EN

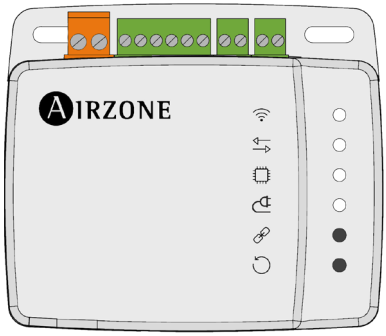
Integration manual

Aidoo Pro Modbus Aquarea

Panasonic

For PAW-AZAW-MBS-1

[For AZAI6WSPPN2]



Modbus

AIRZONE

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Precautions and environmental policy

PRECAUTIONS

- For your security, and to protect the devices, follow these instructions:
- Do not manipulate the system with wet or damp hands.
- Disconnect the power supply before making any connections.
- Take care not to cause a short circuit in any of the system connections.

ENVIRONMENTAL POLICY

Do not dispose of this equipment in the household waste. Electrical and electronic equipment contain substances that may damage the environment if they are not handled appropriately. The symbol of a crossed-out waste bin indicates that electrical equipment should be collected separately from other urban waste. For correct environmental management, it must be taken to the collection centers provided for this purpose, at the end of its useful life.

The equipment components may be recycled. Act in accordance with current regulations on environmental protection.
If you replace it with other equipment, you must return it to the distributor or take it to a specialized collection center.

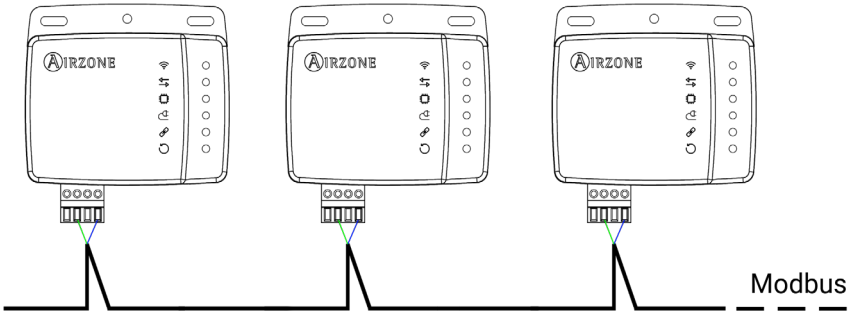
Those breaking the law or by-laws will be subject to such fines and measures as are laid down in environmental protection legislation.

RS-485 Communication port

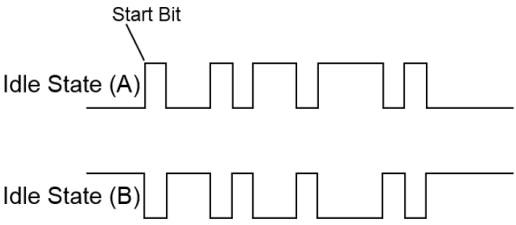
RS-485, also known as EIA-485, is a communication standard in bus.

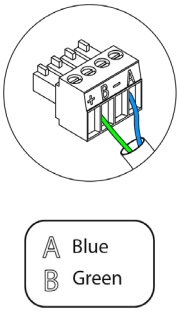
Integration bus	
Speed of the communication port	19200 bps
Communication	Half duplex
Frame length	8-bits
Stop bit	1-bit
Stream control	None
Parity	Even

CONNECTION



For proper operation of the system, verify that only the communication cables (green-blue) are connected to their matching domotic buses. Attach the wires with the terminal screws following the color code.





Modbus protocol

Modbus protocol is a communication structure used to establish **master-slave/client-server communication** between intelligent devices connected on different types of buses or networks.

Each device intended to communicate using Modbus is given a unique address. Master devices send a command in a frame which contains the address of the device or the end-devices (slaves). All devices are sent the frame, but only the recipient interprets and executes the command. Modbus commands contain checksum information, to allow the recipient to detect transmission errors.

Note: *It is possible to send information to multiple devices simultaneously using a frame called "Broadcast".*

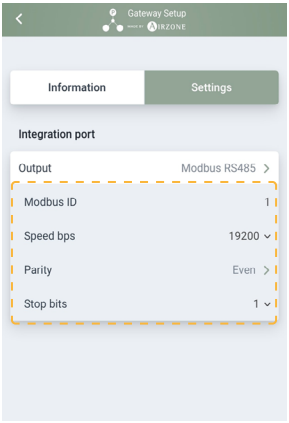
Each message includes redundant information that ensures it is properly received. If, after a certain time, the master does not receive a confirmation it interprets that an error has occurred and terminates communication.

The mode of transmission used is MODBUS-RTU. Each byte of data is represented by two 4-bit characters in hexadecimal format. The format of the frame is the following:

Start	0	1	2	3	4	5	6	7	Parity	Stop

CONFIGURATION OF THE SLAVE ADDRESS FOR THE AIDOO PRO MODBUS PANASONIC AQUAREA DEVICE

Aidoo is a **Modbus slave device**, so it is necessary to indicate its address. To do this, associate your Aidoo via the Gateway Setup for Panasonic app (available for iOS and Android) by following the steps described in the “Gateway Setup for Panasonic” section.



Modbus function codes

Modbus basic commands allow the control of a device to change the value of its registers (memory slot) or to request the content of these registers, depending on the codes:

Code	Function
03	Read holding registers
04	Read input registers
06	Preset/write single holding register
16	Preset/write multiple holding registers

Modbus commands

The format of the commands for the read/write operations is as follows (8 byte):

Slave address	Operation code	Register address	Data	CRC
1 byte	1 byte	1 byte	1...2·N bytes	2 bytes

- **Slave address:** Defines the system to access. A Modbus command contains the Modbus address of the device it is intended for (1 to 247). 0 address is reserved for a transmission to all devices (broadcast).
- **Operation code:** Specifies the operation to be performed.
- **Register address:** Specifies the operation to be accessed. In commands to be performed in multiple registers, defines the boot log, from which you want to operate consecutively.
- **Data:** Formed by 2 bytes (simple operations) or a set of 2 bytes (multiple operations) that contain the information in the command.
- **CRC:** Two bytes are added to the end of the stream in order to detect transmission o reception errors. This action is done using the Cyclic Redundant Code.

  Generator polynomial: **CRC-16 = $x^{16} + x^{15} + x^2 + 1$.**

WRITE COMMANDS

Write a single holding register

Byte	Field
0	Address of the slave (1 - 247) (0: Broadcast)
1	Write single register (6)
2	Register address
3	
4	Data to be written
5	
6	CRC
7	

The response, as long as there is no error type, must be exactly the same format as the write command.

Write multiple registers

Byte	Field
0	Address of the slave (1 - 247) (0: Broadcast)
1	Write multiple register (16)
2	Starting register address
3	Number of registers to be written (N)
4	
5	Total number of bytes of write data (2·N)
6	Data to be written in register 1
7	
...	
5 + 2·N	Data to be written in register N
6 + 2·N	
7 + 2·N	CRC
8 + 2·N	

The response, as long as it is error-free, will be:

Byte	Field
0	Address of the slave (1-247) (0: Broadcast)
1	Write multiple registers (16)
2	Starting register address
3	
4	Number of registers to be written (N)
5	
6	CRC
7	

READ COMMANDS

Question

Byte	Field
0	Address of the slave (1 - 247) (0: Broadcast)
1	Reading records (3/4)
2	Starting register address
3	
4	Number of registers to be read (N)
5	
6	CRC
7	

Response

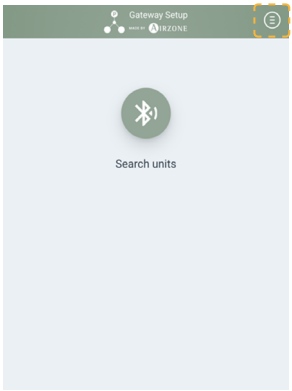
Byte	Field
0	Slave address (1 - 247) (0: Broadcast)
1	Read holding registers (3/4)
2	Number of response bytes (2·N)
3	Data to be read in register 0
4	
...	
3 + 2·N	Data to be read in register N
4 + 2·N	
5 + 2·N	CRC
6 + 2·N	

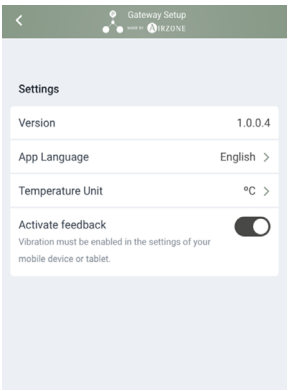
Gateway Setup for Panasonic

NETWORK CONFIGURATION

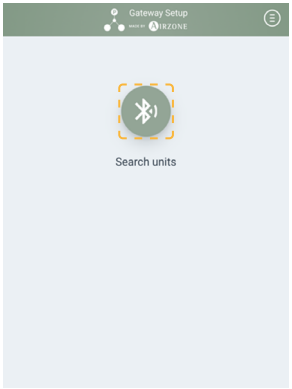
If you click the *Configuration* button on the main screen of the "Gateway Setup for Panasonic" app, you can select the application's working language, as well as the temperature units.

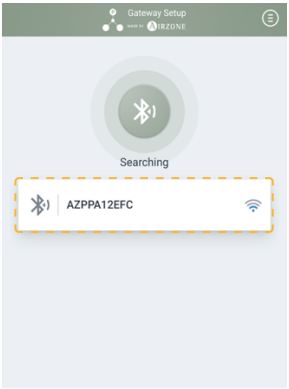
- **Version.** It indicates the application version.
- **Language.** The app is available in 9 languages (German, Greek, English, Spanish, French, Italian, Polish, Portuguese and Turkic).
- **Units.** Celsius (°C) or Fahrenheit (°F).
- **Active feedback.** This functionality requires the device's vibration to be activated.





Once again, on the main screen, click the *Bluetooth* item to begin to search for nearby devices. Select your "Aidoo Pro Modbus Panasonic Aquarea" to continue.

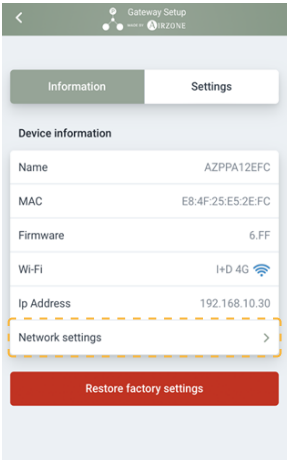




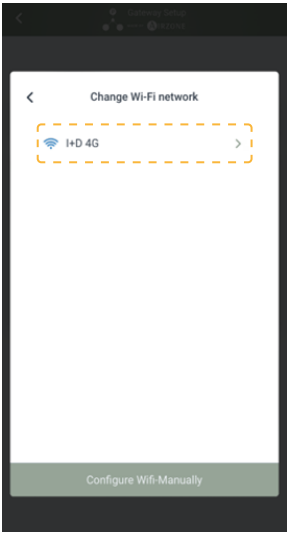
Once the device has been selected, the information menu will be displayed.

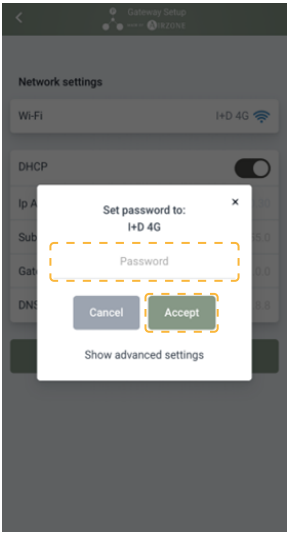
- **Name.** Device name.
- **MAC.** Device's MAC address.
- **Firmware.** It indicates the device version.
- **Wi-Fi.** Network linked to the device.
- **IP Address.** It displays the device's IP address.
- **Network configuration.** It is used to configure the device.

Press the *Factory reset* button to restore the initial values.



By entering the *Network configuration* submenu you can change the Wi-Fi network if necessary.

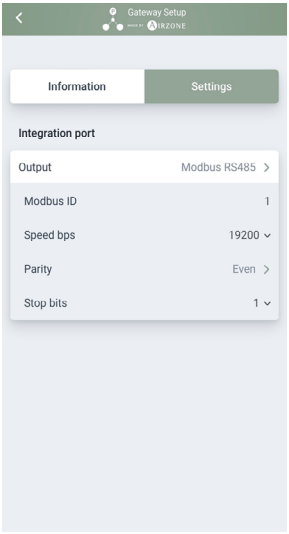




CONFIGURATION MODBUS RS-485

By accessing the configuration menu you can change the following device parameters:

- **Modbus ID.** Value between 1 and 255.
- **Speed in bps.** There are 14 selectable speeds (100, 300, 500, 600, 1200, 2400, 4800, 7800, 9600, 19200 (default), 38400, 57600, 76800 and 115200 bps).
- **Parity.** None, even or odd.
- **Stop bit.** Select a value between 1 and 2.



Download the Gateway Setup for Panasonic App

Modbus registers

AIDOO PRO MODBUS PANASONIC AQUAREA (PAW-AZAW-MBS-1 [AZAI6WSPPN2])

Registers	Description	Values	Read (R) Write (W)	Operations
0	Operation	0 → OFF 1 → ON	R & W	0x03, 0x04, 0x06, 0x10, 0x16
1	Outdoor actual temperature	-127 ~ 127 °C	R	0x03, 0x04
2	Outlet water temperature	-127 ~ 127 °C	R	0x03, 0x04
3	Inlet water temperature	-127 ~ 127 °C	R	0x03, 0x04
4	Mode	0 → Invalid 1 → Heat 2 → Heat Tank 3 → Tank 4 → Cool Tank 5 → Cool 6 → Auto (Default)	R & W	0x03, 0x04, 0x06, 0x10, 0x16
		7 → Auto Tank 8 → Auto Heat 9 → Auto Heat Tank 10 → Auto Cool 11 → Auto Cool Tank	R	0x03, 0x04
5	Heat mode water temperature sensor	1 → Compensation curve 2 → Direct	R & W	0x03, 0x04, 0x06, 0x10, 0x16
6	Cool mode water temperature sensor	1 → Compensation curve 2 → Direct	R & W	0x03, 0x04, 0x06, 0x10, 0x16
9	Zone 1 - Zone 2 ON/OFF	1 → On/Off 2 → Off/On 3 → On/On	R & W	0x03, 0x04, 0x06, 0x10, 0x16
10	Zone 1 sensors	1 → Water temperature 2 → External 3 → Internal 4 → Thermistor	R	0x03, 0x04
11	Zone 2 sensors	1 → Water temperature 2 → External 3 → Internal 4 → Thermistor	R	0x03, 0x04

Registers	Description	Values	Read (R) Write (W)	Operations
12	Zone 1: (Water shift/room/pool) set point temperature	**HEAT** Water Shift → -5 ~ 5 °C Water → 20 ~ 75 °C Room → 10 ~ 30 °C Pool → 15 ~ 35 °C **COOL** Water Shift → -5 ~ 5 °C Water → 5 ~ 20 °C Room → 18 ~ 35 °C	R & W	0x03, 0x04, 0x06, 0x10, 0x16
13	Zone 2: (Water shift/room/pool) set point temperature	**HEAT** Water Shift → -5 ~ 5 °C Water → 20 ~ 75 °C Room → 10 ~ 30 °C Pool → 15 ~ 35 °C **COOL** Water Shift → -5 ~ 5 °C Water → 5 ~ 20 °C Room → 18 ~ 35 °C	R & W	0x03, 0x04, 0x06, 0x10, 0x16
14	Zone 1: Actual (Water outlet/ room/pool) temperature	-127 ~ 127 °C	R	0x03, 0x04
15	Zone 2: Actual (Water outlet/ room/pool) temperature	-127 ~ 127 °C	R	0x03, 0x04
16	Zone 1: Temperature conf. mode	1 → Room 2 → Compensation curve 3 → Direct 4 → Pool	R	0x03, 0x04
17	Zone 2: Temperature conf. mode	1 → Room 2 → Compensation curve 3 → Direct 4 → Pool	R	0x03, 0x04
18	Zone 1: Min. set point temperature	**HEAT** Water Shift → -5 °C Water → 20 °C Room → 10 °C Pool → 15 °C **COOL** Water Shift → -5 °C Water → 5 °C Room → 18 °C	R	0x03, 0x04

Registers	Description	Values	Read (R) Write (W)	Operations
19	Zone 1: Max. set point temperature	**HEAT** Water Shift → 5 °C Water → 75 °C Room → 30 °C Pool → 35 °C **COOL** Water Shift → 5 °C Water → 20 °C Room → 35 °C	R	0x03, 0x04
20	Zone 2: Min. set point temperature	**HEAT** Water Shift → -5 °C Water → 20 °C Room → 10 °C Pool → 15 °C **COOL** Water Shift → -5 °C Water → 5 °C Room → 18 °C	R	0x03, 0x04
21	Zone 2: Max. set point temperature	**HEAT** Water Shift → 5 °C Water → 75 °C Room → 30 °C Pool → 35 °C **COOL** Water Shift → 5 °C Water → 20 °C Room → 35 °C	R	0x03, 0x04
30	Tank ON/OFF	0 → OFF 1 → ON	R & W	0x03, 0x04, 0x06, 0x10, 0x16
32	Tank actual temperature	-127 ~ 127 °C	R	0x03, 0x04
33	Tank water set temperature	40 ~ 75 °C	R & W	0x03, 0x04, 0x06, 0x10, 0x16
34	Tank heater	1 → Internal 2 → External	R	0x03, 0x04
35	Tank water min. set point temperature	40 °C	R	0x03, 0x04
36	Tank water max. set point temperature	75 °C	R	0x03, 0x04
45	Tank mode energy consumption	If H/J Series 0 ~ 50.800 W	R	0x03, 0x04

Registers	Description	Values	Read (R) Write (W)	Operations
46	Heat mode energy consumption	If H/J Series 0 ~ 50.800 W	R	0x03, 0x04
47	(Cool mode / Heat recovery mode) energy consumption	If H/J Series 0 ~ 50.800 W	R	0x03, 0x04
50	Version of Modbus gateway	Example: 0x0100 → v1.0.0	R	0x03, 0x04
52	Error code	0 → No error 1XXX → H + error 2XXX → F + error 3XXX → U + error	R	0x03, 0x04
64	Deice status	0 → OFF 1 → ON	R	0x03, 0x04
70	Current error status	0 → No error 1 → Error	R	0x03, 0x04
81	Tank connection	0 → No 1 → Yes	R	0x03, 0x04
82	Number Zones	1 → 1 Zone 2 → 2 Zones	R	0x03, 0x04
83	Zone 1 setup	1 → Room 2 → Pool	R	0x03, 0x04
84	Zone 2 setup	1 → Room 2 → Pool	R	0x03, 0x04
85	Direction	1 → Room 2 → Tank	R	0x03, 0x04
86	Outdoor type	1 → STD 2 → TCAP 3 → HWT	R	0x03, 0x04
112	Water pressure	If K Series onwards 0 ~ 5,08 bar Resolution: 0,02 bar	R	0x03, 0x04
117	Model series selection	0 - 1 → H-Series 2 → J-Series 3 → K-Series 4 → L-Series	R	0x03, 0x04
120	Heat mode energy consumption total (MSB)	0 ~ 4.294.967.295 kWh	R	0x03, 0x04
121	Heat mode energy consumption total (LSB)			

Registers	Description	Values	Read (R) Write (W)	Operations
124	(Cool mode / Heat recovery mode) energy consumption total (MSB)	0 ~ 4.294.967.295 kWh	R	0x03, 0x04
125	(Cool mode / Heat recovery mode) energy consumption total (LSB)			
128	Tank mode energy consumption (MSB)	0 ~ 4.294.967.295 kWh	R	0x03, 0x04
129	Tank mode energy consumption (LSB)			
269	Powerful (Actual)	0 → Invalid 1 → OFF 2 → ON	R	0x03, 0x04
270	Quiet (Actual)	0 → Invalid 1 → OFF 2 → ON	R	0x03, 0x04
360	Heat mode energy consumption (LSB)	If K Series onwards 0 ~ 65.534 W Resolution: 1 W	R	0x03, 0x04
361	Heat mode energy consumption (MSB)			
362	(Cool mode / Heat recovery mode) energy consumption (LSB)	If K Series onwards 0 ~ 65.534 W Resolution: 1 W	R	0x03, 0x04
363	(Cool mode / Heat recovery mode) energy consumption (MSB)			
364	Tank mode energy consumption (LSB)	If K Series onwards 0 ~ 65.534 W Resolution: 1 W	R	0x03, 0x04
365	Tank mode energy consumption (MSB)			

Error codes

AIDOO PRO MODBUS PANASONIC AQUAREA (PAW-AZAW-MBS-1 [AZAI6WSPPN2])

Diagnosis display	Abnormality / Protection control	Abnormality judgement	Primary location to verify
H00	No abnormality detected	-	-
H12	Indoor / Outdoor capacity unmatched	90s after power supply	· Indoor / Outdoor connection wire · Indoor / Outdoor PCB · Specification and combination table in catalogue
H15	Outdoor compressor temperature sensor abnormality	Continue for 5s	· Compressor temperature sensor (defective or disconnected)
H20	Water pump abnormality	Continue for 10s	· Indoor PCB · Water pump (malfunction)
H23	Indoor refrigerant liquid temperature sensor abnormality	Continue for 5s	· Refrigerant liquid temperature sensor (defective or disconnected)
H27	Service valve error	Continue for 5 minutes	· High pressure sensor (defective or disconnected)
H28	Abnormal solar sensor	Continue for 5s	· Solar temperature sensor (defective or disconnected)
H31	Abnormal swimming pool sensor	Continue for 5s	· Pool temperature sensor (defective or disconnected)
H36	Abnormal buffer tank sensor	Continue for 5s	· Buffer tank sensor (defective or disconnected)
H38	Brand code not match	When indoor and outdoor brand code not same	-
H42	Compressor low pressure abnormality	-	· Outdoor pipe temperature sensor · Clogged expansion valve or strainer · Insufficient refrigerant · Outdoor PCB · Compressor
H43	Abnormal Zone 1 sensor	Continue for 5s	· Water temperature Zone 1 sensor
H44	Abnormal Zone 2 sensor	Continue for 5s	· Water temperature Zone 2 sensor
H62	Water flow switch abnormality	Continue for 1 minute	· Water flow switch

Diagnosis display	Abnormality / Protection control	Abnormality judgement	Primary location to verify
H63	Refrigerant low pressure abnormality	Continue for 5s	· Outdoor low pressure sensor (defective or disconnected)
H64	Refrigerant high pressure abnormality	Continue for 5s	· Outdoor high pressure sensor (defective or disconnected)
H65	Deice circulation error	Continue for 10s	· Water flow switch sensor (defective or disconnected) · Water pump malfunction · Buffer tank (is used)
H67	Abnormal external thermistor 1	Continue for 5s	· Room temperature Zone 1 sensor
H68	Abnormal external thermistor 2	Continue for 5s	· Room temperature Zone 2 sensor
H70	Back-up heater OLP abnormality	Continue for 60s	· Back-up heater OLP (disconnection or activated)
H72	Tank sensor abnormal	Continue for 5s	· Tank sensor
H74	PCB communication error	Communication or transfer error	· Indoor main PCB and Sub PCB
H75	Low water temperature control	Room heater disable and deice request to operate under low water temperature	· Heater operation must enable to increase water temperature
H76	Indoor - control panel communication abnormality	-	· Indoor - control panel (defective or disconnected)
H90	Indoor / Outdoor abnormal communication	> 1 minute after starting operation	· Internal / External cable connections · Indoor / Outdoor PCB
H91	Tank heater OLP abnormality	Continue for 60s	· Tank heater OLP (disconnection or activated)
H95	Indoor / Outdoor wrong connection	-	· Indoor / Outdoor supply voltage
H98	Outdoor high pressure overload protection	-	· Outdoor high pressure sensor · Water pump or water leakage · Clogged expansion valve or strainer · Excess refrigerant · Outdoor PCB
H99	Indoor heat exchanger freeze prevention	-	· Indoor heat exchanger · Refrigerant shortage
F12	Pressure switch active	4 times occurrence within 20 minutes	· Pressure switch
F14	Outdoor compressor abnormal revolution	4 times occurrence within 20 minutes	· Outdoor compressor

Diagnosis display	Abnormality / Protection control	Abnormality judgement	Primary location to verify
F15	Outdoor fan motor lock abnormality	2 times occurrence within 30 minutes	· Compressor tank temperature sensor · Clogged expansion valve or strainer · Insufficient refrigerant · Outdoor PCB · Compressor
F16	Total running current protection	3 times occurrence within 20 minutes	· Excess refrigerant · Outdoor PCB
F20	Outdoor compressor overheating protection	4 times occurrence within 30 minutes	· Compressor tank temperature sensor · Clogged expansion valve or strainer · Insufficient refrigerant · Outdoor PCB · Compressor
F22	IPM (power transistor) overheating protection	3 times occurrence within 30 minutes	· Improper heat exchange · IPM (power transistor)
F23	Outdoor direct current (DC) peak detection	7 times occurrence continuously	· Outdoor PCB · Compressor
F24	Refrigeration cycle abnormality	2 times occurrence within 20 minutes	· Insufficient refrigerant · Outdoor PCB · Compressor low compression
F25	Cooling / Heating cycle changeover abnormality	4 times occurrence within 30 minutes	· 4-way valve · V-coil
F27	Pressure switch abnormality	Continue for 1 minute	· Pressure switch
F29	Low discharge superheat	1 time occurrence within 2550 minutes	· Discharge temperature sensor · Discharge pressure sensor · Pressure switch · Outdoor PCB
F30	Water outlet sensor 2 abnormality	Continue for 5s	· Water outlet sensor 2 (defective or disconnected)
F32	Abnormal internal thermostat	Continue for 5s	· Control panel PCB thermostat
F36	Outdoor air temperature sensor abnormality	Continue for 5s	· Outdoor air temperature sensor (defective or disconnected)
F37	Indoor water inlet temperature sensor abnormality	Continue for 5s	· Water inlet temperature sensor (defective or disconnected)
F40	Outdoor discharge pipe temperature sensor abnormality	Continue for 5s	· Outdoor discharge pipe temperature sensor (defective or disconnected)
F41	PFC control	4 times occurrence within 10 minutes	· Voltage at PFC

Diagnosis display	Abnormality / Protection control	Abnormality judgement	Primary location to verify
F42	Outdoor heat exchanger temperature sensor abnormality	Continue for 5s	· Outdoor heat exchanger temperature sensor (defective or disconnected)
F43	Outdoor defrost sensor abnormality	Continue for 5s	· Outdoor defrost sensor (defective or disconnected)
F45	Indoor water outlet temperature sensor abnormality	Continue for 5s	· Water outlet temperature sensor (defective or disconnected)
F46	Outdoor current transformer (CT) open circuit	-	· Insufficient refrigerant · Outdoor PCB · Compressor low
F48	Outdoor EVA outlet temperature sensor abnormality	Continue for 5s	· Outdoor EVA outlet temperature sensor (defective or disconnected)
F49	Outdoor bypass outlet temperature sensor abnormality	Continue for 5s	· Outdoor bypass outlet temperature sensor (defective or disconnected)
F95	Cooling high pressure overload protection	-	· Outdoor high pressure sensor · Water pump or water leakage · Clogged expansion valve or strainer · Excess refrigerant · Outdoor PCB

Panasonic

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v. 102