DAIKIN UNIVERSITY

90 Plus AFUE Furnace Install & Commissioning

Participant Guide

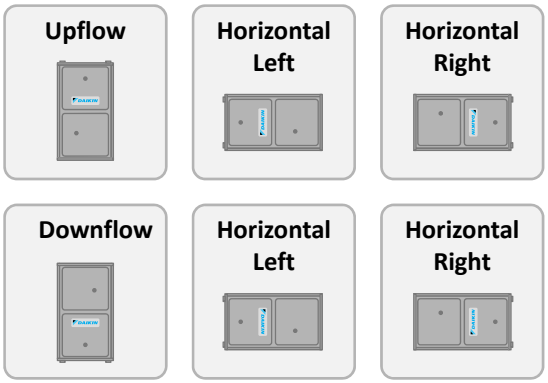
90 Plus AFUE Furnace I&C

Agenda

- Suspension, Leveling, Filters, Return Options
- Condensate Drain Trap, Drain Pan, and Lines
- Horizontal Right Side Down
- Horizontal Left Side Down
- Venting
- Gas Valve and Connections
- Electrical Connections
- 24 Volt Thermostat Wiring
- ComfortNet
- Furnace Start Up
- Temperature Rise and Blower Speed Adjust
- Duct Static

Daikin 90 Plus AFUE Furnace Installation

The new 90 Plus AFUE Furnace can be installed in an upflow, downflow, or horizontal left or right applications.



DAIKIN

Furnace Suspension

- **Suspension from rafters or joists**
  - Use 3/8 threaded rod
  - 2”x2”x1/8” angle iron
- **Crawl space installation**
  - Suspended from floor joists
  - Supported by concrete pad
- **Never install on ground under home**, as it could be exposed to water

DAIKIN

Furnace Leveling

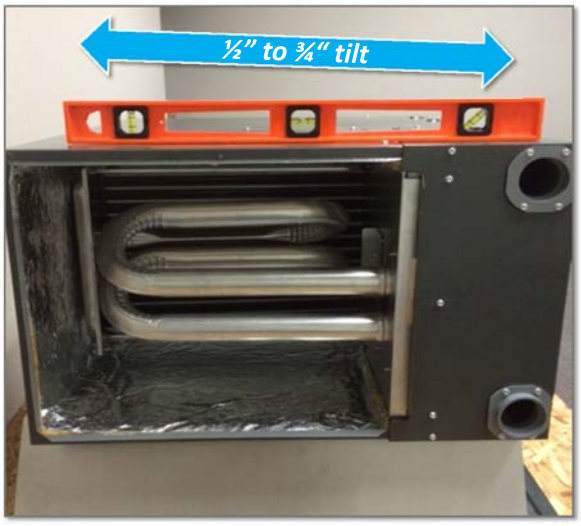
- **Leveling ensures proper condensate drainage** from the heat exchanger and inducer draft blower.
- **Level lengthwise from end-to-end** for proper flue pipe drainage.

DAIKIN

Furnace Leveling

Install the furnace with a slight tilt from back to front with the access doors downhill from the back panel.

- Tilt approximately 1/2 to 3/4 inches.
- Allows the condensate from the secondary heat exchanger to **flow forward to the recuperator coil front cover**, and into drain trap.

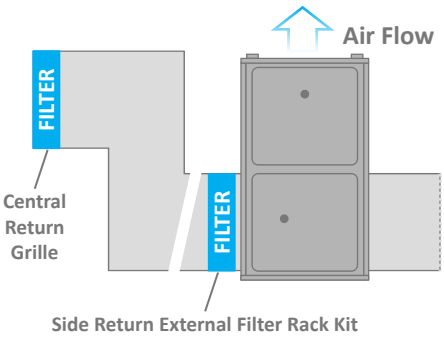


DAIKIN

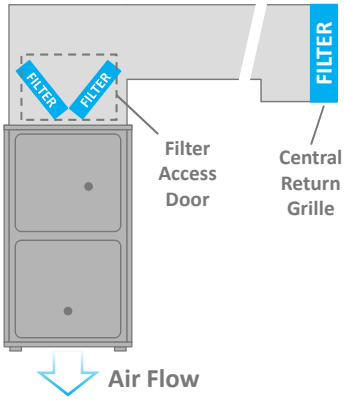
Air Filter Locations

Depending on the installation and/ or customer preference, differing filter arrangements can be applied.

Possible Upright Upflow



Possible Upright Counterflow Filter Locations



DAIKIN

Air Filters

- **Filters must be used with this furnace**.
- **Filters** are not shipped with this furnace, but **must be provided, sized, and installed externally by the installer**.
- **If the furnace is installed without filters, the warranty will be voided.**
- **NOTE:** Change filters before occupants take ownership of a new home!

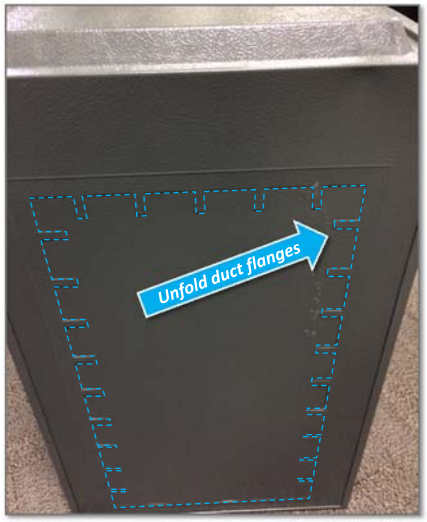
Filter Sizing Chart	
Model	Minimum Filter Size
DM96VC0403B	20 x 24
DM96VC0603B	20 x 25
DM96VC0803B	18 x 36
DM96VC0804C	24 x 30
DM96VC1005C	24 x 36
DM96VC1205D	2 (20 x 25)
DC96VC0403B	20 x 24
DC96VC0603B	20 x 25
DC96VC0804C	18 x 36
DC96VC1005C	24 x 30
DC96VC1205D	2 (20 x 25)

(Based on 300 ft/min filter face velocity)

DAIKIN

Bottom Return Air Opening

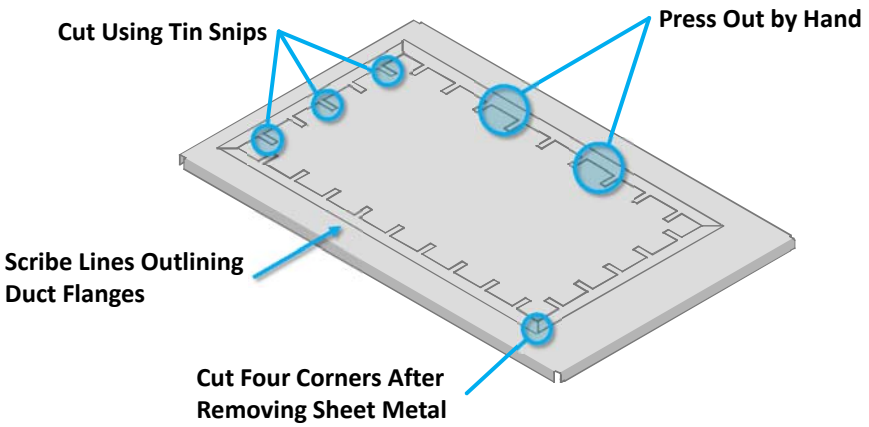
- The bottom return air opening on upflow models utilize a **"lance and cut" method to remove sheet metal** from the duct opening in the base pan.
- **Unfold the duct flanges around the perimeter of the opening** using a pair of seamer pliers or seamer tongs.
- **WARNING:** Sharp edges. Gloves required.



DAIKIN

Bottom Return Air Opening

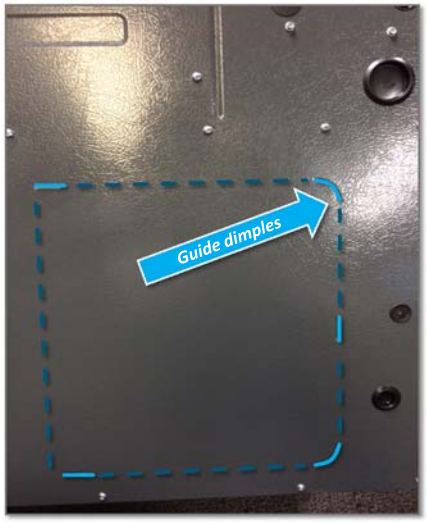
Airflow area will be reduced by approximately 18% if duct flanges are not "unfolded". This could cause performance issues and noise issues.



DAIKIN

Side Return Air Opening

- On upflow units, **"guide dimples"** locate the side return cutout locations.
- **Use a straight edge to scribe lines** that will connect the dimples before cutting your opening.
- **NOTE:** An undersized opening will caused reduced airflow.



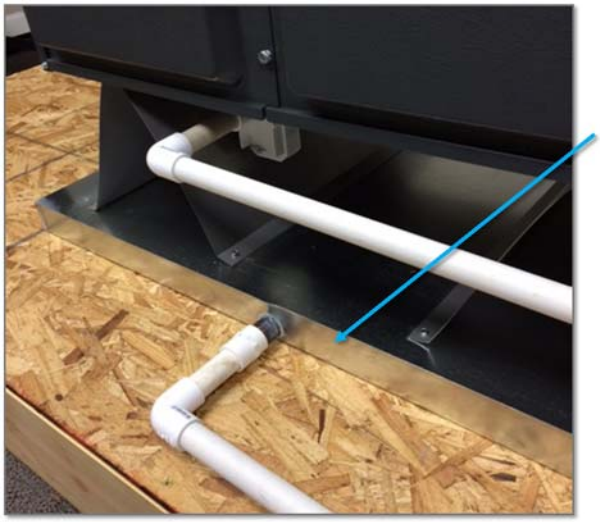
DAIKIN

Agenda

- Suspension, Leveling, Filters, Return Options
- Condensate Drain Trap, Drain Pan, and Lines
- Horizontal Right Side Down
- Horizontal Left Side Down
- Venting
- Gas Valve and Connections
- Electrical Connections
- 24 Volt Thermostat Wiring
- ComfortNet
- Furnace Start Up
- Temperature Rise and Blower Speed Adjust
- Duct Static

DAIKIN

Drain Pan, Trap, and Lines

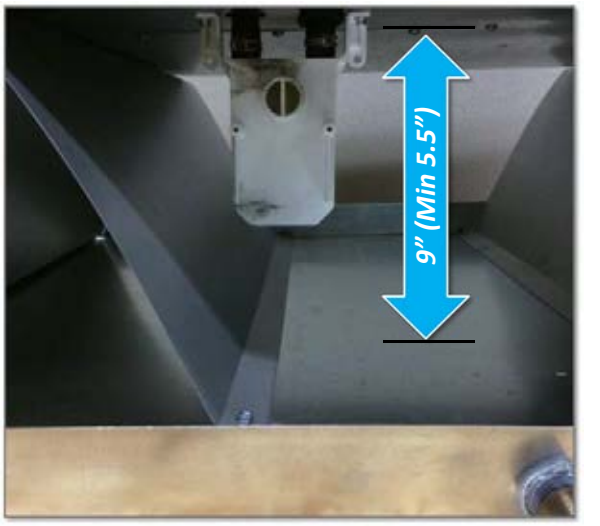


An "auxiliary" drain pan must be installed under the furnace if it's being installed over a conditioned space.

- Must cover the entire area under the furnace.
- Secondary containment for trap.
- Under furnace and evaporator coil when applicable.

DAIKIN

Drain Pan, Trap, and Lines



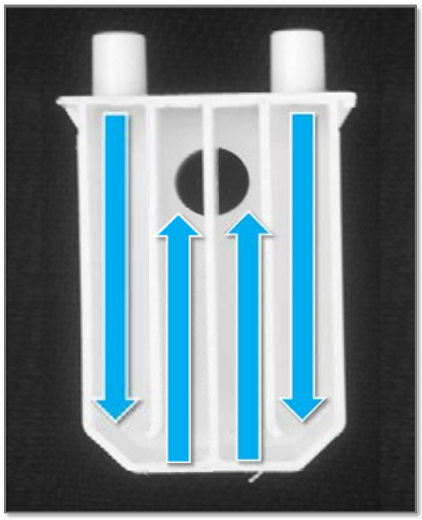
Condensate drain trap is secured to furnace side panels in horizontal applications.

- A **minimum clearance of 5.5"** below the furnace must be provided for trap installation.

DAIKIN

Drain Pan, Trap, and Lines

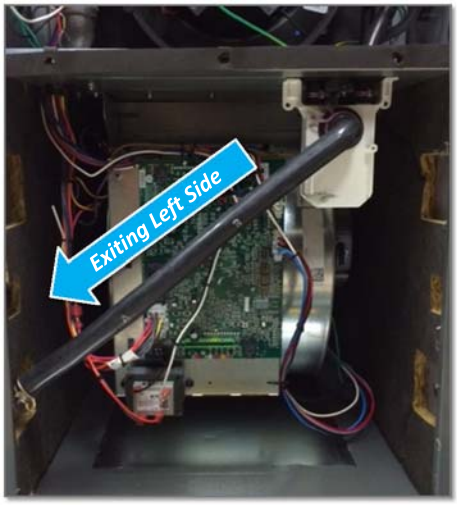
- The **drain trap must be primed** prior to furnace startup.
- **Fill both sides** of the drain trap with water.
- **Importance of drain trap priming:**
  - Ensures proper furnace drainage upon startup
  - Prohibits the possibilities of flue gases escaping through the drain system.



DAIKIN

Drain Trap Installed in Vertical Upflow Furnace

Drain Exiting Left Side



Drain Exiting Right Side

DAIKIN

Agenda

- Suspension, Leveling, Filters, Return Options
- Condensate Drain Trap, Drain Pan, and Lines
- Horizontal Right Side Down
- Horizontal Left Side Down
- Venting
- Gas Valve and Connections
- Electrical Connections
- 24 Volt Thermostat Wiring
- ComfortNet
- Furnace Start Up
- Temperature Rise and Blower Speed Adjust
- Duct Static

DAIKIN

Horizontal Right Side Down

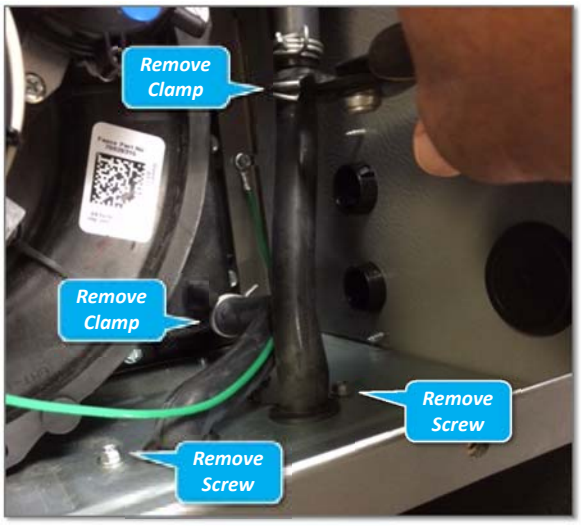
Condensate Drain Trap Conversion

- All furnace models are shipped with a **factory installed drain trap for vertical installations**.
- Horizontal installs require the **trap to be relocated**.
- Two conversions being covered in this period of instruction:
  - Upflow model installed horizontally with **right side down**.
  - Upflow model installed horizontally with **left side down**.

DAIKIN

Horizontal Right Side Down

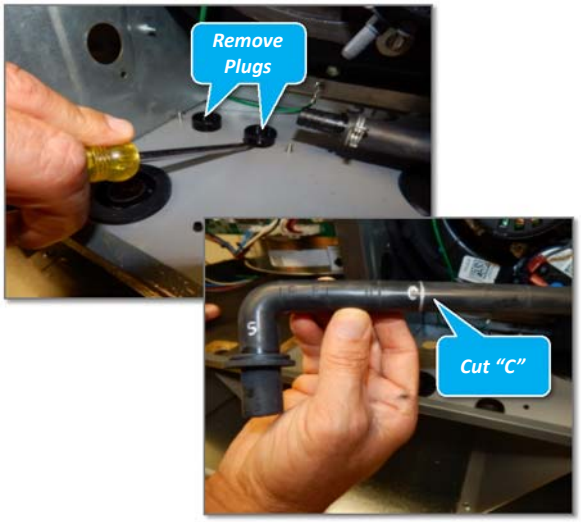
- **Remove the clamps** from both ends of the drain hoses.
- **Remove the two screws** holding the drain trap to the blower deck.
- **Remove the trap and two hoses** from the blower deck.



DAIKIN

Horizontal Right Side Down

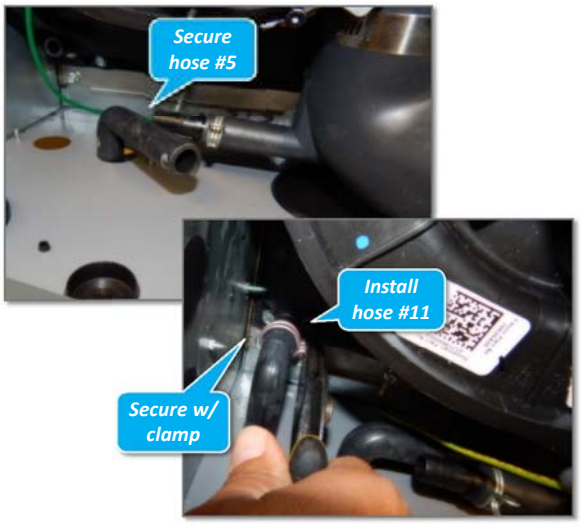
- **Remove the two plugs from the right side of the cabinet** and install them in the blower deck.
- Locate hose #5 and **cut at line "C"**.
- **Install the cut end of hose #5** from outside of the cabinet through the cabinet drain hole nearest the top of the furnace.



DAIKIN

Horizontal Right Side Down

- **Secure hose #5 to the barbed** fitting in the elbow with a red clamp.
- **Install the "non-grommet" end of hose #11** from the outside of the cabinet through the bottom drain hole.
- **Install on collector box and secure** with a silver clamp.



DAIKIN

Horizontal Right Side Down

- Use two silver clamps and **secure both hoses to the drain trap**.
- **The trap outlet faces the front of the furnace.**
- **Secure the trap to the cabinet** using the two original screws removed from the blower deck in the earlier steps.
- **Refer to the "Field Supplied Drain" section in the manual for instructions** on field supplied/ installed drain on outlet of furnace trap.

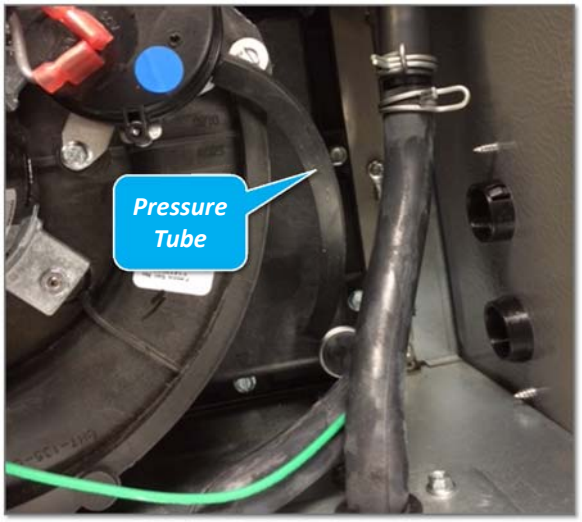
DAIKIN

Agenda

- Suspension, Leveling, Filters, Return Options
- Condensate Drain Trap, Drain Pan, and Lines
- Horizontal Right Side Down
- Horizontal Left Side Down
- Venting
- Gas Valve and Connections
- Electrical Connections
- 24 Volt Thermostat Wiring
- ComfortNet
- Furnace Start Up
- Temperature Rise and Blower Speed Adjust
- Duct Static

DAIKIN

Front Cover Pressure Tube (Relocating)

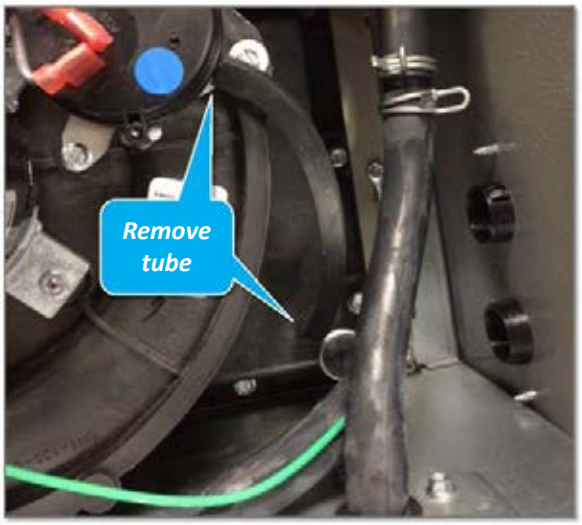


Relocate pressure tube to lower collector box port when:

- **Upflow** model is installed horizontal **left side down**.
- **Downflow** model is installed horizontal **right side down**.

DAIKIN

Front Cover Pressure Switch Tube

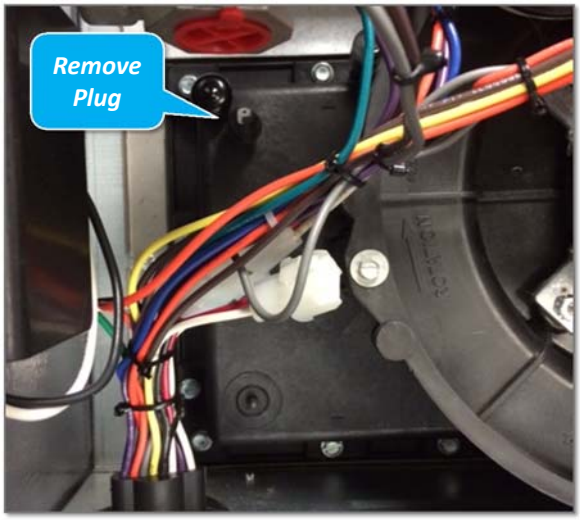


Step 1

- **Remove factory installed 6" square tubing** that connects the front cover pressure switch, and the top collector box cover port.

DAIKIN

Front Cover Pressure Switch Tube

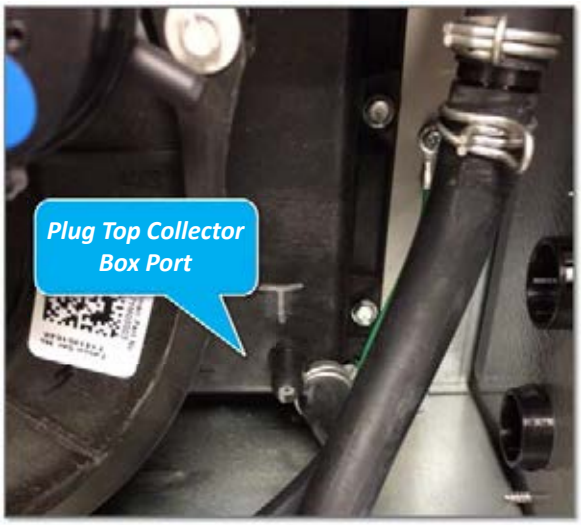


Step 2

- **Remove rubber plug** from the bottom collector box port.

DAIKIN

Front Cover Pressure Switch Tube



Step 3

- **Install rubber plug** on top collector box port.

DAIKIN

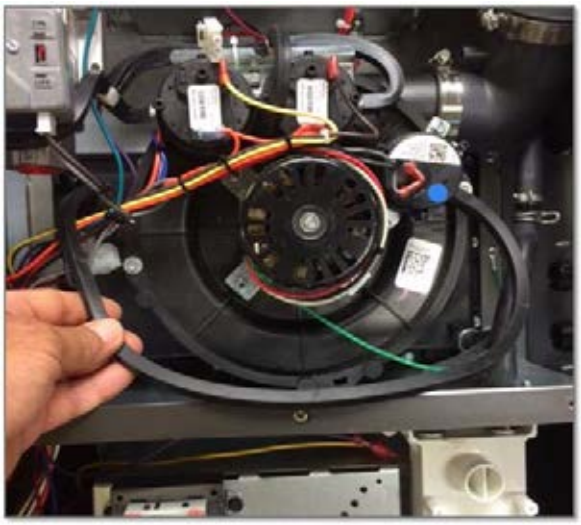
Front Cover Pressure Switch Tube

Step 4

- **Locate the 24” x ¼” square tube** in parts/ “drain assembly bag” that is shipped with furnace.
- Install one end on **the front cover pressure switch**, and the other end onto the bottom/**lower collector box port**.

DAIKIN

Front Cover Pressure Switch Tube



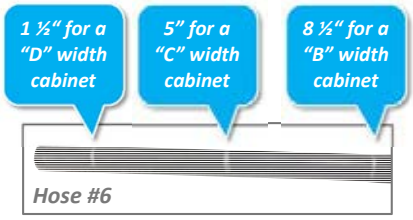
Step 5

- **Cut off access tubing**, and tuck access hose into the furnace compartment close to the inducer draft motor.

DAIKIN

Horizontal Left Side Down

- **Remove the hose clamps**, two screws that hold the trap onto blower deck in prior procedure.
- **Remove the two plugs from the left side of the cabinet** and re-install in the blower deck.
- **Locate hose #6.** Measuring from the non-grommet end, **cut off and discard:**



DAIKIN

Furnace Cabinet Dimensions

Look at model number of your furnace. (11th place)

D	M	9	7	M	C	0	8	0	3	B	N	A	A
1	2	3	4	5	6	7	8	9	10	11	12	13	14

Brand
D - Daikin

Configuration
M - Upflow/Horizontal
C - Downflow/Horizontal

AFUE
97 - 97% AFUE

Gas Valve
M - Modulating
V - 2 Stage
H - Convertible 2 Stage
S - Single Stage

Motor
C - Variable Speed ECM / ComfortNet
E - Multi-Speed ECM
S - Single Speed

MBTU/h
040 - 40,000 BTU/h
120 - 120,000 BTU/h

Minor Revision
A - Initial Release
B - 1st Revision

Major Revision
A - Initial Release
B - 1st Revision

NOx
N - Low NOx

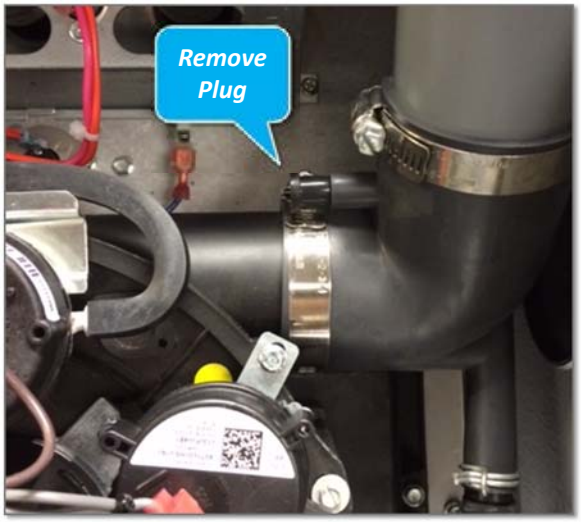
Cabinet Width
A - 14"
B - 17.5"
C - 21"
D - 24.5"

Maximum CFM
2 - 800 CFM
3 - 1200 CFM
4 - 1600 CFM
5 - 2000 CFM

DAIKIN

Horizontal Left Side Down

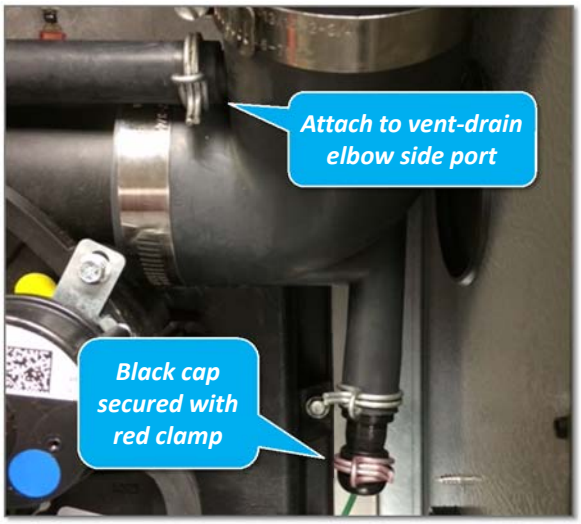
- **Remove the rubber plug** from the vent-drain elbow side port.



DAIKIN

Horizontal Left Side Down

- **Place hose #6 on the vent-drain elbow side port** and secure with a silver clamp.
- **Remove black drain cap** near the lower collector box port, and place on barbed fitting.
- **Secure with a red clamp.**



DAIKIN

Horizontal Left Side Down

- **Locate hose #5 and cut 3” from the non-grommet end.**
- **Insert the cut end of hose #5 through the lower cabinet drain hole** furthest from the top of the furnace. (insert from the outside of cabinet in)
- **Connect hose #5 & #6 using the 100 degree elbow**, (in drain assembly bag) and secure with two red clamps.

DAIKIN

Horizontal Left Side Down

- **Drain the collector box.**
- **Install the non-grommet end of hose #11 from the inside of the cabinet**, into the cabinet hole closest to the top/ air discharge end of the furnace.
- **Install on collector box** and secure with a silver clamp.
- Use two silver clamps and **secure the hoses to the drain trap**.

DAIKIN

Agenda

- Suspension, Leveling, Filters, Return Options
- Condensate Drain Trap, Drain Pan, and Lines
- Horizontal Right Side Down
- Horizontal Left Side Down
- Venting
- Gas Valve and Connections
- Electrical Connections
- 24 Volt Thermostat Wiring
- ComfortNet
- Furnace Start Up
- Temperature Rise and Blower Speed Adjust
- Duct Static

DAIKIN

Direct or Non-Direct Venting

- All furnaces are dual certified, and built with a **2" vent/ intake pipe and connectors**.
- Transitioning from **2" to 3" PVC** pipe should be done as **close to the furnace as possible**.
- **Do not connect to Type B, BW, or L vent or any vent connector.** (metal)
- **Must not be vented to any portion of a factory built, or masonry chimney** except when used as a pathway for PVC to pass through.

DAIKIN

Direct Venting

- Requires both a **combustion air intake/vent flue pipe**.
- PVC may run **horizontally** and exit through the **side of the building**, or **vertically** and exit through the **roof of building**.
- PVC may be run through an existing ***unused*** chimney.
- PVC must extend a **minimum of 12" above** the top of the chimney.

DAIKIN

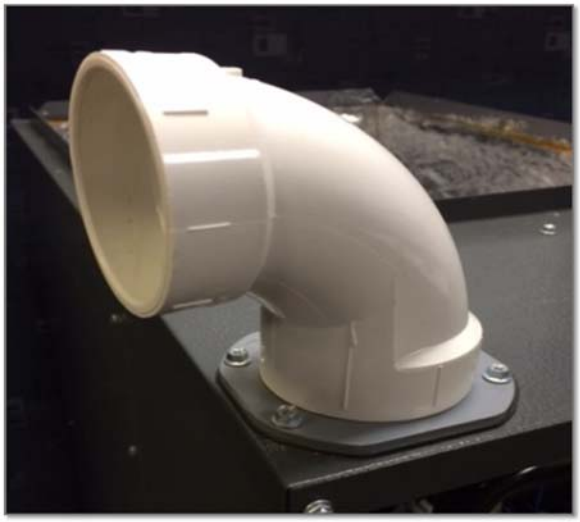
Non-Direct Venting

- Requires **vent/ flue pipe only**.
- PVC may **run horizontally** and exit through **the side of the building** or run **vertically** and exit through the **roof of building**.
- PVC may be run through and existing ***unused*** chimney.
- PVC must extend a **minimum of 12"** above the top of the chimney.
- The space between the vent pipe and the chimney **must be closed with a weather-tight corrosion-resistant flashing**.

DAIKIN

Non-Direct Venting

- A 90 degree elbow should be **attached to the furnace's combustion air intake**.
- The 90 degree elbow will guard against **inadvertent blockage of the air intake**.



DAIKIN

Pipe Lengths, Diameters, and Elbows Allowed

- Refer to the table in each manual for **applicable length, elbows, and pipe diameter for construction of the vent/ flue pipe system**.
- **Elbows** and/ or **tees** used in the terminations must be **included** when determining the number of elbows in the pipe system.

*DM96VC/*DC96VC Direct Vent (2 - Pipe) and Non-Direct Vent (1- Pipe) [6]									
Maximum Allowable Length of Vent/Flue Pipe & Combustion Air Pipe (ft) [1] [2]									
Unit Input (Btu)	Pipe Size [4] (in.)	Number of Elbows [3] [5]							
		1	2	3	4	5	6	7	8
40,000	2 or 2 1/2	120	115	110	105	100	95	90	85
60,000	2 or 2 1/2	95	90	85	80	75	70	65	60
80,000 "B"	2 or 2 1/2	75	70	65	60	55	50	45	40
80,000 "B"	3	200	193	186	179	172	165	158	151
80,000 "C"	2 or 2 1/2	25	20	15	10	5	N/A	N/A	N/A
80,000 "C"	3	200	193	186	179	172	165	158	151
100,000	2 or 2 1/2	25	20	15	10	5	N/A	N/A	N/A
100,000	3	200	193	186	179	172	165	158	151
120,000	2 or 2 1/2	45	40	35	30	25	20	15	10
120,000	3	95	90	85	80	75	70	65	60

DAIKIN

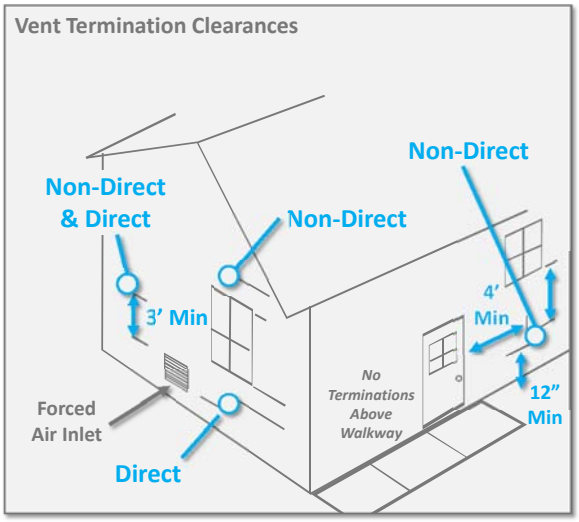
Vent Terminations

Direct and Non-Direct

- If a 90 or 45 degree elbow is used for termination… it **must be pointed downward**.
- Must terminate **at least 3' above** any forced air inlet located within **10'**.

Non-Direct Vent Termination:

- **At least 4' below** a window
- **4' horizontally** from a door or window or gravity air inlet
  - **1' above** any door, window, or gravity air inlet into any building.

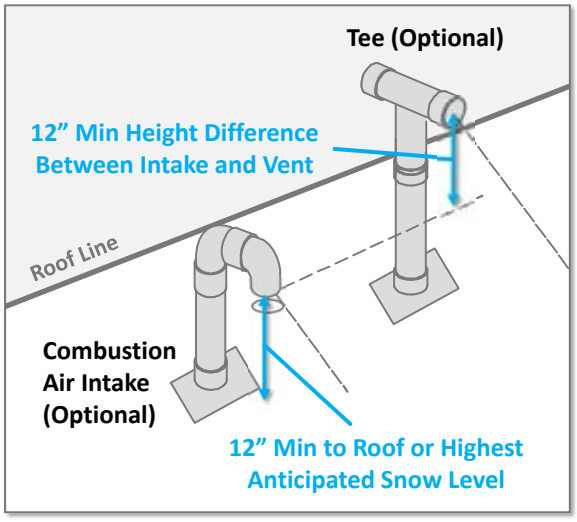


DAIKIN

Vent Terminations

Direct Vent Terminations

- Must terminate **at least 12"** from any opening through which flue gases may enter a building. (door, window, or gravity fed inlet)
- A vent pipe run vertically through a roof must terminate **at least 12" above** the roof line, and be at **least 12"** from any vertical wall.

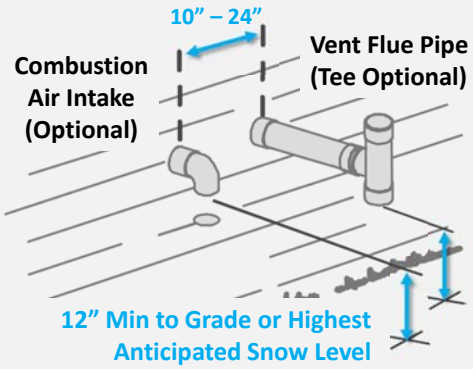


DAIKIN

Vent Terminations

- Also, **may not terminate** over a public walkway, or over any area **where condensate or vapor could cause a nuisance or hazard**.
- The **combustion air intake termination of a direct vent application** should not terminate in an **area which is frequently dusty or dirt**.

Standard Horizontal Terminations (Dual Pipe)

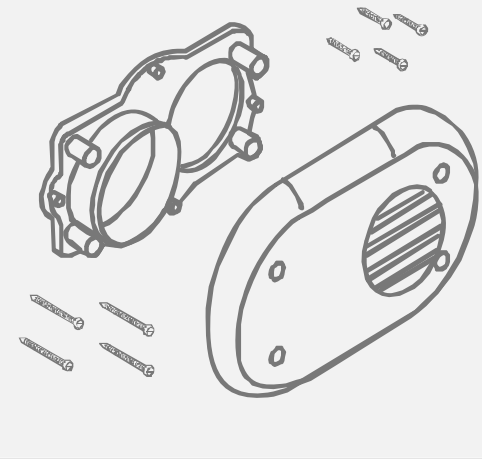


DAIKIN

Concentric Vent Terminations (side wall)

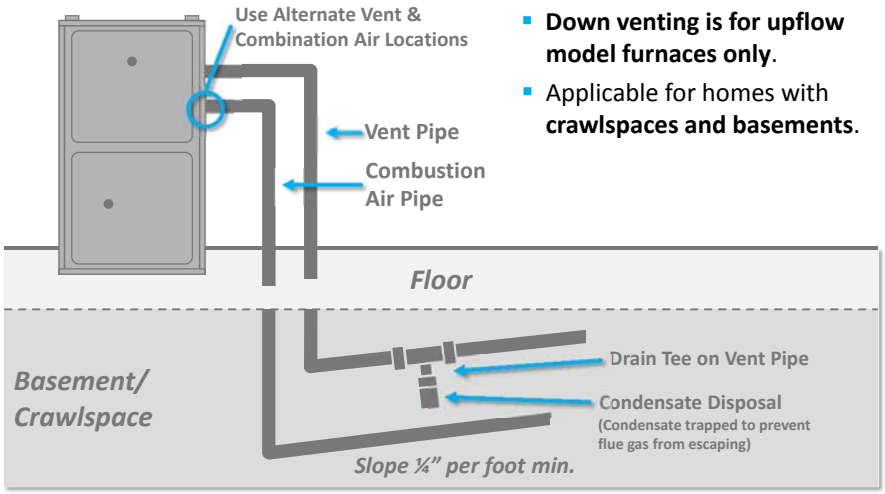
- Used with **2" or 3" direct vent systems**.
- May be installed with the intake and exhaust pipes located **side-by-side** or with **one pipe above the other**.
- Not intended for use with **single pipe/ non-direct vent installations**.

Side Wall Vent Kit



DAIKIN

Down Venting Upflow Model Furnaces



- **Down venting is for upflow model furnaces only**.
- Applicable for homes with **crawlspaces and basements**.

DAIKIN

Venting (Rubber Coupling)

Direct Vent	Non-Direct Vent
	

DAIKIN

Agenda

- Suspension, Leveling, Filters, Return Options
- Condensate Drain Trap, Drain Pan, and Lines
- Horizontal Right Side Down
- Horizontal Left Side Down
- Venting
- Gas Valve and Connections
- Electrical Connections
- 24 Volt Thermostat Wiring
- ComfortNet
- Furnace Start Up
- Temperature Rise and Blower Speed Adjust
- Duct Static

DAIKIN

Gas Valve

- **24 volt gas valve controlled by the integrated control module**.
- **Manual ON/ OFF control** located on the valve itself.
- The **gas piping supplying the furnace must be properly sized based on the gas flow required**, specific gravity of the gas, and length of the run.

DAIKIN

Natural Gas Capacity of Pipe Chart

	Nominal Black Pipe Size				
Pipe Length	1/2"	3/4"	1"	1 1/4"	1 1/2"
10'	132	278	520	1050	1600
20'	92	190	350	730	1100
30'	73	152	285	590	980
40'	63	130	245	500	760
50'	56	115	215	440	670
60'	50	105	195	400	610
70'	46	96	180	370	560
80'	43	90	170	350	530
90'	40	84	160	320	490
100'	38	79	150	305	460

$$CFH = \frac{\textit{BTUH Furnace Input}}{\textit{Heating Value of Gas (BTU/ Cubic Foot)}}$$

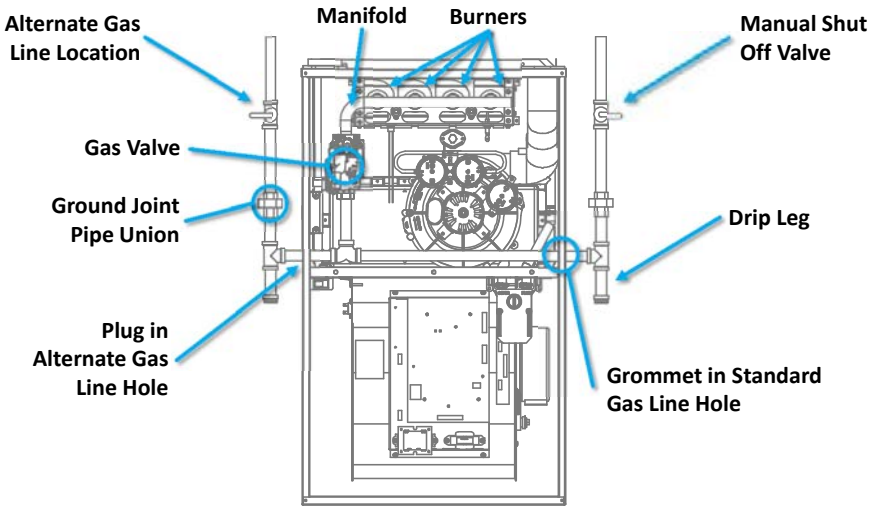
DAIKIN

Gas Connections

- Piping may enter **the left or right side of cabinet**.
- The installer must supply **rigid pipe long enough to reach the outside of the cabinet** to seal the grommet cabinet penetration.
- A **semi-rigid connector** to the gas piping can be used **outside the cabinet per local codes**.
- **1/2" NPT pipe and fittings** are required.

DAIKIN

Gas Connections



Note: Union may be inside furnace cabinet where allowed by local codes

DAIKIN

Propane/ L.P. Kits Available

- Manufacturer's **propane gas conversion kits** are available.
- The **24 volt gas valve is field convertible for use with propane gas** by replacing the regulator spring with a propane gas spring from the appropriate propane gas conversion kit.
- Consult the furnace specification sheet for a **listing of appropriated kits**.
- All gas to propane conversions must be performed by a **qualified installer, or service agency**.

DAIKIN

LP Kits

	LPM-09	LPM-08	LPM-07
Description	*Replacement gas valve and orifices*	*Replacement spring and orifices.*	*Replacement spring and orifices.*
DM97MC DC97MC	●		
DM96VC DC96VC		●	
DM96VE		●	
DM96HS DC96HS			●
DM92SS DC92SS			●

DAIKIN

Agenda

- Suspension, Leveling, Filters, Return Options
- Condensate Drain Trap, Drain Pan, and Lines
- Horizontal Right Side Down
- Horizontal Left Side Down
- Venting
- Gas Valve and Connections
- Electrical Connections
- 24 Volt Thermostat Wiring
- ComfortNet
- Furnace Start Up
- Temperature Rise and Blower Speed Adjust
- Duct Static

DAIKIN

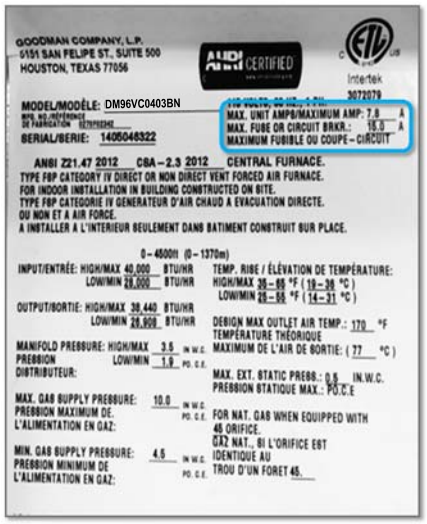
Wiring Harness

- **Wires are color coded** for identification purposes.
- **If any of the original wire as supplied with the furnace must be replaced**, it must be with wiring material having a **temperature rating of at least 105 degree C**.
- Must also be a **copper conductor**.

DAIKIN

115 Volt Line Connections

- **Check furnace data plate** before installing electrical connections.
- **Power supply to the furnace must be NEC Class 1**, and must comply with all applicable codes.
- **Use a SEPARATE fused branch electrical circuit** containing properly sized wire, and fuse or circuit breaker.
- **An electrical disconnect must be provided at the furnace location.**


GOODMAN COMPANY, L.P.
6151 SAN FELIPE ST., SUITE 500
HOUSTON, TEXAS 77056

MODEL/MODÈLE: DM96VC0403BN
SERIAL/BERIE: 1405046322

MAX. UNIT AMPS/MAXIMUM AMP: 7.9 A
MAX. FUSE OR CIRCUIT BRKR.: 15.0 A
MAXIMUM FUSIBLE OU COUPE-CIRCUIT

ANSI Z21.47 2012 CSA-2.3 2012 CENTRAL FURNACE.
TYPE F9P CATEGORY IV DIRECT OR NON DIRECT VENT FORCED AIR FURNACE.
FOR INDOOR INSTALLATION IN BUILDING CONSTRUCTED ON SITE.
TYPE F9P CATEGORIE IV GENERATEUR D'AIR CHAUD A EVACUATION DIRECTE.
OU NON ET A AIR FORCE.
A INSTALLER A L'INTERIEUR SEULEMENT DANS BATIMENT CONSTRUIT SUR PLACE.

0-4500ft (0-1370m)

INPUT/ENTRÉE: HIGH/MAX 40,000 BTU/HR
LOW/MIN 28,000 BTU/HR

OUTPUT/SORTIE: HIGH/MAX 38,440 BTU/HR
LOW/MIN 26,908 BTU/HR

MANIFOLD PRESSURE: HIGH/MAX 3.5 IN W.C.
PRESSION LOW/MIN 1.8 PO. C.E.
DISTRIBUTEUR:

MAX. GAS SUPPLY PRESSURE: 10.0 IN W.C.
PRESSION MAXIMUM DE PO. C.E.
L'ALIMENTATION EN GAZ:

MIN. GAS SUPPLY PRESSURE: 4.5 IN W.C.
PRESSION MINIMUM DE PO. C.E.
L'ALIMENTATION EN GAZ:

TEMP. RISE / ÉLÉVATION DE TEMPÉRATURE:
HIGH/MAX 35-65 °F (19-36 °C)
LOW/MIN 25-55 °F (14-31 °C)

DESIGN MAX OUTLET AIR TEMP.: 170 °F
TEMPÉRATURE THÉORIQUE
MAXIMUM DE L'AIR DE SORTIE: (77 °C)

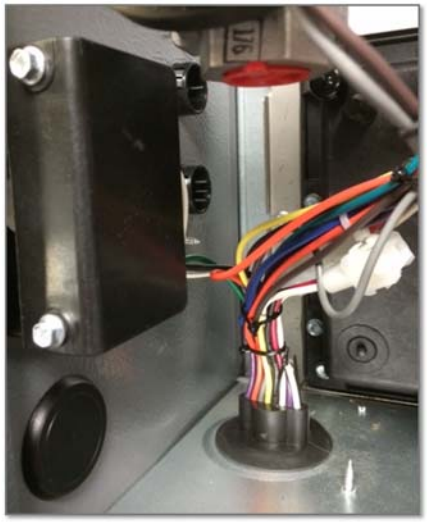
MAX. EXT. STATIC PRESS.: 0.5 IN.W.C.
PRESSION STATIQUE MAX.: PO.C.E

FOR NAT. GAS WHEN EQUIPPED WITH 45 ORIFICE.
GAZ NAT., SI L'ORIFICE EST IDENTIQUE AU TROU D'UN FORET 45.

DAIKIN

115 Volt Line Connections

- **Connect hot, neutral, and ground wires** as shown in the wiring diagram located on the unit's blower door.
- For direct vent applications, **the cabinet opening to the junction box must be sealed air tight**.
- **Line polarity must be observed** when making field connections.
- **Line voltage connections** can be made through either the **right or left side panel**.



DAIKIN

Checking For Line Polarity

Hot Leg (L1)	Common/ Neutral Leg
	

DAIKIN

Grounding

- **Ground wire should run from furnace ground** screw located inside the furnace junction box all the way back **to the electrical panel**.
- **DO NOT use gas piping as an electrical ground.**
- **Confirm proper unit grounding:**
  - **Turn off electrical power** to unit.
  - **Measure resistance** between the neutral (white) and one of the burners.
  - Resistance should be **10 ohms or less.**

DAIKIN

115 Volt Line Connection of Accessories

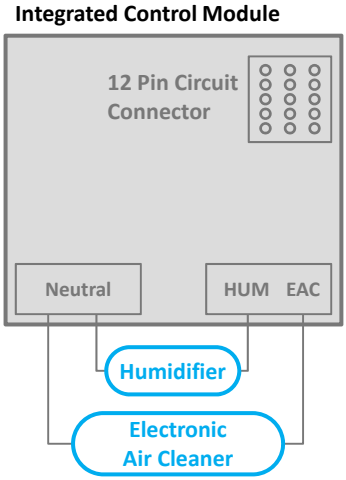
Humidifier

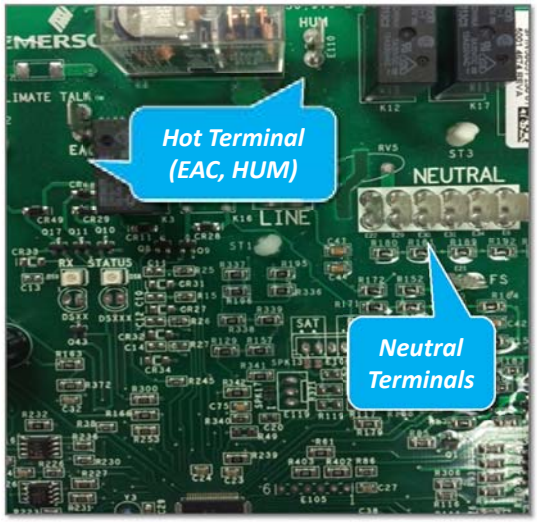
- Line voltage accessory terminals for **controlling power to an optional field supplied humidifier and/ or electronic air cleaner**.
- **Follow the humidifier or air cleaner manufacturers instructions** for locating, mounting, grounding, and controlling these accessories.
- The **accessory load specifications** are as follows:

Humidifier	1.0 Amp Maximum at 120 VAC
Electronic Air Cleaner	1.0 Amp Maximum at 120 VAC

DAIKIN

115 Volt Line Connection of Accessories





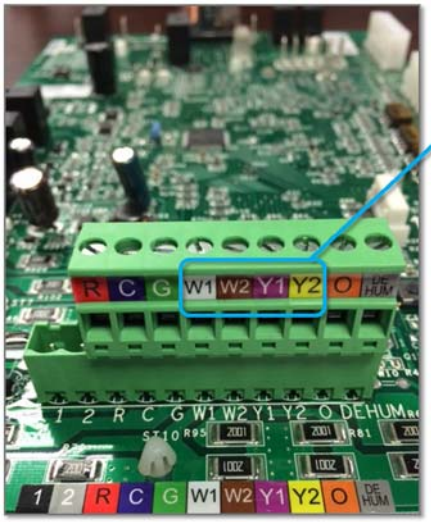
DAIKIN

Agenda

- Suspension, Leveling, Filters, Return Options
- Condensate Drain Trap, Drain Pan, and Lines
- Horizontal Right Side Down
- Horizontal Left Side Down
- Venting
- Gas Valve and Connections
- Electrical Connections
- 24 Volt Thermostat Wiring
- ComfortNet
- Furnace Start Up
- Temperature Rise and Blower Speed Adjust
- Duct Static

DAIKIN

24 Volt Thermostat Wiring

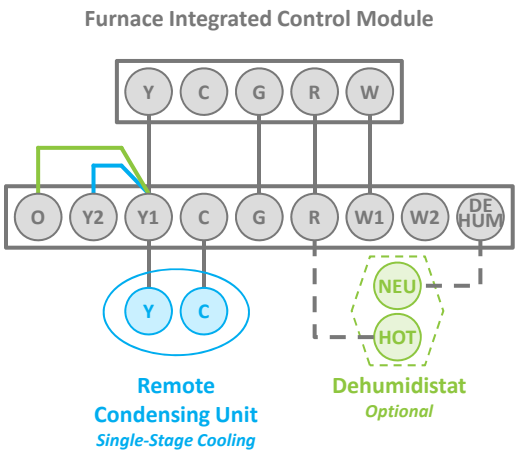


- As a two-stage non-communicating furnace, the **furnace integrated control module provide terminals for both W1, W2, Y1 and Y2** thermostat connections.
- This allows the furnace to support the following **system applications**:
  - Two-stage **heating only**
  - Two-stage **heating with single stage cooling**
  - Two-Stage **heating with two-stage cooling**

DAIKIN

24 Volt Thermostat Wiring

Single-Stage Heating with Single-Stage Cooling



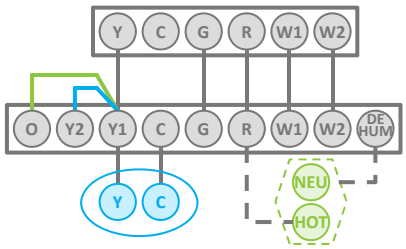
- For **single stage cooling applications**, a "jumper" may be required between "Y1" and "Y2" at the furnace control in order to achieve the desired single stage cooling airflow.
- Use of **ramping profiles and dehumidification features** require a jumper between "Y1" and "O."

DAIKIN

24 Volt Thermostat Wiring

Two-Stage Heat, Single-Stage Cool

Furnace Integrated Control Module

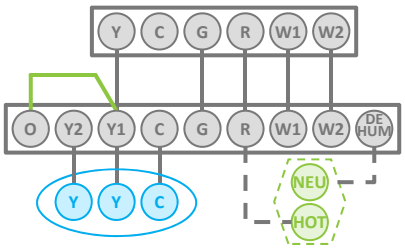


Remote Condensing Unit
Single-Stage Cooling

Dehumidistat
Optional

Two-Stage Heat, Two-Stage Cool

Furnace Integrated Control Module

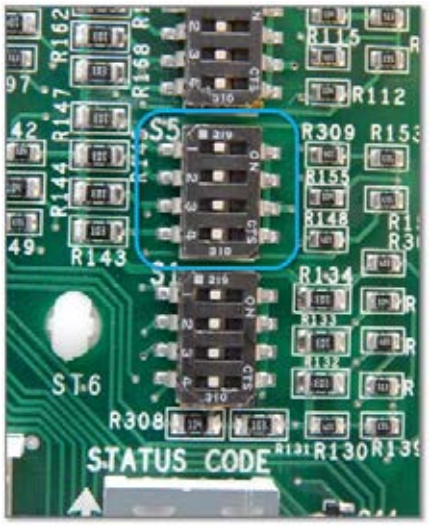


Remote Condensing Unit
Single-Stage Cooling

Dehumidistat
Optional

DAIKIN

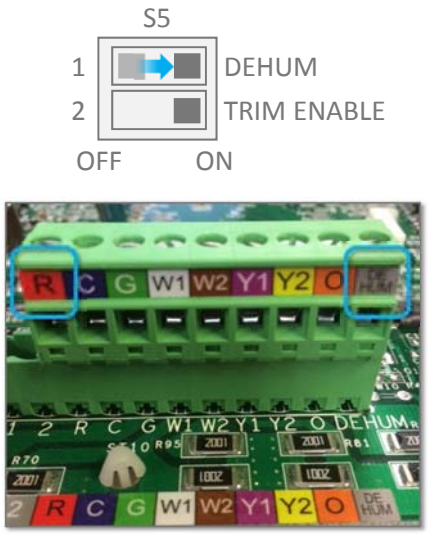
24 Volt Dehumidistat Wiring



- The **optional usage of a dehumidistat allows the furnace's circulator blower to operate at a slightly lower speed** (85% of desired speed) during a combined thermostat call for cooling and dehumidistat call for dehumidification.
- A dehumidistat applied to this furnace **must operate on 24VAC**.

DAIKIN

24 Volt Dehumidistat Installation



- **Turn off power** to the furnace.
- **Set** the dehumidification **"ENABLE" dip switch** from OFF to ON.
- **Secure dehumidistat neutral wire to the terminal marked "DEHUM"** on the integrated control module.
- **Secure the dehumidistat hot wire to the terminal marked "R"** on the furnace integrated control module.

DAIKIN

Dual Fuel Applications

- This furnace can be used in conjunction with a **heat pump in a dual fuel application**.
- A "dual fuel" application refers to a **combined gas furnace and heat pump installation**.
- **Strictly follow the wiring guidelines** in the dual fuel kit installation instructions.

DAIKIN

Agenda

- Suspension, Leveling, Filters, Return Options
- Condensate Drain Trap, Drain Pan, and Lines
- Horizontal Right Side Down
- Horizontal Left Side Down
- Venting
- Gas Valve and Connections
- Electrical Connections
- 24 Volt Thermostat Wiring
- ComfortNet
- Furnace Start Up
- Temperature Rise and Blower Speed Adjust
- Duct Static

DAIKIN

ComfortNet System

- The ComfortNet system is one that includes a **ComfortNet compatible furnace, an air conditioner or heat pump, with a CTK04 thermostat**.
- A valid ComfortNet system could also be a **compatible furnace, CTK04 thermostat, and non-compatible, single stage air conditioner**.
- Indoor unit, outdoor unit, and thermostat **interact/ communicate digitally** with one another.
- **Two-way** communication

ComfortNet control system recommended for furnace models:

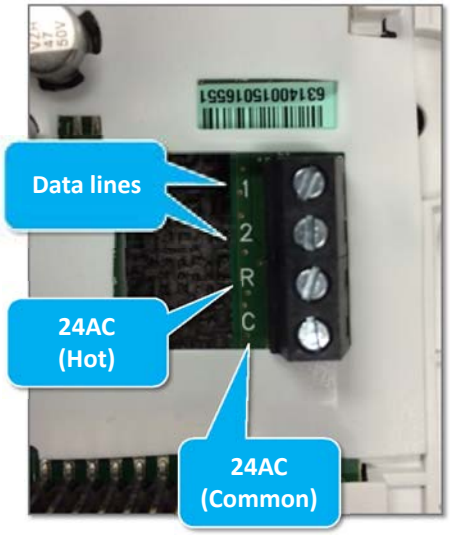
DM97MC **DC97MC**

DM96VC **DC96VC**

DAIKIN

ComfortNet System

- The two-way digital communication between the thermostat and subsystems is the key to unlocking the benefits and features of the ComfortNet system.
- **Two way communication** is accomplished using only **two wires**.
  - **Data lines** connect to "1" and "2"
  - "R" is **24VAC (hot)**
  - "C" is **24VAC (common)**



DAIKIN

ComfortNet System

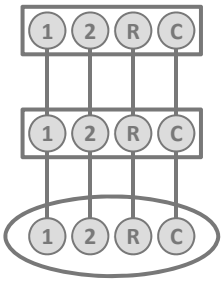
- A removable plug connector is provided with the control.
- It is STRONGLY recommended that you **do not connect multiple wires into a single terminal**.
- Minimum 18 AWG wire **no longer than 100' max length between all components**:
  - 100' b/t indoor and outdoor units
  - 100' b/t indoor unit and t-stat

DAIKIN

ComfortNet System

Four-Wire Indoor and Outdoor Wiring

Typical ComfortNet wiring will consist of four wires between the indoor unit, outdoor unit, and thermostat.



CTK0 Thermostat

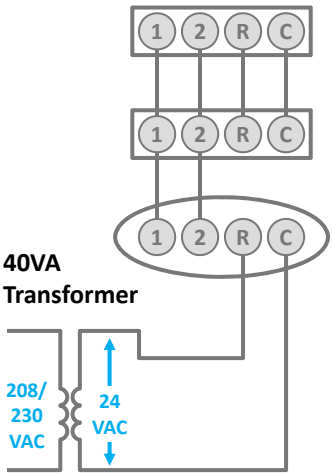
ComfortNet Compatible Furnace Integrated Control Module

ComfortNet Compatible AC/HP Integrated Control Module

DAIKIN

ComfortNet System

Two-Wire Outdoor, Four-Wire Wiring



CTK0 Thermostat

ComfortNet Compatible Furnace Integrated Control Module

ComfortNet Compatible AC/HP Integrated Control Module

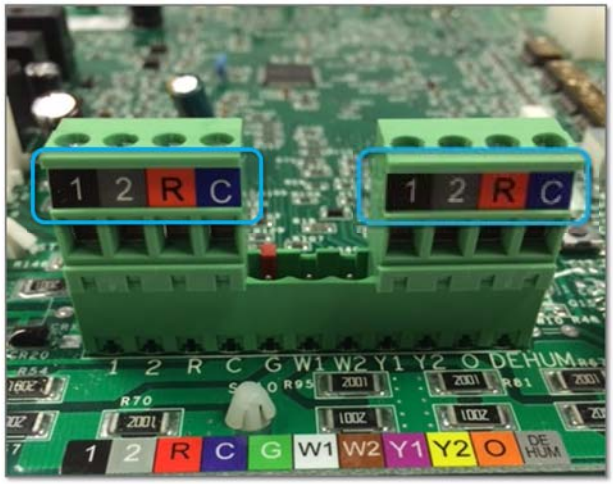
- Two wires can be **utilized between the indoor and outdoor units**.
- For this wiring scheme: **only the data lines**, (1 & 2) are needed between **the indoor and outdoor units**.
- A **40VA, 208/ 230 VAC to 24VAC transformer must be installed in the outdoor unit** to provide 24VAC power to the outdoor units electronic control.

DAIKIN

ComfortNet System

C-Net Compatible Furnace w/ Non- C-Net Compatible Single Stage AC

- **Four wires are required** between the **furnace and thermostat**.
- **Two wires are required** between the **furnace control** and the **single stage air conditioner**.

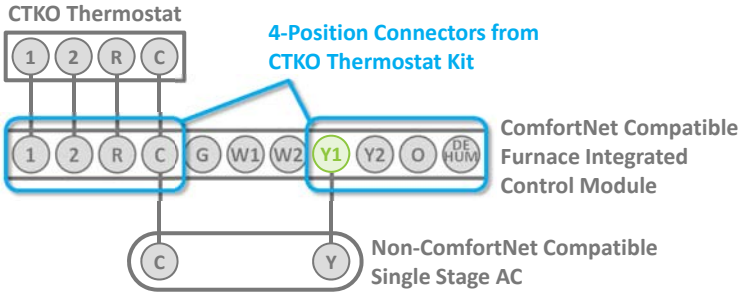


DAIKIN

ComfortNet System

C-Net Compatible Furnace w/ Non- C-Net Compatible Single Stage AC

- For this system configuration, the **"Y1" terminal** on the integrated furnace control **becomes an output rather than an input**.
- The **"Y1" connection** to the outdoor unit is made using **both 4-position thermostat connections in the CTK0* kit**.



DAIKIN

Agenda

- Suspension, Leveling, Filters, Return Options
- Condensate Drain Trap, Drain Pan, and Lines
- Horizontal Right Side Down
- Horizontal Left Side Down
- Venting
- Gas Valve and Connections
- Electrical Connections
- 24 Volt Thermostat Wiring
- ComfortNet
- Furnace Start Up
- Temperature Rise and Blower Speed Adjust
- Duct Static

DAIKIN

Gas Piping Leak Checks

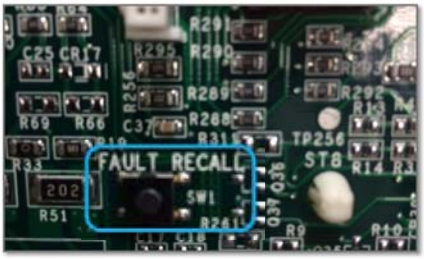
- **Leak test before placing unit into operation**.
- **Use approved chloride-free soap and water solution**, electronic combustible gas detector, or other approved testing methods.
- **WARNING!** Never use a match or open flame to test for leaks.

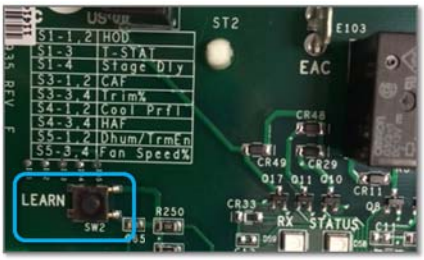
DAIKIN

Gas Pressure Test

Field Test Mode Only

- Allows gas valve pressure to be checked at **100% firing rate**.
- Steps to **test Gas Pressure**:
  - **Push the "FAULT RECALL" and "LEARN"** push buttons greater than one second.
  - Fault display will go blank.
  - **Release buttons** within 5 seconds
  - **Display will flash "Ft"** to indicate that you are now in the "test mode."
  - The control will force a **high capacity demand** at this time.





DAIKIN

Gas Pressure Test

- Cont:
  - The "Ft" will flash until the furnace has reached 100%.
  - Solid "FT" once 100% capacity is achieved.
  - A 5-minute timer has just started.
- The line pressure supplied to the gas valve must be within the range specified below:
  - Supply pressure can be measured at the gas valve inlet pressure tap.
  - The supply pressure MUST be measured with the burners operating.

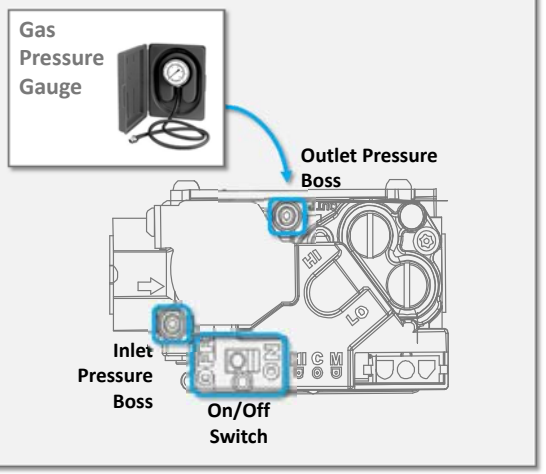
Inlet Gas Supply Pressure		
Natural Gas	Minimum: **4.5" w.c.**	Maximum: **10.0" w.c.**
Propane Gas	Minimum: **11.0" w.c.**	Maximum: **13.0" w.c.**

DAIKIN

Measuring Gas Supply Pressure

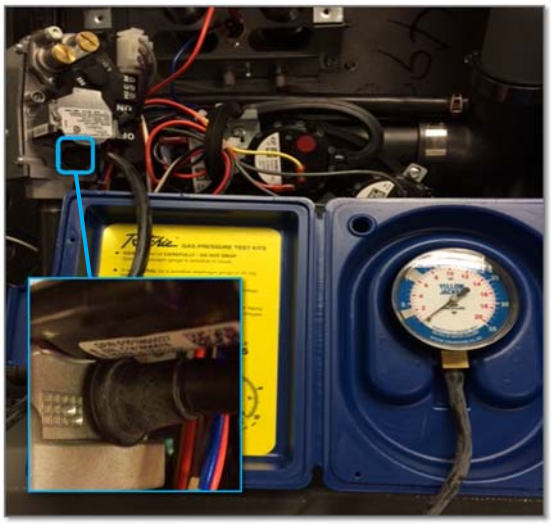
- Turn OFF gas to furnace at the **manual gas shutoff valve**.
- Connect an appropriate gas pressure gauge at either the **gas valve inlet pressure tap or the gas piping drip leg**.
- Turn on gas and operate **ALL other gas consuming appliances on the same gas supply line**.

White Rodgers Model 36J54 Connected to Manometer



DAIKIN

Measuring Gas Supply Pressure

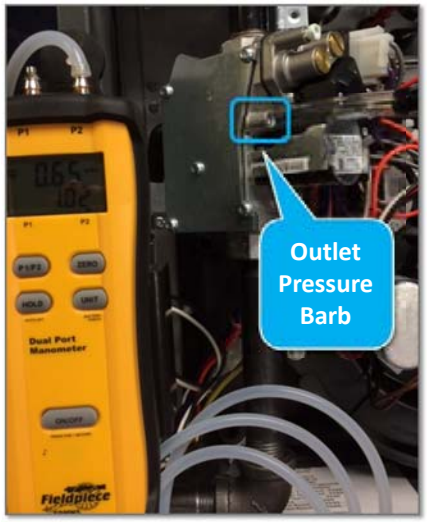


- **Measure furnace gas supply pressure with burners firing.** Supply pressure must be within the range specified in the "Inlet Gas Supply Pressure Table.
- **If supply pressure differs from table, make the necessary adjustments** to the pressure regulator, gas piping size, etc.
- **Turn off gas to furnace,** disconnect manometer.

DAIKIN

Gas Manifold Pressure Measurement and Adjust

- Manifold pressure must be measured **with burners operating**.
- Steps to measure and adjust the manifold pressure:
  - Turn off gas and power to furnace.
  - Attach manometer hose to the **outlet pressure barb** on gas valve.
  - Turn on gas and power to furnace.
  - Close thermostat “R” and “W1” contacts to call for low stage heat.
  - Measure the gas manifold pressure with burners firing.



DAIKIN

Gas Manifold Pressure Measurement and Adjust

(LO) Pressure Regulator Adjust

- Remove regulator cover screw from the low (LO) outlet pressure regulator.
- Adjust tower and turn screw clockwise to increase pressure, or counterclockwise to decrease pressure.
- Replace regulator cover screw.

DAIKIN

Gas Manifold Pressure Measurement and Adjust

(HI) Pressure Regulator Adjust

- Close thermostat “R” and “W2” contacts to call for high stage heat.
- Remove regulator cover screw from the high (HI) outlet pressure regulator.
- Adjust tower and turn screw clockwise to increase pressure or counterclockwise to decrease pressure.
- Replace regulator cover screw.
- Turn off power and gas to furnace.

DAIKIN

Gas Manifold Pressure Measurement and Adjust

Manifold Gas Pressure Chart

	Natural Gas		Propane Gas	
	Low Stage	High Stage	Low Stage	High Stage
Range (w.c.)	**1.6 – 2.2”**	**3.2 – 3.8”**	**5.7 – 6.3”**	**9.7 – 10.3”**
Nominal (w.c.)	**1.9”**	**3.5”**	**6.0”**	**10.0”**

DAIKIN

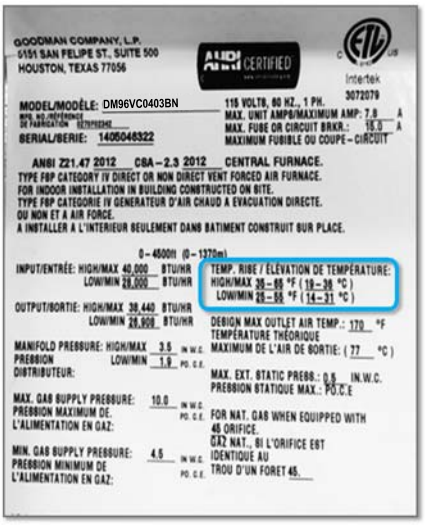
Agenda

- Suspension, Leveling, Filters, Return Options
- Condensate Drain Trap, Drain Pan, and Lines
- Horizontal Right Side Down
- Horizontal Left Side Down
- Venting
- Gas Valve and Connections
- Electrical Connections
- 24 Volt Thermostat Wiring
- ComfortNet
- Furnace Start Up
- Temperature Rise and Blower Speed Adjust
- Duct Static

DAIKIN

Temperature Rise

- Temperature rise must be within the **range specified on the unit rating plate**.
- An incorrect temperature rise may result in **condensing or overheating of the heat exchanger**.
- An airflow and temperature rise table is **provided in the Specification Sheet applicable to your model**.
- **Determine the temperature rise** from furnace data plate, and conduct the following steps to adjust:


GOODMAN COMPANY, L.P.
5151 SAN FELIPE ST., SUITE 500
HOUSTON, TEXAS 77056

AUDI AIR CERTIFIED

Intertek 3072079

MODEL/MODÈLE: DM96VC0403BN
SERIAL/SERIE: 1405046322

115 VOLTS, 60 HZ., 1 PH.
MAX. UNIT AMPS/MAXIMUM AMP: 7.9 A
MAX. FUSE OR CIRCUIT BRKR.: 15.0 A
MAXIMUM FUSIBLE OU COUPE-CIRCUIT

ANSI Z21.47 2012 CSA-2.3 2012 CENTRAL FURNACE.
TYPE FSP CATEGORY IV DIRECT OR NON DIRECT VENT FORCED AIR FURNACE.
FOR INDOOR INSTALLATION IN BUILDING CONSTRUCTED ON SITE.
TYPE FSP CATEGORIE IV GENERATEUR D'AIR CHAUD A EVACUATION DIRECTE.
OU NON ET A AIR FORCE.
A INSTALLER A L'INTERIEUR SEULEMENT DANS BATIMENT CONSTRUIT SUR PLACE.

0 - 4500ft (0 - 1370m)

INPUT/ENTRÉE: HIGH/MAX 40,000 BTU/HR
LOW/MIN 28,000 BTU/HR

TEMP. RISE / ÉLÉVATION DE TEMPÉRATURE:
HIGH/MAX 26 - 56 °F (19 - 36 °C)
LOW/MIN 25 - 55 °F (14 - 31 °C)

OUTPUT/SORTIE: HIGH/MAX 38,440 BTU/HR
LOW/MIN 26,908 BTU/HR

DESIGN MAX OUTLET AIR TEMP.: 170 °F
TEMPÉRATURE THÉORIQUE
MAXIMUM DE L'AIR DE SORTIE: (77 °C)

MANIFOLD PRESSURE: HIGH/MAX 3.5 IN W.C.
PRESSION LOW/MIN 1.9 PO. C.E.
DISTRIBUTEUR:

MAX. EXT. STATIC PRESS.: 0.5 IN.W.C.
PRESSION STATIQUE MAX.: PO.C.E

MAX. GAS SUPPLY PRESSURE: 10.0 IN W.C.
PRESSION MAXIMUM DE PO. C.E.
L'ALIMENTATION EN GAZ:

FOR NAT. GAS WHEN EQUIPPED WITH 45 ORIFICE.
GAZ NAT., SI L'ORIFICE EST IDENTIQUE AU TROU D'UN FORET 45.

MIN. GAS SUPPLY PRESSURE: 4.5 IN W.C.
PRESSION MINIMUM DE PO. C.E.
L'ALIMENTATION EN GAZ:

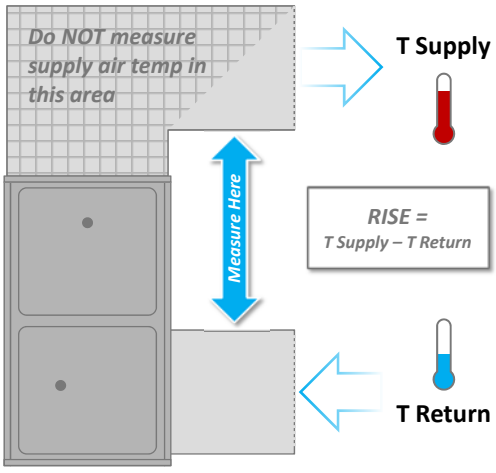
DAIKIN

Temperature Rise Measurement

- Operate furnace with burners firing for approximately **10 minutes**.
- Ensure that all **registers and duct dampers are open** .
- Place temp sensors in the **return and supply ducts**.
- Subtract the return air temperature from the supply air temperature to **determine the air temperature rise**.

DAIKIN

Temperature Rise Measurement



- Adjust temperature rise by **adjusting the circulator blower speed**.
- **Increase** the blower speed to **reduce temperature rise**.
- **Decrease** the blower speed to **increase temperature rise**.
- Refer to the **"Startup Procedure and Adjustment-Circulator Blower Speeds"** section of your furnace manual for instructions on how to adjust blower speeds.

DAIKIN

Setting Variable Speed Blower Switches

- This furnace may be equipped with a **variable speed ECM** circulator blower.
- **The Specification Sheet applicable to your model provides an airflow table**, showing the relationship between airflow (CFM) and external static pressure for the proper selection of heating and cooling speeds.
- The **heating blower speed is shipped set at "B"**, and the **cooling blower speed is set at "D"** for variable speed models.

Switch Bank: S4

Heating Airflow	DIP Switch No. 3	4
A	OFF	OFF
B*	ON	OFF
C	OFF	ON
D	ON	ON

**Indicates factory setting*

Switch Bank: S3

Cooling Speed Taps	DIP Switch No. 3	4
A	OFF	OFF
B	ON	OFF
C	OFF	ON
D*	ON	ON

**Indicates factory setting*

DAIKIN

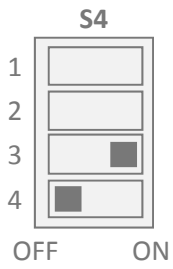
Setting Variable Speed Blower Switches

- **Airflow speed adjustments are made at the dip switches** located on the integrated control module. (furnace board)
- The **3rd and 4th dip switches** down in "Switch Bank: S4" represent the **heating airflow setting**.
- In the **heating "B" factory setting**, **switch 3** is in the **"ON"** position, (to the right) and **switch 4** is in the **"OFF"** position. (to the left)

Switch Bank: S4

Heating Airflow	DIP Switch No. 3	4
A	OFF	OFF
B*	ON	OFF
C	OFF	ON
D	ON	ON

**Indicates factory setting*



DAIKIN

Blower Speed Adjust

- **Use the dual 7-segment LED display** adjacent to the dip switches to obtain the approximate **airflow quantity**.
- The **airflow quantity is displayed** as a number on the display, **rounded to the nearest 100 CFM**.
- The **display alternates airflow delivery** indication and the **operating mode** indication.
- If the airflow being delivered is 1375, CFM, the LED display will indicate a “14.” (for 1400 CFM)

DAIKIN

Blower Speed Adjust

Example 1

- Determine the tonnage of the cooling system installed with the furnace.
- If the cooling capacity is the BTU/hr, divide it by 12,000 to convert the capacity to tons.
- So, if your cooling capacity requirement is 42,000 BTU/hr then 42,000 ÷ 12,000 = 3.5 tons.

Example 2

- Determine the proper air flow for the cooling system.
- Most cooling systems are designed to work with air flows between 350 and 450 CFM per ton.
- 3.5 tons X 400 CFM = 1400 CFM.

DAIKIN

Blower Speed Adjust

Example 3

Knowing the furnace model, locate the high stage cooling air flow charts in the furnace "specification sheet" applicable to your model. Look up the cooling air flow determined in example 3 above, and find the required cooling speed and adjust the setting.

1. A ***DM96VC0603B*** model furnace has been installed with a 2.5ton air conditioning system.
2. The air flow needed is 1000 CFM.
3. Looking at the cooling speed chart/ air flow table in your furnace manual for a *DM96VC0603B*, find the air flow closest to 1000 CFM.
4. A cooling airflow of **1007** CFM can be attained by setting the cooling speed to "C".
5. Cooling speed "C" can be set for your furnace on "Switch Bank: S3" located on the furnace board.
6. "Cooling Speed Tap C" is in positions 1 and 2 of dip switch S3.
7. Position 1 is set to "OFF."
8. Position 2 is set to "ON."

DAIKIN

Blower Speed Adjust

Airflow Table from Manual IOD-2008 (2 Stage Heat/ Variable Speed ECM)

Model	Tap	Low Stage Cool	High Stage Cool	Low Stage Heat	High Stage Heat
DM96VC0403BN	A	403	596	422	494
	B	527	796	471	553
	C	675	974	521	601
	D	803	1192	574	676
DM96VC0603BN	A	398	599	667	953
	B	557	817	740	1059
	C	696	1007	808	1158
	D	810	1212	881	1260
DM96VC0803BN	A	403	629	855	1202
	B	540	806	923	1316
	C	705	1023	1033	1389
	D	819	1230	1063	1396
DM96VC0804CN	A	513	789	867	1228
	B	660	967	939	1337
	C	791	1182	1016	1430
	D	913	1375	1077	1516
DM96VC1005CN	A	564	820	1256	1818
	B	784	1133	1292	1870
	C	982	1464	1316	1910
	D	1259	1736	1358	1957

DAIKIN

Blower Speed Adjust for Multi Speed ECM Blower

Airflow Table from Manual IOD-2011A (2 Stage Heat, Multi-Speed ECM)

Dip Switch Setting DM96VE0302B					0.1		0.2		0.3		0.4		0.5		0.6	0.7	0.8
					CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	Rise	CFM	CFM	CFM
Factory Setting	All DIP Switch Positions			G	870		658		548		469		413		349	293	N/A
				W1	870	21	658	28	548	34	469	40	413	45	349	293	N/A
				W2	885	30	821	32	755	35	684	39	621	43	557	508	461
	1	2	3														
✓	OFF	OFF	OFF	Ylo	874		697		612		533		470		414	361	303
				Y	1146		1097		1049		1002		941		895	846	787
	ON	OFF	OFF	Ylo	874		697		612		533		470		414	361	303
				Y	921		868		810		743		670		614	560	505
	ON	ON	OFF	Ylo	928		868		810		743		670		614	560	505
				Y	1146		1097		1049		1002		941		895	846	787
	OFF	ON	OFF	Ylo	928		868		810		743		670		614	560	505
				Y	870		658		548		469		413		349	293	N/A
	OFF	OFF	ON	Ylo	928		868		810		743		670		614	560	505
				Y	885		821		755		684		621		557	508	461
	OFF	ON	ON	Ylo	874		697		612		533		470		414	361	303
				Y	1146		1097		1049		1002		941		895	846	787
	ON	OFF	ON	Ylo	885		821		755		684		621		557	508	461
				Y	1146		1097		1049		1002		941		895	846	787
	ON	ON	ON	Ylo	885		821		755		684		621		557	508	461
				Y	874		697		612		532		470		414	361	303

DAIKIN

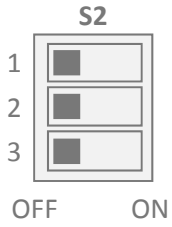
Setting Multi Speed ECM Blower Switches

- **"Multi-Speed"** blower speeds are adjusted in the 1st, 2nd, and 3rd dip switches in "Switch Bank: S2" represent the **cooling airflow setting**.
- Review the chart in the prior slide that represents multi speed ECM blowers for furnace model **DM96VE0302B.**
- In the **high cooling "Y" factory setting**, **switch 1, 2, and 3** are in the **"OFF"** position. (to the left)

Switch Bank: S2

Cooling Airflow	DIP Switch No. 1	2	3
Y*	OFF	OFF	OFF
Ylo*	OFF	OFF	OFF

**Indicates factory setting*



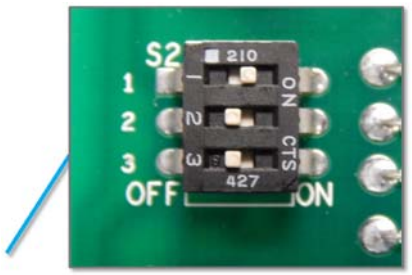
DAIKIN

Setting Multi Speed ECM Blower Switches

- **Example:**
- A cooling capacity requirement is 18,000 BTU/hr. (18,000 ÷ 12,000 = 1.5 tons/ 600 CFM's of air)
- Using the chart in your manual, find the closet airflow setting to "600" for a static pressure rating of 0.5.
- You would choose "670" in the next row/section down on the chart.
- Set dip switches to "ON, OFF, OFF".

Switch Bank: S2			
Cooling Airflow	DIP Switch No.		
	1	2	3
Y*	ON	OFF	OFF
Ylo	ON	OFF	OFF

**Use the "Y" setting only for single stage air conditioners.*



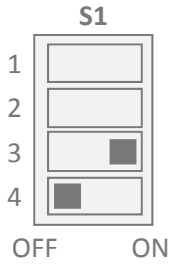
DAIKIN

Setting Multi Speed Blower "Off-Delay"

- The integrated control module (furnace board) provides a selectable **heat off delay** function.
- The **3rd and 4th dip switches** down in "Switch Bank: S1" represent the **blower heat off delay timings**.
- In the **off-delay "150- second" factory setting**, **switch 3** is in the **"ON"** position, (to the right) and **switch 4** is in the **"OFF"** position. (to the left)

Switch Bank: S1		
Off- Delay Seconds	DIP Switch No.	
	3	4
90	OFF	OFF
120	OFF	ON
*150	ON	OFF
180	ON	ON

**Indicates factory setting*



DAIKIN

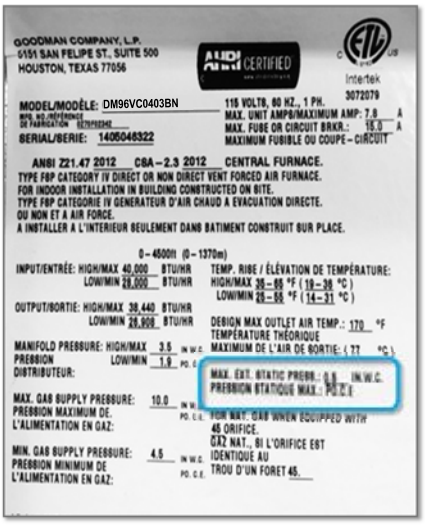
Agenda

- Suspension, Leveling, Filters, Return Options
- Condensate Drain Trap, Drain Pan, and Lines
- Horizontal Right Side Down
- Horizontal Left Side Down
- Venting
- Gas Valve and Connections
- Electrical Connections
- 24 Volt Thermostat Wiring
- ComfortNet
- Furnace Start Up
- Temperature Rise and Blower Speed Adjust
- Duct Static

DAIKIN

Checking Duct Static

- Refer to your furnace rating plate for **the maximum (ESP) external duct static rating**.
- Too much external static pressure will result in **insufficient air that can cause excessive temperature rise**.
- This can cause **limit switch tripping and heat exchanger failure**.


GOODMAN COMPANY, L.P.
6151 SAN FELIPE ST., SUITE 500
HOUSTON, TEXAS 77056

AUI CERTIFIED

Intertek
3072079

MODEL/MODÈLE: DM96VC0403BN
SERIAL/BERIE: 1405046322

115 VOLTS, 60 HZ., 1 PH.
MAX. UNIT AMPS/MAXIMUM AMP: 7.9 A
MAX. FUSE OR CIRCUIT BRKR.: 15.0 A
MAXIMUM FUSIBLE OU COUPE-CIRCUIT

ANSI Z21.47 2012 CSA-2.3 2012 CENTRAL FURNACE.
TYPE F9P CATEGORY IV DIRECT OR NON DIRECT VENT FORCED AIR FURNACE.
FOR INDOOR INSTALLATION IN BUILDING CONSTRUCTED ON SITE.
TYPE F9P CATEGORIE IV GENERATEUR D'AIR CHAUD A EVACUATION DIRECTE.
OU NON ET A AIR FORCE.
A INSTALLER A L'INTERIEUR SEULEMENT DANS BATIMENT CONSTRUIT SUR PLACE.

0-4500ft (0-1370m)

INPUT/ENTRÉE: HIGH/MAX 40,000 BTU/HR
LOW/MIN 28,000 BTU/HR

TEMP. RISE / ÉLÉVATION DE TEMPÉRATURE:
HIGH/MAX 35-65 °F (19-36 °C)
LOW/MIN 25-55 °F (14-31 °C)

OUTPUT/SORTIE: HIGH/MAX 38,440 BTU/HR
LOW/MIN 26,908 BTU/HR

DESIGN MAX OUTLET AIR TEMP.: 170 °F
TEMPÉRATURE THÉORIQUE
MAXIMUM DE L'AIR DE SORTIE: (77 °C)

MANIFOLD PRESSURE: HIGH/MAX 3.5 IN W.C.
PRESSION LOW/MIN 1.9
DISTRIBUTEUR:

MAX. EXT. STATIC PRESS.: 0.5 IN.W.C.
PRESSION STATIQUE MAX.: PO. C. E.

MAX. GAS SUPPLY PRESSURE: 10.0
PRESSION MAXIMUM DE L'ALIMENTATION EN GAZ:

FOR NAT. GAS WHEN EQUIPPED WITH 45 ORIFICE.
GAZ NAT., SI L'ORIFICE EST IDENTIQUE AU TROU D'UN FORET 45.

MIN. GAS SUPPLY PRESSURE: 4.5
PRESSION MINIMUM DE L'ALIMENTATION EN GAZ:

DAIKIN

Checking Duct Static

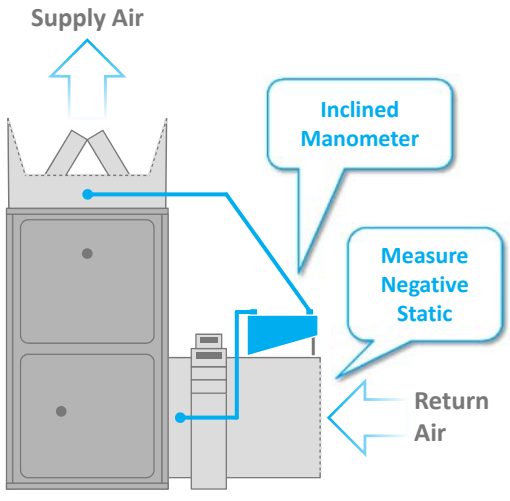
- The **positive** static reading is taken at the furnace supply outlet, and must be read **between the furnace and the cooling coil**.
- The **negative** static reading is taken at the furnace return duct inlet, and must be read **between the furnace and filter**.
- Take **duct static readings through test holes in ducts**, and tape up holes once your test is complete.

DAIKIN

Checking Duct Static

Steps to determine total external static pressure:

- Inspect/replace filter in furnace.
- Install an inclined manometer, magnehelic, or digital manometer into return duct of furnace **closest to blower, but downstream of filter**.
- Measure the **negative static pressure** of the return duct at the **inlet of the furnace**.



DAIKIN

Checking Duct Static

- Measure the **positive static pressure** of the supply duct at the **outlet of the furnace**.
- Total Static Example:
  - Negative static pressure: -.4” w.c.
  - Positive static pressure: .2” w.c.
  - Total external static pressure would be: .6” w.c.
- The difference between the two numbers is the **total external static pressure on the system**.

DAIKIN

DAIKIN

QUESTIONS?

1. When installing/ leveling the Daikin 90 Plus furnace, the tilt from back to front should be ___ to ___ inches to allow condensate to drain into drain trap.

A. 1 to 2
B. 2 to 3
C. ¼ to ½
D. ½ to ¾

2. If the Daikin 90 Plus furnace is installed without filters, the warranty will be voided.

A. True
B. False

3. The condensate trap can be relocated to the outside/ side panel of the furnace. How many inches of clearance are needed for the trap to be installed properly?

A. 6.5 inches
B. 5.0 inches
C. 4.5 inches
D. 5.5 inches

4. The condensate drain trap on the Daikin 90 Plus furnace must be primed prior to furnace start up.

A. True
B. False

5. In a “horizontal right side down” drain trap conversion, hose number 5 is cut at line ___.

A. E
B. G
C. D
D. C

6. In a “horizontal left side down” drain trap conversion, hose number 6 is cut at different lengths depending on the width of your furnace. How many inches of hose number 6 would be cut off and discarded for a “C” width cabinet?
A. 5 inches
B. 8 inches
C. 8.5 inches
D. 1.5 inches

7. When venting a Daikin 90 Plus furnace, it’s ok to connect to an existing type B, BW, or L metal flue pipe as long as the first 10 feet of flue pipe is PVC.

A. True
B. False (Never connect PVC to metal when constructing a 90 Plus flue)

8. A “non-direct” vent termination should terminate ___ feet horizontally from a door, window, or gravity air inlet.

A. 6 Feet
B. 1 Foot
C. 2 Feet
D. 4 Feet

9. A “direct” vent termination must terminate at least ___ feet from any opening through which flue gases may enter a building.

A. 6 Feet
B. 10.5 Feet
C. 12 Feet
D. 10 Feet

10. The gas piping supplying the furnace must be properly sized based on the gas flow required, specific gravity of the gas, and the _____.

A. Model number on the furnace.
B. Length/ distance of the run
C. Serial number on the furnace
D. Depends on manufacturer of gas valve

11. An L.P. conversion kit for a Daikin DM97MC or DC97MC (97% modulating) furnace would include a new replacement gas valve, and orifices.

A. True
B. False

12. When confirming proper unit grounding, resistance should be measured between the neutral (white) wire and one of the burners. Resistance should be ___ ohms.

A. Less than 2 ohms
B. 10 ohms or less
C. 5 ohms
D. 2 ohms

13. When grounding a Daikin 90 Plus furnace in a basement, it's ok to use a section of gas pipe as a ground.

A. True
B. False (Ground from the furnace ground screw all the way back to electrical panel; Never connect a ground wire to gas piping)

14. The use of ramping profiles and dehumidification features require a jumper between "Y1" and ____ on the integrated control module.

A. O
B. R
C. G
D. Y2

15. The first step taken when installing a dehumidistat to the integrated control module, is to turn off power to the Daikin 90 Plus furnace.

A. True
B. False

16. When installing a ComfortNet system for Daikin 90 plus furnace, 18 gauge thermostat wiring should be no longer than ____ feet between the indoor and outdoor units.

A. 25 Feet
B. 50 Feet
C. 100 Feet
D. 80 Feet

17. In the ComfortNet system, two way digital communication between the thermostat and subsystems is accomplished by connecting only four (4) wires between each subsystem.

A. True
B. False (two-wires for communication: 1 and 2)

18. During the gas pressure test, after pushing the “fault recall” and “learn” push buttons, then releasing them within 5 seconds, the fault screen will flash “FT.” What does this mean?

A. A fault has occurred in the furnace.
B. Improper ground. Check grounds, and resume test.
C. The furnace gas valve has malfunctioned.
D. Furnace is now in the test mode.

19. The gas manifold pressure should be measured and adjusted with the burners firing.

A. True
B. False

20. The temperature rise on a Daikin 90 Plus furnace can be adjusted by the blower speed. Decrease the blower speed to _____ temperature rise.

A. Monitor
B. Decrease
C. Reduce
D. Increase

21. The airflow quantity is displayed on the LED display adjacent to the dip switches on the integrated control module. If the furnace airflow being delivered is 1255 CFM, the LED display will indicate a “12” on the screen.

A. True
B. False (rounded up to 1300, so it will display a “13”)

22. Using the airflow table below, what “tap” would you adjust to deliver 1200 CFM’s for furnace model MVC960803BN?

A. Tap C
B. Tap D
C. Tap A
D. Tap B

23. When checking duct static, the negative pressure must be read between the return filter and the furnace blower.

A. True
B. False

24. The first step when checking total external static pressure would be to _____.

A. Install inclined manometer, magnehelic, or digital manometer.
B. Turn the furnace on to “fan on.”
C. Inspect/ replace filter in the furnace.
D. Turn the furnace to the highest heat setting.

25. The positive static pressure should be measured at outlet of the furnace after the evaporator coil.

A. True
B. False (Measure at outlet of furnace, before the evap coil)

Model	Tap	Low Stage Cool	High Stage Cool	Low Stage Heat	High Stage Heat
MVC960403BN	A	403	596	422	494
	B	527	796	471	553
	C	675	974	521	601
	D	803	1192	574	676
MVC960603BN	A	398	599	667	953
	B	557	817	740	1059
	C	696	1007	808	1158
	D	810	1212	881	1260
MVC960803BN	A	403	629	855	1202
	B	540	806	923	1316
	C	705	1023	1033	1389
	D	819	1230	1063	1396
MVC960804CN	A	513	789	867	1228
	B	660	967	939	1337
	C	791	1182	1016	1430
	D	913	1375	1077	1516
MVC961005CN	A	564	820	1256	1818
	B	784	1133	1292	1870
	C	982	1464	1316	1910
	D	1259	1736	1358	1957