

WEAVER®

Safety Lane

Rayoscope and Photoscope Headlight Tester Manual

DISCONTINUED No Parts Are Available

Rayoscope had Three Indicator Meters

Photoscope had one Indicator Meter

WX-45A Photoscope was portable with one Meter

WX-46A Photoscope used a floor mounted track with one Meter

WX-50A Rayoscope was portable with Three Meters

WX-51A Rayoscope used a floor mounted track with Three Meters

Visit www.castleequipment.com and view the Weaver History Page for additional details

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INSTRUCTIONS FOR USING WEAVER HEADLIGHT TESTERS Portable Model WX-50 and Track Type Model WX-51

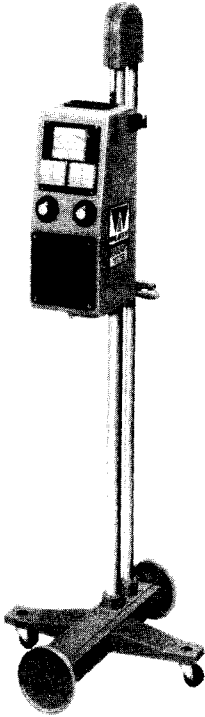


FIG. 1

DESCRIPTION OF THE MODEL WX-50

This Weaver Headlight Tester provides a machine that is portable in the truest sense of the word. It can be used in any stall where the car may be standing, provided the floor in front of the car where the tester will be used is reasonably smooth and flat. Calibration to the floor slope can be done in much less time than a mechanic can back a car out of a stall, store it in some other place and drive another car in. Calibration is a one man job and may be done accurately in one minute or less. Thus the tester may be moved from one car to another to check and adjust headlights.

The features which give this particular model Headlight Tester its speed and accuracy are the three highly sensitive meters and four balanced photoelectric cells made up into a self contained and calibrated unit as illustrated in Fig. 2. Two of the three meters are the aiming meters marked Left-Right and High-Low and the other is the candlepower meter reading in thousands of candlepower, all of which indicate simultaneously the condition of the headlight by means of the attached four calibrated photoelectric cells in the following manner.

This meter and cell unit is mounted in the top of the case as illustrated in Fig. 3 so that a beam from the headlamp passing through the condensing lens is concentrated on the

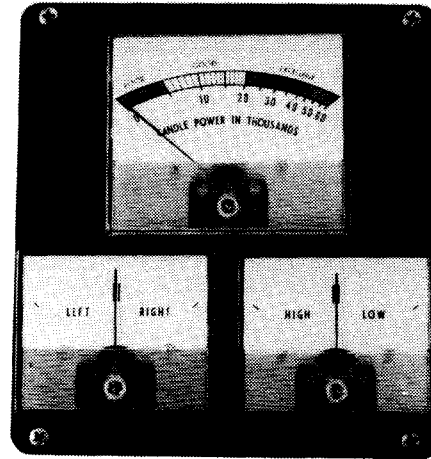


FIG. 2

cells which are protected by a translucent screen. Because of this concentrated light beam falling on the cells a current is generated by them and indicated on the three meters simultaneously, thereby showing the condition of the headlight beam.

A plane mirror illustrated in Fig. 3 is mounted just behind the condensing lens and serves to direct the concentrated beam from the headlamp on to the screen over the cells. The reduced beam pattern on the cell screen may be seen through the viewing window as illustrated. This plane mirror is so mounted that it may be pivoted sideways or vertically and is controlled by the two pointer knobs on the front of the case which act over the aiming scales. The scales are graduated in inches at 25 ft. By turning the pointer knobs, which in turn tilt the mirror, it is possible to approximately center the beam pattern on the

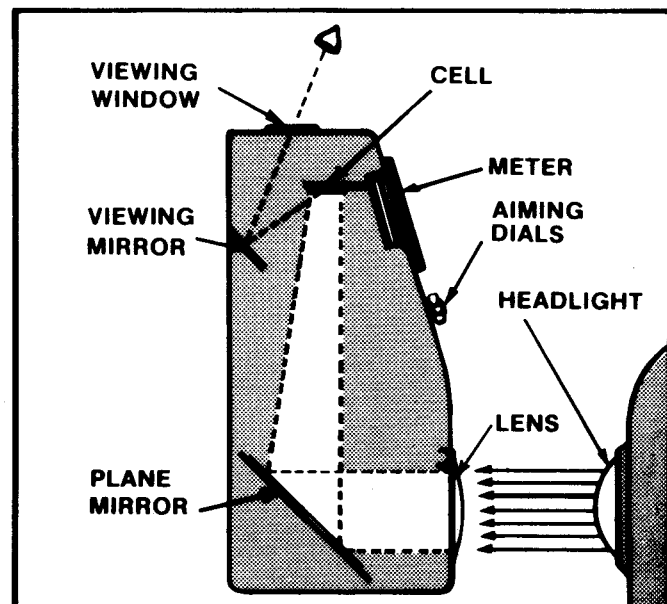


FIG. 3

screen by observing the screen through the view window. However, accurate centering of the beam pattern on the screen is accomplished by adjusting the pointer knobs until the pointers on the two aiming meters are on zero.

The case is mounted on a slider casting so that it may be adjusted vertically to the same height as the headlamp. The vertical posts on which the slider operates are securely mounted to a substantial base which rolls sideways on the floor. Thus the Tester may also be positioned in front of the headlamp sideways.

Due to the unique construction employed in mounting the wheels and casters to the base it will roll sideways in a straight line on a reasonably smooth flat floor. Due to this construction it is possible to aim the tester up the hood line, then roll the tester in front of a head lamp and check it, then roll it in front of the other head lamp and check it without resighting up the hood. Thus it is possible to attain the same accuracy and speed as with a track model.

FLOOR CALIBRATION

1. Place the Tester in front of the vehicle with the large front lens about 12" but not more than 18" in front of the headlamps and facing the vehicle.

2. Roll the Tester sideways until it has a clear line of vision to the rear alongside the vehicle.

3. Place the Calibrating Stand in front of the Tester. Raise or lower the Tester until the white line on the side of the lens frame is the same height as the white line on the flat circular portion of the stand. (Fig. 4.)

4. Move the stand to a position alongside the rear wheel of the vehicle and place a lighted flashlight on it so the light beam shines through the hole in round portion of the stand, pointing the beam directly at the Tester lens. (Fig. 5.) It is suggested the flashlight be a two cell unit having a body diameter not larger than 1 3/4" and a lens enclosure not larger than 2 1/4" diameter. Use fresh batteries in the flashlight.

Note: You will see a small reflection of the flashlight in the lens. Turn the flashlight back and forth until this reflection is the brightest. The beam is then pointed directly at the Tester lens.

5. While observing the image of the flashlight beam on the viewing screen, turn the High-Low and Left-Right pointer knobs (Fig. 6) until the image is well centered between or symmetrically about the top and bottom lines of the elongated oval and the two short vertical arc lines. (Fig. 8a.)

6. With the flashlight image correctly positioned on the screen, the High-Low knob pointer must be on zero. If it is not, hold the knob firmly with one hand and turn the

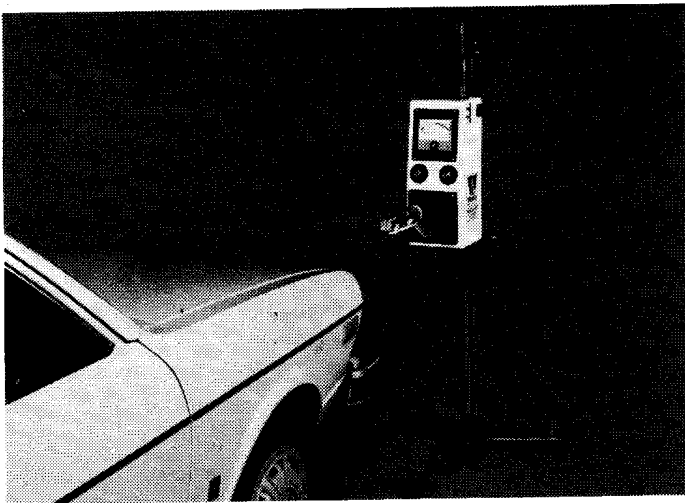


FIG. 4



FIG. 5



FIG. 6



FIG. 7

spring loaded pointer to zero (0). Check the flashlight image on the viewing screen, making sure it is still centered as described in paragraph 5 and shown in Fig. 8a. **DO NOT DISTURB** the Left-Right knob position on its shaft.

7. If used in the same floor area, the Tester need not be calibrated each time it is used. However, it is wise to check it occasionally.

8. If the testing area floor is not flat, it is suggested, because of the short time required for checking, that the Tester be calibrated to the floor for each side of the vehicle for the respective lamps each time the tester is used.

9. The machine is now calibrated to the floor where the vehicle stands and is ready for operation.

10. Caution: In order that the Tester give continuous proper operation, it is imperative that the floor be clean so the large wheels and caster rollers on the base do not pick up grease and dirt on their rims. Clean wheels will insure the Tester rolling in a straight line.

OPERATION

1. See that vehicle is loaded or unloaded to the normal anticipated operating condition. i.e., A carpenter might usually have trunk loaded with tools, etc. Check for broken or excessively sagging springs, and proper operation of any "level-ride" control if so equipped. Remove accumulations of mud, snow, ice, etc. from under fenders, bumpers, etc. Check for excessive error in wheel alignment, rear end tracking, and other conditions which might result in improper lighting equipment aim.

2. Rock the vehicle to relieve spring and shock absorber set. Clean the lenses of the lamps to be checked.

3. The Tester, having previously been calibrated to the floor, is now rolled in front of the vehicle so the Tester lens is about 12" but not more than 18" from lamps to be tested or aimed.

4. Aligning the Test head parallel with the center line of the vehicle is a most important step in the Tester operation and is accomplished by means of the sights on the upper left side of the Test head. Look thru the narrow slot of the rear sight and roll the Tester sideways as needed to sight up the center line of the hood or line the sight up with the hood ornament and some other centerline indicator near the windshield or vehicle rear window. Turn the aiming screw on the Test Head support casting (Fig. 10) until the front sight is also in line with chosen sighting points on the vehicle. It may be necessary to roll the Tester sideways slightly while making this adjustment. After the Test head alignment with the vehicle centerline has been attained the aiming screw is not to be disturbed throughout checking or aiming the vehicle lighting equipment unless the portable tester has been thrown out of alignment as it is moved from one lamp to another.

5. If headlamps are to be checked or aimed turn them on and make certain the high and low beams switch together. If they do not, change wiring so they will switch properly.

6. Roll the Tester sideways until it is in front of one lamp. *In the case of headlamps check the Class and see that the proper beam is turned on.* See **VEHICLE ROAD LIGHTING EQUIPMENT** section which follows later.

7. To properly position the Tester lens in front of a headlamp or other road lighting equipment, raise or lower the test head, roll the Tester back and forth sideways and adjust both control knobs until the highest candlepower possible is indicated on the meter.

VIEWING SCREEN MARKINGS AND THEIR USE

V - Vertical center reference line in relation to a vertical plane thru a lamp center parallel to the longitudinal axis of the vehicle.

H - Horizontal center reference line in relation to a horizontal plane thru a lamp center parallel to the plane of the floor upon which the vehicle rests.

o - The small circle is used only for factory calibration.

The two short arc lines together with the horizontal sides of the elongated oval are used to locate the flashlight image when calibrating the tester for floor slope, or when checking tester side aim calibration. See Fig. 8a.

The horizontal reference line H is used to locate the top cut off edges of all fog lamp and auxiliary passing lamp beam patterns. The vertical reference line V is used to locate the *left cut off edges* of the *asymmetric* beam patterns of one type fog lamp and the auxiliary passing lamp. See Fig. 8C. The vertical reference line V is also used to locate the *center of the high intensity zone* of the *symmetric* beam fog lamp. See Fig. 8B.

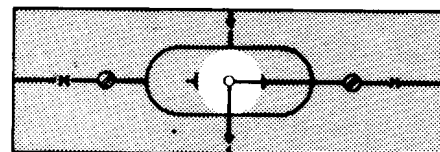


FIG. 8A

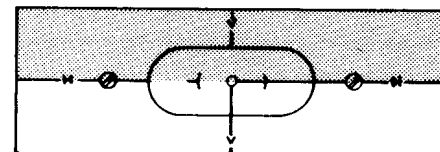


FIG. 8B

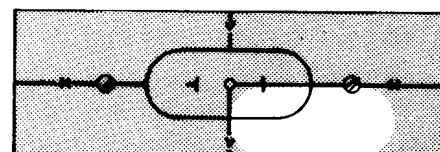


FIG. 8C

VEHICLE ROAD LIGHTING EQUIPMENT DESCRIPTION

1. When considering the aiming requirements of vehicle headlamps we may think of them as being in two classes.

2. Class I headlamps are to have their aim checked, or are to be aimed by their high beams only. These include the single beam 5¾" diameter, Type 1 lamps Nos. 4001 and 4006 with the figure 1 molded in the lens near the top. This class also includes the older 7" diameter dual filament headlamps which do not have a figure 1 or 2 molded in the lens near the top.

Correct aim settings of the Weaver Tester control knob pointers for this class headlamp is at 2" below Zero on the High-Low scale and at Zero on the Left-Right scale.

For most inspection programs, headlamp aim would be permitted to vary from 0" to 4" below Zero on the High-Low scale and 6" Left to 6" Right on the Left-Right scale.

3. Class II headlamps are to have their aim checked, or are to be aimed by their low beams only. These include the dual filament 5¾" diameter, Type 2 lamps Nos. 4002 and 4005 and also the dual filament 7" diameter Type 2 lamps Nos. 6006, 6012 and 6013. All of the headlamps in this class have a figure 2 molded in the lens near the top.

Correct aim settings of the Weaver Tester control knob pointers for this class headlamp is 11" below Zero on the High-Low scale and 17" to the right of Zero on the Left-Right scale.

For most inspection programs, headlamp aim would be permitted to vary from 9" to 13" below Zero on the High-Low scale and from 15" to 21" to the right of Zero on the Left-Right scale.

4. Adverse weather lamps consisting of fog lamps having symmetric or asymmetric beam patterns and auxiliary passing lamps are covered in the following section.

AIM INSPECTION AND AIMING INSTRUCTIONS

1. Before proceeding with aim inspection or aiming, the preparations described in the section "OPERATION" must be completed.

2. To inspect headlamp aim, turn control knobs until pointers on the Left-Right and High-Low meters are on zero (between the two black lines). Lamp aim is then indicated on the two aiming scales.

3. To aim headlamps, turn control knob pointers to the desired aim and then adjust the headlamp aim to bring the Left-Right and High-Low meter pointers on zero (between the two black lines). See the section "VEHICLE ROAD LIGHTING EQUIPMENT DESCRIPTION" for proper control knob pointer settings for the type headlamp being aimed.

4. Inspecting the aim or aiming the types of auxiliary road lighting equipment listed in the chart, Fig. 9, is to be done visually in the following manner.

- a. Aim Inspection: Turn control knob pointers while observing the lamp beam pattern on the screen and bring its high intensity zone into the correct area or position on the screen for the particular type lamp being inspected. See Fig. 9. Read the aim indicated on the aiming scales. It should come within the tolerances shown under Section II of the chart.
- b. Lamp Aiming: For the particular lamp being aimed, set the control knob pointers on the scale positions shown under Section I of the chart in Fig. 9. Adjust the lamp aim to bring its beam pattern high intensity zone into the correct area or position on the screen.

5. Should aim characteristics other than those described for Class I and II headlamps and adverse weather lamps be required to comply with local rulings or special loading conditions, set control knob pointers at the desired aim and then aim the lamp as described in paragraphs 3 and 4(b) above.

Lamp Types	Portion of beam to be aimed	SECTION I S.A.E. Recommended Aim Inches at 25 feet		SECTION II S.A.E. Recommended Inspection Aim Limits Inches at 25 feet	
		Lateral Aim	Vertical Aim	Lateral Aim	Vertical Aim
Fog Lamp Symmetric Beam	Top edge and horizontal center	0"	Top Edge 4" below 0"	0" to 6" right or left	Top Edge 2" below 0" is upper limit
Fog Lamp Asymmetric Beam	Top and Left edges of high intensity zone	Left Edge 2" right of 0"	Top Edge 2" below 0"	Left Edge 0" to 6" Right	Top Edge 0" is upper limit
Auxiliary Passing Lamp Asymmetric Beam	Top and Left edges of high intensity zone	Left Edge 2" to right of 0"	Top Edge 0"	Left Edge 0" to 6" Right	Top Edge 2" above 0" is upper limit

FIG. 9

SIDE AIM CALIBRATION CHECK

This will be necessary only if the front or rear sight has been damaged or when the meter and cell unit has to be replaced.

1. Follow step 3 of the Floor Calibration procedure and then move the Stand about 12 feet in front of the Tester so the cradle end of the flashlight holder is on the same side as the side aim sights on the Test Head.

2. Adjust side aim screw to bring sights in line with the center of the vertical portion of the rear end of the flashlight holder. If this portion is not readily visible, raise or lower the Test Head until it can be easily seen in the sights.

3. Place flashlight on the stand and pivot it to shine into the lens of the Tester as explained in step 4 of Floor Calibration procedure, being careful not to move the stand on the floor.

4. Look in the view window of the Tester and adjust the High-Low and Left-Right knobs until the image on the screen is well centered between or symmetrically about the top and bottom lines of the elongated oval and the two short vertical arc lines. Fig. 8a. During this procedure be careful not to move the Tester sideways on the floor or track.

5. Check the position of the pointer on the Left-Right knob. If the pointer is on zero, the side aim calibration is satisfactory. If the pointer is not on zero, loosen the set screw in the side of the knob and move the pointer up to zero, after which the set screw should be tightened very firmly. Be sure the image of the flashlight on the screen has not moved when the pointer is repositioned. After the pointer is locked on the shaft in the above calibration, IT MUST NOT BE DISTURBED during the regular operation of the Tester.

The above operations complete the calibration for side aim.

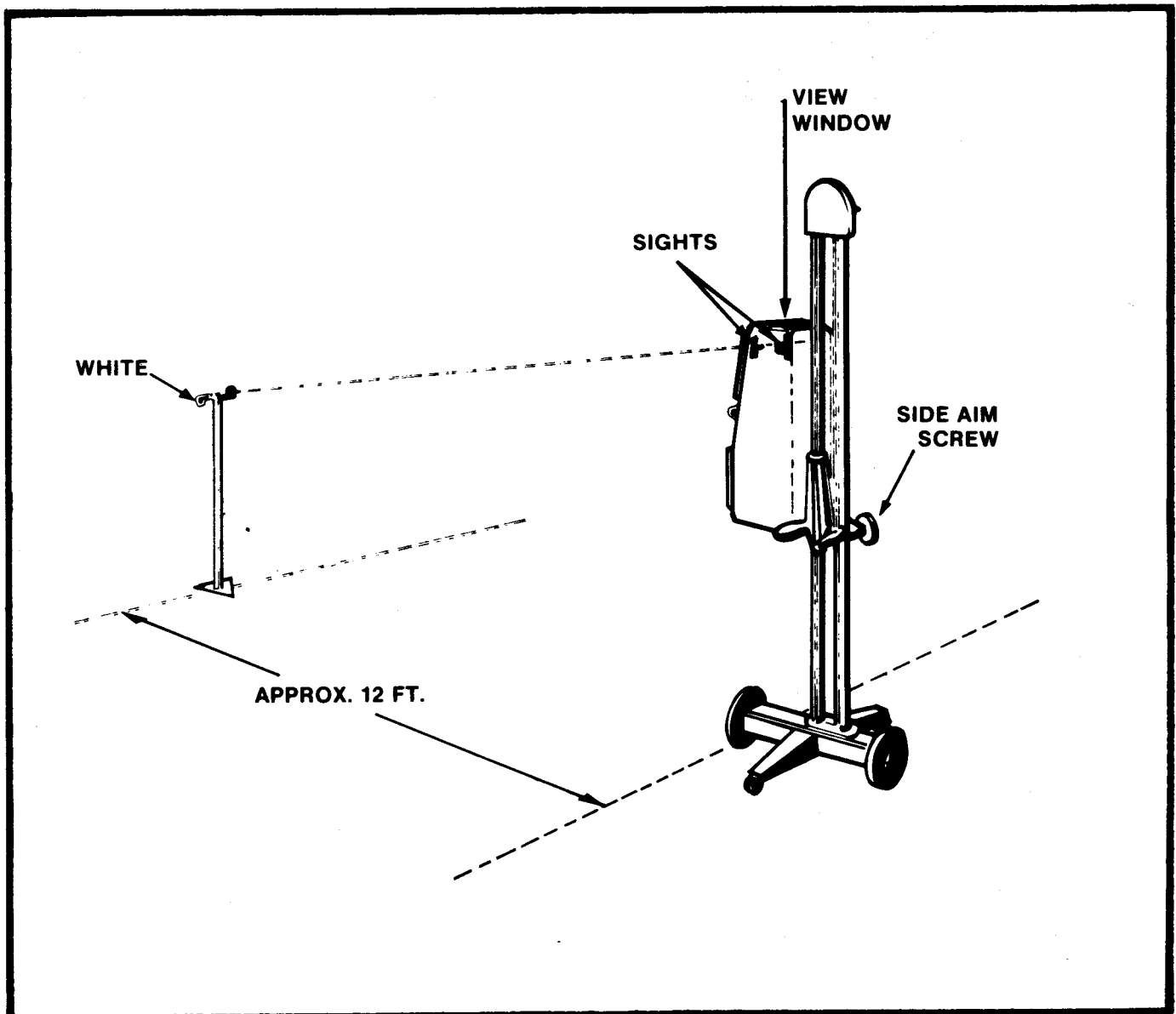


FIG. 10

danger of cars striking the Tester. In most cases it is possible to place the track so about 8 feet of one end of the track is used for testing, while the other 4 feet allows the Tester to be run off to the side where it is protected from traffic.

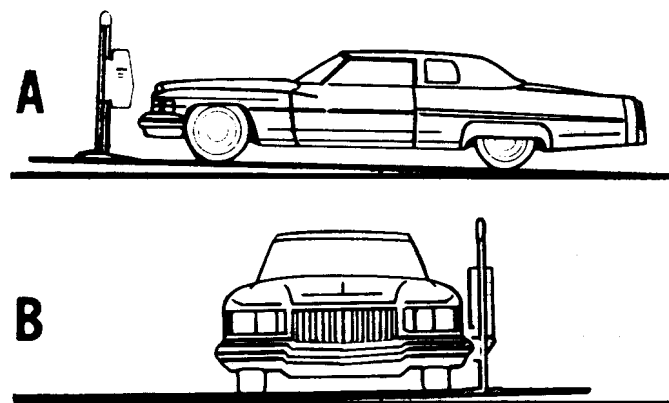


FIG. 11

Two identical lengths of track are furnished. The one which is located farthest from the vehicle and at the rear of the tester base is to have the rubber bumpers and brackets mounted on it as shown in Fig. 12. Preassemble the bumpers on the brackets and when the track is fastened to the floor the bolt at the outer ends of the track fastens the bumper brackets down.

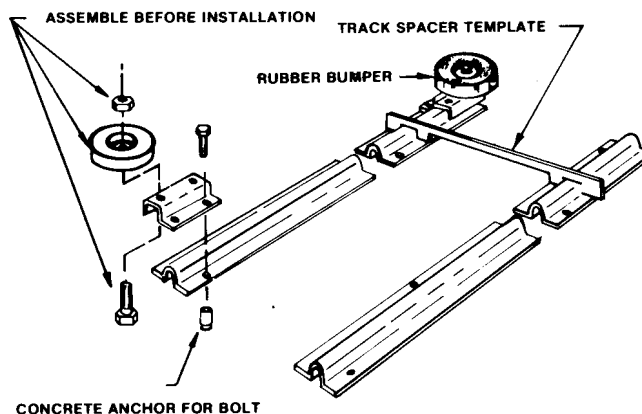
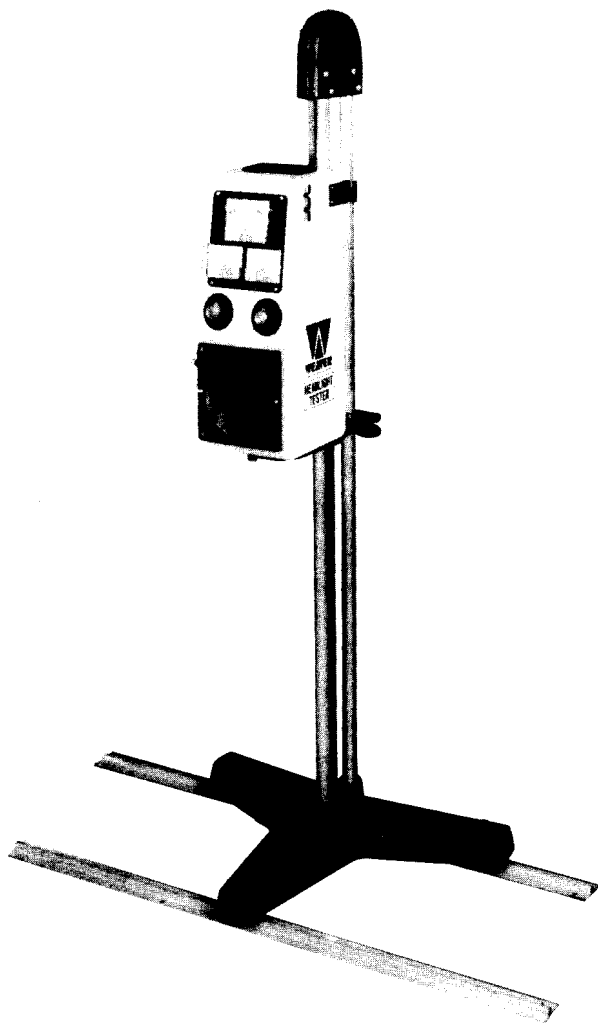


FIG. 12

The track spacer template illustrated is to be used at several locations along the track to properly space them apart. Mark the hole locations on the floor with a star drill using the holes in the track as guides. Drill the holes in the concrete the same size as the diameter of the bolt anchor and as deep as the length of the bolt. Fasten the track securely to the floor.

Whenever the tester is to be used in a driveway or inspection lane having a large amount of traffic, the track should be installed flush with the surrounding floor. An instruction print is furnished with the track to show this type installation.



DESCRIPTION AND OPERATION OF THE MODEL WX-51

This model Tester is offered as a means of checking and setting headlights when it is found impractical, because of a poor floor or other conditions, to use the portable type WX-50. This machine is identical to the WX-50 except that it operates on a track and therefore necessitates the use of a different type base.

INSTALLATION WX-51

First locate a spot in your service station where headlight service can be properly and quickly done. It should be easy for customers to drive their cars to the spot on your floor you have chosen for this important service.

Secondly, the floor area upon which the Tester and vehicle rest does not have to be perfectly level but it must be reasonably flat. A floor which slants up or down as in A or tilts sideways as in B of Fig. 11 is acceptable if it is flat throughout the working area.

If the Tester is to be used in a traffic lane it is advisable to install a flush type track so that vehicles traveling over it will not be likely to loosen it and throw the Tester out of calibration. Finally, locate the track so there will be no

FLOOR CALIBRATION WX-51

This is identical with the instruction for the calibration of the Portable Model WX-50 for one side of the car.

Having followed the floor calibration procedure as directed for the WX-50 portable machine, with the "High-Low" knob set at 0 (zero) at one side of the car, either right or left, roll the tester to the other side of the vehicle and check calibration: Should the "High-Low" knob still be on 0 (zero), everything is O.K. and the calibration is completed. However, should the "High-Low" knob not be on 0 (zero), turn it to 0 (zero) WITHOUT loosening the screw which locks it to its shaft or moving the pointer on the knob. Now, the flashlight image is not in the exact center of the viewing screen as described earlier. It should be centered by shimming one rail or the other of the track until the image centers in the proper area on the screen. With the car removed, check the machine at several other positions along the track, where the Tester will be used, shimming as necessary to center the flashlight image on the viewing screen.

It is recommended that the track be shimmed with wooden wedges with the lag screws which fasten it to the floor pulled down tight against the wedges. Then mix up a good iron cement such as Smooth-On No. 1 and fill all spaces under the track between the wedges with the cement. After the cement has set, remove the wedges, or temporary shims, and fill the spaces left with the cement. This makes a good solid job, especially where floors are uneven.

The machine is now ready and the operation procedure is identical with the WX-50 model.

A check for side aim calibration is the same for this model as for the WX-50.

HIGH INTENSITY HEADLAMPS

The use of high intensity sealed beams as standard headlamps has been approved and is in use on some vehicles.

These lamps generate 130,000 to 150,000 high beam candlepower or twice as much as the present 75,000 candlepower systems.

All sealed beams used as headlamps must be aimed to the same criteria as a standard high beam.

IMPORTANT: Use of a Weaver Headlight Tester to aim the high intensity without the WX-61 Filter Screen will destroy the photo cells in the unit.

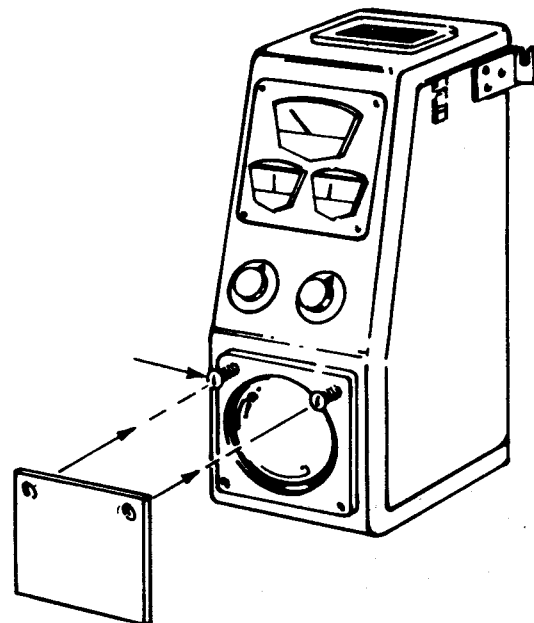
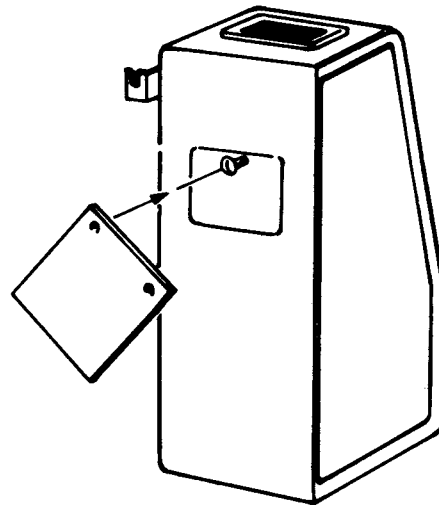
A special filter screen is supplied with Weaver Headlight Testers to aim high intensity lamps. This screen reduces the intensity of the light transmitted to the meter and cell assembly by 50%. The meter reading with the screen in place is exactly $\frac{1}{2}$ of the candlepower output of the lamp.

When there is any doubt as to whether or not the lamp is high intensity, use the filter screen. If the candlepower reading is less than one half of full scale the screen is not required for a proper test.

In most states, vehicle lamps other than headlamps such as fog and running lamps do not have to be aimed.

PREPARATION OF FILTER SCREEN MOUNTINGS AND INSTRUCTIONS (USED ON WX-45-46-50-51)

1. Remove the two flat head screws at A and B.
2. Install the two sleeves and $1\frac{1}{2}$ " long round head machine screws at A and B.
3. The filter may now be slipped over the two screw heads to position the filter in front of the Headlight Tester lens when any Iodine Quartz Lamp is being tested.
4. When not in use the filter is to be slipped over the head of a long screw and sleeve which is to be installed in place of the top screw holding the name plate of the back of the case at C.



When does your customer need a Headlight Alignment?

AT LEAST ONCE A YEAR

Twelve months of driving can dislodge the careful calibration and cause misalignment of headlights.

WITH NEW TIRES, NEW SHOCKS, OR HEAVY LOADS

Vertical alignment depends directly on the height of the vehicle. Changing tires, installing new shock absorbers, or making frequent trips with heavy loads...all affect the height of the headlights.

WHEN PULLING A BOAT OR TRAILER

A heavy burden on the rear of a car forces the rear down and the front up. The driver is likely to find normally aligned headlights illuminating the treetops.

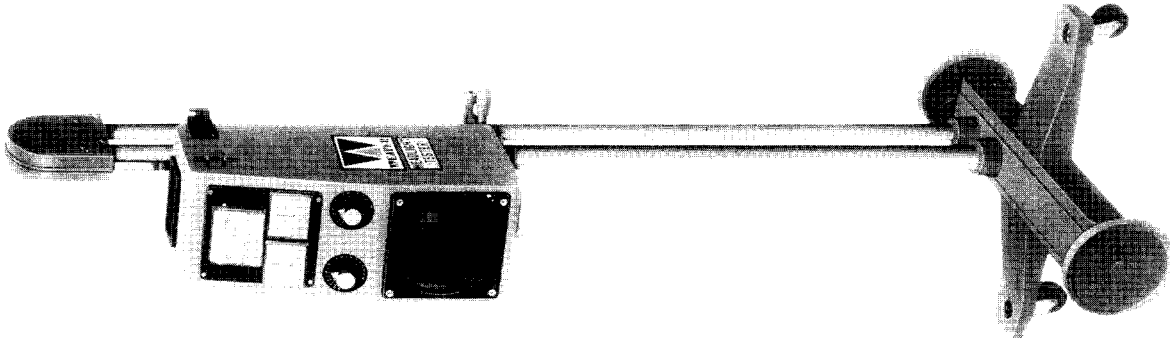
WHEN PLANNING A TRIP

A driver planning a trip can be heading for unfamiliar roadways. All the while, he will be looking for landmarks and road signs. Efficient lighting is essential.

WITH FREQUENT HIGHWAY DRIVING

Highways don't have street lights or neon signs. On the highway the driver can see only what his headlights illuminate. The driver who waits until the city's lights are behind him to discover his own lights are not working properly has waited too long.

Will the driver
of this car
see the child in time?



FOR ADDITIONAL INFORMATION CONTACT

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You can make the
difference

don't be blinded...
to an important service you
should provide your customers...
or to your own opportunity
to increase profits.

Look Into Headlight Testing!

There is no more important factor in automotive safety than the sight of the driver; and, when driving at night, the driver's sight depends entirely on the successful and efficient operation of his vehicle's headlights. Yet many drivers take their headlights for granted. They will pull into a service facility to have a squeak eliminated, a shimmy corrected, even a cigarette lighter replaced—all the while neglecting to have their all-important headlights tested.

In this time of self-serve gas pumps and do-it-yourself repair, professional service centers are being called upon to put more and more emphasis on **Total Car Care and Truck Care**—with ever-increasing consideration given to aspects of vehicle service the motorist can not provide for himself. One such profit-increasing service you can provide is headlight testing. After all, what could be simpler for you... or more important for your customer?

Weaver Even Helps You Sell the Service!

With every headlight tester Weaver provides a point-of-purchase wall poster to help you remind your customers of the importance of this simple procedure. We know you will have to *suggest* a headlight test to your customer. But we also know, when you do suggest it, you'll be surprised how many of your customers not only will ask for the service—but actually will thank you for reminding them about it!

Improve Your Customer Relations

Headlight testing can be performed while a vehicle is in your service bay for almost any reason—and usually without added delay in delivering the vehicle back to your customer.

A Weaver Headlight Tester makes it quick and easy for you to protect this most vital operation of your customer's vehicle. The Weaver **Photoscope** and the Weaver **Rayoscope** are completely self-contained and are available with your choice of a fully portable base or a semi-portable base (for use with our floor-mounted track). Both have candle-power meters and photoelectric cells for power—a Weaver Headlight Tester requires no electricity. Both models' cases are mounted on slider castings to adjust vertically to headlight height of any vehicle. And both allow you to aim *low and high beams*, even on the new Halogen headlamps. The difference between the two is the **Rayoscope's** two additional aiming meters, which make lamp alignment even *easier*.

Either Weaver Headlight Tester can be calibrated to a particular car or truck and positioned in less than a minute. Both the calibration and the test itself can be performed—quickly, easily, and by any of your servicemen—by following the instructions provided with the tester. An Authorized Weaver Representative will show you how.

ALIGNMENT ADJUSTER Adjusting-screw with large knob and spring-loaded pin. Used when aligning Tester with centerline of car or truck.

COUNTERBALANCE Unique spring-loaded device eases precise positioning of tester head.

PORTABLE OR TRACK OPTION Track type used in high-volume testing lanes. Portable type allows testing in more than one location.

