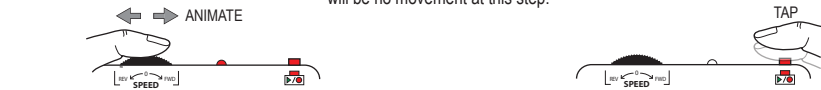## Recording Animation

If you just need the PicoVolt to keep a motor running at a constant speed, or a light at a constant brightness, then you don't need to record animation. Simply move the wheel until your motor or light is where you want it and leave it there. If you would like to record some motor animation or lighting effects that can be triggered by a sensor or constantly looped, follow the steps below. Two different scenes can be recorded, one for input 1, one for input 2.

Recording Animation

1 Hold the Button
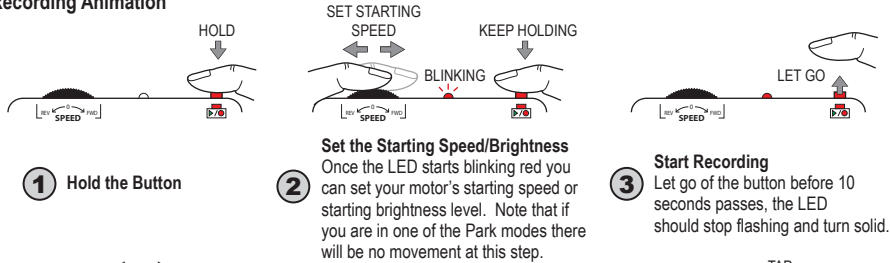
2 Set the Starting Speed/Brightness
Once the LED starts blinking red you can set your motor's starting speed or starting brightness level. Note that if you are in one of the Park modes there will be no movement at this step.

3 Start Recording
Let go of the button before 10 seconds passes, the LED should stop flashing and turn solid.


4 Animate the Motor or Adjust Light Brightness
Use the wheel to animate the motor or create your lighting effect. If you're using a motor, any combination of speed and direction can be recorded. Avoid quick direction changes, this can overload the power supply causing it to reset and interrupt recording. You can record up to 85 seconds of animation per input.

5 Stop Recording
Tap the button when you're finished recording. If you'd like to try again simply go back to step 1.

If you're using one of the parking modes, do not try to stop the motor at the park position. Set the motor at the speed you'd like it to be at as it returns to the park position. Stop recording BEFORE the motor reaches the park position. The PicoVolt will keep the motor at the last set speed and stop it automatically.

Playing the Animation
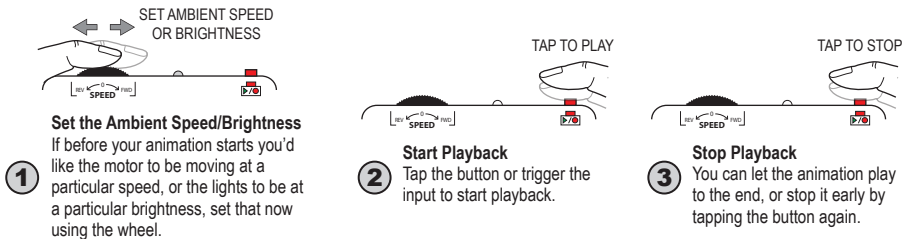
1 Set the Ambient Speed/Brightness
If before your animation starts you'd like the motor to be moving at a particular speed, or the lights to be at a particular brightness, set that now using the wheel.

2 Start Playback
Tap the button or trigger the input to start playback.

3 Stop Playback
You can let the animation play to the end, or stop it early by tapping the button again.

Selecting the Input 1 or 2 Scene for Playback / Recording
Hold the button for 10 seconds until the Status LED blinks red slowly. While still holding the button, rotate the wheel to select the Input 1 Scene (1 red blink) or Input 2 Scene (2 red blinks). Let go when the correct scene is selected. Proceed with Recording or Playing Animation above to work with the selected scene.

Troubleshooting

NOTE: If at any point you want to start from scratch, see *Operating Modes* for details on how to Factory Reset.

The LED is blinking yellow and the PicoVolt won't trigger.
The PicoVolt is currently ignoring the trigger. It does this at startup to allow a PIR motion sensor to warm up, after recording, or anytime a triggered scene is cancelled by pressing the button. It will resume normal operation shortly.

Recording won't start.
Write protection is enabled. See *Operating Modes* for instructions on disabling the write-protect.

Motor stops for a few seconds and PicoVolt blinks green, then yellow, then red.
The power supply has likely seen a surge and reset. Try making smoother transitions from one direction to another. It's also possible that the power supply is too small for your application.
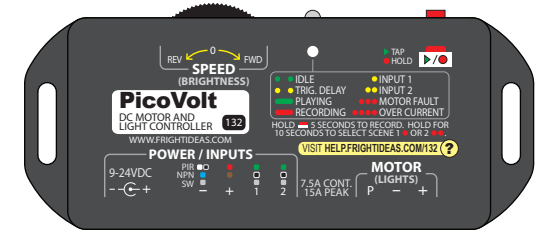
Motor/Lights turn off, PicoVolt LED blinks red.
The PicoVolt has detected a short, motor fault, or over-current condition. The PicoVolt will reset in 20 seconds.
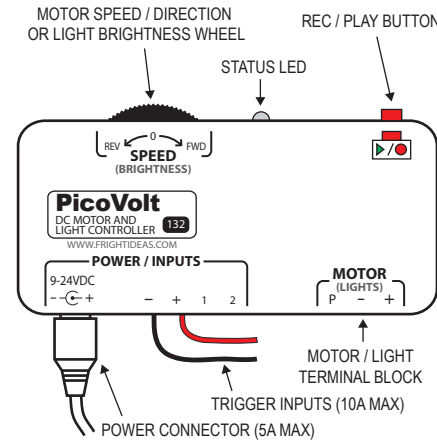

Operating Manual

PicoVolt

Getting Familiar

Sizing your Power Supply
Your PicoVolt does not include a power supply as the size required will vary depending on what it's used to control.

If you are using the PicoVolt with a wiper motor, a 12V 5A power supply is generally used. Linear actuators often require 12V 10A power supplies. If it's used for lighting, add up the current (or watts) required by all the lights/LEDs and select a power supply that can handle the load.

Power can be supplied via the barrel connector or the Trigger Input terminal block, they are connected internally. If you will be drawing more than 5 amps for extended periods, power should be supplied to the terminal block rather than the barrel connector.

Maximum Output Current
The maximum output current it can hold is 7.5 amps. This limit can be exceeded for short periods, ex: 10 amps for 15 seconds, or 15 amps for about 5 seconds. This is provided the power supply can output that much current.
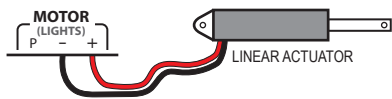
CONNECTIONS AND CONTROLS	
Motor Speed / Direction or Brightness Wheel	When the PicoVolt is used with a DC motor, this wheel controls the speed and direction of the Motor. When the PicoVolt is connected to DC Lights or LEDs, this wheel will control the brightness.
Rec. / Play Button	Tap this button to play your animation, hold it to start recording.
Power Connector	Your power supply should plug in here. The connector is a center-positive 2.1mm barrel connector. It's rated for a maximum current of 5 amps.
Trigger Inputs	If you're using triggers to control the PicoVolt, or a jumper to loop it, those will connect here. Your power supply can be connected to the -/+ of this screw-down terminal block if it's more convenient than the barrel connector or if you are exceeding 5 amps of current.
Motor / Light Terminal Block	The motor or lights being controlled must connect to this screw-down terminal block.
Status LED	The status LED will blink different patterns to indicate the current status: ●● Green blink every 2 sec - Idle mode. Ready to record, playback, or be triggered. ○○ Yellow blink every 2 sec - Idle mode, ignoring triggers. Occurs after recording or if playback is interrupted. ▬ Steady green with brief flash - Playback. Number of brief off flashes indicates the current playback scene. ▬ Steady red with brief flash - Recording. Number of brief off flashes indicates the current recording scene. ○,○○ One or Two yellow blinks - Trigger Active. Indicates trigger input 1 or 2 became active. ●●● Red Blinks (3 or 4) - Motor fault or over-current error. Wait 20 seconds for it to reset.

Motor / LED Wiring

MOTOR (LIGHTS)
P – +

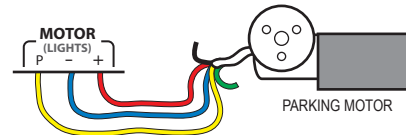STANDARD MOTOR OR PARKING MOTOR
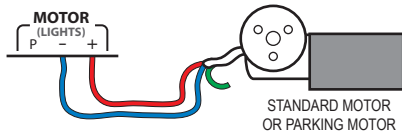
MOST WIPER MOTORS HAVE TWO SPEED RANGES. USE THE BLUE WIRE FOR THE FAST RANGE, OR THE GREEN WIRE FOR THE SLOW RANGE. LEAVE THE UNUSED WIRE DISCONNECTED. COLORS SHOWN ARE FOR THE MOST COMMON MOTORS, YOURS MAY BE SLIGHTLY DIFFERENT.

FORWARD/REVERSE SPEED CONTROL

MOTOR (LIGHTS)
P – +

PARKING MOTOR

SEE THE OPERATING MODES SECTION FOR INFORMATION ON SWITCHING TO THE PARK OR PARK/BRAKE MODES. SUBSTITUTE THE BLUE WIRE FOR THE GREEN TO USE THE SLOW SPEED RANGE.

FORWARD/REVERSE SPEED CONTROL WITH PARK OPTION

MOTOR (LIGHTS)
P – +

LINEAR ACTUATOR

THIS PICOVOLT IS ESPECIALLY GOOD FOR LINEAR ACTUATORS. ONE INPUT CAN BE USED TO EXTEND THE ACTUATOR, ANOTHER CAN BE PROGRAMMED TO RETURN IT. NOTE THAT LINEAR ACTUATORS WILL OFTEN REQUIRE MORE THAN 5 AMPS OF CURRENT UNDER DECENT LOADS SO A LARGE POWER SUPPLY IS USUALLY NECESSARY.

LINEAR ACTUATOR

MOTOR (LIGHTS)
P – +

LED LIGHTS OR 12V LAMPS 7.5 AMPS MAX
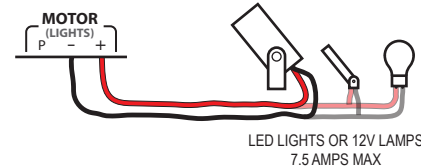
SEE THE OPERATING MODES SECTION FOR INFORMATION ON SWITCHING TO LIGHT MODE. ANY NUMBER OF LIGHTS CAN BE CONNECTED AS LONG AS THE TOTAL CURRENT DOES NOT EXCEED 7.5 AMPS (90 WATTS) FOR EXTENDED PERIODS .

LED LIGHTING

Trigger Input Wiring

THE WIRING REQUIREMENTS FOR INPUTS 1 AND 2 ARE THE SAME. CONNECTING EITHER INPUT TO – TRIGGERS THAT INPUT. IF YOU WANT TO USE ONE OF THE DIAGRAMS BELOW FOR ANOTHER INPUT, JUST MOVE THE WIRE FROM 1 TO 2 OR VICE VERSA.
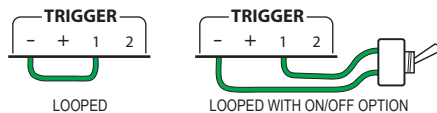
TRIGGER
– + 1 2

NOTE: PIR SENSORS CAN TAKE UP TO A MINUTE TO "WARM UP". DURING THIS TIME THE PICOVOLT'S LIGHT WILL BLINK YELLOW AND THE SENSOR WILL BE IGNORED.

PIR MOTION SENSOR

TRIGGER
– + 1 2

OR

PUSH BUTTON
SWITCH
PRESSURE MAT
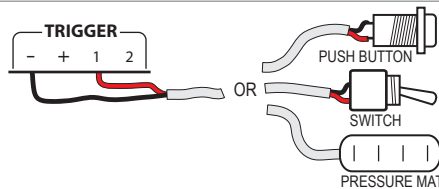
PUSH BUTTON, PRESSURE MAT, SWITCH

TRIGGER
– + 1 2

TRIGGER
– + 1 2

LOOPED   LOOPED WITH ON/OFF OPTION

IF YOU WANT YOUR SCENE TO PLAY OVER AND OVER AS SOON AS THE UNIT POWERS UP, INSERT A SMALL WIRE JUMPER AS SHOWN. PROGRAM YOUR ANIMATION INTO THE DEFAULT INPUT 1 SCENE.

CONTINUOUS LOOP

TRIGGER
– + 1 2

PUSH BUTTON OR OTHER TRIGGER

TO LOOP ONE ANIMATION BUT ALSO BE ABLE TO INTERRUPT THAT WITH A TRIGGER TO PLAY A DIFFERENT ONE, USE INPUT MODE 2. IN THIS SETUP INPUT 2 IS JUMPERED SO SCENE 2 LOOPS AT STARTUP. THE TRIGGER WILL INTERRUPT SCENE 2 TO PLAY SCENE 1.

CONTINUOUS LOOP WITH INTERRUPT

TRIGGER
– + 1 2

OR
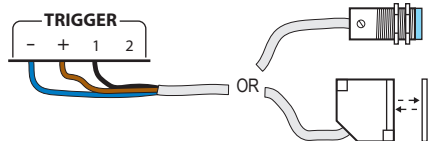
NPN OUTPUT BEAM OR PROXIMITY SENSOR

TRIGGER
– + 1 2

RESET BUTTON

MAGNETIC CONTACT
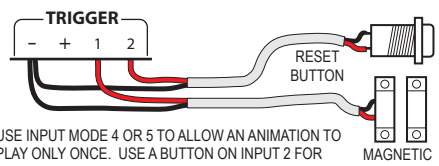
USE INPUT MODE 4 OR 5 TO ALLOW AN ANIMATION TO PLAY ONLY ONCE. USE A BUTTON ON INPUT 2 FOR MANUAL RESET, OR JUMPER IT SO INPUT 1 RUNS ONLY ONCE PER TRIGGER (SINGLE SHOT MODE).

RUN ONCE THEN REQUIRE RESET

Operating Modes, Write-Protect, Factory Reset

Operating Modes
The PicoVolt has different motor and input modes which allow you to optimize its operation for different applications. At power up, the led will flash the current output mode in green, input mode in yellow, then write protect status (green if write-protect enabled, red if it's not). See the tables below for information on these different modes.

(1) Select Output Mode - Power up holding the red button to enter the output mode menu. When the green light starts blinking let go of the button. Turn the speed wheel to change modes, tap the button to select and continue to Input Mode.

OUTPUT MODES	
x1	**Default -** *Default mode for controlling motors.* Use this mode to control the speed and direction of a DC motor. Center the speed wheel to stop the motor, move it left for reverse, right for forward. The farther you move the wheel the faster the motor will go.
x2	**Transition -** *Gently transitions motor speed and direction between scenes* Same as above except the PicoVolt will transition the speeds at the beginning and end of each scene to prevent abrupt movements. Transitions will occur to and from idle mode when any input has been triggered, and between inputs if one input interrupts another.
x3	**Park -** *Use this mode with a parking motor to always start and stop in the same position.* This mode requires the motor's park wire be connected to P so the PicoVolt can detect when the motor reaches its park position. In this mode the PicoVolt will bring the motor back to the park position after playing the recorded animation.
x4	**Park / Brake -** *Park mode with braking enabled* This mode is the same as the one above except the motor will be stopped quickly, rather than allowing it to coast, once it reaches the park position.
x5	**Light Mode -** *For controlling 12 volt LEDs or small bulbs.* Since a reverse option is not necessary for controlling lights, this mode uses the entire range of the wheel for brightness. All the way left will turn the lights off, all the way right is full brightness.

(2) Select Input Mode - The LED should now be blinking yellow. Select your input mode below then tap the button to save mode changes and continue with normal operation. Pull the power any time before saving to discard changes.

INPUT MODES	
x1	**Default -** *Both inputs are normally-open and not interruptible* In this mode either input can be triggered to start its animation. If an input is kept on the scene will loop.
x2	**Input 2 Interruptible -** *Only input 2 is interruptible* In this mode Input 1 can be triggered to interrupt input 2's scene. This could be used when you need one input to cancel another. You could also use this mode to loop an ambient animation. Program your ambient into input 2 and jumper it so it loops, put your triggered scene into input 1.
x3	**Inputs 1 & 2 Interruptible -** *Both inputs are interruptible by the other* In this mode either input will interrupt the other input's scene.
x4	**Run Once with Reset -** *Input 1 is single-shot and can only run once until input 2 is pulsed* Use this mode when you need a particular animation to play only once. Input 2 could be connected to a reset button which would reset the cycle. Input 2 could be jumpered so input 1 operates in a single-shot mode where it still runs once per trigger but does not require the reset.
x5	**Run Once with Reset with IN1 Normally-Closed** Same as above except for use with normally-closed sensors. For example an escape room where a proximity sensor is used to detect the presence of an object and you need something to run once when the object is moved out of its original location.

Toggle Write Protection or Perform a Factory Reset
Power up with the button held and keep holding it for about 10 seconds until the status LED starts blinking red, then let go. You are now in the advanced menu. Use the wheel to select an option, tap the button to select.

ADVANCED MENU	
x1	**Toggle Write-Protect -** Selecting this option will toggle the write-protect state. With write-protect enabled, the animation is protected from being erased or changed.
x2	**Factory Reset** - Selecting this option will reset all animation and settings to their factory defaults.