



# Aira Control Configuration Options

## DU/SD/HCV and HCVR

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## Introduction.

This document is design to describe the wiring requirements for the three different Aira DU/SD and HCV control boxes **WD-CH637-M**, **WD-CH37-S** and **WD-CH641** (for DU/SD) and needs to be used in conjunction with the Aira applicable wiring diagrams. ONLY authorised electricians should attempt to make any connections with these control boxes.

## Control box Design.

Aira Control boxes are supplied in two configurations, WD-CH641 is designed to suit DU and SD heaters. WD-CH637-M HCV, HCVR, Heaters. Dual heat exchanger variants of all models use a combination of WD-CH637-M and WD-CH637-S. There are multiple control configurations which can be used, including Building Management System (BMS), Rotary wall switch, and Wall switch. In order to access the different control options, different control box connections must be made to suit the installation type. For an installation type which is not listed within this document please contact a Seeley International representative for assistance.

## Unit Identification

First step is to determine the unit configuration DU, SD, HCV or HCVR. All units using this control box use either a DU or SD heater which are identical except for the heat exchanger height. The heat exchanger height does not affect the wiring of the unit so DU and SD heater can be treated as the same unit.

DU/SD units can have either a blower attached or a remote blower (Customer supplied) further back in the ductwork. If the unit has a blower attached it is known as a DU with blower or SD with blower. If it has a remote blower the unit is supplied as a DU without blower or SD without Blower.

HCV and HCVR units are easily identified by the blower section also containing evaporative cooling pads. And are essentially a DU/SD heater and an evaporative cooler adjoined.

Dual heat exchanger models can be variants of any of the units described above. They are identified by  
1. Clear division in the heat exchanger 2. Dual control boxes (Master and Slave) and 3. Dual Gas inlets

## All Units Main Isolator

All control boxes will require 1Phase 240V power supply. Depending on the model requirements the Main Isolator will need to be supplied with either 1 Phase 240V or 3 Phase 415V, Please refer to Model Specifications and Rating Plate

NOTE: The drawing package contains the full wiring diagram for the Aira universal control box and is supplied for fault finding only. No attempt should be made to alter/bypass the wiring within the control box except where specified in this document. A Seeley International representative must be contacted if there is a perceived fault present.

## Control box labelling

The control box is labeled to help identify the control terminals need. The terminal strips have a 'X' identifier and the individual terminals a unique number within the corresponding terminal block i.e. X1/43 is Terminal number 43 within Terminal block X1. The terminal blocks are numbered within the control box but can also be identified by using the drawings. Terminal Block locations see Drawing WD-CH637-002 and WD-CH641-002. See drawing WD-CH637-003 for control box WD-CH637-S.

## Units Operated by BMS

BMS have the ability to control the systems within the unit but should not be used to bypass fundamental safety controls.

### SD/DU Heater 3<sup>rd</sup> Party Supplied Blower

DU/SD heater without blower will require a blower to supply air to the unit. This is generally in the form of an evaporative cooler in ventilation mode or an independent blower installed upstream of the heater, which is customer supplied. The DU/SD heater uses an Auto Fan Switch (AFS) which must be operated in order for the heater to function. This is links in with the temperature sensors and forms part of the heaters safety system, this must not be bridged or bypassed. In addition the AFS / Fan Low signal must be incorporated into the fan control circuit to prevent overheating of the heat exchanger at the end of the heating cycle. The AFS is a thermostat that detects when the heat exchanger is hot and operates the fan to provide air flow over the heat exchanger until the temperature lowers to the set condition.

In order to operate the AFS a 24V signal **must be connected** from X3/67 to the customer supplied fan relay/contactator. All BMS setups are expected to be a dry contact.

See wiring diagram **WD-CH641-005** & **WD-CH641-006** for full BMS connection details.

### SD/DU Heater with AIRA Blower

DU/SD heater with blower have a fan/blower factory fitted to the rear of the DU/SD heater and will have the fan motor starter box prewired to the control box. All BMS setups are expected to be a dry contact. See wiring diagram **WD-CH641-005** & **WD-CH641-006** for full BMS connection details.

### SD/DU Heater VSD

There are several different ways a Variable speed drive can be setup to operate with the unit. The most typical installation is to setup the VSD to operate when low fan relay is switched on. A 24V signal **must be connected** from X3/67 to the customer supplied fan relay/contactator. All BMS setups are expected to be a dry contact.

See wiring diagram WD-CH641-005 & **WD-CH641-006** for full BMS connection details.

### Control Signals BMS All

Common control signals when using a BMS, Heat X3/44, BMS common terminal X3/46

Common control signals when using a BMS, Low fan X3/41, Heat X3/44, BMS common terminal X3/46

See wiring diagram **WD-CH641-005** & **WD-CH641-006** for full BMS connection details.

### Heating Cooling Ventilation (HCV) Units

HCV units being an integrated gas heater and evaporative cooler, which can operate in three modes. Heating Cooling and Ventilation.

To operate each mode the following signal connections are needed.

#### HEAT ON

- Signal in for fan low on X3/41
- Signal in for Heat X3/44

#### COOL ON

- BMS connect to X3/43 Pump only
- Low fan on X3/41
- High Fan X3/42

#### VENTILATION ONLY

- Signal in Low fan on X3/41
- Signal in High Fan X3/42

See wiring diagram No. **WD-CH637-007** for full connection details.

### HCV VSD

A unit specified for supply with a VSD will not have a motor starter box installed from factory. The VSD will need to have high fan and low fan speeds preset which will be used for heating and cooling alike. These will need to connect to the corresponding relays.

Need to take a signal to the Auto Fan Switch (AFS) from fan Low relay (X4/61, X4/62).

#### HEAT ON

- Signal in for fan low on X3/41
- Signal in for Heat X3/44

#### COOL ON

- BMS connect to X3/43 Pump only
- Low fan on X3/41
- High Fan X3/42

In order to operate the AFS a 24V signal must be connected from fan Low relay (X4/61, X4/62) to the AFS. All BMS setups are expected to be a dry contact. See wiring diagram No. **WD-CH637-007** and No **WD-CH637-011** for full connection details.

### Heating Cooling Ventilation Return Air (HCVR)

Heat ON will close fresh air dampers and open return air. Once Heat is switched off dampers will automatically return to cooling position as default. All the connection for HCV are applicable for the HCVR. Refer to HCR section of this document for connections.

### Dual Heat exchanger

Dual heat exchanger models have a master and slave control box which are looped together. The BMS must supply a 0-10V signal for the room temperature and set point temperatures.

### 3<sup>rd</sup> Party External Cooler Attachment Heater Only

The fan function within the 3<sup>rd</sup> party cooler will need to be used to trigger the Low fan signal on X3/41. Be aware the temperature rise of the heater is affected by the airflow. Seeley cannot guarantee the correct temperature rise of the heater with the use of 3<sup>rd</sup> party supply air.

### Rotary Switch

Rotary switch control is only Applicable for HCV and HCVR, therefore not applicable for SD/DU Heater with or without Blower.

- Switch requires 24V supply from X4/65, X4/66.
- Connect Fan Low switch to X3/41
- Connect Fan High switch to X3/42
- Connect Heat Switch to X3/44
- Connect reset switch to X3/45 needs 24V from X4/65 which can be looped in plate.
- Connect Remote lockout light to X3/50 and bridge X3/49 to X4/65 and connect light to 0 volts, X4/66
- Room Thermostat QAA25 B or T2 wires to X3/51, and M or T1 wire to X3/52 and R or T3 wires to X3/53

See wiring diagram **WD-CH637-004** for full connection details.

### Dual Heat exchanger

Dual heat exchanger models have a master and slave control box. Each control box has a PLC with which requires a thermostat input. In order to use a single room thermostat the following connection must be made.

- Pickup 24V supply from X4/65, X4/66
- Connect Low Fan switch to X3/41
- Connect Heat Switch to X3/44
- Connect Reset switch to X3/45 also need 24V can pick up from X4/65 can be looped in wall plate.
- Remote lockout light X3/50 and X3/49 bridges to X4/65 and X4/66 wires to 0 volts for light
- Room Thermostat Separate QAA2061 – G wires to X4/65 and U1 wires to X3/51 and G0 wires to X4/66
- Setpoint Thermostat RLA162 – G wires to X4/65 and Y1 wires to X3/53 and G0 wires to X4/66 – Set dipswitch 4 to ON. 0 to 10V output is set by temp dial.
- RLU settings – X2 0 to 10 V min 0 max 50Deg C and X3 0to10V min 8 max 30Deg C

See wiring diagram WD-CH637-008 for full connection details.

### Heating Cooling Ventilation Return Air (HCVR)

Heat ON will close fresh air dampers and open return air. Once Heat is switched off dampers will automatically return to cooling position as default. All the connection for HCV are applicable for the HCVR. Refer to HCR section of this document for connections.

## Wall Switch

The wall switch plate control can be found on either DU/SD heaters or HCV/HCVR units. And either single or dual burner heat exchanger models. The correct process is unit type dependent.

### DU/SD Heater with Blower SINGLE heat exchanger

DU/SD heater with blower has a fan/blower factory fitted to the rear of the DU/SD heater and will have the fan motor starter box prewired to the control box. To operate the heater start signals to heat signal (X3/44) are required.

The following terminals need to be connected for supplied wall switch control

- Connect Heat Switch to X3/44
- Connect Reset switch to X3/45 also need 24V can pick up from X4/65 can be looped in plate.
- Remote lockout light X3/50 and X3/49 bridges to X4/65 and X4/66 wires to 0 volts for light
- Room Thermostat QAA25; B or T2 wires to X3/51, and M or T1 wire to X3/52 and R or T3 wires to X3/53

See wiring diagram **WD-CH641-007** for full connection details.

### DU/SD Heater without Blower SINGLE heat exchanger

DU/SD heater without blower will require a blower/fan to supply air to the unit. This is generally in the form of an evaporative cooler in ventilation mode or an independent blower installed upstream of the heater, which is customer supplied. The DU/SD heater uses an Auto Fan Switch (AFS) which must be operated in order for the heater to function. This is links in with the temperature sensors and forms part of the heaters safety system, this must not be bridged or bypassed.

#### 3<sup>rd</sup> Party External Cooler Attachment

Use supplied HCV wall switch to operate the heater and the cooler. This will ensure that the low speed setting on the cooler can be used with the heater. The Cooler must have a 2 speed motor fitted and the pulley ratio set to match the required temperature rise of the heater.

Where the coolers operation is more complex than the wall switch is designed to manage, an additional 3<sup>rd</sup> party controller may be required. which is not covered within this document. For assistance please contact a Seeley International representative.

See wiring diagram **WD-CH641-005 & WD-CH641-007** for full connection details.

### HCV and HCVR SINGLE heat exchanger

HCV units are intended to operate in Heating with Low speed fan operating and cooling with high speed fan and water pump. The will switch needs to be connected in the following way to operate all functions.

- Connect Low Fan switch to X3/41
- Connect High Fan switch to X3/42
- Connect Heat Switch to X3/44
- Connect Cool Switch to X3/43

- Connect Reset switch to X3/45 also need 24V can pick up from X4/65 can be looped in plate.
- Remote lockout light X3/50 and X3/49 bridges to X4/65 and X4/66 wires to 0 volts for light
- Common X3/46 bridge to X4/66
- Room Thermostat QAA25; B or T2 wires to X3/51, and M or T1 wire to X3/52 and R or T3 wires to X3/53

See wiring diagram **WD-CH637-005** for full connection details.

### DU/SD Heater with Blower DUAL heat exchanger

DU/SD heater with blower has a fan/blower factory fitted to the rear of the DU/SD heater and will have the fan motor starter box prewired to the control box. To operate the heater start signals to heat signal and fan low are required.

Dual heat exchanger models have a master and slave control box. Each control box has a PLC with which requires a thermostat input. In order to use a single room thermostat the following connection must be made.

- Pickup 24V supply from X4/65, X4/66
- Connect Low Fan switch to X3/41
- Connect Heat Switch to X3/44
- Connect Reset switch to X3/45 also need 24V can pick up from X4/65 can be looped in wall plate.
- Remote lockout light X3/50 and X3/49 bridges to X4/65 and X4/66 wires to 0 volts for light
- Room Thermostat Separate QAA2061 – G wires to X4/65 and U1 wires to X3/51 and G0 wires to X4/66
- Setpoint Thermostat RLA162 – G wires to X4/65 and Y1 wires to X3/53 and G0 wires to X4/66 – Set dipswitch 4 to ON. 0 to 10V output is set by temp dial.
- RLU settings – X2 0 to 10 V min 0 max 50Deg C and X3 0to10V min 8 max 30Deg C

See wiring diagram **WD-CH637-010** for full connection details.

### DU/SD Heater without Blower DUAL heat exchanger

DU/SD heater without blower will require a blower/fan to supply air to the unit. This is generally in the form of an evaporative cooler in ventilation mode or an independent blower installed upstream of the heater, which is customer supplied. The DU/SD heater uses an Auto Fan Switch (AFS) which must be operated in order for the heater to function. This is links in with the temperature sensors and forms part of the heaters safety system, this must not be bridged or bypassed.

Dual heat exchanger models have a master and slave control box. Each control box has a PLC with which requires a thermostat input. In order to use a single room thermostat the following connection must be made.

- Pickup 24V supply from X4/65, X4/66
- Connect Low Fan switch to X3/41
- Connect Heat Switch to X3/44
- Connect Reset switch to X3/45 also need 24V can pick up from X4/65 can be looped in wall plate.



- Remote lockout light X3/50 and X3/49 bridges to X4/65 and X4/66 wires to 0 volts for light
- Room Thermostat Separate QAA2061 – G wires to X4/65 and U1 wires to X3/51 and G0 wires to X4/66
- Setpoint Thermostat RLA162 – G wires to X4/65 and Y1 wires to X3/53 and G0 wires to X4/66 – Set dipswitch 4 to ON. 0 to 10V output is set by temp dial.
- RLU settings – X2 0 to 10 V min 0 max 50Deg C and X3 0to10V min 8 max 30Deg C

### HCV and HCVR DUAL heat exchanger

Dual heat exchanger models have a master and slave control box. Each control box has a PLC with which requires a thermostat input. In order to use a single room thermostat the following connection must be made.

- Pickup 24V supply from X4/65, X4/66
- Connect High Fan switch to X3/42
- Connect Low Fan switch to X3/41
- Connect Heat Switch to X3/44
- Connect Cool Switch to X3/43
- Connect Reset switch to X3/45 also need 24V can pick up from X4/65 can be looped in wall plate.
- Remote lockout light X3/50 and X3/49 bridges to X4/65 and X4/66 wires to 0 volts for light
- Room Thermostat Separate QAA2061 – G wires to X4/65 and U1 wires to X3/51 and G0 wires to X4/66
- Setpoint Thermostat RLA162 – G wires to X4/65 and Y1 wires to X3/53 and G0 wires to X4/66 – Set dipswitch 4 to ON. 0 to 10V output is set by temp dial.
- RLU settings – X2 0 to 10 V min 0 max 50Deg C and X3 0to10V min 8 max 30Deg C

See wiring diagram **WD-CH637-009** for full connection details.

### Climate Wizard Connection

To connect an Aira DU/SD heater in line with a Seeley International Climate Wizard please contact a Seeley International representative.

### Summary

This document is details for the installation of standard option configurations. For any installation which is not listed her. Please contact a Seeley International representative.