

Technical Submittal Document



Project Name: Circle Square 3		Project Number: 68B227						
Description: Air Source Heat Pump		Issue Number: TS-01	Revision: P02					
Date Issued: 20/03/2024		Date Response Required: 10/04/2024						
Completed by: S.Butterworth		Approved by:						
Technical Details:		Technical Authorisation by: S.Butterworth						
Description: Document containing all data related to proposed ASHP.								
Reference Information: - Specification - Drawings - Materials / Workmanship Specification - Design Criteria - Equipment Schedule		Included? (Yes, No, N/A) <table border="1"> <tr><td>Y</td></tr> <tr><td>N</td></tr> <tr><td>N</td></tr> <tr><td>Y</td></tr> <tr><td>Y</td></tr> </table>		Y	N	N	Y	Y
Y								
N								
N								
Y								
Y								
Compliance Statement: - List any non-compliances (Technical, Part L etc.)		<table border="1"> <tr><td>No</td></tr> </table>		No				
No								
CDM & Designing for Safety Implications:		<table border="1"> <tr><td>N/A</td></tr> </table>		N/A				
N/A								
Interfaces:		<table border="1"> <tr><td>No</td></tr> </table>		No				
No								
Manufacturers Information:		<table border="1"> <tr><td>Yes</td></tr> </table>		Yes				
Yes								
Technical Drawings:		<table border="1"> <tr><td>Yes</td></tr> </table>		Yes				
Yes								
BIM Information:		<table border="1"> <tr><td>No</td></tr> </table>		No				
No								
Calculations:		<table border="1"> <tr><td>Yes</td></tr> </table>		Yes				
Yes								
Technical Data:		<table border="1"> <tr><td>Yes</td></tr> </table>		Yes				
Yes								
Recipients:	MEP Consultant:							
	Principal Contractor:							
	Other:							

Technical Submittal Document



Project Name: Circle Square 3

Project Number: 68B227

Description: Air Source Heat Pump

Issue Number: TS-01

Revision: P02

Consultant Comments:

Approval Status (M&E Consultant)

-

Principal Contractors Comments

Approval Status (Principal Contractor)

-

2968-No3 Circle Square
Mechanical Equipment Schedule

Airsource Heat Pump Schedule



PROJECT NAME	No3 Circle Square
PROJECT NUMBER	2968
SCHEDULE REFERENCE	L014-SES-50-XX-XX-L-M-500020
ISSUE REF	C01
DATE	11.01.2024
BY	JL
CHECKED	BH

Reference No.			ASHP-RF-01	ASHP-RF-02-13
PERFORMANCE				
COOLING ONLY - EN14511 VALUE				
Cooling capacity		kW	299	188
Flow Temperature		°C	7	7
Return Temperature		°C	12	12
Flowrate		kg/s	14.32	8.9
Pressure Drop		kPa	43.8	85
EER		kW/kW	2.76	3.56
ESEER		kW/kW	3.76	5.51
HEATING ONLY - EN14511 VALUE				
Heating capacity		kW	219.8	127
Flow Temperature		°C	45	45
Return Temperature		°C	40	40
Flowrate		kg/s	11.83	7
Pressure Drop		kPa	34.3	53
COP		kW/kW	2.25	2.23
SCOP		kW/kW	3.8	3.33
Fans				
No. Fans		No.	6	4
Fan Input Power		kW	7.2	3.68
REFRIGERANT CIRCUIT				
Refrigerant type			R545B	R32
Refrigerant charge		kg	97.2	46
Compressors no.		No.	4	4
No. circuits		No.	2	
Number of Capacity Steps		No.	4	
Minimum Capacity Control Step		%	25	
NOISE LEVEL				
Sound pressure		dB(A)	57	
Sound power level		dB(A)	90	
Electrical Supply				
V/Ph/Hz			400/3/50	380-415/3/50
Maximum Absorbed Power		kW	150	120
SIZE AND WEIGHT				
Width		mm	2220	1080
Length		mm	4110	3405
Height		mm	2150	2350
Operating weight		kg	2680	1307

NOTES

1. Units selected as Integra NX-Q-G06 /LN 1204 and R32 e-series Modular Chiller Range from Mitsubishi Electric
2. Units to be externally located on roof plant deck
3. ASHP RF-02 to ASHP-RF-13 to be blocked together as per schematics and drawings

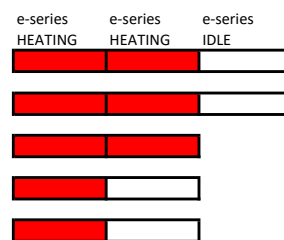
Project: Circle Square 3
Heat Pump Calcs Incorporating Accepted VE & Comms Reduction
L014-CWC-50-XX-XX-L-M-501006

Season	Month	Htg kW	Clg kW	without com	Integra Htg	Integra Clg	Integra Clg w	no.Htg Units	no.Clg Units	no.Htg Units	no.Clg Units	Total Units
Winter	Jan	1110	150	0	890	-149	-299	7.00787402	-1.5904255	8	0	8
Winter	Feb	1110	150	0	890	-149	-299	7.00787402	-1.5904255	8	0	8
Spring	Mar	800	400	250	580	101	-49	4.56692913	-0.2606383	5	0	5
Spring	Apr	850	600	450	630	301	151	4.96062992	0.80319149	5	1	6
Spring	May	900	1300	1150	680	1001	851	5.35433071	4.52659574	6	5	11
Summer	Jun	450	2285	2135	230	1986	1836	1.81102362	9.76595745	2	10	12
Summer	Jul	250	2285	2135	30	1986	1836	0.23622047	9.76595745	1	10	11
Summer	Aug	350	2285	2135	130	1986	1836	1.02362205	9.76595745	2	10	12
Autumn	Sep	400	950	800	180	651	501	1.41732284	2.66489362	2	3	5
Autumn	Oct	900	1050	900	680	751	601	5.35433071	3.19680851	6	4	10
Winter	Nov	1110	300	150	890	1	-149	7.00787402	-0.7925532	8	-1	7
Winter	Dec	1110	150	0	890	-149	-299	7.00787402	-1.5904255	8	0	8

Seasonal Plant Configuration - WINTER

 module sitting idle
 module in heating mode
 module in cooling mode

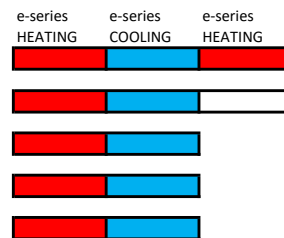
INTEGRA
HEATING/COOLING



Seasonal Plant Configuration - SPRING

 module sitting idle
 module in heating mode
 module in cooling mode

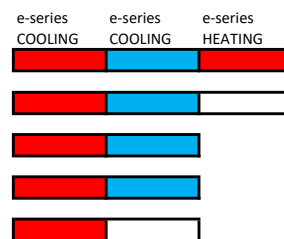
INTEGRA
HEATING/COOLING



Seasonal Plant Configuration - SUMMER

 module sitting idle
 module in heating mode
 module in cooling mode

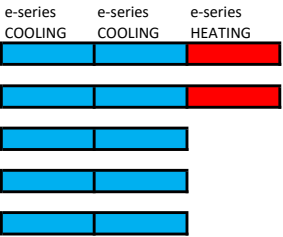
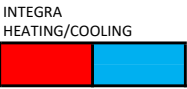
INTEGRA
HEATING/COOLING

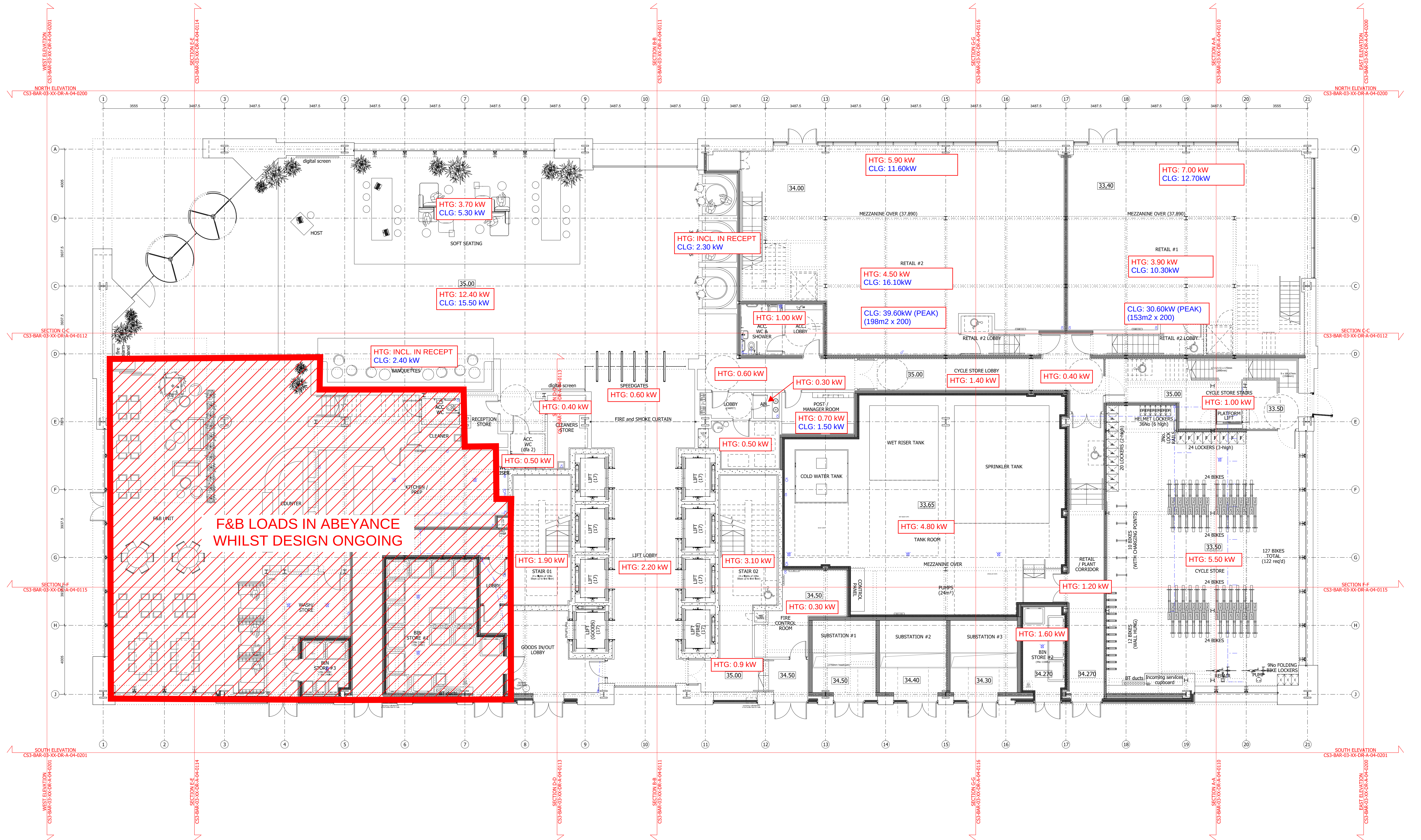


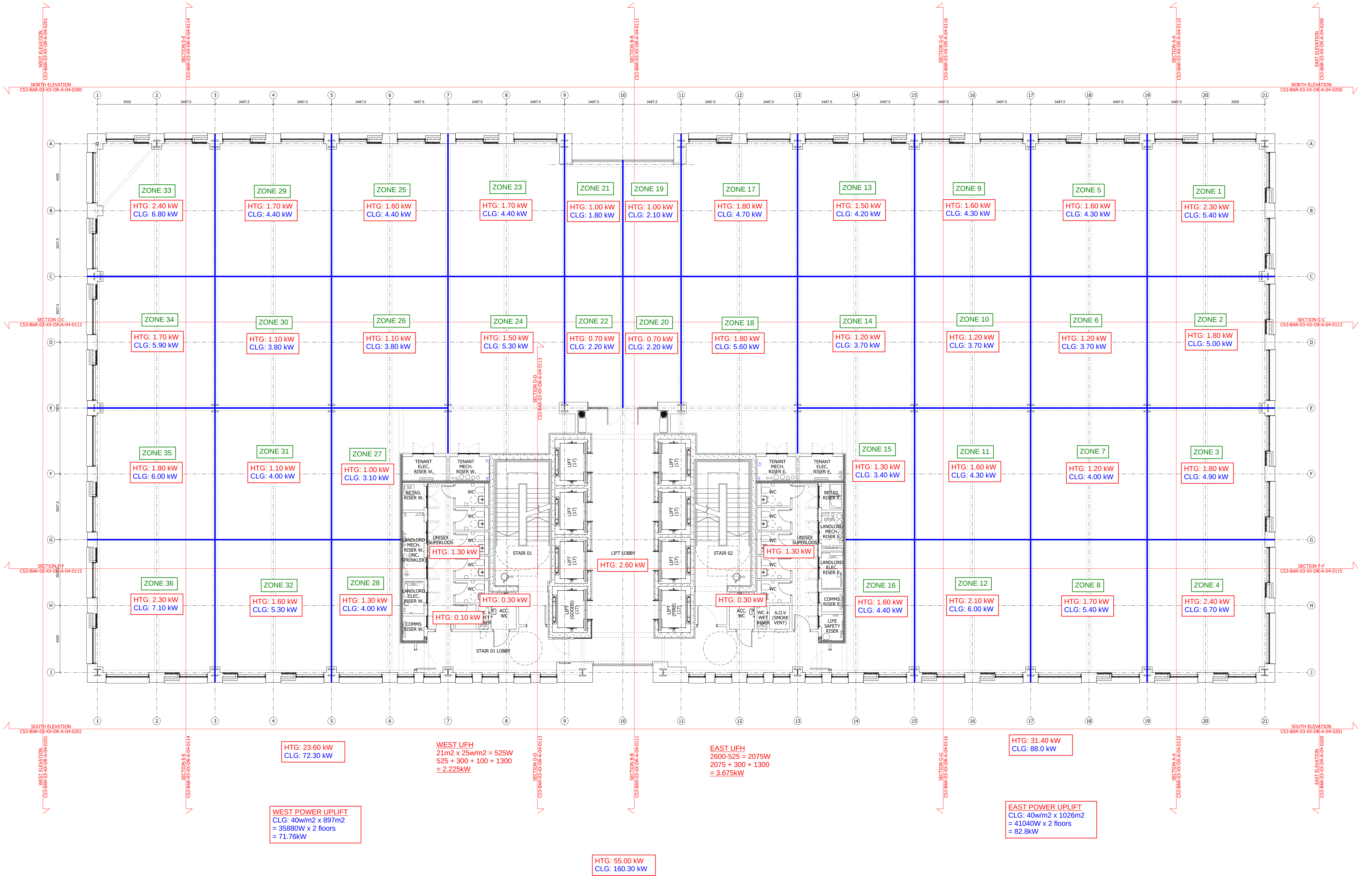
Seasonal Plant Configuration - AUTUMN

 module sitting idle
 module in heating mode
 module in cooling mode









ALL DIMENSIONS TO BE CHECKED ON SITE
PRIOR TO CONSTRUCTION/ERECTION.

bridge
architects

address 14 Old Mill Street, Manchester, M4 6DZ
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phone 0161 679 2828 web www.bridgearchitects.com
company # 07793934 email info@bridgearchitects.com

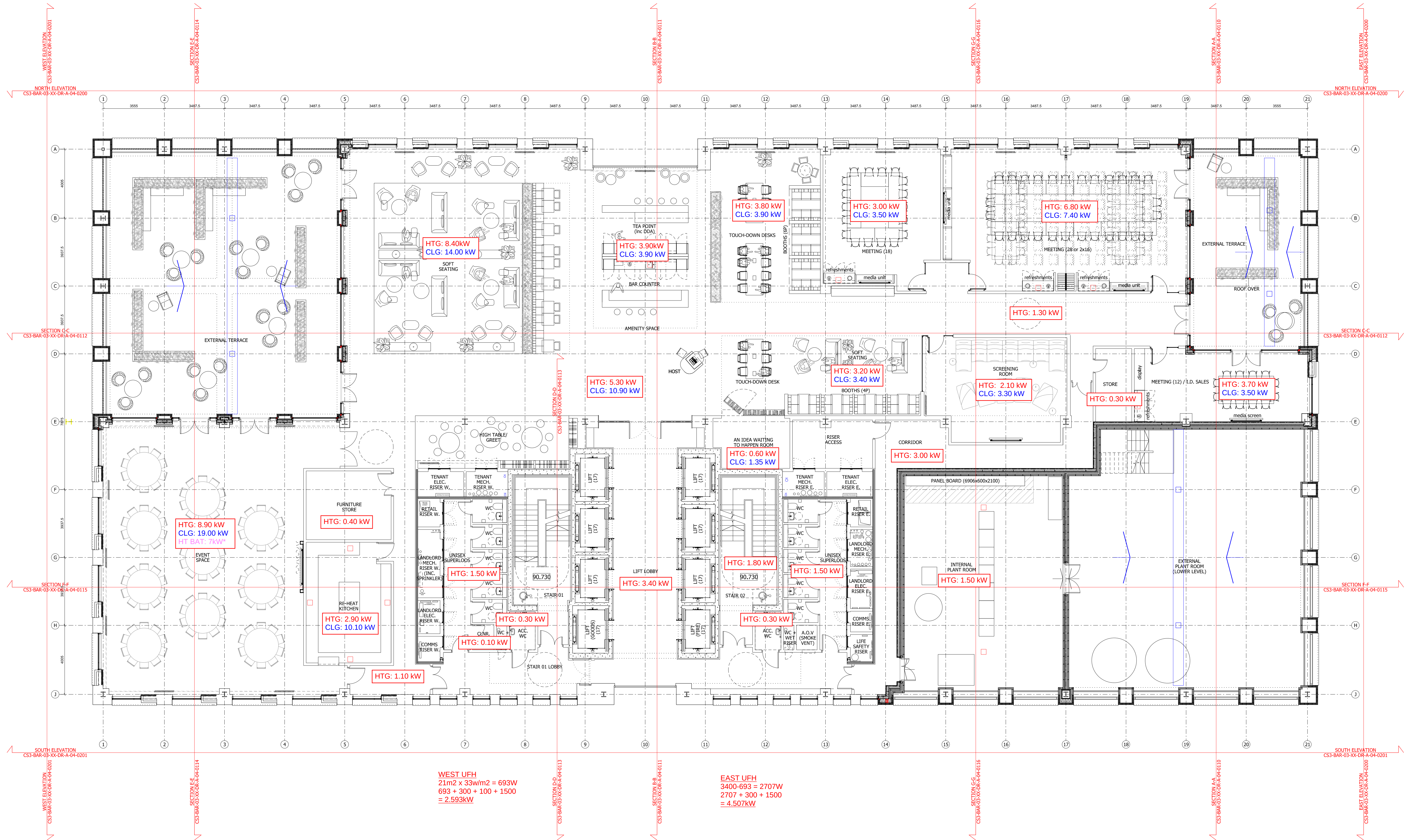
revision notes
rev P01 - 2022-06-07 - Stage 1 Issue

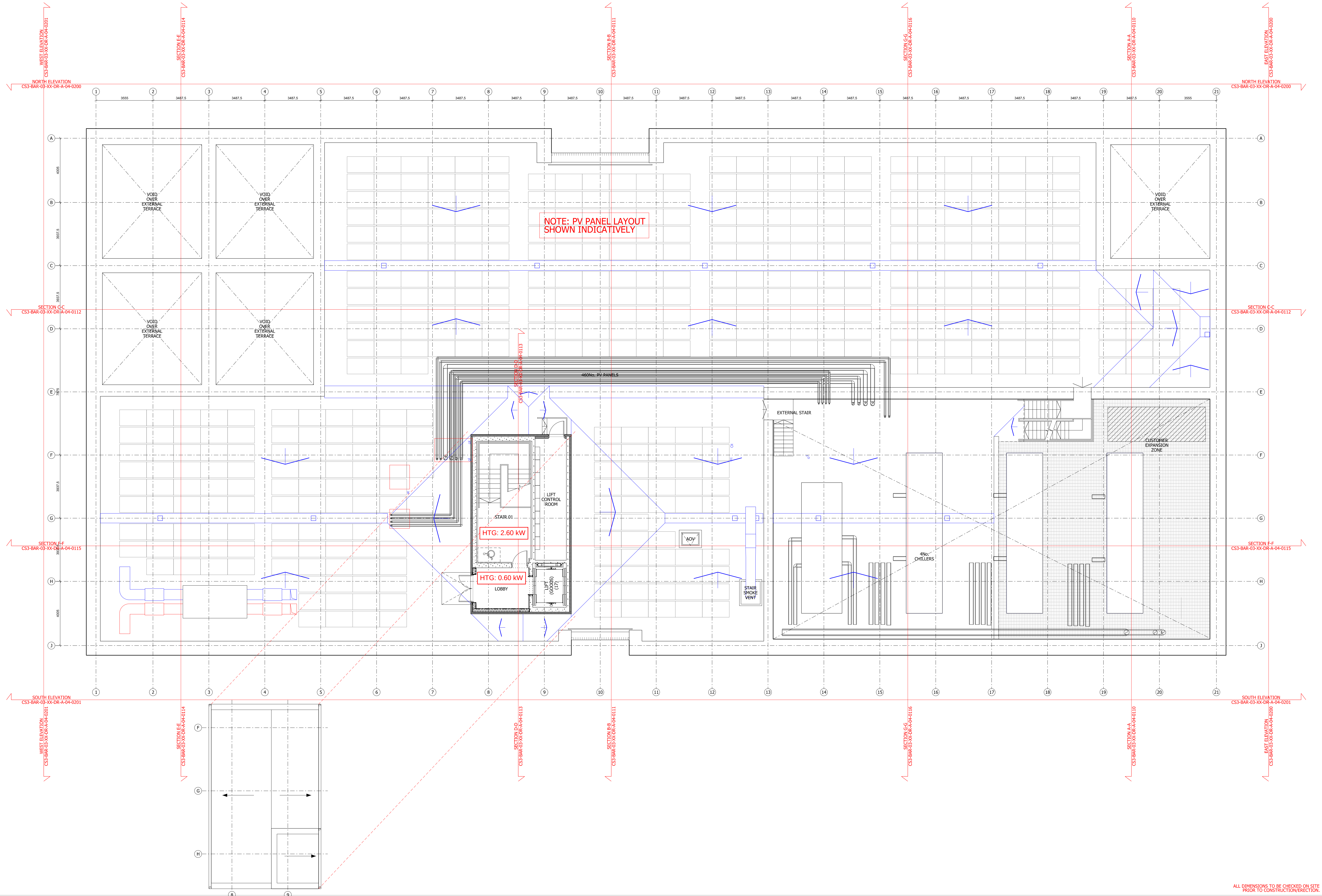
project No.3 Circle Square
client Bruntwood SoftTech
job no. 0256
drawing no. CS3-BAR-03-ZZ-DR-A-04-0102-1

drawing title
drawing scale
drawing created
drawing rev

Proposed Levels: 01, 03, 05, 07, 09, 11, 13 Floor Plan GA
1:100 @ A1; 1:200 @ A3
June 2022
P01

STAGE 3
bridge
architects
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R32 e-series Modular Chiller Range

Project Reference

No 3 Circle Square

Quote Reference

PRO-53435 -01.12.22

Prepared By

PB





Important Note

EAHV-M1800YCL(-N)

Air Source Reversible Heat Pump / Chiller

Important Note: e-series chillers are delivered to site with 12kg of refrigerant charge. Additional gas charge needs to be added on site. Please contact Mitsubishi Electric Site Services to arrange additional FREE OF CHARGE gas and commissioning using the following link -

<https://les.mitsubishielectric.co.uk/installers/site-services/book-site-services>



EAHV-M1800YCL(-N)

Air Source Reversible Heat Pump / Chiller

Design Conditions - Cooling

Outdoor Condition	°C	30
Fluid Inlet Temperature	°C	12
Fluid Outlet Temperature	°C	7
Concentration of Glycol	%	0
Number of Units	No.	4

Total Cooling Capacity	kW	753.2
Cooling Capacity per Unit	kW	188
Input Power per Unit	kW	53
Flow Rate per Unit	l/s	8.9
Pressure Drop	kPa	85

EER	kW/kW	3.56
SEER (See page 3)	kW/kW	5.51
SEER (EN 14825)	kW/kW	5.36

Design Conditions - Heating

Outdoor Condition	°C	-5
Fluid Inlet Temperature	°C	40
Fluid Outlet Temperature	°C	45
Concentration of Glycol	%	0
Number of Units	No.	4

Total Heating Capacity*	kW	509
Heating Capacity per Unit*	kW	127
Input Power per Unit	kW	57
Flow Rate per Unit	l/s	7.0
Pressure Drop	kPa	53

COP	kW/kW	2.23
SCOP (See page 3)	kW/kW	3.33
SCOP Low/Medium (EN 14825)	kW/kW	3.31 / 2.88

*Capacity corrected for defrost



EAHV-M1800YCL(-N)

Air Source Reversible Heat Pump / Chiller

Refrigerant

Refrigerant Type		R32
GWP		675
Total Charge Per Unit	kg	46
Equivalent CO ₂ Emissions per Unit	kg	31,050

Compressors

Compressor Type	Inverter Scroll Hermetic Compressor	
Starting Method		Inverter
Number of Compressors per Unit	No.	4
Compressor Motor Output (per Compressor)	kW	11.5

Water Side Heat Exchangers

Heat Exchanger Type		Stainless Steel Plate
Minimum Water Circuit Volume per Unit	Litres	1650
Total Minimum Water Circuit Volume	Litres	6600

Fans

Fan Type		Propeller Fan
Starting Method		Inverter
Number of Fans per Unit	No.	4
Total Airflow per Unit	l/s	18000
Fan Motor Output (per Fan)	kW	0.92
Available External Static Pressure	Pa	20

Electrical Data

Power Supply per Unit	V/ph/Hz	380-415V/3-phase/50Hz
Max Total Current per Unit	A	120
Starting Current per Unit	A	23.1

Weight

Weight per Unit (with headers)	kg	1307
Total Weight (with Headers)	kg	5228



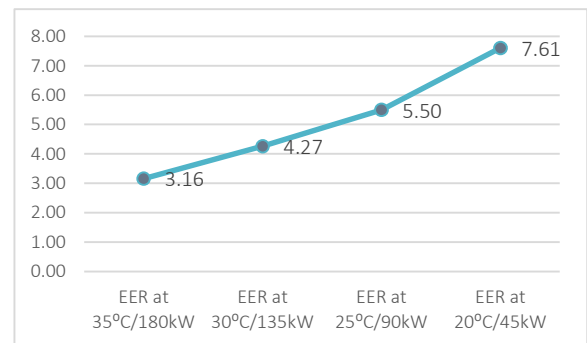
EAHV-M1800YCL(-N)

Air Source Reversible Heat Pump / Chiller

Seasonal Efficiencies - SEER User Defined

Prated,c	kW	180
Fluid Outlet Temp	°C	7
SEER*	kW/kW	5.51

EER at 35°C/180kW	kW/kW	3.16
EER at 30°C/135kW	kW/kW	4.27
EER at 25°C/90kW	kW/kW	5.50
EER at 20°C/45kW	kW/kW	7.61



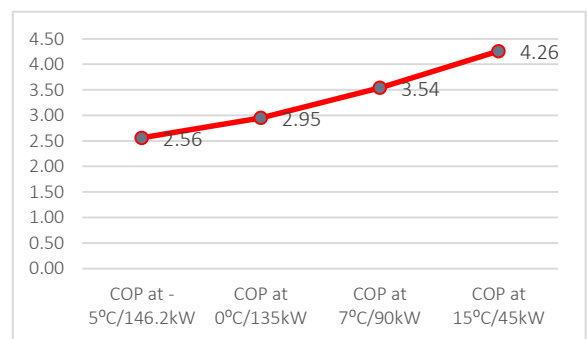
*SEER given as an indication based on the guidance found in Part L of the building regulations with a fixed flow rate of 8.6l/s.

$$\text{SEER} = (0.03 * \text{EER@35°C}) + (0.33 * \text{EER@30°C}) + (0.41 * \text{EER@25°C}) + (0.23 * \text{EER@20°C})$$

Seasonal Efficiencies - SCOP User Defined

Prated,h	kW	146.2
Fluid Outlet Temp	°C	45
SCOP**	kW/kW	3.33

COP at -5°C/146.2kW	kW/kW	2.56
COP at 0°C/135kW	kW/kW	2.95
COP at 7°C/90kW	kW/kW	3.54
COP at 15°C/45kW	kW/kW	4.26



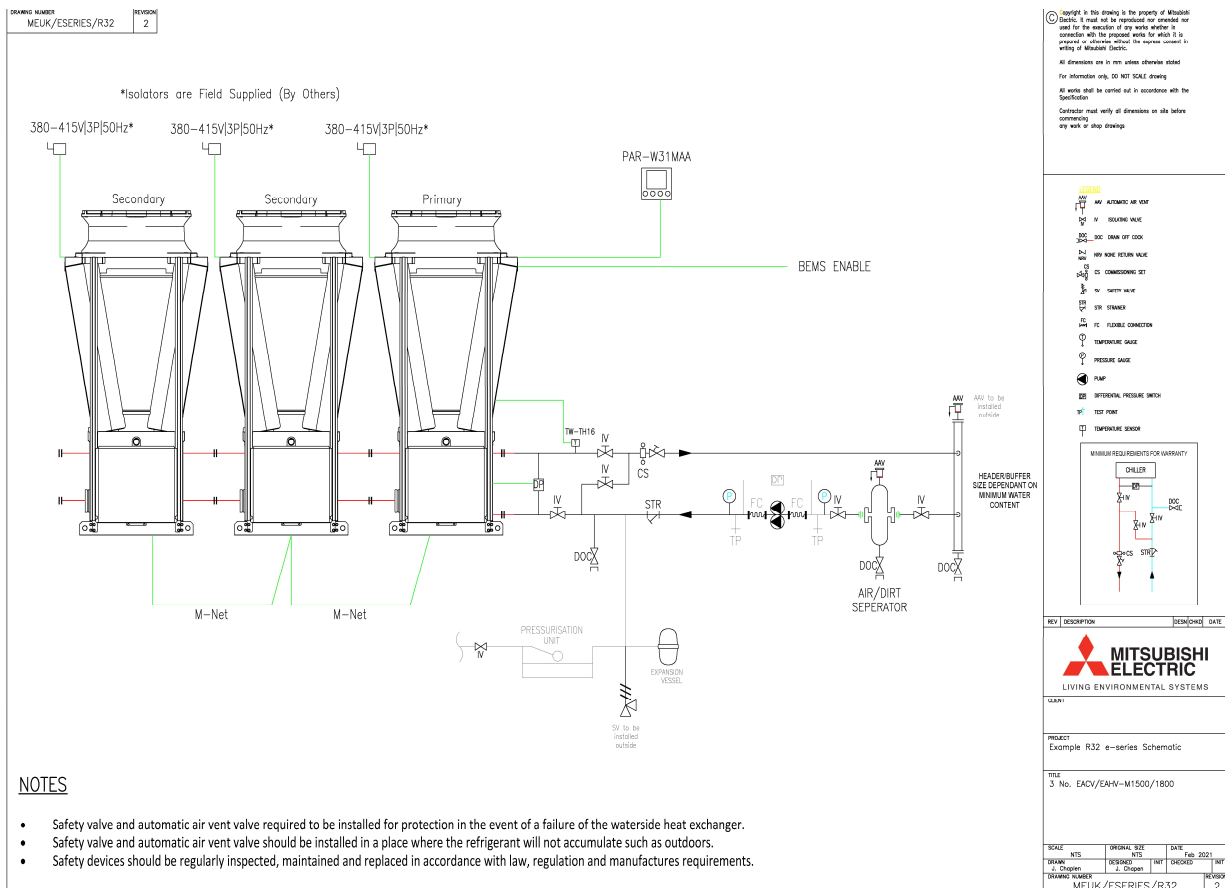
**SCOP given as an indication based on simplified ambient temperatures and weighting from EN18525 with a fixed flow rate of 8.6l/s.

$$\text{SCOP} = (0.05 * \text{COP@-5°C}) + (0.4 * \text{COP@0°C}) + (0.45 * \text{COP@7°C}) + (0.1 * \text{COP@15°C})$$

EAHV-M1800YCL(-N)

Air Source Reversible Heat Pump / Chiller

Example Schematic



Water Filtration

Strainer	Magnetic Filter	Air Dirt Separator
20 Mesh or More (Minimum)	Recommended if steel pipe	Minimum

Minimum-Without this filtration method the installations risks not receiving full warranty.

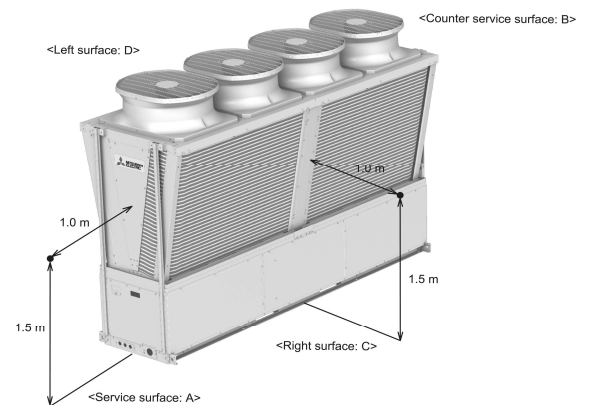
Recommended -This filtration method has recognised benefits for this type of system but its inclusion will not affect warranty

EAHV-M1800YCL(-N)

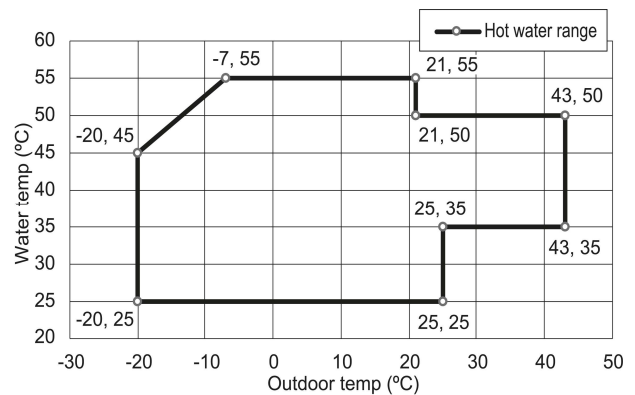
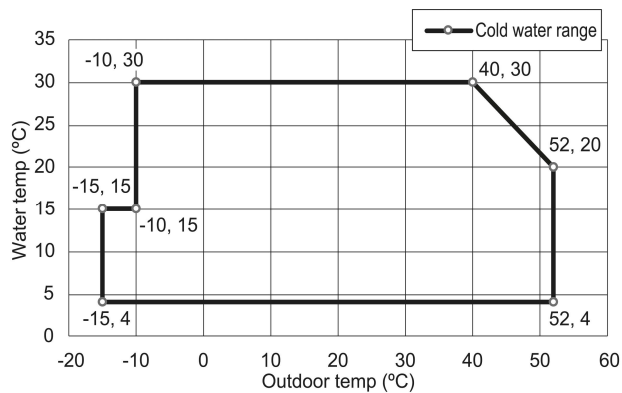
Air Source Reversible Heat Pump / Chiller

Noise Level

EAHV-M1800YCL(-N)	
Measured Location	Sound Pressure Level dB(A)
Service Surface A	67
Counter Service Surface B	67
Right Surface C	71
Left Surface D	71



Operating Window

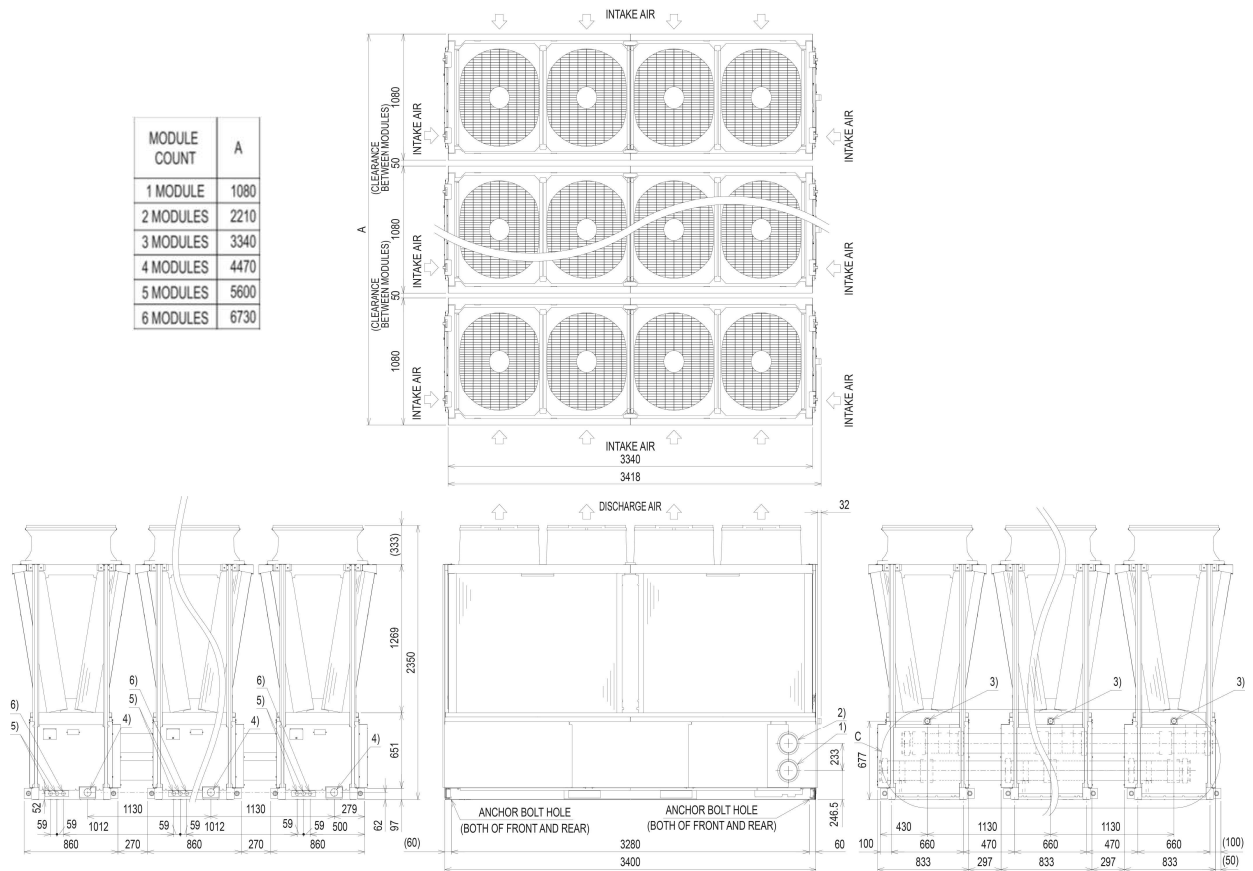


EAHV Models Only

EAHV-M1800YCL(-N)

Air Source Reversible Heat Pump / Chiller

Dimensions





EAHV-M1800YCL(-N)

Air Source Reversible Heat Pump / Chiller

Import to Read

IMPORTANT: Please read and observe our “Safety precaution” warnings and cautions and any warnings included within the Technical guidance set out in the relevant equipment data book before you carry out any function on the product. This output is based upon the best available information but is given as indicative guidance only and should not be considered as final system design. We recommend that the information in this Technical Proposal Form is read in conjunction with the latest equipment data book and installation manual at all times. All water systems should be designed, installed and commissioned in accordance with industry good practice guidelines; such as, but not limited to: BSRIA Guide BG2/2010 – Water System Commissioning, BSRIA Guide BG29/2012 – Pre-Commissioning of Pipework Systems, BSRIA Guide BG50/2013 – Water Treatment for Closed Heating & Cooling Systems, CIBSE Commissioning Code W – Water distribution systems.

Mitsubishi Electric takes no design responsibility or liability for the system, components, equipment selections or control strategy – it is your responsibility to check the suitability of the proposed equipment selections. In order to comply with the Mitsubishi Electric warranty requirements all Mitsubishi Electric products must have adequate planned preventative maintenance undertaken in accordance with our recommendations. To meet Mitsubishi Electric’s warranty requirements a suitable method of filtration must be provided within the system – please refer to installation manual available from the document library. The recommended water flow rates must be maintained at all times when the equipment is operating. Particular attention should be paid to any change in pressure drop due to glycol and start up temperatures. Operating the equipment with less than the minimum flow rate will invalidate the warranty.

The freezing temperatures, capacity de-rates and pressure drop based on glycol concentration will vary between manufacturers. We also remind you of our quotation texts:

This quotation is given by Mitsubishi Electric in good faith based upon information provided by you or your company. We have not undertaken a site survey to support this quotation. Whilst we endeavour to factor into our quotation any special site conditions or user requirements which you may have expressly identified to us previously in writing, this quotation is not a project system design and is not a confirmation of project volumetric or yield analysis. We recommend that you assess final product selection and make the final system design based upon your own volumetric or yield analysis and project knowledge, including any project requirements which might impact on that selection. Please check carefully any requirement for a Mitsubishi Electric product to integrate with any third party equipment. We are not responsible for integration capability of our products with any third party equipment unless we have expressly confirmed that this integration is approved in the current Mitsubishi Electric product specification or in a current technical bulletin.

R32 e-series Modular Chiller Range

Project Reference

No 3 Circle Square

Quote Reference

PRO-53435 -01.12.22

Prepared By

PB





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EAHV-M1800YCL(-N)

Air Source Reversible Heat Pump / Chiller

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EAHV-M1800YCL(-N)

Air Source Reversible Heat Pump / Chiller

Design Conditions - Cooling

Outdoor Condition	°C	30
Fluid Inlet Temperature	°C	12
Fluid Outlet Temperature	°C	7
Concentration of Glycol	%	0
Number of Units	No.	2

Total Cooling Capacity	kW	376.6
Cooling Capacity per Unit	kW	188
Input Power per Unit	kW	53
Flow Rate per Unit	l/s	8.9
Pressure Drop	kPa	85

EER	kW/kW	3.56
SEER (See page 3)	kW/kW	5.51
SEER (EN 14825)	kW/kW	5.36

Design Conditions - Heating

Outdoor Condition	°C	-5
Fluid Inlet Temperature	°C	40
Fluid Outlet Temperature	°C	45
Concentration of Glycol	%	0
Number of Units	No.	2

Total Heating Capacity*	kW	254
Heating Capacity per Unit*	kW	127
Input Power per Unit	kW	57
Flow Rate per Unit	l/s	7.0
Pressure Drop	kPa	53

COP	kW/kW	2.23
SCOP (See page 3)	kW/kW	3.33
SCOP Low/Medium (EN 14825)	kW/kW	3.31 / 2.88

*Capacity corrected for defrost



EAHV-M1800YCL(-N)

Air Source Reversible Heat Pump / Chiller

Refrigerant

Refrigerant Type	R32	
GWP	675	
Total Charge Per Unit	kg	46
Equivalent CO ₂ Emissions per Unit	kg	31,050

Compressors

Compressor Type	Inverter Scroll Hermetic Compressor	
Starting Method	Inverter	
Number of Compressors per Unit	No.	4
Compressor Motor Output (per Compressor)	kW	11.5

Water Side Heat Exchangers

Heat Exchanger Type		Stainless Steel Plate
Minimum Water Circuit Volume per Unit	Litres	1650
Total Minimum Water Circuit Volume	Litres	3300

Fans

Fan Type		Propeller Fan
Starting Method		Inverter
Number of Fans per Unit	No.	4
Total Airflow per Unit	l/s	18000
Fan Motor Output (per Fan)	kW	0.92
Available External Static Pressure	Pa	20

Electrical Data

Power Supply per Unit	V/ph/Hz	380-415V/3-phase/50Hz
Max Total Current per Unit	A	120
Starting Current per Unit	A	23.1

Weight

Weight per Unit (with headers)	kg	1307
Total Weight (with Headers)	kg	2614



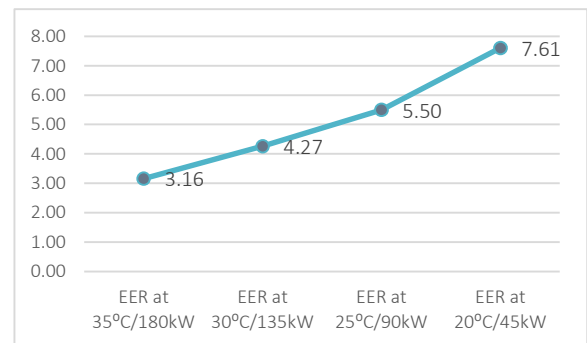
EAHV-M1800YCL(-N)

Air Source Reversible Heat Pump / Chiller

Seasonal Efficiencies - SEER User Defined

Prated,c	kW	180
Fluid Outlet Temp	°C	7
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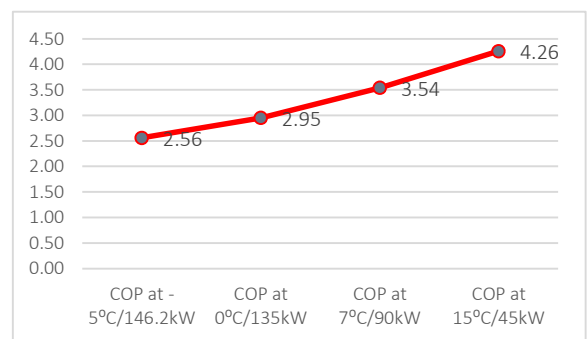
*SEER given as an indication based on the guidance found in Part L of the building regulations with a fixed flow rate of 8.6l/s.

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Seasonal Efficiencies - SCOP User Defined

Prated,h	kW	146.2
Fluid Outlet Temp	°C	45
SCOP**	kW/kW	3.33

COP at -5°C/146.2kW	kW/kW	2.56
COP at 0°C/135kW	kW/kW	2.95
COP at 7°C/90kW	kW/kW	3.54
COP at 15°C/45kW	kW/kW	4.26



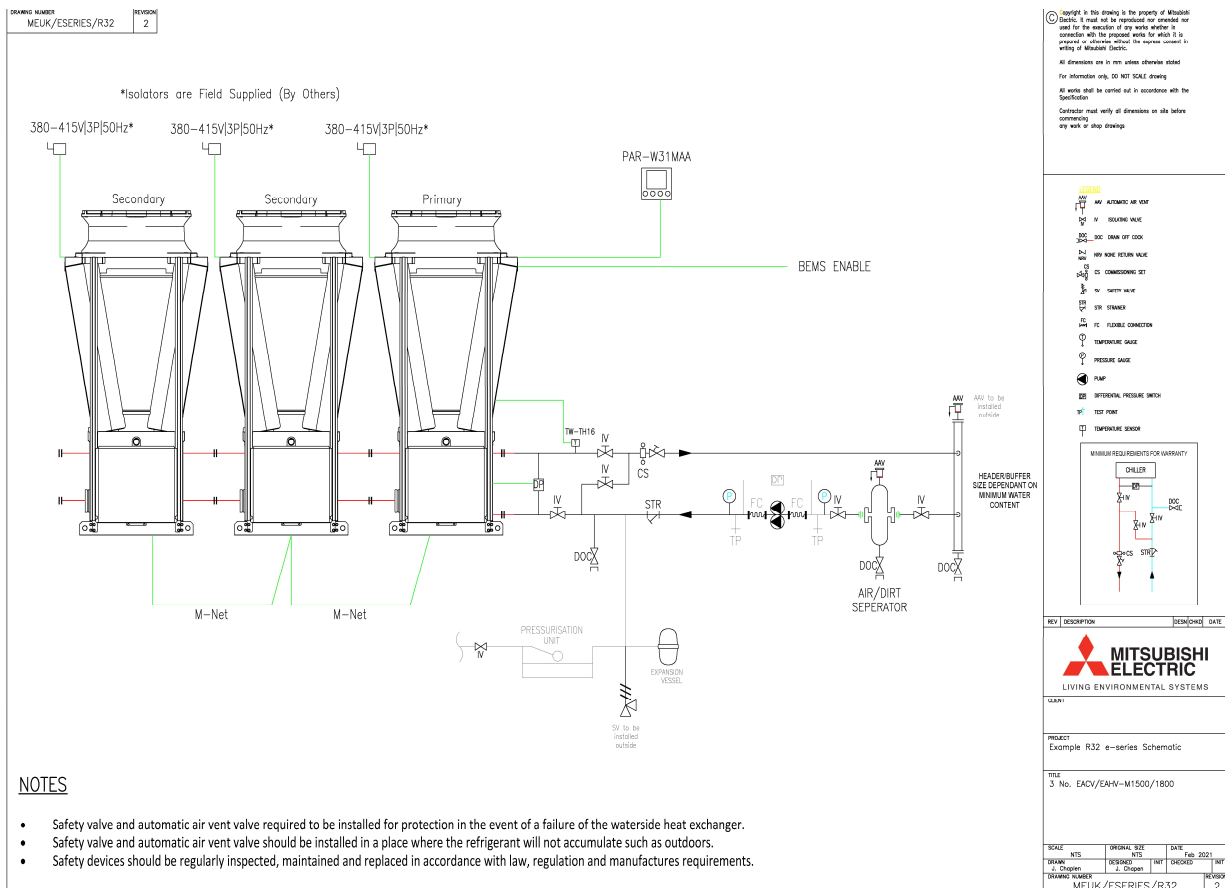
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EAHV-M1800YCL(-N)

Air Source Reversible Heat Pump / Chiller

Example Schematic



Water Filtration

Strainer	Magnetic Filter	Air Dirt Separator
20 Mesh or More (Minimum)	Recommended if steel pipe	Minimum

Minimum-Without this filtration method the installations risks not receiving full warranty.

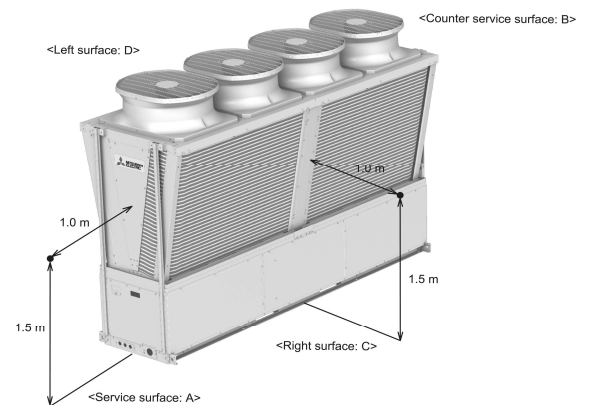
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EAHV-M1800YCL(-N)

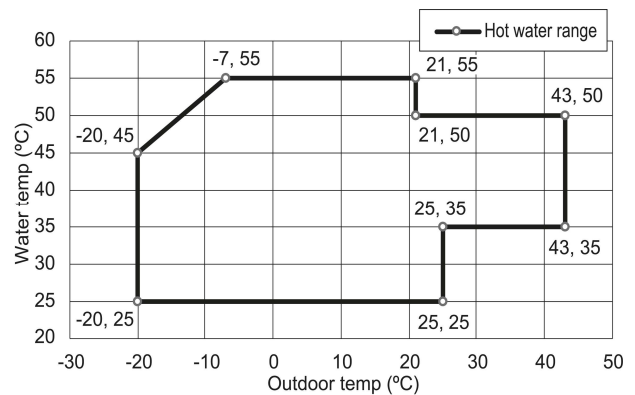
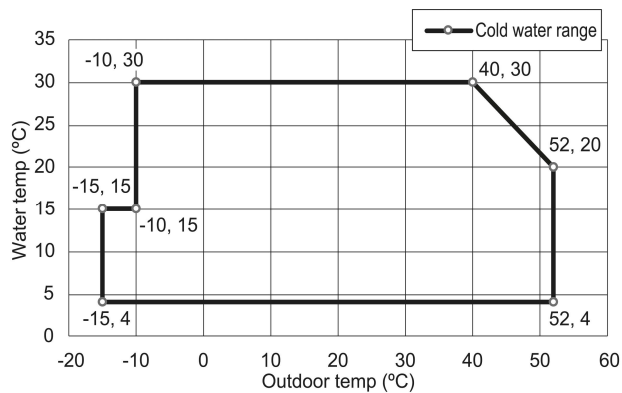
Air Source Reversible Heat Pump / Chiller

Noise Level

EAHV-M1800YCL(-N)	
Measured Location	Sound Pressure Level dB(A)
Service Surface A	67
Counter Service Surface B	67
Right Surface C	71
Left Surface D	71



Operating Window

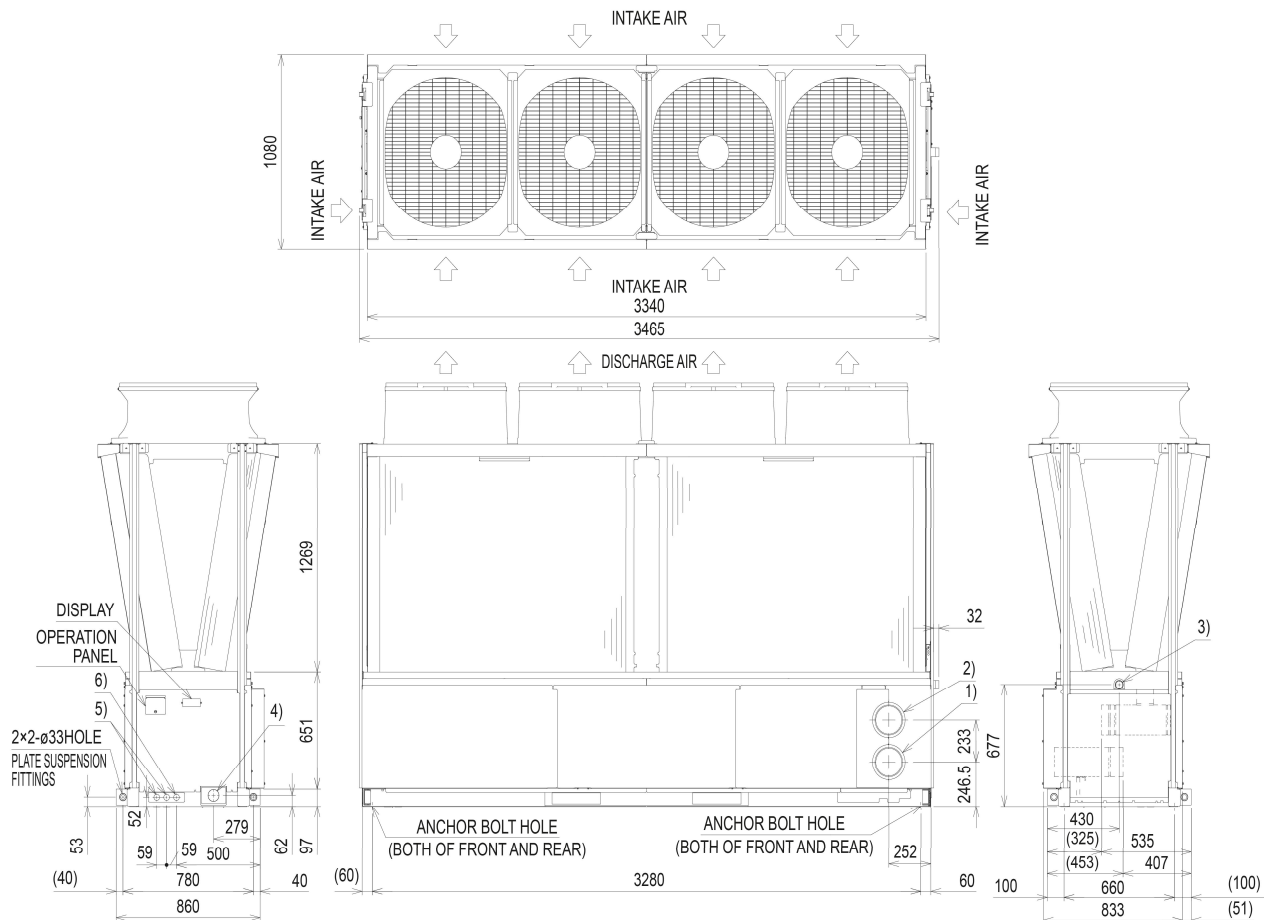


EAHV Models Only

EAHV-M1800YCL(-N)

Air Source Reversible Heat Pump / Chiller

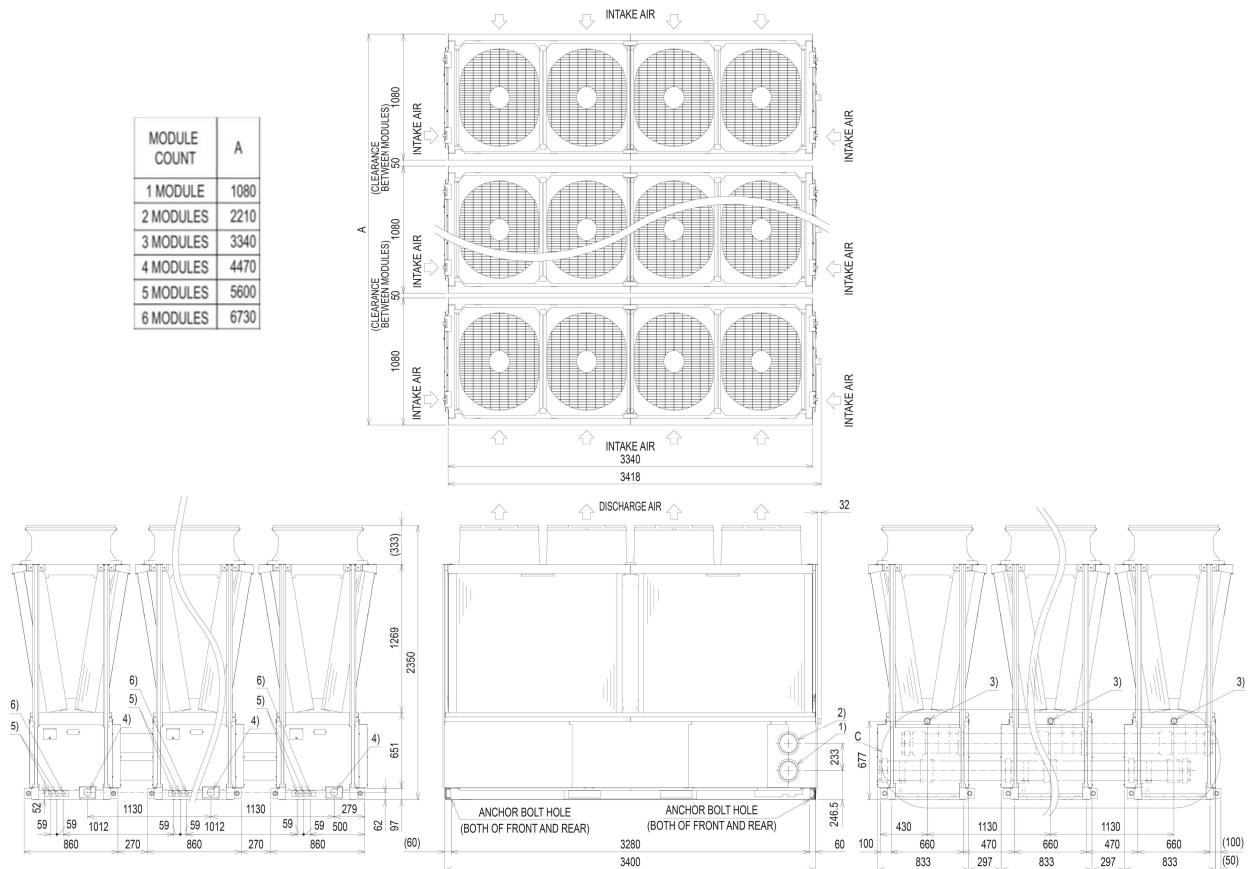
Dimensions



EAHV-M1800YCL(-N)

Air Source Reversible Heat Pump / Chiller

Dimensions





EAHV-M1800YCL(-N)

Air Source Reversible Heat Pump / Chiller

Import to Read

IMPORTANT: Please read and observe our “Safety precaution” warnings and cautions and any warnings included within the Technical guidance set out in the relevant equipment data book before you carry out any function on the product. This output is based upon the best available information but is given as indicative guidance only and should not be considered as final system design. We recommend that the information in this Technical Proposal Form is read in conjunction with the latest equipment data book and installation manual at all times. All water systems should be designed, installed and commissioned in accordance with industry good practice guidelines; such as, but not limited to: BSRIA Guide BG2/2010 – Water System Commissioning, BSRIA Guide BG29/2012 – Pre-Commissioning of Pipework Systems, BSRIA Guide BG50/2013 – Water Treatment for Closed Heating & Cooling Systems, CIBSE Commissioning Code W – Water distribution systems.

Mitsubishi Electric takes no design responsibility or liability for the system, components, equipment selections or control strategy – it is your responsibility to check the suitability of the proposed equipment selections. In order to comply with the Mitsubishi Electric warranty requirements all Mitsubishi Electric products must have adequate planned preventative maintenance undertaken in accordance with our recommendations. To meet Mitsubishi Electric’s warranty requirements a suitable method of filtration must be provided within the system – please refer to installation manual available from the document library. The recommended water flow rates must be maintained at all times when the equipment is operating. Particular attention should be paid to any change in pressure drop due to glycol and start up temperatures. Operating the equipment with less than the minimum flow rate will invalidate the warranty.

The freezing temperatures, capacity de-rates and pressure drop based on glycol concentration will vary between manufacturers. We also remind you of our quotation texts:

This quotation is given by Mitsubishi Electric in good faith based upon information provided by you or your company. We have not undertaken a site survey to support this quotation. Whilst we endeavour to factor into our quotation any special site conditions or user requirements which you may have expressly identified to us previously in writing, this quotation is not a project system design and is not a confirmation of project volumetric or yield analysis. We recommend that you assess final product selection and make the final system design based upon your own volumetric or yield analysis and project knowledge, including any project requirements which might impact on that selection. Please check carefully any requirement for a Mitsubishi Electric product to integrate with any third party equipment. We are not responsible for integration capability of our products with any third party equipment unless we have expressly confirmed that this integration is approved in the current Mitsubishi Electric product specification or in a current technical bulletin.

TECHNICAL SELECTION

Software version: ELCA World v. 1.7.3.0

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TECHNICAL SELECTION

NX-Q-G06 /LN 1204

INTEGRA unit for 4-pipe systems, air source for outdoor installation



Code	NX-Q-G06 /LN 1204	
Version	LN	
Size	1204	
Power supply	V/ph/Hz	400/3/50

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1 UNIT DESCRIPTION

Data Book

NX-Q-G06 0604 - 1204_202209_EN R454B

1.1 Standard unit composition

INTEGRA unit for 4-pipe systems, air source for outdoor installation

Multi-purpose outdoor unit for use in 4-pipe systems for the simultaneous production of hot and chilled water by means of two independent hydronic circuits. These units are able to satisfy the demand for hot and cold water simultaneously through a system that does not require seasonal switching and is therefore a valid alternative to traditional plants with chiller and boiler. Unit with two independent refrigerant circuits, each equipped with two hermetic rotary Scroll compressors, low-GWP and ozone-friendly refrigerant R454B, axial fans, braze-welded plate-type exchanger and thermal expansion valve. External panels in Peraluman and base in galvanised sheet steel with paint finish.

R454B REFRIGERANT

The refrigerant used in these units is R454B, one of the most eco-sustainable refrigerants for replacing traditional R410A, thanks to the 76% lower GWP.

Unlike R410A, R454B is classified as A2L according to ISO 817. The first digit defines toxicity (A: NON-TOXIC), while the last digits define the flammability level (2L: MILDLY FLAMMABLE - low burning velocity). It is classified by PED Directive into Group 1.

The main characteristics of this refrigerant and some additional guidelines are reported below. Despite the minimal risk, the indications provided cannot replace a more detailed risk analysis if required, also based on any regulations in force in the installation area.

Further and more detailed guidelines are available in the dedicated area of the website www.melcohit.com (Guidelines) or in the dedicated addendum of the general installation and maintenance manual.

Main characteristics of R454B refrigerant:

- Safety classification (ASHRAE / ISO 817): A2L
- PED Group: 1
- Ozone Depletion Potential (ODP) (R11=1): 0
- AR5 (AR4) GWP (CO2=1): 467 (466)
- Composition (Wt %): 68,9% R32, 31,1% R1234yf
- LFL@23°C, 50% RH (% v/v): 11,7
- UFL@23°C, 50% RH (% v/v): 22,0
- Burning velocity (cm/s): 5,2
- Minimum Ignition Energy (mJ) (ASTM E582-13): 100-300

- All operations on the unit must be performed by trained and qualified personnel on flammable refrigerants handling, in accordance with the relevant local standards and codes of practice.
- The refrigerant is heavier than air and can stagnate, reaching a dangerous concentration. To avoid risks, maintain a safe environment by ensuring adequate ventilation.
- The units must be installed in such a way as to prevent any refrigerant leaks from flowing into the buildings or any place where it could cause damage to people, animals or properties. Pay particular attention to the presence and disposition of any external air intakes, doors, shutters, etc.
- The units are equipped with conveyed safety valves with external discharge. In case of over-pressure, refrigerant gas can escape from these valves: the discharge of these ducts must be directed towards safe areas and away from the ground or potential sources of ignition.
- Do not braze pipes and components containing refrigerant.
- Do not use flames to cut / open pipes.
- The units are equipped with a safety valve (water side). In case of breakage of the heat exchanger and resulting overpressure, refrigerant gas can escape from these valves: the discharge of these valves must be directed towards safe areas and away from the ground or potential sources of ignition.
- The hydraulic circuit must be designed in such a way as to prevent the release of refrigerant gas inside the buildings or in any case in places where it can cause damage to people, animals or properties.

Structure

Frame with base in polyester-painted thick hot-galvanised sheet steel. Shaped aluminium walls.

UNIT DESCRIPTION

Data Book

NX-Q-G06 0604 - 1204_202209_EN R454B

Panelling

The external panelling, made from simil peraluman, epoxy painted sheet metal, offers maximum ease of access to the internal components.

Refrigerant circuit

Main components of the refrigerant circuit:

- R454B refrigerant
- liquid line shut-off valve
- Liquid line solenoid valve
- drier filter with replaceable cartridge
- refrigerant line sight glass with humidity indicator
- externally equalised thermostatic valve
- Liquid receivers
- Liquid separators
- electrovalves for circuit configuration
- High pressure switches
- high and low pressure transducers
- crankcase heater on each compressor
- 4-way reverse cycle valve
- high and low pressure safety valves, conveyed to external discharge

Compressor

Hermetic scroll compressors complete with an oil sump heater, electronic overheating protection with centralised manual reset and a two-pole electric motor.

Plant side cold heat exchanger

Braze welded AISI 316 steel plate heat exchanger, it acts as an evaporator. The heat exchangers are lined on the outside with closed-cell neoprene lagging. When the unit is not operating, these are protected against formation of ice on the inside by an electric heater with thermostat, while when the unit is operating protection is ensured by a differential pressure switch on the water side. The unit can also operate with non-freezing mixes, down to heat exchanger outlet temperatures of -8°C.

Plant side hot heat exchanger

Braze welded AISI 316 steel plate heat exchanger, it acts as a condenser. The heat exchangers are lined on the outside with closed-cell neoprene lagging. When the unit is not operating, these are protected against formation of ice on the inside by an electric heater with thermostat, while when the unit is operating protection is ensured by a differential pressure switch on the water side.

Source side heat exchanger

Air-refrigerant heat exchanger, working as a condenser or an evaporator depending to the specific operating mode. Made with copper tubes and aluminium fins. The aluminium fins are spaced to guarantee the best heat exchange efficiency.

UNIT DESCRIPTION

Data Book

NX-Q-G06 0604 - 1204_202209_EN R454B

Fan section source side

Axial electric fans, protected to IP 54, with external rotor and pressed sheet metal blades. Housed in aerodynamic hoods complete with safety grille. 6-pole electric motor with built-in thermal protection. The fan chamber is divided into two sections. This improves efficiency with partial loads as the fans of the idle circuit can be stopped.

Electrical and control panel

Electrical and control panel built in accordance with EN60204-1 standard, complete with:

- control circuit transformer
- general door lock isolator
- fuses and contactors for compressors and fans
- terminals for cumulative alarm block
- remote ON/OFF terminals
- spring-type control circuit terminal board
- electric panel with double door and seals for outdoor installation
- Electronic control W3000+
- Pump control relay + 0-10V modulating signal to control an external variable speed pump with the VPF.E control logic (plant-side constant ΔT for plants with primary circuit only and terminals with bypass)

Certification and applicable directives

The unit complies with the following directives and relative amendments:

- EUROVENT Certification program
- CE - Declaration of conformity certificate for the European Union
- Machinery Directive 2006/42/EC
- Pressure Equipment Directive 2014/68/EU
- 2014/30/EC EMC Directive
- ErP Directive 2009/125/EC

Tests

Tests performed throughout the production process, as indicated in ISO9001.

Performance or noise tests can be performed by highly qualified staff in the presence of customers.

Performance tests comprise the measurement of:

- electrical data
- water flow rates
- working temperatures
- power input
- power output
- pressure drops on the water-side exchanger both at full load (at the conditions of selection and at the most critical conditions for the condenser) and at part load conditions.

During performance testing it is also possible to simulate the main alarm states.

Noise tests are performed to check noise emissions according to ISO9614.

1.2 Versions

- Basic version

Standard unit

UNIT DESCRIPTION

Data Book

NX-Q-G06 0604 - 1204_202209_EN R454B

/LN - Low Noise

This configuration features a special soundproofing for the compressor compartment and the pumps (if present), a reduced fan speed and an oversized condensing section.

The fan speed is automatically increased in case of particularly tough environmental conditions.

/SL - Super Low noise

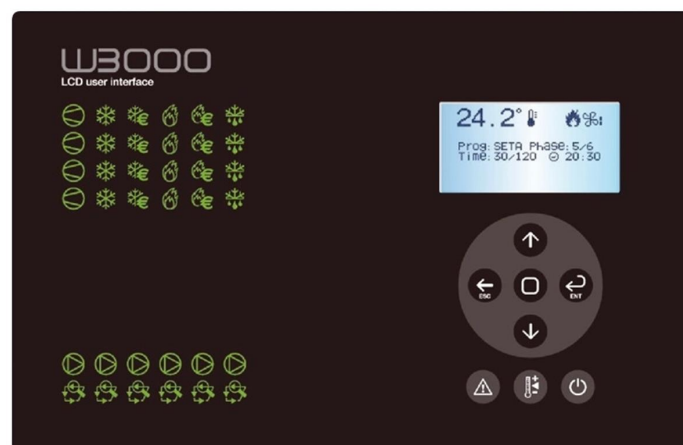
This configuration features a reduced fan speed and an oversized condensing section.

The fan speed is automatically increased in case of particularly tough environmental conditions.

1.3 Electronic controller

Electronic control W3000+

The brand new W3000+ controller offers advanced functions and algorithms. The Large keypad, as standard, features function controls and a complete LCD display to view data and activate the unit, via a multi-language menu. In addition to or as an alternative, KIPLink - Keyboard In Your Pocket - is available. It is an innovative user interface based on WiFi technology that allows one to operate on the unit directly from a smartphone or tablet. Using KIPLink, it is possible to turn the unit on and off, adjust the set-point, plot the main operating variables, monitor the status of the refrigerant circuits, the compressors, the fans and the pumps (if present), and display and reset the possible alarms. The regulation features the continuous modulation of capacity, based on sequential adjustment + DIP referring to the leaving water temperature. Diagnostics include complete alarm management, with "blackbox" functions (via PC) and alarm log (display or PC) for best analysis of unit behavior. The built-in clock can be used to create an operating profile containing up to 4 typical days and 10 time bands, essential for efficient programming of energy production. Optional proprietary devices can perform the adjustment of the resources in systems comprised of several units. Consumption metering and performance measurement are possible as well. The variable primary flow control is always available as per standard (VPF.E function). Supervision is available with different options, using proprietary devices or by integration into third party systems using ModBus, BACnet, BACnet-over-IP and Echelon LonWorks protocols. A dedicated wall-mounted keypad can be used as a remote control of all the functions.



KIPlink - Keyboard In your Pocket (option 6196)

KIPlink - Keyboard In Your Pocket - is the innovative user interface based on WiFi technology that allows one to operate on the unit directly from the smartphone or tablet. Using KIPlink, it is possible to turn the unit on and off, adjust the set-point, plot the main operating variables, monitor in detail the status of the refrigerant circuits, the compressors, the fans (if present) and the pumps (if present) and display and reset the possible alarms.

**Climatic curve (option 5941)**

Available as option an outside air temperature probe to control the system water temperature set point based on cooling and heating (reversible units) climatic curves.

Night mode (option 1430)

The night mode function allows to reduce the sound power of the unit, reducing the speed of the fans and the number of active compressors.

U.L.C. - User limit control (option 4960)

Guaranteed the start-up of the units with the option U.L.C. even when the critical working condition could generate an alarm.

The controller can manage a 3way mixing valve (not provided) by 0-10V signal for ensuring a dynamic control of the water temperature on user heat exchanger according to the operating limits allowed. This ensures the start-up and correct functioning of the unit into the envelope, also even critical whether condition.

2 TECHNICAL SELECTION

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User: Tim Cheng
Print data: 28/09/2022 10:54
Calculation type: EN 14511 - EN 14825



NX-Q-G06 /LN 1204



AXIAL



HEATING



SCROLL

2.1 PERFORMANCE AT DESIGN CONDITIONS

RUNNING CONDITIONS

CHILLED WATER HEAT EX. USER SIDE

Fluid type		WATER
Glycol	%	0
Fouling factor	m ² K/kW	0.000

COOLING

Fluid inlet temperature (cooling mode)	°C	12.00
Fluid outlet temperature (cooling mode)	°C	7.00
Water flow	l/s	14.32
Pressure drop at the heat exchanger	kPa	43.8
Available unit head	kPa	0.00

COOLING + HEAT RECOVERY

Fluid inlet temperature (cooling + heat recovery)	°C	12.00
Fluid outlet temperature (cooling + heat recovery)	°C	7.00
Water flow	l/s	14.54
Pressure drop at the heat exchanger	kPa	45.2

WARM WATER HEAT EX. USER SIDE

Fluid		WATER
Glycol	%	0
Fouling factor	m ² K/kW	0.000

HEATING

Fluid inlet temperature (heating mode)	°C	40.00
Fluid outlet temperature (heating mode)	°C	45.00
Water flow	l/s	11.83
Pressure drop at the heat exchanger	kPa	34.3
Available unit head	kPa	0.00

COOLING + HEAT RECOVERY

Fluid inlet temperature (cooling + heat recovery mode)	°C	40.00
Fluid outlet temperature (cooling + heat recovery mode)	°C	45.00
Water flow	l/s	19.09
Pressure drop at the heat exchanger	kPa	89.2

OUTDOOR CONDITION

Air temperature (cooling mode)	°C	30.0
Air temperature (heating mode)	°C	-5.0

COOLING (EN 14511)

Cooling capacity	kW	299.0
Compressor power input	kW	99.82
Fans power input (cooling mode)	kW	7.20
Total power input	kW	108.3
EER	kW/kW	2.760
ESEER EN 14511	kW/kW	3.760

The performance shown are obtained from theoretical calculations and tolerances will apply. Rpt.version: 1.0.6.0

TECHNICAL SELECTION

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NX-Q-G06 /LN 1204



AXIAL



HEATING



SCROLL

COOLING WITH HEAT RECOVERY (EN 14511 VALUE)

Cooling capacity	kW	305.7
Recovery heat exchanger capacity	kW	396.8
Total power input	kW	98.22
TER	kW/kW	7.152

HEATING (EN14511)

Total heating capacity	kW	219.8
Compressors power input (heating mode)	kW	92.03
Fan power input (heating mode)	kW	7.20
Total power input	kW	97.70
COP	kW/kW	2.250

SCOP

SCOP Official (Reg. 813/2013 EU)

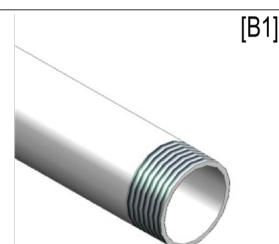
LOW TEMPERATURE

Type climate		Average
Temperature application	°C	35
Type flow		Variable
Type Temperature		Variable
Bivalent temperature	°C	-7.0
PDesign	kW	240
Qhe	kWh	130266
SCOP		3.80
Performance η_s	%	149
Seasonal efficiency class		-

2.2 EXCHANGERS

CHILLED WATER HEAT EX. USER SIDE

Typology		PLATE
Quantity	N°	2
Type of connections		[B1] - Male threaded pipe (EN 10226 - R: external taper thread)
Diameter of connections		4"
Min flow	l/s	9.250
Max flow	l/s	21.11
Heat exchanger water content	l	28.4
Minimum water content admitted in the plant	l	2200



The performance shown are obtained from theoretical calculations and tolerances will apply. Rpt.version: 1.0.6.0

TECHNICAL SELECTION

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**NX-Q-G06 /LN 1204**

AXIAL



HEATING

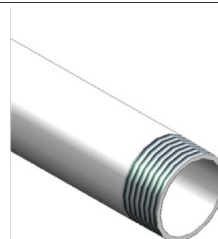


SCROLL

WARM WATER HEAT EX. USER SIDE

Typology		PLATE
Quantity	N°	2
Type of connections		[B1] - Male threaded pipe (EN 10226 - R: external taper thread)
Diameter of connections		4"
Min flow	l/s	9.250
Max flow	l/s	21.11
Water content	l	28.4

[B1]

**2.3 FANS**

Fans type		AXIAL AC
Quantity	N°	6
Total fans power input	kW	7.20
F.L.I.	kW	6x2
F.L.A.	A	6x3.8

COOLING

Total fans power input	kW	7.20
Air flow	m³/s	18.95
Available static pressure	Pa	0

HEATING

Total fans power input	kW	7.20
Air flow	m³/s	18.95
Fan available static pressure	Pa	0

2.4 COMPRESSORS**COMPRESSORS**

Compressor type		SCROLL
Compressors nr.	N°	4
No. Circuits	N°	2
Number of capacity steps	N°	4
Min. capacity step	%	25
Regulation		STEPS
Oil charge	kg	21.2
F.L.I. - Max absorbed power	kW	4x34.5
F.L.A. - Max absorbed current	A	4x55.1
L.R.A. - Locked rotor amperes for single compressor	A	4x326

The performance shown are obtained from theoretical calculations and tolerances will apply. Rpt.version: 1.0.6.0

TECHNICAL SELECTION

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NX-Q-G06 /LN 1204



AXIAL



HEATING



SCROLL

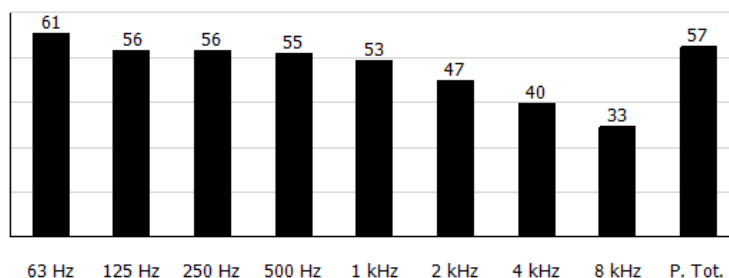
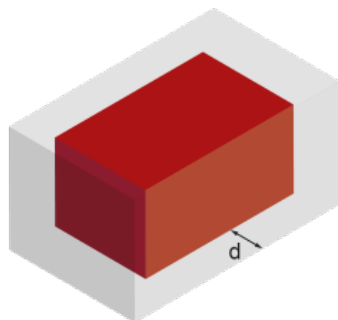
REFRIGERANT

Refrigerant		R454B
Theoretical refrigerant charge	kg	97.2
GWP100 value (from IPCC AR5)		467
CO2 equivalent	t	45.4

2.5 NOISE DATA

SOUND DATA COLD

Frequencies	Hz	63	125	250	500	1000	2000	4000	8000
Sound power (spectrum)	dB	93	88	88	87	85	79	72	65
Total sound power level in cooling	dB(A)	89							
Sound pressure level (spectrum)	dB	61	56	56	55	53	47	40	33
Total sound Pressure	dB(A)	57							



SOUND DATA OUTDOOR HOT

Total sound power level in heating	dB(A)	90
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Note

Distance	m	10
Note	Average sound pressure level at 10 m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level. Sound power on the basis of measurements taken in compliance with ISO 9614.	

The performance shown are obtained from theoretical calculations and tolerances will apply. Rpt.version: 1.0.6.0

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NX-Q-G06 /LN 1204

AXIAL

HEATING

SCROLL

2.6 OPERATING LIMITS



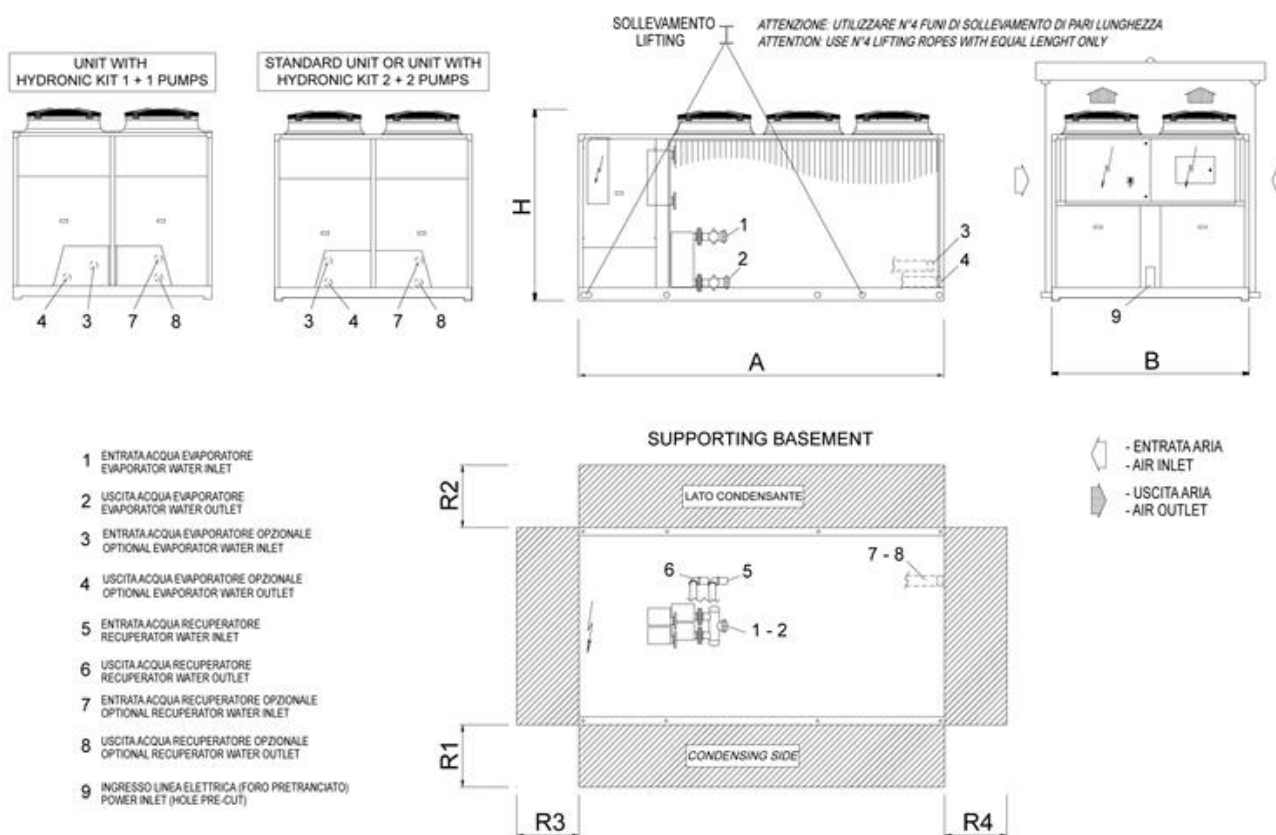
2.7 ELECTRICAL DATA

Power supply	V/ph/Hz	400/3/50
F.L.I. - Max absorbed power	kW	150.0
F.L.A. - Max absorbed current	A	243
S.A. - Inrush current	A	514

The performance shown are obtained from theoretical calculations and tolerances will apply. Rpt.version: 1.0.6.0

2.8 WEIGHT & DIMENSIONS

A	mm	4110
B	mm	2220
H	mm	2150
Operating weight	kg	2680
R1	mm	2000
R2	mm	2000
R3	mm	1100
R4	mm	1100







TECHNICAL SELECTION

Software version: ELCA World v. 1.7.3.0

User: Tim Cheng

Database version: 1.8.3.0

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TECHNICAL SELECTION

EW-HT /0612

Water to water heat pumps, heating only, very high temperature water production



R HFC R-134a

SCROLL

Code	EW-HT /0612
Version	-
Size	0612
Power supply	V/ph/Hz 400/3/50

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1.1 Standard unit composition

Water to water heat pumps, heating only, very high temperature water production

EW-HT represents the best solution for systems where very high temperature water is needed, for domestic hot water production, space heating or industrial process purpose.

The special compressor adopted grants hot water production up to 78°C and allows high evaporation temperature (evaporator leaving water temperature up to 40°C). The extraordinary operating limits ensure the perfect integration of the unit in any application, such as 4-pipe systems for residential and commercial buildings, industrial process heat recovery, district heating systems, IT cooling plants.

Installation note

The unit is supplied fully refrigerant charged and factory tested. On site installation only requires power and hydraulic connection.

Structure

Load-bearing base and structure made from suitably thick hot galvanized steel plate. All parts painted with polyester power coat.

Panelling

The external paneling, made from aluminium-like epoxy painted sheet metal, offers maximum ease of access to the internal components. Standard version without acoustic insulation on compressors case. Available, on request, acoustic insulation on compressors section by 30mm thick Fiberform. See acoustic performances section to be informed on the noise reduction level.

Compressors

Latest generation hermetic rotary scroll compressors operating on R134a, complete with sump heater, electronic thermal protector with centralized manual reset, and two-pole electric motor.

Plant side heat exchanger

Braze-welded AISI 316 plate heat exchanger, dual circuit type. The heat exchanger is externally insulated with a layer of closed-cell neoprene. When the unit is operating, the heat exchangers are protected against no flow conditions by a water differential pressure switch. Hydraulic connections: grooved couplings with male threaded counter-pipes user side.

Source side heat exchanger

Braze-welded AISI 316 plate heat exchanger, dual circuit type. The heat exchanger is externally insulated with a layer of closed-cell neoprene. When the unit is operating, the heat exchangers are protected against no flow conditions by a water differential pressure switch. Hydraulic connections: grooved couplings with male threaded counter-pipes user side.

UNIT DESCRIPTION

Data Book
EW-HT 0152 - 0612_202209_EN R134a

Refrigerant circuit

Unit fitted with 2 independent refrigerant circuits.
Standard equipment of each circuit:

- electronic expansion valve
- liquid line shut-off valve
- drier filter with replaceable cartridge
- high pressure safety valve
- high and low pressure transducers

Electrical and control panel

Electrical and control panel built in accordance with EN60204-1 standard, complete with:

- control circuit transformer
- numbered cables
- general door lock isolator
- automatic circuit breakers and contactors for compressors
- terminals for cumulative alarm block
- relay for remote pump(s) activation
- remote ON/OFF terminals
- spring-type control circuit terminal board
- electronic controller
- multi-language user keypad with LCD display
- protection level IP21

Power supply: 400V~ ±10% - 3ph - 50Hz - PE

Certification and applicable directives

The unit complies with the following directives and relative amendments:

- Machine directive 2006/42/EC
- PED directive 2014/68/EU
- Low Voltage directive 2006/95/EC
- ElectroMagnetic compatibility directive 2004/108/EC
- ISO 9001 - Company Quality Management System certification
- ISO 14001 - Company Environmental Management System certification

Tests

Tests performed throughout the production process, as indicated in ISO9001.

Performance or noise tests can be performed by highly qualified staff in the presence of customers.

Performance tests comprise the measurement of:

- electrical data
- water flow rates
- working temperatures
- power input
- power output
- pressure drops on the water-side exchanger both at full load (at the conditions of selection and at the most critical conditions for the condenser) and at part load conditions.

During performance testing it is also possible to simulate the main alarm states.

Noise tests are performed to check noise emissions according to ISO9614.

1.2 Electronic controller

Electronic control W3000TE

W3000TE Compact control features an easy-to-use interface and a complete LCD display that allows one to consult and intervene by means of a multi-language menu (19 languages are available).

The regulation is based on the patented "Quickmind" water temperature regulation logic and uses self-adapting control to maintain flow temperatures and optimize performance even in low water content scenarios. As an alternative, the proportional or proportional-integral regulations are also available.

The diagnostics are comprised of a complete alarm management system, with the "black-box" (via PC) and the alarm history display (via display or PC) for enhanced analysis of the unit's operation

Optional proprietary devices can perform the adjustment of resources in systems comprised of several units. Consumption metering and performance measurement are possible as well.

Supervision can be easily developed via proprietary devices or the integration of third party systems by means of the most common protocols as ModBus, Bacnet, Bacnet-over-IP, LonWorks.

Compatibility with the remote keyboard (up to 8 units).

The programmable timer manages a weekly schedule organised into time bands to optimize unit performance by minimizing power consumption during periods of inactivity. Up to 10 daily time bands can be associated with different operating set points.

The defrosting (air source reversible unit only) follows a proprietary self-adaptive logic, which features the monitoring of several operational parameters. This reduces the number and duration of the defrost cycles, with a benefit for the overall energy efficiency.



2 TECHNICAL SELECTION

Software version: ELCA World v. 1.7.3.0
Database version: 1.8.3.0
User: Tim Cheng
Print data: 28/09/2022 09:53
Calculation type: EN 14511 - EN 14825

EW-HT /0612



2.1 PERFORMANCE AT DESIGN CONDITIONS

RUNNING CONDITIONS

HEAT EXCHANGER USER SIDE

Fluid type		WATER
Glycol	%	0
Fouling factor	m ² K/kW	0.000
Fluid inlet temperature (heating mode)	°C	70.00
Fluid outlet temperature (heating mode)	°C	75.00
Water flow	l/s	13.86
Pressure drop at the heat exchanger	kPa	53.0
Available unit head	kPa	0.00

HEAT EXCHANGER SOURCE SIDE

Fluid		WATER
Glycol	%	0
Fouling factor	m ² K/kW	0.000
Fluid inlet temperature (heating mode)	°C	45.00
Fluid outlet temperature (heating mode)	°C	40.00
Water flow	l/s	10.80
Pressure drop at the heat exchanger	kPa	40.5
Available unit head	kPa	0.00

HEATING (EN14511)

Total heating capacity	kW	284.8
Compressors power input (heating mode)	kW	63.50
Total power input	kW	65.60
COP	kW/kW	4.340

SCOP

SCOP Official (Reg. 813/2013 EU)

MEDIUM TEMPERATURE

Type climate		Average
Temperature application	°C	55
Type flow		Fixed
Type Temperature		Variable
Bivalent temperature	°C	-7.0
PDesign	kW	157
Qhe	kWh	98660
SCOP		3.30
Performance η_s	%	124
Seasonal efficiency class		-

The performance shown are obtained from theoretical calculations and tolerances will apply. Rpt.version: 1.0.6.0

TECHNICAL SELECTION

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User: Tim Cheng
Print data: 28/09/2022 09:53
Calculation type: EN 14511 - EN 14825

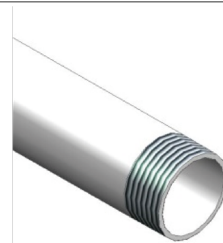
EW-HT /0612**SCROLL****HEATING****R** HFC R-134a

2.2 EXCHANGERS

HEAT EXCHANGER USER SIDE

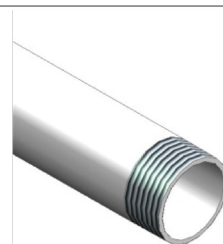
Typology		PLATE
Quantity	N°	1
Type of connections	[B1] - Male threaded pipe (EN 10226 - R: external taper thread)	
Diameter of connections		2"1/2
Min flow	l/s	4.167
Max flow	l/s	16.75
Heat exchanger water content	l	16.8
Minimum water content admitted in the plant	l	1050

[B1]

**HEAT EXCHANGER SOURCE SIDE**

Typology		PLATE
Quantity	N°	1
Type of connections	[B1] - Male threaded pipe (EN 10226 - R: external taper thread)	
Diameter of connections		2"1/2
Min flow	l/s	4.083
Max flow	l/s	17.28
Water content	l	14.7

[B1]



The performance shown are obtained from theoretical calculations and tolerances will apply. Rpt.version: 1.0.6.0

TECHNICAL SELECTION

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User: Tim Cheng
Print data: 28/09/2022 09:53
Calculation type: EN 14511 - EN 14825

EW-HT /0612



R HFC R-134a

2.3 COMPRESSORS

COMPRESSORS

Compressor type		SCROLL
Compressors nr.	N°	2
No. Circuits	N°	2
Number of capacity steps	N°	2
Min. capacity step	%	50
Regulation		STEPS
Oil charge	kg	12.6
F.L.I. - Max absorbed power	kW	2x38.2
F.L.A. - Max absorbed current	A	2x62.7
L.R.A. - Locked rotor amperes for single compressor	A	2x310

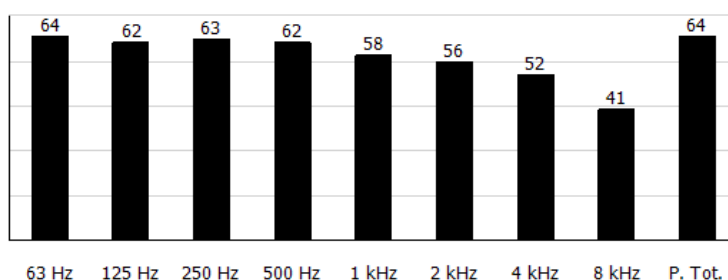
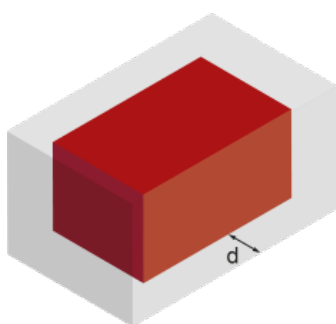
REFRIGERANT

Refrigerant		R134a
Theoretical refrigerant charge	kg	14.3
GWP100 value (from IPCC AR5)		1300
CO2 equivalent	t	18.6

2.4 NOISE DATA

SOUND DATA INDOOR HOT

Frequencies	Hz	63	125	250	500	1000	2000	4000	8000
Sound power (spectrum)	dB	80	78	79	78	74	72	68	57
Sound power level in heating	dB(A)	80							
Sound pressure level (spectrum)	dB	64	62	63	62	58	56	52	41
Total sound Pressure	dB(A)	64							



The performance shown are obtained from theoretical calculations and tolerances will apply. Rpt. version: 1.0.6.0

TECHNICAL SELECTION

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Database version: 1.8.3.0
User: Tim Cheng
Print data: 28/09/2022 09:53
Calculation type: EN 14511 - EN 14825

EW-HT /0612



R HFC R-134a

Note

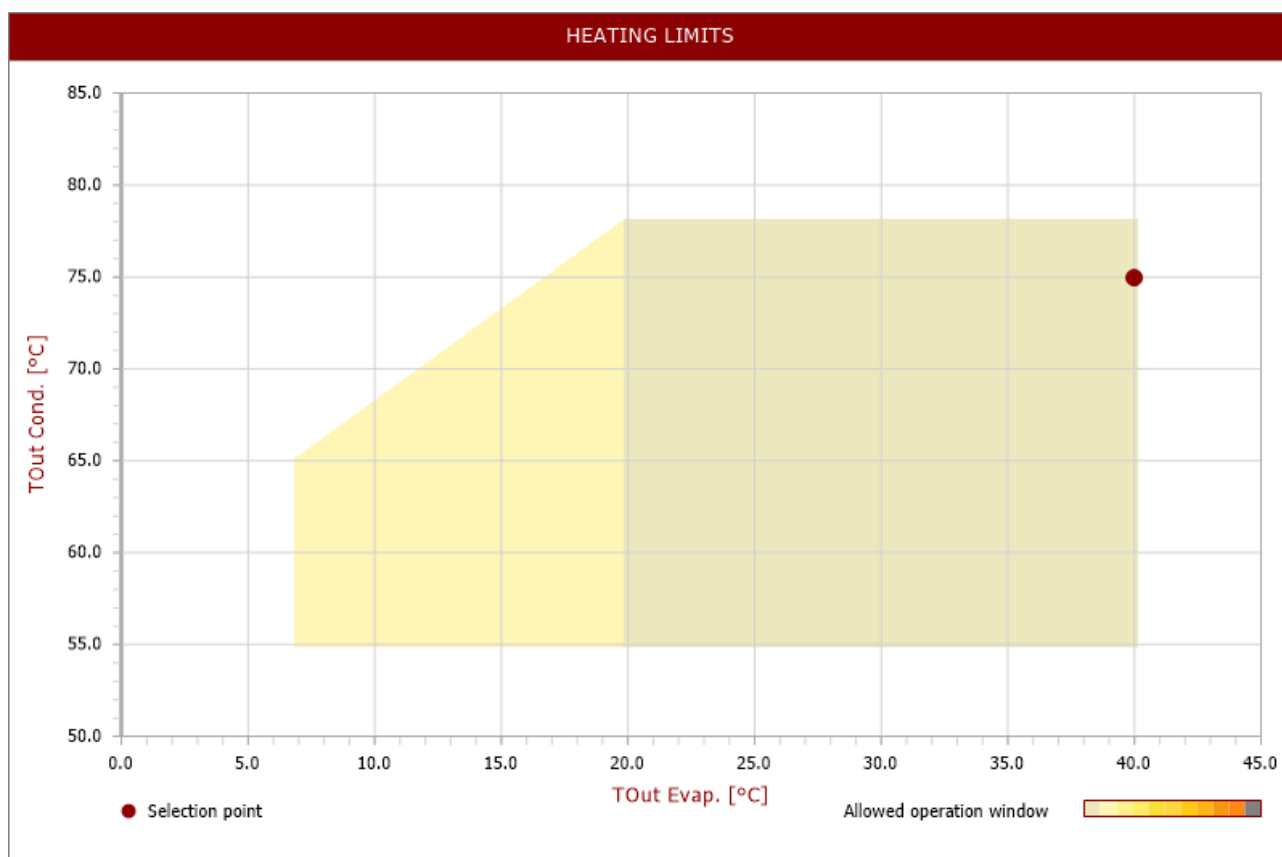
Distance m 1

Note

Average sound pressure level at 1 m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.

Sound power on the basis of measurements taken in compliance with ISO 9614.

2.5 OPERATING LIMITS



2.6 ELECTRICAL DATA

Power supply	V/ph/Hz	400/3/50
F.L.I. - Max absorbed power	kW	76.40
F.L.A. - Max absorbed current	A	125
S.A. - Inrush current	A	373

The performance shown are obtained from theoretical calculations and tolerances will apply. Rpt. version: 1.0.6.0

2.7 WEIGHT & DIMENSIONS

A	mm	1223
B	mm	877
H	mm	1496
Operating weight	kg	740
R1	mm	600
R2	mm	600
R3	mm	800
R4	mm	600

