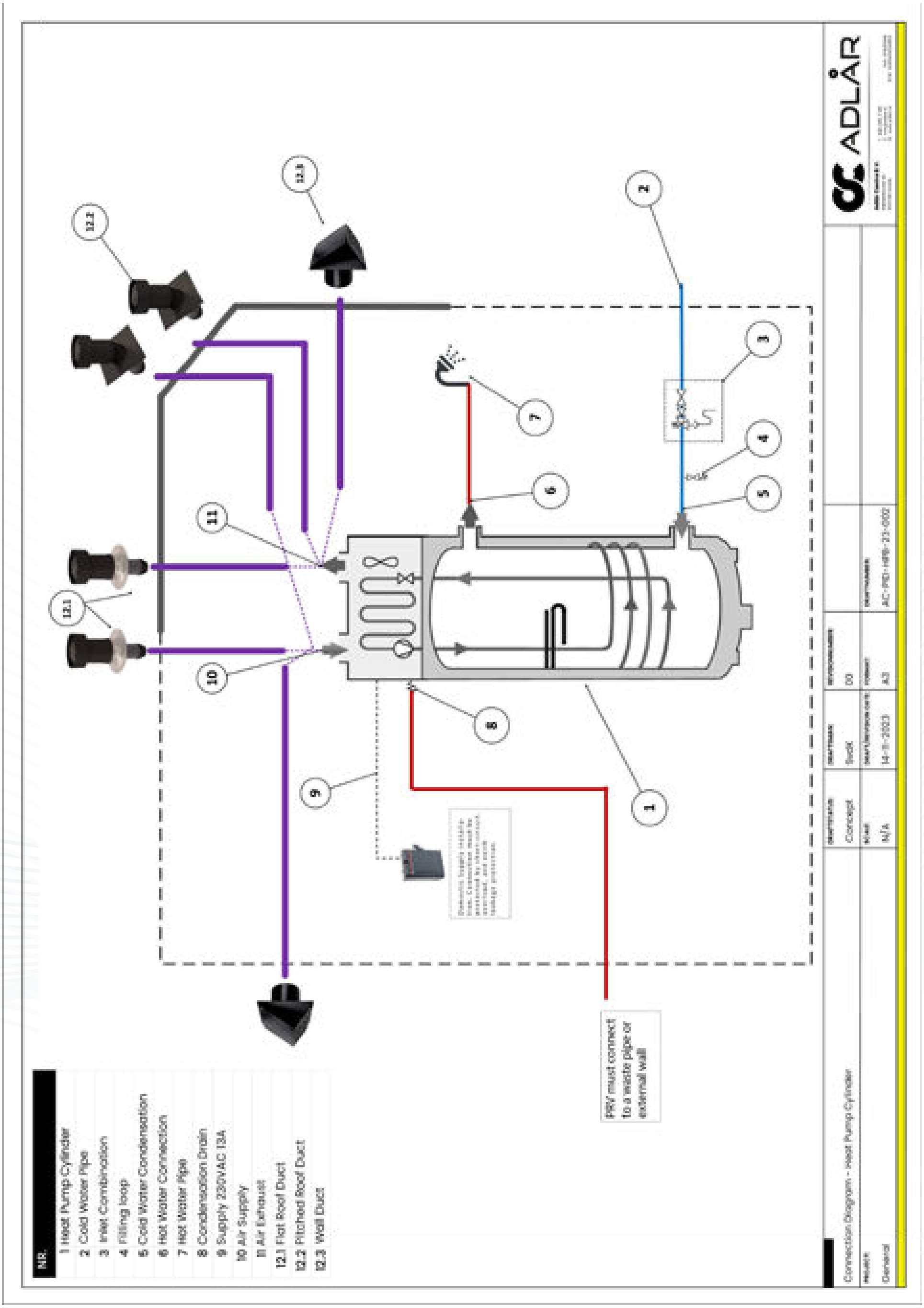
ADLÅR

Ducting & AC

FJORD I

80 | 120 | 200 | 300 L

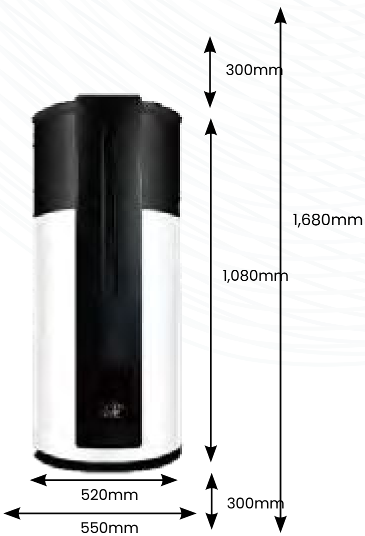
Table of Contents


NR.
1 Heat Pump Cylinder
2 Cold Water Pipe
3 Inlet Combination
4 Filling loop
5 Cold Water Condensation
6 Hot Water Connection
7 Hot Water Pipe
8 Condensation Drain
9 Supply 230VAC 13A
10 Air Supply
11 Air Exhaust
12.1 Flat Roof Duct
12.2 Pitched Roof Duct
12.3 Wall Duct
PRV must connect to a waste pipe or external wall
Connection Diagram - Heat Pump Cylinder
Concept
SvdK
00
General
N/A
14-11-2023
A3
AC-PID-HPB-23-002
ADLÅR

Floor Standing 200L

Floor Standing 300L

Wall Hung 80L



Wall Hung 120L

Air source heat pump (ASHP) hot water cylinders are specialized storage tanks designed to work in tandem with air source heat pumps to provide efficient, renewable domestic hot water.

How They Work

An air source heat pump extracts heat from the outside air—even in cold weather—and transfers it into a refrigerant circuit. This low-grade heat is then compressed to a higher temperature and transferred via a heat exchanger into the water in the cylinder. Because heat pumps work most efficiently at lower temperatures, the hot water cylinder must be well-insulated and often slightly larger than traditional ones to ensure a sufficient supply of usable hot water.

Key Features

- High Levels of Insulation: To reduce heat loss and improve system efficiency
- Immersion Heater Backup: Most cylinders include an electric immersion element to top-up water temperature or provide sterilization (e.g. for legionella control).
- Smart Controls: Some models offer integration with smart home systems and programmable settings to optimize performance and running costs.

Benefits

- Energy Efficiency: When paired with an efficient ASHP, these cylinders can deliver hot water using significantly less energy than fossil fuel systems.
- Low Carbon Footprint: Particularly when powered by renewable electricity.
- Cost Savings: Reduced running costs compared to electric-only or oil-based systems, especially when used with off-peak electricity tariffs or time-of-use energy pricing.
- Futureproofing: Complies with UK and EU energy efficiency goals and low-carbon heating strategies.

Considerations

- Size: ASHP systems often require larger cylinders to store sufficient hot water due to lower heating rates.
- Recovery Time: Heat pumps typically take longer to reheat water than gas boilers.

Typical Applications

- New builds aiming for high energy efficiency standards (e.g. Passivhaus or SAP-compliant homes)
- Retrofits replacing older gas, electric, oil, or LPG water heating systems
- Off-grid homes seeking a low-carbon heating solution

Overall, ASHP hot water cylinders are a crucial component in transitioning to sustainable domestic heating and hot water systems, offering efficiency, reliability, and long-term cost-effectiveness when properly specified and installed. HOW DOES HEAT PUMP CONTROL WORK?

The Aurora II heat pump controls your home’s temperature using a heating curve.

DUCTING OVERVIEW

Proper ducting is essential for the efficient and safe operation of air source heat pump (ASHP) hot water cylinders that are installed indoors.

Ducting Requirements

Duct Size: duct diameter size depends on the length of run, and is required for both the intake and outtake to ensure adequate airflow and system efficiency. See next page for sizing and length of runs.

Material: Ducting should be rigid or semi-rigid insulated ducting to reduce pressure drop and avoid condensation, especially on the cold air outtake.

Intake Duct

Function: Brings in outside air to feed the heat pump.

Location: The intake duct should draw air from an external wall or vent, ideally shaded and away from heat sources (e.g. boiler flues or south-facing walls) to ensure consistent air temperatures.

Duct Routing: Should be as short and straight as possible to minimize resistance and maintain performance.

Outtake Duct

Function: Expels cold air generated during the heat extraction process.

Location: Must vent to an external space to prevent chilling the room in which the unit is located.

Considerations: The outtake air can be significantly colder than ambient (e.g. 0–5°C), so the duct should not discharge near windows, doors, or air intakes to avoid discomfort or icing. Ensure appropriate condensation management (e.g. drainage or insulation).

Best Practices

Grilles and Hoods: External terminations should be fitted with weatherproof grilles or cowls to prevent ingress of water, debris, and pests.

Correctly specified and installed 160mm intake and outtake ducting helps maintain the efficiency, performance, and longevity of the ASHP hot water system, while preventing issues such as backflow, heat loss, or condensation problems.

Proper ducting is essential for the efficient and safe operation of air source heat pump (ASHP) hot water cylinders that are installed indoors.

MAXIMUM DUCT LENGTHS

It is recommended to adhere to the following duct sizing and run lengths to ensure optimal performance.

DUCT TYPE		Ø100	Ø160	Ø190
Rigid Duct*	m	9	24	40
Flexible Duct*	m	4.5	12	20

*considering only 1x 90° curves and louvers at the air inlet and outlet of the equipment.

160mm ducting should be the default selection.

The maximum static pressure limit is 60 Pa.

Alternative duct sizes and shapes are allowable as long as Adlår is consulted. For example, square ducting. Please always check the size and distance first.

AIRFLOW

A house's minimum air flow requirement is 0.3 l/s per m2 for internal air intake.

Airflow when in operation		
80/120L	m³/h	250
200/300L	m³/h	350

DUCT TYPES

Semi-Rigid Ducting

Example Link

Best for flexibility and low cost. Ducting should be insulated to avoid condensation. This is provided as standard by Adlår.

Insulation example

Joiners

Pre-Insulated Rigid Ducting

Example Link

High quality and best finish.

Plastic Rigid Ducting

Example Link

Best for size. Takes up the least amount of space.

The ducting system must be correctly terminated outside the building to manage air intake and outtake effectively. Depending on the building structure and installation location, you can use external wall terminals, flat roof terminals, or pitched roof terminals

EXTERNAL WALL DUCTING

A stainless steel louvered wall cowl with an integrated mesh guard, suitable for both air intake and outtake. It protects against rain, birds, and debris.

Use Cases: Ideal for installations where ducting can pass horizontally through an external wall.

FLAT ROOF TERMINALS

Ubbink Flat Roof Terminals

Description: Weather-sealed terminals specifically designed for flat roofs, often with integral flashing and rain protection.

Use Cases: When ducting needs to exit vertically through a flat roof—such as plant rooms or utility spaces located centrally in a building.

PITCHED ROOF TERMINAL

Ubbink Pitched Roof Terminals

Description: Discreet, tile-integrated terminals designed to match roof pitches and profiles, with weather protection built in.

Use Cases: Ideal for ducting that needs to exit through sloped ceilings or attic spaces.

General Recommendations
Diameter: All duct terminals should accommodate the full 160mm duct to avoid restriction.

Insulation: Ducting, particularly for the outtake (which discharges cold air), should be insulated to prevent condensation and reduce thermal loss.

Maintenance Access: Position terminals for easy inspection and occasional cleaning if needed.

By selecting the appropriate terminal type based on your installation site—whether wall, flat roof, or pitched roof—you ensure that your ASHP hot water cylinder operates efficiently, quietly, and safely in all seasons. Correctly specified and installed 160mm intake and outtake ducting helps maintain the efficiency, performance, and longevity of the ASHP hot water system, while preventing issues such as backflow, heat loss, or condensation problems.

Adlår is committed to ensuring all heat pump hot water installations comply fully with both MCS and Ofgem regulations.

MCS REGULATION: 3005-D 5.6.9

Hot water heat pumps delivering domestic hot water shall use waste heat from boiler rooms, waste heat from server rooms, or waste heat from external ambient air only as detailed in Commission Regulation (EU) No 814/2013. The extraction of heat by the heat pump shall not deplete the heat in the inhabited building space (thus increasing the space heating requirement).

Regulatory Framework

The regulation explicitly prohibits drawing heat from inhabited building spaces, as this would increase the space heating load of the property.

Ofgem Regulation (2)(1) defines an air source heat pump as a system that must use energy from outside the property. Drawing heat from an internal environment contradicts this definition and may render systems ineligible for funding or certification.

Implications for Adlår Installations

Historically, some Fjord cylinders were installed drawing air from internal warm spaces to maximize efficiency such as plant or boiler rooms. Under Ofgem regulations, this practice is no longer compliant. Going forward, all Adlår installations must source both intake and outtake air from the external ambient environment to ensure compliance.

Performance and Efficiency Considerations

It's important to understand how this affects system performance:

Heat pumps operate more efficiently with warmer intake air. For example, under typical internal ambient conditions (20°C dry bulb / 15°C wet bulb), the Fjord cylinder can achieve a COP of 3.802.

However, when using colder external ambient air (7°C / 6°C), efficiency drops to a COP of 3.113.

This difference in COP (Coefficient of Performance) reflects reduced energy efficiency and longer runtimes in colder conditions.

Internal vs. External Air – What You Need to Know

Using external air (as now required) ensures compliance and avoids unintended heating penalties.

Using internal air previously offered a performance boost, but could unintentionally increase space heating demand—especially if the hot water cylinder draws warm air from within a living space, resulting in lower room temperatures and greater heating loads.

That said, it's worth noting a Fjord cylinder's heat draw is far lower than a full space heating cycle.

During a typical hot water cycle (e.g., ~1 hour per day), the heat extracted with a hot water heat pump is less than the daily heat loss of the whole-home when running a full domestic hot water cycle with a single heat pump system, where the heating is disabled entirely during a hot water cycle.

This makes the impact of using internal air for a cylinder relatively low—though it remains non-compliant.

How Much Heat is Taken from the Environment?

For the Fjord 200L cylinder (typical mid-range unit):

- Daily Energy Consumption (20°C/15°C condition): 3.605 kWh/day
- COP: 3.605

Therefore, useful heat delivered = 3.605 kWh × COP = ≈ 13.00 kWh/day

So, heat drawn from the environment = 13.00 - 3.605 = ≈ 9.395 kWh/day

Fjord cylinders typically draw between 7.8–9.4 kWh/day from the surrounding environment depending on ambient air temperature.

Final Recommendation

You are free to alter the system as you see fit. However, Adlår's responsibility is to ensure that installations comply with both MCS and Ofgem rules. Therefore, external ambient air must be used for both intake and outtake ducting during installation.

While performance is better with warmer air, regulatory compliance takes precedence. If efficiency is critical in your setup, consider:

- Locating the intake vent on a sun-facing wall
- Minimizing duct length and resistance
- Installing thermal insulation around the duct

DEHUMIDIFICATION

When drawing air from spaces like utility rooms, lofts, or plant rooms, the heat pump also acts as a dehumidifier. As it extracts heat from the air, it simultaneously reduces moisture levels—helping to prevent damp, mould, and condensation in enclosed or under-ventilated areas. While current regulations require that air must come from non-habitable or external spaces, these semi-conditioned zones could offer both compliance and practical benefits in system design.

MAXIMUM EFFICIENCY

To maximise year-round efficiency, consider a seasonal air source switching strategy—drawing external air in summer, when outdoor temperatures are warmer, and internal air in winter from non-habitable areas like lofts or utility rooms.

This approach allows the heat pump to operate with higher efficiency (higher COP) while remaining practical. However, any internal air source must still comply with MCS and Ofgem regulations, meaning it must not be from inhabited living spaces.

AIR CONDITIONING

Air source heat pump hot water cylinders naturally generate cold air as a byproduct during operation. While the system's primary function is to heat water, this expelled cold air can be harnessed for passive air conditioning, especially during warmer months.

How It Works

Cold air is only produced while the unit is running (typically 4-5 hours per day depending on usage).

The temperature of the outtake air is generally 8–12°C colder than the intake air. For example, if intake air is 20°C, outtake air is often around 8–12°C—giving you a mild but noticeable cooling effect.

On warm days (e.g. 25°C intake), outtake air may still be around 13–17°C, depending on system performance and COP.

Practical Setup

You can duct this cool air into a targeted room or space, like a hallway, utility room, or office, using a basic damper-controlled duct system. The setup includes:

A) 2x Motorised Zone Dampers
Polyaire 240V Motorised Dampers
One damper routes air outside, the other diverts air indoors.

B) 1x Smart Switch
Wi-Fi Smart Switch with Timer Function
Automatically triggers damper redirection when the cylinder is running.
C) Ducting
Use insulated 160mm ducting to reduce condensation and maintain air temperature.

D) Ceiling or Wall Vent
Ubbink Air Valves & Grilles
Neat, low-profile grilles for directing cool air into the chosen space.

Advantages

- Free cooling during hot weather—without any added running cost
- Customisable air routing based on season or occupancy (e.g., send outside in winter, inside in summer).

Things to Note

- Cold air delivery is intermittent, limited to hot water cylinder run times.
- The effect is mild but effective in small or enclosed spaces.
- In winter, the cold air should always be diverted outside to avoid unintended heat loss.
- This simple, low-cost enhancement allows you to get more utility from your ASHP hot water cylinder—turning a byproduct into a bonus.

SYMBOLS:

Symbols will appear during different operating modes. Generally you can ignore the symbols and focus on the temperatures.

SYMBOOL	MEANING
	Hot water available
	Fan active
	Boost
	Heating
	Lock / Wifi

SWITCHING VENTILATION ON/OFF:

SWITCHING ON:

1. Hold  for 5 seconds to turn the ventilation function **ON**

(The fan symbol will appear even when the heating symbol is no longer present)

SWITCHING OFF*:

1. Hold  for 5 seconds to turn the ventilation function **OFF**

(The fan symbol will only appear when the heating symbol appears)

	FJORD I		
MODEL	**120L**	**200L**	**300L**
Voltage (V/Hz)	220-240/50 Hz	220-240 50 Hz	380~415 50 Hz
Capacity (kW)	1.1* (+1.55**)	1.6* (+1.5**)	1.6* (+1.5**)
Duct Air Flow (nom.)	250	350	350
Rated Power Input (W)	416 (+1550**)	600 (+1500**)	600 (+1500**)
ELE. Heating Rated Input (W)	1550	1500	1500
Current (nom.) (A)	1.30* (+6.8**)	1.88* (+6.8**)	1.88* (+6.8**)
Current (Rated.) (A)	1.81 (+6.8**)	2.61 (+6.8**)	2.61 (+6.8**)
Max outlet water temperature (without using E-heater) (°C)	60	60	60
Refrigerant type/charge (.../g)	R290/150	R290/150	R290/150
COP (W/W)	2.626***	2.915***	3.113***
Storage Tank Volume (L)	120	200	300
Sound Prower Level (dB(A))	55.0****	55.3****	55.7****
DRY BULB / WET BULB CONDITION 20 °C / 15 °C			
COP (DHW)	3.135	3.605	3.802
Inlet Cold Temperature (°C)	10	10	10
Set Point Temperature (°C)	53	53	53
Daily Electric Energy Consumption (kWh)	1.864	3.2333	5.0151
Water Heating Energy Efficiency (%)	133.3%	150.1%	156.2%
Energy Efficiency Class	A++	A++	A++
Annual Energy Consumption (kWh/a)	385	682	1072
DRY BULB / WET BULB CONDITION 7 °C / 6 °C			
COP (DHW)	2.626	2.915	3.113
Inlet Cold Temperature (°C)	10	10	10
Set Point Temperature (°C)	53	53	53
Daily Electric Energy Consumption (kWh)	2.225	3.9992	6.1251
Water Heating Energy Efficiency (%)	111.6%	121.1%	127.9%
Energy Efficiency Class	A+	A+	A+
Annual Energy Consumption (kWh/a)	460	845	1310

* Capacity and power under following conditions: Ambient Temperature 20°C, Water Temperature 15°C to 55°C

** Related to the supplementary heater

*** COP based on ERP.M cylce, Ambient Temperature 20°C, Heat sourve temperature 7°C/6°C, Water 10° to 53°C

**** Noise is tested according to EN12102

Publisher:
Adlår Castra Ltd.
Walnut, Greenhills Estate,
Tilford Road, Tilford, GU10 2DZ (UK)
www.adlar.co.uk

Product Information:

This document contains information about the operation of the Aurora II and Fjord I heat pump.

Copyright and Licenses

© 2024 Castra Groep B.V.
All rights reserved. No part of this manual may be reproduced, stored in a retrieval system or transmitted in any form or by any means without the prior written permission of the publisher.

While we have made reasonable efforts to make this document as accurate and useful as possible, we make no express or implied warranty as to the accuracy or completeness of the information contained therein. Spelling and typographical errors reserved.

Version

Version: EN 3.1.2
Date: 25-1-2024

ADLÅR LTD
Walnut, Greenhills Estate,
Tilford, GU10 2DZ

T: 01252 268 669
W: www.adlar.co.uk
E: info@adlar.co.uk