



CLADE

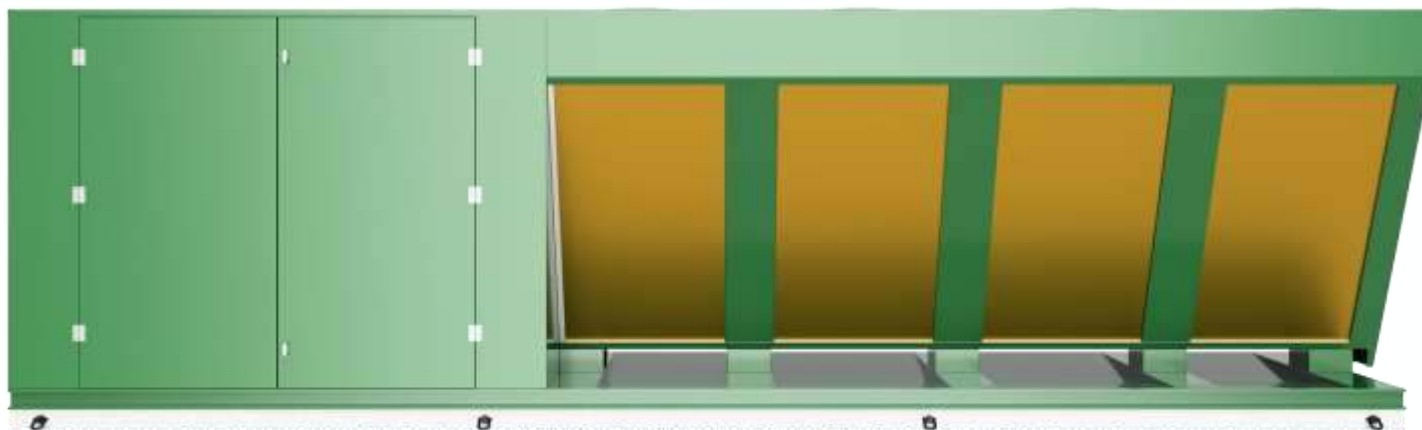
OAK 400kW HEAT PUMP //

Sept 22 //



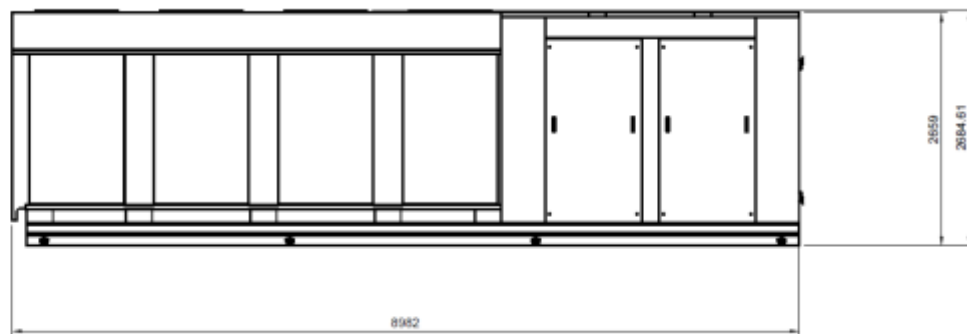
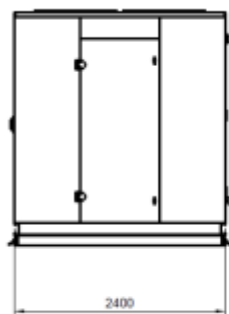
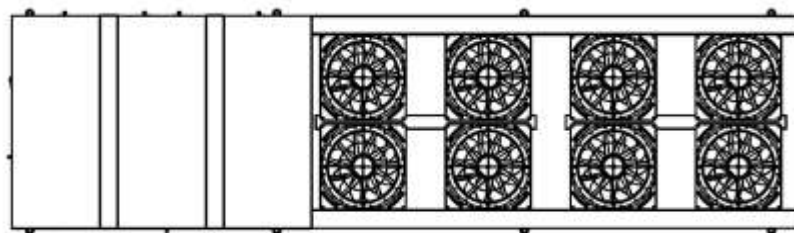
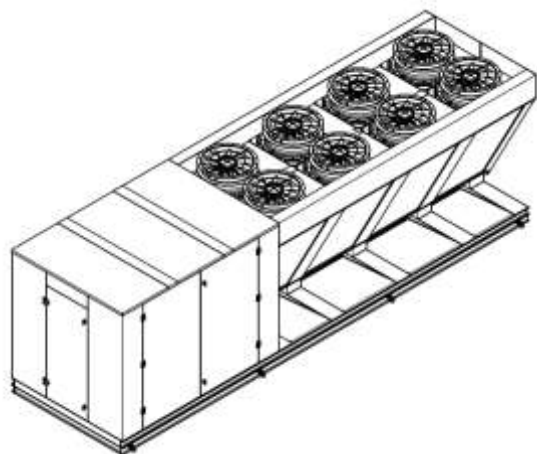
THE CLADE OAK 400kW //

Single unit combining; compressor station, controls, gas cooler and water side pump, evaporator section





DIMENSIONAL INFORMATION //





TECHNICAL INFORMATION //

OAK 400kW //

Clade Oak ASHP		Oak -400Kw ASHP
Nominal conditions: Water side		flow 45c to 85c Return temperature <35°C
Nominal conditions: CO ₂ side		Ambient air temperature +3°C (85% RH) and -9°C evaporation
Compressor Manufacturer		Dorin
Compressor Heating Qty	Pcs.	3
Compressor Paralell Qty	Pcs.	1
Compressor Power @ Design total	kW	149.4
Evaporator fans Power at design	kW	11.2
Total	kW	163
Heat Pump Design Run Amps DRA	A	281.75
Ancillary Controls Amps	A	4
Total Amps	A	285.75
Variable speed drive (VSD)	Pcs.	2
Refrigerant charge (CO ₂)	kg	250
Electrical supply	-	3- 400V 50 HZ
Housing Weight (empty)	kg	2,957
Housing Weight (operational)	kg	3,082
Load Cell A Weight (empty)	kg	2,031
Load Cell A Weight (operational)	kg	2,156
Load Cell B Weight (empty)	kg	N/A
Load Cell B Weight (operational)	kg	N/A
Sound Power	dB(A)	62
Connections waterside flow	DN	67mm Copper
Connections waterside Return	DN	67mm Copper
Connections waterside Pressure Rating	PN	10
Waterside Burst Disk	PN	10
Communication protocol	-	MODBUS/BACNET
IP-Class	-	IP54
Evaporators Type		V Block
No. evaporators	Pcs.	8
Fin Material	-	AL/MG
Defrost Type	-	Cool Gas CO ₂
Defrost medium	-	CO ₂
Defrost design/condition	-	> +6c ambient Off Cycle / < +6c ambient Cool Gas
Fan regulation	-	0-10v
Colour	-	BS48 – 000A05 Textured Grey





HEAT PUMP PERFORMANCE //

Noise Performance Characteristics					
Model name	Nameplate output (kW)	Output Temp (°C)	Noise Data db(A)		
			Sound Power	Sound Pressure @ 1m	Sound Pressure @ 10m
Oak 400Kw	400	65	87	61	51
		70	87	61	51
		75	88	62	52
		80	88	62	52

Clade Heat Pump Performance Characteristics																													
Model name	Nameplate output (kW)	Output Temp (°C)	Return Temp (°C)	SCOP	SPF	-10°C External			-5°C External			0°C External			5°C External			10°C External			15°C External			20°C External			25°C External		
						QH (kW)	PI (kW)	COPH (-)	QH (kW)	PI (kW)	COPH (-)	QH (kW)	PI (kW)	COPH (-)	QH (kW)	PI (kW)	COPH (-)	QH (kW)	PI (kW)	COPH (-)	QH (kW)	PI (kW)	COPH (-)	QH (kW)	PI (kW)	COPH (-)	QH (kW)	PI (kW)	COPH (-)
Oak 400kW	400	55	35	2.8	2.9	320	155	2.06	400	175	2.29	440	171	2.57	480	168	2.86	480	153	3.13	480	142	3.39	480	132	3.63	480	122	3.95
		60	35	2.8	2.9	320	155	2.06	400	175	2.29	440	171	2.57	480	168	2.86	480	153	3.13	480	142	3.39	480	132	3.63	480	122	3.95
		65	35	2.8	2.9	320	155	2.06	400	175	2.29	440	171	2.57	480	168	2.86	480	153	3.13	480	142	3.39	480	132	3.63	480	122	3.95
		70	35	2.8	2.9	320	159	2.01	400	182	2.2	440	176	2.5	480	171	2.8	480	157	3.05	480	145	3.3	480	135	3.55	480	123	3.9
		75	35	2.8	2.9	320	160	2	400	182	2.2	440	176	2.5	480	171	2.8	480	157	3.05	480	145	3.3	480	135	3.55	480	123	3.9
		80	35	2.8	2.9	320	160	2	400	182	2.2	440	176	2.5	480	171	2.8	480	157	3.05	480	145	3.3	480	135	3.55	480	123	3.9

Clade Heat Pump Performance Characteristics																													
Model name	Nameplate output (kW)	Output Temp (°C)	Return Temp (°C)	SCOP	SPF	-10°C External			-5°C External			0°C External			5°C External			10°C External			15°C External			20°C External			25°C External		
						QH (kW)	PI (kW)	COPH (-)	QH (kW)	PI (kW)	COPH (-)	QH (kW)	PI (kW)	COPH (-)	QH (kW)	PI (kW)	COPH (-)	QH (kW)	PI (kW)	COPH (-)	QH (kW)	PI (kW)	COPH (-)	QH (kW)	PI (kW)	COPH (-)	QH (kW)	PI (kW)	COPH (-)
Oak 400kW	400	55	30	3	3.1	320	144	2.22	400	161	2.48	440	158	2.78	480	155	3.09	480	142	3.39	480	131	3.66	480	122	3.93	480	112	4.27
		60	30	3	3.1	320	144	2.22	400	161	2.48	440	158	2.78	480	155	3.09	480	142	3.39	480	131	3.66	480	122	3.93	480	112	4.27
		65	30	3	3.1	320	144	2.22	400	161	2.48	440	158	2.78	480	155	3.09	480	142	3.39	480	131	3.66	480	122	3.93	480	112	4.27
		70	30	3	3.1	320	149	2.15	400	167	2.4	440	163	2.7	480	160	3	480	145	3.3	480	133	3.6	480	125	3.85	480	114	4.2
		75	30	3	3.1	320	149	2.15	400	167	2.4	440	163	2.7	480	160	3	480	145	3.3	480	133	3.6	480	125	3.85	480	114	4.2
		80	30	3	3.1	320	149	2.15	400	167	2.4	440	163	2.7	480	160	3	480	145	3.3	480	133	3.6	480	125	3.85	480	114	4.2



BUILDING CONNECTIONS //

POWER

3 phase.

Connection box mounted in position shown.

Isolation at control panel only.

Installer to provide local isolator external to heat pump.

HEATING

Supplied with primary pump with 14m spare head.

Flow and return located in position shown.

PN 10 Flanged steel connections with butterfly valve.

CONDENSATE

Condensate from the evaporator will drain centrally from the base of the unit.

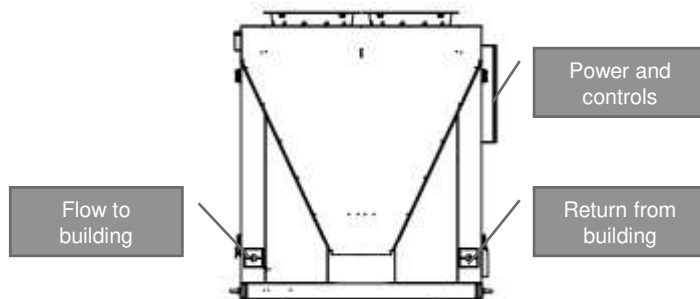
It is recommended that a gully be installed below the heat pump and lead to a soak away.

CONTROLS

The heat pump has self contained controls that manage its operation and the primary pump.

Alarms

- ❖ Hardwired shut down signal for fire alarm
- ❖ CO₂ detection
- ❖ Other fault
- ❖ High return water temperature.



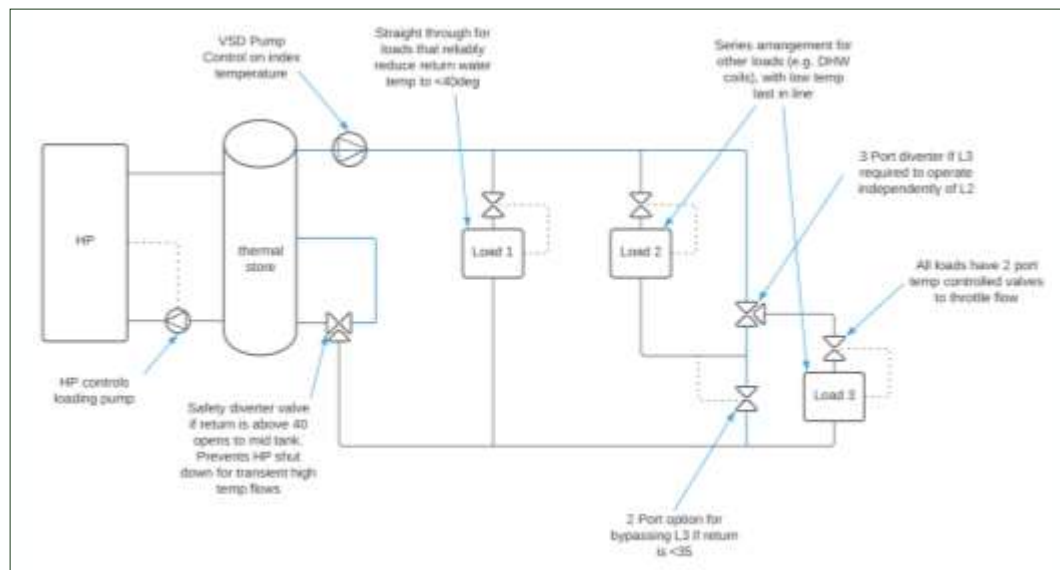
SYSTEM DESIGN

Here are our recommendations for good system design, however each building and application is different and so the system should be designed to meet the specific needs of the building.

The designer should aim to minimise the return water temperature to the heat pump in order to generate the highest COP possible.

Clade offers engineering support if required.

- ❖ Series arrangement of heat load by temperature with the lowest last
- ❖ Proper sizing of terminal units for high DT
- ❖ High quality two port control on terminal units to prevent high temperature bypass
- ❖ VSD pumping controlled on temperature at the index point
- ❖ Zero bypass on the system
- ❖ Proper commissioning of systems
- ❖ Data and analytics for continuous improvement
- ❖ Primary control on the return water temperature
- ❖ Thermal store to even out temperature variations





LEEDS MANUFACTURING CENTRE //



- UK based
- 35 years of engineering experience
- Leeds manufacturing division
- Committed to sustainable business and sustainable products
- Investing in people, diversity & inclusion
- Non leveraged, owner operated



ACCREDITATIONS
 ISO 9001:2015
 ISO 14001:2015
 OHSAS ISO 18001:2007



CERTIFICATIONS
 Altius Assured Vendor Award
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