

Hydra

Single master controller
assembly for Hybrid
Heat Pump System



Description

Single master controller assembly for managing Heat Pump installation into an existing boiler (combination boiler preferential) heating system and creating a HYBRID domestic system.

The gas boiler (secondary heat source) is only called upon when the heat pump (primary heat source) cannot meet the heat load demand. The gas boiler is only called upon when the heat pump is not functioning or out of service. Timed out delays stop unnecessary switching of the heat source, and only one heat source is permitted to operate at any one time.

To create the most energy efficient home heating system the primary heat source should be designed to meet 100% of the calculated heat load.

How to make the most of the advantages?

- Add the new heat pump to an existing combi boiler installation.
- Consider a high temperature heat pump so existing heat emitters and pipework don't need replacing.
- Make sure the home is well insulated and upgrade where possible.
- Design the system for the heat pump to deliver 100% of the calculated heat load.

Maximum size primary heat source based on flow requirement.

To achieve 5C delta T in the flow and return, for a 11kW ASHP ideally need 31 l/min. or 1.86 M3 / hour is required, so this is the limit size heat pump for the Hydra,.

The 1" actuated ballvalve is a full flow 1" bore to maintain minimum pressure drop.

Diverting Manifold Body:	AISI 304
Connections:	Brass CW617N-DW
Seals:	EPDM
Insulation shell Body:	EPP 38 kg/m3

Wiring switching connections for the Installer

- Primary heat source (heat pump).
- Secondary heat source (boiler).
- Room Thermostat
- Additional temperature sensor options

Assembly pre-wired at the factory.

- Grundfos UPM3 Auto 25/60
- AQD Actuator on full bore 1" ballvalve
- T1 temperature sensor (PT1000)

Features

- Four preset operating profiles.
- All settings adjustable.
- Installer setting menu LOCK.
- Auto / Off / Manual operation selection.
- Boost function (Boiler intervention)
- Boiler lock out option when the heat pump initiates a defrost cycle.
- High return temperature protection option for the heat pump.
- Outside temperature monitoring option to prevent any conflict with a heat pump's weather compensation control.
- Language / Time & Date / back light adjustment.
- Settings memory on loss of power.
- Pump seizing in summer prevention function.
- Operations history display.
- Sensor calibration
- Factory reset.
- Daylight saving auto switching.
- Anti-legionella program for stored DHW.
- Error message for faulty or unconnected temperature sensors.
- Two operating screens, main display and system scheme display.

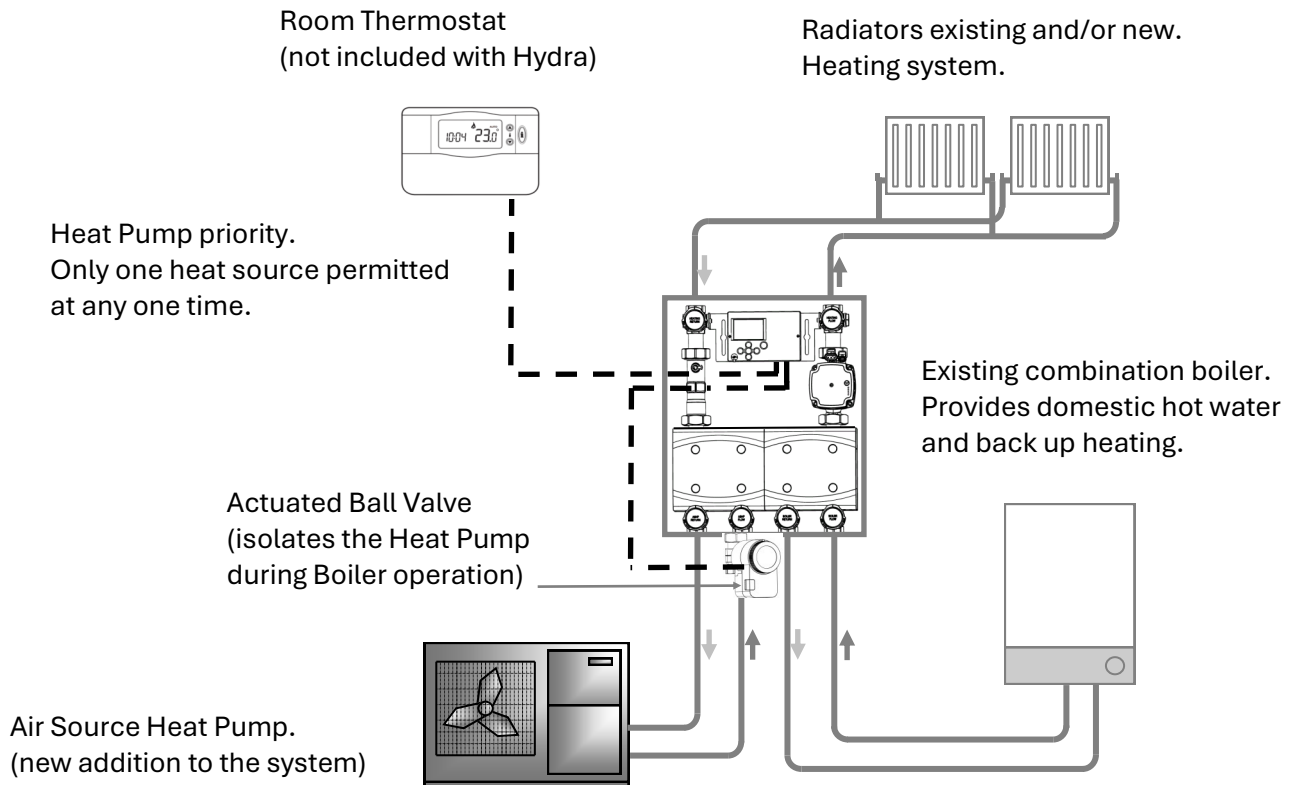
Hydra and hybrid heat pump system



Create a hybrid heating system using Hydra

The Hydra single master controller manages heating operations so that the primary heat source (the electric heat pump) provides heating to the designed heat loss 100% of the time under normal operation conditions.

The secondary heat source is only called upon when the primary heat source is unable to meet the heating demand or is out of service. The two heat sources should never run together at the same time.



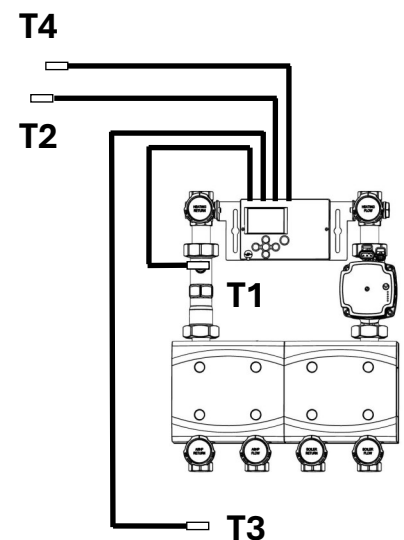
Accessory - PT1000 Temperature Sensors

Part Code HCUTF300

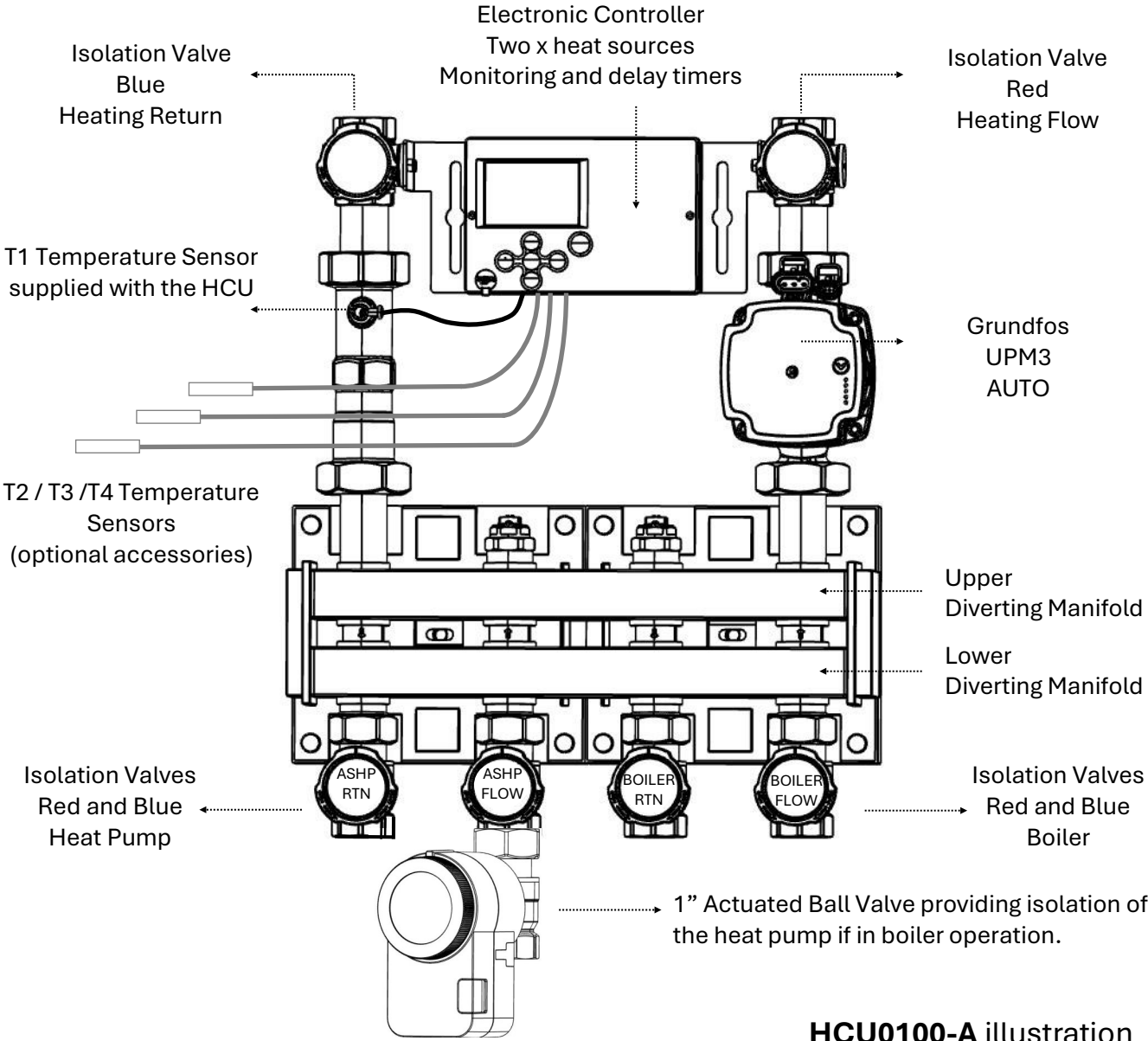
Use for T2 connection and activate DEFROST detection. Monitors for heat pump activating DEFROST function and locks out the BOILER from switching on. Attach inside the heat pump near the inlet pipe to the Evaporator.

Use for T3 connection for activate High Return Temperature Protection. Monitors for high return temperatures that may adversely affect the heat pump. Attach onto the heat pump heating return pipe

Use for T4 connection and activate Heat Pump Weather Comp When weather compensation on the heat pump is active locks out the boiler in warmer weather (adjustable value set by the installer). Attach onto the heat pump heating return pipe'



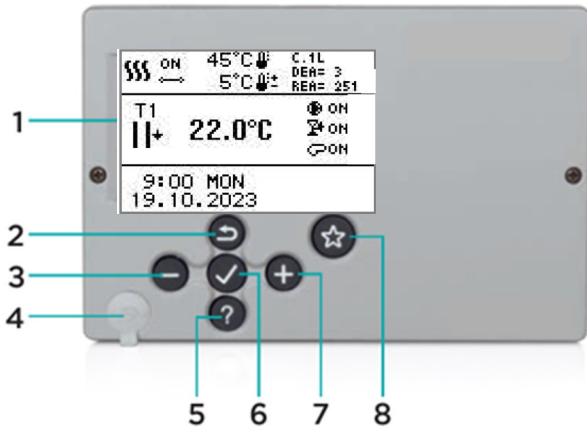
Hydra assembly components and versions










HCU0100-A illustration

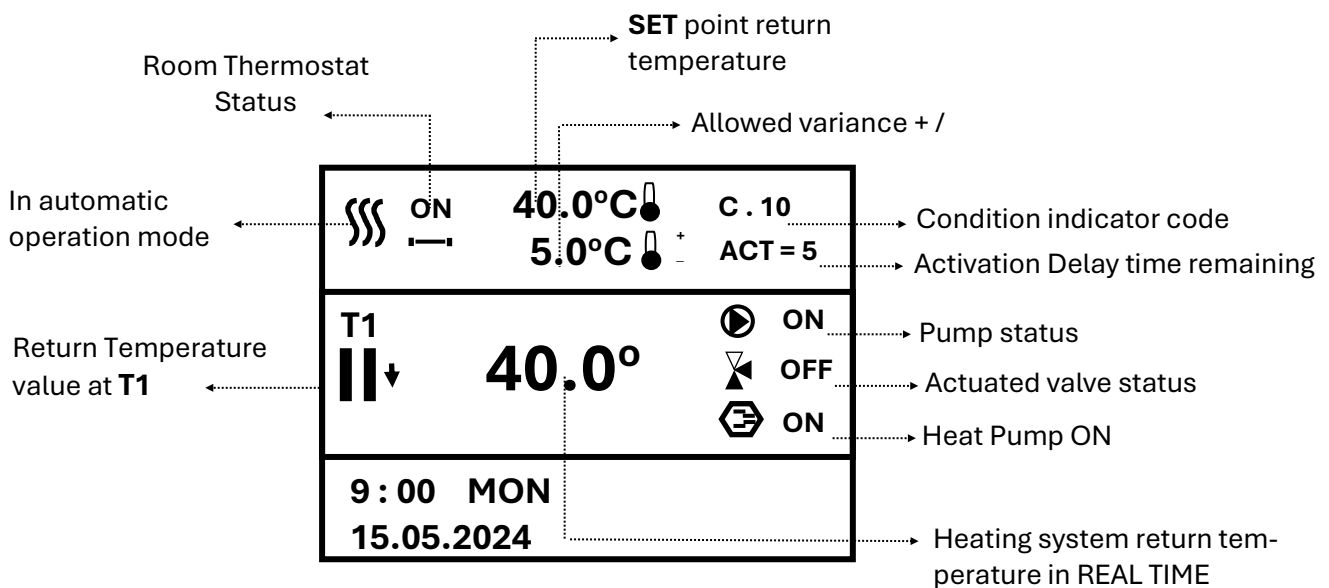
Part Number	Description
HCU0100-A	HYDRA control unit assembly. Electronic Controller, Pump, Actuated Ballvalve assembled on Upper and Lower Diverting Manifolds With 1 x PT1000 sensor for T1 sensing only. Isolation valves on all connections Heating connections flow and return UPWARDS
HCU0100-U	HYDRA control unit assembly. Electronic Controller, Pump, Actuated Ballvalve assembled on Upper and Lower Diverting Manifolds With 1 x PT1000 sensor for T1 sensing only. Isolation valves on all connections Heating connections flow and return DOWNWARDS

Controller operating keys

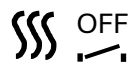







Press the  key for more operating screens

1. Graphic display screen.
-  2. Return key
-  3. Move left or decrease a value key
4. USB port for connecting to a PC
-  5. Help
-  6. Menu entry or confirm selection
-  7. Move right or increase a value key
-  8. Boost or anti-legionella Menu



Screen symbols

	Room Thermostat OFF Automatic mode
	Room Thermostat ON Automatic mode
	Pump
	Actuated Valve
	Heat Pump
	Boiler








Screen abbreviations / condition indicators

C.00	Both heat source OFF
C.10	Primary Heat Source
C.1L	Secondary Heat Source
ACT	Activation of monitoring DELAY
DEA	Deactivation of heat source DELAY
REA	Reactivation of heat source DELAY

Hydra operation sequence - normal conditions










Heating OFF screen display.

	OFF	45.0°C		C . 00
		5.0°C		
T1				OFF
	18.5°			OFF
				OFF
7: 30 MON				
15.05.2025				

No demand from the heating system room thermostat.
Everything OFF
Displayed as condition C.00

Heating ON - Stage 1 ACTIVATION DELAY ON








	ON	45.0°C		C . 10
		5.0°C		ACT = 5
T1				ON
	43.0°			OFF
				ON
7 : 31 MON				
15.05.2025				

Room thermostat calls for heating.
Heat pump ON (Primary heat source)
Hydra Pump ON
Valve is OFF (open position)
Displayed as condition C.10

Hydra control operation.

When the room thermostat has called for heating, the **ACTIVATION DELAY TIMER** will count down for the set delay period. This is displayed as condition C.10. (this time period is adjustable in the installer menu if required) During this period the **Return Temperature Monitor** function is **NOT ACTIVATED!**

Heating ON - Stage 2 DEACTIVATION DELAY ON

	ON	38.0°C		C . 1H
		5.0°C		DEA = 20
T1				ON
	47.0°C			OFF
				ON
9 : 15 MON				
15.05.2024				

Room thermostat still calling for heating.
Heat pump ON
Hydra Pump ON
Valve is OFF (open position)
Displayed as condition C.1H

The room thermostat still calls for heating, now the **DEACTIVATION DELAY TIMER** will continue to count down the set delay period and repeat this until the room thermostat is satisfied and switches OFF. This is displayed as condition C.1H. and can be adjusted in the installer menu between 1 and 30 minutes. During this period the **Return Temperature Monitor** is **NOW IN OPERATION!**









When the room temperature setting satisfied, then the switch on the Room Thermostat will open, and the controller will turn **OFF** the PRIMARY heat source (heat pump) and Pump.

The controller will revert back to **Heating OFF** screen display.

Hydra operation sequence - abnormal conditions











Heating ON - Stage 2 DEACTIVATION DELAY ON.
The return temperature not as per set value!

	ON	40.0°C		C . 1H
		5.0°C		DEA = 2
T1				
		29.0°C		ON
				OFF
				ON
9 : 46 MON				
15.05.2024				

Room thermostat still calling for heating.
Heat pump ON
Hydra Pump ON
Valve is OFF (open position)
Displayed as condition C.1H

ACTUAL return temperature is below the SET POINT
return and outside of the allowed variance value!
Primary heat source (heat pump) not adequate.
A secondary heat source (BOILER) needs to be
deployed, and the primary heat source (heat pump)
needs to be isolated!

Heating ON - Stage 3 REACTIVATION DELAY ON.
Boiler is now the heat source.

	ON	40.0°C		C . 1L
		5.0°C		REA = 120
T1				
		50.0°		ON
				ON
				ON
10:00 MON				
15.05.2024				

Room thermostat calls for heating.
Heat pump ON (Primary heat source)
Hydra Pump ON
Valve is ON (actuated closed position)
Displayed as condition C.1L

BOILER is now deployed and switched on.
The Heat Pump is switched OFF and the ac-
tuated ballvalve is closed.
Heat Pump is isolated

REACTIVATION DELAY is now on and counting down the time for which the BOILER is now the heat source.
Erratic switching between heat source is not allowed by the Hydra control logic.
The Room thermostat dictates the demand and switching of the Boiler as normal.
The primary heat source (Heat Pump) is allowed returned to operation after the REACTIVATION delay has
Finished, then the controller returns to normal operation with the primary heat source the default choice.

All temperature values and delay time out periods are adjustable in the installer settings menu.
The installer menu is locked, and only accessible by using a access code.

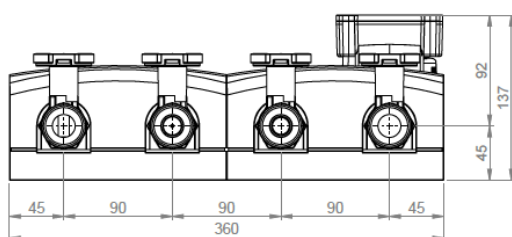
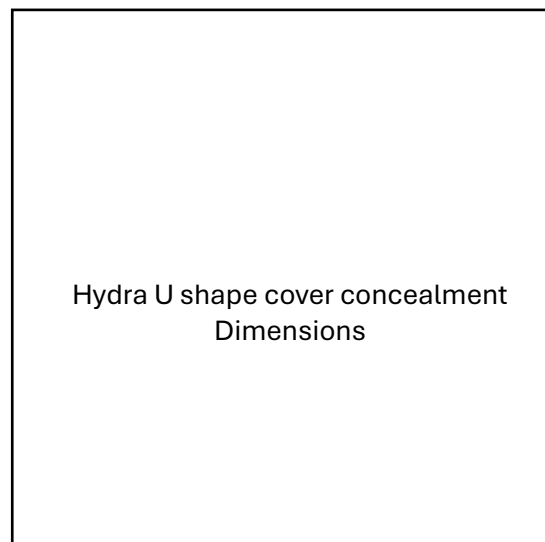
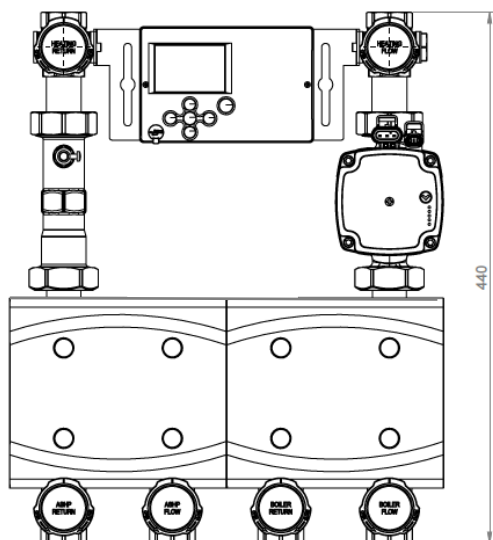
T1 Return temperature.	Min 2C / Max 55C	delays / times out the start of T1 monitoring
T1 Temperature tolerance	Min 5C / Max 10C	temperature range within normal operation
Activation Delay	1 to 30 minutes	Delay before T1 starts temperature monitoring
Deactivation Delay	1 to 30 minutes	T1 monitoring is active. By the end of this period if the re- turn temperature is at the set point (within the allowed var- iance) then primary heat source stays active
Reactivation Delay	30 to 1440 minutes	Delay before allowing the primary heat source (Heat pump) as the default choice. Boiler (secondary heat source is active)

Hydra dimensions



Hydra HCU0100-A
Heating system connections UP

Accessory - Cover - to conceal the Hydra control unit assembly .White gloss finish.
Part Code HY-AC2WH



HCU0100-U
Heating system connections DOWN

