DVM01
Rev 4.1

DVM S Training

Introduction & Basic Installation

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DVM S Training

Due to Samsung's policy of ongoing product development, specifications are subject to change without prior notice. Every effort has been made to insure that the information included in this presentation is as accurate as possible at the time of it's publication.

This presentation is provided as a guide to help HVAC field technicians understand the proper procedures for installing Samsung DVMS VRF systems. This training module is not intended to replace Samsung service manuals, technical data books, installation/operation manuals or other factory documents.

Only properly trained, HVAC professionals should attempt to install and start up any Samsung heating and air-conditioning system.

High Voltage Caution:
Extra care must be taken when working on or around DVMS equipment due to numerous high voltage components. Whether installing or servicing DVMS equipment in the field or while attending Samsung HVAC training classes which include powered simulators and equipment, be aware of the potential dangers of high voltage – use caution

This presentation may only be used with authorization by Samsung HVAC. Unauthorized use, duplication or alteration of this presentation is prohibited.

For technical support issues, always contact your Samsung equipment provider.

www.samsunghvac.com www.dvmdownload.com

2

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DVM S Training

Samsung *DVM S* Product Line Training

DVM S & DVM S MAX-Heat 6 to 44 ton
3 phase air-cooled VRF
commercial applications
Heat Pump & Heat Recovery Systems
Focus for this training

***DVM* Chiller** 20 to 240 ton
3 phase air to water heat pump
commercial applications
Register for this training

***DVM S* Water** 6 to 50 ton
Single & 3 phase water-cooled VRF
residential and commercial applications
Heat Pump, Heat Recovery Systems &
Geothermal
Register for this training

DVM S Eco 3,4,4.4 & 5 ton models
Single phase air-cooled VRF Heat Pump &
Heat Recovery - residential and light
commercial applications
Register for this training

3

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DVM S Training Topics

- DVM S VRF Introduction
- Outdoor Units & Features
- Outdoor Unit Basic Installation
- Indoor Units: Features & Installation Guidelines
- HR Mode Change Units
- MCU Basic Installation
- Refrigerant Flow Devices
- Digital Control Wiring
- Basic Controls Overview
- Field Piping Installation
- Addendum
  - DVMS Control Wiring Quiz & Exercises
  - Split DOAS Intro & Installation

4

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Samsung Business Academy

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Samsung Business Academy (SBA)

SBA Account Sign Up Required:

- Register for future training classes/courses.
- Receive credit for this training class.
- Access completion certificates.
- Complete surveys/submit feedback.

List of Courses | Training Courses Catalog | Visitor's Guide | Samsung Business Academy Login | Samsung Business Academy Registration

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Samsung Business Academy (SBA)

1. **Sign up for a SBA Account**
   - Contractor
   - Distributor
2. **View/print completion certificates**
3. **Register for future training**
   - Instructor-Led Courses
   - Online Demand

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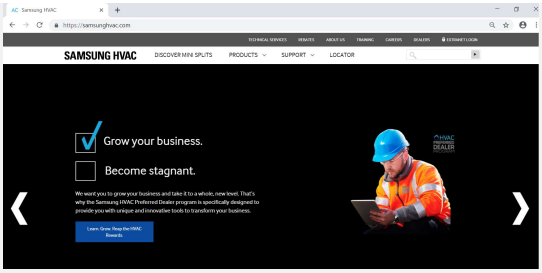
1. Sign Up for a SBA Account

Go to:
www.samsunghvac.com*
*Disable popup blocker.



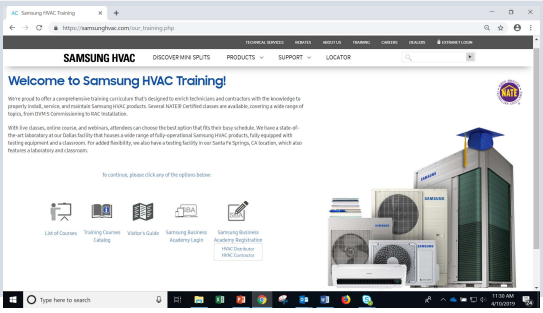
Hover over:

SBA

Samsung Business Academy Registration

Choose either:

HVAC Distributor
HVAC Contractor



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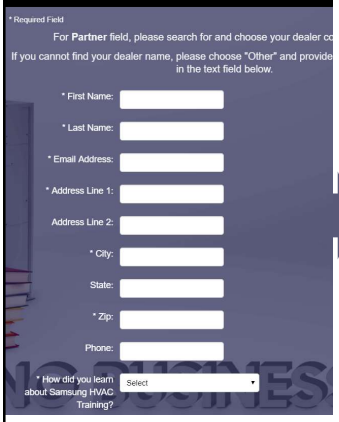
1. Sign Up for a SBA Account

HVAC Contractor

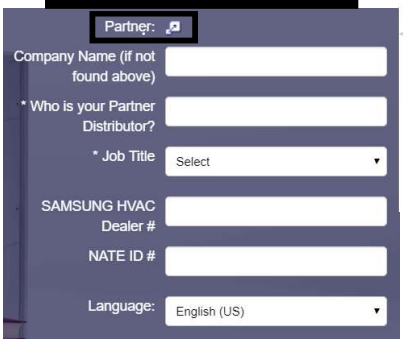
Complete all required fields designated by an asterisk (*).



1 Type Distributor Name

2 Click Search

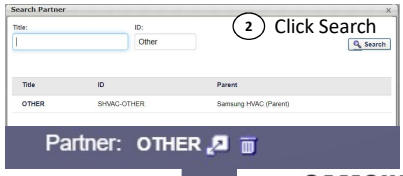
Click Partner: **to add Distributor information.**



3 Click your Distributors name to add to form.

If your Distributor is not in the list,

1 Type **Other** in the **ID**: field.



2 Click Search

3 Click OTHER to add to form.

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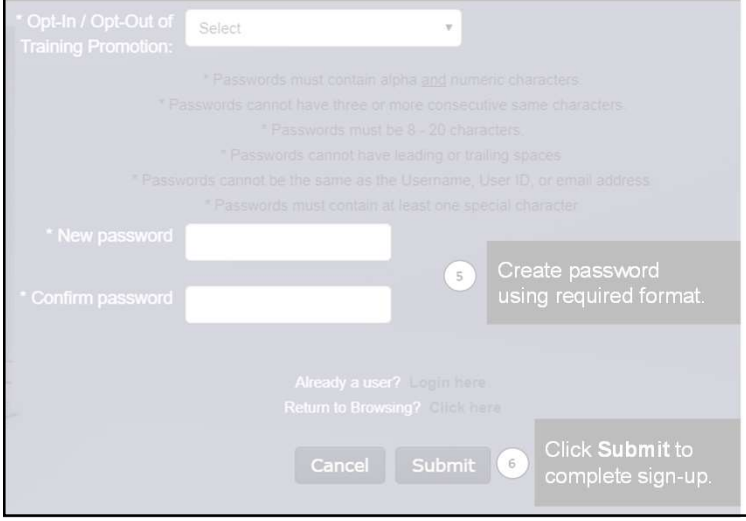
1. Sign Up for a SBA Account

Complete the rest of the Sign Up form.

4 Select "**Opt-In**" to receive training communications.



5 Create password using required format.

6 Click **Submit** to complete sign-up.

After account is setup…

01 Approval takes 1-2 business days.

02 Attendance is marked complete.

03 Certificate available in SBA.

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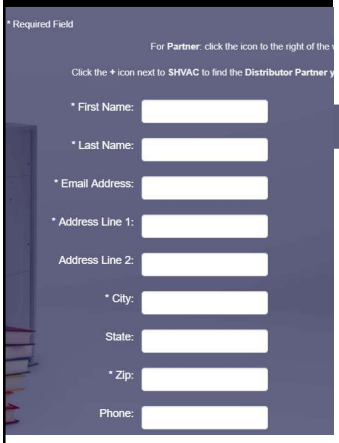
1. Sign Up for a SBA Account

HVAC Distributor

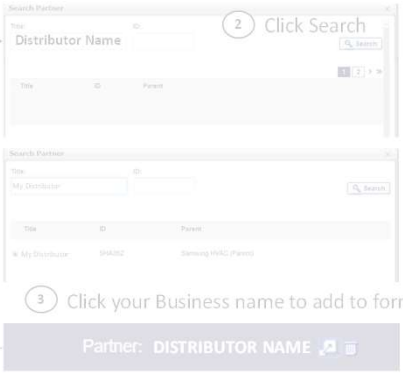
Complete all required fields designated by an asterisk (*).



1 Type your Business Name

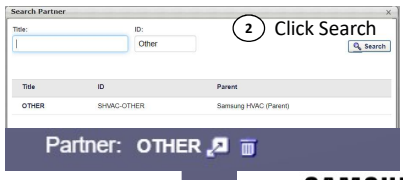
2 Click Search

Click Partner: **to add Distributor information.**



If your Business is not in the list,

1 Type **Other** in the **ID**: field.



3 Click OTHER to add to form.

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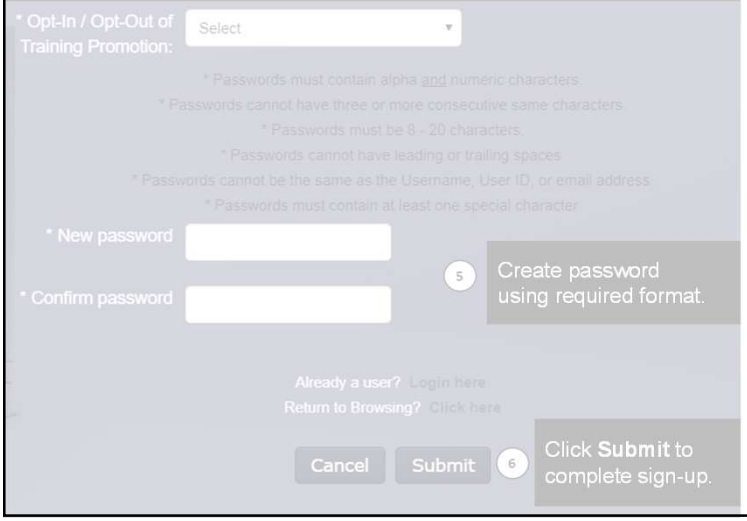
1. Sign Up for a SBA Account

Complete the rest of the Sign Up form.

4 Select "**Opt-In**" to receive training communications.



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6 Click **Submit** to complete sign-up.

After account is setup…

01 Approval takes 1-2 business days.

02 Attendance is marked complete.

03 Certificate available in SBA.

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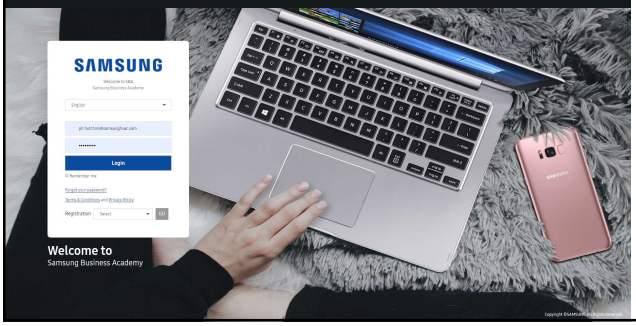
2. View/Print Completion Certificates

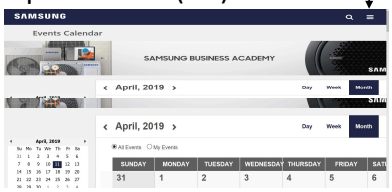
① Go to www. https://samsunghvac.com/our_training.php

② Click: SBA Samsung Business Academy Login

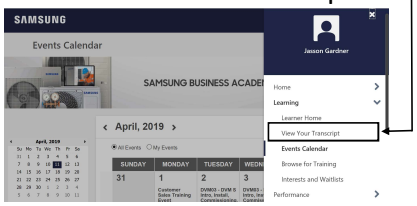
Login with Samsung Business Academy (SBA) username/password.



③ Open Menu. (☰)



④ Click "View Your Transcript".



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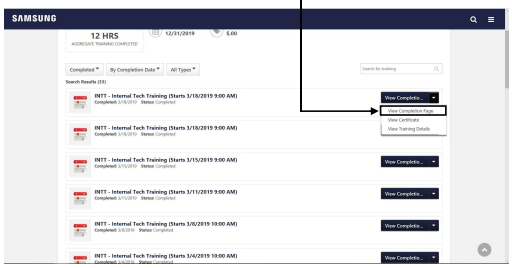
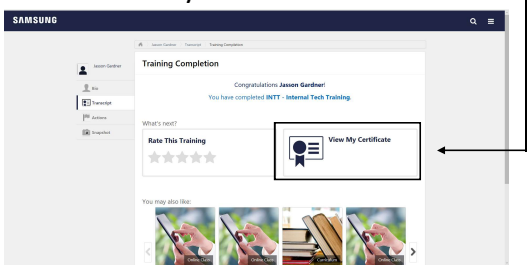
2. View/Print Completion Certificates

④ Click "View Completion Page".

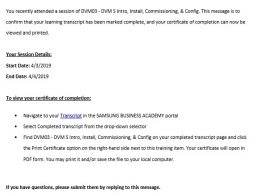


⑤ Click "View My Certificate".



⑥ Select "Print" or "Save" option(s).

Note: Confirmation email will be sent with link to down-load certificate.



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3. Register for Future Training

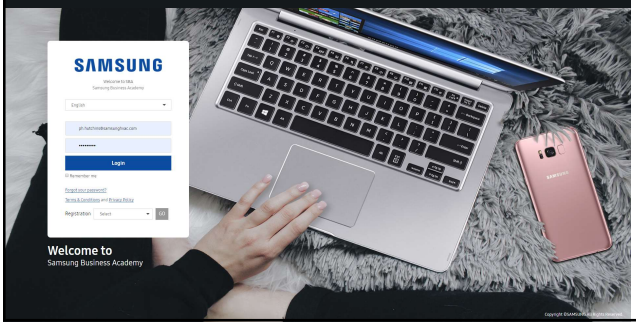
① Go to www. https://samsunghvac.com/our_training.php

② Click: SBA Samsung Business Academy Login

③ Samsung Business Academy (SBA) displays.

- **Hover** - on class name to view class information.
- **Click** - on class name to open the class registration form.

Login with Samsung Business Academy (SBA) username/password.



Instructor - Led Training

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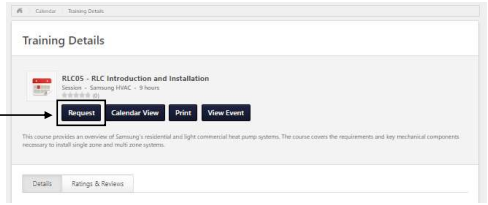
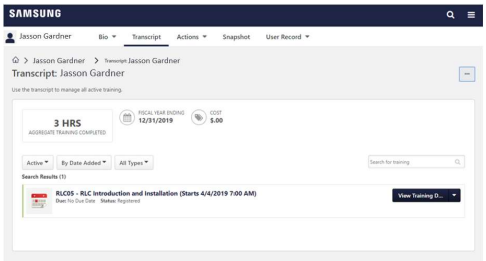
3. Register for Future Training

④ Click "Request".



Registration status screen displays.



⑤ Confirmation email will be sent.

Dear **Jasson**, this message is to confirm you are registered to attend:

Title: RLC06 - RLC Advanced Service Introduction 4/17 RLC06 - Roanoke, TX

Session Details:

4/17 RLC06 - Roanoke, TX

Date:	4/17/2019 9:30 AM
Time:	9:30 AM - 5:30 PM EST
Location:	Samsung HVAC Roanoke, TX
Address:	776 Henrietta Creek Road, Suite 100, Roanoke, TX 76262
Room:	
Instructor(s):	Michael Wertzberger (Primary Instructor)

Training Hours: 8 Hours 0 Min

If the training address does not appear above, please use the below address:

Please ensure that you download or print the **Training Material** prior to the class. Training documents can be found here, sorted by class name.

Please accept this meeting request to add this session to your Outlook or Google calendar.

If you can no longer attend this session, please withdraw by clicking the "Withdraw" link from your Transcript in the SAMSUNG BUSINESS ACADEMY portal.

If you have questions, please submit them by replying to this message.

2018 Corporate Bulletin 2018-0004 Training Materials.PDF

Note: If you do not receive with email within 15 minutes, check your Junk/Spam folder. Add *@samsunghvac.com to trusted sites.

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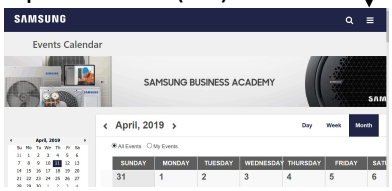
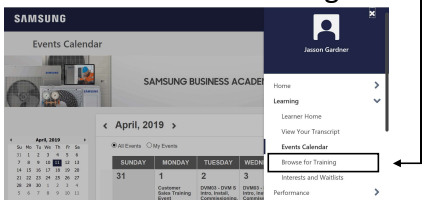
3. Register for Future Training

On - Demand Training

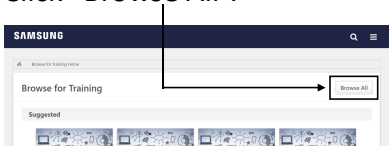
① Open Menu. ( )



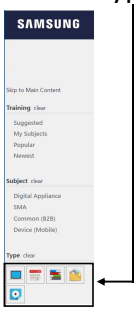
② Click “Browse for Training”.



③ Click “Browse All”.

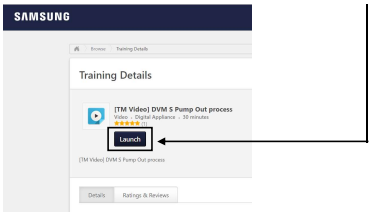


④ Click “Type”*.



*Online, Video and Materials.

⑤ Select course and click “Launch”.



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Thank You for setting up your account in class!

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DVM S VRF Introduction

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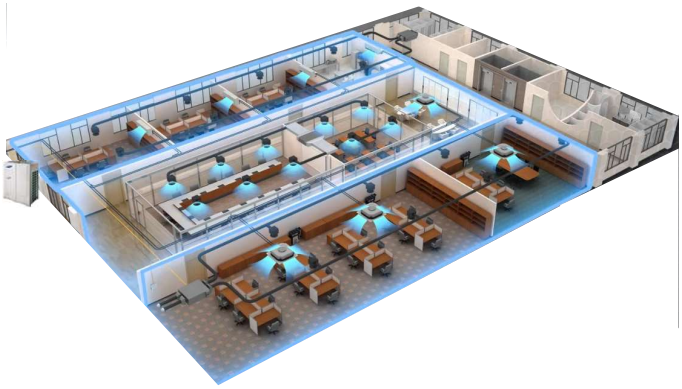
DVM S VRF Introduction

Digital Variable Multi

- Designed to control multiple indoor fan coil units on a single refrigerant network using Samsung digital communications (NASA protocol)
- Refrigerant flow (capacity) is controlled by inverter driven variable speed scroll compressors and electronic expansion valves
- System capacity is controlled based on the individual zone load changes
- Increased system efficiency in part load conditions
- ***DVM S***: 3rd ***DVM*** design generation



20

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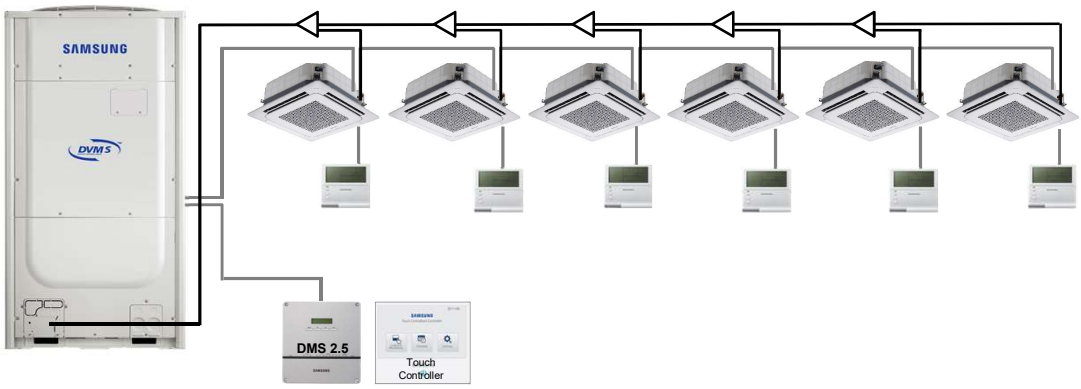
DVM S VRF Introduction

- ***DVM S*** VRF systems can applied to small, medium and large size commercial projects comprised of 1 to 3 outdoor unit modules connected to multiple indoor units on a single refrigerant network up to 3,280 ft. collective piping length
- ***DVM S*** VRF systems are controlled by optional wired and wireless local remote controllers and are compatible with the full line of Samsung centralized and external NASA protocol controls



21

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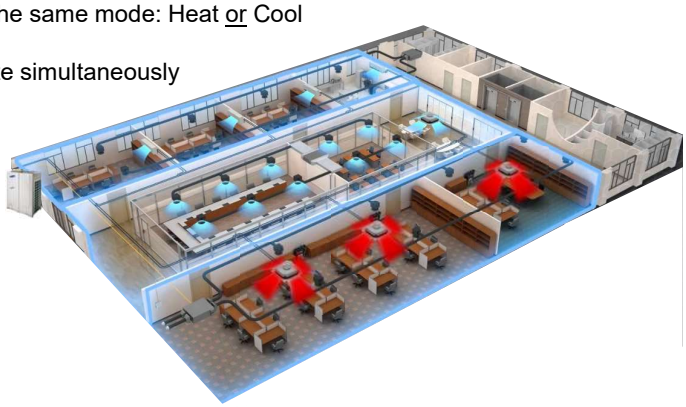
DVM S VRF Introduction

Samsung *DVM S* systems are offered for Heat Pump and Heat Recovery applications
"MAX Heat" models offered for low ambient heating requirements

- **Heat Pump** Systems: All indoor units operate in the same mode: Heat or Cool
- **Heat Recovery** Systems: Indoor units can operate simultaneously in Heat and Cool operation
  - Mode Change Units are designed to control heat and cool operation for connected indoor units
  - Auto mode changeover control



22

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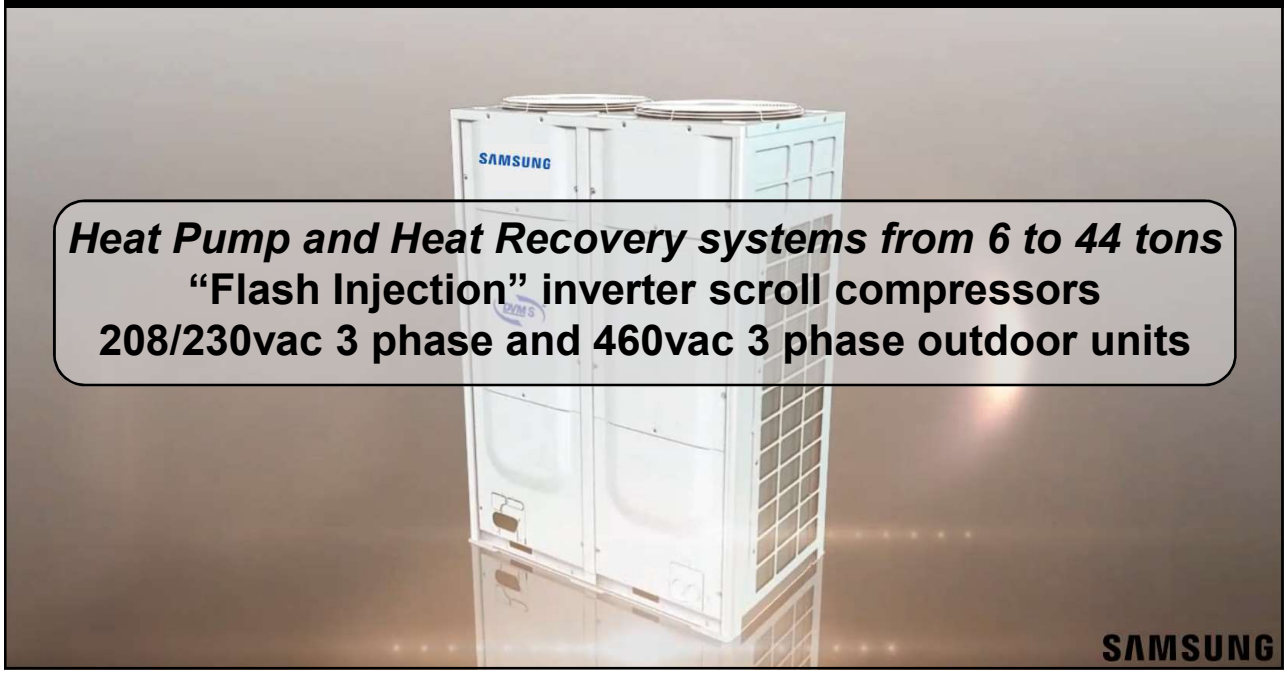
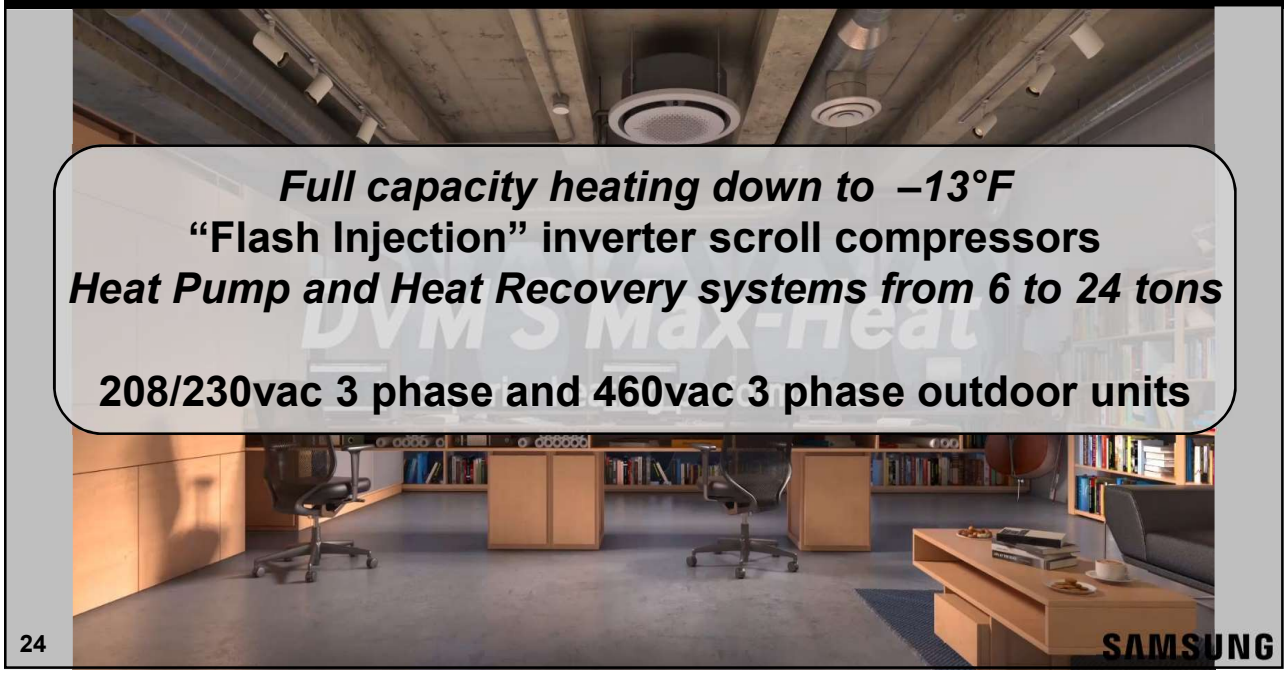
DVM S VRF Introduction



Heat Pump and Heat Recovery systems from 6 to 44 tons
"Flash Injection" inverter scroll compressors
208/230vac 3 phase and 460vac 3 phase outdoor units

DVM S VRF Introduction



Full capacity heating down to –13°F
"Flash Injection" inverter scroll compressors
Heat Pump and Heat Recovery systems from 6 to 24 tons

208/230vac 3 phase and 460vac 3 phase outdoor units

24

DVM S System Configurations

The outdoor units are available in 6,8,10,12,14,16 & 18 ton units – MAX HEAT™ offered in 6 & 8 ton units

6 ton Single fan & compressor
208/230vac 3 Ph
460vac 3 Ph

8,10,12,14,16 &18 ton
6 & 8 ton "MAX Heat"
Dual fan & Compressors
208/230vac 3 Ph
460vac 3 Ph

18 ton Heat Pump & Heat Recovery
Dual fan & Compressors
460vac 3 Ph

25

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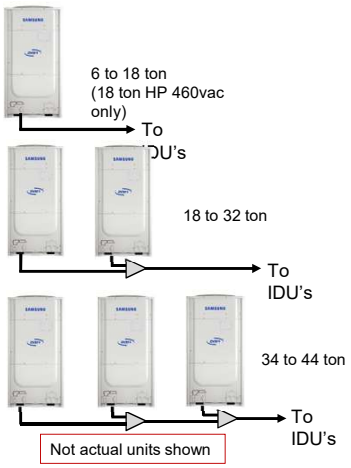
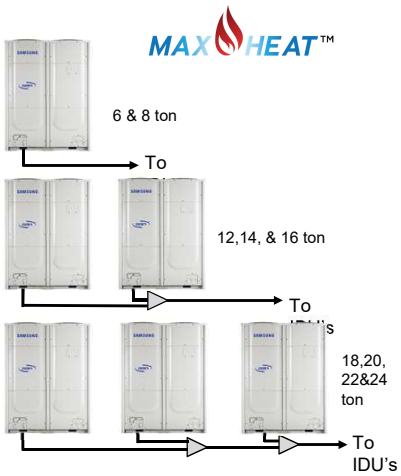
DVM S System Configurations

VRF System Configurations – Single & Modular

The outdoor units can be connected together to provide additional system capacity up to 44 ton (MAX Heat – 24 ton)

Must be factory approved combinations (DVM Pro)





26

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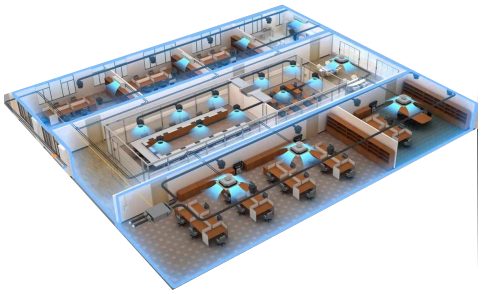
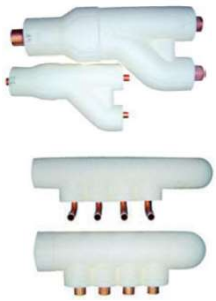
DVM S Heat Pump Systems

- **Heat Pump systems from 6 to 44 tons**
- **"MAX HEAT" HP systems from 6 to 24 tons**
  - 2-Pipe refrigerant network
    - Liquid & Dual pressure gas
      - Y-Joints/Headers





27

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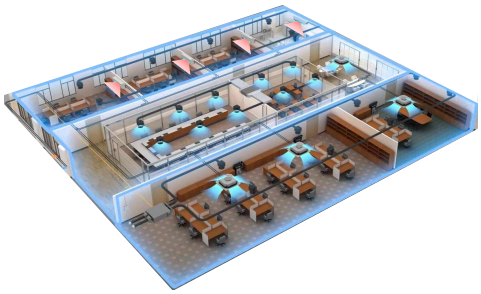
DVM S Heat Recovery Systems

- **Heat Recovery systems from 6 to 44 tons**
- **"MAX HEAT" HR systems from 6 to 24 tons**
  - 3-Pipe refrigerant network
    - Liquid – Low pressure gas – Dual pressure gas
      - **MCU** – **M**ode **C**hange **U**nit
        - Y-Joints



28

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DVM S Indoor Units

DVM S indoor units include a full compliment of ducted and non-ducted indoor units ranging from 5,000 up to 96,000 MBtu/h Including Outside Air Units

29

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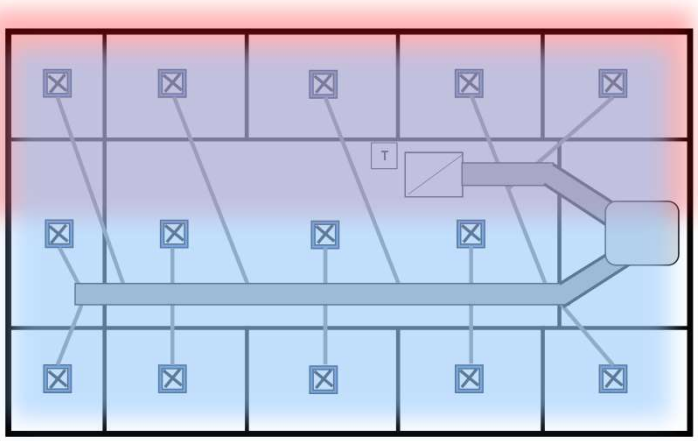
Load Diversity – Standard Central System

Cooling operation shown

- Example: Commercial office building
- Standard 12 ton roof-top package unit
  - The main trunk and each branch duct is sized to deliver the designed airflow (cfm) for the designed load in each room
  - System operates in full capacity based on thermostat location and cool temperature setpoint
- The cooling load changes throughout the day due to the orientation of the sun to the building and occupant usage
- Because of the centralized ductwork and single temperature control, all rooms receive the same air flow and cooling capacity regardless of the individual load requirements



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30

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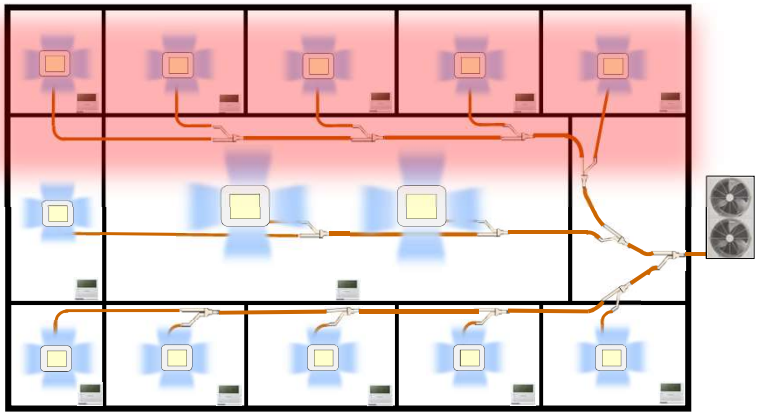
DVM S System With Load Diversity

Cooling operation shown

- Example: Commercial office building
- ***DVM S*** Heat Pump system
  - Little or no ductwork
  - Small diameter refrigerant lines with Y-joints
  - Individual zone control
- Individual indoor units cool the space according to the setpoint temperatures on the individual remote controllers
- The cooling load changes throughout the day due to the position of the sun and occupant usage
- Zones with reduced cooling loads decrease system capacity and energy consumption



Note: Piping layout shown for explanation purposes only

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31

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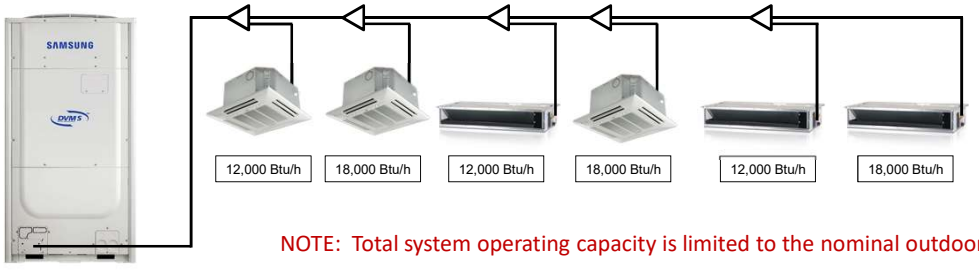
Capacity Connection Ratio

- All Samsung DVM S, VRF systems incorporate the “Connection Ratio” feature
- Connection Ratio is the maximum nominal capacity of the outdoor unit in relation to the cumulative total capacity of the connected indoor units
  - Indoor unit collective capacity can be increased above the maximum capacity of the outdoor unit
- DVM S standard connection ratio range: 50% - 130%

Example: 90,000 Btu/h total nominal indoor unit capacity connected to a 72,000 Btu/h outdoor unit = Capacity Connection Ratio of 125%



NOTE: Total system operating capacity is limited to the nominal outdoor unit capacity

32

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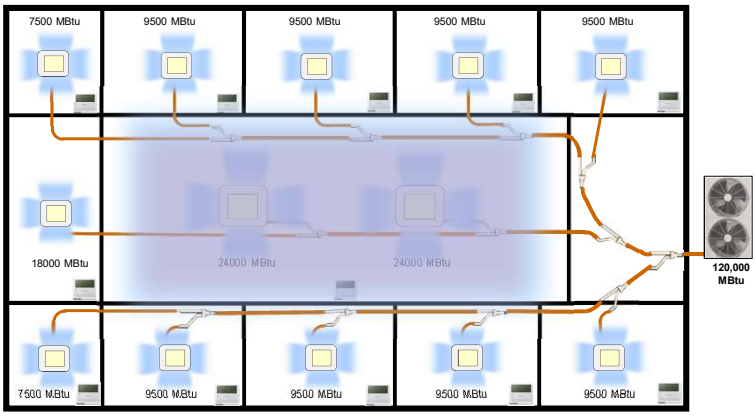
Capacity Connection Ratio With Load Diversity

Cooling operation shown

Selected zone(s) within the controlled areas can experience occasional increased loads

- Example: Additional people attending a special meeting or conference, beyond the normal daily load requirements
- Select indoor unit(s) can be upsized in capacity to handle the occasional increased load demands
- The total indoor unit collective capacity can be increased a maximum of 130% of the outdoor unit nominal output capacity
- System capacity is transferred from areas with reduced load to the area(s) which are experiencing temporary high loads
- NOTE: The outdoor unit will only provide the designed nominal capacity in full load conditions

Example: 120,000 MBtu Outdoor Unit with 157,000 MBtu total indoor unit nominal capacity = 130% connection ratio



Note: Piping layout shown for explanation purposes only

2

33

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DVM S System Power & Control Circuits

- The outdoor unit is powered by a dedicated 3 phase line voltage circuit
  - Indoor units are powered by a separate dedicated 208/230vac single phase circuit(s)
- The outdoor unit communicates with the indoor units and remote controllers via 2 conductor control wire
  - Control wire: 16 AWG 2 conductor stranded with shield

Concept example only

34

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Variable System Capacity

- All DVMS Indoor units incorporate an internal EEV (excl. Under Ceiling unit)
  - EEV controls individual fan coil superheat and subcooling based on load demand
- Indoor ambient temperature is read from indoor unit return air sensor (standard)
  - Wired controller sensor, or external room temperature sensor (optional)

Example: 4-Way Cassette

Return Air Temperature Sensor

2

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Variable System Capacity

- Overall system capacity modulates based on load demand of the conditioned spaces and remote controller temperature setpoints

- Compressor modulation
  - Cooling: Target refrigerant low pressure
  - Heating: Target refrigerant high pressure

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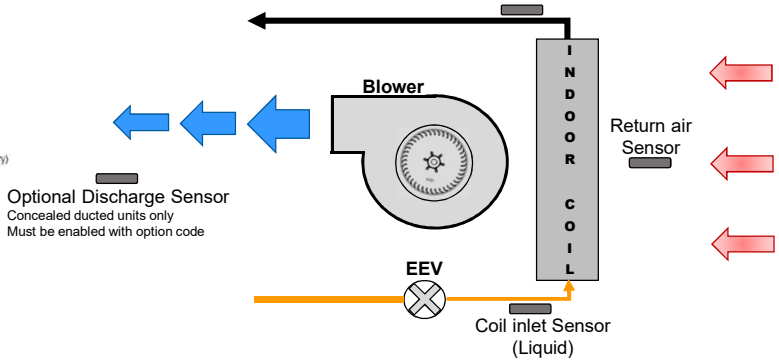
Indoor Fan Coil Basic Components

Indoor unit component diagram

- Control components
  - Control PCB
  - Electronic Expansion Valve (EEV)
  - Wired Remote Controller w/built-in sensor (optional)
  - External Room Sensor (optional)
  - Condensate Lift Pump (specific units)



Example: 4-Way Cassette PCB

Example:
MWR-WE11(13)N

Room Sensor

MWR-TA
External Room Sensor

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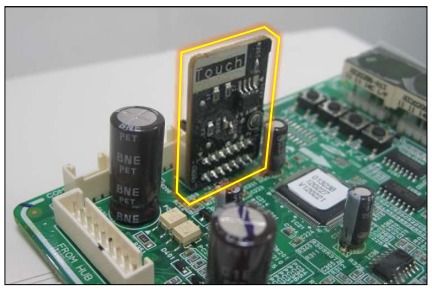
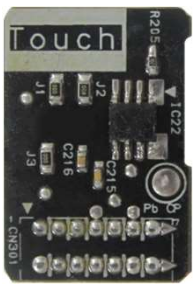
Indoor & Outdoor PCB - EEPROM

- DVMS indoor and outdoor units have a removable EEPROM to store all unit settings and information
- Maintains system information during service or PCB replacement



Outdoor unit main PCB

Front



Back

Outdoor unit data stored in EEPROM
- HP information
- Auto start up result
- Key tact option
- Error back up data (30min)
- Serial and model number

Indoor unit data stored in EEPROM
- Model/serial number (Excl. Multi-position AHU)
- Option settings
- Saves unit name for future service work and controls setup
- Other data

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Outdoor Units & Features

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DVM S Outdoor Unit Nomenclature

Example: AM 072 F X V A F H / AA
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Classification

AM	DVM S

② Capacity

3 digits x 1,000 Btu/h

③ Version

F	2013
H	2014
J	2015
K	2016
M	2017
N	2018

④ Product Type

X	Outdoor Unit
N	Indoor Unit

⑤ Unit Type

V	DVM S Outdoor Unit – 72,000 MBtu and larger

⑥ System Orientation Type

A	Modular outdoor unit – 72,000 MBtu and larger
T	Low temp – high EER

⑦ Voltage

F	208/230vac 3 Ph
J	460vac 3 Ph

⑧ Mode

H	Heat Pump
R	Heat Recovery

40

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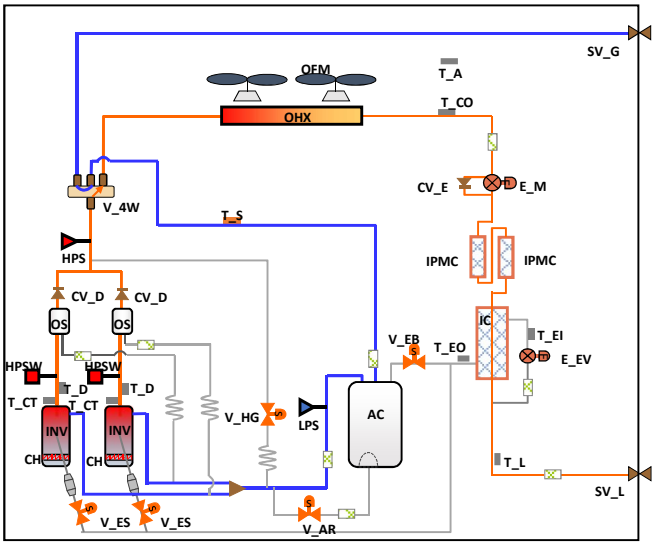
Outdoor Units

Heat Pump Refrigerant Circuit

Example: Dual fan – dual compressor model



	Name
INV	Inverter Compressor
OFM	Outdoor Fan Motor
OHX	Outdoor Heat Exchanger
AC	Accumulator
OS	Oil Separator
IC	Intercooler
IPMC	IPM Cooler
CH	Crank Case Heater
HPS	High Pressure Sensor
LPS	Low Pressure Sensor
HPSW	High Pressure Switch
E_M	Main EEV
E_EV	EVI EEV
V_ES	EVI Sol. Valve
V_EB	EVI Bypass Valve
V_HG	Hot Gas Bypass Valve
V_4W	4Way Valve
V_AR	Accumulator Oil Return Valve
CV_E	EEV Bypass Check Valve
CV_D	Discharge Check Valve
T_D	Discharge Temp. Sensor
T_S	Suction Temp. Sensor
T_CO	Cond Out Temp. Sensor
T_EI	EVI In Temp. Sensor
T_EO	EVI Out Temp. Sensor
T_L	Liquid Tube Temp. Sensor
T_CT	Comp. Top Temp. Sensor
T_A	Ambient Temp. Sensor
SV_G	Gas Pipe Service Valve
SV_L	Liquid Pipe Service Valve

41

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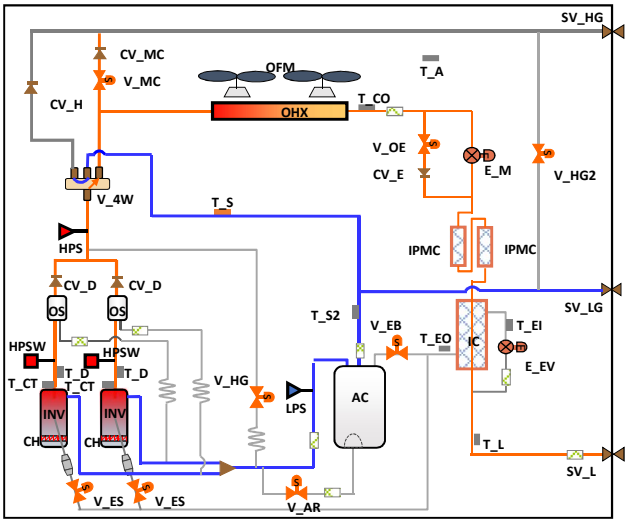
Outdoor Units

Heat Recovery Refrigerant Circuit



	Name
INV	Inverter Compressor
OFM	Outdoor Fan Motor
OHX	Outdoor Heat Exchanger
AC / OS	Accumulator / Oil Separator
IC / IPMC	Intercooler / IPM Cooler
CH	Crank Case Heater
HPS	High Pressure Sensor
LPS	Low Pressure Sensor
HPSW	High Pressure Switch
E_M / E_EV	Main EEV / EVI EEV
V_MC	Main Cooling Valve
V_ES	EVI Sol. Valve
V_EB	EVI Bypass Valve
V_HG1	Hot Gas Bypass Valve 1
V_HG2	Hot Gas Bypass Valve 2
V_4W	4Way Valve
V_AR	Accumulator Oil Return Valve
V_OE	Outdoor EEV Valve
CV_E	EEV Bypass Check Valve
CV_D	Discharge Check Valve
CV_H	HR Check valve
CV_MC	Main Cooling Check Valve
T_D	Discharge Temp. Sensor
T_S1	Suction Temp. Sensor 1
T_S2	Suction Temp. Sensor 2
T_CO	Cond Out Temp. Sensor
T_EI	EVI In Temp. Sensor
T_EO	EVI Out Temp. Sensor
T_L	Liquid Tube Temp. Sensor
T_CT	Comp. Top Temp. Sensor
T_A	Ambient Temp. Sensor
SV_HG	High Gas Pipe Service Valve
SV_LG	Low Gas Pipe Service Valve
SV_L	Liquid Pipe Service Valve

42

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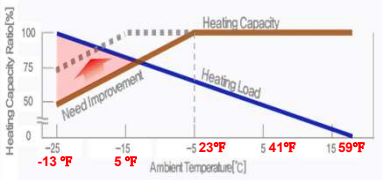
Flash Injection Scroll Compressor

Problem of low temp Heating

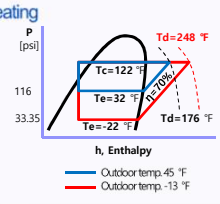
- Basic Heat Pump Concept

Need to increase Heating capacity during low ambient outdoor temperatures



- Problem of low temp heating

① High C/R operation
② High Discharge temp.
④ Less Ref. Flow Rate
⑤ Insufficient Heating Capacity

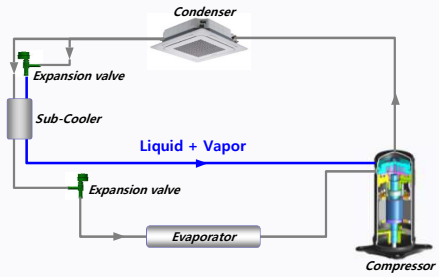


* C/R : Compression Ratio

Improvement with Flash Injection

- Flash Injection Function

Two-Phase (Vapor + Liquid) Ref. Injection
→ Decrease Discharge Temperature
→ Increase Refrigerant Flow Rate
→ Increase heating under Low ambient temperature conditions



43

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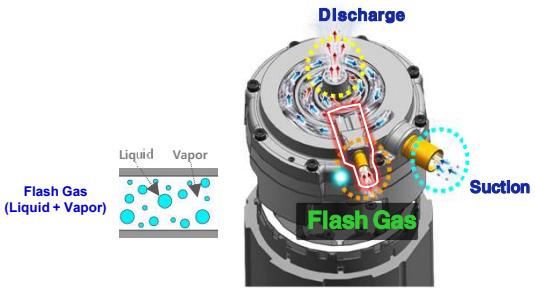
Flash Injection

- Increased Heating capacity at low ambient temperature conditions by increasing the refrigerant Flow-Rate
- Enhanced operating range by decreasing discharge temperature under high compression ratio conditions

Flash Injection

- High Density Gas increase Refrigerant Flow-Rate
- Heat Capacity 43% ↑ at -13°F
- MAX Heat systems 100% heat capacity at -13° F



44

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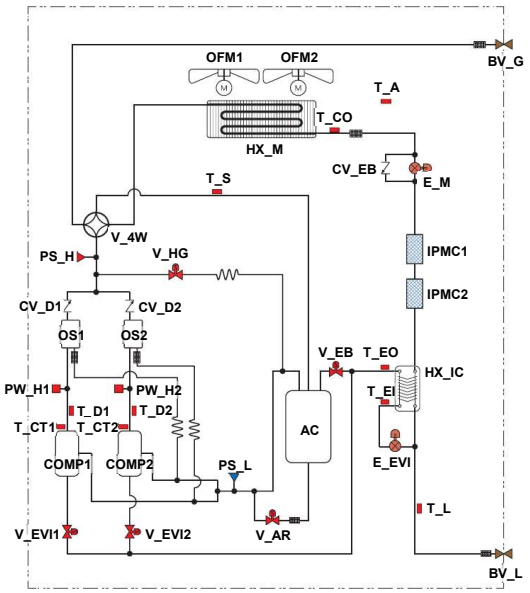
MAX HEAT Outdoor Units

MAX HEAT™ Outdoor Unit Refrigerant Circuit – Heat Pump



	Name
COMP	Compressor (Inverter)
OFM	Outdoor Fan Motor
HX_M / HX_IC	Heat Exchanger – Main / Intercooler
AC / OS	Accumulator / Oil Separator
IPMC	IPM Cooler
PS_H / PS_L	Pressure Sensor – High / Low
PW_H	Pressure Switch - High
E_M / E_EVI	Electronic Expansion Valve - Main / EVI
V_4W	Solenoid Valve - 4Way
V_AR	Solenoid Valve - Accumulator oil Return
V_EB	Solenoid Valve - EVI Bypass
V_EVI	Solenoid Valve - EVI
V_HG	Solenoid Valve - Hot Gas bypass
CV_D	Check Valve - Discharge
CV_EB	Check Valve - EEV Bypass
T_A	Thermistor - Ambient
T_CO	Thermistor - Cond Out
T_CT	Thermistor - Compressor Top
T_D	Thermistor - Discharge pipe
T_EI / T_EO	Thermistor - EVI In / Out
T_L	Thermistor - Liquid pipe
T_S	Thermistor - Suction pipe
BV_HG	Ball Valve - Gas pipe
BV_L	Ball Valve - Liquid pipe

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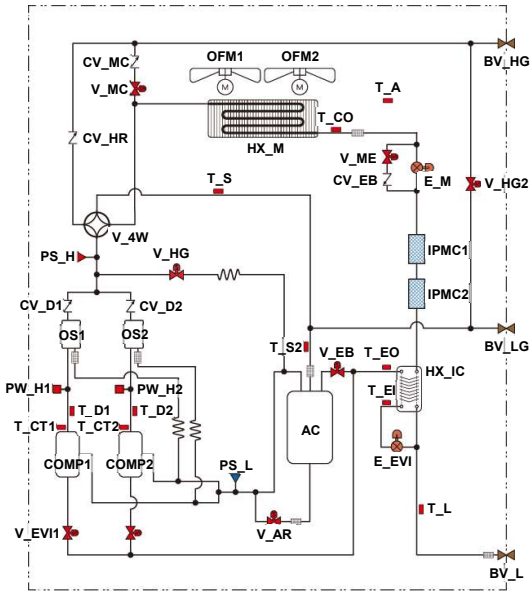
MAX HEAT Outdoor Units

MAX HEAT™ Outdoor Unit Refrigerant Circuit – Heat Recovery



	Name
COMP	Compressor (Inverter)
OFM	Outdoor Fan Motor
HX_M / HX_IC	Heat Exchanger – Main / Intercooler
AC / OS	Accumulator / Oil Separator
IPMC	IPM Cooler
PS_H / PS_L	Pressure Sensor – High / Low
PW_H	Pressure Switch - High
E_M / E_EVI	Electronic Expansion Valve - Main / EVI
V_4W	Solenoid Valve - 4Way
V_AR	Solenoid Valve - Accumulator oil Return
V_EB	Solenoid Valve - EVI Bypass
V_EVI	Solenoid Valve - EVI
V_HG	Solenoid Valve - Hot Gas bypass
V_HG2	Solenoid Valve - Hot Gas bypass 2
V_MC	Solenoid Valve - Main Cooling
V_ME	Solenoid Valve - Main EEV
CV_D	Check Valve - Discharge
CV_EB	Check Valve - EEV Bypass
CV_HR	Check Valve - Heat Recovery
CV_MC	Check Valve - Main Cooling
T_A	Thermistor - Ambient
T_CO	Thermistor - Cond Out
T_CT	Thermistor - Compressor Top
T_D	Thermistor - Discharge pipe
T_EI / T_EO	Thermistor - EVI In / Out
T_L	Thermistor - Liquid pipe
T_S	Thermistor - Suction pipe
BV_HG	Ball Valve - High pressure Gas pipe
BV_LG	Ball Valve - Low pressure Gas pipe
BV_L	Ball Valve - Liquid pipe

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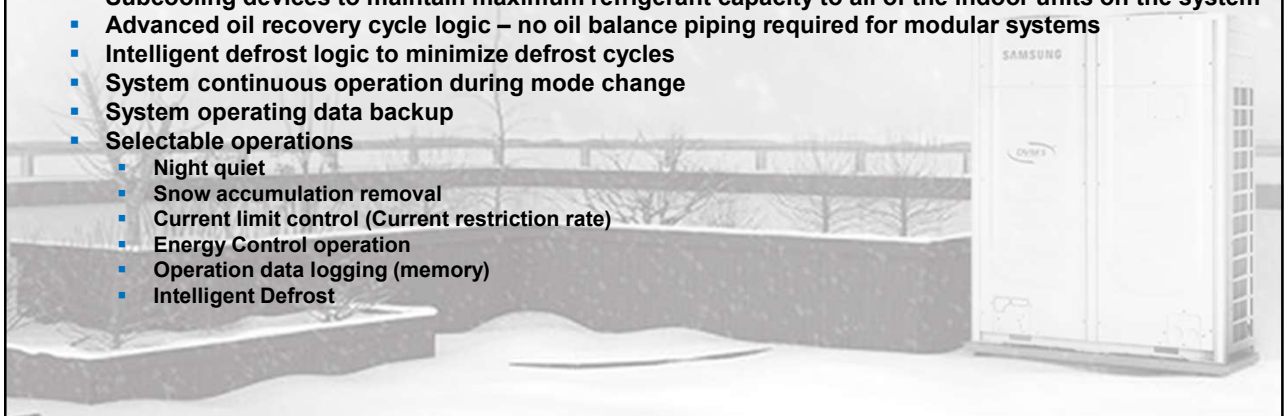
DVM S Outdoor Features

Operating Temperature Range

- **Cooling: 23ºF – 120ºF (-13°F w/LACH Low Ambient Cooling Hood – Heat Pump only)**
- **Heating: -13°F – 75°F ("MAX HEAT" 100% capacity at -13°F)**

Features

- **Samsung BLDC Flash Injection inverter scroll compressors**
- **Subcooling devices to maintain maximum refrigerant capacity to all of the indoor units on the system**
- **Advanced oil recovery cycle logic – no oil balance piping required for modular systems**
- **Intelligent defrost logic to minimize defrost cycles**
- **System continuous operation during mode change**
- **System operating data backup**
- **Selectable operations**
  - **Night quiet**
  - **Snow accumulation removal**
  - **Current limit control (Current restriction rate)**
  - **Energy Control operation**
  - **Operation data logging (memory)**
  - **Intelligent Defrost**



47

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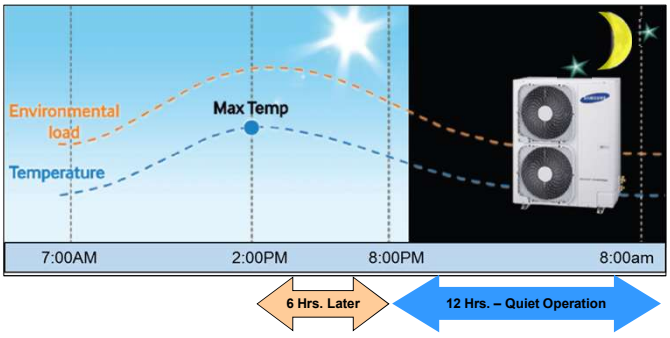
DVM S Outdoor Unit Features

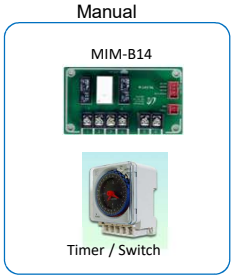
Night Quiet Mode

- Operation in "Night Quiet" mode has a noise reduction of up to 15dB(A)
- Feature automatic operation is enabled during system setup
  - Can be configured for manual operation by external contact (MIM-B14)
- 6 hours after the hottest point in the day, the system will enter "night quiet" mode
- This mode reduces fan and compressor speeds thus reducing operating sound level
- 12 hours later, the outdoor unit will release from this mode and return to normal operation

Automatic



Manual



48

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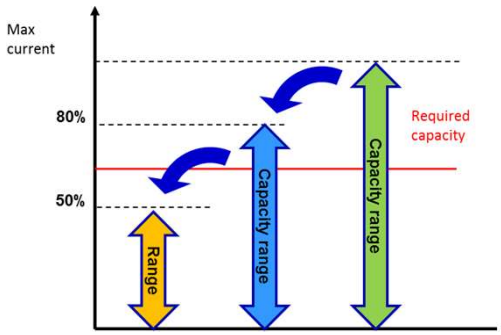
DVM S Outdoor Unit Features

Maximum Current Control

Outdoor Unit maximum operating current option settings

- Selectable 50% up to 100%
  - 100% option seg 3,4 = 0,0 (Factory default)
  - 95% 0,1
  - 90% 0,2
  - 85% 0,3
  - 80% 0,4
  - 75% 0,5
  - 70% 0,6
  - 65% 0,7
  - 60% 0,8
  - 55% 0,9
  - 50% 1,0



NOTE: Maximum operating current option setting may reduce system capacity and affect temperature control performance

49

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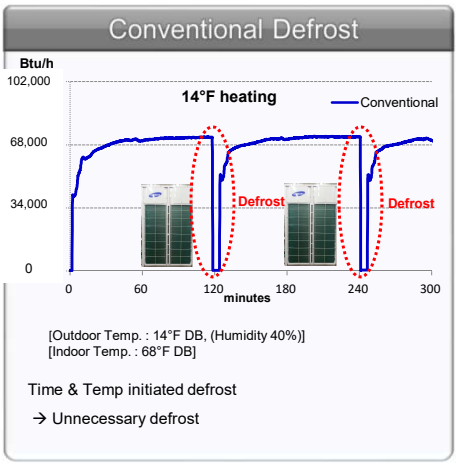
DVM S Outdoor Unit Features

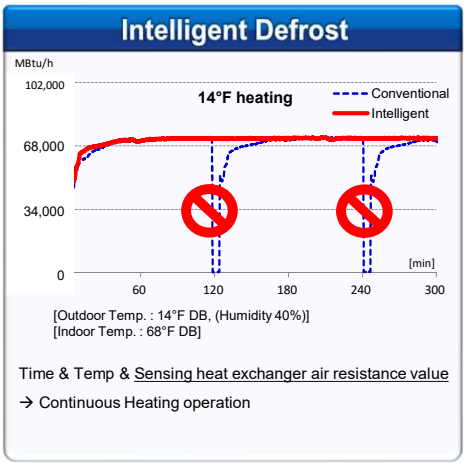
Intelligent Defrost



[Outdoor Temp. : 14°F DB, (Humidity 40%)]
[Indoor Temp. : 68°F DB]

Time & Temp initiated defrost

→ Unnecessary defrost



[Outdoor Temp. : 14°F DB, (Humidity 40%)]
[Indoor Temp. : 68°F DB]

Time & Temp & Sensing heat exchanger air resistance value

→ Continuous Heating operation

50

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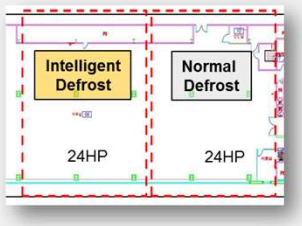
DVM S Outdoor Unit Features

Outdoor Unit Features – Intelligent Defrost

Test condition

- Installation 24HP Outdoor for each zone.



. Indoor unit operation rate 10~40%
. Lowest ambient temperature 17.6°F~ 32°F
. Highest ambient temperature 33.8°F ~ 59°F
. Test period 10 days.

Test result

** Only 2 defrost cycles for 10 days*

Result	Intelligent Defrost	Conventional Defrost
Total Operating time(min)	12,130	11,568
Defrost operation(times)	2	19
Average Heating Operation without defrost(min)	6,065	608

51

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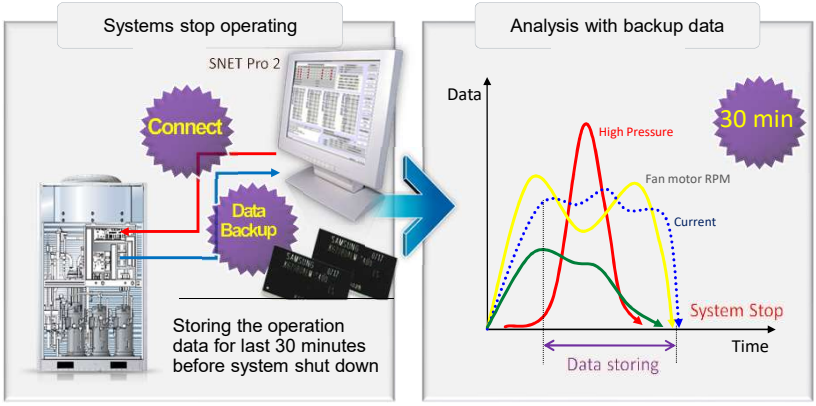
DVM S Outdoor Unit Features

Built-in System Operation Memory

Data Backup on main PCB - SNET Pro 2 to access and display operating data



52

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DVM S Outdoor Unit Basic Installation Guidelines

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DVM S Outdoor Unit Basic Installation

- **It is important to follow Samsung's outdoor unit placement guidelines**
  - Specific placement guidelines are referenced in the ***DVM S*** Installation Manual
- **Failure to follow these recommendations can severely impact system capacity, performance & reliability**
- **Improper placement can also shorten equipment service life**
- **Installations must always follow national, state and local HVAC and electrical codes to insure compliance**

54

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Outdoor Unit Placement Guidelines

Cautions when placing the *DVM S* outdoor unit into position

- Protect the unit from snow obstructing air flow
- Position the unit to avoid damage or reduced performance due to prevailing winds
- Avoid locations near bathroom and exhaust hood ventilators, corrosive atmospheres, etc.
- Insure proper unit clearances to enable adequate servicing and maintenance
- Units must be installed level to insure proper condensate drainage (Defrost)
- Refer to the outdoor unit Installation manual for specific placement requirements

55

Note: Always follow local and state codes for proper unit placement and clearances

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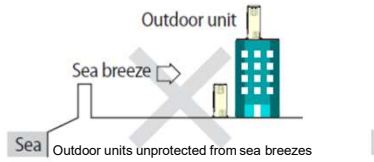
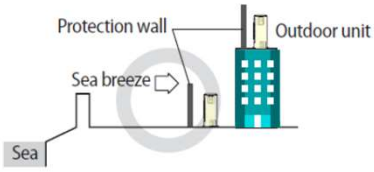
Outdoor Unit Placement Guidelines

Coastal Installations

- Outdoor units should never be installed in locations where direct sea/ocean breezes prevail
- In coastal locations, outdoor units should be installed behind the building, wall or other obstruction to protect against direct winds
- Refer to installation and technical guides for exact specifications
  - 3rd party coil coatings may be recommended





56

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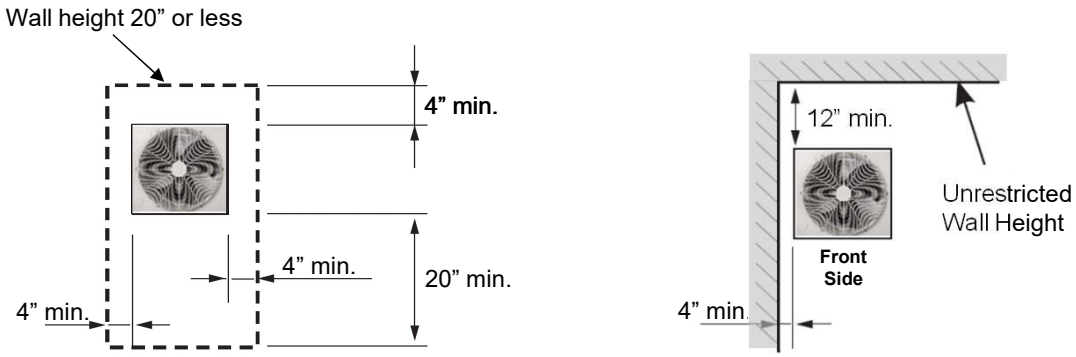
Outdoor Unit Placement Guidelines

Single Unit Installation - Restricted Wall Height and Unrestricted Wall Height



NOTE: Stated clearances based on cooling operation with maximum outdoor temperature of 95°F – Refer to ODU Installation Manual for all clearance requirements

57

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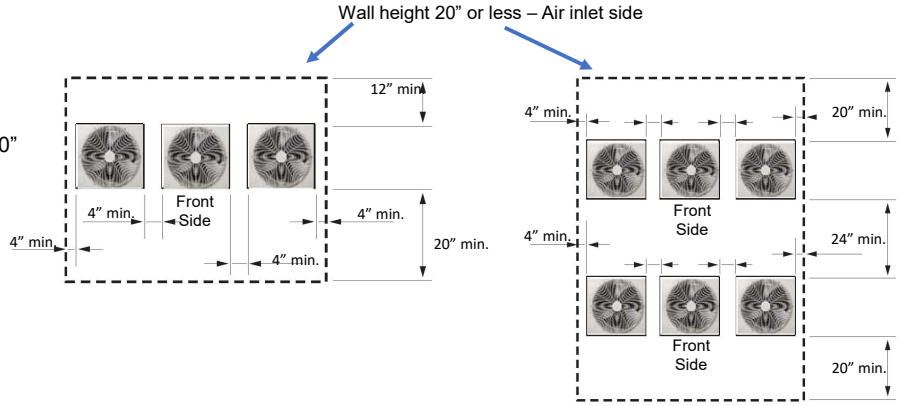
Outdoor Unit Placement Guidelines

Module Unit Installation - Restricted Wall Height

- Height of the wall on the front side should not exceed 60”
- Height of the wall on the air inlet side should not exceed 20”



NOTE: Stated clearances based on cooling operation with maximum outdoor temperature of 95°F – Refer to ODU Installation Manual for all clearance requirements

58

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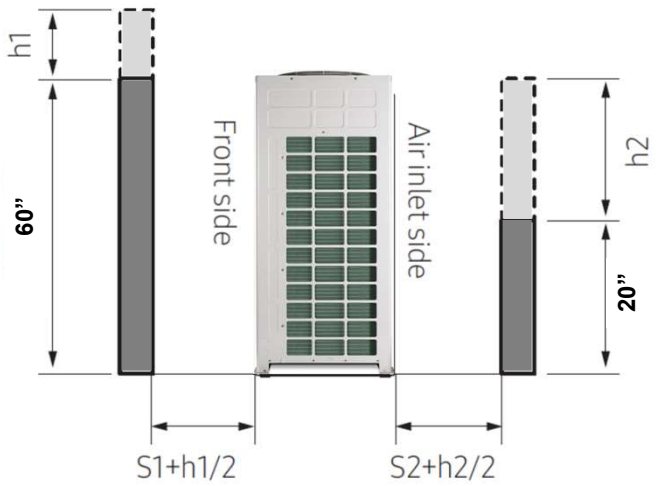
DVMS Outdoor Unit Placement

If the wall height exceeds the standard maximum stated height (h1,h2), add one half of the additional height amount to the unit clearances S1, S2.



Refer to DVMS Installation Manual for all clearance requirements

59

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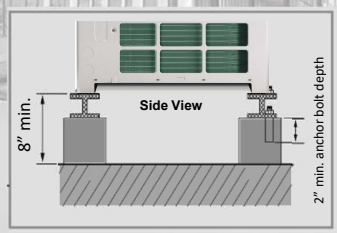
Outdoor Unit Placement Guidelines

- Support the outdoor unit above grade a minimum of 8 inches
- Unit should be installed above the normal snow line
- Each unit must be securely anchored to the base support: roof or ground
- Support the full width of the unit front & rear
  - Individual unit weight 413 ~783 lb. depending on model



60

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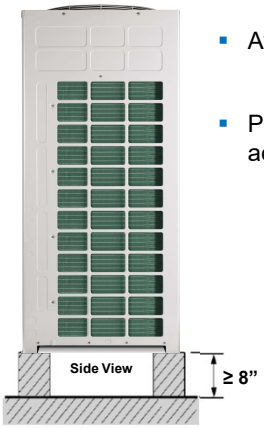
Outdoor Unit Placement Guidelines

- The outdoor units must be properly anchored for stability in windy conditions
- Avoid locations where building exhausts are present
  - Bathroom, kitchen, oxides, sulfur, etc.
- Place outdoor units where service and maintenance access is maintained



61

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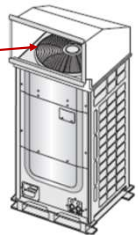
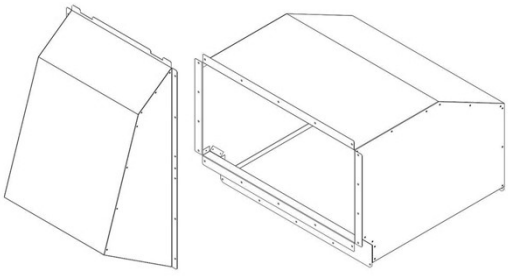
Outdoor Unit Wind/Hail Guards

- Optional metal Wind/Hail guards are provided to protect the outdoor unit coil surfaces from high winds, hail, snow accumulation and debris
- Guards are factory assembled and include all hardware
- Modular systems (2or3 ODUs) require 1 left and 1 right guard when modules are installed with the minimum side to side distance as per the installation manual
- Top guard may be installed facing forward or backward on the unit
  - Must be installed opposite of prevailing wind direction
  - NOTE: Wire fan blade guard(s) must stay in place – do not remove





Part Model Number	Description
WHG-T1/T2	Top Guard **T1**(6 ton ODU) **T2** (8-18 ton ODUs)
WHG-SL	Left Side Guard **SL** (6-16 ton ODU)
WHG-SR/SLR	Right Side Guard **SR** (6-16 ton ODU) **SLR** (18 ton ODU)
WHG-R1/R2/R3	Rear Guard **R1** (6 ton) **R2** (8-16 ton ODU) **R3** (18 ton ODU)
WHG-F1	Front Guard (18 ton ODU)

62

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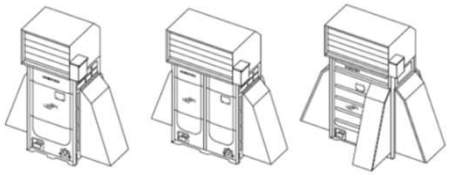
Outdoor Unit Low Ambient Cooling Hood Kit

- Optional low ambient cooling hood kits for DVMS heat pumps to lower the cooling operating range below 23°F, down to -13°F
- Kits include side guards and top hood with damper assembly, damper actuator, control PCB and control transformer – Factory assembled
  - 208/230vac 1 Ph power required (ODU HUB PCB)
- ODU must be installed ≥ 12" above grade or above normal snow level
- ODU must have an additional 18" of clearance greater than standard
  - See Installation Manual
- ODU Main PCB may require firmware upgrade
- Damper hood must be positioned away from prevailing wind direction
  - NOTE: Wire fan blade guard(s) must be removed



Part Model Number	Description
LACH-1	Hood Kit (6 ton ODU)
LACH-2	Hood Kit (8-16 ton ODU)
LACH-3	Hood Kit (18 ton ODU)

63

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Indoor Unit Features & Installation Guidelines

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DVM S Indoor Units

Indoor Unit Model Nomenclature

AM 0 F N * D C H / AA**
① ② ③ ④ ⑤

① Classification
AM = ***DVM S***

② Capacity
3 digits x 1,000 Btu/h

③ Version
E = 2012
F = 2013
G = 2014
J = 2015
K = 2016
M = 2017
N = 2018

④ Product Type
N = Indoor Unit

⑤ Unit Type
1 = 1-Way Cassette
4 = 4-Way/360 Cassette
N = Mini 4-Way Cassette
L = Slim Duct
M = MSP Ducted
H = HSP Ducted
Q = Wallmount
C = Ceiling/Under Ceiling
Z = Multi-position AHU
G = Floor Standing
F = Concealed Floor Standing

⑥ System Orientation Type

⑦ Voltage
C = 1ø, 208/230vac, 60Hz

⑧ Mode
H = Heat Pump

65

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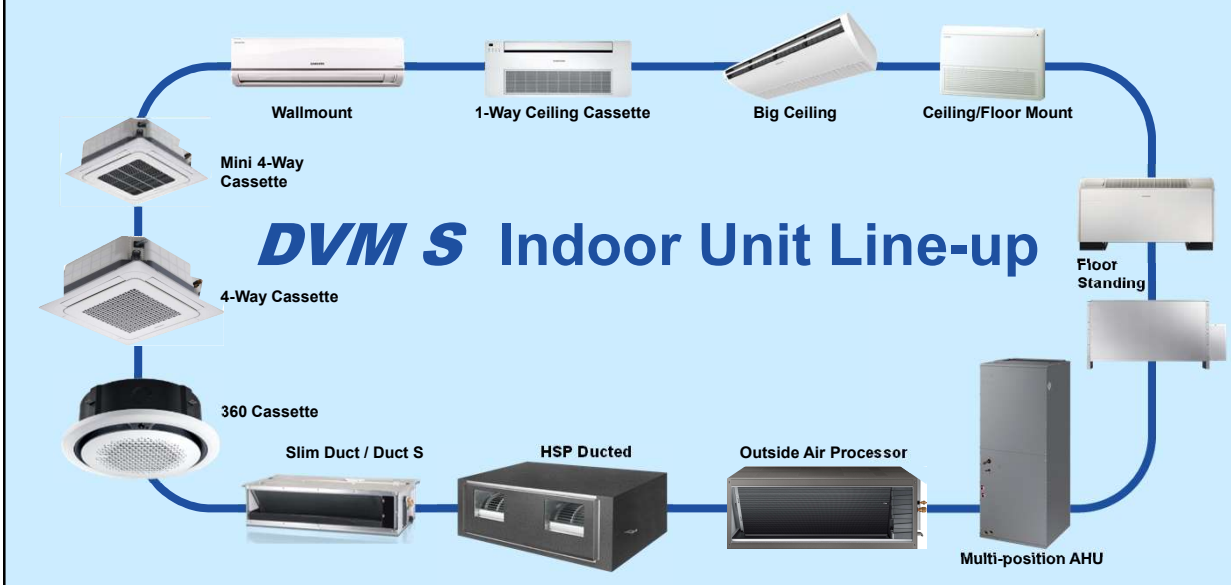
DVM S Indoor Units



66

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Wind-Free Indoor Units

New 2018 - *DVM S* Indoor Units

4-Way Cassette

Mini 4-Way Cassette

1-Way Cassette

Wind-Free™

67

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Wind-Free Technology

Wind-Free™ *Technology*

- Wind Free Ceiling Cassettes deliver an air current that is under 0.15 m/s while in Wind Free mode. Air velocity that is below 0.15 m/s is considered “still air” as defined by ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers)
- The Wind-Free™ Ceiling Cassettes use thousands of micro holes to distribute air throughout the space without blowing directly on the occupants, eliminating potential drafts.
- Activate Wind-Free™ cooling by pressing the Wind-Free™ button on the controller.
- Smart Cooling mode cools air quickly and efficiently, with Fast Cooling at first, and automatically switches to Wind-Free™ mode when room temperature nears set temperature. *

68

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69

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Indoor Unit Basic Installation Guidelines

General indoor unit installation recommendations

- Always refer to the specific indoor unit Installation Manual for the proper clearances, placement and installation procedures
- Follow all national, state and local codes to insure installation compliance
- Every installation should be laid out onsite to insure proper placement of the indoor units and refrigerant lines
- Any indoor unit which is installed in an area where the temperature is above 80°F and, or the humidity rises above 80%, the entire body of the indoor unit should be insulated with a minimum of 3/8" insulation
- All indoor unit refrigerant flare connections must be completely insulated
- Indoor units must be installed level to insure proper condensate removal and float switch operation
- Proper service access must be provided for each indoor unit as indicated in the Installation Manuals

70

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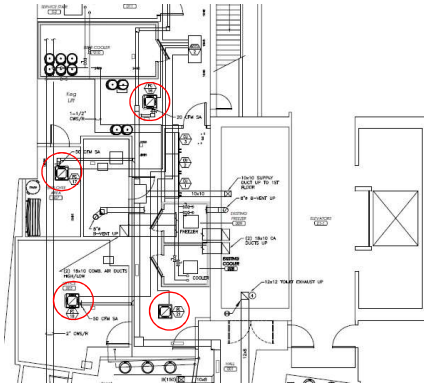
Indoor Unit Installation

Indoor Unit Placement Documentation

- While placing the indoor units in their respective locations, it is important to document each unit's model and serial number including location and ID (room no. area, zone, etc.)
  - This information should be included in the project "As-built" drawings (floor plan) and spreadsheet for future reference



71

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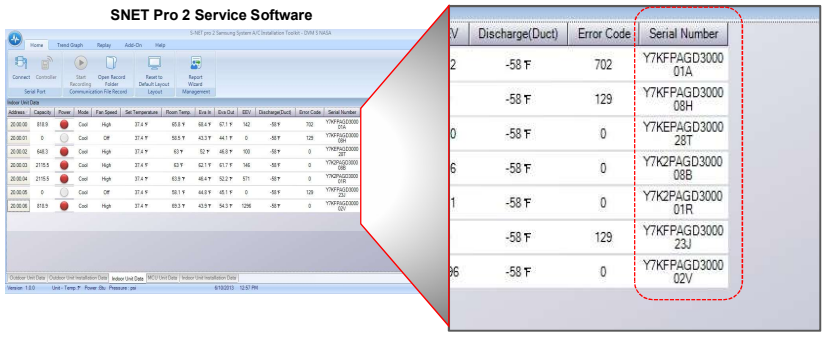
Indoor Unit Installation

Indoor Unit Placement Documentation

- Accurate indoor unit documentation will be important for quick and easy address setting in the system commissioning process
- With **SNET Pro 2** Service Software, the indoor units can be viewed based on their serial number (Excluding the Multi-position AHU's)



72

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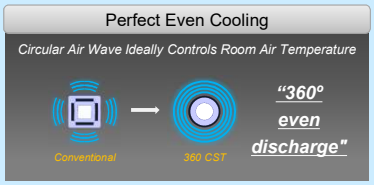
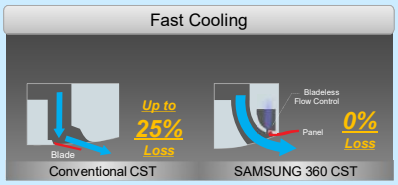
360 Ceiling Cassette

Features

- Models: AM0 09,12,18,24,30,36 & 48 KN4DCH/AA
- Built-in IR receiver for easy addition of wireless controller
- Bladeless air direction control
- Fan speed can be adjusted for ceiling height
- Built-in condensate lift pump – 29” lift with check valve
- Facia Panels sold separately (White & Black)
  - Electro-static washable pleated air filter included

39 3/8” x 39 3/8”
Weight: 52 – 61lbs (incl. facia panel)





73

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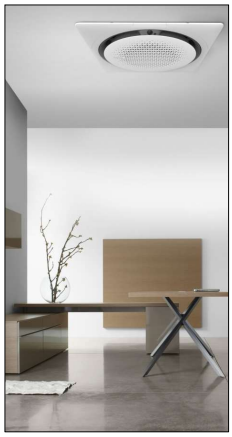
360 Cassette – Optional Facia Panels



“Ceiling Type”

“Open Type”

Panel type	Panel color	Model number
Ceiling Type (Square)	White	PC4NUDMAN
	Black	PC4NBDMAN
Open Type (Circle)	White	PC4NUNMAN
	Black	PC4NBNMAN

74

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360 Cassette – Facia Panels

75

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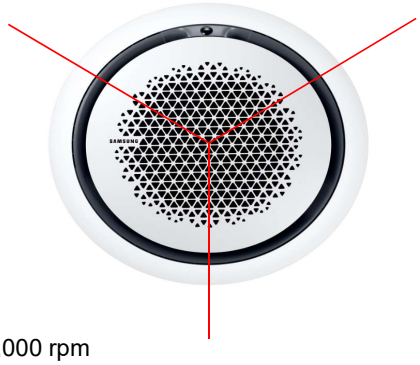
360 Cassette – Air Flow Control

The unique 360 design of the coil and chassis uses booster fans to provide even air flow



- The cassette unit has 3 booster fans that operate from 500 to 2,000 rpm
- These booster fans also provide air direction control similar to a standard 4-way cassette's powered louvers
- Individual air direction control is also possible (3 directions)

76

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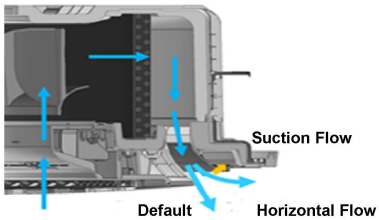
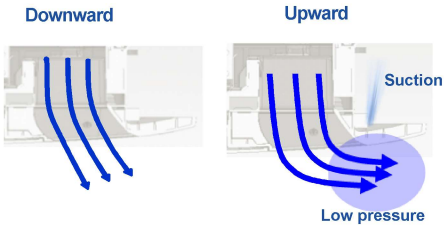
360 Cassette – Air Flow Control

- Air outlet angle settings: 10°, 40°, & 60° (default without booster fans)
- The booster fans create an area of low pressure near the air outlet drawing the cassette discharge air upward





77

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360 Cassette Remote Controller Options

AR-KH00U Optional Wireless Remote Controller

- Air flow direction control
- Simple schedule control (On timer / Off timer)
- On/Off operation mode, fan speed, airflow, temperature setting
- Zone selecting control (Max. 4 zones)
- Buzzer sound mute
- Address and option setting

MWR-WE13N Optional Wired Controller

- Time synchronization with DMS2.5 gateways
- Airflow direction control
- Indoor unit On/Off and fan speed control
- Daylight savings
- Weekly schedule
- Built-in room temperature sensor

NOTE: Indoor unit may require firmware update

78

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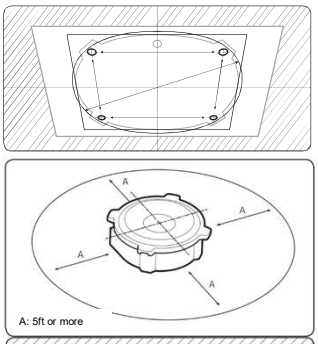
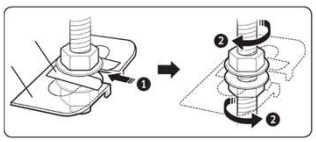
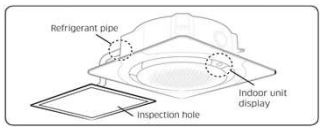
360 Cassette Installation Guidelines

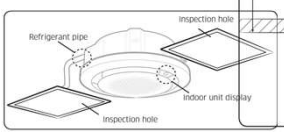
Caution: When handling the cassette chassis, hold it by the metal mounting brackets to avoid potential damage

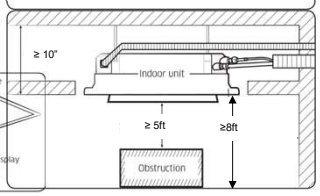
- Layout the cassette position and mounting hangars using the included template
- Space the cassette ≥ 5ft. from any wall or smoke detector
- Space multiple cassettes ≥ 10ft. apart
- Maintain ½" to ¾" gap around the unit from the ceiling
- Level the unit and secure the hangar nuts
- For solid lid ceilings provide access panel(s) for future servicing (18"x18")











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79

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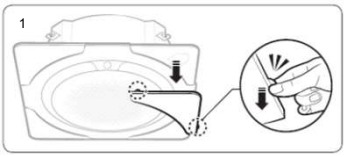
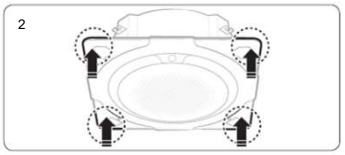
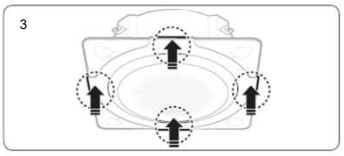
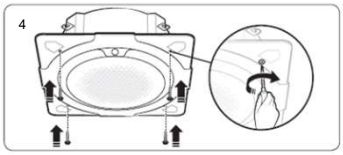
360 Cassette Installation Guidelines

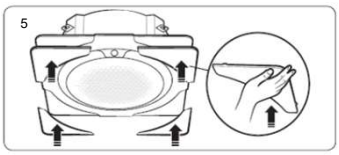






- Remo… pressing the 2 …
- Lift th… s each corne… ce
- Press… to place one a… place
- Insert… el front and adjus… ween the panel…
- Snap … el to the fascia… tallation





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80

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360 Cassette Installation Guidelines

360 “Open Type” Fascia Panel Installation

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81

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Mini 4-Way Cassette

Wind-Free™ 4-Way Cassette & Mini 4-Way Cassette

- Wind Free cooling – Extremely quiet operation
- Larger discharge blades for wider cooling area as compared to the standard 4-Way Cassette models
- Smart Comfort Operation – Maintains optimal occupied space control by sensing temperature and humidity
- Optional Motion Detection Sensor control for both models
- Facia panels can be installed in any orientation
- Condensate lift pump with check valve standard

82

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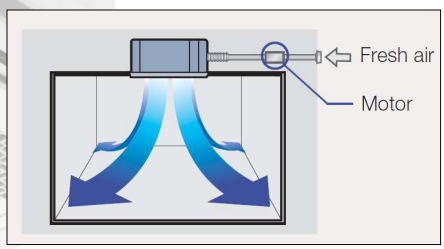
DVM S 4-Way Cassette

4-Way Cassette – Standard & Wind-Free

- Fresh air can be introduced through the fresh air knock out to supply up to 4% of the rated CFM of fresh air (4”)
- This is a 0” static unit so a booster fan must be used to force fresh air into the cassette unit
- Fresh air must be pre-filtered before entering the cassette
- Optional MIM-B14 External Contact Controller can be used as an interlock for the fresh air booster fan



83

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Standard Mini 4-Way Cassette

Features

- Models: AM005&07KNNDCH AM009,012,018,020ENNDCH
- Built-in condensate lift pump – 29” lift with check valve
- Individual powered swing louvers with independent control from 32° to 65°
- Fresh air can be introduced through the fresh air knock-out to supply fresh air
- This is a 0.0” static unit so a booster fan must be used to force fresh air into the cassette unit
- Optional MIM-B14 External Contact Controller can be used as an interlock for the fresh air booster fan
  - Fresh air must be pre-filtered before entering the cassette
- Facia Panel sold separately (PC4SUSMEN)
- Optional motion sensor available (MCR-SMA) with configurable operation
- Electro-static washable pleated air filter included

26 ½” x 26 ½”
Weight: 32lbs

84

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Wind-Free Mini 4-Way Cassette

Features

- Models: AM005,07,09,012,018,020NNNDCH
- Smart Cooling Mode
- Integral humidity sensor
- Built-in condensate lift pump – 29” lift with check valve
- Individual powered swing louvers with independent control from 32° to 65°
- Optional remote controllers: MWR-WE13N wired & AR-EH03E wireless
- Facia Panel sold separately: PC4SUFMAN (PC4SUSMEN standard facia panel)
  - Wind Free panel has an integral humidity sensor to control the discharge louvers to open when space conditions could cause condensation formation on the panel
- Optional motion sensor available (MCR-SMD) with configurable operation
- Electro-static washable pleated air filter included

85

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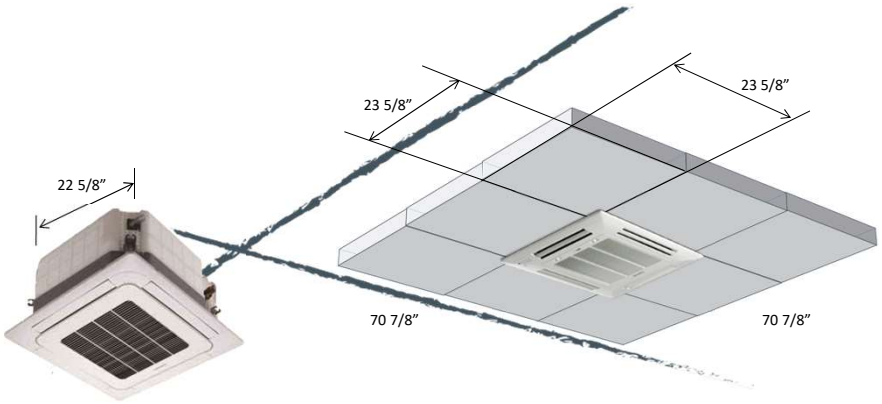
4-Way Mini Cassette

Without any unnecessary alterations to the ceiling grid, the Mini 4-Way Cassette body can be installed within one ceiling tile (24X24) in a T-bar suspended ceiling



86

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4-Way Cassette

Features

- Models: AM0 09,12,18,24,30,36,48 FN4DCH
- Built-in IR receiver for easy addition of wireless controller
- 4 X auto-swing louvers with independent control from 32° to 65°
- 3 Fan speed settings
- Built-in condensate lift pump – 29” lift with check valve
- Facia Panel sold separately (PC4NUSKFN)
- Electrostatic washable pleated air filter included

37 3/8” x 37 3/8”
Weight: 46 – 54lbs. (Incl. facia panel)

87

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Wind-Free 4-Way Cassette

Features

- Models: AM0 09,12,18,24,30,36,48 NN4DCH
- Smart cooling mode
- Integral humidity sensor
- Built-in IR receiver for easy addition of wireless controller
- Optional remote controllers: MWR-WE13N wired & AR-EH03E wireless
- 4 X auto-swing louvers with independent control from 32° to 65°
- 3 Fan speed settings
- Built-in condensate lift pump – 29” lift with check valve
- Facia Panel sold separately: PC4NUFMAN (PC4NUSKFN Standard)
- Electrostatic washable pleated air filter included

88

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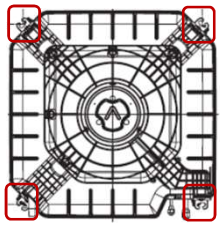
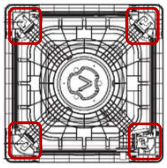
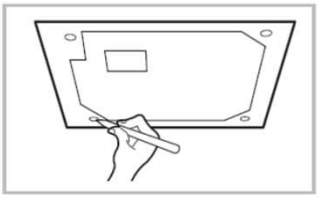
4-Way & Mini 4-Way Cassette

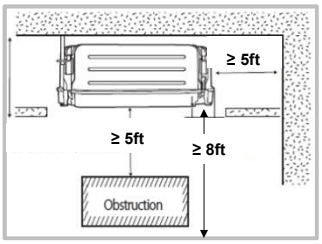
Caution: When handling the cassette unit hold it by the metal mounting brackets to avoid potential damage

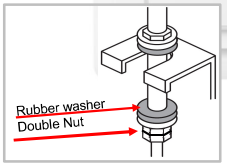


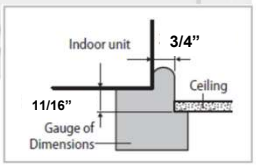


- Layout the cassette position and mounting hanger bolts using the included template
- Space the cassette ≥ 5ft. from any wall or smoke detector
- Use the provided spacing gauge to insure the correct unit to ceiling spacing
- Use the provided rubber vibration absorbers to reduce vibration and install double nuts on the threaded rod below the mounting bracket









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89

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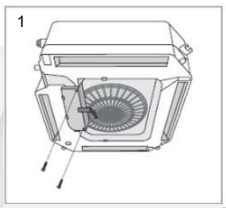
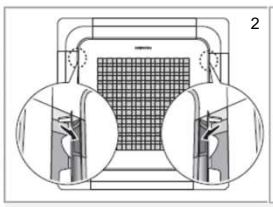
4-Way & Mini 4-Way Cassette

Fascia Panel Installation

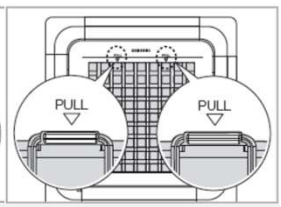
- Fascia panel installation is similar for the 4-Way & Mini 4-Way cassettes
- Remove the electrical box cover
- Open the fascia return grille
- Align the fascia panel in the correct position and lift up to the unit and use the 2 hooks to clip the panel to the body
  - Wind-Free facia panel can be installed in any position
- Remove the 4 corner trim pieces and install the 4 mounting bolts loosely
- Adjust each bolt to secure the fascia panel to the ceiling without any gaps



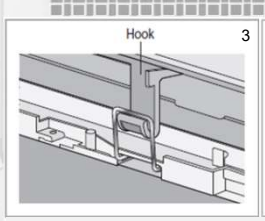
4-Way & Mini 4-Way



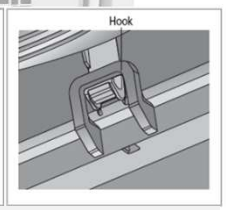
4-Way



Mini 4-Way



4-Way



Mini 4-Way

4-Way & Mini 4-Way

4

90

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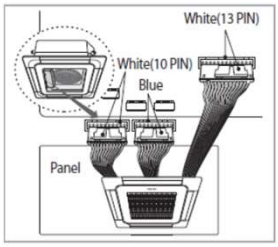
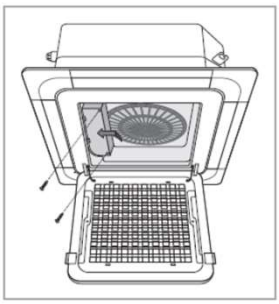
4-Way & Mini 4-Way Cassette

Fascia Panel Installation

- **Connect the 3 wire harnesses from the fascia panel into the unit electrical box**
  - Tip: Verify the number of pins on the 2 white terminals to insure the correct connection
- **Close the electrical box cover and tighten the screws**
- **Close the fascia return grille**





2

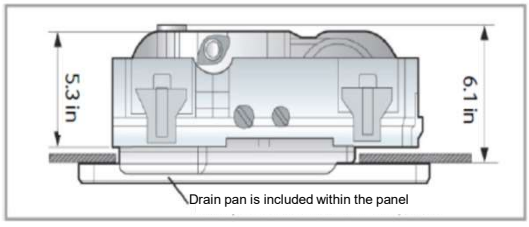
91

SAMSUNG

1-Way Cassette

Features

- Models: AM0 07, 09,12 FN1DCH
- 3 speed fan operation with crossflow blower
- Built-in IR receiver for easy addition of wireless controller
- Single powered louver
- Built-in condensate lift pump – 29” lift with check valve
- Optional facia panels: “Classic” & “Slider”
- Facia panel has status LEDs
- Electro-static washable pleated air filters




Classic


Slider

92

SAMSUNG

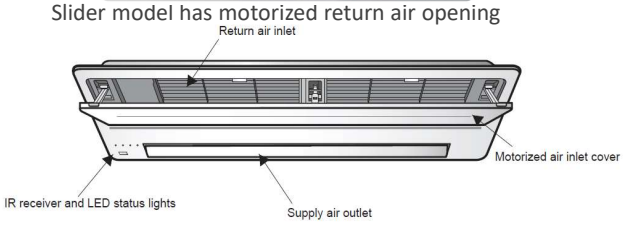
1-Way Cassette

Optional Facia Panels

Classic: PC1NU**S**MAN
(S = standard)

Slider: PC1NU**P**MAN
(P = premium)

Slider model has motorized return air opening

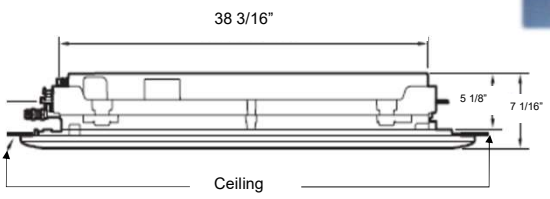


93

SAMSUNG

Wind Free 1-Way Cassette

- Wind Free cooling – Extremely quiet operation with discharge micro holes design
- Smart cooling mode
- Integral humidity sensor
- Single powered discharge louver
- Minimal above ceiling space required
- Condensate lift pump with check valve standard

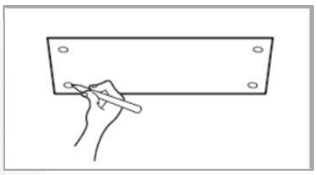


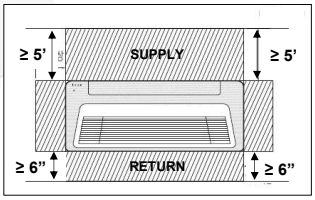
94

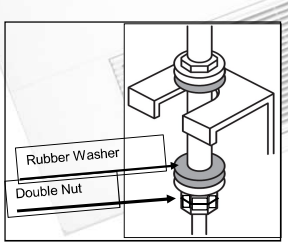
SAMSUNG

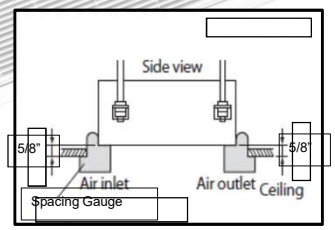
1-Way Cassette – Standard Installation

- Layout the cassette position and mounting hanger bolts using the included template
- Space the supply air side of the cassette ≥ 5ft. from any side wall or smoke detector
- Minimum clearance on the return air side: ≥ 6 inches
- Use the included spacing gauge to provide the correct unit to ceiling spacing
- Use the provided rubber vibration absorbers to reduce vibration and install double nuts on the threaded rod below the mounting bracket









95

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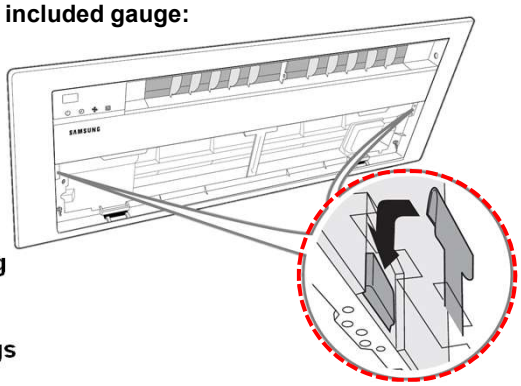
1-Way Cassette – Standard Installation

Fascia Panel Installation

After adjusting the unit height in relation to the ceiling with the included gauge:

- Orient the panel in the proper direction before lifting it into place
- Lift the panel up to the unit guiding the panel hooks into the openings on the unit chassis
- Guide the louver and display wires into the PCB box, making sure not to pinch or damage them
- Push upwards until the hooks catch in the provided openings



96

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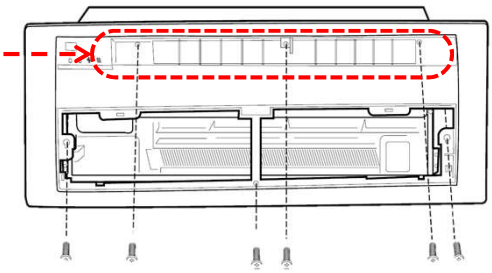
1-Way Cassette – Standard Installation

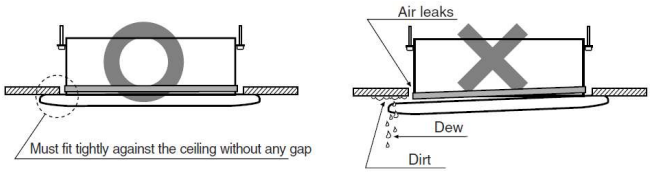
Fascia Panel Installation

With the provided hardware, screw the panel to the unit

- Take care not to overtighten to prevent damaging the panel
- Insure that the panel is snug to the ceiling to prevent air leakage and potential condensation issues

Install the 3 white screw covers by the supply air outlet louver





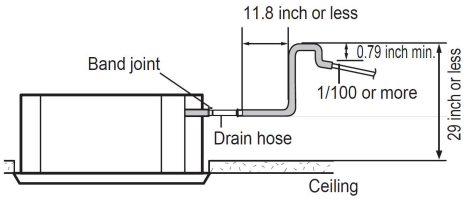
97

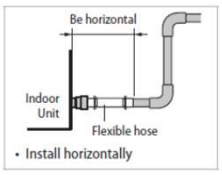
SAMSUNG

Ceiling Cassette Condensate Drain Piping

360, 4-Way, Mini 4-Way,1-Way Cassettes

- Current ceiling cassette models have condensate lift pumps rated for a maximum 29” of lift from the bottom of the unit
- Inside diameter of the condensate drain outlet & riser piping must not exceed ¾” ID
- The flexible hose should be installed level or bent downward
- All condensate lines must be insulated throughout the building
- The horizontal main condensate lines must be properly supported with hangars every 40” to 60”.
- **Condensate piping installation must be in accordance with state and local codes**





98

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Multiple Cassette Condensate Drain Piping

- The individual drain lines must tap into the main drain line from the top only
- Failure to install the drain piping correctly may cause check valve and pump failure, including water leaks
- Condensate drain piping within the building must be properly insulated

99

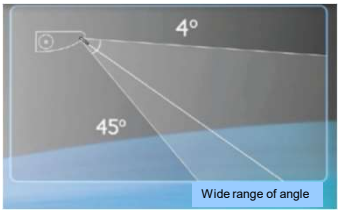
SAMSUNG

Big Ceiling Indoor Units

Features

- Models: AM0 36 & 48JNCDCH
- Long air throw – up to 1,286 cfm
- Motorized adjustable louver from 4° to 45°
- Gravity condensate drain
- IR receiver and LED status indicator lights
- Piping and electrical connections on RH side rear of unit
- Provision for fresh air
- Electro-static washable pleated air filter included

53 1/8" x 26 9/16"
Weight: 74lbs. & 94lbs.



100

SAMSUNG

Under Ceiling Indoor Units

Features

- Models: AM0 18 & 24FNCDCH
- Flexible installation under ceiling or low side wall
- Powered air discharge louver
- IR receiver built-in
- Power button and status LED lights on front of unit
- Electro-static washable pleated air filter
- Requires the optional external EEV kit
- Gravity condensate drain

101

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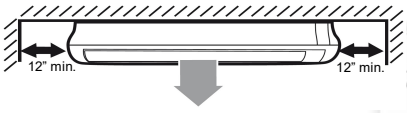
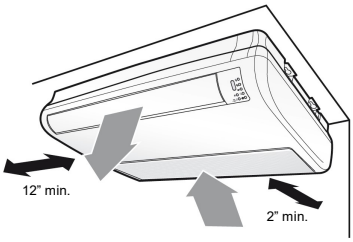
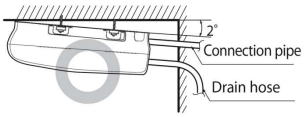
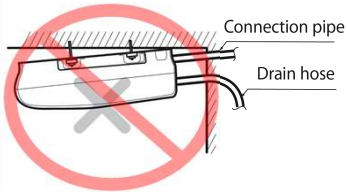
Big Ceiling & Under Ceiling Installation





- **Ceiling Type & Big Ceiling Type units are installed horizontally under the ceiling**
- **Maintain at least 12" clearance on the sides and 2" on rear**





102

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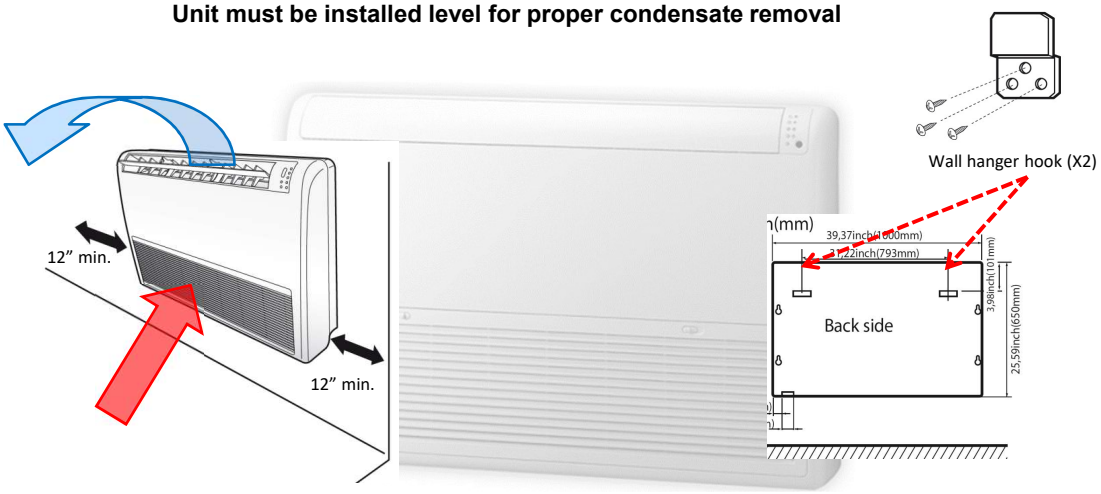
Under Ceiling Unit - Low Wall Installation

When hanging the unit on the wall, use the supplied hanging brackets

Unit must be installed level for proper condensate removal



103

SAMSUNG

Neo Forte Wallmount

Features

- Models: AM0 07, 09, 12, 18, 24HNQDCH
- Integrated IR receiver
- Single powered louver
- Gravity condensate drain
- Optional condensate pump kit
- Electro-static washable air filter included with supplemental replaceable anti-allergy and deodorizing filters

104

SAMSUNG

Whisper Wallmount

Features

- Models: AM0 05,07,09,12,15,18,24,28MNVDCH
- Triangular design with wider air inlet opening for better air flow
- Efficient 27 watt blower motor

105

SAMSUNG

MAX Wallmount

Features

- Model: AM032MNQDCH
- Integrated IR receiver
- Single powered louver
- Gravity condensate drain
- Optional condensate pump kit
- Electro-static washable pleated air filter

106

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General Wallmount Installation Guidelines

Wallmount Placement

- Recommended minimum clearances from air outlet to nearest obstruction:
  - 7,500 Btu/h – 10 ft.
  - 9,000-12,000 Btu/h – 15 ft.
  - 18,000 – 32,000 Btu/h – 25 ft.
- Stated clearances are required to eliminated potential for discharge air recirculation (bounce-back) which can cause short cycling, loss of temperature control and reduced equipment service life

107

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General Wallmount Installation Guidelines

Wallmount Placement

- While operating, the powered louver will direct air up and down
- In these examples the wallmount unit will create a bounce-back effect as the air is directed at the top of the shelving unit or the floor, causing sporadic operation and poor temperature control
- **Wallmount unit must be installed at least 5ft above the floor**

108

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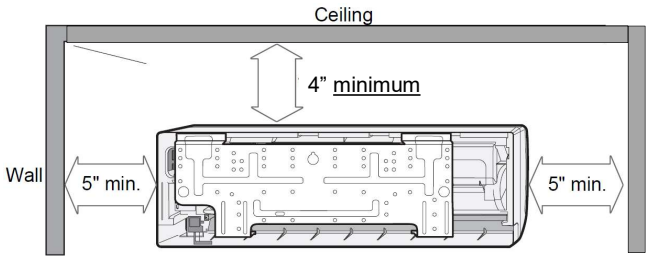
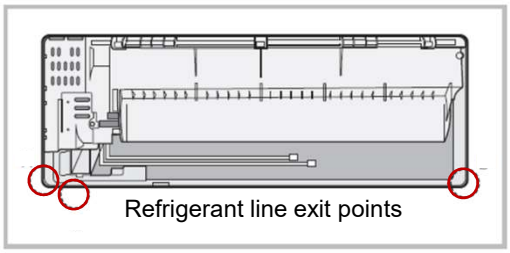
General Wallmount Installation Guidelines

Wallmount Placement

- Install the included wall bracket to the wall – must be level
- Insure that the unit is secured to framing or appropriate anchors are used to support the weight of the unit
- Refrigerant line exit points: R/L Surface – R/L Rear – R Surface Bottom
  - When exiting through an outside wall, the piping must run at a slight slant downward



(Rear view of unit)



109

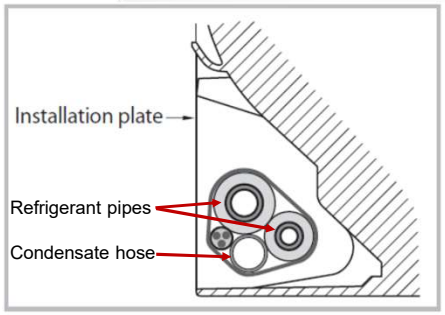
SAMSUNG

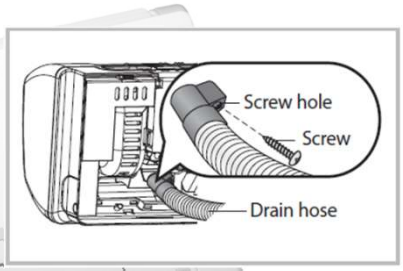
General Wallmount Installation Guidelines

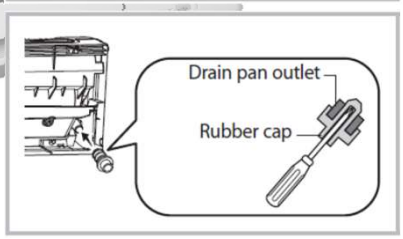
General Wallmount Condensate Installation

To change the direction of the drain hose

- Remove the clamp screw then twist to the left and pull the hose off the pan fitting
- Remove the drain plug from the opposite side and insert it using a screwdriver and turning it to the right until it seats
- Slip the drain hose on the drain outlet and re-secure with the clamp screw





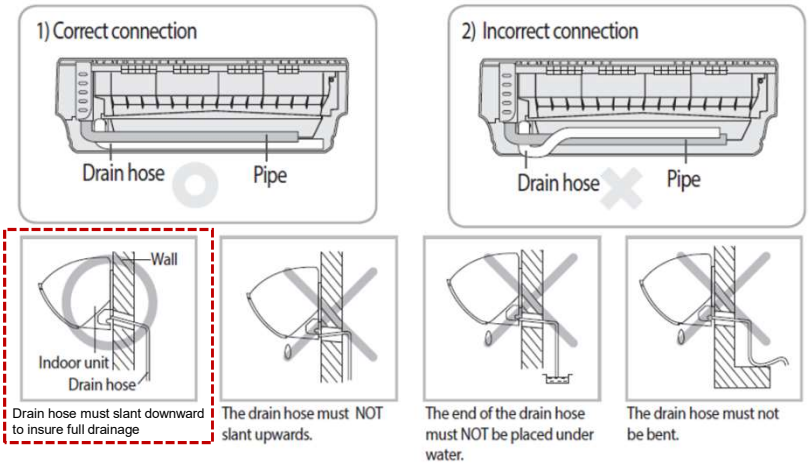


110

SAMSUNG

General Wallmount Installation Guidelines

Condensate tubing must be properly installed to insure complete condensate removal



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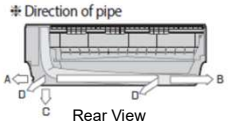
General Wallmount Installation Guidelines

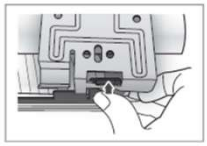
Basic Whisper Wallmount Installation

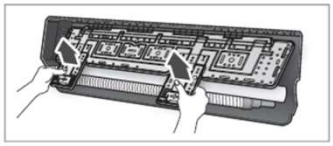
Installing the Hangar Plate

- Determine the exit point for the refrigerant tubing, condensate drain pipe and wiring
  - When exiting through a wall from the rear of the unit drill a hole 2.5” to 3”
  - The hole should have a downward slant through the wall
- Remove the Hangar plate from the unit
  - Remove the 2 screws securing thee plate to the unit
  - Press up on the bottom hooks to release the plate
- Install the plate to the wall securing the plate to the wall studs

- Right (A)
- Left (B)
- Underside_right (C)
- Rear_right or left (D)







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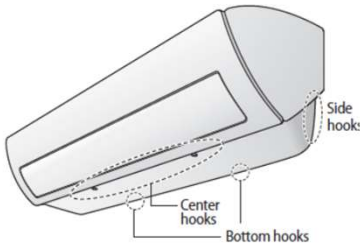
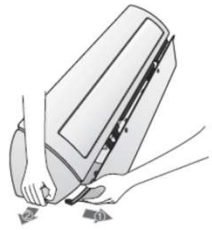
General Wallmount Installation Guidelines

Basic Whisper Wallmount Installation

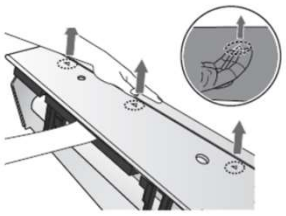
Removing the front cover

- The bottom cover panel must be removed by releasing the side hooks then the center and bottom hooks
- Refer to the Whisper Installation Manual for complete unit installation procedures





* Caution (fragile)
  - Gently press the both side of the cover panel inwards (①) and release the hooks on both sides(②).



* Caution (fragile)
  - Use both hands
  - Release each hook by pushing it up at an angle.

113

SAMSUNG

General Wallmount Installation Guidelines

Wallmount Condensate Pump Installation

- Wallmount units require an optional condensate pump when the standard gravity drain will not fit the condensate removal requirements: # ASP-MO-UNIV 110-250
- The pump is provided as a kit
  - Field supplied discharge tubing (1/4") may be required
- The pump is powered from the line voltage supplied by the indoor unit

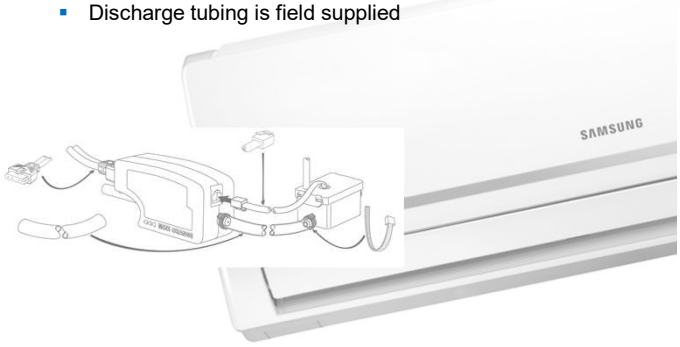
114

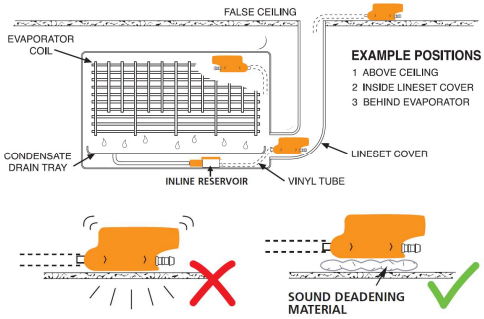
SAMSUNG

General Wallmount Installation Guidelines

Wallmount Condensate Pump Installation

- The pump float switch must be installed inside the wallmount unit, the pump motor must be installed above the condensate pan water level
  - It is recommended that whenever possible, install the pump motor above the ceiling using sound deadening material, or within the lineset cover
  - Discharge tubing is field supplied





115

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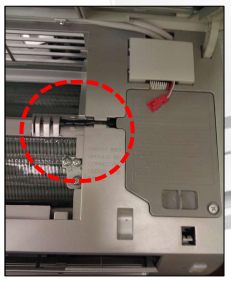
General Wallmount Installation Guidelines

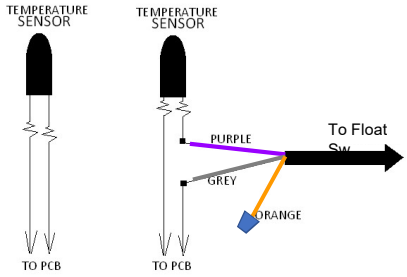
Wallmount Condensate Pump Installation

There are 2 methods for disabling the wallmount unit using the float switch on the optional pump kit

Method 1: Temperature sensor connection

- Use the N.C. (Purple) and common (Grey) wires from the pump float switch to interrupt the temperature sensor signal (return air sensor on the front of the indoor coil)
  - Do not use this method to interrupt the line voltage to the IDU, as this will cause the entire system to shut down when the float switch opens





116

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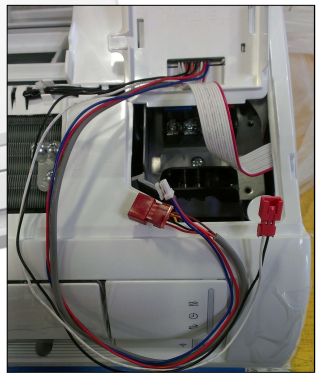
General Wallmount Installation Guidelines

Wallmount Condensate Pump Installation

Method 2 – External Contact Signal

- Locate the external contact control wires (White & Black) inside the wallmount unit behind the PCB cover



- Cut the red external contact wire connector off
- Connect the pump's N.C. wires (Purple & Grey) to the wallmount's external contact wires (White & Black)
- Ensure that the wiring is properly connected and insulated and secure within the unit chassis
- Enable the external contact control for "Off Only" by changing the option code segment from "14" to a "2"

- When the float switch contact closure is "open" the wall unit will stop without an error code
- When the contact switch returns to the closed status the wall unit will enter "standby"
- The unit must be manually turned on at remote controller or schedule event from a MWR-WE13N, WiFi or BMS system

117

SAMSUNG

Floor Standing Unit

Features

- Models: AM0 06,09,12,18, 24JNF(G)DCH
- Gravity condensate drain
- Electro-static washable pleated air filter

Front View

AM0**JN**F**DCH/AA
"Concealed" Floor Standing

AM0**JN**G**DCH/AA
"Cased" Floor Standing

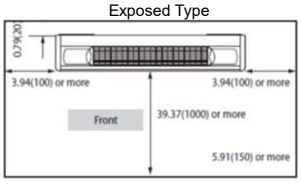
118

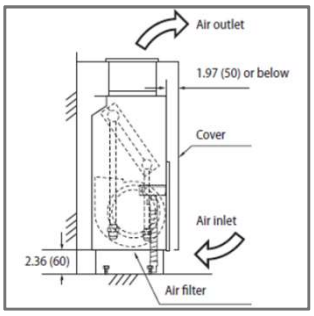
SAMSUNG

Floor Standing Unit Installation

- Samsung floor standing units for under window or wall installations
- Concealed type can be installed on the floor or sidewall
- Units must be properly supported and level for condensate draining

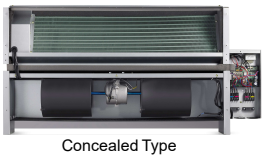
Exposed Type





Concealed Type

Exposed Type



Concealed Type

119

SAMSUNG

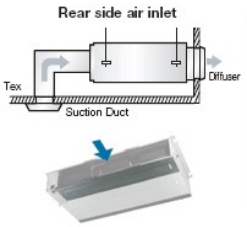
Slim Duct Unit

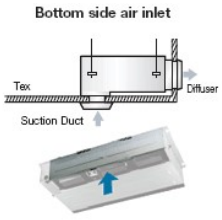
Features

- Models: AM0 07,09,12,18,24,30,36,48FNLDCH h
- Static pressure range: 0" to ".24" WC depending on model
- Gravity condensate drain as standard
- Low sound levels ; 31dB to 39dB depending on model and fan speed
- Washable air filter screen
- Rear or bottom return air
- Optional condensate lift pump assembly – max. 29" lift (No check valve)

Weight: 54 – 92lbs

(Actual product appearance may vary)
Incl. float switch, hardware & flexible outlet hose





120

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Slim Duct Unit

Slim Duct Lift Pump Installation

- Slim duct units are manufactured with gravity condensate drain
- Optional MDP-E075SEE3D factory pump kit is installed in the unit cabinet

- Remove the unit control side covers
- Align the position and install the pump unit
- Connect the pump harness (yellow)
- Connect the float switch harness (white)
- Install the control covers and connect the flexible tubing to the condensate drain piping

- Program the pump option code during system commissioning

121

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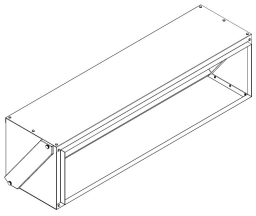
Duct S Unit

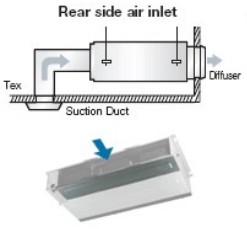
Features

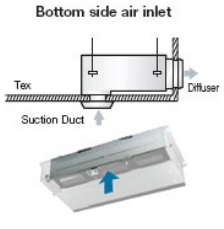
- Models: AM0 07,09,12,15,18,24,27,30,36,48MNHDCH
- Static pressure range: 0" to ".79" WC depending on model
- "Auto Air Volume" (ESP) function setting
- Field selectable ESP settings
- User "Smart Tuning" function
- Low sound levels ; 22dB to 41dB depending on model and fan speed
- Washable air filter screen
- Rear or bottom return air
- Factory installed condensate lift pump assembly – max. 29" lift (No check valve)
- Optional air filter box

Weight: 56 – 101lbs

(Actual product appearance may vary)
Includes integrated float switch







122

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Duct S Installation

Duct S unit provides service access from top – side – bottom

- Top cover (Front & Rear) – Heat Exchanger, Blowers & Motor
- Bottom cover (Front & Rear) – Drain pan – Heat Exchanger – Blowers & Motor
- Side cover – Control box – Refrigerant piping – Sensor – Drain pump

2

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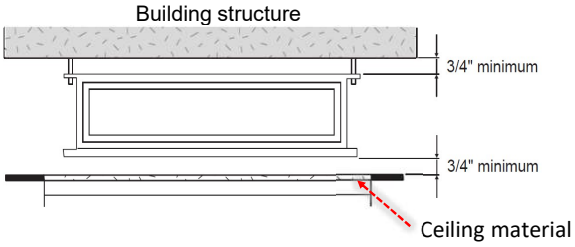
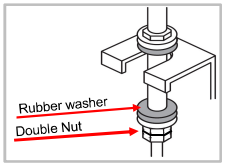
Slim Duct & Duct S Basic Installation

- Maintain a minimum of ¾" clearance above the ducted unit to building structure and ¾" clearance below the ducted unit to ceiling to prevent noise transmission
- If the ducted unit is installed in an area above the ceiling with humidity conditions over 80% RH, the unit must be insulated with minimum 3/8" insulation
- Install the unit level and double nut the threaded rod under each mounting bracket
- Unit must have ample access for maintenance and future service





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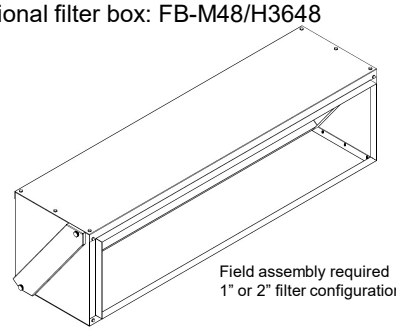
HSP Duct

High Static Pressure Unit Features

- Model: AM054JNHDCH
- Front discharge air and rear return air
- Discharge air temperature sensor
- Fan output can be field configured for various external static pressure settings
- Built-in condensate lift pump – max. 29” lift (No check valve)
  - Includes float switch
- Optional filter box: FB-M48/H3648



Field assembly required
1” or 2” filter configurations

125

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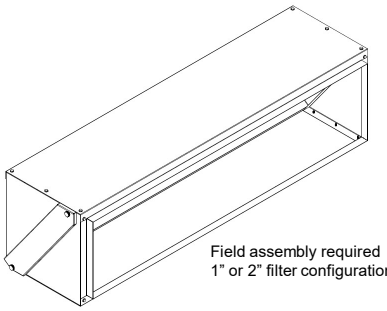
HSP Duct

High Static Pressure Unit Features

- Models: AM0 76 & 96FNHDCH MBtu/h
- Front discharge air and rear return air
- Discharge air temperature sensor – Can be configured for target discharge temperature control
- Fan output can be field configured for various external static pressure settings
- Gravity condensate drain
- Optional filter box: FB-H7696



Field assembly required
1” or 2” filter configurations

76 & 96 MBtu Models

126

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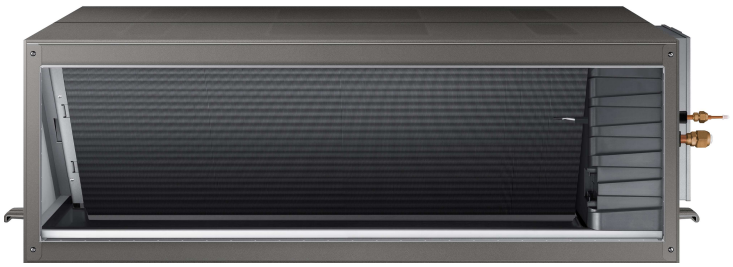
Outside Air Processor

Features:

- Models: AM072 & 96JNESDCH
- Discharge air temperature sensor with target control capability
- Applied to DVMS Heat Pump systems only
  - OAP capacity must be within 50-100% of ODU nominal capacity
- Can be installed with system DVMS indoor units
  - OAP capacity must be ≤30% of the ODU nominal capacity
  - DVMS system must not exceed 100% connection ratio
- Damper output control for field supplied external inlet damper
- Gravity condensate drain
- Optional filter box: FB-OAP



127

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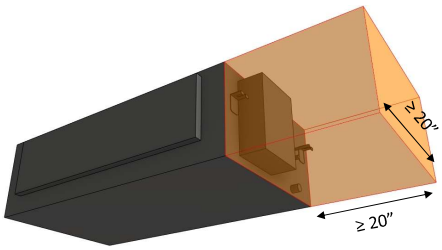
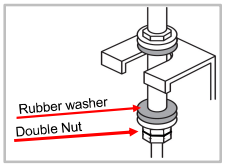
Ducted Unit Installation Guidelines

HSP & OAP Ducted Units

- Ducted units must be installed level and double nut the threaded rod under each mounting bracket
- When installed above solid ceiling with no attic access, service access panel must be provided: 20” x 20” minimum (control side)
  - Service access for blower assembly is from bottom of unit
  - Service access required: width & depth of unit plus 4 inches (WxD)
- If the installed location is subject to humidity above 80%RH, the cabinet must be insulated with ≥3/8” insulation to eliminate the potential of sweating

HSP Ducted





Outside Air Processor

128

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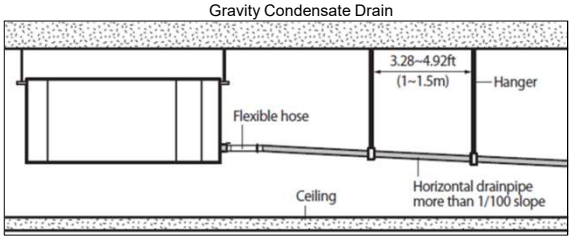
Ducted Unit Installation Guidelines

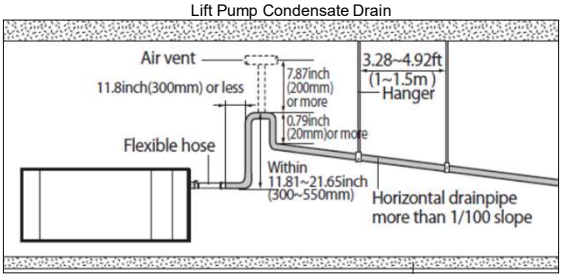
Ducted Unit Condensate Removal

- Gravity drain – requires drain line to downward slope 1/100 or more
- Lift Pump - Inside diameter of the condensate drain outlet & riser piping must not exceed ¾" ID
- The flexible hose should be installed level or bent slightly downward
- The horizontal main condensate lines must be properly supported with hangars every 40" to 60".
- **Condensate piping installation must be in accordance with state and local codes**

Gravity Condensate Drain



Lift Pump Condensate Drain



129

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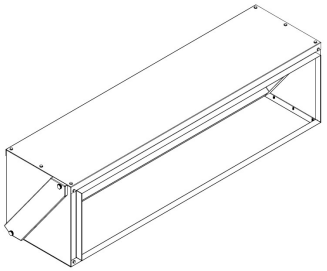
Ducted Unit Installation Guidelines

Ducted Unit Air Filters

- Slim Duct, Duct S & HSP 54 MBtu Ducted units all have a washable electrostatic filter panel
- Duct S, HSP 76&96MBtu & OAP Ducted units are available with optional filter boxes
  - Filter boxes are assembled in the field and can be configured for 1" or 2" air filters



Slim Duct

130

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Ducted Unit Installation Guidelines

Ducted Unit Fresh Air Guidelines

- Up to 10% of outside fresh air can be introduced into the return side of the ducted units (Slim Duct, Duct S & HSP ducted)
- When using outside fresh air into the return it is recommended to not use the ducted unit's return air sensor
  - If using the MWR-WE13N or MWR-SH10N wired remote controllers, the built-in sensor can be configured to be used in place of the unit RA sensor
  - If using a remote controller without a built-in sensor, the MWR-TA External Room Sensor can be used

131

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Ducted Unit Installation Guidelines

Ducted Unit Secondary Float Switch Installation

- Certain installations using concealed ducted units may require a secondary condensate drain pan with a field supplied emergency float switch

132

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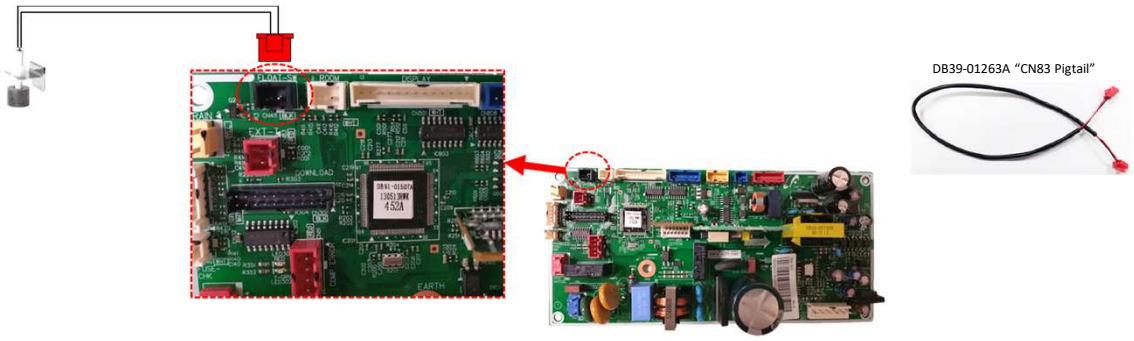
Ducted Unit Installation Guidelines

Ducted Unit Secondary Float Switch Installation

Ducted unit with gravity condensate drain application

- Connect the secondary drain pan emergency float switch to the “FLOAT-SW” connector on the indoor unit PCB (CN411)
  - Factory pigtail wire harness with connector is required (DB39-01263A)
- At commissioning enable the condensate pump setting
- When the float switch contact is open, error E153 is generated (“Detect indoor float switch”)



133

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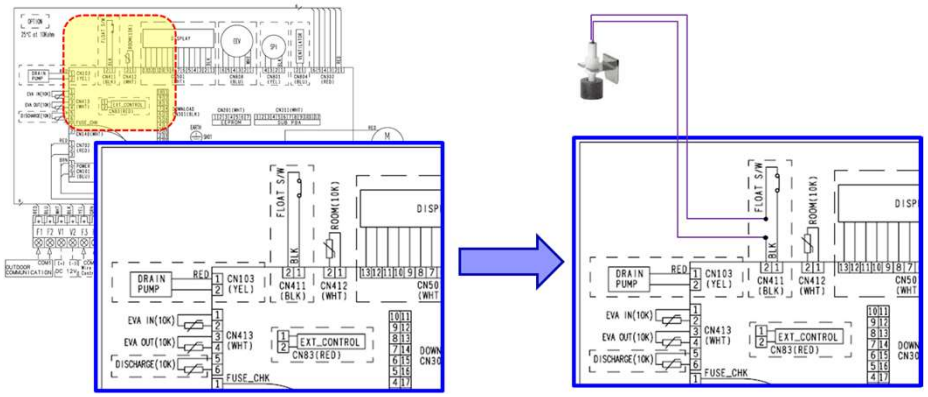
Ducted Unit Installation Guidelines

Ducted Unit Secondary Float Switch Installation

Ducted unit with factory condensate lift pump application

- Connect the secondary float switch leads in series with the built-in float switch connection CN411 black connector



134

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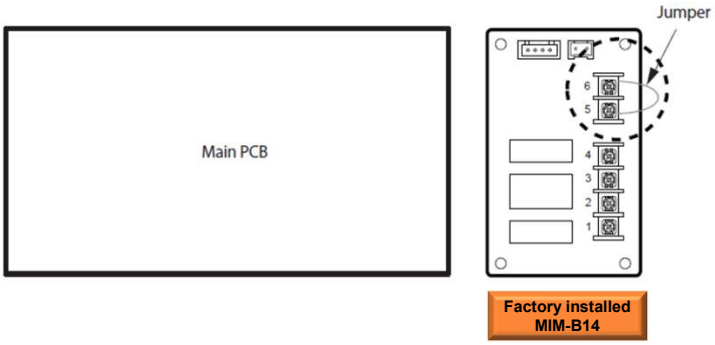
Ducted Unit Secondary Float Switch Installaation

AM0**JNZDCH Multi-Position AHU

The Multi-Position AHU's have an MIM-B14 External Contact control module factory installed which can be used for a float switch safety.

- Terminals 5 & 6 on the MIM-B14 module have a jumper as standard, which can be connected to a condensate pump float switch or a secondary drain pan float switch.
- With the float switch open, the air handler will turn off and the wired remote controller disabled.
  - CAUTION: the switch contacts are for 0 volt application only.



135

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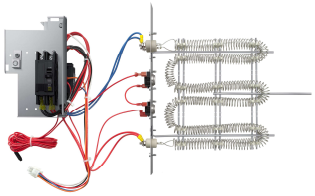
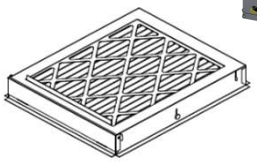
Multi Position AHU

Features

- Models: AM0 12,18, 24,30,36,48,54,60,72JNZDCH
- Made in the USA
- Upflow, Horizontal Right, Horizontal Left installations
- Gravity condensate drain
- Constant torque ECM blower motor w/5 speed taps
- Standard ESP: .4" WC
  - Max. ESP: 1.0" WC (systems over 18,000Btu/h)
- Optional electric strip heat kits and filter bases



3,5,10,15 & 20Kw



1" & 2" filter sizes
Hinged filter access door

136

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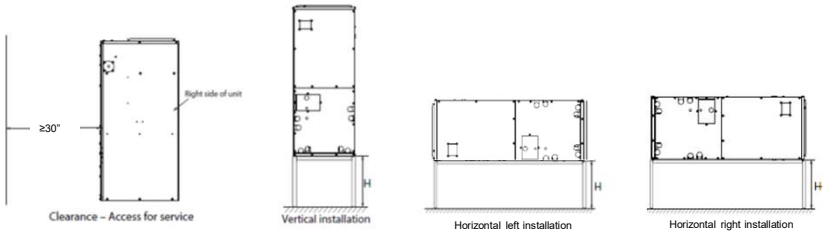
Multi Position AHU Installation

- Unit is shipped from the factory for upflow and horizontal left installation
  - For vertical installations an optional filter base is available
  - Unit can be field configured for horizontal right installation
- AHU cabinet is designed for 0” clearances (sides & back) for units without electric heat
  - For units with electric heat kit installed, 1” clearance is required for supply plenum and supply duct



Condensate requires trap

NOTE: For installations in non-conditioned airspace (attic or garage) unit must be insulated (1”) and, or full dimension auxiliary drain pan. Refer to state and local codes for specific requirement

137

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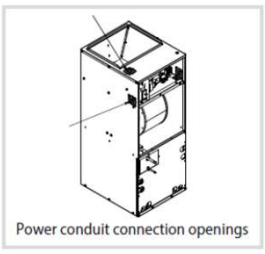
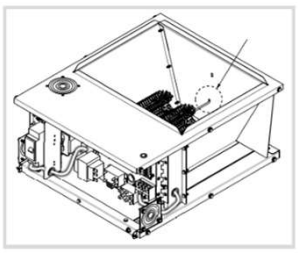
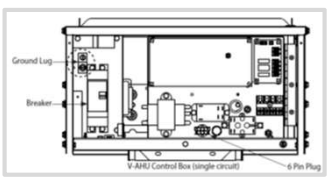
Multi Position AHU Installation

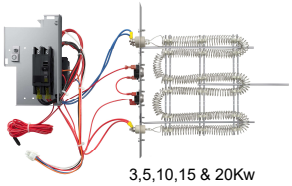
Electric Heat Kit

- Heater kit includes circuit breaker and power pigtail leads
  - Install the heater assembly into the rectangular opening in the discharge air
  - Install the provided circuit breaker(s) in the front left of the control box
  - Install the heater power wires through the knockout on the cabinet
  - Connect the 6 pin male plug to the 6 pin female plug on the bottom of the control door
  - Place the heater kit adhesive backed wiring diagram to the blower housing
  - Install the heater unit temperature sensor to the lower section of the cabinet on the bottom of the gas pipe









3,5,10,15 & 20Kw

138

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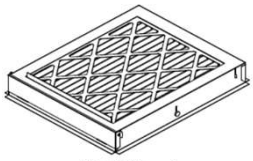
Multi Position AHU Installation

Multi-position AHU Air Filters

- Samsung “VBF” filter bases are offered for vertical installations
- Filter bases include a 1” disposable air filter
- Filter base can be field configured for a 2” air filter
- Hinged filter access door
- All galvanized steel
- Assembled in the field



1” & 2” filter sizes
Hinged filter access door

139

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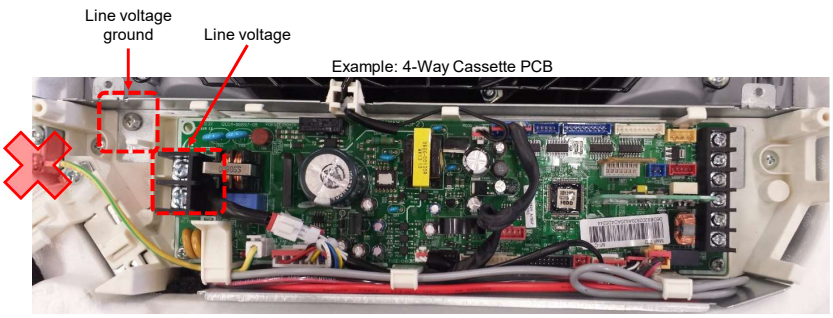
All Indoor Unit Power Wiring

- Connect the 208-230vac 1Ø wires to the 1(L) and 2(N) terminals in each indoor unit
- Ensure the unit is properly grounded for proper operation and safety
  - Do not connect the main ground at the same point where the indoor unit PCB is grounded



140

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Heat Recovery – Mode Change Units

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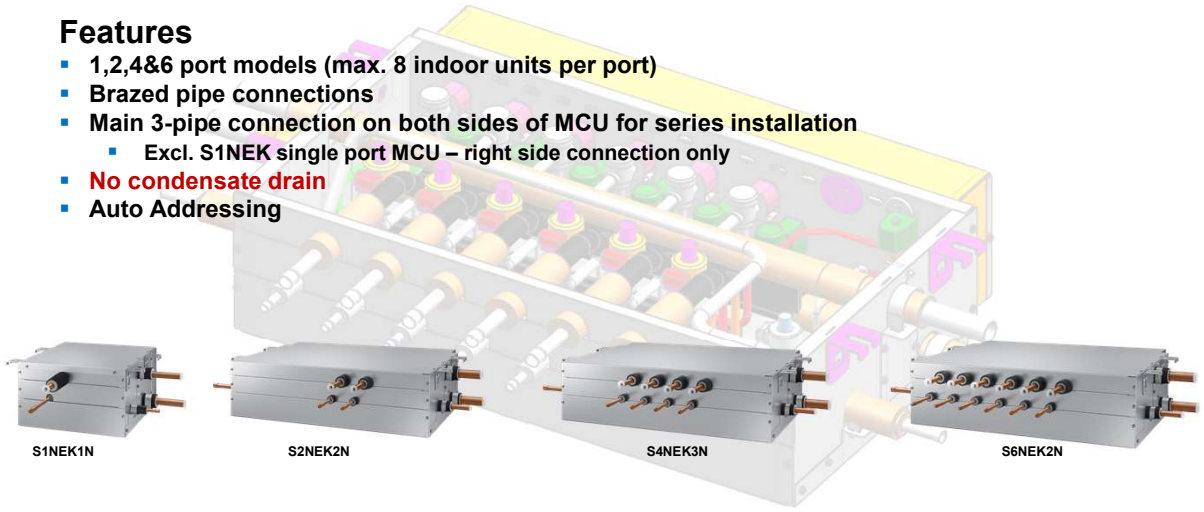
Mode Change Units

Features

- 1,2,4&6 port models (max. 8 indoor units per port)
- Brazed pipe connections
- Main 3-pipe connection on both sides of MCU for series installation
  - Excl. S1NEK single port MCU – right side connection only
- No condensate drain
- Auto Addressing



142

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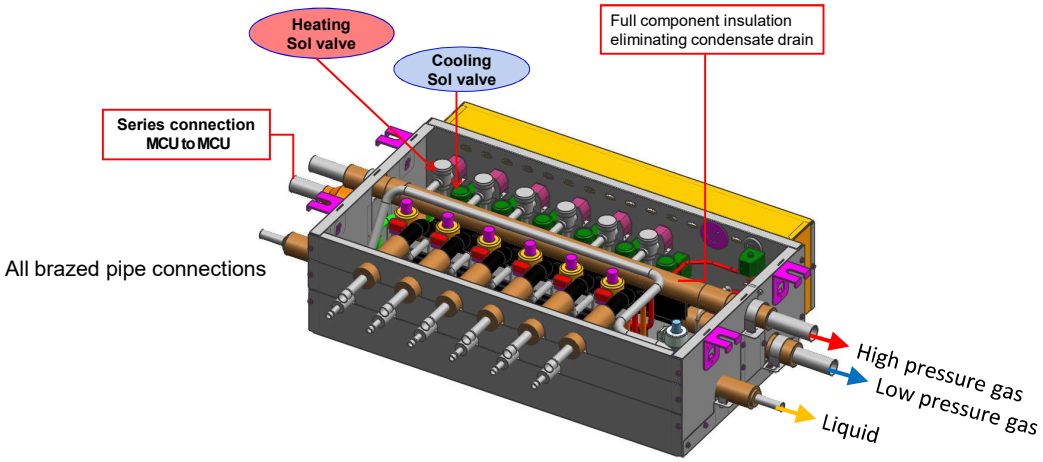
Mode Change Units



143

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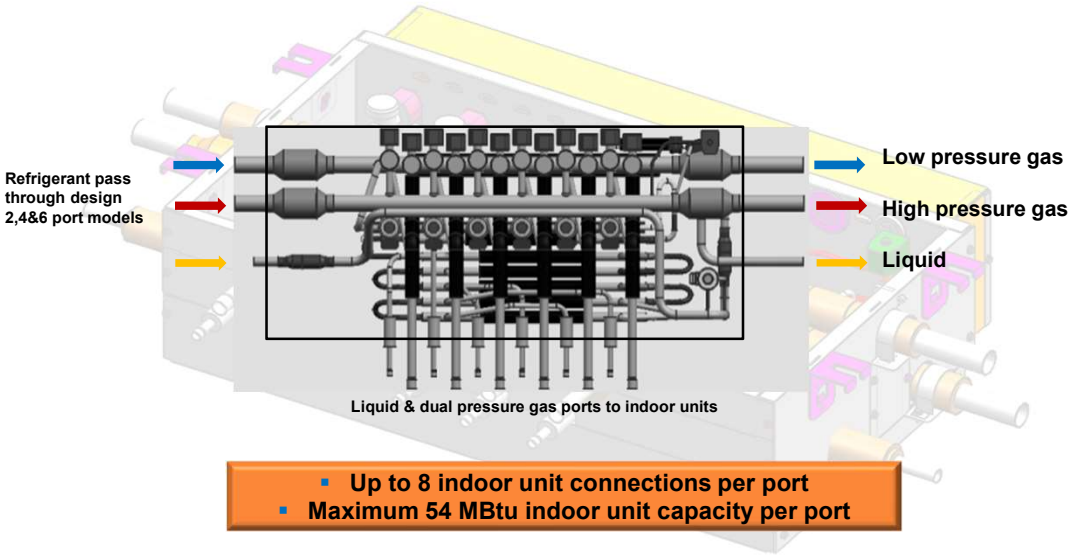
Mode Change Units



- Up to 8 indoor unit connections per port
- Maximum 54 MBtu indoor unit capacity per port

144

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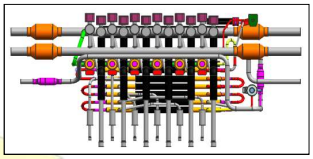
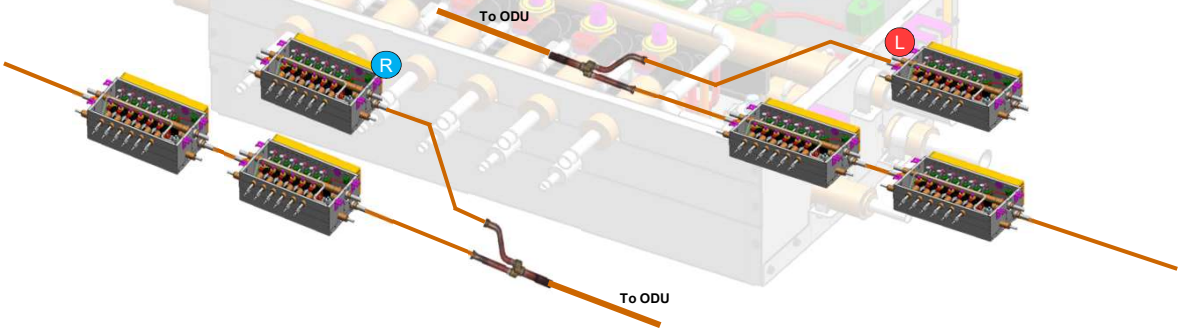
Mode Change Units

- The 2,4&6 port MCU's have main pipe straight-through design to accommodate multiple MCU connections without requiring Y-joints
  - Allows single main pipe connection on either right or left side of the MCU
- Maximum capacity in MCU series connections: 108 MBtu - 2 port / 216 MBtu - 4&6 port
  - Single port: Connected indoor units: Max. 54 MBtu
  - Total MBtu capacity is not increased in series connections only the number of IDU ports





145

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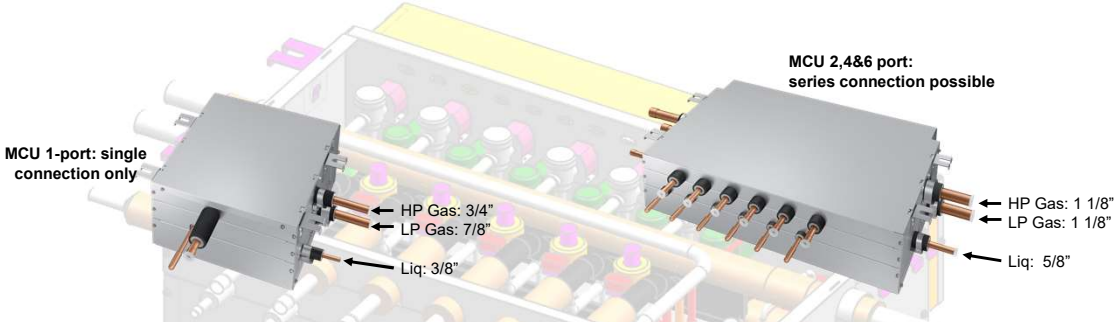
Mode Change Units

MCU Specifications



Model	WxHxD	Max. IDU per 1 Port	Max. IDU	Max. Capacity per 1 Port	Max. Total Capacity	Pipe Size
S1NEK	13.3x7.8x16	8	8	54 MBtu	54 MBtu	Hi: 3/4 Lo: 7/8 Liq: 3/8
S2NEK	28.6x7.8x18.5	8	16	54 MBtu	108 MBtu	Hi: 1 1/8 Lo: 1 1/8 Liq: 5/8
S4NEK	28.6x7.8x18.5	8	32	54 MBtu	216 MBtu	Hi: 1 1/8 Lo: 1 1/8 Liq: 5/8
S6NEK	28.6x7.8x18.5	8	32	54 MBtu	216 MBtu	Hi: 1 1/8 Lo: 1 1/8 Liq: 5/8

146

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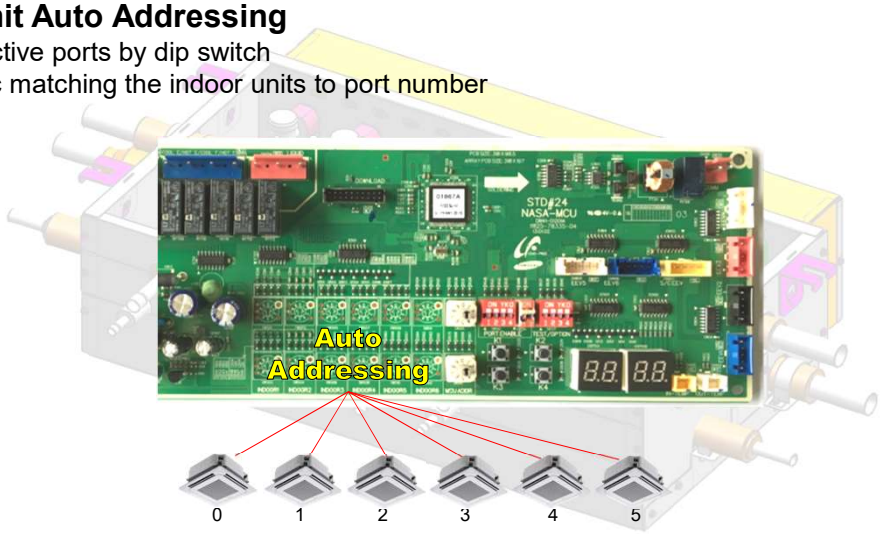
MCU Features

Indoor Unit Auto Addressing

- Set the active ports by dip switch
- Automatic matching the indoor units to port number



147

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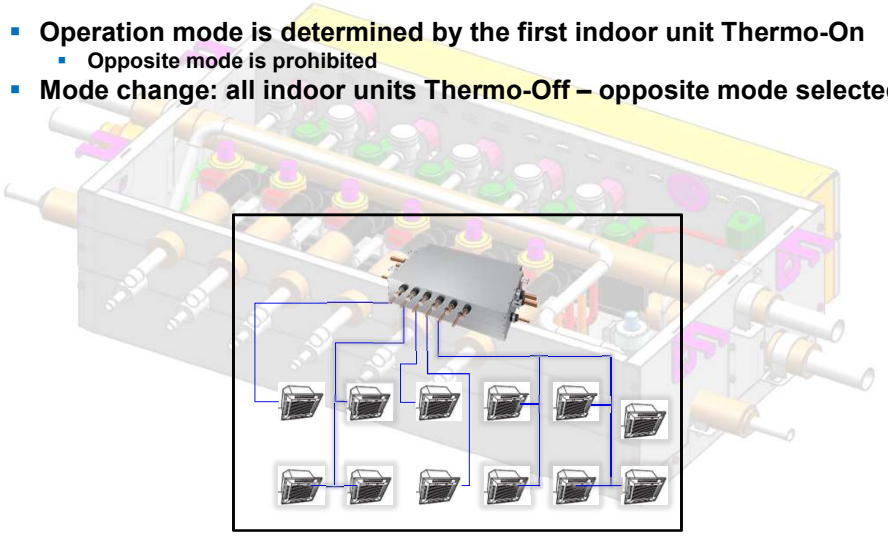
MCU Operation

MCU connected to multiple indoor units

- **Operation mode is determined by the first indoor unit Thermo-On**
  - **Opposite mode is prohibited**
- **Mode change: all indoor units Thermo-Off – opposite mode selected**



148

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MCU Basic Installation

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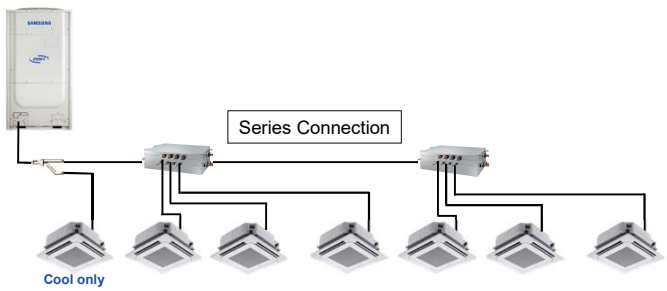
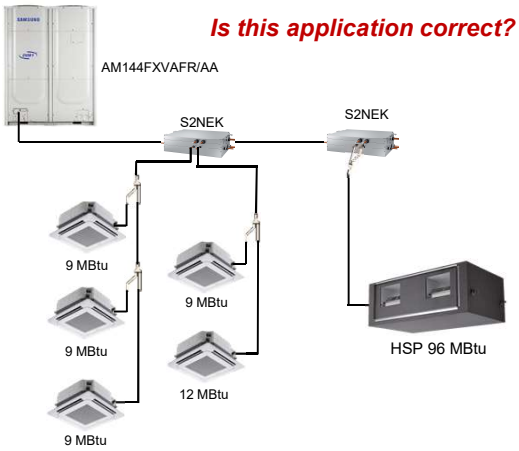
MCU Basic Installation Installation

Y-joint Branch-off fittings and MCU piping layout

- IDU connected directly to the main liquid & low pressure piping for cool-only operation
  - Requires installation option setting
  - Total cooling-only IDU capacity: ≤ 50%
- Max. 54 MBtu IDU connection per MCU port
- Any unused ports must be capped



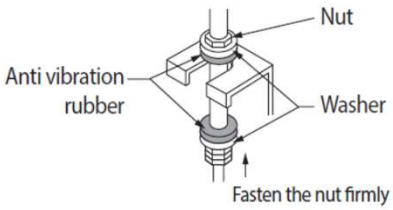
Is this application correct?

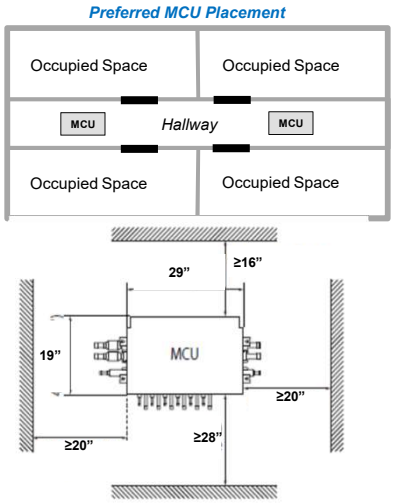


150

MCU Basic Installation Guidelines

- MCU must be installed securely upright and level
- Recommendation:
  - Avoid installation over occupied areas
- Support refrigerant piping properly:
  - Refer to state and local code requirements
- MCU must have proper service access space
- Condensate drain not needed





151

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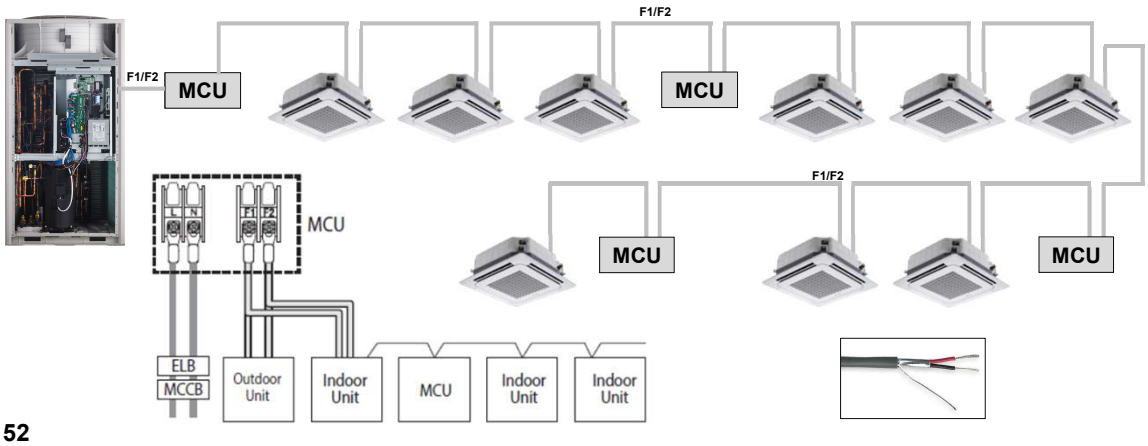
MCU F1 F2 Communications Circuit

- MCU's communicate on the same F1 F2 buss as the indoor units
- Each MCU is connected to the F1 F2 buss via daisy chain connections
- Control wire shield is grounded in the Outdoor Unit only



152

System Refrigerant Flow Control Devices

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Electronic Expansion Valve Kit

- Under Ceiling indoor units have no internal EEV and require the extra cost EEV kit
- Under Ceiling EEV Kits available in 1, 2 & 3 zone models
- EEV Kits are powered (208/230vac) and controlled from indoor unit PCB

MEV-E32SA
Single zone

MXD-E32K200A
2 zones
Heat Pump systems only

MXD-E32K300A
3 zones
Heat Pump systems only

154

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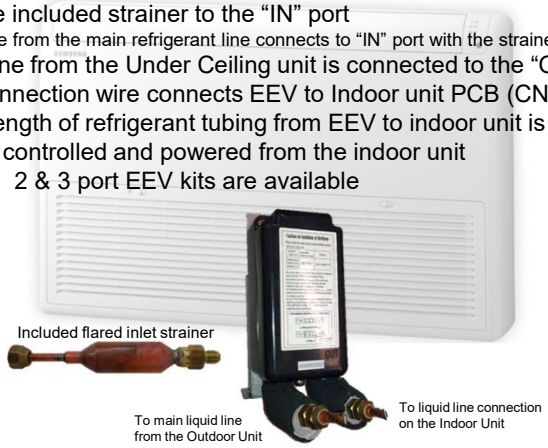
Electronic Expansion Valve Kit

Under Ceiling Unit EEV Kit Installation

- MEV-A**SA EEV Kit: allows connection of one Under Ceiling unit
- Install the EEV unit vertically in an accessible location for future servicing
- Connect the included strainer to the “IN” port
  - Liquid line from the main refrigerant line connects to “IN” port with the strainer
- The liquid line from the Under Ceiling unit is connected to the “OUT” port
- Included connection wire connects EEV to Indoor unit PCB (CN808)
- Maximum length of refrigerant tubing from EEV to indoor unit is 6 1/2 ft.
- The EEV is controlled and powered from the indoor unit
- MXD-E **K: 2 & 3 port EEV kits are available



155

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Electronic Expansion Valve Kit

Single Port EEV Kit

- **MEV-E24/32SA EEV kit** – Powered and controlled by the “Under Ceiling” main PCB
  - EEV unit includes the required wire harness to connect the EEV to the IDU control PCB on CN808

156

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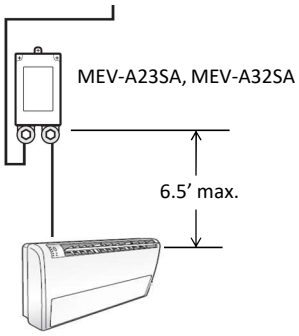
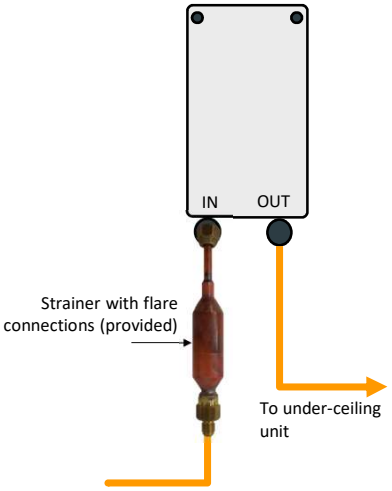
Electronic Expansion Valve Kit

Single Port EEV Kit

- Maximum pipe length between single unit and EEV: ≤6.5'
- Must install vertical as pictured on this page
- Install included strainer on the inlet side
- Never extend the interconnect wire





157

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Digital Control Wiring

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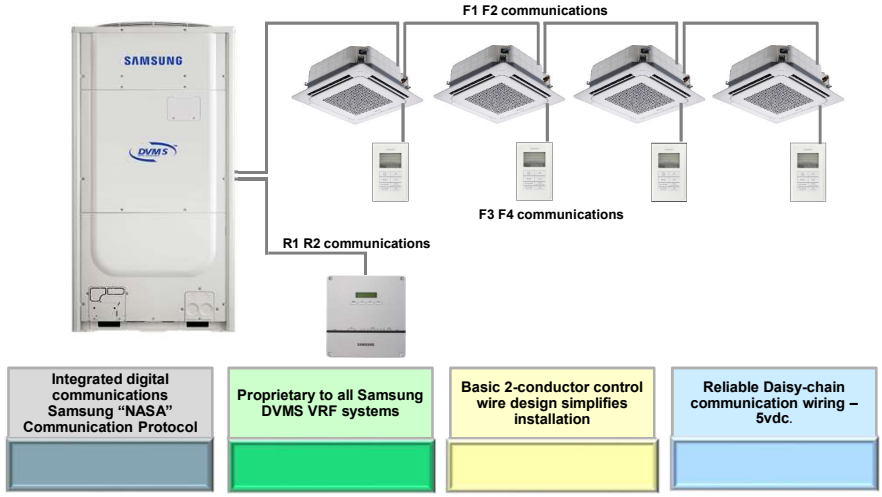
DVM S Control Wiring

Samsung NASA Digital Communications



Integrated digital communications Samsung "NASA" Communication Protocol	Proprietary to all Samsung DVMS VRF systems	Basic 2-conductor control wire design simplifies installation	Reliable Daisy-chain communication wiring – 5vdc.

159

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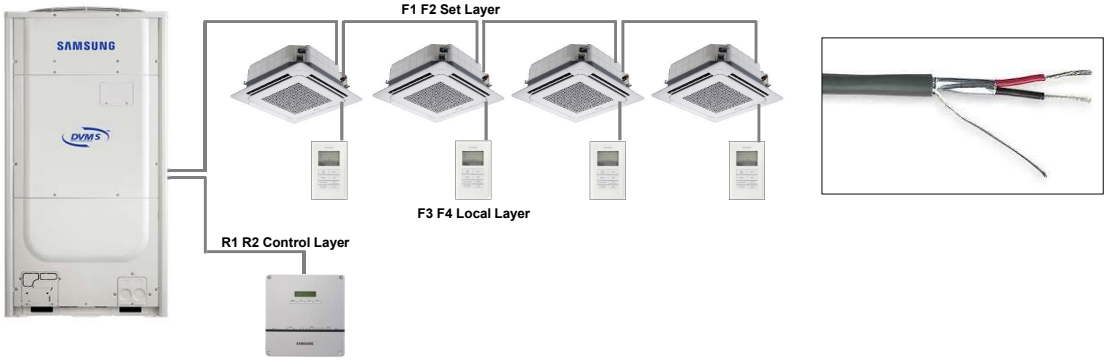
DVM S NASA Digital Control Layers

- **F1 F2 – Set Layer:** ODU to IDU's (incl. EEV Kit) daisy chain connections
- **F3 F4 – Local Layer:** Wired Remote Controller to indoor unit
- **R1 R2 – Control Layer:** Outdoor Unit to DMS Centralized Control
- **Control Wire:** 16/2 AWG stranded with shield
- Never use solid core thermostat wire for digital communications



160

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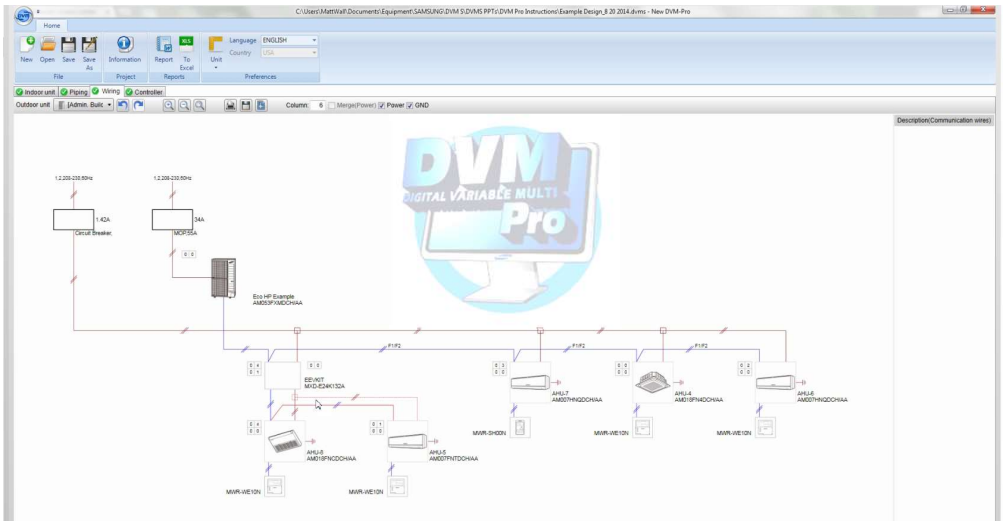
DVM Pro- Design Software Tool

DVM Pro – Power & Control Wiring Diagram



161

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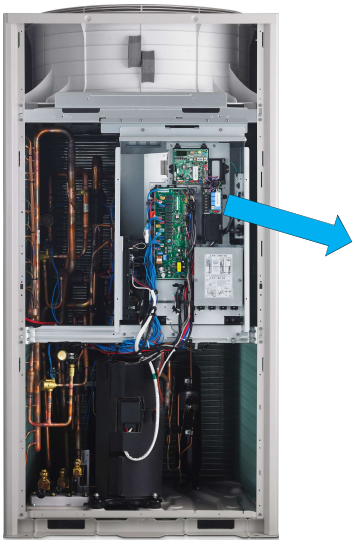
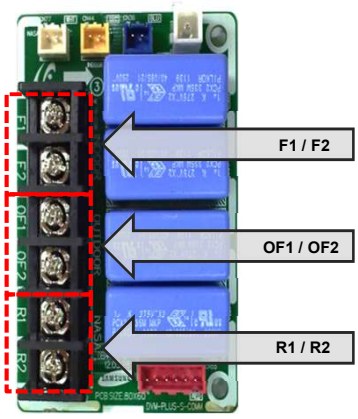
Outdoor Unit Control Connections





Communication from the outdoor unit (Main) daisy chain to all indoor units, MCU's, and EEV Kits on the system

Communication from the Main outdoor unit in a modular system daisy chain to Sub 1 and Sub 2 ODU modules (3 ph. only)

Communication from outdoor unit (Main) to centralized controls: DMS2.5 Gateways, Touch Controller, etc.

162

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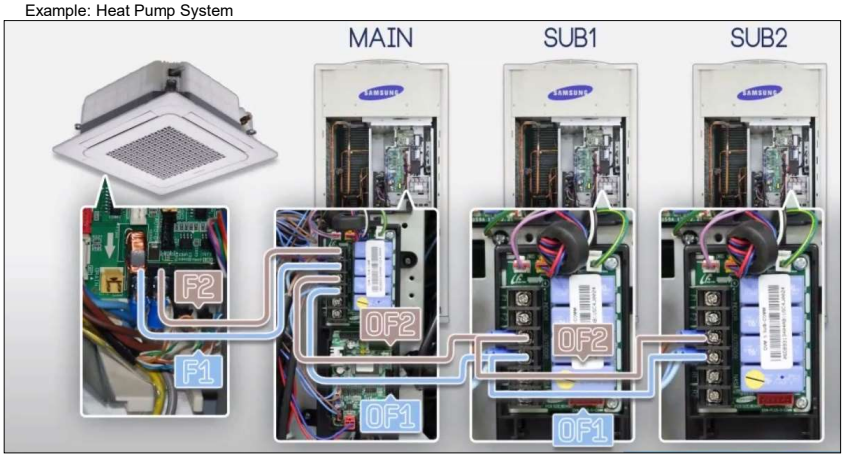
Control Wire Connections

Modular Outdoor Units

- Modular systems incorporate 2 or 3 outdoor units connected together providing system capacities over 16 ton
- Digital communications between the outdoor units is established through a 2-wire daisy chain connection on **OF1/OF2** to each outdoor unit in the system
- Modular systems must be configured during commissioning Main-Sub1-Sub2
- Most commissioning option settings are made on the **"Main"** outdoor unit
- Refer to the ODU Installation Manual for all commissioning and option settings

Example: Heat Pump System



163

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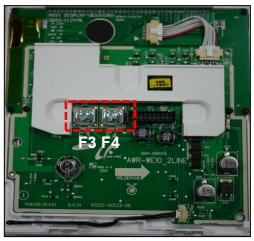
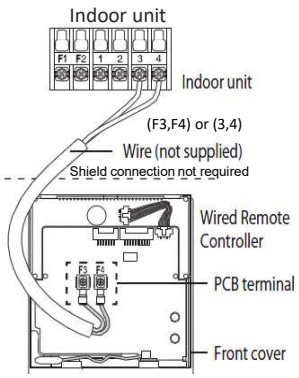
Control Wire Connections

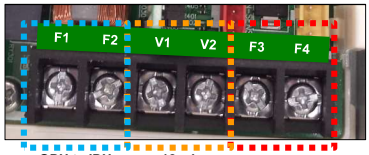
Indoor Unit to Wired Remote Controller

Example: MWR-WE13N controller

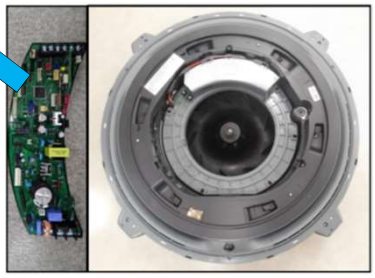




Indoor unit PCB Terminal Block



Example: 360 Cassette



164

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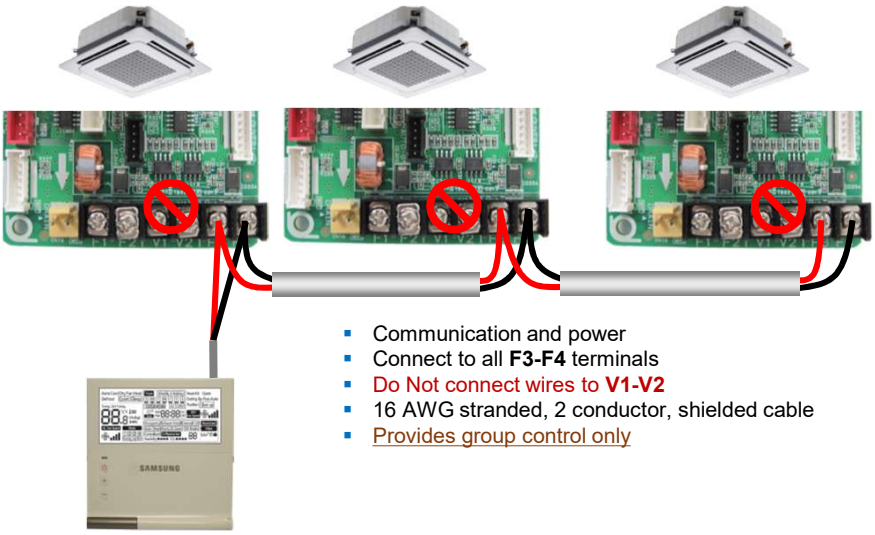
Control Wire Connections

Wired Remote Controller to Multiple Indoor Units

Single wired remote controller can be connected to multiple indoor units up to 16

Maximum wire distance from remote controller to farthest indoor unit: 328ft.



- Communication and power
- Connect to all **F3-F4** terminals
- Do Not connect wires to **V1-V2**
- 16 AWG stranded, 2 conductor, shielded cable
- Provides group control only

165

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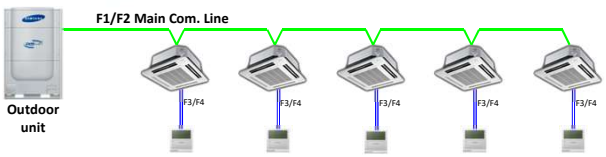
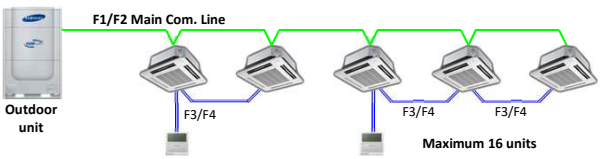
Control Wire Connections

Wired Remote Controller to Indoor Unit Examples

Individual control	One indoor unit for one remote controller
	
Control	- The connected indoor unit
Display	- Operation display of the connected indoor unit

Group control	Multiple indoor units for one remote controller
	
Control	- All the connected indoor units
Display	- One of the connected indoor units on a random basis

166

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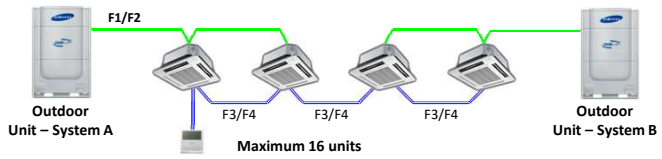
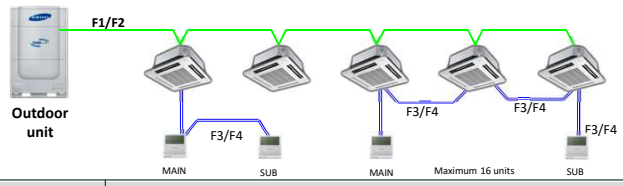
Control Wire Connections

Wired Remote Controller to Indoor Unit Examples

Group control	Multiple indoor units on more than one system
	
Control	- All the connected indoor units
Display	- One of the connected indoor units on a random basis

Group control	One or multiple indoor units for two remote controllers
	
Control	- All the connected indoor units
Display	- One of the connected indoor units on a random basis

167

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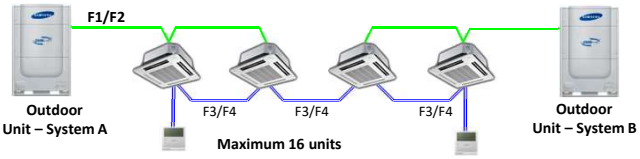
Control Wire Connections

Wired Remote Controller to Indoor Unit Examples

Group control	Multiple indoor units on different outdoor units, for two remote controllers
	
Control	- All the connected indoor units
Display	- One of the connected indoor units on a random basis

168

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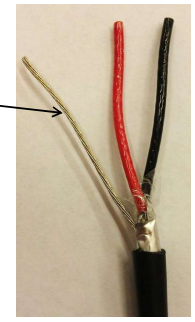
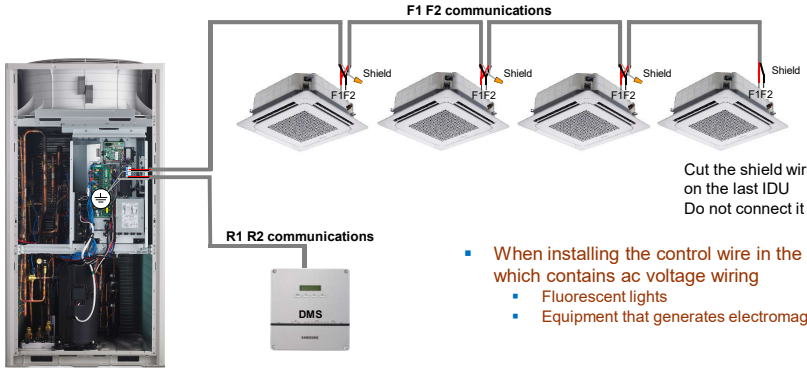
Control Wire Connections – Grounding

- Bond the bare shield wire throughout the system (daisy chain)
  - Do not connect the F1 F2 shield wire to any indoor unit
- Ground the bare shield wire in the outdoor unit to a separate point other than the main line voltage electrical service ground





- When installing the control wire in the building, avoid contact with conduit which contains ac voltage wiring
  - Fluorescent lights
  - Equipment that generates electromagnetic interference (maintain 10 ft. clearance)

169

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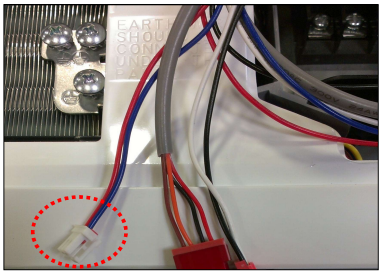
Wired Remote Controller Connections

Neo Forte & MAX Wallmount

- NOTE: The Neo Forte & MAX wallmount units do not have screw terminals for wired controller connection (F3/F4) 2-wire harnesses are used instead
- **Neo Forte Wallmount:** From the control box, locate the white harness connector with red and blue wires.
  - Cut the white connector off and connect the red wire to F3 and blue wire to F4 on the remote controller
- **MAX Wallmount:** From the control box locate the tagged 2-wire harness (F3 F4).
  - Clip the end and extend the wires to the remote controller terminals

Neo Forte Wallmount



MAX Wallmount

170

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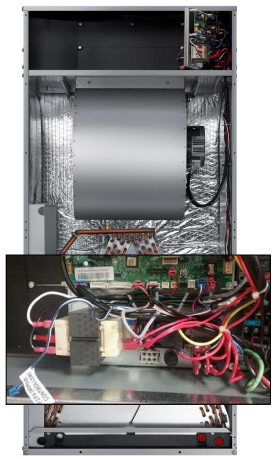
Wired Remote Controller Connections

Multi-position AHU

- NOTE: The Multi-position AHU's do not have screw terminals for wired controller connection (F3/F4), 2-wire harnesses are used instead
- Locate the blue harness connector with white and blue tagged wires in the control box
  - Cut the blue connector off and connect the white and blue wires to F3 and F4 on the remote controller



171

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Wired Remote Controller Installation

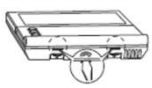
MWR-WE13N

- Remote controller should be installed level and secure
- Do not install controller in direct sunlight
- Do not install controller on an outside wall
- Do not install controller near any heat source
- Do not install controller within supply air direction or drafts

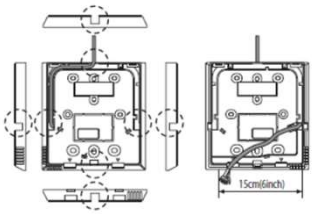
1. Push the two hooks at the bottom of your Wired Remote Controller at the same time, and then pull up the front cover to separate it from the rear cover.

※ Push the two hooks at the same time.

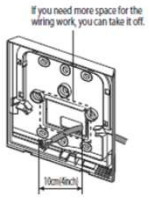
NOTE • Insert a flat head screwdriver into the square groove in the upper area of the hook to disassemble it easily.



2. Arrange the power cable and the communication cable so that they fit in the housing along the edges of the rear cover.



<When the cable is not concealed>



<When the cable is concealed>

172

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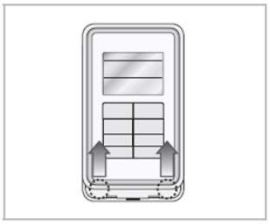
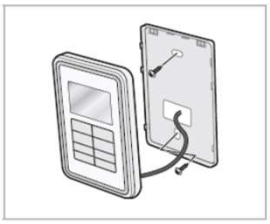
Wired Remote Controller Installation

MWR-SH00N

- Remove the front cover by sliding it upwards and away from the backing plate

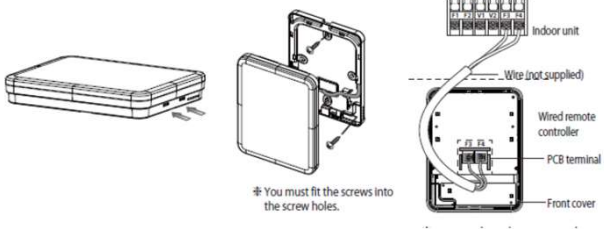


- Properly secure the backing plate to the wall
- Route the control wire through the backing plate
- Connect the wires to the F3 F4 terminals
- Slide front cover onto the backing plate



MWR-SH10N

- Separate the front cover from backing plate using a flat blade screw driver
- Attach backing plate to wall with 4 screws
- Connect the control wiring to F3 F4
- Snap front cover to backing plate



173

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Basic Controls Overview

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Wireless Remote Controllers

MR-EH03U

- On/Off operation mode, fan speed, airflow, temperature setting, filter reminder
- Independent louver control
- Zone selecting control (Max. 4 zones)
- Airflow direction
- Wind-Free cooling & Long Reach functions
- Single event timer
- Select C or F temperature display
- Address and option setting

AR-KH00U 360 Cassette

- Air flow direction control
- Simple schedule control (On timer / Off timer)
- On/Off operation mode, fan speed, airflow, temperature setting
- Zone selecting control (Max. 4 zones)
- Buzzer sound mute
- Address and option setting

175

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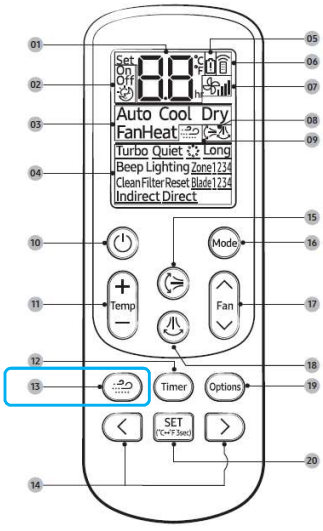
MR-EH03U Wireless Remote Controller



No.	Function
01	Set temperature / Timer indicator
02	Timer option indicator
03	Operation mode indicator
04	Options indicator
05	Low battery indicator
06	Signal transmission indicator
07	Fan speed indicator
08	Air flow direction indicator
09	Wind-Free indicator
10	Power button
11	Temperature button
12	Timer button
13	Wind-Free button
14	Direction button / Selection button
15	Vertical air swing button
16	Mode button
17	Fan speed button
18	Horizontal air swing button
19	Options button
20	SET button / Temperature type button (℃ ↔ ℉)

176

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Wired Remote Controller

MWR-WE13N – Multi-function Wired Remote Controllers

- Built-in room temperature sensor
- Controls from 1 to 16 indoor units
- A/C On/Off, operation mode, temp setting, air flow, fan speed
- **4-Way, Mini 4-way & 360 Round Flow Cassette control**
- **Wind Free –** Activate/Deactivate-dedicated function settings
- Sleep & Silent mode
- Backlit LCD display
- Error display
- Air filter maintenance reset
- Weekly operating schedule
- Upper/lower temperature limit setting
- Automatic operation stop function
- Energy saving operation mode
- Child lock
- Different button permission levels (operation mode, temp setting, On/Off, fan speed)
- Wireless remote control restriction
- Real time clock function: current time/day display, summer time
- Motion detection sensor function
- Service mode support

177

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Wired Remote Controller

MWR-SH10N – Simple Touch Wired Controller

- Touchscreen control
- Backlit LCD display
- Controls from 1 to 16 indoor units
- Built-in room temperature sensor
- Indoor unit On/Off, operation mode, set point temperature and fan speed
- Error display
- Air filter maintenance alarm and reset
- Built-in infrared receiver allowing control of indoor unit wirelessly with the MR-EH03U controller
- Outing function for min. heat (61° - 72°F) min. cool (77° - 86°F)
- Button lock feature: All buttons or selected buttons: On/Off, temperature set, fan speed, timer function, louver swing, sleep function, quiet function, outing function, and operation mode.
- Temperature display option – Relative Temperature
  - Display indicates temperature increase or decrease compared to the reference temperature (0 to 3)

178

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Wired Remote Controller

MWR-SH00N – Simplified Wired Controller

- Controls from 1 to 16 indoor units
- Indoor unit On/Off, operation mode, set point temperature and fan speed
- Error display
- Air filter maintenance alarm and reset
- Partial button lock feature: operation mode, temperature set, fan speed, timer function, timer and lock mode button
- Upper/lower temperature setting restriction
- Auto mode skip – Heat mode skip (cooling only)
- Restrict wireless controller signal (optional)
- Louver position setting (cassette & wallmount)
- Single event timer function
  - On/Off control, 30 mins. To 18 hour timer setting options
- System/indoor unit function and operation indication
  - Defrost, error, restricted controller, Spi status
- Quiet mode setting (supported units only)
- Service mode for connected indoor unit operation monitoring addressing and setup
- Can be used to specify the “Mode Master” when connected to a single indoor unit in a heat pump system
- No built-in room temperature sensor- set point temperature display only

179

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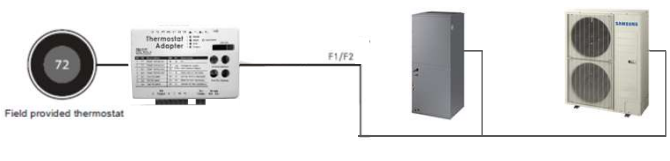
24vac Thermostat Adapter – TADPT2

For those applications which require a 3rd party 24 volt thermostat the TADPT2 thermostat adapter is available

- Adapter can control one or two DVMS indoor units (two units controlled as a group)
- Can be configured to operate indoor unit as primary or secondary heat source
- Can be configured for cooling only with heat from external source
- “Emergency Heat” output
- External contact input to disable unit – N.C. operation
- Supports 1 or 2 stages of Heat and Cool
- Stage 1 & 2 Heat and Cool temperature setpoints
- Configurable fan operations
- Requires field supplied 24vac class 2 transformer
  - AMO***JNZD Multi-position AHU’s have an internal 24vac transformer as standard



180

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Wireless Signal Receiver MRK-A10N

Allows wireless control for concealed ducted units and the floor standing units

- On/Off control button
- Operation indication
- Error indication
- Filter replacement sign
- Recessed installation
- Includes interconnect cable

181

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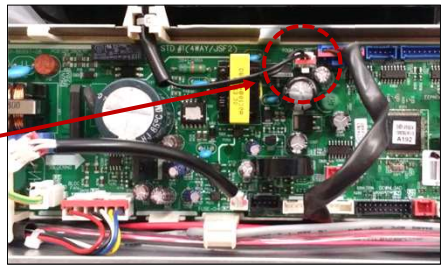
External Room Sensor MRW-TA

Provides for more accurate room temperature control when indoor unit is installed in high ceiling, outside fresh air into the return, or using a remote controller with no built-in space sensor

- 2-wire connection to indoor unit PCB
- Replaces input from return air sensor and provides temperature sensing for remote controllers without internal sensor
- Applies to all DVM S indoor units
- Includes a 39 ft. 2-conductor connection cable

Thermistor Sensor

Unplug the IDU return air sensor (CN412) and plug in the MRW-TA wire in it's place



182

SAMSUNG

Motion Detector Sensor

MCR-SMA – Motion Sensor Standard Mini 4-Way Cassette
MCR-SMD – Motion Sensor Wind-Free Mini 4-Way Cassette

- Senses motion
- Detects temperature stratification throughout the room
- Function enable/disable via MWR-WE13N wired remote controller
- Snaps into the cassette facia panel corner
- Connection cable included – plugs into “human sensor” plug on PCB (CN401)
- “Learns” occupant schedule

Mode	Soft Off (minutes)	Hard Off (minutes)	Function Description
Standard	20	30	SOFT OFF: turns off indoor unit but can restart with motion detection before HARD OFF. HARD OFF: Turns unit off but will not turn back on after motion is sensed. Unit will need to be power ON with a unit controller.
	40	60	
	80	120	
	120	180	
Premium	20	30	SOFT OFF and HARD OFF are the same as Standard Mode. Samsung comfort functions are activated.
	40	60	
	80	120	
	120	180	

183

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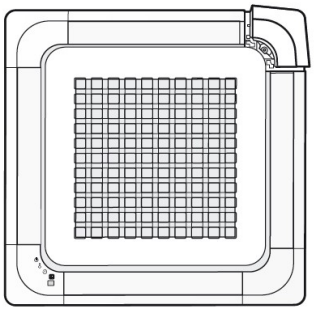
Motion Detector Sensor

- Samsung Comfort Logics (activated in “Premium” mode)
- **Comfort Flow:** MDS prevents the cassette from blowing air directly on occupants by changing air flow direction
- **Comfort Temperature:** When the temperature difference between the upper and lower parts of the room is large, the supply air louvers will lower to direct the air downward
- **Comfort Saving:** When no motion is detected the MDS will adjust the set temperature to reduce energy consumption
  - Max. +3.6°F cooling & -3.6°F heating



184

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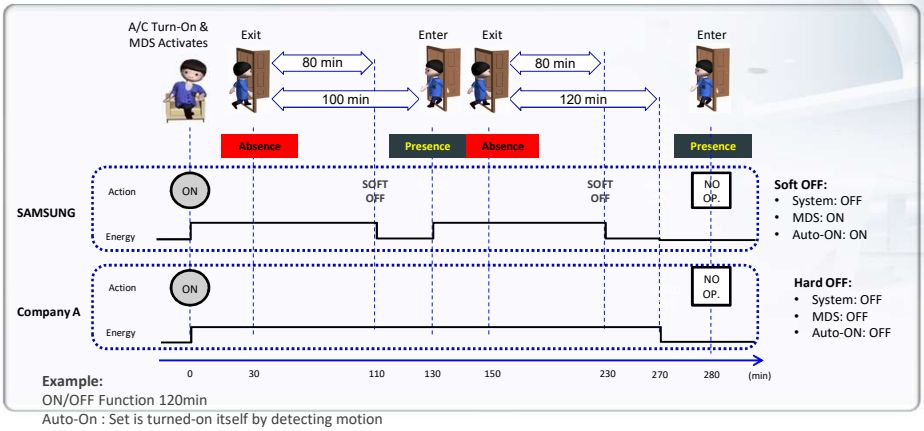
Motion Detector Sensor

Power On/Off



Soft OFF:
- System: OFF
- MDS: ON
- Auto-ON: ON

Hard OFF:
- System: OFF
- MDS: OFF
- Auto-ON: OFF

Example:
ON/OFF Function 120min
Auto-On : Set is turned-on itself by detecting motion

185

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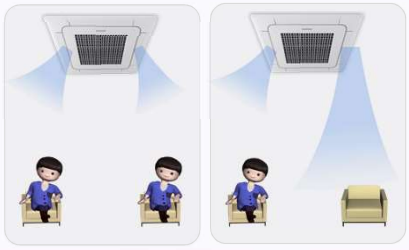
Motion Detector Sensor

Indirect Air Flow

- People sensing O → avoid direct air flow
- People sensing X → direct air flow

⇒ Feeling comfortable



Floor Temperature sensing

Ceiling Temperatures sensing
→ Temperature difference of Floor-Ceiling

Floor – Ceiling Temperatures sensing
→ Feeling comfortable

186

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WiFi Adapter MIM-H03UN

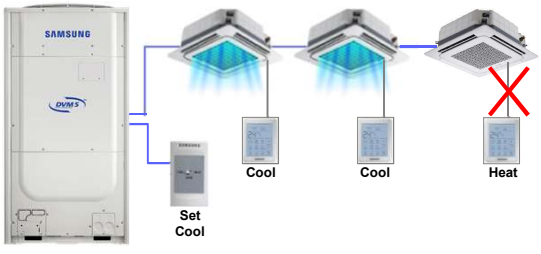
- WiFi Adapter allows control and scheduling of the VRF system remotely through Android and Apple devices
- Configuration requires the Samsung “SmartThings” app

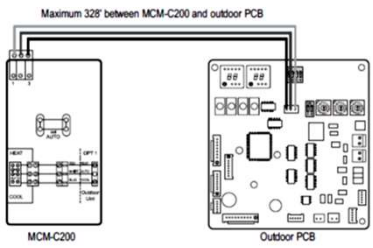
187

SAMSUNG

Mode Selector Switch – MCM-C200

- Manual system mode select – Heat Pump systems only
  - Selectable Cool only – Heat only – Auto settings
- Installed in outdoor unit or in building
- Allows manual operation mode change preventing mixed operation
- Max. 328ft of 3 conductor control wire from control to outdoor unit
  - Connects to **K5 Cool**, **AUTO** & **K6 Heat** terminals on the outdoor unit PCB





188

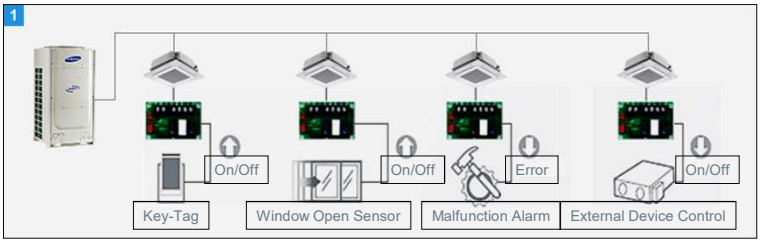
SAMSUNG

External Contact Controller MIM-B14

Direct indoor unit control by external contact signal

- Function examples: Hotel key card switch, door/window switch, occupancy sensor, On/Off ventilation control with indoor unit thermo-on/ thermo-off, external heat control, Indoor unit operation/error state output through relay contacts
- Emergency control with simple contact input
- Compatible with all DVM S indoor fan coil units

NOTE: MIM-B14 is factory installed as standard on the Multi-position AHU's



189

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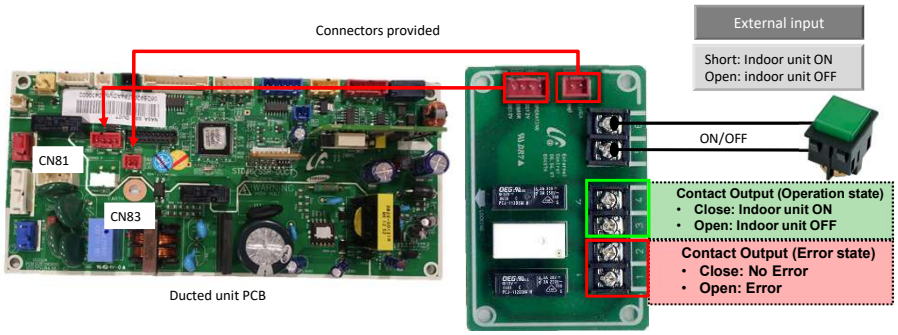
External Contact Controller MIM-B14

- To control the indoor unit providing synchronized control with other devices through the external contact input/output signal
- Indoor unit option setting must be set to enable external control operation
- External contact input load: 5vdc – 5mA
- Output terminals are open/close contacts 0 volts
- Maximum load rating on the Operation & Error terminals: 250vac, 3A



190

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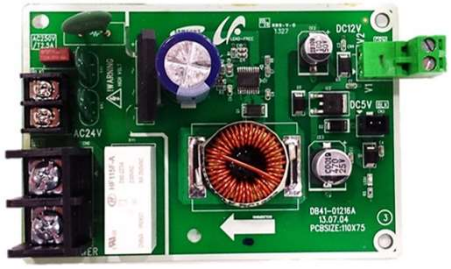
Multi-tenent Function Controller MCM-C210N

- When supply voltage to an indoor unit is removed/off, MCM-C210N will provide auxiliary 12V DC and 5V DC power to the indoor unit PCB (see table for indoor unit operation details) to keep "awake".
- When supply voltage to an indoor unit is supplied normally, MCM-C210N will cut auxiliary power to the indoor unit PCB allowing normal operation.



191

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BMS Centralized Controls

Touch Controller
MCM-A300N

DMS Data Management Server 2.5 MIM-D01AUN

BACnet Gateway 2.5
MIM-B17BUN

LonWorks Gateway 2.5
MIM-B18BUN

192

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Refrigerant Piping Installation

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Refrigerant Piping Installation

- Samsung piping installation guidelines and restrictions must be strictly adhered to
- Failure to follow Samsung piping guidelines may result in poor system performance, premature component failure, and reduced system service life
- Always refer to the DVM Pro piping diagram and mechanical prints when laying out the refrigerant piping system

194

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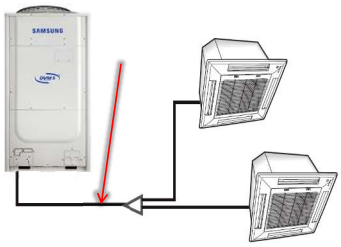
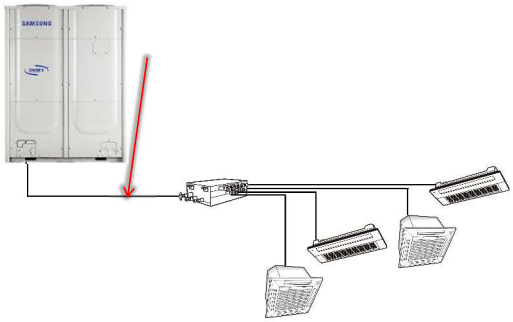
DVM S Refrigerant Piping Specifications

- When referring to pipe length specifications, the term “main pipe” refers to the set of refrigerant pipes that enter the building from the outdoor unit(s) to the first Y-joint, EEV kit, or MCU’s





195

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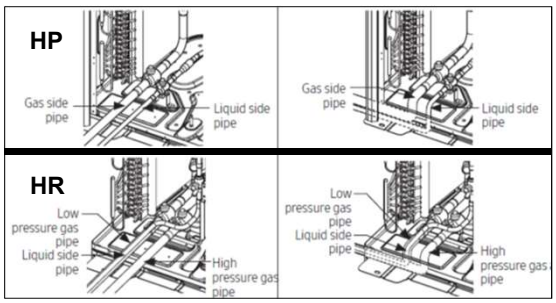
DVM S Refrigerant Piping Specifications

- Single unit systems (Heat Pump & Heat Recovery)
- Main refrigerant piping must be connected at the same or lower level to the outdoor unit
- There is no maximum piping length from the unit service valve to the start of a vertical elevation change

One pipe shown for example only



Main piping vertical elevation change

196

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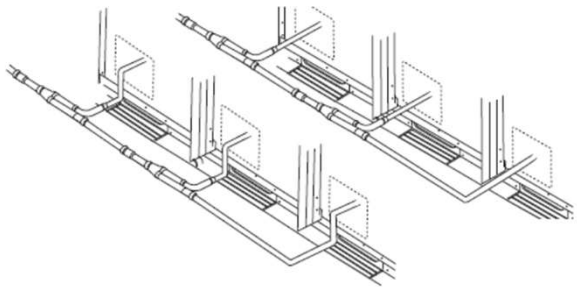
DVM S Refrigerant Piping Specifications

- Modular systems (2 or 3 ODU's) outdoor unit piping (Heat Pump & Heat Recovery)
- Main refrigerant piping must be connected at the same or lower level to each outdoor unit

NOTE: Outdoor connections shown vertical for simple viewing
All outdoor fittings must be installed horizontally
One pipe shown for example only



197

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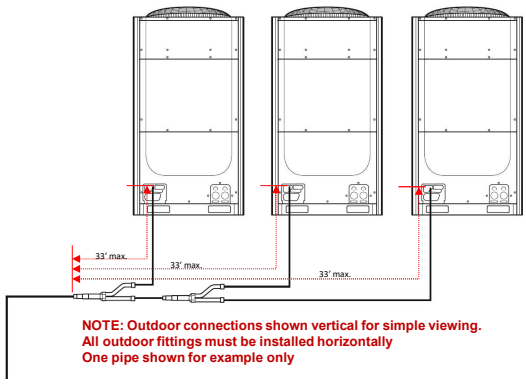
DVM S Refrigerant Piping Length Specifications

Maximum piping lengths between modules

- ≤ 33' actual length (43' equivalent) from the first branchTee to each outdoor module
- Outdoor units must have **no** vertical separation between modules



NOTE: Outdoor connections shown vertical for simple viewing.
All outdoor fittings must be installed horizontally
One pipe shown for example only

198

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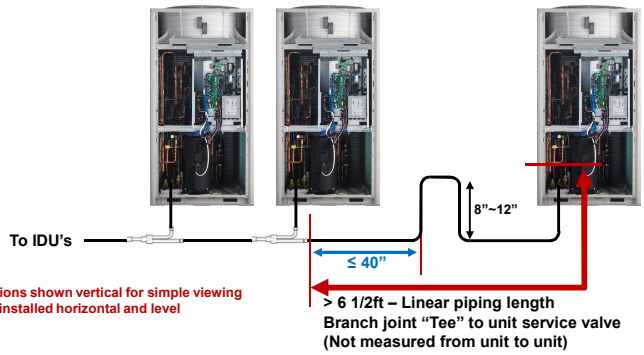
DVM S Refrigerant Piping Length Specifications

Modular systems – Multiple outdoor unit horizontal separation main piping design (2 or 3 ODU's)

When the piping length between the outdoor unit service valve and branch joint (Tee) exceeds 6 1/2ft. an inverted trap is required

- Heat Pump units: Dual Pressure Gas line only
- Heat Recovery units: Dual Pressure Gas and Low Pressure Gas lines



NOTE: Outdoor unit branch off connections shown vertical for simple viewing
All outdoor branch off "Tee's" must be installed horizontal and level
Single pipe shown for example only

199

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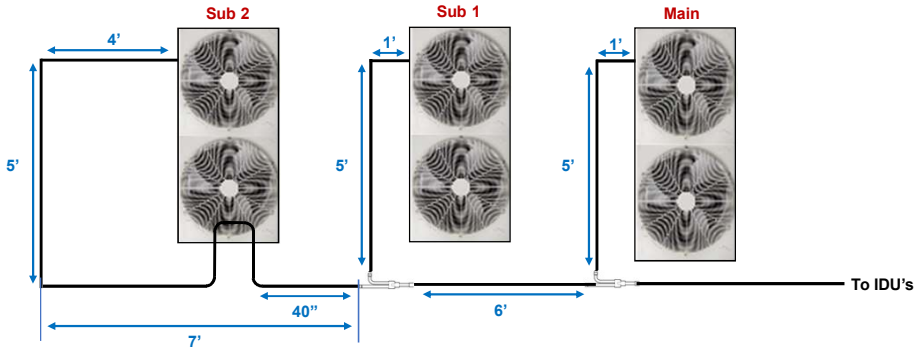
DVM S Refrigerant Piping Length Specifications

Modular systems – Inverted trap example: Outdoor unit to branch "Tee" or between branch "Tee's"

- **Main:** No trap required (1' + 5' = 6')
- **Main** to **Sub 1** branch "Tee's": (6') No trap required
- **Sub 1:** No trap required (1' + 5' = 6')
- **Sub 2:** Inverted trap required on gas line(s) (4' + 5' + 7' = 16')



NOTE: Outdoor connections shown vertical for simple viewing
All outdoor fittings must be installed horizontally
One pipe shown for example only

200

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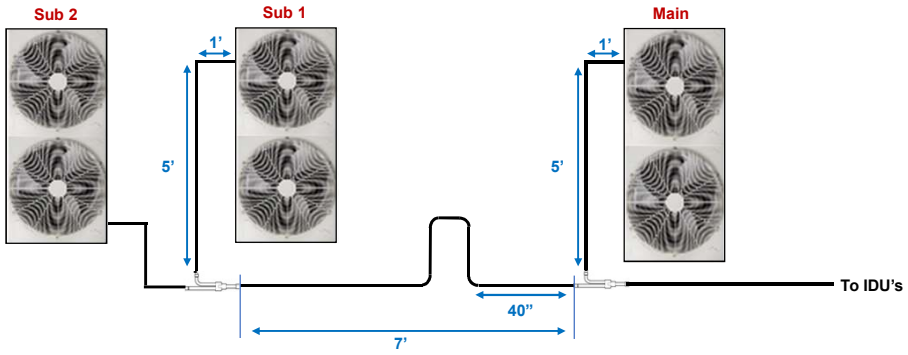
DVM S Refrigerant Piping Length Specifications

- Modular systems – Inverted trap example: Piping length between branch "Tee's"
  - **Main** to **Sub 1** branch "Tee's": (7') Requires inverted trap on gas lines



201

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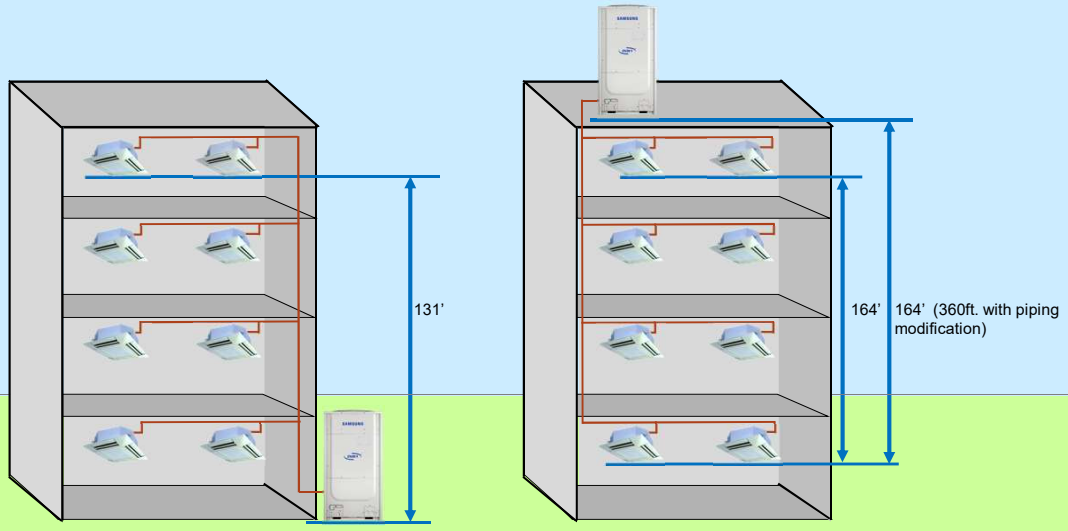
DVMS Refrigerant Piping Length Specifications

Standard Maximum Vertical Separation

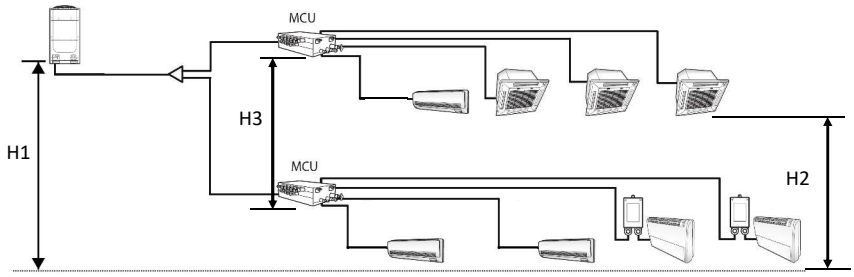


202

DVM S Refrigerant Piping Length Specifications

- Heat Recovery – Maximum height difference from outdoor unit to lowest indoor unit (H1):
  - When condenser is above indoor units (ex: rooftop): 164' (standard), 360' with PDM kit
  - When condenser is below indoor units (ex: ground level): 131'

Maximum height difference between indoor units (H2): 49'
Maximum level difference between S*NEK MCU's (H3): 98'



203

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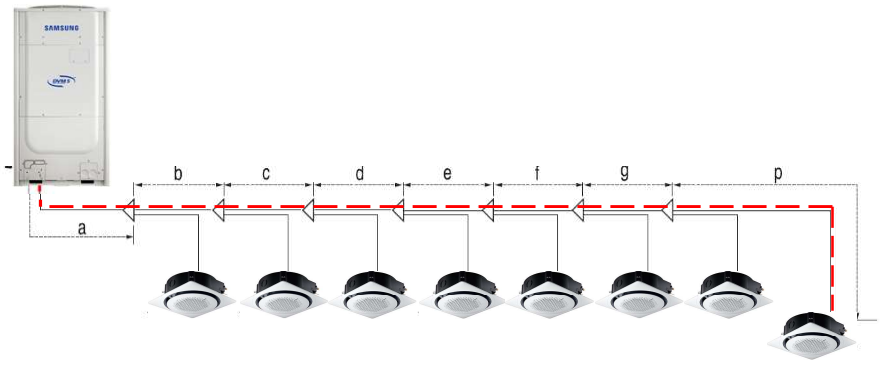
DVM S Refrigerant Piping Length Specifications

- Heat Pump & Heat Recovery Systems
- Maximum of 656 ft. (722 ft. equiv.) length from the outdoor unit(s) to the farthest indoor unit
  - (a+b+c+d+e+f+g+p)



204

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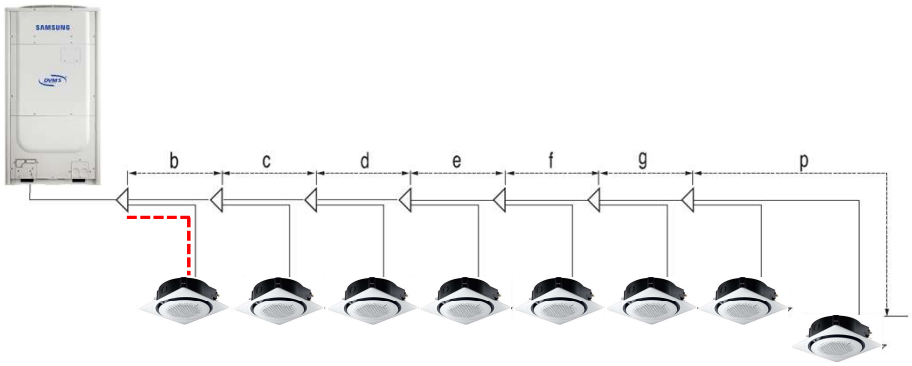
DVM S Refrigerant Piping Length Specifications

Maximum distance from a Y-Joint to an indoor unit is 148 ft.



205

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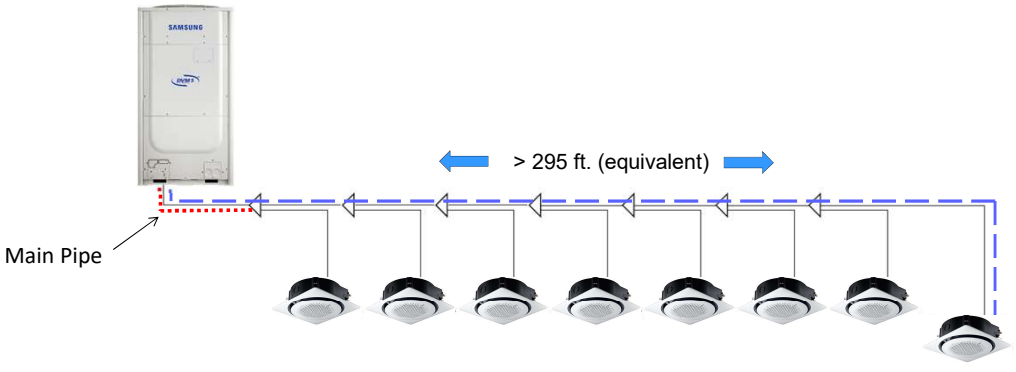
DVM S Refrigerant Piping Length Specifications

- For heat pump systems, if this distance from the outdoor unit(s) to the farthest indoor unit is over 295' equivalent increase the liquid and suction pipes one size for the "main pipe" section
- DVM Pro design software will do this for you automatically



206

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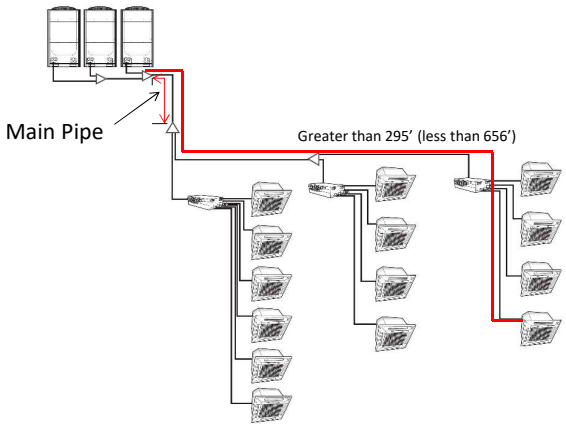
DVM S Refrigerant Piping Length Specifications

- For heat recovery systems, If this distance is from the outdoor unit(s) to the farthest indoor unit is over 295', increase the liquid pipe one size for the "main pipe" section
- DVM Pro design software will do this for you automatically



207

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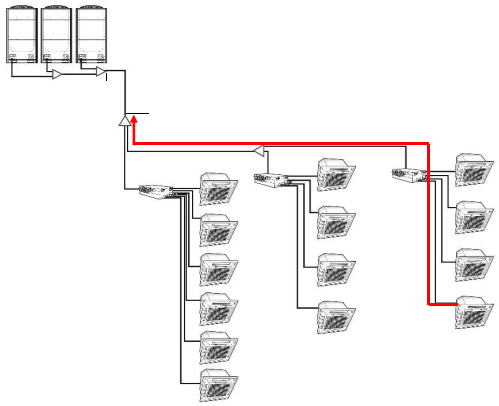
DVM S Refrigerant Piping Length Specifications

- For heat recovery systems, maximum 148' from the first branch to the farthest indoor unit
- If this length is over 148' while designing a system, consider putting the first branch joint further into the building



208

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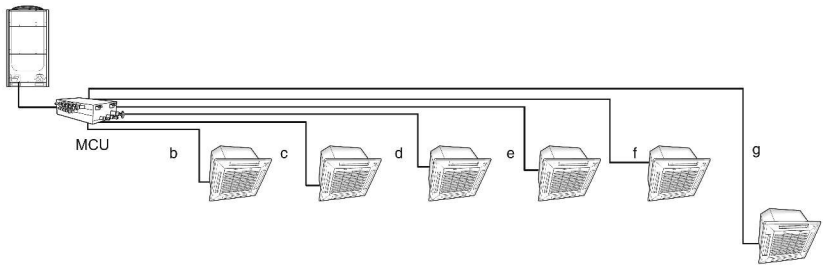
DVM S Refrigerant Piping Length Specifications

Heat Recovery – Maximum piping length from MCU to farthest indoor unit: 148 ft.



209

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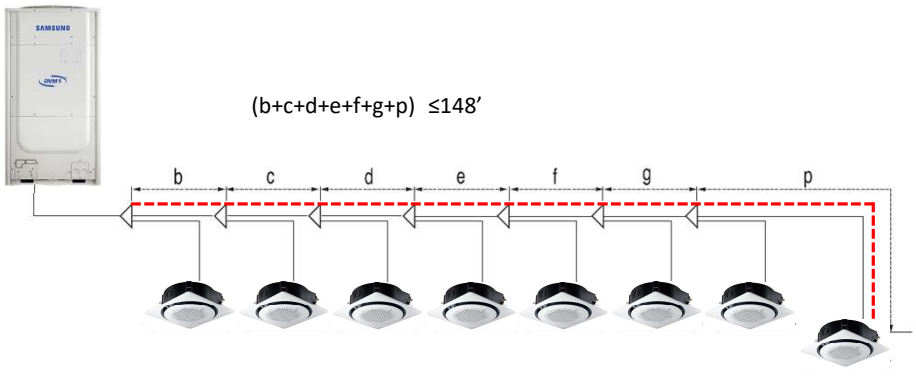
DVM S Refrigerant Piping Length Specifications

- Maximum 295' from the first Y-joint to the farthest indoor unit (heat pump systems)
  - If the distance from the first branch joint to the farthest indoor unit is ≥148' increase each branch liquid and suction pipes one size from the first branch joint throughout the system (sections: b,c,d,e,f,g+p)



210

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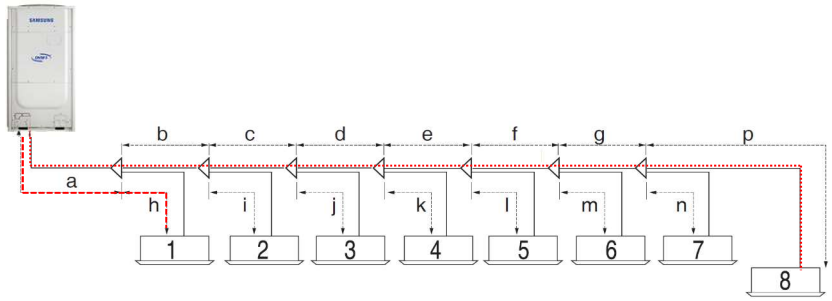
DVM S Refrigerant Piping Length Specifications

- (a+b+c+d+e+f+g+p) – (a+h) ≤ 148’
- Maximum 148’ from the closest to the farthest indoor unit
- Example from above: h+b+c+d+e+f+g+p ≤ 148’ if unit 1 is the closest to the outdoor unit and unit 8 is the farthest



211

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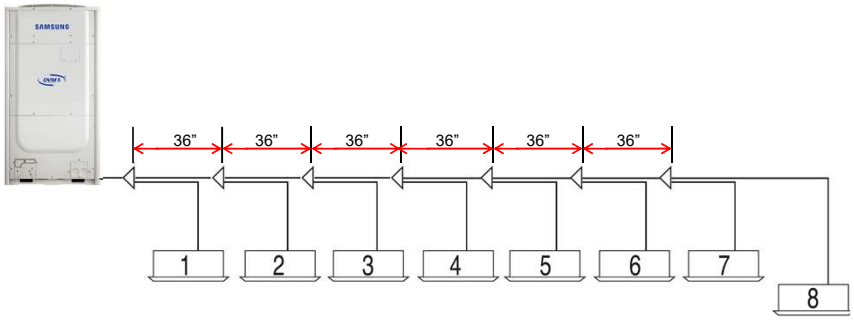
DVM S Refrigerant Piping Length Specifications

- Maintain a minimum straight line distance: ≥ 20” before connecting to a Y-joint
  - Minimum 36” straight line piping between Y-joints
  - Controls potential refrigerant turbulence and noise



212

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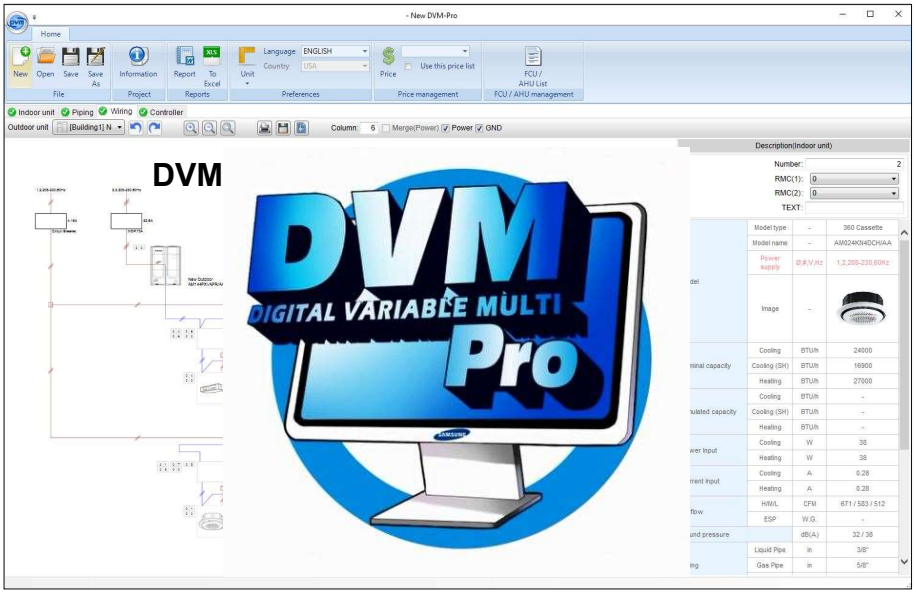
DVM Pro Design Software



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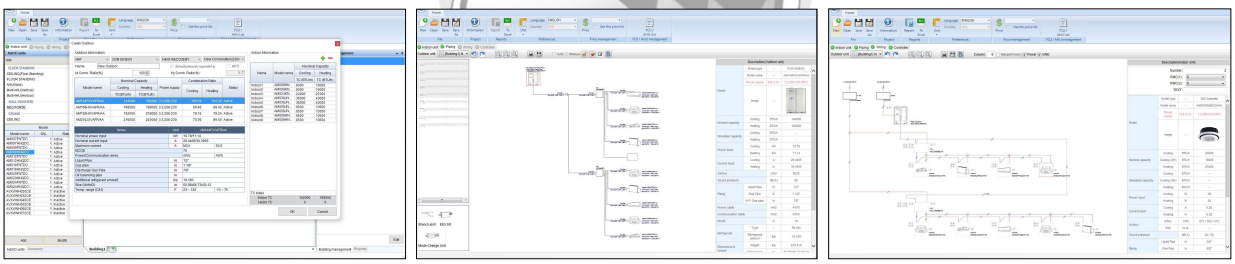
DVM Pro Design Software

- Every DVM S project must be designed through DVM Pro
  - Insures all system components are compatible
    - Insures correct layout of all system components
      - Calculates all piping sizes & additional refrigerant
        - Insures that system will perform as designed



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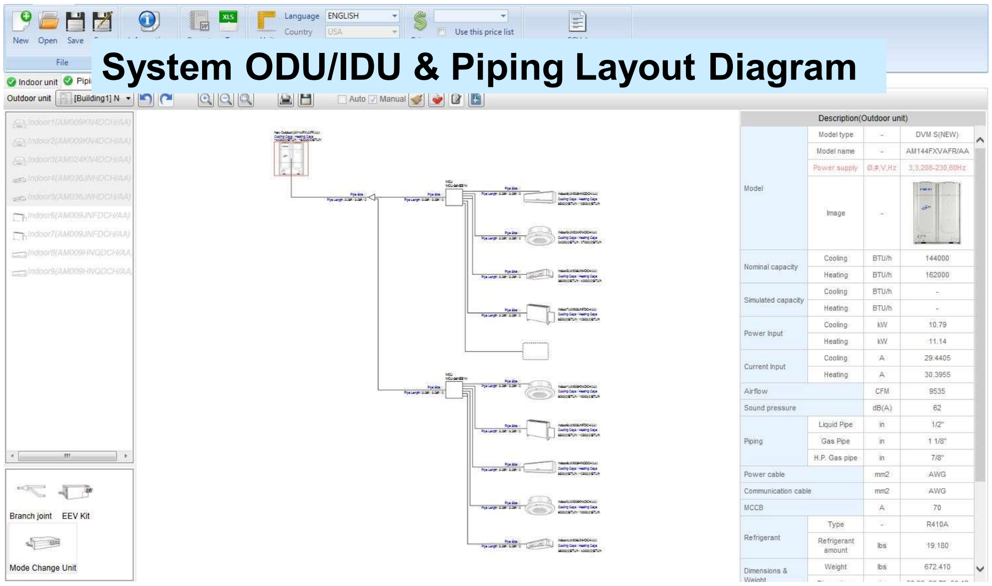
DVM Pro Design Software



215

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DVM Pro Design Software

The DVM Pro software will generate a complete material and equipment list including the amount of refrigerant piping by size and the additional refrigerant required

Total Equipment List

Index	Model	Qty	Remark(Categories)	Unit Price	Amount
Outdoor unit	AM053FXMDCH/AA	1	DVM S Eco(NEW)	0	0
	AM072FXVAFR/AA	1	DVM S(NEW)	0	0
	AM120FXVAFR/AA	1	DVM S(NEW)	0	0
Indoor unit	AM018FN4DCH/AA	1	4Way CASSETTE	0	0
	[illegible]	2	[illegible]	0	0
	[illegible]	2	MSP DUCT	0	0
	AM096FNHDCH/AA	1	HSP DUCT	0	0
	[illegible]	1	[illegible]	0	0
	[illegible]	1	[illegible]	0	0
	[illegible]	2	NEO FORTE	0	0
	AM018FNCDCH/AA	1	CEILING	0	0
Piping	[illegible]	1	[illegible]	0	0
	[illegible]	1	[illegible]	0	0
	MXD-E24K132A	1	Distributor Kit	0	0
	[illegible]	1	Y-Joint	0	0
	[illegible]	1	[illegible]	0	0
	MXJ-YA2815M	1	Y-Joint	0	0
	MXJ-YA2500M	1	Y-Joint	0	0
	[illegible]	[illegible]	[illegible]	0	0
	[illegible]	[illegible]	[illegible]	0	0
Control System	MIM-D00AN	1	DMS 2.0	0	0
	[illegible]	1	Touch Controller	0	0
Optional accessories	[illegible]	[illegible]	[illegible]	0	0
	[illegible]	9	WIRED REMOTE CONTROLLER	0	0
	MDP-M075SGU3D	2	DRAIN PUMP	0	0
	[illegible]	2	4Way CASSETTE (600x600) PANEL	0	0
	[illegible]	1	DRAIN PUMP	0	0
	MRW-TA	2	EXTERNAL TEMPERATURE SENSOR	0	0
	PC4NUSKFN	1	4Way CASSETTE PANEL	0	0
	MWR-SH00N	1	WIRED REMOTE CONTROLLER	0	0
Ref. Pipe	6.35(1/4")	175	ft	0	0
	9.52(3/8")	168.99	ft	0	0
	12.70(1/2")	212.01	ft	0	0
	15.88(5/8")	204.01	ft	0	0
	19.05(3/4")	61.02	ft	0	0
	22.22(7/8")	31	ft	0	0
	28.58(1 1/8")	192.98	ft	0	0
Additional Ref. Quantity	R410A	31.97	lbs	0	0
		Total			0

- New installations always start with jobsite layout using DVM Pro reports, diagrams and the project mechanical prints
- Never install refrigerant piping without first accurately measuring the lengths from the outdoor unit to each indoor unit
- DVM Pro Piping Diagram and Equipment (material) list must be updated
- Updated Piping, Wiring and Materials list should be included in the project "As-built" documents

216

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Field Piping Components

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Field Piping Components

Refrigerant Components Not To Be Used in DVM S Systems

- Liquid line drier

- Liquid sight glass

- Copper Tee's

- Aluminum tubing

218

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Field Piping Components

Recommended Refrigerant Components For DVM S Systems

Isolation Valves (Field supplied)

- Allows future indoor unit service, replacement or additional installation to be done easier
- May allow main system operation during IDU service or replacement

General Specifications
- Full port
- Bi-flow
- Service port
- Rated up to 750psi

219

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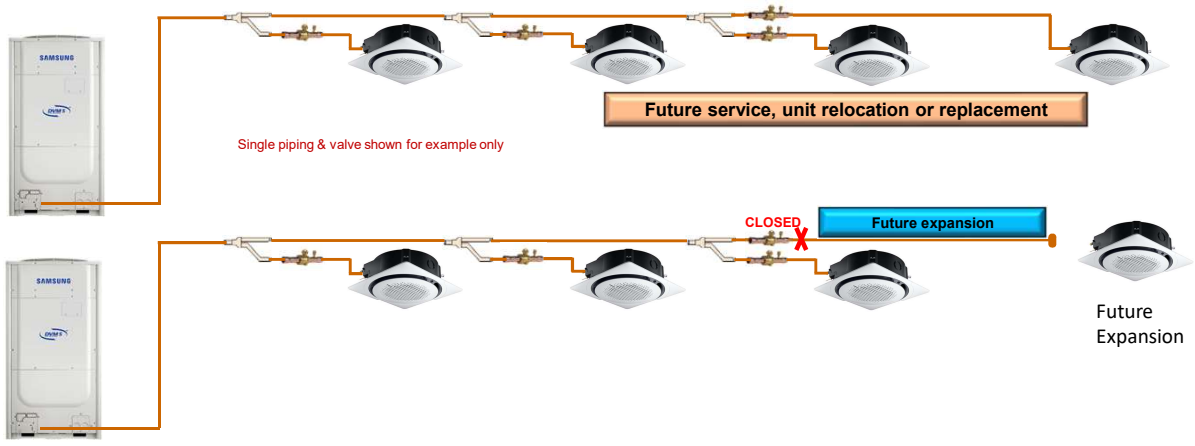
Field Piping Components

Isolation Valves – Placement

- To insure proper system oil return, Isolation valves must be installed directly after a Y-joint or Header port
- Isolation valve service port must be located on the indoor unit side



220

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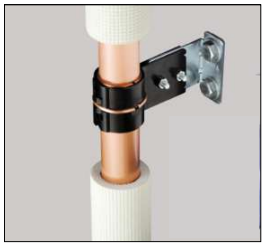
Field Piping Components

Required Refrigerant Components For DVM S Systems

Field Piping Support

- Horizontal support hangars and clamps should be secured around the piping insulation and not the copper pipe
- Vertical piping must be secured with the correct clamp specifically for that purpose
- Always follow state and local codes for proper pipe support



Vertical clamp example

221

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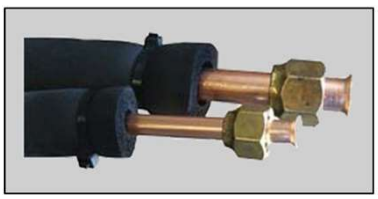
Required Refrigerant Components

- **ACR – dehydrated and sealed copper tubing – Soft & Hard drawn**

- **Field piping insulation – Wall thickness from 1/2" up to 1 ½"**
  NOTE: Refer to the indoor unit installation manual for specific requirements
- **Each pipe is to be insulated individually the entire length**
- Always follow state and local codes for insulation requirements



222

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Field Piping Components

Indoor Piping – Y-Joint & Header Fittings

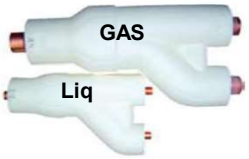
Branch Fittings – Outdoor unit to indoor units

- **MXJ-Y** Y-joint (HR & HP) kits & **MXJ-H** Header kits (Heat Pump only)
  - Kits include liquid & gas fittings – Insulation – pipe reducers
  - Y-joint sizes based on system and indoor unit capacities
- Heat Recovery systems require the **MXJ-Y** Y-joint kit and one HR Hi pressure gas Y-joint
  - Headers are only used on heat pump systems

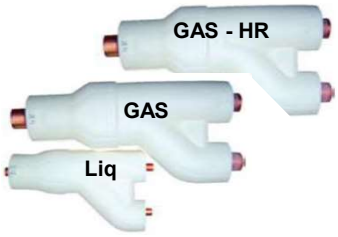
Heat Pump systems only
4,6&8 port models available

Example: 4-port header kit

Heat Pump Y-joint kit



Heat Recovery Applications



223

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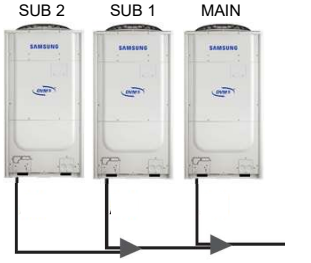
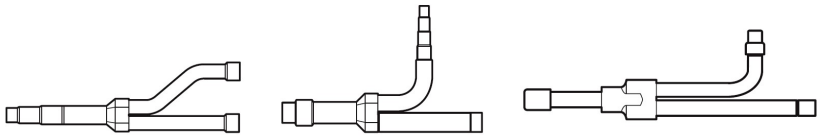
Field Piping Components

Modular Outdoor Unit Refrigerant "Tee's

Outdoor Unit refrigerant "Tee" fittings MXJ-TA**M**

- Modular systems – 2 or 3 outdoor units piped together for one system
  - Heat Pump 2-module system requires 1 heat pump fitting kit (Liq & Gas)
  - Heat Pump 3-module system requires 2 heat pump fitting kits
  - Heat recovery requires the heat pump kit plus the HR Hot Gas Tee
  - Outdoor unit branch fittings are installed level only, never vertical





NOTE: Identification examples only

224

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Piping Installation Tools

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R-410A Manifold Gauge Set

Required Installation & Service Tools

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R-410A Manifold Gauge Set

- "Combination" Manifold Gauges should never be used on any R-410A system
- Use a dedicated R-410A manifold set, for DVM S systems only (5/16" flare recommended)
- Vacuum rated hoses recommended for system evacuation
- Maintain Hoses for dependability (replace as needed)



227

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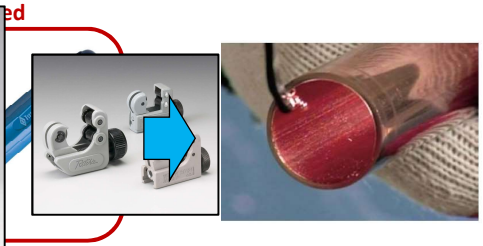
Required Installation & Service Tools

- Always use the appropriate size tubing cutters with a sharp cutting wheel
- When cutting copper tubing the cut ends must be de-burred to provide a square end to provide a perfectly flat and smooth surface for making good flares
- To properly remove the cut burrs, a "deburring" tool is preferred to provide a smooth and square cut end in the tubing



1

228

Required Installation & Service Tools

- Use a burnishing or eccentric - burnishing type - 45° R-410A rated flare tool for high quality flares
  - Burnished flare cones provide a superior seal
- R-410A flares are deeper providing more surface area for sealing
- Samsung DVMS indoor units provide the proper flare nuts
  - NOTE: S*NEK MCU's are all braze connections

Very Good

Burnishing Style 45° Flare Tool
- Tubing height gauge
- Self centering yoke
- Multi-faceted burnishing cone
- 1/4" to 3/4" flares

Preferred

Eccentric – Burnishing 45° Flare Tool
- Off-center cone rolls copper into a 45° burnished flare
- Handle clutch releases to avoid excessive torque on the tubing and flare
- 1/4" to 3/4" flares

229

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Required Installation & Service Tools

Digital Vacuum Gauge

- As driers are not used in DVMS refrigerant lines it is imperative to properly evacuate the system to remove all moisture to insure a dry system
- All Samsung DVMS systems must be triple evacuated down to 500 microns or less
  - The moisture level can only be determined with an accurate micron gauge
  - Micron gauge should be connected to the system as far from the vacuum pump as possible for the most accurate reading
- Never evacuate a refrigeration system using atmospheric pressure or vacuum pump run time duration

230

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Required Installation & Service Tools

Digital Refrigerant Scale

- A good quality digital scale must be used to properly weigh in the liquid R-410A refrigerant
- DVMS systems are charged with liquid R-410A refrigerant by weight based on the length of the liquid lines and the indoor unit models (Additional criteria may apply - refer to the ODU Installation Manual)
  - All liquid lines should be measured as accurately as possible during installation to insure the proper refrigerant charge calculation
  - Using accurate liquid line lengths, the DVM Pro Design tool will calculate the amount of additional refrigerant required for the system

231

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Required Installation & Service Tools

Metric Hex Keys

Torque Wrench Set

Digital Clamp-on Meter

Adjustable Wrench or Wrench Set

Nitrogen Regulator

232

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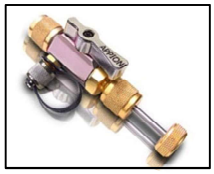
Required Installation & Service Tools



5/16” Valve Core Removal Tool w/side port

1/4” to 5/16” Service Valve Adapter

Recommended Installation Tools

Tubing Bender Kit

Tubing Swaging Kit

233

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Field Piping Installation Guidelines

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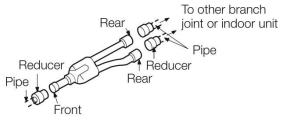
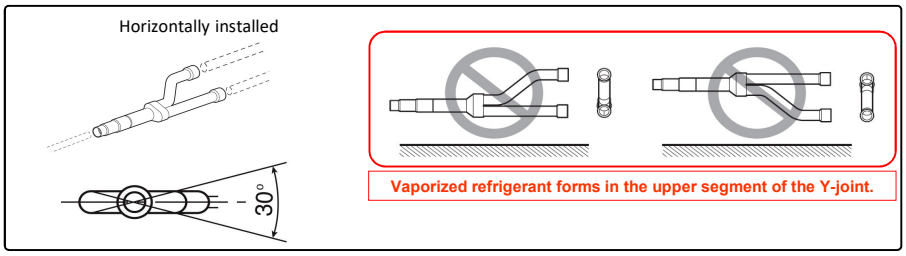
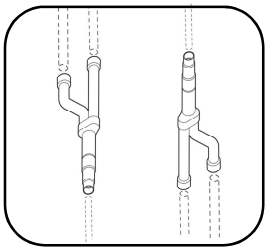
Y-Joint Installation Guidelines

- Samsung Y-Joint fitting kits will include the necessary reducers to connect to various pipe sizes



- All Y-Joint fittings are installed horizontal level (± 15° of horizontal plane) or vertical up / down





235

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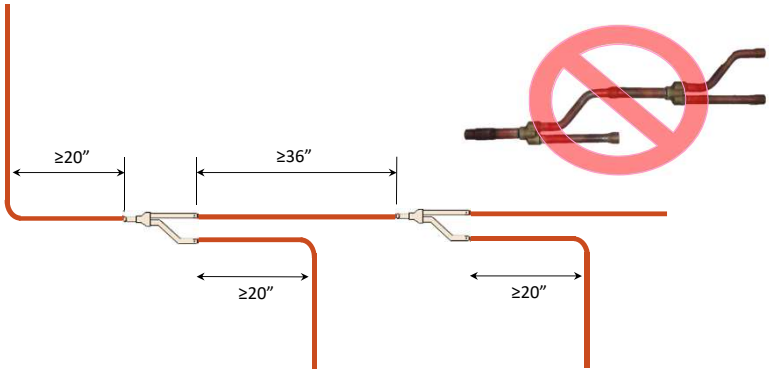
Y-Joint Installation Guidelines

- Required: To avoid turbulence and potential noise in the Y-joint refrigerant piping, space 90° elbows at least 20” from the Y-Joint inlet, and 36” between Y-Joint fittings
- Recommended: Allow a minimum of 20” on the branch side
- Y-Joints are not to be connected together



236

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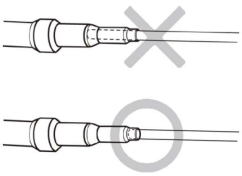
Y-Joint Installation Guidelines

- Care must be taken to ensure that the refrigerant piping is not inserted too far into the Y-Joint before brazing
- If the Y-Joint fitting does not have a groove to stop the copper pipe from entering too far, measure and mark the pipe at 5/8” from the end
- If the pipe is inserted too far, turbulence is created and potential noise



- Some Y-Joint fittings have selectable end segments to facilitate multiple pipe diameters
  - Cut the segment from 3/8” to 5/8” from the end

1

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Y-Joint Installation - Support

- Install a support before and after each Y-joint to prevent sagging and stress on the brazed connections (within 18” of the inlets and outlets)
- Gas piping up through 7/8” should be supported up to 47” apart

- Refer to state and local codes for piping support compliance

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Header Installation

- Header branch off kits will include a liquid fitting, gas fitting, reducers and insulation
- The liquid fitting is open at both ends to allow left or right installation
- Braze the included plug on the open end after the incoming refrigerant pipe is connected

- Pinch and braze any unused ports
- The outlet ports (liquid and gas) can only connect to a single indoor unit, never a Y-joint or Multi-port EEV kit

239

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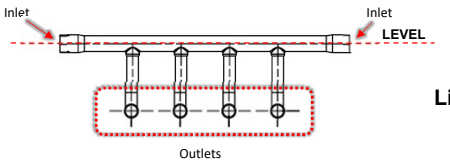
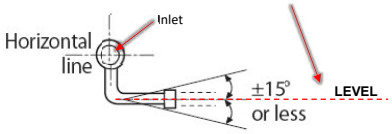
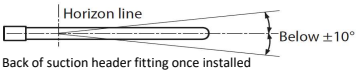
Header Installation

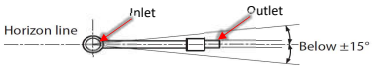


Liquid Header

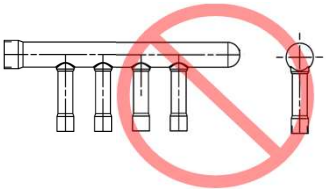


Both the liquid and gas headers must be installed level





Gas Header



240

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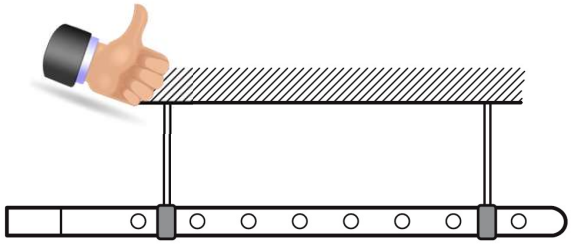
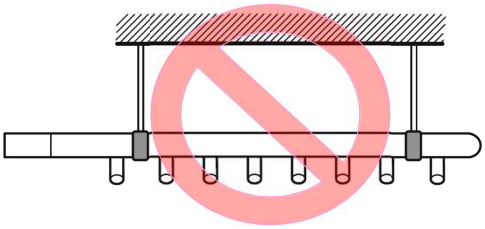
Header Installation

Liquid and gas headers must be supported to eliminate any stress on brazed connections





(Gas ports pointing down)

241

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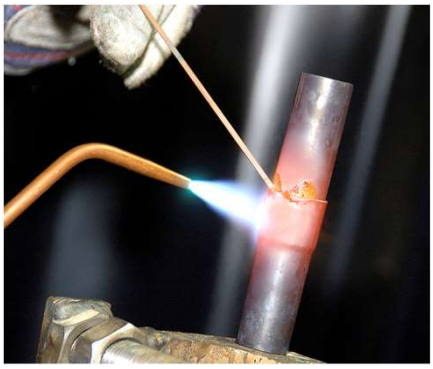
Required Piping Practices - Brazing



15% Silver-Phosphorus brazing rods are the recommended brazing material for all Samsung DVMS systems

Never use a brazing material that requires flux to be applied

242

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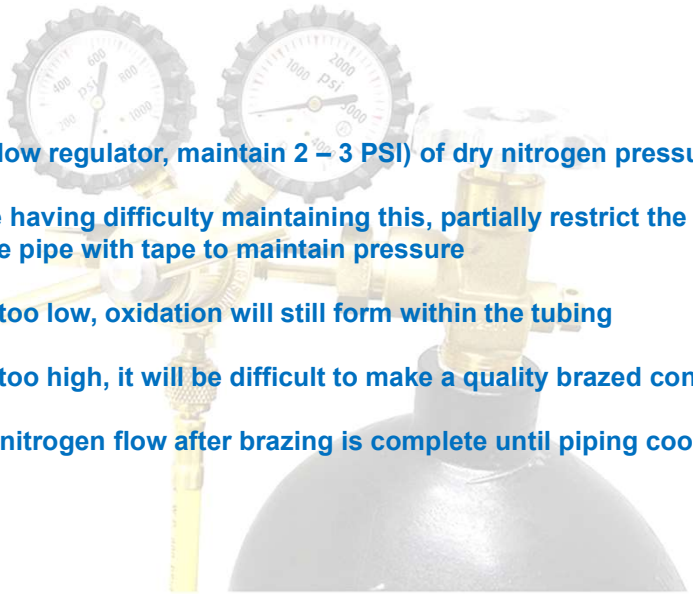
Required Piping Practices – Nitrogen Purge



- Using a flow regulator, maintain 2 – 3 PSI) of dry nitrogen pressure
- If you are having difficulty maintaining this, partially restrict the opposite end of the pipe with tape to maintain pressure
- If flow is too low, oxidation will still form within the tubing
- If flow is too high, it will be difficult to make a quality brazed connection
- Maintain nitrogen flow after brazing is complete until piping cools

243

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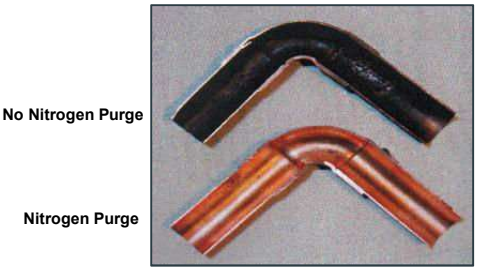
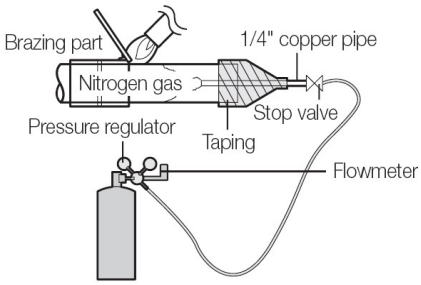
Required Piping Practices – Nitrogen Purge

- The nitrogen purge displaces oxygen and prevents oxidation from forming inside the tubing preventing contamination of the refrigerant piping network
- Problems caused include:
  - Plugged up EEV's, filter screens & orifices
  - Contamination of compressor oil
  - Compressor damage





244

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Good Piping Practices

- During the course of installation the piping should be blown out with nitrogen to clear out any debris
- When the refrigerant lines are not connected to the Indoor and outdoor units during construction the piping ends should be pinched off and brazed to properly seal the piping
- Maintaining a dry nitrogen charge in the sealed dormant lines is recommended

Pinched & brazed

Capped or taped not recommended

245

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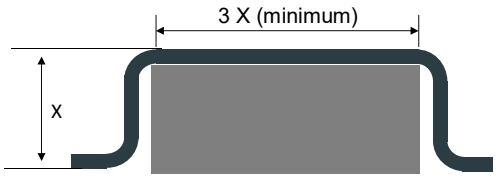
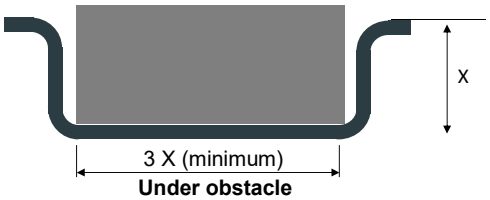
Required Piping Practices – Proper Pipe Routing

Piping around obstacles – Elevation Changes

- When an obstacle, such as a beam or concrete structure, is in the path of the planned refrigerant pipe run, it is best practice to route the piping over the obstacle or under.
- If adequate space is not available to route the insulated pipe over the obstacle, then route the pipe under the obstacle.
- In either case, it is imperative the length of the horizontal section of pipe above or below the obstacle be a minimum of three (3) times the longest vertical rise (or fall) at either end of the segment.



Over obstacle



Under obstacle

246

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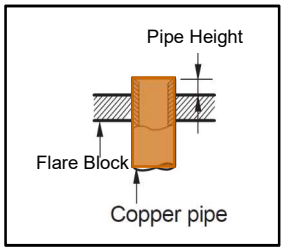
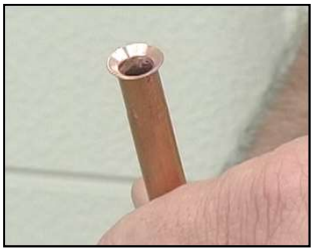
Making A Good R-410A Flare

- After cutting and deburring the copper tube, place the flare nut onto the copper pipe
- Set the copper pipe into the flare block and adjust the height
- Run the flare handle in twice for a well polished flare cone
- Verify correct flare diameter by slipping the flare nut over the flare cone





247

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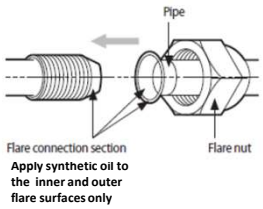
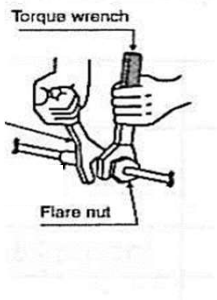
Making A Good R-410A Flare

- Apply any synthetic oil to the flare cone inner and outer surfaces only
- Do not lubricate the flare threads
- Do not use any type of thread sealant on the flare threads
- Always use a torque wrench with a backup wrench to properly tighten flare nut connections
  - Refer to the unit Installation Manual for flare nut torque specifications by flare nut size





248

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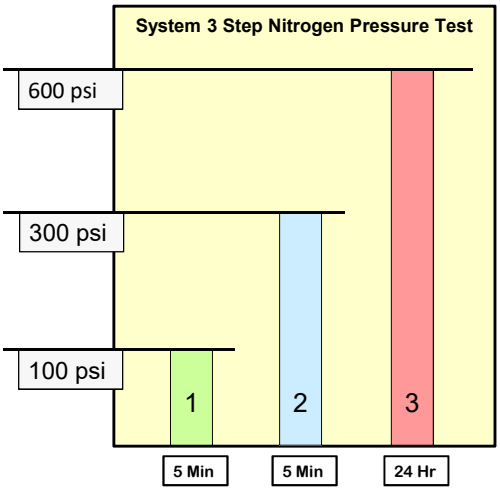
High Pressure Leak Test

- Samsung requires a 3 step high pressure nitrogen leak test on the completed system
- All field refrigerant piping is installed and connected to the Outdoor and Indoor units
  - ODU stop valves are closed

1. **Pressurize the system to 100 psi for 5 minutes**
2. **Increase the pressure to 300 psi for 5 minutes**
3. **Increase the pressure to 600 psi and hold for 24 hours**



249

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High Pressure Leak Test Pressure Drop

- Nitrogen pressure is subject to pressure fluctuation above 300 psi, based on ambient temperature changes
  - Use this formula to compensate for temperature changes from one day to the next when performing the 24 hour pressure test
- The following formula will determine system pressure drop caused by low ambient temperature change

Record the **T**emperature when the system is **p**ressurized (**Tp**)
Subtract the **T**emperature when the pressure is **c**hecked (**Tc**)
Multiply by a factor of 0.80 to get the **P**ressure **D**rop (**PD**)

(**Tp – Tc**) x 0.80 = **P**ressure **D**rop

250

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High Pressure Leak Test

To properly check for leaks in the piping network during the high pressure test, use only commercial liquid gas leak detector

- Never use household liquid soap for leak detection
- Never use a refrigerant dye for leak detection
- Never use an injectable refrigerant leak sealant

251

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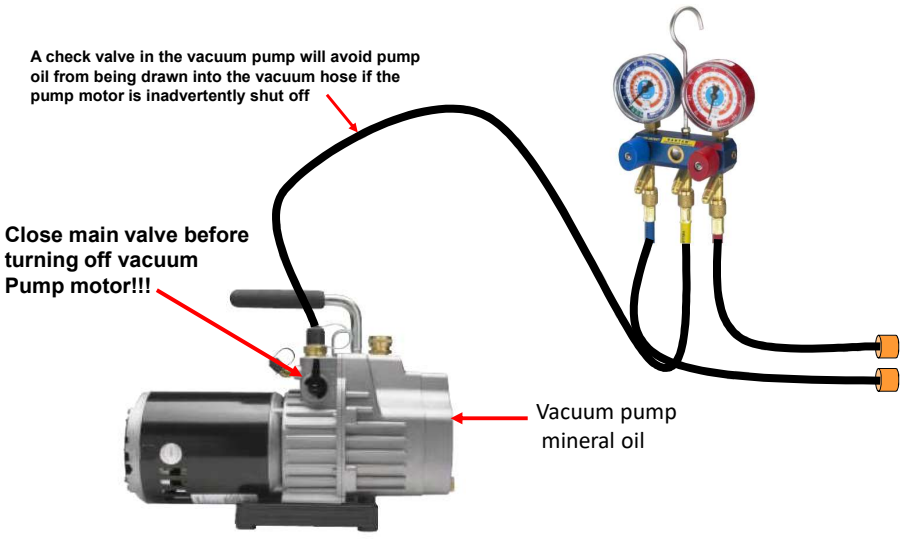
System Evacuation



252

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System Triple Evacuation

System Triple Evacuation Procedure

- **Evacuate the system down to 4000 microns**
  - Break vacuum with dry nitrogen – Hold for 15 minutes
- **Evacuate the system down to 1500 microns**
  - Break vacuum with dry nitrogen – Hold for 15 minutes
- **Evacuate the system down to 500 microns or less**
  - Hold the vacuum for 60 minutes
  - DO NOT remove manifold gauges with system under vacuum
  - DO NOT leave system under vacuum
- **Use the system vacuum to draw in the additional refrigerant charge as calculated by DVM Pro, and then open the outdoor unit service valves**

253

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DVMS Day – 1 Training Completed

DVMS system is now ready for commissioning and configuration

SNET Pro 2 Service Software tool is recommended for system set up and operation review

254

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Thank You !

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DVMS Training Addendum

Control Wiring Review Quiz & Exercises
Split DOAS Introduction & Installation

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DVMS Control Wiring Quiz & Exercises

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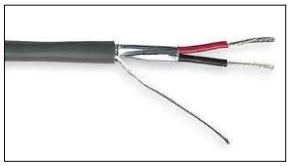
DVM S Control Wiring Review Quiz

1. What is the DVMS control wire specification?

   16/2 AWG stranded with shield



2. Indicate the communication terminal designations for the DVMS outdoor unit?

   F1 F2 – OF1 OF2 – R1 R2

F1 F2 - OF1 OF2 - R1 R2

3

258

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DVM S Control Wiring Review Quiz

3. Indicate the communication terminal designations for the MCU

   F1 F2

4. Indicate the communication terminal designations for the Indoor Unit

   F1 F2 – V1 V2 – F3 F4

5. What is the function of the **V1 V2** terminals ?

   V1 V2 is a 12vdc power supply – not required for the "NASA" protocol wired remote controllers

6. Indicate the communication terminal designations for the MWR-WE13N "NASA" wired remote controller

   F3 F4

7

259

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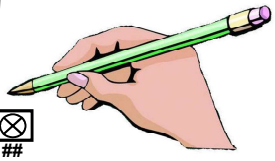
DVM S Control Wiring Review Exercises

Write in each device's communication terminal designations and then draw a single line to connect the specific communication circuit from one device to the other

Example:



260

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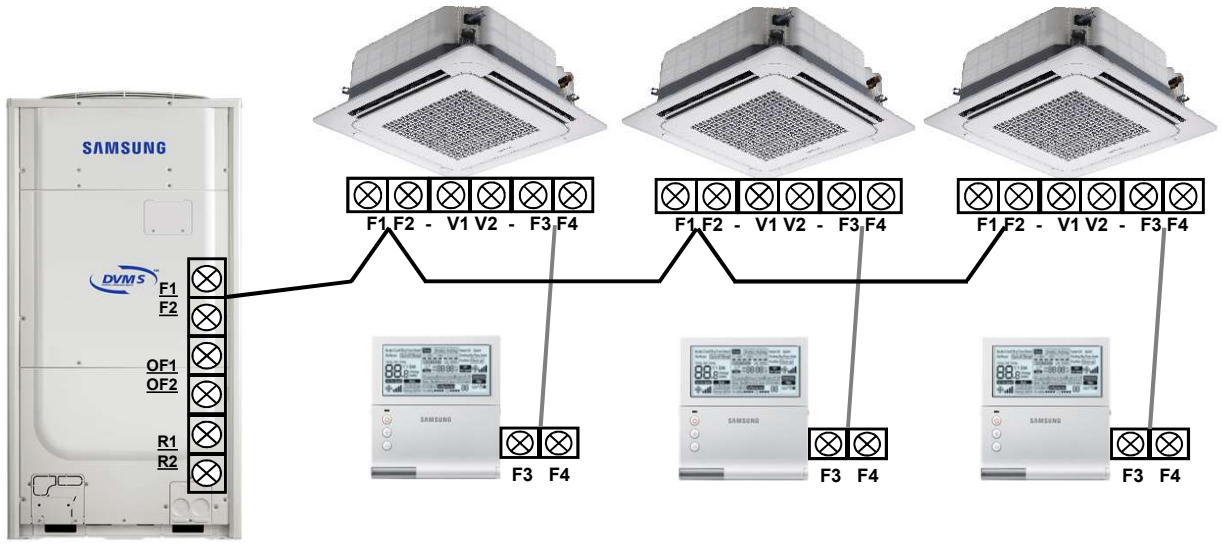
DVM S Control Wiring Review Exercises

3 Zone Heat Pump System



261 2

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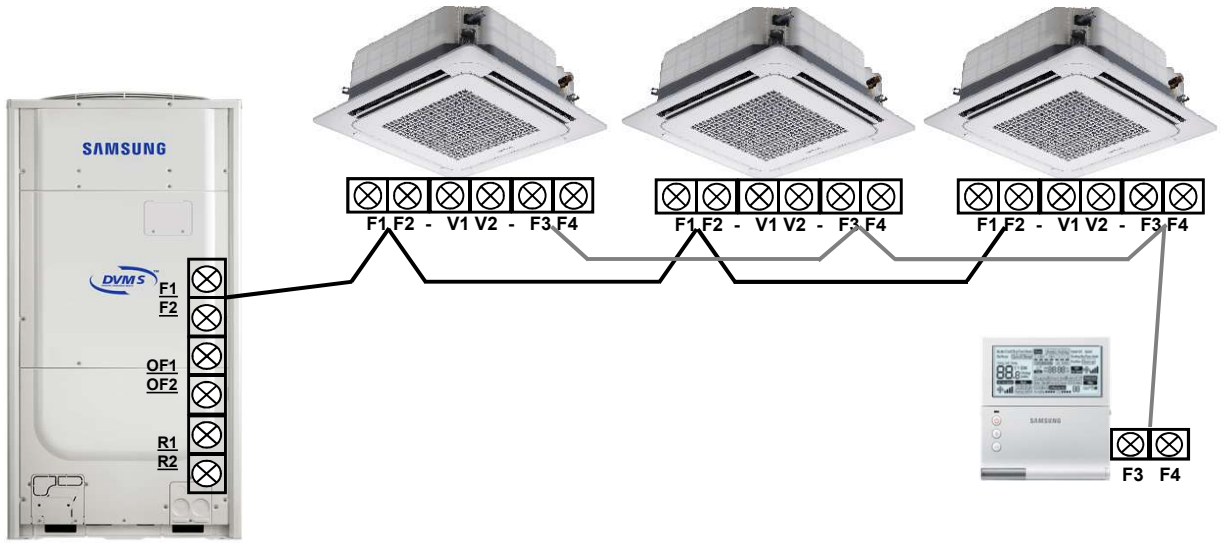
DVM S Control Wiring Review Exercises

Single Zone Heat Pump System



262 2

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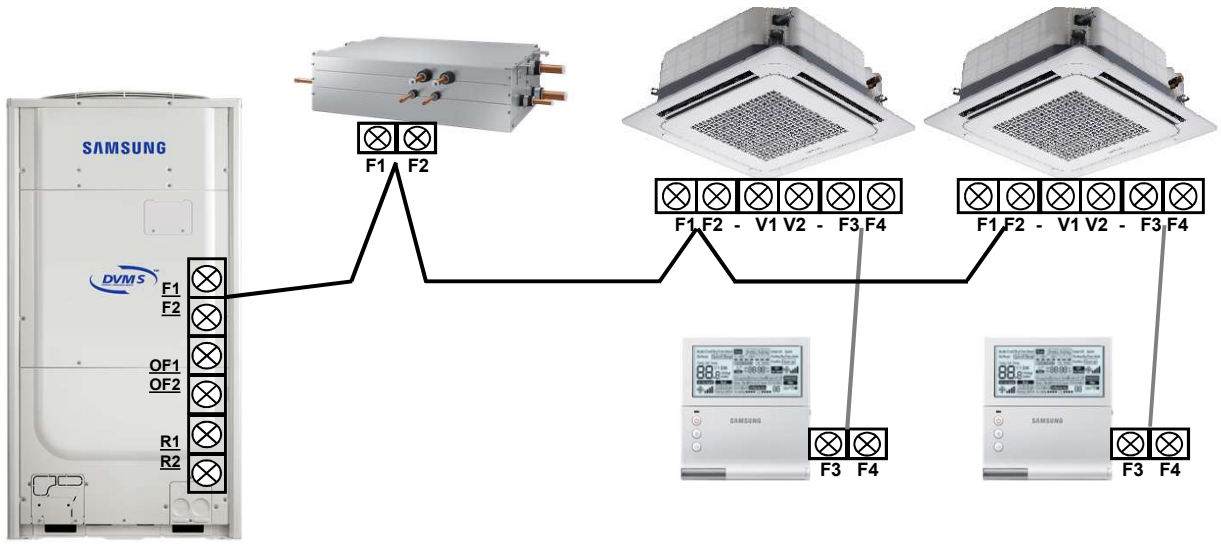
DVM S Control Wiring Review Exercises

Heat Recovery System



263 2

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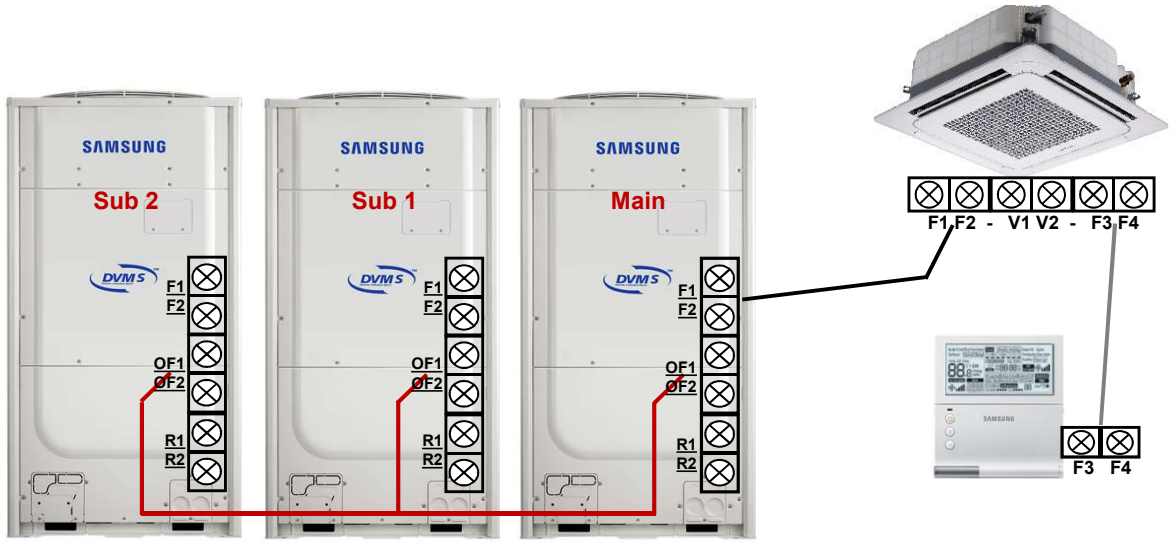
DVM S Control Wiring Review Exercises

Modular Heat Pump System – 3 outdoor units connected together



264 3

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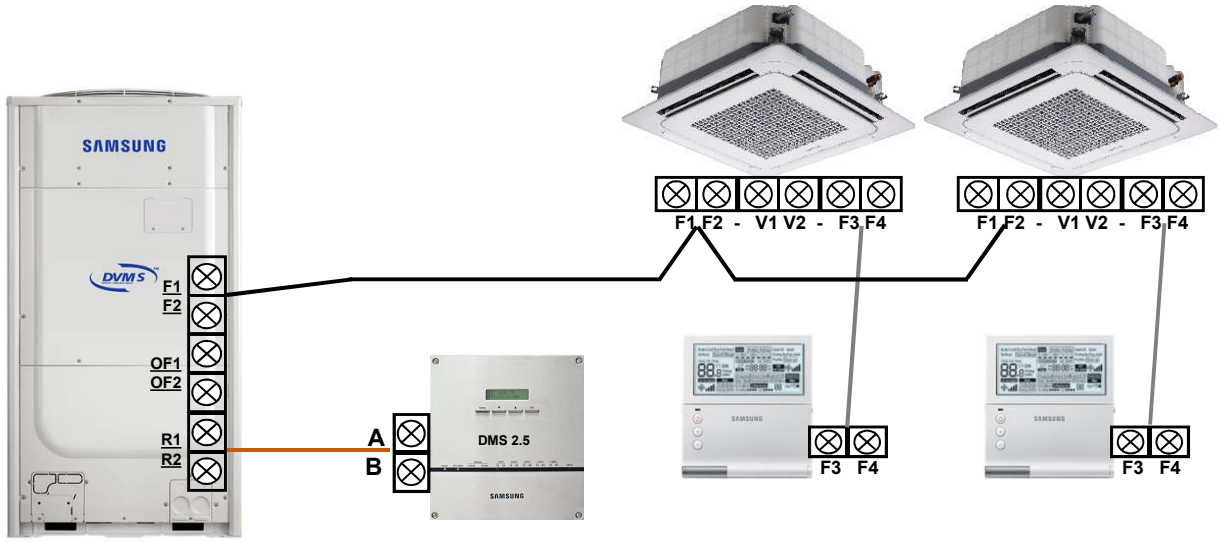
DVM S Control Wiring Review Exercises

Heat Pump System & Centralized Control



265 3

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You have completed the Day-1 DVMS training

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Split DOAS System Overview

- The Split DOAS is designed as a stand-alone, dedicated 1 to 1 connected system
- DOAS unit provides a dual coil design to deliver clean, dehumidified 100% outside air
  - Cooling main coil to cool and dehumidify the incoming outside air
    - Includes Honeywell C7400C enthalpy sensor allowing cooling at lower OA temperatures
  - Reheat coil to maintain neutral discharge air temperature
  - Each coil is controlled by a dedicated PCB and EEV

- VFD controlled three speed blower (Lo – Med – Hi)
- Integral filter rack to accommodate MERV rated high efficiency air filters

268

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Split DOAS System Overview

- Available in 1200, 2000 & 3000 CFM models AM***NNDDCV/AA
- Requires single dedicated Heat Recovery MCU (Mode Control Unit)
- Connects to specific Heat Recovery DVMS & DVMS Water outdoor units
  - 208/230 & 460 vac Models

- System controlled via Samsung NASA Protocol
  - Wired Controller, DMS 2.5 or BACnet

269

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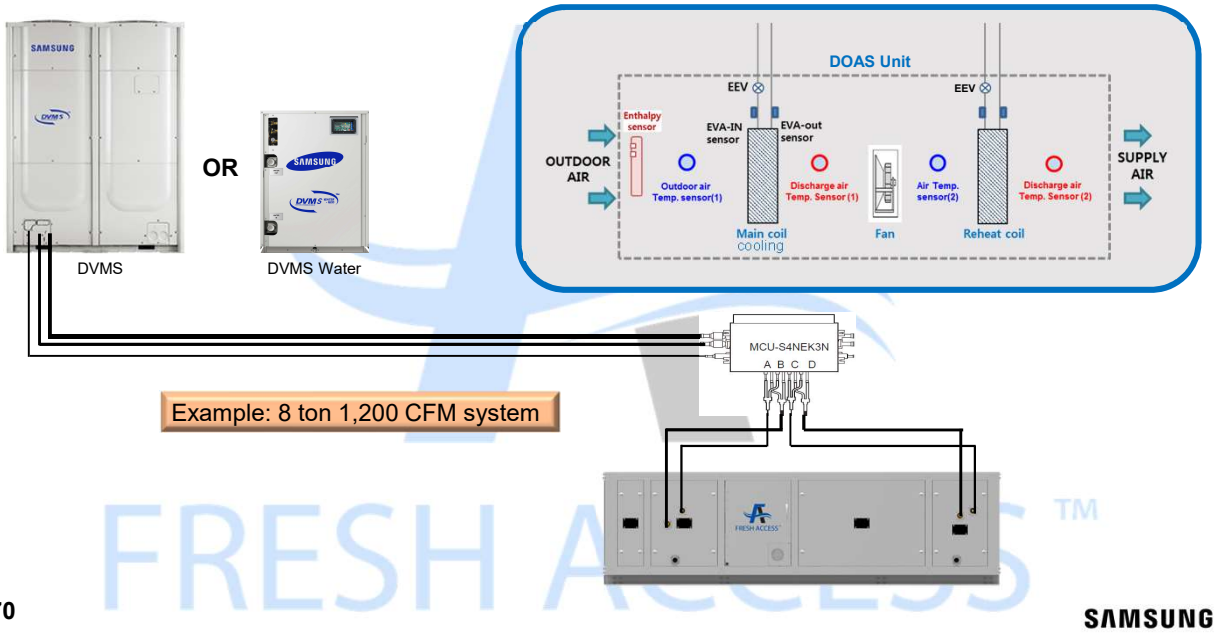
Split DOAS System Overview



270

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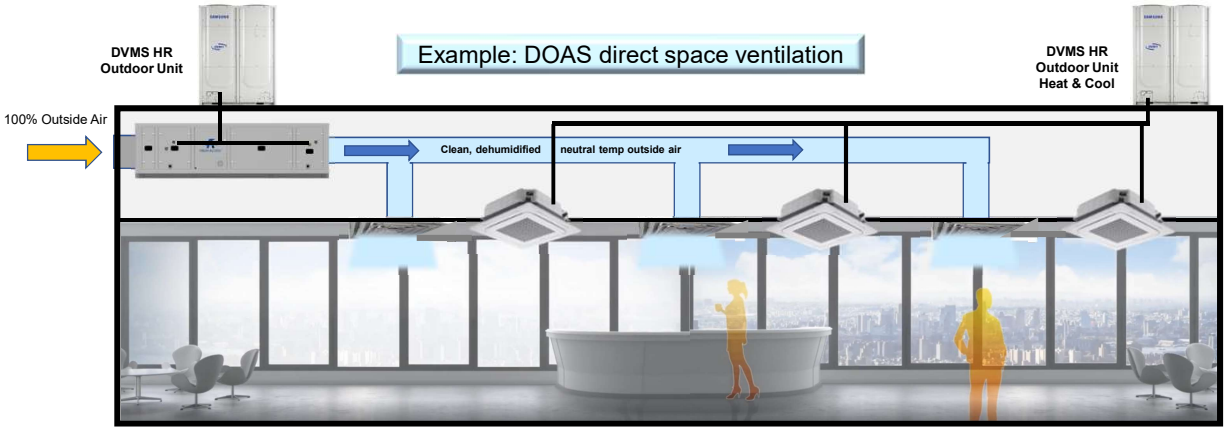
Split DOAS System Application

- Split DOAS system incorporates a dedicated Heat Recovery DVMS or DVMS Water outdoor unit
  - Provides 100% outside air, filtered, dehumidified and reheated as required
- The DVMS system is the main air conditioning system to control room temperatures
- All Split DOAS systems must be designed through Samsung DVM Pro software



271

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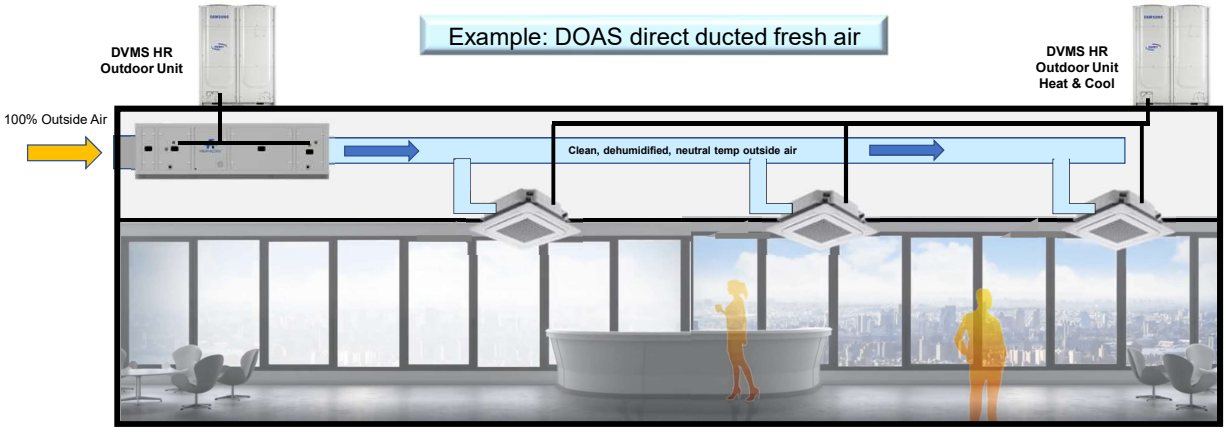
Split DOAS System Application

The Split DOAS unit can be directly ducted to DVMS cassette indoor units, and the return air of the DVMS ducted indoor units



272

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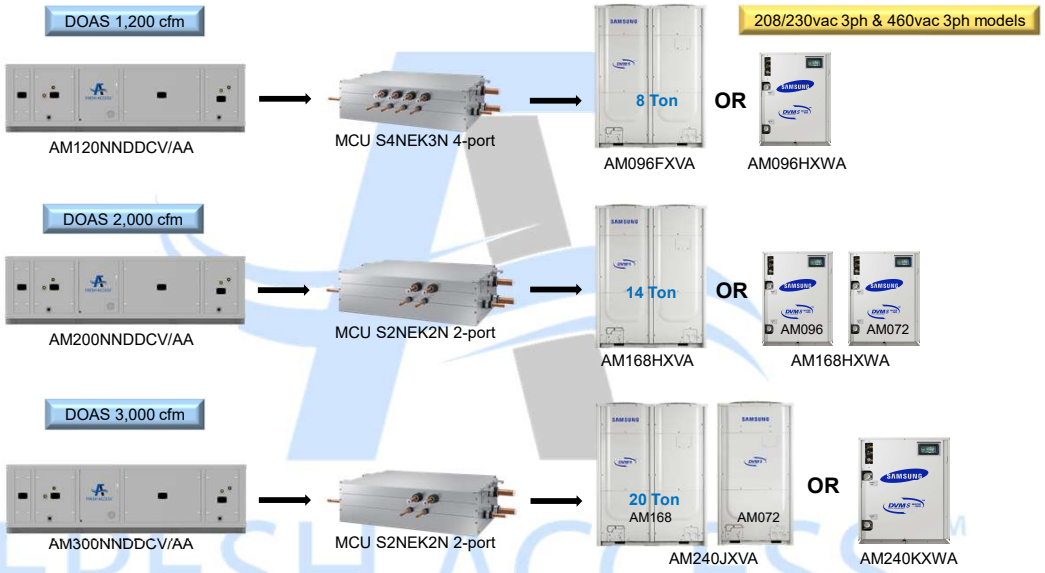
Split DOAS Approved Systems



273

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Split DOAS Features & Specs

- Inlet air temperature range:
  - Cooling DB 50°F ~ 125°F WB 48°F ~ 109°F
  - Heating DB 23°F ~ 59°F (incoming outside air below 23°F requires preheating)
- Discharge air temperature range: 64°F ~ 109°F
- Reheat coil is disabled when the outside ambient temperature is above 86°F
- DOAS indoor unit option settings are preprogrammed

- DOAS main and reheat coil PCB controllers are set up from the factory
  - The reheat PCB controller is the master
- DOAS indoor unit includes a factory installed MWR-WE13N wired controller, used to configure and control the unit (Wired controller can be installed remotely up to 328ft)

274

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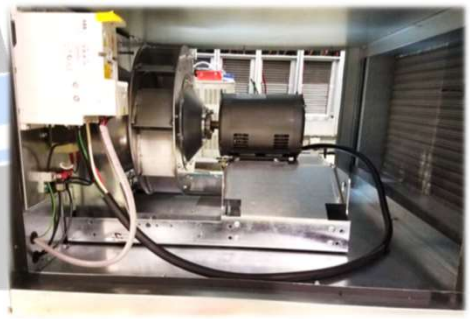
Split DOAS Features & Specs

- DOAS indoor unit includes a VFD and is factory programmed to control the fan speeds from Lo to Med and Hi
  - Alternate fan speed control can be field programmed in the DOAS VFD controller



275

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Split DOAS Features & Specs

- The DOAS system standard configuration and control is through the factory installed MWR-WE13N wired controller
- The Split DOAS system can be controlled via Samsung central controls or 3rd party BMS through the Samsung BACnet gateway

MWR-WE13N
Wired Controller
Standard

DMS Data Management
Server 2.5 MIM-D01AUN

BACnet Gateway 2.5
MIM-B17BUN

276

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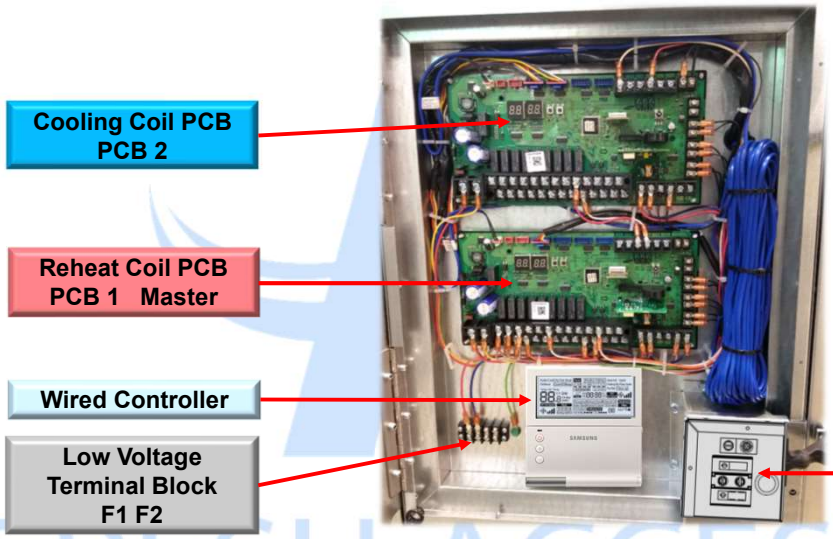
Split DOAS Control Box



277

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Split DOAS Unit Installation

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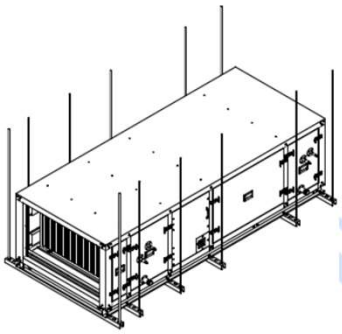
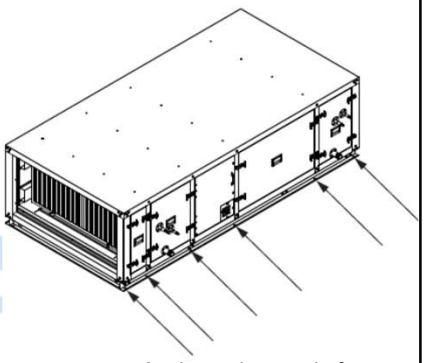
Split DOAS Indoor Unit Installation



- Maintain proper clearances and service access
  - ≥30” access clearance in front of unit
- DOAS unit must be installed level
- Condensate drains should include traps
  - Cooling coil is under negative pressure
  - Reheat coil is under positive pressure
- Inlet and supply ductwork should be connected to the DOAS unit using flexible connectors
- The DOAS indoor unit can be installed on a level platform base (floor)
  - Unit must be secured to the platform base with appropriate hardware
- The DOAS unit can be suspended using 2” Unistrut with ½” threaded rod, nuts and washers
  - Insure that the hangar rods do not interfere with service panels, piping and air filter access
  - Hangar vibration eliminators are recommended



Anchor points to platform front and rear

279

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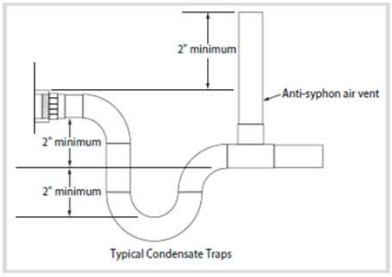
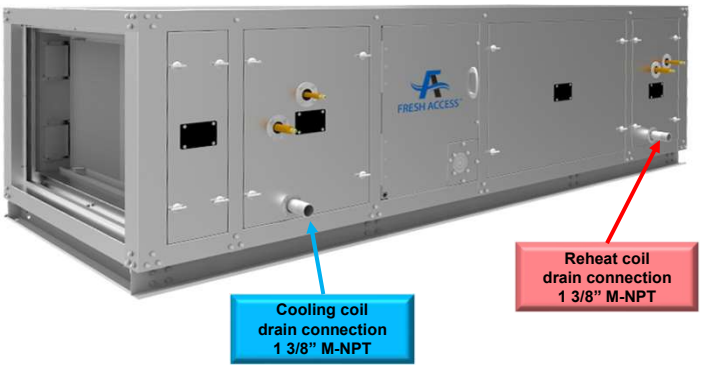
Split DOAS Indoor Unit Condensate Drains





- Condensate traps must be installed for both the cooling and reheat coils
  - Cooling coil is under negative pressure
  - Reheat coil is under positive pressure
- Always follow state and local codes for condensate piping requirements

280

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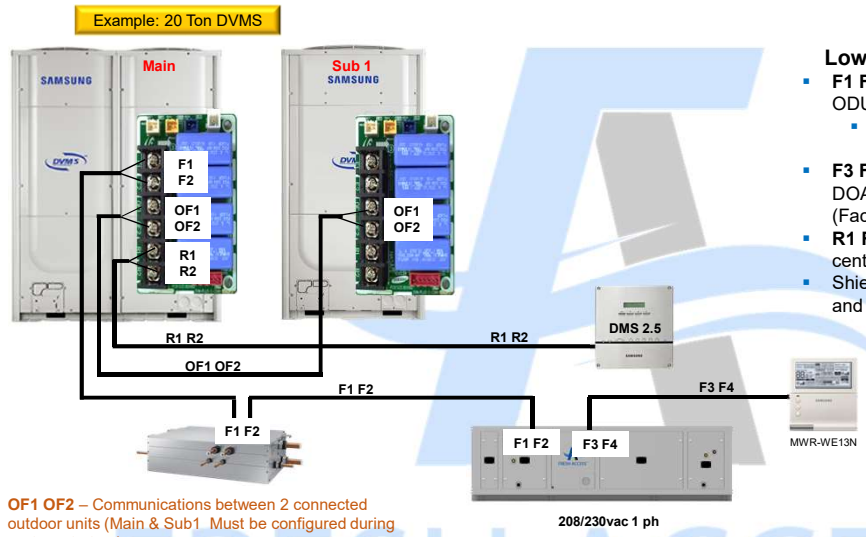
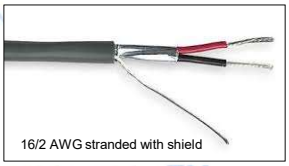
Split DOAS System Control Wiring



Low voltage control circuits (Layers)

- **F1 F2** – Set Layer: Communications from ODU to MCU and DOAS unit
  - Must be connected in a Daisy chain configuration
- **F3 F4** – Local layer: Communication from DOAS unit and wired controller (Factory wired – can be relocated up to 328ft)
- **R1 R2** – Control Layer: Communications with centralized control or BACnet gateway
- Shield is bonded through MCU and DOAS unit and terminated at the outdoor unit (Main)



OF1 OF2 – Communications between 2 connected outdoor units (Main & Sub1 Must be configured during system start up)

281

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Split DOAS Refrigerant Piping

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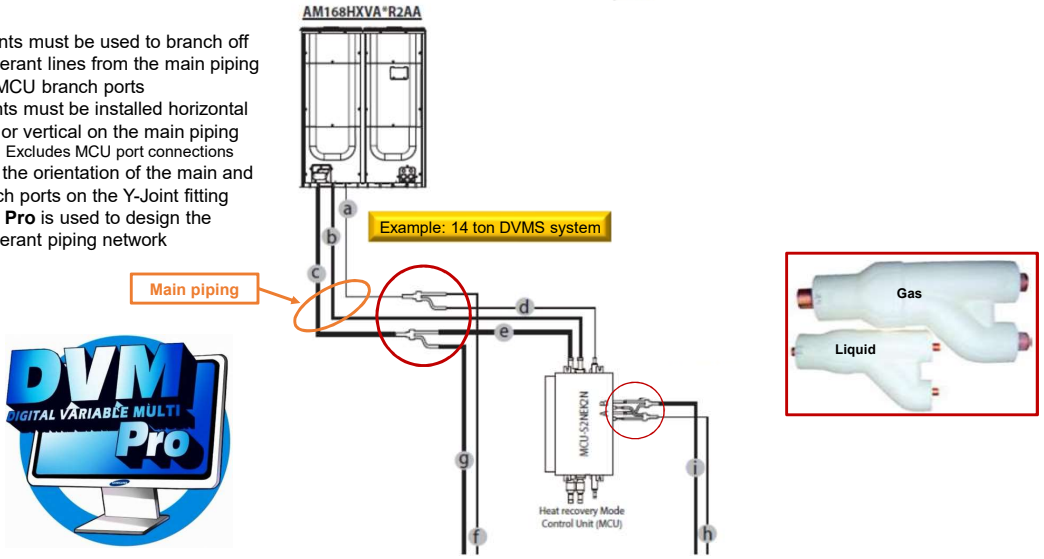
Refrigerant Piping Components

Main Indoor Piping & MCU – Y-Joint Fittings

- Y-Joints must be used to branch off refrigerant lines from the main piping and MCU branch ports
- Y-joints must be installed horizontal level or vertical on the main piping
  - Excludes MCU port connections
- Note the orientation of the main and branch ports on the Y-Joint fitting
- **DVM Pro** is used to design the refrigerant piping network



283

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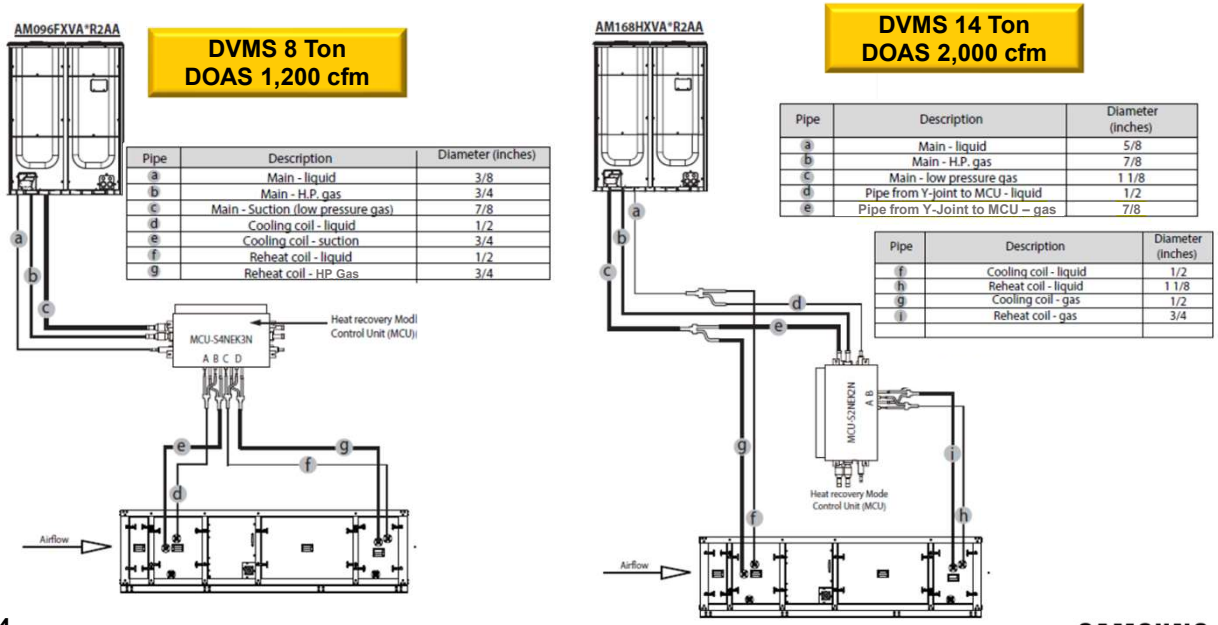
Basic Refrigerant Piping Layout



284

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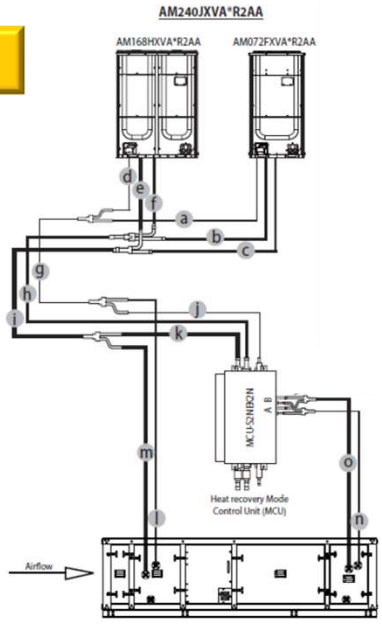
Basic Refrigerant Piping Layout

DVMS 20 Ton
DOAS 3,000 cfm



Pipe	Description	Diameter (inches)
a	ODU 2 - liquid	3/8
b	ODU 2 - H.P. gas	5/8
c	ODU 2 - suction (low pressure gas)	3/4
d	ODU 1 - liquid	5/8
e	ODU 1 - H.P. gas	7/8
f	ODU 1 - suction (low pressure gas)	1 1/8
g	Main - liquid	5/8
h	Main – HP gas	3/4

Pipe	Description	Diameter
i	Main - Suction (low pressure gas)	1 1/8
j	Pipe from Y-joint to MCU - liquid	1/2
k	Pipe from Y-joint to MCU - suction	1 1/8
l	Cooling coil - liquid	5/8
m	Cooling coil - suction	1 1/8
n	Reheat coil - liquid	1/2
o	Reheat coil - H P Gas	3/4

285

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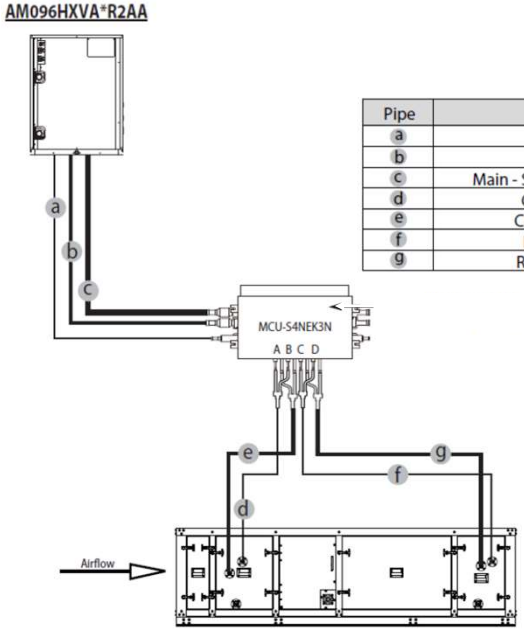
Basic Refrigerant Piping Layout

DVMS Water 8 Ton
DOAS 1,200 cfm



Pipe	Description	Diameter (inches)
a	Main - liquid	3/8
b	Main - H.P. gas	3/4
c	Main - Suction (low pressure gas)	7/8
d	Cooling coil - liquid	1/2
e	Cooling coil - suction	3/4
f	Reheat coil - liquid	1/2
g	Reheat coil - HP gas	3/4

286

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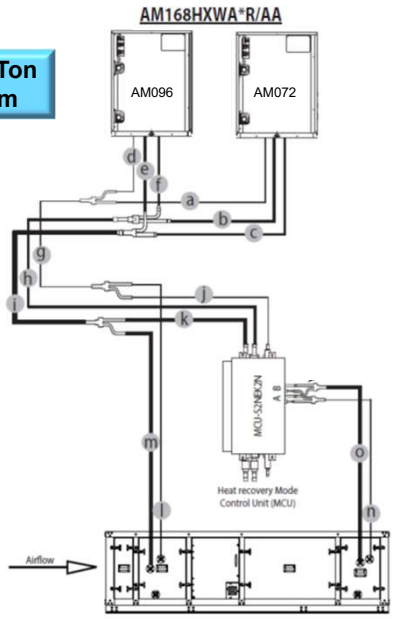
Basic Refrigerant Piping Layout

DVMS Water 14 Ton
DOAS 2,000 cfm



Pipe	Description	Diameter (inches)
a	ODU 2 - liquid	3/8
b	ODU 2 - H.P. gas	5/8
c	ODU 2 - suction (low pressure gas)	3/4
d	ODU 1 - liquid	3/8
e	ODU 1 - H.P. gas	3/4
f	ODU 1 - suction (low pressure gas)	7/8
g	Main - liquid	5/8
h	Main – HP gas	3/4

Pipe	Description	Diameter
i	Main - Suction (low pressure gas)	1 1/8
j	Pipe from Y-joint to MCU - liquid	1/2
k	Pipe from Y-joint to MCU - suction	1 1/8
l	Cooling coil - liquid	1/2
m	Cooling coil - suction	1 1/8
n	Reheat coil - liquid	1/2
o	Reheat coil - H P Gas	3/4

287

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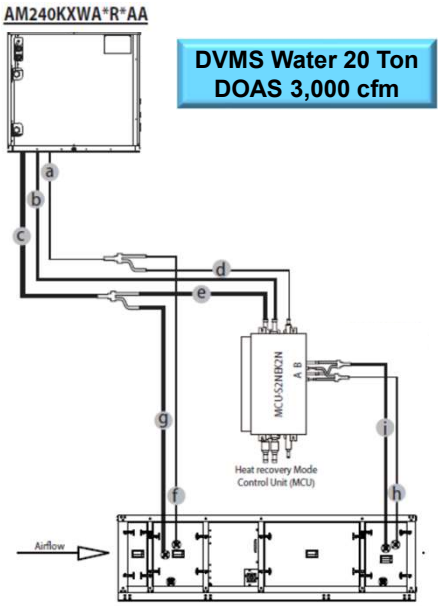
Basic Refrigerant Piping Layout

DVMS Water 20 Ton
DOAS 3,000 cfm



Pipe	Description	Diameter (inches)
a	Main - liquid	5/8
b	Main – HP gas	3/4
c	Main - Suction (low pressure gas)	1 1/8
d	Pipe from Y-joint to MCU - liquid	1/2
e	Pipe from Y-joint to MCU - suction	1 1/8

Pipe	Description	Diameter (inches)
f	Cooling coil - liquid	5/8
g	Cooling coil - suction	1 1/8
h	Reheat coil - liquid	1/2
i	Reheat coil - H P Gas	3/4

288

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Split DOAS Startup

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System Startup

System Power Up

- When power is applied to the system, the outdoor unit will display basic tracking information
- Power does not need to be applied in a specific order (outdoor units, indoor units, MCU's)
- If the outdoor unit is powered before the indoor units, error codes will appear but will go away once all system components are powered up

Sequence	Display	Details
1		Check display segment • Digit "8" flicker consecutively from left to right
2		Starting Tracking - "Ad" means starting tracking

290

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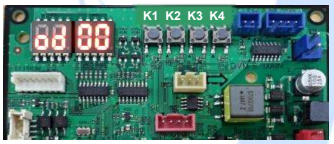
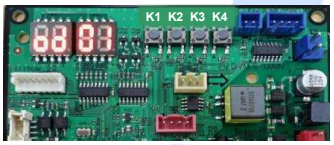
System Startup

Sequence	Display	Details
3		Outdoor Unit address not set
4		Press and hold **K1** & **K2** simultaneously to enter the setting mode. "od" = Outdoor Unit "od 00" = One outdoor unit (Main when more than 1 ODU) Modular system: each ODU must be addressed Main & Sub1
5		Press and release the **K4** button to set number of outdoor units "od 00" = Main "od 01" = Sub1 unit Confirm setting: Press and hold the **K2** button, settings are saved This procedure is performed on each outdoor unit

291

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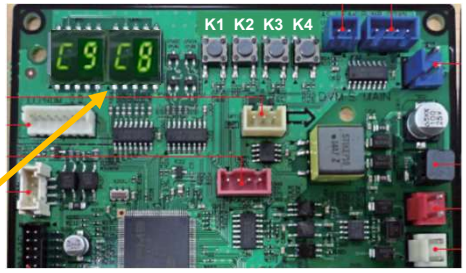
Outdoor Unit Commissioning

Confirming multiple outdoor unit communications

- When the outdoor units are properly addressed the display indicates the communication status on the Main outdoor unit PCB
- "C" (communication) blinks when outdoor units communicate



Unit	Main MICOM
Main	8
Sub 1	9

292

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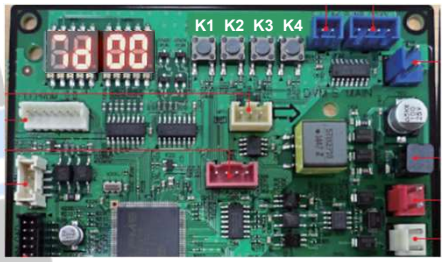
Outdoor Unit Settings – Quantity of Indoor Units

- Enter the option setting mode
  - Press and hold K1 & K2 for 2 seconds
- Enter the “Indoor Unit Quantity” setting mode:
  - Press K1 once
- Manual setting mode (Default)
  - Press K4: once (ones)
- Automatic setting mode (option)
  - Press and hold K4 for 2 seconds
- Press and hold K2 for 2 seconds to save the count display back to normal

- Cancel setting: Press and hold K2 for 2 seconds



293

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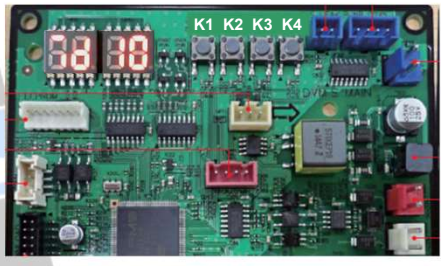
Outdoor Unit Settings – Quantity MCU

- Enter the option setting mode
  - Press and hold K1 & K2 for 2 seconds
- Enter the setting mode: Indoor Unit Quantity
  - Press K1
- Enter setting mode: MCU Quantity
  - Press K1
- Manual setting mode (Default)
  - Press K4: once (ones)
- Automatic setting mode (option)
  - Press and hold K4 for 2 seconds
- Press and hold K2 for 2 seconds to save the count display back to normal

- Cancel setting: Press and hold K2 for 2 seconds



294

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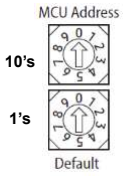
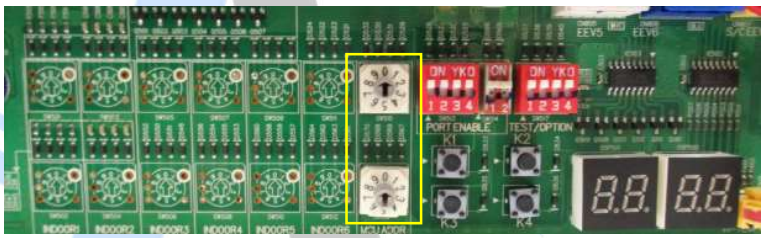
MCU Address Setting





295

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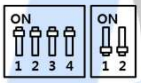
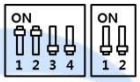
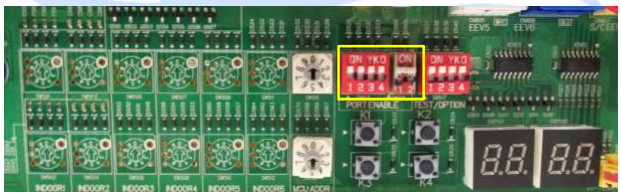
MCU Port Settings

DIP switch setting for using each MCU port

Model	MCU-S4NEK3N	MCU-S2NEK2N
1200/2000CFM		
3000CFM		



296

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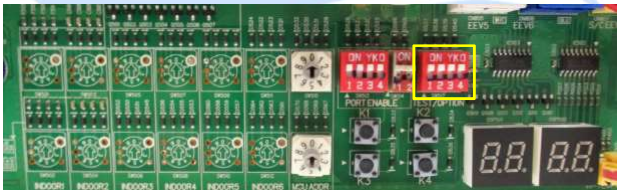
MCU Port Settings

DIP switch setting for using Y-Joint fittings

Model	MCU-S4NEK3N	MCU-S2NEK2N
1200/2000CFM		
3000CFM		



297

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MCU Auto Pipe Pairing

NOTE: MCU address and dip switch settings must be completed before Auto Pipe Pairing operation is initiated

You can use the Automatic pipe-address setting operation to automatically set the address of each MCU port that is connected to an indoor unit.

To run the Auto pipe pairing operation, take the following steps:

1.Press the **K2 button 13 times** on the main PBA of the outdoor unit to start the Auto pipe pairing operation. (Display : 88)

Temperature	Outdoor temperature < 75°F	75°F ≤ Outdoor temperature < 86°F	86°F ≤ Outdoor temperature
Avg. Indoor temperature < 75°F	Main heating operation	Main heating operation	Main cooling operation
Avg. Indoor temperature ≥ 75°F		Main cooling operation	

- The operation takes about 25 to 55minutes normally depending on the number of indoor units connected.(Max 2hours)

Step 1 (Start 88) → Steps 2 - 8 (Setup 88) → Step 9 (Check 88) → Step 10 (Confirmation 88)

298

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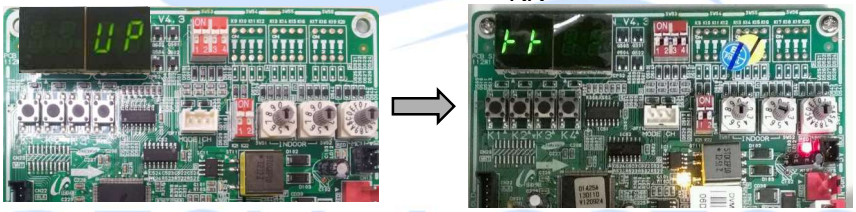
Auto Trial

Step 1: Auto-Trial Operation

Hold K1 on MAIN outdoor unit for 5 seconds

- "UP" = "UnPrepared"
- To clear UP status, hold K1 button for 5 seconds
- The display will show "KK"
- The outdoor unit will run through various outdoor unit and system checks
- The unit will also look at indoor unit sensors, outdoor temperature, etc.
- When complete, the unit will stop and display will scroll connected equipment addresses

"KK"



299

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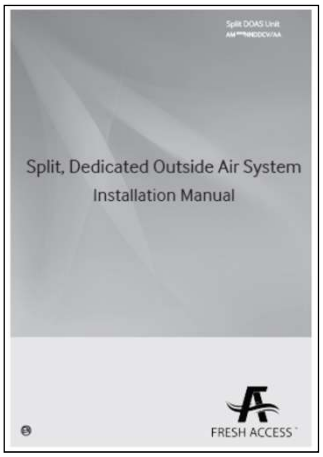
Additional Information

For specific installation related information and additional features and function settings, refer to the Split DOAS Installation Manual



300

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FRESH ACCESS™

Thank You !

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SAMSUNG HVAC Exclusive Dealer Features

Easy System Error Code Diagnostics & New System Registration

SAMSUNG HVAC Dealer Mobile App

Dealer support at your fingertips
Android or IOS devices

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Error Code Diagnostics

All Samsung Residential/Light Commercial and Commercial systems implement processor based self-diagnostics which generate error codes to identify specific operational and component issues

System error code lists are included in the Installation and Service Manuals & DVMS Error Code Booklet

There is an easy way to access the error code lists with descriptions by simply using the

SAMSUNG HVAC Dealer Mobile app on your Android or IOS devices

303

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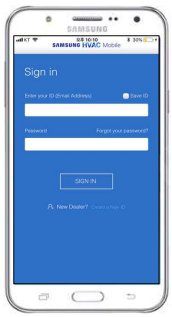
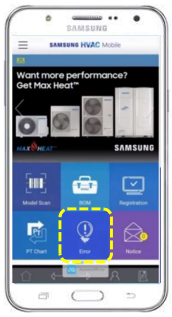
Error Code Diagnostics

The error code listing with descriptions for the complete Samsung product line is easily accessed through the Dealer Mobile App.



Launch the app and sign in



Select "Error" tab from Menu

Enter the error code or enter the type of error i.e. "Communication"

You can select the video description of the error code

Error codes greatly enhance the diagnostic procedures required to quickly and accurately analyze and resolve system component and operation issues

304

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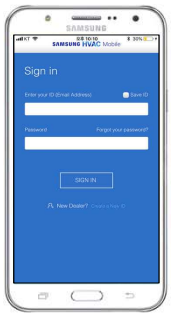
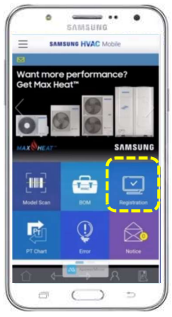
Samsung System Registration

New Samsung systems can be conveniently registered through the SAMSUNG HVAC Dealer Mobile App

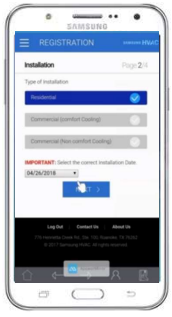


Launch the app and sign in



Select the "Registration" tab from Menu

Enter the installation information including the end-user email address



Select the installation type:
Residential
Commercial (comfort cooling)
Commercial (non-comfort cooling)
Select installation date

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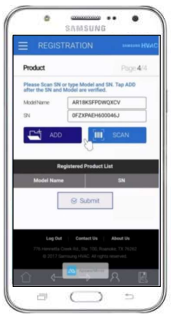
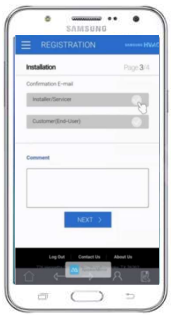
Samsung System Registration

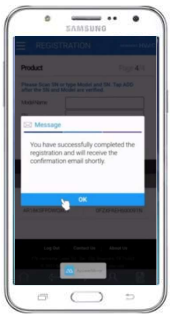
System unit model and serial numbers can be typed in, however with the Dealer Mobile App, each unit's model and serial number can be easily scanned in – Multiple units can be scanned for each system



The product model & serial # will appear, then Select "ADD" to enter an additional unit
Select "Submit" when all units have been added for the system



Enter the confirming E-mail address
Select:
Installer/Servicer or Customer (end-user)
Add any comments



When properly submitted, the registration is complete and confirming email will be sent

NOTE: Every new Samsung air conditioning system must be properly registered within 60 days of installation to activate the enhanced warranty on eligible products

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Thank You !

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