Samsung DVM S Installation & Start Up Training

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Samsung DVM S Installation & Start Up Training Disclaimer

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 DVM S 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 DVM S equipment due to numerous high voltage components. Whether installing or servicing DVM S 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

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

www.samsunghvac.com https://Samsung.csod.com

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DVM S VRF Technology Defined

- Digital Variable Multi
- Applications
  - 6 – 44 tons, per system
  - 1 - 3 outdoor units
  - 64 indoor units per system
  - Single refrigerant network
    - Up to 3,280 ft. collective piping length
  - Capacity is controlled by
    - Inverter driven variable speed scroll compressors
    - Electronic expansion valves
  - Capacity control
    - Is based on the individual zone load changes
    - Allows for increased system efficiency in part load conditions

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VRF Heat Pump Systems

- Heat Pump Systems
  - Heating or cooling
    - Not simultaneous
  - 2-Pipe refrigerant network
    - Liquid & Dual pressure gas
    - Utilizing Y-Joints/Headers

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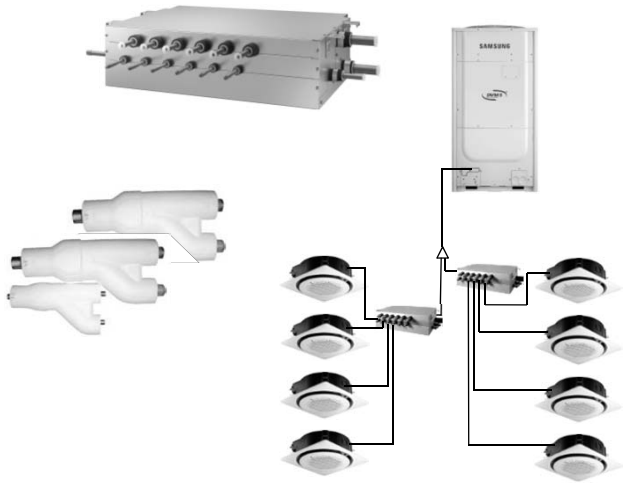
VRF Heat Recovery Systems

- Heat Recovery Systems
  - Simultaneous heating and cooling operation
  - Auto changeover control
  - 3-pipe refrigerant network
    - Liquid
    - Low pressure gas
    - Dual pressure vapor
  - Utilizing MCU'S & y-joints



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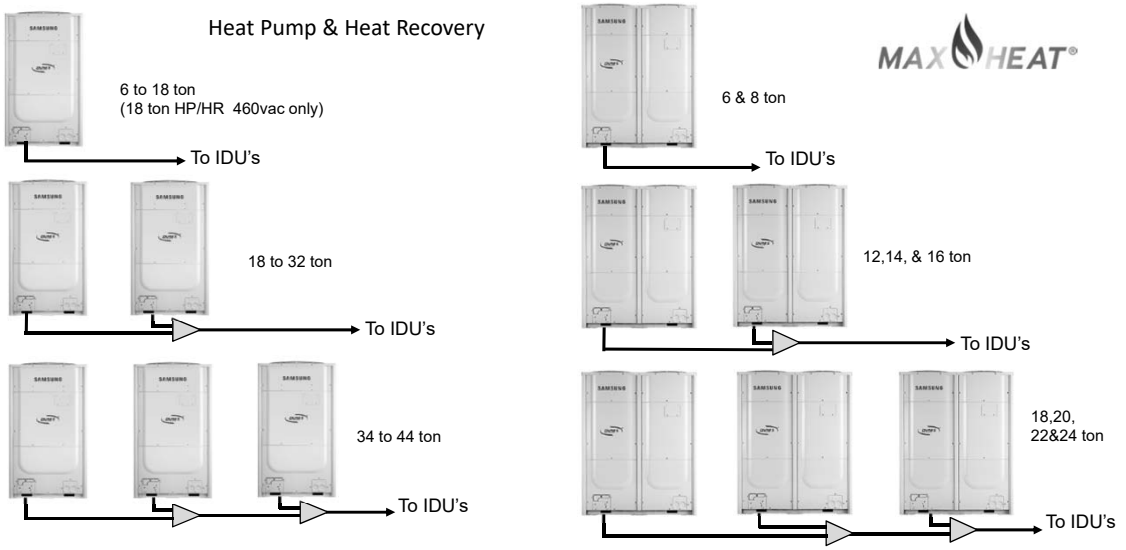
VRF Air Cooled Configurations - Single & Modular



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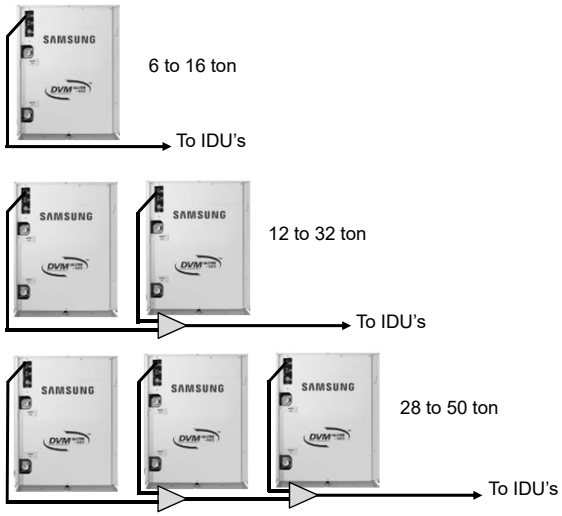
VRF Water Cooled Configurations - Single & Modular

- 3 phase condensers
  - 6,8,10 ton single compressor units
  - 16 & 20 ton dual compressor units
- Field configured Heat Pump or Heat Recovery operation
  - Requires “K” tactile setting and HP valve set
- Closed loop condenser water circuit
- If hydrothermal or open cooling towers are used, additional heat exchangers must be installed.



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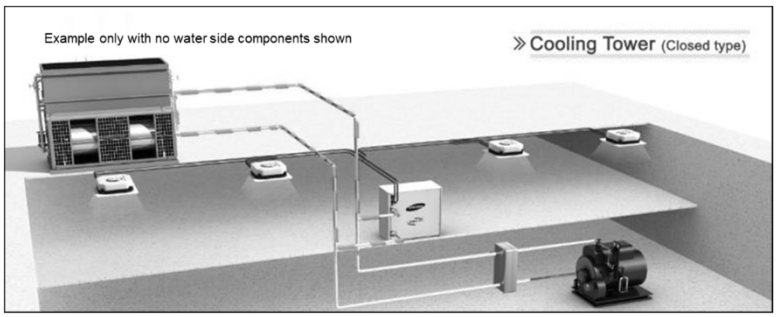
Condenser Water Circuit Applications



- Closed loop circulating water must have proper water treatment (Samsung specifications)
- Standard operating water temperature: 50˚F to 113˚F (without antifreeze)
  - Inlet water temperature below 50˚F requires antifreeze
  - Lowest inlet water temperature: 14˚F (requires antifreeze rated below 5˚F)
  - Refer to Samsung Water Design Guide

NOTE: ALL closed loop designs require Samsung’s water quality management – See Installation Manual for water quality requirements

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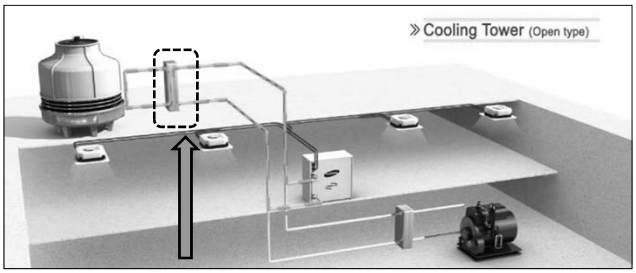
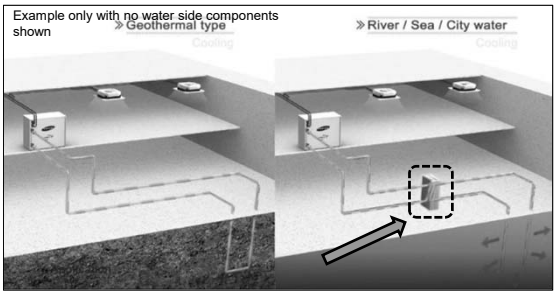
Condenser Water Circuit Applications



Example only with no water side components shown



When using an open type cooling tower, an intermediate heat exchanger must be used

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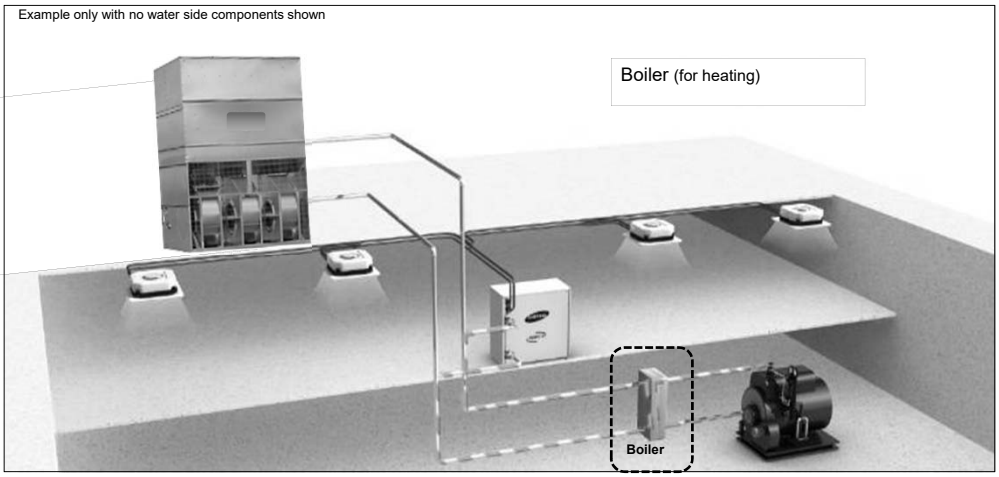
Condenser Water Circuit Applications



Boiler is used to temper water loop temperature in heating operation

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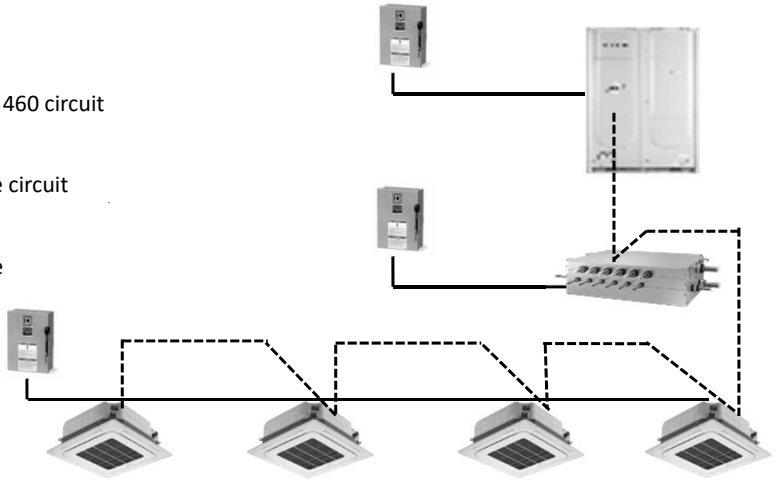
DVM S System Power & Control Circuits

- Line voltage
  - Outdoor:
    - Dedicated 3 Phase 208/230 or 460 circuit
  - Indoor:
    - Dedicated 208/230vac 1 phase circuit
  - MCU
    - Dedicated 208/230vac 1 phase
- Control Circuits
  - Communication
    - 2 conductor control wire
    - 16/2 stranded with shield



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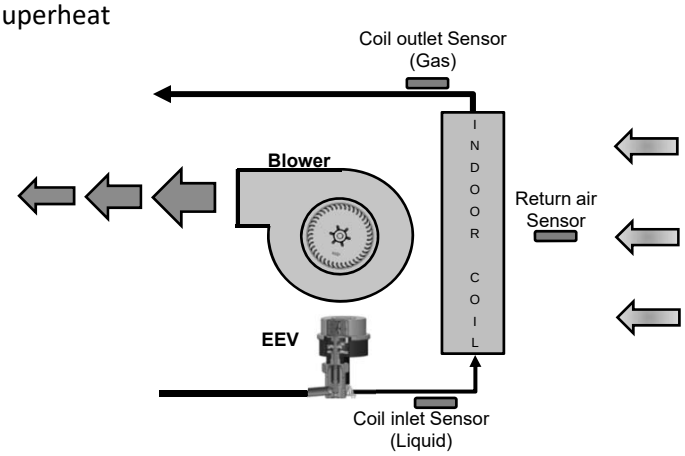
Indoor Fan Coil Basic Operation

- Internal EEV controls individual fan coil superheat and subcooling based on load demand
- Indoor temperature read from
  - Indoor unit return air sensor
  - Wired controller sensor
  - External room temperature sensor

MWR-TA
External Room Sensor

Example:
MWR-WE13UN

Room Sensor



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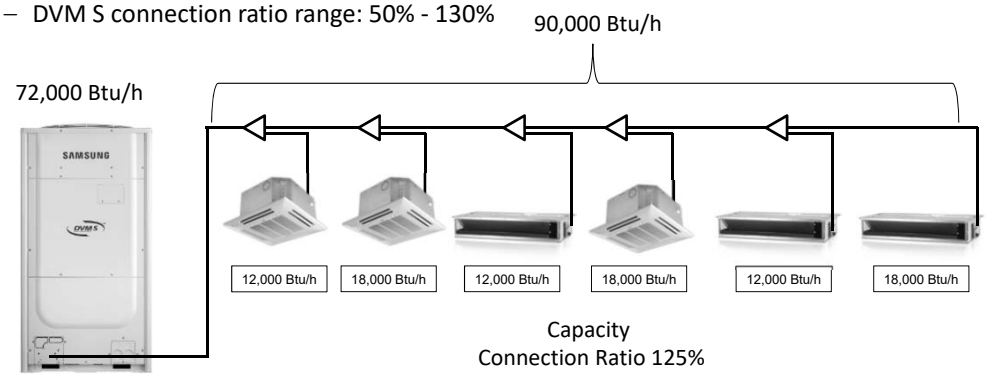
Capacity Connection Ratio

- Maximum outdoor unit capacity in relation to total capacity of the connected indoor units
- Indoor unit capacity can be greater or lower than outdoor unit maximum capacity
  - DVM S connection ratio range: 50% - 130%



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

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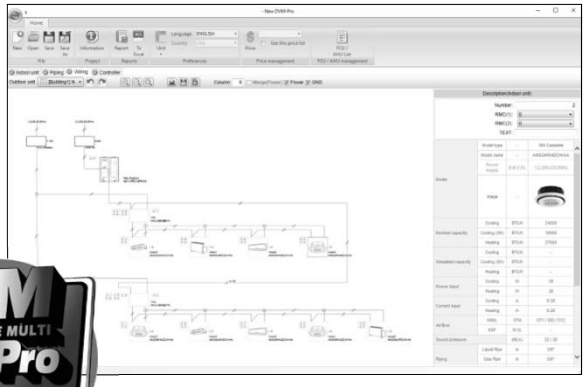
DVM PRO Software

- Every great job starts and finishes with DVM PRO
  - Piping Size and layout
  - Power & Communication Wiring
  - System Match Ups
  - Charge Adjustment



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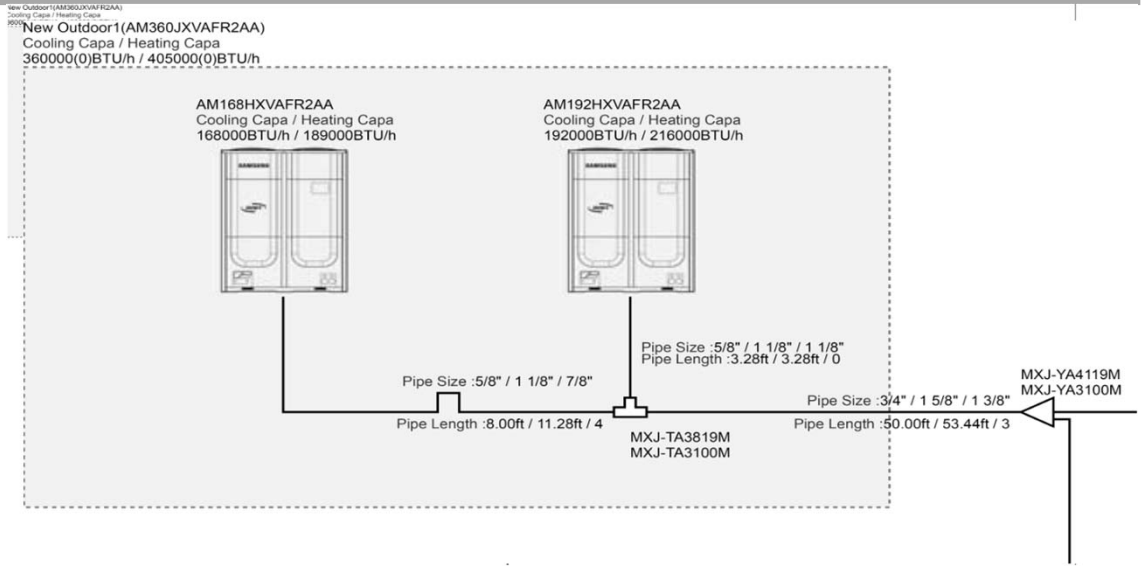
Piping Size and Layout



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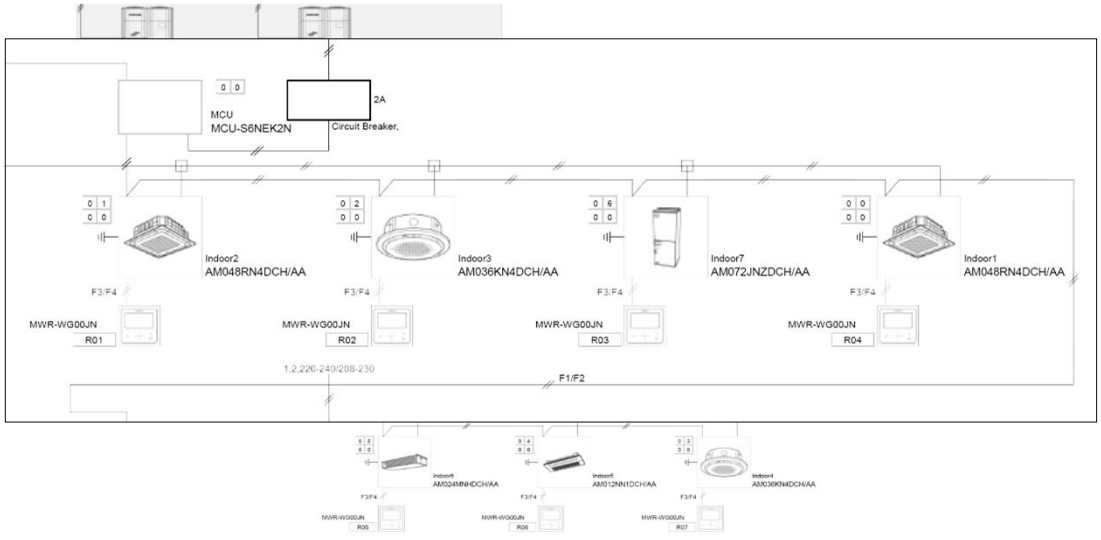
Wiring



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System Match up & Charge Adjustment

1) Equipment list

Categories	Model name		Qty	Categories	Model name		Qty
DVM S(NEW)	AM360JXVAFR2AA	AM168HXVAFR2AA	1			MXJ-TA3819M	1
		AM192HXVAFR2AA	1	Y-Joint		MXJ-TA3100M	1
Wind-Free 4Way Cassette		AM048RN4DCH/AA	2			MXJ-YA4119M	1
360 CST (Circle)		AM036KN4DCH/AA	2			MXJ-YA3100M	1
Wind-Free 1Way Cassette		AM012NN1DCH/AA	1			DB96-23143A	1
DUCT S		AM024MNHDCH/AA	1			DB96-23144A	1
Multi AHU(Vertical)		AM072JNZDCH/AA	1	Mode Change Unit		MCU-S6NEK2N	2

2) Piping length

Length as pipe diameter		1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 3/8"	1 1/2"	1 5/8"	1 3/4"	1 7/8"	2"	2 1/8"
1. Liquid piping	ft	3.28	33.69		36.29	50.00											
2. Gas piping	ft			3.28	16.40	17.29			36.29				50.00				
3. High pressure gas piping	ft				3.28		8.01		28.28		50.00						
Restriction of pipe length		Restriction (Based on installation manual)							Actual piping length							Equivalent piping length	
1. Total piping length	ft	3281.00							126.21								
2. Maximum piping length	ft	656.00							99.48								121.46
3. Main pipe length	ft								50.00								
4. Piping length between the first branch and the farthest indoor unit	ft	148.00/295.28							40.49								
5. Level difference between outdoor and indoor unit(Max) (OD above ID unit / OD below ID unit)	ft	131.23/360.99							3.28								
6. Level difference between indoor units	ft	131.23															

3) Basic and additional charging ref. amount

Basic (Factory) charge ref. amount : 48.502 lbs

Additional Field charging ref. amount : 30.644 lbs

Total number of bendings : 13

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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***

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Air Cooled 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

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Water cooled Nomenclature - Outdoor unit

Example: AM 220 K X W A N H AA
(1) (2) (3) (4) (5) (6) (7) (8) (Buyer)

(1) Classification	
AM	DVM

(2) Capacity (3Digit)	
BTU	x 1000

(3) Year	
E	2012
F	2013
H	2014
J	2015
K	2016
M	2017

(5) Feature 1	
W	DVM Water

(6) Feature 2	
A	STANDARD / GENERAL / MODULE

(7) Voltage	
F	F(208~230V, 60Hz, 3Φ)
J	J(460V, 60Hz, 3Φ)

(8) Mode		
R	Heat Recovery	R410A

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Outdoor Unit Features

- Operating Temperature Range
  - Cooling: 23°F – 120°F (-13°F w/LACH1(2) Low Ambient Cooling Hood)
  - Heating: -13°F – 75°F ("MAX HEAT" 100% capacity at -13°F)

- Compressor modulation
  - Cooling: Target refrigerant low pressure
    - Sample Rate every 40 Seconds
  - Heating: Target refrigerant high pressure
    - Sample Rate every 40 Seconds

- Features
  - Indoor & Outdoor PCB – Removable EEPROM
  - Intelligent Defrost
  - Flash & Vapor Injection inverter scroll compressors
  - Advanced oil recovery cycle logic

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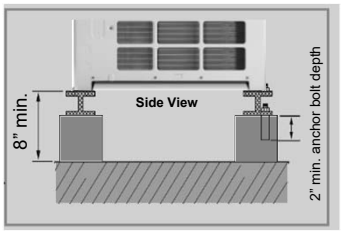
Outdoor Unit Placement

- Support the unit a minimum of 8 inches above grade, install above the normal snow line



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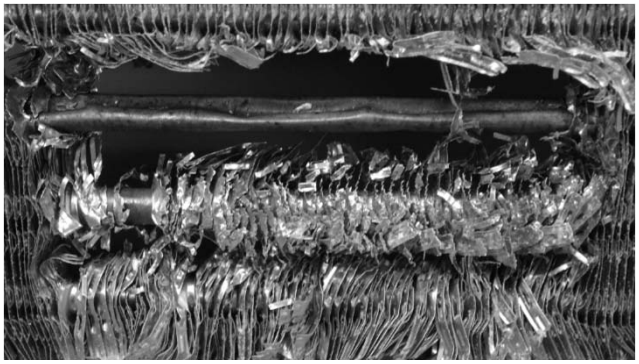
Outdoor Unit Placement

- Units must be installed on rails, or support structure for proper defrost operation or damage to the equipment may occur



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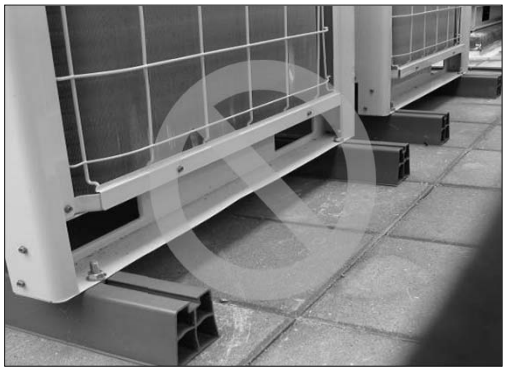
Outdoor Unit Placement



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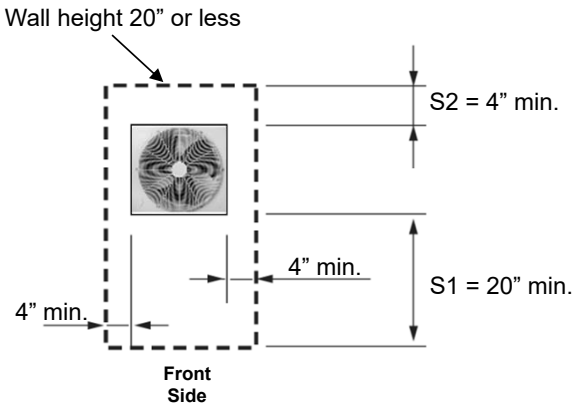
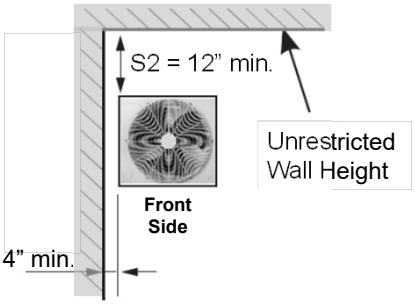
Single Unit Installation - Clearances Based on Wall Height





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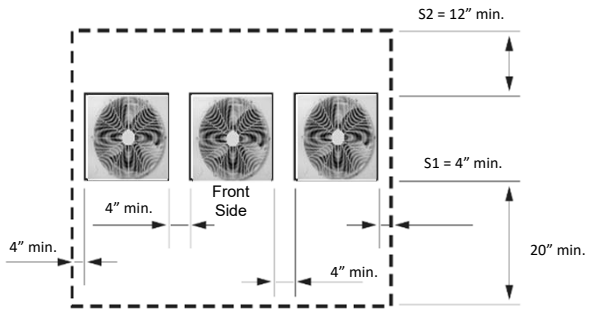
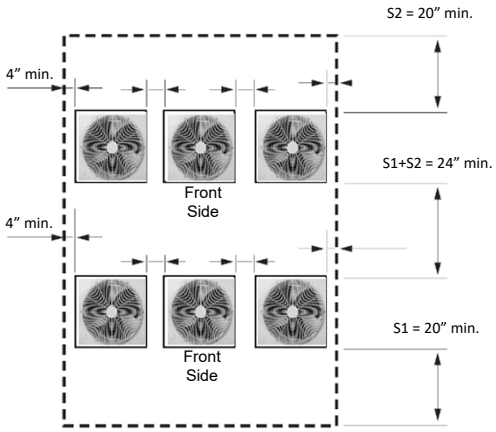
Module Unit Installation - Clearances Based on Wall Height

- 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”





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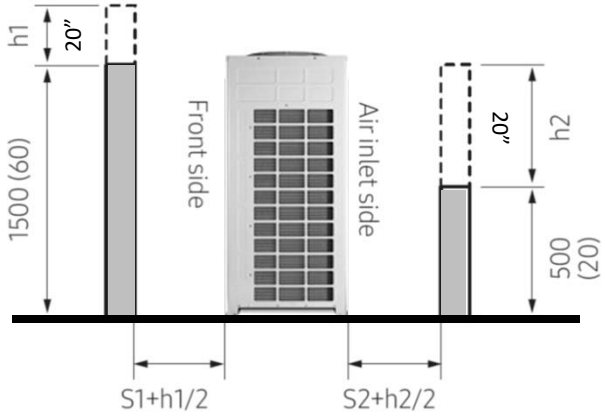
Module Unit Installation - Clearances Based on Wall Height

- If wall height exceeds the standard wall height
- Additional clearance of Half of the exceeded wall height must be added to the service space



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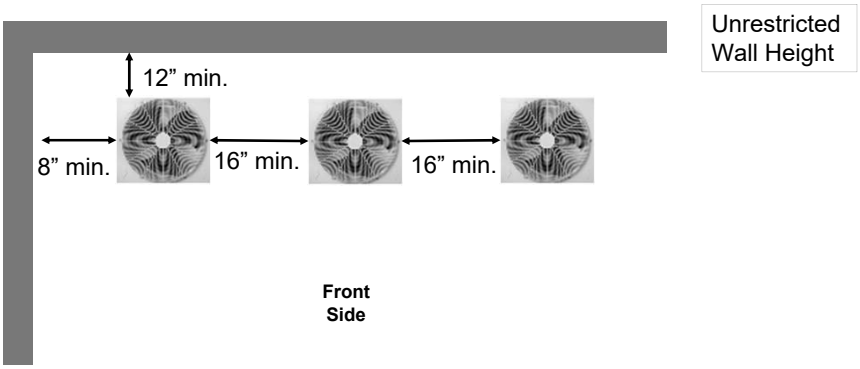
Module Unit Installation - Clearances Based on Wall Height

- Multiple systems with only two walls



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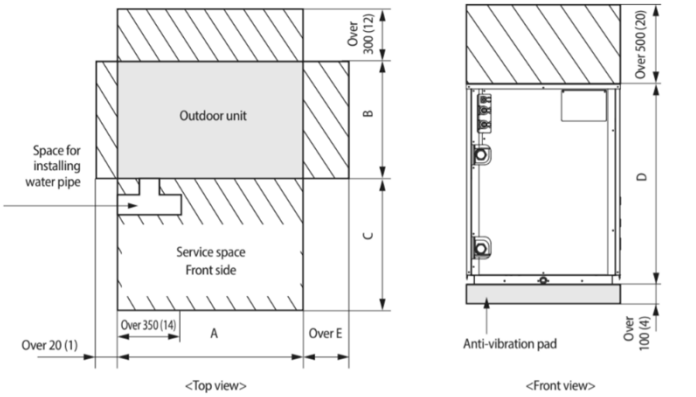
Water Cooled Clearance

Single installation

When the water pipe passes through top of the product

Unit: mm (inch)



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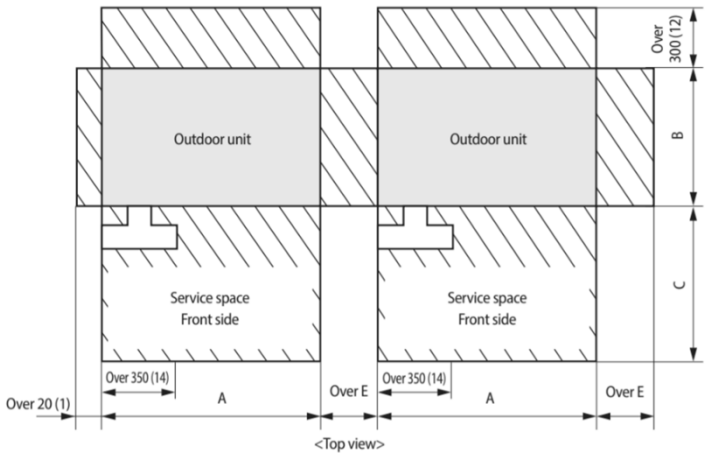
Water Cooled Clearance

Module or continuous installation

Unit: mm (inch)



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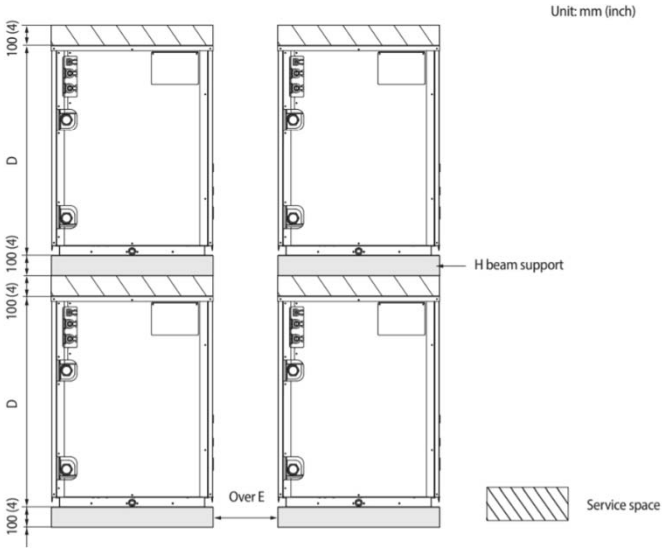
Water Cooled Clearance



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Outdoor Unit Placement Corrosive Atmospheres

- Avoid locations near bathroom and exhaust hood ventilators, boiler stacks or other corrosive atmospheres, etc.

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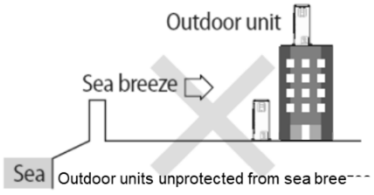
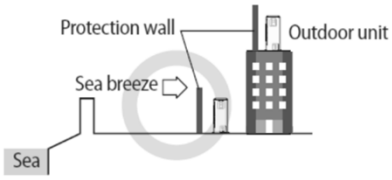
Outdoor Unit Placement - Coastal Installations

- 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*





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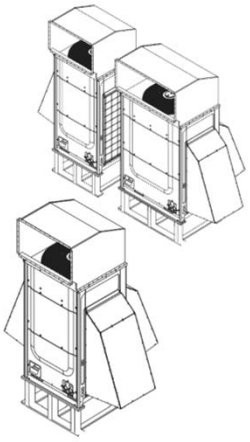
Outdoor Unit Wind/Hail Guards

- Protection from
  - high winds, Hail
  - Snow accumulation, Debris
- Single unit installation requires
  - Left, Right & Rear Guard required
- Modular systems
  - 1 left , 1 right guard, Multiple rear guards
- Top guard
  - May be installed facing forward or backward
  - Must be installed opposite of prevailing wind direction
- NOTE: Wire fan blade guard(s) must stay in place – do not remove



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Outdoor Unit Low Ambient Cooling Hood Kit

- Operating range down to -13°F
- Includes
  - Side guards, Top hood, Damper assembly
  - Damper actuator, Control PCB
  - Control transformer
- 208/230vac 1 Ph power required
- ODU must be installed ≥ 22” above normal snow level
- Damper hood must be positioned away from prevailing wind
- NOTE: Wire fan blade guard(s) must be removed to reduced noise potential

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Water Cooled Condenser Placement Guidelines

- DVMS Water condensers must be installed indoors only
  - Ambient temperature range: 33°F - 104°F <80% RH
  - Installation area must be ventilated
  - Condensers must be installed on a solid level surface
  - Minimum of 24 inch service clearance required in front of unit
- Refrigerant piping can be installed below or above condensers

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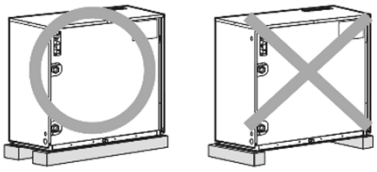
Water Cooled Condenser Placement Guidelines

- Condenser(s) must be properly supported
- Condenser base pans have a condensate drain fitting to direct condensate removal during unit operation
- Drain piping does not require a trap

Solid level base



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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 the humidity rises above 80%, the 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**

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Indoor Unit Model Nomenclature

AM 0 F N * D C 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
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

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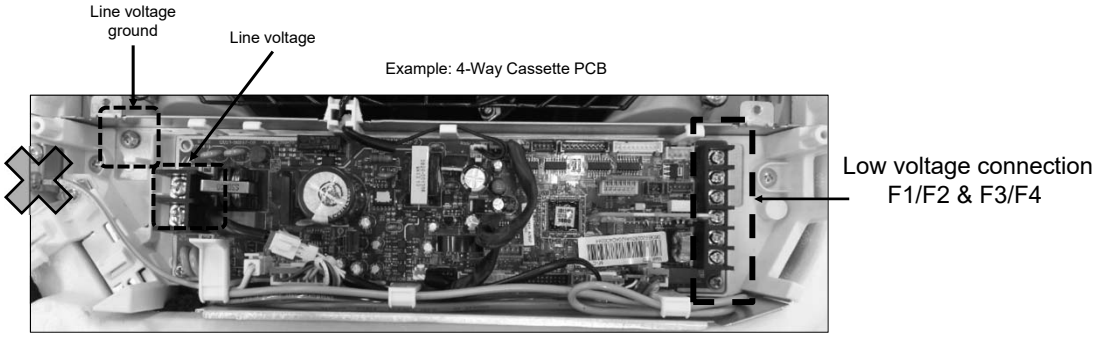
Indoor Unit Power Wiring

- 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



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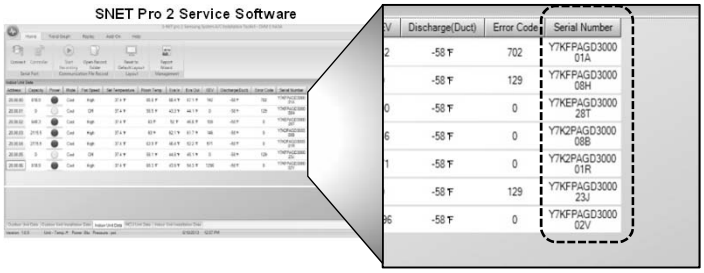
Indoor Unit Placement Documentation

- Document each unit's model, serial number and location and ID on a field supplied log form
  - Remove the model and serial sticker from the box
  - Place stickers on a field supplied log form to track location of units
  - SNET Pro 2 Service Software, can be viewed based on their serial number
  - Location can be edited in SNET Pro 2



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Cassette Features

Feature	Wind-Free™ 4 way	Wind-Free™ Mini 4 way	1 Way Wind-Free™
Capacity Mbtu	09,12,18,24,30,36,48	05,07,09,12,18,20	07,09,12
Controls	Wireless or wired	Wireless or wired	Wireless or wired
Louvers	4 x auto swing, independent control	4 x auto swing, independent control	Single powered discharge louver
Condensate	Built in pump 29" lift with check valve	Built in pump 29" lift with check valve	Built in pump 29" lift with check valve
Fan	3 speed	3 speed	3 Speed
Filter	Electrostatic washable air filter included. Optional MERV 13	Electrostatic washable air filter included	Electro-static washable
Facia Panel	Sold separately	sold separately	Sold separately
Metering device	Factory installed EEV	Factory installed EEV	Factory installed EEV

The Wind-Free™ unit delivers 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).

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Cassette Features

Feature	360	Under Celling/ Floor	Big Ceiling
Capacity Mbtu	09,12,18,24,30,36 & 48	18 & 24	36 & 48
Controls	Wireless or wired sold separately	Wireless or wired sold separately	Wireless or wired sold separately
Louvers	Bladeless air direction control	Powered air discharge louver	Motorized adjustable louver from 4° to 45°
Condensate	Built in pump 29” lift with check valve	Gravity condensate drain	Gravity condensate drain
Fan	3 Speed	3 Speed	3 Speed
Filter	Electrostatic washable air filter included	Electrostatic washable air filter included	Electrostatic washable air filter included
Facia Panel	Sold separately (white or black)	Included	included
Metering device	Factory installed EEV	Requires external EEV kit	Factory installed EEV

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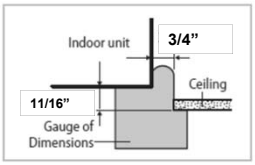
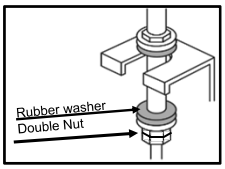
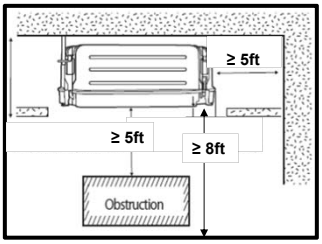
Basic Cassette Installation

- Layout position using included template
- Clearances
  - ≥ 5ft. from walls or smoke detectors
  - multiple cassettes ≥ 10ft. apart
- Maintain ½” to ¾” gap between unit & ceiling
  - Refer to installation manual for specific requirements
- Installation
  - Recommended to use rubber vibration washers
  - Install double nuts on the threaded rod
  - For enclosed ceilings provide access panel(s) for future servicing (18”x18”)
  - Hold cassette by the mounting brackets to avoid potential damage







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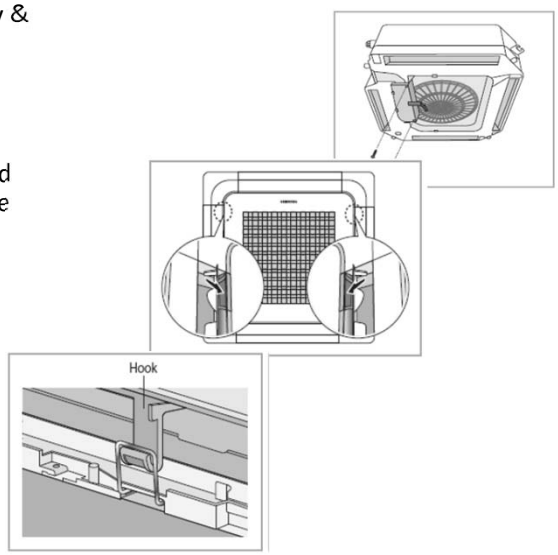
4-Way Cassette Fascia Panel Installation

- 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



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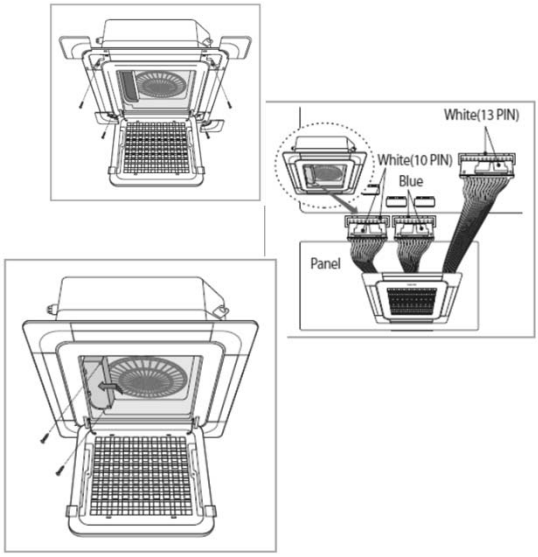
4-Way Cassette Fascia Panel Installation

- 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
- Connect the 3 wire harnesses from the fascia panel into the unit electrical box
- Close the electrical box cover and tighten the screws
- Close the fascia return grille



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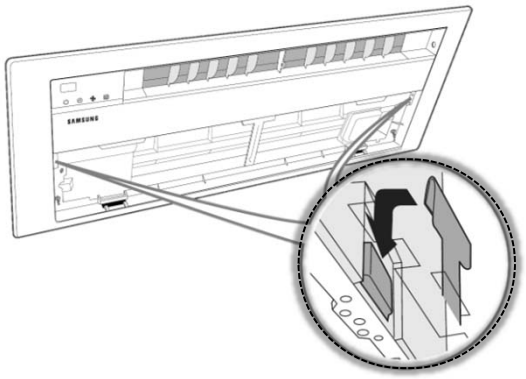
1-Way Ceiling Cassette Fascia Panel Installation

- 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



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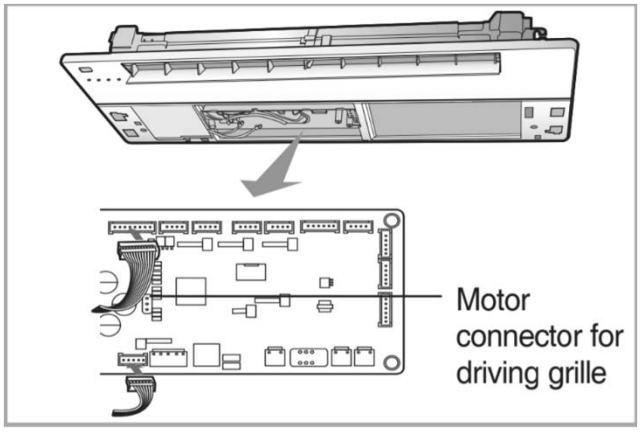
1-Way Ceiling Cassette Fascia Panel Installation

- Making electrical connections on one way cassette



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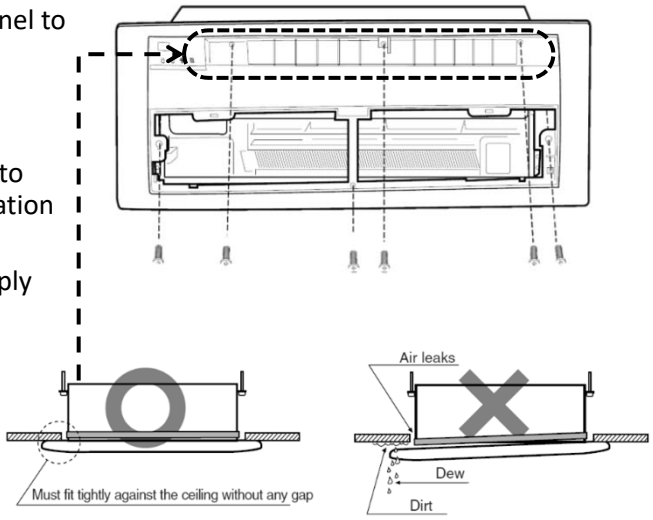
1-Way Ceiling Cassette Fascia Panel Installation

- 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



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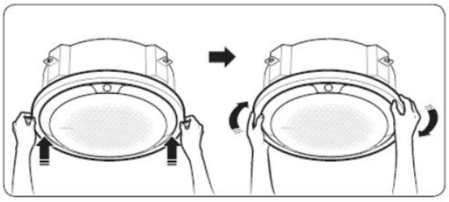
360 "Open Type" Fascia Panel Installation

- Raise the panel up onto the unit body and rotate clockwise to secure into place
- Adjust the unit so there is no gap between the panel and the ceiling



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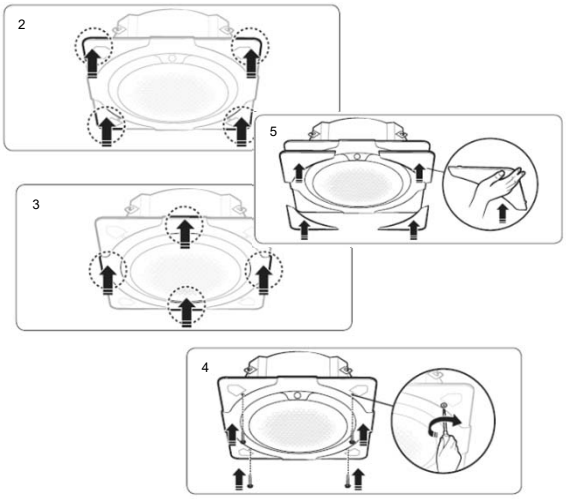
360 "Ceiling Type" Fascia Panel Installation

- Remove the 4 corner panels by pressing the 2 tabs on each panel
- Lift the fascia panel up and press each corner up until it clicks into place
- Press the center of each side into place one at a time until it clicks into place
- Insert the 4 screws into the panel front and adjust until there is no gap between the panel and ceiling
- Snap into place each corner panel to the fascia panel to complete the installation



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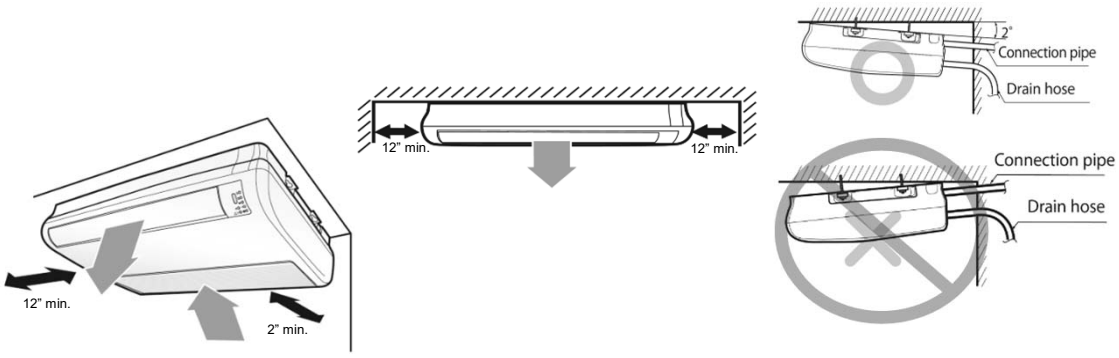
Ceiling Type & Big Ceiling Type Installation

- Ceiling Type & Big Ceiling Type units are installed horizontally under the ceiling
- Maintain at least 12" clearance on the sides and 2" on rear
- Pitch the unit backwards slightly for proper Condesate drainage



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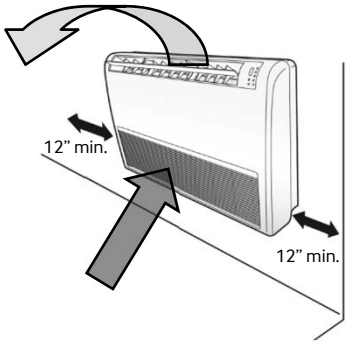
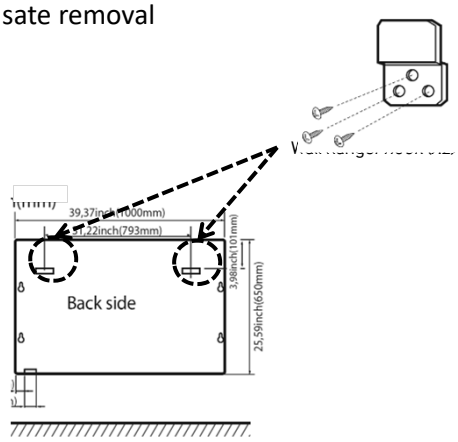
Ceiling Unit Clearances - Wall Installation

- When hanging the unit on the wall, use the supplied hanging brackets
- Unit must be installed level for proper condensate removal
- Connect to wall studs or backer plate





Note: Install unit high enough from floor to prevent damage from brooms, feet, vacuums, etc.

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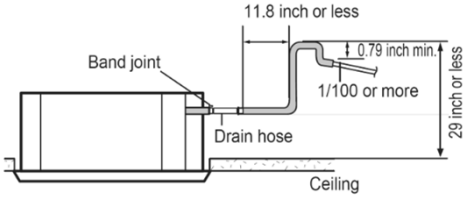
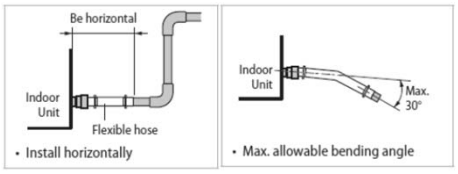
Ceiling Cassette Condensate Drain Piping

- Ceiling cassette have condensate lift pumps rated for a max 29" 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
- Condensate piping installation must be in accordance with state and local codes
  - Condensate lines may require insulation in high humidity areas
  - The condensate lines must be properly supported with hangars every 40" to 60"





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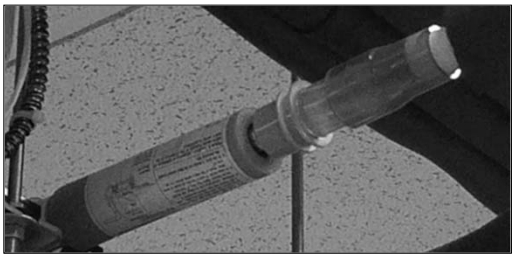
Condensate - Flexible Hose and Coupler



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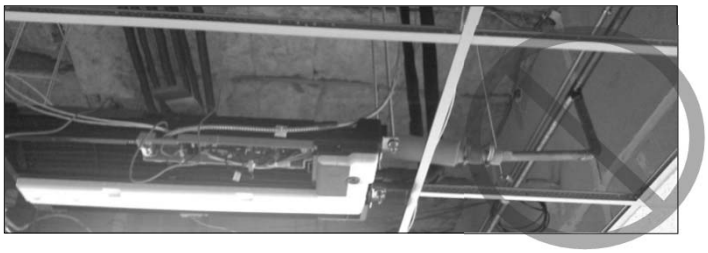
Multiple Cassette Condensate Drain Piping

- 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



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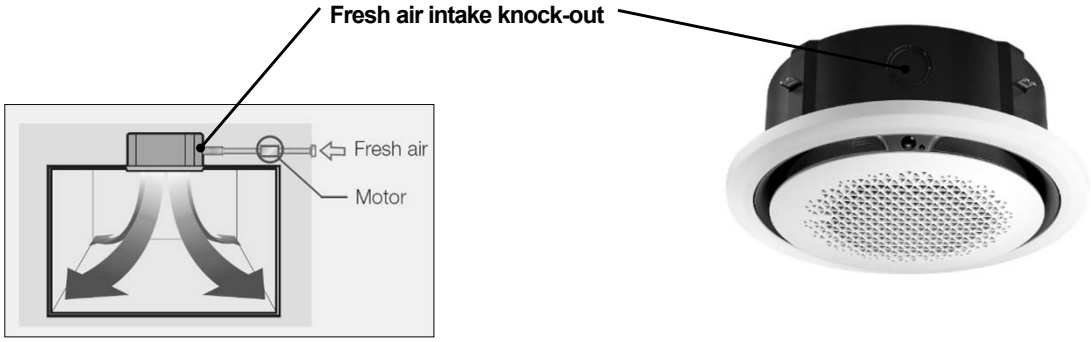
Cassette Fresh Air

- Fresh air can supplied for all cassette units except for 1-Way and Under Ceiling/Low Wall Mount cassettes
  - 0” static unit, booster fan must be used
  - Fresh air must be pre-filtered
  - Optional MIM-B14 External Contact Controller can interlock the booster fan



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Cassette Fresh Air Allowances

Small Chassis	
AM0**FNNDCH/AA	
P ("W.C.)	Q (CFM)
0	0
0.02	5
0.04	7
0.05	9
0.08	13
0.10	15
0.12	17
0.14	18
0.16	20

Medium Chassis	
AM0 09/12/18/24 FN4DCH/AA	
Q (CFM)	Q (CFM)
0	0
0.04	14
0.08	21
0.12	27
0.16	32
0.20	37
0.24	42
0.28	47
0.31	52

Large Chassis	
AM0 30/36/48 FN4DCH/AA	
P ("W.C.)	Q (CFM)
0	0
0.04	17
0.08	31
0.12	44
0.14	50
0.16	55
0.20	66
0.24	76
0.28	85
0.40	106

Small Chassis	
18, 24K	
P ("WC)	Q (CFM)
0.0	0.00
0.01	9.88
0.012	14.83
0.017	18.72
0.023	21.89
0.029	28.07
0.037	27.9

Large Chassis	
30K ~ 48K	
P ("WC)	Q (CFM)
0.0	0.00
0.01	9.53
0.012	14.48
0.017	18.01
0.023	21.19
0.029	24.37
0.037	27.19

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Big Ceiling Fresh Air Allowances

Big Ceiling 36Mbtu	
" W.C	CFM
0	0
0.04	60.03
0.08	76
0.11	90
0.16	100
0.2	111
0.24	119
0.26	127
0.31	135
0.35	142
0.39	148
0.43	155
0.47	161

Big Ceiling 48 Mbtu	
" W.C	CFM
0	37
0.04	61
0.08	77
0.11	90
0.16	101
0.2	111
0.24	119
0.26	127
0.31	135
0.35	142
0.39	149
0.43	155
0.47	161

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No Fresh Air Allowance

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Wall Mount unit Features

Feature	MAX	Whisper
Capacity Mbtu	32	05,07,09,12,15,18,24 & 28
Controls	Sold Separately Integrated IR receiver Wireless/Optional wall controller	Sold Separately Integrated IR receiver Wireless/Optional wall controller
Louvers	Single powered louver	Single powered louver
Cabinet	Rectangular	Triangle
Fan	3 speed	3 speed
Condensate	Gravity condensate drain,	Gravity condensate drain,
Filter	Electro-static washable	Electro-static washable

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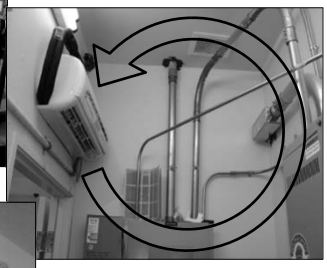
General Wall mount Placement

- 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 – 24,000 Btu/h – 25 ft.
- Eliminates potential for discharge air recirculation
- Wall mount unit must be installed at least 5ft above the floor



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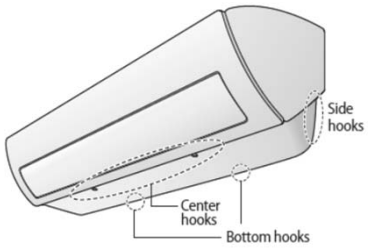
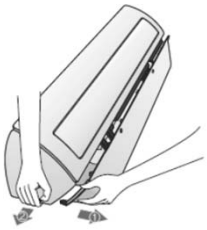
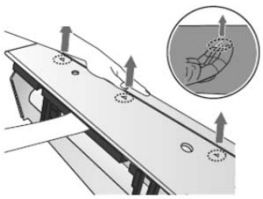
Whisper Wall mount Installation

- 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 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.

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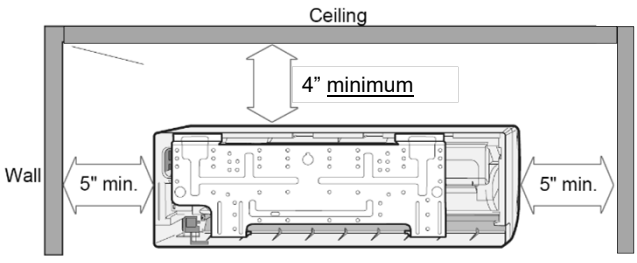
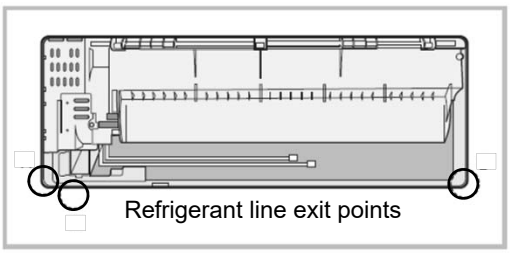
General Wall mount Placement

- Remove the Hangar plate from the unit
- Install the included wall bracket to the wall – must be level
- Secure to framing or use appropriate anchors
- Determine the exit point for the refrigerant tubing, condensate drain pipe and wiring
- When exiting through a wall drill a hole 2.5” to 3” must be properly sealed
  - The hole should have a downward slant



(Rear view of unit)



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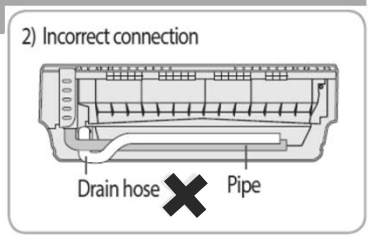
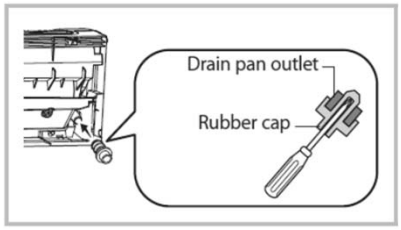
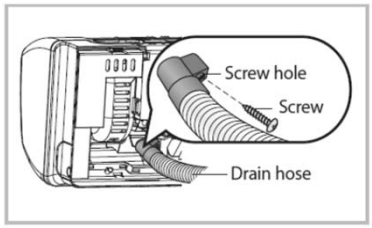
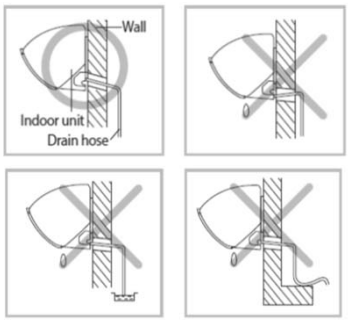
General Wall mount Installation

- Condensate tubing must be properly installed
- Avoid routing the tube in a manner that creates a trap
- 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









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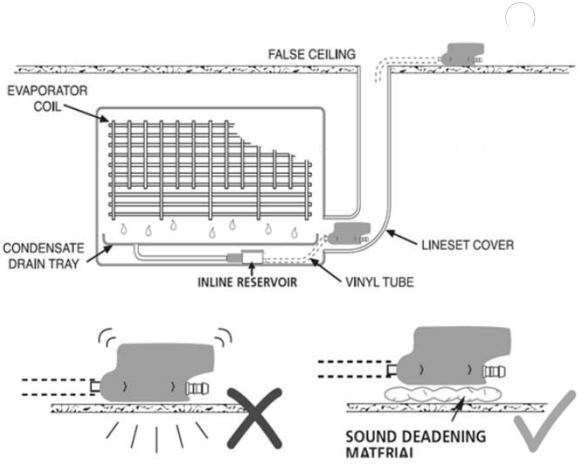
Wall mount Condensate Pump Installation

- Third party accessory condensate pumps can be used when needed
- The pump is powered from the line voltage supplied by the indoor unit
- The pump float switch must be installed inside the wall mount unit,
- Always install an inline fuse to one of the wires powering the pump
- Always install the anti siphon device
- Refer to manual of the third part pumps for pump capacity and lift



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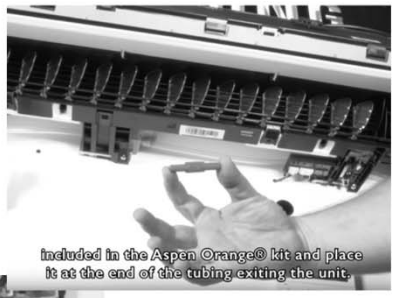
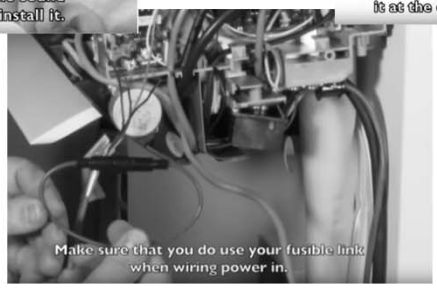
Wall mount Condensate Pump Installation





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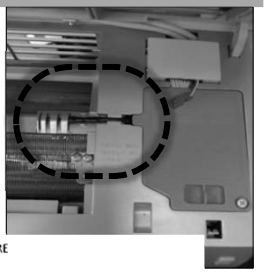
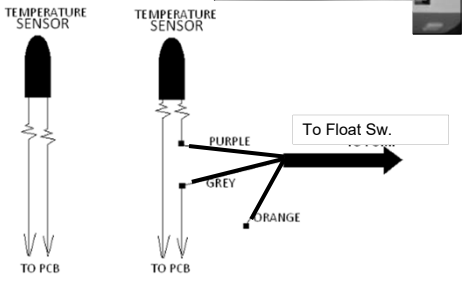
Wall mount Condensate Pump Installation

- Use the N.C. and common wires from the float switch to break the return air sensor, or external room sensor
  - This will generate a E121 code
- Do not interrupt the line voltage, or communication signal to the IDU
  - this will cause the entire system to shut down when the float switch opens
- **Condesate pumps that use a heated sensor instead of a float switch can not break the return air sensor, and will require the installation of the MIM-B14 external contact controller**





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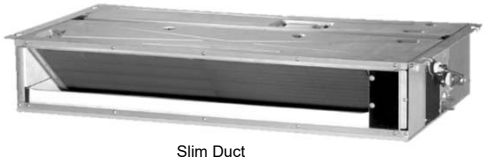
Ducted Units



Slim Duct

Outside Air Processor

Duct S

MPAH

HSP Ducted

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Ducted Unit Features

Feature	Slim Duct	Duct S	HSP
Capacity Mbtu	07, 09, 12, 18, 24, 30, 36, 48	07,09,12,15,18, 24, 27,30, 36, 48	54
Controls	Wired control or IR Receiver and wireless remote, sold separately	Wired control or IR Receiver and wireless remote, sold separately	Wired control or IR Receiver and wireless remote, sold separately
Condensate	Gravity condensate drain (optional lift pump field installed)	Built-in condensate lift pump – max. 29" lift (No check valve) Includes float switch	Built-in condensate lift pump – max. 29" lift (No check valve) Includes float switch
Filter	Washable air filter screen	Washable air filter screen	optional filter box
Installation	Rear or bottom return air	Rear or bottom return air Optional air filter box	Front discharge air and rear return air Optional filter box
Ventilation	When adding fresh air to the return, do not use return air sensing	When adding fresh air to the return, do not use return air sensing	When adding fresh air to the return, do not use return air sensing
Static Pressure	0" to ".24"	0" to ".79" "Auto Air Volume" (ESP)	.12"-.59"
Additional	Discharge air temperature sensor	Discharge air temperature sensor	Discharge air temperature sensor
Fan access	Bottom	Top or Bottom	Bottom

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Ducted Unit Features

Feature	HSP	OAP	MPAH
Capacity Mbtu	76 & 96	72 & 96	12, 18, 24, 30, 36, 48, 54, 60 & 72
Controls	Wired control or IR Receiver and wireless remote, sold separately	Wired control sold separately	Wired control sold separately
Condensate	Gravity condensate drain/optional Condesate pump	Gravity condensate drain/optional Condesate pump	Gravity condensate drain/requires properly sized Condesate pump
Filter	Optional filter box:	Optional filter box:	Optional filter box:
Installation	Front discharge air and rear return air	Applied to DVMS Heat Pump systems only	Up flow, Horizontal Right, Horizontal Left & Downflow
Ventilation	When adding fresh air to the return, do not use return air sensing	When adding fresh air to the return, do not use return air sensing	When adding fresh air to the return, do not use return air sensing
Static Pressure	76 = .20"-.98" 98 = .20 – 1.10"	.20 – 1.18	Standard ESP: .4" WC Max. ESP: 1.0" WC
Additional	Discharge air temperature sensor	Discharge air temperature sensor	Optional electric strip heat kits & filter bases
Fan Access	Bottom	Bottom	Front

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Ducted Unit Optional Condesate Pumps

- Specifications
  - All models excluding MDP-G075SP installs inside ducted unit chassis (MDP-G075SP installs externally)
  - Powered and controlled by indoor unit PCB
  - Built-in float switch
  - Flexible hose outlet ≈ 1 1/4" OD
  - All optional pumps will require an installation option change (refer to installation manual)

Internal Installation Type
(actual product appearance may vary)

Model Number	Max. Lift	Compatible Indoor Unit Models
MDP-E075SEE3D	29"	All Slim Duct Models (AM0**FNLDCH/AA)
MDP-E075SEE3	29"	All FJM Slim Duct Models (AJ0**JNLDCH/AA)
MDP-M075SGU3D	29"	MSP Models: AM018FNMDCH/AA and AM024FNMDCH/AA
MDP-M075SGU1D	29"	MSP Models: AM030FNMDCH/AA and AM036FNMDCH/AA
MDP-M075SGU2D	29"	MSP Model: AM048FNMDCH/AA
		HSP Models: AM036FNHDCH/AA and AM048FNHDCH/AA
MDP-N047SNC1D	18 1/2"	HSP Models: AM076FNHDCH/AA and AM096FNHDCH/AA
MDP-G075SP	29"	OAP Models: AM072JNESCH/AA and AM096JNESCH/AA

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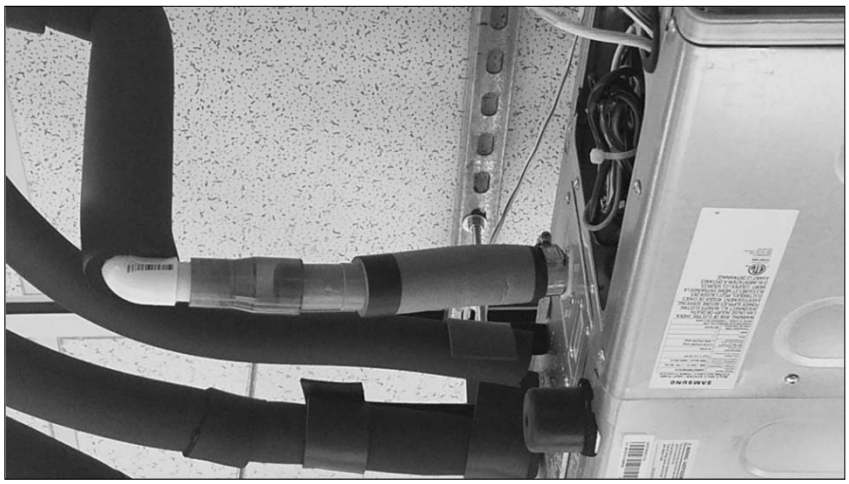
Condensate - Flexible Hose and Coupler



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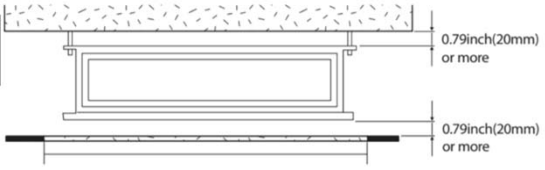
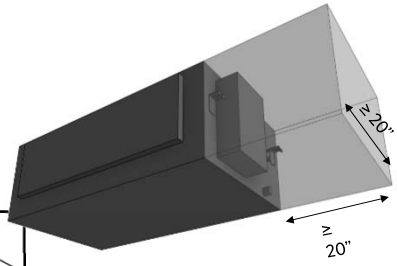
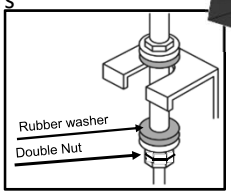
Ducted Unit Installation

- Maintain a minimum of ¾" clearance above & below the ducted unit to prevent noise transmission
- If the ducted unit is installed in an area above the ceiling with humidity conditions over 80%, the unit must be insulated with minimum 3/8" insulation
- Install the unit level and double nut the threaded rod under each mounting bracket
- Recommended to use rubber vibration washers
- Provide control side service access panel
  - 20" x 20" minimum







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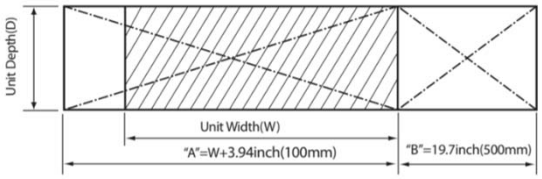
Ducted Unit Installation

- When installed above solid ceiling with no attic access, service access panel must be provided
- Service access must be equal to the units
  - width X depth + 4 inches



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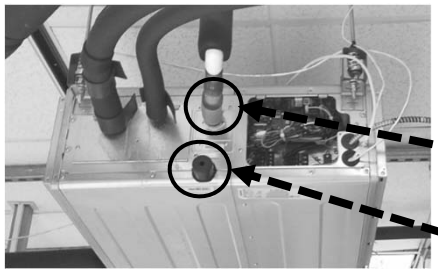
Ducted Unit Installation

- Ducted units must be installed with the mounting hooks at the top of the unit
- Installation with mounting hooks at the bottom of the unit will generate an E153 error (float switch) on units with a lift pump and will lead to water damage



Lift Pump Connection

Gravity Drain Connection

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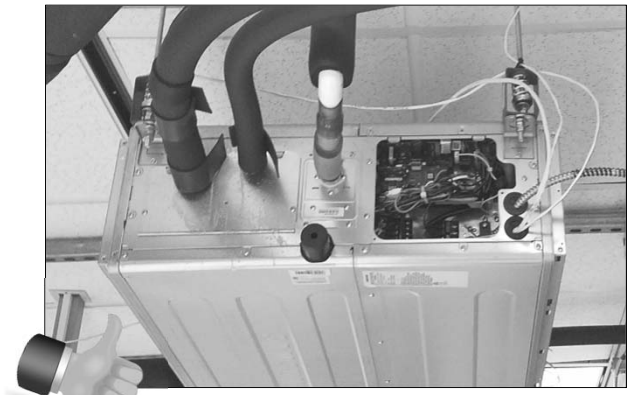
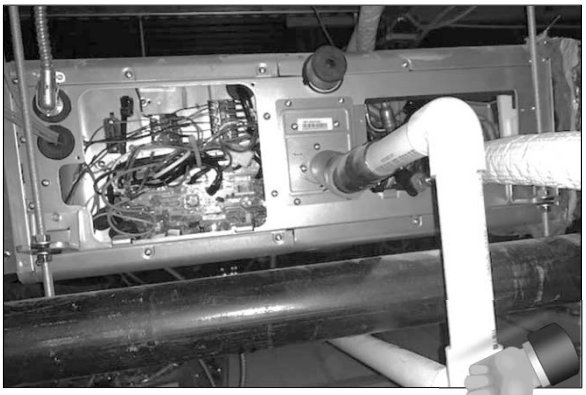
Ducted Unit Installation



Correct



Incorrect

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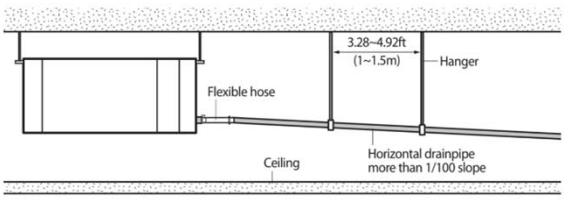
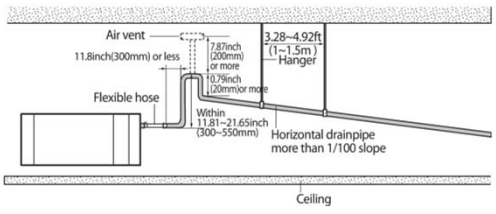
Ducted Unit Condensate Drains

- Gravity drain – requires drain line to downward slope 1/100 or more
  - Unplug Condesate pump when installing with a gravity drain
- Lift Pump - Inside diameter of the condensate drain outlet & riser piping must not exceed ¾” ID
  - Max 29” lift from the bottom of the unit
- 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 installation must be in accordance with state and local codes**

Gravity Condensate Drain



Lift Pump Condensate Drain



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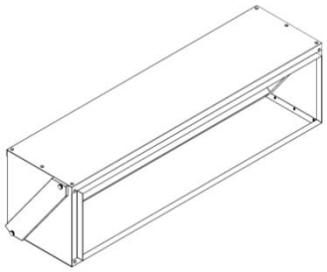
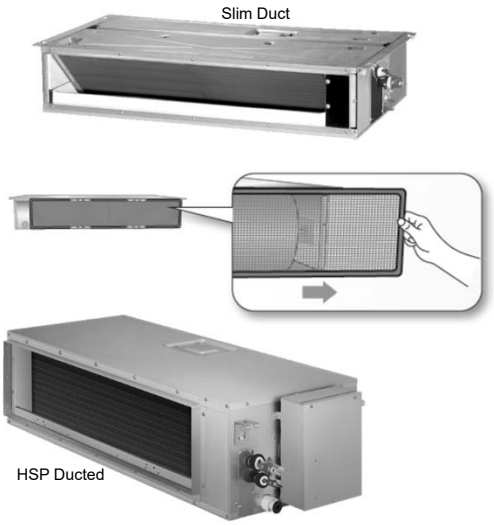
Ducted Unit Air Filters

- Slim Duct, Duct S & HSP Ducted units all have a washable electrostatic filter panel
- Duct S, HSP & 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





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Ducted Unit Fresh Air Guidelines

- Up to 10% of outside fresh air can be introduced into the return side of the ducted units
- When using outside fresh air into the return do not use the ducted unit’s return air sensor
  - Use the wired remote controllers, built-in sensor
  - Use the External Room Sensor

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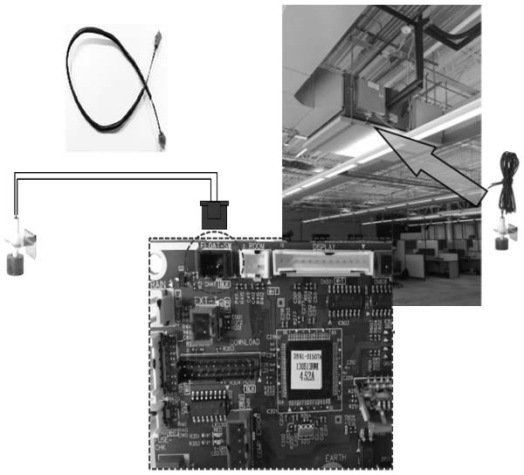
Ducted Unit Secondary Float Switch Installation

- **Gravity condensate drain application**
  - Connect the secondary drain pan float switch to the “FLOAT-SW” connector (CN411)
    - Pigtail harness is required (DB39-01263A)
  - Option setting required to enable pump
  - When the float switch contact is open, error E153 is generated



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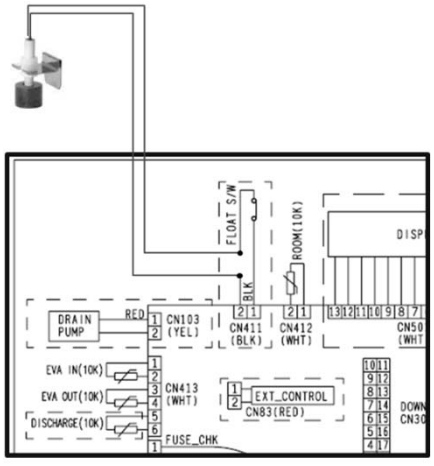
Ducted Unit Secondary Float Switch Installation

- **Factory condensate lift pump application**
  - Connect the secondary float switch leads in series with the built-in float switch connection CN411 black connector



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Multi-position AHU Installation

- Unit is shipped from the factory for upflow and horizontal left installation
- Unit can be field configured for
  - horizontal right installation
  - downflow installation
    - Downflow conversion kit is required
- Condesate Trap is required
- 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

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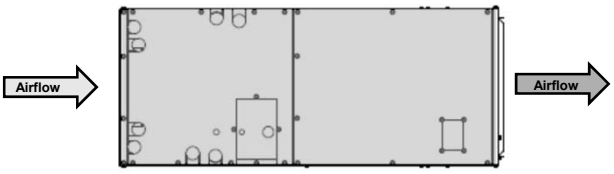
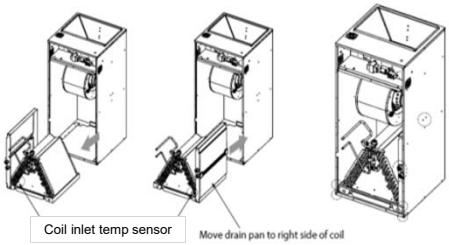
Multi-position AHU Installation

Horizontal Right Field Configuration



- Remove the indoor coil after disassembling the coil bracket & plate
- Relocate the condensate drain pan to the right side of the unit
- IMPORTANT: Move the coil inlet sensor to the holder on the right side
- Reinstall the indoor coil
- Connect the condensate drain piping including P-trap
- Braze in the refrigerant lines using Dry Nitrogen purge
- All horizontal applications should include a full dimension secondary drain pan with an auxiliary float switch
- Always follow state and local codes for unit installation



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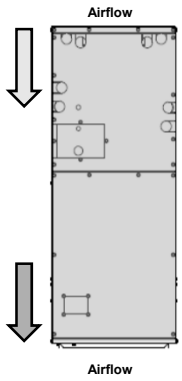
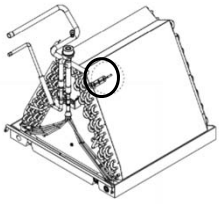
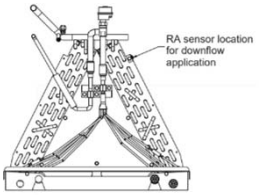
Multi-position AHU Installation

Downflow Position Configuration



- Invert Air Handling unit 180° and reinstall the coil support rails.
- Evaporator coil must be installed in its original “A” configuration, and use the 2 self taping screws to hold down the front brace to the unit.
- Reinstall the coil sensors in their original locations and plug the EEV connector back into the PCB.
- Install the room air temperature sensor HOLDER as noted below.
- Place the room temperature sensor onto the sensor HOLDER allowing the sensor to extend past the end of the sensor HOLDER. (approximately 1.5”) Secure the sensor to the HOLDER with (3) wire ties.
- IMPORTANT: AM012-AM036 units will require a EEV extension cable which is sold separately





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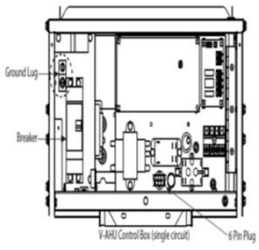
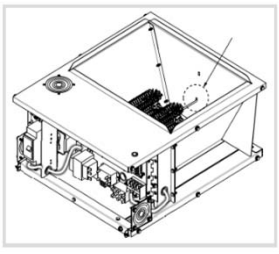
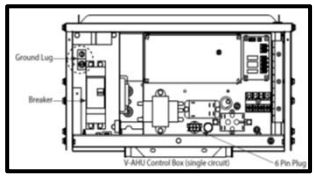
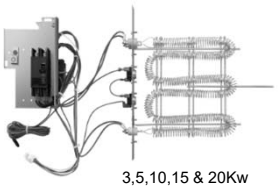
Multi-position AHU Electric Heat Kit

- 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









3,5,10,15 & 20Kw

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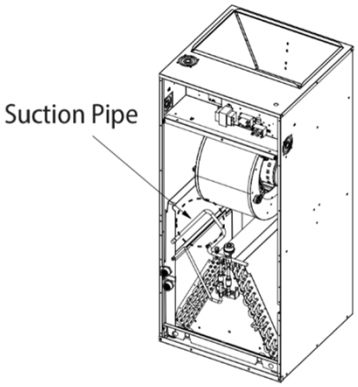
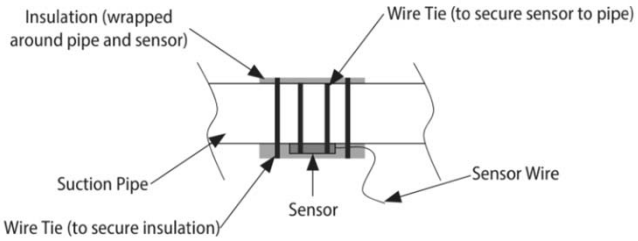
Multi-position AHU Electric Heat Kit

- Install the heater unit temperature sensor to the lower section of the cabinet on the bottom of the gas pipe
- 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





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Multi position air handler Float Switch Installation

- **Factory installed MIM-B14 External Contact control module used for a float switch safety.**
- Remove jumper from terminals and connect the normally closed wires from the float switch
- With the float switch open, the air handler will turn off and the wired remote controller will be disabled.
- CAUTION: the switch contacts are for 0 volt application only.

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Floor Standing Unit Features

Feature	Concealed	Floor Standing
Capacity Mbtu	06, 09, 12, 12 & 24	06, 09, 12, 12 & 24
Controls	Wired control or IR Receiver and wireless remote, sold separately	Wired control or IR Receiver and wireless remote, sold separately
Fan	3 speed	3 speed
Condensate	Gravity condensate drain	Gravity condensate drain
Facia Panel	included	NA
Filter	Electrostatic washable air filter included	Electrostatic washable air filter included

"Concealed" Floor Standing

"Cased" Floor Standing

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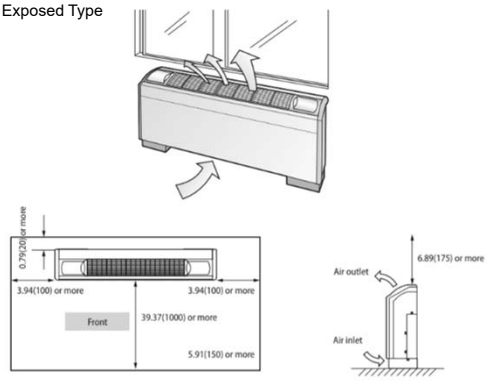
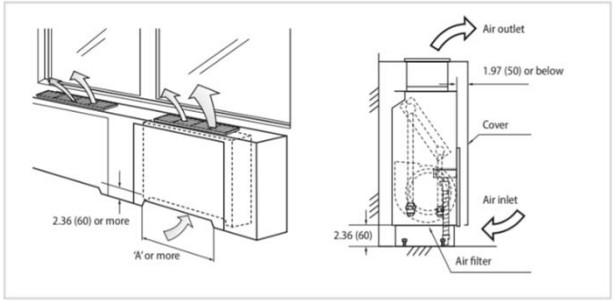
Floor Standing Units - Installation

- 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



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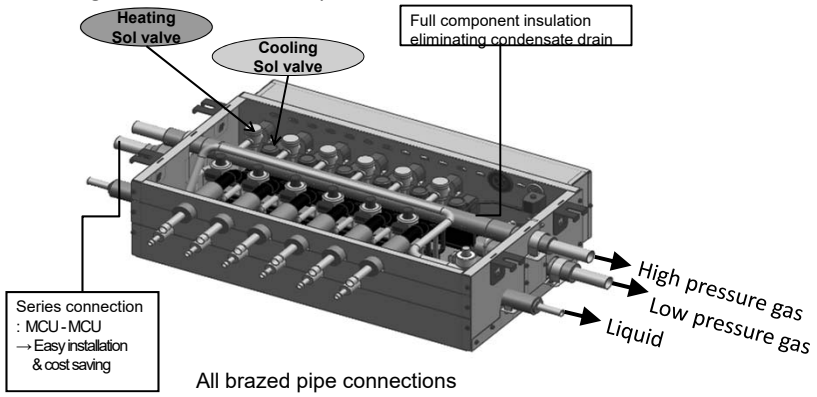
Mode Change Units - Features

- 1,2,4 & 6 port models
- Brazed pipe connections
- Main 3-pipe connection on both sides of MCU for series installation
  - Excl. S1NEK single port MCU – right side connection only



All brazed pipe connections

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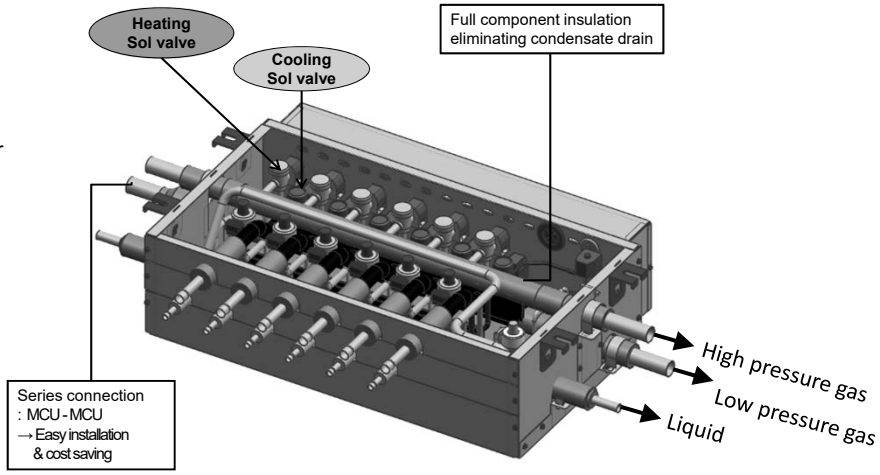
Mode Change Units - Features

- No condensate drain
- Auto Pairing
- Refrigerant pass through design 2,4&6 port models
- Up to 8 indoor unit connections per port
- Maximum 54 MBtu indoor unit capacity per port



All brazed pipe connections

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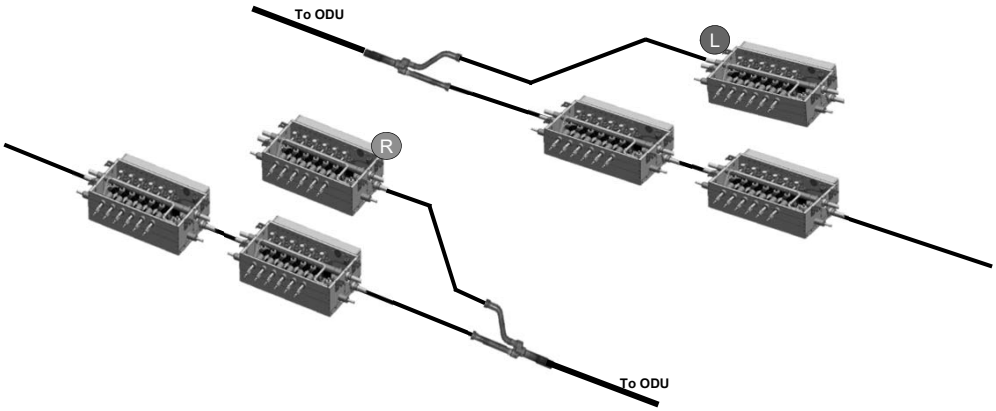
Mode Change Units - Features

- **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**



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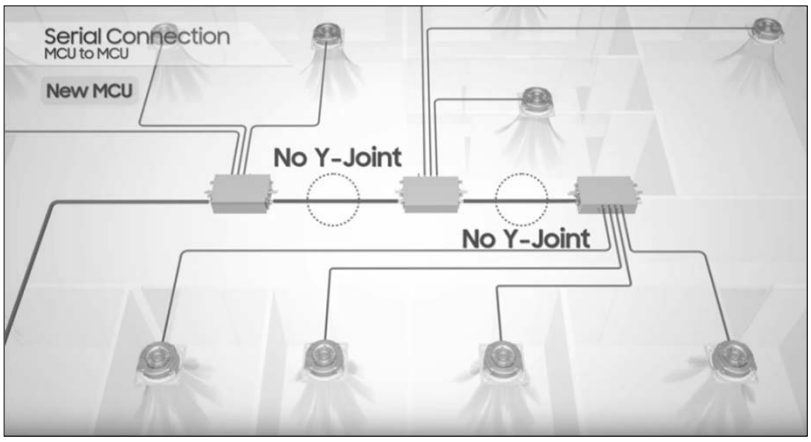
Mode Change Units - Features

- MCU's can be rotated 180°to allow branch piping to connect to either the left or right hand side.



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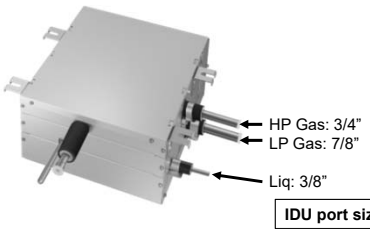
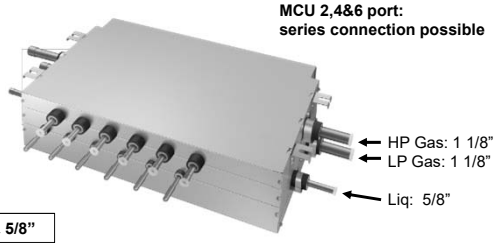
Mode Change Unit Specifications

MCU 1-port: single connection only



IDU port sizes: 3/8” & 5/8”

MCU 2,4&6 port: series connection possible



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

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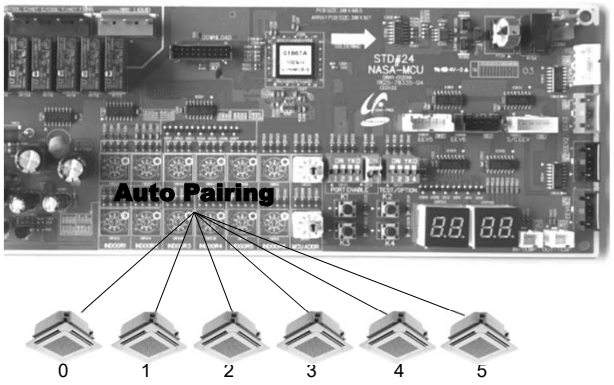
Mode Change Unit - Indoor Unit Port Assignement

- Manually Set the active ports by dip switch
- System Automatically matches the indoor units to port number



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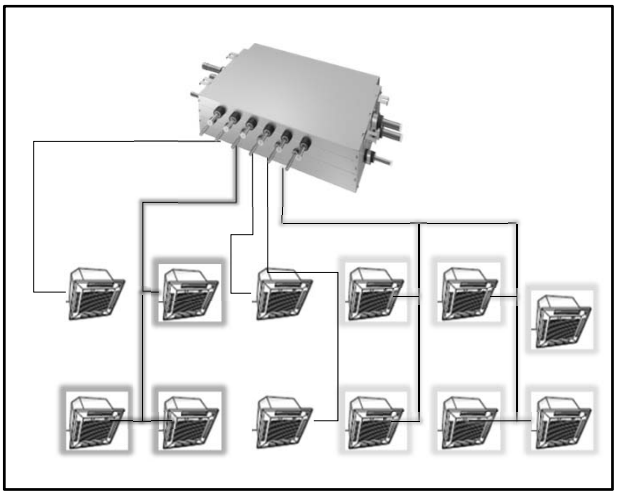
Multiple Unit Single Port Operation



- When multiple units are on one port
  - 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

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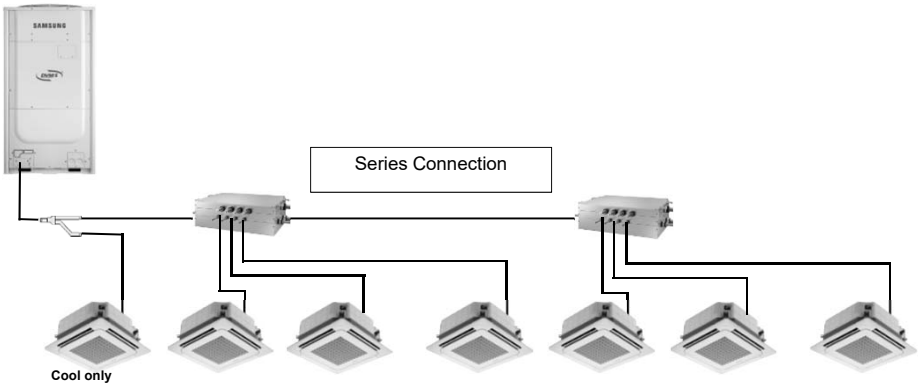
Cooling Only Unit Connection

- IDU connected directly to the liquid & low pressure piping for cool-only operation
  - Requires installation option setting
  - Total cooling-only IDU capacity: ≤ 50%



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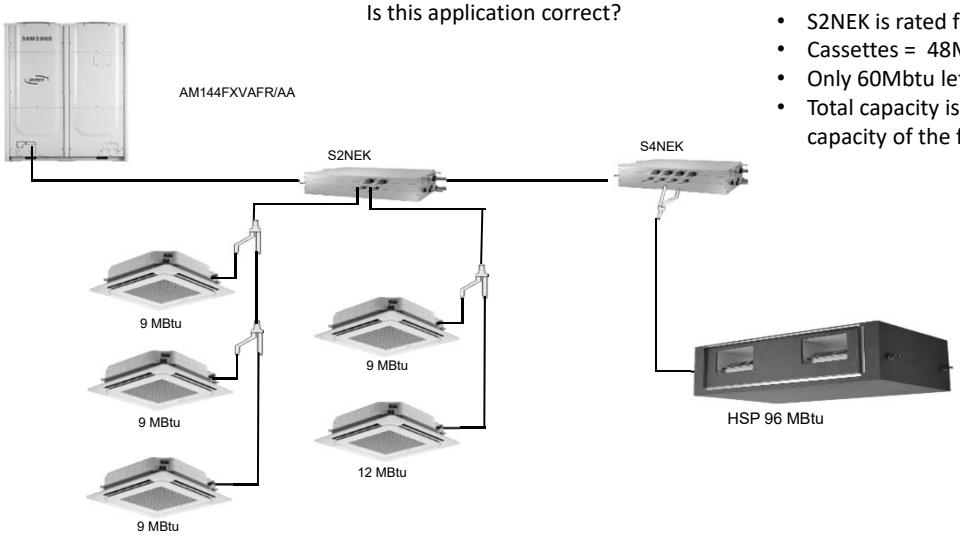
Mode Change Unit Installation

Is this application correct?



- S2NEK is rated for 108 Mbtu
- Cassettes = 48Mbtu
- Only 60Mbtu left over
- Total capacity is limited to the capacity of the first box

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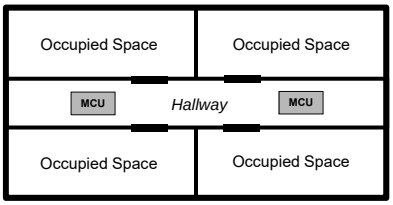
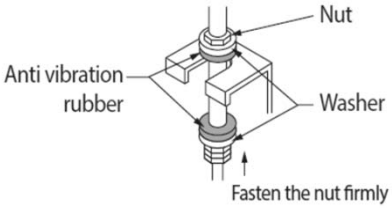
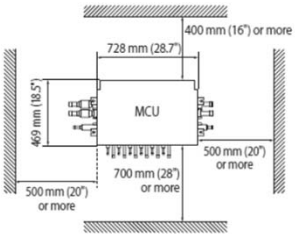
Mode Change Unit Placement

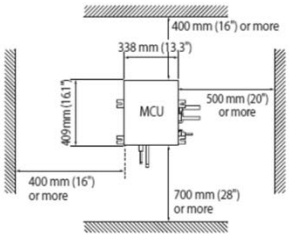
- MCU must be installed securely upright and level
- Recommendation:
  - Avoid installation over occupied areas
- Support refrigerant piping properly:
  - Refer to state and local code requirements
- MCU must have proper service access space

Preferred MCU Placement









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Under Ceiling Units External EEV Kit

- Under Ceiling EEV Kits available in
  - 1, 2 & 3 zone models
- Powered (208/230vac)
- Controlled from indoor unit PCB
- Maximum distance between unit and EEV:
  - Single ≤6.5’
  - Multiport ≤ 65’
- Must install vertical
- Install included strainer on the inlet side
- Single kit includes 6.5’ cable with connector
- Multiport field installed 16/2 shielded cable to F1/F2
- Set rotary dials to address EEV’S

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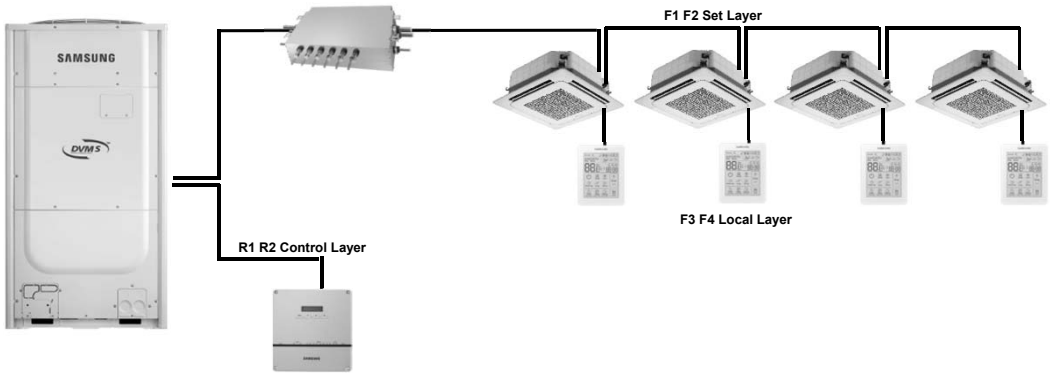
NASA Digital Control Layers

- **F1 F2 – Set Layer:** ODU to IDU’s & MCU’S (incl. EEV Kit) daisy chain connections 0.5 VDC
- **F3 F4 – Local Layer:** Wired Remote Controller to indoor unit 12 VDC
- **R1 R2 – Control Layer:** Outdoor Unit to DMS Centralized Control 5 VDC
- **Control Wire:** 16/2 AWG stranded with shield
  - Never use solid core thermostat wire for digital communications



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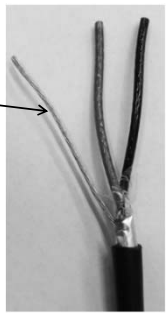
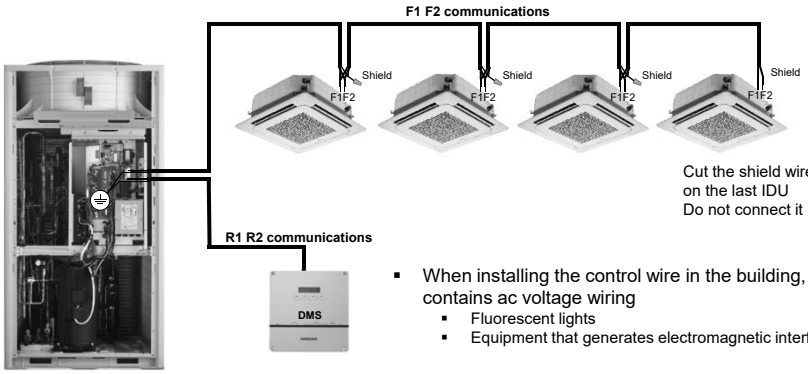
Control Circuit Grounding

- 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 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)

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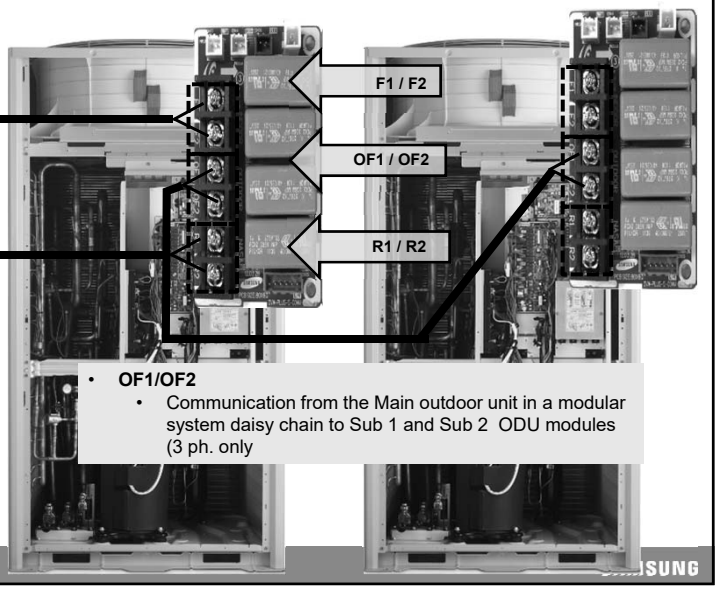
Control Wire Connections - Outdoor Unit

- **F1/F2**
  - Communication from the outdoor unit (Main) daisy chain to all indoor units, MCU's, and EEV Kits on the system
  - (Connection must b made on the main unit)

To Indoor Units

Centralized Controller

- **R1/R2**
  - Communication from outdoor unit (Main) to centralized controls: DMS2.5 Gateways, Touch Controller, etc.



- **OF1/OF2**
  - Communication from the Main outdoor unit in a modular system daisy chain to Sub 1 and Sub 2 ODU modules (3 ph. only

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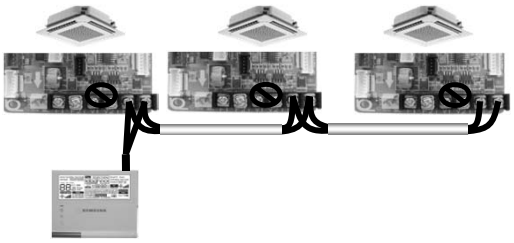
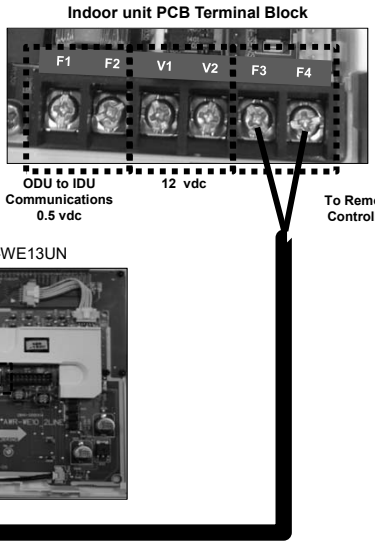
Wired Remote Controller

- F3/F4
  - 16 AWG stranded, 2 conductor, shielded cable
  - Do Not connect to V1 V2
  - Maximum wire distance from remote controller to farthest indoor unit: 328ft.
- Single wired remote controller can be connected to 16 units
  - Communication and power
  - Daisy chain all F3-F4 terminals
  - Provides group control only





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Wired Remote Controller Installation

- 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

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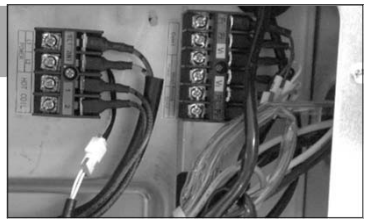
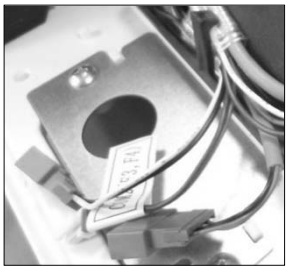
Wired Remote Controller Installation

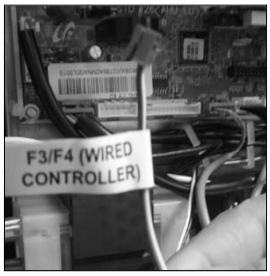
- Cassette & Ducted
  - locate F3/F4 screw terminal
  - Connect shielded wire to wired controller
- MAX & Whisper Wall mount
  - locate the tagged 2-wire harness
    - (F3 F4).
  - Clip the end and extend the wires to the remote controller terminals
- MPAH
  - locate the tagged 2-wire harness (F3 F4).
  - Clip the end and extend the wires to the remote controller terminals



Cassette F3/F4



MAX & Whisper



MPAH

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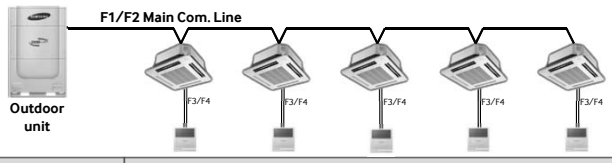
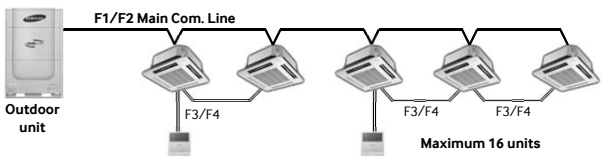
Remote Controller to Indoor Unit Examples

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

F3 F4

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

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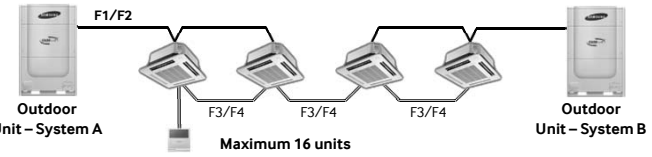
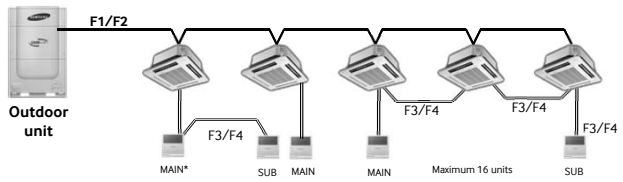
Remote Controller to Indoor Unit Examples

*When using more than one controller temperature will be sensed on the main controller

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

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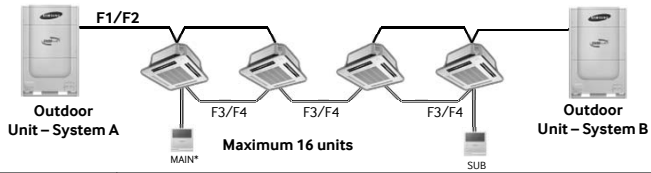
Remote Controller to Indoor Unit Examples

*When using more than one controller temperature will be sensed on the main controller

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

F3 F4

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Communication Wiring Warnings

- Never run communication wiring in the same conduit as high voltage.
- Keep communication wires a minimum of 2 inches away from any high voltage wires.
- Make sure to tighten screws properly

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Communication Wiring Warnings

- If going through bare metal hole make sure wire is protected from rubbing against metal of cabinet as not to wear through the wire.
- Wire may not be broken
- No Wire Nuts

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DVMS Control Wiring Quiz & Exercises

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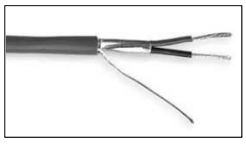
DVM S Control Wiring Review Quiz

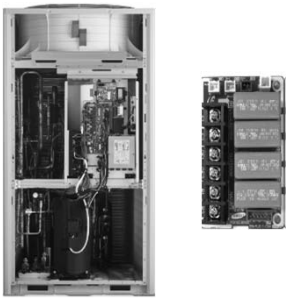
1. What is the DVMS control wire specification?

   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

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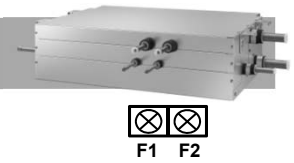
DVM S Control Wiring Review Quiz



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

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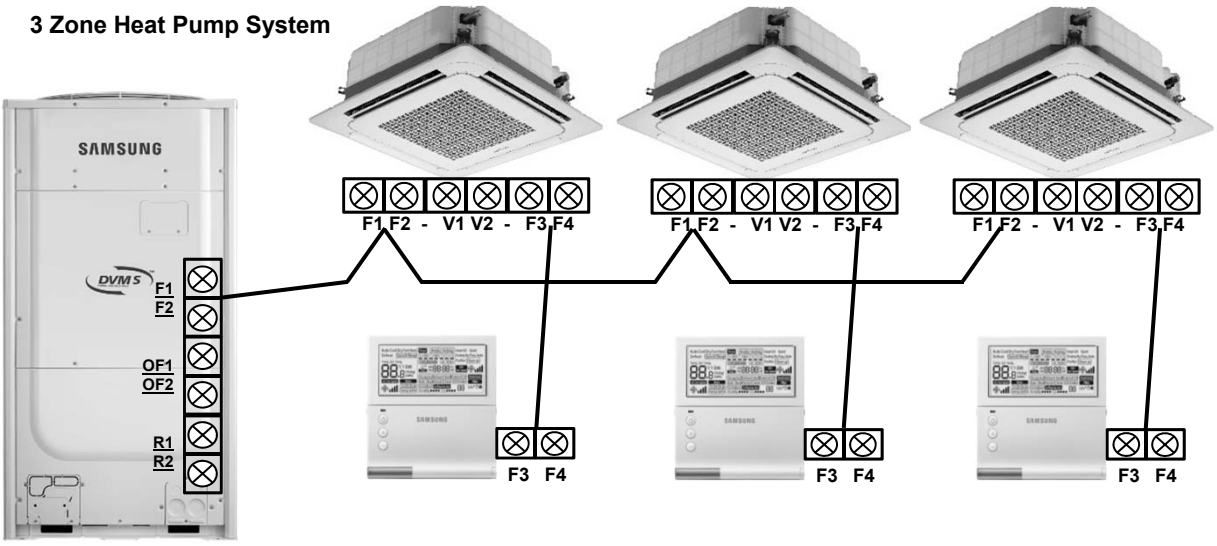
DVM S Control Wiring Review Quiz

3 Zone Heat Pump System



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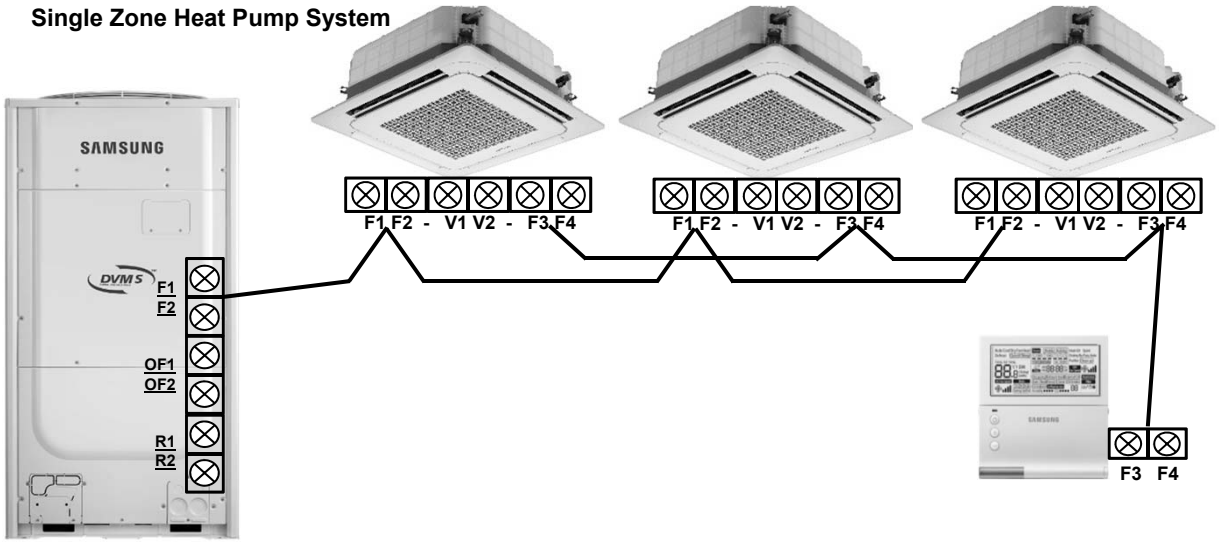
DVM S Control Wiring Review Quiz

Single Zone Heat Pump System



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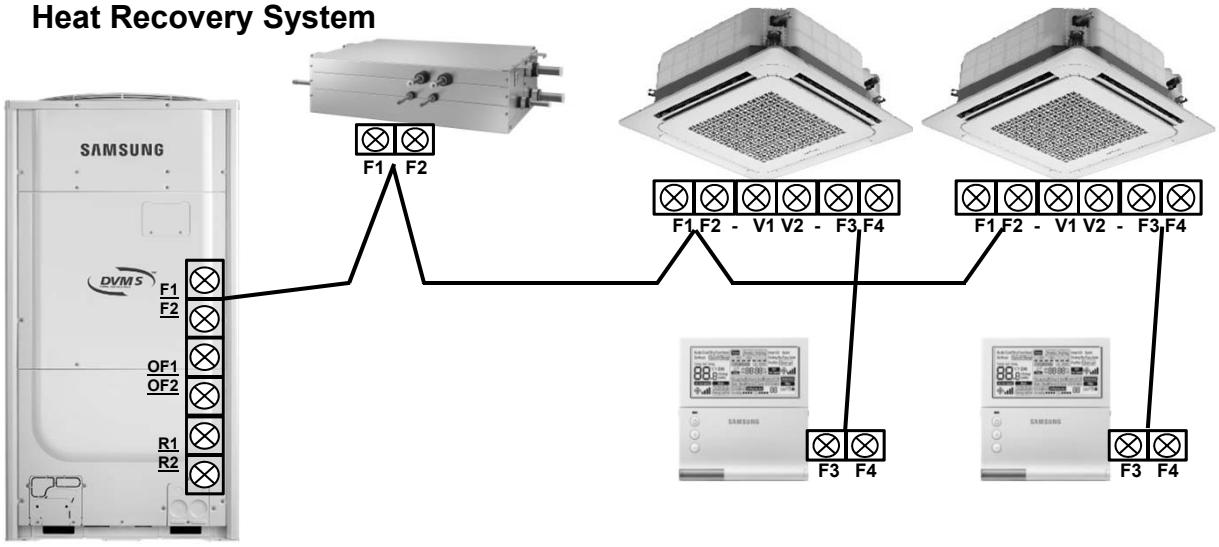
DVM S Control Wiring Review Quiz

Heat Recovery System



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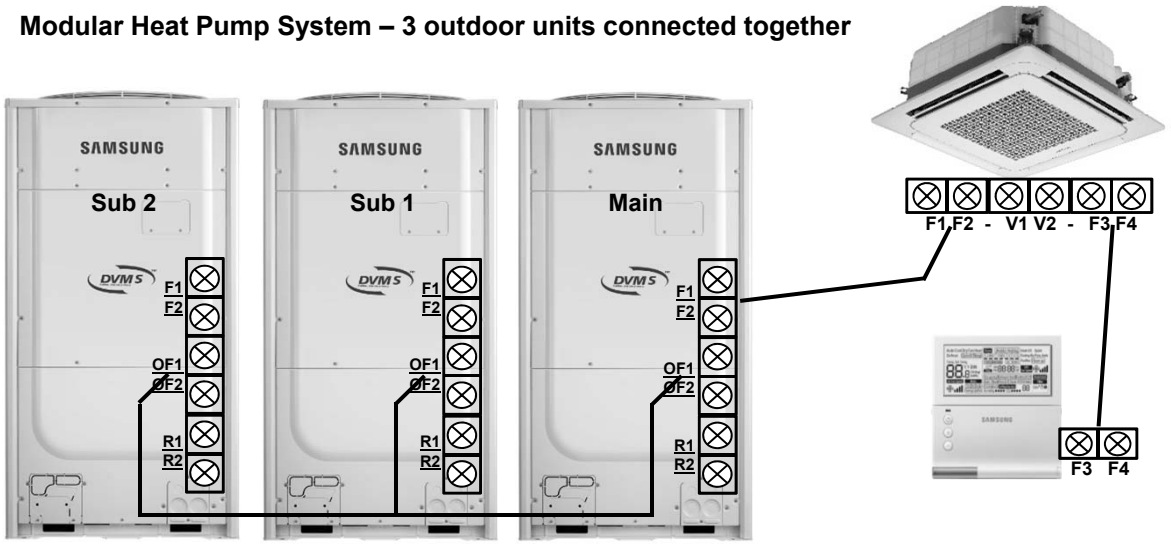
DVM S Control Wiring Review Quiz

Modular Heat Pump System – 3 outdoor units connected together



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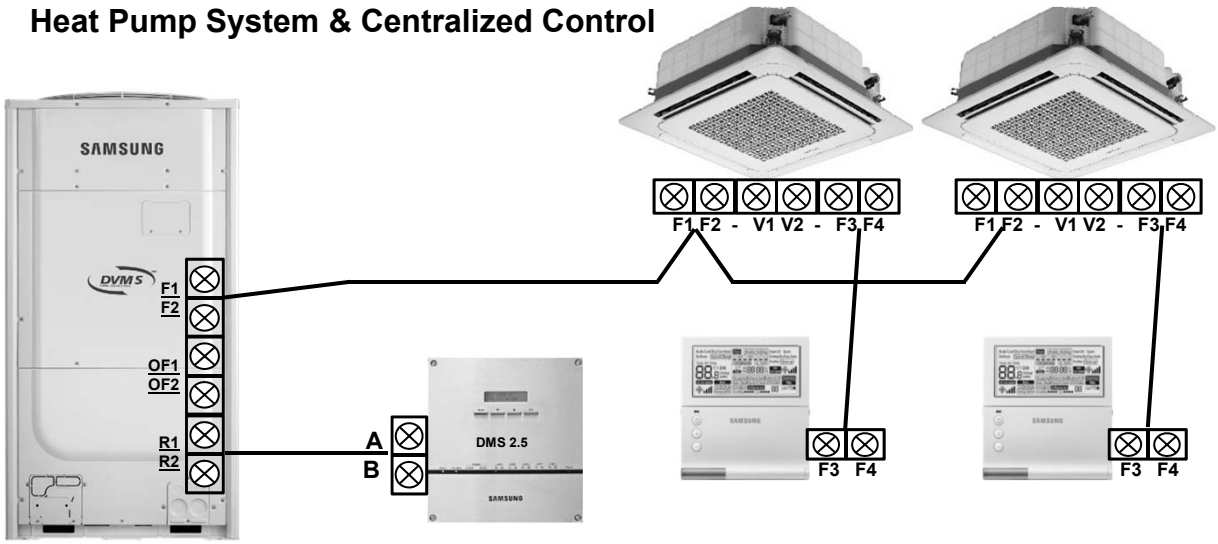
DVM S Control Wiring Review Quiz

Heat Pump System & Centralized Control



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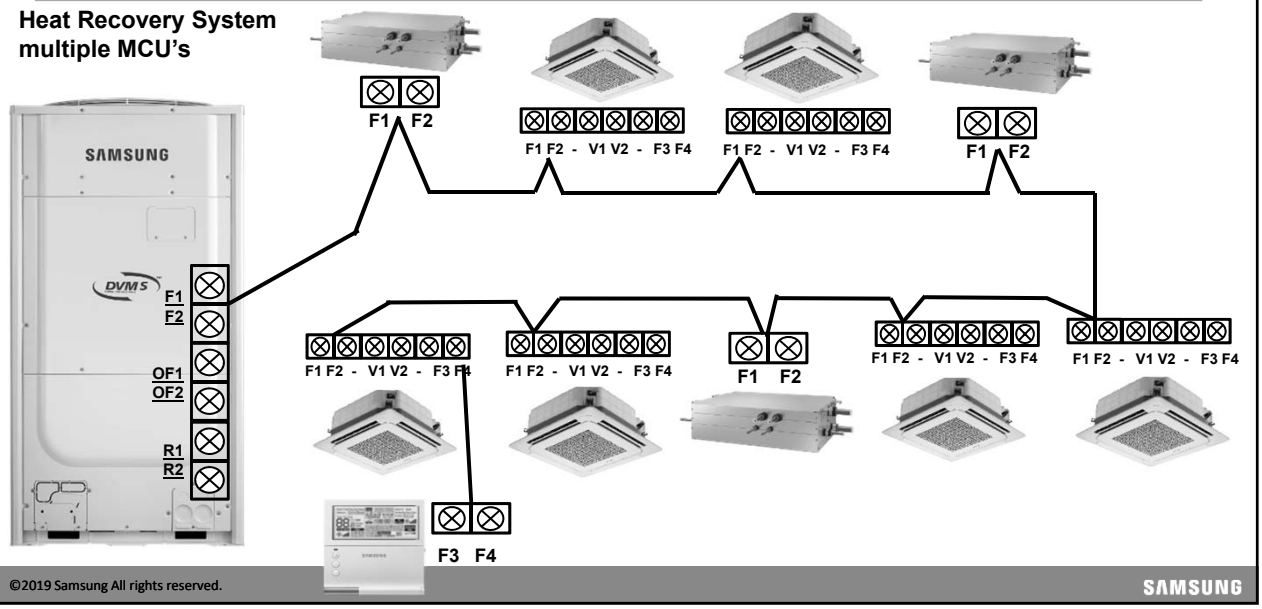
DVM S Control Wiring Review Quiz

Heat Recovery System multiple MCU's



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Basic Controls Overview

MR-EH00U
Simple schedule control

MWR-WE13UN
Multi-function Wired Remote Controllers
Built-in room temp sensor
4-Way, Mini 4-way
360 Cassette
Wind Free
Scheduling

MWR-WG00JN
Advanced Wired Controller
- Built-in room temp sensor
- Dual Set Point (DSP) Setting (for supported indoor units)
- 4-Way, Mini 4-way
- 360 Cassette
- Wind Free
- Scheduling

MR-KH00U 360 Cassette
Simple schedule control
Air flow direction control

MWR-SH11UN – Simple Touch Wired Controller
- Touchscreen control
- Built-in room temperature sensor
- Built-in infrared receiver
- Wind-Free

MRK-A10N – Wireless Signal Receiver
- 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

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Basic Controls Overview

- **TADPT 2**
  - Can control 1 -2 DVMS indoor units (controlled as a group)
  - operate indoor unit as primary or secondary heat source
  - “Emergency Heat” output
  - External contact input to disable unit – N.C. operation
  - Supports 1 or 2 stages of Heat and Cool
  - Requires field supplied 24vac class 2 transformer
    - one transformer per adaptor

MIM-H04UN – WiFi Adapter

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

MCM-C200 – Mode Selector Switch

- Manual system mode select – Heat Pump systems only
- Installed in outdoor unit or in building
- Max. 328ft of 3 conductor control wire from control to outdoor unit

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Basic Controls Overview

MRW-TA – External Room Temperature Sensor

- Remote sense of room temperature when
- unit is installed in high ceiling
- outside fresh air ducted into the return,
- using a remote controller with no built-in space sensor

Multi-Tenant Function Controller – MCM-C210N

Used to keep a DVM S system online in the event of a power loss to a indoor unit

MIM-B14 – External Contact Controller

- Direct indoor unit control by external contact signal
- Emergency control with simple contact input
- Indoor unit option setting must be set to enable external control operation

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Basic Controls Overview

Touch Controller MCM-A300N

Maximum:
• 64 indoor units, 1 system, and 16 MCU's when connected to F1/F2 (system/set layer)
• 128 indoor units and 16 systems when connected to R1/R2 (control layer)

DMS Data Management Server 2.5 MIM-D01AUN

Easy Control & Monitoring Through Web Browser
Schedule Control Function Through Web Browser
Advanced Programmable Control Logic
Advanced Heat Pump Auto Changeover Logic
External Contact Interface
Energy Management / Power Distribution Function
History Management

BACnet Gateway 2.5 MIM-B17BUN

DMS 2.5 + built in BACnet gateway

LonWorks Gateway 2.5 MIM-B18BUN

DMS 2.5 + built in LonWorks gateway

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Refrigerant Piping Introduction

- Samsung piping installation guidelines and restrictions must be strictly followed
- 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

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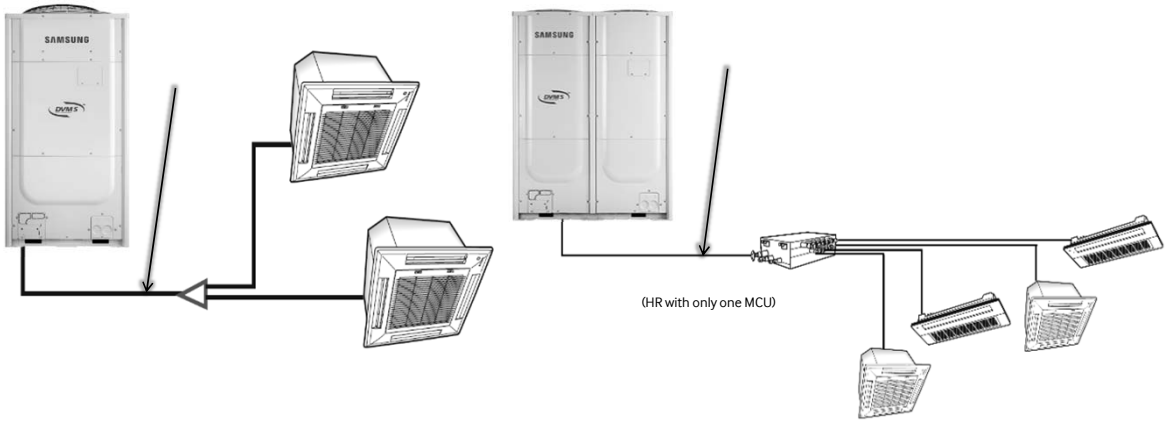
DVM S Piping

- **"Main Pipe"** refrigerant pipes that enter the building from the outdoor(s) unit to the first Y-joint, EEV kit, or MCU (single MCU systems)



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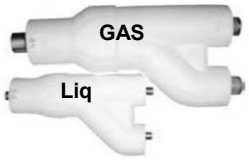
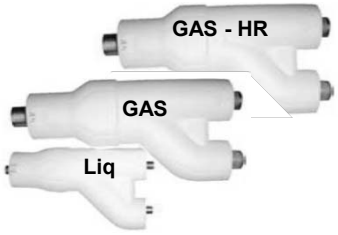
DVM S Piping - Branch Fittings

- MXJ-Y Y-joint (HR & HP)
  - Y joints split refrigerant pipes to indoor units or MCU'S
  - Y joints twin ports from MCU'S
  - Y-joint sizes based on system and indoor unit capacities
  - Kit includes
    - liquid & gas fittings
    - Insulation
    - pipe reducers
  - Heat recovery systems will require the additional GAS HR fitting

Heat Pump Y-joint kit



Heat Recovery Applications



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DVM S Piping Y-joint Installation

- 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

Improper Installation Using a electricians level this is 30º off level

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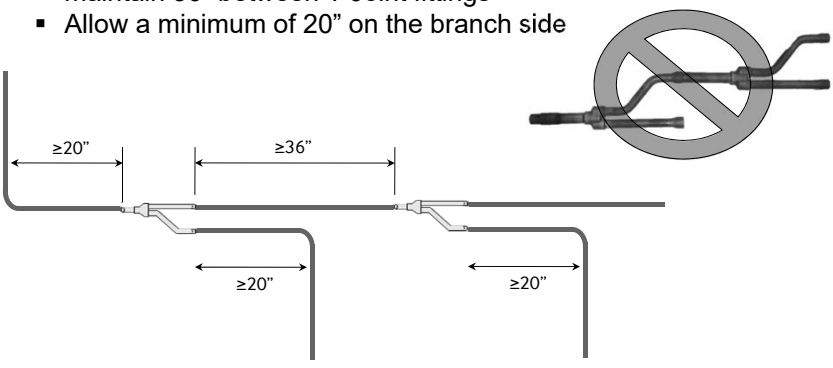
DVM S Piping Y-joint Installation

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



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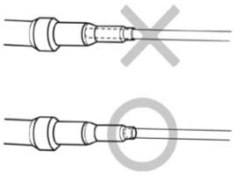
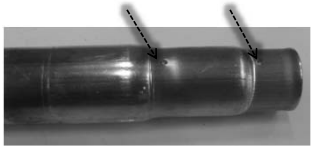
DVM S Piping Y-joint Installation

- 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 increase noise potential





- 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

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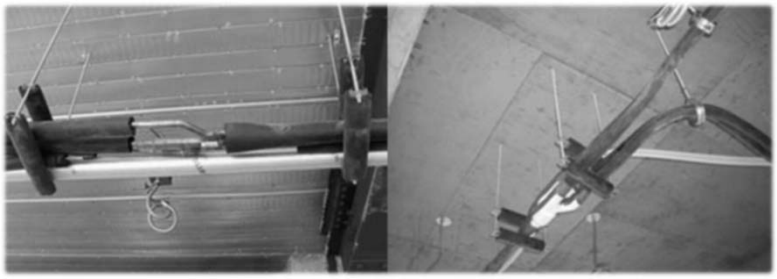
DVM S Piping Y-joint Installation

- 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)



- Refer to state and local codes for piping support compliance

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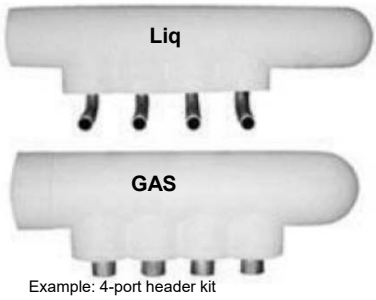
DVM S Piping – Header Fittings

- MXJ-H Header kits
  - Always connect the largest capacity unit to the first port on the header
  - Are used at the end of the line to distribute refrigerant to multiple indoor units
  - Y joints or additional headers may not be connected to the header
  - Includes fitting, cap and insulation
  - Headers sized based on system and indoor unit capacities
  - Headers are only used on heat pump systems

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



Example: 4-port header kit

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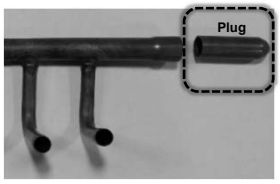
DVM S Piping Header Installation

- Header joint 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

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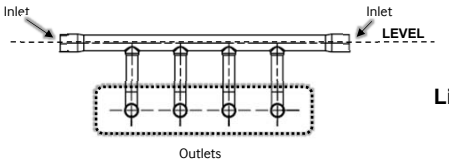
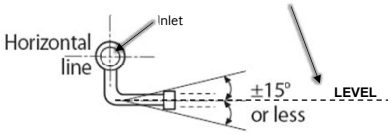
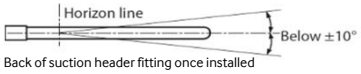
DVM S Piping Header Installation

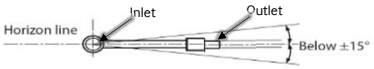


Liquid Header

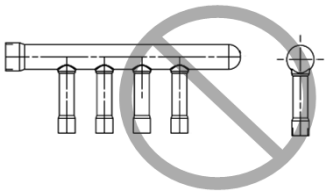


Both the liquid and gas headers must be installed level





Gas Header



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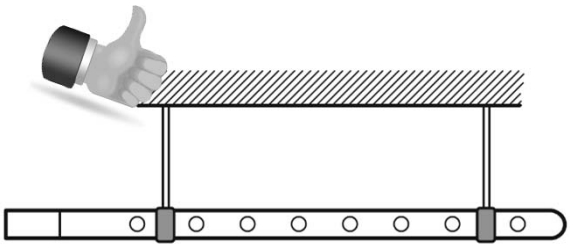
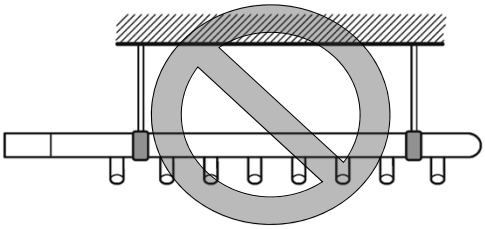
DVM S Piping Header Installation

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





(Gas ports pointing down)

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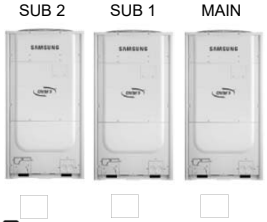
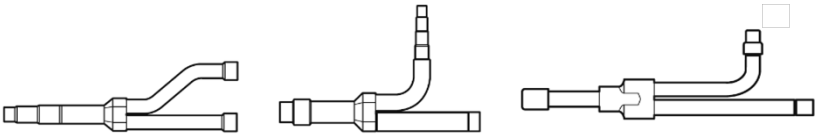
DVM S Piping Tee's

MXJ-TA**M**

- Tees are used in modular systems to make 2 or 3 outdoor units piped together for one system
  - 2-module system requires 1 heat pump fitting kit (Liq & Gas)
  - 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

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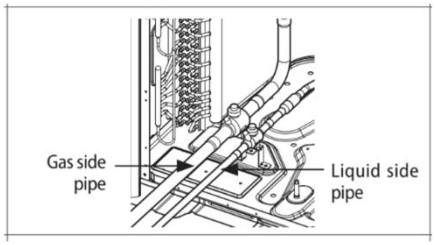
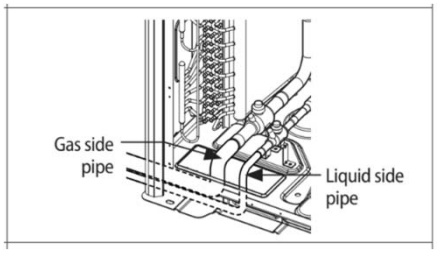
DVM S Piping Connections

- Single unit systems (Heat Pump & Heat Recovery)
- Refrigerant pipes may enter from the front, or bottom of unit

One pipe shown for example only





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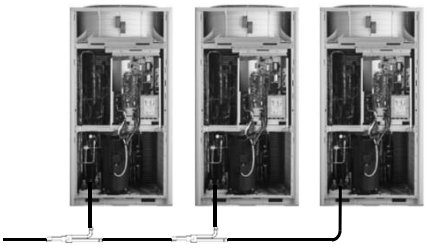
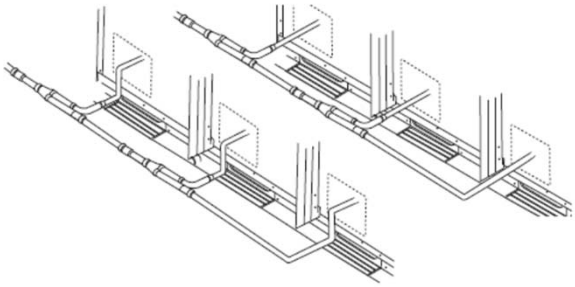
DVMS Piping Connections

- 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



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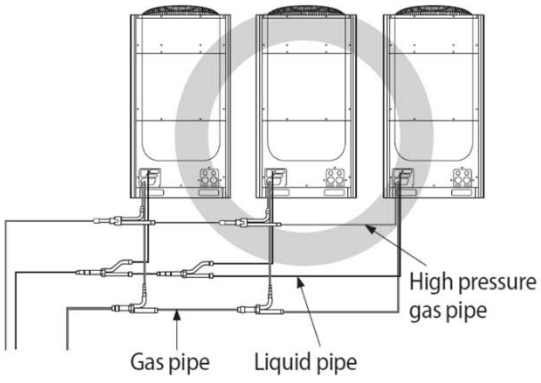
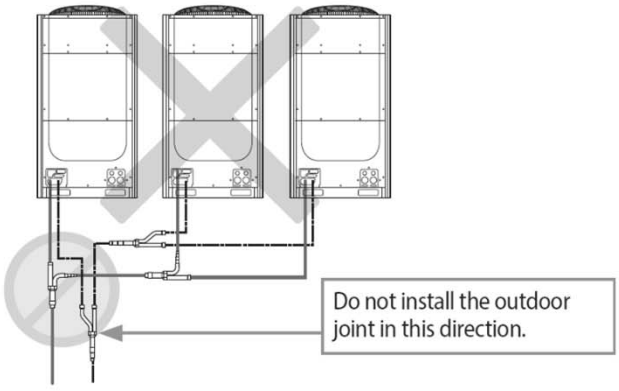
DVMS Piping Connections





✳ High pressure gas pipe only applies to the H/R product.

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DVMS Piping Connections

In modular systems all piping must be parallel with the units, these images are improper installation

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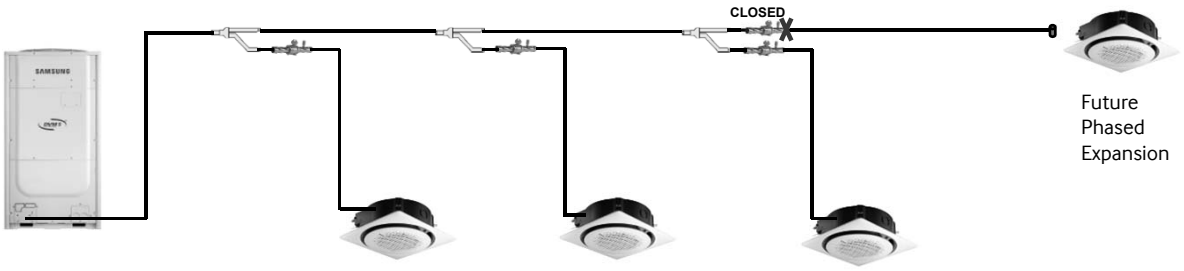
DVM S Piping Isolation Valves

- Isolation valves must be installed directly after a Y-joint, Header port or MCU port
- Service port must be located on the indoor unit side
- 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



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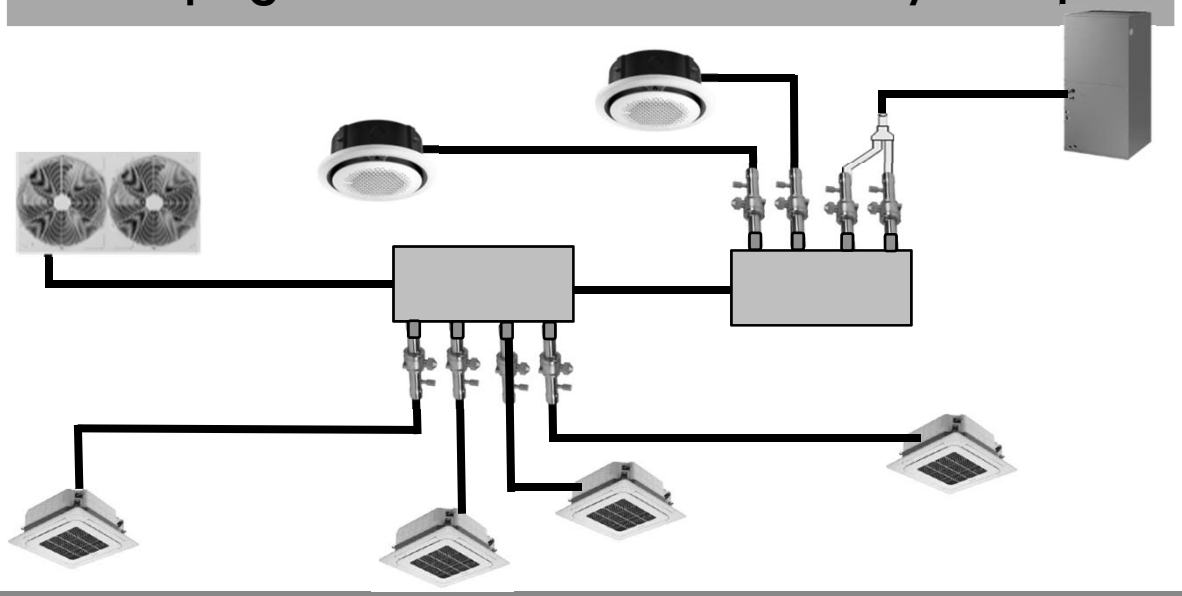
DVM S Piping Isolation Valves Heat Recovery Example



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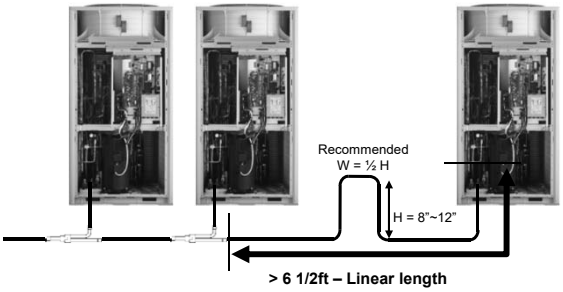
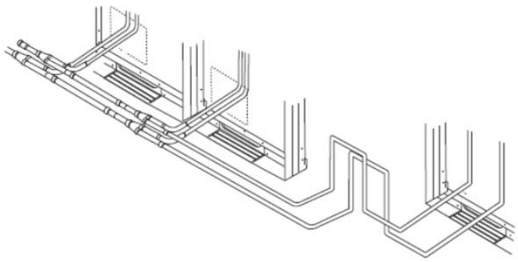
DVM S Piping - Inverted Traps

- Modular systems (2 or 3 ODU's) outdoor unit piping
- When the piping length between outdoor unit and branch joint exceeds 6 1/2ft. An inverted trap is required
  - Trap rise: 8 to 12 inches
  - Rap Width = 1/2H





Vertical Trap
- Gas Pipe: Mandatory
- High Press: Mandatory
- Liquid Pipe: Optional

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

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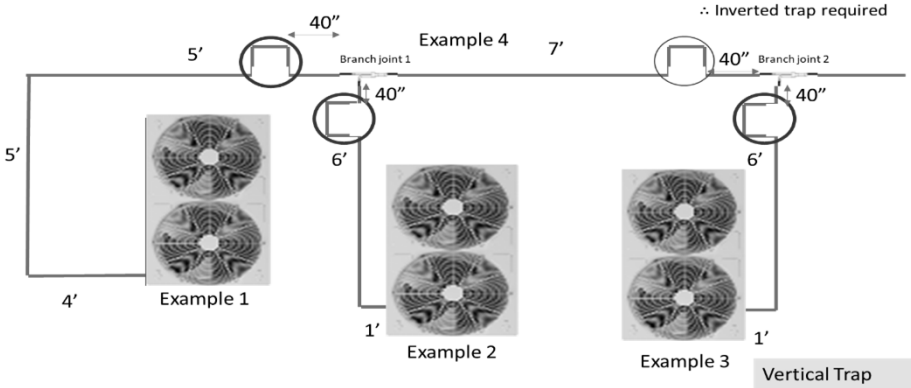
DVM S Piping - Inverted Traps

Example 1. From branch joint1 to Sub2
- Sum pipe length : 5+5+4=14
∴ Inverted trap required

Example 4. From branch joint1 to branch joint 2
- Sum pipe length : 7
∴ Inverted trap required

Example 3. From branch joint2 to Main
- Sum pipe length : 6+1=7
∴ Inverted trap required



Vertical Trap
- Gas Pipe: Mandatory
- High Press: Mandatory
- Liquid Pipe: Optional

Install traps 40" from any Tee connection,
Traps must be 8 – 12 " in height
Vertical position only

Example 2. From branch joint1 to Sub1
- Sum pipe length : 6+1=7
∴ Inverted trap required

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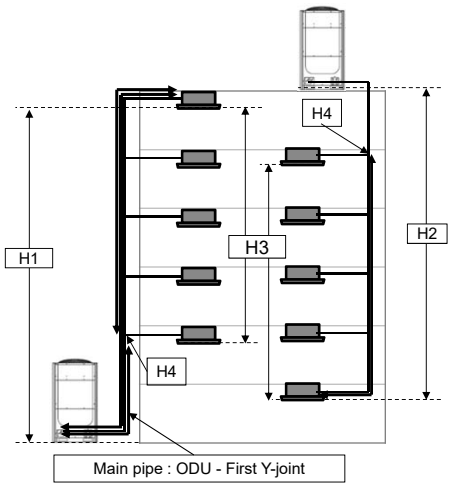
Heat Pump General Piping Limitations



Classification	Pipe	Length
Max length	Total piping length	3281'
	ODU – IDU (equivalent)	656'(722')
	ODU-ODU(equivalent)	33'(43')
	1st branch joint - farthest IDU H4	148'/295'
Level difference	ODU~IDU H1	131'/361'
	ODU~IDU H2	164'/361'
	IDU~IDU H3	164'
		49' for highwall with internal EEV
	ODU~ODU	0'

1) The pipe size(Liquid & Low pressure gas) shall be increased by one grade over 148'
2) PDM kit may be required over 164'.
3) Pipe size up is required according to condition

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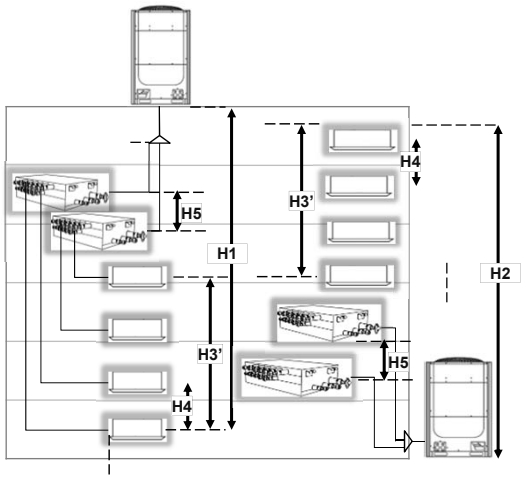
Heat Recovery General Piping Limitations



Classification	Pipe	Length
Max length	Total piping length	3281’
	ODU – IDU (equivalent)	656’(722’)
	MCU - Indoor unit	148’
	ODU-ODU(equivalent)	33’(43’)
	1st branch joint - farthest IDU	148’/295’
Level difference	ODU~IDU H1	164’/361’
	ODU~IDU H2	131’/361’
	IDU~IDU in different MCU H3	131’
		49’ for highwall with internal EEV
	IDU-IDU or IDU-MCU in one MCU H4	49’
	MCU-MCU H5	98’
	MUC-MCU in series	16’
	ODU~ODU	0’

1) The pipe size(Liquid & Low pressure gas) shall be increased by one grade over 148’
2) PDM kit may be required over 164’.
3) Pipe size up is required according to condition

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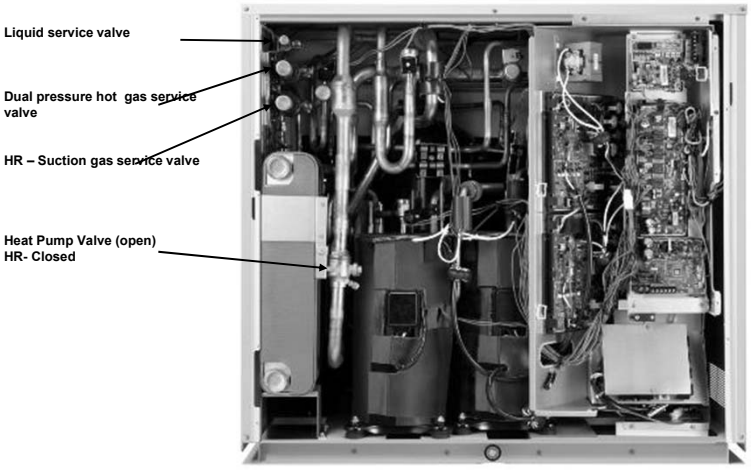
Water Cooled Refrigerant Piping

AM072/096/120/192HXWA (HP& HR)



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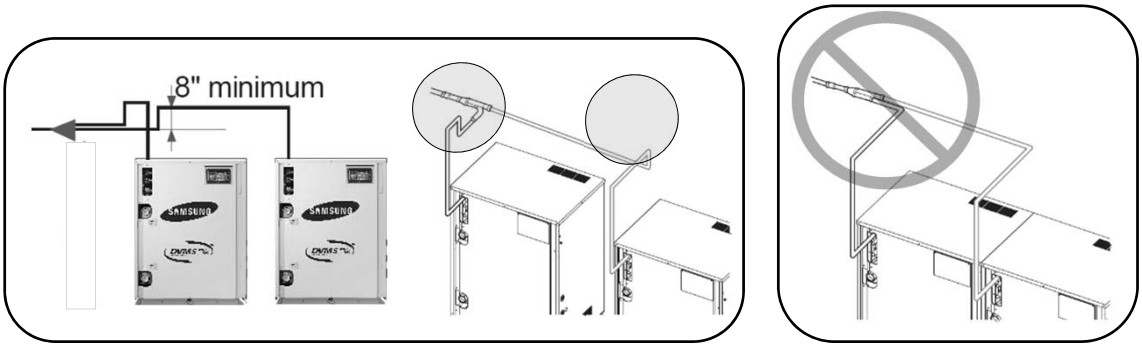
Water Cooled Refrigerant Piping

Modular systems

- The refrigerant piping can be installed above the condensers
  - Heat Pump – Install an inverted trap (≥ 8”) in the dual pressure gas piping
  - Heat Recovery – Install an inverted trap (≥ 8”) in the dual pressure gas and suction gas piping



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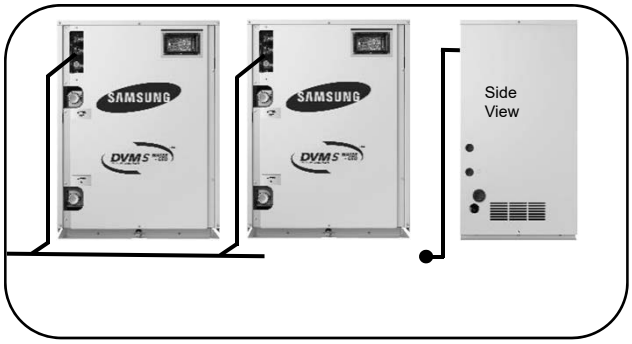
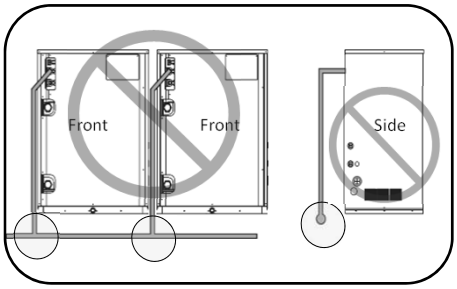
Water Cooled Refrigerant Piping

Modular systems

- The refrigerant piping can be installed horizontally below the condensers
- Refrigerant piping must not block the front service panel
- The condenser branch “Tee” fittings must be installed horizontal level, never vertical





Standard refrigerant Tees cannot used

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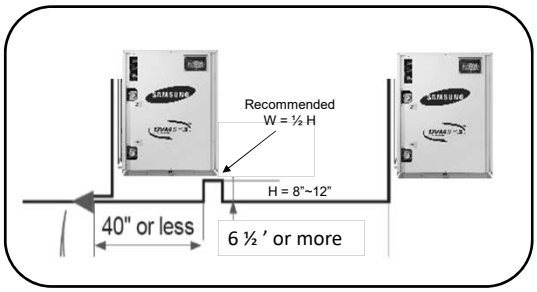
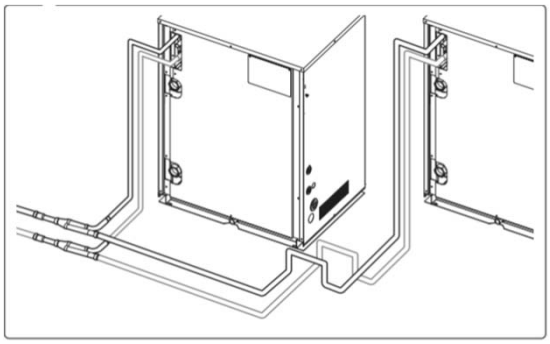
Water Cooled Refrigerant Piping Connections

Modular systems

When the refrigerant piping is installed horizontally below the condensers and there is a piping length between condenser module and branch fitting of 6.5' or more:

- An inverted trap must be installed in the gas piping





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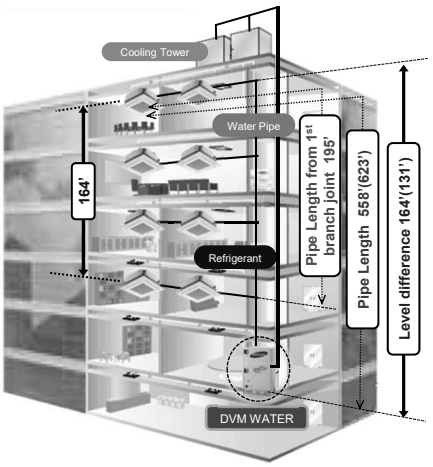
Water Cooled Piping Limitations

- **Piping limitations**
  - Total Pipe length : 1640ft
  - Max pipe length : 558ft (equivalent 623ft)
  - Max pipe length(ODU~ODU) 33ft (equivalent 43ft)
  - Max level difference(ODU~IDU)
    - 164ft when ODU is highest
    - 131ft when ODU is lowest
  - Max level difference(IDU~IDU) : 164ft
  - Max pipe length from 1st branch joint to furthest indoor unit : 148ft 295ft under special conditions (note 1)
  - HR Max level difference (MCU – MCU) : 98ft
  - HR Max level difference IDU - IDU in one MCU 49ft
  - HR Max level difference IDU - IDU in one system : 131ft



※ **Standard Water Pressure : 284 psi or less**

1) Pipe size must be increased one size

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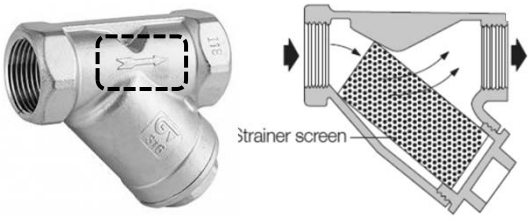
Water Side System Components - Field Supplied

Closed loop flow switch – Mandatory

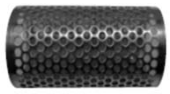
- Prove water flow through the closed loop and plate heat exchanger
  - **Flow switch must be carefully installed according to manufacturer's installation instructions**

Closed loop inlet strainer 50 Mesh – Mandatory

- Required to filter the water entering the plate heat exchanger



Required

Mixed Type

Wire Type(inner) + Punching Type(outer)
Filtration area : large Stiffness : good
O

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Recommended System Components - Field Supplied

Recommended water side components

- Closed loop supply & return temperature gauges
  - Monitor water △T through the PHE
- Closed loop supply & return pressure gauges
  - Monitor pressure drop through the PHE
- Closed loop supply & return ball style service valves
- Refer to the Installation Manual and the Water Guide Manual for specific guidelines on the closed loop design and requirements

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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**

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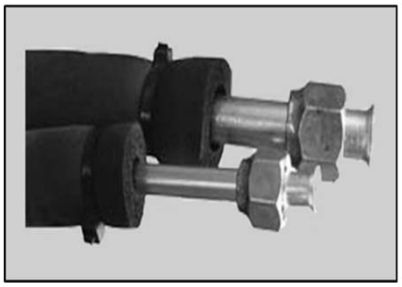
Field Piping Components

- Required Refrigerant Components
- ACR – dehydrated and sealed copper tubing – Soft & Hard drawn
- Field piping insulation – Wall thickness from 1/2" up to 1 ½"
- Always follow state and local codes for insulation requirements



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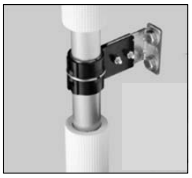
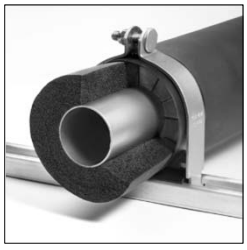
Required Refrigerant Components

Field Piping Support

- Horizontal support hangers 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



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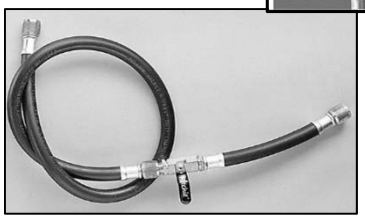
Required Installation & Service Tools

- Use a dedicated R-410A manifold set, for DVM S systems only
  - Oil Compatibility
    - PVE/POE
  - (5/16” flare recommended)
- Vacuum rated hoses recommended for system evacuation
- Maintain Hoses for dependability
  - replace as needed



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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

Preferred

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Required Installation & Service Tools

- Use a <u>burnishing</u> or <u>eccentric - burnishing</u> type 45° R-410A rated flare tool for high quality flares
  - Burnished flare cones provide a superior seal
- Samsung DVMS indoor units provide the proper flare nuts

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

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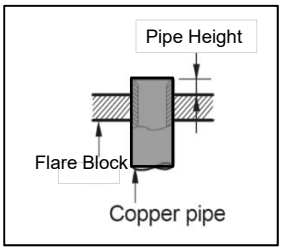
Making A Good R-410A Flare

- **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**
- **Apply any synthetic oil to the flare cone inner and outer surfaces only**
  - Pen style applicators allow better oil distribution
- **Run the flare handle in twice for a well polished flare cone**
  - Do not lubricate the flare threads
- **Verify correct flare diameter by using a flare gauge**
- **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**



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Required Installation & Service Tools

Vacuum Pump

- Pump capacity should be a minimum of 6 cfm
- Vacuum pump must have a built-in check valve
- Pump must be kept properly maintained
- Start the evacuation process with new pump oil
  - Large systems may require additional oil changes

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Required Installation & Service Tools

Digital Vacuum Gauge

- it is imperative to properly evacuate the system to remove all moisture
- 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 an accurate reading
- Never evacuate a refrigeration system without a micron gauge

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Required Installation & Service Tools

- 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
- 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

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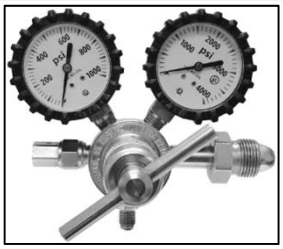
Required Installation & Service Tools

Metric Hex Keys

Adjustable Wrench or Wrench Set



High Pressure Nitrogen Regulator

Torque Wrench Set

¼ to 5/16 Adaptor

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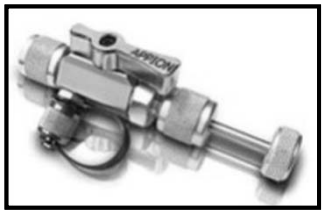
Recommended Installation & Service Tools



¼ to 5/16 core removable tool (vacuum rated)

Inverter checker

SNET converter

Tubing Swaging Kit

Low Pressure Nitrogen Regulator

Tubing Bender

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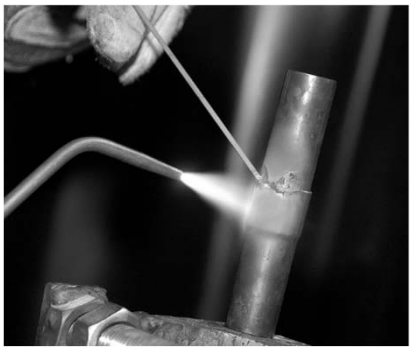
Required Piping Practices - Brazing



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

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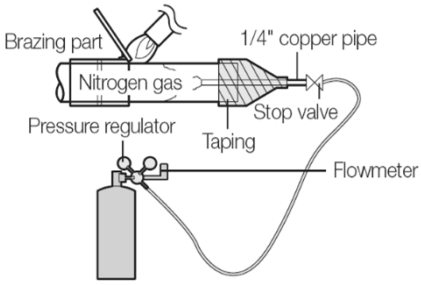
Required Piping Practices - Nitrogen Purge

- **A dry nitrogen purge is required for the entire brazing process (Pressure regulated up to 3 psi)**
- **Using a flow regulator, maintain 2 – 3 PSI of dry nitrogen pressure**
- **If you are having difficulty maintaining this, partially cover 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**



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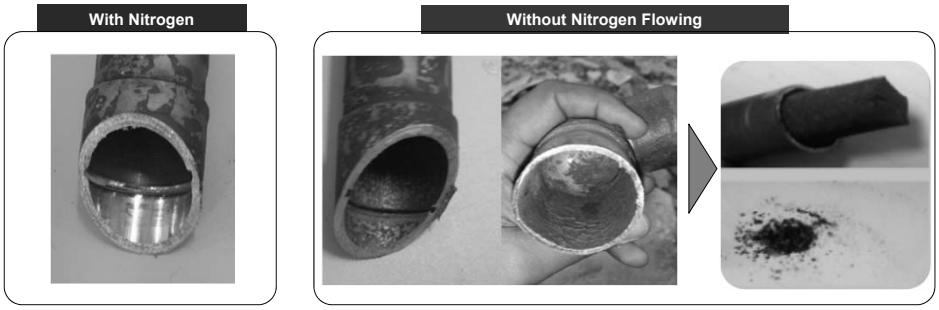
Required Piping Practices - Nitrogen Purge

- 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



Ex) Restricted Filter

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Required Piping Practices

- Do NOT cool off the joint immediately after brazing
- Allow joint to cool down naturally as to not stress the bonding of the fill metal.
- After checking with mirror and light, cool with wet rag
- Do Not Lap Fill Metal Over Holes

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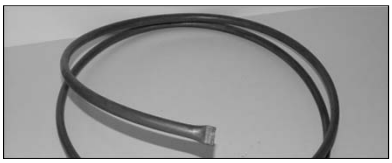
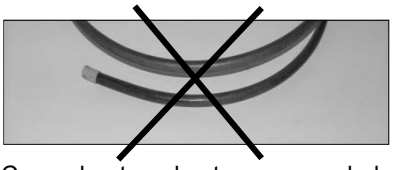
Good Piping Practices

- 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 dormant lines is recommended



Pinched & brazed



Capped or taped not recommended

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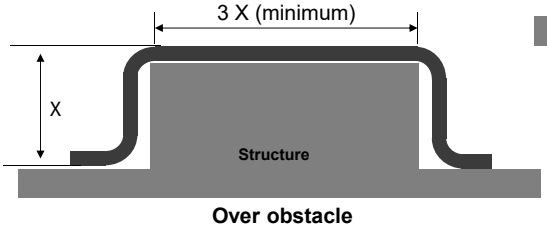
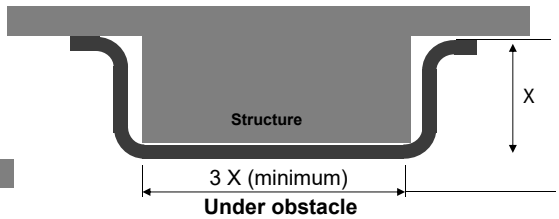
Required Piping Practices - Proper Pipe Routing

Piping around obstacles

- 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

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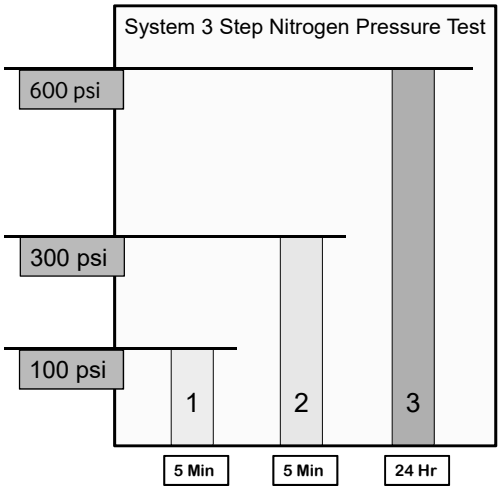
High Pressure Leak Test

- 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



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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

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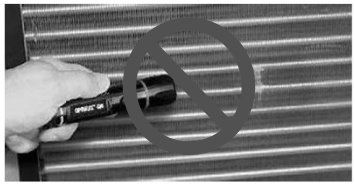
High Pressure Leak Test

- 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



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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**

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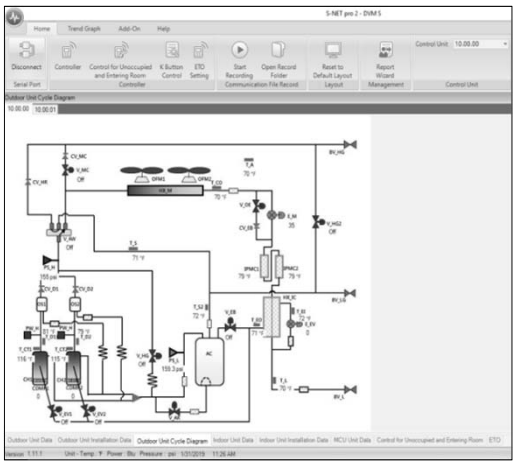
- This completes the installation portion of the class
- Q&A

SNET Pro 2 Introduction

- SNET Pro 2 Service Software is used to monitor and program all Samsung DVM S systems
- DVM S system commissioning and configuration can be performed through the local remote controllers however, use of the SNET Pro 2 is easy and strongly recommended
- This section will cover the basic use and operation of the SNET Pro 2 software



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SNET Pro 2 Communication Converter

- **MIM-C02N** – Includes the communication converter, USB cable, and firmware update cable, field supplied 16/2 stranded/ shielded cable is required to connect to the main PCB
  - The firmware update cable is used to connect to a PCB and reprogram the MICOM with new firmware

S-Converter

USB Cable

Firmware Update Cable

Control wire - Field supplied

NOTE: Software and driver can be downloaded from www.samsunghvac.com

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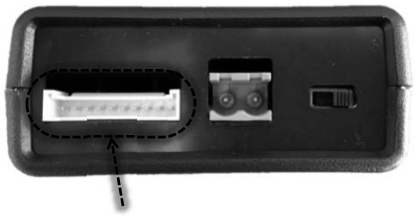
SNET Pro 2 Introduction

MIM-C02N Components

RS232-to-RS485 S-Converter bottom view



Firmware update cable

- Equipment/control PCB update cable connection
- Included cable will allow connection of the converter to IDU & ODU controller PCB's for firmware updates
- This is one of two ways to reprogram a PCB with updated firmware

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SNET Pro 2 Introduction

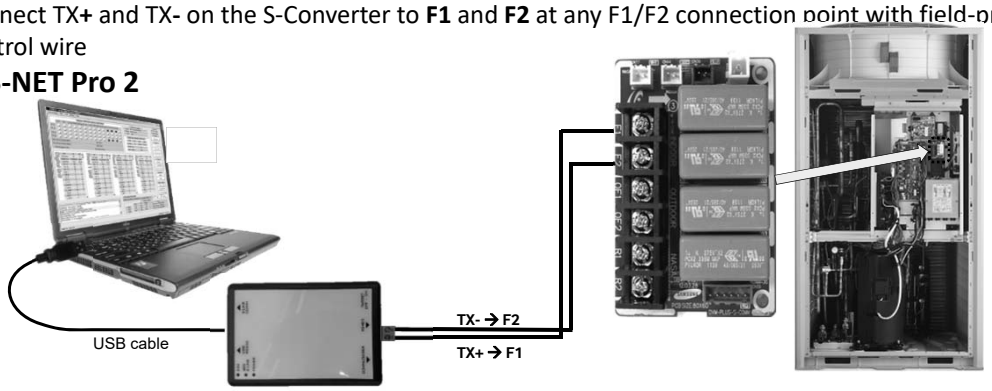
USB cable

- Connect the USB cable to the Laptop computer and the S-Converter
- After connection wait 30 seconds before opening software, this allows Windows to configure COM port

RS485 Communication

- Connect TX**+** and TX**-** on the S-Converter to **F1** and **F2** at any F1/F2 connection point with field-provided control wire

Run S-NET Pro 2



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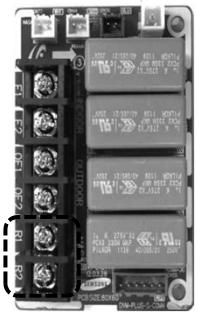
SNET Pro 2 Introduction

- SNET Pro 2 version 1.4.6 or newer will allow connection to **R1 R2** on the ODU communication terminal block
  - This will allow connection of multiple systems on a central controller **R1 R2** communication line



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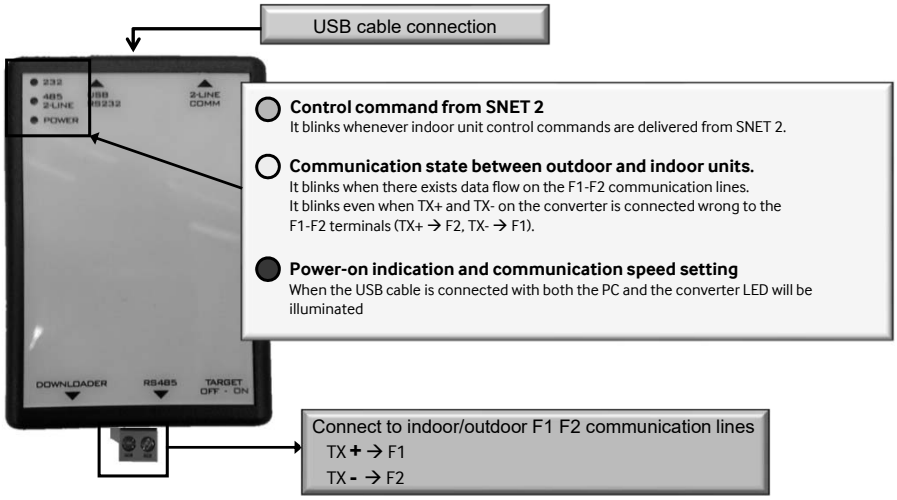
SNET Pro 2 Introduction

Status LED's



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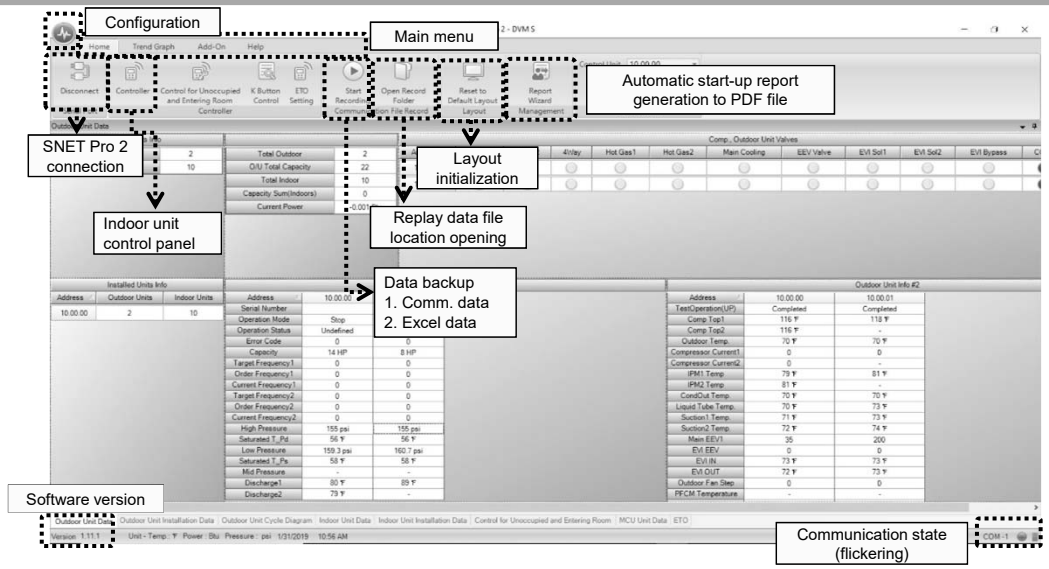
Main Screen - Basic Layout



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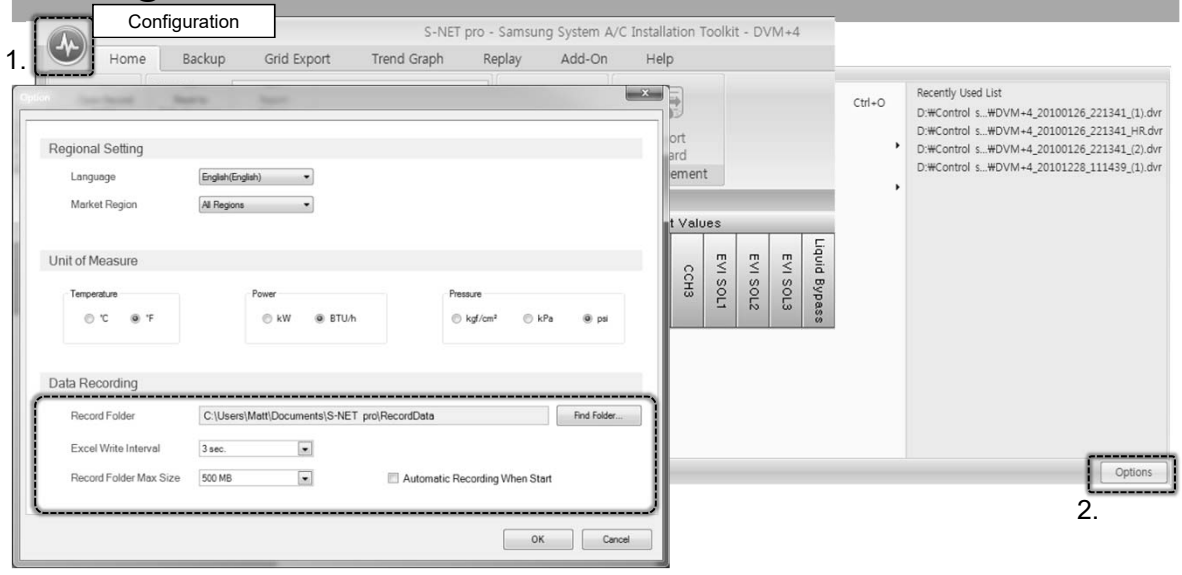
Configuration



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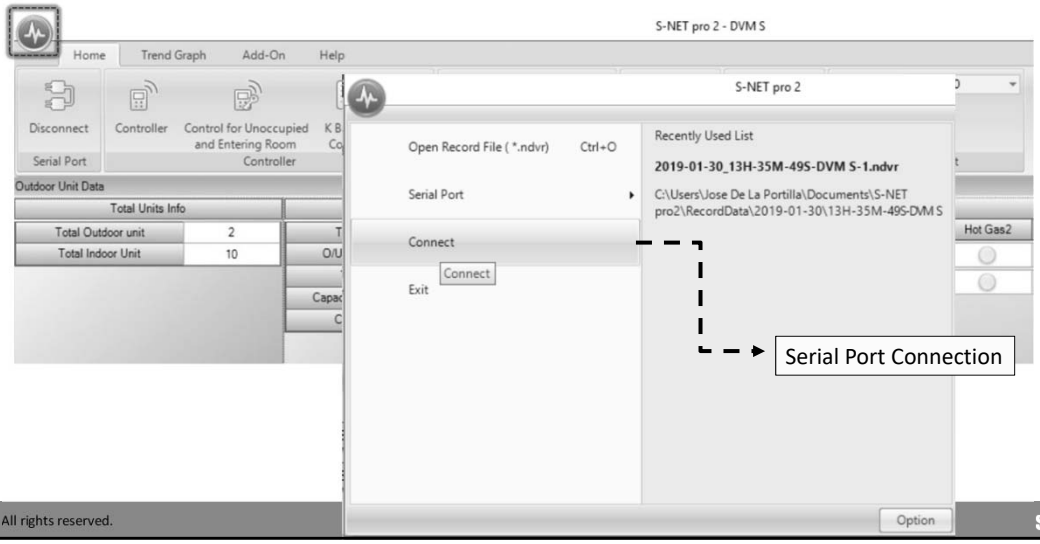
Configuration

Click **"Connect"** to initiate communication with the **DVM S** system



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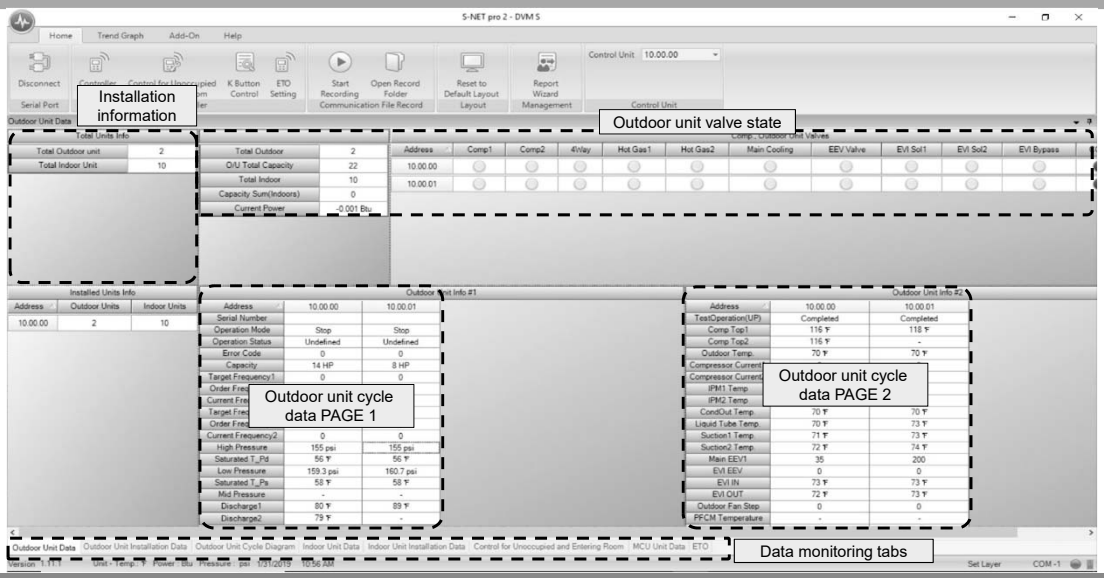
Main Screen



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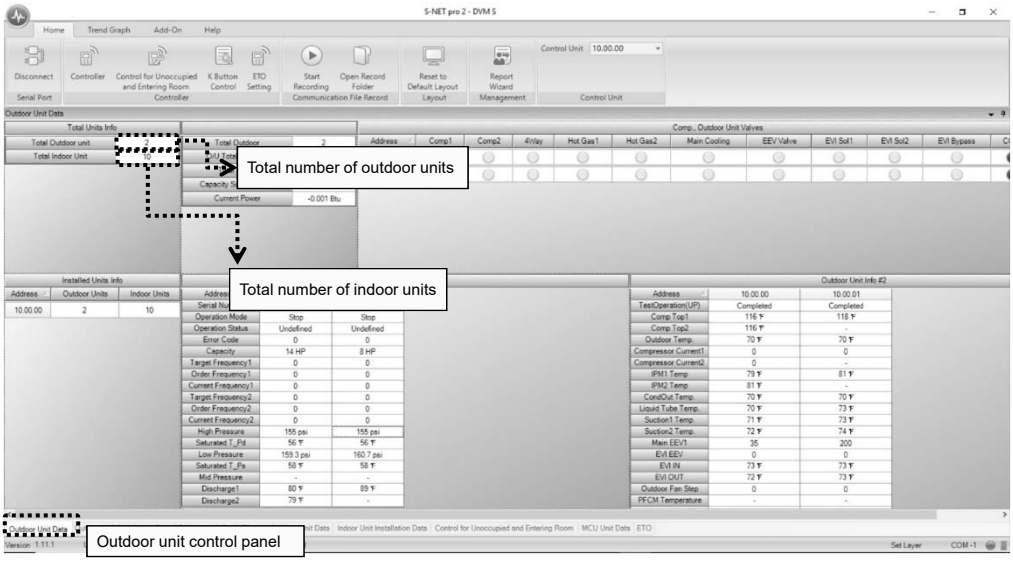
Main Screen



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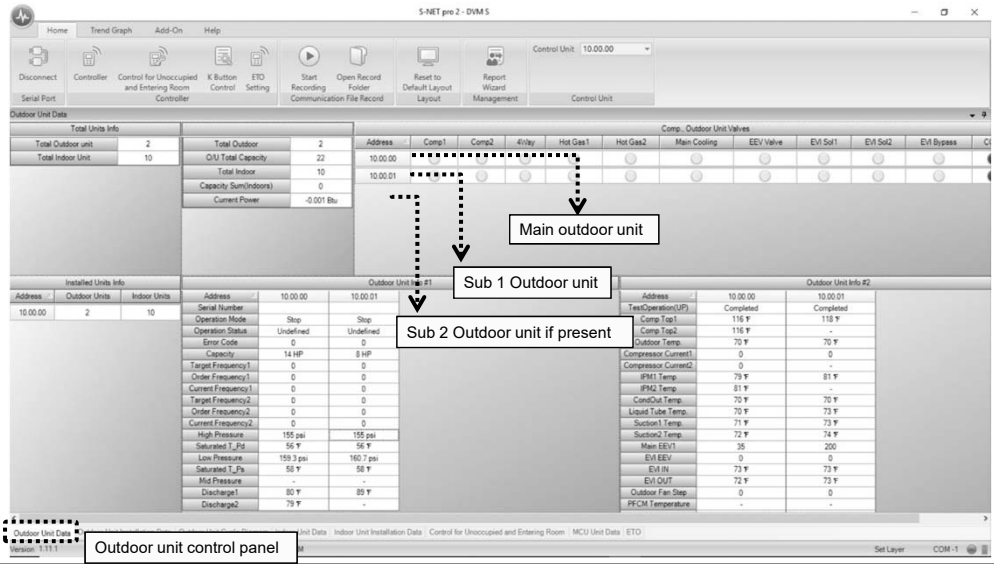
Main Screen



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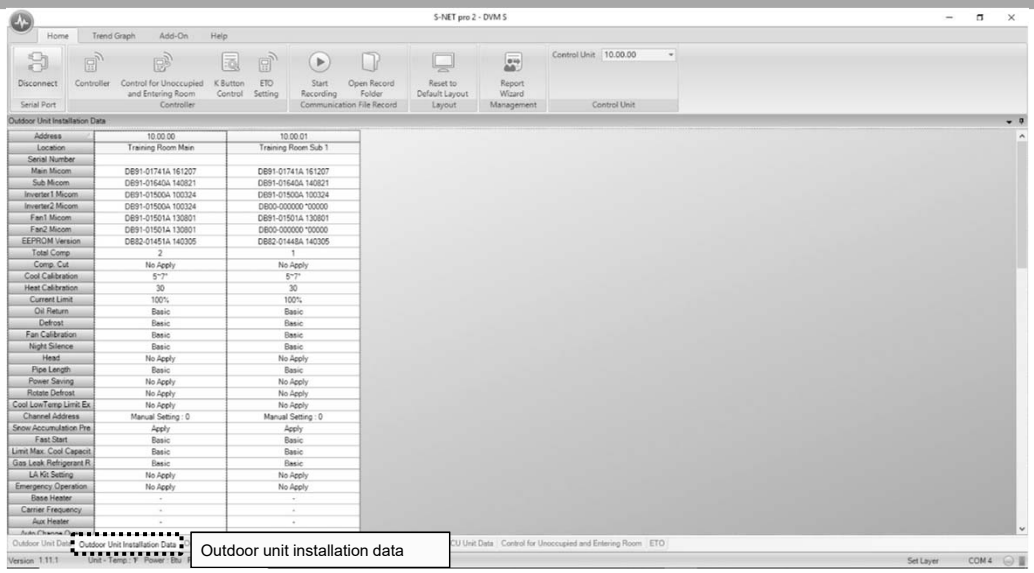
Main Screen



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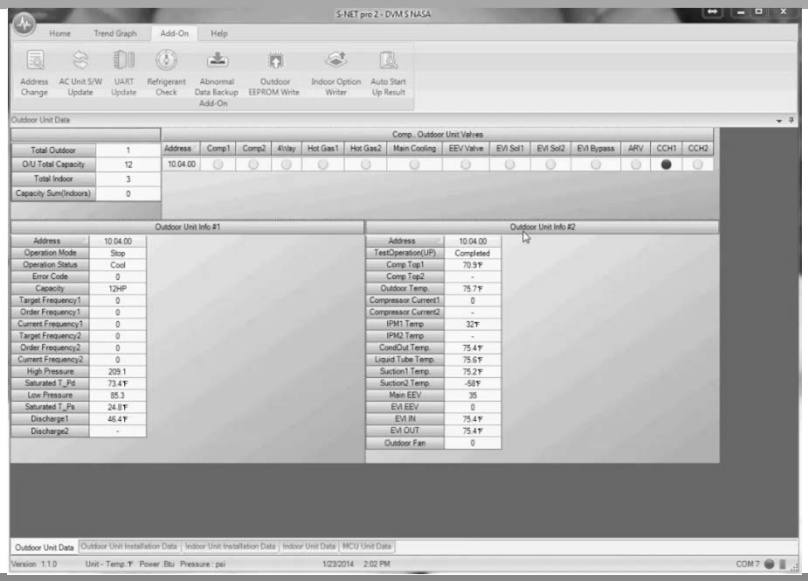
Changing The Outdoor Unit Name - Video



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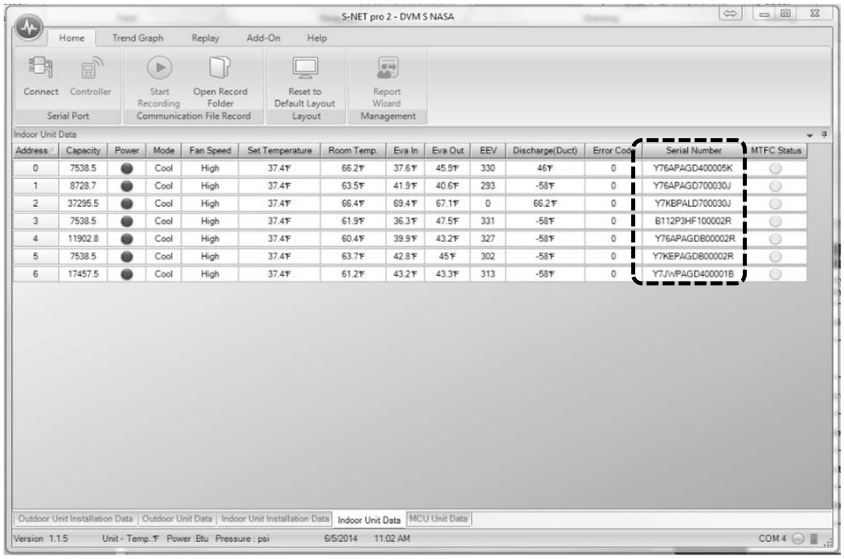
Indoor Unit Data Screen



Item	Description
Capacity	Indoor unit capacity (variable depending on heat load)
Mode	Operation mode
Speed	Fan speed
Set temp	Set temperature
Intemp	Room temperature
EVA IN	Evaporator inlet temperature
EVA OUT	Evaporator outlet temperature
EEV	EEV open position
Discharge (Duct)	Duct unit discharge air temperature. Cassette and wall units will display "-58" at all times.
MTFC Status	Multi-Tenant Function Controller Status (MCM-S210N)

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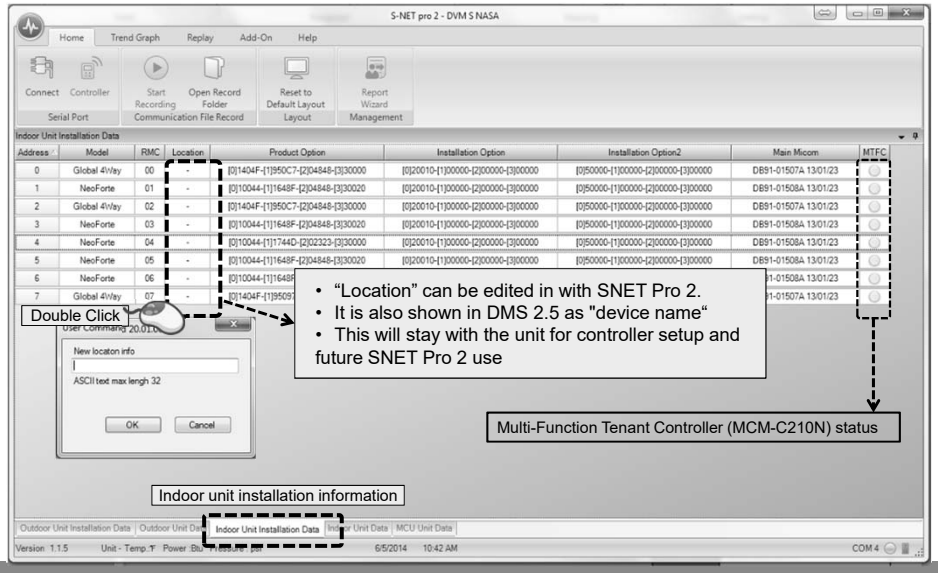
Indoor Unit Installation Data Screen



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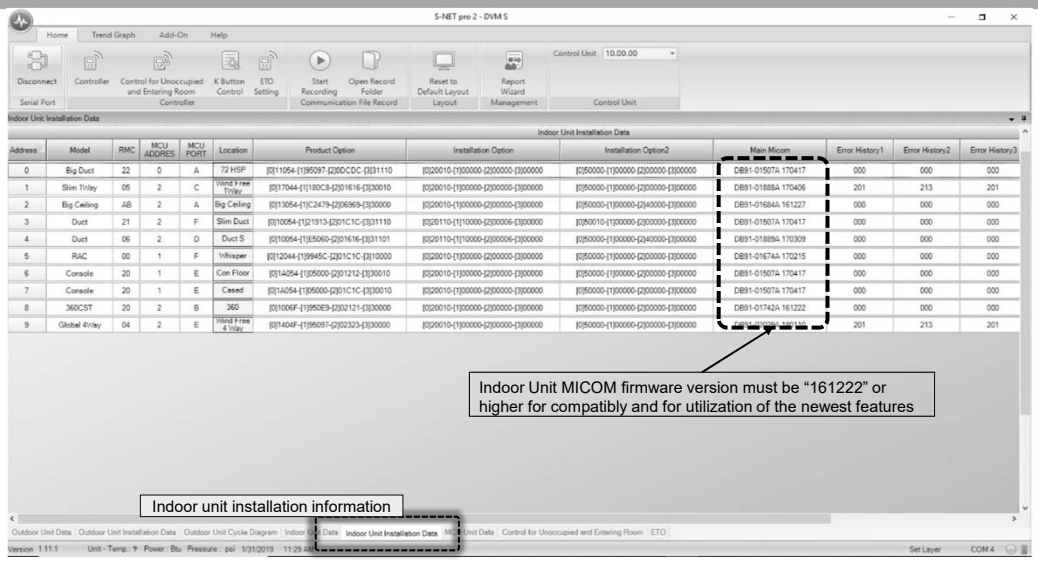
Indoor Unit Installation Data Screen



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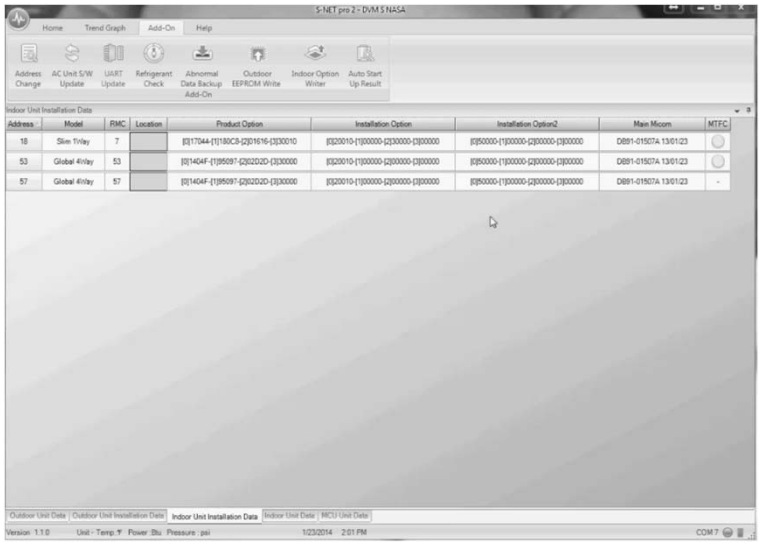
Changing Indoor Unit Name - Video



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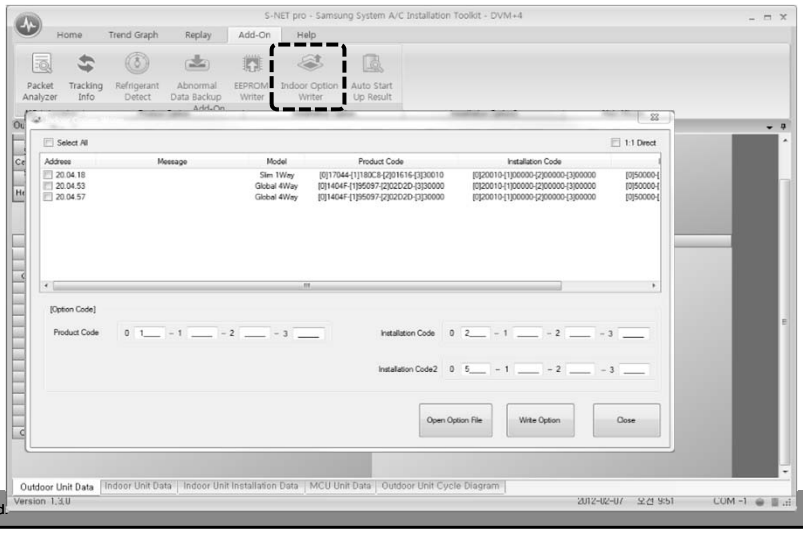
Add-on – Indoor Unit Option Writer

- In the Add-On tab, click "**Indoor Option Writer**" to change indoor basic option settings, advanced option settings, and factory option codes



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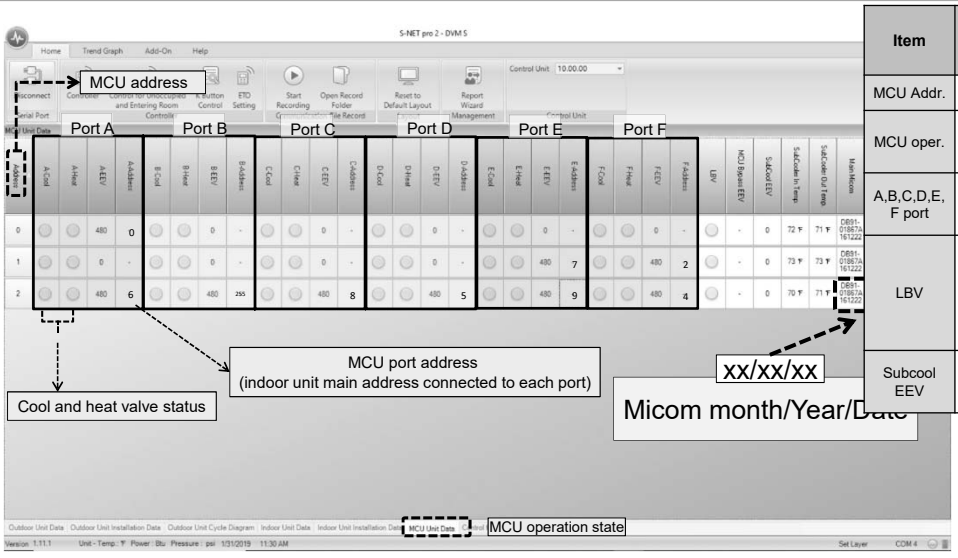
MCU Tab



Item	Explanation
MCU Addr.	MCU Address
MCU oper.	MCU operation mode
A,B,C,D,E, F port	Indoor unit address and running mode
LBV	Prevent refrigerant accumulation and evaporator freezing
Subcool EEV	EEV position for MCU subcooler

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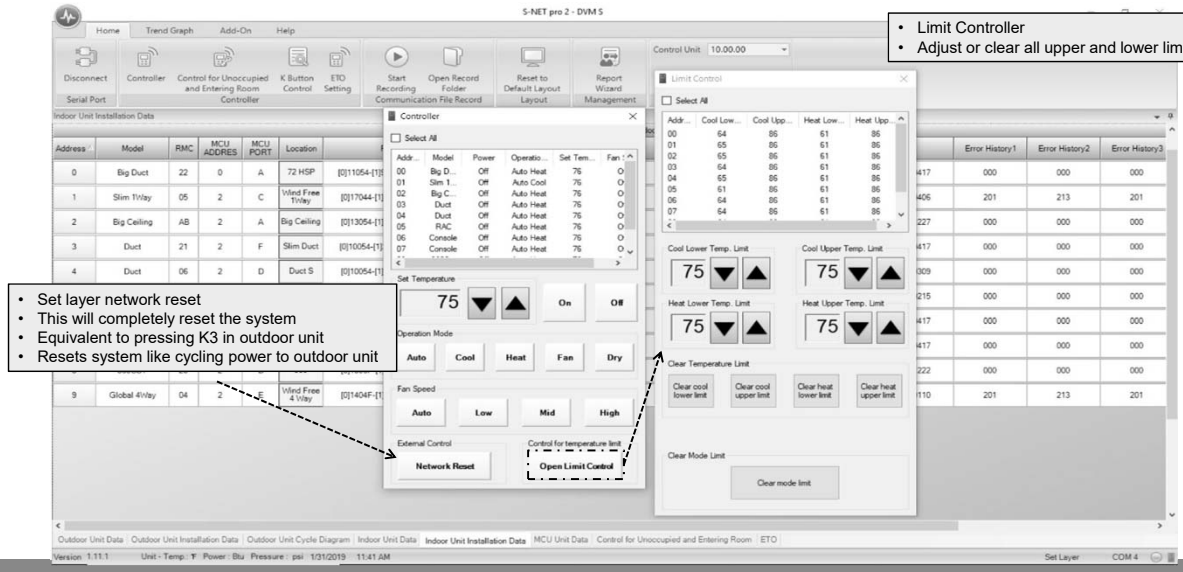
Main Screen - Controller



- Limit Controller
- Adjust or clear all upper and lower limits

- Set layer network reset
- This will completely reset the system
- Equivalent to pressing K3 in outdoor unit
- Resets system like cycling power to outdoor unit

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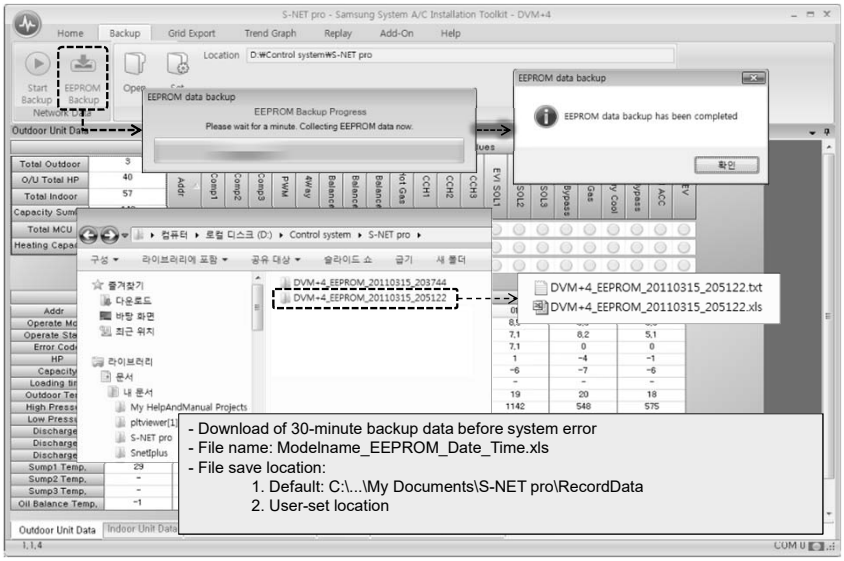
Backup

If the system has disabled itself due to a system error and the system has not been manually reset, data leading up to the error code can be retrieved

- If data is available, the "EEPROM Backup" icon will be available
- Click and follow prompts to save data for review



- Download of 30-minute backup data before system error
- File name: Modelname_EEPROM_Date_Time.xls
- File save location:
  1. Default: C:\...\My Documents\S-NET pro\RecordData
  2. User-set location

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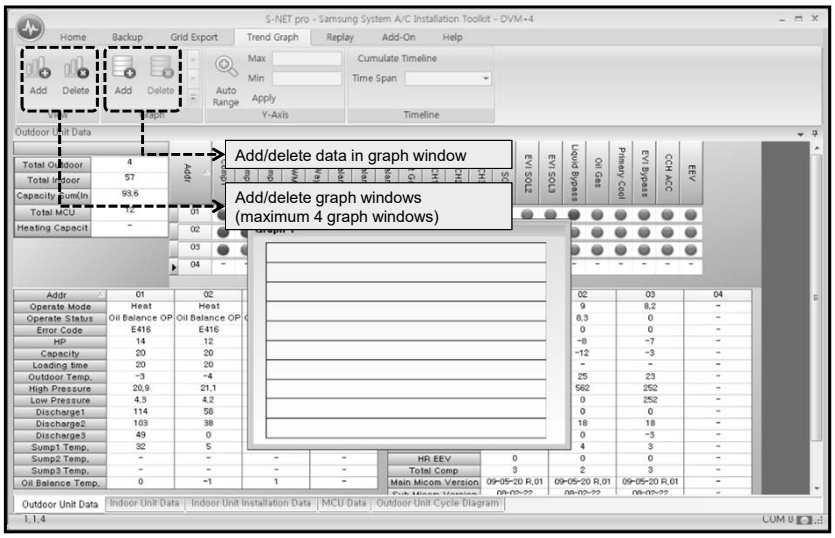
Trend Graph

1. Click “**Add**” to create a new window
2. Click “**Add**” to add items/monitor points to that window



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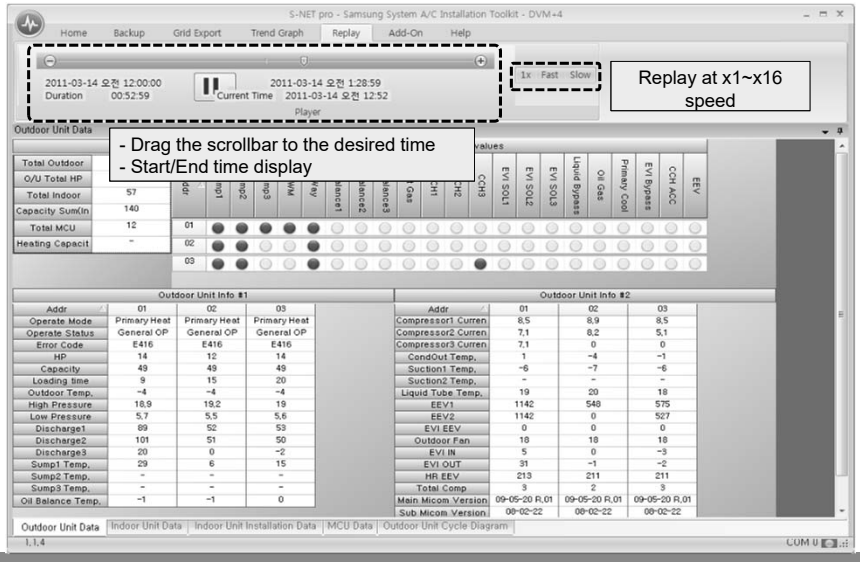
Replay

- In the Replay tab, you can view the current position during recorded file viewing
- Here you can also speed up the playback, rewind, or fast forward



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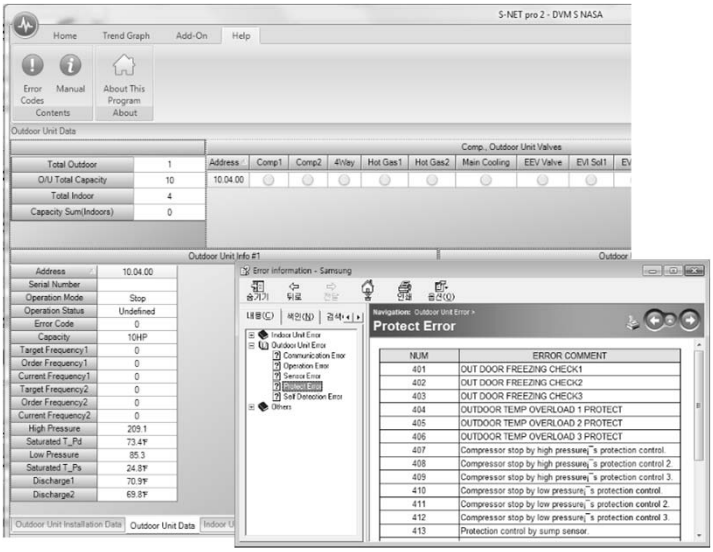
Main Menu - Help

In the "**Help**" tab, click "**Error Codes**" to view all error codes with a brief description



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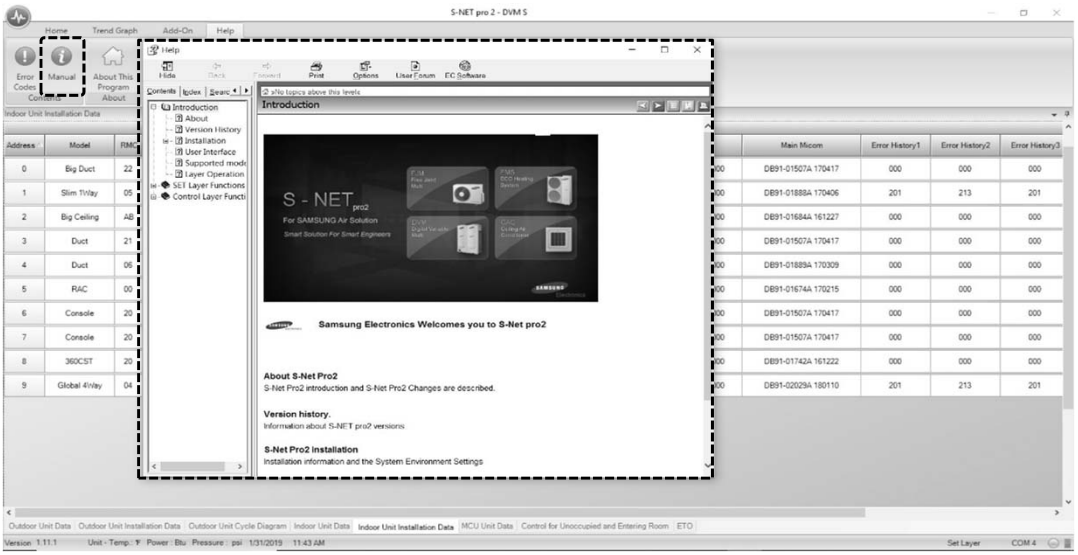
Main Menu - Manual



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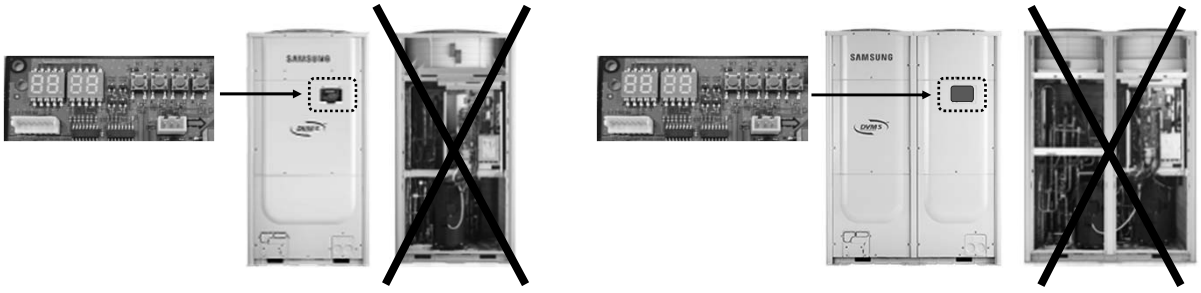
System Power Up

- Recommended for system commissioning – Power up Indoor units before the outdoor unit(s)
- Outdoor unit(s) should be powered up for a minimum of 3 hours before operation to insure no liquid refrigerant in the compressor crankcase
  - When the outdoor temperature is low, power the outdoor unit(s) at least 6 hours before operation
- Before operating the compressors, all of the service panels must be in place on the outdoor unit(s)
  - Main PCB display and “K” buttons can be accessed through PCB inspection door on front of the unit



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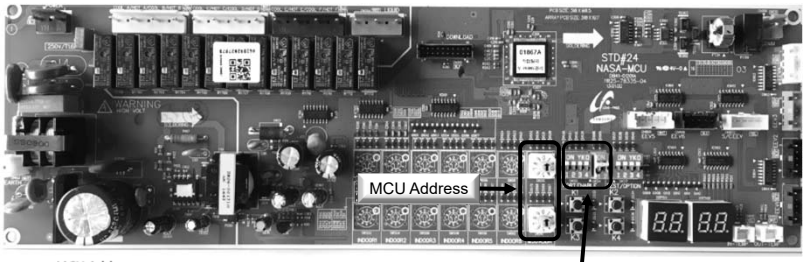
MCU Setup

MCU's must be addressed for the system components to communicate



MCU Address

10's

1's

Default

Set a unique address for each MCU in the system

DIP Switches: Port Assign

ON 1 2 3 4 — A B C D

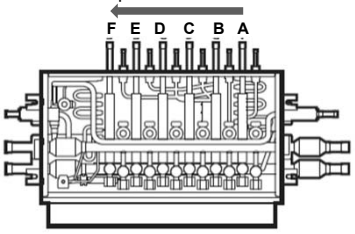
ON 1 2 — E F

On: Port Enable (default)

Off: Port Disable

Assign ports to be enabled on each MCU in the system

Example: 6-Port MCU
Individual port connection



Unused MCU ports must be set to disable before commissioning the system, or an E216 will be generated

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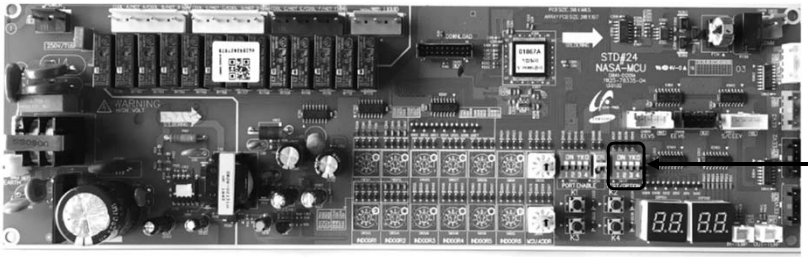
MCU Setup

Twinning MCU Ports



S/W Option **DIP** Switches

S/W Option

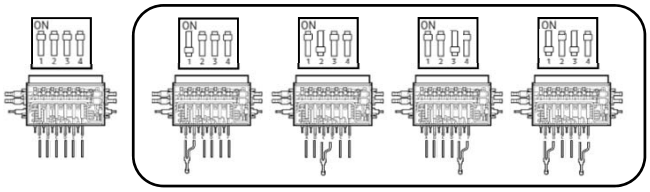
ON 1 2 3 4

Y-Joint Dual Port Assign

S/W Option

ON 1 2 3 4

S/W option DIP switch No.	ON (Default) (Individual connection)	OFF (Shared connection)
1	Each of ports A and B	Paring port A and B
2	Each of ports C and D	Pairing port C and D
3	Each of ports E and F	Pairing port E and F
4	N/A	N/A



Be sure to cycle power to the MCU'S after changing DIP switch position, or changes will not be saved

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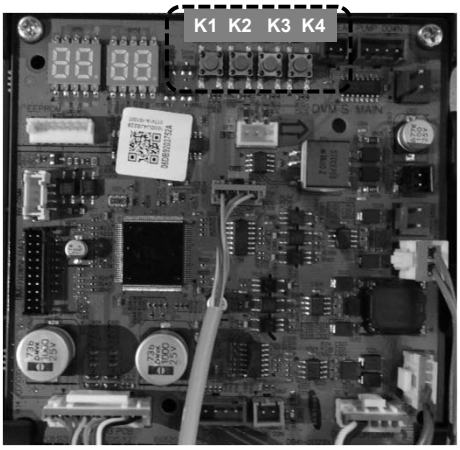
Outdoor Unit Setup

- **K1, K2, K3, and K4 buttons are used to put the system into various service and commissioning modes**
- **Also used for service mode operations and operation data display**



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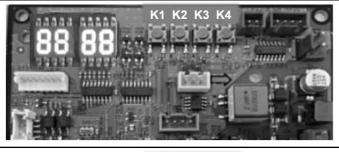
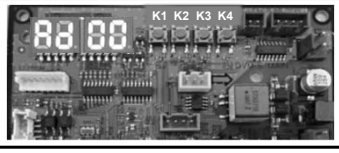
Outdoor Unit Setup

- When power is applied to the system, the outdoor unit will display Ad 00 indicating it is awaiting the tracking process
- 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

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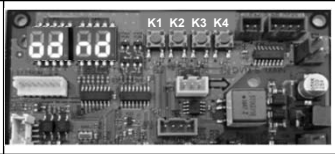
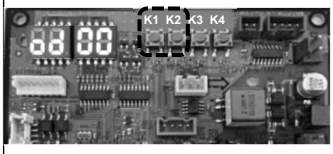
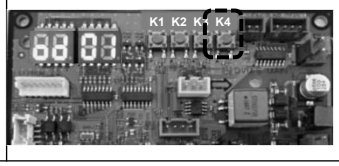
Outdoor Unit Setup

Sequence	Display	Details
3		The PCB display will indicate “od nd” stating that the unit has not been set as a main or sub unit
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)
5		Press and release the **K4** button to set main or sub for each outdoor unit : “od 00” = Main “od 01” = Sub1 unit “od 02” = Sub2 unit Confirm setting: Press and hold the **K2** button, settings are saved This procedure is performed on each outdoor unit

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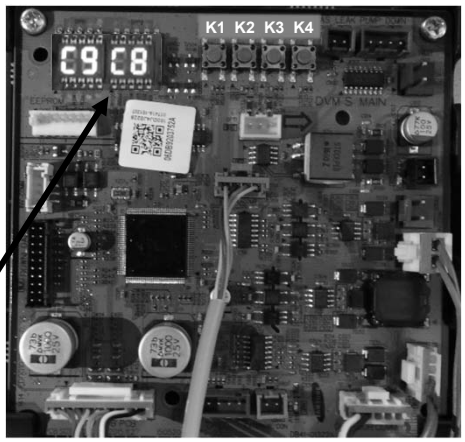
Outdoor Unit Setup

Confirm multiple outdoor unit communications

- When the outdoor units are properly set the display indicates the communication status on the Main outdoor unit PCB
- “C” (communication) blinks when outdoor units communicate
- The first sub unit PCB display will be flashing C9/C8 indicating that it is the first sub in the system
- The second sub unit PCB will be flashing CA/C8 indicating it is the second sub in the system



Unit	Main MICOM
Main	8
Sub 1	9
Sub 2	A

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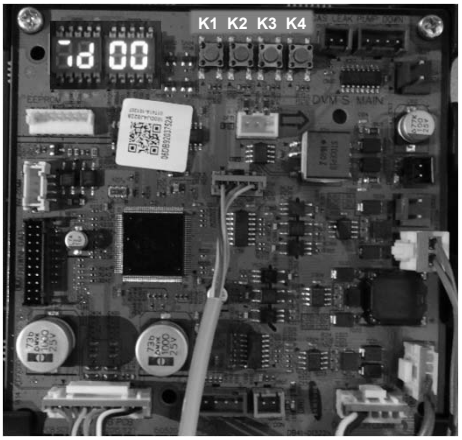
Outdoor Unit Settings

- 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
    - Press **K4**: ones
    - Press **K2**: 10's
  - Press and hold **K2** for 2 seconds to save the count display back to normal
  - Automatic setting mode (Preferred)
    - Press and hold **K4** for 2 seconds
      - This is the preferred method, if you install 10 units, but auto only finds seven you know three units are not communicating,
      - SNET can be used to determine which units are not communicating based on missing serial numbers
      - Refer to your plans, and go directly to the units not communicating.



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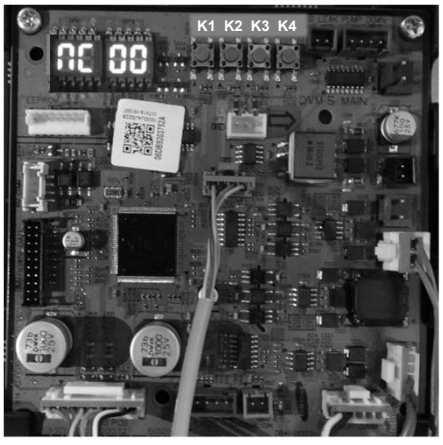
MCU Settings

- MCU Quantity
  - 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
    - Press **K4**: ones
    - Press **K2**: 10's
  - Press and hold **K2** for 2 seconds to save the count display back to normal
  - Automatic setting mode (preferred)
    - Press and hold **K4** for 2 seconds
      - This is the preferred method, if you install 4 MCU'S, but auto only finds 2 you know 2 MCU'S are not communicating,
      - SNET can be used to determine which MCU'S are not communicating based on found MCU addresses
      - Refer to your plans, and go directly to the units not communicating.



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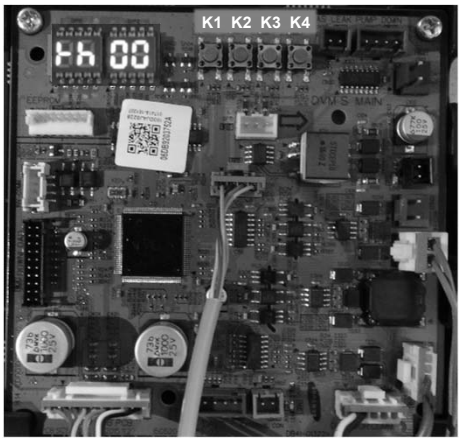
MCU Auto Pipe Pairing

You can use the Automatic pipe-pairing 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.
2. The display will start with Kh-00 and run through 10 steps (Kh-10) in the paring process
3. Upon completion the display will show END
4. The operation takes about 25 to 55 minutes normally depending on the number of indoor units connected.(Max 2hours)

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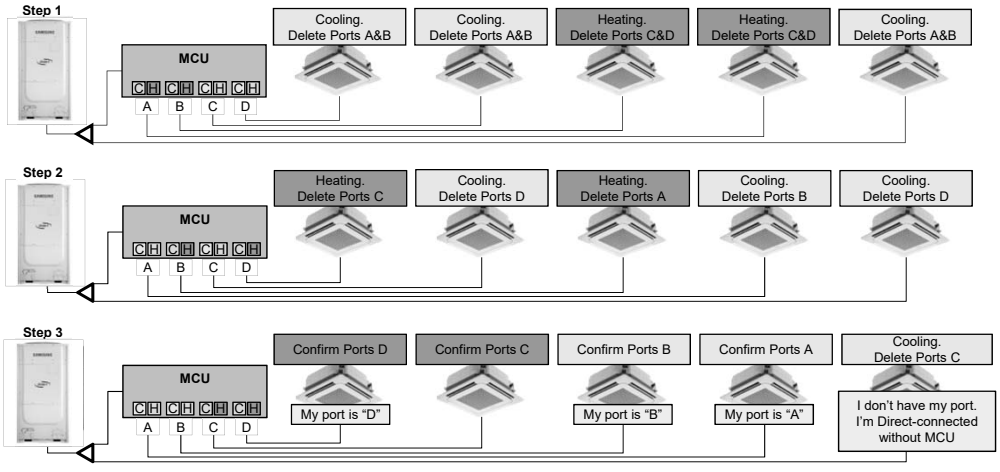
Heat Recovery - Auto Pipe Pairing



Cooling only units will require an install option code change Segment 3 of the 05 option settings must be changed to 2

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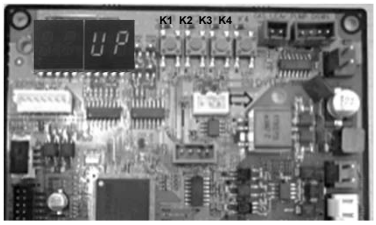
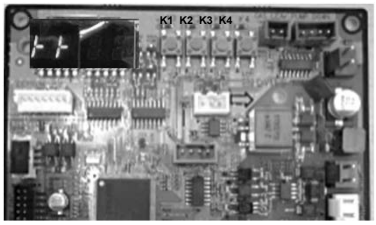
Auto-Trial Operation

Auto-Trial Operation

- Press and hold K1 on condenser (main) for 5 seconds
  - "UP" – "UnPrepared" displayed
  - Press and hold K1 for 5 seconds to clear
  - "KK" is displayed
  - The condenser will run through various system checks including indoor unit and outdoor sensors
  - When Auto-Trial is complete, unit will stop and display connected equipment addresses





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Auto-Trial Operation

Heating or Cooling trial operation

Heating Trial Operation: Press K1 two times
Cooling Trial Operation: Press K2 two times

- Operate in Heating or Cooling trial operation to allow the system to stabilize
- The system will operate the indoor units with extreme set temperatures that are normally not available (cooling set temperature = 37°F, heating high temperature of 104°F)
- Depending on the outdoor and indoor conditions, the system should operate at a high capacity
- Wired and wireless controller signals are ignored during this operation
- Maximum time: 10 hours

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Water Cooled Commissioning

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System Power Up

- Recommended for system commissioning – Power up Indoor units before the outdoor unit(s)
- Outdoor unit(s) should be powered up for a minimum of 3 hours before operation to insure no liquid refrigerant in the compressor crankcase
  - When the outdoor temperature is low, power the outdoor unit(s) at least 6 hours before operation
  - Main PCB display and “K” buttons can be accessed through PCB inspection door on front of the unit

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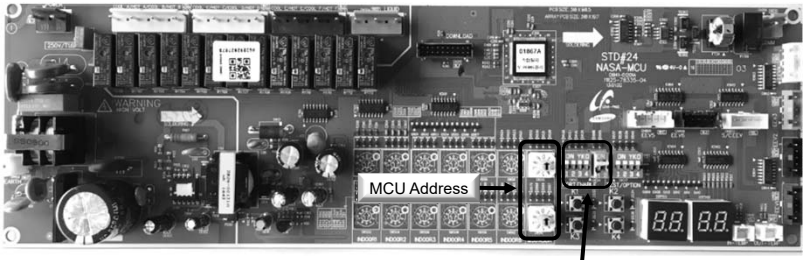
MCU Setup

MCU's must be addressed for the system components to communicate



MCU Address

10's

1's

Default

Set a unique address for each MCU in the system

DIP Switches: Port Assign

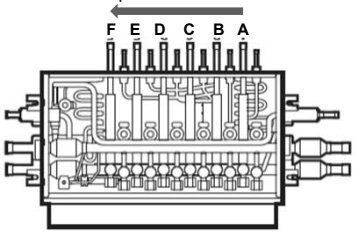
ON 1 2 3 4 — A B C D

ON 1 2 — E F

On: Port Enable (default)
Off: Port Disable

Assign ports to be enabled on each MCU in the system

Example: 6-Port MCU
Individual port connection



Unused MCU ports must be set to disable before commissioning the system, or an E216 will be generated

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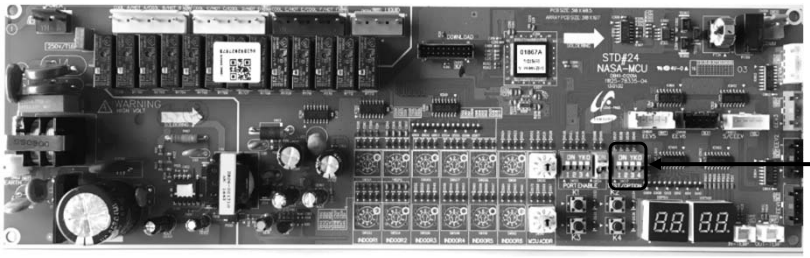
MCU Setup

Twinning MCU Ports



S/W Option **DIP** Switches

S/W Option

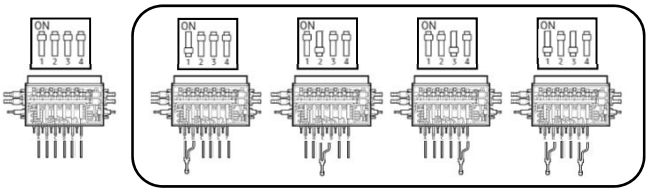
ON 1 2 3 4

Y-Joint Dual Port Assign

S/W Option

ON 1 2 3 4

S/W option DIP switch No.	ON (Default) (Individual connection)	OFF (Shared connection)
1	Each of ports A and B	Paring port A and B
2	Each of ports C and D	Pairing port C and D
3	Each of ports E and F	Pairing port E and F
4	N/A	N/A



Be sure to cycle power to the MCU'S after changing DIP switch position, or changes will not be saved

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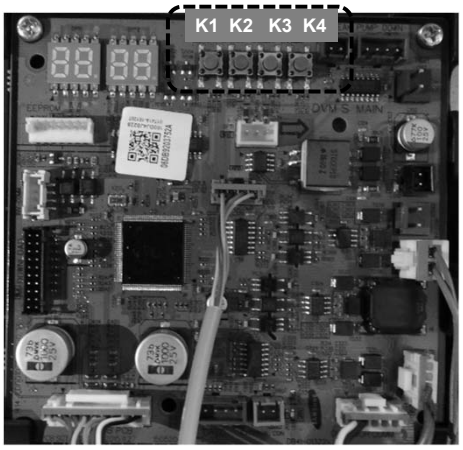
Outdoor Unit Setup

- **K1, K2, K3, and K4 buttons are used to put the system into various service and commissioning modes**
- **Also used for service mode operations and operation data display**



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Outdoor Unit Setup

- Standard closed loop entering water temperature range: 50°F to 113°F
  - Below 50°F down to 23°F requires antifreeze and PCB option setting
  - Below 23°F down to a 14°F requires antifreeze and PCB option setting
- Press and hold K2 to enter option setting
- Press K1 to change SEG 1&2: to “2”,”0” Circulating Fluid Flow
- Press K2 to change SEG 3&4: “0”,”0” = water
- “0”.”1” Antifreeze – Min 23°F
- “0”,”2” Antifreeze - Min 14°F

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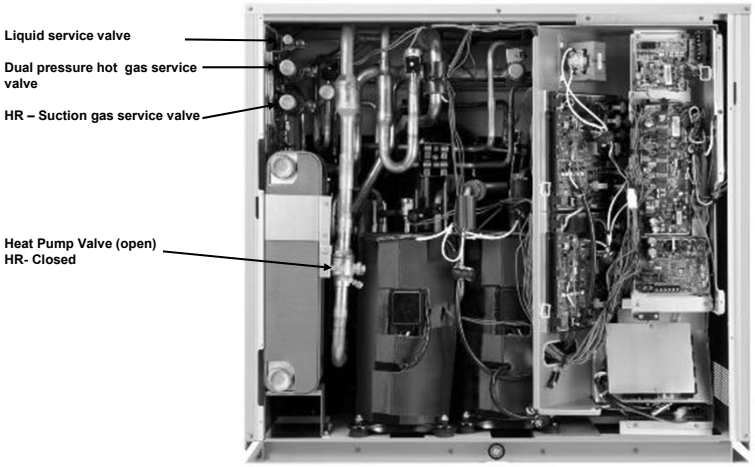
System Power Up

- Before starting the system up the unit must be field configured for Heat Pump or Heat Recovery operation
- For heat pump operation the Heat pump valve must remain open
- For Heat Recovery operation the heat pump valve must be closed
- Heat recovery requires “K” tactile setting
- Press and hold K1 & K2 for two seconds to enter setting mode
  - Press K1 three time to set as
    - “ht 01” for heat recovery



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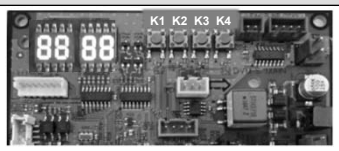
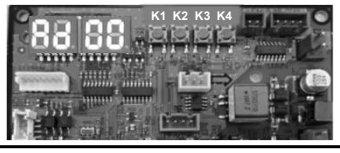
Outdoor Unit Setup

- When power is applied to the system, the outdoor unit will display Ad 00 indicating it is awaiting the tracking process
- 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

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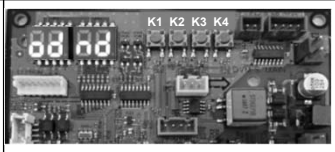
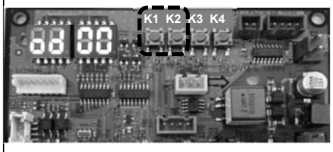
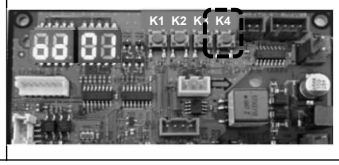
Outdoor Unit Setup

Sequence	Display	Details
3		The PCB display will indicate “od nd” stating that the unit has not been set as a main or sub unit
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)
5		Press and release the **K4** button to set main or sub for each outdoor unit : “od 00” = Main “od 01” = Sub1 unit “od 02” = Sub2 unit Confirm setting: Press and hold the **K2** button, settings are saved This procedure is performed on each outdoor unit

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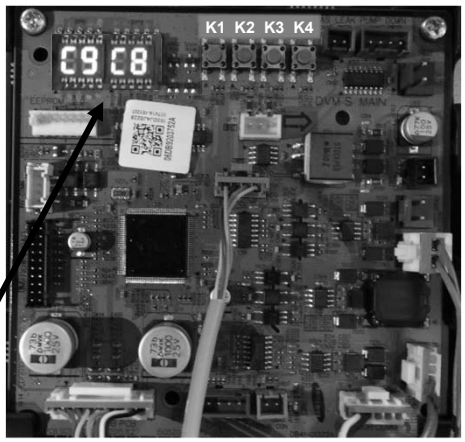
Outdoor Unit Setup

Confirm multiple outdoor unit communications

- When the outdoor units are properly set the display indicates the communication status on the Main outdoor unit PCB
- “C” (communication) blinks when outdoor units communicate
- The first sub unit PCB display will be flashing C9/C8 indicating that it is the first sub in the system
- The second sub unit PCB will be flashing CA/C8 indicating it is the second sub in the system



Unit	Main MICOM
Main	8
Sub 1	9
Sub 2	A

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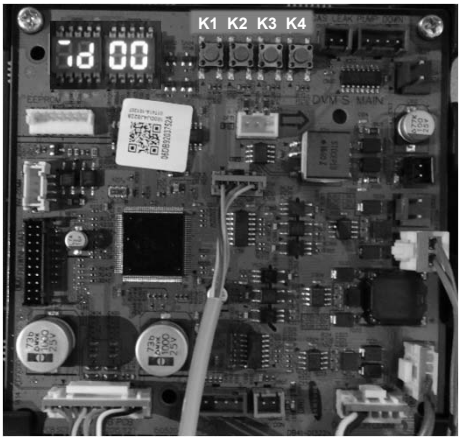
Outdoor Unit Settings

- 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
    - Press **K4**: ones
    - Press **K2**: 10's
  - Press and hold **K2** for 2 seconds to save the count display back to normal
  - Automatic setting mode (Preferred)
    - Press and hold **K4** for 2 seconds
      - This is the preferred method, if you install 10 units, but auto only finds seven you know three units are not communicating,
      - SNET can be used to determine which units are not communicating based on missing serial numbers
      - Refer to your plans, and go directly to the units not communicating.



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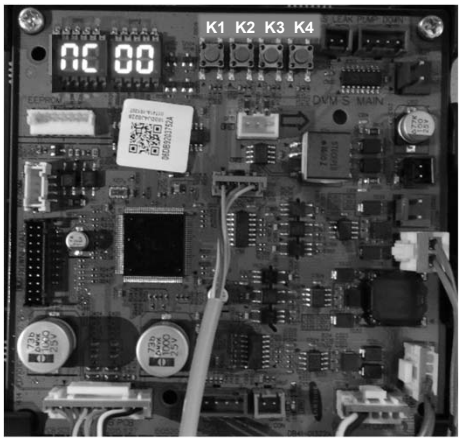
MCU Settings

- MCU Quantity
  - 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
    - Press **K4**: ones
    - Press **K2**: 10's
  - Press and hold **K2** for 2 seconds to save the count display back to normal
  - Automatic setting mode (preferred)
    - Press and hold **K4** for 2 seconds
      - This is the preferred method, if you install 4 MCU'S, but auto only finds 2 you know 2 MCU'S are not communicating,
      - SNET can be used to determine which MCU'S are not communicating based on found MCU addresses
      - Refer to your plans, and go directly to the units not communicating.



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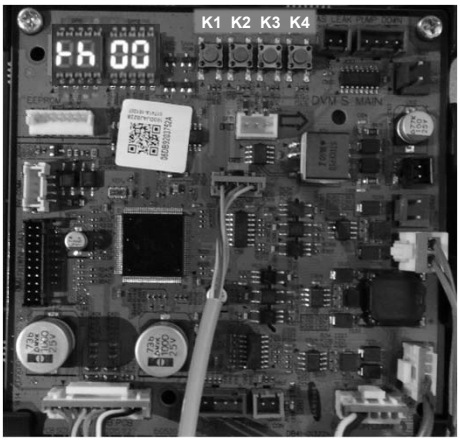
MCU Auto Pipe Pairing

You can use the Automatic pipe-pairing 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 12 times** on the main PBA of the outdoor unit to start the Auto pipe pairing operation.
2. The display will start with Kh-00 and run through 10 steps (Kh-10) in the paring process
3. Upon completion the display will show END
4. The operation takes about 25 to 55 minutes normally depending on the number of indoor units connected.(Max 2hours)



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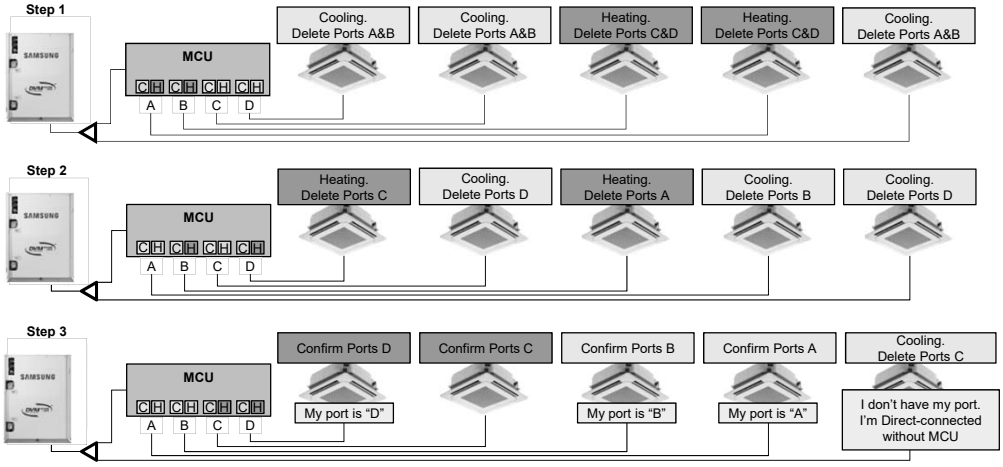
Heat Recovery - Auto Pipe Pairing



Cooling only units will require an install option code change Segment 3 of the 05 option settings must be changed to 2

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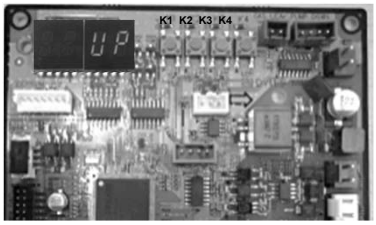
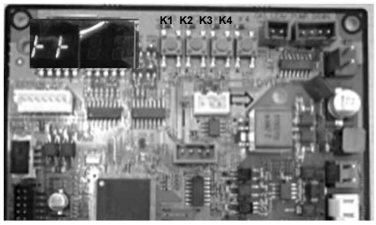
Auto-Trial Operation

Auto-Trial Operation

- Press and hold K1 on condenser (main) for 5 seconds
  - "UP" – "UnPrepared" displayed
  - Press and hold K1 for 5 seconds to clear
  - "KK" is displayed
  - The condenser will run through various system checks including indoor unit and outdoor sensors
  - When Auto-Trial is complete, unit will stop and display connected equipment addresses





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Auto-Trial Operation

Heating or Cooling trial operation

Heating Trial Operation: Press K1 two times
Cooling Trial Operation: Press K2 two times

- Operate in Heating or Cooling trial operation to allow the system to stabilize
- The system will operate the indoor units with extreme set temperatures that are normally not available (cooling set temperature = 37°F, heating high temperature of 104°F)
- Depending on the outdoor and indoor conditions, the system should operate at a high capacity
- Wired and wireless controller signals are ignored during this operation
- Maximum time: 10 hours

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Water Side Control

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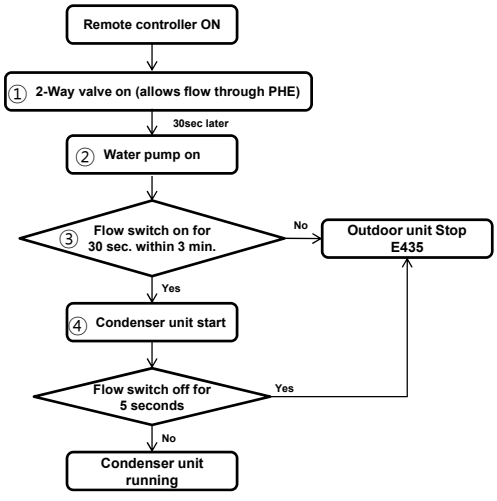
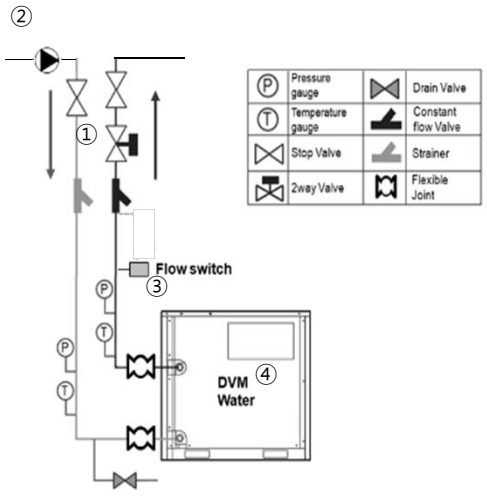
System Operation Sequence





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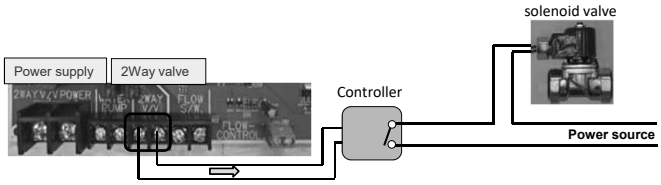
2-Way Solenoid Valve Control

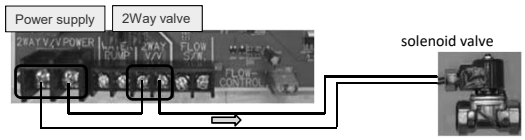
2-way solenoid valve control configurations – Condenser PCB

- 2WAY V/V output: Dry Contact
- 2WAY V/V Power output: 208/230vac (max. 0.2A – 250v)

Example 1: External 208/230v. power source to solenoid valve



Example 2: PCB power source to solenoid valve (208/230v.)



Remote controller	Contact signal	Water valve	Remark
On	Close	Valve open	-
Off	Open(after 40sec from off)	Valve close	Delay for PHE & pump

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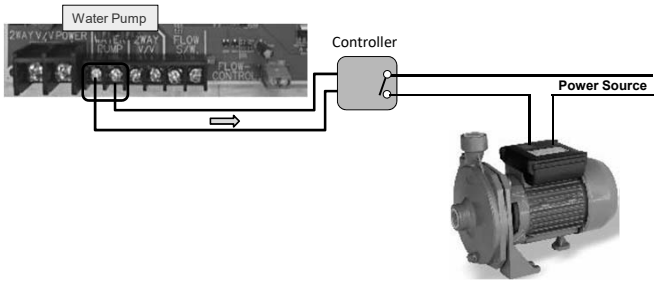
Closed Loop Pump Control

Condenser pump operation interlock

- WATER PUMP terminals output: Dry contact



Remote controller	Contact signal	Water pump	Remark
On	Close (after 30 sec. from on)	Pump on	Delay for water pump
Off	Open (after 30 sec. from off)	Pump stop	Delay for PHE

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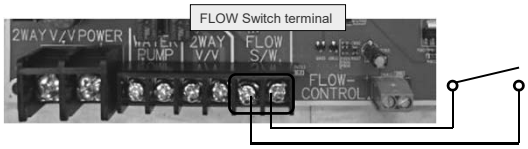
Flow Switch Control

- **Flow switch is required for system operation**
  - FLOW-CONTROL terminals: Dry contact
  - When flow is not detected during system “on” status, error E435 is generated with system stop



Water flow rate	Contact signal	Set working
Increased flow velocity	Close	System working normally
“0” flow velocity	Open	System stop & Error(E435)

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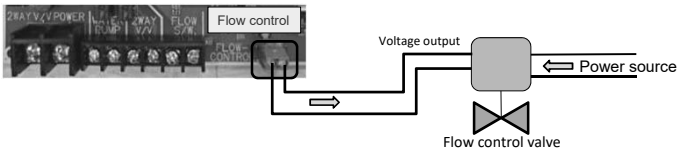
Flow Control Valve

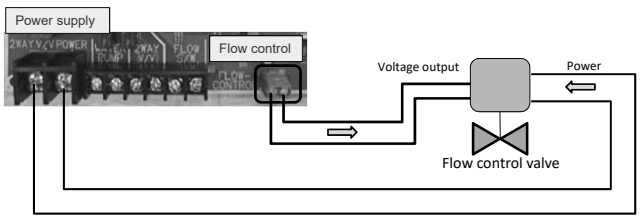
Flow Control Valve Configurations – Condenser PCB

- FLOW CONTROL output: 0 – 10volts
  - Requires option setting during commissioning
- 2WAY V/V POWER output: 208/230vac. (max. 0.2A 250v)

Example 1:
External power to flow control valve



Example 2:
Power from condenser PCB



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Flow Control Valve Logic

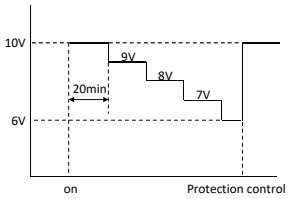
Seg 1, 2	Seg 3, 4	Control Range
15	00	Not used
	01	7~10V
	02	5~10V
	03	3~10V

Control range

- Outdoor option setting
- Below 3 volts is not stable (minimum is 3V)

Operation

- Control starts 10 minutes after compressor starts
- Flow rate decrease
- Current condition = “voltage down condition for 20 mins”
  → Output = current value - 1V
- Flow rate increase (full open)
  Any protection control → Output = 10V (immediately)



Voltage down condition				
Water Temp.	< 50°F	< 68°F	< 95°F	< 122°F
For Cooling	< (Max. Comp Hz) X 0.8	< (Max. Comp Hz) X 0.6	< (Max. Comp Hz) X 0.4	< (Max. Comp Hz) X 0.2
For Heating	< (Max. Comp Hz) X 0.2	< (Max. Comp Hz) X 0.4	< (Max. Comp Hz) X 0.6	< (Max. Comp Hz) X 0.8
Time	Keep the condition for 20 minutes			

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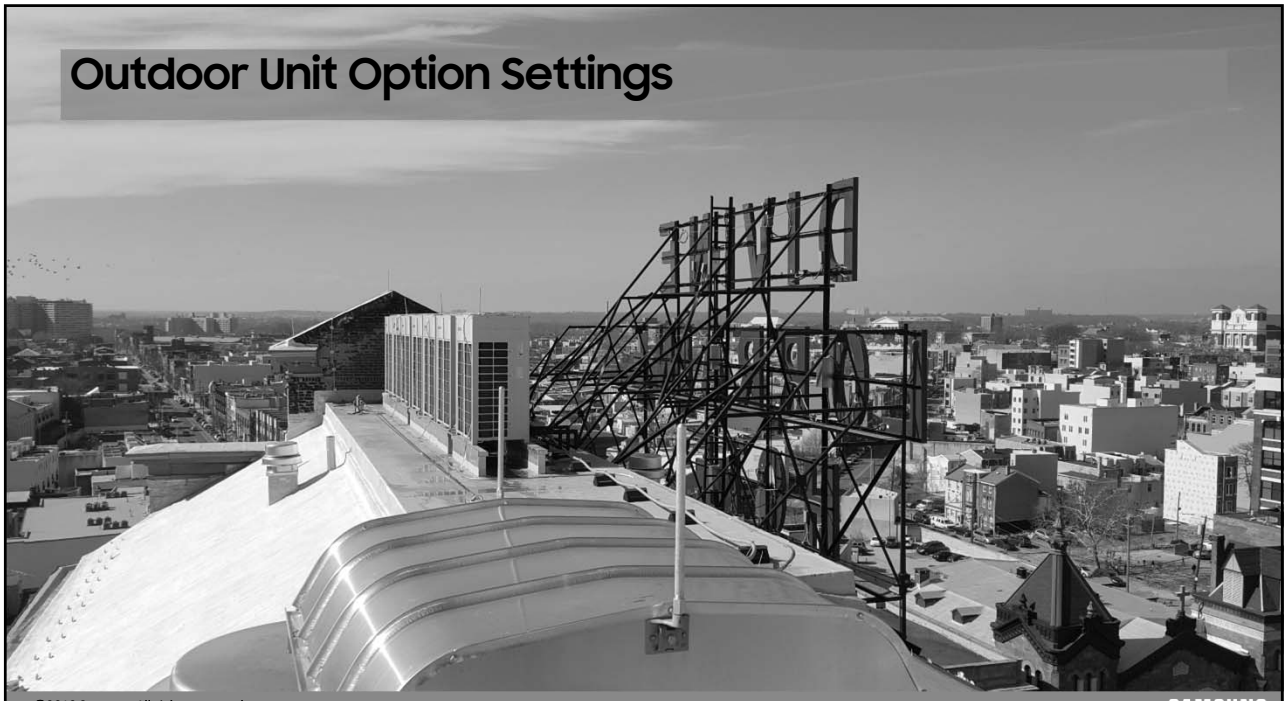
Outdoor Unit Option Settings



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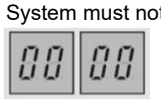
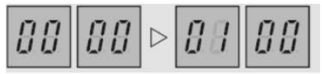
Outdoor Unit Option Settings

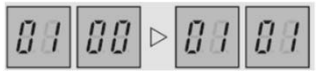
1. Press and hold the **K2** button to enter Option Settings mode
   System must not be in operation

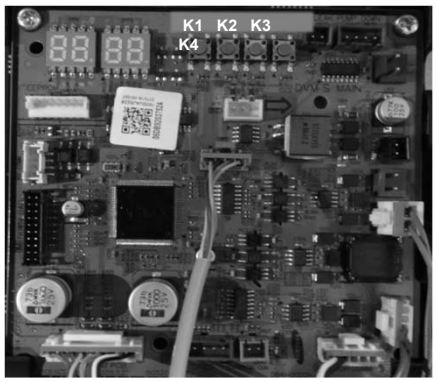
2. Press **K1** repeatedly to change SEG1, SEG2 option numbers

3. Press **K2** repeatedly to change SEG3, SEG4 option value

4. Press and hold **K2** to store the changed option code
   All of the segments blink to indicate the changed option has been stored



NOTE: During the option setting mode, the setting value can be reset to the previous setting by pressing and hold the **K1** button
To restore option setting to factory default press and hold **K4** during the option setting mode – Press and hold **K2** during tracking mode to save setting

Refer to the Outdoor Unit Installation Manual for all of the outdoor unit option settings that can be configured per main and sub units.

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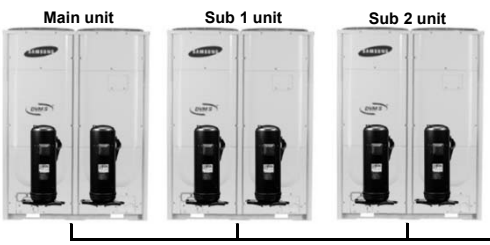
Option Settings - Rotation Defrost HR

- Heat Recovery manifolded outdoor units (2 or 3)
- Full system defrost after final rotation defrost cycle
- Continuous heat operation during defrost cycles
- During rotation defrost indoor units in the heat mode shift the fan speed to low

(Example)



Rotation defrost (HR only)	Main	1	1	0	0	Disabled (Factory default)
				0	1	Enabled

Rotation

Master	Sub 1	Sub 2
Heating	Heating	Heating
Defrost	Heating	Heating
Heating	**Defrost**	Heating
Heating	Heating	**Defrost**
Heating	Heating	Heating

Full defrost cycle

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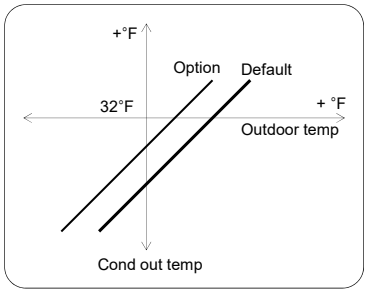
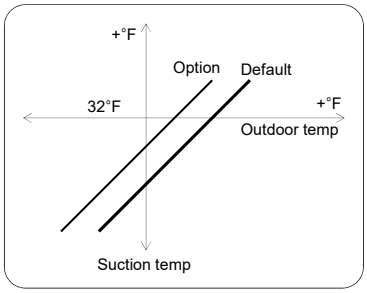
Option Settings - Defrost Temperature

Temperature to trigger defrost operation setting

- Increase the temperature setting to initiate defrost operation in high humidity areas

Optional item	Input unit	SEG1	SEG2	SEG3	SEG4	Function of the option	Remarks
Temperature to trigger defrost operation	Main	0	5	0	0	Factory default	
				0	1	Apply setting when the product is being installed in humid area such as near river or lake	





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Energy Savings / Snow Accumulation Prevention

Energy Savings – Heat Mode

- Energy savings mode triggers when the room temperature is within 4°F of the setpoint temperature
  - Target high pressure is reduced
- Note: Heating capacity is also reduced to save energy

Energy control Operaton (B Type PBA)	Main	1	0	0	0	Basic (Factory default)
				0	1	Energy saving
				0	2	Power

Snow Accumulation Prevention

- When the outdoor ambient temperature is at or below 41°F the outdoor fan(s) will run for 60 seconds once every 30 minutes
- NOTE: The outdoor fan(s) may run when the system is not in operation

Snow accumulation prevention control	Main	1	4	0	0	Enabled (Factory default)
				0	1	Disabled

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Channel Address

Outdoor unit address for R1 R2 connection to centralized/ upper level control – DMS 2.5

Channel address	Main	1	3	A	U	Automatic setting (Factory default)	Address for classifying the product from upper level controller (DMS, S-NET 3, etc.)
				0 ~15		Manual setting for channel 0~15	

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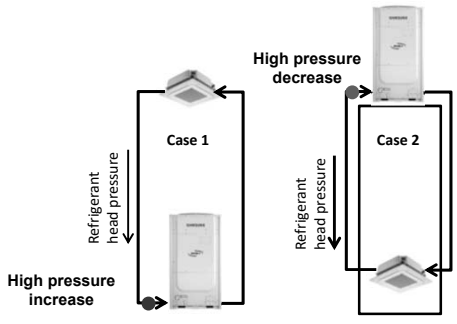
Option Settings - High Head Pressure Condition

High-head Condition Setting

- To optimize system refrigerant flow control based on the distance of vertical separation between the Outdoor Unit to the highest or lowest Indoor unit
  - EEV and other refrigerant control devices adjust quickly to compensate for the system high pressure

Optional item	Input unit	SEG1	SEG2	SEG3	SEG4	Function of the option	Remarks
High-head condition setting	Main	0	8	0	0	Disabled (Factory default)	
				0	1	Level 1 of height difference type 1 (Indoor unit is lower than outdoor unit)	When outdoor unit is located 40~80m above the indoor unit (131' -262')
				0	2	Level 2 of height difference type 1 (Indoor unit is lower than outdoor unit)	When outdoor unit is located over 80m above the indoor unit (262')
				0	3	Height difference type 2 (Outdoor unit is lower than indoor unit)	When indoor unit is over 30 m above the outdoor unit (98')

- Case 1: EEV step is less than normal
- Case 2: EEV step is greater than normal



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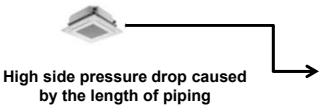
Long Piping Condition

Long Piping Condition Setting

- Optimize system refrigerant control based on the distance between the farthest IDU and the ODU

Optional item	Input unit	SEG1	SEG2	SEG3	SEG4	Function of the option	Remarks
Long-pipng condition setting (Setting is unnecessary if high-head condition is set)	Main	0	9	0	0	Disabled (Factory default)	
				0	1	LEVEL 1	When equivalent length of farthest indoor unit from the outdoor unit is between 100~170m (328' -558')
				0	2	LEVEL 2	When equivalent length of farthest indoor unit from the outdoor unit is over 170m(558')



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Cooling Capacity Correction

Cooling capacity correction

- System cooling capacity can be changed from the factory default setting by changing the indoor coil (evaporator) target temperature values

Optional item	Input unit	SEG1	SEG2	SEG3	SEG4	Function of the option	Remarks
Cooling capacity correction	Main	0	1	0	0	7-9 (Factory default)	Targeted evaporation temperature [℃]. (When low temperature value is set, discharged air temperature of the indoor unit will decrease)
				0	1	5-7	
				0	2	9-11	
				0	3	10-12	
				0	4	11-13	
				0	5	12-14	
				0	6	13-15	

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Heating Capacity Correction

Capacity Correction For Heating Setting

- System heating capacity can be changed from the factory default setting by changing the target high pressure values at the indoor coil

Optional item	Input unit	SEG1	SEG2	SEG3	SEG4	Function of the option	Remarks
Capcity correction for heating	Main	0	2	0	0	435 Default	Target High Pressure PSI
				0	1	363	
				0	2	377	
				0	3	392	
				0	4	406	
				0	5	421	
				0	6	450	
				0	7	464	
				0	8	479	

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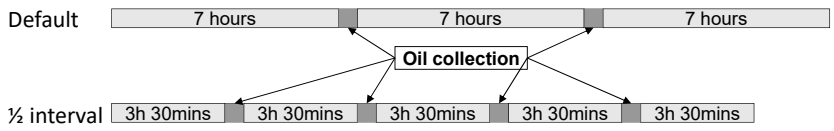
Oil Return Interval

Oil Collection Interval

- To change the oil return operation interval from the factory default of 7 hrs. cumulated run time to 3 ½ hours

Optional item	Input unit	SEG1	SEG2	SEG3	SEG4	Function of the option	Remarks
Oil collection interval	Main	0	4	0	0	Factory default	
				0	1	Shorten the interval by 1/2	



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Outdoor Fan Speed Increase

Fan speed correction for outdoor unit Setting

- Increase outdoor fan speed to accommodate ducted fan discharge (.32")
- In modular systems, each module must be programmed with this setting

Optional item	Input unit	SEG1	SEG2	SEG3	SEG4	Function of the option	Remarks
Fan speed correction for outdoor unit	Individual	0	6	0	0	Factory default	
				0	1	Increase fan speed	Increase the outdoor unit's fan speed to maximum value

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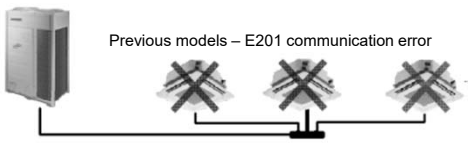
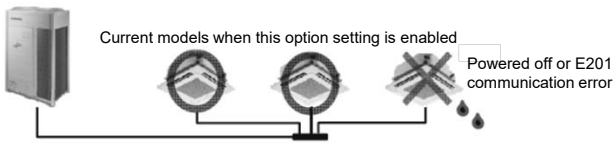
Emergency Operation - IDU Communication Error

Emergency Operation Option Setting

- Temporarily restore system operation when IDU error code E201 occurs
- This function must be field enabled in Main outdoor unit

Optional item	Input unit	SEG 1	SEG 2	SEG 3	SEG 4	Option Function	Remarks
Emergency operation during indoor unit communication error	Main ODU	2	2	0	0	Disabled (factory default)	When set, emergency operation is possible even if an indoor communication error occurs.
				0	1	Indoor high humidity condition (operating for **up to 12hours**)	
				0	2	Indoor low humidity condition (operating for **up to 24hours**)	





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Indoor Unit Option Setting Codes

02xxxx – 1xxxxx – 2xxxxx – 3xxxxx
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

- Samsung indoor units use a 24 segment code for indoor unit option programming
- Based on the indoor unit option settings, the 24 segment code may vary
- Installer option settings start with “02”
- Segments 1, 7, 13, and 19 are “page numbers” and are always “0”, “1”, “2”, and “3”
- Each segment represents a different indoor option (excluding segments: 1, 2, 7, 13, 19, and 24)
- These codes are available in the installation manuals
- ** Varies per unit type, refer to indoor installation manual for specific setting

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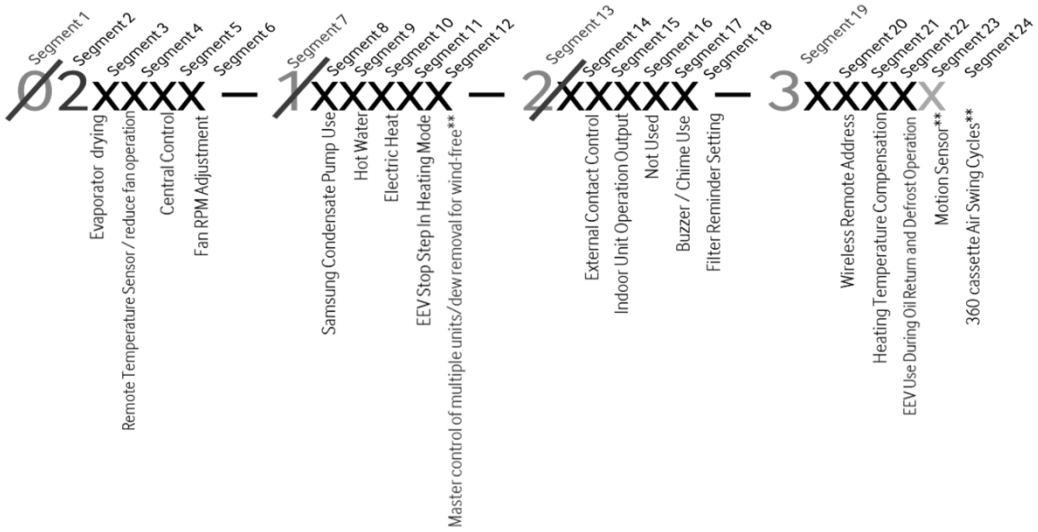
Indoor Unit Option Setting Codes



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Optional Indoor Unit Settings

Indoor Unit Programming Options

- To program indoor unit option settings, the following can be used:
  - SNET Pro 2 is the easiest and recommended method for programming indoor unit option settings

SNET Pro 2 service software **Preferred**

Wired controllers

Wireless controllers

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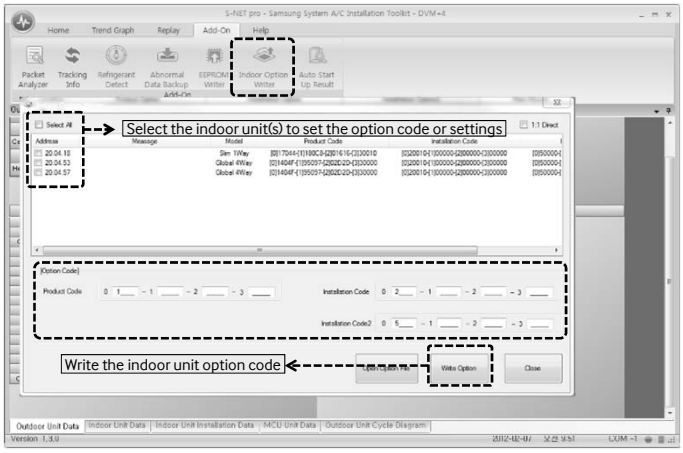
SNET Add-on Tab - Indoor Unit Option Writer

- **The indoor option setting section allows quick change of product and installation codes**
  - **Using the product or install options tables from indoor unit installation manuals,**
  - **Enter the settings in the appropriate box (all 24 segments must be entered)**
  - **Select the indoor unit(s) that need code change**



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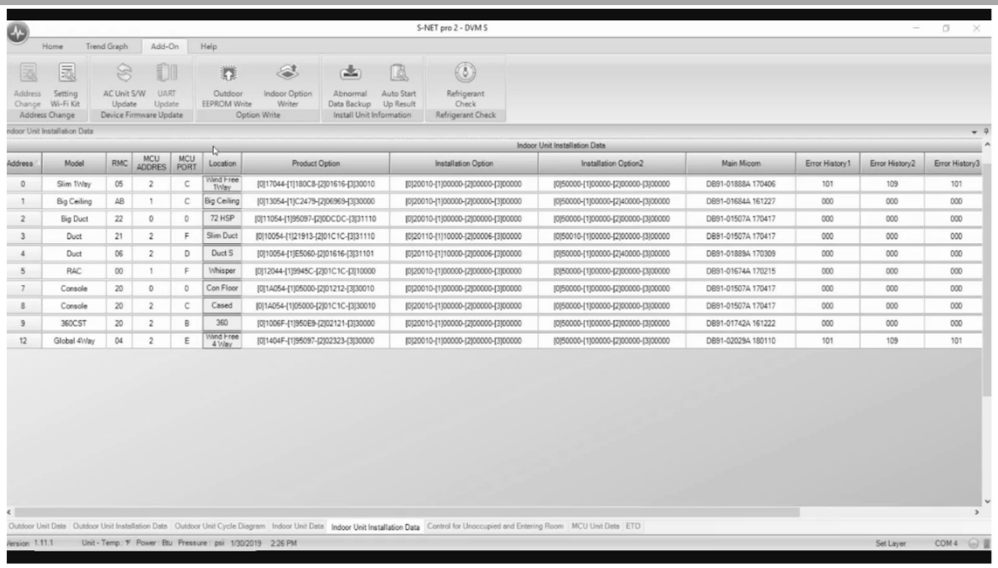
Indoor Unit Option Writing Example - Video SNET



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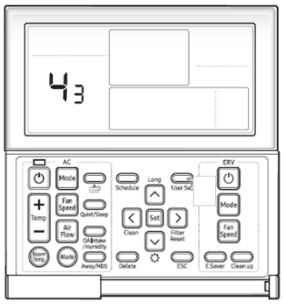
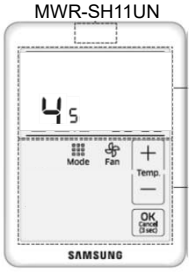
Indoor Unit Option Settings - Wired Controller

- **MWR-WE13UN** wired controller menu 4, sub menu 3 is where indoor unit option settings can be reviewed/changed
- **MWR-SH11UN** wired controller Menu 4, sub menu 5 is where indoor unit option settings can be reviewed/changed

MWR-WE13UN



MWR-SH11UN



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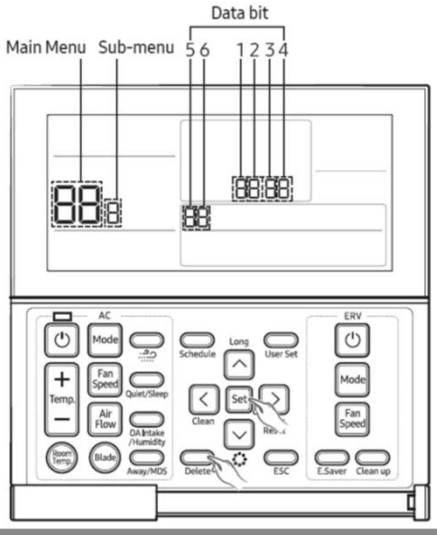
Option Settings Mode - Wired Controller

Press and hold the “Set” & “Delete” buttons simultaneously for 3 seconds – MWR-WE13UN



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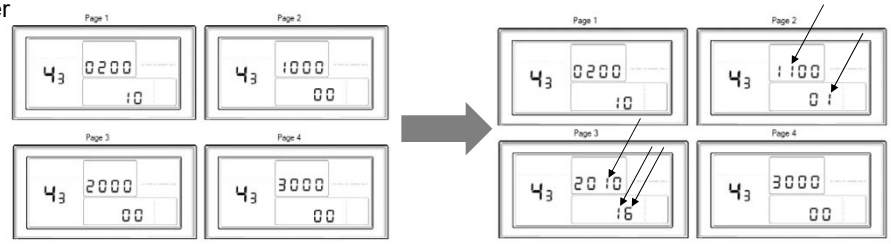
Indoor Unit Option Settings - MWR-WE13UN

- As you scroll through each segment using the ">" button, the pages will change
- Changes can be made to each segment to make the desired indoor unit changes
- Default indoor unit options displayed below

Option changes made in example below:

- Factory condensate pump (ducted unit)
- Indoor unit MASTER
- External control output: Thermo ON/OFF
- Chime off
- 2,000 hour filter reminder



020010 – 100000 – 200000 - 300000

020010 – 1**1**0000**1** – 20**1**0**16** - 300000

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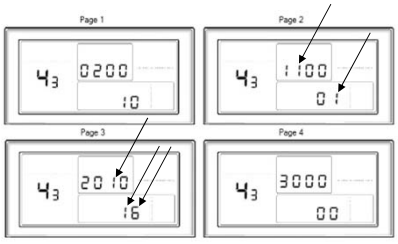
Indoor Unit Option Settings - MWR-WE13UN

Video

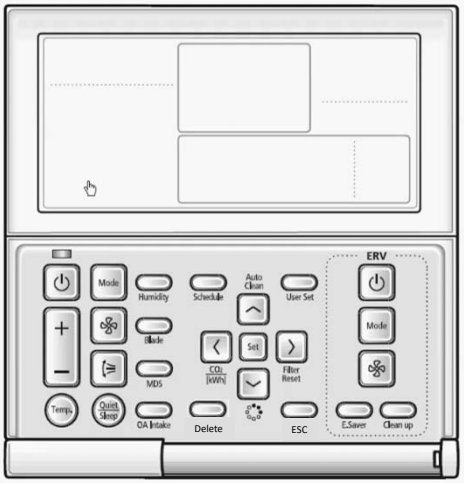
Option changes made in example below:

- Factory condensate pump (ducted unit)
- Indoor unit MASTER
- External control output: Thermo ON/OFF
- Chime off
- 2,000 hour filter reminder



Code Entered:

020010 – 110001 – 201016 - 300000



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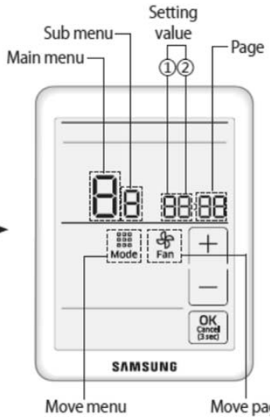
Indoor Unit Option Settings - MWR-SH11UN

Press and hold the hidden button on the upper right corner of the display

- Press the +/- buttons to select number "3"
- Press "OK" to enter option settings



- Press the +/- buttons to select the main menu number-then press "Mode" to enter the Sub Menu setting
- Press +/- buttons to select the Sub Menu number and press "Mode" to enter data setting
- Press +/- buttons to select setting
- Press "Fan" to select page
- Press "OK" to save settings

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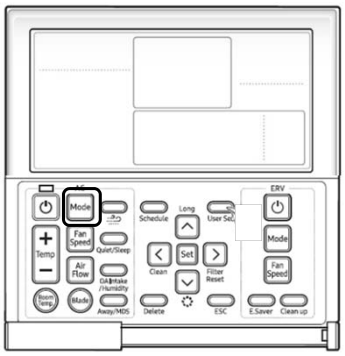
Heat Pump Mode Master - Wired Remote Controller

Set the Mode Master: Press and hold the "Mode" button for 5 seconds



MWR-WE13UN

Set the Mode Master: Program option setting

MWR-SH11UN

Main menu	Sub menu	Function description		Value
	2	Mode master indoor unit setting/ checking	Mode master indoor unit checking	Indoor unit master address (Example : 20-07-15)
7	3		Mode master indoor unit setting 6)*	0-No use, 1-Use, 2-Release 7)*

To set a heat pump mode master the system must be in standby mode (not running)

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Wirless Remote Control - Indoor Unit Option Example

Option	SEG1	SEG2	SEG3	SEG4	SEG5	SEG6
Explanation	PAGE	MODE	Use of robot cleaning	Use of external room temperature sensor	Use of central control	FAN RPM compensation
Remote Controller Display		2	8	8	8	8
Indication and Details	0	0 Use	0 Disuse	0 Disuse	0 Disuse	0 Disuse 1 RPM compensation
		1 Use	1 Use	1 Use	1 Use	2 High ceiling KIT

Option	SEG7	SEG8	SEG9	SEG10	SEG11	SEG12
Explanation	PAGE	Use of drain pump	Use of hot water heater	Use of electronic heater	EEV Step when heating stops	Master / Slave
Remote Controller Display		8	8	8	8	8
Indication and Details	1	1 Use	0 Disuse	0 Disuse	0 Default value	0 slave
Option		2 When the indoor unit stops, drain pump will operate for 3min	1 Use	1 Use	1 Noise decreasing setting	1 master

Option	SEG13	SEG14	SEG15	SEG16	SEG17	SEG18
Explanation	PAGE	Use of external control	Setting the output of external control	S-Plasma ion	Buzzer control	Number of hours using filter
Remote Controller Display		8	8	8	8	8
Indication and Details	2	0 Disuse	0 Thermo on	0 Disuse	0 Use buzzer	2 1000 Hour
		1 ON/OFF control	1 Operation on	1 Use	1 Disuse buzzer	6 2000 Hour
		2 OFF control				
		3 Window ON/OFF control				

Option	SEG19	SEG20	SEG21	SEG22	SEG23	SEG24
Explanation	PAGE	Individual control of a remote controller	Heating setting compensation	EEV Step of stopped unit during oil return/ defrost mode	Motion detect sensor	-
Remote Controller Display		8	8	0	0	
Indication and Details	3	0 or 1 channel 1	0 Disuse	0 Default value	0 Disuse 1 Turn out in 30min. without motion	
		2 channel 2	1 3.6 °F (2°C)	1 Oil return or Noise decreasing in defrost mode	2 Turn out in 60min. without motion	
		3 channel 3	2 9°F (5°C)		3 Turn out in 120min. without motion	
		4 channel 4			4 Turn out in 180min. without motion	
					5 Turn out in 30min. without motion or "advanced function	
					6 Turn out in 60min. without motion or "advanced function	
					7 Turn out in 120min. without motion or "advanced function	
					8 Turn out in 180min. without motion or "advanced function	

Example: Ducted unit with MRW-TA external temperature sensor, Samsung condensate pump installed, and 2000 hour filter reminder.

Full settings code: **02**0110 **1**10000 **2**00006 **3**00000

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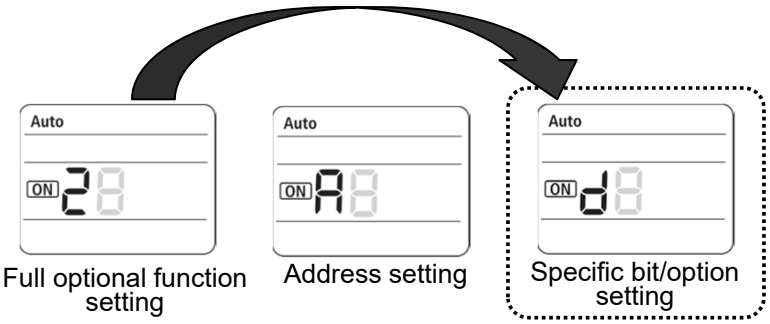
Indoor Unit Option Settings - Wireless

- When programming indoor units, a single option setting or multiple option settings can be changed at a time
- Let's discuss changing a single option with a wireless controller



Full optional function setting

Address setting

Specific bit/option setting

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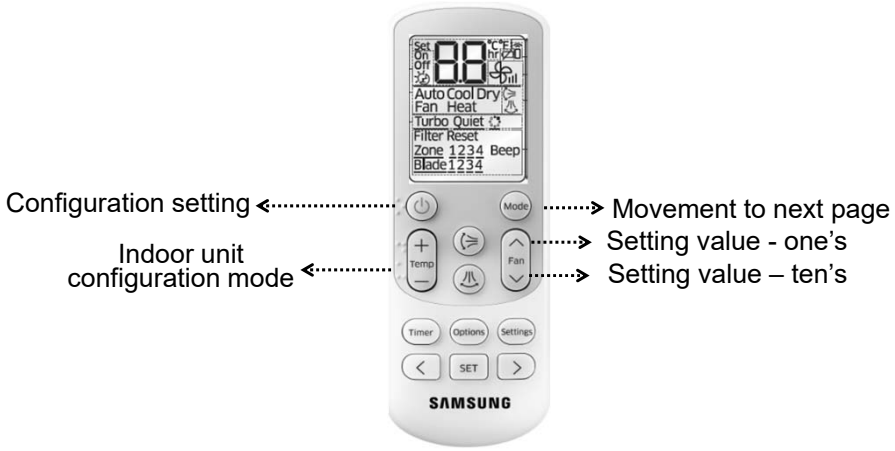
Indoor Unit Option Settings - Wireless



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Indoor Unit Option Settings - Wireless

Entering option setting mode with a wireless controller

1. Remove a battery

2. While holding both the temperature up and temperature down buttons, put the battery back in

3. Press the fan speed UP/DOWN button to change each bit.

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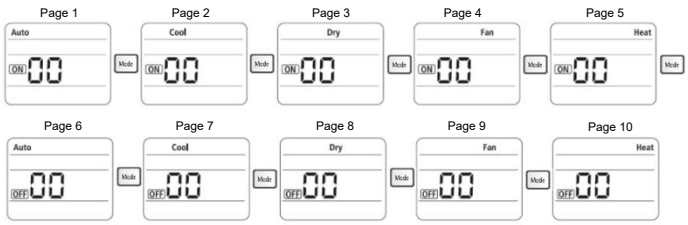
Indoor Unit Option Settings - Wireless

4. Press the Mode button to go to next “page”.



5. Press the On/Off button two times to set the option setting.

6. When finished, remove a battery then replace to return to normal use

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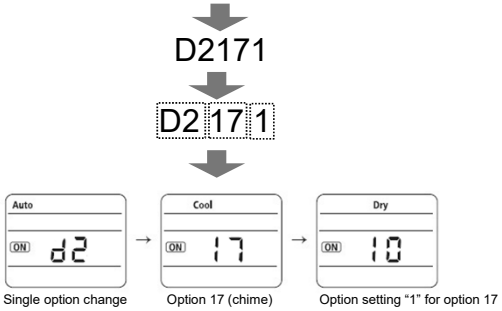
Indoor Unit Option Settings - Wireless

VIDEO

- Entering an option setting code to change a single option with a wireless controller
- This example shows the code used to change the chime setting on an indoor unit to OFF
- AUTO, COOL, DRY, FAN, HEAT, and ON/OFF display signifies current “page”

0D2171 – 1XXXXX – 2XXXXX – 3XXXXX



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Advanced Indoor Unit Option Settings

	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6		Segment 7	Segment 8	Segment 9	Segment 10	Segment 11	Segment 12		Segment 13	Segment 14	Segment 15	Segment 16	Segment 17	Segment 18		Segment 19	Segment 20	Segment 21	Segment 22	Segment 23	Segment 24
	0	5	x	x	x	x	–	1	x	x	x	x	x	–	2	x	x	x	x	x	–	3	x	x	x	x	x	
	Options "Page" number	Option setting type/series	HR systems – use of special AUTO mode programming	HR systems – auto changeover standard heat temp. offset	HR systems – auto changeover standard cooling temp. offset	HR systems – auto changeover ΔT, heating to cooling		Options "Page" number	HR systems – auto changeover ΔT, cooling to heating	HR systems – auto changeover, time delay	Compensation for long pipe distance or vertical separation	MTFC enable (Multi Tenant Function Controller)	Reserved		Options "Page" number	Reserved	Reserved	Reserved	Reserved	External heat control temperature offset and time delay		Options "Page" number	AHU kit capacity setting	AHU kit fan feedback setting	AHU kit defrost signal setting	AHU kit – prevent cold air blowing in heat mode	Reserved

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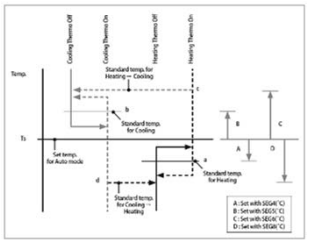
Advanced Indoor Unit Option Settings

Heat Recovery
Indoor unit auto changeover setting



		Setting Number and Details								
		0	1	2	3	4	5	6	7	
SEG1	0									
SEG2	5									
SEG3	1	Standard	Custom							
SEG4	**A**	0	0.9	1.8	2.7	3.6	4.5	5.4	6.3	Setting Details
SEG5	**B**	0	0.9	1.8	2.7	3.6	4.5	5.4	6.3	
SEG6	**C**	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	
SEG8	**D**	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	
SEG9	**T**	5	7	9	11	13	15	20	30	

Initial determination

Cooling	Heating
Tr ≥ Ts + A + 1	Tr < Ts – A – 1

Mode change

Cooling → Heating	Heating→ Cooling
Tr < Ts + B – 1 for T & Tr < Ts-D	Tr ≥ Ts - A + 1 for T & Tr ≥ Ts + C

Thermo On/Off

Cooling	Heating
Thermo on : Tr ≥ Ts + B + 1 Thermo off : Tr ≤ Ts + B – 1	Thermo on : Tr < Ts - A – 1 Thermo off : Tr ≥ Ts - A + 1

Tr = room temperature
Ts = set temperature

A, B, C, D = ° F
T = minutes

Segment 1: Always “0”
Segment 2: Always “5”
Segment 3: Use factory auto change programing or use custom programming
Segment 4 (A): Heating temperature offset
Segment 5 (B): Cooling temperature offset
Segment 6 (C): Temperature difference when changing from heating to cooling
Segment 8 (D): Temperature difference when changing from cooling to heating
Segment 9: Time required for mode change

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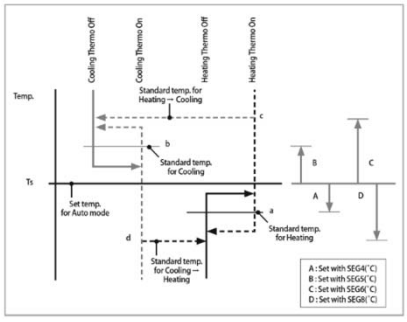
Advanced Indoor Unit Option Settings

HR Indoor unit auto changeover example



		Setting Number and Details								
		0	1	2	3	4	5	6	7	
SEG1	0									
SEG2	5									
SEG3	1	Standard	Custom							
SEG4	**A**	0	0.9	1.8	2.7	3.6	4.5	5.4	6.3	Setting Details
SEG5	**B**	0	0.9	1.8	2.7	3.6	4.5	5.4	6.3	
SEG6	**C**	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	
SEG8	**D**	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	
SEG9	**T**	5	7	9	11	13	15	20	30	

Segment 1 – Page number
Segment 2
Segment 3
Segment 4
Segment 5
Segment 6
Segment 7 – Page number
Segment 8
Segment 9

051113-124000-200000-300000

Segment 2: 5 = advanced option settings
Segment 3: 1 = Use custom changeover settings
Segment 4: 1 = 0.9° F heating offset
Segment 5: 1 = 0.9° F cooling offset
Segment 6: 3 = 4.5° F offset when changing from heating to cooling
Segment 8: 3 = 3.6° F offset when changing from cooling to heating
Segment 9: 4 = 13 minute delay before changing modes

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Indoor Product Option Code Settings

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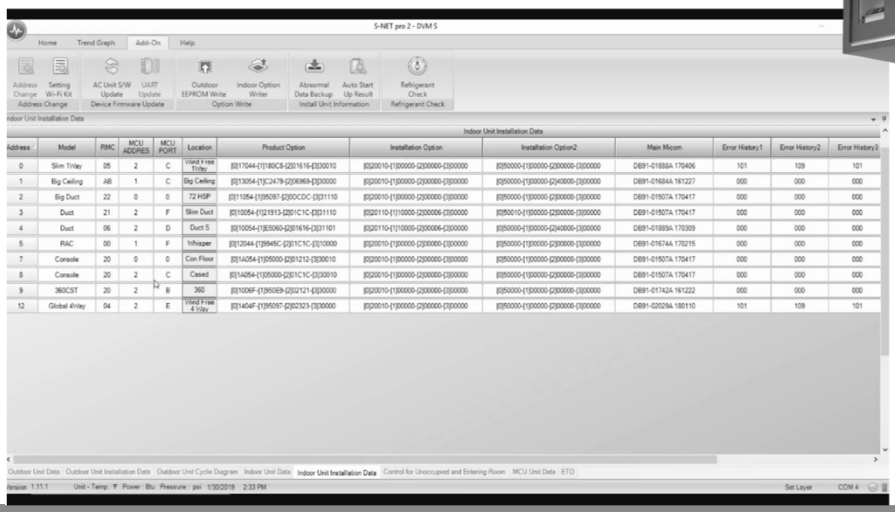
Product Option Code Settings

Product options codes are used to change the ESP value on ducted units

Example: AM076FNHDCH/AA: Change from 0.2" ESP to 0.6" ESP using SNET Pro



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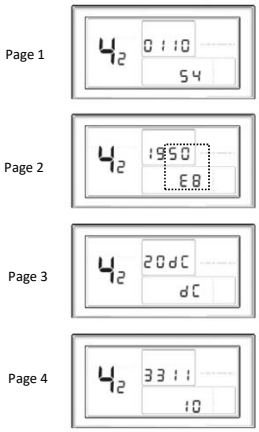
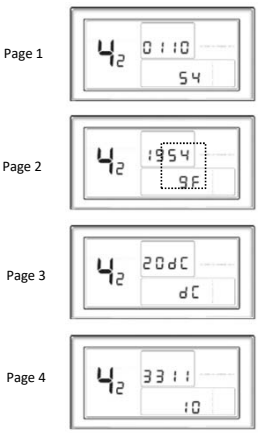
Product Option Code Settings

Example: AM076FNHDCH/AA: Change from default 0.6” ESP to 0.98” ESP using MWR-WE13N

Original option code:
011054-1950E8-20DCDC-331110



New option code:
011054-19549F-20DCDC-331110



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System Start-up - Common Errors

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Outdoor Unit PCB Commissioning - Error Display

- **During initial system start or normal operation, the system has hundreds of checkpoints that are constantly monitored to ensure proper operation and system safety**
- **If at any time a checkpoint is outside of its programmed range, an error code will display**
- **Depending on the error code, the indoor units and/or outdoor units may or may not stop operation**
- **Error code meanings can be found in the outdoor unit Installation manual, service manuals, SNET Pro 2 service software, and the DVM Mobile app.**

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Outdoor Unit PCB Commissioning - Error Display

Common Errors

- **Some lower priority error codes will appear due to higher priority system error codes**
- **Fix higher priority error codes first before dealing with low level error codes**
- **Wired controllers might not turn on initially until all addressing related error codes are resolved**

EXAMPLE:
E-604: No communication between wired remote controller and indoor unit(s)

This error might display on wired controllers while the system displays E201 (addressing related error code, seen on ODU and SNET Pro 2)

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Outdoor Unit PCB Commissioning - Error Display

- **The most common error codes will start with "E" and will be followed with three numbers (example: E153)**
- **After the "E_ _ _" error code, additional error status codes may appear.**
- **If an indoor unit error code is displayed, it will be followed up with "A0 _ _". The last two digits represent the indoor unit with the error. The error code and unit code will repeat.**

Error display method	Display example*
Error # → Indoor unit address → Error #, repeat display	E153 → A002 → E153 → A002 →

* The example above displays an error code for the indoor unit with main address "02".

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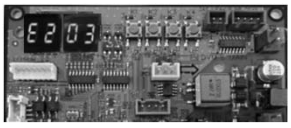
Outdoor Unit PCB Commissioning - Error Display

Common errors

Error Code	Display	Details / Items to check
E201		**"E201": Indoor unit quantity settings error** ▪ The outdoor unit found more/less indoor units than specified on the MAIN outdoor unit's indoor unit quantity setting dials ▪ Verify that indoor unit quantity is set properly ▪ Make sure all indoor units have power and have F1/F2 connected ▪ Check indoor unit address overlapping
E213		**"E213": Assigned indoor unit address does not exist on an MCU PCB** NOTE: This error will temporarily appear after "UP" is displayed until the Auto Pairing test is performed ▪ Check indoor unit address overlapping ▪ Check communication cable status.
E203		**"E203": Communication error between main unit and sub units** ▪ Check which outdoor unit has problem (U200, U201, U202… error code details on next page) ▪ Check the communication cable and power cable to outdoor units

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Outdoor Unit PCB Commissioning - Error Display

First error code digit meaning

E	P	U	A	C
▪ **101 ~ 700** ▪ Displayed when an error is decided by self diagnosis	▪ **701 ~ 800** ▪ Display an item that requires more than 2 detections for deciding whether it is an error or not during the 1st detection	Displays the outdoor unit address where an error has occurred. **U200** : Main Outdoor Unit **U201** : Sub1 Outdoor Unit **U202** : Sub2 Outdoor Unit	▪ Displays the indoor unit address where an error has occurred. ▪ Ex) A000 : An error has occurred at indoor unit address 00 ▪ Ex)A047 : An error is occurred at number 47 address indoor unit	▪ Displays the PCB code where a communication error has occurred. **C001** = Hub PCB **C002** = Fan PCB **C003** = Inverter1 PCB **C004** = Inverter2 PCB

Type	Error display method	Display example
Indoor unit error display	Error # → Indoor unit address → Error #, repeat display	E153 → A002 → E153 → A002
Outdoor unit error display	Error # → Outdoor unit address → Error #, repeat display	E438 → U200 → E438 → U200→ E206 → C002 → E206 → C002

Animation:
E296 = Low Pressure Sensor Error
U200 = Error in MAIN outdoor unit

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System Operation Key Mode - Main ODU

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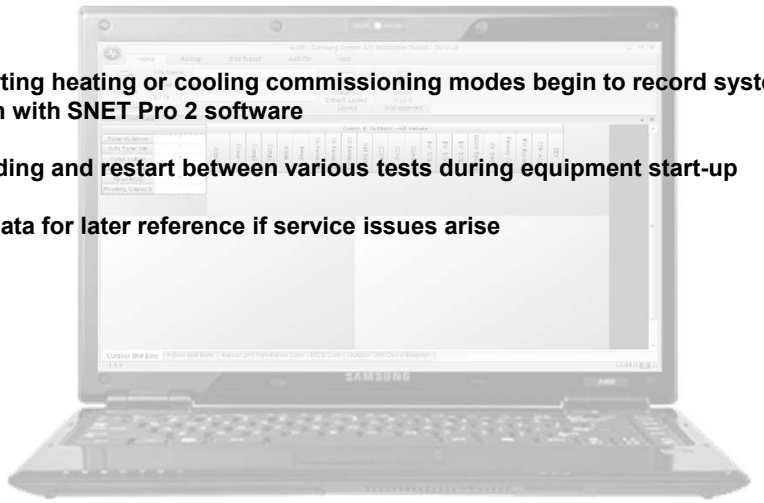
SNET Pro 2 - Recording System Data



- **Before starting heating or cooling commissioning modes begin to record system information with SNET Pro 2 software**
- **Stop recording and restart between various tests during equipment start-up**
- **Save this data for later reference if service issues arise**

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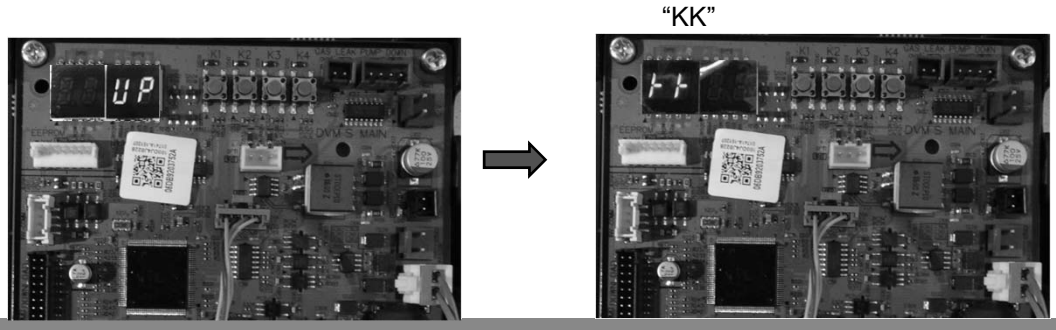
System Auto Trial Operation

- "**UP**" = "UnPrepared"
- To clear **UP** status, hold **K1** button for 5 seconds
- The display will show "KK" and the unit will run in either heating or cooling depending on various conditions.
- The outdoor unit will run through various outdoor unit and system checks (service valves, sensors, EEV's, fan, reversing valve, etc.)
- 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



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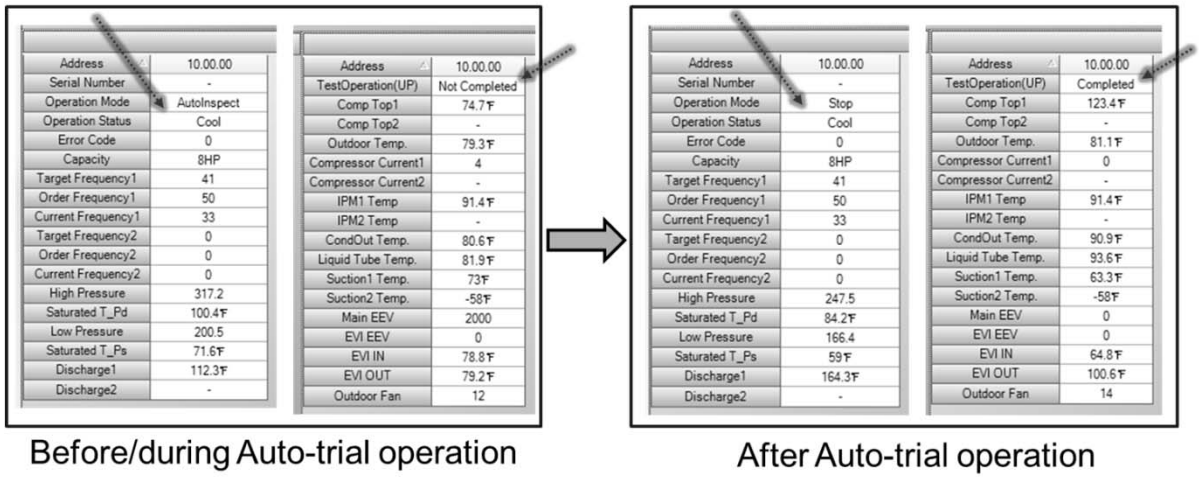
SNET Pro 2 - Auto Trial Display Example

Step 1



Address	10.00.00
Serial Number	-
Operation Mode	AutoInspect
Operation Status	Cool
Error Code	0
Capacity	8HP
Target Frequency1	41
Order Frequency1	50
Current Frequency1	33
Target Frequency2	0
Order Frequency2	0
Current Frequency2	0
High Pressure	317.2
Saturated T_Pd	100.4℉
Low Pressure	200.5
Saturated T_Ps	71.6℉
Discharge1	112.3℉
Discharge2	-

Address	10.00.00
TestOperation(UP)	Not Completed
Comp Top1	74.7℉
Comp Top2	-
Outdoor Temp.	79.3℉
Compressor Current1	4
Compressor Current2	-
IPM1 Temp	91.4℉
IPM2 Temp	-
CondOut Temp.	80.6℉
Liquid Tube Temp.	81.9℉
Suction1 Temp.	73℉
Suction2 Temp.	-58℉
Main EEV	2000
EVI EEV	0
EVI IN	78.8℉
EVI OUT	79.2℉
Outdoor Fan	12

Before/during Auto-trial operation

Address	10.00.00
Serial Number	-
Operation Mode	Stop
Operation Status	Cool
Error Code	0
Capacity	8HP
Target Frequency1	41
Order Frequency1	50
Current Frequency1	33
Target Frequency2	0
Order Frequency2	0
Current Frequency2	0
High Pressure	247.5
Saturated T_Pd	84.2℉
Low Pressure	166.4
Saturated T_Ps	59℉
Discharge1	164.3℉
Discharge2	-

Address	10.00.00
TestOperation(UP)	Completed
Comp Top1	123.4℉
Comp Top2	-
Outdoor Temp.	81.1℉
Compressor Current1	0
Compressor Current2	-
IPM1 Temp	91.4℉
IPM2 Temp	-
CondOut Temp.	90.9℉
Liquid Tube Temp.	93.6℉
Suction1 Temp.	63.3℉
Suction2 Temp.	-58℉
Main EEV	0
EVI EEV	0
EVI IN	64.8℉
EVI OUT	100.6℉
Outdoor Fan	14

After Auto-trial operation

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Heat / Cool Test Operation Mode

Step 2

Heat or Cool test operation is initiated from the outdoor unit (main) control PCB
Heating Trial Operation: Press **K1** two times
Cooling Trial Operation: Press **K2** two times

- Operate in Heating or Cooling trial operation to allow the system to stabilize
- The system will operate the indoor units with extreme set temperatures that are normally not available (cooling set temperature = 37° F, heating high temperature of 104° F)
- Depending on the outdoor and indoor conditions, the system should operate at a high capacity
- Wired and wireless controller signals are ignored during this operation
- Maximum time: 10 hours

You must use K3 to take the unit out of test mode or the system will operate in test mode for 10 hours

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System Startup Basic Operating Data

During Start up observe the following conditions

- Compressor discharge temperature
- Condenser outlet temperature
- High and Low pressure
- Compressor current
- Indoor unit EEV (cool)
- Indoor unit EEV (heat)
- Startup report

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System Operation Data

Compressor discharge temperature

- **Discharge temperatures should be between 140º F - 221º F during normal operation**
  - If over 221º F, check for low refrigerant and verify liquid service valve is open.
- **Compressor will stop if discharge temperature reaches 248º F**
  - If below 140º F for long periods, the system is most likely overcharged.
- **Heating trial operation discharge temperature - high pressure saturated temperature ≥ 54º F**
  - If this condition is not satisfied the system may be overcharged. Check refrigerant volume, outdoor EEV, outdoor liquid bypass valve, and EVI_EEV.

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System Operation Data

- **Condenser outlet temperature (CondOut Temp)**
  - **CondOut range: 86º F ~ 131º F under standard conditions and normal operation.**
    - **Low or high ambient temperatures can extend this range down or up.**
  - **Cooling CondOut should be between 5º F ~ 36º F greater than outside ambient temperature.**
  - **Heating CondOut: should be at least 2º F lower than outside ambient temperature.**

- **Subcooler outlet temperature (Liquid Tube Temp)**
  - **Liquid tube temp: 68º F ~ 122º F under standard conditions and normal operation.**
  - **Low or high ambient temperatures can extend this range down or up.**

- **System Superheat**
  - **(Suction temp - Suction saturated temp) = 0 ~ 12.6º F**

- **Outdoor EEV (Main EEV)**
  - During cooling operation, outdoor EEV should be at 2,000 steps

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System Operation Data

High / Low pressure

- Low pressure range during cooling test operation: 85 ~ 128 PSI.
  - When outdoor temperatures and indoor loads are high, this value may be higher.

- Low pressure range during heating test operation: 71 ~ 106 PSI.
  - This is a basic reference as ambient temperatures will change this value.

- High pressure range during cooling test operation: 355 ~ 469 PSI.
  - This value can increase with ambient temperatures (max. 512 PSI)

- High pressure range during heating test operation: 355 ~ 455 PSI.
  - This value can decrease when outside ambient temperature is below 32º F or indoor temperature is below 68º F.

IPM Temperatures – Inverter PCB Temp (IPM1 Temp / IPM2 Temp)

- When IPM board temperatures ≥ 194º F the system will modify operation to prevent overheating.
- No errors will occur until temperatures reach 212º F.
- Capacity can decrease during protection without any visual indication of protection occurring if below 212º F

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System Operation Data

Indoor Unit EEV (Cool mode)

- EVA_IN temperature
  - Under normal operation and conditions, temperature should be between 45º F - 57º F for all indoor units.
- EVA_OUT temperature
  - Under normal operation and conditions, temperature should be between 45º F - 57º F for all indoor units.
- Indoor Unit Superheat (EVA OUT - EVA IN)
  - should equal approximately 0 ~ 7 after sufficient system operation times.
  - This value will vary initially based on outdoor conditions and indoor conditions.
- Indoor EEV steps 0 ~ 2,000
  - Under normal operation and conditions the indoor unit EEV(s) should stay within 250 ~ 1400 steps.
  - If more than 50% of indoor unit EEV's SH > 11º F and EEV step of those units > 1400, the system maybe undercharged.
  - If a small percentage of indoor unit EEV steps are > 1400 under standard operating and space conditions, verify the distance from the first Y-joint to each unit is within Samsung pipe limitations.

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System Operation Data

Indoor Unit EEV (Heat mode)

- EVA_OUT temperature
  - Under normal operation and conditions, temperature should be between 113º F - 194º F for all indoor units.
- EVA_IN temperature
  - Under normal operation and conditions, temperature should be between 91º F - 122º F for all indoor units.
- Supply Air Temperature
  - Under normal operation and conditions, temperature should be 105° F or greater.
- EEV position
  - will vary based on indoor and outdoor conditions.
  - If all indoor unit EVA_IN temperatures are lower than 91.4º F, outside ambient temperature is below 41º F, and high pressure is below 356 PSI, the system maybe oversized or overcharged
  - If only a small number of indoor unit EVA_IN and EVA_OUT temperatures are lower than normal under standard operating and space conditions, verify the distance from the first Y-joint to each unit is within Samsung pipe limitations.

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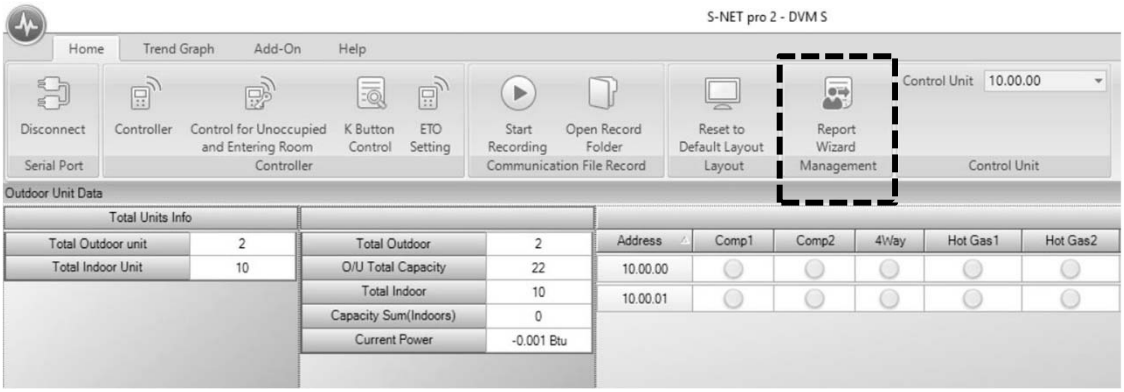
System Operation Data Report

After proper system operation has been confirmed, create a system report in SNET Pro 2

1. In the "**Home**" tab, click "**Report Wizard**"



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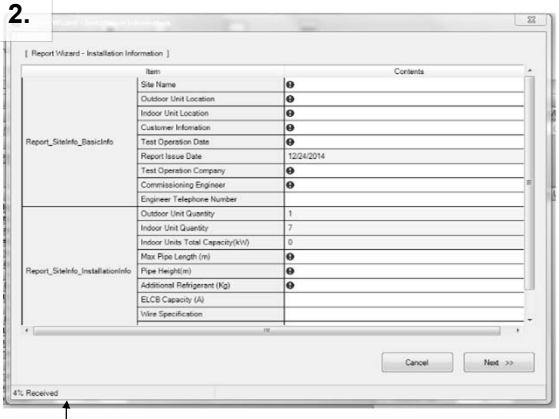
System Operation Data Report

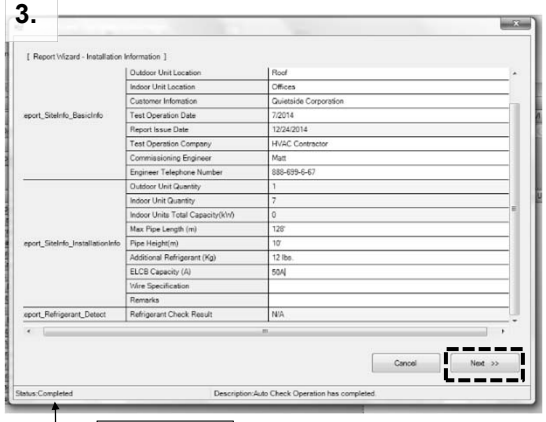
2. Enter site name, equipment location, etc. All fields with ❗ must have data entered.
3. After all data is entered and the **"% Received"** has reached 100% and displays **"Status: Complete**", click the **"Next"** button

2.



4% Received

3.



Status Completed

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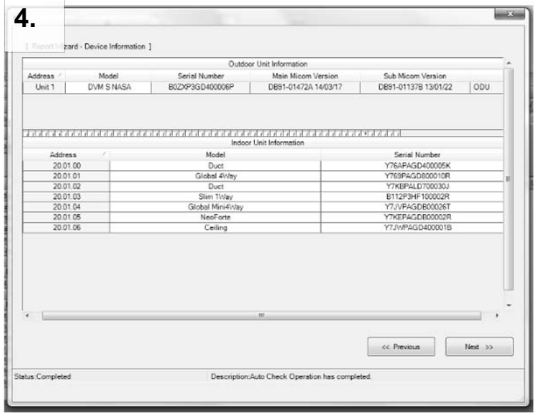
System Operation Data Report

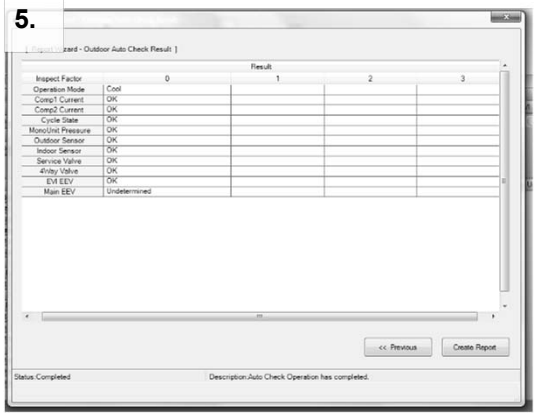
4. The next window will display the indoor unit addresses, type, and serial number and outdoor unit model, serial number, main MICOM and sub MICOM versions. Click “Next”

5. The next window will display the Auto-trial results from “UP” mode.

4.



5.



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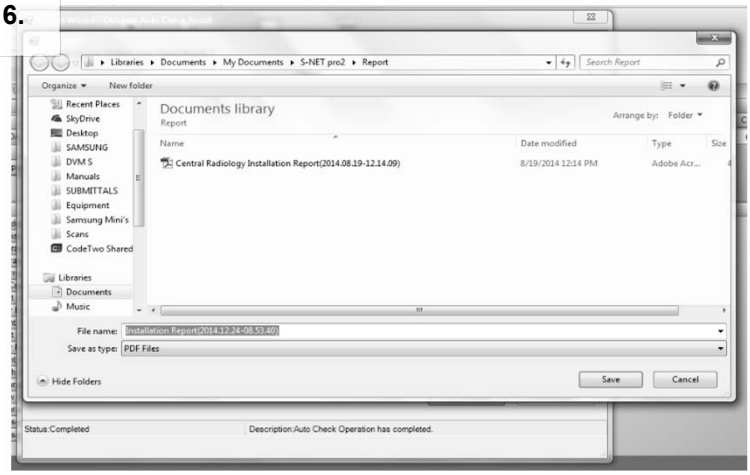
System Operation Data Report

6. Click “**Create Report**” and specify where you would like to save the PDF report

6.



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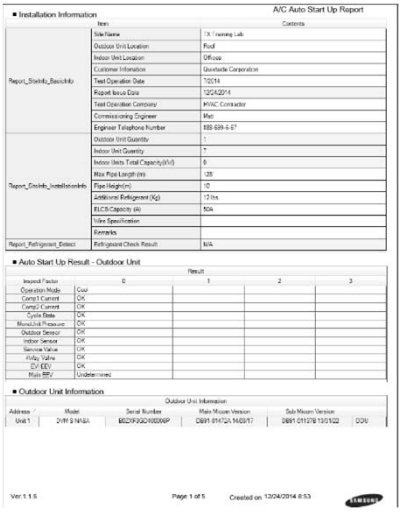
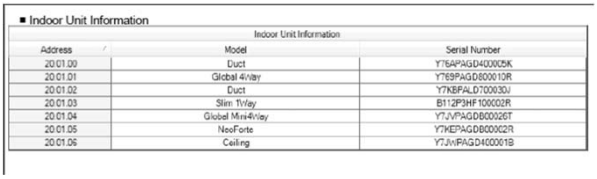
System Operation Data Report

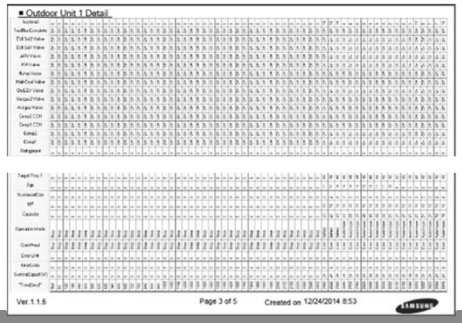
Page 1 – Basic system data, Auto-trial results, and outdoor unit serial and firmware versions.



Page 2 – Indoor unit address, type, and serial number



Page 3 – Outdoor Unit operation details from Auto Trial operation



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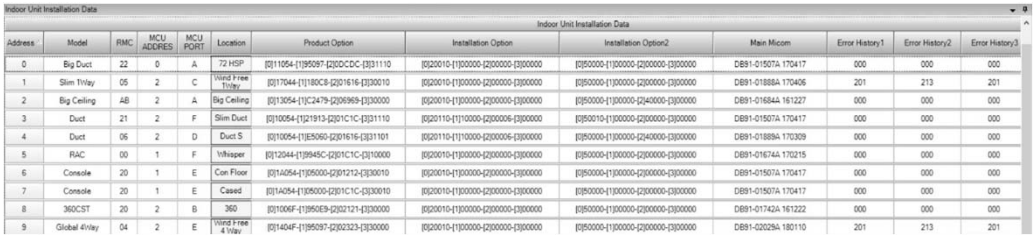
System Operation Data Report

Page 4 - Indoor unit address, type, "Location" (name given with SNET Pro 2), factory program code, basic option settings, advanced options settings, MICOM firmware version and MTFC installation status for each indoor unit.



Indoor Unit MICOM firmware version must be "161222" or higher

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System Operation Data Report

MCU Unit Data

Address	A-Cool	A-Heat	A-EEV	A-Address	B-Cool	B-Heat	B-EEV	B-Address	C-Cool	C-Heat	C-EEV	C-address	D-Cool	D-Heat	D-EEV	D-Address	E-Cool	E-Heat	E-EEV	E-Address	F-Cool	F-Heat	F-EEV	F-Address	LBV	MCU Bypass EEV	SubCool EEV	SubCooler In Temp	SubCooler Out Temp	Main Micom
0	○	○	480	-	○	○	0	-	○	○	0	-	○	○	0	-	○	○	0	-	○	○	0	-	○	-	0	72 ℉	71 ℉	DB91-01867A 161222
1	○	○	0	-	○	○	0	-	○	○	0	-	○	○	0	-	○	○	480	-	○	○	480	-	○	-	0	73 ℉	73 ℉	DB91-01867A 161222
2	○	○	480	-	○	○	480	-	○	○	480	-	○	○	480	-	○	○	480	-	○	○	480	-	○	-	0	70 ℉	71 ℉	DB91-01867A 161222

Page 5 - MCU address, valve status, MICOM version, and firmware version for each MCU.

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System Operation Data Report

To register for warranty

- Locate the Report wizard files from your documents
  - Excel & PDF
- Email the complete reports to your rep or distributor

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External Controls

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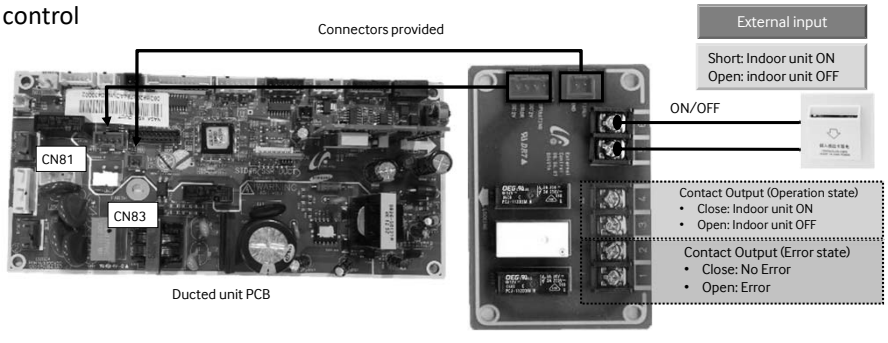
External Contact Controller - MIM-B14

- Direct indoor unit control by external contact signal
- External contact input load: 5v – 5,A
- Output terminals are open/close contacts 0 volts
- Maximum load rating on the Operation & Error terminals: 250vac, 3A
- Emergency control with simple contact input
- Compatible with all DVM S indoor fan coil units
- External heat control



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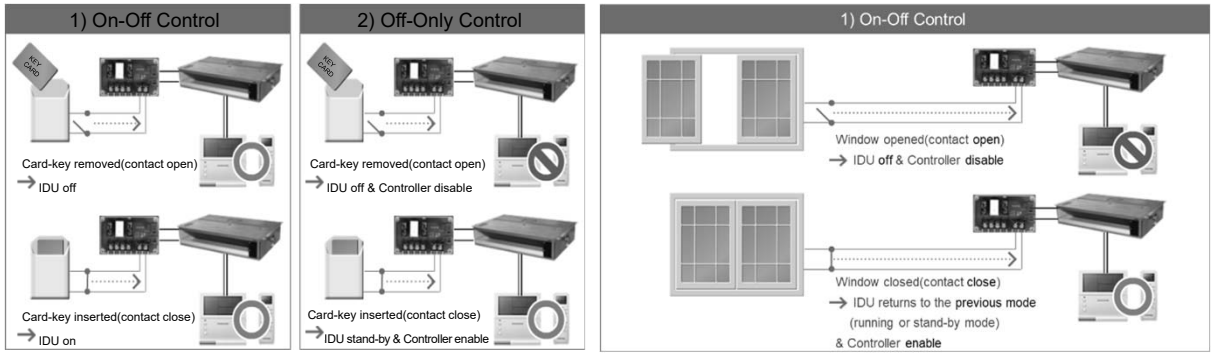
External Contact Controller - MIM-B14

Direct indoor unit On & Off control by external contact signal

02 Series Installation Options



Segment 14 set to 1 | Segment 14 set to 2 | Segment 14 set to 3

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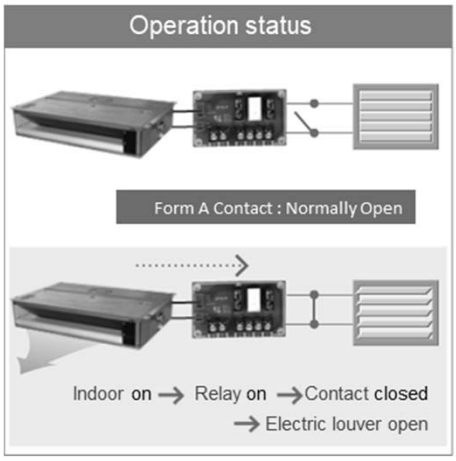
External Contact Controller - MIM-B14

Indoor unit operation state output through relay contacts

- 02 Series Installation Options Segment 15
  - (0) Thermo On/Off
    - Output based on connected indoor unit's current operation
    - Heating/Cooling trying to condition the space
    - Satisfied set point and in a "Thermo-Off" state
  - (1) Operation On/Off
    - Output based on power status of connected indoor unit
    - (On or Off including fan)
  - Fan mode – contact open



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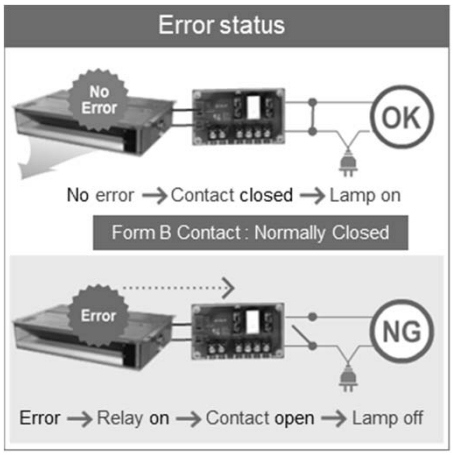
External Contact Controller - MIM-B14

- Error state output through relay contacts
  - Once the MIM-B14 is enabled terminal 1 & 2 will be active
  - When the system is active with no error code the contacts will be closed
  - When an error occurs the contact will open
  - Maximum load rating on the Error terminals: 250vac, 3A



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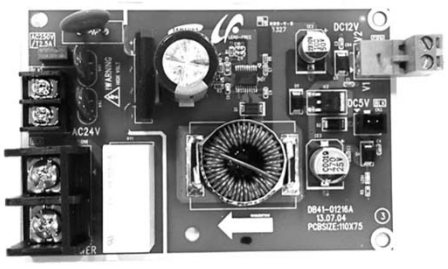
Multi-Tenant Controller - MCM-C210N

- When supply voltage to an indoor unit is disabled, MCM-C210N will provide auxiliary 12V DC and 5V DC power to the indoor unit PCB to keep "awake“ (see table for indoor unit operation details)
- When supply voltage to an indoor unit is supplied normally, MCM-C210N will cut auxiliary power to the indoor unit PCB allowing normal operation.
- This also prevents property damage inside due to ice/water accumulation/dripping from a stopped indoor unit (open EEV, no fan →"ice formation")



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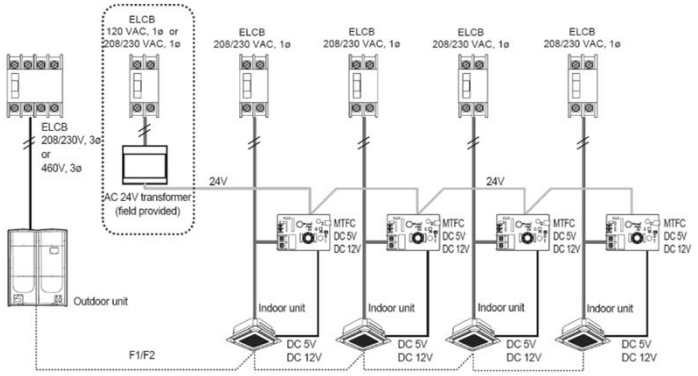
Multi-Tenant Controller – MCM-C210N

- MCM-C210N will monitor supply voltage to an indoor unit and provide power to that unit's PCB when supply voltage is removed to prevent full system failure due to offline unit.
- The 24V transformer must be powered by a different circuit than the indoor units. The controller could be powered by the outdoor unit circuit



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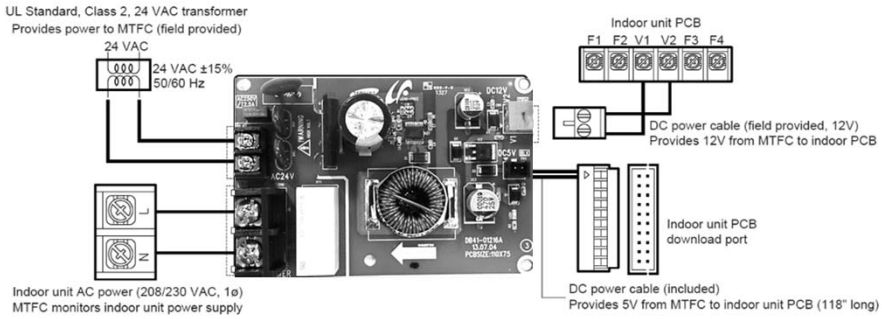
Multi-Tenant Controller – MCM-C210N

- When indoor units are powered from individual tenant power supply/meter where there is a risk of power loss to individual indoor units
- When indoor unit supply power is enabled/disabled for simple indoor unit ON/OFF control



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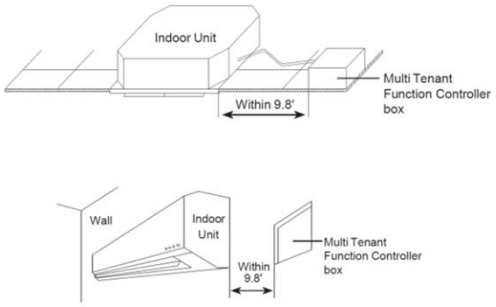
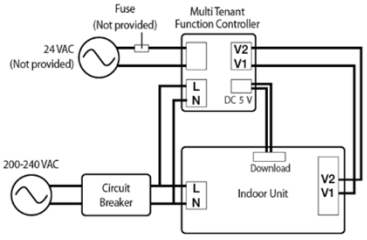
Multi-Tenant Controller – MCM-C210N

- Wired remote controllers (MWR-WE13N, MWR-SH00N, MWR-SH10N) connected to multiple indoor units should not be connected to indoor units using MCM-C210N that are powered from different sources
- 5V DC indoor unit connection cable length: 118"
- MCM-C210N must be installed in an NEC approved enclosure (field provided)





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Multi-Tenant Controller – MCM-C210N

Indoor unit operation details when powered by MCM-C210 MTFC

Item	Indoor Unit Operation	Details
Indoor unit operation	OFF	Indoor unit will display OFF status and cannot be turned ON
Indoor unit expansion valve	Close	Operation OFF
		In heat mode the EEV will operate the same as "noise reduction" control option, momentarily opening and closing EEV at fixed intervals to prevent refrigerant migration
Self error diagnosis	Functional	Indoor unit can still detect some errors (ex: EEV close/open error)
Error display on panel	Partial operation	The indoor unit will display its own errors but not other system errors
Connected wired controller	OFF	Power is removed, will not function
Panel display	All OFF	All LED's on indoor unit are disabled (except during error display)
Input outdoor unit key mode (test mode)	OFF, no operation	All other indoor units will operate that have supply power
Control from central control devices	OFF, no operation	Indoor unit will remain OFF, operation is not possible
Setting option/program codes	Not possible	Option settings from wireless controller, wired controller, SNET Pro 2, and S-Checker is not possible
Recognition of MTFC status	Possible through SNET Pro 2	SNET Pro 2 service software will allow monitoring of MTFC status
Indoor unit chime/beep	OFF	The indoor unit will not provide audible operation notifications
Condesate Pump	Not possible	Without high voltage Condesate pumps cannot run

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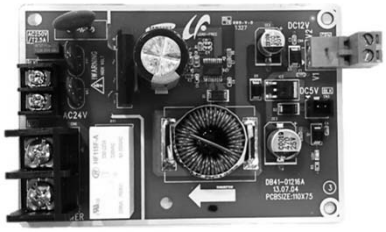
Multi-Tenant Controller – MCM-C210N

Indoor Unit Settings

- MTFC must be enabled by changing the advanced indoor unit option setting segment “11” to “2”
  - “0” = Disable MTFC (Default)
  - “2” = Enable MTFC



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Controls Accessories

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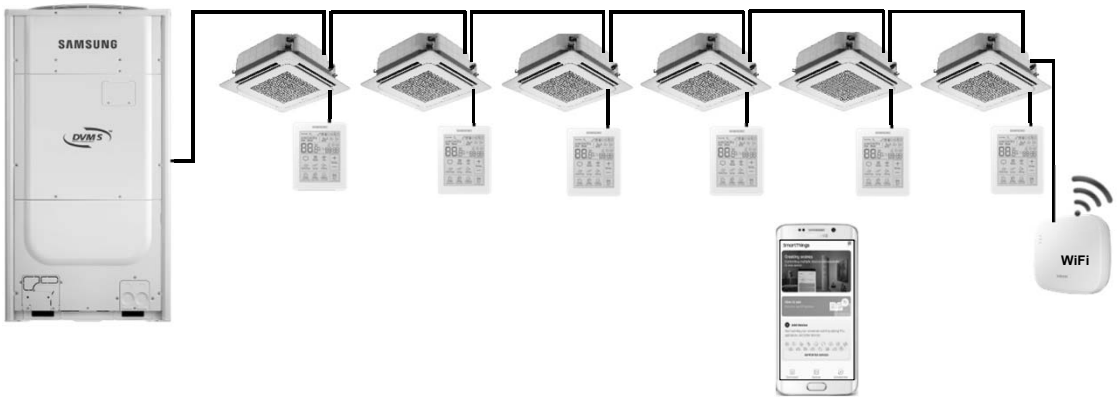
Wi-Fi Adapter - MIM-H04UN

- WiFi Kit allows control and scheduling of the DVMS system remotely through Android and Apple devices
- Configuration requires the Samsung "**SmartThings**" app.
- 2.4 GHZ or 5 GHZ WI-FI
- One WiFi kit can be registered to a maximum of 5 users



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Wi-Fi Adapter - MIM-H04UN

- 4-wire connection to an indoor unit – **F1 F2** communications **V1 V2** 12vdc power from indoor unit
- WiFi adapter should be installed as close to the wireless router as possible
- For the indoor units with no **V1 V2** terminals use the external control wires – Org to **V1** & Blk to **V2**

Refer to the WiFi Kit Installation Manual for step by step setup and configuration procedures

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Thermostat Adapter – TADPT2

- Adapter can control one or two DVMS indoor units
  - Two connected indoor units are 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
  - Low, medium, and high
- Each adaptor requires its own field supplied 24vac class 2 transformer

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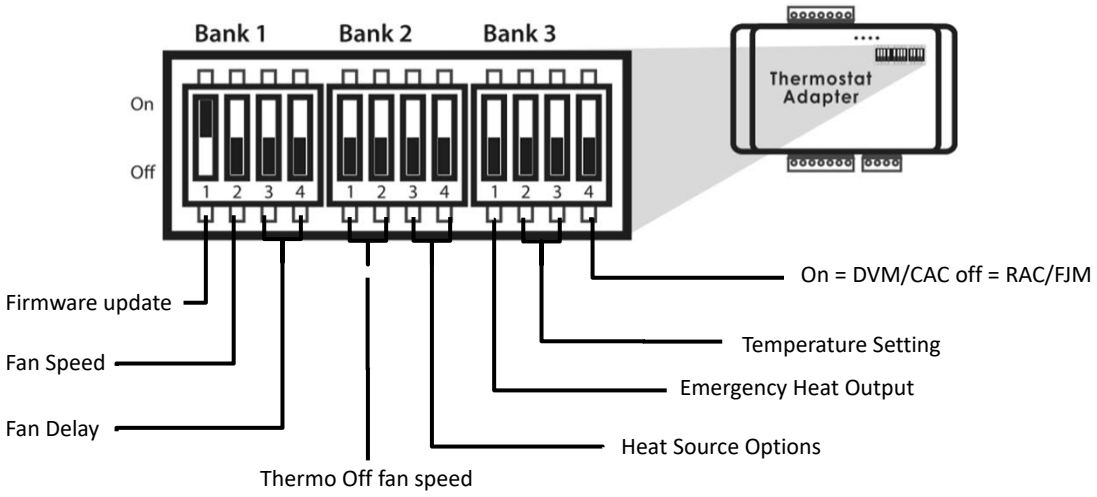
Thermostat Adapter – TADPT2



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Motion Detect Sensors

- MCR-SMA Motion Sensor
  - Standard Mini 4-Way Cassette
- MCR-SMC Motion Sensor
  - Wind-Free ™ 4 Way Cassette
- MCR-SMD Motion Sensor
  - Wind-Free™ Mini 4 Way
- MCR-SME Motion Sensor
  - 360 Cassette

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Motion Detect Sensors

MCR-SMA Motion Sensor – Mini 4-Way Cassette

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	

Samsung Comfort Logics (activated in "Premium" mode)

Comfort Flow:

- MDS prevents cassette from blowing 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 air downward

Comfort Saving:

- When no motion is detected, MDS will adjust set temperature to reduce energy consumption (maximum +3.6º F in cooling, and -3.6º F in heating)

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Motion Detect Sensors

MCR-SMC,D,E Motion Sensor – Mini 4-Way Cassette

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	
Premium	20	30	SOFT OFF and HARD OFF are the same as Standard Mode. Samsung comfort functions are activated.
	40	60	
	80	120	

Samsung Comfort Logics (activated in "Premium" mode)

Comfort Flow:

- MDS prevents cassette from blowing 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 air downward

Comfort Saving:

- When no motion is detected, MDS will adjust set temperature to reduce energy consumption (maximum +3.6º F in cooling, and -3.6º F in heating)

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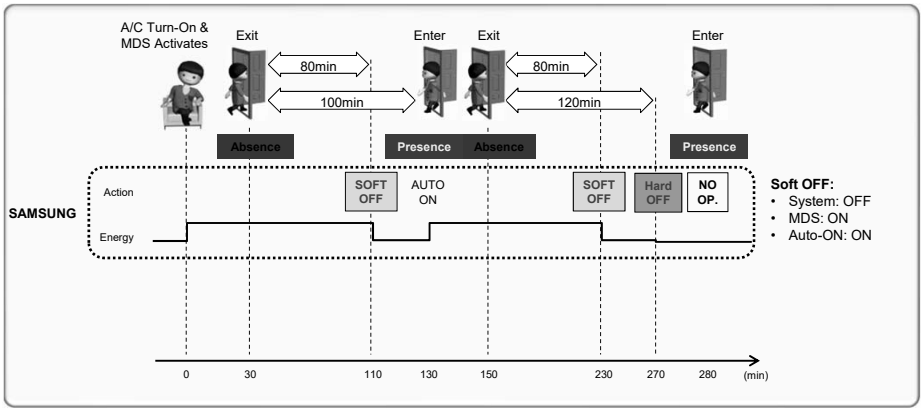
Motion Detect Sensors

MCR-SMA Motion Sensor – Mini 4-Way Cassette

Power On/Off



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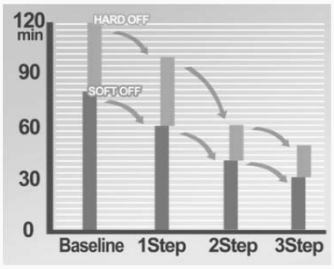
Motion Detect Sensors

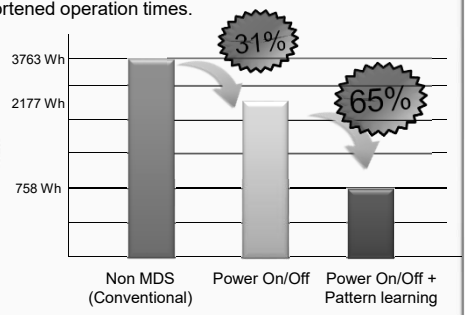
MCR-SMA Motion Sensor – Mini 4-Way Cassette

Pattern Learning Function Details

- Pattern Learning Function is implemented with ON/OFF function baseline (default OFF times)
- Pattern Learning Function is 3rd step
- If there is a pattern of leaving and not returning, the MDS will slowly decrease the amount of time for Soft OFF and Hard OFF saving energy with shortened operation times.



*ON/OFF Function 120min



*Cooling set point 64.4° F, 18,000 btu/h Mini 4way 1 set

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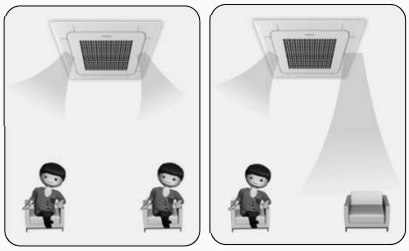
Motion Detect Sensors

MCR-SMA Motion Sensor – Mini 4-Way Cassette

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

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External Heat Control

- When a system is operating in heat mode and an indoor unit cannot reach or maintain desired set temperature, the indoor unit can activate supplemental auxiliary heat (EX: -12°F outside temperature). Although Samsung DVM S systems are designed to heat effectively at low ambient temperatures, some projects might require an additional heat source.
- This is not designed to be used as “emergency heat”. If the outdoor unit stops due to low ambient conditions but not an error code, the indoor unit will still operate its fan and auxiliary heat output connection (outdoor temperature must be -22°F or greater). If outside conditions are low enough to cause an error code, external heater control is not guaranteed (EX: low suction error code caused by low outside temperatures).
- When indoor units are configured to use the auxiliary heat control output, the outdoor unit compressor will still operate as this control option is simply supplemental heat control.

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External Heat Control

External Heat Concept

All Multi-position air handlers models AM0**JNZDCH will have this firmware or newer and will have an electric heat accessory option. When using accessory VHK-*** electric heat kits, the indoor unit is configured using the HOT COIL output from the PCB. The heat kits will plug into the vertical air handler electric heat plug and will not require additional relays, etc. See details in the electric heat kit installation instructions.

ATTENTION

Samsung cannot guarantee indoor unit fan operation in the event of an error or fan issue. Samsung cannot guarantee sufficient airflow for heaters in the supply duct outlet as duct design, filter selection, and filter status will directly effect this. When controlling an auxiliary heat source with a Samsung indoor unit, make sure that all required thermal protection devices are present per national, local, and ASHRAE standards.
External heat control output is not designed to control electric heat options that were not provided by Samsung. Do not use Samsung indoor unit auxiliary heat control output to enable/disable electric heat in the supply duct.

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External Heat Control

Applicable Indoor Unit Firmware Versions

Indoor unit type	Indoor Model Number	Version / date code
Neo Forte (wall mount)	AM0**FNTDCH/AA	DB91-01508A, date code (14/06/13) and newer
	AM0**HNQDCH/AA	
Cassette	AM0**FN4DCH/AA	DB91-01507A, date code (14/06/13) and newer
	AM0**FN1DCH/AA	
	AM0**FNNDCH/AA	
Ducted	AM0**FNLDCH/AA	
	AM0**FNMDCH/AA	
	AM0**FNHDCH/AA	
Under Ceiling / Low-Wall	AM0**FNCDCH/AA	
Vertical Air Handler / AHU Kit	AM0**GNVQCH	DB91-01509A, date code (14/06/13) and newer
	MXD-K***AN	

Use SNET Pro 2 Service Software to view the installed firmware version of an indoor unit.

Indoor Unit Installation Data

Address	Model	RMC	Location	Product Option	Installation Option	Installation Option2	Main Micom	MTFC
0	Duct	04	Slim Duct	[0]10054-[1]255D1-[2]01616-[3]31110	[0]20310-[1]21000-[2]10000-[3]00000	[0]50000-[1]00000-[2]00009-[3]00000	DB91-01507A 14/06/13	
1	Global 4Way	03	4 Way	[0]1404F-[1]95097-[2]01A1A-[3]30000	[0]20310-[1]21000-[2]10000-[3]00000	[0]50000-[1]00000-[2]00009-[3]00000	DB91-01507A 14/06/13	
2	Duct	06	MSP Duct	[0]10054-[1]25E44-[2]06E6E-[3]31110	[0]20310-[1]21000-[2]10000-[3]00000	[0]50000-[1]00000-[2]00009-[3]00000	DB91-01507A 14/06/13	
3	Slim 1Way	02	1 Way	[0]17064-[1]180C8-[2]01616-[3]30010	[0]20310-[1]21000-[2]10000-[3]00000	[0]50000-[1]00000-[2]00009-[3]00000	DB91-01507A 14/06/13	

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External Heat Control

Connection

Depending on the model of unit that is installed, the indoor unit can connect to and control an auxiliary heat source one of two ways:

1. MIM-B14 external contact control (recommended method)
2. “HOT WATER” coil connection (ducted models only)

- When using MIM-B14, its operation output terminals will be used to control an external heat source. This connection provides a 0 volt switch to control the auxiliary heat source (maximum 250V, 3A at this terminal). Using MIM-B14 is the preferred method of external heat control.
- The HOT WATER terminal in a duct unit supplies a high voltage control signal. One terminal supplies 120 VAC constantly and the other terminal supplies an additional 120 VAC (same as supply voltage) to activate the auxiliary heat source. A field-provided, 230 VAC relay must be used. Never power a device from the HOT WATER output, only use to control external devices.

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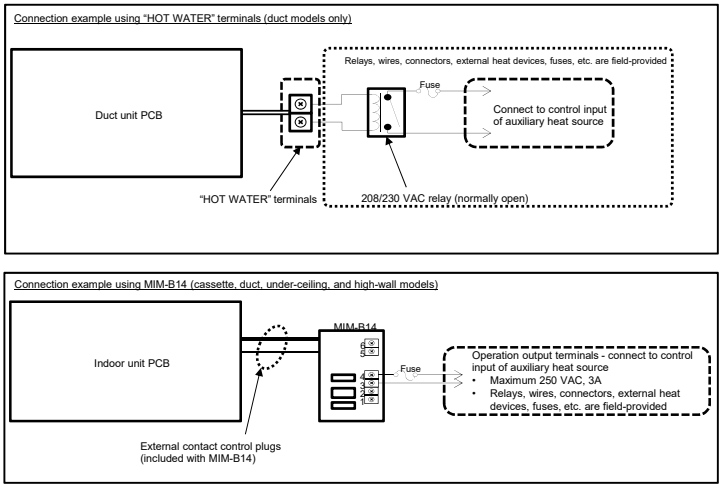
External Heat Control

External Heat Connection Example



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External Heat Control

External Heat Control Programming

If controlling auxiliary heat with the HOT COIL output, you must enable this function for that ducted unit.

02 Series Installation Options Settings (basic options), segment 09		
Use of HOT WATER output	Details	Segment 9 option setting
Do not use	DEFAULT - Do not use	0
Use	Use, fan operation is interlocked with auxiliary heat signal	1
Use	Use, fan is OFF when auxiliary signal ON for cooling only indoor units (install MCM-C200 mode selector switch in the outdoor unit and set to cool mode for this option).	3

If the external heat source is controlled by MIM-B14, indoor unit option 15 of the basic indoor unit option settings (02 series) must be enabled.

02 Series Installation Options Settings (basic options), segment 15		
External control output	Details	Segment 15 option setting
THERMO-ON/OFF	DEFAULT - Output terminals open/close based on standard THERMO-ON/OFF settings (1° C)	0
Operation ON/OFF	Output terminals open/close based on indoor unit power ON/OFF	1
Use*	Use, fan operation is interlocked with auxiliary heat signal	2
Use*	Use, fan is OFF when auxiliary signal ON for cooling only indoor units (install MCM-C200 mode selector switch in the outdoor unit and set to cool mode for this option).	3

* When this option is enabled, this output cannot be used for normal THERMO-ON/OFF, only auxiliary heat control.

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External Heat Control

External Heat Control Programming

- After programming the indoor unit for the desired auxiliary heat control output, you can specify how and when you would like to enable the external heat control signal.
- Below is a table that details the temperature difference between set temperature and room temperature and an optional 10 or 20 minute time delay.

05 Series Installation Options Settings (advanced options), segment 18			
Heater signal on (H)	Time delay (T)		
	No delay	10 minute delay	20 minute delay
THERMO-ON (1.8° F, 1° C, can vary depending on other settings)	0	1	2
2.7° F (1.5° C)	3	4	5
5.4° F (3° C)	6	7	8
8.1° F (4.5° C)	9	A	B
10.8° F (6° C)	C	D	E

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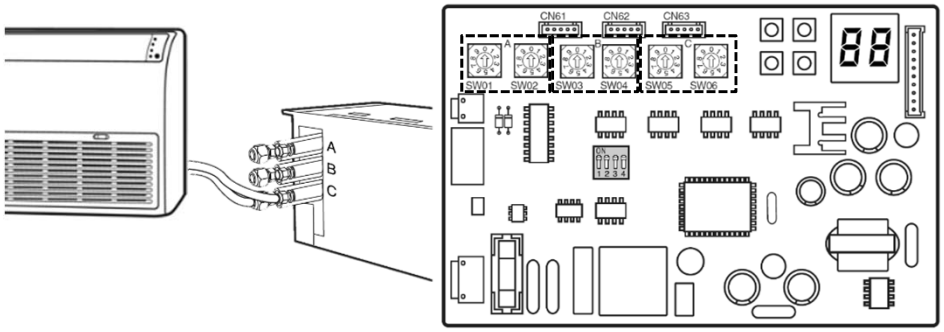
Multi-unit EEV Setup

- Multi-unit EEV Kit Addressing
- EEV kits will address similar to the MCU's
- Set the main address of the units connected to A, B, and C (C is only used with 3 zone EEV kits)
- EEV Kits require 208/230V AC power
- Also require connection of F1/F2 to system



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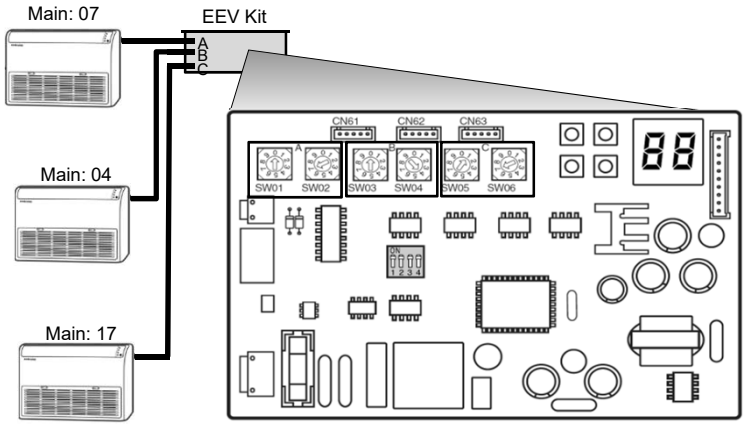
Multi-unit EEV Kit Setup

Set the EEV kit dials according to the address of the connected indoor units, Use SNET Pro or the units controller to determine the indoor unit address



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