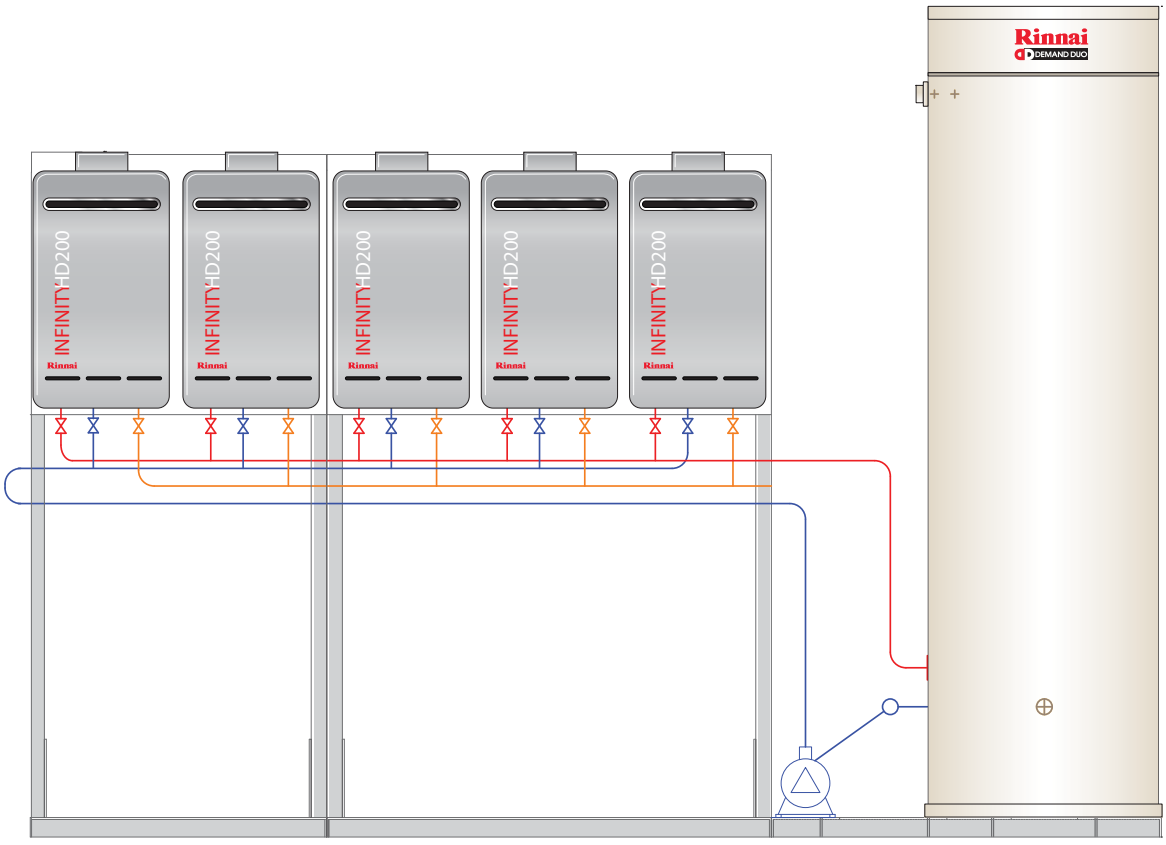
Rinnai

Installation guide

Demand Duo

Continuous flow with storage backup

Customised hot water systems with 2-5 Rinnai INFINITY HD or EF commercial continuous flow gas hot water heaters.



Important:

This system shall be installed in accordance with:
- Manufacturer's installation instructions
- AS/NZS 5601 Gas Installations
- Current AS/NZS 3000, G12, AS/NZS 3500.4
- Local regulations and municipal building codes

Installation, servicing and repair shall be carried out only by authorised personnel.

Warning
Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life.

For more information about buying, using, and servicing of Rinnai appliances call: 0800 RINNAI (0800 746 624).

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contents:

Before you start

Unpack the system and components and check for damage. DO NOT install any damaged items. Check all components have been supplied and that you have the correct gas type.

Read these instructions to get an overview of the steps required before starting the installation. Failure to follow these instructions could cause a malfunction of the system. This could result in serious injury and/or property damage.

Models covered

Code/model	Description
RCWDD400E315N/L	2 x HD200 external units with a 315 litre Demand Duo cylinder
RCWDD600E315N/L	3 x HD200 external units with a 315 litre Demand Duo cylinder
RCWDD800E315N/L	4 x HD200 external units with a 315 litre Demand Duo cylinder
RCWDD1000E315N/L	5 x HD200 external units with a 315 litre Demand Duo cylinder
RCWDD400FF315N/L	2 x HDi200 internal units with a 315 litre Demand Duo cylinder
RCWDD600FF315N/L	3 x HDi200 internal units with a 315 litre Demand Duo cylinder
RCWDD800FF315N/L	4 x HDi200 internal units with a 315 litre Demand Duo cylinder
RCWDD1000FF315N/L	5 x HDi200 internal units with a 315 litre Demand Duo cylinder
Customised systems	
DD 420 external	2 x EF250 external units with a 315 litre Demand Duo cylinder
DD 630 external	3 x EF250 external units with a 315 litre Demand Duo cylinder
DD 840 external	4 x EF250 external units with a 315 litre Demand Duo cylinder
DD 500 external	2 x HD250 external units with a 315 litre Demand Duo cylinder
DD 750 external	3 x HD250 external units with a 315 litre Demand Duo cylinder
DD 420 internal	2 x EFi250 internal units with a 315 litre Demand Duo cylinder
DD 620 internal	3 x EFi250 internal units with a 315 litre Demand Duo cylinder
DD 840 internal	4 x EFi250 internal units with a 315 litre Demand Duo cylinder

N: Natural Gas
L: LPG
FF: Forced flue (internal units)

Location

System should be installed in accordance with G12 and AS/NZS 3500.4. For servicing and maintenance, please allow sufficient room for access of all components of the system.

Ensure the hot water system is installed in a corrosive free environment and free from chemicals as this could potentially create an atmosphere that attacks the Rinnai INFINITY water heaters.

Base requirements

System should be installed on a flat level surface of sufficient strength to support the weight of the Demand Duo system when full of water.

The frame must be secured to the floor using anchor bolts (not supplied).

Access to system

All components of the system must be installed to ensure access can be gained without hazard or undue difficulty for inspection, repair, renewal, or operational purposes. Sufficient clearances shall allow access to removal of all serviceable components.

Where a system is not accessible for maintenance, servicing, or replacement, the Rinnai warranty will not cover any additional costs caused by access difficulty. The system must be accessible without the use of a ladder or scaffold.

Catch pan

It is important a suitably drained catch pan (or drain system) is fitted where damage could be caused by discharge from the cylinder. This is a mandatory requirement of the installation. If damage is caused by a leaking cylinder that has not been installed with a suitable drain system the owner can seek compensation through the installer or consider claiming on insurance.

Rinnai INFINITY flue clearances

Flue clearances must comply with AS/NZS 5601.1.

Demand Duo systems with HDi200 and EFi250 internal units, where each unit is flued individually, must use a Rinnai approved flue system.

Specification summary

All of these systems are connected to a 315 L Demand Duo cylinder.

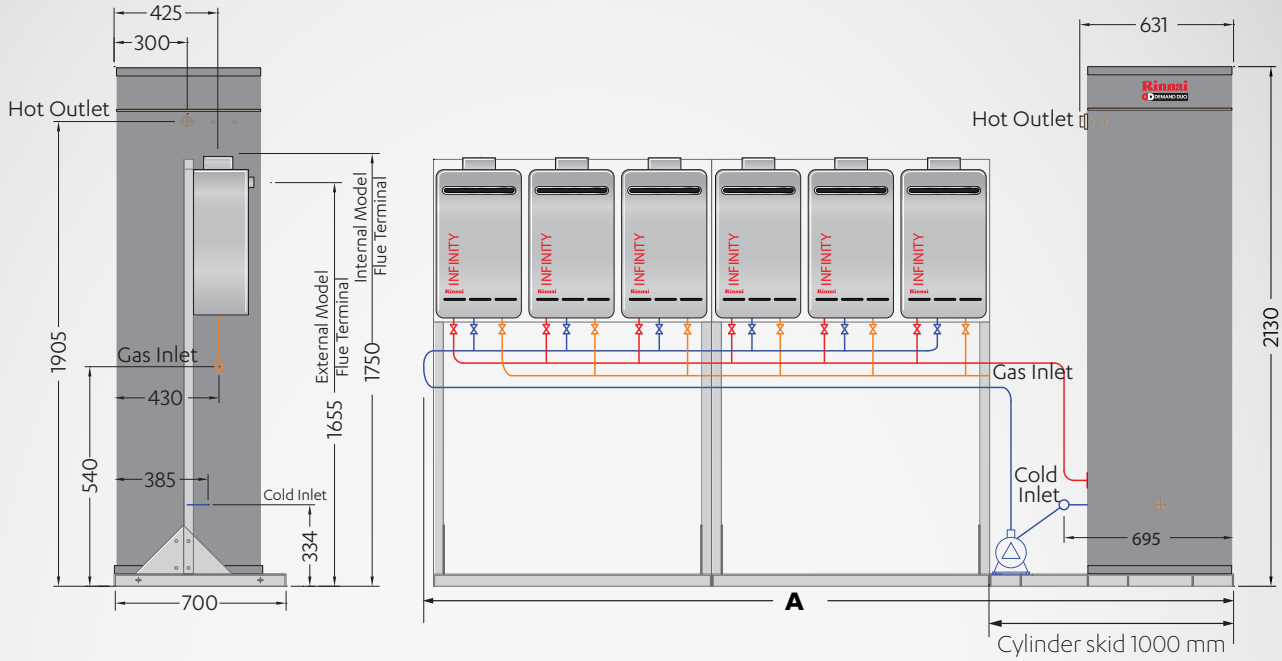
RINNAI DEMAND DUO SYSTEMS					Auckland and Northland		BOP, Gisborne, & Hawkes Bay		Wellington, Waikato, Taranaki, Manawatu, & South Island	
Model	**INFINITY**	**Input (MJ/h)**	**Output (kW)**	**Approx. weight when full**	**1st hr delivery (L/hr) @ 50 ° rise**	**2nd hr delivery (L/hr) @ 50 ° rise**	**1st hr delivery (L/hr) @ 55 ° rise**	**2nd hr delivery (L/hr) @ 55 ° rise**	**1st hr delivery (L/hr) @ 60 ° rise**	**2nd hr delivery (L/hr) @ 60 ° rise**
DD 400 ext	2 x HD200 ext	398	94	510 kg	1812	1560	1670	1418	1552	1300
DD 600 ext	3 x HD200 ext	597	141	540 kg	2592	2340	2379	2127	2202	1950
DD 800 ext	4 x HD200 ext	796	188	590 kg	3372	3120	3088	2836	2852	2600
DD 1000 ext	5 x HD200 ext	995	235	620 kg	4152	3900	3797	3545	3502	3250
DD 420 ext	2 x EF250 ext	422	111.2	545 kg	2172	1920	1998	1746	1852	1600
DD 630 ext	3 x EF250 ext	633	166.8	590 kg	3132	2880	2871	2619	2652	2400
DD 840 ext	4 x EF250 ext	844	222.4	665 kg	4092	3840	3744	3492	3452	3200
DD 500 ext	2 x HD250 ext	500	119.8	530 kg	2172	1920	1998	1746	1852	1600
DD 750 ext	3 x HD250 ext	750	179.7	570 kg	3132	2880	2871	2619	2652	2400
DD 400 int	2 x HDi200 int	390	90.2	510 kg	1812	1560	1670	1418	1552	1300
DD 600 int	3 x HDi200 int	858	135.3	545 kg	2592	2340	2379	2127	2202	1950
DD 800 int	4 x HDi200 int	780	180.4	595 kg	3372	3120	3088	2836	2852	2600
DD 1000 int	5 x HDi200 int	975	225.5	630 kg	4152	3900	3797	3545	3502	3250
DD 420 int	2 x EFi250 int	422	111.2	545 kg	2172	1920	1998	1746	1852	1600
DD 620 int	3 x EFi250 int	633	166.8	590 kg	3132	2880	2871	2619	2652	2400
DD 840 int	4 x EFi250 int	844	222.4	665 kg	4092	3840	3744	3492	3452	3200

Connections:	Gas - 32 mm	Water - 32 mm	TPR - 20 mm
Supply pressures:	Gas (NG) - 1.13-3.5 kPa	Gas (LPG) - 2.75 kPa	Water - 700 kPa max.
Primary pump:	Grundfos CM5-2, for more information refer to the Grunfos book supplied in the accessory pack		
Ingress protection rating:	IPX4 (cylinder, control box, and Rinnai INFINITY)		

Delivery rates, first hour assumes the system has a full cylinder of hot water. Second hour delivery is the maximum output of the Rinnai INFINITY units. For static recovery rates contact Rinnai.

Dimensions

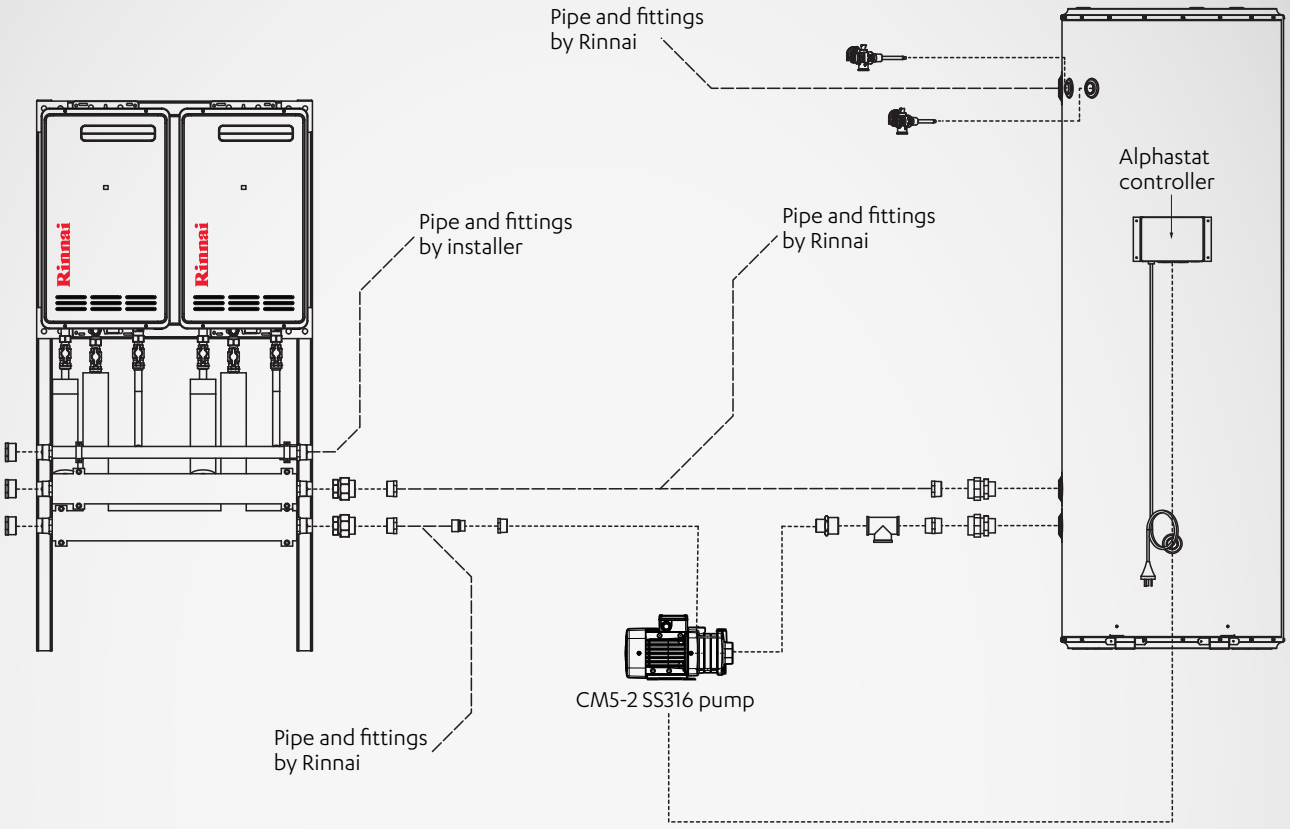
All dimensions are in mm.



Model	INFINITY	'A' dimension (total width of system - mm)
DD 400 external and internal	2 x HD200/HDi200	1770
DD 600 external and internal	3 x HD200/HDi200	2240
DD 800 external and internal	4 x HD200/HDi200	2540
DD 1000 external and internal	5 x HD200/HDi200	2920
DD 420 external and internal	2 x EF250/EFi250	2140
DD 630 external and internal	3 x EF250/EFi250	2540
DD 840 external and internal	4 x EF250/EFi250	3280
DD 500 external	2 x HD250	2140
DD 750 external	3 x HD250	2540

General layout of system

The system layout below, depicting the DD400 system, highlights components provided by Rinnai and components that are required to be supplied by the installer.



Cold water inlet

32 mm fitting on the left hand side of the cylinder, approximately 280 mm above the ground. For ease of draining it is advisable to fit a 'tee' piece with a capped valve or drain line between the cold water isolation valve and cold water inlet connection on the Demand Duo cylinder.

Hot water outlet

32 mm fitting on the left hand side of the cylinder. Ensure adequate insulation/lagging is fitted to the hot water pipe to minimise heat loss. Pipe sizing must be sized to allow sufficient water flow to the hot water fixtures.

Pressure limiting valve

500 kPa.

Cylinder thermostat setting

To meet the New Zealand Building code requirement[1] to disinfect water for legionella bacteria[2], the cylinder thermostat has been set to 65 °C.

1 Clause G12.3.9, Acceptable Solution G12/AS1 6.14.3

2 Legionella is a bacterium that can cause Legionnaires' disease—a severe form of pneumonia

Connections

Expansion control valve (ECV)

The Demand Duo cylinder comes with an Expansion Control Valve (HT575) set to 700 kPa. This valve allows for expansion of the water in the flow and return during the initial heat-up period. This should be fitted to the cold water supply line.

TPR valves

Two 850 kPa TPR valves are supplied and fitted to a 20 mm fitting near the top of the cylinder.

Relief valve drain lines

Connect an independent 20 mm copper tube relief valve drain line to the TPR valve outlets. Drain should be installed with a continuous fall toward a visible discharge point over a drain or gully in accordance with AS/NZS 3500.4 sections 5.8 and 5.9.

- Drain line should not exceed 9 m in length
- Valves or other restrictions should not be installed with the relief vent line
- TPR valve drain line should not be joined to other drain lines

Return pump

A secondary or building return pump may be installed in conjunction with the Demand Duo hot water system. Return line from the building loop is connected to the 32 mm return connection. This is located just above the cold water inlet connection on the left hand side of the Demand Duo cylinder.

If the secondary pump is not used a 32 mm brass plug should be fitted to the 32 mm return connection, located just above the cold water inlet connection.

Install an effective filter to the circulating loop return line.

Gas connection

Check gas type of the Rinnai INFINITY matches the gas supply available on site.

Ensure gas pipe sizing is adequate to deliver the required volume/pressure. The pipe size used on the inlet fitting is no indication of the pipe size required. Refer to appropriate pipe sizing chart in AS/NZS 5601.1.

Gas meter or LPG cylinders and regulator should also be of a suitable size to ensure sufficient gas supply to the gas installation.

Purge gas line and ensure removal of debris prior to final connection. Check for gas leaks using suitable methods as listed in AS/NZS 5601.1

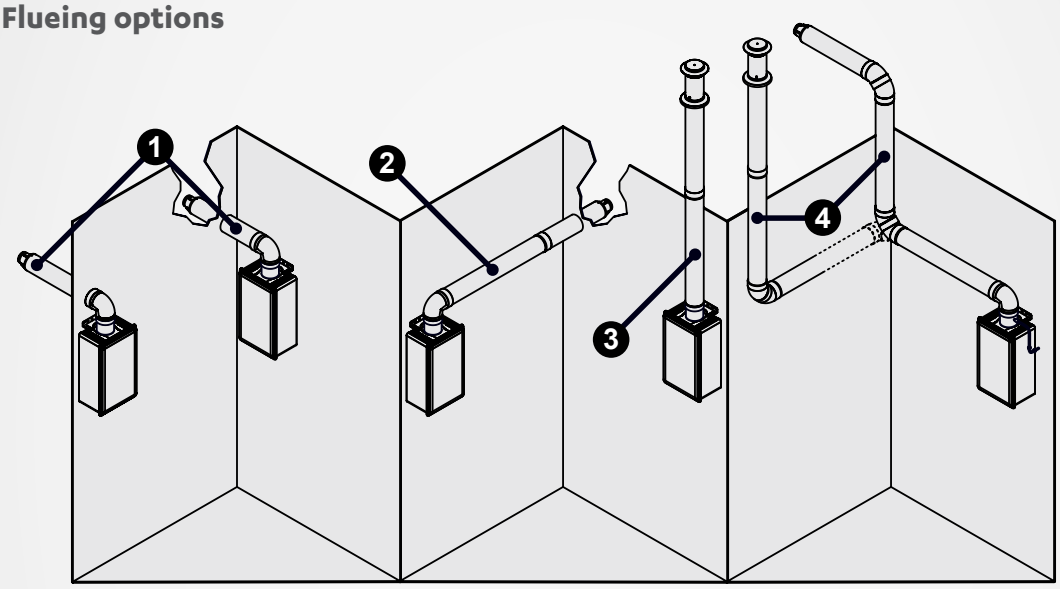
Individual flueing of internal units

Flue gases can reach temperatures up to 200 °C. The flue terminal is to terminate in a location so as not to cause a nuisance, in accordance with AS/NZS 5601.1.

The Rinnai INFINITY internal gas hot water heaters are room sealed appliances—sealed from the room as it takes air for combustion from the outside, and expels products of combustion outside. No ventilation in the space where the water heater is installed is required. Each Rinnai INFINITY water heater is flued individually.

The flueing for internal water heaters is a coaxial design. It has a stainless steel inner pipe to discharge products of combustion and a thermoplastic outer pipe for air supply to the appliance.

Flueing options



1. **Direct flueing:** For installations where the internal continuous flow unit is mounted directly on the inside of an external wall.

2. **Horizontal extension flueing**: The same as direct flueing with additional pipe required due to the longer horizontal distance.

3. **Vertical straight flueing**: Installations where the internal unit is flued vertically through the roof.

4. **Combination vertical and horizontal flueing**: A combination of all the above.

Important

- All heaters need to be flued individually—refer separate installation guide for installing Rinnai INFINITY gas hot water heater internal flueing
- A condensate drain tube must be fitted to HDi200* units if the vertical flue length exceeds 1.5 m
- Internal models MUST BE flued with a Rinnai approved flue system

* EFi units have an inbuilt system to drain condensate

Systems with EF models - condensate drain

The Rinnai INFINITY EF water heaters generate condensate continuously at a rate of up to five litres per hour as a by-product of a highly efficient gas burner. Condensate must be drained via a pipe to a suitable discharge point.

As condensate is a by-product of gas combustion it is mildly acidic. For this reason copper tube and fittings MUST NOT be used as it will corrode. Instead Rinnai recommend plastic pipes and fittings.

Condensate drain pipe
Content of AS3500.4.2003 section 5.12 'Temperature/ Pressure Relief and Expansion Control Valve Drain Lines' has been used in preparing these guidelines.

A. Water heater drain outlet connection, ½ " (15 mm) BSP male.

B. PE ½ "BSP (15 mm) female to barbed ignition system connector (13-19 mm) or equivalent plastic fitting.

C. Drain pipe and fittings to match (B).

D. Continuous fall of at least 2° from water heater to discharge point.

E. Suitable points of discharge are deemed to be sewers or pits. DO NOT discharge onto electrical connections, earth stakes, copper pipes, concrete paths, or into a pond.

Condensate drain installation
Point of discharge from each drain line shall be located so the release of condensate does not cause a nuisance, is readily discernible and incurs no risk of building damage. There shall be no tap, valve or other restrictions in any line. Each line shall fall continuously from the valve to the approved point of discharge.

Drain lines shall not discharge into a storage water heater safe tray. The end of the condensate drain line shall be:

- Not lower than 200 mm, or higher than 300 mm above an unpaved surface; or

- Not lower than 75 mm, or higher than 300 mm above a gravel pit, and not less than 100 mm in diameter in a paved surface.

Where discharging over a tundish or gully trap, drain lines shall have an air gap of a size at least twice the diameter of a drain line.

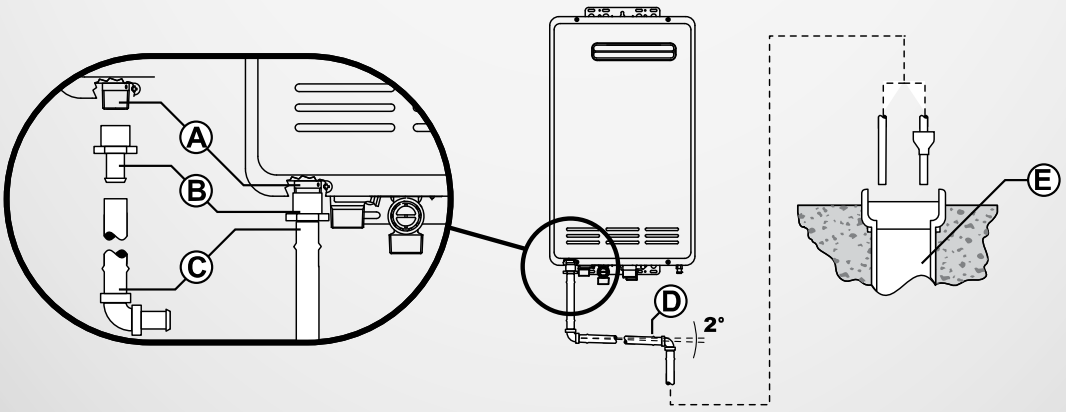
Joining condensate drain lines
Condensate drain lines from multiple water heaters may be joined together provided they conform with the installation requirements stated on this page.

Common stack discharge
Where individual heaters are installed in a multistory building, the condensate drain lines may discharge into a common stack subject to the following:

- Drained to a tundish having a discharge line that is not less than the common stack, directly connected to a fixture trap, and installed in a connection with any adjacent soil or waste stack.

- Discharge point of the common stack is readily visible and does not cause any nuisance.

- Common stack is vented by extending the pipe upwards, above the roof level.



About the AlphaStat-Plus thermostat

The Rinnai AlphaStat-Plus is a thermostat configured to switch primary pumps on water heating systems where Rinnai INFINITY continuous flow gas hot water heaters are combined with storage cylinders. It is preset when leaving Rinnai.

Depth: 40 mm
Weight: 1.2 kg

Principle of operation

- The hot water cylinder sensor is called 'TANK'.
- The upper temperature threshold is called 'SET OFF'.
- The lower temperature threshold is called 'SET ON'.

The Rinnai AlphaStat-Plus is a thermostat. The thermostat measures the temperature at the 'TANK' sensor and compares this to the 'SET ON' threshold. If the cylinder is below this threshold, then the pump is turned on to activate the Rinnai INFINITY unit(s) to heat the water in the cylinder. Once the cylinder has reached the 'SET OFF' threshold, the pump is switched off.

Important

The Rinnai INFINITY must be set to produce water at a temperature to at least 10 °C higher than the SET OFF/SET ON values on the controller. Failure to observe this requirement can cause premature system failure, which is not covered by warranty.

Rinnai preset settings

Demand	= 65 °C
Set off/on	= 65 °C/60 °C
Biosafe	= OFF
Locked	= YES

If you need different settings to those above please let us know at the time of the order or contact Rinnai to obtain the programming sheet (also available online on the Rinnai TradeSmart website).

Adjustable values range

Set off	= 21~75 °C
Set on	= 20~74 °C
Demand	= 20~100 °C
Biosafe	= 50~70°C or OFF

Features

- 20 mm soft green LED display
- External mounting holes
- UV resistant cables and enclosure
- Stainless steel water resistant temperature sensor

Power supply

230 V, 50 Hz AC. Maximum current draw with standard mains cable supplied - 10 A (at 230 VAC).

Maximum current draw with permanent fixed wiring - 16 A (at 230 VAC).

Enclosure construction

Polycarbonate (impact resistant), UL94 V-2 non-burning, UV stabilised.

IP rating - IP54 (when gland is fitted)

AlphaStat-Plus display panel

PWR light indicates that power is being applied to the unit.

The **HWC** will be on when the pump is on.

The **TANK**, **SET OFF**, and **SET ON** indicates which temperature is being displayed. Only one of the three can ever be on.

REHEAT indicates the cylinder has dropped below the SET ON point and the pump will be on. Controller will remain in this mode until the SET OFF point is reached.

HWC puts the controller into demand mode, initiating a manual request to turn the pump on. Only the HWC light will come on in this mode. To cancel press the HWC button.

If in programming mode **NEXT** will step from TANK to SET OFF to SET ON, and the display will show the temperature in °C.

AWAY puts the controller in away mode. To cancel press the AWAY button again.

TEST will check the system, all lights will flash, then displays the number of times the pump has been on. The count will reset and start again after 999.

Biosafe

The biosafe mode is to prevent the growth of dangerous organisms within the cylinder. The cylinder must reach a preset temperature of 60 °C at least once every two hours. The Rinnai AlphaStat-Plus controller is preset to have BIOSAFE switched off as the demand temperature of 65 °C ensures that the water temperature in the cylinder is above the threshold for bacterial growth.

If for some reason temperatures below 60 °C are programmed into the controller BIOSAFE will need to be set.

Away

The AWAY function is to allow for long periods where hot water is not required. Pressing the AWAY button will prevent the pump from being switched on to activate the Rinnai INFINITY units.

The AWAY light flashes to indicate the user has placed the controller in a suspended state. No power will be applied to the hot water system until the AWAY button is pressed again to cancel it. The AlphaStat-Plus will remember AWAY mode even if the power goes off and comes on again.

Filling and draining

Do not turn on the pump or system until the cylinder is completely full of water. Damage to the system as a result of not following this instruction will void any warranty.

Filling

1. Flush the cold water inlet pipe to remove any debris before final connection to the cold water inlet of the Demand Duo cylinder.

2. Ease the TPR valve open to expel air while the cylinder is filling with cold water.

3. Slowly open cold water expansion valve on the cold water supply pipe.

4. Allow cylinder to fill.

5. Check all connections for water leaks and tighten as required.

6. Prime circulating pump before start up.

7. The thermostat on the Demand Duo cylinder is set to 65 °C and the Rinnai INFINITY is set to 75 °C. If the cylinder thermostat does not appear to be set correctly the thermostat may need to be reprogrammed—refer programming sheet available within the technical section of the Demand Duo product on the Rinnai website or contact Rinnai for assistance.

   If hotter water is required the cylinder and the Rinnai INFINITY dip switches will need to be adjusted.

8. Plug 3-core flex into suitably earthed general power outlet (GPO). Turn on power supply. The thermostat will display the current water temperature in the cylinder, the pump should start and the Rinnai INFINITY units should ignite.

9. The Rinnai INFINITY units will continue to operate until the thermostat reaches 65 °C. Once the set temperature has been reached the thermostat will turn off the primary circulating pump.

Draining

1. Isolate power supply to the Demand Duo system.
2. Close the cold water isolation valve.
3. Ease the TPR valve open to expel air.
4. Remove cap on the cold water drain valve if no drain line is fitted.
5. Connect a hose or similar to allow water to drain to a safe location.
6. Open cold water drain valve and allow water to drain from the system.

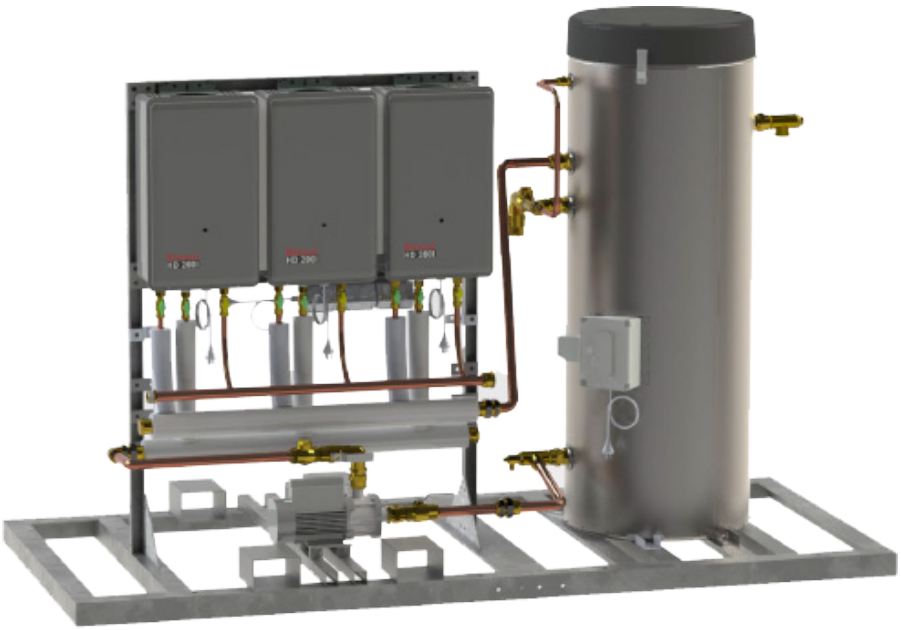
Commissioning

Fill cylinder as detailed on previous page and commission the Rinnai INFINITY units in accordance with the commissioning sheet attached to the front cover of each unit.

Troubleshooting

A full set of error codes for the Rinnai INFINITY units* and thermostat are available in the owner's manual—separate document that is provided with the system.

* Error codes are displayed in the status monitor of all commercial Rinnai INFINITY units except the HDi200 and HD250 models (no status window on these models).



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