

OWNER'S MANUAL

 **SKYFOLD**
mirage®

 **SKYFOLD**
eclipse™

Part of the Railtech Architectural Group



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TRADEMARKS

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Congratulations on your purchase of your Skyfold Wall System, the most technologically advanced and only vertically folding operable wall of its kind.

Before operating your Skyfold wall, please read this manual carefully, as this owner's manual includes a description of the wall's major components, as well as procedures related to the operation of the wall, a maintenance schedule and explanations regarding the warranty.

Your Skyfold wall is a fully automatic, operable wall that is activated by applying pressure to 2 switches simultaneously. In addition to simplicity of operation, please note that your Skyfold wall was designed with safety as a primary concern. This is reflected not only in the design philosophy of the system, but also in certain specific subsystems and components, as follows:

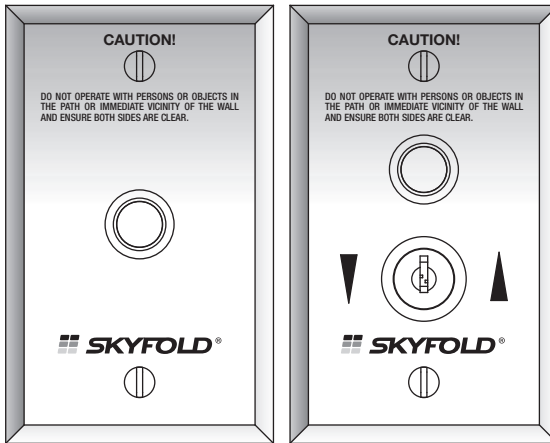
- the wall's movement is stopped instantly when
 - pressure is released from either switch.
 - a loss of power occurs.
 - a mechanical jamming occurs. (up direction only)
 - excessive current is being drawn by the motor.
 - the infra-red sensor detects an obstruction across the length of the wall.
- if, at any given time, the downward wall speed is substantially higher than normal, a hydraulic checking device lowers the wall speed.
- the cables used to lift and support your Skyfold wall are of the highest strength and quality. In the unlikely event that a cable fails, this will not affect any of the other cables.
- the programmable logic controller cuts off power if a short circuit is detected on the 12V or 24V line or if polarity is reversed.
- the electrical control box contains the latest in overload protection (models >1HP) and other electrical safeguards.
- the interface between the gearbox and the line shaft also ensures a high degree of safety.
- the movement of the wall is triggered by two switches, thus increasing security.



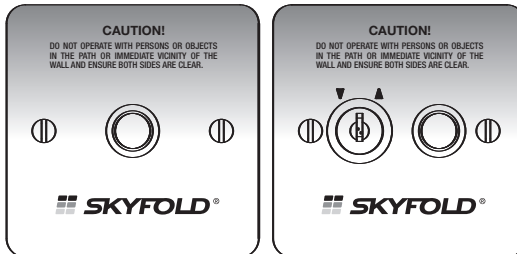
OPERATING SWITCHES

Figure 1: Key switch

North America



Europe & Asia



In an effort to optimize the safety features provided by the Skyfold wall, two switches are installed at opposite sides of the Skyfold wall. These switches control the wall's movement. Both switches must be activated simultaneously for the wall to move upwards or downwards, while the key is turned to the desired position.

When one of the switches is released, the wall stops immediately, without coasting.

Before operating the switches, please read the safety precautions and the procedures contained in the **Skyfold walls in operation** section.

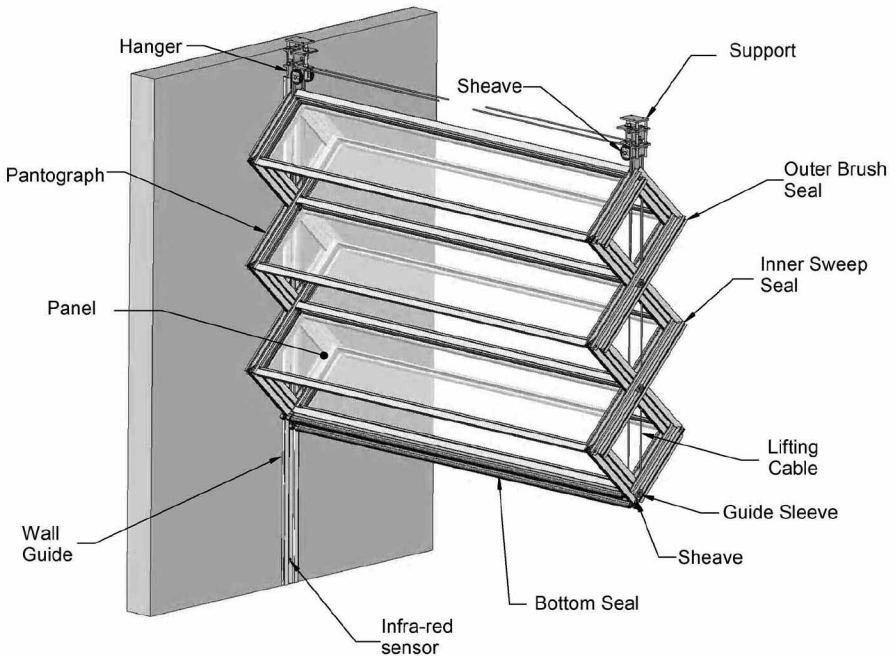
PANTOGRAPH AND PANELS

LIFTING MECHANISMS (PANTOGRAPHS)

The internal skeleton of the Skyfold Mirage/Eclipse wall consists of a series of lifting mechanisms or pantographs that are made of structural grade aluminum and steel. For greater longevity and silent operation, all mechanical pivot points are made of high strength steel bolts or pins on plastic bushings. Aircraft-grade wire rope or cable, of the highest strength and quality, pass through the mechanisms and fold and unfold the mechanisms as they wrap and unwrap on their respective drums.

See Figure 2.

Figure 2: Pantographs and Panels (Mirage glass panels shown)



Glass Panels (for Skyfold Mirage only)

Skyfold Mirage walls can either have a single glass composition or a double glass composition.

The single laminated glass composition consists of 3/16" (5 mm) annealed glass + 0.060" (1.5 mm) film + 3/16" (5 mm) annealed glass. Overall thickness: approximately 7/16" (11.5 mm).

The double laminated glass composition consists of 1/8" (3 mm) annealed glass + 0.030" (0.8 mm) film + 1/8" (3 mm) annealed glass + 1/2" (13 mm) spacer + 1/8" (3 mm) annealed glass + 0.030" (0.8 mm) film + 1/8" (3 mm) annealed glass. Overall thickness: approximately 1 1/8" (29mm).

The glass panel's construction also provides superior acoustic properties. Alone, the double laminated glass panels have a Sound Transmission Classification (STC) rating of 42 (Rw 42), according to industry standards.

Steel Panels (for Skyfold Eclipse only)

The panels used on Skyfold Eclipse walls are a composite construction with a heavy-gauge steel face sheet to resist abuse. *See Figures 4 & 6.* Your choice of finish has been carefully applied to the panels and a thin plastic wrap protects it from dirt and other debris.

The protective coating must be removed at the latest two weeks after the date of shipment.

Skyfold Eclipse walls have an STC rating of 32 (31 Rw) as tested according to the Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions (ASTM E90) and the Measurement of Airborne Sound Insulation in Accordance with ISO 140-3.

Cables

The cables that lift and support the Skyfold wall are aircraft-grade wire cable of the highest strength and quality. These cables are sized to offer a high factor of safety. Each of these cables is attached to and lifted by a separate drum and each drum is keyed into the solid-steel line shaft. In the unlikely event that a cable fails, this will not affect any of the other cables. *See Figures 2 & 7.*

Sheaves (pulleys)

As illustrated in *Figure 2*, the lifting cables wrap around the sheaves, thus providing an additional pick-up point.

Infra-red Sensor

Located at the bottom of the wall track is an infra-red sensor. When the infra-red beam is broken by an obstruction while the wall is descending, power is cut to the lifting motor, the electromagnetic brake engages and the wall's descent is instantly halted. See Figure 2.

Warning

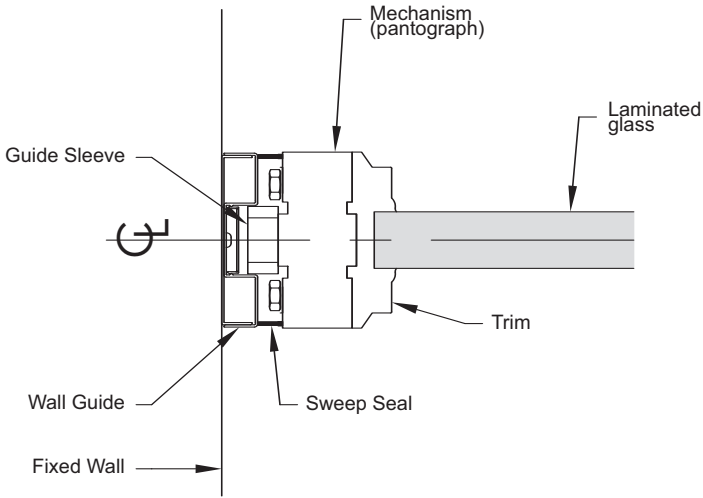


- Before the Skyfold wall can resume its descent, you must raise the Skyfold wall and remove the obstruction.
- If the wall has incurred damage, do not operate the wall and call your local, authorized Skyfold dealer for an immediate inspection.

End seals

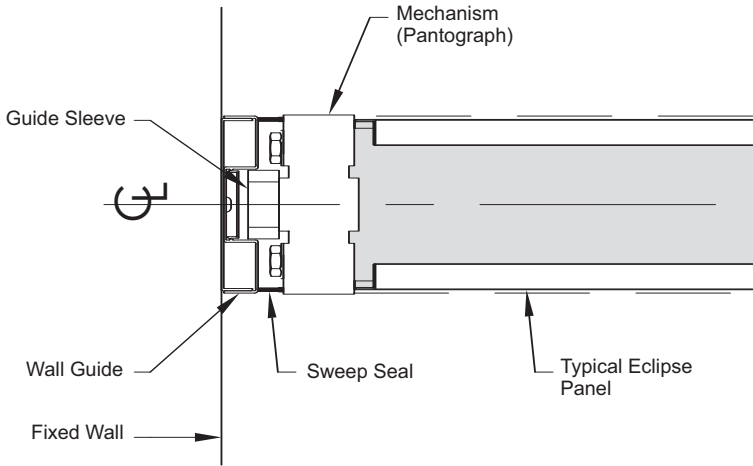
Fixed brush and sweep seals close the gap between the wall track and the pantographs (lifting mechanisms) thus providing a visual barrier. See Figure 3 for Skyfold Mirage and Figure 4 for Skyfold Eclipse.

*Figure 3: Vertical end-seals at fixed wall
(section looking down through the Skyfold Mirage wall)*



End seals (cont'd)

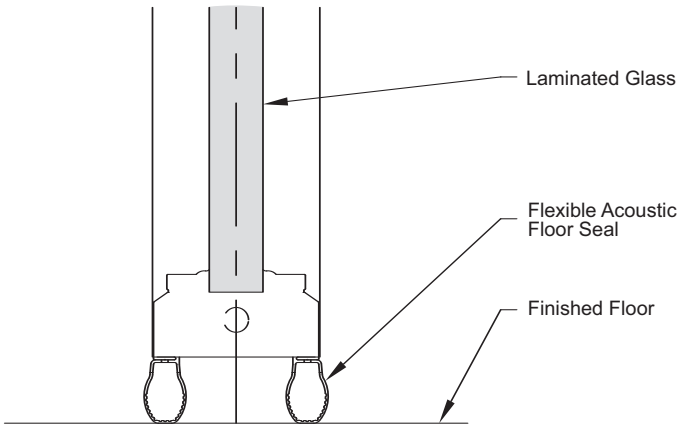
*Figure 4: Vertical end seals at fixed wall
(section looking down through the Skyfold Eclipse wall)*



Floor seals

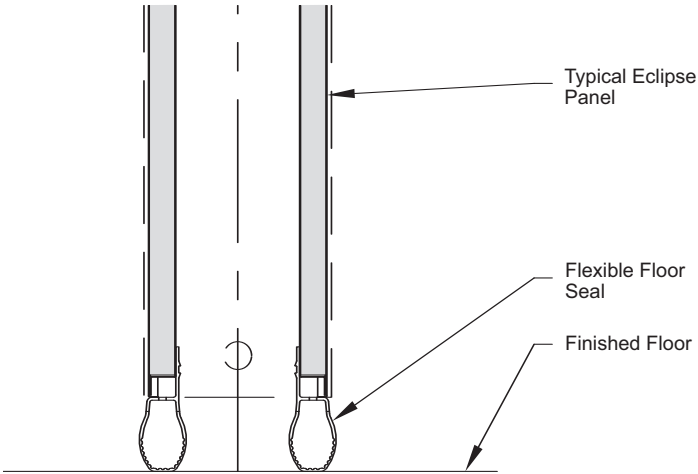
Flexible bulb seals close the gap between the floor and bottom panel.
See Figure 5 for Skyfold Mirage and Figure 6 for Skyfold Eclipse.

*Figure 5: Floor Seals
(section looking through the Skyfold Mirage wall)*



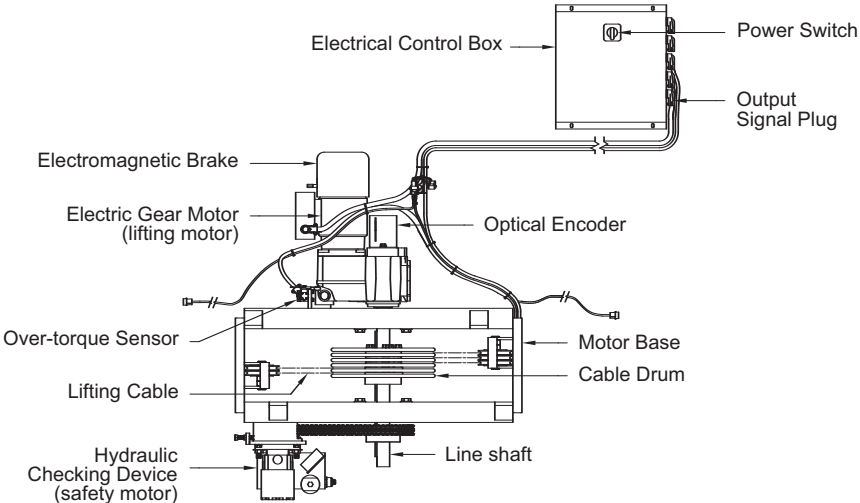
Floor seals (cont'd)

*Figure 6: Floor Seals
(section looking through the Skyfold Eclipse wall)*



MOTOR UNITS

Figure 7: Compact Drive Unit



This manual is accompanied by shop drawings that clearly illustrate where the motor unit is located.

Electric gear motor (lifting motor)

Your Skyfold wall is equipped with a sealed, heavy-duty gear motor that powers the entire system. This lifting motor is designed for hundreds of stops and starts an hour and is rated for service several orders of magnitude more severe than the service it experiences while operating your Skyfold wall.

The lifting motor is equipped with an **electromagnetic brake**. Power to the lifting motor is cut and its electromagnetic brake engages automatically when one of the following occurs:

- A switch is released.
- The wall reaches its upper limit, fully retracted into the pocket.
- The wall reaches its lower limit (fully closed position).
- While descending, the beam emitted by the infra-red sensor is broken by an obstruction.
- While ascending, the over-torque sensor detects excessive torque on the motor.
- The thermal-overload relay in models >1HP, which is located in the electrical control box, detects excessive current being drawn by the motor.
- A short circuit is detected on the 12V or 24V line or if the polarity is reversed
- The main power switch, breaker or fuse is tripped.

Without power, the electromagnetic brake can be manually released by pulling the brake release lever. This allows the wall to descend under its own weight. Its speed is controlled by the hydraulic checking device. The system must be recalibrated before it can be used again. Leave the control box disconnect switch in the off position until it can be calibrated by a certified SKYFOLD installer.

Spring-cushioned torque arm

A spring-cushioned torque arm supports the motor assembly in order to soften the starts and stops of the system. As part of this assembly, there is a sensor on the torque arm that detects higher than normal torque levels. In the event that mechanical jamming has occurred in the system, or if the upper limit switch fails to operate, this over-torque sensor quickly cuts power to the motor. *See Figure 7.*

Line shaft

The line shaft that rotates all of the cable drums is continuous through the gear motor, without a coupling. This assures a higher degree of safety by providing a better interface between the gearbox and the line shaft. *See Figure 7.*

Hydraulic checking device (safety motor)

There is a hydraulic checking device, also referred to as a hydraulic parachute, which is separate from the gear motor assembly and is powered by the line shaft itself.

See Figure 7.

When the wall is traveling downwards, this hydraulic checking device builds up a certain hydraulic pressure that is dependent on the wall's travel speed. In normal operation, this pressure is very low and this checking device offers no appreciable braking force on the wall. If, at any time, the wall speed is substantially higher than normal, this checking device offers sufficient braking force to lower the wall at a speed of approximately 150% of the normal operating speed.

Electrical control box

Skyfold's electrical control box meets both Underwriters Laboratories (UL) and Canadian Standards Association (CSA) requirements. The enclosure itself is constructed of heavy-gauge steel. It is typically located within 15 feet (4.5 meters) of the motor unit and is accessible via an access panel in the ceiling. For warranty protection, it has a manufacturer's seal, thus deterring unauthorized tampering.

There is a main power switch on the cover of the electrical control box. *See Figure 7.*

In the event that your wall does not operate at all, you must ensure that the main power switch is in the "ON" position. Any other type of maintenance or repair work, in these cases, must be performed by your local, authorized Skyfold dealer. Unauthorized work will void the Skyfold warranty, as stated in the Warranty section of this owner's manual.

Upper (opened) and lower (closed) limit control

Your Skyfold wall stops automatically upon reaching its upper limit (fully open) position or its lower limit (fully closed) position. There is no need for the operator to carefully time the release of the switches. These limits are set by the Skyfold installer at the time of installation.

AV / Dry Contact for linked building systems

For integration with other building systems, your Skyfold wall is equipped with dry contacts identifying when the wall is in the "UP" or "DOWN" position. The dry contacts are sourced from the control box and are labelled as such. *See Figure 8.*

A maximum power supply of 24 volts is provided by the A/V system that is to be controlled by these contacts. Skyfold provides a connector plug and a 6" (150 mm) long extension cord to the A/V Dry contacts found on the outside of the control box. See Figure 8. The extension cord comes with a male and female connector and a separate female connector is supplied for the connection to the A/V system. The male connector on the extension cord has the following wire designations:

- Black #1 – Wall Down Com1
- White #2 – Wall Down Dry Contact 250mA
- Red #3 – Wall Up Com1
- Green #4 – Wall Up Dry Contact 250mA

Using 18 or 22 gauge wires, the electrician connects the A/V system to the pins in the separate female connector. Access to the interior of the control box is not required for this hook-up and a manufacturer's seal deters unauthorized entry.

Warning



➤ Only qualified Skyfold personnel are authorized to perform any type of maintenance and/or repair work on your Skyfold wall. Unauthorized work will void the Skyfold warranty, as stated in the Warranty section of this owner's manual.

Figure 8 : A/V Dry Contact Plug (position signal)



Warning



➤ Heat generated by lights inside of the ceiling pocket can damage the panels. Therefore, you can only turn on lights that are located in the ceiling pocket when the wall is completely down and never when the wall is partially or fully retracted into the pocket.

A/V Dry Contact Connector Plug



The time required for a Skyfold wall to ascend or descend varies depending on the size of the wall. On average, a Skyfold wall will take approximately two minutes to either completely travel upwards or downwards.

OPERATING A SKYFOLD WALL

The following procedures apply to normal operating situations.

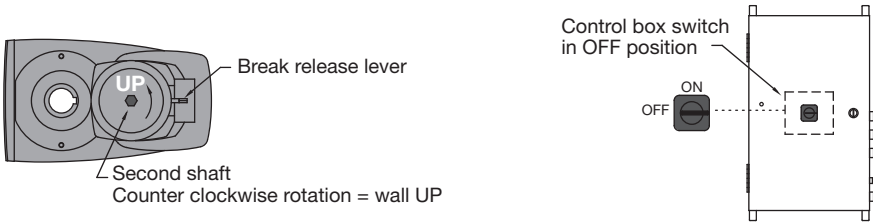
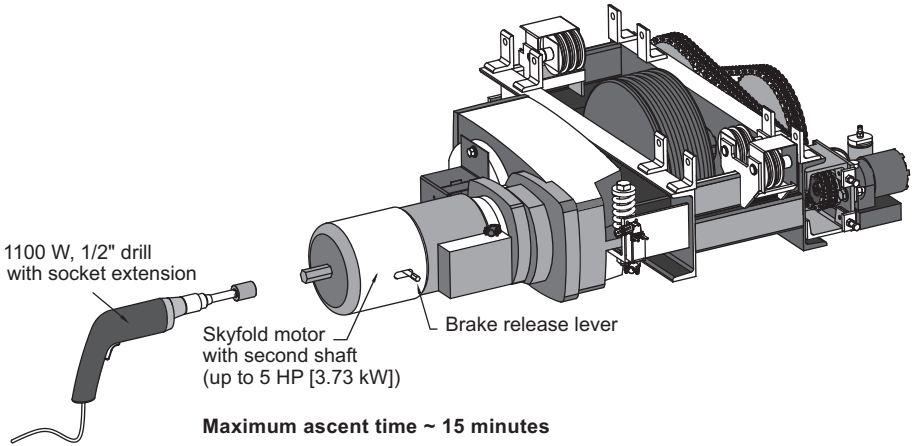
Warning



- Do not place objects between the panels, underneath the Skyfold wall, or in the near vicinity of the Skyfold wall, as this can cause damage to the Skyfold wall when it is in motion.
- Do not operate your Skyfold wall with persons or objects in the path or immediate vicinity of the Skyfold wall, and ensure that both sides of the Skyfold wall are clear.
- In case of a malfunction, do not operate the Skyfold wall or attempt to repair it. In such a case, call your local, authorized Skyfold dealer for service.
- Do not operate your Skyfold wall if there are any abnormal noises or if the wall does not appear to be working properly. In such a case, contact your local, authorized Skyfold dealer immediately.
- Do not operate your Skyfold wall if panels are missing as this can damage the system.
- Heat generated by lights inside of the ceiling pocket can damage the panels. Therefore, you must only turn on lights that are located in the Skyfold ceiling pocket when the wall is completely down and never when the wall is partially or fully retracted into the pocket.
- In cases where an obstruction has caused the Skyfold wall to halt its descent, you must raise the wall and remove the obstruction prior to resuming the wall's descent.

1. Ensure that both operators of the Skyfold wall have a clear and unobstructed view of the wall. The Skyfold wall must be monitored from both sides of the wall for the duration of the wall's ascent or descent, as this can prevent injury and/or damage to the Skyfold wall.
2. At both switches, simultaneously, activate and maintain pressure on the switches with the key turned in the desired position.
3. Release the switches when the desired position has been reached or after the wall is stopped automatically by its upper or lower limit controls.

BACK-UP OPERATING PROCEDURE (OPTIONAL FEATURE)



In the unlikely event that the Skyfold wall does not respond to the key switch operation, it could possibly be operated by using a heavy duty drill. If you have opted for this option, a shaft extension was added to the motor allowing for an alternative method of raising and lowering the wall. Please note this diagram is for illustration purposes only.

Please contact your local authorized Skyfold dealer for complete operating instructions.

OPERATING MULTIPLE, IN-LINE WALL SECTIONS

Multiple Skyfold wall sections, controlled from a single pair of switches but with their own independent motor units, are used to create a monolithic barrier across long distances. Regular fixed sweep and brush seals are used to close the gap between each Skyfold wall section. All Skyfold wall sections operate simultaneously. However, the Skyfold wall sections may take different amounts of time to reach their upper or lower limits because there can be slight differences in the motor speeds of these Skyfold wall sections.

In this instance, the procedure to operate the Skyfold wall is the same as for normal operating situations. However, the switches must be activated for the entire duration that it takes all sections to reach their respective upper (open) or lower (closed) limits.



Only qualified Skyfold personnel are authorized to perform any type of maintenance and/or repair work on your Skyfold wall.

Warning



- Unauthorized work will void the Skyfold warranty, as stated in the Warranty section of this owner's manual.

However, as the owner of a Skyfold wall, you must assume the basic cleaning responsibilities related to your Skyfold wall. Periodic servicing and inspection of certain components of the Skyfold wall must be performed to ensure that its mechanical performance, acoustic properties and aesthetics are prolonged and that it operates safely, as originally designed and installed. Contact your local, authorized Skyfold dealer when service is required in accordance with the maintenance schedule outlined below.

A cycle is defined as follows: the wall has completed one ascent and one descent.

PERIODIC MAINTENANCE

EVERY 500 CYCLES, OR 1 YEAR

Wall height adjustment (upper and lower limits)

Over time, the lifting cables may stretch and make it necessary to reset the upper (open) position limit and the lower (closed) position limit.

- The upper and lower limits must be verified, inspected and adjusted.

Warning



- The Skyfold wall should stop automatically once it reaches either of these limits. If this is not the case, do not operate the wall and call your local authorized Skyfold dealer for service.

Lifting cables and rigging hardware

- The lifting cables, drums, bearings, sheaves (pulleys), couplings, tie-offs, and other rigging hardware must be inspected for wear, alignment and fit.

Lifting motor gearbox

- Inspection of the lifting motor gearbox

Electromagnetic brake

- Inspection of the electromagnetic brake

Hydraulic checking device (safety motor)

The hydraulic checking device assembly includes a manifold, reservoir, pressure gauge, hydraulic motor, sprocket and chain. During normal operation, the gauge pressure should be 0-100 psi (0 – 800 Kpa) while the wall is ascending and 200-300 psi (1500 – 2000 Kpa) while the wall is descending.

- The hydraulic checking device must be inspected and its operating pressure verified.

PERIODIC MAINTENANCE (cont'd)

1 YEAR AFTER INSTALLATION

Electrical system

- The entire electrical system, including the control box, encoder, over-torque sensor, lifting motor, electromagnetic brake, infra-red sensor, switches and all plugs and cables, must be tested.

In the event of complete failure of the electrical system, check the main breaker before calling for service.

Lifting mechanisms (pantographs)

The lifting mechanisms require little maintenance over their 10,000-cycle life span.

- The lifting mechanisms must be inspected for defects and abnormal wear.

EVERY 500 CYCLES OR 2 YEARS (STARTING ONE YEAR AFTER INSTALLATION)

Hydraulic checking device (safety motor)

- The hydraulic oil must be visually inspected (and changed if required).

EVERY 1000 CYCLES OR 2 YEARS (STARTING ONE YEAR AFTER INSTALLATION)

Electrical system

- The entire electrical system, including the control box, over-torque sensor, lifting motor, electromagnetic brake, infra-red sensor, key switches and all plugs and cables, must be tested.

In the event of complete failure of the electrical system, check the main breaker before calling for service.

Lifting mechanisms (pantographs)

The lifting mechanisms require little maintenance over their 10,000-cycle life span.

- The lifting mechanisms must be inspected for defects and abnormal wear.

EVERY 10 YEARS

Lifting motor gearbox

- The gearbox lubricant must be changed.

Hydraulic checking device (safety motor)

- The hydraulic oil must be changed.

ADDITIONAL SERVICING

Over and above the regular maintenance listed above, additional servicing may be necessary, as described in this section.

Visible or audible problems

Ordinarily, your Skyfold wall should operate very smoothly and quietly, possibly with only minor or barely detectable noises from moving parts, lifting cables or motors. When the wall is in the up position all panels should be fully retracted into the ceiling pocket and rest at an angle.

Warning



- Do not operate your Skyfold wall if there are any abnormal noises or if it does not appear to be working properly, in such a case, contact your local, authorized Skyfold dealer immediately.

Lifting cables and rigging hardware

Lubrication of the chains must be done according to the use of the Skyfold wall, and the environment where they are located. It is suggested to have the condition of the chains inspected and to verify chain tension during each routine servicing visit.

Lifting motor and electromagnetic brake

The electromagnetic brake halts the Skyfold wall's movement at the instant that power is cut to the motor. If this is not the case, the electromagnetic brake may require adjustment.

Hydraulic checking device (safety motor)

Lubrication of the chain and sprocket must be done according to the use of the Skyfold wall, and the environment where it is located. It is suggested to have the condition of the chains inspected during each routine servicing visit.

CLEANING

As the owner of a Skyfold wall, you are responsible for cleaning certain parts of your Skyfold wall.

Fixed perimeter seals

Dust build up on the brush and rubber seals can be transferred to the fixed walls, wall track and floor. The seals can be vacuumed if required.

Panel cleaning

Dust may collect on the panels when they are stored in the ceiling pocket. The **Skyfold Mirage** glass panels can be cleaned by using any regular glass cleaning product. The **Skyfold Eclipse** panels can be vacuumed with a brush attachment or by other non-abrasive means.

Warning



- Do not use harsh solvents or cleaners and consult the finish fabricator's cleaning specifications before attempting to clean the finish. If damaged, individual panels can be replaced, or removed and repaired, as required (in such cases, contact your local, authorized Skyfold dealer for service.)
- Do not operate your Skyfold wall if panels are missing as this can damage the system.



Skyfold Basic Warranty: The operable wall shall be warranted free from defects in material and workmanship for a period of two (2) years or five thousand (5,000) cycles, whichever occurs first.

Extended Parts Warranty (optional): An extended warranty on parts is available in addition to the basic warranty. It includes coverage on all parts for a period of ten (10) years or five thousand (5,000) cycles, whichever occurs first.

Furthermore, the **Skyfold** warranty includes the following additional guarantees:

- the acoustical performance of the Skyfold wall will be unaffected for a period of (5) five years or 5,000 cycles, whichever occurs first.

In all the cases stated above, the period covered by the warranty begins on the date of shipment.

THIS WARRANTY DOES NOT COVER THE FOLLOWING:

- Parts and labour required to maintain the operable wall and all parts subject to normal wear and tear are specifically excluded from warranty coverage.
- Damages incurred from improper use or mistreatment;
- Excessive force beyond the normal daily operation of the product;
- Negligence;
- Acts of God.

Skyfold will carry out any repairs required to the Skyfold wall due to defects in materials or workmanship and occurring under normal use, at no charge for parts and/or labor during the warranty period, provided that:

- the Skyfold wall was operated according to manufacturer's specifications and/or operating instructions;
- all servicing and inspections have been performed by a local authorized Skyfold dealer, according to the maintenance schedule included in this manual;
- the Skyfold wall was operated in a normal environment similar to the one that prevailed when it was originally installed.

Skyfold's maximum liability is limited to the initial purchase price of the product providing that required maintenance and servicing have been done.

By no means shall **Skyfold** be liable for any consequential, indirect, incidental or special damages arising from the sale or use of the product, whether by contract or otherwise.

This warranty supersedes all other warranties, whether oral, written or implied. Should the need arise to modify this warranty to meet special circumstances, it must be amended in writing, witnessed and signed in the presence of the **Skyfold Administration**.