SeaChange

Consumer Module | Data Sheet A3

AHU Controller - for Supply Air Control

Main Features

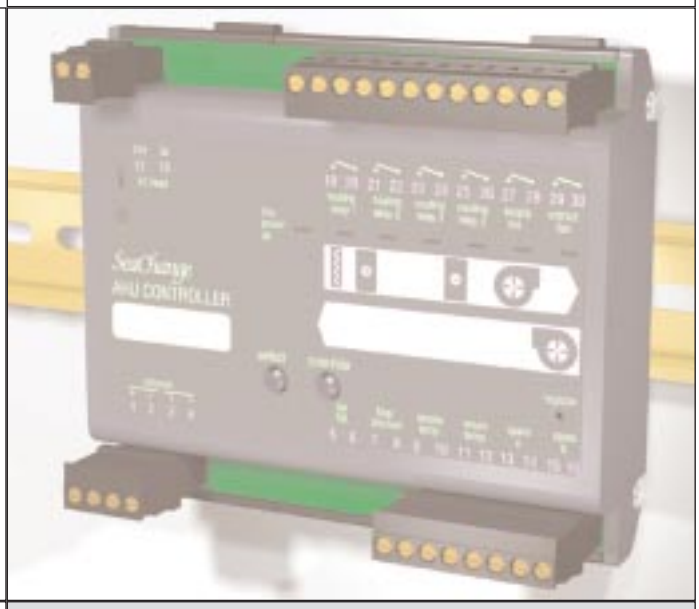
Controls Supply & Extract Fans, Heating and Cooling Batteries

More complex Air Handling Units controlled by adding modules

AHU may feed single or multiple zones

Variable Supply Air Temperature, based on demand from Zones

Demand signals fed to Main Plant automatically



Occupation Times for the spaces served by the AHU are set on Zone Controllers. The AHU will run if any of the Zones are in their Occupation or Warm-Up period, thus providing Optimum Start of the AHU

Alternatively the AHU can be set so that it will only run if the space is demanding heating or cooling

Engineering Features

Automatic “Plug-and-Play” engineering using SeaChange Pushbutton Registration

Demand Signals for Heating and Cooling are automatically fed back to main plant so that Boilers and Chillers only run when needed

Control of more complex AHUs (e.g. with Preheater, Heat recovery, Multiple Heating or Cooling Stages, Humidity Control etc.) is achieved by adding further modules

Interlocks are used by additional modules automatically

Configuration Parameters may be set using a Zone Controller or SeaChange Doorway

General Control Description

The AHU Controller will control supply (off-coil) temperature to a variable setpoint, which it will determine from Heating and Cooling demand signals received either from Zone / Terminal Unit Controllers, or from another AHU Controller which is acting as a “master”. The Controller will accept multiple demand signals, which may be all Cooling demands, all Heating demands, or a mixture of Cooling and Heating, and will calculate setpoint accordingly.

Maximum and Minimum values can be set for Heating and Cooling setpoints. A return air temperature sensor may be fitted, either for monitoring purposes, or because it is needed for Night Cooling (see later) or by another module (eg Mixing Damper Controller or Heat Recovery Controller).

Heating and cooling batteries may be “wet” ie. coils fed with LPHW and Chilled water, controlled by raise/lower type valves, or they may be staged electric batteries, switched by external contactors.

Supply and Extract Fans are interlocked with the batteries to ensure correct operation. It is possible to select whether the supply or extract starts first, to ensure positive or negative pressurisation of the building.

Features

Temperature Indicator indicates how far the controlled temperature is from setpoint.
Green = close to setpoint.
heating and cooling batteries will be off for most of the time
Amber = above setpoint.
cooling battery (if fitted) will be running
Red = below setpoint.
heater battery will be running

24V AC Power Supply connectors are connected to a 24V Transformer or to "Aux" connectors on the Power Supply module to provide power for the AHU Controller's relay coils.

24V Power OK lamp indicates that the external 24V supply is healthy.

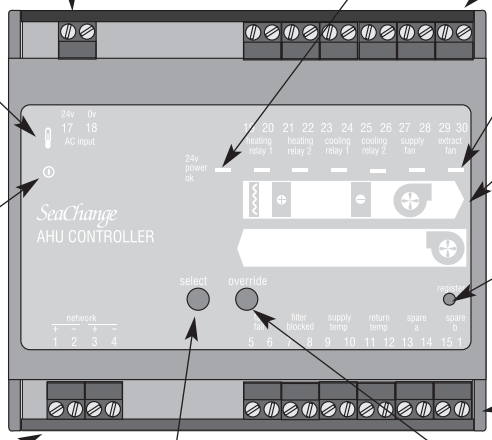
Relay Output Connectors are for connection to the controlled devices.

Relay status lamps indicate when the output relays are energised

Plant schematic shows type of plant to be controlled.

Registration Button is used during the commissioning process to build logical links between controllers

Input Connectors are for connection of the Temperature sensors and status signals. Twisted pair, unscreened cable is required.



Status Lamp indicates that the AHU Controller is receiving demand signals from other controllers if lit steadily, also indicates that controller is in Configuration Mode (slow flashing) or Maintenance Mode (rapid flashing)

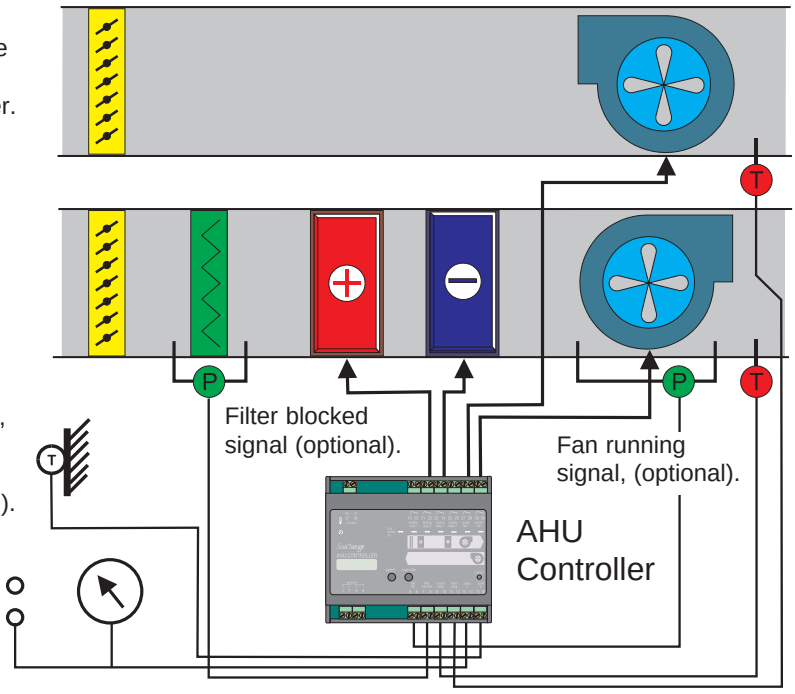
Network connectors Two pairs are fitted to facilitate star wiring of the network, or to allow temporary local connection of a Zone Controller to act as a display during commissioning. Twisted pair, unscreened cable is required.

Select is used during commissioning to allow a Zone Controller to display the Engineering Parameters of this controller. Also used to set stroke time for Heating and Cooling Valves (see Commissioning Guide for details).

Override is used to change from Normal to Maintenance mode; Maintenance mode will allow the plant to run without demand signals from the Zone Controllers, which is useful for plant maintenance purposes.
(see Detailed Features in this Data Sheet for further information).

Application

If isolation dampers are fitted, use the fan outputs to open the dampers, then energise the fan using end switches on the damper. This ensures that the dampers are open before the fan starts.



Return Temp (optional, may be mandatory. See General Control Description).

Supply Temp, (mandatory).

Outside Temp, (if /SH variant, see System Housekeeping).

Filter blocked signal (optional).

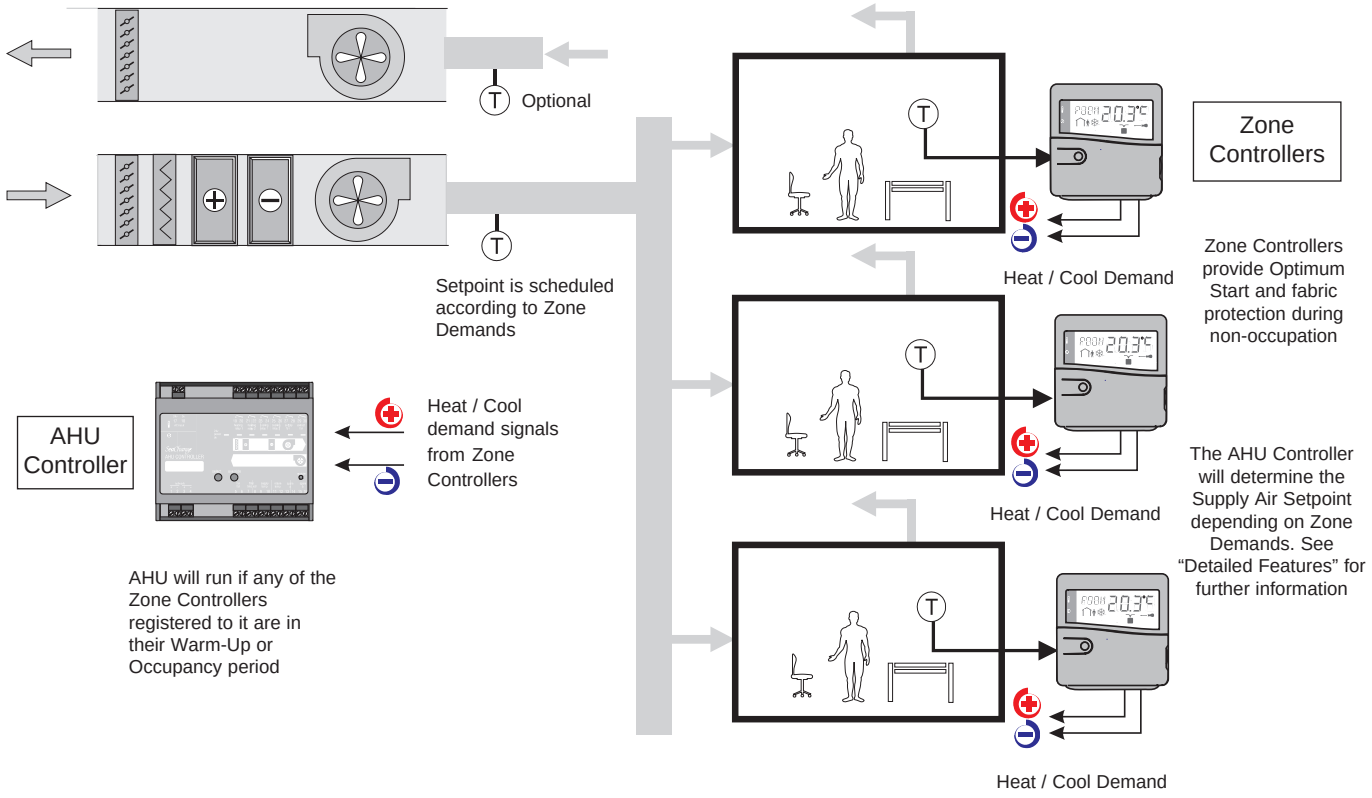
Fan running signal, (optional).

AHU Controller

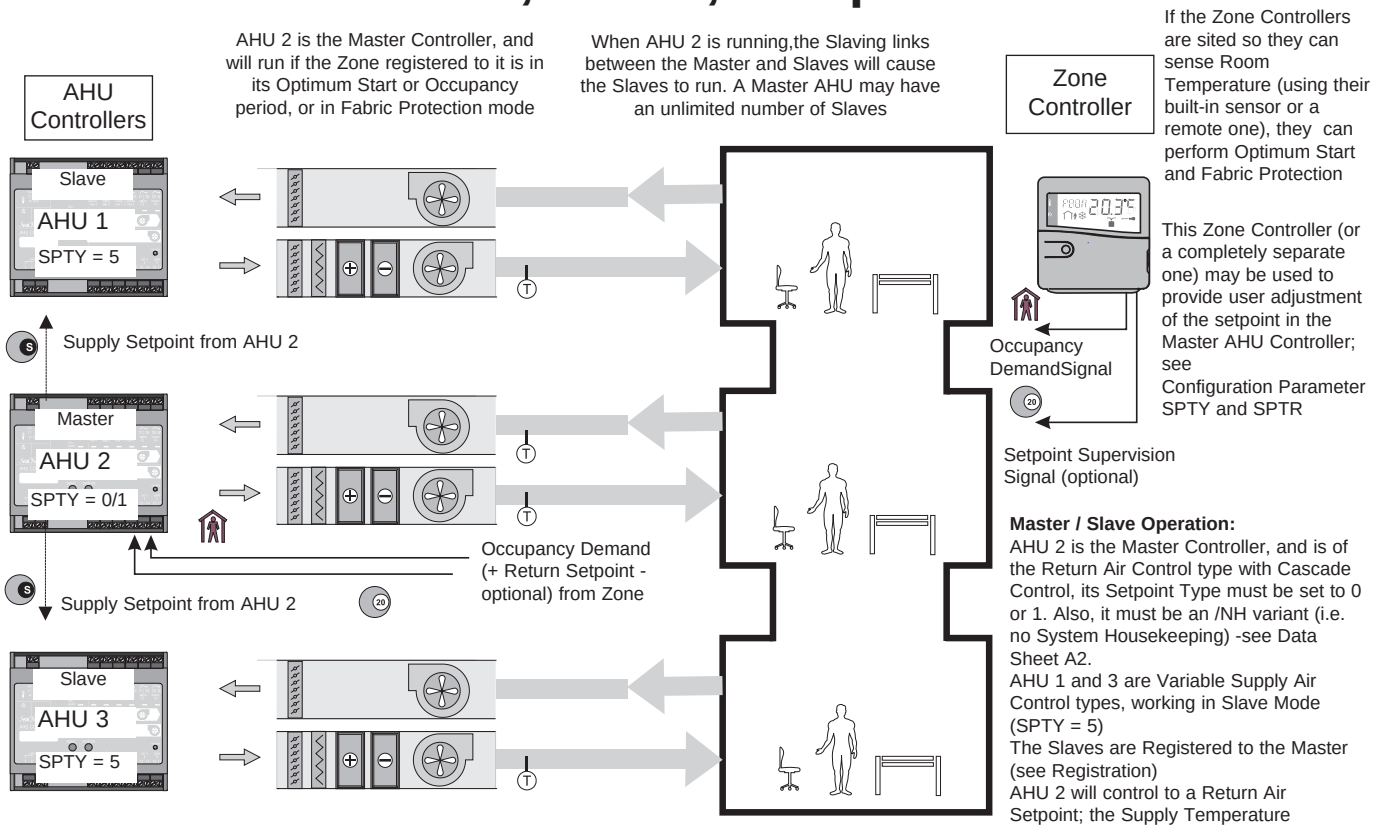
External enable/disable signal or setpoint adjuster, (optional: see page 6).

Raise/lower valves or 2 stage electric batteries. 0-10V valves or modulating electric batteries need submodules

Temperature Control of Supply Air - 1 or multiple Zones



Master / Slave Control, 1 Zone, Multiple AHUs



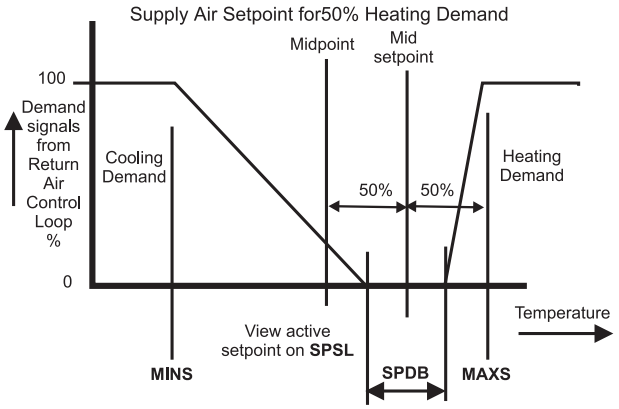
If the Zone Controllers are sited so they can sense Room Temperature (using their built-in sensor or a remote one), they can perform Optimum Start and Fabric Protection

This Zone Controller (or a completely separate one) may be used to provide user adjustment of the setpoint in the Master AHU Controller; see Configuration Parameter SPTY and SPTR

Master / Slave Operation:
AHU 2 is the Master Controller, and is of the Return Air Control type with Cascade Control, its Setpoint Type must be set to 0 or 1. Also, it must be an /NH variant (i.e. no System Housekeeping) -see Data Sheet A2.
AHU 1 and 3 are Variable Supply Air Control types, working in Slave Mode (SPTY = 5)
The Slaves are Registered to the Master (see Registration)
AHU 2 will control to a Return Air Setpoint; the Supply Temperature Setpoint that it is using will be transmitted to the Slaves and used by them; thus the space will be controlled from a single Return Air Temeprature sensor, and all plants will be supplying air into the space at the same temperature

Temperature Control

The AHU Controller will control supply (off-coil) temperature to a variable setpoint which will be automatically adjusted according to demand signals for Heating and Cooling received from other controllers (either Zone or Terminal Unit Controllers in the controlled space, or another AHU Controller of the Return Air Control type which is feeding the same space and acting as a "master").Parameters **MAXS** and



MINS are used to set Maximum and Minimum setpoints for Supply Air Temperature (see diagram). Parameter **SPDB** creates a deadband which will prevent cycling between heating and cooling and reduce energy usage. The AHU Controller will receive demand signals from many other controllers simultaneously. The Controller will calculate a Mid-Setpoint based on these demand signals. If all of the Zone demands are for heating, the Maximum will be taken, and used to set the Mid-Setpoint between MAXS and the midpoint between MAXS and MINS. If the Zone demands are all cooling demands, the Mid-Setpoint will be chosen to be between MINS and the midpoint. If there are a mixture of heating and cooling demands, the average of the 2 maxima are used to select the Mid-Setpoint.
The Deadband **SPDB** is now used to generate the working Heating and Cooling setpoints; only one of these will be active (unless **HCOK** is set, see below), and may be displayed on Monitoring parameter **SPSL**.
Heating and cooling batteries may be "wet" i.e. coils fed with LPHW and Chilled water, controlled by raise/lower type valves, or they may be staged electric batteries, switched by external contactors. The correct product variant should be selected to suit the combination of wet or electric batteries (see page 12).
Normally, the AHU will run for the whole of the Occupancy period of the registered Zones; if desired, it can be made to switch off if no demand for heating or cooling exists. Setting **MIND** to a non-zero value will cause the AHU to switch off if all Zone demands drop below the MIND setting.

Simultaneous Heating and Cooling

Normally, simultaneous use of the heating and cooling batteries is automatically prevented. However, under certain circumstances it may be necessary: either when Dehumidifying the Supply Air (see Humidity Control) or because staged cooling is being used.
With staged (DX) cooling, large step changes to the supply air temperature may be experienced when the stage is switched on and off. If this is not permissible, and a modulating heater battery is provided, this can be enabled at the same time as the staged cooling battery. Although this is not energy efficient, it may be the only way to achieve stable control of temperature using the mechanical plant provided.
To enable simultaneous heating and cooling, set parameter **HCOK** to 1. (Note: do not adjust this parameter when using dehumidifying control).

Humidity Control

If the AHU Controller is equipped with a Cooling battery and is appropriately constructed (with condensate trays, baffles etc.), it is possible to De-Humidify the Supply Air by applying full cooling. If the dew point of the incoming air is higher than the off-coil temperature, condensation will occur, thus de-humidifying the air. The Heater Battery can now be used to reheat the air to the required temperature; this will mean allowing Heating and Cooling Batteries to run simultaneously (which is normally prohibited). Setting a non-zero value for **RHSP** (see below) automatically allows simultaneous heating and cooling.

Parameters **RHSP** and **RHDB** set the Return (or Space) Humidity setpoint and deadband respectively; setting RHSP to a non-zero value enables Dehumidification control. If the Return Air Humidity rises above: (setpoint + 1/2 of the deadband) the supply air cooling setpoint will be depressed to drive the cooling coil fully open. It will stay in this mode until the Return Air Humidity falls to: (setpoint - 1/2 of the deadband) when normal temperature control will resume.
A Networked Temp + Rh sensor must be fitted in the Return Air (or in the space) and registered as a Submodule to the AHU Controller (see *Registration*, later). Supply and Outside T+Rh sensors can also be registered to the AHU Controller for monitoring purposes.
Humidification of the Supply Air using a Humidifier may be controlled by a Humidity Controller Submodule. Also, a different regime of Hum / DeHum control can be used to give tighter control of Rh; see Humidity Controller Data Sheet for further details.

Frost Protection

If the Heating and Cooling Batteries are "wet", the Controller will open both batteries to 50% in the event that the Outside Temperature falls below the Frost Protection Setpoint **SPFR** during non-occupation.This will ensure that both the coil and its bypass have water circulating through them. Control of the water temperature and pumps is handled either by the Boiler Controller, or by an existing control system.

Interlocks

The fans are interlocked with heating and cooling batteries automatically, to prevent damage to the batteries from frost or overheating. The nature of the interlock varies according to the type of battery:

Wet Heating Interlocks

The fans will start after the heater battery has been opened, to avoid drawing cold air through the unit before the heater battery is operational, and thus causing damage or tripping the frost thermostat (if fitted).

If the Controller is receiving valid signals for both Outside Temperature and Boiler Flow Temperature, the fan will not start until:

a) Outside Temp >5 ^{O}C and Boiler Flow Temp>10 ^{O}C, Or,

b) Flow Temp> (20-Outside Temp) x 2 AND a delay of 5 minutes has elapsed since the valve achieved 50% open

If either the Boiler Flow Temperature or Outside Temperature are not available (because of a system fault, or because the Boilers are not under SeaChange control), then the fan will not start until a delay of 10 minutes has elapsed since the valve achieved 50% open.

Electric Heating and Cooling Interlocks

The batteries will not be enabled until the supply fan is running, and the fan will continue to run after the battery has shut down, for a period determined by the fan minimum run time parameter **MINR.**

Alarm Handling

The AHU Controller has 2 status inputs for volt-free contacts. The Controller may be set to ignore these inputs as alarm conditions and use them purely for monitoring, report them to a SeaChange Doorway Supervisor (either locally connected to the system, or via an autodialling modem), or to both report alarms and shut down the AHU. The **ALRM** parameter is used to select the desired Alarm Mode, whilst **ALST** is used to set the sense (ie. whether a closing or opening contact generates an alarm) of the Fan Fail and Filter Blocked inputs.

The AHU Controller will generate 2 different alarms from these 2 inputs;

FANF Fan Failure (which would need a “fan running” status signal wired to the appropriate input),

FLTF Filter Blocked (which would need a differential pressure switch installed across the filter).FLTF will not shut down the AHU.

Note that if only one of the two inputs is used, the other input may need a shorting link wired across it in order to prevent the generation of spurious alarms.

The AHU Controller can also be set to respond to the **STOP** System Stop Alarm which is generated by a Boiler Controller; this can be used to shut down the entire control system, or parts of it, if a particularly critical event occurs (e.g.. Pressurisation Unit failure).

The setting of **ALRM** is as follows:

ALRM = 0: ignore alarms (inputs could be used for monitoring status of any volt-free contact)
= 1: report alarms FANF and FLTF, no control action
= 2: report alarms, shut down all outputs on receipt of STOP alarm
= 3: report alarms, shut down all outputs on STOP alarm or FANF alarm

Alarm Interlocks

Some protection interlocks (which are active *at all times* unless specifically disabled) cause the AHU to shut down, and will generate an alarm. Once shut down,the AHU will attempt to restart after a delay set on parameter **RTRY** (retry), or if the Override button is pressed.

FANF alarm if generated from a Fan Changeover Module registered to the AHU (if this feature is not required, the Changeover Module’s ALRM parameter may be set to generate no alarms).

FREZ Danger of Freezing, which is generated when the Supply Air Temperature drops below a limit set on parameter **CUTS** (default 4 degC). If this value is set to zero, this feature is disabled.

SPLF Supply Temperature Failed which is generated when the Supply Sensor reading is invalid.

OUTF Outside Temperature Fail, which is generated when the AHU Controller is not receiving a valid Outside Temperature (either locally connected or via the network from another module).This alarm does not cause the AHU to shut down.

Local Indication of Alarms

The AHU Controller will flash its temperature lamp red if any Alarm or Alarm Interlock is current. When the Alarm clears, the flashing will stop.

Night Cooling

It may be possible to use the Air Handling Unit to provide free cooling of the space during non-occupied hours by running the fans only (ie. with the cooling battery disabled). This requires that a sensor is wired to the Return Air Temperature terminals; the sensor may need to be located in the space, as it must give a representative reading of space temperature when fans are not running.

Normally, the setpoint for Night Cooling would be set to be within the normal deadband (using parameter **NTCL**).

Night Cooling will then commence (using the preheater if necessary), if

The Return Sensor reading is valid, and above the Night Cooling Setpoint AND the Outside Temperature is above 5 deg C, AND the outside Temperature is at least 1 deg C below the Night Cooling Setpoint AND it is at least 1 hour since the last Night Cooling cycle terminated

Detailed Features

Operation from an external volt-free contact and trim potentiometer

It may not possible to use a Zone Controller (or a number of Zone Controllers) as the only devices to set Occupancy times for the space, and hence determine running times for the AHU. It is possible to use an external signal to run the AHU Controller, for instance a timed signal from an existing control system, or a simple timeclock. Alternatively, it is possible to disable the AHU using an external signal. The **INMD** parameter is used to set the desired mode, and then a volt-free contact from the timeclock device may be wired to the "**Spare a**" input (note that contact must be "made" for AHU to run).

Three different modes are available; the external contact may be used in conjunction with a Zone Controller (or a number of Zone Controllers), either:

a) as an "OR" function (**INMD** = **2**) when the Zones Occupancy *or* the external contact will cause the AHU to run or,

b) as an "AND" function (**INMD** = **1**) when both the Zones Occupancy *and* the external signal need to be present - this can be used as a disabling input, e.g. a window contact.

Alternatively, the external contact can be used as the sole means of enabling the AHU (**INMD** = **3**).

Setpoint Trim using an external potentiometer

If a 10Kohm potentometer and a 10Kohm resistor (use SeaChange SEN/PTR/ROM/004) are wired in series with the external contact, the pot will apply a +/- 5 degC trim adjustment to the current setpoint when in Occupancy. Note that this feature applies to Slave AHUs only (i.e. with SPTY set to 5)

Submodules

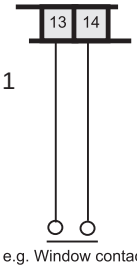
AHU Controllers may have a number of *Submodules* which extend its control capabilities; these can be as follows:

Max No.	Submodule Type	Function
2	*Cascade Module*	additional stages of heating or cooling (5 stages max total of each)
or:		
2	*Actuator Controller*	driven by AHU demand signals; can use AOP version for 0 -10V DC valves.
or:		
2	*Static Pressure Controller*	to control fan speed in a VAV plant.
or:		
1	*Dessicant Wheel Controller*	refer to SeaChange for details.
also:		
2	*Changeover Modules*	for Auto Changeover of Supply and Extract fans.
1	*Preheater Controller*	for Preheater (frost) battery control.
1	*Humidity Controller*	to control Humidifier.
3	*T+Rh Networked Sensors*	to sense Return (or Space), Supply and Outside Temp + Humidity
also:		
1	*Damper Controller*	to control mixing dampers for heat recovery
or:		
1	*Heat recovery Controller*	to control heat wheel, runaround coil etc.

External Input Options

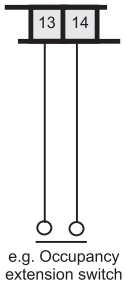
Disabling AHU from an External Contact

Set INMD = 1



Enabling AHU from an External Contact

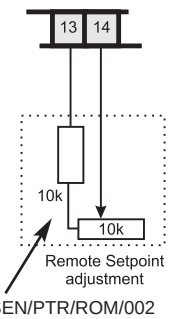
Set INMD = 2 (for Zones or VFC enable)
Set INMD = 3 (for VFC enable only



External Setpoint Trim Potentiometer

Set INMD = 1, 2 or 3

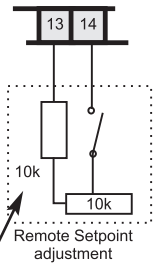
Pot gives +/- 5 DegC Setpoint adjustment



SeaChange SEN/PTR/ROM/002

Setpoint Trim with external Enable or Disable Contact

Set INMD = 1 (Disable contact)
Set INMD = 2 or3 (Enable contact)



Make contact to start AHU

SeaChange SEN/PTR/ROM/004

Fan Control

Supply and Extract fans may be switched (via a contactor) directly from the outputs on the controller. Alternatively, the fan outputs may be used to open dampers (if fitted) and limit switches on the dampers used to start the fan; this ensures that fresh air and exhaust dampers are fully open before the fans start, so as to avoid damage to the damper blades.
The parameter **SFRT** may be used to determine which fan starts first; some buildings (e.g.. clean rooms) need to be positively pressurised, in which case the supply fan should start first. Other buildings (e.g.. hospitals) require the opposite; the parameter should be set accordingly.
Fans will normally run if any of the registered zones are in Occupancy, Optimum Start or Fabric Protect mode. If desired, the AHU can be made to shut down if no heating or cooling demand exists, by setting **MIND** to a non-zero value.
The fan is also subject to an automatic start delay, which is determined according to the address of the controller. This ensures that, where a building has multiple AHUs, all of the fans do not start at once, thus causing a high peak electrical load. AHUs will start with 10 second intervals between them.
Fans are subject to a Minimum-Run time (parameter **MRUN**) which ensures fans do not cycle on and off too frequently.

Registration

Registration is the simple process by which logical connections are made between Controllers in a SeaChange system; it is done at time of commissioning and involves pressing buttons on the Controllers in a specific sequence**.

Registration of the AHU Controller

The AHU Controller must first be registered with the Controller in the system which is performing System Housekeeping Functions, unless it is performing the Housekeeping Functions for the system itself (see later section). This part of the registration process will allocate a system address to the Controller. Press the register button; the status lamp should flash according to the address that has been allocated.**.
If the AHU has “wet” heating or cooling batteries, it must then be registered with its heating or cooling source, ie. the Controller that is providing hot or chilled water to the batteries (e.g. a Boiler Controller).This will automatically set the **HTSC** and **CLSC** parameters in the AHU Controller to “point” to the source of heating and/or cooling. Demand signals will then automatically be sent to the heat/cooling sources when the AHU coils require heating and cooling. The heat or cooling source Controller is put into Configuration Mode, and the AHU Controller is registered to it**.

Registration of Submodules

The AHU Controller may have one, or a number of *Submodules* associated with it for controlling Preheaters, Mixing Dampers and so on. These Submodules must be registered to the AHU Controller so that it works in co-ordination with the Submodules, and all necessary demand signals, interlocks etc. are passed between them.
The AHU Controller is put into Configuration Mode, and the Submodules are registered to it. This process will allocate an address to each Submodules; the status lamp on each one should flash to indicate the address that the AHU Controller has allocated to it.

Registration of Zone Controllers or Terminal Unit Controllers- Heating/Cooling Demand Control

One, or many Zone Controllers can be used to determine the Supply Air Setpoint of the AHU Controller. This is done by registering the Zone Controllers to the AHU Controller. This part of the process will automatically set the Heat and Cool Source parameters (**HTSC** and **CLSC**) in the Zone Controllers to “point” to the AHU Controller. The parameters will be set to (50+*n*), where *n* is the AHU address (so a Zone would have its HTSC and CLSC parameters set to 51 for AHU 1, 52 for AHU 2 etc). Thus when any of these Zone Controllers enter their Occupied or Optimum Start state or enter Fabric Protection, the AHU will run (unless **MIND** is non-zero - see Fan Control) and its setpoint will be determined by the demand signals it receives. The AHU Controller is put into Configuration Mode, and the Zone Controllers are registered to it**.

Registration of Master-Slave AHUs

Another AHU Controller (it must be of the Return Air Control type - see Data Sheet A2) can be used as a “Master” to determine the Supply Air Setpoint of this AHU Controller. Note that this “Master” Controller must be an **/NH** variant (i.e. no System Housekeeping).
This is done by registering this AHU Controller (and any other slaves) to the “Master”. This part of the process will automatically cause the setpoint currently being used by the “Master” to.be sent to this “Slave” AHU .
Thus several AHUs can feed the same space with the same Supply Setpoint This allows one 'master AHU' to provide the Return Air control for a large space and to send its Supply Setpoint to one or more 'Slave AHU's.
The parameter **SPTR** may be used to offset the setpoint of this AHU from that of the Master if desired.
The Master must be operating in mode **SPTY 0** or **1**, i.e. must be measuring and controlling Return temperature.
The 'Slave' must be operating in mode **SPTY 5**. The registration process involves putting the master into config mode and then pressing the registration button on all the 'Slave AHU's'. The Slave will be registered again flashing it's Status led green as normal, then after 5 seconds the Temperature led will flash green to indicate the Master AHU number.
Any number of Slaves can be linked to a single Master.

If a Slave AHU is subsequently linked to a Zone Controller the link to the Master AHU will automatically be broken

**For further details of the registration process, see our publication “Engineering Guide”.

Detailed Features

Accessing Configuration and Monitoring Parameters

Configuration Parameters are used to adjust settings from their factory defaults; Monitoring Parameters are used to monitor internal readings (such as temperature readings) during the Commissioning process.
The Parameters may be viewed, and in the case of Configuration Parameters, adjusted by one of two methods; Either by using a Zone Controller connected to the network, or by using the SeaChange Doorway Supervisor.

Using the Zone Controller:

a) The Zone Controller must be connected to the network and *registered* (see Commissioning Guide for further details).
b) Put the Zone Controller into Configuration Mode by depressing Select and Override buttons for 10 seconds, until the CNFG legend appears on the display.
c) Press Select button on the target device (in this case, the Boiler Controller).
d) Hold down Select button on the Zone Controller, and rotate the rotary knob:

clockwise to view Monitoring Parameters
anticlock to view Configuration Parameters

e) When desired Configuration Parameter appears, release Select, hold down Override and turn knob to adjust the parameter (some Monitoring Parameters cannot be adjusted).

Using SeaChange Doorway:

Data Points may be added to a Doorway page to access/adjust any Configuration or Monitoring Parameter. Graphs of certain Parameters are also available. The code used to access an AHU Controller is **A*n***,where *n* is the AHU number. The code for each parameter is shown in the adjacent tables.
Further details of how to set up Doorway pages may be found in the SeaChange Doorway Manual, or in the online help facility supplied with SeaChange Doorway
The PC running SeaChange Doorway can be connected locally via a Serial Adaptor Module, or remotely using standard High-Speed Modems; all Parameters can thus be monitored and adjusted remotely.

System Housekeeping Functions

A SeaChange system needs certain system-wide functions to be provided by a single Controller, to ensure synchronisation, and to avoid conflicts. These functions are known as System Housekeeping Functions; examples of these are the management of time-of-day information, Outside Temperature and address allocation during registration. A full description of these functions may be found in the Boiler Controller Data Sheet. These functions may be provided by a Boiler Controller (if one is present) or by an Air Handling Unit Controller; either way, **it is important that only one controller in each SeaChange system has System Housekeeping capability**.
Refer to “Products and Order Codes” on page 8 of this data sheet to select the Controller, either to have System Housekeeping Functions, or not.

Manual Override

Manual override allows the AHU to be forced ON or OFF independant of the Automatic Control requirement. This is particularly useful for proving plant and wiring during commissioning and to drive plant for maintenance purposes.

The override function allows the AHU to be driven into one of three states;

a) AHU running continuously under temperature control, controlling to its normal Occupied setpoint.

b) AHU running continuously with 100% heating; the temperature is NOT controlled in this mode.

c) AHU running continuously with 100% cooling; the temperature is NOT controlled in this mode.

When in Override mode, the module retains all its inherant time delays and safety functions. So for example, Sequence outputs will increase to bring in all the stages with the time delays between stages that have been set in the modules configuration parameters.

To put module into Override state:

1. Press and hold the Override Button until the Green status LED flashes rapidly.
   Temperature indicator LED - green
   Unit goes into Occupied state, so AHU runs and controls to Occupied setpoint
2. Press and release the Override Button.
   Temperature indicator LED - red
   Heating output turns on to 100%
   If Raise/Lower type output, valve will open fully, if staged heating, all stages will be brought on under normal sequence timing control.
   Additional stages controlled by Cascade Modules or analogue valve controlled by Actuator Controller will also be driven 100%
3. Press and release the Override Button
   Temperature indicator LED - yellow
   Heating outputs close down under normal stroke or sequence timing
   Cooling output channel turns ON to 100%
   Cooling Valves or Staged outputs brought on as for Heating outputs
4. Press and release Override Button
   Status LED stops flashing
   Module resumes Automatic Control

As the Override Mode does not time out, care should be exercised to ensure that the module is returned to Automatic mode.

Override mode can also be set and reset via Doorway where AUTO and OVRD are used to set the Automatic and Override modes.

Setting Stroke Times for Raise/Lower outputs and Minimum-on time for Staged outputs

To position a valve accurately using a Raise/Lower driver type relies on the AHU Controller having an accurate knowledge of the Stroke Time of the actuator. Similarly, for Staged (Sequenced) outputs, it is sometimes important to set Minimum-on time for each stage (to prevent excessive cycling of a DX Cooling battery, for example).

These times may be set for the Heating and Cooling outputs by using the parameters **HPRD** (for the heating output and **CPRD** (for the cooling output).

A3 Configuration Parameters

Label	Doorway Code	Description	Units	Default Value	Range
SPAH	C1(or K1)	Occupied Supply Air Setpoint	Deg C	20	10 - 35
SPDB	C2	Supply Air Setpoint Deadband	Deg C	1	0 - 10
SPTR	C3	Setpoint Trim; is added to the Occupied Setpoint (C1) to produce the working setpoint, used when setpoint is slaved from a Zone Controller	Deg C	0	-10 - +10
SPTY	C4	Setpoint Type: 2: For AHUs feeding 1 or more Zones 5: For Slave AHUs working to setpoint sent by Master AHU	-	2	0 - 7
SPFR	C5	Frost Protection Setpoint; opens valves to 50% if OAT< SPFR	Deg C	10	0 - 20
INMD	C6	Input Mode; decides influence of external Volt Free Contact 0: Normal operation, external signal ignored 1: Occupied is External AND normal occupation (window contact or contact used to stop AHU) 2: Occupied is External OR normal occupation (Occupancy extension switch for outside normal hours) 3: Occupation controlled by external signal only	-	0	0 - 3
MAXS	C7	Maximum supply air setpoint	Deg C	30	2 - 70
MINS	C8	Minimum supply air setpoint	Deg C	10	0 - 30
CUTS	C9	Supply Air safety cutoff; 0: This feature inactive; AHU will not shut down >0: If Supply Air falls below this value, AHU will shut down	Deg C	4	0 - 20 2 - 30
NTCL	C10	Night Cooldown Setpoint; If Return Air sensor fitted, can be used to pre-cool the building using free cooling at night: 0: Night Cooling disabled >0: value used as Night Cooldown Setpoint	Deg C	0	0 - 25
MIND	C11	Minimum Demand necessary to run the AHU; 0: AHU will run if any Zone is in Occupation or Warm-Up (used for plants that are supplying Fresh Air) >0: AHU will only run if max Zone demand is higher than MIND (used for plants not supplying Fresh Air)	%	4	0 - 10
MRUN	C12	Minimum Run Time for AHU	Mins	5	1 - 20
HPRD	C13	Heating Valve Stroke Time (for Wet Coils) or Minimum-On Time for Electric Heater	secs/10	18	2 - 60
CPRD	C14	Cooling Valve Stroke Time (for Wet Coils) or Minimum-On Time for Electric Cooling stage	secs/10	18	2 - 60
SFRT	C15	Supply First; used to ensure positive pressurisation of building: 0 : Extract Fan starts before Supply Fan 1 : Supply Fan starts before Extract Fan	-	1	0 - 1
OCCO	C16	Occupancy Only; not used in this application	-	1	0 - 1
RTRY	C17	Retry Delay after fan failure has shut down AHU (before AHU restarts)	hrs	0	0 - 24
HTSC	C18	Heat Source; defines source of heat for Heater Battery: 0: for Electric Battery or non-SeaChange Boiler plant 1-20: to indicate source of heat (Boiler, Secondary Circuit Controller etc.), set automatically during registration	-	1	0 - 20
CLSC	C19	Cool Source; 0: for Electric Battery or non-SeaChange cooling plant, 1-20: to indicate source of cooling (Chiller etc.)	-	0	0 - 20
OCDS	C20	Occupancy Destination; Occupancy demand signal “pointer” points to other AHUs or other controllers: 0: feature is inactive 51-100 : will send Occupancy Status to AHU 1 - 50 (for AHU 1, set to 51, AHU2, set to 52 etc.) 101-200: will send Occupancy Status to Zones 1-100 (for Zone 1, set to 101, Zone 2, set to 102 etc.)	-	0	0 - 255
MXCT	C21	Maximum CT demand to Heat Source	Deg C	70	20 - 100
MNCT	C22	Minimum CT demand to Heat Source	Deg C	50	20 - 100
HTSG	C23	Number of Heating Stages (not used if wet heating battery)	-	2	1 - 5
CSTG	C24	Number of Cooling Stages (not used if wet cooling battery)	-	2	1 - 5
HCOK	C25	Heat/Cool OK; 1: allows heating and cooling to run simultaneously for closer control when using staged DX battery with modulating heating coil (not to be set when using DeHum control) 0: simultaneous heating and cooling not allowed (unless DeHum control is enabled using RHSP)	-	0	0 - 1

Configuration Parameters

A3

Label	Doorway Code	Description	Units	Default Value	Range
ALRM	C26	Alarm Mode: 0: Ignore Alarms 1: Report Alarms to supervisor (Fan Failure, Filter Blocked, Danger of Freezing, Outside Temperature sensor fault) 2: Report Alarms, shut down all outputs on STOP Alarm 3: as 2) above, and shut down TP or Staged outputs on Fan Failure	-	0	0 - 3
ALST	C27	Alarm State: State of inputs for Fan Failure/Filter Blocked: 0: Contact Closure generates alarm 1: Contact Opening generates alarm	-	0	0 - 1

Monitoring Parameters

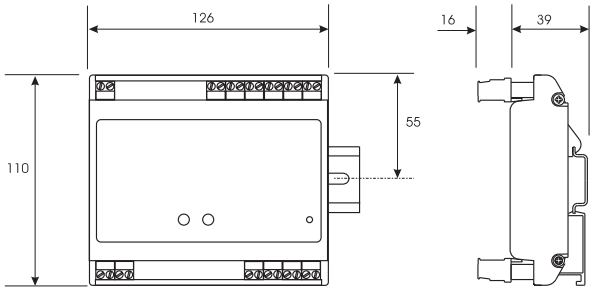
Label	Doorway Code	Description	Units	Default Value	Adjust Range
INPA	I1 (C30)	Input A (fan fail) input status (Contact Closure = 1)	On/Off	-	-
INPB	I2 (C31)	Input B (filter blocked) input status (Contact Closure = 1)	On/Off	-	-
RLYA	I3 (C32)	Heating relay 1 status	On/Off	-	-
RLYB	I4 (C33)	Heating relay 2 status	On/Off	-	-
RLYC	I5 (C34)	Cooling relay 1 status	On/Off	-	-
RLYD	I6 (C35)	Cooling relay 2 status	On/Off	-	-
SFAN	I7 (C36)	Supply Fan status	On/Off	-	-
EFAN	I8 (C37)	Extract Fan Status	On/Off	-	-
AUTO	W1 (C38)	Automatic, control mode	On/Off	-	On/Off
OVRD	W2 (C39)	Override	On/Off	-	On/Off
RSET	W3..(C40)	Reset AHU after Fan failure shutdown (auto resetting after use)	On/Off	-	On/Off
SERV	W7 (C44)	remote initiation of service pin message (SeaChange diagnostic use)	On/Off	-	On/Off
CGST	W8 (C45)	Configuration mode status	On/Off	-	On/Off
SPLA	S1* (C50)	Supply Air Temperature	Deg C	-	0 - 35
RTNA	S2* (C51)	Return Air Temperature	Deg C	-	0 - 35
HCOP	S3* (C52)	Heat / Cool output to Batteries	%	-	-100/+100
INCL	S4 (C53)	Inter-coil temperature (not used in this application)	Deg C	-	0 - 50
OUTS	S5 (C54)	Outside Temperature (locally wired or via network)	Deg C	-	-30/+35
SPSL	S6 (C55)	Current Supply temperature Setpoint	Deg C	-	5 - 30
SPRT	S7 (C56)	Current Return Temperature Setpoint	Deg C	-	5 - 30
SPLH	S8 (C57)	Supply Air Humidity	%	-	0 - 100
RTNH	S9 (C58)	Return Air Humidity	%		0 - 100
OUTH	S10.(C59)	Outside Air Humidity	%	-	0 - 100
SPOC	K1 (C60)	Supply Temperature Setpoint	Deg C	20	5 -35
SPFR	K2 (C61)	Frost Protection Setpoint	Deg C	0	5 - 20
SPSV	K3 (C62)	Supervised Setpoint from Zone Controller (overrides C60)	Deg C	0	0 - 50
SPTR	K4 (C63)	Setpoint Trim; added to C62 to form current setpoint	Deg C	-	+/- 10
RHSP	K5 (C64)	RH Setpoint for Return Air Humidity; 0: Disables Dehumidification 10 - 100: forms setpoint for Dehum control	%	- -	10 - 100 - -
RHDB	K6..(C65)	RH deadband for Dehumidification	%	-	2 - 50
		These parameters are only accessible using SeaChange Doorway:			
NOAL	C90	No Alarms currently in this controller (1 = no alarms)	On/Off	-	-
FANF	C91	Fan Failure Alarm current (1 = alarm current)	On/Off	-	-
FLTF	C92	Filter Blocked Alarm current (1 = alarm current)	On/Off	-	-
FREZ	C93	Danger of Freezing Alarm current (1 = alarm current)	On/Off	-	-
OUTF	C94	No Outside Temperature Available Alarm current (1 = alarm current)	On/Off	-	-
SPFL	C95	Supply Sensor Failed (1 = alarm current)	On/Off	-	-
STOP	C96	Controller shut down due to System Stop Alarm received (1 = alarm current)	On/Off	- -	- -
		These parameters are factory set; refer to SeaChange for special applications before changing these settings			
HTYP	C150	Heating Driver Type	-	-	-
HINT	C151	No. of internal Heating stages	-	-	-
CTYP	C152	Cooling Driver Type	-	-	-
CINT	C153	No. of internal Cooling stages	-	-	-
HRMN	C154	Heating Driver input rescale minimum	-	-	-
HRMX	C155	Heating Driver input rescale maximum	-	-	-
CRMN	C156	Cooling Driver input rescale minimum	-	-	-
CRMX	C157	Cooling Driver input rescale maximum		-	-

* indicates 24 hour graph available

A3

Specification

Dimensions



all dimensions in mm

Electrical

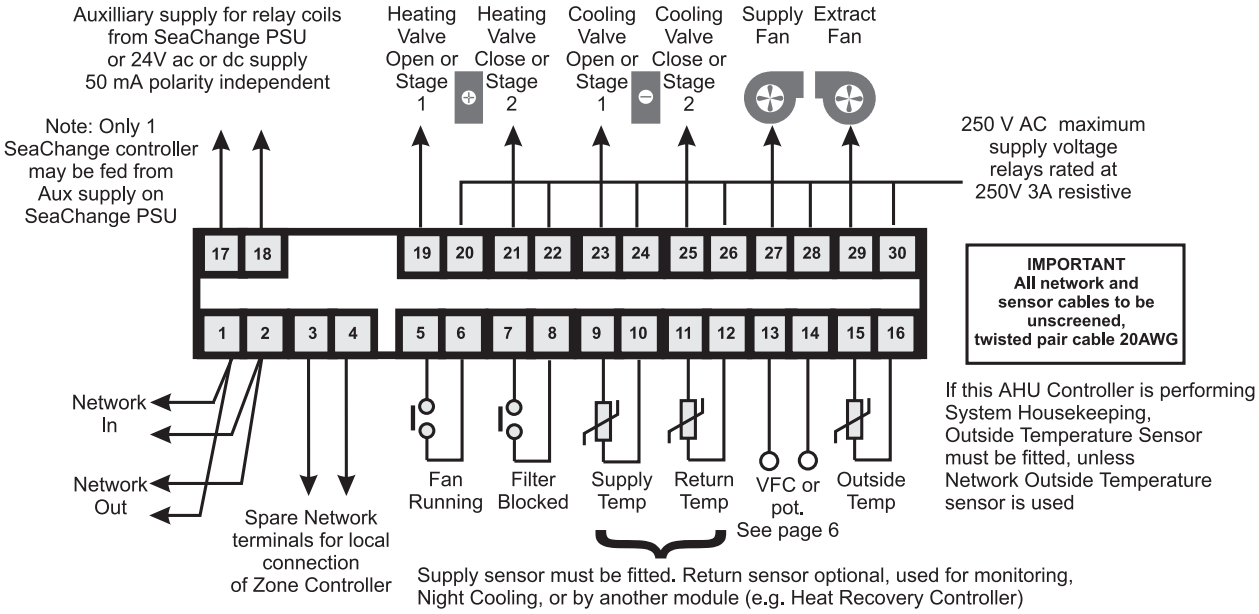
Inputs	4 Thermistors 2 Volt Free Contacts
Outputs	6 Relay Outputs N/O contacts 3 A 250 V resistive Load
Consumption	13 mA from Network 100 mA from 24V AC Input

Physical

Weight	0.25 kg
Cover Material	PC/ABS alloy Self extinguishing to UL 94 V0/1.60
Base Material	Polyamide 6.6 Self extinguishing to UL 94 VO
Colour	Dark Grey to Pantone 425

CE Conformant product

Wiring Information



Options and Product Codes

AHU / DIN / SUP / [*battery types*] / [*with / without housekeeping*] / [*variant*]

Battery Types:

Option	Heater Battery	Cooling Battery
/ W W /	Raise / Lower Valve	Raise / Lower Valve
/ W E /	Raise / Lower Valve	2 - Stage Electric
/ E W /	2 - Stage Electric	Raise / Lower Valve
/ E E /	2 - Stage Electric	2 - Stage Electric

System Housekeeping:

/ S H /	With System Housekeeping Functions
/ N H /	No System Housekeeping Functions

Variant:

/ 001	Standard Variant

e.g. AHU / DIN / SUP / WW / SH / 001 AHU Controller, DIN rail mounting, Variable Supply Temperature, with Raise / Lower outputs for Heating and Cooling Batteries, with System Housekeeping Functions

AHU / DIN / SUP / EW / NH / 001 AHU Controller, DIN rail mounting, Variable Supply Temperature, with 2-Stage Electric outputs for Heating, Raise / Lower outputs for Cooling Batteries, with no System Housekeeping Functions

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