Samsung NASA Outdoor unit protocol (Interlock the Automation control) (Ver.2.55)

※ NASA : Samsung New communication

If S/W is not made in according to this document,
Samsung can't support technical issue.

May, 2020

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Diagram
Address structure
Sequence

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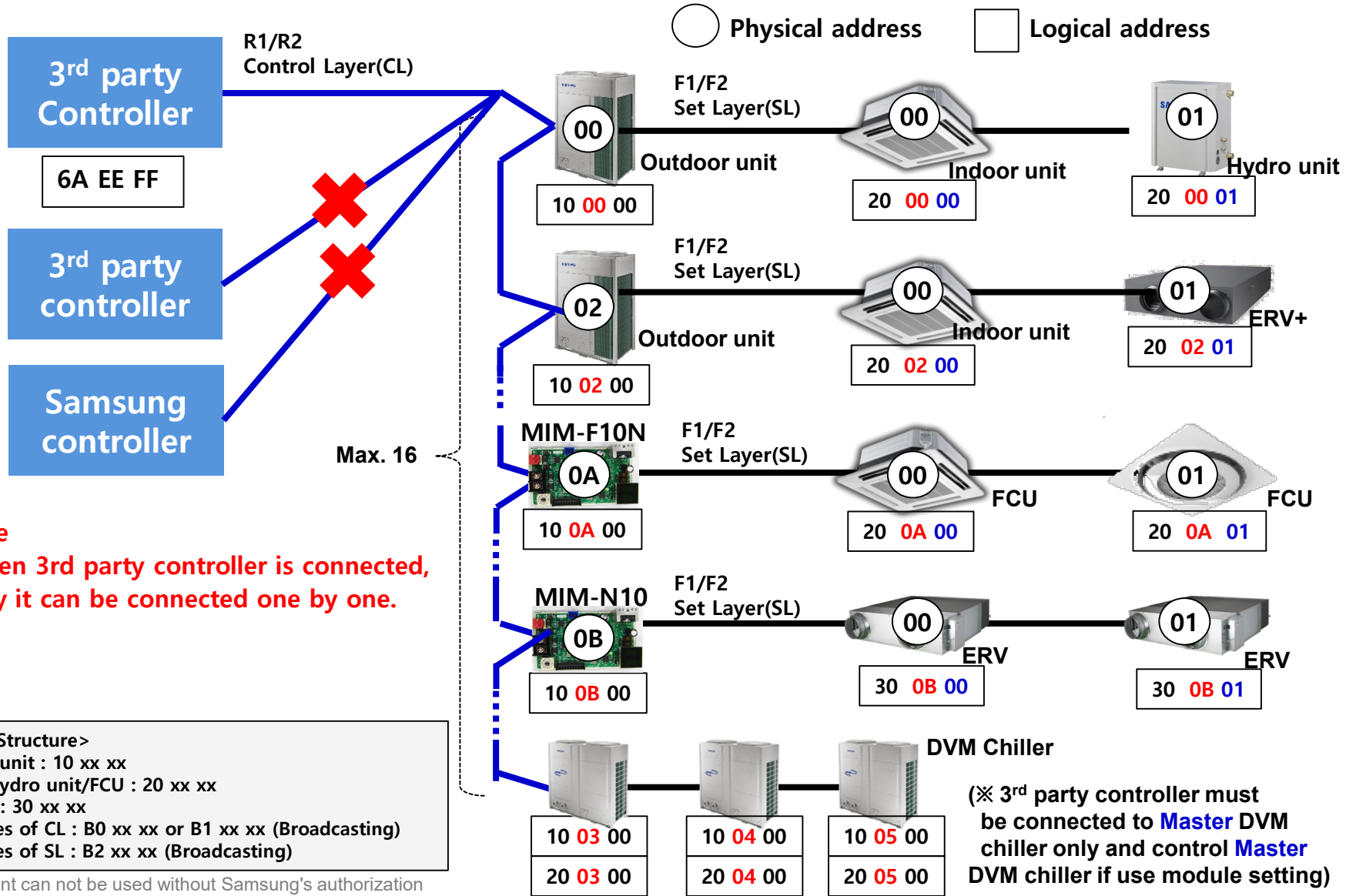
Indoor/Outdoor Network & Address

※ It is example. System diagram and address are able to different in according to PJT condition.



※ Note
- When 3rd party controller is connected, only it can be connected one by one.

<Address Structure>
- Outdoor unit : 10 xx xx
- Indoor/Hydro unit/FCU : 20 xx xx
- ERV unit : 30 xx xx
- All devices of CL : B0 xx xx or B1 xx xx (Broadcasting)
- All devices of SL : B2 xx xx (Broadcasting)

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Communication Spec.

▶ Communication setting

Interface	Baud rate	Data Bit	Stop Bit	Parity
RS-485	9600bps	8	1	Even

▶ Packet structure

※ Please delay the time about 2~3ms between Preamble and STX.

Preamble	STX	Length	SA	DA	Command	Number of Message Set's	Message Set #1		Message Set #2		...	CRC	ETX
							Index	Value			..		
55H (100 bytes)	32H (1 byte)	2 bytes	3 bytes	3 bytes	3 bytes	1 byte	2 bytes	variable	2 bytes	variable	..	2 bytes	34H (1 byte)

		Size (byte)	Content
Preamble		100	Fill 100 bytes with 55H (in case of sending request packet)
STX		1	Start of Packet (32H)
Length		2	Length of full packet (32H~34H) – 2, ie. Length ~ CRC
SA		3	Source Address
DA		3	Destination Address
Command		3	Command Type
Number of Message Sets		1	Number of Message sets
Message Set	**Index**	2	Message index
	Value	Variable	1, 2 or 4 bytes depending on index
CRC		2	CCITT CRC16 (SA ~ Message Set)
ETX		1	End of Packet (34H)

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Communication Spec. - Address

SA : Source Address | DA : Destination Address

<Unicast>
- 6A EE FF : 3rd party controller
- 10 xx 00 : Outdoor unit (xx : setting address in outdoor unit pcb set by installer)
- 20 xx yy : Indoor unit (xx : outdoor unit address, yy : Indoor unit address)
- 30 xx yy : ERV unit (xx : MIM-N10 address, yy : ERV unit address)

<Broadcast>
- B0 FF FF : CL devices
- B0 FF 10 : CL outdoor unit
- B0 xx FF : CL devices connected to xx Outdoor unit
- B1 FF FF : CL devices
- B1 FF 10 : CL outdoor unit
- B1 xx FF : CL devices connected to xx Outdoor unit
- B2 FF FF : SL devices
- B2 xx FF : SL devices connected to xx outdoor unit
- B2 xx 20 : SL indoor unit connected to xx outdoor unit
- B3 xx FF : CL & SL devices connected to xx outdoor unit

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Communication Spec. - Command

Field	Size(bit)	Definition	Remark
Don't care	8bit	Don't care	C0h(fixed)
Packet Type (PT)	4bit	Packet type	0 : Standby 1 : Normal 2 : Gathering 3 : Install 4 : Download
Data Type (DT)	4bit	Packet processing method	1 : Read 2 : Write 3 : Request 4 : Notification 5 : Response 6 : Ack
Packet Number (PN)	8bit	Packet number	0 ~ 255 (Increase by 1 each time you create a packet)

Ex) Packet Type : normal, Data Type : Noti, Packet Number : A8h
32 00 2E 20 00 14 B3 00 FF C0 14 A8 08 42 03 00 FC 42 04 01 2E 42 05 00 FE 42 06 00 FF 42 0B 00 FD 42 17 00 23 42 1C 00 00 42 3E 00 00 B9 9D 34

Ex) Packet Type : Gathering, Data Type : Read, Packet Number : A7h
32 00 20 80 FF 00 B1 FF FF C0 21 A7 04 04 01 00 FF FF FF 20 0F FF 20 10 FF 24 00 00 FF FF FF 16 45 34

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Communication Spec – Message set

Section				Size	Remark
Message Set	Message (2byte)	ID	Device	3bit	▪ 0 : Common ▪ 1 : Network Management ▪ 2 : Indoor Unit ▪ 3 : Reserved ▪ 4 : Outdoor Unit ▪ 5 : Reserved ▪ 6 : Reserved ▪ 7 : Reserved
			Reserved	2bit	Reserved
			Type	2bit	▪ 0 : Enumeration Type(1byte) ▪ 1 : Variable Type(2byte) ▪ 2 : Long Variable Type(4byte) ▪ 3 : Structure Type(over 4byte)
		Index		9bit	▪ Range : 0 ~ 511
	Data (Variable)			1~46 byte	▪ Enumeration Type : 1byte ▪ Variable Type : 2byte ▪ Long Variable Type : 4byte ▪ Structure Type : over 4byte

: Number of Message Set
: Message
: Data

Ex) 32 00 1B 10 00 00 B0 FF FF C0 14 01 03 20 10 FF 02 02 00 00 04 01 00 10 00 00 08 DF 34
→ number of message set's is 3
20 10 FF -> Enumeration type, index : 16, data : FF
02 02 00 00 -> Variable type, index : 2, data : 00 00
04 01 00 10 00 00 -> Long variable type, index : 1, data : 00 10 00 00

Ex) 32 00 1A 10 00 00 80 FF 00 C0 15 02 01 06 08 91 01 47 2A 13 08 01 00 00 00 28 50 34
→ number of message set's is 1
06 08 91 01 47 2A 13 08 01 00 00 00 -> Structure type, index : 8, data : 91 01 47 2A 13 08 01 00 00 00
※ Only one structure type message can be stored in 1 packet. The length calculation is as follows.
Structure Message Set length = Packet length – header
= Packet length – (STX + Length + SA + DA + CMD + Number of Message Set + CRC + ETX)
= Packet length – (1 + 2 + 3 + 3 + 3 + 1 + 2 + 1)
= Packet length – 16
= Structure type message index + Data length

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Communication Spec – CRC

```
const unsigned int CCITT_CRC16_TABLE[256] = {
  0x0000, 0x1021, 0x2042, 0x3063, 0x4084, 0x50A5, 0x60C6, 0x70E7, 0x8108, 0x9129, 0xA14A, 0xB16B, 0xC18C,
  0xD1AD, 0xE1CE, 0xF1EF, 0x1231, 0x0210, 0x3273, 0x2252, 0x52B5, 0x4294, 0x72F7, 0x62D6, 0x9339, 0x8318,
  0xB37B, 0xA35A, 0xD3BD, 0xC39C, 0xF3FF, 0xE3DE, 0x2462, 0x3443, 0x0420, 0x1401, 0x64E6, 0x74C7, 0x44A4,
  0x5485, 0xA56A, 0xB54B, 0x8528, 0x9509, 0xE5EE, 0xF5CF, 0xC5AC, 0xD58D, 0x3653, 0x2672, 0x1611, 0x0630,
  0x76D7, 0x66F6, 0x5695, 0x46B4, 0xB75B, 0xA77A, 0x9719, 0x8738, 0xF7DF, 0xE7FE, 0xD79D, 0xC7BC, 0x48C4,
  0x58E5, 0x6886, 0x78A7, 0x0840, 0x1861, 0x2802, 0x3823, 0xC9CC, 0xD9ED, 0xE98E, 0xF9AF, 0x8948, 0x9969,
  0xA90A, 0xB92B, 0x5AF5, 0x4AD4, 0x7AB7, 0x6A96, 0x1A71, 0x0A50, 0x3A33, 0x2A12, 0xDBFD, 0xCBDC, 0xFBBF,
  0xEB9E, 0x9B79, 0x8B58, 0xBB3B, 0xAB1A, 0x6CA6, 0x7C87, 0x4CE4, 0x5CC5, 0x2C22, 0x3C03, 0x0C60, 0x1C41,
  0xEDAE, 0xFD8F, 0xCDEC, 0xDDCD, 0xAD2A, 0xBD0B, 0x8D68, 0x9D49, 0x7E97, 0x6EB6, 0x5ED5, 0x4EF4, 0x3E13,
  0x2E32, 0x1E51, 0x0E70, 0xFF9F, 0xEFBE, 0xDFDD, 0xCFFC, 0xBF1B, 0xAF3A, 0x9F59, 0x8F78, 0x9188, 0x81A9,
  0xB1CA, 0xA1EB, 0xD10C, 0xC12D, 0xF14E, 0xE16F, 0x1080, 0x00A1, 0x30C2, 0x20E3, 0x5004, 0x4025, 0x7046,
  0x6067, 0x83B9, 0x9398, 0xA3FB, 0xB3DA, 0xC33D, 0xD31C, 0xE37F, 0xF35E, 0x02B1, 0x1290, 0x22F3, 0x32D2,
  0x4235, 0x5214, 0x6277, 0x7256, 0xB5EA, 0xA5CB, 0x95A8, 0x8589, 0xF56E, 0xE54F, 0xD52C, 0xC50D, 0x34E2,
  0x24C3, 0x14A0, 0x0481, 0x7466, 0x6447, 0x5424, 0x4405, 0xA7DB, 0xB7FA, 0x8799, 0x97B8, 0xE75F, 0xF77E,
  0xC71D, 0xD73C, 0x26D3, 0x36F2, 0x0691, 0x16B0, 0x6657, 0x7676, 0x4615, 0x5634, 0xD94C, 0xC96D, 0xF90E,
  0xE92F, 0x99C8, 0x89E9, 0xB98A, 0xA9AB, 0x5844, 0x4865, 0x7806, 0x6827, 0x18C0, 0x08E1, 0x3882, 0x28A3,
  0xCB7D, 0xDB5C, 0xEB3F, 0xFB1E, 0x8BF9, 0x9BD8, 0xABBB, 0xBB9A, 0x4A75, 0x5A54, 0x6A37, 0x7A16, 0x0AF1,
  0x1AD0, 0x2AB3, 0x3A92, 0xFD2E, 0xED0F, 0xDD6C, 0xCD4D, 0xBDAA, 0xAD8B, 0x9DE8, 0x8DC9, 0x7C26, 0x6C07,
  0x5C64, 0x4C45, 0x3CA2, 0x2C83, 0x1CE0, 0x0CC1, 0xEF1F, 0xFF3E, 0xCF5D, 0xDF7C, 0xAF9B, 0xBFBA, 0x8FD9,
  0x9FF8, 0x6E17, 0x7E36, 0x4E55, 0x5E74, 0x2E93, 0x3EB2, 0x0ED1, 0x1EF0
};

 unsigned int Calculate_CCITT_CRC16(unsigned int count, char *buffer) {
    unsigned int crc = 0;

    do {
       int value = *buffer++;
       crc = (unsigned short)((crc << 8) ^  CCITT_CRC16_TABLE[((crc >> 8) ^ value) & 255]);
    }
    while (--count);
    return crc;
 }
```

※ CRC is from SA to Message set's

32 00 11 **20 00 1E B0 FF FF C0 14 04 01 20 04 00** A5 72 34

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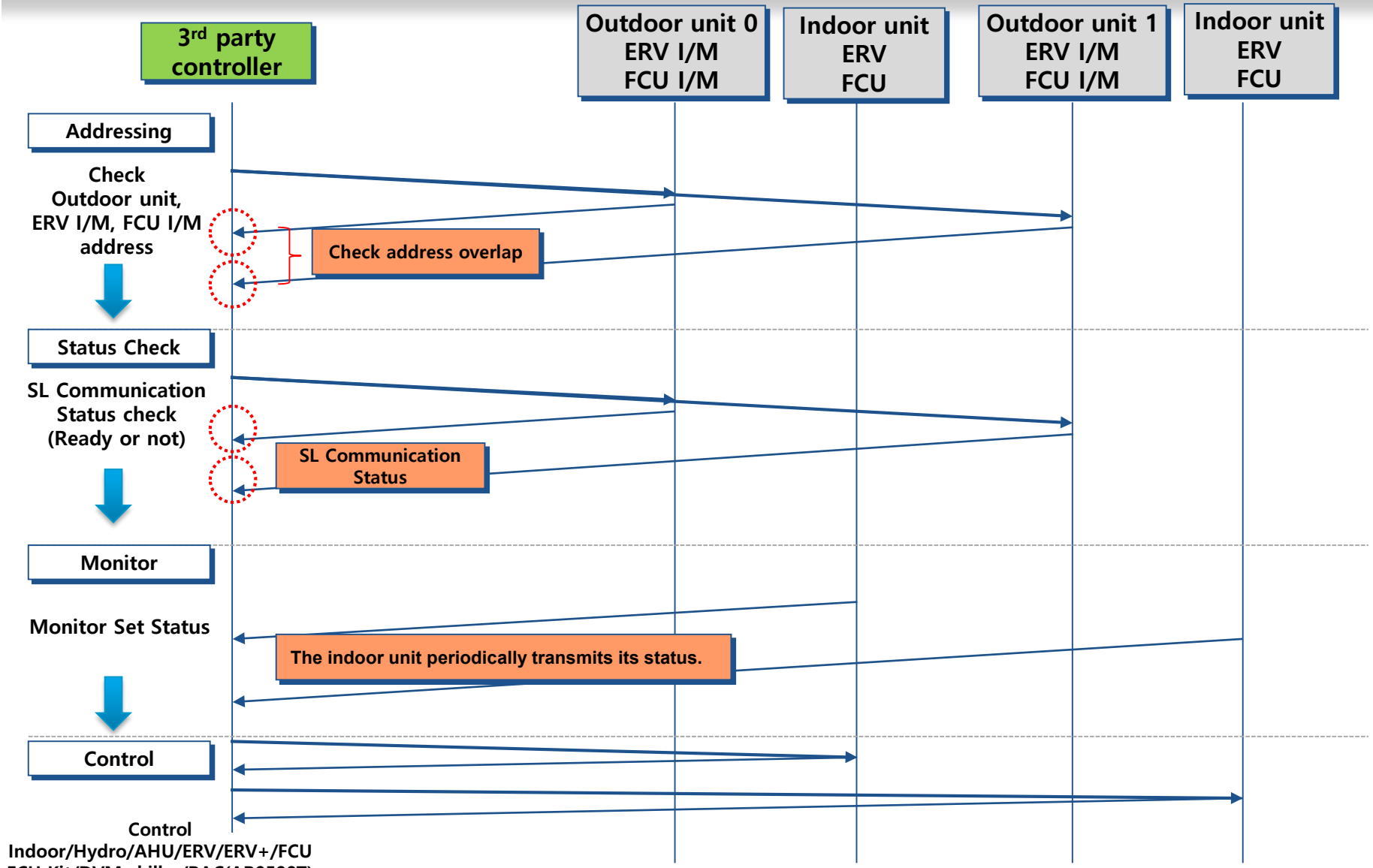
Overall Sequence



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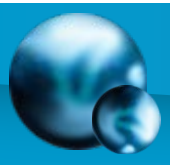

1. Addressing

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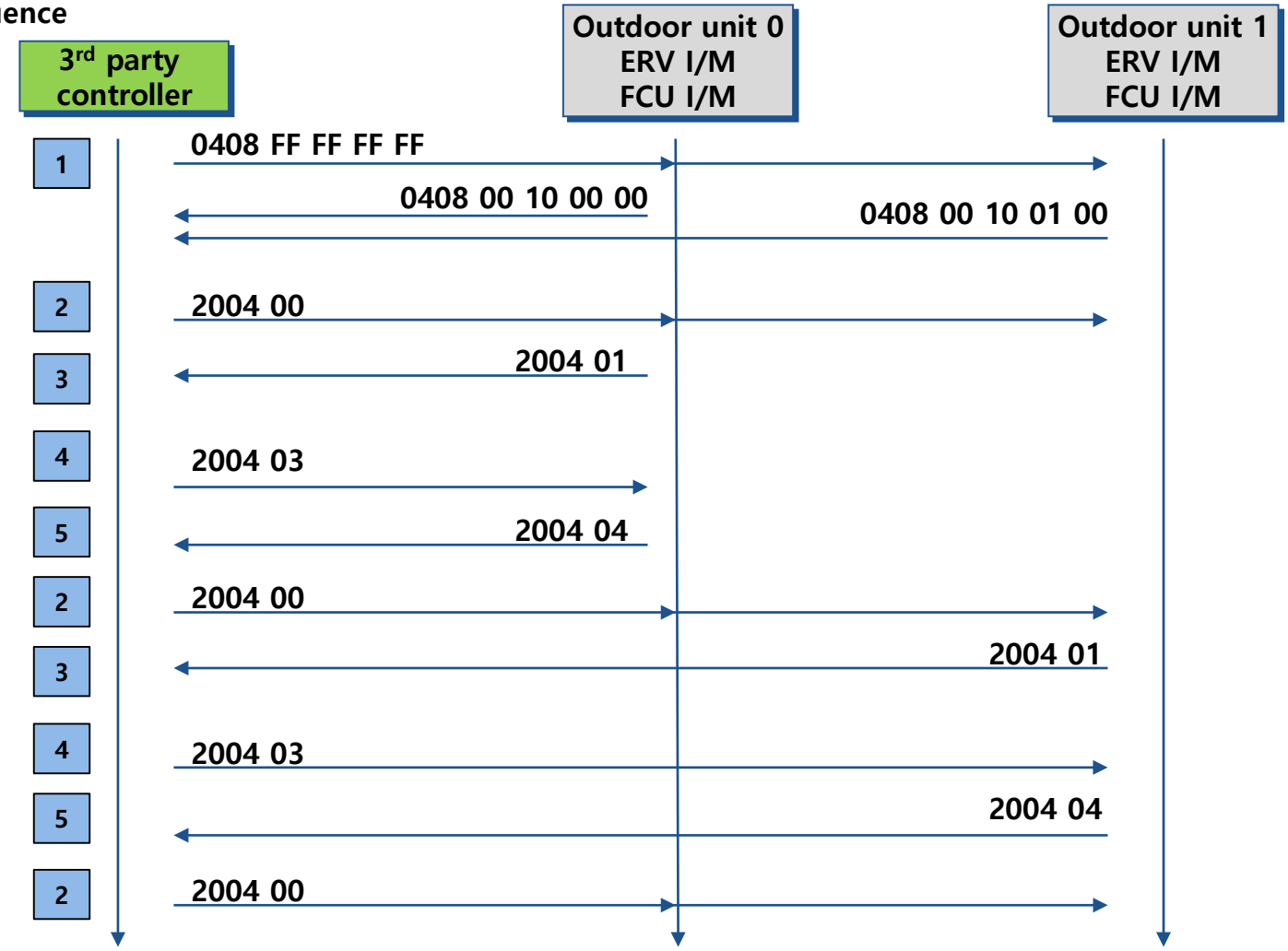
1. Addressing

▶ Detail Sequence



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1. Addressing

Step1 **3rd party controller → Outdoor unit/ERV interface module/FCU interface module**

. 3rd party controller sends the read packet to the outdoor unit to get address information.

. Send the following packets 10 times with 3-second intervals

(In HEX format)

Preamble	STX	Length	SA	DA	Command	Number of Message Set's	Message Set	CRC	ETX
55 (100 bytes)	32	00 14	6A EE FF	B0 FF FF	C0 01 xx	01		2 bytes	34

Broadcast
(CL devices)

Message Set	Index	value	Description
Message Set #1	04 08	FF FF FF FF	setting address

Ex) 32 00 14 6A EE FF B0 FF FF C0 01 AD 01 04 08 FF FF FF FF B7 42 34

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1. Addressing

※ Outdoor unit address range : 0~F

Step2 Outdoor unit/ERV interface module/FCU interface module → 3rd party controller

When receiving the following packet, confirm the number of installed outdoor units and address.

(In HEX format)

Preamble	STX	Length	SA	DA	Command	Number of Message Set's	Message Set	CRC	ETX
55 (100 bytes)	32	00 14	10 xx xx	6A EE FF	C0 05 xx	01		2 bytes	34

Message Set	Index	value	Description
Message Set #1	04 08	00 10 xx 00	setting address

Ex) 32 00 14 10 00 00 6A EE FF C0 05 AD 01 04 08 00 10 00 00 AB 13 34
32 00 14 10 01 00 6A EE FF C0 05 AD 01 04 08 00 10 01 00 36 DE 34
32 00 14 10 02 00 6A EE FF C0 05 AD 01 04 08 00 10 02 00 80 A8 34
32 00 14 10 03 00 6A EE FF C0 05 AD 01 04 08 00 10 03 00 1D 65 34

※ 3rd party controller must not decide the outdoor unit address before Step 2. It must be checked according to **outdoor unit address information that is received through Step 2.**

※ If two over outdoor unit have same "setting address", It's not normal installation. Need to change address by installer and system reset.

Ex) 32 00 14 10 00 00 6A EE FF C0 05 AD 01 04 08 00 10 00 00 AB 13 34
32 00 14 10 01 00 6A EE FF C0 05 AD 01 04 08 00 10 01 00 36 DE 34
32 00 14 10 02 00 6A EE FF C0 05 AD 01 04 08 00 10 02 00 80 A8 34
32 00 14 10 03 00 6A EE FF C0 05 AD 01 04 08 00 10 02 00 2E 54 34

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1. Addressing

Step3 3rd party controller → Outdoor unit/ERV interface module/FCU interface module

. The outdoor unit starts communication only when the addressing is completed.
. So, to start addressing, send the following packet.
. If the step4 packet is not received from the outdoor unit for up to 3 seconds after transmitting the step3 packet, complete the addressing and perform the "System Installation Check" step.

Preamble	STX	Length	SA	DA	Command	Number of DATA	DATA	CRC	ETX
55H (100byte)	32H	00 11	6A EE FF	B0 FF FF	C0 14 XX	01H	ⓐ	2bytes	34H

ⓐ

DATA		Description
Index	value	
2004	00	Request to all Outdoor units

EX) 32 00 11 6A EE FF B0 FF FF C0 14 40 01 20 04 00 DD 1F 34

※ When the outdoor unit is reset, it must get this packet. If not, it will not work.
So, after Addressing step and System Installation Check step is completed, it should be transmitted once every 61 seconds.

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1. Addressing

Step4 **Outdoor unit/ERV interface module/FCU interface module → 3rd party controller**

. Outdoor units that have not set address will transmit the following packet when receiving 2004 00.
. When the 3rd party receives the following packet, performs Step5.
※ In any case, if the 3rd party controller receives the following packet, Step5 must be performed.

Preamble	STX	Length	SA	DA	Command	Number of DATA	DATA	CRC	ETX
some bytes	32H	00 27	10 FF FF	B0 FF FF	C0 14 XX	05H	ⓐ	2bytes	34H

ⓐ

DATA		Description
Index	value	
2004	01	address request
0418	4bytes	Random Address (ex:00 10 9F D9)
0217	2bytes	Network Address (Important)
0417	4bytes	Origin Address
0419	4bytes	Setting Address (00 10 FF FF means “not ready”. Need to set by installer) (Important)

Ex) 32 00 27 10 FF FF B0 FF FF C0 14 0C 05 20 04 01 04 18 00 10 9F D9 02 17 1D D1 04 17 00 10 00 00 04 19 00 10 00 00 FC 53 34

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1. Addressing

Step5 **3rd party controller → Outdoor unit/ERV interface module/FCU interface module**

Preamble	STX	Length	SA	DA	Command	Number of Message Set's	Message Set	CRC	ETX
55 (100 bytes)	32	00 27	6A EE FF	ⓐ	C0 12 xx	05	ⓑ	2bytes	34

ⓐ Input the last 3 bytes of Random Address received from the outdoor unit in Step 4 (ex: **10 9F D9**)

ⓑ

DATA		Description
Index	value	
20 04	03	Acceptance
04 18	4 bytes	Random Address(Same as received data from outdoor unit)
02 17	2 bytes	Network Address(Same as received data from outdoor unit)
04 17	4 bytes	Origin Address(Set to setting address below)
04 19	4 bytes	Setting Address(Same as received data from outdoor unit)

Ex) 32 00 27 6A EE FF 10 9F D9 C0 12 3E 05 20 04 03 04 18 00 10 9F D9 02 17 1D D1 04 17 00 10 00 00 04 19 00 10 00 00 FC 9A 34

Random Address | Network Address | Origin Address (set to setting address) | setting address

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1. Addressing

Step6 **Outdoor unit/ERV interface module/FCU interface module → 3rd party controller**

Preamble	STX	Length	SA	DA	Command	Number of DATA	DATA	CRC	ETX
some bytes	32H	00 27	ⓐ	6A EE FF	C0 15 XX	05H	ⓑ	2bytes	34H

ⓐ Outdoor unit address (10 xx 00..) xx means setting address in outdoor unit is set by installer
(ex: 10 00 00, 10 01 00, 10 02 00 .....10 0F 00)

ⓑ

DATA		Description
Index	value	
2004	04	Complete
0418	4bytes	Random Address
0217	2bytes	Network Address
0417	4bytes	Origin Address
0419	4bytes	Setting Address

Ex) 32 00 27 10 00 00 6A EE FF C0 15 3E 05 20 04 04 04 18 00 10 9F D9 02 17 1D D1 04 17 00 10 00 00 04 19 00 10 00 00 64 65 34

. When the above packet is received from the outdoor unit, restart from Step 3.

. If the 2004 01 is not received from the outdoor unit for up to 3 seconds after transmitting the step3 packet, complete the addressing and perform the "System Installation Check" step.

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1. Addressing - Sample packet

Step3 32 00 11 6A EE FF B0 FF FF C0 14 40 01 20 04 00 DD 1F 34

Step4 32 00 27 10 FF FF B0 FF FF C0 14 0C 05 20 04 01 04 18 00 10 9F D9 02 17 1D D1 04 17 00 10 00 00 04 19 00 10 00 00 FC 53 34

Step5 32 00 27 6A EE FF 10 9F D9 C0 12 3E 05 20 04 03 04 18 00 10 9F D9 02 17 1D D1 04 17 00 10 00 00 04 19 00 10 00 00 FC 9A 34

Step6 32 00 27 10 00 00 6A EE FF C0 15 3E 05 20 04 04 04 18 00 10 9F D9 02 17 1D D1 04 17 00 10 00 00 04 19 00 10 00 00 64 65 34

Step3 32 00 11 6A EE FF B0 FF FF C0 14 40 01 20 04 00 DD 1F 34

Step4 32 00 27 10 FF FF B0 FF FF C0 14 74 05 20 04 01 04 18 00 10 D4 F9 02 17 1D D1 04 17 00 10 01 00 04 19 00 10 01 00 D6 E7 34

Step5 32 00 27 6A EE FF 10 D4 F9 C0 12 3E 05 20 04 03 04 18 00 10 D4 F9 02 17 1D D1 04 17 00 10 01 00 04 19 00 10 01 00 A0 EE 34

Step6 32 00 27 10 01 00 6A EE FF C0 15 3E 05 20 04 04 04 18 00 10 D4 F9 02 17 1D D1 04 17 00 10 01 00 04 19 00 10 01 00 BA 22 34

Step3 32 00 11 6A EE FF B0 FF FF C0 14 40 01 20 04 00 DD 1F 34

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2. System Installation Check

Outdoor(Including interface module)/Indoor unit Communication Status
Indoor unit Model Type

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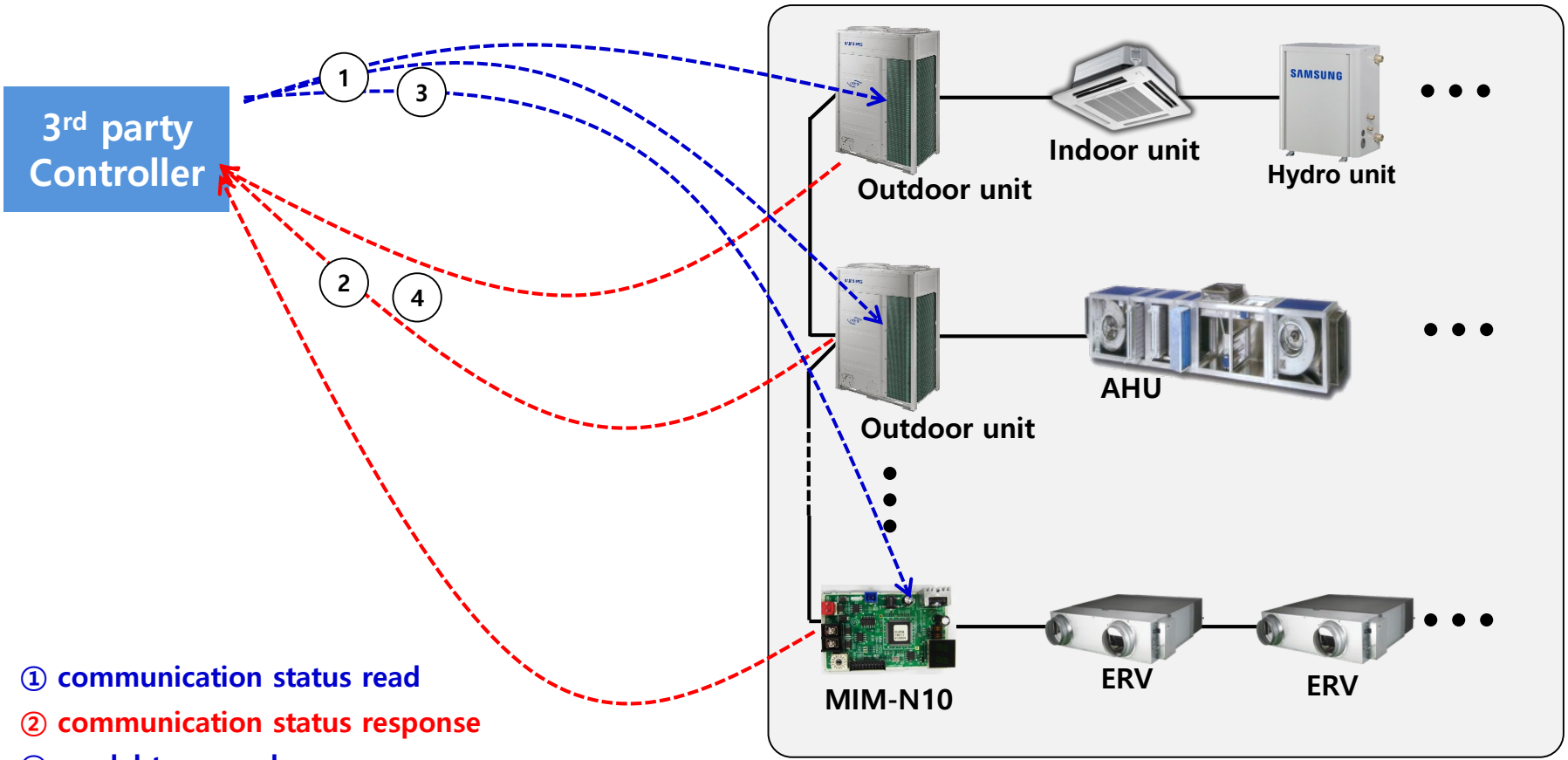
2. System installation check

System installation check

Send the read packet for communication status to possible max 16 outdoor units (address 00~0F).



① communication status read
② communication status response
③ model type read
④ model type response

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2. System installation check

Step1 **3rd party controller → Outdoor unit/ERV interface module/FCU interface module**

. 3rd party controller sends the READ packet to the outdoor unit to get communication status.

. Send the following packets every 10 seconds

(In HEX format)

Preamble	STX	Length	SA	DA	Command	Number of Message Set's	Message Set	CRC	ETX
55 (100 bytes)	32	00 11	6A EE FF	B0 FF 10	C0 11 xx	01		2 bytes	34

Message Set	Index	value	Description
Message Set #1	20 10	FF	Outdoor/Indoor unit communication status

Ex) 32 00 11 6A EE FF B0 FF 10 C0 11 01 01 20 10 FF D0 4F 34

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2. System installation check

Step2 **All unit → 3rd party controller**

. All the outdoor units transmit communication status to 3rd party controller.

. Step 3 is performed when CL and SL status of all outdoor units are Ready.

(In HEX format)

STX	Length	SA	DA	Command	Number of Message Set's	Message Set	CRC	ETX
32	00 11	10 xx 00	6A EE FF	C0 15 xx	01		2 bytes	34

Message Set	Index	value	Description
Message Set #1	20 10	Bit7	Outdoor unit ready
		Bit6	Outdoor unit not ready
		Bit5	Indoor unit(s) ready
		Bit4	Indoor unit(s) not ready
		Bit3210	Don't care

Ex) 32 00 11 10 00 00 6A EE FF C0 15 01 01 20 10 A8 2B EF 34
32 00 11 10 01 00 6A EE FF C0 15 01 01 20 10 A8 28 9A 34
32 00 11 10 02 00 6A EE FF C0 15 01 01 20 10 A8 2D 05 34
32 00 11 10 03 00 6A EE FF C0 15 01 01 20 10 A8 2E 70 34

※ If any of the outdoor units is not ready, retry it after 10 second (Refer to 21p)

Ex) 32 00 11 10 00 00 6A EE FF C0 15 01 01 20 10 A8 2B EF 34
32 00 11 10 01 00 6A EE FF C0 15 01 01 20 10 A8 28 9A 34
32 00 11 10 02 00 6A EE FF C0 15 01 01 20 10 58 2D 05 34
32 00 11 10 03 00 6A EE FF C0 15 01 01 20 10 A8 2E 70 34

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2. System installation check

Step3 **3rd party controller → Outdoor unit/ERV interface module/FCU interface module**

. 3rd party controller sends the READ packet to each of the outdoor channel to get indoor unit model type.

. The following packet is transmitted to each outdoor unit every 5 seconds

(In HEX format)

Preamble	STX	Length	SA	DA	Command	Number of Data Set's	Data Set	CRC	ETX
55 (100 bytes)	32	00 12	6A EE FF	B2 xx FF	C0 11 xx	01		2 bytes	34

xx : outdoor unit/N10 address ranging 00 ~ 0F

Data Set	Index	value	Description
Data Set #1	42 29	FF FF	Model Code

Ex) 32 00 12 6A EE FF B2 00 FF C0 11 00 01 42 29 FF FF 22 D7 34
32 00 12 6A EE FF B2 01 FF C0 11 01 01 42 29 FF FF 08 32 34
32 00 12 6A EE FF B2 02 FF C0 11 02 01 42 29 FF FF 77 1D 34
32 00 12 6A EE FF B2 03 FF C0 11 03 01 42 29 FF FF 5D F8 34
.
.
.
32 00 12 6A EE FF B2 0F FF C0 11 0F 01 42 29 FF FF B1 65 34

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2. System installation check

Step4 **All unit → 3rd party controller**

. All the units (indoor/hydro units, etc) in the outdoor unit are transferred to 3rd party controller with their model type. (In HEX format)

STX	Length	SA	DA	Command	Number of Data Set's	Data Set	CRC	ETX
32	00 12	10 xx 00 20 xx yy 30 xx yy	6A EE FF	C0 15 xx	01		2 bytes	34

SA	Description
10 xx 00	Outdoor unit information . xx : outdoor unit address range (00~0F)
20 xx yy	Indoor unit information . xx : outdoor unit address ranging 00~0F . yy : indoor/hydro/AHU/ERV+/DVM chiller/FCU FCU Kit/RAC(AR9500T) address range (00~3F)
30 xx yy	ERV unit information . xx : MIM-N10 address range (00~0F) . yy : ERV unit address range (00~0F)

Ex) 32 00 12 10 00 00 6A EE FF C0 15 01 01 42 29 FF FF 1C 5F 34
32 00 12 20 00 03 6A EE FF C0 15 01 01 42 29 00 51 15 23 34
32 00 12 20 00 0B 6A EE FF C0 15 01 01 42 29 00 6E C9 37 34
32 00 12 20 00 0C 6A EE FF C0 15 01 01 42 29 00 78 B3 8B 34
32 00 12 20 00 01 6A EE FF C0 15 01 01 42 29 00 5B B2 83 34
32 00 12 20 00 02 6A EE FF C0 15 01 01 42 29 00 6C F1 A8 34

Ex) ERV
32 00 12 10 00 00 6A EE FF C0 15 01 01 42 29 FF FF 1C 5F 34
32 00 12 30 00 00 6A EE FF C0 15 01 01 42 29 03 64 E5 EE 34

Data Set	Index	value	Description
Data Set #2	42 29	xx 6E (xx : don't care)	Hydro unit (HE model)
		xx 78 (xx : don't care)	Hydro unit (HT model)
		FF FF	Outdoor unit/ERV interface module
		xx 5B (xx : don't care)	AHU kit (10HP Model)
		xx 5C (xx : don't care)	AHU kit (40HP Model)
		xx 64 (xx : don't care)	ERV
		xx 6C (xx : don't care)	ERV+
		xx 73 (xx : don't care)	EHS
		xx 75 (xx : don't care)	TDM+
		xx 8C (xx : don't care)	DVM Chiller
		0A xx (xx : don't care)	FCU
		0A A0 ~ 0A A9	FCU Kit
		xx 10 or xx 19 (xx : don't care)	RAC(AR9500T)
		Others	Indoor unit

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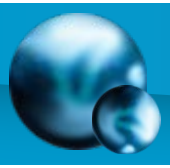

3. Monitoring

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3. Monitoring

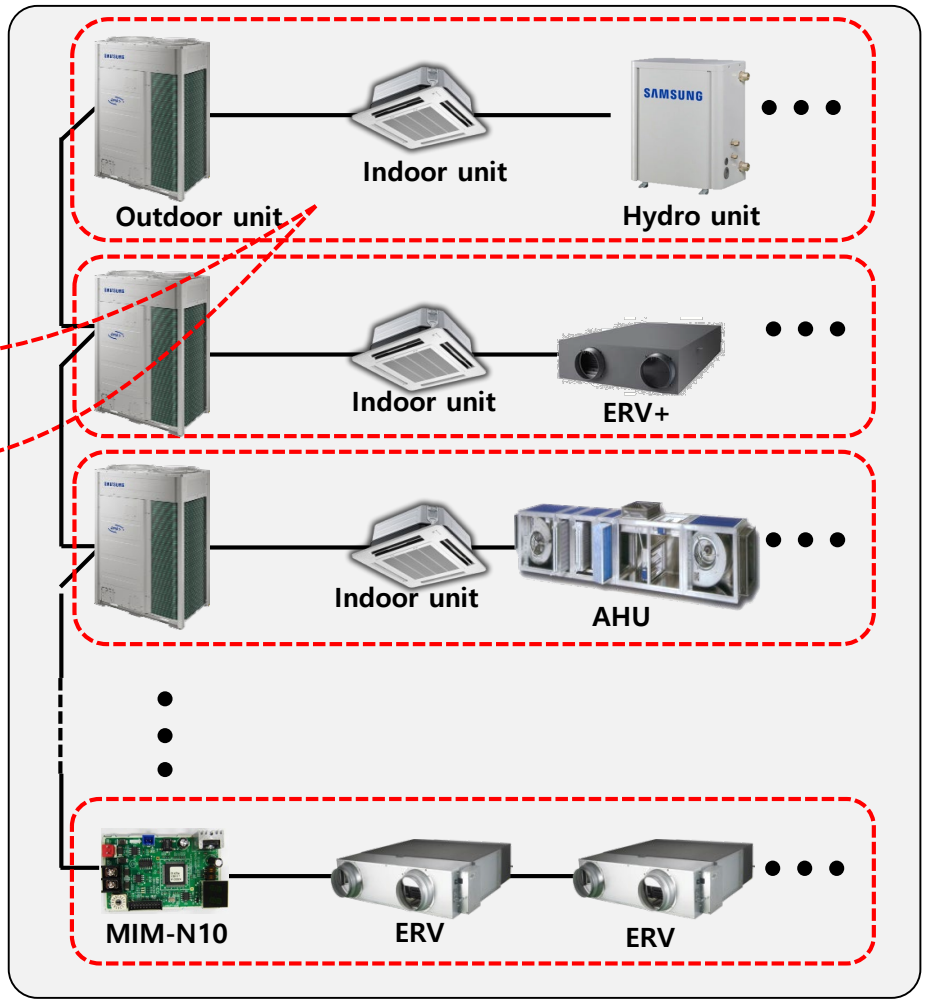
Indoor/Outdoor units are sending data to 3rd party controller automatically and periodically.
So if necessary, 3rd party controller monitor this data continuously and update devices status in real time.

※ SAMSUNG doesn't open all data of unit. This document opens the general data of indoor unit for 3rd party controller to control and monitor indoor unit's state.

3rd party Controller

1 Periodical update

2 Automatic update after event occurred.



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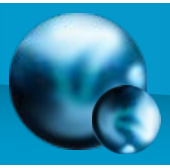

Common data Monitoring

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3. Monitoring – Common data

■ All units → 3rd party controller

xx : outdoor unit address ranging 00 ~ 0F
yy : All units address ranging 00~3F

STX	Length	SA	DA	Command	Number of Message Set's	Message Set	CRC	ETX
32	Variable	20 xx yy	B3 xx FF	C0 14 xx	Variable	※	2 bytes	34

※ Indoor unit sends many data. You can use the below data only among them.

* : FCU Kit Data

Data Set	Index	Value	Description	Applied to
Data Set #1	40 00	00 : Off, 01 : On	Operation On/Off	Indoor/Hydro/EHS/TDM+/ERV+/ AHU unit/RAC(AR9500T) DVM Chiller/FCU/FCU Kit
*Data Set #2	40 01	00 : Auto(Water law), 01 : Cooling, 02 : Dry, 03 : Fan, 04 : Heating 0x15 : Cool Storage, 0x18 : Hot water	Operation mode 00 : Water law is applied for EHS/TDM+ only * DVM Chiller is operated "Auto" in 00 * FCU supports 01, 03, 04 only * FCU Kit supports 00, 01, 03, 04 only	
*Data Set #3	40 06	00 : Auto, 01 : Low, 02 : Mid, 03 : High	Air flow	Indoor unit/FCU/FCU Kit/RAC(AR9500T)
Data Set #4	40 11	00 : Swing Off, 01 : Swing On	Up/Down swing	Indoor unit/FCU/RAC(AR9500T)
Data Set #5	40 7E	00 : Swing Off, 01 : Swing On	Left/Right swing	RAC(AR9500T) (Functional RAC only)
Data Set #6	40 27	00 : No alarm, 01 : Alarm	Filter alarm status	Indoor/ERV+/AHU unit/FCU/ RAC(AR9500T)
*Data Set #7	42 01	xx xx	Desired temperature (real* 10) Ex) 27.0℃ → 27.0 * 10 = 270 → 0x010E → 01 0E	Indoor/ERV+/AHU unit/FCU/FCU Kit/ RAC(AR9500T) EHS/TDM+(when use indoor room temp. sensor)
*Data Set #8	42 03	xx xx	Room temperature (real*10) (-41℃ ~ 100℃) Ex) 0x0000→0℃, 0xFFFF→-1→-0.1℃ 0xFFF6→-10→-1℃, 0xFE66→-410→41.0℃ 0x03E8→1000→100℃	Indoor/ERV+/AHU unit/FCU/FCU Kit/ RAC(AR9500T) EHS/TDM+(when use indoor room temp. sensor)
*Data Set #9	02 02	00 00	Error code Ex) 201 (decimal) → 00 C9 (Hex)	Indoor/Hydro/EHS/TDM+/ERV/ ERV+/AHU unit/RAC(AR9500T) DVM Chiler/FCU/FCU Kit * FCU Kit can't support wired R/C restriction
Data Set #10	04 09	00 00 00 00 : No Restriction 00 00 6A 6A : Restriction	Wired Remote controller restriction	
Data Set #11	40 43	00 : Off, 01 : On	Air Clean(or SPI)	Indoor/RAC(AR9500T) (Functional Indoor only)
Data Set #12	40 60	00 : None, 09 : WindFree	Wind-Free	Indoor/RAC(AR9500T) (Functional Indoor only)

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3. Monitoring – Common data

Data Set	Index	Value	Description	Applied to
Data Set #13	40 12	6Ah : Spot, 55h : Mid 40h : Wide, 0Fh : Swing etc : Individual	360 air flow direction	Indoor/FCU (360CST only)

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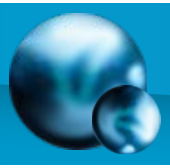

Special data Monitoring

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3. Monitoring – Special data

■ All units → 3rd party controller

xx : outdoor unit address ranging 00 ~ 0F
yy : All units address ranging 00~3F

STX	Length	SA	DA	Command	Number of Message Set's	Message Set	CRC	ETX
32	Variable	20 xx yy	B3 xx FF	C0 14 xx	Variable		2 bytes	34

※ Indoor unit sends many data. You can use the below data only among them.

Data Set	Index	Value	Description	Applied to
Data Set #1	42 36	xx xx	Water In Temperature. Ex) 27.0℃ → 27.0 * 10 = 270 → 0x010E → 01 0E	Hydro/EHS/TDM+ unit
Data Set #2	42 38	xx xx	Water Out Temperature Ex) 27.0℃ → 27.0 * 10 = 270 → 0x010E → 01 0E	
Data Set #3	42 47	xx xx	Water Out Desired Temperature Ex) 27.0℃ → 27.0 * 10 = 270 → 0x010E → 01 0E	
Data Set #4	40 65	00 : Off, 01 : On	Hot water On/Off	
Data Set #5	40 66	Hydro unit 00:Eco, 01:Standard, 02:Power EHS 00:Eco, 01:Standard, 02:Power, 03:Force	Hot water operation mode	
Data Set #6	42 35	xx xx	Hot water set temperature Ex) 27.0℃ → 27.0 * 10 = 270 → 0x010E → 01 0E	
Data Set #7	42 37	xx xx	Hot water current temperature Ex) 27.0℃ → 27.0 * 10 = 270 → 0x010E → 01 0E	
Data Set #8	40 85	00:Off, 01:On	Sanitary Operation On/Off	
Data Set #9	40 03	00:Off, 01:On	Ventilation On/Off	ERV+ unit
Data Set #10	40 04	00:Bypass, 01:HeatEx, 02:Auto, 06:Sleep	Ventilation Operation mode	
Data Set #11	40 08	2 : Low, 3 : High, 4 : Turbo	Ventilation Air flow	
Data Set #12	42 2A	xx xx	Discharge temperature in Cooling mode Ex) 12.0℃ → 12.0 * 10 = 120 → 0x0078 → 00 78	Indoor/AHU unit
Data Set #13	42 2B	xx xx	Discharge temperature in Heating mode Ex) 34.0℃ → 34.0 * 10 = 340 → 0x0154 → 01 54	
Data Set #14	42 0B	xx xx	Discharge current temperature Ex) 34.0℃ → 34.0 * 10 = 340 → 0x0154 → 01 54	

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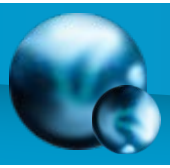

ERV Unit Monitoring

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3. Monitoring – ERV unit

■ ERV unit → 3rd party controller

xx : outdoor unit address ranging 00 ~ 0F
yy : All units address ranging 00~3F

STX	Length	SA	DA	Command	Number of Message Set's	Message Set	CRC	ETX
32	Variable	30 xx yy	B3 xx FF	C0 14 xx	Variable		2 bytes	34

※ ERV unit sends many data. You can use the below data only among them.

Data Set	Index	Value	Description	Applied to
Data Set #1	40 03	00 : Off, 01 : On	Ventilation On/Off	ERV
Data Set #2	40 04	00 : Bypass, 01 : HeatEx, 02 : Auto, 06 : Sleep	Ventilation Operation mode	ERV
Data Set #3	40 08	2 : Low 3 : High 4 : Turbo	Ventilation Air flow	ERV
Data Set #4	40 27	00 : No alarm, 01 : Alarm	Filter alarm status	ERV
Data Set #5	02 02	00 00	Error code Ex) 201 (decimal) → 00 C9 (Hex)	ERV
Data Set #6	04 09	00 00 00 00 : No Restriction 00 00 6A 6A : Restriction	Wired Remote controller restriction	ERV

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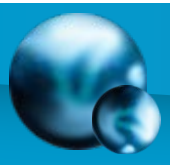

DVM Chiller Monitoring

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3. Monitoring – DVM chiller unit

■ DVM chiller → 3rd party controller

xx : DVM Chiller outdoor unit address ranging (00 ~ 0F)
yy : DVM Chiller Hydro part address ranging (00)

STX	Length	SA	DA	Command	Number of Message Set's	Message Set	CRC	ETX
32	Variable	20 xx 00	B3 xx FF	C0 14 xx	Variable		2 bytes	34

※ DVM chiller sends many data. You can use the below data only among them.

★ Some chiller model supports from -10ºC and others from 5ºC. It determined by field setting on product side.

Data Set	Index	Value	Description	Applied to
Data Set #1	40 00	00 : Off 01 : On	DVM chiller operation On/Off	DVM Chiller
Data Set #2	40 01	01 : Cooling 04 : Heating 0x15: Cool Storage 0x18 : Heat Storage	DVM chiller operation mode	
Data Set #3	02 02	00 00	Error code Ex) 201 (decimal) → 00 C9 (Hex)	DVM Chiller
Data Set #4	04 09	00 00 00 00 : No Restriction 00 00 6A 6A : Restriction	Wired Remote controller restriction	
Data Set #5	42 47	00 00	Water Out Desired Temperature -Heat, Hot water : 25~55ºC, -cool, cool storage : -10~25 ºC ★	DVM Chiller
Data Set #6	42 BA	00 00	Water Out average Temperature (Real temp * 10) - 00 A0 : 16℃ (A0H → 160 → 16℃) - 00 F0 : 24℃ (F0H → 240 → 24℃)	DVM Chiller
Data Set #7	44 1E	00 00 00 00	Error information of slave chiller unit *Byte 0, 1 : Error code of the lowest # unit among error occurred units. (=same range as error code index 0202) *Byte 2, 3 : Each bit# indicates the error occurred unit #. (Byte2 → 0~7# unit, Byte3 → 8~15# unit) Ex) #0,#2 unit has error, its error code 201 (decimal) → 00 05 00 C9 (hex)	DVM Chiller

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3. Monitoring – sample packet

■ **All units → 3rd party controller**

[Ex. Sample data packet]

32	00 3B	10 00 00	B3 00 FF	C0 14 6F	0F	80 46 01 80 00 00 80 01 00 80 03 00 80 10 00 80 11 00 80 13 00 80 14 00 80 17 00 80 18 00 80 19 00 80 1A 00 80 1F 00 80 20 00 80 21 00	2F 7F	34
32	00 39	10 00 00	B3 00 FF	C0 14 6F	0C	80 22 00 80 23 00 80 37 00 80 8D 00 80 25 00 02 02 00 00 82 03 01 2F 82 06 00 C8 82 08 00 32 82 0A 00 D2 82 0C 00 DC 82 17 07 D0	94 6E	34
32	00 3A	10 00 00	B3 00 FF	C0 14 6F	0B	82 77 08 34 82 18 01 4A 82 1A 00 C8 82 9A 00 FA 82 1C 01 2C 82 1E 00 E6 82 20 00 BE 82 26 00 1E 82 27 00 28 82 29 01 F4 82 2E 01 90	19 A3	34
32	00 3A	10 00 00	B3 00 FF	C0 14 6F	0B	82 2F 01 2C 82 31 00 14 82 33 00 64 82 35 00 00 82 36 01 2C 82 37 00 C8 82 38 00 64 82 74 01 2C 82 75 00 C8 82 76 00 64 82 3F 00 C8	6A D6	34
32	00 3A	10 00 00	B3 00 FF	C0 14 6F	0B	82 40 00 64 82 41 00 64 82 44 00 00 82 45 00 00 82 47 00 00 82 48 00 00 82 54 00 C8 82 55 00 D2 82 78 00 64 82 79 00 64 82 80 01 0E	7B 19	34
32	00 3A	10 00 00	B3 00 FF	C0 14 6F	0A	82 81 01 18 82 83 00 FA 82 98 00 64 82 9B 00 00 82 9C 00 00 82 9D 00 00 82 BC 00 00 82 5E 01 F4 84 05 00 00 00 00 84 06 00 00 00 00	AE DF	34
32	00 1E	20 00 00	B3 00 FF	C0 14 04	04	42 03 00 C8 42 05 00 C8 42 06 00 C8 42 17 00 01	3A DD	34
32	00 1C	20 00 00	B3 00 FF	C0 14 11	01	46 04 1F 17 65 03 00 FF 00 01 00 00 00 00	40 E2	34
32	00 3B	20 00 00	B3 00 FF	C0 14 11	0C	04 02 00 0A 00 00 42 29 00 0A 40 1B 01 42 0C 01 90 42 11 00 02 42 12 00 02 42 13 00 01 02 02 00 00 40 7D 00 40 00 00 40 01 00 40 06 00	BE 49	34
32	00 39	20 00 00	B3 00 FF	C0 14 11	0C	40 2E 00 40 60 00 40 23 01 40 43 00 40 3E 01 40 3F 00 40 27 00 40 11 00 40 7E 00 42 01 00 C8 04 11 01 2C 60 60 04 12 00 B4 60 60	01 A2	34
32	00 34	20 00 00	B3 00 FF	C0 14 11	07	04 13 01 2C 60 60 04 14 00 A0 60 60 42 2A 00 C8 42 2B 00 C8 04 09 00 00 00 00 04 10 00 00 60 60 44 0F 00 00 00 00	76 FD	34
32	00 1E	20 00 01	B3 00 FF	C0 14 10	04	42 03 00 C8 42 05 00 C8 42 06 00 C8 42 17 00 01	0F 86	34
32	00 1C	20 00 01	B3 00 FF	C0 14 65	01	46 04 1F 17 65 03 00 FF 00 01 00 00 00 00	44 DE	34
32	00 3B	20 00 01	B3 00 FF	C0 14 65	0C	04 02 00 0A 00 00 42 29 00 0A 40 1B 01 42 0C 01 90 42 11 00 02 42 12 00 02 42 13 00 01 02 02 00 00 40 7D 00 40 00 00 40 01 00 40 06 00	68 1A	34
32	00 39	20 00 01	B3 00 FF	C0 14 65	0C	40 2E 00 40 60 00 40 23 01 40 43 00 40 3E 01 40 3F 00 40 27 00 40 11 00 40 7E 00 42 01 00 C8 04 11 01 2C 60 60 04 12 00 B4 60 60	EF 8E	34
32	00 34	20 00 01	B3 00 FF	C0 14 65	07	04 13 01 2C 60 60 04 14 00 A0 60 60 42 2A 00 C8 42 2B 00 C8 04 09 00 00 00 00 04 10 00 00 60 60 44 0F 00 00 00 00	66 5D	34
32	00 1E	20 00 02	B3 00 FF	C0 14 D5	04	42 03 00 C8 42 05 00 C8 42 06 00 C8 42 17 00 01	4A 95	34
32	00 1C	20 00 02	B3 00 FF	C0 14 B1	01	46 04 1F 17 65 03 00 FF 00 01 00 00 00 00	D5 37	34
32	00 3B	20 00 02	B3 00 FF	C0 14 B1	0C	04 02 00 0A 00 00 42 29 00 0A 40 1B 01 42 0C 01 90 42 11 00 02 42 12 00 02 42 13 00 01 02 02 00 00 40 7D 00 40 00 00 40 01 00 40 06 00	73 A8	34
32	00 39	20 00 02	B3 00 FF	C0 14 B1	0C	40 2E 00 40 60 00 40 23 01 40 43 00 40 3E 01 40 3F 00 40 27 00 40 11 00 40 7E 00 42 01 00 C8 04 11 01 2C 60 60 04 12 00 B4 60 60	62 33	34
32	00 34	20 00 02	B3 00 FF	C0 14 B1	07	04 13 01 2C 60 60 04 14 00 A0 60 60 42 2A 00 C8 42 2B 00 C8 04 09 00 00 00 00 04 10 00 00 60 60 44 0F 00 00 00 00	7C 42	34

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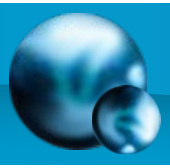

4. Control

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. Receiving device of control packet(Read/Write/Request) ack same packet number(PN) of control packet

Therefore, the response to the control packet is judged as a response if the PN generated at the time of transmission and the PN of the received response packet are the same.

EX) Good case

control : 32 00 11 61 00 FF B0 FF 10 C0 01 **27** 01 20 10 FF C1 50 34

response : 32 00 11 10 00 00 61 00 FF C0 05 **27** 01 20 10 A8 E3 2A 34

EX) Bad case

control : 32 00 11 61 00 FF B0 FF 10 C0 01 **27** 01 20 10 FF C1 50 34

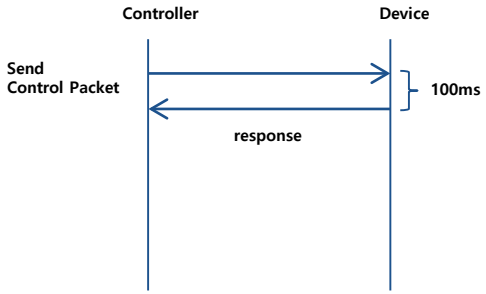
response : 32 00 11 10 00 00 61 00 FF C0 05 **45** 01 20 10 A8 BE 75 34

. In case of normal communication, response wait time for control packet is 1 second. If there is no response within 1 second, additional retry is performed twice (total 3 times).

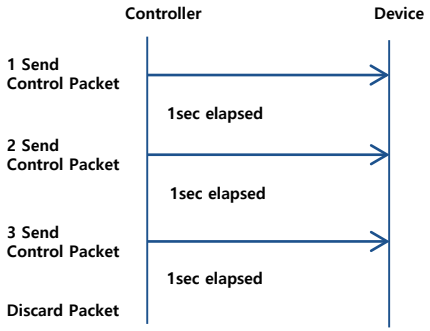
. If there is no response after transmitting 3 times, the packet is discarded..

. No other control packets can be transmitted during control.

EX) During normal response in 100ms



EX) No response



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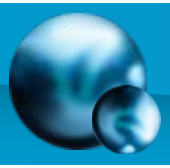

Indoor/FCU/FCU Kit/ RAC(AR9500T) Control

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Indoor/FCU/FCU Kit/RAC(AR9500T) control

■ 3rd party controller → Indoor unit/FCU/FCU Kit/RAC(AR9500T)

Preamble	STX	Length	SA	DA	Command	Number of Data Set's	Data Set	CRC	ETX
55 (100 bytes)	32	00 32	6A EE FF	20 xx yy	C0 13 00	0A	ⓐ	2 bytes	34

xx : outdoor unit/FCU interface module address range (00~0F)
yy : indoor/FCU/FCU Kit address range (00~3F)

* : FCU Kit Data

Data Set	Index	Value	Description
Data Set #1	40 50	00 : Buzzer On, 01 : Buzzer Off	Buzzer sound
Data Set #2	40 00	00 : Off, 01 : On	Operation On/Off
Data Set #3	40 01	00 : Auto, 01 : Cooling, 02 : Dry, 03 : Fan, 04 : Heating	Operation mode ※ Auto, Dry mode are not available in FCU.
Data Set #4	40 06	00 : Auto, 01 : Low, 02 : Mid, 03 : High	Air flow
Data Set #5	40 11	00 : Up/Down swing Off 01 : Up/Down swing On	Up/Down swing
Data Set #6	40 7E	00 : Left/Right Swing Off 01 : Left/Right Swing On	Left/Right swing
Data Set #6	40 25	00 : No reset, 01 : Reset	Filter alarm reset function
Data Set #7	42 01	xx xx	Desired temperature (Real temp * 10) - 00 A0 : 16℃ (A0H → 160 → 16℃) - 00 F0 : 24℃ (F0H → 240 → 24℃) - 01 2C : 30℃ (01 2CH → 300 → 30℃) (If temperature setting is ouf of range, the indoor unit can't be controlled) **※ Range : Cool(18~30℃), Heat(16~30℃) (increase by 1℃ unit)** *** RAC Cool/Heat : 16~30℃**
Data Set #8	42 2A	xx xx	Discharge temperature in Cooling mode (Range : 8℃~18℃) (by 1℃ unit) - 00 A0 : 16℃ (A0H → 160 → 16℃)
Data Set #9	42 2B	xx xx	Discharge temperature in Heating mode (Range : 30℃~43℃) (by 1℃ unit) - 01 2C : 30℃ (01 2CH → 300 → 30℃)
Data Set #10	04 09	FF FF 00 00 : No restriction FF FF 6A 6A : Restriction	Wired Remote controller restriction
Data Set #11	40 43	00 : Off, 01 : On	Air Clean(or SPI)
Data Set #12	40 60	00 : None, 09 : WindFree	WindFree
Data Set #13	40 12	6Ah : Spot, 55h : Mid 40h : Wide, 0Fh : Swing	360 CST Air flow direction

Ex) 32 00 32 6A EE FF 20 01 00 C0 13 00 0A 40 50 00 40 00 00 40 01 01 40 06 01 40 11 01 40 25 00 42 01 00
F0 42 2A 00 A0 42 2B 01 2C 04 09 FF FF 00 00 C6 CD 34

This [

Indoor/FCU/FCU Kit/RAC(AR9500T) control

■ **Indoor unit/FCU/FCU Kit/RAC(AR9500T) → 3rd party controller (Ack)**

STX	Length	SA	DA	Command	Number of Data Set's	Data Set	CRC	ETX
32	00 0E	20 xx yy	6A EE FF	C0 16 00	00	None	2 bytes	34

xx : outdoor unit/FCU interface module address range (00~0F)
yy : indoor/FCU/FCU Kit address range (00~3F)

Ex) 32 00 0E 20 01 00 6A EE FF C0 16 00 00 81 29 34

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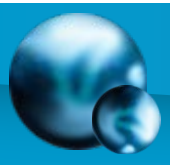

Hydro Unit Control

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Hydro unit control

■ 3rd party controller → hydro unit

Preamble	STX	Length	SA	DA	Command	Number of Data Set's	Data Set	CRC	ETX
55 (100 bytes)	32	00 22	6A EE FF	20 xx yy	C0 13 00	06		2 bytes	34

xx : outdoor unit address range (00~0F)
yy : hydro unit address range (00~3F)

Data Set	Index	value	Description	Remark
Data Set #1	40 00	00 : Off 01 : On	Hydro unit operation On/Off	
Data Set #2	40 01	01 : Cooling 04 : Heating	Hydro unit operation mode	
Data Set #3	42 47	00 00	Water Out Desired Temperature - Hydro unit(HE) : Cool(5~25℃), Heat(15~50℃) - Hydro HT : Heat(25~80℃) ※ No Cooling mode in Hydro HT	Temperature (Real temp * 10) - 00 A0 : 16℃ (A0H → 160 → 16℃) - 00 F0 : 24℃ (F0H → 240 → 24℃) - 01 2C : 30℃ (01 2CH → 300 → 30℃) (If temperature setting is ouf of range, the hydro unit can't be controlled) (increase by 1℃ unit)
Data Set #4	40 65	00 : Off, 01 : On	Hot water On/Off	
Data Set #5	40 66	00:Eco 01:Standard 02:Power	Hot water operation mode	
Data Set #6	42 35	xx xx	Hot water set temperature - Hydro unit(HE) : 30~75 - Hydro unit(HT) : 35~75	- 01 2C : 30℃ (01 2CH → 300 → 30℃)
Data Set #7	04 09	FF FF 00 00 : No restriction FF FF 6A 6A : Restriction	Wired Remote controller restriction	

Ex) 32 00 22 6A EE FF 20 00 00 C0 13 00 06 40 00 01 40 01 04 42 47 01 40 40 65 00 40 66 01 42 35 01 90 5F F7 34

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Hydro unit control

■ **Hydro unit → 3rd party controller (Ack)**

STX	Length	SA	DA	Command	Number of Data Set's	Data Set	CRC	ETX
32	00 0E	20 xx yy	6A EE FF	C0 16 00	00	None	2 bytes	34

xx : outdoor unit address range (00~0F)
yy : hydro unit address range (00~3F)

Ex) 32 00 0E 20 00 0B 6A EE FF C0 16 00 00 BC A5 34

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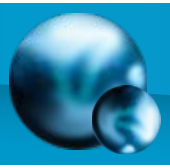

EHS/TDM+ Control

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EHS/TDM+ unit control

■ 3rd party controller → EHS/TDM+ unit

Preamble	STX	Length	SA	DA	Command	Number of Data Set's	Data Set	CRC	ETX
55 (100 bytes)	32	00 22	6A EE FF	20 xx yy	C0 13 00	06		2 bytes	34

xx : outdoor unit address range (00~0F)
yy : EHS unit address range (00~3F)

Data Set	Index	value	Description	Remark
Data Set #1	40 00	00 : Off 01 : On	EHS/TDM+ operation On/Off	
Data Set #2	40 01	00 : Water Law 01 : Cooling 04 : Heating	EHS/TDM+ operation mode	Water Law – water temperature auto control with ambient air temperature
Data Set #3	42 47	00 00	Water Out Desired Temperature - Cool(5~25℃) - Heat(15~55℃) **※ Must not be in Auto mode**	Temperature (Real temp * 10) - 00 A0 : 16℃ (A0H → 160 → 16℃) - 00 F0 : 24℃ (F0H → 240 → 24℃) - 01 2C : 30℃ (01 2CH → 300 → 30℃)
Data Set #4	40 65	00 : Off, 01 : On	Hot water On/Off	
Data Set #5	40 66	00:Eco 01:Standard 02:Power 03:Force	Hot water operation mode	
Data Set #6	42 35	xx xx	Hot water set temperature (30~70℃)	- 01 2C : 30℃ (01 2CH → 300 → 30℃)
Data Set #7	04 09	FF FF 00 00 : No restriction FF FF 6A 6A : Restriction	Wired Remote controller restriction	
Data Set #8	42 01	xx xx	Desired temperature (Real temp * 10) - 00 A0 : 16℃ (A0H → 160 → 16℃) - 00 F0 : 24℃ (F0H → 240 → 24℃) - 01 2C : 30℃ (01 2CH → 300 → 30℃)	when use indoor room temp. sensor (If temperature setting is ouf of range, AHU unit can't be controlled)
Data Set #9	40 85	00 : Off, 01 : On	Sanitary Operation On/Off	

Ex) 32 00 22 6A EE FF 20 00 00 C0 13 00 06 40 00 01 40 01 04 42 47 01 40 40 65 00 40 66 01 42 35 01 90 5F F7 34

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EHS unit control

■ **EHS unit → 3rd party controller (Ack)**

STX	Length	SA	DA	Command	Number of Data Set's	Data Set	CRC	ETX
32	00 0E	20 xx yy	6A EE FF	C0 16 00	00	None	2 bytes	34

xx : outdoor unit address range (00~0F)
yy : EHS unit address range (00~3F)

Ex) 32 00 0E 20 00 0B 6A EE FF C0 16 00 00 BC A5 34

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AHU Kit Control

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AHU Kit control

■ 3rd party controller → AHU Kit

Preamble	STX	Length	SA	DA	Command	Number of Data Set's	Data Set	CRC	ETX
55 (100 bytes)	32	00 26	6A EE FF	20 xx yy	C0 13 00	06	ⓐ	2 bytes	34

xx : outdoor unit address range (00~0F)
yy : AHU Kit address range (00~3F)

Data Set	Index	Value	Description
Data Set #1	40 00	00 : Off, 01 : On	Operation On/Off
Data Set #2	40 01	00 : Auto, 01 : Cooling, 02 : Dry, 03 : Fan, 04 : Heating	Operation mode
Data Set #3	42 01	xx xx	Desired temperature (Real temp * 10) **※ Range : Cool(18~30℃), Heat(16~30℃)** - 00 A0 : 16℃ (A0H → 160 → 16℃) **(increase by 1℃ unit)** - 00 F0 : 24℃ (F0H → 240 → 24℃) - 01 2C : 30℃ (01 2CH → 300 → 30℃) (If temperature setting is ouf of range, AHU unit can't be controlled)
Data Set #4	42 2A	xx xx	Discharge temperature in Cooling mode (Range : 8℃~25℃) (by 1℃ unit)
Data Set #5	42 2B	xx xx	Discharge temperature in Heating mode (Range : 18℃~43℃) (by 1℃ unit)
Data Set #6	04 09	FF FF 00 00 : No restriction FF FF 6A 6A : Restriction	Wired Remote controller restriction

Ex) 32 00 26 6A EE FF 20 01 00 C0 13 00 06 40 00 00 40 01 01 42 01 00 F0 42 2A 00 96 42 2B 01 7C 04 09 FF FF 00 00 59 28 34

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AHU Kit control

■ **AHU Kit → 3rd party controller (Ack)**

STX	Length	SA	DA	Command	Number of Data Set's	Data Set	CRC	ETX
32	00 0E	20 xx yy	6A EE FF	C0 16 00	00	None	2 bytes	34

xx : outdoor unit address range (00~0F)
yy : AHU Kit address range (00~3F)

Ex) 32 00 0E 20 01 00 6A EE FF C0 16 00 00 81 29 34

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ERV Unit Control

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ERV unit control

■ 3rd party controller → ERV unit

Preamble	STX	Length	SA	DA	Command	Number of Data Set's	Data Set	CRC	ETX
55 (100 bytes)	32	00 20	6A EE FF	30 xx yy	C0 13 00	05	ⓐ	2 bytes	34

xx : ERV interface module address range (00~0F)
yy : ERV unit address range (00~0F)

Data Set	Index	Value	Description
Data Set #1	40 03	00 : Off, 01 : On	Ventilation On/Off
Data Set #2	40 04	00 : Bypass, 01 : HeatEx, 02 : Auto, 06 : Sleep	Ventilation Operation mode
Data Set #3	40 08	2 : Low 3 : High 4 : Turbo	Ventilation Air flow
Data Set #4	40 25	00 : No reset, 01 : Reset	Filter alarm reset function
Data Set #5	04 09	FF FF 00 00 : No Restriction FF FF 6A 6A : Restriction	Wired Remote controller restriction

Ex) 32 00 20 6A EE FF 30 00 00 C0 13 00 05 40 03 00 40 04 00 40 08 03 40 25 00 04 09 FF FF 00 00 90 83 34

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ERV unit control

■ **ERV unit → 3rd party controller (Ack)**

STX	Length	SA	DA	Command	Number of Data Set's	Data Set	CRC	ETX
32	00 0E	30 xx yy	6A EE FF	C0 16 00	00	None	2 bytes	34

xx : ERV interface module address range (00~0F)
yy : ERV unit address range (00~0F)

Ex) 32 00 0E 30 00 00 6A EE FF C0 16 00 00 FE 9C 34

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ERV+ Unit Control

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ERV+ unit control

■ 3rd party controller → ERV+ unit

Preamble	STX	Length	SA	DA	Command	Number of Data Set's	Data Set	CRC	ETX
55 (100 bytes)	32	00 26	6A EE FF	20 xx yy	C0 13 00	07	ⓐ	2 bytes	34

xx : outdoor unit address range (00~0F)
yy : ERV+ unit address range (00~3F)

Data Set	Index	Value	Description
Data Set #1	40 00	00 : Off, 01 : On	Operation On/Off
Data Set #2	40 01	00 : Auto, 01 : Cooling 04 : Heating	Operation mode
Data Set #3	40 25	00 : No reset, 01 : Reset	Filter alarm reset function
Data Set #4	40 03	00 : Off, 01 : On	Ventilation On/Off
Data Set #5	40 04	00 : Bypass, 01 : HeatEx, 02 : Auto, 06 : Sleep	Ventilation Operation mode
Data Set #6	40 08	2 : Low 3 : High 4 : Turbo	Ventilation Air flow
Data Set #7	04 09	FF FF 00 00 : No restriction FF FF 6A 6A : Restriction	Wired Remote controller restriction

Ex) 32 00 26 6A EE FF 20 01 00 C0 13 00 07 40 00 00 40 01 01 40 25 00 40 03 00 40 04 00 40 08 03 04 09 FF FF 00 00 4E 18 34

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ERV+ unit control

■ **ERV+ unit → 3rd party controller (Ack)**

STX	Length	SA	DA	Command	Number of Data Set's	Data Set	CRC	ETX
32	00 0E	20 xx yy	6A EE FF	C0 16 00	00	None	2 bytes	34

xx : outdoor unit address range (00~0F)
yy : ERV+ unit address range (00~3F)

Ex) 32 00 0E 20 01 00 6A EE FF C0 16 00 00 81 29 34

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DVM Chiller Control

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DVM chiller control

■ 3rd party controller → DVM chiller

Preamble	STX	Length	SA	DA	Command	Number of Data Set's	Data Set	CRC	ETX
55 (100 bytes)	32	00 1E	6A EE FF	20 xx yy	C0 13 00	04		2 bytes	34

xx : DVM Chiller outdoor unit address range (00~0F)
yy : DVM Chiller Hydro part address range (00)

Some chiller model supports from -10ºC and others from 5ºC.
It determined by field setting on product side.

Data Set	Index	value	Description	Remark
Data Set #1	40 00	00 : Off 01 : On	DVM chiller operation On/Off	
Data Set #2	40 01	01 : Cooling 04 : Heating 15 : Cool Storage 18 : Heat Storage	DVM chiller operation mode	
Data Set #3	04 09	FF FF 00 00 : No restriction FF FF 6A 6A : Restriction	Wired Remote controller restriction	
Data Set #4	42 47	00 00	Water Out Desired Temperature -Heat, Heat Storage : 25~55ºC, -Cool, Cool storage : -10~25 ºC	Temperature (Real temp * 10) - 00 A0 : 16℃ (A0H → 160 → 16℃) - 00 F0 : 24℃ (F0H → 240 → 24℃) - 01 2C : 30℃ (01 2CH → 300 → 30℃)

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DVM chiller control

■ **DVM chiller → 3rd party controller (Ack)**

STX	Length	SA	DA	Command	Number of Data Set's	Data Set	CRC	ETX
32	00 0E	20 xx yy	6A EE FF	C0 16 00	00	None	2 bytes	34

xx : DVM Chiller outdoor unit address range (00~0F)
yy : DVM Chiller Hydro part address range (00)

Ex) 32 00 0E 20 00 0B 6A EE FF C0 16 00 00 BC A5 34

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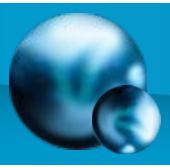

Q & A

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Q&A

※ Communication Spec

1. P3) The DVM Chiller does not have a separate DVM and Hydro Unit, but since it contains the corresponding unit, does it mean that you have an address for it?

→ Yes. Since the unit is composed of outdoor unit and indoor unit connected to it, it has address.

2. P4) Can I change the baud rate? The communication speed is 9600, and the preamble needs to send 100 bytes, but the data update speed seems to be a problem.

→ The communication speed can not be changed.

3. P6) What are the rules and purposes of the command's packet number (C0 14 XX) ?

→ A number used to identify the packet, used for debugging purposes.

EX) When sending the same packet repeatedly, the value of XX is incremented by 1 to distinguish it.

→ There is no logic to judge the order of messages using this internal logic.

→ However, 1:1 communication except a broadcast communication will return same packet number.

EX) Step 5 of the addressing process, response status of the corresponding address reflected in Step 6, packet number 3E of Command can be checked

Send : 32 00 27 6A EE FF 10 9F D9 C0 12 3E 05 20 04 03 04 18 00 10 9F D9 02 17 1D D1 04 17 00 10 00 00 04 19 00 10 00 00 FC 9A 34

Response : 32 00 27 10 00 00 6A EE FF C0 15 3E 05 20 04 04 04 18 00 10 9F D9 02 17 1D D1 04 17 00 10 00 00 04 19 00 10 00 00 64 65 34

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Q&A

※ Addressing

1. p12) If I send a broadcast only once to check the outdoor address of Step1, does Outdoor respond with time difference?

→ If you send a broadcast only once, all the outdoor units you receive will respond.

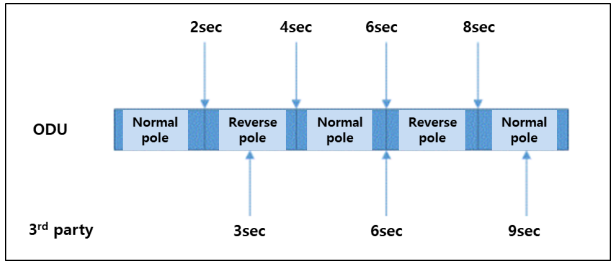
→ The outdoor unit performs the collision avoidance, and the outdoor unit that preempts the line first responds.

Therefore, the response sequence is random, and the response time is 10 ms to 25 ms after the response of one outdoor unit is completed and the next outdoor unit responds.

2. P12) About 10 transmissions with 3sec intervals, if the outdoor units I am interested in have responded by sending the first time, do not have to send the remaining 9 times?

→ R1/R2 is polarity because it is 485 communication. If the controller and the outdoor unit have the opposite polarity, they will not communicate. Therefore, the outdoor unit receives packets while changing the polarity every 2 seconds. Since it is not possible to confirm that all outdoor units have received all the transmissions (only the outdoor unit connected with the opposite polarity can not receive them), it is requested to transmit them every 3 seconds different from the polarity change period (2 seconds).

→ Therefore, please send 10 times with 3 sec intervals.



3. p13) How long does the outdoor unit respond? (When do I have to wait and go to step2)?

→ after 10 transmissions with 3sec intervals, proceed to step2.

4. p13) If two outdoor units are set to the same address, the outdoor unit will respond at the same time and the communication will be broken.

→ The outdoor unit responds with time difference because it avoids collision itself.

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Q&A

※ Addressing

5. p13) The response address of Step1 responds 00 10 FF and can not proceed anymore.

→ Since the 3rd party controller does not implement the address (Auto Addressing), the outdoor unit must be manually addressed.

→ Normally, it is set manually, but if you make an anomaly response, please contact the air conditioner installer in the field.

(Please refer to Appendix for DVM S setting method.)

→ If manual setting is not normal, respond as follows.

1) Abnormal response - No outdoor address manual address

Step1) 32 00 14 6A EE FF B0 FF FF C0 01 02 01 04 08 FF FF FF FF E8 69 34

Step2) 32 00 14 10 00 00 6A EE FF C0 05 02 01 04 08 00 10 FF 00 F7 C7 34

2) Normal response

Step2) 32 00 14 10 00 00 6A EE FF C0 05 AD 01 04 08 00 10 00 00 AB 13 34

32 00 14 10 01 00 6A EE FF C0 05 AD 01 04 08 00 10 01 00 36 DE 34

32 00 14 10 02 00 6A EE FF C0 05 AD 01 04 08 00 10 02 00 80 A8 34

32 00 14 10 03 00 6A EE FF C0 05 AD 01 04 08 00 10 03 00 1D 65 34

6. p14) In step3, 3seconds after packet transmission If step4 does not respond, the addressing of the outdoor unit is finished. Does it mean to go to the installation check step? Step3 is broadcast too, but the individual outdoor unit responds in 3 seconds. Does the whole unit respond in 3 seconds?

→ Yes. One outdoor unit responds within 100 ms. So, it responds within 3 seconds.

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Q&A

※ Addressing

7. P14) Do I have to address and check the installation periodically, even though the initial addressing and installation check are completed and communication with all devices is normal. Will addressing and installation check be possible only in abnormal situations?
→ Turn on the power. Perform addressing and installation check only once at the first time. When normal communication starts, you can send only Step3 packet every 61 seconds.
→ However, if a Step4 packet is received at any time, perform Step5 → Step6 as described in p15, and then send the Step3 packet again every 61 seconds.

8. p14) If there is a change in configuration, such as adding an outdoor unit during operation, should I address the individual outdoor unit or do I need to restart for the entire outdoor unit?
→ You can address each individual outdoor unit. So, If an outdoor unit is added during operation, the added outdoor unit will send a packet of 15 pages (Step 4). Therefore, you can start from Step3.

9. P17) If the installer manually sets the setting address, do I have to set the address?
→ Because the address is not an address for communication, it is necessary to write Setting Address in Origin Address.
→ Once written, the contents are stored in the EEPROM, so the process is not necessary until the addresses overlap or a new outdoor unit is added. In other words, Step 5 and Step 6 are performed only when there is a packet request like Step 4.

10. p17) When step6 is done, step3 is restarted again. How long do you repeat this process? Repeat until there is no 2004 01 within 3 seconds, then go to the installation check step?
→ If there is no response to Step3, proceed to the installation check step.

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Q&A

※ System Installation Check

1. P24) Please also provide information on the number of indoor units connected to outdoor unit.

→ It is described in P24. 00~3F, maximum 4 * 16 = 64 units can be connected.

20 xx yy : indoor unit

. xx : outdoor unit (00~0F) , yy : indoor unit/hydro/AHU/ERV+/DVM chiller/FCU (00~3F)

2. Do I have to do Step1, Step2 (communication state check) and Step3 (model information check)?

→ Step1, Step2 must proceed for understanding communication.

→ Step3 can be avoided if it is unnecessary to know the model.

(In other words, it is not always necessary to know the model with fixed indoor and outdoor units.)

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Q&A

※ Monitoring

1. P26) Is there any possibility of data loss due to collision between data because it is updated periodically and event occurs? Are all collision avoidance processed?

→ There is no chance of loss, and all collisions are avoided.

2. p26) When will in/outdoor unit be sent automatically/periodically? If I go through the installation check, do I send it from then?

→ When the data of message 20 10h of p22 becomes "outdoor unit ready", "indoor unit ready", it is sent periodically.

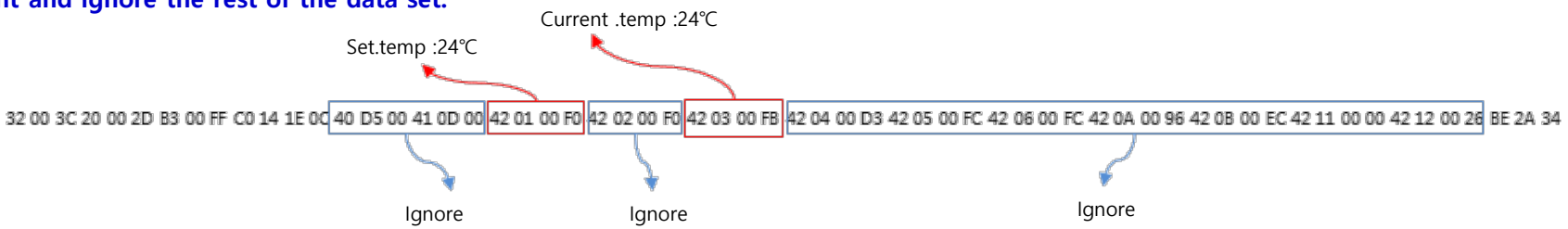
→ If the controller is ready before asking, it can be sent periodically at the end of the Addressing phase.

3. P26) How often send monitoring data to 3rd party controller?

→ It depends on by product, message set. Usually, monitoring data is sent 10sec, 40sec, 160sec periodically.

4. P26) When monitoring and control commands, is the number of data sets always fixed?

→ When an indoor unit transmits a packet, the dataset is larger than the one in the document. Therefore, only monitor what is in the document and ignore the rest of the data set.



5. P28) Monitoring(common data) is common to all Indoor, Hydro, and FCU? Is there any outdoor unit monitoring information?

→ Yes, common data is common. (However, there are restrictions on modes and functions depending on model and options.)

→ Outdoor monitoring information is not subject to open protocols.

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Q&A

※ Control

1. P38) I am still receiving monitoring information. When can I control? Do you have any special timing?

→ You can control it when you want to control

2. P38) If I only want to start when you want to control, is it necessary to add only the start command to the data set?

→ Yes. When sending the control command, send only the start command.

3. P38) While it is said that control is performed at the desired time during reception of monitoring information, since it is 485 communication, if the control command is sent during reception, data will be destroyed. How do I avoid collisions when I say that individual devices avoid collisions?

→ Internally, each device performs collision avoidance by CSMA / CDCA method.

→ The set device detects the collision and retransmits it later, so it is good to send it at the desired timing.

4. P38) The third party controller should also use the same collision avoidance method to avoid collisions.

→ In order to avoid collision, it is difficult to implement the circuit because the circuit and communication port for detecting the line are separately configured on the PBA and the occupation state of the line must be grasped. Therefore, the protocol is not opened by the corresponding method.

5. How do next step after throw away packet when there is no response even though 3 times trying?

→ After throw away packet, it can keep normal state. But, this part can be consisted by 3rd party logic.

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Q&A

※ Normal Question

1. Data is sent at regular intervals according to each step. Please inform about the timeout for communication and the number of retries in case of communication failure.

→ When controlling the set, the response timeout from the set is set to 1 second. If there is no response, send it twice. (3 times in total)

→ In case of other than control (3, 5, 10, 61 sec transmission data), timeout and retry count are considered.

. p12(Step1) : You can send 10 times at 3sec intervals, there is no timeout. All outdoor units can respond within 3 seconds.
And, in case of a failure, it was decided to send 10 times considering retry.

. p14(Step3) : If you do not receive the step3 packet within 3 seconds after the packet transmission, you should complete the addressing and enter the installation check phase.
After completing the addressing step and installation check step, please send Step3 packet every 61 seconds.

. p21(Step1) : You can send it every 10 seconds, there is no timeout. All outdoor units can respond within 10 seconds.
In all outdoor units, it is possible to transmit until both CL and SL are ready.

. p23(Step3) : You can send it every 5 seconds, there is no timeout. All indoor and outdoor equipment can respond within 5 seconds. If there is no response, send it twice. (3 times in total)

2. Preamble does not appear in packets sent from DVM and indoor unit like P22/24/28, do some packets not transmit preamble?

→ Both indoors / outdoors send a preamble every time a packet is sent, but not a UART waveform, but a signal made with GPIO to occupy the line. Therefore, we did not mark the document separately. Also, the third party controller does not receive the contents when communicating in CL (R1R2) layer.

→ The preamble sent by the 3rd controller is supposed to send 55 bytes to 100 bytes, which is the most similar UART waveform to the preamble signal.

3. Is there +- error range of periodic packet like 3sec, 61sec, 10sec, 5sec, 1sec?

→ We can't guide error range because it is very short (ms unit).

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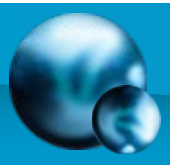

Finish

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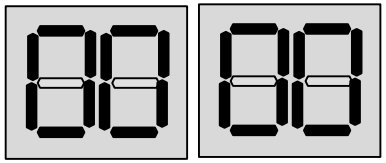
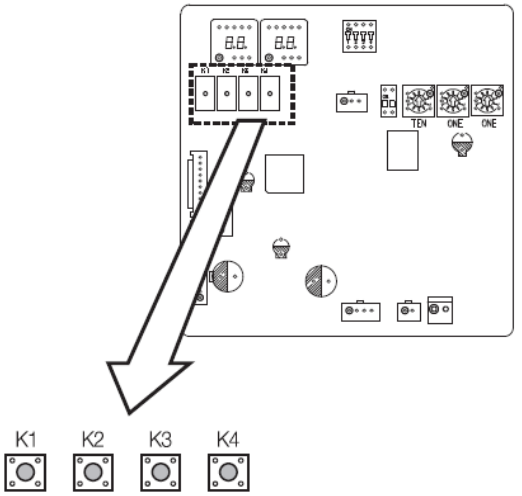
Appendix. Manual ODU Address Setting

※ How to set outdoor address manually using Tact switch (Please check manual, It's for DVM S)

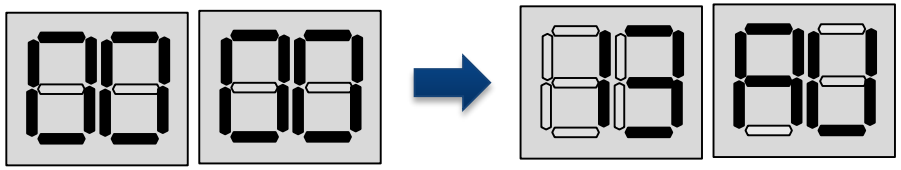
1) Press and hold K2 to enter. (Only available during operation stop)
- When entering, it is displayed as follows.



Seg1, Seg2 : Currently selected setting option.
Seg3, Seg4 : Currently selected setting value.

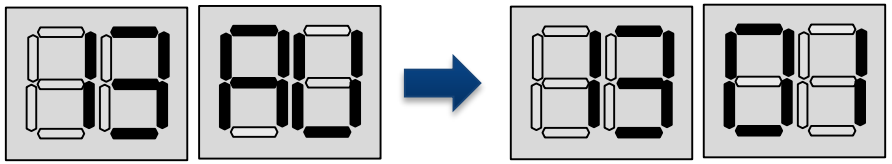


2) If you press the K1 switch, the value of Seg1 and Seg2 will be changed by 1,
Press it several times to select the 13 option item.



▶ Option 13
Auto ODU address setting status

3) 13 In the option item, if you press K2 switch, the values of Seg3 and Seg4 will change,
Select an address.
※ Value Description: AU (automatic setting, default value), 00-15 (outdoor setting 0-15 manual setting)



▶ Option 13
ODU unit address Manual 01 Setting status

4) After selecting the outdoor address manual address, press the K2 switch for 2 seconds, the whole 7-segment will blink and the option value will be saved.
● If the normal termination is not performed as described above, the option setting is not saved.

※ If you want to return to the setting value before, press and hold K1 to cancel the setting.
※ If you want to set the factory setting, press and hold K4 in the option setting mode.
- Press and hold the K4 switch to return all option settings to their factory settings, but not save the settings.
- Press and hold the K2 switch to enter the tracking mode for the 7-segment to save the setting.

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Appendix. Functions-1

Function	Indoor unit / FCU	Hydro unit(HE / HT)	EHS/TDM+	AHU	ERV / ERV+
On/Off	On/Off	On/Off Hot water On/Off	•On/Off •Hot water On/Off	On/Off	<ERV> Ventilation On/Off <ERV+> Operation On/Off Ventilation On/Off
Operation Mode	Auto, Cooling, Heating, Dry, Fan ※ Auto, Dry mode are not available in FCU.	<HE> Cooling, Heating <HT> Heating <Hot Water> Economic, Standard, Power	Water Law, Cooling, Heating <Hot Water> Economic, Standard, Power, Force	Auto, Cooling, Heating, Dry, Fan	<ERV> • Ventilation : Bypass, Auto, HeatEx <ERV+> • Operation mode : Auto, Cooling, Heating • Ventilation : Bypass, Auto, HeatEx
Air flow	Auto, Low, Mid, High	No function	No function	No function	<ERV/ERV+> • Ventilation : Mid, High, Turbo, Auto ※ Auto is available only when CO2 sensor use
Air Swing	Up/Down, Left/Right	No function	No function	No function	No function
Filter Alarm/Reset	Available	No function	No function	No function	Available
Current Temperature	•Room Temp. •Set Temp. •Discharge current Temp.	•Water In Temp. •Water Out Temp. •Water Out Set Temp. •Hot water Set Temp. •Hot water Current. Temp •Room Temp. •Set Temp.	•Water In Temp. •Water Out Temp. •Water Out Set Temp. •Hot water Set Temp. •Hot water Current Temp •Room Temp. •Set Temp.	•Room Temp. •Set Temp. •Discharge current Temp.	No function
Set Temperature	•Cool:18~30℃ •Heat:16~30℃ •Discharge Temp. in Cooling (8~18℃) •Discharge Temp. in Heating (30~43℃)	•Water Out Set Temp. <HE> (Cool:5~25℃, Heat:15~50℃) <HT> (Heat:25~80℃) •Hot Water Set Temp. <HE> (30~75℃) <HT> (35~75℃) •Cool: 18~30℃ •Heat: 16~30℃	•Water Out Set Temp. (Cool: 5~25℃) (Heat: 15~55℃) •Hot Water Set Temp. (30~70℃) •Cool: 18~30℃ •Heat: 16~30℃	•Cool: 18~30℃ •Heat: 16~30℃ •Discharge Temp. in Cooling (8~25℃) •Discharge Temp. in Heating (18~43℃)	No function
Buzzer sound	On/Off	No function	No function	No function	No function
Error Code check	Available	Available	Available	Available	Available
Wired/wireless control restriction	Available	Available	Available	Available	Available

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Appendix. Functions-2

Function	DVM Chiller
On/Off	•On/Off
Operation Mode	Cooling, Heating Cool storage, Heat Storage
Current Temperature	•Water Out average Temp. •Water Out Set Temp. •Room Temp. •Set Temp.
Set Temperature	•Water Out Set Temp. (Low Temp. model : Cool:-10~25℃ / Others : Cool: 5~25℃) (Heat:25~55℃) •Cool: 18~30℃ •Heat: 16~30℃
Filter Alarm/Reset	No function
Air flow	No function
Air Swing	No function
Buzzer sound	No function
Error Code check	Available (Includes slave chiller in error)
Wired/wireless control restriction	Available

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Appendix. Functions-1

Function	Indoor unit / FCU	Hydro unit (HE/ HT)	EHS/TDM+	AHU	ERV / ERV+
On/Off	On/Off	On/Off Hot water On/Off	•On/Off •Hot water On/Off	On/Off	<ERV> Ventilation On/Off <ERV+> Operation On/Off Ventilation On/Off
Operation Mode	Auto, Cooling, Heating, Dry, Fan ※ Auto, Dry mode are not available in FCU.	<HE> Cooling, Heating <HT> Heating <Hot Water> Economic, Standard, Power	Water Law, Cooling, Heating <Hot Water> Economic, Standard, Power, Force	Auto, Cooling, Heating, Dry, Fan	<ERV> • Ventilation : Bypass, Auto, HeatEx, Sleep <ERV+> • Operation mode : Auto, Cooling, Heating • Ventilation : Bypass, Auto, HeatEx, Sleep
Air flow	Auto, Low, Mid, High	No function	No function	No function	<ERV/ERV+> • Ventilation : Low, High, Turbo
Air Swing	Up/Down, Left/Right	No function	No function	No function	No function
Filter Alarm/Reset	Available	No function	No function	Available	Available
Current Temperature	•Room Temp. •Set Temp. •Discharge current Temp.	•Water In Temp. •Water Out Temp. •Water Out Set Temp. •Hot water Set Temp. •Hot water Current. Temp	•Water In Temp. •Water Out Temp. •Water Out Set Temp. •Hot water Set Temp. •Hot water Current Temp •Room Temp. •Set Temp.	•Room Temp. •Set Temp. •Discharge current Temp.	No function
Set Temperature	•Cool:18~30℃ •Heat:16~30℃ •Discharge Temp. in Cooling (8~18℃) •Discharge Temp. in Heating (30~43℃)	•Water Out Set Temp. <HE> (Cool:5~25℃, Heat:15~50℃) <HT> (Heat:25~80℃) •Hot Water Set Temp. <HE> 30~75℃ <HT> 35~75℃	•Water Out Set Temp. (Cool:5~25℃) (Heat:15~55℃) •Hot Water Set Temp. (30~70℃) •Cool:18~30℃ •Heat:16~30℃	•Cool:18~30℃ •Heat:16~30℃ •Discharge Temp. in Cooling (8~25℃) •Discharge Temp. in Heating (18~43℃)	No function
Buzzer sound	On/Off	No function	No function	No function	No function
Error Code check	Available	Available	Available	Available	Available
Wired/wireless control restriction	Available	No function	No function	Available	Available

Appendix. Functions-2

Function	DVM Chiller
On/Off	•On/Off
Operation Mode	Cooling, Heating Cool storage, Heat Storage
Current Temperature	•Water Out average Temp. •Water Out Set Temp. •Room Temp. •Set Temp.
Set Temperature	•Water Out Set Temp. (Low Temp. model : Cool:-10~25℃ / Others : Cool: 5~25℃) (Heat:25~55℃) •Cool:18~30℃ •Heat:16~30℃
Filter Alarm/Reset	No function
Air flow	No function
Air Swing	No function
Buzzer sound	No function
Error Code check	Available (Includes slave chiller in error)
Wired/wireless control restriction	No function

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