Model 35BNC Chronograph Instructions

FEATURES

The Model 35BNC chronograph has a LCD display and an ink on paper printer. It is used to record velocity of projectiles when connected to either two or three Model 55 or Model 57 photoelectric screens. A single *primary* velocity is recorded using two screens. The screens must be connected to the *start* and *stop* connectors on the back of the chronograph. The screen nearest the muzzle is the s*tart* screen and the screen located farthest from the muzzle is the *stop* screen. The third or *mid* screen connector on the back of the chronograph is used for the *mid* screen when three screens are used. If the third screen is used, it MUST be placed exactly halfway between the *start* and *stop* screens.

The LCD window displays only the *primary* velocity. This velocity is measured using the *start* and *stop* screens. If you use three screens, the chronograph measures two velocities. The primary velocity is displayed and printed, but the second or *proof* velocity measured from the start screen to the mid screen is only printed on the paper tape. Below is an example of a velocity test on the printer tape when using 3 screens. The number on the left is the *proof* velocity. The proof velocity is recorded from the start to the mid screen. In the middle is the round number. The *primary* velocity on the right.

Example of a two velocity print out:

1568-01-1566

There are three buttons on the top of the chronograph below the LCD display. On the left is the RESET/EDIT button. It is used to reset or clear the memory to assure that the display shows **---0** before beginning a group of shots. It may also be used to put the chronograph in the EDIT mode. If the display does not show **---0** at the beginning of the group, the memory is contaminated and the summary will be incorrect. The center button is labeled OMIT. Pushing this OMIT button will omit the displayed round from the group summary. The button on the right is labeled SUMMARY/STEP. After a group of shots has been fired, pushing the SUMMARY button will print out the summary for the group. It will print the *high* velocity of the group noted on the printout by a **+**, the *low* velocity of the group noted by **-** on the printout, the *extreme spread* or range identified by an **E** or **T**, the *average* or *mean* velocity noted by **M** on the printout and the *standard deviation* of the group noted by **S** or **$** on the printout.

PROGRAM SWITCHES

A *dip switch* with 8 slide switches is located inside the chronograph. To find the dip switch, remove the small access door from the bottom of the chronograph. The first five numbered switches tell the chronograph the distance between the start and stop screens. The spacing distance must be in whole units. The tables below show the correct settings for the indicated screen spacing distance to record velocities in feet per second. A small arrow on the left side of the switch points in the *on* direction.

	1ft	2ft	3ft	4ft	5ft	6ft	7ft	8ft
SW1	on	off	on	off	on	off	on	off
SW2	off	on	on	off	off	on	on	off
SW3	off	off	off	on	on	on	on	off
SW4	off	off	off	off	off	off	off	on
SW5	off	off	off	off	off	off	off	off

	9ft	10ft	11ft	12ft	13ft	14ft	15ft
SW1	on	off	on	off	on	off	on
SW2	off	on	on	off	off	on	on
SW3	off	off	off	on	on	on	on
SW4	on	on	on	on	on	on	on
SW5	off	off	off	off	off	off	off

	20ft	30ft	40ft	50ft	60ft	70ft
SW1	off	on	off	on	off	on
SW2	on	on	off	off	on	on
SW3	off	off	on	on	on	on
SW4	off	off	off	off	off	off
SW5	on	on	on	on	on	on

For metric velocities use the following tables:

	1m	2m	3m	4m	5m	6m	7m	8m
SW1	on	off	on	off	on	off	on	off
SW2	off	on	on	off	off	on	on	off
SW3	off	off	off	on	on	on	on	off
SW4	off	off	off	off	off	off	off	on
SW5	off	off	off	off	off	off	off	off

	9m	10m	11m	12m	13m	14m	15m
SW1	on	off	on	off	on	off	on
SW2	off	on	on	off	off	on	on
SW3	off	off	off	on	on	on	on
SW4	on	on	on	on	on	on	on
SW5	off	off	off	off	off	off	off

	20m	30m	40m	50m	60m	70m
SW1	off	on	off	on	off	on
SW2	on	on	off	off	on	on
SW3	off	off	on	on	on	on
SW4	off	off	off	off	off	off
SW5	on	on	on	on	on	on

If the screens are spaced in meters, then set the switches using the metric tables. The displayed and printed output will be in meters per second. For increased resolution at lower velocities, measure spacing in decimeters and read decimeters per second.

Switch #5 turned on multiplies the screen spacing setting by 10 or causes the displayed velocity to be multiplied by 10. For example, if a precision air rifle gives velocities near 750 ft. per sec, turning switch #5 on causes a read out of 7504 instead of the expected 750. The 7504 reading corresponds to 750.4 ft. per sec. This switch is most useful for work in metric units where many velocities are less than 999 meters per second and you want extra resolution.

Switch #6 controls the edit mode. With switch #6 turned on, the edit or replay function is available. In the edit mode, the chronograph will store the results of up to 20 shots in memory. You can replay these shots during or after the test and individual shots can be omitted from the summary. If switch #6 is turned off, the edit mode is inactive and you can fire and summarize up to 255 shots in a single group. The chronograph is shipped with switch #6 turned off.

Switch #7 controls the printer. Switch #7 is normally on to enable the printer. If you do NOT wish to use the printer, turn switch #7 off before powering the unit on.

Switch #8 tells the chronograph if you are using two or three screens. If switch #8 is in the off position, the unit expects signals from three screens. If switch #8 is on, it expects signals from only two screens.

The chronograph reads the switches only as it is powered on. If you change switch settings with power on, you must power off, wait at least 30 seconds, and power the unit back on before new switch settings will take effect.

POWER REQUIREMENTS

The Model 35BNC chronograph is powered by an AC to DC transformer that supplies +9 volts DC at 500 milliamps to the chronograph. There is a small round receptacle on the back of the unit for the transformer plug. Connect the plug to the chronograph before you connect the transformer to your AC outlet. The transformer usually supplied is for 120 volt AC power. You can use a similar locally available 240 volt AC transformer. It must have an output of 9 volts DC at least 500 milliamps with a similar output connector. The center pin is positive.

SIGNAL INPUTS

The Model 35BNC chronograph was designed to accept input pulses of nominal +12 volts with nominal two millisecond duration. The chronograph triggers on the leading edge of the pulse and ignores following pulses until the unit is reset in anticipation of the next round. The chronograph will typically accept input signals from +5 volts to +25 volts amplitude. Three input connectors located on the back of the unit are labeled: START, MID and STOP. The connectors are standard female BNC and mate with the typical male BNC connectors used on RG-58 cables.

PRINTER PAPER

The Model 35BNC chronograph printer uses standard 2.25 inch wide adding machine paper. The printer box allows use of a small roll of paper, about one-quarter of a standard roll of adding machine paper.

A wire bracket allows use of a full roll of paper external to the chronograph. If you opt to use the heavier bracket with a large roll of adding machine paper, remove the small wire clip from the paper box and retain it for possible future use. Starting with the straightest end of the heavy wire bracket inside the paper box, feed and twist the bracket through the side hole until the straight end forms an external hanger for the large paper roll. The hanger end remaining inside the box can hook through one of the holes on the top of the box.

When the printer runs out of paper and a new paper roll must be started, cut half-inch triangles from the corners of the end of the paper tape. Insert this pointed end of the paper tape into the back of the print mechanism. The leading edge of the paper must be fed into the print mechanism through the slot in the printer paper box. With the power on, hold the paper in the slot with slight pressure and push any one of the three buttons. After the friction roller starts pulling the paper through the printer, continue pushing the button until the paper feeds up through the top of the printer. The chronograph is ready to print.

There is **NO** *off/on* switch. When you connect the power supply to your AC supply, the chronograph is powered on.

EXTRA INFORMATION

You will find it informative to read the instructions for the sister Model 35 chronograph

TROUBLE SHOOTING

The following assumes M57 screens connected to the chronograph.

1. Verify that there is power to the chronograph by checking the display and pushing one of the buttons on the unit to see that paper advances. If there is no display and the paper does not advance, there is a power problem. Make sure that the power supply is plugged into a live receptacle. If the voltage output is less than +9 VDC, the power supply is defective

2. All 12 red diodes should illuminate when power is applied to the M57 screens. If only some of the red diodes illuminate, there is a problem with the upper circuit board of the M57 and there will be gaps in the coverage. The screen will trigger only if the bullet passes in the vicinity indicated by the lighted diode.

3. Verify that the cables connecting the M57 screens to the chronograph are connected correctly. The screen closest to the muzzle must connect to the START input. The middle screen (if used) connects to the MID input. The farthest screen connects to the STOP input.

ISOLATING BAD SCREENS

1. Be sure the Model 35BNC is reset and displaying **- - - 0**. Connect one screen to the START input. Physical position of the screen is not important; just connect the signal cable to the START input.

2. Fire a shot through the screens. If the screen connected to the start input is **not** working, the chronograph will continue to show **- - - 0** on the display.

3. If the M57 screen is working normally, the chronograph will recognize the signal and the display will change from **- - - 0** and will typically print a round number and velocity, **01-0000**. The screen saw the bullet and that the cable was connected. Push the reset button to again to display **- - - 0.** Fire additional rounds to verify that the screen is working.

4. Disconnect the tested screen and then connect the second M57 screen. Repeat steps 1 through 3. Check any remaining M57 screen using this same procedure.

5. If one screen works normally, and one or more do not work, re-check any suspect screen with a known good signal cable. If the screen works with the good cable, you've found a bad cable. If the screen does not work with the good cable, and the red LEDs are all lit, then the front panel assembly of the M57 needs repair. The front panel is held in the frame by 6 screws. This front panel assembly must to be returned to Oehler for repair.

6. If no screen seems to work with any cable, then there is likely a problem with the chronograph. Return the Model 35BNC chronograph for repair.

7. If all screens appear to function, set up the system again and try a normal test. If you now observe normal results, there was a connection problem with the cables.

TYPICAL OPERATING SEQUENCE

The logic sequence of the Model 35BNC chronograph when powered on is:

1. The chronograph reads the switch settings of the dip switch to determine:
   a) The screen spacing
   b) Use of 2 or 3 screens
   c) Use of the "edit" feature
   d) Use of the printer.

2. The M35BNC waits for a signal from the start screen.

3. After a start signal is received, it waits for a stop signal.

4. NOTE: A start signal must be received before any stop signal will be recognized. If no stop signal is received within 1 second following a start signal, the unit prints a round number with velocity of 0000, resets, and again waits for a start signal for a new measurement.

5. The M35BNC computes and displays the velocity based on the time recorded between the start and stop signals.

6. It prints the round number and velocity.

7. The M35BNC resets and waits for a signal from the start input to begin a new measurement.

8. The statistical summary is computed and printed when you push the SUMMARY button at the end of a test. You must push the RESET button to start a new test group.

You can get help by phone 512-327-6900 or e-mail sales@oehler-research.com.

Return shipping address for repairs is:

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