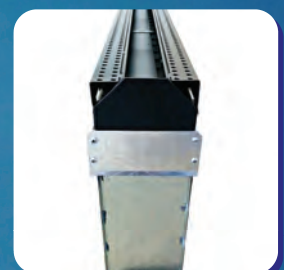
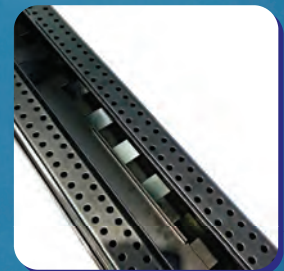


VARIABLE VOLUME LINEAR BAR CEILING DIFFUSERS

VLB 1

- ✱ INTEGRATES WITH MLM & THE BMS
- ✱ JOIN END TO END
- ✱ HORIZONTAL/VERTICAL FLOW PATTERN
- ✱ HEATING AND COOLING
- ✱ TERMINAL REHEAT AVAILABLE
- ✱ CONTROL THE PERIMETER EFFECTIVELY
- ✱ EXCELLENT THROW & FLOW
- ✱ ATTRACTIVE LINEAR LENGTHS



FEATURES

When a buildings thermal efficiency is paramount, the ideal solution to limit thermal losses or gains through its exterior is required. The Rickard Variable Volume Linear Bar Diffuser (VLB) is an ideal solution to control a buildings internal perimeter zone or be an aesthetically attractive alternative to plate diffusers in internal zones. A VLB's flow pattern can be adjusted to create a vertical curtain of conditioned air to act as a barrier to external thermal loads or a horizontal flow pattern that creates good mixing without drafts.

Rickard VLB linear bars are designed to be joined end-to-end to create uninterrupted lengths of attractive linear bar.



PERFORMANCE

Rickard VAV Diffusers control Room Temperature by adjusting the volume of air at the diffuser outlet. By changing the diffusers exit geometry, Coanda, Air Velocity and Throw is maintained at minimum and maximum volume. This technology prevents cold air from dumping at minimum, ensures excellent ventilation, air mixing, Air Change Effectiveness (ACE) and therefore thermal comfort (ADPI). Rickard VAV diffusers reduce pressure loss in the system due to their aerodynamic design and the absence of restrictions in the duct work.

OPERATION

Room temperature is intelligently controlled by varying the supply air volume in accordance with demand.

Used in conjunction with our MLM controls, maximum and minimum supply air volumes may be adjusted to suit the particular design conditions.

A further useful feature of the RICKARD VLB is the ease with which the direction of airflow may be adjusted.

ENERGY SAVINGS

Green Building Benefits. Receive Management, Indoor Environmental Quality and Energy Efficiency Credits by using Rickard VAV Diffusers.

Rickard VAV diffusers reduce energy by supplying the correct amount of air cooling or heating where it is required. In addition, the system lends itself to reduce pressure losses in ducting, thereby reducing fan energy consumption.

Rickard MLM controls use energy efficiently. Rickard MLM Diffusers use <2.4 VA (24VDC 100mA) only when the motor is running. MLM24 Power Supply Units use 40VA (220VAC 2A) or (115VAC 35A)

max and can supply up to 15 diffusers. MLM Master Communications Units (MCU2) use 10VA (24VAC 4A) max and can connect to 60 diffusers.

CONTROLS

STANDARD MLM+ CONTROLLER CAPABILITIES

The VLB Diffuser are all configured as secondary diffusers. To be controlled it needs a remote wall thermostat to make it a primary diffuser. Every zone needs one primary VLB diffuser connected for the zone to control temperature as a unit. Zoning of multiple diffusers is done through the MLM application.

To power a VLB, power from a PSU is required. Up to fifteen VLB's can be daisy chained from a single PSU power supply unit (purchased separately). Inter-diffuser connecting cables are included with each diffuser.

Electronically **adjustable maximum and minimum damper limits** allow designed airflow volumes to be achieved.

Global commands can be used to reduce the time of adjusting multiple diffusers.

MLM+ OPTIONS

WALL THERMOSTATS are available to be added to every VAV diffuser as required. When plugged into the diffuser interface on the diffuser, the controls will automatically override the on-board master to provide sensing and setpoint adjustment through the wall thermostat.

REVERSE CHANGE-OVER sensors are available to ensure each zone is controlled correctly when the supply air changes from cooling to heating.

ELECTRIC HEATING is available should additional heating be required. The heater controller is plugged into the heater socket on the diffuser interface module.

AIRFLOW MEASUREMENT is available to simplify electronic commissioning and to control pressure independent maximum and minimum flow volumes.

A Master Communications Unit/MCU is used to integrate the diffuser network with a **BACnet BMS** and the MLM application. One module can connect to a maximum of 4 PSU's at a time. This is a cost effective way of linking BACnet to up to 60 diffusers per MCU. A single channel iPSU device is also available if a Bacnet connection to only 15 diffusers is needed.

INSTALLATION SAVINGS

A perforated plate running next to the diffuser nozzle makes it easy to plaster the ceiling up to the nozzle edge.

Optional Jubilee Clamp saves time and material when attaching the flex.

CAPITAL & OPERATING COST

Low VLB height can reduce a buildings overall cost by reducing the height of the ceiling void.

MAINTENANCE

Diffuser life cycle testing gives peace of mind far beyond our two year warranty period (Electronic diffuser range). Life cycle testing is based on 3000 operating hours and 4000 control cycles per year which is the equivalent of 30 years of service.

The VLB diffusers active section and plenum is constructed from corrosion resistant mill galvanized sheet steel and the diffuser bars are coated black with epoxy powder coating.

No regular maintenance is required.

AESTHETICS

Rickard VLB's are designed to be joined end-to-end to create uninterrupted lengths of attractive linear bar. The Linear Bar Nozzle is finished in a high quality black epoxy powder coated finish. The Perforated ceiling plate running next to the nozzle makes it easy for the plaster to bond to the diffuser and the nozzle acts as straight edge to ensure a high quality finish.



SAFETY

Working plastic components are moulded in glass reinforced Makrolon - Makrolon is flame retardant and chlorine and bromine free when burnt. The Rickard Electronic actuators are moulded in Makrolon and are UL Certified.

WARRANTY

Rickard offers a 2 year manufacturer's warranty on its Electronic VAV diffusers. Please see Terms and Conditions for a full description of our warranty.

APPLICATION

VAV COOLING AND HEATING

VAV COOLING AND HEATING WITH TERMINAL REHEAT

STAND ALONE OR BMS CONTROLS

REMOTE SETPOINT

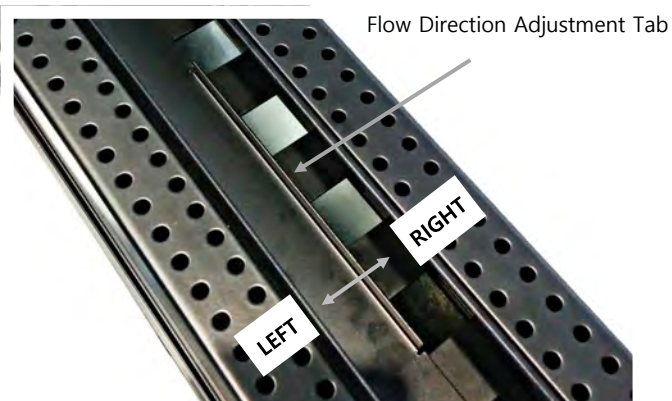
When a buildings thermal efficiency is paramount, the ideal solution to limit thermal losses or gains through its exterior is required. The Rickard Variable Volume Linear Bar Diffuser (VLB) is an ideal solution

to control a buildings internal perimeter zone or be an aesthetically attractive alternative to plate diffusers in internal zones. RICKARD Variable Volume Linear Bar Diffusers (VLB) are intended to heat or cool zones where load fluctuations vary. The Variable Volume Linear Bar Diffusers (VLB), as its name implies, automatically regulates the air volume entering the conditioned space and in turn controls the temperature.

The Rickard MLM controller automatically changes it's control direction as supply temperatures switch from heating to cooling and vice versa. Please note that a changeover sensor should be fitted for this function to work.

Top-up heaters are available if required. This is achieved by fitting a Rickard Neck Heater and Triac.

A VLB's flow pattern can be adjusted to create a vertical curtain of conditioned air to act as a barrier to external thermal loads or a horizontal flow pattern that creates good mixing without drafts.



Rickard VLB linear bars are designed to be joined end-to-end to create uninterrupted lengths of attractive linear bar.

NOTE: No onboard sensing is available: A remote wall thermostat is required in zones where top-up heating is fitted.

OPERATION

FLOW DIRECTION ADJUSTMENT

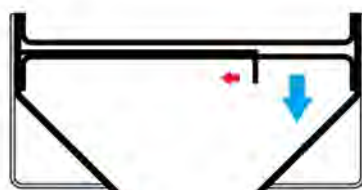
A useful feature of the RICKARD VLB is the ease with which the direction of airflow may be adjusted. Although airflow direction is not normally changed once the system is operational, it does simplify the ordering procedure. The choice of one-way (vertical) or two-way (horizontal blow) is easily implemented on site by simply shifting the flow directional plate left or right.

Air is generally directed vertically downwards for better room penetration, especially when the VLB is in the heating mode.

FLOW DIRECTION ADJUSTMENT TAB POSITION	FLOW DIRECTION
Centre	Vertically Downwards
Left	Left Horizontal
Right	Right Horizontal

CENTRE POSITION


Downward Flow

LEFT POSITION


Left Horizontal Flow

RIGHT POSITION


Right Horizontal Flow

JOINING END-TO-END

Remove both end plates from the ends you wish to join and connect using the alignment tabs fitted.



SELECTION

The first consideration when designing a system is to calculate the required supply air volume and temperature to satisfy room conditions at maximum heat loads. It is recommended that ducting is sized using static regain design principles. Supply air velocities in branch ducts should be between 3.5 and 7.5m/s (650 and 1500ft/min).

THROW

This is the distance from the centre of the diffuser to the point at which the supply air velocity has reduced to 0.25m/s (50ft/min) when measured 25mm (1 inch) below the ceiling. Coning occurs when two airstreams travelling in opposite directions meet and result in a downward moving cone of air (applies to horizontal flow). A similar effect is experienced should a diffuser be positioned at a distance from the wall that is less than its throw. The air will strike the wall and flow in a downward direction such that the point at which the air reaches a velocity of 0.25m/s (50ft/min), the sum of the horizontal and vertical travel of the air is equal to the diffuser throw.

NOISE LEVEL REQUIREMENTS

PLEASE CONTACT RICKARD FOR NOISE DATA.

DUCT STATIC PRESSURE

Diffuser performance has been established using diffuser neck TOTAL pressure, although that which is normally known or measured is duct STATIC pressure. What happens between the duct and the diffuser depends on the length and type of flexible duct being used. For simplicity, it can be assumed that the duct STATIC pressure is approximately equal to the diffuser neck total pressure. This is a valid assumption for systems where flexible duct lengths are not excessive and can be explained briefly as follows:

The static pressure loss due to friction in the flexible duct ($\pm 10\text{Pa}$ or 0.04ins Wg) would normally be about the same as the velocity pressure in the neck of the diffuser and since total pressure is the sum of static and velocity pressure. Although the tables reflect diffuser performance for neck total pressures ranging from $30\text{-}70\text{Pa}$ ($0.12\text{-}0.28\text{ins Wg}$), caution should be exercised when selecting diffuser outside the $30\text{-}50\text{Pa}$ ($0.12\text{-}0.20\text{ins Wg}$). At lower pressures air movement and induction may be insufficient and at higher pressures draughts and excessive noise may result. Best results are obtained when diffusers are selected at pressures of $30\text{-}40\text{Pa}$ ($0.12\text{-}0.16\text{ins Wg}$).

TYPES

NECK SIZES & TRACK LENGTHS

LENGTH	NECK SIZE
600mm	150mm
900mm	200mm
1200mm	250mm
1500mm	300mm

LINEAR BAR TYPES

VLB Linear Bar Diffusers are only available with a single linear nozzle.

VLB's are designed to fit Plastered Ceilings (Surface Mount) only.

VLB's controls are mounted to the outside of the plenum on a removable access panel that gives access to the motor.

Rickard VLB Diffuser tracks are designed to be joined end-to-end to create uninterrupted lengths of attractive linear bar. The linear bar nozzles are finished in a high quality matt black epoxy powder coating as standard.

OPTIONS

HEATING OPTION

VLB's are also available with built in heaters. Please see the Electric Heating Section for more Information on this option.

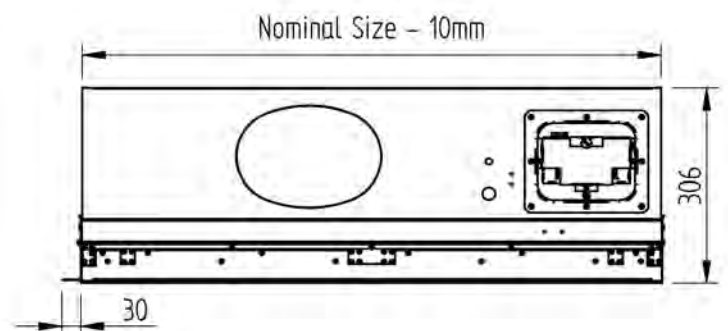
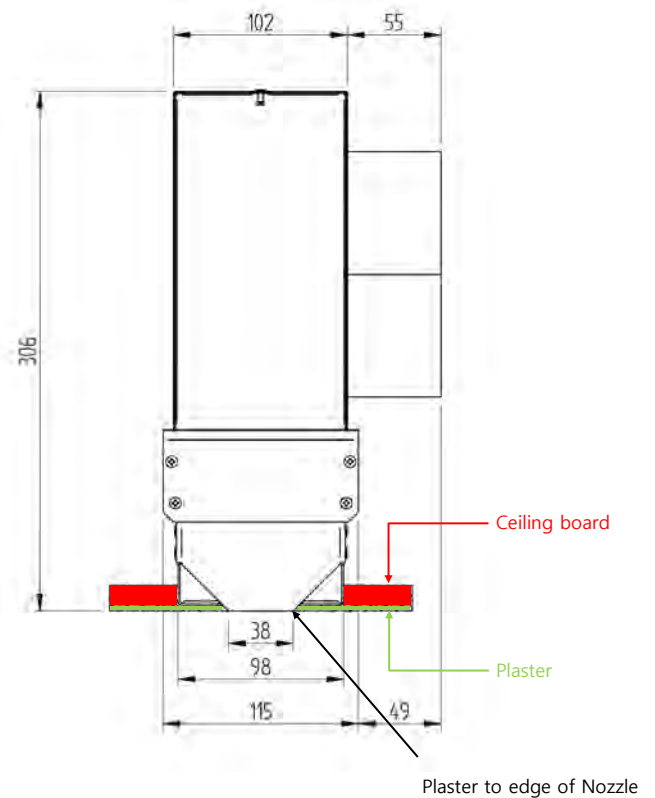
SENSING OPTIONS

VLB's need to be connected to a Primary Diffuser or a remote thermostat to control temperature as a zone. Onboard Sensing is not available.

Sensing options available:

- Wired Wall Thermostat
- Wired Wall Thermostat with Occupancy Sensing
- Wired Wall CO2 Thermostat
- Wireless RF Wall Thermostat
- Wireless RF Pod Sensor

MOUNTING METHODS



PERFORMANCE DATA

VLB 600 - FULLY OPEN - HORIZONTAL & VERTICAL FLOW						
NECK TOTAL PRESSURE (Pa)	10	20	30	40	50	60
FLOW (l/s)	27	39	49	58	65	71
THROW (m)	5,1	7,5	8,3	9,1	9,3	10,2
NC LEVEL (Horizontal/Pat. C)	-	19	24	28	31	33
NC LEVEL (Vertical/ Pat. B)	-	20	23	26	30	33

VLB 900 - FULLY OPEN - HORIZONTAL & VERTICAL FLOW						
NECK TOTAL PRESSURE (Pa)	10	20	30	40	50	60
FLOW (l/s)	43	62	78	90	100	110
THROW (m)	3,2	5,4	6,9	7,9	8,1	9,2
NC LEVEL (Horizontal/Pat. C)	-	21	27	30	34	37
NC LEVEL (Vertical/ Pat. B)	-	19	24	27	30	33

VLB 1200 - FULLY OPEN - HORIZONTAL & VERTICAL FLOW						
NECK TOTAL PRESSURE (Pa)	10	20	30	40	50	60
FLOW (l/s)	54	80	99	115	129	140
THROW (m)	3,0	3,9	4,5	4,9	5,2	5,3
NC LEVEL (Horizontal/Pat. C)	-	22	27	31	34	36
NC LEVEL (Vertical/ Pat. B)	-	22	27	31	34	36

VLB 1500 - FULLY OPEN - HORIZONTAL & VERTICAL FLOW						
NECK TOTAL PRESSURE (Pa)	10	20	30	40	50	60
FLOW (l/s)	69	100	124	143	161	176
THROW (m)	3,0	3,8	4,1	4,5	4,9	5,3
NC LEVEL (Horizontal/Pat. C)	-	20	26	29	32	35
NC LEVEL (Vertical/ Pat. B)	-	20	25	29	32	35

Throw is measured 25mm below the ceiling following a line through the centre of the diffuser at the point at which the air velocity reaches 0.25m/s.

Performance Data applies to Standard Air with a density of 1.2 kg/m³.

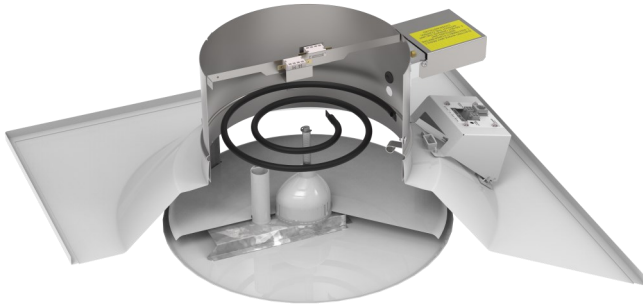


H&M STORE (V&A Waterfront), CAPE TOWN

FEATURES

FORM FACTOR

RICKARD diffusers are fitted with electric re-heaters that are either housed in a modular sleeve (VCD1, VSD1, CCD3, CSD3, VSW1, CSW, WBD's, CLN's and VLN's) or fitted directly to the unit (WBD, VLN). The heaters are energised when additional heating is required in a room.

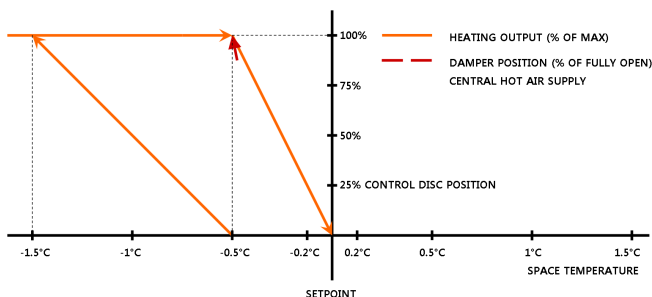


VAV PLATE DIFFUSER FITTED WITH MODULAR HEATER SPIGOT



WBD WITH DEDICATED HEATER FITTED

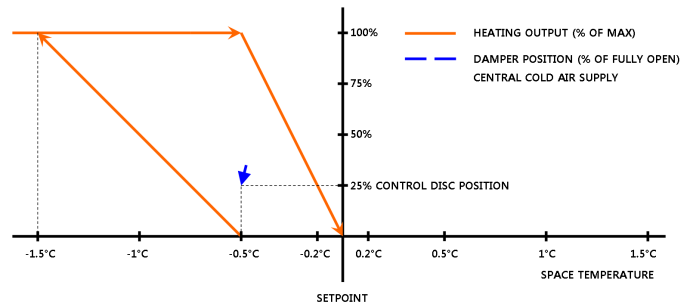
Electric heating can be considered to save energy when they are used to heat isolated offices that wouldn't be efficiently heated by raising the central plants temperature. The most efficient scenario in heating is for the central plant to supply sufficient heated air to allow most of the zones to be in control when the diffusers damper is close to minimum position. Zones that are colder are controlled by the diffuser opening further. Zones that cannot be satisfied by the diffuser supplying warm air at full volume are topped up with supplementary heating.



The most efficient scenario in cooling is for the central plant to supply sufficient cool air to allow most of the zones to be in control when the diffuser dampers are close to minimum position. Zones that are warmer can be controlled by the diffuser opening further. Zones that cannot be warmed sufficiently by reducing the cold air supply can be controlled by heating this reduced volume of air.

If the room temperature were to fall by 0.5°C below set point, the

triac controller will commence energizing the heater proportionally and will fully energize the heater when the room temperature is approximately 1.5°C below set point.



To ensure a building is efficiently heated it is necessary to integrate the Rickard VAV diffuser system with the central plant BMS. This is possible by using Rickard's MLM BMS Compatible Controls.

PROPORTIONAL HEATING

For accurate control of room temperature, the electric re-heater is controlled on a step-less, proportional basis. In addition to having a proportional output signal for cooling control, the temperature controller also has a proportional output signal for heating.

This is done by means of a triac switching set (current valve) which varies the heater output capacity by cycling the power supply to the heater on and off – Pulse Width Modulation (PWM). This switching takes place over a cycle of approximately 2 seconds and always occurs at zero voltage to avoid radio frequency interference and voltage spikes. The "on" and "off" periods are varied in proportion to the amount of heating required, i.e. a required heating capacity of 75% will result in an "on" period of 1.5 seconds and an "off" period of 0.5 seconds.

CONTROLS

In a situation where multiple diffusers are controlled from a single controller, each diffuser will be fitted with its own triac that will receive a heating signal from the Primary controller. From the table "Maximum Recommended Heater Output (Watts)" at the end of this section, notice that for each neck total pressure there is a specific heater output quoted. For each diffuser size a standard heater capacity is referenced e.g. in the case of a VCD 250 diffuser, the re-heater sleeve would be factory fitted with a 1500 watt heater. By utilizing the RICKARD MLM or MLM Interoperable BMS Compatible Controls, the heater can be electronically set for an output from 100 to 1500W to match the design engineer's requirements. If the diffuser neck total pressure were to be set to 50Pa and the minimum desired air flow was 30% of maximum with a 17°C temperature rise, the heater output for a VCD 250 should be set to 1350 watts. Please refer to the MLM software help section for setup information.

IMPORTANT ELECTRICAL INFORMATION: Electrical reticulation should be designed to manage the heaters full capacity i.e. when a heater is set to 50%, the heater element draws the same current as it would when set to 100% but only draws it for 50% of the time.

SELECTION GUIDELINES

When calculating heater capacities for VAV diffusers, please keep in mind that heating in the cooling mode takes place when the diffuser is supplying minimum air flow. Care must therefore be taken to ensure that excessive supply air temperature rises are avoided. Discharge temperatures in excess of 32°C are likely to cause stratification within the room. As a guide-line, the temperature of the air leaving the diffuser should not be more than 10°C above room temperature. Please refer to the "Maximum Recommended Heater Output (Watts)" table on page 3 for each diffuser size. These heater output ratings calculated to ensure that the heat rise is no more than 15°C in VAV diffusers and 10°C in CAV diffusers. Please note that these values are a guide and are calculated at 30% volume for VAV diffusers and 100% volume for CAV diffusers.

IMPORTANT: These maximum capacities do not take into account limitations of the triac which are rated at 12A maximum. This reduces the capacity of the triac at low voltage supply.

ELECTRICAL AND OVERHEAT SAFETIES

NOTE: The following safeties should not exclude duct airflow safeties and a dedicated heater electrical circuit. Please see the following Installation guidelines section.

Every Heater Module is fitted with a coiled electrical element inside a galvanised sheet metal enclosure. The heater elements is constructed from an incoloy material that does not glow when energised. This element is selected to reduce the risk of combustible materials igniting should they come into contact with the heater element itself. No combustible materials are used in the construction of a Rickard Diffuser or Heater Module. Rickard diffusers use a high spec flame retardant, self extinguishing polycarbonate plastic that is chlorine and bromine free with a UL94 V-0 rating at 1.5mm. The Heater modules are fitted with their own triac/heater driver and receive a proportional signal from the diffuser controls when heating is required. The triac receives its power from a separate power circuit. Dedicated plug tops can be fitted to the heater module on request.

Each heater modules is fitted with a number of safeties to reduce the risk of failure. The triac is fitted inside an electrically grounded metal enclosure that is physically attached to the heater module enclosure. This increases the electrical safety of the device should a short circuit occur. A fuse offers additional protection against large current surges and shorts. A Transient suppressor prevents the Triac from failing closed and therefore driving the heater permanently if a voltage surge occurred.

In some cases when no flow or very low flows occur in the ducting, it is necessary to limit the heaters output to avoid excessive heat build up in the diffuser. For this reason the triac is fitted with a temperature sensor and controls to limit the triac so that the supply air exiting the diffuser never rises above 50°C or 122°F.

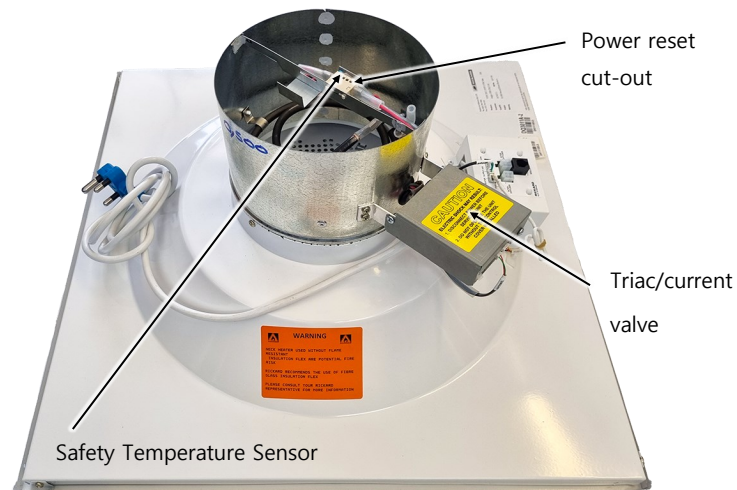
As an added safety a power-reset 85±5°C or 185±9°F (3000 cycles) safety cut-out is fitted as standard. The reset temperatures indicates the air temperature inside the overheat safety cut-out casing at which it operates. Rickard heater modules are designed so that the overheat safety cut-outs trigger when the neck Total pressure is approximately 30Pa or below. The trigger point can vary depending on a number of factors namely, excessively squashed or bent flex, neck size, heater size and damper position. Rickard controls do not activate its heaters below 20% flow damper position, thereby reducing the likelihood of the overheat safeties not triggering in the

range described. Push-button type manual reset safeties are not recommended in conjunction with diffuser re-heaters.

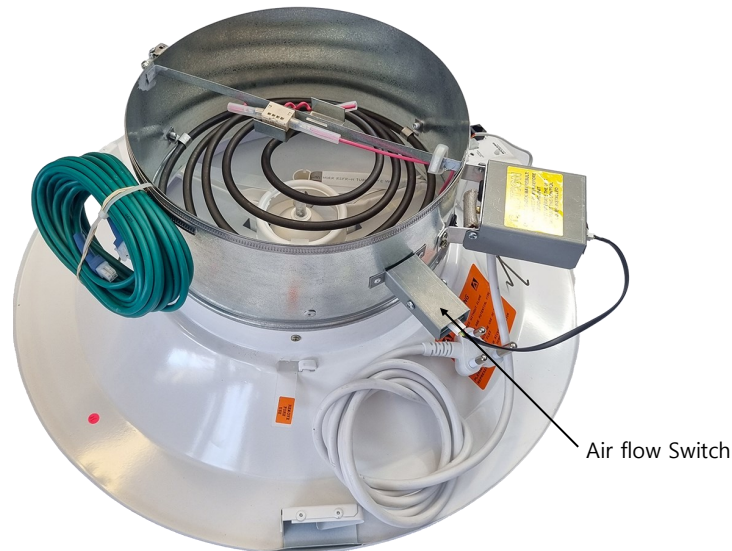
For additional safety, RICKARD offer an Airflow Switch to interrupt power to the re-heater controls when there is insufficient airflow across the heater element. The switch is calibrated to disable the heater current valve below a static pressure of 12Pa (+/- 5Pa).

The switch operates as a dead man switch i.e. if the cable between the switch and the heater controls is unplugged, the heater will not operate.

STANDARD SAFETIES FITTED TO ALL VAV DIFFUSER TYPE (VCD1, VSD1, CCD3, CSD3, VSW1, CSW, WBD's, CLN's and VLN's)



OPTIONAL AIRFLOW CUT-OUT/SWITCH



TESTING

All electrical wiring associated with the re-heater is carried out in the factory and all units are carefully tested for correct operation.

OPTIONS

- Heaters are available in various capacities, ranging from 0.5kW to 2.5kW.
- Airflow Switch to interrupt power to the re-heater controls when there is insufficient airflow across the heater element.

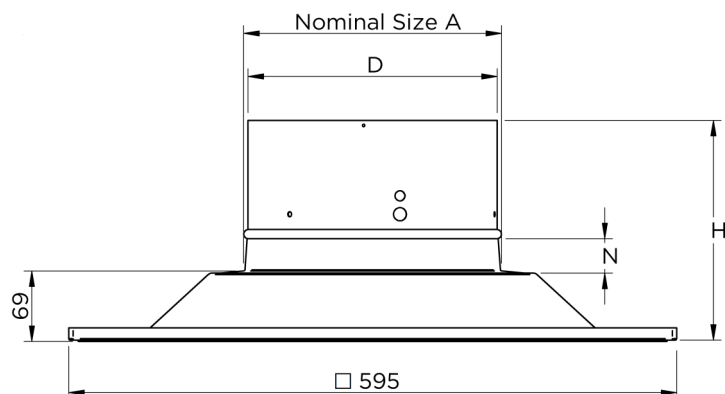
INSTALLATION GUIDELINES

Your duct design should supply between 30 and 60Pa total pressure at each diffuser to ensure adequate flow across the heaters.

Please ensure the ducting is fitted with an airflow interlock/paddle switch that cuts the power to the electrical reticulation serving the diffusers in the event of a loss of flow. This will ensure that the diffusers heaters are not energised when the AHU is off.

Rickard recommends a dedicated electrical outlet be fitted to the building heater reticulation and dedicated plug top be fitted to the diffusers. This will ensure that the airflow interlock always cuts power to the diffusers heaters and not other equipment plugged into the same circuit. This will also ensure that heaters are always plugged into a protected circuit.

Please see the "Electric Plug Ordering" Document for more details to order the correct plug top for your installation.



NOMINAL SIZE A	NECK DIAMETRE Ø D (mm)	NECK HEIGHT Ø N (mm)	OVERALL HEIGHT Ø H (mm)
150	148	26	211
200	195	32	217
250	244	32	217
300	287	35	220
350	337	40	225

Max Heater Size for each neck extension height or heater type *																			
Pa		20			30			40			50			60			70		
Diffuser Neck Extension Height/Type *		145 mm	200 mm	Other *	145 mm	200 mm	Other *	145 mm	200 mm	Other *	145 mm	200 mm	Other *	145 mm	200 mm	Other *	145 mm	200 mm	Other *
Heater Size		kW			kW			kW			kW			kW			kW		
VCD Neck Size (mm)	150	0.25	n/a	0.25	0.25	n/a	0.25	0.5	n/a	0.5	0.5	n/a	0.5	0.5	n/a	0.5	0.5	n/a	0.5
	200	0.5	n/a	0.5	0.75	n/a	0.75	0.75	n/a	0.75	0.75	n/a	0.75	1	n/a	1	1	n/a	1
	250	0.75	n/a	0.75	1	n/a	1	1	n/a	1	1.25	n/a	1.25	1.25	n/a	1.25	1.25	n/a	1.25
	300	1	n/a	1	1.25	n/a	1.25	1.5	n/a	1.5	1.5	n/a	1.5	1.5	n/a	1.5	2	n/a	2
	350	1.25	n/a	1.25	1.5	n/a	1.5	1.5	n/a	1.5	1.5	n/a	1.5	2	n/a	2	2.5	n/a	2.5

VSW		Max Heater Size for each neck extension height or heater type *																
		Pa		30			40			50			60			70		
		Diffuser Neck Extension Height/Type *		145 mm	200 mm	Other *	145 mm	200 mm	Other *	145 mm	200 mm	Other *	145 mm	200 mm	Other *	145 mm	200 mm	Other *
		Heater Size		kW			kW			kW			kW			kW		
		VSW Neck Size (mm)	150	0.25	n/a	0.25	0.25	n/a	0.25	0.5	n/a	0.5	0,5	n/a	0,5	0.5	n/a	0.5
			200	0.5	n/a	0.5	0.75	n/a	0.75	0.75	n/a	0.75	0.75	n/a	0.75	0.75	n/a	0.75
			250	0.75	n/a	0.75	1	n/a	1	1	n/a	1	1.25	n/a	1.25	1,25	n/a	1,25
300	1		n/a	1	1.25	n/a	1.25	1.25	n/a	1.25	1,5	n/a	1,5	1.5	n/a	1.5		

* Other: In-line Heater/Side Entry Plenum.

The largest heater shown for each neck size creates a heat rise of +/- 15°C when the damper closes down to minimum position i.e. the diffusers default minimum position is set to supply 30% air volume when the heaters are activated. If the diffusers minimum is reduced a larger heat rise will result.

WBD	Max Heater Size				
	Pa	20	30	40	50
	Size (mm)	kW			
	300/100	0.25	0,5	0.5	0.5
	350/100	0.5	0.5	0.75	0,75
	400/100	0.5	0,75	0.75	0.75
	450/100	0.75	0.75	0.75	1
	500/100	0.75	0.75	1	1
	550/100	0,75	1	1	1.25
	600/100	0.75	1	1.25	1,25
	650/100	1	1	1,25	1.5
	500/150	1	1,25	1.5	1.5
	550/150	1.25	1.25	1.5	1.5
	600/150	1.25	1.5	1.5	2
	650/150	1.25	1.5	2	2
	700/150	1.25	1.5	2	2.5
	800/150	1,75	2	2,5	2,5

VLN1 2 Slot	Max Heater Size					
	Pa	30	40	50	60	70
	Heater Size		kW			
	Track Length	600mm	0.25	0.25	0.5	0,5
		900mm	0.5	0.75	0.75	0.75
		1200mm	0.5	1	1	1,25
		1500mm	0.75	1.25	1.25	1,5

The largest heater shown for each neck size creates a heat rise of +/- 15°C when the damper closes down to minimum position i.e. the diffusers default minimum position is set to supply 30% air volume when the heaters are activated. If the diffusers minimum is reduced a larger heat rise will result.

CCD	Max Heater Size for each neck extension height or heater type																			
	Pa		20			30			40			50			60			70		
	Diffuser Neck Extension Height/ Other Type *		145 mm	200 mm	Other *	145 mm	200 mm	Other *	145 mm	200 mm	Other *	145 mm	200 mm	Other *	145 mm	200 mm	Other *	145 mm	200 mm	Other *
	Heater Size		kW			kW			kW			kW			kW			kW		
	CCD Neck Size (mm)	150	0.5	1	1.25	0.5	1	1.5	0.5	1	1.5	0.5	1	2	0.5	1	2	0.5	1	2
		200	1	1.5	1.5	1	1.5	2	1	1.5	2.5	1	1.5	2.5	1	1.5	2.5	1	1.5	2.5
		250	1	1.5	2	1	1.5	2.5	1	1.5	2.5	1	1.5	2.5	1	1.5	2.5	1	1.5	2.5
		300	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
		350	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

CSW	Max Heater Size for each neck extension height or heater type																			
	Pa		20			30			40			50			60			70		
	Diffuser Neck Extension Height/ Other Type *		145 mm	200 mm	Other *	145 mm	200 mm	Other *	145 mm	200 mm	Other *	145 mm	200 mm	Other *	145 mm	200 mm	Other *	145 mm	200 mm	Other *
	Heater Size		kW			kW			kW			kW			kW			kW		
	CSW Neck Size (mm)	150	0.5	0.75	0.75	0.5	0.75	0.75	0.5	0.75	1	0.5	0.75	1	0.5	0.75	1	0.5	0.75	1.25
		200	1	1.25	1.25	1	1.25	1.25	1	1.25	1.5	1	1.25	1.5	1	1.25	2	1	1.25	2
		250	1.25	1.5	1.5	1.25	2	2	1.25	2	2	1.25	2	2.5	1.25	2	2.5	1.25	2	2.5
		300	2	2	2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

* Other: In-line Heater/Side Entry Plenum.

Orange cells indicate In-line Heaters/Side Entry Plenums that require 2 heater elements and 2 triacs.

The largest heater shown for each neck size creates a heat rise of +/- 10°C when the damper is 100% open. A heat rise of >10°C will occur when damper positions are less 100% open.