DOMETIC

HEATING
RV - PROPANE

DFSA, DFSD, DFMD, DFLD, DFLA

⚠ WARNING

Handling passenger or off-highway motor vehicle parts can expose you to chemicals such as phthalates and lead, which can cause cancer and reproductive harm. To minimize exposure, service the vehicle in a well-ventilated area, wear gloves, and wash your hands. For more information see www.P65Warnings.ca.gov/motor-vehicle-parts.

FIRE OR EXPLOSION HAZARD

Failure to obey the following warnings could result in death or serious injury.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- Installation and service must be performed by a qualified installer, service agency, or gas supplier.

WHAT TO DO IF YOU SMELL GAS

- Evacuate all persons from the vehicle.
- Shut off the gas supply at the gas container of source.
- Do not touch any electrical switch, or use any phone or radio in the vehicle.
- Do not start the vehicle's engine or electric generator.
- Contact the nearest gas supplier or qualified service technician.
- If you cannot reach a gas supplier, contact the nearest fire department.
- Do not turn on the gas supply until the gas leak(s) has been repaired.

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English

1 Important notes

Please read these instructions carefully and follow all instructions, guidelines, and warnings included in this product manual in order to ensure that you install, use, and maintain the product properly at all times. These instructions MUST stay with this product.

By using the product, you hereby confirm that you have read all instructions, guidelines, and warnings carefully and that you understand and agree to abide by the terms and conditions as set forth herein. You agree to use this product only for the intended purpose and application and in accordance with the instructions, guidelines, and warnings as set forth in this product manual as well as in accordance with all applicable laws and regulations. A failure to read and follow the instructions and warnings set forth herein may result in an injury to yourself and others, damage to your product or damage to other property in the vicinity. This product manual, including the instructions, guidelines, and warnings, and related documentation, may be subject to changes and updates. For up-to-date product information, please visit documents.dometic.com.

2 Explanation of symbols

A signal word will identify safety messages and property damage messages, and also will indicate the degree or level of hazard seriousness.

WARNING!
Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION!
Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

NOTICE!
Indicates a situation that, if not avoided, could result in property damage.

NOTE Supplementary information for operating the product.

3 Safety instructions

WARNING! Fire or explosion hazard
Failure to obey these warnings could result in death or serious injury.

- Installation annual maintenance and repair of the device must only be carried out by qualified personnel who are familiar with the risks involved and the relevant and national regulations. Inadequate repairs may cause serious hazards. For repair service, please contact the manufacturer's support (see back page).
- Do not modify the device.
- Do not store gasoline, oil- or gasoline-soaked rags, or other flammable vapors and liquids the vicinity of this appliance or any other appliance.
- Before refueling or parking near a gasoline pump, ensure all LPG appliances (vented to the outside of the vehicle) are shut off.
- Turn off the LPG supply at the LPG tank.
- In the event of a fire only use approved extinguishing agents. Do not use water to extinguish fires.
- Keep the furnace area free and clear of insulating material, as insulating materials may be combustible. Examine the furnace area after installation or when insulation is added.
- Only use with the type of gas approved for the device. Refer to the data plate.
- Do not overfill LPG tanks. LPG tanks must be filled by a qualified gas supplier only. Follow the tank manufacturer's operating instructions located on the tank.
- Immediately shut down the furnace and call a service agency if the furnace cycles erratically or delays on ignition.
- If the gas supply fails to shut off, or if overheating occurs, shut off the gas valve to the furnace before shutting off the electrical supply.
- The compartment must be closed when operating the furnace.
- Do **not** use the furnace cabinet area as a storage compartment.
- Do **not** try to light the burner by hand.

WARNING! Health hazard
Failure to obey these warnings could result in death or serious injury.
This device is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the device by a person responsible for their safety.

WARNING! Asphyxiation hazard
Failure to obey these warnings could result in death or serious injury.

- The furnace can produce carbon monoxide, which has no odor and can be life-threatening. Keep the burner and vent assembly system clean.
- Do not operate the furnace if venting into a room enclosure with the privacy panels closed. At least one panel must be open for ventilation when using the furnace.
- All doors as well as the draft cap and assemblies must be properly adjusted and sealed correctly to prevent carbon monoxide from entering the vehicle.
- Do not allow snow or any objects to block the exhaust system of the furnace.
- Combustion products must be properly vented to the atmosphere so that all combustion air supplied to the burner is drawn from the outside atmosphere.

WARNING! Electrocution hazard
Failure to obey these instructions could result in death or serious injury.

- Do not connect to 120 V ~ / 240 V ~ if the furnace is designed for 12 V ⎓ only.
- Do not use a 120 V ~ / 240 V ~ current with DC models.
- Do not use a 12 V ⎓ current with AC models.
- Do not use battery charger to supply power to DC model furnaces even when testing.

3.1 Installing the device safely

WARNING! Electrocution, fire, explosion, and/or asphyxiation hazard
Failure to obey these instructions could result in death or serious injury.
> This furnace must be installed, repaired, and serviced by a qualified service technician.
> Ensure all intended components are attached to the device after installation. The device should never be used without all intended components attached.
> Use only Dometic replacement parts and components, which are specifically approved for use with the furnace.
> Do **not** modify this furnace in any way.
> Do **not** install the furnace if any part has been under water.
> Do **not** install a mesh insect screen over the intake air or exhaust vents.
> Do **not** keep insulating material, clothing, or flammable material on or near the furnace.
> Do **not** restrict the ducting or block furnace outlet registers and return-air grills.
> Protect building materials from degrading from vent assembly gas exhaust.

CAUTION! Risk of injury
Failure to obey these instructions could result in minor or moderate injury.
> Do not touch exterior exhaust grills when the furnace is operating.
> Take care when handling or touching sharp sheet metal edges.

NOTICE! Damage hazard
Failure to obey these instructions could result in property damage.
> Protect furnace electrical components from water.
> Do **not** use petroleum or citrus-type cleaning agent on plastic parts.

4 Supplemental directives

To reduce the risk of accidents and injuries, observe the following directives before proceeding to install or operate this appliance:
- Read and follow all safety information and instructions.
- Read and understand these instructions before installing, operating, or performing maintenance on this product.

The installation must comply with all applicable local or national codes, including the latest edition of the following standards:

USA
- ANSI/NFPA70, National Electrical Code (NEC)
- ANSI/RVIA LV, Low Voltage Systems in Conversion and Recreational Vehicles
- ANSI/NFPA1192, Recreational Vehicles Code
- ANSI Z223.1, NFPA54 National Fuel Gas Code

Canada
- CSA C22.1 Parts I and II, Canadian Electrical Code
- CSA Z240 RV Series, Recreational Vehicles
- CAN/CGA B149, Natural Gas and Propane Installation Code

5 Scope of delivery

Quantity	Description
2	Mounting brackets
2 – 4	Duct adapter (depending on the furnace model)
1	15 A Breaker (DFMD35, DFLD35, DFLD40 models only)

6 Target group

The assembly and installation of the gas connection must be performed by a qualified person who has demonstrated skill and knowledge related to the construction, installation and operation of gas appliances and has received safety training to identify and avoid the hazards involved.

7 Intended use

Use only with the type of gas approved for the furnace. Refer to the furnace rating label.

All **DFSA, DFS, DFM** models and **DFLD** models are LP only.

All **DFLA** models are LP or natural gas.

The device is intended for use inside a recreational vehicle.

The device may only be used to heat the interior of the vehicle.

The device must be installed in accordance with the applicable national and local codes.

The device is **not** suitable for installation in construction machines, agricultural machines, utility vehicles, marine craft, houses and apartments, hunting and forestry cabins, weekend homes, awning tents, or similar equipment or locations.

The device is **not** suitable for temporary heating of buildings or structures under construction.

Never use the device when the vehicle is in motion or being towed.

Only use the device with original parts from the manufacturer. Only use original replacement parts from the manufacturer.

Devices not installed according to the manufacturer's installation requirements are not allowed to be used.

This product is only suitable for the intended purpose and application in accordance with these instructions.

This manual provides information that is necessary for proper installation and/or operation of the product. Poor installation and/or improper operation or maintenance will result in unsatisfactory performance and a possible failure.

The manufacturer accepts no liability for any injury or damage to the product resulting from:
- Incorrect installation, assembly or connection, including excess voltage
- Incorrect maintenance or use of spare parts other than original spare parts provided by the manufacturer
- Alterations to the product without express permission from the manufacturer
- Use for purposes other than those described in this manual

Dometic reserves the right to change product appearance and product specifications.

8 Technical description

The Dometic DF Series a heating appliance that provide heat using LPG (propane) (DFLA series use Propane or Natural Gas). The furnace uses a Thermostat (not provided). Inside the burner of the furnace, LPG (or Natural Gas) is mixed with air where it is ignited and it combusts. The combustion gases are expelled through the exhaust vent assembly and the generated heat from the combustion process is distributed into the vehicle.

9 Installation

9.1 Tools required
- Manometer gauge / U-tube
- Gas leak detector liquid
- Safety glasses
- Pipe thread sealing compound
- Multimeter (15 A)
- Wrenches
- RTV type sealant
- Foil tape (optional)
- Butyl tape

9.2 Determining the installation type
> Determine if you are using a horizontal or vertical installation.
  - Horizontal installation: Locate the furnace so that the gas line is at the top or rear of the furnace.
  - Vertical installation: The furnace top becomes the right side of the furnace. Locate the furnace so that the vent is at the floor and the gas line is at the right or rear side.
> Identify the clearances required between the furnace and the building materials surrounding the furnace to allow for proper airflow.

See section Required clearances on page 5 and section Return air inlet clearance on page 6 as guidelines.

9.3 Installation location

WARNING! Fire, explosion, and poisoning hazard

- Install the furnace only in a location and position specified in these instructions.
- Provide adequate combustion and ventilation air to the furnace space.
- Combustion products must be discharged outdoors.
- Connect this furnace to an approved vent system only.
- Always install the furnace to operate within the furnace's intended temperature-rise range, with a duct system that has an external static pressure within the allowable range, as specified in 5 of these instructions. See furnace rating plate.
- Do not install the furnace near tilt-out rooms, slide-outs, and doors.
- Do not install the furnace where wires, pipes, or other objects may interfere with installation or operation.
- Do not install the furnace less than 12 in above a water heater, unless a heat shield is installed.
- Do not install the furnace directly on combustible flooring that restricts return air.
- Do not install the furnace where clearance to combustibles cannot be maintained.
- Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections.

NOTE The furnace must be accessible for repairs. Dometic does not pay labor to remove obstructions when maintaining a furnace.

Locate the furnace near the midpoint of the RV, at least 3 ft (91.44 cm) from the gas service regulator, for a Single-furnace application. The furnace must be installed through an exterior wall. Spacing of 0.25 in (6.4 mm) to ducting, within 3 ft (91.44 cm) of furnace, must be provided unless UL-listed, wire-bound, vinyl ducts are used. All ducting material used must be rated for continuous use at a minimum of 200°F (93°C).

9.3.1 Required clearances

NOTE The furnace cannot be fully enclosed using only these minimum dimensions.

Table 1: Clearance to combustibles

Combustible objects (Vertical and horizontal)	**Top**	**Sides**	**Rear**	**Bottom** (to screw heads)
Small furnaces	0.5 in	0.5 in	0.5 in	0 in
Medium furnaces	0.5 in	0.5 in	0.5 in	0 in
Large furnaces	0.5 in	1 in	0.5 in	0 in

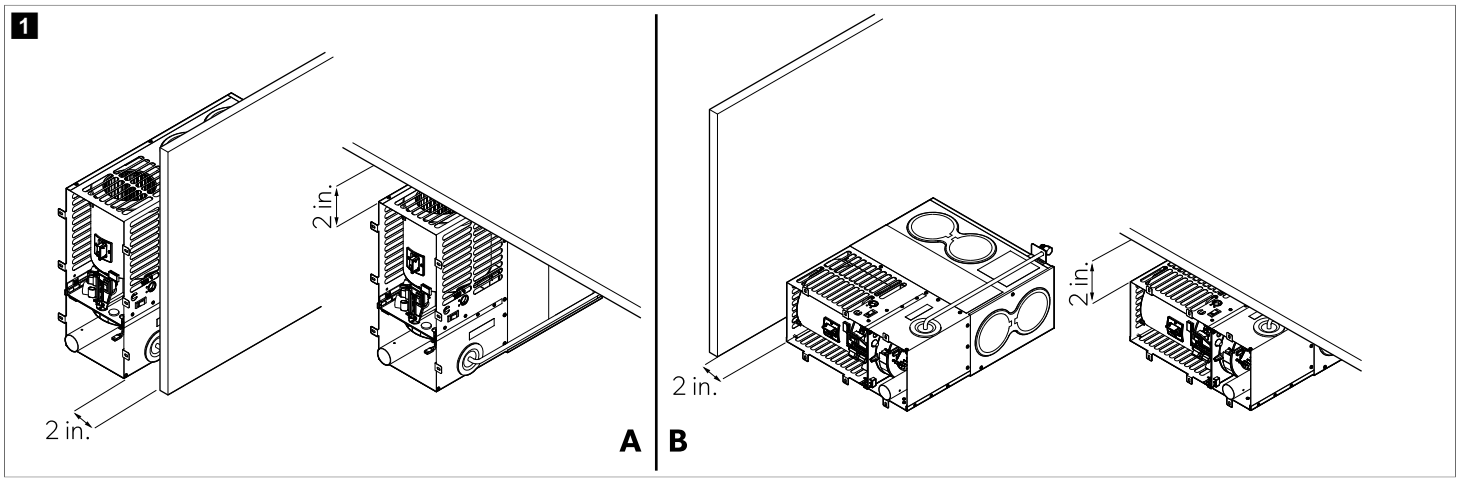
9.3.2 Return air inlet clearance

WARNING! Injury hazard due to improper duct installation
Failure to obey the following warnings could result in death or serious injury.
> If the furnace supply ducts deliver air to areas outside the room where the furnace is installed, the return air must also be handled by ducts.
> These ducts must be sealed to the furnace casing.
> The ducts must end outside the room that contains the furnace.

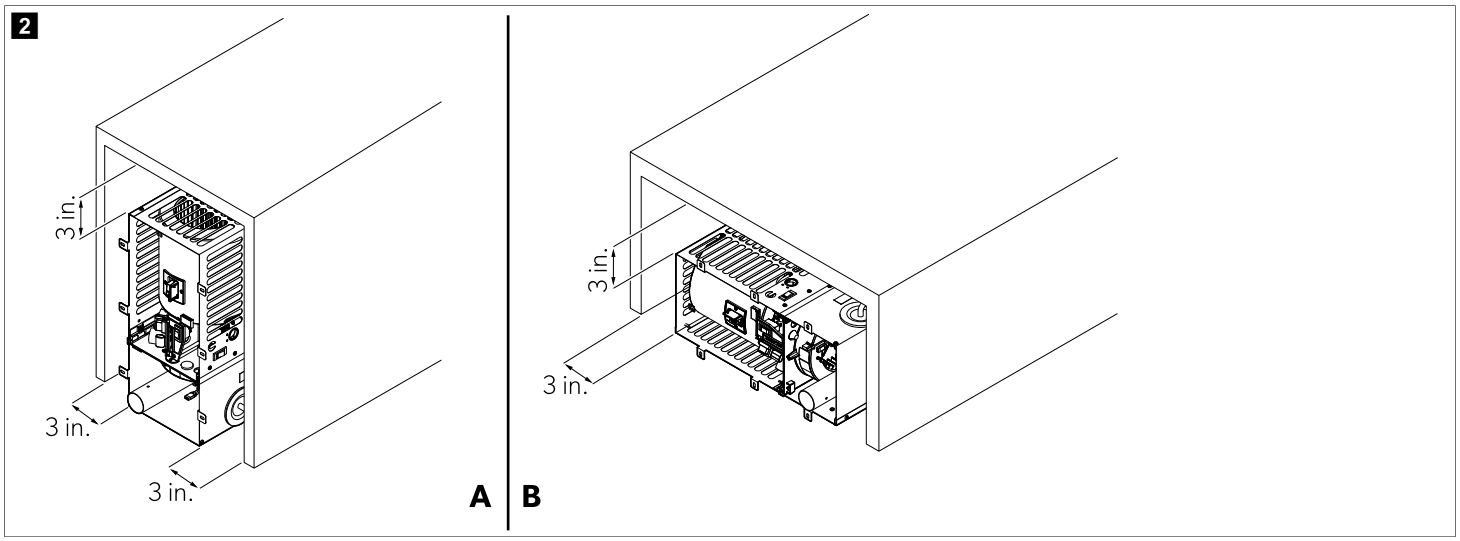
NOTE Furnaces must have at least the minimum return air detailed in Technical data on page 21.

- **A** Vertical installation
- **B** Horizontal installation

If one wall is close to the return air inlet, there must be at least 2 in clearance from the top or inlet side.



If two or more walls are close to the return air inlet, there must be at least 3 in clearance from the top and inlet side.



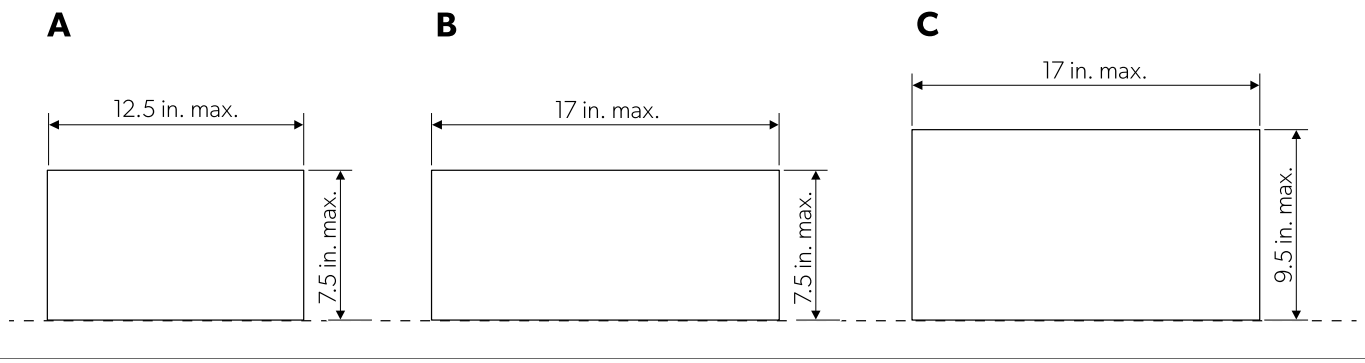
9.4 Door installation option and cutout sizing

1. Determine whether the RV has a standard door, flush door, or small vent configuration.
2. Cut an opening through the side wall to fit the door installation option.

9.4.1 Standard door cutout

- **A** Small standard door cutout
- **B** Medium standard door cutout
- **C** Large standard door cutout

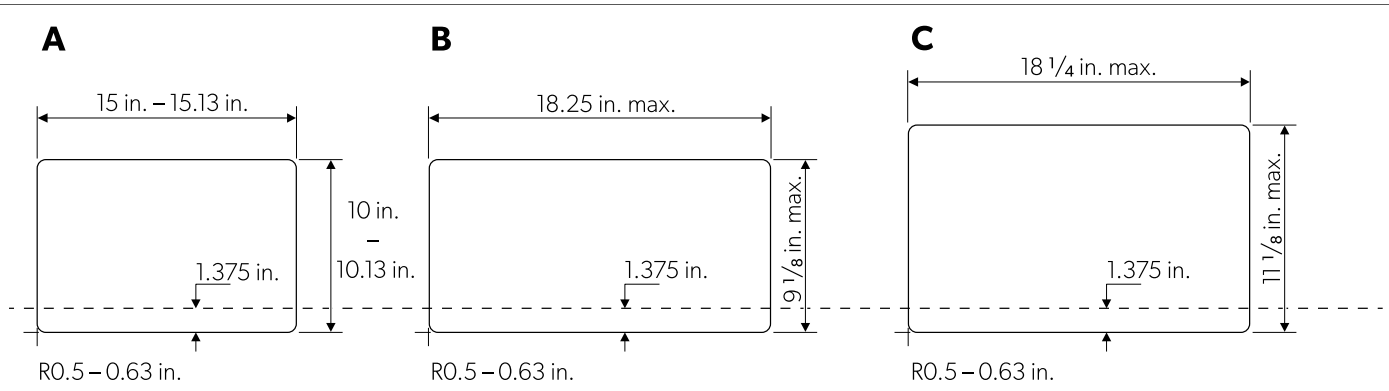
3



9.4.2 Flush door cutout

- **A** Small flush door cutout
- **B** Medium flush door cutout
- **C** Large flush door cutout

4



9.4.3 Small vent cutout

There is no door cutout on the exterior of the RV for installing the small vent. The cutout refers to an opening in the side wall of the RV that allows the furnace to vent to the outside.

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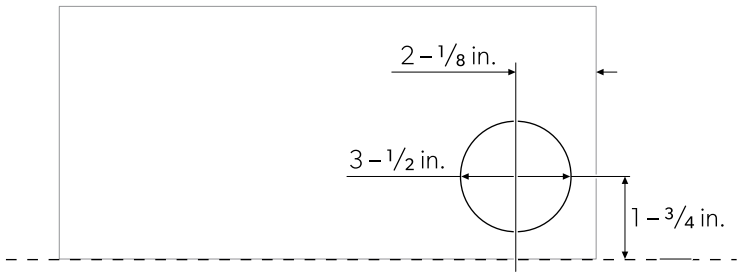


NOTE Access must be provided directly in front of the furnace on the inside of the RV for removal of the furnace during maintenance.

9.5 Ducting

See Installing the floor discharge system on page 14 for information on closable Ducts.

WARNING! Overheating and asphyxiation hazard due to wrong ducting installation

Failure to obey the following warnings could result in death or serious injury

- Do not install floor registers within 24 in of return-air openings.
- Do not block the return airflow path with ducting.
- Do not use undersized ducting, which can cause high-temperature limiting.
- Do not use oversized ducting which can cause inadequate air flow from the registers.
- When hard ducting is 1.5 in deep, extra flex ducts may be needed to maintain air flow requirements.
- Hard ducting must be sealed to the furnace and the floor.
- Spacing of 0.25 in to ducting, within 3 ft of the furnace, must be provided unless tested and certified by UL, wire-bound, vinyl ducts are used.
- All ducting material used must be rated for continuous use at a minimum of 200 °F .
- Floor registers must not be installed directly below the thermostat.

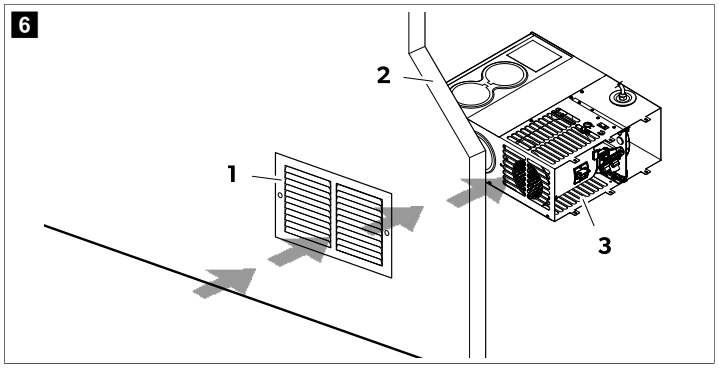
9.5.1 Setting up the return-air pathways

NOTE Keep all return-air passages clear to allow the furnace to function properly. Ensure that the total return-air opening size(s) meet the clearance requirements specified in Technical data on page 21.

NOTE If the return air opening is located behind a sofa or other obstruction, extra return air may be required to ensure proper furnace operation and avoid limit trips.

Item in Fig. 6 on page 8	Description
1	Return-air vent
2	RV wall
3	Furnace

6

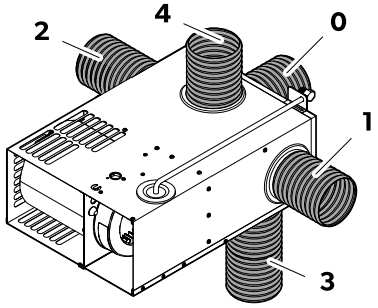


9.5.2 Identifying duct locations

Small furnace

Item in Fig. 7 on page 8	Description
0	Front discharge
1 — 4	Duct

7

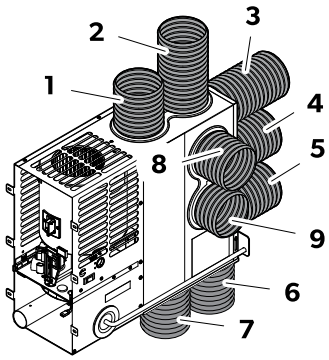


Medium furnace

1 — **5**, **8**, **9** Duct

Item in Fig. 8 on page 8	Description
1 — 9	Duct

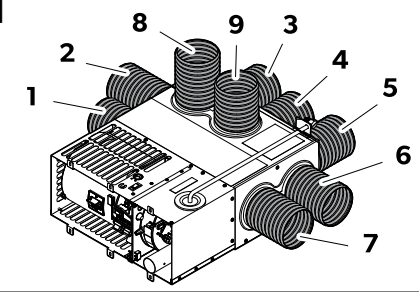
8



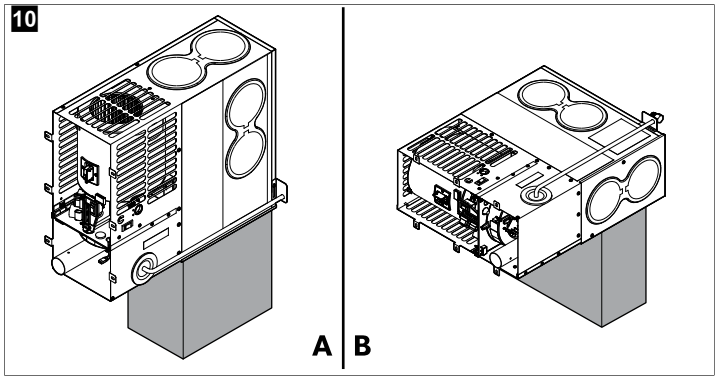
Large furnace

Item in Fig. 9 on page 8	Description
1 — 9	Duct

9



- **A** Vertical discharge
- **B** Horizontal discharge

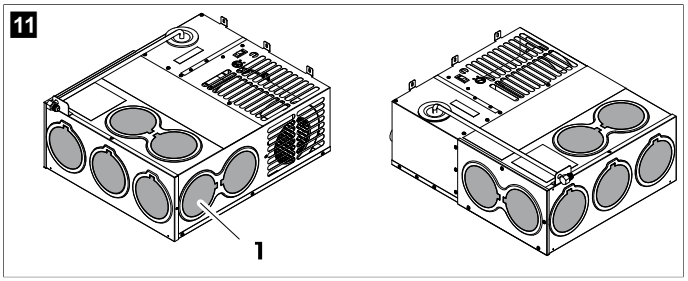


9.5.3 Installing the duct adapters

1. Remove the knockout plates from the desired outlets.

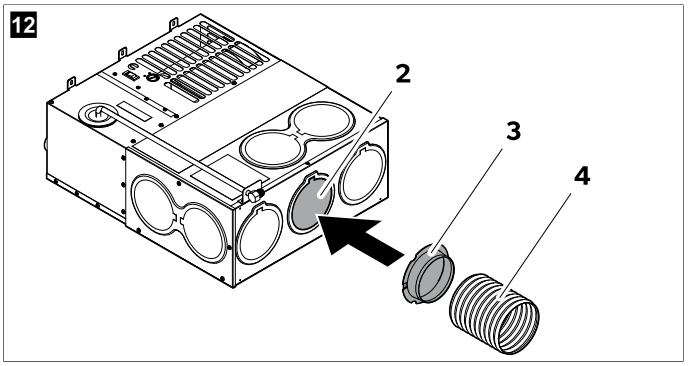
   If a knockout is removed accidentally, cover plates are available. Contact your local Dometic dealer: Part number **31361**.

2. Cover all unused knockouts.



3. Insert the flange over the casing hole to install the duct adapters.
4. Turn the duct adapter 90 ° to lock the tab into the casing slot.
5. Attach the ducting securely to the duct adapter.

   If using screws to secure the ducting, do not use screws longer than 0.5 in (12.7 mm).



9.6 Air discharge requirements

NOTE For medium and large furnaces: Ducts **8** and **9** are used for extra ducting only, and are not used to calculate the required discharge area (see Air discharge requirements on page 10).

NOTE Airflow measurements are provided in CFM (cubic feet per minute) and are based on readings taken with a cold system (Cold CFM).

2 in ducts exiting into return-air space count as part of the minimum discharge area and CFM (cubic feet per minute). 2 in ducts provide 3.14 in^2 each.

Register type impacts airflow performance:

- 4 in × 10 in floor registers offer better airflow than 4 in round plastic registers.
- If using 4 in round registers, extra ducting may be required to maintain adequate airflow.

Table 2: Small furnaces

	DFS20	DFS16	DFS12	DFS12 (Low Amperage)
Horizontal or vertical Ducts 3, 4, 5 or bottom exit into hard floor duct	N/A			
4 in Flex ducts	130 ft^3/min	110 ft^3/min	90 ft^3/min	N/A
	Two ducts, one on the left and one on the right, suitable for both horizontal and vertical mounting.			N/A
5 in Front exit flex ducts	92 ft^3/min	82 ft^3/min	80 ft^3/min	60 ft^3/min
	One 5 in or two 4 in ducts (5 in can be reduced to 4 in if necessary)			One 5 in front duct only

Table 3: Medium furnaces

	DFM35	DFM30	DFM25	DFM20	DFM16
Horizontal bottom exit into hard floor duct	225 ft^3/min	210 ft^3/min	175 ft^3/min	135 ft^3/min	135 ft^3/min
	4 in × 10 in bottom exit plus one 4 in flex duct (for hard ducting under 2.5 in deep). Duct **6** or **7** is recommended.		4 in × 10 in bottom exit (40 in^2).		
Vertical bottom exit into hard floor duct	155 ft^3/min	150 ft^3/min	160 ft^3/min	85 ft^3/min	85 ft^3/min
	5 in × 9.75 in bottom exit does not require extra ducts.				
Horizontal or vertical use Ducts 3, 4, 5 into hard floor duct	155 ft^3/min	155 ft^3/min	160 ft^3/min	115 ft^3/min	115 ft^3/min
	Horizontal or vertical. Use ducts **3**, **4** and **5**.			Horizontal or vertical. Use any two ducts: **3**, **4** or **5**.	
4 in Flex ducts	285 ft^3/min	220 ft^3/min	190 ft^3/min	132 ft^3/min	132 ft^3/min
	Four ducts minimum	Three ducts minimum		Two ducts minimum	
5 in Front exit flex ducts	N/A				

Table 4: Large furnaces

	DFL40	DFL35
Horizontal bottom exit into hard floor duct	220 ft^3/min	220 ft^3/min
	4 in × 10 in bottom exit plus one 4 in flex duct (for hard ducting under 2.5 in deep). Duct **6** or **7** is recommended.	
Vertical bottom exit into hard floor duct	175 ft^3/min	
	5 in × 9.75 in bottom exit does not require extra ducts.	
Horizontal or vertical use Ducts 3, 4, 5 into hard floor duct	165 ft^3/min	
	Horizontal or vertical. Use ducts **3**, **4** and **5**.	
4 in Flex ducts	215 ft^3/min	

	DFL40	DFL35
	Three ducts minimum. Four ducts recommended.	
5 in Front exit flex ducts	N/A	

9.6.1 Required discharge

Furnace size	Models	Required discharge area
Small	**DFSA12**	Front grill or 15 in²
	DFS12, DFS16, DFS20	24 in²
Medium	**DFM16, DFM20**	24 in² with 4 in flex
	DFM25, DFM30	36 in² with 4 in flex
	DFM35	48 in² with 4 in flex
	DFM30, DFM35 Horizontal bottom	48 in² (Bottom + 4 in duct)
	DFM16, DFM20, DFM25 Horizontal bottom	40 in² (Bottom only)
	DFM Vertical bottom	48 in² (Bottom only)
Large	**DFL35, DFL40**	36 in² with 4 in flex
	DFL35, DFL40 Horizontal bottom	48 in² (Bottom + 4 in duct)
	DFL35, DFL40 Vertical bottom	48 in² (Bottom only)

9.6.2 Air discharge configuration

The following figures show examples of vertical and horizontal installations, using different furnace models and ducting options.

Small furnace only

1. Install a 5 in duct.
   The 5 in duct cannot be longer than 12 in .
2. Connect a 5 in flex duct to the cabinet cutout.
3. Ensure the connection to the interior grill.

NOTE For easier furnace removal through the grill cutout, align the front interior grill with the furnace orientation: Horizontal for a horizontal furnace, vertical for a vertical furnace.

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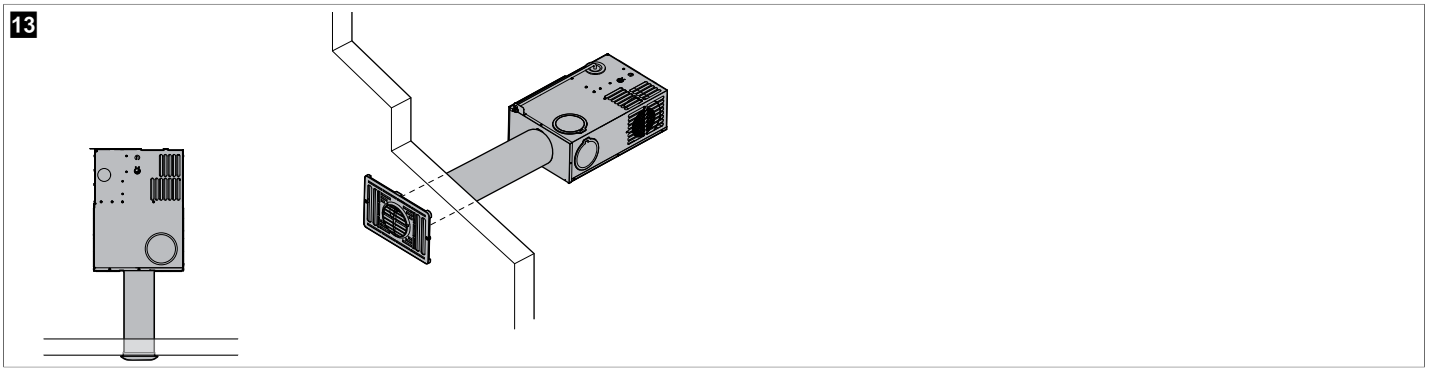
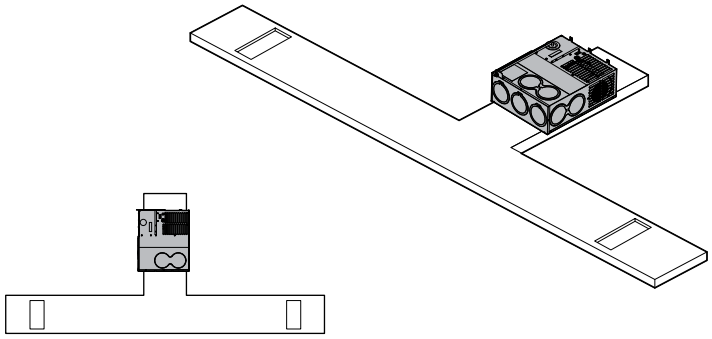


Medium or large furnaces only

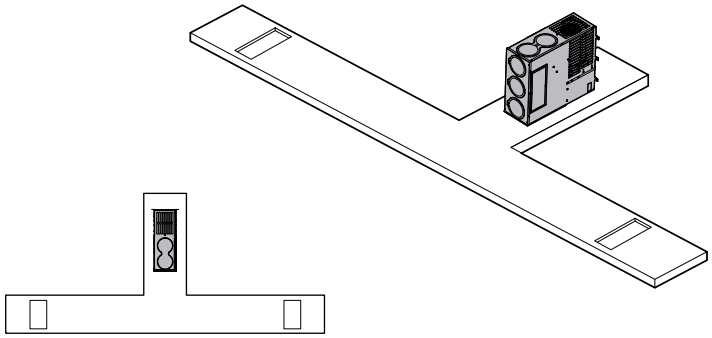
> Install the furnace horizontal with a bottom exit into hard ducting.

14



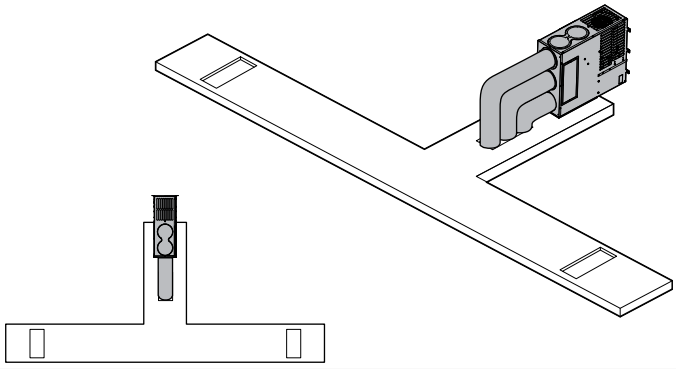
> Install the furnace vertical with a bottom exit into hard ducting.

15



> Install the furnace with 4 in flex ducts and secure them into the hard ducting.

16



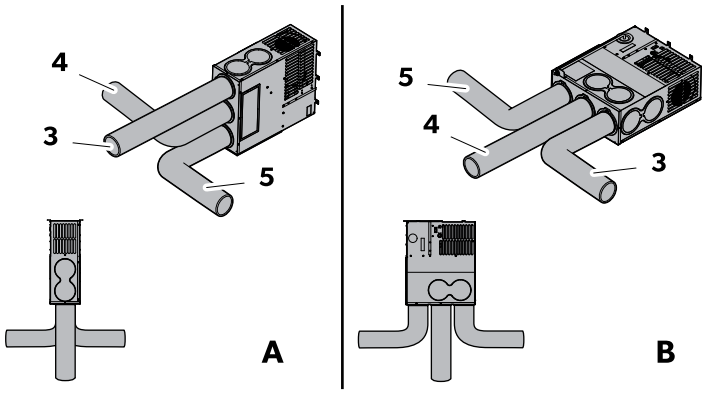
Small, medium and large furnaces

› Install the furnace with 4 in flex ducts **3** — **5** and secure them into the hard ducting.

NOTE Ensure to use at least the minimum number of 4 in flex ducts required for the ordered model size (see Air discharge requirements on page 10).

- **A** Vertical mount
- **B** Horizontal mount

17

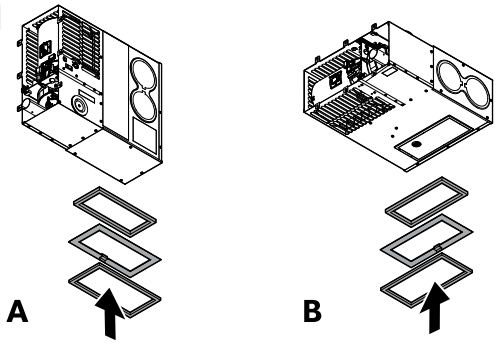


9.7 Installing the floor discharge system

Before installation

- Verify each duct (4 in) opening provides 12 in² of discharge area.
- For each closable register, add an extra 12 in² of non-closable duct discharge area.
- Ensure all clearances and temperature requirements are met and the seal is airtight.
- Avoid ducting into dead-air spaces without return air. These do not count toward achieving minimum discharge requirements.
- Confirm that medium and large furnaces are installed as bottom-discharge systems, either horizontally or vertically.
- **A** Vertical bottom discharge
- **B** Horizontal bottom discharge

18



1. Cut the opening for the floor discharge system in the floor of the RV.
   - Standard door: See Standard door floor discharge installation on page 14
   - Flush door: See Flush door floor discharge installation on page 14
   - Small vent: See Small vent floor discharge installation on page 15
2. Remove the bottom discharge plate or side.
3. Fasten the plenum plate bend tabs over the floor cutout.
4. Place the gasket on the plenum around the floor opening.

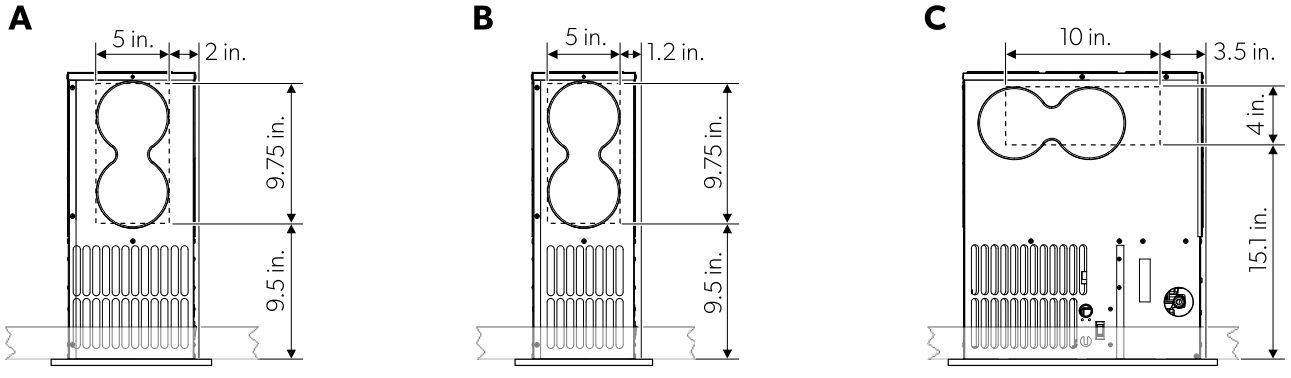
NOTE If not using a Dometic gasket and plenum plate, seal the furnace to the hard ducting system using a gasket that has a 300°F (149°C) minimum temperature rating and a **UL94-V0** rating.

9.7.1 Standard door floor discharge installation

The dotted lines around the knockouts in the following figures Fig. 19 on page 14 – Fig. 21 on page 15, represent the floor-hole position, viewed looking down from the top of the furnace.

- **A** Large door vertical installation
- **B** Medium door vertical installation
- **C** Medium and large door horizontal installation

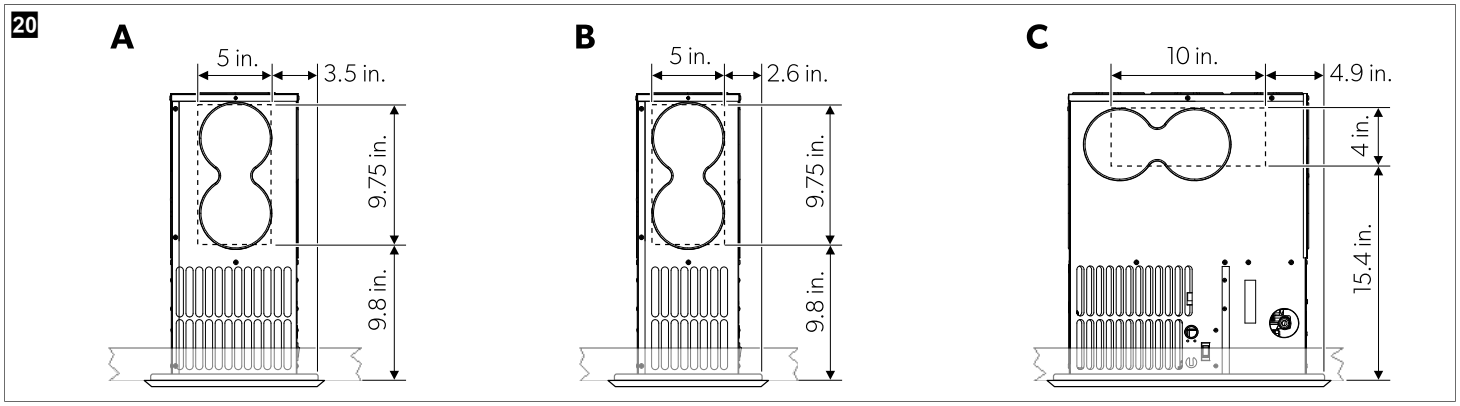
19



9.7.2 Flush door floor discharge installation

- **A** Large door vertical installation
- **B** Medium door vertical installation
- **C** Medium and large door horizontal installation

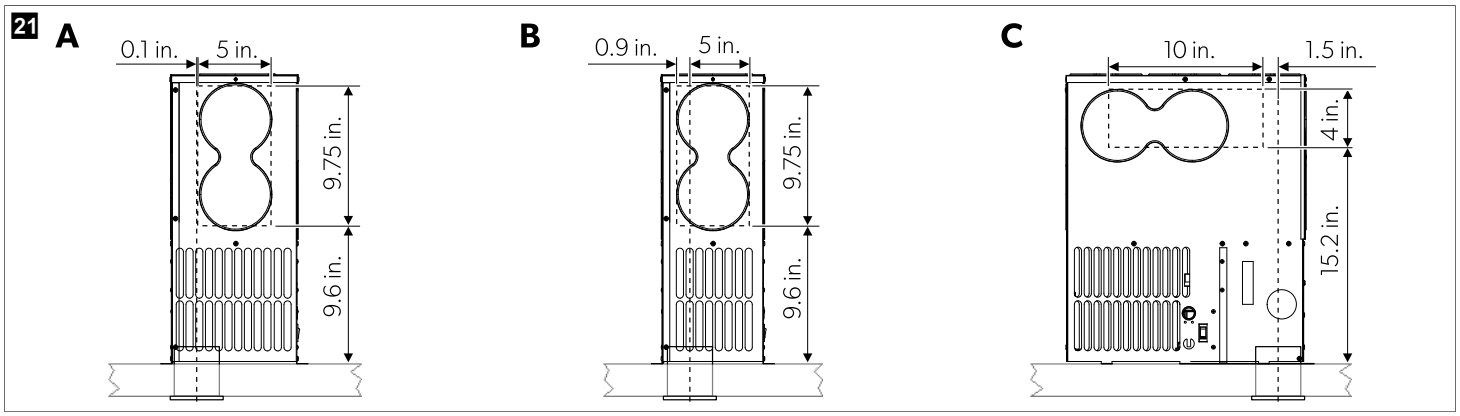
20



9.7.3 Small vent floor discharge installation

- **A** Large door vertical installation
- **B** Medium door vertical installation
- **C** Medium and large door horizontal installation

21

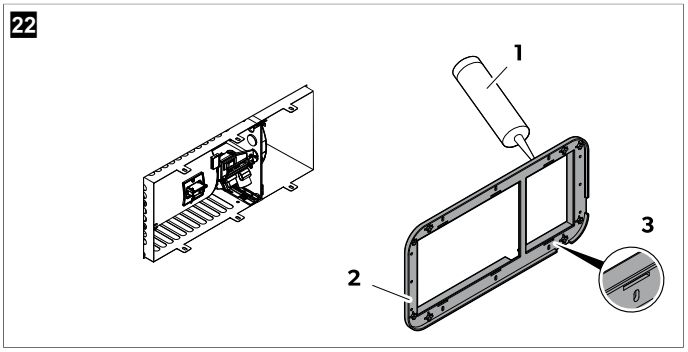


9.8 Installing the furnace

Installing the furnace using the standard door option

The standard door option requires that the rectangular hole cut into the wall for the door opening has sharply cut corners to match the furnace. The furnace must be able to slide freely through the opening.

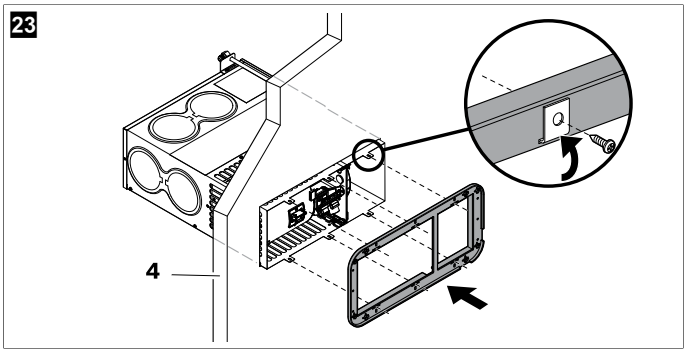
1. Place the furnace through the cutout about 1 in – 2 in from the wall.
2. Apply RTV sealant or butyl tape **1** to the entire back flange of the bezel **2**.



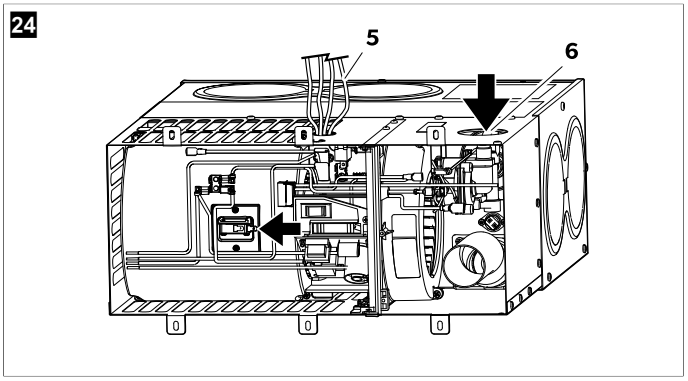
3The tab slot must be sealed to prevent water intrusion.

3. Place the bezel over the tabs and ensure it is flush with the front edge of the casing.
4. Ensure that the edge of the bezel marked "TOP" is facing the top of the casing.
5. Bend the casing tabs over the bezel to secure it in place.
6. Push the furnace and bezel against the side wall.
7. Secure the bezel with six pan head type A screws #6 with 18 threads per inch or #8 with 18 threads per inch (not included) placed through the bent tabs, bezel, and into the RV wall **4**.

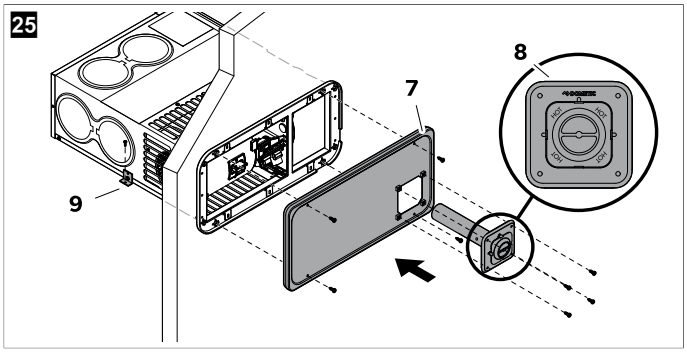
NOTE The flange must sit flush with the sidewall or the door will not seal.



8. Place six more screws (three per side) to the left and right side of the bezel.
   The bezel must fit tightly against the wall.
9. Remove excess sealant from around the installation area.
10. Connect the electrical wiring **5** (see Connecting the Electrical on page 19).



11. Connect the gas line to the valve **6** (see Connecting the Gas on page 18).
12. Align the door **7** with the bezel.



13. Secure the door with four #6-19 × 0.5 in screws for plastic (not included), or with a screw that engages the RV wall and that is longer than 0.5 in .

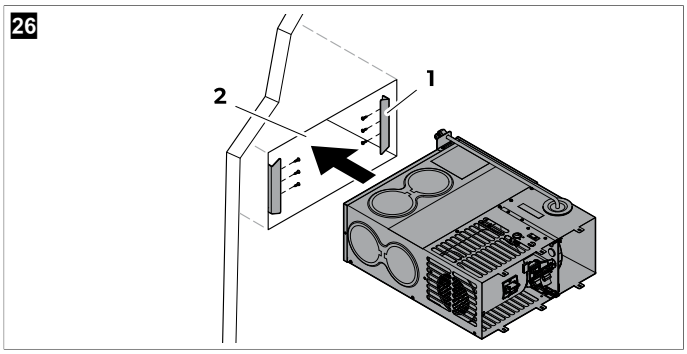
NOTE Self drilling screws are allowed.

14. Place the screws through the door into the bezel bosses.
15. Insert the vent assembly **8** through the hole in the door.
16. Ensure that the vent assembly goes into the chamber tube.
17. Ensure that the vent assembly is aligned with the Dometic text at the top.
18. Secure the vent assembly to the door using four stainless steel exhaust screws (provided with the door).
19. Secure the furnace to the floor of the RV **9** (see Installing the mounting brackets on page 17).

Installing the furnace using the flush door option

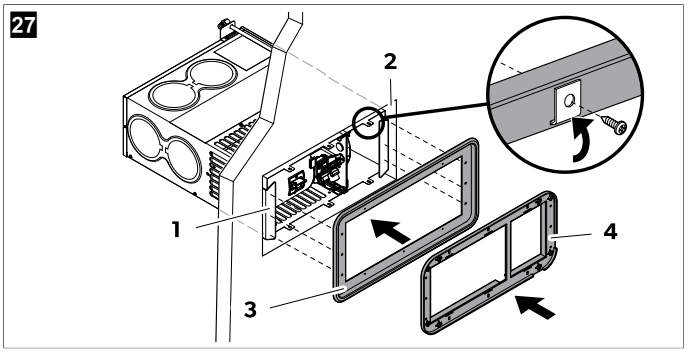
Flush-mounted door systems require the furnace to be installed on a secured platform that is 1 in high, ensuring the door cutout aligns level with the floor surface. If this is not feasible, the side wall must be routed at the bottom to the depth of the bezel to create a pocket area. Additionally, the flush door option requires corners with a 0.5 in radius.

1. Place the furnace through the cutout **2**.
2. Connect the electrical wiring (see Connecting the Electrical on page 19).
3. Connect the gas line to the valve (see Connecting the Gas on page 18).
4. Position the flush mounting brackets **1** on each side of the furnace.



5. Secure each bracket to the wall using three screws (not included).
6. Ensure that there is 5 in / 16 in of space between the bracket and the exterior surface of the wall.
7. Apply RTV sealant, butyl tape, or closed-cell foam to the back of the bezel **4** and the flanges on the recess pan **3** where they will touch the wall.
8. Pull the front edge of the furnace out of the wall about 2 in .

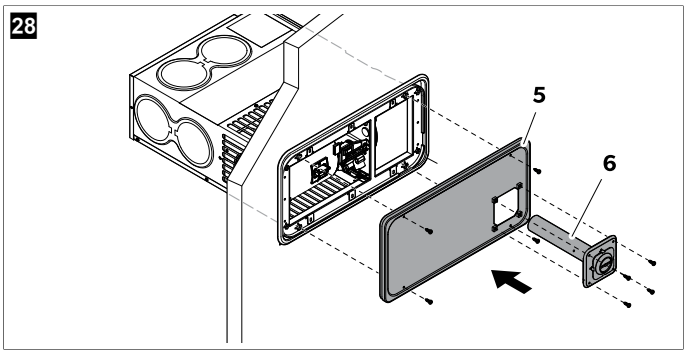
9. Push the recess pan **3** and bezel **4** forward until the six casing tabs move through the slots in the bezel.



10. Bend the casing tabs to the outside of the bezel **4**.
11. Align the bezel so the top three holes match the holes in the recess pan.
12. Place three screws along the top and three screws along the bottom, inserting them through the bezel into the recess pan.

    Use #6 × 0.5 in or #8 × 0.5 in pan head Type AB screws or self-drilling screws (not included).
13. Tighten the screws to secure the bezel firmly to the recess pan.
14. Place the furnace so the bezel **4**, recess pan **3**, and flush mounting brackets **1** are properly aligned.
15. Insert six screws (three on each side) through the bezel and recess pan into the flush mounting brackets.

    Use #6 × 0.5 in or #8 × 0.5 in pan head type AB screws or self-drilling screws (not included).
16. Tighten the screws to secure the furnace in place.
17. Remove excess sealant from around the installation area.
18. Place the door **5** so it is flush with the RV wall.



19. Insert four #6-19 × 0.38 in thread-forming screws for plastic (not included) through the door mounting holes.
20. Tighten the screws to secure the door firmly in place.
21. Insert the vent assembly **6** through the hole in the door.
22. Ensure that the vent assembly goes into the chamber tube.
23. Ensure that the vent assembly is aligned with the Dometic text at the top.
24. Secure the vent assembly to the door using four stainless steel exhaust screws.
25. Secure the furnace to the floor of the RV (see Installing the mounting brackets on page 17).

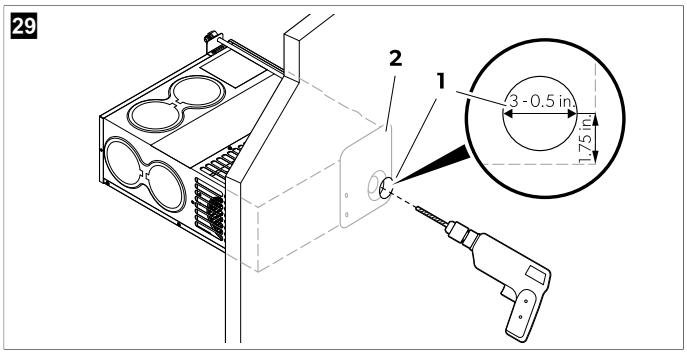
NOTE Do not cap-seal the vent assembly.

Installing the furnace using the small vent option

WARNING! Fire and asphyxiation hazard

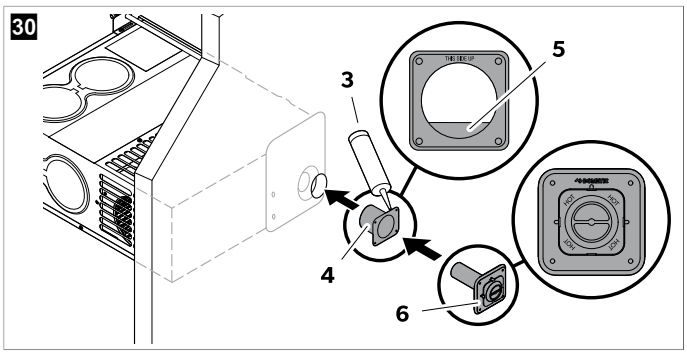
- Do not install vents where projections or door openings come within 6 in of the vent opening.
- Properly seal the vent assembly to prevent carbon monoxide from entering the RV.
- Do not vent exhaust air or draw combustion air from the living area or an enclosed porch.
- Do not connect the furnace to a venting system serving another appliance.

1. Locate the furnace exhaust vent cutout location.
2. Drill a 3 in – 0.5 in hole **1** through the wall for intake and exhaust.



NOTE The maximum exterior wall thickness is 2 in – 0.5 in . Do not exceed maximum wall thickness.

3. Push the furnace vent panel **2** against the RV wall.
4. Apply butyl tape or RTV sealant **3** to the back flange of the vent extension before securing to the wall.



5. Hold the vent extension **4** with the printed text at the top, and the water dam **5** at the bottom.
6. Push the vent extension **4** into the wall until it slides onto the vent panel **2**.
7. Align the vent assembly **6** over the vent extension so that the Dometic text is at the top.
8. Push the vent assembly **6** into the chamber tube and secure it using four stainless steel exhaust screws (not included).

   Overlap the vent tube over the chamber tube by at least 1 in – 0.5 in to ensure proper exhaust venting.
9. Connect the electrical wiring (see Connecting the Electrical on page 19).
10. Connect the gas line to the valve (see Connecting the Gas on page 18).
11. Install the mounting brackets (see Installing the mounting brackets on page 17).

9.9 Installing the mounting brackets

NOTE Mounting brackets can be attached to the furnace casing by removing an existing casing screw only with prior approval from the company. When securing the furnace, it must remain accessible and easily removable for maintenance.

1. Ensure the RV mounting surface is flat and the furnace is positioned evenly.
2. Place the two mounting brackets **1** over any two of the three holes located at the rear of the furnace.

   Secure each bracket with one #8-18 x 0.5 in screw (included).

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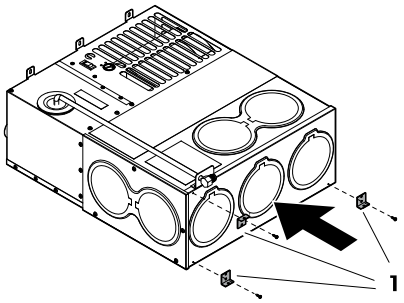
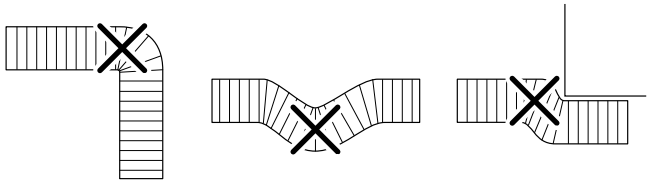


3. Fasten the mounting brackets to the RV structure.
   - Remove an existing casing screw to attach a mounting bracket only with prior approval from Dometic.
4. Ensure that the installed furnace remains accessible and can be easily removed for future maintenance.

9.10 Running the ductwork

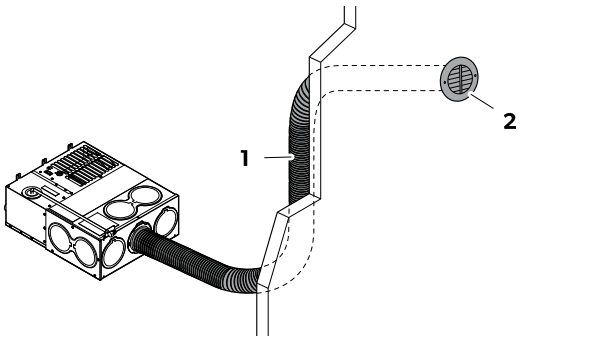
NOTICE! Damage hazard
Keep the number of angles to a minimum and avoid sharp bends, deep sags, or crushed ducts (see Fig. 32 on page 18.

32



1. Attach and secure the 4 in flexible duct to the adapter(s).
2. Run the ducting to the desired location(s) within the RV.
3. Attach the ducting **1** firmly to the register(s).

33



4. Check for burner cycling.
   a) If the burner cycles **ON** and **OFF** at the high-temperature limit, inspect the ductwork for restrictions or sharp bends.
   b) Add extra ducting if necessary to correct airflow issues.
5. Adjust the furnace to the proper temperature rise after installation of the furnace and ducting is complete.
6. Test the furnace to ensure it achieves the temperature rise specified on the rating plate.
   - If checking the temperature rise is not possible, measure the airflow at each register.

   Airflow should meet or exceed the measurements (see Air discharge requirements on page 10).
7. Measure the airflow (in CFM) at each register.
8. Ensure the total airflow meets or exceeds the values (see Air discharge requirements on page 10).
   - If the airflow readings fall below the required values, add extra ducts to improve the airflow.
   - If the airflow readings fall below the required values, reduce restrictions in the system to improve the airflow.

9.11 Connecting the Gas

WARNING! Fire or explosion hazard
> Install gas connections in compliance with the applicable supplemental directives listed in this manual.
> Never use an open flame to check for gas leaks.
> Use a commercially available soap solution made specifically for the detection of leaks to check all connections.
> If the gas supply fails to shut off or if the furnace overheats, shut of the gas valve to the furnace before shutting of the electrical supply.
> Do not put sealing compound on flare fittings.

You may use an extended manifold, tubing, or other approved variations to connect the gas line.

1. Remove the grommet plug **3** from the furnace.
2. Install the grommet plug **3** onto the gas line so the orientation of the grommet is the same as it was prior to removal.

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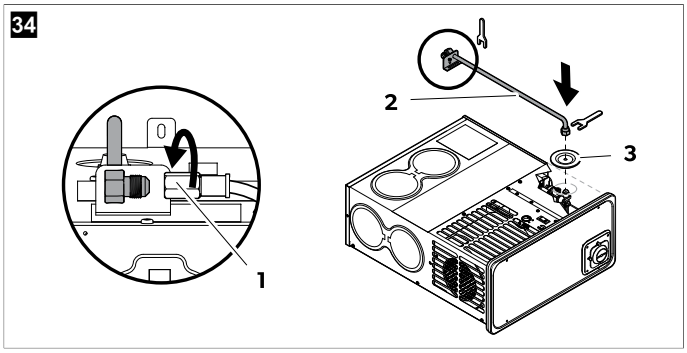

3. Feed the gas line through the hole in the top of the casing.
4. Connect the gas line to the fitting located on the valve **1**.
   - If the furnace includes an extended manifold **2**, connect the gas line at the rear of the furnace **1**.
5. Reinsert the grommet plug **3** into the casing to maintain the required air seal.

NOTE Do not cut the grommet.

6. Tighten the flare nut securely over the gas line.

   Use two wrenches to hold the valve or extended manifold and the flare nut.
7. Torque the flare fitting to 20 ft·lb – 22 ft·lb .

NOTE Do not twist the valve out of position during tightening.

NOTE DFLA35 and DFLA40 models only: A gas conversion kit is included with the furnace.

9.11.1 LP gas pressure test

Before testing

- Test all piping systems before connecting the furnace.
- Disconnect the furnace and any individual shut-off valves from the gas supply piping system when pressure testing the system at pressures of more than 0.5 psi .
- If local codes allow the use of a flexible gas appliance connector, do not use a connector which has before serviced another gas appliance.
- For gas conversions only, a 0.12 in NPT plug is provided upstream of the gas connections for checking the gas pressure.

1. Perform an air pressure test on the piping system.

   The test must maintain an air pressure of a least 6 in of mercury or 3 psi for at least 10 min .
2. Adjust the piping system to maintain the minimum gas supply pressure listed on the rating label, when all appliances are in operation.
3. Test gas connections for leakage with a commercially available soap solution made specifically for the detection of leaks.

9.12 DFLA35/40 only: Converting the furnace gas type

DFLA35 AND DFLA40 models are set up for LP gas at the factory, but can be converted to natural gas. A natural gas conversion kit is included.

DFLA35 and DFLA40 models only: This Furnace is manufactured for use with Liquid Propane (LP) gas. A kit has been provided with the Furnace, so that a qualified service technician can convert the Furnace for use with natural gas. Any conversion to natural gas must conform with local codes or, in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1/ NFPA 54 Natural Gas and Propane Installation Code in addition to the Standard for Recreational Vehicles NFPA1192 and CSA Z240 RV Recreational Vehicle Code.

Changing the adjustment regulator caps

The convertible valve is set for a pressure setting of 3.5 in for natural gas (NAT) and 10.5 in for LP gas. These settings are not adjustable. Do not change the adjustment regulator caps or use them with any other valve.

1. Unscrew the adjustment regulator cap and remove from the valve regulator tower **3**.

NOTE Do not remove the rod from inside the regulator tower or perform any adjustments.

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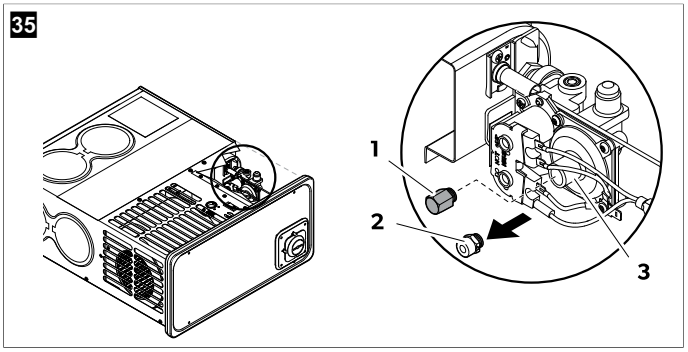

2. Place the NAT cap **1** or LP cap **2** appropriate for the conversion onto the valve regulator tower **3**.
3. Tighten the adjustment regulator cap by hand or use a small wrench.

NOTE Do not over-tighten the adjustment regulator cap.

4. Install the main burner orifice.

Conversion specifications table

Gas type	BTU/HR	Line pressure	Regulator cap setting	Drill size
Propane (LP)	40000 Btu/h	11 in WC	10.5 in WC	49P
Natural (NAT)	40000 Btu/h	7 in WC	3.5 in WC	#30
Propane (LP)	35000 Btu/h	11 in WC	10.5 in WC	#51
Natural (NAT)	35000 Btu/h	7 in WC	3.5 in WC	#30

WC = Water column

Replacing the orifice

Each Furnace is supplied with two main burner orifices. One is installed on the manifold and the other is attached to the blower housing cover. The type of gas in use must match the adjustment regulator cap and orifice installed in the Furnace.

1. Disconnect the gas line from the valve.

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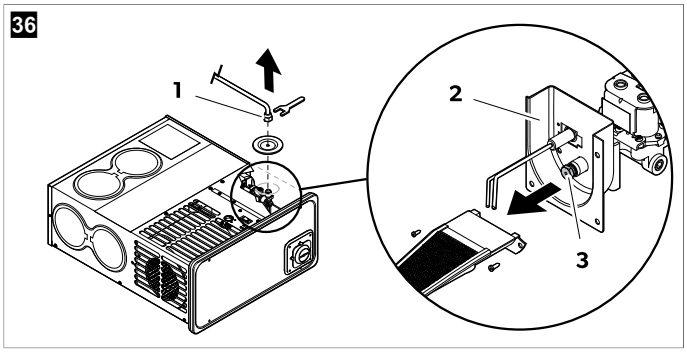

2. Remove the three screws holding the burner assembly **2** to the back wall of the control box.
3. Remove the two screws holding the burner to the manifold.
4. Unscrew the orifice **3** using a 7 in / 16 in wrench or socket.
5. Use the conversion specifications table to select the correct orifice needed for the gas type (see Conversion specifications table on page 19).
6. Install the new orifice.
7. Reverse steps **1**—**3** to reinstall the burner, burner assembly, and the gas line.
8. Test the gas connections **1** for leakage with a commercially available soap solution made specifically for the detection of leaks.
9. Place the converted sticker (included) in a visible location, next to the model number label.

9.13 Connecting the Electrical

WARNING! Risk of electrical shock

- Ensure the furnace is electrically grounded in accordance with local electrical codes or, in their absence, with the National Electrical Code (ANSI/NFPA 70), and/or the Canadian Electrical Code (CSA C22.1, Part 1) when using an external electrical source.
- Install the furnace in a manner that protects all electrical components from water and installation debris.
- Do not try to convert a 12 V ⎓ negative ground model to a positive ground system, and never connect a 12 V ⎓ furnace to 120 V ~ / 240 V ~ power sources.
- Disconnect the electronic ignition system (circuit board) before performing a high potential test.
- Do not use a battery charger to power a DC model furnace, even for testing.
- Use only 12 V ⎓ power for DC models, and only 120 V ~ for 120 V ~ models. Do not interchange.
- To avoid radio frequency interference from the high-voltage spark ignition, locate microprocessor-based equipment at least 5 ft from the furnace.

Table 5: Over-current protection (No wire bundling restrictions)

Wire size	Ampacity	Wire type
20	3	Stranded only

Wire size	Ampacity	Wire type
18	6	
16	8	
14	15	
12	20	
10	30	
8	40	
6	55	
4	75	
2	100	

Wiring information

- Check the wiring diagrams for correct wiring routes (see Wiring diagrams on page 22).
- Use the smallest wire size listed in the table to reduce voltage drop.
- If using a converter with a charging port, connect both the converter and the battery to the furnace at the same time.
- If the furnace includes a connector block for field connections, use the matching connector parts provided.
- All furnaces have a power switch. Ensure that the switch is in the **ON** position before operating.

Additional information for VAC wiring only

- Furnaces with 120 V ~ motors use a 24 V ~ transformer (located inside the furnace) to power the electrical components.
- The power switch for AC furnaces is installed only in the valve circuit leg.
- Use a minimum of 18 AWG wire to connect the 120 V ~ power and thermostat leads to the wires located on the left side of the control box.

Table 6: Over-current protection

AWG or SAE conductor size		Maximum ampacitiy at conductor insulation temperature rating of 90 °	Maximum ampacitiy at conductor insulation temperature rating of 105 ° / 125 °
20	Not more than seven wires per harness	5	7.5
18		7.5	10
16		10	15
14		17.5	20
12		22.5	25
10	Not more than three wires per harness	40	50
8		55	70
6		75	100
4		95	120
2		130	150
1		150	—
1/0		170	—
2/0		195	—
3/0		225	—
4/0		260	—

DFMD35, DFLD35, DFLD40 only:

A 15 A circuit breaker is included with the DFMD35, DFLD35, and DFLD40 furnace models.

- Install this breaker in the main fuse panel, replacing a standard fuse.
- Use this breaker only for the furnace circuit.

9.14 Installing the Thermostat

WARNING! Risk of serious injury or death

> Do not install the thermostat near other heat sources such as direct sunlight, heat-producing appliances, furnace, or air conditioner output registers.

> Install the thermostat in a location free from external heat influences to ensure right temperature regulation and prevent malfunction.

- Wire the thermostat with an 22 AWG minimum stranded wire.
- Purchase a thermostat rated for 12 V ⎓ or 24 V ~, minimum 1 A rating.

> Disconnect all electrical power to the furnace.

> Locate a dry area away from the heat registers with good air circulation for the thermostat installation.
  - If possible, place the thermostat 48 in – 54 in above the main living area floor on an interior wall.
  - Use a 0.75 in spacer between the thermostat and wall, for proper room air sensing when placing on an exterior wall.

> Follow manufacturer's installation instructions provided with the thermostat.

10 Troubleshooting

Problem	Possible cause	Suggested remedy
Furnace will not light	Blower does not turn on.	> Check the main fuse panel for a blown fuse. > Check the intake and vents to ensure they are not blocked or obstructed.
	The furnace-installed breaker switch may be tripped or switched **OFF**	Contact a trained RV service provider.
	The 12 V power is low.	Check the RV nominal voltage.
	The Furnace may be in lockout.	1. Reset the furnace by switching the thermostat to **OFF** for 10 s . 2. Switch the thermostat back to **ON**. If air is in the propane line, repeat this process up to three times.
	Air is in the propane line.	Purge the air by turning on other appliances, like a cook top, that are further downstream from the propane tanks.
	The thermostat is not set to Heat or a high enough temperature.	Adjust the thermostat.
Furnace shuts off before it reaches the desired temperature.		> Check to ensure all the vents are open and not covered. > Check the air intake to ensure that it is not blocked or obstructed.

10.1 Ignition control diagnostic codes

The ignition control typically attempts ignition three times. If faults occur the LED indicator at the center of the control board will flash a specific sequence from the tale below.

- A "soft lockout" is a condition that is timed and will make more attempts to correct the problem.
- A "hard lockout" requires resetting the thermostat or turning the power switch off, and then back on.

Table 7: LED Codes

LED indicator	Fault	Lockout
Steady on and no flashing	Internal circuit board failure	Hard
1 flash with 3 s pause	Limit switch or air-flow problems	Soft
2 flashes with 3 s pause	Flame sense fault	Hard
3 flashes with 3 s pause	Ignition lockout fault	Soft (1 h retry)
4 flashes with 3 s pause	High voltage 16 V – 17 V	Soft
5 flashes with 3 s pause	Low voltage 8 V – 9 V	

10.2 Ordering spare parts

WARNING! Electrocution, fire, explosion and/or asphyxiation hazard
Failure to obey the following warnings could result in death or serious injury. Use only Dometic replacement parts and components, which are specifically approved for use with the furnace.

1. Read the product number (PNC) or part number (SKU) on the data plate.
2. Visit dometicparts.dometic.com to see the DF Series Furnace Parts List and latest spare part information.
3. Contact the nearest Dometic service partner or dealer to place the order.

11 Warranty

2-year(s) limited warranty available at qr.dometic.com/bfneEw. If you have questions, or to obtain a copy of the limited warranty free of charge, contact:

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DOMETIC CORPORATION
CUSTOMER SUPPORT CENTER
5155 VERDANT DRIVE
ELKHART, INDIANA, USA 46516
1-800-544-4881
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12 Disposal

Place the packaging material in the appropriate recycling waste bins, wherever possible. Consult a local recycling center or specialist dealer for details about how to dispose of the product in accordance with applicable national and local disposal regulations.

13 Technical data

Table 8: Small furnace models

	DFSAD12, DFSADH12	DFSD12	DFSD16	DFSD20, DFSDH20
Type of gas	LP gas			
BTU input	12000 Btu		16000 Btu	18000 Btu
BTU output	9120 Btu		12160 Btu	13680 Btu
Duct static pressure	0.1 iwc , 0 iwc front	0.1 iwc		
Amperage	2.4 A	3.4 A		4.8 A
	Requires dedicated 15 A circuit for furnace			
Watts	29 W	41 W	41 W	58 W
Power supply	12 V⎓			
Minimum return air	35 in²			

Table 9: Medium furnace models

	DFMD16	DFMD20	DFMD25, DFMDH25	DFMD30, DFMDH30	DFMD35, DFMDH35
Type of gas	LP gas				
BTU input	16000 Btu	20000 Btu	25000 Btu	30000 Btu	35000 Btu
BTU output	12160 Btu	15200 Btu	19000 Btu	22800 Btu	25840 Btu
Duct static pressure	0.2 iwc	0.1 iwc			
Amperage	4.2 A		7.5 A		11.1 A
	Requires dedicated 15 A circuit for furnace				
Watts	50 W		90 W		132 W
Power supply	12 V⎓				
Return air	80 in²				
Minimum return air	65 in²				

Table 10: Large furnace models

	DFLD35	DFLD40	DFLA35	DFLA40
Type of gas	LP gas		LG gas and natural gas	
BTU input	35000 Btu	40000 Btu	35000 Btu	40000 Btu
BTU output	26600 Btu	30400 Btu	26600 Btu	30400 Btu
Duct static pressure	0.1 iwc			
Amperage	12.5 A		2.5 A	
	Requires dedicated 20 A circuit for furnace		Requires dedicated 15 A circuit for furnace	
Watts	138 W		300 W	
Power supply	12 V⎓		120 V~	
Return air	80 in²			
Minimum return air	65 in²			

Dimensions:

Table 11: Small furnace models

Component	Width	Height	Depth	Weight
Casing	12 in	7 in	20 in	Furnace: 21 lb
Small vent	4.44 in	4.44 in	1.06 in	
Door	14.75 in	9.75 in	0.5 in	
Interior grill	8.5 in	12.5 in	0.5 in	Boxed: 24 lb

Component	Width	Height	Depth	Weight
Trim ring	14.12 in	10.12 in	0.12 in	

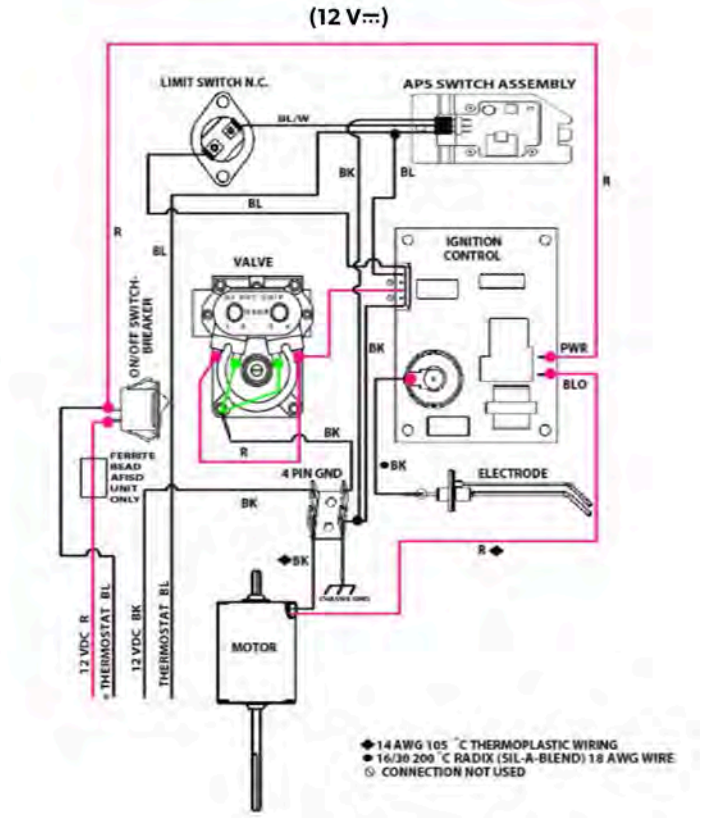
Table 12: Medium furnace models

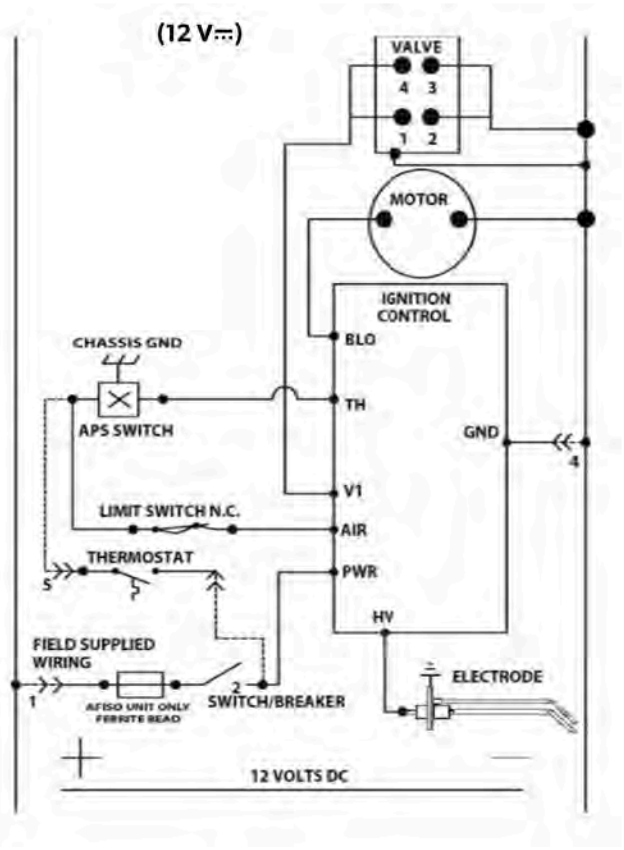
Component	Width	Height	Depth	Weight
Casing	16.5 in	7 in	20 in	
STD Door	19.06 in	9.5 in	0.44 in	Furnace: 26 lb
Flush Door	20.62 in	11 in	0.22 in	
Small vent	4.44 in	4.44 in	1.06 in	Boxed: 29 lb

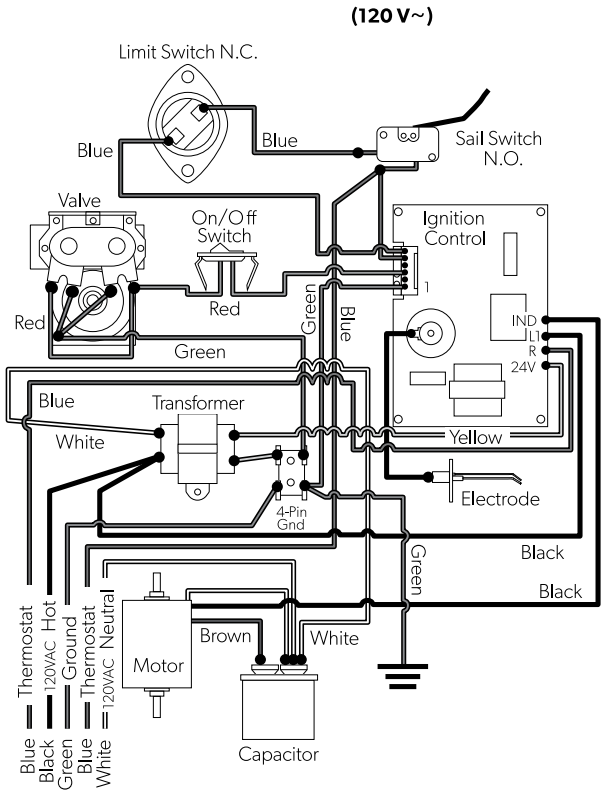
Table 13: Large furnace models

Component	Width	Height	Depth	Weight
Casing	16.5 in	9 in	20 in	
Door	19.25 in	9.25 in	0.25 in	Furnace: 39 lb
Recess bezel	20.56 in	11.5 in	0.38 in	
Small vent	4.44 in	4.44 in	1.06 in	Boxed: 46 lb

13.1 Wiring diagrams

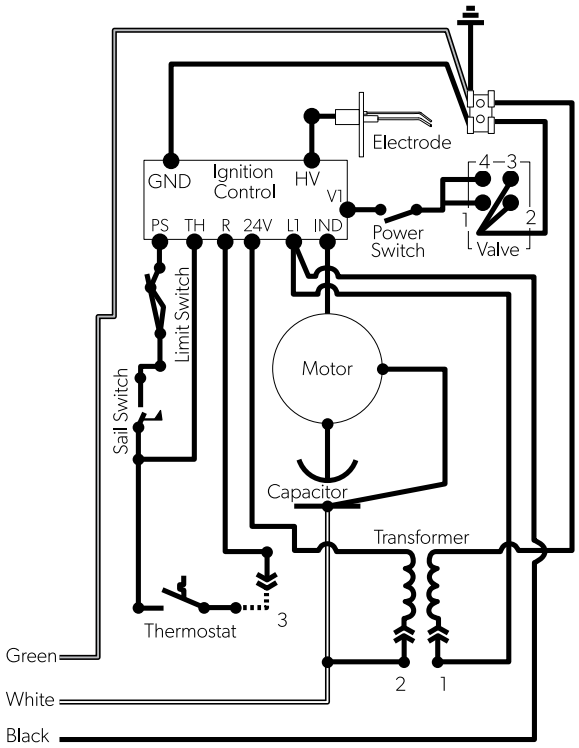






Abbreviations	Description
BL	blue
BK	black
R	red
W	white

(120 V~)


Electrode
GND
Ignition Control
HV
V1
4
3
1
2
PS
TH
R
24V
L1
IND
Power Switch
Valve
Limit Switch
Sail Switch
Motor
Capacitor
Transformer
Thermostat
3
Green
White
Black
2
1

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