

# HVR ZERO **APX**

INSTALLATION GUIDE

# HVR ZERO APX

## Installation Guide

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**UK UK**  
**CA NI**

- Machinery Directive 2006/42/EU
- EMC Directive 2014/30/EU
- LVD Directive 2014/35/EU
- ERP Directive 2009/125/EU

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## Installation Guide

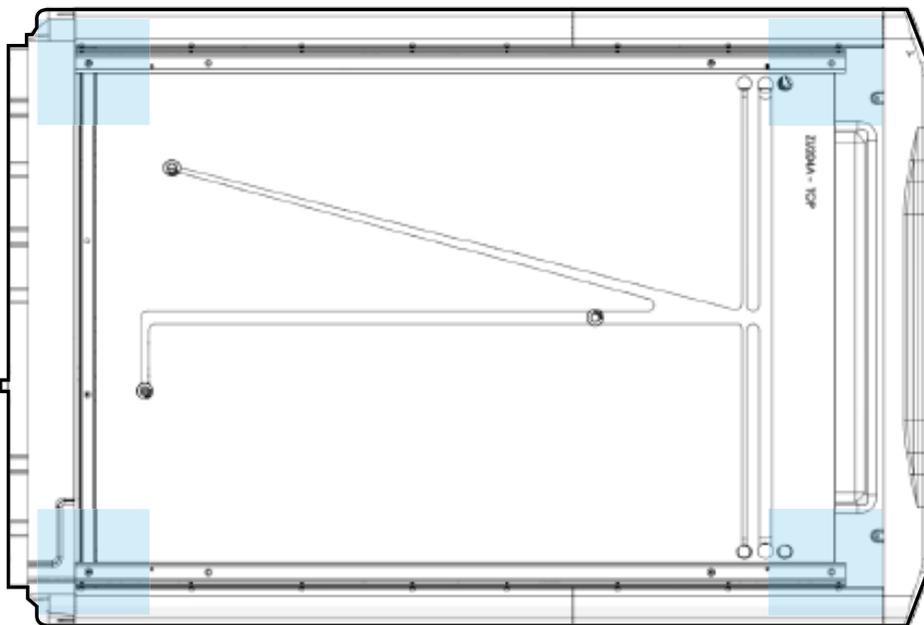
### Packing and handling of the unit

The unit will arrive covered in protective bubble wrap.  
Always handle the unit with at least 2 people.  
Handle with care, the unit is highly susceptible to damage and scratches.

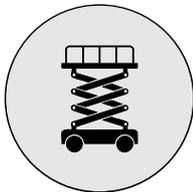


CAUTION

SHARP EDGES



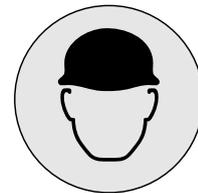
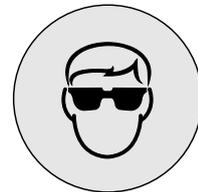
#### Access Equipment



Access equipment is required when installing the unit.

Suitable lifting method e.g. genie lift/  
panel lifter is required.

#### Personal Protective Equipment (PPE) Required



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### Delivery, Receipt and Storage of Equipment

#### Receipt of Goods Onsite:

A Delivery Advice Note will be issued in advance of any delivery, usually providing 5-7 working days' notice of the delivery date, destination and any other delivery conditions.

Prior to dispatch all equipment is tested and inspected in accordance with our Quality Assurance procedures.

On arrival to site the client must thoroughly inspect the goods before signing the Delivery Note in accordance

with Monodraught Terms and Conditions.

Any damage or shortages in delivery must be confirmed by writing on the note and by reporting the matter to our main sales office within 48 hours of receipt.

No responsibility will be accepted for damage sustained during offloading from the delivery vehicle or thereafter from distribution of goods around the site.



**It is the purchaser's responsibility to ensure that offloading of equipment from the delivery vehicle is undertaken in an appropriate manner, and that suitable mechanical lifting and/or moving devices are available to suit the delivery vehicle and site conditions.**

#### Offloading and Distribution:

Equipment will be palletised for delivery (as shown in the next page), and each unit will have an individual identification label of the equipment.

It is recommended that offloading is undertaken using a suitably rated fork-lift truck or other mechanical lifting device.

Alternatively, the equipment may be lifted from above using a crane. Lifting beams should be passed through the pallet in the same way as the forks of a forklift truck would be inserted. When lifting in this way, spreaders must be used to avoid damage to the casings of the equipment. Care must be taken to ensure that slings

are correctly positioned. Care must be always taken to prevent damage to the equipment.

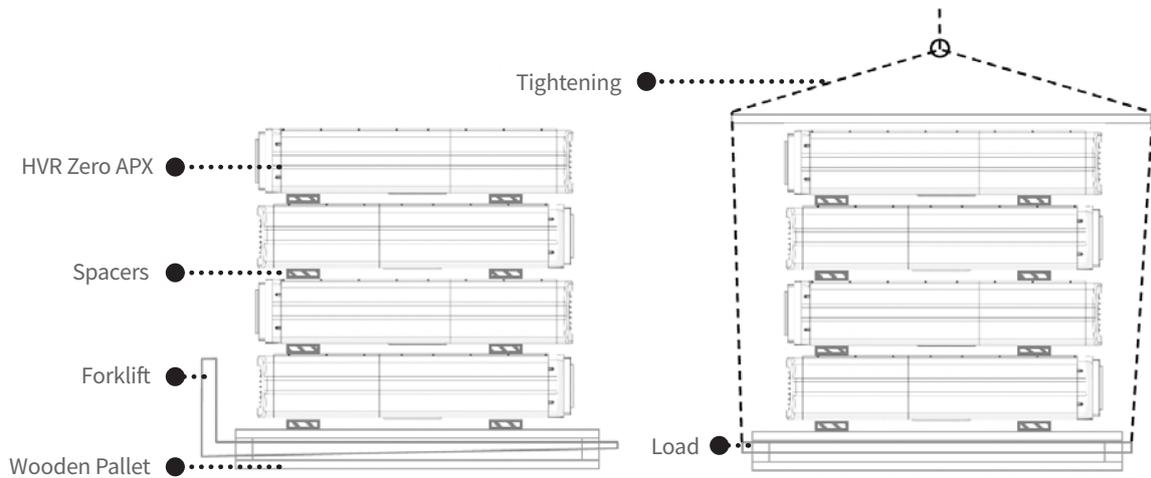
Corners, edges and protruding components may be particularly susceptible to damage if handled incorrectly.

Controls enclosures, duct connectors pipework connections or drain trays must not be used as lifting points.

Care must be taken to avoid subjecting the equipment to any shocks or impacts, as these may result in misalignment of the fan impellor, or damage to internal components.

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When the equipment is ready to be put into installation, the instructions in this documentation should be strictly adhered to.

### Extended Storage:

If the equipment is likely to be in storage for a period exceeding two months, the following instructions should be observed to preserve the life of all static and moving parts of the equipment which may be particularly susceptible to deterioration. It is strongly advised to pay careful attention to stored equipment and to make regular inspections to ensure that

adequate storage conditions are being maintained.

Although other procedures or considerations commensurate with good engineering practice may be necessary but not detailed in this document, the purchaser's attention is particularly drawn to the following items:

- If ducting is not connected it is essential that all inlet openings, discharge openings and pipe openings are completely sealed
- Whenever any access panels are removed for inspection purposes they must be replaced and made secure
- The exterior should be kept free from any falling objects, dampness or extreme cold or heat
- The unit exterior surfaces must be inspected monthly, and any signs of corrosion or scratches should be treated immediately to prevent further degrading

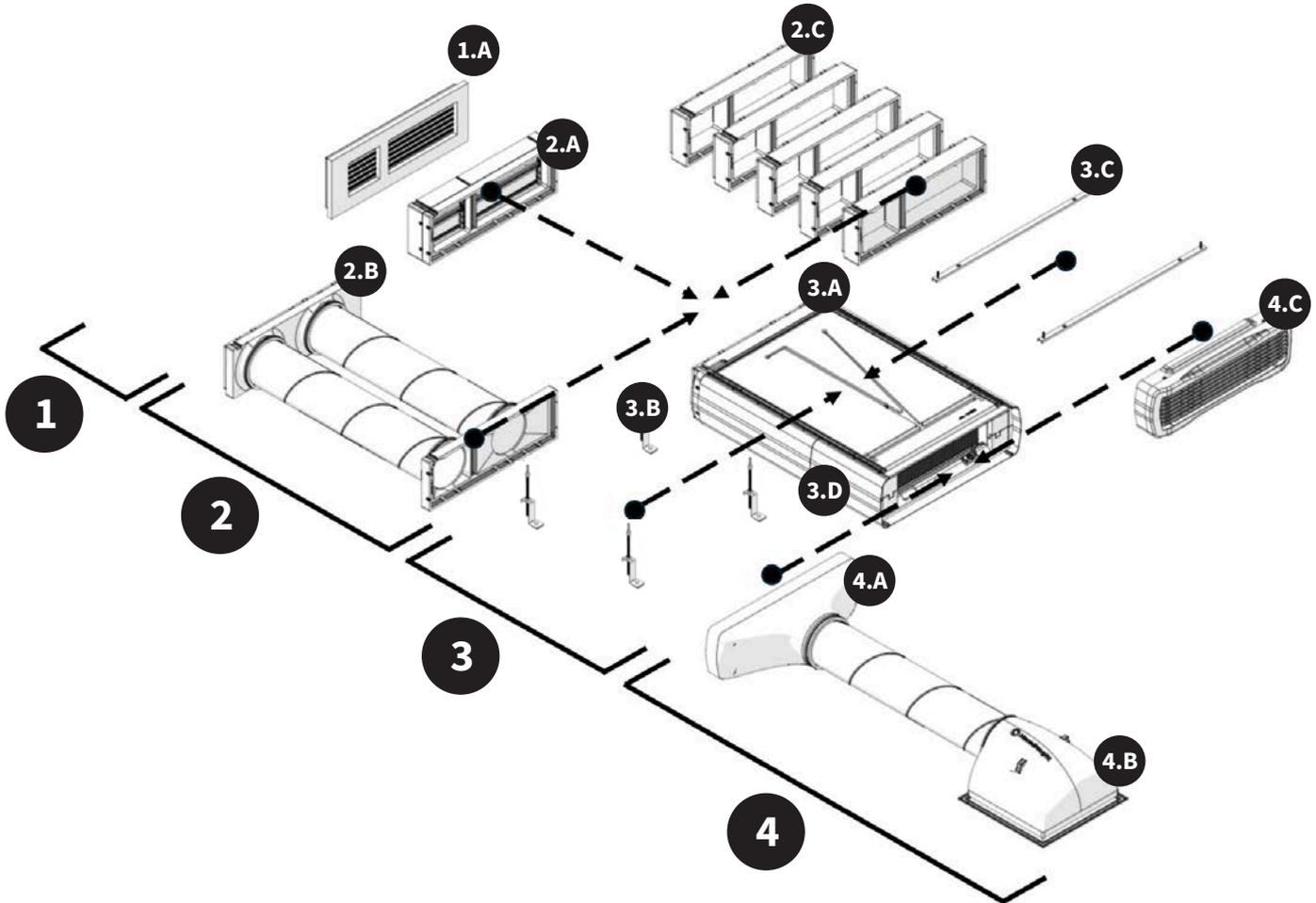


The equipment must be stored in dry internal conditions. Duct connection apertures must remain sealed against the ingress of dust, debris or any other foreign matter.

# HVR ZERO APX

## Installation Guide

### Unit Overview



#### 1 External Louvre

- 1.A Louvre (Flanged or Glazed)\*  
Product code: HVR-Z-FL/HVR-Z-GL

#### 2 Extensions and Transitions

- 2.A External Damper Module  
Product code: HVR-APX-DMP-G
- 2.B Transition Duct (Pair)\*  
Product code: HVR-APX-LVD-G
- 2.C Transition Extension  
Product code: HVR-APX-EXT-G

#### 3 Fixing Methods & Condensation Pump

- 3.A Main Unit  
Product code: HVR-APX-R-W/HVR-APX-L-W

- 3.B Z-Bracket Mount  
Product code: HVR-APX-R/L-W/B/G

- 3.C Channel Mount  
Product code: HVR-APX-CHN

- 3.D Condensation Pump (optional)  
Product code: HVR-APX-CON

#### 4 Exposed or Ducted Front Grilles

- 4.A Spiral Duct Transition Module\*\*  
Product code: HVR-APX-DCT-G

- 4.B Duct Pack\*\*  
Product code: HVR-Z-DC-PK

- 4.C Motorised Grille Module  
Product code: HVR-APX-GRL-W/B/G

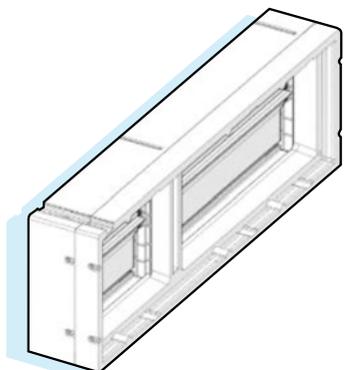
\*Anti-bird mesh required for all louvre applications

\*\*Spiral Ducting Not Included

# HVR ZERO APX

Installation Guide

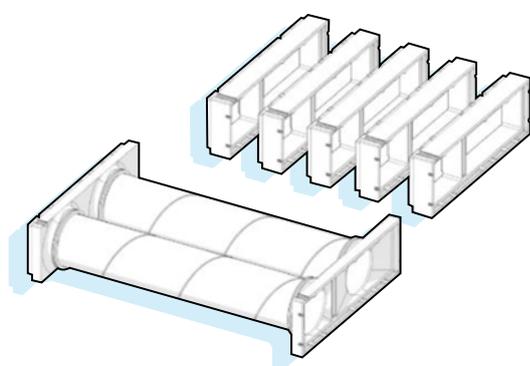
## Installation Contents



Damper Installation

Go to page

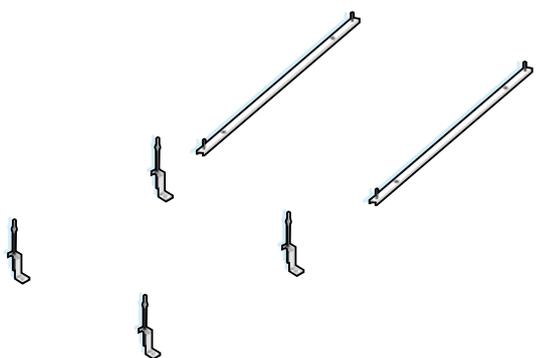
**08**



Rear Installation

Go to page

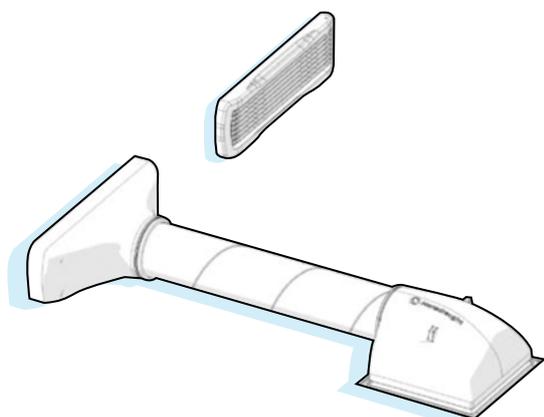
**12**



Main Unit Installation

Go to page

**19**



Front Installation

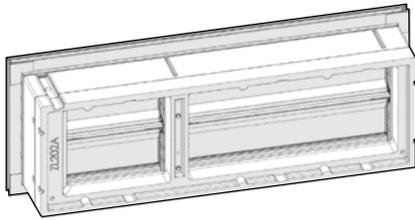
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# HVR ZERO APX

Installation Guide

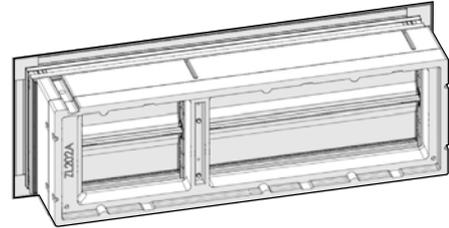
## Damper Installation



Damper Installation for  
Glazed Louvre

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**08**

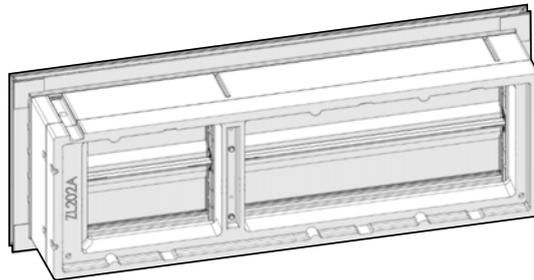


Damper Installation for  
Flanged Louvre

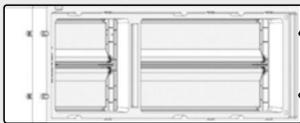
Go to page

**12**

## Damper Installation for Glazed Louvre



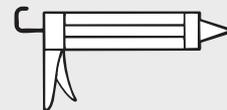
### Parts & Fixings



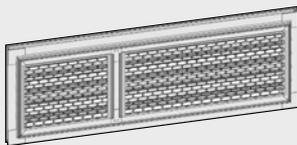
External Damper Assembly  
Quantity: 1



M5.5 x 120mm Self-drilling Tek Screws  
Product code: ZF512TS  
Quantity: 5



Clear Silicone  
As required - Supplied by others



Glazed Louvre  
Quantity: 1



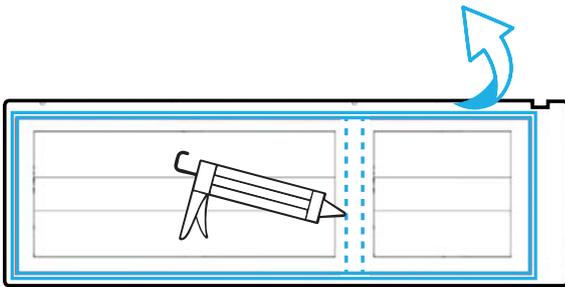
Louvre Backing Plate  
(Only for oversized louvres or Std 955x355mm louvres supplied by others)  
Quantity: 1

# HVR ZERO APX

## Installation Guide

### Damper Installation - Glazed Louvre

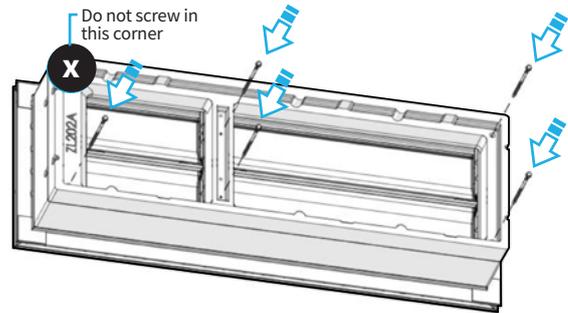
**1**



Remove backing tape from air tape and apply silicone to damper in the pattern shown by the solid and dashed blue lines, respectively.

**2a**

**Monodraught standard louvre**  
955 x 355 mm

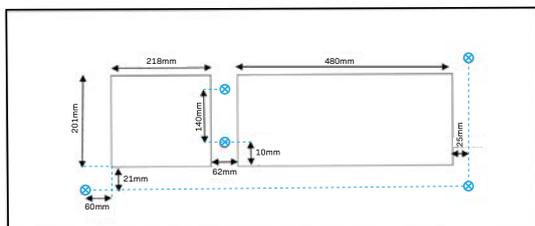


-  • 8mm hex socket required for screwing
-  • 5 self-drilling Tek screws

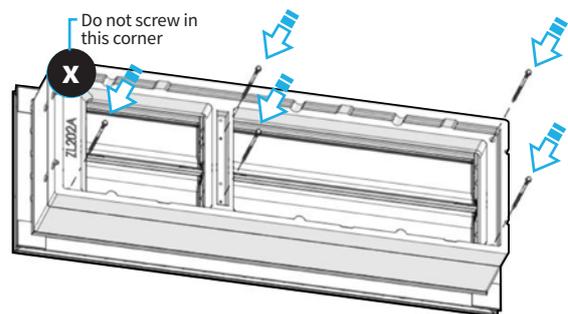
If using a standard Monodraught louvre size, fasten the external damper to the louvre using 5 Tek screws (ZF512TS).

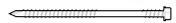
**2b**

**Oversized louvre or Standard 955 x 355mm louvre supplied by others**



 Drill holes



-  • 8mm hex socket required for screwing
-  • 5 self-drilling Tek screws

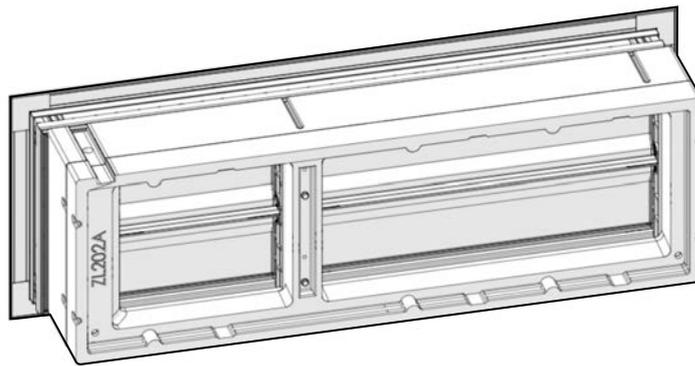
In the case of a non-standard Monodraught louvre, a spigot plate is needed with the above dimensions.

Followed by fastening the external damper to the spigot plate using 5 Tek screws (ZF512TS).

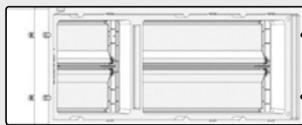
# HVR ZERO APX

## Installation Guide

### Damper Installation for Flanged Louvre



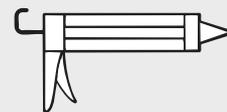
### Parts & Fixings



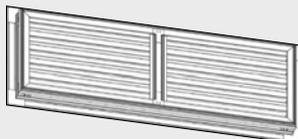
**External Damper Assembly**  
Product code: HVR-APX-DMP-G  
Quantity: 1



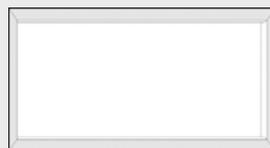
**M5.5 x 120mm Self-drilling Tek Screws**  
Product code: ZF512TS  
Quantity: 5



**Clear Silicone**  
As required - Supplied by others



**Flanged Louvre**  
Product code: HVR-Z-FL  
Quantity: 1



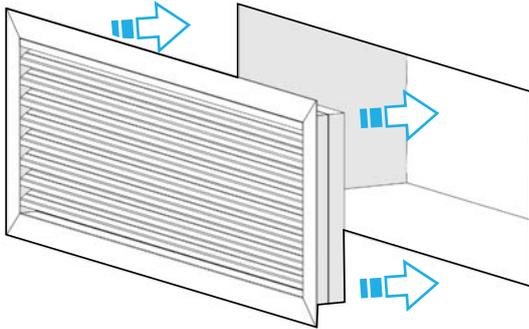
**Wall Closure Plate/Picture Frame**  
Product code: HVR-Z-WP  
Quantity: 1

# HVR ZERO APX

## Installation Guide

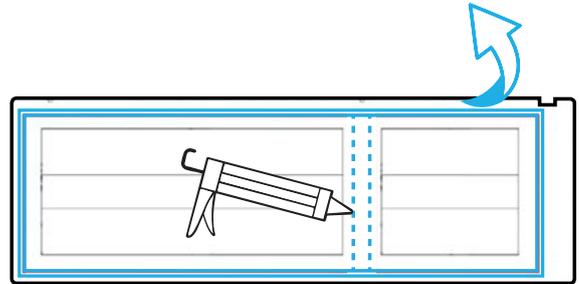
### Damper Installation - Flanged Louvre (HVR-Z-FL)

1



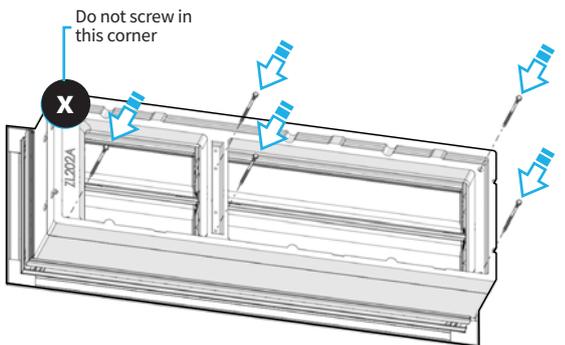
Insert the flanged louvre into the weather sealed closed cavity.

2



Remove backing tape from air tape and apply silicone to damper in the pattern shown by the solid and dashed blue lines, respectively.

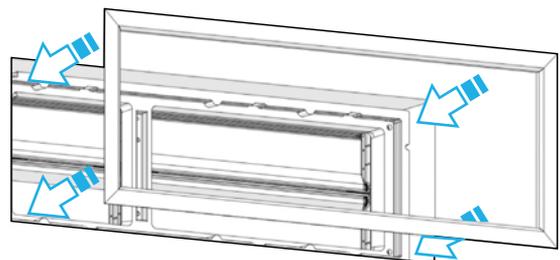
3



- 8mm hex socket required for screwing
- 5 self-drilling Tek screws

Fasten the damper to the louvre using 5 Tek screws (ZF512TS).

4

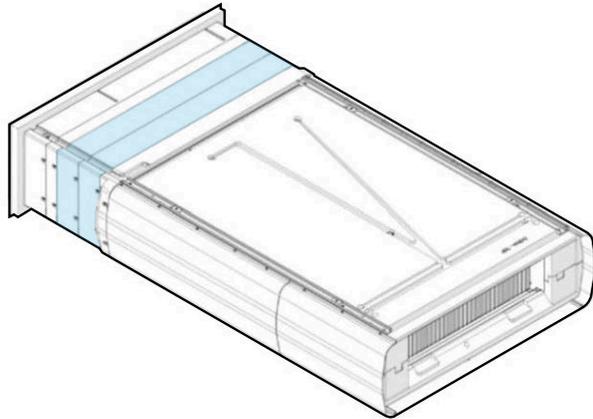


Using suitable grip adhesive, attach the wall closure plate to the internal face of the wall.

# HVR ZERO APX

Installation Guide

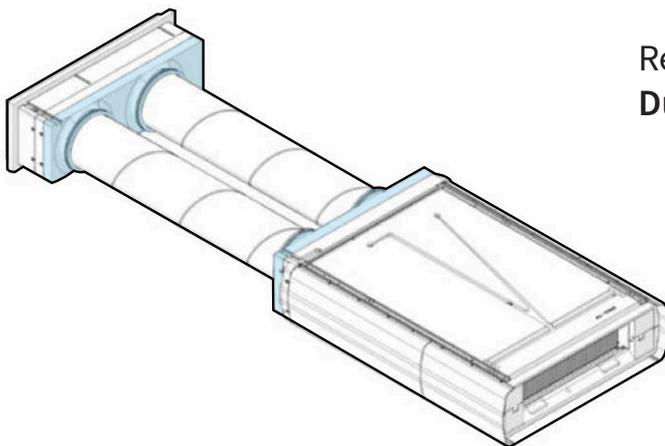
## Rear Installation



Rear Installation for  
Extended Louvre Connection

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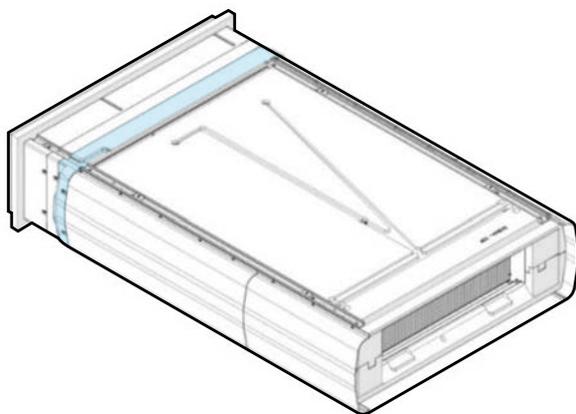
**13**



Rear Installation for  
Ducted Louvre connection

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Rear Installation for  
Standard Louvre Connection

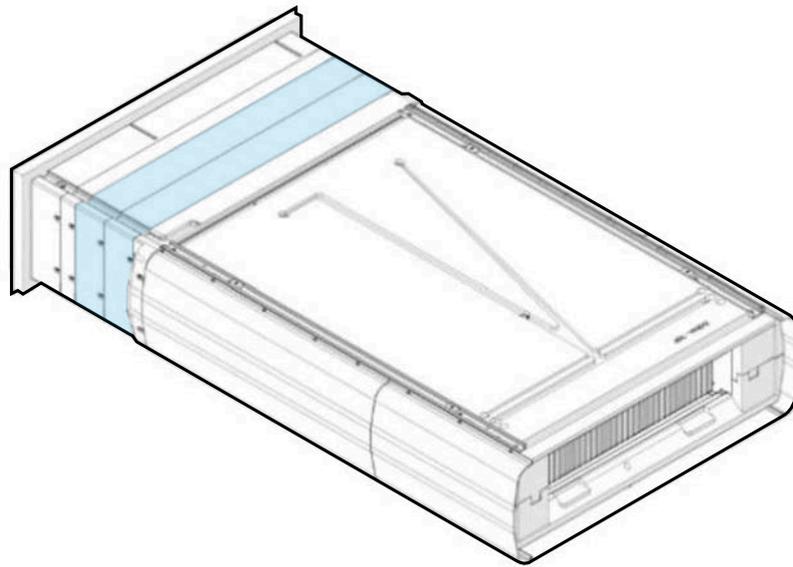
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**19**

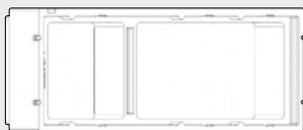
# HVR ZERO APX

## Installation Guide

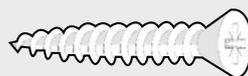
### Rear Installation - Extended Louvre Connection



### Parts & Fixings



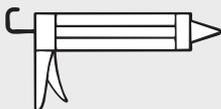
Louvre Extension  
Product Code: ZL203A  
Quantity: 1



M4.5 x 25mm Wood Screw  
Product Code: ZF452WS  
Quantity: 4 (per extension)



M5 x 120mm Wood Screw  
Product Code: ZF512WS  
Quantity: 6 (per extension)



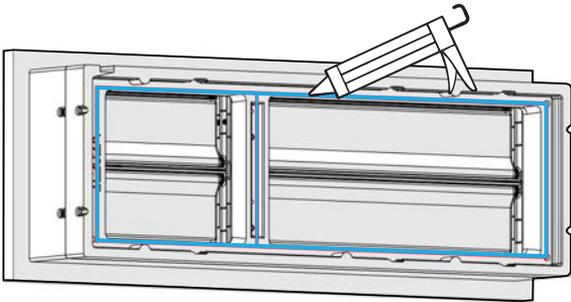
Clear Silicone  
As required - Supplied by others

# HVR ZERO APX

## Installation Guide

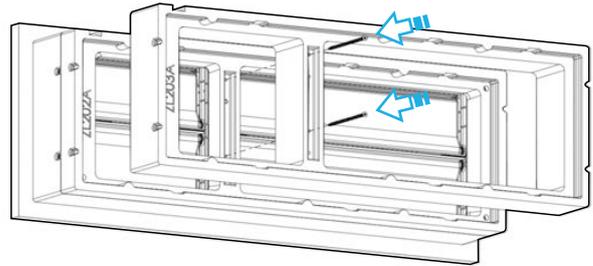
### Rear Installation - Extended Louvre Connection

1



Apply silicone to damper following the pattern shown by the solid blue lines.

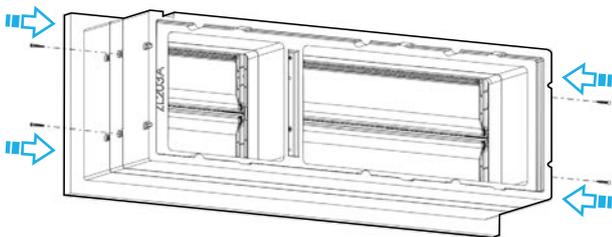
2



-  PZ2 driver bit is required
-  2 wood screws

Fasten the extension to the damper using two M5 x 120mm wood screws (ZF512WS)

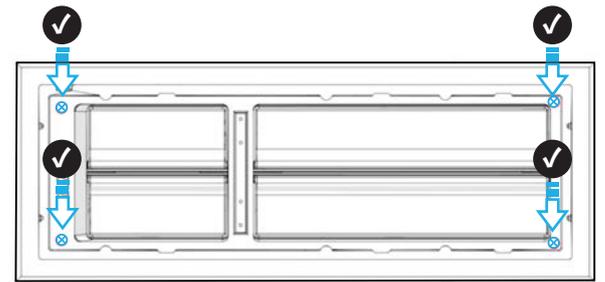
3a



-  PZ2 driver bit is required
-  4 wood screws

Fasten sides using four M4.5 x 25mm (ZF452WS).

3b



-  PZ2 driver bit is required
-  2 wood screws

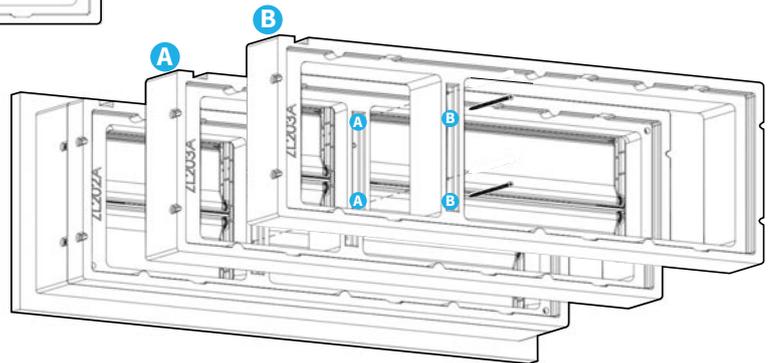
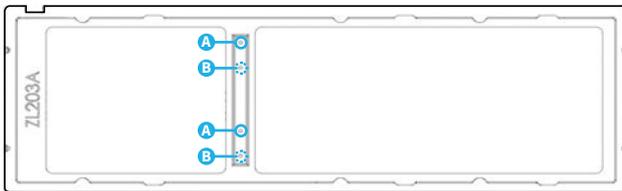
If the sides of the extensions are inaccessible for ZF452WS screws, fasten with four M5 x 120mm wood screws (ZF517WS) in the corners at the front, as indicated by the blue marks.

# HVR ZERO APX

## Installation Guide

### Rear Installation - Extended Louvre Connection - Extra Extension Blocks

4



-  • PZ2 driver bit is required
-  • 2 wood screws

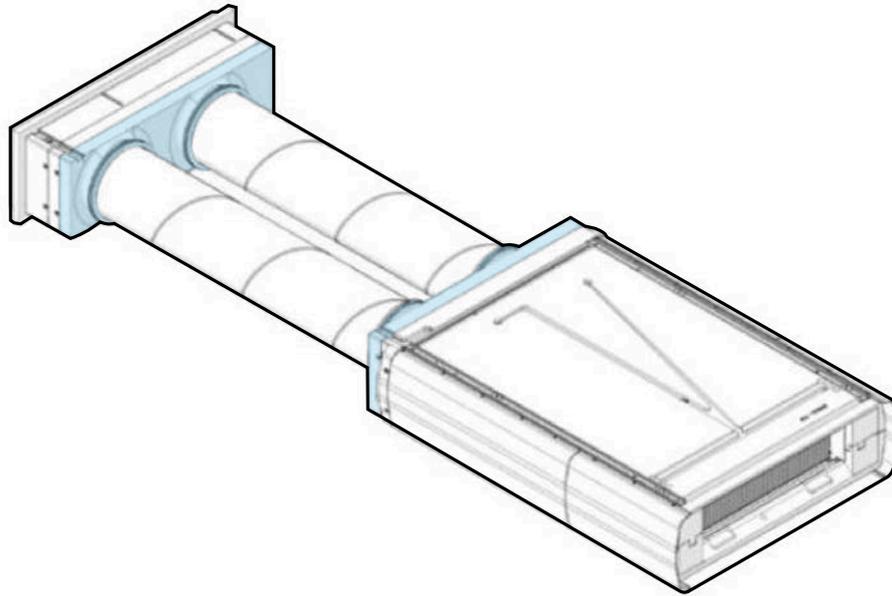
#### Optional:

If additional extension blocks are required, repeat steps 1 - 3 with the ZF512WS wood screws, alternating in A/B pattern for each block.

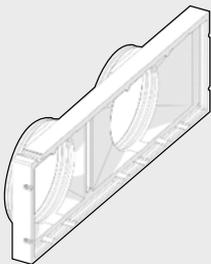
# HVR ZERO APX

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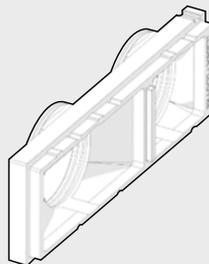
## Rear Installation - Ducted Louvre Connection



### Parts & Fixings



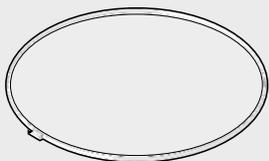
Louvre Duct Transition - Unit side  
Product Code: ZL204A  
Quantity: 1



Louvre Duct Transition - Louvre side  
Product Code: ZL205A  
Quantity: 1



Spiral Duct  
Quantity: 2 (supplied by others)



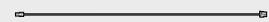
Ducting Clamp  
Quantity: 4 (supplied by others)



M5 x 120mm Wood Screw  
Product Code: ZF512WS  
Quantity: 4



M4.5 x 25mm Wood Screw  
Product Code: ZF452WS  
Quantity: 4



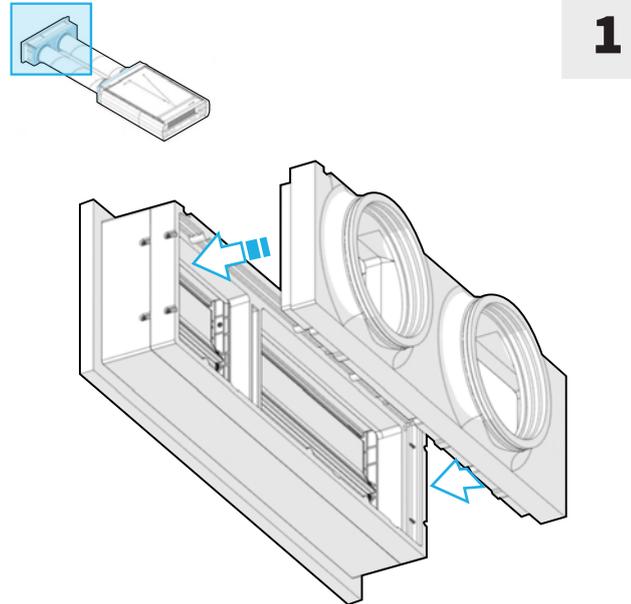
Extension Loom  
Product Code: ZC131A  
Quantity: 1

# HVR ZERO APX

## Installation Guide

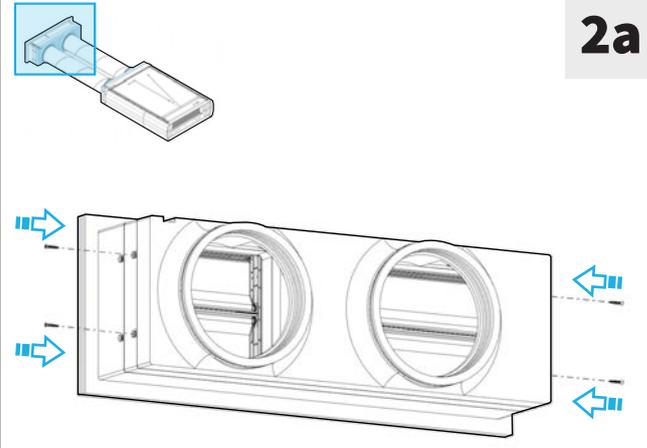
### Rear Installation - Ducted Louvre Connection

**1**



Push the louvre duct transition (louvre side) into the external damper assembly.

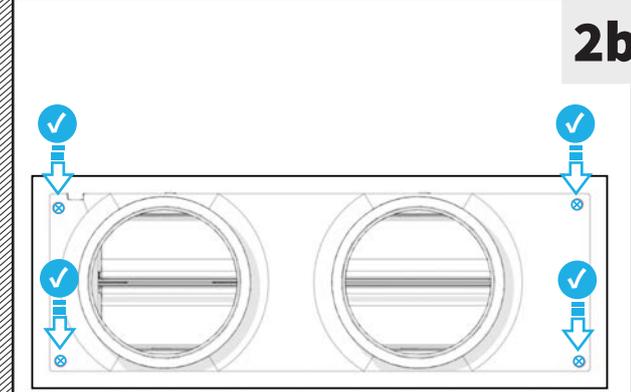
**2a**



- PZ2 driver bit is required
- 4 wood screws

Fasten the duct transition (louvre side) to the damper using 4 M4.5 x 25mm wood screws (ZF452WS).

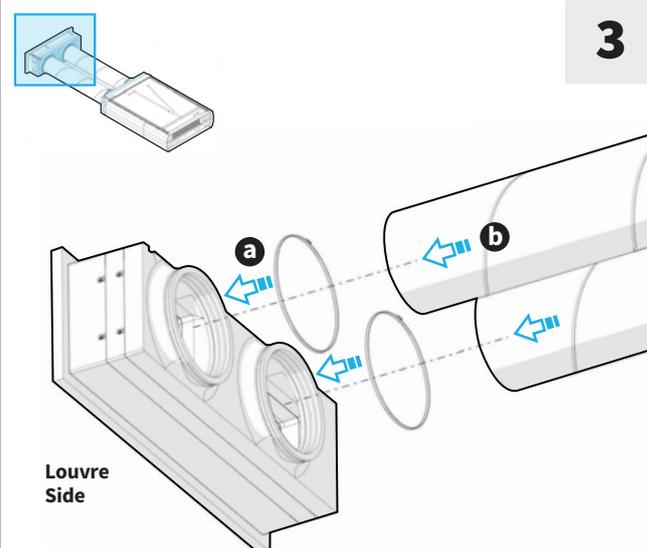
**2b**



- PZ2 driver bit is required
- 4 wood screws

If the sides are inaccessible, fasten using four M5 x 120mm wood screws (ZF512WS) through the corners of the front face as marked above.

**3**



**Louvre Side**

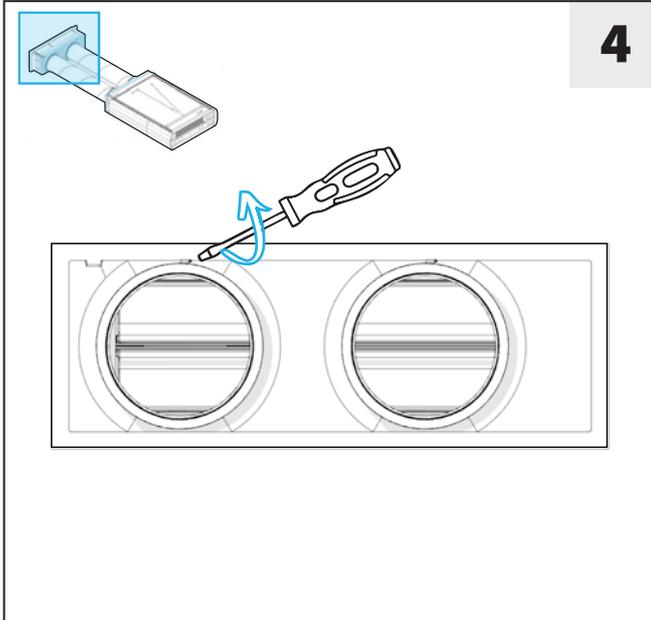
**a.** Fit the ducting clamps over the circular cut out on the transition block (louvre side). **b.** Push the spiral ducts into the the transition block. Ducting may need support.

# HVR ZERO APX

## Installation Guide

### Rear Installation - Ducted Louvre Connection

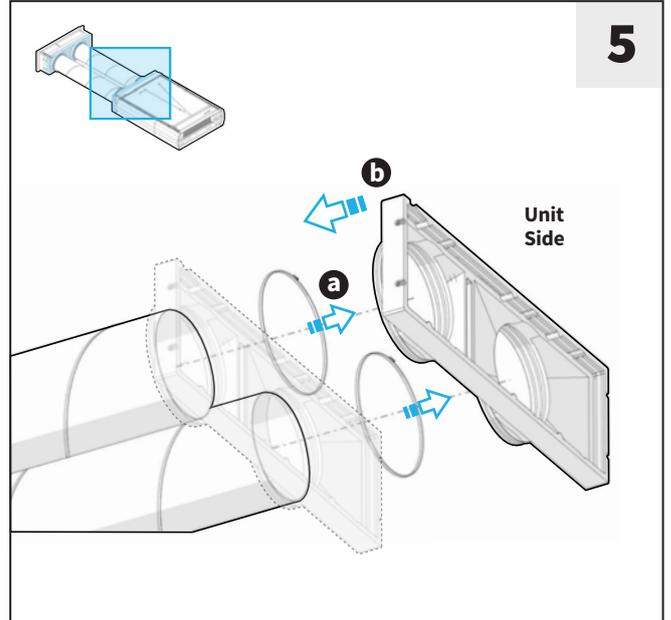
**4**



The diagram shows a close-up of a ducting clamp being tightened onto a circular duct. A flat head screwdriver is used to turn the clamp. Below this, a larger view shows two circular ducts side-by-side, with a screwdriver being used to tighten the clamp on the left one.

Tighten the ducting clamps using a flat head screwdriver.

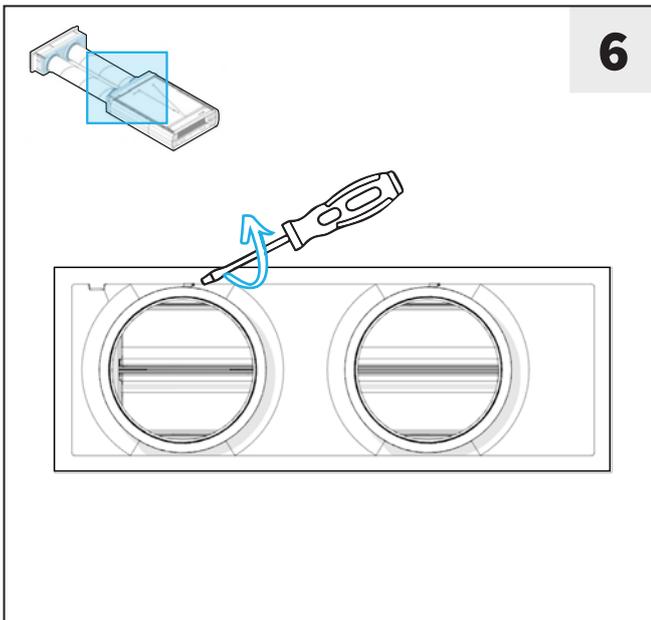
**5**



The diagram shows a transition block being pushed into two spiral ducts. The block is labeled 'Unit Side'. Arrows 'a' and 'b' indicate the direction of movement. Arrow 'a' points towards the ducts, and arrow 'b' points away from the unit side.

Fit the ducting clamps over the transition block (unit side) and then push the transition block into the spiral ducts until it hits a stop.

**6**



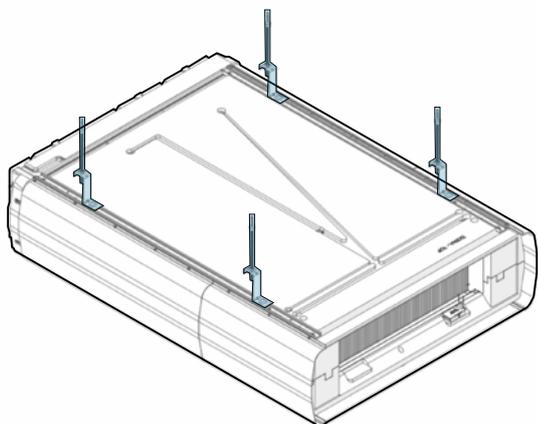
The diagram shows a close-up of a ducting clamp being tightened onto a circular duct. A flat head screwdriver is used to turn the clamp. Below this, a larger view shows two circular ducts side-by-side, with a screwdriver being used to tighten the clamp on the left one.

Tighten the ducting clamps using a flat head screwdriver.

# HVR ZERO APX

Installation Guide

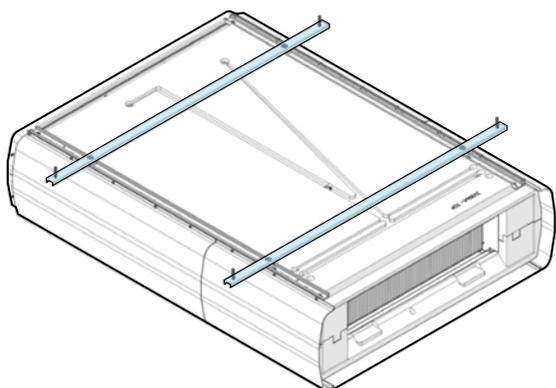
## Unit Installation



**Hang Rods**  
(Void > 150mm)

Go to page

**20**



**Ceiling Frame**  
(Direct installation to slab concrete or  
plaster board ceiling)

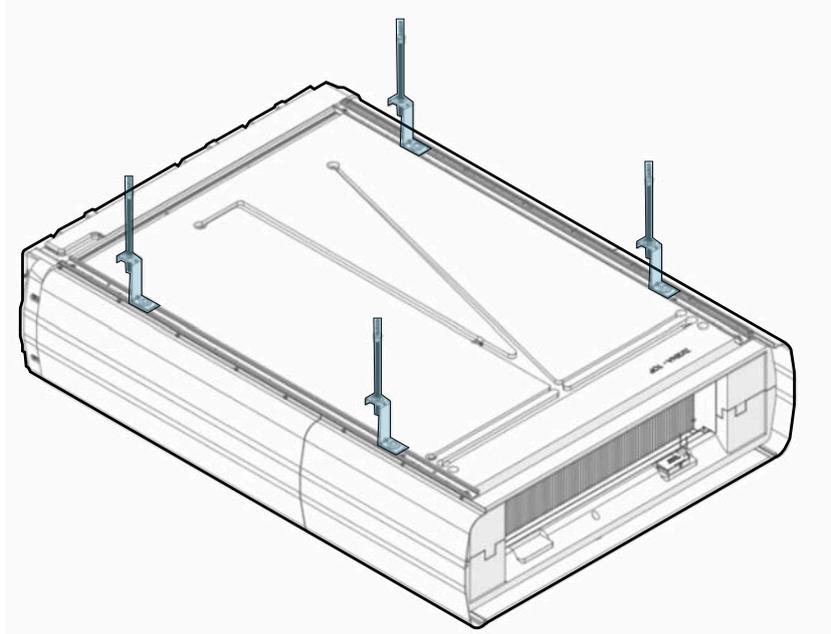
Go to page

**25**

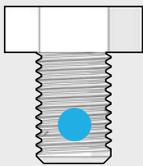
# HVR ZERO APX

## Installation Guide

### Unit Installation - Hang Rods



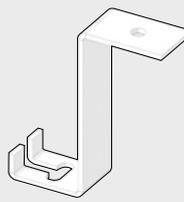
### Parts & Fixings



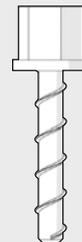
**M8 x 16mm Hex Bolt**  
Product Code: ZF816HB  
Quantity: 4



**M8 x 200mm Drop Rod**  
Product Code: ZF820DR  
Quantity: 4



**Z Bracket**  
Product Code: ZU119A  
Quantity: 4



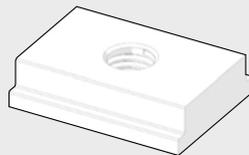
**M6 x 55mm Socket Bolt**  
Product Code: ZF655SB  
Quantity: 4



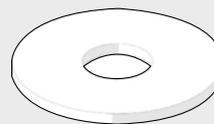
**M8 40 x 40mm Square Washer**  
Product Code: ZF801SW  
Quantity: 4



**M8 x 6.5mm Nut**  
Product Code: ZF800FN  
Quantity: 8



**Channel Nut**  
Product Code: ZU118A  
Quantity: 4



**M8 x 25mm Flat Washer**  
Product Code: ZF825FW  
Quantity: 8



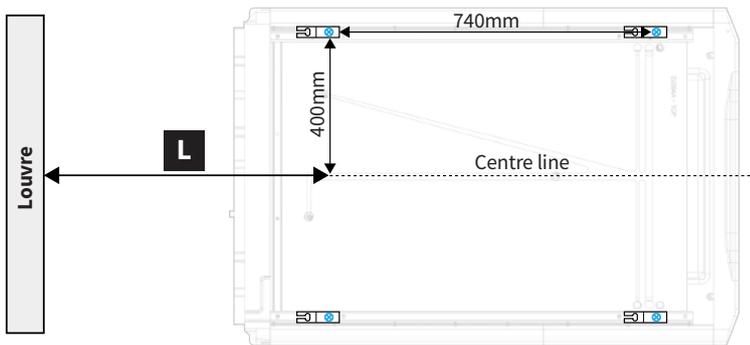
**M4.5 x 25mm Wood Screw**  
Product Code: ZF452WS  
Quantity: 4

# HVR ZERO APX

## Installation Guide

### Unit Installation - Hang Rods

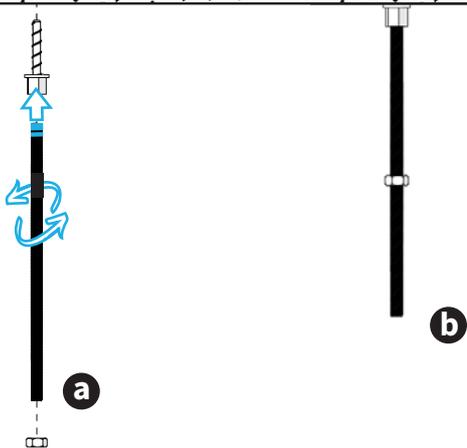
**1**



Transition	L mm
Standard Transition	460
Extended Transition	460 + 100 per extension block
Ducted	585 + duct length

Drill 4 holes in the ceiling in the positions of the blue points shown above for drop rod locations.

**2**



- TX30 driver bit required
- 4 Socket Bolts (ZF655SB)

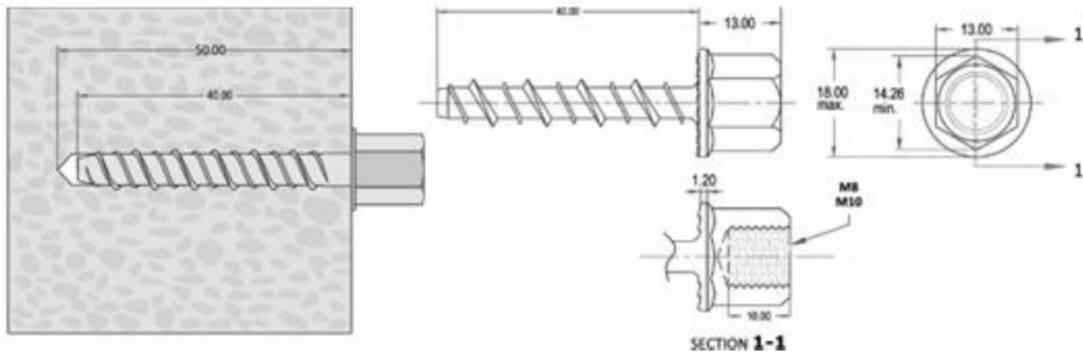
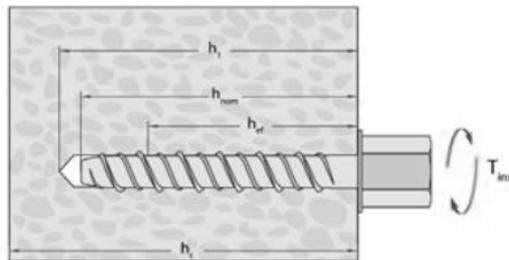
Fasten the concrete socket bolts using a tangential impact screwdriver with a suitable impact screwdriver socket and screw in the drop rod and M8 nut.

# HVR ZERO APX

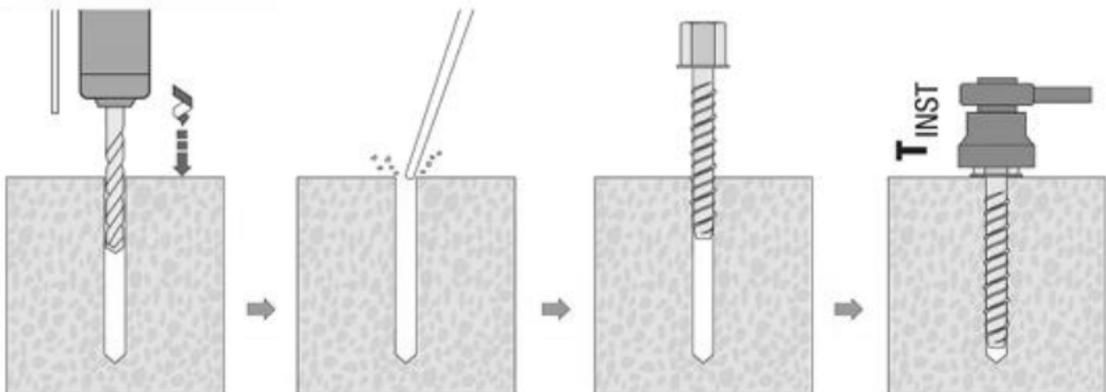
## Installation Guide

### JCP Ankerbolt Socket Bt Install instructions – Concrete

RANGE AND LOAD DATA (SOLID CONCRETE C20/25 AND HOLLOW CONCRETE PLANKS)										
Part Number	Drill Hole Diam (d <sub>p</sub> )	Hole Depth (h <sub>1</sub> )	Overall Length (L)	Embedment Depth (h <sub>emb</sub> )	M8 Internal Thread Length (l <sub>m8</sub> )	M10 Internal Thread Length (l <sub>m10</sub> )	Across Flats (AF)	Design Tensile Resistance (N <sub>t,d</sub> )	Recommended Tensile Resistance (N <sub>t,r</sub> )	Tightening Torque (T <sub>inst</sub> )
	mm	mm	mm	mm	mm	mm	mm	kN	kN	Nm
JAB06/08SOCM08	6	50	55	40	10	N/A	13	3.3	2.3	25



#### INSTALLATION INSTRUCTIONS



-Drill correct diameter hole to corresponding depth by using the rotary hammer drilling mode

-Clean hole by blowing to remove drilling debris and dust

-Insert anchor into concrete using suitable impact wrench

-Tighten with torque wrench to recommended torque

# HVR ZERO APX

## Installation Guide

### Unit Installation - Hang Rods

**3**

Insert 2 channel nuts (ZU118A) into each top channel and position with an approximate distance of 740mm between them.

**4**

Attach the Z brackets to the unit using M8 x 16mm bolts and square washers.

- 4 Hex bolts

**5**

Insert the back of the unit into the damper enclosure EPP (may be duct transition or louvre extension), ensuring that the drop rods are also inserted into the Z channels.

**!**

Follow the lifting equipment manufacturer's operation manual

**!**

Ensure that the unit is angled with the front end 5mm higher than the back end

**6**

Secure all four Z brackets with M8 nuts and washers. Tighten with 2 spanners.

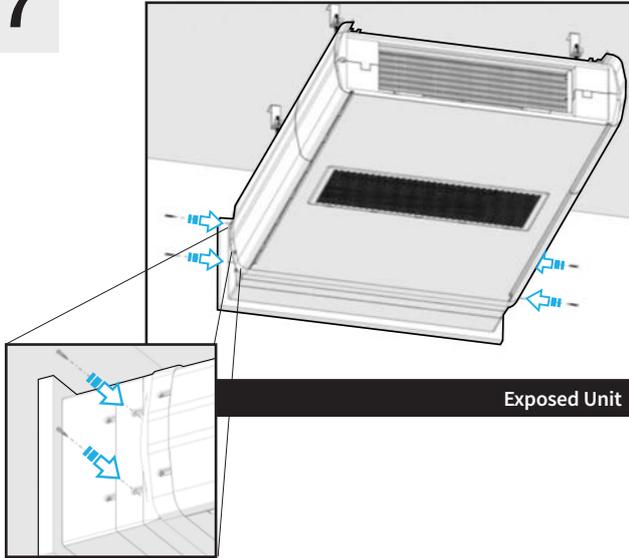
- M8 Nuts (ZF800FN)
- M8 Flat washer (ZF825FW)

# HVR ZERO APX

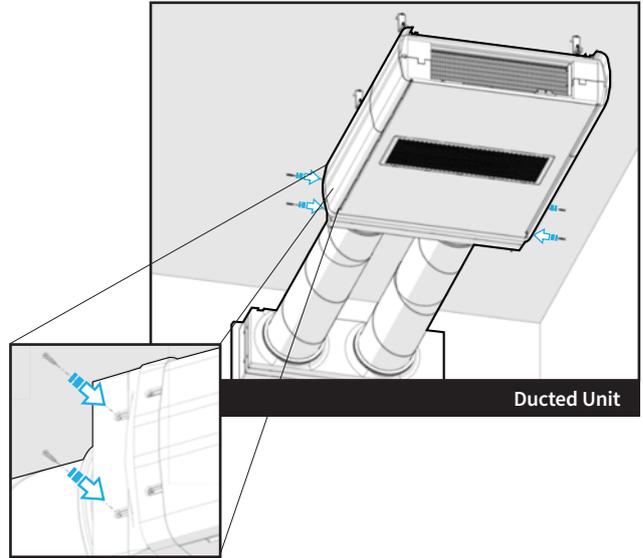
## Installation Guide

### Unit Installation - Hang Rods

7



Exposed Unit

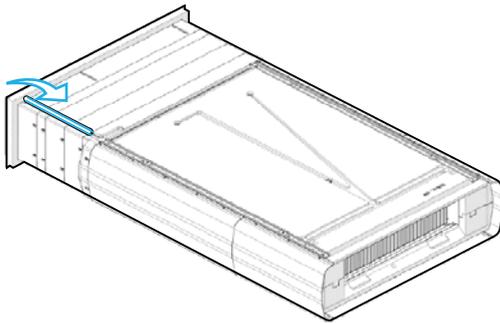


Ducted Unit

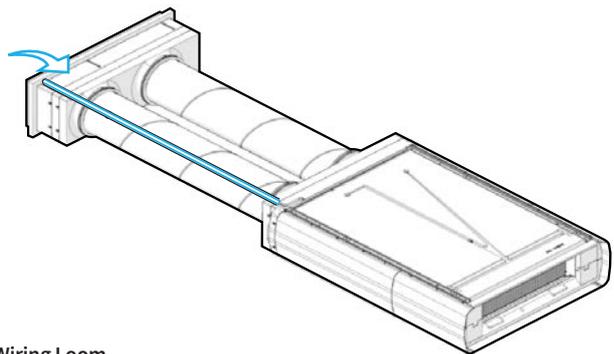
-  • PZ2 driver bit is required
-  • 4 wood screws (ZF452WS)

Insert four wood screws into the EPP to secure the unit.

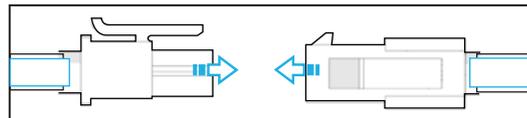
Exposed Unit



Ducted Unit



Wiring Loom



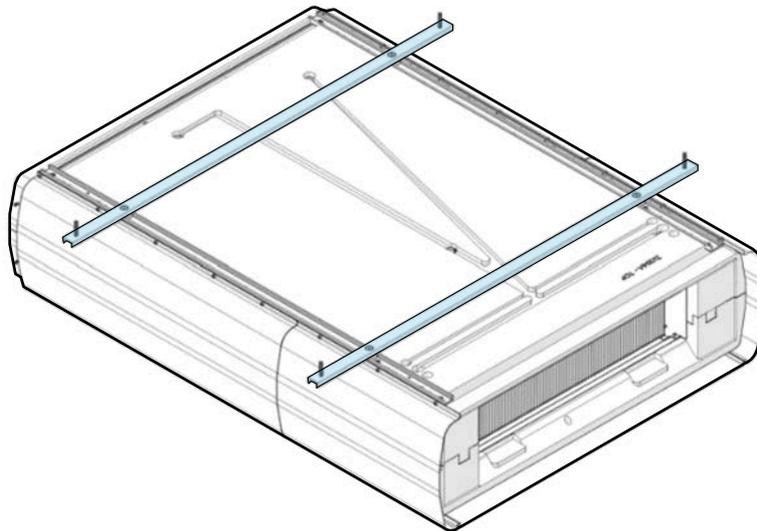
Run cable from the external damper along the channel to the wiring loom and connect it to the unit.  
Use cable extensions if needed for longer distances up to 2.5m.

8

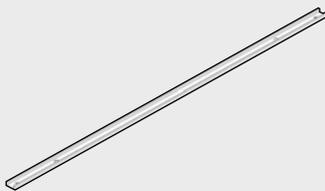
# HVR ZERO APX

## Installation Guide

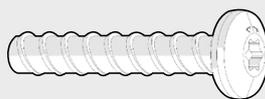
### Unit Installation - Ceiling Frame



### Parts & Fixings



**Cross Channel**  
Product Code: ZU124A  
Quantity: 2



**Concrete Screw**  
Product Code: ZF640CS  
Quantity: 4



**M8 x 20mm CSK Hex Socket Screw**  
Product Code: ZF820HS  
Quantity: 4



**M4.5 x 25mm Wood Screw**  
Product Code: ZF452WS  
Quantity: 4



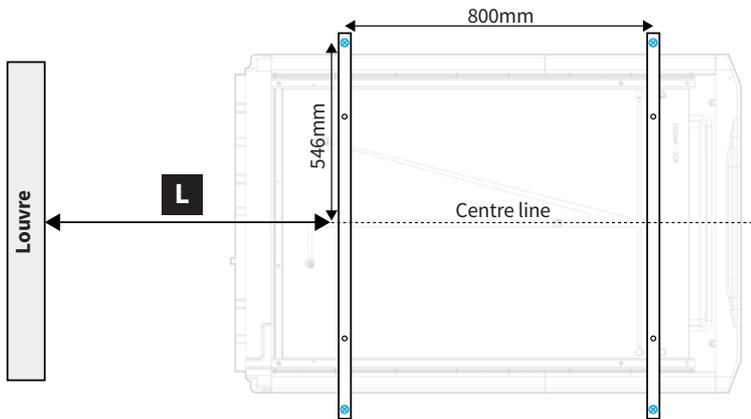
**M8 x 40mm Flat Washer**  
Product Code: ZF840FW  
Quantity: 4

# HVR ZERO APX

## Installation Guide

### Unit Installation - Ceiling Frame

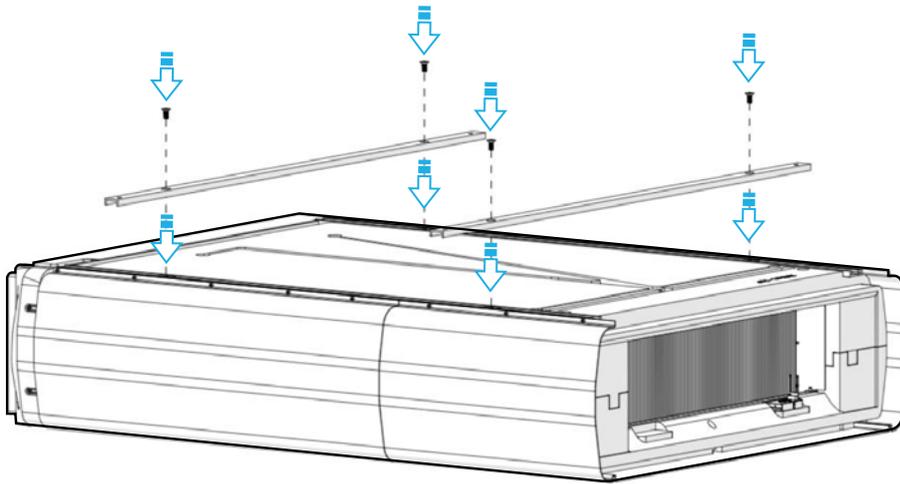
1



Transition	L mm
Standard Transition	460
Extended Transition	460 + 100 per extension block
Ducted	585 + duct length

Mark and drill pilot holes (between 3mm to 6mm) in locations shown above.

2



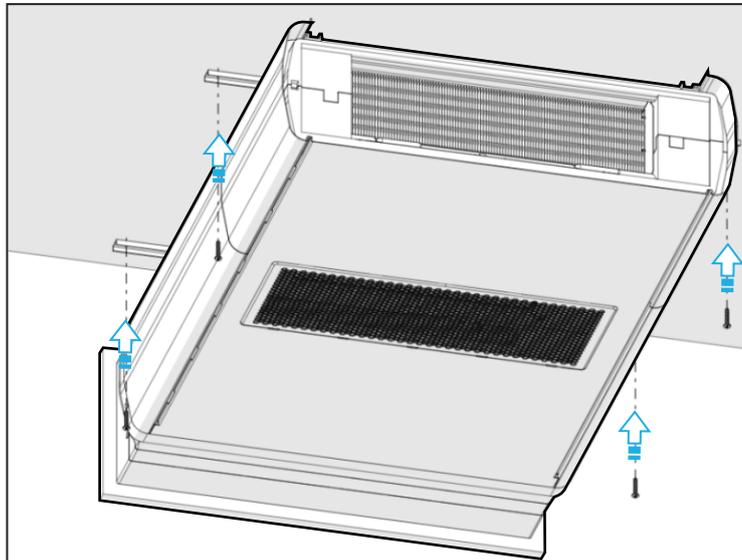
-  • 4mm hex nut required
-  • 4 CSK Hex Socket Screw

Securely fasten the cross beams to the unit using M8 x 20mm hex socket screws (ZF820HS) with washers between the channel and the unit.

# HVR ZERO APX

## Installation Guide

### Unit Installation - Ceiling Frame



3

Follow the lifting equipment manufacturer's operation manual

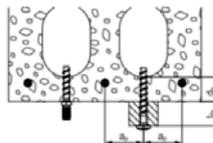
- TX30 driver bit required
- 4 Socket Bolts (ZF655SB)

Insert the back of the unit into the damper (may be louvre extension or duct transition) and fix the cross beams to ceiling using four M6 x 40mm concrete screws (ZF640CS)

## Fischer UltraCut FBS II 6 GVZ Install instructions – Concrete

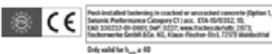
UltraCut FBS II GVZ	6	ETA-18/0242		ETA-15/0352	
		6	6	6	6
$d_h$	[mm]	6	6	6	6
$h_{max1}$	[mm]	20 - 55	40 - 55	40	40
$h_{max2}$	[mm]	-	-	-	-
$h_z$	[mm]	l+5( + 10)	l+10	-	-
$d_s$	[mm]	-	-	l+10	l+10
$T_{req,max}$	[Nm]	80 (450°)	450	80	65
$max T_{inst}$	[Nm]	5 (10°)	10	10	3
SW	[Nm]	10/13	10/13	10/13	10/13
TX	[-]	30 (SK/P/LP)			

\* $h_{min} \geq 35$



UltraCut FBS II	US, SK, P, LP, I
$a_p \geq$	[mm] 50
$d_s \geq$	[mm] 25
$t_{in} \geq$	[mm] l-d <sub>s</sub> - 30mm
$T_{req,max}$	[Nm] 80 (450°)
$max T_{inst}$	[Nm] 12 (25°)

Acc. ETA-18/0242: Additional installation characteristics for prestressed concrete hollow core slabs.  
\* $a_p \geq 35$  mm and  $h_{min} \geq 35$  mm



**1.1**

**1.2**

**1.3**

**2.1**

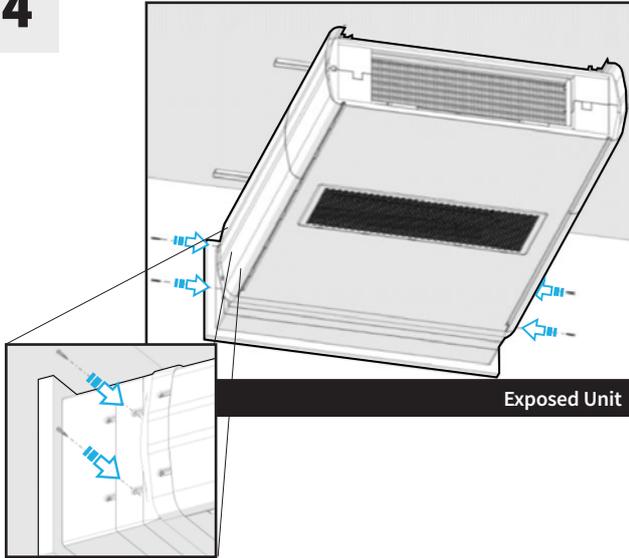
**2.2**

# HVR ZERO APX

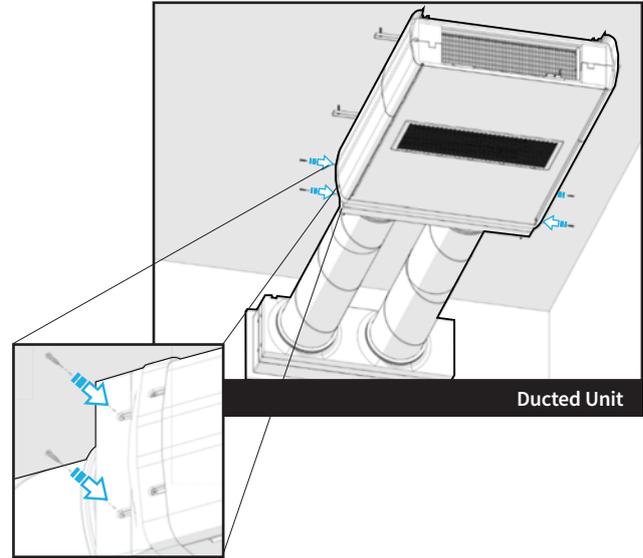
## Installation Guide

### Unit Installation - Ceiling Frame

4



Exposed Unit

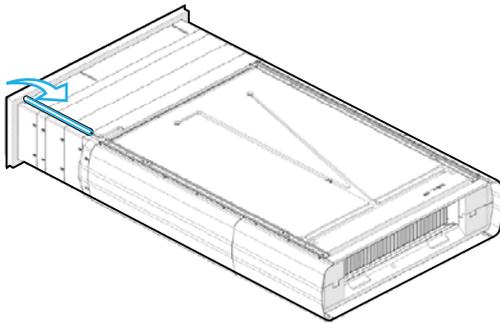


Ducted Unit

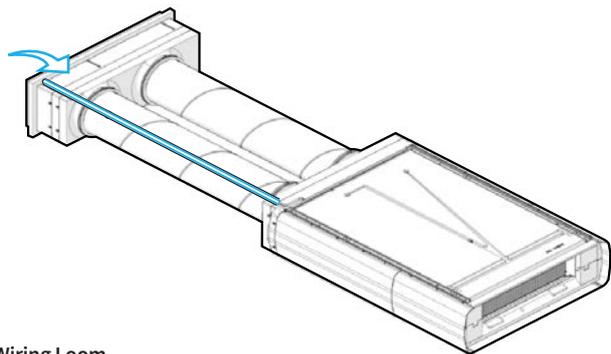
-  • PZ2 driver bit is required
-  • 4 wood screws (ZF452WS)

Insert four wood screws into the EPP to secure the unit.

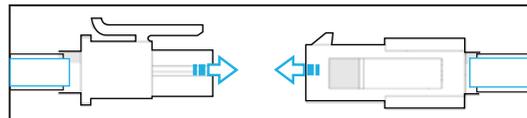
Exposed Unit



Ducted Unit



Wiring Loom



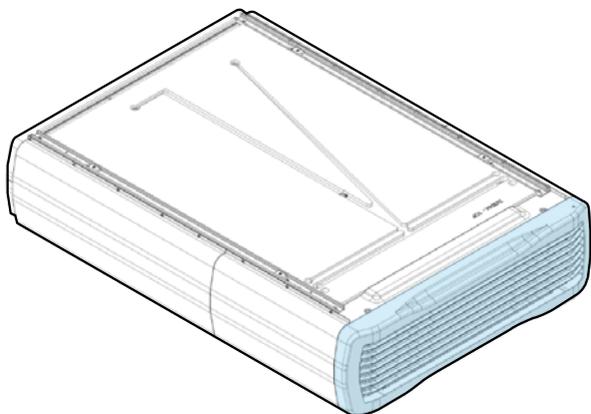
Run cable from the external damper along the channel to the wiring loom and connect it to the unit.  
Use cable extensions if needed for longer distances up to 2.5m.

5

# HVR ZERO APX

Installation Guide

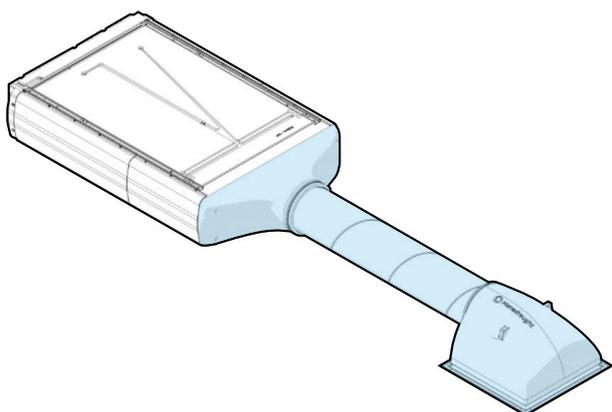
## Front Installation



Exposed Grille

Go to page

**30**



Ducted Front

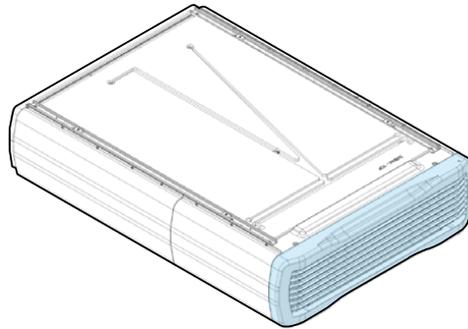
Go to page

**32**

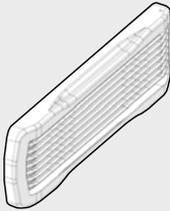
# HVR ZERO APX

## Installation Guide

### Front Installation - Exposed Grille



#### Parts & Fixings



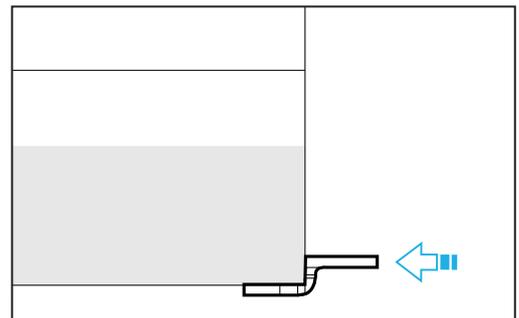
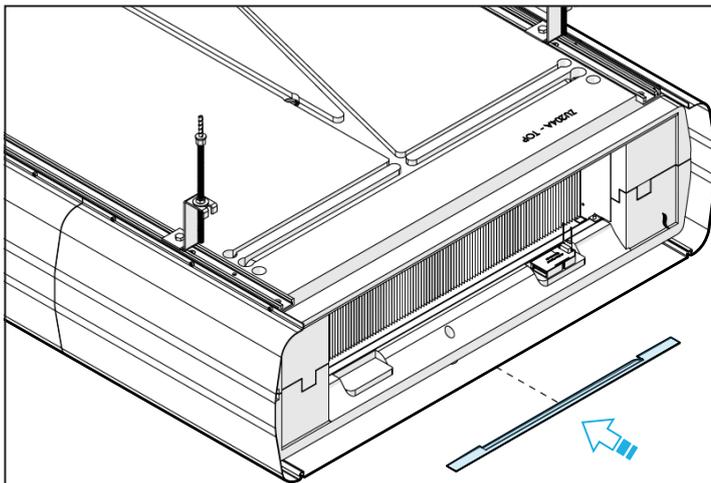
Exposed Front-of-Unit  
Product code: ZU700  
Quantity: 1



M6 x 90mm CSK Wood Screw  
Product code: ZF690WS  
Quantity: 4



Wrap Support Clip  
Product code: WS001  
Quantity: 1



Side view - wrap support clip placement

Place the wrap support clip over the centre of the front lip of the bottom wrap.

# HVR ZERO APX

## Installation Guide

### Front Installation - Exposed Grille

**2**

**a** • PZ2 driver bit is required  
• 4 wood screws (ZF690WS)

**Wiring Loom**

**a**

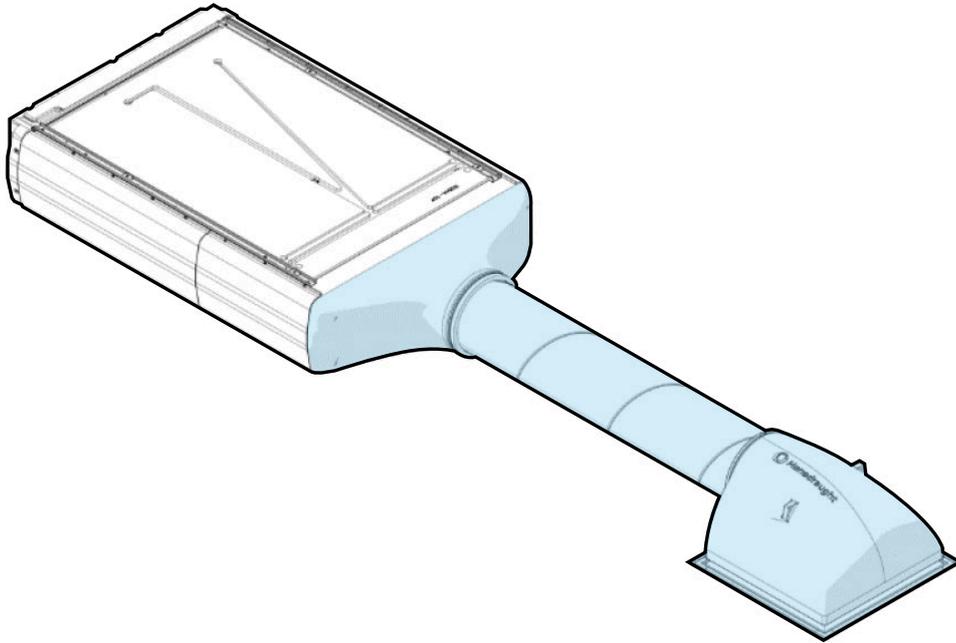
**b**

Use 4 wood screws to secure the exposed front assembly to the unit, ensuring that the Active Grille connection is wired into the wiring loom (see wiring guide for further details).

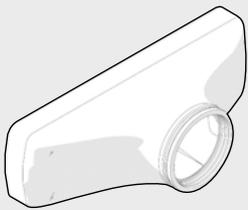
# HVR ZERO APX

## Installation Guide

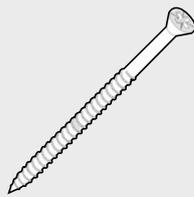
### Front Installation - Ducted Front



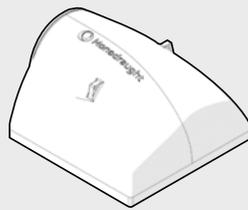
### Parts & Fixings



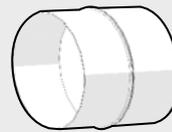
**Duct Transition**  
Product Code: ZD011A  
Quantity: 1



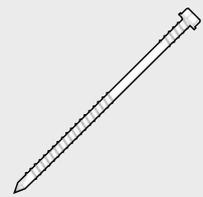
**M6 x 90mm CSK Wood Screw**  
Product Code: ZF690WS  
Quantity: 4



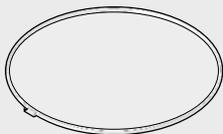
**Duct Transition Bend (90°)**  
Product Code: ZD005A  
Quantity: 1



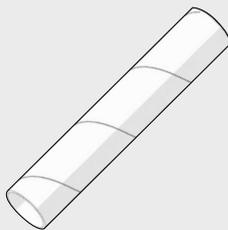
**250mm Male Coupler**  
Product Code: ZD008B  
Quantity: 2



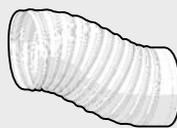
**M5.5 x 50mm Self-drilling Tek Screws**  
Product Code: ZF450TS  
Quantity: 4



**Ducting Clamp**  
Quantity: 3  
(supplied by others)



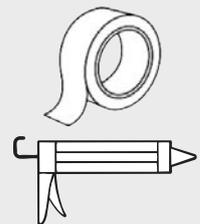
**Spiral Ducting**  
Quantity: 1  
Supplied by others



**Flexible Ducting (0.5m)**  
Product Code: FS854A  
Quantity: 1



**Ceiling Grille**  
Product Code: CNF600B  
Quantity: 2



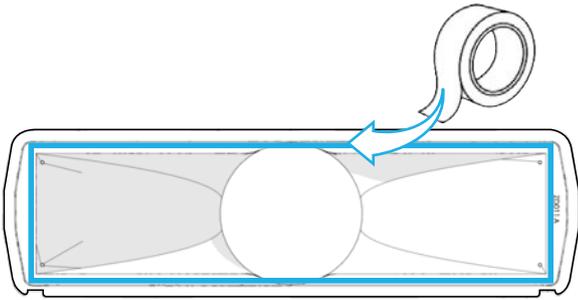
**Air Tape / Clear Silicone**  
Supplied by others

# HVR ZERO APX

## Installation Guide

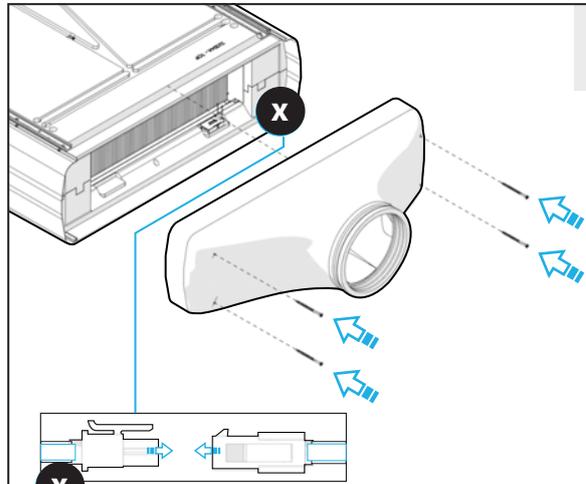
### Front Installation - Ducted Front

1



Apply air tape to duct transition in pattern shown by the blue lines.

2

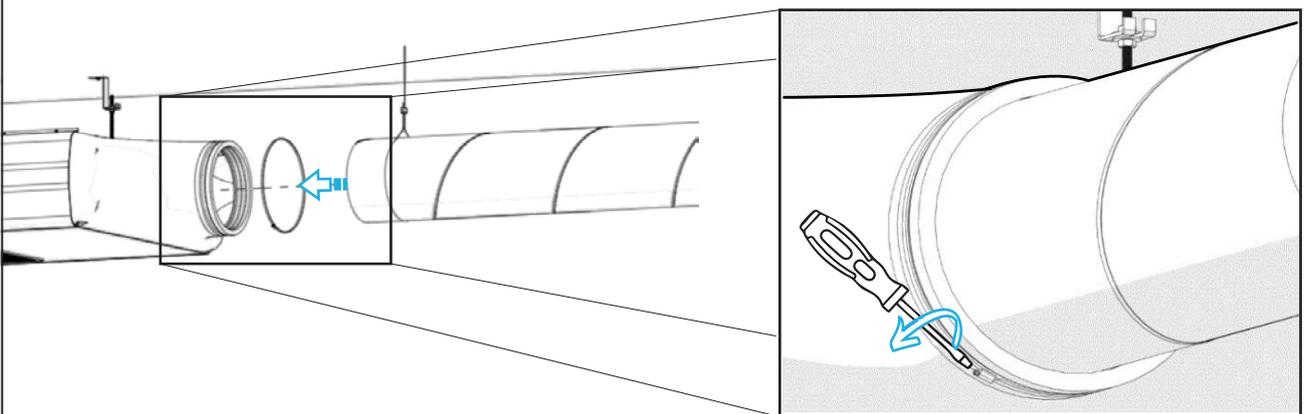


**X** Cable is not used in this configuration

-  • PZ2 driver bit is required
-  • 4 wood screws (ZF690WS)

Fasten duct transition to the unit using four wood screws (ZF690WS) making sure that the channels are at the bottom.

3



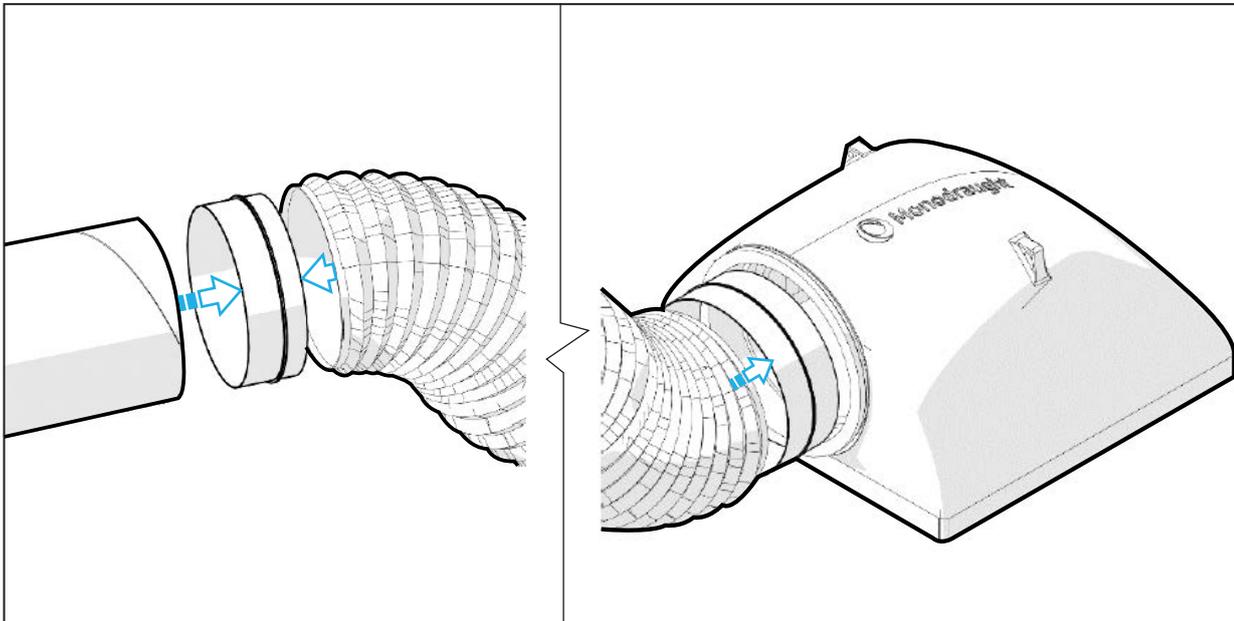
Assemble the setup by placing the ducting clamps over both transition pieces and then inserting the spiral ducting to join them together.

# HVR ZERO APX

## Installation Guide

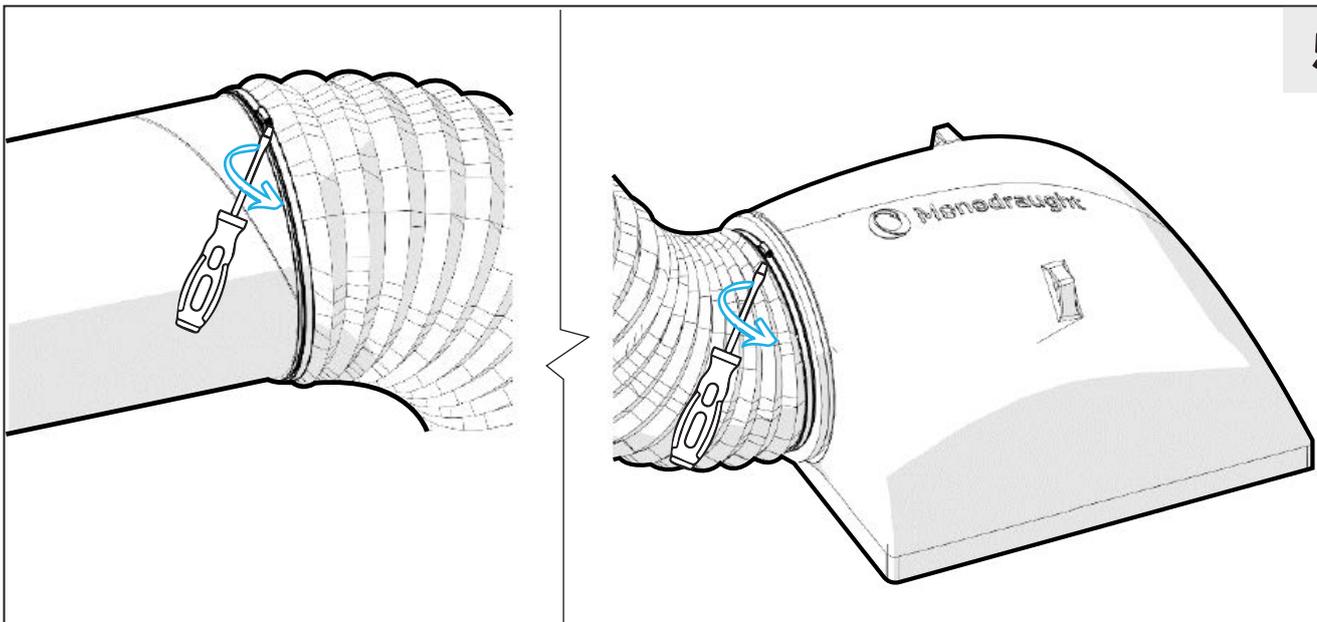
### Front Installation - Ducted Front

4



Attach the flexi-duct at both ends using the male couplers with a ducting clamp over the flexi-duct.

5



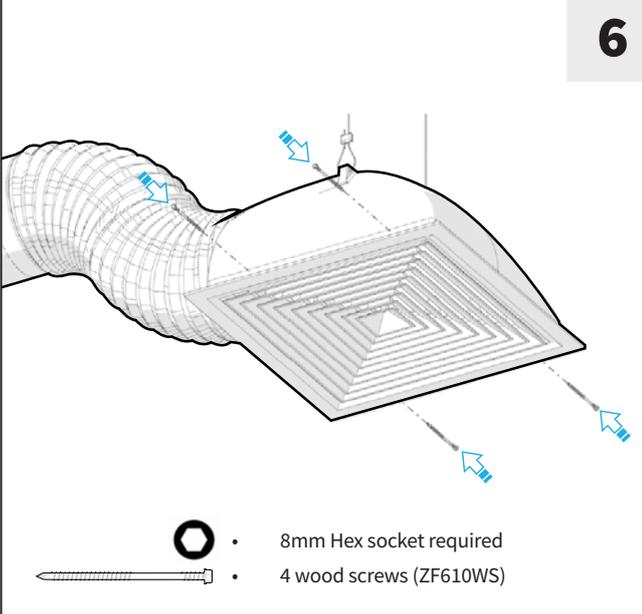
Tighten the ducting clamps using a flathead screwdriver.

# HVR ZERO APX

## Installation Guide

### Front Installation - Ducted Front

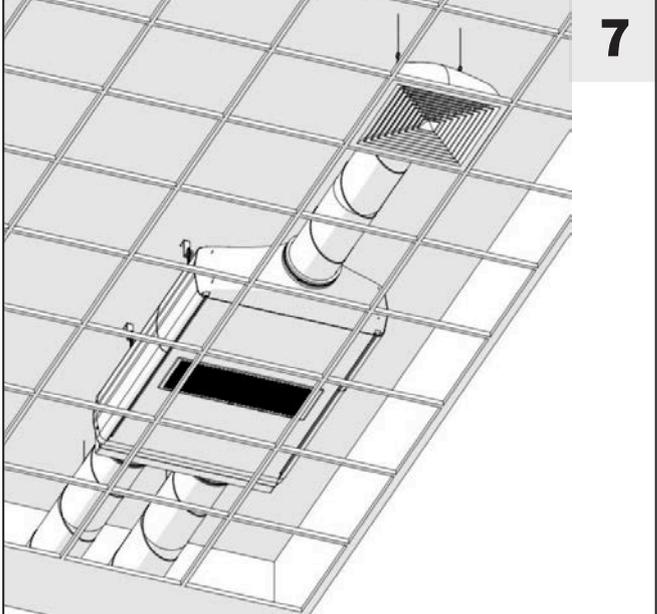
**6**



- 8mm Hex socket required
- 4 wood screws (ZF610WS)

Attach the ceiling grille onto the transition bend using four Tek screws (ZF450TS).

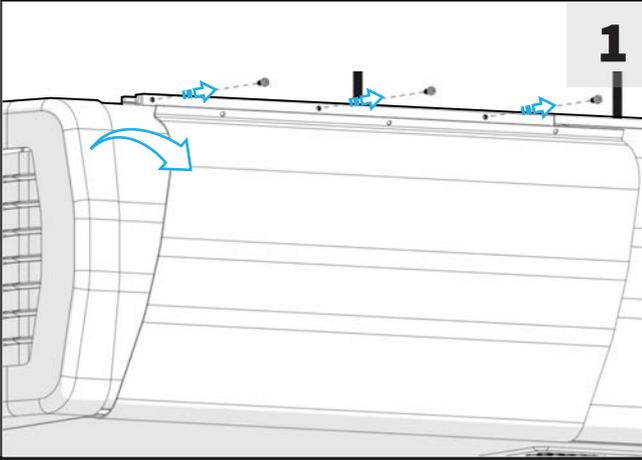
**7**



Assemble the ceiling grid as required.

### Electronics Enclosure Access

**1**

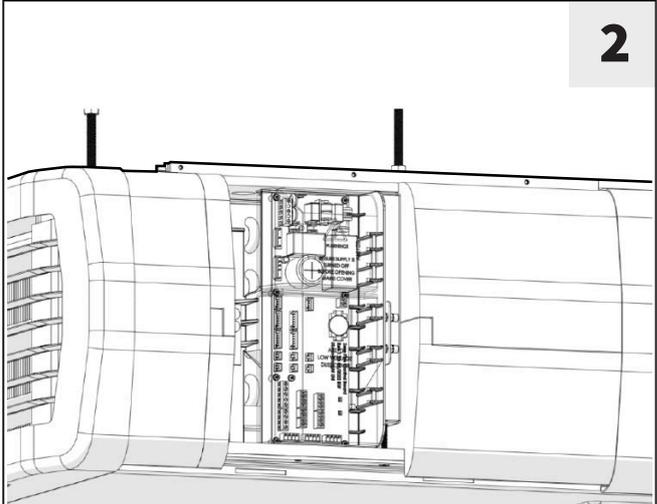


**CAUTION**

The HVR APX Electronics Enclosure contains mains voltage live circuits. **Power must be isolated at the switch fuse supply prior to opening power covers.**

HVR APX Units are supplied with an internally mounted electronics enclosure. To access the enclosure, remove the front panel on the side opposite the coil.

**2**

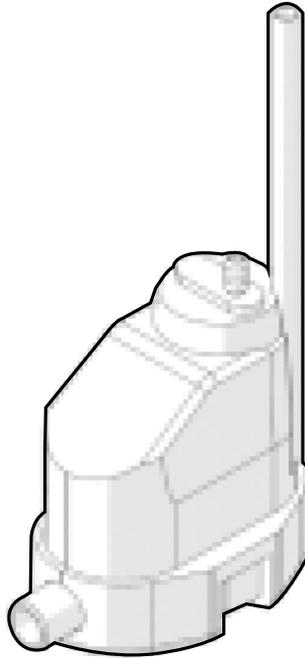


Undo the three M3 screws before removing the wrap panel by pivoting around the bottom edge.

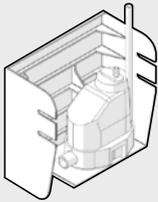
# HVR ZERO APX

Installation Guide

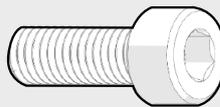
## Condensate Pump (optional)



### Parts & Fixings



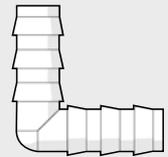
**Condensate Pump Assembly**  
Product Code: TBC  
Quantity: 1



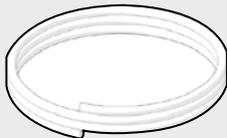
**M5 x 14mm Socket Head Screw**  
Product Code: ZF514HS  
Quantity: 2



**Connector Pipe**  
Product Code: TBC  
Quantity: 1



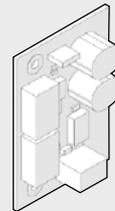
**90° Bend**  
Product Code: TBC  
Quantity: 1



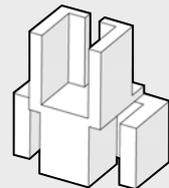
**Drainage Pipe**  
Quantity: 1  
Supplied by others



**M3 x 6mm Polyfix Screw**  
Product Code: ZF306PF  
Quantity: 2



**Condensate Pump Converter PCB**  
Product Code: ZC119A  
Quantity: 1



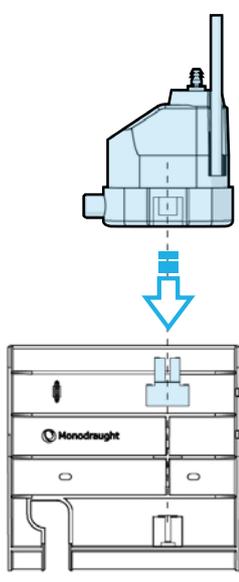
**Mounting Clip**  
Product code: TBC  
Quantity: 1

# HVR ZERO APX

## Installation Guide

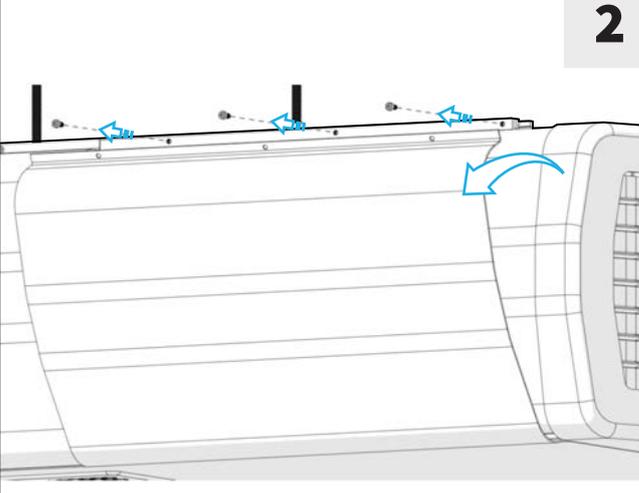
### Condensate Pump Enclosure Installation

**1**



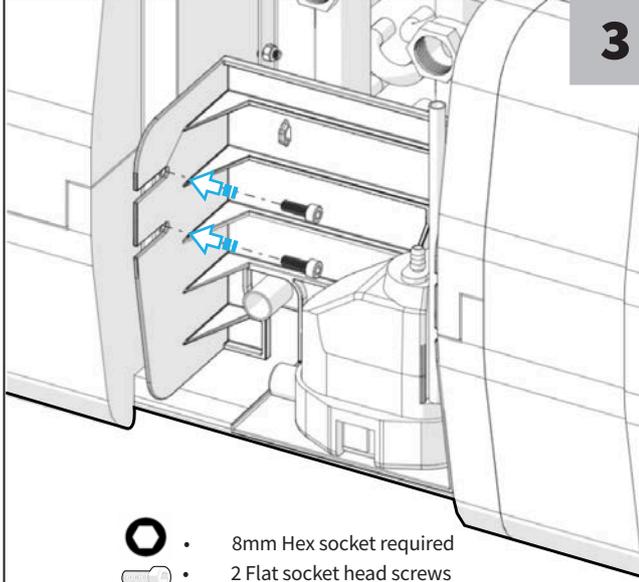
Ensure the condensate pump is correctly mounted onto the enclosure using the mounting clip.

**2**



Remove the M4 screws along the top of the front wrap on both sides of the unit before pivoting the panel from the bottom to remove it.

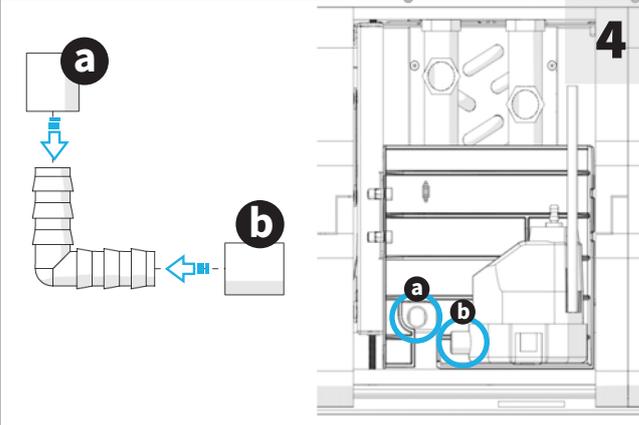
**3**



- 8mm Hex socket required
- 2 Flat socket head screws

Attach the condensate pump enclosure using two Flat Socket Head screws (ZF514HS).

**4**



- PZ2 driver bit is required
- 2 wood screws

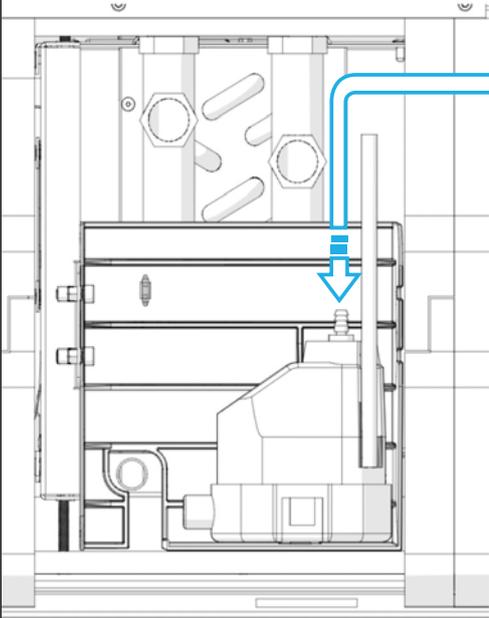
Cut the connector pipe into two joining pieces and attach them to the 90-degree bend.

Attach the pump to the condensate tray using the connector pipe. The bend may also need to be cut to the correct length.

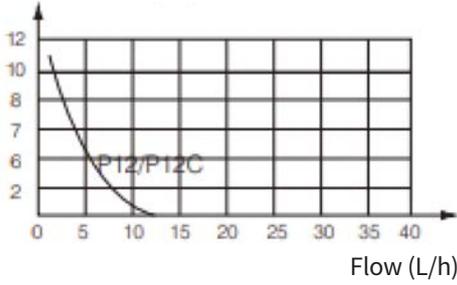
# HVR ZERO APX

## Installation Guide

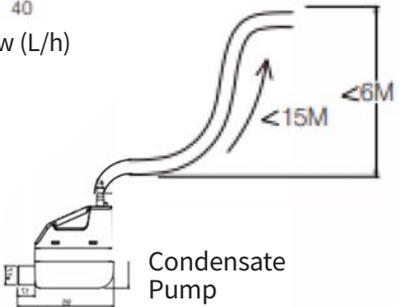
### Condensate Pump Enclosure Installation



Meters head (m)



Flow (L/h)

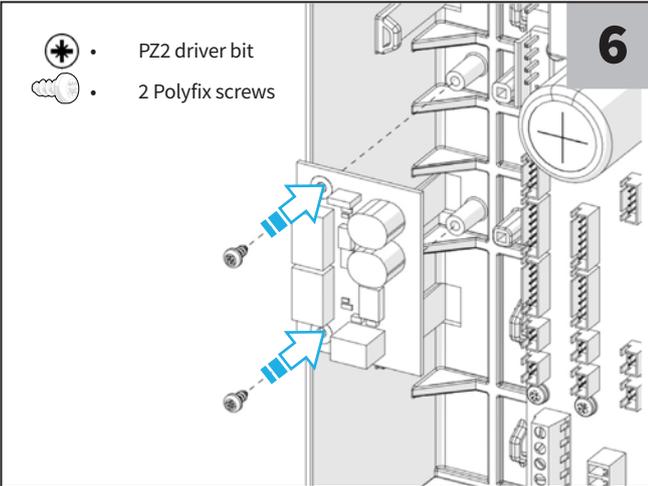


Condensate Pump

5

Connect the drainage pipe to the water outlet ensuring that the discharge head is less than 6m and the length of the water pipe is less than 15m (as shown above).

-  • PZ2 driver bit
-  • 2 Polyfix screws

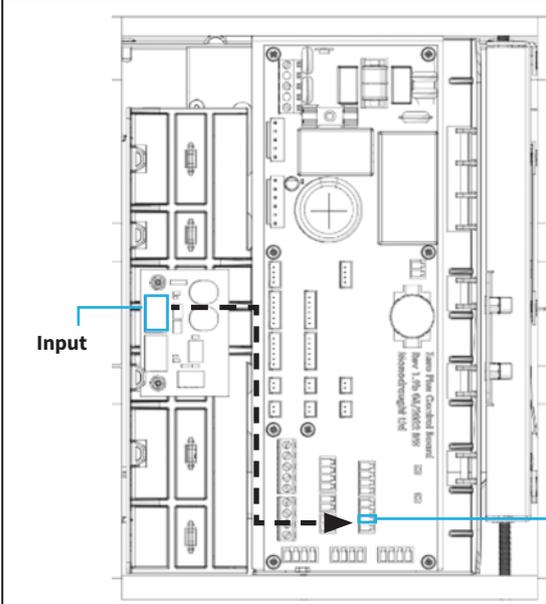


6

 CAUTION

The HVR APX Electronics Enclosure contains mains voltage live circuits. Power must be isolated at the switch fuse supply prior to opening power covers.

On the other side of the unit, attach condensate pump converter PCB to the PCB enclosure with 2 M3 x 6mm Polyfix screws (ZF306PF).



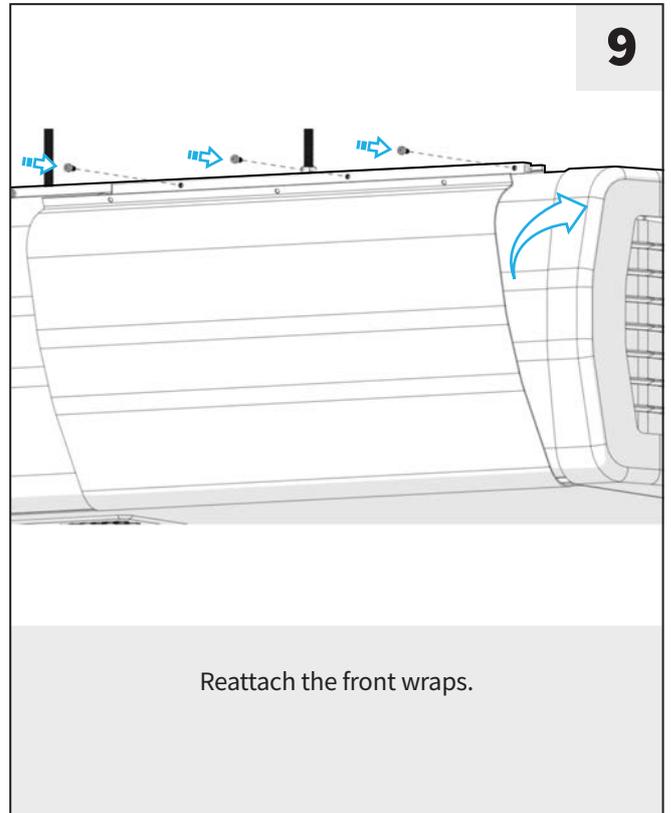
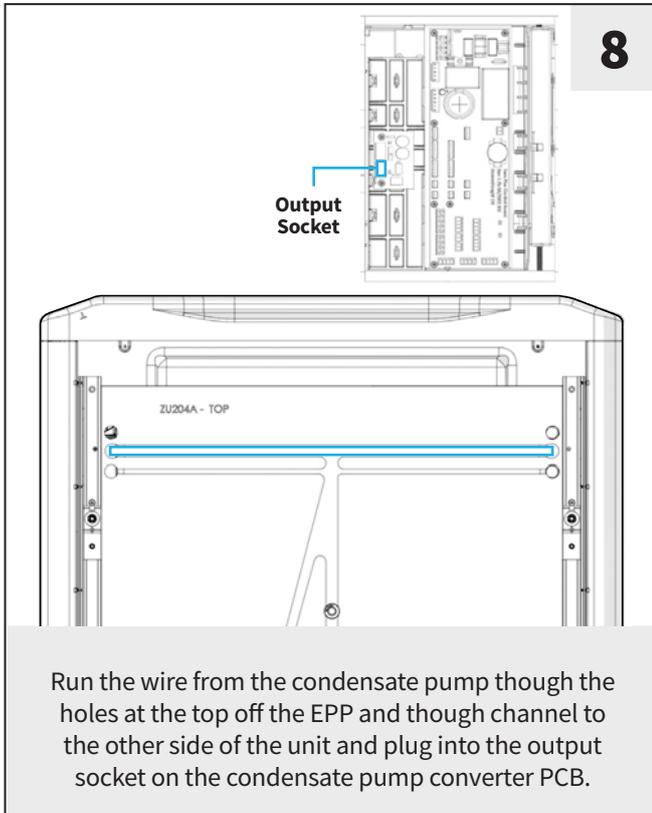
7

Plug the condensate pump converter PCB (Input) into the main unit PCB (servo 2).

# HVR ZERO APX

## Installation Guide

### Condensation Pump Enclosure Installation



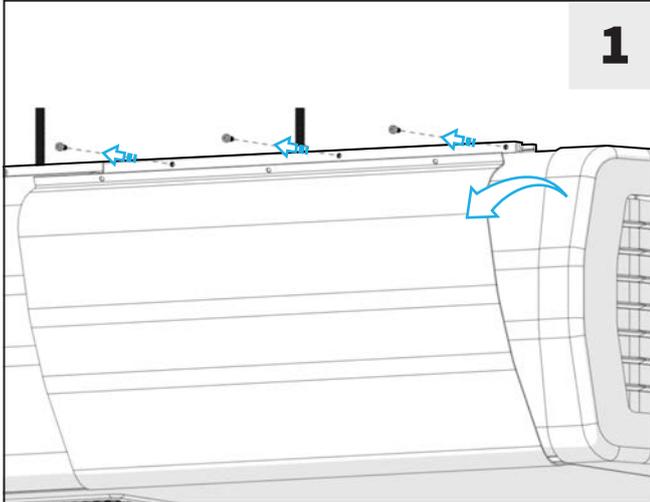
### Valves, Actuators and Piping

# HVR ZERO APX

## Installation Guide

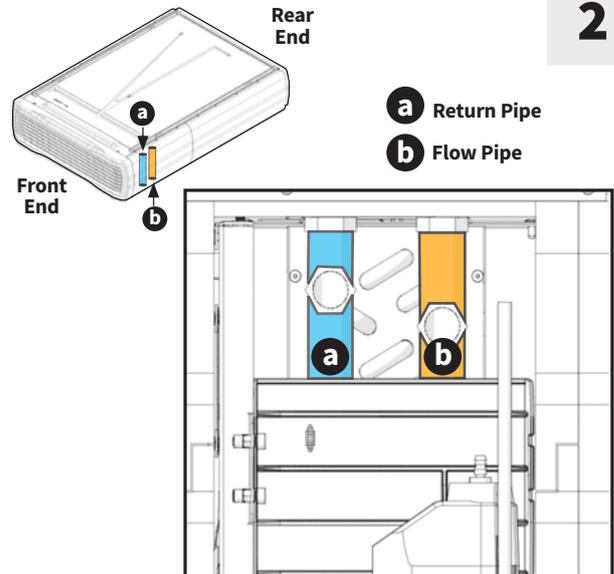
### Valves, Actuators and Piping

1



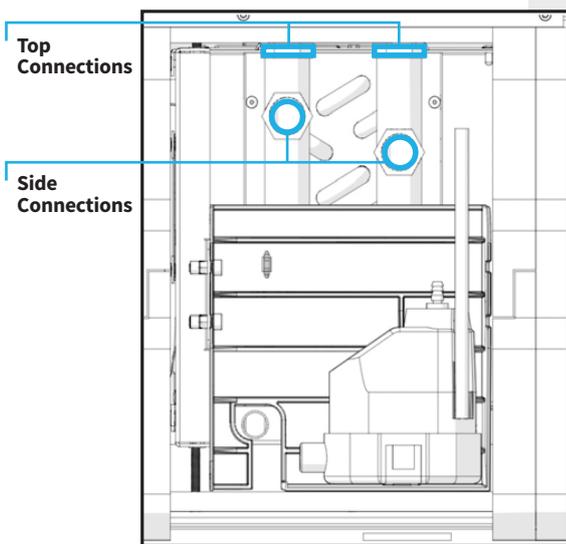
Remove the M4 screws along the top of the front wrap on both sides of the unit before pivoting the panel from the bottom to remove it.

2



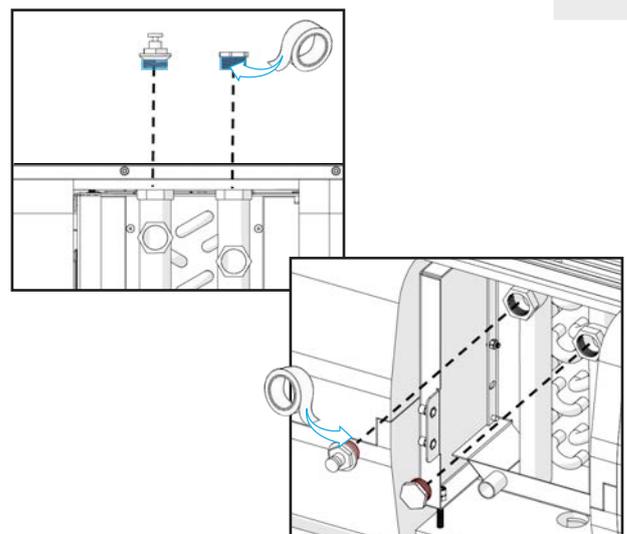
Refer to the illustration above to ensure the flow and return pipes are connected correctly, preventing uneven heating, pressure imbalances, and flow issues that could affect system performance.

3



The unit will either use the top or the side plumbing connections. The connections that are not used will need to be blanked off and have a bleed valve as shown above.

4

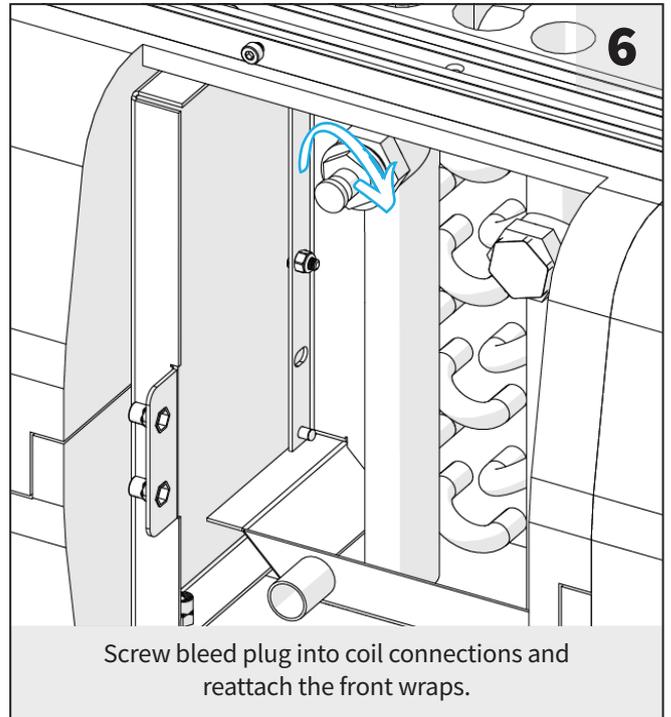
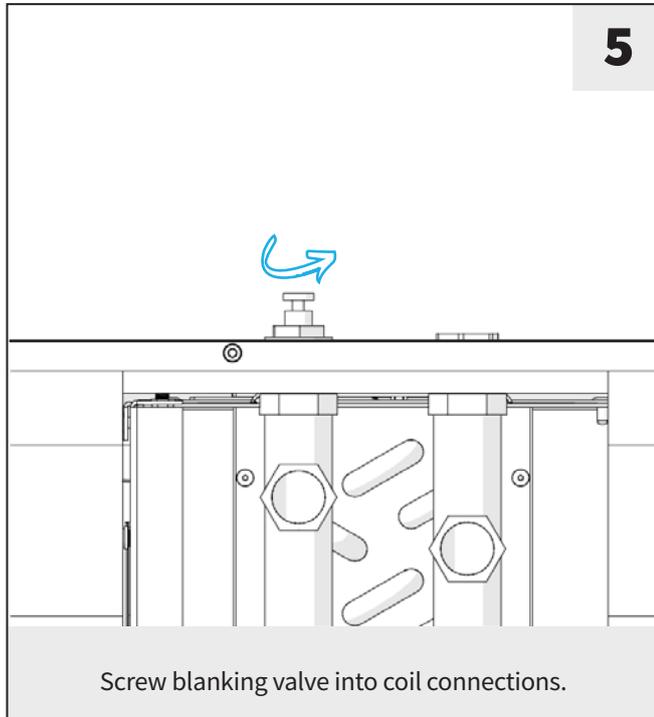


Blank off either top or side connections based on piping preference. Ensure that two spanners are used to avoid damaging the pipes.

# HVR ZERO APX

## Installation Guide

### Valves, Actuators and Piping



#### PLEASE NOTE:

- Valve and actuators are not provided by Monodraught
- Actuator must use a 0-10V control signal and be powered by 24VDC to be compatible with the Monodraught system
- Valve must be sized in accordance with water flowrates
- Monodraught suggests the below options



It is the responsibility of the installation party that all pipework connections which is to include bleed valves and blanking caps are suitably checked, tightened and made watertight irrespective of switching between top mount coil connections or side mount coil connections.

#### 2-Way Basic Valve

- CQ24A-SR 24V Modulating Actuator
- C220Q-K 2-Way valve
- Usually with inverter driven pump
- Requires additional balancing valve



#### 2-Way PICV Valve

- CQ24A-SR 24V Modulating Actuator
- C220QPT 2-Way valve with pressure tapings
- Usually with inverter driven pump



#### 3-Way Modulating Valve

- LR24A-SR 24V Modulating Actuator
- R3015 3-Way Modulating Valve



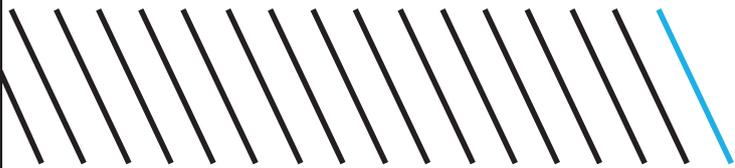
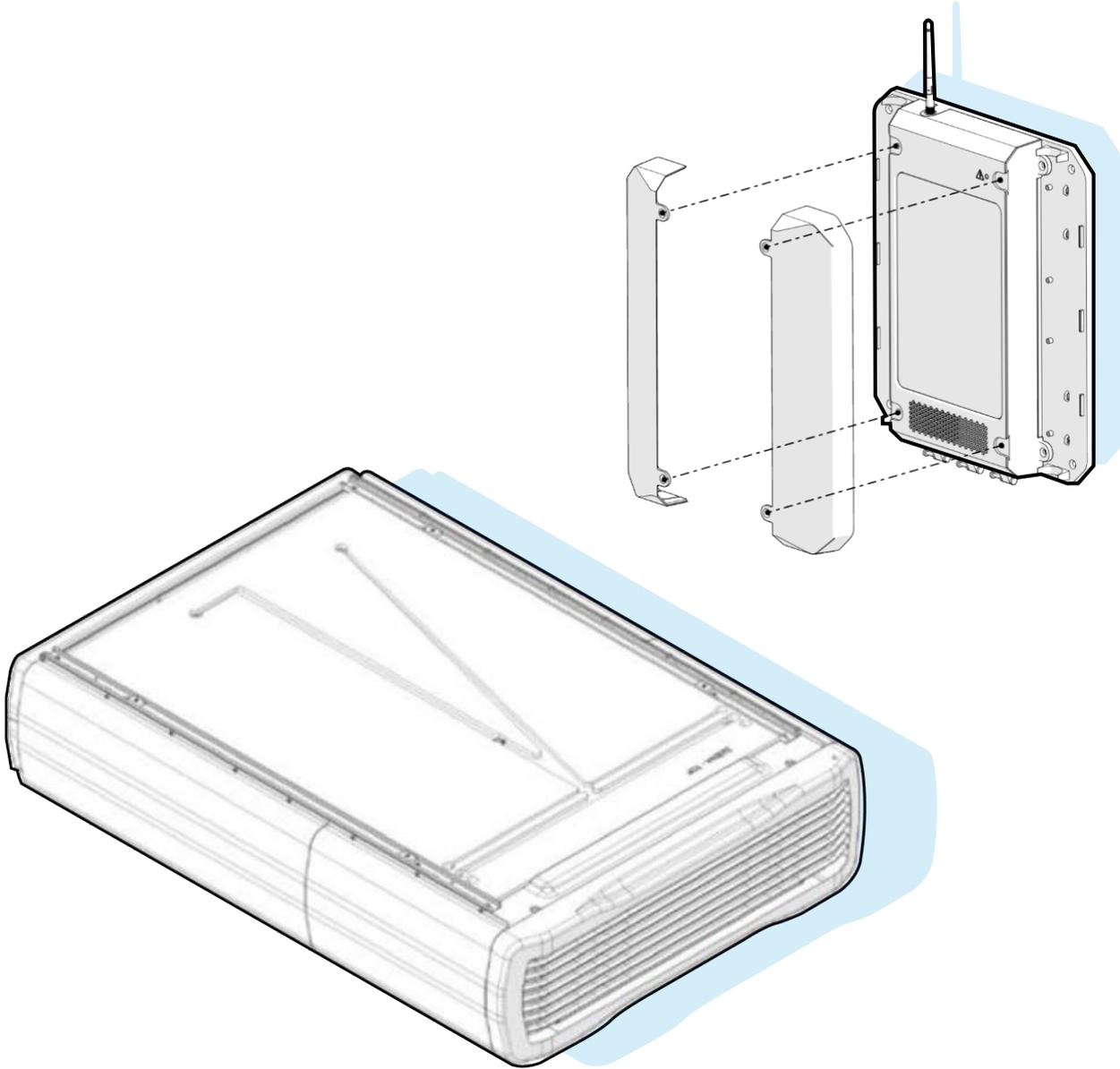
# HVR ZERO APX

## Installation Guide

### Maintenance Instructions

After one year from installation a signed service agreement is recommended. A typical maintenance schedule is shown below.

Time Interval	Carried out by	Checks	Procedure
3 months	User	External inspection to ensure the wall or window louvre is not blocked with leaves or debris.	Switch off HVR unit at switched fuse spur. Remove debris with a brush and clean with soapy water if required.
		Internal inspection to ensure that the grilles are clean and clear of any debris and obstructions.	Switch off HVR unit at switched fuse spur. Remove debris with a brush / vacuum cleaner and clean with soapy water if required.
After 1 year	Monodraught	Monodraught will service the system and ensure system has latest firmware.	Monodraught will make contact to arrange suitable time to access the system.



# HVR ZERO **APX**

WIRING GUIDE

# HVR ZERO APX

## Wiring Guide

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# HVR ZERO APX

Wiring Guide

## HVR ZERO APX Wiring Access

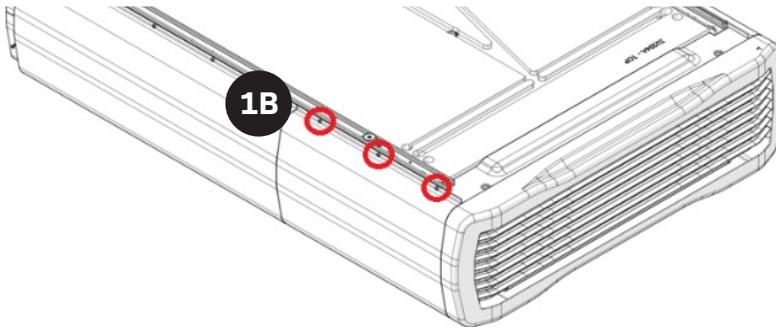
CAUTION



**Danger**  
Live electrical  
equipment



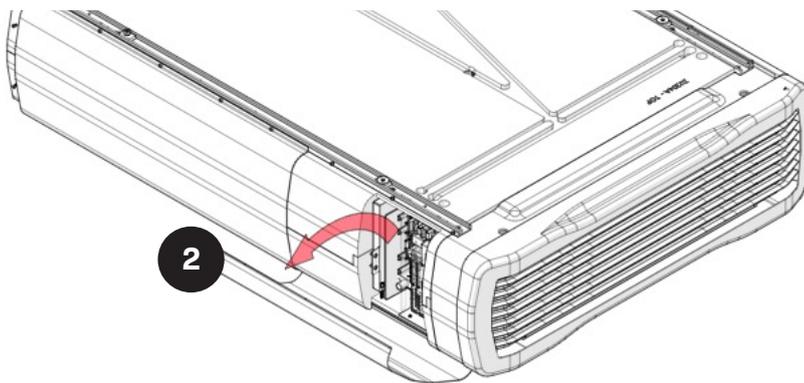
The HVR Zero electronics enclosure contains mains voltage live circuits. **Prior to removing the cover power must be isolated at the switched fuse supply**



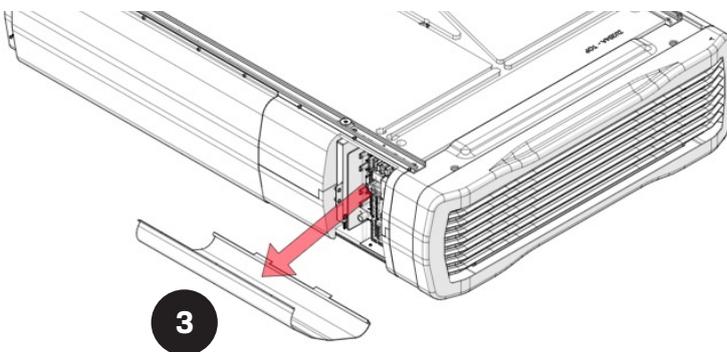
**1A.** Check which side the electronics enclosure is on.

HVR APX comes in Left and Right-handed units. Look for the side with wires coming out of the top of the unit. There will be pipework on the opposite side of the Electronics Enclosure.

**1B.** Remove 3x Panel Screws



**2.** Hinge Panel away from the unit



**3.** Remove panel to access PCB



Place the panel somewhere clean and soft so it doesn't get scratched or dirty.

# HVR ZERO APX

## Wiring Guide

### HVR ZERO APX Wiring Overview

Each HVR APX unit requires:

- Mains power from a switched-fused spur (3A)
- “MonoComms” network connection(s) to connect the unit to other units and the Acuity control panel
- Additional wiring for features such as heating/cooling coil valve actuators, science mode interconnection with gas proving devices, etc.

### Wiring Channels

The HVR APX unit has 3 holes between the Electronics Enclosure and the top of the unit for wiring. One of these holes is used by the internal wiring, but the other 2 holes are available for the external wiring. The location of these holes depends upon whether the HVR APX unit is a left or right-handed model. The pipework for the heating/cooling coil uses the holes on the opposite side of the electronics enclosure.

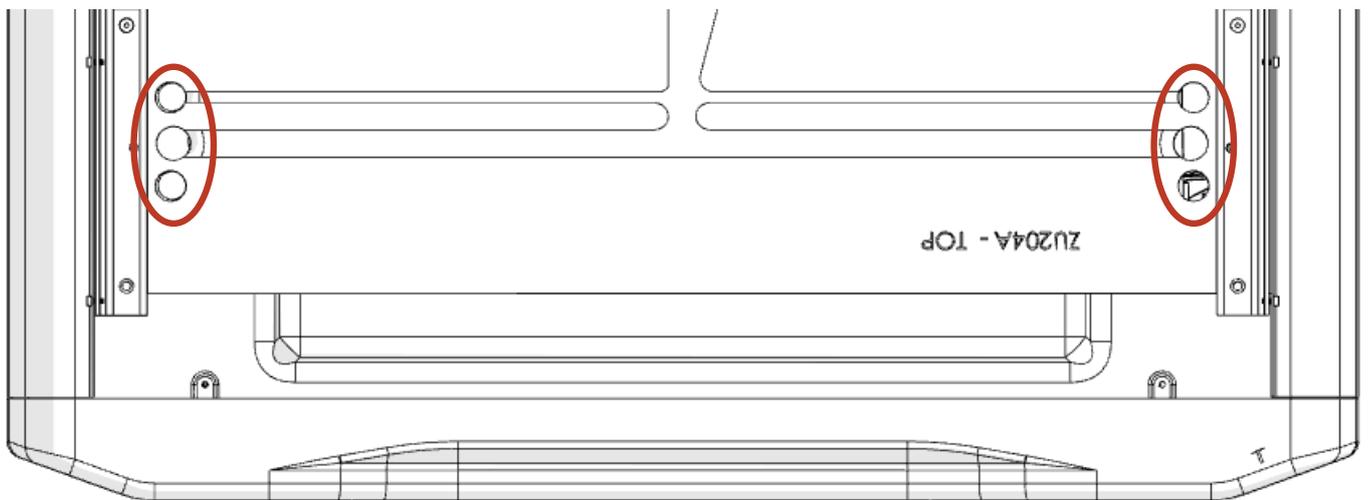


Figure 1 - Wiring/Coil Pipework holes

### Mains Connection

Each HVR APX unit is powered by a connection to the mains electricity and requires a protective earth connection to protect against electric shocks. It should be connected via a switched-fused spur with a fuse rating of 3A.

Rated Voltage	230V AC
Frequency	50Hz
Rated current	TBC
Peak current	TBC

# HVR ZERO APX

## Wiring Guide

### MonoComms Network Connections

The “MonoComms” network used with HVR APX and the Acuity control panel enables communication between the different devices, providing data logging, monitoring and centralised control of the devices on the network. The physical signalling is based upon the RS485 (TIA-485) standard.

There are 2 different levels of network used in the Monodraught “Zero” range of products. They are:

- **Acuity Building network** – This connects all the rooms to Acuity via the room’s Parent Unit.
- **Acuity Room Network** – Each room has a sub-network between all devices in the room. This includes the Modena user interface which also measures the temperature and CO<sub>2</sub> levels in the room.

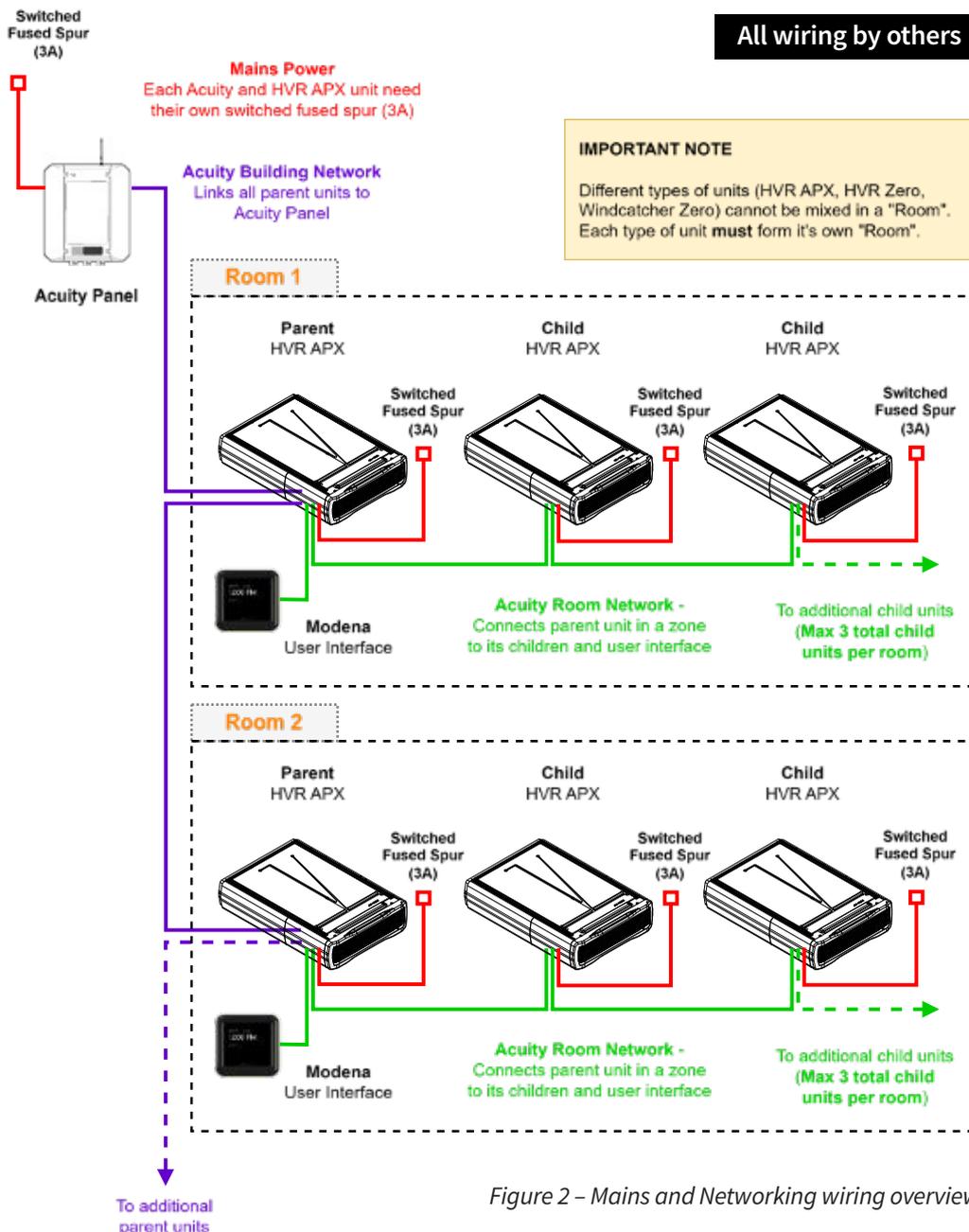


Figure 2 – Mains and Networking wiring overview

# HVR ZERO APX

## Wiring Guide

### Acuity Building Network

On the long-distance building network, the cable specification requires a twisted pair RS485 cable with screening and must have a characteristic impedance of **120 Ω**.

#### The key parameters are:

- 2 Pair
- 0.2-0.23 mm<sup>2</sup> (24 AWG)
- Screened cable

For example, the following cables are suitable for use.

Name	Supplier Part Number	Supplier	Link
<b>PRO POWER PP001165</b> Screened RS-485 Cable, 2 Pair, 24 AWG, 50m, Grey -	<b>CB21473</b>	CPC	<a href="https://cpc.farnell.com/pro-power/pp001165/shld-multipair-cable-2pr-24awg/dp/CB21473">https://cpc.farnell.com/pro-power/pp001165/shld-multipair-cable-2pr-24awg/dp/CB21473</a>
<b>ALPHA WIRE 6413 SL005</b> Multipair Cable, Communication, Screened, 2 Pair, 24 AWG, 0.23 mm <sup>2</sup> , 100 ft, 30.5 m	<b>1746265</b>	Farnell	<a href="https://uk.farnell.com/alpha-wire/6413-sl005/cable-24awg-2-pair-slate-30-5m/dp/1746265">https://uk.farnell.com/alpha-wire/6413-sl005/cable-24awg-2-pair-slate-30-5m/dp/1746265</a>
<b>Belden 9842NH</b> 2 Pairs, 4 Cores, 0.2 mm <sup>2</sup> , Screened, 24 AWG, 304m, Screened Shield, RS-485 Cable	<b>382-7381</b>	RS	<a href="https://uk.rs-online.com/web/p/twisted-pair-multicore-data-cable/3827381">https://uk.rs-online.com/web/p/twisted-pair-multicore-data-cable/3827381</a>

### Acuity Room Network

On the short-distance room network, the cable specification requires a twisted pair cable with screening. The characteristic impedance of the cable is not as critical due to the short lengths. The example cables for the building network are also suitable for use in the room network.

#### The key parameters are:

- 2 Pair
- 0.14-0.23 mm<sup>2</sup> (26-24 AWG)
- Screened cable

For example, the following cables are suitable for use.

Name	Supplier Part Number	Supplier	Link
<b>Alpha Wire B962024 GE321</b> Twisted Pair Data Cable, 2 Pairs, 0.14 mm <sup>2</sup> , 4 Cores, 26 AWG, Screened, 50m, Grey Sheath	<b>740-4917</b>	RS	<a href="https://uk.rs-online.com/web/p/twisted-pair-multicore-data-cable/7404917">https://uk.rs-online.com/web/p/twisted-pair-multicore-data-cable/7404917</a>
<b>ALPHA WIRE 5472L SL005</b> Multipair Cable, Communication, Screened, 2 Pair, 24 AWG, 0.22 mm <sup>2</sup> , 100 ft, 30.5 m	<b>1712528</b>	Farnell	<a href="https://uk.farnell.com/alpha-wire/5472l-sl005/cable-24awg-lszh-2-pair-30-5m/dp/1712528">https://uk.farnell.com/alpha-wire/5472l-sl005/cable-24awg-lszh-2-pair-30-5m/dp/1712528</a>

# HVR ZERO APX

## Wiring Guide

### Valid Network Topology

The Acuity building network must be wired in a bus topology, as shown in Figure 1. Failure to wire the building network correctly will result in the units being unable to communicate with the Acuity control panel.

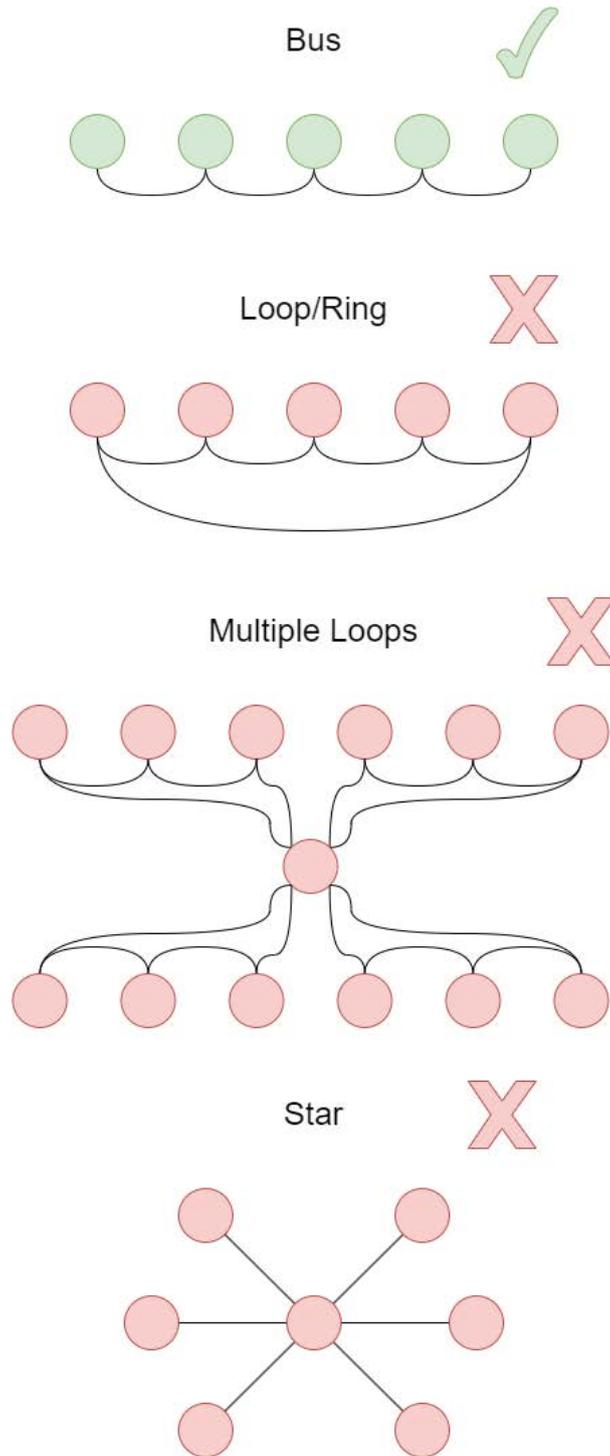


Figure 3 - MonoComms Building Network Topologies

# HVR ZERO APX

## Wiring Guide

### End-of-line Terminating Resistors

In addition to requiring a bus topology, the Acuity building network requires that 120ohm end-of-line terminating resistors are enabled on the first and last device on the bus. This is usually the Acuity control panel and a HVR APX device. If the acuity panel is not at one of the ends of the bus, then it can be two HVR APX devices. The end-of-line terminating resistors are independent of device type, so even if there are a mix of device types on the network (HVR Zero, HVR APX, Windcatcher Zero, etc.) it is still only the first and last devices on the network that require the end-of-line terminating resistor enabled.

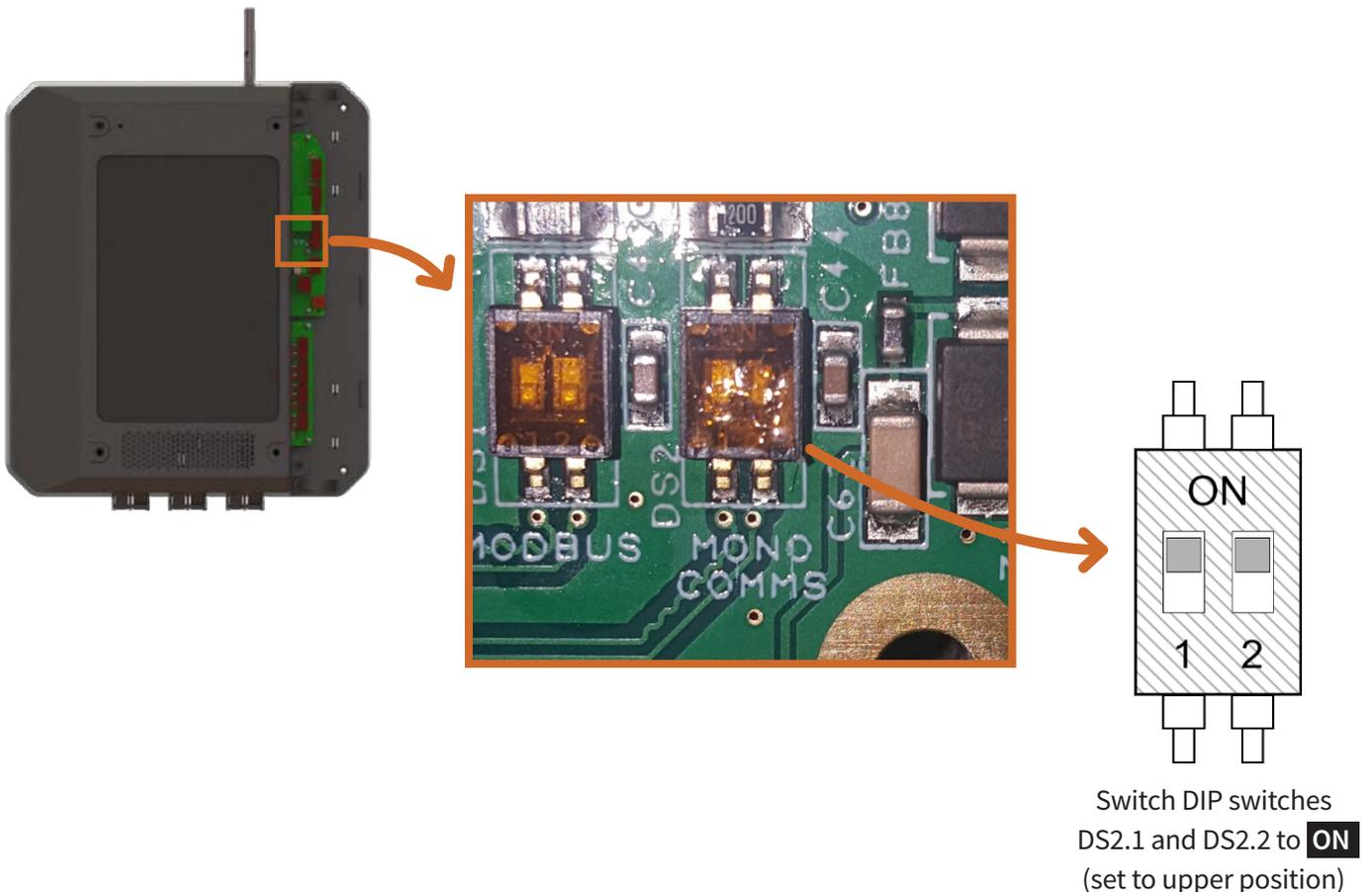


**Failure to enable the terminating resistors correctly will result in poor communication, and can lead to some or all of the devices failing to communicate with the Acuity panel.**

Each Acuity and HVR APX has a built-in end-of-line terminating resistor that can be enabled via DIP switches on the PCB. They can be found in the following locations:

#### Acuity (Green PCB):

The DIP switches are found on the topmost PCB beneath the right-hand panel of the Acuity unit. Use a flathead screwdriver to manipulate the switches if necessary.

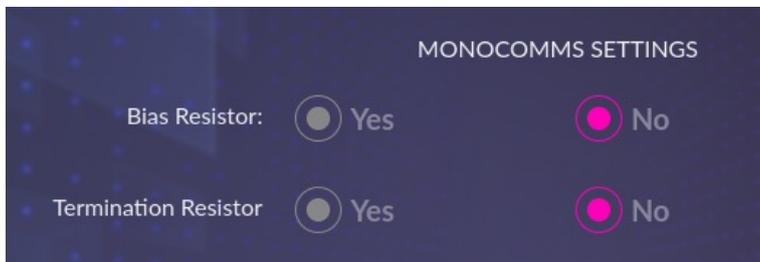


# HVR ZERO APX

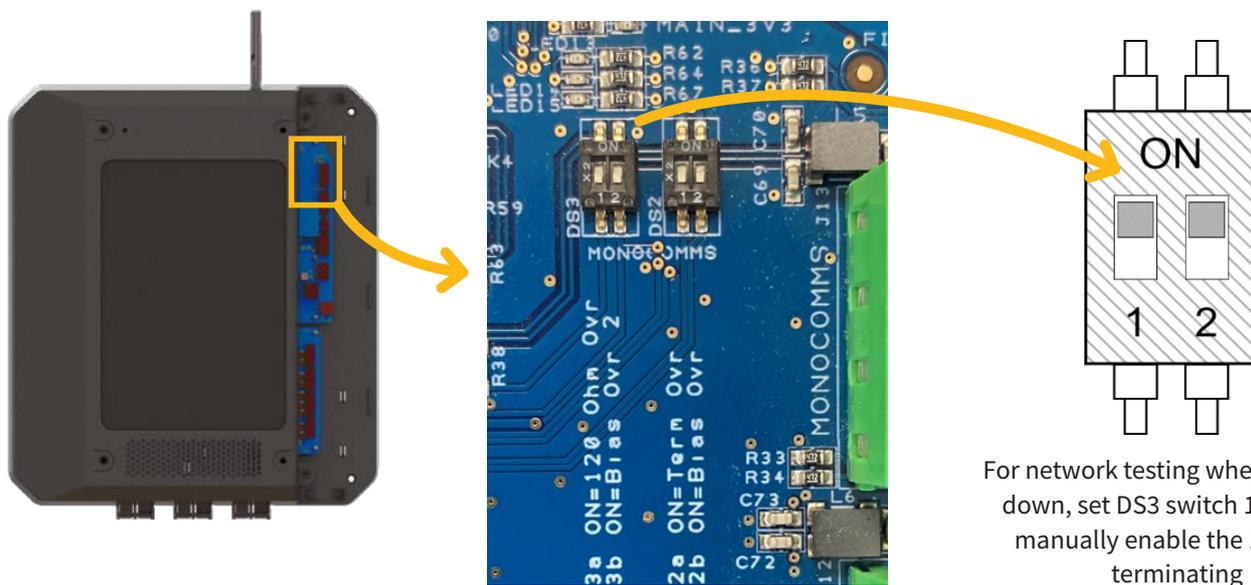
## Wiring Guide

### Acuity (Blue PCB):

The terminating resistor can be enabled in software via the screen, and can be found on the “Site Settings” tab within the commissioning setup screens.

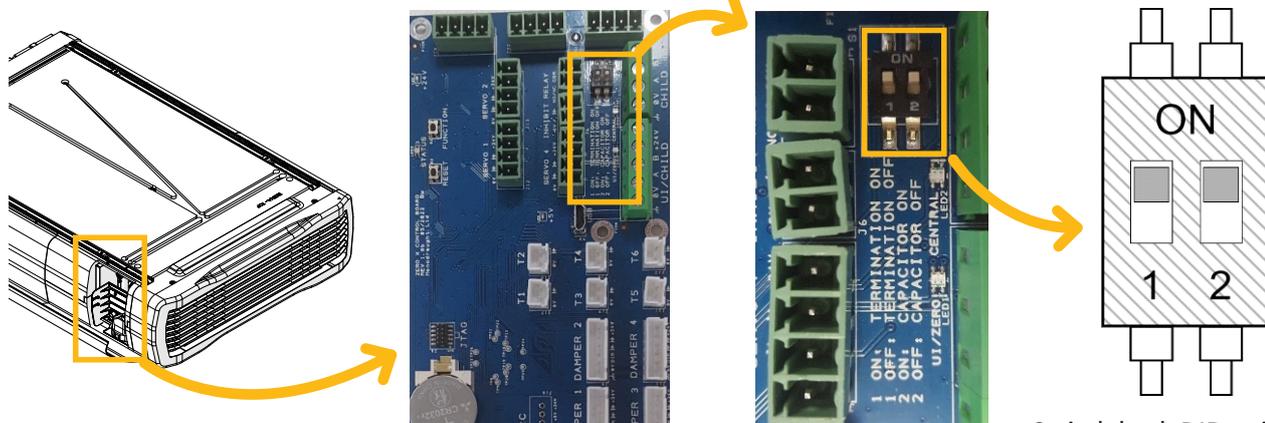


In addition, it can be manually enabled via a DIP switch on the Main Interface PCB in case the wiring needs to be tested with the unit powered down. The DIP switches are found on the topmost PCB beneath the right-hand panel of the Acuity unit. Use a flathead screwdriver to manipulate the switches if necessary.



For network testing when powered down, set DS3 switch 1 “ON” to manually enable the 120ohm terminating

### HVR APX PCB:



Switch both DIP switches (S1.1 and S1.2) to **ON**

# HVR ZERO APX

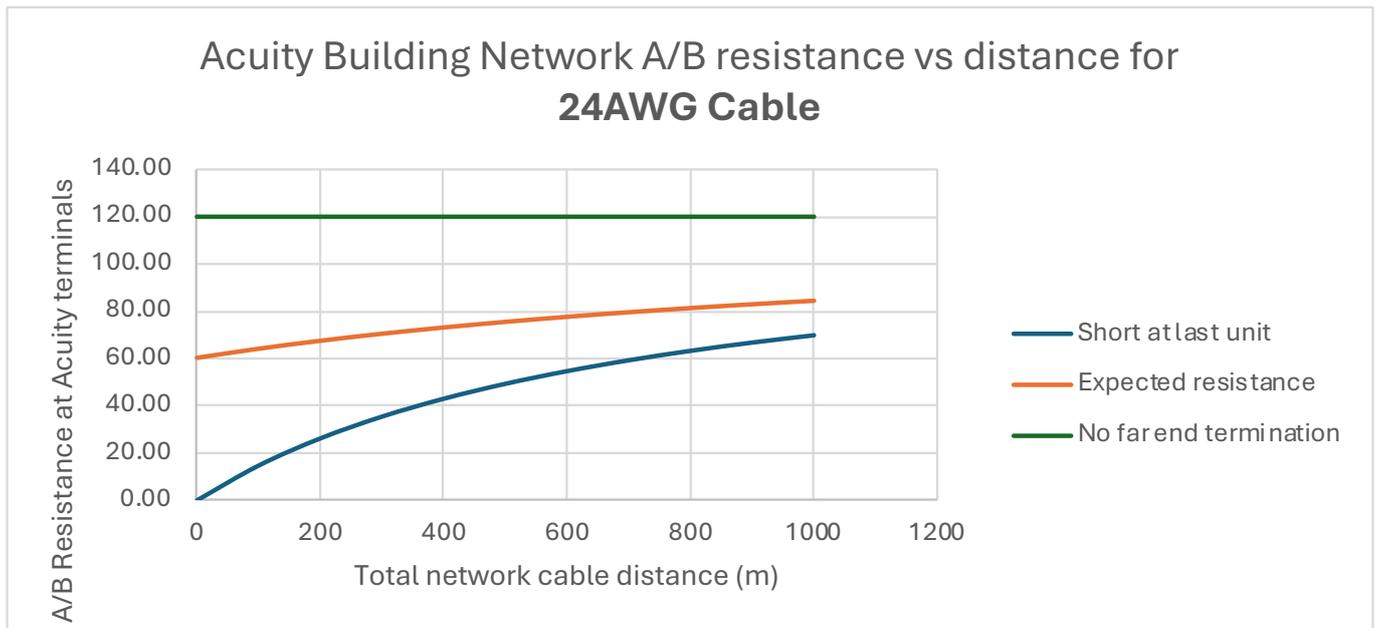
## Wiring Guide

### How to Verify Correct Building Network Wiring

When the terminating resistors have been enabled, it is quite simple to check that the Acuity building network wiring is correct using a multimeter. The resistance across the A and B terminals at a device which has the end-of-line terminating resistors enabled should measure approximately 60 to 85 ohms (Actual value varies in this range depending upon total length of building network cabling and size of cable used).

The following table shows a list of readings and what they mean:

Resistance between A & B terminals at Acuity	MonoComms building network state
0 - 59 ohms (or up to “short at last unit” value in graph below)	Short-circuit on cable. Fix wiring before retrying this test.
Open Circuit	Break/disconnect in cable, or no terminating resistors enabled. Check switches and/or fix wiring before retrying this test.
120 ohms	Break/disconnect in cable or only 1 end-of-line terminating resistor has been enabled. Check switches and/or fix wiring before retrying this test.
60-85 ohms (See graph below)	Cable OK! Record the resistance value and relay to the commissioning engineer.

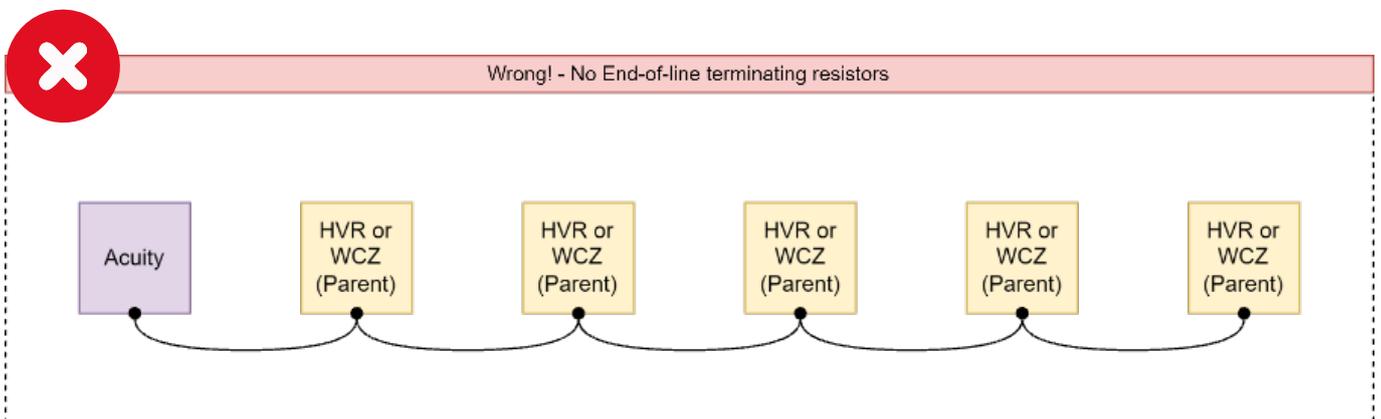
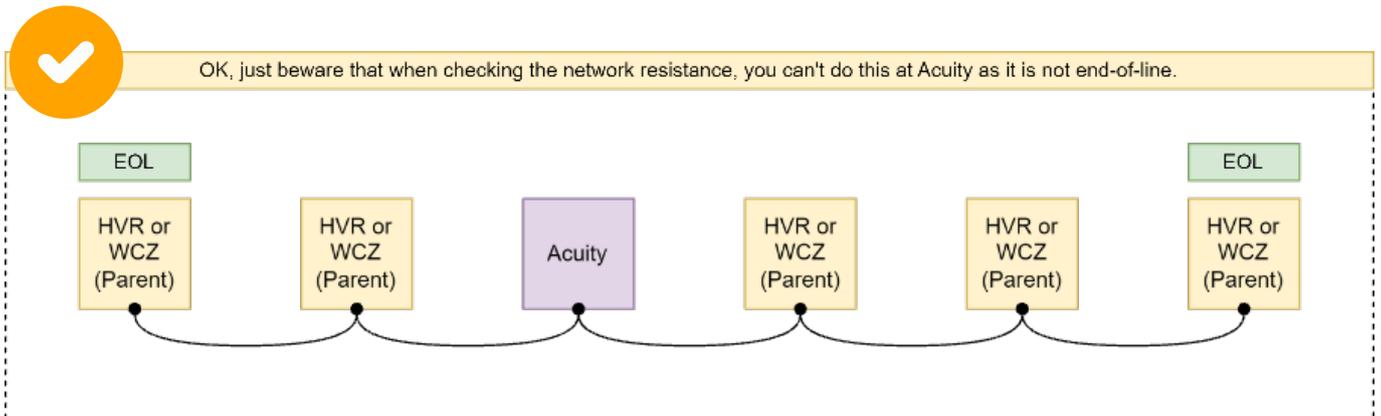
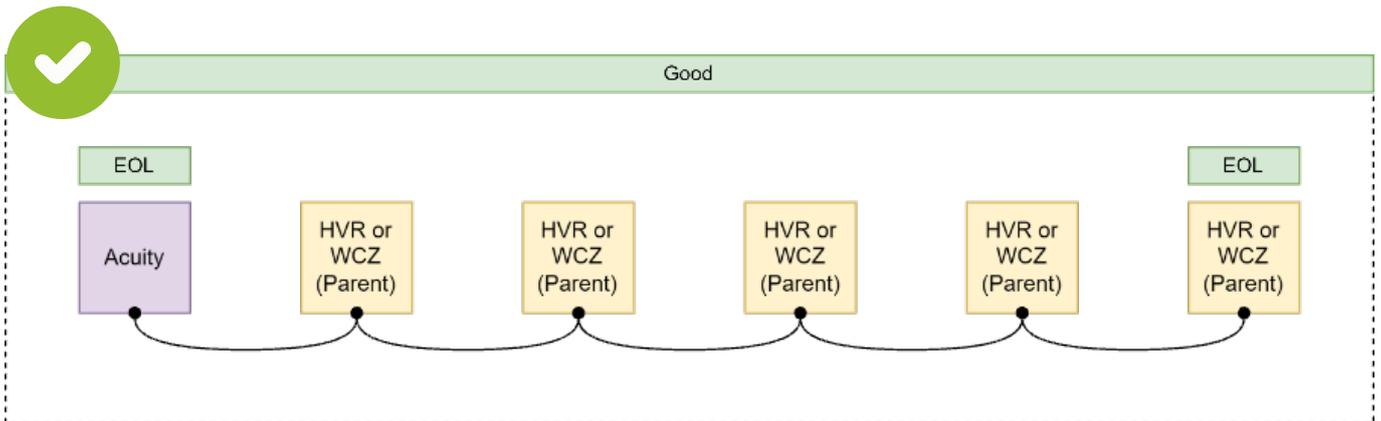


# HVR ZERO APX

## Wiring Guide

### Examples of Correct and Incorrect Building Network Wiring

The following diagrams show examples of correct and incorrect building network wiring, ranging from too many/few end-of-line terminating resistors, to incorrect wiring topologies along with some ways to modify the wiring so that it can work.

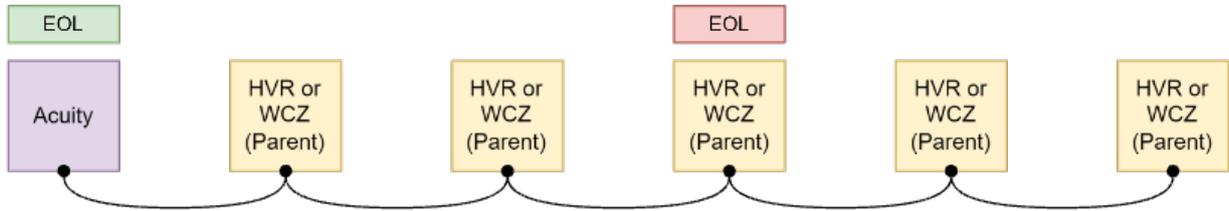


# HVR ZERO APX

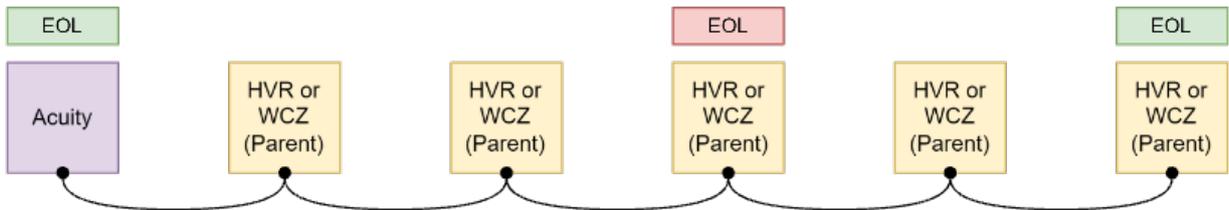
## Wiring Guide



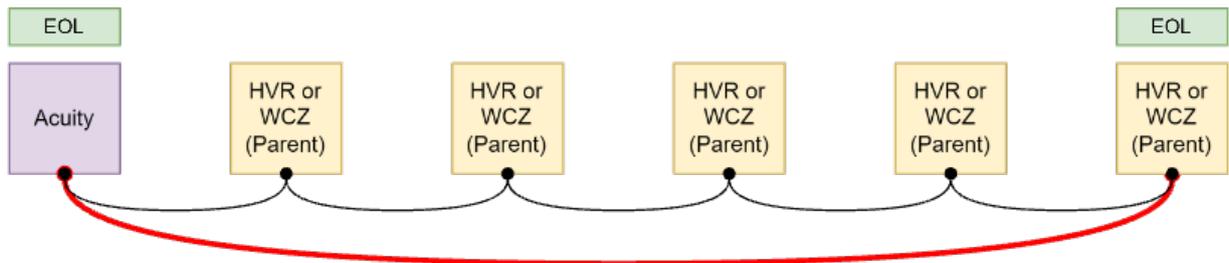
Wrong! - End-of-line terminating resistor not **ACTUALLY** at the end of line.



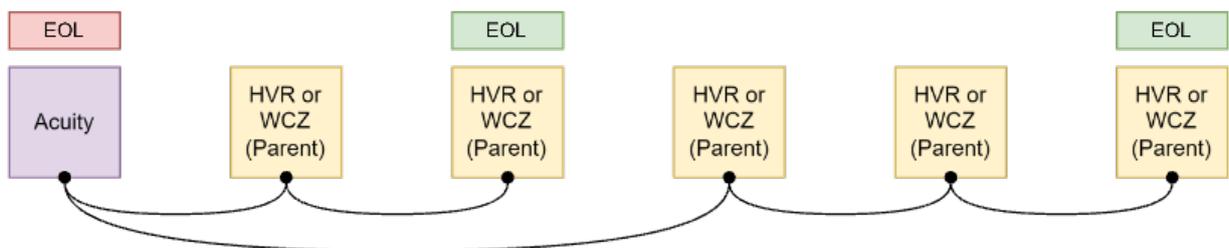
Wrong! - Additional end-of-line terminating resistor enabled. Network resistance will measure less than 60 ohms.



Wrong! - Network looped back to Acuity from end unit. This is **NOT** a bus network.



Wrong! - This is actually a bus network with Acuity mid-network. Remove the end-of-line resistor from Acuity => OK,

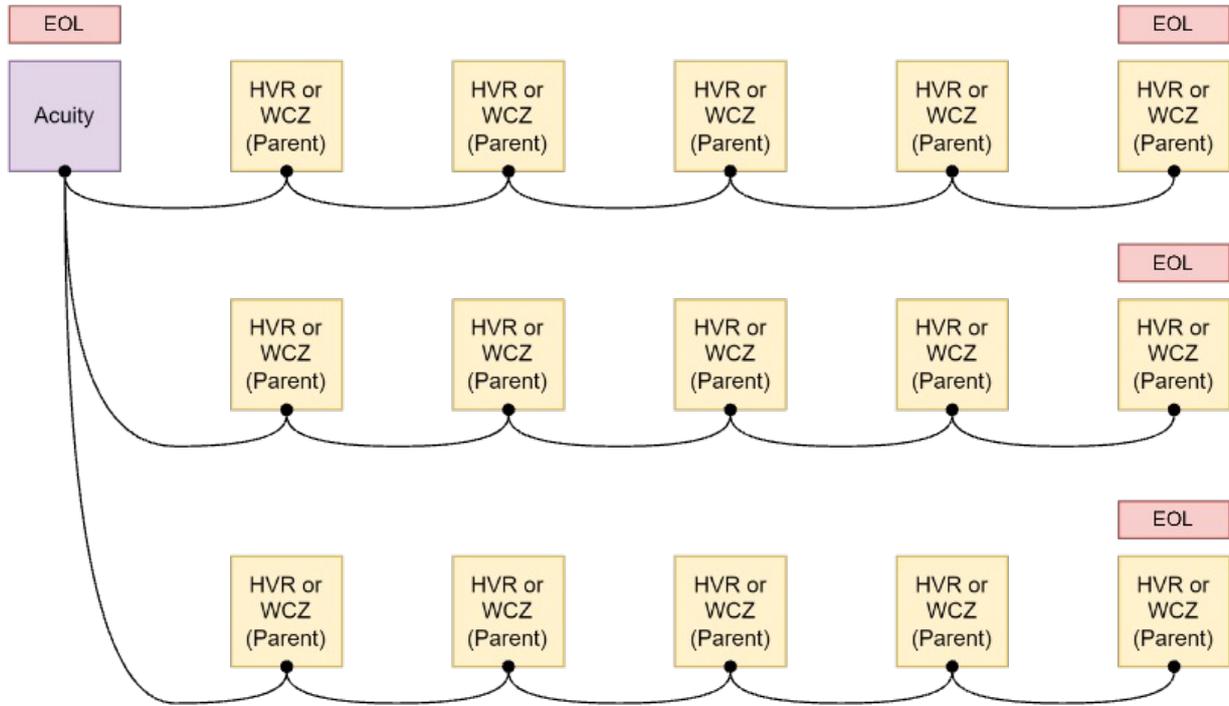


# HVR ZERO APX

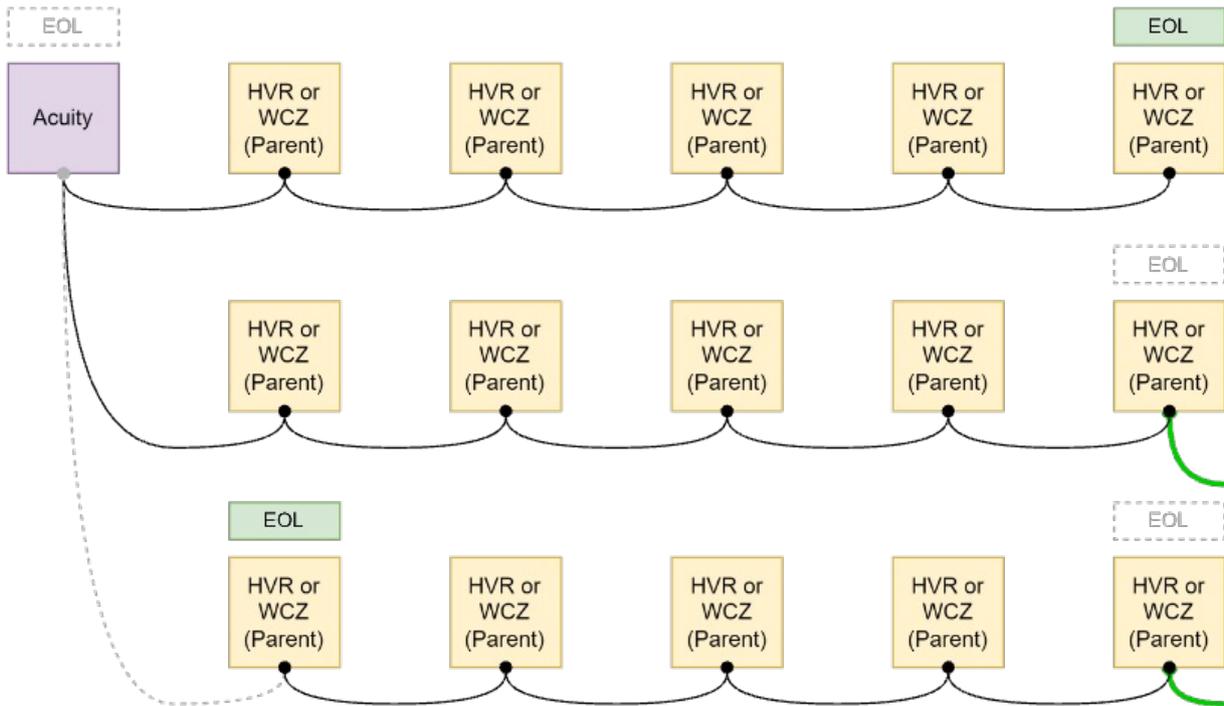
## Wiring Guide



Wrong! - This is a star network. It needs to be converted to a bus network.



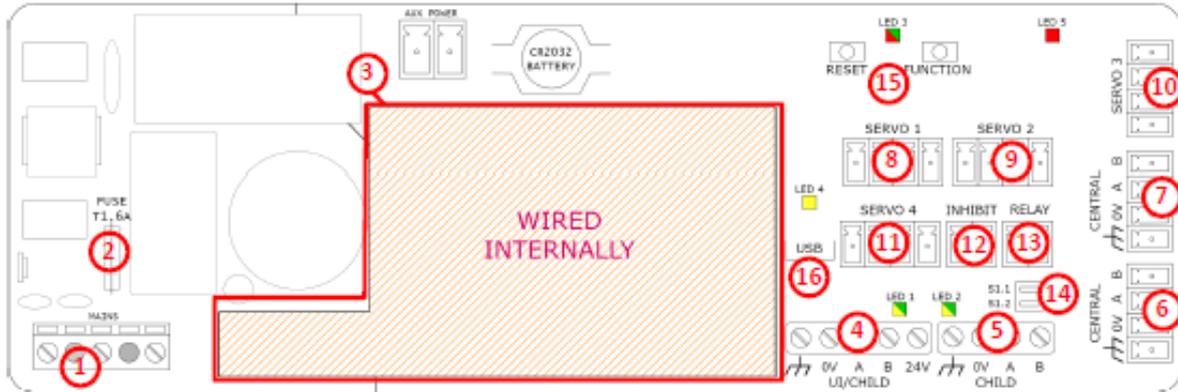
OK! - Conversion of star network to bus network.



# HVR ZERO APX

## Wiring Guide

### HVR APX Internal PCB connections



Ref	Name	Connector	Description
1	MAINS Power	3 Way Screw Terminal	Earth, Neutral, Live
2	Fuse	Cartridge fuse, 5x20mm	1.6A Time Delay Fuse, 250V, 5x20mm
3	Internal connections	Unit sensors, fan and actuators	Factory tested connections—Do No Touch
4	UI/CHILD	5 Way Screw Terminal	Data, 0V, Shield and 24VDC for Child HVR or UI
5	CHILD	4 Way Screw Terminal	Data, 0V and Shield for child HVR
6	CENTRAL	3.81mm 4 Way Plug Terminal	Data, 0V and Shield to Acuity or other Parent units
7	CENTRAL	3.81mm 4 Way Plug Terminal	Data, 0V and Shield to Acuity or other Parent units
8	SERVO 1	3.81mm 4 Way Plug Terminal	Power, control (0-10VDC) and feedback(0-10VDC)
9	SERVO 2	3.81mm 4 Way Plug Terminal	Power, control (0-10VDC) and feedback(0-10VDC)
10	SERVO 3	3.81mm 4 Way Plug Terminal	Power, control (0-10VDC) and feedback(0-10VDC)
11	SERVO 4	3.81mm 4 Way Plug Terminal	Power, control (0-10VDC) and feedback(0-10VDC)
12	INHIBIT	3.81mm 2 Way Plug Terminal	Inhibit input (Normally closed) for enabling/disabling unit
13	RELAY	3.81mm 2 Way Plug Terminal	General purpose volt-free contact (Relay output)
14	DIP SWITCH S1	2 way DIP Switch	Acuity/HVR Network End-of-line termination*
15	RESET & FUNCTION	Microswitches	Enables reset of unit and bootloader functions
16	USB Connection	USB micro-B	Used in commissioning process only
Label	Name	Description	
LED 1	UI/Zero	Blinking Yellow—Incoming Data Solid Yellow — Wiring Fault	Blinking Green—Outgoing Data
LED 2	Central	Blinking Yellow—Incoming Data Solid Yellow — Wiring Fault	Blinking Green—Outgoing Data
LED 3	Status	Green—Blinks every half second Solid Red—Firmware Fault, Fast flashing Red—2nd Stage Bootloader, No LEDs—Off or int 1st stage bootloader/programming mode	
LED 4	5V	Shows 5V is present	
LED 5	24V	Shows 24V is present	

\* Switches Off = no terminator; Switch 1 On = RC terminator; Switches 1&2 On = 120Ω terminator

# HVR ZERO APX

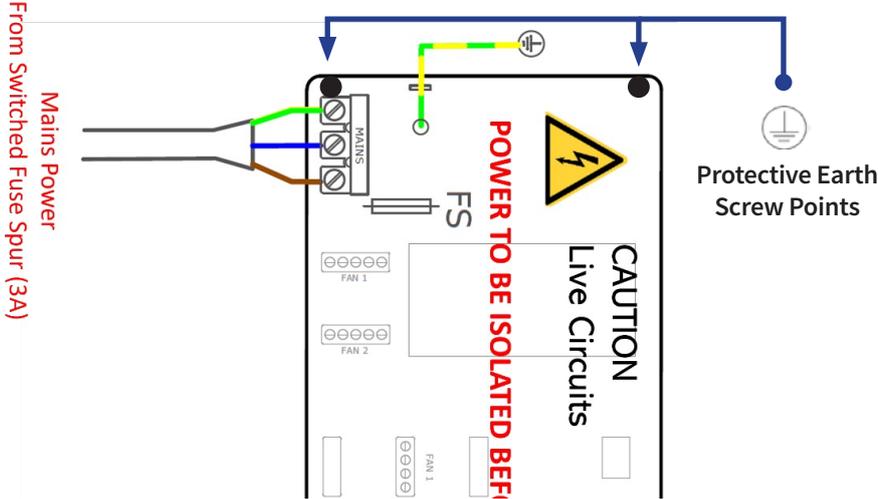
## Wiring Guide

### HVR APX Standard Connection Details

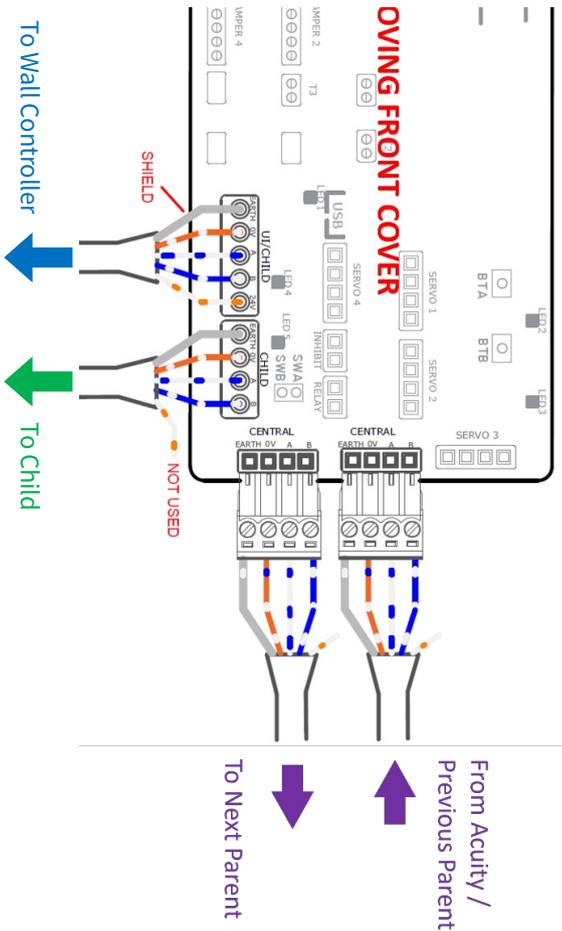
#### Mains Power Connection



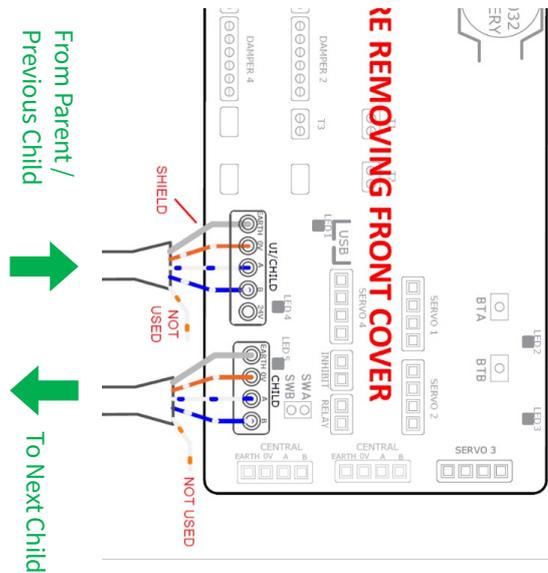
**Danger**  
Live electrical equipment



#### Parent PCB Network Connections



#### Child PCB Network Connections

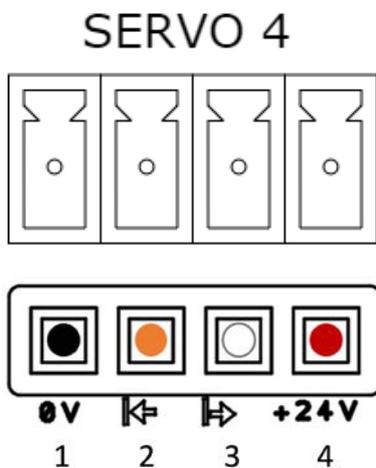


# HVR ZERO APX

## Wiring Guide

### Heating/Cooling Valve Actuator Connections

HVR APX units use an electronic valve actuator to control the supply of hot/cold water to the internal coil for heating/cooling purposes. They require a 24V DC modulating actuator that takes a 0-10V control signal (2-10V control signal is also acceptable). HVR APX can support a feedback signal for additional monitoring/fault detection. For 2-pipe coil units, this typically wires into Servo 4 on the internal PCB. For 4-pipe coil units, the 2nd valve actuator is typically wired into Servo 3.



Pin No	Typical Wire Colour	Functionality
1	● Black	Ground
2	● Orange	Actuator Feedback (Optional)
3	○ White	Actuator Control
4	● Red	+24V DC Power

#### Number of actuators per unit

Monodraught recommend a 1:1 ratio of valve/actuator per HVR APX unit. Depending upon flowrates, a 1 actuator per 2 HVR APX can be supported. In this case, the valve actuator **MUST** be wired to the **Parent** HVR APX unit so that heating/cooling operational logic is performed correctly. Additionally, when 1 actuator is used for multiple units, Monodraught recommends the flow is balanced between units to ensure correct operation.

### External Damper Wiring

The External Damper for HVR APX is a separate part that fits to the façade and the louvre to ensure air tightness, which is then connected directly or via spacers/ductwork to the HVR APX unit. If the distance between the back of HVR APX and the external damper is more than 250mm, then an extension cable will be needed. The extension cable is 2m in length.

# HVR ZERO APX

## Wiring Guide

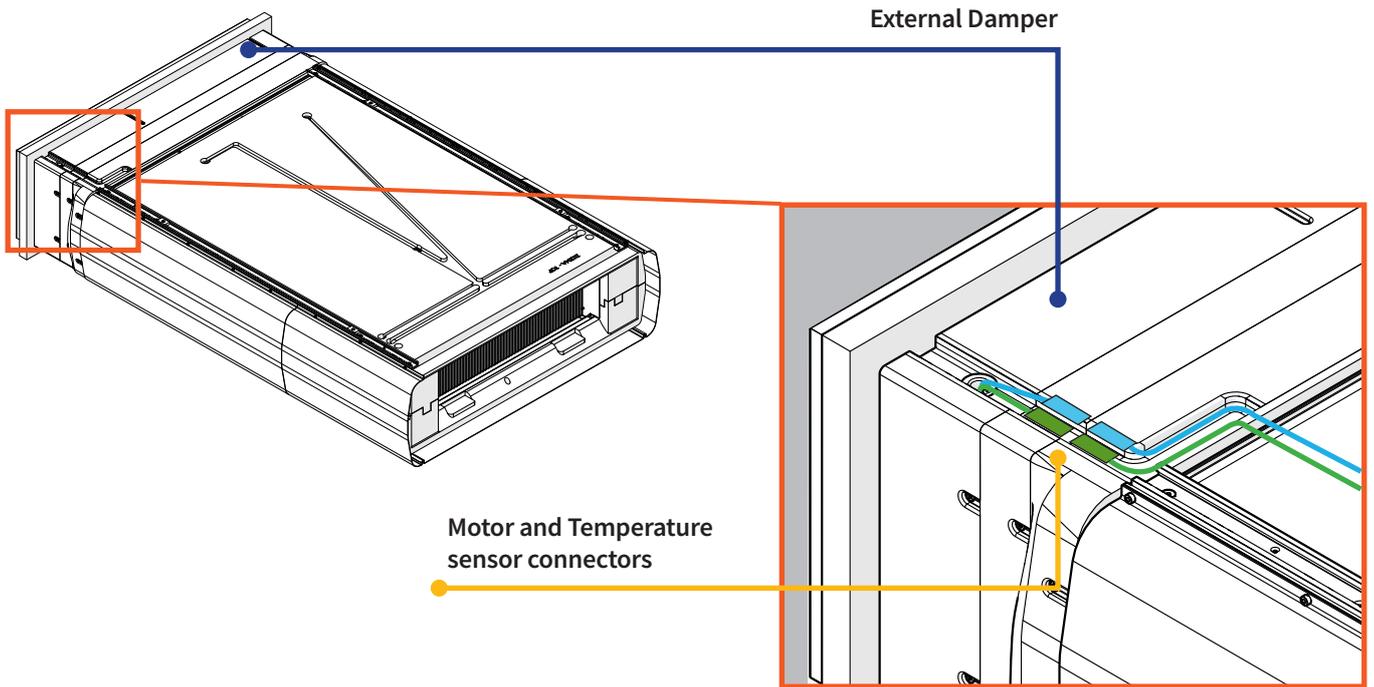


Figure 4 – External Damper to HVR APX unit – Direct connection

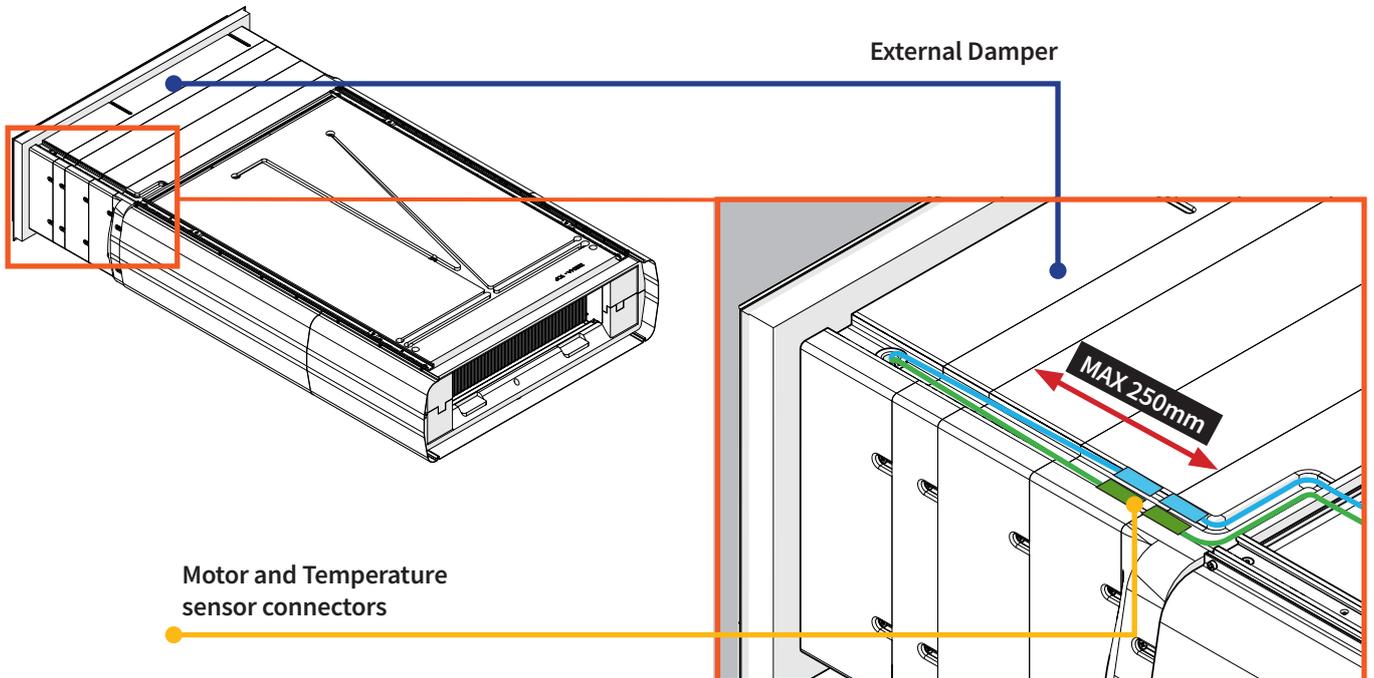


Figure 5 – External Damper to HVR APX unit – Less than 250mm of spacers

Run cable from the external damper along the channel to the wiring loom and connect it to the unit.  
Use cable extensions if needed for longer distances up to 2.5m.

# HVR ZERO APX

## Wiring Guide

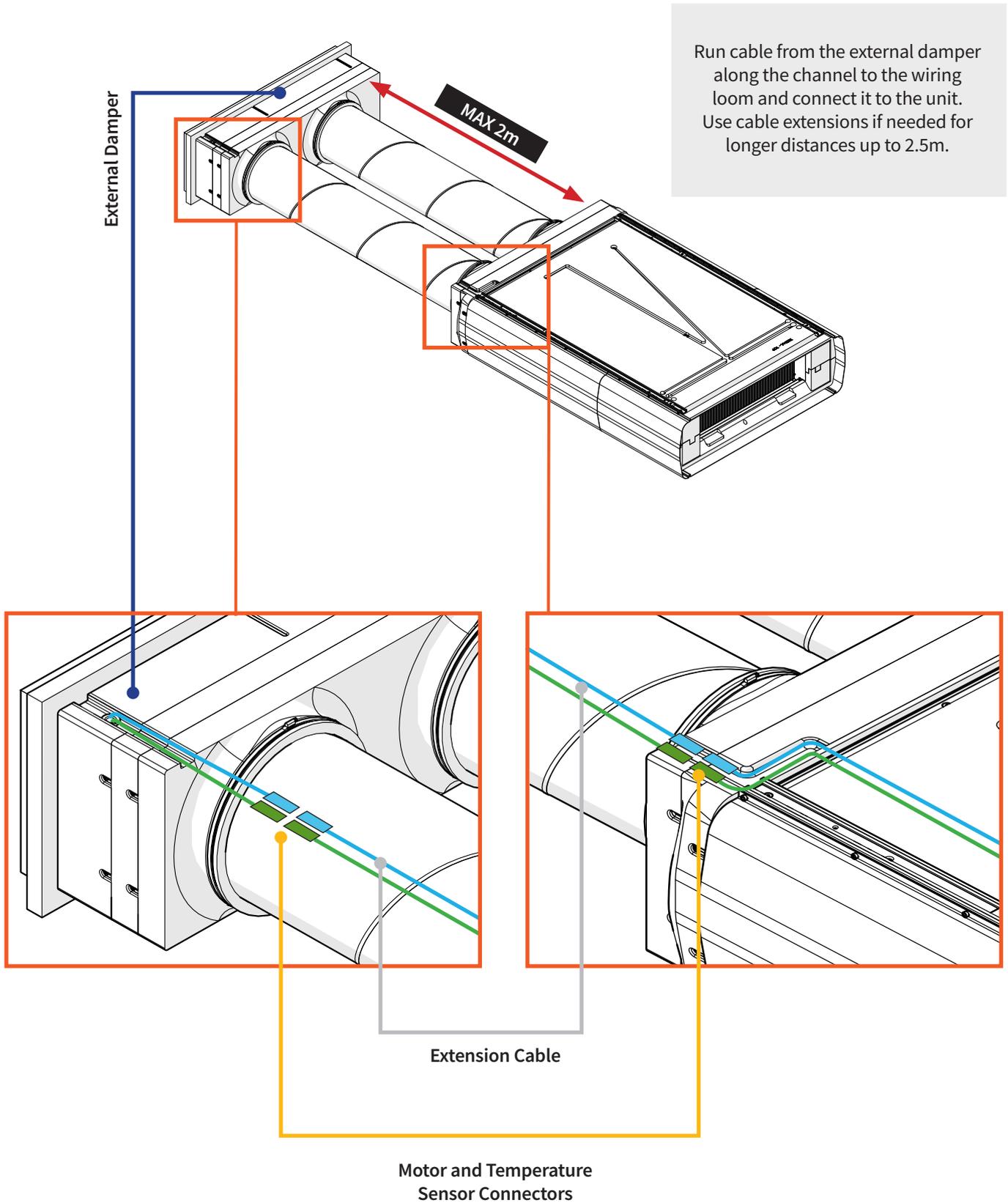


Figure 6 – External Damper to HVR APX unit - Ducted

# HVR ZERO APX

## Wiring Guide

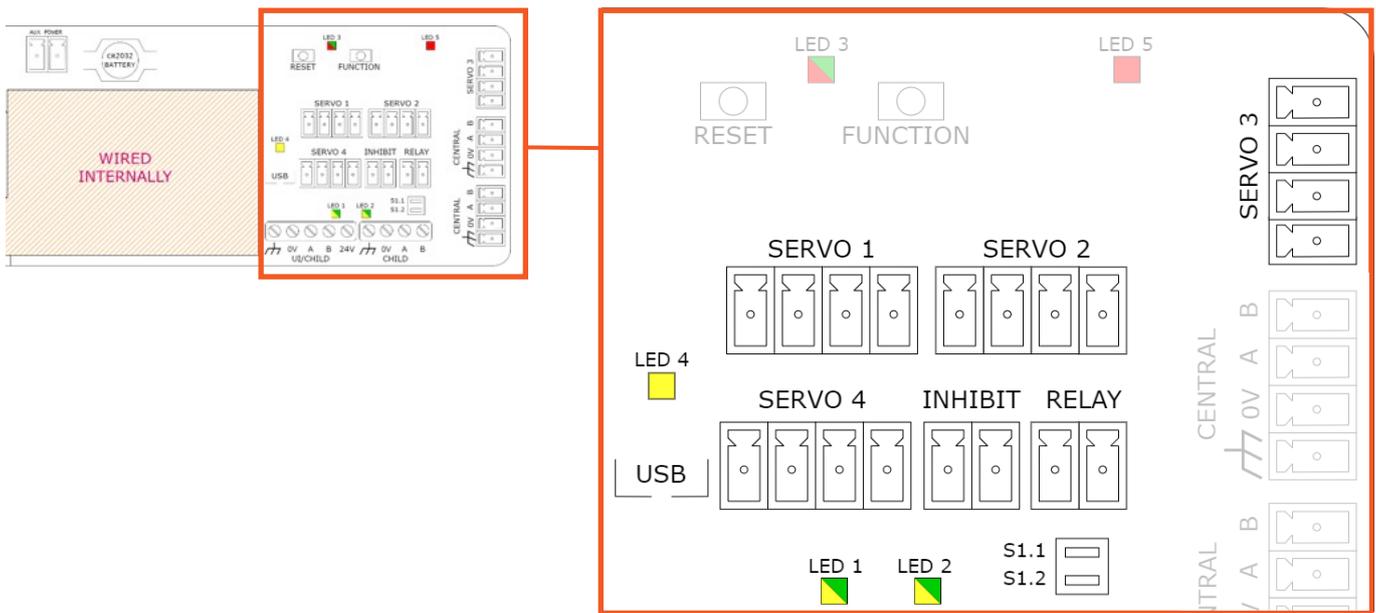
### Grille connection (For exposed units only)

The front grille assembly contains a motorised damper which needs to be connected to the main HVR APX unit. These connections are found on the underside of the unit and grille and need to be connected when installing the front grille assembly. The installation guide shows this in more detail.

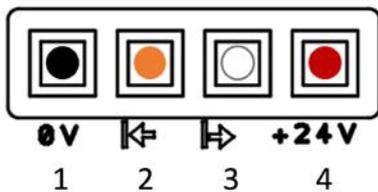
## HVR APX Optional Connections

### Servo, Relay and Inhibit Connections

HVR Zero contains 4x Servo connections, 1x Relay output connection and 1x Inhibit input. The “Servo x” connections provide 24V DC power to connected devices, as well as a 0-10V output signal and 0-10V feedback signal. The “Relay” connection is a volt-free contact providing a number of different output signals. The “Inhibit” is a volt-free input that can be used to disable the device. The different servo, relay and inhibit functions can be enabled and configured during commissioning. The typical configuration for each type of auxiliary connection can be found below.



### Ventsair Louvre Servo Connection (Typically on Servo 1)

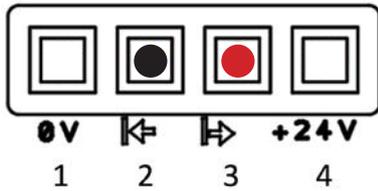


Pin No	Wire Colour	Functionality
1	Black	Ground
2	Orange	Damper Feedback
3	White	Damper Control
4	Red	+24V DC Power

# HVR ZERO APX

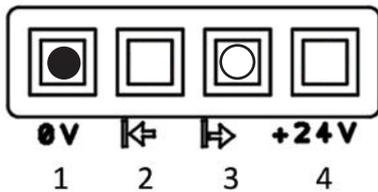
## Wiring Guide

### Gas Proving Device Servo Connection (Typically on Servo 3)



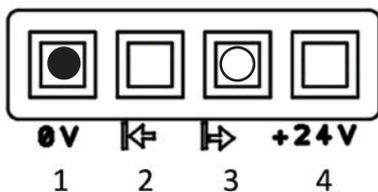
Pin No	Wire Colour	Functionality
1		
2	Black	10V Feedback
3	Red	10V Output
4		

### Aux Cooling Servo Connection (Typically on Servo 2)



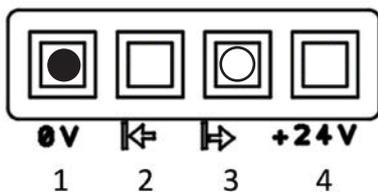
Pin No	Wire Colour	Functionality
1	Black	0V Reference
2		
3	White	Output (10V = On, 0V = Off)
4		

### Aux Heating Servo Connection (Typically on Servo 1)



Pin No	Wire Colour	Functionality
1	Black	0V Reference
2		
3	White	Output (10V = On, 0V = Off)
4		

### Fault Servo Connection

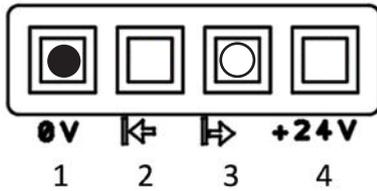


Pin No	Wire Colour	Functionality
1	Black	0V Reference
2		
3	White	Output (10V = Fault, 0V = OK)
4		

# HVR ZERO APX

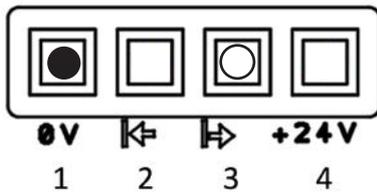
## Wiring Guide

### Heat pump On/Off Servo Connection (Typically on Servo 1)



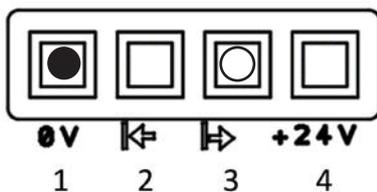
Pin No	Wire Colour	Functionality
1	Black	0V Reference
2		
3	White	Output (10V = On, 0V = Off)
4		

### Heat pump Heat/Cool Servo Connection (Typically on Servo 2)



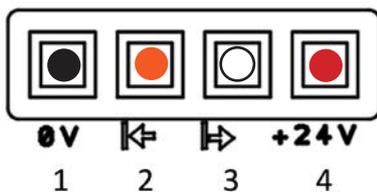
Pin No	Wire Colour	Functionality
1	Black	0V Reference
2		
3	White	Output (10V = Heating, 0V = Cooling)
4		

### Duct Heater Servo Connection (Typically on Servo 4)



Pin No	Wire Colour	Functionality
1	Black	0V Reference
2		
3	White	Output (10V = On, 0V = Off)
4		

### External Exhaust Damper Servo Connection (Typically on Servo 1)

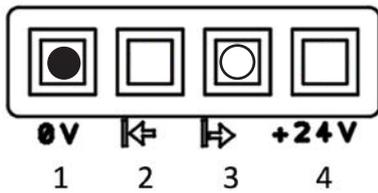


Pin No	Wire Colour	Functionality
1	Black	Ground
2	Orange	Damper Feedback
3	White	Damper Control
4	Red	+24V DC Power

# HVR ZERO APX

## Wiring Guide

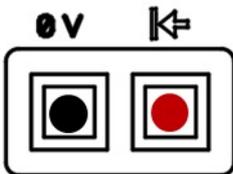
### Aux Seasonal Servo Connection (Typically on Servo 1)



Pin No	Wire Colour	Functionality
1	Black	0V Reference
2		
3	White	Output (10V = On, 0V = Off)
4		

### Inhibit Input (System Enable/Fire Interlock)

The inhibit input allows a BMS or Fire Alarm system to enable/disable the HVR APX unit. It requires a volt-free normally closed contact to enable the system and will inhibit the system (turning off the fan and closing the dampers) if open-circuited. This is the preferred method of inhibiting a HVR APX unit.

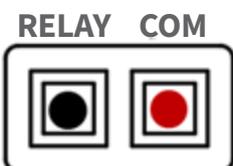


Pin No	Wire Colour	Functionality
1	Black	0V
2	Red	Input (Normally Closed)

### Relay Output

The relay output can be configured to perform several different functions at commissioning. It is a volt-free contact rated at 24V, 0.1A. **Do not use 240V with this output as it will damage the electronics.**

Output Function	Output Type	Description
Fault	Normally Closed	A fault in the unit will trigger the relay to open
Aux Heating	Normally Open	Auxiliary heating output that can be used to indicate additional heating is needed.
Aux Cooling	Normally Open	Auxiliary cooling output that can be used to indicate additional cooling is needed.
Aux Seasonal	Normally Open	Auxiliary output that can be used to indicate additional heating or cooling is needed. Can be used with AC systems to help keep the room temperature within a required band.



Pin No	Typical Wire Colour	Functionality
1	Black	0V
2	Red	Input (Normally Closed)

# HVR ZERO APX

## Wiring Guide

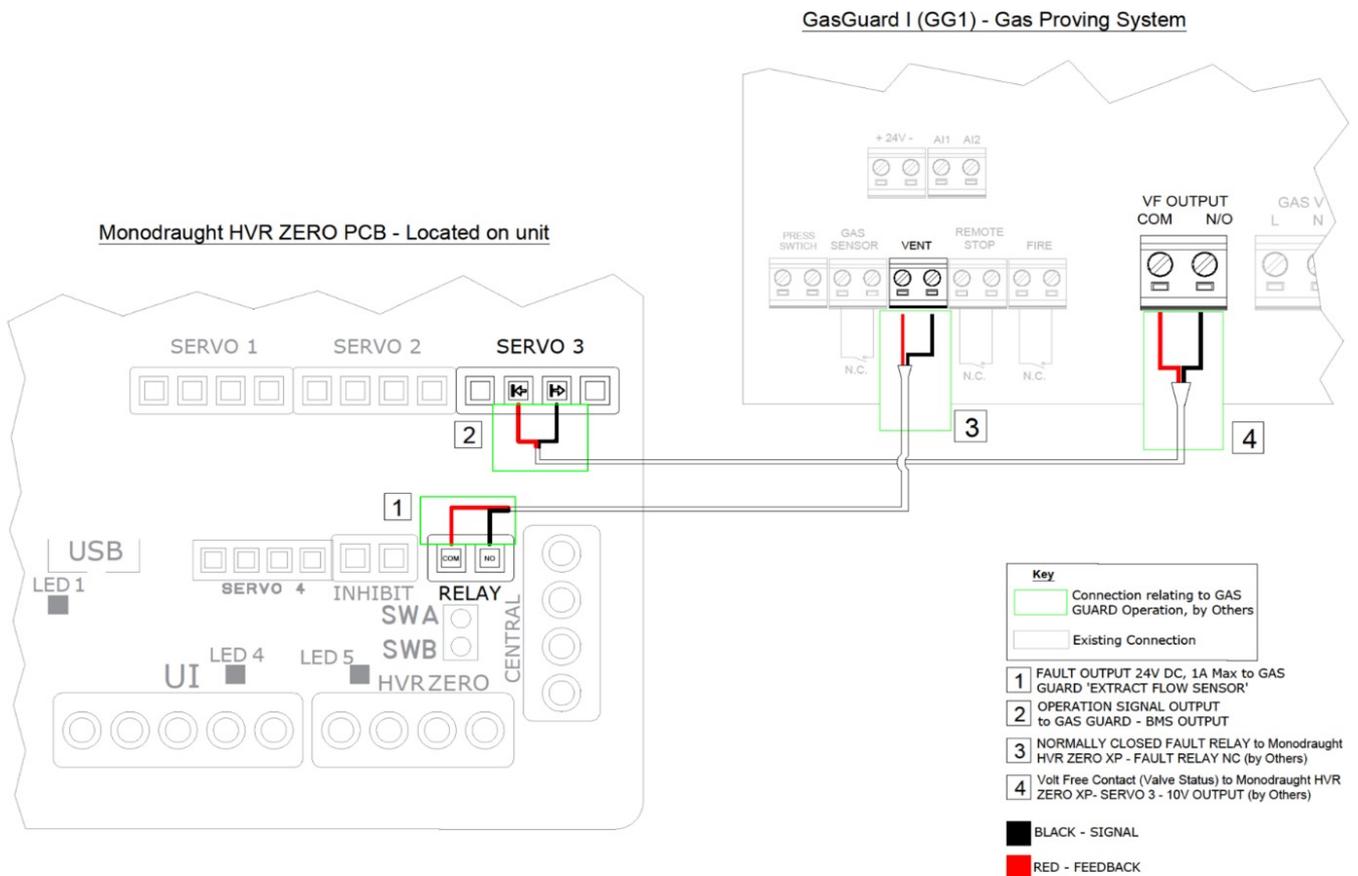
### Science Mode

Science mode is used to ensure a minimum ventilation rate or external air is introduced into a room for times when this is required, such as when using Bunsen burners.

The HVR APX can be wired together with a gas proving device to automatically enable science mode when the gas supply to the room is enabled. HVR APX requires a volt-free output from the gas proving device which is triggered when the gas valve is open. This is wired into a servo port configured for science mode. The HVR APX can then send a “System OK” signal back to the gas proving device via the relay output, allowing the gas proving device to shut off if there is an issue with the ventilation supplied by the HVR APX.

There are 2 example wiring diagrams for Gas Guard 1 and Merlin 1000V units, but other gas proving devices can be used.

### GasGuard I (GG1) Wiring Details



# HVR ZERO APX

## Wiring Guide

### MERLIN 1000V Wiring Details

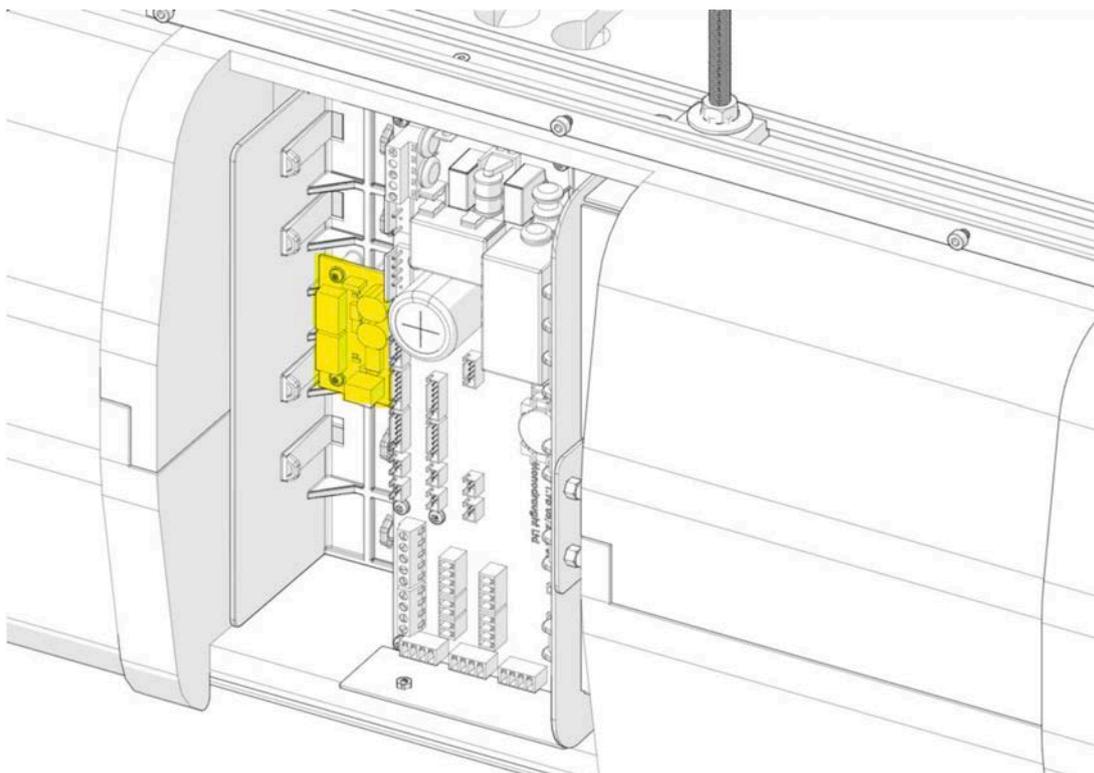
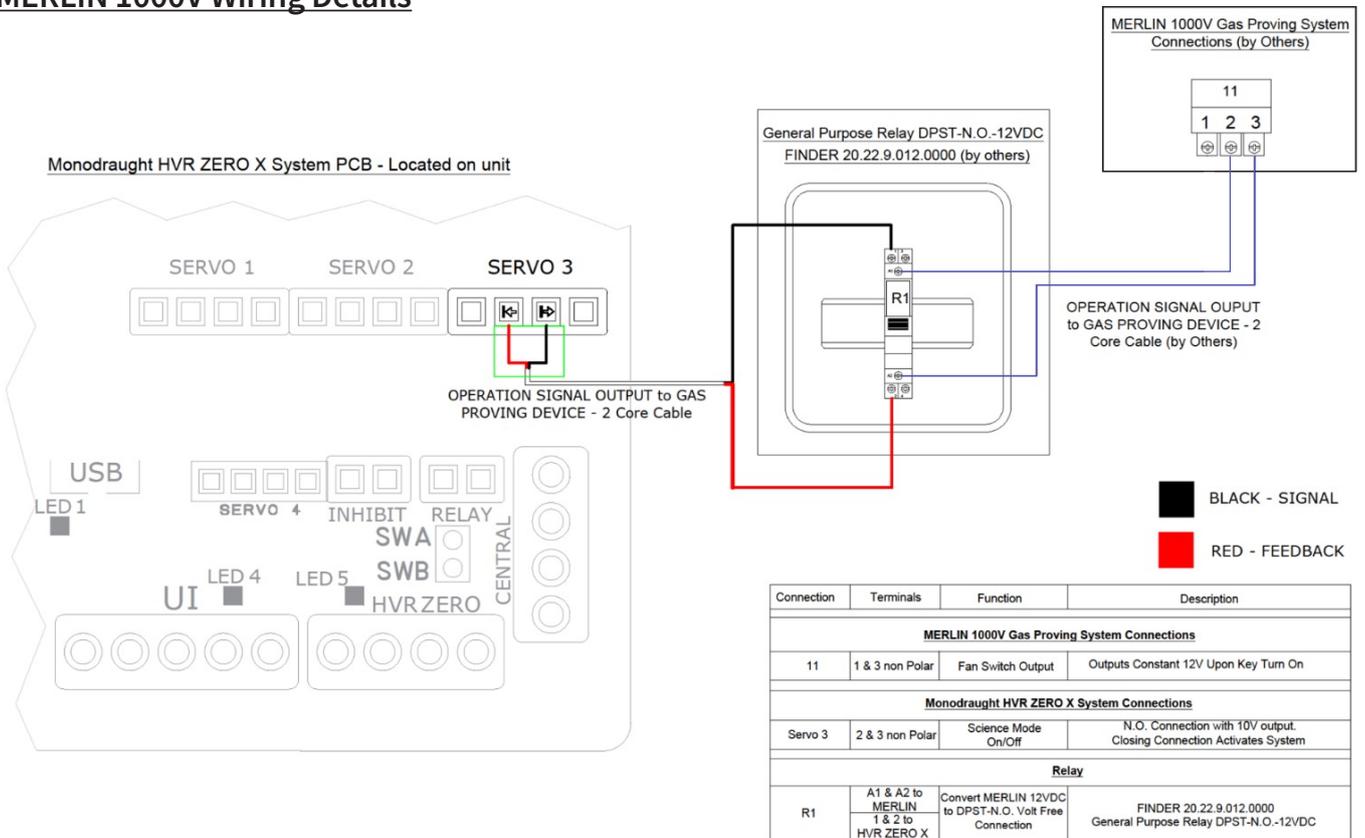


Figure 7 - Converter PCB location on APX

# HVR ZERO APX

## Wiring Guide

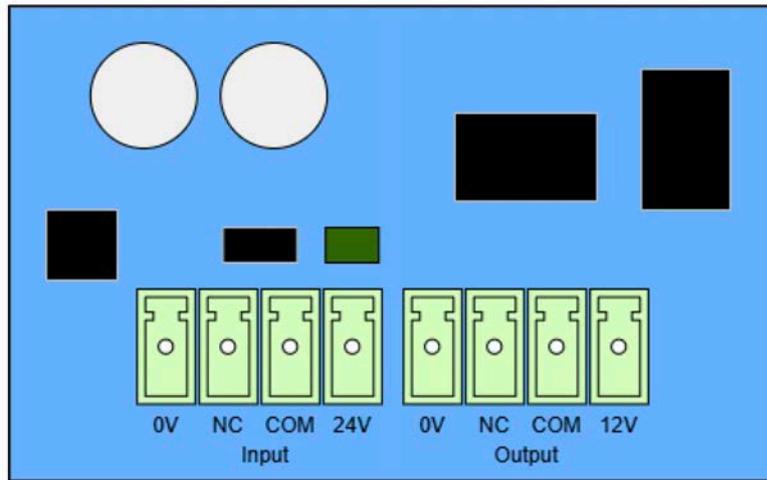
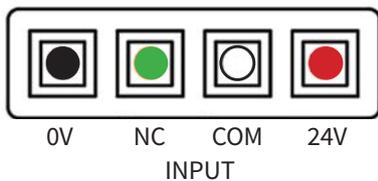
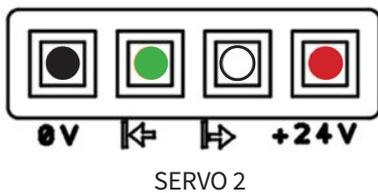


Figure 8 - Condensate Pump Converter PCB

### Wiring Condensate Pump Converter PCB into Main PCB

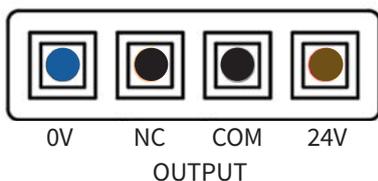
Using the “COND” cable provided with the Condensate Pump Converter PCB, connect one end to a Servo port on the APX PCB (typically Servo 2) and connect the other end to the “Input” port on the Converter PCB.



Pin No	Wire Colour	Functionality
1	Black	0V Reference
2	Green	Feedback (normally closed)
3	White	COM
4	Red	24V DC Power

### Wiring Condensate Pump into Condensate Pump Converter PCB

Once the Condensate Pump Converter PCB has been connected, plug the Condensate Pump cable into the “Output” port of Converter PCB.



Pin No	Wire Colour	Functionality
1	Blue	0V Reference
2	Black	Feedback (normally closed)
3	Black	COM
4	Brown	24V DC Power

# HVR ZERO APX

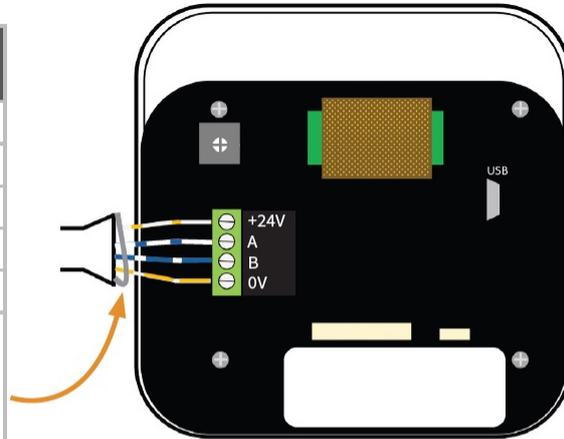
## Wiring Guide

### Modena Wiring Details

#### Connection Details

Typical Wire Colour	Pin Title
White with orange specks	+24V
White with blue specks	A
Blue with white specks	B
Orange with white specks	0V
Shield - Grey (if present)	None*

\* Excess shield should be wrapped around other wires and taped with electrical tape. Care must be taken to avoid any uncovered strands.



Insert grommet to cable entry point **PRIOR TO** feeding cable through



#### NOTES ON MODENA INSTALLATION

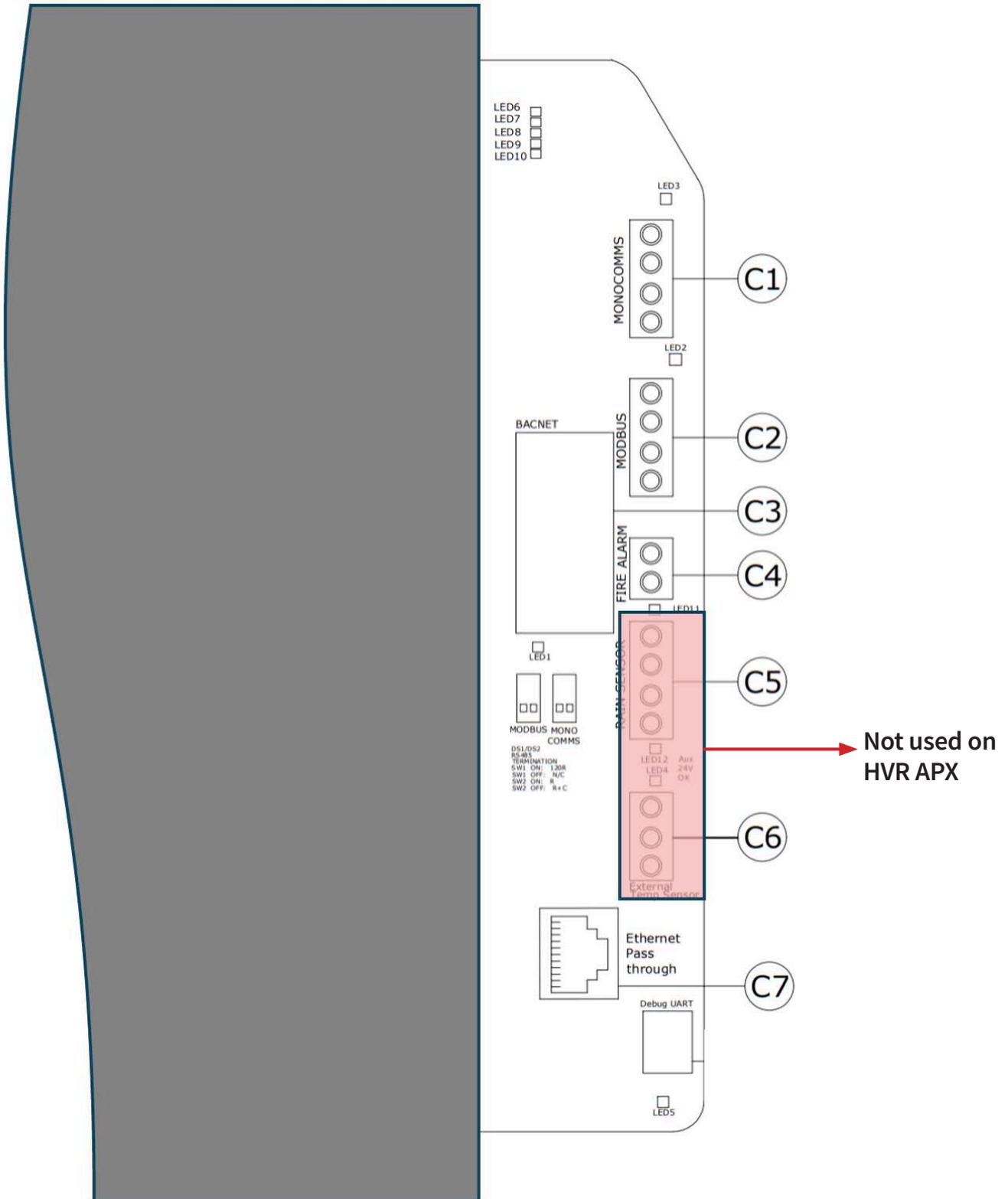
- The wall controller should be mounted between 1.2m and 2.1m above floor level.
- As the controller contains a temperature sensor, care should be taken to ensure it is not mounted in locations with unusual temperature profiles e.g. above heat sources, draughty areas, in direct sunlight.
- Avoid placing the wall controller in a direct air path coming out of a HVR APX unit. This will cause room temperature measurement errors.
- If the connected cable is shielded, ensure that the shield is wrapped around the used cables and covered with electrical tape. Take care to ensure there are no stray strands still loose.
- Apply the grommet to the back piece **before** feeding the cable through or affixing the piece to the wall.

# HVR ZERO APX

Wiring Guide

## Acuity Wiring Details

Main Interface PCB Connections



# HVR ZERO APX

## Wiring Guide

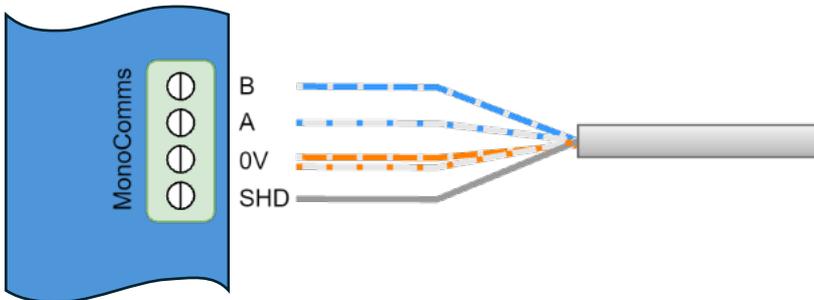
No.	Connector	Description
C1	5mm pitch 4-way Screw Terminal 16 AWG Max	MonoComms Port (Building-wide network to HVR Zero units)
C2	5mm pitch 4-way Screw Terminal 16 AWG Max	Modbus Port
C3	RJ45	BACnet/IP Module
C4	5mm pitch 2-way Screw Terminal 16 AWG Max	Fire alarm interlock to disable systems in case of fire
C5	5mm pitch 4-way Screw Terminal 16 AWG Max	Rain sensor connection
C6	5mm pitch 3-way Screw Terminal 16 AWG Max	External temperature sensor connection
C7	RJ45	Ethernet connection as back-up connection (in case 4G connection not available)



**Not used on HVR APX**

### Acuity Building Network Connection (C1)

This connection must use a differential pair for the A/B signals.



#### Connection Details

Connection	Typical Wire Colour
B	Blue with White specks
A	White with Blue specks
0V	White with Orange specks & Orange with White specks
Shield Icon	Shield - Grey

### BMS Interfaces (C2 & C3)

The status of the HVR APX units can be monitored by a BMS system via the iNvent Acuity control panel. It can connect via Modbus RTU (C2) or BACnet/IP (C3), but the level of information and control available is greater via Modbus. See the Acuity product literature for more information.

### Fire Interlock (C4)

The Fire interlock can be used to send a signal to all HVR APX units to go into “Fire Mode” where they will turn off the fans and close their dampers. The network cabling used to communicate between Acuity and HVR APX isn’t fire rated.

# HVR ZERO APX

## Wiring Guide

### Ethernet Interface (C7)

If a 4G signal cannot be established, or higher reliability remote monitoring is required, the ethernet port on Acuity can be connected to a network with internet access. It will automatically acquire an IP address via DHCP and is up to the IT operator at the site to set this up if needed.

### Digital I/O PCB

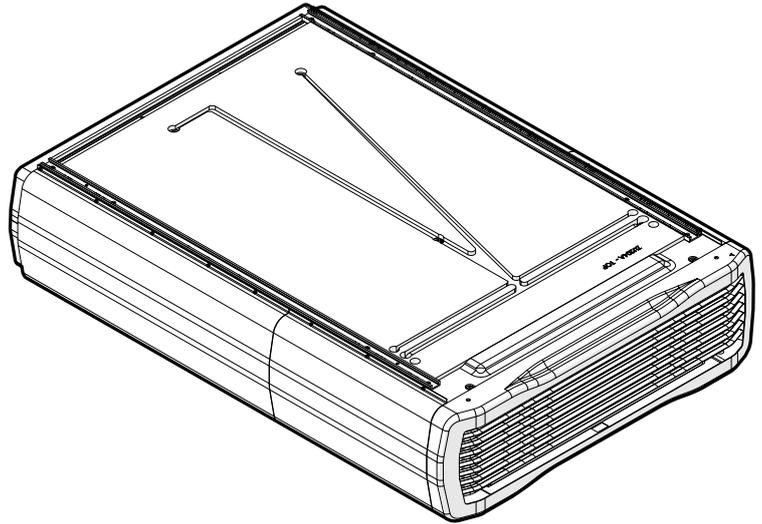
The Acuity has a digital I/O interface of 4x volt-free digital outputs (24V 0.1A rated) and 4x digital inputs suitable for use with volt-free outputs (the inputs use a 24V signal). These I/O can be configured to several different functions via the touch-screen during commissioning.

#### *Digital Output Types*

Type	Description
Heating Needed	One or more HVR APX units is trying to <b>heat</b> a room using the internal heating/cooling coil and requires <b>hot water</b> .
Cooling Needed	One or more HVR APX units is trying to <b>cool</b> a room using the internal heating/cooling coil and requires <b>cold water</b> .
Device Fault Signal	One or more HVR APX units is reporting a <b>fault</b> .
Heating Needed Z1	One or more HVR APX units in <b>Zone 1</b> is trying to <b>heat</b> a room using the internal heating/cooling coil and requires <b>hot water</b> .
Heating Needed Z2	One or more HVR APX units in <b>Zone 2</b> is trying to <b>heat</b> a room using the internal heating/cooling coil and requires <b>hot water</b> .
Heating Needed Z3	One or more HVR APX units in <b>Zone 3</b> is trying to <b>heat</b> a room using the internal heating/cooling coil and requires <b>hot water</b> .
Heating Needed Z4	One or more HVR APX units in <b>Zone 4</b> is trying to <b>heat</b> a room using the internal heating/cooling coil and requires <b>hot water</b> .
Cooling Needed Z1	One or more HVR APX units in <b>Zone 1</b> is trying to <b>cool</b> a room using the internal heating/cooling coil and requires <b>cold water</b> .
Cooling Needed Z2	One or more HVR APX units in <b>Zone 2</b> is trying to <b>cool</b> a room using the internal heating/cooling coil and requires <b>cold water</b> .
Cooling Needed Z3	One or more HVR APX units in <b>Zone 3</b> is trying to <b>cool</b> a room using the internal heating/cooling coil and requires <b>cold water</b> .
Cooling Needed Z4	One or more HVR APX units in <b>Zone 4</b> is trying to <b>cool</b> a room using the internal heating/cooling coil and requires <b>cold water</b> .

#### *Digital Input Types*

Type	Description
Competition Switch Open	For use with Windcatcher Zero
Competition Switch Close	<b>For use with Windcatcher Zero</b>



We are pioneers in the design and manufacture of advanced sustainable ventilation, cooling, heating and lighting solutions for new and refurbished commercial buildings. We deliver outstanding temperature-control and indoor air quality whilst minimising the consumption of both electricity and refrigerants so as to reduce our carbon footprint. Monodraught have over 50 years' experience and our products have saved the equivalent of nearly 540,000 tonnes CO<sub>2</sub> over the last two decades.

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APXIG/10.2025

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