Internal use only

DVM S Trouble Shooting

SAMSUNG ELECTRONICS Co. LTD.

HQ CS

This is a general training material. Always refer to Samsung technical data books, installations manuals, and service manuals prior to and during installation.

Modified history

Date	Ver.	Modifier	Detail	Remarks
22 Jan 14	1.0	Lee Yihyeong	New	
06 Feb 14	1.1	Lee Yihyeong	Add P75	
9 Mar	1.2	Lee Yihyeong	Modify E108 error, Page76 comp change when oil contaminated	
09 Apr 15	1.3	Lee Yihyeong	Comp replacement guide	

Trainer Profile

- Name :
- E-mail :

Contents

◆ OBJECTIVES

1. To understand service process
2. How to measure and take an action for system error

◆ CONTENTS

1. Service process
2. Case study & trouble shooting guide

◆ TRAINING TIME : 3 hour

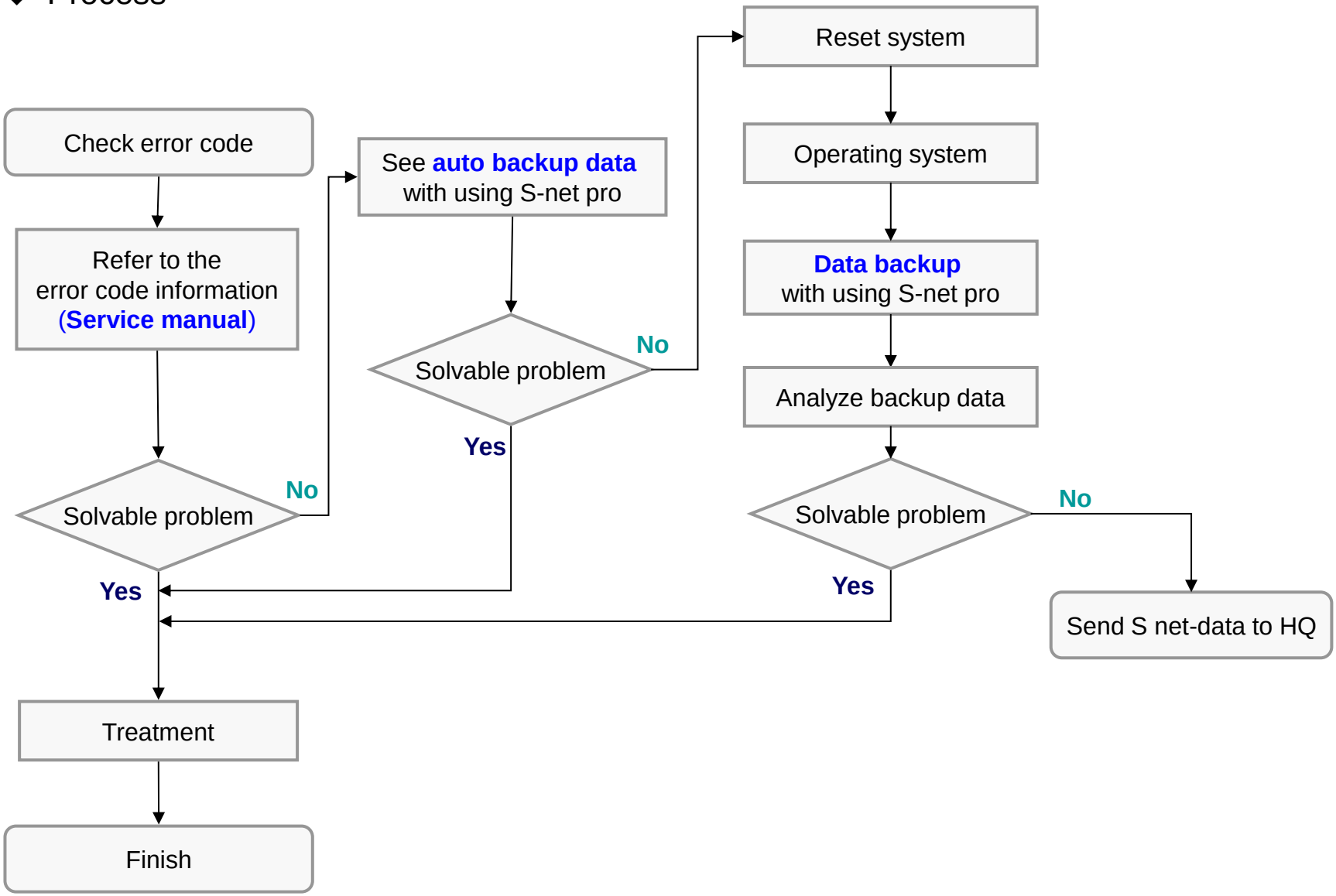
This is a general training course. Always refer to Samsung technical data books, installations manuals, and service manuals prior to and during installation.

Service process

How to access trouble-shooting

Detailed Analytic Speedy

◆ Process



Guide request sheet

Detailed Analytic Speedy

Technical report form

Version	JKTR-1
Update	2009'12
Contact person	JK Choi

Technical Report for DMS 2 ISSUES IN CURACAO

Reported Date	J
Reported by	Jimmy
Country	C

Basic information of Jobsite

Jobsite			
Address	CURACAO (SEVERAL PROJECTS)		
Installation date	2014	Type of building	COMMERCIAL
Weather of Jobsite	Temp(C), Humidity level (%)		
Responsible person for installation			
Name / Company	OMNI CURACAO	Tel / Email	
Air-conditioner defected			
OUTDOOR UNIT	Serial No	IND	
Option part (solution) & Accessory defected			
Name	Serial No		
DMS 2 (MIM-D00AN)	07DB9307959HDC10E7A		
DMS 2 (MIM-D00AN)	07DB9307959HDC10D7P		

What's the problem?

Details of the phenomenon

Phenomenon (Error code : HTTP ERROR:500)

1. HTTP ERROR: 500 appeared when trying to connect to DMS2 IP address.

Management in Jobsite

1. Download DMS 2 service program: failed
2. Replace DMS2 with other from stock: system worked OK

Preparation for trouble shooting

Preparation for trouble shooting

- Software update -

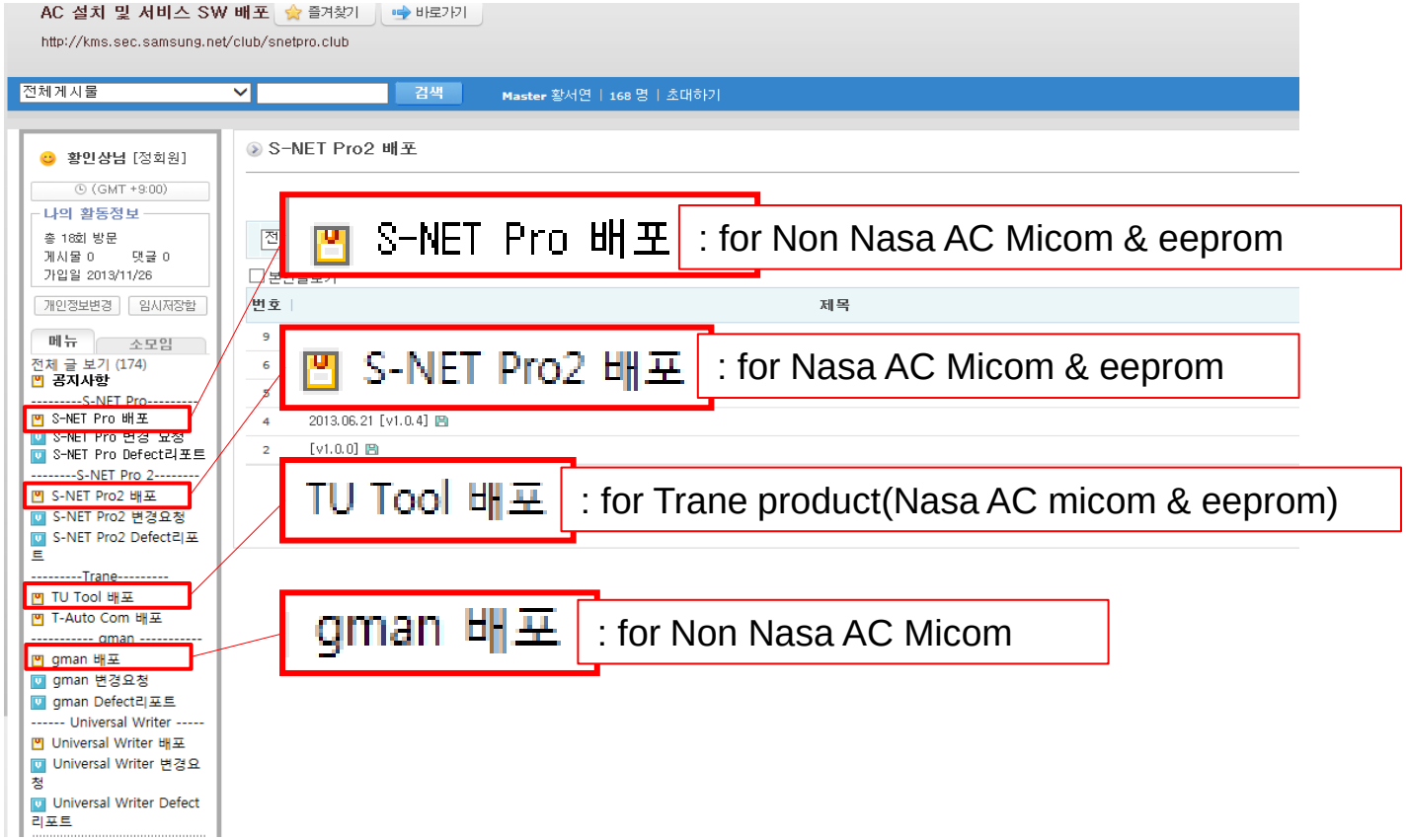
Software update

◆ S-net pro Download

Download link

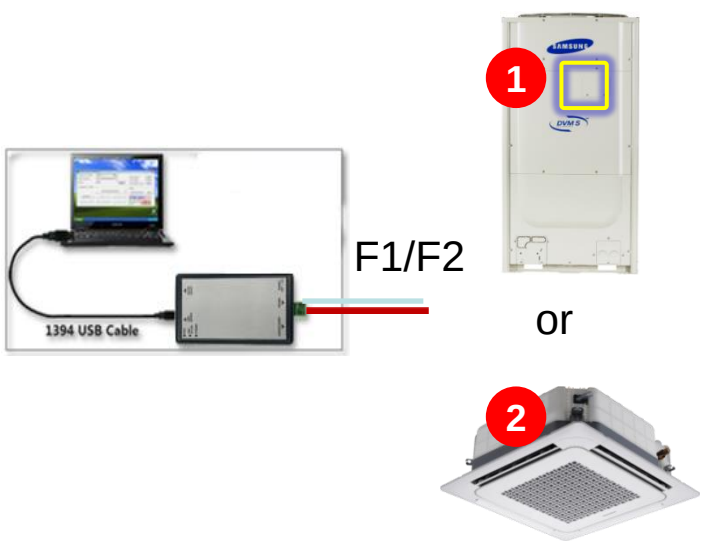
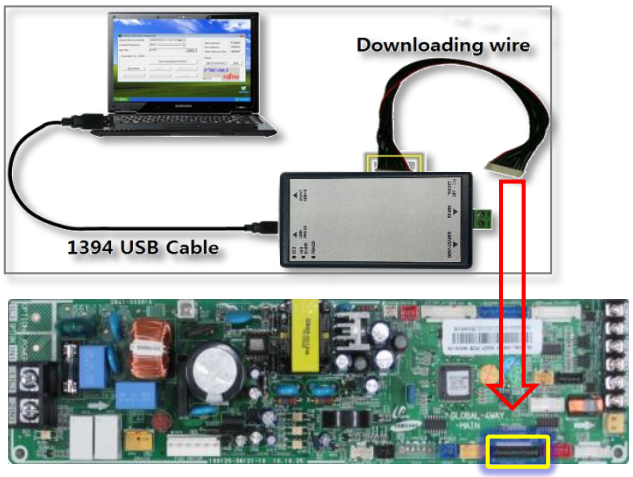
: http://mosaic.sec.samsung.net/club/club.menu.bbs.list.screen?p_club_id=1219&p_menu_id=14

Note : If you do not have an authority to access the intranet, contact to your counter partner !!



Software update

◆ RS485 VS RS232(UART)

	RS485(Through communication)	RS232(UART)
Feature	- Multiple IDUs update at once	- Fast update but one by one
Accessibility	- Easy, Connect F1/F2 to any IDUs or OUD	- Difficult, Connect UART cable to pcb directly
Speed	- approx. 10 min	- approx. 1 min
Power/Comm.	- Power supplied, Normal communication	**- Power must be off**
Application	- S-net pro 2(DVM S)	- S-net pro 2(DVM S), Gman(CAC,FJM)
Connection		

Software update

◆ How to update the Micom(RS485)

- **Cautions**

- Never turn off the system or halt S-net pro2 if you started update process.
  If we fail update, device won’t wake up.
  The unit will be disappeared from the communication list.

- When update fail occurs, you can retry by following abnormal case.
  * We need to input the unit address manually to try again.

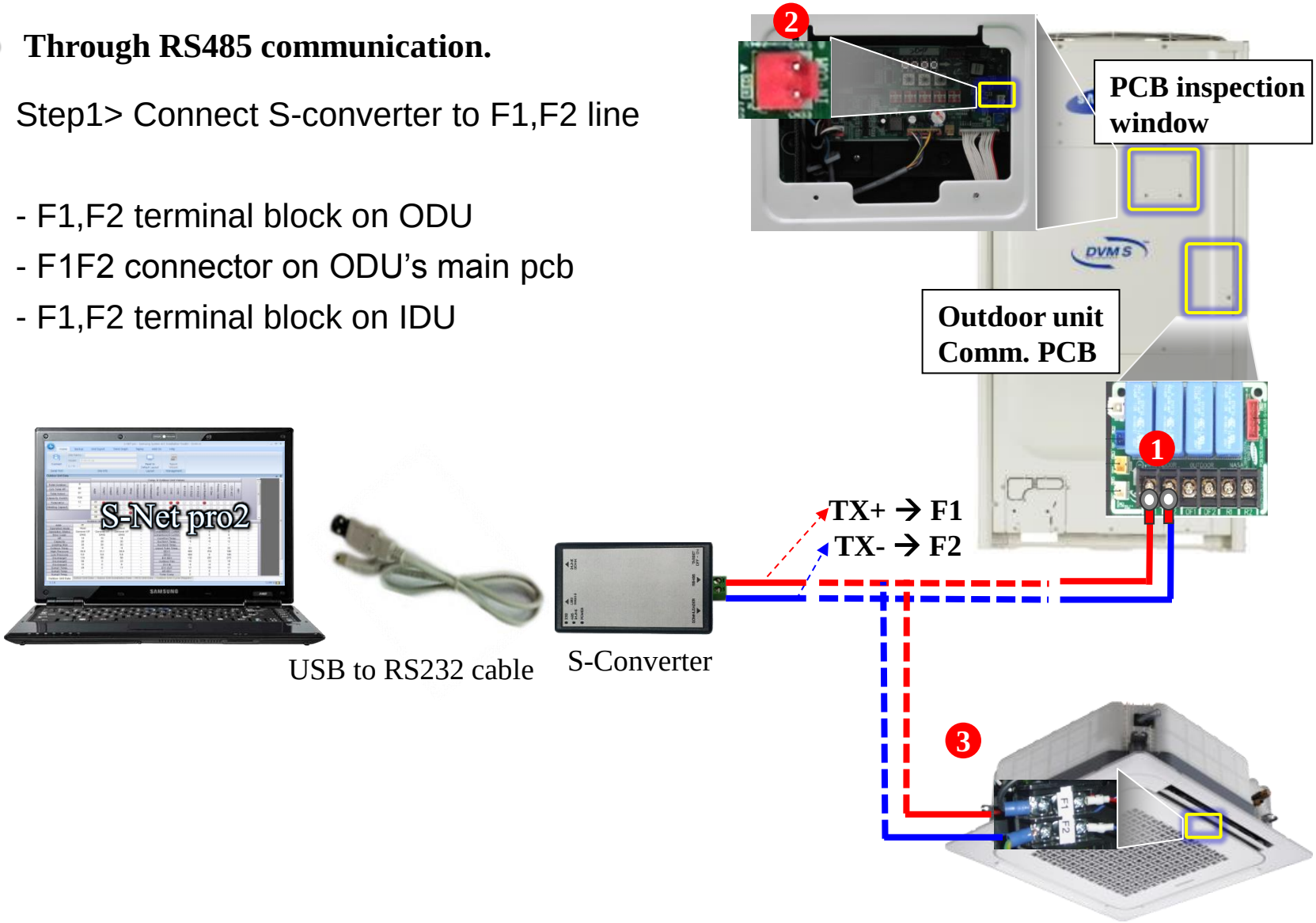
Software update

◆ How to update the Micom(RS485)

- **Through RS485 communication.**

Step1> Connect S-converter to F1,F2 line

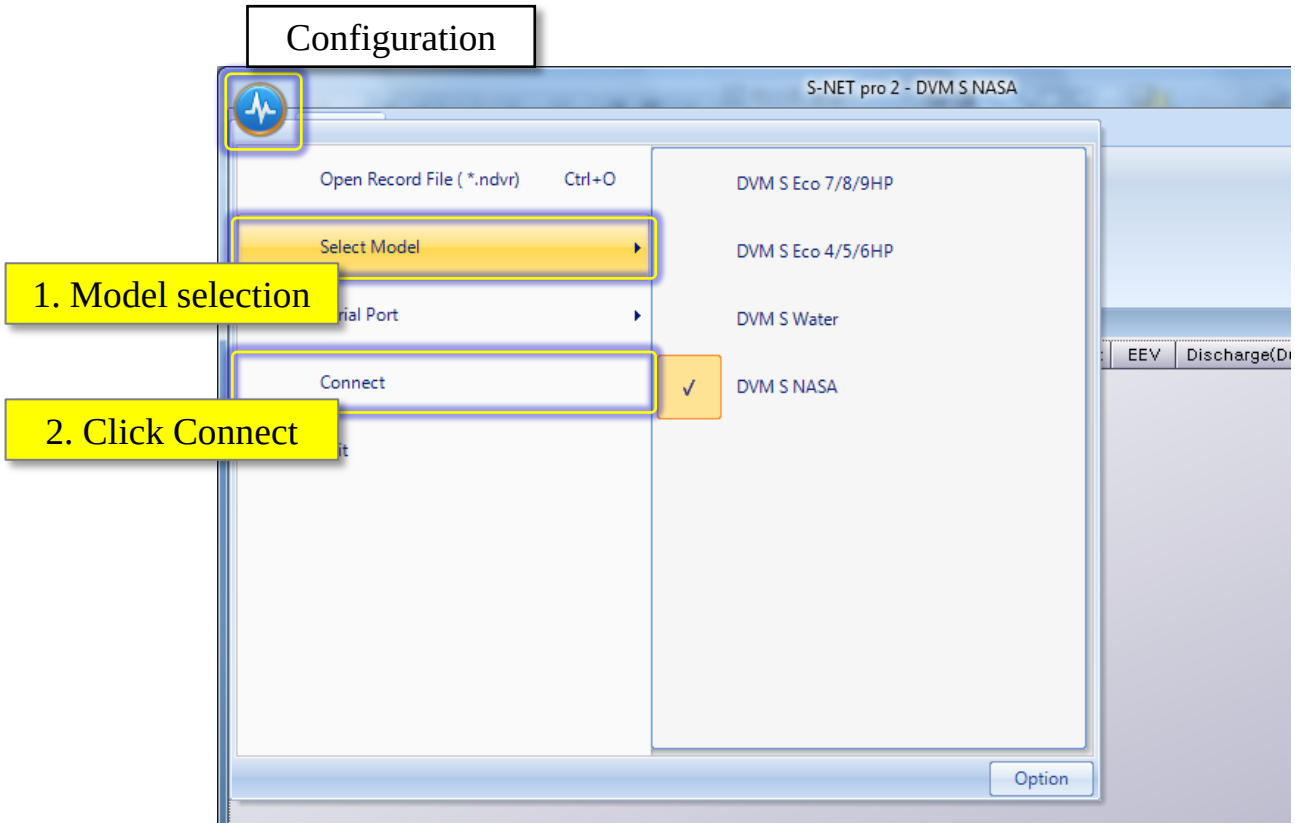
- F1,F2 terminal block on ODU
- F1F2 connector on ODU's main pcb
- F1,F2 terminal block on IDU



Software update

◆ How to update the Micom(RS485)

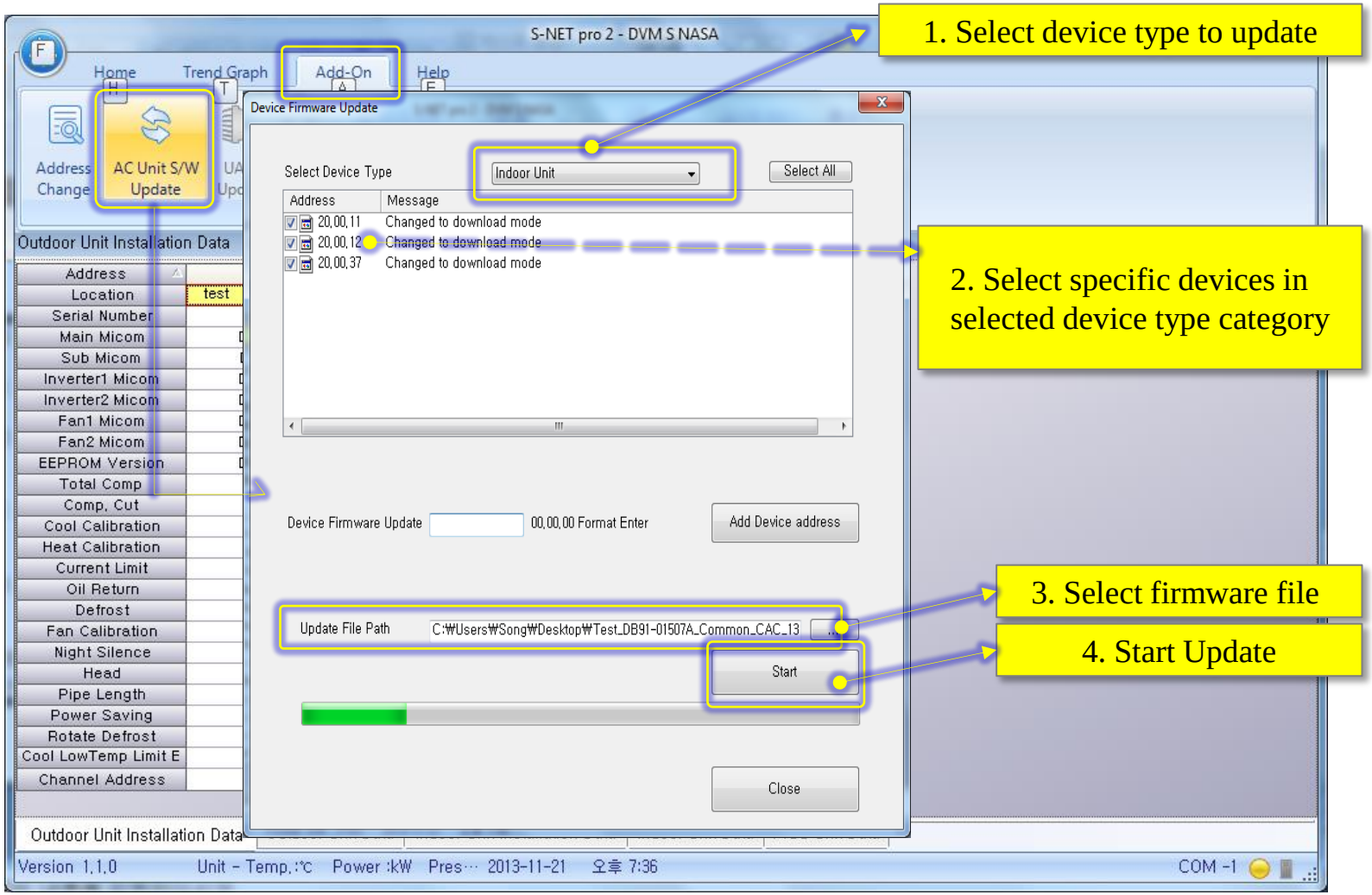
Step2> Execute S-net pro 2 and set environment then click connect button



Software update

◆ How to update the Micom(RS485)

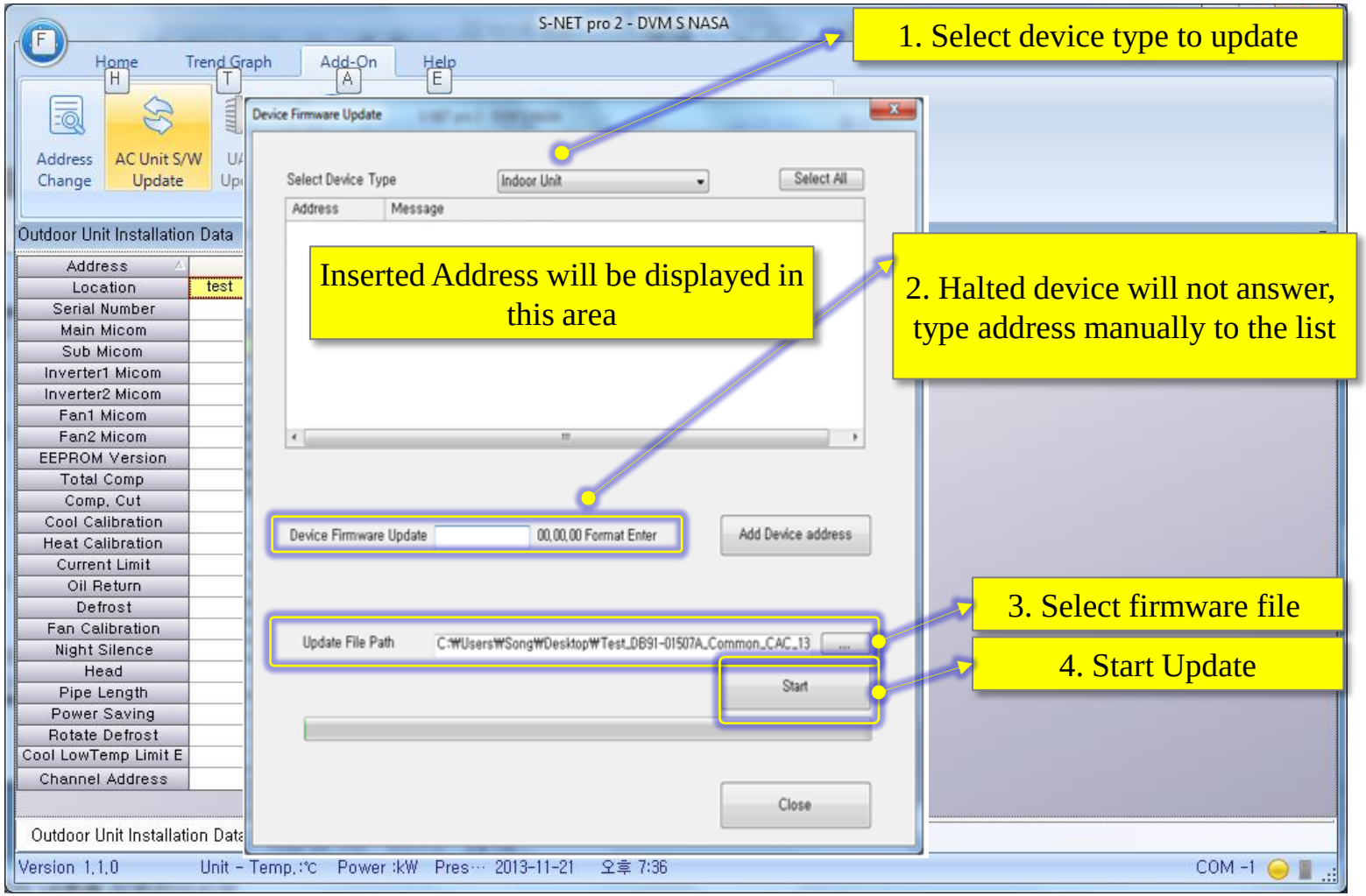
Step3> Go to Add-On tab and click AC Unit S/W Update.



Software update

◆ How to update the Micom(RS485)

- **Abnormal case**



Software update

◆ How to update the Micom(UART)

- **Cautions**

  - Power down the unit before you connect the download cable.

    Otherwise your computer may get damaged.

Software update

◆ How to update the Micom(UART)

- **Update SW through RS232(UART) communication.**

Step1> Power down the unit and prepare to connect download cable to the PCB

* 20 pin connecter in black color(ODU - 10 pin connecter)

Step2> Execute S-net pro 2 and go to Add-On tab and click UART Update button

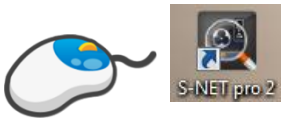
USB to RS232 cable

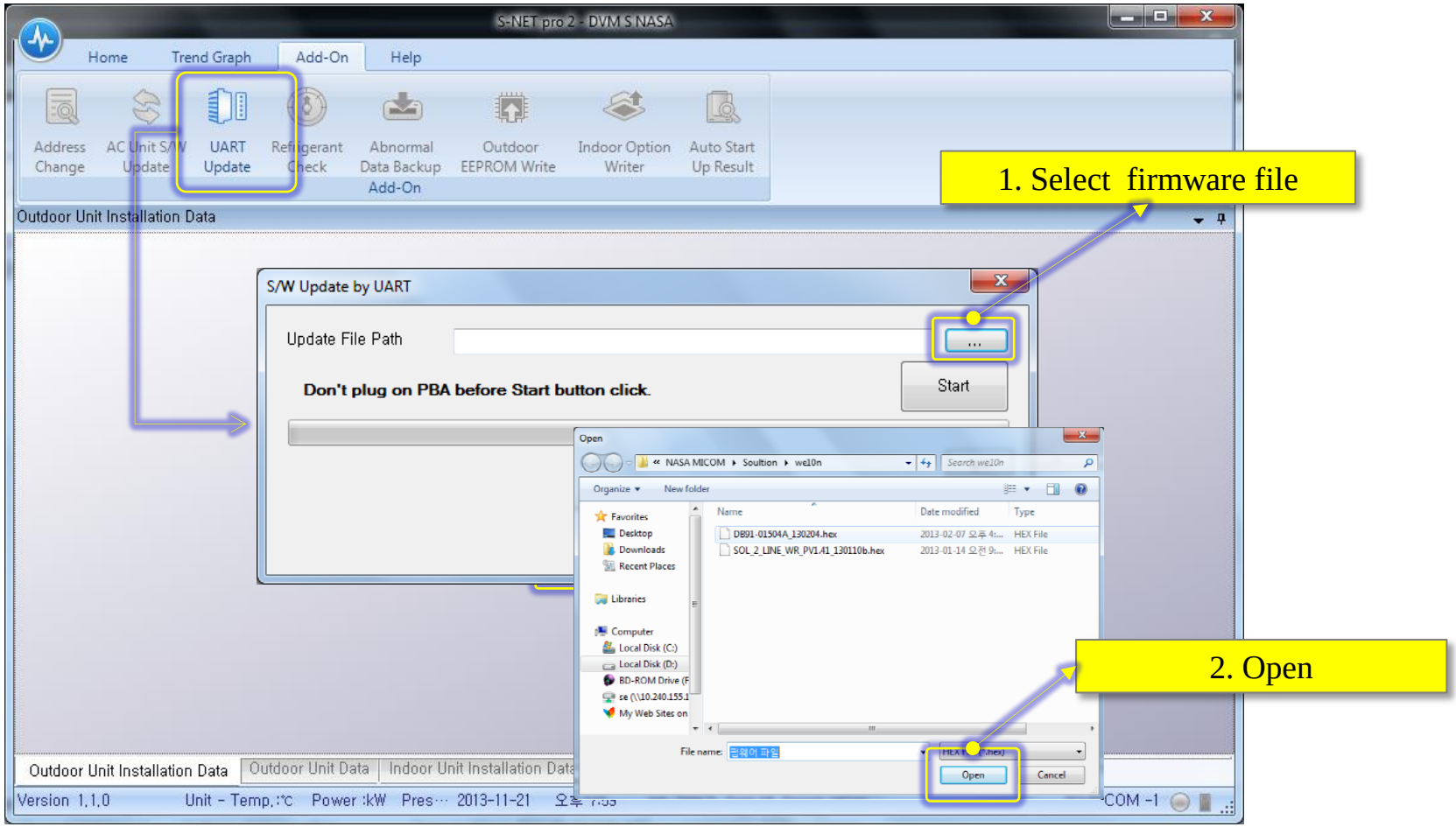
S-Converter

Software update

◆ How to update the Micom(UART)

Step3> Select firmware file



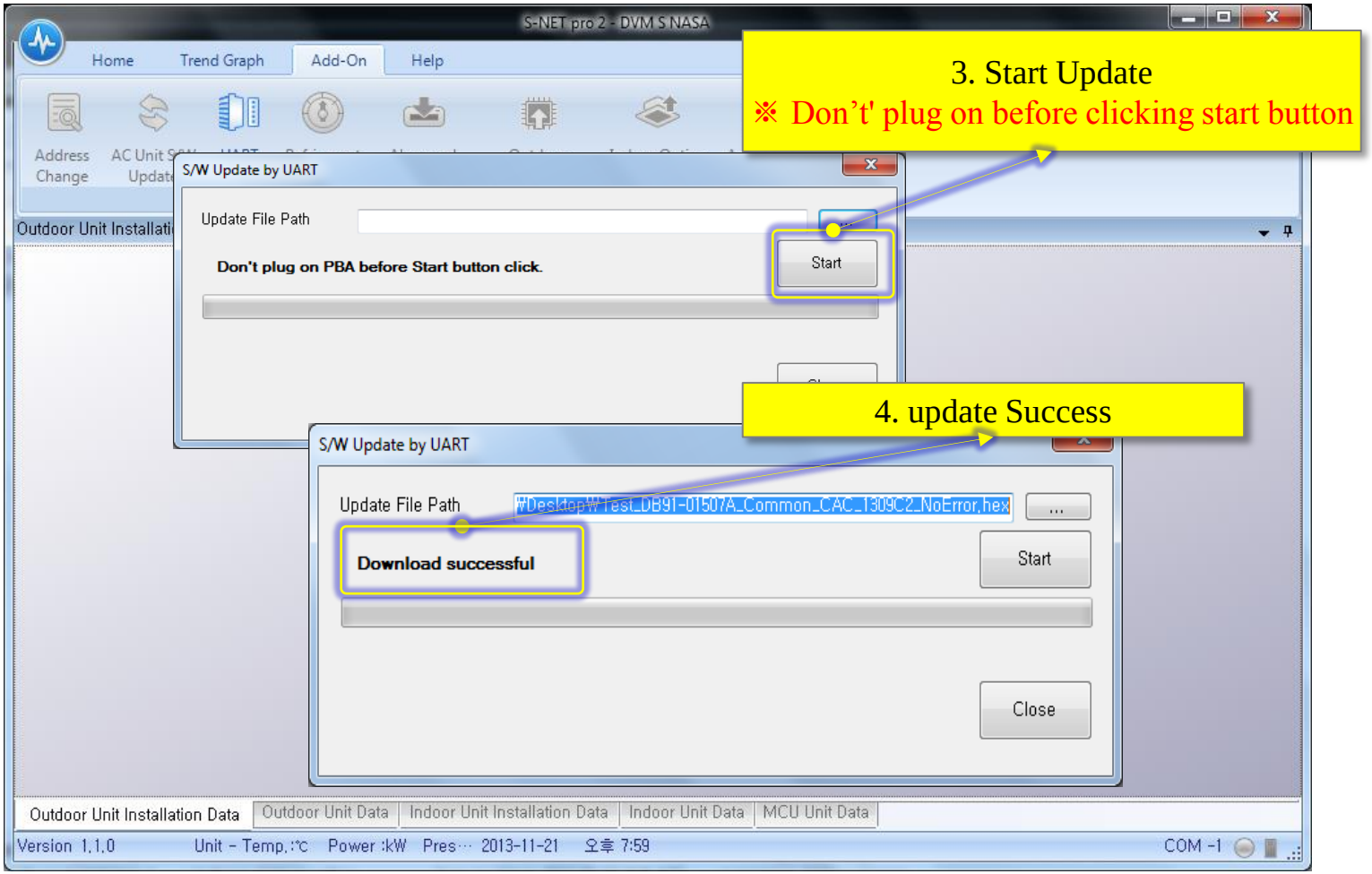


Software update

◆ How to update the Micom(UART)

Step4> Click Start button then Connect S-converter to 20 pin on the PCB

** If you connect the cable first then click start button, update won't start*



Software update

◆ How to write the EEPROM

Caution

- This is only for Outdoor unit.

- EEPROM writing should be proceeded in case of EEPROM IC replacement by EEPROM IC defect.
  Because all the data in the EEPROM IC will be deleted.
  * You need to proceed auto trial operation again.

- So when you replace main PCB, keep EEPROM IC and insert it to new PCB without EEPROM writing.

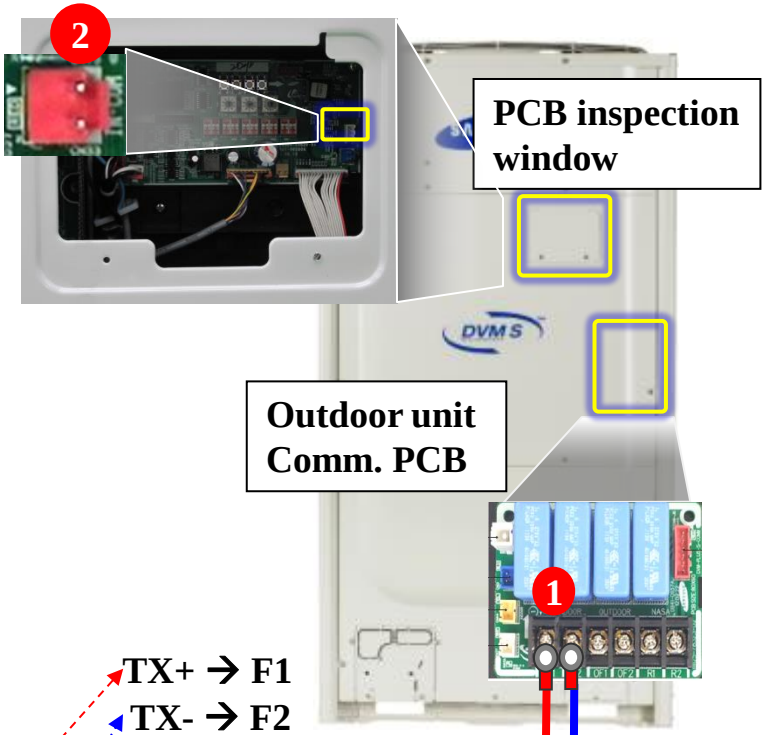
* EEPROM data : eeprom file, S/N, Auto trail operation result, Ref amount check result, etc.

Software update

◆ How to write the EEPROM

- **update EEPROM through RS485 communication.**

Step1> Connect S-converter to F1,F2 line



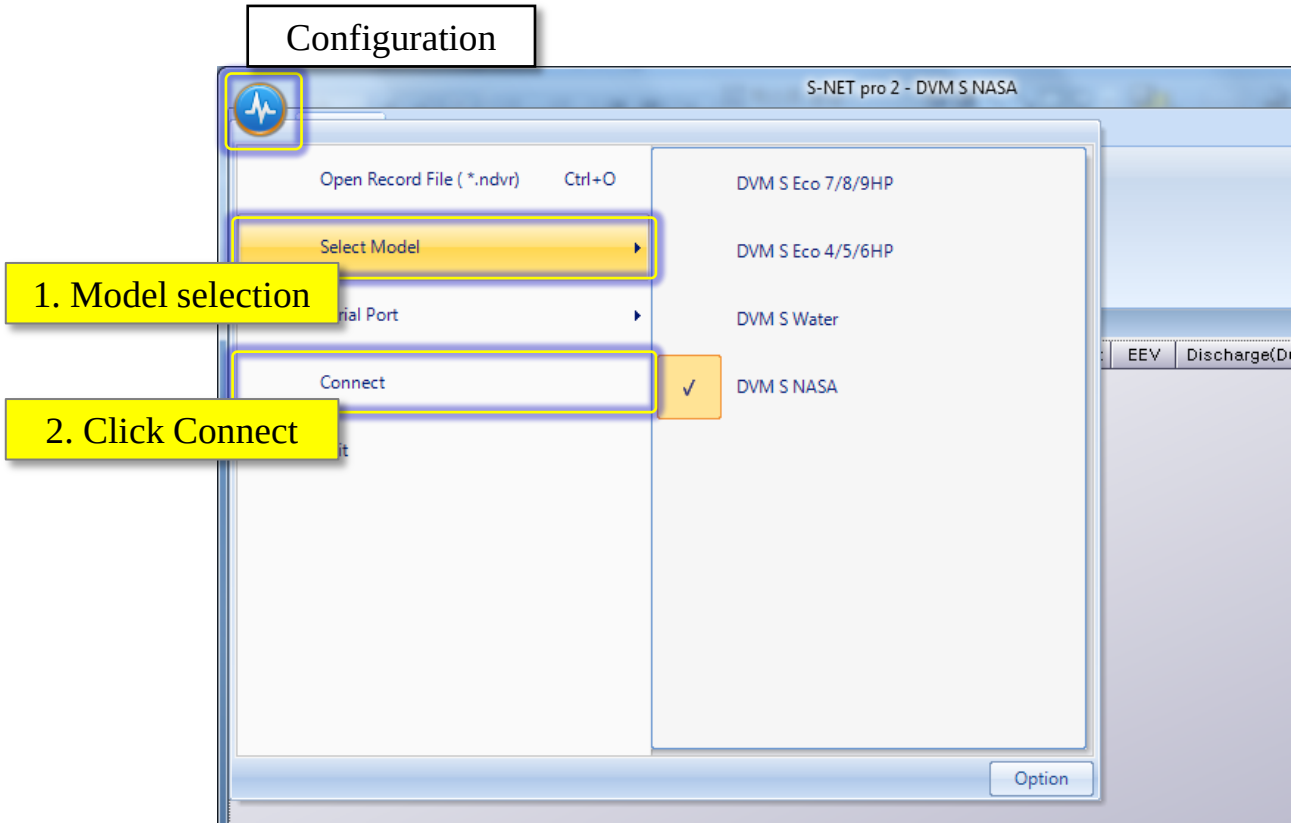
USB to RS232 cable

S-Converter

Software update

◆ How to write the EEPROM

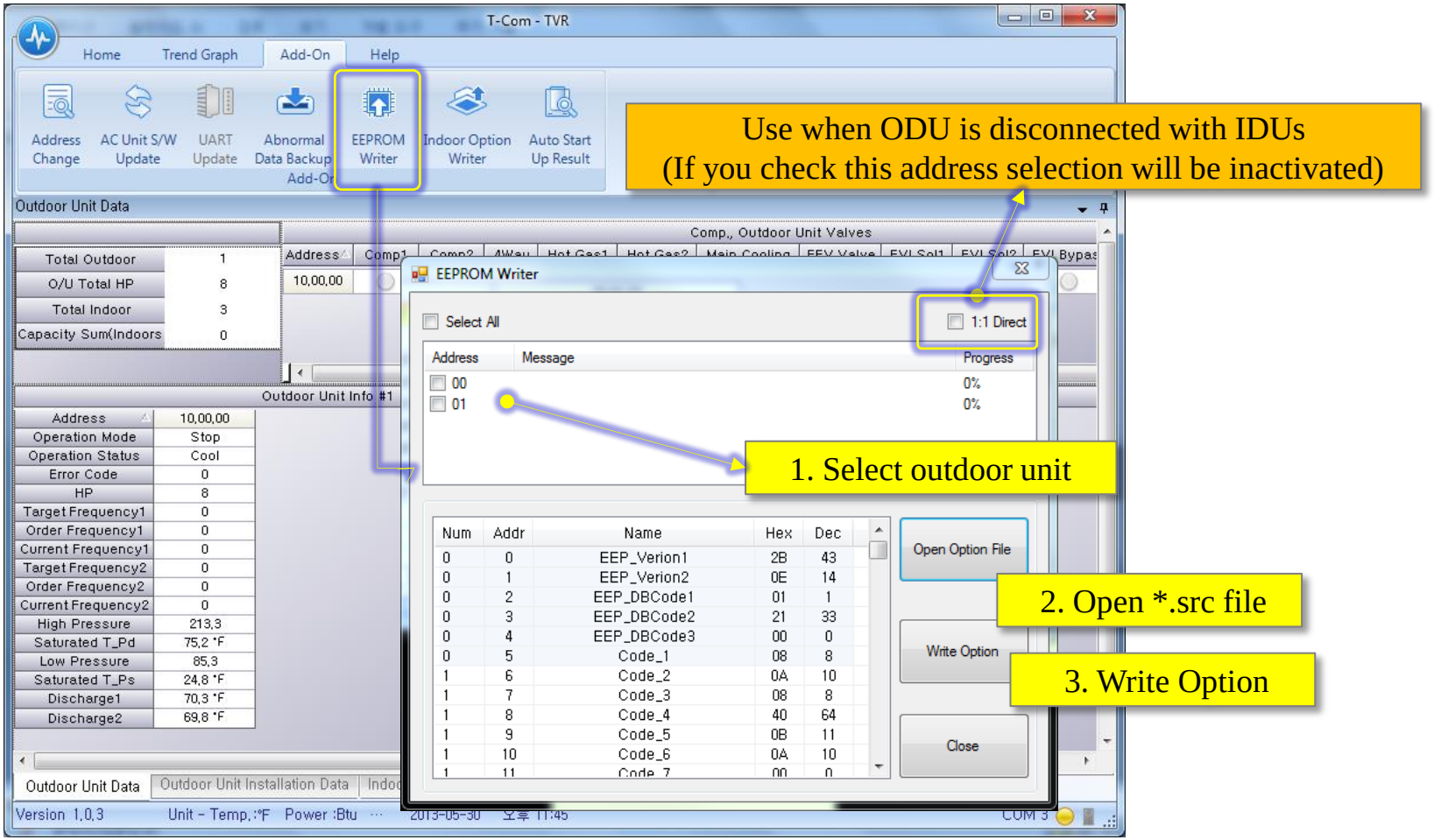
Step2> Execute S-net pro 2 and set environment then click connect button



Software update

◆ How to write the EEPROM

Step3> Go to Add-On tab and click EEPROM Writer



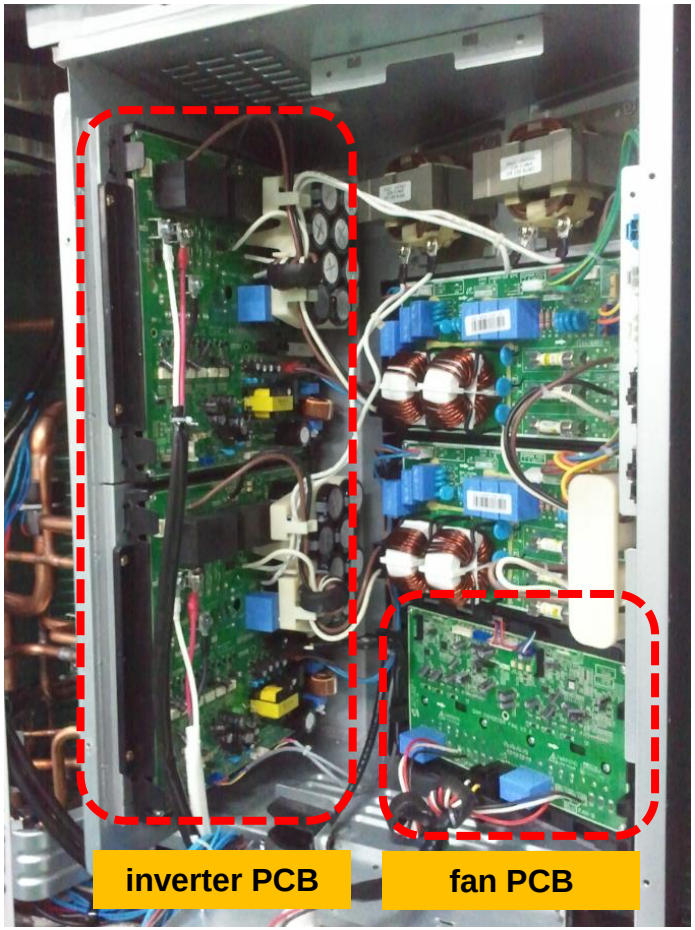
Preparation for trouble shooting

- Electric discharge mode -

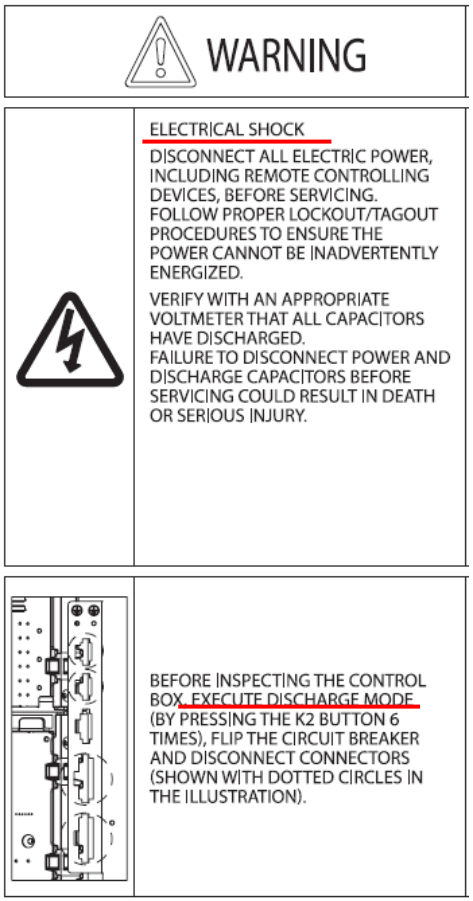
Electric discharge mode

◆ Warning of Electrical Shock from DC Power

- It is seriously dangerous to touch inverter PCB, fan PCB as high DC voltage is charged.
- Must do key operation “Electric Discharge mode” or Wait for more 15 minutes to discharge naturally.



Warning Label



Electric discharge mode

◆ How to proceed

K2 (Number of press)	KEY operation	Display on segment
1 time	Refrigerant charging in Cooling mode	"K""5""BLANK""BLANK"
2 times	Trial operation in Cooling mode	"K""6""BLANK""BLANK"
3 times	Pump down all units in Cooling mode	"K""7""BLANK""BLANK"
4 times	H/R: Checking the pipe connection H/P: Automatic setting of operation mode (Cooling/ Heating) for trail operation	"K""8""BLANK""BLANK"
5 times	Checking the amount of refrigerant	"K""9" X X (Display of last two digits may differ depending on the progress)
6 times	Discharge mode of DC link voltage	"K""A""BLANK""BLANK"
7 times	Forced defrost operation	"K""B""BLANK""BLANK"
8 times	Forced oil collection	"K""C""BLANK""BLANK"
9 times	Inverter compressor 1 check	"K""D""BLANK""BLANK"
10 times	Inverter compressor 2 check	"K""E""BLANK""BLANK"
11 times	Fan 1 check	"K""F""BLANK""BLANK"
12 times	Fan 2 check	"K""G""BLANK""BLANK"
13 times	End Key operation	-

- During "Discharge mode of DC link voltage", voltage of INV1 and INV2 will be displayed alternately.
- Even when the outdoor unit power is off, it is dangerous when you come in contact with inverter PCB and fan PCB since they are charged with high DC voltage.
- When replacing/repairing the PCB, cut-off the power and wait until the DC voltage is discharged before replacing/ repairing them. (Wait for more than 15 minutes to allow it to discharge naturally.)

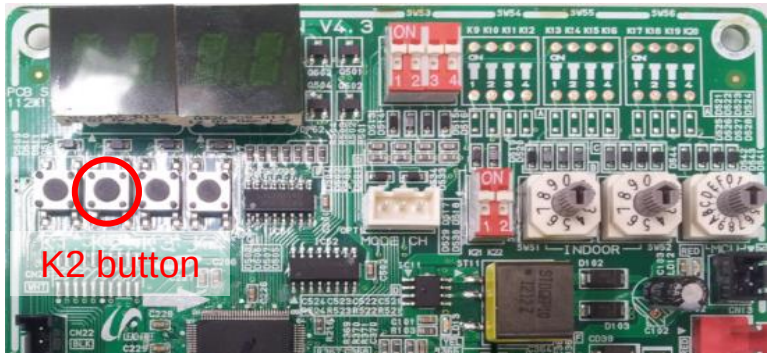
Caution

- When there were error, 'Dicharge mode of DC link voltage' may not have been effective. Especialy if error E464 and E364 have been occured, power element might be damaged by fire and therefore, do not use the 'Discharge mode of DC link voltage'.

Electric discharge mode

◆ How to proceed

Press K2 button 6 times shortly



Items		Cooling
Key	Number	K2
	Push time	6
Display		┣ **A** → Inv. 2 DC voltage → ┣ **A** → Inv. 1 DC volt Ex) 445V → 0445  ※ Below 30 Volt, ┣ **A o** ┣ displays.

Preparation for trouble shooting

- Pump down / out -

Pump down / out

◆ Pump down operation

Pump down : Recovering the refrigerant to outdoor unit.

▶Caution.

1. Before pump down : In module installation or long piping condition, some refrigerant into the outdoor unit can not be recovered, therefore should use a separate container.(Refer to the next page)

2. Observe low pressure using View Mode of K4 button(6times) when compressor starting.
   - If low pressure goes down below about 0.2MPa.g
     : Immediately close the gas side service valve, then shut down the Pump Out operation
     (Pump out operation shut down : K2 button 2 more press or K3 button one time press)
   - If low pressure goes down below 0.1MPa.g while pump down operation
     system will stop automatically to protect the compressor.

3. After pump out about 1.5kg of refrigerant will be remained in the pipe so use pipe cutter to detach the pipe. (Do not use flame to detach the pipe)

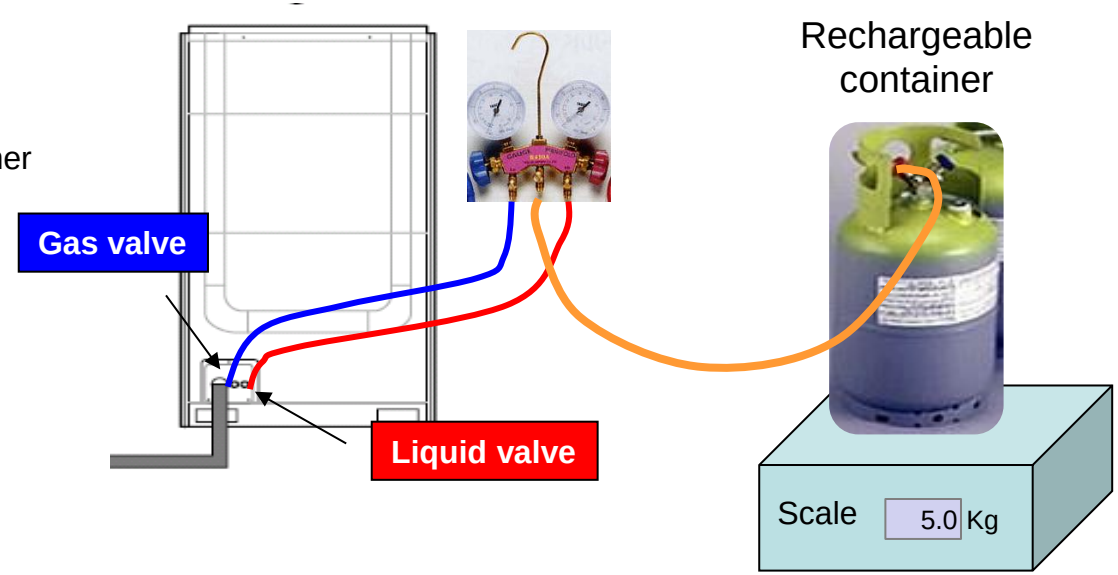
Pump down / out

◆ Pump down operation

▶ How to store refrigerant to the separate container before pump down.

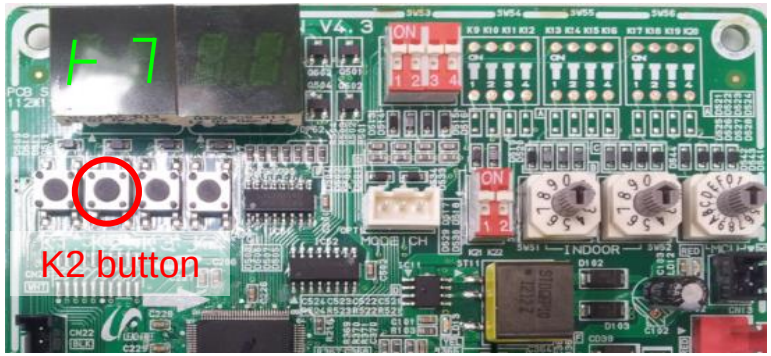
1. Prepare manifold gage, container, scale.
2. Check total refrigerant in the system.
3. Connect manifold gage hose(liquid tab) & Turn on 50% IDUs in cooling mode
4. 10mins later if the high pressure is over 30kg/cm2.g, turn off some indoor unit till high pressure is same or lower than 30kg/cm2.g
5. If high pressure is same or lower than 30kg/cm2.g, open the liquid valve and container valve.
6. Check the weight of container and then close the valve.

* Recommend to store 50% of total refrigerant.
* If too much refrigerant is stored in the container system can't proceed pump down properly.



Pump down / out

◆ **Pump down operation**



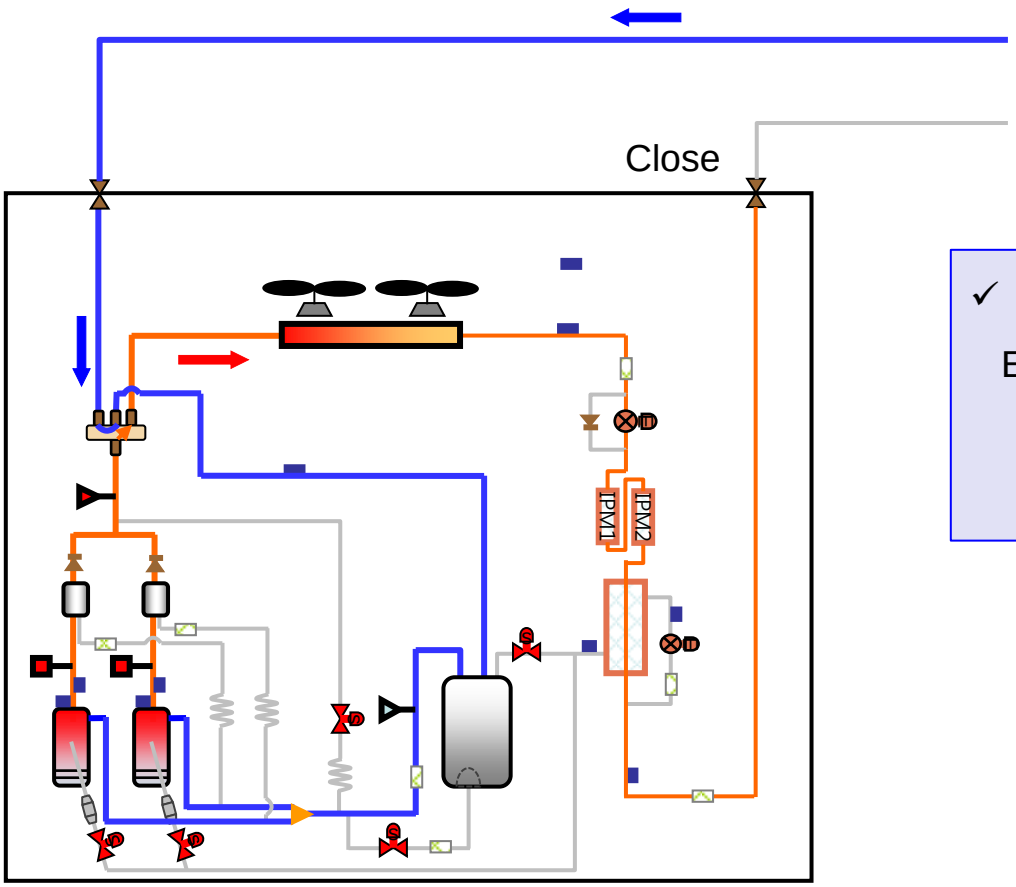
How to Initiate	K2 Tact Switch 3 times
Compressor	Address No.1 Outdoor Unit - 60Hz (Other Outdoor Unit COMP OFF)
Indoor Unit	Whole Operation (The set temperature=3°C)
4Way Valve	OFF (Cooling Mode)
Outdoor Fan	Maximum air flow
Main EEV	Operation side : 2000 Step , Stop side : 2000 step
Maximum Operation Time	30 minutes
Etc.	Does not conduct the operation of the special operation, and protection control. Pressure and temperature is outside normal limits : Operation is shut down after gas pipe manually closed.

Pump down / out

Detailed Analytic Speedy

◆ Pump down operation - Single

1. Close Liquid valve | **2. Pump down start** | **3. Wait till L.P under 0.2MPa.g** | **4. Close liquid V/V** | **5. Press K3 to stop**



✓ Low pressure monitoring

Ex) **41 22**

→ **4**_ __ : Menu(Low pressure)

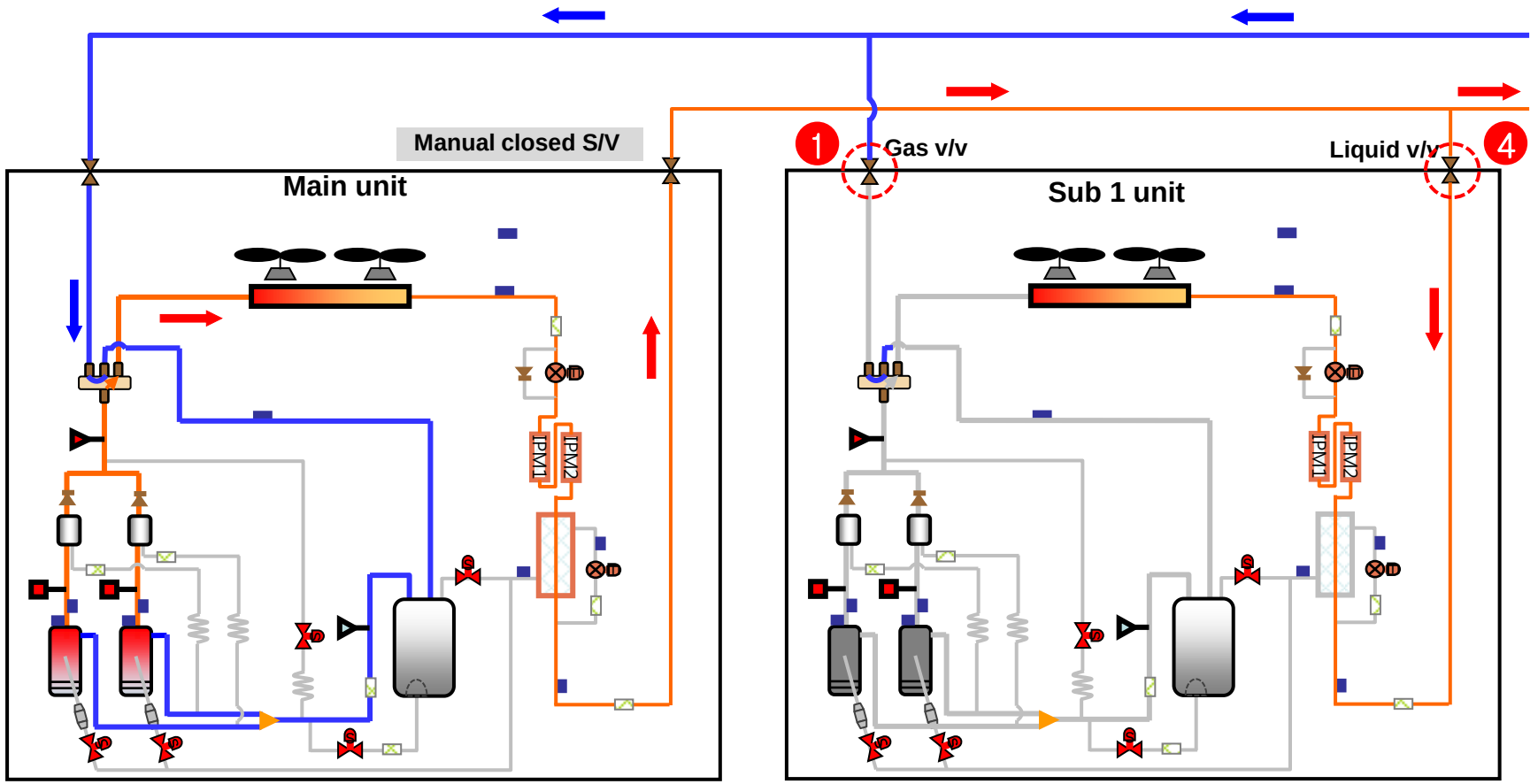
→ _**1 22** : 12.2kg/cm2,g.

Pump down / out

Detailed Analytic Speedy

◆ Pump down operation - Module

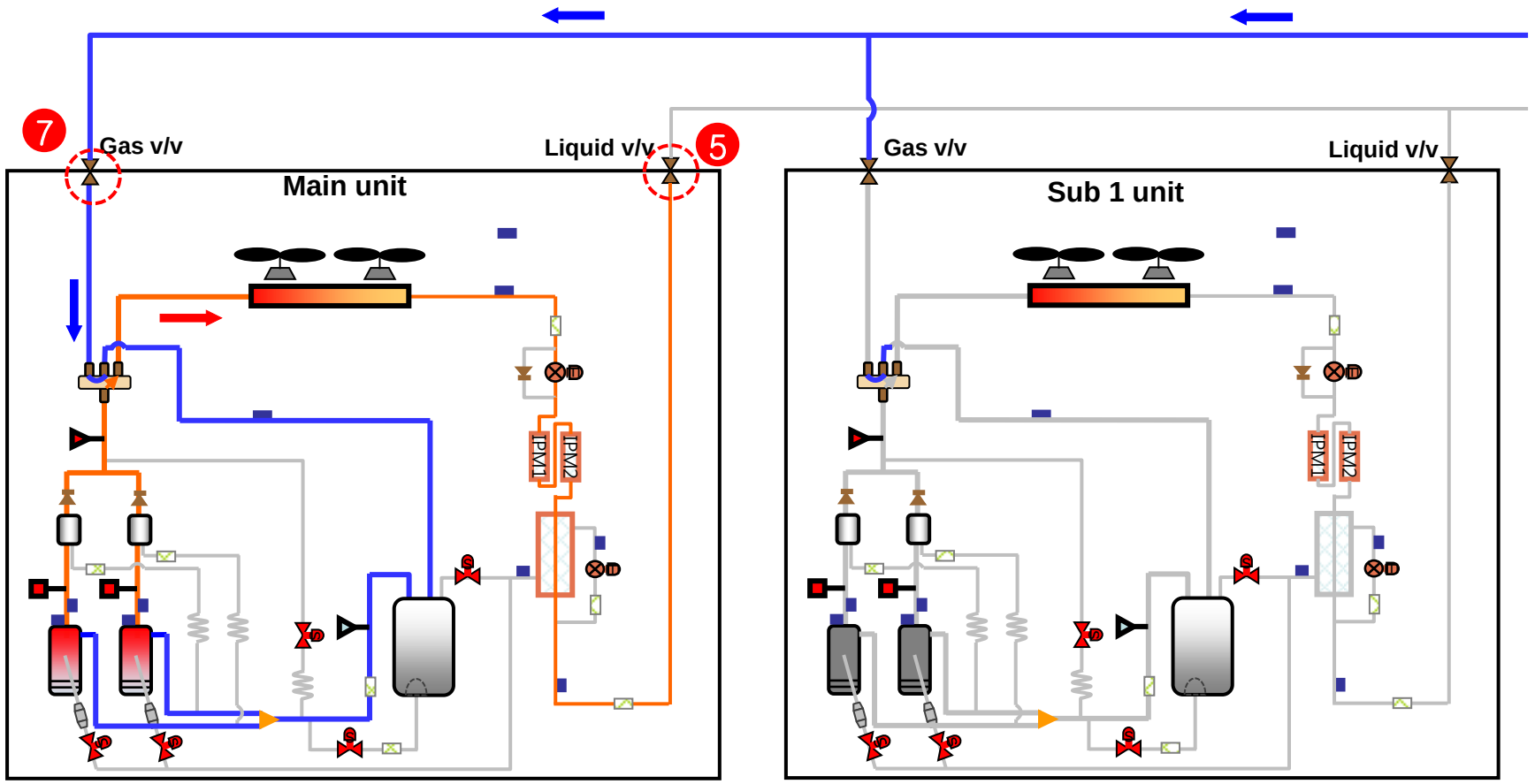
1. Close gas V/V in sub units	2. Pump down start	3. Wait 20mins	4. Close liquid V/V in sub units



Pump down / out

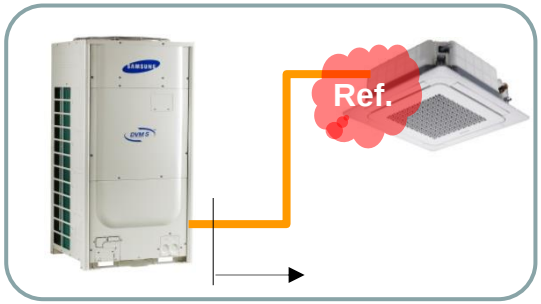
◆ Pump down operation - Module

5. Close liquid V/V in main	6. Wait till L.P under 0.2MPa.g	7. Close gas V/V in main	8. Press K3 to stop



Pump down / out

◆ Pump out operation



Pump out : Refrigerant emissions to the indoor side.

▶Caution.

1. Observe low pressure using View Mode of K4 button if compressor operate.

- If low pressure goes down below about 0.2MPa.g

: Immediately close the gas side service valve, then shut down the Pump Out operation

(Pump out operation shut down : K1 button once more press or K3 button one time press)

- If low pressure goes down below 0.1MPa.g while pump down operation

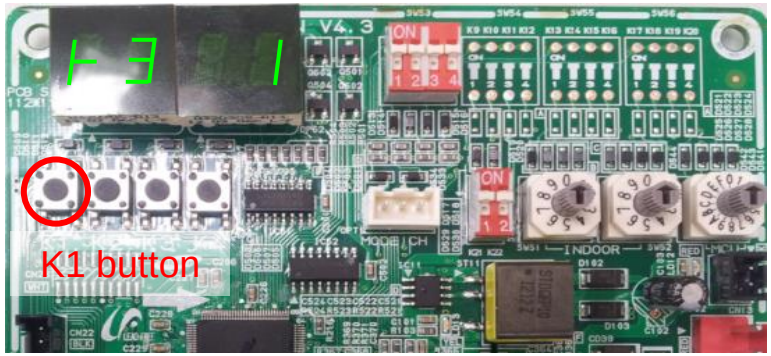
system will stop automatically to protect the compressor.

2. After pump out about 1.5kg of refrigerant will be remained in the pipe so use pipe cutter to detach the pipe. (Do not use flame to detach the pipe)

Pump down / out

◆ Pump out operation

Outdoor unit	Main	Sub1	Sub2	Sub3
Key number	K1			
Push time	3	4	5	6



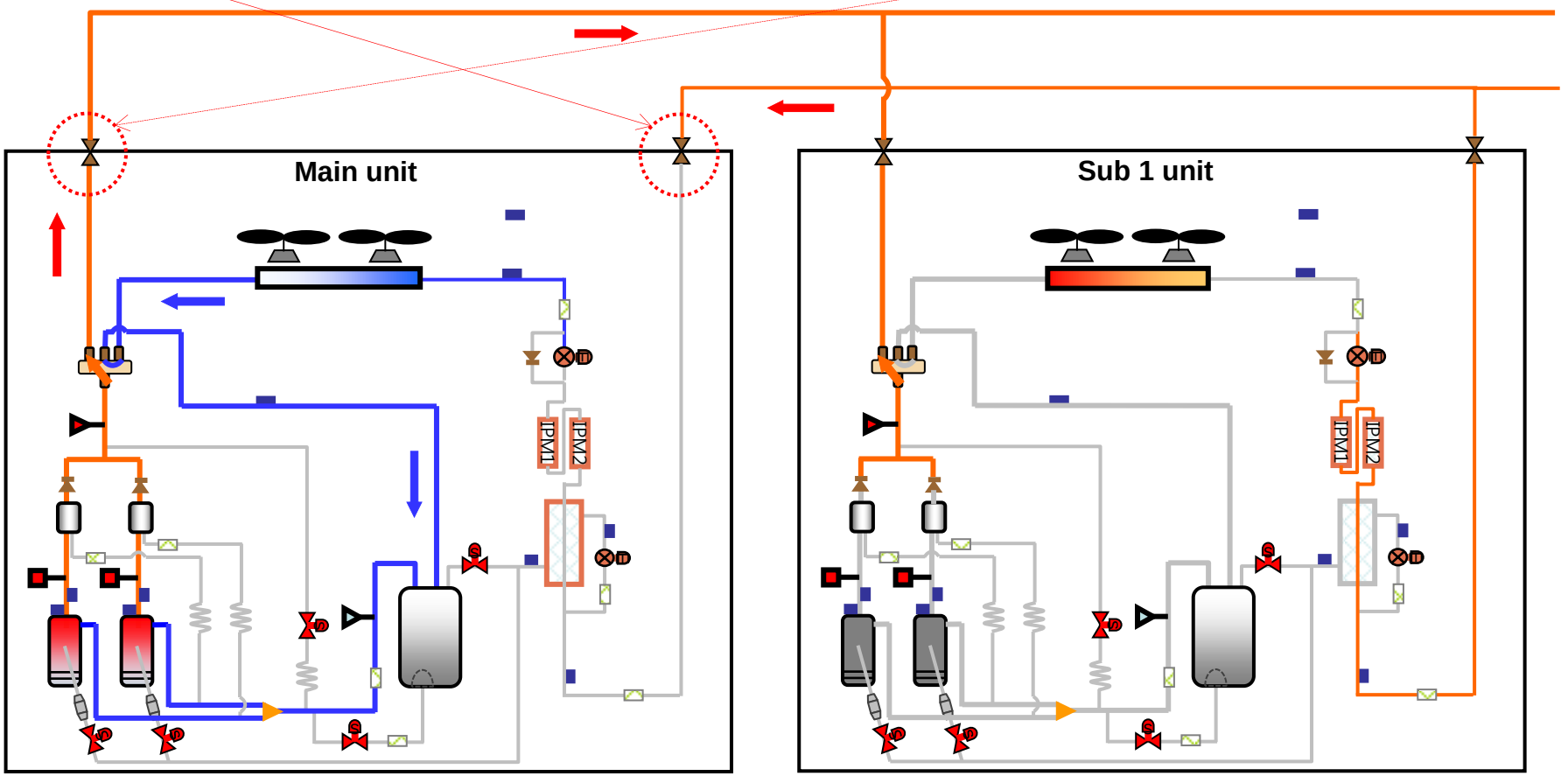
How to Initiate	K1 Tact Switch 3 times~6 times
Compressor	60Hz
Indoor Unit	Whole Operation (The set temperature=40℃)
4Way Valve	ON (Heating Mode)
Outdoor Fan	Maximum air flow
Main EEV	Operation side : 700 Step (Stop side : 0 step)
Maximum Operation Time	10 minutes
Protection Control	Conduct the discharge temperature, high pressure control. (Low pressure protection control is not carried out) ※ Low pressure is outside normal limits : Operation is shut down after gas pipe manually closed.
Etc.	Entry after safety start. (Only the corresponding Outdoor Unit operation.) To pump out more than 2 : Except communication between Outdoor Unit of relevant set after working for one, remainder set makes Pump Out add.

Pump down / out

Detailed Analytic Speedy

◆ Pump out operation

1. Liquid V/V close
2. Start pump out
3. Wait till Low.P under 0.2MPa.g
4. Close the gas V/V
5. K3 button to stop



Pump down / out

◆ Vacuum

Operation to facilitate vacuum to open the valve after the Outdoor Unit repair.

There are several EEV & solenoid valve so to secure perfect vacuum this function is required

K1 button	Display on segment	Function
7 times	├, 4, blank, 1	Vacuuming(Outdoor unit address 1)
8 times	├, 4, blank, 2	Vacuuming(Outdoor unit address 2)
9 times	├, 4, blank, 3	Vacuuming(Outdoor unit address 3)
10 times	├, 4, blank, 4	Vacuuming(Outdoor unit address 4)
11 times	├, 4, blank, A	Vacuuming(All outdoor units)

How to Initiate	K1 Tact Switch 7 times~11 times
Compressor	OFF
Indoor Unit/Outdoor Fan	OFF
4Way Valve	OFF
Valves	Open all valves maximum
Etc.	If not turn off the vacuum mode, the start of normal operation is prohibited.

Preparation for trouble shooting

- Corrosion -

Corrosion

◆ Symptom

1. "Gas leak" because of corrosion
2. "E151,152" because of corrosion
3. "Customer claim" because of corrosion



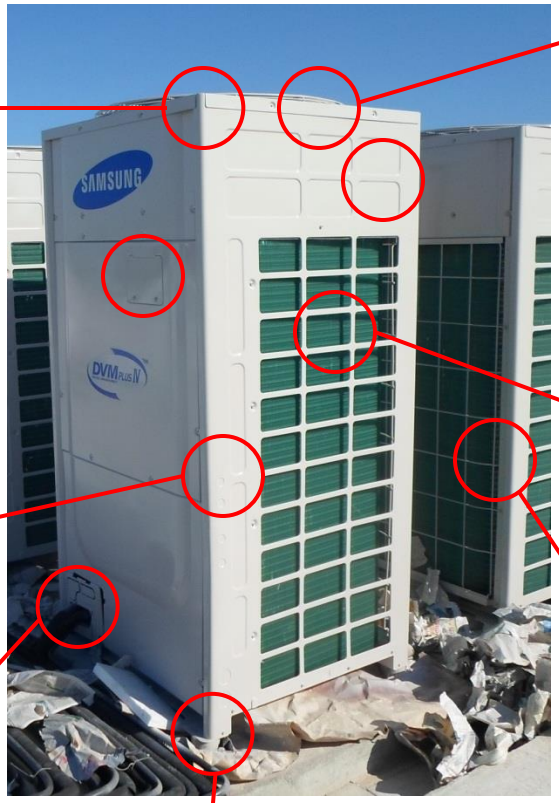
◆ Trouble shooting

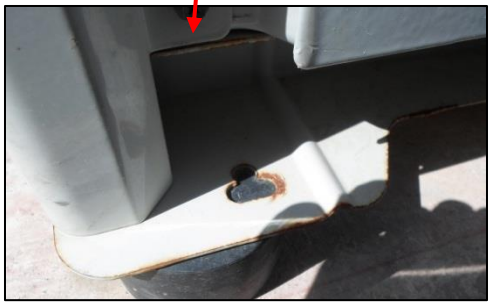
Symptom	Description	Cause	Solution
Gas leak	EEV body was broken by corrosion	Wrong installation	Need annual Maintenance (1/yr)
E151, 152	EEV coil and body does not Work by corrosion	Wrong installation	Need annual Maintenance
Customer claim	Customer claimed for corrosion of surface of ODU	Wrong installation	Need annual Maintenance

Corrosion

Symptom	Description	Cause	Solution
Gas leak	   	Salt, Sand, Wet wind, Wet dust	Remove rust Spray R-pro Cap the EEV body  
E151, 152	Coil corrosion -> malfunction Body corrosion -> malfunction	1. Moisture inside of system, 2. Corrosive gas  Corrosive gas	1. Replace EEV body Add drier filter 2. Replace EEV Spray R-pro
Customer claim	  **Corrosion happen within 6 month**	Wet wind, salt, Corrosive gas	Remove rust Spray R-pro Check annually

Corrosion





※ Model code : MOK-220SA

※ SIZE : 108mm x 173mm
※ Black & White printing

R-Pro®

< Major Features >

◎ It forms a strong rust preventive film on the surface.
◎ The coat is transparent to maintain the original color of the product .
◎ 2-way spray & quick drying.
◎ Eco-friendly material that is safe for humans.

Capacity : 220ml
Made in Korea

Super ultra rust preventive coat

Precautions before use !!

// Custody Precautions
◎ Do not leave it near a fire as it is made from inflammable and high-pressure gases .
◎ Do not leave it in badly ventilated locations where the temperature is over 50°C and keep it away from direct sun light.
◎ Store it in a cool, well-ventilated location.
◎ Keep it out of the reach of children.

// Use Precautions
◎ Do not smoke or stand near a fire while spraying the coat
◎ Remove any rust, dust or moisture before spraying.
◎ If the area to be sprayed is wide, spray it from a distance (approximately 15~20cm) in a zigzagging motion.
◎ When spraying the external screws of the outdoor unit, use the enclosed paper pad.
(To prevent the coating liquid from running or dripping.)
◎ Shake it slightly before use.
◎ Since spraying just one coat forms a rust preventive film with a thickness of 15㎛, there is no need to spray repeatedly.
(If sprayed excessively, the coating liquid will drip.)
◎ Empty the container fully before disposing of it. (To prevent the container from exploding when it is burnt.)
◎ Wear a mask when working In badly-ventilated locations.

// Ingredients: Acrylic resin, Solvent
// Manufactured by: BUHMWOO
Sold by: WOW CORPORATION.

Inflammable

8 809319 340010 >

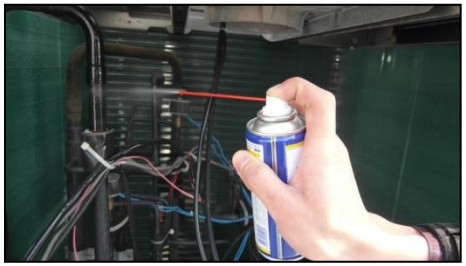
Corrosion

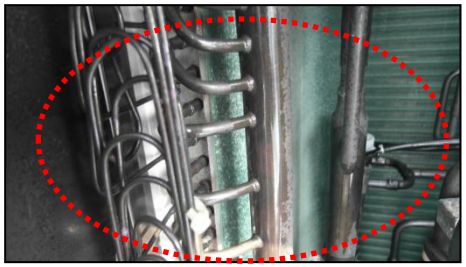
◆ Working procedure

【Separate the outdoor panel】

【check the corrosion spot】

【Remove rust, and then Spray R-Pro on it】





【Spray R-Pro on pipe & other parts】

【Finish】

Corrosion

◆ Notice

1】 You should wear protective equipment like goggles and mask during work.

2】) One should do the spray with his back against wind. Sprayed surface must be dried naturally

3】One should avoid moisture like snow and rain when do the spray works

4】 If the layer of coating is damaged, one should spray again to protect

5】 You can spray this any part including PCB

* Reference

- 1 spay can use for about 1 outdoor unit (with heat exchanger coating)
- 1 spay can use for about 3 outdoor units (without heat exchanger coating)

Corrosion

◆ Maintenance of R-Pro according to installation condition

1) The installation site marked Blue-color box absolutely need anti-corrosion coating to prevent corrosion of equipment.

2) All installation site need inspection every year after initial installation complete.

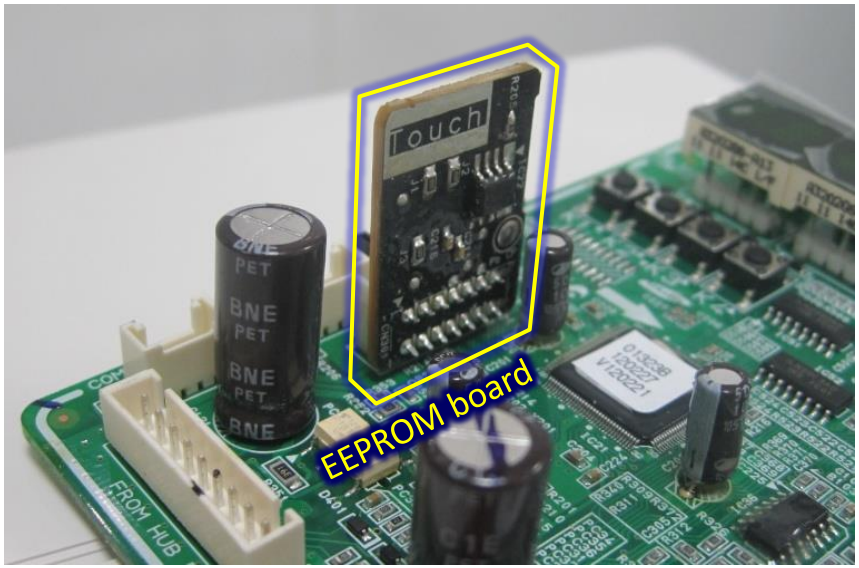
Environment	Installation conditions	Anti-Corrosion Effect from Installation	Anti corrosion Effect by Maintenance
Seashore	compulsory ① Seashore within 500m ② Direct exposure	-With Anti-corrosion coating : 2 years from installation * Check 1 year later from installation	■ After Corrosion Protection period (3 years) - Cleaning & Spay R-Pro : 2 years extended
	① Seashore within 500m ② Building / Protection Wall	-With Anti-corrosion coating : 4 years from installation -Without Anti-corrosion coating : 2 years from installation * Check 1 year later from installation	■ After Corrosion Protection period - Cleaning & Spay R-Pro (With initial coating) : 4 years extended - Cleaning & Spay R-Pro (without initial coating) : 2 years extended
	① Seashore within 500m~2km	-With Anti-corrosion coating : 4 years from installation -Without Anti-corrosion coating : 2 years from installation * Check 1 year later from installation	■ After Corrosion Protection period - Cleaning & Spay R-Pro (With initial coating) : 4 years extended - Cleaning & Spay R-Pro (Without initial coating) : 2 years extended
Seashore + corrosive gas area	compulsory ① Seashore within 500m ② Corrosive gas area	- With Anti-corrosion coating : 2 years from installation * Check 1 year later from installation	■ After Corrosion Protection period (3 years) - Cleaning & Spay R-Pro : 2 years extended
	① Seashore within 500m~2km ② Corrosive gas area		
corrosive gas area	①The place where corrosive gas generates		

Preparation for trouble shooting

- Reuse of EEPROM -

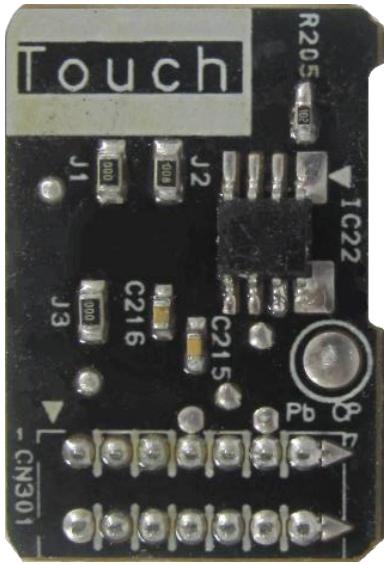
EEPROM

◆ What is EEPROM



Outdoor unit main PCB

TOP



BOTTOM

Outdoor unit data stored in EEPROM

- Serial number & HP information
- ODU option setting
- Auto start up result / Ref. amount test result
- Error back up data (30min)
- Etc.

Indoor unit data stored in EEPROM

- Serial number
- Option code – Product, Installation, Address
- “Location” text – Input using S-net pro2
- Etc.

EEPROM

◆ When you replace Main PCB

✓ Reuse the inserted EEPROM chip after replace the Main PCB.

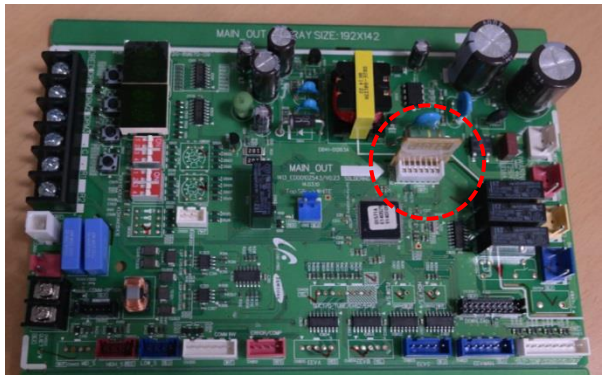
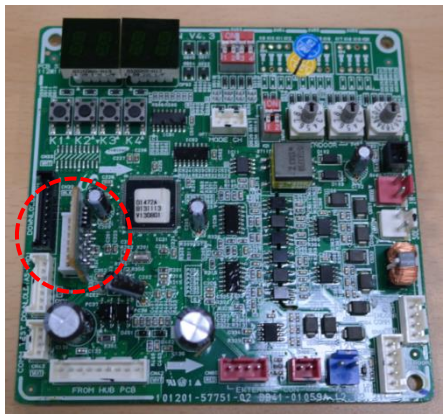
* You don't need to use new EEPROM chip. So do not throw it away.

✓ If you lost EEPROM or EEPROM defect

- Order EEPROM Chip(part code : DB93-12483A) & insert
- Insert the EERPM chip on the PCB and follow below

IDU	ODU
1. Set option code again (Product, installation, address, etc)	1. Upload EEPROM data(*SRC) using S-ne pro2 2. Set ODU option

* Please check part code before order, some EEPROM may have different part code.

	IDU	ODU
Picture		

Error code & Trouble shooting

Error code & Trouble shooting

◆ How to display integrated Error code

► Meanings of First Alphabetical Character / Number of Error Code

Displayed alphabet	Explanation	
E	When displaying Error 101~700	
P	When displaying Error 701~800	
C	When E206 occurs	Displays address of subordinate within the set C001 : HUB, C002: FAN, C003: INV1, C004: INV2
	When MCU error occurs	Displays address of MCU Ex) C100: MCU address 0, C101: MCU address 1, C102: MCU address 2
U	When displaying outdoor unit address Ex) U200: Outdoor unit 1, U201: Outdoor unit 2, U202: Outdoor unit 3, U203: Indoor unit 4	
A	When displaying indoor unit address Ex) A000: Indoor unit adress 0, A001: Indoor unit address 1, A002: Indoor unit address 2	

► Order of Error Display

Classification	Error display method	Display Example
Display method for error that occurred in indoor unit	Error Number → Indoor unit address → Error Number, repeat display	E471 → A002 → E471 → A002
Display method for error that occurred in outdoor unit and other methods of error display	Error Number → Outdoor unit address → Error Number, repeat display	E471 → U200 → E471 → U200 E206 → C001 → E206 → C002

Error code & Trouble shooting

◆ **Error code list**

DVM S error code list.pdf

Error code & Trouble shooting

- Communication error -

Error code & Trouble shooting

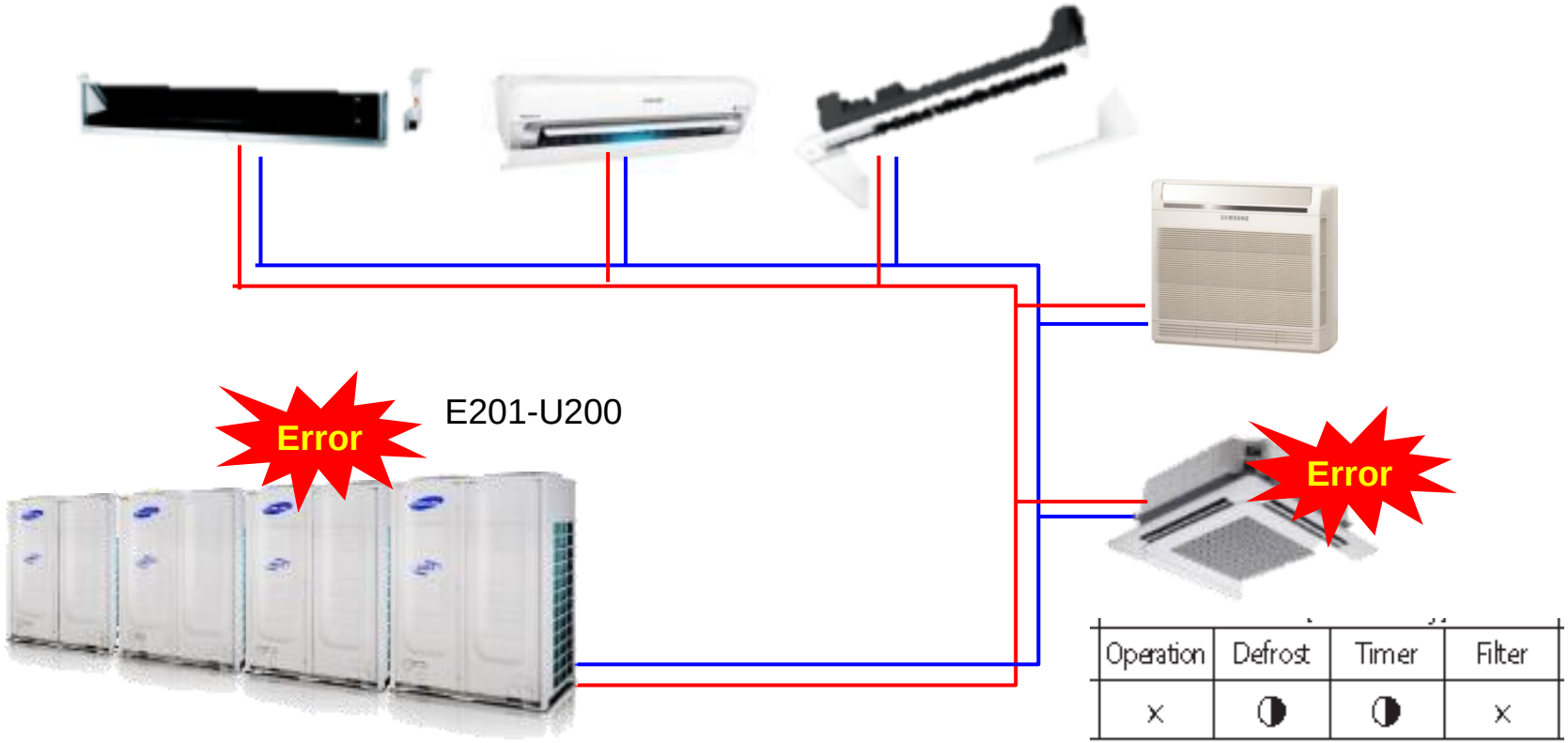
Outdoor unit display	E201 **(Communication error between IDU & ODU during tracking)**
Indoorunit display	Duct, Cassette (1/2 Way),Console, Celing: Operation ×, Defrost ×, Timer ◑, Fan ◑, Filter/MPI × Cassette (4/Mini4 Way): Operation ×, Defrost ◑, Timer ◑, Filter × Wall-mounted (NeoForte): Operation ×, Timer ×, Turbo ◑, 24℃ ◑, 27℃ × ※ ● : ON ◑ : Flash × : OFF
Judgment Method	· Communication error between indoor and outdoor units.
Cause of problem	· Refer to the judgment method below.

Cause	Solution
Indoor quantity ≠ IDU quantity setting in Outdoor unit	Adjust the setting
F1,F2 wire disconnection / Any IDU power down	Check the F1,F2 wire / Power on
Communication IC faulty	Check the IC
Duplicated address setting(E108 will be shown as well)	Change the indoor unit's address

Error code & Trouble shooting

◆ Case study – E201(Communication error between IDU & ODU during tracking)

- Problem : System stop by E201 intermittently
- Condition : System was ok when commissioning



Error code & Trouble shooting

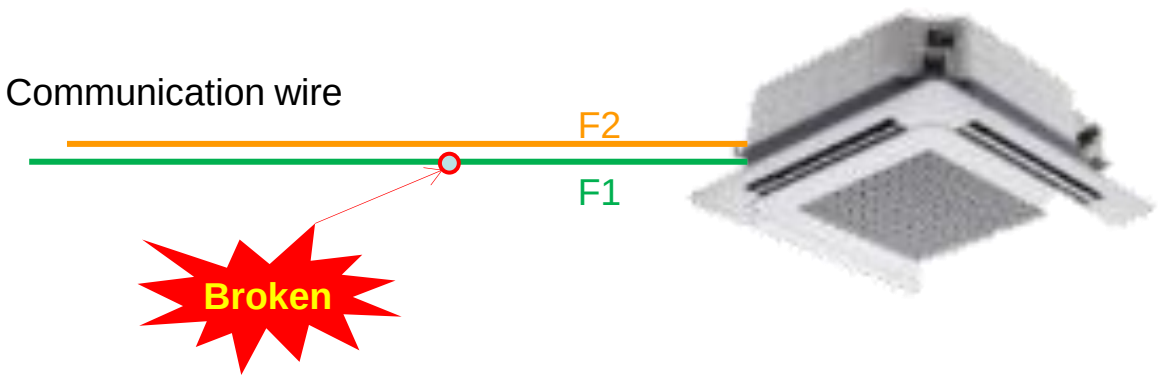
◆ Case study – E201(Communication error between IDU & ODU during tracking)

✓ Action

Action	Result
Check wiring to F1,F2 terminal block	OK
Comm. IC check	OK
Check ODU PCB setting	OK
Check Other error occurrence	OK
Wiring broken check	NG – middle of the F1 wire was broken

✓ Solution

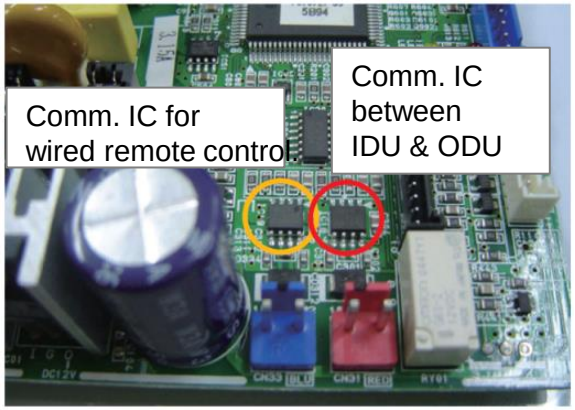
- Change the wire to new one



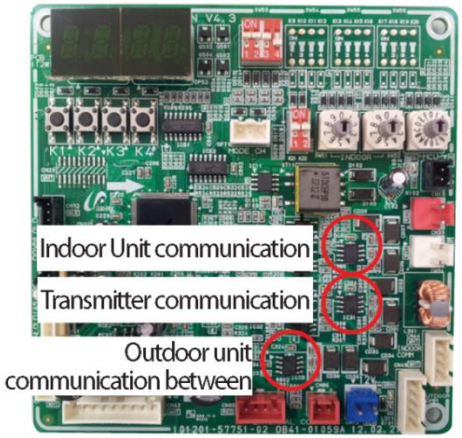
Error code & Trouble shooting

◆ Case study – E201(Communication error between IDU & ODU during tracking)

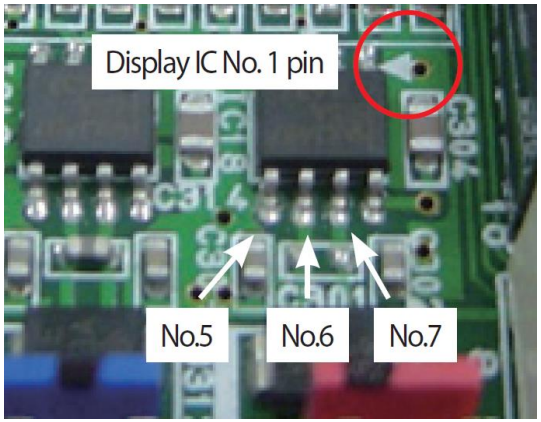
✓ Check Communication IC before PCB replace



Indoor unit

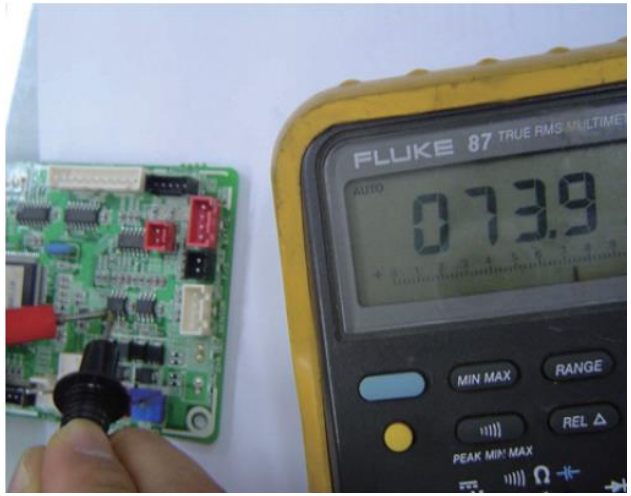


Outdoor unit



✓ Measurement Method

Measure resistance : No.5 - No.6 / No.5 - No.7 / No.5 - No.8



✓ Judgment

- Normal : All are in hundreds Ω ~ to hundreds of kΩ.
- Defective : One or more are low with tens of Ω

  One or more of them are open

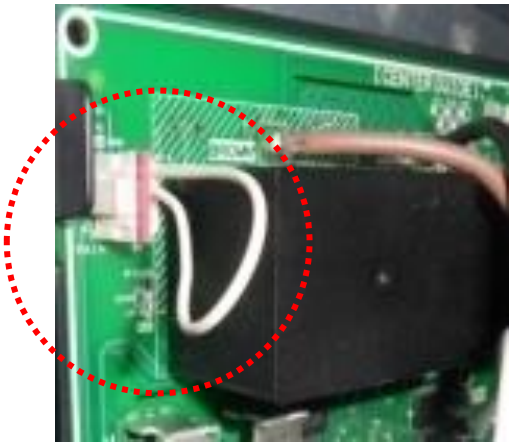
Error code & Trouble shooting

Outdoor unit display	E205 **Internal Communication error of the Outdoor Unit C-Box**
Indoorunit display	Duct, Cassette (1/2 Way), Console, Celing / Cassette (4/Mini4 Way) / Wall-mounted (NeoForte)
Judgment Method	· Communication error between the C-Box PCB
Cause of problem	· Communication wire inside the C-Box is unconnected · Main PCB defective

Duct, Cassette (1/2 Way), Console, Celing					Cassette (4/Mini4 Way)				Wall-mounted (NeoForte)				
Operation	Defrost	Timer	Fan	Filter/MPI	Operation	Defrost	Timer	Filter	Operation	Timer	Turbo	24℃	27℃
×	×	◑	◑	×	×	◑	◑	×	×	×	◑	◑	×

※ ● : ON ◑ : Flash ×: OFF

Possibility	1) No communication jumper connector on Inverter PCB 2) No power supply to inverter PCB 3) Poor connection of communication wiring and connector 4) Wrong HP information in EEPROM (2comp eeprom in 1comp)



Comm. jumper

Connection Inv1 and inv2

<PCB Connection order>

- MAIN PCB
- HUB PCB
- FAN PCB
- INV PCB 1
- INV PCB 2
- Communication jumper (important)

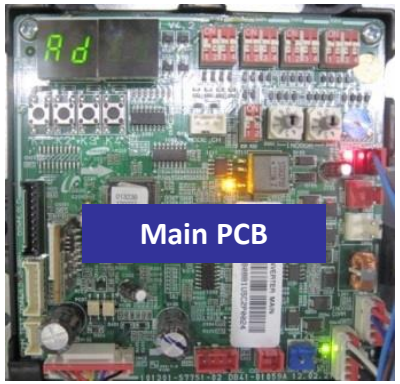
Error code & Trouble shooting

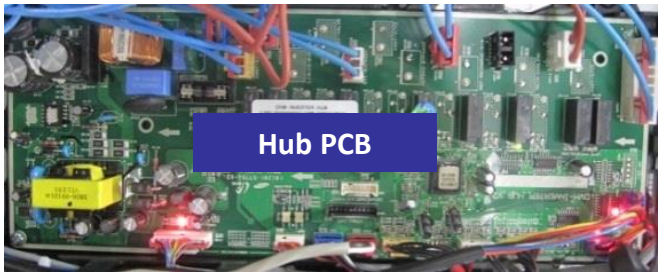
Outdoor unit display	E206 **Internal Communication error of the Outdoor Unit C-Box**
Indoorunit display	Duct, Cassette (1/2 Way),Console, Celing: Operation, Defrost, Timer, Fan, Filter/MPI; Cassette (4/Mini4 Way): Operation, Defrost, Timer, Filter; Wall-mounted (NeoForte): Operation, Timer, Turbo, 24℃, 27℃ × × ◑ ◑ × × ◑ ◑ × × × ◑ ◑ × ※ ● : ON ◑ : Flash ×: OFF
Judgment Method	· PCB does not respond to the invoked Main PCB
Cause of problem	· C-Box internal Inverter PCB, Fan PCB, Hub PCB defective

Possibility	1) Poor connection of communication wiring and connector 2) Defect of related electric component

* Reference

E206-C001: HUB PBA communication error / E206-C002: FAN PBA communication error
E206-C003: INV1 PBA communication error / E206-C004: INV2 PBA communication error
E206-C005 : Water Hub PBA communication error





Error code & Trouble shooting

◆ Case study - E108

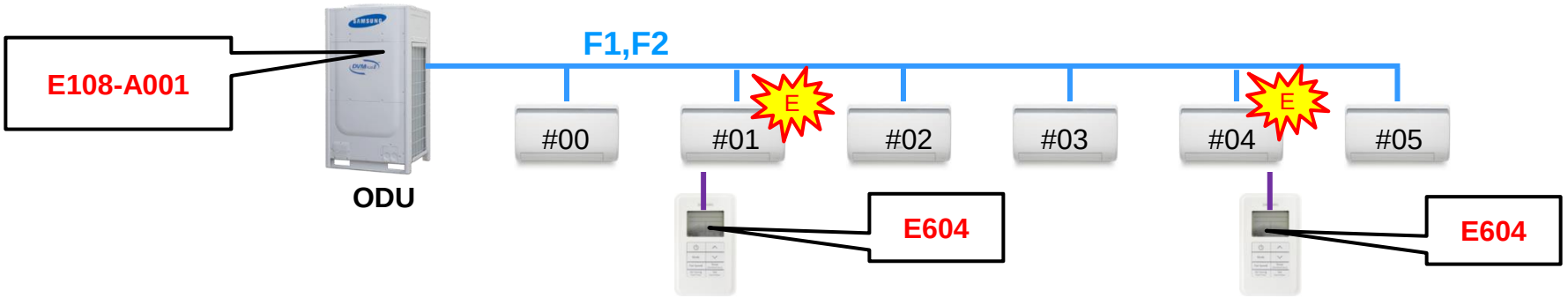
Outdoor unit display	E108 - A00X (X : Address of duplicate indoor unit)
Indoor unit display	Operation: × / Defrost: × / Timer: ◑ / Fan: ◑ / Filter/EMI: × ※ ● : ON ◑ : Flash × : OFF
Judgment Method	Refer to the judgment method below.
Cause of problem	· Indoor unit and MCU address duplication.

Cause	Check point
Display : E108-A001-E108-A001… → Duplicated address of indoor unit → A001 IDU tried to use address already exist.	1. Find IDU address #01 and then set the address again (The indoor unit has an error LEB is blinking). 2. Use S-net pro to fine the IDU and set the address again.
Duplicated address of indoor unit in EEV kit	Check the EEV Kit setting
Display : E108-C101-E108-C101… → Duplicated address of MCU	Check MCU address rotary switch

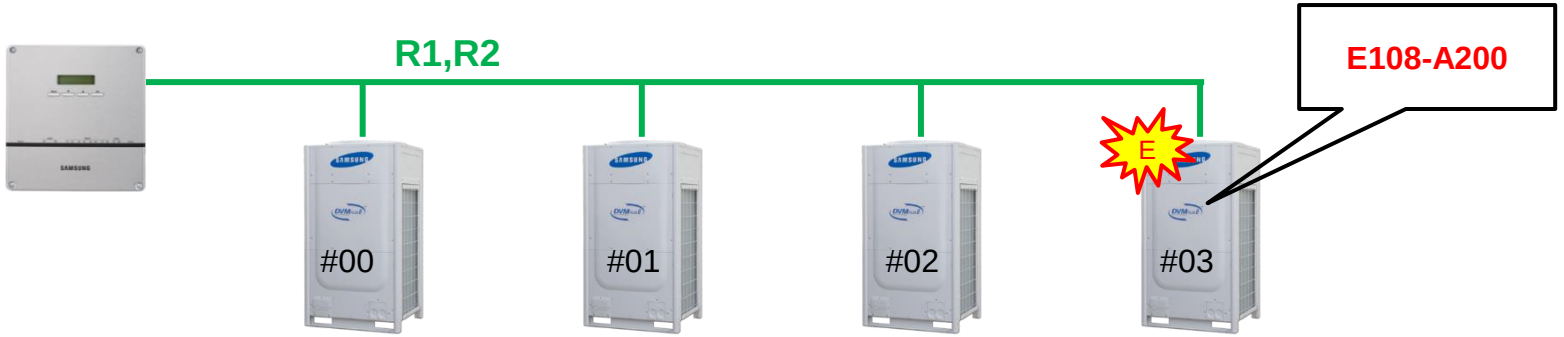
Error code & Trouble shooting

◆ Case study - E108

Case 1. After set all IDU's address system show E108-A001, 2 IDU LED is bilking
What is the problem?

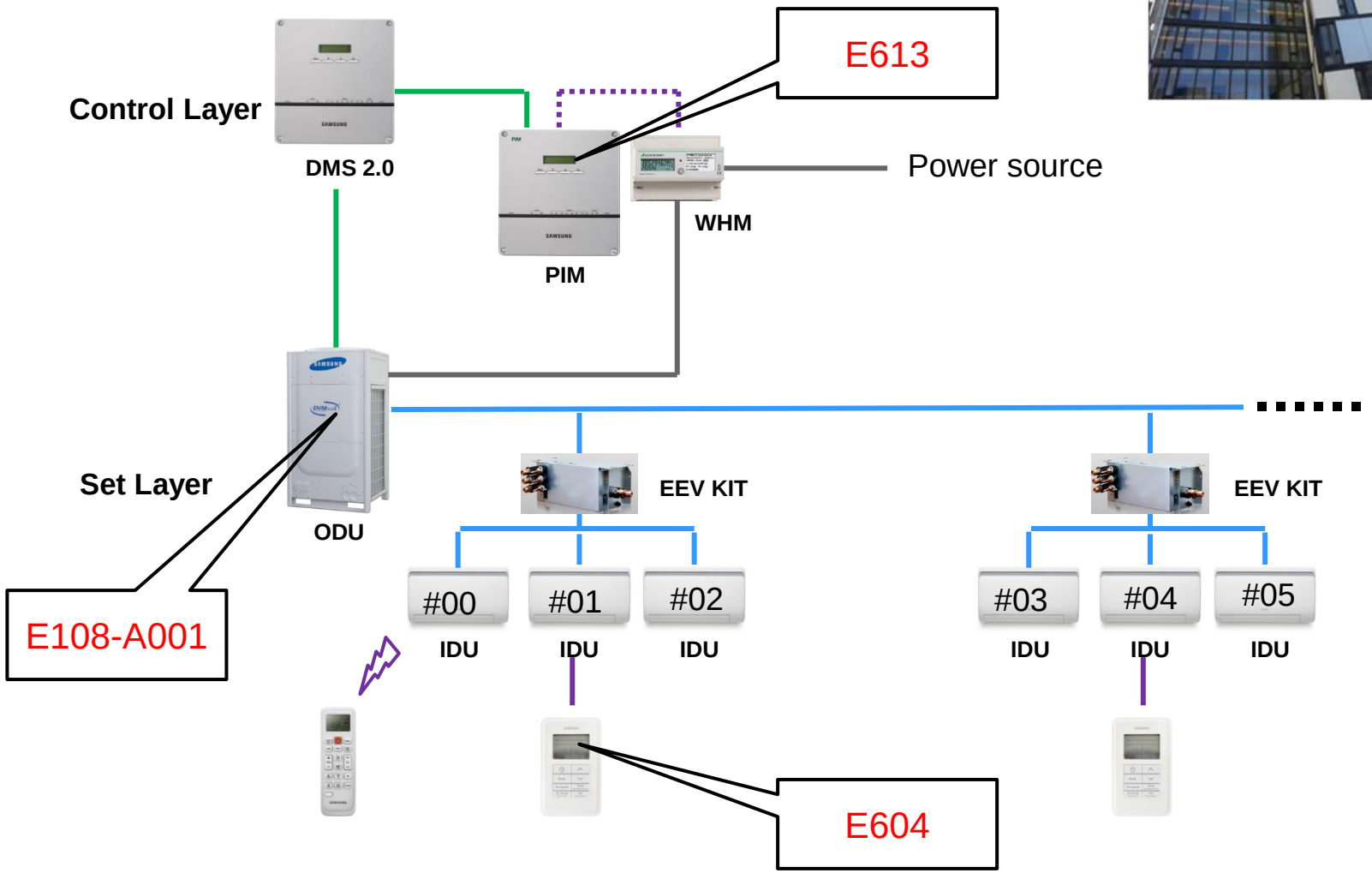


Case 2. After tracking in DMS2 system shows E108. What is the problem?



Error code & Trouble shooting

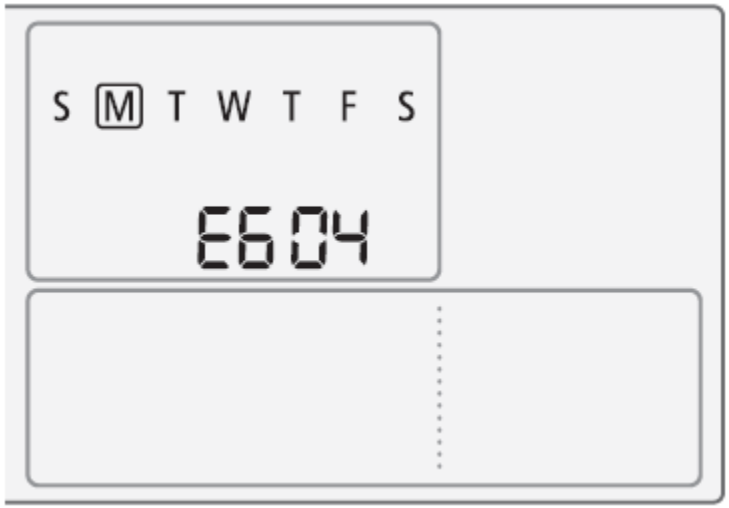
◆ **Case study - E108, E604, E613**



Error code & Trouble shooting

◆ Case study - E108, E604, E613

PIM display	E604
Contents	Communication error between wired remote controller & Indoor unit
Error result	Remote controller stop
Cause	- When tracking between wired remote controller and indoor unit/ventilator (ERV) is not complete for more than 3minutes(ex: System communication error like E201, E108…) - IDU address has been changed after wired remote controller tracking completion
Treatment	1) Power reset of Wired Remote controller (Manual reset ; re connect the power wire)



Error code & Trouble shooting

◆ Case study - E108, E604, E613

PIM display	E613
Contents	Error which occurs when there is no communication between DMS and PIM/SIM for 15 minutes
Error result	PIM stop
Cause	- System communication error like E201, E108… - Wired disconnection
Treatment	- System communication error fix - Check the wire

Error code & Trouble shooting

◆ Case study - E108, E604, E613

- Trouble shooting

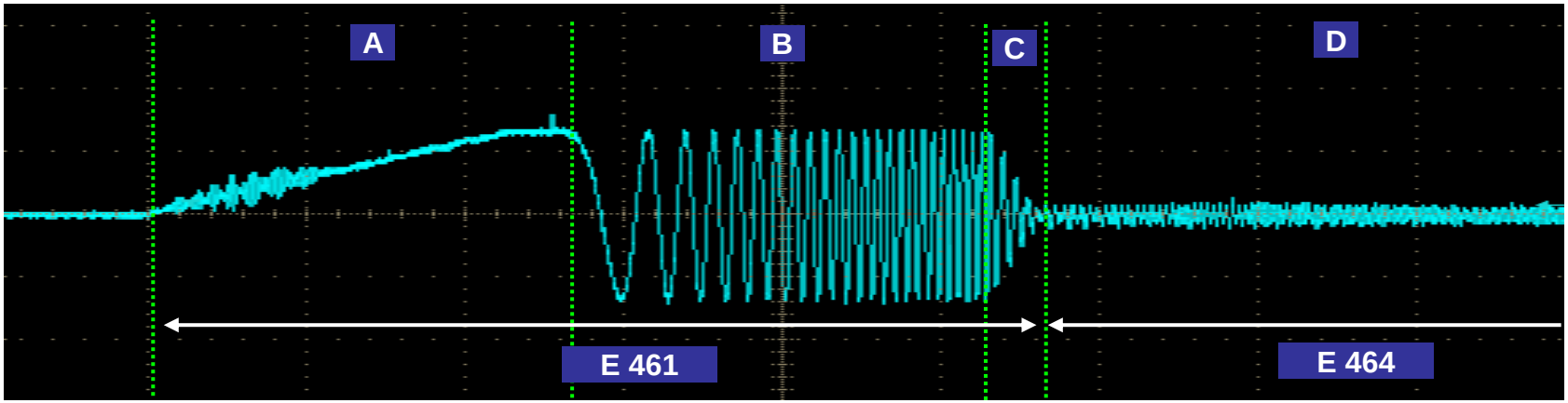
Error code	Description	Cause	Solution
E613	Comm. error between DMS and PIM/SIM	Comm. was not finished Because of E108	Fix E108
E108	Address duplication of IDU/MCU/EEV kit	EEV KIT address setting Failure (human error)	Fix IDU address
E604	Tracking error between remote controller and the IDU	Tracking fail because of E108	Power reset on Wired remote controller

Error code & Trouble shooting

- Compressor error-

Error code & Trouble shooting

Outdoor unit display	E461 (INVERTER1 PCB) E361 (INVERTER2 PCB) **Compressor starting error**
Judgment Method	· Startup, and then if the speed increase is not normally. · Detected by H/W or S/W.
Cause of problem	· Compressor connection error · Defective Compressor · Defective PCB



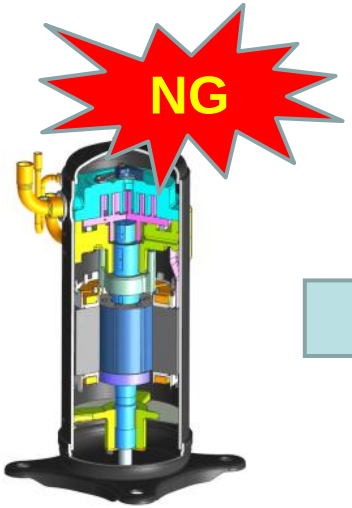
Error code & Trouble shooting

Outdoor unit display	E464/E465 (INVERTER1 PCB) E364/E365 (INVERTER2 PCB)	**Inverter Overcurrent error**
Judgment Method	· Will occur if the overcurrent flowing in the IPM. · Detected by H/W or S/W	
Cause of problem	· Installation defective · Comp. defective · PCB defective	· Connection wire error · Motor defective

✓ Check whether compressor defect or Inverter PCB defect

Inverter PCB

Or



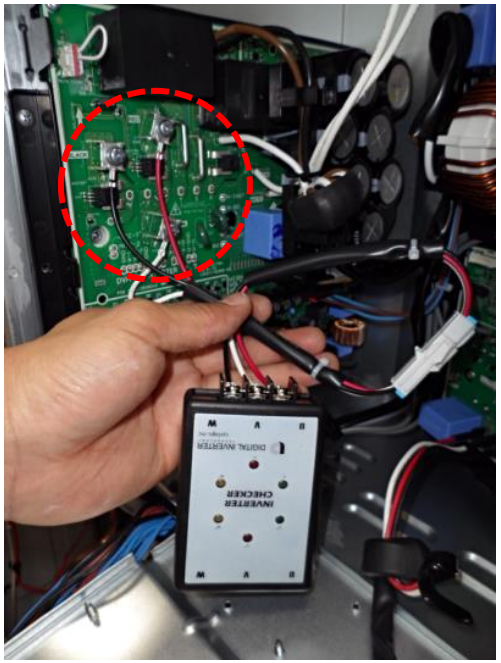
compressor

E461/464

E361/364

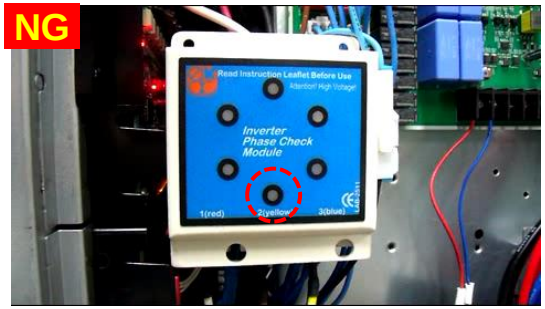
Error code & Trouble shooting

◆ Trouble shooting for E461/361 & E464/364

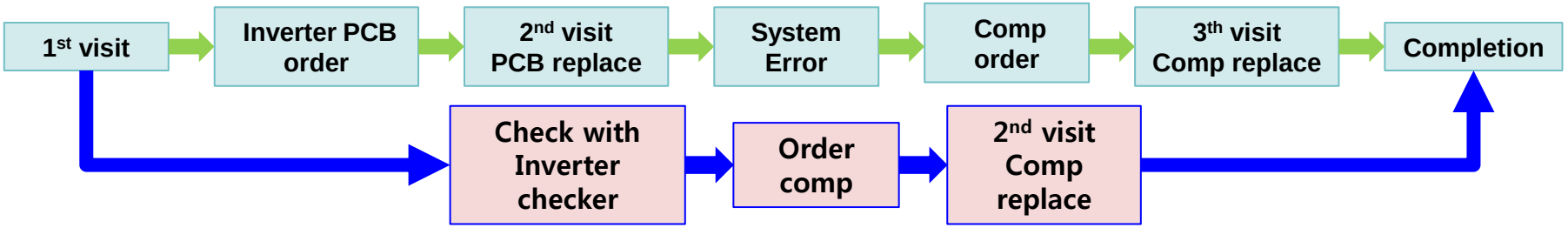


✓ Diagnosis 1 : Using **inverter checker**

1. Power Off
2. Wait more than 15 minutes after the Power Off as in case of IPM failure, as discharge mode may not work properly.
3. Connect inverter checker(Phase checker)(U : RED / V : WHT / W : BLK)
4. Execute inverter checker function in OUD main PCB.
5. If any LED is not blinking → PCB defect → Change PCB



← Let's see video



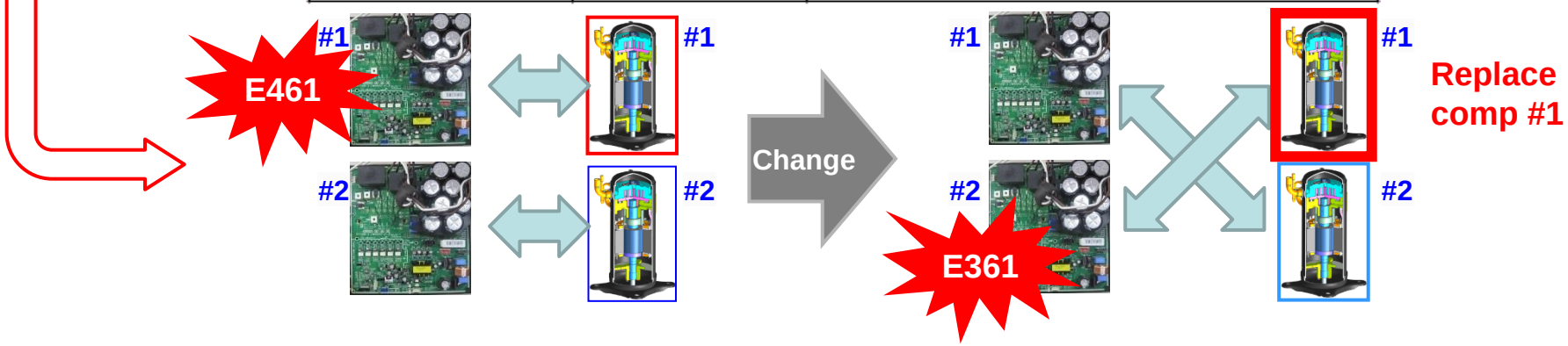
Error code & Trouble shooting

◆ Trouble shooting for E461/361 & E464/364

✓ Diagnosis 2 : When **2comp** system

1. Power Off
2. Wait more than 15 minutes after the Power Off.
3. Exchange comp wire (Inver PCB 1 ↔ comp 2 & Inverter PCB 2 ↔ comp 1)
4. Take measure according to the result

Before Change	After Change	Measure
E461	E361	Replace No.1 Compressor
E461	E461	Replace No.1 Inverter PCB
E361	E461	Replace No.2 Compressor
E361	E361	Replace No.2 Inverter PCB



Error code & Trouble shooting

◆ Trouble shooting for E461/361 & E464/364

✓ Diagnosis 3 : Check Inveter PCB defect with **Tester**

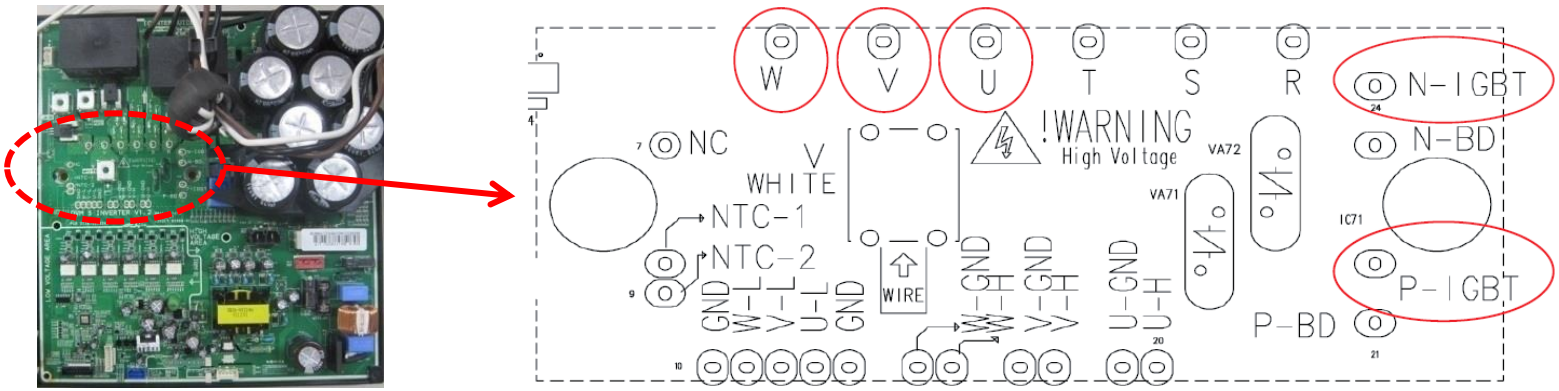
1. Power Off.
2. Wait more than 15 minutes after the Power Off as in case of IPM failure, discharge mode may not work properly.
3. Remove all of the Inverter PCB connectors and wire that is fixed as screw. (Include wire that is fixed to compressor and DC Reactor.)
4. Prepare the digital multi tester.

Error code & Trouble shooting

◆ Trouble shooting for E461/361 & E464/364

✓ Diagnosis 3 : Check Inveter PCB defect with Tester

Division	Measured Point		Criterion	Remark
	+	-		
Measure the resistance values	P-IGBT	U	More than 3 MΩ	Measurement error can occur for reasons s uch as the initial measurement condenser discharge. Measured over at least three times.
	P-IGBT	V		
	P-IGBT	W		
	U	N-IGBT		
	V	N-IGBT		
	W	N-IGBT		
Measure the diode voltage values	U	P-IGBT	0.3~0.7V	
	V	P-IGBT		
	W	P-IGBT		
	N-IGBT	U		
	N-IGBT	V		
	N-IGBT	W		



Error code & Trouble shooting

◆ Trouble shooting for E461/361 & E464/364

✓ Diagnosis 4 : Check compressor defect with Tester

1. Power Off.
2. Wait more than 15 minutes after the Power Off as in case of IPM failure, discharge mode may not work properly.
3. Prepare the digital multi tester.

Resistance test	Normal range
Resistance value of (U↔V,V↔W,W↔U) on compressor	less than 2Ω
Resistance value between the body of compressor and chassis	MΩ

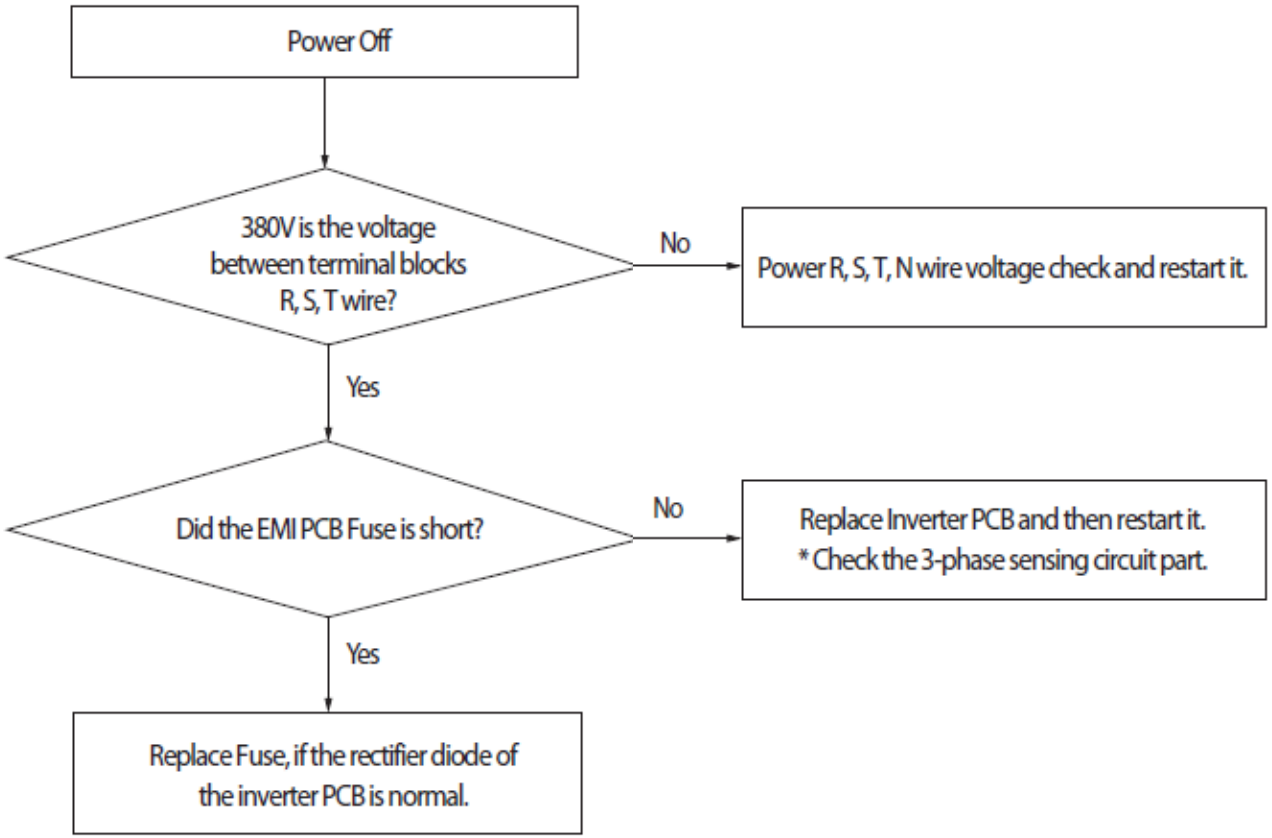
Compressor

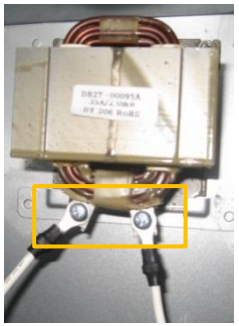
(Example)

No	Comp Name	Resistance (20℃)								
		C-R or U-V (Ω)			C-S or U-W (Ω)			V-W (Ω)		
		Spec.	Min	Max	Spec.	Min	Max	Spec.	Min	Max
1	DS-GB052FA++	0.21	0.20	0.22	0.21	0.20	0.22	0.21	0.20	0.22
2	DS-GB052FB++	0.13	0.12	0.13	0.13	0.12	0.13	0.13	0.12	0.13
3	DS-GB066FA++	0.14	0.13	0.15	0.14	0.13	0.15	0.14	0.13	0.15
4	DS-GB070FA++	0.11	0.11	0.12	0.11	0.11	0.12	0.11	0.11	0.12

Error code & Trouble shooting

Outdoor unit display	E466 (INVERTER1 PCB) E366 (INVERTER2 PCB) **Overvoltage / Low voltage error**
Judgment Method	· N-phase wiring error and EMI Fuse short. · DC-Link Overvoltage / Low voltage occurs.
Cause of problem	· Check the input wiring (reactor, etc) · EMI Fuse short





Reactor

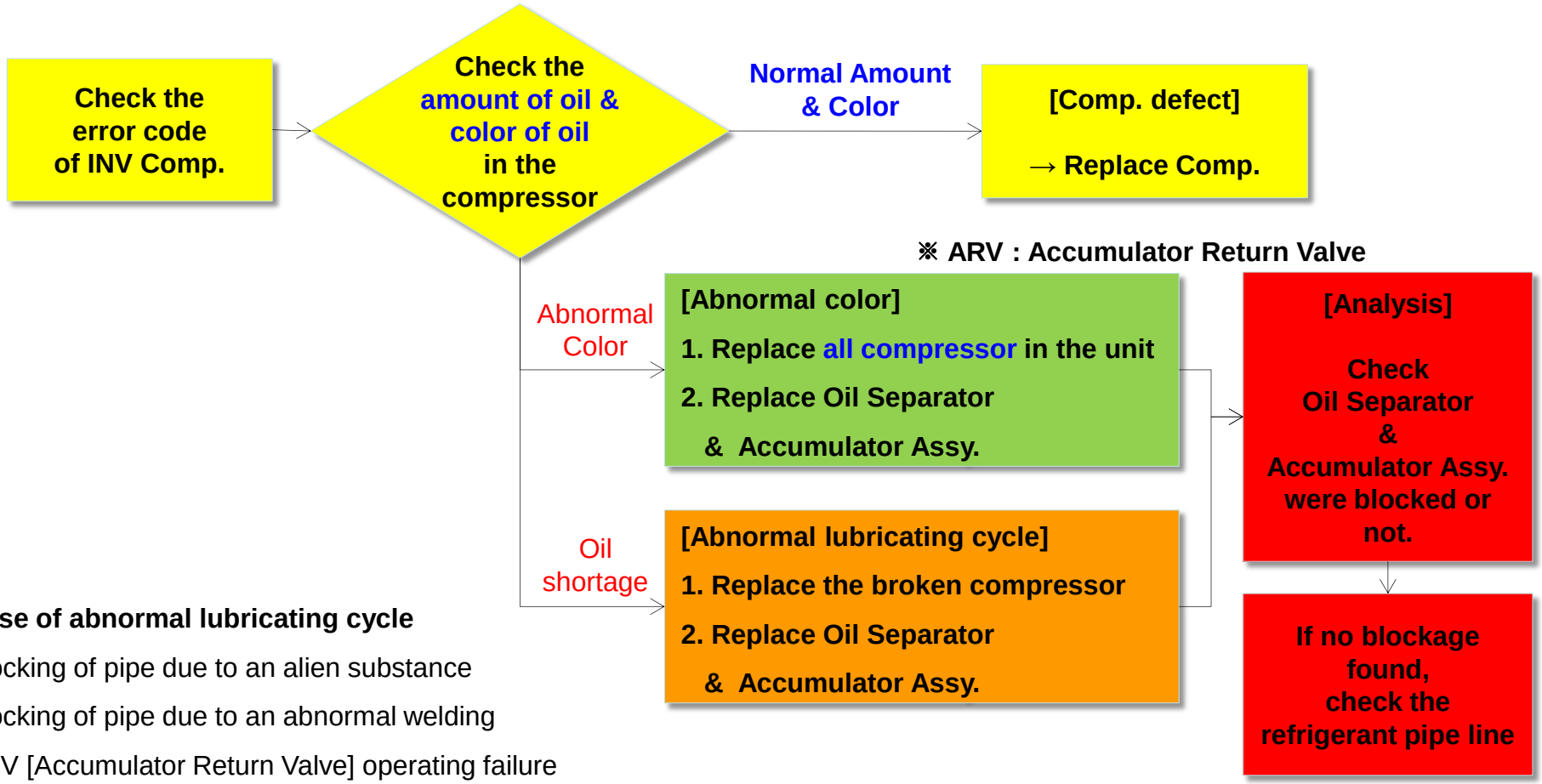
EMI PCB

How to change the compressor

Error code & Trouble shooting

◆ How to change the compressor

-. If you find compressor error code, you have to check whether the compressor defect itself or compressor damaged due to an abnormal lubricating cycle.



*** Cause of abnormal lubricating cycle**

- Blocking of pipe due to an alien substance
- Blocking of pipe due to an abnormal welding
- ARV [Accumulator Return Valve] operating failure

Error code & Trouble shooting

◆ How to change the compressor

✓ Part replacement and inspection

Lubricating problem can be caused by other units so other unit's lubricating parts must be checked.

Main ODU Comp #1 broken		Main ODU		Sub 1	Sub 2
		comp #1 (Broken)	comp #2	comp #1	comp #1
If oil is contaminated	Comp	Replace	Replace	X	X
	Accum	Replace		X	X
	Oil separate	Replace	Chocking test by nitrogen gas	X	X
If oil is shortage	Comp	Replace	X	X	X
	Accum	Replace (Production ~ 2014.09)		X	X
	Oil separate	Check & Replace		X	X
Remark				Check chocking of lubricating parts	

Error code & Trouble shooting

◆ How to change the compressor

✓ Detach the faulty compressor

Step	When compressor is 1 inside outdoor unit	When compressor is 2 inside outdoor unit
1		Set faulty compressor cut from ODU PCB setting
2		Proceed pump out only 1 time. ※ Continues pump out will cause compressor breakdown
3	Lock all SVC valve of liquid pipe and gas pipe.	
4	Enter in vacuum mode to open all EEV and Valve	
5	Reclaim refrigerant of outdoor unit using Recovery Unit. ※ 1. After pump out, amount of refrigerant remaining is about 1.5kg ordinarily. In the winter, refrigerant can remain more because refrigerant fills to Accumulator 2. Refer to factory charging refrigerant had registered to Label of outdoor unit.	
6	Turn off the power of outdoor unit.	
7	Separate faulty compressor from outdoor unit. ※ Use pipe cutter or confirm whether refrigerant of outdoor unit was reclaimed all through manifold gauge before use welding machine to detach the compressor.	

Error code & Trouble shooting

◆ How to change the compressor

✓ Oil condition check and replace new compressor

Step	When compressor is 1 inside outdoor unit	When compressor is 2 inside outdoor unit
1	Measure quantity of broke down oil of compressor.	
2	Check amount and color of compressor oil that broke down	
3	When oil is polluted(ASTM : more than 3) replace all comp. & the Oil Separator & Accumulator Assy. as well. When shortage replace the broken comp. & Oil Separator & Accumulator Assy. as well.	
4		When oil is shortage, check other compressor's oil separator if chocking and if so replace the oil separator.
5	Decide amount of oil to be added after compressor replacement	
6	Install new compressor & Add oil as decided in the previous step	
7	Supply the power and then enter in vacuum mode to open all EEV and Valve	
8	Execute leakage examination using nitrogen then proceed vacuum work	
9	Add refrigerant as much as recovered from step 5. ※ Can get help to decide additional refrigerant amount if use refrigerant amount check function in ODU	
10	Execute Auto Trial Operation after open SVC Valve.	

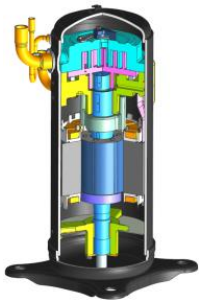
Error code & Trouble shooting

◆ How to change the compressor

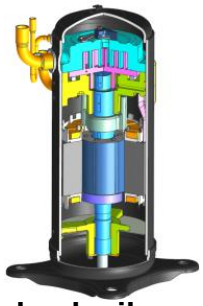
✓ Oil color decision

Exchange all compressor in the system if the oil color is same or worse than 3.

[Disassemble Comp.]



[Comp. weight check.]



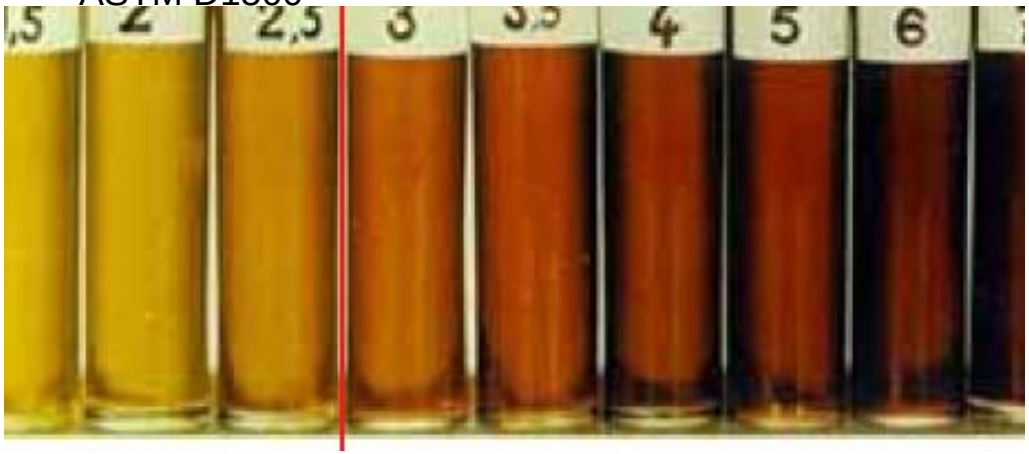
***to check oil amount**

[Pour oil]

[Check amount / color]

Oil shortage
or abnormal color

* ASTM D1500



Error code & Trouble shooting

◆ How to change the compressor

Type	Comp	Set	Total
1 Comp	1,100cc	2,800cc	3,900cc
2 Comp	1,100cc *2	4,000cc	6,200cc

✓ Decide additional amount of oil

Decide amount of oil to be added after compressor replacement

Otherwise new compressor will be broken continuously by bad lubricating cycle.

※ Amount oil amount(kg)= Weight(kg) of replaced part - Weight(kg) of new part((Refer to the weight info.)

※ Add 100cc of oil every 0.1kg difference

※ DVM S oil service code : DB81-02598A [1ℓ can]


weight info.

1. Check the weight of broken compressor

* GB052FAVA : 31.6kg(including oil 1100cc) / GB066FAVA : 35.4kg(including oil 1100cc)

* If broken compressor is 0.8kg or more lighter than new one, Oil return line is blocked.

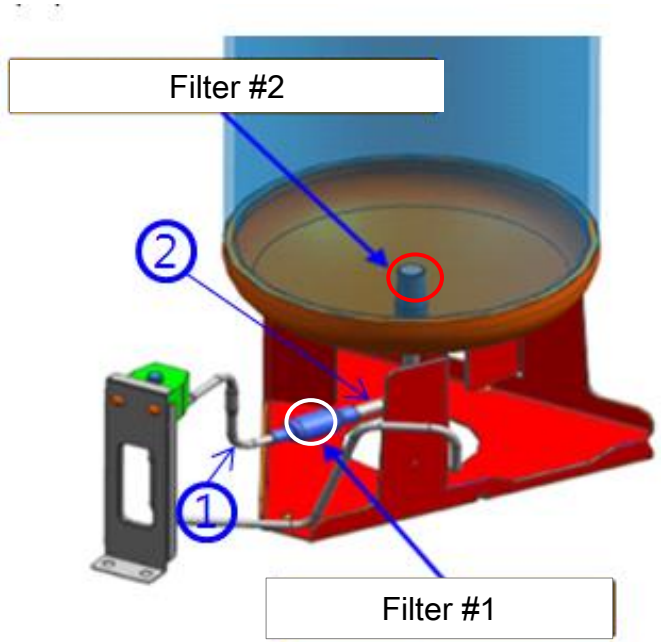
2. Check the weight of oil lubricating part(Assy. accumulator, Assy. oil separator)

3. If module installation, install Filter dryer to liquid of each unit to prevent further problem.

Error code & Trouble shooting

◆ Check point after remove the compressor

1. How to check the Accumulator blockage
   - Cut ① and check
     : No oil flow - filter#1 or pipe block / Oil flow - ARV valve block
   - Cut ② and check
     : No oil flow - filter#2 or pipe block / Oil flow - filter #1 block



*** If there is moisture in the system**

In heating mode, saturated temperature is below 0℃
and it makes ice which can block the filter

< oil with add 200cc water test>

Address	10,06,00
Serial Number	-
Operation Mode	Test
Operation Status	Heat
Error Code	911
Capacity	22HP
Target Frequency1	58
Order Frequency1	58
Current Frequency1	58
Target Frequency2	61
Order Frequency2	61
Current Frequency2	61
High Pressure	23,6
Saturated T_Pd	40℃
Low Pressure	5,4
Saturated T_Ps	-7℃
Discharge1	53,1℃
Discharge2	53,5℃

*** If filter is blocked** by substance there is no oil flow

Cut #1
No oil flow

Cut #2
Oil flow

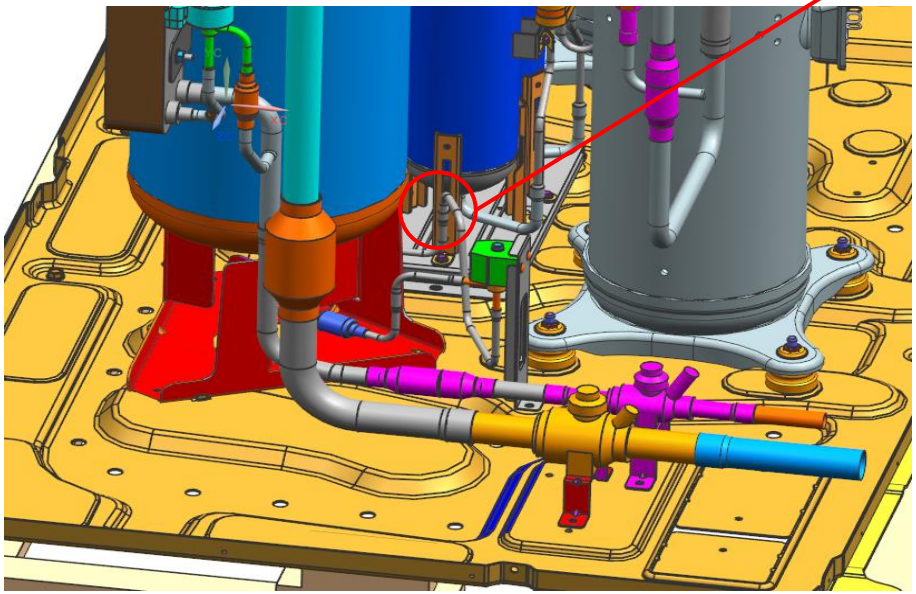
Cut filter#1
Filter block

Error code & Trouble shooting

◆ Check point after remove the compressor

2. How to check the ARV blockage

- There is oil in accumulator but there is no block in the filter.
- Cut the brazing point and check



▷ Blocked by brazing substance

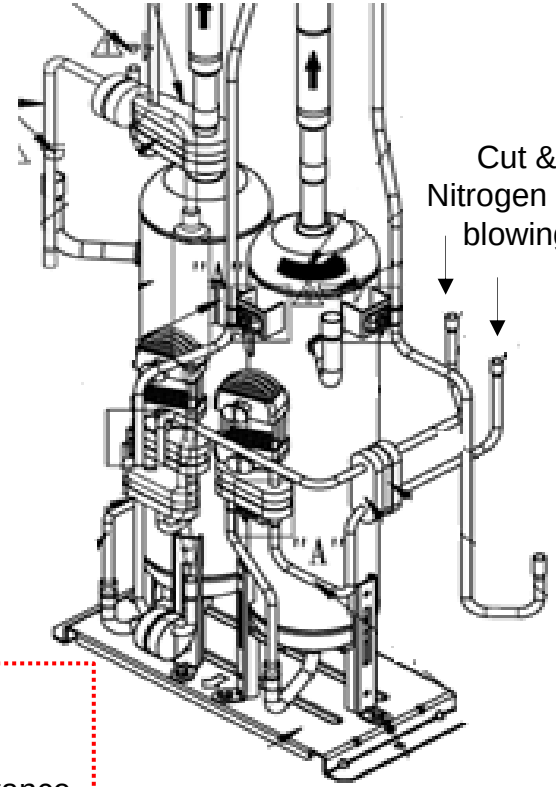
Error code & Trouble shooting

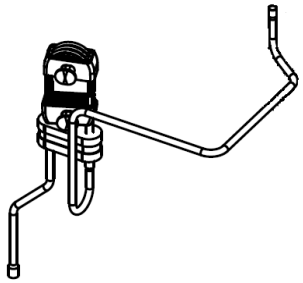
◆ Check point after remove the compressor

3. How to check the Oil separator blockage

- If there is little oil in accumulator, oil may stay in Oil separator.
- Check brazing point

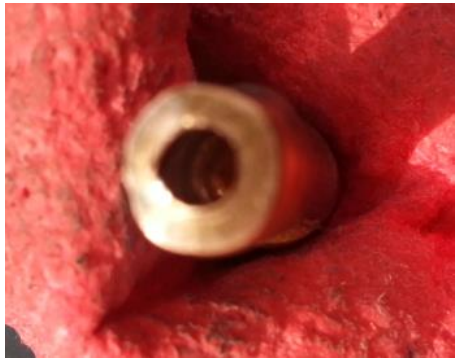
1. Blowing by nitrogen gas
2. Cut and see





* Brazing point check

Ex) blocked by brazing substance



Error code & Trouble shooting

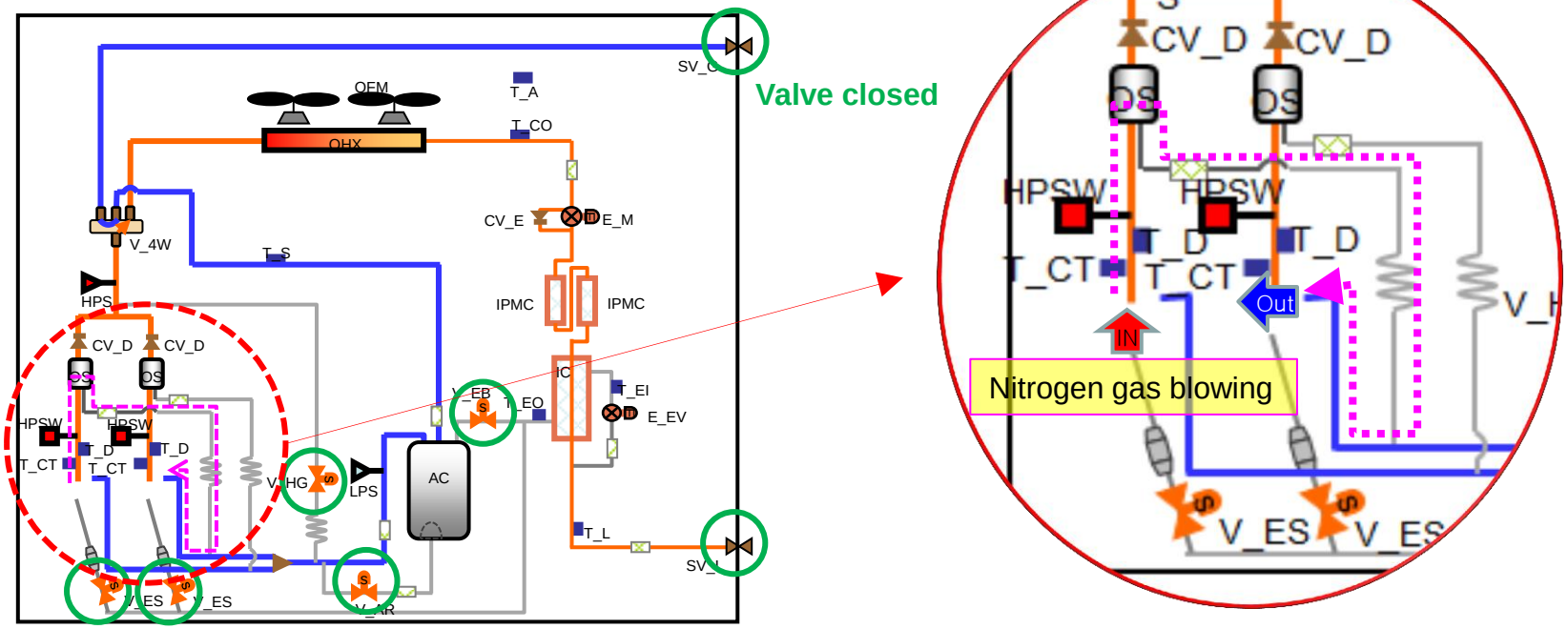
◆ Check point after remove the compressor

3. How to check the Oil separator blockage

- Nitrogen gas blowing to Discharge line

OK : Nitrogen gas come out from suction line
NG : No gas come out from suction line

* Some solenoid valve or 4way valve may have leak.
So even though the result was ok, check the temperature of oil separator return line again after replace the compressor.
(See the page 88)



Error code & Trouble shooting

◆ Check point after replace the compressor

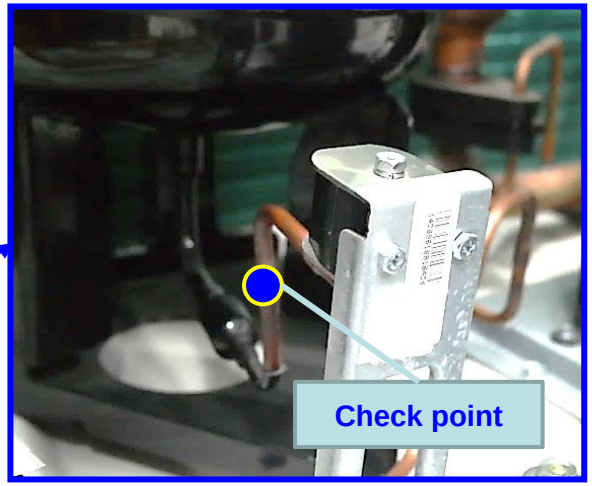
- Test run to check Accumulator(low pressure side)

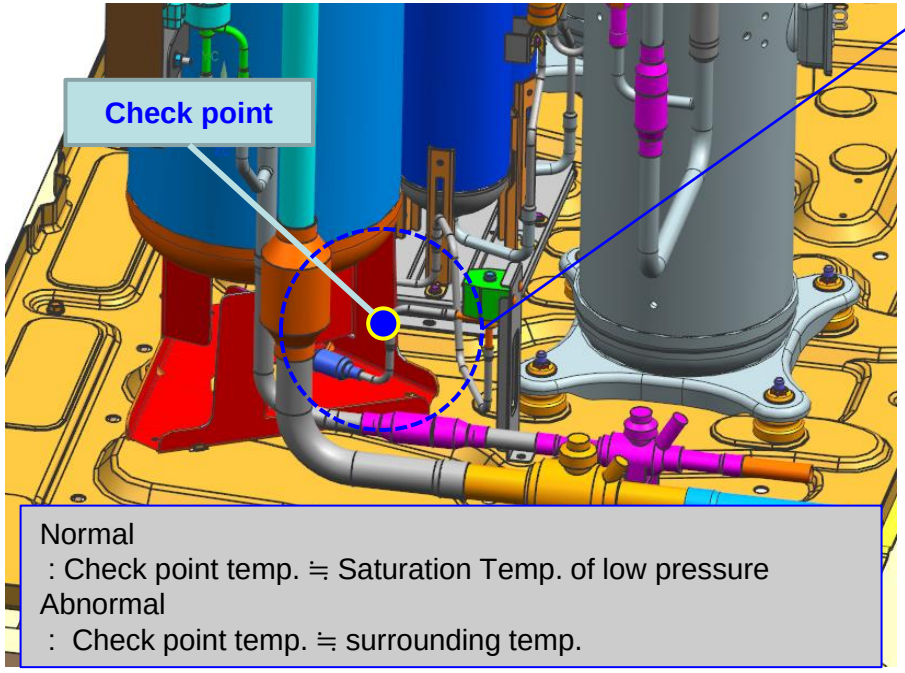
▷ Normal : ARV close(off) temp. – ARV open(on) temp. **> 5℃**

* Test run(30mins) → ARV disconnect(ARV close)

→ Warm up the pipe by hand or heater → 5mins wait → temp. check

→ ARV connect(ARV open) → 5mins wait → temp. check





Normal
: Check point temp. ≒ Saturation Temp. of low pressure
Abnormal
: Check point temp. ≒ surrounding temp.

No	ODU No1		ODU No2	
	ARV Off	ARV On	ARV Off	ARV On
Outdoor Temp	8.2	8.7	8.6	8.7
High Pressure	28.4	28.5	28.4	28.5
Low Pressure	5.4	4.6	5.4	4.6
Current Freq	53	64	49	58
Hotgas	OFF	OFF	OFF	OFF
Suction	4.9	3.8	4.8	4.2
ARV off	22 →	10.7	20 →	19

NG

Error code & Trouble shooting

◆ Check point after replace the compressor

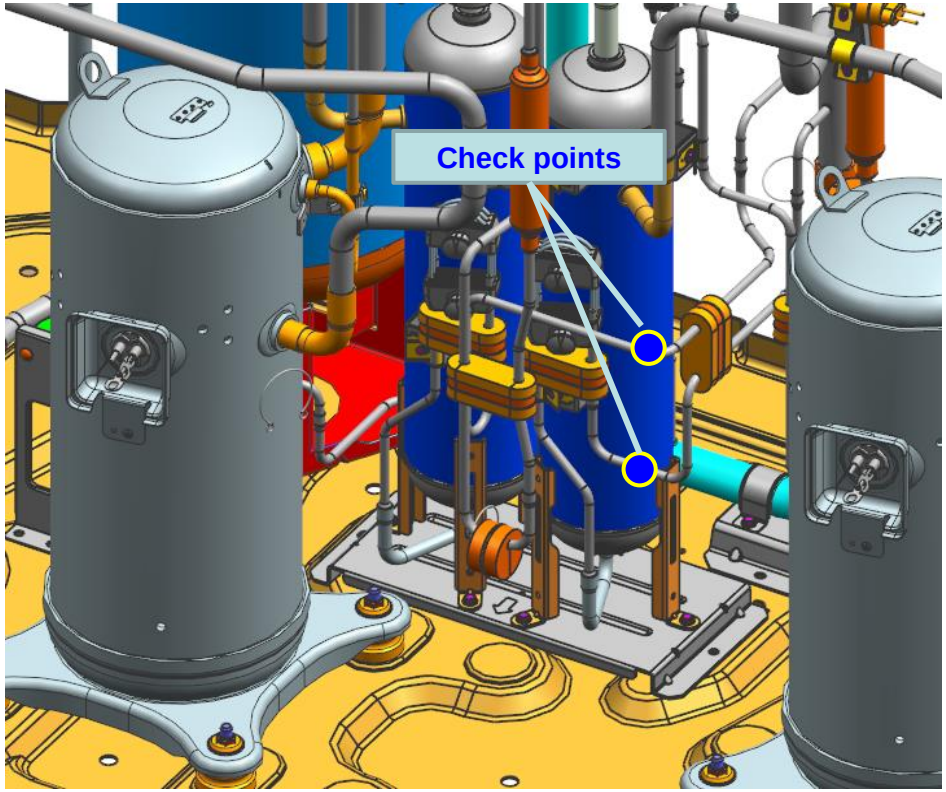
- Test run to check Oil separator(high pressure side)

▷ Normal : Check point temp. ≒ Saturated T_Pd

▷ Abnormal : Check point temp. ≒ surrounding temp.

* Check point : Oil out line of oil separator

Address	10,06,00	10,06,01
Serial Number	-	-
Operation Mode	Test	Test
Operation Status	Heat	Heat
Error Code	911	911
Capacity	22HP	22HP
Target Frequency1	58	61
Order Frequency1	58	61
Current Frequency1	58	61
Target Frequency2	61	64
Order Frequency2	61	64
Current Frequency2	61	64
High Pressure	23,6	24,6
Saturated T_Pd	40℃	42℃
Low Pressure	5,4	5
Saturated T_Ps	-7℃	-9℃
Discharge1	53,1℃	68℃
Discharge2	53,5℃	62,7℃



Error code & Trouble shooting

- EEV error -

Error code & Trouble shooting

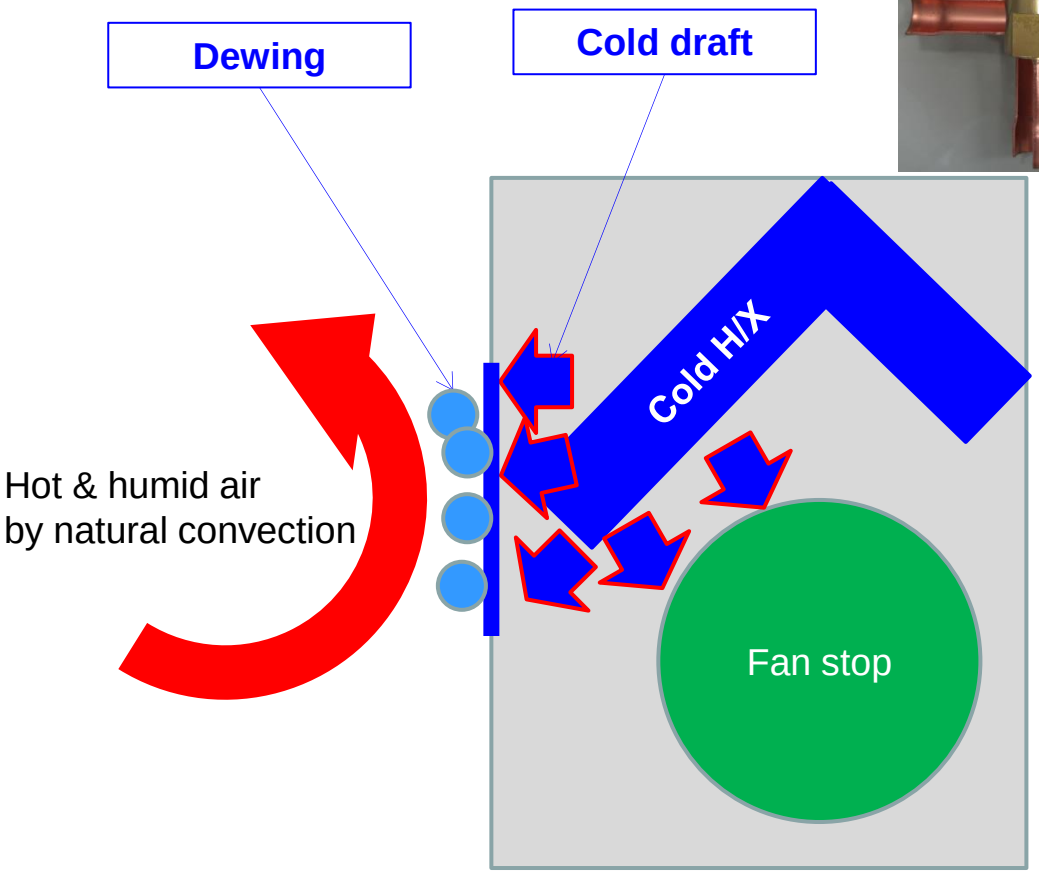
◆ **Case study – EEV leak(No error)**

- **Problem : Water dewing on body of IDU**
- **Condition : IDU stop, room is Humid**

Error code & Trouble shooting

◆ Case study – EEV leak

- Reason : EEV leak



EEV leak

↓

Refrigerant flow

↓

H/X temperature down

↓

Indoor unit' body temperature down

↓

Indoor unit' body temperature down

↓

Dewing on the body

Error code & Trouble shooting

◆ **Case study – EEV leak**

- **Trouble shooting : Find root cause of EEV leak and fix it**

*** How to check eev leak**

1. **Turn on 1 indoor unit in cooling mode & others in fan mode.**
2. **Wait 10mins or more**
3. **See the Eva in/out temperature**

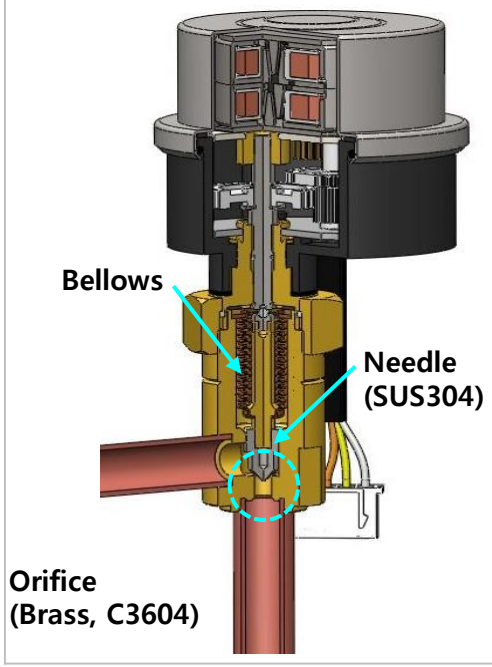
Addr	능력코드	운전	운전모드	풍속	Set temp.	Room temp.	Eva In	Eva Out	EEV
10	3.7 kW		Cool	High	21 ℃	21 ℃	7 ℃	17 ℃	116
11	0 kW		Fan	Auto	22 ℃	20 ℃	> 6 ℃	14 ℃	0
12	0 kW		Fan	Auto	22 ℃	20 ℃	> 6 ℃	17 ℃	
13	0 kW		Fan	Auto	22 ℃	19 ℃	> 5 ℃	13 ℃	0
14	0 kW		Fan	Auto	22 ℃	20 ℃	> 15 ℃	15 ℃	0
15	0 kW		Fan	Auto	22 ℃	27 ℃	26 ℃	26 ℃	35
16	0 kW		Fan	Auto	22 ℃	28 ℃	25 ℃	26 ℃	35
17	0 kW		Fan	Auto	22 ℃	27 ℃	27 ℃	26 ℃	0

EEV leak

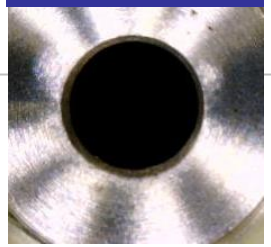
Error code & Trouble shooting

◆ Case study – EEV leak

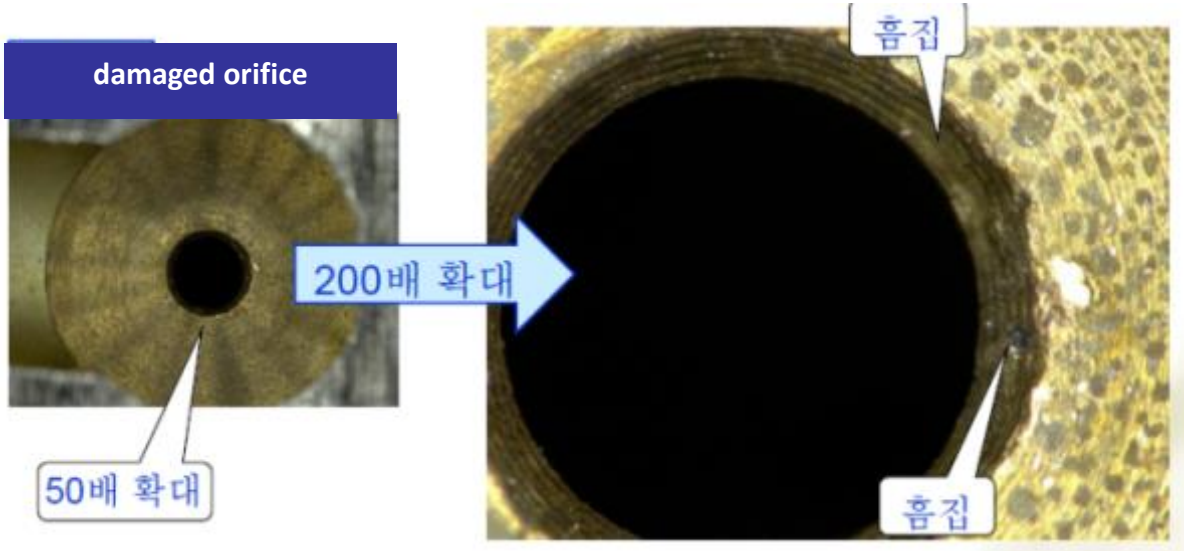
Error code	Reason
Contents	Malfunction of EEV (Scratching in orifice and pin surface because of foreign materials)
Error result	Water dewing in stopped indoor unit
Possibility	1) Scratching in orifice and pin surface because of foreign materials
Treatment	1) Replace the damaged EEV assembly 2) Evacuate the system again and Remove the foreign materials by using drier filters



Normal orifice



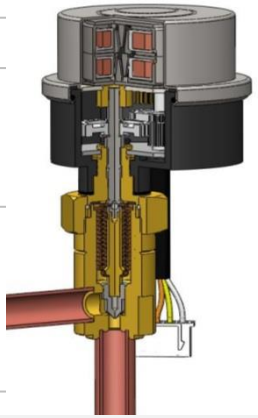
damaged orifice



Error code & Trouble shooting

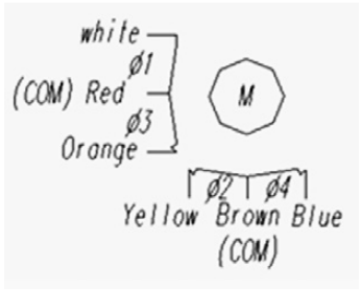
◆ Case study – Related error with EEV

Error code	E152
Contents	Error due to closed EEV od indoor unit (2nd detection)
Error result	No cooling, No heating
Possibility	1) EEV coil or wire or connector disconnection 2) EEV coil / body is broken 3) Eva in/out sensor is pulled out totally at the same time
Treatment	1) Connect EEV coil again 2) Check EEV coil resistance and replace 3) Replace EEV body 4) Check both Eva sensors



* 1st detection of eev closing : E-703 error → The indoor unit stop → Remocon On : The indoor unit restarts.

※ Main EEV Coil resistance value standard (measured temperature 20℃)

Main EEV Coil	Operation voltage (VDC)	Interphaseresistance (Ω)
	12±1.2	Re-Wh Re-Or Br-Ye Br-Bi -------- 150±15

Detection Factor	Condition
Tcond_out – Tair_out > 3℃	OK
T room air_in – Teva_in > 4℃	NO
T room air_in – Teva_out > 4℃	NO
Comp. On & Indoor unit On	OK

Issue : 2012.02.21
관리번호 : SAC-2012-8호

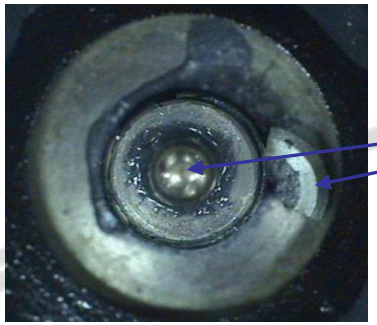
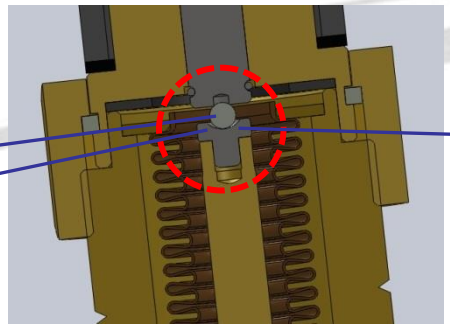
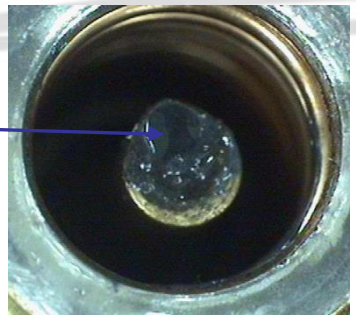
DVM Service bulletin

Product : DVM	Related model : All

Title : How the change EEV head & precaution

■ Purpose

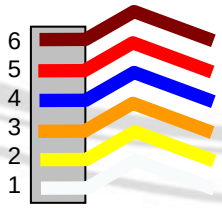
- Notice the SVC method of MAIN EEV & precaution during SVC

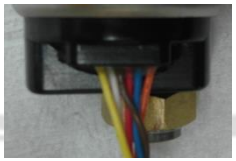
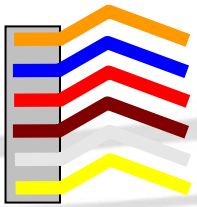
※ Remark : Black external substance is grease

■ Pre inspection

1. Check wiring condition of connector

2. Check wiring condition of coil

3. Check coil resistance each terminal

RED – WHITE	150±15Ω
RED – ORANGE	〃
BROWN-YELLOW	〃
BRWON-BLU	〃

COM : RED, BROWN

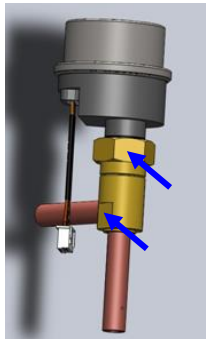
Issue : 2012.02.21
관리번호 : SAC-2012-8호

DVM Service bulletin

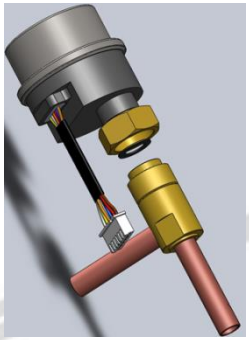
Product : DVM	Related model : All

Title : How the change EEV head & precaution

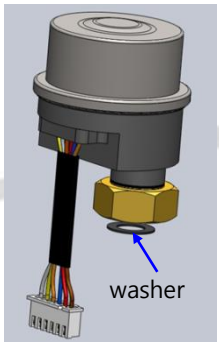
■ Changing process



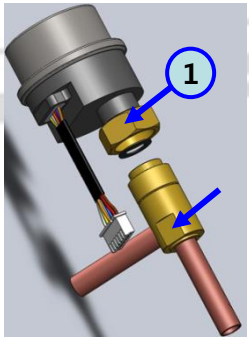
Disassemble EEV body & net with a spanner



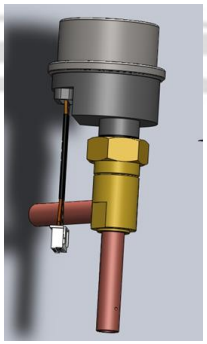
Disassemble motor



Replace it as normal motor & washer



Assemble ① with a torque spanner
Specification
: 150±5 kgf·cm



Finished

■ Precaution

1. Motor have to be 'Full Open' status (New motor is 2000Pulse Full Open status → This motor can be used)
2. Replacing work have to be done under 1.4MPa pressure condition (※ Recommendation : under 1.0MPa)

Shaft which is connected with Bellows stick out pressure by pressure

Deformation of Bellows
→ Opening level may be changed

Issue : 2012.02.21
관리번호 : SAC-2012-8호

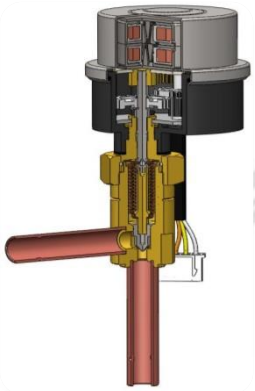
시스템에어컨 서비스 정보지

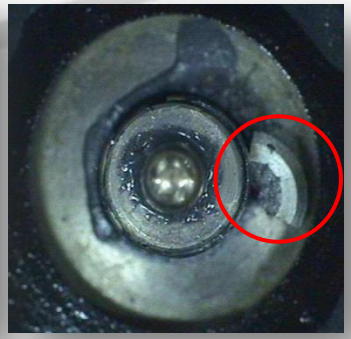
제 품 군 : DVM 全 제품	적용모델 : 全 모델

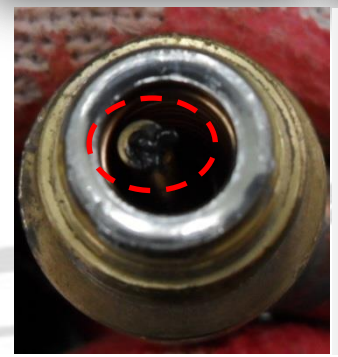
Title : How the change EEV head & precaution

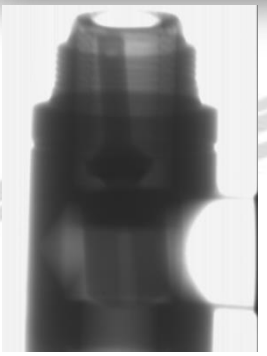
■ Defect cases which do not meet the guide

Mismatching (Motor's pushing rod ~ Body's shaft) → Malfunction









Error code & Trouble shooting

- IPM error -

Error code & Trouble shooting

◆ Case study – Poor cooling caused by IPM overheated

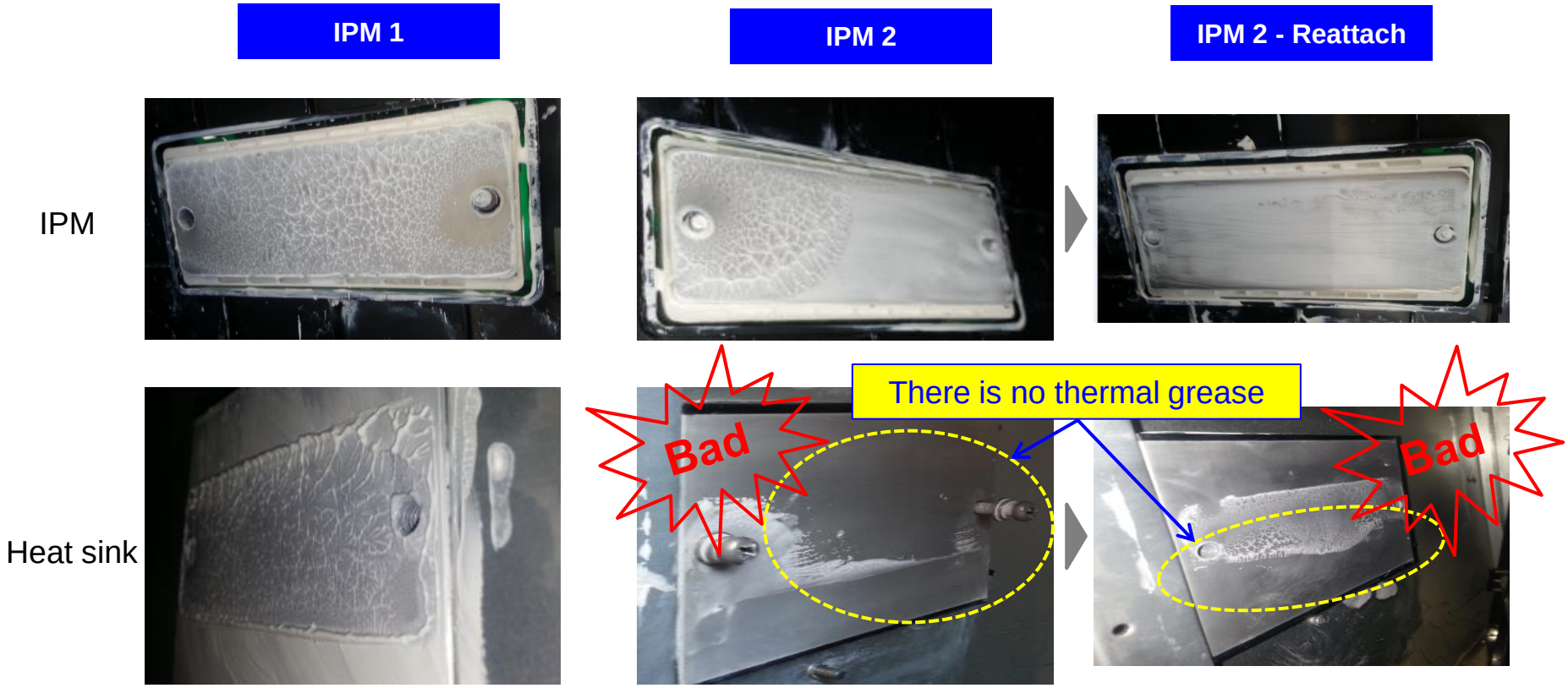
- Problem : Poor cooling
- Condition
  : Compressor frequency doesn't increase, IPM temperature is too high, Low pressure is high
- History
  : 13.05.07 Trial operation
  : 13.05.27 Inverter PCB, EMI PCB, Reactor replacement
  : 13.05.27 IPM temperature ↑ → comp Hz ↓ → cooling capacity ↓

Test	5/27	5/28		
		case 1	case 2	case 3
		upper pcb change	lower PCB change	exchange pcb position each other
Upper PCB (inv 2)	PCB_A freq. 55hz IPM 89℃	**PCB C** freq. 54hz **IPM 82℃**	PCB C freq. 55hz **IPM 79℃**	**PCB D** freq. 55hz **IPM 81℃**
Lower PCB (inv 1)	PCB B freq. 52hz IPM 86℃	PCB B freq.51hz **IPM 92℃**	**PCB D** freq. 52hz **IPM 91℃**	**PCB C** freq. 52hz **IPM 89℃**

Error code & Trouble shooting

◆ Case study – Poor cooling caused by IPM overheated

- Root cause : Bad contact of IPM cause by faulty bolt



Error code & Trouble shooting

◆ Case study – Poor cooling caused by IPM overheated

- Conclusion : Change bolt to new one, reattach the IPM → Problem solved

Date	5/28	5/29
OD Temp	38	38
High pressure	30.5	30.4
Low pressure	**10.9**	**11.4**
Comp1	**52**	52
Comp2	**55**	55
Current1	12.3	15.3
Current2	10.3	14.2
IPM1	86	**89**
IPM2	**89**	81
	Basic	Reattach #1

Date	6/5	6/5
OD Temp	41.6	40.8
High pressure	34.7	36.4
Low pressure	10.5	**9.9**
Comp1	61	**82**
Comp2	64	**85**
Current1	14.9	20.2
Current2	14.2	19.3
IPM1	**88**	**85**
IPM2	**90**	**86**
	Reattach #2	**Solved**

◎ IPM Temp Protection

- Hz Hold : 90℃
- Hz Down : 93℃

◎ HP Protection

- Hz Hold : 36 kgf/㎠
- Hz Down : 37 kgf/㎠

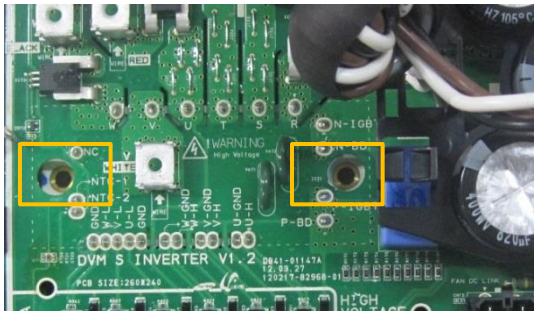
Error code & Trouble shooting

◆ Case study – related error with IPM

Error code	E500 (INV 1) / E400 (INV 2)
Contents	IGBT module over heated error
Error result	
Possibility	1) Loose screw connection between IGBT module and heat sink 2) No thermal grease on Heat sink 3) Defect of related electronic component
Treatment	1) Check status of screws on IGBT module 2) Plastering thermal grease to IGBT module or heat sink 3) Change INV PCB

Heat sink

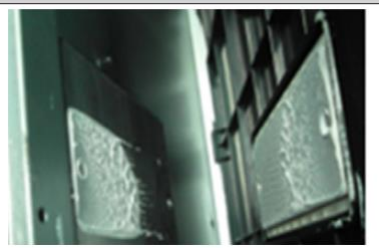
IGBT(IPM) module



Inv. PCB

Good

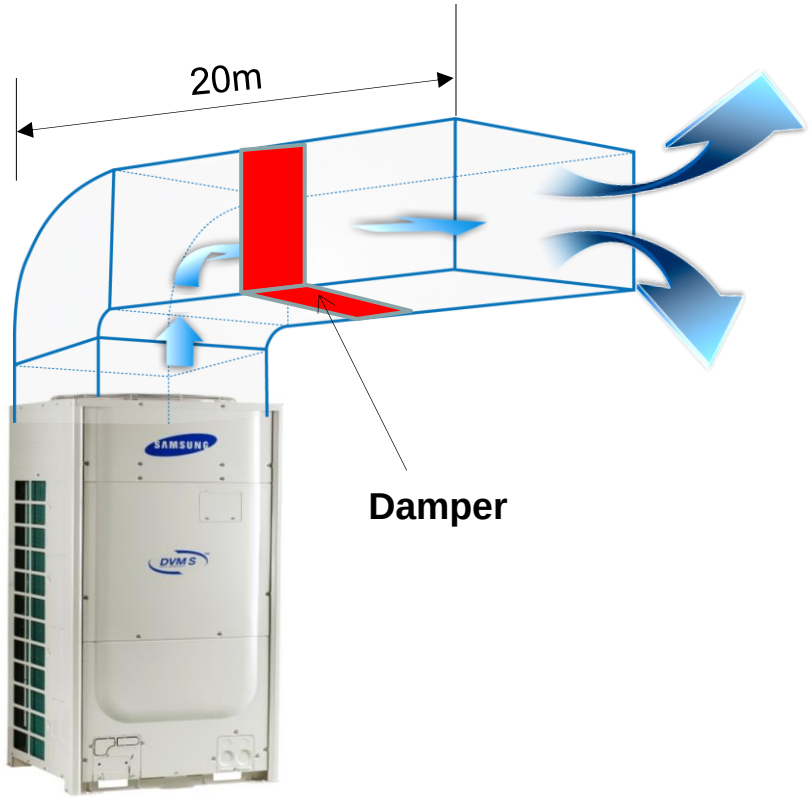
No Good



Error code & Trouble shooting

◆ Case study – E455 (Fan IPM Overheat error)

- Problem : system failure by E455
- Condition : DVM S HR 16HP, Discharge guide duct 20m with motorized damper



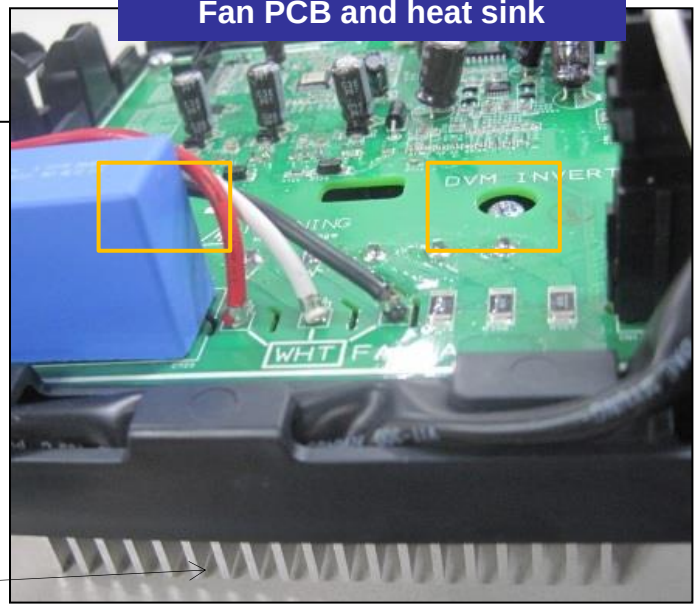
Error code & Trouble shooting

◆ Case study – E455 (Fan IPM Overheat error)

- Trouble shooting

Outdoor unit display	E455 (FAN1 PCB) E355 (FAN2 PCB)
Judgment Method	· IPM internal temperature more than 85℃ (E455, E355)
Cause of problem	· Heat sink and IPM assembly defective. · Defective heat sink cooling

Fan PCB and heat sink



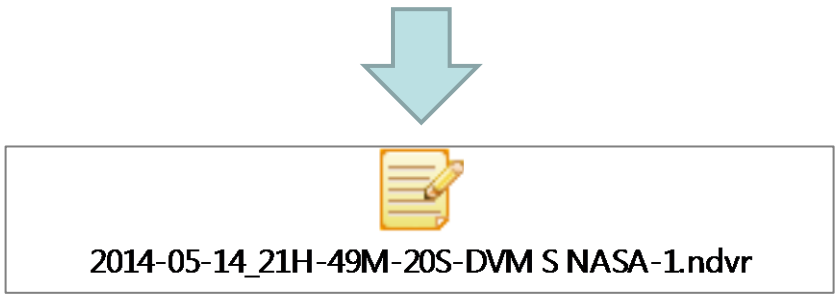
Heat sink

Error code & Trouble shooting

◆ Case study – E455 (Fan IPM Overheat error)

- Action : S-net pro data check & back up

Let’s check the S-net pro backup data.



Error code & Trouble shooting

◆ Case study – E455 (Fan IPM Overheat error)

- Analysis result : Cond out temperature is too high & Outdoor temperature is too high.

→ Suspect insufficient air flow rate

Address	10,00,00
Serial Number	-
Operation Mode	CompDown
Operation Status	Cool
Error Code	455
Capacity	16HP
Target Frequency1	0
Order Frequency1	0
Current Frequency1	0
Target Frequency2	0
Order Frequency2	0
Current Frequency2	0
High Pressure	34
Saturated T_Pd	56℃
Low Pressure	11,3
Saturated T_Ps	14℃
Discharge1	55℃
Discharge2	88,5℃

Address	10,00,00
TestOperation(UP)	Completed
Comp Top1	50,1℃
Comp Top2	89,8℃
Outdoor Temp.	47,1℃
Compressor Current	0
Compressor Current	0
IPM1 Temp	53℃
IPM2 Temp	76℃
CondOut Temp.	54,8℃
Liquid Tube Temp.	53,7℃
Suction1 Temp.	12,2℃
Suction2 Temp.	12,6℃
Main EEV	0
EVI EEV	0
EVI IN	17,5℃
EVI OUT	50,6℃
Outdoor Fan	35

Error code & Trouble shooting

◆ Case study – E455 (Fan IPM Overheat error)

- Solution : Check the motorized damper and open it manually.
- Result : System operate properly

Address	10,00,00	Address	10,00,00
Serial Number	-	TestOperation(UP)	Completed
Operation Mode	AutoInspect	Comp Top1	64,1℃
Operation Status	Cool	Comp Top2	65,8℃
Error Code	0	Outdoor Temp.	22,2℃
Capacity	16HP	Compressor Current	9,4
Target Frequency1	64	Compressor Current	9,6
Order Frequency1	64	IPM1 Temp	52℃
Current Frequency1	64	IPM2 Temp	51℃
Target Frequency2	67	CondOut Temp.	40,3℃
Order Frequency2	67	Liquid Tube Temp.	39,2℃
Current Frequency2	67	Suction1 Temp.	10,4℃
High Pressure	27,8	Suction2 Temp.	10,3℃
Saturated T_Pd	47℃	Main EEV	2000
Low Pressure	8,9	EVI EEV	0
Saturated T_Ps	7℃	EVI IN	32,6℃
Discharge1	64,8℃	EVI OUT	34,8℃
Discharge2	66,1℃	Outdoor Fan	16

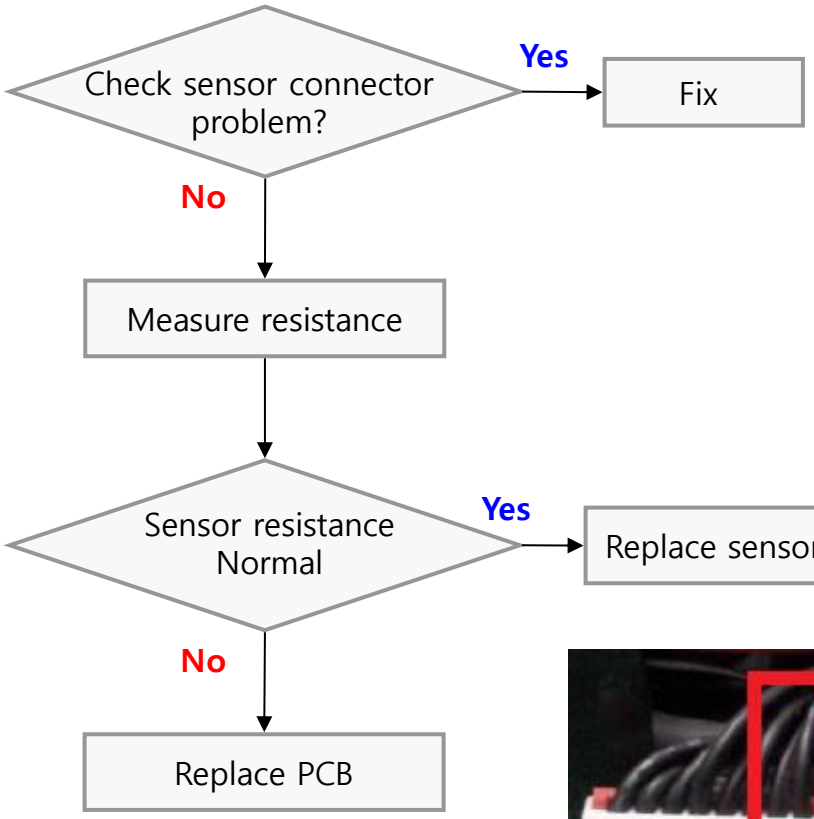
Error code & Trouble shooting

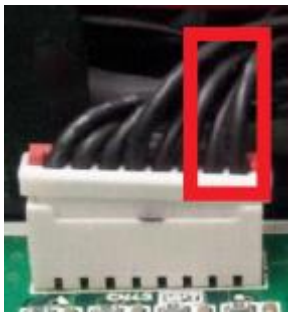
- Other error -

Error code & Trouble shooting

◆ Temperature sensor open/short

✓ Disconnection or breakdown of relevant sensor.





Name	Type	Error
Ambient temp. sensor	103AT	E221
Cond_out temp. sensor	103AT	E231
EVI in/out temp. sensor	103AT	E321,322
Liquid tube temp. sensor	103AT	E311
Suction temp. sensor	103AT	E308,323
Discharge temp. sensor	204CT	E251,257
Comp. top temp. sensor	204CT	E276,277

103 AT	
Temp. (℃)	Resistance (kΩ)
70	2.2
60	3.0
50	4.2
40	5.8
30	8.3
21	12.1
10	18.0
0	27.3
-10	43.0

204 CT	
Temp. (℃)	Resistance (kΩ)
130	8.9
120	11.2
100	18.5
80	32
60	59
25	200
20	242
10	362
0	553

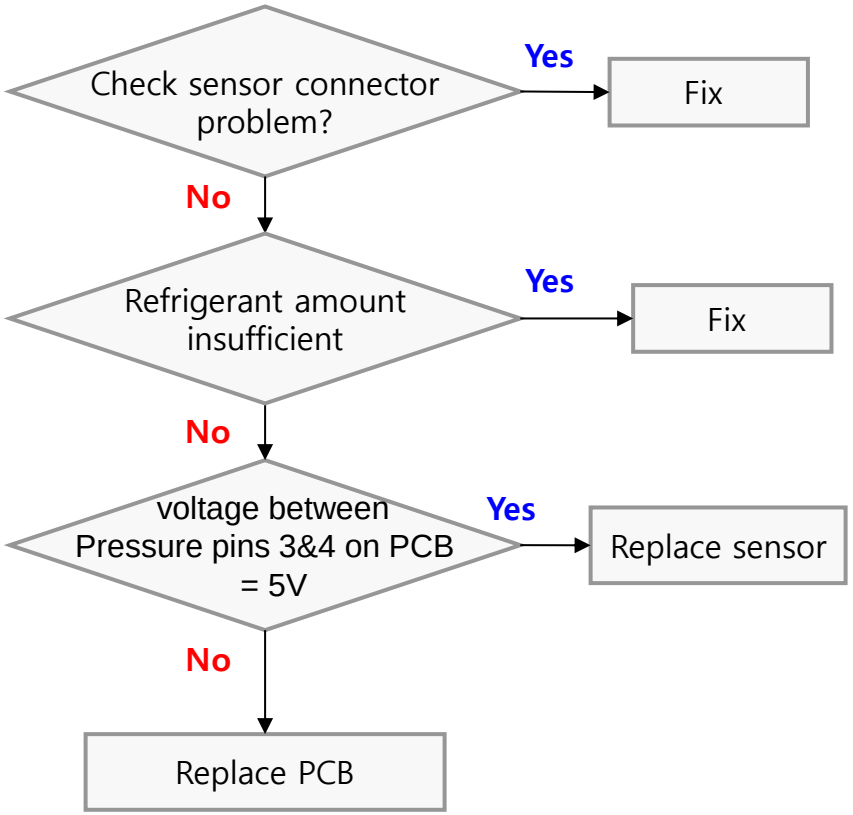
Error code & Trouble shooting

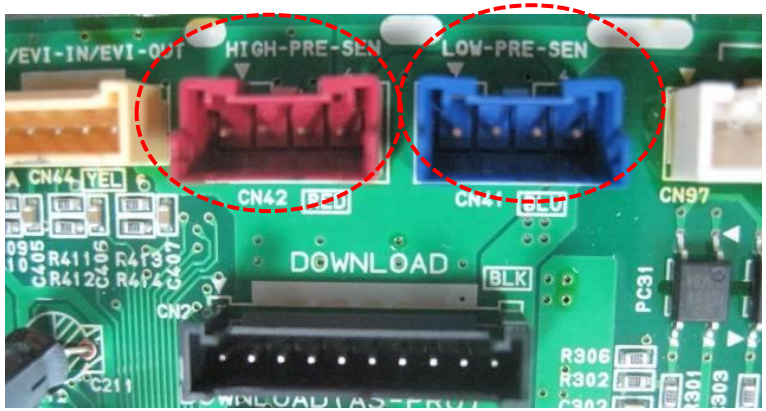
◆ Pressure sensor open/short

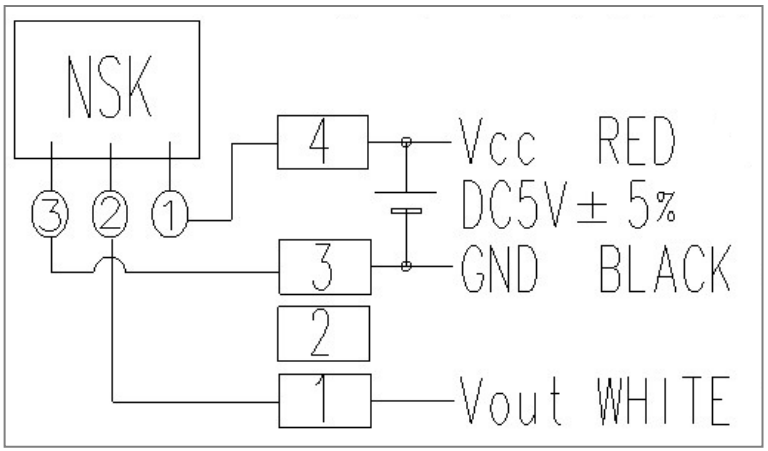
✓ Disconnection or breakdown of relevant sensor.

- E291 : High pressure sensor error(open/short)
- E296 : Low pressure sensor error(open/short)

} if the input voltage is out of 0.5V ~ 4.95V







Error code & Trouble shooting

◆ E407 : Comp. Down due to High Pressure Protection Control

Outdoor unit display	E407 (AM✳✳✳FXV✳✳✳)
Indoorunit display	See table below
Judgment Method	**Value of the high pressure sensor is detected at 40kg/cm² or more**
Cause of problem	**<Cooling Operation>** · Outdoor unit fan motor problem (constrained, defective) · Motor driver defective or wire is cut · Outdoor heat exchanger is contaminated. · Service valve locked/Fill refrigerant **<Heating Operation>** · Outdoor unit fan motor problem (constrained, defective) · Motor driver defective or wire is cut · Service valve locked/Excessive refrigerant

Duct, Cassette (1/2 Way), Console, Celing					Cassette (4/Mini4 Way)				Wall-mounted (NeoForte)				
Operation	Defrost	Timer	Fan	Filter/MPI	Operation	Defrost	Timer	Filter	Operation	Timer	Turbo	24℃	27℃
×	×	◑	◑	◑	×	◑	◑	◑	×	×	◑	◑	◑

※ ● : ON ◑ : Flash × : OFF

※ On of the most common error at trial operation stage because of closed service valve.

Error code & Trouble shooting

◆ E410 : Comp. Down due to Low Pressure Protection Control

Outdoor unit display	E410 (AM***FXV***)
Indoorunit display	

Duct, Cassette (1/2 Way), Console, Celing					Cassette (4/Mini4 Way)				Wall-mounted (NeoForte)				
Operation	Defrost	Timer	Fan	Filter/MPI	Operation	Defrost	Timer	Filter	Operation	Timer	Turbo	24℃	27℃
×	×	◑	◑	◑	×	◑	◑	◑	×	×	◑	◑	◑

※ ● : ON ◑ : Flash ×: OFF

Judgment Method	· Judgment Method : Inspection when the value of low pressure sensor is 1.8kg//cm^2, or less for air conditioning and 0.8kg//cm^2 for heating
Cause of problem	· Refrigerant shortage · Electronic expansion valve blocked · Service valve blocked · Low pressure sensor defective · Leakage of compressor discharge check valve of not-go-end outdoor unit · Error may be found when used in temperature range outside the conditions of use (Operating outside temperature at -20℃ or less for heating and operating outside temperature at -5℃ or less for Cooling)

Error code & Trouble shooting

◆ E416 : Discharge temperature or Top temperature over 120℃

Outdoor unit display	E416
Indoorunit display	

Duct, Cassette (1/2 Way), Console, Celing					Cassette (4/Mini4 Way)				Wall-mounted (NeoForte)				
Operation	Defrost	Timer	Fan	Filter/MPI	Operation	Defrost	Timer	Filter	Operation	Timer	Turbo	24℃	27℃
×	×	◑	◑	◑	×	◑	◑	◑	×	×	◑	◑	◑

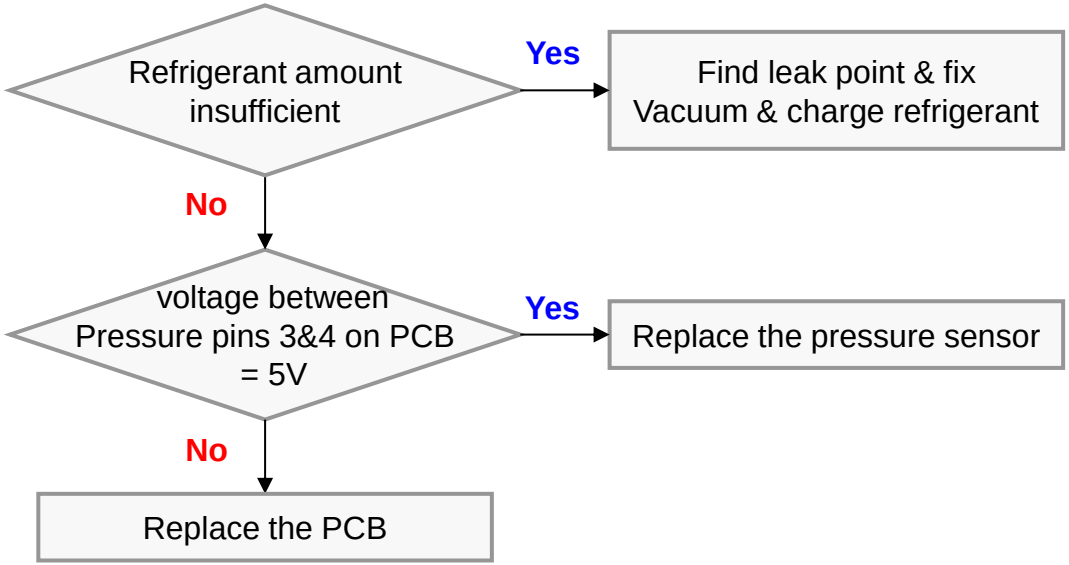
※ ● : ON ◑ : Flash ×: OFF

Judgment Method	· When value of Compressor discharge temperature sensor / Top temperature sensor is checked at 120℃ or more
Cause of problem	· Refrigerant shortage · Electronic expansion valve is blocked. · Service valve blocked · Defective discharge temperature sensor · TOP temperature sensor defective · Blocked pipe and defective · Leakage of compressor discharge check valve of not-go-end outdoor unit

Error code & Trouble shooting

◆ Refrigerant leakage error

Outdoor unit display	E439 (Refrigerant leakage judgment before starting) E443 (When start, refrigerant leakage judgment)
Judgment Method	· Before starting : Before compressor starting after system halt 2 minutes (High & low pressure sensor Open / Short error occurs and 1kg/cm2 or less) · When start : When the high pressure sensor value(cooling 3.1kg/ ㎠ , heating 2.2kg/ ㎠) is detection continuously for 3 seconds
Cause of problem	· Refrigerant leakage and shortage · Disconnection or breakdown of high & low pressure sensor



Error code & Trouble shooting

◆ Prevention of heating / cooling operation due to outdoor temperature

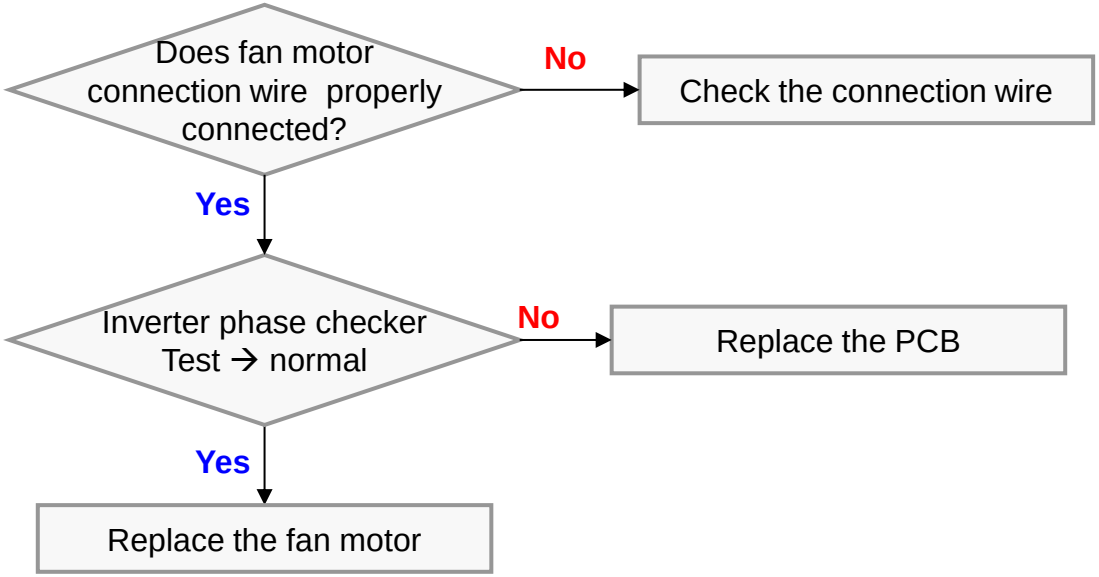
<table>
<tr><td>Outdoor unit display</td><td>E440 (Prevention of heating operation due to high temperature of outdoor)
E441 (Prevention of cooling operation due to low temperature of outdoor)</td></tr>
<tr><td>Indoor Unit Display</td><td>
<table>
<tr><th colspan="5">Duct, Cassette (1/2 Way),Console, Celing</th><th colspan="5">Cassette (4/Mini4 Way)</th><th colspan="5">Wall-mounted (NeoForte)</th></tr>
<tr><th>Operation</th><th>Defrost</th><th>Timer</th><th>Fan</th><th>Filter/MPI</th><th>Operation</th><th>Defrost</th><th>Timer</th><th>Filter</th><th>Operation</th><th>Timer</th><th>Turbo</th><th>24℃</th><th>27℃</th></tr>
<tr><td>×</td><td>×</td><td>◑</td><td>◑</td><td>◑</td><td>×</td><td>◑</td><td>◑</td><td>◑</td><td>×</td><td>×</td><td>◑</td><td>◑</td><td>◑</td></tr>
</table>
※ ● : ON ◑ : Flash × : OFF
</td></tr>
<tr><td>Judgment Method</td><td>· Heating operation : When the outdoor temperature is more than 30℃
· Cooling operation : When the outdoor temperature is less than -15℃</td></tr>
<tr><td>Cause of problem</td><td>· System protection operation status (Is not breakdown)</td></tr>
</table>

※ Not a system broken but specification of the system operating range.

Error code & Trouble shooting

◆ Fan starting error

Outdoor unit display	E446 (FAN PCB(FAN1)) E346 (FAN PCB(FAN2))
Judgment Method	· Startup, and then if the speed increase is not normally. · Detected by H/W or S/W
Cause of problem	· Compressor connection error · Defective Compressor · Defective PCB



▷ How to check no defect with tester

1. Resistance value between different phases of an Motor (U↔V,V↔W,W↔U) less than 10Ω.

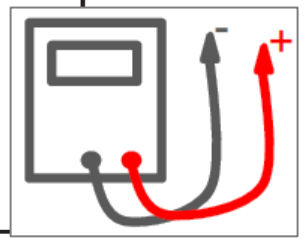
2. Resistance between the body of Fan Motor and chassis MΩ.

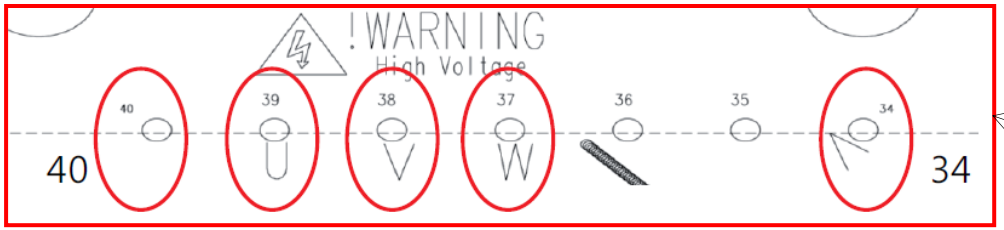
Error code & Trouble shooting

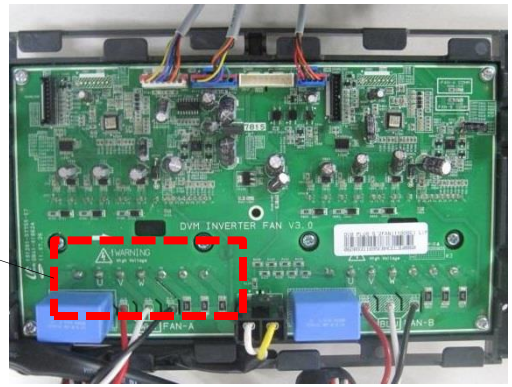
◆ Fan starting error

✓ Check Inveter PCB defect with Tester

Division	Measured Point		Criterion	Remark
	+	-		
Measure the resistance values	40	U	More than 3 MΩ	Measurement error can occur for reasons such as the initial measurement condenser discharge. Measured over at least three times.
	40	V		
	40	W		
	U	34		
	V	34		
	W	34		
Measure the diode voltage values	U	40	0.3~0.7V	
	V	40		
	W	40		
	34	U		
	34	V		
	34	W		







Thank You !!!

◆ K1 button function

K1 (Number of press)	Key operation	Display on segment
1 time	Refrigerant charging in Heating mode	K, 1, BLANK, BLANK
2 times	Trial operation in Heating mode	K, 2, BLANK, BLANK
3 times	Pump out in Heating mode (Outdoor unit address 1)	K, 3, BLANK, 1
4 times	Pump out in Heating mode (Outdoor unit address 2)	K, 3, BLANK, 2
5 times	Pump out in Heating mode (Outdoor unit address 3)	K, 3, BLANK, 3
6 times	Pump out in Heating mode (Outdoor unit address 4)	K, 3, BLANK, 4
7 times	Vacuumig (Outdoor unit address 1)	K, 4, BLANK, 1
8 times	Vacuumig (Outdoor unit address 2)	K, 4, BLANK, 2
9 times	Vacuumig (Outdoor unit address 3)	K, 4, BLANK, 3
10 times	Vacuumig (Outdoor unit address 4)	K, 4, BLANK, 4
11 times	Vacuuming (All outdoor units)	K, 4, BLANK, A
12 times	End Key operation	-
Press and hold 1 time	Auto Trial Operation	K, K, BLANK, BLANK

Reference

◆ K2 button function

K2 (Number of press)	Key operation	Display on segment
1 time	Refrigerant charging in Cooling mode	K, 5, BLANK, BLANK
2 times	Trial operation in Cooling mode	K, 6, BLANK, BLANK
3 times	Pump down all units in Cooling mode	K, 7, BLANK, BLANK
4 times	H/R: Checking the pipe connection H/P: Automatic setting of operation mode (Cooling/Heating) for trail operation	K, 8, BLANK, BLANK
5 times	Checking the amount of refrigerant	"K""9" X X (Display of last two digits may differ depending on the progress)
6 times	Discharge mode of DC link voltage	K, A, BLANK, BLANK
7 times	Forced defrost operation	K, B, BLANK, BLANK
8 times	Forced oil collection	K, C, BLANK, BLANK
9 times	Inverter compressor 1 check	K, D, BLANK, BLANK
10 times	Inverter compressor 2 check	K, E, BLANK, BLANK
11 times	Fan 1 check	K, F, BLANK, BLANK
12 times	Fan 2 check	K, G, BLANK, BLANK
13 times	End Key operation	-

◆ K4 button function

K4 (Number of press)	KEY operation	Display on segment	
		SEG 1	SEG2, 3, 4
1 time	Outdoor unit model	1	AM160FXV✳✳✳✳ → Off, 1, 6
2 times	Order frequency (Compressor 1)	2	120 Hz → 1, 2, 0
3 times	Order frequency (Compressor 2)	3	120 Hz → 1, 2, 0
4 times	High pressure (MPa)	4	1.52 MPa → 1, 5, 2
5 times	Low pressure (MPa)	5	0.43 MPa → 0, 4, 3
6 times	Discharge temperature (Compressor 1)	6	87 ℃ → 0, 8, 7
7 times	Discharge temperature (Compressor 2)	7	87 ℃ → 0, 8, 7
8 times	IPM temperature (Compressor 1)	8	87 ℃ → 0, 8, 7
9 times	IPM temperature (Compressor 2)	9	87 ℃ → 0, 8, 7
10 times	CT sensor value (Compressor 1)	A	2 A → 0, 2, 0
11 times	CT sensor value (Compressor 2)	B	2 A → 0, 2, 0
12 times	Suction temperature	C	-42 ℃ → -, 4, 2
13 times	COND OUT temperautre	D	-42 ℃ → -, 4, 2
14 times	Temperature of liquid pipe	E	-42 ℃ → -, 4, 2
15 times	TOP temperature (Compressor 1)	F	-42 ℃ → -, 4, 2

Reference

◆ K4 button function

K4 (Number of press)	KEY operation	Display on segment	
		SEG 1	SEG2, 3, 4
16 times	TOP temperature (Compressor 2)	G	-42 ℃ → -, 4, 2
17 times	Outdoor temperature	H	-42 ℃ → -, 4, 2
18 times	EVI inlet temperature	I	-42 ℃ → -, 4, 2
19 times	EVI outlet temperature	J	-42 ℃ → -, 4, 2
20 times	Main EEV1 step	K	2000 steps → 2, 0, 0
21 times	Main EEV2 step	L	2000 steps → 2, 0, 0
22 times	EVI EEV step	M	300 steps → 3, 0, 0
23 times	HR EEV step	N	300 steps → 3, 0, 0
24 times	Fan step (SSR or BLDC)	O	13 steps → 0, 1, 3
25 times	Current frequency (Compressor 1)	P	120 Hz → 1,2,0
26 times	Current frequency (Compressor 2)	Q	120 Hz → 1,2,0
27 times	Suction 2 temperature (H/R)	R	-42 ℃ → -, 4, 2
28 times	Master indoor unit address	S	Master indoor unit not selected → BLANK, N, D If indoor unit No.1 is selected as the master unit → 0, 0, 1

Reference

◆ K4 button function

K4 (Number of press) Press and hold the K4 to enter the setting	Displayed content	Display on segment			
		page1	page2		
1 time	Main version	MAIN	Version (ex. 1412)		
2 times	Hub version	HUB	Version (ex. 1412)		
3 times	Inverter 1 version	INV1	Version (ex. 1412)		
4 times	Inverter 2 version	INV2	Version (ex. 1412)		
5 times	Fan 1 version	FAN1	Version (ex. 1412)		
6 times	Fan 2 version	FAN2	Version (ex. 1412)		
7 times	EEP version	EEP	Version (ex. 1412)		
8 times	Automatically assigned address of the units	AUTO	SEG1	SEG2	SEG3, 4
			Indoor unit: "A" MCU: "C"	Indoor unit: "0" MCU: "1"	Address (ex: 07)
9 times	Manually assigned address of the units	MANU	SEG1	SEG2	SEG3, 4
			Indoor unit: "A"	Indoor unit: "0"	Address (ex: 15)