Colt Group

Installation, Operation and Maintenance Manual

1032 – Airlite

2021 - 06

English

1 About this manual

Please check that you have the latest version of the manual before reading this manual. You are also welcome to contact your Colt representative.

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 Airlite natural smoke and heat exhaust ventilator (hereafter known as a 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 Colt representative:

- Spare Parts List
- Guide to the controls for the complete Colt 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:

An Airlite ventilator fitted with pneumatic controls is opened and closed using one or two pneumatic cylinders, which are activated using compressed air. These cylinders move the louvres to their open position and are locked open. Similarly the NSHEV is closed using pneumatic pressure. The cylinders are unlocked, they close the ventilators and lock them again.

Opening and closing units with electric actuators:

The NSHEV is opened and closed using one or 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 louvres move to their final position (in either the open or closed position), they cannot be moved unless they are subjected to undue 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
- Energy saving

The NSHEV should be controlled from a central control panel only by authorised 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 a roof opening 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 suitable for use as dampers.
- Not suitable as openings for mechanical ventilators.

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 Colt 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 louvres breaking when they are trodden upon** ▸ Do not walk on the NSHEV since the louvres 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. Please observe all applicable health and safety regulations. Those who are installing or working on an 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	**Risks 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.

⚠ WARNING	**Risk of smoke entering the building** ▸ 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 malfunctions or if people are working on the unit, 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.

⚠ CAUTION	**Danger through unexpected opening or closing louvres** ▸ It is possible to trap a part of the body between the louvres if they opened or close unexpectedly whilst working on the ventilator. There is no built-in protection to prevent finger trapping. ▸ When working on the 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 function can open the NSHEV unexpectedly. Those who are installing or working on an NSHEV need to be qualified and trained suitably.

⚠ CAUTION	**Damage as a result of rain ingress through open louvres 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. ▸ Water may fall off the louvres 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.

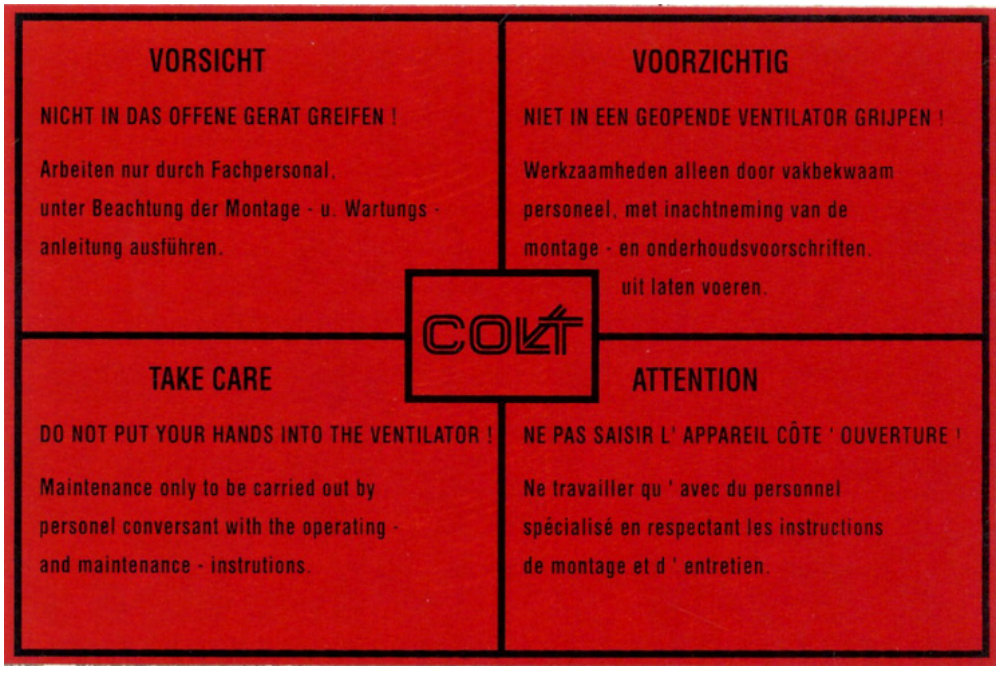
Please note additional safety warnings within the following chapters of this manual.

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 louvres opening and closing.



This label advises personnel not to put their hands into the NSHEV when it is open. Additionally, the label indicates the need for the unit only to be maintained by trained personnel.

5 Delivery

Included in the delivery is:

- An NSHEV, either completely pre-assembled or in break down form
- A control panel (only when ordered).
- Where ventilators are partially pre-assembled: Rivets for fixing the louvres.

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

NOTE	**Not included in the delivery is:** - Sealing tape - Fixings for attaching the ventilator to the supporting structure

6 Unit components

For further information please check the PID label. As standard the NSHEV has a PID label on the inside and outside of the ventilator body.

Base

Manufactured in accordance with the specific requirements of the customer.

- E N5-125 mm extruded insulated base
- S Insulated extruded base with sheet flanges
- H Raised extruded base with insulated sheet flanges

Louvres

These comprise a front and a rear aluminium extrusion, sealed off on their sides by aluminium extrusions.

Polycarbonate louvres

- PC16 Transparent polycarbonate, 16 mm thick
- PO16 Non-transparent polycarbonate, 16 mm thick
- PG16 Non-transparent grey polycarbonate, 16 mm thick
- PO16 H Hail-resistant non-transparent polycarbonate, 16 mm thick

Glass louvres

- GL24: Toughened laminated insulation glass, 24 mm thick

Insulated louvre

- IA24 2 mm aluminium sheet / 20 mm polystyrol rigid foam / 2 mm aluminium sheet

Controls

One or two actuators, designed in accordance with requirements.

- P*B** Double acting pneumatic cylinder(s)
- M*B24 24 V DC electric actuators
- M1B230 230 V AC electric actuator

Wind baffle

The optional wind baffle is pre-assembled into the unit.

Control panel

The optional control panel is supplied separately. A description of how to use this control panel is provided separately and these instructions are supplied with the control box.

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) / T(-25) – see PID label

NOTE

Actuators

- The type of drive depends on the unit size, the louvre type, 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 Colt 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 SHEVs with pneumatic cylinders (P*B**)

Day-to-day ventilation

Pneumatic controls: min. 6.0 bar

Smoke control ventilation

Primary energy: Thermal ventilation valve with CO_2 bottle (optional)

CO_2 quantity: Separately calculated for every order

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

7.2.2 SHEVs with 24 V DC electric actuators (M*B24)

Primary energy: 24 V DC

Current: Dependent on the actuator type (depending on unit size and snow load)

EDP 352444:	4.1 A for each electric actuator
EDP 357666:	0.8 A for each electric actuator
EDP 357667:	1.0 A for each electric actuator
EDP 357668:	1.3 A for each electric actuator
EDP 357669:	1.6 A for each electric actuator
EDP 357670:	2.0 A for each electric actuator
EDP 357671:	2.6 A for each electric actuator
EDP 357672:	4.0 A for each electric actuator

7.2.3 SHEV with 230 V AC electric actuator (M1B230)

Primary energy: 230 V AC

Current: EDP 357698: 1.2 A for each electric actuator

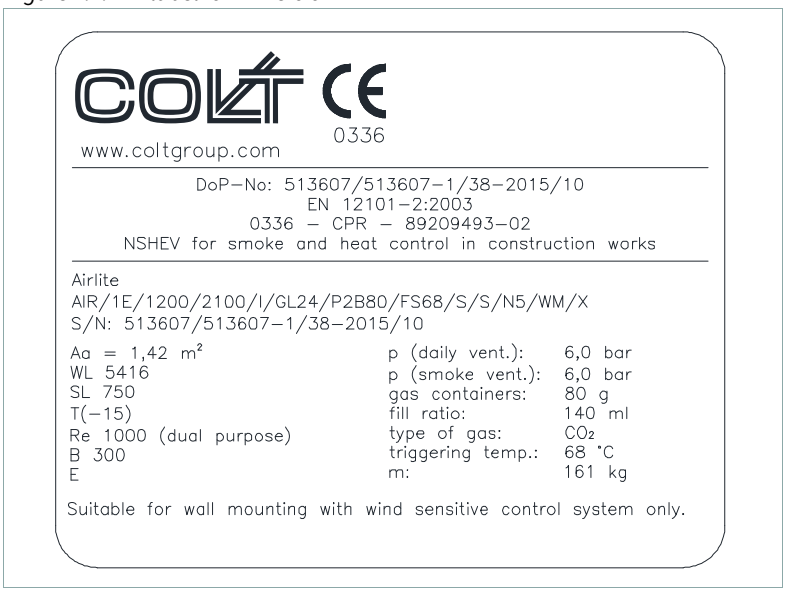
7.3 Sound emissions

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.

Figure 7.1: PID label for 1E version



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. Ventilators 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.

8.2 Transport to the place of assembly

It is recommended to use either nylon ropes or mechanical lifting equipment for lifting ventilators 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. 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.

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 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 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.

Before connecting any supply lines make sure they are isolated.

It is necessary to provide appropriate support for the unit.

The unit must be fixed to the supporting structure right round its circumference with suitable fixing materials spaced out at least every 250 mm, depending on the nature of the supporting structure.

Ensure that the loads (the ventilator's own weight, snow load, wind load, opening forces) can be absorbed by the supporting structure (frames, glazing profiles etc.) provided by the customer.

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 for the ventilator's own weight should be taken into account.

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.

It should be noted that the loads (own weight, snow load, wind load) will be essentially transmitted to the supporting structure via the long sides of the ventilator.

9.2 Installation to the building

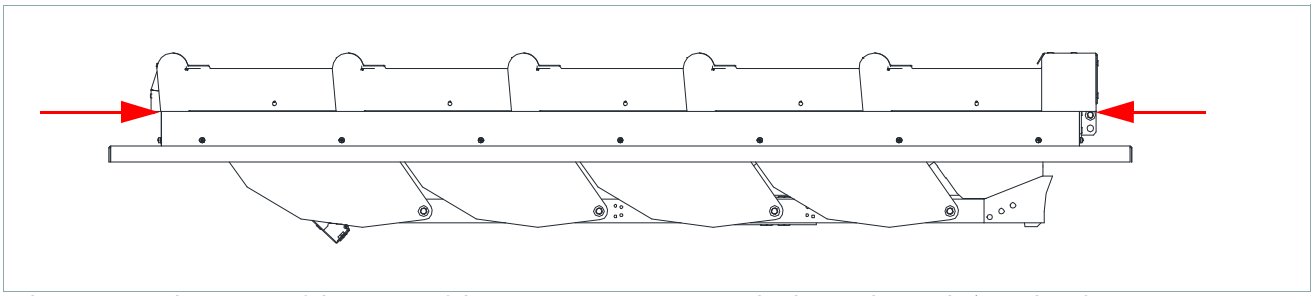
It is necessary to observe the essential safety information published here.

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

Do not subject the blades to loads when transporting and lifting them. Seals may get damaged.

When the unit is closed, the lower edges of the louvre ears should be in line. In this case, the NRWG may be closed properly.

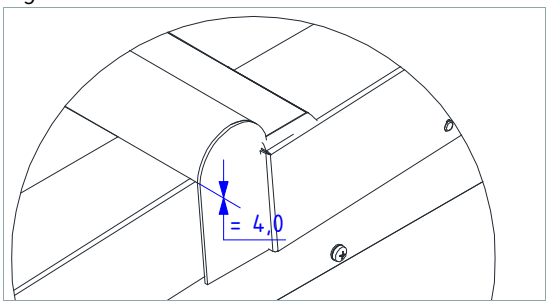
Figure 9.1: Completely closed Airlite



Otherwise an adjustment of the piston of the actuator / pneumatic cylinder can be made (see also chapter "12.3 Repairs"). You can screw this in to make the louvres shut more tightly.

While there is no exact tolerance, a maximum deviation of 3 mm is acceptable. However, a gap of 4 mm between the blades must not be exceeded.

Figure 9.2: Maximum deviation



In particular when installing a unit with a raised base onto an upstand, take into account the clear opening width on the underside of the base.

Figure 9.3: Opening width

NOTE

Opening width

- If the clear opening width on the underside of the base is less than the nominal width of the NSHEV, the opening mechanism can rub against the base. This can cause visual impairments and also shortening the life of the unit.

Opening the unit

Connect the power supply and drive the unit to its open position with the supplied control box. If one is not supplied, use a temporary source of power and controls. This may be e.g. a mobile compressor, a 24 V power supply unit or a 230 V connection.

Closing the unit

If not already done, connect the power supply and drive the unit to its closed position with the supplied control box. If one is not supplied, use a temporary source of power and controls. This may be e.g. a mobile compressor, a 24 V power supply unit or a 230 V connection.

WARNING

Potential damage caused by improperly connected devices

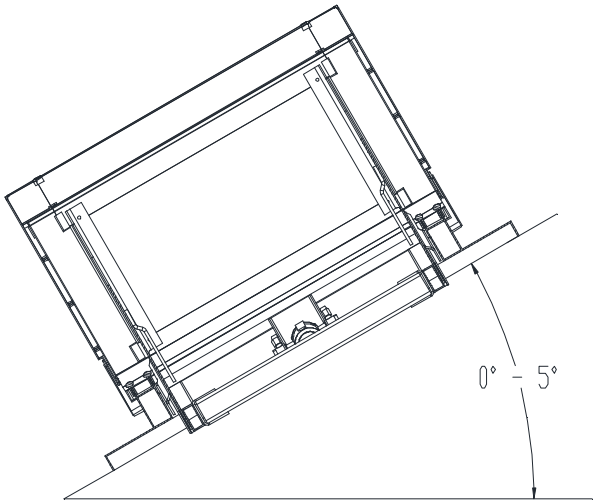
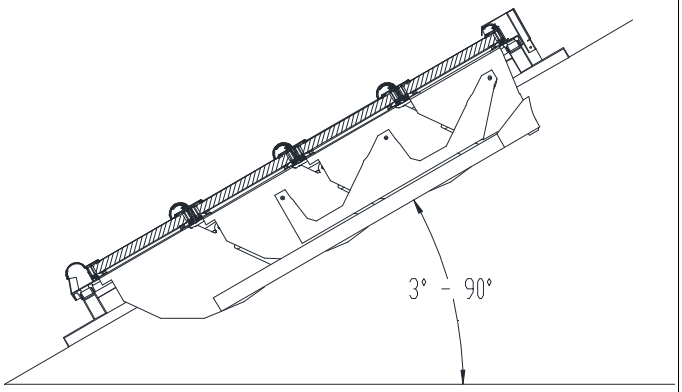
- There is a significant risk of injury when the louvres are closed if the unit is not correctly connected or controlled. There is also the risk of damaging the unit.

NOTE

Pneumatic cylinder

- Please ensure that when you close the unit, return pressure is always applied to the open-line and that the choke is installed correctly. See section "Choke" for further info. This also applies when a substitute power supply (such as a mobile compressor) is used.

9.2.1 Kind of installation and installation angle

Width side of unit inclined on a sloping roof Installation angle 0° to 5° permitted.	**Length side of unit inclined on a sloping roof** Installation angle 0° to 90° (wall installation) permitted. It is only possible to use glass louvres when the ventilator is installed onto a flat roof.
	
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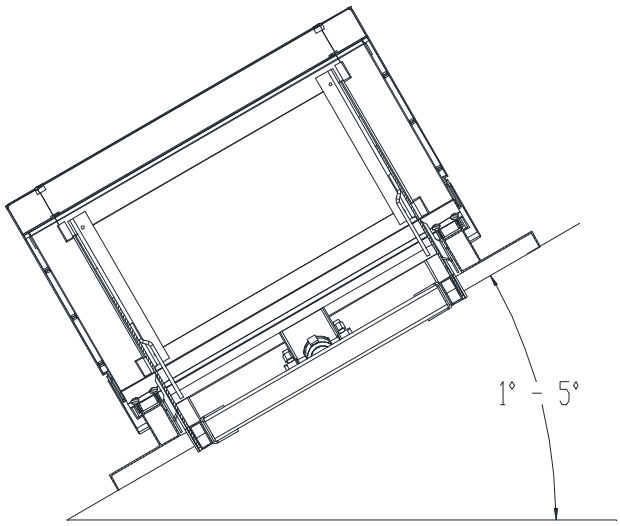
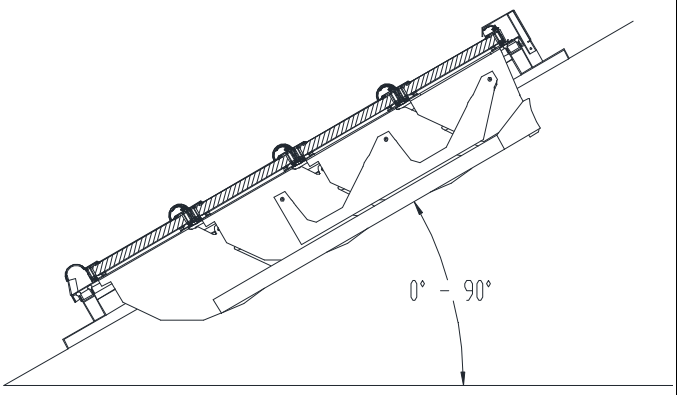
	

NOTE

Minimum installation angle

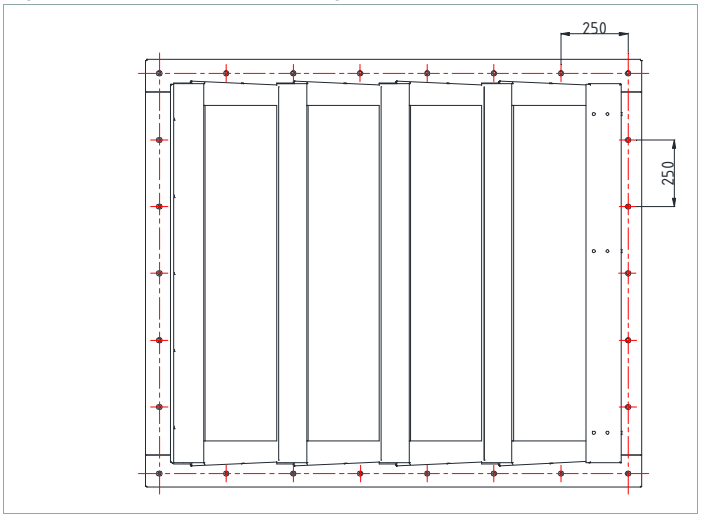
- A minimum installation angle of 1° in the direction of the unit's width or 3° in the direction of the unit's length is has to be observed. There are further restrictions such as how to achieve the stated aerodynamic performance, and assembly instructions to consider.

9.2.2 Assembly onto an upstand

NSHEVs are supplied as completely or nearly completely assembled units. It is necessary to provide a seal between the ventilator flange and the upstand before positioning the ventilator onto the upstand. Independent of the type of upstand, it is necessary to attach the ventilator to the upstand using the following fixings at a distance of maximum 250 mm centres.

Upstand construction	Fixings
Timber subframe:	6 x 50 wood screws to DIN 96 or DIN 571 with washers
Concrete:	Machine screws M8 DIN 933 with metal anchors M8 with washers
Steel roofing or profile sheeting:	6.3 x 25 DIN 7504-C self-tapping screws with washers

Figure 9.4: Distance between fixings



NOTE

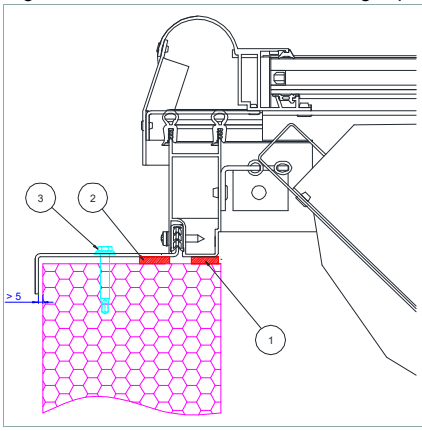
Assembly of the flange

- When connecting the flange to the building, it must be noted that water penetration may occur if no sealing tape or similar is used for sealing.

9.2.2.1 Connection to the building structure

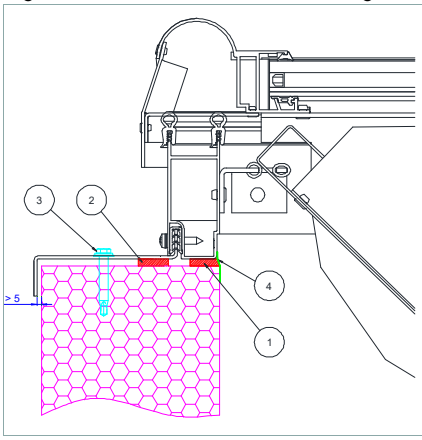
The following example fixing methods should ensure a tight connection of an NSHEV to the building.

Figure 9.5: Variant A: with Colt sealing tape for simple requirements



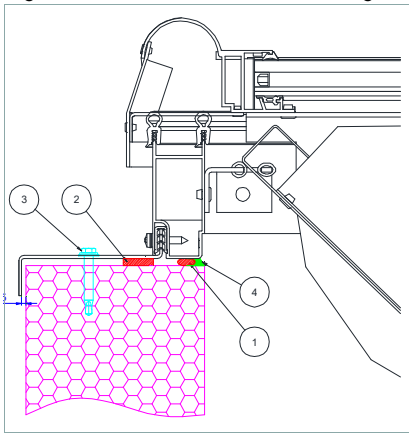
① 20x20 Compriband Item Code 851
② 20x20 Compriband Item Code 851
③ 6.3 x 25 DIN 7504-C self-tapping screws with washers

Figure 9.6: Variant B: with Colt sealing foil for more challenging requirements



① Sealing tape, e.g. 20x20 Compriband Item Code 851
② Sealing tape, vapour-permeable; e.g. illbruck illmod 600
③ 6.3 x 25 DIN 7504-C self-tapping screws with washers
④ Sealing foil / tape, vapour-permeable; e.g. Illbruck TwinAktiv

Figure 9.7: Variant C: with Colt sealing foil for more challenging requirements



① Cord, e.g. illbruck PR102 PE cord
② Sealing tape, vapour-permeable; e.g. illbruck illmod 600
③ 6.3 x 25 DIN 7504-C self-tapping screws with washers
④ Perimeter silicone; e.g. illbruck Perennator FA101

The selected sealing tapes must meet the following requirements:

- 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.

In addition, the sealing strips to be used must fulfil the following for more challenging requirements at the connection to the building (variants B + C):

- Internal vapour diffusion-tight sealing tape
- External vapour-permeable sealing tape

9.2.3 Installation into glazing

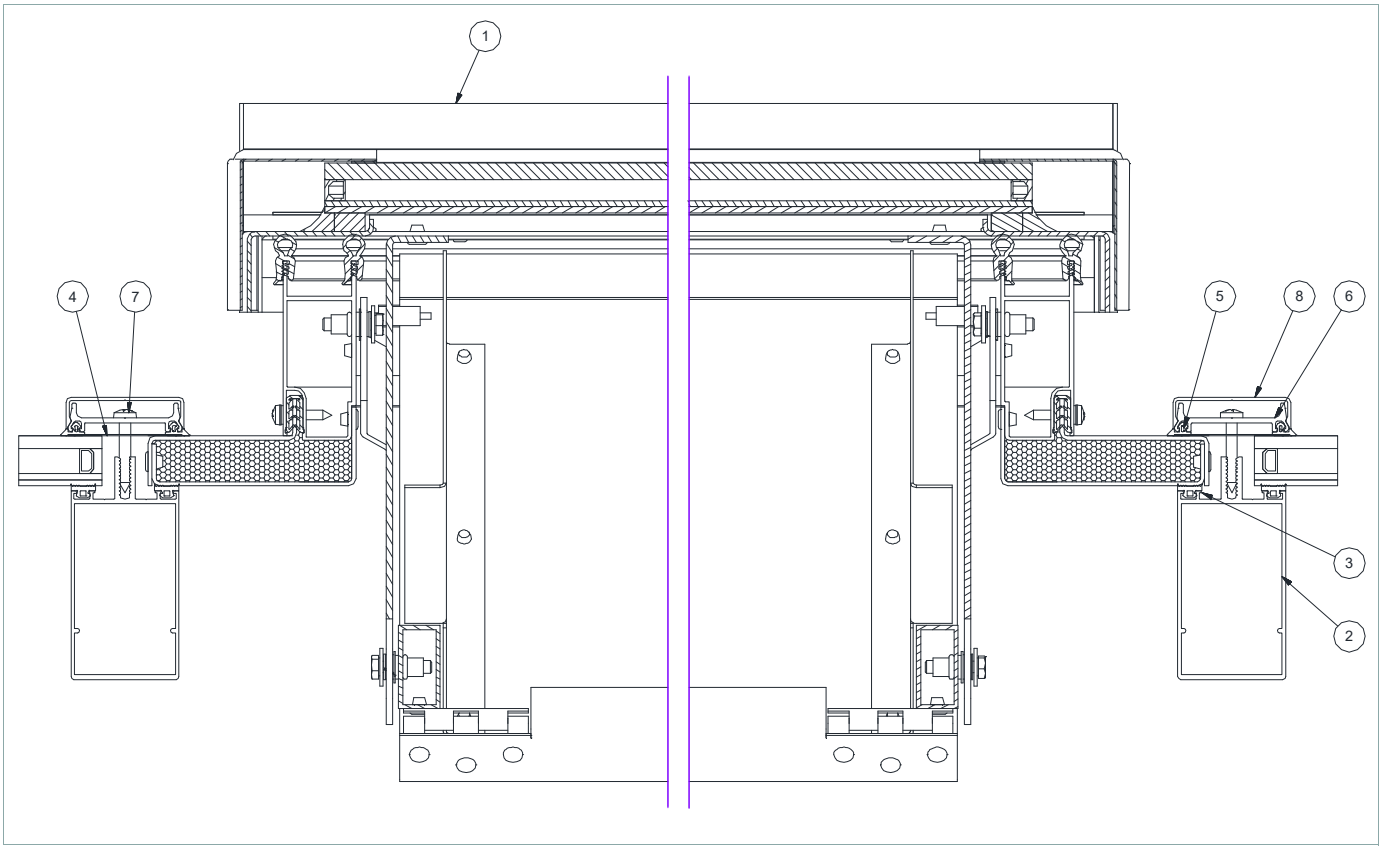
The NSHEV are supplied as completely or nearly completely assembled units.

The diagram below shows a typical schematic of a glass structure with a NSHEV built into it.

- The NSHEV ① is set down onto the supporting construction ②; it is important to make sure that the seal ③ is in good contact with it, especially in the corner area.
- In the most ventilators, a butyl band ④ is glued, then a frame profile ⑥ is fitted with seals ⑤.
- The frame profile is fitted ⑥ is screwed down with appropriate screws at 250 mm centres.
- Grease the screws ⑦ a little to avoid damaging the butyl tape / sealing tape.

The screws are tightened uniformly to the manufacturer's instructions. Finally attach the cover strip ⑧. The water drainage system should not be damaged either from the outside or from the inside. It is important to allow drainage at all times.

Figure 9.8: Installation into glazing



NOTE

Sealing

- The customer is responsible for the correct installation and sealing. The directives and standards of the specific country have to be complied with.

Pressure and cover strips

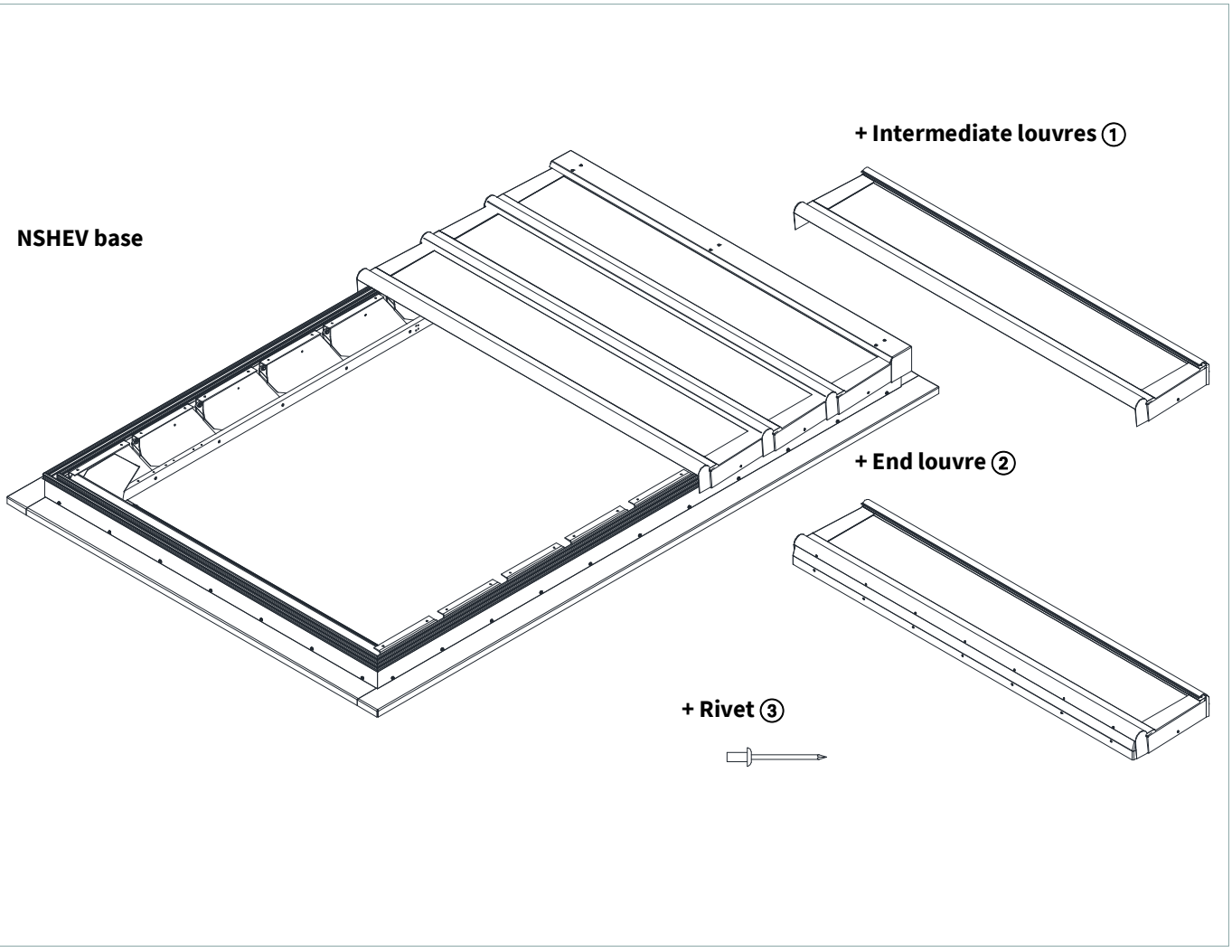
- Take care when choosing pressure or cover strips that the lid does not interfere with the pressure and/or cover strip.

9.3 Assembling the louvres (P*16 / PO16 H / GL24)

If the NSHEV is delivered partially pre-assembled, the remaining louvres must be installed on site within the NSHEV.

Louvres are assembled after the remainder of the NSHEV has been installed. In addition to the separately supplied louvres, rivets are also included.

Figure 9.9: Assembling louvres



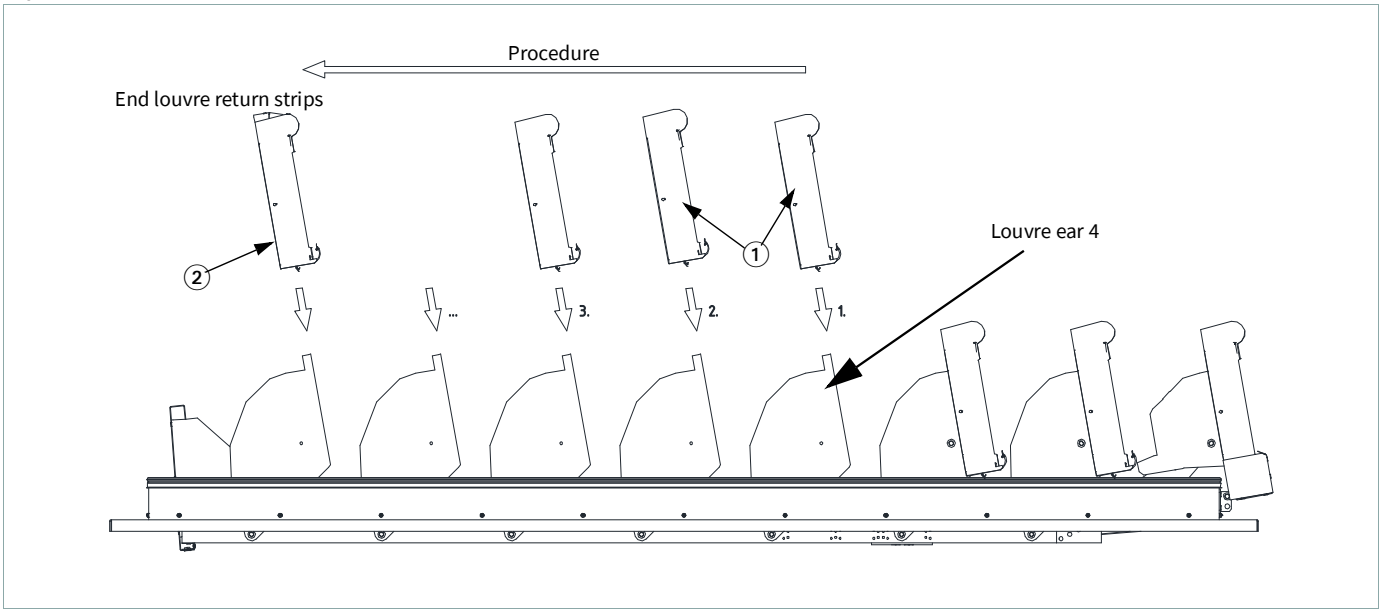
NOTE

- The three louvres adjacent to the ridge are always pre-assembled.

Open the ventilator in order to assemble the louvres. This is only possible by connecting the power supply or a short-term alternative power supply (e.g., mobile compressor or 24 V power supply).

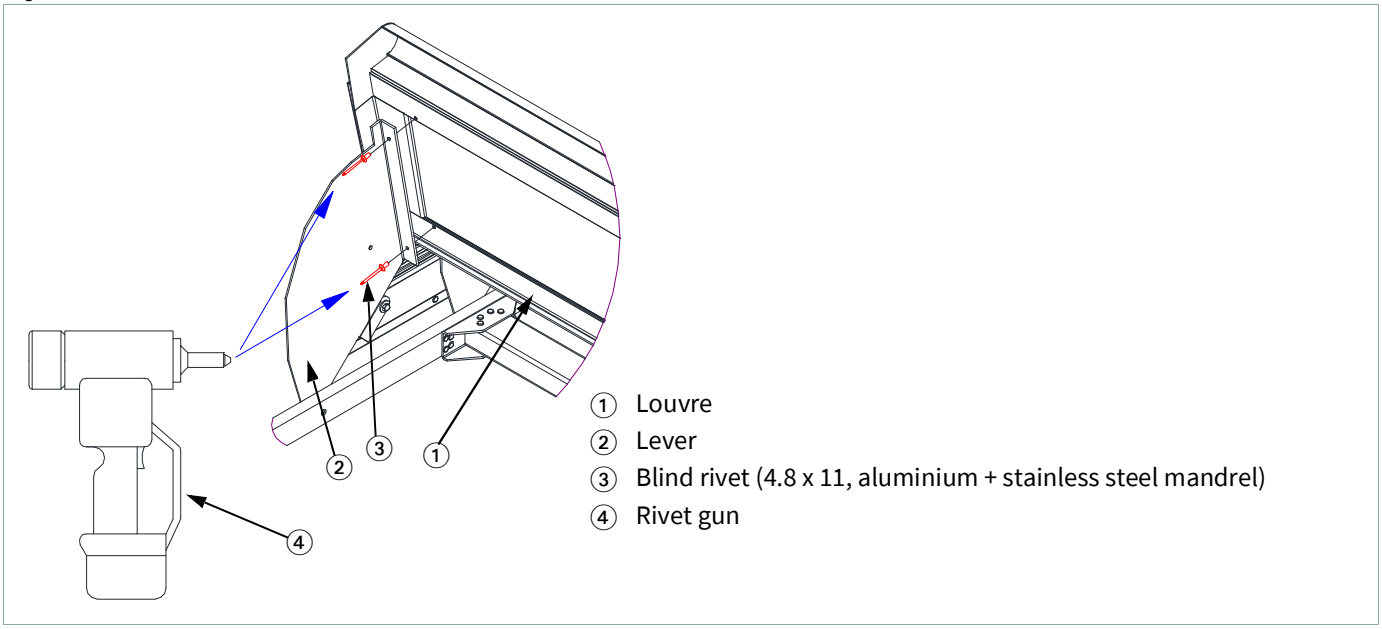
Starting with the standard pre-assembled louvres adjacent to the ridge, each louvre ① is attached to the right and left louvre ear return strips ④ one after the other using two rivets ③ on each ear.

Figure 9.10: Procedure



The louvres ① have to be laid flat onto the louvre ear return strips ④. The end louvre ② is assembled last.

Figure 9.11: Detail of louvre installation



NOTE

Applying the rivets

- Use an electric or pneumatic rivet gun ④ to apply rivets.

9.3.1 Rivet gun

Example: Gesipa PowerBird

Technical data

- Voltage: 14.4 V Li-Ion
- Power: 2.6 Ah
- Actuator type: DC - actuator
- Stroke: 20 mm
- Power: 13 kN
- Weight: 2 kg

Example: Avdel Genesis

Technical data

- Pressure: 5 to 7 bar
- Stroke: 26 mm
- Duration (approx.): 1.2 sec.
- Force at 5.5 bar: 12.9 KN
- Weight: 2.3 kg

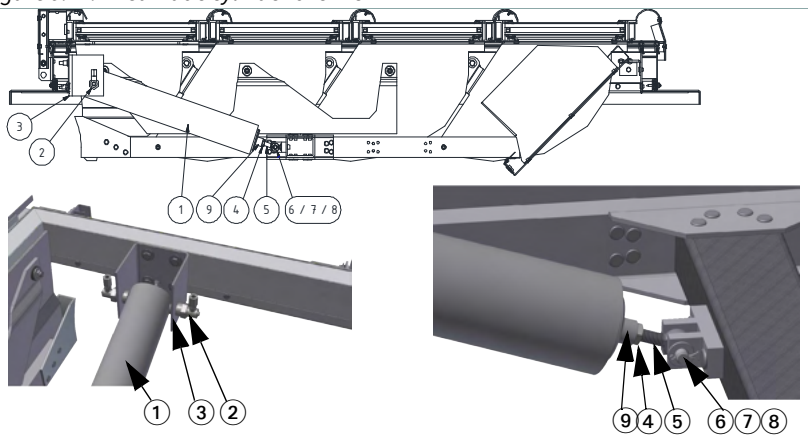
9.4 Fitting the pneumatic cylinders / electric actuators

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 such a way that the actuators move completely to their end positions, and completely close the louvres and pull them towards the seals.

9.4.1 P*B** – Pneumatic cylinder

Figure 9.12: Pneumatic cylinder overview



① Pneumatic cylinder
② Angle connector
③ Cylinder bracket
④ Lock nut
⑤ Eye bolt
⑥ Connecting bolts
⑦ Washer
⑧ Safety cotter pin
⑨ Piston rod

Check that the pneumatic cylinder ① locks

1.) To do this, remove the connecting bolts ⑥.
2.) With no pressure being applied, check that the piston rod ⑨ of the pneumatic cylinder ① can be pulled out by hand.
3.) If the pneumatic cylinder ① is locked, the connecting bolt ⑥ can be reassembled. The pneumatic cylinder ① 1must be replaced if the locking system does not work.

Closed louvres with a non-locking pneumatic cylinder ①

1.) In this case, the eye bolt ⑤ of the pneumatic cylinder ① must be rotated out from of the piston rod ⑨.
2.) For this purpose remove the connecting bolt ⑥ and loosen the lock nut ④ of the eye bolt ⑤.
3.) The eye bolt ⑤ is rotated out of the piston rod ⑨ in just a few revolutions.
4.) Finally, the lock nut ④ is again tightened, the connecting bolt ⑥ is reassembled and a check made that the unit locks and closes.

Open louvres with a locked, retracted pneumatic cylinder ①

1.) In this case, the eye bolt ⑤ of the pneumatic cylinder ① must be screwed into the piston rod ⑨.
2.) For this purpose remove the connecting bolt ⑥ and loosen the lock nut ④ of the eye bolt ⑤.
3.) The eye bolt ⑤ is further turned into the piston rod ⑨.
4.) Finally, the lock nut ④ is again tightened, the connecting bolt ⑥ is reassembled and a check made that the unit locks and closes.

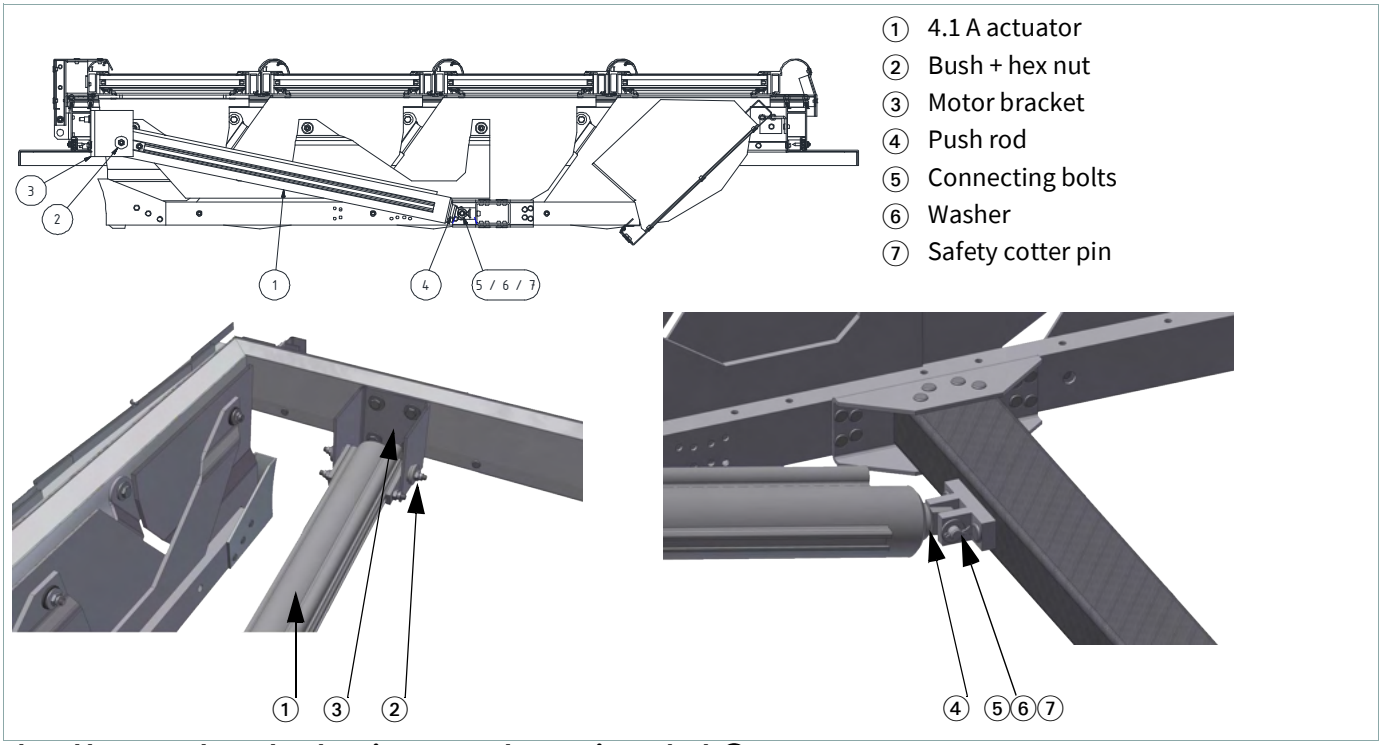
NOTE

Final checks

- After any adjustment work, check that the lock nut ④ fits tightly and that the connecting bolt ⑥ is properly secured to the washer ⑦ and the safety cotter pin ⑧.
- Failure to do so may result in a permanent failure of the components or allow components which have been released to fall to the ground.

9.4.2 M*B24 – 24 V DC – 4.1 A electric actuator

Figure 9.13: Overview of the electric actuator



① 4.1 A actuator
② Bush + hex nut
③ Motor bracket
④ Push rod
⑤ Connecting bolts
⑥ Washer
⑦ Safety cotter pin

Closed louvres where the electric actuator has not instroked ①

1.) In this instance the hex nuts ② need to be disconnected from the actuator ①.
2.) Now the actuator ①is pulled a few mm out of the motor bracket ③.
3.) Finally, the hex nuts ② of the electric actuator ① are tightened again and the closing process is checked.

Open louvres where the electric actuator has not in-stroked ①

1.) In this instance the hex nuts ② need to be disconnected from the actuator ①.
2.) Now the actuator ①i s pushed a few mm into the motor bracket ③.
3.) Finally, the hex nuts ② of the electric actuator ① are tightened again and the closing process is checked.

NOTE

Final checks

- After any adjustment work, check whether all four hexagon nuts ② have been tightened again.
- Failure to do so may result in a permanent failure of the components or allow components which have been released to fall to the ground.

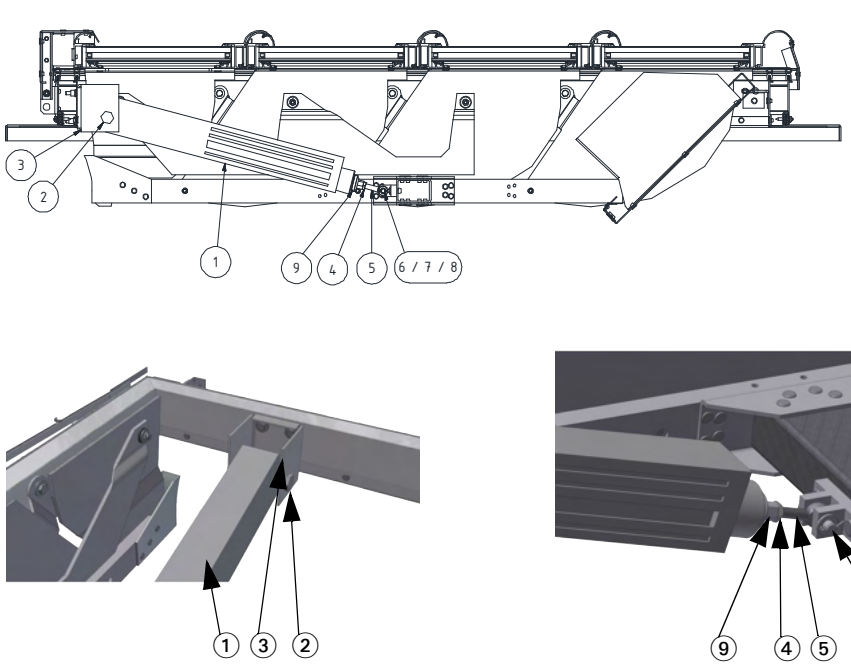
9.4.3 M*B24 – 24 V DC – 0.8-4.0 A electric actuator

NOTE

Drive type

- The type of drive depends on the unit size, the louvre type, 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 Colt representative.

Figure 9.14: Overview of the electric actuator



① 0.8-4.0 A actuator
② Bearing pin
③ Motor bracket
④ Lock nut
⑤ Eye bolt
⑥ Connecting bolts
⑦ Washer
⑧ Safety cotter pin
⑨ Push rod

Closed louvres where the electric actuator has not instroked ①

1.) In this case, the eye bolt ⑤ of the electric actuator ① must be rotated out from of the piston rod 9.
2.) For this purpose remove the connecting bolt ⑥ and loosen the lock nut ④ of the eye bolt ⑤.
3.) The eye bolt ⑤ is rotated out of the piston rod ⑨ in just a few revolutions.
4.) Finally, the lock nut ④ is again tightened, the connecting bolt ⑥ is reassembled and a check made that the unit locks and closes.

Open louvres where the electric actuator has not in-stroked ①

1.) In this case, the eye bolt ⑤ of the electric actuator ① must be screwed into the piston rod ⑨.
2.) For this purpose remove the connecting bolt ⑥ and loosen the lock nut ④ of the eye bolt ⑤.
3.) The eye bolt ⑤ is further turned into the piston rod ⑨.
4.) Finally, the lock nut ④ is again tightened, the connecting bolt ⑥ is reassembled and a check made that the unit locks and closes.

NOTE

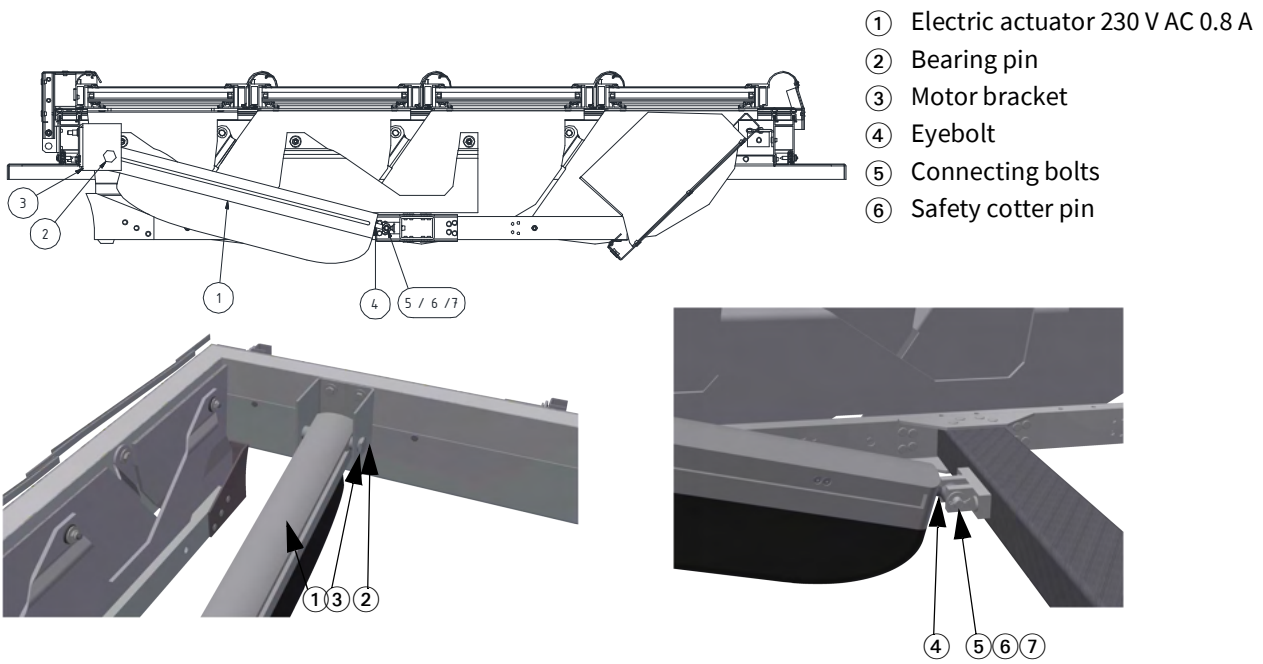
Final checks

- After any adjustment work, check that the lock nut ④ fits tightly and that the connecting bolt ⑥ is properly secured to the washer ⑦ and the safety cotter pin ⑧.

Failure to do so may result in a permanent failure of the components or allow components which have been released to fall to the ground.

9.4.4 M1B230 – 230 V AC – 1.2 A electric actuator

Figure 9.15: Overview of the electric actuator



① Electric actuator 230 V AC 0.8 A
② Bearing pin
③ Motor bracket
④ Eyebolt
⑤ Connecting bolts
⑥ Safety cotter pin

Closed louvres where the electric actuator has in-stroked ①

1.) In this case, the eye bolt ④ of the electric actuator ① must be rotated out from of the rack and pinion drive.
2.) For this purpose the connecting bolt ⑤ must be removed.
3.) The eye bolt ④ is rotated out of the rack and pinion drive in just a few revolutions.
4.) Finally, the connecting bolts ⑤ are re-assembled and the closing process is checked.

Open louvres where the electric actuator has out-stroked ①

1.) In this case, the eye bolt ④ of the electric actuator ① must be screwed into the rack and pinion drive.
2.) For this purpose the connecting bolt ⑤ must be removed.
3.) The eye bolt ④ is turned further into the rack and pinion drive.
d.) Finally, the connecting bolts ⑥ are re-assembled and the closing process is checked.

NOTE

Final checks

- After any adjustment work, check that that the connecting bolt ⑤ is properly secured to the washer ⑥ and the safety cotter pin ⑦.
- Failure to do so may result in a permanent failure of the components or allow components which have been released to fall to the ground.

9.5 Limitations

9.5.1 Opening and closing time

For all units the run time from the louvres closing to the louvres opening must be taken into consideration. In general electric actuators need a run time of 20 seconds when there is no weight on the unit.

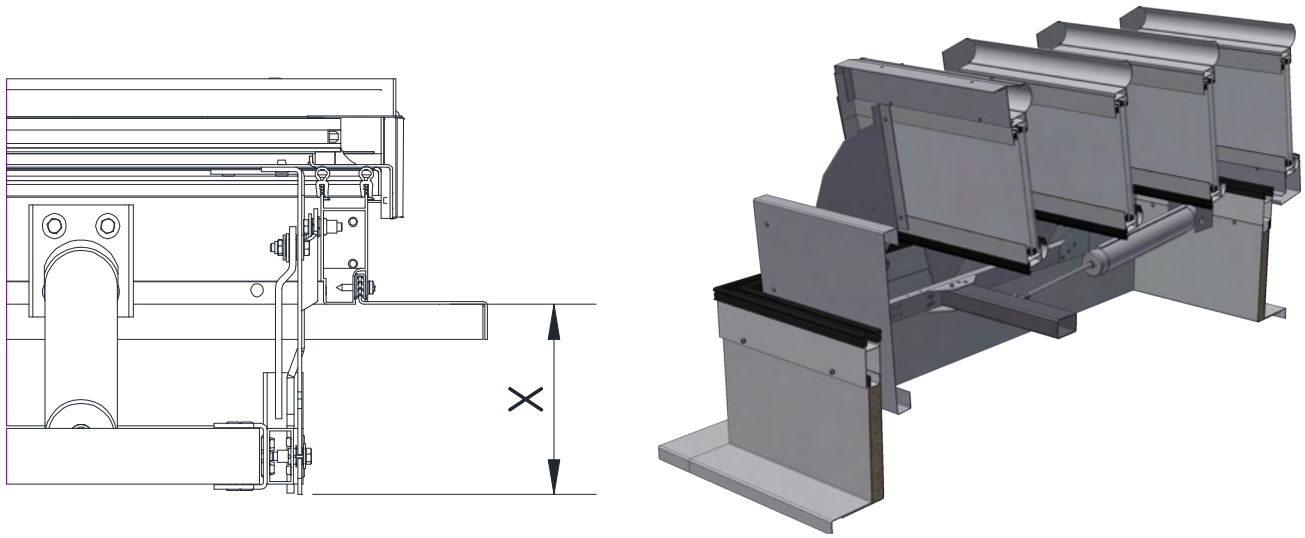
The run time of pneumatic cylinders from the closed to the opening position of the louvres depends on the working pressure and whether a choke is fitted. A realistic time is 20 seconds. See chapter "9.7.1.1 Choke" for further info about chokes.

Please note that when fail-safe control systems are used, the ventilator closing times can increase considerably, since the receiver must first be filled before there is sufficient pressure to close the ventilator. Additional information regarding the fail-safe control is available in chapter "9.8 Pneumatic fail-safe controls (FF***)".

9.5.2 Necessary clearance under the NSHEV

The control unit protrudes inwards when closed, so a clearance **X** of 160 mm must be observed.

Figure 9.16: Necessary clearance



NOTE

- When 230 V AC electric actuators are used, a clearance of 180 mm is necessary

9.6 FS*** – Attaching the thermal ventilation valve

WARNING

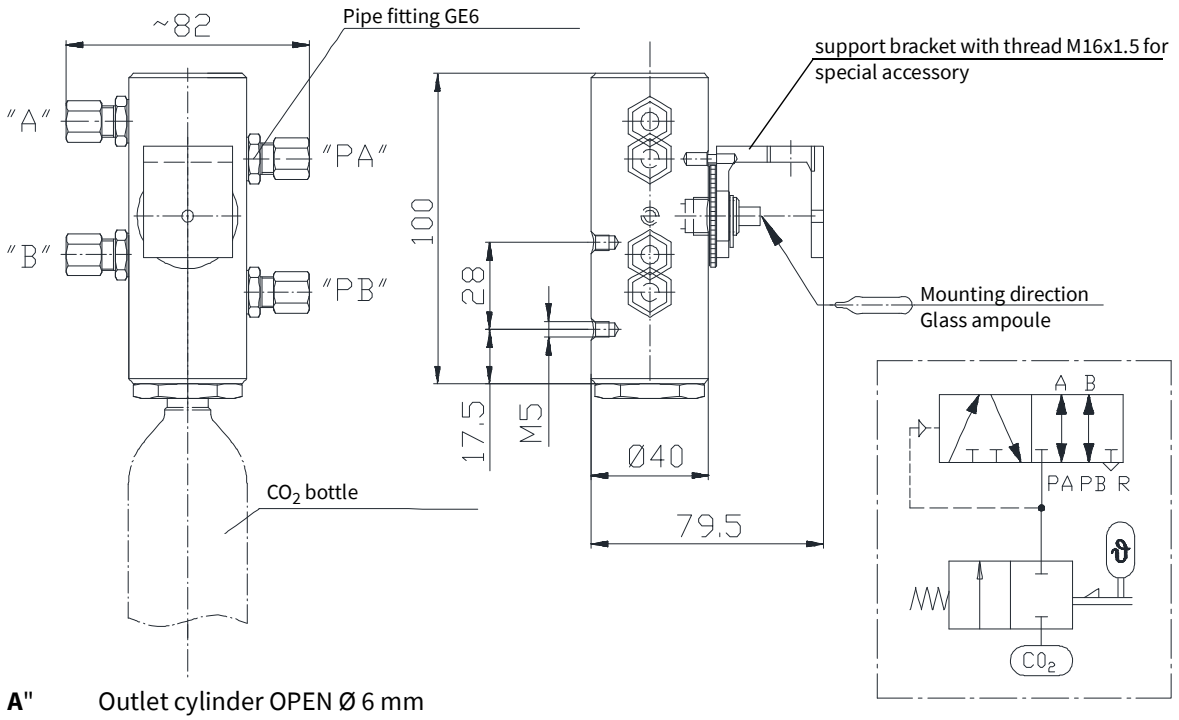
Risk caused by smoke damage

- 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.
- Smoke and heat ventilators need to be installed by trained personnel and also commissioned appropriately.

How it works

The thermal ventilation valve has a glass ampoule and an independent CO_2 bottle. The burst fusible bulb enables the primary source of energy (CO_2 bottle) and allows pressure to be brought to port "A". Air is removed from connection "B". The network air connections "PA" and "PB" is cut off. The pneumatic cylinder then moves out.

Figure 9.17: TW detailed drawings



A" Outlet cylinder OPEN Ø 6 mm

B" Outlet cylinder CLOSED Ø 6 mm

PA" Inlet cylinder OPEN Ø 8 mm

PB Inlet cylinder CLOSED Ø 8 mm

Fixing / commissioning

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.

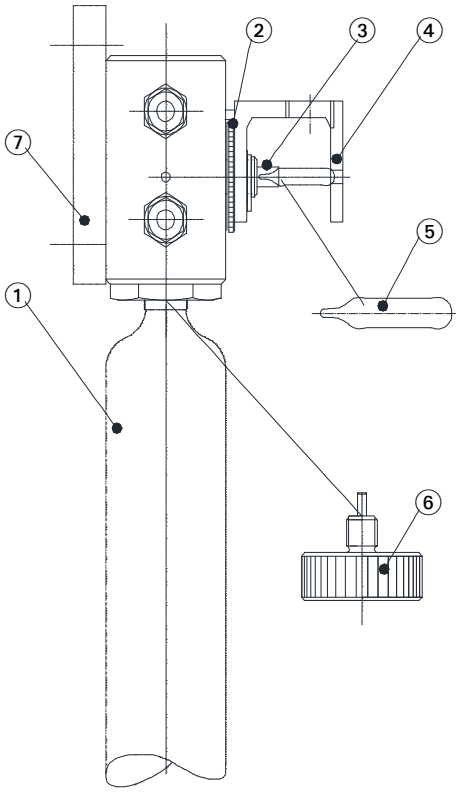
2.) The clamp screw ⑥ has to be screwed into the CO_2 bottle connection to tension the release spring.

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.

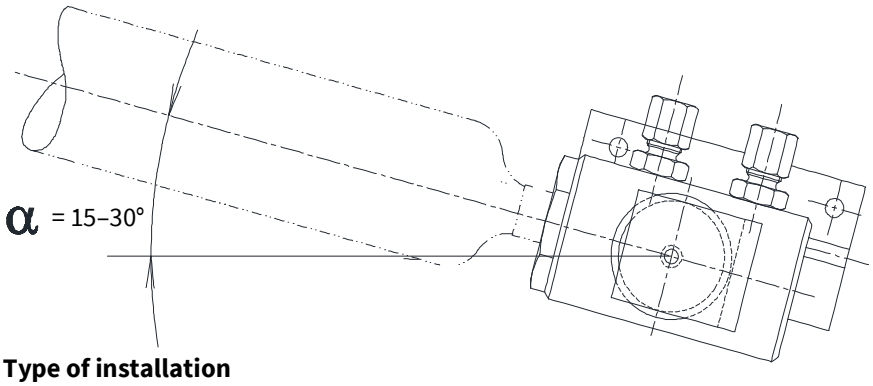
Figure 9.18: Overview of TVV



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

9.6.1 Positioning the thermal ventilation valve

Figure 9.19: Positioning the thermal ventilation valve



Type of installation

Electrical and pneumatic remote actuation of ventilators is possible

NOTE

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

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 P*B**	min. 6.0 bar for day-to-day ventilation. Depending on the design of the entire system, a higher pressure may be required. Opening the ventilator in the event of a fire via thermal ventilation valve, see chapter "7 Technical data".
Electric M*B24	24 V DC (direct voltage), variable current (according to chapter "9.7.2 M*B24 - Electrical connection of 24 V DC electric actuators")
Electric M1B230	230 V AC (alternating voltage); 1.2 A for each electric actuator

NOTE

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

9.7.1 P*B** – Pneumatic connection

WARNING

Risk of damage when louvres are closed

- There is a significant risk of injury when the louvres are closed if the unit is not correctly connected or controlled. There is also the risk of damaging the unit.
- Connect up the unit correctly.

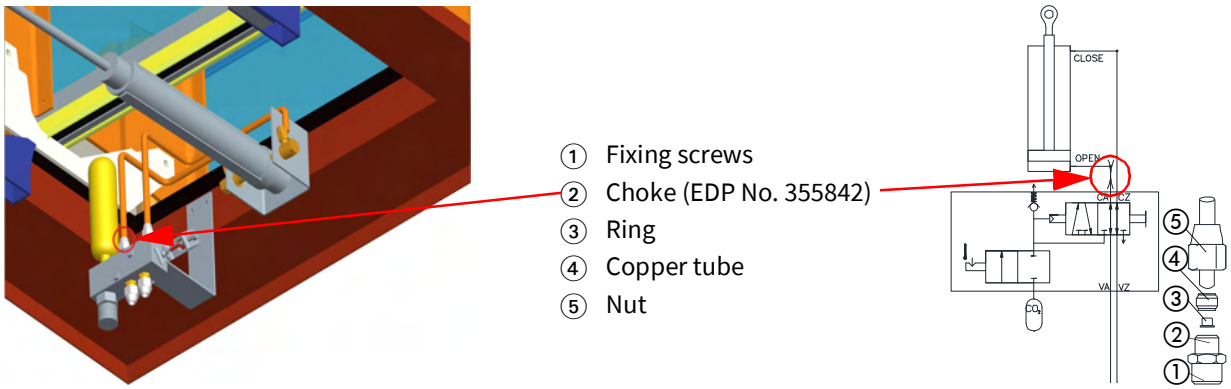
The length of time for opening and closing a single ventilator depends on the size of the unit, the number and diameter of the selected cylinders, on the kind of installation and the air supply pressure (including any choke).

9.7.1.1 Choke

Airlite + TVV

The choke is inserted between the TVV and the pneumatic cylinders into the Ø6 mm "on" pipework. This option is **pre-assembled** at the factory.

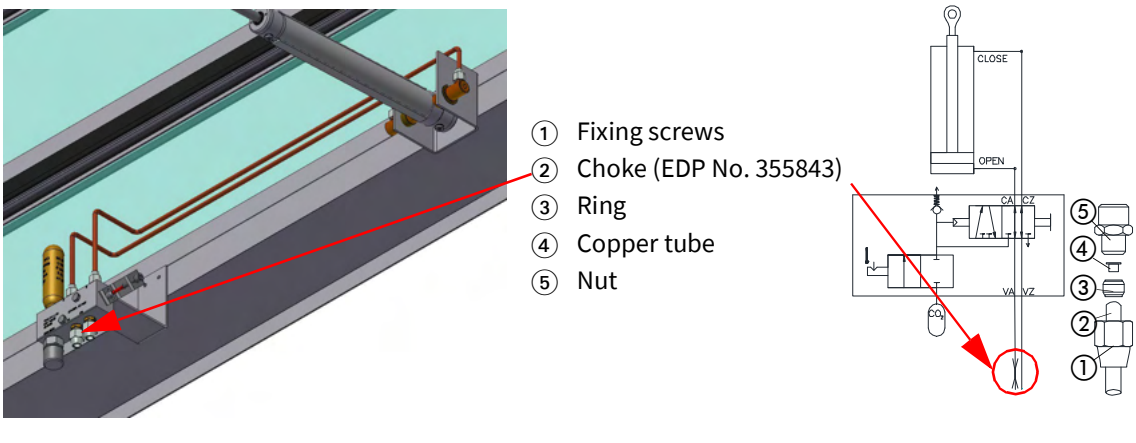
Figure 9.20: Airlite + TVV chokes



Airlite + TVV + Ambient temperature T(-15)

The choke is designed to prevent the likelihood of icing up, by being mounted in front of the TVV on the customer-supplied Ø8 mm pipework. The pre-assembled choke between the TVV and the pneumatic cylinder (see 1.)) must be removed. The choke with Ø8 mm is **supplied** by the factory.

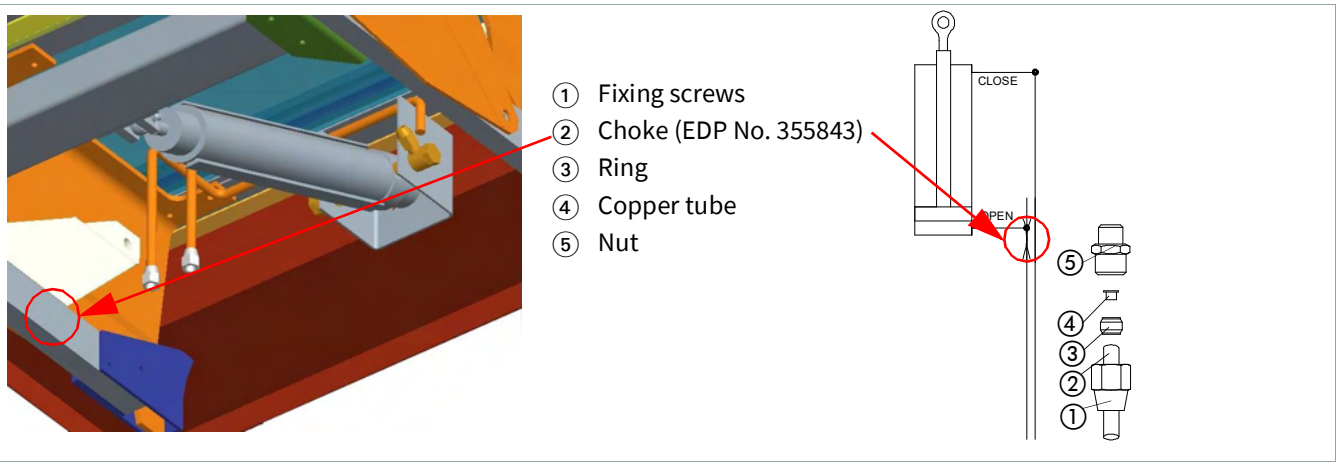
Figure 9.21: Airlite + TVV chokes + Ambient temperature T(-15)



Airlite without TVV

If no TVV is used, then the choke must be attached to the cylinder port into the "on" pipework. The choke with Ø8 mm is **supplied** by the factory.

Figure 9.22: Airlite chokes where there is no TVV



NOTE

Other types of choke

- The chokes can be replaced to meet the circumstances on site (Ø0,3 mm / Ø0,7 mm) and are available to order separately from the Sales & Service Department (D6d0,3: 355927, D6d0,7: 355926, D8d0,3: 355925, D8d0,7: 355924)

NOTE

Pressure relief valve

- It is not permitted to install a pressure relief valve in the control panel. Otherwise the louvres can be damaged when they close. Excessive loads caused by the louvres clashing may lead to visible damage only much later. If necessary, install an appropriate switch which sets the on-line under pressure again after pressure relief when the unit is open and before it closes.
- So always take care that there is no back pressure when the unit is closing - also when the unit is being maintained.
- Never remove the CO_2 bottle in the control box and close the units.
- After changing the CO_2 bottle, first switch the unit to "open", wait until the pressure has built up (you will hear air flow noise in the control box) and then close again.

9.7.2 M*B24 - Electrical connection of 24 V DC electric actuators

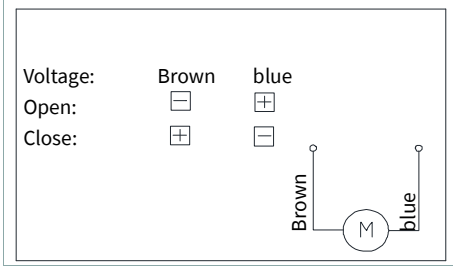
WARNING

Danger through electrocution

- 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 equipped with two electrical cables. Optionally floating limit switches which may be connected. Connection details are as shown below. Wire to on site distribution boxes

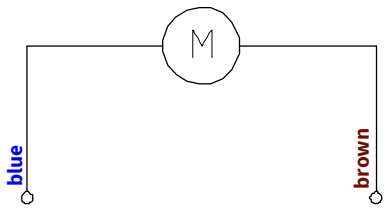
Wiring diagram 4.1 A electric actuator (EDP No. 352444)



Voltage:	24 V DC, +30%/-20%, residual ripple 5%
Full load current:	4,1 A / 98.4 W
Protection class	IP65
Operating mode:	S3 (30% duty cycle)
Connecting cable (on motor):	2 x1 mm²

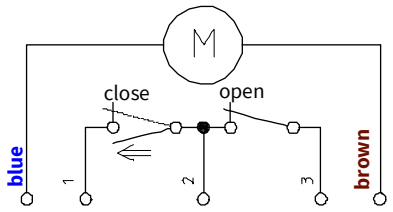
Wiring diagram 0.8A - 4.0A electric actuators

Standard diagram:



PIN	Cable
1	Brown
2	blue

With option E* (on request):

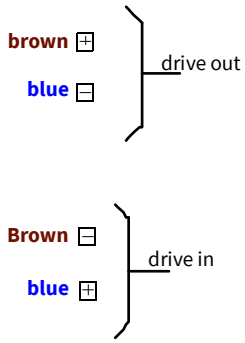


(the arrangement shown here is for in-stroke

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

* Drive with voltage free opening contacts for both end positions

General:



Voltage:	24 V DC, +30%/-20%, residual ripple 48%
Full load current:	Variable 0.8 A – 4.0 A (19.2 W – 96 W)
Protection class	IP54
Operating mode:	S3 (variable)
Connecting cable (on motor):	2 x 2.5 mm², 2 x 2.5 mm² + 3 x 1.5 mm² (with option E)

NOTE

- The type of drive depends on the unit size, the louvre type, 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 Colt representative.

9.7.3 M1B230 – Electrical connection with 230 V AC electric actuators

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.

The use of 230 V AC electric actuators is generally possible with all sizes of NSHEV, depending on the size, type of louvres and the required snow load class.

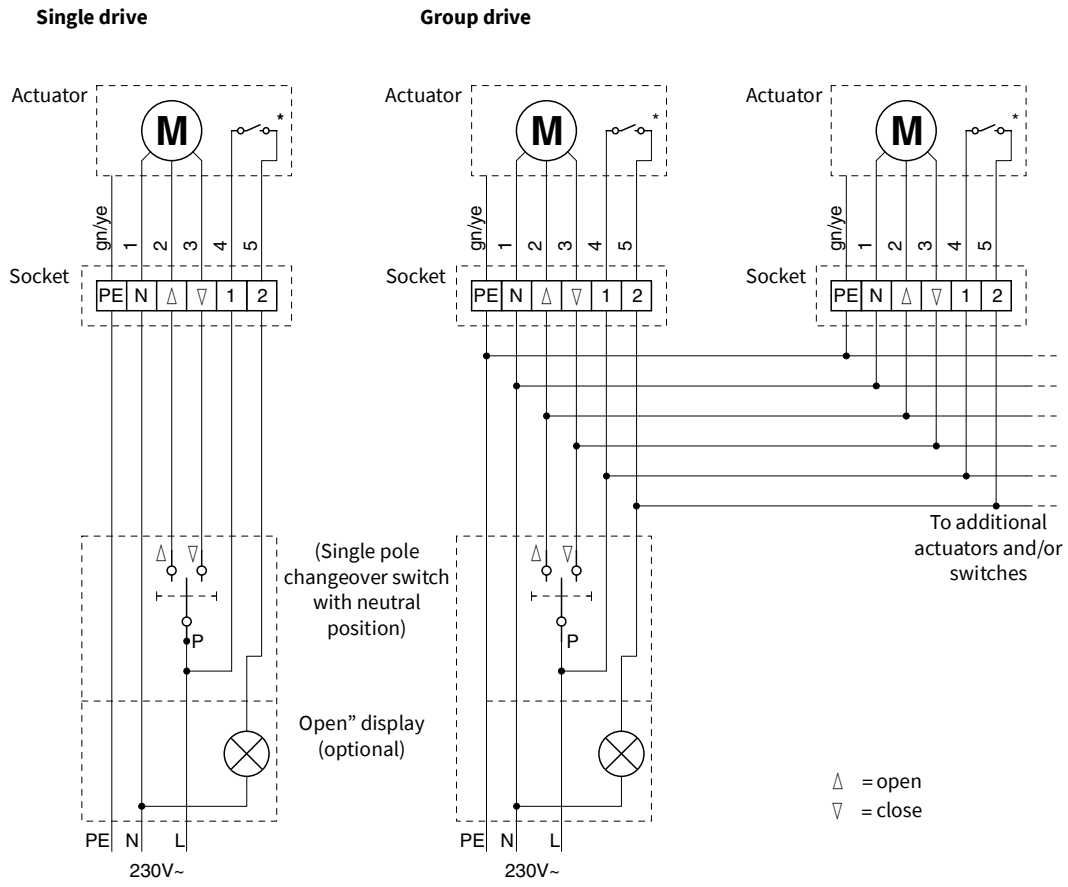
The electric actuators are equipped with as standard with a six-core electric cable. Connection details are as shown below. Wire to on site distribution boxes

Electric rack and pinion drive (EDP No. 357698)

Voltage: 230 V AC

Current: 1.2 A

Figure 9.23: Wiring diagram electric rack and pinion drive 357698



NOTE

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

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. 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 louvres, 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.

9.8.1 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 in chapter "9.8.2 Control valve 355153".

Figure 9.24: Arrangement of the fail-safe control

9.8.2 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 9.25: Control valve

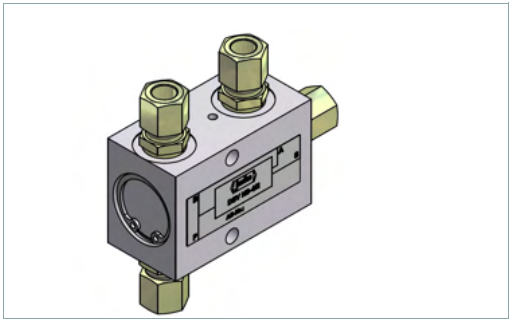
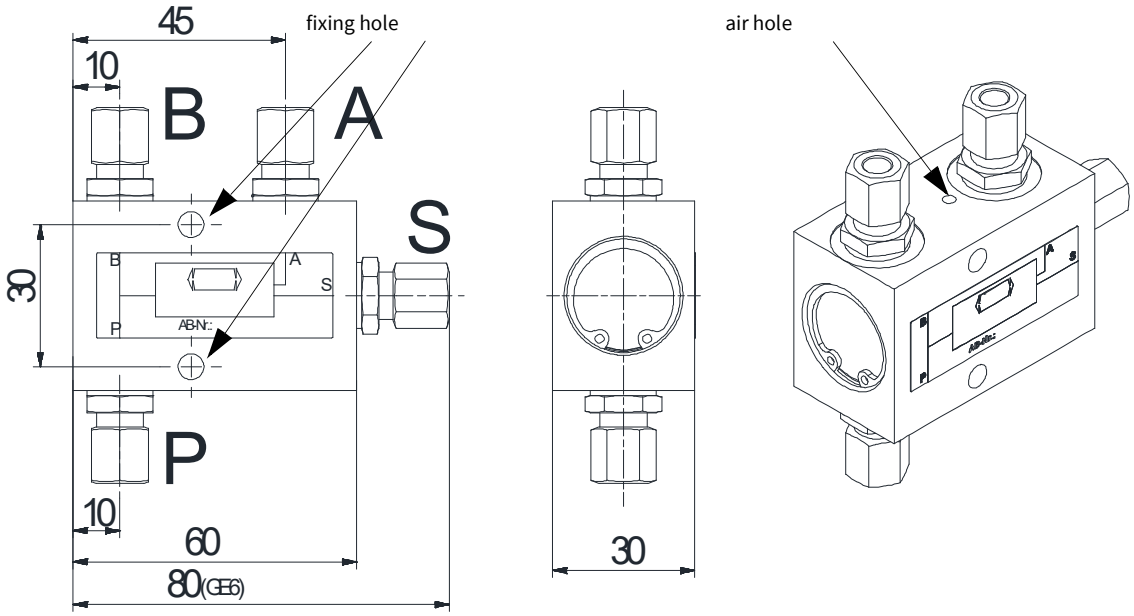
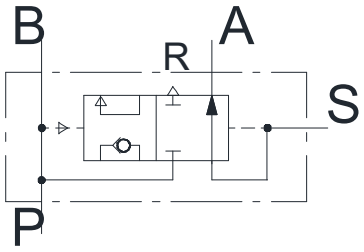


Figure 9.26: Control valve drawings



Schematic for PUV control valve, item no. 355153



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

NOTE

- 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 by Colt in the design of the ventilator.

9.9 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 louvres open and closes without problems.

The louvres must close simultaneously onto the seals. 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 louvres do not open and close correctly, it is generally possible to adjust the louvres on site. You will find more information on this in chapter "9.4 Fitting the pneumatic cylinders / electric actuators" and chapter "12.3 Repairs".

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".

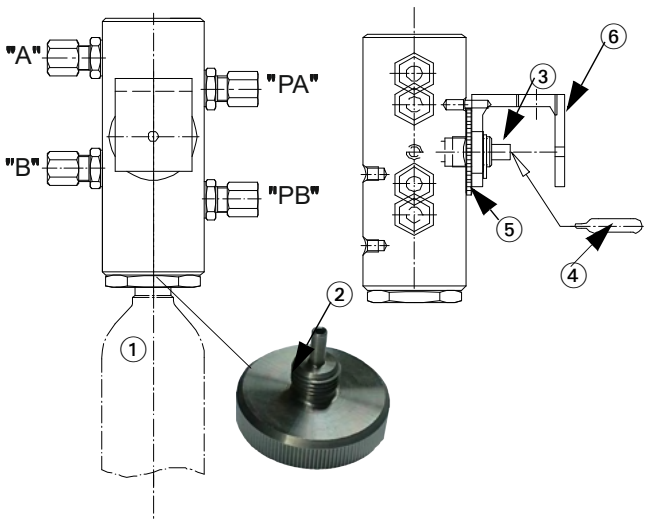
This also applies to those situations where units have been taken out of service for a long time and then need to be put back into service.

10.1 FS*** – Connection of the thermal ventilation valve

When commissioning, after the vent has been opened or when doing the annual maintenance, for pneumatic versions carry out a functional check of the primary energy supply of the thermal ventilation valve.

It is important to ensure that all units open and close freely in accordance with chapter "9.9 Functional tests".

Figure 10.1: Commissioning of the TVV



① CO_2 bottle
② Clamp screw
③ Clamp bolt
④ Glass ampoule
⑤ Adjusting screw
⑥ Retaining 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 clamp bolt ③ and retaining bracket ⑥ 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:

- visually inspect the glass ampoule ④ (the air bubble in the glass vial must not be greater than 2-3 mm)
- a check of the CO_2 bottle ①
- Check that nothing has deformed when the piercing took place
- 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:

NOTE

- The application of liquid plastics or similar for the repair of e.g. broken or damaged polycarbonate louvres 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 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 louvres for damage.
- Check louvres pivots for damage.
- Check seals for damage.
- Check fixings.
- Check that all fixings are securely in place and undamaged.

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.
- When cleaning aluminium parts only use a soft brush or cloth to remove dust. Do not use corrosive or abrasive materials. The reason for this is that there is an oxide layer on the outside of the equipment which protects against corrosion, which should not be removed.
- 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.
- Pneumatic cylinders and electric actuators have a permanent lubricant. Only apply additional lubricant if there are squeaks or other noises. If necessary silicone-free grease can be used for lubrication.
- The louvres pivot on maintenance free bushes 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 any 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 when the piercing took place
- 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.

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, do not use detergents with a pH-value less than 5 or greater than-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 louvres 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 Colt representative.

NOTE

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

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. **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 (M*B24 / M1B230)

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 (P*B**)

1.) With pneumatic ventilators take out the CO_2 bottle.

2.) Take out the CO_2 bottle from the control panel.

3.) Remove the pneumatic pipework from the unit.

Store the CO_2 bottles until you can dispose them correctly.

De-commissioning of extract ventilators

1.) Remove the cabling or pneumatic pipework from the unit.

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.) Disassemble the ventilator from the supporting construction. Remove the ventilator from the supporting construction and take it to a suitable position away from 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. Colt can take care of this for you.

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

The disposal of ventilators requires no special protective measures, since they are made of stainless steel, aluminium, silicone and polypropylene. These materials are not hazardous and can be recycled.

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

14 Service and Guarantee

Please contact your Colt representative.

www.coltgroup.com

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Installation, Operation and Maintenance Manual
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