

Medal Aircon Recommended settings for commisioning Aquarea systems

| STEP | Process |
|------|--|
| 1 | Fill in the customer, unit and site details on the Commisioning Sheet |
| 2 | Physical inspection of unit, installation, electrical & pipe details |
| 3 | Ensure Mechanical Strainer is fitted |
| 4 | Ensure Glycol is present in monobloc units |
| 5 | Check Water Pressure |
| 6 | Check RCDs |
| 7 | Check Connections FLOW is OUT, RETURN is IN |
| 8 | Ensure system is filled and air has been removed |
| 9 | Power up the controller and set the time |
| 10 | Run in heating mode and FORCE to perform final purge and check flow |
| 11 | If DHW tank fitted check heat is going only to the heating circuit |
| 12 | Set the controller up with TEST settings |
| 13 | Run the unit in all modes to confirm correct operation |
| 14 | Set the controller to ACTUAL settings applicable for the application |
| 15 | Fill in the balance of the Commisioning Report and hand over to client |
| 16 | Log the Report with Panasonic Pro Club & mark@medalaircon.co.uk |

Note - The Old Rads settings are for HT models only

| SPECIAL FUNCTION SETTINGS - Turn Unit off and press/hold SET & CHECK | | | | | | |
|---|-------------|--|--|---------|---------|----------|
| FUNCTION | | TEST | UFH | LT Rads | HT Rads | Old Rads |
| On Screen | | Commisioning | Setting | Setting | Setting | Setting |
| room con | | NO | Set to ON if using a remote thermostat | | | |
| HEATER CAP | | Leave at factory setting unless site conditions require downrating | | | | |
| Anti FrE | | YES | NO for splits, YES for monobloc unless 40% Glycol used | | | |
| TANK con | | YES if an external tank is used | | | | |
| SOLAR PrY | | NO | | | | |
| HEAT PrY | | NO | Normally NO but confirm with customer | | | |
| Heat pry yes | HEAT int | 1.0 hours | | | | |
| | TANK int | 0.4 hours | | | | |
| | BOOSTER htr | Set to YES if the tank heater is powered from the Aquarea | | | | |
| | BOOSTER dIY | 0.25 hours | | | | |
| Strl Fun | | Set to YES if tank set temperature is lower than 48C & BOOSTER htr YES | | | | |
| strifun yes | Str | SUNDAY 23.00 | | | | |
| | Strl boi | 65C | | | | |
| | Str oPr | 1.0 hours | | | | |
| bPAn htr | | NO unless a base pan heater is fitted in which case YES | | | | |
| If Yes | bPAn htr | Normally choose B | | | | |
| drY con | | DO NOT USE - except for drying concrete pre commisioning | | | | |

| TEMPERATURE SETTINGS - Turn unit off and press/hold SET | | | | | | |
|--|------|--|---------|---------|----------|--|
| FUNCTION | TEST | UFH | LT Rads | HT Rads | Old Rads | |
| out lo | -5 | -5 | -5 | -5 | -5 | |
| out Hi | 15 | 15 | 15 | 15 | 15 | |
| H2O Lo | 55 | 35 | 45 | 50 | 60 | |
| H2O Hi | 45 | 30 | 30 | 30 | 40 | |
| HEAT OFF | 30 | 20 | | | | |
| HEATER OUT ON | 15 | -7 for LT models or -10C for TCAP or HT models | | | | |
| TANK SET | 50 | Discuss with customer but 50C is safe | | | | |

Aquarea Water TD for commisioning

Temperature differences for 3KW boost heater running in FORCE mode

To test for flow rate put the unit in FORCE for 12 minutes. If it trips H62 then flow is too low.

Use digital thermometer to measure TD between flow and return pipes with 3KW Heater engaged

If flow is too low increase pump speed. If flow is too high then decrease pump speed.

Models 03 to 09 only have a 3KW Heater. Models 12 to 16 in 1ph have two 3KW heaters

Models 12 to 16 in 3ph have three 3KW heaters

Use Amp meter to ensure only the first 3KW stage is engaged for TD readings

Split Systems operating with pure water

| | Model Ref | Heating KW | Required l/min | Minimum l/min | Required TD C | Minimum TD C |
|------|-----------|------------|----------------|---------------|---------------|--------------|
| LT | WH-SDF03 | 3 | 9 | 5 | 5.0 | 8.6 |
| | WH-SDF05 | 5 | 14 | 5 | 3.0 | 8.6 |
| | WH-SDF07 | 7 | 20 | 10 | 2.1 | 4.3 |
| | WH-SDF09 | 9 | 26 | 10 | 1.7 | 4.3 |
| | WH-SDF12 | 12 | 34 | 19 | 1.3 | 2.3 |
| | WH-SDF14 | 14 | 40 | 19 | 1.1 | 2.3 |
| TCAP | WH-SDF16 | 16 | 46 | 19 | 0.9 | 2.3 |
| | WH-SXF09 | 9 | 26 | 10 | 1.7 | 4.3 |
| | WH-SXF12 | 12 | 34 | 19 | 1.3 | 2.3 |
| HT | WH-SXF16 | 16 | 46 | 19 | 0.9 | 2.3 |
| | WH-SHF09 | 9 | 26 | 10 | 1.7 | 4.3 |
| | WH-SHF12 | 12 | 34 | 19 | 1.3 | 2.3 |

Monobloc Systems operating with pure water

| | Model Ref | Heating KW | Required l/min | Minimum l/min | Required TD C | Minimum TD C |
|------|-----------|------------|----------------|---------------|---------------|--------------|
| LT | WH-MDF06 | 6 | 17 | 10 | 2.5 | 4.3 |
| | WH-MDF09 | 9 | 26 | 10 | 1.7 | 4.3 |
| | WH-MDF12 | 12 | 34 | 19 | 1.3 | 2.3 |
| | WH-MDF14 | 14 | 40 | 19 | 1.1 | 2.3 |
| | WH-MDF16 | 16 | 46 | 19 | 0.9 | 2.3 |
| TCAP | WH-MXF09 | 9 | 26 | 10 | 1.7 | 4.3 |
| | WH-MXF12 | 12 | 34 | 19 | 1.3 | 2.3 |
| HT | WH-MHF09 | 9 | 26 | 10 | 1.7 | 4.3 |
| | WH-MHF12 | 12 | 34 | 19 | 1.3 | 2.3 |

Monobloc Systems operating with 40% Glycol Mix (Protection down to -22C)

| | Model Ref | Heating KW | Required l/min | Minimum l/min | Required TD C | Minimum TD C |
|------|-----------|------------|----------------|---------------|---------------|--------------|
| LT | WH-MDF06 | 6 | 21 | 10 | 2.5 | 4.9 |
| | WH-MDF09 | 9 | 32 | 10 | 1.7 | 4.9 |
| | WH-MDF12 | 12 | 42 | 19 | 1.3 | 2.6 |
| | WH-MDF14 | 14 | 49 | 19 | 1.1 | 2.6 |
| | WH-MDF16 | 16 | 56 | 19 | 0.9 | 2.6 |
| TCAP | WH-MXF09 | 9 | 32 | 10 | 1.7 | 4.9 |
| | WH-MXF12 | 12 | 42 | 19 | 1.3 | 2.6 |
| HT | WH-MHF09 | 9 | 32 | 10 | 1.7 | 4.9 |
| | WH-MHF12 | 12 | 42 | 19 | 1.3 | 2.6 |

Actual Aquarea Capacity for different applications at typical design ambient

MCS requires that a heat pump is capable of doing 100% of the duty required at the design air temperature
For most applications the design ambient is around -3C so duties are shown below

Standard LT models WH-SD and WH-MD

| Model Capacity | Nominal Capacity | UF Heat at 35C | LT Rads at 45C | HT Rads at 50C | Old Rads at 60C |
|----------------|------------------|----------------|----------------|----------------|-----------------|
| WH-SDF03 | 3.0 KW | 3.2 KW | 3.2 KW | 3.2 KW | N/A |
| WH-SDF05 | 5.0 KW | 4.2 KW | 4.0 KW | 3.8 KW | N/A |
| WH-MDC05 | 5.0 KW | 4.6 KW | 4.5 KW | 4.4 KW | N/A |
| WH-MDF06 | 6.0 KW | 5.1 KW | 5.1 KW | 5.2 KW | N/A |
| WH-SDF07 | 7.0 KW | 5.9 KW | 5.8 KW | 5.6 KW | N/A |
| WH-M/SDF09 | 9.0 KW | 7.3 KW | 7.2 KW | 7.2 KW | N/A |
| WH-M/SDF12 | 12.0 KW | 10.7 KW | 9.9 KW | 9.3 KW | N/A |
| WH-M/SDF14 | 14.0 KW | 11.5 KW | 10.6 KW | 9.8 KW | N/A |
| WH-M/SDF16 | 16.0 KW | 12.2 KW | 11.1 KW | 10.2 KW | N/A |

High Efficiency TCAP models WH-SX and WH-MX

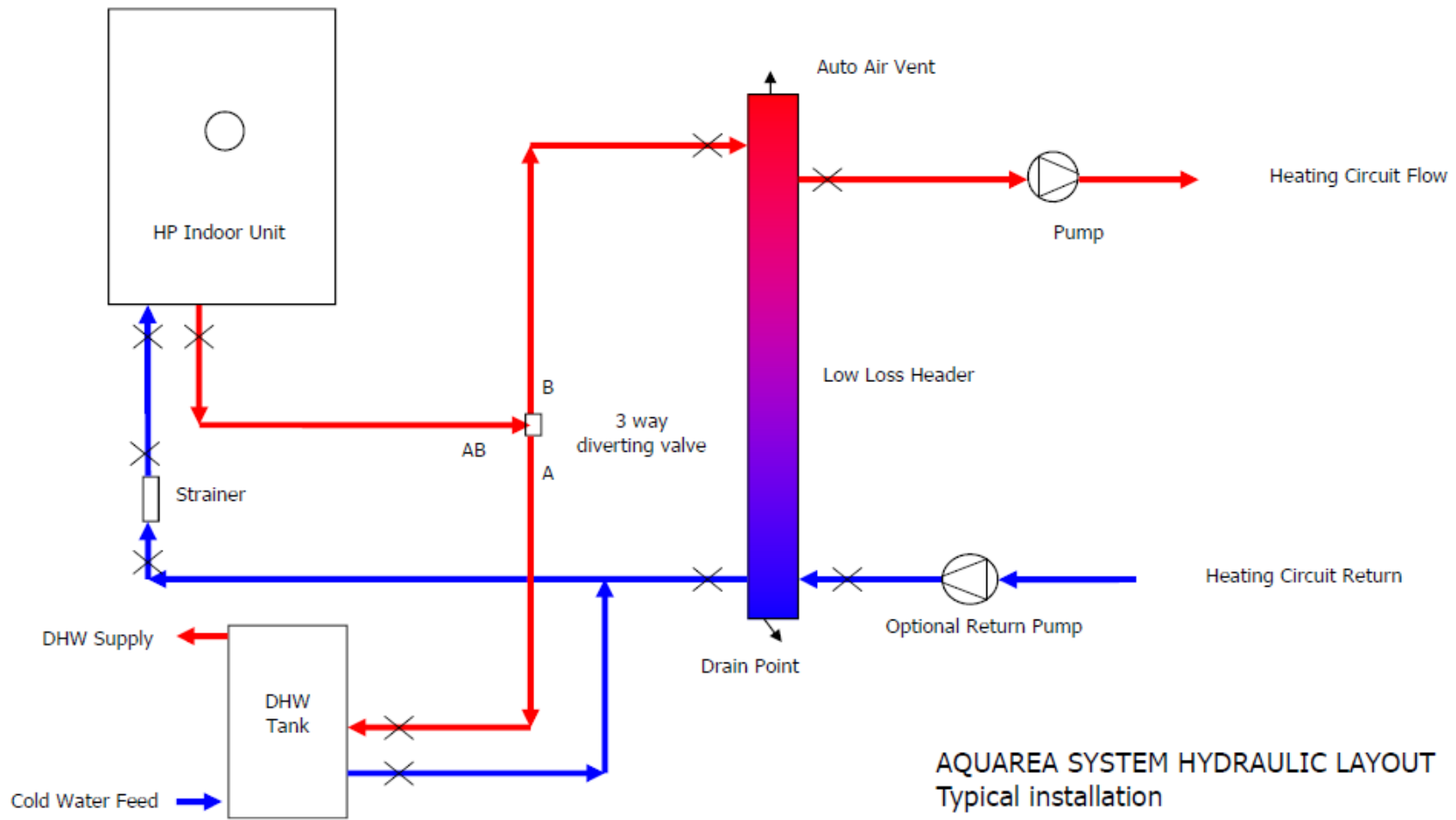
| Model Capacity | Nominal Capacity | UF Heat at 35C | LT Rads at 45C | HT Rads at 50C | Old Rads at 60C |
|----------------|------------------|----------------|----------------|----------------|-----------------|
| WH-M/SXF09 | 9.0 KW | 9.0 KW | 9.0 KW | 9.0 KW | N/A |
| WH-M/SXF12 | 12.0 KW | 12.0 KW | 12.0 KW | 12.0 KW | N/A |
| WH-SXF16 | 16.0 KW | 16.0 KW | 16.0 KW | 16.0 KW | N/A |

High Temperature HT models WH-SH and WH-MH

| Model Capacity | Nominal Capacity | UF Heat at 35C | LT Rads at 45C | HT Rads at 50C | Old Rads at 60C |
|----------------|------------------|----------------|----------------|----------------|-----------------|
| WH-M/SHF09 | 9.0 KW | 9.0 KW | 9.0 KW | 9.0 KW | 9.0 KW |
| WH-M/SHF12 | 12.0 KW | 12.0 KW | 11.2 KW | 10.8 KW | 10.2 KW |

AQUAREA CONNECTIONS

| | | |
|----|---|--|
| 1 | 2WV CLOSE | ONLY FOR COOLING MODELS |
| 2 | 2WV OPEN | ONLY FOR COOLING MODELS |
| 3 | 2WV NEUTRAL | ONLY FOR COOLING MODELS |
| 4 | 3WV CLOSE | NOT NORMALLY USED |
| 5 | 3WV OPEN | TO GREY AND WHITE ON SALUS VALVE OPENS A SHUTS B |
| 6 | 3WV NEUTRAL | TO BLUE ON SALUS VALVE |
| 7 | LIVE TO BOOSTER (IMMERSION) HEATER | |
| 8 | NEUTRAL TO BOOSTER (IMMERSION) HEATER | |
| 9 | LIVE TO CONTROLLER L AND COM | |
| 10 | NEUTRAL TO CONTROLLER | |
| 11 | ONLY FOR COOLING MODELS | |
| 12 | SWITCHED HEATING FEED FROM CONTROLLER NO | |
| 13 | OLP - NORMALLY JOIN TO 14 | |
| 14 | OLP - NORMALLY JOIN TO 13 | |
| 15 | TANK SENSOR | |
| 16 | TANK SENSOR | |
| 17 | EXTERNAL OFF SIGNAL NORMALLY JOINED TO 18 | |
| 18 | EXTERNAL OFF SIGNAL NORMALLY JOINED TO 17 | |
| 19 | SOLAR 3WV NEUTRAL | |
| 20 | SOLAR 3WV CLOSE | |
| 21 | SOLAR 3WV OPEN | |
| 22 | SOLAR PUMP | |
| 23 | SOLAR PUMP | |



AQUAREA SYSTEM HYDRAULIC LAYOUT
 Typical installation

All main pipes to be 28mm or above

Water Pipe Flow Rates

Based upon copper tube carrying water, not glycol

| Size Diameter | Ideal Flow l/s | Max Flow l/s | Ideal Flow l/min | Max Flow l/min | Ideal KW | Max KW | KPa at max |
|---------------|----------------|--------------|------------------|----------------|----------|--------|------------|
| 6mm | 0.02 | 0.03 | 1.2 | 1.8 | 0.42 | 0.63 | 5.7 |
| 8mm | 0.03 | 0.05 | 2.0 | 3.0 | 0.7 | 1.05 | 3.6 |
| 10mm | 0.06 | 0.09 | 3.6 | 5.4 | 1.26 | 1.89 | 2.5 |
| 12mm | 0.09 | 0.13 | 5.2 | 7.8 | 1.82 | 2.73 | 1.8 |
| 15mm | 0.13 | 0.20 | 8.0 | 12.0 | 2.8 | 4.2 | 1.5 |
| 22mm | 0.30 | 0.45 | 18.0 | 27.0 | 6.3 | 9.45 | 0.8 |
| 28mm | 0.50 | 0.75 | 30.0 | 45.0 | 10.5 | 15.75 | 0.7 |
| 35mm | 0.78 | 1.17 | 46.8 | 70.2 | 16.38 | 24.57 | 0.6 |
| 42mm | 1.15 | 1.72 | 68.8 | 103.2 | 24.08 | 36.12 | 0.5 |
| 54mm | 1.95 | 2.93 | 117.2 | 175.8 | 41.02 | 61.53 | 0.3 |

Sizing rules of thumb

Based upon maintaining around 20C in an ambient temperature of -3C
These are very approximate

| Application | Watts/m2 |
|-------------------------------|----------|
| Old house without insulation | 140 |
| Old house but with insulation | 100 |
| House built after 1990 | 80 |
| House built after 2005 | 60 |
| New House | 50 |



Typical Radiator Capacity per metre length

Based upon Myson Select Compact

Typical performance with **gas boiler**, water 75/65C and air 20C so 50C TD

| Height | Type 11 | Type 21 | Type 22 | Type 33 |
|--------|---------|---------|---------|---------|
| 300mm | 0.55 | 0.77 | 0.97 | 1.35 |
| 400mm | 0.71 | 0.97 | 1.23 | NA |
| 500mm | 0.87 | 1.17 | 1.49 | NA |
| 600mm | 1.02 | 1.36 | 1.73 | 2.36 |
| 700mm | 1.17 | 1.54 | 1.96 | NA |

Single Convector - Type 11G
(with factory fitted top grille and side panels)



Double Panel "Xtra" - Type 21G
(with factory fitted top grille and side panels)



Typical performance with **heat pump**, water 52.5/47.5C and air 20C so 30C TD

| Height | Type 11 | Type 21 | Type 22 | Type 33 |
|--------|---------|---------|---------|---------|
| 300mm | 0.28 | 0.4 | 0.49 | 0.69 |
| 400mm | 0.37 | 0.5 | 0.63 | NA |
| 500mm | 0.45 | 0.6 | 0.75 | NA |
| 600mm | 0.52 | 0.69 | 0.87 | 1.18 |
| 700mm | 0.59 | 0.78 | 0.98 | NA |

Double Convector - Type 22G
(with factory fitted top grille and side panels)



Triple Convector - Type 33G
(with factory fitted top grille and side panels)



Typical Hot Water Cylinder Sizes

| Application | Cylinder |
|------------------------------------|------------|
| 1 bed / 1 shower | 130 litres |
| 1 bed / 1 bath / 1 shower | 150 litres |
| 2 bed / 1 bath / 1 shower | 175 litres |
| 3 bed / 1 bath / 2 showers | 215 litres |
| 4 bed / 1 bath / 3 showers | 255 litres |
| Large domestic or small commercial | 305 litres |
| Small Hotel 8 beds / 8 baths | 500 litres |

Allow 50 litres per person per day for water use



16.1 Refrigeration Cycle System

In order to diagnose malfunctions, make sure that there are no electrical problems before inspecting the refrigeration cycle.

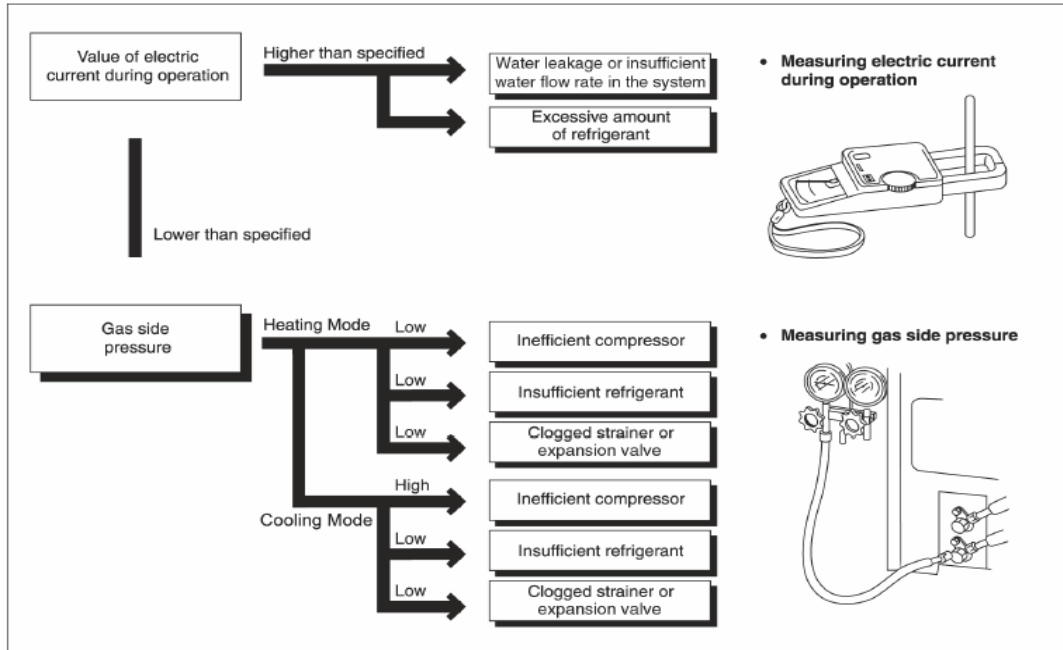
Such problems include insufficient insulation, problem with the power source, malfunction of a compressor and a fan.

The normal pressure of the refrigeration cycle depends on various conditions, the standard values for them are shown in the table on the right.

Normal Pressure (Standard)

| | Gas pressure MPa (kg/cm ² G) |
|--------------|--|
| Heating Mode | 2.3 ~ 2.9 (23 ~ 29) |
| Cooling Mode | 0.9 ~ 1.2 (9 ~ 12) |

- ★ Condition:
- Outdoor temperature 7°C at heating mode and 35°C at cooling mode.
 - Compressor operates at rated frequency.



| Condition of the Air-to-Water Heatpump indoor and outdoor units | Heating Mode | | | Cooling Mode | | |
|---|--------------|---------------|-----------------------------------|--------------|---------------|-----------------------------------|
| | Low Pressure | High Pressure | Electric current during operation | Low Pressure | High Pressure | Electric current during operation |
| Water leakage or insufficient water flow rate in the system | ➔ | ➔ | ➔ | ➔ | ➔ | ➔ |
| Excessive amount of refrigerant | ➔ | ➔ | ➔ | ➔ | ➔ | ➔ |
| Inefficient compression | ➔ | ➔ | ➔ | ➔ | ➔ | ➔ |
| Insufficient refrigerant (gas leakage) | ➔ | ➔ | ➔ | ➔ | ➔ | ➔ |
| Outdoor heat exchange deficiency | ➔ | ➔ | ➔ | ➔ | ➔ | ➔ |
| Clogged expansion valve or Strainer | ➔ | ➔ | ➔ | ➔ | ➔ | ➔ |

- Carry out the measurements of pressure, electric current, and temperature fifteen minutes after an operation is started.

AQUAREA FAULT FINDING CHART - F series and above

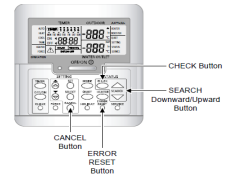
A fault code is shown if a fault condition exists or has tripped the unit

A non serious fault will not show but will be logged into the memory as the last fault

To see the memory press (& hold - pre F series) CHECK then scroll to last fault

To clear the fault memory power down, power up and press / hold ERROR RESET

Remember - the system does not check for a fault until it needs to operate that part of the system



| Code | Meaning | Quantity | Suggested course of action |
|------|-----------------------------------|-----------------|--|
| H00 | No Fault | | |
| H12 | Indoor and Outdoor unit mismatch | 90s after power | Check IDU, ODU, PCBs and wiring |
| H15 | Compressor Temp sensor fail | After 5s | Sensor failed or missing |
| H20 | Water Pump Fail | After 10s | Faulty pump or PCB |
| H23 | IDU liquid temp sensor fail | After 5s | Sensor failed or missing |
| H27 | Service Valve Error | After 5 mins | High Pressure Sensor operated, failed or missing |
| H38 | Indoor / Outdoor Unit mismatch | | Mixup over units or incorrect PCB replacement |
| H42 | Low Pressure | | Low gas, pipe blockage, sensor, compressor etc. |
| H62 | Low Water Flow | After 1 min | Not enough water flow |
| h63 | Low Pressure | After 5s | LP trip or sensor failed / missing |
| H64 | High Pressure | After 5s | HP trip or sensor failed / missing |
| H65 | De-ice circulation failure | After 10s | Water flow detected in defrost (prob external pump) |
| H70 | Back Up Heater Failure | After 1 min | No power to PS2 or klixons tripped |
| H72 | Tank sensor problem | After 5s | Faulty or disconnected tank sensor |
| H76 | PCB & Controller disconnected | | In memory at startup |
| H90 | IDU / ODU disconnected | After 1 min | Connecting cable or PCBs |
| H91 | Tank OLP | After 1 min | Tank OLP (Panasonic tank) or no link 13 & 14 |
| H95 | IDU / ODU wrong connection | | Incorrect Voltage at ODU |
| H98 | Outdoor HP Trip | | Probably nuisance trip |
| H99 | Indoor HX Freeze Protection | In cooling only | Gas charge or flow |
| F12 | OD Very High Pressure Trip | 4 x in 20 mins | Very High Pressure (more than H98) |
| F14 | Compressor Revolution Abnormal | 4 x in 20 mins | Duff Compressor or inverter |
| F15 | OD Fan lock | 2 x in 30 mins | Outdoor PCB or fan motor |
| F16 | Overcurrent Protection | 3 x in 20 mins | Excess gas or outdoor PCB |
| F20 | Compressor Overheat | 4 x in 30 mins | Low gas or gas starvation |
| F22 | Overheating IPM | 3 x in 30 mins | IPM fail or problem with heat transfer |
| F23 | High DC Current | 7 x | Outdoor PCB or Compressor |
| F24 | Refrigerant Cycle Abnormal | 2 x in 20 mins | Low gas, faulty PCB or faulty compressor |
| F25 | 4 way valve failure | 4 x in 30 mins | Low Gas, faulty 4WV or solenoid coil (or disconnected) |
| F27 | Pressure Switch Abnormal | After 1 min | Pressure Switch |
| F30 | Water Outlet Sensor 2 fault | After 5s | Faulty or disconnected sensor |
| F36 | Outdoor Air Sensor Faulty | After 5s | Faulty or disconnected sensor |
| F37 | Water Inlet Temp Sensor Faulty | After 5s | Faulty or disconnected sensor |
| F40 | Discharge Pipe Temp Sensor Faulty | After 5s | Faulty or disconnected sensor |
| F41 | PFC Control | 4 x in 10 mins | Voltage at PFC |
| F42 | Outdoor HX sensor Faulty | After 5s | Faulty or disconnected sensor |
| F43 | Outdoor Defrost Sensor Faulty | After 5s | Faulty or disconnected sensor |
| F45 | Water Outlet Temp Sensor Faulty | After 5s | Faulty or disconnected sensor |
| F46 | Outdoor Current Transformer Fault | | Low gas or faulty PCB / Compressor |
| F48 | Outdoor EVA temp sensor faulty | After 5s | Faulty or disconnected sensor |
| F49 | OD Bypass Outlet Sensor faulty | After 5s | Faulty or disconnected sensor |
| F95 | OD High Pressure in cooling | | High gas / low flow / high temp etc. |