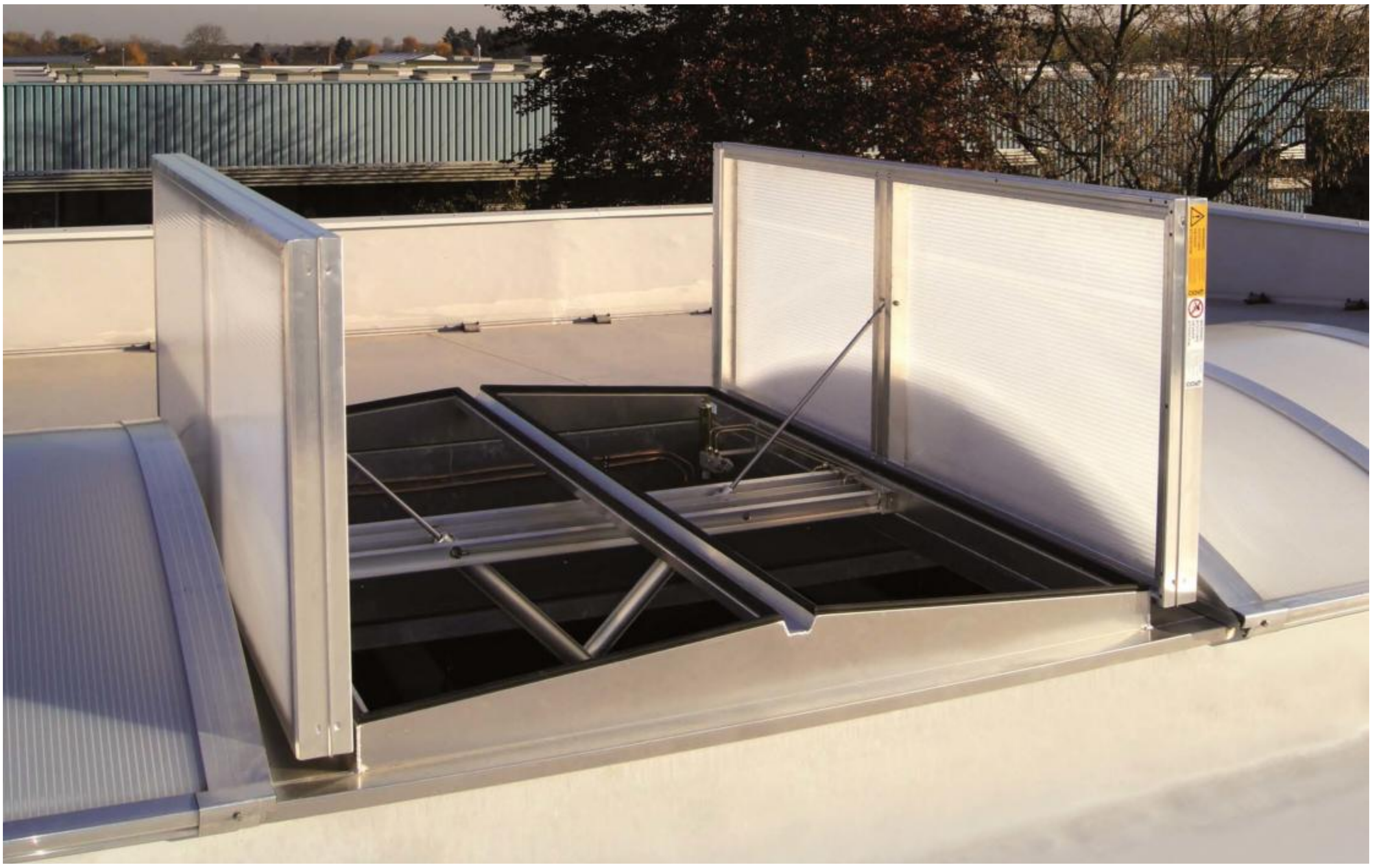
Light + Air
English
2025 - 03

Kingspan Apollo IOM - 1026

Installation, Operation and Maintenance Manual



1 About this manual

Please take time to read this instruction manual thoroughly before using the product.

Thank you.

This document forms an integral part of the product and needs to be retained for use at a later time. Its contents are important for anyone who uses, operates or maintains an Apollo natural smoke and heat exhaust ventilator (hereafter known as NSHEV) and a copy of it needs to be kept near to the control box.

All product codes used in these Installation, Operation and Maintenance Instructions can be found on the PID label. The PID label is installed both inside and outside the NSHEV.

1.1 Associated documents

The following documents also contain important information. If you don't have them, you can obtain them from your Kingspan representative.

- Spare Parts List
- Guide to the controls for the complete Installation.

1.2 Explanation of safety symbols

This instruction manual contains important safety symbols. It is necessary to take of note of any safety notices in order to avoid damage to equipment and also to ensure that the Colt guarantee is maintained. In extreme situations non-observance of safety instructions can lead to injury and even death.

Symbols used in this manual:

⚠ **DANGER**	**indicates a hazardous situation which, if not avoided, will result in death or serious injury.**
⚠ **WARNING**	**indicates a hazardous situation which, if not avoided, could result in death or serious injury.**
⚠ **CAUTION**	**indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.**
NOTE	**describes a situation which may arise if damage occurs, or gives practical tips for installation, operation and maintenance.**

2 Using an NSHEV

2.1 How it works

Air moves through an open NSHEV as a result of the pressure difference between the inside and the outside of the building. This pressure difference is a result of convection, wind pressure or mechanical ventilation. The direction of the airflow and also its speed depends on the prevailing conditions and can change while the NSHEV is being used.

Opening and closing units with pneumatic cylinders:
The flaps are opened and closed using two pneumatic cylinders, which are activated using compressed air. These cylinders move the flaps to their open position and are locked open. Similarly the NSHEV is closed using pneumatic pressure. The cylinders are unlocked, they close the NSHEV and lock them again.

Opening and closing units with electric actuators:
The NSHEV is opened and closed using two 24 V DC or 230 V AC-electric actuators. The opening speed of the electric actuators depends on the size of the NSHEV, the installation position and also the loading on the electric actuator.

When the flaps move to their final position (in either the open or closed position), they cannot be moved by external influences such as excessive wind pressure.

2.2 Acceptable applications

NSHEVs are suited as roof ventilators for industrial, commercial and public buildings to provide:

- ► Smoke control and exhaust ventilation
- ► Day to day ventilation
- ► Daylight entry

The NSHEV should be controlled from a central control panel only by informed or trained personnel.

2.3 Improper use

Such ventilators may only be used in the manner described on these pages. In particular such a ventilator is:

- ► not suitable for accessing the roof.
- ► not suitable as roof openings to allow the movement of building components, machines or similar objects onto the roof.
- ► not suitable for use in places where there is likely to be an explosion.
- ► not suitable for use in extreme conditions (for instance where there is high condensation, very high temperature or corrosive substances within the air stream).
- ► Not suited as an inlet air opening.

Optional pre-installed fall protections are not suitable for:

- ► using as a rack or hanging objects off
- ► Using as a means by which a person can stand on it when carrying out maintenance or repair works

The maximum installation height depends, among other things, on local requirements and wind loads. For this reason the maximum installation height must always relate to the requirements of the project. If you have any questions, please contact your Kingspan representative.

3 Essential safety information

It is essential to take note of these basic warning signs. There are additional warnings given within other pages of this manual.

⚠ **WARNING**	**Danger from electrically live components** ▶ Danger of electrocution and death. ▶ Ensure that electrical supplies are always switched off before working on electrical components. Work on electrical components is only to be carried by qualified personnel.

⚠ **WARNING**	**Danger of flaps breaking when they are trodden upon** ▶ Do not walk on the NSHEV since the flaps are not designed for such loads and can break. The danger of this can arise particularly if there has been snow or if the NSHEV is very dirty or if the visibility is poor and as a result the safety labels are not clearly visible. If someone falls through an NSHEV ventilator, this can lead to injury or death as well as damage to property. ▶ It is important to inform all those who have access to the roof about the danger of falling through such an NSHEV, particularly when it is snowing, when the roof is dirty or when visibility is poor. In addition the NSHEV must be cleared of snow and cleaned.

⚠ **WARNING**	**Injury as a result of the height of the installed ventilators** ▶ Persons working on the ventilator at height need to avoid the possibility of tools or building components dropping. If this is not observed, there can be fatal consequences. Those working at height should always observe all applicable health and safety regulations. Those who are installing or working on a NSHEV need to be qualified and trained suitably. ▶ The optional wind baffle and associated components are not stable enough to be used as positions to fix safety harnesses to, which would have the purpose of stopping people from falling off buildings. If this is not observed, there can be fatal consequences.

⚠ **WARNING**	**Danger related to unsuitable positioning of the ventilator** ▶ If it is installed onto an unsuitable roof there is a risk of collapse caused by its weight, among other things. If this is not observed, there can be fatal consequences. Before installation the engineering calculations must be checked in accordance with applicable rules, to check whether the roof is suitable for installation of the NSHEV. ▶ A NSHEV is designed for extract ventilation and are not to be used for inlet air. Polluted air or exhaust gas can harm people within the building.

⚠ **WARNING**	**Danger due to incorrect assembly or commissioning** ▶ If the unit is not appropriately installed or commissioned, it is possible that the unit will not function as a smoke ventilator in the case of fire. This can lead to damage, injury or death. ▶ An NSHEV needs to be installed by trained personnel and also commissioned appropriately. If there are any functional errors, appropriate measures need to be taken to remedy them. A NSHEV must be inspected, maintained and, where appropriate, be repaired regularly, at least once per year.

⚠ **WARNING**	**Danger from unexpected opening or closing of the flaps** ▶ It is possible to trap a part of the body between the flaps if they opened or closed unexpectedly whilst working on a ventilator. There is no built-in protection to prevent finger trapping. ▶ When working on a NSHEV it is necessary to ensure that the control system cannot be accessed and the ventilator cannot be opened or closed in an unexpected manner. It is also important to keep in mind that the smoke exhaust and ventilation control function can open the unit unexpectedly. Those who are installing or working on an NSHEV need to be qualified and trained suitably.

⚠ CAUTION	**Danger as a result of rain ingress through open flaps or damaged seals**
	▶ If the NSHEV is left open when it rains or if seals are damaged, water can enter the building, Water can result in damage to property or injury to persons.
	▶ Pay attention to the possibility that water that has been sitting on the flaps needs to drain off them when they close. However damaged seals or flaps need to be replaced in a timely fashion.

⚠ CAUTION	**Danger as a result of its high weight**
	▶ The product identification (PID) label shows the unit's weight. The PID label is affixed both inside and outside the NSHEV.
	▶ The unit's weight can lead to injury or damage if the unit is not correctly handled.
	▶ If the unit is moved manually, a sufficient numbers of people must be available. There is Health and Safety guidance which provides information on the correct handling, lifting and carrying of heavy weights.

Please note additional safety warnings within the following chapters of this manual.

4 Safety notices attached to the NSHEV

Take note of the safety labels attached to the NSHEV.

This label warns the user not to walk onto the unit.

This label warns the person about the possibility of flaps opening and closing unexpectedly.

This label advises personnel not to put their hands into the ventilator. Additionally, the label indicates the need for the unit only to be maintained by trained personnel.

5 Delivery

Included in the delivery is:

- ► A completely pre-assembled NSHEV (depending on the size of the order, wind baffles may be supplied separately).
- ► Wind baffle (only when ordered).
- ► A control panel (only when ordered).

Please make sure that the delivery is complete when unloading these components. Please report any damages or shortages to your Kingspan representative within two working days.

NOTE	**Not included in the delivery is:** ► Sealing tape ► Screws for fixing the ventilator to the supporting structure

6 Unit components

An NSHEV comprises the following parts:

Base

Manufactured in accordance with the specific requirements of the customer.

- B1 Uninsulated base
- B2 Insulated base
- B3 Thermally broken base and flap

Flap

Contains a surrounding aluminium profile.

Polycarbonate flaps

- P*16 7 Polycarbonate sheet (transparent, non-transparent or non-transparent grey), 16 mm thick (7 layer)
- PO16 H Hail-resistant multi-skin polycarbonate sheet (non-transparent), 16 mm thick (7 layer)
- P*16 21 6 mm solid external sheet plus 10 mm internal sheet (transparent or non-transparent), 16 mm thick
- P*32 Polycarbonate sheet (transparent or non-transparent), 32 mm thick

Aluminium flaps

- A2 Double skin insulated or thermally broken aluminium, 20 mm thick

Glass flaps

- GL28 Safety laminated glass, 28 mm thick
- GL30 Safety laminated glass, 30 mm thick
- GL32 Safety laminated glass, 32 mm thick
- GLS Safety laminated glass flaps, special (thickness 24-40 mm, weight max. 45) kg/m²

Controls

As standard two actuators, designed in accordance with the customer's requirements.

- P2BD Double locking pneumatic cylinders
- M2B24 24 V actuators
- M2B230 230 V actuators

Wind baffle

The wind baffle is optional and has to be fitted on site (if not pre-assembled) as set out in chapter "9.9 Assembly of wind baffle".

Fall-through proof

Fall-through protection for fall protection in the open and closed position are /optionally available and pre-installed.

Control panel

The optional control panel is supplied separately. A description of how to operate the control panel is provided in a separate Installation, Operation and Maintenance Manual. These instructions are provided together with the control panel.

7 Technical data

An NSHEV is supplied with either pneumatic or electrical controls depending on the requirements. The PID label provides information about the version that is being supplied. The PID label also shows either the operating pressure for pneumatic controls or the electrical supply voltage.

7.1 Performance classes in accordance with EN 12101-2

Snow load (SL class):	See PID label
Wind load (WL class):	See PID label
Reliability (RE):	1000 (under operating conditions)
Dual purpose ventilator:	Certified for day to day ventilation
Operating temperature:	T00 / T(-15) – see PID label

> **NOTE**
>
> **Actuators**
>
> ► The type of drive depends on the unit size, the flap variant, the installation angle and the snow load. Details on the type of drive used can be found on the PID label or can be obtained from your Kingspan representative.

If in doubt, the information on the PID label has priority over any of the information in this manual.

7.2 Sources of energy

7.2.1 Units with pneumatic cylinders (P2BD)

Day-to-day ventilation

Pneumatic connection:	Minimum 6 bar

Smoke control ventilation

Primary source of energy:	Thermal ventilation valve with CO_2 bottle
CO_2 volume:	Calculated for each order individually

You can get information concerning the external secondary energy source from your Kingspan representative.

7.2.2 Units with 24 V DC electric actuators (M2B24)

Primary source of energy:	24 V DC
Current:	depending on actuator type (depending on unit size and snow load) For further information please check the PID label.

7.2.3 Units with 230 V AC electric actuators (M2B230)

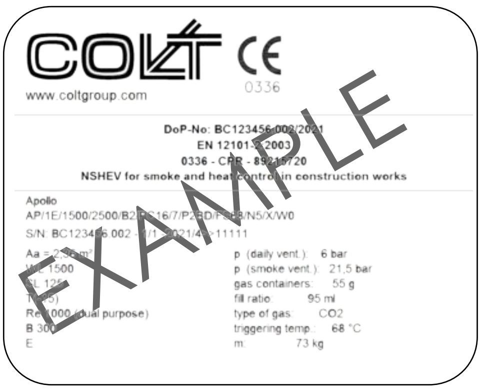
Primary source of energy:	230 V AC
Current:	1.2 A for each electric actuator, two electric actuators per NSHEV. For further information please check the PID label.

7.3 Sound emissions

In all operating modes the sound emissions from the NSHEV as it opens or closes are less than 70 dB (A).

7.4 PID label

The technical data and unit type are set out on the PID label.



The PID label (see example above) can be seen on the inside and outside of the unit.

8 Transport and storage

It is necessary to observe the essential safety information published here.

8.1 On-site storage

An NSHEV must be stored in a clean, dry place and protected from possible damage. The NSHEV are delivered on a pallet and if more than one is supplied then suitable protection is provided between each unit in order to prevent damage. Protection is provided to prevent surface damage.

NOTE	► Units with glass flaps have to be stored upright.

8.2 Transport to the place of assembly

It is recommended to use either nylon ropes or mechanical lifting equipment for lifting NSHEV to the place of assembly.

It is not advised to use chains or wires without adequate protection of the product's surfaces. The weight of the unit is as indicated on the PID label. There is a PID label on each of the inside and the outside of the NSHEV. See chapter "7.4 PID label".

It is recommended that larger NSHEV (where the weight is more than 50 kg) are always picked up by at least four people.

The NSHEV must not be twisted while being transported.

We point out that if these instructions are not heeded, Colt can accept no warranty claims.

When carrying the units, observe any guidance and legal limits for lifting and carrying loads. See the EC Directive 90/269/EC for more information.

Forward this information to the appropriate groups of people (fitters / construction manager).

9 Installation

9.1 Before installation

Before any work is carried out, ensure that adequate access is available at the place of assembly. Take any appropriate safety precautions in accordance with local safety regulations.

Before installing the NSHEV the planner needs to ensure that the cutting of a hole and the weight of the equipment does not unduly weaken the structure of the roof.

The location of the installation must be chosen so that there is sufficient space to inspect, maintain and repair the NSHEV.

Detailed installation instructions should be created by the project manager for every single order.

Before beginning with the installation, it is necessary to check the drawing and specifications to ensure that the nature and location of the installation are correct and conform to that drawing, including the layout of any power or air lines. Any variances need to be clarified with the customer before starting installation.

It is necessary to provide appropriate support for the unit.

Ensure that all loads (the ventilator's own weight, snow load, wind suction, opening forces) can be accommodated by the building structure (frames, glazing bars, etc.).

For each kind of load, a maximum deflection of L/300 is allowed for the unit's base.

An additional maximum deflection of 5 mm and a flatness tolerance according to DIN 18202, Table 3, line 7 must be taken into account for the "dead weight" load.

A greater deflection or sideways movement of the base can lead to increased stresses within NSHEV, which can lead to leaks, a reduced life or even damage or destruction of equipment.

Before connecting any supply lines make sure they are switched off.

9.2 Installation to the building

It is necessary to observe the essential safety information published here.

The unit is fixed from the roof. However the connection of any air supply or power lines is done from inside the building.

The NSHEV units are delivered as completely pre-assembled units, with the exception of glass flaps (GL28, GL30, GL30, GLS).

NOTE	**Assembly of the flange** ► When connecting the flange to the building, water may enter if no sealing tape or similar is used for sealing.

The NSHEV with glass flaps are supplied as partly assembled units:

► Base

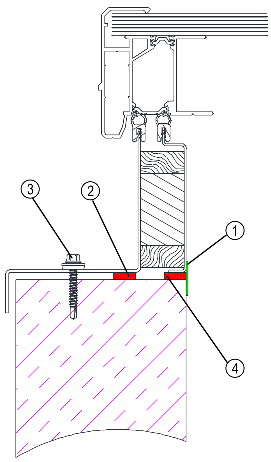
► Flaps

Where the units are small and are lower weights the glass flaps are supplied ready to be fixed on to the base.

9.2.1 Connection to the building structure

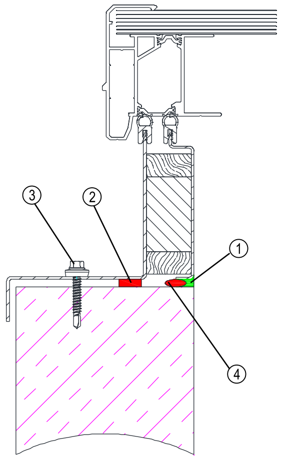
The following example fixing methods should ensure a tight connection of an NSHEV to the building.

Option A: with sealing foil + insulated upstand



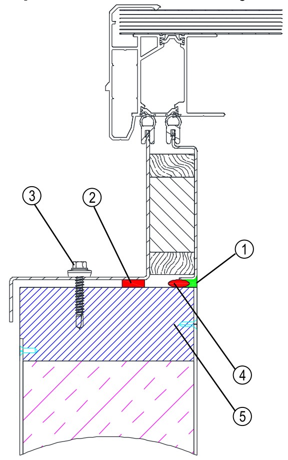
Item	Description	Recommendation
①	Sealing tape	
②	Vapour-permeable sealing tape	illbruck illmod 600
③	Self-tapping screw with washer	
④	Vapour-impermeable or foil sealing tape	illbruck TwinAktiv

Option B: with silicone joints + insulated upstand



Item	Description	Recommendation
①	Round cord	illbruck PR102 PE round cord
②	Vapour-permeable sealing tape	illbruck illmod 600
③	Self-tapping screw with washer	
④	Silicone joint	illbruck Perennator FA101

Option C: with silicone joints + thermally broken upstand



Item	Description	Recommendation
①	Round cord	illbruck PR102 PE round cord
②	Vapour-permeable sealing tape	illbruck illmod 600
③	Self-tapping screw with washer	
④	Silicone joint	illbruck Perennator FA101
⑤	Thermal break / hardwood / plastic	

The selected sealing tapes must meet the following requirements:

- ► Internal vapour diffusion-tight sealing tape
- ► External vapour-permeable sealing tape
- ► The sealing strips must be installed right round, tightly sealed and without kinks

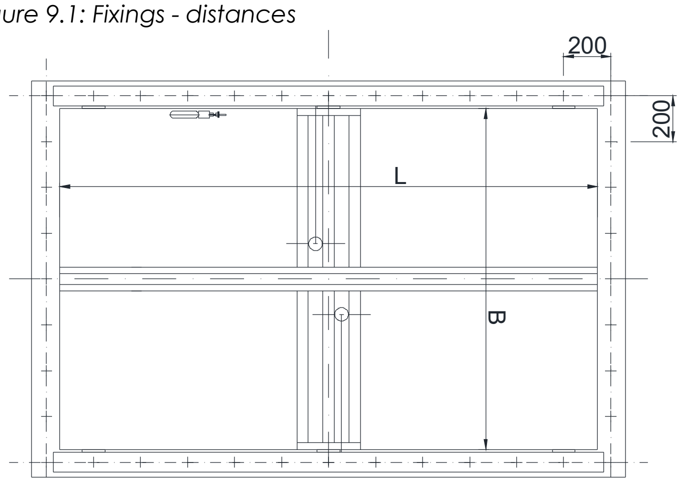
The sealing tapes must fully compensate for any unevenness of the base.

9.2.2 Fixation to the building structure

It is necessary to provide a seal between the flange and the upstand. Depending on the type of upstand, it is necessary to attach the ventilator to the upstand using the following fixings all round at a distance of ≤ 200 mm.

Supporting steelwork	Fixings
Timber subframe	6 x 50 wood screws to DIN 96 or DIN 571 with sealing washer
Concrete	Machine screws M8 DIN 933 with metal anchors M8 with washers
Steel and trapezoidal sheet	DIN 7504-K tapping screws 6.3 x 25 with sealing washers e.g. Zebra pias (Würth®)
Daylighting system	Insert into the daylighting unit and secure with all-round fixing system.

Figure 9.1: Fixings - distances

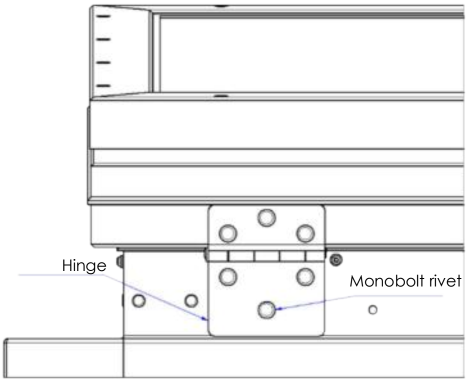


9.3 Fixing glass flaps (GL28/GL30, GL32/GLS)

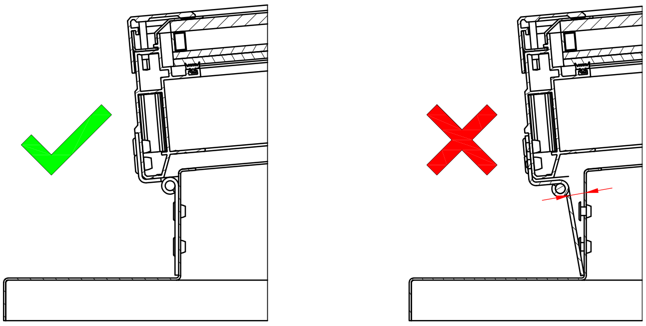
The flaps need to be mounted centrally into the unit base. The type of flaps and base determines the position of the flaps. To ensure the flawless function of the NSHEV, ensure that the flaps are positioned at the centre of the unit and adjust if necessary. To do this, the correct alignment of the unit base should be checked before installing the glass hoods (e.g. by measuring the diagonals of the opening area)

After inserting the flaps, the hinges, which are pre-assembled on the appliance base, can be attached to the glass flaps. Monobolt blind rivets, which are supplied, and a suitable setting tool must be used for this purpose.

Figure 9.2: Mounting glass flaps



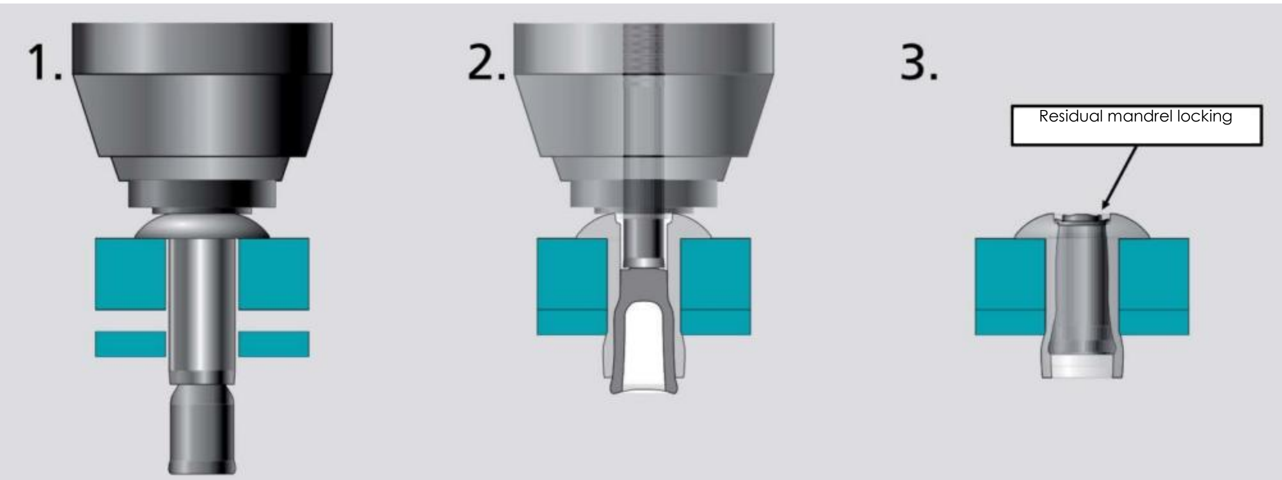
Ensure that the hinges are properly seated. There must be no gap between the hinge and the base of the device or the glass flap.



The following riveting tools are recommended for installing the monobolt blind rivets see chapter "9.9.5.1 Fixing with Monobolt rivets (standard)".

When setting Monobolt blind rivets, ensure that the tools are matched to the blind rivets and that the setting stroke or pulling force is set correctly. It must also be checked that the monobolt blind rivets have been locked by the setting tool after installation. This can be recognised by the visible residual mandrel locking (see Figure 9.3)

Figure 9.3: Typical setting sequence for monobolt blind rivets



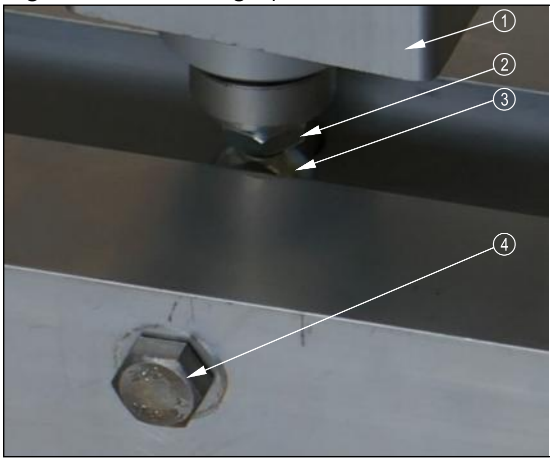
NOTE	► If monobolt blind rivets are not locked, the rivet mandrels can loosen over time and reduce the stability of the rivet, fall off and lead to water leaks. • • •

9.4 Fitting the pneumatic cylinders / electric actuators

NOTE

► The pneumatic cylinders or electric actuators are not adjusted in the factory. After the installation of the NSHEV, the eye bolts must be adjusted in such a way that the actuators move completely to their end positions, and completely close the flaps and pull them towards the seals.

Figure 9.4: Attaching eye bolts



① Pneumatic cylinder / electric actuator
② Lock nut
③ Eye bolt
④ Connecting screw

Check that the pneumatic cylinders lock

Check whether the pneumatic cylinder (if fitted) is locked when the flap is closed. This can be checked once air has been removed from the compressed air by attempting to open the flaps manually. If it is possible to open the flaps the pneumatic cylinder is not locked. In order to lock the pneumatic cylinder properly again, the following steps can be carried out.

a.) Remove the screw connecting the control channel to the pneumatic cylinder.
b.) Loosen the lock nut on the eye bolts.
c.) Turn the eye bolt of the piston rod of the pneumatic cylinder to move it out a bit further.
d.) Mount the connecting bolt between the flap channel and pneumatic cylinder and check again whether the pneumatic cylinder locks. Repeat steps a.), c.) and d.) if necessary.
e.) After making the adjustment, tighten the lock nut securely again.
f.) Tighten the connecting screw again.
g.) Perform a test run to check if the unit closes correctly.

Check that the flap closes hard onto the seal

Check that the flap closes hard onto the seal. If a pneumatic cylinder has been retracted and locked, or an electric actuator has been retracted, there remains a gap between the body and flap of the ventilator, then the eyebolt of the drive must be readjusted. The following steps should be carried out to complete a fine adjustment of the eyebolt.

a.) Remove the screw connection between the flap channel and the pneumatic cylinder or electric actuator.
b.) Loosen the lock nut on the eye bolts.
c.) Turn the eye bolt of the piston rod of the pneumatic cylinder or the push rod of the electric actuator further in.
d.) Mount the connecting bolt between the flap channel and pneumatic cylinder or electric actuator and check again whether the flap closes hard onto the seal. Repeat steps a.), c.) and d.) if necessary.
e.) Tighten the connecting screw again.
f.) Perform a test run to check if the unit closes correctly.

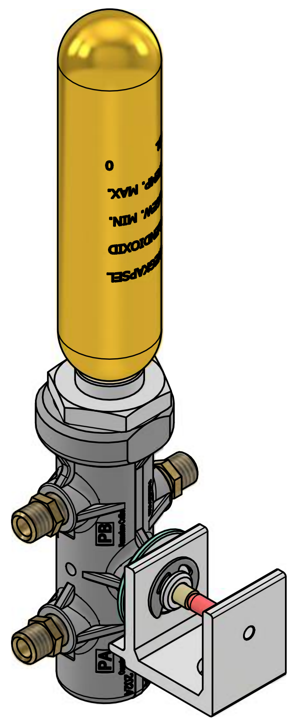
9.5 Connection of the thermal ventilation valve (FS***)

9.5.1 Connection of the TFC thermal release

⚠ WARNING	**Risk caused by smoke damage** ► If the thermal override valve is either incorrectly fitted or incorrectly commissioned, it can fail. If this happens there can be damage to property or even death. ► Smoke and heat ventilators need to be installed by trained personnel and also commissioned appropriately.

Automax TFC is a release valve. When reaching the release temperature (68°C/93°C/141°C/182 °C), the primary source of energy (CO_2 bottle) is activated and allows pressure to be brought to port A for activating the cylinder. The air connection to port B is closed off.

When at rest there is a passage between the inputs PA / PB and outputs A / B which allows unobstructed ventilation.

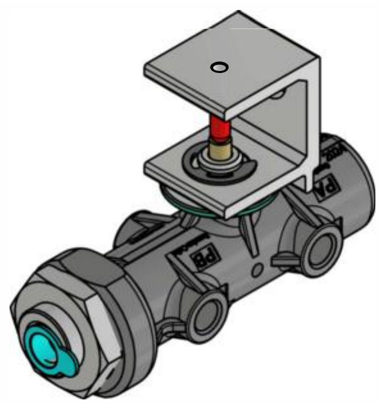


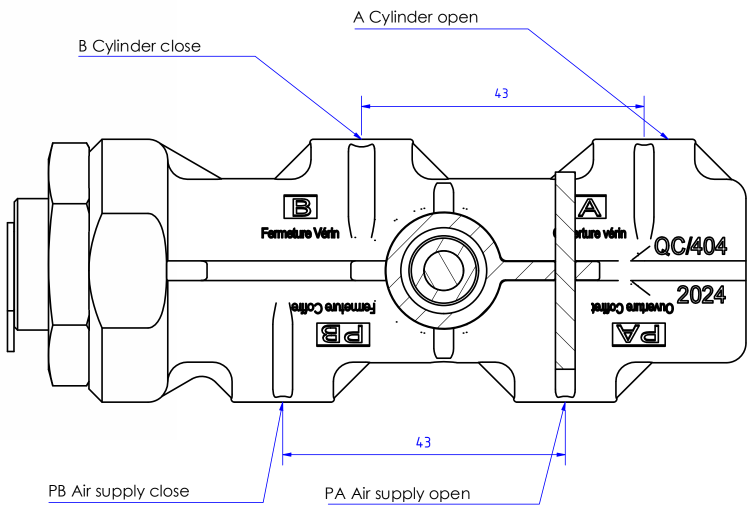
Connecting the Automax valve

- ► Orientate and properly fix the cylinder to the Apollo
- ► Remove the plastic cap from the valve
- ► Screw in the CO_2 bottle hand-tight
- ► Check that the cylinder engages in the bottom locking position

The bottom of the CO_2 bottle should always be pointing up.

The connection diagram of the Automax valve is shown below.





9.5.2 Pneumatic connections

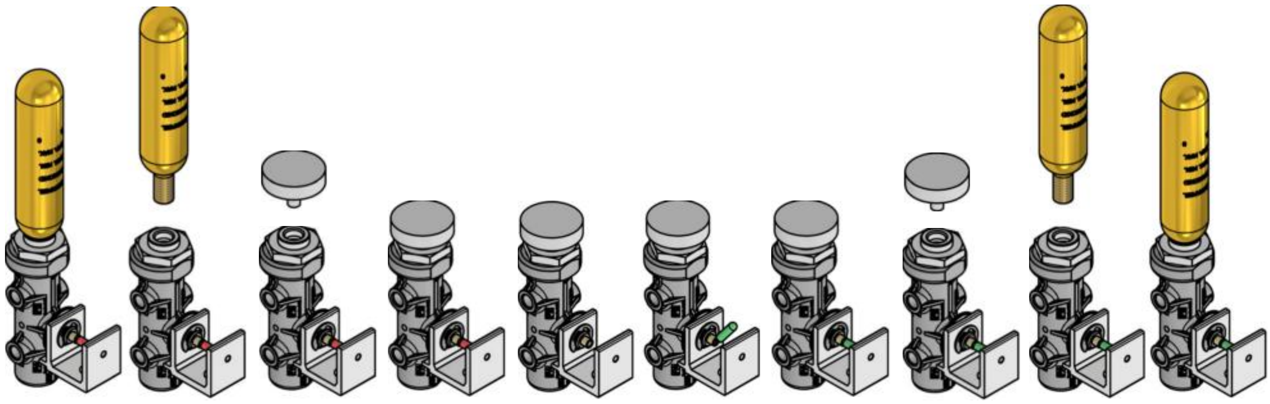
The pneumatic connection to the customer air supply has to be undertaken by trained personnel.

9.5.3 Replacing a glass bulb

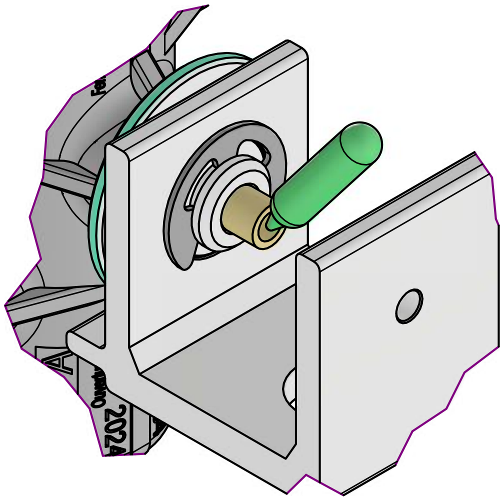
Replacing the glass bulb of the Automax valve requires usage of a tension screw tool. This tool can be ordered at the production sites that manufacture products that make use of the Automax valve.

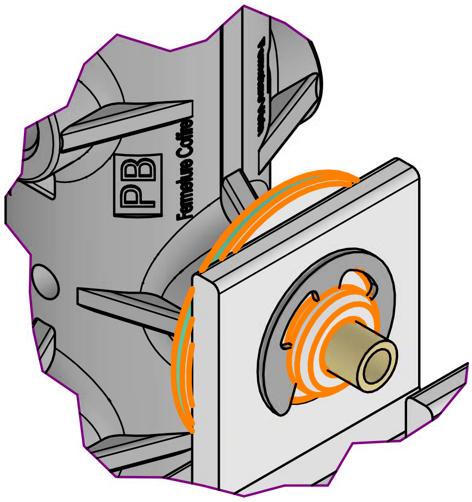
The tension screw is used to put tension on the pin that punctures the CO_2 bottle in case the glass bulb breaks during a fire.

The process of changing a glass bulb in the Automax valve is displayed and described below:



1.) Unscrew the CO_2 bottle that is installed in the system.
2.) Remove the CO_2 bottle and screw in the tension screw by hand.
3.) Make sure that the tool is fully screwed in and that it releases tension on the glass bulb.
4.) Remove the old glass bulb.
5.) Place the new glass bulb with the pointy end facing the valve. It might be required to turn the orange highlighted wheel for easier placement of the new glass bulb.





6.) When the glass bulb is properly placed, remove the tool from the valve by turning.
7.) Place the CO_2 bottle hand tight into the valve.

⚠ WARNING	**Risk caused by smoke damage** ▶ If the thermal override valve is either incorrectly fitted or incorrectly commissioned, it can fail. If this happens there can be damage to property or even death. ▶ Smoke and heat ventilators need to be installed by trained personnel and also commissioned appropriately.

NOTE	**Check glass ampoule** ▶ The glass ampoule need to be checked for leaks before use. Escaping fluid indicates a leak. Always align the end of the glass ampoule with the pointy end facing to the valve.

9.6 Functional tests

The final stage of installation of a NSHEV is the functional test.

It is necessary to check whether the ventilators can be operated from the control panel in accordance with the Operation Instructions, and that the louvres of the shutter mechanism open and close without problems.

The pneumatic cylinders or electric actuators must be able to move to their final positions.

A correct functional check does not replace the necessity to carry out a complete commissioning of the system.

9.6.1 TCA-VV-1.02

⚠ WARNING	**Risk caused by smoke damage** ► If the thermal ventilation valve is either incorrectly fitted or incorrectly commissioned, it can fail. If this happens, there can be damage to property or even death. ► An NSHEV needs to be installed by trained personnel and also commissioned appropriately.

The thermal ventilation valve TCA-VV-1.02 (and its internal supply lines) is pre-installed onto the inside of an NSHEV controlled by pneumatic cylinders.

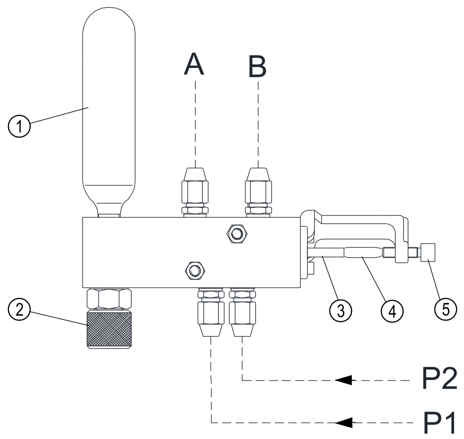
1.) In accordance with the connection diagram, connect the supply lines (min. 6 bar pressure) to the thermal ventilation valve. Connect the air supply line for ventilator "open" at Port "P1". Connect the air supply line for ventilator "closed" at Port "P2".

2.) Attach the glass ampoule ④ between the adjusting screw ⑤ and clamp bolt ③ and tighten. The red marked ring on the clamp bolt ③ should not be visible. Tighten the clamp screw ②.

NOTE	► The glass ampoule ④ needs to be checked for leaks before use. Escaping fluid indicates a leak. Align the ampoule tip with the ⑤ adjusting screw.

3.) Screw in the CO_2 bottle ①.

Figure 9.5: TCA-VV-1.02



① CO_2 bottle
② Clamp screw
③ Clamping bolt
④ Glass ampoule
⑤ Bolt

A Outlet cylinder OPEN Ø 6mm
B Outlet cylinder CLOSED Ø 6 mm
P1 Inlet cylinder OPEN Ø 8 mm
P2 Inlet cylinder CLOSED Ø 8 mm

9.6.2 TAVZ-2

WARNING	**Risk caused by smoke damage** ► If the thermal ventilation valve is either incorrectly fitted or incorrectly commissioned, it can fail. If this happens, there can be damage to property or even death. ► An NSHEV needs to be installed by trained personnel and also commissioned appropriately.

The thermal ventilation valve TAVZ-2 (and its internal supply lines) is pre-installed onto the inside of an NSHEV controlled by pneumatic cylinders.

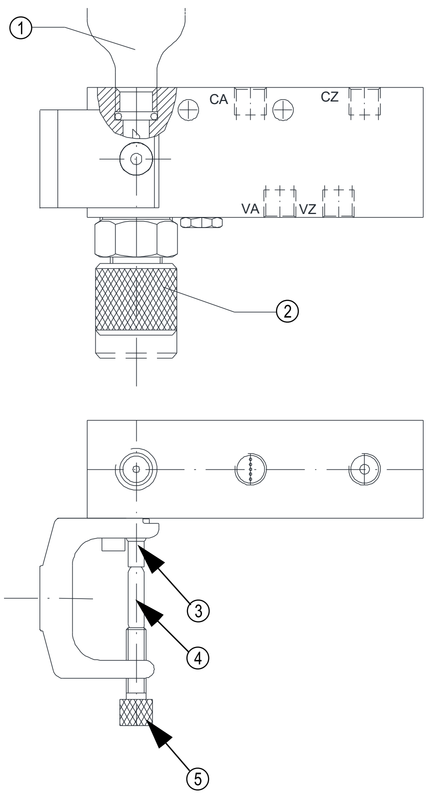
1.) In accordance with the connection diagram, connect the supply lines (min. 6 bar pressure) to the thermal ventilation valve. Connect the air supply line for ventilator "open" at Port "VA". Connect the air supply line for ventilator "close" at Port "VZ".

2.) Attach the glass ampoule ④ between the adjusting screw ⑤ and clamp bolt ③ and tighten.

NOTE	► The glass ampoule ④ needs to be checked for leaks before use. Escaping fluid indicates a leak. Align the ampoule tip with the ⑤ adjusting screw.

3.) Screw in the CO_2 bottle ①.

Figure 9.6: TAVZ-2



① CO_2 bottle
② Clamp screw
③ Clamping bolt
④ Glass ampoule
⑤ Bolt

CA Outlet cylinder OPEN, Ø 6 mm
CZ Outlet cylinder CLOSED, Ø 6 mm
VA Inlet cylinder OPEN, Ø 8 mm
VZ Inlet cylinder CLOSED, Ø 8 mm

9.6.3 TAG-690-VV-42

⚠ **WARNING**	**Risk caused by smoke damage** ► If the thermal ventilation valve is either incorrectly fitted or incorrectly commissioned, it can fail. If this happens, there can be damage to property or even death. ► An NSHEV needs to be installed by trained personnel and also commissioned appropriately.

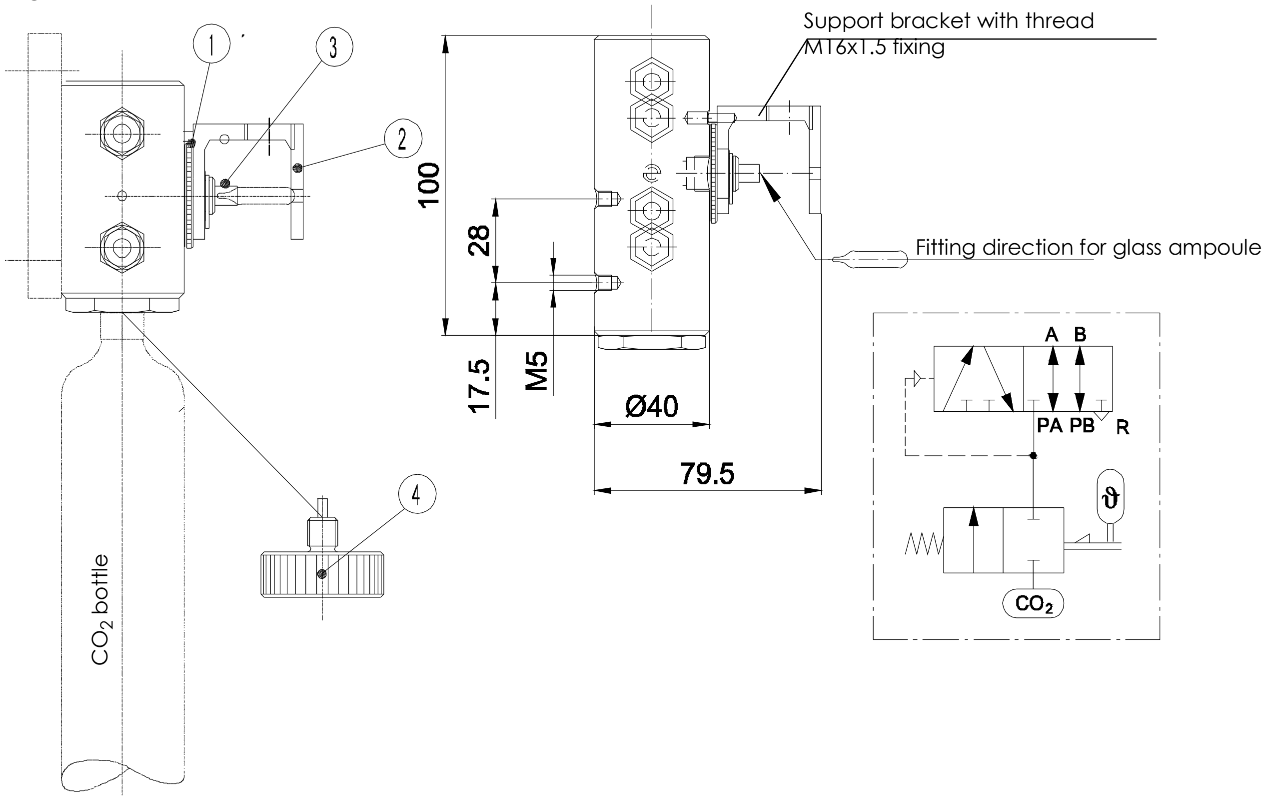
1.) In accordance with the connection diagram, connect the supply lines (min. 6 bar pressure) to the thermal ventilation valve. Connect the air supply line for ventilator "OPEN" at Port "PA". Connect the air supply line for ventilator "CLOSED" at Port "PB".

2.) The knurled nut ① has to be unscrewed completely and the glass ampoule has to be clamped between support bracket ② and valve slider ③.

3.) The clamp screw ④ has to be screwed into the CO_2 bottle connection to tension the release spring.

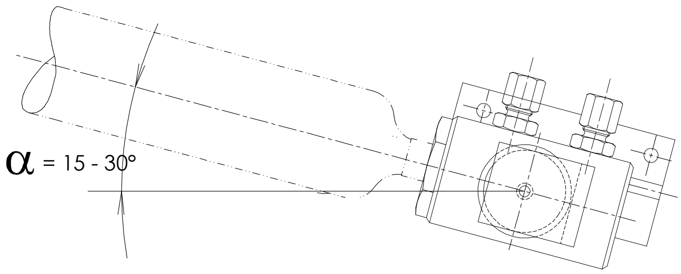
4.) Fit the unit with the glass ampoule. After the knurled screw ① has been tightened by hand, the clamp screw ④ can be taken apart, and the CO_2 bottle can be screwed in.

Figure 9.7: TAG-690-VV-42



9.6.3.1 Installation position TAG-690-VV-42

CO_2 bottle without riser tube



Type of installation

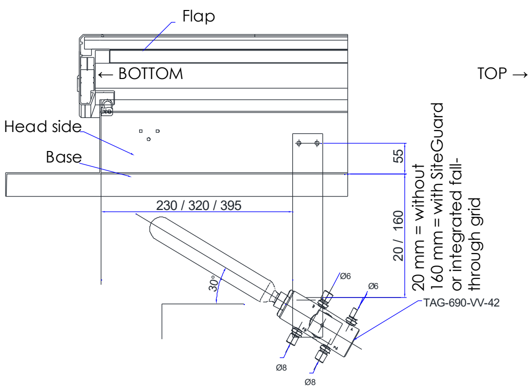
Electrical and pneumatic remote actuation of ventilators is possible

- ► **It must always be possible for the fire gases to have contact with the thermal releases.**
- ► **Always install these devices correctly.**

It is installed as follows:

Figure 9.8: Dimension between TVV and the body

Standard: Straight thermal release bracket

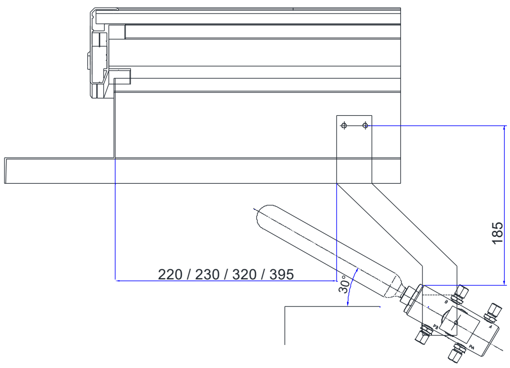


Without integrated fall-through grid (X, 600J, 1200J, P)	
230 mm at unit lengths:	1000 mm to 1200 mm
320 mm at unit lengths:	1201 mm to 1400 mm
395 mm at unit lengths:	1401 mm to 3000 mm

With integrated fall-through grid (B1200J)	
230 mm at unit lengths:	1000 mm to 1200 mm
320 mm at unit lengths:	1201 mm to 2200 mm
395 mm at unit lengths:	2201 mm to 3000 mm

SPECIAL: Angled thermal release bracket

Special for angled thermal release bracket
Special 150g / 182°C CO_2 bottle
Special Ø63 mm cylinder and 120g CO_2-bottle



Without integrated fall-through grid (X, 600J, 1200J, P)	
230 mm[1)] at unit lengths:	1000 mm to 1200 mm
320 mm at unit lengths:	1201 mm to 1400 mm
395 mm at unit lengths:	1401 mm to 3000 mm

[1)]With integrated fall-through grid (B1200J),CO_2-bottle

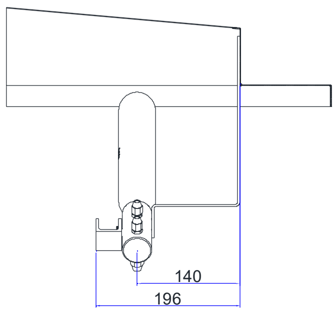
With integrated fall-through grid (B1200J)	
230 mm[1)] at unit lengths:	1000 mm to 1200 mm
320 mm at unit lengths:	1201 mm to 2200 mm
395 mm at unit lengths:	2201 mm to 3000 mm

[1)]With integrated fall-through grid (B1200J),CO_2-bottle

Figure 9.9: Dimension of the TVV - front view

NOTE

- ► When installing without a SiteGuard ; short bracket (20mm)
- ► When installing with a SiteGuard ; long bracket (160mm)
- ► SPECIAL:
  - Unit length 1000-1200 mm, Ø63 cylinder and 120 g CO_2 cylinder: angled thermal release bracket
  - 150 g / 182 °C CO_2-bottle: angled thermal release bracket



Only original spare parts and accessories may be used. Only use original equipment spare parts when making repairs.

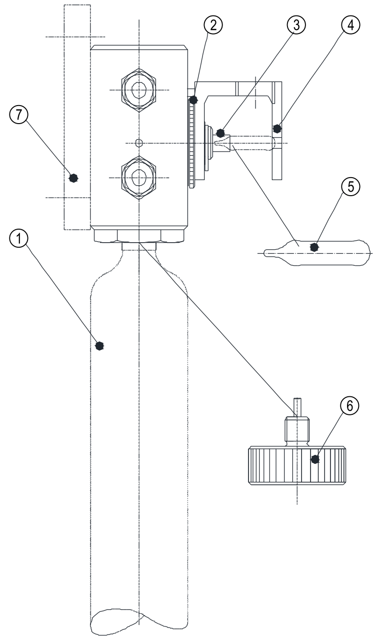
1.) During commissioning the adjusting screw ② has to be unscrewed completely and the glass ampoule ⑤ has to be clamped between support bracket ④ and clamp bolt ③.

2.) The clamp screw ⑥ has to be screwed into the CO_2 bottle connection to tension the release spring.

3.) Now the unit with the glass ampoule ⑤ can be installed.
After the adjusting screw ② has been tightened by hand, the clamp screw ⑥ can be taken apart, and the CO_2-bottle ① can be screwed in.

NOTE	► The glass ampoule ⑤ needs to be checked for leaks before use. Escaping fluid indicates a leak.

Figure 9.10: TAG-690-VV-42 - Overview



① CO_2 bottle
② Bolt
③ Valve
④ Support bracket
⑤ Glass ampoule
⑥ Clamp screw
⑦ Support bracket

9.7 Connecting the source of energy

It is necessary to observe the essential safety information published here.

Depending on the type of the selected NSHEV, it can be controlled either pneumatically or electrically. The connection details are:

Pneumatic P2BD	: Minimum 6 bar
M2B24z elektric	: 24 V DC (direct voltage), variable current (according to chapter "9.7.2 Electrical connection for 24 V DC electric actuators (M2B24)")
Electric M2B230	: 230 V AC (alternating voltage); 1.2 A

NOTE	► Before connecting any supply it is essential to make sure that electric and pneumatic supply lines are turned off.

NOTE	► With a pneumatic control unit in combination with glass flats, a pressure relief in the control box is not permitted, as otherwise the product may be damaged if the flap close too quickly.

9.7.1 Pneumatic connection (P2BD)

The thermal ventilation valve need to be connected to the pneumatic energy supply of the building by trained personnel.

9.7.2 Electrical connection for 24 V DC electric actuators (M2B24)

⚠ WARNING	**Danger from electrically live components** ► Danger of electrocution and death. ► Ensure that electrical supplies are always switched off before working on electrical components. Work on electrical components is only to be carried by qualified personnel.

Electric actuators are available for all sizes of the NSHEV. Electric actuators are equipped with a two-core electrical cable. Optionally floating limit switches may be connected. Connection details are as shown below. Wire to on-site distribution boxes. The current can be determined on the PID label (further info in chapter "7.4 PID label")

It is necessary to differentiate between standard actuators and special actuators:

	Standard actuators (G40P)	Special actuators (SG)
Actuator type	550 mm stroke: Item code: 353440 800 mm stroke: Item code: 353439	SG range
Nominal voltage	24 V DC+30% / -20%	24 V DC +30% / -20%
Current	4.0 A	variable: 0.8 A to 6.0 A

Figure 9.11: Circuit diagrams for standard actuators

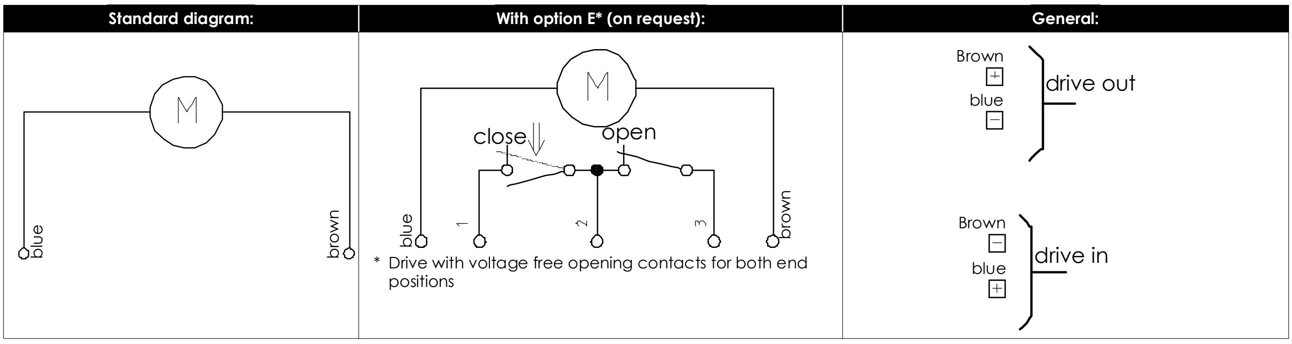
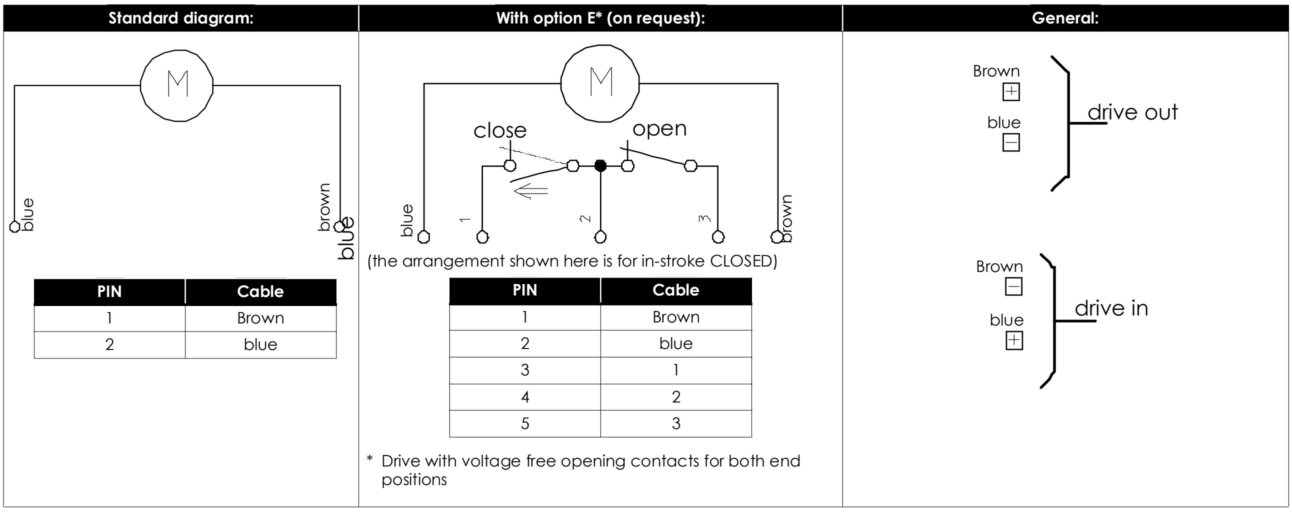


Figure 9.12: Circuit diagram for special motors (SG)



Standard diagram:

PIN	Cable
1	Brown
2	blue

With option E* (on request):

PIN	Cable
1	Brown
2	blue
3	1
4	2
5	3

The standard cable length is 2.5 m. It is possible to request longer cable lengths.

9.7.3 Electrical connection 230 V AC electric actuators (M2B230)

⚠ WARNING	**Danger from electrically live components**
	▶ Danger of electrocution and death.
	▶ Ensure that electrical supplies are always switched off before working on electrical components. Work on electrical components is only to be carried by qualified personnel.

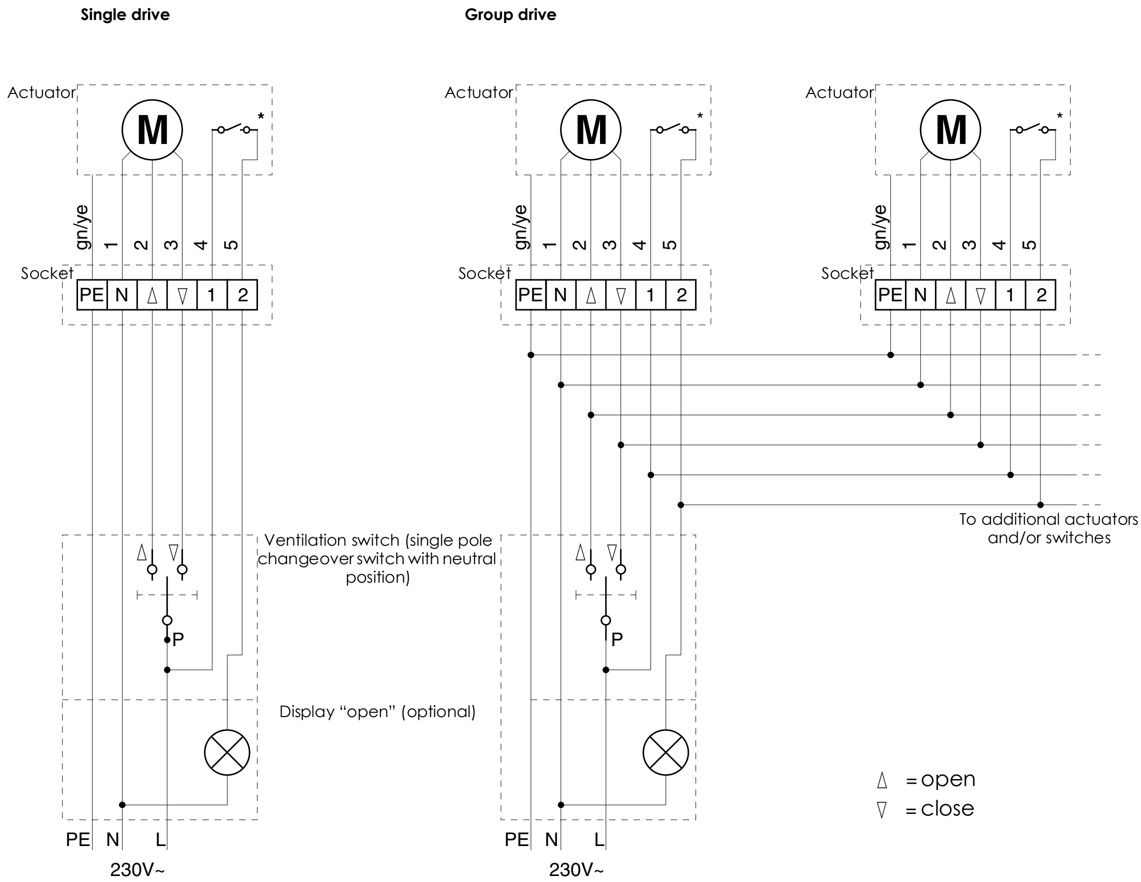
230 V AC electric actuators are available for all sizes of the NSHEV.

The electric actuators are equipped with as standard with a six-core electric cable. Connection details are as shown below. Wire to on-site distribution boxes.

Electric rack and pinion drive

Voltage	: 230 V AC
Current	: 1.2 A
Force	: 1000 N
Stroke	: 550 mm (Item code: 357692) 800 mm (Item code: 357693) 1000 mm (Item code: 357694)

Electric rack and pinion drive circuit diagram

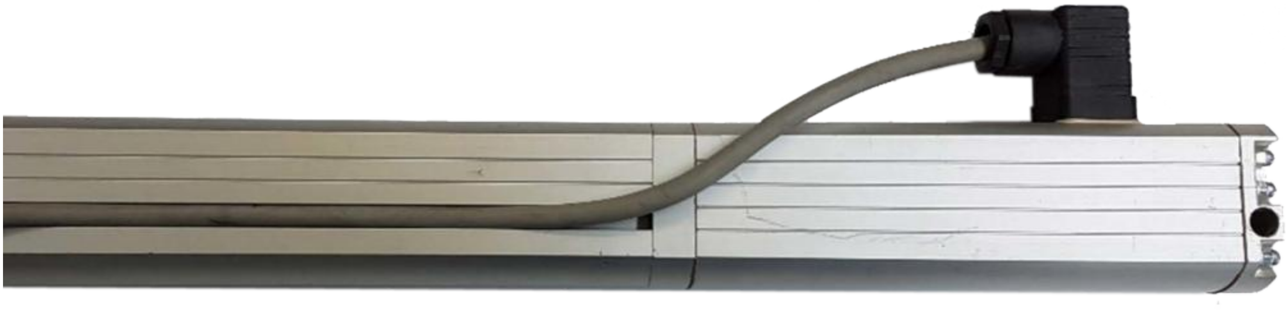


The standard cable length is 2.5 m. It is possible to request longer cable lengths.

9.7.4 Cabling for electric motors

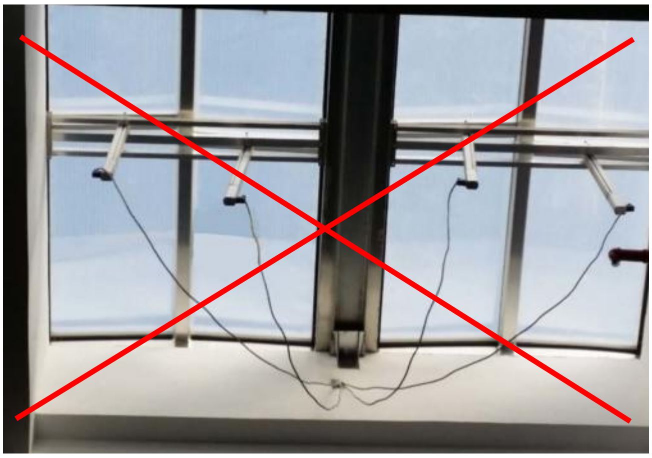
In the case of electric actuators, the cable is first routed through the groove on the electric actuator to the channel:

Figure 9.13: Example with a SG actuator



The cable is then routed along the channel to the terminal box. To be fixed according to local conditions. Use the most up to date methods.

Here are two examples of how the electric actuator should **NOT** be wired:



Here is one example of how the electric actuator should be wired:

9.8 Pneumatic fail-safe controls (FF***)

These controls operate autonomously with a pressure standby reservoir which stores the required energy to open the ventilator, as well as a control valve. The ventilator opens if the operating pressure reduces. When the operating pressure increases the ventilator closes. At the same time the pressure standby reservoir is refilled.

So the pneumatic fail-safe control is an additional system which is fixed onto the standard ventilator.

The following versions are available (see product coding on the PID label):

FFX: Fail-safe without thermal ventilation valve

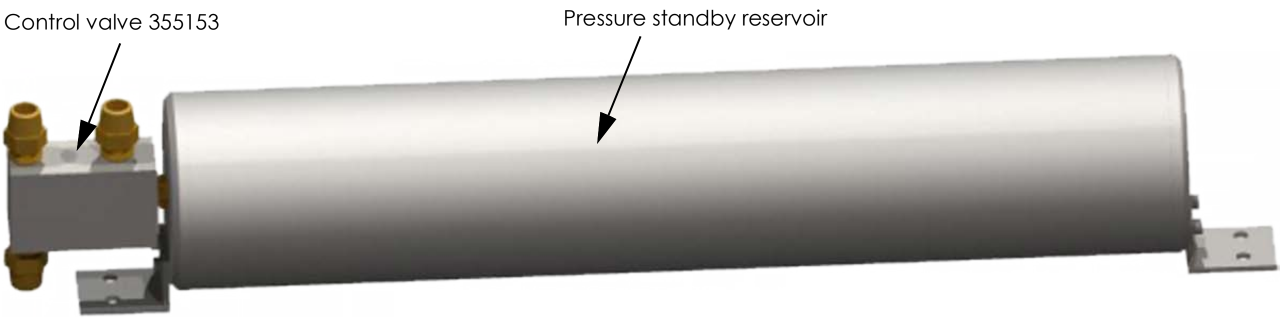
FF***: Fail-safe control with TVV (release temperature 68° / 93° / 141°)

NOTE

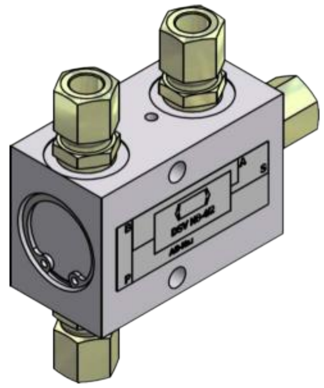
- ► Both for day to day ventilation as well as in case of fire, the pneumatic supply line must be vented when the ventilator is being opened. The customer's pneumatic air system must be so designed as to ensure that the inflowing air is vented quickly from the ventilator. If this does not happen, there can be a malfunction in the opening process because of undefined pressures in the supply line (the control valve may switch over randomly).
- ► For safe venting, the use of a quick-release valve (size 1/8" item no.: 6410, size 1/4" item no.: 105156) in the supply line directly upstream of the control valve is recommended. The optimum position for the quick release valve is at the position where the volumes of the pneumatic lines and the cylinder(s) respectively are approximately equal (½ volume before the quick release valve / ½ volume after the quick release valve).
- ► Especially where groups of ventilators are being controlled or where multiple devices are connected to a valve or have long pneumatic line lengths, special emphasis must be placed on venting away.
- ► It is necessary to provide a supply line with sufficient cross-sectional area.
- ► All connections should be checked for leaks. These can adversely affect the functioning of the Apollo and in particular the opening process.
- ► During the filling of the pressure standby reservoir or during the closing of the flaps, there may be a slight noise caused by the airflows within the valve.
- ► For certified versions (for 1E version see product coding on the PID label), both the pressure standby reservoir and the control valve must be installed outside the unit.

Arrangement of the fail-safe control

The pneumatic fail-safe control consists of a control valve and a pressure standby reservoir, which are installed onto of the standard ventilator. See additional info concerning the control valve in chapter "9.8.1 Control valve 355153".



9.8.1 Control valve 355153



Technical data

Min. operating pressure:	2.0 bar
Max. dynamic operating pressure:	12.0 bar
Operating temperature:	-20°C to 50°C
Pressure difference P > S:	1.0 bar
Dimensions:	60 mm x 40 mm x 30 mm
Item Code:	355153

Figure 9.14: Control valve

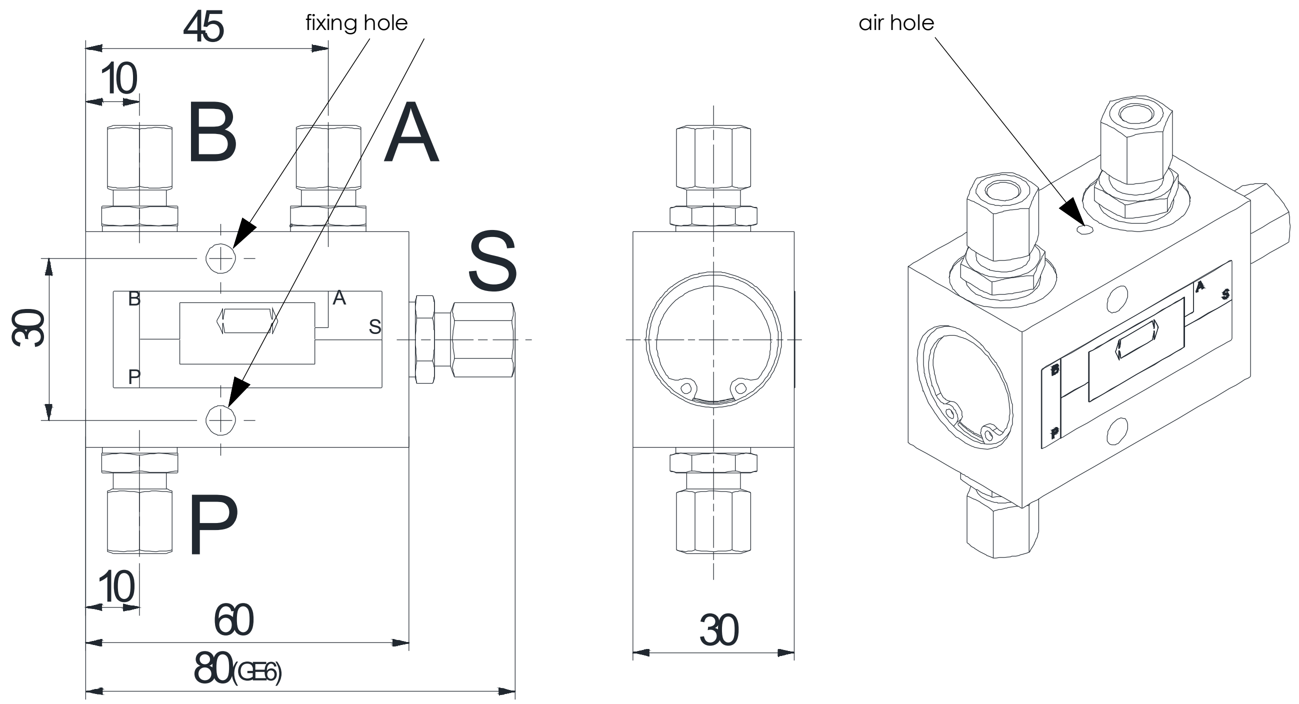
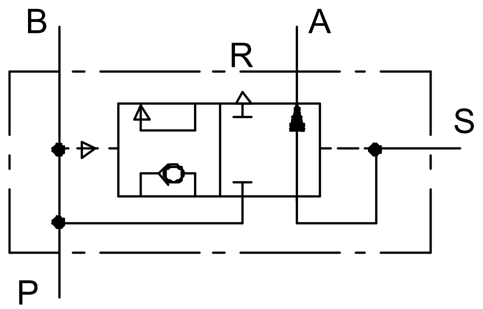


Figure 9.15: Control valve schematic DSV N8-4/2



P	Air supply
S	Pressure standby reservoir
A	Cylinder outlet OPEN
B	Cylinder outlet CLOSED

Because of the difference in pressure between the pressure standby reservoir (S) and the operating pressure (P) of the supply air, the effective working pressure is reduced by 1.0 bar. The reduction of the effective working pressure has been taken into account in the design of the ventilator.

9.9 Assembly of wind baffle

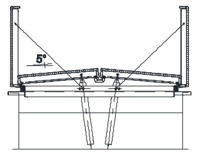
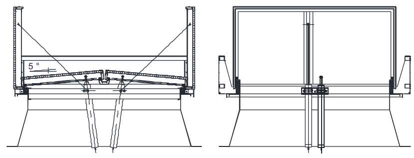
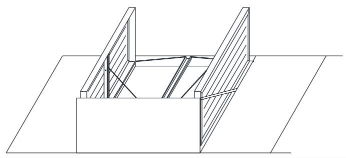
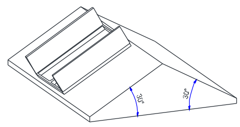
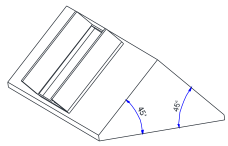
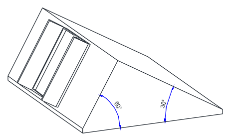
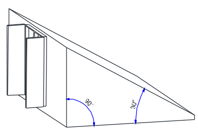
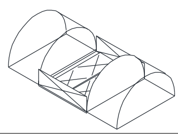
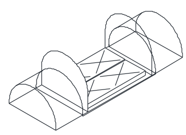
The PID label sets out what type of wind baffle must be installed.

Example: AP/1E/1000/1000/B1/A2/X/P2BD/FS68/N5/X/**W2**/**A4**

W2 = Two-sided wind baffle

A4 = Flat roof, 350-499 mm conical upstand

The table below shows the various kinds of installation and wind baffles:

Coding	Description	Wind baffle	
A1	Flat roof, 250-349 mm straight upstand	W0	
A2	Flat roof, 350-449 mm straight upstand	W0	
A3	Flat roof, 450-500 mm straight upstand	W0	
A4	Flat roof, 350-499 mm conical upstand	W0 or W2	
A5	Flat roof, 500 mm conical upstand	W0 or W2	
B	Saddle roof light	W1	
C1	30°/30° shed roof	W0	
C2	45°/45° shed roof	W0	
C3	30°/60° shed roof	W0	
C4	30°/90° shed roof	W0	
D1	350-499 mm roof light, ventilator installed parallel	W0 or W2	
D2	500 mm roof light, ventilator installed parallel	W0 or W2	
D3	350-500 mm roof light, ventilator installed at right angles	W0 or W2	

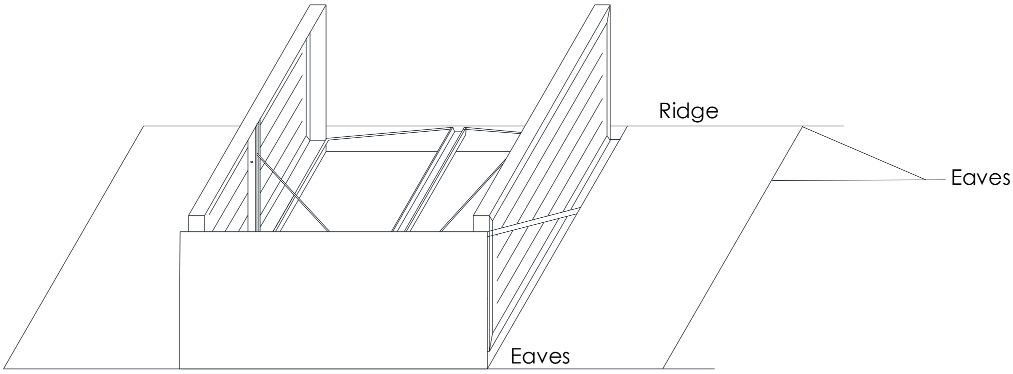
Key

Coding	Description
W0	No wind baffle
W1	One-sided wind baffle
W2	Two-sided wind baffle

9.9.1 Installation of the wind baffle in a saddle roof light (W1/B)

For EN 12101-2 certified NSHEV installed into a saddle roof light, wind baffles must be installed on the eaves side. Only the original wind baffle may be used with its original fixings.

Figure 9.16: Schematic showing how to assemble the wind baffle (W1/B)

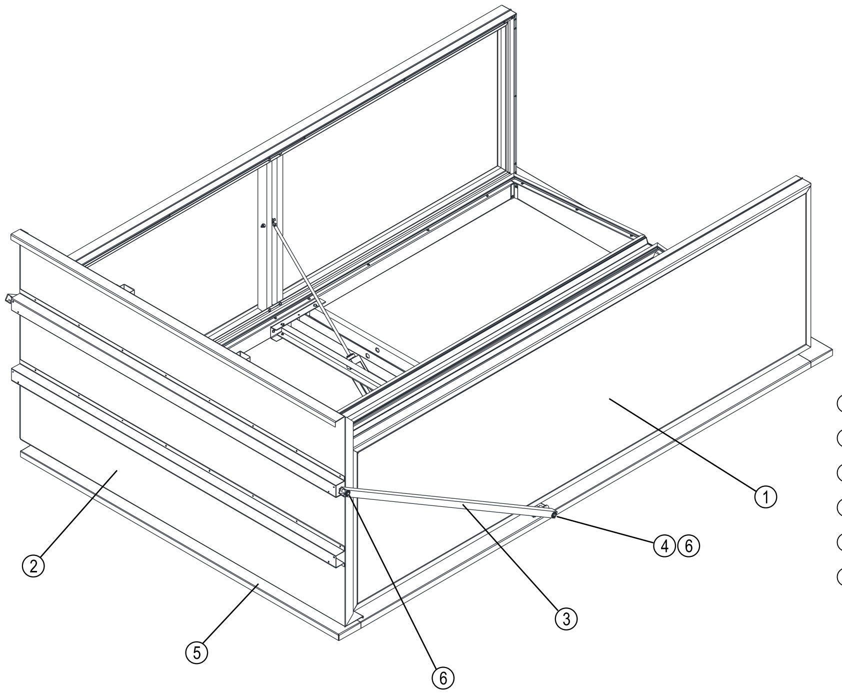


Owing to the large size of the wind baffle, it is necessary to fix these once the NSHEV itself has been fixed, and to do this with at least three people.

Procedure:

1.) Set the wind baffle onto the eaves sided flange, then centre it.
2.) Fix with 4.9 x 11 rivets on to the base.
3.) Apply the lateral square tubes by applying bolts (d=10 mm) through the wind baffle as well as the lower construction.
4.) Secure the square tubes with Starlock push on fasteners.

Figure 9.17: Schematic showing the fully assembled wind baffle (W1/B)



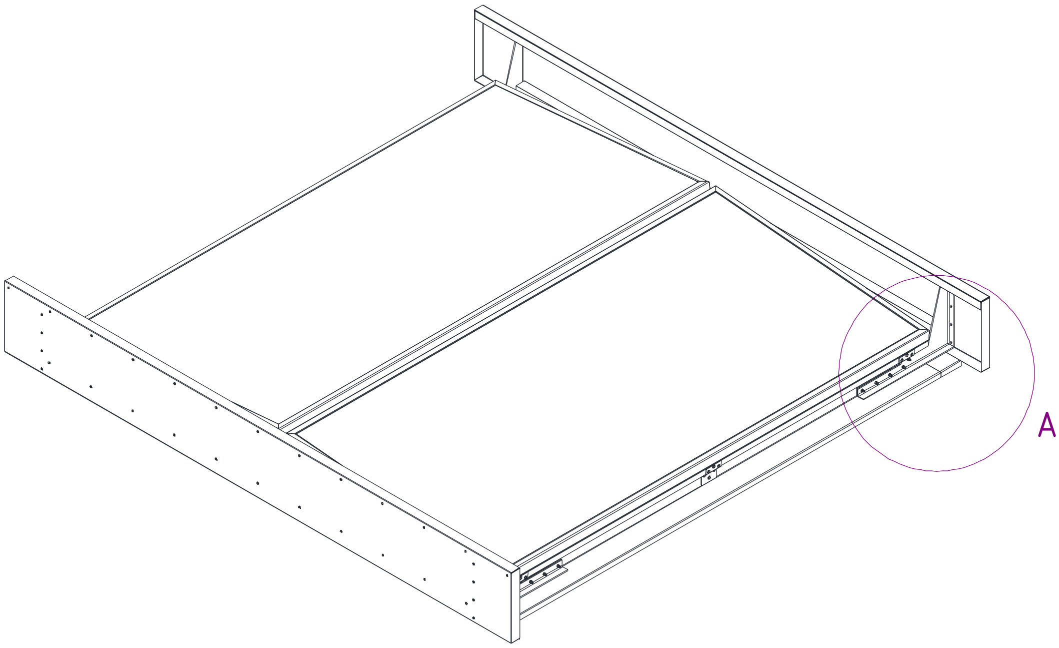
① NSHEV
② Wind baffles
③ Square tube 30/30/3
④ Lower assembly
⑤ 4.9 x 11 blind rivet
⑥ Starlock push on fasteners

9.9.2 Installation of wind baffles when installing onto a conical upstand (W2/A4 or A5)

For EN 12101-2 certified NSHEV units fixed onto a conical upstand, it is recommended that wind baffles are installed on both sides so as to improve the aerodynamic coefficient.

Only the original wind baffle may be used with its original fixings. These are delivered along with the baffle.

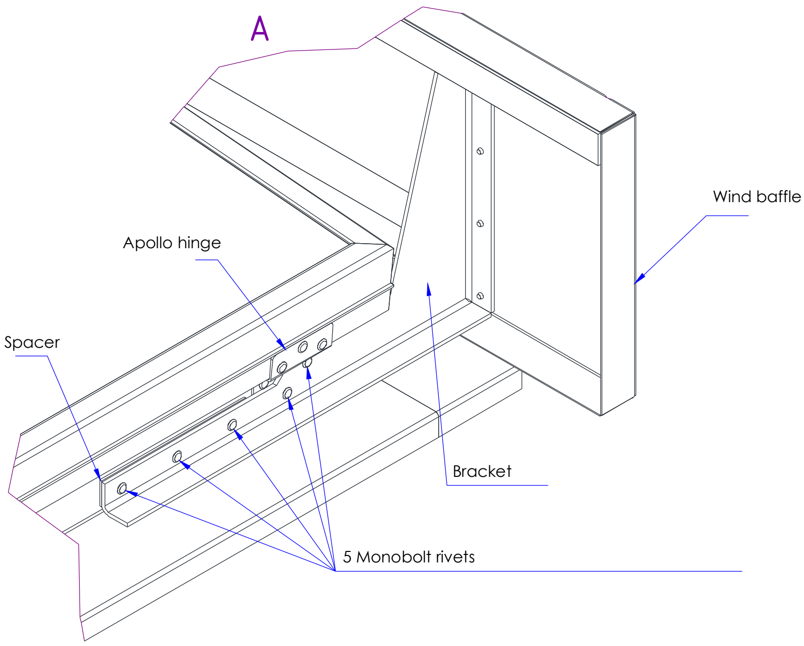
Figure 9.18: Schematic showing how to assemble the wind baffle (W2/A4 or A5)



Baffles are delivered in break down form and have to be installed on site. Wind baffles are installed on each side with either five Monobolt rivets or five screws together with a sealing disc. In this instance two of the five fixings always also have the job of fastening the Apollo hinges.

See chapter "9.9.5 Installation of wind baffles (W2) for conical upstand (A4/A5) and roof lights (D1/D2/D3)" for further details.

Figure 9.19: Schematic showing how to assemble the wind baffle (W2/A4 or A5) - Detail A

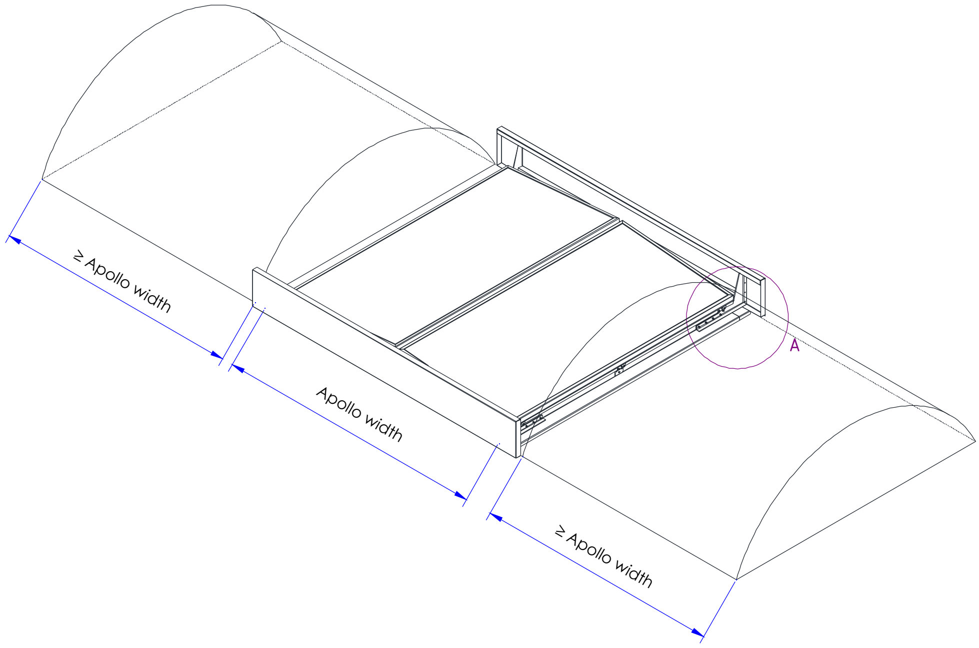


9.9.3 Installation of wind baffles when they are being fixed at right angles to a roof light (W2 / D3)

For EN 12101-2 certified NSHEV units fixed at right angles to a roof light it is recommended that wind baffles are installed on both sides so as to improve the aerodynamic coefficient.

Only the original wind baffle may be used with its original fixings. These are delivered along with the baffle.

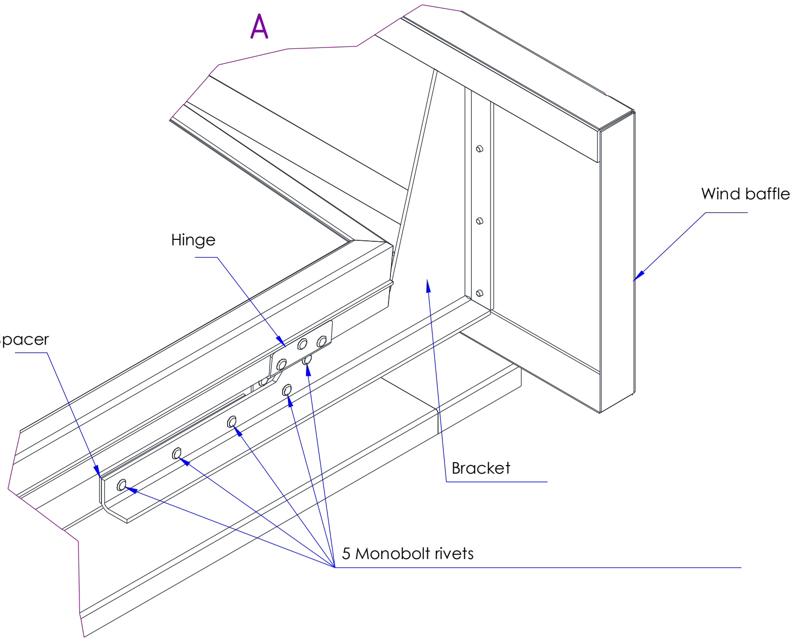
Figure 9.20: Schematic showing how to assemble the wind baffle (W2/D3)



Baffles are delivered in break down form and have to be installed on site. Wind baffles are installed on each side with either five Monobolt rivets or five screws together with a sealing disc. In this instance two of the five fixings always also have the job of fastening the Apollo hinges.

See chapter "9.9.5 Installation of wind baffles (W2) for conical upstand (A4/A5) and roof lights (D1/D2/D3)" for further details.

Figure 9.21: Schematic showing how to assemble the wind baffle (W2/D3) - Detail A

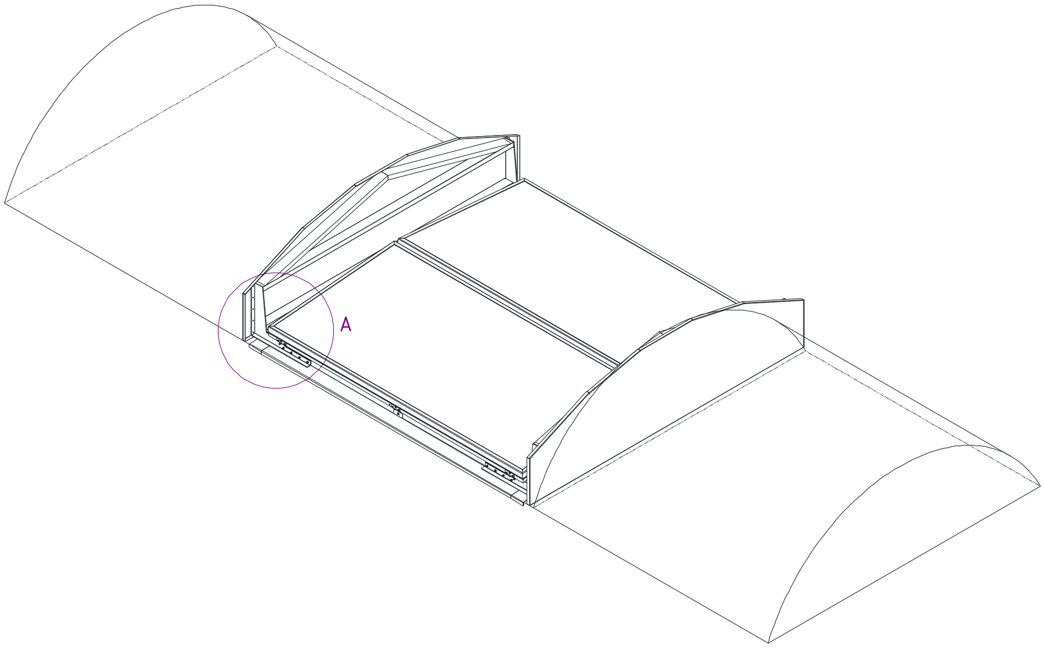


9.9.4 Installation of wind baffles when they are being parallel to a roof light (W2/D1 or D2)

For EN 12101-2 certified NSHEV units fixed parallel to a roof light it is recommended that wind baffles are installed on both sides so as to improve the aerodynamic coefficient.

Only the original wind baffle may be used with its original fixings. These are delivered along with the baffle.

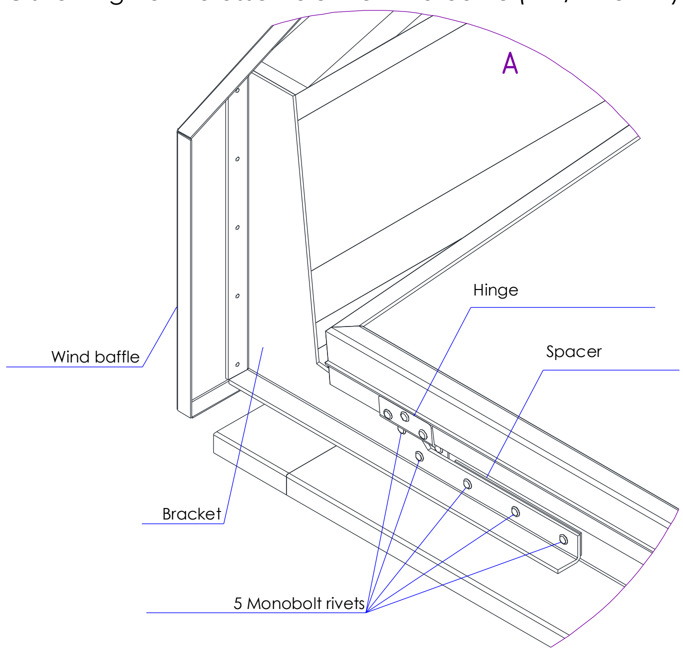
Figure 9.22: Schematic showing how to assemble the wind baffle (W2/D1 or D2)



Baffles are delivered in break down form and have to be installed on site. Wind baffles are installed on each side with either five Monobolt rivets or five screws together with a sealing disc. In this instance two of the five fixings always also have the job of fastening hinges.

See chapter "9.9.5 Installation of wind baffles (W2) for conical upstand (A4/A5) and roof lights (D1/D2/D3)" for further details.

Figure 9.23: Schematic showing how to assemble the wind baffle (W2/D1 or D2) - Detail A



9.9.5 Installation of wind baffles (W2) for conical upstand (A4/A5) and roof lights (D1/D2/D3)

9.9.5.1 Fixing with Monobolt rivets (standard)

We recommend the following tools:

Gesipa PowerBird

Technical data

- Voltage: 14,4 V Li-Ion
- Current: 2,6 Ah
- Drive type: DC actuator
- Stroke 20 mm
- Force: 13 kN
- Weight: 2.3 kg

Avdel Genesis® nG3

Technical data

- Pressure: 5 to 7 bar
- Stroke 26 mm
- Cycle time (approx.) 1.2 s
- Force at 5.5 bar: 12.9 kN
- Weight: 2 kg

Figure 9.24: Isometric view - installation with Monobolt rivets

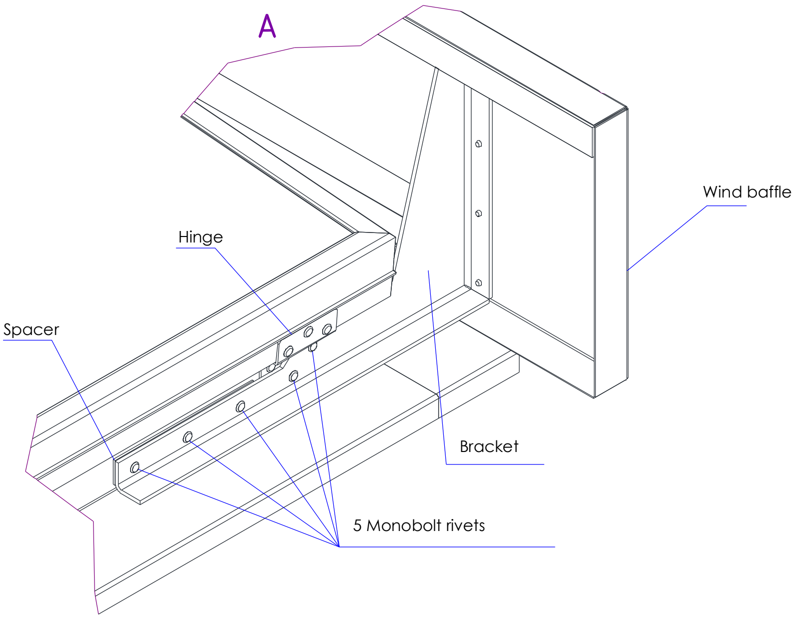


Figure 9.25: Front view - installation with Monobolt rivets

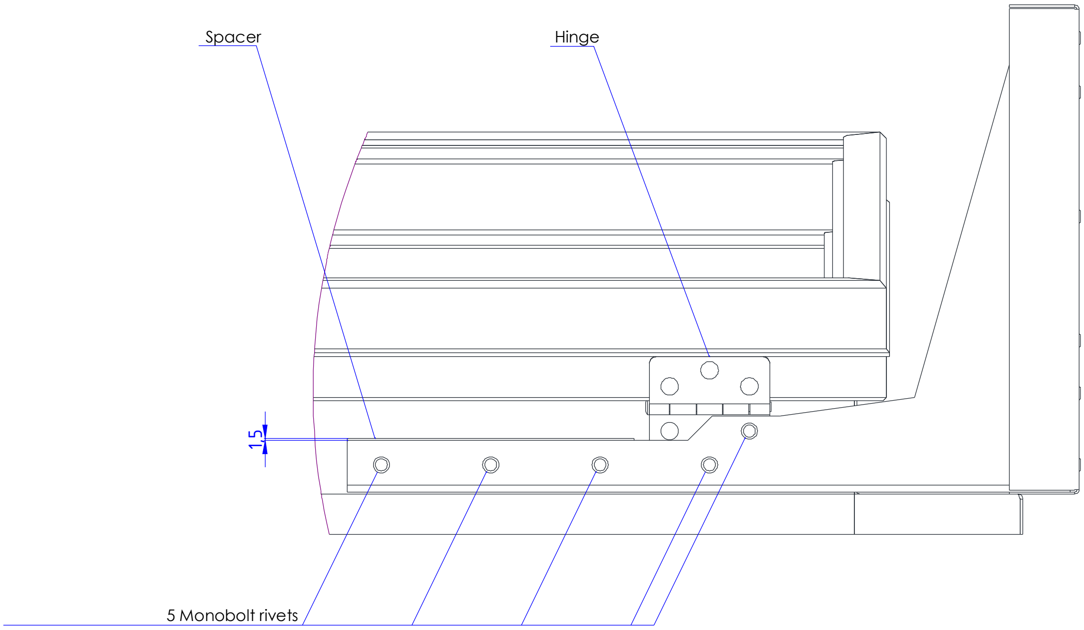
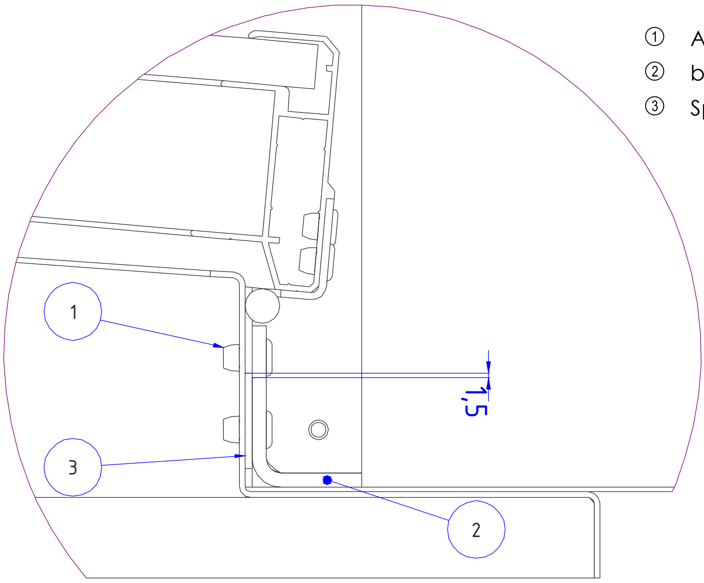


Figure 9.26: Side view - installation with Monobolt rivets



① Avdel Monobolt rivet 2774 6.4 x 15.87 (02774-00824)

② bracket 5 mm; alum.

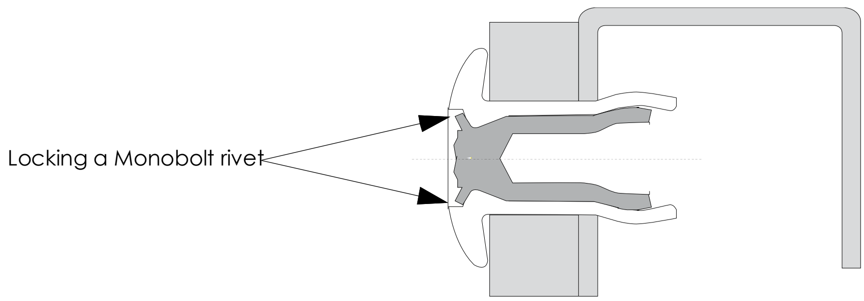
③ Spacer 212 x 33 x 2.5

Procedure:

1.) Place the wind baffle on the lower flange, aligning it in the middle so that the brackets rest against the base.

2.) Place the brackets ② of the wind baffle in front of the hinge, then place the spacer ③ between bracket ② and the base. Care must be taken that the spacer ③ is approximately 1.5 mm higher than the bracket ② of the wind baffle. Seal with silicone if necessary according to the following instructions.

3.) The brackets ② are riveted together to the hinge, each with two Monobolt rivets ①. Ensure that the Monobolt rivet ① is properly attached and that it is locked.



4.) With three further Monobolt rivets ①, the holders ② are riveted together with a spacer ③ onto the base. Again, attention must be paid to the locking of the rivet.

NOTE	
	► Prior to riveting, ensure that the rivet holes are free from burrs. ► If the wind baffles are retrofitted to an NSHEV that has not been prepared for their installation, first remove two rivets ① of the hinges. Then the three missing installation holes are to be made in the base. Check that the area is free from burrs. ► In order to ensure optimal rain defence, silicone can be used between the spacers ③ and the brackets ② of the wind baffle and the unit base. This can be particularly useful in the case of roughly made rivet holes.

9.9.5.2 Installation with screws (only possible with B1 base) (special)

Figure 9.27: Isometric view - installation with screws

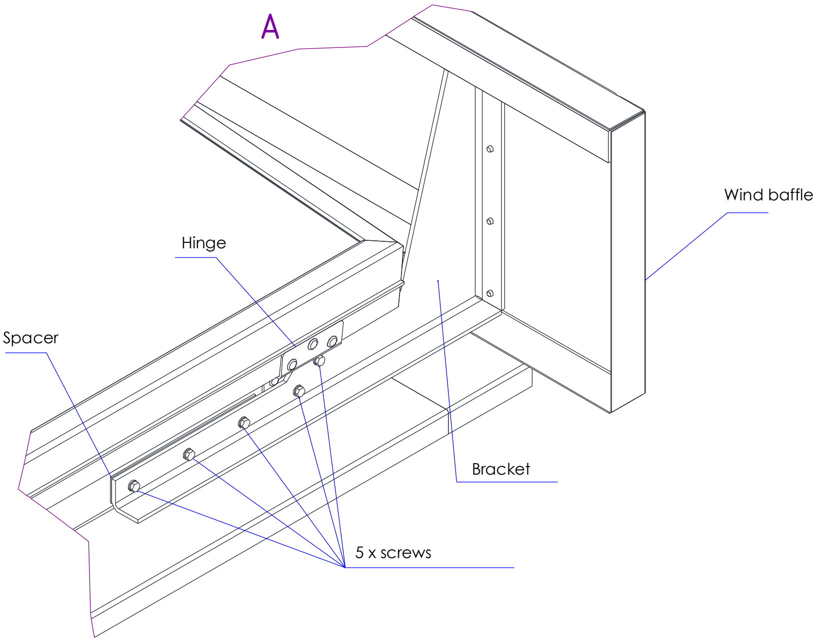


Figure 9.28: Front view - installation with screws

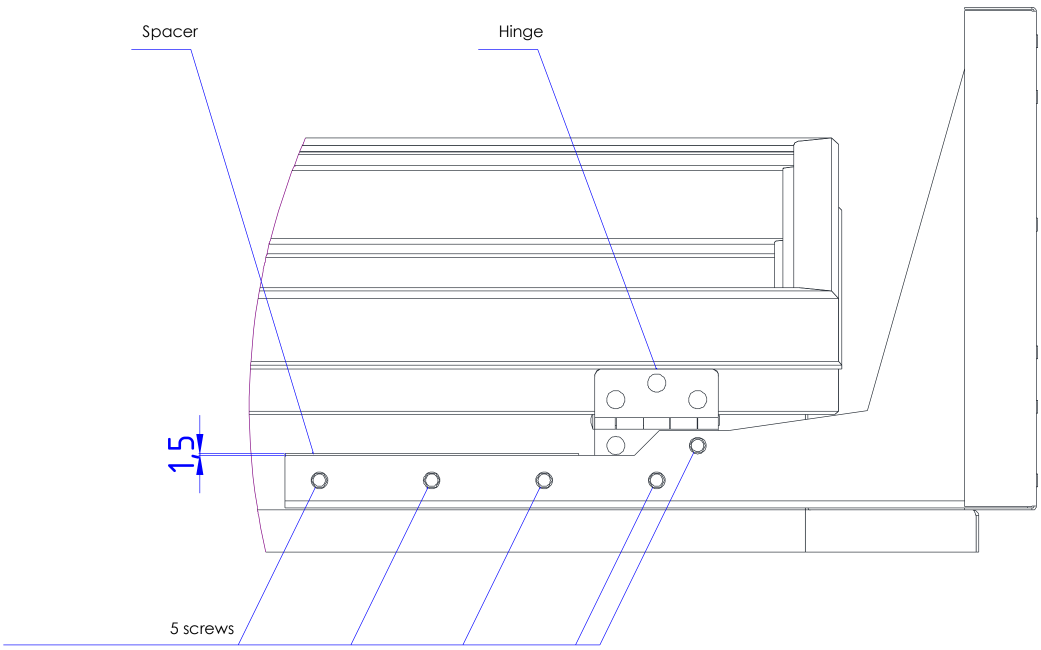
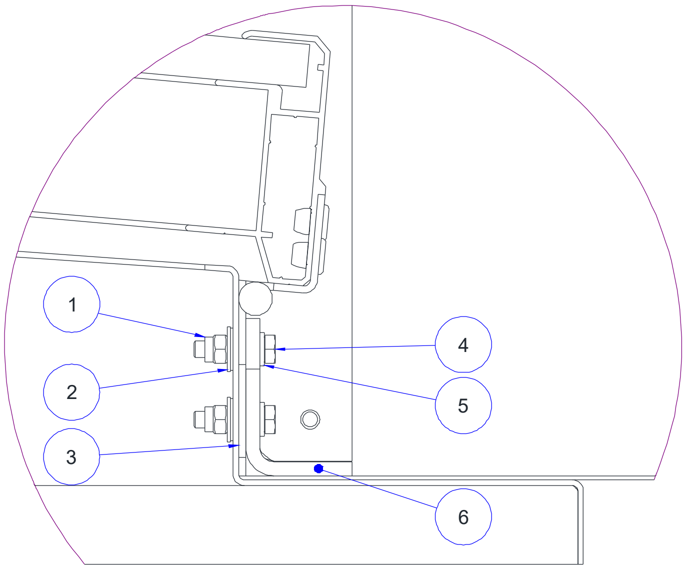


Figure 9.29: Side view - installation with screws



① M6 self-locking nut
② Washer
③ Spacer 212 x 33 x 2.5
④ M6 screw
⑤ M6 washer
⑥ bracket 5 mm; alum.

Procedure:

1.) Place the wind baffle on the lower flange, aligning it in the middle so that the brackets ⑥ rest against the base.

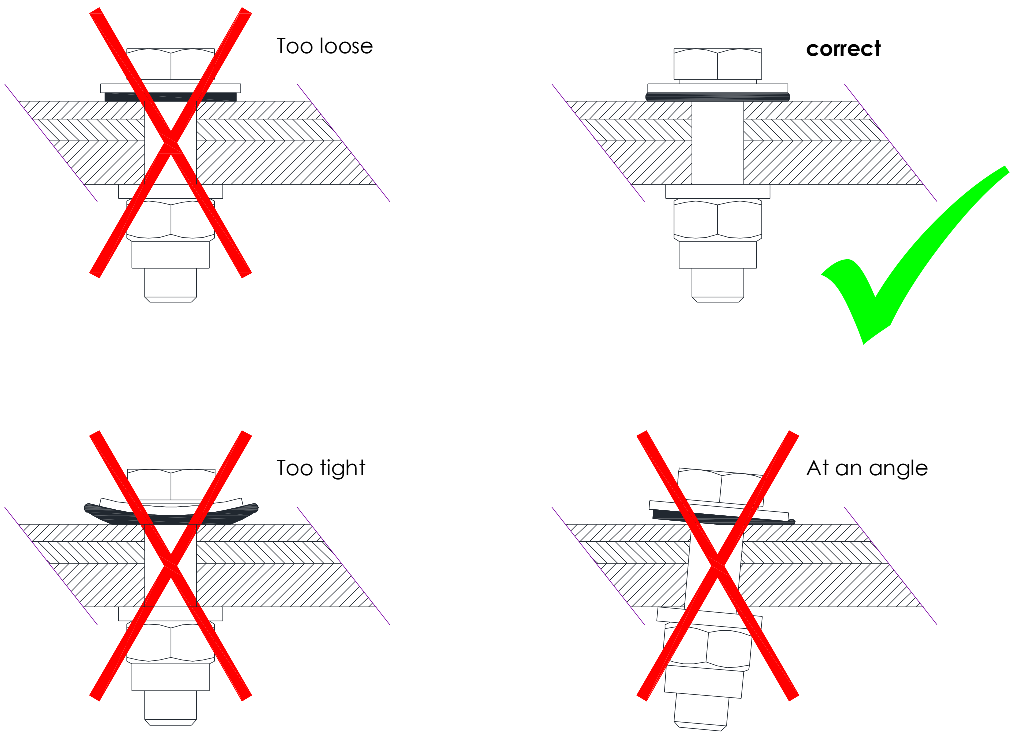
2.) Place the brackets ⑥ of the wind baffle in front of the hinge, then place the spacer ③ between bracket ⑥ and the base. Care must be taken that the spacer ③ is approximately 1.5 mm higher than the bracket ⑥ of the wind baffle.

3.) The brackets ⑥ are screwed together to the hinge, each with two screws ①.

4.) With three further screws ④, the brackets ⑥ are screwed together with a spacer ③ onto the base.

5.) The fastenings consist of a screw ④ with an inner sealing washer ②, a M6 washer ⑤ from the outside, and a M6 self-locking nut ①.

6.) The screws must be tightened (5 Nm).



NOTE	
	► The inner sealing washers must be installed from the inside. Otherwise water may enter. ► If the wind baffles are retrofitted to an NSHEV that has not been prepared for their installation, first remove two rivets of the hinges. Then the three missing installation holes are to be made in the base. Ensure that the area is free from burrs. ► The screws must be tightened according to the above illustration.

9.10 Retroffiting the support profiles

The NSHEV in the B1 (non insulated) and B2 (insulated) versions is fall-through proof according to GS-BAU-18 (as of February 2015).

Depending on the type of flaps, additional support profiles may be necessary. Usually these are pre-assembled in the factory. However retrofitting is also possible.

NOTE	► The additional support profiles increase the flap weight which leads to slightly reduced snow loads. Therefore consider the following in addition, on a project by project basis. ● Check the snow loads and weights with the product configurator ● Apply new PID labels with the changed weights and snow loads

Fix the additional profiles with Monobolt rivets into the flaps. The following tools are recommended for fitting the Monobolt rivets:

Gesipa PowerBird

Technical data

► Voltage:	14.4 V Li-Ion
► Current:	2.6 Ah
► Drive:	DC actuator
► Stroke	20 mm
► Force:	13 kN
► Weight:	2.3 kg

Avdel Genesis® nG3

Technical data

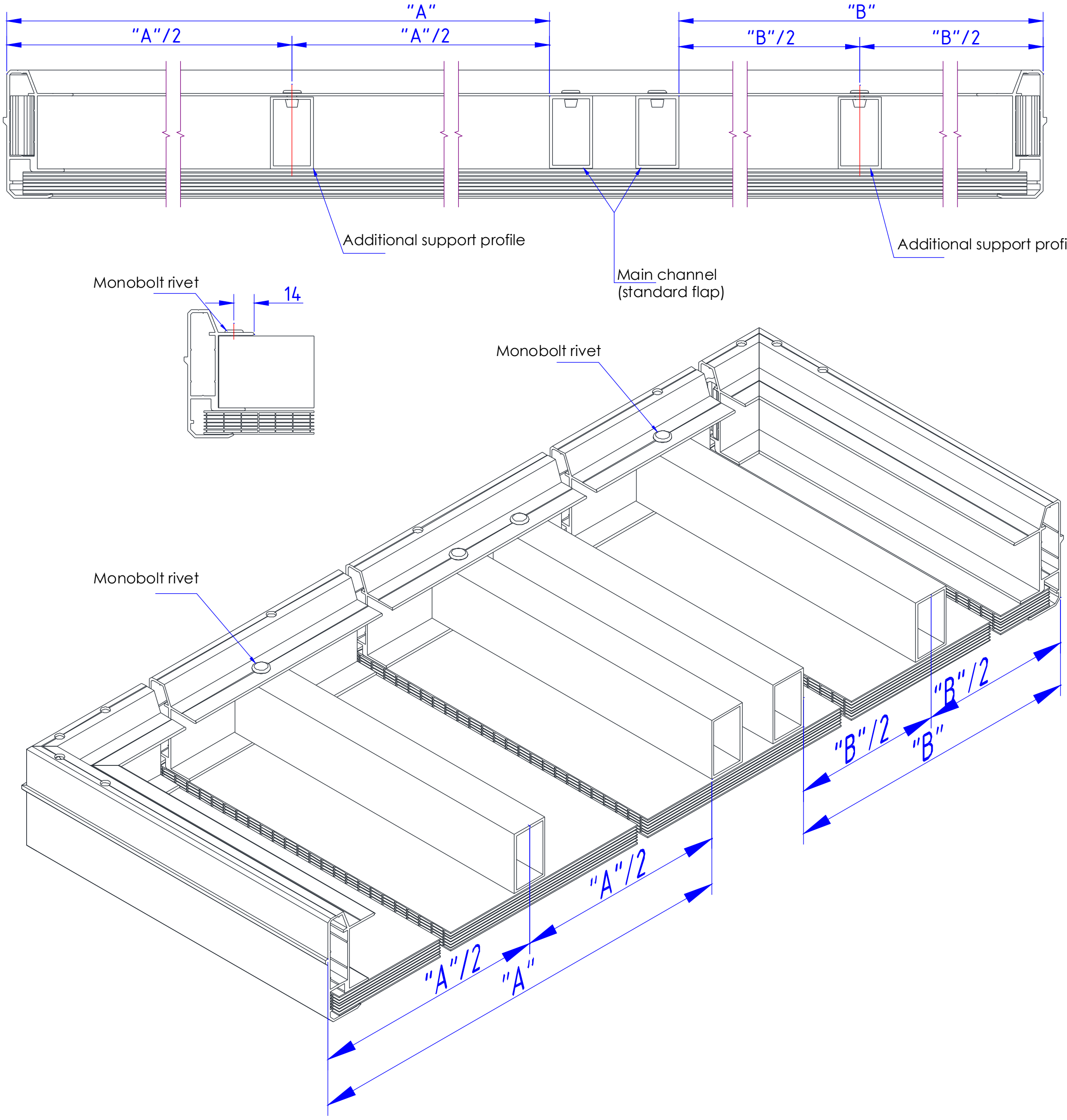
► Pressure:	5 to 7 bar
► Stroke	26 mm
► Cycle time (approx.)	1.2 s
► Force at 5.5 bar:	12.9 kN
► Weight:	2 kg

Furthermore e.g. a cordless screwdriver and a 6.5 mm metal drill to make the rivet holes in the flaps is needed.

9.10.1 Assembly and distribution of the support profiles

With two additional support profiles per flap, these are evenly distributed in the flap as follows.

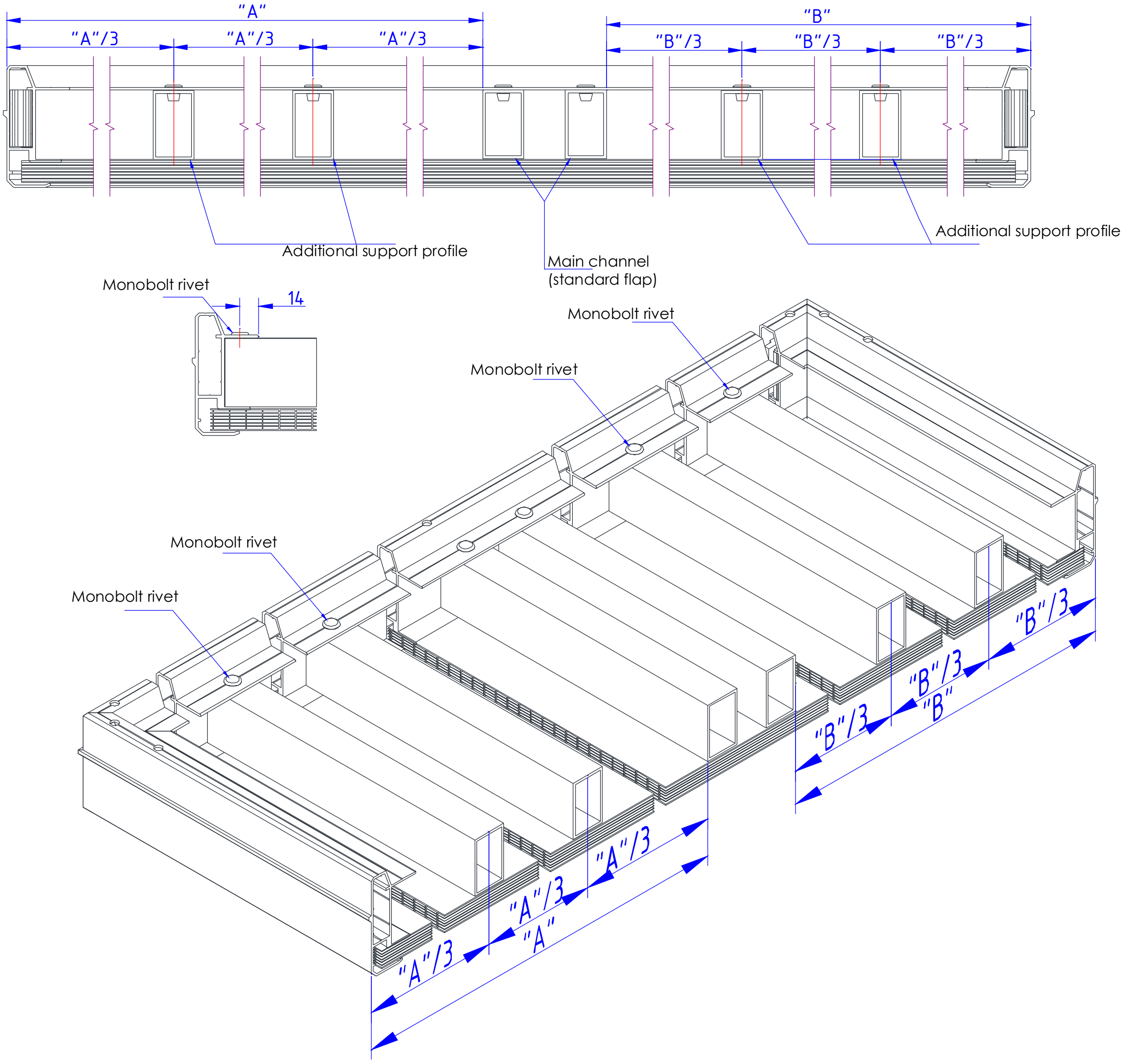
Figure 9.30: Distribution of the two additional support profiles



Two 6.5 mm holes have to be drilled for each support profile on the two longitudinal sides of the flap. The two additional support profiles are distributed as shown in the drawing above.

With four additional support profiles per flap, these are evenly distributed over the flap as follows.

Figure 9.31: Distribution of the four additional support profiles



Two 6.5 mm holes have to be drilled for each support profile on the two longitudinal sides of the flap.

The four additional support profiles are distributed as shown in the drawings above.

9.11 Functional tests

The final stage of installation of an NSHEV is the functional test.

It is necessary to check whether the NSHEV can be operated from the control panel in accordance with the Operation Instructions, and that the flaps open and close without problems.

The flaps must be evenly distributed over the seals, if this is not the case, the actuators must be adjusted (see also chapter "9.4 Fitting the pneumatic cylinders / electric actuators"). There should be no air gaps. Where pneumatic cylinders are fitted, the locking system must operate at the end position. Where electric actuators are fitted they must drive to their end positions

If the flaps do not open and close correctly, it is generally possible to adjust the flaps on site. You will find more information on this in chapter "9.4 Fitting the pneumatic cylinders / electric actuators".

Even if you have carried out a correct functional check, this does not mean that a complete commissioning of the system is not required.

10 Commissioning

It is necessary to observe the essential safety information published here.

If there is a long period between the delivery and commissioning of an NSHEV, it is necessary to carry out a basic inspection and perhaps also a maintenance procedure before commissioning.

In particular, it may be necessary to lubricate pneumatic cylinders or electric actuators. With regards to inspection and maintenance please read chapter "12 Inspection, maintenance and repair".

This also applies to those situations where units have been taken out of service for a long time and then need to be put back into service.

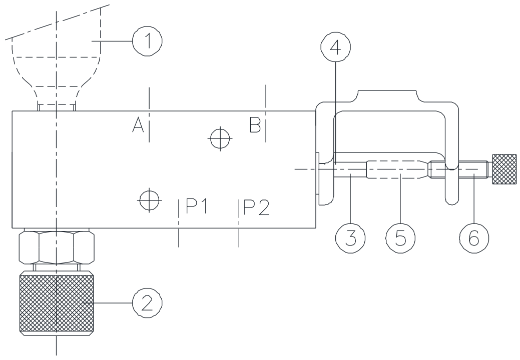
10.1 Functional check of the thermal ventilation valve (FS***)

Pneumatically controlled units require a functional check during commissioning, following release and at the yearly service to ensure that the primary energy supply is correctly supplying the thermal ventilation valve (types TCA-VV-1.02, TAVZ-2 and TAG-690-VV).

It is important to ensure that all units open and close freely in accordance with chapter "9.7 Connecting the source of energy".

10.1.1 TCA-VV-1.02

Figure 10.1: TCA-VV-1.02 - Overview



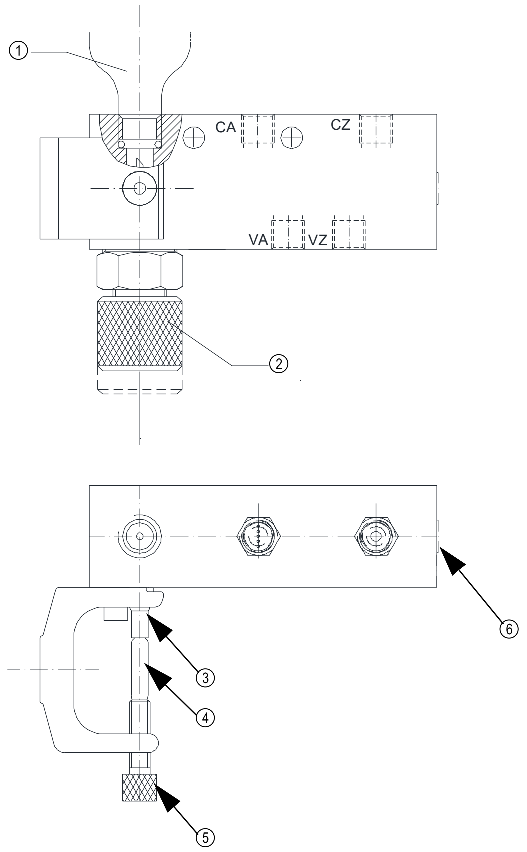
① CO_2 bottle
② Clamp screw
③ Clamping bolt
④ Red marked ring
⑤ Glass ampoule
⑥ Bolt
A Outlet cylinder OPEN Ø 6 mm
B Outlet cylinder CLOSED Ø 6 mm
P1 Inlet cylinder OPEN Ø 8 mm
P2 Inlet cylinder CLOSED Ø 8 mm

1.) Completely unscrew clamp screw ②.
2.) Insert glass ampoule ⑤ so that the tip points in the direction of the adjusting screw ⑥.
3.) Tighten clamp bolt ③ via glass ampoule ⑤ and adjusting screw ⑥.When you feel noticeable resistance, you have to turn the adjusting screw ⑥ a further ½ - rotation.
4.) Tighten clamp screw ② to its end position.
5.) Check if the piercing needle is positioned behind the piercing surface of the bottle screw-in thread.
6.) Check if the red marked ring ④ is no longer visible.
7.) Lightly grease the O-ring in the bottle screw-in thread.
8.) Screw in a new CO_2 bottle ① until it is tight.
9.) See installation instructions in chapter "9.6.1 TCA-VV-1.02" for installation of a glass ampoule ④.

NOTE	► Important: first unscrew the clamp screw and then the CO_{2}- bottle following release.

10.1.2 TAVZ-2

Figure 10.2: TAVZ-2 - Overview



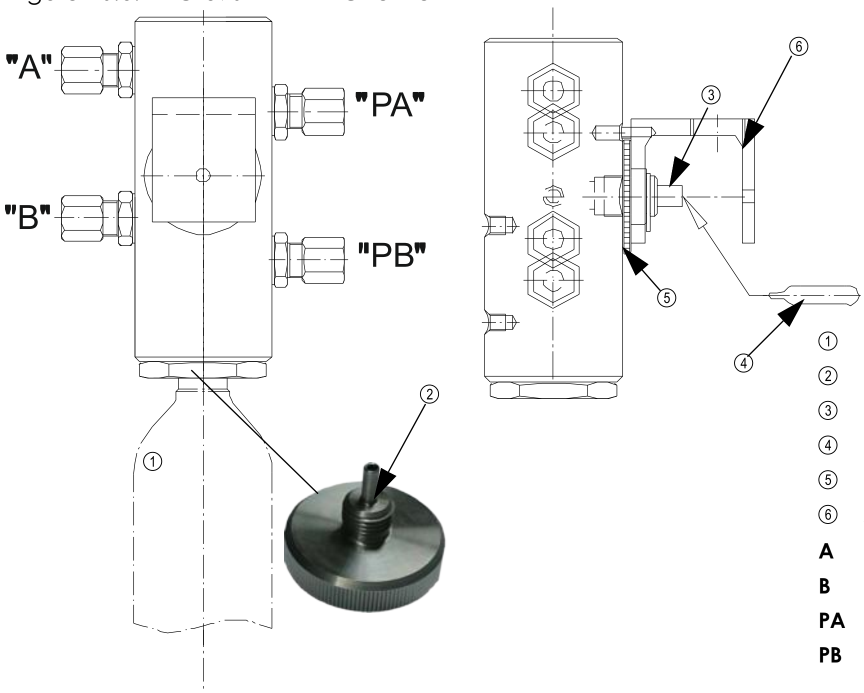
① CO_2 bottle
② Clamp screw
③ Clamping bolt
④ Glass ampoule
⑤ Bolt
⑥ Reset button
CA Outlet cylinder OPEN, Ø 6 mm
CZ Outlet cylinder CLOSE, Ø 6 mm
VA Inlet cylinder OPEN, Ø 8 mm
VZ Inlet cylinder OPEN, Ø 8 mm

1.) Fully unscrew the clamp screw ②.
2.) Insert glass ampoule ④ so that the tip points in the direction of the adjusting screw ⑤.
3.) Tighten clamp bolt ③ via glass ampoule ④ and adjusting screw ⑤ .When you feel noticeable resistance, you have to turn the adjusting screw ⑤ a further ½ - rotation.
4.) Tighten clamp screw ② to its end position.
5.) Check if the piercing needle is positioned behind the piercing surface of the bottle screw-in thread.
6.) Lightly grease the O-ring in the bottle screw-in thread.
7.) Check if the reset button ⑥ is pushed into its stop position (day-to-day ventilation).
8.) Screw in the CO_2 bottle ①.
9.) See installation instructions in chapter "9.6.2 TAVZ-2" for installation of a glass ampoule ④.

NOTE	►Important: first unscrew the clamp screw and then the CO_{2}- bottle following release.

10.1.3 TAG-690-VV-42

Figure 10.3: TAG-690-VV-42 - Overview



①	CO_2 bottle
②	Clamp screw
③	Clamping bolt
④	Glass ampoule
⑤	Bolt
⑥	Support bracket
A	Outlet cylinder OPEN Ø 6 mm
B	Outlet cylinder CLOSED Ø 6 mm
PA	Inlet cylinder OPEN, Ø 8 mm
PB	Inlet cylinder OPEN, Ø 8 mm

Commissioning

1.) During commissioning the adjusting screw ⑤ has to be unscrewed completely and the glass ampoule ④ has to be clamped between support bracket ⑥ and clamp bolt ③.

2.) The clamp screw ② has to be screwed into the CO_2 bottle connection to tension the release spring.

3.) Now the unit with the glass ampoule ④ can be installed. After the adjusting screw ⑤ has been tightened by hand, the clamp screw ② can be taken apart, and the CO_2 bottle ① can be screwed in.

A repeat commissioning differs from commissioning only in that the valve and bracket must be emptied of glass residues.

Functional check

A functional check is to be carried out regularly, at least once every twelve months. A functional check comprises:

► A visual inspection of the glass ampoule (the air bubble in the glass vial must not be greater than 2 - 3 mm)

► A check of the CO_2 bottle

► Check that nothing has deformed the piercing needle.

► Set off of the fire detection system for at least for one unit per roof or smoke zone.

11 Operation

It is necessary to observe the essential safety information published here.

The NSHEV is controlled in accordance with the controls instructions which are provided with the control panel.

12 Inspection, maintenance and repair

12.1 Inspection

It is necessary to observe the essential safety information published here.

Inspection is to be carried out regularly at least every twelve months together with a service and it should include the following activities (if applicable):

NOTE	► The application of liquid plastics or similar for the repair of e.g. broken or damaged polycarbonate flaps is not permitted.

- ► Check the manual controls at the control panel. Ensure that the indicators reflect what is actually going on at the unit.
- ► Check fire detectors.
- ► Check that control and release mechanisms, whether they be pneumatic or electric, work satisfactorily. Such elements should not be prevented from moving freely.
- ► Check that pneumatic cylinders or electric actuators are not damaged.
- ► Check inlet and exhaust openings. It should be free from obstruction, and grilles should not be allowed to become dirty. All components must be complete.
- ► Ensure that all sources of energy are available and are not defective.
- ► Check that the wind baffles (when ordered) are complete and attached satisfactorily to the ventilator.
- ► Check flaps for damage.
- ► Check seals for damage.
- ► Check fixings.
- ► Check that all fixings and connection lines are securely in place and undamaged.
- ► Checking the integrated fall-through grille (if present) and its brackets for damage, corrosion and loose parts.
  - A fall-through grille is considered damaged if it exhibits plastic deformations such as kinks, cracks and fractures in the grille structure or the surrounding frame. As a rule of thumb, Where cracks or deformations exceed L/50, then the equipment can be considered as damaged.
  - Check the fixing points: Screws and hexagon nuts must be firmly tightened so that the brackets of the grille are securely mounted on the Apollo. Loose parts must be fixed or replaced in consultation with the manufacturer.
  - Check for corrosion: If necessary, arrange for corroded components to be replaced with original parts in consultation with the manufacturer.

Where necessary carry out repairs to avoid any further damage and possible danger.

12.2 Maintenance

It is necessary to observe the essential safety information published here.

When necessary switch the controls into automatic mode for smoke control function.

The following steps are to be carried out regularly, at least every twelve months.

When replacing consumables or spare parts, only original (OEM) parts from the manufacturer may be used, as otherwise any warranty claims will be void. Furthermore, if non OEM parts were used, then the CE marking would be invalid for an NSHEV certified according to EN 12101-2. Necessary repairs may be carried out either by a specialist company authorized by Colt or Colt itself. In special cases it may be necessary to make temporary repairs. For repair or refurbishment work, only Colt original spare parts are to be used. Check in advance which parts are required.

If the NSHEV is situated in a particularly heavily contaminated or dusty area, the service intervals should be reduced. If necessary follow local standards and regulations.

- ► Where pneumatic controls are used, there is the additional requirement to take care of compressed air lines, compressors, filters and so on.
- ► The seals on the base can become dirty as a result of climatic influences. In this case just clean with soapy hot water or a household cleaner.
- ► The seals on the base can become damaged as a result of climatic influences. In this case, the seals should be replaced.
- ► Pneumatic cylinders and electric actuators have a permanent lubricant. Only apply additional lubricant if there are squeaks or other noises. If necessary silicone-free greased can be used for lubrication.
- ► The flaps pivot on maintenance free hinges so there is no maintenance for them.
- ► Check over functionality of the complete smoke control system. Do this by:
  - Changing the control positions in the control panel.
  - Activating the automatic smoke control system.

- Check that the smoke vent opens completely. The moving parts of the NSHEV must be checked. Dirt should be removed (e.g. around fire detectors) and damaged parts replaced.
- Check the source of energy, whether this be electric or pneumatic. If CO_2 bottles are used, check the weight of the CO_2 bottle. Make sure that any battery power is up to capacity and operates if the mains supply is interrupted.

The TVV valves (FS ***) must be maintained according to the following steps:

- Visually inspect the glass ampoule (the air bubble in the glass vial must not be greater than 2-3 mm)
- A check of the CO_2 bottle
- Check that nothing has deformed the piercing needle.
- Set off of the fire detection system for at least for one unit per roof or smoke zone.

Once these steps have been carried out set the whole system back into normal use.

In normal circumstances, we recommend that you use check lists and document the steps that you have taken in a log book.

NOTE	**Fall-through proof grille** ► As a safety-relevant component, the fall-through grille is inevitably exposed to environmental influences and is subject to unavoidable soiling. In order to maintain a good appearance and functionality, it is necessary to clean and maintain the fall-through grille properly in accordance with the maintenance instructions.

12.2.1 Cleaning and care

NSHEVs are exposed to the weather and pollution and therefore become dirty. In order to maintain a good appearance as well as their good functioning, it is necessary to professionally clean and maintain the ventilators at least twice a year. In case of serious environmental pollution consider to clean the NSHEV more often.

In these instructions we have limited ourselves to the principal points for optimum cleaning and care:

- Use clean water; use detergents with a weak alkaline value (pH 5--8).
- Do not use steam cleaners or pressure cleaners.
- Only use soft cloths or sponges.
- Where ventilators are colour-coated, do not allow the surface temperature of 25°C to be exceeded while cleaning them (detergent may also have a maximum operating temperature of 25°C).
- Do not use detergents containing scrubbing materials or emery paper.
- Do not use any acidic or highly alkaline cleaning or wetting agents.
- Do not use organic solvents, esters, ketones, alcohol, aromatics, glycol ether, or halogen hydrocarbons or similar.
- Do not use detergents of unknown composition.
- For those surfaces previously coated, carry out a sample application on a concealed area to ensure that the paint has not been mechanically or chemically attacked.
- To clean the brush seals, open the unit and apply a dry scrubbing brush. For very stubborn dirt, you should moisten the brush with water or use a neutral cleaner.

Detailed descriptions of cleaning procedures for aluminium components are available from:

- Aluminium Zentrale e.V., Königsallee 30, 40212 Duesseldorf, Germany (bulletin A5)
- GUETEGEMEINSCHAFT FUER DIE REINIGUNG VON METALLFASSADEN e.V. (GRM), Marientorgraben 13, 90402 Nuernberg
- American Architectural Manufacturers Association, USA (AAMA 610-1979 Cleaning Procedures).

Prescriptions and notes given by the particular powder producer. E.g. www.Tiger-coatings.com / data sheet 1090.

12.3 Repairs

It is necessary to observe the essential safety information published here.

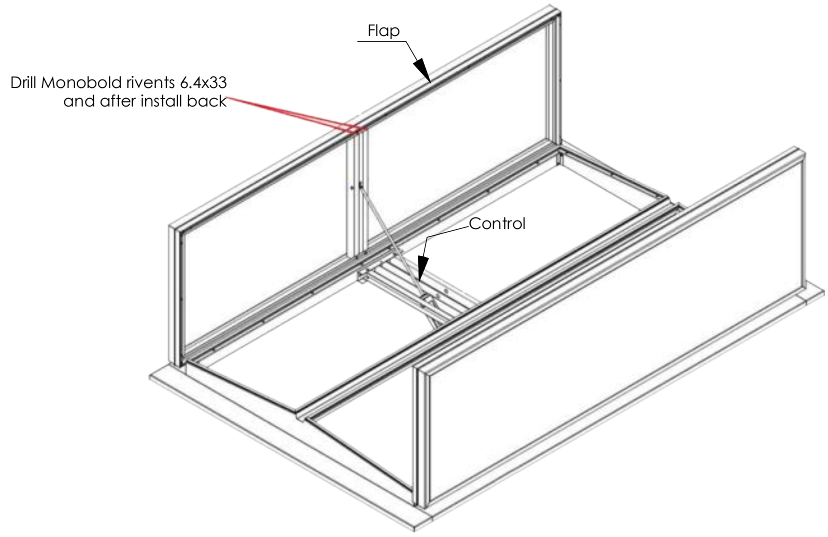
When replacing consumables or spare parts, only original (OEM) parts from the manufacturer may be used, as otherwise any warranty claims will be void. Furthermore, if non OEM parts were used, then the CE marking would be invalid for an NSHEV certified according to EN 12101-2. Necessary repairs may be carried out either by a specialist company authorized by Colt or Colt itself. In special cases it may be necessary to make temporary repairs. For repair or refurbishment work, only Colt original spare parts are to be used. Check in advance which parts are required.

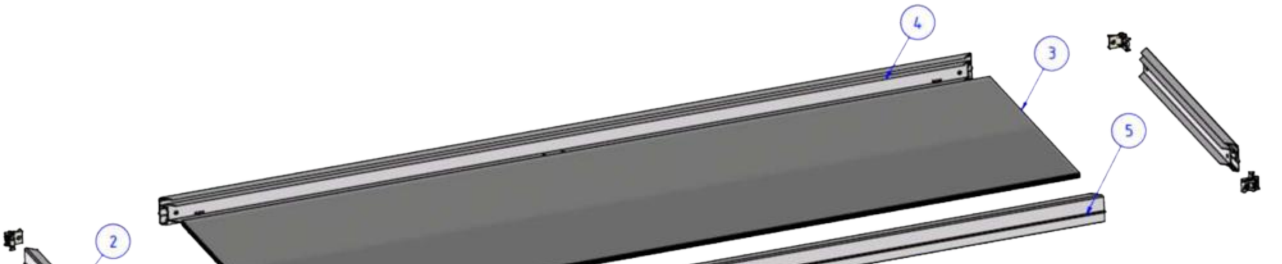
If the flaps do not open or close properly, this can be for various reasons. See chapter "9.4 Fitting the pneumatic cylinders / electric actuators" If the ventilator still doesn't work correctly despite these measures, please contact your Kingspan representative.

NOTE	► The application of liquid plastics or similar for the repair of e.g. broken or damaged polycarbonate flaps is not permitted.

12.3.1 Replace of polycarbonate in Flaps with corner joints.

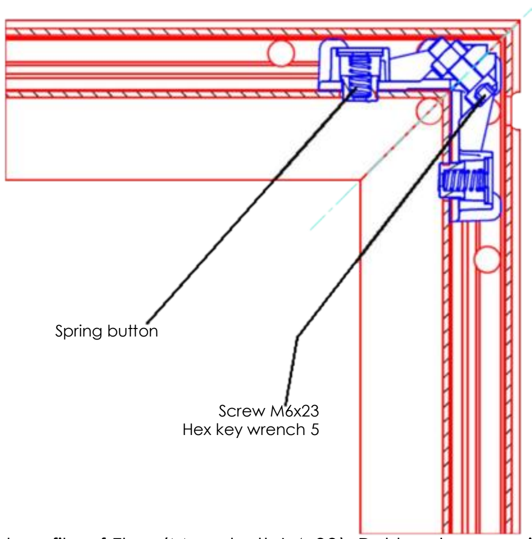
Apollo equipped with corner joints in flaps is possible to replace only polycarbonate. For disassembly need to drill two Monobolt rivets on lid actuator mounting profiles on opposite side of hinges.





PARTS LIST		
ITEM	QTY	DESCRIPTION
1	4	Cornerjoint Apollo Family - 45x20
2	2	PC 16 LID EXTRUSION RH SIDE
3	1	POLYCARBONATE PANEL 16-7
4	1	LID EXTRUSION HINGE SIDE
5	1	LID EXTRUSION CENTER

Corners could be unscrew with Hex Key wrench size 5. After release corners joint by pushing spring button. Than you can replace polycarbonate.



Install Monobolt rivets back on top Lid profile of Flap (Monobolt 6.4x33). Put back corner joints into the profiles and connect all profiles of flap. Than screw back corners with torque of 9N/m.

13 Decommissioning, disassembly and disposal

13.1 Decommissioning

It is necessary to observe the essential safety information published here.

Before starting on the de-commissioning it is necessary to remove all sources of energy, whether these are pneumatic or electric. Avoid switching on power unintentionally.

⚠ **WARNING**	**Danger from electrically live components** ► Danger of electrocution and death. ► Ensure that electrical supplies are always switched off before working on electrical components. Work on electrical components is only to be carried by qualified personnel.

⚠ **WARNING**	**Hazards relating to CO_2 bottles** ► If they are handled, stored or transported inappropriately, CO_2 bottles are likely to burst or blow. This can cause serious injury.

Think about the general safety in the building while decommissioning.

Decommissioning NSHEV fitted with electric actuators (M2B24 / M2B230)

1.) For electrically powered ventilators, remove the emergency battery if present.
2.) Remove the cabling pipework from the unit.

Store the batteries until you can dispose of them correctly.

Decommissioning NSHEV fitted with pneumatic cylinders (P2BD)

1.) With pneumatic ventilators take out the CO_2 bottle.
2.) Take out the CO_2 bottle from the control panel if present.
3.) Remove the pneumatic pipework from the unit.
4.) Store the CO_2 bottles until you can dispose of them correctly.

Store the batteries or CO_2 bottles until you can dispose of them correctly.

13.2 Disassembly

It is necessary to observe the essential safety information published here.

⚠ **WARNING**	**Danger from electrically live components** ► For disassembly make sure that the decommissioning step has been completed.

Disassembly takes place in 3 steps:

1.) Remove the screws of the NSHEV which fix it to the roof structure.
2.) Remove the ventilator from the supporting construction. If necessary, disassemble the ventilation unit into its individual parts and transport it to a suitable collection point on the roof.

⚠ **WARNING**	**Danger of overloading the roof** ► If more than one NSHEV is stored at one place on the roof, there is the danger that the roof could collapse. If this is not observed, there can be fatal consequences. ► Where units are stored on the roof it is necessary to check whether the roof has sufficient load bearing capability.

3.) Take the NSHEV off the roof with suitable lifting apparatus.

13.3 Disposal

Those who are disposing an NSHEV should wear the appropriate protective gear. Appropriate protective gear includes:

- ► Protective helmet
- ► Safety boots
- ► Safety gloves
- ► Safety goggles

The primary sources of energy (batteries, CO_2 bottles) need to be disposed of in accordance with local regulations. When disposed by Kingspan, the energy sources are fed into the currently applicable disposal process.

Pneumatic cylinders / electric actuators and EPDM seals also need to be disposed of in accordance with local regulations.

However the disposal of most of the NSHEV requires no special measures since a NSHEV are made from aluminium glass steel and polycarbonate. These materials are suitable for recycling in most places.

The disposal of these materials is to be done in accordance with local requirements.

14 Service and Guarantee

Please contact your Kingspan representative if you have any queries as regards service and maintenance.

www.coltgroup.com

For the product offering in other markets please contact your local sales representative or visit www.kingspan.com

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Light + Air