

Failure diagnosis tool for ZEAS_A type
Digital Pressure Gauge Kit
BHGP26A1(E)(H)

Connected model

ZEAS (A type)

LRLEQ5AY1(E), LRLEQ6AY1(E), LRLEQ8AY1(E), LRLEQ10AY1(E),
LRLEQ12AY1(E), LRLEQ15AY1(E), LRLEQ20AY1(E)
LRMEQ5AY1(E), LRMEQ6AY1(E), LRMEQ8AY1(E), LRMEQ10AY1(E),
LRMEQ12AY1(E), LRMEQ15AY1(E), LRMEQ20AY1(E)

Contents

1. Preparation before Connection of Digital Pressure Gauge Kit.....	2
2. Overview of Product	2
3. Connection Drawing	4
4. Display Item and Method of Operation	7
4.1 Normal	7
4.2 Abnormal.....	7
4.3 Manual Operation Display 1.....	8
4.4 Manual Operation Display 2.....	13
5. Service Diagnosis	15
6. The Entire Flow	16

1. Preparation before Connection of Digital Pressure Gauge Kit

When the Digital Pressure Gauge Kit is connected to the outdoor unit, please confirm the software version of control PCB of ZEAS and you need to change the software if necessary.

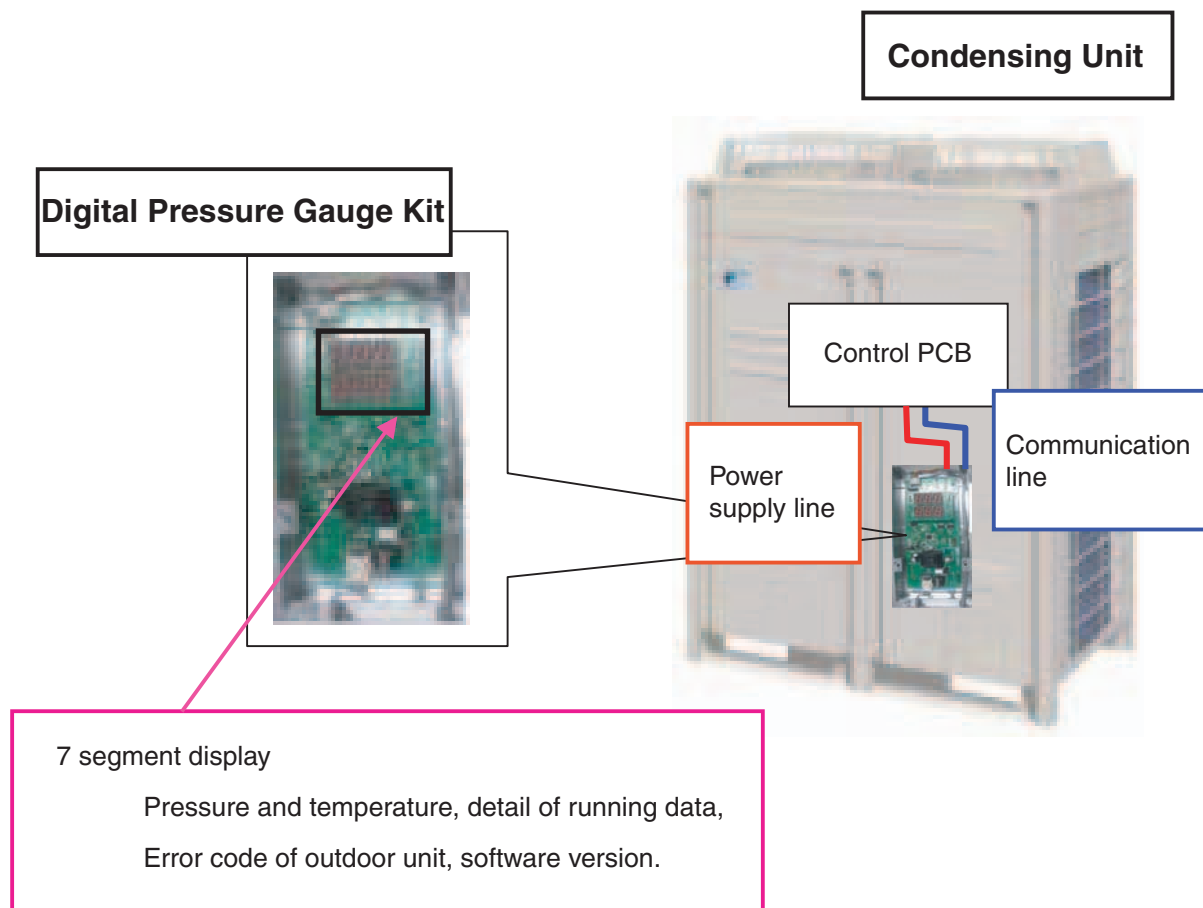
* Please refer to the manual of software writing delivered.

■ Check the Software of Condensing Unit

- Condensing unit: If ver. 91 or earlier, please update the software ver. 93 or later.
- Condensing unit: ver. 93 and later...You do not need to change the software.

2. Overview of Product

■ Communicated image

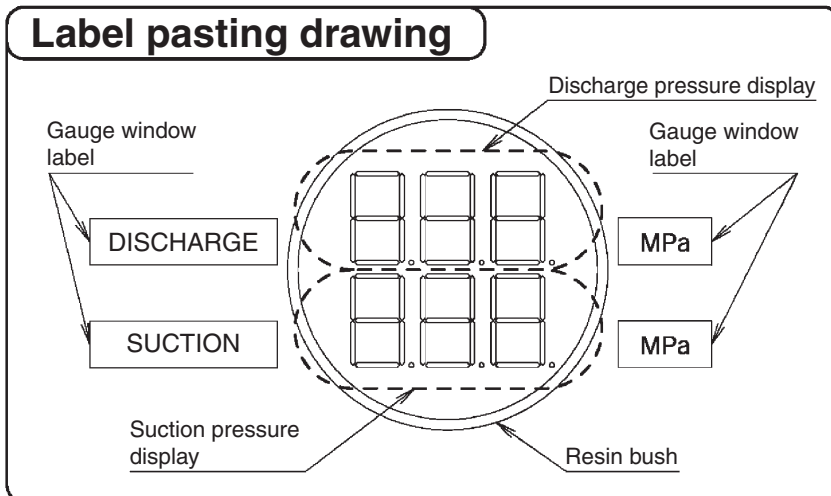
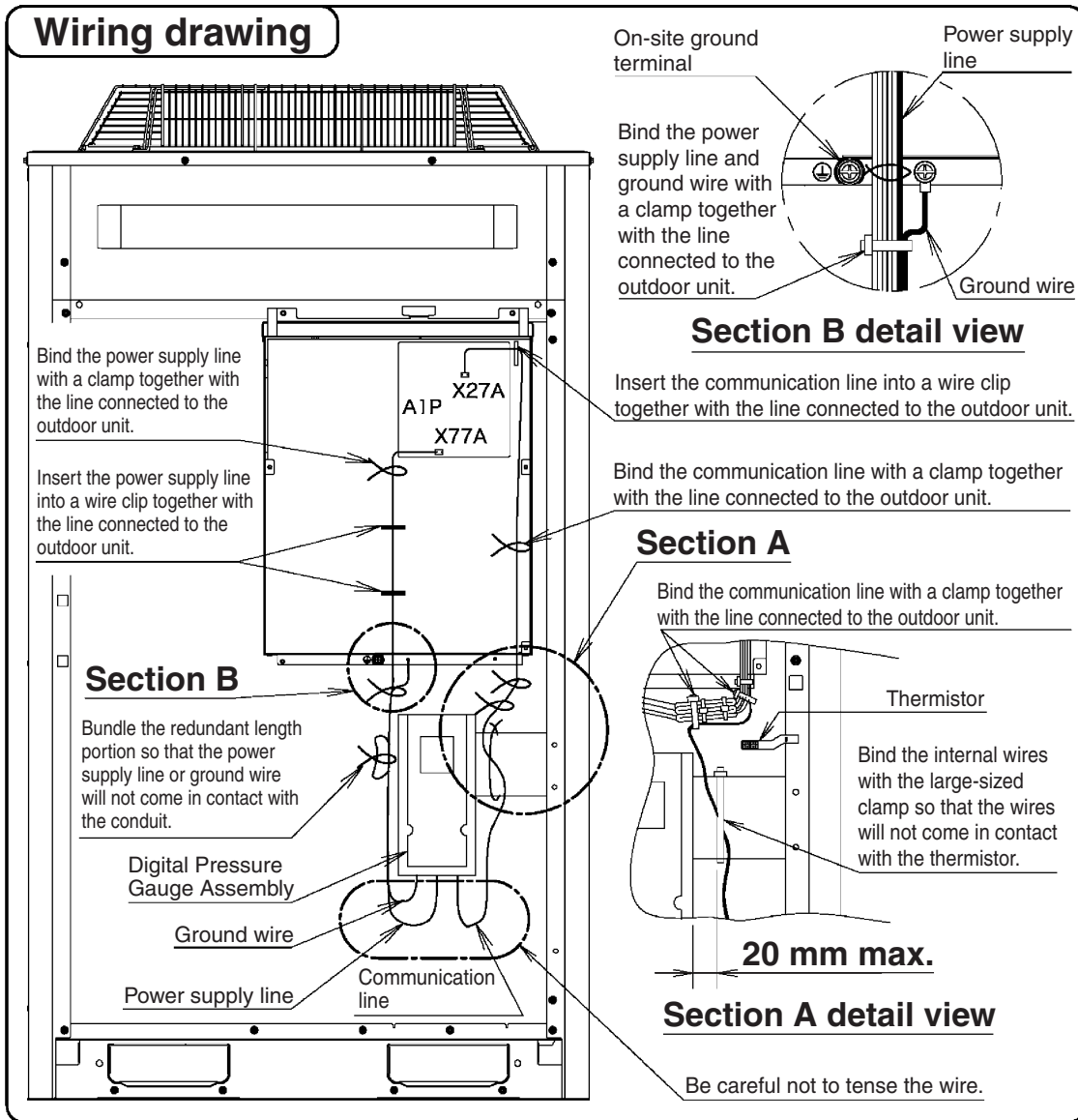


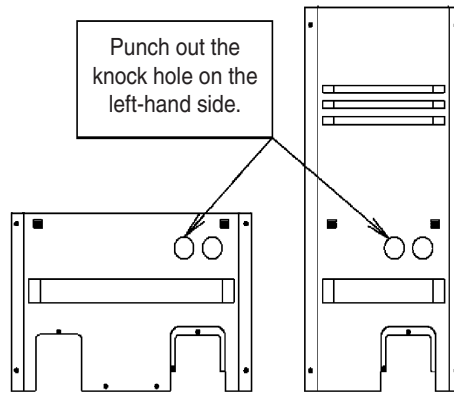
* Power supply line and communication line are included with BHGP26A1.

■ **Specification of Digital Pressure Gauge Kit**

Outdoor Temp. range		-20°C~65°C
Power supply		AC200-240V (+10%, -15%) 50/60Hz
Dimensions	Height (mm)	268
	Width (mm)	286
	Depth (mm)	47.5
Casing	Pressure gauge box main body	Hot-dip zinc-coated steel sheets
	Pressure gauge (cover)	Metacrylate resin
Mass		1.8kg
Location		Inside casing of outdoor unit

3. Connection Drawing





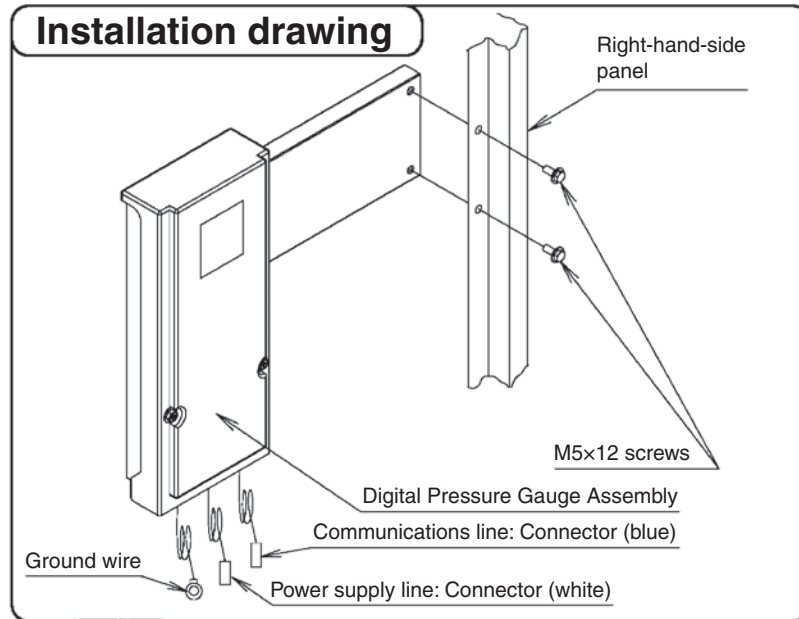
Knock hole on the front panel

■ Connection drawing

1. Turn the outdoor unit power OFF.
2. Remove the front panel. (If the model has two front panels (i.e., one each on the left-hand side and right-hand side), remove the panel on the right-hand side only.)
3. Remove the lid of the electrical box.
4. Refer to the [Installation drawing](#) and mount the Digital Pressure Gauge Assembly to the panel on the right-hand side.
[Parts used: Digital Pressure Gauge Assembly: 1, M5×12 screw: 2]
5. Secure the ground wire to the electrical box with a screw.
Refer to section B (detail view) in the [Wiring drawing](#) for the screwing position.
[Parts used: M4×12 screw: 1]
6. Connect the power supply line and communication line of the Digital Pressure Gauge Assembly to the control PCB (A1P) in the electrical box.
 - Power supply line: Connector (white) • X77A
 - Communication line: Connector (blue) • X27A
 At that time, wire the communication line behind the Digital Pressure Gauge Assembly. (Refer to section A (detail view) in the [Wiring drawing](#).)
7. After connecting the power supply line, communication line, and ground wire, secure the wiring path according to the [Wiring drawing](#).
[Parts used: Clamps: small 6, large 1]
8. Mount the lid of the electrical box.
9. Punch out the knock hole with a diameter of 70 mm on the front panel. (Refer to the mounting dimensions on the upper right-hand side.)
10. Attach the resin bush to the knock hole on the front panel. [Parts used: Resin bush: 1]
11. Mount the front panel.
12. On completion of installation, turn the outdoor unit power ON and make sure that pressures are displayed normally.
When figures appear in the discharge pressure display and suction pressure indicate, the product is working normally.
(Pressure is indicated in the operation switch "OFF or ON" of outdoor unit.)
Abnormal upper section: Error code, Abnormal lower section: LP
Abnormal display case: Please refer to the service diagnosis P.15

■ **Attention in the display.**

Digital Pressure Gauge Kit and RAM-monitor can not be used at the same time for communication line is connected to X27A of control PCB of outdoor unit.



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4. Display Item and Method of Operation

■ Display item

There are four major display items as follows:

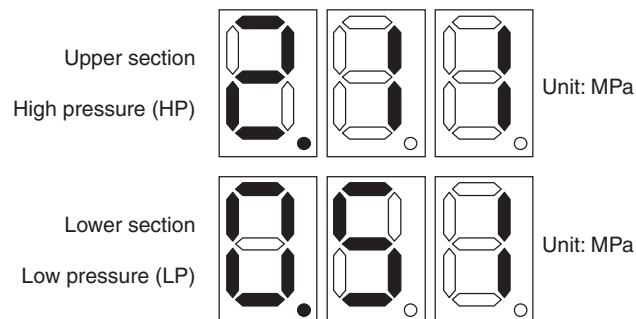
- 4.1: Normal; Displays high pressure and low pressure in MPa
- 4.2: Abnormal; Error code is blinking, which should be seven-segment blinking display for attention seeking.
- 4.3: Manual Operation Display 1; Check the individual operation data. (compressor operation frequency, target evaporation temperature, etc.)
- 4.4: Manual Operation Display 2; Check error history for the preceding 3 times.

4.1 Normal

High pressure is displayed in the upper section, and low pressure is displayed in the lower section with lighting display for both.

Display examples are shown below:

●Display example Lighting LED : Upper section and lower section



4.2 Abnormal

If error occurs, error code blinks in the upper section automatically. The low pressure is kept displayed in the lower section.

Both upper and lower section are blinking.

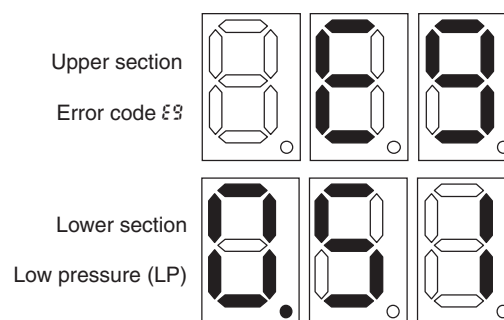
After reset the error, "4.1 Normal" is automatically displayed again.



Note:

If the low pressure sensor is abnormal (error code: $\mu\epsilon$), correct low pressure is not displayed.

●Display example Blinking LED : Upper section and lower section



4.3 Manual Operation Display 1

On the Manual Operation Display 1, you can check the individual operation data. (compressor operation frequency, target evaporation temperature, etc.)

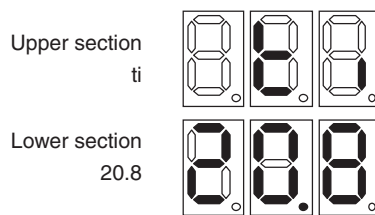
- Table 1 on P. 9 shows how to set Manual Operation Display 1.
- Table 2 on P. 10,11 shows which operation data you can check.

* Cautions for Manual Operation Display 1

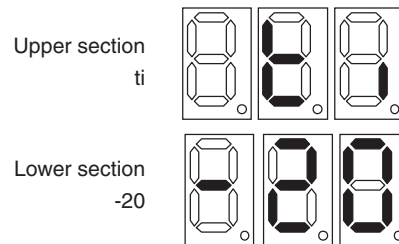
1. Each display item is displayed by automatic scroll (interval of 3 sec.) in the order of display No.
2. After display No. 32 displayed, automatically returns to display No. 1
3. After 120 minutes of continuous displaying, the display is automatically returned to the initial display so that it will not be lost.
4. Display items and values are fixed by pressing the RETURN (BS3).
Display is returned to automatic scroll by pressing the RETURN (BS3) again.
Note 1: Once display item is fixed, the fixed value is maintained.
Note 2: Display is fixed for up to 2 minutes. After 2 minutes, returns automatically to scroll display
5. Display digit number
Pressure and temperature data are displayed in the top 3 digits. The 4th digit is cut out.
If the displayed value is below 0, it is displayed in the top 2 digits with negative sign "-". The third digit is cut out.
Display examples are shown below:

●Display example

(1) When the suction pipe temperature of INV. compressor is 20.89 °C, 20.8 °C is displayed.



(2) When the suction pipe temperature of INV. compressor is -20.9 °C, -20 °C is displayed.



6. Display in case horsepower is different
As for the outdoor unit with 5 to 12 HP, discharge pipe temperature, operation data of STD compressor, and so on, are not displayed, as those data are produced from the equipment which is not equipped to the outdoor unit.
In such case, "-" is displayed in the lower section.

●Display example

Display when LRLEQ5AY1 is connected

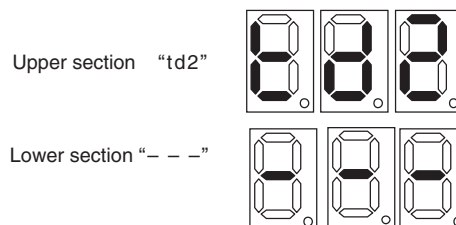


Table1. Operation method of manual operation display 1

●: OFF / ○: ON / ◐: Blinking

No.	Operation		LED display of outdoor unit							Display example	Remarks	
			H1P	H2P	H3P	H4P	H5P	H6P	H7P			
1	Initial display (Normally of connected outdoor unit and Digital Pressure Gauge Kit)		●	●	○	●	●	●	●	Upper section HP Lower section LP		
	Initial display (Abnormally of connected outdoor unit)		●	○	○	●	●	●	●	Upper section Lower section LP	Error code 	
2	Selection of manual operation display	Press the TEST (BS4)	◐	●	●	◐	●	●	●			
3		Press the SET (BS2)	◐	●	◐	●	●	●	●			
4		Decision of manual operation display	Press the RETURN (BS3)	◐	●	○	●	●	●	◐		
5	Display of operation data	Press the RETURN (BS3)	◐	●	○	●	●	●	○	Upper section tE0 *1 Lower section value of tE0 *1		Automatic scroll indication (Interval of 3 sec.) Display item refer to the next page
6	Fixed display of 7 segment	Press the RETURN (BS3)	◐	●	○	●	●	●	○	Upper section tE0 *1 Lower section value of tE0 *1		Press the RETURN (BS3): Fixed display of 7 segment Fix display items and value when pressed. Example is shown left.
		Press the RETURN (BS3)	◐	●	○	●	●	●	○	Upper section tE0 *1 Lower section value of tE0 *1		One more press the RETURN (BS3): Cancel of fixed display of 7 segment After cancel of fixed display of 7 segment: Return automatic scroll (Interval of 3 sec.)

*1 For a display example, "tE0" is displayed. Refer to the detailed information of display items on the following page onward.

Table2. Display items of manual operation display 1

Display No.	Display item	Unit	LED display (7 segment)		Connection unit (○: display target ※: different HP)		
			Upper section	Lower section	LRLEQ5・6AY1(E) LRMEQ5・6AY1(E)	LRLEQ8・10・12AY1(E) LRMEQ8・10・12AY1(E)	LRLEQ15・20AY1(E) LRMEQ15・20AY1(E)
1	Target evaporation temperature	°C		Value of display item	○	○	○
2	LP	MPa		Value of display item	○	○	○
3	HP	MPa		Value of display item	○	○	○
4	INV. compressor frequency	rps		Value of display item	○	○	○
5	Point of contact output/CCU		Point of contact output "ON": Lighting LED		○	○	○
	① INV. compressor (M1C)/K1M	—			*1	○	○
	② STD1 compressor (M2C)/K2M	—			*1	*1	○
	③ STD2 compressor (M3C)/K3M	—			○	○	○
	④ Operating output/K10R	—			*1	○	○
	⑤ Solenoid valve (Y2S)/K4R	—			*1	○	○
	⑥ Solenoid valve (Y5S)/K11R	—			*1	*1	○
⑦ Four way valve (Y3S)/K5R	—	○			○	○	
6	Discharge pipe temperature (INV. compressor) ※2	°C		Value of display item	○	○	○
7	Discharge pipe temperature (STD1 compressor) ※2	°C		Value of display item	*1	○	○
8	Discharge pipe temperature (STD2 compressor) ※2	°C		Value of display item	*1	*1	○
9	Suction pipe temperature ※2	°C		Value of display item	○	○	○
10	Subcooling heat exchanger inlet temperature ※2	°C		Value of display item	○	○	○
11	Subcooling heat exchanger outlet temperature ※2	°C		Value of display item	○	○	○
12	Outdoor air temperature ※2	°C		Value of display item	○	○	○
13	Condensation pressure equivalent saturation temperature ※2	°C		Value of display item	○	○	○
14	Evaporation pressure equivalent saturation temperature ※2	°C		Value of display item	○	○	○
15	Outdoor unit heat exchanger temperature (R6T) ※2	°C		Value of display item	○	○	○

After 3 sec.

Automatic return from display item No.32 to item No.1.

- *1 No display is available as target equipments are not present.
- *2 In case each sensor is abnormal, correct value can not be displayed. Before checking the sensor measurement, please check if there is an abnormal report.

Display No.	Display item	Unit	LED display (7 segment)		Connection unit (○: display target *: different HP)		
			Upper section	Lower section	LRLEQ5 · 6AY1(E) LRMEQ5 · 6AY1(E)	LRLEQ8 · 10 · 12AY1(E) LRMEQ8 · 10 · 12AY1(E)	LRLEQ15 · 20AY1(E) LRMEQ15 · 20AY1(E)
16	Suction air superheated *2	K	SH 	Value of display item	○	○	○
17	Discharge pipe superheated (INV. compressor) *2	K	IS1 	Value of display item	○	○	○
18	Discharge pipe superheated (STD1 compressor) *2	K	IS2 	Value of display item	*1	○	○
19	Discharge pipe superheated (STD2 compressor) *2	K	IS3 	Value of display item	*1	*1	○
20	Secondary current valve of INV. compressor *2	A	AdC 	Value of display item	○	○	○
21	Current value of STD1 compressor *2	A	An1 	Value of display item	*1	○	○
22	Current value of STD2 compressor *2	A	An2 	Value of display item	*1	*1	○
23	Current value of outdoor unit FAN1 *2	A	AF1 	Value of display item	○	○	○
24	Current value of outdoor unit FAN2 *2	A	AF2 	Value of display item	*1	*1	○
25	Radiation fin temperature *2	°C	IF 	Value of display item	○	○	○
26	Total operation compressor frequency	Hz	HzA 	Value of display item	○	○	○
27	Outdoor unit fan tap	-	FtP 	Value of display item	○	○	○
28	Opening degree of electronic expansion valve 1	pls	EV1 	Value of display item	○	○	○
29	Opening degree of electronic expansion valve 2	pls	EV2 	Value of display item	○	○	○
30	Opening degree of electronic expansion valve 3	pls	EV3 	Value of display item	*1	○	○
31	Operation state	-	StA 	Value of display item	○	○	○
32	Software version of PCB	-	Ver 	Value of display item	○	○	○

*1 No display is available as target equipments are not present.

*2 In case each sensor is abnormal, correct value can not be displayed. Before checking the sensor measurement, please check if there is an abnormal report.

■ Note

○ Display No. 1: Target Evaporation Temperature

Displays target evaporation temperature which is set by using the target evaporation temperature set with DIP switch of the outdoor unit and correction value of target evaporation temperature by pressing BS button.

○ Display No. 13: Condensation pressure equivalent saturated temperature f (HP)

The value of saturated temperature calculated from the high pressure of display No. 3

○ Display No. 14: Evaporation pressure equivalent saturated temperature f (LP)

The value of saturated temperature calculated from the low pressure of display No. 2

○ Display No. 16: Suction air SH

The difference between the suction pipe temperature T_i of display No. 9 and the saturated temperature at the low pressure of display No. 2.

○ Display No. 17: INV. compressor discharge pipe SH

The difference between the INV. compressor discharge pipe temperature T_{d1} of display No. 6 and the saturated temperature at the high pressure of display No. 3.

○ Display No. 18: STD1 compressor discharge pipe SH

The difference between the STD1 compressor discharge pipe temperature T_{d2} of display No. 7 and the saturated temperature at the high pressure of display No. 3.

○ Display No. 19: STD2 compressor discharge pipe SH

The difference between the STD2 compressor discharge pipe temperature T_{d3} of display No. 8 and the saturated temperature at the high pressure of display No. 3.

○ Display No. 26: Value of operating compressor total frequency

The total frequency is calculated by the equation below.

Total frequency = frequency of INV. compressor + (frequency of STD compressor^{*1} × number of STD compressor)

*1 The frequency of STD compressor is fixed to 166 Hz.

4.4 Manual Operation Display 2

On the manual operation display 2, you can check error history for the preceding 3 times.

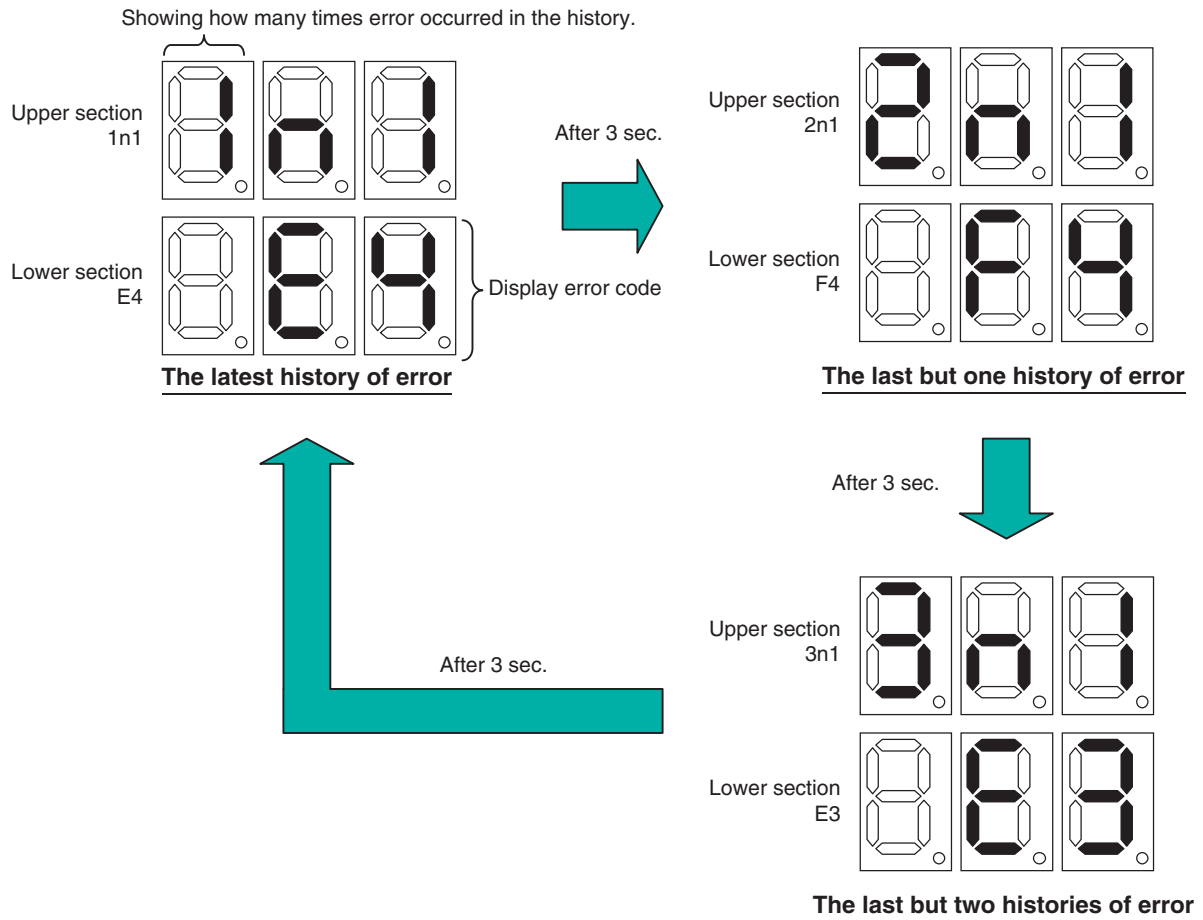
In this case, both upper and lower sections show lighting display.

The upper section indicates how many times error occurred in the history.

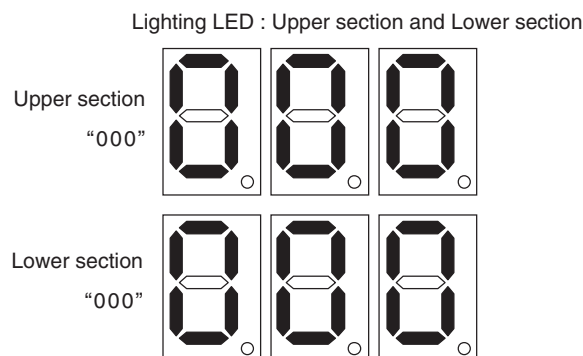
The lower section displays error code.

- Table 3 on P. 14 shows how to set manual operation display 2.

● Display example



● In case no error is present



* Cautions for manual operation display 2

1. Each display item is displayed by automatic scroll (interval of 3 sec.) in the order of display No.
2. After display No. 3 displayed, automatically returns to display No. 1
3. After 120 minutes of automatic scroll, the display is automatically returned to the initial display so that it will not be lost.
4. If booster unit is abnormal, a batch of error codes from outdoor units such as E₁, E₂, etc. are displayed.

Table3. Operation procedure of manual operation display 2

●: OFF / ○: ON / ●: Blinking

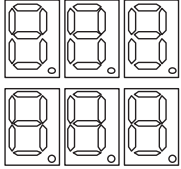
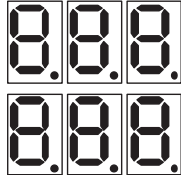
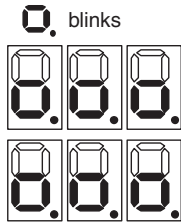
No.	Operation		LED display of outdoor unit							Display example	Remarks	
			H1P	H2P	H3P	H4P	H5P	H6P	H7P			
1	Initial display (Normally of connected outdoor unit and Digital Pressure Gauge Kit)		●	●	○	●	●	●	●	Upper section HP Lower section LP		
	Initial display (Abnormally of connected outdoor unit or Digital Pressure Gauge Kit)		●	○	○	●	●	●	●	Upper section Error code Lower section LP		
2	Selection of manual operation display	Press the TEST (BS4)	●	●	●	●	●	●	●			
3		Press the SET (BS2)	●	●	●	●	●	●	●			
4	Display	Press the RETURN (BS3)	●	●	○	○	●	●	●	Upper section 1n1 Lower section The last error history (Error code)		History of error : automatic scroll indicate (Interval of 3 sec.)

5. Service Diagnosis

On completion of installation (P.4 3. Connection Drawing), turn the outdoor unit power ON and make sure that pressures are displayed normally.

Abnormal display: Refer to “Service Diagnosis” below and take necessary remedies if no figures are displayed. If the trouble do not fall under any of the items described, change the Digital Pressure Gauge Kit.

■ Error display and measurements

	Error display	Cause	Remedy
1	The LED indicator is not lit 	Power supply is not provided to the outdoor unit.	Provide power supply to the outdoor unit.
		The connector of the power supply line is unplugged.	Insert the connector of the power supply line.
		The power supply line is disconnected or damaged.	Replace the power supply line.
		Others	Please change the Digital Pressure Gauge Kit.
2	All LEDs blink 	The connector of the communications line is unplugged.	Plug in the connector of the communications line.
		The communications line is disconnected or damaged.	Replace the communications line.
		The outdoor unit is not compatible with the Digital Pressure Gauge Kit.	Check with a this service manual if the outdoor unit is compatible with the Digital Pressure Gauge Kit. If the outdoor unit is not compatible, this Digital Pressure Gauge Kit cannot be used.
		Others	Please change the Digital Pressure Gauge Kit.
3		There is a high-voltage line generating noise around the communications line.	Noise may be imposed on the communications line. Separate the high-voltage line.
		The outdoor unit has a defect.	Refer to the Service Guide and remedy the problem.
		Others	Please change the Digital Pressure Gauge Kit.

6. The Entire Flow

