SKIA

INSTALLATION & WIRING MANUAL

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Contents

1 Introduction

This manual is intended to provide qualified technical personnel with complete and easy-to-follow instructions for the installation and commissioning of the Innotech SKIA devices. Although the intent of this manual is to simplify the installation task, instructions contained in this manual assume that installation of an Innotech SKIA Device will be accomplished by technically qualified personnel. Also, these instructions assume that installation personnel are familiar with local regulations, codes, and safety requirements. Installers should familiarise themselves with the content of this manual before attempting installation of the SKIA devices.

Throughout this manual there are icons to illustrate notes and points of caution, as illustrated below:

These notices indicate a piece of useful information which should be read.

*These notices important information that **must be read** before proceeding further to ensure success. Ignoring these instructions could result in damage to person or device.*

1.1 Special Considerations

The following precautions and installation considerations must be observed to ensure personal safety and to prevent damage to equipment:

- Local safety regulations, building codes and ordinances must be complied with during installation. In cases of conflict with procedures in this manual, contact Innotech or its authorised representative for clarification.
- To prevent damage to equipment, avoid applying electrical power to the equipment prior to checking the system, unless specifically instructed to do so in this manual.
- The SKIA devices can be installed using common tools and test equipment. Only qualified personnel familiar with local codes and practices should install the system. Wiring should only be performed by someone knowledgeable of electronics and wiring installation practices. Refer to the appropriate documentation when installing items provided by other manufacturers.

1.2 Installation Plans

The following precautions and installation considerations must be observed to ensure personal safety and to prevent damage to equipment:

- Local safety regulations, building codes and ordinances must be complied with during installation. In cases of conflict with procedures in this manual, contact Innotech or its authorised representative for clarification.
- To prevent damage to equipment, avoid applying electrical power to the equipment prior to checking the system, unless specifically instructed to do so in this manual.
- The SKIA System can be installed using common tools and test equipment. Only qualified personnel familiar with local codes and practices should install the system. Wiring should only be performed by someone knowledgeable of electronics and wiring installation practices. Refer to the appropriate documentation when installing items provided by other manufacturers.

1.3 Tools and Test Equipment

A 2mm flat blade screwdriver is required for wiring of the terminals. A high impedance digital Multi-meter is the only item of electronic test equipment required.

2 Installation Instructions

This section of the manual contains instructions and related data to facilitate the installation of components of the Innotech SKIA System.

It is recommended that the Innotech SKIA Controllers be mounted in steel cabinets to minimise the effects of electromagnetic interference.

The flexibility of the Innotech SKIA controllers and associated devices allows them to be installed in a wide variety of configurations depending on the user's preference. It is not possible to include all the various installation configurations in this manual and this manual provides examples of installations that are considered typical.

Innotech recognises that the installation examples described in this manual may not meet the user's requirements. However, information in this document should be used as a guide for all installations, regardless of whether the specific circumstances match the examples given. In all cases, installation personnel should familiarise themselves with the information contained in this section.

2.1 General Installation Instructions

- Do not mount near high voltage, high current cables or sources of strong radio frequency emissions such as transmitter antenna cables.
- Mount the devices in an area of minimum vibration and minimum exposure to mechanical damage.
- Ensure there is enough clearance for cabling above and below device.
- Ensure devices vents are not impeded by the wiring or other obstructions.

2.2 Din Rails

The DIN rail is an industry-standard item and is available from a large number of commercial sources. The rail is usually manufactured from galvanised steel and may be provided with a finish. 25mm Mounting Slot 18mm X 5.2mm (1") (0.71" x 0.2") 7.5mm (0.30") 25mm (1") 35mm (1.38") 15mm (0.59") Din Rail Depths 7.5mm 15mm 25mm (1") 35mm (1.38") Figure 2-20: DIN Rail Dimensions Allow a minimum 20mm (40mm recommended) gap between the end of the terminal plug and cable ducts.

2.3 Din Rain - Installation

1. Pull the DIN rail release tab down.
2. Align the DIN rail clip on the top edge of the DIN rail.
3. Lower the device so it is level and push the DIN rail clips upwards to secure the device and in two positions.

2.4 Din Rail - Removal

1. Pull the DIN rail release tabs down and in two positions.
2. Pull bottom of device away and lift up.

2.5 SKIA VAV - Installation

1. Refer to the SKIA SK8Vx Installation Instructions in the Appendix.

3 Electrical Installation

This section of the manual contains instructions and related data to facilitate the electrical installation of Innotech SKIA devices. Devices and systems can be installed in a wide variety of configurations, depending on the user's preference. For this reason, it is not possible to include all the various installation configurations in this manual. Instead, this manual provides examples of installations that are considered typical.

Innotech recognises that the installation examples described in this manual may not meet the user's requirements. However, information in this document should be used as a guide for all installations, regardless of whether the specific circumstances match the examples given. In all cases, installation personnel should familiarise themselves with the information contained in this section.

This section contains the following specific information:

- Electrical installation practices of a general nature
- Wiring information for Innotech SKIA devices

3.1 Electrical Installation Practices

This paragraph provides general information which is intended to assist qualified personnel installing SKIA Devices. More detailed information for wiring of controllers and devices are contained in subsequent paragraphs. All wiring between the controller/devices and system input/output devices, such as sensors, fans, and compressors, must be in accordance with the instructions in the applicable instruction manual or datasheet.

If any data presented in this manual disagrees with information in the applicable instruction manual, information in the manufacturer's instruction manual takes precedence. Customers are encouraged to contact Innotech Control Systems for further information or clarification of information presented herein via the contact details at the back of this document.

Electrical power to the system must be turned off throughout the installation process. Do not apply power to any part of the system until ready for Commissioning.

Cabling plays an important role in the installation of SKIA devices. The following general cabling guidelines should be observed:

- In all cases, use electromagnetic-shielded cable for sensor wiring:
- When necessary to protect cabling from physical damage, both shielding and physical protection may be provided by running the cable in a metal conduit. Alternatively, use steel wire armoured (SWA) cable, which also contains an electromagnetic shield
- Avoid running cables in the vicinity of high voltage power cables or cables carrying switching voltages/currents. This especially applies to sensor signal cables
- Power supply and digital outputs cables must have multi-strand conductors with a cross-sectional area of 1mm^2 for each conductor
- For UI/Os, a minimum 16 conductor (0.5mm^2) cable is strongly recommended.
- For communications, a minimum 16 conductor (0.5mm^2) shielded cable is required.

The table below shows the dimensions, wire gauge designations and resistance values per unit length for common wire sizes. Use this table to determine specific cabling requirements for your installation.

Conductor Area (mm^2)	Diameter (mm)	Nearest SWG or BWG	Nearest AWG	Ohms per 100 meters
0.5	0.80	21	20	3.44
1.0	1.13	18	17	1.72
1.5	1.38	17	15	1.15
2.0	1.60	16	14	0.86
2.5	1.78	15	13	0.69

Note: SWG = Standard Wire Gauge, BWG = British Wiring Gauge, AWG = American Wire Gauge
All SWG, BWG and AWG numbers are for the largest wire if a direct equivalent to the mm^2 wire size is not available.

3.2 Power Input

The SKIA power requirements are as follows:

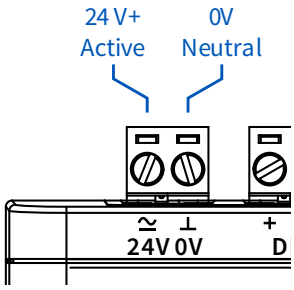
- 24VAC or 24VDC ±10%
- Recommended Transformer Rating: Refer to the applicable product data sheet.
- Power Consumption: Refer to the applicable product data sheet.

The operating voltage must meet the requirements of Safety Extra Low Voltage (SELV) to EN60730. The transformer used must be a class 2 safety transformer in compliance with EN60742 and be designed for 100% duty. It must also be sized and fused in compliance with local safety regulations.

A single transformer may be used to supply voltage to more than one controller, but you must ensure that the planned load is well within the rating of the transformer. The transformer output terminal designated as AC Neutral must be solidly earthed to the main earth link of the enclosure panel.

> ⚠ *The SKIA's power input is polarity dependent, ensure the active and neutral connections are made as per the below diagram.*

The wiring to the power terminal (orange colour) should be as follows:

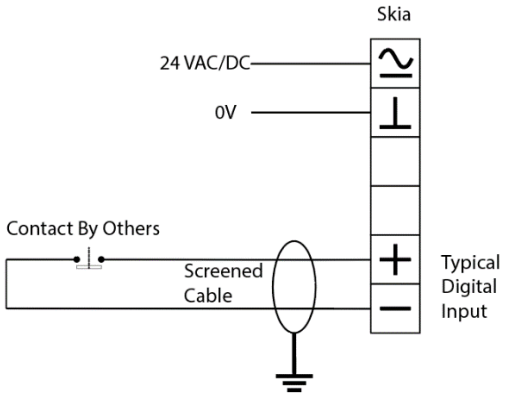


3.3 Inputs & Outputs

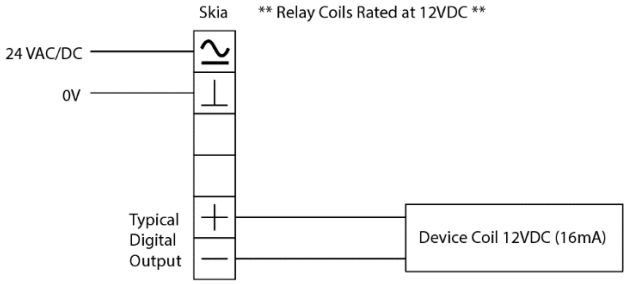
The SKIA's inputs and outputs enable the connection to various types of analogue or digital signals with each type having strict specification and wiring conditions.

All inputs and outputs have their negative (-) terminal directly connected internally to the controller's neutral / 0V terminal and care should be taken when connecting other powered devices.

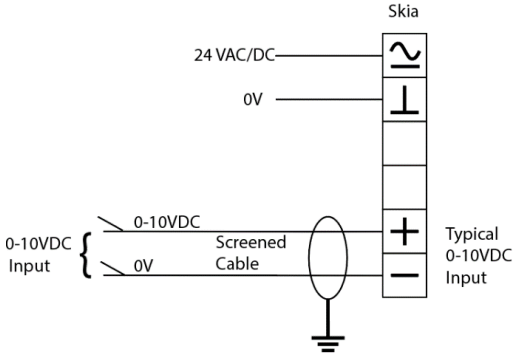
3.3.1 TYPICAL DIGITAL INPUTS



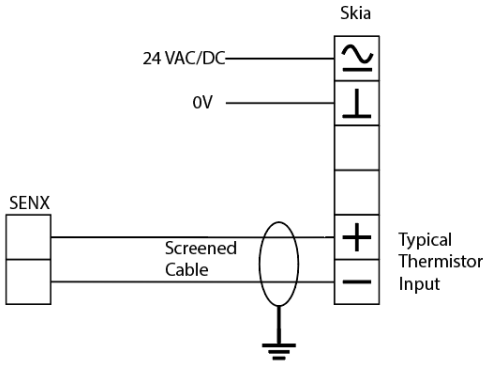
3.3.2 TYPICAL DIGITAL OUTPUTS



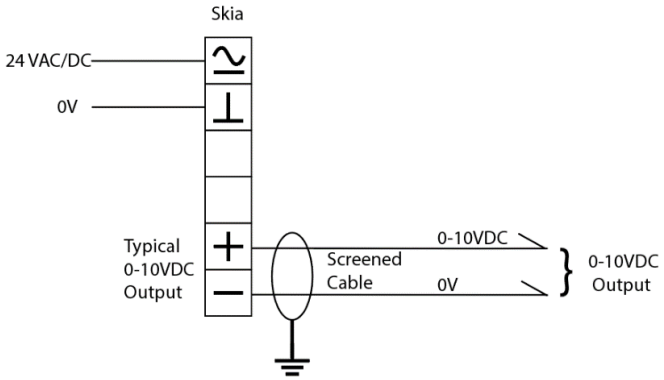
3.3.3 TYPICAL 0-10VDC INPUTS (UNIVERSAL INPUT)



3.3.4 TYPICAL THERMISTOR INPUTS (UNIVERSAL INPUT)



3.3.5 TYPICAL 0-10VDC OUTPUTS (UNIVERSAL OUTPUT)



4 Network Installation

4.1 Ethernet Comms

SKIA Controllers have two Ethernet ports depending on the model, which when connected to an active local area network, enables a PC to configure and monitor the Digital Controller and connected devices. Using the controller's IP address, it is also possible to connect to the controller remotely. When connected to a Local Area Network, the digital controller should have a user-assigned IP Address to be configured using the SKIA Web-Server interface.

BACIP Local

The BACIP local settings configures the SKIA for the local BACnet network communications and connecting from iComm via a BACnet UDP connection. This one BACnet UDP connection discovers all networked SKIA controllers and is the preferred connection type. Connect by specifying a unique Network Number, UDP Port and specifying the Mode.

4.2 RS-485

BACnet MS/TP

BACnet MS/TP is a token passing protocol. It stands for Master Slave / Token Passing. It is well suited for connecting BACnet MS/TP devices

4.3 Installation

It is not possible to cover all the situations that may be encountered in the wide range of installations found in the field. The following examples are provided as a guide to assist in deciding the best method of connection for an SKIA System Installation. Some situations require additional care to avoid hazardous conditions. These may be covered by legislation or regulations such as those set by Telecommunications Authorities, Electrical Wiring Rules and Local Authorities. The SKIA product line is designed to comply with the Extra Low Voltage standards and therefore any wiring connected to these products should also comply with these standards if the product compliance is to be maintained. Communication links between equipment located within different electrical switchboards should be electrically isolated from one another. The voltages at the earth connections of the switchboards will usually have a small difference under normal conditions but, if a fault occurs on equipment connected to one switchboard, the voltage difference can increase dangerously. If a non-isolated communications link is used, this voltage difference can cause a large current to flow through the communications cable and the integrated circuits (ICs) connected to it. An isolated connection will block the current, but it would have to withstand the full supply voltage for up to several seconds.

4.4 Ethernet Considerations

Only Cat 6 or Cat 5e cables should be used. Cat 5 Ethernet cabling should NOT be used.

The signal degrades over distance more in lower quality cables, which causes the bandwidth to drop due to frequent re-transmissions of data.

It is recommended that high quality branded Cat 6 / 5e Ethernet cable is used for your networking requirements to achieve the best results.

4.5 RS-485 Cable Specifications

Innotech recommends the use of cables specifically designed for RS-485 networks. There are many cables on the market that meet the specifications for RS-485 networks.

Best reliability is achieved through a cable consisting of two individually shielded twisted pairs of low capacitance. Such cables also provide excellent mechanical strength and lowest electrical resistance, which is beneficial for maximum length cable runs.

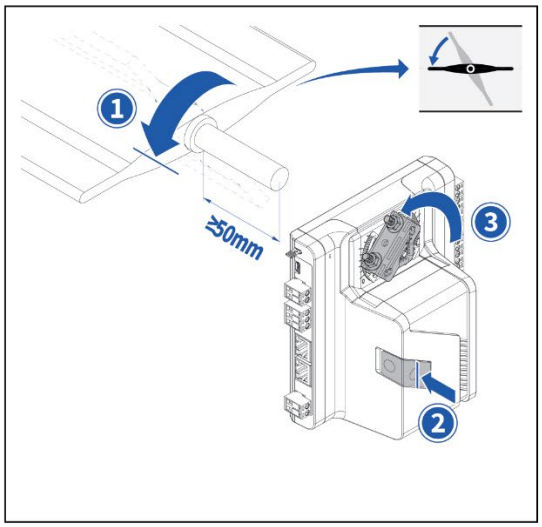
Some CAT6 cable types may also be suitable in certain applications. Care should be taken when using CAT6 for Primary Networks as they frequently omit shielding. CAT6 cables should be shielded in order to provide reliable communications.

Any cable that meets or exceeds all the stated specifications is suitable for use:

- 2 twisted pairs
- Minimum conductor cross section AWG24 (0.205 mm2)
- Stranded core type is recommended (7 strands of 0.193 mm)
- Conductor Foil screened cable with a wire drain
- Less than 50 pf capacitance per metre between conductors
- Less than 80 pf capacitance per metre between conductors and screen
- Impedance 100 – 120 Ohms
- Sheath thickness 0.8 mm 240 V rated
- Equivalent to the Belden Part #8102

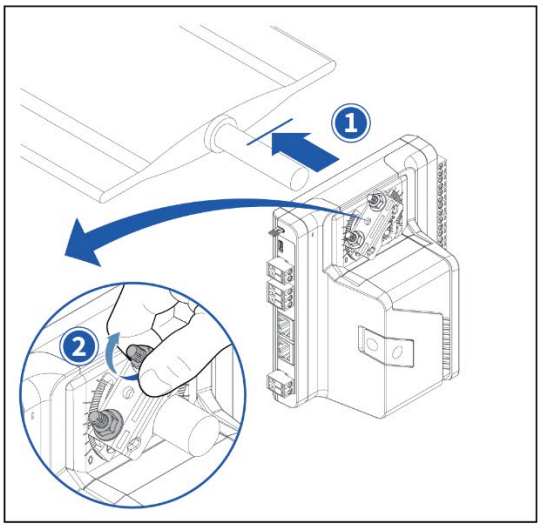
5 Appendix - SKIA SK8Vx Installation Instructions

Step 1



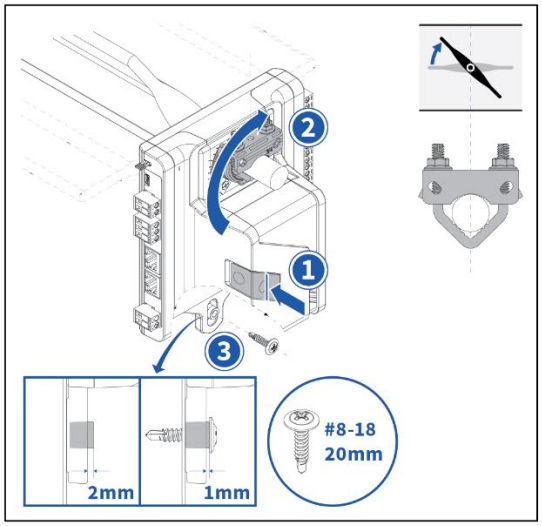
1. Rotate the Terminal Unit Blade to be in the fully open position
2. Press and hold the Manual Release Button
3. Rotate the Actuator Clamp completely to the left then release the Button

Step 2



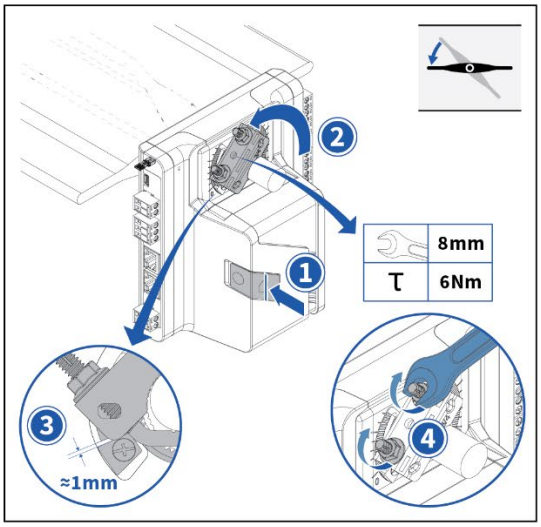
1. Install the Skia VAV onto the Terminal Unit Shaft and push flush to the sheet metal side wall
2. Finger-tighten the Actuator Clamp so it grips to the Shaft

Step 3



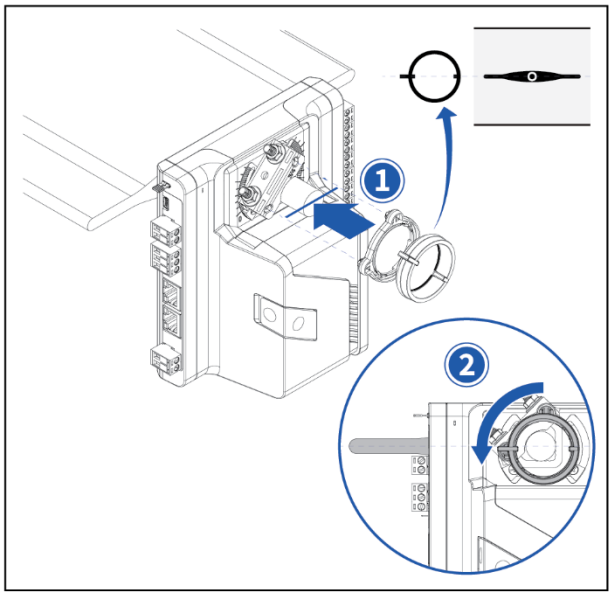
1. Press and hold the Manual Release Button
2. Rotate the Actuator Clamp to the 50% position then release the Button
3. Install the Sheet Metal Screw through the anti-rotation sleeve, into the duct metal. Ensure the Sleeve breaks away from the plastic housing and can move freely in the slot – Do not overtighten the screw as it may crush the sleeve

Step 4



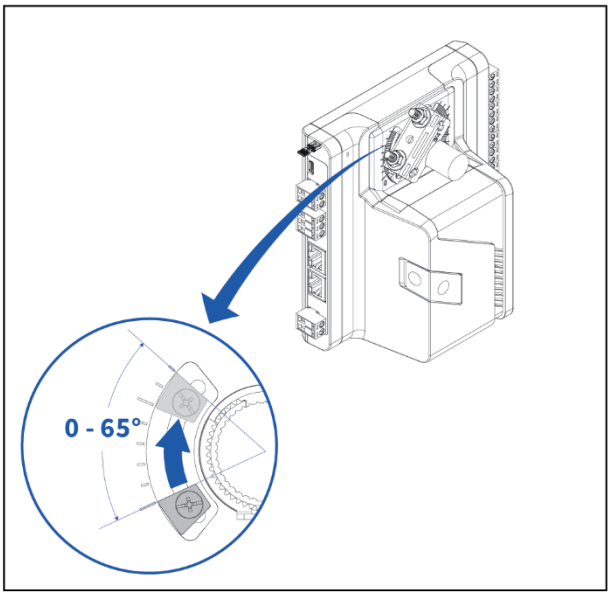
1. Press and hold the Manual Release Button
2. Rotate the Actuator Clamp completely to the left then release the Button
3. Leave a 1mm gap between the Actuator Clamp and End Stop
4. Evenly tighten the Actuator Clamp nuts using an 8mm Spanner to 6Nm

Optional Position Indicator Installation



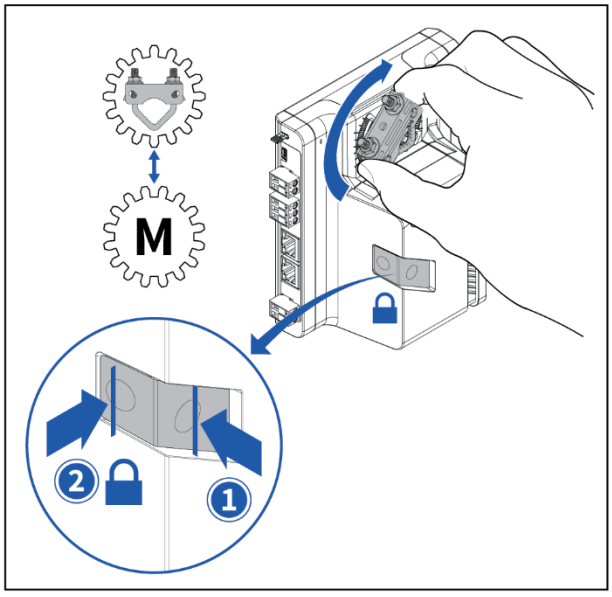
1. Install the Position Indicator Assembly onto the Actuator Clamp
2. Rotate the Indicator Dial to be aligned with the known position of the Terminal Unit Blade for future visual reference

Optional End Stop Limiting



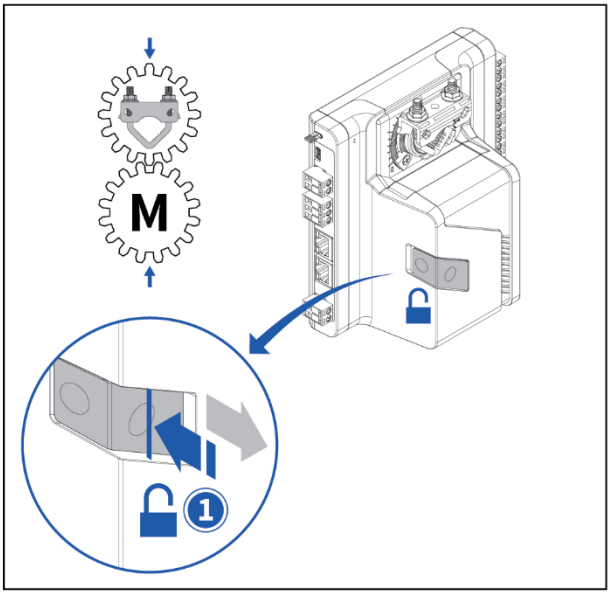
The Actuator End Stops can be repositioned within a 65° Range on either side to mechanically limit the range of motion of the Actuator

Temporarily Disengage the Motor



1. Press and hold the Manual Release Button
2. Completely push the lower side of the Manual Release Button inwards to engage the lock, then release the Button – it should remain depressed and allow free movement of the Actuator

Re-engaging the Motor



1. Press and release the Manual Release Button to re-engage the motor – the Button should spring back to the normal position and the Skia VAV will resume its control

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