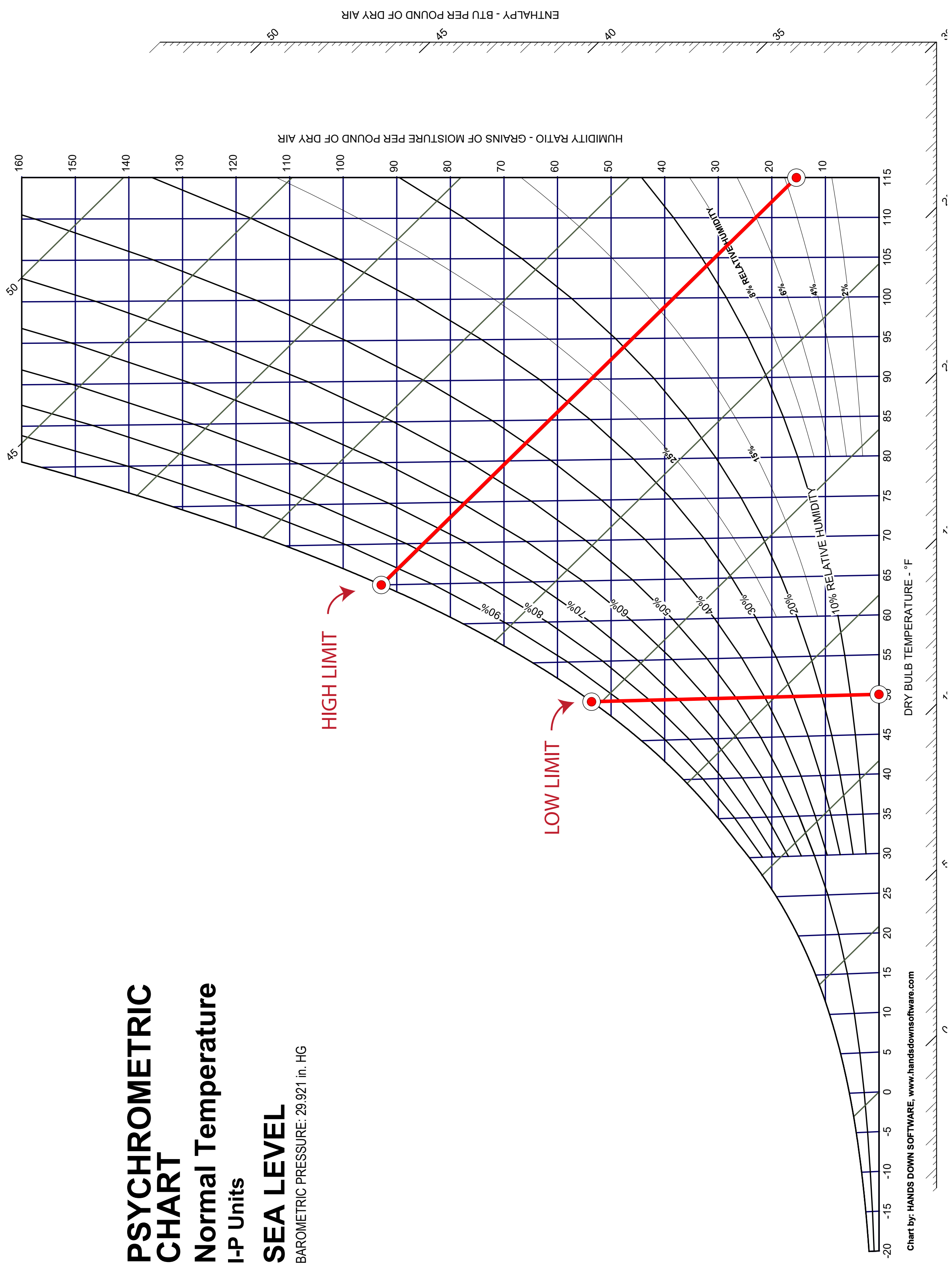


FIGURE 3.0.1 PSYCHOMETRIC CHART (ENTHALPY CONTROL)

4.0 COMPONENT DESCRIPTION

NOTE: For ERVs with Enhanced or Premium controls, the following control components and sensors do not apply. See *Enhanced Controls Supplement* or *Premium Controls Supplement*.

4.1 DRY BULB CONTROLLER

The Dry Bulb Controller is the simpler of the two control options. It is connected to a thermistor that senses the ambient temperature. There are two user-adjusted controls on the dry bulb controller, one for Low Limit Set Point and a second for High Limit Set Point.

The temperature band that falls between the Low Limit Set Point and the High Limit Set Point is the only time that the bypass function is switched "ON."

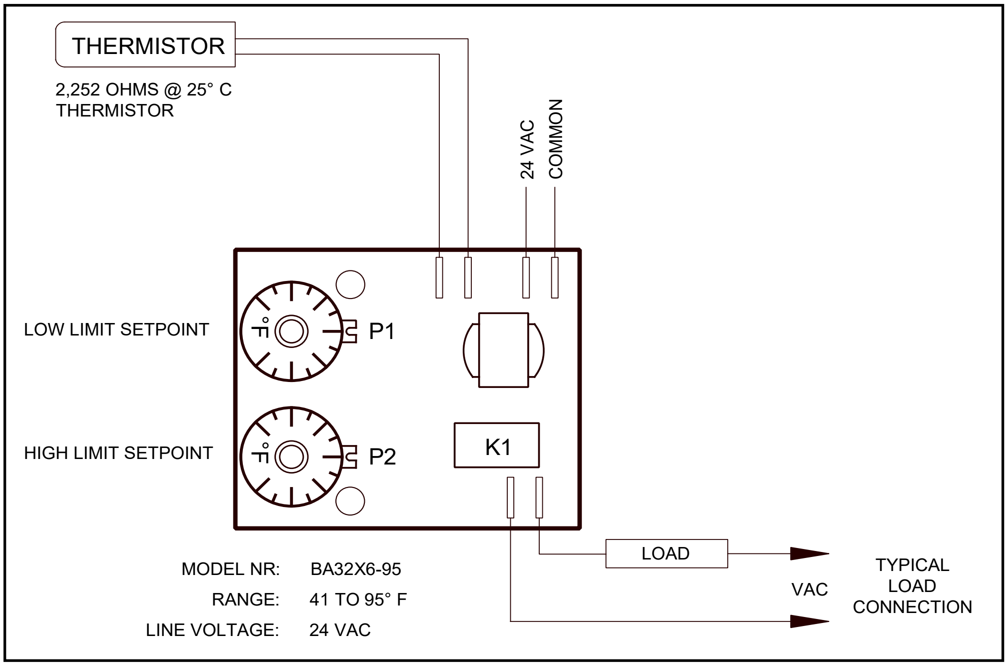


FIGURE 4.1.0 DRY BULB CONTROLLER PARTIAL WIRING SCHEMATIC

4.2 THERMISTOR

The thermistor is used with all control schemes. It is factory-installed in the ERV and operates on 24VAC.

4.3 LOW LIMIT DRY BULB CONTROLLER

The low limit dry bulb controller is the device where the user sets the low limit setpoint. It is connected to both a thermistor and to the Outdoor Air Enthalpy Controller.

4.4 OUTDOOR AIR ENTHALPY CONTROLLER

The outdoor air enthalpy controller is connected to both the low limit dry bulb controller and the RA Enthalpy Transmitter. The outdoor air enthalpy controller compares its enthalpy reading to that of the RA enthalpy transmitter. If the outdoor air enthalpy is less than the RA enthalpy, and the outdoor air temperature is greater than the low limit setpoint, the bypass function will switch "ON."

4.5 RA ENTHALPY TRANSMITTER

The RA Enthalpy Transmitter passes an enthalpy reading for the RA airstream to the Outdoor Air Enthalpy Controller. See Section 6.2 for more details.

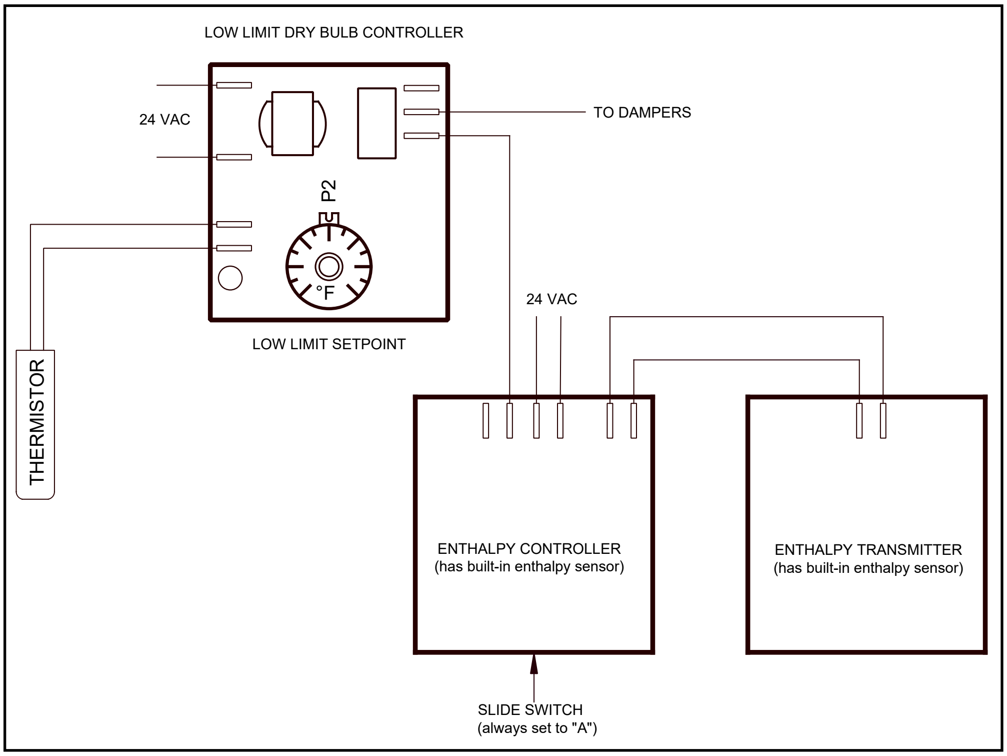


FIGURE 4.5.0 ENTHALPY CONTROLLER PARTIAL WIRING SCHEMATIC

4.6 ROUND DAMPER

Round dampers are used in field-supplied and installed 12” round bypass ductwork for HE07IN units. When the damper is shipped loose for field installation, the damper actuator is pre-assembled to the damper. Whenever a round damper is used, it operates in conjunction with a Belimo LF24-S Damper Actuator. See chart of Damper Actuators on page 16.

4.7 RECTANGULAR DAMPER

Rectangular dampers are typically used as either face dampers or bypass dampers, depending on the field-supplied and installed bypass ductwork. See chart of Damper Actuators on page 16.

NOTE: All duct installations must conform to SMACNA guidelines.

> NOTE: All bypass damper actuators have a built-in adjustable stop that is used for balancing air flow. See Section 6.0 of this manual for instructions on balancing the air flow at time of start-up.

4.8 DAMPER ACTUATORS

4.8.1 Belimo TFB24-S Damper Actuator

The Belimo TFB24-S actuators are used for all rectangular bypass dampers.

For further information on this specific damper actuator, see the manufacturer's website: https://www.belimo.us/shop/en_US/Actuators/Fail-Safe-Actuators/TFB24-S/p?code=TFB24-S

4.8.2 Belimo LF-24S Damper Actuator

The larger Belimo LF24-S damper actuators are typically used in 12" round bypass damper and for the 26" x 38" face dampers on the HE6XIN and HE8XIN ERVs.

For further information on this specific damper, see the manufacturer's website: https://www.belimo.com/us/shop/en_US/Actuators/Fail-Safe-Actuators/LF24-S-US/p?code=LF24-S+US

RENEWAIRE ERV MODEL	FACE DAMPER ACTUATOR	BYPASS DAMPER ACTUATOR
HE07IN	TFB24-S	LF24-S
HE07RT	TFB24-S	TFB24-S
HE10IN	(1) LF24-S Driving Face & Bypass Sections	
HE10RT	TFB24-S	TFB24-S
HE15IN	(1) LF24-S Driving Face & Bypass Sections	
HE15RT	TFB24-S	TFB24-S
HE20RT	TFB24-S	TFB24-S
HE3XIN	LF24-S	TFB24-S
HE4XIN	LF24-S	LF24-S
HE6XIN	LF24-S	LF24-S
HE7XIN	LF24-S	LF24-S
HE8XIN	LF24-S	LF24-S

FIGURE 4.8.0 CHART OF DAMPER ACTUATORS BY RENEWAIRE MODEL

FIGURE 4.8.1 BYPASS ACTUATOR

FIGURE 4.8.2 FACE ACTUATOR

5.0 INSTALLATION

For every RenewAire ERV with Bypass Economizer Option, controls and dampers are installed at the factory, with the exception of those components shown below. Bypass ductwork is always supplied, fabricated and installed by others, in the field. A bypass duct is only required for some indoor ERVs, to direct the RA around the energy recovery core and into the EA duct. For indoor ERVs with internal bypass, the outside air is directed through an internal bypass tunnel, and thus requires no additional ductwork from an indoor ERV without the bypass feature. For rooftop ERVs in bypass mode, the RA exits the ERV to atmosphere through the back wall and bypass hood, and thus requires no additional ductwork from a rooftop ERV without the bypass feature. For further information on the needed bypass ductwork, see the technical data sheet for the specific model, found in this manual in Section 5.3 through 5.9.

In those cases where a damper(s) must be field-installed, the damper is labeled “BYPASS” and is already assembled to its actuator. The damper and actuator are then field-installed and the actuator is plugged into the factory-installed wiring harness using the plug located outside the unit.

RENEWAIRE ERV MODEL	CONTROLS INSTALLED?	CONTROL WIRING INSTALLED?	BYPASS DAMPER INSTALLED?	FACE DAMPER INSTALLED?	RECOMMENDED BYPASS DUCT SIZE*
HE07IN	Yes	Yes	Shipped Loose	Yes	12" Round
HE07RT	Yes	Yes	Yes	Yes	N/A
HE10IN	Yes	Yes	Yes	Yes	N/A
HE10RT	Yes	Yes	Yes	Yes	N/A
HE15IN	Yes	Yes	Yes	Yes	N/A
HE15RT	Yes	Yes	Yes	Yes	N/A
HE20RT	Yes	Yes	Yes	Yes	N/A
HE3XINH	Yes	Yes	Yes	Yes	30" x 16"
HE3XINV	Yes	Yes	Yes	Yes	36" x 14"
HE4XINH	Yes	Yes	Yes	Yes	34" x 16"
HE4XINV	Yes	Yes	Yes	Yes	42" x 14"
HE6XIN	Yes	Yes	Yes	Yes	38" x 16"
HE7XIN	Yes	Yes	Yes	Yes	38" x 16"
HE8XIN	Yes	Yes	Yes	Yes	38" x 16"

*Recommended duct sizes are based on ensuring that the pressure drop in the bypass duct is less than the pressure drop through the core. Equivalent duct sizes at the same pressure drop are acceptable.

FIGURE 5.0.0 TABLE OF INSTALLED FEATURES BY MODEL

1. Fabricate and install bypass ductwork in accordance with the guidelines shown for each model in this section of this manual.
2. Install dampers and damper actuators as required, shown on the chart above.
3. Balance the air flow through the bypass duct. See Section 6.1 of this manual. Adjust the damper actuator stops as needed.
4. Verify the settings on the dry bulb controllers. See Section 6.2 of this manual.
5. Complete the Unit Information on page 3 of this manual.

5.1 DRY BULB CONTROL WIRING SCHEMATIC

Dry bulb control is comprised of two dampers and their actuators, a dry bulb controller and a thermistor. The only user adjustments that are made to this system during normal operation are the “LOW” and “HIGH” settings on the controller.

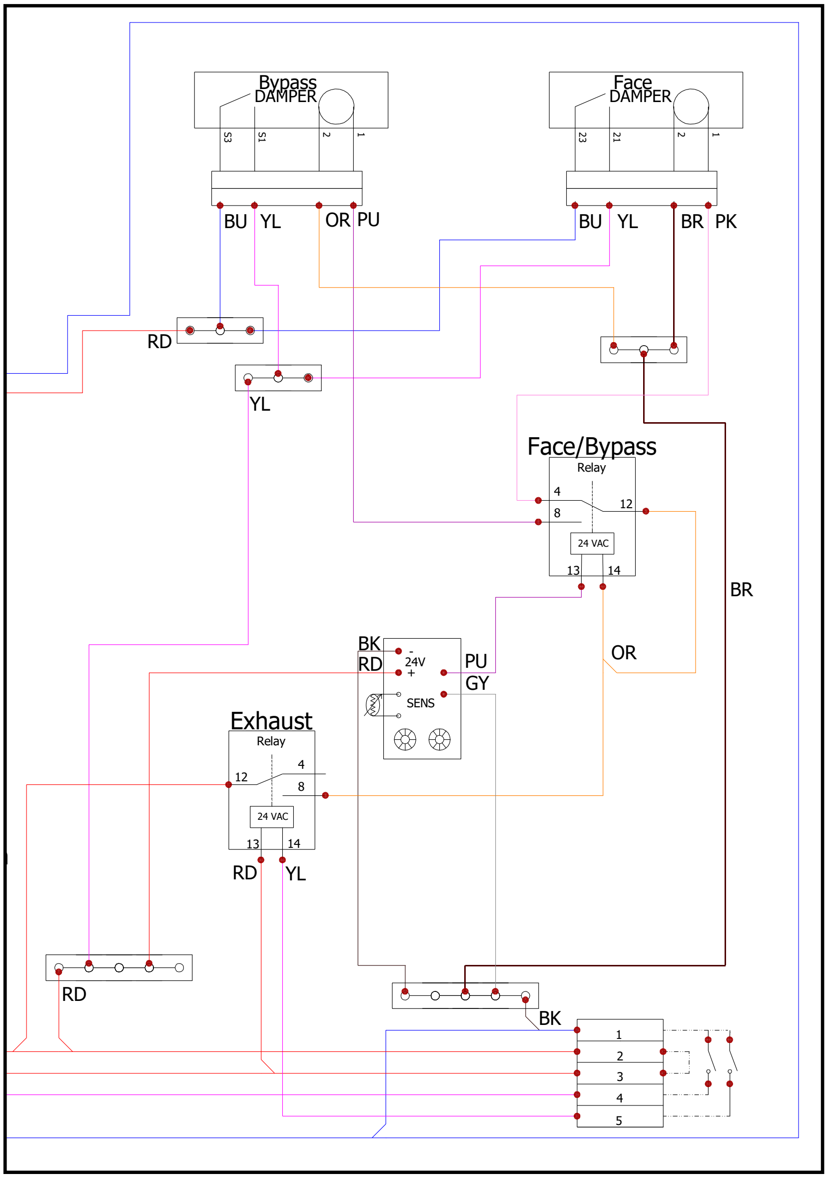


FIGURE 5.1.0 DRY BULB CONTROL WIRING SCHEMATIC

RenewAire Energy Recovery Ventilation

5.2 ENTHALPY CONTROL WIRING SCHEMATIC

Enthalpy control is comprised of two dampers and their actuators, an enthalpy transmitter, an enthalpy controller that receives data from the enthalpy transmitter, and a low limit dry bulb controller. The only user adjustment that may be made to this system during normal use is the "LOW LIMIT" setpoint on the dry bulb controller.

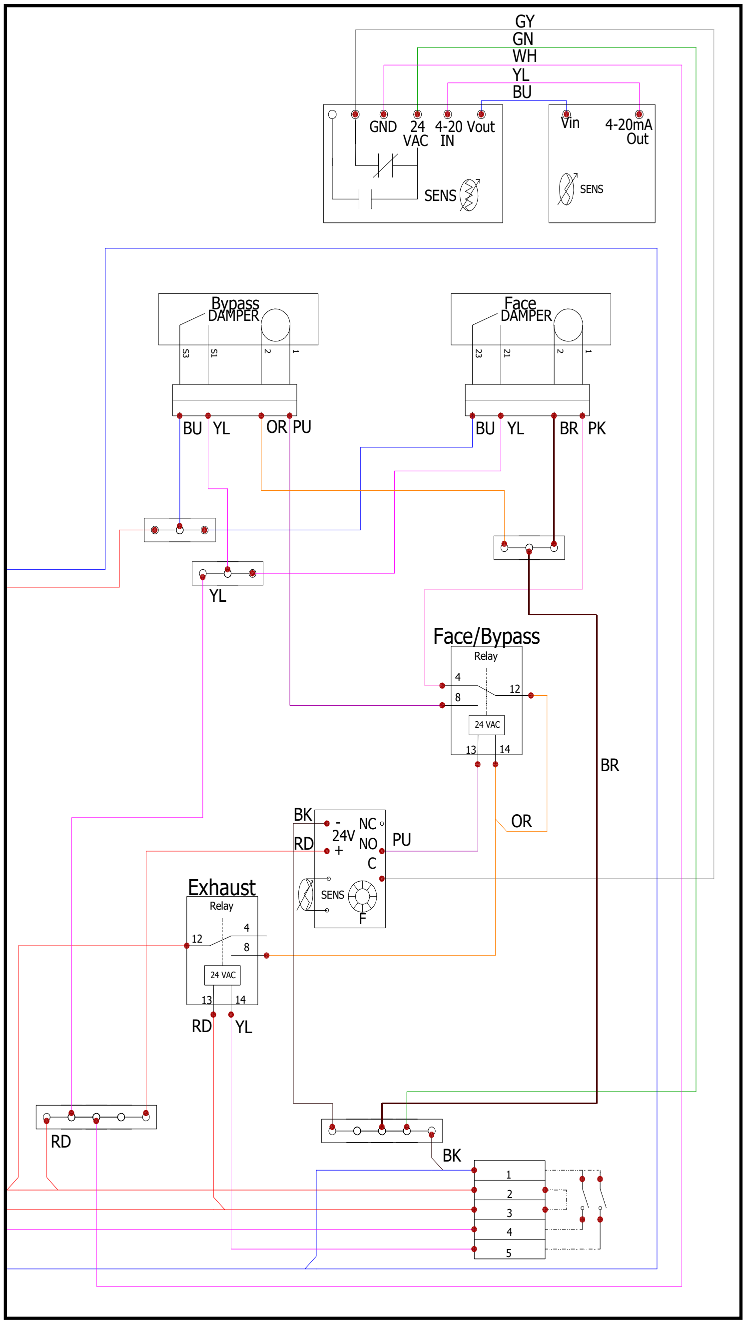


FIGURE 5.2.0 ENTHALPY CONTROL WIRING SCHEMATIC

5.3 MODEL HE07IN DIMENSION DRAWINGS

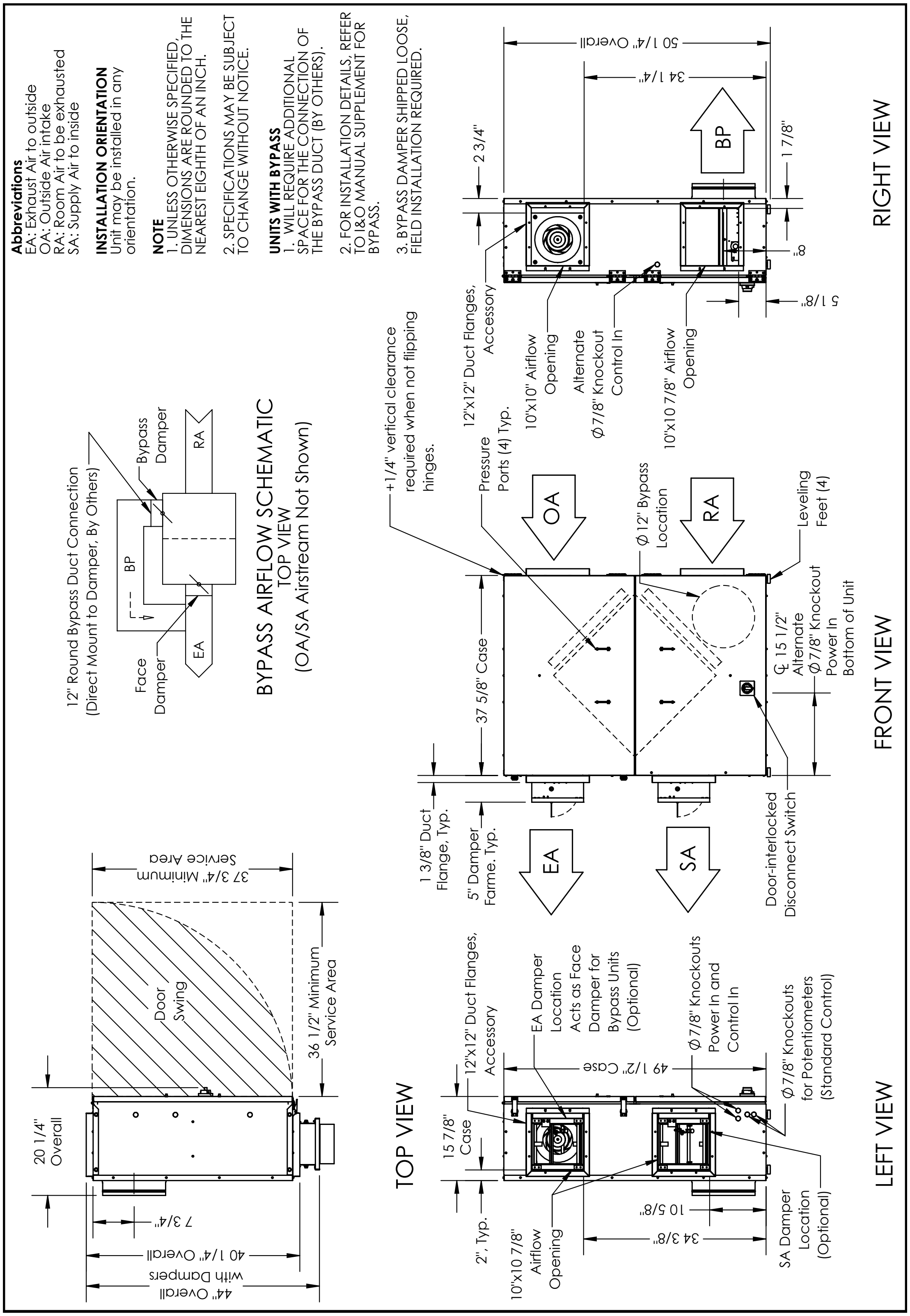


FIGURE 5.3.0 HE07INH DIMENSION DRAWING (HORIZONTAL AIRFLOW ORIENTATION)

RenewAire® Energy Recovery Ventilation

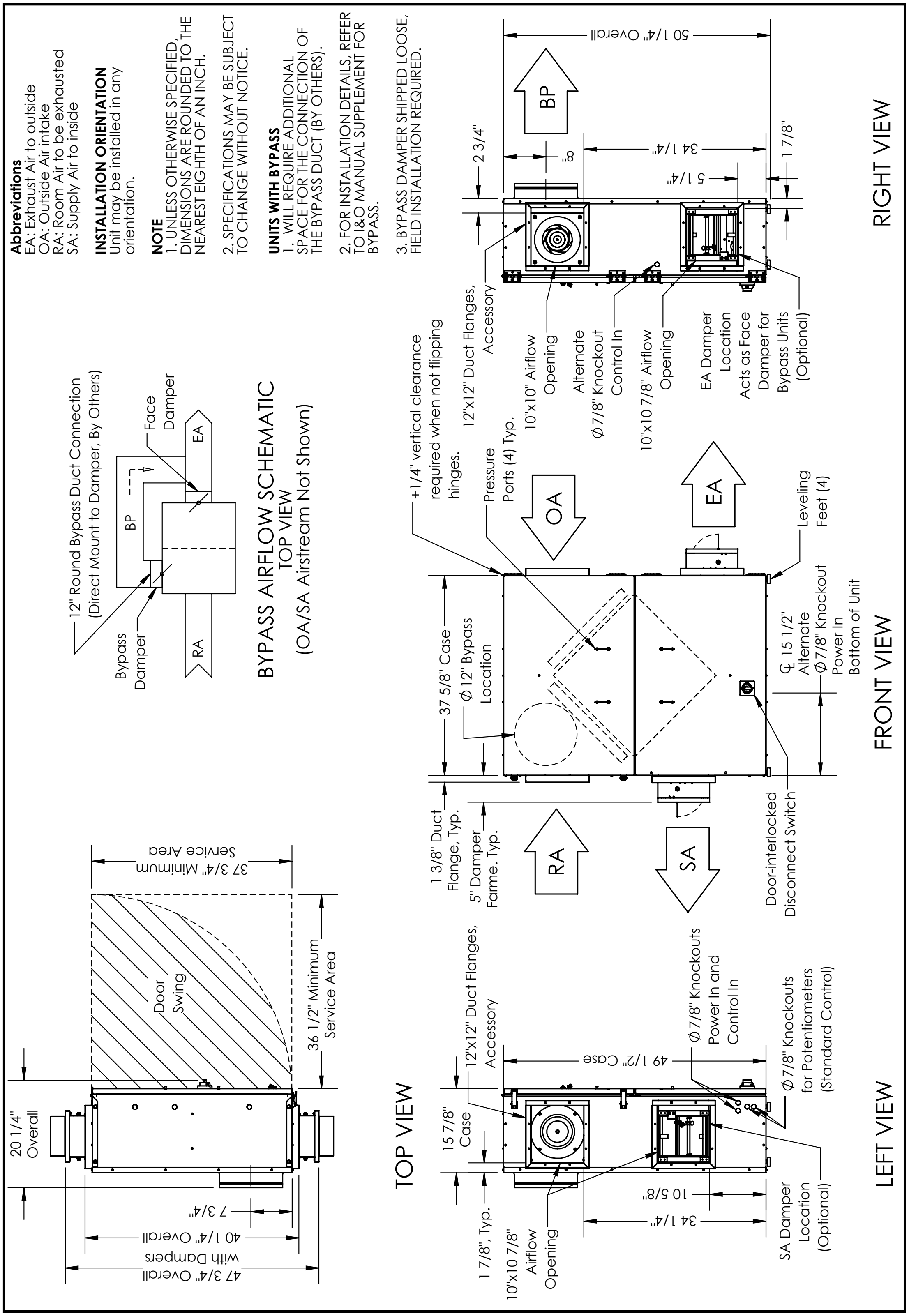


FIGURE 5.3.1 HE07INV DIMENSION DRAWING (VERTICAL AIRFLOW ORIENTATION)

5.4 MODEL HE07RT DIMENSION DRAWINGS

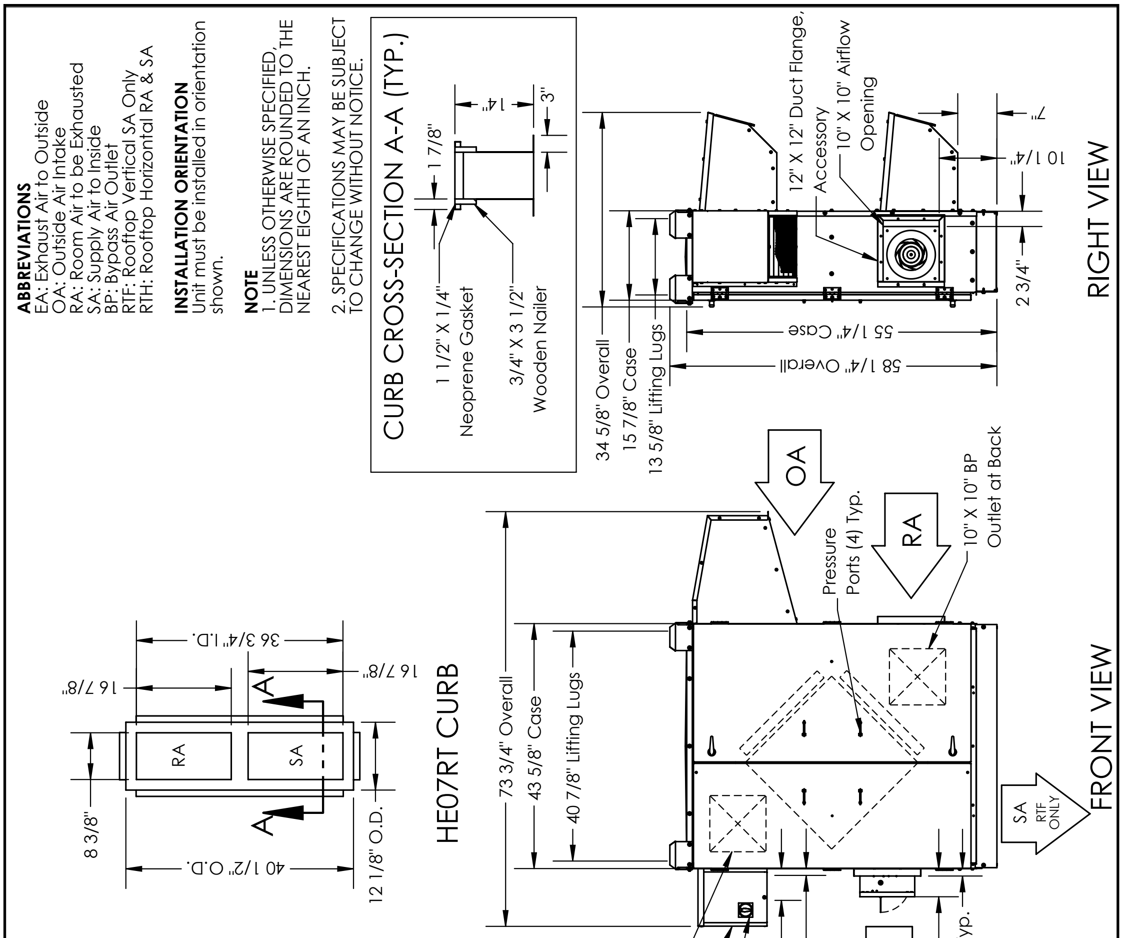


FIGURE 5.4.0 HE07RTF-H DIMENSION DRAWING

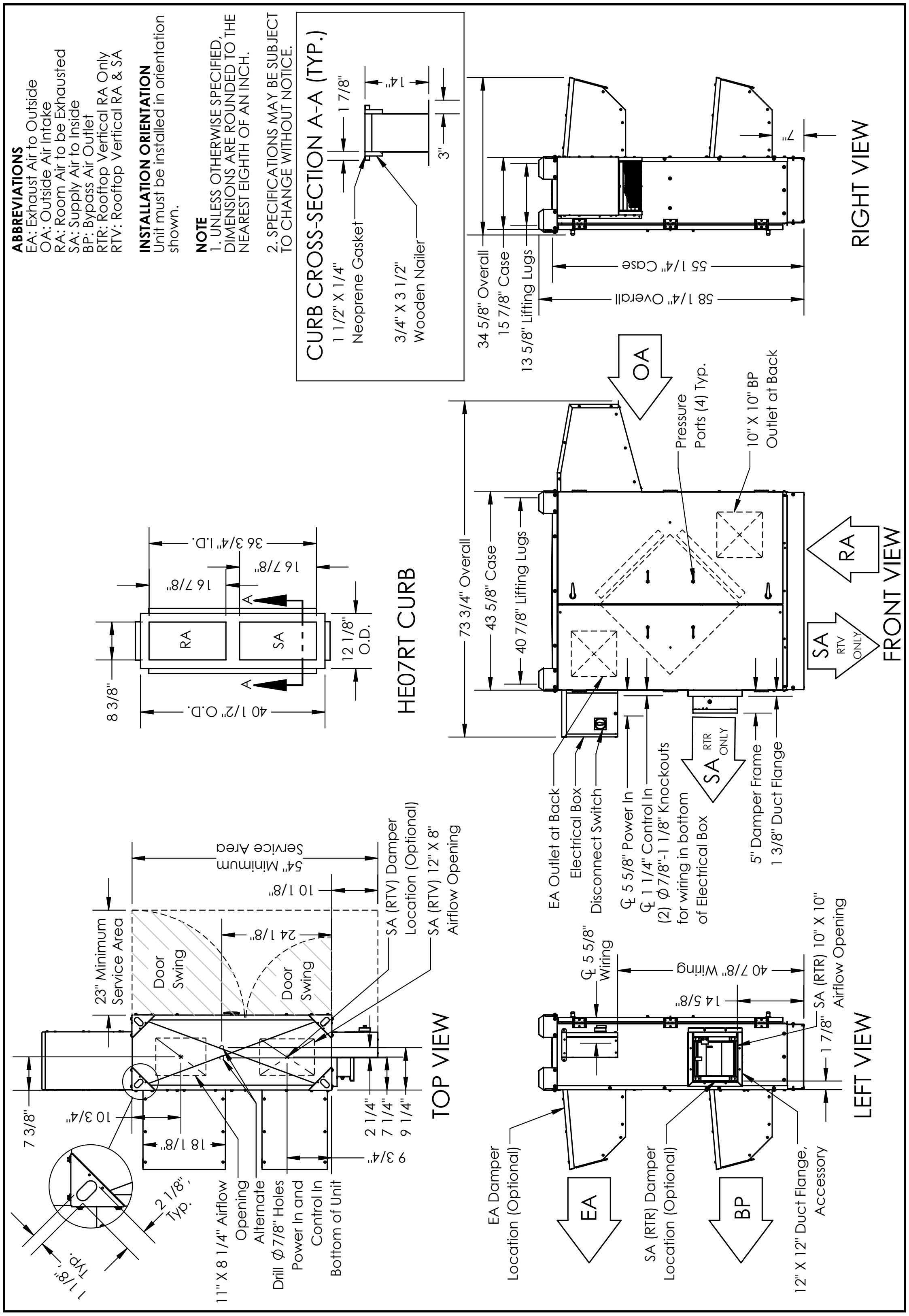


FIGURE 5.4.1 HE07RTR-V DIMENSION DRAWING

5.5 MODEL HE10IN DIMENSION DRAWINGS

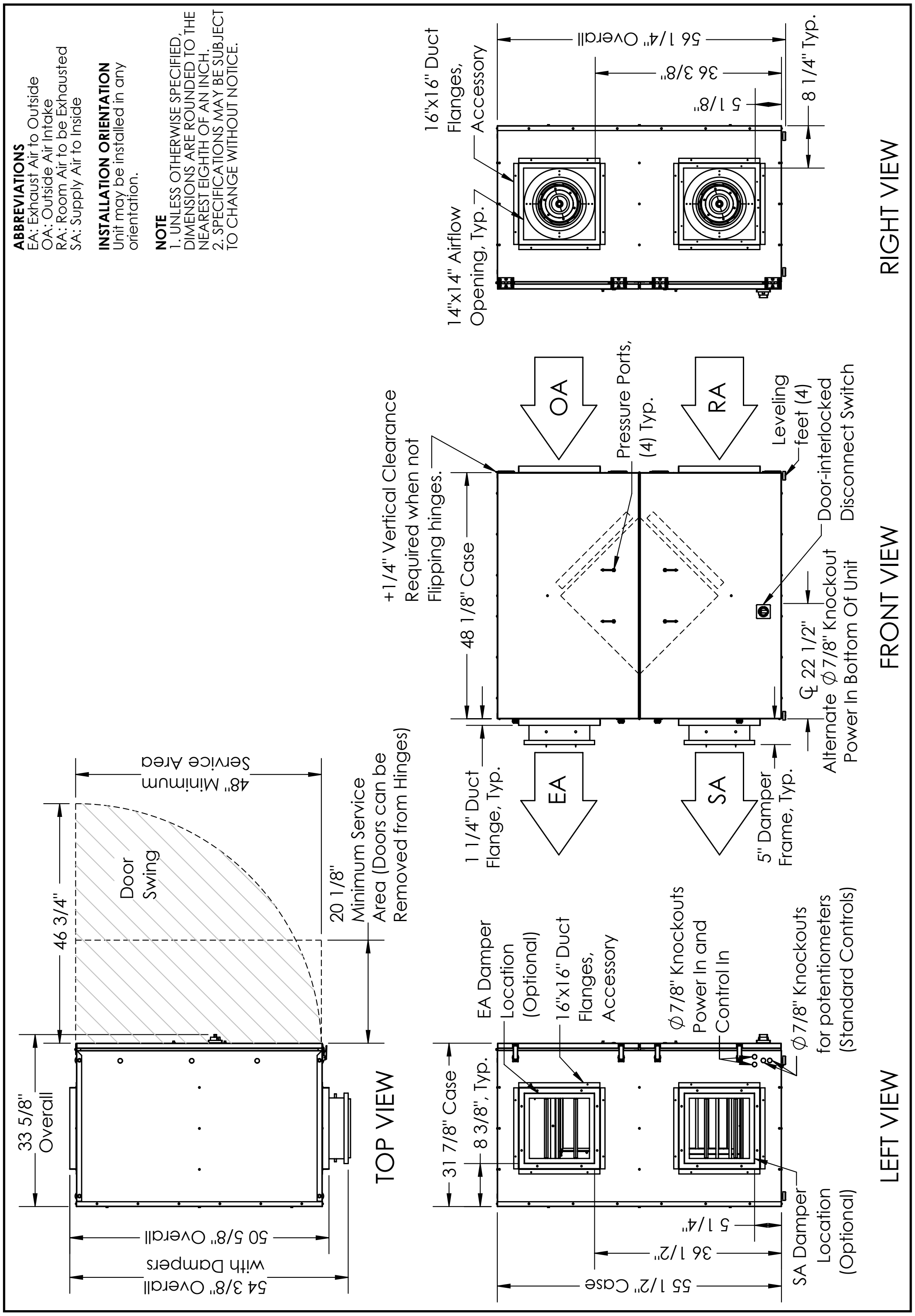


FIGURE 5.5.0 HE10INH DIMENSION DRAWING (HORIZONTAL AIRFLOW ORIENTATION)

RenewAire® Energy Recovery Ventilation

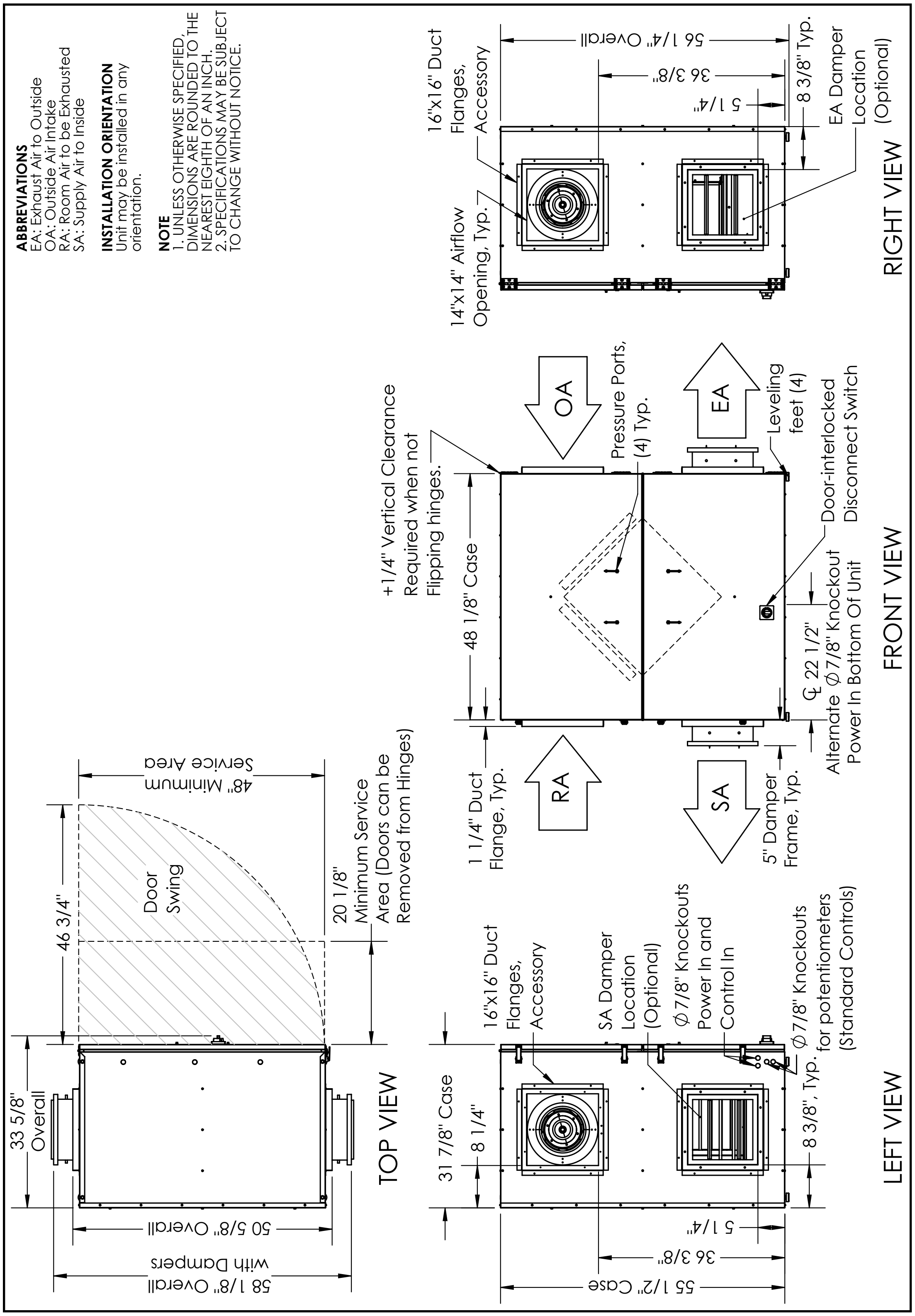


FIGURE 5.5.1 HE10INV DIMENSION DRAWING (VERTICAL AIRFLOW ORIENTATION)

5.6 MODEL HE10RT DIMENSION DRAWINGS

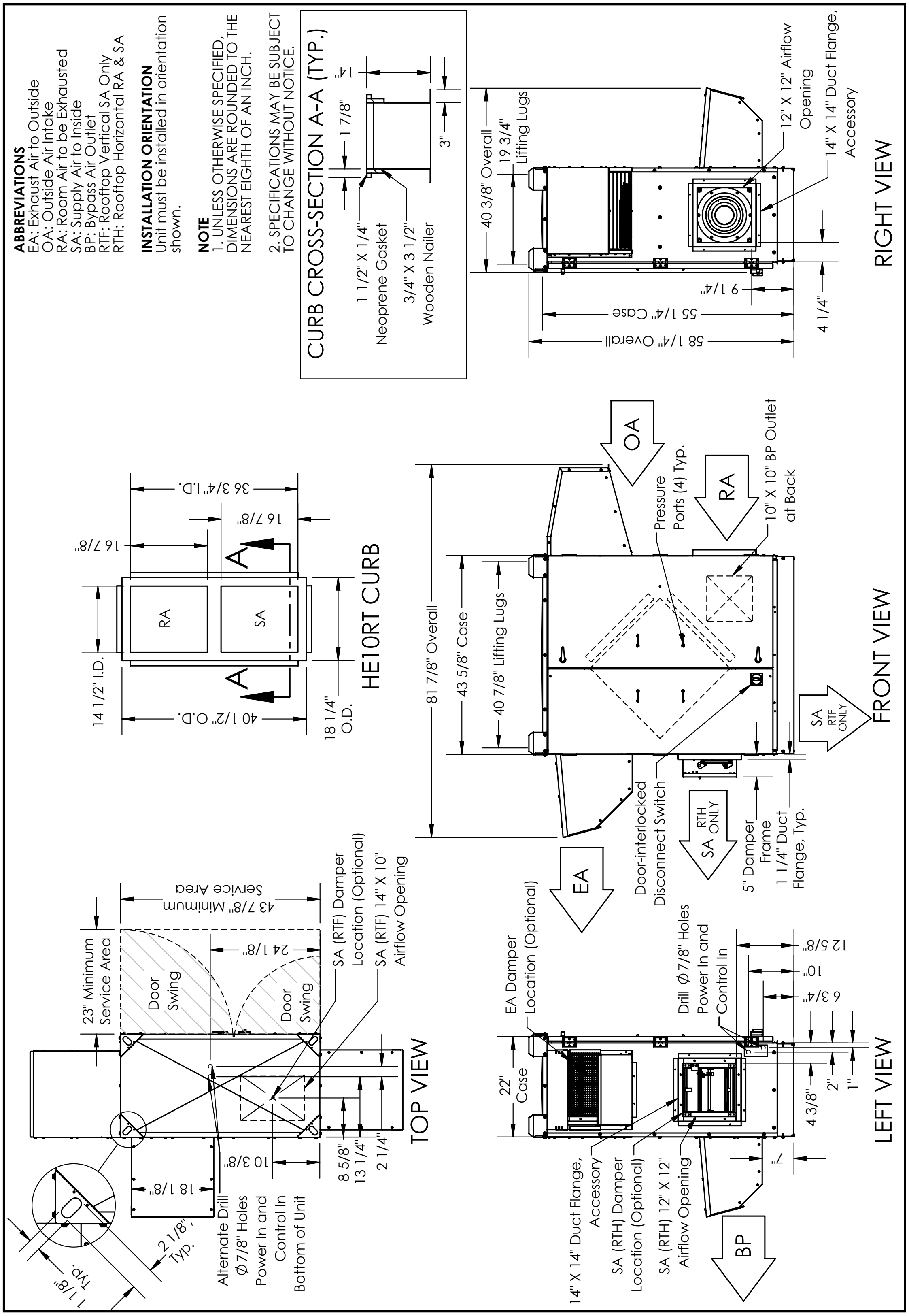


FIGURE 5.6.0 HE10RTF-H DIMENSION DRAWING

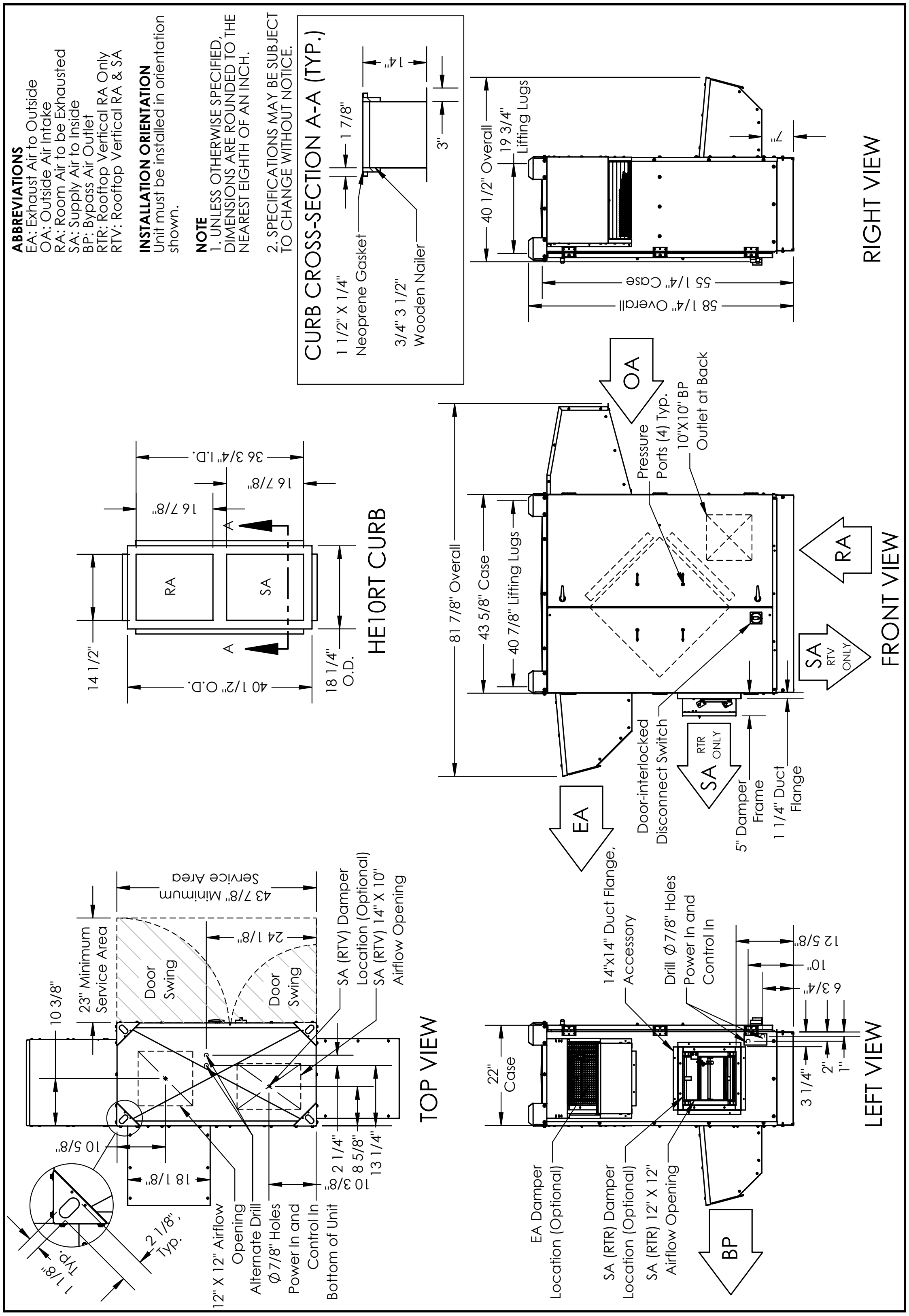


FIGURE 5.6.1 HE10RTR-V DIMENSION DRAWING

5.7 MODEL HE15IN DIMENSION DRAWINGS

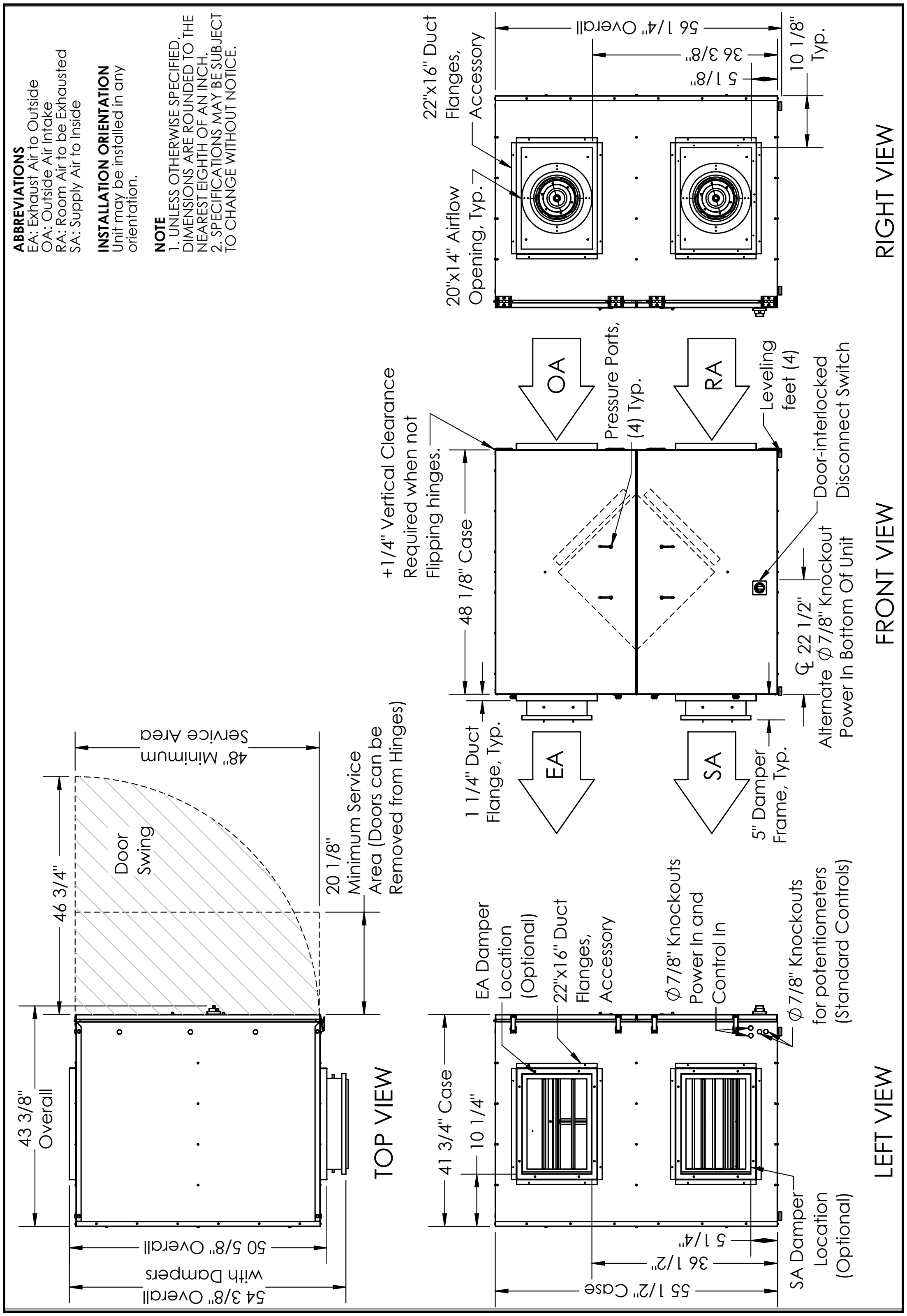


FIGURE 5.7.0 HE15INH DIMENSION DRAWING (HORIZONTAL AIRFLOW ORIENTATION)

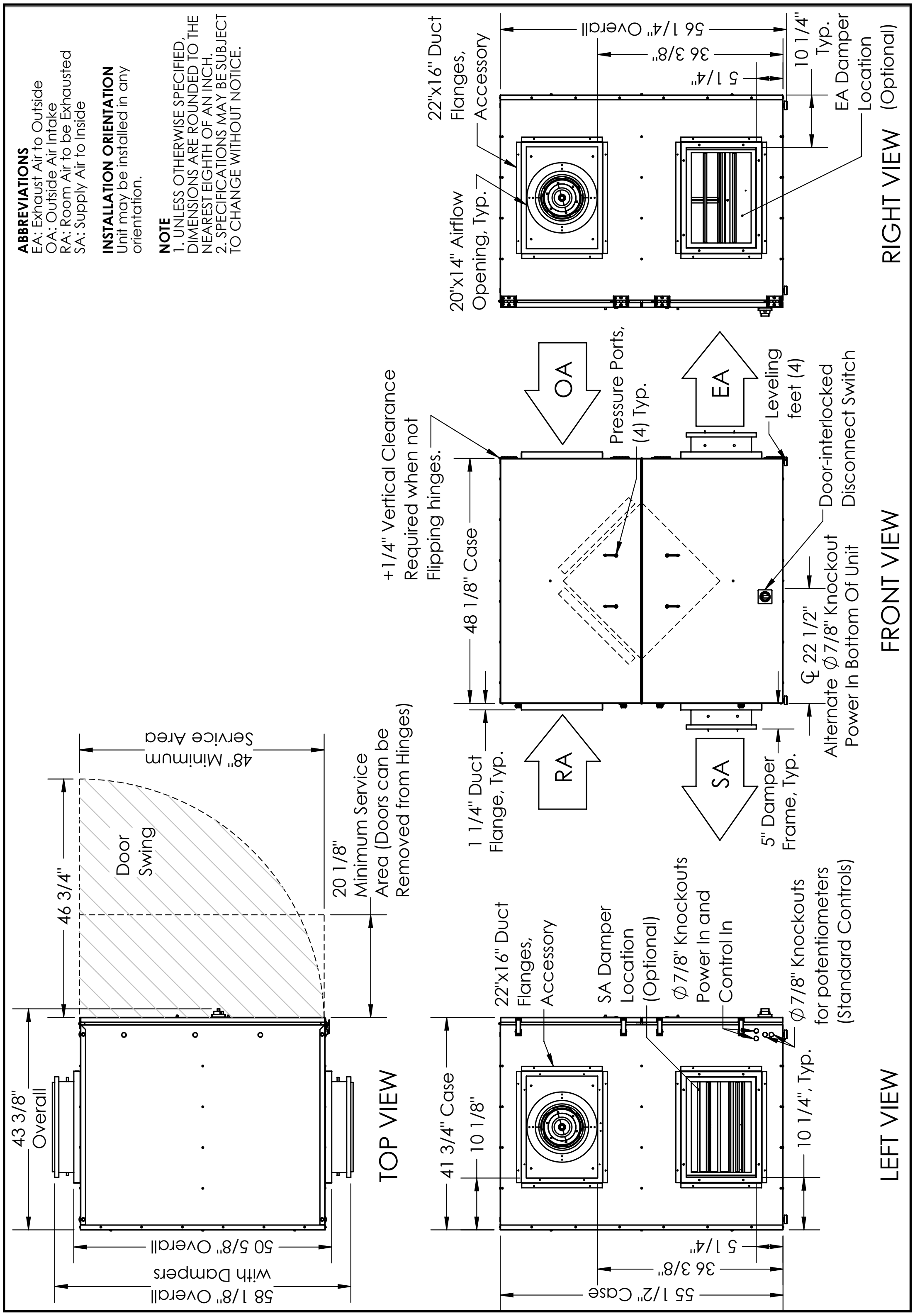


FIGURE 5.7.1 HE15INV DIMENSION DRAWING (VERTICAL AIRFLOW ORIENTATION)

5.8 MODEL HE15RT DIMENSION DRAWINGS

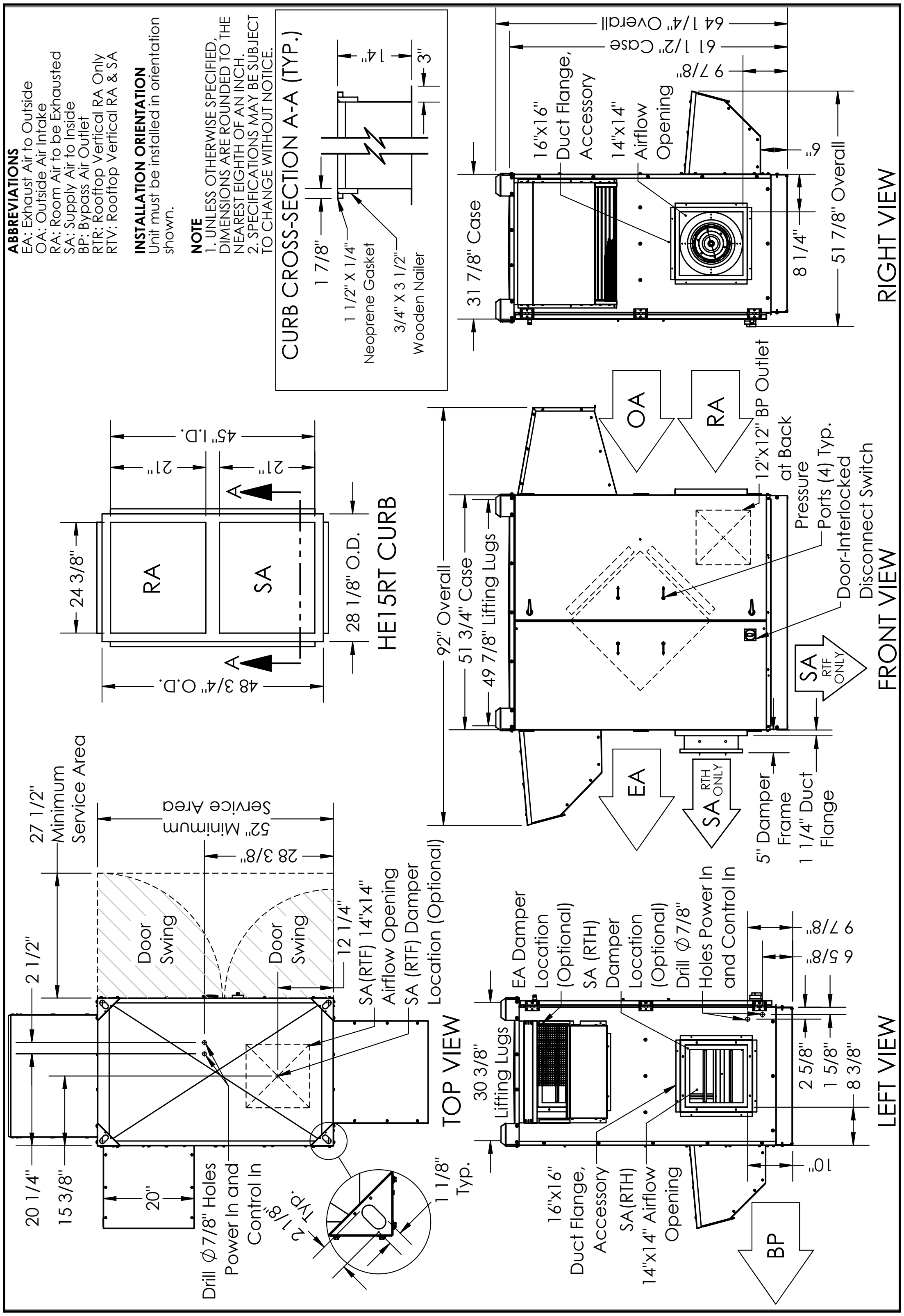


FIGURE 5.8.0 HE15RTF-H DIMENSION DRAWING

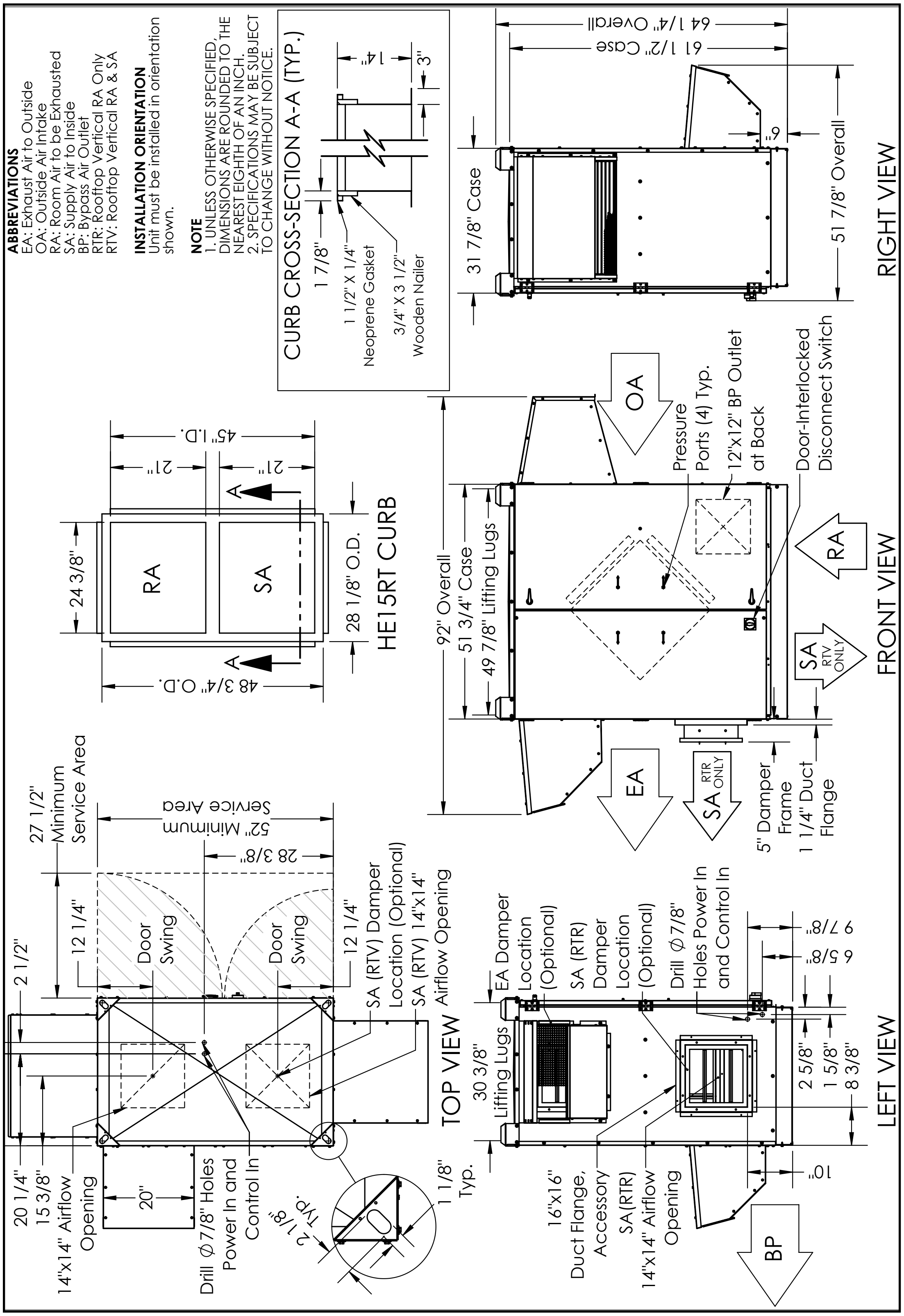


FIGURE 5.8.1 HE15RTR-V DIMENSION DRAWING

5.9 MODEL HE20RT DIMENSION DRAWINGS

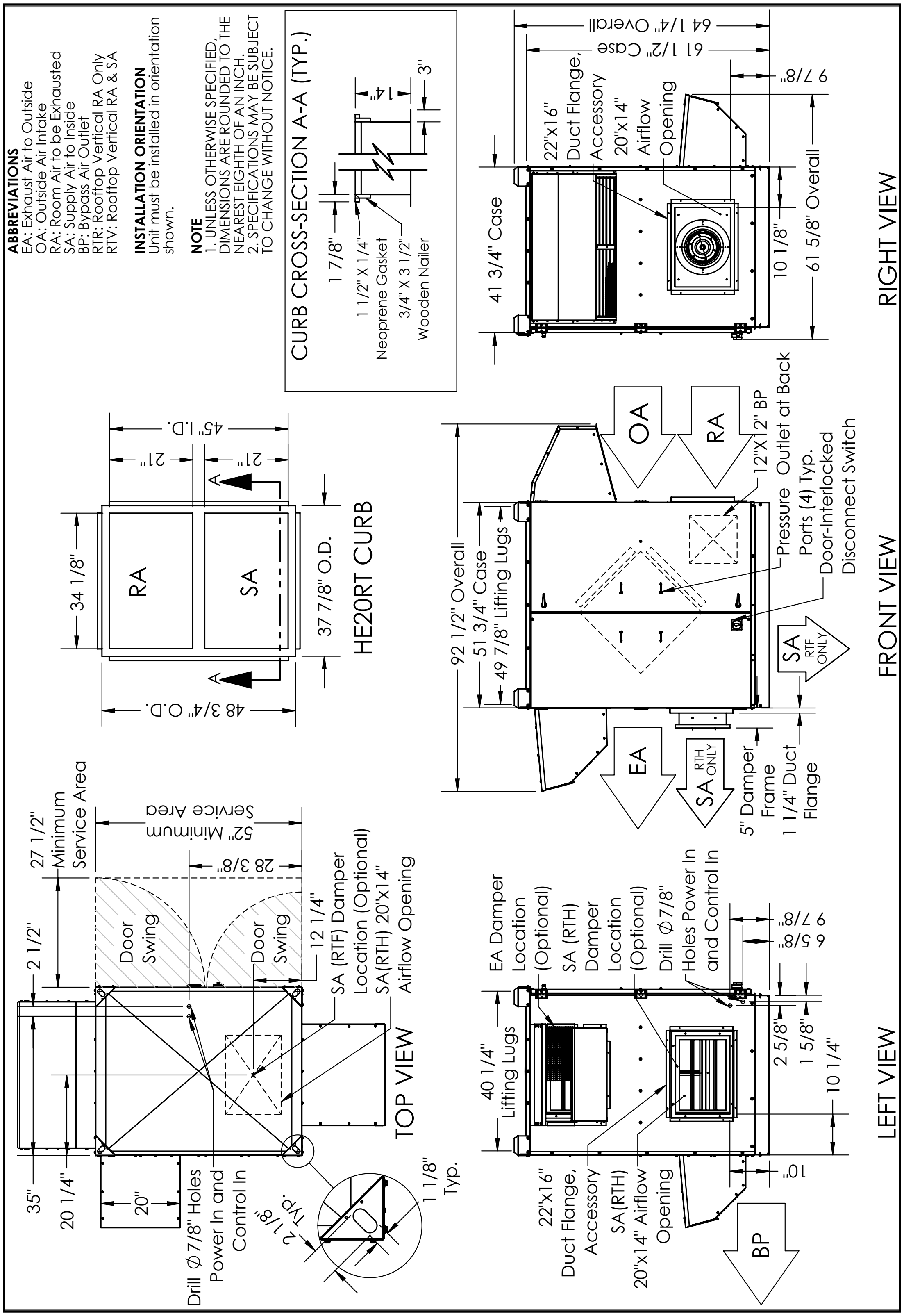


FIGURE 5.9.0 HE20RTF-H DIMENSION DRAWING (HORIZONTAL AIRFLOW ORIENTATION)

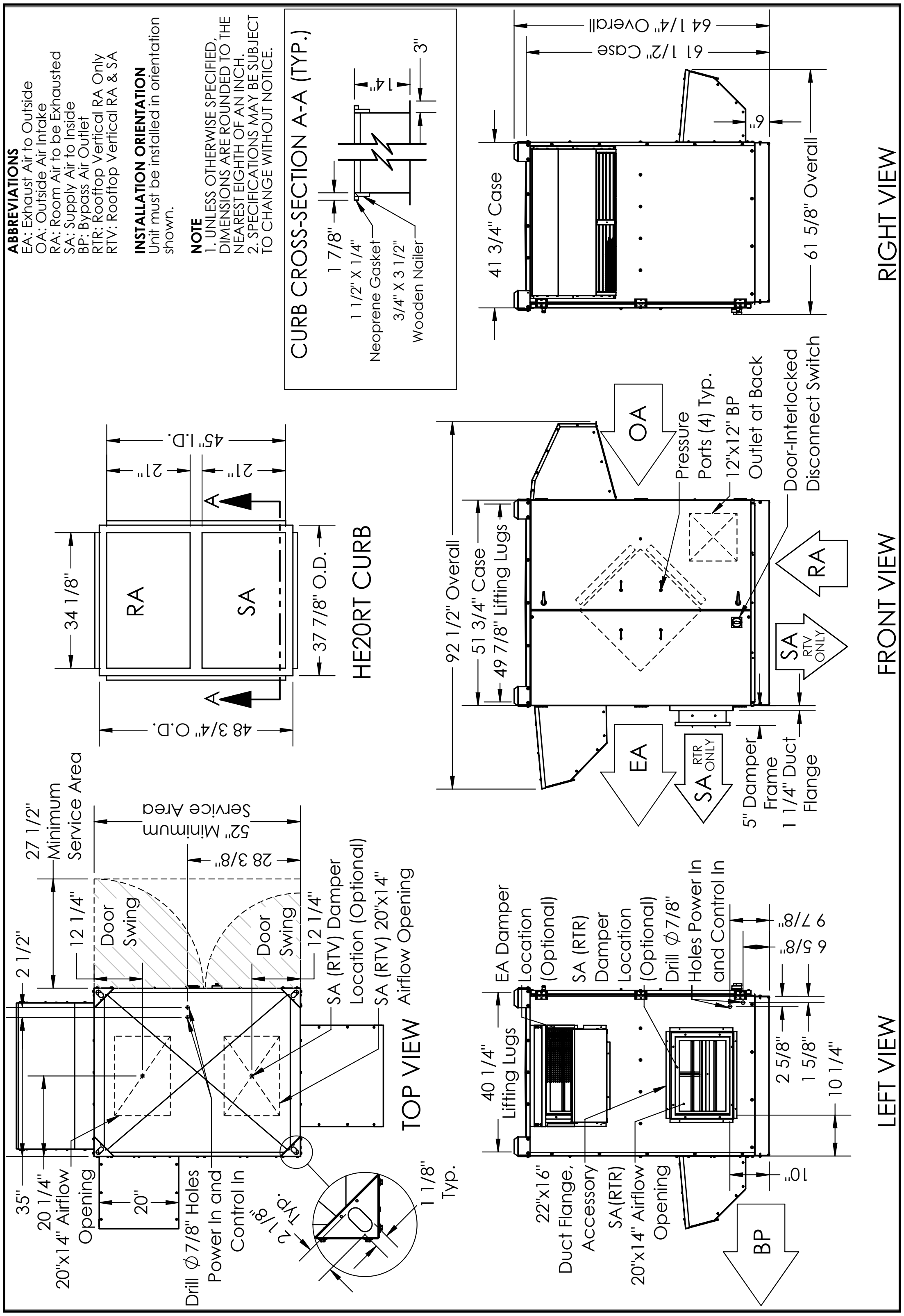


FIGURE 5.9.1 HE20RTR-V DIMENSION DRAWING (VERTICAL AIRFLOW ORIENTATION)

5.10 MODEL HE3XIN DIMENSION DRAWINGS

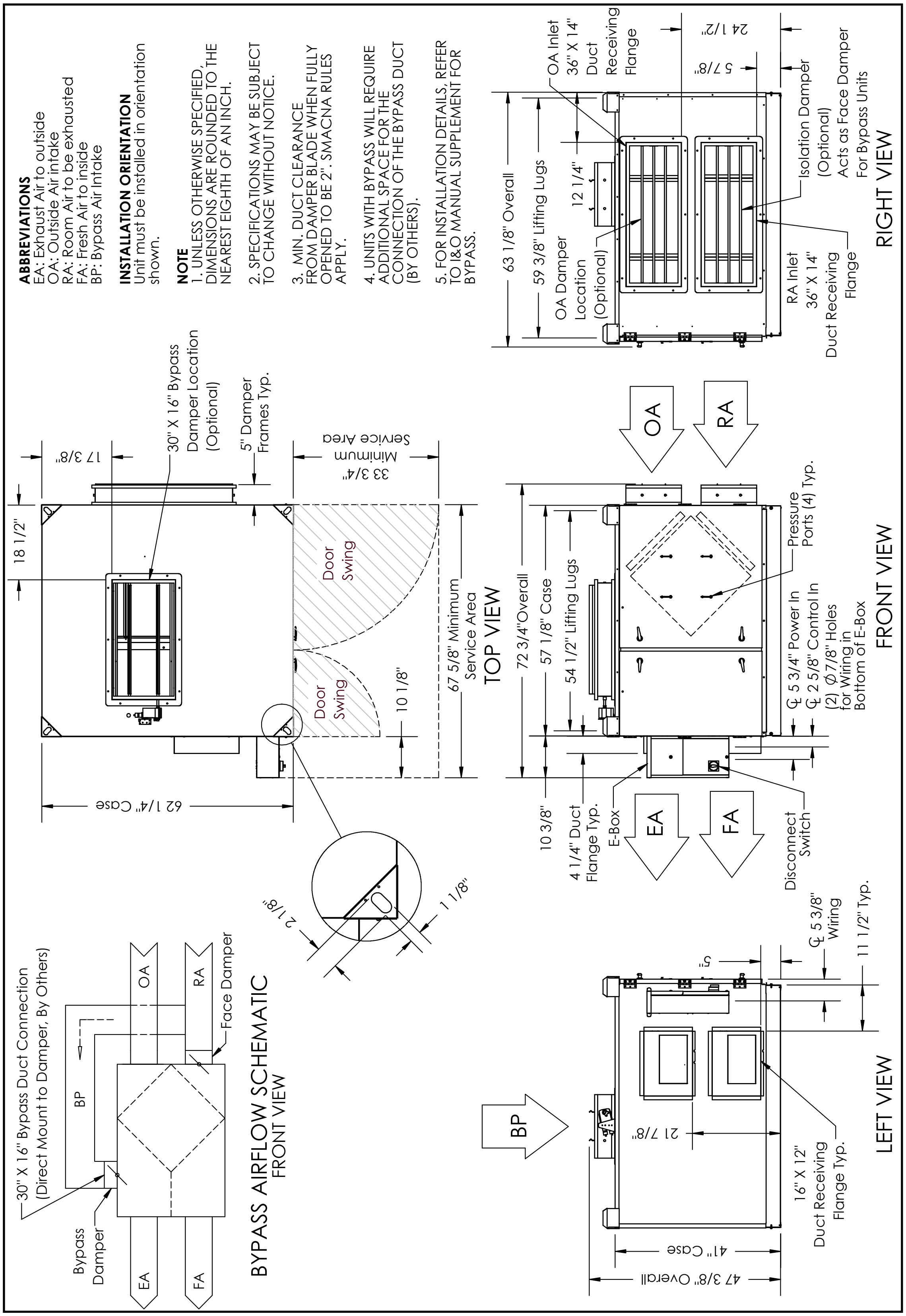


FIGURE 5.10.0 HE3XINH DIMENSION DRAWING (HORIZONTAL AIRFLOW ORIENTATION)

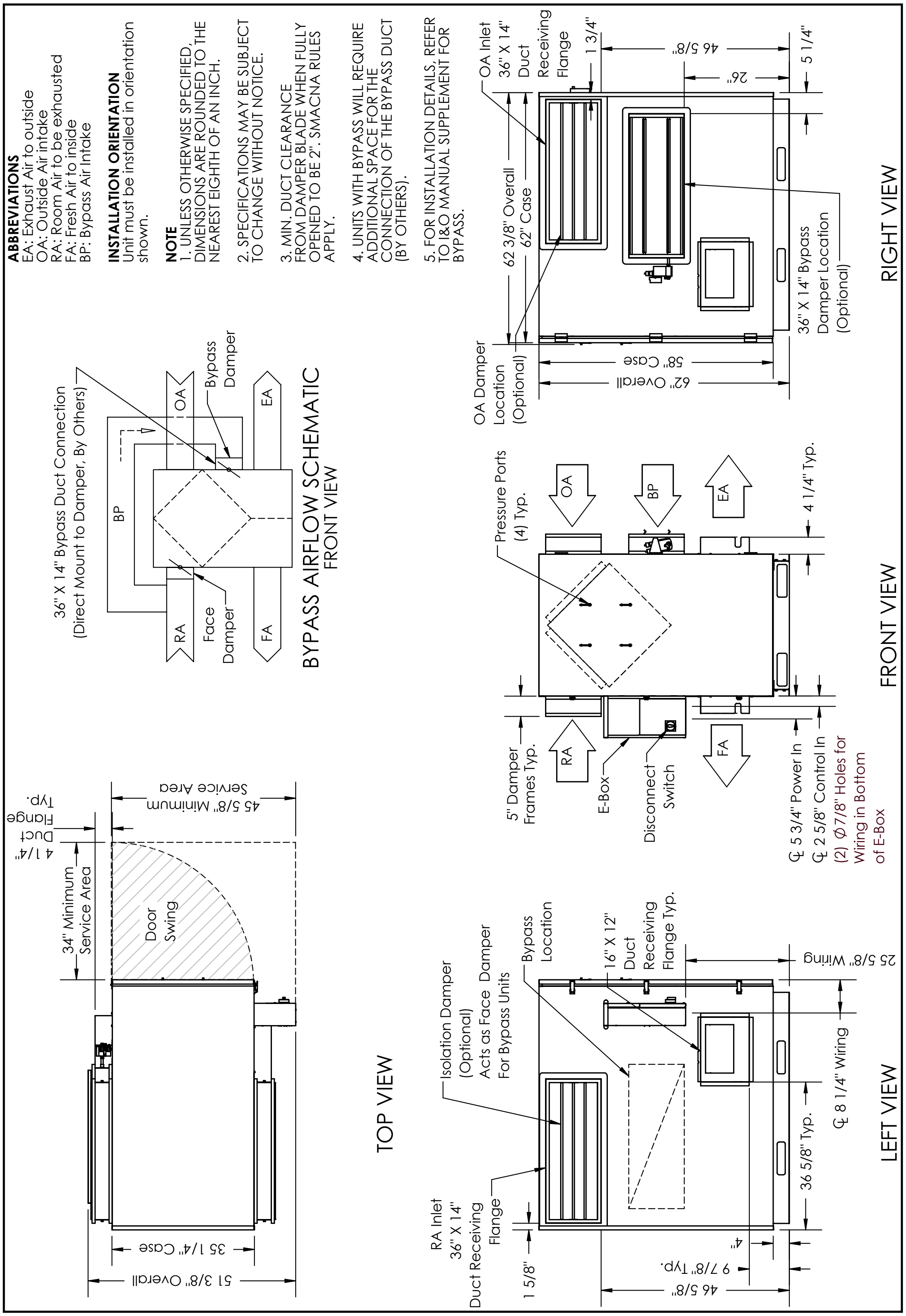


FIGURE 5.10.1 HE3XINV DIMENSION DRAWING (VERTICAL AIRFLOW ORIENTATION)

5.11 MODEL HE4XIN DIMENSION DRAWINGS

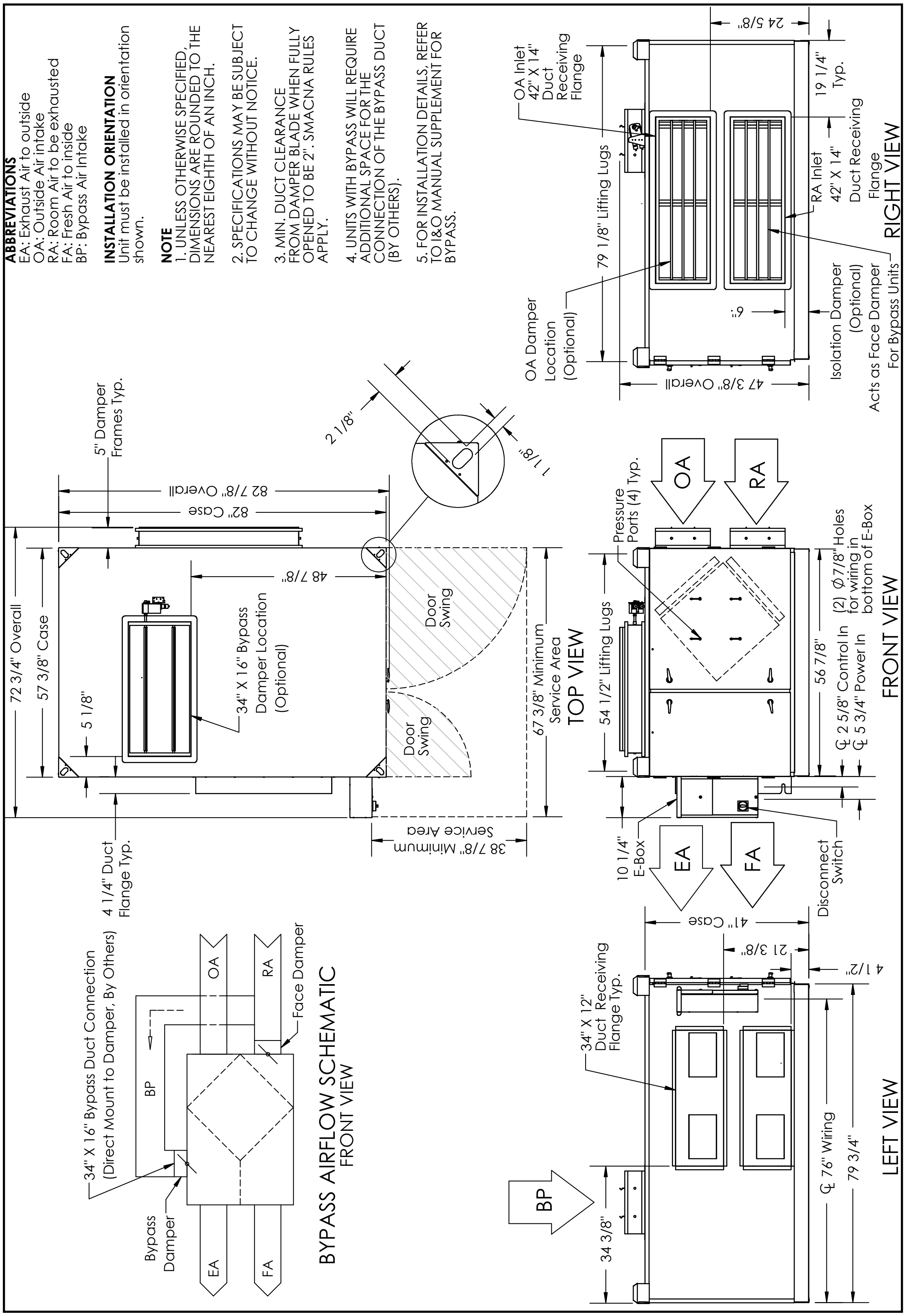


FIGURE 5.11.0 HE4XINH DIMENSION DRAWING (HORIZONTAL AIRFLOW ORIENTATION)

RenewAire Energy Recovery Ventilation

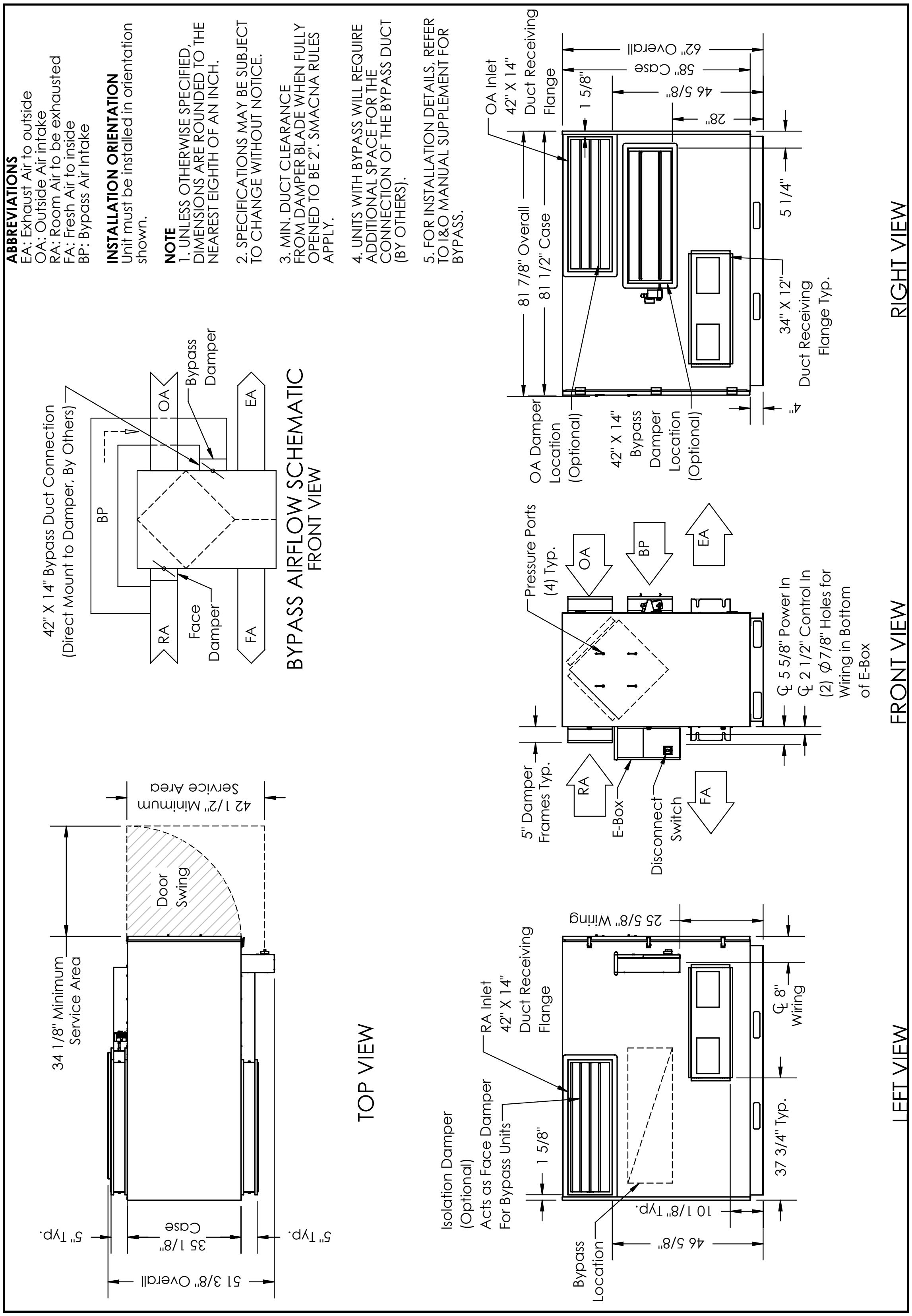


FIGURE 5.11.1 HE4XINV DIMENSION DRAWING (VERTICAL AIRFLOW ORIENTATION)

5.12 MODEL HE6XIN, HE7XIN, & HE8XIN DIMENSION DRAWING

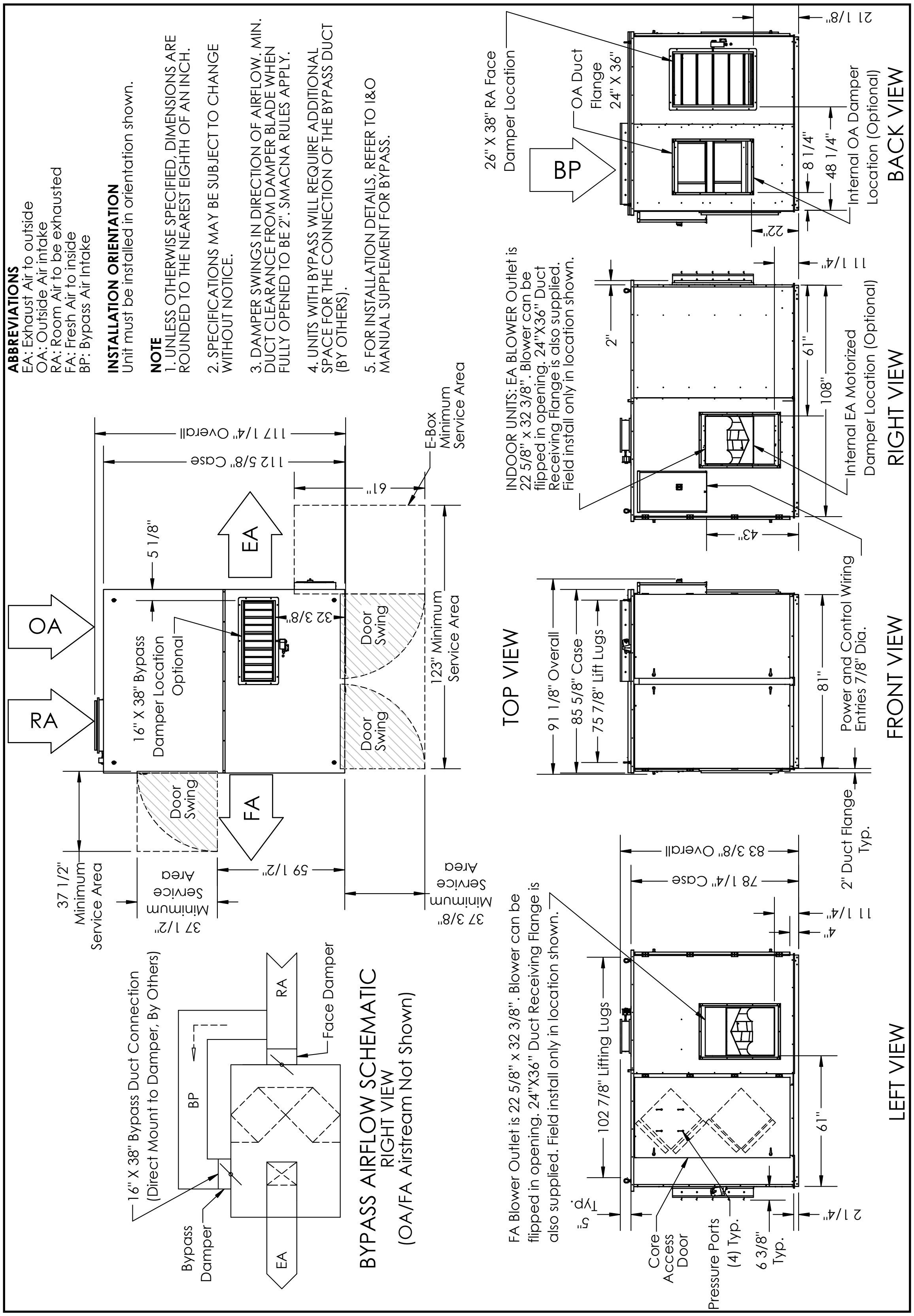


FIGURE 5.9.0 HE6XIN, HE7XIN, & HE8XIN DIMENSION DRAWING

6.0 OPERATION

6.1 UNIT START-UP DAMPER ADJUSTMENT

At time of unit start-up, it is recommended that the airstreams be balanced to achieve maximum efficiency of the ERV and the bypass system. This adjustment is not necessary for indoor ERVs with internal bypass. Balancing of the airstreams is accomplished by measuring air flow in the two airstreams and then adjusting the damper stops. This procedure will ensure that the static pressure drop through the bypass air path equals that of the energy recovery air path, which will cause the ventilation flow rate to be the same in both energy recovery mode and free cooling mode.

6.1.1 Tools Required for Damper Adjustment

Air velocity manometer or similar device.

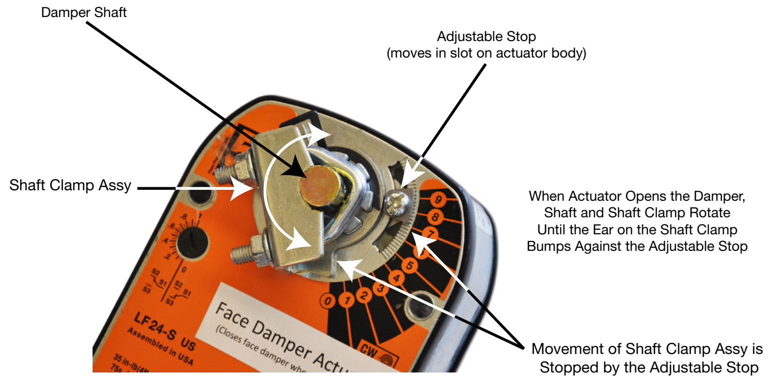
6.1.2 Damper Adjustment Procedure

The bypass duct size is designed to allow more air than is needed in regular ventilation and is combined with a damper and an adjustable damper actuator to achieve balanced airflow.

When the ERV is in ventilation/recovery mode (not in bypass), use an air velocity manometer or similar device to determine the airflow CFM in both airstreams. Take note of the airflow in the RA to EA airstream. The airflow CFM in the RA to EA airstream during free cooling mode should match the airflow CFM during energy recovery.

1. Before starting the balancing procedure, confirm that the supply, exhaust, and bypass connections have been connected properly.
2. Make sure all power to the unit is "OFF" and all disconnect switches are in the "OFF" position.
3. In order to put the unit in free cooling mode manually, first disconnect the face and bypass damper actuators from the internal wire harness.
4. Connect each actuator to a known 24V power source with an appropriate cable.
5. Power on the unit and the bypass damper, allowing at least 60 seconds for the actuator to move to the proper position and the flow to stabilize.
6. Using an air velocity manometer or similar device, read the amount of airflow in the RA to EA airstream.
7. The actuator on the bypass damper has an adjustable stop that can be loosened and set so that the airflow (CFM) when in bypass is similar to the airflow (CFM) when in ventilation/ recovery mode.
    a. If the airflow in recovery free cooling mode is too high, adjust the actuator so that the bypass damper opens to something less than 90 degrees (fully open). Repeat steps 5 and 6. When the desired flow rate is achieved move on to step 8.
8. Power down the unit and reconnect the damper actuators to the proper wire harnesses.

NOTE: Start-up is defined as the process of activating each system within a newly installed ERV after it has been properly installed in the system in which it is expected to operate. A full and proper start-up cannot be performed unless the Occupied Space with all its associated ductwork, controls, and design options are completed and intact and ready for full load testing.



Damper Actuator Stop Adjustment
(shown in fully closed position)

FIGURE 6.1.0 TYPICAL DAMPER ACTUATOR STOP ADJUSTMENT

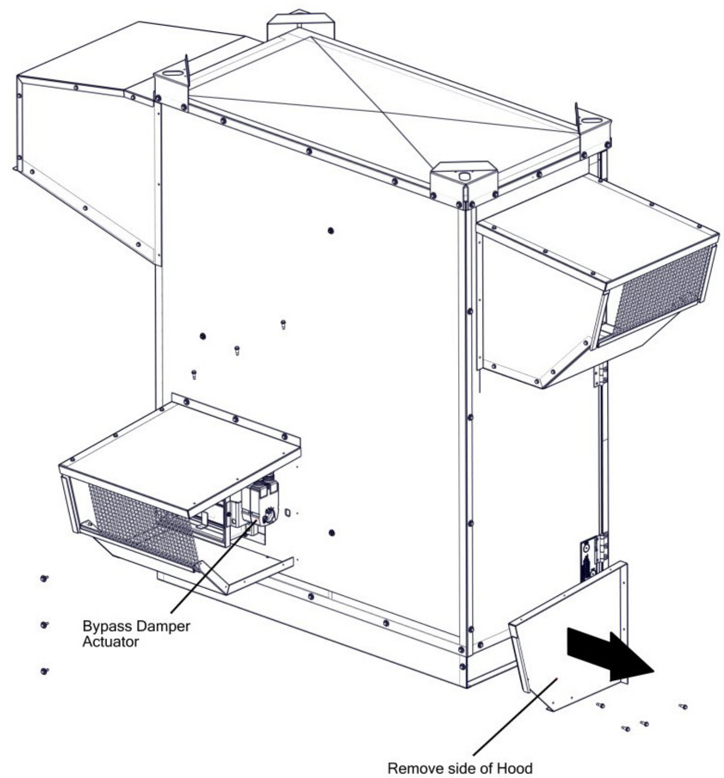


FIGURE 6.1.1 ACTUATOR LOCATION FOR ROOFTOP UNITS

6.2 UNIT START-UP CONTROLS ADJUSTMENT

At time of unit start-up, the bypass controls must be checked for correct settings. The controls have been pre-set at the factory but they may become out of adjustment during shipping and handling. Remember that there are two different kinds of controls: dry bulb and enthalpy. Follow the settings information for the type of controls on the unit.

6.2.1 Dry Bulb Control Settings

The dry bulb temperature controller features a thermistor placed in the OA airstream (internal to the unit) that senses the OA temperature as it enters the unit. There are two dials on the dry bulb temperature controller to adjust both the high and low limits of the bypass range, and each dial has a range of 40˚F to 95˚F. Any time the OA temperature rises through the temperature indicated on the high limit dial (labeled “H”), the controller calls for energy recovery. Any time the OA temperature falls through the temperature indicated on the low limit dial (labeled “L”), the controller also calls for energy recovery. Any time the OA temperature is above the low limit setpoint and below the high limit setpoint, the controller calls for bypass. Typical settings for the dry bulb temperature controller are 53˚F for the low limit setpoint and a high limit setpoint that matches the desired room air temperature.

6.2.2 Enthalpy Control Settings

The differential enthalpy controller features two enthalpy sensors placed in the OA and RA airstreams (internal to the unit), and a thermistor placed in the OA airstream (internal to the unit). There is one low limit temperature dial (labeled “L”) on the controller with a range of -20˚F to 120˚F. The controller compares the OA enthalpy to the room air enthalpy, and any time the OA enthalpy rises above the room air enthalpy, the controller calls for energy recovery. Any time the OA temperature falls through the low limit setpoint, the controller calls for energy recovery. Any time the OA enthalpy is below the room air enthalpy and the OA temperature is above the low limit setpoint, the controller calls for bypass. The typical setting for the low limit setpoint is 53˚F.

7.0 MAINTENANCE

The most critical factor in maintaining the ERV and Core Bypass is cleanliness. Experience on the part of the customer will dictate the frequency of maintenance activities. Air conditions can change seasonally or even day-by-day. Follow the maintenance instructions for the RenewAire ERV, as found in the its Installation, Operation and Maintenance Manual.

⚠ CAUTION

Risk of damage to the enthalpic core. Improper maintenance procedures may lead to damage of the enthalpic core.
When performing maintenance of the ERV or the core bypass, organic solvents are not to be used within the enclosure. In addition, high pressure air is not to be applied to the enthalpic core.

⚠ CAUTION

Risk of damage to the Core Bypass controls.
Whenever a control device is connected to or disconnected from the controls circuits, the power supply to the ERV must be disconnected. Lock and tag the disconnect switch or circuit breaker to prevent accidental reconnection of electric power.

NOTE: To ensure proper operation, DO NOT choose a low limit setpoint that is greater than the high limit setpoint.

NOTE: For ERVs with Enhanced or Premium controls, the following control adjustments do not apply. See *Enhanced Controls Supplement* or *Premium Controls Supplement*.

NOTE: It is possible to choose a low-limit setpoint that is greater than the high-limit setpoint for the dry-bulb controller. Doing so will result in a control scheme where there is no OA temperature that will satisfy both setpoint conditions and thus cause the controller to call for bypass.

8.0 TROUBLESHOOTING

⚠ CAUTION

Risk of damage to the Core Bypass controls.

Whenever a control device is connected to or disconnected from the controls circuits, the power supply to the ERV must be disconnected. Lock and tag the disconnect switch or circuit breaker to prevent accidental reconnection of electric power.

The most important resources for troubleshooting a suspected problem are the Sequence of Operation (SOO) and the wiring schematics. By referring to the SOO, it is possible to determine if an issue is a fault in the Core Bypass system or if the issue is a symptom of some other problem. Example: the ERV and its Bypass Option may be controlled by a BMS that is not allowing the ERV to go into free cooling mode. The symptom appears to be that the Core Bypass is not working, but the cause is actually the BMS.

Using the SOO, identify the stage in the sequence where the issue appears. Identify the reason why the core bypass is thought to be an issue. Using the electrical wiring schematics, further isolate the problem to a single component.

The SOO is found below, the electrical schematics are to be found in Section 5.0 of this document, and the ERV unit schematics are located in the red envelope in the unit electrical box.

NOTE: There is no known pattern of failures with Core Bypass units. This section is provided as a guide for the user.

8.1 SEQUENCE OF OPERATION (SOO) FOR ERVS WITH EXTERNAL BYPASS

1. Power is applied to the ERV
2. The bypass controls draw power from the onboard 24V transformer and begin sensing the OA and RA (differential enthalpy only) conditions.
3. One of two things occurs:
   Energy recovery mode
   - The sensors report to the controller that the ERV should be in energy recovery mode and the controller supplies power to the face damper actuator.
   - The face damper begins to power open, which may take up to 60 seconds.
   - Powering on the OA blower will begin immediately if there is no isolation damper on that airstream, or will be delayed until the isolation damper has been opened.
   - Powering on the EA blower will be delayed until the face damper has been opened.

   Recovery free cooling mode
   - The sensors report to the controller that the ERV should be in recovery free cooling mode and the controller immediately supplies power to the bypass damper actuator.
   - The bypass damper begins to power open, which may take up to 60 seconds.
   - Powering on the OA blower will begin immediately if there is no isolation damper on that airstream, or will be delayed until the isolation damper has opened.
   - Powering on the EA blower will be delayed until the bypass damper has been opened.
4. If there is any significant distance between the ERV OA inlet and the intake at the building wall, it may take some time for the outdoor air to reach the ERV's sensors. Allow for the ERV airflows to reach a steady state, during which time the unit could change modes.
5. When powering down the ERV, the blowers will turn off and both the bypass and face dampers will return to their default positions. The bypass damper and the face damper will be closed. Any installed isolation dampers will also spring closed.

NOTE: If a controls contractor was engaged to set-up the controls during installation of the ERV, refer to that contractor's documentation regarding settings and connections.

8.2 SEQUENCE OF OPERATION (SOO) FOR ERVS WITH INTERNAL BYPASS

1. Power is applied to the ERV
2. The bypass controls draw power from the onboard 24V transformer and begin sensing the OA and RA (differential enthalpy only) conditions.
3. One of two things occurs:

   Energy recovery mode

   - The sensors report to the controller that the ERV should be in energy recovery mode and the controller does not supply power to the face/bypass damper actuator.
   - Any isolation dampers begin to power open, which may take up to 60 seconds. Powering on the blowers will begin immediately if there is no isolation damper on that airstream, or will be delayed until the isolation damper has been opened.

   Recovery free cooling mode

   - The sensors report to the controller that the ERV should be in recovery free cooling mode and the controller immediately supplies power to the face/bypass damper actuator.
   - The bypass damper begins to power open and the face damper is closed simultaneously, which may take up to 60 seconds.
   - Any isolation dampers begin to power open, which may take up to 60 seconds. Powering on the blowers will begin immediately if there is no isolation damper on that airstream, or will be delayed until the isolation damper has been opened.
4. If there is any significant distance between the ERV OA inlet and the intake at the building wall, it may take some time for the outdoor air to reach the ERV's sensors. Allow for the ERV airflows to reach a steady state, during which time the unit could change modes.
5. When powering down the ERV, the blowers will turn off and all dampers will return to their default positions. The face damper will be open and the bypass damper will be closed. Any installed isolation dampers will also spring closed.

CASE	STEPS TO IDENTIFY MALFUNCTIONING COMPONENTS	ACTION
Mechanical Issues: Either the face damper or the bypass damper does not open when the ERV enters free cooling mode or energy recovery mode.	1. Ensure that damper blades are not blocked or otherwise obstructed in the duct. 2. Ensure that the actuator has not come loose from the damper blade shaft. 3. Apply 24V power to the actuator to confirm that the actuator moves when it is powered, and spring returns when it is unpowered. Each damper should open when powered.	1. If the damper blades are blocked, remove any obstruction. 2. If the actuator clamp is loose, re-tighten the clamp on the blade shaft. 3. If the actuator does not respond or behave as expected when powered, replace the actuator.
Control Issues: Neither damper responds when the unit is turned on or changes modes.	4. Ensure that the ambient conditions are correct for the unit to be in free cooling mode. For dry bulb controls: The air entering the OA inlet for the unit has a temperature between the high and low limit settings. (NOTE: The low limit setting must be below the high limit setting in order for the unit to be in free cooling mode.) For enthalpic controls: The OA temperature is above the low limit setting and the OA enthalpy is less than the RA enthalpy.	If the air conditions are such that the ERV should be in free cooling mode and it is not, use the SOO to isolate the control component that seems to be malfunctioning and replace it.

9.0 FACTORY ASSISTANCE

In the unlikely event that you need assistance from the factory for a specific issue with the ERV or its Bypass Economizer Option, make sure that you have the information called for in the Unit Records pages at the front of this manual. The person you speak with at the factory will need that information to properly identify the unit and the installed options.

To contact RenewAire Customer Service:

Call 800-627-4499

Email: RenewAireSupport@RenewAire.com

Remember that RenewAire Customer Service can only assist with the ERV and its options, it cannot resolve engineering issues that result from air handling system design by others.

10.0 WARRANTY

The ERV Bypass Economizer Option is covered under the standard RenewAire ERV warranty. A copy of the warranty is included with the unit manuals. If the warranty should be lost or misplaced, a PDF version can be downloaded from:

https://www.renewaire.com/support/warranty/

About RenewAire

For over 40 years, **RenewAire has been a pioneer in enhancing indoor air quality (IAQ)** in commercial and residential buildings of every size. This is achieved while maximizing sustainability through our fifth-generation, static-plate, enthalpic-core **Energy Recovery Ventilators (ERVs) that optimize energy efficiency**, lower capital costs via load reduction and decrease operational expenses by minimizing equipment needs, resulting in significant energy savings. Our ERVs are competitively priced, simple to install, easy to use and maintain and have a quick payback. They also enjoy the industry's best warranty with the lowest claims due to long-term reliability derived from innovative design practices, expert workmanship and **Quick Response Manufacturing (QRM)**.

As the pioneer of static-plate core technology in North America, RenewAire is the largest ERV producer in the USA. We're **committed to sustainable manufacturing** and lessening our environmental footprint, and to that end our Waunakee, WI plant is 100% powered by wind turbines. The facility is also one of the few buildings worldwide to be LEED and Green Globes certified, as well as having achieved ENERGY STAR Building status. In 2010, RenewAire joined the Soler & Palau (S&P) Ventilation Group in order to provide direct access to the latest in energy-efficient air-moving technologies. For more information, visit: renewaire.com

201 Raemisch Road | Waunakee, WI | 53597 | 800.627.4499 | RenewAire.com

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