DVM S Water Training

Introduction & Basic Installation

Rev 2.2

SAMSUNG HVAC

DVM S Water Training

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

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

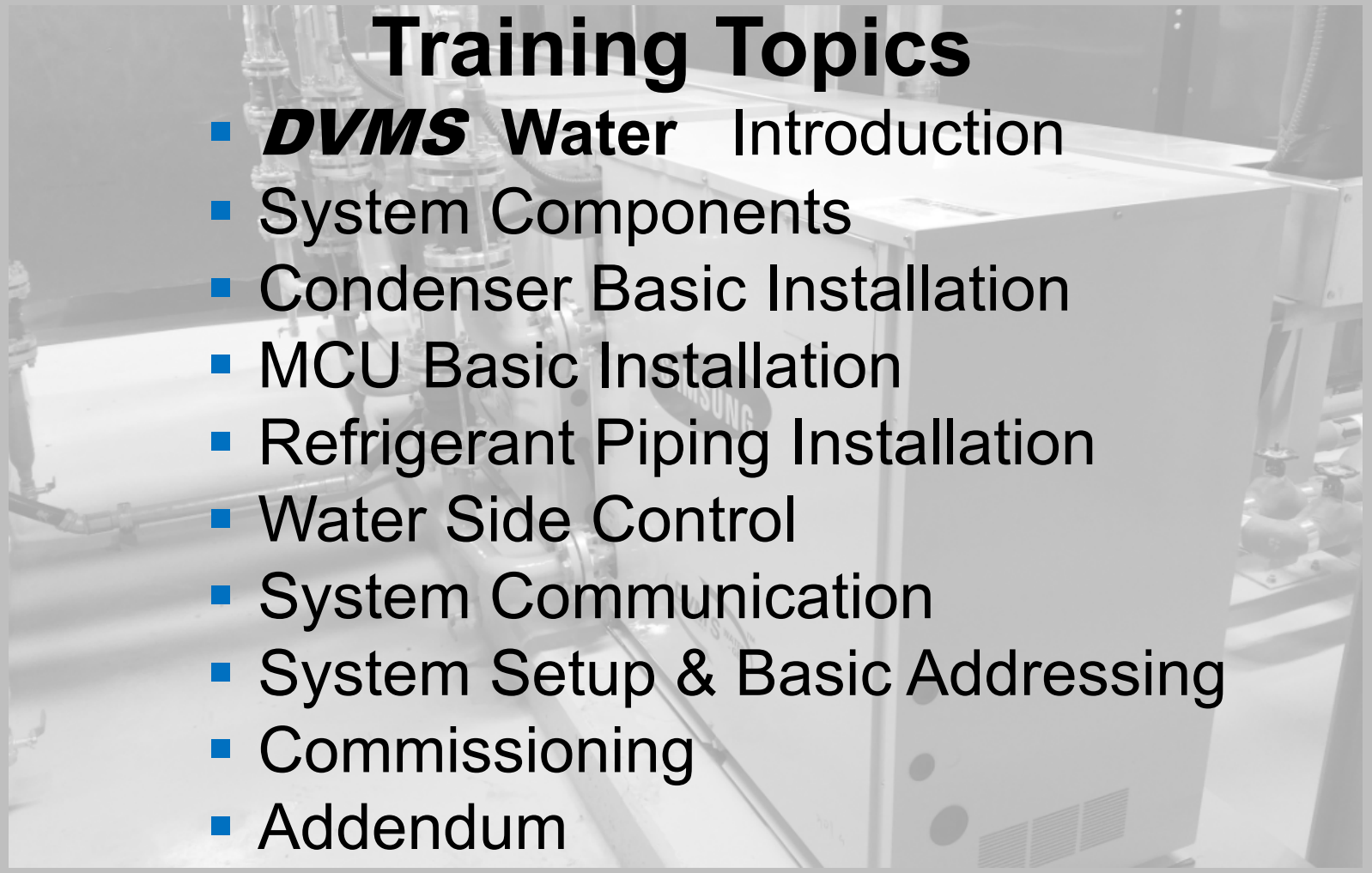
Only properly trained, HVAC professionals should attempt to install and start up any Samsung heating and air-conditioning system.

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

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

www.samsunghvac.com https://samsunghvac.learnernation.com www.dvmdownload.com


DVM S
WATER
- GEO
TM
DIGITAL VARIABLE MULTI



Training Topics

- ***DVMS*** **Water** Introduction
- System Components
- Condenser Basic Installation
- MCU Basic Installation
- Refrigerant Piping Installation
- Water Side Control
- System Communication
- System Setup & Basic Addressing
- Commissioning
- Addendum

Samsung Business Academy

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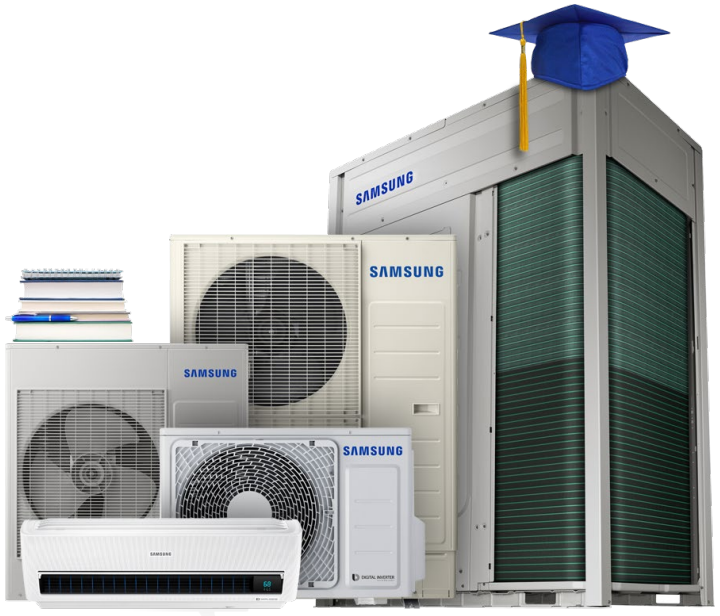
Samsung Business Academy (SBA)

SBA Account Sign Up Required:

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



List of Courses

Training Courses Catalog

Visitor's Guide

Samsung Business Academy Login

Samsung Business Academy Registration

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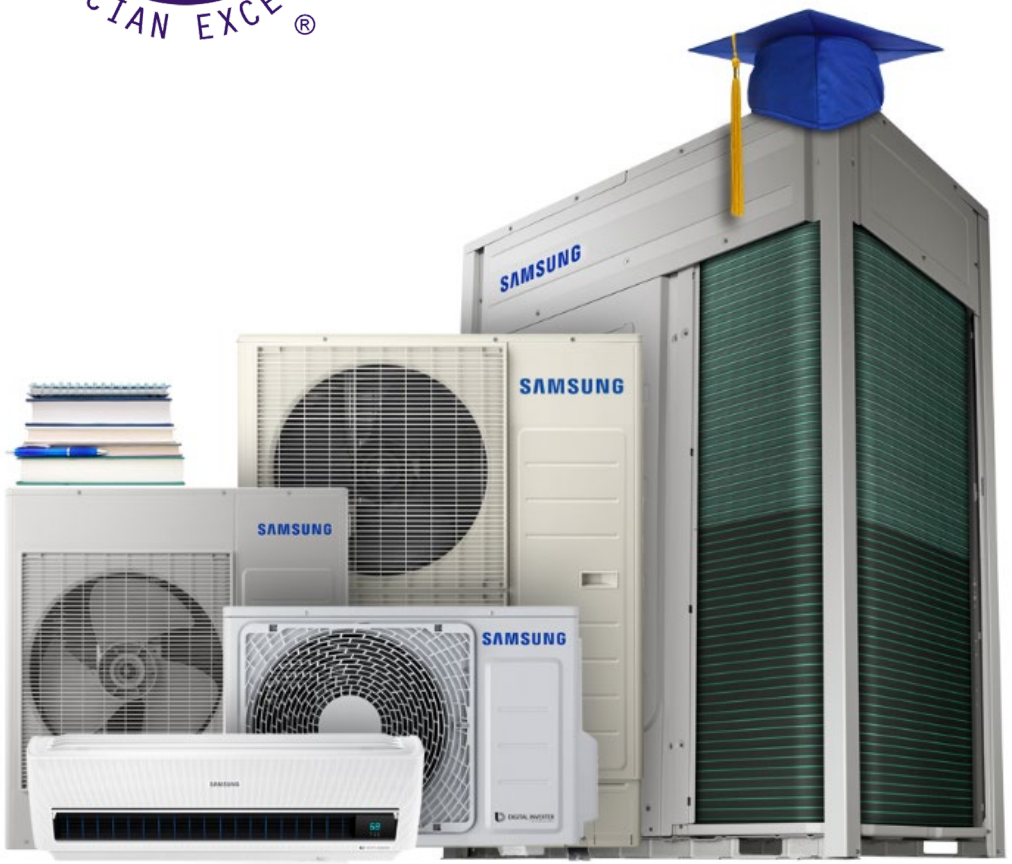
Samsung Business Academy (SBA)



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

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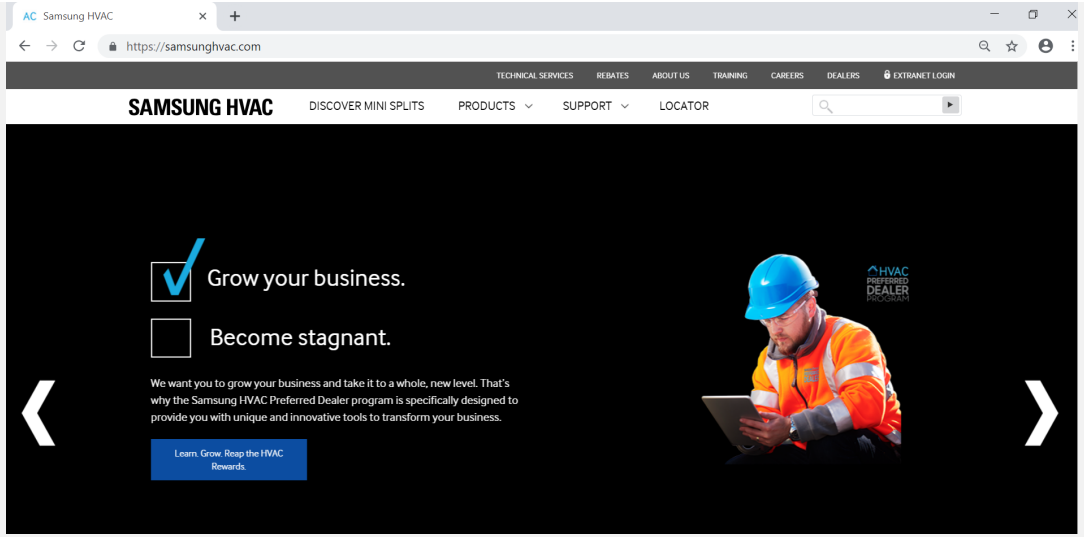
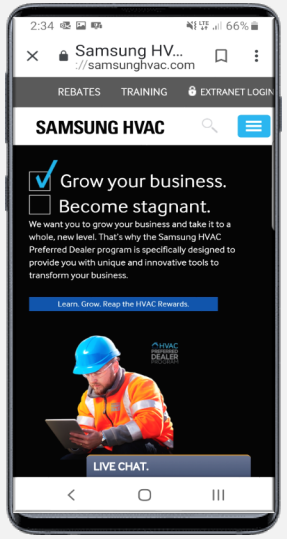
1. Sign Up for a SBA Account

Go to:

www.samsunghvac.com*

*Disable popup blocker.



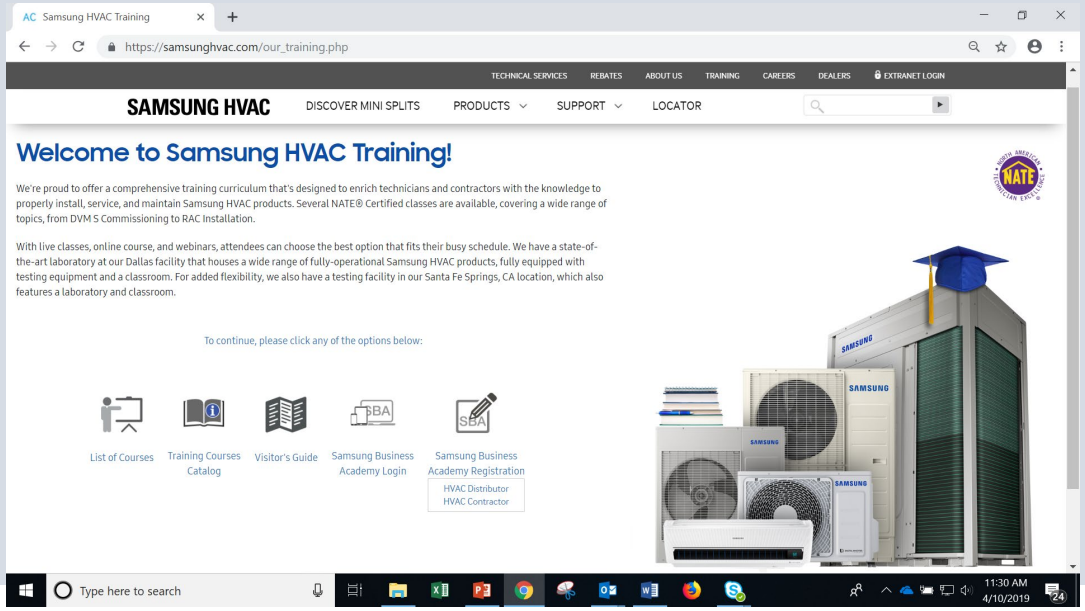


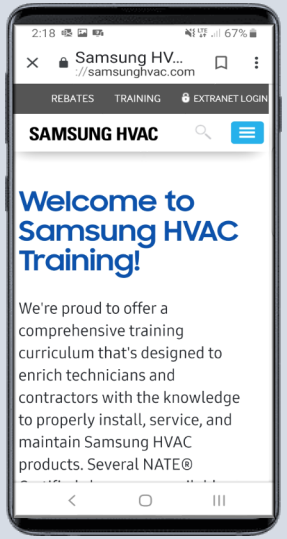
Hover over:

Samsung Business Academy Registration

Choose either:

HVAC Distributor
HVAC Contractor





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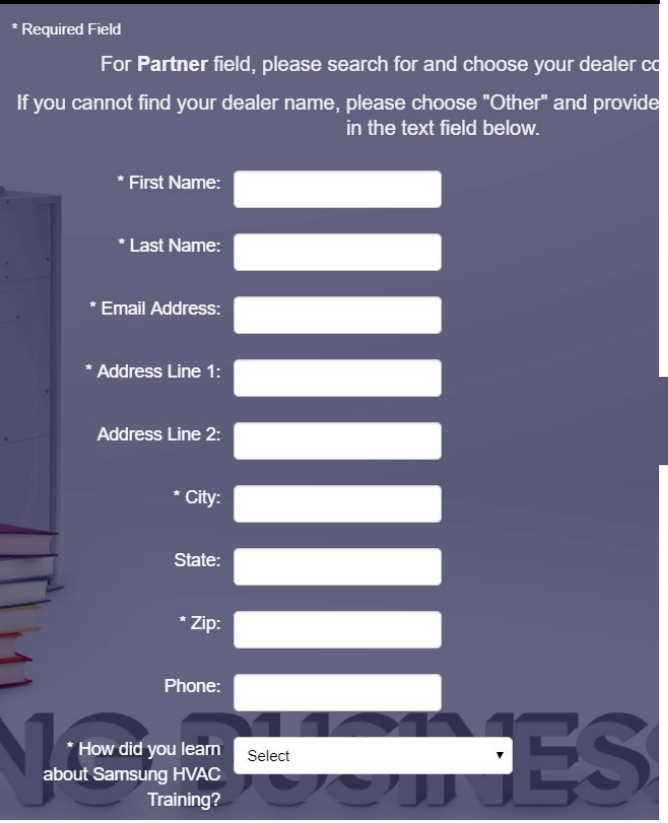
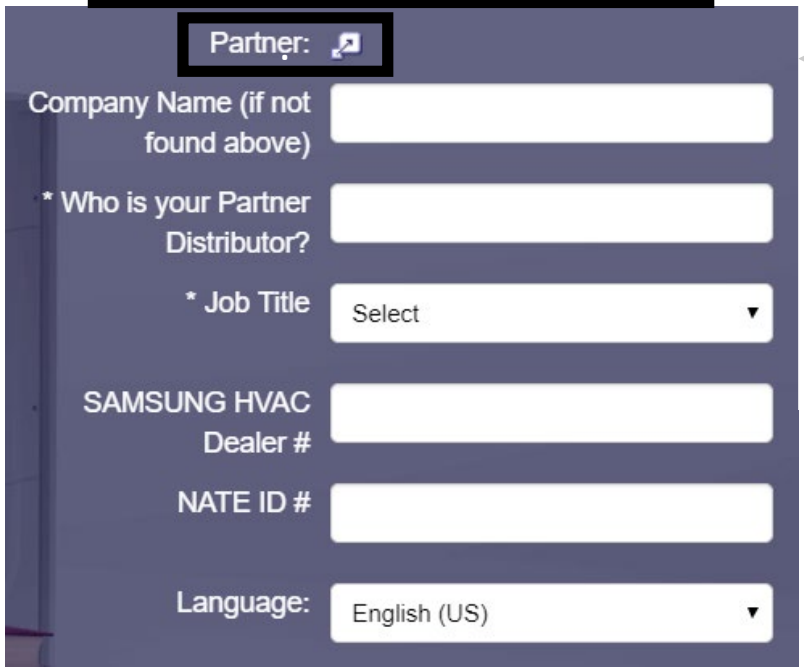
1. Sign Up for a SBA Account

HVAC Contractor

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



Click Partner: to add Distributor information.



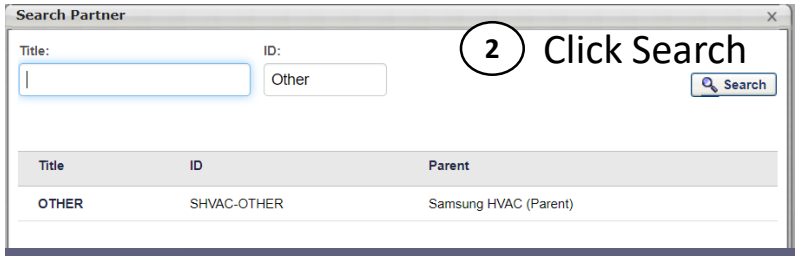
1 Type Distributor Name

2 Click Search

3 Click your Distributors name to add to form.

If your Distributor is not in the list,

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



2 Click Search

3 Click OTHER to add to form.

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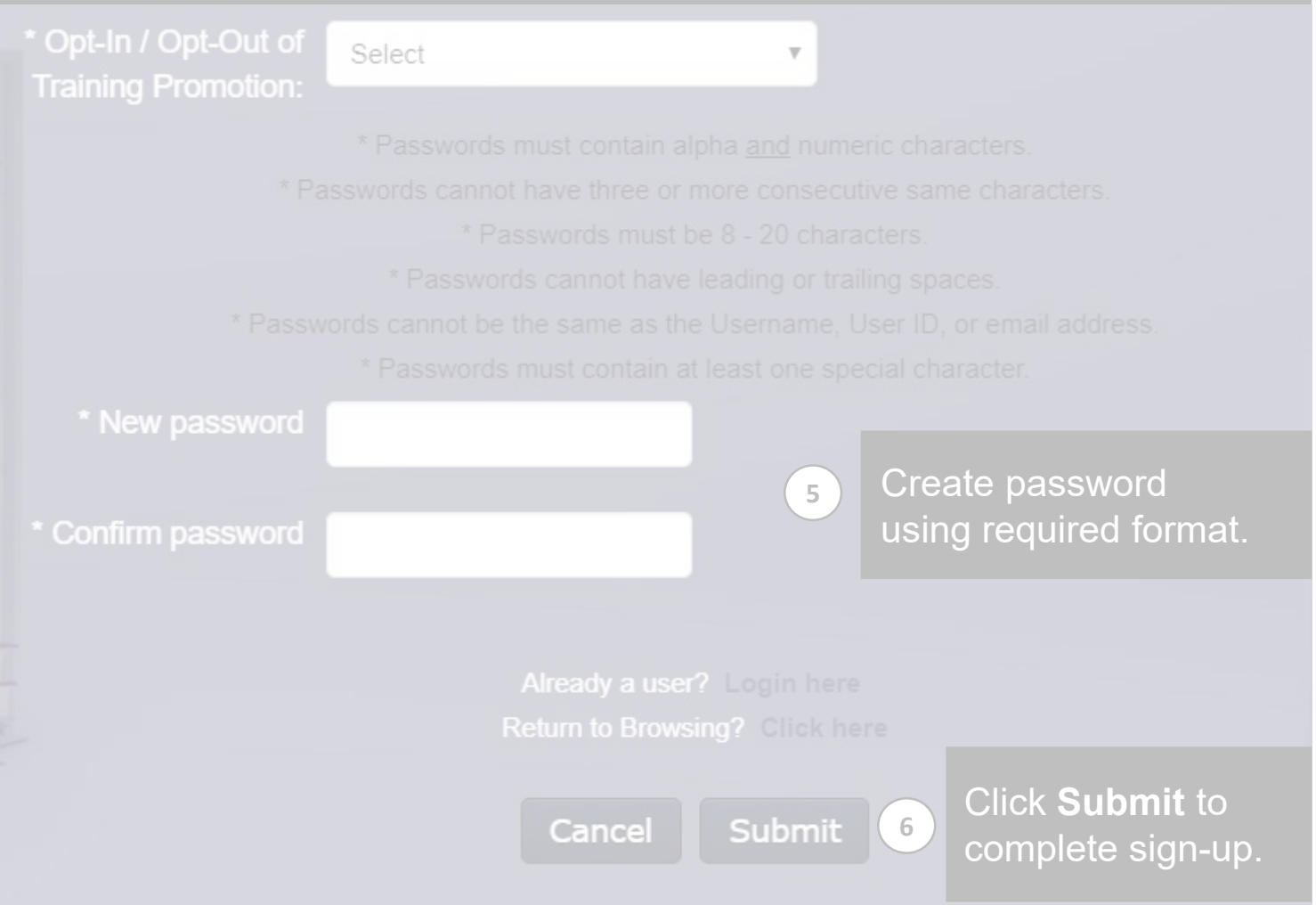
1. Sign Up for a SBA Account

Complete the rest of the Sign Up form.

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



5 Create password using required format.

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

After account is setup…

01 Approval takes 1-2 business days.

02 Attendance is marked complete.

03 Certificate available in SBA.

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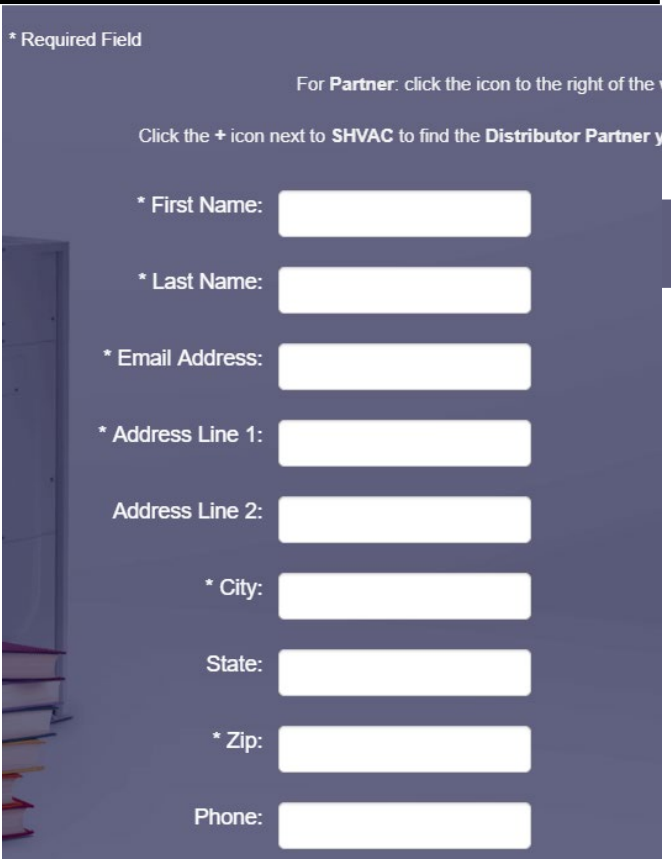
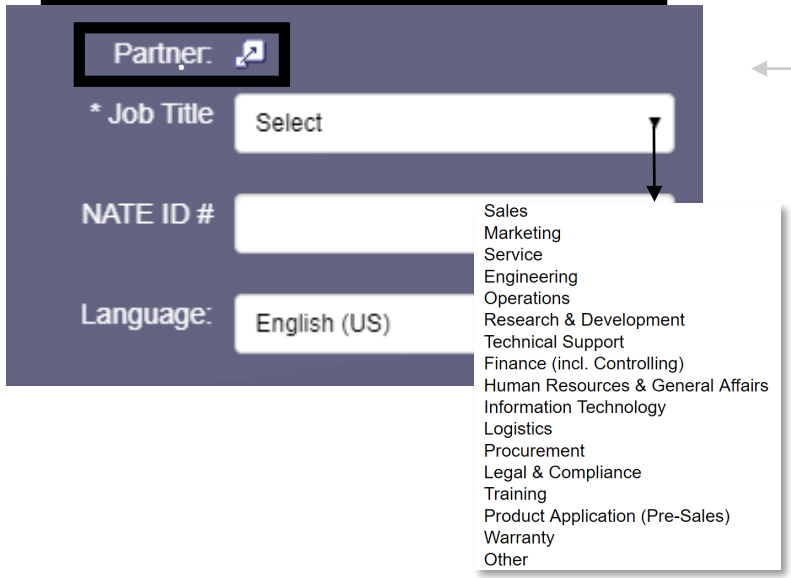
1. Sign Up for a SBA Account

HVAC Distributor

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



Click Partner: to add Distributor information.



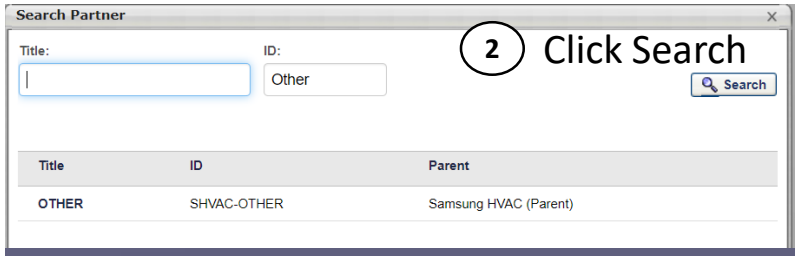
1 Type your Business Name

2 Click Search

3 Click your Business name to add to form.

If your Business is not in the list,

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



2 Click Search

3 Click OTHER to add to form.

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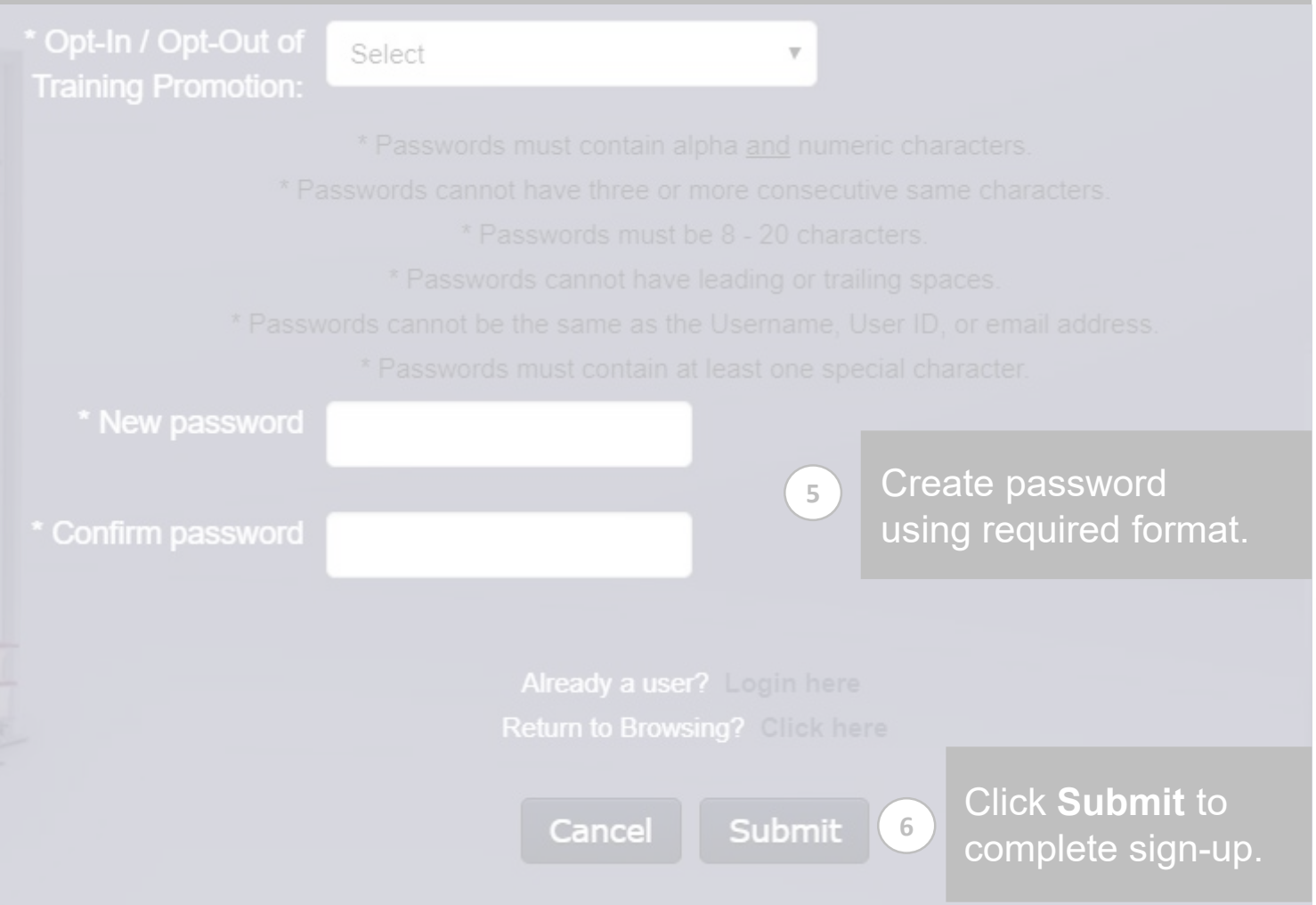
1. Sign Up for a SBA Account

Complete the rest of the Sign Up form.

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



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01 Approval takes 1-2 business days.

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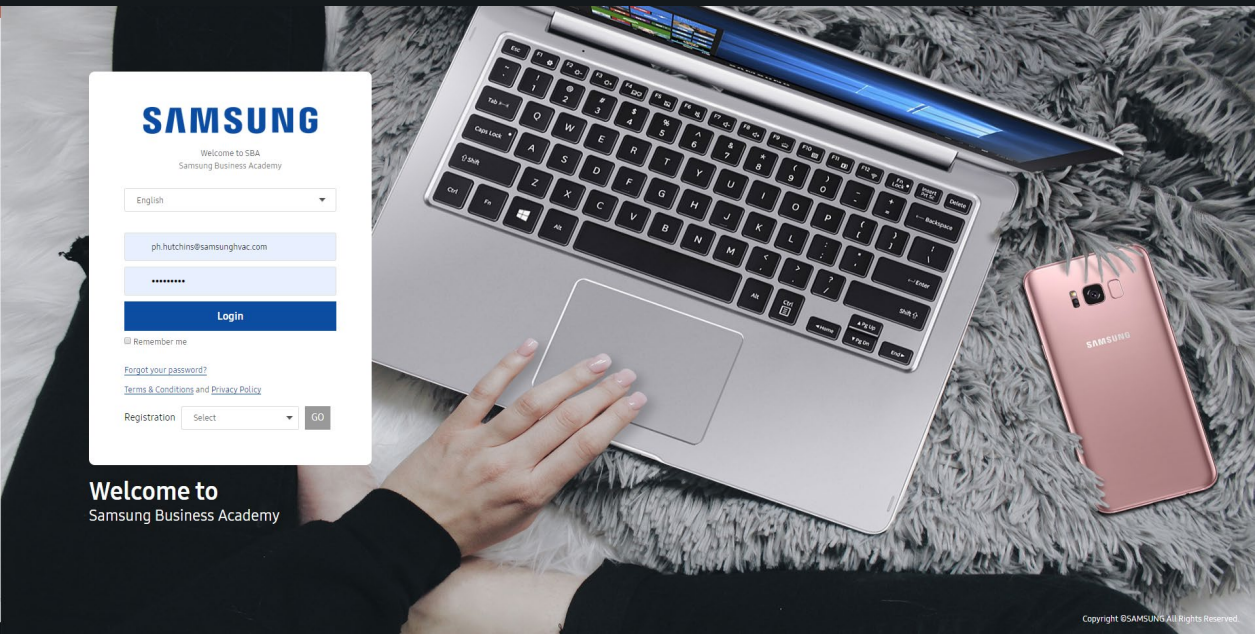
2. View/Print Completion Certificates

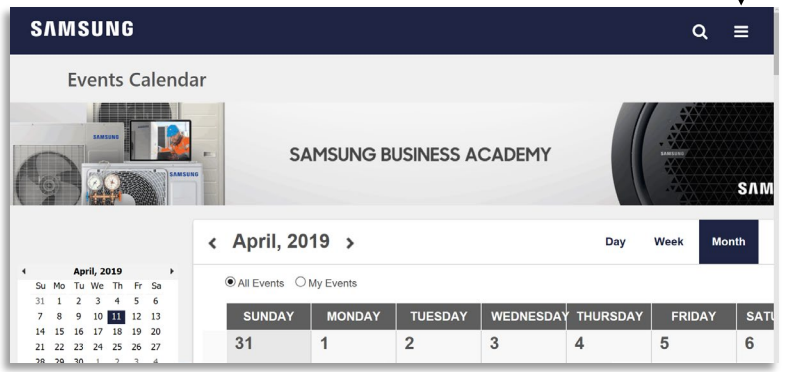
① Go to www. https://samsunghvac.com/our_training.php

② Click: SBA Samsung Business Academy Login

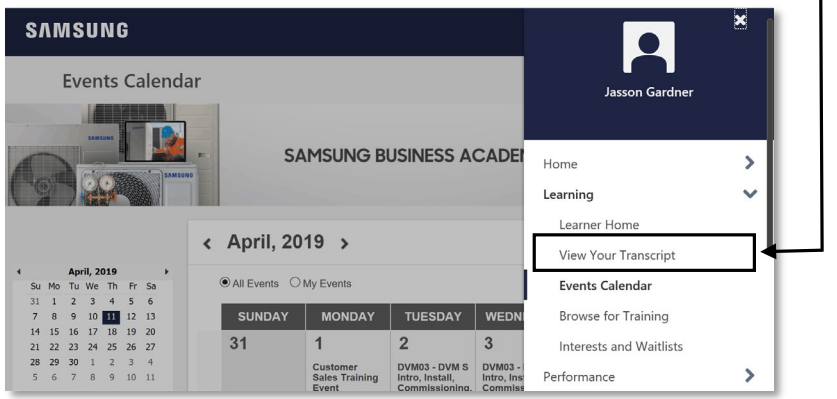
Login with Samsung Business Academy (SBA) username/password.



③ Open Menu. (☰)



④ Click “View Your Transcript”.



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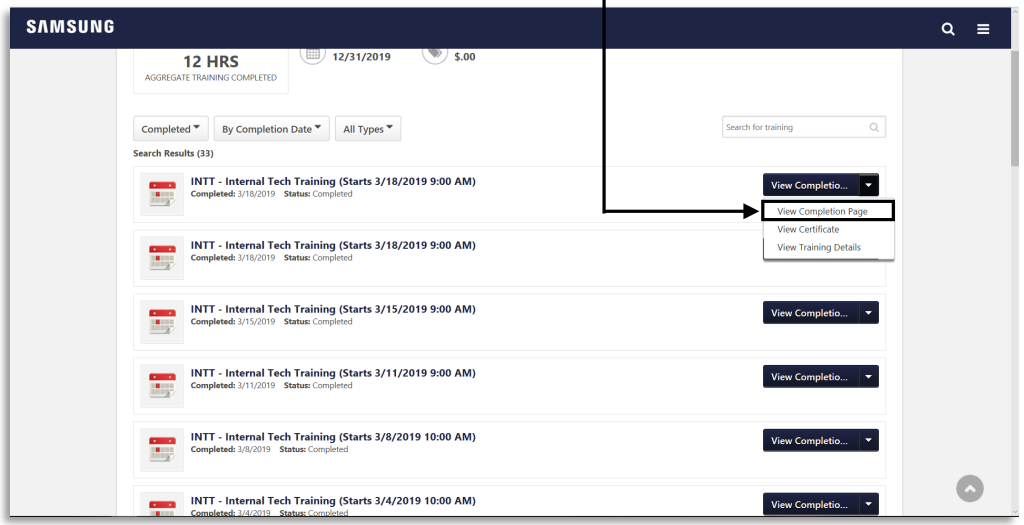
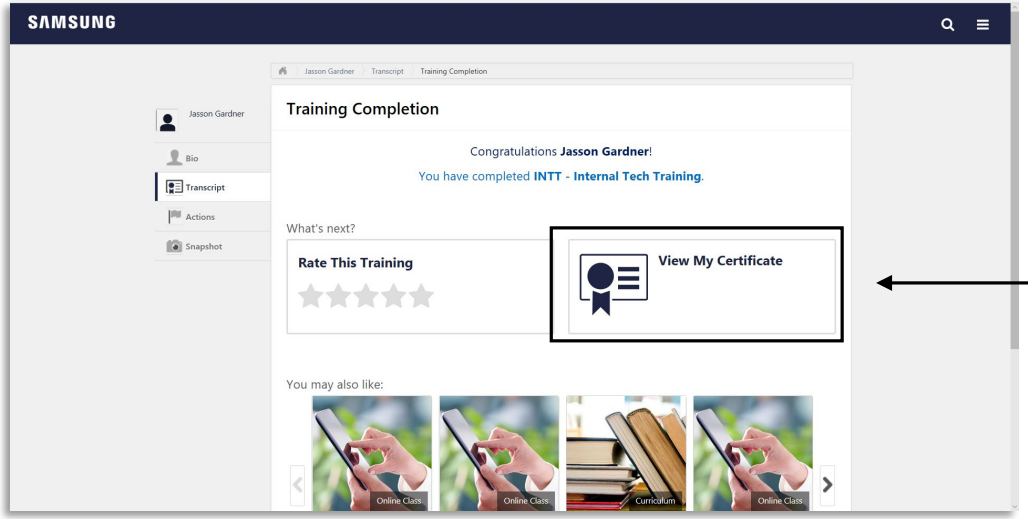
2. View/Print Completion Certificates

④ Click “View Completion Page”.

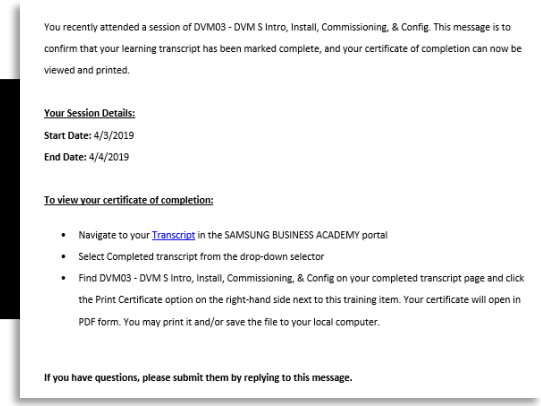


⑤ Click “View My Certificate”.



⑥ Select “Print” or “Save” option(s).

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



You recently attended a session of DVM03 - DVM S Intro, Install, Commissioning, & Config. This message is to confirm that your learning transcript has been marked complete, and your certificate of completion can now be viewed and printed.

Your Session Details:

Start Date: 4/3/2019

End Date: 4/4/2019

To view your certificate of completion:

- Navigate to your Transcript in the SAMSUNG BUSINESS ACADEMY portal
- Select Completed transcript from the drop-down selector
- Find DVM03 - DVM S Intro, Install, Commissioning, & Config on your completed transcript page and click the Print Certificate option on the right-hand side next to this training item. Your certificate will open in PDF form. You may print it and/or save the file to your local computer.

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

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3. Register for Future Training

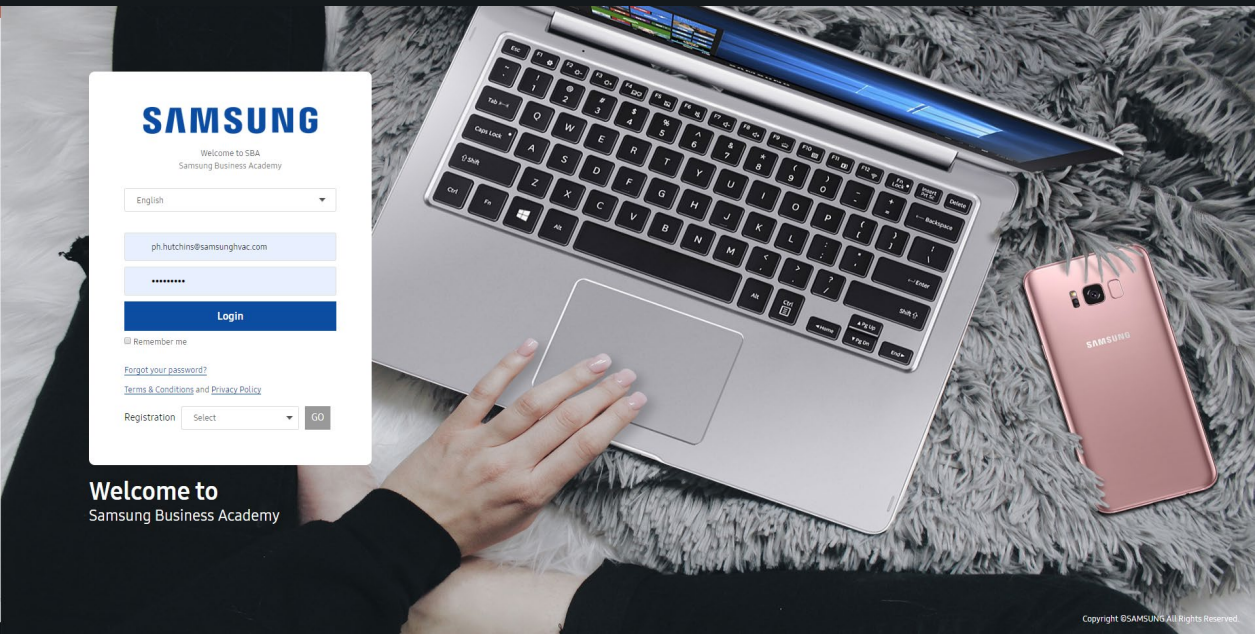
① Go to www. https://samsunghvac.com/our_training.php

② Click: SBA Samsung Business Academy Login

③ Samsung Business Academy (SBA) displays.

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

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



Instructor - Led Training

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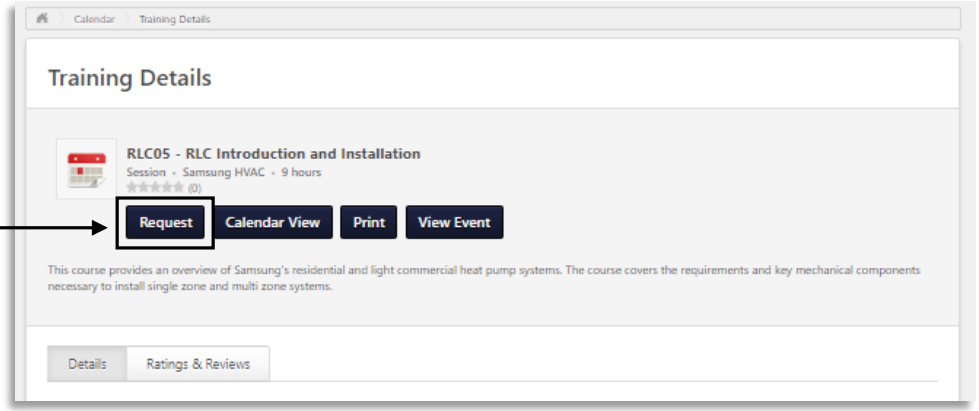
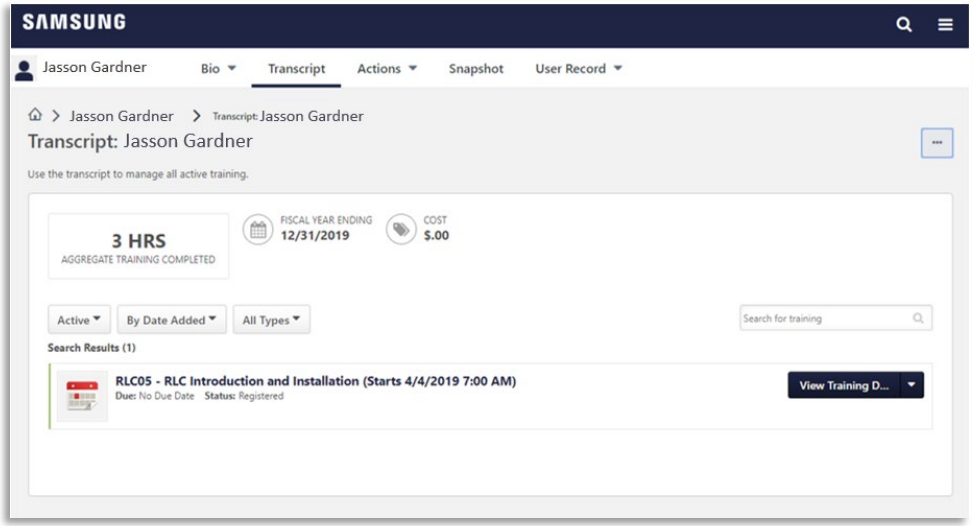
3. Register for Future Training

④ Click “Request”.



Registration status screen displays.



⑤ Confirmation email will be sent.

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

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

Session Details:

4/17 RLC06 - Roanoke, TX

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

Training Hours: 8 Hours 0 Min

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

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

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

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

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

2018 Corporate Bulletin 2018-0004 Training Materials.PDF

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

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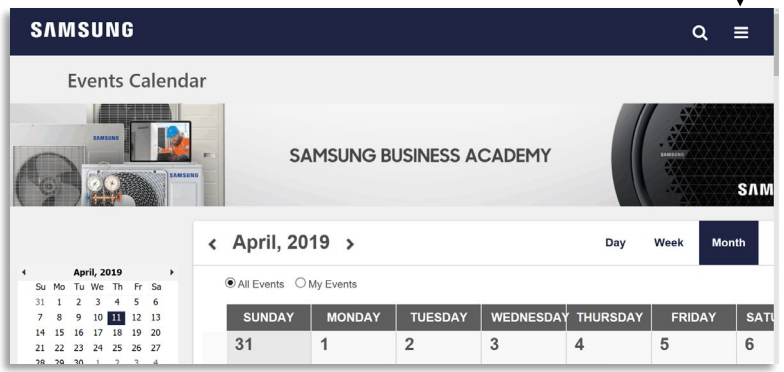
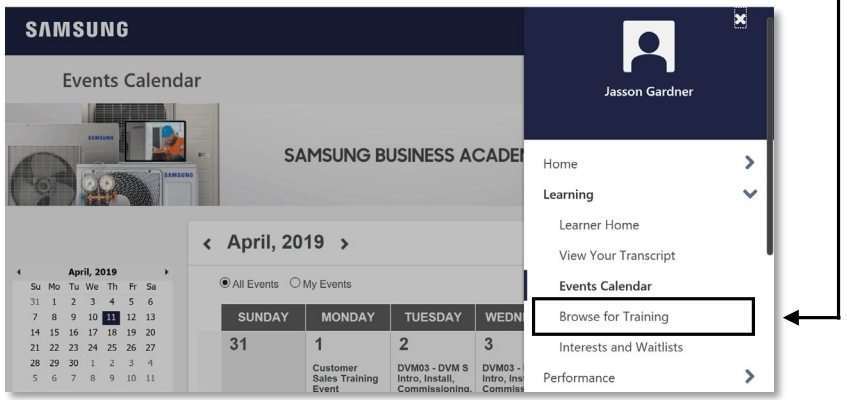
3. Register for Future Training

On - Demand Training

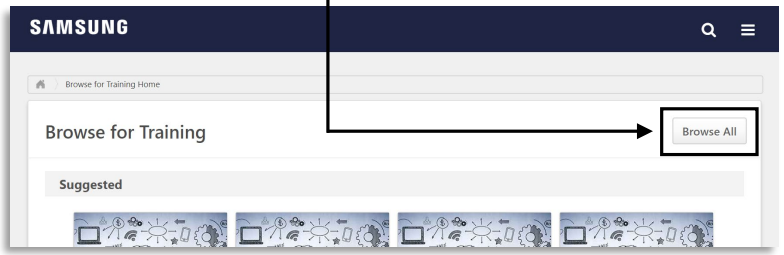
① Open Menu. ( )



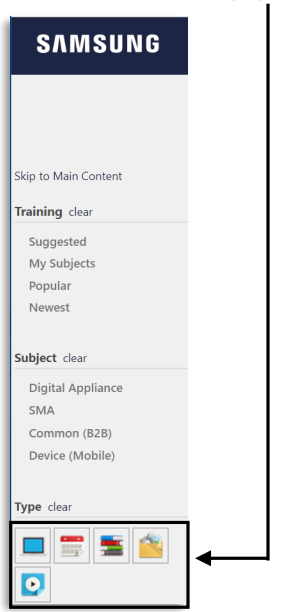
② Click “Browse for Training”.



③ Click “Browse All”.

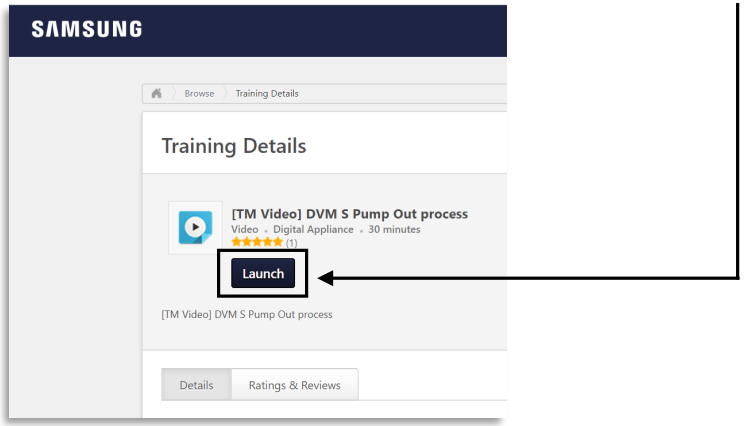


④ Click “Type”*.



*Online, Video and Materials.

⑤ Select course and click “Launch”.



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Thank You for setting up your account in class!

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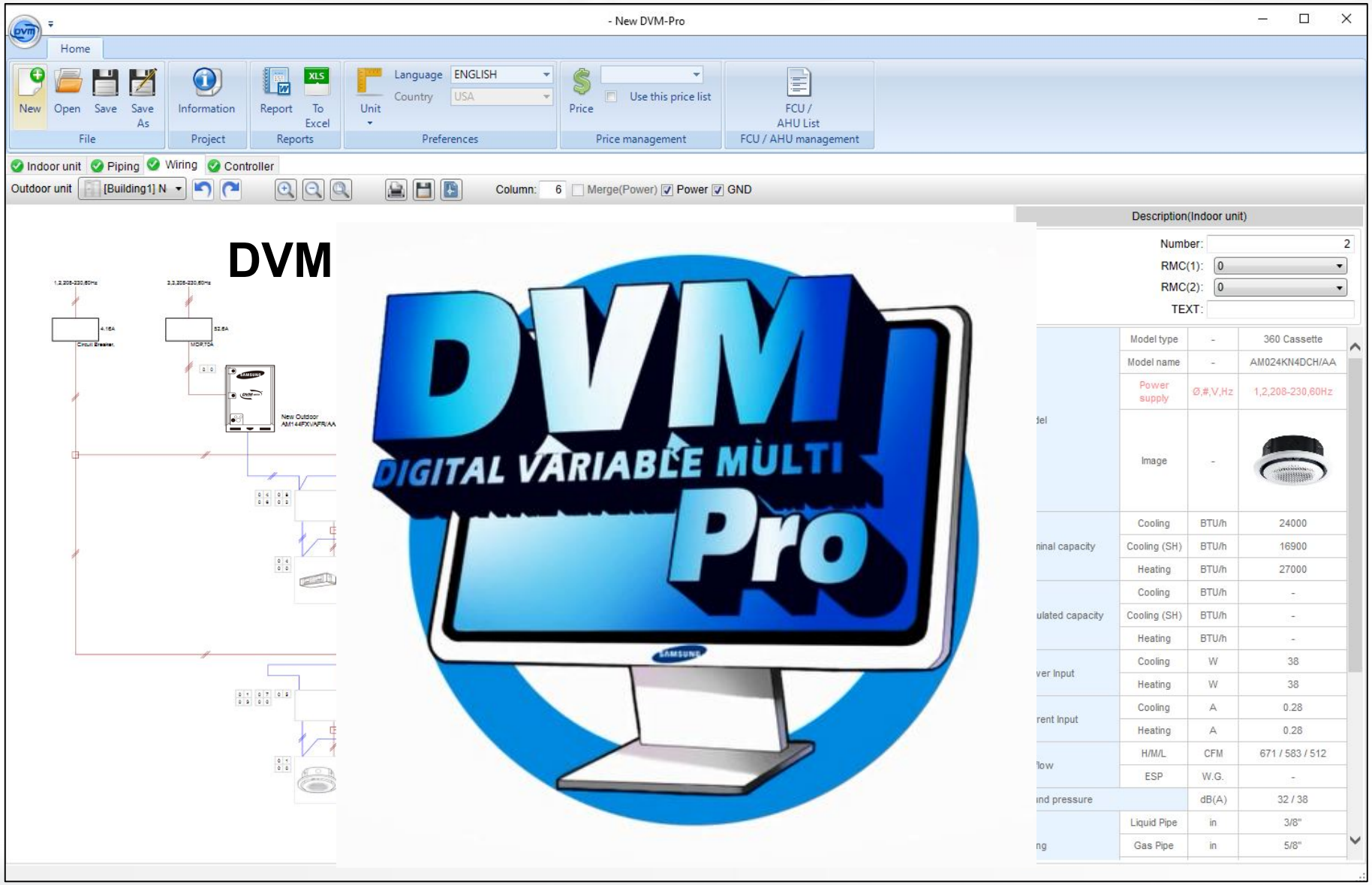
SAMSUNG DVM S Water

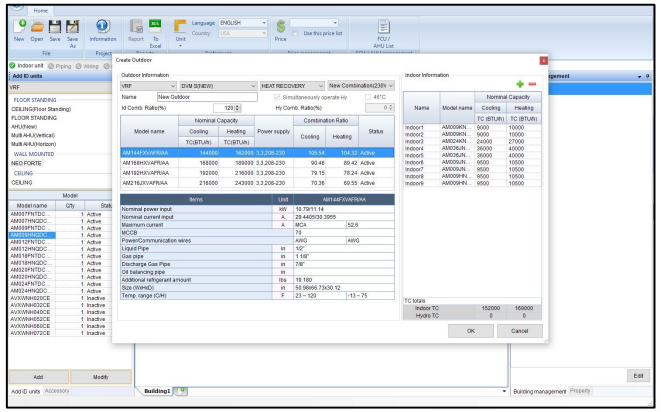
Introduction

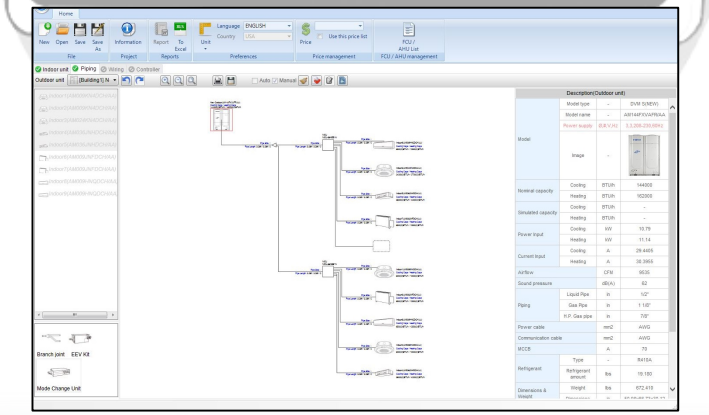
DVM S Water Introduction

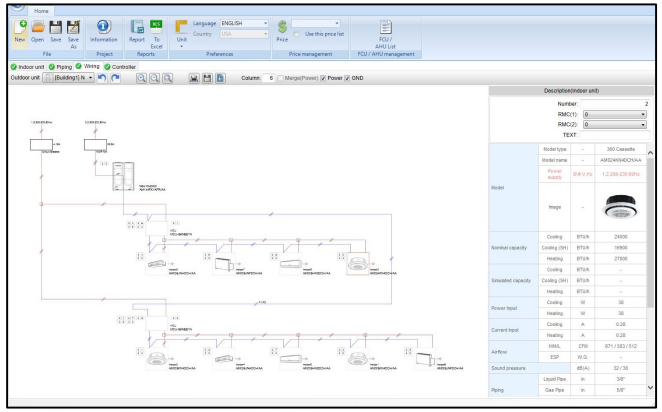


DVM Pro Design Software

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





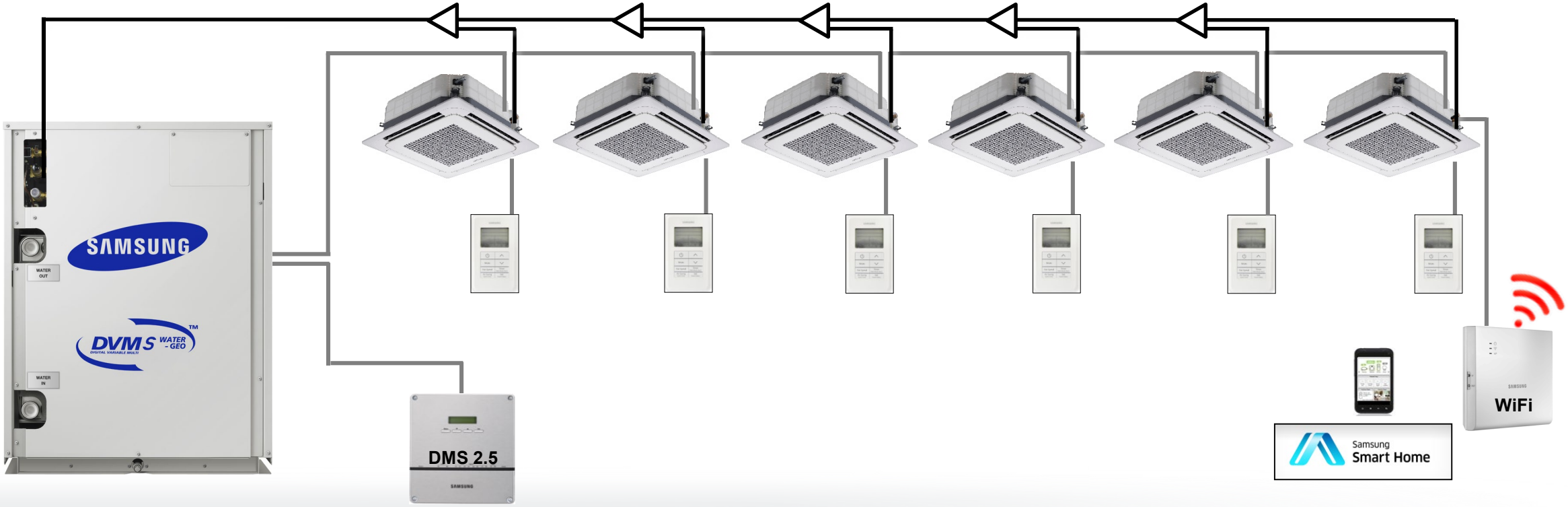


DVM S Water Introduction

- ***DVM S*** Water cooled VRF systems can be applied to residential and commercial projects comprised of 1 to 3 condenser unit modules connected to multiple indoor units on a single refrigerant network up to 984 ft.

- ***DVM S*** Water systems are controlled by optional wired and wireless remote controllers including Samsung Smart Home WiFi and DMS centralized controls through a 2 conductor communication buss (16 AWG 2 conductor stranded with shield)

- ***DVM S*** Water systems are compatible with the full line of Samsung NASA protocol controls

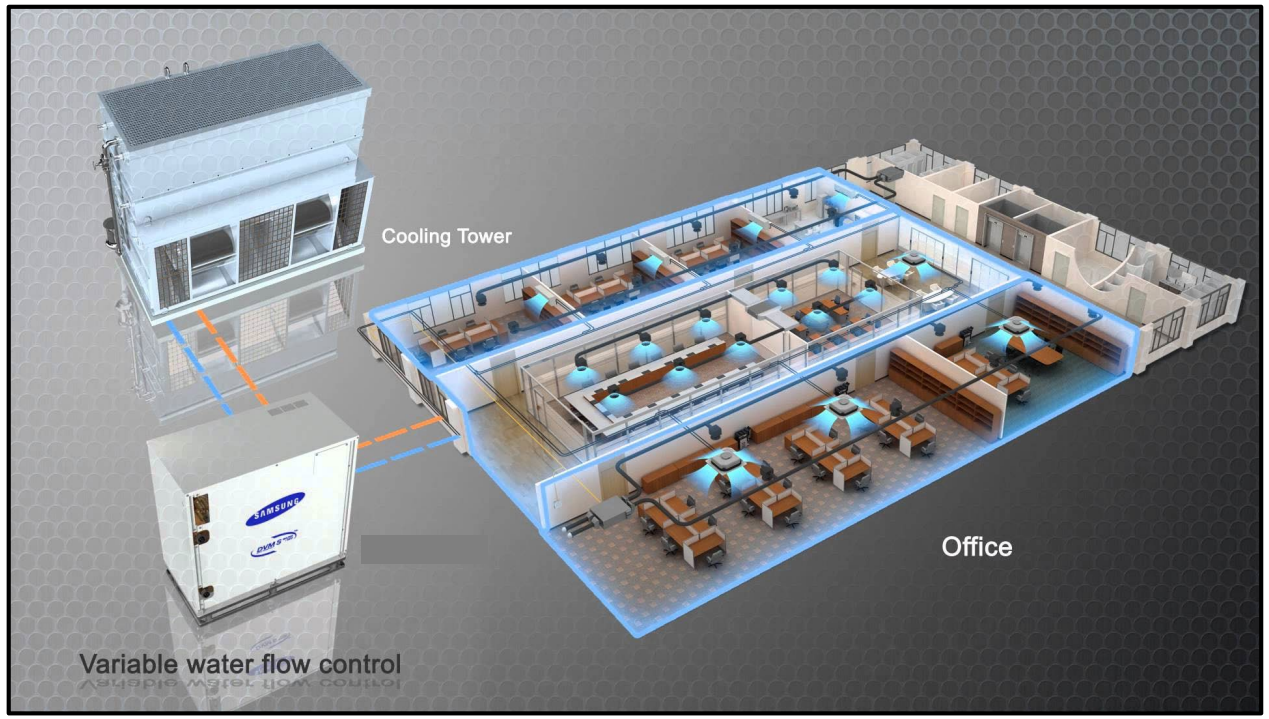


DVM S Water Introduction

System Concept

DVMS VRF Water systems

- 3, 4 & 4 ½ ton single phase models 208/230vac: AM0**KXWDCH
  - Heat pump only – Single condenser systems
  - Maximum 6 to 9 indoor units
- 6,8,10,16 & 20 ton 3 phase models
  - 208/230vac: AM***HXWA**F**R
  - 460vac: AM***HXWA**J**R
- 6 to 48 ton system configurations
  - Maximum 12 to 64 indoor units
- Field configured Heat Pump or Heat Recovery operation & Geothermal
- Closed loop condenser water circuit
- Samsung NASA protocol digital communications



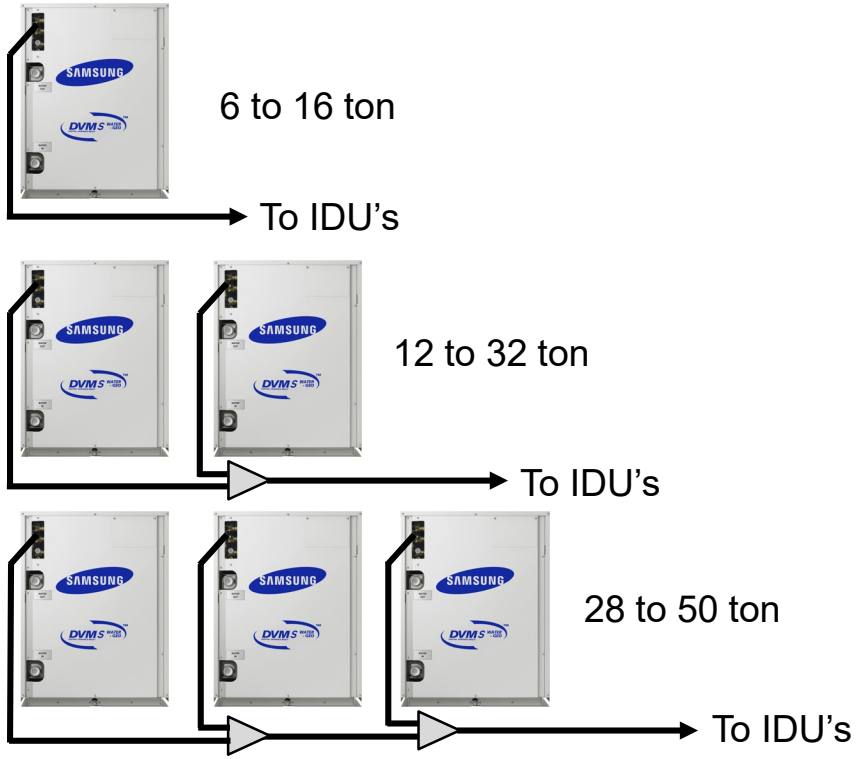
SAMSUNG HVAC

System Configurations

- The 3 phase condensers are available in 6,8,10 ton single compressor units – 16 & 20 ton dual compressor units
- The condensers can be manifolded together to provide additional system capacity up to 50 ton

6, 8, 10 ton

16&20 ton

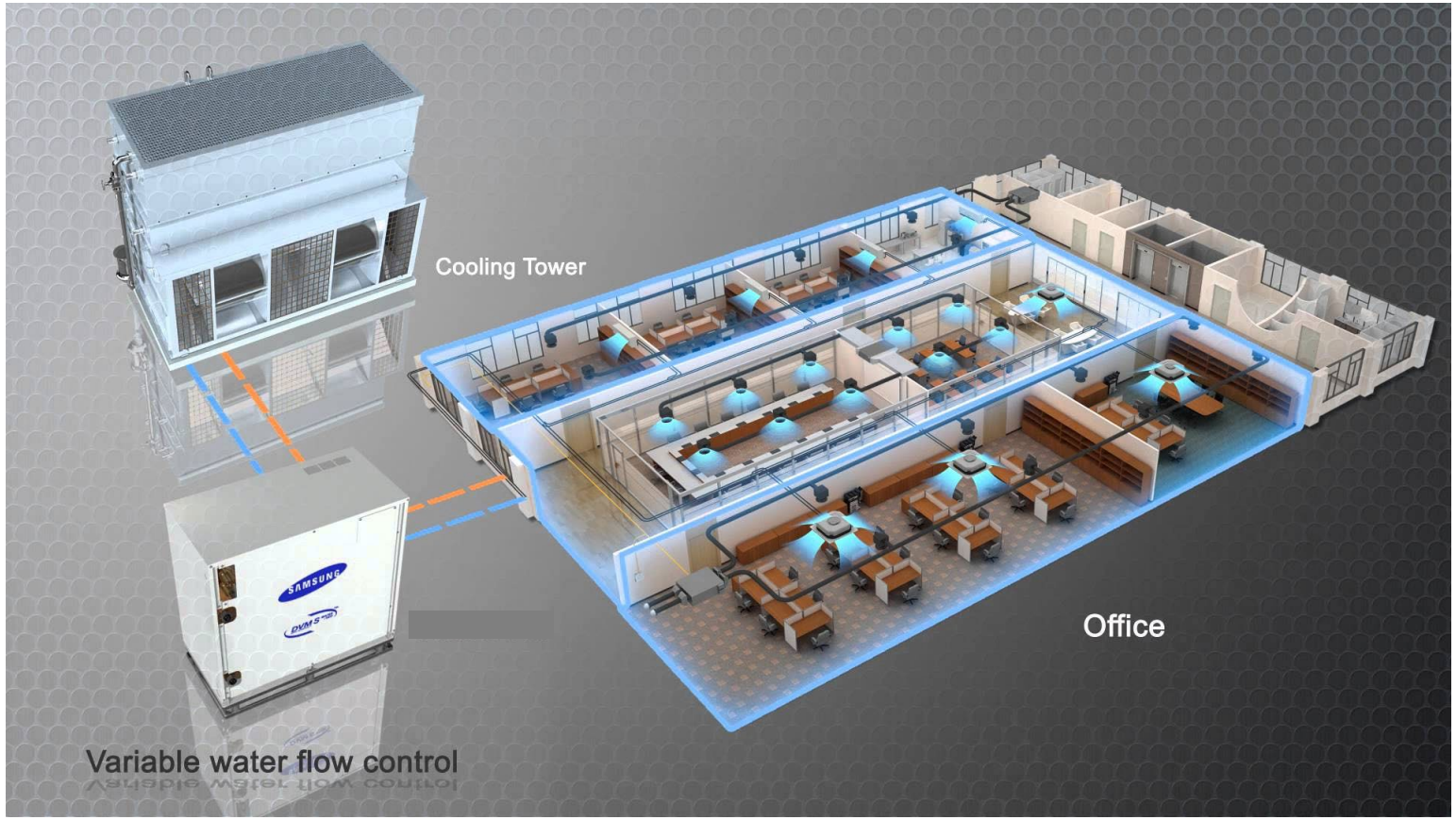


DVM S Water Introduction

System Types

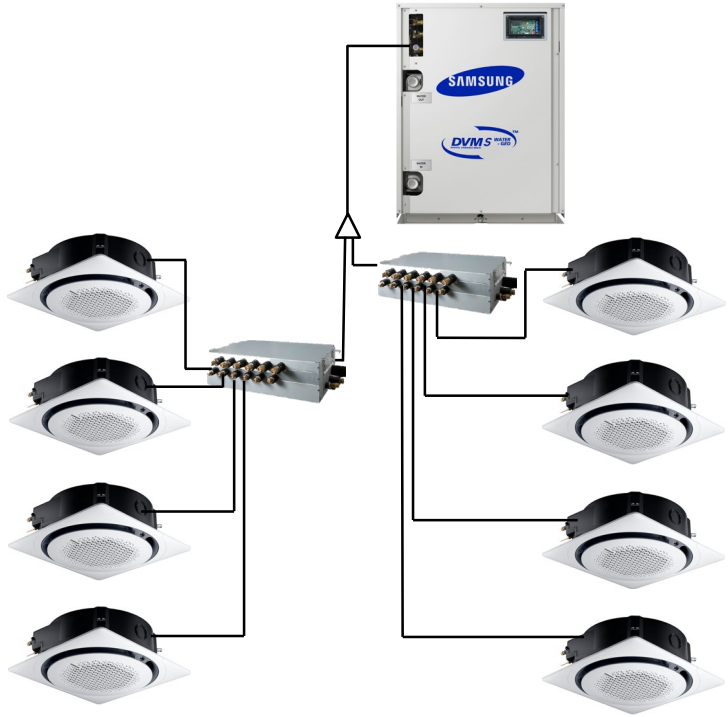
- The 3 phase condensers are shipped from the factory for Heat Pump operation
- The condensers can be easily field configured for Heat Recovery operation
  - Requires DIP switch or “K” tactile setting and HP valve set

“K” tactile = Momentary push button switch



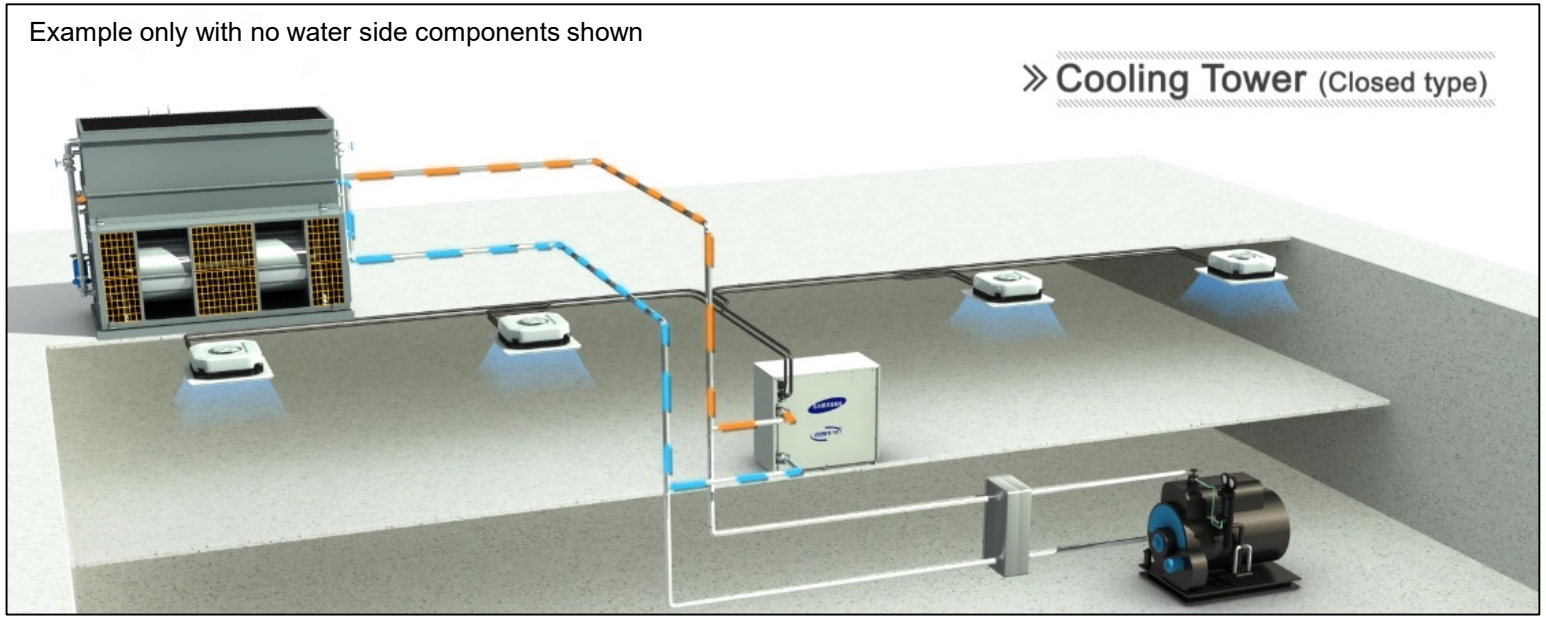
Main System Components – Refrigerant Side

- **Heat Recovery systems from 6 tons to 50 tons**
  - 3-Pipe refrigerant network
    - Liquid – Low pressure gas – Dual pressure gas
    - MCU – **M**ode **C**hange **U**nit



System Configurations

Condenser Water Circuit Applications

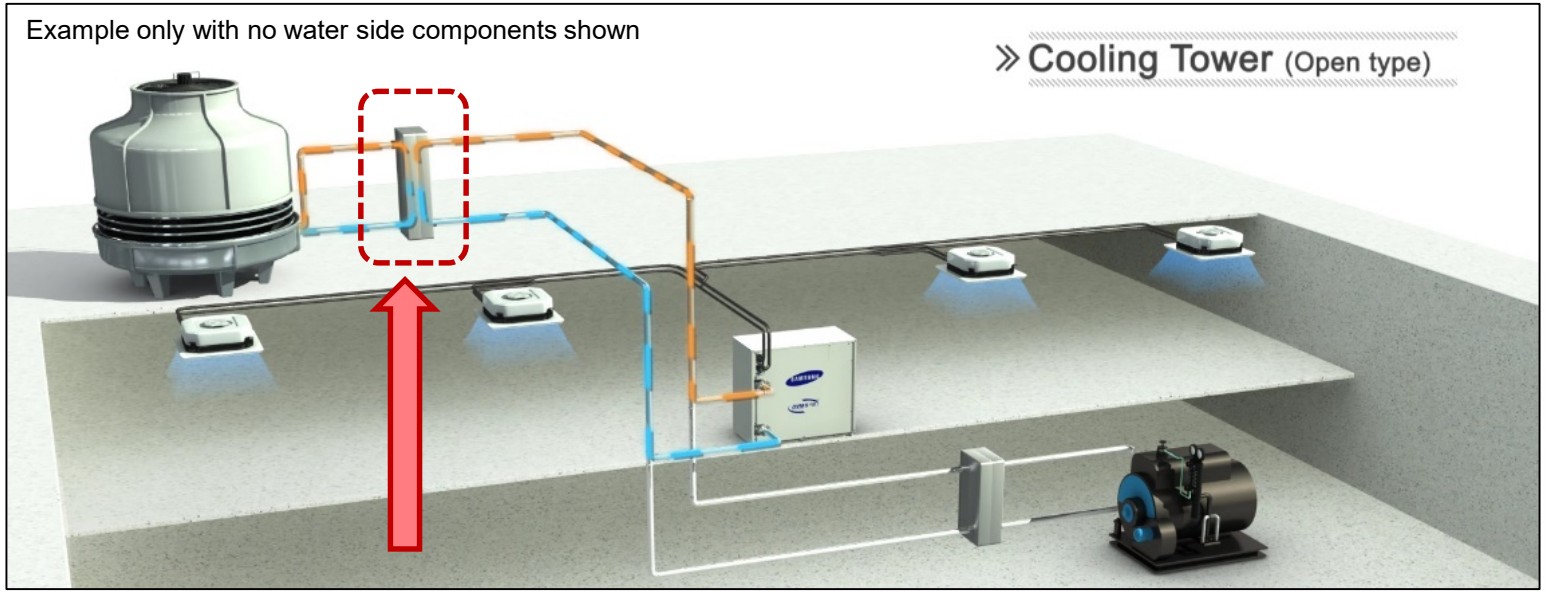


- Closed loop circulating water must have proper water treatment (Samsung specifications)
- Standard operating water temperature: 50°F to 113°F (without antifreeze)
  - Inlet water temperature below 50°F requires antifreeze
  - Lowest inlet water temperature: 14°F (requires antifreeze rated below 5°F)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

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

System Configurations

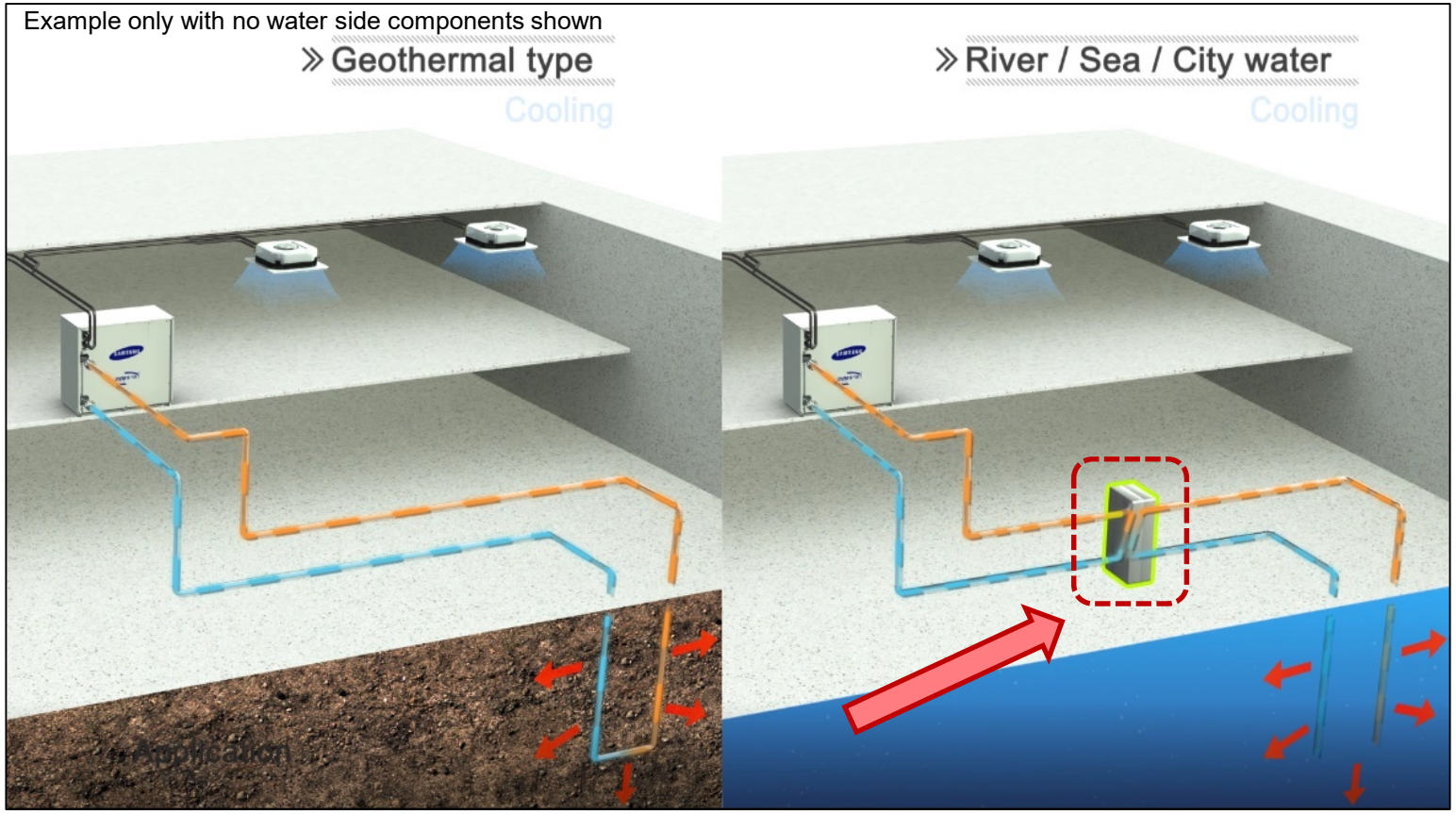
Condenser Water Circuit Applications



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

System Configurations

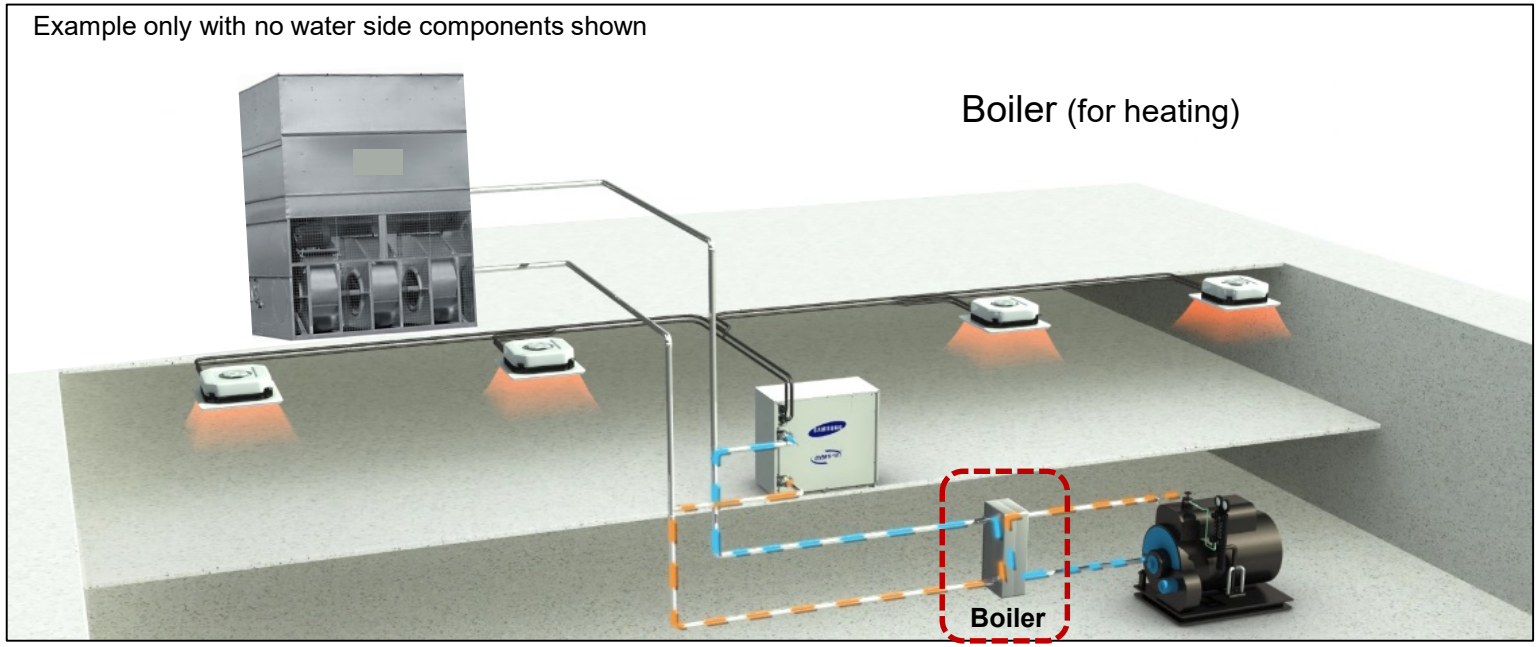
Condenser Water Circuit Applications



When using any open type condenser water loop, an intermediate heat exchanger must be used

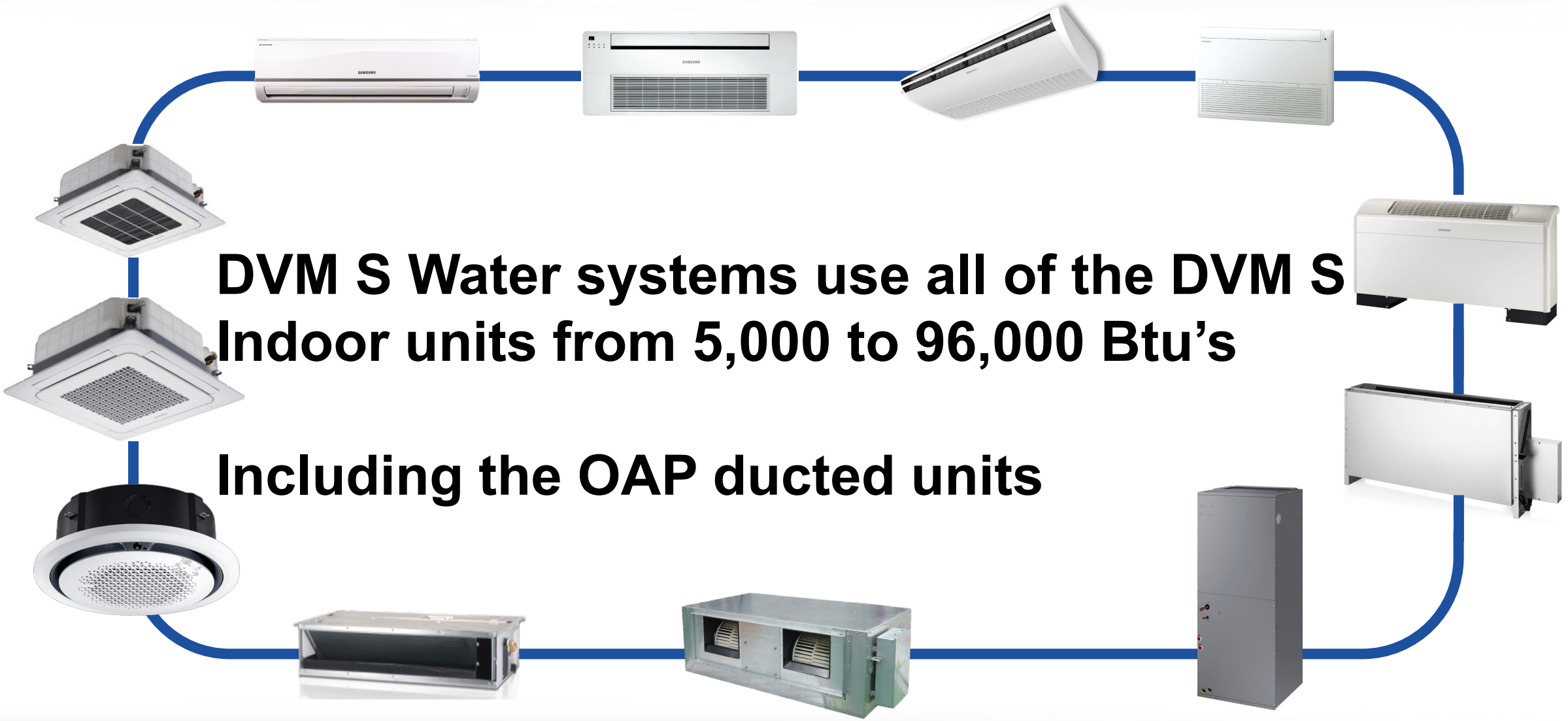
System Configurations

Condenser Water Circuit Applications



Boiler is used to temper water loop temperature in heating operation

DVM S Water Introduction



DVM S Water systems use all of the DVM S Indoor units from 5,000 to 96,000 Btu's

Including the OAP ducted units

SAMSUNG DVM S Water

System Components

System Components

System Components – Condenser

Single Phase Condensers – 208/230vac

- Models: AM0**38**,**48**&**55**KXWDCH
- Heat Pump operation only
  - 2-pipe refrigerant network
- Single module system
- Single inverter BLDC rotary compressor
  - **B**rush**L**ess **D**igitally **C**ommutated
- Capacity connection ratio: 50% - 130%
- Plate Heat Exchanger
- Requires closed loop water circulation
- Optimum closed loop water temperature range: 68°F to 95°F
  - Closed loop water temperature range: 50°F to 113°F
  - Selectable heat operation inlet water temperature: 14°F and 23°F (requires antifreeze)
- Requires water inlet strainer & flow switch (field supplied)

Model	AM038	AM048	AM055
Standard GPM	10.5	13	16
GPM Range	6 ~ 13	8 ~ 16	9.5 ~ 19

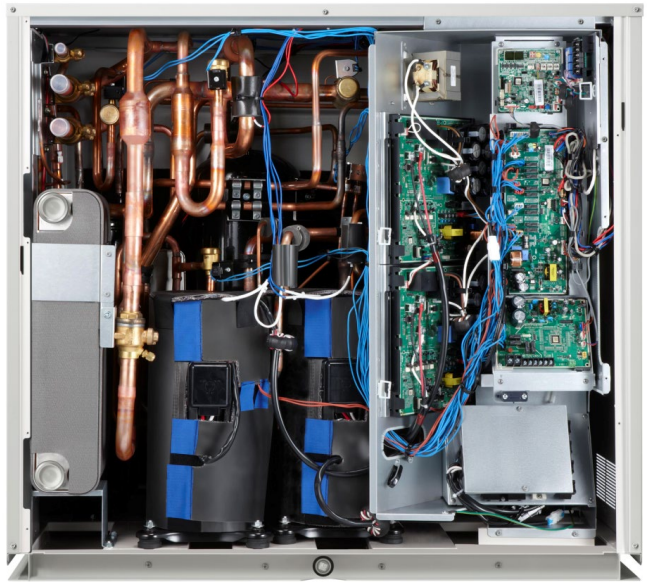
Closed loop water flow rate

System Components – Condenser

3 Phase Condensers – 208/230vac & 460vac

- Models: AM**072**,**096,120,192 & 240** HXWAF(J)R
- Heat Pump operation (factory default)
  - 2-pipe refrigerant network
- Field configured Heat Recovery operation
  - 3-pipe refrigerant network including MCU's
- 1,2 & 3 module systems 6 to 50 ton capacity
- Vapor Injected inverter scroll compressors
- Capacity connection ratio: 50% - 130%
- Plate Heat Exchanger
- Requires closed loop water circulation
- Optimum closed loop water temperature range: 68°F to 95°F
  - Closed loop water temperature range: 50°F to 113°F
  - Selectable heat operation water inlet temperature: 14°F and 23°F (requires antifreeze)
- Requires water inlet strainer & flow switch (field supplied)

72,96 &120



192&240

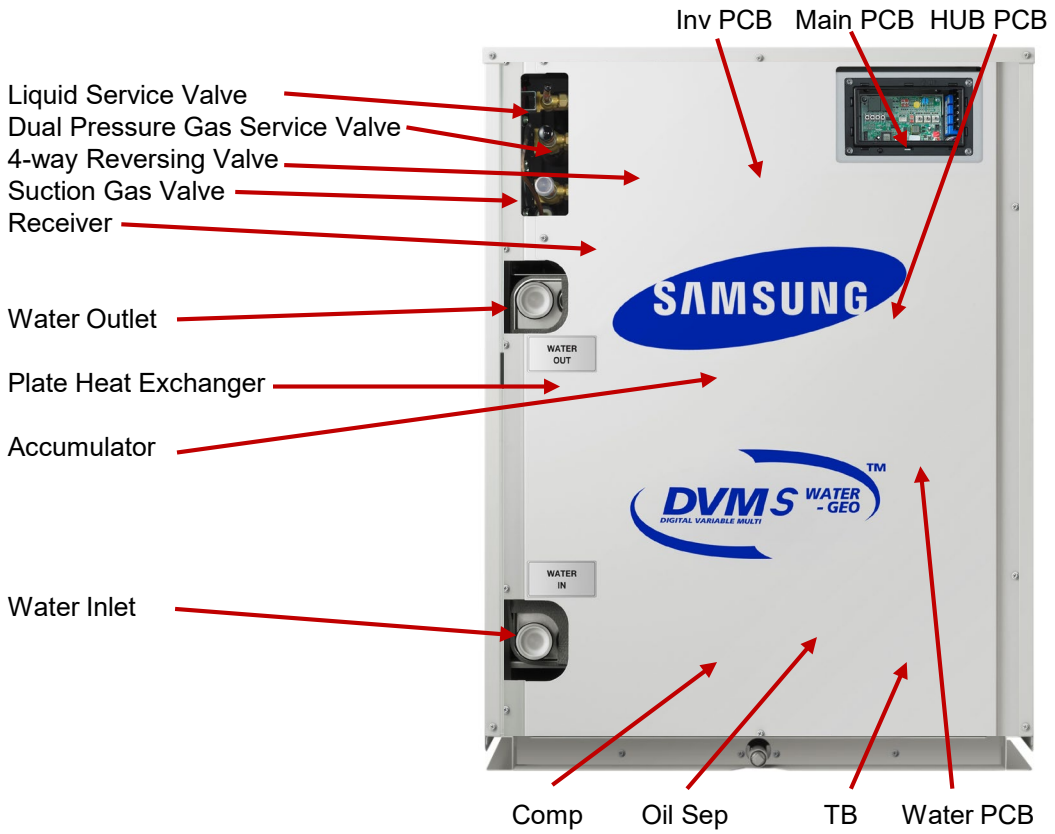
Model	AM072	AM096	AM120	AM192	AM240
Standard GPM	21	25	30	50	60
GPM Range	13~25	15~30	18~36	30~60	36~72

Closed loop water flow rate

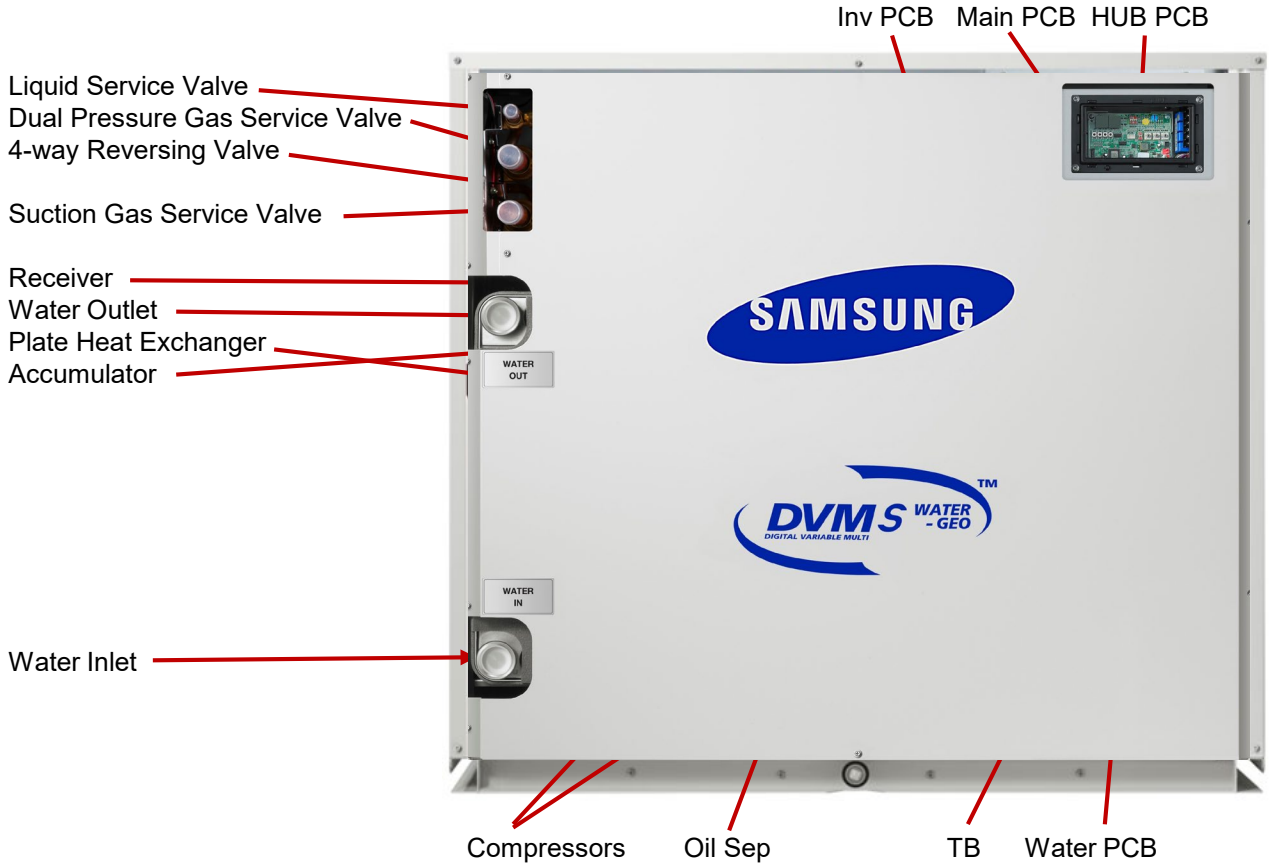
SAMSUNG HVAC

System Components – Condenser

3 Phase Condensers – Component Layout



6, 8 & 10 Ton



16 & 20 Ton

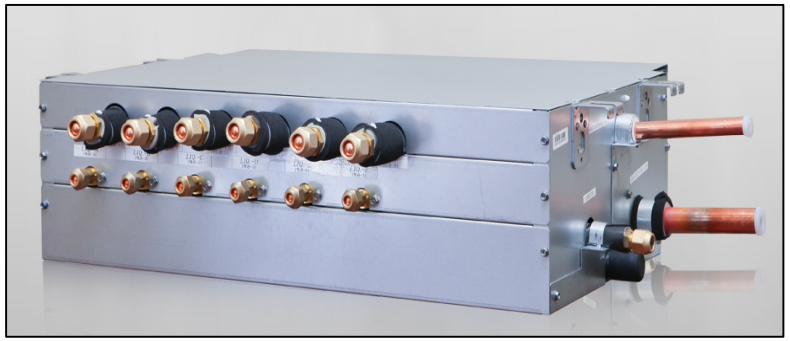
System Components

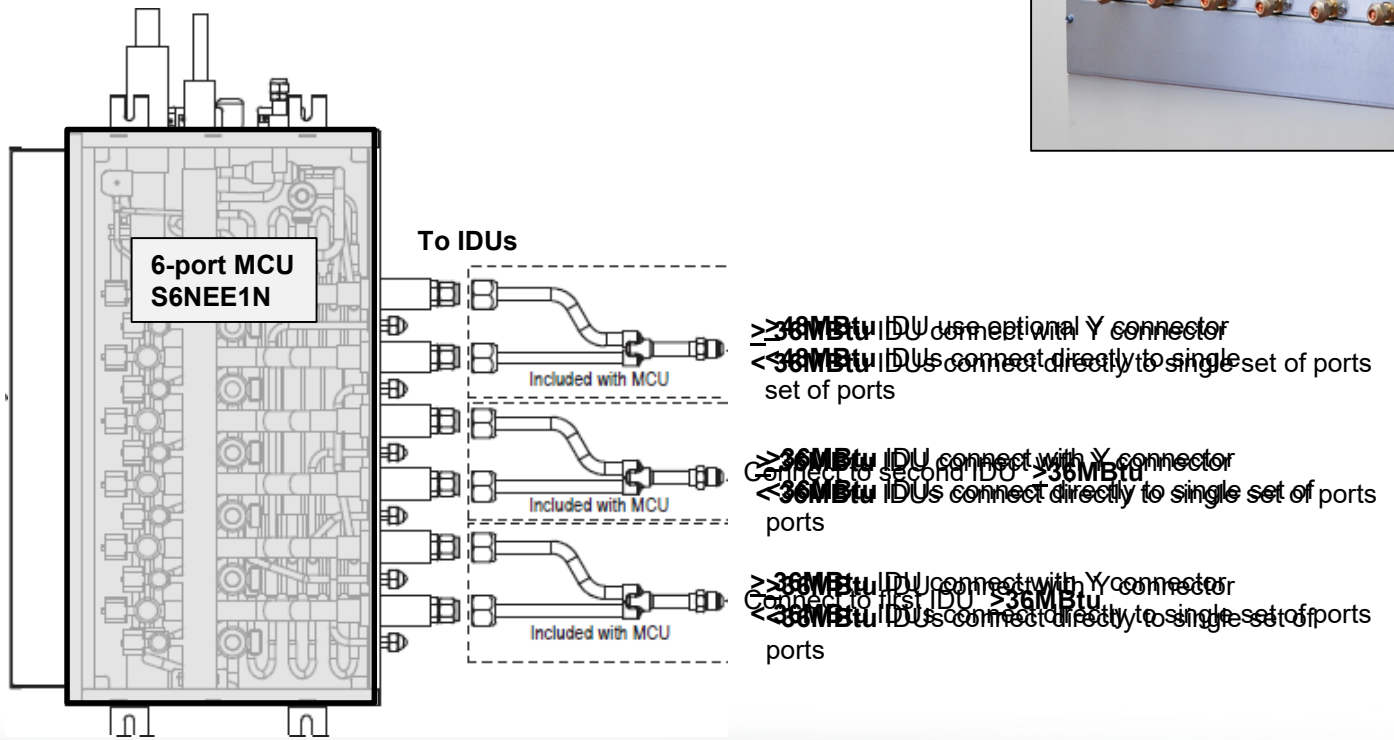
System Components – Mode Change Unit
Pre 2017 Models

Heat Recovery – MCU **Mode Change Unit** (S*NEE models)

- 2,4&6 port models for simultaneous heat and cool operation

Example: 6-port MCU

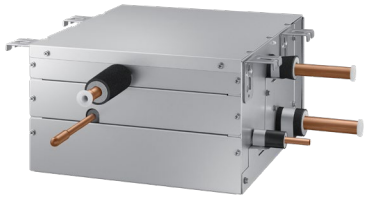




System Components – Mode Change Unit
New for 2017

Heat Recovery – MCU Mode Change Unit (Current S*NEK models)

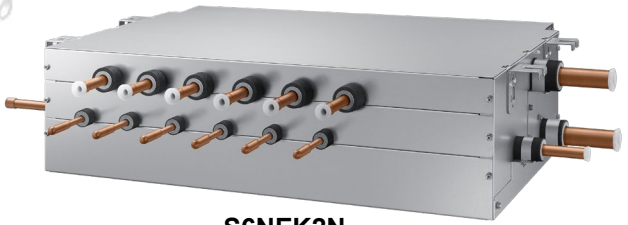
- 1,2,4&6 port models (max. 8 units per port)
- Brazed pipe connections
- Main 3-pipe connection on both sides of unit for MCU series installation (Excl. S1NEK single port MCU)
- No condensate drain
- Auto addressing



S1NEK1N

S2NEK2N

S4NEK3N



S6NEK2N

System Components – EEV Kit

- Under Ceiling EEV Kits in 1, 2 & 3 zone models available
- EEV Kits are powered (208/230vac) and controlled from indoor unit PCB

MEV-E32SA
Single zone

MXD-E32K200A
2 zones

Heat Pump systems only

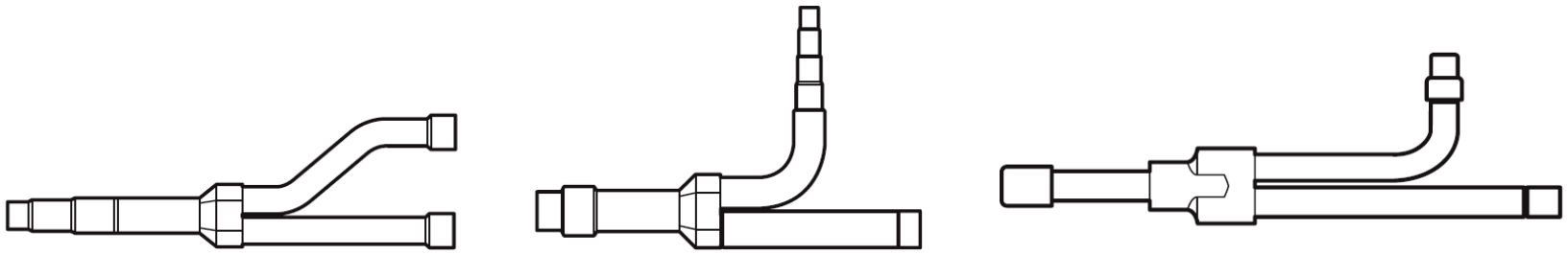
MXD-E32K300A
3 zones

Heat Pump systems only

System Components – Refrigerant Side

3 phase condenser refrigerant “Tee” fittings MXJ-TA****M

- Modular systems – 2 or 3 condensers 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

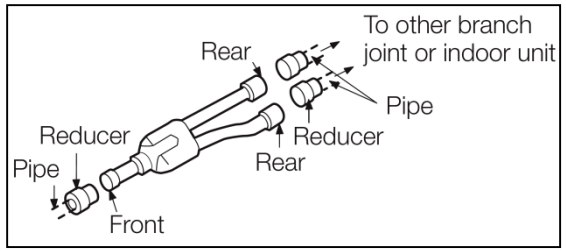


Liquid **Gas** **HR Gas**

NOTE: Identification examples only

SAMSUNG HVAC

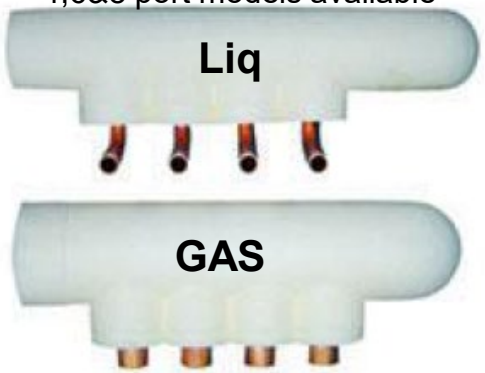
System Components – Refrigerant Side



Branch Fittings - Condenser to indoor units

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

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



Example: 4-port header kit

Heat Pump Y-joint kit

Heat Recovery Applications

System Components

Recommended System Components – Refrigerant Side

Isolation Valves (Field supplied)

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

General Specifications

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

System Components

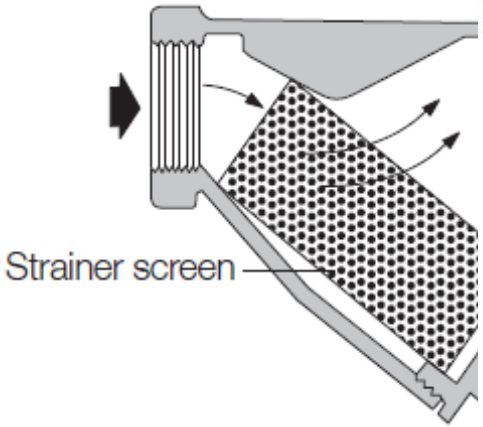
Water Side System Components – Field Supplied

Closed loop flow switch – Mandatory

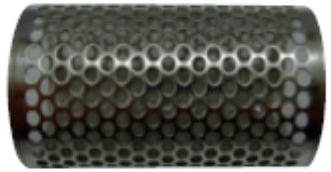
- Prove water flow through the closed loop and plate heat exchanger
  - **Flow switch must be carefully installed according to manufacturer's installation instructions**

Closed loop inlet strainer 50 Mesh – Man

- Required to filter the water entering the plate h



Preferred

Type	Punching Type	Mixed Type
		
ire	Punching in plate	Wire Type(inner) + Punching Type(outer)
Filtration area : large Stiffness : bad	Filtration area : small Stiffness : good	Filtration area : large Stiffness : good
△	△	O

System Components

Recommended System Components – Field Supplied

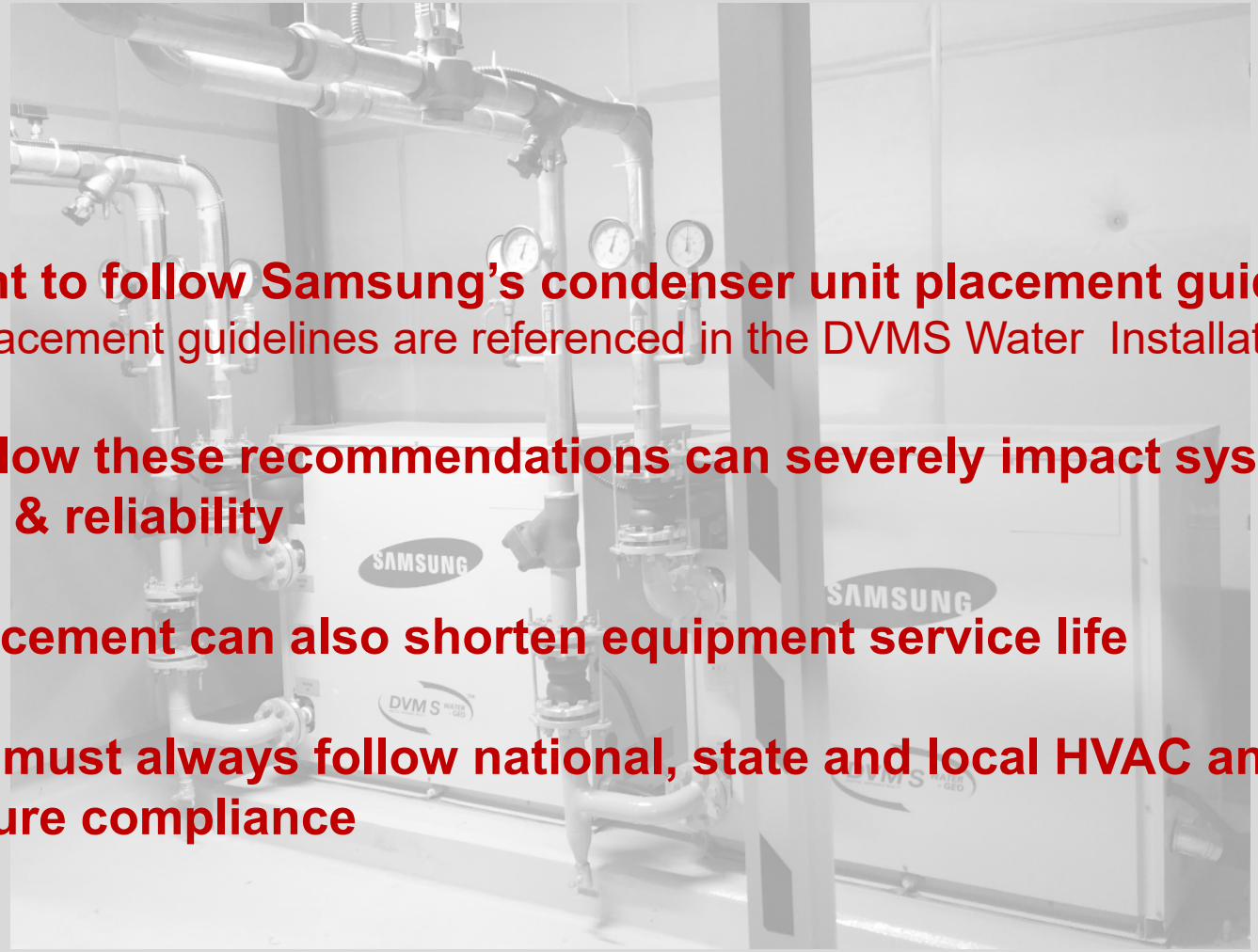
Recommended water side components

- 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

SAMSUNG DVM S Water

Condenser Basic Installation

Condenser Basic Installation



- **It is important to follow Samsung's condenser unit placement guidelines**
  - Specific placement guidelines are referenced in the DVMS Water 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**

Condenser Basic Installation

Condenser Placement Guidelines

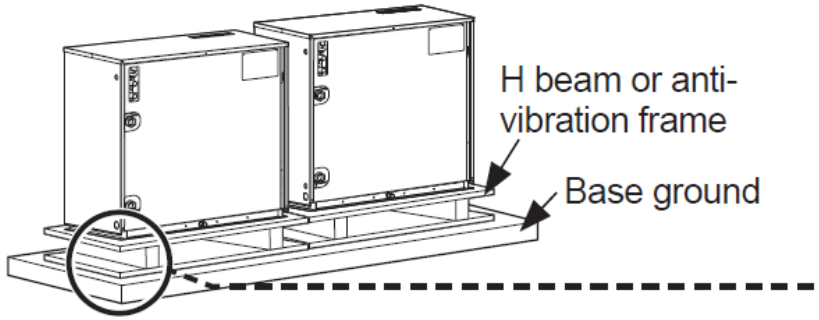
- DVMS Water condensers must be installed indoors only
  - Ambient temperature range: 33°F - 104°F <80% RH
  - Installation area must be ventilated
  - Condensers must be installed on a solid level surface
  - Minimum of 24 inch service clearance required in front of unit
- Multiple condensers may be installed in a stacked configuration
  - Maintain proper clearances for ventilation and service access
- Refrigerant piping can be installed low level or above condensers

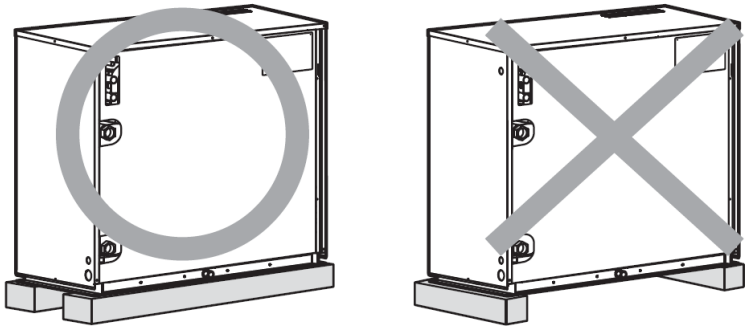
Condenser Basic Installation

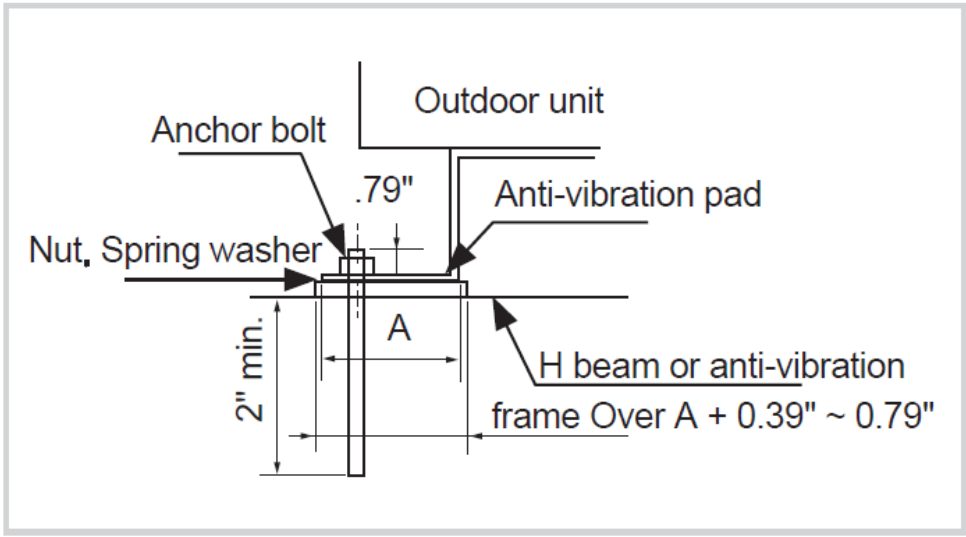
Condenser Placement Guidelines

- Condenser(s) must be properly supported

Solid level base





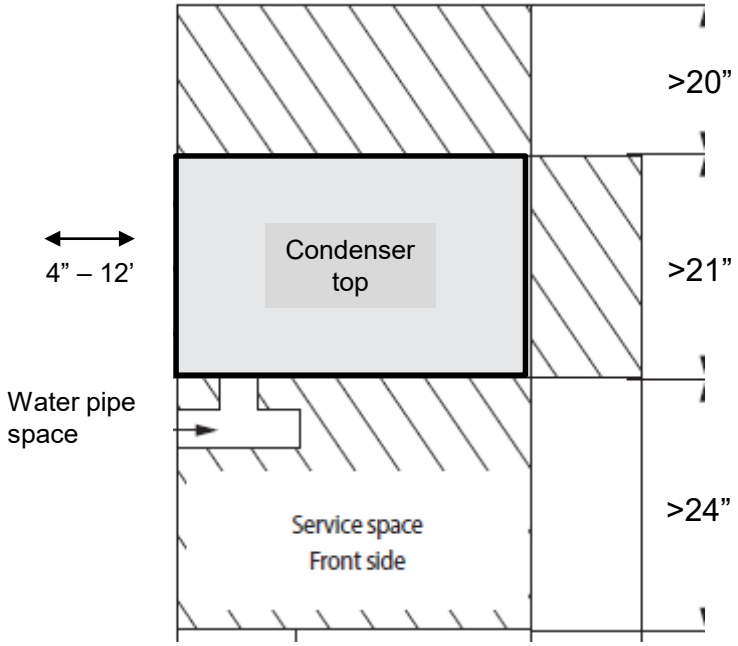


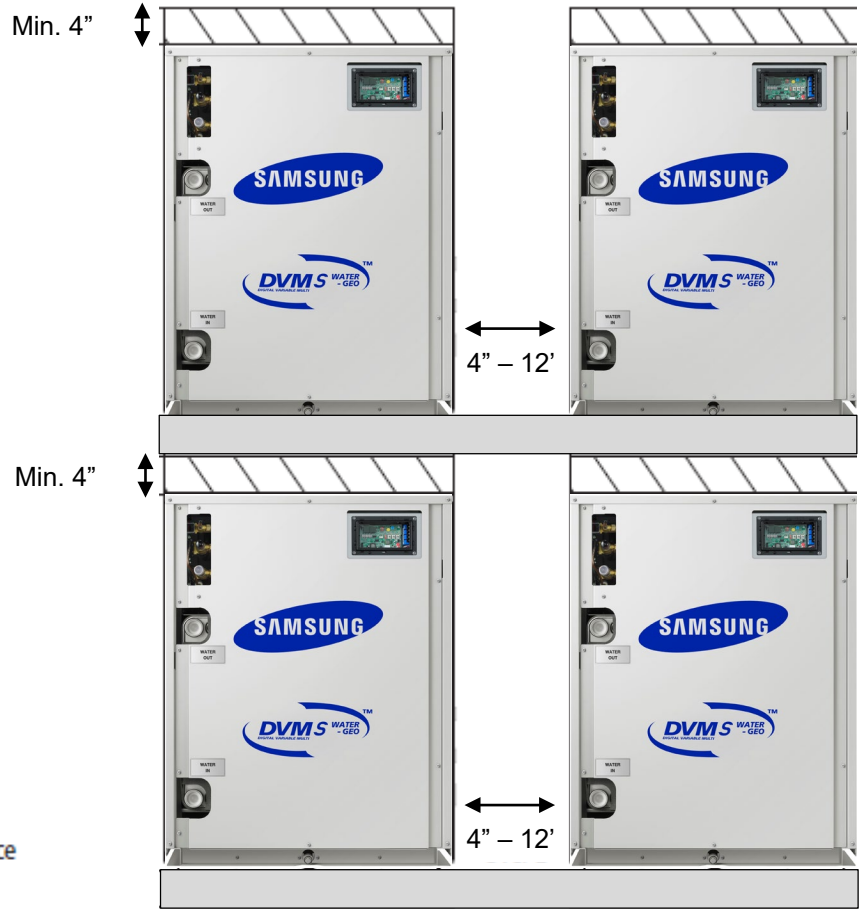
Condenser basic Installation

Condenser Placement Guidelines

Clearances

- Maintain clearances for ventilation, servicing and water piping
  - Water piping must not block front service panel





NOTE: Refer to the DVMS Water Installation Manual for model specific clearance requirements

Condenser basic Installation

Condenser Condensate Drain

Condenser base pans have a condensate drain fitting to direct condensate removal during unit operation

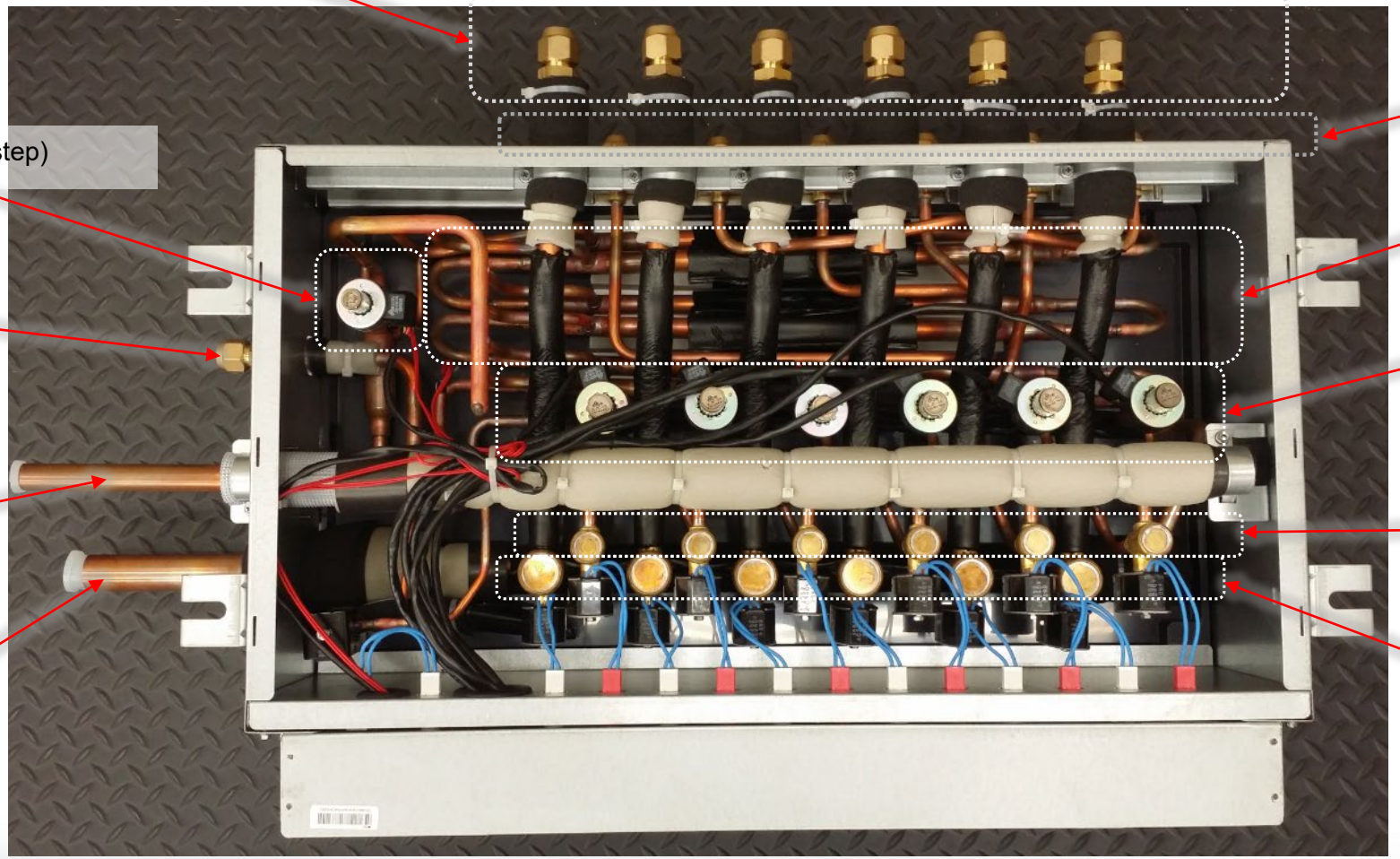
Drain piping does not require a trap

SAMSUNG DVM S Water

MCU Basic Installation

System Components

Mode Change Unit Layout – S*NEE Models Pre 2017

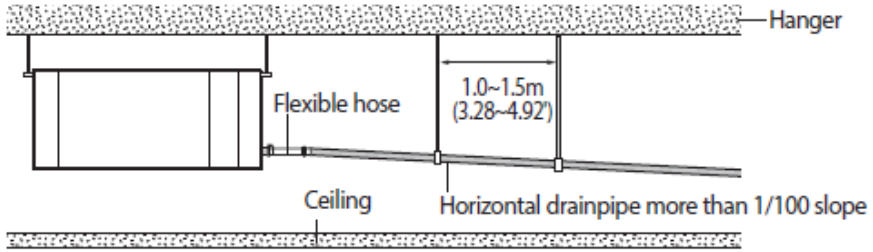


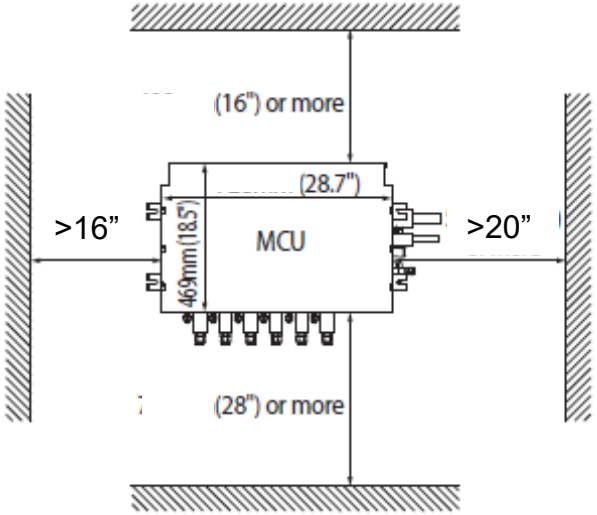
MCU Basic Installation

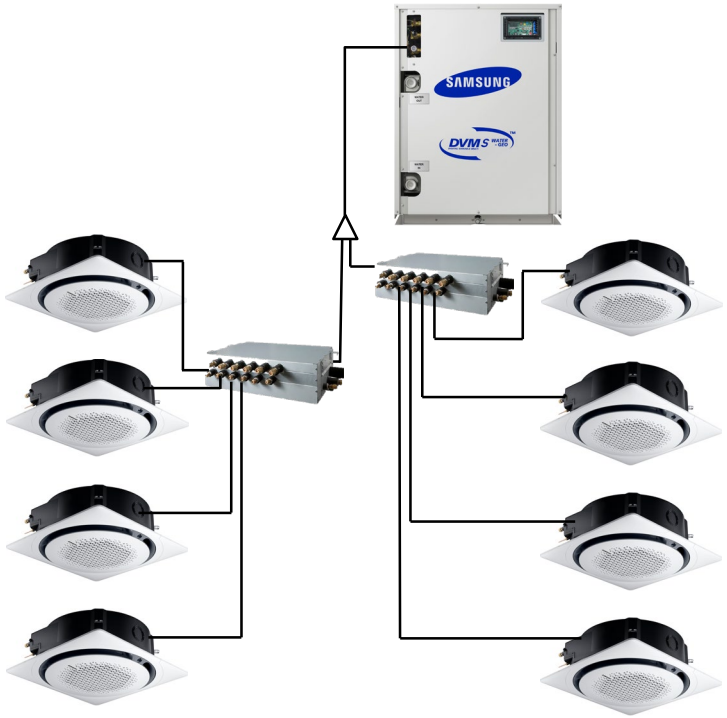
MCU Basic Installation Guidelines – S*NEE Models

MCU Placement Guidelines

- MCU's should be installed over hallways
  - Avoid placement over occupant areas sensitive to noise
  - Maintain proper clearances to insure service access
  - MCU requires condensate removal





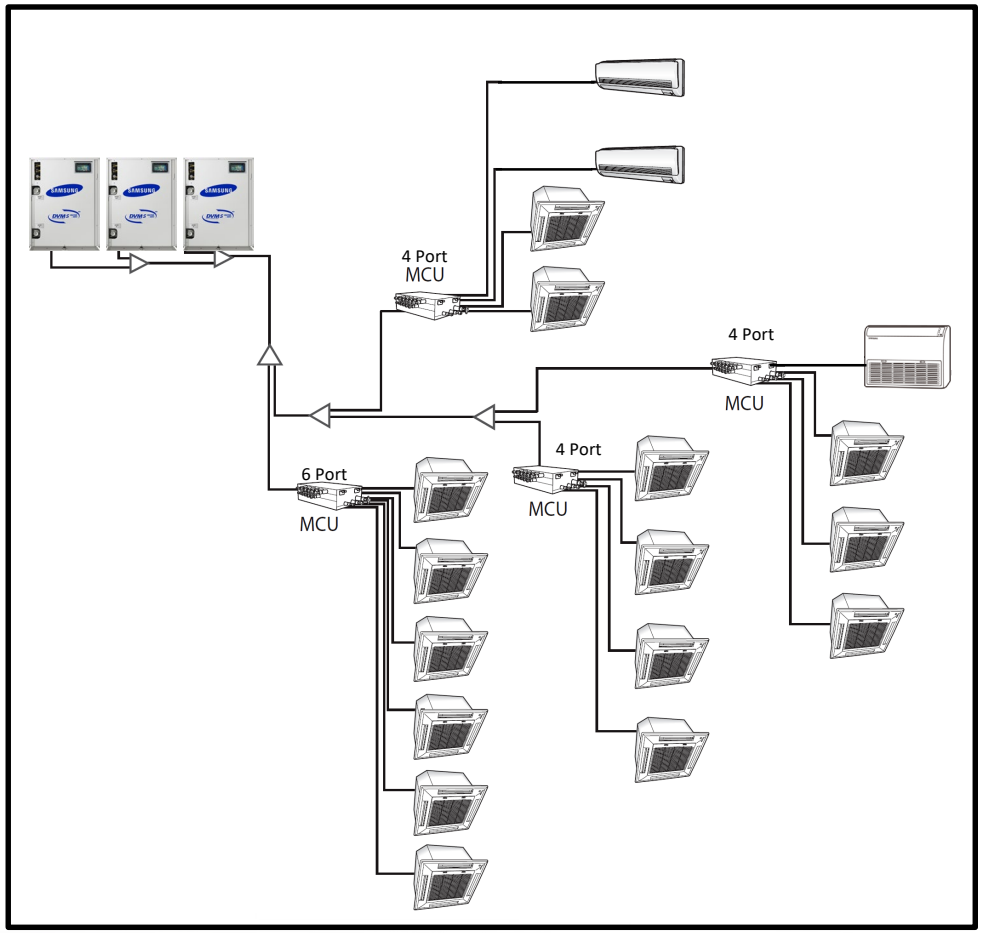


MCU Basic Installation

MCU Basic Installation Guidelines – S*NEE Models

Y-joint Branch-off fittings and MCU piping layout - HR

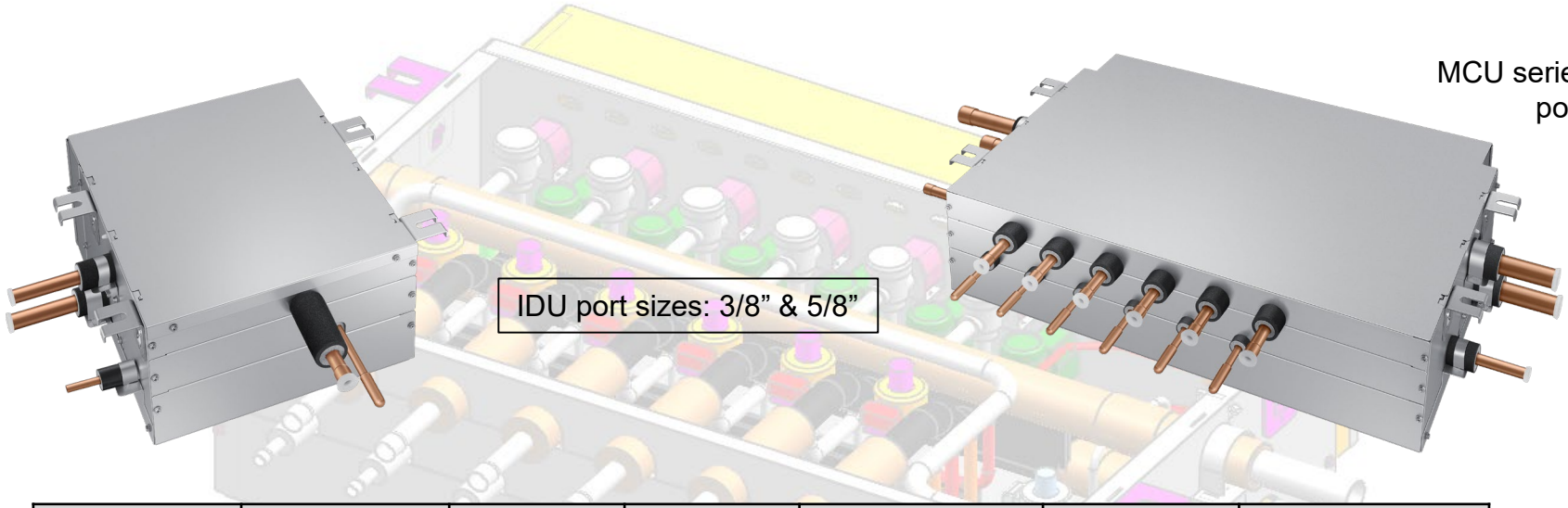
- Y-joints are only installed before MCU's on the refrigerant network
- MCU's are multiport eliminating additional Y-joints
- Y-joints are never installed after the MCU ports



MCU Basic Installation

MCU Basic Installation Guidelines – New S*NEK Models

MCU single connection only



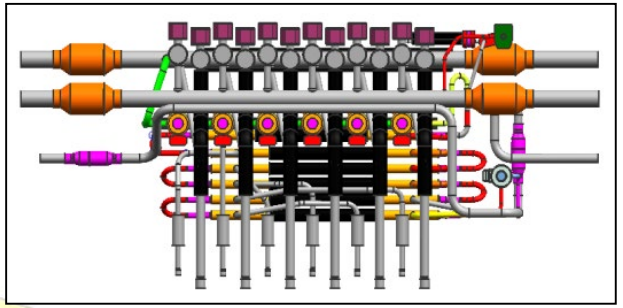
MCU series connection possible

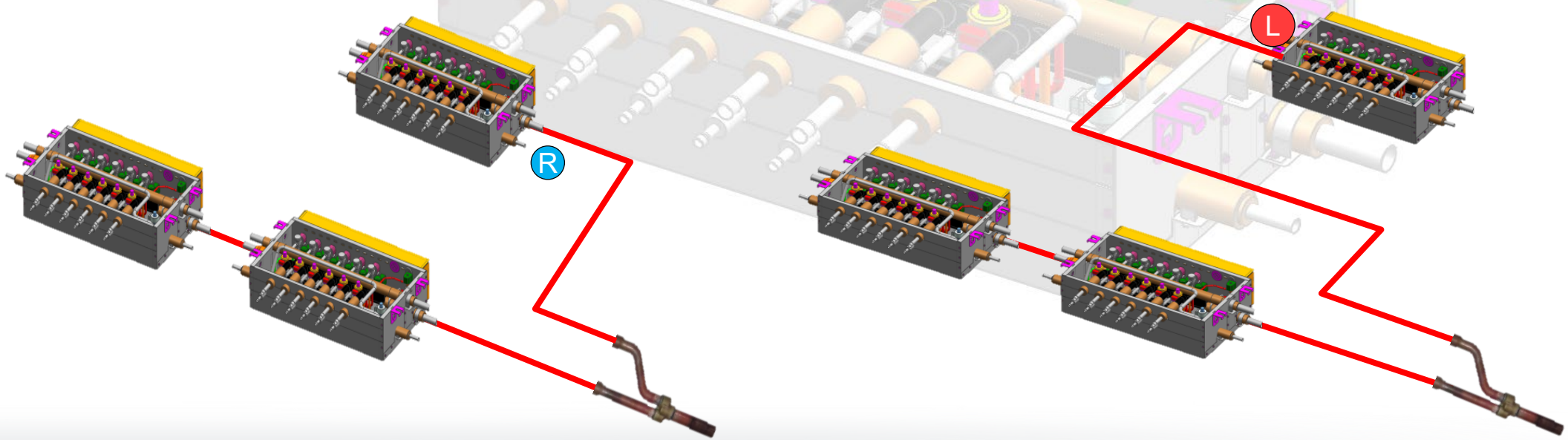
Model	WxHxD	Max. IDU per 1 Port	Max. IDU	Max. Capacity per 1 Port	Max. Total Capacity	Pipe Size
S1NEK	13.3x7.8x16	8	8	54 MBtu	54 MBtu	Hi: 3/4 Lo: 7/8 Liq: 3/8
S2NEK	28.6x7.8x18.5	8	16	54 MBtu	108 MBtu	Hi: 1 1/8 Lo: 1 1/8 Liq: 5/8
S4NEK	28.6x7.8x18.5	8	32	54 MBtu	216 MBtu	Hi: 1 1/8 Lo: 1 1/8 Liq: 5/8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

MCU Basic Installation

MCU Basic Installation Guidelines – New S*NEK Models

- The 2,4&6 port MCU's have main pipe straight-through design to accommodate multiple MCU connection without requiring a Y-joint
  - Allows single main pipe connection on either side of the MCU
- Maximum MBtu capacity in MCU series connections: 108: 2-port / 216: 4&6 port
  - Total MBtu capacity is not increased in series connections only the IDU ports
- MCU condensate drain pipe is not needed



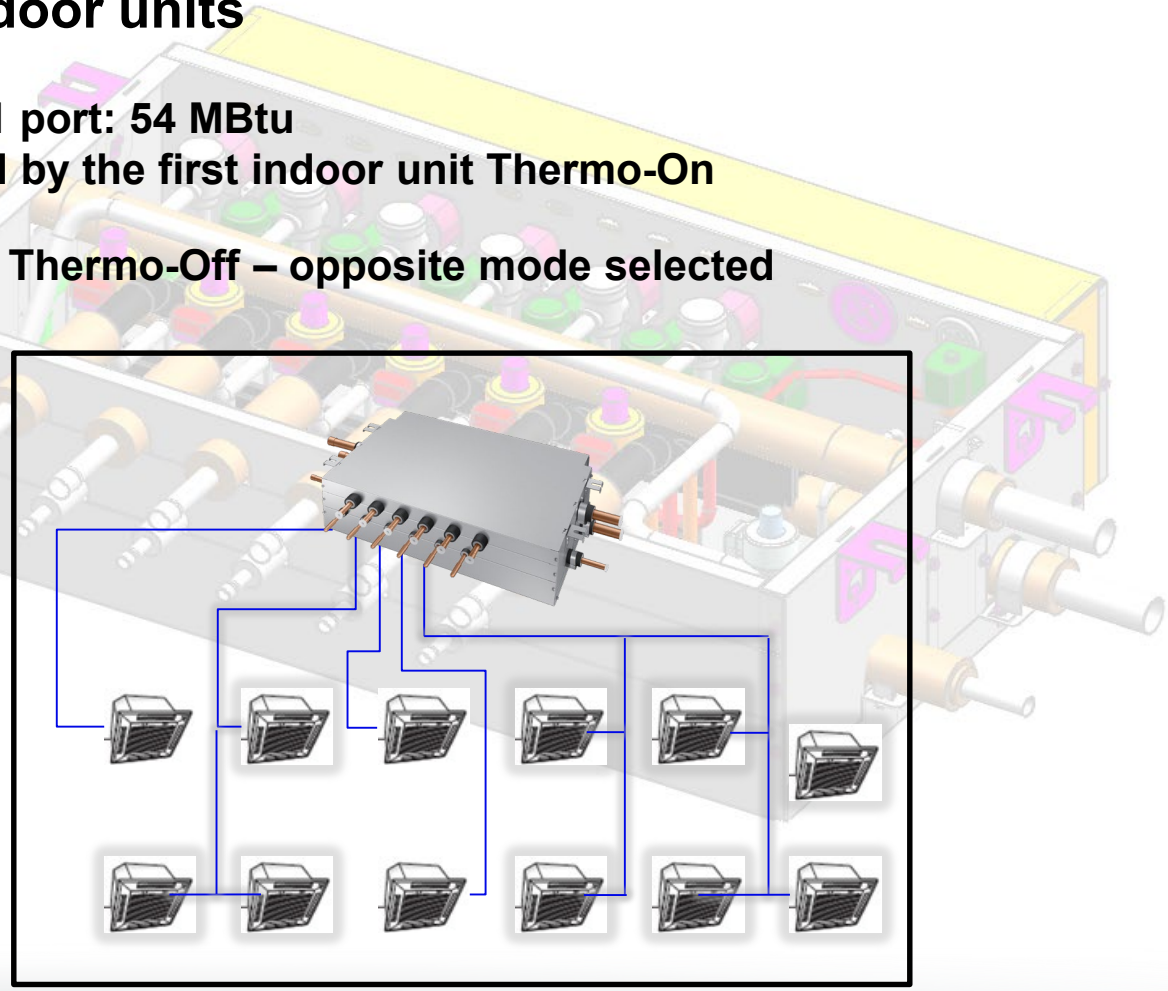


MCU Basic Installation

MCU Basic Installation Guidelines – New S*NEK Models

MCU connected to multiple indoor units

- Total indoor unit capacity on 1 port: 54 MBtu
- 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



SAMSUNG DVM S Water

Refrigerant Piping Installation

Refrigerant Piping Installation

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

Total Equipment List

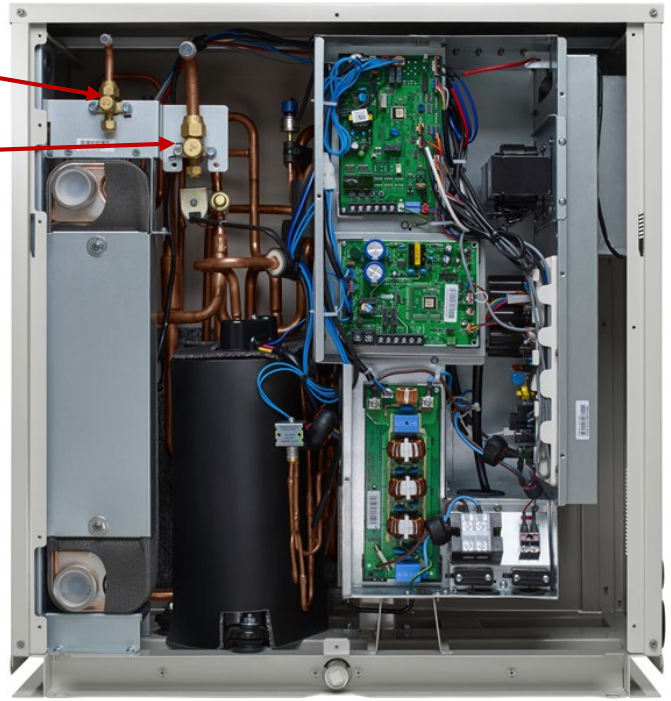
Index	Model	Qty	Remark(Categories)	Unit Price	Amount
Outdoor unit	AM053FXMDCH/AA	1	DVM S Eco(NEW)	0	0
	AM072FXVAFR/AA	1	DVM S(NEW)	0	0
	AM120FXVAFR/AA	1	DVM S(NEW)	0	0
Indoor unit	AM018FN4DCH/AA	1	4Way CASSETTE	0	0
	[illegible]	[illegible]	[illegible]	0	0
	AM018FNDDCH/AA	2	MSP DUCT	0	0
	AM096FNHDCH/AA	1	HSP DUCT	0	0
	[illegible]	1	SLIM DUCT	0	0
	[illegible]	1	NEO FORTE	0	0
	AM072HNQDCH/AA	2	NEO FORTE	0	0
	AM018FNCDCH/AA	1	CEILING	0	0
Piping	[illegible]	1	Mode Change Unit	0	0
	[illegible]	1	Mode Change Unit	0	0
	MXD-E24K132A	1	Distributor Kit	0	0
	MXJ-YA3819M	1	Y-Joint	0	0
	[illegible]	1	Y-Joint	0	0
	MXJ-YA2815M	1	Y-Joint	0	0
	MXJ-YA2500M	1	Y-Joint	0	0
	[illegible]	1	Y-Joint	0	0
	[illegible]	1	Y-Joint	0	0
Control System	MIM-D00AN	1	DMS 2.0	0	0
	MCM-A300N	1	Touch Controller	0	0
	[illegible]	1	DRAIN PUMP	0	0
Optional accessories	MWR-WE00N	9	WIRED REMOTE CONTROLLER	0	0
	MDP-M075SGU3D	2	DRAIN PUMP	0	0
	[illegible]USMEN	2	4Way CASSETTE (600x600) PANEL	0	0
	[illegible]N047SNC1D	1	DRAIN PUMP	0	0
	MRW-TA	2	EXTERNAL TEMPERATURE SENSOR	0	0
	PC4NUSKFN	1	4Way CASSETTE PANEL	0	0
	MWR-SH00N	1	WIRED REMOTE CONTROLLER	0	0
Ref. Pipe	6.35(1/4")	175	ft	0	0
	9.52(3/8")	168.99	ft	0	0
	12.70(1/2")	212.01	ft	0	0
	15.88(5/8")	204.01	ft	0	0
	19.05(3/4")	61.02	ft	0	0
	22.22(7/8")	31	ft	0	0
	28.58(1 1/8")	192.98	ft	0	0
Additional Ref. Quantity	R410A	31.97	lbs	0	0
		Total			0

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

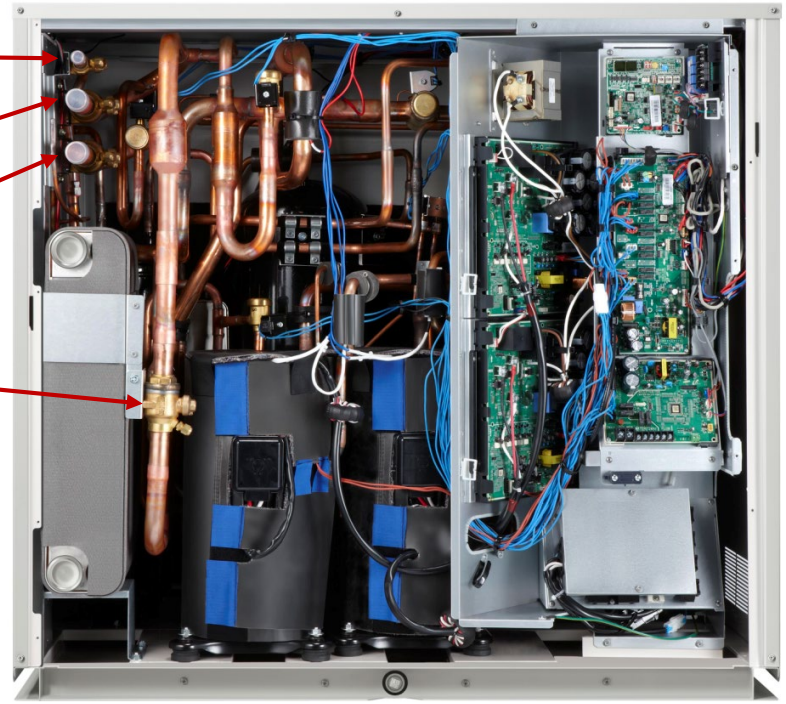
Refrigerant Piping Installation

Condenser Refrigerant Piping Connections

AM038/048/055KXWD (Heat Pump)



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

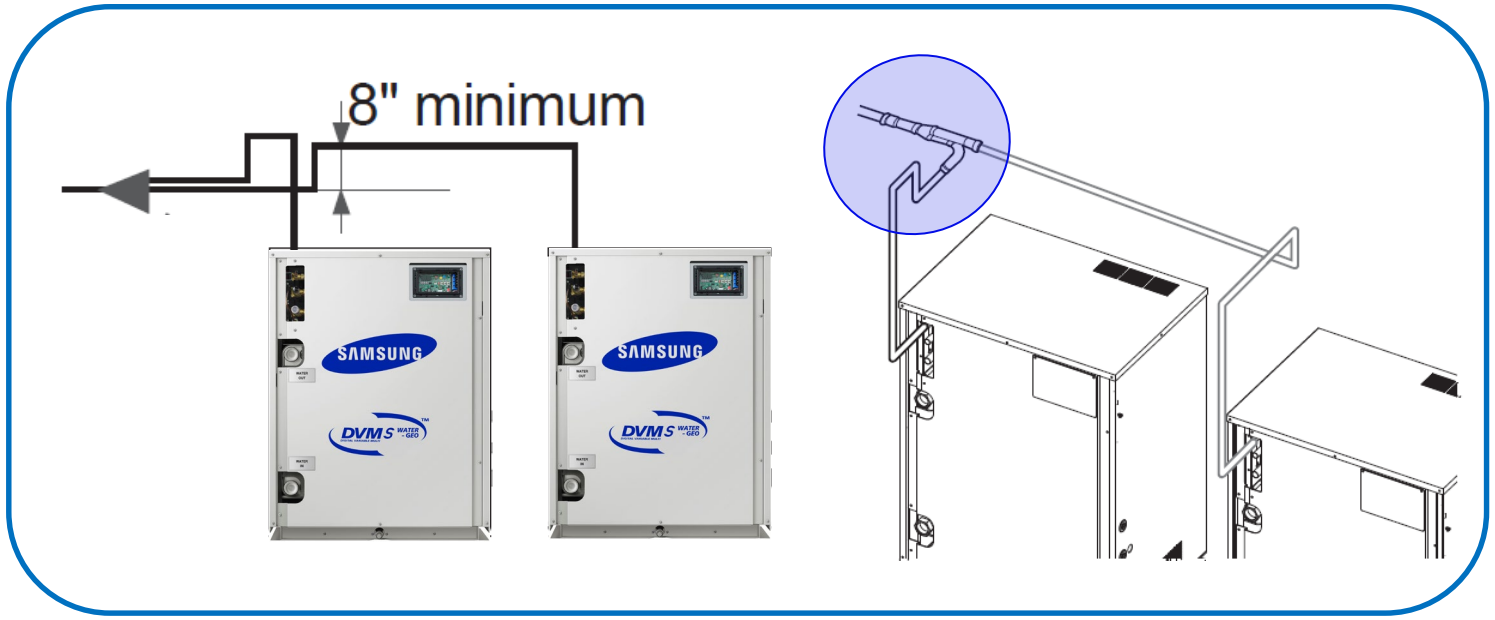


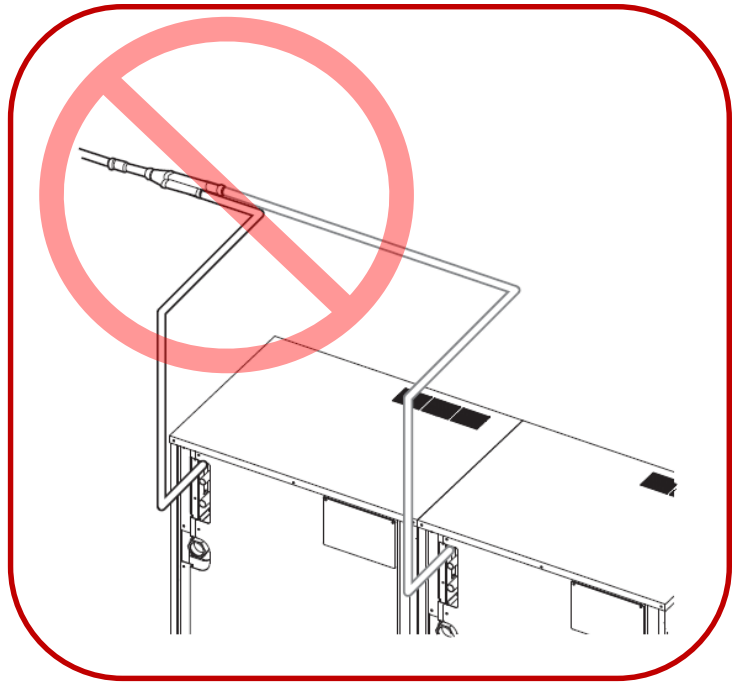
Refrigerant Piping Installation

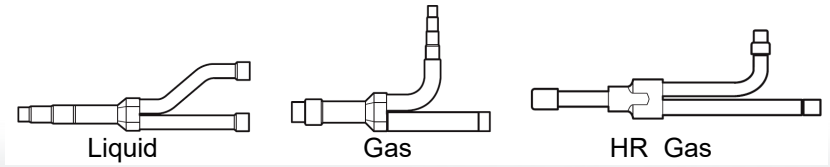
Refrigerant Piping Configurations

Modular systems – 2 or 3 condensers piped together

- 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





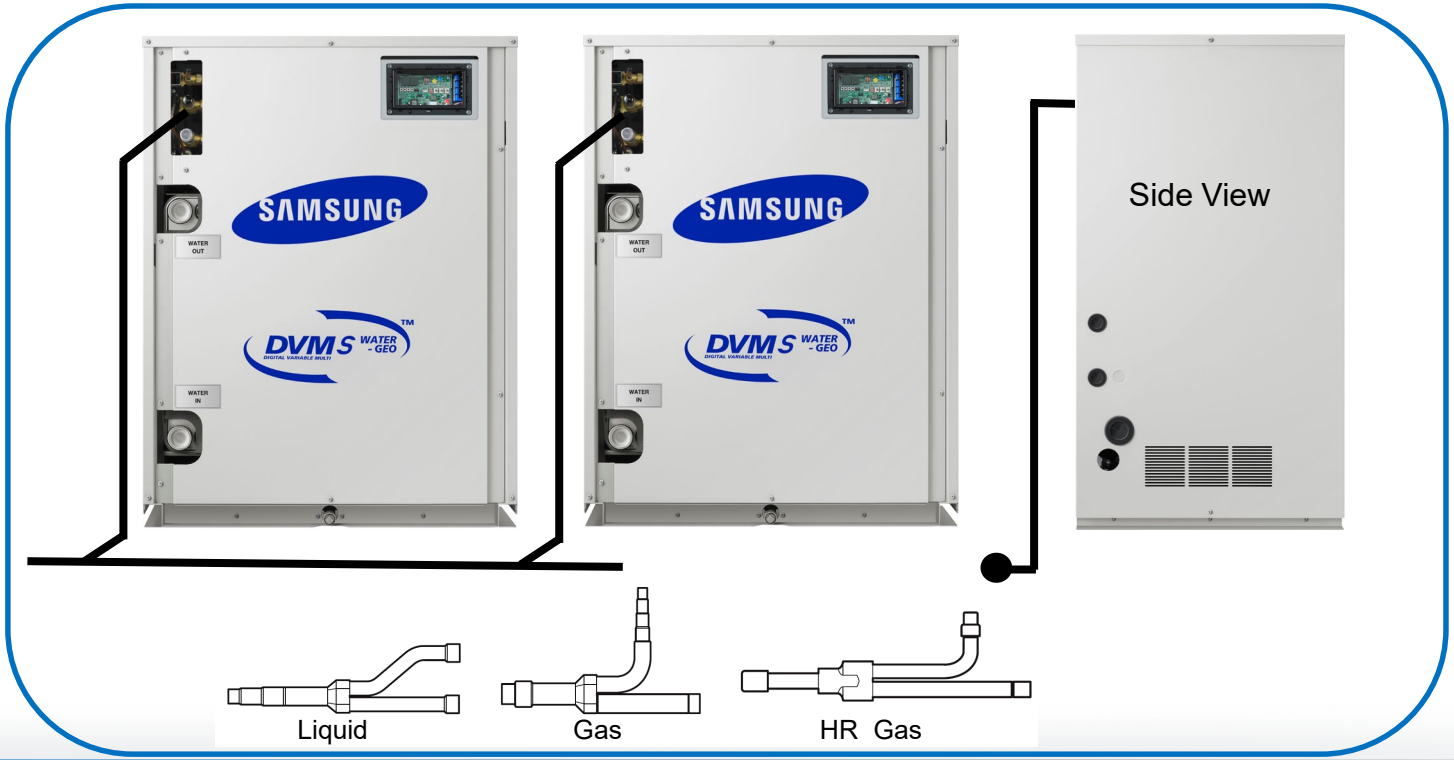


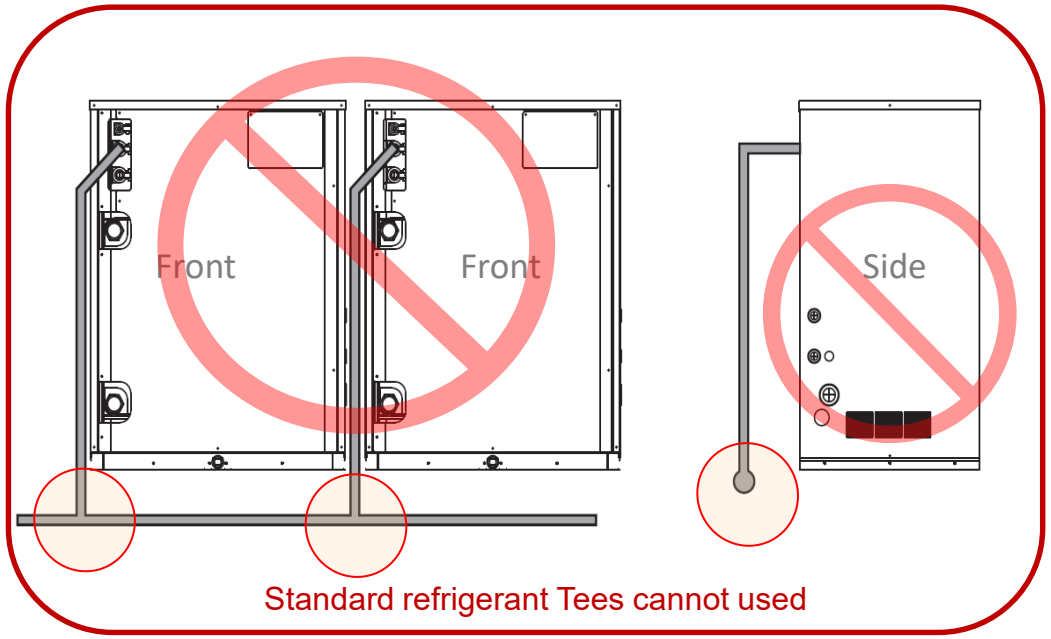
Refrigerant Piping Installation

Refrigerant Piping Configurations

Modular systems – 2 or 3 condensers piped together

- 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



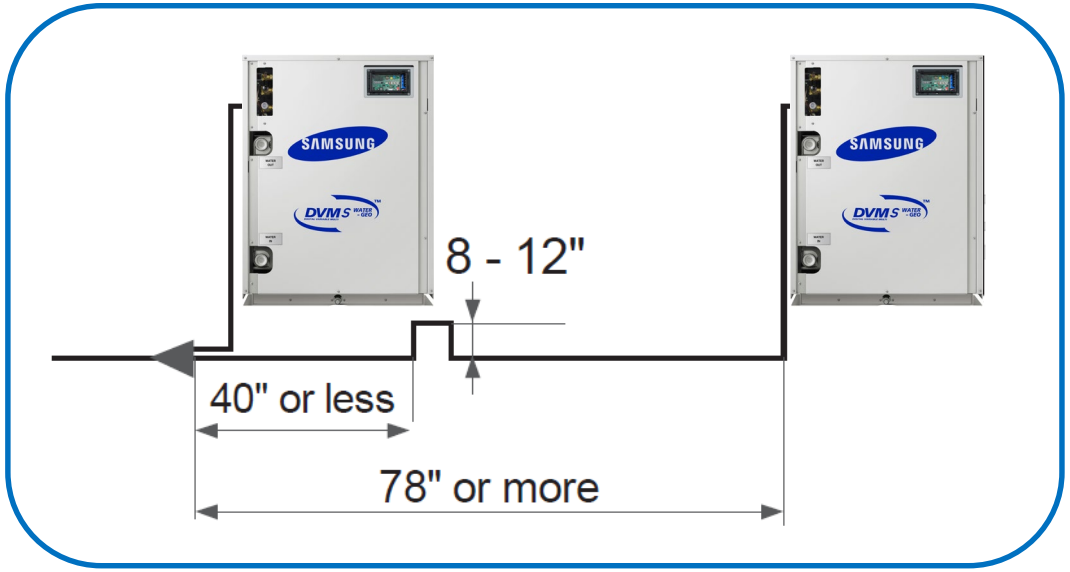


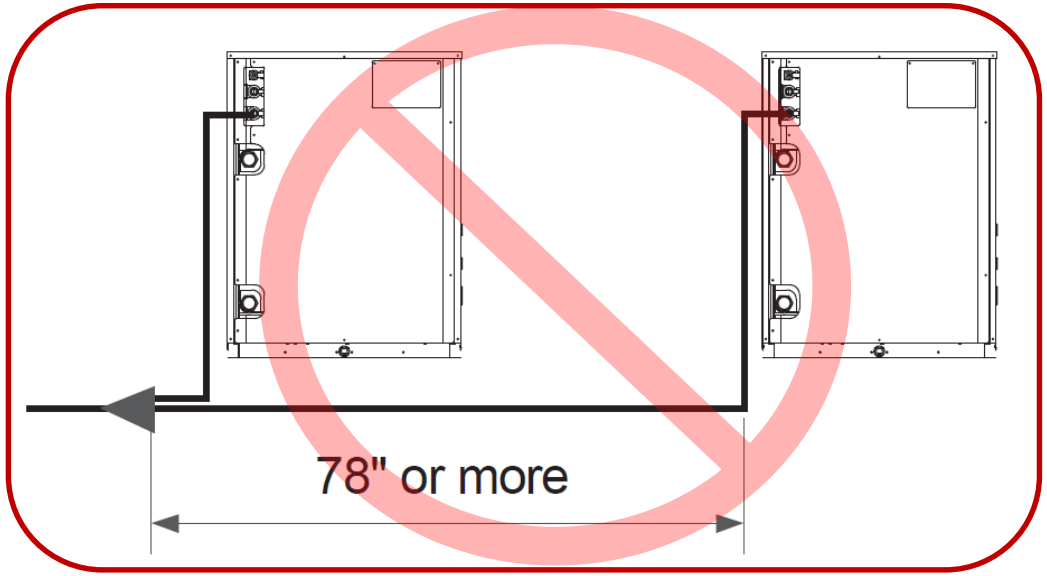
Refrigerant Piping Installation

Refrigerant Piping Configurations

Modular systems – 2 or 3 condensers piped together

- When the refrigerant piping is installed horizontally below the condensers and there is a piping length between condenser module and branch fitting of 78” or more:
  - An inverted trap must be installed in the gas piping



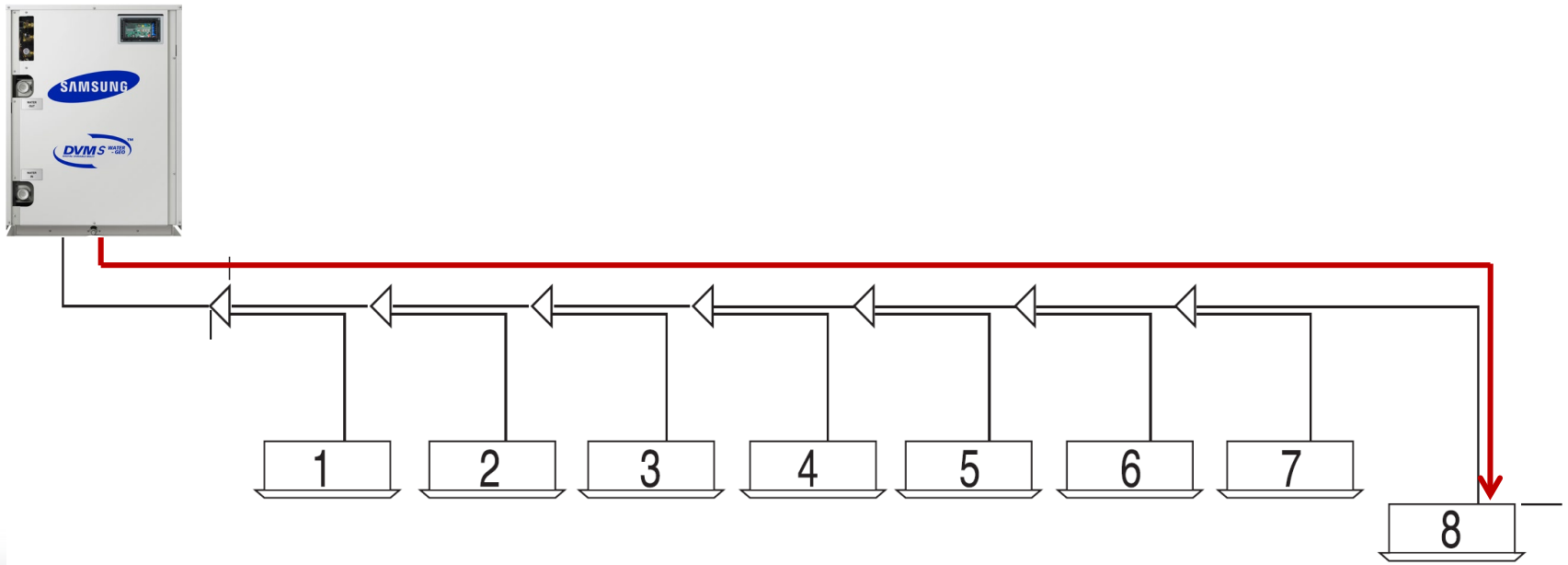


Refrigerant Piping Installation

Refrigerant Piping Specifications

Refrigerant piping specifications vary between the 1 phase and 3 phase systems

- 1 Phase systems: Maximum piping distance from the condenser to the farthest indoor unit – 246ft.
  - Total collective piping maximum length: 656ft.
- 3 Phase systems: Maximum piping distance from the condenser to the farthest indoor unit – 558ft.
  - Total collective piping maximum length: 984ft.



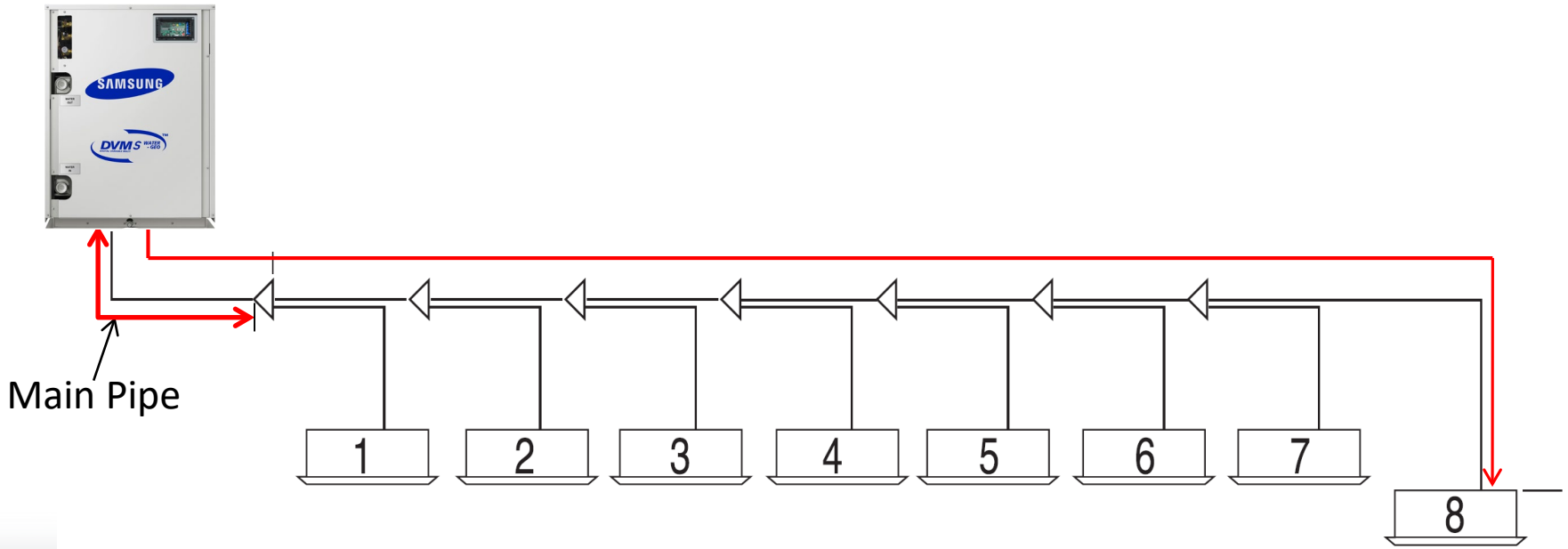
Refrigerant Piping Installation

Refrigerant Piping Specifications

Heat Pump systems

- 1 Phase system: If the distance from the condenser to the farthest indoor unit is over 246ft. – Increase the main piping (liq.& gas) by one size
- 3 Phase system: If the distance from the condenser to the farthest indoor unit is over 295ft. – Increase the main piping (liq.& gas) by one size

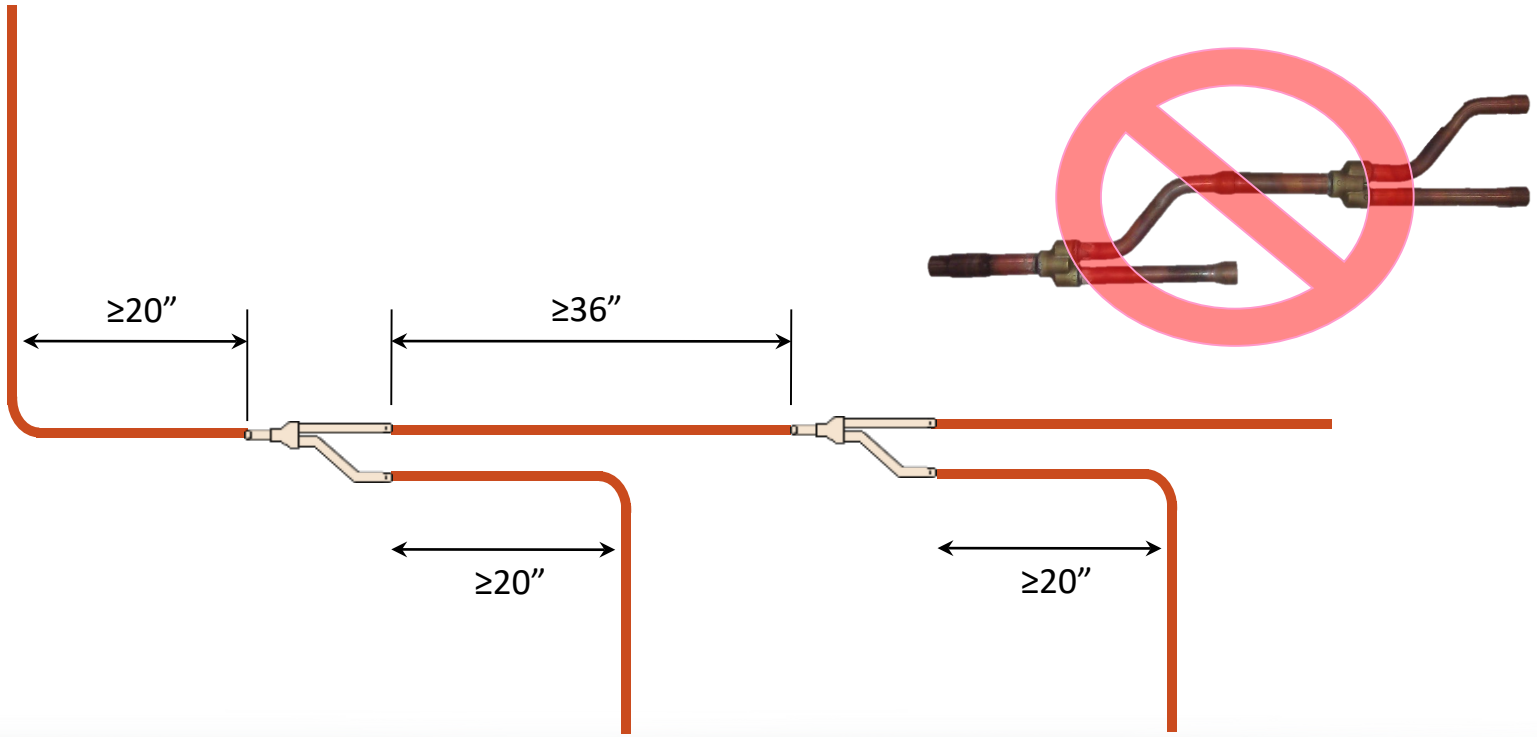
Heat Recovery systems – Increase main pipe (liq. only) by one size



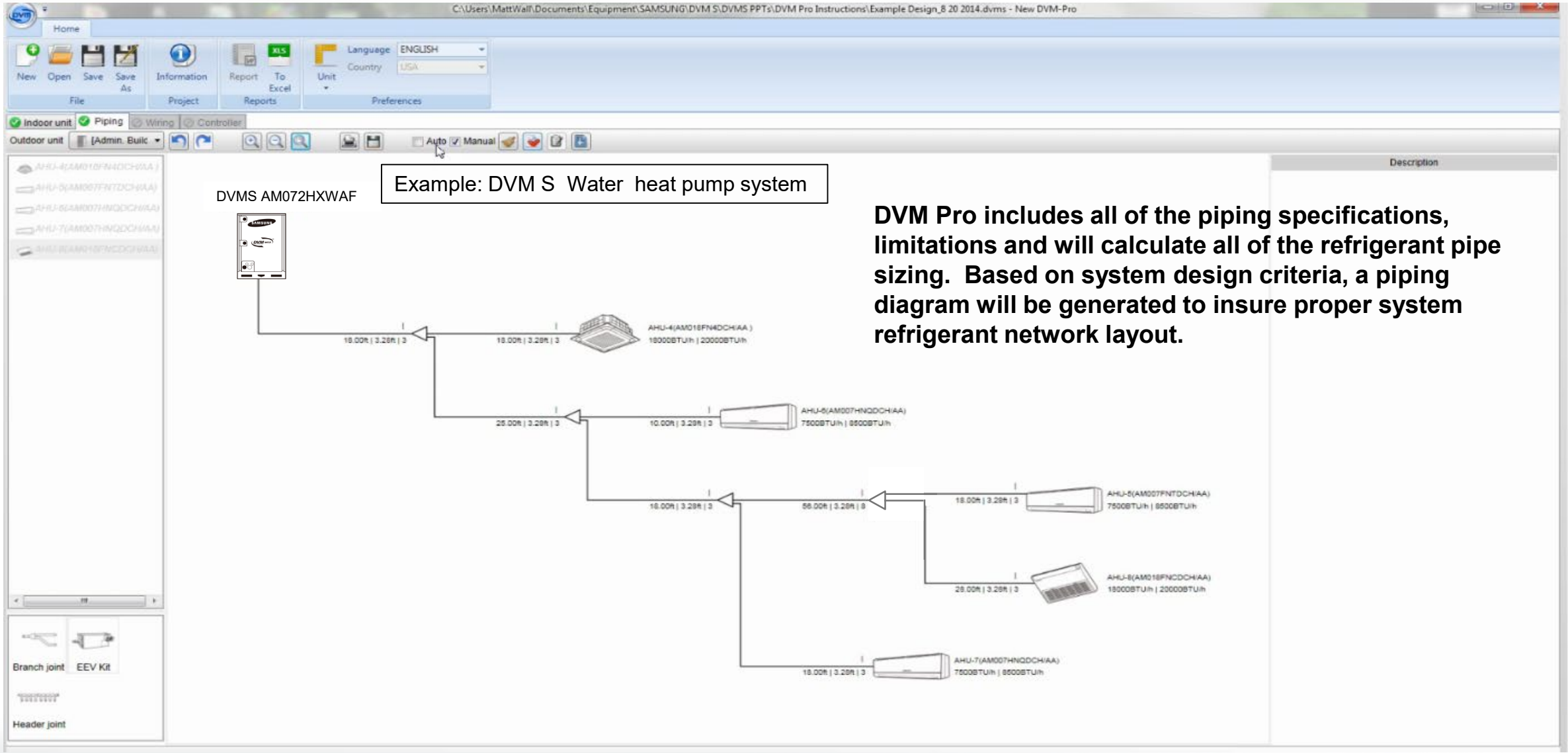
Refrigerant Piping Installation

Y-joint Installation Guidelines

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



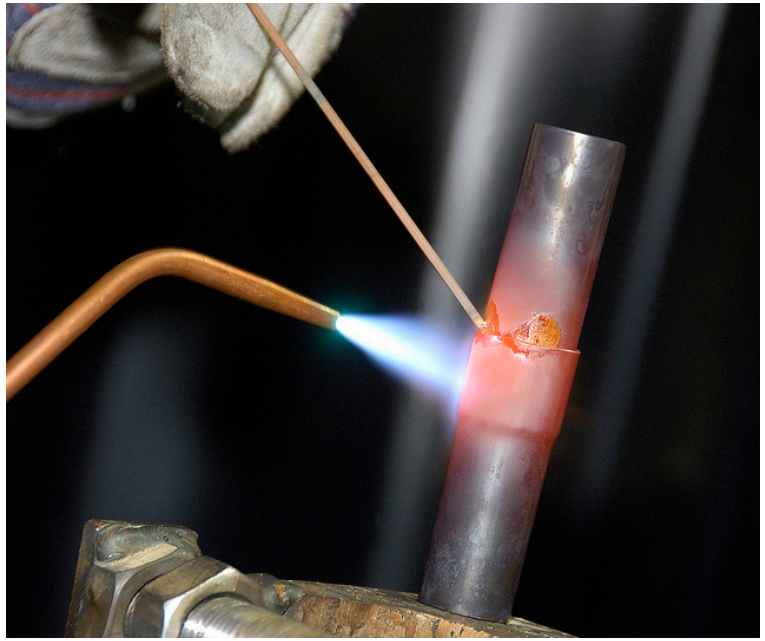
Refrigerant Piping Installation



DVM Pro includes all of the piping specifications, limitations and will calculate all of the refrigerant pipe sizing. Based on system design criteria, a piping diagram will be generated to insure proper system refrigerant network layout.

Refrigerant Piping Installation

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

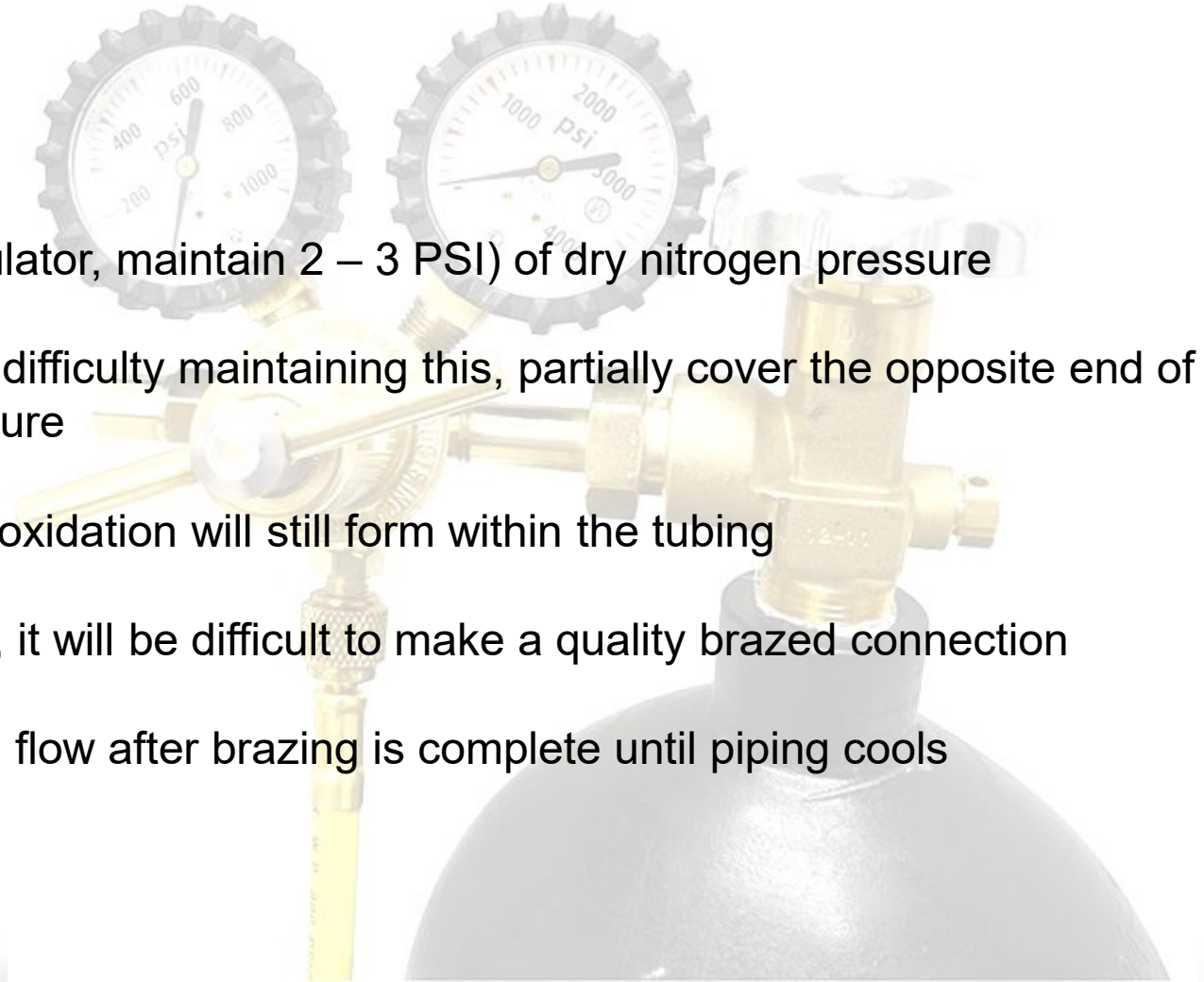
Refrigerant Piping Installation

Required Piping Practices – Nitrogen Purge

A dry nitrogen purge is required for the entire brazing process
(Pressure regulated up to 3 psi)

Refrigerant Piping Installation

Required Piping Practices – Nitrogen Purge

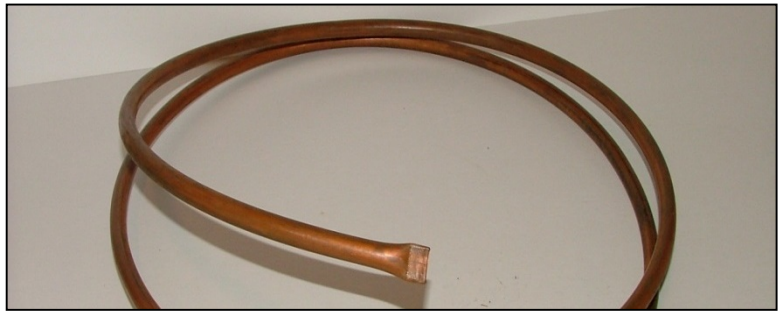


- Using a flow regulator, maintain 2 – 3 PSI) of dry nitrogen pressure
- If you are having difficulty maintaining this, partially cover the opposite end of the pipe with tape to maintain pressure
- If flow is too low, oxidation will still form within the tubing
- If flow is too high, it will be difficult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

Refrigerant Piping Installation

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 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

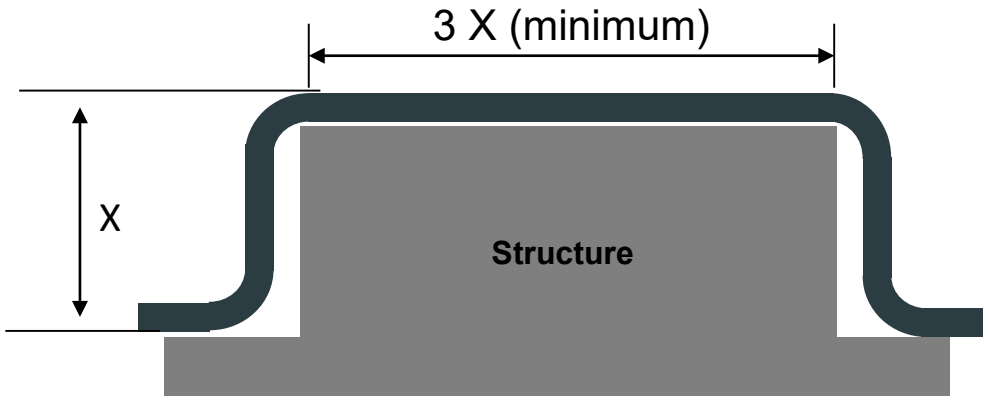
Capped or taped ends are not recommended

Refrigerant Piping Installation

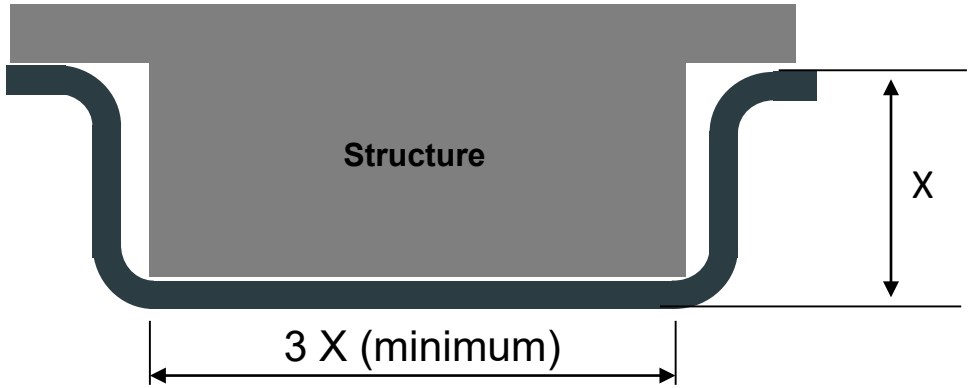
Required Piping Practices – Proper Pipe Routing

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

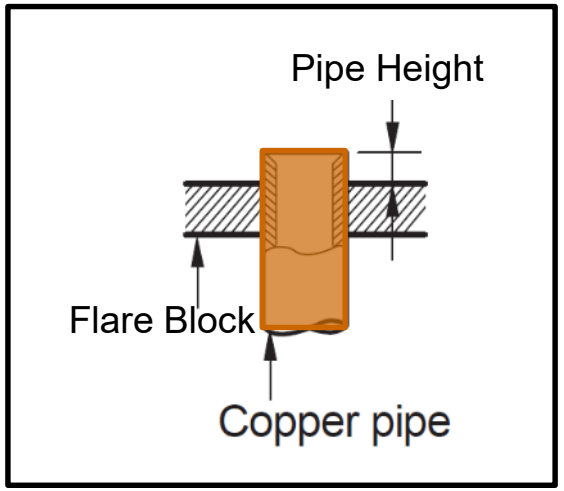


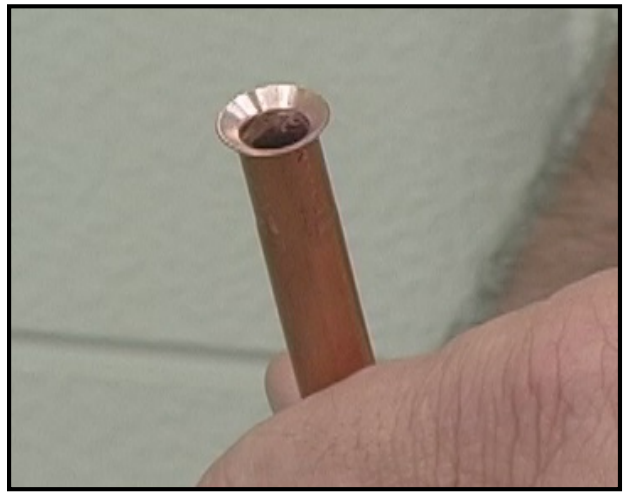
Under obstacle

Refrigerant Piping Installation

Making A Good R-410A Flare

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

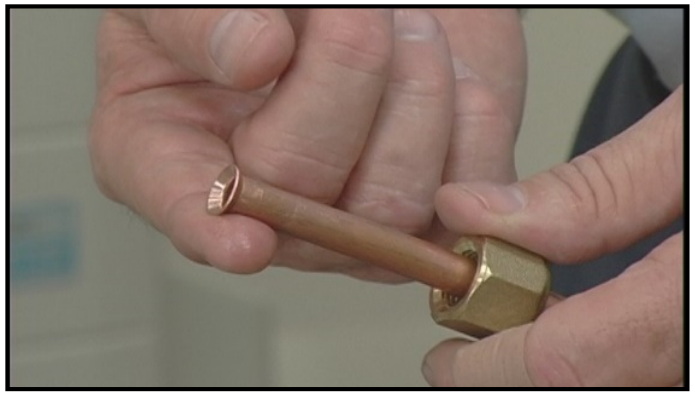


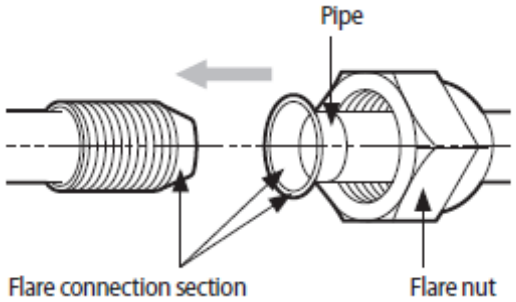


Refrigerant Piping Installation

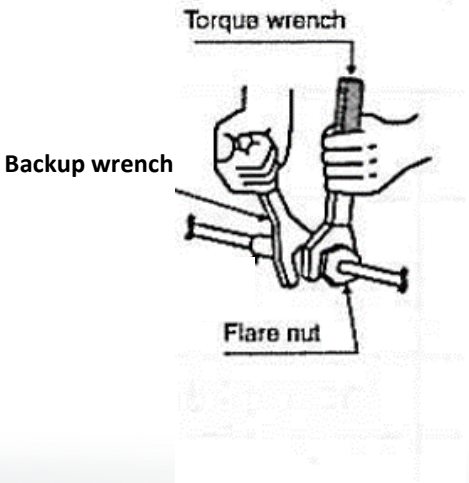
Making A Good R-410A Flare Connection

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





Apply synthetic oil to the inner and outer flare surfaces only



Refrigerant Piping Installation

Pre-Commissioning Steps

- All indoor units including MCU's are shipped from the factory with the EEV's in full open position
  - To insure all EEV's are open before the pressure test and evacuation process, the condenser main PCB can be used to electronically open the EEV's
  - Line voltage power must be applied to all system components and communication wires are connected and addresses set
  - Upon completion, press K3 to reset system

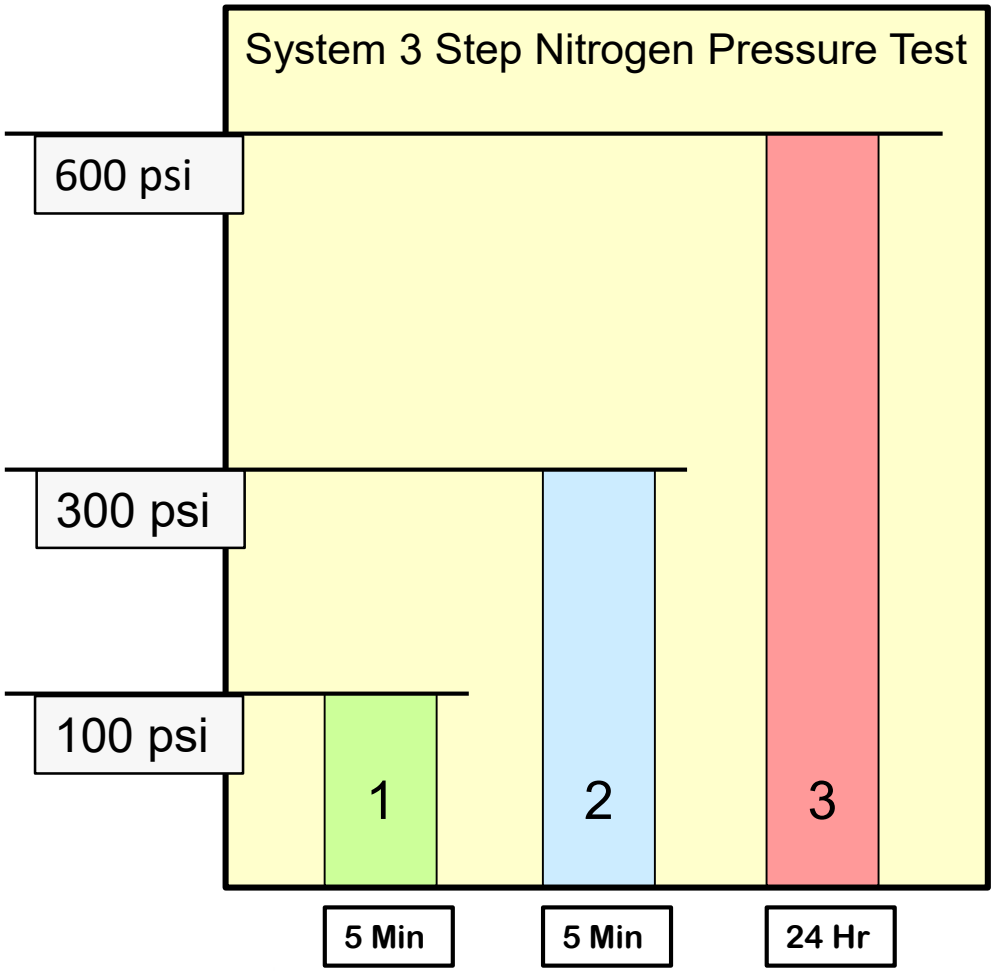
K1 press	Function	7-segment display
7	Open all valves of Main outdoor unit for vacuuming	
8	Open all valves of Sub1 outdoor unit for vacuuming	
9	Open all valves of Sub2 outdoor unit for vacuuming	
10	Open all valves of Sub3 outdoor unit for vacuuming	
11	Open all valves for vacuuming (all outdoor units, indoor units and MCU units)	
12	Finish key mode	

Refrigerant Piping Installation

Required Piping Practices – 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



Refrigerant Piping Installation

Required Piping Practices –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

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

Refrigerant Piping Installation

Required Piping Practices – 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

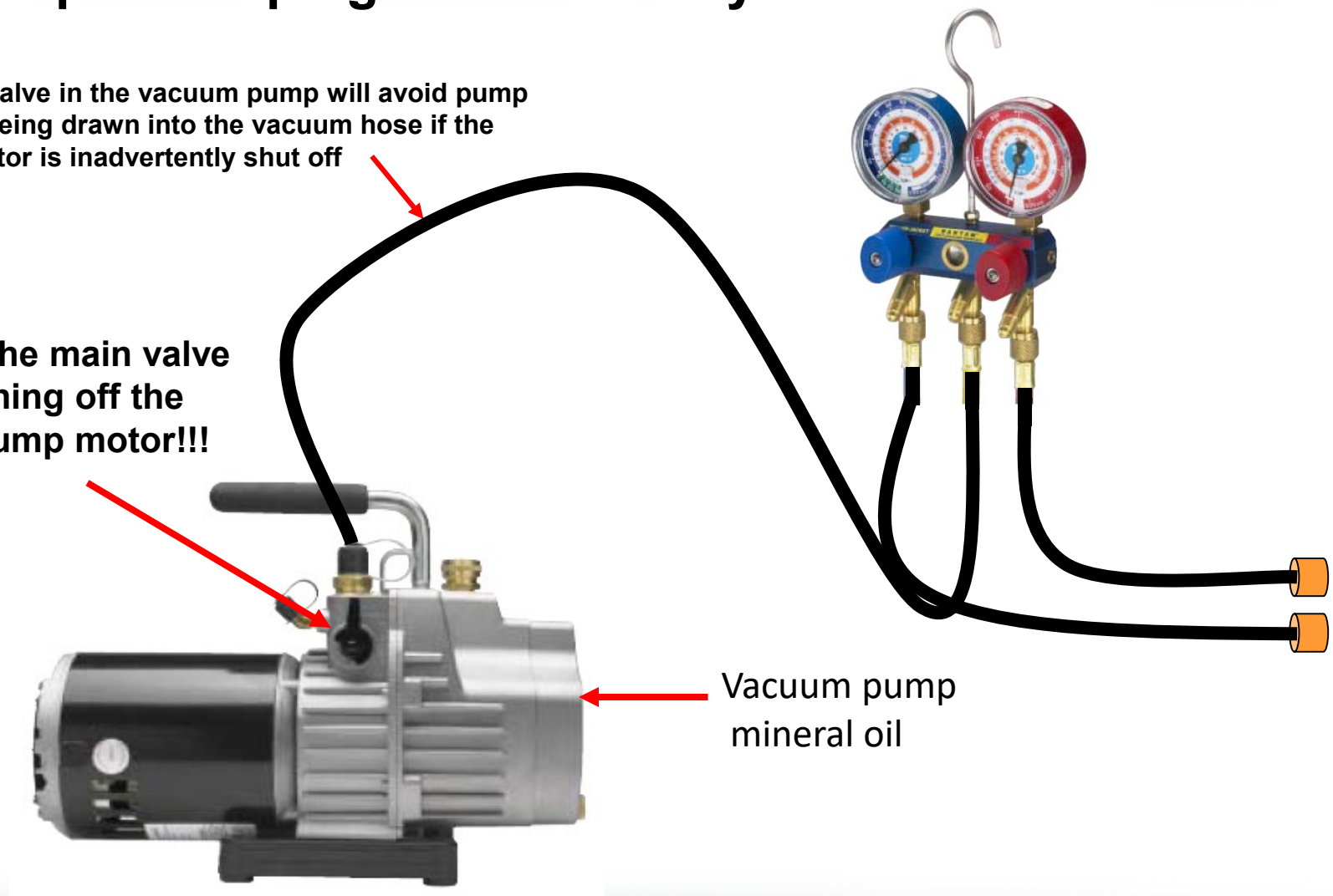
- Never use household liquid soap for leak detection
- Never use a refrigerant dye for leak detection
- Never use an injectable refrigerant leak sealant

Refrigerant Piping Installation

Required Piping Practices – System Evacuation

A check valve in the vacuum pump will avoid pump oil from being drawn into the vacuum hose if the pump motor is inadvertently shut off

Close off the main valve before turning off the vacuum pump motor!!!



Vacuum pump mineral oil

Required Piping Practices – System Triple Evacuation

System Triple Evacuation Procedure

- **Evacuate the system down to 4000 microns**
  - Break vacuum with dry nitrogen – Hold for 15 minutes
- **Evacuate the system down to 1500 microns**
  - Break vacuum with dry nitrogen – Hold for 15 minutes
- **Evacuate the system down to 500 microns or less**
  - Hold the vacuum for 60 minutes
  - DO NOT remove manifold gauges with system under vacuum
  - DO NOT leave system under vacuum
- **Use the system vacuum to draw in the additional refrigerant charge as calculated by DVM Pro**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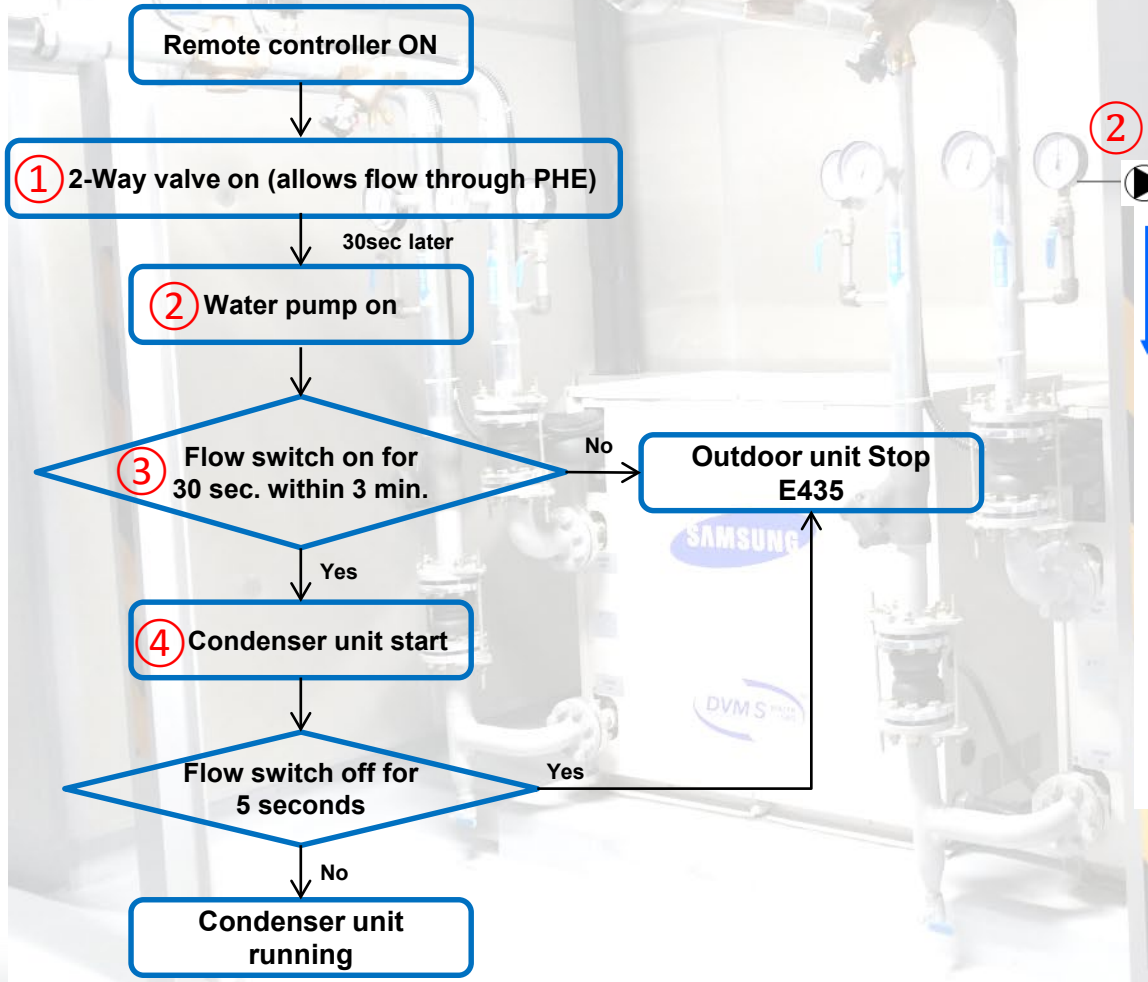
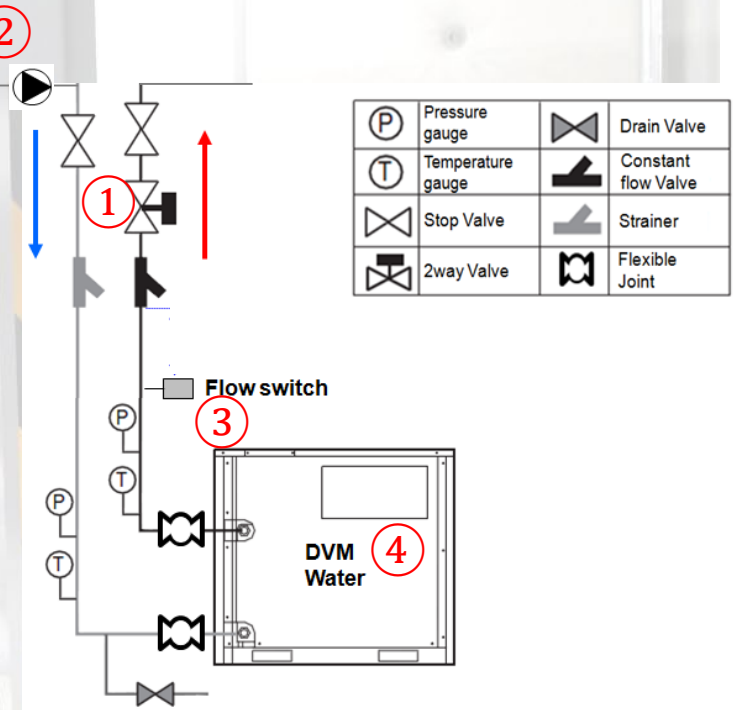
DVM S Water
Water Side Control

Water Side Control

System Operation Sequence





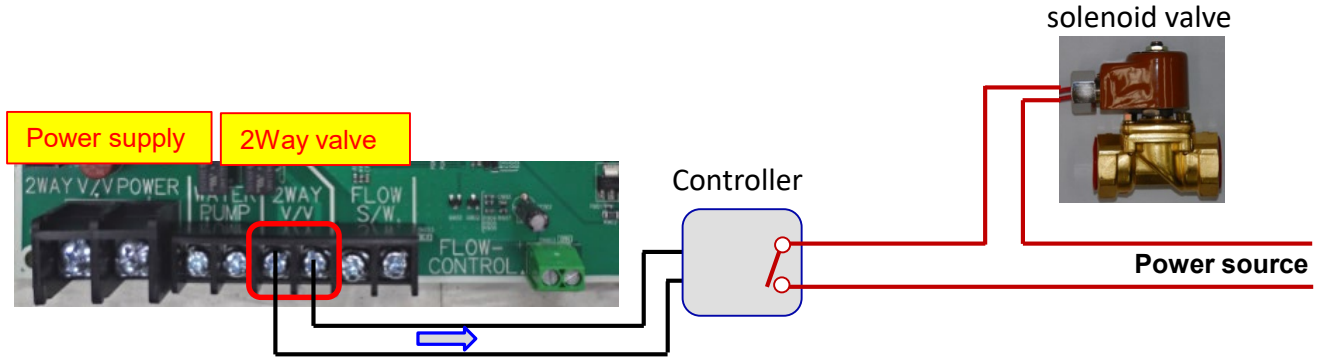
Water Side Control

2-Way Solenoid Valve Control

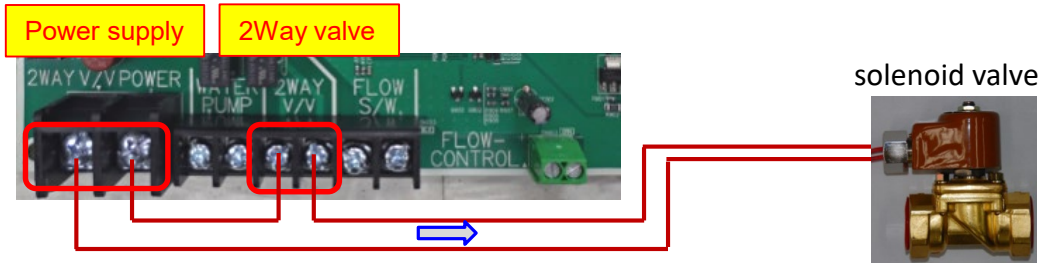
2-way solenoid valve control configurations – Condenser PCB

- 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.)



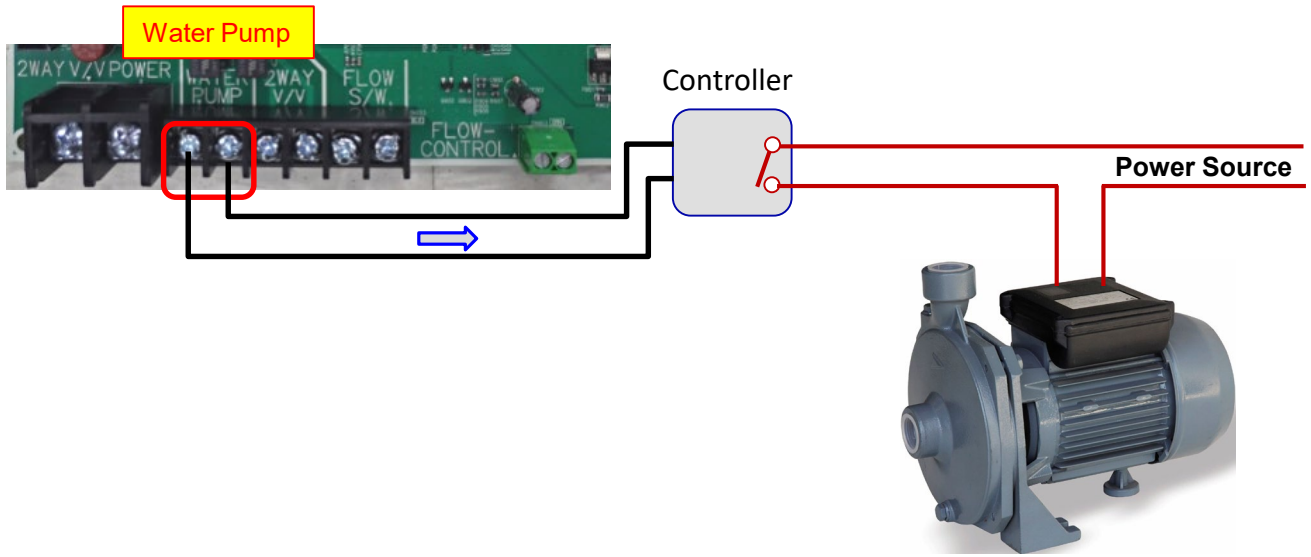
Remote controller	Contact signal	Water valve	Remark
On	Close	Valve open	-
Off	Open(after 40sec from off)	Valve close	Delay for PHE & pump

Water Side Control

Closed Loop Pump Control

Condenser pump operation interlock

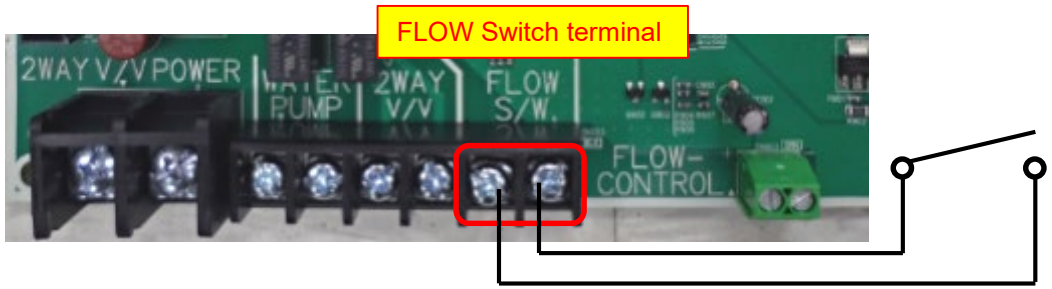
- WATER PUMP terminals output: Dry contact

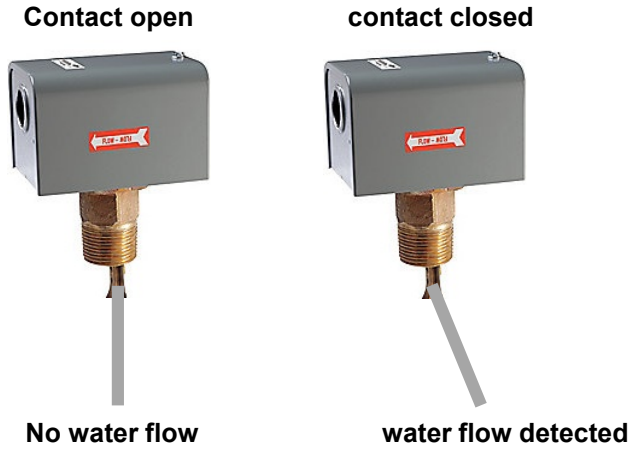


Remote controller	Contact signal	Water pump	Remark
On	Close (after 30 sec. from on)	Pump on	Delay for water pump
Off	Open (after 30 sec. from off)	Pump stop	Delay for PHE

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)

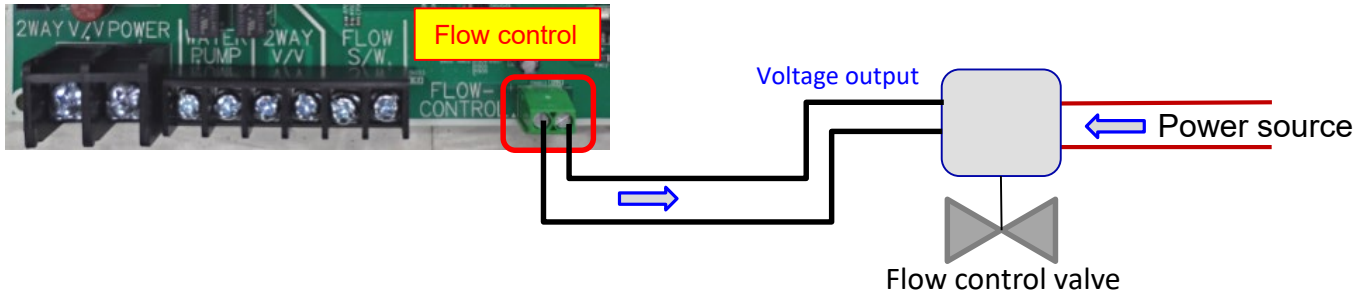
Water Side Control

Flow Control Valve

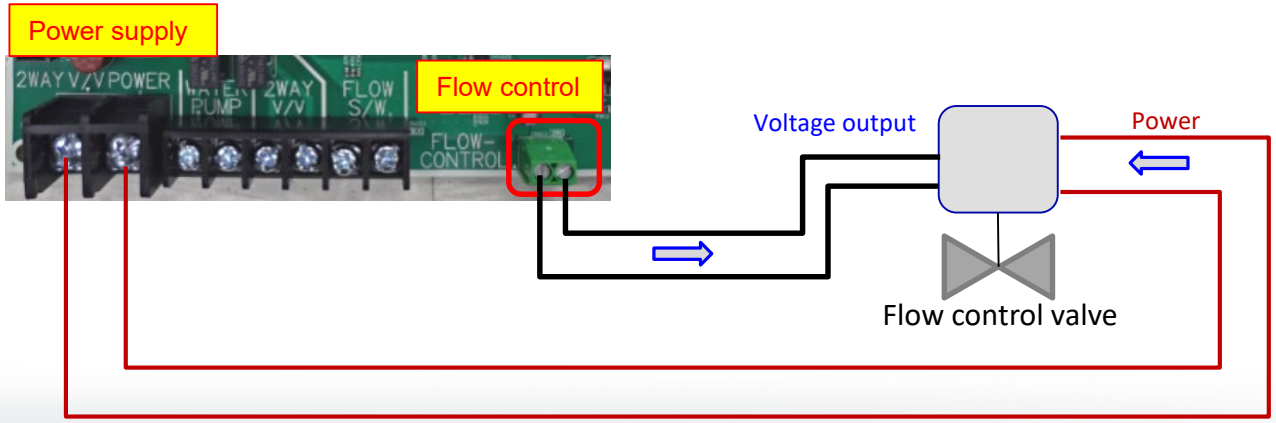
Flow Control Valve Configurations – Condenser PCB

- 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



Water Side Control

Flow Control Valve Logic

Control range

- Outdoor option setting (option 15, covered in later section)
- Below 3 volts is not stable (minimum is 3V)

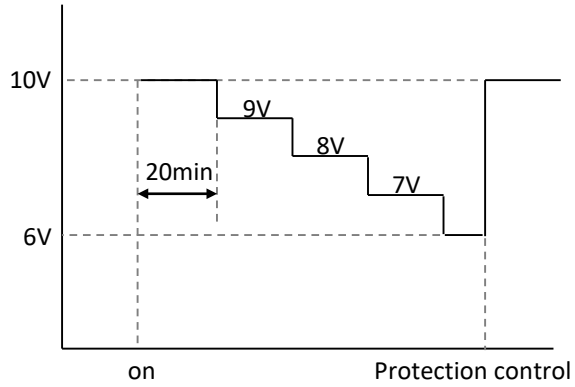
Seg 1, 2	Seg 3, 4	Control Range
15	00	Not used
	01	7~10V
	02	5~10V
	03	3~10V

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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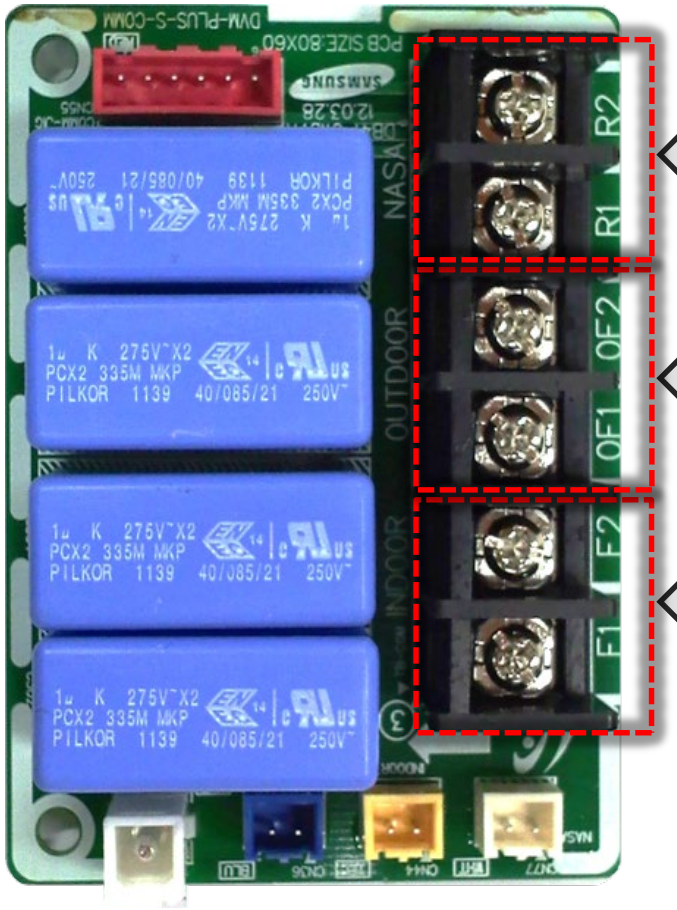
System Communication

System Communication

Communication – Condenser Main PCB



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

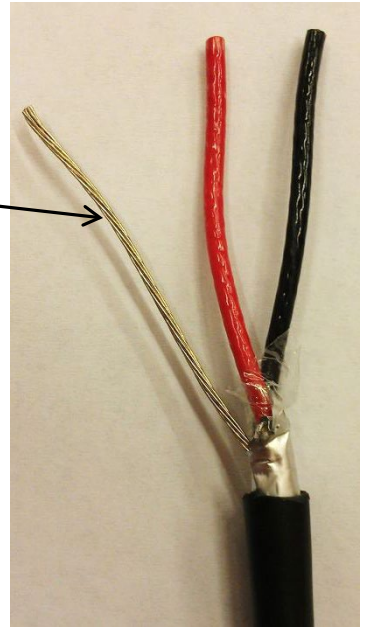
Communication from the Main condenser in a modular system daisy chain to Sub 1 and Sub 2 condenser modules (3 ph. only)

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

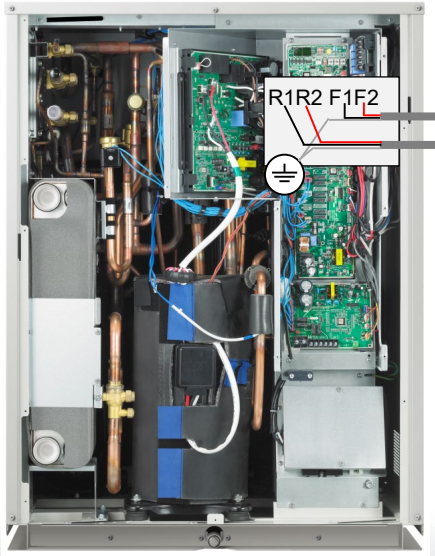
System Communication

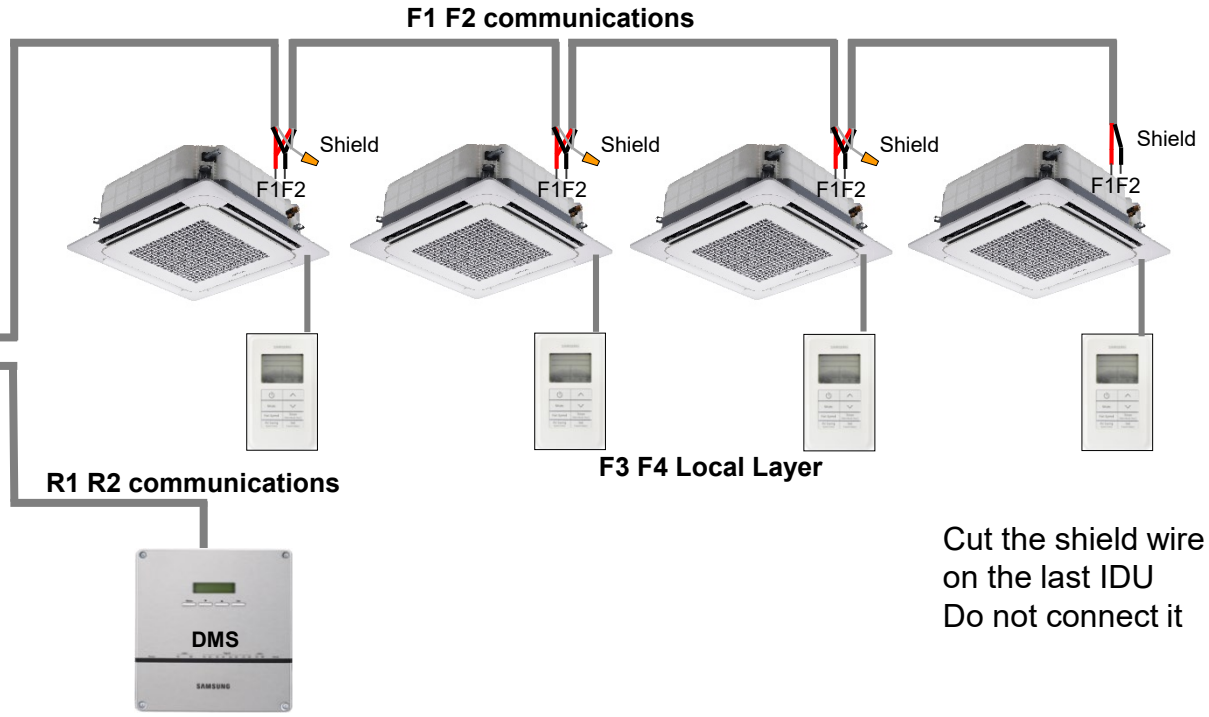
Control Circuit Grounding

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



EXAMPLE: Single module heat pump system



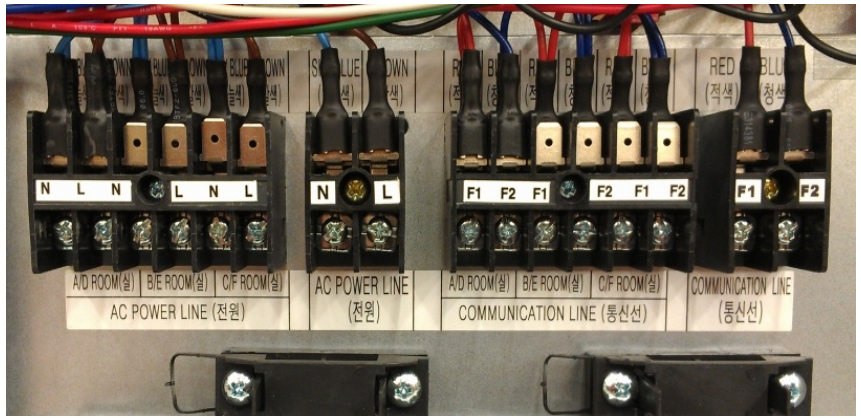


Cut the shield wire
on the last IDU
Do not connect it

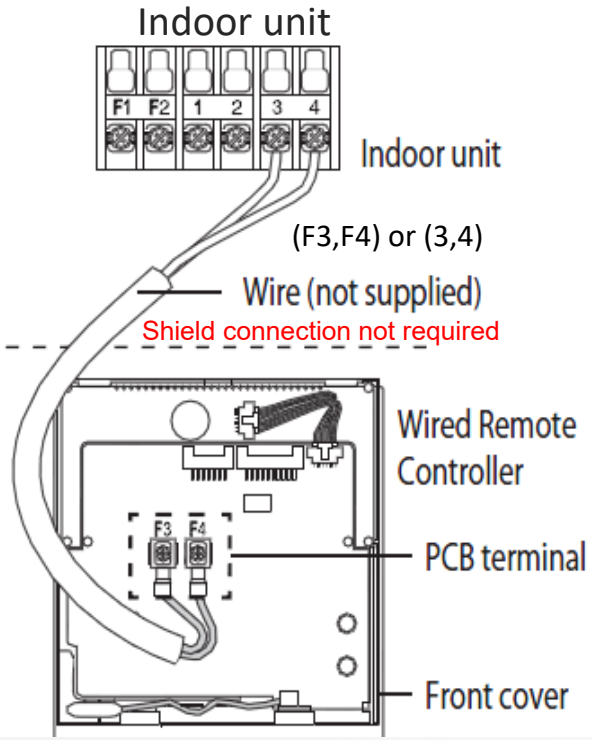
System Communication

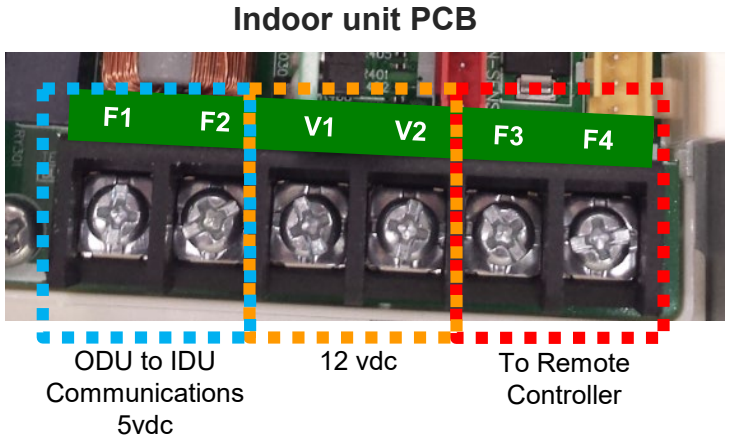
Control Wire Connections

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



COM1 and Power connections in MCU PCB box

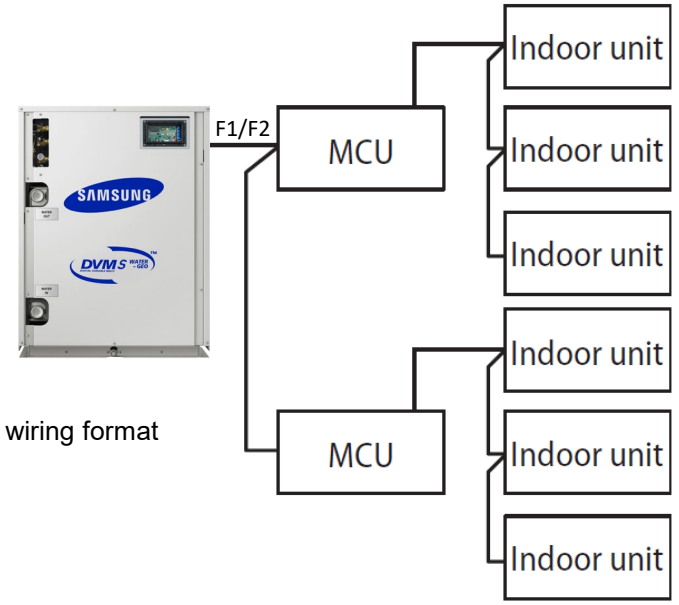




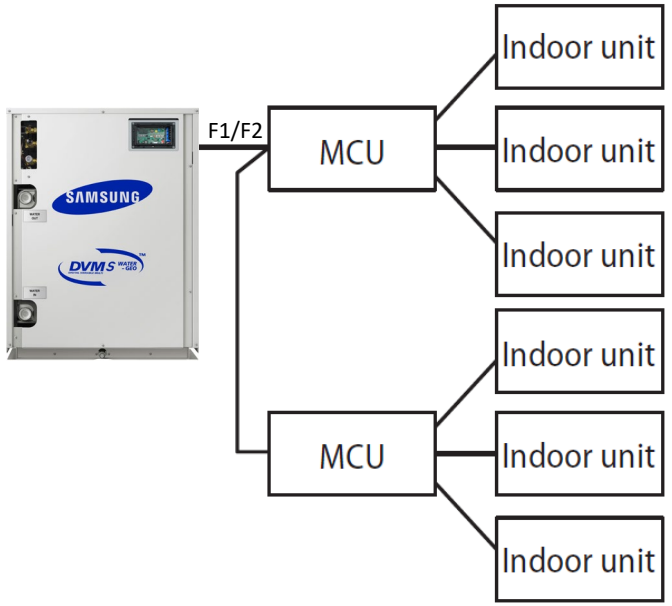
System Communication

F1 F2 Communications

- The MCU's, EEV Kits communicate on the F1 F2 buss the same as the indoor units
- Each MCU is connected to the F1 F2 buss via daisy chain connections
- MCU's have multiple F1 F2 connection terminals allowing connection of individual indoor units if desired



SNET Pro wiring format



SAMSUNG DVM S Water

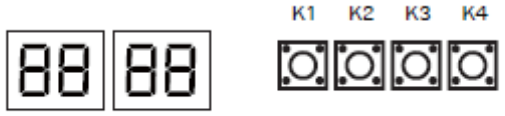
System Setup & Basic Addressing

System Setup & Basic Addressing

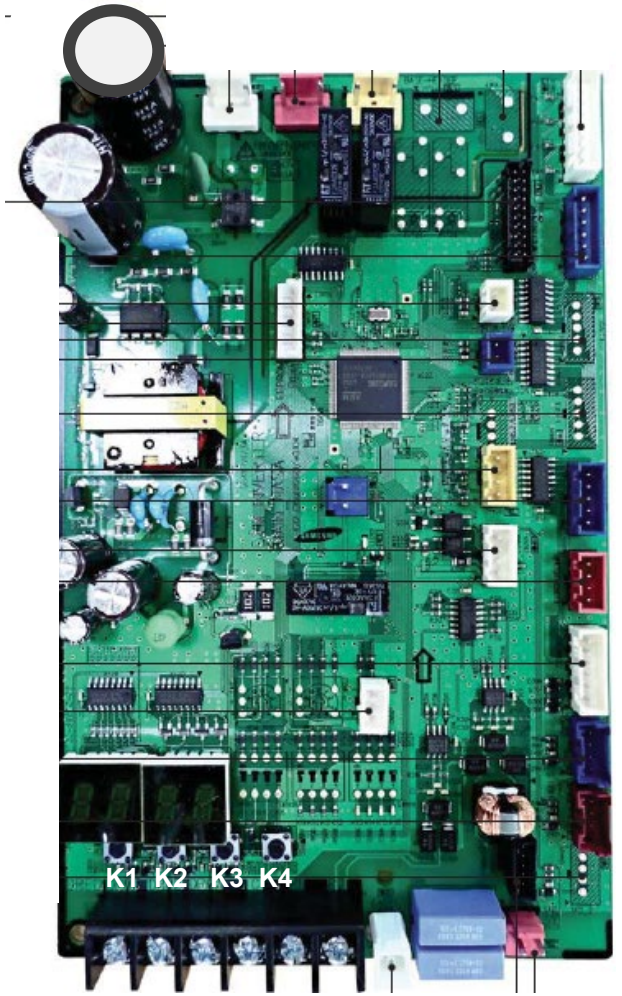
1 Phase Condenser Main PCB

Condenser and all indoor units powered up – Set number of indoor units

- Note condenser PCB display – refer to “Step 1”
- Press and hold K1 & K2 simultaneously for 2 seconds to enter setting mode
- Press K4 to display total number of indoor units (max. 9)
- Press and hold K4 for 2 seconds to verify number of indoor units
- Press and hold the K2 button for 2 seconds to save the setting



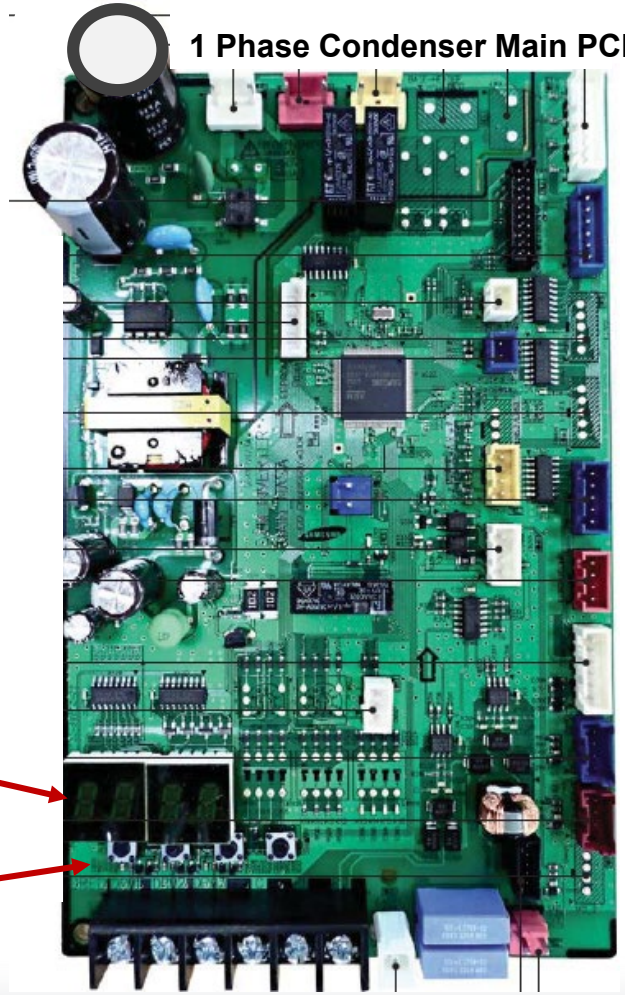
Step	Button	Display	Description	Remarks
The number of indoor units				
Step 1	Display of outdoor unit	1d nd	Required to set	-
Step 2	Press the K1 and K2 buttons for 2 seconds simultaneously.	1d 00	Ready to set	Example) 03: 3 units 64: 64 units
	Press the K2 button n times.	1d x0	Tens digit (0 ~ 6)	
	Press the K4 button n times.	1d 0x	Units digit (0 ~ 9)	
	Press the K4 button for 2 seconds - the number of connected indoor units is automatically detected.			
Step 3	Press the K2 button for 2 seconds to save the option and exit from menu. (System reset)			



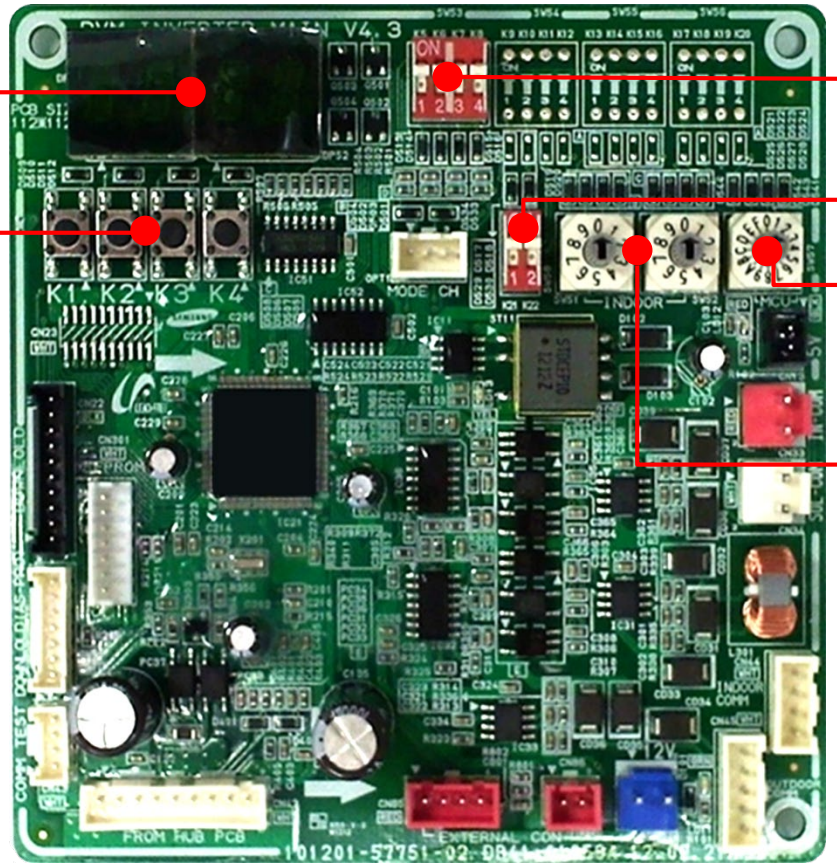
System Setup & Basic Addressing

Condenser Main PCB

1 Phase Condenser Main PCB



3 Phase Condenser Main PCB



72,96,120&192 MBtu Models

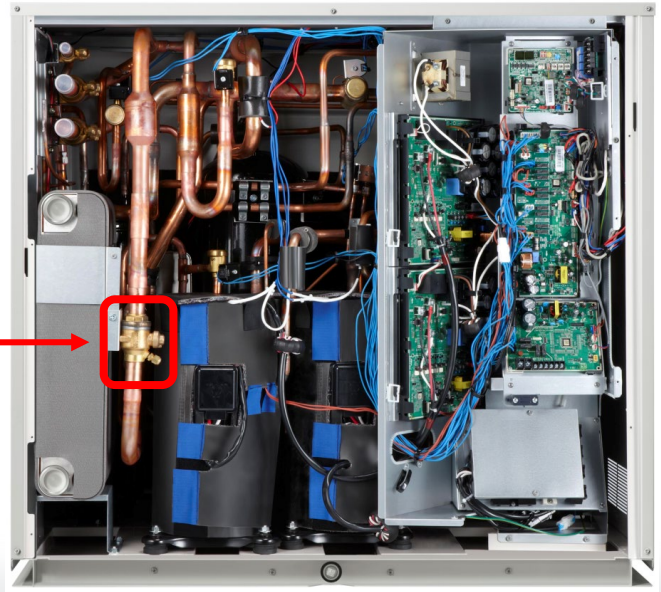
System Setup & Basic Addressing

3 Phase Condenser HP – HR Configuration

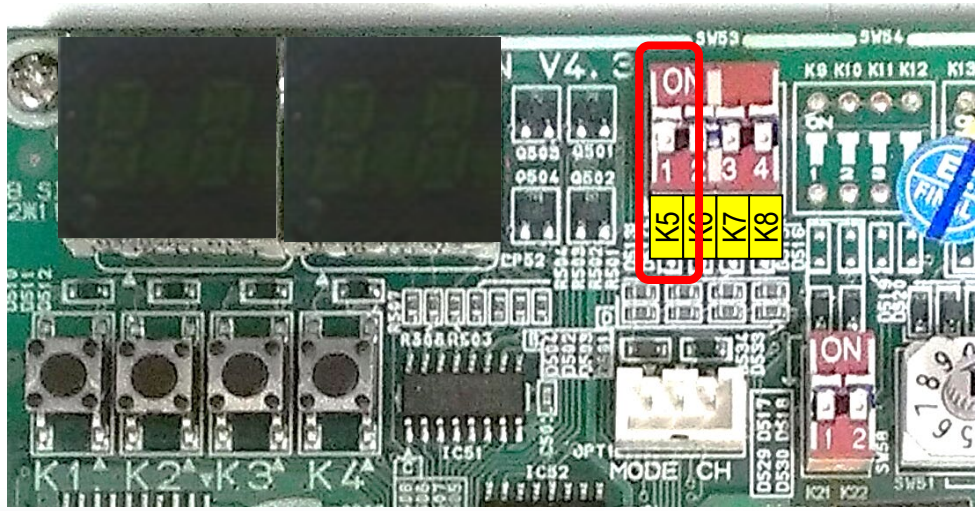
AM072,96,120&192 MBtu Models

Before powering up the condenser(s) the system operation type must be set

- Heat Pump operation – DIP switch K5 on SW53 is “On” (Factory setting)
  - Heat Pump Valve – open position (Factory setting)
- Configure to Heat Recovery operation – Set DIP switch K5 to “Off”
  - Close Heat Pump valve
- Modular systems – all condensers must be configured



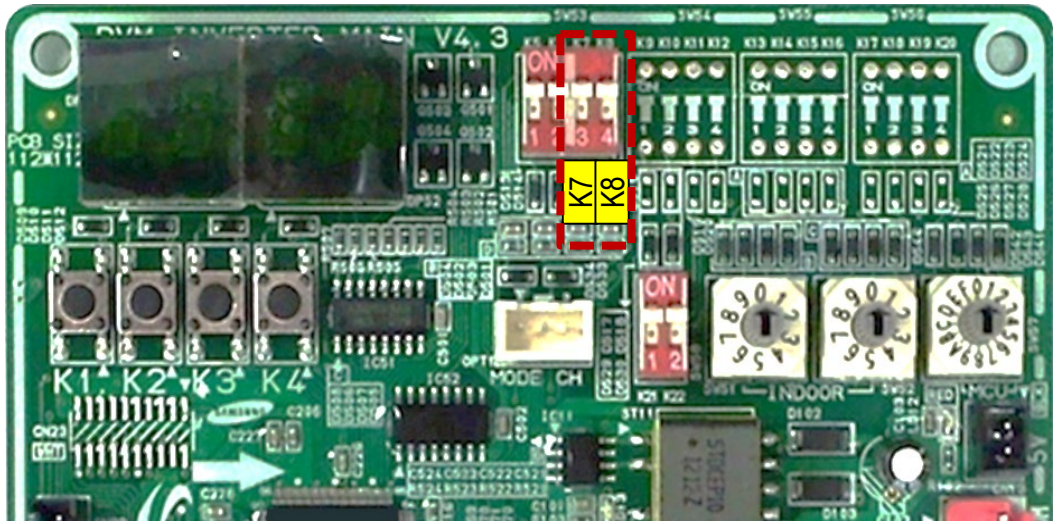
Condenser Main PCB



System Setup & Basic Addressing

Modular Condenser Addressing
AM072,96,120&192 MBtu Models

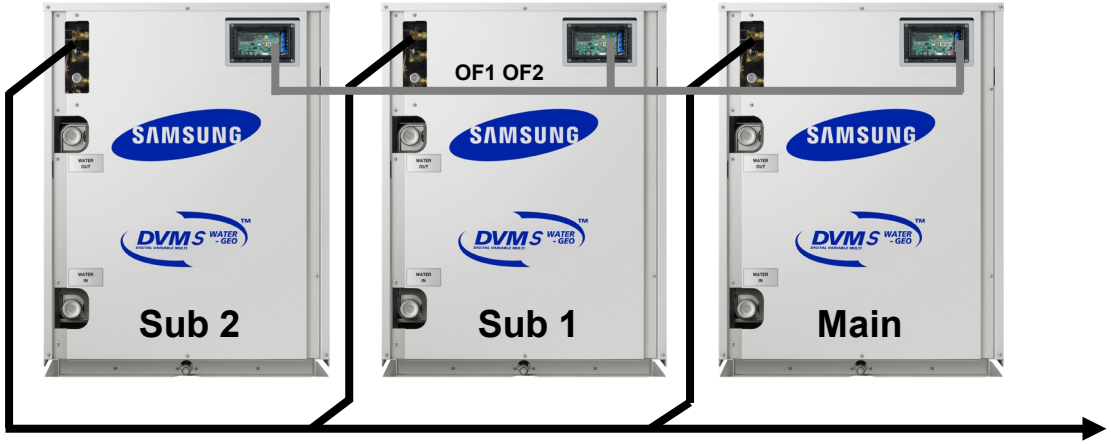
- Communication between multiple condensers must be configured for modular systems – 2 or 3 condensers piped together for one system
- OF1 & OF2 wire connections must be made on each condenser module
- Set DIP switches K7 & K8 on SW53 to designate Main – Sub1 – Sub2
- See Next Slide

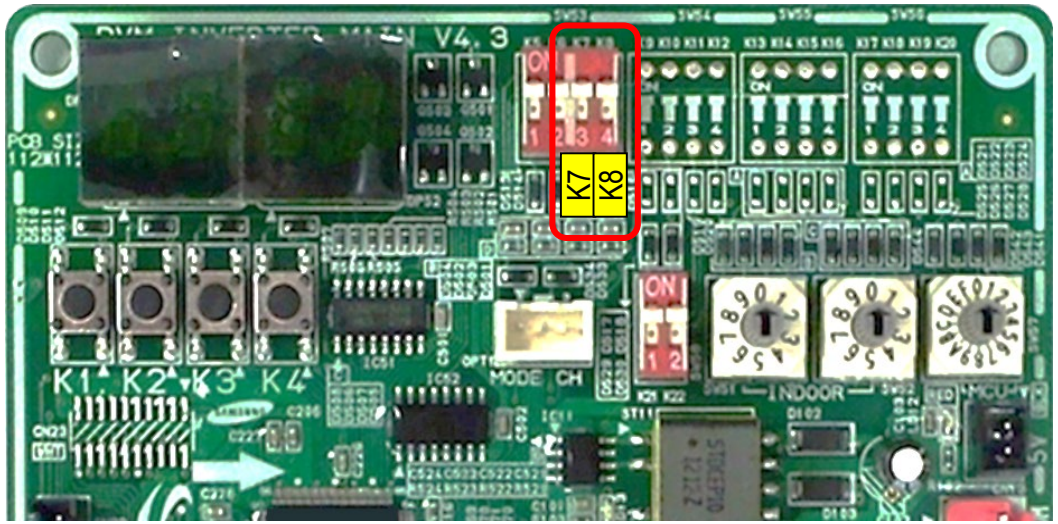


System Setup & Basic Addressing

Modular Condenser Addressing
AM072,96,120&192 MBtu Models

K7	K8	Setting Condenser Module Address
On	On	Condenser address #1 – **Main unit**
On	Off	Condenser address #2 – **Sub unit 1**
Off	On	Condenser address #3 – **Sub unit 2**

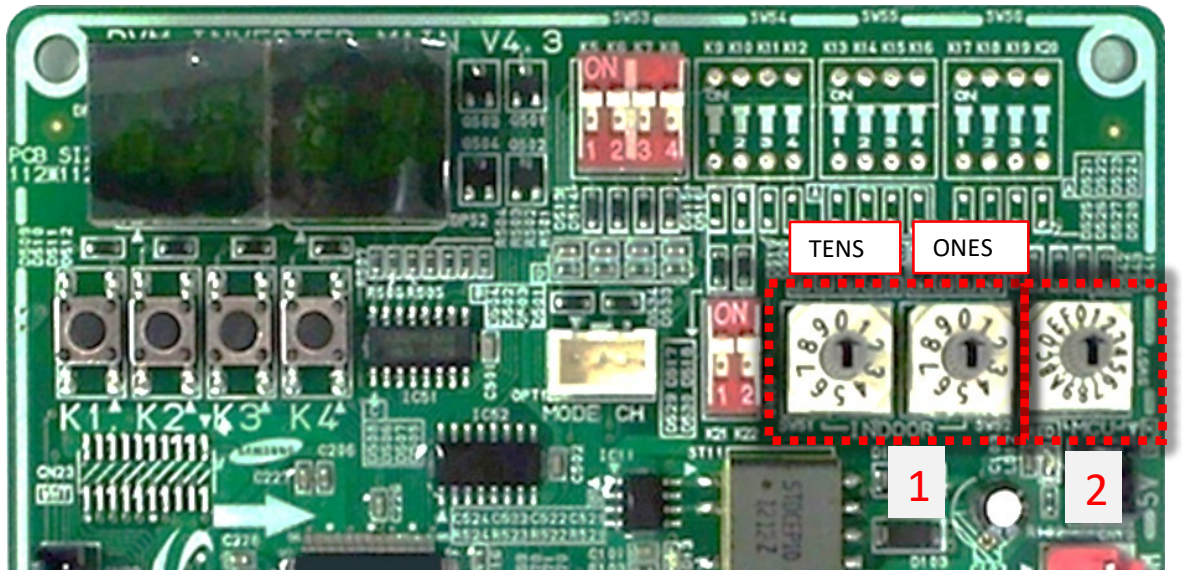




System Setup & Basic Addressing

3 Phase Condenser Main PCB
AM072,96,120&192 MBtu Models

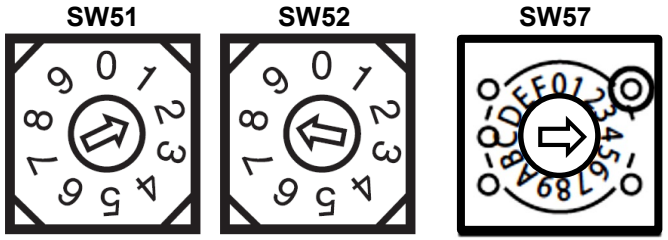
1. Using rotary switches SW51 & SW52 (Main unit) to set the total number of indoor units in the system
2. Rotary switch SW57 to set the total number of MCU's in the system (Heat Recovery only)



Example:

28 indoor units

4 MCU's



Dial Setting	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Actual Address	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

System Setup & Basic Addressing

240 MBtu Condenser Main PCB

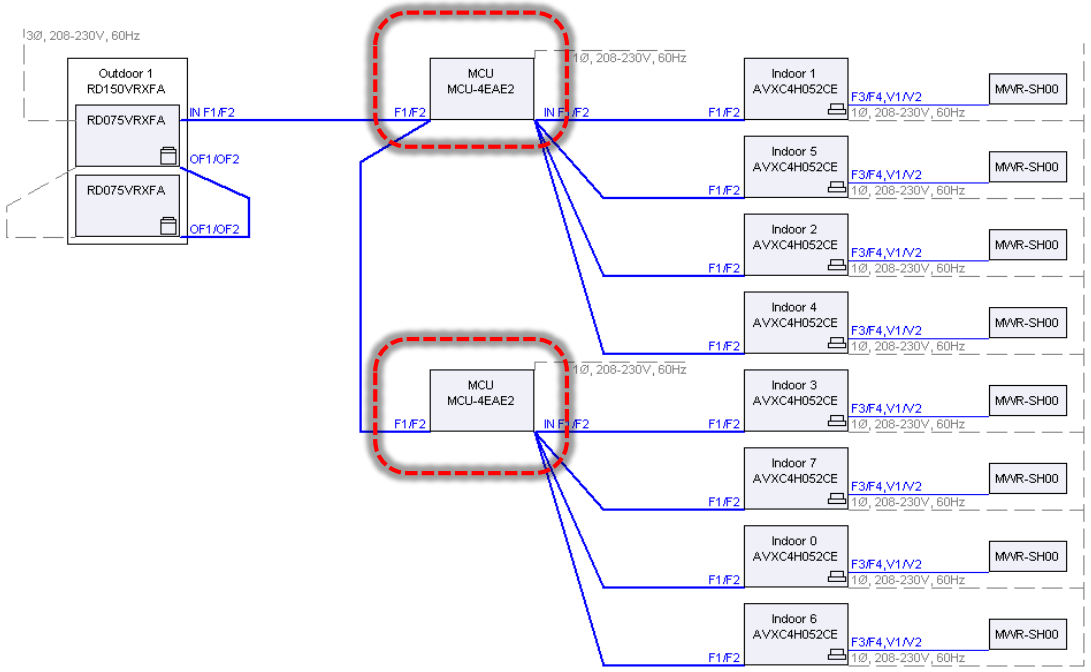
Configuring AM240 condenser options

Step	Button	Display	Description	Note
Outdoor unit address				
Step1	Outdoor unit display	ad nd	Setting required	-
Step2	Press (K1+K2) for 2 seconds	ad 00	Unit address for module combination	00: Main unit
	K4 x 1 time	ad 01		01: Sub1 unit
	K4 x 2 times	ad 02		02: Sub2 unit
	K4 x 3 times	ad 03		03: Sub3 unit
Step3	If it is main unit, go to step4. Otherwise, press K2 button for 2 seconds to save & exit (system will be reset)			
Quantity of indoor units				
Step4	Press K1	Id 00	Ready to set	-
Step5	K2 x n times	Id x0	Tens digit (0 ~ 6)	Ex) 03: 3 units 64: 64 units
	K4 x n times	Id 0x	Ones digit (0 ~ 9)	
	* K4: Press for 2 seconds - automatic detection of indoor units' quantity			
Step6	If it is heat recovery model, go to step 7. Otherwise, press K2 button for 2 seconds to save & exit (system will be reset)			
Quantity of MCUs * Heat recovery model only				
Step7	Press K1	nC 00	Ready to set	-
Step8	K2 x n times	nC x0	Tens digit (0 ~ 1)	Ex) 03: 3 units 16: 16 units
	K4 x n times	nC 0x	Ones digit (0 ~ 9)	
	* K4: Press for 2 seconds - automatic detection of MCUs' quantity			
Step9	Press K1	ht 00	Ready to set	00 : Heat pump system 01 : Heat recovery system
Step10	Press K4	ht 01	Ones digit(0~1)	
Step11	K2: long	Ad 00	Save	Restart
* Press K1 for 2 seconds to exit without save regardless of setting step.				

System Setup & Basic Addressing

MCU Basic Addressing – Pre 2017 Models

- In Heat Recovery systems the MCU's must be addressed to establish communications with the MCU's and their connected indoor fan coil units
  - Maximum 16 MCU's per system (0 to F)
  - Each indoor unit must be addressed to the connected MCU port

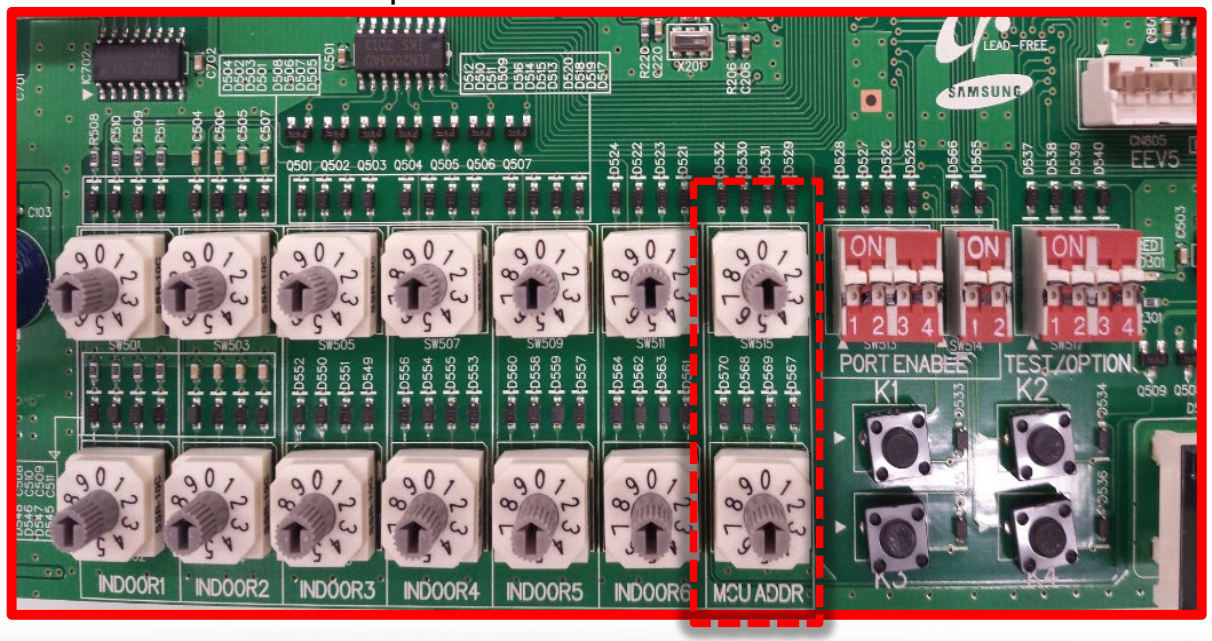


System Setup & Basic Addressing

MCU Basic Addressing – Pre 2017 Models

- First MCU must be addressed “00”
  - MCU addresses must not overlap (duplicate) on a single system
  - MCU addresses can overlap with indoor unit main addresses

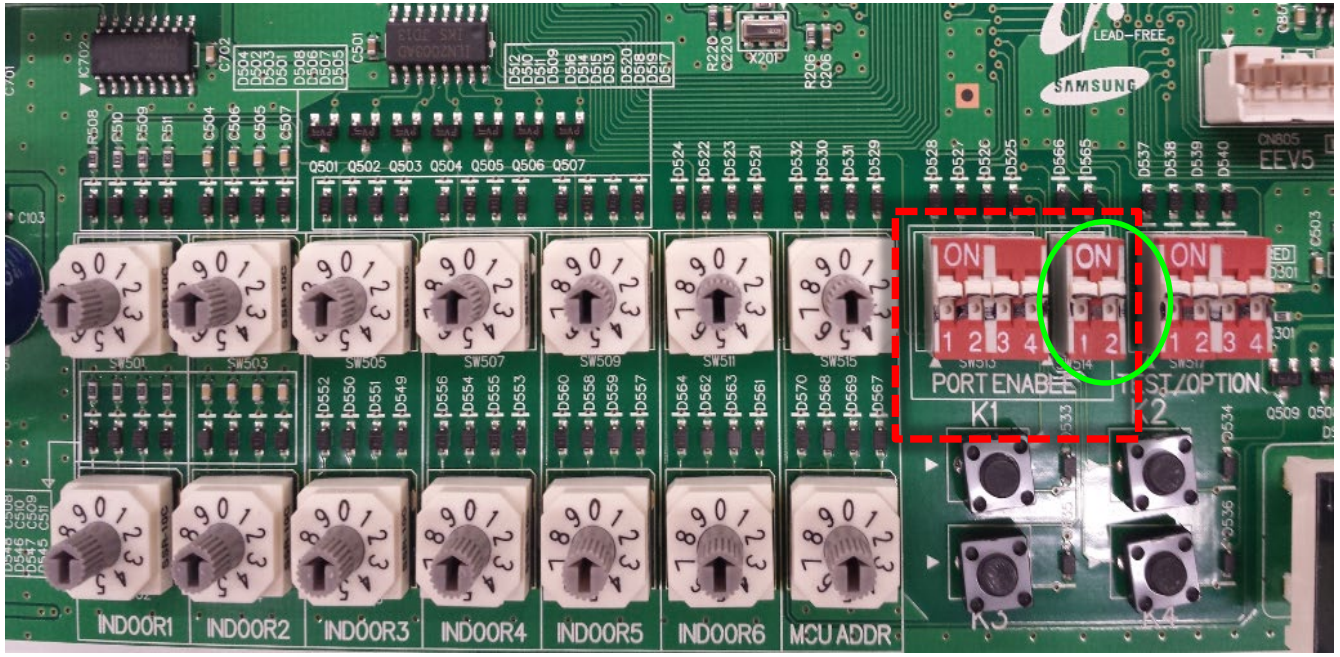
Example: First MCU is addressed “00”



System Setup & Basic Addressing

MCU Basic Addressing – Pre 2017 Models

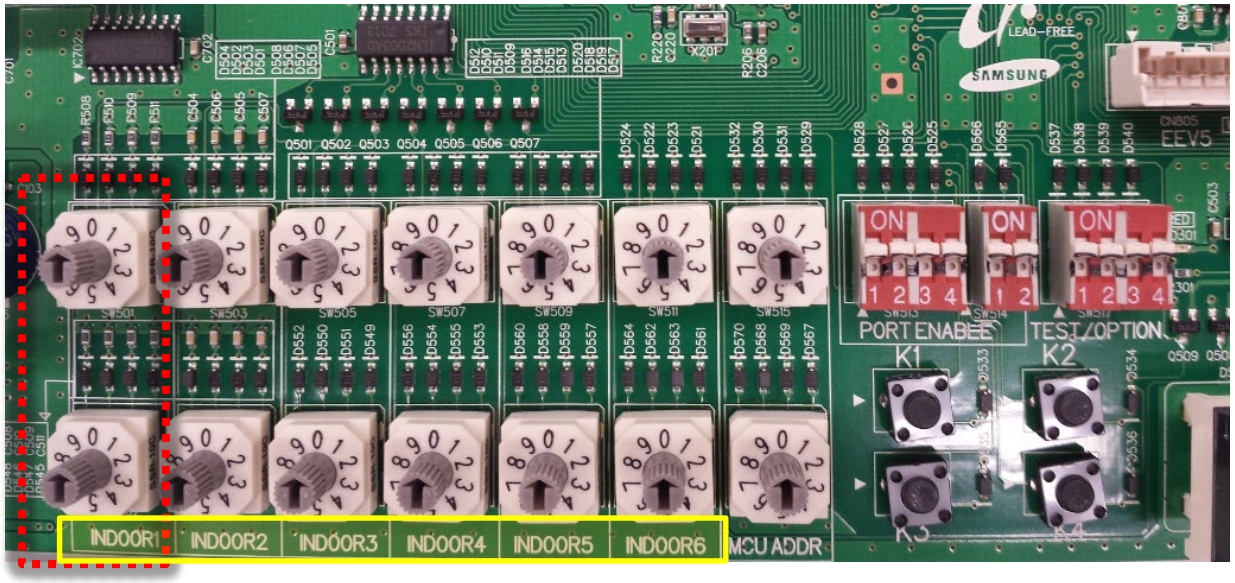
- MCU Indoor Unit functioning ports must be activated using the DIP switches “PORT ENABLE”
  - All MCU’s (2,4&6) use the same PCB
  - Any unused ports, the DIP switches must be off
  - Any indoor units requiring 2 ports connected with a Y-joint – both ports must be enabled (switched on)

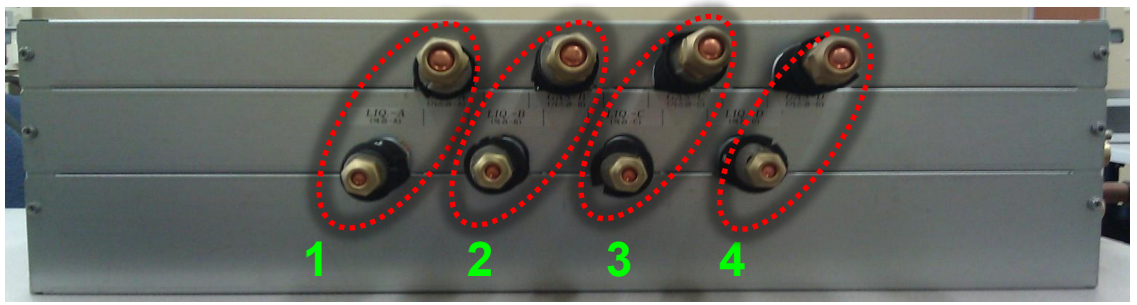


System Setup & Basic Addressing

MCU Basic Addressing – Pre 2017 Models

- Set the main address of the indoor fan coils piped to each set of ports

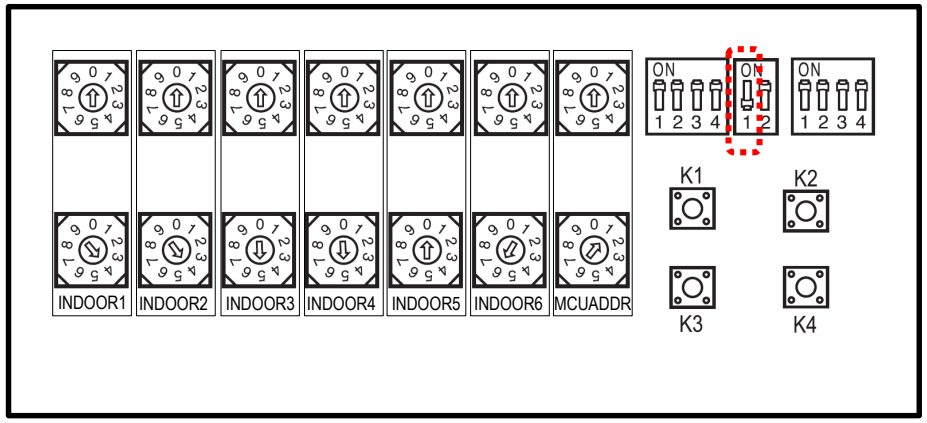




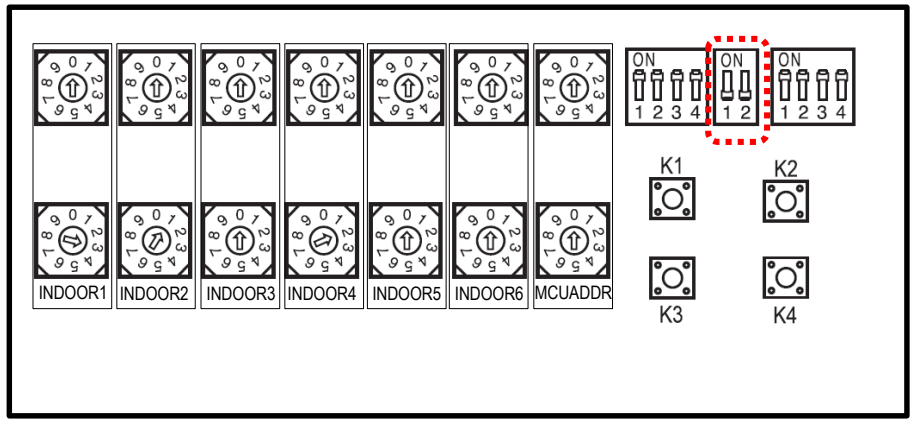
System Setup & Basic Addressing

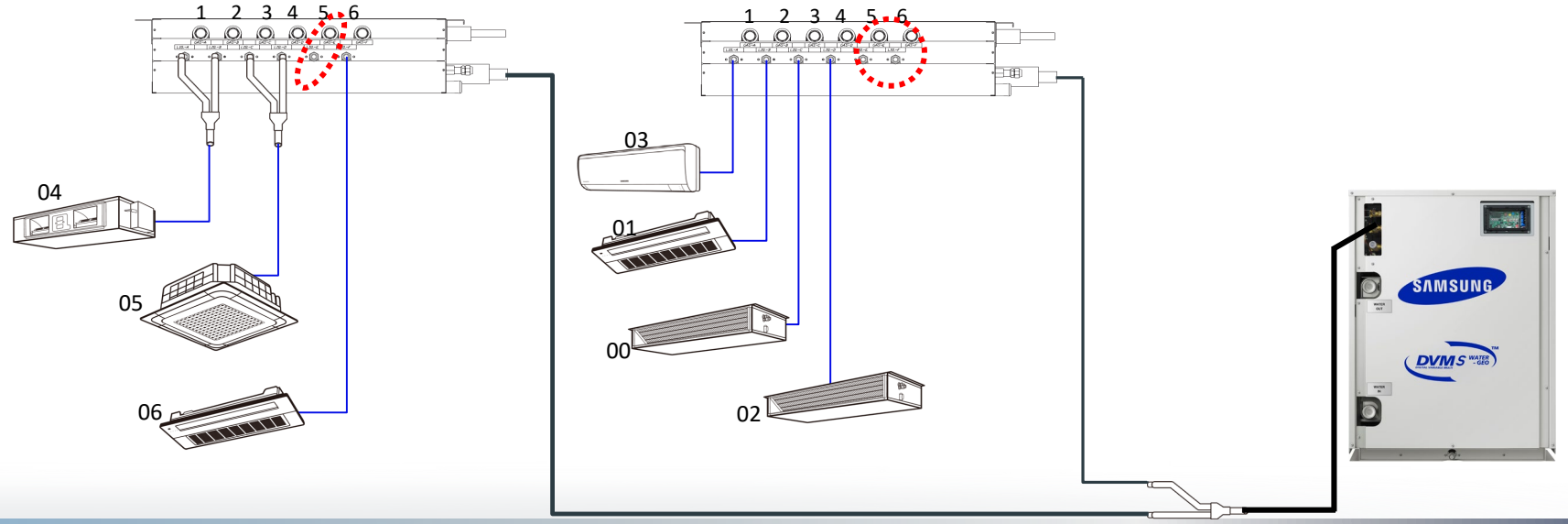
MCU Basic Addressing – Pre 2017 Models

MCU: 01 PCB



MCU: 00 PCB

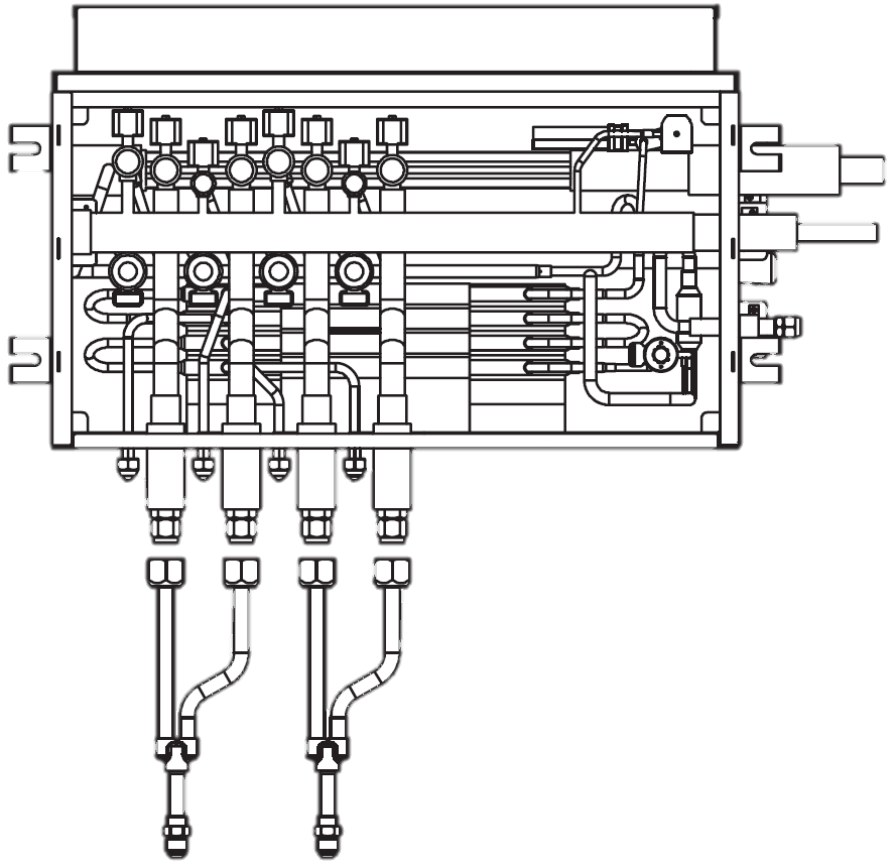




System Setup & Basic Addressing

MCU Basic Addressing – Pre 2017 Models

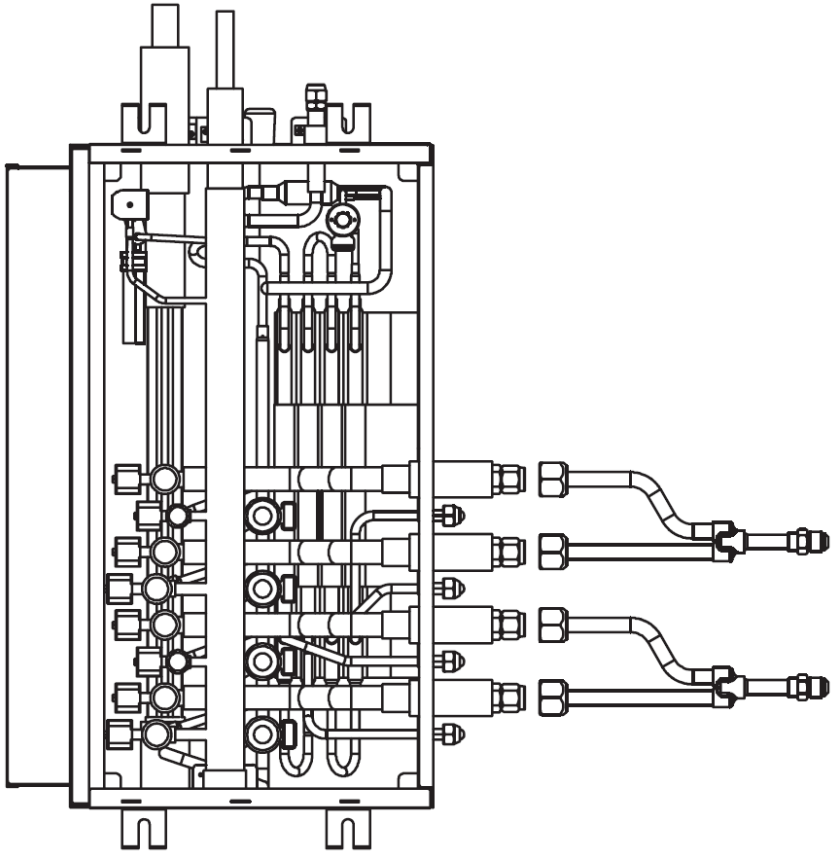
- Indoor units 36,000 Btu/h and larger must connect to 2 adjacent MCU ports.
- MCU-**S4NEE2N** is the only MCU that will work with 6 and 8 ton HSP units.
- Additional fittings are included to connect 2 sets of MCU ports to a single indoor unit



System Setup & Basic Addressing

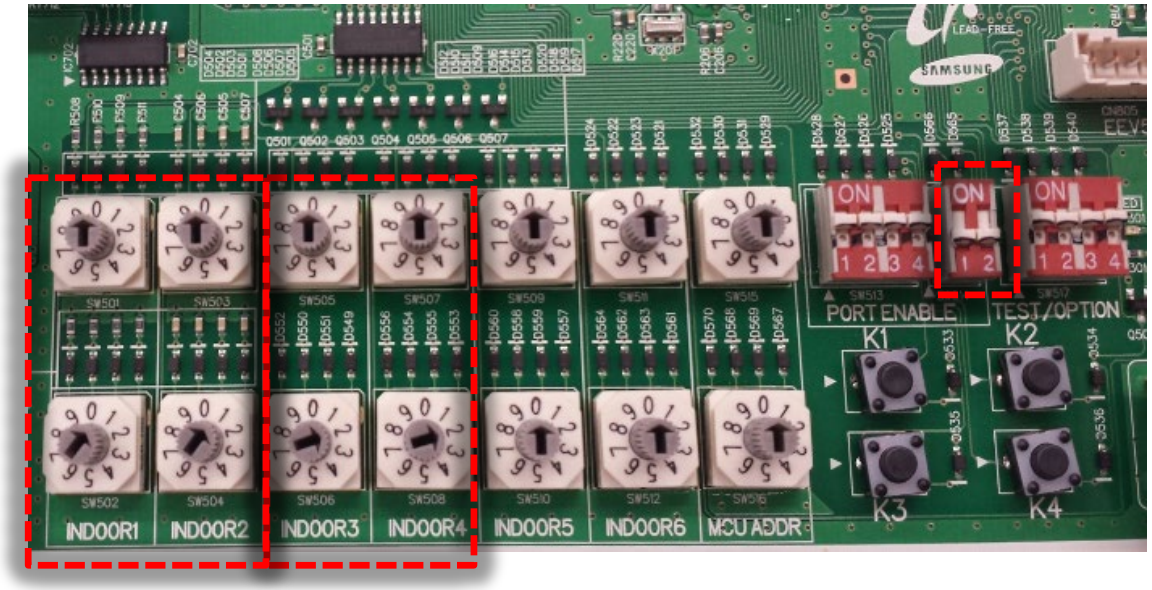
MCU Basic Addressing – Pre 2017 Models

Input the Main address of the unit on the rotary dials that correspond to the 2 ports that it is connected to



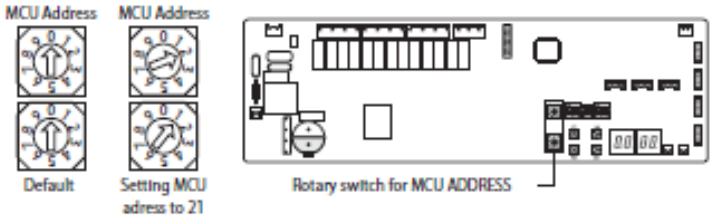
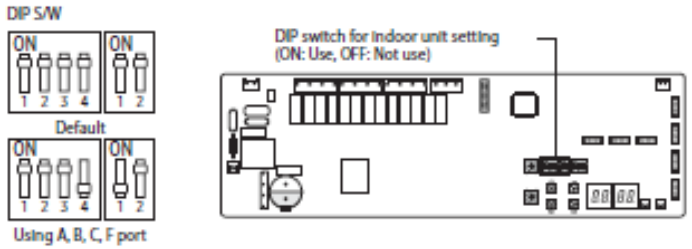
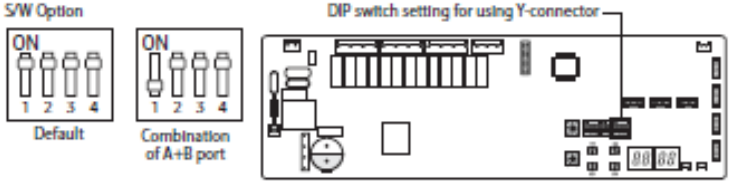
Connected to indoor unit with main address: 02

Connected to indoor unit with main address: 01

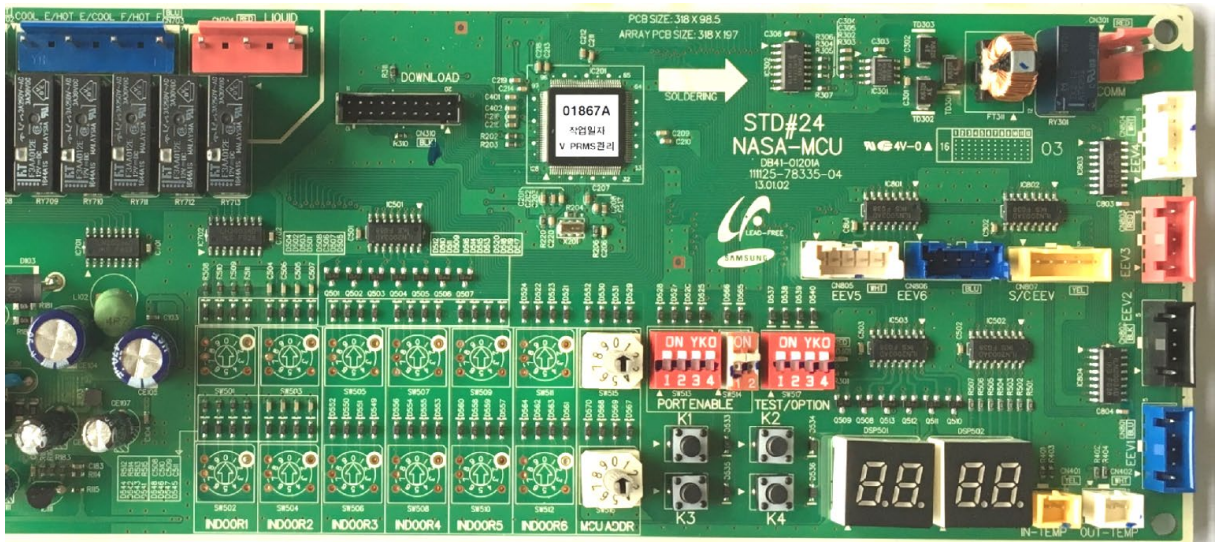


System Setup & Basic Addressing

MCU Basic Addressing – New 2017 Models

Process	
1. MCU address setting	Set MCU address by rotary switch. Example> If you want to set MCU address to 21, set upside rotary switch to 2 and set bottom rotary switch to 1 
2. DIP switch setting for using each port	Set using each port (connected to Indoor unit) by DIP switch Example> If you want to connect Indoor units at A,B,C,F port, set DIP switch 1,2,3,2 to 'ON' 
3. DIP switch setting for using Y-connetor	In case of using Y-connector to connect 2 port , Set DIP Switch S/W option Example> If you want to connect A port and B port with Y-connector , set DIP switch 1 to 'ON' 

MCU Control PCB



MCU Basic Addressing – New 2017 Models

Auto pipe pairing operation

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

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

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

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

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

Step 1 (Start HH 01) → Steps 2 to 8 (Setup HH 08) → Step 9 (Check HH 09) → Step 10 (Confirmation HH 10)

NOTE: Auto pipe pairing operation cannot be used when the system includes the following IDU's: OAP Duct, AHU w/fresh air, ERV.


SAMSUNG
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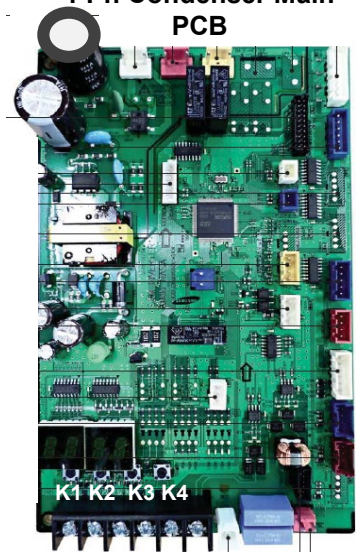
Commissioning

Condenser Entering Water Temperature Configuration

- 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

1 Ph Condenser Main PCB



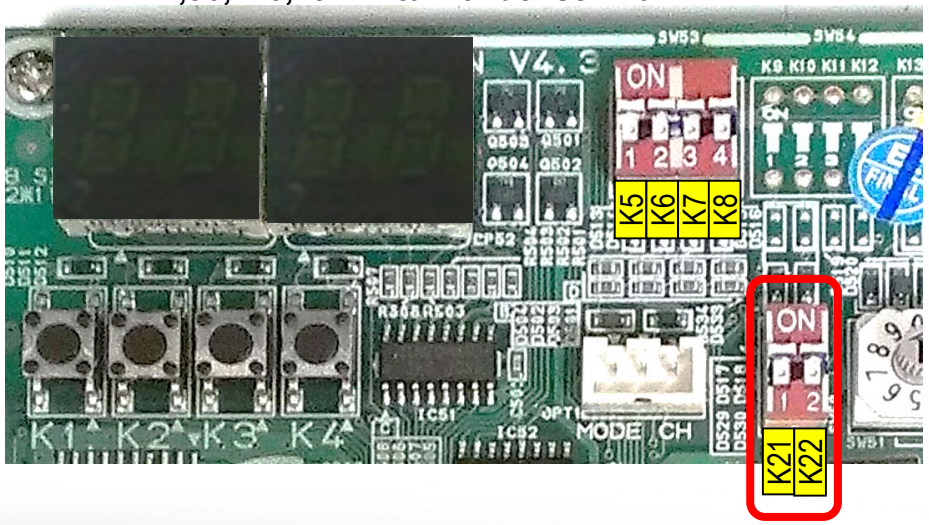
AM240 Condenser Main PCB

- Press and hold K2 to enter option setting
  - Press K1 to change SEG 1&2: Circulating Fluid Flow "2","0"
  - Press K2 to change SEG 3&4: "0","0" "0"."1" – Min 23°F "0","2" Min 14°F

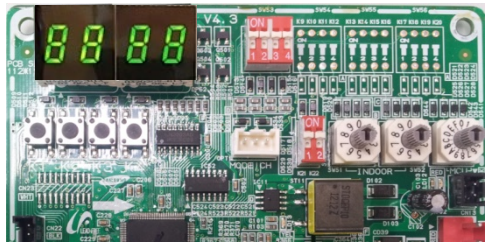
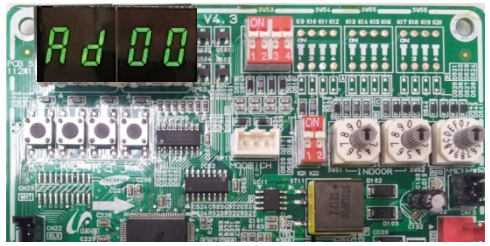
Entering water temperature setting : DIP Switches K21 & K22

- Standard entering water temperature range: On/On (default)
- Min. entering water temperature 23°F: On/Off (requires antifreeze)
- Min. entering water temperature 14°F: Off/On

72,96,120,192MBtu Condenser Main PCB



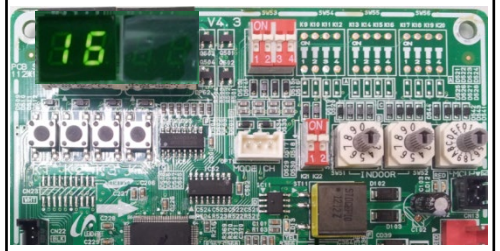
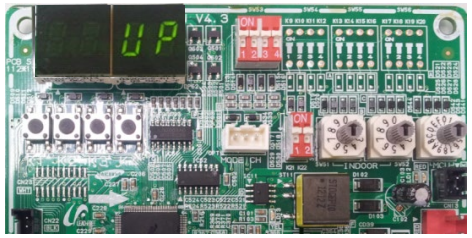
Condenser Main PCB

Sequence	Display	Details
1		Check display segment - Digit “8” flicker consecutively from left to right - Check whether seven-segment defect or not
2		Starting Tracking - “Ad” means starting tracking

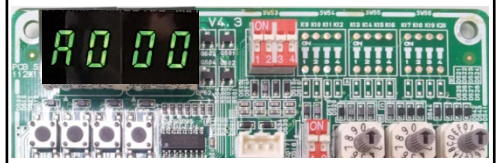
Indoor unit quantity found

8 → 88 → 88 8 → 88 88 → AD 00 → A0 03 → A0 07 → Release to normal tracking display

Condenser Main PCB

Sequence	Display	Details
3		Communication between outdoor and indoor unit - Micom tracking indoor unit address 0 to 63 - If Micom receives response from indoor unit, the address displays on the right side ★ 0~63: Indoor address
4		UP display - After tracking complete, “UP” is shown on display at initial installation. - “UP” means UnPrepared: Not ready for operation - Implement test operation(Cooling/heating mode) → more than 1 hour → “UP” disappearance → normal operation

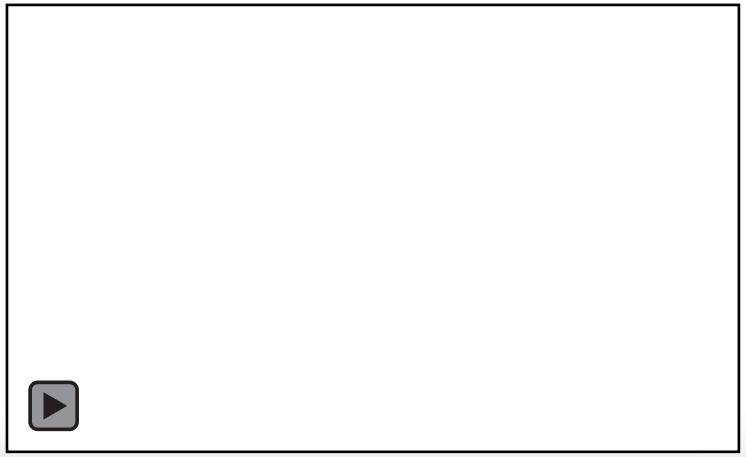
Condenser Main PCB

Sequence	Display	Details
5		Segment meaning - Scrolls “A0_ _” displaying connected indoor unit addresses - Scrolls “C1_ _” displaying connected MCU addresses

VIDEO:

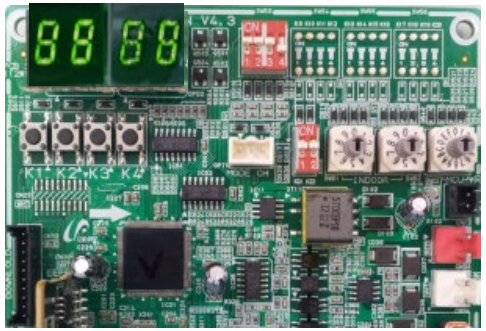
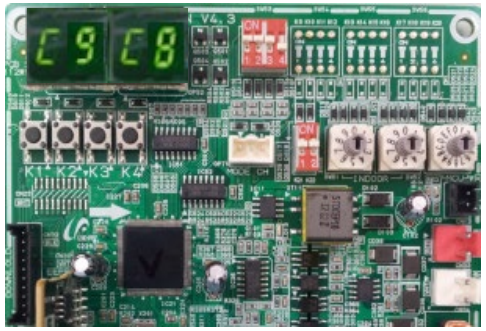
EXAMPLE: Heat recovery scrolling 7 indoor unit addresses (0 ~ 6) and 2 MCU’s (00, 01)

A0 00 → A0 01 → A0 02 → A0 03 → A0 04 → A0 05 → A0 06 → C1 00 → C1 01



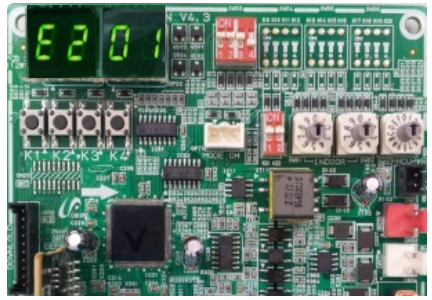
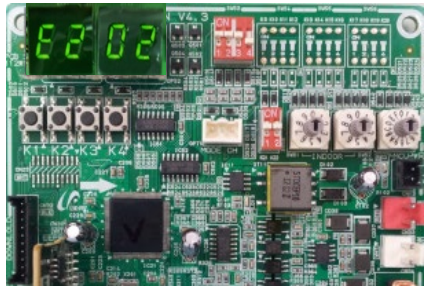
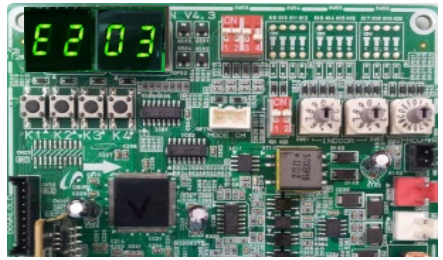
A0 00 = Indoor unit 00
A0 01 = Indoor unit 01
A0 02 = Indoor unit 02
A0 03 = Indoor unit 03
A0 04 = Indoor unit 04
A0 05 = Indoor unit 05
A0 06 = Indoor unit 06
C1 00 = MCU 00
C1 01 = MCU 01

Condenser Main PCB

Sequence	Display	Check point
1		Check display segment - Digit “8” flicker consecutively from left to right - Check whether seven-segment defect or not
2		Starting communication among outdoor units - “C*” flicker when outdoor unit communicate each other - “C” means communication, ” *” means address of main Micom. Refer to the below chart.

Unit	Main MICOM
Main	8
Sub 1	9
Sub 2	A

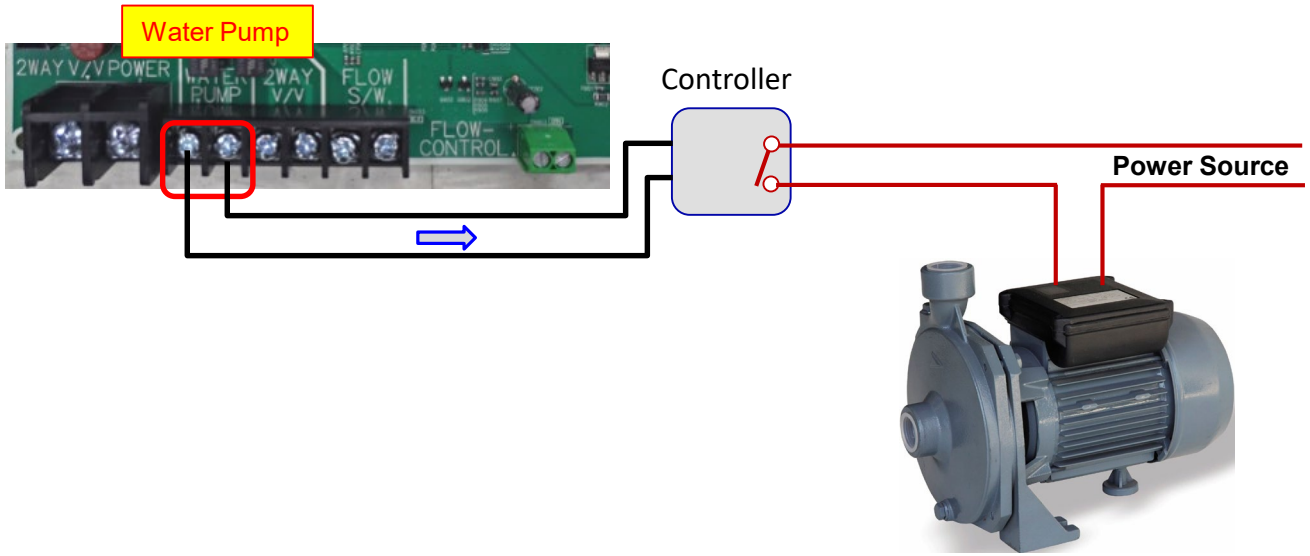
Condenser Main PCB – Common Errors

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 rotary dials are set properly • Make sure all indoor units have power and have F1/F2 connected • Check indoor unit address overlapping
E202		"E202": Communication error between indoor unit and outdoor unit after tracking • 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 • Check the option switch K7,K8 on outdoor units

Start-up Procedure – Step 1

Test closed loop pump operation

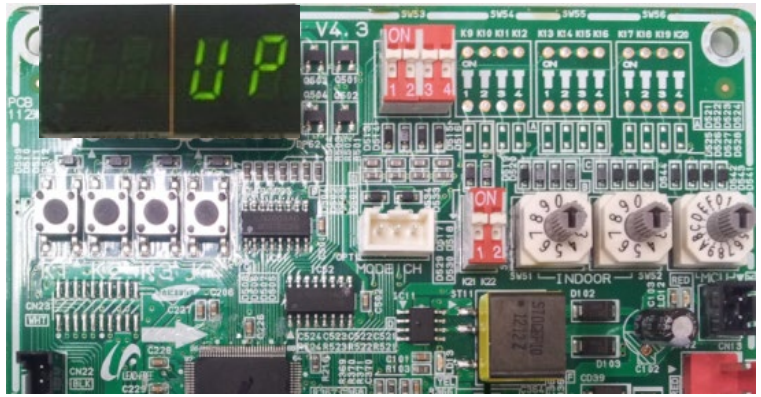
- With the system idle, press K2 X 10.
- The unit will send a signal to activate the pump
- Verify the pump is activated and operates



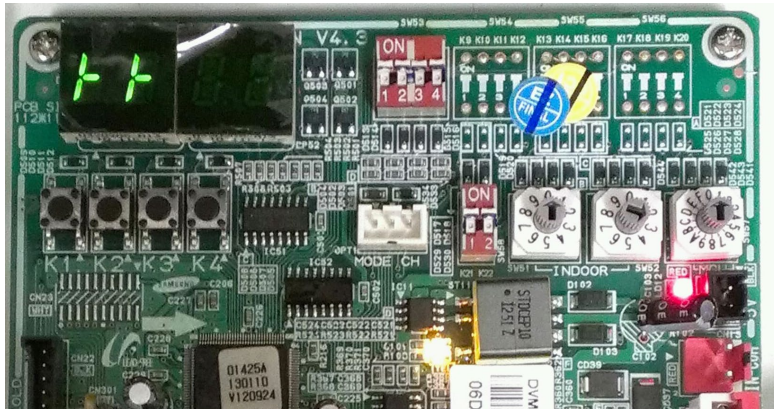
Start-up Procedure – Step 2

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

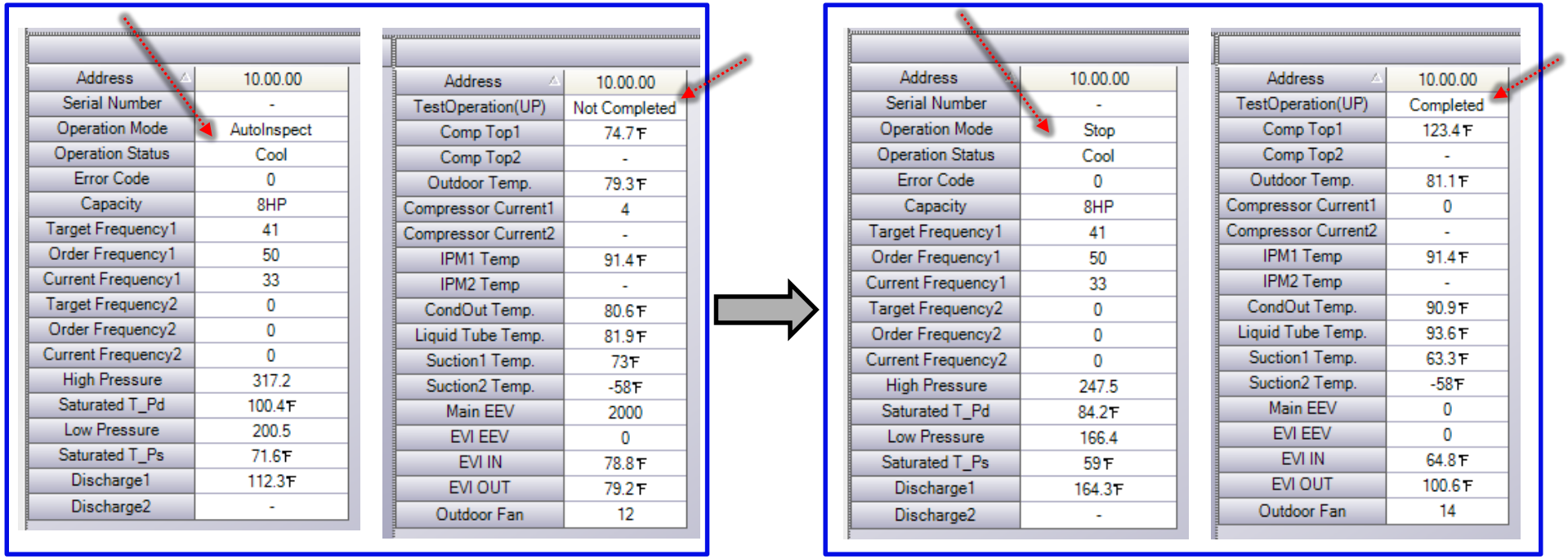


"KK"



Start-up Procedure – Step 2 Cont.

SNET Pro 2 example



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	-

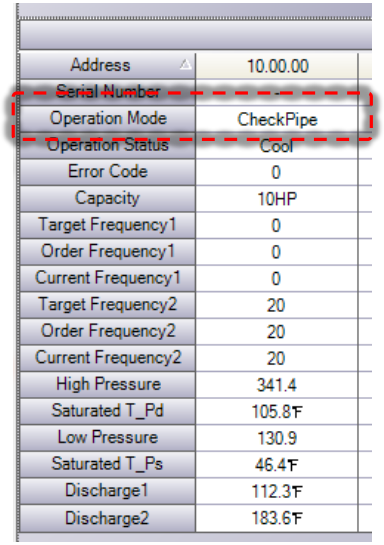
Address	10.00.00
TestOperation(UP)	Completed
Comp Top1	123.4℉
Comp Top2	-
Outdoor Temp.	81.1℉
Compressor Current1	0
Compressor Current2	-
IPM1 Temp	91.4℉
IPM2 Temp	-
CondOut Temp.	90.9℉
Liquid Tube Temp.	93.6℉
Suction1 Temp.	63.3℉
Suction2 Temp.	-58℉
Main EEV	0
EVI EEV	0
EVI IN	64.8℉
EVI OUT	100.6℉
Outdoor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

After Auto-trial operation

Start-up Procedure – Step 3

Pipe Check – Heat Recovery (Heat Pump, skip to Step 4)

- Press K2 on MAIN outdoor unit 4 times (if the system was just in operation, wait 15 minutes minimum before enabling pipe check mode to ensure accuracy).
- This operation will operate the outdoor unit and open one set of MCU ports at a time
- Indoor unit operation:
  - Cooling: All indoor units will operate in Fan mode at high speed, one unit will operate in COOL mode at a time.
  - Heating: All indoor units will operate in HEAT mode, one will operate in FAN mode at a time.
- The system verifies that a temperature change is seen at each indoor unit when its MCU port is open
- If a temperature change is seen on a different unit, an error code will be displayed.
- Helps ensure that MCU dial settings are correct

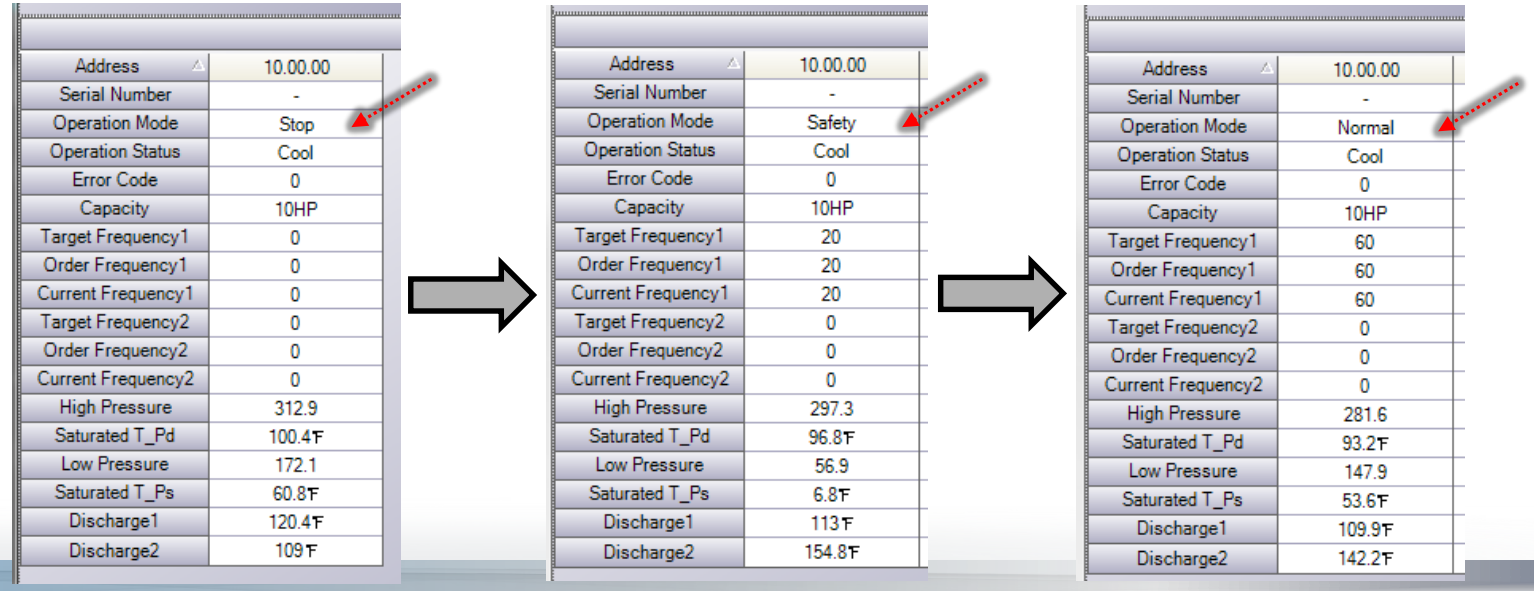


Address	10.00.00
Serial Number	
Operation Mode	CheckPipe
Operation Status	Cool
Error Code	0
Capacity	10HP
Target Frequency1	0
Order Frequency1	0
Current Frequency1	0
Target Frequency2	20
Order Frequency2	20
Current Frequency2	20
High Pressure	341.4
Saturated T_Pd	105.8℉
Low Pressure	130.9
Saturated T_Ps	46.4℉
Discharge1	112.3℉
Discharge2	183.6℉

Start-up Procedure – Step 4

System Operation - Turn indoor units in “phases” to ensure a soft initial system start for new systems

- Turn on 25% of indoor units using zone controllers or SNET Pro 2 and monitor
- Make sure that all units that are turned on are in the same mode and have a set temperature that will insure compressor demand (ex: Heat mode, set temp = 83°F)
- 15 minutes after SNET Pro 2 shows the system in “Normal” operation, turn on 25% more indoor units and monitor.
- In 15 minutes turn on the remaining indoor units and monitor



Address	10.00.00
Serial Number	-
Operation Mode	Stop
Operation Status	Cool
Error Code	0
Capacity	10HP
Target Frequency1	0
Order Frequency1	0
Current Frequency1	0
Target Frequency2	0
Order Frequency2	0
Current Frequency2	0
High Pressure	312.9
Saturated T_Pd	100.4℉
Low Pressure	172.1
Saturated T_Ps	60.8℉
Discharge1	120.4℉
Discharge2	109℉

Address	10.00.00
Serial Number	-
Operation Mode	Safety
Operation Status	Cool
Error Code	0
Capacity	10HP
Target Frequency1	20
Order Frequency1	20
Current Frequency1	20
Target Frequency2	0
Order Frequency2	0
Current Frequency2	0
High Pressure	297.3
Saturated T_Pd	96.8℉
Low Pressure	56.9
Saturated T_Ps	6.8℉
Discharge1	113℉
Discharge2	154.8℉

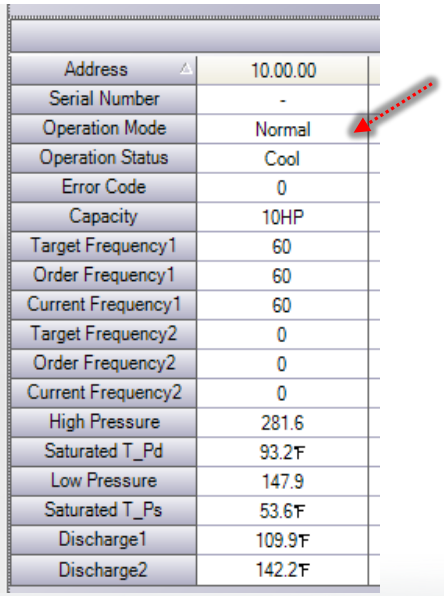
Address	10.00.00
Serial Number	-
Operation Mode	Normal
Operation Status	Cool
Error Code	0
Capacity	10HP
Target Frequency1	60
Order Frequency1	60
Current Frequency1	60
Target Frequency2	0
Order Frequency2	0
Current Frequency2	0
High Pressure	281.6
Saturated T_Pd	93.2℉
Low Pressure	147.9
Saturated T_Ps	53.6℉
Discharge1	109.9℉
Discharge2	142.2℉

Start-up Procedure – Step 5

Manual MCU Address Checking (HR systems only)

Although not mandatory, this process will ensure that all MCU PCB settings are correct

- Operate the system with all indoor units in the same mode with a set temperature that will demand compressor operation
- After the system operation mode is “Normal”, turn one indoor unit to the opposite mode (ex: all in heat mode → all in heat mode except 1 unit in cooling)
- Monitor indoor unit operation data (“Indoor Unit Data” tab in SNET Pro 2) to make sure the indoor unit in the opposite mode than the others has an acceptable coil temperature for that mode.



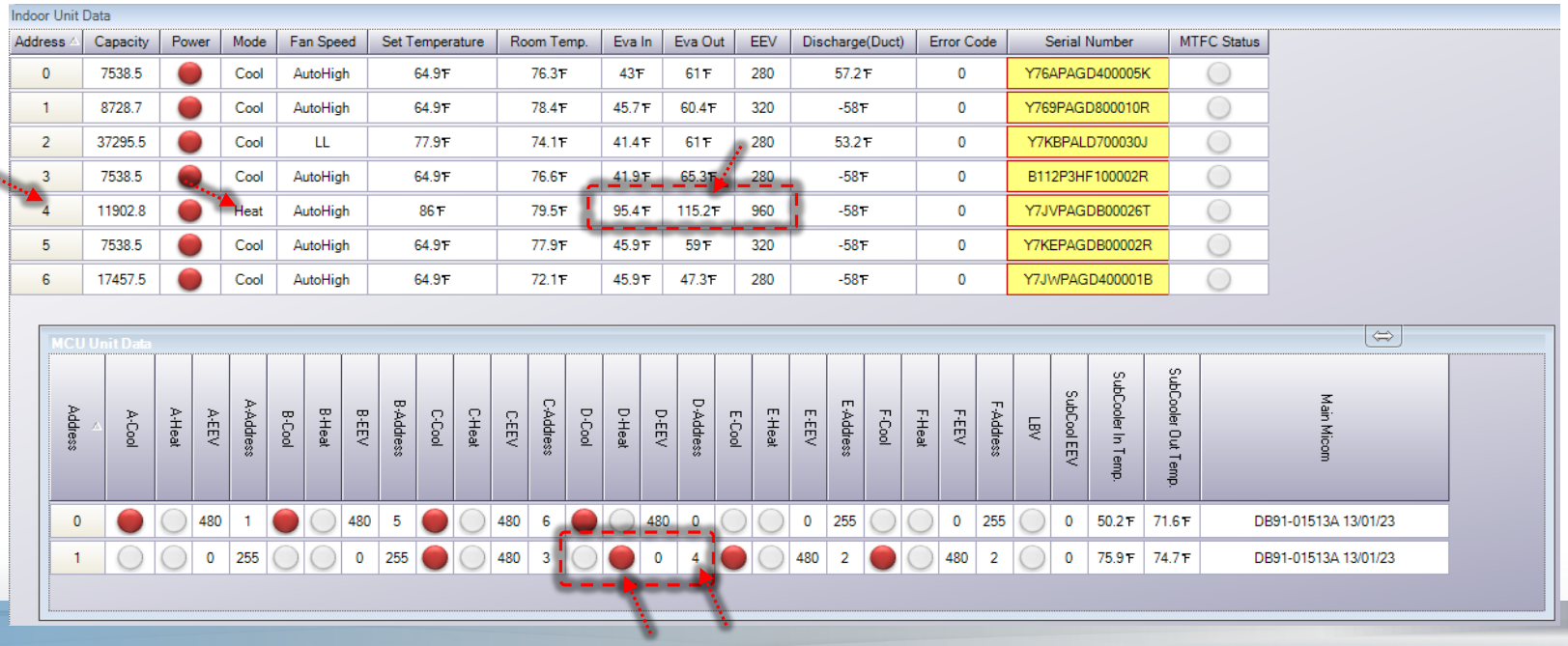
Address	10.00.00
Serial Number	-
Operation Mode	Normal
Operation Status	Cool
Error Code	0
Capacity	10HP
Target Frequency1	60
Order Frequency1	60
Current Frequency1	60
Target Frequency2	0
Order Frequency2	0
Current Frequency2	0
High Pressure	281.6
Saturated T_Pd	93.2℉
Low Pressure	147.9
Saturated T_Ps	53.6℉
Discharge1	109.9℉
Discharge2	142.2℉

Start-up Procedure – Step 5 Cont.

EXAMPLE:

Majority of indoor units are in Cool mode and one is in Heat,

- The coil inlet temperatures (Eva In) for the units in cool mode will be 40 ~ 50°F.
- The coil outlet temperature (Eva Out) of the unit in heat should be between 95 ~ 150°F.
- The MCU for that unit should also show that the heating solenoid valve is energized.
- If the indoor unit address displayed for the MCU solenoid valve that is energized for heating does not match the indoor unit with the high temperature coil (heating temperatures), then there is an issue with the indoor unit address settings on the MCU(s).



Indoor Unit Data

Address	Capacity	Power	Mode	Fan Speed	Set Temperature	Room Temp.	Eva In	Eva Out	EEV	Discharge(Duct)	Error Code	Serial Number	MTFC Status
0	7538.5		Cool	AutoHigh	64.9℉	76.3℉	43℉	61℉	280	57.2℉	0	Y76APAGD400005K	
1	8728.7		Cool	AutoHigh	64.9℉	78.4℉	45.7℉	60.4℉	320	-58℉	0	Y769PAGD800010R	
2	37295.5		Cool	LL	77.9℉	74.1℉	41.4℉	61℉	280	53.2℉	0	Y7KBPALD700030J	
3	7538.5		Cool	AutoHigh	64.9℉	76.6℉	41.9℉	65.3℉	280	-58℉	0	B112P3HF100002R	
4	11902.8		Heat	AutoHigh	86℉	79.5℉	95.4℉	115.2℉	960	-58℉	0	Y7JVPAGDB00026T	
5	7538.5		Cool	AutoHigh	64.9℉	77.9℉	45.9℉	59℉	320	-58℉	0	Y7KEPAGDB00002R	
6	17457.5		Cool	AutoHigh	64.9℉	72.1℉	45.9℉	47.3℉	280	-58℉	0	Y7JWPAGD400001B	

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	SubCool EEV	SubCooler In Temp.	SubCooler Out Temp.	Main Micom
0			480	1			480	5			480	6			480	0			0	255			0	255		0	50.2℉	71.6℉	DB91-01513A 13/01/23
1			0	255			0	255			480	3			0	4			480	2			480	2		0	75.9℉	74.7℉	DB91-01513A 13/01/23

Start-up Procedure – Step 6

Heating or Cooling trial operation

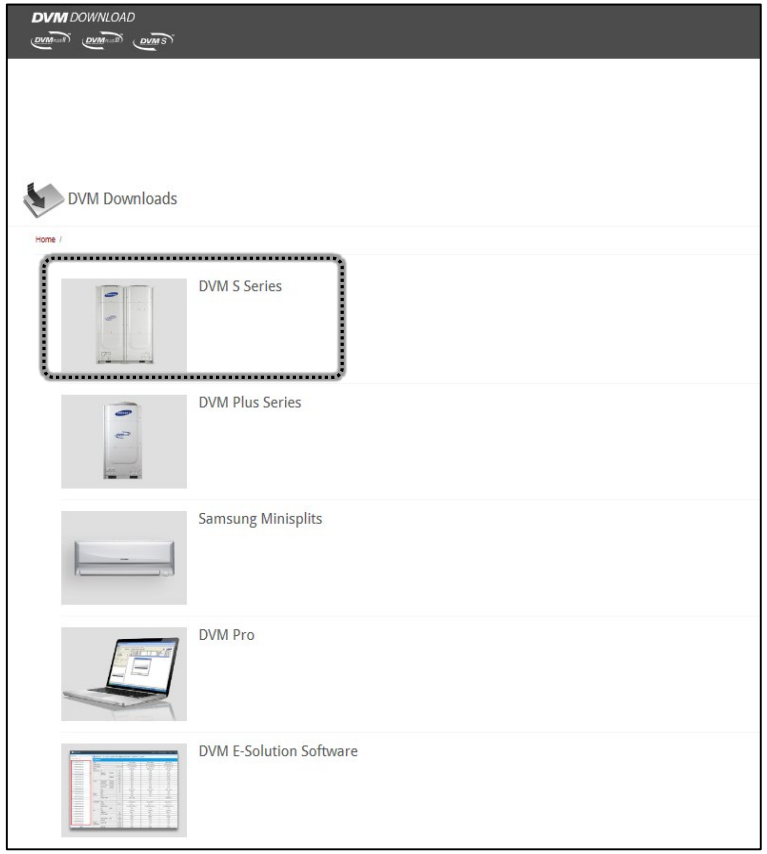
Heating Trial Operation: Press K1 two times
Cooling Trial Operation: Press K2 two times

- 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

Start-up Procedure – Step 7

Fill out operation checklist

- Available at www.DVMdownloads.com
- The following pages will walk though the main operation checklist points from the checklist



Refrigerant Check

Items		Contents
Key	Number	K2
	Push time	5

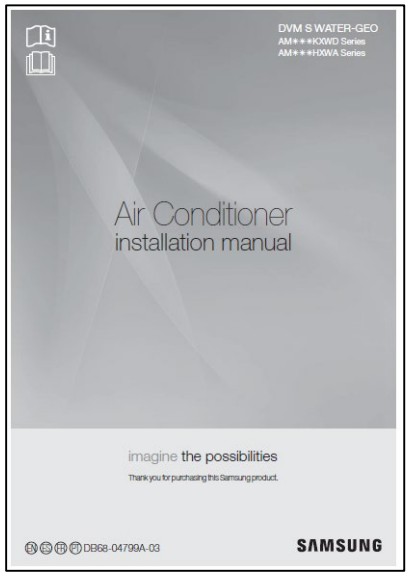
Step	Display
Safety start	
Feedback control	
Judgment of stability	
Judgment	Overcharged Shortage Normal Judgment not Available

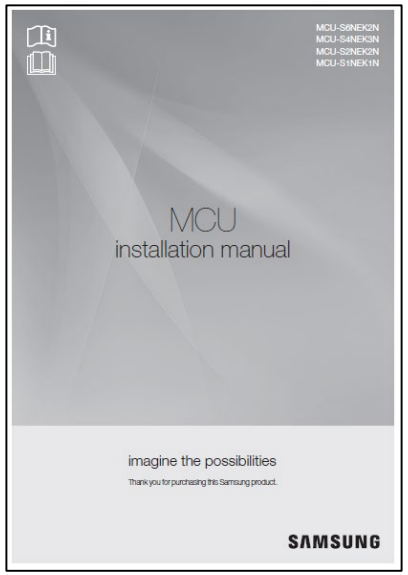
Use refrigerant detect mode after the system has ran in cooling mode for a minimum of 30 minutes

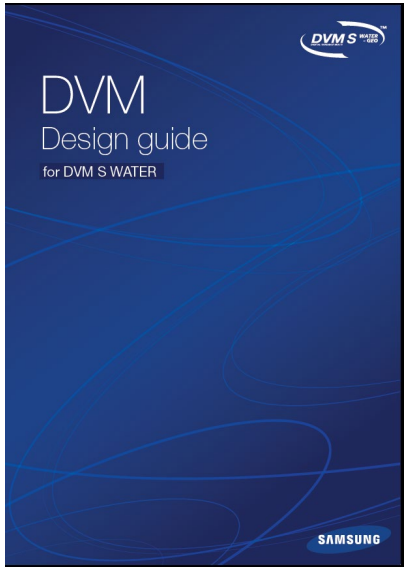
Refrigerant check can also be used with SNET Pro 2 software

- Overcharged – Recover 5% of system refrigerant and restart refrigerant detection mode
- Shortage/Insufficient – Add 5% of system refrigerant to system and restart refrigerant detect mode
- Insufficient degree of subcooling – add 10% of system refrigerant volume and restart refrigerant detect mode

Always refer to the Samsung Installation Manuals and submittals for specific specifications, installation procedures and option codes







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DVM S Water Training

Thank you !

SAMSUNG HVAC

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: (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.

System Operation Data

Condenser outlet temperature (CondOut Temp) / subcooler outlet temperature (Liquid Tube 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.
- (Suction temp - Suction saturated temp) = 0 ~ 12.6º F
- 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.
- **Outdoor EEV (Main EEV)**
  - During cooling operation, outdoor EEV should be at 2,000 steps.

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.

System Operation Data

Indoor Unit EEV (Cool mode)

- Under normal operation and conditions, EVA_IN temperature should be between 45º F - 57º F for all indoor units.
- Under normal operation and conditions, EVA_OUT temperature should be between 45º F - 57º F for all indoor units.
- (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 will range between 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 ((EVA_OUT) - (EVA_IN)) > 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.

System Operation Data

Indoor Unit EEV (Heat mode)

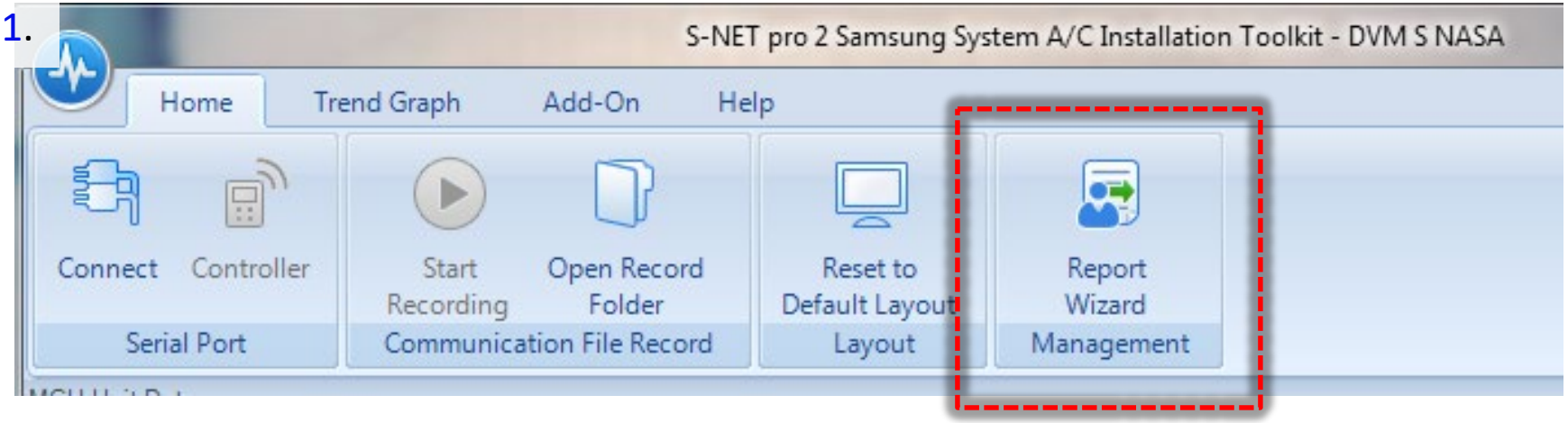
- Under normal operation and conditions, EVA_OUT temperature should be between 113º F - 194º F for all indoor units.
- Under normal operation and conditions, EVA_IN temperature should be between 91º F - 122º F for all indoor units.
- Under normal operation and conditions, diffuser temperatures should be 105° F or greater.
- EEV position will vary based on indoor and outdoor conditions.
- 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.
- 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.

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”

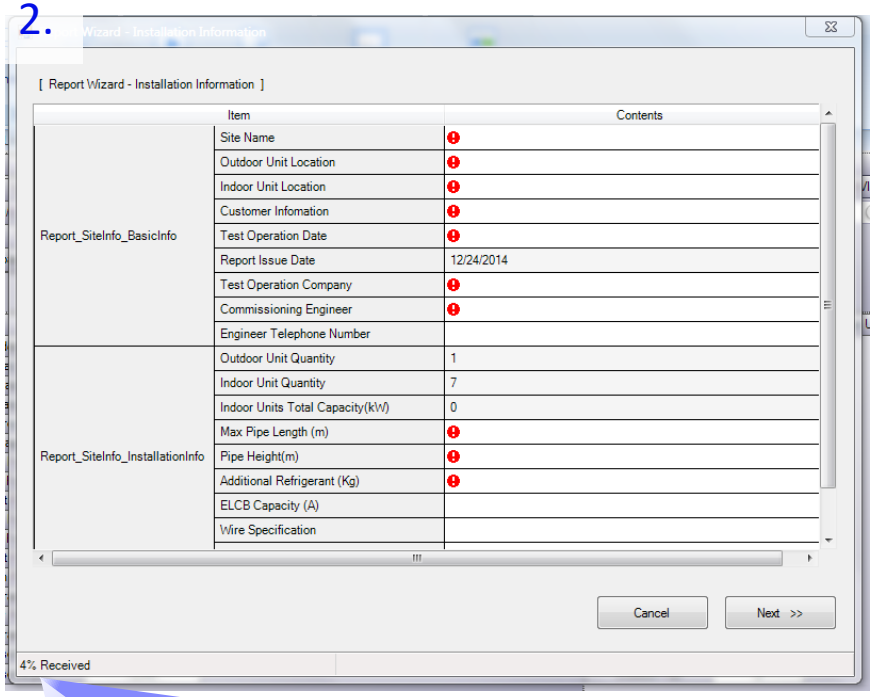
1.

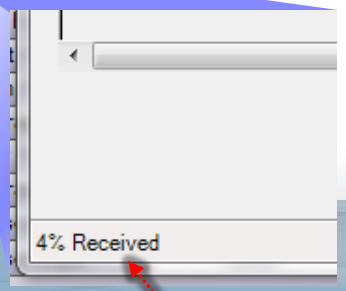


System Operation Data Report

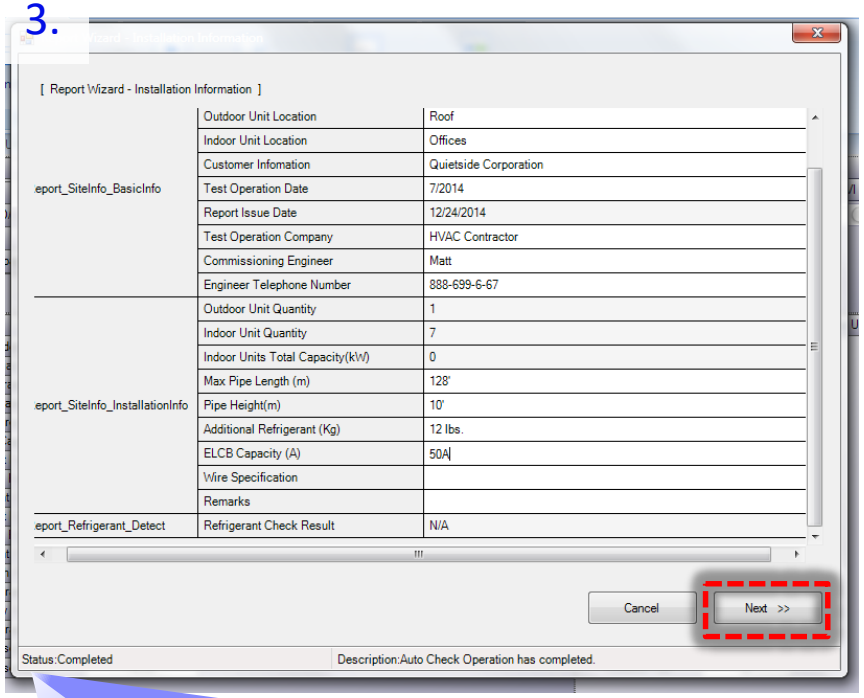
2. Enter site name, equipment location, etc. All field with ❗ must have data entered.
3. After all data is entered and the “% Received” has reached 100% and displays “Status: Complete”, click the “Next” button

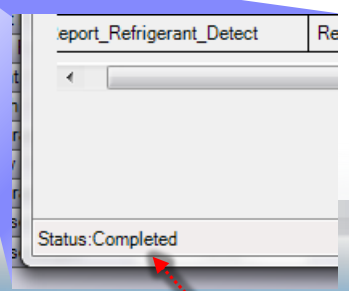
2.





3.



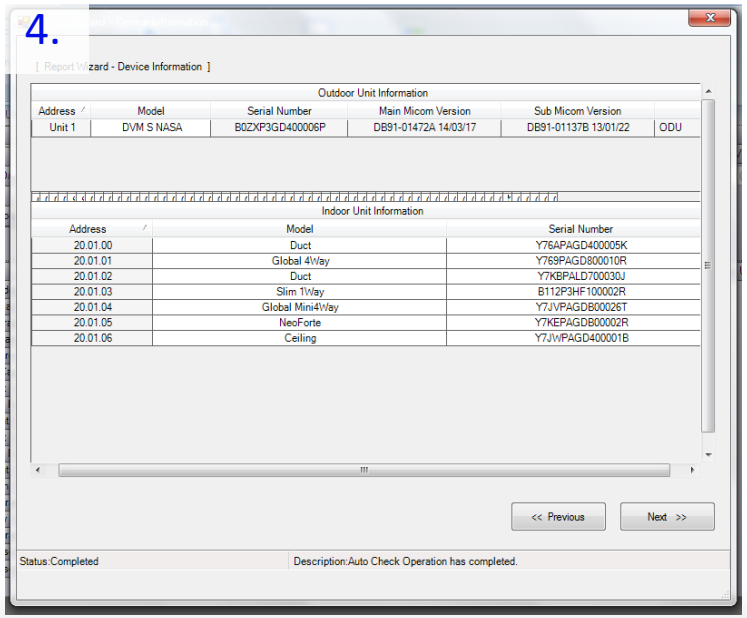


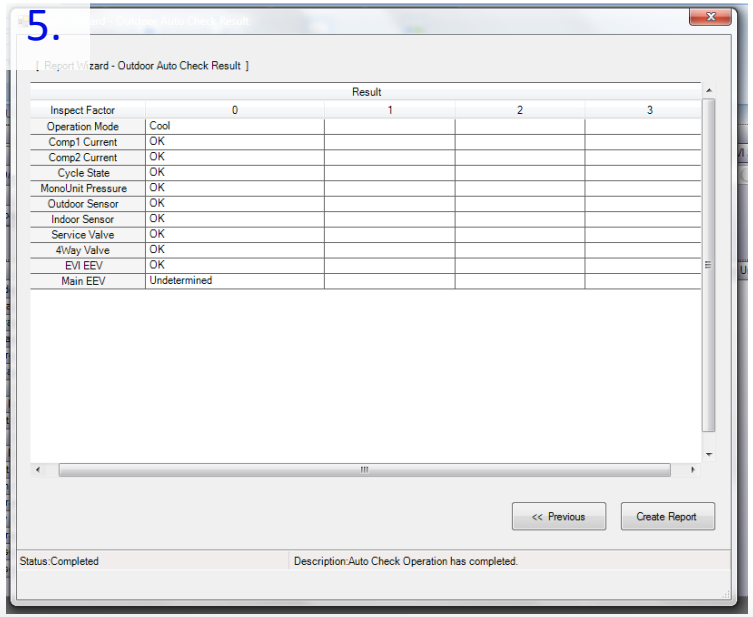
System Operation Data

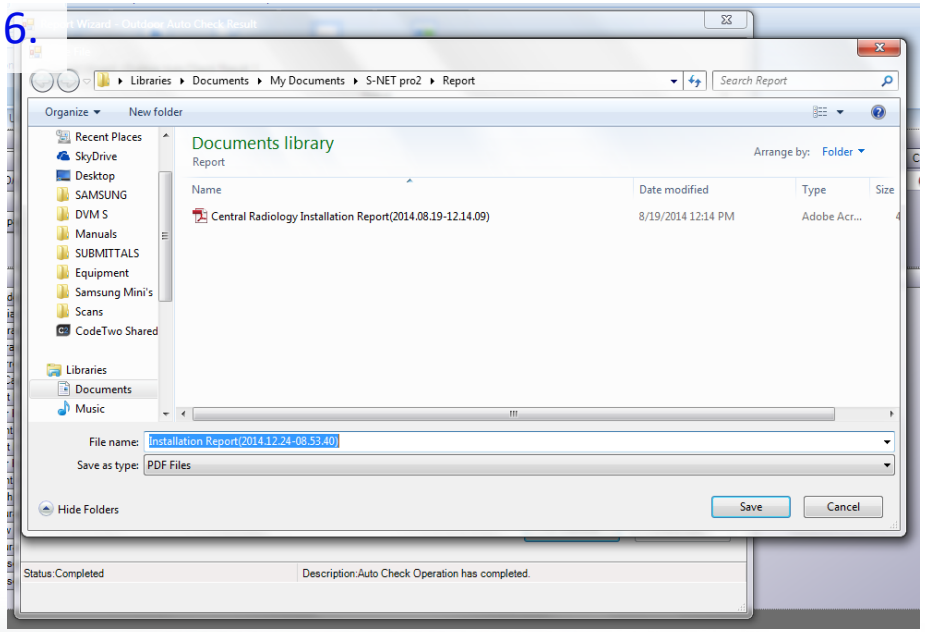
4. The next window will display the indoor unit addresses, type, and serial number and outdoor unit model, serial number, main MICOM and sub MICOM versions. Click “Next”

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

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







System Operation Data Report

After finishing commissioning, send the following to startup@SamsungDVM-S.com

1. Recording file from the following operations:
   a. Auto-trial mode (clear UP)
   b. Pipe check
   c. Cooling test mode (if temperatures allow)
   d. Heating test mode (if temperatures allow)

2. Commissioning checklist (available at www.dvmdownload.com)

3. PDF Report from SNET Pro 2 for each system

4. OPTIONAL – photos of outdoor unit installation and other installation photos

SAMSUNG HVAC Exclusive Dealer Features

Easy System Error Code Diagnostics & New System Registration

SAMSUNG HVAC Dealer Mobile App

Dealer support at your fingertips
Android or IOS devices

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Error Code Diagnostics

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

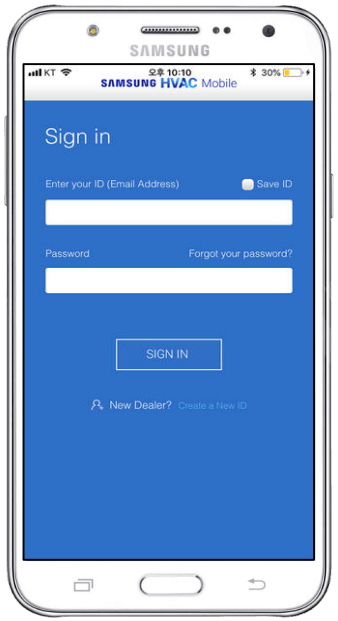
System error code lists are included in the Installation and Service Manuals & DVMS Error Code Booklet

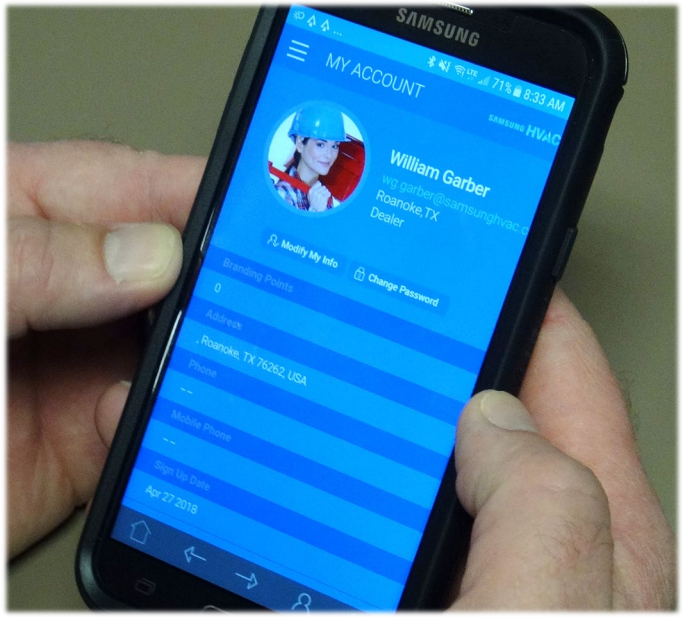
There is an easy way to access the error code lists with descriptions by simply using the

SAMSUNG HVAC Dealer Mobile app on your Android or IOS devices

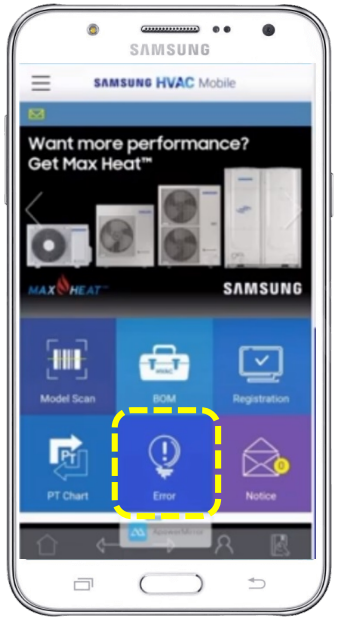
Error Code Diagnostics

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



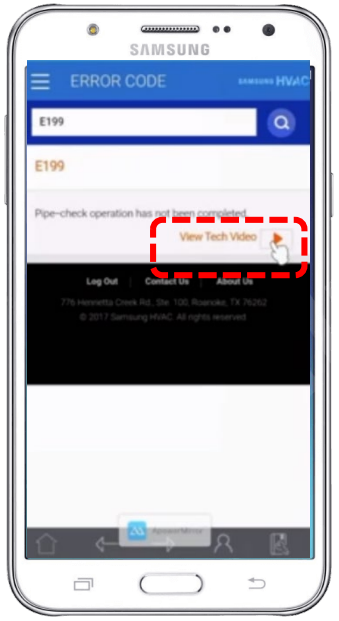


Launch the app and sign in



Select “Error” tab from Menu

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



You can select the video description of the error code

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

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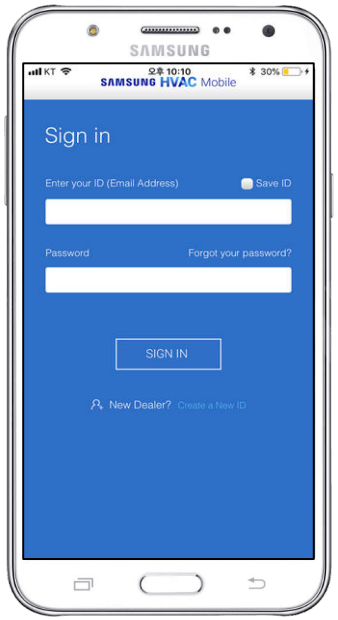
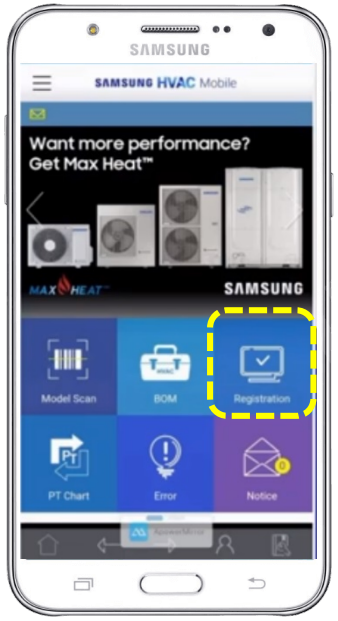
Samsung System Registration

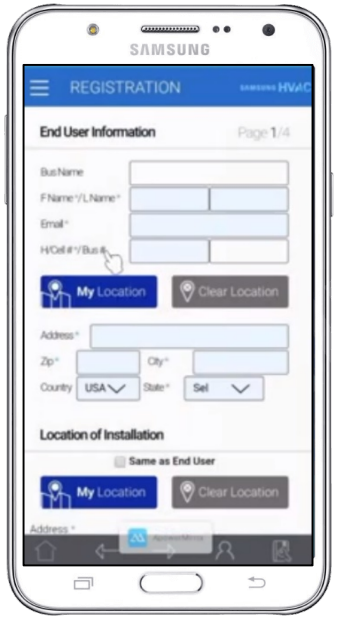
New Samsung systems can be conveniently registered through the SAMSUNG HVAC Dealer Mobile App



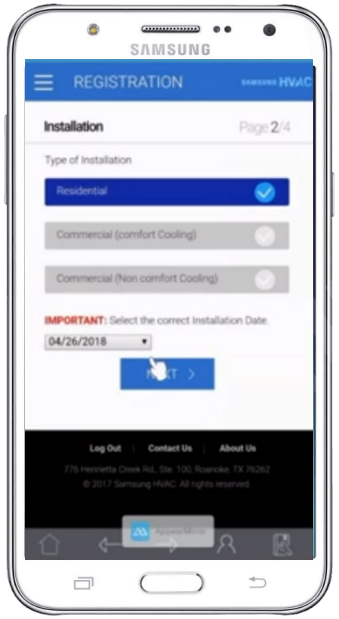
Launch the app and sign in



Select the "Registration" tab from Menu



Enter the installation information including the end-user email address



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

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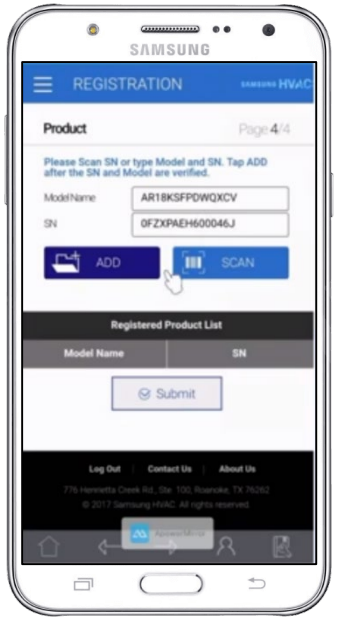
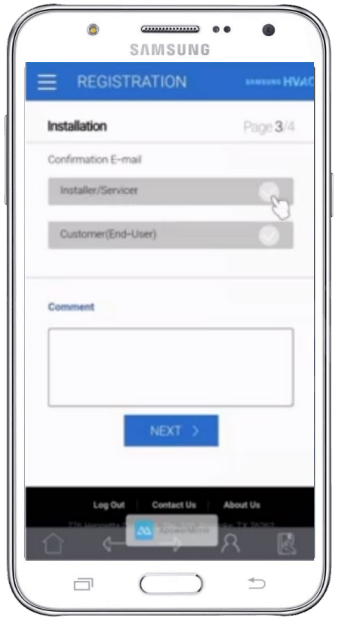
Samsung System Registration

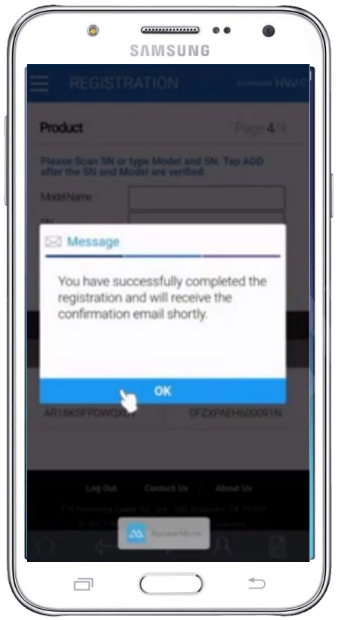
System unit model and serial numbers can be typed in, however with the Dealer Mobile App, each unit's model and serial number can be easily scanned in – Multiple units can be scanned for each system



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



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



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

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

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Thank You *!*

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