

nuaire

**XBOXER HYBRID
HYBRID
VENTILATION
SYSTEMS**

xboxer
Hybrid 

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PROUD TO BUILD BRITISH



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We've been pioneers in new air technology since 1966. Our heritage is in the design and manufacture of fans and ventilation systems. *We put our energy into efficient ventilation so you don't waste yours.*



Pioneering

We lead the way in product innovation with a stream of ground-breaking products over decades.



Agile

We're one of the UK's leading manufacturers, covering both residential and commercial air quality. We offer innovative advice and provide flexible solutions.



Attentive

We're expert listeners, rising to any challenge and going the extra mile for our customers. We add value by solving problems. We sell solutions, not fans.



Trusted

We have a reputation for our build quality. We establish long term relationships and are always transparent with our test data.



Expert

Our team is made up of over 600 people, 50 of which have over 25 years' experience. We have the skills and knowledge to help find the best solution for our customers.



Personal

We work closely with our customers and can provide bespoke solutions to meet their specific project needs. Many of our product ranges were developed this way.

“Our expertise, experience and innovation are what makes us stand out from the rest of the market.”

Nuaire.



For help with selecting a unit, speak to us on **02920 858200** or email: enquiries@nuaire.co.uk

ABOUT HYBRID VENTILATION



Hybrid ventilation, or mixed-mode ventilation, is a ventilation strategy utilising pure ventilation techniques coupled with mechanical components to supplement natural airflow rates when conditions, such as CO₂ levels and temperature, are unsatisfactory.

Hybrid units are primarily used in classroom environments due to their low energy consumption and therefore low SFPs. Mixing ventilation, which allows heat re-use within the space, also provides high seasonal efficiencies, ensuring heat loss from a space is minimal whilst air change rates are maintained.

Nuaire's XBOXER Hybrid range has been developed to meet an increased demand from customers for hybrid ventilation. As experts in mechanical ventilation, we have approached product design from a unique approach. Like our XBC heat recovery units, Hybrid is part of our XBOXER range and leans on award-winning mechanical credentials. The XBOXER range is a suite of units designed specifically for school projects and allows us to provide a complete school offering.

Hybrid ventilation strategy

For projects where guaranteed airflow or demand control ventilation is required - such as science labs, design technology rooms, server rooms or catering kitchens - Nuaire suggests the use of mechanical ventilation. However, classrooms can benefit from a hybrid ventilation strategy providing high levels of energy efficiency and indoor comfort.

Nuaire would advise against ventilating by openable windows only and instead recommend a hybrid ventilation strategy. Using fan assisted or demand controlled hybrid ventilation, provides energy savings whilst maintaining superior thermal comfort compared to a system using only windows.

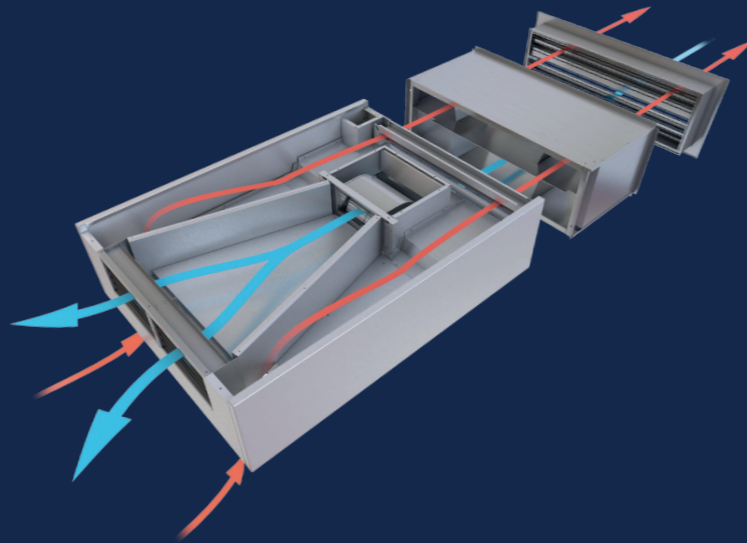


XBOXER HYBRID VENTILATION

Designed for classroom spaces, the XBOXER Hybrid uses pure natural ventilation with mechanical assistance to aid in achieving higher flow rates in hotter weather and tempered recirculation in colder weather.

Part of the XBOXER range, Nuair's Hybrid leans on award-winning mechanical ventilation design paired with industry-leading natural ventilation techniques resulting in the best unit of its class. Latest EC motor technology ensures lower SFPs, meaning a greener and much more energy efficient offering.

For a better hybrid ventilation solution, choose Nuair.



CODING XB-H130M-P

XB - H 130 M - P
1 2 3 4 5

SAMPLE CODING

1. XBOXER range.
2. Hybrid.
3. Unit size 130 or 260.
4. 'M' Master or 'S' Secondary (130 units only).
5. Painted Signal White RAL 9003 (optional).

For other finishes, including coastal, please contact Nuair.

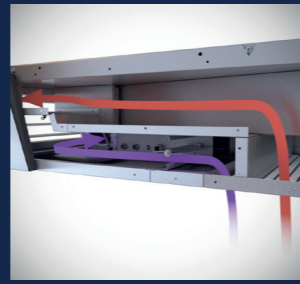
▶ ROBUST ALUZINC CONSTRUCTION

provides long life and helps minimise on site installation damage.



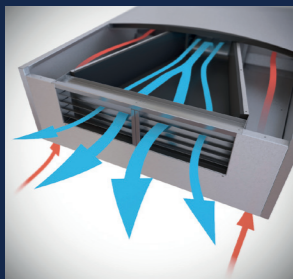
▶ SEPARATE DISCHARGE TO RECIRCULATION PATH

for guaranteed ventilation during recirculation mode.



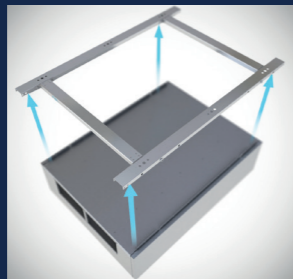
▶ NIGHT PURGE OR NIGHT FREE COOLING

available up to 470l/s (260 model).



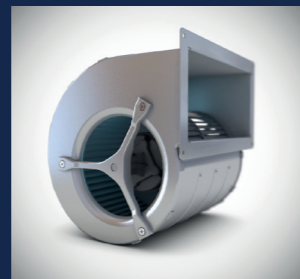
▶ SEPARATE QUICK-FIX CEILING BRACKET

for slab or drop rod installation.



▶ LATEST EC MOTORS

for maximum efficiency and guaranteed low SFPs.



▶ EASY-TO-USE CONTROLS

with a control strategy designed in partnership with Siemens and bespoke to the XBOXER Hybrid.



XBOXER HYBRID RUNNING MODES

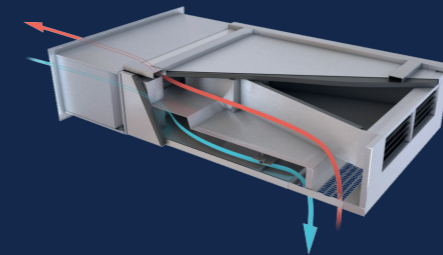
The XBOXER Hybrid will automatically monitor the space and change running mode depending on internal conditions, such as temperature and occupancy, and external conditions, such as the temperature and the weather.

The unit's motorised intake damper will slowly modulate between open and closed depending on which mode the unit is running. To avoid classroom interruption, the damper has been designed to move as slowly as possible, meaning the XBOXER Hybrid damper is one of the quietest on the market. Below are the three running modes the XBOXER Hybrid will automatically switch between throughout the year, depending on conditions:

NATURAL MODE

Pure natural ventilation with no mechanical assistance.

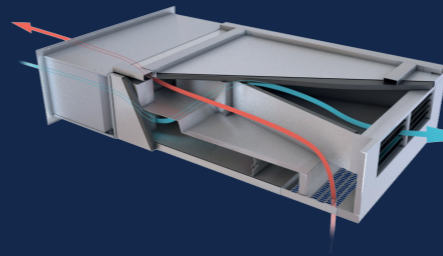
- ✔ Intake damper partially opens.
- ✔ Stale room air is naturally extracted from the space.
- ✔ Fresh external air is naturally supplied into the space.



FAN ASSIST MODE

Motors assisting with natural ventilation, combatting overheating by supplying fresh external air in summer months.

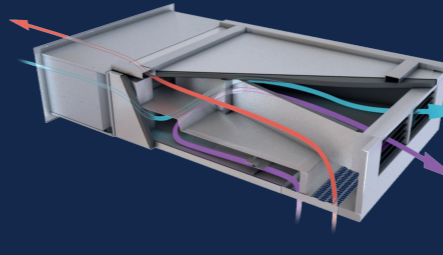
- ✔ Intake damper fully opens.
- ✔ Stale room air is naturally extracted from the space.
- ✔ Motor assists in supplying fresh external air into the space.



RECIRCULATION MODE

Motors assisting with natural ventilation, whilst recirculating some warm room air to temper supplied external air.

- ✔ Intake damper modulates open.
- ✔ Stale room air is naturally extracted from the space.
- ✔ Motor assists in supplying fresh external air into the space, with warm room air mixed in.



● ROOM AIR ● EXTERNAL AIR ● RECIRCULATED AIR

XBOXER HYBRID DEVELOPMENT

XBOXER Hybrid has been specifically designed for school classroom environments utilising a hybrid ventilation strategy. The technology is based on a natural ventilation system with fans to aid tempered mixing in colder weather and to achieve higher flow rates in hotter weather. The XBOXER Hybrid range, currently consisting of two models, is Nuair's first move into the hybrid ventilation market – as such, we have approached product design from a unique point of view, with a focus on proving the mechanical side of the unit.

Early development began in early 2018, with a unit design typical to other hybrid ventilation systems on the market. Supply, extract, intake and discharge were designed as two pathways inside the unit, with an internal damper to open and recirculate warm classroom air in colder months to temper incoming external air and mitigate draughts.

XBOXER Hybrid was tested in Nuair's AMCA accredited test laboratory. For testing purposes, the unit was treated as a mechanical unit; however, results were not as anticipated.

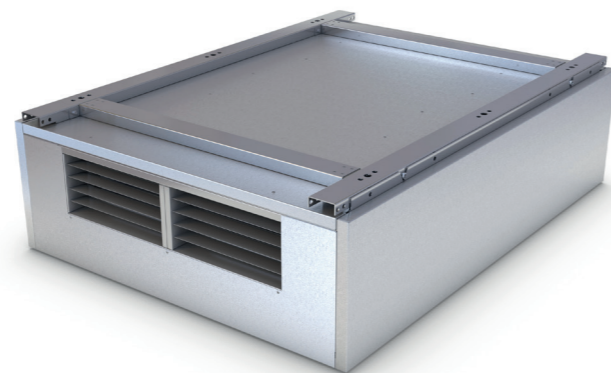
During recirculation mode, the fan is supposed to supply fresh external air into the room, discharge stale room air and also temper incoming air via tempered recirculation; however, test results confirmed this was not how the fan was operating. In recirculation mode, it was found that the intake side of the fan overpowered the natural buoyancy of the room and began to draw in air from both the intake and discharge paths, meaning no air was allowed to leave the space. These findings confirmed that the typical recirculation design we had initially followed, and a design that is used by many units on the market, does not work as expected.

For recirculation mode to work correctly, the recirculation path needed to be disconnected from the discharge path. In late 2018, the team started a new design, separating the recirculation path from the discharge path when the unit is in recirculation mode. This design is specific to the XBOXER Hybrid range and ensures guaranteed airflow in recirculation mode.

Development of the range will continue. Lead Designer on the project, Adam Plimmer commented: "we will be working closely with our customers and looking at their specific requirements to develop the range further and to the best of its potential."



Original concept for XBOXER Hybrid.



Final XBOXER Hybrid design - XB-H130M model shown.

Final design of the XBOXER Hybrid range massively improves on typical industry hybrid ventilation techniques. A separate discharge to recirculation path ensures guaranteed ventilation in recirculation, or mixing mode. This innovation was recognised by the industry. The XBOXER Hybrid range won 'Air Movement Product Of The Year' at the 2020 H&V News Awards.



Judges commented:

This winning product was judged a very simple innovative system that has had its design considered in the round – taking in quality, cost, maintenance and environmental impact.

XBOXER HYBRID REGULATIONS

XBOXER Hybrid was designed with all major regulations and considerations in mind. With the importance of wellbeing in schools, BB101 and BB93 were key drivers in the performance of our Hybrid range. Below are some key points from these regulations, and how the XBOXER Hybrid range meets these points.



BB101: VENTILATION, THERMAL COMFORT AND INDOOR AIR QUALITY

BB101 is a guideline for ventilation, thermal comfort and indoor air quality in schools. Some key points from BB101 for natural ventilation (or when hybrid is operating in natural mode) are:

- ▶ Daily average CO₂ levels must be less than 1500ppm (during occupied period).
- ▶ Maximum CO₂ concentration should not exceed 2000ppm.
- ▶ The system should be designed to achieve a carbon dioxide level for the majority of the time of less than:
 - 1) 1200ppm for a new building, and 2) 1750ppm for a refurbished building.
- ▶ Teachers must have control of the ventilation and understand how to use it.

HOW XBOXER HYBRID MEETS THESE REQUIREMENTS (BASED ON A CLASSROOM OF 32 OCCUPANTS):

The XB-HCO₂ sensor used with the XBOXER Hybrid range constantly monitors CO₂ and temperature levels in the space. If CO₂ levels in the space exceed 1000ppm, Hybrid will go into Fan Assist mode – if levels rise above 1500ppm the unit will go into Boost mode, ensuring all CO₂ is removed from the space. This strategy ensures levels never go close to the maximum given in BB101. A traffic light indicator comes as standard with Nuair's XB-HBC key-switch controllers which will indicate when CO₂/temperature levels are too high in the space. Nuair offers both switch and key operated wall controllers, giving the teacher complete control over the system.



BB93: ACOUSTIC DESIGN OF SCHOOLS - PERFORMANCE STANDARDS

BB93 sets out a minimum standard for the acoustics of a school and how to demonstrate compliance within the Building Regulations. Some key points from BB93 for natural ventilation (or when hybrid is operating in natural mode) are:

- ▶ Indoor ambient noise levels (IANL) should not exceed (values quoted in LAeq, 30mins):
 - Classrooms – 35dB new-build, 40dB refurbishment.
 - Lab rooms / Library / Design Technology – 40dB new-build, 45dB refurbishment.

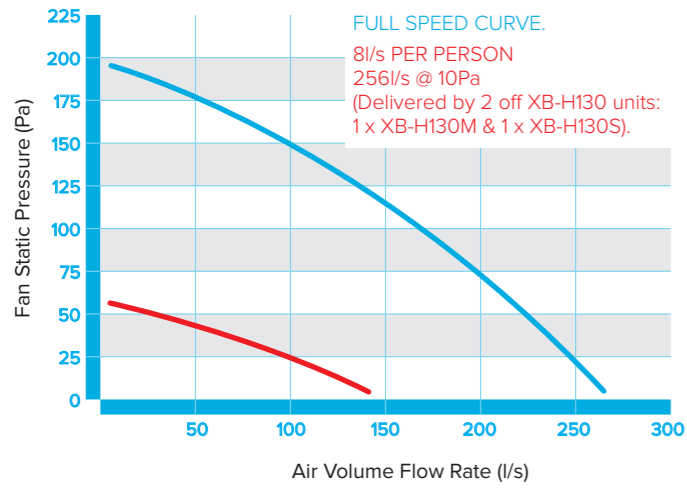
HOW XBOXER HYBRID MEETS THESE REQUIREMENTS (BASED ON A CLASSROOM OF 32 OCCUPANTS):

In Fan Assist mode, Hybrid units have a noise target of 35dB IANL. During testing of the XBOXER Hybrid range, the acoustic levels for each unit were recorded. When performing as part of a system (using the XBOXER Hybrid louvre and wall sleeve ancillary pieces) the XB-H130M performed under 35dB at 128l/s and the XB-H260 performed under 35dB at 256l/s. These levels ensure compliance to BB93, with regards to the sound insulation properties of the unit. Nuair has also generated a report confirming that the system will give a reduction of at least 32Rw when situated in a classroom, meaning if there is a noise of 65dB outside, the room will still be achieving its 35dB target during normal unit operation.

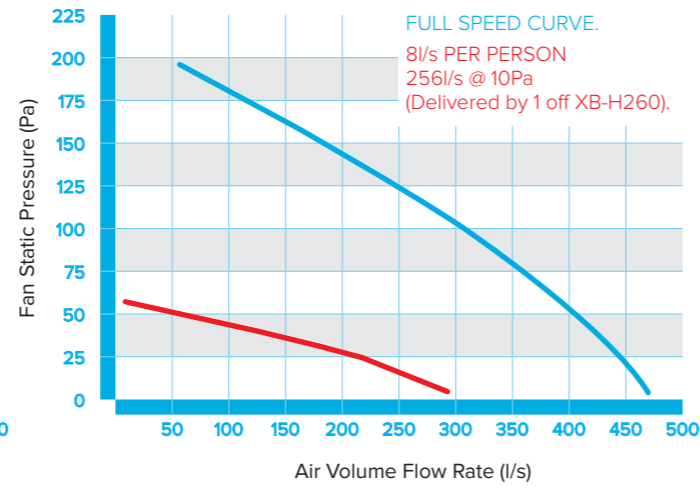
XBOXER HYBRID

PERFORMANCE, TECHNICAL INFORMATION & DIMENSIONS

XB-130 PERFORMANCE CURVE



XB-H260 PERFORMANCE CURVE



Curve based on typical classroom with 32 occupants.

XB-H130 TECHNICAL AND ACOUSTIC DATA

CODE	VOL. PER PERSON (l/s)	VOL. FOR 16 PEOPLE (l/s)	FAN STATIC PRESSURE (Pa)	NOMINAL INPUT POWER (W)	SFP (W/l/s)	SOUND POWER LEVELS DB RE 1pW								dBA @3M	MOTOR CURRENTS	
						63	125	250	500	1K	2K	4K	8K		FLC (A)	SC (A)
XB-H130M	8	128	10	16	0.1	39	44	41	41	35	22	17	<16	20	0.7	0.7
	5	80	4	8	0.1	34	36	36	30	21	<16	<16	<16	10	0.7	0.7
XB-H130S	8	128	10	16	0.1	39	44	41	41	35	22	17	<16	20	0.7	0.7
	5	80	4	8	0.1	34	36	36	30	21	<16	<16	<16	10	0.7	0.7

XB-H260 TECHNICAL AND ACOUSTIC DATA

CODE	VOL. PER PERSON (l/s)	VOL. FOR 32 PEOPLE (l/s)	FAN STATIC PRESSURE (Pa)	NOMINAL INPUT POWER (W)	SFP (W/l/s)	SOUND POWER LEVELS DB RE 1pW								dBA @3M	MOTOR CURRENTS	
						63	125	250	500	1K	2K	4K	8K		FLC (A)	SC (A)
XB-H260	8	256	10	37	0.1	43	43	41	39	33	21	<16	<16	18	1.3	1.3
	5	160	4	16	0.1	42	40	39	36	29	10	<16	<16	16	1.3	1.3

dBA-Spherical free field radiation at a distance of 3m. For accurate figures, please refer to Nuair Fan Selection Programme at www.nuair.co.uk, alternatively call Nuair on 029 2085 8200.

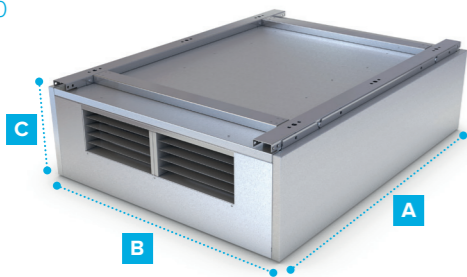
DIMENSIONS (mm) AND WEIGHT (kg)

MODEL	A	B	C	WEIGHT
XB-H130	1250	950	359	125

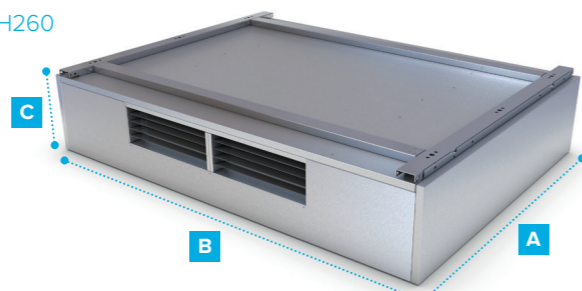
MODEL	A	B	C	WEIGHT
XB-H260	1250	1700	359	175

C dimension is unit height including mounting bracket. For further dimensions, please refer to I&M or Nuair Fan Selector program.

XB-H130



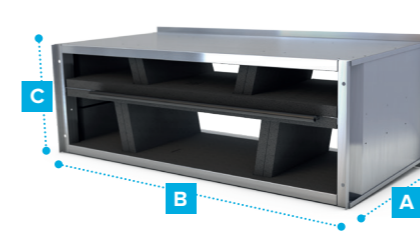
XB-H260



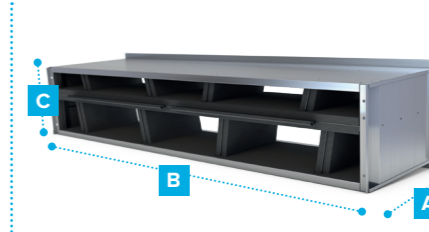
XBOXER HYBRID

ANCILLARIES & DIMENSIONS

WALL SLEEVE XB-H130-WS

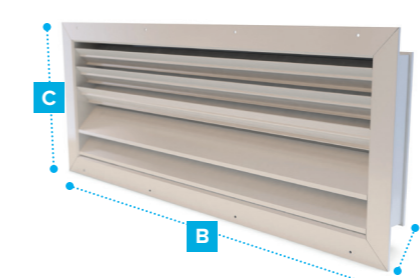


XB-H260-WS

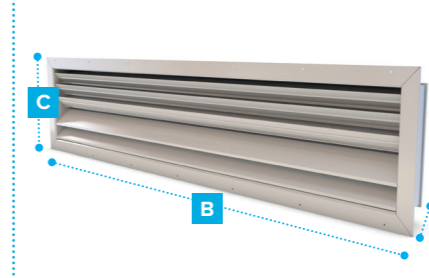


Wall sleeve for use with XB-H External Weather Louvre. Galvanised finish as standard with optional Signal White RAL 9003 paint finish.

EXTERNAL WEATHER LOUVRE XB-H130-L

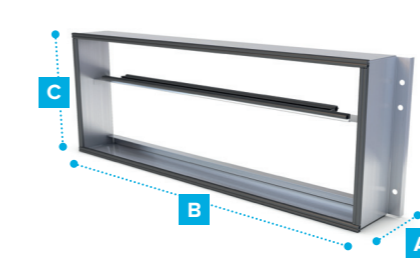


XB-H260-L

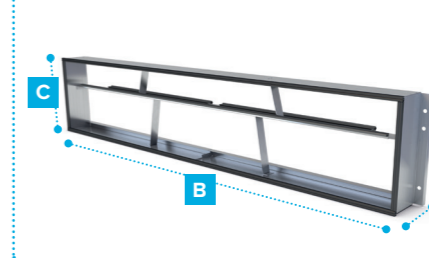


External weather louvre painted in Goose Wing Grey BS 10A05 as standard.

GLAZED WALL SLEEVE XB-H130-GS



XB-H260-GS

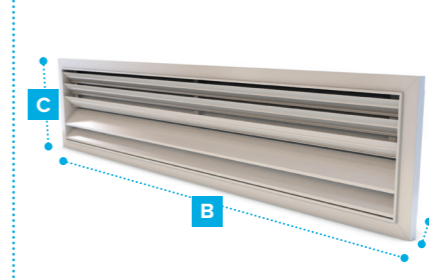


Glazed wall sleeve for use with XB-H Glazed Weather Louvre. Galvanised finish as standard with optional Signal White RAL 9003 paint.

GLAZED WEATHER LOUVRE XB-H130-GL



XB-H260-GL



Glazed wall louvre painted in Goose Wing Grey BS 10A05 as standard.

ANCILLARIES CODING

XB-H130-WS-P

XB - H 130 - WS - P
1 2 3 4 5

SAMPLE CODING

1. XBOXER range
2. Hybrid
3. Unit size 130 or 260
4. WS – Wall sleeve
L – External weather louvre
GS – Glazed wall sleeve
GL – Glazed weather louvre
5. P – Painted to Signal White RAL9003 (GS and WS only)
No suffix – Natural Aluzinc finish

DIMENSIONS (mm) AND WEIGHT (kg)

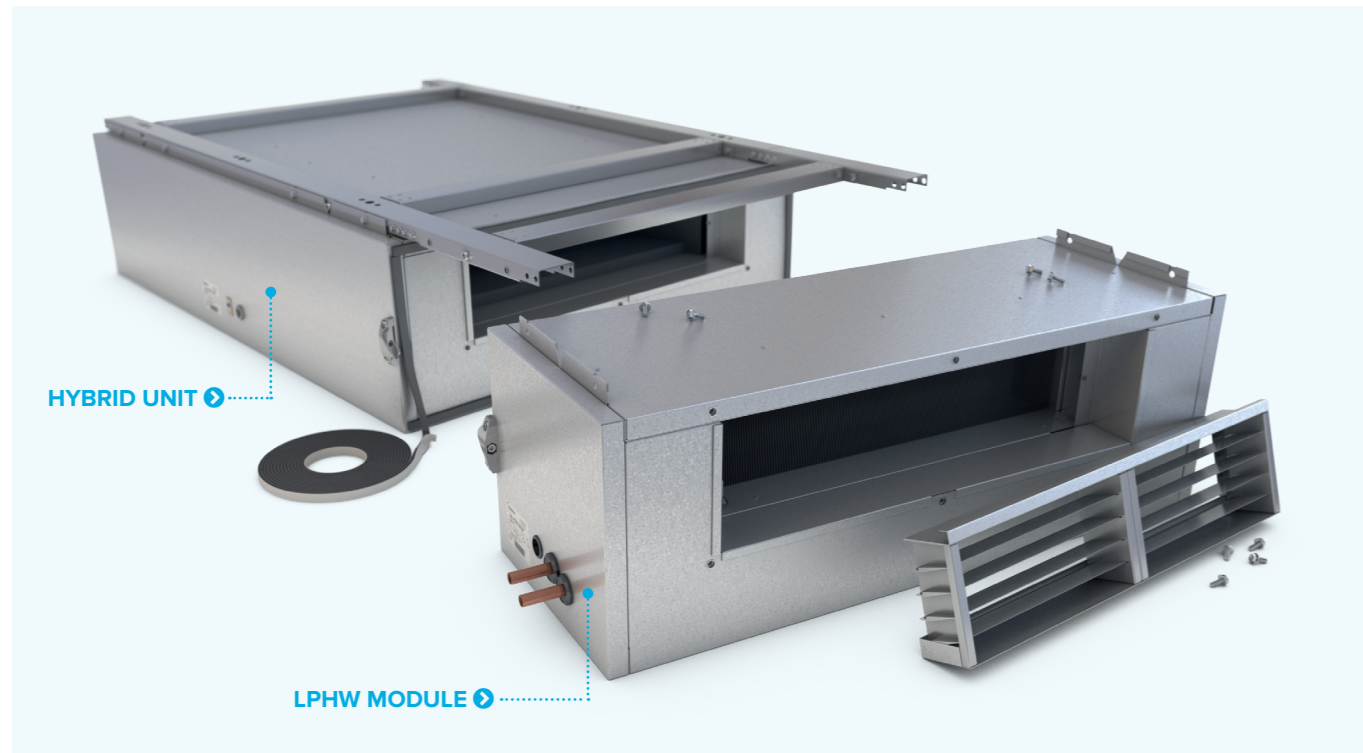
MODEL	A	B	C	WEIGHT
XB-H130-WS	450	958	327	10
XB-H130-L	118	1036	405	15
XB-H130-GS	138	958	334	5
XB-H130-GL	102	955	387	20
XB-H260-WS	450	1708	327	25
XB-H260-L	118	1786	405	30
XB-H260-GS	138	1708	334	10
XB-H260-GL	102	1707	387	35

For further details, mounting bracket dimensions or unit mounting points, please refer to I&M.

XBOXER HYBRID

LPHW

If cold draughts become an issue in a classroom environment, Nuair offers a retrofit LPHW module to temper or heat incoming air depending on requirement. This ensures that air quality is kept at a high standard with consistent air changes, whilst incoming air is tempered as not to cause cold draughts.



Both tempered and primary heating options are available, making XBOXER Hybrid with LPHW a complete heating solution for hybrid ventilation projects.

RETROFIT INSTALLATION

Unlike many Hybrid LPHW coils on the market which are installed inside the unit itself, XBOXER Hybrid LPHW modules are optional ancillaries. As such, they are suitable for a retrofit installation, meaning coils can be purchased and installed at a later date if unforeseen cold draughts are discovered post-occupancy.

Hybrid LPHW coils are not handed and can be flipped to have bare tails on either side. This ensures complete design and installation flexibility.

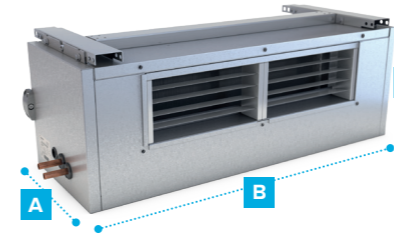


For animations of our retrofit LPHW coils, plus 3D models of all our Hybrid ancillaries take a look at our Sketchfab library at www.sketchfab.com/nuaire

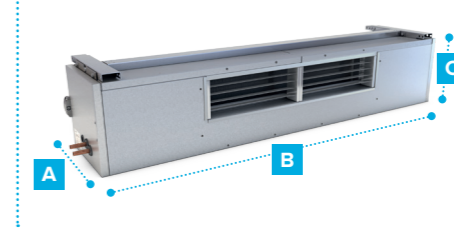
XBOXER HYBRID

LPHW DIMENSIONS & COIL DATA

XB-H130 LPHW



XB-H260 LPHW



XBOXER Hybrid bolt-on LPHW heating coil.

DIMENSIONS (mm) AND WEIGHT (kg)

MODEL	A	B	C	WEIGHT
XB-H130 LPHW	350	950	325	35
XB-H260 LPHW	350	1700	325	65

C dimension is coil height including mounting bracket. For further dimensions, please refer to the I&M.

CODING

XB-H130-L4P-P

XB - H 130 L 4 P - P
1 2 3 4 5 6 7

SAMPLE CODING

- XBOXER range
- Hybrid
- Unit size 130 or 260
- L - LPHW heating coil ancillary
- 2 - 2 port valve
4 - 4 port valve
No suffix - supplied with bare coils
- P - Primary heating
T - Tempered heating
- Painted Signal White RAL 9003 (optional)

LPHW PRIMARY HEATING COIL DATA

CODE	LPHW DEG (°C)	AIRFLOW (m³/s)	OUTPUT (kW)	AIR OFF TEMP (°C)	WATER FLOW (l/s)	COIL WATER ΔP (kPa)	PIPE CONNECTION (mm)	VALVE ΔP _{MAX} (kPa)	VALVE ΔP _{MIN} (kPa)	VALVE ΔP ₁₀₀ (kPa)	VALVE KVS (m³/h)	VALVE TYPE	Z FACTOR
XB-H130-L2P	LPHW 80/60	0.128	7.19	37.58	0.088	5.4	15	600	14.3	--	--	2-PORT	700
XB-H130-L4P	LPHW 80/60	0.128	5.04	32	0.062	11	15	300	--	0.41	1.6	4-PORT	700
XB-H260-L2P	LPHW 80/60	0.256	10.74	26.8	0.131	10	15	600	14.3	--	--	2-PORT	128
XB-H260-L4P	LPHW 80/60	0.256	7.56	24	0.092	5.4	15	300	--	0.44	1.6	4-PORT	128

LPHW TEMPERED HEATING COIL DATA

CODE	LPHW DEG (°C)	AIRFLOW (m³/s)	OUTPUT (kW)	AIR OFF TEMP (°C)	WATER FLOW (l/s)	COIL WATER ΔP (kPa)	PIPE CONNECTION (mm)	VALVE ΔP _{MAX} (kPa)	VALVE ΔP _{MIN} (kPa)	VALVE ΔP ₁₀₀ (kPa)	VALVE KVS (m³/h)	VALVE TYPE	Z FACTOR
XB-H130-L2T	LPHW 80/60	0.128	4.01	18.75	0.049	0.98	15	600	14.3	--	--	2-PORT	440
XB-H130-L4T	LPHW 80/60	0.128	2.49	15	0.03	0.4	15	300	--	0.53	1.6	4-PORT	440
XB-H260-L2T	LPHW 80/60	0.256	6.75	14.99	0.082	4.4	15	600	14.3	--	--	2-PORT	73
XB-H260-L4T	LPHW 80/60	0.256	4.97	15	0.061	2.5	15	300	--	0.43	1.6	4-PORT	73

ΔP_{max} = maximum permissible differential pressure across the valve's control path, valid for the entire actuating range of the motorized valve.

ΔP₁₀₀ = differential pressure across the fully open valve and control path A-D AB by a volume flow %V 100.

ΔP_{min} = minimum differential pressure required across the valve's control path, so that the difference pressure regulator works reliably.

Kvs = nominal flow rate of cold water (5... 30 °C) through the fully opened valve (H100) at a differential pressure of 100 kPa (1 bar).

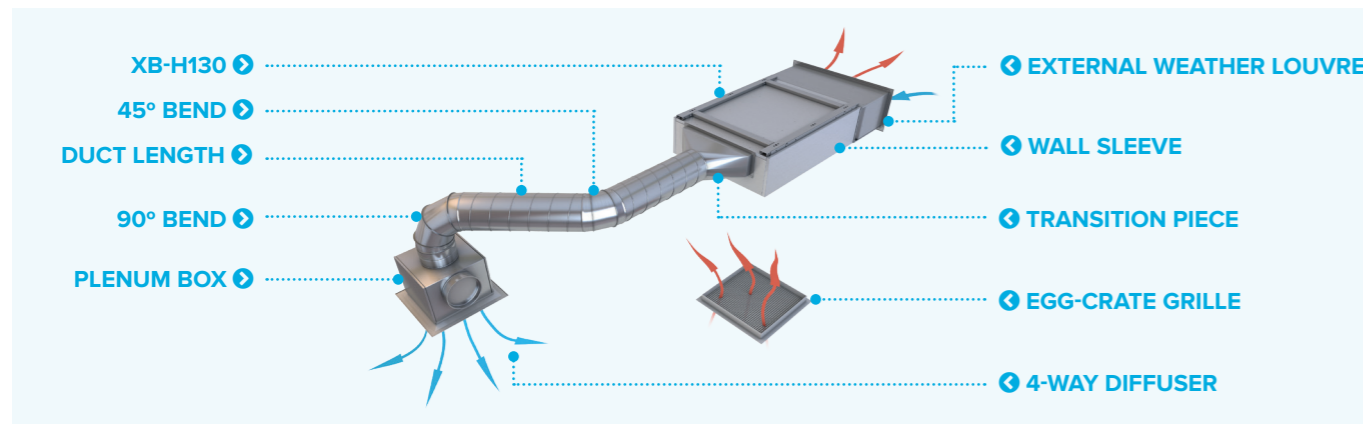
XBOXER HYBRID DUCTED INSTALLATION

For projects which have a ceiling void and require the unit to be hidden completely out of sight, a ducting kit is available for the XBOXER Hybrid range. Using a ducted installation will also reduce overall noise breakout from the unit to the classroom.

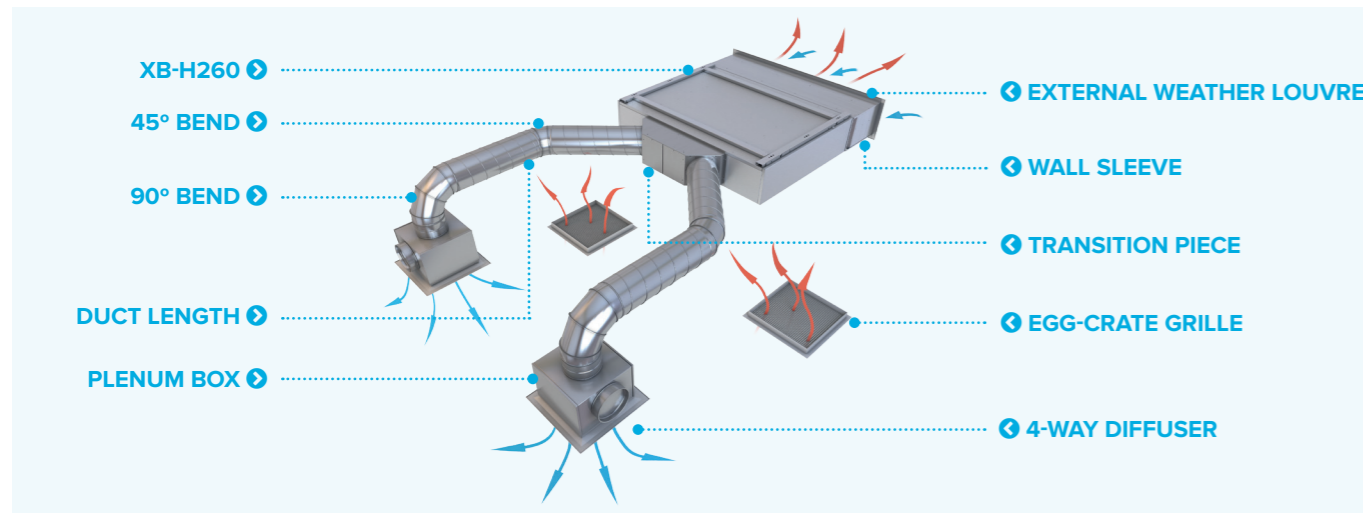
TYPICAL DUCTED XBOXER HYBRID UNIT

A typical ducted XBOXER Hybrid system will allow the unit to be installed in a ceiling void and ducted into the room. A louvre connected to a plenum box will supply fresh air into the room from the unit, whilst air is extracted through an egg-crate grille in the ceiling.

XB-H130 DUCTED INSTALLATION



XB-H260 DUCTED INSTALLATION



XBOXER HYBRID DUCTING KITS

XB-H130 DUCTING KIT

Ducting kit for XB-H130 unit includes:

- ✓ 1 x XB-H130 transition piece
- ✓ 1 x Duct length
- ✓ 1 x 90° bend
- ✓ 1 x 45° bend
- ✓ 1 x Plenum box
- ✓ 1 x 4-way diffuser
- ✓ 1 x Egg-crate grille

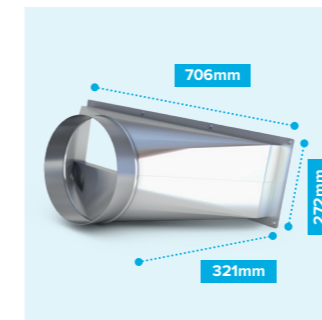
Kit code: XB-H130-DKIT1

XB-H260 DUCTING KIT

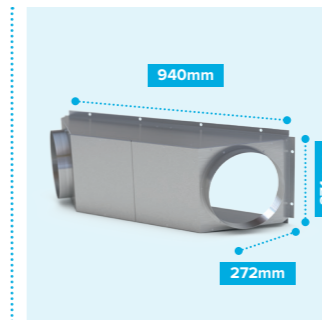
Ducting kit for XB-H260 unit includes:

- ✓ 1 x XB-H260 transition piece
- ✓ 2 x Duct length
- ✓ 2 x 90° bend
- ✓ 2 x 45° bend
- ✓ 2 x Plenum box
- ✓ 2 x 4-way diffuser
- ✓ 2 x Egg-crate grille

Kit code: XB-H260-DKIT1



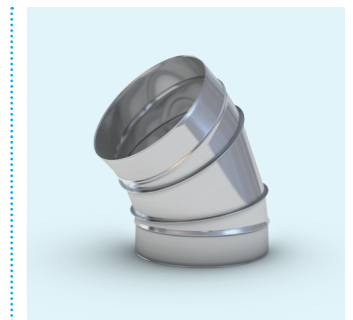
XB-H130 TRANSITION PIECE
Circular spigot attachment to Ø250mm.



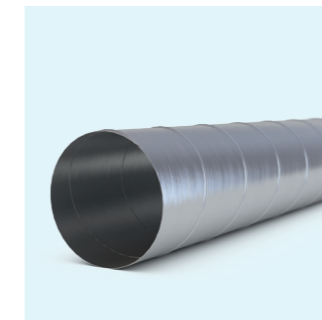
XB-H260 TRANSITION PIECE
Circular spigot attachment to Ø250mm.



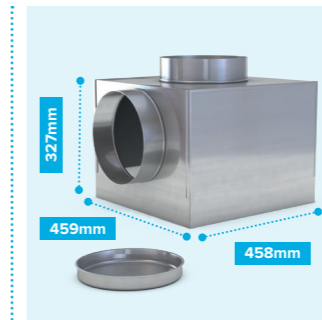
90° BEND
90° spiral duct bend Ø250mm.



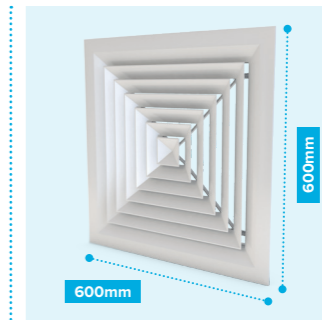
45° BEND
45° spiral duct bend Ø250mm.



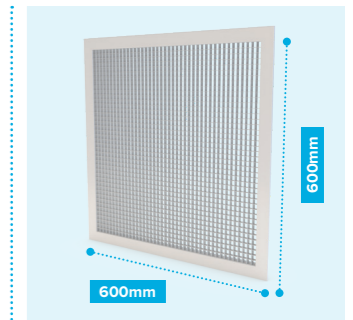
DUCT LENGTH
3m spiral duct length Ø250mm.



PLENUM BOX
Acoustically-lined plenum box with end cap. 2 x Ø250mm spigots to 450 x 450mm



4-WAY DIFFUSER
4-way diffuser for use as supply louvre (white). Outside dimensions: 600 x 600mm.



EGG-CRATE GRILLE
Ceiling egg-crate for use as extract grille (white). Outside dimensions: 600 x 600mm.

Z FACTORS	ITEM	CODE	Z FACTOR	Z FACTOR CALCULATION
	External weather louvre	XB-H130-L	719	Resistance = Z * Q ²
		XB-H260-L	236	Where Z = factor
	Wall sleeve	XB-H130-WS	84	Q = air volume flowrate in m ³ /s
		XB-H260-WS	26	
	Ducted kit	XB-H130-DKIT1	162	
		XB-H260-DKIT2	156	

For further dimensions please contact Nuaire.

HYBRID VENTILATION

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RESIDENTIAL

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