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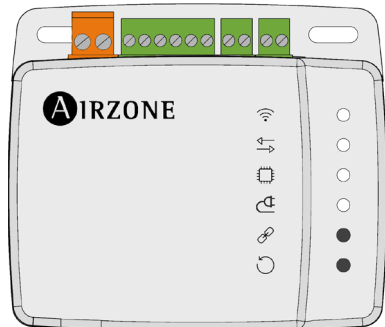
# Priročnik za integracijo

## Aidoo Pro Modbus Aquarea

### Panasonic

Za PAW-AZAW-MBS-1

[Za AZAI6WSPPN2]



AIRZONE

# Kazalo

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|                                                                                      |    |
|--------------------------------------------------------------------------------------|----|
| PREVIDNOSTNI UKREPI IN OKOLJSKA POLITIKA                                             | 3  |
| > Previdnostni ukrepi                                                                | 3  |
| > Okoljska politika                                                                  | 3  |
| KOMUNIKACIJSKI VMESNIK RS-485                                                        | 4  |
| > Priključek                                                                         | 4  |
| PROTOKOL MODBUS                                                                      | 5  |
| > Konfiguracija podrejenega naslova za napravo Aidoo Pro Modbus<br>Panasonic Aquarea | 5  |
| FUNKCIJSKE KODE MODBUS                                                               | 6  |
| UKAZI MODBUS                                                                         | 6  |
| > Zapisovanje ukazov                                                                 | 7  |
| > Zapisovanje vodenja enega samega registra                                          | 7  |
| > Zapisovanje več registrov                                                          | 7  |
| > Branje ukazov                                                                      | 8  |
| > Vprašanje                                                                          | 8  |
| > Odziv                                                                              | 8  |
| GATEWAY SETUP FOR PANASONIC                                                          | 9  |
| > Konfiguracija omrežja                                                              | 9  |
| > Konfiguracija Modbus RS-485                                                        | 11 |
| REGISTRI MODBUS                                                                      | 12 |
| > Aidoo Pro Modbus Panasonic Aquarea (PAW-AZAW-MBS-1<br>[AZAIGWSPPN2])               | 12 |
| KODE NAPAK                                                                           | 17 |
| > Aidoo Pro Modbus Panasonic Aquarea (PAW-AZAW-MBS-1<br>[AZAIGWSPPN2])               | 17 |

# Previdnostni ukrepi in okoljska politika

## PREVIDNOSTNI UKREPI

- Zaradi lastne varnosti in zaščite naprav upoštevajte spodnja navodila:
- Sistema ne upravljajte z mokrimi ali vlažnimi rokami.
- Odklopite napajanje, preden opravite kakršne koli priključke.
- Pazite, da ne povzročite kratkega stika na kateri koli sistemski povezavi.

## OKOLJSKA POLITIKA



Te opreme ne odlagajte med gospodinjske odpadke. Električna in elektronska oprema vsebuje snovi, ki lahko škodujejo okolju, če se z njimi ne ravna ustrezno. Simbol prečrtanega koša za odpadke pomeni, da je treba električno opremo zbirati ločeno od drugih komunalnih odpadkov. Zaradi pravilnega ravnanja z okoljem jo je treba ob koncu življenjske dobe oddati v zbirne centre, ki so na voljo za ta namen.

Komponente opreme se lahko reciklirajo. Delujte v skladu z veljavnimi predpisi o varstvu okolja.

Če napravo zamenjate z drugo opremo, jo morate vrniti distributerju ali jo odnesti v specializiran zbirni center.

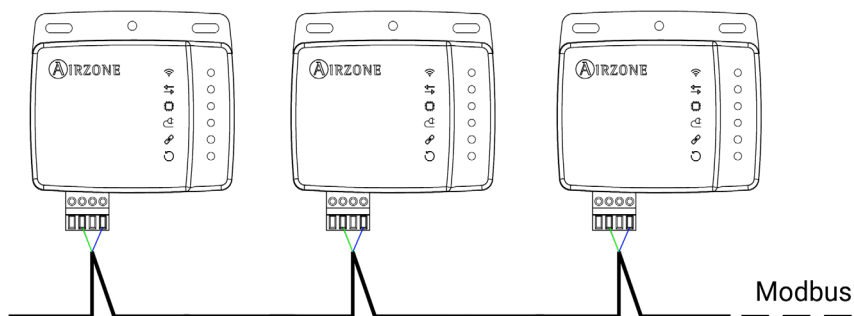
Za kršitelje zakona ali podzakonskih predpisov bodo veljale globe in ukrepi, ki so določeni v zakonodaji o varstvu okolja.

# Komunikacijski vmesnik RS-485

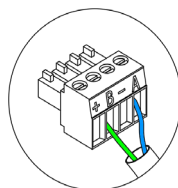
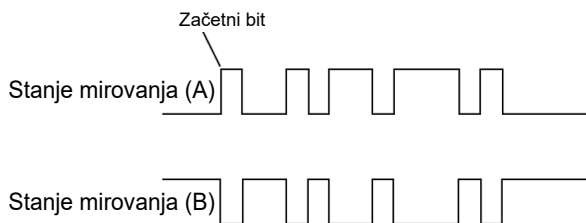
RS-485, znan tudi kot EIA-485, je komunikacijski standard v vodilu.

| Vodilo za integracijo             |                                  |
|-----------------------------------|----------------------------------|
| Hitrost komunikacijskega vmesnika | 19200 b/s                        |
| Komunikacija                      | Polovična dvosmerna komunikacija |
| Dolžina okvirja                   | 8 bitov                          |
| Zaustavitveni bit                 | 1 bit                            |
| Upravljanje toka                  | Brez                             |
| Pariteta                          | Enako                            |

## PRIKLJUČEK



Za pravilno delovanje sistema preverite, ali so samo komunikacijski kabli (zeleno-modri) priključeni na ustrezna domotična vodila. Žice pritrdite s priključnimi vijaki ob upoštevanju barvne kode.



A Modra  
B Zelena

# Protokol Modbus

Protokol Modbus je komunikacijska struktura, ki se uporablja za vzpostavitev **komunikacije med glavno in podrejeno enoto/odjemalcem in strežnikom** med inteligentnimi napravami, povezanimi v različne vrste vodil ali omrežij.

Vsaka naprava, namenjena komunikaciji prek Modbusa, ima edinstven naslov. Glavne naprave pošljejo ukaz v okvirju, ki vsebuje naslov naprave ali končnih naprav (podrejenih naprav). Okvir se pošlje vsem napravam, vendar ga interpretira in izvede le prejemnik. Ukazi Modbus vsebujejo informacije o kontrolni vsoti, da lahko prejemnik zazna napake pri prenosu.

***Opomba:** Informacije je mogoče poslati več napravam hkrati z uporabo okvirja, imenovanega »Oddajanje«.*

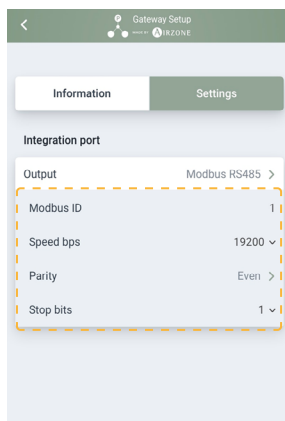
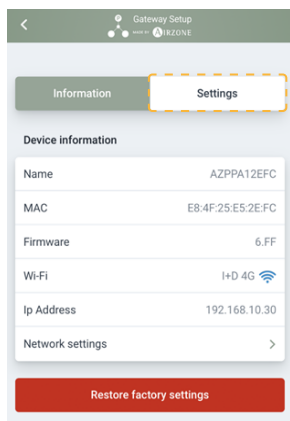
Vsako sporočilo vsebuje odvečne informacije, ki zagotavljajo, da bo pravilno sprejeto. Če po določenem času nadrejena enota ne prejme potrditve, to razume kot da je prišlo do napake, in prekine komunikacijo.

Uporablja se način prenosa MODBUS-RTU. Vsak bajt podatkov je predstavljen z dvema 4-bitnima znakoma v heksadecimalni obliki. Oblika okvirja je naslednja:

|         |   |   |   |   |   |   |   |   |          |       |
|---------|---|---|---|---|---|---|---|---|----------|-------|
| Začetek | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Pariteta | Konec |
|---------|---|---|---|---|---|---|---|---|----------|-------|

## KONFIGURACIJA PODREJENEGA NASLOVA ZA NAPRAVO AIDOO PRO MODBUS PANASONIC AQUAREA

Aidoo je **Podrejena naprava Modbus**, zato je treba navesti njen naslov. To storite tako, da z aplikacijo Gateway Setup for Panasonic (na voljo za iOS in Android) povežete napravo Aidoo po korakih, opisanih v razdelku »Gateway Setup for Panasonic«.



# Funkcijske kode Modbus

Osnovni ukazi Modbus omogočajo nadzor naprave za spreminjanje vrednosti njenih registrov (pomnilniška reža) ali za zahtevanje vsebine teh registrov, odvisno od kod:

| Koda | Funkcija                                          |
|------|---------------------------------------------------|
| 03   | Branje vodenja registrov                          |
| 04   | Branje vhodnih registrov                          |
| 06   | Prednastavitev/zapisovanje vodenja enega registra |
| 16   | Prednastavitev/zapisovanje vodenja več registrov  |

## Ukazi Modbus

Oblika ukazov za operacije branja/zapisovanja je naslednja (8 bajtov):

| Podrejeni naslov | Koda delovanja | Naslov registra | Podatki        | CRC     |
|------------------|----------------|-----------------|----------------|---------|
| 1 bajt           | 1 bajt         | 1 bajt          | 1...2-N bajtov | 2 bajta |

- **Podrejeni naslov:** Opredeljuje sistem, do katerega želite dostopati. Ukaz Modbus vsebuje naslov Modbus naprave, ki ji je namenjen (1 do 247). Naslov 0 je rezerviran za prenos na vse naprave (oddajanje).
- **Koda delovanja:** Določa operacijo, ki jo je treba izvesti.
- **Naslov registra:** Določa operacijo, do katere je treba dostopati. Pri ukazih, ki se izvajajo v več registrih, določi dnevnik zagona, iz katerega želite delovati zaporedno.
- **Podatki:** Oblikujeta ga 2 bajta (preproste operacije) ali niz 2 bajtov (več operacij), ki vsebujeta informacije v ukazu.
- **CRC:** Na koncu toka se dodata dva bajta za odkrivanje napak pri prenosu ali sprejemu. To dejanje se izvede z uporabo ciklične redundantne kode.

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

## ZAPISOVANJE UKAZOV

### Zapisovanje vodenja enega samega registra

| Bajt | Polje                                         |
|------|-----------------------------------------------|
| 0    | Naslov podrejene enote (1-247) (0: oddajanje) |
| 1    | Zapisovanje enega registra (6)                |
| 2    | Naslov registra                               |
| 3    |                                               |
| 4    | Podatki, ki jih je treba zapisati             |
| 5    |                                               |
| 6    | CRC                                           |
| 7    |                                               |

Odgovor, če ni vrste napake, mora biti popolnoma enake oblike kot ukaz za pisanje.

### Zapisovanje več registrov

| Bajt    | Polje                                               |
|---------|-----------------------------------------------------|
| 0       | Naslov podrejene enote (1-247) (0: oddajanje)       |
| 1       | Zapisovanje več registrov (16)                      |
| 2       | Naslov začetnega registra                           |
| 3       | Število registrov za zapisovanje (N)                |
| 4       |                                                     |
| 5       | Skupno število bajtov podatkov za zapisovanje (2·N) |
| 6       | Podatki za zapisovanje v register 1                 |
| 7       |                                                     |
| ...     |                                                     |
| 5 + 2·N | Podatki za zapisovanje v register N                 |
| 6 + 2·N |                                                     |
| 7 + 2·N | CRC                                                 |
| 8 + 2·N |                                                     |

Odgovor, če je brez napak, bo naslednji:

| Bajt | Polje                                         |
|------|-----------------------------------------------|
| 0    | Naslov podrejene enote (1–247) (0: oddajanje) |
| 1    | Zapisovanje več registrov (16)                |
| 2    | Naslov začetnega registra                     |
| 3    |                                               |
| 4    | Število registrov za zapisovanje (N)          |
| 5    |                                               |
| 6    | CRC                                           |
| 7    |                                               |

## BRANJE UKAZOV

### Vprašanje

| Bajt | Polje                                         |
|------|-----------------------------------------------|
| 0    | Naslov podrejene enote (1–247) (0: oddajanje) |
| 1    | Evidenca odčitkov (3/4)                       |
| 2    | Naslov začetnega registra                     |
| 3    |                                               |
| 4    | Število registrov za branje (N)               |
| 5    |                                               |
| 6    | CRC                                           |
| 7    |                                               |

### Odziv

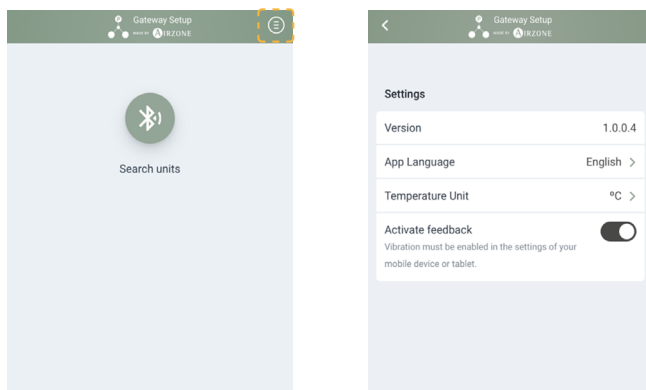
| Bajt    | Polje                                         |
|---------|-----------------------------------------------|
| 0       | Naslov podrejene enote (1–247) (0: oddajanje) |
| 1       | Branje vodenja registrov (3/4)                |
| 2       | Število bajtov za odziv (2·N)                 |
| 3       | Podatki za branje v registru 0                |
| 4       |                                               |
| ...     |                                               |
| 3 + 2·N | Podatki za branje v registru N                |
| 4 + 2·N |                                               |
| 5 + 2·N | CRC                                           |
| 6 + 2·N |                                               |

# Gateway Setup for Panasonic

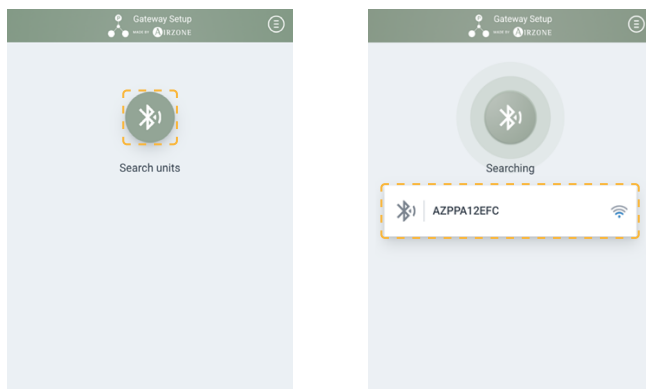
## KONFIGURACIJA OMREŽJA

Če na glavnem zaslonu aplikacije »Gateway Setup for Panasonic« kliknete gumb *Konfiguracija*, lahko izberete delovni jezik aplikacije in temperaturne enote.

- **Različica.** Označuje različico aplikacije.
- **Jezik.** Aplikacija je na voljo v 9 jezikih (nemščina, grščina, angleščina, španščina, francoščina, italijanščina, poljščina, portugalsčina in turščina).
- **Enote.** Celzij (°C) ali Fahrenheit (°F).
- **Aktivne povratne informacije.** Ta funkcija zahteva aktivacijo vibracij v napravi.



Na glavnem zaslonu ponovno kliknite *Bluetooth* za začetek iskanja naprav v bližini. Za nadaljevanje izberite svojo napravo »Aidoo Pro Modbus Panasonic Aquarea«.



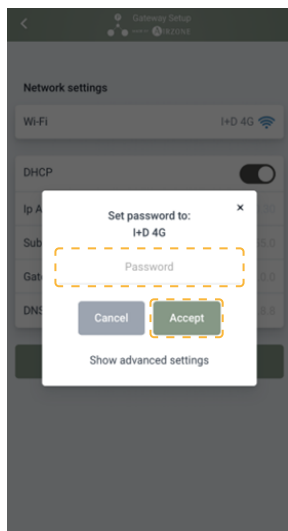
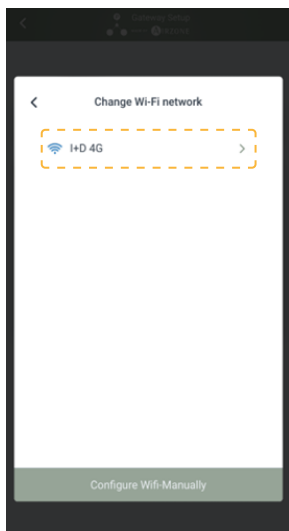
Ko izberete napravo, se bo prikazal meni z informacijami.

- **Ime.** Ime naprave.
- **MAC.** Naslov MAC naprave.
- **Vdelana programska oprema.** Označuje različico naprave.
- **Wi-Fi.** Omrežje, povezano z napravo.
- **Naslov IP.** Prikaže naslov IP naprave.
- **Konfiguracija omrežja.** Omogoča konfiguriranje naprave.

Pritisnite gumb *Tovarniška ponastavitev* za povrnitev začetnih vrednosti.



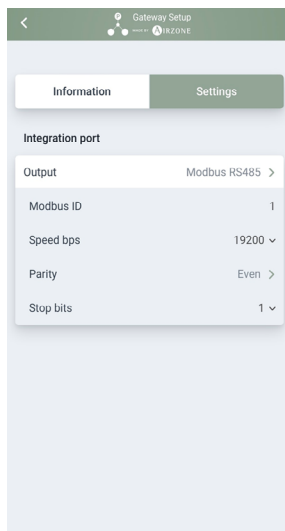
Če vstopite v podmeni *Konfiguracija omrežja*, lahko po potrebi spremenite omrežje Wi-Fi.



## KONFIGURACIJA MODBUS RS-485

Z dostopom do menija za konfiguracijo lahko spremenite naslednje parametre naprave:

- **Modbus ID.** Vrednost med 1 in 255.
- **Hitrost v b/s.** Na voljo je 14 izbirnih hitrosti (100, 300, 500, 600, 1200, 2400, 4800, 7800, 9600, 19200 (privzeto), 38400, 57600, 76800 in 115200 b/s).
- **Pariteta.** Brez, soda ali liha.
- **Zaustavitveni bit.** Izberite vrednost med 1 in 2.



Prenesite aplikacijo Gateway Setup for Panasonic

# Registri Modbus

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

| Registers | Description                        | Values                                                                                                  | Read (R)<br>Write (W) | Operations                      |
|-----------|------------------------------------|---------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------|
| 0         | Operation                          | 0 → OFF<br>1 → ON                                                                                       | R & W                 | 0x03, 0x04,<br>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<br>1 → Heat<br>2 → Heat Tank<br>3 → Tank<br>4 → Cool Tank<br>5 → Cool<br>6 → Auto (Default) | R & W                 | 0x03, 0x04,<br>0x06, 0x10, 0x16 |
|           |                                    | 7 → Auto Tank<br>8 → Auto Heat<br>9 → Auto Heat Tank<br>10 → Auto Cool<br>11 → Auto Cool Tank           | R                     | 0x03, 0x04                      |
| 5         | Heat mode water temperature sensor | 1 → Compensation curve<br>2 → Direct                                                                    | R & W                 | 0x03, 0x04,<br>0x06, 0x10, 0x16 |
| 6         | Cool mode water temperature sensor | 1 → Compensation curve<br>2 → Direct                                                                    | R & W                 | 0x03, 0x04,<br>0x06, 0x10, 0x16 |
| 9         | Zone 1 - Zone 2 ON/OFF             | 1 → On/Off<br>2 → Off/On<br>3 → On/On                                                                   | R & W                 | 0x03, 0x04,<br>0x06, 0x10, 0x16 |
| 10        | Zone 1 sensors                     | 1 → Water temperature<br>2 → External<br>3 → Internal<br>4 → Thermistor                                 | R                     | 0x03, 0x04                      |
| 11        | Zone 2 sensors                     | 1 → Water temperature<br>2 → External<br>3 → Internal<br>4 → Thermistor                                 | R                     | 0x03, 0x04                      |

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

| Registers | Description                           | Values                                                                                                                                                    | Read (R)<br>Write (W) | Operations                   |
|-----------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------|
| 19        | Zone 1: Max. set point temperature    | <b>HEAT</b><br>Water Shift → 5 °C<br>Water → 75 °C<br>Room → 30 °C<br>Pool → 35 °C<br><b>COOL</b><br>Water Shift → 5 °C<br>Water → 20 °C<br>Room → 35 °C  | R                     | 0x03, 0x04                   |
| 20        | Zone 2: Min. set point temperature    | <b>HEAT</b><br>Water Shift → -5 °C<br>Water → 20 °C<br>Room → 10 °C<br>Pool → 15 °C<br><b>COOL</b><br>Water Shift → -5 °C<br>Water → 5 °C<br>Room → 18 °C | R                     | 0x03, 0x04                   |
| 21        | Zone 2: Max. set point temperature    | <b>HEAT</b><br>Water Shift → 5 °C<br>Water → 75 °C<br>Room → 30 °C<br>Pool → 35 °C<br><b>COOL</b><br>Water Shift → 5 °C<br>Water → 20 °C<br>Room → 35 °C  | R                     | 0x03, 0x04                   |
| 30        | Tank ON/OFF                           | 0 → OFF<br>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<br>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<br>0 ~ 50.800 W                                                                                                                             | R                     | 0x03, 0x04                   |

| Registers | Description                                         | Values                                                                   | Read (R)<br>Write (W) | Operations |
|-----------|-----------------------------------------------------|--------------------------------------------------------------------------|-----------------------|------------|
| 46        | Heat mode energy consumption                        | If H/J Series<br>0 ~ 50.800 W                                            | R                     | 0x03, 0x04 |
| 47        | (Cool mode / Heat recovery mode) energy consumption | If H/J Series<br>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<br>1XXX → H + error<br>2XXX → F + error<br>3XXX → U + error | R                     | 0x03, 0x04 |
| 64        | Deice status                                        | 0 → OFF<br>1 → ON                                                        | R                     | 0x03, 0x04 |
| 70        | Current error status                                | 0 → No error<br>1 → Error                                                | R                     | 0x03, 0x04 |
| 81        | Tank connection                                     | 0 → No<br>1 → Yes                                                        | R                     | 0x03, 0x04 |
| 82        | Number Zones                                        | 1 → 1 Zone<br>2 → 2 Zones                                                | R                     | 0x03, 0x04 |
| 83        | Zone 1 setup                                        | 1 → Room<br>2 → Pool                                                     | R                     | 0x03, 0x04 |
| 84        | Zone 2 setup                                        | 1 → Room<br>2 → Pool                                                     | R                     | 0x03, 0x04 |
| 85        | Direction                                           | 1 → Room<br>2 → Tank                                                     | R                     | 0x03, 0x04 |
| 86        | Outdoor type                                        | 1 → STD<br>2 → TCAP<br>3 → HWT                                           | R                     | 0x03, 0x04 |
| 112       | Water pressure                                      | If K Series onwards<br>0 ~ 5,08 bar<br>Resolution: 0,02 bar              | R                     | 0x03, 0x04 |
| 117       | Model series selection                              | 0 - 1 → H-Series<br>2 → J-Series<br>3 → K-Series<br>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)<br>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<br>1 → OFF<br>2 → ON                       | R                     | 0x03, 0x04 |
| 270       | Quiet (Actual)                                                  | 0 → Invalid<br>1 → OFF<br>2 → ON                       | R                     | 0x03, 0x04 |
| 360       | Heat mode energy consumption (LSB)                              | If K Series onwards<br>0 ~ 65.534 W<br>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<br>0 ~ 65.534 W<br>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<br>0 ~ 65.534 W<br>Resolution: 1 W | R                     | 0x03, 0x04 |
| 365       | Tank mode energy consumption (MSB)                              |                                                        |                       |            |

# Kode napak

## 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                      | <ul style="list-style-type: none"> <li>Indoor / Outdoor connection wire</li> <li>Indoor / Outdoor PCB</li> <li>Specification and combination table in catalogue</li> </ul>                                |
| H15               | Outdoor compressor temperature sensor abnormality        | Continue for 5s                             | <ul style="list-style-type: none"> <li>Compressor temperature sensor (defective or disconnected)</li> </ul>                                                                                               |
| H20               | Water pump abnormality                                   | Continue for 10s                            | <ul style="list-style-type: none"> <li>Indoor PCB</li> <li>Water pump (malfunction)</li> </ul>                                                                                                            |
| H23               | Indoor refrigerant liquid temperature sensor abnormality | Continue for 5s                             | <ul style="list-style-type: none"> <li>Refrigerant liquid temperature sensor (defective or disconnected)</li> </ul>                                                                                       |
| H27               | Service valve error                                      | Continue for 5 minutes                      | <ul style="list-style-type: none"> <li>High pressure sensor (defective or disconnected)</li> </ul>                                                                                                        |
| H28               | Abnormal solar sensor                                    | Continue for 5s                             | <ul style="list-style-type: none"> <li>Solar temperature sensor (defective or disconnected)</li> </ul>                                                                                                    |
| H31               | Abnormal swimming pool sensor                            | Continue for 5s                             | <ul style="list-style-type: none"> <li>Pool temperature sensor (defective or disconnected)</li> </ul>                                                                                                     |
| H36               | Abnormal buffer tank sensor                              | Continue for 5s                             | <ul style="list-style-type: none"> <li>Buffer tank sensor (defective or disconnected)</li> </ul>                                                                                                          |
| H38               | Brand code not match                                     | When indoor and outdoor brand code not same | -                                                                                                                                                                                                         |
| H42               | Compressor low pressure abnormality                      | -                                           | <ul style="list-style-type: none"> <li>Outdoor pipe temperature sensor</li> <li>Clogged expansion valve or strainer</li> <li>Insufficient refrigerant</li> <li>Outdoor PCB</li> <li>Compressor</li> </ul> |
| H43               | Abnormal Zone 1 sensor                                   | Continue for 5s                             | <ul style="list-style-type: none"> <li>Water temperature Zone 1 sensor</li> </ul>                                                                                                                         |
| H44               | Abnormal Zone 2 sensor                                   | Continue for 5s                             | <ul style="list-style-type: none"> <li>Water temperature Zone 2 sensor</li> </ul>                                                                                                                         |
| H62               | Water flow switch abnormality                            | Continue for 1 minute                       | <ul style="list-style-type: none"> <li>Water flow switch</li> </ul>                                                                                                                                       |

| 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)<br>· Water pump malfunction<br>· 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<br>· 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<br>· Water pump or water leakage<br>· Clogged expansion valve or strainer<br>· Excess refrigerant<br>· Outdoor PCB |
| H99               | Indoor heat exchanger freeze prevention          | -                                                                            | · Indoor heat exchanger<br>· 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  | <ul style="list-style-type: none"> <li>Compressor tank temperature sensor</li> <li>Clogged expansion valve or strainer</li> <li>Insufficient refrigerant</li> <li>Outdoor PCB</li> <li>Compressor</li> </ul> |
| F16               | Total running current protection                      | 3 times occurrence within 20 minutes  | <ul style="list-style-type: none"> <li>Excess refrigerant</li> <li>Outdoor PCB</li> </ul>                                                                                                                    |
| F20               | Outdoor compressor overheating protection             | 4 times occurrence within 30 minutes  | <ul style="list-style-type: none"> <li>Compressor tank temperature sensor</li> <li>Clogged expansion valve or strainer</li> <li>Insufficient refrigerant</li> <li>Outdoor PCB</li> <li>Compressor</li> </ul> |
| F22               | IPM (power transistor) overheating protection         | 3 times occurrence within 30 minutes  | <ul style="list-style-type: none"> <li>Improper heat exchange</li> <li>IPM (power transistor)</li> </ul>                                                                                                     |
| F23               | Outdoor direct current (DC) peak detection            | 7 times occurrence continuously       | <ul style="list-style-type: none"> <li>Outdoor PCB</li> <li>Compressor</li> </ul>                                                                                                                            |
| F24               | Refrigeration cycle abnormality                       | 2 times occurrence within 20 minutes  | <ul style="list-style-type: none"> <li>Insufficient refrigerant</li> <li>Outdoor PCB</li> <li>Compressor low compression</li> </ul>                                                                          |
| F25               | Cooling / Heating cycle changeover abnormality        | 4 times occurrence within 30 minutes  | <ul style="list-style-type: none"> <li>4-way valve</li> <li>V-coil</li> </ul>                                                                                                                                |
| F27               | Pressure switch abnormality                           | Continue for 1 minute                 | <ul style="list-style-type: none"> <li>Pressure switch</li> </ul>                                                                                                                                            |
| F29               | Low discharge superheat                               | 1 time occurrence within 2550 minutes | <ul style="list-style-type: none"> <li>Discharge temperature sensor</li> <li>Discharge pressure sensor</li> <li>Pressure switch</li> <li>Outdoor PCB</li> </ul>                                              |
| F30               | Water outlet sensor 2 abnormality                     | Continue for 5s                       | <ul style="list-style-type: none"> <li>Water outlet sensor 2 (defective or disconnected)</li> </ul>                                                                                                          |
| F32               | Abnormal internal thermostat                          | Continue for 5s                       | <ul style="list-style-type: none"> <li>Control panel PCB thermostat</li> </ul>                                                                                                                               |
| F36               | Outdoor air temperature sensor abnormality            | Continue for 5s                       | <ul style="list-style-type: none"> <li>Outdoor air temperature sensor (defective or disconnected)</li> </ul>                                                                                                 |
| F37               | Indoor water inlet temperature sensor abnormality     | Continue for 5s                       | <ul style="list-style-type: none"> <li>Water inlet temperature sensor (defective or disconnected)</li> </ul>                                                                                                 |
| F40               | Outdoor discharge pipe temperature sensor abnormality | Continue for 5s                       | <ul style="list-style-type: none"> <li>Outdoor discharge pipe temperature sensor (defective or disconnected)</li> </ul>                                                                                      |
| F41               | PFC control                                           | 4 times occurrence within 10 minutes  | <ul style="list-style-type: none"> <li>Voltage at PFC</li> </ul>                                                                                                                                             |

| 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<br>· Outdoor PCB<br>· 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<br>· Water pump or water leakage<br>· Clogged expansion valve or strainer<br>· Excess refrigerant<br>· Outdoor PCB |

# Panasonic



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