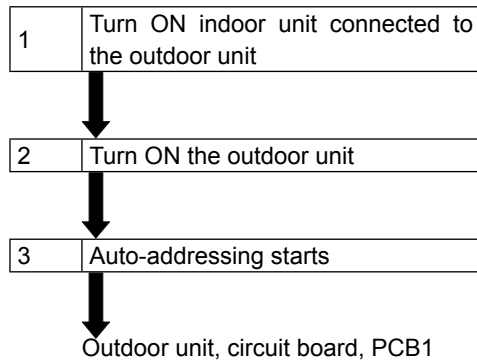


8.3.3 Troubleshooting using the 7 segment display

◆ Simple checking by 7-segment display

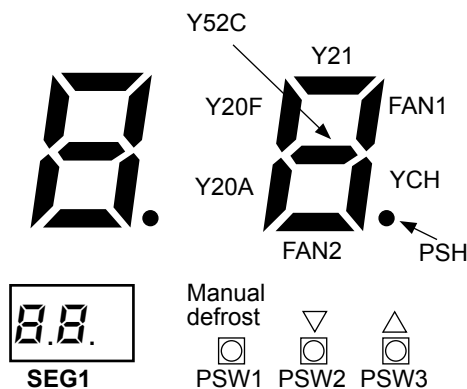


During auto-addressing, the following items can be checked using the outdoor unit's on-board 7-segment LED display:

- 1 Disconnection of power supply to the indoor unit.
- 2 Reverse connection of the operating line between the outdoor and indoor units.
- 3 Duplication of indoor unit number.

◆ Checking method by 7-segment display

Operating conditions and each part of refrigeration cycle can be checked by 7-segment and push switches (PSW) on the PCB in the outdoor unit. During checking data, do not touch the electric parts except for the indicated switches because 220-240V is applied to them. Pay attention not to contact the tools with electrical parts. If contacted, electrical parts will be damaged.



- To start checking, press PSW2 switch for more than three seconds.
- To proceed checking, press the PSW2 switch.
- To back to the previous item, press the PSW3 switch.
- To cancel this checking, press the PSW2 switch for more than 3 seconds.

◆ Check mode items

RAS-(2-2.5)HVNP / RAS-3HVNP

Item	Item		Indication data	
	Check No.	In-dic.	In-dic.	Contents
Input/output state of outdoor micro-computer	01	SC	3	Indicates only for the segments corresponding to the equipment in the figure. (See figure above)
Capacity of operating indoor unit	02	oP	11	00~199 In case that capacity is higher than 100, the last two digits flash
Inverter order frequency to compressor	03	H1	74	0~115 (Hz) In case that frequency is higher than 100Hz, the last two digits flicker
Indoor order frequency to compressor	04	H2	74	0~115 (Hz) In case that frequency is higher than 100Hz, last two digits flicker
Air flow ratio	05	Fo	80	00~100 (%) In case that air flow ratio is 100%, "00" flashes
Outdoor unit expansion valve opening	06	EO	30	00~100 (%) In case that expansion valve opening is 100%, "00" flashes
Temperature at the top of compressor	07	Td	02	00~142 (°C) In case that temperature is higher than 100°C, the last two digits flash
Evaporating temperature at heating	08	TE	-12	-19~80°C
Ambient air temperature	09	To	-3	-19~80°C
Control PCB information	10	TF	20	Internal information of the PCB
Control PCB information	11	A1	12	Internal information of the PCB
Inverter secondary current	12	A2	20	00~199 (A) In case that current is higher than 100°C, the last two digits flash
Outdoor unit address	13	nA	00	00~63
Indoor unit expansion valve opening	14	EA	20	00~100 (%) In case that opening is 100%. "00" flashes
Liquid pipe temperature of indoor unit (freeze protection)	15	LA	05	-19~127 (°C)
Indoor unit intake air temperature	16	IA	28	-19~127 (°C)
Indoor unit discharge air temperature	17	oA	20	-19~127 (°C)
Cause of indoor unit stoppage	18	dA	05	(See table at the next page)
Accumulated Operating Time of Compressor	19	UU	00	0 to 9,999 (x 10 hours) Alternately upper 2 digits and lower 2 digits are indicated every 0.5 sec.
Accumulated Operating Time of Compressor	20	LU	00	0 to 9,999 (x 10 hours) Alternately upper 2 digits and lower 2 digits are indicated every 0.5 sec.
Alarm code for abnormal stoppage of compressor	21	AC	08	Alarm code on compressor
Cause of stoppage at inverter	22	iF	1	(See table at the next page)
Abnormal data record	23	n1	00	One of the abnormal data record from latest (n1) to oldest (n9) is indicated. Alarm code or cause code is indicated.
Total capacity of indoor unit connected	24	CP	22	00~96 In case that capacity is higher than 100, the last two digits flash
Connected indoor unit number	25	AA	2	00~64
Refrigerant adress	26	CA	0	00~63

RAS-(3-12)H(V)NP(E)

Item	Item		Indication data	
	Check No.	In-dic.	In-dic.	Contents
Input/output state of outdoor micro-computer	01	SC	3	Indicates only for the segments corresponding to the equipment in the figure. (See figure above)
Capacity of operating indoor unit	02	oP	11	00~199 In case that capacity is higher than 100, the last two digits flash
Control software No.	03	SP	11	Control Software No. in use is indicated. Alternately upper 2 digits and lower 2 digits are indicated every 0.5 sec.
Inverter software No.	04	iP	11	Control Software No. in use is indicated. Alternately upper 2 digits and lower 2 digits are indicated every 0.5 sec.
Inverter order frequency to compressor	05	H1	74	0~115 (Hz) In case that frequency is higher than 100Hz, the last two digits flicker
Air flow ratio	06	Fo	80	00~15
Outdoor unit expansion valve opening	07	EO	30	00~100 (%) In case that expansion valve opening is 100%, "00" flashes
Discharge pressure (high)	08	Pd	30	0.1 to 4.9 MPa
Temperature at the top of compressor	09	Td	02	00~142 (°C) In case that temperature is higher than 100°C, the last two digits flash
Evaporating temperature at heating	10	TE	42	-19~80°C
Ambient air temperature	11	To	-3	-19~80°C
Inverter fin temperature	12	TF	20	-10~100 (°C) In case that temperature is 100%, "00" flashes
Inverter firstly current	13	A1	12	00~199 (A) In case that current is higher than 100°C, the last two digits flash
Inverter secondary current	14	A2	20	00~199 (A) In case that current is higher than 100°C, the last two digits flash
Outdoor unit address	15	nA	00	00~63
Indoor unit expansion valve opening	16	EA	20	00~100 (%) In case that opening is 100%, "00" flashes
Liquid pipe temperature of indoor unit (freeze protection)	17	LA	05	-19~127 (°C)
Indoor unit intake air temperature	18	iA	28	-19~127 (°C)
Indoor unit discharge air temperature	19	oA	20	-19~127 (°C)
Cause of indoor unit stoppage	20	dA	05	(See table at the next page)
Accumulated Operating Time of Compressor	21	UU	00	0 to 9,999 (x 10 hours) Alternately upper 2 digits and lower 2 digits are indicated every 0.5 sec.
Accumulated Operating Time of Compressor	22	cU	00	0 to 9,999 (x 10 hours) Alternately upper 2 digits and lower 2 digits are indicated every 0.5 sec.
Alarm code for abnormal stoppage of compressor	23	AC	08	Alarm code on compressor
Cause of stoppage at inverter	24	iF	1	(See table at the next page)
Abnormal data record	25	n1	00	One of the abnormal data record from latest (n1) to oldest (n9) is indicated. Alarm code or cause code is indicated.
Total capacity of indoor unit connected	26	CP	22	00~199 In case that capacity is higher than 100, the last two digits flash
Connected indoor unit number	27	AA	2	00~64
Refrigerant adress	28	GA	0	00~63

RAS-(4-12)H(V)NC(E)

Item	Item		Indication data	
	Check No.	In-dic.	In-dic.	Contents
Input/output state of outdoor micro-computer	01	SC	3	Indicates only for the segments corresponding to the equipment in the figure. (See figure above)
Capacity of operating indoor unit	02	oP	11	00~199 In case that capacity is higher than 100, the last two digits flash
Control software No.	03	SP	11	Control Software No. in use is indicated. Alternately upper 2 digits and lower 2 digits are indicated every 0.5 sec.
Inverter software No.	04	iP	11	Control Software No. in use is indicated. Alternately upper 2 digits and lower 2 digits are indicated every 0.5 sec.
Inverter order frequency to compressor	05	H1	74	0~115 (Hz) In case that frequency is higher than 100Hz, the last two digits flicker
Air flow ratio	06	Fo	80	00~15
Outdoor unit expansion valve opening	07	EO	30	00~100 (%) In case that expansion valve opening is 100%, "00" flashes
Temperature at the top of compressor	08	Td	02	00~142 (°C) In case that temperature is higher than 100°C, the last two digits flash
Evaporating temperature at heating	09	TE	12	-19~80°C
Ambient air temperature	10	To	-3	-19~80°C
Condensing temperature	11	TC	10	-19~80°C
Inverter fin temperature	12	TF	20	-10~100 (°C) In case that temperature is 100%, "00" flashes
Inverter firstly current	13	A1	12	00~199 (A) In case that current is higher than 100°C, the last two digits flash
Inverter secondary current	14	A2	20	00~199 (A) In case that current is higher than 100°C, the last two digits flash
Outdoor unit address	15	nA	00	00~63
Indoor unit expansion valve opening	16	EA	20	00~100 (%) In case that opening is 100%, "00" flashes
Liquid pipe temperature of indoor unit (freeze protection)	17	LA	05	-19~127 (°C)
Indoor unit intake air temperature	18	iA	28	-19~127 (°C)
Indoor unit discharge air temperature	19	oA	20	-19~127 (°C)
Cause of indoor unit stoppage	20	dA	05	(See table at the next page)
Accumulated Operating Time of Compressor	21	UJ	00	0 to 9,999 (x 10 hours) Alternately upper 2 digits and lower 2 digits are indicated every 0.5 sec.
Accumulated Operating Time of Compressor	22	cU	00	0 to 9,999 (x 10 hours) Alternately upper 2 digits and lower 2 digits are indicated every 0.5 sec.
Alarm code for abnormal stoppage of compressor	23	AC	08	Alarm code on compressor
Cause of stoppage at inverter	24	iF	1	(See table at the next page)
Abnormal data record	25	n1	00	One of the abnormal data record from latest (n1) to oldest (n9) is indicated. Alarm code or cause code is indicated.
Total capacity of indoor unit connected	26	CP	22	00~199 In case that capacity is higher than 100, the last two digits flash
Connected indoor unit number	27	AA	2	00~64
Refrigerant adress	28	GA	0	00~63

In case of twin/triple/quad-type unit, the information of 2nd to the 4th indoor units is indicated repeatedly.

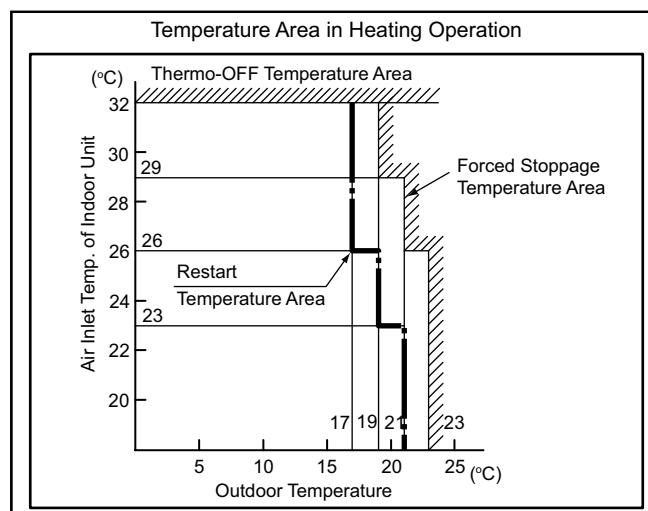
The right character of the indication represents the indoor unit setting No.

Single: A
Twin: A, b
Triple: A, b, c
Quad: A, b, c, d

◆ Cause of indoor unit stoppage (dR)

Indication	Contents
00	Operation OFF, Power OFF
01	Thermo-OFF
02	Alarm
03	Freeze protection overheating protection
05	Instantaneous power failure at outdoor unit
06	Instantaneous power failure at indoor unit
07	Stoppage of heating operation due to high outdoor air temperature
10	Demand thermo OFF
13	Retry for Pd increase prevention
15	Vacuum/discharge gas temperature increase retry
16	Retry due to discharge gas SUPERHEAT decrease
17	IPM error retry, instantaneous over current of inverter retry, electronic thermal activation of inverter retry, abnormal current sensor of inverter retry
18	Retry due to inverter voltage decrease Retry due to inverter Overvoltage Retry due to inverter transmission abnormality
19	Other retry
21	Forced Thermo-OFF
22	Outdoor hot start control
24	Thermo-OFF during energy saving operation mode
26	Retry due to high pressure decrease
28	Cooling air discharge temperature decrease
33	Forced Thermo-OFF
34	Forced Thermo-OFF
35	Retry due to abnormal operating mode (Reversing valve switching failure)

i Demand thermo OFF:



NOTE

- The cause code for indoor unit stoppage is not always "02" (Alarm) during stoppage by the abnormality. If the unit is under Thermo-OFF by other cause of stoppage before "02" (Alarm) occurs, the previous cause code for indoor unit stoppage remains.
- When the transmitting between the inverter PCB and the outdoor unit PCB1 is disconnected for 30 seconds, the outdoor micro-computer will be reset. Accordingly when the alarm code "04" (Abnormal Transmitting between Inverter PCB and Outdoor Unit PCB1) occurs, the cause code for indoor unit stoppage may be indicated "05".
- When the transmitting between the indoor unit and the outdoor unit is disconnected for 3 minutes, the indoor micro-computer will be reset. Accordingly when the alarm code "03" (Abnormal Transmitting between Indoor Unit and Outdoor Unit) occurs, the cause code for indoor unit stoppage may be indicated "06".
- For twin, triple and quad combination, if the cause code for indoor unit stoppage "01" is indicated, check the cause of stoppage for other indoor units.
- Cause code for indoor unit stoppage "02" is indicated when it is forced thermo-OFF during compressor pre-heating for RAS-12HN(P/C) models.

Cancellation of Forced Thermo OFF (21)

Turn ON the power source and wait for more than 30 seconds. Then press PSW1 and PSW3 simultaneously for more than 3 seconds.

Forced thermo-OFF (indoor unit error code 21) will be cancelled.

However, this function may damage the compressor, use only on inevitable occasion.

- In case of using the remote control switch (PC-ART), the cancellation is also available with it.
- When "Operation Lock" indication flashes on the remote control LCD, press FAN SPEED and LOUVER switches simultaneously for more than 3 seconds.
- "Operation Lock" Indication is disappeared and operation is available.

◆ Cause of inverter stoppage (24)

Code	Cause	Cause of Stoppage for Corresponding Unit	Remark	
			Indication during Retry	Alarm Code
1	Automatic Stoppage of Transistor Module (DIP-IPM Error) (Overcurrent, Undercurrent, Temperature increase)	17	P7	53
2	Instantaneous Over Current	17	P7	48
3	Abnormal Inverter Fin Thermistor	17	P7	54
4	Electronic Thermal Activation (Inverter overcurrent)	17	P7	48
5	Inverter Voltage Decrease (Undervoltage)	18	P8	06
6	Over Voltage	18	P8	06
7	Abnormal Inverter Transmission	18	-	-
8	Abnormal Current Detection	17	P7	51
9	Instantaneous Power Failure Detection	18	-	-
11	Reset of Micro-Computer for Inverter	18	-	-
12	Earth Fault Detection from Compressor (Only Starting)	17	P7	53
13	Phase detection abnormality	18	P8	-
14	Inverter Non-Operation	18	-	55
15	Inverter Non-Operation	18	-	55
16	Inverter Non-Operation	18	-	55
17	Communication Abnormality	18	-	55
18	Protection Device Activation (PSH)	-	-	02
19	Protection Detection Device Abnormality	-	-	38
20	Early Return Protection Device	18	P7	53
21	Step-Out Detection	17	-	31

8

◆ Table of capacity codes of indoor unit

Code	Equivalent horsepower	Code	Equivalent horsepower	Code	Equivalent horsepower
06	0.8	14	2.0	40	5.0
08	1.0	16	2.3	48	6.0
10	1.3	18	2.5	64	8.0
11	1.5	22	3.0	80	10.0
13	1.8	32	4.0		

◆ Protection control code on 7-segment display

- 1 Protection control code is displayed on 7-segment when a protection control is activated.
- 2 Protection control code is displayed while function is working, and goes out when released.
- 3 When several protection control are activated, code number with higher priority will be indicated (see below for the priority order).
 - a. Higher priority is given to protection control related to frequency control than the other. Priority order:
 - ◆ High-pressure increase protection
 - ◆ Over current protection
 - ◆ Cold draft protection
 - b. In relation to retry control, the latest retrial will be indicated unless a protection control related to frequency control is indicated.

RAS-(2-2.5)HVNP / RAS-3HVNC

Priority	Protection control	Code
1	Low-Pressure Ratio Control at Cooling Operation	P00
2	High-pressure ratio control at heating operation	P01
3	High-pressure rise protection	P02
4	Current protection	P03
5	Inverter fin temperature rise prevention	P04
6	Discharge gas temperature rise protection	P05
7	Unbalance Power Source Detecting	P09
8	Demand current control	P0A
9	Low-Pressure Decrease Protection	P0b

RAS-(3-12)H(V)N(P/C)(E)

Priority	Protection control	Code
1	Pressure ratio control	P01
2	High-pressure rise protection	P02
3	Current protection	P03
4	Inverter fin temperature rise prevention	P04
5	Discharge gas temperature rise protection	P05
6	Demand current control (running current limit control)	P0A
7	High pressure decrease protection (only Premium series)	P09



NOTE

The protection control code being indicated on 7-segment display is changed to an alarm code when the abnormal operation occurs. Also, the same alarm code is indicated on the remote control switch.

◆ Activating condition of protection control code

To monitor the conditions such as the temperature change and others, the control of the frequency and other controls are performed by the protection control in order to prevent the abnormal operations. The activating conditions of protection control are shown in the table below:

RAS-(2-2.5)HVNP / RAS-3HVNC

Code	Protection Control	Activating Condition	Remarks
<i>P0</i>	Low-Pressure Ratio Control at Cooling Operation	If Compression Ratio ϵ exceeds a threshold value => Frequency Increase	—
<i>P1</i>	High-Pressure Ratio Control at Heating Operation	If Compression Ratio ϵ is lower than a threshold value => Frequency Decrease	—
<i>P2</i>	High-Pressure Increase Protection	High Pressure Switch for Control is activated => Frequency Decrease	—
<i>P3</i>	Over Current Protection	Inverter Output Current > (*1)A => Frequency Decrease	—
<i>P4</i>	Inverter Temperature Increase Protection	Inverter Fin Temperature RAS-(2-2.5)HVNP / RAS-3HVNC $\geq 70\text{ }^{\circ}\text{C}$ => Frequency Decrease	—
<i>P5</i>	Discharge Gas Temperature Increase Protection	Temperature at the top of compressor is high => Frequency Decrease	—
<i>P9</i>	Unbalance Power Source Detecting	Inverter Output Current exceeds a threshold value => Frequency Decrease	—
<i>PR</i>	Current Demand Control	Inverter Output Current exceeds a threshold value => Frequency Decrease	In case of Demand Control Setting
<i>Pb</i>	Low-Pressure Decrease Protection	Low Pressure Switch for Control is activated. => Frequency Decrease	—

(1*)

Connection	220-240V		
HP	2	2.5	3
Current (A)	8.0	8.0	10.5

RAS-(3-12)H(V)N(P/C)(E)

Code	Protection control	Activating condition	Remarks
P01	Pressure ratio control	Compression ratio $\varepsilon \geq 7.5 \Rightarrow$ frequency decrease Compression ratio $\varepsilon \leq 1.6 \Rightarrow$ frequency increase	$\varepsilon = (Pd+0.1)/(Ps+0.1)$
P02	High-pressure increase protection	High Pressure Switch for Control is activated \Rightarrow Frequency Decrease	
P03	Inverter current protection	If Inverter PCB secondary current $> (*1)A$ \Rightarrow frequency decrease	
P04	Inverter fin temperature increase prevention	Inverter fin temperature RAS-3HVNPE / RAS-(4-6)HN(P/C)E $\geq 70^\circ\text{C}$ RAS-(4-6)HVNPE $\geq 80^\circ\text{C}$ RAS-(4-6)HVNCE $\geq 87^\circ\text{C}$ RAS-(8-12)HN(P/C)(E) $\geq 82^\circ\text{C}$ \Rightarrow frequency decrease	
P05	Discharge gas temperature increase protection	Temperature at the top of compressor is high \Rightarrow frequency decrease (Maximum temperature is different depending on the frequency) Temperature at the top of compressor $> 107^\circ\text{C}$ \Rightarrow Indicate P5	
P09	High-pressure decrease protection	Discharge pressure of compressor decrease under 10MPa \Rightarrow Frequency increase	Cooling operation and lowest step fan or heating operation
P0A	Demand current control (running current limit control)	Compressor run current \geq demand setting value \Rightarrow frequency decrease	Demand setting value: upper limit of total running current is set to 100%, 80%, 70%, 60% at normal operation using input on PCB1

Ps: Suction pressure of compressor (MPa)

Pd: Discharge pressure of compressor (MPa)

(1*)

Connection	380-415V						220-240V			
HP	4	5	6	8	10	12	3	4	5	6
Current (A)	12.0	12.0	12.0	17.5	19.0	20.0	16.0	16.0	24.0	24.0


NOTE

- **During protection control (except during alarm stoppage), the protection control code is indicated.**
- **The protection control code is indicated during protection control and turns off when cancelling the protection control.**
- **After retry control, the condition of monitoring is continued for 30 minutes.**