

The Renewable Solutions Provider

Making a World of Difference

e-series

Modular Chiller Range



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Air Conditioning | Heating
Ventilation | Controls

A modern update to traditional chiller technology

Chiller systems have been used for decades to deliver controlled cooling to buildings, but with increasing pressure on energy efficiency and running costs, we now need a low-carbon, cost effective option.

Comprising of Cooling Only, Heat Pump and Heating Only models, Mitsubishi Electric's new **e-series modular chiller range** provides the perfect solution.

e-series



Excellent Efficiency

The name Mitsubishi is synonymous with excellence

Founded in 1921, we have led the way in air conditioning and the use of innovative, energy efficient, heat pump technology.

The company has manufactured chillers for over 40 years and has now combined this extensive experience with advanced component technology from the commercial air conditioning sector to produce the new e-series modular chiller range.

Mitsubishi Electric has evolved, and today our areas of expertise go way beyond advanced air conditioning systems that formed the foundation of our business. Here in the UK, we provide advanced solutions that cool, heat, ventilate and control buildings in the most energy efficient and cost effective ways possible.

Through our technical expertise, long experience and innovative product range, we enable building operators everywhere to significantly improve energy efficiency, reduce running costs and adhere to increasingly tough legislation. We believe that global climate challenges need local solutions. Our aim is to help individuals and businesses reduce the energy consumption of their buildings and their running costs.

Mitsubishi Electric offers advanced technology that really can **make a world of difference**.

The benefits of Mitsubishi Electric's e-series modular chiller range

High efficiency

The e-series uses highly efficient scroll compressor technology from our City Multi VRF units, along with advanced inverters and controls to deliver exceptional efficiency and wide operating range.

Unique modular approach

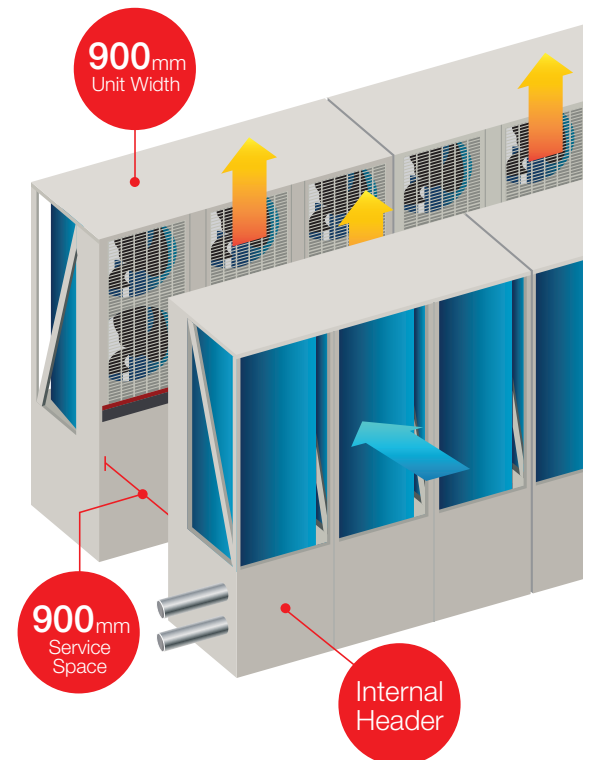
Up to six individual units can be connected together to provide a system capacity from 90kW to 540kW.

Using this modular approach reduces space requirements and simplifies lifting and installation.

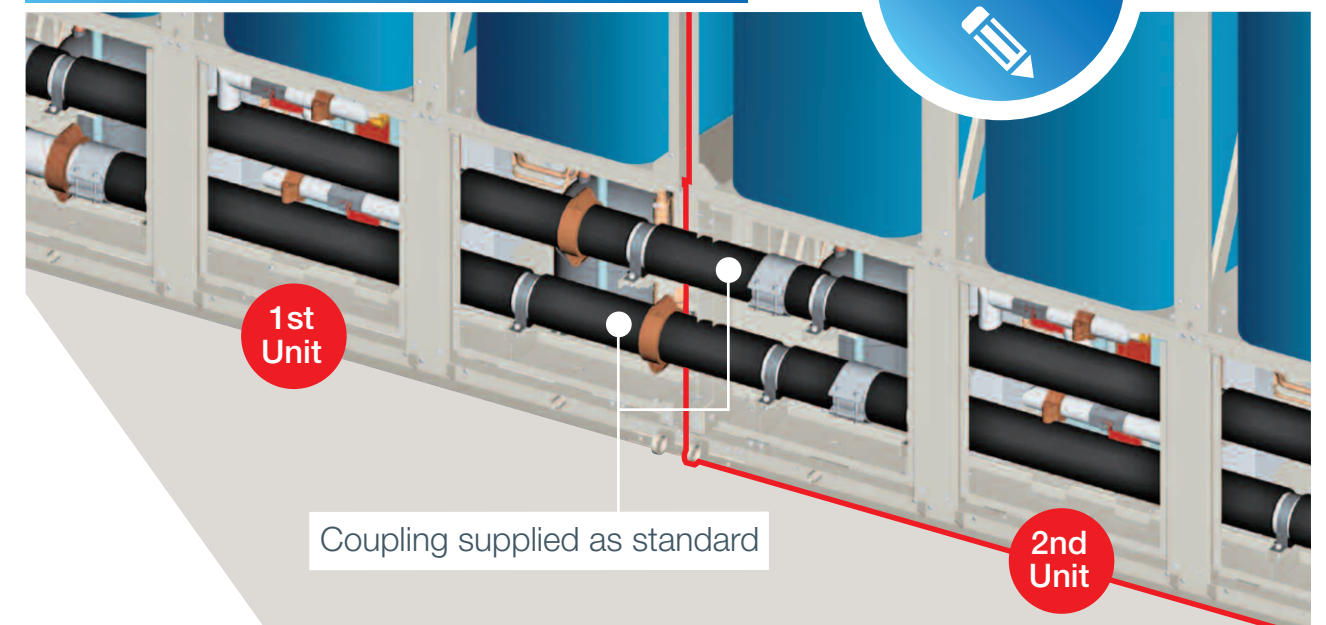
Reduced plant space

Each 90kW module can be positioned in a row of up to six connected units using the same internal header.

For larger systems it is possible to have the units facing each other with a gap of only 900mm service space.



Internal header pipe connecting multiple units



Exceptional Space Saving Design

Low noise levels

By utilizing highly efficient components within a uniquely shaped chiller, the **e-series offers market leading low noise levels**.

Low noise levels are especially important in today's city centre locations where there is often a mixture of commercial and residential properties in the same area.

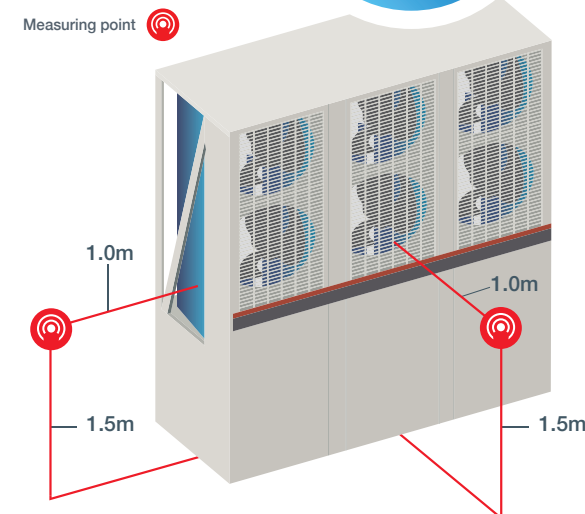
Quiet Operation

Sound pressure levels

EACV/EAHV-P900YA-N		dB(A)
Measurement Point	Front	64
	Right	62
	Back	65
	Left	61

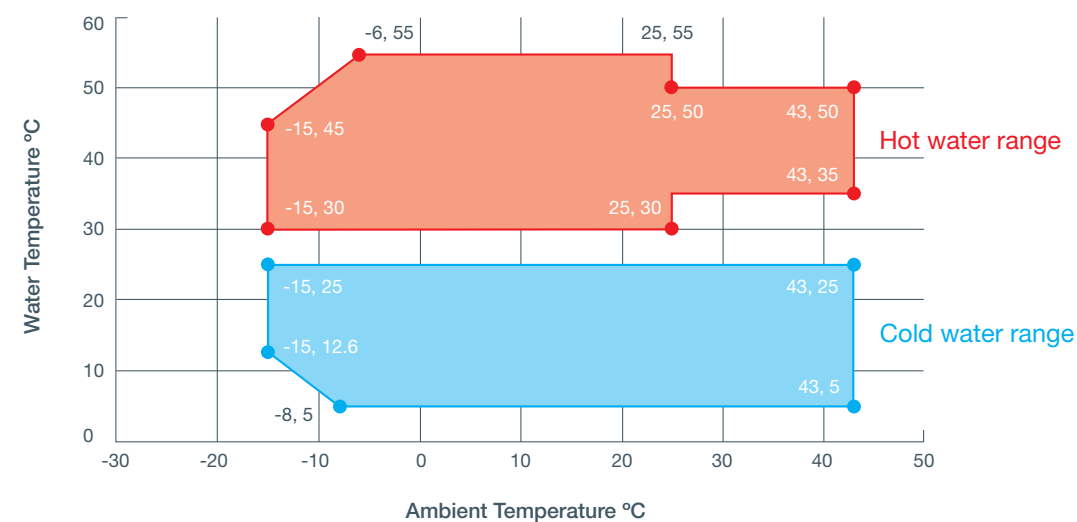
Sound power levels

EACV/EAHV-P900YA-N		63	125	250	500	1000	2000	4000	8000	dB(A)
Frequency	(Hz)									
PWL	dB(A)	55.8	60.8	66	67.4	70.1	74	65.2	54.1	77.1



Wide operating range

Wide water temperature range

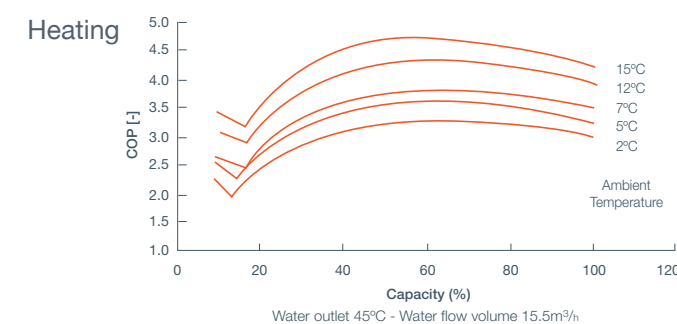
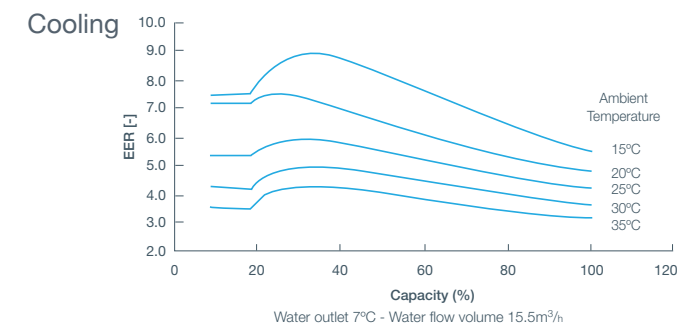


Efficiency and controllability

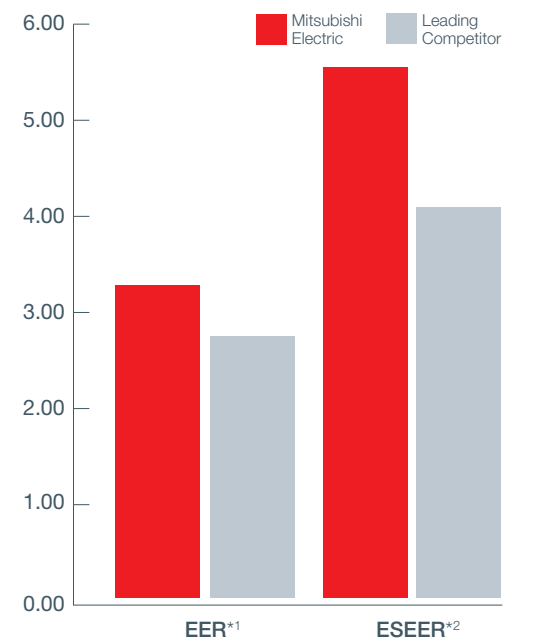
System efficiency

The e-series modular chiller has **two inverter driven compressors** that allow the unit to operate between 8% ~ 100% of capacity. By having a broad operating range the e-series has exceptional part load efficiencies which is where most systems will operate.

High partial load performance



Energy Ratings



*1 Pump is not included in e-series. *2 Calculated based on EUROVENT condition.

Easy Lifting
+ Installation



Exceptional features

With the new e-series modular chiller range, we have examined every single component to find ways of increasing performance, reliability and overall system efficiency.

The new products bring all of this advanced technology and know-how together in a unique package to aid design, specification, installation and on-going operation.

A. High efficiency inverter compressor

Two advanced DC inverter-driven scroll compressors are incorporated within each 90kW module. This gives a capacity range of 8% to 100% for each module.

B. Two-stage cooling circuit

Both compressors serve separate plate heat exchangers located in the centre of the unit. By modulating the evaporating temperature individually, overall system efficiency can increase by an additional 3.9%, compared to single evaporating refrigeration cycles.

C. Fan inverter control

Each of the two refrigerant circuits has three separately controlled, inverter-driven DC fans, allowing for more precise control to save energy and optimise system efficiency.

D. Front service

Access for the control box and other service parts is located at the front of the unit to ease service and maintenance regimes.

E. U-shaped high performance compact air heat exchanger

The use of U-shaped heat exchangers allows for a greater surface area whilst also keeping the e-series units much narrower than conventional chillers. Blue Fin anti-corrosion coating on the heat exchanger is also provided as standard.

F. Fans

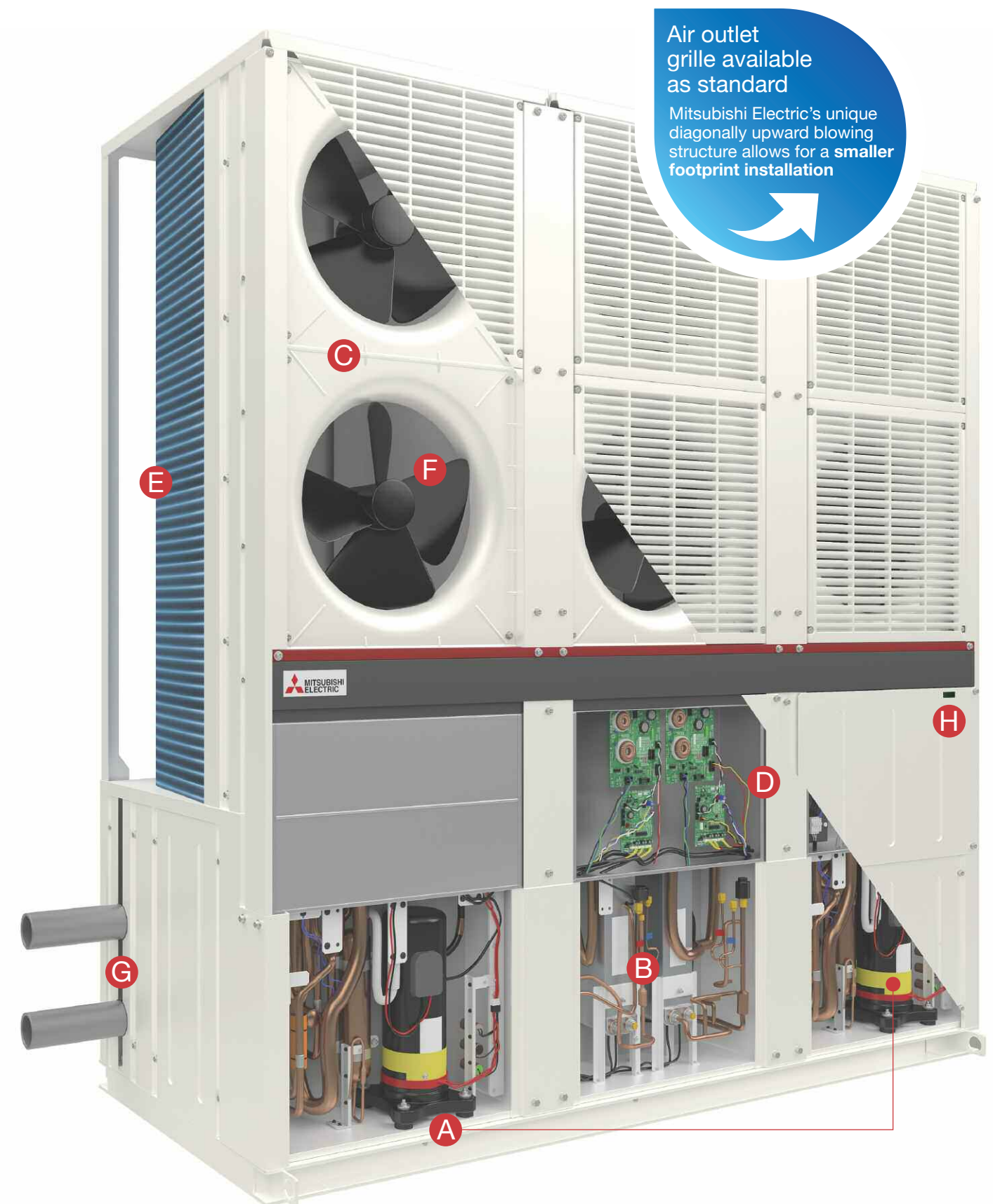
The e-series fan blades have improved ventilation characteristics and a newly designed rear edge that suppresses wind turbulence to increase efficiency and reduce noise levels.

G. Internal header pipe

The in-built internal header pipes simplify design, installation and maintenance and makes the e-series range modular and suitable for almost any situation.

H. Digital indicator

A dedicated digital indicator inside the PCB displays high pressure, low pressure, water inlet temperature, water outlet temperature, error codes etc., thereby aiding service and maintenance.



Mitsubishi Electric Nagoya Works

When Mitsubishi Electric was looking to build a new production facility for its range of factory automation products at the company’s Nagoya Works, located in Aichi Prefecture, Japan, the need for energy efficiency was paramount to match the company’s ambitious carbon reduction targets.



The production facility plays a key role in meeting the growing global demand for reliable, high-quality factory automation products and like all modern buildings, it is constructed to the highest standards of air tightness and insulation.

The 26,000 square metres of floor space throughout the six storey building needs to be comfortable for staff and visitors alike, as well as incorporating the most advanced energy-efficient measures possible.

In addition to a 50kW photovoltaic system on the roof, low voltage LED lighting and comprehensive energy management systems, **the factory is also benefiting from the installation of 48 of the company’s e-series chiller range - which brings a modern, low carbon update to traditional standard chiller technology.**

The controls for the high-efficiency e-series units at Nogaoya Works have been easily integrated into the Building Energy Management Systems (BEMS) system so that they can operate smoothly alongside the Air Handling Units and VRF air conditioning, to maximise efficiency.

In addition to delivering 4.3MW of cooling and heating to the building, the modular approach of the e-series range reduced both space and weight on the rooftop and the in-built header pipes simplified the design and installation. The ability to position units as close as 900mm apart has also ensured easy access for maintenance.

4.3MW
of cooling
and heating



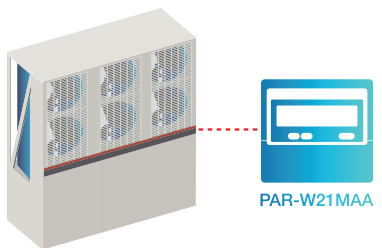
Control options

The e-series has three options for its control and functional operation:

Simple control

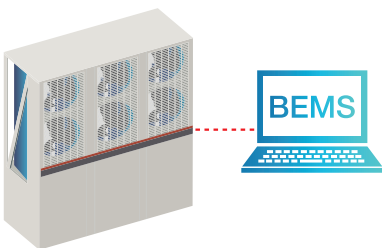
Connection to PAR-W21MAA local remote controller allows a simple intuitive user interface to control the functions of:

- Operation (on/off)
- Water setpoint
- Malfunction display
- Mode (heat/ cool - model dependant)
- Timer operation schedule
- Demand control mode selection



Advanced control

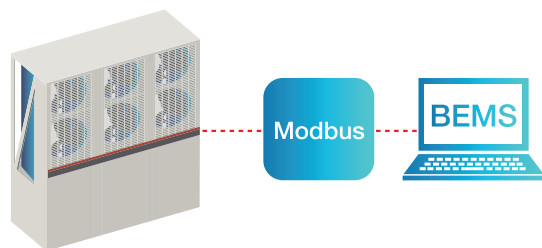
e-series can be controlled remotely using BEMS systems for volt free input / ouput control & monitoring via the chiller digital inputs / outputs (terminals K01 - K64) of control areas:



Digital inputs (control points)	Digital outputs (read only points)
Operation (on/off)	Operation (on/off)
Heat/ cool mode (model dependant)	Malfunction (normal / malfunction)
Water setpoint	Mode (heating / cooling)
Setpoint temperature switching (1st/2nd)	Defrost operation (normal / defrost)
Demand operation mode (on/off)	3rd party external pump operation (on/off)
Capacity change mode (COP / capacity)	Drain pan heater (off/on)
Heating operation mode (normal / ECO mode)	Auxiliary heater - external 3rd party heater for frost protection (off/on)
Fan operation for snow (off/on)	

Procon Modbus control

This option provides Modbus control over the digital input / outputs (terminals K01 - K64) on the e-series and reports these as Modbus RTU RS485 communication points of Modbus holding registers (control) and Modbus input registers (read only). Modbus registers:



Digital inputs (control points)	Input registers (read only points)
Operation (on/off)	Operation (on/off)
Heat/ cool mode (model dependant)	Malfunction (normal / malfunction)
Water setpoint	Mode (heating / cooling)
Setpoint temperature switching	Defrost operation (normal / defrost)
Demand operation mode (on/off)	3rd party external pump operation (on/off)
Capacity change mode (COP / Capacity)	Drain pan heater (off/on)
Heating operation mode (normal / ECO mode)	Auxiliary heater - external 3rd party heater for frost protection (off/on)
Fan operation for snow (off/on)	

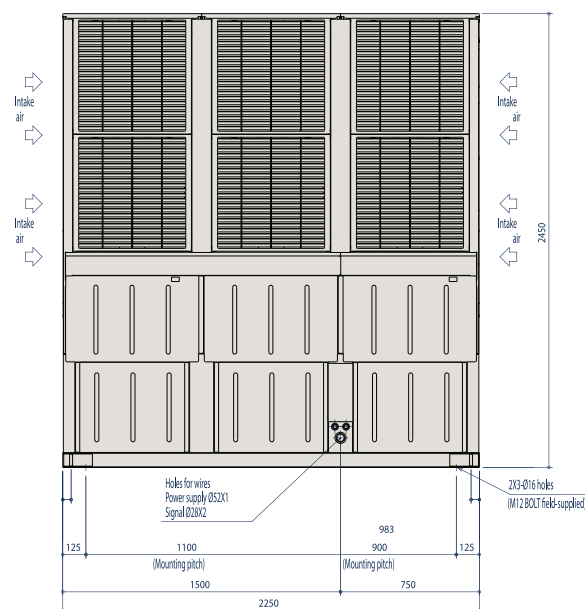
Mandatory safety interlock input signals (for all control modes)

The e-series has mandatory connections for external safety devices which MUST BE CONNECTED via hardwired Volt Free connections to the chiller terminals, these signals are:

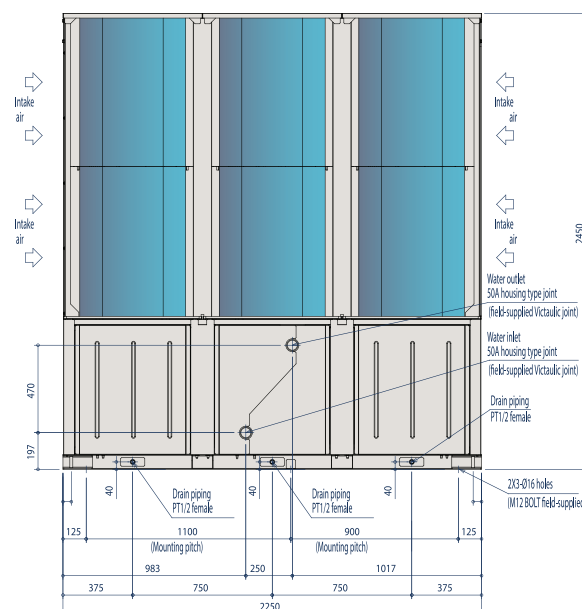
- Water Flow Switch – External 3rd party Volt Free Contact (close on flow) MUST BE CONNECTED to chiller terminals K10 & K11.
- Pump Interlock - External 3rd party Volt Free Contact (close on pump run) MUST BE CONNECTED to chiller terminals K04 & K06.

Dimensions

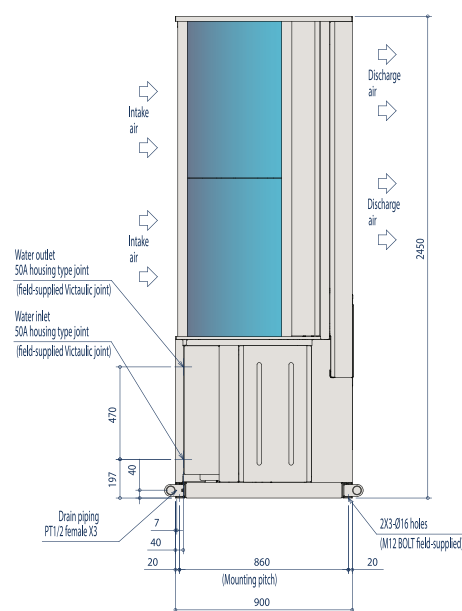
Front Elevation



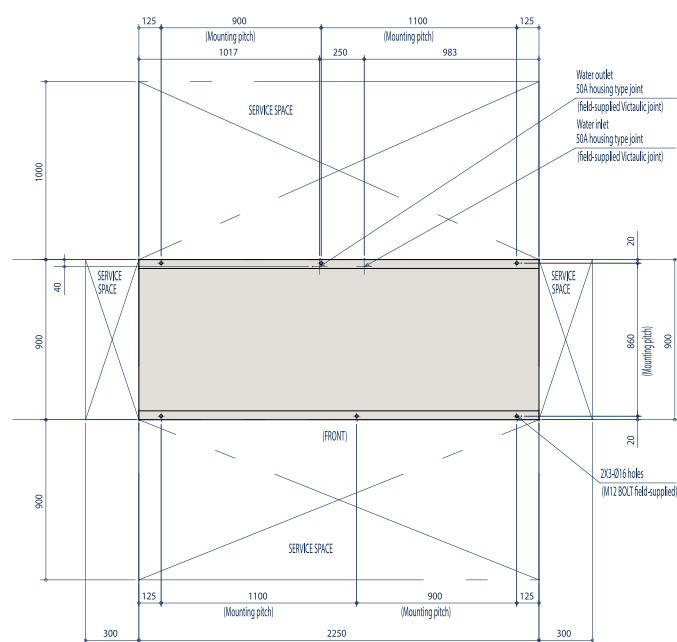
Rear Elevation



Side Elevation



Plan



Specifications

System Model Names

Maximum capacity	90kW	180kW	270kW	360kW	450kW	540kW
Cooling Only	EACV-P900YA-N	EACV-P900YA-N x2	EACV-P900YA-N x3	EACV-P900YA-N x4	EACV-P900YA-N x5	EACV-P900YA-N x6
Heating / Cooling	EAHV-P900YA-N	EAHV-P900YA-N x2	EAHV-P900YA-N x3	EAHV-P900YA-N x4	EAHV-P900YA-N x5	EAHV-P900YA-N x6
Heating Only	EAHV-P900YA-H-N	EAHV-P900YA-H-N x2	EAHV-P900YA-H-N x3	EAHV-P900YA-H-N x4	EAHV-P900YA-H-N x5	EAHV-P900YA-H-N x6

Model	EACV-P900YA-N Cooling Only	EAHV-P900YA-H-N Heating Only	EAHV-P900YA-N Heating / Cooling
Power source	3-phase 4-wire 380-400-415V 50/60Hz		
Cooling capacity ^{*1}	kW	90.0	90.0
	kcal/h	77,400	77,400
	BTU/h	307,080	307,080
	Power input ^{*3}	25.71	25.71
	Current input	43.4 - 41.2 - 39.7	43.4 - 41.2 - 39.7
	EER (Pump input is not included)	3.30	N/A
	ESEER (Pump input is not included)	5.66	N/A
	EER (Includes pump input based on EN14511) ^{*4}	3.08	N/A
	ESEER (Includes pump input based on EN14511) ^{*5}	5.46	N/A
	Water flow rate	m ³ /h 15.5	N/A
Heating capacity ^{*2}	Minimum Water Circuit Volume	N/A	780
	kW	N/A	90.00
	kcal/h	N/A	77,400
	BTU/h	N/A	307,080
	Power input ^{*3}	25.71	25.71
	Current input 380-400-415V	N/A	43.4 - 41.2 - 39.7
	COP (Pump input is not included)	N/A	3.50
	COP (Includes pump input based on EN14511) ^{*4}	N/A	3.25
	Water flow rate	m ³ /h 15.5	15.5
	Minimum Water Circuit Volume	420	780
Maximum current input	A	61	61
Water pressure drop ^{*6}	kPa	135	135
Temp range	Cooling	Outlet water 5 ~ 25 ^{*8}	
	Heating	Outlet water 30 ~ 55 ^{*8}	
	Outdoor	-15 ~ 43 ^{*8}	
Circulating water volume	m ³ /h	15.5	15.5
Sound pressure level (measured in anechoic room) at 1m ^{*6}	dB (A)	65	65
Sound power level (measured in anechoic room) ^{*6}	dB (A)	77	77
Diameter of water pipe	Inlet	100A housing type joint	100A housing type joint
(Standard piping)	Outlet	100A housing type joint	100A housing type joint
External finish	Polyester powder coating steel plate		
External dimension	HxWxD	2450 x 2250 x 900	2450 x 2250 x 900
Net weight	Standard piping	kg (lbs)	987 (2176)
	Inside header piping "N" model	kg (lbs)	1022 (2253)
Design pressure	R410A	MPa	4.15
	Water	MPa	1.0
Heat exchanger	Water side	Stainless steel plate and copper brazing	Stainless steel plate and copper brazing
	Air side	Plate fin and copper tube	Plate fin and copper tube
Compressor	Type	Inverter scroll hermetic compressor	Inverter scroll hermetic compressor
	Maker	MITSUBISHI ELECTRIC CORPORATION	MITSUBISHI ELECTRIC CORPORATION
	Starting method	Inverter	Inverter
	Quantity	2	2
	Motor output	kW	11.7 x 2
	Case heater	kW	0.045 x 2
	Lubricant	MEL32	MEL32
	Starting Current	A	8.5
	Max Running Current	A	61
	Air flow rate	m ³ /min	77 x 6
Fan		L/s	1283 x 6
		cfm	2719 x 6
	Type, Quantity	Propeller fan x 6	Propeller fan x 6
Protection	Starting method	Inverter	Inverter
	Motor output	kW	0.19 x 6
	High pressure protection	High pres.Sensor & High pres. Switch at 4.15MPa (601psi)	High pres.Sensor & High pres. Switch at 4.15MPa (601psi)
Refrigerant	Inverter circuit	Over-heat protection, Over current protection	Over-heat protection, Over current protection
	Compressor	Over-heat protection	Over-heat protection
	Type x charge	R410A x 19(kg) x 2 ^{*5}	R410A x 19(kg) x 2 ^{*7}
Control	LEV	LEV	LEV

^{*1} Under normal cooling conditions at outdoor temp 35°CDB/24°CWB (95°FDB/75.2°FWB) outlet water temp 7°C (44.6°F) inlet water temp 12°C (53.6°F).

^{*2} Under normal heating conditions at outdoor temp 7°CDB/6°CWB (44.6°FDB/42.8°FWB) outlet water temp 45°C (113°F) inlet water temp 40°C (104°F).

^{*3} Pump input is not included. ^{*4} Pump is not included in e-series. ^{*5} Calculated based on EUROVENT condition.

^{*6} Under normal cooling conditions at outdoor temp 35°CDB/24°CWB (95°FDB/75.2°FWB) outlet water temp 7°C (44.6°F) inlet water temp 12°C (53.6°F) capacity 90kW water flow rate 15.5m³/h.

^{*7} Amount of factory-charged refrigerant is 6 (kg)x2. Please add the refrigerant at the field.

*Please don't use the steel material for the water piping. *Please always make water circulate, or pull the circulation water out completely when not in use. *Please do not use groundwater or well water in direct.

*The water circuit must be closed circuit. *Due to continuous improvement, the above specifications may be subject to change without notice.

* EAHV-P900YA-H-N Heating A-3 W35 Output 77kW Input 22.7kW 3.39COP. A2 W35 Output 87kW Input 22.7kW 3.83COP.



Telephone: 01707 282880

MELSmart Technical Services: 0161 866 6089

Technical Help - option 1

Warranty - option 3

Training - option 6 followed by option 1

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to the environment



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