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Yew Standard & Low Noise

210/140kW

315/210kW

420/280kW

525/350kW

Planner Manual

PD-Yew-03

Version: 2.1

Contents

1 General Specifications

1.1 Features and benefits

1.1.1 Energy Efficiency

The unit has been evaluated for performance and reliability against stringent industry standards, ensuring consistent, verified results.

SCOP - Achieves a high Seasonal Coefficient of Performance of 3.8*

Energy Label A++: Designed to exceed typical regulatory requirements for energy labeling, reducing overall operational costs and environmental impact.

1.1.2 Functionality

Boiler Matching Temperatures: With flow and return temperatures of up to 80/70°C the Elm can act as direct boiler replacement.

Wide Operating Range: Suitable for a broad range of outdoor temperatures, from extremely low ambient conditions to warmer climates. This flexibility ensures year-round heating reliability.

Minimum/Maximum Outdoor Temperatures: -15°C to +40°C

Minimum/Maximum Flow Water Temps: From 35°C up to 80°C

Compatible with weather-compensated control and 0-10 V or BACnet temperature/ capacity inputs.

1.1.3 Modular design

Cascade Operation: Multiple units can be linked together to increase total capacity or provide redundancy. The system's modular architecture allows for phased installations or expansions.

Load-Sharing Logic: When multiple heat pumps operate in multiplex mode with a Clade multi-unit controller, run-hours and capacity demands are automatically balanced, optimizing efficiency and extending equipment life.

1.1.4 Technology

DC inverter technology on compressors and fans: Ensures precise load matching, smoother ramp-ups, and more stable temperatures. Reduces energy consumption and noise by adjusting speed according to actual demand.

Electronic expansion valve: Maintains optimal refrigerant flow for higher efficiency and better control of discharge/evaporating temperatures, enhancing reliability and performance.

Hydrophilic coil: Allows moisture to drain off smoothly, reducing potential ice build-up and improving heat transfer.

External Header & Pump Arrangement: Each Yew module is designed to work with an external header system arranged in reverse return for balanced water flows. This external pump design allows for more accurate sizing of the pump to specific site demands, and it can be phased in alongside additional modules as needed.

* Average Climate, Flow 35°C, inlet 25°C

2 Technical Specification

2.1 Standard & Low Noise Unit Technical Specifications

2.1.1 Minimum and Maximum kW output:

Model	Min Compressor kW (-10°C)	Max Compressor kW (+7°C)
210/140kW	142kW	195kW
315/210kW	203kW	293kW
420/280kW	271kW	391kW
525/350kW	339kW	489kW

Structure: Built on a heavy-duty FeZn 15/10 galvanized steel frame, the Yew unit offers rigidity and longevity. The core chassis is designed for quick installation and stable placement, featuring integrated lifting eyes and forklift slots that streamline transport while ensuring reliable, vibration-resistant operation once sited.

Paneling: All external panels are fabricated from aluminium-zinc (AluZn)-coated steel, offering excellent corrosion resistance and a clean, uniform finish. Panels are secured to the chassis with stainless-steel fasteners and include integrated drip-edges and seal profiles to prevent water ingress. Access panels are hinged and lockable, providing full tool-free entry for service and maintenance. All panel joints are gasket-sealed to maintain IP54 protection

Internal exchanger: A stainless-steel plate heat exchanger is employed on the water side for optimised heat transfer and improved corrosion resistance. Its compact footprint and turbulent flow path contribute to higher efficiency, lower pressure drop, and prolonged service life.

External exchanger: The Yew's fin-and-tube coil arrangement is designed for Propane (R290) operation. Constructed with copper tubing and aluminium fins, the coil maximizes heat transfer within a compact space. Options such as hydrophilic fin coating may be added to reduce ice build-up and enhance condensate drainage.

Fans: High-performance EC (electronically commutated) axial fans, typically classified as IE5 for motor efficiency, deliver precise airflow control with reduced energy consumption. Their smart speed modulation matches fan speed to real-time load demands, helping to reduce operating noise and extend component life.

Refrigeration circuit: The state-of-the-art refrigeration system is engineered for Propane (R290) operation, ensuring superior thermal performance and ultra-low GWP (Global Warming Potential).

Electrical Panel: A Siemens-based control system provides advanced monitoring, diagnostics, and remote-connectivity capabilities. Seamless BMS integration (BACnet or similar protocols) allows central oversight of performance, alarms, and setpoints.

2.2 Refrigerant Information

2.2.1 Characteristics of R290 refrigerant

The Yew range of heat pumps manufactured by Clade Engineering Systems are equipped with propane (R290). Propane is classified as an A3 refrigerant (low toxicity but highly flammable) and must be handled in accordance with flammable gas safety guidelines.

Propane is odorless in its pure form and is heavier than air. If released in an enclosed or low-lying area, it can accumulate and form a flammable mixture with air. All personnel involved with specification, installation, operation, and maintenance of these units must be fully qualified, competent, and hold any certifications required for work on flammable refrigerants.

Propane is listed with two GWP values to the difference between its theoretical warming impact and its practical behaviour in the atmosphere. Its theoretical GWP, as defined by the IPCC, is approximately 3 and represents propane’s inherent ability to absorb infrared radiation, assuming it behaves like long-lived greenhouse gases such as CO_2. However, in real-world applications, propane breaks down rapidly in the atmosphere, typically within two weeks, due to reactions with hydroxyl radicals. This short atmospheric lifetime means it does not accumulate and has a negligible long-term climate impact. As a result, its adjusted GWP over a 100-year timeframe is approximately 0.02, reflecting its true environmental impact in practical use.

Each unit is evacuated and pre-charged at the factory with the correct amount of R290, so no additional charge is required. The refrigerant charge can be found on the PED label.

In the event of component failure or a leak, the system should be stopped immediately. The remaining charge must be reclaimed or vented in a safe, controlled manner, observing all local regulations for flammable refrigerants. See the system maintenance manual for service valve access points and isolation procedures. Once repairs have been made, the system must be thoroughly evacuated and re-charged with the specified quantity of refrigerant as recorded on the PED label.

Model (SN & LN)	Refrigerant (Kg)	Equivalent CO_2 tons (tCO_2e)
210/140kW	12	0.036
315/210kW	18	0.054
420/280kW	24	0.072
525/350kW	30	0.090

Physical characteristics of the R290 refrigerant	
Safety class (ISO)	A3 (Low toxicity, Highly flammable)
GWP (kg.CO_2e)	3
Low flammability limit (LFL) (Kg/m^3 @ 60°C)	~0.038 (varies with temperature)
Burning velocity (BV) (cm/s)	~46
Boiling point (°C)	-42
GWP (100 yr ITH)	0.02
ODP (Ozone Layer Depletion)	0
Self-ignition temperature (°C)	470

2.2.2 Gas Leak Detection

The Yew heat pump is supplied with full leak detection safety systems. The design of the heat pump includes enhanced tightness joints and the refrigerant circuit is a sealed system. The design also separates electrical equipment to protect the system from any sources of ignition.

In the unlikely event of component failure or a leak the heat pump will detect a gas escape and shut down operation. Electrical systems will power down at 20% of the LFL (Lower Flammable Limit) except for the ventilation fan within the heat pump housing. The fan will continue to operate to remove any gas from the housing, ensuring any remaining charge is vented to atmosphere in a controlled manner.

The system will require a manual reset in the event of a gas leak shut down event. This prevents the system from automatically restarting until the cause of the leak or leak alarm is fully investigated and resolved.

See system maintenance manual for access points and isolation procedures. Once the issue has been rectified the system would need to evacuated and re-charged with the correct amount of refrigerant as recorded on the PED label.

⚠ **WARNING**

The designer/installer must consider adequate protection for gas escapes

2.2.3 Hazardous Area Classification (HAC)

We hereby declare that the hazardous area classification for the space above the Yew has been assessed and calculated in accordance with the requirements of:

BS EN IEC 60079-10-1: Explosive atmospheres – Part 10-1: Classification of areas – Explosive gas atmospheres

This assessment has determined that the area directly above the heat pump qualifies as a **Zone 2 hazardous area**, defined as:

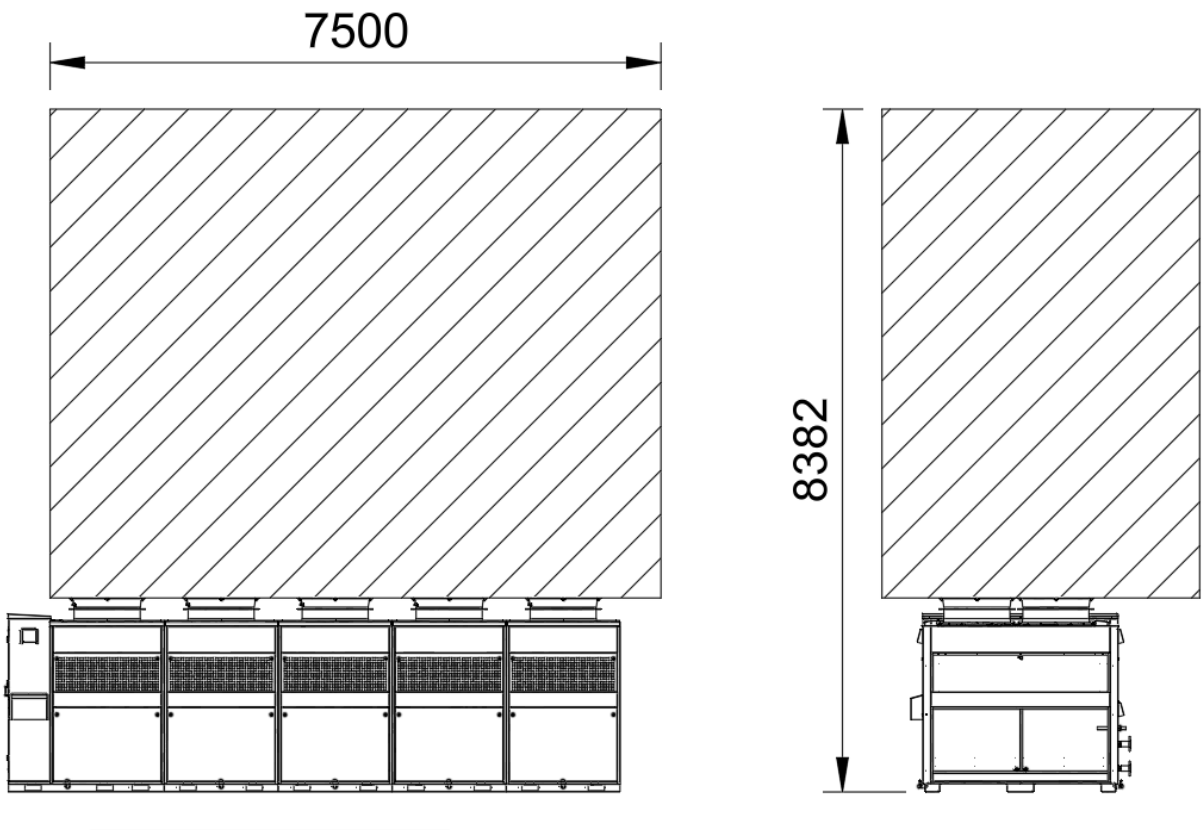
"An area in which an explosive gas atmosphere is not likely to occur in normal operation and, if it does occur, will persist for a short period only."

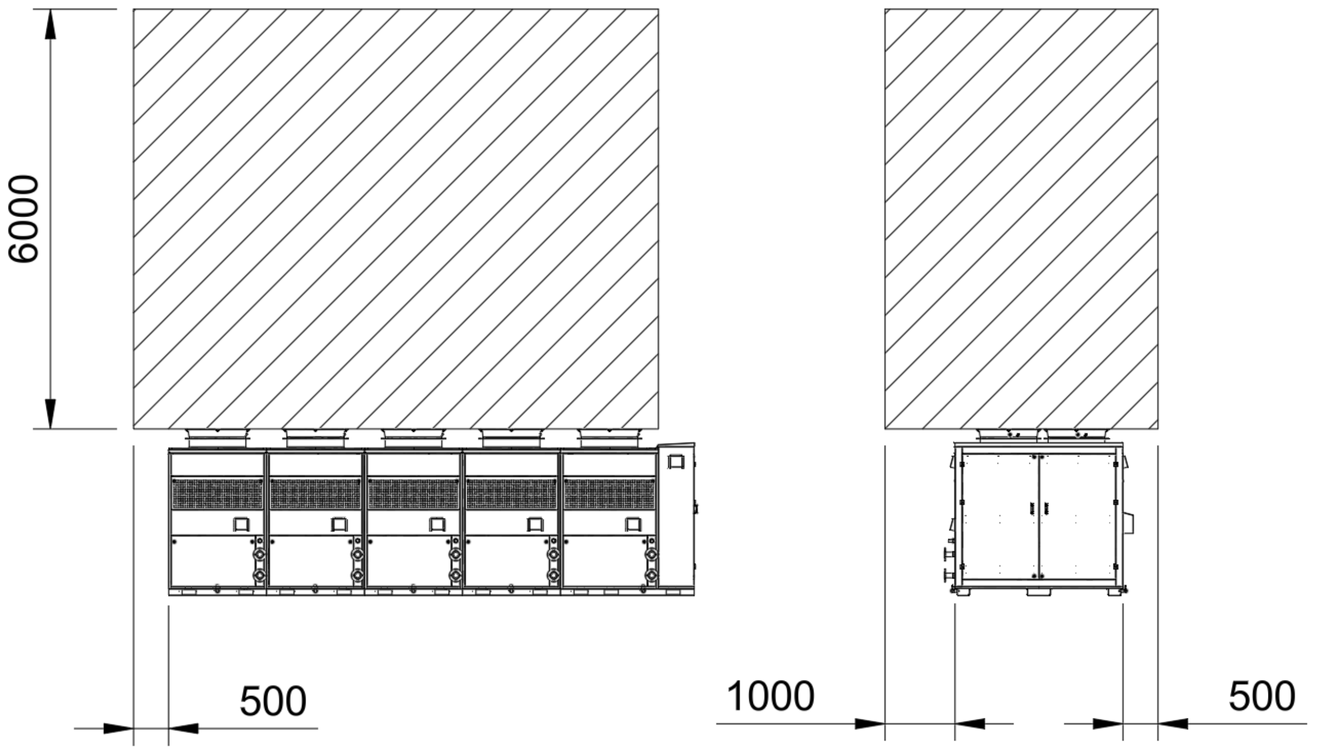
The classification was based on the following considerations:

- Identification of potential sources of release of flammable refrigerants or gases.
- Evaluation of ventilation conditions and dispersion characteristics.
- Estimation of the frequency and duration of potential explosive atmospheres.
- Application of qualitative and, where appropriate, quantitative methods as outlined in BS EN IEC 60079-10-1 and relevant industry codes.

All relevant documentation, including hazard identification, zone extent drawings, and supporting calculations, has been compiled.
.
This declaration affirms that the classification has been carried out by competent personnel and that the installation complies with applicable UK legislation, including the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR). **As PRVs are located on the top of the unit and fans expel gas upwards there is no ATEX zone around the sides of the unit.**

The Zone 2 requirements can be seen in the images below:

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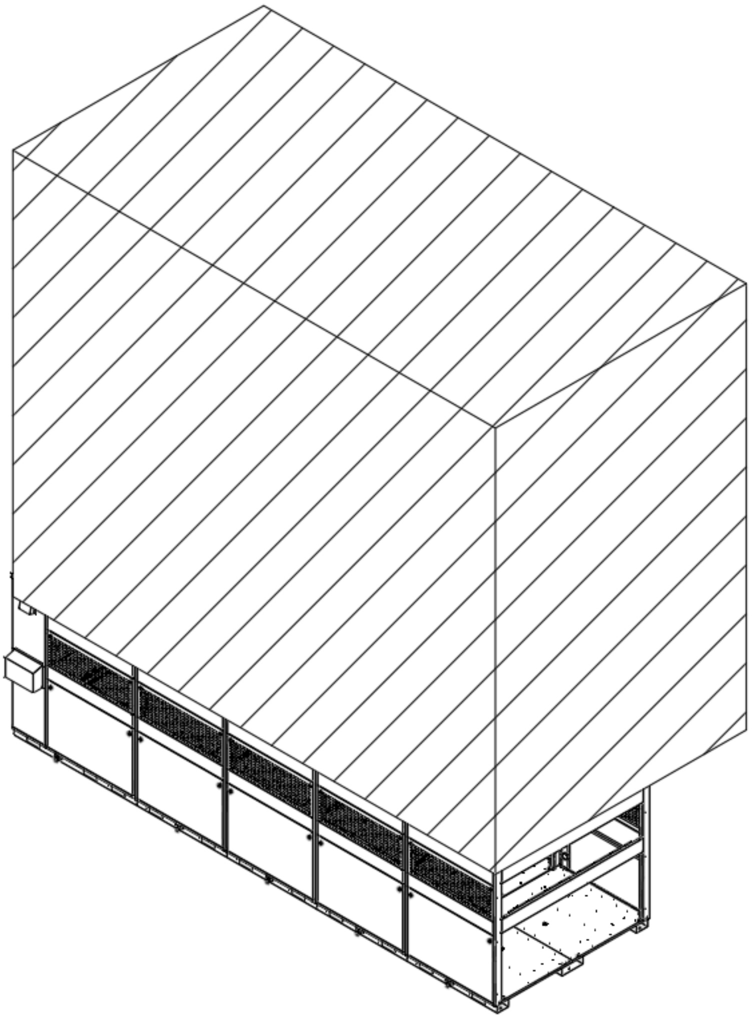
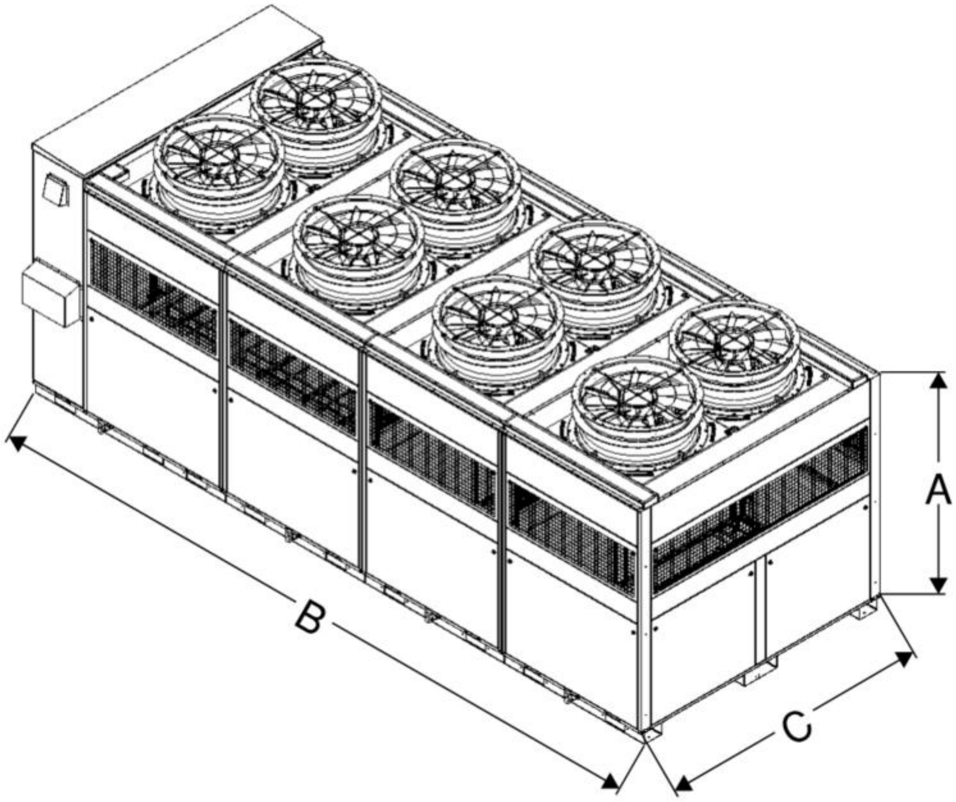


2.3 Dimensions Standard Noise



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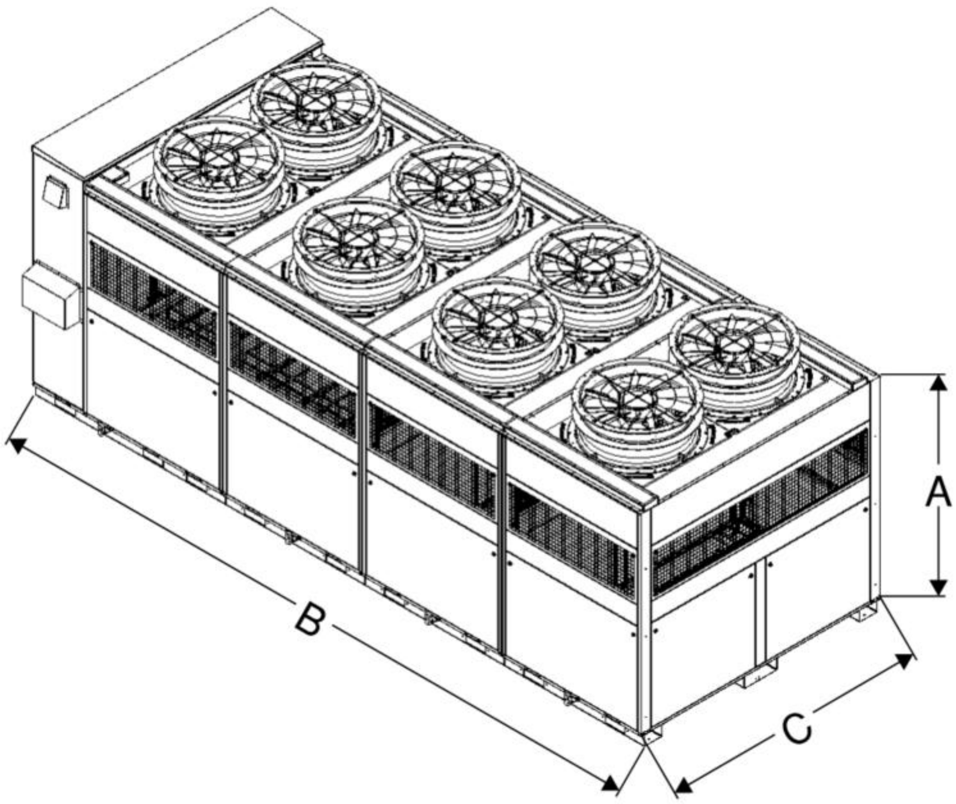
Unit	Height 'A' (mm)	Length 'B' (mm)	Depth 'C' (mm)	Operating Weight (kg)	Shipping Weight (kg)
210/140 kW SN	2640	3315	2400	4018	3950
315/210 kW SN	2640	4715	2400	5742	5640
420/280 kW SN	2640	6115	2400	7475	7340
525/350 kW SN	2640	7515	2400	9200	9030

2.4 Dimensions Low Noise

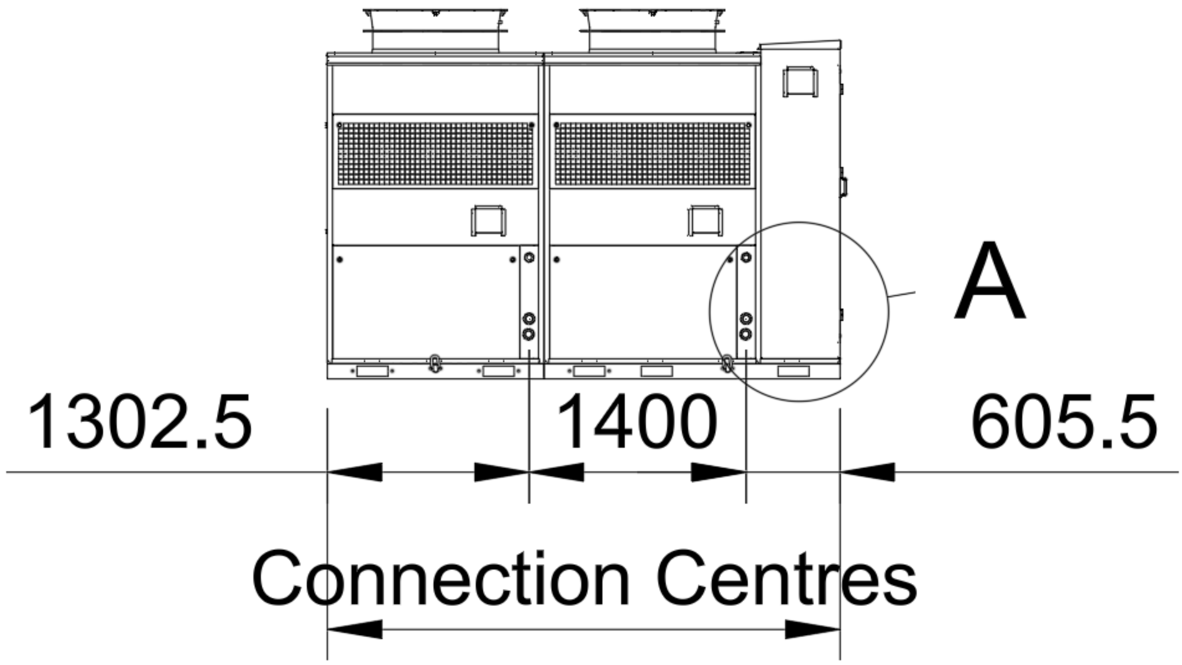


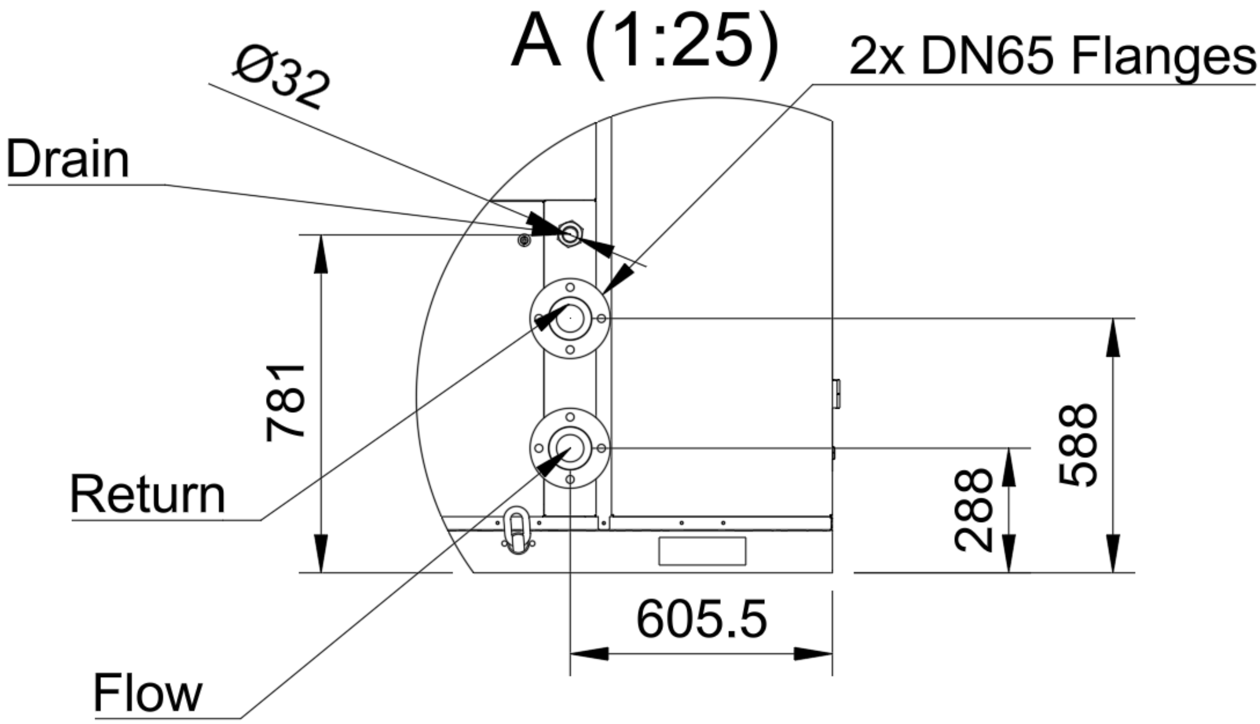
Unit	Height 'A' (mm)	Length 'B' (mm)	Depth 'C' (mm)	Operating Weight (kg)	Shipping Weight (kg)
210/140 kW LN	2840	3315	2400	4358	4290
315/240 kW LN	2840	4715	2400	6270	6172
420/280 kW LN	2840	6115	2400	8188	8053
525/350 kW LN	2840	7515	2400	10105	9935

2.5 Service Connections

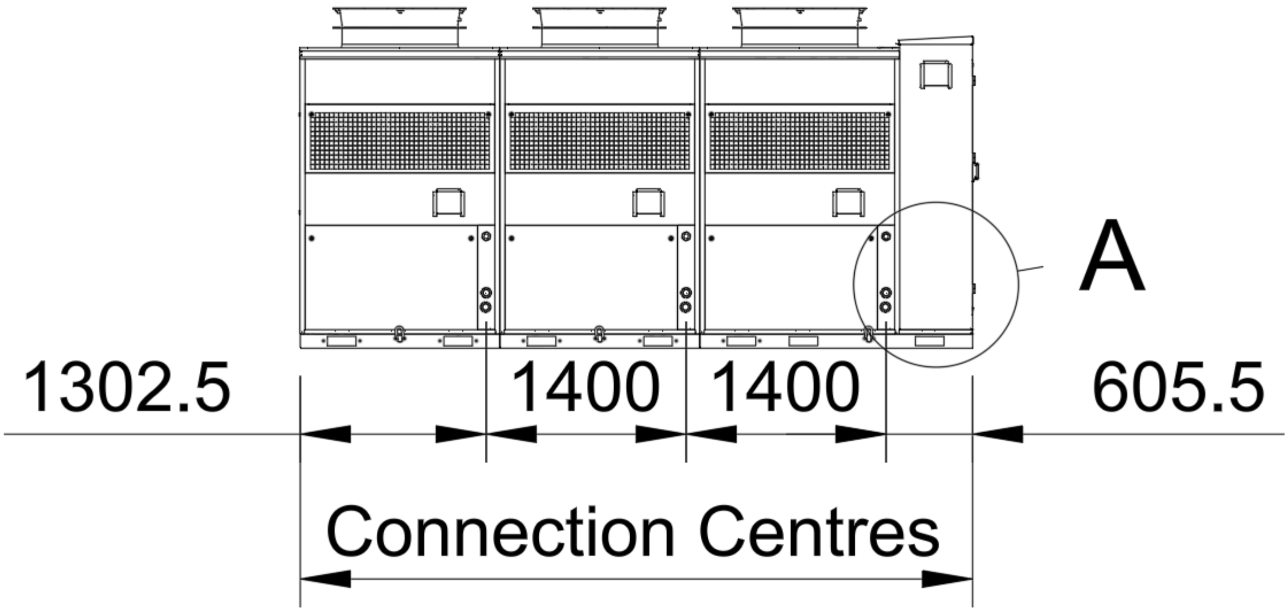
When selecting a location for the unit(s) consideration of the service connection positions is required. Each module has its own water service connections which are located on the right hand side panel. The electrical cabinet and termination point are at the back of the heat pump.

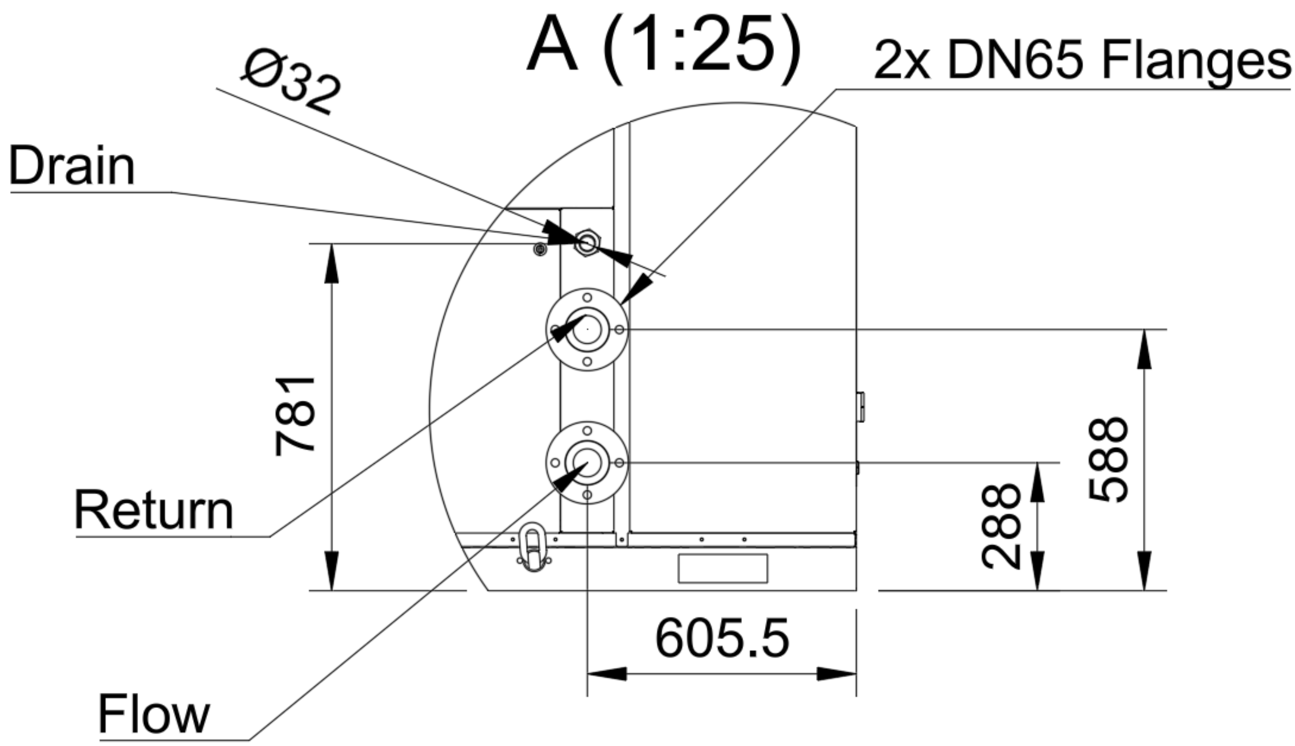
2.5.1 Yew SN + LN 210/140 kW



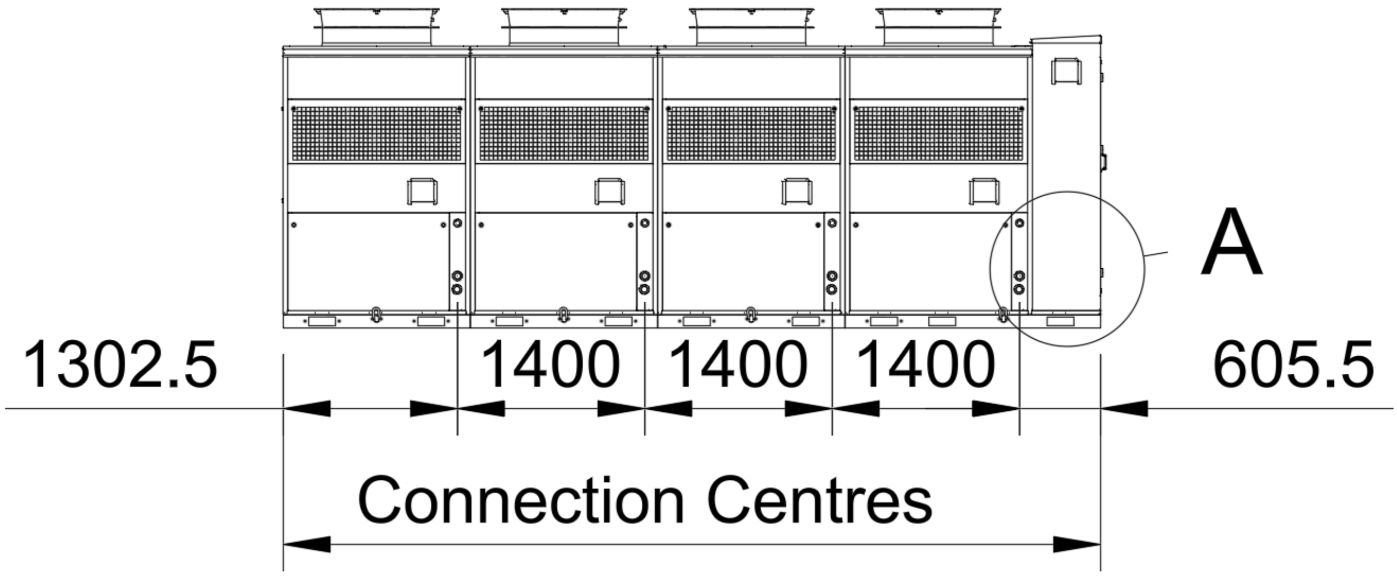


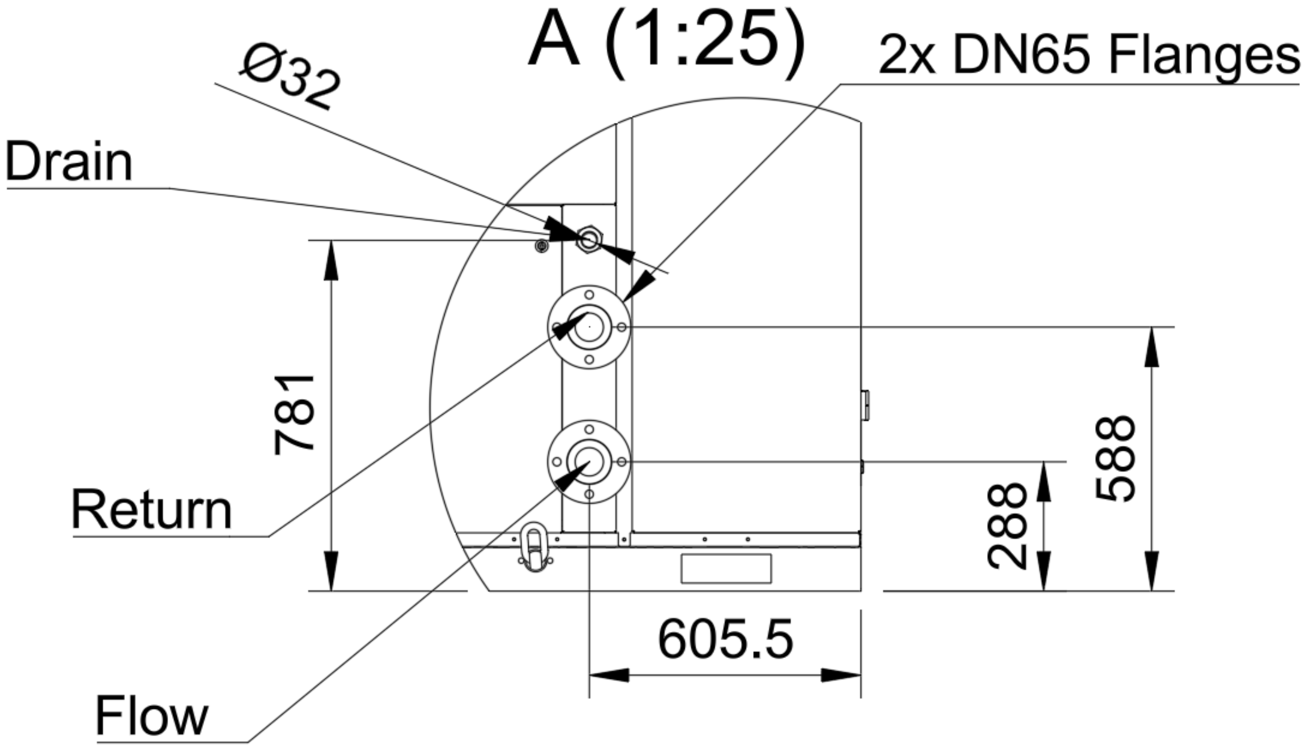
2.5.2 Yew SN +LN 315/210 kW



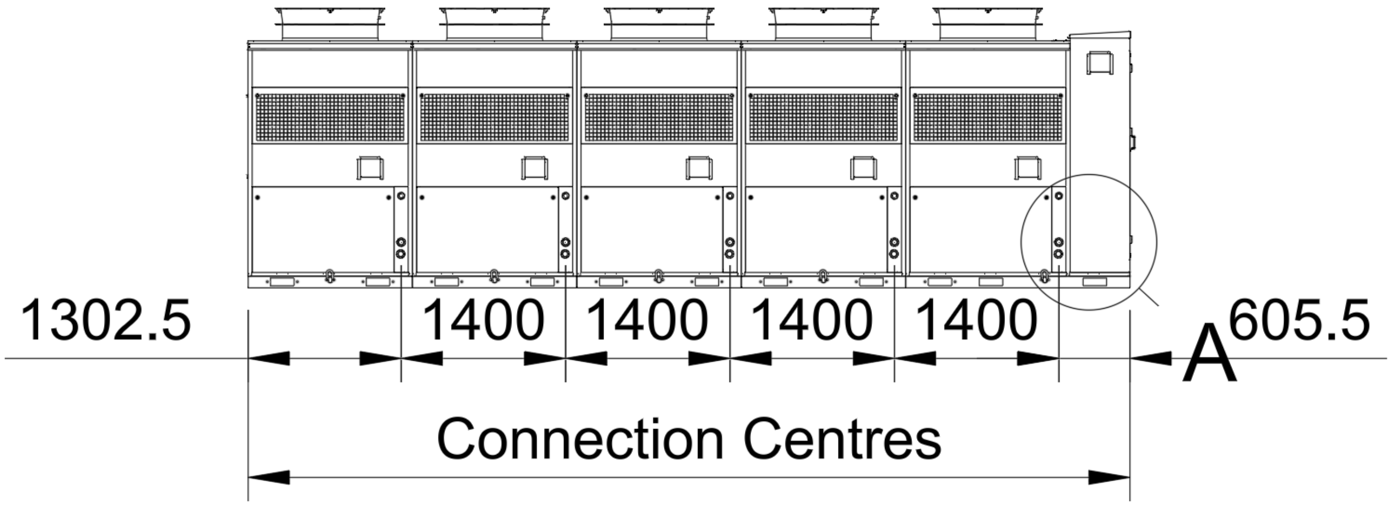


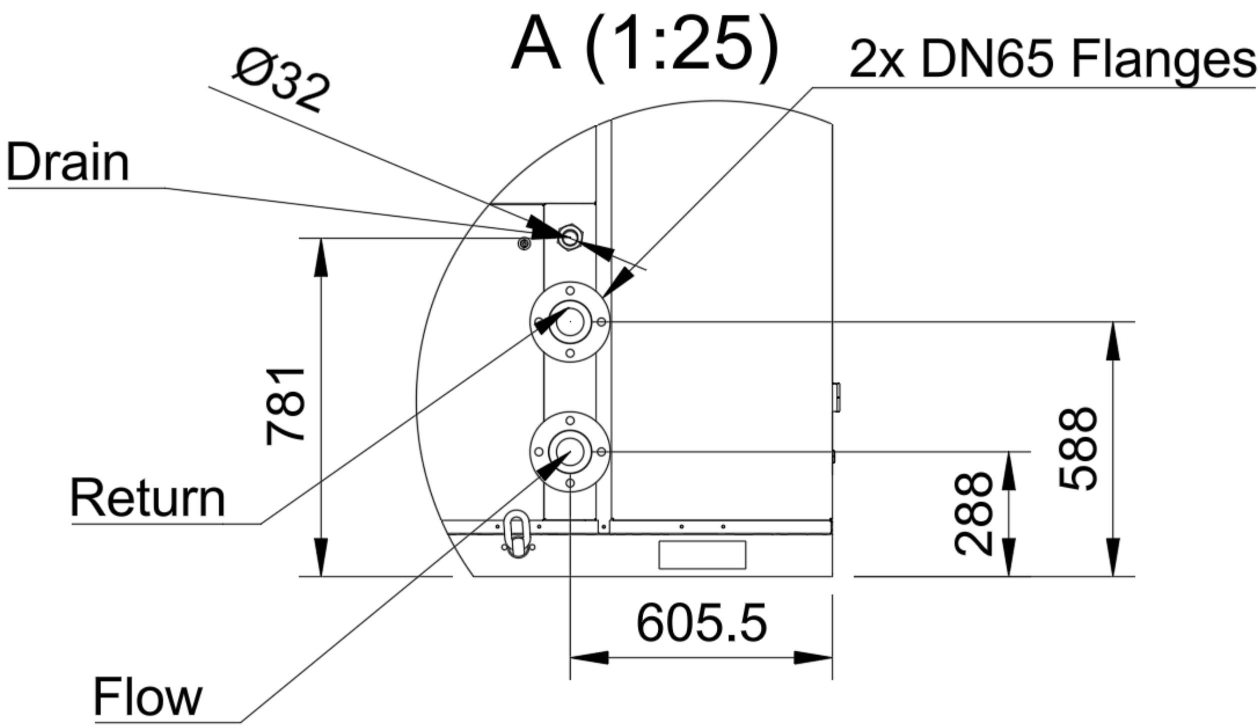
2.5.3 Yew SN +LN 420/280 kW





2.5.4 Yew SN +LN 525/350 kW

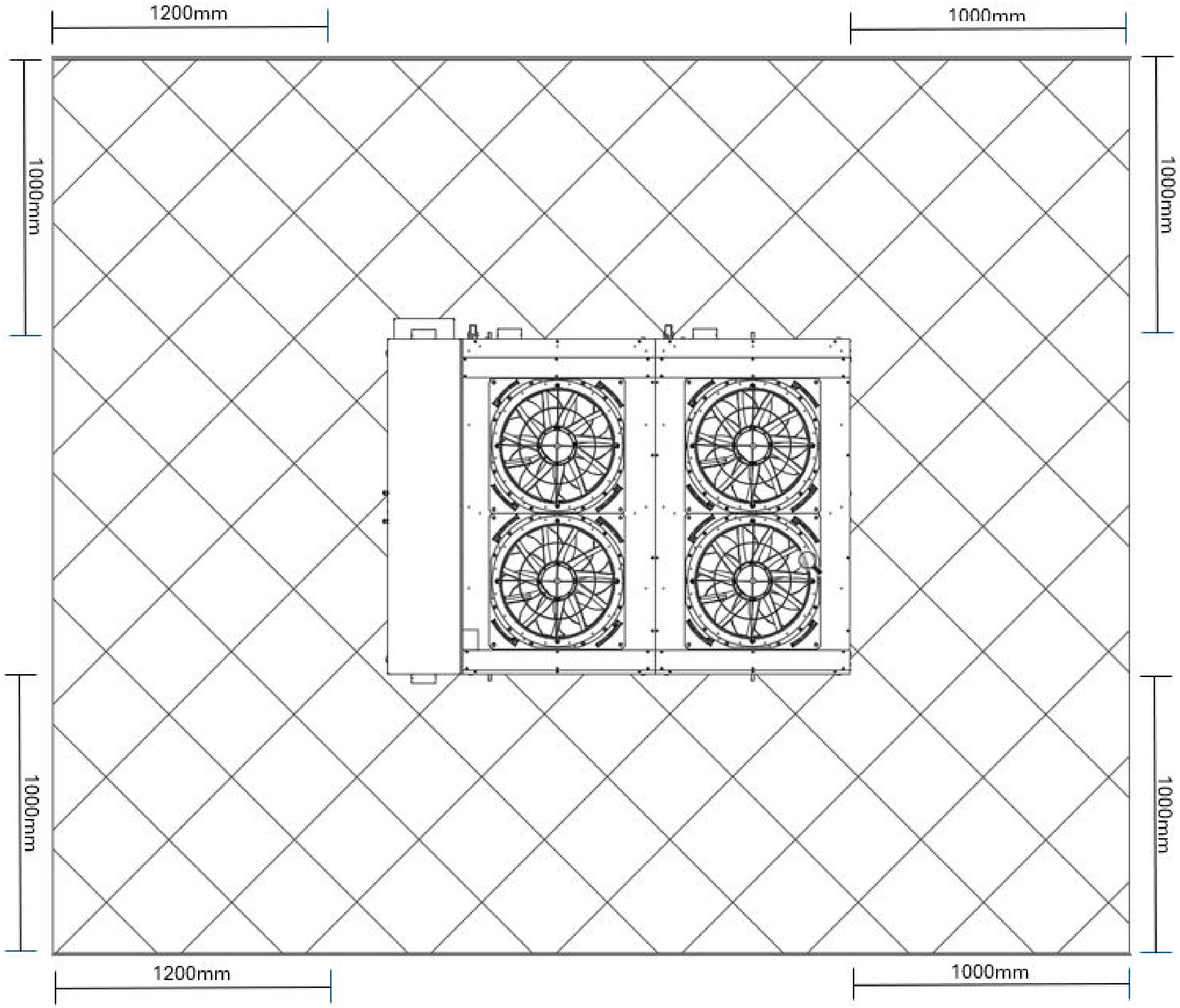




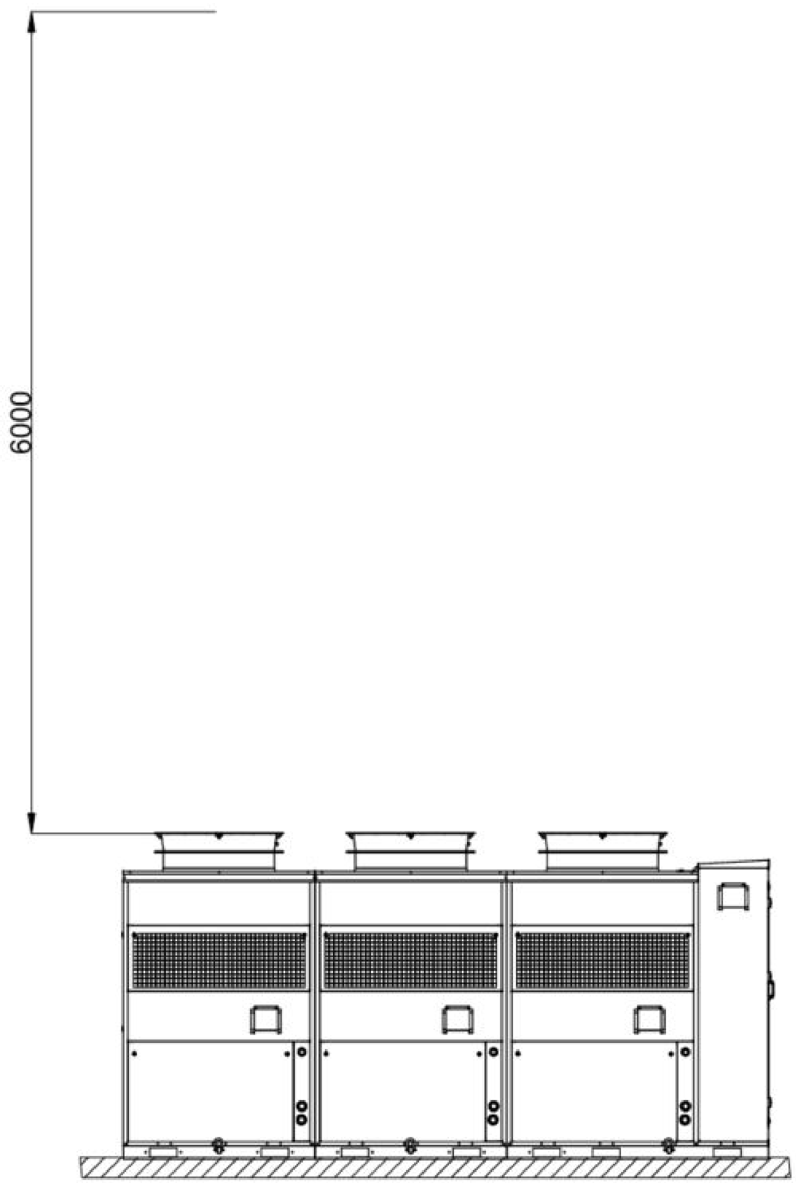
2.6 Installation Space Requirements

It is essential that the space requirements detailed in this section are strictly followed. Inadequate clearance will restrict airflow and compromise unit performance. Insufficient space will also obstruct access for routine maintenance, repairs, or replacement of components, which may result in warranty being void. Particular attention must be given to the electrical cabinet side of the unit. Clearance here must also account for "bounce-back" space, which is a health and safety requirement to ensure safe working conditions during servicing.

2.6.1 Single Unit Installation

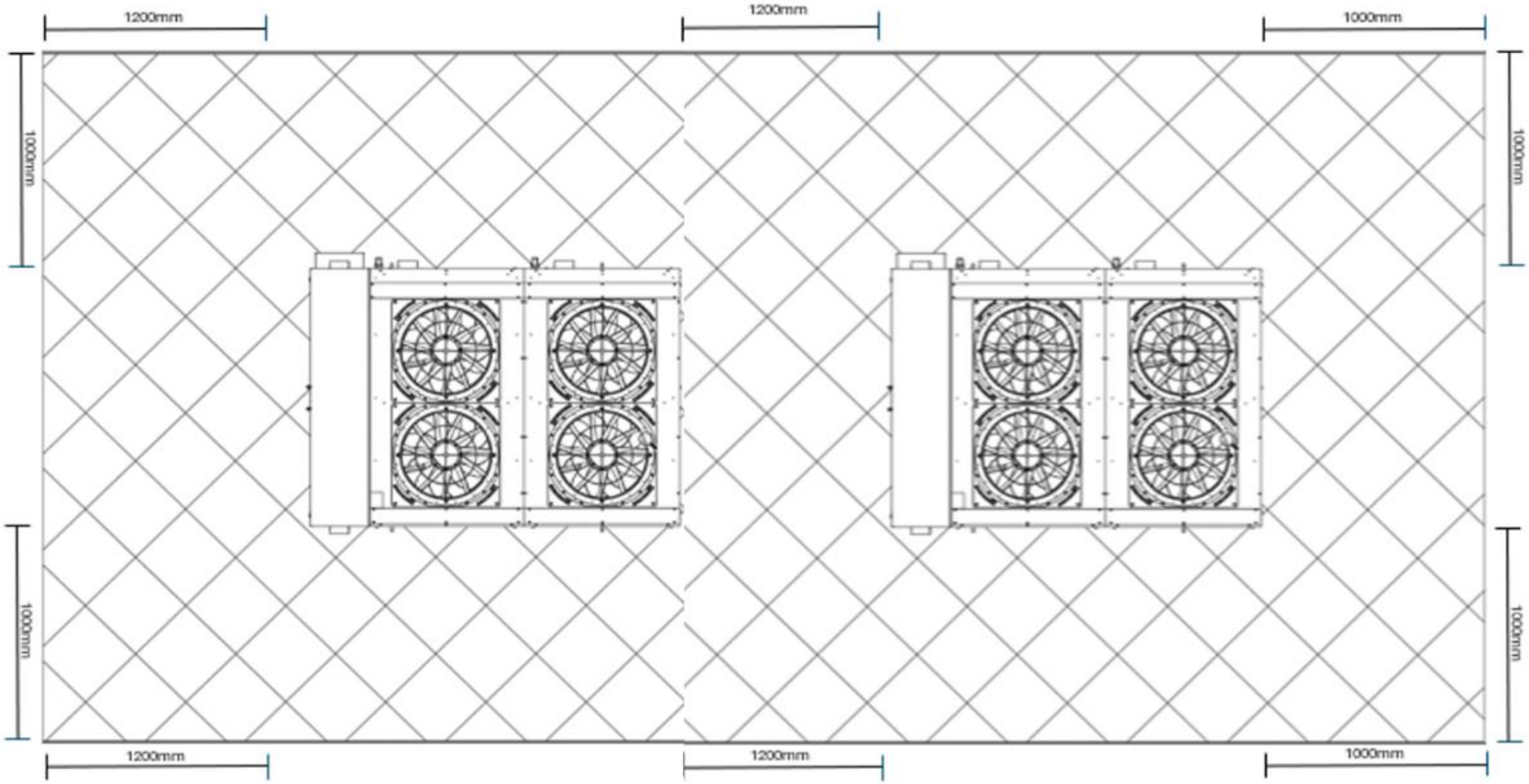


2.6.2 Clearance Above the Unit

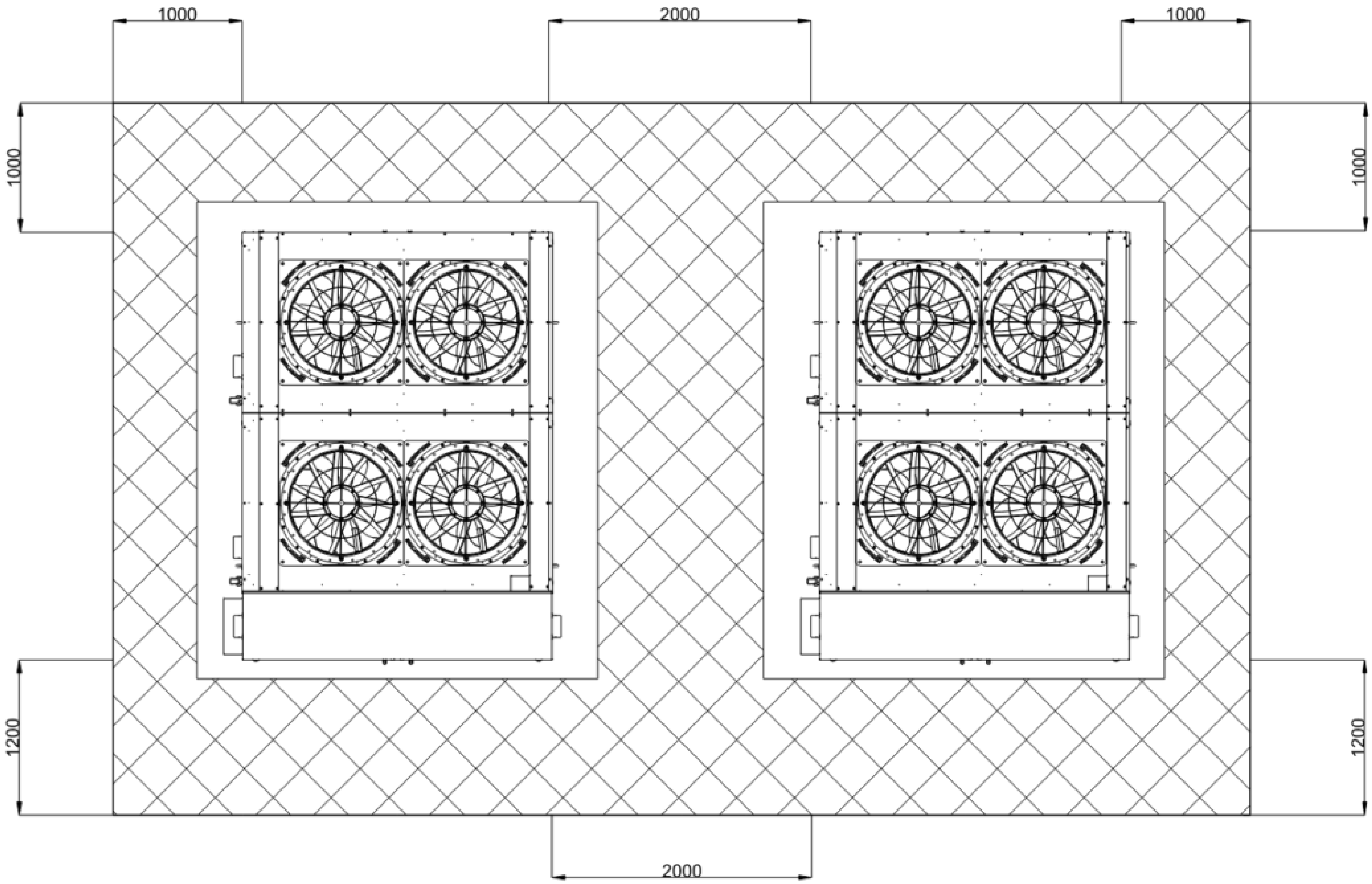


2.6.3 Multiple Unit Installation

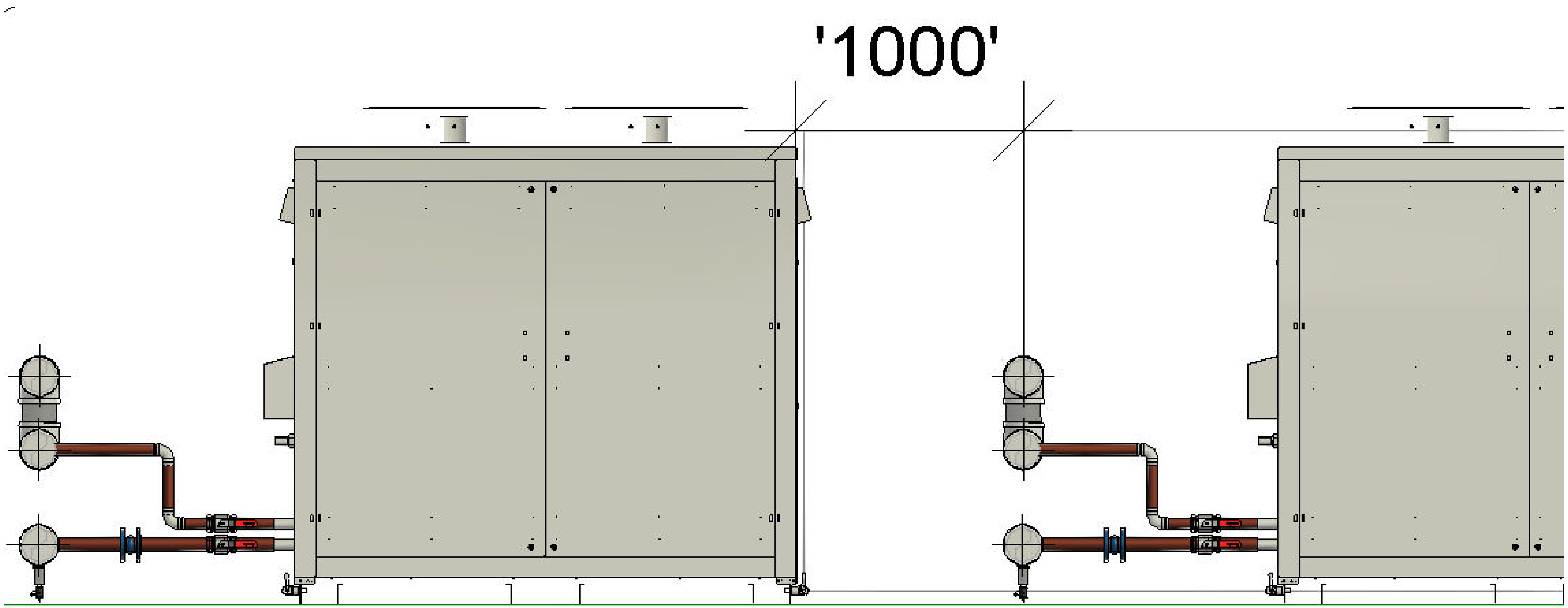
When installing multiple units, make sure to take into consideration factors such as providing enough space for people to pass through, ample space between blocks of units, and sufficient space for airflow.



Side by side installation, allow access to side of each unit for access. Ensure there is at least 2m between each unit. This allows ample room for pipework and access to the compressor in case of repair or replacement.



When installing units side by side there must be at least 1 meter between the header and the back of the next unit.



3 Technical Data

3.1 Performance Data

Yew Range SN +LN		210/140kW	315/210kW	420/280kW	525/350kW
Heating performance data to EN14825 (A-5/W80) 10K TD					
Rated heating output	kW	162.8	244.1	325.5	406.9
Coefficient of Performance (COP)		1.8	1.8	1.8	1.8
Seasonal Coefficient of Performance (SCOP)		2.0	2.0	2.0	2.0
Heating performance data to EN14825 (A7/W80) 10K TD					
Rated heating output	kW	209.7	314.5	419.4	524.2
Coefficient of Performance (COP)		2.1	2.1	2.1	2.1
Seasonal Coefficient of Performance (SCOP)		2.0	2.0	2.0	2.0
Temperature Range	Minimum Inlet water temp	20°C			
	Maximum Outlet water temp	80°C			
	Outdoor temp range	-15°C to 40°C			

3.1.1 Variable Supply SCOP/SPFs

To increase system performance water flow temperature can be varied based on external ambient temperature. The related SCOP or SPF (seasonal performance factor) can be seen in the table below.

Yew Range	210/140kW	315/210kW	420/280kW	525/350kW
SCOP - Variable Supply Temp - W65 (1)	**3.31**	**3.31**	**3.31**	**3.31**
SCOP - Variable Supply Temp - W55 (1)	**3.71**	**3.71**	**3.71**	**3.71**
SCOP - Variable Supply Temp - W45 (1)	**3.96**	**3.96**	**3.96**	**3.96**
SCOP - Variable Supply Temp - W35 (1)	**4.31**	**4.31**	**4.31**	**4.31**

(1) COP figures provided in this table are calculated in line with EN14825 at the stated ambient conditions and design water flow and return temperatures. Figures shown relate to specific design conditions which in physical application may vary significantly due to changes and fluctuations in conditions such as ambient temperature, humidity and fluctuations to system temperatures, flow rates etc. As such all COP figures are subject to variation and should be taken as maximum achievable instantaneous figures at the design condition.

Yew Range	210/140kW	315/210kW	420/280kW	525/350kW
REFRIGERATION SIDE				

Compressor Type	-	Reciprocating			
Compressor Qty	Pcs.	2	3	4	5
Refrigerant	-	Propane (R290)			
Refrigerant Circuits	Pcs	2	3	4	5
Variable speed drive (VSD)	Pcs.	2	3	4	5
Refrigerant charge	kg	12	18	24	30
No. evaporators	Pcs.	2	3	4	5
Evaporators Type	-	Flat bed			
Fin Material	-	AL/MG			
Defrost Type	-	Hot Gas			
Defrost medium	-	R290			
Electrical supply	-	3~ 400V 50 HZ			
DIMENSIONS & NOISE					
Colour	-	RAL7016 Anthracite			
STANDARD NOISE					
Unit Weight (empty)	kg	3950	5640	7340	9030
Unit Weight (operational)	kg	4018	5742	7475	9200
Sound Power Level $L_{W(A)}$ (dB)*	dB	86	88	90	92
LOW NOISE					
Unit Weight (empty)	kg	4290	6172	8053	9935
Unit Weight (operational)	kg	4358	6270	8188	10105
Sound Power Level $L_{W(A)}$ (dB)*	dB	72	74	77	78
ACCESS					
Minimum free space side	mm	1000	1000	1000	1000
Minimum free space front	mm	1000	1000	1000	1000
Minimum free space back	mm	1200	1200	1200	1200
Minimum free space above	mm	6000	6000	6000	6000
WATER SIDE					
Type of internal exchangers	-	Stainless steel plate heat exchanger			
Number of internal heat exchangers	l	2	3	4	5
Exchanger Water Content (per module)	l	8.4			
Connections waterside inlet/outlet	DN	67	67	67	67
Connections waterside pressure rating	PN	6			
Factory pressure test rating	PN	6			
Control Methodology	-	PICV			
Pressure Drop Across Each Module (A7/W80) 15K TD	kPa	79.2			

3.2 Construction Table

Yew Range`		210/140kW	315/210kW	420/280kW	525/350kW
WATER FLOW RATES					
PER MODULE					
Nominal dT 10 K	l/s	2.44			
Minimum Water Flow Rate	l/s	0.85			
PER UNIT					
Nominal dT 10 K	l/s	4.88	7.20	9.76	12.20
Minimum water volume in heating	l	2612			
Total internal water volume	l	58.2	87.3	116.4	145.5
FANS SECTION					
Fans type	-	Axial fans			
N° fans	Pcs.	4	6	8	10
Standard air-flow	m^3/s	17.8	26.7	35.6	44.4
Additional Static Pressure Available	Pa	0	0	0	0
Fan regulation	-	0-10V			
Fan Power Input	kW	7.1	10.6	14.1	17.1
ELECTRICAL DATA (W80 10K TD)					
Total Absorbed Power (at 7°C ambient)	kW	110.2	150.4	200.5	250.6
Total Current per phase	A	170.2	255.3	340.5	425.6
Starting Method	-	Soft Start			
Max Starting Current	A	88.1	132.2	176.2	220.3
Total kVA	kVA	117.9	176.9	235.9	294.8
Electrical supply	-	3~ 400V 50 HZ			
Communication protocol	-	BACNET over IP (optional extra)			
IP-Class	-	IP54			

3.4 Noise

Noise attenuation is built into the Low Noise (LN) Yew heat pump. The LN heat pump is designed with upgraded housing to minimise noise. Standard Noise (SN) Yew units have no additional attenuation to the evaporator fans or housing.

To reduce the transmission of vibration and associated noise through pipework and structural elements, flexible connections must be used on all water connections to the unit. Proper isolation and support of attached pipework is also essential to minimise operational noise.

External fixings to the housings, such as pipe supports, fencing, or brackets, will adversely affect vibration and noise performance and are not recommended.

3.4.1 Noise Calculation

Noise details are detailed below for the Yew heat pump range. Data includes units with optional silencers installed as well as a low noise housing option with silencers for comparison. Reported In accordance with BS EN ISO 4871: 2009 and Measured in Accordance with BS EN ISO 9614 - Part 1: 2009

Yew Range	210/140kW		315/210kW		420/280kW		525/350kW	
	SN	LN	SN	LN	SN	LN	SN	LN
Sound Power Level, $L_{W(A)}$ (dB) (1)(2)	86	72	88	74	90	77	92	78
Sound Pressure Level at 10m (dB) (3)	54	39	56	42	58	44	59	46
Uncertainty (dB)	4		4		4		4	

Unit	Octave Band Centre Frequency (Hz)									
	63	125	250	500	1000	2000	4000	8000	Lin	(A)
210/140 SN Lw (dB)	96	100	82	82	76	68	63	53	102	86
210/140 LN Lw (dB)	83	84	71	68	63	57	54	48	89	72
315/210 SN Lw (dB)	98	102	85	84	78	70	65	56	104	88
315/210 LN Lw (dB)	86	87	74	71	66	60	57	51	92	74
420/280 SN Lw (dB)	100	104	87	86	80	72	67	58	106	90
420/280 LN Lw (dB)	88	89	76	73	68	62	59	53	94	77
525/350 SN Lw (dB	102	106	88	88	82	74	69	60	108	92
525/350 LN Lw (dB)	90	90	78	74	70	64	61	55	95	78

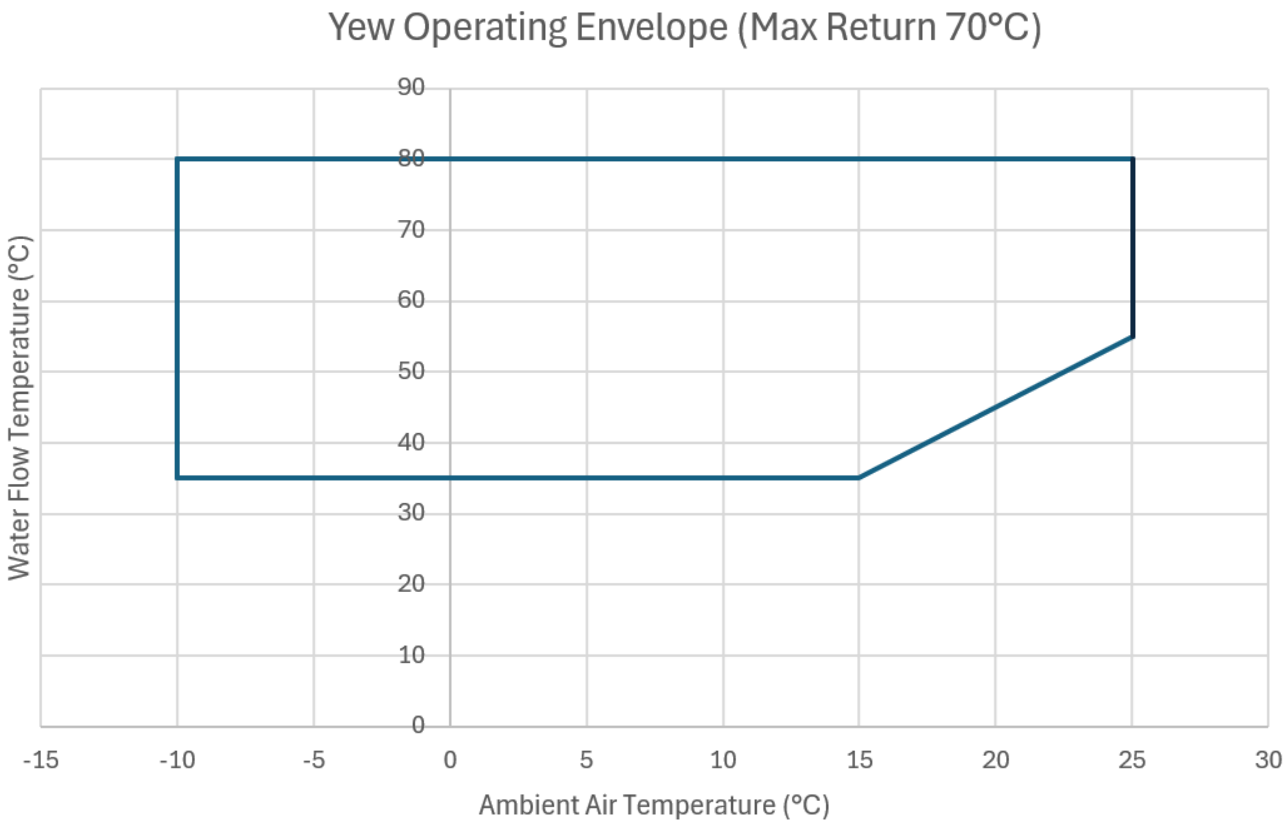
(1) The sum of a measured noise emission value and its associated uncertainty represents an upper boundary of the range of values which is likely to occur in measurements
(2) The sound levels refer to a unit operating under conditions that guarantee a thermal capacity equal to that declared at an outdoor air temperature of 7°C DB (6°C WB), according to EN 14825:2022
(3) Assumed 10m parallelpiped sound propagation

3.5 Glycol use correction factors

% propylene glycol by weight		0%	10%	20%	30%
Freezing point	°C	0	-3	-8	-14
Correction factor for flow rate	Nr	1	1.020	1.045	1.074
Correction factor for system pressure drop	Nr	1	1.019	1.042	1.071
Correction factor for unit heating capacity	Nr	1	1.000	1.000	1.001

The correction factors shown refer to water and propylene glycol mixes used to prevent the formation of frost on the exchangers in the water circuit during inactivity in winter. Glycol has no impact on kW output of the Yew units, instead the unit modulates flow rate.

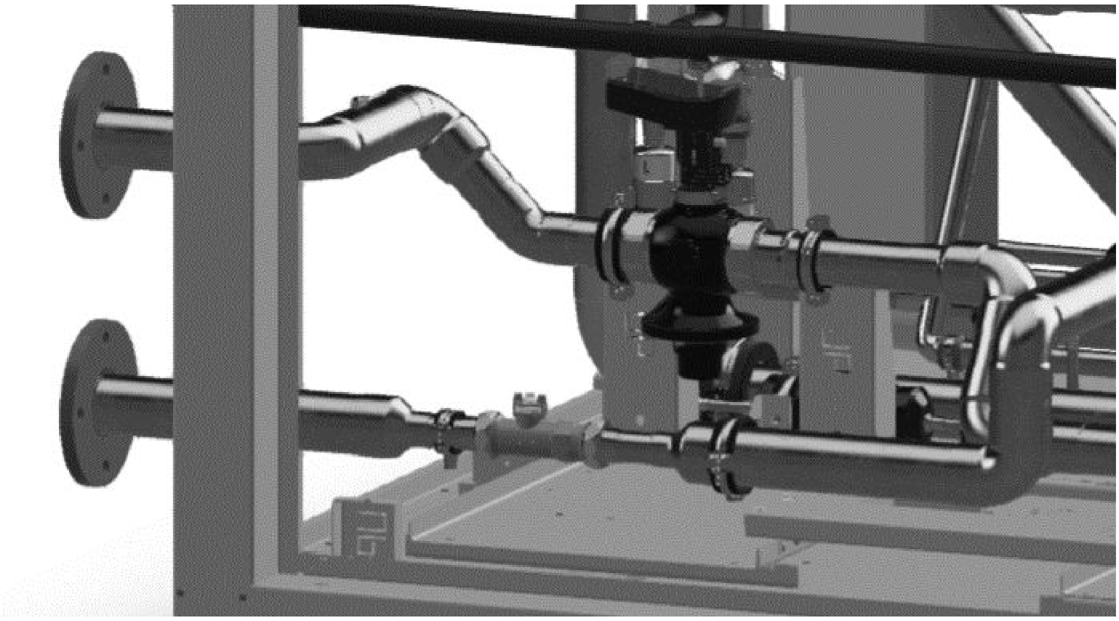
3.6 Operating Ranges



Return temperature range: 20- 70°C

3.7 Pressure Independent Control Valves

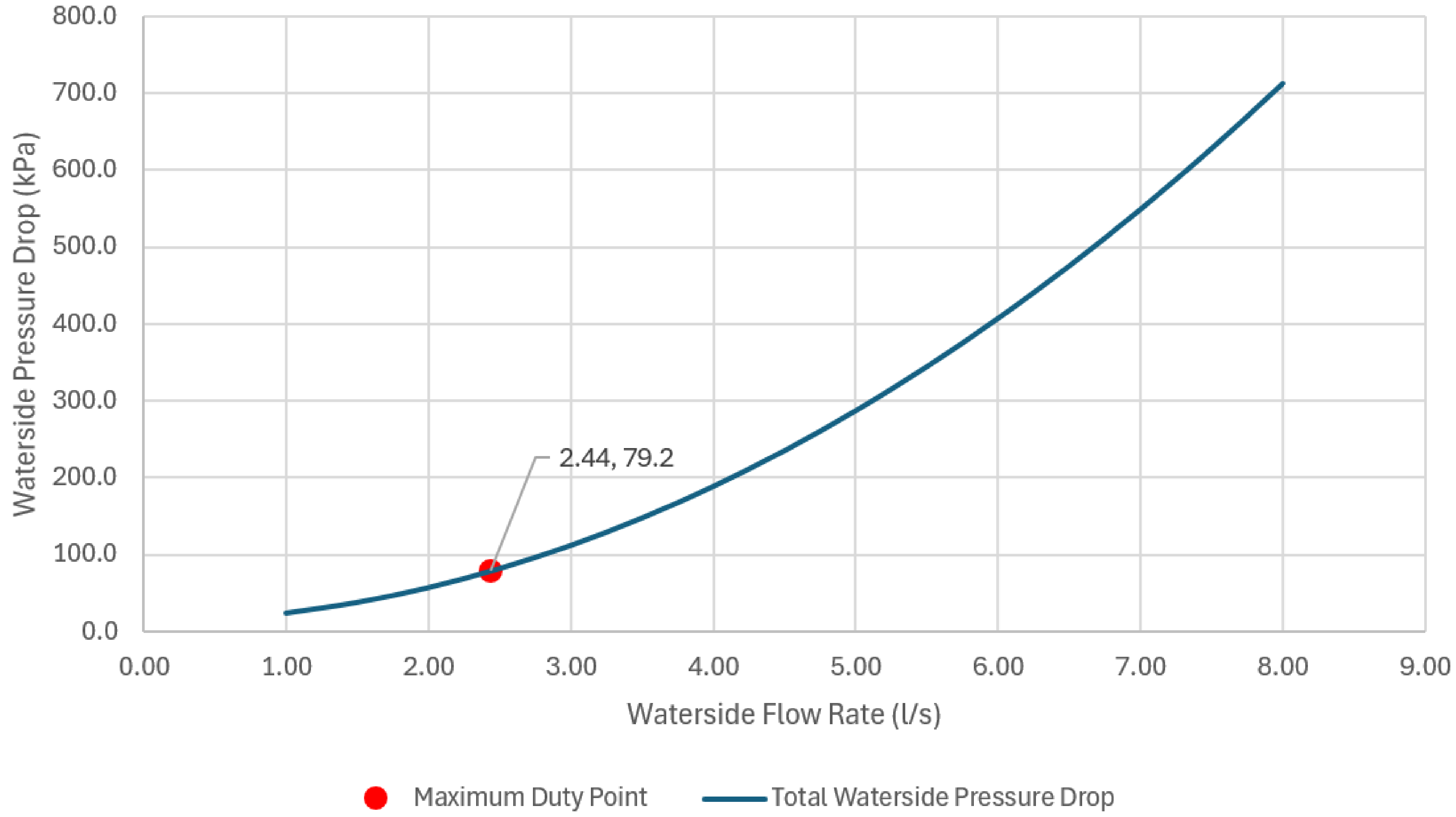
All Yew R290 heat pump systems are equipped with Pressure Independent Control Valves (PICVs) and do not include an internal circulating pump. Instead, the water circulating pump for the system must be sized, sourced, and installed by a third party; Clade does not supply a circulating pump as part of the standard heat pump offering.



The PICVs are engineered to regulate the flow through the plate heat exchanger by varying the pressure drop across the valve independently of the inlet pressure. This design ensures that the system-side flow balance remains unaffected. Moreover, the design flow rate is directly set in the actuator in built software, eliminating the need for manual valve presetting since the actuator automatically manages the valve’s operating envelope.

3.8 Internal Exchanger Pressure Drops and Admissible Water Flow Rates

Yew Range (per module)



3.9 Heating Performances

The performance data presented here reflects testing under the controlled parameters outlined in EN 14825 and is intended for ideal conditions only. Actual performance may differ due to variables such as installation specifics, operational settings, and climatic variations. Customers should verify requirements for each individual application, recognizing that local conditions in the United Kingdom can markedly influence real-world results.

These units support two operating modes:

1. **Power Mode:** Heat output remains unrestricted up to outdoor temperatures of 7 °C, offering greater capacity in milder conditions, albeit with increased power input.

2. **Efficiency Mode:** Heat output is capped at conditions equivalent to -5 °C, allowing the electrical demand to remain at the same level as -5 °C operation. This is particularly beneficial for installations where electrical capacity is limited.

3.9.1 Yew Range 210/140 kW

POWER MODE (+7°C CAPACITY CONTROL)

Model name	Water Temp (°C)	SCOP	-10°C External			-5°C External			0°C External			5°C External			7°C External			10°C External			15°C External		
			QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP
YEW SN + LN 210/140	80/70	2.0	145.3	84.7	1.7	162.8	90.5	1.8	180.4	94.7	1.9	201.1	99.2	2.0	209.7	100.2	2.1	209.7	98.3	2.1	209.7	94.6	2.2
	75/65	2.1	146.2	79.9	1.8	164.2	85.3	1.9	182.9	89.2	2.0	204.1	93.3	2.2	213.1	94.2	2.3	213.1	92.4	2.3	213.1	88.7	2.4
	70/60	2.3	147.3	75.5	2.0	165.6	80.5	2.1	185.4	84.2	2.2	207.1	87.8	2.4	216.6	88.6	2.4	216.6	86.9	2.5	216.6	83.3	2.6
	65/55	2.5	148.5	71.4	2.1	167.2	76.1	2.2	188.0	79.6	2.4	210.1	82.8	2.5	220.0	83.4	2.6	220.0	81.7	2.7	220.0	78.2	2.8
	60/50	2.6	149.7	67.8	2.2	168.9	72.1	2.3	190.6	75.2	2.5	213.2	78.1	2.7	223.5	78.5	2.8	223.5	77.0	2.9	223.5	73.4	3.0
	55/45	2.8	151.1	64.4	2.3	170.6	68.3	2.5	193.2	71.2	2.7	216.2	73.7	2.9	226.9	74.0	3.1	226.9	72.5	3.1	226.9	68.9	3.3
	50/40	3.0	152.5	61.3	2.5	172.3	64.9	2.7	195.8	67.5	2.9	219.3	69.6	3.2	230.3	69.8	3.3	230.3	68.3	3.4	230.3	64.8	3.6
	45/35	3.2	154.0	58.4	2.6	174.1	61.7	2.8	198.5	64.0	3.1	222.3	65.7	3.4	233.6	65.8	3.5	233.6	64.3	3.6	233.6	60.8	3.8
	35/30	3.7	157.5	53.8	2.9	178.3	56.6	3.2	204.3	58.4	3.5	228.9	59.6	3.8	232.6	56.9	4.1	232.6	56.3	4.1	232.6	52.8	4.4
	30/20	3.9	159.0	51.5	3.1	180.1	54.0	3.3	206.8	55.5	3.7	231.7	56.4	4.1	244.1	56.1	4.4	244.1	54.7	4.5	244.1	51.1	4.8
	25/20	4.3	160.5	49.3	3.3	181.8	51.5	3.5	209.2	52.7	4.0	232.6	48.6	4.8	232.6	50.3	4.6	232.6	48.9	4.8	232.6	45.5	5.1

EFFICIENCY MODE (-5°C CAPACITY CONTROL)

Model name	Water Temp (°C)	SCOP	-10°C External			-5°C External			0°C External			5°C External			7°C External			10°C External			15°C External		
			QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP
YEW SN + LN 210/140	80/70	1.9	145.3	84.7	1.7	162.8	90.5	1.8	162.8	87.1	1.9	162.8	83.0	2.0	162.8	80.6	2.0	162.8	79.0	2.1	162.8	75.7	2.1
	75/65	2.1	146.2	79.9	1.8	164.2	85.3	1.9	164.2	81.8	2.0	164.2	77.8	2.1	164.2	75.3	2.2	164.2	73.9	2.2	164.2	70.7	2.3
	70/60	2.2	147.3	75.5	2.0	165.6	80.5	2.1	165.6	76.9	2.2	165.6	73.0	2.3	165.6	70.5	2.3	165.6	69.2	2.4	165.6	66.0	2.5
	65/55	2.4	148.5	71.4	2.1	167.2	76.1	2.2	167.2	72.5	2.3	167.2	68.6	2.4	167.2	66.1	2.5	167.2	64.8	2.6	167.2	61.7	2.7
	60/50	2.6	149.7	67.8	2.2	168.9	72.1	2.3	168.9	68.4	2.5	168.9	64.5	2.6	168.9	62.0	2.7	168.9	60.7	2.8	168.9	57.6	2.9
	55/45	2.7	151.1	64.4	2.3	170.6	68.3	2.5	170.6	64.6	2.6	170.6	60.7	2.8	170.6	58.2	2.9	170.6	57.0	3.0	170.6	53.9	3.2
	50/40	2.9	152.5	61.3	2.5	172.3	64.9	2.7	172.3	61.0	2.8	172.3	57.2	3.0	172.3	54.7	3.2	172.3	53.5	3.2	172.3	50.4	3.4
	45/35	3.1	154.0	58.4	2.6	174.1	61.7	2.8	174.1	57.8	3.0	174.1	53.9	3.2	174.1	51.4	3.4	174.1	50.2	3.5	174.1	47.2	3.7
	35/30	3.6	157.5	53.8	2.9	178.3	56.6	3.2	178.3	52.5	3.4	178.3	48.6	3.7	178.3	46.1	3.9	178.3	44.9	4.0	178.3	41.9	4.3
	30/20	3.8	159.0	51.5	3.1	180.1	54.0	3.3	180.1	49.8	3.6	180.1	45.9	3.9	180.1	43.3	4.2	180.1	42.2	4.3	180.1	39.2	4.6
	25/20	4.0	160.5	49.3	3.3	181.8	51.5	3.5	181.8	47.2	3.8	181.8	43.3	4.2	181.8	40.7	4.5	181.8	39.6	4.6	181.8	36.6	5.0

3.9.2 Yew Range 315/210 kW

POWER MODE (+7°C CAPACITY CONTROL)

Model name	Water Temp (°C)	SCOP	-10°C External			-5°C External			0°C External			5°C External			7°C External			10°C External			15°C External		
			QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP
YEW SN + LN 315/210	80/70	2.0	217.9	127.1	1.7	244.1	135.8	1.8	270.5	142.0	1.9	301.6	148.8	2.0	314.5	150.4	2.1	314.5	147.5	2.1	314.5	141.8	2.2
	75/65	2.1	219.3	119.8	1.8	246.2	127.9	1.9	274.3	133.9	2.0	306.1	140.0	2.2	319.7	141.3	2.3	319.7	138.6	2.3	319.7	133.1	2.4
	70/60	2.3	220.9	113.2	2.0	248.5	120.7	2.1	278.1	126.3	2.2	310.6	131.8	2.4	324.9	132.9	2.4	324.9	130.3	2.5	324.9	124.9	2.6
	65/55	2.5	222.7	107.2	2.1	250.8	114.2	2.2	282.0	119.3	2.4	315.2	124.2	2.5	330.0	125.1	2.6	330.0	122.6	2.7	330.0	117.2	2.8
	60/50	2.6	224.6	101.6	2.2	253.3	108.1	2.3	285.9	112.8	2.5	319.8	117.1	2.7	335.2	117.8	2.8	335.2	115.4	2.9	335.2	110.1	3.0
	55/45	2.8	226.6	96.6	2.3	255.9	102.5	2.5	289.8	106.8	2.7	324.3	110.5	2.9	340.3	111.0	3.1	340.3	108.7	3.1	340.3	103.4	3.3
	50/40	3.0	228.8	91.9	2.5	258.5	97.3	2.7	293.8	101.2	2.9	328.9	104.4	3.2	345.4	104.7	3.3	345.4	102.4	3.4	345.4	97.1	3.6
	45/35	3.2	231.0	87.6	2.6	261.2	92.6	2.8	297.7	96.0	3.1	333.4	98.6	3.4	350.4	98.7	3.5	350.4	96.5	3.6	350.4	91.2	3.8
	35/30	3.7	236.2	80.7	2.9	267.5	84.9	3.2	306.4	87.6	3.5	343.4	89.3	3.8	348.8	85.3	4.1	348.8	84.4	4.1	348.8	79.2	4.4
	30/20	3.9	238.5	77.2	3.1	270.1	81.0	3.3	310.2	83.2	3.7	347.6	84.5	4.1	366.2	84.1	4.4	366.2	82.0	4.5	366.2	76.7	4.8
	25/20	4.3	240.7	74.0	3.3	272.7	77.3	3.5	313.8	79.1	4.0	348.8	72.9	4.8	348.8	75.4	4.6	348.8	73.4	4.8	348.8	68.2	5.1

EFFICIENCY MODE (-5°C CAPACITY CONTROL)

Model name	Water Temp (°C)	SCOP	-10°C External			-5°C External			0°C External			5°C External			7°C External			10°C External			15°C External		
			QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP
YEW SN + LN 315/210	80/70	1.9	217.9	127.1	1.7	244.1	135.8	1.8	244.1	130.6	1.9	244.1	124.5	2.0	244.1	120.9	2.0	244.1	118.5	2.1	244.1	113.6	2.1
	75/65	2.1	219.3	119.8	1.8	246.2	127.9	1.9	246.2	122.7	2.0	246.2	116.7	2.1	246.2	113.0	2.2	246.2	110.8	2.2	246.2	106.0	2.3
	70/60	2.2	220.9	113.2	2.0	248.5	120.7	2.1	248.5	115.4	2.2	248.5	109.5	2.3	248.5	105.8	2.3	248.5	103.7	2.4	248.5	99.0	2.5
	65/55	2.4	222.7	107.2	2.1	250.8	114.2	2.2	250.8	108.7	2.3	250.8	102.9	2.4	250.8	99.2	2.5	250.8	97.2	2.6	250.8	92.5	2.7
	60/50	2.6	224.6	101.6	2.2	253.3	108.1	2.3	253.3	102.6	2.5	253.3	96.8	2.6	253.3	93.0	2.7	253.3	91.1	2.8	253.3	86.5	2.9
	55/45	2.7	226.6	96.6	2.3	255.9	102.5	2.5	255.9	96.9	2.6	255.9	91.1	2.8	255.9	87.3	2.9	255.9	85.5	3.0	255.9	80.9	3.2
	50/40	2.9	228.8	91.9	2.5	258.5	97.3	2.7	258.5	91.6	2.8	258.5	85.8	3.0	258.5	82.0	3.2	258.5	80.2	3.2	258.5	75.7	3.4
	45/35	3.1	231.0	87.6	2.6	261.2	92.6	2.8	261.2	86.7	3.0	261.2	80.9	3.2	261.2	77.1	3.4	261.2	75.3	3.5	261.2	70.8	3.7
	35/30	3.6	236.2	80.7	2.9	267.5	84.9	3.2	267.5	78.7	3.4	267.5	72.9	3.7	267.5	69.1	3.9	267.5	67.4	4.0	267.5	62.9	4.3
	30/20	3.8	238.5	77.2	3.1	270.1	81.0	3.3	270.1	74.7	3.6	270.1	68.9	3.9	270.1	65.0	4.2	270.1	63.3	4.3	270.1	58.8	4.6
	25/20	4.0	240.7	74.0	3.3	272.7	77.3	3.5	272.7	70.8	3.8	272.7	65.0	4.2	272.7	61.1	4.5	272.7	59.4	4.6	272.7	54.9	5.0

3.9.3 Yew Range 420/280 kW

POWER MODE (+7°C CAPACITY CONTROL)																							
Model name	Water Temp (°C)	SCOP	-10°C External			-5°C External			0°C External			5°C External			7°C External			10°C External			15°C External		
			QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP
YEW SN + LN 420/280	80/70	2.0	290.6	169.5	1.7	325.5	181.1	1.8	360.7	189.4	1.9	402.1	198.4	2.0	419.4	200.5	2.1	419.4	196.6	2.1	419.4	189.1	2.2
	75/65	2.1	292.5	159.8	1.8	328.3	170.6	1.9	365.7	178.5	2.0	408.1	186.6	2.2	426.3	188.4	2.3	426.3	184.8	2.3	426.3	177.4	2.4
	70/60	2.3	294.6	150.9	2.0	331.3	161.0	2.1	370.8	168.4	2.2	414.2	175.7	2.4	433.2	177.2	2.4	433.2	173.8	2.5	433.2	166.5	2.6
	65/55	2.5	296.9	142.9	2.1	334.5	152.2	2.2	376.0	159.1	2.4	420.3	165.5	2.5	440.1	166.8	2.6	440.1	163.5	2.7	440.1	156.3	2.8
	60/50	2.6	299.5	135.5	2.2	337.8	144.1	2.3	381.2	150.5	2.5	426.4	156.1	2.7	446.9	157.1	2.8	446.9	153.9	2.9	446.9	146.8	3.0
	55/45	2.8	302.2	128.8	2.3	341.2	136.7	2.5	386.4	142.4	2.7	432.4	147.3	2.9	453.8	148.0	3.1	453.8	144.9	3.1	453.8	137.9	3.3
	50/40	3.0	305.0	122.6	2.5	344.7	129.8	2.7	391.7	135.0	2.9	438.5	139.1	3.2	460.5	139.6	3.3	460.5	136.5	3.4	460.5	129.5	3.6
	45/35	3.2	308.0	116.8	2.6	348.3	123.4	2.8	396.9	128.0	3.1	444.5	131.5	3.4	467.2	131.6	3.5	467.2	128.7	3.6	467.2	121.6	3.8
	35/30	3.7	315.0	107.6	2.9	356.6	113.2	3.2	408.6	116.7	3.5	457.8	119.1	3.8	465.1	113.8	4.1	465.1	112.6	4.1	465.1	105.6	4.4
	30/20	3.9	318.0	103.0	3.1	360.1	108.0	3.3	413.6	110.9	3.7	463.5	112.7	4.1	488.2	112.2	4.4	488.2	109.4	4.5	488.2	102.3	4.8
	25/20	4.3	320.9	98.6	3.3	363.6	103.1	3.5	418.5	105.5	4.0	465.1	97.2	4.8	465.1	100.5	4.6	465.1	97.9	4.8	465.1	91.0	5.1

EFFICIENCY MODE (-5°C CAPACITY CONTROL)																							
Model name	Water Temp (°C)	SCOP	-10°C External			-5°C External			0°C External			5°C External			7°C External			10°C External			15°C External		
			QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP
YEW SN + LN 420/280	80/70	1.9	290.6	169.5	1.7	325.5	181.1	1.8	325.5	174.1	1.9	325.5	166.0	2.0	325.5	161.1	2.0	325.5	158.1	2.1	325.5	151.5	2.1
	75/65	2.1	292.5	159.8	1.8	328.3	170.6	1.9	328.3	163.6	2.0	328.3	155.6	2.1	328.3	150.7	2.2	328.3	147.8	2.2	328.3	141.3	2.3
	70/60	2.2	294.6	150.9	2.0	331.3	161.0	2.1	331.3	153.9	2.2	331.3	146.0	2.3	331.3	141.1	2.3	331.3	138.3	2.4	331.3	132.0	2.5
	65/55	2.4	296.9	142.9	2.1	334.5	152.2	2.2	334.5	145.0	2.3	334.5	137.2	2.4	334.5	132.2	2.5	334.5	129.6	2.6	334.5	123.3	2.7
	60/50	2.6	299.5	135.5	2.2	337.8	144.1	2.3	337.8	136.7	2.5	337.8	129.0	2.6	337.8	124.0	2.7	337.8	121.5	2.8	337.8	115.3	2.9
	55/45	2.7	302.2	128.8	2.3	341.2	136.7	2.5	341.2	129.1	2.6	341.2	121.4	2.8	341.2	116.4	2.9	341.2	113.9	3.0	341.2	107.8	3.2
	50/40	2.9	305.0	122.6	2.5	344.7	129.8	2.7	344.7	122.1	2.8	344.7	114.4	3.0	344.7	109.4	3.2	344.7	106.9	3.2	344.7	100.9	3.4
	45/35	3.1	308.0	116.8	2.6	348.3	123.4	2.8	348.3	115.5	3.0	348.3	107.8	3.2	348.3	102.8	3.4	348.3	100.4	3.5	348.3	94.4	3.7
	35/30	3.6	315.0	107.6	2.9	356.6	113.2	3.2	356.6	105.0	3.4	356.6	97.2	3.7	356.6	92.1	3.9	356.6	89.8	4.0	356.6	83.9	4.3
	30/20	3.8	318.0	103.0	3.1	360.1	108.0	3.3	360.1	99.6	3.6	360.1	91.8	3.9	360.1	86.6	4.2	360.1	84.4	4.3	360.1	78.4	4.6
	25/20	4.0	320.9	98.6	3.3	363.6	103.1	3.5	363.6	94.5	3.8	363.6	86.6	4.2	363.6	81.4	4.5	363.6	79.2	4.6	363.6	73.3	5.0

3.9.4 Yew Range 525/350 kW

POWER MODE (+7°C CAPACITY CONTROL)

Model name	Water Temp (°C)	SCOP	-10°C External			-5°C External			0°C External			5°C External			7°C External			10°C External			15°C External		
			QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP
YEW SN + LN 525/350	80/70	2.0	363.2	211.8	1.7	406.9	226.3	1.8	450.9	236.7	1.9	502.6	248.0	2.0	524.2	250.6	2.1	524.2	245.8	2.1	524.2	236.4	2.2
	75/65	2.1	365.6	199.7	1.8	410.4	213.2	1.9	457.2	223.1	2.0	510.2	233.3	2.2	532.8	235.5	2.3	532.8	231.0	2.3	532.8	221.8	2.4
	70/60	2.3	368.2	188.7	2.0	414.1	201.2	2.1	463.5	210.5	2.2	517.7	219.6	2.4	541.5	221.5	2.4	541.5	217.2	2.5	541.5	208.1	2.6
	65/55	2.5	371.2	178.6	2.1	418.1	190.3	2.2	470.0	198.9	2.4	525.3	206.9	2.5	550.1	208.5	2.6	550.1	204.4	2.7	550.1	195.4	2.8
	60/50	2.6	374.4	169.4	2.2	422.2	180.1	2.3	476.5	188.1	2.5	533.0	195.1	2.7	558.7	196.4	2.8	558.7	192.4	2.9	558.7	183.5	3.0
	55/45	2.8	377.7	161.0	2.3	426.5	170.8	2.5	483.0	178.0	2.7	540.6	184.2	2.9	567.2	185.0	3.1	567.2	181.2	3.1	567.2	172.3	3.3
	50/40	3.0	381.3	153.2	2.5	430.9	162.2	2.7	489.6	168.7	2.9	548.1	173.9	3.2	575.7	174.5	3.3	575.7	170.7	3.4	575.7	161.9	3.6
	45/35	3.2	385.0	146.0	2.6	435.3	154.3	2.8	496.1	160.0	3.1	555.6	164.4	3.4	584.0	164.6	3.5	584.0	160.9	3.6	584.0	152.1	3.8
	35/30	3.7	393.7	134.5	2.9	445.8	141.5	3.2	510.7	145.9	3.5	572.3	148.9	3.8	581.4	142.2	4.1	581.4	140.7	4.1	581.4	132.1	4.4
	30/20	3.9	397.4	128.7	3.1	450.2	135.0	3.3	517.0	138.7	3.7	579.4	140.9	4.1	610.3	140.2	4.4	610.3	136.7	4.5	610.3	127.9	4.8
	25/20	4.3	401.1	123.3	3.3	454.5	128.9	3.5	523.1	131.8	4.0	581.4	121.5	4.8	581.4	125.6	4.6	581.4	122.3	4.8	581.4	113.7	5.1

EFFICIENCY MODE (-5°C CAPACITY CONTROL)

Model name	Water Temp (°C)	SCOP	-10°C External			-5°C External			0°C External			5°C External			7°C External			10°C External			15°C External		
			QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP	QH (kW)	PI (kW)	COP
YEW SN + LN 525/350	80/70	1.9	363.2	211.8	1.7	406.9	226.3	1.8	406.9	217.6	1.9	406.9	207.5	2.0	406.9	201.4	2.0	406.9	197.6	2.1	406.9	189.3	2.1
	75/65	2.1	365.6	199.7	1.8	410.4	213.2	1.9	410.4	204.4	2.0	410.4	194.5	2.1	410.4	188.4	2.2	410.4	184.7	2.2	410.4	176.7	2.3
	70/60	2.2	368.2	188.7	2.0	414.1	201.2	2.1	414.1	192.3	2.2	414.1	182.5	2.3	414.1	176.4	2.3	414.1	172.9	2.4	414.1	165.0	2.5
	65/55	2.4	371.2	178.6	2.1	418.1	190.3	2.2	418.1	181.2	2.3	418.1	171.5	2.4	418.1	165.3	2.5	418.1	162.0	2.6	418.1	154.2	2.7
	60/50	2.6	374.4	169.4	2.2	422.2	180.1	2.3	422.2	170.9	2.5	422.2	161.3	2.6	422.2	155.0	2.7	422.2	151.8	2.8	422.2	144.1	2.9
	55/45	2.7	377.7	161.0	2.3	426.5	170.8	2.5	426.5	161.4	2.6	426.5	151.8	2.8	426.5	145.5	2.9	426.5	142.4	3.0	426.5	134.8	3.2
	50/40	2.9	381.3	153.2	2.5	430.9	162.2	2.7	430.9	152.6	2.8	430.9	143.0	3.0	430.9	136.7	3.2	430.9	133.7	3.2	430.9	126.1	3.4
	45/35	3.1	385.0	146.0	2.6	435.3	154.3	2.8	435.3	144.4	3.0	435.3	134.8	3.2	435.3	128.5	3.4	435.3	125.5	3.5	435.3	117.9	3.7
	35/30	3.6	393.7	134.5	2.9	445.8	141.5	3.2	445.8	131.2	3.4	445.8	121.5	3.7	445.8	115.2	3.9	445.8	112.3	4.0	445.8	104.9	4.3
	30/20	3.8	397.4	128.7	3.1	450.2	135.0	3.3	450.2	124.5	3.6	450.2	114.8	3.9	450.2	108.3	4.2	450.2	105.5	4.3	450.2	98.0	4.6
	25/20	4.0	401.1	123.3	3.3	454.5	128.9	3.5	454.5	118.1	3.8	454.5	108.3	4.2	454.5	101.8	4.5	454.5	99.0	4.6	454.5	91.6	5.0

4 Electrical Installation

4.1 Electrical data

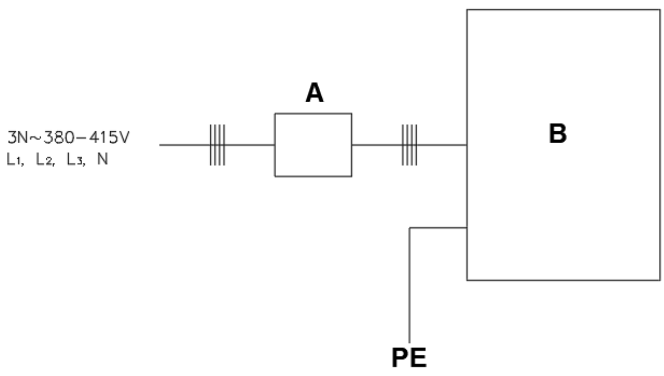
4.1.1 Supply voltage 400/3/50+N

YEW SN + LN		210/140kW	315/210kW	420/280kW	525/350kW
F.L.A. - Full load current at max admissible conditions (per phase)					
F.L.A. - Total	A	170.2	255.3	340.5	425.6
F.L.I. - Full load power input at max admissible conditions					
F.L.I. - Total	kW	110.2	150.4	200.5	250.6
M.I.C. - Maximum inrush current					
M.I.C. - Total	A	216.7	298.4	380.1	461.8

Power supply 400/3/50 (+ NEUTRAL) +/- 10%. Maximum Phase Unbalance: 2%.

For non-standard voltage please contact Clade technical office

4.2 Mains Supply Installation



A: Upstream Protection (by others)
B: ASHP

4.2.1 Power Supply Details

UNIT SN + LN	External power supply		
	Power supply	Switch manual	Local Protection
Yew 210/140 kW	380-415V 3N~ 50Hz	200A (pre mounted)	200A
Yew 315/210 kW	380-415V 3N~ 50Hz	315A (pre mounted)	315A
Yew 420/280 kW	380-415V 3N~ 50Hz	400A (pre mounted)	400A
Yew 525/350 kW	380-415V 3N~ 50Hz	500A (pre mounted)	500A

Each Yew ASHP requires a dedicated 400/3/50 +N power supply with tolerance ±10% and a maximum allowable phase imbalance of 2%.

- Each unit is supplied with its own local isolator and protection device.
- Upstream protection must be provided by the installer and correctly sized to suit the unit's full load and inrush currents (see Section 4.1).
- Cable sizing must consider local climatic conditions, service routes, ambient temperature, installation method, and grouping factors.
- The electrical installation must comply with BS 7671:2018 (IET Wiring Regulations) or the equivalent national wiring regulations in the country of installation.

⚠ **CAUTION**

- Always use correctly rated fuses or breakers. Incorrectly sized protective devices may result in malfunction, overheating, or fire.
- Ensure cables are adequately supported and that no external mechanical stress is imparted on terminations. Loose or stressed connections can cause overheating and arcing.

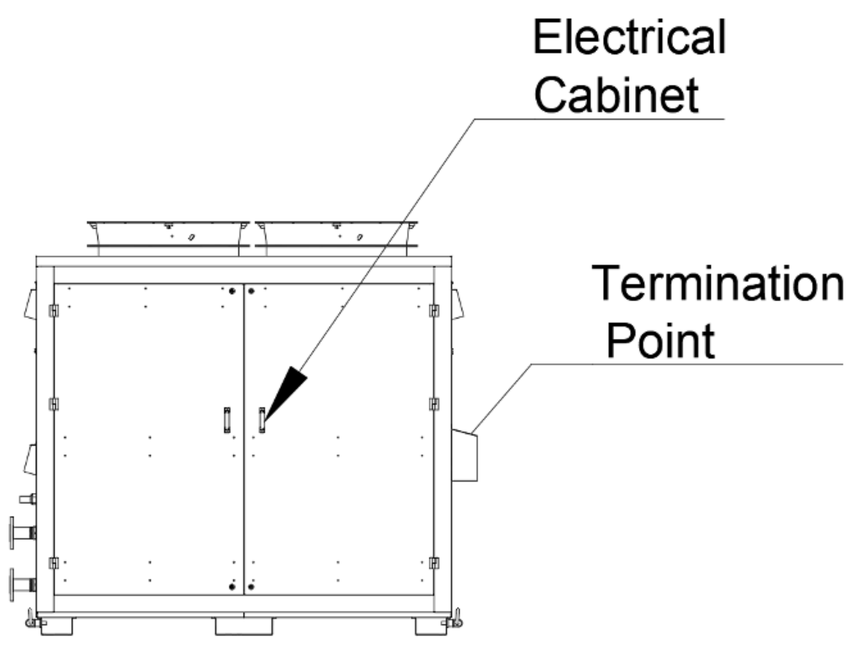
4.2.2 Terminal Block Arrangement

Each Yew heat pump is fitted with a dedicated terminal-box for the incoming mains supply. The termination entry point is identical across the entire Rowan range and is positioned on the rear, right-hand side of the unit (refer to the illustration below).

- Route supply conductors through the factory-installed gland plate at the termination point.
- Size all supply cables in accordance with the full load current (FLA) of the unit (see Electrical Data section).
- Tighten all terminals to the torque values specified on the terminal-strip label.

⚠ **CAUTION**

Earth tabs must be reconnected prior to refitting access panels



4.2.3 Maximum Cable Sizes

The maximum cable sizes into the isolators of the unit can be seen below.

Model SN + LN	Maximum Cu cable cross-section (mm²)
Yew 210/140 kW	95
Yew 315/210 kW	150
Yew 420/280 kW	185
Yew 525/350 kW	240

⚠ **WARNING**

Be sure to use specified wires and ensure no external force is imparted to terminal connections. Loose connections may cause overheating and fire.

⚠ **CAUTION**

Only use properly rated breakers and fuses. Using a protection device of the wrong size may cause the unit to malfunction or set fire.

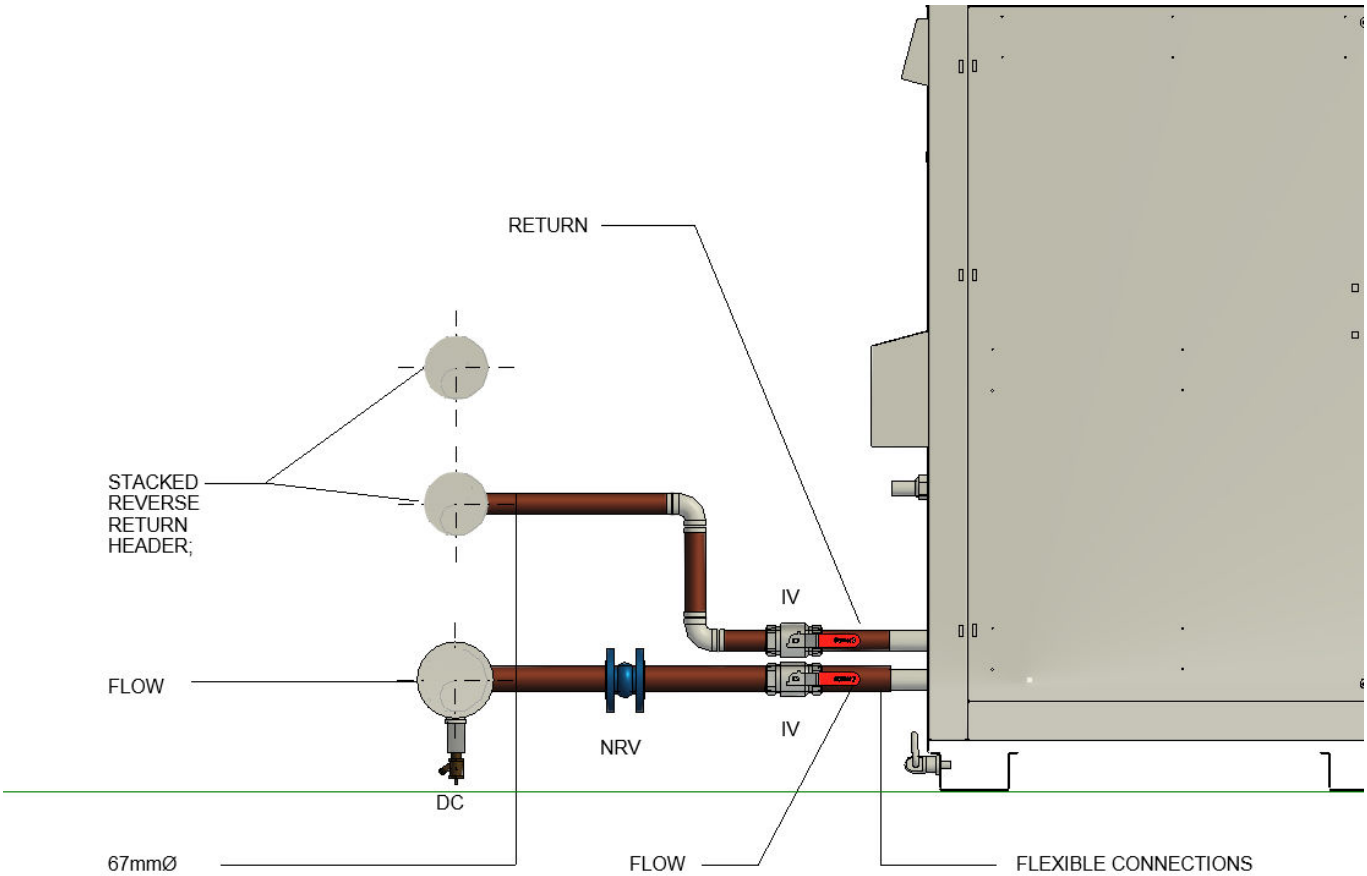
4.2.4 Control Connections

The following control cable specifications are required:

Remote controller cable size	0.3 - 1mm² Shielded cable recommended to minimise electrical interference.
Cable between units	Cat 6 data cable

5 Hydraulics

5.1 Piping Connections (per module)



Each module must be fitted with the above ancillaries before tying into the main header. The abbreviations on the diagram can been seen below.

IV	Isolation Valve	Allow for isolation for maintenance
NRV	Non return Valve	Prevents reverse flow of fluid ensuring unidirectional flow.
DC	Drain valve	Allows for drainage during servicing of components

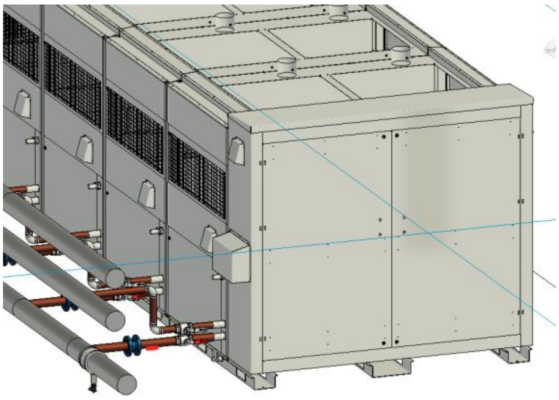
Optional: Flow rates per module can be measured from the PICV valves inside the unit, however a commissioning set or orifice plate can be added on the return for easier access to confirm flow rates.

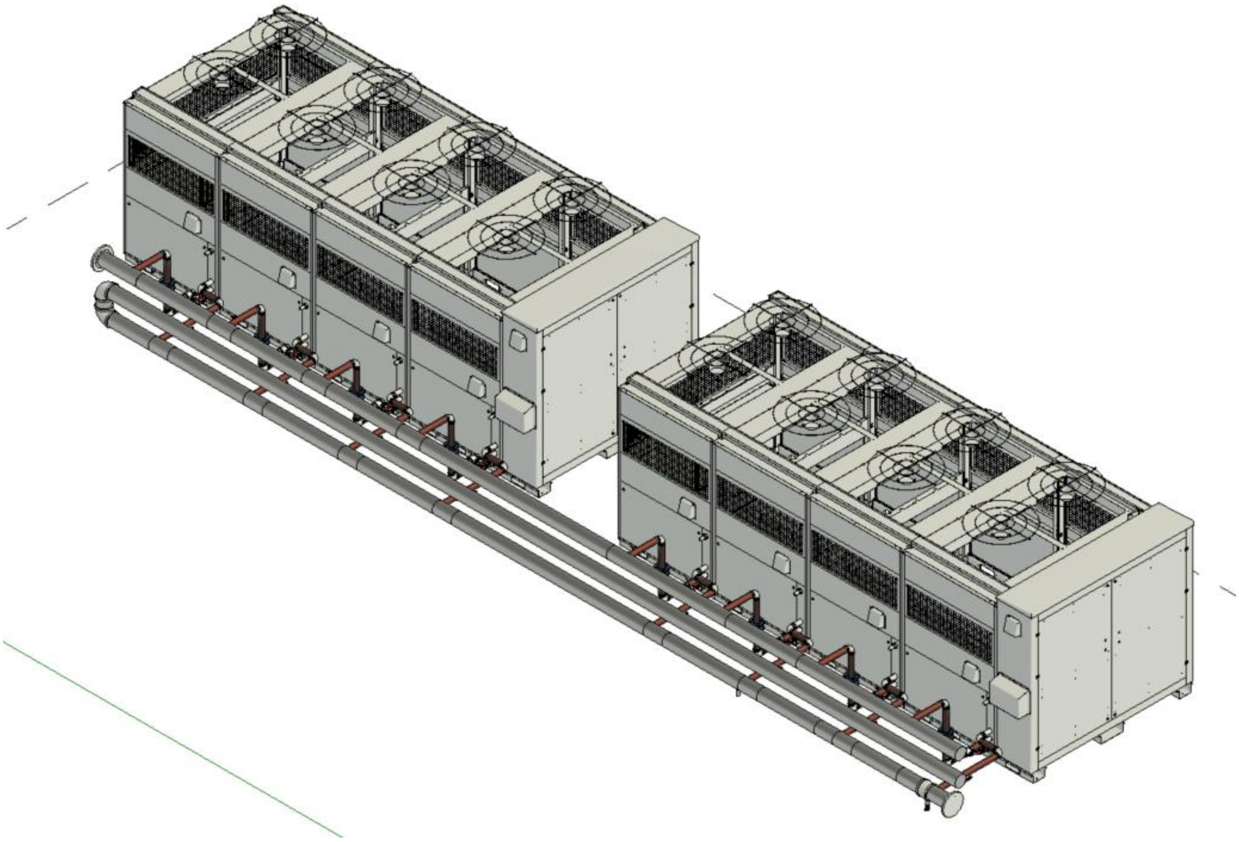
Each of these items should be located on the modules flow and return pipework, as illustrated, before connecting to the common reverse-return header. Further installation details and header-pipe arrangement are provided on the following page.

5.1.1 Pipe Connection Sizes

Connection Type	Yew (each module)
Heating Flow	67mm Copper – plain end
Heating Return	67mm Copper – plain end
Condensate	32mm solvent weld waste pipe – plain end

5.1.2 Header Details





For Yew units, a stacked reverse-return header is the recommended configuration to achieve optimal hydraulic performance with minimal manual balancing. This arrangement consists of two parallel headers, one for flow and one for return—mounted in a compact "stacked" format, typically one directly above the other. Implementing this stacked reverse-return header setup on Yew units delivers consistent flow distribution, reduces commissioning time, and simplifies ongoing maintenance by inherently balancing all circuits.

5.2 Defrost

The ASHPs come with their own hot gas frost protection cycle. This shuts off the internal LTHW flow through the ASHPs and directs hot gas through the evaporation coils removing any ice build-up. To mitigate the loss of output while in defrost, the system buffer vessel must be sized accordingly.

5.3 Minimum Free Flowing Water Content

Clade's minimum water content for the Yew units are given in the table. These represent the minimum storage requirements necessary to protect the heat pump and allow for a maximum of six starts per hour. This volume is per unit, if there are multiple units then the minimum volume needs to be multiplied by the number of units.

	Yew
Minimum Water Volume (litres)	2612

Please Note: This is the minimum volume to protect the compressor and extend the lifespan of the units. If the units are to be controlled on capacity control, there will need to be more volume in the vessel to allow for stratification control.

5.3.1 Optimal Buffer Sizing

While the minimum buffer sizes ensure basic heat pump protection and operational stability, optimally sized buffers enhance system efficiency, reduce cycling frequency, and improve overall performance. Buffer vessel sizing ultimately rests with the system designer however, the following recommendations provide guidance on selecting the ideal buffer capacity to maximise energy efficiency and maintain consistent heating output.

Defrost Cycle Management: Air source heat pumps undergo periodic defrost cycles, during which the heat pump uses hot gas to clear ice from the evaporator. During this period, the buffer vessel provides stored thermal energy to maintain heating supply to the building. The vessel must be sized to cover the full heat load during defrost to prevent temperature drops. Clade recommends a minimum of 30 minutes storage to cover this.

Peak Load Consideration: The buffer volume should accommodate the total peak kWh heating demand of the building while accounting for variations in heat pump output due to defrost.

Building Load Profiles: CIBSE Guide A shows how to perform detailed analysis of building heating load profiles. Factors such as occupancy patterns, thermal mass, and intermittent heating requirements should be evaluated to determine the total time the peak load is required and the necessary storage capacity.

5.3.2 Buffer Design Considerations

To ensure optimal performance and efficiency in heat pump systems, proper buffer vessel design is crucial. A well-designed buffer enhances stratification, maximises usable volume, and provides precise control for charging and discharging cycles. Key aspects of an effective buffer design include:

- **Height-to-Width Ratio**: A buffer vessel should have a minimum height-to-width ratio of 2.5:1. This geometry promotes better thermal stratification by reducing the potential for mixing between layers, ensuring a stable temperature gradient within the vessel.

- **Sparge Pipes**: Increases the useable volume of the vessel.

- **External Combined Headers:** One in one out header based on CIBSE Cp1. Prevents mixing and maintains stratification and is sized to achieve less than 0.3 m/s velocity into the vessel. The header helps maintain stable pressure conditions across both the primary and secondary circuits. This is essential for variable flow systems and avoids issues with fluctuating demand.

- **Temperature sensors:** Five temperature sensors distributed vertically within the buffer need to be distributed properly for precise monitoring and adjustments to maintain optimal conditions. When there are multiple buffers, these need to be spread across the vessels evenly.

5.4 System Pressure

All mechanical/LTHW systems require pressure relief equipment to maintain the safe working condition of the system. This will be designed and specified by the system designer/installer.

5.4.1 Safety Valves

Safety valves on the low-temperature hot-water side are compulsory on all Yew installations. Their role is to prevent system pressure from rising above the maximum allowable working pressure, thereby protecting pipework, heat exchangers and ancillary equipment from over-pressure incidents. It is the system designer's or installer's responsibility to select, size and install these valves in accordance with the national standards ensuring correct set pressure, sufficient discharge capacity and proper discharge piping.

5.4.2 Degasser

A degasser is a specialised component installed in the heating system's pipework. In the rare event of a propane leak from the plate heat exchanger into the heating water circuit, the degasser helps mitigate the risk by Separating propane from water and then safely venting the gas.

As the contaminated water circulates through the degasser, the internal pressure drop and design features cause any dissolved propane to come out of solution and form gas bubbles. The separated propane gas is directed to a dedicated vent line that safely discharges it to the outside atmosphere. This prevents the gas from recirculating within the system or accumulating indoors, where it could pose a fire or health hazard.

For systems using propane refrigerant and a plate heat exchanger, it is strongly recommended to install a degasser with an appropriate gas separation and venting mechanism. Ensure the vent line is compliant with EN378 and terminates in a safe, well-ventilated outdoor location.

5.5 Frost Protection

To prevent freezing of the water circuit, the following frost protection strategy is implemented in all Clade units without internal circulating pumps: When the leaving fluid across the unit falls below 7 °C, the primary circulating pump is enabled. The pump will continue to run until the unit's flow sensor and return sensor detect that the fluid temperature has increased to 10 °C. This control logic assumes that heat is available within the external pipework from trace heating, which must be designed, installed, and maintained by the system designer/contractor.

Trace Heating Responsibility: Clade does not supply or control external trace heating. It is the designer's responsibility to ensure that pipework is correctly insulated and equipped with trace heating to maintain minimum fluid temperature during periods of low ambient conditions or unit inactivity.

When Primary Pumps Are Not Controlled by Clade:
If the primary pump(s) are controlled by an external BMS or by-site strategy, Clade cannot guarantee frost protection of the unit. In this scenario, the BMS designer must ensure that the pumps are enabled in synchronisation with the frost thresholds defined above or provide an equivalent strategy to maintain water temperatures above 7 °C. Failure to run the pumps as described may result in localised freezing of the heat exchanger and external pipework, potentially causing permanent damage. Such damage is outside the scope of Clade warranty

6 Unit Installation

6.1 General notes

6.1.1 Installation criteria:

Accessibility & Space

- Select a location that is safely and easily accessible for maintenance.
- Allow sufficient technical clearance around the unit for its overall dimensions, airflow paths (intake and exhaust), and service access (as specified in this manual).
- Ensure unobstructed airflow by avoiding siting near tall walls, in corners, beneath overhangs, or below ground level where air can stagnate or recirculate.

Structural Support

- Verify that all support points can bear the unit's weight.
- Mount the unit above ground level to facilitate condensate drainage and reduce moisture ingress.
- Align and level all bearing points accurately to prevent vibration and uneven loading.

Environmental Considerations

- Avoid flood-prone areas and account for maximum potential snow levels—ensure snow drift won't block airflow or drainage.
- Protect against debris accumulation (leaves, litter, etc.) on the air coil.
- Avoid siting near strong wind corridors that could impede or exaggerate airflow, and steer clear of nearby heat or pollution sources (e.g. chimneys, flues, vehicle exhausts).
- Prevent cold-air stratification by ensuring intake air remains free-flowing and that expelled air cannot be drawn back in.
- Consult the unit's declared sound power level (dB A) in the technical specifications. Use this to model expected sound pressure levels at neighbouring facades and property boundaries.

Utilities & Drainage

- Confirm that electrical connection runs do not exceed the maximum allowable distance specified by the manufacturer.
- Provide a dedicated condensate drainage system to prevent standing water beneath the unit.
- Ensure water from the unit can be drained properly at all times.

Security & Safety

- If there is a risk of unauthorised access (children, vandalism, wildlife), install appropriate barriers or fencing.
- This unit is designed for outdoor installation only and must not be enclosed indoors.

Final Verification

- After positioning and securing the unit, verify that all space requirements (clearances for airflow, service access, and noise dissipation) outlined in this manual are met.

Adherence to these guidelines will ensure safe installation, effective airflow, and long-term reliability of the outdoor unit.

6.1.2 Structural

- Concrete bases are preferred. .
- Check that all supports are level.
- Provide adequate condensate drainage when the unit is in heating mode, ensuring water drains safely away from traffic areas where ice may form.
- Separate the foundation from the building structure to limit noise and vibration transmission.
- Use the factory-provided holes to secure the unit to its foundation.

6.1.3 Positioning

The unit is intended for outdoor use in a permanent, flat orientation, either at ground level or on a roof. In roof installations, verify that the structure supports both the unit's weight and potential maintenance loads.

Minimising vibration:

- Install anti-vibration mounts or neoprene pads under the heat pump support.
- Use flexible joints in the water circuit to reduce transmitted vibration.
- Keep the unit perfectly level.

Key considerations:

- Required service clearances.
- Electrical connection routes.
- Water/hydraulic connection access.
- Potential increases in overall height if optional vibration dampers are used.

6.1.4 Charging lines

Where heat pumps are installed at roof level, ensure that dedicated charging lines are provided. These lines must allow for safe and efficient charging of refrigerant, either during commissioning when pre-charging is not feasible, or for subsequent top-ups during maintenance. The charging lines should be easily accessible from ground or plant level, designed to minimise pressure drop, and clearly identified to avoid confusion with other services.

6.1.5 Pressure Relief Valve Refrigerant Side

PRVs are included on the refrigerant loop within the unit.

6.1.6 Condensate

Heat pumps produce significant condensate from defrost cycles. Route condensate away from areas where frozen water could pose hazards. Use a downward-sloping drainpipe to prevent ice buildup. In colder climates, consider trace heating cables to prevent freezing.

6.1.7 Freezing Prevention

In event of pump power failing, it is essential to protect all external pipework and equipment from ice formation. Install self-regulating trace heating cables beneath the insulation on external water lines to maintain fluid temperatures above 0 °C, even when the air temperature drops to -25 °C. After commissioning, verify under worst-case conditions that inlet and outlet pipe temperatures remain above freezing. Where trace heaters alone may not suffice, use one or more of the following measures—particularly if outdoor temperatures hover around 0 °C—to avoid permanent damage (which voids warranty):

- Mix the system water with an appropriate concentration of antifreeze glycol.
- Install electric heating cables directly under the insulation on all exposed piping.
- Drain down and isolate the system during extended shutdown periods.

Select self-regulating heaters to prevent local hot spots or overheating and always ensure adequate control and monitoring of pipe temperatures.

6.2 Water quality

6.2.1 New Systems

Before commissioning any new installation, remove the circulator and thoroughly flush the entire system to clear out welding residue, waste, sealants, mineral oils, and other preservatives. Only then should you fill the system with clean, high-quality tap water.

6.2.2 Existing Systems

When replacing or adding a heat pump to an existing system, first drain and flush all pipework before installing the new unit. Flush each section separately, paying special attention to areas prone to debris build-up due to reduced flow, then refill with clean, high-quality tap water. If the water is still unsuitable, install an appropriate filter, such as a coarse (mesh) filter for larger debris or a finer tissue filter for smaller particles.

6.2.3 Water Filter

- Use a filter of ≥30 mesh at the water inlet, positioned for easy cleaning.
- Never remove the filter, as doing so invalidates the warranty.

6.2.4 Exclusions

Warranty coverage does not extend to damage caused by limescale, deposits, or impurities from the water supply, nor to issues stemming from improper system cleaning.

6.2.5 Anti-freeze Solutions

Adding antifreeze increases system pressure drop, and only inhibited (non-corrosive) glycol compatible with the circuit should be used. Do not use different glycol mixture (i.e. ethylene with propylene).

% PROPYLENE GLYCOL BY WEIGHT	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Freezing temperature (°C)	-1.6	-3.3	-5.1	-7.6	-9.6	-12.7	-16.4	-21.1	-27.9	-33.5
Safety temperature (°C)	-7.0	-8.0	-10.0	-13.0	-15.0	-18.0	-21.0	-26.0	-33.0	-39.0

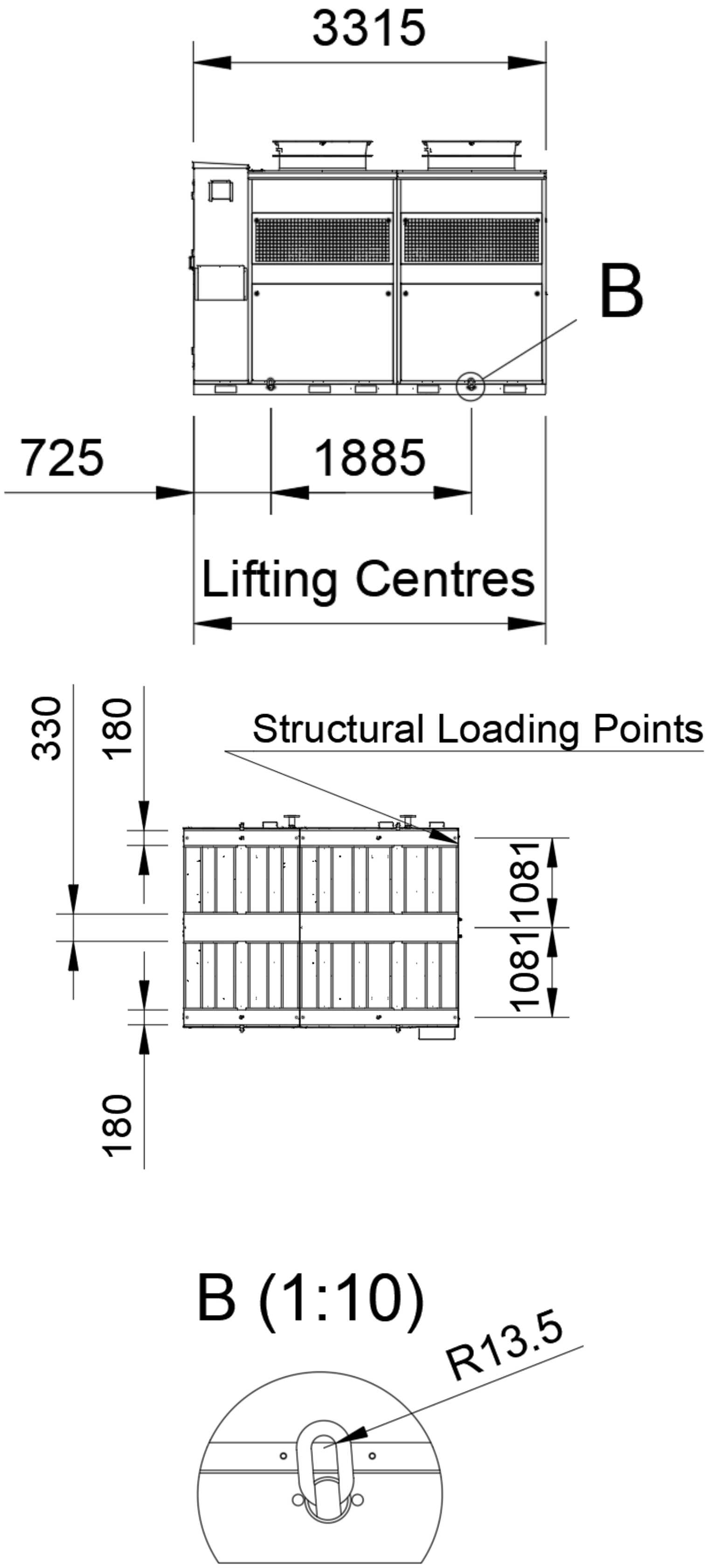
6.2.6 Minimum Water Quality Requirements for Yew Units

The water system should be maintained to BS 8552. Below is an extract of the figures the minimum performance requirements for on site analysis for closed systems.

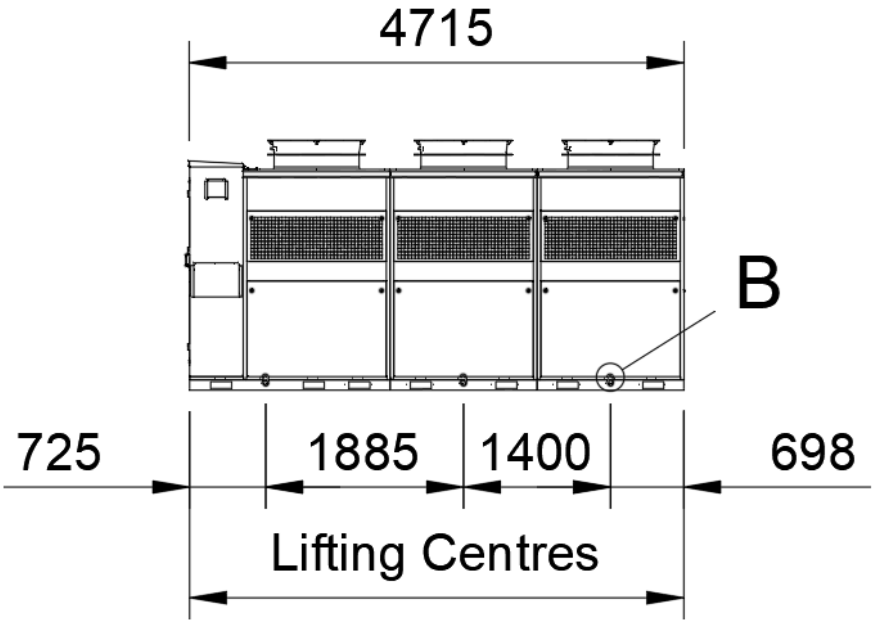
Parameter	Typical level in system	Lower detection limit of method (A, B)	Resolution of method (A, B)	Uncertainty of method (A, B)
Conductivity (µS/cm)	100 to 3,000	100	10% MV	20% MV
pH (pH units)	5 to 11	n/a	0.1	0.2
Dissolved oxygen (mg/L O_2)	0.1 to 10	0.1	0.1	0.2
Total alkalinity (mg/L $CaCO_3$)	20 to 500	10	10% MV	20% MV
Total hardness (mg/L $CaCO_3$)	20 to 500	10	10% MV	20% MV
Ammoniacal nitrogen (mg/L N)	1 to 50	0.5	0.5	1.0
Nitrite (NO_2) [c]	0 to 1,000	10	10% MV	20% MV
Molybdate (mg/L MoO_4) [c]	0 to 1,000	10	10% MV	20% MV
Sulfate (as mg/L SO_4) [c]	20 to 200	10	10% MV	20% MV
Total iron (mg/L Fe)	0 to 10	0.2	0.2	0.5
Soluble iron (mg/L Fe)	0 to 10	0.2	0.2	0.5
Total copper (mg/L Cu)	0 to 5	0.2	0.1	0.2

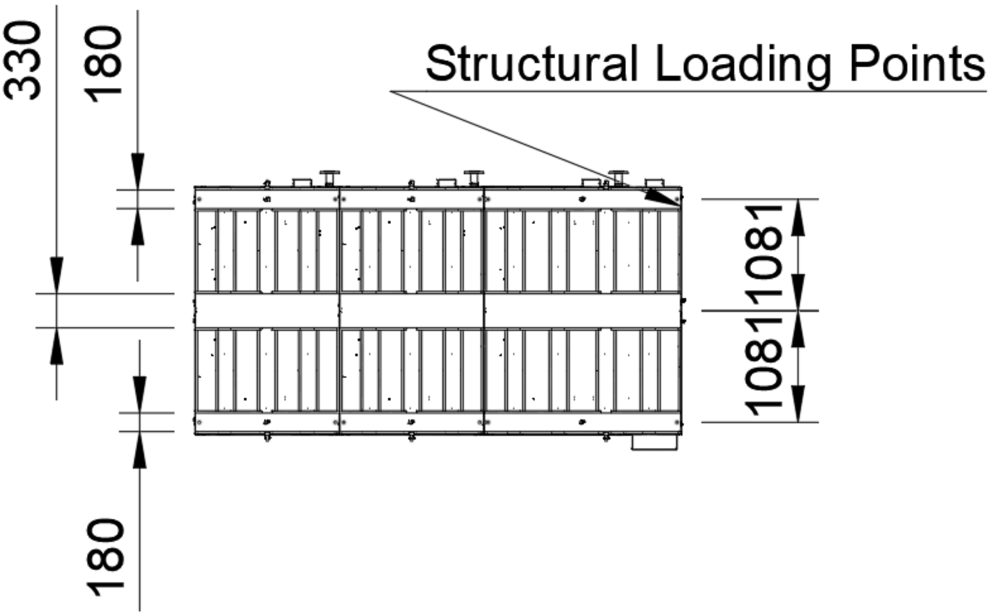
6.3 Lifting Centers and Structural Loading Points SN + LN

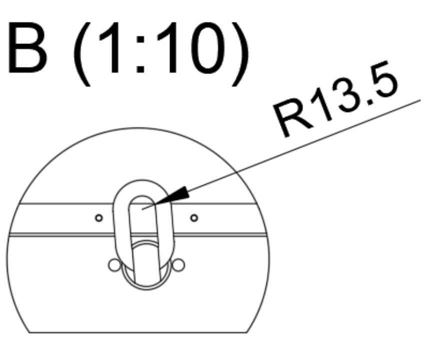
6.3.1 Yew 210/140 kW



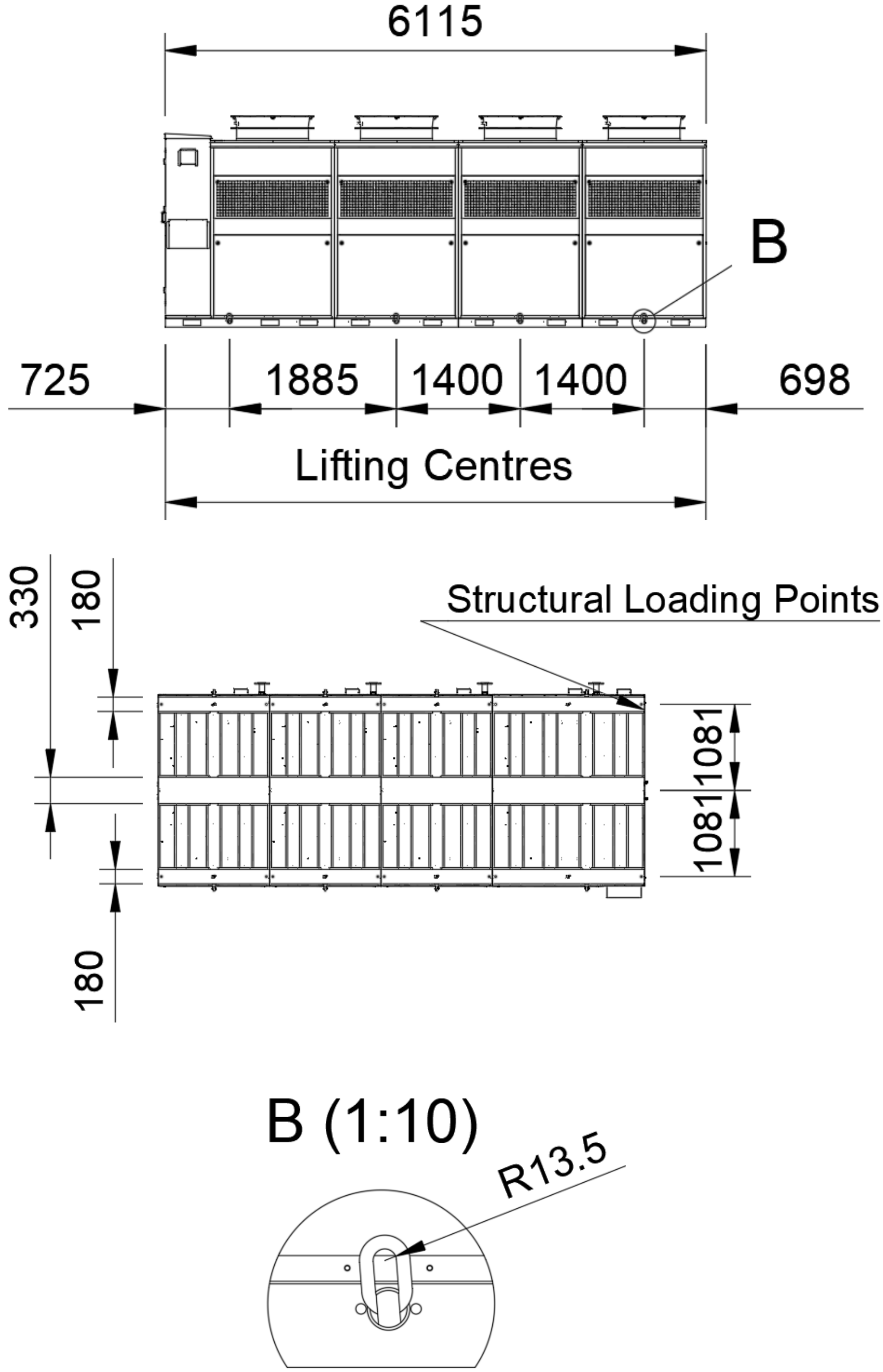
6.3.2 Yew 315/210 kW



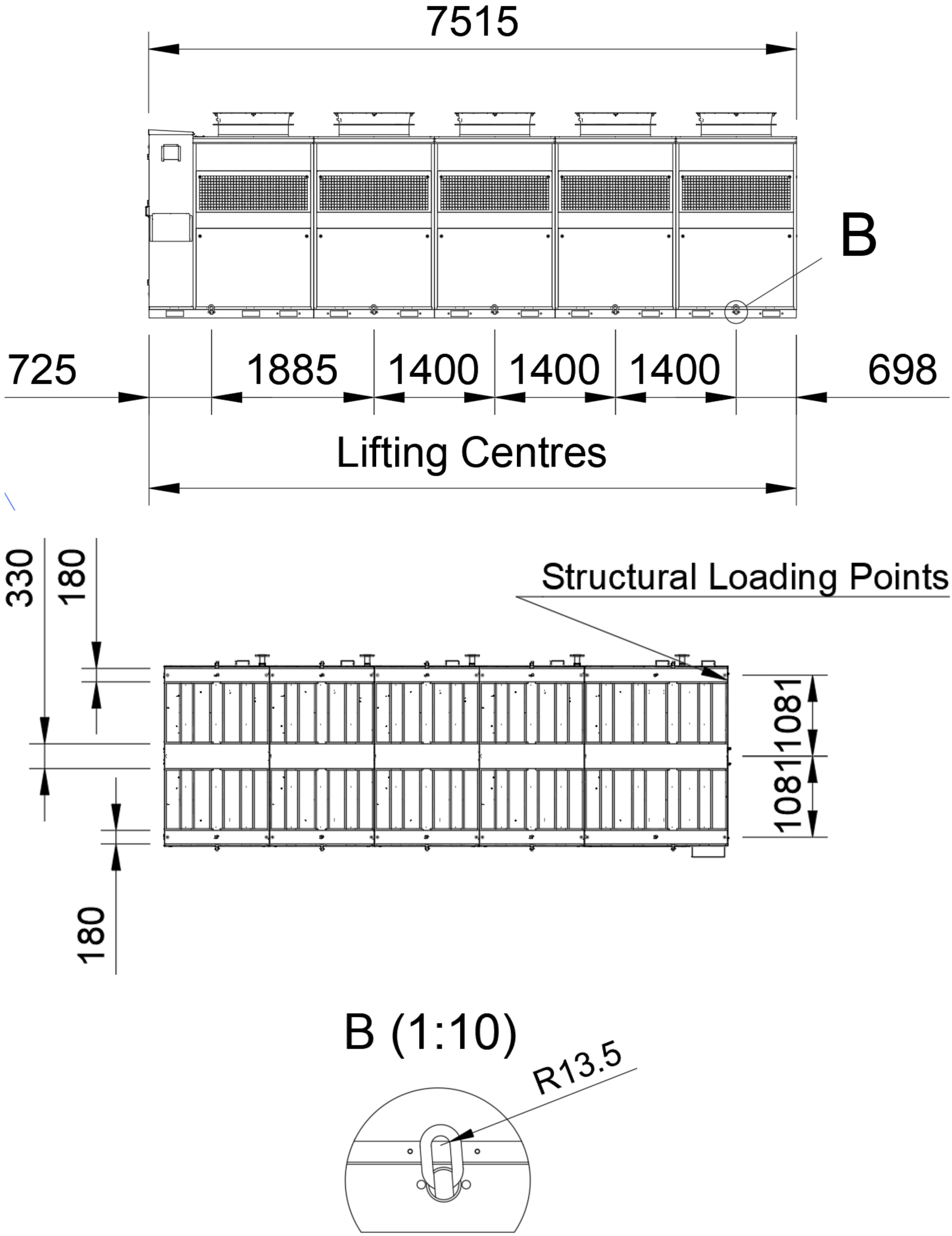




6.3.3 Yew 420/280 kW



6.3.4 Yew 525/350 kW



7 System Configuration

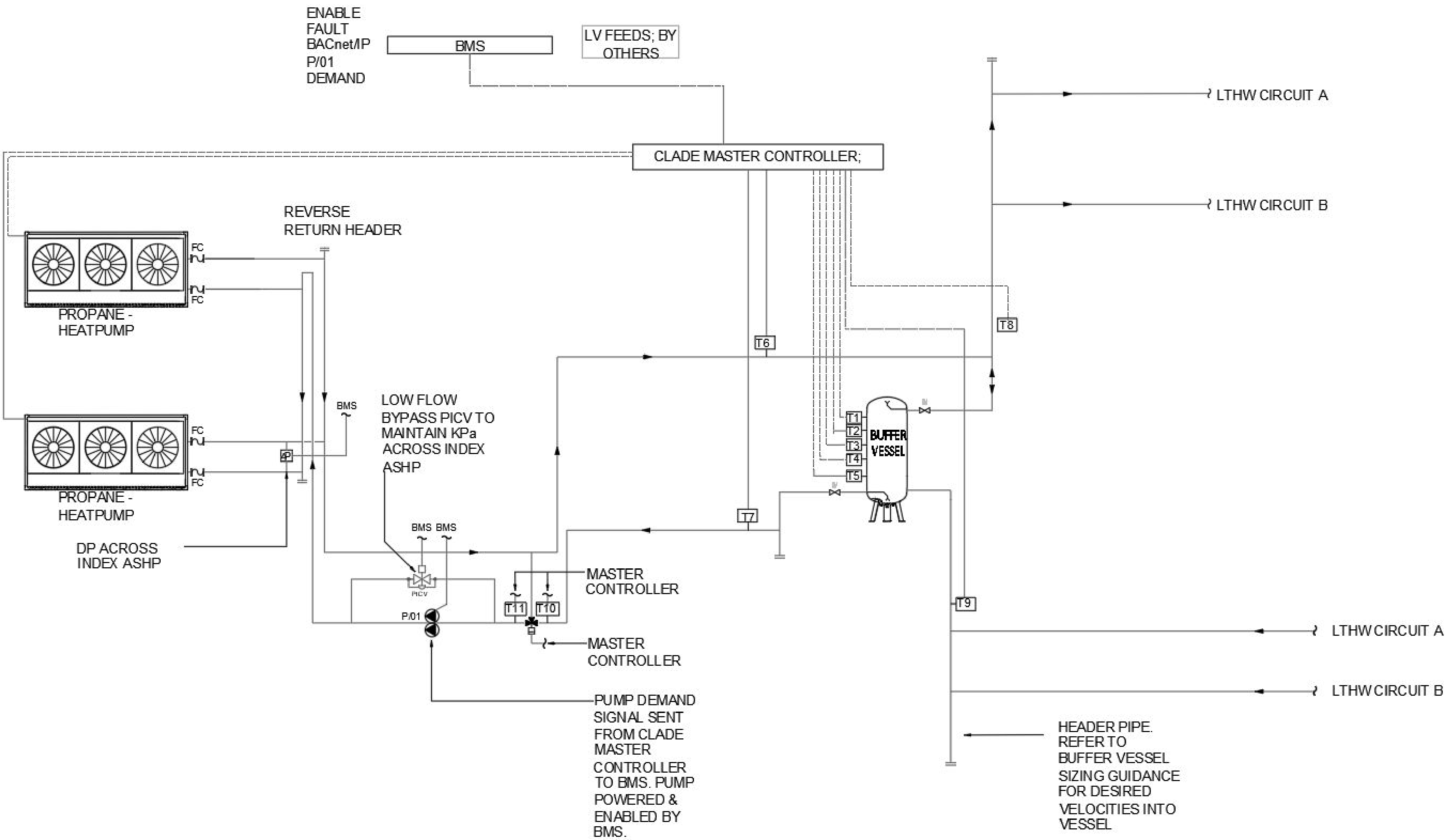
7.1 System Schematics

The unit must be installed in a configuration that allows correct hydraulic balance between primary and secondary systems. It is recommended that a buffer vessel is installed in the following configuration, allowing each system to operate independently at different flow conditions.
It is important that the secondary system is designed to operate at the correct flow and return temperatures. For detailed schematics please refer to Clade's Schematic Pack document.

The Yew can be used for heating and DHW applications and combined systems.
Buffer temperature sensors can be used to modulate heat pump output, see Section 8 for further details of controls.

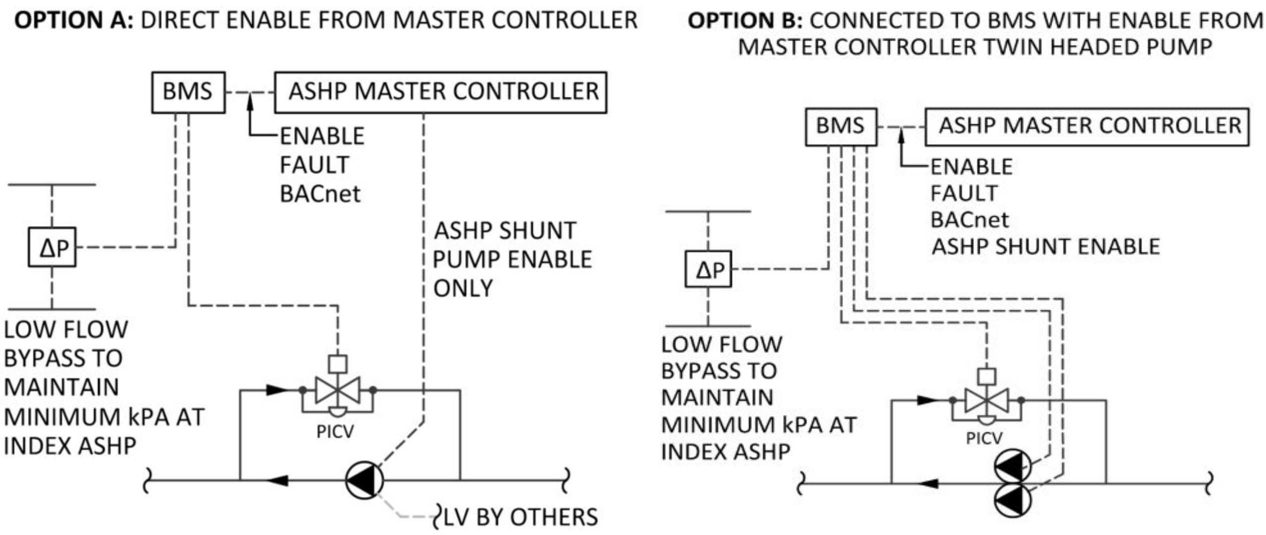
Multiple ASHP units are to be connected in a reverse return configuration to ensure equal flow distribution across all units. Even flow distribution across ASHPs enhances system efficiency and prolongs equipment lifespan.

7.1.1 General Arrangement



7.1.2 ASHP Shunt Pump and Low flow Bypass

The primary ASHP shunt pump can be controlled via an enable via the Clade controller (option A) or via the BMS (option B) with an enable from the Clade controller. Option B is mandatory for twin-head duty/standby or duty/assist pump sets, as the Clade controller provides only one enable output and cannot manage automatic head change-over:



Please note: Pump motor power circuits shall be provided, protected and wired by others; the Clade controller supplies control signals only.

The primary circulation pump shall be fitted with a dedicated low-flow bypass loop incorporating a pressure-independent control valve (PICV) sized based on the system's minimum bypass flow requirement. This configuration ensures that, under minimum pump speed and flow conditions, the hydraulically most distant air-source heat pump module still experiences the requisite ΔP and volumetric flow rate for stable operation at its lowest modulation point.

8 Controls

8.1 Individual Heat Pump Controls

Each heat pump is equipped with its own integrated, independent control system. It is designed to maintain a constant temperature differential (ΔT) between flow and return. The standard flow temperature can be set between 35 °C and 80 °C. Heating capacity and flow temperature are automatically regulated based on the return temperature, with ΔT set at 10K.

8.1.1 Off/On Switch

The Off/On switch selects the operation of the heat pump. Selecting the on position will start the heat pump. Selecting the Off position will instigate a stop sequence and stop the heat pump from running. The heat pump will continue to run for a short period until it has completed the stop sequence.

⚠ **CAUTION**

The Off/On switch should not be used in an emergency. Any emergency isolation should be carried out at the local isolator.
The inverter should be fully discharged, prior to removal of the compressor terminal box cover.

8.2 Control Type

There are three options for the method of control on the heat pump:

- Multiplex
- BMS
- Local control

These will be described in the following sections.

8.3 Multiplex Controls

8.3.1 Multiplex Control

Multiplex control should be used when the heat pump is to be controlled by a Clade Multi Heat Pump Controller. This enables the control of the heat pump by the Clade Controller which can operate multiple heat pumps.

NOTE: Should the return water temperature go above 70°C, this will initiate a high return water fault and shut down the heat pump instantly.

The controller generates a single demand signal (0–100%) and apportions it across the connected heat pumps to stage units in/out in line with instantaneous load.

Target A - Buffer energy state.

Multi-point sensing within the buffer vessel (typical probes T1–T5) is used to estimate the vessel's usable thermal charge. An internal weighting and normalisation routine produces a Buffer Charge Index. As the vessel approaches its calibrated "full" condition (accounting for stratification), the index tapers so that additional capacity is requested progressively less aggressively.

Target B – return protection.

The controller monitors either the common heat-pump return or the lowest vessel sensor (typically T5) against a protected maximum return limit. The deviation below this limit generates a Return Temperature Assist signal via a calibrated proportional slope with built in damping. This biases capacity upward when return water is comfortably below the limit, and backs capacity off as the limit is approached.

Blending of targets

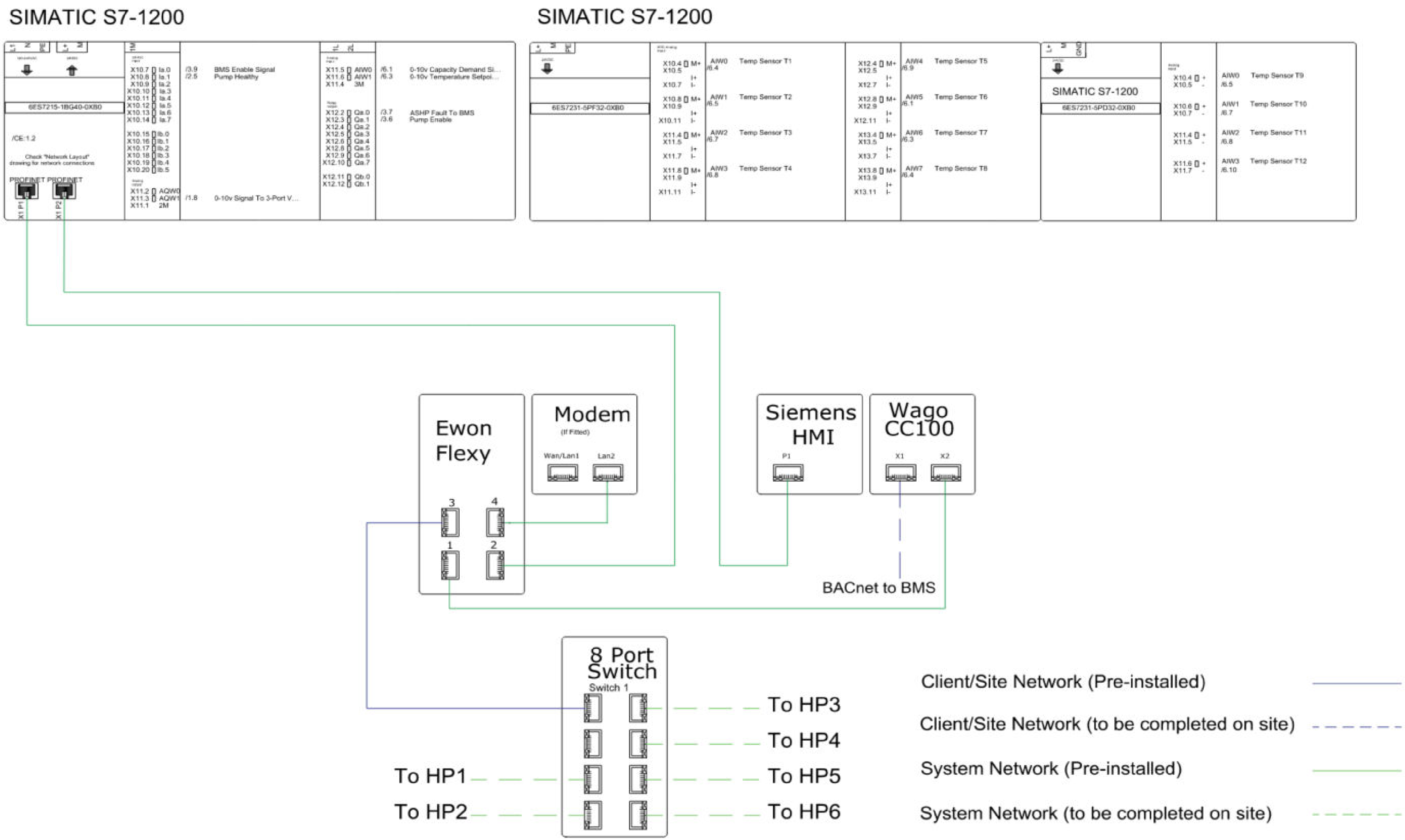
The demand signal is derived from a proprietary mapping that blends the Buffer Charge Index with the Return Temperature Assist. The resulting demand (0–100%) is divided across the available heat pumps to determine staging increments for each unit.

The strategy maintains a slight bias toward higher flow on the heat pump circuit so that hotter supply water is continuously pulled through the buffer and blended with the system return. This steadily raises the vessel's usable charge while keeping source-side returns within the safe operating envelope. If the monitored return approaches the protected limit, capacity is progressively reduced, and may be suspended, to prevent sending excessively hot water back to the heat pumps.

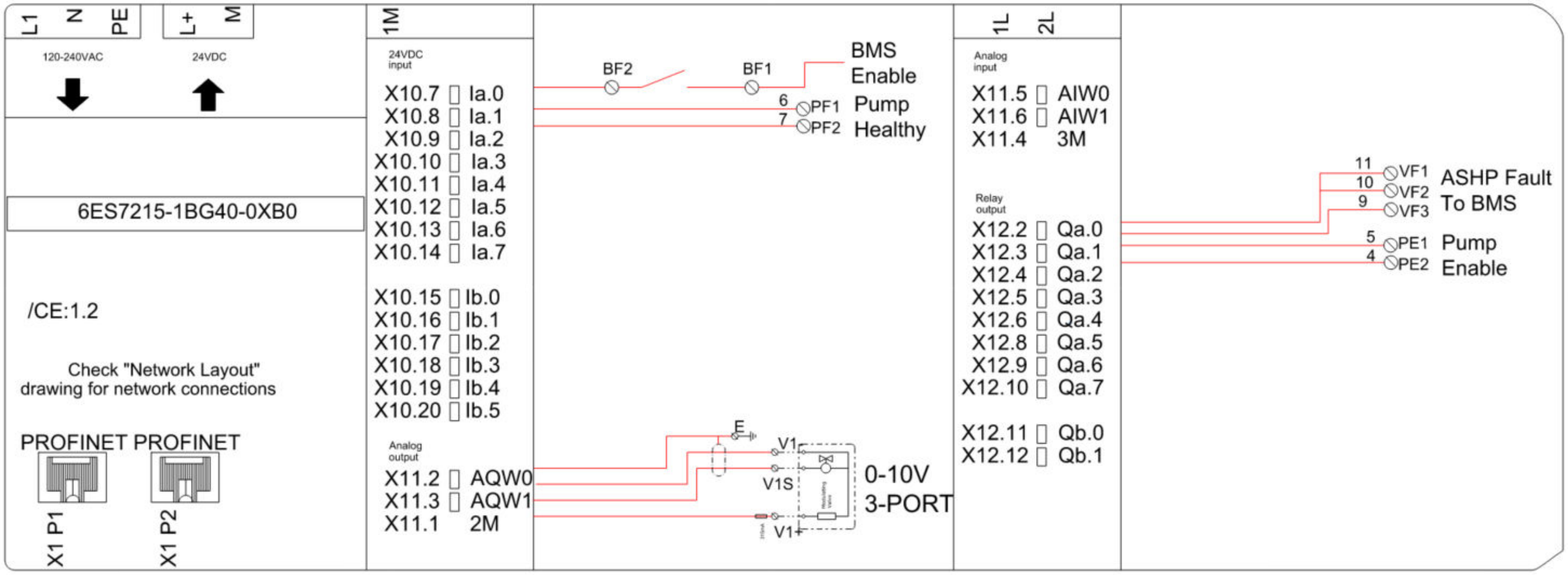
An optional, selectable weather compensation function is available within the controller. By progressively lowering the flow temperature in response to higher outdoor temperatures, this mode optimises seasonal efficiency and delivers higher coefficients of performance.

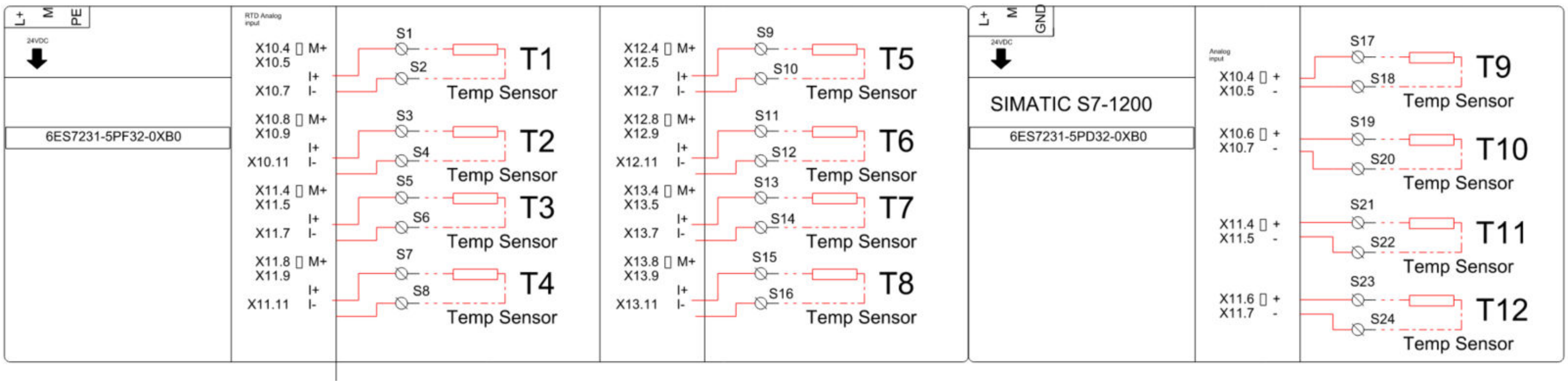
Clade Multi Heat Pump Controller will be installed as a standalone unit. The heat pumps will connect to the controller by CAT6 cable between the two units, installed by the contractor as below.

Multiplex System Network Diagram
Clade Multi Heat Pump Controller

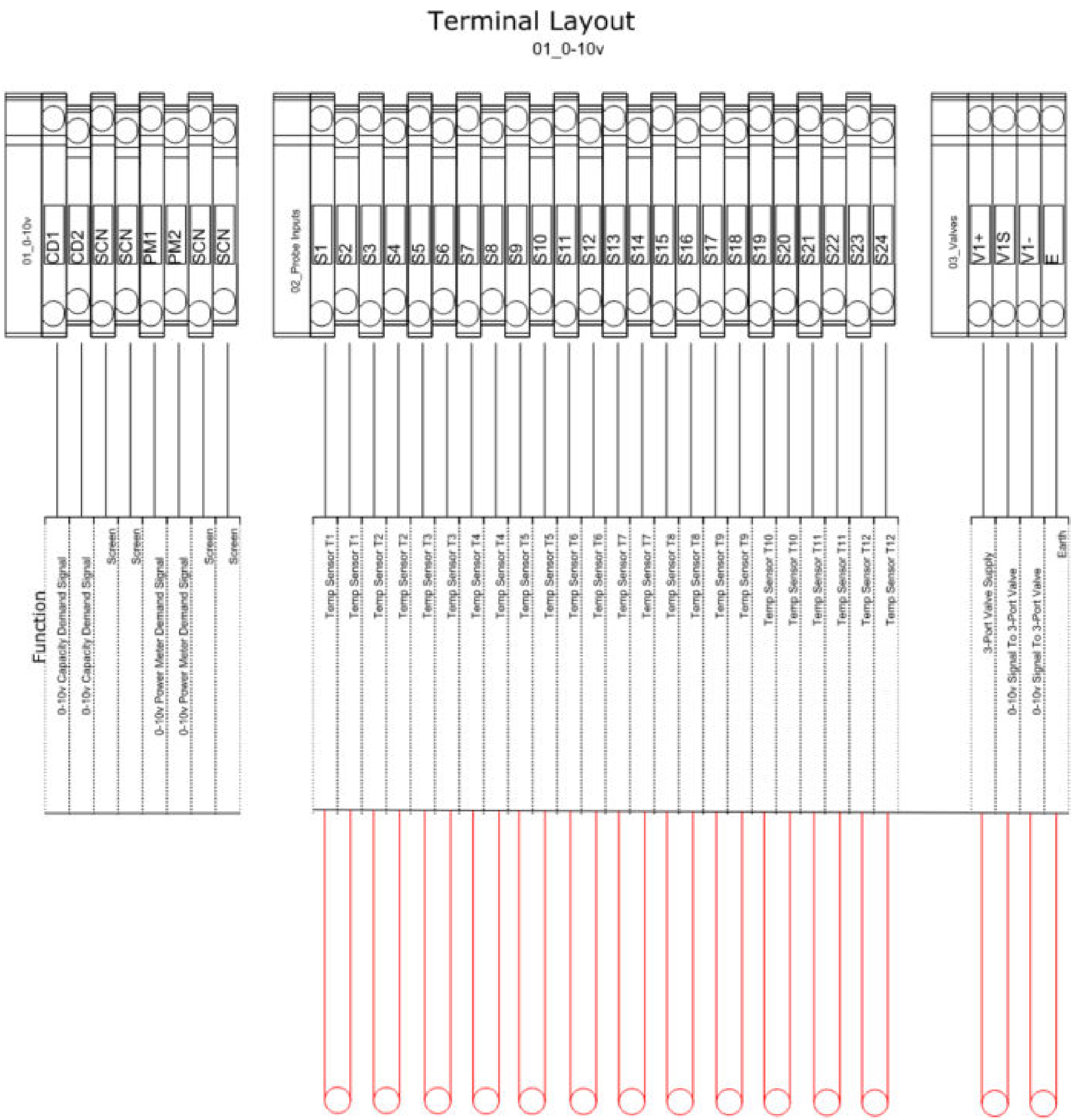


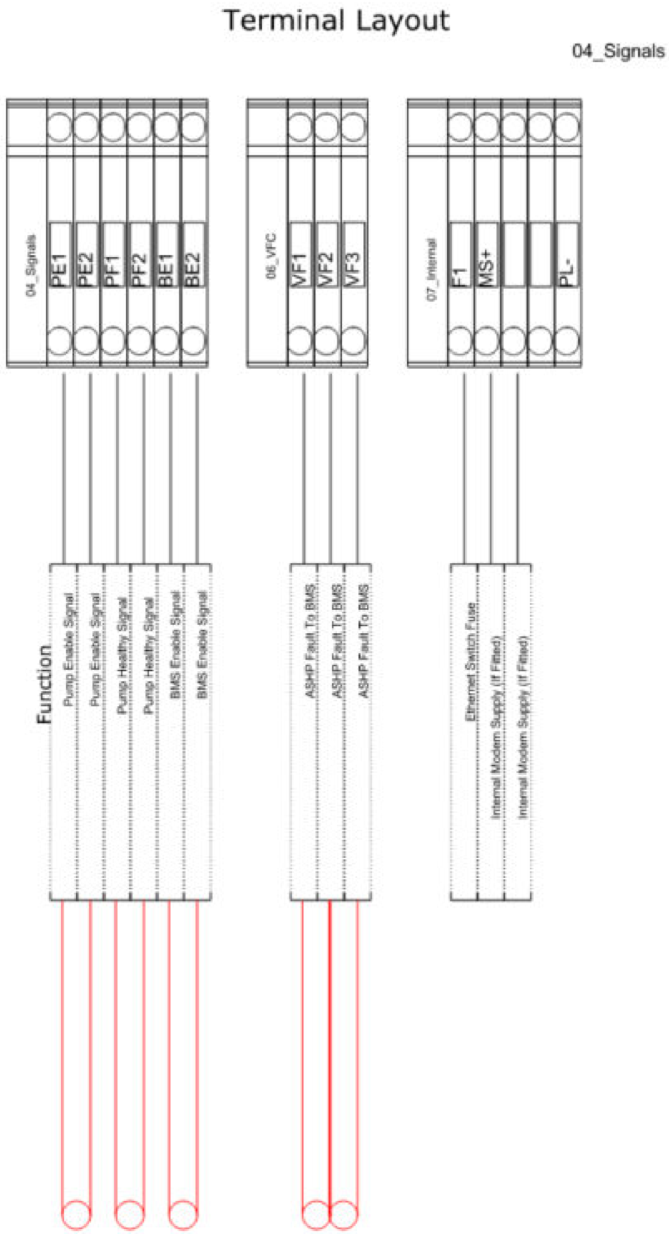
Siemens Controller





Terminal Layout





8.3.2 Heat Pump Data

A single connection to the Clade Multi Heat Pump Controller is all that is required to access all connected heat pump data. If the client wishes to monitor or log this data via their Building Management System, the Clade controller can be integrated through its BACnet interface. The table below details the data points available via the BACnet connection from the Clade controller:

Clade Multi Heat Pump Controller (large)				
Device Name		BACnet		
Inst.-No.		280028		
Obj. Type	**Object Name**	**Description**	**Unit**	**Read/Write**
BO	obj_1	System Healthy	On=Healthy / Off=Fault	Read
AO	obj_2	Ambient Temp	ºC	Read
AO	obj_3	ASHP Target Temp	ºC	Read
AO	obj_4	Heating Demand	%	Read
AO	obj_5	T1 Temp	ºC	Read
AO	obj_6	T2 Temp	ºC	Read
AO	obj_7	T3 Temp	ºC	Read
AO	obj_8	T4 Temp	ºC	Read
AO	obj_9	T5 Temp	ºC	Read
AO	obj_10	T6 Temp	ºC	Read
AO	obj_11	T7 Temp	ºC	Read
AO	obj_12	T8 Temp	ºC	Read
AO	obj_13	T9 Temp	ºC	Read
AO	obj_14	T10 Temp	ºC	Read
AO	obj_15	T11 Temp	ºC	Read
AO	obj_16	T12 Temp	ºC	Read
AO	obj_17	HP1 Status	*See Status Table	Read
AO	obj_18	HP1 P11 Flow Temp	ºC	Read
AO	obj_19	HP1 P12 Return Temp	ºC	Read
AO	obj_20	HP2 Status	*See Status Table	Read
AO	obj_21	HP2 P11 Flow Temp	ºC	Read
AO	obj_22	HP2 P12 Return Temp	ºC	Read
AO	obj_23	HP3 Status	*See Status Table	Read
AO	obj_24	HP3 P11 Flow Temp	ºC	Read
AO	obj_25	HP3 P12 Return Temp	ºC	Read
AO	obj_26	HP4 Status	*See Status Table	Read
AO	obj_27	HP4 P11 Flow Temp	ºC	Read
AO	obj_28	HP4 P12 Return Temp	ºC	Read
AO	obj_29	HP5 Status	*See Status Table	Read
AO	obj_30	HP5 P11 Flow Temp	ºC	Read
AO	obj_31	HP5 P12 Return Temp	ºC	Read
AO	obj_32	HP6 Status	*See Status Table	Read
AO	obj_33	HP6 P11 Flow Temp	ºC	Read
AO	obj_34	HP6 P12 Return Temp	ºC	Read
AO	obj_35	HP7 Status	*See Status Table	Read
AO	obj_36	HP7 P11 Flow Temp	ºC	Read
AO	obj_37	HP7 P12 Return Temp	ºC	Read
AO	obj_38	HP8 Status	*See Status Table	Read
AO	obj_39	HP8 P11 Flow Temp	ºC	Read
AO	obj_40	HP8 P12 Return Temp	ºC	Read
***Status Table**				
0=Off				
1=Heating				
2=Defrost				
3=Satisfied				
4=Initialising				
5=Fault				
6=Not Present				
7=Offline				

8.4 BMS Control

This control type must be selected when it is intended to control the heat pump from an independent BMS.

Selecting BMS will allow the heat pump to operate on a 0-10V input signal from the BMS, overriding the local return temperature control.

NOTE: Should the return water temperature go above 70°C, this will initiate a high return water fault and cause the heat pump to eventually shut off.

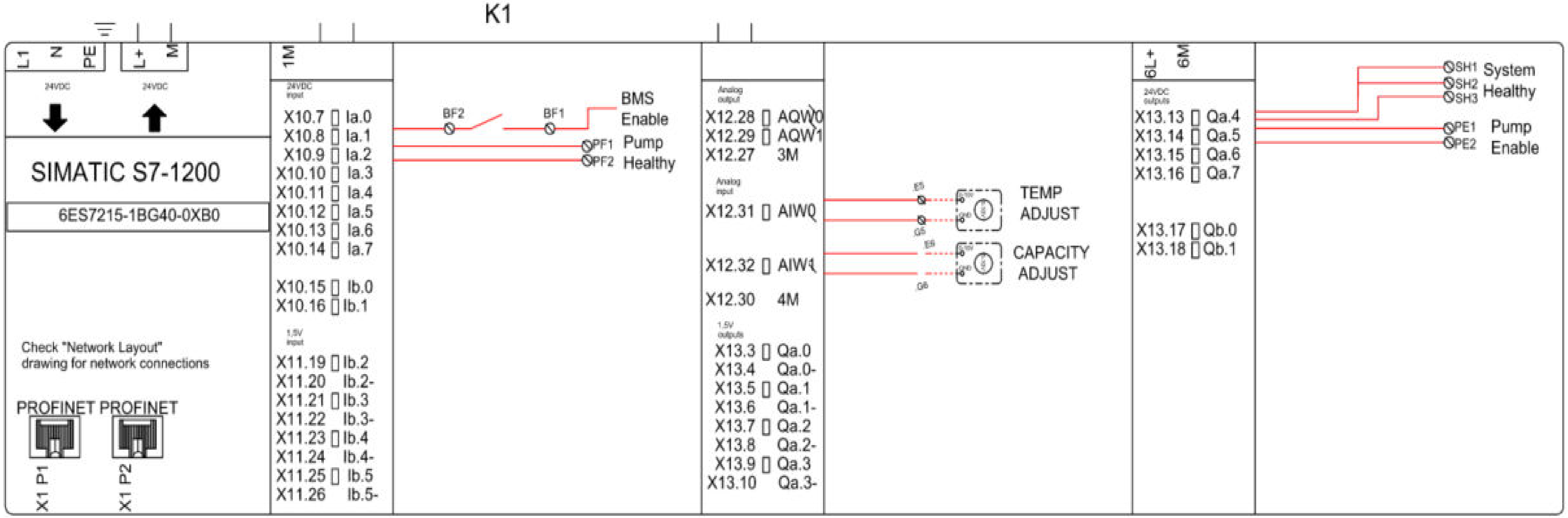
A 0-10V signal allows the heat pump to be controlled to a desired capacity (QH) based on a percentage of maximum capacity.

NOTE: Maximum capacity will alter dependent on ambient temperatures. Therefore, the minimum QH at 2V (50%) at -5ºC will be less than the minimum capacity during times of warmer ambient conditions. When sizing and selecting buffer vessels the low demands of the building need to be considered in conjunction with minimum turn capacity of the heat pump. Published capacities at 7ºC ambient temperatures are deemed as maximum capacities.

The table below denotes the controls associated with a 0-10V signal:

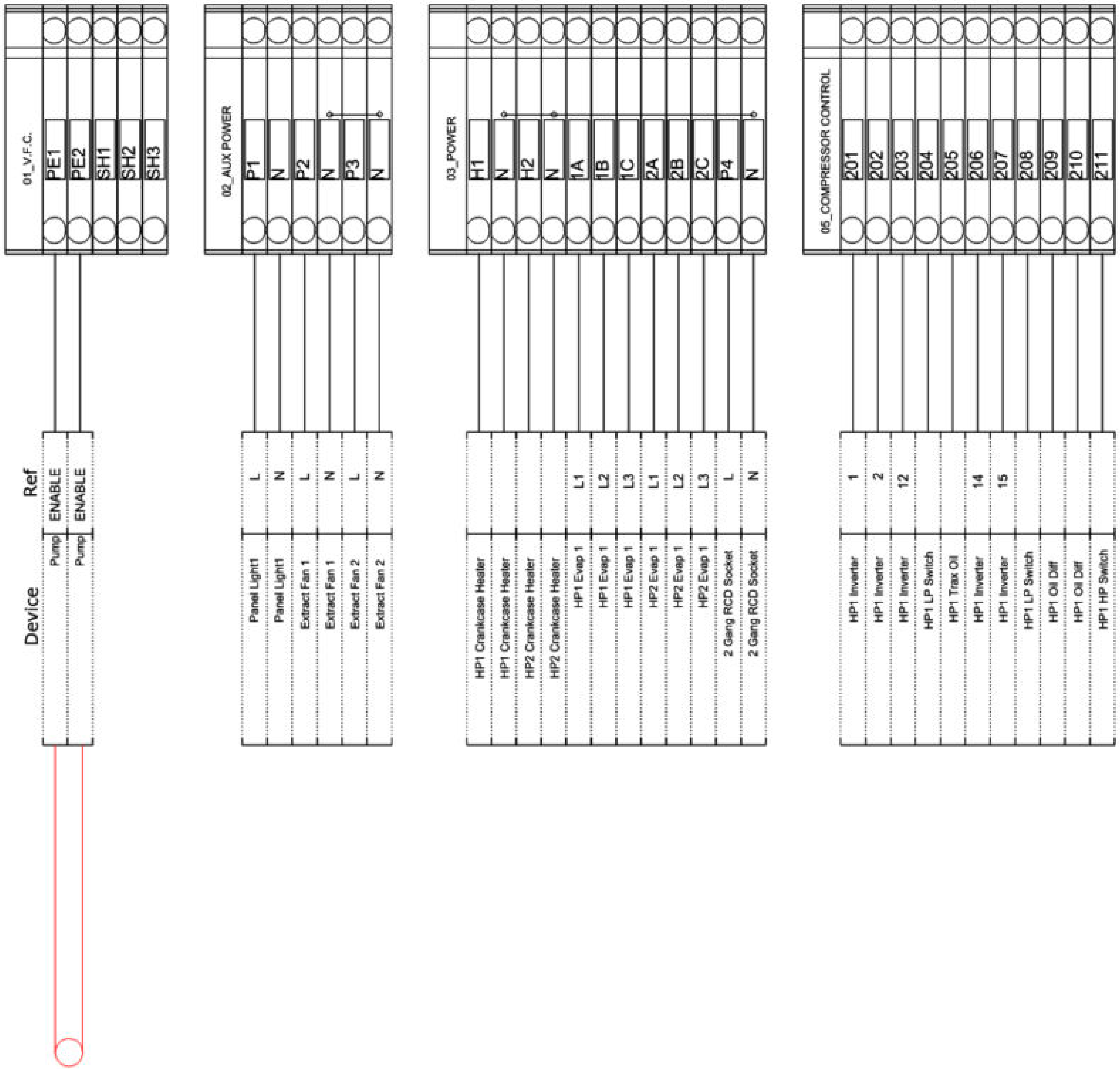
Voltage Signal	Status
0-0.9	Fault
1-1.9	Off
2	Capacity Control (50-100%)
3	
4	
5	
6	
7	
8	
9	
10	

NOTE: The function will not be available when operating as a multiplex installation using the Clade controller


K1
L1 N PE L+ M
24VDC
24VDC
SIMATIC S7-1200
6ES7215-1BG40-0XB0
Check "Network Layout" drawing for network connections
PROFINET PROFINET
X1 P1
X1 P2
1M
X10.7 Ia.0
X10.8 Ia.1
X10.9 Ia.2
X10.10 Ia.3
X10.11 Ia.4
X10.12 Ia.5
X10.13 Ia.6
X10.14 Ia.7
X10.15 Ib.0
X10.16 Ib.1
X11.19 Ib.2
X11.20 Ib.2-
X11.21 Ib.3
X11.22 Ib.3-
X11.23 Ib.4
X11.24 Ib.4-
X11.25 Ib.5
X11.26 Ib.5-
BF2
BF1
BMS Enable
PF1
PF2
Pump Healthy
X12.28 AQW0
X12.29 AQW1
X12.27 3M
X12.31 AIW0
X12.32 AIW1
X12.30 4M
X13.3 Qa.0
X13.4 Qa.0-
X13.5 Qa.1
X13.6 Qa.1-
X13.7 Qa.2
X13.8 Qa.2-
X13.9 Qa.3
X13.10 Qa.3-
TEMP ADJUST
CAPACITY ADJUST
6L+ 6M
X13.13 Qa.4
X13.14 Qa.5
X13.15 Qa.6
X13.16 Qa.7
X13.17 Qb.0
X13.18 Qb.1
SH1
SH2
SH3
System Healthy
PE1
PE2
Pump Enable

Terminal Layout

01_V.F.C.



Terminal Layout

05_COMPRESSOR CONTROL

05_COMPRESSOR CONTROL

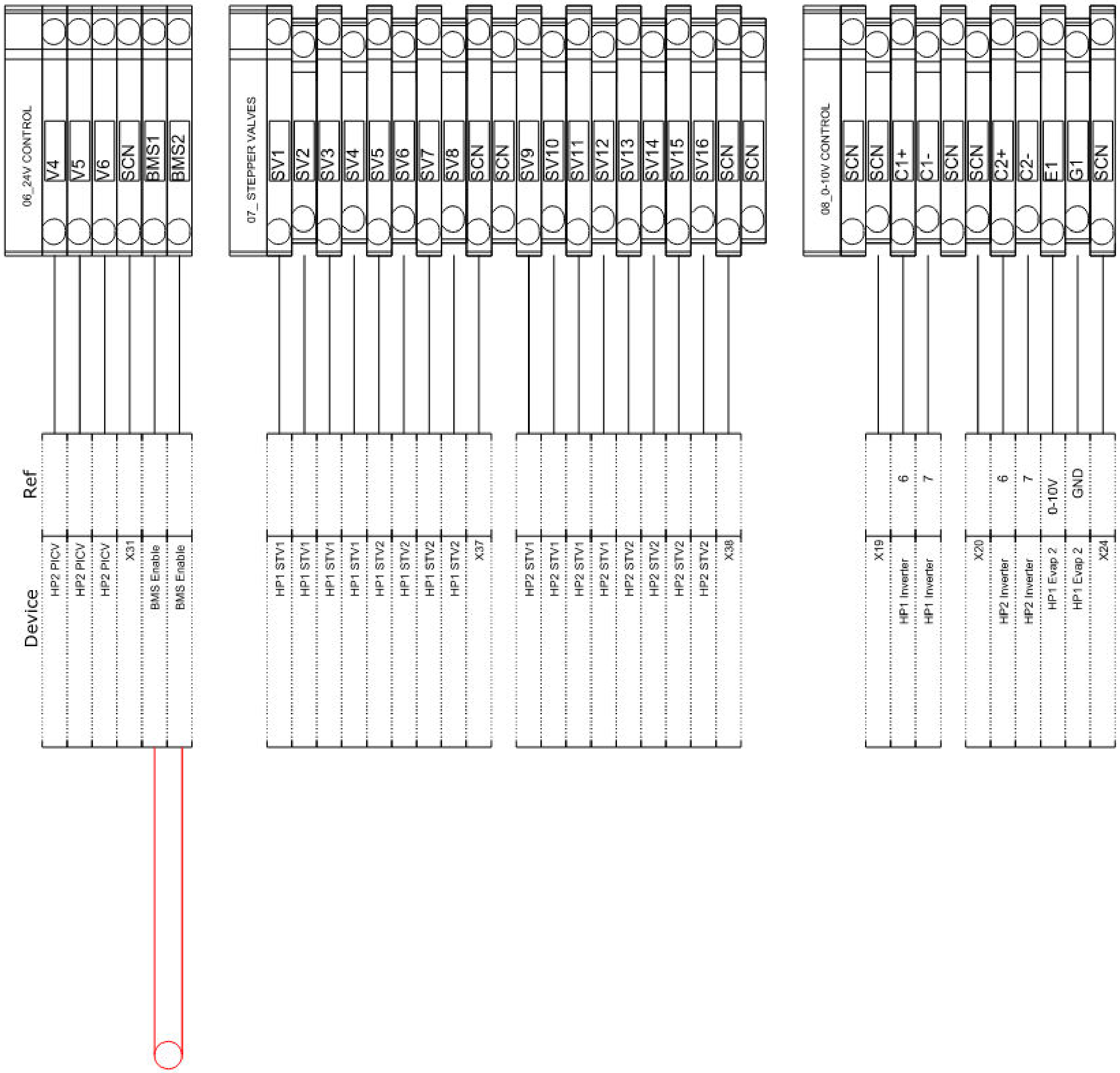
	Ref	Device
212		HP1
213		HP1
214		HP1 Oil Diff
221	1	HP2 Inverter
222	2	HP2 Inverter
223	12	HP2 Inverter
224		HP2 LP Switch
225		HP2 Trax Oil
226	14	HP2 Inverter
227	15	HP2 Inverter
228		HP2 LP Switch
229		HP2 Oil Diff
230		HP2 Oil Diff
231		HP2 HP Switch
232		HP2
233		HP2
234		HP2 Oil Diff

06_24V CONTROL

	Ref	Device
LD1		Leak Detector
LD2		Leak Detector
LD3		Leak Detector
LD4	2	LDR2
LD5		Remote Beacon Sounder
FF1	COM	HP1 Evap 1
FF2	NO	HP1 Evap 2
FF3	COM	HP2 Evap 1
FF4	NO	HP2 Evap 2
FR1		HP1 Evap 1
FR2		HP1 Evap 1
FR3		HP1 Evap 2
FR4		HP1 Evap 2
FR5		HP2 Evap 1
FR6		HP2 Evap 1
FR7		HP2 Evap 2
FR8		HP2 Evap 2
PF1	COM	Pump
PF2	NO	Pump
V1		HP1 PICV
V2		HP1 PICV
V3		HP1 PICV
SCN		X30

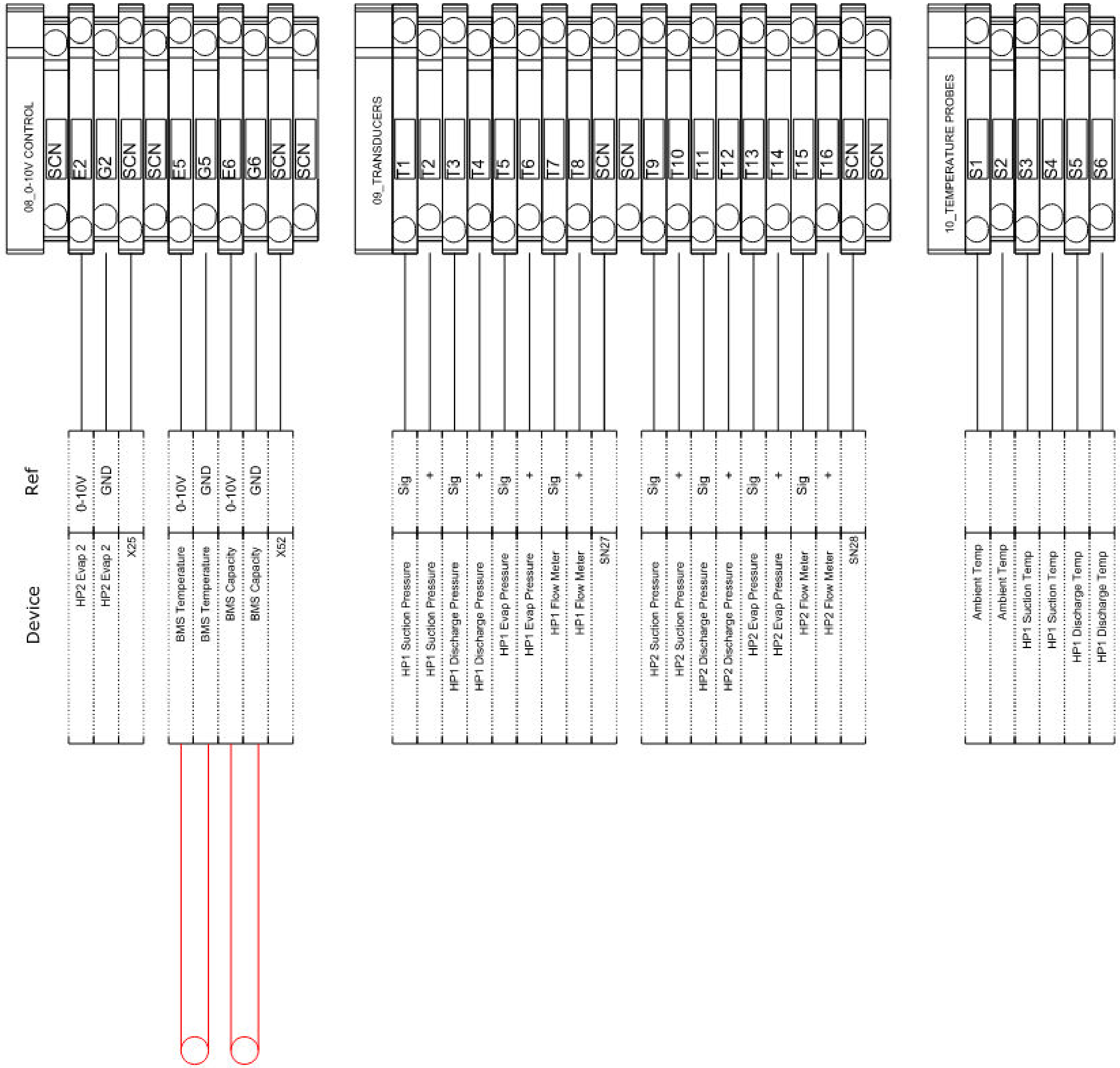
Terminal Layout

06_24V CONTROL



Terminal Layout

08_0-10V CONTROL



8.5 Local control

Selecting LOCAL control means the heat pump will control without any external control signals. This should be selected when there is no BMS 0-10V capacity control input or Clade Multi Heat Pump Controller input. Selecting this control type means the unit will operate on return temperature control.

Flow Temperature and Return Temperature Control

When the return water temperature rises into the designated delta-temperature (ΔT) range, the heat pump automatically reduces its heat output. This reduction lowers the pump's flow rate while still maintaining the desired flow temperature. Conversely, if the return water temperature drops, the heat pump's heating capacity increases, thereby increasing the flow rate to maintain a constant flow temperature.

High Return Water Condition

If the return water temperature increases further, the system will trigger a high return water stop condition. In this state, the heat pump switches to a 'Satisfied' status, indicating that the required heating has been met. The heat pump will resume its normal 'Heating' mode once the return water temperature drops enough so that the temperature difference exceeds the reactivation threshold.

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