

# ECO G, THE GAS DRIVEN VRF

**200000**  
GHP outdoor units  
were sold in all over  
the world

ECO G satisfies special requirement for your application and environmentally friendly solution by Panasonic professional technology.

Reliable quality by 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

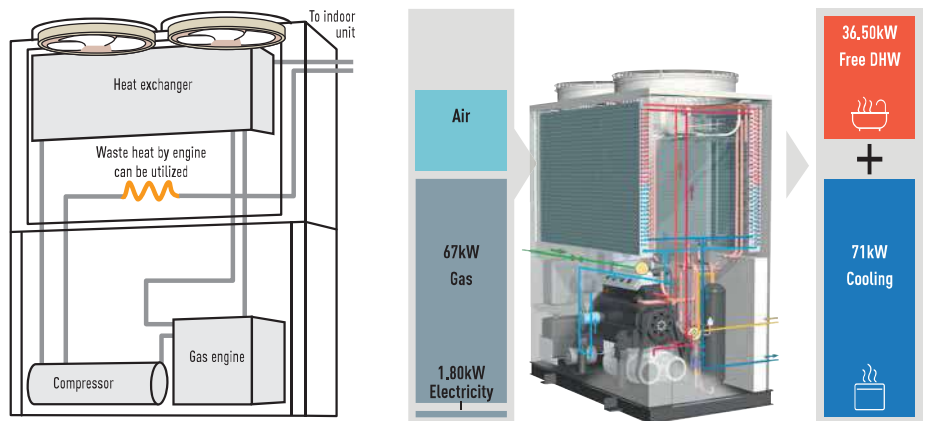


## What is GHP? The Gas Heat Pump (GHP)

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

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

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



\* Regarding a 25HP model.

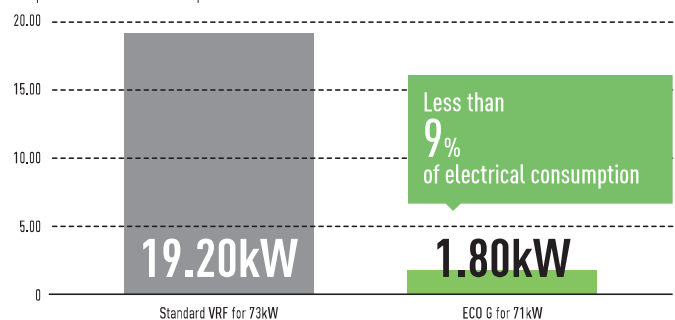
## Power supply problems?

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.

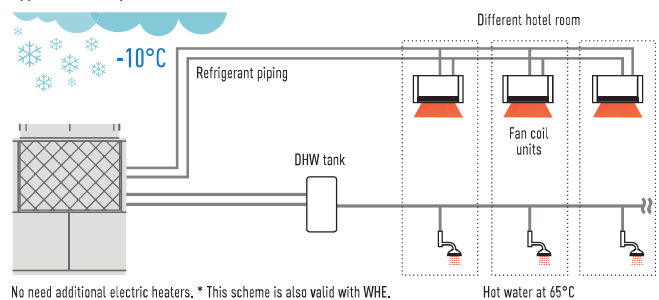
Comparison of electrical consumption on a 71kW outdoor unit.



## 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 46kW of hot water at 65°C. DHW at 65°C is also ready to use in heating without additional electric heaters.

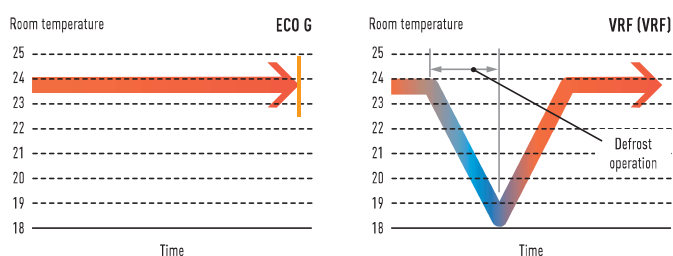
### Application example: Hotel



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

Waste heat from gas engine is utilized to raise temperature quicker than electric VRF system.

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 new 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 chiller 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	✓
Hotel	Needs to warm up swimming pool	✓ Energy recovery of ECO G system can fulfill different requirement
Office	Quick start up is necessary	✓ Speed of start up is quicker than VRF system
Winery	1) Outlet water demand at specific temperature 2) Needs high amount of power temporary (not every month)	✓ 1) Chiller application with hydro module (ECO G + WHE) can make this special process ✓ 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 - 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 & Google Block R. Ireland.

ECO G 3-way units with a 243kW 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-way units. Over 150 indoor units in meeting rooms and open-plan areas. Intelligent touch screen controller, the CZ-256ESMC2.



#### French winery Gennevilliers, France.

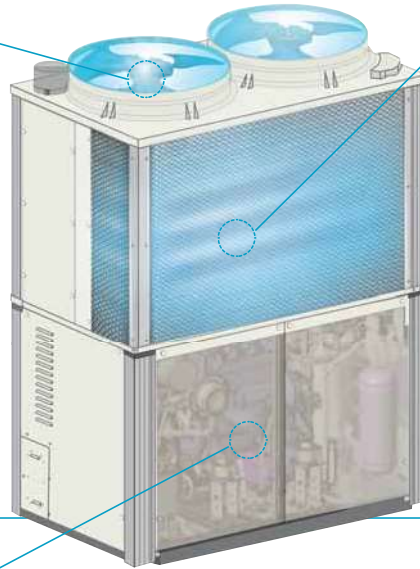
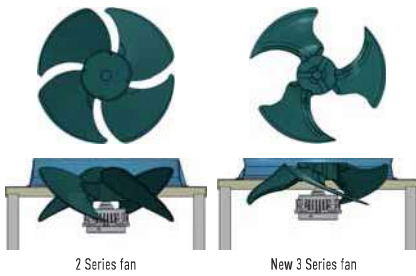
ECO G 3-way units. One of the best solution utilized our ECO G solution for wine production process.

# ECO G 3 SERIES

## Improvement in blast efficiency

### New 3-blades fan.

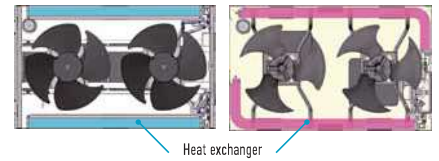
Propeller shape with 3 blades is more efficient  
Max. 30% of fan electrical consumption is saved compared to conventional fan.



## New "L" type heat exchanger

Heat exchanger surface area is included by 25% compared to conventional model to optimize efficiency.

Heat exchanger surface area **25% up**

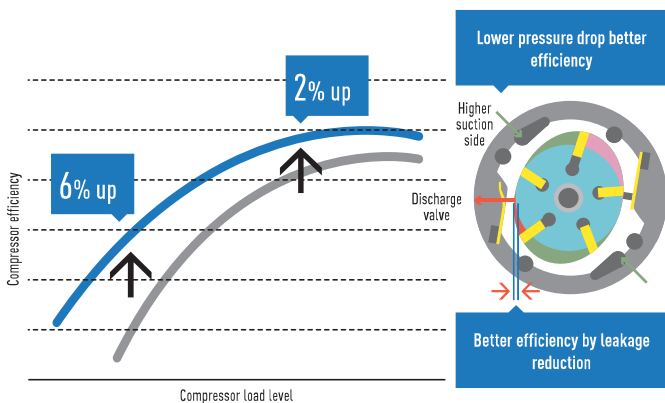


## Better partial load control

Reduce start / stop loss has reduced by expanding the are where continuous operation is possible. Annual operation efficiency has further improved by better efficiency at lower partial load.

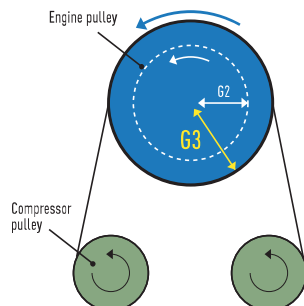
## Compressor.

- Amount of internal leakage has reduced by the reduction of clearance, the compressor efficiency in the low load and low rotation region has been greatly improved. Moreover, efficiency of high speed and high load is also improved by reduction of suction pressure loss due to expansion of suction path
- Optimize compressor capacity



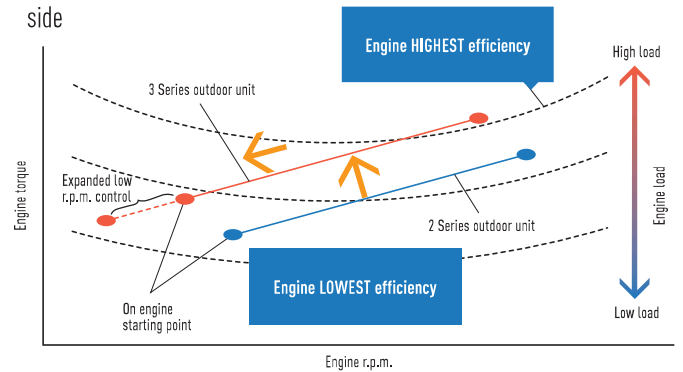
## Engine pulley.

- Bigger diameter of engine pulley contributes the optimization of the compressor rotation speed ratio with engine speed  
Higher engine pulley diameter giving better performance at partial load and reducing ON/OFF operation.



## Engine.

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



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

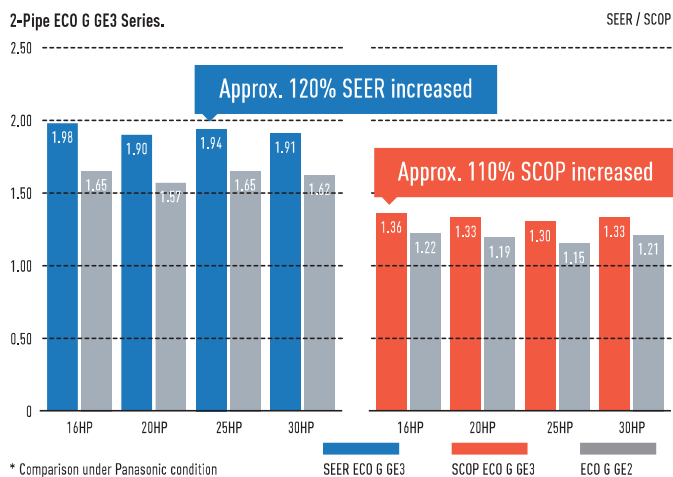
- For new or renewal
- Available for water heat exchanger
- Maximum 60HP combination

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

### The highest seasonal performance in all capacity ranges

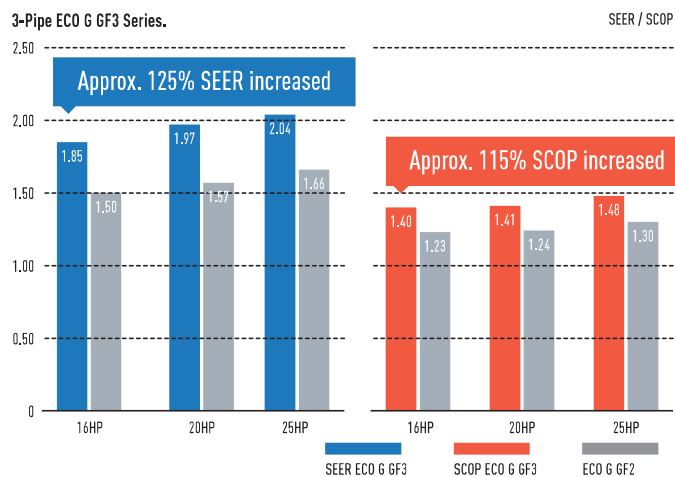
#### High power efficiency of W-Multi system.

ECO G 3 Series system offers seasonal efficiency which has been drastically improved with new heat exchanger design, blast efficiency, partial load control.



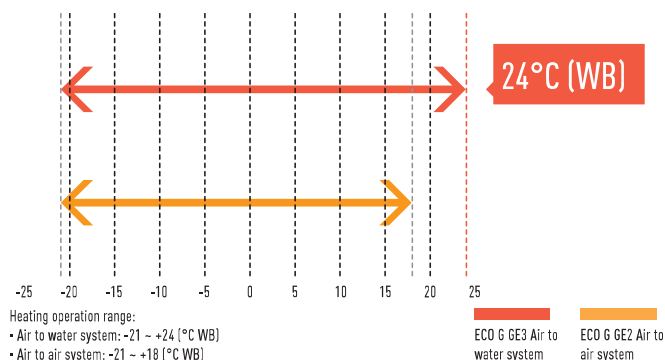
#### Compared to conventional model ECO G 2 Series.

All models are newly developed and have maximum 25% of SEER, 15% of SCOP better than conventional model.



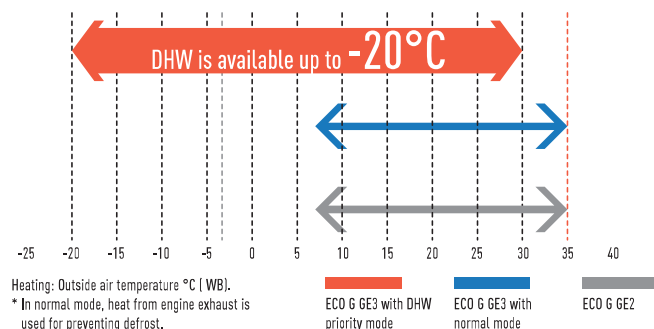
### Heating design operation conditions (GE3)

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



### 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.



### No defrost requirement (GE3 / GF3)

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

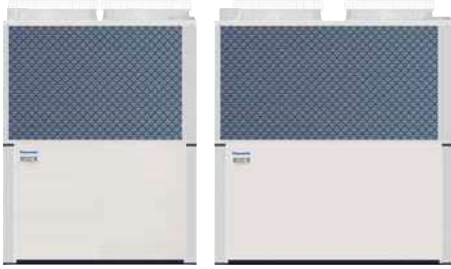
### Flexible design with wide line up of indoor units

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

Series	16HP	20HP	25HP	30HP	32HP	36HP	40HP	45HP	50HP	55HP	60HP
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

The new GE3 Series has a top level of 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.



### 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% <sup>1)</sup>
- 0-10V control demand by a connection with 3rd party controllers (CZ-CAPBC2 required)
- Option of DX or chilled water for indoor heat exchange
- Maximum total piping length: 780m

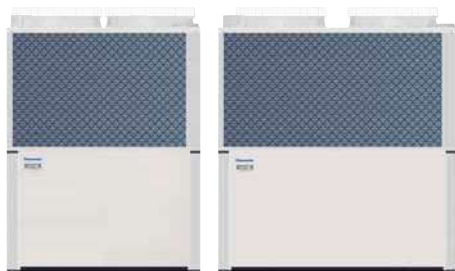
<sup>1)</sup> 50 ~ 200% only when one outdoor unit is installed. In other cases 50 ~ 130%.

HP			16HP	20HP	25HP	30HP
Model			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
Capacity	Cooling (Nominal)	kW	45.00	56.00	71.00	85.00
	Cooling (UK/IRE) <sup>1)</sup>	kW	39.96	49.73	63.05	75.48
	Heating (Nominal)	kW	50.00	63.00	80.00	95.00
	Heating (UK/IRE) <sup>2)</sup>	kW	52.90	66.84	78.08	90.25
Gas Consumption	Cooling gas consumption (Nominal)	kW	41.10	52.10	67.20	84.10
	Cooling gas consumption (UK/IRE) <sup>1)</sup>	kW	36.58	46.37	59.81	74.68
	Heating gas consumption (Nominal)	kW	38.00	51.10	68.60	75.30
	Heating gas consumption (UK/IRE) <sup>2)</sup>	kW	44.57	62.24	60.92	73.94
Input Power	Cooling input power (Nominal)	kW	1.17	1.12	1.80	1.80
	Heating input power (Nominal)	kW	0.56	1.05	0.91	1.75
Cooling / Heating refrigeration load Pdesign	kW		45 / 37	56 / 53	71 / 60	85 / 65
$\eta_{sc}$ (LOT21) / $\eta_{sh}$ (LOT21) <sup>3)</sup>	%		<b>220.6 / 150.6</b>	<b>219.3 / 143.7</b>	<b>240.1 / 146.9</b>	<b>229.3 / 151.3</b>
Hot water in cooling mode (at 65°C outlet)	kW		23.6	29.1	36.4	46
Max COP in hot water	W/W		1.55	1.55	1.49	1.47
Starter amperes	A		30	30	30	30
External static pressure	Pa		10	10	10	10
Air volume	l/s		6167	7000	7667	7667
Sound power	Normal / Silent mode	dB	80/77	80/77	84/81	84/81
Dimension	HxWxD	mm	2255x1650x1000	2255x1650x1000	2255x2026x1000	2255x2026x1000
Net weight		kg	765	765	870	880
Piping connections	Liquid pipe	Inch (mm)	1/2(12.70)	5/8(15.88)	5/8(15.88)	3/4(19.05)
	Gas pipe	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)	19.05(R3/4)	19.05(R3/4)	19.05(R3/4)	19.05(R3/4)
	Exhaust drain	mm	25	25	25	25
	Hot water supply in/out			Rp3/4 (Nut. thread)	Rp3/4 (Nut. thread)	Rp3/4 (Nut. thread)
Elevation difference (in/out)			50	50	50	50
Refrigerant (R410A) / CO <sub>2</sub> 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

<sup>1)</sup> UK/IRE Cooling = 30°C Outdoor, 21°C DB / 16°C WB Indoor. <sup>2)</sup> UK/IRE Heating = 0.8°C DB / 0°C WB Indoor, 20°C Outdoor. <sup>3)</sup> SEER/SCOP is calculated based on the seasonal space cooling/heating efficiency " $\eta$ " values of the COMMISSION REGULATION (EU) 2016/2281.

Hot water take out function added, EU safety regulation standard cleared. 25HP chassis enlarged due to specification improvement. Pre-coat corrosion fin. Auto pump down function.

## 2-Pipe ECO G GE3 Series combination



The new GE3 Series has a top level of 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.

### Technical focus

- Maximum 60HP 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
- 0-10V control demand by a connection with 3rd party controllers (CZ-CAPBC2 required)
- Option of DX or chilled water for indoor heat exchange
- Maximum total piping length: 780m

HP			32HP	36HP	40HP	45HP	50HP	55HP	60HP
Model			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	101	112	127	142	156	170
Input power cooling		kW	2.34	2.29	2.24	2.92	3.6	3.6	3.6
Hot water in cooling mode (at 65°C outlet)		kW	47.2	52.7	58.2	65.5	72.8	82.4	92
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	82.2	93.2	104.2	119.3	134.4	151.3	168.2
Heating capacity	Standard	kW	100	113	126	143	160	175	190
	Low temperature	kW	106	120	134	145	156	168	180
Input power heating		kW	1.12	1.61	2.1	1.96	1.82	2.66	3.5
Gas consumption heating	Standard	kW	76	89.1	102.2	119.7	137.2	143.9	150.6
	Low temperature	kW	90.8	108.1	125.4	123.4	121.4	134.6	147.8
Starter amperes		A	30	30	30	30	30	30	30
External static pressure		Pa	10	10	10	10	10	10	10
Air volume		l/s	6168 / 6168	6168 / 7001	7001 / 7001	7001 / 7668	7668 / 7668	7668 / 7668	7668 / 7668
Sound power	Normal / Silent mode	dB	83/80	83/80	83/80	86/83	87/84	87/84	87/84
	Height	mm	2255	2255	2255	2255	2255	2255	2255
Dimension	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 connections	Liquid pipe	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 pipe	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)	19.05(R3/4)	19.05(R3/4)	19.05(R3/4)	19.05(R3/4)	19.05(R3/4)	19.05(R3/4)	19.05(R3/4)
	Exhaust drain port	mm	25	25	25	25	25	25	25
	Hot water supply in/out		Rp3/4 (Nut. thread)	Rp3/4 (Nut. thread)	Rp3/4 (Nut. thread)	Rp3/4 (Nut. thread)	Rp3/4 (Nut. thread)	Rp3/4 (Nut. thread)	Rp3/4 (Nut. thread)
Elevation difference (in/out)			50	50	50	50	50	50	50
Refrigerant (R410A) / CO <sub>2</sub> 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. 25HP chassis enlarged due to specification improvement. Pre-coat corrosion fin. Auto pump down function.

# 3-PIPE ECO G GF3 SERIES



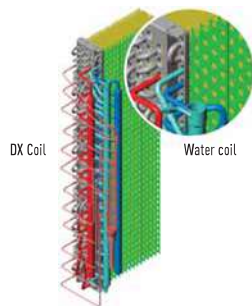
## Power supply problems?

If you are short of electrical power, our gas heat pump could be the 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.

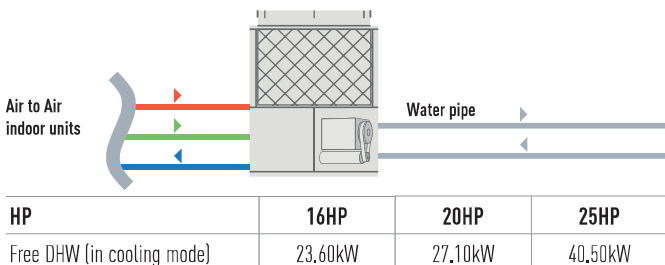
## ECO G Outdoor Heat Exchanger.

- Integrated DX and hot water coil
- No defrost required
- Faster reaction to demand for heating



## DHW production in heating and cooling

Free DHW is available 365 days a year, in all seasons. Hot water is produced effectively from waste heat from engine. Perfect solution for hotel projects required high demand of hot water.



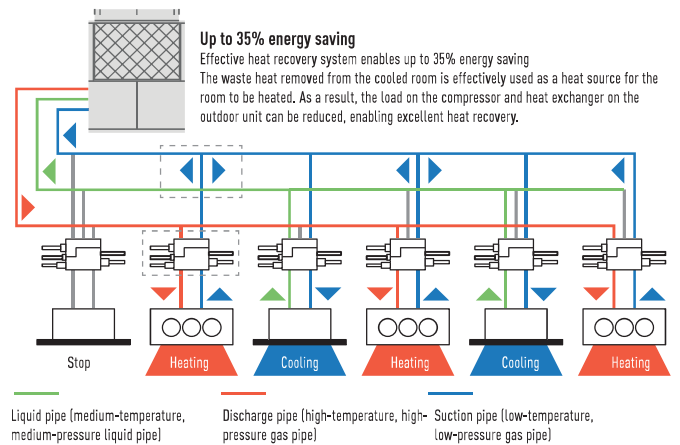
## Excellent performance and free Domestic Hot Water

Panasonic 3-Pipe Multi system is capable of simultaneous heating/cooling and individual operation of each indoor unit by only one outdoor unit. As a result, efficient individual air conditioning is possible in buildings having diverse room temperatures.

In addition, Domestic Hot Water is created for free in cooling mode without additional boilers or electric heaters.

### System example.

Improved maintenance intervals. The unit only needs to be serviced every 10000 hours. This is the best in the industry.



## Solenoid valve kit.

To be fitted on all 'zones' to allow simultaneous heating and cooling. Up to 24 indoor units are capable of simultaneous heating/cooling operation. Oil-recovery operation to gives more stable comfort air-conditioning control.

### 3-Pipe control Solenoid valve kit



**CZ-P56HR3**  
Up to 5.60kW  
**CZ-P160HR3**  
Up to 16.00kW

**KIT-P56HR3**  
(CZ-P56HR3+CZ-CAPE2)  
**KIT-P160HR3**  
(CZ-P160HR3+CZ-CAPE2)

### 3-Pipe control PCB



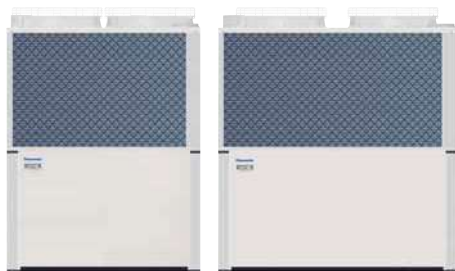
**CZ-CAPE2\***  
3-Pipe control PCB

\* For wall mounted. Must be added to the CZ-P56HR3 or CZ-P160HR3.

**HOT WATER  
AT 65°C  
OUTLET FOR  
FREE**



## 3-Pipe ECO G GF3 Series



### DHW available in all seasons

Domestic hot water can be taken out from waste heat of engine effectively in heating & cooling - all year round.

### Outstanding seasonal energy efficiency, maximum 204.9%

- Capacity ratio 50 ~ 200%
- No defrost cycle
- Maximum total piping length: 780m

### Flexible installation

- Full heating capacity down to -21°C (WB)
- DHW production for all the year
- Maximum 24 indoor units connectable

HP			16HP	20HP	25HP
<b>Model</b>			<b>U-16GF3E5</b>	<b>U-20GF3E5</b>	<b>U-25GF3E5</b>
Power supply	Voltage	V	220/230/240	220/230/240	220/230/240
	Phase		Single Phase	Single Phase	Single Phase
	Frequency	Hz	50	50	50
Capacity	Cooling (Nominal)	kW	45.00	56.00	71.00
	Cooling (UK/IRE) <sup>1)</sup>	kW	39.96	49.73	63.05
	Heating (Nominal)	kW	50.00	63.00	80.00
	Heating (UK/IRE) <sup>2)</sup>	kW	52.90	66.84	78.08
Gas Consumption	Cooling gas consumption (Nominal)	kW	45.80	54.80	73.70
	Cooling gas consumption (UK/IRE) <sup>1)</sup>	kW	40.76	48.77	65.59
	Heating gas consumption (Nominal)	kW	42.20	51.10	68.60
	Heating gas consumption (UK/IRE) <sup>2)</sup>	kW	49.50	62.24	60.92
Input Power	Cooling input power (Nominal)	kW	1.17	1.40	1.80
	Heating input power (Nominal)	kW	0.56	1.05	0.91
Cooling / Heating refrigeration load Pdesign	kW		45 / 38	56 / 52	71 / 60
$\eta_{sc}$ (LOT21) / $\eta_{sh}$ (LOT21) <sup>3)</sup>	%		<b>185.2 / 139.2</b>	<b>198.8 / 140.2</b>	<b>204.9 / 150.9</b>
Hot water in cooling mode (at 65°C outlet)	kW		23.6	27.1	40.5
Starter amperes	A		30	30	30
Air volume	l/s		6167	6667	7667
Sound power	dB	Normal / Silent mode	80/77	81/78	84/81
Dimension	mm	HxWxD	2255x1650x1000	2255x1650x1000	2255x2026x1000
Net weight	kg		775	775	880
Piping connections	Liquid pipe	Inch (mm)	3/4(19.05)	3/4(19.05)	3/4(19.05)
	Gas pipe	Inch (mm)	1 1/8(28.58)	1 1/8(28.58)	1 1/8(28.58)
	Discharge	Inch (mm)	7/8(22.22)	1(25.40)	1(25.40)
	Fuel gas	Inch (mm)	19.05(R3/4)	19.05(R3/4)	19.05(R3/4)
	Exhaust drain	mm	25	25	25
	Hot water supply in/out			Rp3/4 (Nut. thread)	Rp3/4 (Nut. thread)
Elevation difference (in/out)			50	50	50
Refrigerant (R410A) / CO <sub>2</sub> Eq.	kg / T		11.50/24.00	11.50/24.00	11.50/24.00
Maximum number of connectable indoor units			24	24	24
Operating range	Cool Min ~ Max	°C (DB)	-10 ~ +43	-10 ~ +43	-10 ~ +43
	Heat Min ~ Max	°C (WB)	-21 ~ +18	-21 ~ +18	-21 ~ +18

1) UK/IRE Cooling = 30°C Outdoor, 21°C DB / 16°C WB Indoor, 2) UK/IRE Heating = 0.8°C DB / 0°C WB Indoor, 20°C Outdoor, 3) SEER/SCOP is calculated based on the seasonal space cooling/heating efficiency "η" values of the COMMISSION REGULATION (EU) 2016/2281.

Hot water take out function added, EU safety regulation standard cleared, 25HP chassis enlarged due to specification improvement, Pre-coat corrosion fin, Auto pump down function.

#### Solenoid valve kit

KIT-P56HR3	<b>KIT-P56HR3</b>	3-Pipe control Solenoid valve kit (up to 5.60kW)
	<b>CZ-P56HR3</b>	Solenoid valve kit (up to 5.60kW)
KIT-P160HR3	<b>CZ-CAPE2</b>	3-Pipe control PCB
	<b>KIT-P160HR3</b>	3-Pipe control Solenoid valve kit (from 5.60 to 16.00kW)
KIT-P160HR3	<b>CZ-P160HR3</b>	Solenoid valve kit (up to 16.00kW)
	<b>CZ-CAPE2</b>	3-Pipe control PCB
<b>CZ-CAPEK2</b>	3-Pipe control PCB for wall mounted	

#### 3-Pipe control box kit

<b>CZ-P456HR3</b>	4 ports 3 pipe box (up to 5.60kW)
<b>CZ-P656HR3</b>	6 ports 3 pipe box (up to 5.60kW)
<b>CZ-P856HR3</b>	8 ports 3 pipe box (up to 5.60kW)
<b>CZ-P4160HR3</b>	4 ports 3 pipe box (up to 16.00kW)

1) SEER/SCOP is calculated based on the seasonal space cooling/heating efficiency "η" values of the COMMISSION REGULATION (EU) 2016/2281.

Hot water take out function added, EU safety regulation standard cleared, 25HP chassis enlarged due to specification improvement, Pre-coat corrosion fin, Auto pump down function.





# PANASONIC GHP/EHP HYBRID SYSTEM. FIRST INTELLIGENT TECHNOLOGY

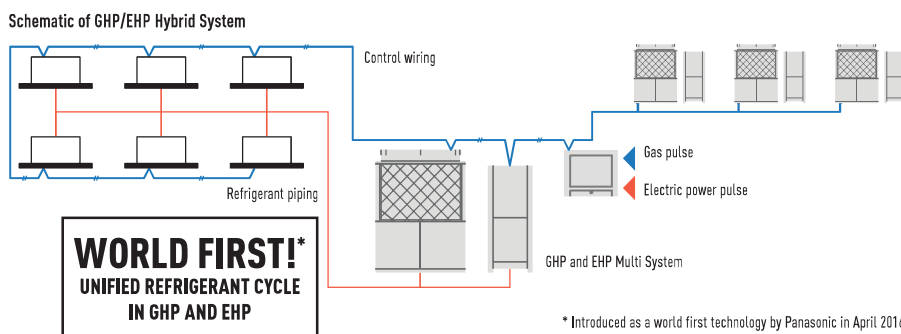
GHP + EHP  
**HYBRID**  
VRF SYSTEM



Taking advantage of Gas and Electricity to achieve better energy saving ever.



- Master unit GHP**
- Load calculation of GHP&EHP
  - Operation in accordance with the upper limit setting.
  - Individual capacity control
  - Device control
  - Special control (Defrost, Oil recovery, 4Way-valve matching / Abnormality processing)
- Slave Unit EHP**
- Intelligent controller**
- Demand monitoring
  - Indoor/Total Load calculation
  - Operation Ratio Indication upper limit setting of MAP according to:
    - Energy unit price
    - Electric power demand
    - Air conditioning load

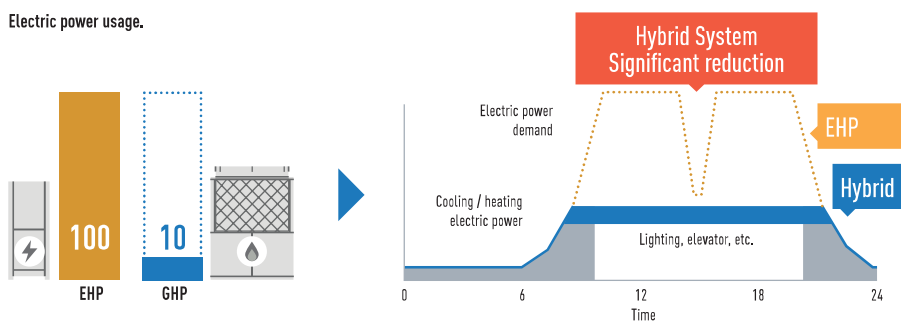


\* Introduced as a world first technology by Panasonic in April 2016.

### 1 Peak cut of electricity consumption

Electrical peak demand is significantly reduced thanks to GHP system consuming less than 10% of electricity of EHP system.

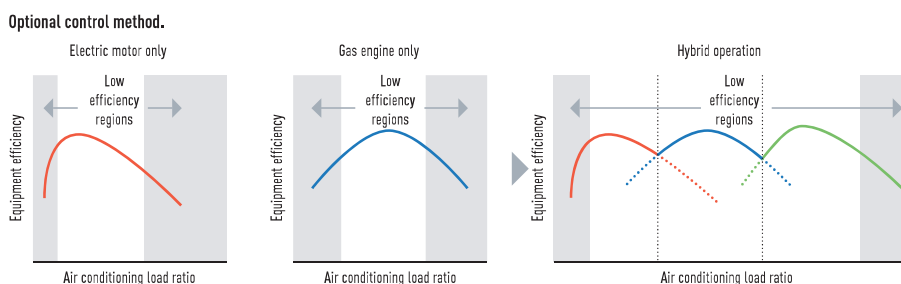
\* Image of Hotel project.



### 2 Optimal control to maximize energy saving

Switching the operation between GHP and EHP system on the basis of usage, energy demand, part load.

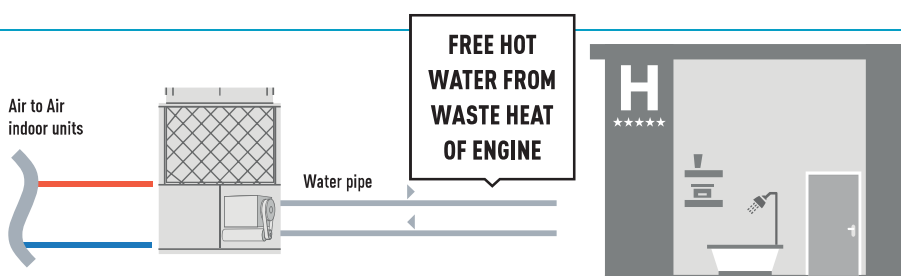
\* Specification is tentative.



### 3 Free Hot Water production by GHP system

Hot water is effectively produced from waste heat of engine.

\* Specification is tentative.



# GHP/EHP HYBRID SYSTEM

It is time to save energy utilising the advantages from gas and electricity by Panasonic reliable ECO G / ECOi technology

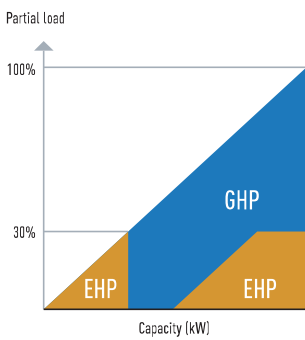
New hybrid system can offer intelligent operation logic for better economy and efficiency by taking the best of ECO G and ECOi. This is like a hybrid car in heating and cooling system.

How smartly operate GHP and EHP system depending on your needs?

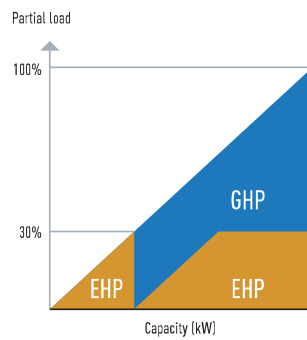
4 different mode settings are available with the intelligent controller. Switch the operation between GHP and EHP or operating both units together to maximize the effect for different requirement such as economy and efficiency.



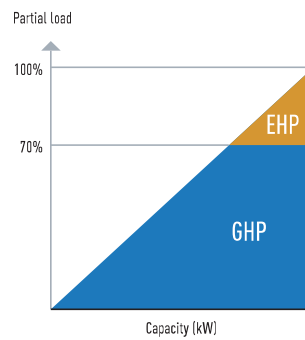
### Economy mode



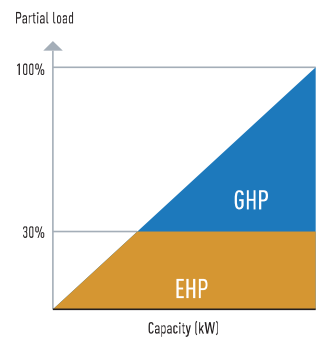
### Efficiency mode



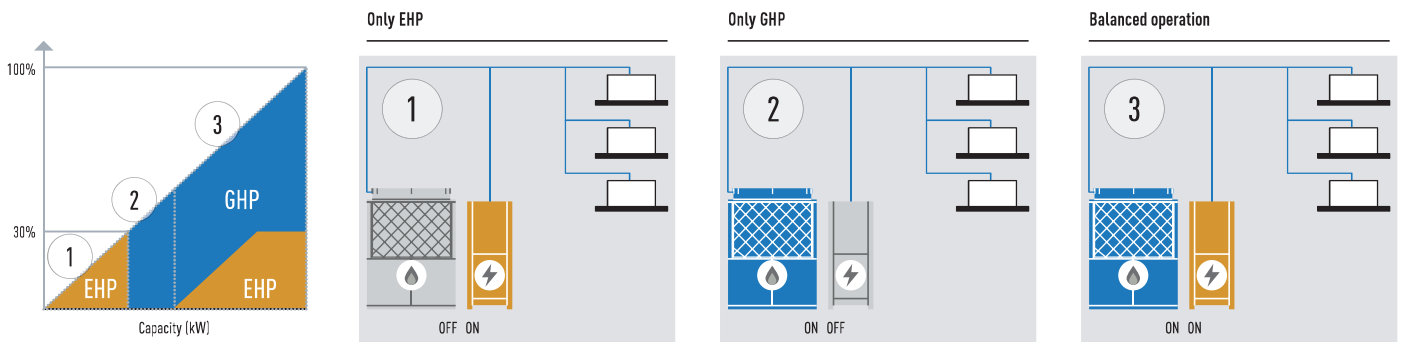
### GHP first mode



### EHP first mode



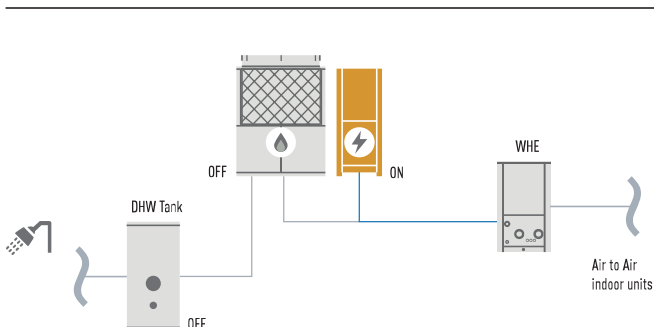
## Optimal control example: Economy mode



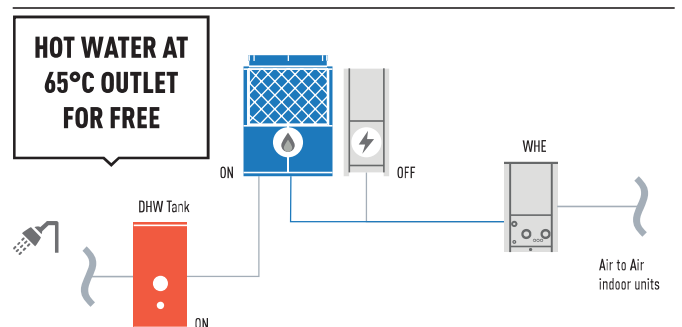
## DHW priority mode in Hybrid + WHE System

When DHW is demanded during cooling operation by EHP, EHP is automatically turned "OFF" and GHP is turned "ON" to produce DHW for free.

### High efficiency mode



### DHW priority mode



## 2-Pipe Hybrid GHP/EHP



- Extended lifespan with intelligent energy management. The goal is for the EHP and GHP to work at optimal speeds
- Low energy cost
- Low emissions

### Technical focus

- 4 different setting (Economy, Efficiency, GHP first mode, EHP first mode)
- DHW energy recovery 26.2kW (at 65°C) by waste heat of engine
- Unified refrigerant cycle in GHP and EHP for easy installation
- DHW priority mode with WHE system
- Up to 48 indoor units connectable

			Hybrid GHP	Hybrid EHP
			20HP	10HP
			U-20GES3E5	U-10MES2E8
HP				
Outdoor units				
Power supply	Voltage	V	220/230/240	220/230/240
	Phase		Single Phase	Three Phase
	Frequency	Hz	50	50
Cooling capacity		kW	56	28
$\eta_{sh}$ (LOT21) <sup>1)</sup>		%	<b>211.8</b>	<b>275.4</b>
Running current cooling		A	5.18	10.70/10.20/9.80
Input power cooling		kW	1.12	6.41
Hot water in cooling mode (at 65°C outlet)		kW	26.2	—
Gas consumption cooling		kW	52.1	—
Heating capacity		kW	63	31.5
$\eta_{sh}$ (LOT21) <sup>1)</sup>		%	<b>143.2</b>	<b>167.6</b>
Running current heating		A	4.79	11.10/10.50/10.10
Input power heating		kW	1.05	6.62
Gas consumption heating	Standard	kW	51.1	—
Starting current		A	30	1
Air volume		l/s	7001	3734
Sound pressure	Normal mode	dB(A)	58	56
Sound power	Normal mode	dB	80	77
Dimension	H x W x D	mm	2255 x 1650 x 1000	1842 x 770 x 1000
Net weight		kg	765	210
Piping connections <sup>2)</sup>	Liquid pipe	Inch (mm)	5/8 (15.88)	3/8 (9.52)
	Gas pipe	Inch (mm)	1 1/8 (28.58)	7/8 (22.22)
	Balance pipe	Inch (mm)	1/4 (6.35)	1/4 (6.35)
Drain heater		W	40	—
Refrigerant (R410A) / CO <sub>2</sub> Eq.		kg / T	11.05/23.0724	5.60/11.6928
Maximum allowable indoor / outdoor capacity ratio %			50 ~ 130	50 ~ 130
Operating range	Cool Min ~ Max	°C	-10 ~ +43	-10 ~ +43
	Heat Min ~ Max	°C	-21 ~ +18	-21 ~ +18

1) SEER/SCOP is calculated based on the seasonal space cooling/heating efficiency " $\eta_{sh}$ " values of the COMMISSION REGULATION (EU) 2016/2281.

2) Please refer service manual when the maximum piping length exceeds 90 meters (equivalent length).

# WATER HEAT EXCHANGER FOR HYDRONIC APPLICATIONS



## Chiller replacement. Chilled water supply to fan coils

### Chiller replacement.

When some old chillers needed replacing at the end of their operational lifetime, ECO Gs with Water Heat Exchangers enabled the project to be carried out in stages whilst still utilising the existing water pipe work and fan coils. This enabled the project to be delivered on time, to a restricted budget and avoided all issues regarding refrigerant in confined spaces.

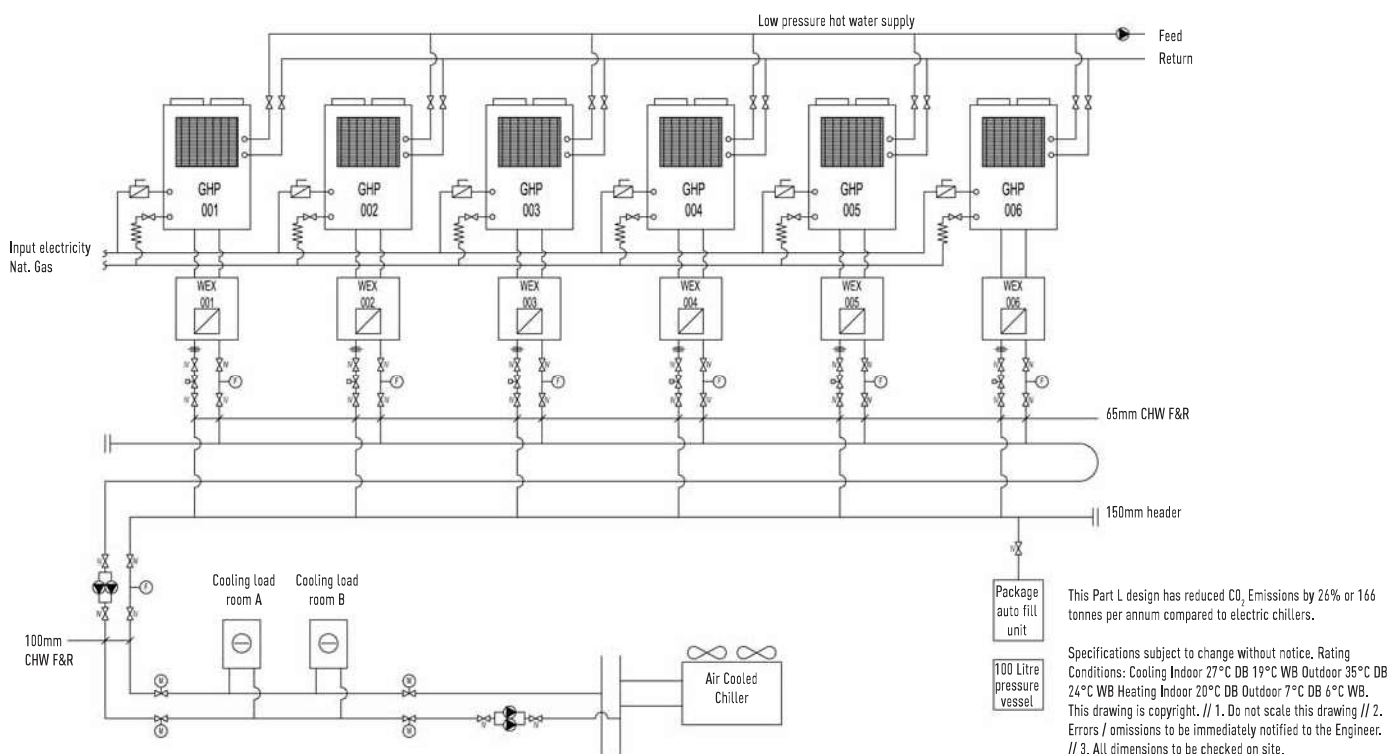


When a top London restaurant opened, it needed large volumes of fresh air to ensure the optimum dining environment. ECO G units connected to the cooling coils within the air handling equipment ensured the air was introduced in the right condition in both summer and winter.

### Connection to 'close control' computer equipment

#### Computer room applications.

When all available electrical power needed to be utilised for the IT equipment for a leading international bank, the cooling load of over 450kW had to be powered by gas. The outdoor units were connected via Water Heat Exchangers to cooling coils inside the 'close control' units thereby maintaining a conditioned environment for temperature and humidity. By utilising the hot water function over 100kW of hot water are supplied to the building and therefore the additional benefit of considerable CO<sub>2</sub> savings is ensured.

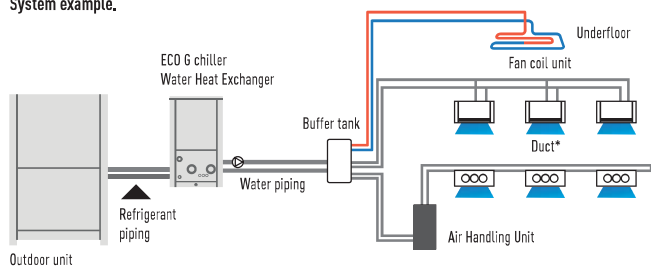


### ECOi Water Heat Exchanger

Electrical VRF with Water Heat Exchanger

- With this easy to install Water Heat Exchanger unit, you can now cover projects up to 51kW hot water demand or 44kW on chilled application on a efficient way and cost effective

System example.



A Buffer tank of minimum 280L for 28kW and 500L for 50kW is always needed.

### Example of Hotel renewal of existing Chiller and Boiler system with Panasonic ECO G and Aquarea mixed solution.

ECO G and Aquarea are the smart solution for renewal Chiller/Boiler applications with annual running cost savings around 13.600€.

