

## INSTRUCTIONS

### **PRO-STAGE**™ THROTTLE CONTROL

Congratulations on your selection of the **Pro-Stage**™ Throttle Control. This top quality unit has a unique 2.5" stroke specially built for use in **Pro-Stage**™ starting line throttle control applications but it can also be used for E.T. control. It utilizes a precision pneumatic actuator for smooth, consistent operation, round after round. A speed control on the solenoid assembly gives you precise adjustment of throttle opening rate to prevent engine stumble or tire spin. All components of the system have been carefully selected for corrosion-resistance and long service life with very little maintenance.

The **Pro-Stage**™ system<sup>1</sup> is designed to improve driver concentration and reaction time consistency on both Pro and Full (bracket) trees. Control for this system is included in our complete line of **Pro-Cube**® delay box/timer units.

#### **BEFORE YOU BEGIN**

1. Read all instructions and make sure you understand the operation of the control before you modify your throttle linkage or change any settings or adjustments on the control.
2. Your car **MUST** have a positive throttle pedal stop such as a bolt or tubular brace fastened to the chassis. Lack of a solid pedal stop could result in consistency problems.
3. **SPECIAL NOTE:** Factory style throttle cables will **NOT** work. These cables were not designed for race applications. This system requires a quality after-market "Morse" style cable or solid "rod type" linkage. The linkage must support the weight of the air cylinder.
4. Remove the quick connect ball stud from the end of the throttle control and mount it in the uppermost hole in your carburetor throttle arm.
5. The female coupler on the end of the throttle control opposite the quick connect has #10-32 threads for compatibility with "Morse" cables and most "rod type" linkages. We also supplied a coupler with ¼"-28 threads if required.
6. Attach a "fish scale" to the ball on the throttle arm and measure the pulling force required to completely open the throttle. If more than 40 lbs of force is required the throttle control will not be able to fully open the throttle. Check for throttle return spring(s) that may be too stiff, binding linkage, or sources of friction. Do not continue until the throttle operates free and smooth with less than 40 lbs of pull force.

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<sup>1</sup> Protected by US Patents 5,839,419 and 5,855,196

## INSTALLATION

1. Connect CO2 supply from regulator to ¼" line fitting attached to the solenoid on the throttle control.
2. Adjust regulator output pressure to 100 psi. NEVER set the pressure higher than 120 psi.
3. Open the CO2 bottle valve and double check pressure at regulator outlet. The throttle control cylinder should pull in quickly as it is pressurized. Test for leaks using soapy water.
4. Attach the throttle control to the quick connect ball previously installed on the carburetor arm. Have a helper sit in the car and press the throttle pedal firmly against the pedal stop in the wide open position. Now at the engine, pull the throttle wide open and align the throttle control threaded coupler with the throttle rod or cable, side by side. For cable type linkages, move the cable mounting bracket so that the throttle control can be threaded onto the cable. For rod type linkages mark the rod at the end of the threaded coupler. Add ½" to allow for threading the rod into the throttle control coupler and cut the rod at this point.
5. Disconnect the throttle control from the quick connect ball stud on the carburetor. Screw the control onto the throttle rod or cable and reconnect to carburetor. Check to make sure that the carburetor is exactly wide open and the throttle control is not being pulled apart (overriding the pressurized cylinder) with the throttle pedal pressed firmly against the pedal stop. Minor adjustments can be accomplished by screwing the throttle control in or out of coupler on the rod or cable. If you have an adjustable pedal stop this adjustment can also be made there. CAUTION: DO NOT ADJUST THREADED ADJUSTER BOLT ON CYLINDER FROM FACTORY SETTING IN AN ATTEMPT TO MAKE THIS CRITICAL INSTALLATION.
6. Verify the throttle operates smoothly from closed throttle to full throttle and there's no interference with the carburetor, manifold, firewall, hood scoop, etc. Ensure all fasteners are secure.
7. Connect one of the solenoid's black wires to a good (steel) chassis ground. Do not connect the other solenoid lead at this time, a temporary jumper to a +12v source will be required during the following adjustment procedure.

## OPERATION and ADJUSTMENTS

The adjuster bolt at the quick connect end of the cylinder allows you to limit how far the throttle closes when the solenoid is activated. A near idle (idle +100-200RPM in gear) setting is recommended for use with the **Pro-Stage**™ system during the staging process. No adjustment procedure is required for an idle. If you want a higher than idle engine RPM setting when the solenoid is activated, loosen the locknut on the adjuster bolt.

1. Activate the solenoid by applying 12v. This will exhaust the cylinder and allow the cylinder to be fully extended. Press the throttle pedal firmly against the pedal stop in the wide open position.

2. Disconnect the quick connect from the carburetor stud. Screw the adjuster bolt into the cylinder for the desired throttle setting and reattach to carburetor. Tighten the locknut after final adjustment. (This adjustment does not change the overall length of the throttle control when pressurized and the wide open setting is not affected.)
3. Remove 12v from the solenoid.

### SPEED CONTROL

1. The solenoid includes an adjustable speed control that governs how fast the throttle opens. This control has been factory preset for fastest operating speed. DO NOT change this setting unless you have to in order to solve a problem such as tire spin or engine stumble. If you have to slow down the operating speed, don't slow it down any more than necessary.
2. The speed control is located on the brass hex fitting attached to the solenoid. Turn the screw in (clockwise) to slow the opening rate. This control can be used to prevent engine stumble on the starting line when coming off the **Pro-Stage**™ idle setting, or tire spin when coming off the stop down-track. The range of adjustment is all the way in to approximately 1/2 turn out.

### WIRING

The solenoid should already be connected to chassis ground. Connect the remaining wire to the **Pro-Stage**™ control unit or other timer equipment if you're using this in an E.T. control application. We recommend using our **Pro-Cube**® delay box/timer unit which includes **Pro-Stage**™ control. Wire size should be 18 awg or larger for making these connections.

### RECOMMENDATIONS FOR CONTROLLING E.T.

Everyone has their own theories regarding when to apply the stop, how much stop (throttle closure), and how long to leave it on (in the closed position). The following recommendations will give you a place to start, based on our own racing experience.

1. When to apply the stop: The reaction of most cars (time required to break the starting beam at launch) is 0.3 seconds or less. To guarantee the car is at full throttle for fastest vehicle reaction, do not activate the stop less than 0.3 seconds after launch. Our suggestion is to wait 0.4-1.0 seconds after launch before activating the stop. This will allow the car to initially accelerate hard where track conditions and residual brake drag can cause consistency problems.
2. How much and how long: Don't apply the stop for less than 1 second (duration). This will ensure enough time for the actuator to fully close before reopening. In order to have a consistent throttle stop ratio, the goal is to set the throttle stop setting were the car does not accelerate nor decelerate while it is activated. For most applications, this RPM setting for the throttle stop is around 3600-4000RPM (loaded against the converter). Your application may vary, call for suggestions.

## MAINTENANCE

1. Twice a year you should lubricate the system by turning off the CO2 bottle valve, disconnecting the ¼" supply line into the solenoid assembly and placing 2 or 3 drops of light oil or air tool oil into the solenoid fitting. DO NOT use a solvent based oil.
2. Periodically check throttle linkage for smooth operation and verify all locknuts are secure.

## WARRANTY

We at K & R Performance Engineering are doing our part to restore quality and pride in American made products. It is with this goal in mind that we proudly offer a full one year parts and labor warranty against design, defective materials, and workmanship under normal service use conditions. Any defect affecting operation will be repaired free of charge and promptly returned.

**K & R PERFORMANCE ENGINEERING SHALL NOT BE LIABLE FOR INJURY, CONSEQUENTIAL, OR ANY OTHER DAMAGE RESULTING FROM USE OR MISUSE OF THIS PRODUCT. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED.**

## TECHNICAL SUPPORT

Contact: *K + R Performance Engineering, Inc.*  
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