



## **Broan® Automatic Make-Up Air Damper**

### **Application Guide**



**Residential Use Only**

**Read and Save this Information**

**INSTALLER: Leave this guide with the consumer.**

Broan–NuTone LLC

Hartford, Wisconsin

[www.broan.com](http://www.broan.com)

800-558-1711

99044565B

## About the Application Guide

Congratulations on your purchase of the Broan Automatic Make-Up Air Damper! This product, called the “Damper” throughout this guide, is designed to keep your home well ventilated and comfortable for years to come. The Damper works automatically once it's properly installed with a compatible Broan®, NuTone®, or BEST® exhaust device, so you won't have to give your home's exhaust systems a moment's thought.

Please read this Guide thoroughly, noting the specific applications for which the Broan Automatic Make-Up Air Damper is intended, as well as the different installation approaches.

Installers – note that a separate set of Installation Instructions for the Damper is available from Broan. The Application Guide does not contain specific installation instructions.

## Important Information about the Application Guide

Please take note that this guide uses the following symbols to emphasize particular information:

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| <b>⚠ WARNING</b>                                                                                                        |
| Identifies an instruction which, if not followed, might cause serious personal injuries including possibility of death. |

|                                                                                                    |
|----------------------------------------------------------------------------------------------------|
| <b>⚠ CAUTION</b>                                                                                   |
| Denotes an instruction which, if not followed, may severely damage the unit and/or its components. |

NOTE: Indicates supplementary information needed to fully complete an instruction.

We welcome any suggestions you may have concerning this manual and/or the product, or ways to better serve you. Please forward all correspondence at the address below:

Broan-NuTone LLC  
Indoor Air Quality Marketing  
926 W. State St.,  
Hartford, WI 53027  
1-800-558-1711

## About the Broan Automatic Make-Up Air Damper Unit

|                  |
|------------------|
| <b>⚠ WARNING</b> |
|------------------|

TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSON(S)  
OBSERVE THE FOLLOWING:

1. This Damper is intended for residential installation only.
2. Installation work and electrical wiring must be done by a qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction codes and standards.
3. This Damper is not designed to provide combustion air for fuel-burning appliances.
4. Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment to prevent backdrafting. Follow the heating equipment manufacturer's guideline and safety standards such as those published by the National Fire Protection Association (NFPA), and the International Fuel Gas Code (IFGC), and the local code authorities.

5. Do not connect the Damper directly to a combustion appliance of any type.
6. Before servicing or cleaning Damper, switch power off at service panel and lock the service disconnecting means to prevent power from being switched on accidentally. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.
7. When performing installation, servicing or cleaning the Damper, it is recommended to wear safety glasses and gloves.
8. The Damper is approved for use with compatible Broan, BEST, and NuTone products. Unless specifically noted, Broan does not warrant proper operation of the Damper if used in conjunction with other brands of exhaust devices.
9. Ensure that the intake area for the outdoor air duct is free of potential obstructions and maintained regularly.
10. When cutting or drilling into wall or ceiling, do not damage electrical wiring or other hidden utilities.
11. When notching or drilling into framing including floor supports, rim joists, and wall studs, comply with code and manufacturer limitations on allowable modifications to these structural members.
12. This Damper is intended to be installed within the home in a location protected from moisture.
13. This unit must be in an accessible location which allows for inspection of the Damper.
14. Use this Damper only in the manner intended by the manufacturer. If you have questions, contact the manufacturer at the address or telephone number listed in this document.
15. When federal, provincial, state, or local legislation or building codes comprise more restrictive installation and/or certification requirements, the aforementioned requirements prevail on those of this document, and the installer agrees to conform to these at his own expense.

### **CAUTION**

1. Damper is for general household ventilation only. Do not use for ventilation near hazardous materials or explosives.
2. Damper shall not be installed to introduce air from crawlspaces, garages, attics, adjacent dwelling units, or other locations within the building shell. Damper shall be installed to introduce air directly from outdoors.
3. Do not run the outdoor air duct directly above or closer than 2 feet to any furnace or its supply plenum, boiler, or other heat producing appliance.
4. Any ductwork used in conjunction with the Damper must be installed in compliance with all local and national codes that are applicable.
5. Do not operate the Damper for fresh outdoor air introduction until all system filters, including the central duct system filter, have been installed per the system design.

6. Please read the Damper specification label on the product for further information and requirements.
7. The Damper's outdoor air intake, ducting, and any filters should be inspected and maintained on a regular basis.

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## 1. Definitions & Key Terms

Within the scope of this document, several important terms are used. To give product installers and users a clear understanding, several key terms are defined below.

*Available static pressure:* for the purpose of this guide, available static pressure represents the amount of suction that is available to draw in outdoor make-up air when the central air handler is running. Manual D, the industry standard for sizing residential duct systems, notes that an available static pressure between -0.2 and -0.35 in w.g. is typical at the return plenum. When estimating the flow through a make-up air damper that is connected to a return trunk, provide the available static pressure at the operating speed of the blower that will be used when the make-up air damper is engaged.

*Natural draft vented appliances:* a category of combustion appliances, including some water heaters, wood burning stoves, and fireplaces, which rely upon the buoyancy of the hot combustion exhaust gas to force it upward through a flue pipe and out of the house. Such appliances do not use a fan to assist in exhausting combustion gasses outdoors.

*Combustion air:* The air provided to fuel-burning equipment including air for fuel combustion, draft hood dilution and ventilation of the equipment enclosure.<sup>1</sup>

*Depressurization:* a condition of lower pressure in one zone with respect to another. For example, a kitchen with a very large range hood flow rate (~ 1000 cfm) may be depressurized with respect to outdoors when the range hood is on. This is due to the fact that the range hood is pulling air out of the kitchen space at a rate greater than the rate at which fresh outdoor air replaces the exhaust air. Pressure levels in homes are typically measured in units called Pascals (1 Pa = 0.004 in w.g.), and are measured “with respect to” another zone such as outdoors or a different part of the home.

*Design depressurization limit:* the designer-selected maximum depressurization of the home with respect to the outdoors, selected by the designer and assuming indoor spaces freely communicate with each other. Recommendations from the Building Performance Institute for maximum acceptable depressurization in a home depend on the types of combustion appliances that are installed indoors, as follows. Lower values are more conservative.

- Orphan natural draft water heater (including outside chimneys): 2 Pa
- Natural draft boiler or furnace commonly vented with water heater: 3 Pa
- Natural draft boiler or furnace with vent damper commonly vented with water heater; Individually vented natural draft boiler, furnace, or domestic water heater; or Mechanically assisted draft boiler or furnace commonly vented with water heater: 5 Pa
- Mechanically assisted draft boiler or furnace alone, or fan assisted domestic hot water alone: 15 Pa
- Chimney-top draft inducer (Exhaust-type or equivalent); High static pressure flame retention head oil burner; or Direct-vented appliances/Sealed combustion appliances: 50 Pa

*Design exhaust rate:* the flow rate that must be offset by make-up air. Depending on friction losses and fittings along the length of the exhaust duct, the design exhaust rate may be less than the exhaust appliance's nominal rated flow.

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<sup>1</sup> Sourced or adapted from the 2012 International Residential Code.

*Direct-vented appliance:* a fuel-burning appliance with a sealed combustion system that draws all air for combustion from the outside atmosphere and discharges all flue gases to the outside atmosphere. Also known as a sealed combustion appliance.<sup>1</sup>

*Exhaust system:* one or more fans that remove air from the building, causing outdoor air to enter by openings in the building shell. These openings can be specifically designed passive inlets or make-up air dampers, or random cracks and gaps in the building envelope such as those typically found around windows, doors, and other features.

*Home leakage rate to outside:* the total building leakage rate determined by a blower door at a pressure of 50 Pa. Typical new home construction falls between 3 and 7.5 Air Changes per Hour at 50 Pa (ACH 50). At lower leakage rates, less make-up air is provided by leakage through the building envelope in response to exhaust fan operation within the home, and more make-up air must be introduced through the make-up air damper duct.

*Infiltration:* uncontrolled inward air leakage to conditioned spaces through unintentional openings in ceilings, floors, and walls from unconditioned spaces or the outdoors caused by pressure differences across these openings due to wind, inside-outside temperature differences (stack effect), and imbalances between supply and exhaust airflow rates.<sup>2</sup>

*Make-up air:* outdoor air and transfer air intended to replace exhaust air<sup>2</sup>. Make-up air may enter the home through an outdoor air duct with a damper, which is open when make-up air is needed and closed at other times. Make-up air may also enter the home through air inlets built into the home's envelope or by infiltration through random cracks and gaps in the building envelope.

*Make-up air damper:* a general category of damper which opens to provide make-up air to a building's indoor environment. Such dampers may open and close based on the ambient air pressure with respect to outdoors, or in response to an electrical signal from a controller or another piece of HVAC equipment. Other make-up air dampers may be permanently kept open, so there is always an open pathway between indoors and outside. In the case of the Broan Automatic Make-Up Air Damper, this device opens in response to an electrical signal from a compatible Broan exhaust device or from a universal pressure switch kit.

*Nominal rated flow:* the exhaust appliance's rated flow at a static pressure of 0.1 in w.g. (25 Pa)

*Outdoor air:* air that enters a building through a ventilation system, through intentional openings for natural ventilation, or by infiltration.<sup>2</sup>

*Passive opening:* an intentionally installed opening in the building shell for the purpose of allowing a pathway for fresh outdoor air to enter the building. Passive openings do not utilize fans to introduce the fresh outdoor air, but merely provide an opening for air transfer.

*Pressure boundary:* the primary air enclosure boundary separating indoor and outdoor air.<sup>3</sup>

*Transfer air:* air moved from one indoor space to another.<sup>2</sup>

## **2. What is Make-Up Air?**

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<sup>2</sup> Sourced or adapted from ASHRAE 62.1-2010, Ventilation for Acceptable Indoor Air Quality.

<sup>3</sup> Sourced or adapted from ASHRAE 62.2-2010, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings.

Simply put, make-up air is air from outdoors and from other indoor spaces (e.g. transfer air) that is used to replace air that is exhausted.<sup>2,4</sup> Outdoor air is air that is provided through natural infiltration across cracks and gaps in the building envelope as well as through intentional openings, like outdoor air ducts that are opened and closed as needed using the Broan Automatic Make-Up Air Damper. The primary function of make-up air is to ensure that exhaust appliances have sufficient air to operate as designed.

### 3. Broan Automatic Make-Up Air Damper – Product Function

The Broan Automatic Make-Up Air Damper (the “Damper”) provides a pathway for fresh outdoor air to enter a home from outdoors when a compatible exhaust device is operating. The Damper opens when a compatible BEST, NuTone, or Broan range hood or exhaust fan is operating, thereby creating a known, controlled point for fresh outdoor air to enter the home while air is being exhausted from the building by the exhaust fan(s) and/or range hood.

By operating in this manner, the Damper provides two key benefits for the home:

- It facilitates air exchange between indoors and outdoors, by helping to allow fresh outdoor air into the home to replace air which is exhausted out of the home.
- By allowing fresh outdoor air into the building when a compatible exhaust device is on, the Damper helps to avoid negative pressure conditions within the home which may interfere with the proper operation of exhaust and/or combustion equipment within the home.

Overall, the Damper lets your Broan, NuTone, or BEST exhaust devices do their job more effectively and without interfering with the proper operation of other home systems.

### 4. Different Models of the Broan Automatic Make-Up Air Damper

The Damper comes in various models – **LinkLogic™** (SMD\* model) **Direct-Wired** (MD\*T model), **Universal** (MD\*TU model), and **Slave** (MD\*S model). Each model is available in 6”, 8” and 10” sizes. The unit size is indicated by the only digit within the model number. For example, a 6” LinkLogic™ model is model SMD6. The main differences between these models are the way in which the Damper communicates with the exhaust device and the compatibility of the Damper with Broan and BEST range hoods.

The LinkLogic™ model (SMD\*) establishes communication and control between the exhaust device and the Damper through a powerline communications protocol. In other words, the exhaust device(s) and the Damper talk to each other by sending signals across your home’s normal electrical wiring. The LinkLogic™ model of the Damper works with compatible Broan exhaust fans (such as the SmartSense® system). Note that Broan range hoods are not compatible with the LinkLogic™ model of the Damper.

The Direct-Wired model (MD\*T) communicates with the exhaust device through an independent, hard-wired, low-voltage connection between the exhaust device and the Damper. The Direct-Wired model of the Damper works with some compatible Broan and BEST range hoods.

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<sup>4</sup> International Code Council. 2012 International Mechanical Code. Section 501.4. See also the definitions section of this guide.

The Universal model (MD\*TU) can be used with any Broan, NuTone, or BEST range hood. Communications between the Damper and the Universal model's pressure sensor at the exhaust device occur via an independent, hard-wired, low voltage connection.

When an installation requires more than one Damper, Slave models (MD\*S) may be specified for any additional Damper beyond the first, regardless of whether the first Damper is Direct-Wired, Universal, or LinkLogic™. Communications for Slave models occur over a hard-wired, low-voltage connection between the upstream Damper and the Slave model.

For the purpose of this Application Guide, the term “Damper” refers to any and all models of the Broan Automatic Make-Up Air Damper, except where noted otherwise.

## 5. When to Use the Broan Automatic Make-Up Air Damper

- *When Required by Code.* If your local code requires make-up air to be supplied in conjunction with a kitchen range hood, use the Broan Automatic Make-Up Air Damper along with a compatible BEST, NuTone, or Broan range hood).
- *Tight Homes with Exhaust-based Whole-House Ventilation.* In homes which are air-sealed to limit infiltration, whole-house ventilation systems (such as Broan SmartSense®, Ultra™, or other models) which use exhaust fans to ventilate, may need help to introduce outdoor air into the home. The Damper provides this help by providing a pathway for fresh outdoor air to enter the home when the exhaust system is operating. Providing this make-up air is especially important in homes with natural draft vented combustion appliances.
- *Homes with large range hoods.* In homes where the kitchen range hood exhausts a lot of the home's air to outdoors, the Damper helps to replace this air by creating an opening for fresh outdoor air to enter the home when the range hood is operating. Range hoods with flow rates over 300 cfm are often considered as large range hoods. Providing this make-up air is especially important in tight homes to allow the range hood to operate effectively in the removal of smoke and odors, and in homes with natural draft vented combustion appliances.

### **WARNING**

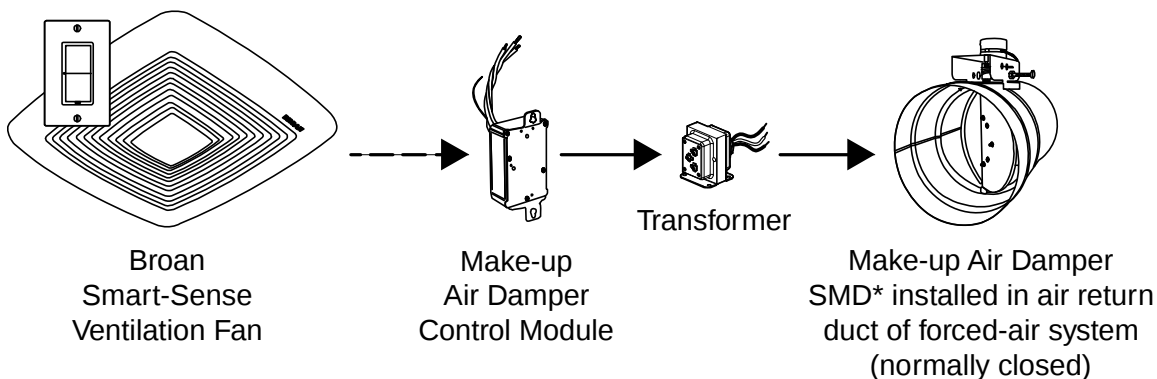
**Please note:** there are other applications in which an unrestricted passive opening or a passive opening with a different type of damper, such as a barometric or “gravity” damper which opens under negative pressure, may be called for. The Broan Automatic Make-Up Air Damper is not intended to be used for supplying combustion air or wired directly to combustion appliances of any type. Consult your mechanical contractor and local code requirements for applications not described above. For applications requiring a barometric damper, Broan offers 4” and 6” models (Broan products BD4 and BD6, respectively).

## 6. Common Applications

The Broan Automatic Make-Up Air Damper can be used in a variety of applications. Common applications are listed below, organized by each model of the Damper: **LinkLogic™** (SMD\* model), **Universal** (MD\*TU model), **Direct-Wired** (MD\*T model), and **Slave** (MD\*S model).

## 6.1 Applications with the LinkLogic™ Model (SMD\* model)

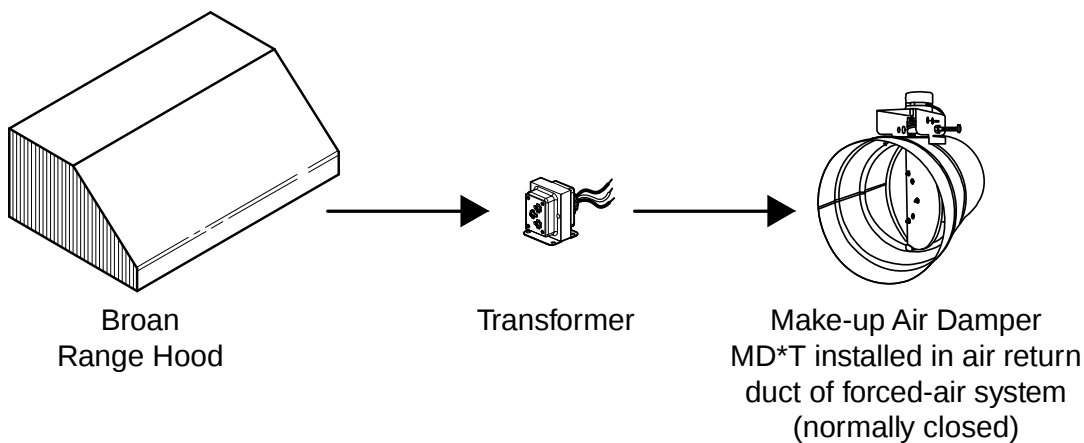
- SmartSense® Whole-House Ventilation System with Damper



- The Damper works in sync with Broan's SmartSense® whole-house ventilation system. When any one or more of the SmartSense® exhaust fans turns on, the Damper fully opens to allow fresh outdoor air into the home. When no SmartSense® fans are operating, the Damper closes. SmartSense® utilizes LinkLogic™, so communications between the fans and the Damper occurs over the home's power lines, and no additional control wiring between the Damper and fans is necessary.

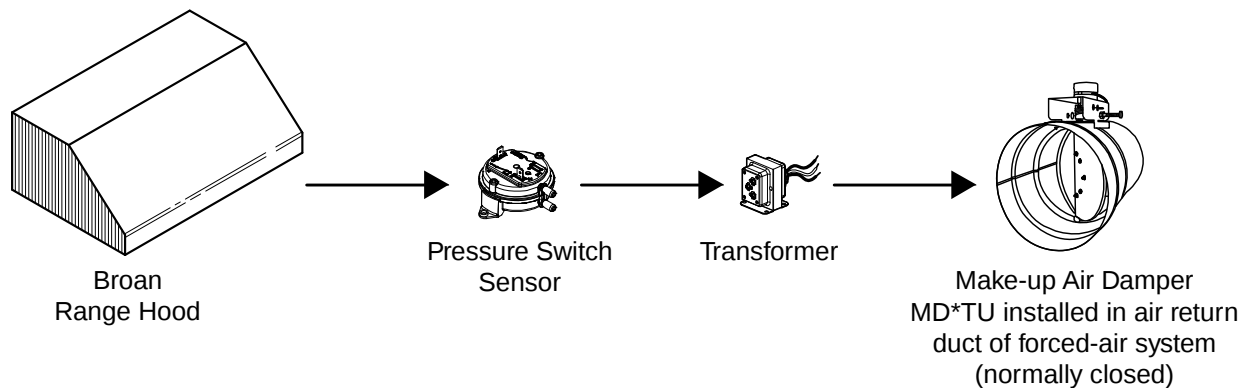
## 6.2 Applications with the Direct-Wired Model (MD\*T) model)

- Compatible BEST, NuTone, or Broan Range Hood with Damper



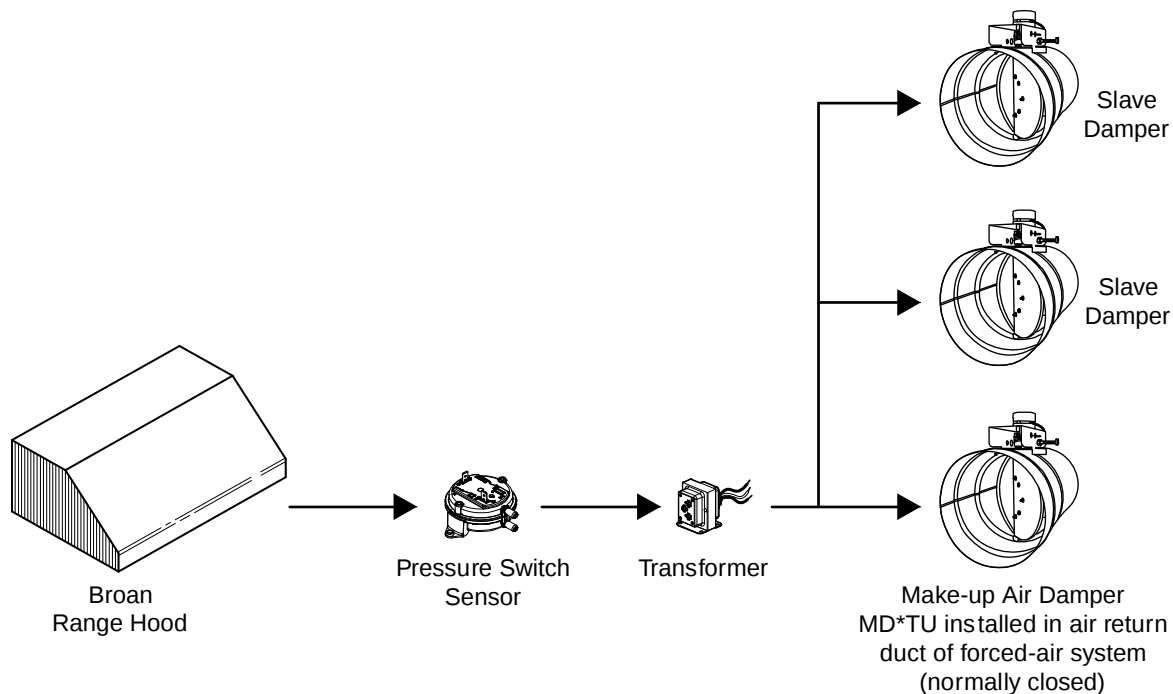
- The Damper fully opens or closes based on a direct signal from a compatible BEST or Broan range hood which is "MD-capable." This signal is triggered by the operation of the range hood, which is sent through a hard wired connection between the two devices using a Broan-supplied transformer. Only those BEST, NuTone, or Broan range hoods which are MD-capable may be used for this application.

### 6.3 Applications with the Universal Model (MD\*TU model)



- Any BEST, NuTone, or Broan Range Hood
  - The Damper opens or closes based on a direct signal from a pressure switch kit that senses the exhaust duct static pressure caused by the operation of the range hood. A direct low-voltage wiring connection between the pressure kit sensor and the Damper is required.
- Any Range Hood and Most Bathroom or Utility Room Exhaust Fans
  - The universal design of the pressure switch kit makes it compatible with virtually any range hood and any bathroom or utility room exhaust system that has an exhaust duct static pressure of at least 0.05 in w.g. A direct low-voltage wiring connection between the pressure kit sensor and the Damper is required.

### 6.4 Applications with the Slave Model (MD\*S model)

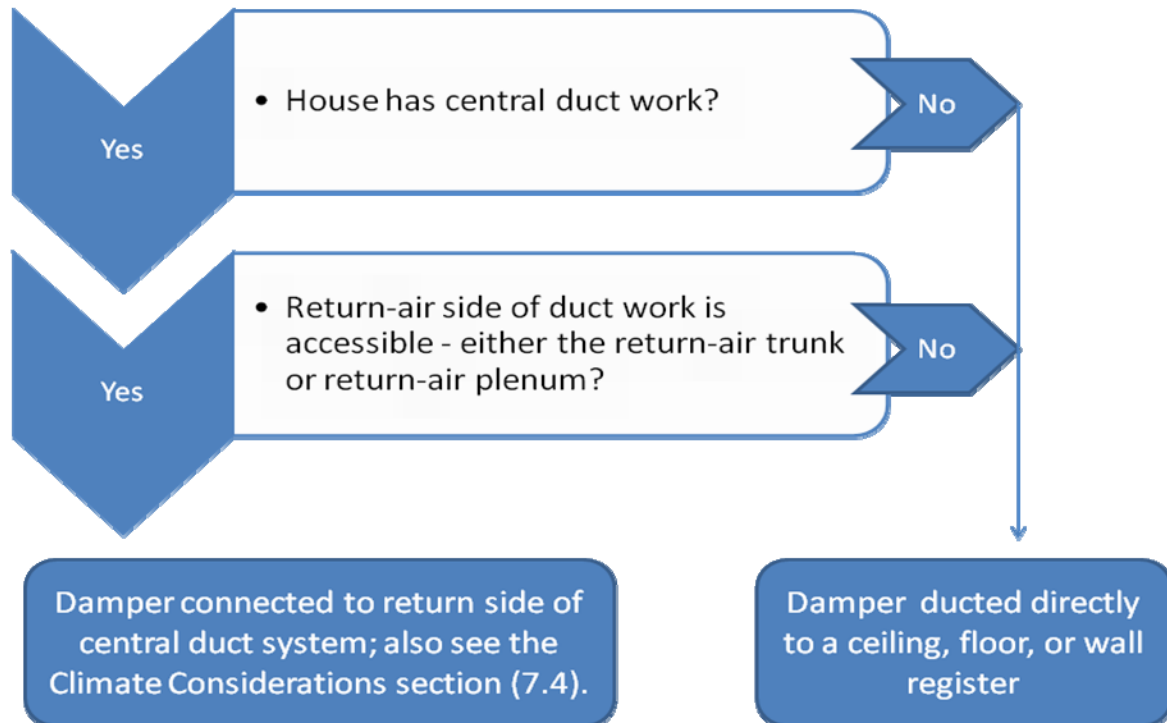


- Any Other Model of Damper (LinkLogic™, Direct-Wired, or Universal)

- When multiple Dampers are required, Up to four Slave Dampers may be directly connected to any primary Damper (whether LinkLogic™, Direct-Wired, or Universal) to increase the available make-up air volume.

## 7. Planning the Installation

Planning the installation first requires selecting the most appropriate installation approach. The chart below offers suggestions for the most effective installation approach by considering a few important factors. Further details on the two main types of installations are provided below.



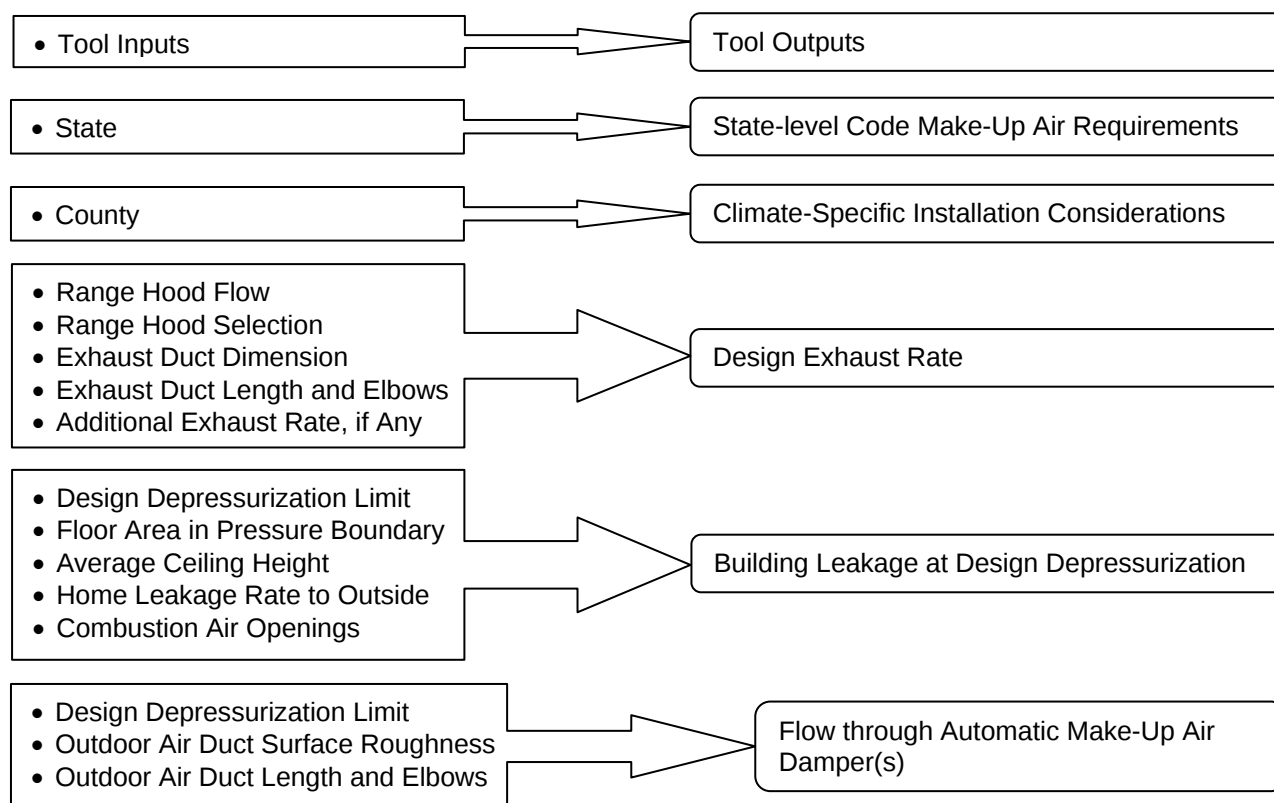
### 7.1 Sizing the Damper & the Duct

*If you're a homeowner who's not interested in the technical details of sizing make-up air systems, feel free to jump ahead to section 7.1.3.*

The required amount of make-up air will vary for each home, depending on the home characteristics, the amount of exhaust ventilation provided within the home, and the local building code requirements. A well designed solution considers the home size, the home's air tightness, the exhaust rate, the presence of combustion appliances, and the installation configuration of the Damper. To assist building professionals in specifying code-compliant makeup air solutions and developing product-specific cut-sheets, Broan-NuTone has developed an on-line tool called the Range Hood Make-Up Air Specifier, available on Broan, BEST, and NuTone websites.

### 7.1.1 Using the On-line Range Hood Make-Up Air Specifier

The Range Hood Make-Up Air Specifier (the “Tool”) takes the guess work out of specifying code-compliant make-up air systems by customizing an engineered design based on user-entered building and system characteristics. All Tool inputs are selected using dropdown lists. Most of the inputs in the Tool are straightforward, including duct characteristics like length, dimension, roughness, and configuration (for example, does the outdoor air duct feed into the return trunk of the central air handler, and does the central air handler operate automatically when the Damper opens?); range hood model and rated flow; and home characteristics like leakage rate to outside, ceiling height, and floor area. See the following schematic for an illustration of Tool inputs and outputs.



Of the Tool inputs, the least familiar is probably the home's “design depressurization limit”. Depressurization can occur when the exhaust appliances in a home cause it to operate at a lower pressure than outdoors. The greater the depressurization, the more make-up air will be introduced across cracks and gaps in the building envelope and across the Broan Automatic Make-Up Air Damper. However, the greater the depressurization, the more difficult it is for exhaust appliances and some combustion appliances to work as designed. The design depressurization limit is the user-targeted value that sizes the make-up air Damper(s) to avoid compromising the performance of exhaust and combustion appliances. See the Definitions section of this Guide or the Tool itself for information on industry guidance in selecting a design depressurization limit.

*Frequent users of the Tool will discover that very tight dwellings with natural vented combustion appliances may require multiple Dampers to satisfy code requirements. In this case, consider specifying mechanically vented combustion appliances or direct vent appliances, which can typically withstand higher design depressurization limits, leading to more make-up air introduced through the Dampers and across cracks and gaps in the building envelope. Another option for increasing the make-up air flow rate is connecting the Damper to the return side of the central duct system.*

One of the key functions of the Tool is its ability to allow users to take credit for make-up air that is supplied through cracks and gaps within the building envelope. While the building code requires that some of the make-up air for range hoods over 400 cfm be provided through a system that can be “automatically controlled to start and operate simultaneously with the exhaust system” (e.g., the Broan Automatic Make-Up Air Damper), it also recognizes that some make-up air can be provided through air leakage across the building envelope. Using engineering equations<sup>5</sup>, the Tool makes it easy to estimate the expected amount of make-up air that can be provided at the user-selected design depressurization limit, both naturally through leakage across the building envelope and intentionally through automatically opening the Damper(s). To avoid double-counting building openings used for combustion air, the Tool has the user input the cross sectional area of any combustion air openings for combustion appliances that are not direct-vent appliances.

Finally, the Tool outputs a cut-sheet of the recommended make-up air solution, including a list of user-selected range hood, Damper(s), design performance characteristics, and information that can be submitted to the code official to demonstrate code compliance.

#### 7.1.2 Simplified Sizing in the Absence of Building Codes

The Tool is configured to provide code-compliant make-up air system specifications for kitchen exhaust systems exceeding 400 cfm. In the case where make-up air is not required by code, but the designer believes that the building's performance would benefit from installing the Broan Automatic Make-Up Air Damper, the following rule of thumb is offered: Select a Broan Automatic Make-Up Air Damper such that the Damper diameter is greater than or equal to the exhaust duct diameter.

#### 7.1.3 Testing

Regardless of the make-up air sizing method selected, Broan highly recommends that a qualified HVAC professional be consulted after installation to ensure that the

- Damper opens and closes as designed,
- Depressurization is not excessive during operation of exhaust appliances, and
- Exhaust and combustion appliances operate as designed.

Where combustion appliances are located within a home's pressure boundary, a combustion appliance zone test performed by a qualified HVAC professional is recommended. Note that other systems and features of the home can also create negative pressures in the home relative to outdoors, and that the Damper is not intended to address these.

#### 7.2 Outdoor Air Intake Location

Proper design and location of the outdoor air intake location is critical in ensuring that the Damper can safely and reliably provide an opening for fresh outdoor air to enter the home. The following requirements for the location of the outdoor air intake should be met:

- Outdoor air intake is located a minimum of 10' from combustion appliance vents, chimneys, plumbing stacks, and bathroom or kitchen exhaust vents. If local codes have more stringent separation requirements, they shall apply.

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<sup>5</sup> The Tool uses the Darcy-Weisbach equation and others sourced from ASHRAE Fundamentals 2009, Chapters 16 and 21.

- If integrated with the return trunk of the central duct system, the outdoor air intake is located at least 10' from the HVAC appliance.
- Outdoor air intake is placed high enough above grade to prevent blockage from snow or other debris such as leaves, and at a minimum of 1' above grade.
- Make-up air damper should not draw air from crawlspaces, garages, attics, adjacent dwelling units, or any enclosed part of the building. The Damper should be installed to draw air directly from outdoors.

### 7.3 Outdoor Air Intake Opening Protection

Because the Damper, together with the end cap and outdoor air duct which are installed with it, will allow outdoor air into the indoor environment, it is important to meet the following requirements:

- Install the protective screen provided with your Damper to protect the opening to the outdoor air duct
- If a protective screen other than the screen provided with your Damper is used, it must cover the entire opening of the outdoor air duct. This screen must also have openings of at least ¼" but no larger than ½"
- The outdoor air intake opening should meet local code provisions for the protection of openings in exterior walls, including steps to prevent moisture intrusion around the opening.

Note that the screen over the outdoor air opening is not a filter. It is intended to prevent the intake of leaves, animals, or debris into the outdoor air duct. A downstream filter is necessary to remove pollen, dust, and other airborne particles. Potential filter locations are shown below in the Typical Installations section (section 8).

### 7.4 Climatic Considerations for Outdoor Air (OA) Ducts Connected to Central Duct Systems

If connecting the OA duct to the return side of a central duct system, check to see if the HVAC equipment manufacturer has any minimum requirements for the air temperature in the return air plenum (a minimum of 60°F return temperature for gas-fired forced air furnaces is recommended by some manufacturers). The installer should adjust both the size of the OA duct and the location of its connection to the return side of the central duct system so that minimum air temperature requirements are satisfied under design conditions. While the volume of OA that can be provided will vary between locations, the following guidance is offered as a rule of thumb:

| <b>International Energy Conservation Code Climate Zone</b> | <b>Maximum Recommended Outdoor Make-Up Air Flow as % of Total Furnace Air Handler Flow</b> |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| 1                                                          | No limit                                                                                   |
| 2                                                          | 40%                                                                                        |
| 3                                                          | 30%                                                                                        |
| 4                                                          | 25%                                                                                        |
| 5                                                          | 20%                                                                                        |
| 6                                                          | 15%                                                                                        |

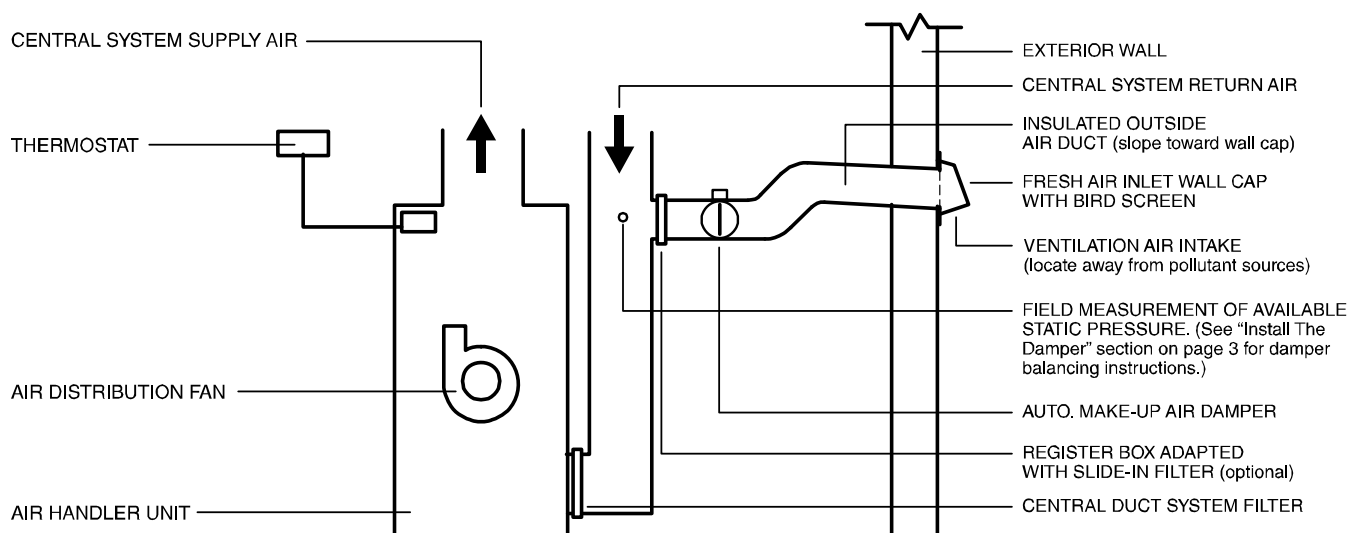
If necessary, homes with more than one central HVAC system may increase the OA volume by installing OA ducts with Dampers on each system.

When connecting the Damper to the return side of a central duct system in humid climates, consider having the HVAC contractor install controls that are configured to reduce the humidity of the incoming make-up air. For example, controls that start the central AC when the thermostat is in “Cool” mode and when the Damper opens, running the AC until a couple minutes after the Damper closes, can help to reduce the moisture in the incoming make-up air.

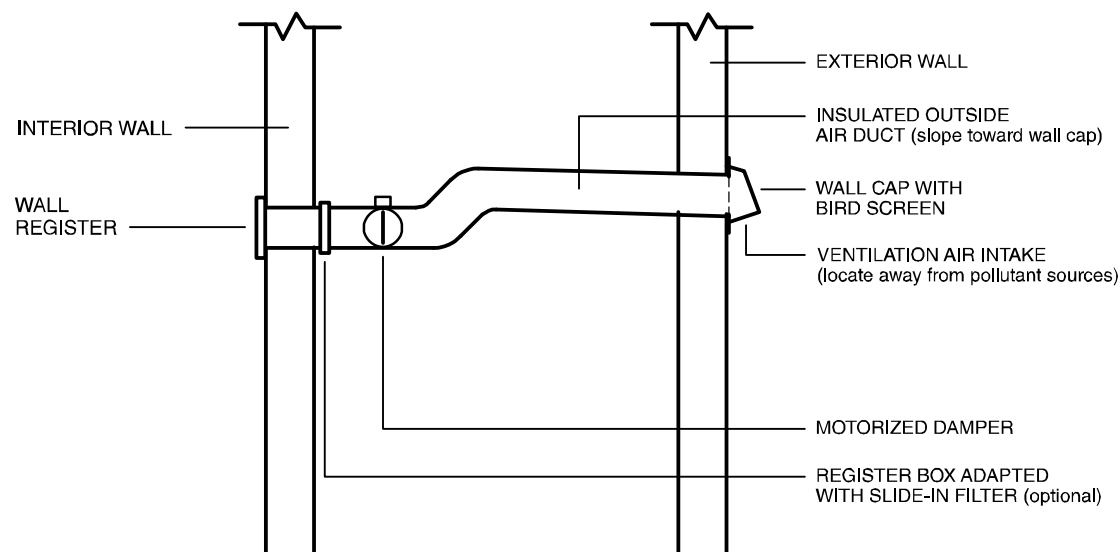
## 8. Typical Installations

Installations will vary according to the location in the home where the unit is installed and which model Damper is used. Use the following illustrations and notes as guidance for your own installation. Always comply with local code requirements and in any instance where a detail shown below conflicts with local code, the local code provision shall apply.

### 8.1 Damper Connected to Return Side of Central Duct System



### 8.2 Damper and OA Duct Connected Directly to a Ceiling, Floor, or Wall Register



## **9. Installation**

A separate set of Installation Instructions for the Damper is available from Broan and must be consulted for installations. The Application Guide does not contain specific installation instructions. To access the appropriate Installation Instructions, visit [www.broan.com](http://www.broan.com) and enter the Damper's model number in the Search box.

For installation guidance on BEST, NuTone, or Broan range hoods or exhaust fans, reference the installation instructions for these products, which can also be found on [www.broan.com](http://www.broan.com), [www.nutone.com](http://www.nutone.com), or [www.bestranghoods.com](http://www.bestranghoods.com).

## **10. System Operation**

Once the Damper and the associated Broan, NuTone, or BEST exhaust devices are installed, the installer should confirm that the Damper opens and closes in conjunction with signals from the exhaust device(s) as intended.

The appropriate contractor should also ensure the proper operation and venting of all combustion equipment in the home.

## **11. Maintenance**

Regular maintenance is necessary to ensure the proper operation of the Damper system. Failure to conduct such routine maintenance can jeopardize the ability of the Damper to introduce fresh outdoor air into the home. Regular maintenance should include the following activities:

- Clean the outdoor insect screen to ensure it is free from debris and open to allow fresh outdoor air to enter.
- Clean or replace the interior filter(s) which serve to filter fresh outdoor air before it enters the home.
- Maintain a clear opening at the outdoor end cap, which means preventing the buildup of snow, leaves, or vegetation at the end cap.
- During regular HVAC maintenance, have the mechanical contractor inspect the Damper system for proper operation.

## 12. Frequently Asked Questions (FAQs)

### 1. What does the Broan Automatic Make-Up Air Damper do?

The Broan Automatic Make-Up Air Damper (the “Damper”) provides a pathway for fresh outdoor air to enter a home when a compatible exhaust device is operating. The Damper opens when a compatible BEST, NuTone, or Broan range hood or exhaust fan is operating, thereby creating a known, controlled point for fresh outdoor air to enter the home while air is being exhausted from the building by the exhaust fan(s) and/or range hood.

By operating in this manner, the Damper provides two key benefits for the home:

- It facilitates air exchange between indoors and outdoors, by helping to allow fresh outdoor air into the home to replace air which is exhausted out of the home.
- By allowing fresh outdoor air into the building when a compatible exhaust device is on, the Damper helps to avoid excessive negative pressure conditions within the home which may interfere with the proper operation of combustion equipment within the home.

Overall, the Damper lets your Broan, NuTone, or BEST exhaust devices do their job more effectively and without interfering with the proper operation of other home systems.

### 2. Does the “Damper” provide combustion air for combustion appliances like a water heater or a furnace?

No. The Damper helps to replace air which is exhausted by a compatible range hood or exhaust fan. But it does **NOT** help to replace air which is drawn from the indoors by a combustion appliance like a natural gas water heater, and it should not be relied upon to perform this function. One main reason for this restriction is that the Damper is only open when the exhaust fan or range hood that it's connected to is operating. So there is no assurance that the Damper would be open when other appliances, like a water heater, are operating. Other means must be provided to ensure adequate combustion air for these appliances.

### 3. How do I know if I need make-up air for my range hood?

In some cases the local building code may tell you that make-up air is necessary. For example, some codes specify that range hoods with exhaust flows of 300 cubic feet per minute (CFM) or higher need a mechanical system to introduce make-up air.

In other cases, make-up air for a range hood is desirable regardless of whether code requires it. This is especially true for:

- larger range hoods (those over 300 cfm), especially in small and/or well-sealed homes
- homes which are well air-sealed - so outdoor air may not be able to easily find its way into the home through cracks, to replace air which is exhausted
- homes with natural draft vented combustion appliances (e.g., a water heater or natural draft fireplace), which are more susceptible to improper venting if depressurization occurs in the home.

In homes with any one of these factors make-up air is advised. And in homes with more than one of these conditions, make-up air for the range hood is strongly advised.

**4. What are the benefits of providing make-up air to replace air which is exhausted out of the home by a range hood or bathroom exhaust fans?**

Exhaust fans in a home are designed to pull out pollutants like cooking odors or moisture from a shower at the source, so they don't linger in the home. Because these fans pull air out of the house, this air needs to be replaced with "fresh" air from outdoors. Normally this make-up air enters the home through cracks and holes in the "shell" of the building. But modern homes are air-sealed much more thoroughly so there are not as many cracks and openings. Plus some exhaust fans like range hoods may be designed to exhaust more air than can be replaced through normal cracks in the building shell.

By providing an intentionally designed opening for fresh outdoor air to replace air which is exhausted by the range hood or bath exhaust fans, several important benefits result:

- A larger amount of the make-up air entering the home comes in at a known point, where it can also be filtered
- The severity of negative pressure conditions, which could arise if air is exhausted from a home without being replaced by fresh outdoor air, are reduced
- Pollutants are more effectively exhausted from the home while fresh outdoor air is drawn into the home, improving ventilation

**5. Does ASHRAE 62.2 – "Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings" – require the use of a make-up air damper?**

ASHRAE 62.2 does not specifically require make-up air dampers. In a few limited circumstances, this standard does require that net exhaust flows from a house be either limited or that make-up air be provided. For example, Section 6.4 of the standard limits the net exhaust flow from a home's two largest exhaust appliances, or requires make-up air to be provided, if the home has natural draft vented or solid-fuel burning appliances located within the pressure boundary of the house. This standard is available at [www.ashrae.org](http://www.ashrae.org).

**6. Can I use the Broan Automatic Make-Up Air Damper with other equipment in my home?**

The Broan Automatic Make-Up Air Damper is approved for use with compatible Broan, BEST, or NuTone range hoods or exhaust fans. Unless specifically noted, Broan does not warrant proper operation of the Damper if used in conjunction with other brands of exhaust devices. None of the Damper models should ever be used to provide combustion air for combustion appliances. More information on various models of the Damper and compatible exhaust devices can be found in the Make-Up Air Specifier on-line tool and in the individual Broan Automatic Make-Up Air Damper specification sheets.

**7. What are the different ways that the Damper can be installed in my home?**

The most common way to install the Damper is to connect it to a home's central duct system. In this application, fresh outdoor air enters the home through the Damper and is then routed and distributed through the home's ducts. More information on this installation approach can be found in the Typical Installations section of this Guide (section 8).

**8. What if my home doesn't have ducts?**

Homes without ducts can still utilize the Damper to help replace air which is exhausted from the home by the range hood or other exhaust fans. An installation illustration for this situation is included in the Typical Installations section of this Guide (section 8).

**9. What happens after a power outage?**

The Damper system and the associated exhaust devices will not lose their settings following a power outage. The system will resume its normal operation following a power outage, based on the settings it used prior to the outage.