

## PRO-TACH CHRONOGRAPH

### OPERATING INSTRUCTIONS

#### \*\*\* WARNING \*\*\*

When using the Pro-Tach Chronograph, it is your responsibility to provide safe conditions for discharging your firearm. Proper eye and ear protection must be used, along with a suitable backstop. Your firearm must be aligned with the sight alignment targets supplied in order to avoid hitting the Pro-Tach Chronograph and causing a dangerous ricochet. Deflection shields are NOT to be placed in front of the Pro-Tach Chronograph, as they may cause a bullet to ricochet toward the shooter or bystanders.

Velocity readings obtained with the Pro-Tach Chronograph should not be used to obtain cartridge combustion pressure. In order to avoid possible injury when using reloaded ammunition, make it a standard practice to watch for excess pressure indications.

Competition Electronics, Inc. assumes no liability for any property damage or personal injury which may result from the improper use of this product.

### BATTERY INSTALLATION

The recommended battery for proper operation of the Pro-Tach Chronograph is a 9-volt alkaline battery, such as the Duracell, or equivalent. The battery compartment is located on the bottom of the Pro-Tach, and its cover is held to the case with two #4 tapping screws. To install the battery, simply remove the battery compartment cover and connect the battery to the battery snaps. Replace the cover, and fasten securely.

### GENERAL OPERATION

The Pro-Tach Chronograph operates on the principle of measuring the time it takes for a bullet to travel from the first bullet shadow sensor to the second bullet shadow sensor. The sensors, mounted internally in the case, gather light through the two slits in the top of the case. The shadow of a bullet passing over each sensor generates a signal which the micro-processor detects, converts the elapsed time between sensors to velocity and displays the velocity on the LCD screen.

## OUTDOOR LIGHTING SET-UP

The Pro-Tach Chronograph may be mounted on a camera tripod or set up on a table. The muzzle of a pistol should be 5-10 feet away from the Pro-Tach, 10-15 feet away with a rifle. The distance is not critical, but it may need to be longer when using rifles in order to keep from bending targets with the muzzle blast. Mount the supplied targets in the front and back slots located on the top of the Pro-Tach case. On sunny or very bright days, the diffuser hoods must be used to obtain accurate readings. Properly positioned, the diffusers are directly over the bullet shadow sensors.

Shooting through the oblong holes in the targets assures correct alignment with the sensors and greatly reduces the chances of hitting the Pro-Tach. Line up the horizontal bars on the targets with your sights. The bars in the middle of the oblong holes are for iron sights, which is also how high the bullet should pass over the Pro-Tach. The upper bars are for scopes and allow for a one inch difference between the scope and the guns bore line.

**IMPORTANT:** Check the bore line-to-scope distance, and aim the crosshairs on the scope that much higher than the iron sight marking on the targets.

## HOW THE PRO-TACH WORKS

Turn on the Pro-Tach by moving the power switch on the side of the case toward the display. The display should read "8888". It is also normal for it to read "00", followed three seconds later by "ERR". Move back 10 feet and fire a shot. The display will show your velocity and will hold it on the display until the next shot. If a duplicate velocity occurs, the period in the display marked "dup. vel." will appear. If the third velocity is also the same, the period will disappear. The period will alternate on and off for as long as duplicate velocities occur.

## LOW BATTERY INDICATION

The Pro-Tach chronograph has a low battery indicator built into the unit. If the battery is nearly dead, the period marked "low bat" will appear on the display. The battery should last for about 20 hours under continuous use.

## NUMBER OF SHOTS & AVERAGE VELOCITY

The Pro-Tach Chronograph will show the number of shots and provide an average velocity reading per shot string. To do this, the unit must be reset prior to each shot string. Reset is accomplished by turning the Pro-Tach off for three seconds, then turning it back on. After the shot string has been fired, Pass your hand (or finger) QUICKLY over the fro bullet shadow sensor in a front-to-back motion. You may have to remove the front target to do this quickly enough.

This will cause the Pro-Tach to display the number of shots fired for one second, followed by a display of the average velocity for 1.5 seconds, followed by the error indication "ERR". Varying light conditions may prevent these displays from appearing every time. Thus, it may be necessary to pass your hand over the sensor again. In any case, the number of shots and average velocity displays may be repeated as many times as you wish. Just remember to reset the Pro-Tach before firing the next shot string.

## ERROR INDICATION

The Pro-Tach unit provides error indication by displaying "ERR". Before it gives an error indication, however, it will show the number of shots fired and the average velocity. "ERR" is displayed when the first bullet shadow sensor detects a shadow, but the second bullet shadow sensor does not. The sun shining directly onto the bullet shadow sensor "eye" can also cause an error indication. To prevent this problem, be sure to use the diffuser hoods and change the angle of the Pro-Tach to the sun. Muzzle blast is another common cause of error. Moving back a few feet farther from the Pro-Tach will solve the problem.

## INDOOR SET-UP

The Pro-Tach will operate indoors using tubular incandescent (filament) bulbs. Fluorescent bulbs WILL NOT WORK, because they cause the Pro-Tach to continuously show random velocity readings, or "ERR". Strong fluorescent bulbs used to light the room may also cause continuous random velocity readings. The incandescent bulbs should be mounted approximately 18 inches directly above the bullet shadow sensors in the case. The bulbs should be 25 watts of the FROSTED type. A simple structure made of wood serves well for mounting the bulbs.

A blast shield mounted in front of the first bulb will protect the bulb

filament from being damaged by the muzzle blast. Use the supplied targets as described in the outdoor lighting section. If you experience any trouble, try using the diffuser hoods and move the bulbs closer. Or, leave the bulb distance the same, and use 40-watt tubular bulbs. An "ERR" reading usually means too much light. Or the second bullet shadow sensor is not picking up the bullet. No reading at all probably means you don't have enough light.

## OPERATING CONSIDERATIONS

The Pro-Tach Chronograph operates best on cloudy days. If you look up at the sky through a rectangular tube, you see what the bullet shadow sensor sees. On a sunny day, the amount of light coming through the tube is actually less than on a cloudy day, because the clouds diffuse the light and redirect it straight down into the bullet shadow sensor. This is the best condition for the bullet to cast a good shadow on the sensor. The diffuser hood actually simulates a cloud above the sensor. That's why it's advisable to use the diffuser hoods on sunny days.

The second problem experienced with sunny days is the sun reflecting off the bullet. These reflections can cancel out the shadow, as well as cause bad velocity readings. Using the diffuser hoods can help eliminate reflection problems. If reflection problems persist, the best solution is to operate the Pro-Tach in the shadow of a building or opaque wall. Trees, however, do not provide a good solid shadow. Make sure the bullet shadow sensors still have a clear view of the sky, but the bullet path over the sensors is in the shadow. This way, the sun can't reflect off the bullet, but the maximum amount of light from the sky is still available to operate the bullet shadow sensors.

## WARNING

When using sabots or gas checks, there is a chance they may depart from the bullet path and hit the Pro-Tach. This usually damages the display.

## BOW & ARROW INSTRUCTIONS

For archery we recommend you do not use the cardboard targets. Stand about an arrow's length away from the Pro-Tach and, if possible, use a black tip on the arrow. The arrow should travel approximately 4-10 inches above the unit. Arrow length makes no difference, as the start of the shadow triggers the shadow sensors.

## SHOTGUN OPERATING CONSIDERATIONS

For shotgun chronographing, use only the front target, and stand with the muzzle of the gun about four feet back from the Pro-Tach. If you stand farther away, the shot spreads out, causing inaccurate velocity readings. Also, the wad will separate from the shot column and may hit the Pro-Tach or the target.

## OPERATING SPECIFICATIONS

Temperature Range: 32 to 95 degrees Fahrenheit

Velocity measuring range: 75 to 4500 feet/second

Accuracy: .5%

## IF THE PRO-TACH DOESN'T WORK

Please call us before you send the unit back. We may be able to tell you if the unit is malfunctioning or if there is some operating consideration that needs further explanation.

## ADDITIONAL TARGETS

A pack of eight targets and two diffuser hoods is available. Poster board available at your local art supplies store can be used to make your own targets, if you wish. Just copy the outline of one of the supplied targets for correct size.

## CLEANING

The Pro-Tach unit may be cleaned using DuPont PREP-SOL, a product available at automotive paint stores. PREP-SOL dissolves most bullet waxes.

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