PROGRESSIVE AUTOMATIONS

FORWARD THINKING

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PA-CB20-1-12V24V

Single Channel Linear Actuator Control Box

V 1.1

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SAFETY PRECAUTIONS

When installing and using your Progressive Automations Control Box, 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 devices.

⚠ DANGER

To reduce the risk of electrical shock and injuries:

- Do not attempt to modify or repair the Control Box.
- Avoid using the Control Box beyond its specified Ingress Protection rating.
- Avoid programming the Control Box (changing mode of operation or adding/removing remotes) under load or connected to a load. Always disconnect it from any load before programming or changing settings.

⚠ WARNING

To reduce personal harm and injury:

- Ensure the applied power to the Control Box has correct polarity, meets the minimum requirements, and has a regulated output.
- Follow recommended load ratings and specifications for the Control Box.
- Avoid operating the Control Box where there may be high electromagnetic interference.
- Ensure that the Control Box and controlled devices are visible to the user during operation, with no obstructions or potential for bodily harm.
- Progressive Automations does not assume any liability for preventing damage or bodily harm, when using the Control Box. All necessary precautions must be taken by the user to ensure safe operation.

Operating Notes

Warranty
Any attempts to disassemble or tamper with the Control Box's internal components or operation outside of the advertised usage limitations will result in immediate voiding of the product's warranty. For more information on our warranty terms, visit: https://www.progressiveautomations.com/pages/warranty-terms

Restrictions
Control Boxes must be used within the specified power, voltage, current input and current output ratings outlined in this documentation. Load must be evenly distributed within an application. Exceeding the recommended ratings may result in failure of the Control Box or permanent damage. Providing reverse voltage input to the Control Box may damage the product and void the warranty.

Operation Time
Control Boxes must be operated within the specified operation time and frequency. Exceeding the duty cycle rating can significantly reduce the Control Box's expected lifespan and will void the warranty.

SPECIFICATIONS

Product Specifications

Function	Control of a single linear actuator (no position feedback)
Number of Channels	1
Input Voltage Range	10 to 26 VDC
Actuator Output Voltage	Same as input voltage
Compatible Actuator Voltage	12 VDC or 24 VDC actuators
Current Capacity	12.5 A at 12 VDC 6.25 A at 24 VDC
Total Power Output	150 W
Efficiency	99%
Duty Cycle	25%, up to max 5 minutes continuous operation
Power Management	Automatic Power Saving Mode
Sleep Response Time	Instant wake up with single press, 100 ms response time
Standby Response Time	60 ms
Ambient Current Draw	15 mA at 12 VDC 10 mA at 24 VDC
Operational Temperature	14°F to 122°F (-10°C to 50°C)
IP Rating	IP65 enclosure only; connectors not IP rated.
Protection and Safety Features	• Output Short Circuit • Overcurrent / Overload • Out of Range Input Voltage • Reverse Input Voltage
System Features	LED indicator
Housing Material	ABS Plastic
Housing Color	Black with blue accents
Dimensions	2.72 in x 1.81 in x 0.75 in (69.2 x 46.0 x 18.95 mm)
Unit Weight	0.14 lbs (63 g)
Included Components	Control Box, RT-40 wireless remote with battery, 2x double sided 3M tape

Control and Interface Specifications

Control Modes	Momentary or non-momentary control. Smooth motion mode.
Wireless Control	433.92 MHz RT-40 wireless remote included
Wireless Range	Maximum 100 ft (30 m)
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)

Power and Cabling

Power Input Connector	Molex Mini-Fit Jr. 1x2-Pin Plug. See Power Input section for details.
Actuator Output Connector	Molex Mini-Fit Jr. 2-Pin Plug. See Actuator Power Port section for details.
Cable Length	10″ (254 mm)

QUICK START GUIDE

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

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

Wireless Remote Setup

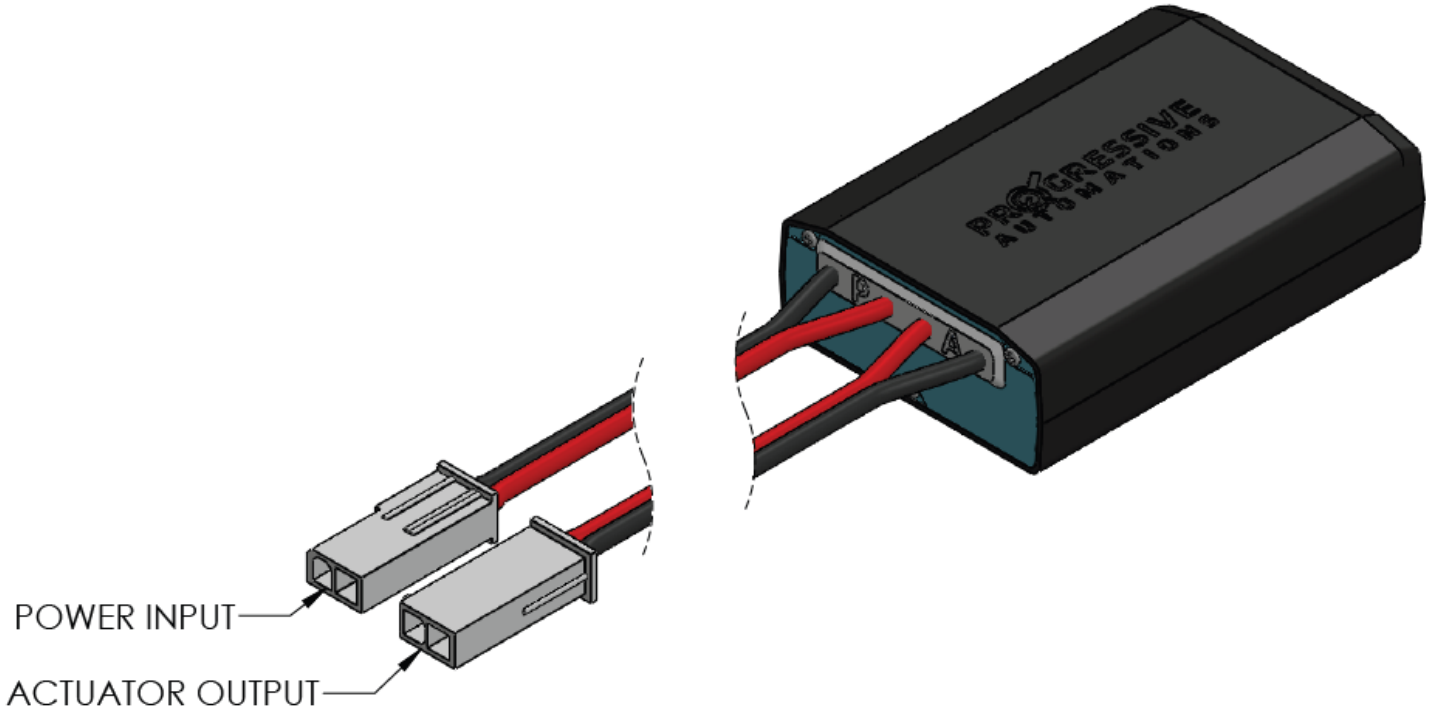
- Each Control Box includes at least one Wireless Remote, pre-paired from the factory.
- Ensure the remote has adequate power.
- Check that the LED indicator on the remote lights up when a button is pressed.
    - Replace the battery if needed—see Control and Interface Specifications for details.
- To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

Wireless Remote Operation

- **UP:** Extends the Linear Actuator
- **DN:** Retracts the Linear Actuator
- **M:** Enters Programming Mode
- **S:** Stops the Linear Actuator
- Pressing any button while the actuator is in motion will stop movement

The Control Box returns to Automatic Power Saving Mode when actuator is not in motion.

Control Box Diagram

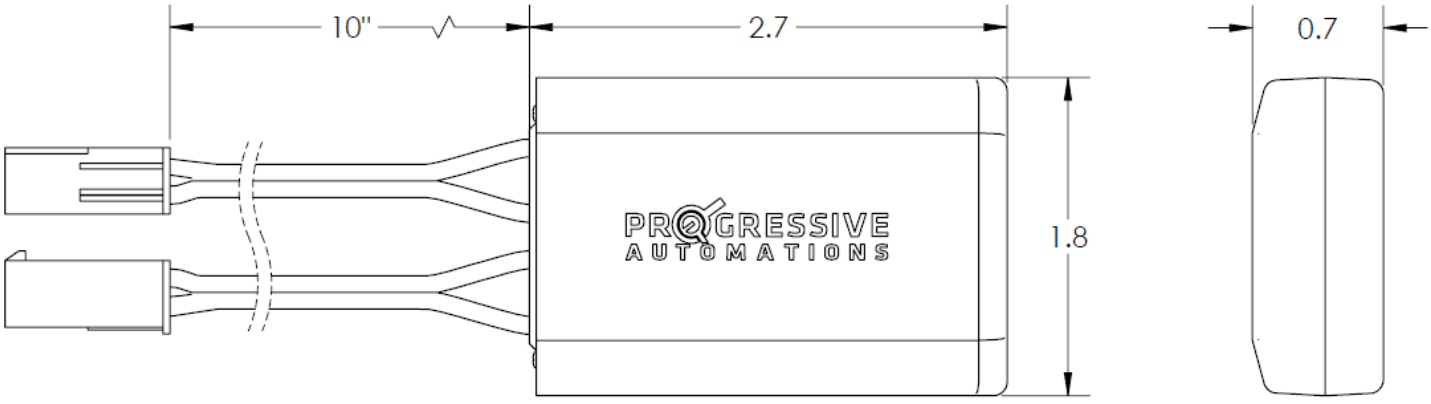


Wireless Remote

DIMENSIONS

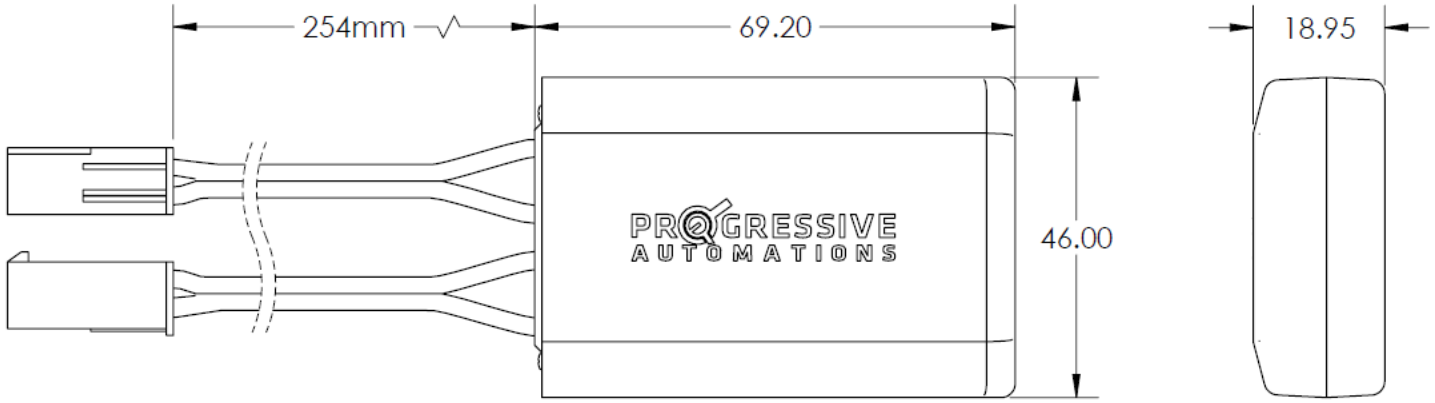
Imperial Diagram

Note: All dimensions are listed in inches.



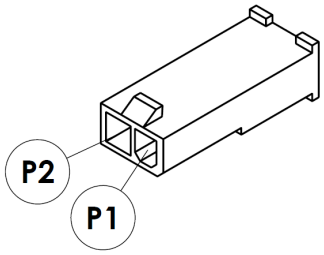
Metric Diagram

Note: All dimensions are listed in millimeters.



CONNECTORS

Power Input

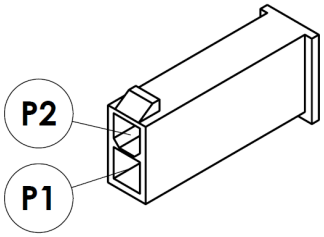


Pin Location	Function	Wire Color	Wire Gauge
P1	Power Input COM / Negative (-)	Black	16 AWG
P2	Power Input VCC / Positive (+)	Red	16 AWG

Parts List

	Part Name	Part Number	Mating Part Number
Housing	Mini-Fit Jr. Plug Housing, Single Row, 2 Circuits	469990656	39014020
Terminals	Mini-Fit Plus Crimp Terminal, 16 AWG, Tin (Sn) Plating	460123141 (Reel) 460123142 (Bag)	457503111 (Reel) 457503112 (Bag)

Actuator Power Port



Pin Location	Function	Wire Color	Wire Gauge
P1	**Motor - / Retract** actuator when (+) voltage applied	Black	16 AWG
P2	**Motor + / Extend** actuator when (+) voltage applied	Red	16 AWG

Parts List

	Part Name	Part Number	Mating Part Number
Housing	Mini-Fit Jr. Plug Housing, Dual Row, 2 Circuits	39013023	39012020
Terminals	Mini-Fit Plus Crimp Terminal, 16 AWG, Tin (Sn) Plating	460123141 (Reel) 460123142 (Bag)	457503111 (Reel) 457503112 (Bag)

INSTRUCTIONS

Control Box Status

Status	LED Action
Initial Power-Up	Blink once
Linear Actuator Output ON	ON
Programming Mode	Slow blinking – one long blink per second
Wireless Remote Pairing Mode	Slow blinking – one brief blink per second
Mode Change / Pairing Complete	Two blinks

Normal Mode

Normal Mode is the active operating mode of the Control Box, entered after a button is pressed on the wireless remote. In this mode, the user can control the connected linear actuator.

Ensure the Control Box is connected to a power source that is capable of meeting the linear actuator's full load voltage and current requirements. Ensure the linear actuator is free of obstructions before operation.

Wireless Remote Operation

- **UP:** Extends the Linear Actuator
- **DN:** Retracts the Linear Actuator
- **M:** Enters Programming Mode
- **S:** Stops the Linear Actuator
- Pressing any button while the actuator is in motion will stop movement

The Control Box returns to Automatic Power Saving Mode when actuator is not in motion.

Programming Mode

Programming Mode allows the user to access Remote Pairing Mode and adjust system settings.

1. Entering Programming Mode
    a. Press and hold the M button for 5 seconds, then release.
2. Navigating Settings
    a. Press the appropriate button (e.g. UP, DN, S) as described in the subsections below to adjust settings.
3. Exiting Programming Mode
    a. Press the M button once at any time to return to Normal Mode.
    b. Normal Mode will resume after 15 seconds if no buttons are pressed.

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 UP once to toggle between Non-Momentary and Momentary Mode.

i. Non-Momentary Control (Default): Press UP or DN once to start movement. The actuator will continue moving until a button is pressed again or the travel limit is reached. Press any button to power off the actuator, or the Control Box will power it off automatically after 5 minutes of inactivity.

ii. Momentary Control: Press and hold UP or DN to start movement. The actuator moves 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 pre-paired with the included Wireless Remote and supports up to 4 Wireless Remotes in total. Additional Wireless Remotes can be paired using either an already paired Wireless Remote or the Control Box jumper pins, as described below.

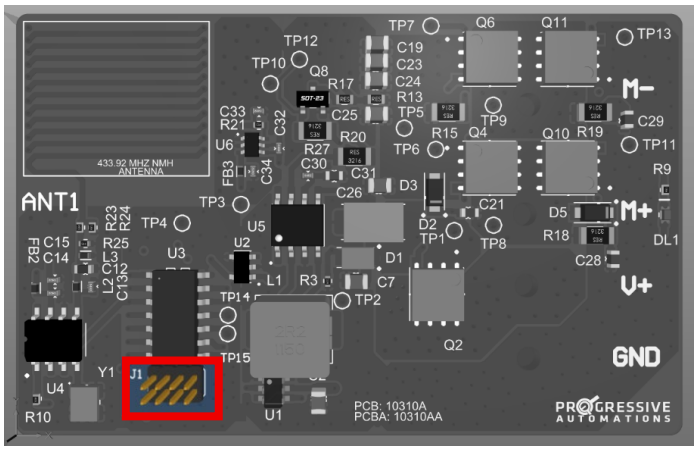
Pairing Using a Paired Wireless Remote

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 Pairing Mode.
      i. Note: The Control Box will automatically return to Normal Mode after 15 seconds if no buttons are pressed.
2. On the new Wireless Remote being paired:
   a. Press and hold any button for at least 1 second. The remote has now been paired.
      i. The Control Box will automatically return to Normal Mode.

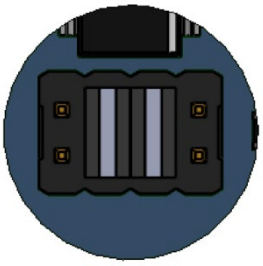
Pairing Using the Control Box Jumper Pins

The following pairing method must be used if there are no paired Wireless Remotes. It requires the Control Box front cover to be removed using a screwdriver.

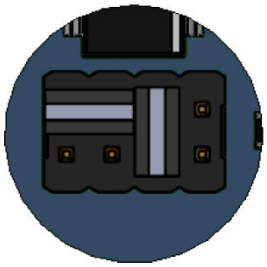
1. Disconnect the power and linear actuator from the Control Box.
2. Disassemble the Control Box:
   a. Remove the three screws securing the front cover.
   b. Carefully slide out the front cover and circuit board from the enclosure.
3. Orientate the circuit board as shown below and identify the programming pins. There will be two jumper connectors pre-installed.



4. Carefully remove the two jumper connectors, then reconnect them in the positions shown below. This will initiate Remote Pairing Mode.



5. Reconnect power to the Control Box. The LED on the circuit board will flash slowly, indicating Remote Pairing Mode is enabled. It will remain in this mode until the jumper connectors are reconfigured.
6. Pair Wireless Remotes:
    a. Press and hold any button on the Wiress Remote for at least 1 second.
    b. The LED on the Control Box will flash quickly to confirm sucessful pairing.
    c. Repeat for all desired Wireless Remotes. Pairing up to 4 remotes total.
7. Disconnect power from the Control Box once all Wireless Remotes have been paired.
8. Set the jumper connectors to the default positions shown below.



9. Reassemble the Control Box:
    a. Align the circuit board between the tracks on the inside walls of the enclosure.
    b. Carefully slide the circuit board into the enclosure
    c. Secure the front cover with the three screws.

Removing Paired Wireless Remotes

- If more than 4 Wireless Remotes are paired, the oldest paired Wireless Remote is automatically removed.
- To remove all other paired Wireless Remotes, pair the same Wireless Remote 4 consecutive times.

Smooth Motion Control (Off by Default)

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

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

STATUS, ERRORS AND TROUBLESHOOTING

- All Error Modes will immediately halt all Control Box actions and cancel all outstanding commands.
- 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.

Status	LED Action	Other Action	Troubleshooting Steps
Initial Power-Up	Blink once		
Linear Actuator Output ON	ON		
Programming Mode	Slow blinking – one long blink per second		
Wireless Remote Pairing Mode	Slow blinking – one brief blink per second		
Mode Change / Pairing Complete	Two blinks		
Error Detected:			
• **Output Short Circuit:** Current exceeds 30 A.	Rapid blinking	Motor Output OFF	• Disconnect power • Check for wiring faults on the Motor Output (e.g. broken or shorted wires) • Confirm there are no physical obstructions preventing movement • Confirm Linear Actuator load is within rated limits • Verify Linear Actuator inrush current is below 30 A • Reapply power to Control Box
• **Overcurrent / Overload:** When Motor Output is ON, output power exceeds 165 W (10% above the rated limit).	Rapid blinking	Motor Output OFF	• Disconnect power • Check for wiring faults on the Motor Output (e.g. broken or shorted wires) • Confirm there are no physical obstructions preventing movement • Confirm Linear Actuator load is within rated limits • Reapply power to Control Box
• **Out of Range Input Voltage:** Power Input voltage exceeds 26 VDC or below 10 VDC.	Rapid blinking	Motor Output OFF	• Disconnect power • Ensure Power Input voltage is within requirements • Reapply power to Control Box
• **Reverse Input Voltage:** Incorrect positive and negative Power Input terminal connections.	OFF	Control Box OFF	• Disconnect power • Ensure Power Input has the correct polarity • Reapply power to Control Box