



CLADE

GUIDE TO COMMISSIONING

07 August 2024//



INTRODUCTION //

Thank you for purchasing a Clade heat pump. In order to make sure you get the best from your heat pump we will commission and work with you to achieve success.

This document sets out the pre commissioning, commissioning and acceptance procedures and requirements for your heat pump. It should be used to prepare for and manage the process of successful commissioning.

Your specific project may have particular requirements in addition to this document.

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1. COMMISSIONING AND ACCEPTANCE PHASES //

Phase		Overview	Responsible
Phase 1	Pre commissioning	Pre commissioning check list	Contractor
		Post transport heat pump checks	Clade
Phase 2	Commissioning	Initial System Checks: - Check all mechanical and electrical connections. - Ensure the system is free of leaks and properly and charged with refrigerant. Control System Testing: - Test control sequences and safety interlocks. - Verify sensor calibrations and data accuracy. Functional Testing: - Test the heat pump under various load conditions. - Verify temperature setpoints and system response.	Clade
Phase 3	Proving functionality and performance	Complete the acceptance tests and provide results	Clade
Phase 4	Training and handover	Documentation: - Compile all commissioning reports, test results, and as-built drawings. - Provide operation and maintenance manuals. Training: - Conduct training sessions for maintenance staff on system operation and troubleshooting. - Provide hands-on training for emergency procedures and routine maintenance. Handover: - Present commissioning documentation to the client. - Review system performance and address any final concerns.	Clade
Phase 5 (Additional option)	Optimisation	Fine-tune control settings for efficiency and comfort. Address any issues identified during performance testing.	Clade



2. BUILDING SYSTEMS REQUIREMENTS AND CONSTRAINTS //

Whilst the heating and cooling systems are out of scope for Clade they are fundamental to the operation of our plant. Here we set out the minimum requirements to achieve the desired performance.

1. System temperatures as set out in the product specification are adhered to and;
 - CO2 systems return temperature from the heating system must not exceed 37°C under any circumstance. (CO2 systems must be designed for a 30C return temperature.)
 - R290 heat pump flow and return temperatures must be +/-3°C of design
2. Capability to provide and measure flow rates between heat pumps / chillers and the buffer tanks.
3. Free air flow around the evaporators and condensers.
4. Frost protection for water side heating systems.

Clade are happy to provide advice on system design but any technical advice provided is for informational purposes only, unless specifically covered by a purchase order, and is based on our current understanding and available information. While we strive to ensure the accuracy and reliability of the information provided, it is not intended to be a substitute for professional advice or services tailored to specific circumstances.

By utilising this advice, you acknowledge that it is provided "as is" without any warranties or guarantees, express or implied, regarding its completeness, accuracy, reliability, suitability, or availability.

We strongly recommend consulting with a qualified professional before implementing any advice or making any decisions based on the information provided.

In no event shall Clade or its representatives be liable for any direct, indirect, incidental, special, or consequential damages, including but not limited to loss of profits, data, or other intangible losses, arising out of or in connection with the use of, or reliance on, the technical advice provided.



3. PRE-COMMISSIONING REQUIREMENTS //

Prior to attending site for commissioning the Pre-commissioning check list must be completed and returned to Clade by the contractor a minimum of 7 days beforehand.

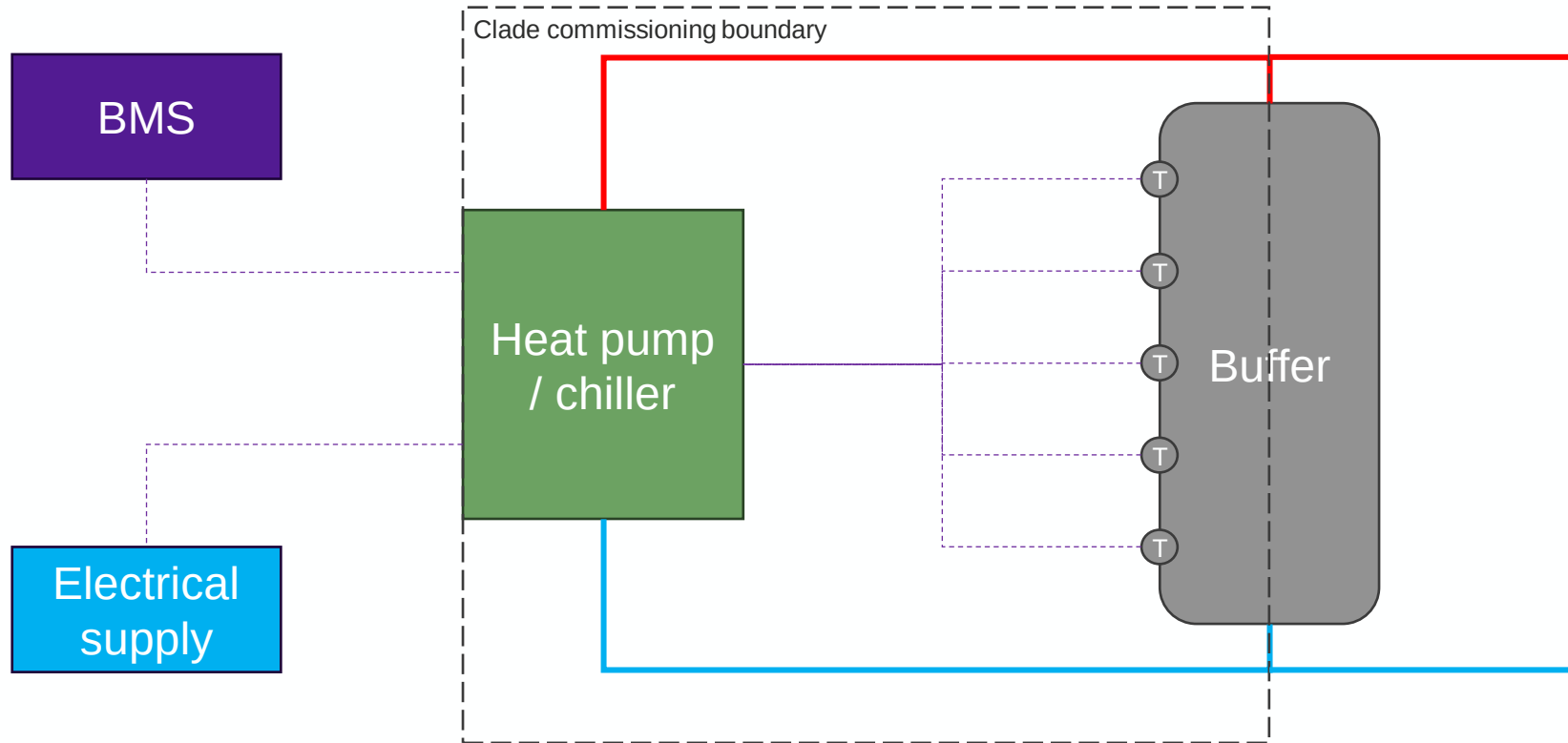
Commissioning requires two weeks notice.

All checklists and booking requests should be sent to vicki.bacon@clade-es.com and sales@clade-es.com

Pre- commissioning check list	☒
Mains power connected and available	
Buffer tanks are filled, pressurised, cold and connected	
A method of measuring flow rates between buffers and heat pump / chiller is provided.	
Verify piping and electrical connections are to design and safe	
Heating / cooling systems can provide load on demand	
System flushed and pressure tested	
Controls wiring and set up and functioning including buffer temperature sensors, BACNET connections etc.	
Commissioning attendance by water system and BMS engineers confirmed.	
All system information available to the commissioning team	
No physical damage to heat pump / chiller	
Access and site readiness confirmed	



4. COMMISSIONING RESPONSIBILITY //





5. PROVING FUNCTIONALITY //

Functionality tests

Once the heat pump / chiller is ready to commission it will be run up to meet the following tests as proof of functionality. N.B the ambient conditions at the time will influence the performance of these tests.

1. Heat production at set point flow temperature and flow rate to cold buffer tanks as set out in the technical specification.
2. Modulation of heat output as the buffers become satisfied.

Energy metering

In our experience using energy meters to calculate plant performance is difficult.

Allowance must be made for the following factors which is non trivial.

- BMS control signal changes
- Time out of operation, e.g. for maintenance
- Frequency of sampling
- Accuracy of measurement
- Duration of run times
- Ambient conditions
- Demand changes

Therefore Clade will only provide or accept plant performance data based on data from the heat pump originating from the Clade control system.



6. TRAINING AND HANDOVER //

On the completion of commissioning or shortly afterwards you will receive training on how to operate the heat pump. Your operational team should be present for this.

Full documentation will be supplied when everything is complete

7. OPTIMISATION AND AFTERCARE //

Clade offer Optimisation services to fine tune the heat pump over a period of time. Generally this is the first winter season when both the heat pump and the system need adjusting for maximum efficiency.

Clade also offer a wide range of aftercare services for maintenance.



8. GENERAL CONDITIONS //

Performance may vary based on climate conditions, installation quality, and specific usage patterns. Actual energy savings may differ from estimates.

Professional installation is required to ensure optimal performance and compliance with local building codes. Improper installation will void the warranty.

Regular maintenance is necessary to maintain efficiency and performance. Failure to perform recommended maintenance may reduce system lifespan and efficiency.

Efficiency ratings (COP) are based on standard testing conditions and control patterns. Actual efficiency may vary depending on operational conditions and geographic location.

Heat pumps are designed for specific use. Using the product for unintended purposes may result in suboptimal performance or damage.

Noise levels produced by the heat pump may vary based on the installation environment and operating conditions. Clade do not publish sound pressure figures as this would be a free field figure without the specifics of the site application which can be misleading. Unlike other manufactures Clade offer noise figures with details of the operating conditions of the equipment, specifically the sound power figures we publish are at 100% capacity at -5°C, i.e. worst case, fans and compressors at 100%.

Please refer to the user manual and installation guide for detailed information on operation, maintenance, and safety instructions.

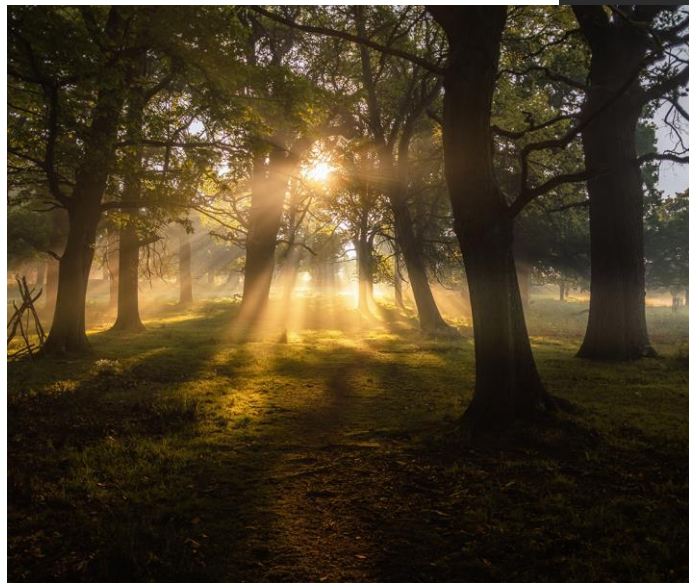
Clade continually innovate to improve our products, the information in this document are valid (excepting typographic errors) at the time of publication. Availability, specification and performance are subject to change from time to time and without warning.

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THANK YOU //

www.clade-es.com

Head Office & Registered Office //
Bristol & Bath Science Park,
Dirac Crescent, Emersons Green,
BRISTOL BS16 7FR

The Technology Centre //
Unit R3 Gildersome Spur Industrial Estate,
Stone Pits Lane, Morley,
LEEDS LS27 7JZ