

# Heating

## Product Information

**Renewable heating for larger homes, listed buildings and light commercial applications**

Making a  
World of  
Difference

**ecodan**



## The Ecodan Cascade System

Homes and buildings with a high heat load require a proven, reliable system that is capable of delivering renewable heating and hot water all year round.

The Ecodan cascade system not only qualifies for the Government's Renewable Heat Incentive grant, it comes with Wi-Fi control and energy monitoring as standard, is available in single or three phase power supply, operates down to -25°C and delivers outstanding performance with low maintenance and quiet operation.

Capacities ranging from 5kW to 84kW, including monobloc and split systems



Cooling | Heating | Ventilation | Controls



**ecodan**<sup>®</sup>  
Renewable Heating Technology

# The Ecodan Cascade System



## Application Examples

- Larger homes and listed buildings
- Difficult to insulate, such as solid walls
- Off-gas areas
- Public sector premises
- Commercial buildings

## Benefits

- Reduces both running costs and CO<sub>2</sub> emissions
- Qualifies for the Renewable Heat Incentive
- Full internet-based control through the MELCloud App
- Energy monitoring as standard
- Suitable for a wide range of buildings - links up to 6 Ecodan heat pumps together in a single cascade heating system

## Ideal for off-gas

**The Ecodan cascade system is ideal for buildings and larger homes in off-gas areas and can be used to replace any existing heating technology to offer a viable, renewable alternative to oil, LPG or direct electric.**

Not only can Ecodan heat pumps reduce both installation and running costs compared to more carbon intensive traditional heating systems, with a professionally maintained Ecodan offering an average lifespan of 15 - 20 years, you'll also save on annual maintenance costs too.

## Ideal for higher heat loads

**Ecodan air source heat pumps are the ideal solution to providing renewable heating and hot water all year round for buildings with higher heat loads.**

Like any heating system, Ecodan works most effectively in buildings with higher levels of thermal efficiency. So wherever possible, basic thermal improvements should be undertaken to improve the thermal efficiency of the building. Improvement measures include cavity wall insulation, loft insulation, double glazing and draught proofing.

In buildings where these thermal improvements are too costly, such as historic buildings with solid stone walls, or in listed buildings (where improvements and changes are limited or restricted), an Ecodan cascade system can still provide high efficiency and comfortable heating all year round. By using Ecodan heat pumps, it is possible to reduce both CO<sub>2</sub> emissions and running costs.



# The Renewable Heat Incentive (RHI)

The Renewable Heat Incentive is designed to encourage the uptake of renewable technologies, such as heat pumps, whilst lowering the UK's carbon emissions.

The Government's Department of Business, Energy and Industrial Strategy (BEIS) fully supports heat pumps and will now pay for the generation of renewable heat. To qualify, both the product and heating installer must be Microgeneration Certification Scheme (MCS) approved.

**How it works:** Your home has a fixed amount of energy (kWh) that is required for heating and hot water to provide a comfortable environment all year round. This figure of required energy is obtained from the property's EPC - Energy Performance Certificate. If an Ecodan air source heat pump system is used to provide all this heat energy then you will be paid on the amount of renewable heat that is used; at a rate of 10.49p/kWh for 7 years\*. Non-domestic installations will receive a rate of 2.69p/kWh for 20 years\*. This is paid on the total heat delivered and heat meters must be installed to verify the amount of heat energy delivered by the renewable heating system.



\*BEIS 2019

## Example 1: Five bedroom detached property

19th century construction, uninsulated, 20kW heat loss with an energy requirement of 35,000kWh/year, the current oil boiler is old and needs to be replaced

Technology Type	Capital Cost	Additional Systems Cost	Annual Run Cost Saving	7yr benefit with RHI	Payback Period (years)	Rate of Return
Replacement 20kW oil boiler	£3,000	£0	-	£0	0	0
2 x 11.2kW Ecodan Cascade	£16,000	£13,000	<b>£591 (26%)</b>	<b>£14,233</b>	<b>6.4</b>	<b>5%</b>

\*Ecodan efficiency 320% / Boiler efficiency 80% / Electricity cost 15p/kWh / Oil cost 5.1p/kWh

## Example 2: Local authority multi-use building

40kW heat loss with an energy requirement of 80,000kWh/year. Current heating system is oil boiler with radiators; local authority wants to reduce run costs and carbon emissions.

Technology Type	Capital Cost	Additional Systems Cost	Annual Run Cost Saving	20yr benefit with RHI	Payback Period (years)	Rate of Return
Oil boiler	-	-	-	0	-	0
3 x 14kW Ecodan ASHP Cascade System	£31,000	£31,000	<b>£1,350 (38%)</b>	<b>£70,040</b>	<b>8.9</b>	<b>11%</b>

\*Ecodan efficiency 320% / Boiler efficiency 80% / Electricity cost 15p/kWh / Oil cost 5.1p/kWh

All figures quoted correct as of January 2019

# Cascade heat pumps help meet high heating demand

**Homeowners in South Devon are enjoying the energy efficient benefits of renewable heating following the installation of two Ecodan heat pumps in a cascade system at their newly renovated farmhouse and barn conversion.**

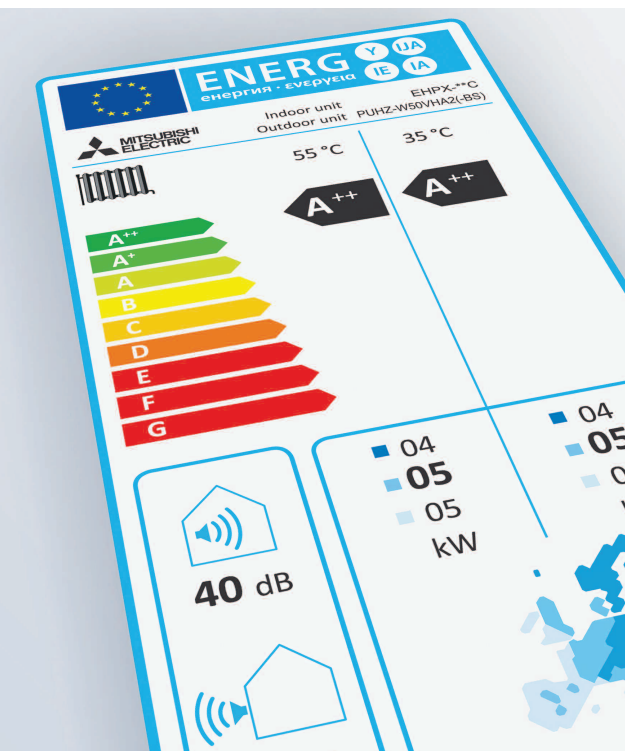
For buildings with a high heat load or with solid stone walls, the Ecodan cascade system offers an ideal solution because it allows the heat pumps to work individually or together to respond accurately to the higher heating requirements of the property. Located on the southern slopes of Dartmoor, the renovation incorporated the existing farmhouse and the conversion of a number of barns to form one dwelling with a floor area of 450m<sup>2</sup>. The renovation uses underfloor heating throughout the majority of the home which incorporated a number of different floor constructions and levels. In the remaining rooms, the homeowners wanted antique radiators which would be sympathetic to the rustic nature of the original property.

The original farmhouse was in an off-gas area and, as is typical of this type of property, had no heating system apart from open fires. The only real alternative would have been oil which would have incurred significant installation and higher running costs.

The cascade system is therefore ideal as it offers a cost effective solution, qualifies for the Renewable Heat Incentive and, in this situation allowed the homeowner to avoid the costs associated with upgrading their electricity to a 3-phase supply.

Further details on the complete range of Ecodan systems can be found by visiting the dedicated website: [www.ecodan.co.uk](http://www.ecodan.co.uk).





## The Energy Related Products Directive

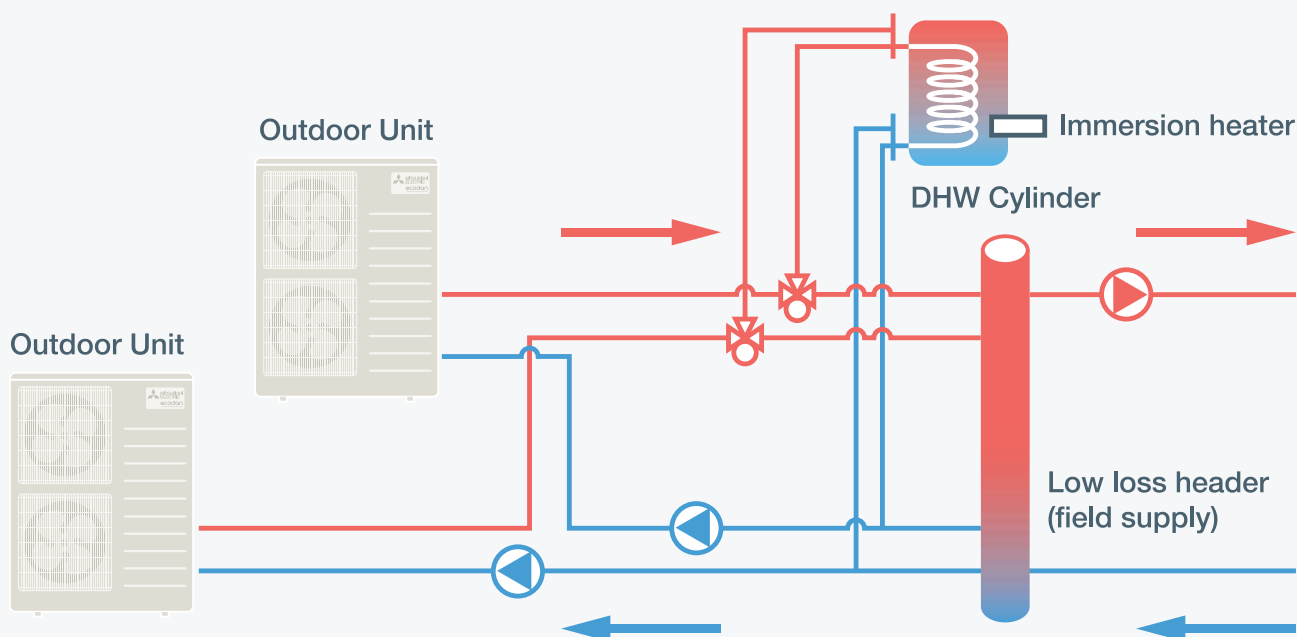
The Ecodan heat pump range used in cascade systems all have an energy label of A++.

The Energy Related Products Directive or ErP is a key part of the European Union's drive to encourage consumers to use more energy efficient products and help reach its target to reduce energy use by 20% and increase the share of renewable energies by 20% by the year 2020.

For space heaters, such as heat pumps, the energy efficiency labels that came into force in 2015, run from G (the lowest) to A++.



## Typical installation of an Ecodan Monobloc Cascade System





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ECODAN MONOBLOC ASHP		PUHZ-W50VHA2(-BS)	PUHZ-W85VAA(-BS)	PUHZ-W112VAA(-BS)	PUHZ-HW140VHA2(-BS)	PUHZ-HW140VHA2(-BS)
HEAT PUMP SPACE HEATER - 55°C	ErP Rating	A++	A++	A++	A++	A++
	$\eta_{\text{L}}$	127%	137%	133%	126%	126%
	SCOP	3.25	3.50	3.40	3.22	3.22
HEAT PUMP SPACE HEATER - 35°C	ErP Rating	A++	A++	A++	A++	A++
	$\eta_{\text{L}}$	162%	171%	170%	157%	157%
	SCOP	4.12	4.35	4.34	3.99	3.99
HEAT PUMP COMBINATION HEATER - Large Profile <sup>1</sup>	ErP Rating	A	A	A	A	A
	$\eta_{\text{L}}$	99%	104%	100%	96%	96%
	SCOP	4.8	8.3	11.0	14.0	14.0
HEATING <sup>2</sup> (A-3/W35)	Capacity (kW)	1.63	2.86	3.73	4.81	4.81
	Power Input (kW)	2.95	2.90	2.95	2.91	2.91
	COP	2.95	2.90	2.95	2.91	2.91
OPERATING AMBIENT TEMPERATURE (°C DB)		-15 ~ +35°C	-20 ~ +35°C	-20 ~ +35°C	-25 ~ +35°C	-25 ~ +35°C
SOUND PRESSURE LEVEL AT 1M (dBA) <sup>3,4</sup>		45	45	47	53	53
LOW NOISE MODE (dBA) <sup>3</sup>		40	58	60	46	46
WATER DATA	Pipework Size (mm)	22	28	28	28	28
	Flow Rate (l/min)	14.3	25.8	32.1	40.1	40.1
	Water Pressure Drop (kPa)	12	16.1	24.4	9	9
DIMENSIONS (mm) <sup>7</sup>	Width	950	1050	1050	1020	1020
	Depth	330+30 <sup>5</sup>	480	480	330+30 <sup>5</sup>	330+30 <sup>5</sup>
	Height	740	1020	1020	1350	1350
WEIGHT (kg)		64	97	118	134	148
	Electrical Supply	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz	380-415v, 50Hz
	Phase	Single	Single	Single	Single	3
	Nominal Running Current [MAX] (A)	5.4 [13]	9.1 [22.0]	10.9 [28.0]	14.9 [35]	5.1 [13]
ELECTRICAL DATA	Fuse Rating - MCB Sizes (A) <sup>6</sup>	16	25	32	40	16

<sup>1</sup> Combination with EHPT20X-MHCW Cylinder <sup>2</sup> Under normal heating conditions at outdoor temp: -3°CDB / -4°CWB, outlet water temp 35°C, inlet water temp 30°C. <sup>3</sup> Under normal heating conditions at outdoor temp: 7°CDB / 6°CWB, outlet water temp 35°C, inlet water temp 30°C as tested to BS EN14511. <sup>4</sup> Sound power level of the PUHZ-W50VHA2 is 61dBA, PUHZ-W85VHA2 is 62.5dBA, PUHZ-W112VHA is 65dBA, PUHZ-HW140VHA2 is 65.5dBA, PUHZ-HW140VHA2 is 67.5dBA. Tested to BS EN12102. <sup>5</sup> Grille. <sup>6</sup> MCB Sizes BS EN60898-2 & BS EN60947-2. <sup>7</sup> Flow Temperature Controller (FTC) for standalone systems PAC-IF062B-E Dimensions WxDxH (mm) - 520x150x450

ECODAN SPLIT ASHP		PUHZ-SW50VKA(-BS)	PUHZ-SW75VHA(-BS)	PUHZ-SW120VHA(-BS)	
HEAT PUMP SPACE HEATER - 55°C	ErP Rating	A++	A++	A++	
	η <sub>L</sub>	125%	127%	125%	
	SCOP	3.20	3.26	3.21	
HEAT PUMP SPACE HEATER - 35°C	ErP Rating	A++	A++	A++	
	η <sub>L</sub>	163%	154%	162%	
	SCOP	4.16	3.92	4.13	
HEAT PUMP COMBINATION HEATER - Large Profile <sup>1</sup>	ErP Rating	A	A	A	
	η <sub>lwn</sub>	98%	93%	99%	
	Capacity (kW)	5.25	7.0	11.2	
HEATING <sup>2</sup> (A-3/W35)	Power Input (kW)	1.84	2.24	3.71	
	COP	2.85	3.12	3.02	
OPERATING AMBIENT TEMPERATURE (°C DB) <sup>7</sup>		-15 ~ +35°C	-20 ~ +35°C	-20 ~ +35°C	
SOUND PRESSURE LEVEL AT 1M (dBA) <sup>3,4</sup>		46	51	54	
LOW NOISE MODE (dBA) <sup>3</sup>		42	48	51	
WATER DATA - Water connections made at indoor hydrobox		Flow Rate (l/min)	11.8	22.9	45.9
DIMENSIONS (mm)	Width	809+62 <sup>8</sup>	950	950	
	Depth	300	330+30 <sup>5</sup>	330+30 <sup>5</sup>	
	Height	630	943	1350	
		43	75	118	
WEIGHT (kg)					
REFRIGERANT	Type	R410A	R410A	R410A	
	Charge (kg) - 10m pipe length	1.4	3.2	4.6	
	Pipe Size - Gas/Liquid (mm (in))	12.7 (1/2") / 6.35 (1/4")	15.88 (5/8") / 9.52 (3/8")	15.88 (5/8") / 9.52 (3/8")	
	Connection Type	Flared	Flared	Flared	
	Max Pipe Length (m)	40	40	75	
	Min Pipe Length (m)	2	5	5	
	Max Height Difference (m)	30	10	30	
ELECTRICAL DATA	Electrical Supply	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz	
	Phase	Single	Single	Single	
	Nominal Running Current [MAX] (A)	3.8 [13]	8.1 [19]	17.5 [29.5]	
	Fuse Rating - MCB Sizes (A) <sup>6</sup>	16	25	40	

<sup>1</sup> Combination with EHST20(D)(C)-MHCW Cylinders <sup>2</sup> Under normal heating conditions at outdoor temp: -3°CDB / -4°CWB, outlet water temp 35°C, inlet water temp 30°C <sup>3</sup> Under normal heating conditions at outdoor temp: 7°CDB / 6°CWB, outlet water temp 35°C, inlet water temp 30°C as tested to BS EN14511 <sup>4</sup> Sound power level of the PUHZ-SW50VKA is 62dBA, PUHZ-SW75VHA2 is 65.6dBA, PUHZ-SW120VHA is 68.8dBA, as tested to BS EN12102 <sup>5</sup> Grille <sup>6</sup> MCB Sizes BS EN60898-2 & BS EN60947-2 <sup>7</sup> Heating maximum ambient temperature ~21°CDB, DHW Hot water maximum ambient temperature ~35°CDB <sup>8</sup> Electrical cover

$\eta_{\text{L}}$  is the seasonal space heating energy efficiency (SSHEE)  $\eta_{\text{L}}$  is the water heating energy efficiency



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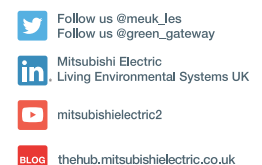
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**Note:** The fuse rating is for guidance only. Please refer to the relevant databook for detailed specification. It is the responsibility of a qualified electrician/electrical engineer to select the correct cable size and fuse rating based on current regulation and site specific conditions. Mitsubishi Electric's air conditioning equipment and heat pump systems contain a fluorinated greenhouse gas, R410A (GWP:2088), R32 (GWP:675), R407C (GWP:1774) or R134a (GWP:1430). These GWP values are based on Regulation (EU) No 517/2014 from IPCC 4th edition. In case of Regulation (EU) No.626/2011 from IPCC 3rd edition, these are as follows. R410A (GWP:1975), R32 (GWP: 550), R407C (GWP:1650) or R134a (GWP:1300).



www.greengateway.mitsubishielectric.co.uk

Mitsubishi Electric UK's commitment to the environment



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