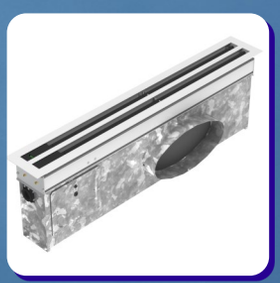
RICKARD

INTELLIGENT COMFORT CONTROL

ELECTRONIC VARIABLE VOLUME LINEAR AEROFOIL DIFFUSER

VLA 1

- CONTROL THE PERIMETER EFFECTIVELY
- HORIZONTAL/VERTICAL FLOW PATTERN
- 3 SLOT WIDTHS SUIT EVERY APPLICATION
- CHOOSE 1 - 4 SLOTS
- ONBOARD/REMOTE SENSING
- EXCELLENT THROW & FLOW
- HEATING AND COOLING CHANGEOVER
- ENERGY EFFICIENT
- NO MAINTENANCE
- 2 YEAR WARRANTY







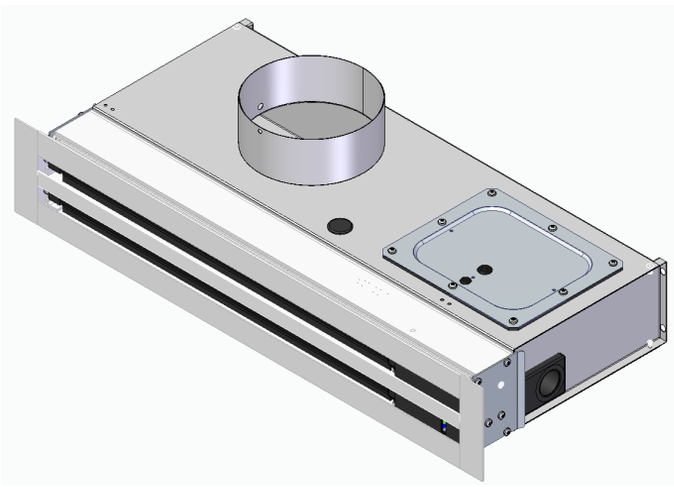


FEATURES

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 Aerofoil Diffuser (VLA1) is the ideal solution to control a buildings internal perimeter zone. It creates a vertical curtain of conditioned air that acts as a barrier to the thermal load transmitted or lost through the building's exterior. By using innovative forced induction technology the VLA1 accurately senses the temperature and adjusts to precisely meet the demand.

Aerodynamic pattern controllers inside the linear slot create a low pressure drop to supply air quietly and efficiently. The pattern controllers can be manually adjusted to direct the air horizontally or vertically.

Rickard VLA1 diffuser tracks are available in $^{3}/_{4}$" or 19mm, 1" or 25mm & 1 $^{1}/_{4}$" or 32mm wide slots. The choice of slot widths give greater choice to select a linear with the correct, flow, throw and noise performance for the specific application. 600, 900, 1200 and 1500mm lengths are available. VLA's are designed to be joined end -to-end to create uninterrupted lengths of attractive linear track.



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). In heating mode, sufficient velocity is maintained at minimum air to help hot air reaching the occupied zone.

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 <2.4VA (24VDC 100mA) only when the motor is running. MLM24 Power Supply Units use - 66VA (220VAC .3A) 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.

SENSING ACCURACY

Rickard Linear Diffusers can be fitted with an induction box, using innovative induction technology, allowing for the option of accurate on-board sensing.

CONTROLS

STANDARD MLM+ CONTROLLER CAPABILITIES

Every VAV linear Diffuser controller has onboard and remote temperature sensing capability. To sense temperature locally on the VLA, the VLA must be ordered as a dedicated Primary diffuser which is fitted with an Induction box for on-board sensing.

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

Every Primary VAV Linear diffuser will **AUTO COMMISSION** when powered up for the first time and will then operate as a stand-alone primary diffuser. The MLM application can be used to change primary diffusers to secondary diffusers and linked to a primary diffuser so that uniform control in a zone can be created.

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.

CAPITAL & OPERATING COST

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

INSTALLATION SAVINGS

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

MAINTENANCE

Surface mount VLA diffusers working components and controls are all accessible from below the ceiling. No skilled labour or special

tools are required. 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 30years of service.

The VLA diffusers active section is constructed from corrosion resistant mill galvanized sheet steel and aluminium. The diffuser tracks are constructed from aluminium extrusion and are coated with epoxy powder coating.

No regular maintenance is required.

AESTHETICS

The slim and attractive slot diffuser style provides a clean uninterrupted appearance that meets most architectural requirements.

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.

SAFETY

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

APPLICATION

VAV COOLING AND HEATING

VAV COOLING AND HEATING WITH TERMINAL REHEAT

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 Diffuser (VLN) is the ideal solution to control a buildings perimeter zone. It creates a vertical curtain of conditioned air that acts as a barrier to the thermal load transmitted or lost through the building's exterior. By using innovative forced induction technology the VLN accurately senses the temperature and adjusts to precisely meet the demand. Aerodynamic pattern controllers inside the linear slot supply air quietly and efficiently and allow adjustment to direct the air horizontally or vertically (single slot variant is only available in horizontal blow).

Rickard VLN diffuser tracks are designed to be joined end-to-end to create uninterrupted lengths of attractive linear track.

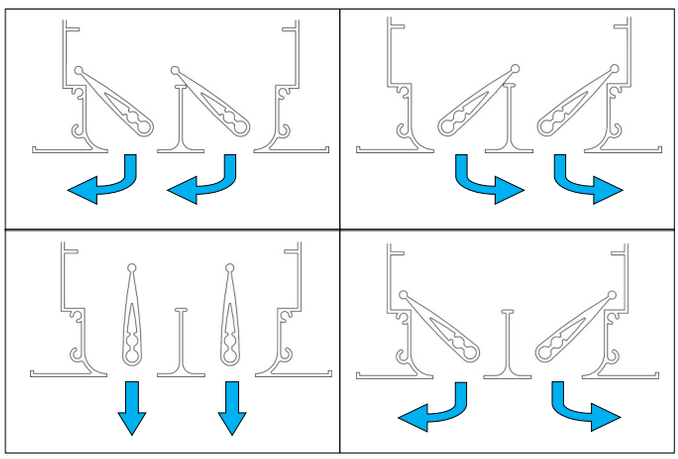
OPERATION

Room temperature is intelligently controlled by varying the supply air volume in accordance with demand. The diffuser controller uses a proportional / integral response to achieve this. Volume control is achieved by opening or closing a set of slotted plates using our patented electric stepper motor, so as to vary the aperture through which the supply air passes. This provides true "VARIABLE GEOMETRY VAV" which effectively maintains air discharge velocity throughout the range of volume control from 100% down to as little as 25%.

Air is discharged in a linear vertical or horizontal pattern. 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 VLN 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. All linear air diffusion track is identical and the choice of one-way (horizontal or vertical) or two-way blow (horizontal) is easily adjusted by simply flipping the flow directional vane to the preferred side.

It is possible to direct air vertically downwards for better room penetration, especially when the VLN is in the heating mode.



Pattern Controller Adjustment

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 and the internal volume control damper is in the fully open position. Coning occurs when two airstreams travelling in opposite directions meet and result in a downward moving cone of air. 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. Throw remains at acceptable levels throughout the range of air flows, a feature of the variable geometry VAV diffuser concept.

NOISE LEVEL REQUIREMENTS

The published diffuser noise level must be checked to ensure it is within the project specification. Published diffuser noise levels represent only the noise generated by the diffuser and do not take into consideration any duct-borne noise.

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 (±10Pa 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, we can say that neck total pressure is numerically approximately the same as duct static pressure. Although the tables reflect diffuser performance for neck total pressures ranging from 30-70Pa (0.12-0.28ins Wg), caution should be exercised when selecting diffusers outside the 40-80Pa (0.8-0.32ins 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 40-60Pa (0.08-0.24ins Wg). Bear in mind that all diffusers served by a common duct will all operate at the same static pressure as controlled by the pressure control damper. Therefore diffusers which are able to supply more air than is necessary will be driven partially closed by the temperature controller and hence the system becomes self-balancing.

NOTE: Avoid upstream restrictions such as manually adjusted dampers or squashed flexible ducting. The reason being that at maximum flow any restrictions will result in a significant static pressure loss (which for some cases may be desirable) whereas at minimum flow conditions offer virtually no restriction, which will result in the static
pressure at the diffuser being too high at minimum flow causing over-cooling/heating and increased noise.

TYPES

TRACK SLOTS

VLA Linear Diffusers are available in a range of slot widths and quantities. The slot widths available are 3/4" or 19mm, 1" or 25mm & 1 1/4" or 32mm. A VLA can be ordered with 1 to 4 slots. This allows for a greater range of flow, throw and noise performance values.

TRACK LENGTHS

The standard VLA is available in unit lengths of:

- **600mm**
- **900mm**
- **1200mm**
- **1500mm**

TRACK MOUNTINGS

VLA Linear Tracks are designed to fit **Plastered Ceilings (Surface Mount)** and most **Ceiling Grid (Drop-in)** variants.

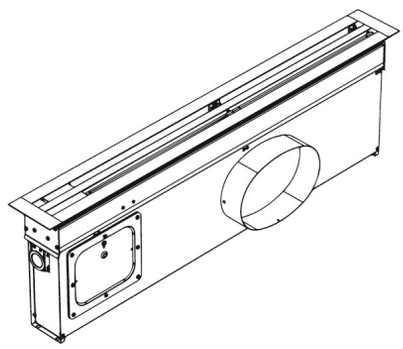
Rickard VLA Diffuser tracks are designed to be joined end-to-end with alignment pins to create uninterrupted lengths of attractive linear track. VLA Tracks are compatible with other Rickard VLA tracks, Dummy tracks (inactive sections of track often used for return air) or CLN tracks (Constant Volume Linear Diffusers).

VLA Linear Diffusers are available with 1 - 4 Slot tracks. with adjustable pattern controllers for vertical to horizontal blow.

Tracks are finished in a wide range of high quality epoxy powder coated finishes. Matt White comes as standard.

SPIGOT SIZE AND QUANTITY

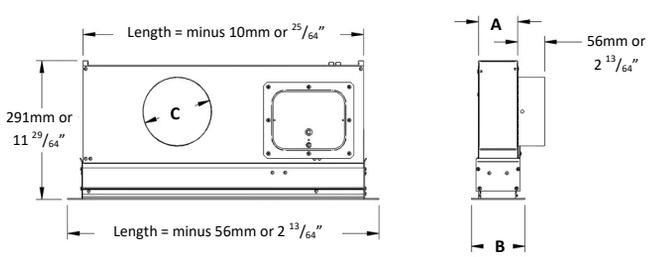
VLA Linear Diffusers with multiple slots require larger and/or more spigots. Please see the VLA Spigot Detail table for more detail.

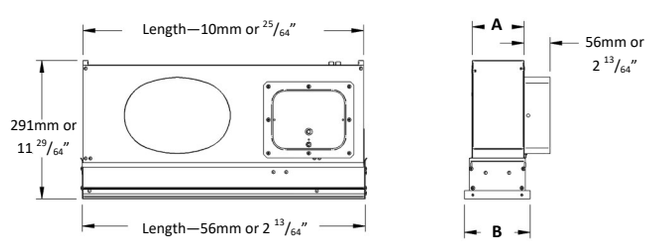


SENSING OPTIONS

- **Primary** (fitted with an onboard sensor and controller)
- **Secondary** (to follow a Primary Diffuser or be converted to a Remote Primary by adding a Remote Wall Thermostat)

DIMENSIONS





Slot Width		Dimension	1 Slot		2 Slot		3 Slot		4 Slot	
mm	"		mm	"	mm	"	mm	"	mm	"
19	3/4	A	47	1 55/64	99	3 57/64	135,5	5 21/64	172	6 25/32
		B	76	3	113	4 7/16	149,5	5 57/64	186	7 21/64
25	1	A	53	2	111	3 3/8	153,5	6	196	7 23/32
		B	82	3 15/64	125	5	167,5	6 19/32	210	8 1/4
31.75	1 1/4	A	60	2 21/64	124	4 7/8	174	6 55/64	223	8 25/32
		B	89	3 1/2	138	5 27/64	188	7 13/32	237	9 21/64

Length		Slot Width		1 Slot Spigot Size (C)		2 Slot Spigot Size (C)		3 Slot Spigot Size (C)		4 Slot Spigot Size (C)	
mm	inches	mm	inches	Ø mm	Ø inches	Ø mm	Ø inches	Ø mm	Ø inches	Ø mm	Ø inches
600	24	19	3/4	150	6	150	6	250	10	250	10
		25	1	150	6	200	8	250	10	300	12
		31.75	1 1/4	150	6	200	8	250	10 x 2	200 x 2	8 x 2
900	36	19	3/4	200	8	200	8	300	12 x 2	350	14 x 2
		25	1	200	8	250	10	350	14	250 x 2	10 x 2
		31.75	1 1/4	200	8	250	10	350 x 2	14 x 2	300 x 2	12 x 2
1200	48	19	3/4	200	8	250	10	350	14 x 2	250 x 2	12 x 2
		25	1	200	8	300	12	300 x 2	12 x 2	300 x 2	12 x 2
		31.75	1 1/4	200	8	350	14	350 x 2	14 x 2	350 x 3	14 x 3
1500	60	19	3/4	250	10	300	12	250 x 2	10 x 2	300 x 2	12 x 2
		25	1	250	10	350	14	300 x 2	12 x 2	350 x 2	14 x 2
		31.75	1 1/4	250	10	250 x 2	10 x 2	350 x 2	14 x 2	350 x 2	14 x 2

19mm - 2-Slot - Fully Open

600		Total Pressure					
		10	20	30	40	50	60
PAT B	Flow	36	50	60	69	78	85
	Noise	10	18	23	28	31	34
PAT C	Flow	26	36	44	51	57	62
	Noise	14	20	26	31	34	37

900		Total Pressure					
		10	20	30	40	50	60
PAT B	Flow	58	82	100	116	129	141
	Noise	10	20	26	30	34	36
PAT C	Flow	38	55	67	78	88	95
	Noise	12	22	28	32	35	38

1200		Total Pressure					
		10	20	30	40	50	60
PAT B	Flow	75	107	131	154	171	188
	Noise	10	22	27	31	34	37
PAT C	Flow	49	72	88	102	115	126
	Noise	12	23	29	34	37	39

1500		Total Pressure					
		10	20	30	40	50	60
PAT B	Flow	92	130	158	184	207	226
	Noise	11	23	28	32	35	38
PAT C	Flow	61	87	109	122	136	151
	Noise	18	27	32	36	39	42

31.75mm - 2-Slot - Fully Open

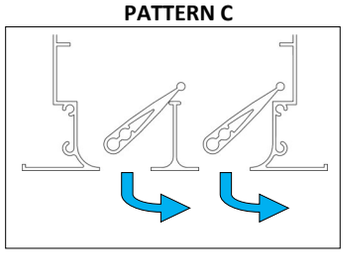
600		Total Pressure					
		10	20	30	40	50	60
PAT B	Flow	56	78	97	113	127	138
	Noise	10	21	26	30	34	36
PAT C	Flow	41	56	68	79	87	97
	Noise	10	21	27	31	34	37

900		Total Pressure					
		10	20	30	40	50	60
PAT B	Flow	86	121	149	167	188	209
	Noise	11	23	28	33	36	39
PAT C	Flow	61	87	104	118	134	149
	Noise	11	23	29	33	37	39

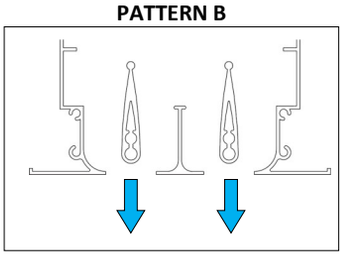
1200		Total Pressure					
		10	20	30	40	50	60
PAT B	Flow	113	160	194	225	250	274
	Noise	13	24	29	33	37	39
PAT C	Flow	87	122	149	172	194	213
	Noise	13	25	30	35	39	42

1500		Total Pressure					
		10	20	30	40	50	60
PAT B	Flow	152	219	274	316	353	384
	Noise	14	27	34	37	40	44
PAT C	Flow	103	145	180	207	234	258
	Noise	14	26	32	37	39	43

PATTERN C



PATTERN B



Noise Criteria levels apply to a single diffuser mounted in a room having a Sound Absorption of 10dB in octave bands having centre frequencies from 125Hz to 8000Hz (i.e. the difference between Sound Pressure Level (dB re:2 x 10-5 Pa) and Sound Power Level (dBW re: 10-12 watts) is equal to 10dB). These levels represent only the noise generated by the diffuser and do not take into account any duct-borne noise.

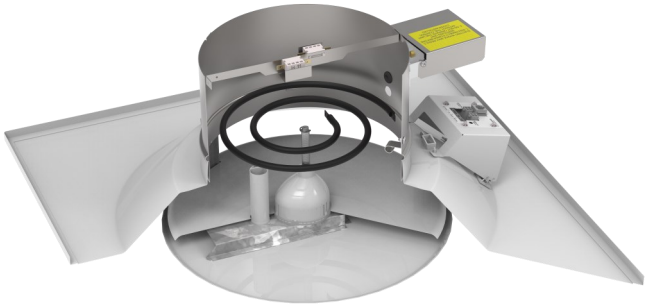
Diffusers are factory set for a minimum of 30% of the maximum flow levels reflected above. It should be noted that minimum diffuser air flow settings are approximate & may require to be reset on site to compensate for actual site system pressures.

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

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.

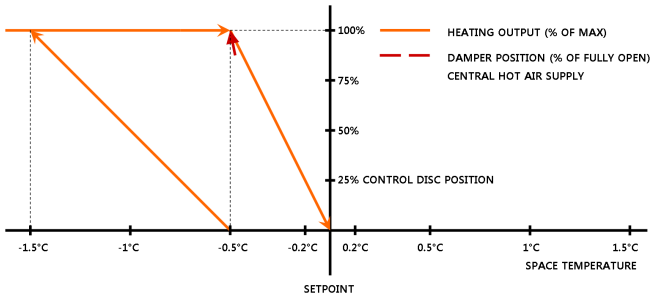


VAV PLATE DIFFUSER FITTED WITH MODULAR HEATER SPIGOT



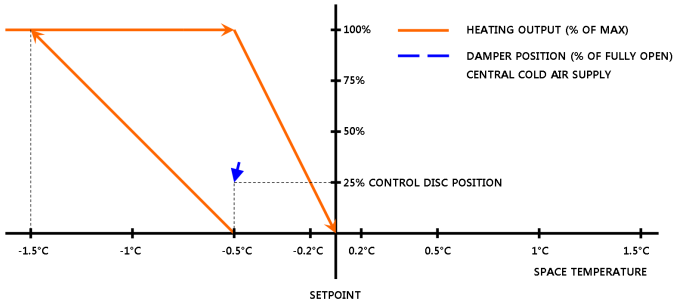
WBD WITH DEDICATED HEATER FITTED

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 toped 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 incaloy 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.

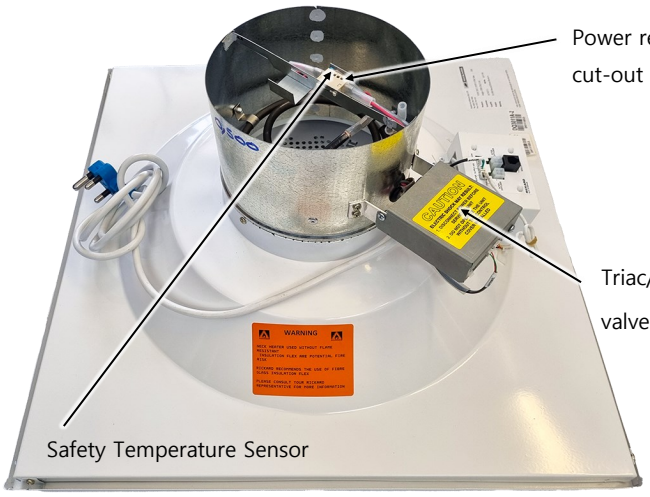
In some cases when no flow or very low flows occur in the ducting, it is necessary to limit the heaters output to avoid excessive heat build up in the diffuser. For this reason the triac is fitted with a temperature sensor and controls to limit the triac so that the supply air exiting the diffuser never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

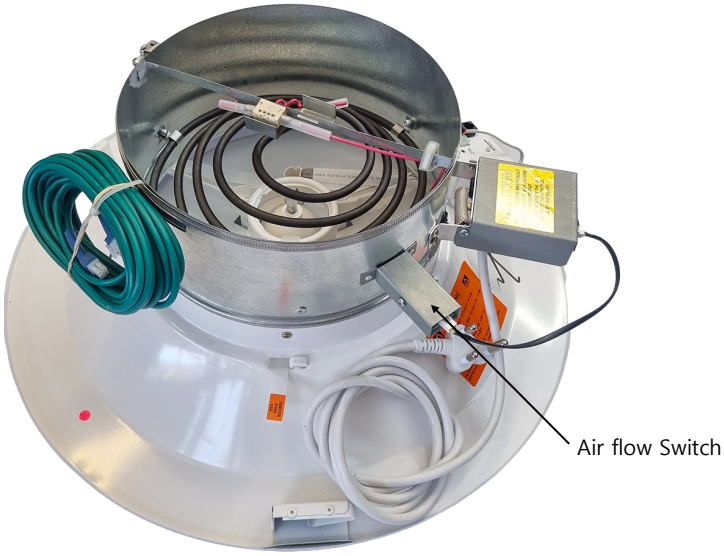
For additional safety, RICKARD offer an Airflow Switch to interrupt power to the re-heater controls when there is insufficient airflow across the heater element. The switch is calibrated to disable the heater current valve below a static pressure of 12Pa (+/- 5Pa).

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.

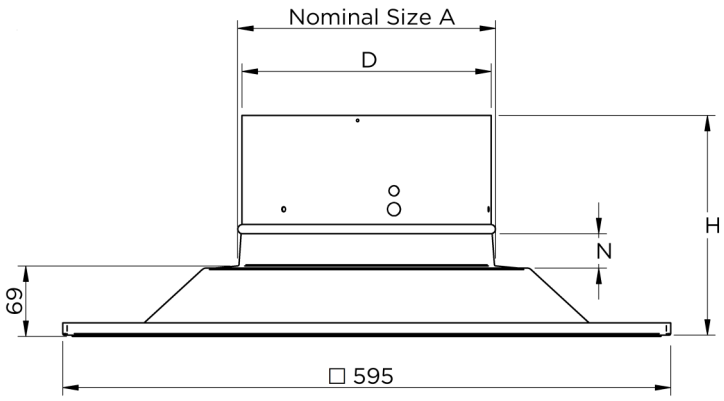
INSTALLATION GUIDELINES

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	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
VCD Neck Size (mm)	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

		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	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
VSW Neck Size (mm)	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.

	Max Heater Size				
	Pa	20	30	40	50
	Size (mm)	kW			
WBD	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

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

	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	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

	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	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.