# ECO G, the gas driven VRF

ECO G

The advanced Gas Driven VRF system offers increased efficiency and performance across the range. Improvements include increased part load performance, reduced gas consumption with a Miller-cycle engine and reduced electrical consumption by using DC-Fan motors.

## 2-Pipe ECO G GE3 Series R410A.

Designed for better energy efficiency.

## 3-Pipe ECO G GF3 Series R410A.

Domestic hot water can be supplied by effectively using waste heat generated during heating and cooling operation.

### 1 Limited electric supply

Electric consumption of ECO G is only 9% compared to ECOi because gas engine is utilized for the compressor driving force.

### 2 High demand of DHW with heating and cooling cogeneration

DHW is produced effectively thanks to heat from engine exhaust during heating and cooling.

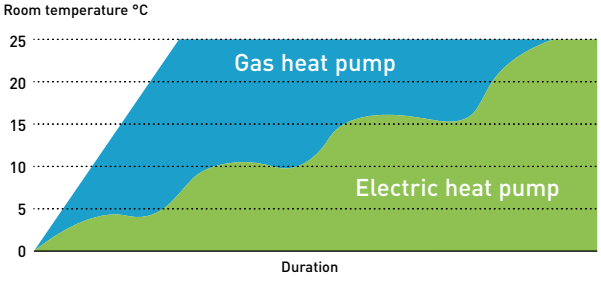
### 3 Open and flexible design

ECO G system is designed to connect various Indoor units and controllers which are available for ECOi systems. With GE3 series, Pump Down system has been implemented to answer commercial needs.

### 4 Quick start up in heating at low ambient temperature

Gas heat pump systems make your building comfortably warm with a quick start by using waste heat from engine.
Heating mode works from an ambient temperature of -21 °C.

**Comparison of heating capacity.**




## GE3/GF3 connectable indoor units

| Type | Model number reference | 2-Pipe ECO G GE3 Series | 3-Pipe ECO G GF3 Series |
|---|---|---|---|
| Standard A2A indoor units | — | Yes [1] | Yes [1] |
| Water heat exchanger | PAW-250/500W(P)5G | Yes [2] | No |
| High static pressure hide-away | S-ME2E5 | Yes | No |
| Air curtain with DX coil | PAW-EAIRC-HS/LS | Yes | Yes [3] |
| AHU connection kit | PAW-MAH3M | Yes | Yes [3] |

1) Except for 1,5 kW capacity. 2) Allowed 1:1 and also mixed. If mixed, not operate at the same time WHE + DX only operate separately. 3) Smaller capacity than 16 kW only.

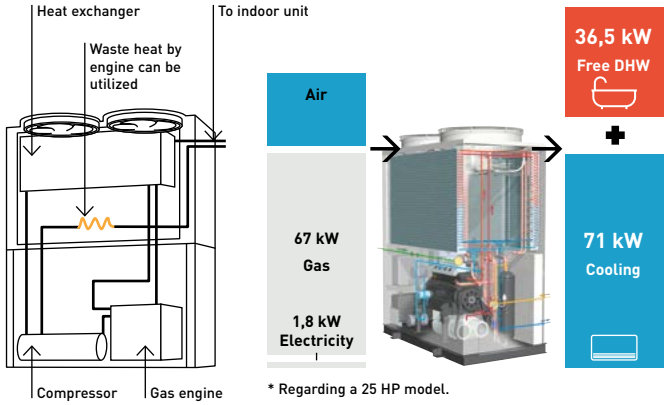
# ECO G, the gas driven VRF

ECO G satisfies special requirements for your application and offers an environmentally friendly solution with Panasonic professional technology, providing reliable quality given its long development history, since 1985.

**Our ECO G VRF range of commercial systems is leading the industry in the development of efficient and flexible systems.**

**200.000**
GHP outdoor units sold all over the world

**1985**
Introduces first GHP (Gas Heat Pump) VRF air conditioner.




* Regarding a 25 HP model.

## What is GHP? The Gas Heat Pump (GHP)

Panasonic Gas Heat Pump is a direct expansion system, with a compressor the same as the VRF system. A Gas engine is used as the driving force of the compressor instead of an electric motor. This gas engine compressor drive has 2 advantages:

1 | Waste heat available from the gas engine.
2 | No need for motor power consumption thanks to gas engine.

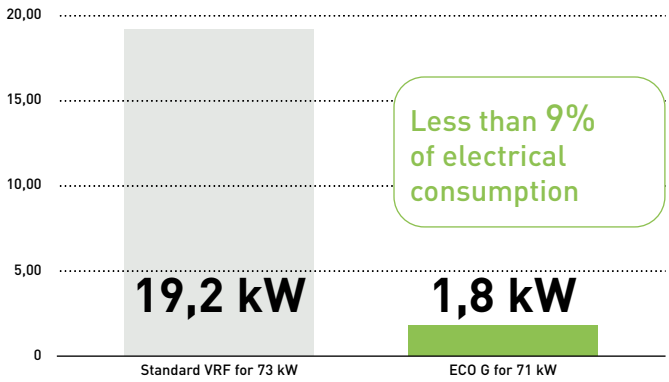
GHP is the natural choice for commercial projects, especially for those projects where electrical power restrictions apply.

## Power supply problems?

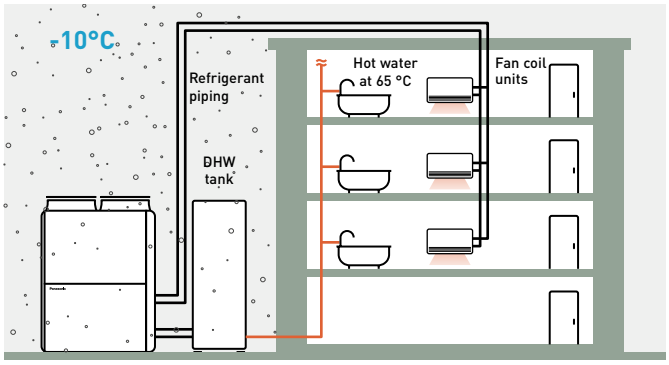
If you are short of electric power, our ECO G is a perfect solution.

- Runs on natural gas or LPG and just needs single phase supply
- Enables the building's electrical power supply to be used for other critical electrical demands
- Reduces capital cost to upgrade power substations to run heating and cooling systems
- Reduces power loadings within a building especially during peak periods
- Electricity supply freed up for other uses such as IT servers, commercial refrigeration, manufacturing, lighting, etc...

**Limited electricity area.**
Comparison of electrical consumption on a 71 kW outdoor unit.




**Application example: Hotel.**



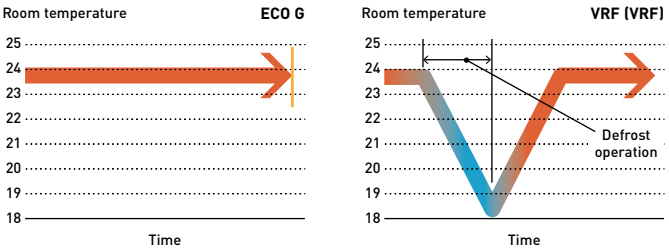

No need additional electric heaters. * This scheme is also valid with WHE.

## High demand of domestic hot water in heating and cooling

The rejected heat from the engine is available for DHW production and can supply up to 46 kW of hot water at 65 °C. DHW at 65 °C is also ready to use in heating without additional electric heaters.

## Quick start up and great heating capacity at low ambient temperature.

Waste heat from gas engine is utilized to raise temperature faster than electric VRF systems.
This contributes great heating capacity at extremely low ambient temperature.




**Lowest nitrogen oxide emissions.**
The ECO G VRF systems have low nitrogen oxide emissions. In a pioneering development, the Panasonic ECO G features a brand lean-burn combustion system that utilizes air fuel ratio feedback control to reduce NOx emissions to an all time low.

**Water chiller option.**
Our ECO G system is also available with a water heat exchanger option, which can be combined with individual outdoor units or as part of a DX chilled water mix of indoor units. The system can be operated via a BMS system or a Panasonic supplied control panel, with chilled water set points from
-15 °C ~ +15 °C and heating set points 35 °C ~ +55 °C.

## Application

| Application | Condition | ECO G | |
|---|---|---|---|
| Hotel | High DHW demand | ✔ | Energy recovery of ECO G system can fulfill different requirement |
| Hotel | Needs to warm up swimming pool | | |
| Office | Quick start up is necessary | ✔ | Speed of start up is quicker than VRF system |
| Winery | 1) Outlet water demand at specific temperature<br>2) Needs high amount of power temporary (not every month) | ✔ | 1) Chiller application with hydro module (ECO G + WHE) can make this special process<br>2) Running cost can be saved since fixed Gas tariff per month is cheaper than fixed electric tariff. |
| Any building | In a city with power restriction | ✔ | - No need an additional power transformer<br>- Space and cost can be saved |
| | At extremely low ambient condition | ✔ | Heating capacity is kept up to -20 °C without defrost process |

## Project case studies


**Savills HQ Dublin and Google Block R. Ireland.**
ECO G 3-Pipe units with a 243 kW load.
The project has been such a success that it has recently been awarded a Panasonic PRO Award for Best Contribution of efficient projects within Europe.

**Thomas Cook's Sunprime Atlantic View resort.**
A holiday resort in the Canaries. Spain.
229 rooms plus full spa and swimming pool facility.

**CAPITA call centre. UK.**
11 ECO G 3-Pipe units.
Over 150 indoor units in meeting rooms and open-plan areas.
Intelligent touch screen controller, the CZ-256ESMC2.

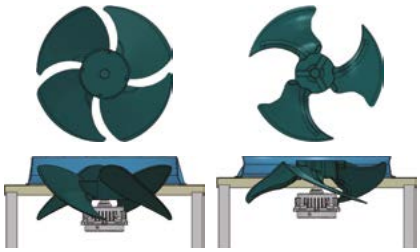
**French winery Gennevilliers, France.**
ECO G 3-Pipe units. One of the best solution utilized our ECO G solution for wine production process.

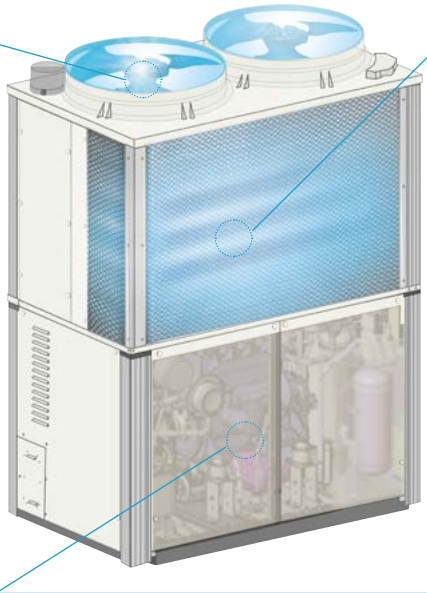
# ECO G 3 Series R410A

## Introducing ECO G 3 Series. Optimised energy saving with reliable Panasonic technologies.

### Improvement in blast efficiency

**3-blades fan.**
Propeller shape with 3 blades is more efficient
Max. 30% of fan electrical consumption is saved compared to conventional fan.

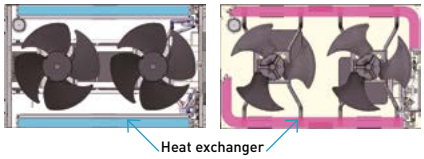


### "L" type heat exchanger

Heat exchanger surface area is increased by 25% compared to previous model to optimise efficiency.

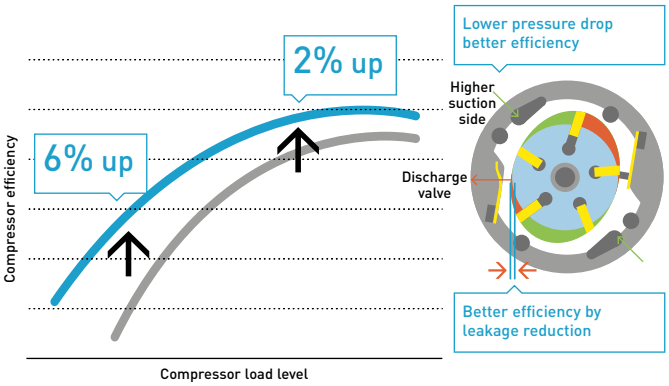
Heat exchanger surface area 25% up



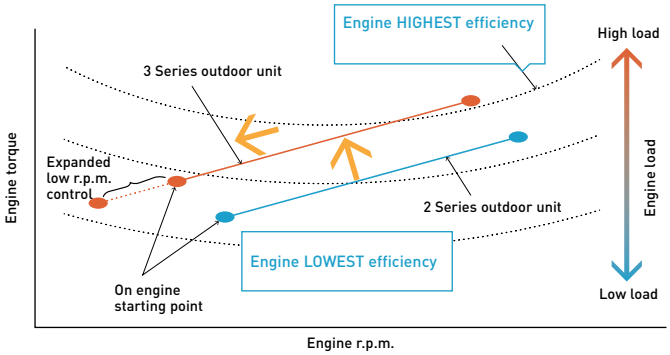

### Better partial load control

Start / stop loss reduced by expanding the area where continuous operation is possible. Annual operation efficiency has further improved due to better efficiency at lower partial load.

**Compressor.**
- Amount of internal leakage is reduced due to reduction of clearances, the compressor efficiency in low load and low rotation region has been greatly improved. Moreover, efficiency of high speed and high load is also improved due to expansion of suction path resulting in reduction of suction pressure
- Optimise compressor capacity

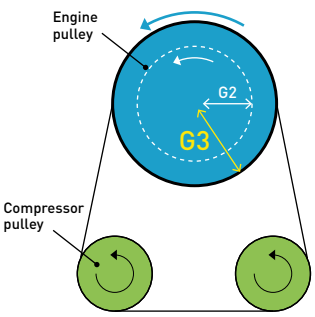



**Engine.**
- Continuous operation area widened at lower partial load by expanding operation area of lower speed
- Engine efficiency has improved by shifting output points to higher torque side




**Engine pulley.**
- Larger diameter engine pulley contributes to optimisation of compressor rotation speed ratio

Increased engine pulley diameter provides better performance at partial load, reducing ON / OFF operation.




### Line up of GE3 2-Pipe W-Multi.

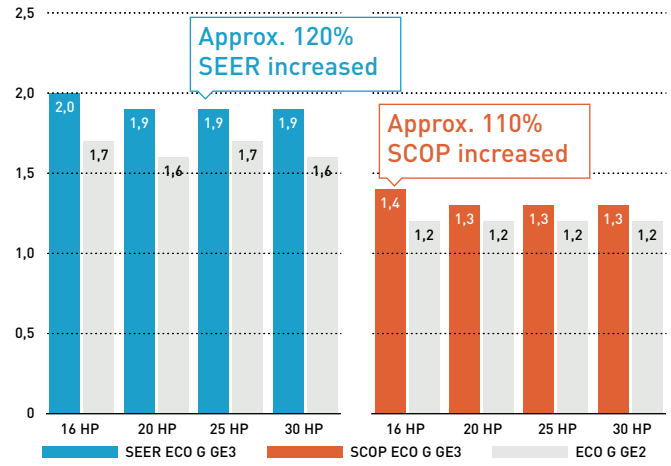
- For new or renewal
- Available for water heat exchanger
- Maximum 60 HP combination

## The highest seasonal performance in all capacity ranges.

**High power efficiency of W-Multi system.**
ECO G 3 Series system offers seasonal efficiency which has been drastically improved with the heat exchanger design, blast efficiency, partial load control.

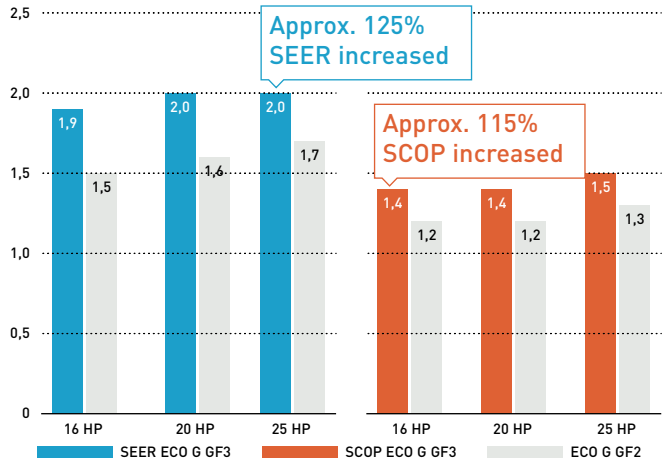
**Compared to previous model ECO G 2 Series.**
All models have maximum 25% of SEER, 15% of SCOP improvement compared to previous model.

**2-Pipe ECO G GE3 Series.** SEER / SCOP



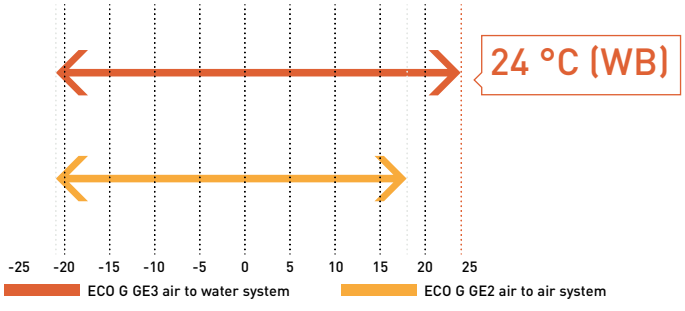

* Comparison under Panasonic condition follows EN14825.

**3-Pipe ECO G GF3 Series.** SEER / SCOP




### Heating design operation conditions (GE3)

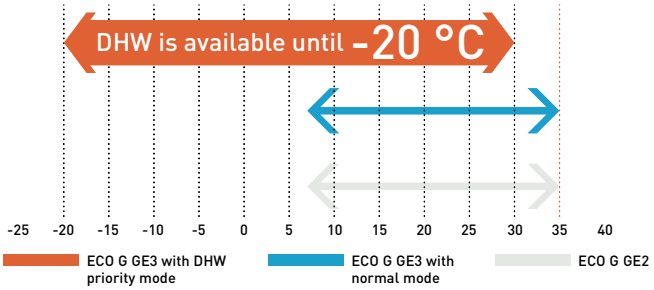
Operating range in heating has been expanded up to 24 °C (WB) for air to water use, to meet the demand of swimming pool applications.




Heating operating range: Air to water system: -21 ~ +24 °C (WB), air to air system: -21 ~ +18 °C (WB).

### DHW priority mode setting in heating (GE3)

Ambient temperature range for DHW production is expandable by setting depending on DHW needs. Hot water at 65 °C is available in heating without additional electric heaters.




Heating: Outside air temperature °C (WB).
* In normal mode, heat from engine exhaust is used for preventing defrost.

### No defrost requirement (GE3 / GF3)

No defrost mode is selectable to get higher capacity at low ambient temperature.

### Flexible design with wide line up of indoor units

The advanced GE3 Series can connect up to 64 indoor units.

| Series | 16 HP | 20 HP | 25 HP | 30 HP | 32 HP | 36 HP | 40 HP | 45 HP | 50 HP | 55 HP | 60 HP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **2-Pipe ECO G GE3 Series** | 26 | 33 | 41 | 50 | 52 | 59 | 64 | 64 | 64 | 64 | 64 |
| **3-Pipe ECO G GF3 Series** | 24 | 24 | 24 | — | — | — | — | — | — | — | — |

## 2-Pipe ECO G GE3 Series · R410A

**The GE3 Series has top level seasonal efficiency in this category. In addition, this product fits with special needs for commercial application thanks to DHW priority setting and auto Pump Down functions.**

| HP | | | 16 HP | 20 HP | 25 HP | 30 HP |
|---|---|---|---|---|---|---|
| **Outdoor unit** | | | **U-16GE3E5** | **U-20GE3E5** | **U-25GE3E5** | **U-30GE3E5** |
| Power supply | Voltage | V | 220 - 230 - 240 | 220 - 230 - 240 | 220 - 230 - 240 | 220 - 230 - 240 |
| | Phase | | Single phase | Single phase | Single phase | Single phase |
| | Frequency | Hz | 50 | 50 | 50 | 50 |
| Cooling capacity | | kW | 45,0 | 56,0 | 71,0 | 85,0 |
| Refrigeration load Pdesign [1] | | kW | 45,0 | 56,0 | 71,0 | 85,0 |
| **$\eta_{s,c}$ (LOT21) [1]** | | | **220,6%** | **219,3%** | **240,1%** | **229,3%** |
| Input power | | kW | 1,17 | 1,12 | 1,80 | 1,80 |
| Hot water in cooling mode (at 65 °C outlet) | | kW | 23,60 | 29,10 | 36,40 | 46,00 |
| Max COP in hot water | | W/W | 1,55 | 1,55 | 1,49 | 1,47 |
| Gas consumption cooling | | kW | 41,10 | 52,10 | 67,20 | 84,10 |
| Heating capacity | Standard | kW | 50,0 | 63,0 | 80,0 | 95,0 |
| | Low temperature | kW | 53,0 | 67,0 | 78,0 | 90,0 |
| Refrigeration load Pdesign [1] | | kW | 37,0 | 53,0 | 60,0 | 65,0 |
| **$\eta_{s,h}$ (LOT21) [1]** | | | **150,6%** | **143,7%** | **146,9%** | **151,3%** |
| Input power | | kW | 0,56 | 1,05 | 0,91 | 1,75 |
| Gas consumption heating | Standard | kW | 38,00 | 51,10 | 68,60 | 75,30 |
| | Low temperature | kW | 45,40 | 62,70 | 60,70 | 73,90 |
| Starter amperes | | A | 30 | 30 | 30 | 30 |
| External static pressure | | Pa | 10 | 10 | 10 | 10 |
| Air flow | | $m^3$/min | 370 | 420 | 460 | 460 |
| Sound power | Normal | dB(A) | 80 | 80 | 84 | 84 |
| | Silent mode | dB(A) | 77 | 77 | 81 | 81 |
| Dimension | H x W x D | mm | 2255 x 1650 x 1000 | 2255 x 1650 x 1000 | 2255 x 2026 x 1000 | 2255 x 2026 x 1000 |
| Net weight | | kg | 765 | 765 | 870 | 880 |
| Piping diameter | Liquid | Inch (mm) | 1/2 (12,70) | 5/8 (15,88) | 5/8 (15,88) | 3/4 (19,05) |
| | Gas | Inch (mm) | 1-1/8 (28,58) | 1-1/8 (28,58) | 1-1/8 (28,58) | 1-1/4 (31,75) |
| | Fuel gas | Inch (mm) | 3/4 (19,05) | 3/4 (19,05) | 3/4 (19,05) | 3/4 (19,05) |
| | Exhaust drain port | mm | 25 | 25 | 25 | 25 |
| | Hot water supply in/out | | Rp¾ (Nut, thread) | Rp¾ (Nut, thread) | Rp¾ (Nut, thread) | Rp¾ (Nut, thread) |
| Elevation difference (in / out) | | | 50 | 50 | 50 | 50 |
| Refrigerant (R410A) / $CO_2$ Eq. | | kg / T | 11,50 / 24,00 | 11,50 / 24,00 | 11,50 / 24,00 | 11,50 / 24,00 |
| Maximum number of connectable indoor units | | | 26 | 33 | 41 | 50 |
| Operating range | Cool Min ~ Max | °C (DB) | -10 ~ +43 | -10 ~ +43 | -10 ~ +43 | -10 ~ +43 |
| | Heat Min ~ Max | °C (WB) | -21 ~ +18 | -21 ~ +18 | -21 ~ +18 | -21 ~ +18 |

1) ErP test data.
Hot water take out function added, EU safety regulation standard cleared. 25 HP chassis enlarged due to specification improvement. Pre-coat corrosion fin. Auto Pump Down function.

## Technical focus

- Superior seasonal energy efficiency, maximum 240,1%
- DHW priority setting
- Operating range in heating down to -21 °C and up to +24 °C for air to water system
- No defrost cycle
- Capacity ratio 50 ~ 200% [1]
- Option of DX or chilled water for indoor heat exchange
- Maximum total piping length: 780 m

1) 50 ~ 200% only when one outdoor unit is installed. In other cases 50 ~ 130%.

GAS POWERED ECO G | 5 YEARS COMPRESSOR WARRANTY

## 2-Pipe ECO G GE3 Series R410A combination from 32 to 60 HP

**The GE3 Series has top level seasonal efficiency in this category. In addition, this product fits with special needs for commercial application thanks to DHW priority setting and Auto Pump Down functions.**

| HP | | | 32 HP | 36 HP | 40 HP | 45 HP | 50 HP | 55 HP | 60 HP |
|---|---|---|---|---|---|---|---|---|---|
| Outdoor unit | | | U-16GE3E5 | U-16GE3E5 | U-20GE3E5 | U-20GE3E5 | U-25GE3E5 | U-25GE3E5 | U-30GE3E5 |
| | | | U-16GE3E5 | U-20GE3E5 | U-20GE3E5 | U-25GE3E5 | U-25GE3E5 | U-30GE3E5 | U-30GE3E5 |
| Power supply | Voltage | V | 220 - 230 - 240 | 220 - 230 - 240 | 220 - 230 - 240 | 220 - 230 - 240 | 220 - 230 - 240 | 220 - 230 - 240 | 220 - 230 - 240 |
| | Phase | | Single phase | Single phase | Single phase | Single phase | Single phase | Single phase | Single phase |
| | Frequency | Hz | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Cooling capacity | | kW | 90,0 | 101,0 | 112,0 | 127,0 | 142,0 | 156,0 | 170,0 |
| Input power | | kW | 2,34 | 2,29 | 2,24 | 2,92 | 3,60 | 3,60 | 3,60 |
| Hot water in cooling mode (at 65 °C outlet) | | kW | 47,20 | 52,70 | 58,20 | 65,50 | 72,80 | 82,40 | 92,00 |
| Max COP in hot water | | W/W | 1,55 | 1,55 | 1,55 | 1,52 | 1,49 | 1,48 | 1,47 |
| Gas consumption cooling | | kW | 82,20 | 93,20 | 104,20 | 119,30 | 134,40 | 151,30 | 168,20 |
| Heating capacity | Standard | kW | 100,0 | 113,0 | 126,0 | 143,0 | 160,0 | 175,0 | 190,0 |
| | Low temperature | kW | 106,0 | 120,0 | 134,0 | 145,0 | 156,0 | 168,0 | 180,0 |
| Input power | | kW | 1,12 | 1,61 | 2,10 | 1,96 | 1,82 | 2,66 | 3,50 |
| Gas consumption heating | Standard | kW | 76,00 | 89,10 | 102,20 | 119,70 | 137,20 | 143,90 | 150,60 |
| | Low temperature | kW | 90,80 | 108,10 | 125,40 | 123,40 | 121,40 | 134,60 | 147,80 |
| Starter amperes | | A | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| External static pressure | | Pa | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Air flow | | $m^3$/min | 370/370 | 370/420 | 420/420 | 420/460 | 460/460 | 460/460 | 460/460 |
| Sound power | Normal | dB(A) | 83 | 83 | 83 | 86 | 87 | 87 | 87 |
| | Silent mode | dB(A) | 80 | 80 | 80 | 83 | 84 | 84 | 84 |
| Dimension | Height | mm | 2255 | 2255 | 2255 | 2255 | 2255 | 2255 | 2255 |
| | Width | mm | 1650+100 +1650 | 1650+100 +1650 | 1650+100 +1650 | 1650+100 +2026 | 2026+100 +2026 | 2026+100 +2026 | 2026+100 +2026 |
| | Depth | mm | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Net weight | | kg | 1530(765+765) | 1530(765+765) | 1530(765+765) | 1635(765+870) | 1740(870+870) | 1750(870+880) | 1760(880+880) |
| Piping diameter | Liquid | Inch (mm) | 3/4(19,05) | 3/4(19,05) | 3/4(19,05) | 3/4(19,05) | 3/4(19,05) | 7/8(22,22) | 7/8(22,22) |
| | Gas | Inch (mm) | 1-1/4(31,75) | 1-1/4(31,75) | 1-1/2(38,10) | 1-1/2(38,10) | 1-1/2(38,10) | 1-1/2(38,10) | 1-1/2(38,10) |
| | Fuel gas | Inch (mm) | 3/4(19,05) | 3/4(19,05) | 3/4(19,05) | 3/4(19,05) | 3/4(19,05) | 3/4(19,05) | 3/4(19,05) |
| | Exhaust drain port | mm | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| | Hot water supply in/ out | | Rp¾ (Nut, thread) | Rp¾ (Nut, thread) | Rp¾ (Nut, thread) | Rp¾ (Nut, thread) | Rp¾ (Nut, thread) | Rp¾ (Nut, thread) | Rp¾ (Nut, thread) |
| Elevation difference (in / out) | | | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Refrigerant (R410A) / $CO_2$ Eq. | | kg / T | 2x11,50/24,00 | 2x11,50/24,00 | 2x11,50/24,00 | 2x11,50/24,00 | 2x11,50/24,00 | 2x11,50/24,00 | 2x11,50/24,00 |
| Maximum number of connectable indoor units | | | 52 | 59 | 64 | 64 | 64 | 64 | 64 |
| Operating range | Cool Min ~ Max | °C | -10 ~ +43 | -10 ~ +43 | -10 ~ +43 | -10 ~ +43 | -10 ~ +43 | -10 ~ +43 | -10 ~ +43 |
| | Heat Min ~ Max | °C | -21 ~ +18 | -21 ~ +18 | -21 ~ +18 | -21 ~ +18 | -21 ~ +18 | -21 ~ +18 | -21 ~ +18 |

Data is for reference. Hot water take out function added, EU safety regulation standard cleared. 25 HP chassis enlarged due to specification improvement. Pre-coat corrosion fin. Auto Pump Down function.

## Technical focus

- Maximum 60 HP combination
- Superior seasonal energy efficiency, maximum 240,1%
- DHW priority setting
- Operating range in heating down to -21 °C and up to +24 °C for air to water system
- No defrost cycle
- Option of DX or chilled water for indoor heat exchange
- Maximum total piping length: 780 m

GAS POWERED ECO G | 5 YEARS COMPRESSOR WARRANTY

Rating conditions: Cooling indoor 27 °C DB / 19 °C WB. Cooling outdoor 35 °C DB / 24 °C WB. Heating indoor 20 °C DB. Heating outdoor 7 °C DB / 6 °C WB. (DB: Dry Bulb; WB: Wet Bulb).
Specifications subject to change without notice. For detailed information about ErP / Energy Labelling, please visit our websites www.aircon.panasonic.eu or www.ptc.panasonic.eu.