Central Heating
TRADE

Ducted Fan Coil Installation Guide

Ducted Fan Coil Installation Guide

This installation guide is intended to support the installation of Ducted fan coils in a roof space installation. This guide should be consulted alongside the manufacturers manual and any system design documents.

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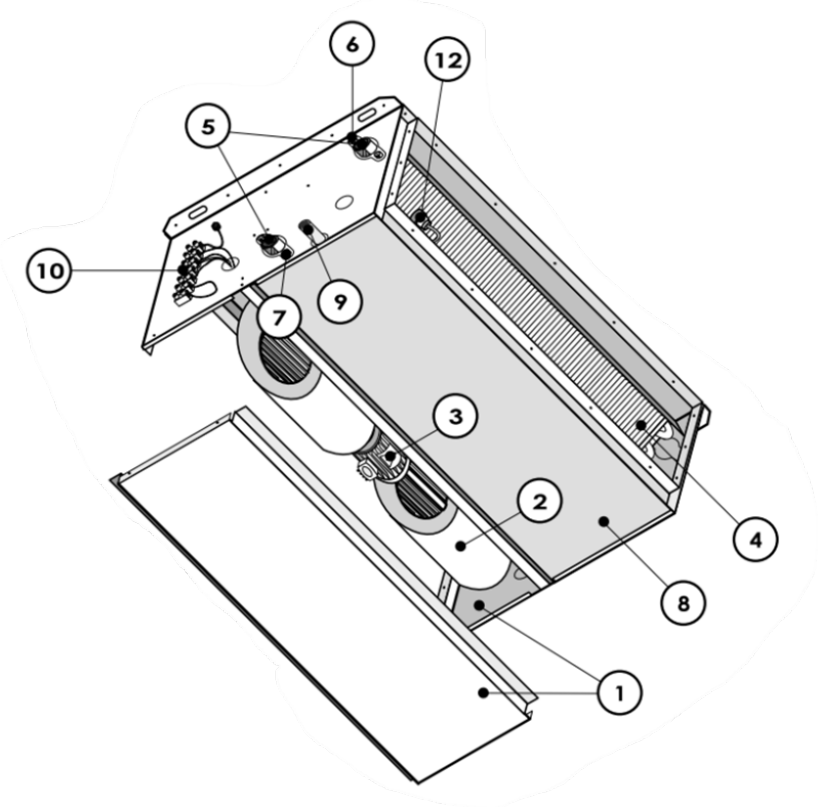
Main Components



Standard Features:

1. External casing
2. Centrifugal Fan group
3. Fan motor
4. Finned coil
5. Hydronic connections
6. Manual air vent
7. Manual drain port
8. Condensate drain pan
9. Condensate drain connection
10. Electrical connections

Optional Accessories:

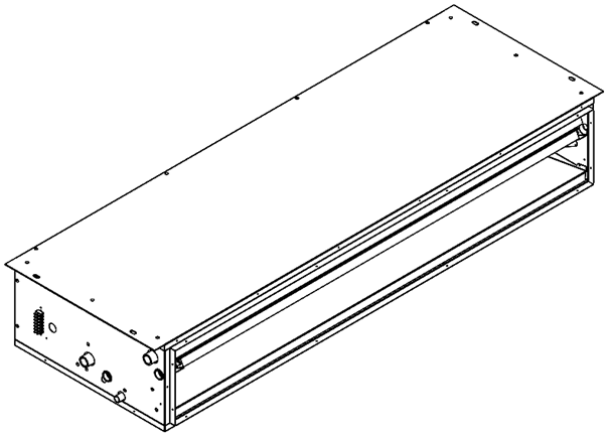
11. Different air filter types
12. Water temperature sensor
13. Auxiliary hydronic and or resistive heater coil

Versions

There are two types of ducted fan coil available.

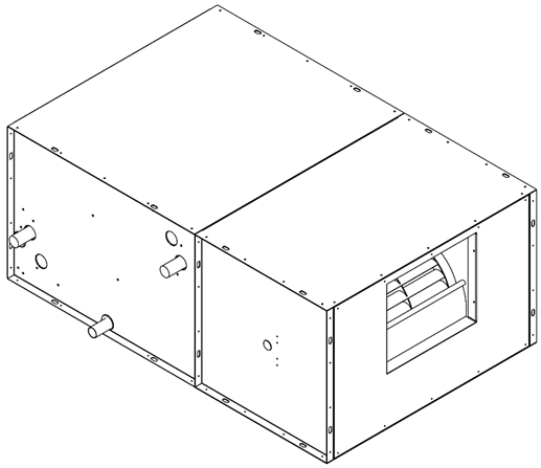
FC-HD-7

Slim, low profile, 2 pipe fan coil with EC motor and 0-10VDC speed control



FC-HDHSP-14

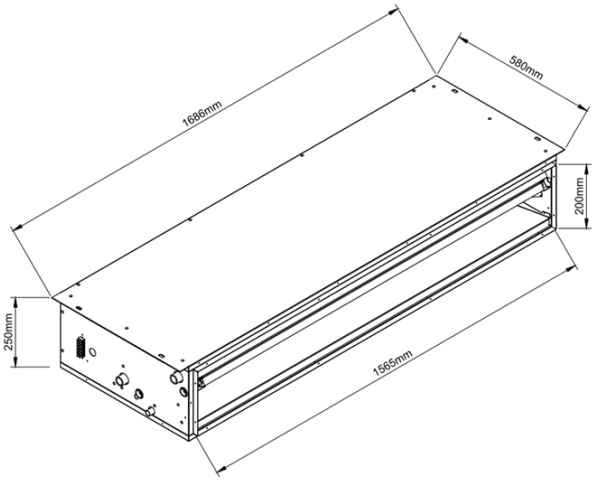
High capacity, high static pressure, 2 pipe fan coil with AC 3 speed motor including 0-10VDC control converter

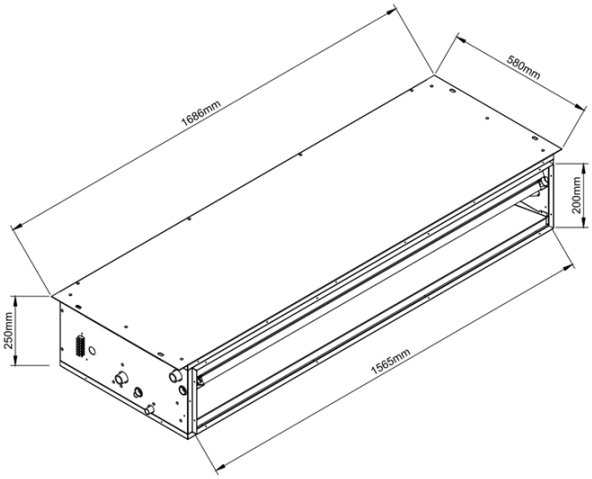


Other sizes, air intake/supply options, and other configurations are available on request to suit project specific requirements.

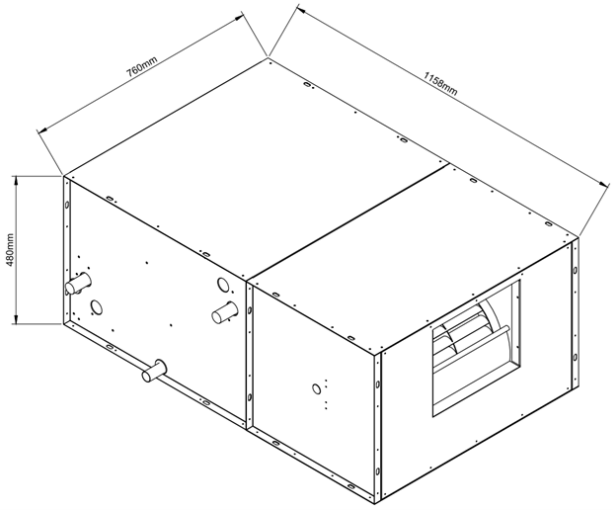
Dimensions

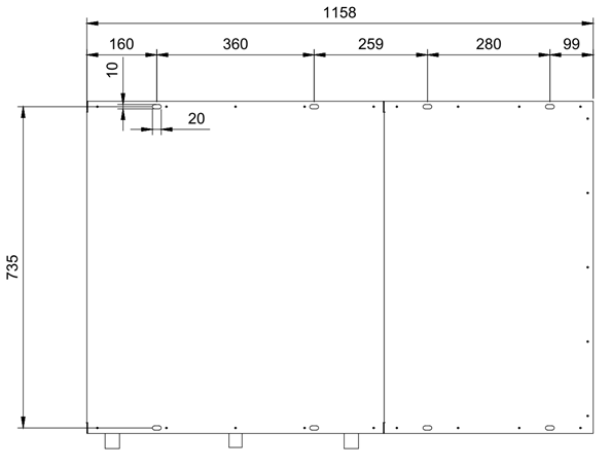
FC-HD-7





FC-HDHSP-14





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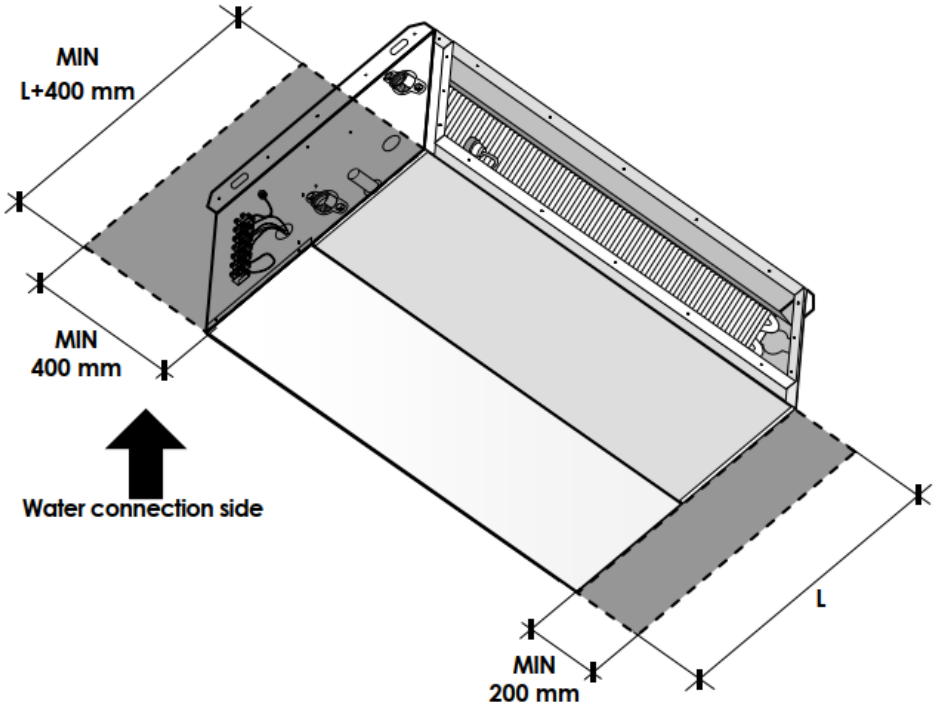
Unit Access

Ducted fan coils need to be provided with sufficient access for installation and maintenance. The roof access hatch should be suitably sized to allow the removal of the unit in the future. A suitable clear space around the unit should be provided for access for maintenance as per the drawing below:



Minimum manhole sizes are:

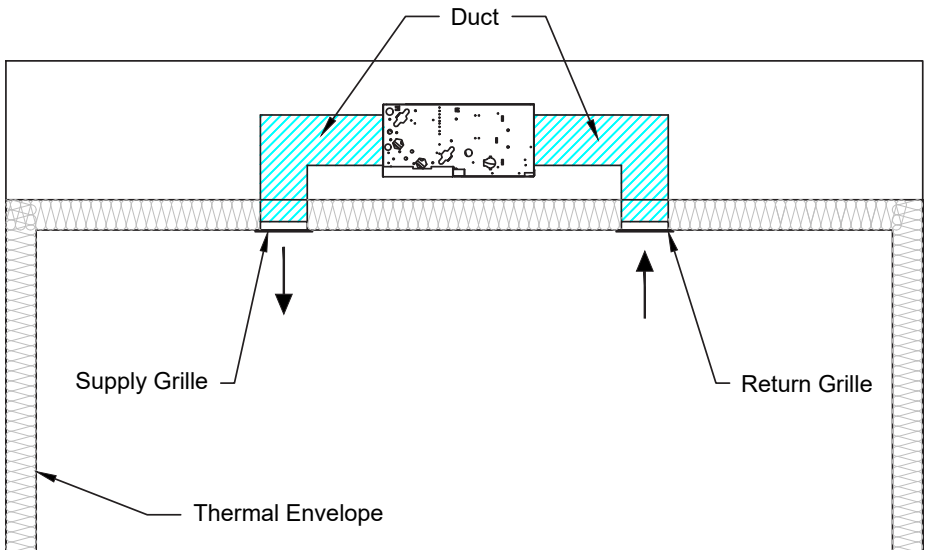
- FC-HD-7 = 600mm x 900mm with 950mm above clear
- FC-HDHSP-14 = 800mm x 900mm x with 950mm above clear

Recommended manhole sizes are:

- FC-HD-7 = 700mm x 1000mm with 950mm above clear
- FC-HDHSP-14 = 850mm x 1000 with 950mm above clear

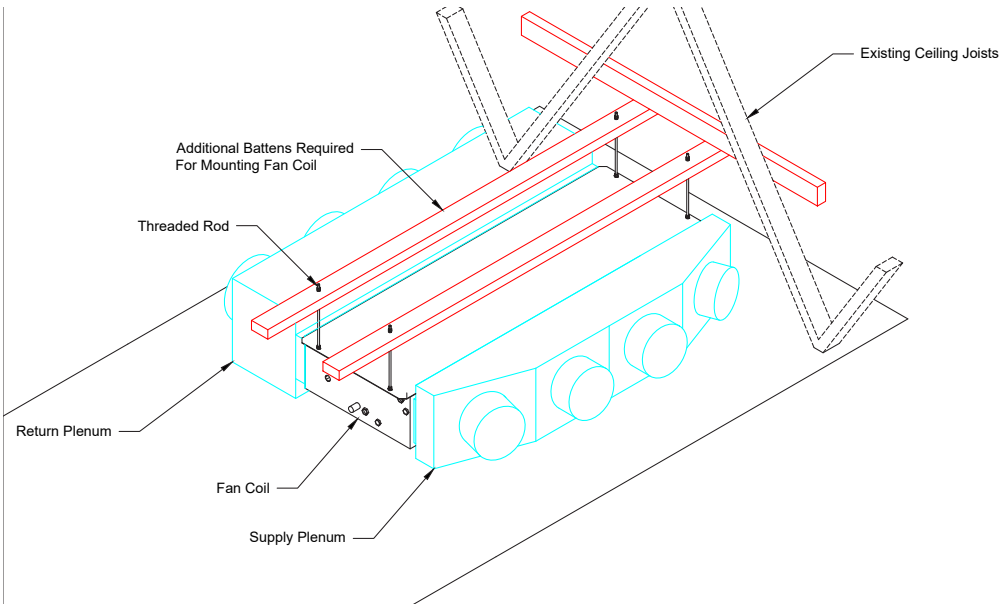
Installation Options

Ducted fan coil units can be installed in various configurations to suit different project requirements. These units are typically installed in the roof cavity and use insulated supply and return ducting to connect the unit to ceiling or wall grilles located throughout the home.



Plenums:

The FC-HD-7 & FC-HDHSP-14 fan coils are available with standard plenums suitable for most installations. However, custom plenums can be fabricated to meet project specific requirements.



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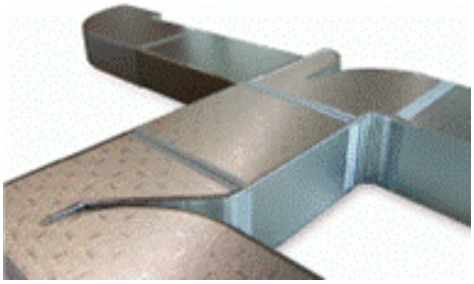
Ducting:

For most FC-HD-7 & FC-HDHSP-14 fan coil installations the ducting from the plenums to the supply and return grilles will be run in flexible insulated ducting, flexible ducting as standard will have an R value of 0.6 however R1.0 flexible ducting is also available:

For specific projects flexible ducting may not be suitable and round or rectangular ducting is required, for these projects the size and type of ducting will be selected to suit the projects requirements;

- Round ducting is typically manufactured from externally insulated galvanised tube



- Rectangular ducting is typically manufactured from internally insulated galvanised sheet or rigid insulation panel

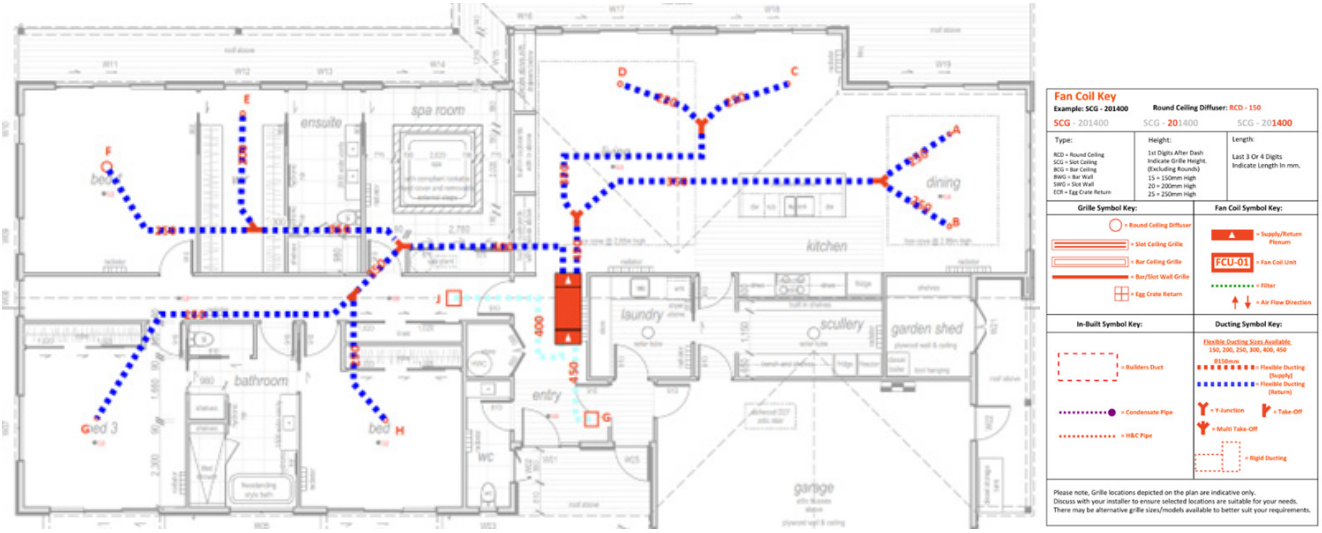
Ducted Design

Central Heating New Zealand's engineering team will complete the design for the ducted system using our fan coils, the design will include the following;

- Cooling load calculations
- Fan coil selection
- Duct and grill sizing
- Ducting layout drawings

The design process for ducted fan coil systems has been developed by our engineering team to complement our standard free design process and will be included with the design of any radiant heating or cooling systems as a package.

At the quoting stage, ducting layout drawings will include a plan view showing the fan coil location, grille positions, ducting paths, and the sizing of all equipment:



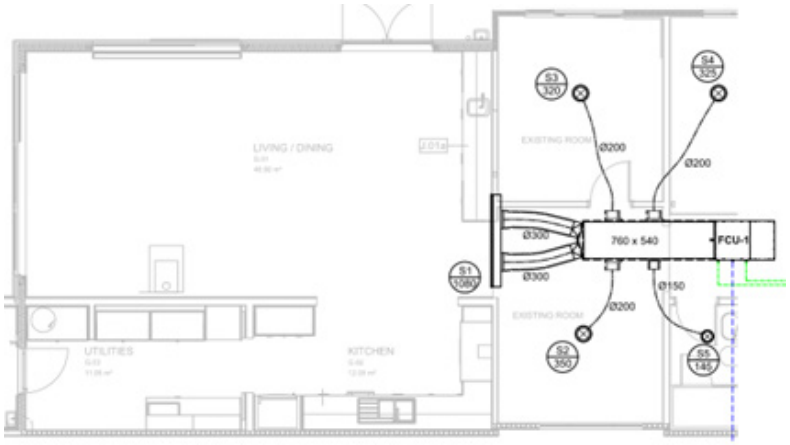
An estimate for the ducting materials will be included with our equipment designs.

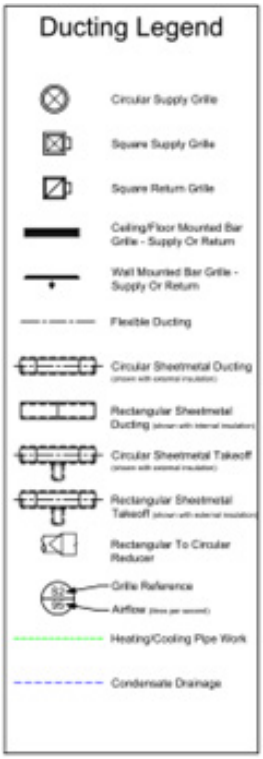
Upon acceptance of the design, a coordinated CAD drawing detailing the ducting layout and components can be provided on request.

This drawing will offer precise specifications for the arrangement of the fan coil unit and associated ducting elements, and will be particularly valuable for the development of more complex ducted system designs:

Fan Coil Schedule					
Ref	Make	Model	Type	Airflow (L/s)	Valve Size
FCU-1	MAXA	HCNA-165	Ducted	2230	1" M

Grille Schedule					
Ref	Make	Model	Type	Size	N°
S1	Holyoake	LD600RCEN	Circular Supply	1800x200	4
S2	SmoothAir	PYCD200	Circular Supply	Ø200	2
S3	SmoothAir	PYCD200	Circular Supply	Ø200	2
S4	SmoothAir	PYCD200	Circular Supply	Ø200	2
S5	SmoothAir	PYCD150	Circular Supply	Ø150	2
S6	SmoothAir	PYCD200	Circular Supply	Ø200	2





Installation Planning

When installing a ducted fan coil the planning of the installation is the most important aspect, these installations can involve many trades and ensuring the requirements for each are considered and coordinated will be key to a successful installation.

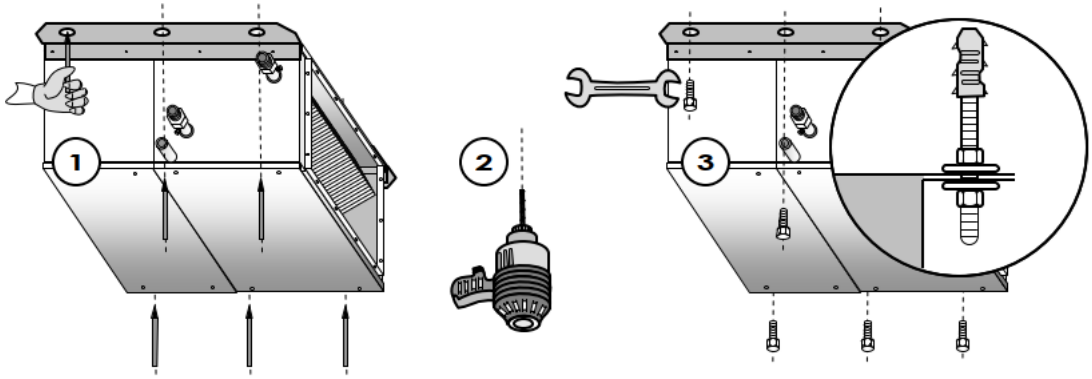
The list below outlines the steps and considerations for ducted fan coil installation planning;

1. **Unit Location:** The intended location of the fan coil should be shown on the plans, including the positions of supply and return grilles, ducting, access panels/hatches, condensate drains, and pipework.
2. **Grille Types & Size:** The size and type of grille will generally be determined by the installation scenario and performance required. The size of the opening required for the grille needs to be coordinated with the builder to ensure this practical with the structural framing requirements.
3. **Insulated Ducting:** Supply and return air must be run in insulated ducting from the unit to the corresponding grilles. Ensure the ducting size can be fitted within the structure. A site visit should be completed once the framing is in place to confirm duct sizes and to schedule the manufacture of any required custom rigid ducting.
4. **Access Panels:** Provision for future access for maintenance or replacement of the units is required. The size of these access panels needs to be provided to the builder so that this is factored into the construction. In most situations access will be possible through the ceiling access hatch but the size, orientation, and location of this may need to be adjusted to permit installation and removal of the fan coil unit.
5. **Insulated pipes:** Insulated pipes that provide the heated and/or chilled water need to be planned and run from the heat source or plant to the units location ensuring that the pipe routes are as short as possible.
6. **Condensate Drains:** Drainage for the condensate pipe must be provided. For units not mounted on or near an external wall, provision for drainage may need to be made in the floor early in the project, (i.e. before the concrete slab is poured).
7. P**ower & Controls:** Electrical supplies and control cable routes are needed from the switch board and/or the systems wiring centre. If these need to be run earlier in the project this should be planned out in advance.

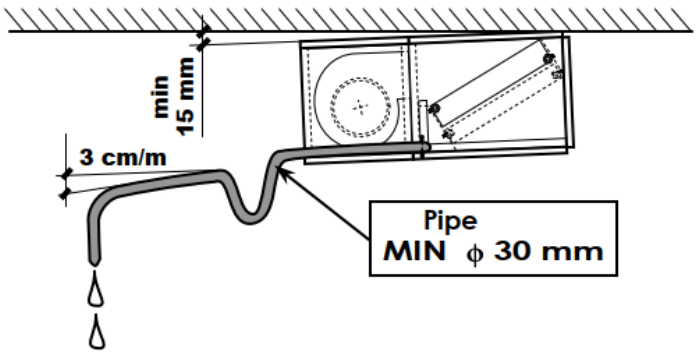
Mounting Unit

Ducted fan coils are fitted into the structure once the building is enclosed. Once this is completed the unit can be installed as per the following process;

1. **Mark Out:** Measure and mark out the unit, grill, access panel, pipe, drain, and electrical locations on the framing, linings, ceiling or floor. Check that the unit can be fitted in its intended configuration and access to all services is suitable.
2. **Fixings:** Add timber or similar into the building structure for the fixing of the fan coil, ducting, grilles, and pipe supports.
3. **Ducting and Grilles:** Mark out the location of the supply and return grilles and adjust as required to suit the locations of ceiling battens and trusses. Run flexible ducting to the location for the grille and allow an extra 1m of ducting to be pulled through the ceiling to fit the grille to later. Record and/or mark out the exact locations of the grilles to allow these to be cut into the gib later.
4. **Fit & Seal Plenums:** Fit the supply and return plenums to the fan coil once it is up in the roof space. Secure and seal the plenums to the fan coils with screws or rivets, and sealing tape.
5. **Mount Unit:** Mark out the units fixing locations on the supporting timber and attach threaded rod to hang the unit from. Hang the unit from the threaded rod and if required fit suitable seismic restraints – refer to the CHNZ Fan Coil Installation Detail Drawings.



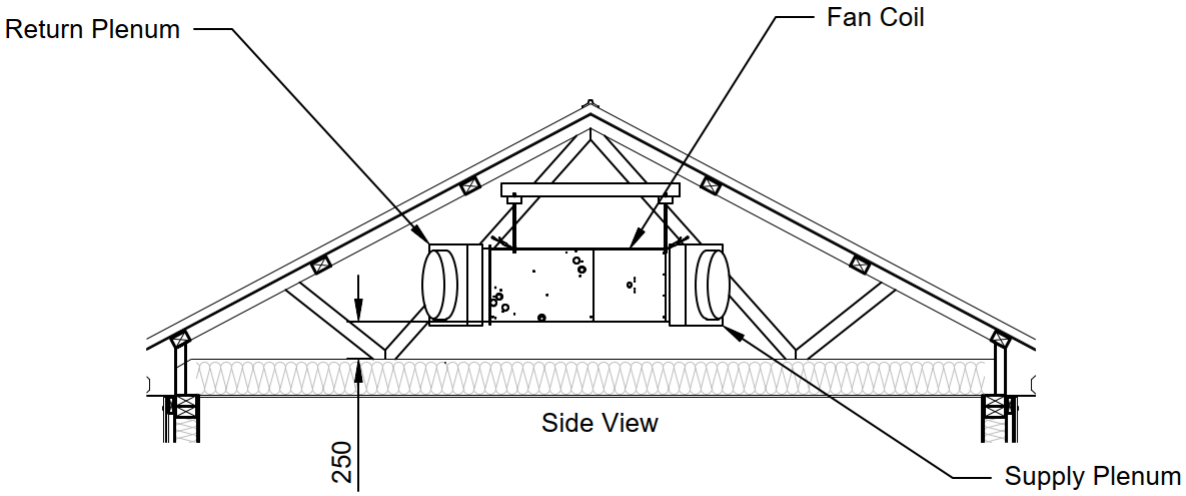
Ensure the unit is installed with a 3% slope to the back and drain side of the condensate tray. Pour a small amount of water into the tray and confirm that this will drain freely to the drain location.



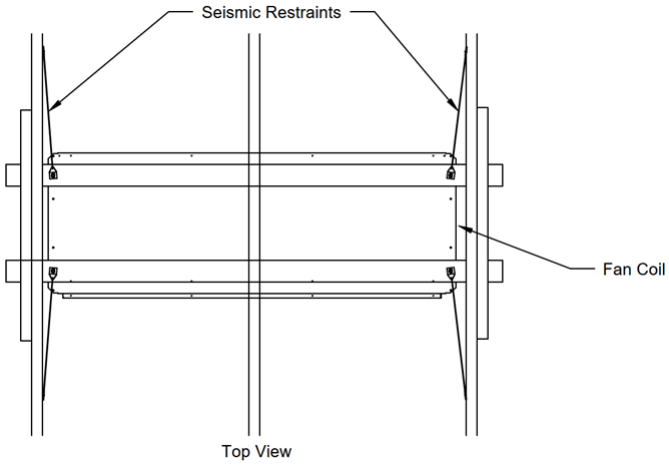
6. **Hydraulic Connections:** Make the required connections from the fan coil to the system pipework, ensuring that all necessary valves, air vents, and control components are installed. All pipe, valves, & fittings should be insulated with a minimum of 9mm insulation but preferably 13mm insulation (see CHNZ Chilled Water Insulation Guide). Connect the units drain to the previously installed condensate drains, ensuring all connections are glued and fall is maintained, using pipe fittings or a proprietary trap a condensate trap must be installed in the drain from the unit (refer to CHNZ condensate guide).
7. **Electrical Connections:** The required cables from the plant, switchboard, and controller which should have been run at an earlier stage and can now be connected to the fan coil and any control valves fitted on the supply pipe. Make these connections now, ensuring they are secure and correctly wired. Some controllers require a temperature probe to be installed on the supply pipe to prevent the fan from operating until the water has reached the appropriate heating or cooling temperature. Secure the probe to a metal fitting on the supply pipe and wrap it with insulating tape. Wiring should be installed to AS/NZS 3000:2000 standard by a registered electrician.
8. **Testing:** Once the unit is installed, the system should be tested. Where possible, the controller should be fitted and the unit powered to confirm proper fan coil operation (speed control & mode check). All pipe connections must be pressure tested to ensure they are watertight, and water should be poured into the condensate tray to verify that the drain is well sealed and free-flowing.
9. **Enclose Unit:** Once the unit has been installed and tested, the surrounding structure, such as wall framing, ceiling, or joinery, can be completed to enclose the unit. Ensure that appropriate access openings are provided, as outlined in the unit access section of this document.

Mounting Units

Ducted fan coils are typically mounted in the roof space of a home and a structure is fabricated to hang the units from the trusses:



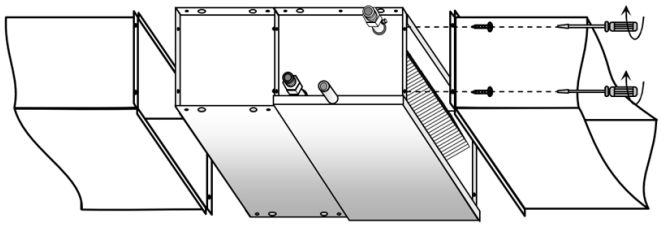
Where the hangers for the units are longer than 200mm seismic restraints must be used to ensure the fan coils movement is limited in a seismic event:



Refer to the CHNZ Ducted Fan Coil Installation Drawings for more details on the unit mounting.

Plenums

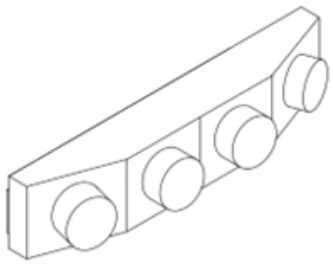
Ducted fan coils will need to be installed with insulated supply and return plenums as the transition from the fan coil to the insulated ducting.



For the two stocked size ducted fan coil units CHNZ have standard plenums available:

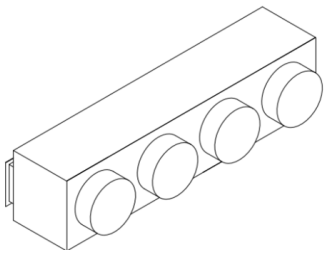
FC-HD-7 Supply Plenum

(4x Ø300 spigots)



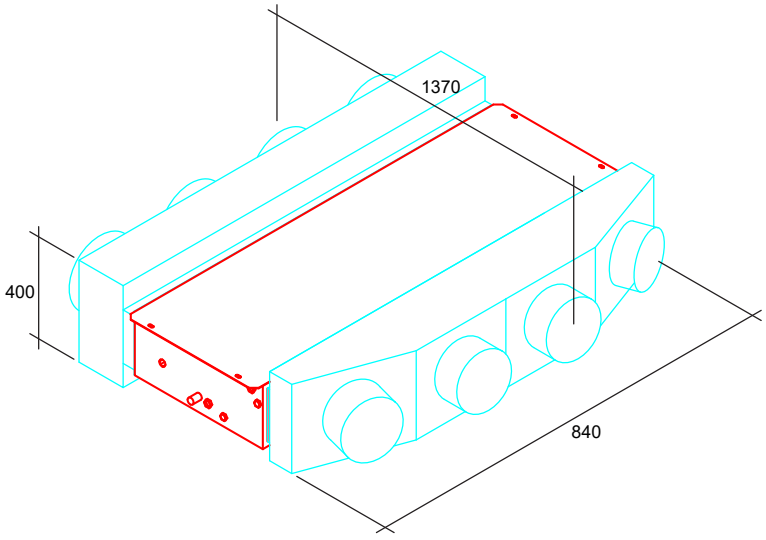
FC-HD-7 Return Plenum

(4x Ø300 spigots)



FC-HD-7

Detail and dimensions of both supply and return plenums fitted



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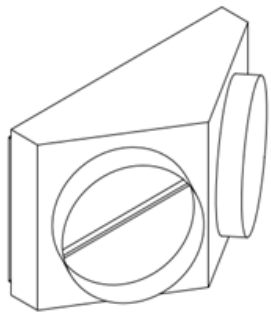
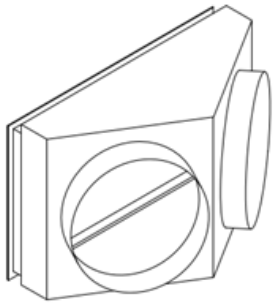
FC-HDHSP-14 Supply Plenum

(2x Ø450 spigots)



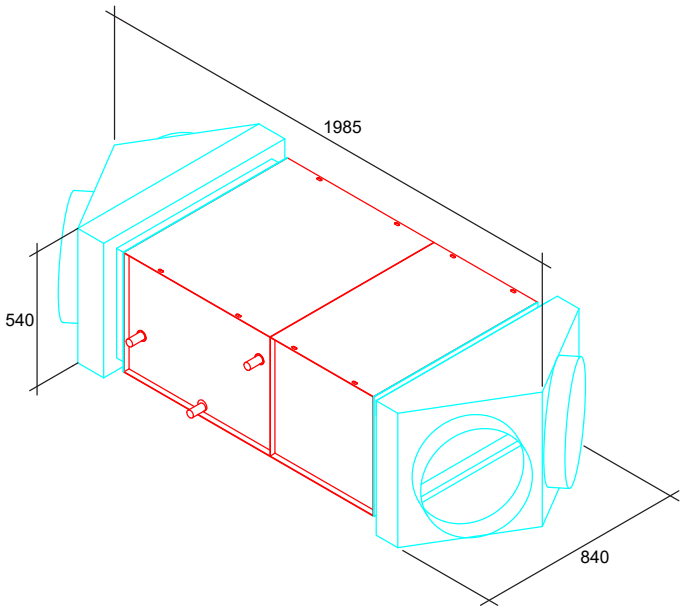
FC-HDHSP-14 Return Plenum

(2x Ø450 spigots)



FC-HDHSP-14

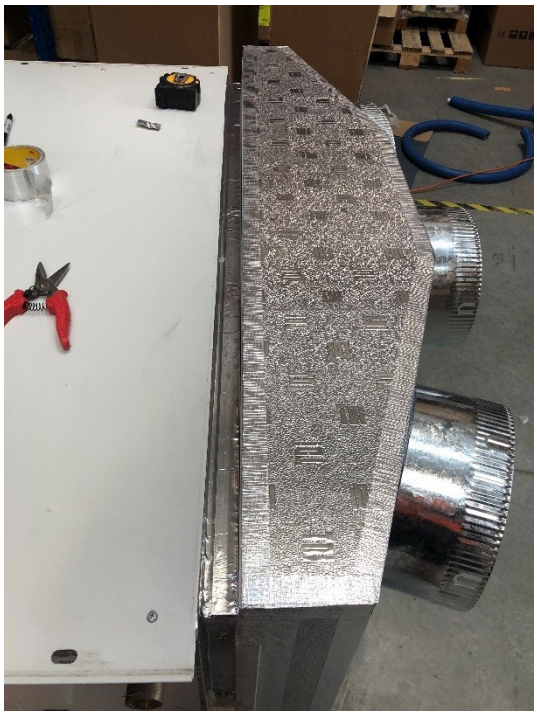
Detail and dimensions of both supply and return plenums fitted



Plenum Fitment

It is recommended to fit both supply and return plenums to the fan coil unit once the unit has been moved into its final position and hung. Verify that plenums, once fitted will clear structural members and not obstruct any services.

- If the unit includes a factory fitted return air filter (FC-HD-7), remove this as a supplied filter will be integrated either in the return air plenum with service access or in the return air grille.
- Dummy fit plenums and mark any holes required for predrilling.
- Drill holes for fixings.
- Fasten plenums to fan coil unit around the perimeter using suitable Tek screws or rivets.
- Seal joint between plenum and fan coil with duct sealant RTV or foil tape to prevent air leakage.



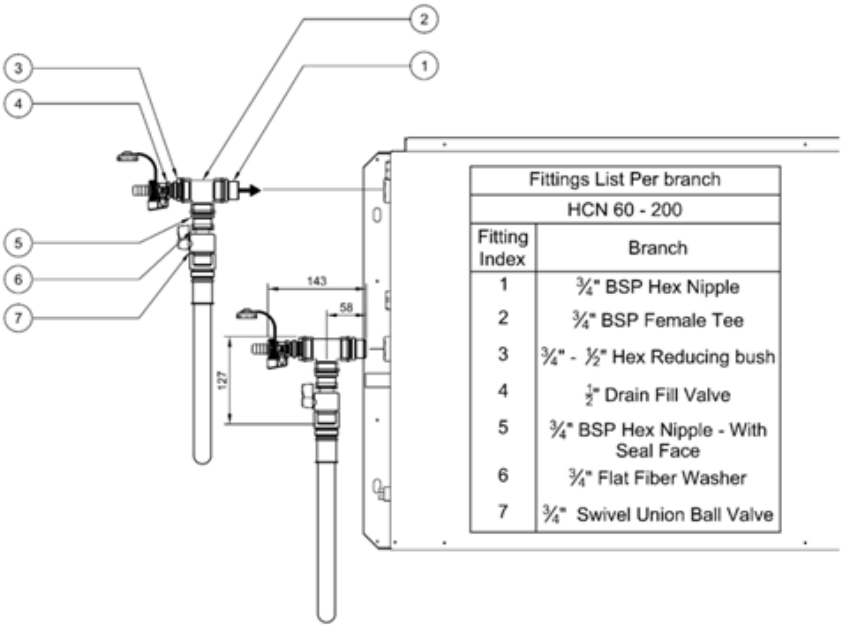
Where a project requires a bespoke plenum CHNZ will design and supply this. If you prefer to source/manufacture your own plenums, please contact us for the plenum flange size and connection requirements.

Water Connections

The FC-HD-7 & FC-HDHSP-14 fan coils are supplied with female hydraulic flow and return connections, each fan coil should as a minimum have isolation and drain/vent connections fitted to each port to allow for easy commissioning and servicing of the units.

To assist with making these connections CHNZ have developed fittings kits than can be ordered with each fan coil model as shown below:

FC-HD-7 Fitting Kit - FCFITHD



Fittings List Per branch	
HCN 60 - 200	
Fitting Index	Branch
1	¾" BSP Hex Nipple
2	¾" BSP Female Tee
3	¾" - ½" Hex Reducing bush
4	½" Drain Fill Valve
5	¾" BSP Hex Nipple - With Seal Face
6	¾" Flat Fiber Washer
7	¾" Swivel Union Ball Valve

Quantity	Description	Product Code
2	Brass ¾" BSP Hex Nipple – Plain	HMHBHN20
2	Brass ¾" BSP Hex Nipple – With Seal Face	HMHBHNS20
2	Brass ¾" – ½" BSP Hex Reducing Bush	HMHBRB2015
2	Brass ¾" BSP Female Tee	HMHBFT20
2	¾" Swivel Union Ball Valve	BXCKHT
2	½" Drain/Fill Tap	DRAINTAP15

New Zealand's Experts

The combination of our skills, products, experience and people, make us New Zealand's experts in the central heating industry. We take pride in supplying the right heating system or products for our customers' specific functionality and budget requirements so that at the end of every project, both our customers and their clients are delighted—and warm.

Central Heating New Zealand: the experts in hydronic central heating and cooling products, systems and design.

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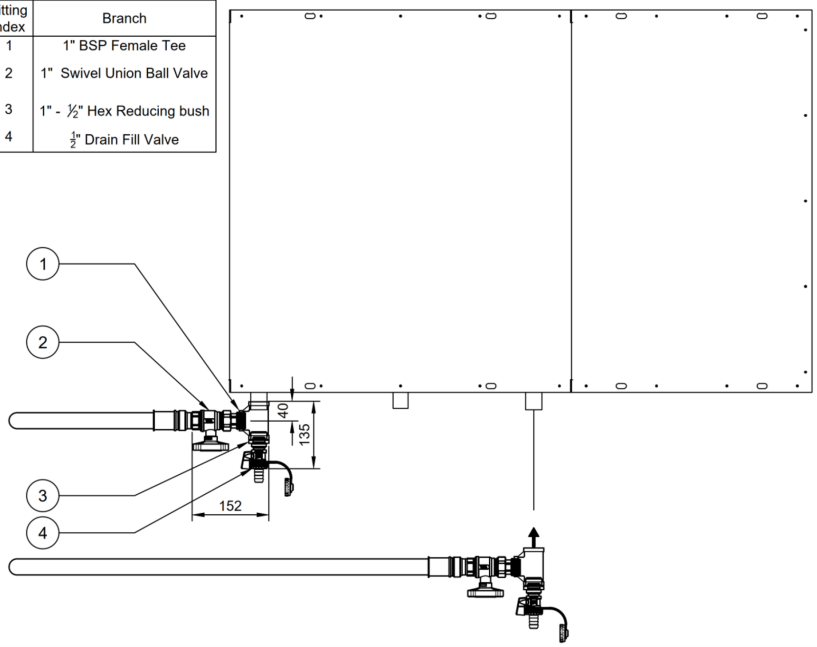
3 Enterprise Avenue, Islington, Christchurch, 8042
info@centralheating.co.nz
0800 357 1233

FC-HDHSP-14 Fitting Kit - FCFITHDHSP

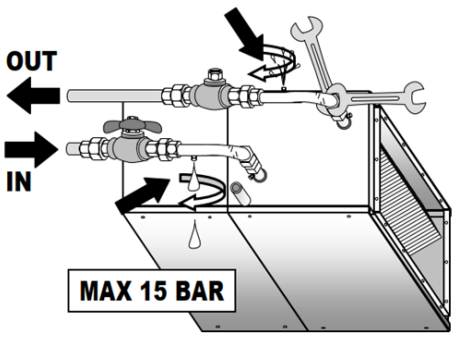
Fittings List Per branch	
FC-HDHSP	
Fitting Index	Branch
1	1" BSP Female Tee
2	1" Swivel Union Ball Valve
3	1" - ½" Hex Reducing bush
4	½" Drain Fill Valve



Quantity	Description	Product Code
2	Stainless 25mm x 15mm Reducing Bush	STREDB2515
2	Stainless Tee 25mm	STT25
2	FAR 1" Ball Valve With Swivel Union	VBF1FMBG
2	½" Drain/Fill Tap	DRAINTAP15

These fittings and valves allow for easy installation, commissioning, and servicing of the fan coil units.

- The fan coils supply and return coil connections include drain valves in each fitting, but these are limited in their ability to allow flushing/venting of the fan coil. For this reason, it is recommended to fit drain/vent taps into the pipe work for each unit to permit easy filling, flushing, and venting of the fan coil.
- If flow control is to be managed at the fan coil, a 2-port motorised valve should be installed at the fan coil unit. The recommended valve for this is the Danfoss zone valve with actuator, with sizing determined based on the system design. Refer to the system schematic to confirm if this is required.
- The minimum pipe size that is permitted to be run to these units is 20mm ID, (25mm OD Multitubo), the sizing of the pipe will be dependent on the system design, and the schematic should be reviewed to confirm he pipe sizing.



- All pipe work, valves, and fittings must be insulated with minimum 9mm thick insulation but 13mm thick insulation should be used where possible.
- Pipe work must be suitably supported and not allowed to 'rest" on the fan coil fittings.

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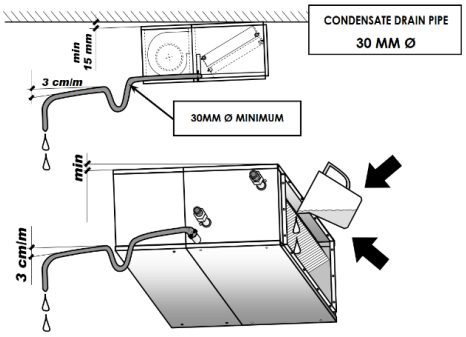
Condensate Drain

The FC-HD & FC-HDHSP fan coils include drain trays to collect the condensate that is produced on the heat exchanger when operating in cooling mode. The condensate needs to be drained away to a suitable drain location.

- The CHNZ Condensate Drainage Guide provides general advice for planning and installing fan coil condensate drains. This should be referred to before installing any fan coil system.
- The FC-HD & FC-HDHSP fan coils should be installed with an intentional slope back to the drain spigot.
- The FC-HD fan coils are supplied with a 20mm stub for connecting the condensate hose to and it is recommended that 20mm PVC pressure pipe is used for the condensate pipe connection to the fan coil with a rubber boot (supplied) used to connect the pipe to the unit.



- The FC-HDHSP fan coils are supplied with a 30mm stub for connecting the condensate hose to and it is recommended that 25mm PVC pressure pipe is used for the condensate pipe connection to the fan coil with a rubber boot (supplied) used to connect the pipe to the unit.
- The condensate pipe should be installed with at least 3% fall along its entire length to a suitable drain location, the installation of a trap/siphon in the drainpipe is mandatory.
- The condensate should be run in its own drain to outside or where combined into an internal wastewater drain this should be done via an open trap to ensure no odours can be drawn into the fan coil.
- The condensate drain should be tested to confirm that there are no leaks.

Filling & Flushing

The following procedure is recommended for filling and flushing of the FC-HD & FC-HDHSP fan coils:

1. Fill and flush the system with all valves on the fan coil closed.
2. Open the fan coil flow pipe isolation valve and then open the return port vent/valve.
3. Once water is present at the return vent, close this and open the return isolation valve.
4. Run the flushing cart/system pumps to remove all air from the unit.
5. Once the fan coil is flushed and free of air, isolate this fan coil from the system until all other system components are flushed.

Commissioning

The following procedure is recommended for commissioning of the FC-HD & FC-HDHSP fan coils:

1. Once the system is filled, flushed, and operating - functional tests and balancing of the fan coil should be completed.
2. The fan coils water supply may include a balancing valve/flow meter. Set the valve to the designed setting/flow rate and record the setting/flow rate achieved.
3. Using the fan coils controller test all of the fan coils functions, this will include all or some of the following;
    - Fan operation prevented until water temperature at controller probe in correct range, test for both heating and cooling.
    - Fan coil operation (fan run and valve open) in both heating and cooling mode.
    - Air flow direction and quantity correct through adjustments of grille.
    - Filter installed correctly and all return air passed through filter element with no gaps.
4. Test the fan coils air flow is sufficient and confirm there is no air leakage around the outside of grilles and builders ducts/joinery.

In the CHNZ design process air pressure drops will be balanced as closely as practical to promote natural balancing of the air flow rates to each room, but as the installation may deviate from the design some additional balancing of the air flows into each space may be required. Installation of additional dampers may be required to achieve this. A anemometer and duct balancing hood will be required to accurately balance a system.

Electrical Connections

The FC-HD & FC-HDHSP fan coils are fitted with a terminal strip inside an electrical enclosure for making the field wiring connections. When making these connections consider the following:

- Wiring diagram: Carry out electrical connections according to the included wiring diagram. Diagrams may be updated, so refer to the one provided on the unit.
- Connection & Switch: Connect the unit to a suitable permanently connected and locally switched power supply.
- FC-HD Connections: the FC-HD fan coil features a brushless fan and requires a suitable 230V power supply along with a 0–10V fan speed control signal. Additionally, depending on system requirements, the zone valve and pipe sensor connections may be needed at the fan coil. These connections may be able to be run through the fan coil's electrical enclosure to maintain a tidy and safe installation.
- FC-HDHSP Connections: the FC-HDHSP fan coil has a 3-speed fan, and the signal converter kit is required to be fitted at this unit also. The 230V power supply will need to be run to the fan coil wiring enclosure and then linked over to the signal converter enclosure, along with a 3-core cable for the 3 fan coil speed supplies. The 0-10V fan speed signal will need to be run to the signal converter. Additionally, depending on system requirements, the zone valve and pipe sensor connections may be needed at the fan coil. These connections may be able to be run through the fan coil's electrical enclosure to maintain a tidy and safe installation.
- Compliance: All wiring and connections must be made in compliance with AS/NZS 3000:2000.

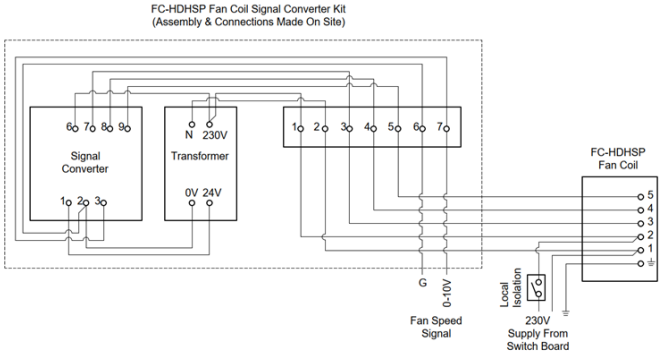
FC-HDHSP Signal Converter (FCACON0103)

To use a 0-10V controller with the FC-HDHSP 3 speed fan coils CHNZ will supply a 0-10V to 3 Speed signal converter kit, this kit will typically be located with the fan coil and includes the following components;

- 0-10V to 3 Speed converter
- 230VAC to 24VDC transformer
- Electrical enclosure
- DIN mounted terminals
- Length of DIN rail.

These items are supplied semi assembled inside the electrical enclosure for assembly and connection by the electrician as per the wiring diagram below:

The signal converter includes 4 potentiometers, the default set points for these suit all typical applications and using the SmartOne thermostat the fan speed voltage output can be easily adjusted if required.



See instruction supplied with the FCACON0103 for detailed installation.

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Grille Options

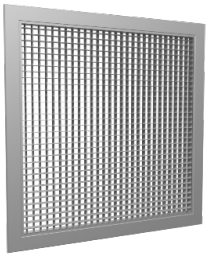
Depending on the system requirements and/or the homeowner's aesthetic preferences, CHNZ will offer three design options:

Standard Installation Specification

This option prioritizes affordability and functionality, using base model components suitable for most residential installations.

Round Ceiling Diffuser (RCD)

Plastic, white, round ceiling diffuser available in diameters from 150 mm to 300 mm.



Return Air Grille (RAG)

Metal construction with a hinged face and integrated filter element. Powder- coated white, egg crate grille type, available in a range of square and rectangular sizes.

Designer Specification

Intended for premium builds where aesthetics is a priority, this specification includes high-end components selected from a predefined range. All items are suitable for painting or powder coating by the customer.

Round Ceiling Diffuser (RCD)

- Round Ceiling Diffuser (RCD as above or options of Linear Bar Grilles and aluminum Round Plaque Diffusers.
- Available in white, with customizable finishes, and offered in various sizes.

Return Air Grille (RAG)

Constructed from metal or aluminum with removable cores for filter access. Available in multiple styles including:

- Pitched blade designs for enhanced visual appeal.
- Louvred grille variants.
- Linear return grilles suitable for low-level plenum installations.

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Bespoke Specification

This specification covers custom solutions outside the scope of Standard or Designer options, tailored to unique architectural or aesthetic requirements.

Components may include:

- Custom supply air diffusers (e.g., ceiling slot diffusers)
- Custom return air grilles
- Specialized plenums and ducting

Design Considerations

- Bespoke installations often require detailed planning and multiple design iterations. CHNZ can perform heat load calculations and ducting design for most projects. Complex designs may be referred to external consultants.

Installation Flexibility

- Bespoke components can be integrated into non-standard locations including floors, walls, and ceilings. Close collaboration with architects and builders is essential to meet both functional and aesthetic goals.

Filters

All air that enters a fan coil needs to be filtered, return grille filters or filters installed in the return air planum must be used to ensure any particles in the air do not enter the fan coil as these would collect on and block the heat exchanger. The filters also provide the added benefit of collecting and removing particles and allergens from the homes air to provide a healthier internal environment.

The filters need to be accessible and at least annually need to be cleaned by the service agent. Correct installation of the filter element is critical to ensure no unfiltered air is allowed to enter the fan coil unit, so it is not recommended that the filter is removed by the homeowner, however if required external vacuuming of the filter grille monthly is sufficient between annual filter cleaning.

The filters supplied with the units are G3 type filters which provide sufficient filtration for normal residential and commercial applications, if a higher level of filtration is needed then filters with a higher filter grade can be custom made.

** If the unit has a factory fitted return air filter (FC-HD-7), remove this as a supplied filter will be integrated either in the return air plenum with service access or in the return air grille. Once plenums are fitted this filter will become inaccessible.*

Maintenance

The following table lists the recommended maintenance tasks along with the recommended frequency:

System Aspect	Maintenance Overview	Who	Frequency
Pipe Insulation	Check joints are sealed and all aspects insulated	Service Agent	Annually
Water Damage	Check for signs of water damage from leaks or drips	Service Agent	Annually
Surface Cooling Condensation	Check that surface cooling systems have not formed condensation and controller settings	Service Agent	Annually
Air Filters	Surface clean of air filters	User	Monthly (during use of fan coils)
Air Filters	Remove, inspect, and clean or replace air filters	Service Agent	Annually
Condensate Drains	Check condensate drains run freely	Service Agent	Annually
Fans	Check fans operate and run freely	Service Agent	Annually
General Condition	Check unit fixings and inspect unit cleanliness	Service Agent	Annually

Product Options

The FC-HD & FC-HDHSP fan coils stocked by CHNZ are supplied in a standard specification however for project specific requirements other product options are available on special order. Some of the product options that may be suitable for project specific requirements are;

- 3 speed AC fan for the FC-HD model.
- Brushless DC fan for the FC-HDHSP model.
- Bottom air intake.
- Auxiliary heating coil for 4 pipe systems.
- Electrical heating elements.

For more information and pricing on these options please contact your local sales representative.

Warranty

The FC-HD & FC-HDHSP fan coils are supplied as per Central Heating New Zealand's standard Warranty and Terms & Conditions. For the warranty period refer to the 'Fancoil and Kickspace heaters' section.

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