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PA-CB41-2-12V24V

Hall Effect Linear Actuator
Synchronization Control Box

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Have any queries? Our expert engineers are here to help!



sales@progressiveautomations.com



1-800-676-6123



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SAFETY PRECAUTIONS

When installing and using your Progressive Automations linear actuator, basic safety precautions should always be followed. Please read all safety precautions thoroughly and be familiar with all functions of the product before use. Apply all other relevant precautions when operating electrical and moving mechanical devices.

DANGER

To reduce the risk of electrical shock and injuries:

- Do not attempt to modify or repair the actuator.
- Avoid using the actuator in environments with explosive gases or flammable materials.
- Avoid using the actuator beyond its specified Ingress Protection rating.
- Make sure that the power source is properly grounded. Neglecting proper grounding can result in a dangerous electrical hazard.

WARNING

To reduce personal harm and injury:

- Follow recommended load ratings and specifications for the actuator.
- Avoid leaving the actuator unattended during operation.
- Avoid operating the actuator in areas with high levels of airborne contaminants.
- Ensure a clear path for full extension and retraction of the actuator.
- Keep hands and body parts clear of the actuator while it is in motion.
- Exercise caution around pinch points and moving components during the actuator's operation.
- Keep all loose clothing, jewelry, and personal items away from the actuator's moving parts.

Operating Notes

Warranty

Any attempts to disassemble or tamper with the actuator's internal components or operation outside of the advertised usage limitations will result in voiding the product's warranty. For more information on our warranty terms, visit:

<https://www.progressiveautomations.com/pages/warranty-terms>

Force Restrictions

Linear actuators must be used within the specified force rating outlined in this documentation. Load must be evenly distributed. Exceeding the recommended force rating may result in failure of the linear actuator. It may also damage the product and void the warranty. Please note that the weight of the load does not always equal the total force due to mechanical advantage, wherein the force may increase or decrease depending on the application.

Operation Time

Linear actuators must be operated within the specified operation time and frequency. Exceeding the duty cycle rating can significantly reduce the actuator's expected lifespan and will void the warranty.

SPECIFICATIONS

Product Specifications

Function	Synchronized control of heavy duty Hall effect linear actuators
Number of Channels	2
Feedback Input	Linear actuator with Hall effect sensor - 5 VDC, 2 channels, 50% duty cycle, 90 degree offset
Limit Switch	Linear actuator must have built-in limit switches. Not compatible with current-detection type limit switch.
Input Voltage (Nominal)	12 VDC or 24 VDC
Input Voltage (Operating Range)	10 VDC to 26 VDC
Output Voltage (Nominal)	12 VDC or 24 VDC
Output Voltage (Operating Range)	10 VDC to 26 VDC
Current Capacity	25 A per channel at 12 VDC 12.5 A per channel at 24 VDC
Total Power Output	600 W total 300 W per channel
Efficiency	99%
Duty Cycle	25%, up to max 5 minutes continuous operation
Power Management	Automatic power saving mode
Wake Response Time	Instant wake up with single press, 100 ms response time
Standby Response Time	60 ms
Ambient Current Draw	3 mA
Operational Temperature	14°F to 122°F (-10°C to 50°C)
Protection and Safety Features	<ul style="list-style-type: none">• Out of synchronization• Output short circuit• Overcurrent / overload• Over duty cycle• Out of range input voltage• Reverse input voltage
System Indicators	Dual LED indicators, audible buzzer, onboard push button
Housing Material	ABS Plastic
Housing Color	Black with blue accents
Dimensions	7.95 in x 5.20 in x 1.47 in (202 x 132 x 37.4 mm)
Unit Weight	0.75 lb (340 g)
Included Components	Control box and RT-40 wireless remote with battery

Control and Interface Options

Control Modes	Momentary or non-momentary control. Smooth motion mode.
Wireless Control	433.92 MHz RT-40 wireless remote included
Wireless Range	Minimum 100 ft
Wireless Remote Functions	Up, down, stop and programming modes
Wireless Remote Capacity	Supports pairing up to four RT-40 wireless remotes
Wireless Remote Battery	12V 27A alkaline battery (included)
RJ45 Smart Port	RJ45 Smart Port V1 for wired remote support and hardwired external control
Wired Remote Support	Up, down and stop control using RT-07, RT-17 or RT-23
Hardwired External Control	AC-67-06 screw terminal adapter for up, down and stop control via external switches or automation systems (upcoming)

QUICK START GUIDE

Linear Actuator Synchronization

- The Control Box uses Hall Effect Feedback to continuously monitor all connected Linear Actuators, ensuring they move synchronously and maintain alignment or same position in real time even under uneven loads or speed variations.
- In the event of misalignment:
 - Automatic realignment occurs when all actuators reach full extension or retraction.
 - Manual realignment can be performed via the Soft Reset or Hard Reset procedures.

Compatibility

Before setting up, verify that your components meet compatibility requirements:

- Refer to the Connectors and Specifications sections to confirm that the connected Linear Actuators and Power Supply are supported.

Wireless Remote Setup

- Each Control Box includes at least one Wireless Remote, pre-paired from the factory.
- Ensure the remote has adequate power.
- Check that the LED indicator on the remote lights up when a button is pressed.
 - Replace the battery if needed—see Battery Specifications for details.
- To pair a new or replacement remote, refer to the Wireless Remote Pairing Procedure section.

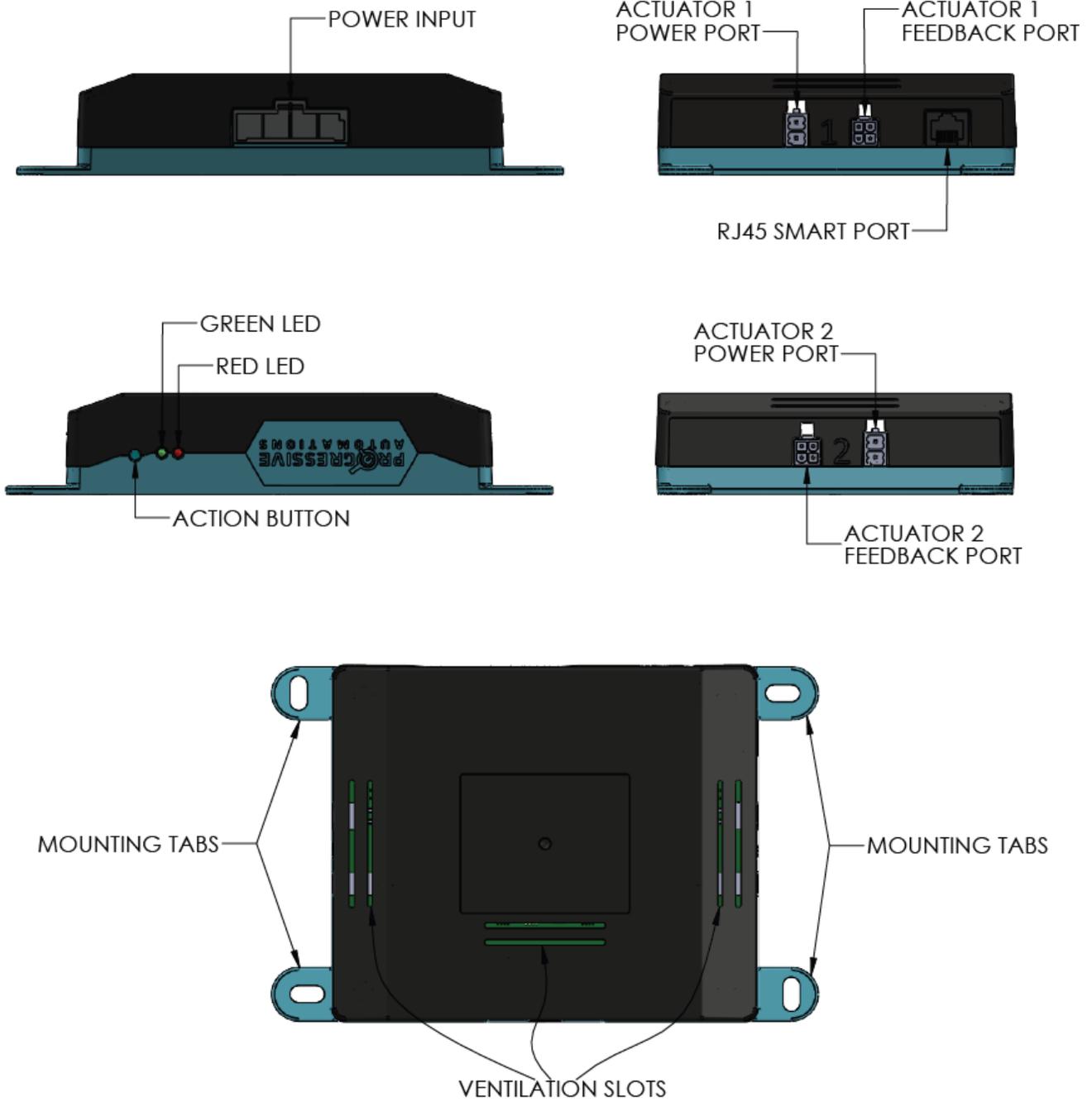
Hard Reset Procedure

- Before first use, a Hard Reset must be performed to initialize the system.
- See the Reset Procedure section for step-by-step instructions.

Wireless Remote Operation

- UP: Extend linear actuators
- DN: Retract linear actuators
- M: Programming Mode
- S: Stop linear actuators
- Pressing any button while linear actuators are in motion will stop the actuators.
- Automatic Power Saving Mode when Linear Actuators not in motion.

Control Box Diagram



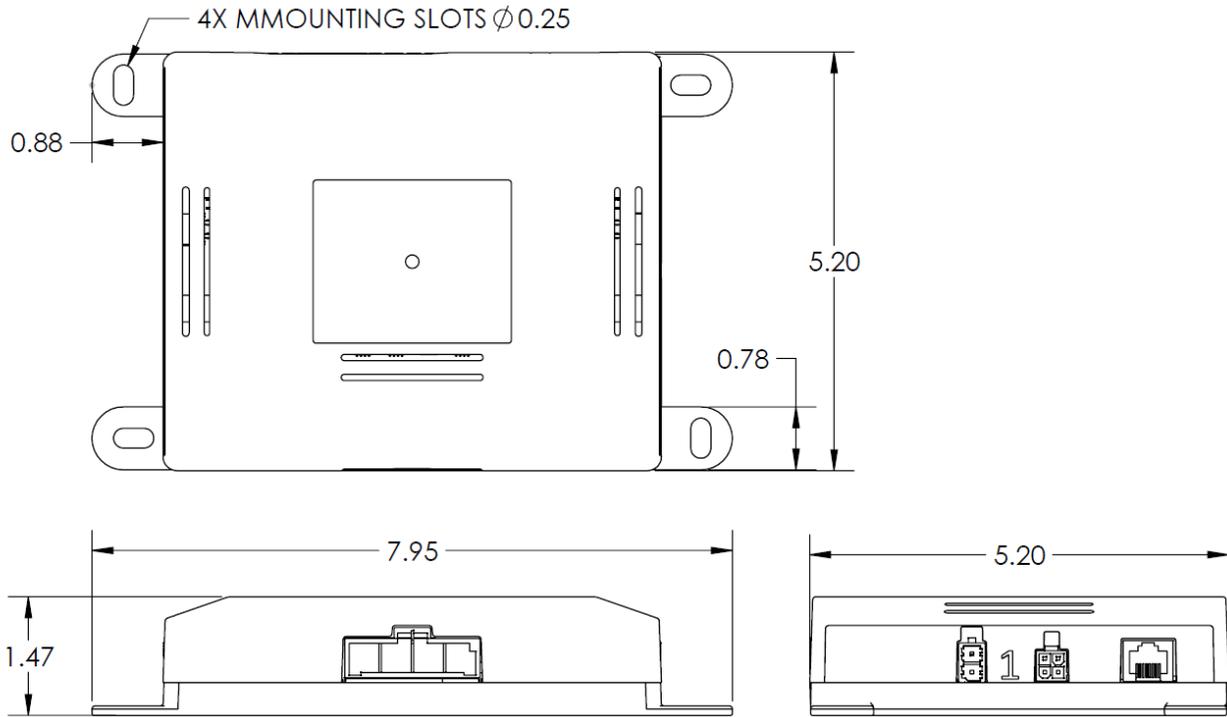
Wireless Remote



DIMENSIONS

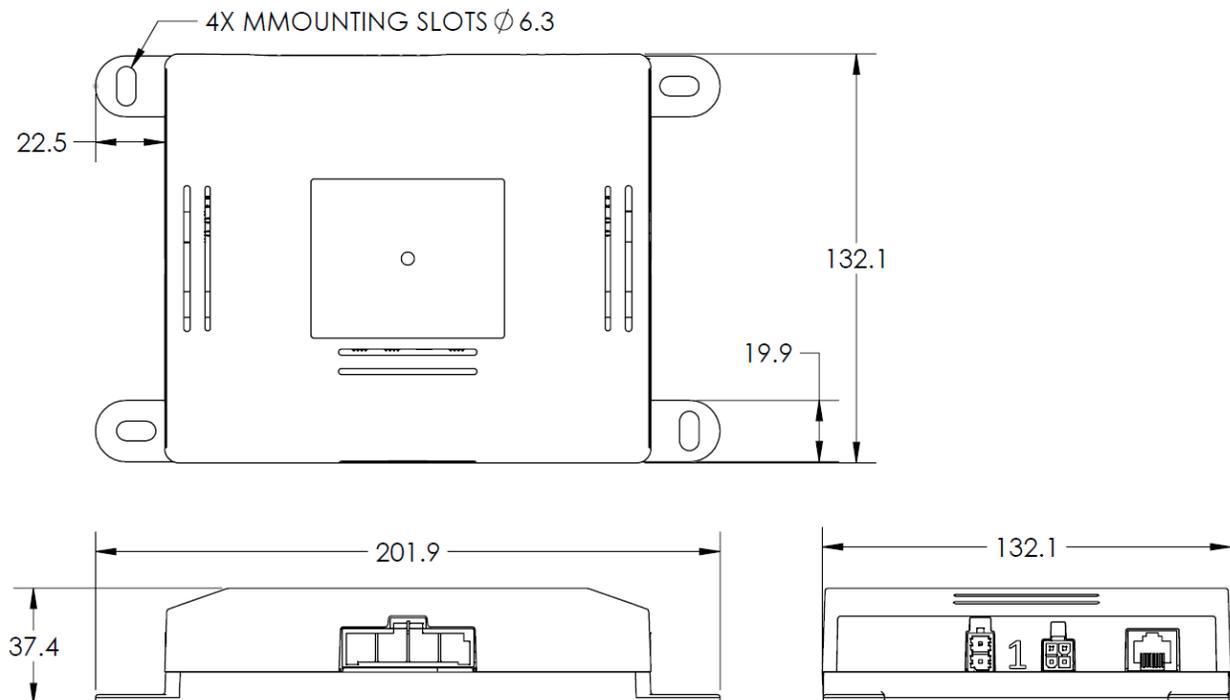
Imperial Diagram

Note: All dimensions are listed in inches.



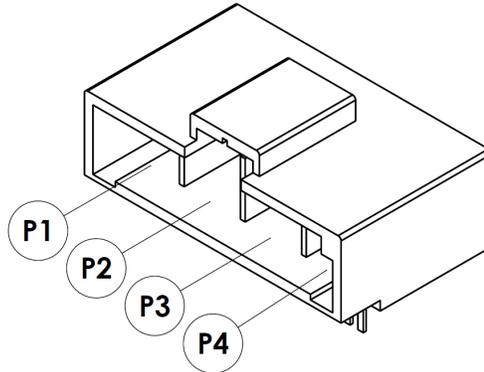
Metric Diagram

Note: All dimensions are listed in millimeters.



CONNECTORS

Power Input

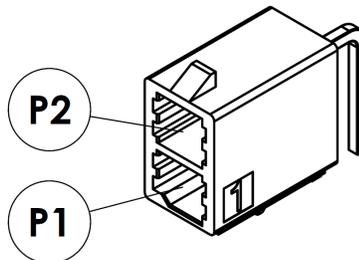


Pin Location	Function	Wire Color	Wire Gauge
P1	Power Input COM / Negative (-)	Black	10 AWG
P2	Power Input COM / Negative (-)	Black	10 AWG
P3	Power Input VCC / Positive (+)	Red	10 AWG
P4	Power Input VCC / Positive (+)	Red	10 AWG

Parts List

	Part Name	Part Number	Mating Part Number
Housing	Hirose Connector Header, Through Hole, Right Angle, 4 Position	DF60-4P-10.16DS (27)	DF60A-4S-10.16C
Terminals			DF60-1012SCFA

Actuator Power Port – 2-Pin Connector

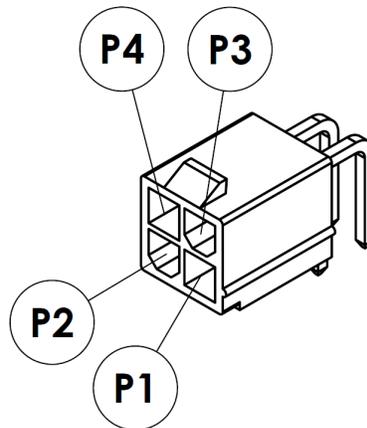


Pin Location	Function	Wire Color	Wire Gauge
P1	Motor - / Retract actuator when (+) voltage applied	Black	12 AWG
P2	Motor + / Extend actuator when (+) voltage applied	Red	12 AWG

Parts List

	Part Name	Part Number	Mating Part Number
Housing	Molex Mega-Fit Right-Angle Header, Dual Row, 2 Circuits	768250002	1716920102
Terminals			768230322

Actuator Feedback Port – 4-Pin Connector



Pin Location	Function	Wire Color	Wire Gauge
P1	Hall Effect 2 – signal leads when extending	Brown	22 AWG
P2	Hall Effect 1 – signal leads when retracting	Green	22 AWG
P3	Hall Effect GND	Black	22 AWG
P4	Hall Effect 5V	Red	22 AWG

Parts List

	Part Name	Part Number	Mating Part Number
Housing	Molex Mini-Fit Jr. Header, Right-Angle, Dual Row, 4 Circuits	50361768	39013045
Terminals			39000039 (Bag) 39000038 (Reel)

INSTRUCTIONS

Control Box Status

Status	Green LED	Red LED	Buzzer	Completion	Cancellation
Initial Power-Up	Blink once	Blink once	-	-	-
Linear Actuator Output ON	ON	-	-	-	-
Programming Mode	Slow blinking	-	Loop: 1x short beep	-	-
• Submenu	Slow blinking	-	-	1x medium buzzer beep	-
• Submenu Setting Changed	-	-	-	2x medium buzzer beeps	-
Wireless Remote Pairing Mode	Slow blinking	-	Loop: 2x short beeps	2x medium buzzer beeps	1x long buzzer beep
Soft Reset Procedure	-	Slow blinking	Loop: 3x short beeps	3x medium buzzer beeps	1x long buzzer beep
Hard Reset Procedure	-	Fast blinking	Loop: 4x short beeps	4x medium buzzer beeps	1x long buzzer beep
Pending Hard Reset Procedure	(see above Modes)	Fast blinking	(see above Modes)	-	-

Programming Mode

Programming Mode allows the user to access various Control Box procedures and adjust system settings.

Ensure that both the LED indicators and buzzer are clearly visible for system feedback and maintain uninterrupted wireless reception to ensure reliable operation.

1. Entering Programming Mode
 - a. Press and hold the M button for 5 seconds, then release.
2. Navigating Submenus
 - a. Press the appropriate button (e.g. UP, DN, S) to enter the desired submenu.
3. Exiting Programming Mode
 - a. Press the M button once at any time to return to Normal Mode.

Programming Mode Submenus

- Press DN: Enter the Standard Submenu
 - Press UP: Toggle Momentary / Non-Momentary Control
 - Press DN: Enter Wireless Remote Pairing Mode
 - Press S: Toggle Smooth Motion Control

- Press S: Enter Hall Effect Submenu (Hall Effect-related functions)
 - Press S: Start the Soft Reset Procedure
 - Press and hold S for 5 seconds. Start the Hard Reset Procedure

Normal Mode

Wireless Remote Operation

- UP: Extend Linear Actuators
- DN: Retract Linear Actuators
- M: Programming Mode
- S: Stop Linear Actuators
- Pressing any button while Linear Actuators are in motion will stop the actuators.
- Automatic Power Saving Mode when Linear Actuators not in motion.

Momentary / Non-Momentary Control (Default)

The Control Box operates in Non-Momentary Mode by default and will retain the last selected mode.

1. On the paired Wireless Remote:
 - a. Press and hold the M button for 5 seconds to enter Programming Mode.
 - b. Press DN once to enter the Standard Menu.
 - c. Press UP once to toggle between Momentary and Non-Momentary Mode.
 - i. Non-Momentary Control (Default): Press UP or DN once to start movement. The actuators continue moving until a button is pressed again or the travel limit is reached. When the travel limit is reached, the Control Box automatically powers off the actuators.
 - ii. Momentary Control: Press and hold UP or DN to start movement. The actuators move only while the button is held and stop when the button is released or the travel limit is reached.
2. The Control Box will automatically return to Normal Mode.

Wireless Remote Pairing Mode

The Control Box is paired with the 1x Wireless Remote included and can be paired with up to 4 Wireless Remotes in total.

Deleting Paired Wireless Remote

- If more than 4 Wireless Remotes are paired, the oldest paired Wireless Remote will be automatically deleted.
- To delete all previous paired Wireless Remotes, pair the same Wireless Remote 4 times.

Pairing Using a Paired Wireless Remote

1. On the paired Wireless Remote:
 - a. Press and hold the M button for 5 seconds to enter Programming Mode.
 - b. Press DN once to enter the Standard Menu.
 - c. Press DN once more to enter Pairing Mode.
2. The Control Box is now in Pairing Mode:
 - a. Green LED: Slow blinking

- b. Buzzer: Loop: 2x short beeps
 - c. Note: The Control Box will automatically return to Normal Mode after 15 seconds if no buttons are pressed.
3. On the new Wireless Remote being paired:
 - a. Press and hold any button for at least 1 second.
 - i. Successful Pairing: 2x medium buzzer beeps
 - b. The Control Box will then automatically return to Normal Mode.

Pairing Using the Control Box Action Button

1. Press and hold the Action Button on the Control Box for approximately 1 second. Release the button when the buzzer beeps once.
2. The Control Box is now in Pairing Mode:
 - a. Control Box Status:
 - i. Green LED: Slow blinking
 - ii. Buzzer: Loop: 2x short beeps
 - b. Note: The Control Box will automatically return to Normal Mode after 15 seconds if no buttons are pressed.
3. On the new Wireless Remote being paired:
 - a. Press and hold any button for at least 1 second.
 - i. Successful Pairing: 2x medium buzzer beeps
 - b. The Control Box will then automatically return to Normal Mode.

Smooth Motion Control (Off by Default)

Smooth Motion gradually increases and decreases the actuator speed when movement starts or stops, providing smoother operation. By default, Smooth Motion is OFF for immediate starts and stops, which is useful for precise positioning.

1. On the paired Wireless Remote:
 - a. Press and hold M for 5 seconds to enter Programming Mode.
 - b. Press DN once to enter the Standard Menu.
 - c. Press S once to toggle Smooth Motion Control ON and OFF.
2. The Control Box will automatically return to Normal Mode.

RJ45 Smart Port

The RJ45 Smart Port enables wired remotes and hardwired external control of the Control Box. For compatible accessories and supported functionality for PA-CB41-2-12V24V, visit progressiveautomations.com.

Reset Procedure (Soft and Hard)

Hard Reset Procedure

The Hard Reset function is used for initial system setup to fully calibrate the Linear Actuators with the Control Box.

Important: The Hard Reset Procedure must be completed once before use.

- Ensure the Linear Actuators are disconnected from the application, unloaded, and free of mechanical obstructions. This prevents binding and ensures accurate calibration.
- The Control Box will not allow actuator movement until the Hard Reset is completed.
- Linear Actuator Synchronization is disabled during the Hard Reset; binding may occur if actuators are loaded or obstructed.

To perform the Hard Reset:

1. Enter Programming Mode:
 - a. On the paired wireless remote, press and hold the M button for 5 seconds.
 - b. Press S once to enter the Hall Effect Menu.
 - c. Press and hold S for 5 seconds to start the Hard Reset procedure.
2. During the Hard Reset:
 - To cancel: Press any button.
 - Buzzer: 1x long beep
 - Control Box Indicators:
 - Green LED: ON
 - Red LED: Slow blinking
 - Buzzer: Loop: 4x short beeps

Actuator Sequence:

1. Linear Actuators retract at 100% speed until fully retracted.
 2. Then extend at 100% speed until fully extended.
 3. Finally, retract again at 100% speed until fully retracted.
3. Completion:
 - a. Buzzer: 4x medium beeps
 - b. The Control Box calibrates the Linear Actuators and clears all Error Modes.
 - c. The system returns automatically to Normal Mode.

Soft Reset Procedure

The Soft Reset function realigns all Linear Actuators and clears any Error Modes.

Note: Linear Actuator Synchronization is enabled to prevent further misalignment. However, Out of Sync Error will not stop motion as this prevents successful realignment of misaligned Linear Actuators.

To perform the Soft Reset:

1. Enter Programming Mode:
 - a. On the paired wireless remote, press and hold the M button for 5 seconds.
 - b. Press S once to enter the Hall Effect Menu.

- c. Press S again to start the Soft Reset procedure.
2. During the Soft Reset:
 - To cancel: Press any button.
 - Buzzer: 1x long beep
 - Control Box Indicators:
 - Green LED: ON
 - Red LED: Slow blinking
 - Buzzer: Loop: 3x short beeps

Actuator Sequence:

1. Retract at 100% speed with synchronization enabled until fully retracted.
 2. Extend at 100% speed for 1.5 seconds.
 3. Pause for 1.0 second.
 4. Retract again at 100% speed until fully retracted.
3. Completion:
 - Buzzer: 3x medium beeps
 - The Control Box zeros actuator positions, re-enables synchronization, and clears all Error Modes.
 - The system returns automatically to Normal Mode.

Control Box Reboot

Used to reboot the Control Box:

- Clear unexpected or erratic behaviour.
- Clear outstanding Error Modes that do not require a Soft Reset or Hard Reset.

Action Button Reboot

1. Press and hold the Action Button on the Control Box for 10 seconds, until the Green LED flashes.
2. The Green and Red LED will flash once.
3. The Control Box reboot is complete.

Power Input Reboot

1. Disconnect the power supply from the Control Box.
2. Wait at least 10 seconds.
3. Reconnect the power supply.
4. The Green and Red LED will flash once.
5. The Control Box reboot is complete.

ERRORS AND TROUBLESHOOTING

- All Error Modes will immediately halt all Control Box actions and cancel and outstanding commands.
- All Error Mode notifications occur once initially.
- If the user attempts to operate the Control Box without completing the required Troubleshooting Steps, the error notification will repeat with each attempt.
- Error Modes do not prevent the Control Box from entering Power Saving Mode.
 - The error condition will persist after wake-up until resolved.

Error Mode	Troubleshooting Steps	Green LED + Buzzer
Out of Synchronization: Linear Actuator positions are too far apart, risking binding.	<ul style="list-style-type: none"> • Check for Linear Actuator wiring faults (e.g. broken wires, disconnected connector) • Confirm there are no physical obstructions preventing movement • Confirm Linear Actuator load is within rated limits • Confirm Linear Actuator is fully operational To clear: Perform Soft Reset Procedure or Hard Reset.	2x long beeps then 1x medium beep
Output Short Circuit: Output current exceeds 78A per channel.	<ul style="list-style-type: none"> • Disconnect power • Check for wiring faults (e.g. broken or shorted wires) • Confirm there are no physical obstructions preventing movement • Confirm Linear Actuator load is within rated limits • Confirm Linear Actuator is fully operational • Verify Linear Actuator inrush current is below 70A <ul style="list-style-type: none"> ○ Enabling Smooth Motion Mode may reduce this To clear: Perform Control Box Reboot.	1x long beep then 1x medium beep
Out of Range Input Voltage: Input voltage is above 29.5 VDC or below 10 VDC.	<ul style="list-style-type: none"> • Disconnect power • Verify input voltage is within 10 VDC – 29.5 VDC To clear: Automatic once Input Voltage is within range - 2x buzzer medium beeps.	1x long beep then 2x medium beeps
Overcurrent / Overload: Per channel current output sustained above 306W for over 2 seconds.	<ul style="list-style-type: none"> • Confirm there are no physical obstructions preventing movement • Confirm Linear Actuator load is within rated limits • Confirm Linear Actuator is fully operational • Check for Linear Actuator wiring faults (e.g. broken wires, disconnected connector) To clear: Perform Control Box Reboot or Hard Reset Procedure.	1x long beep then 3x medium beeps
Over Duty Cycle: Control Box operation exceeds 5 minutes continuous and 25% duty cycle.	<ul style="list-style-type: none"> • Confirm the total operation time is within the Duty Cycle limits. To clear: Automatically resumes after 15 minutes of inactivity or performing Control Box Reboot.	1x long beep then 4x medium beeps