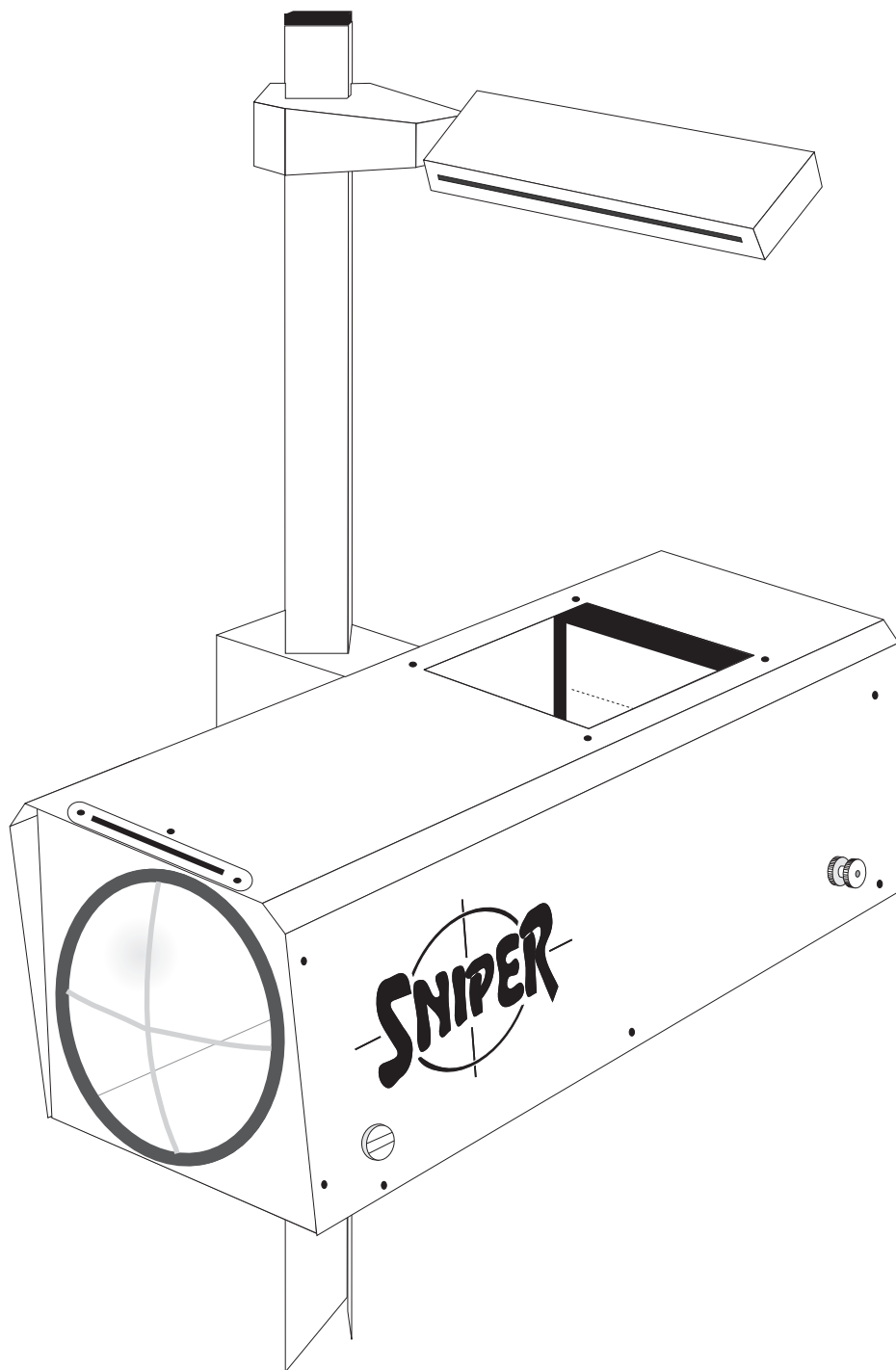


Professional Headlight Aimer



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Ver 000128

Model 5412



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Forewords

THE "SNIPER" OPTICAL HEADLIGHT AIMER MODEL 5412

Thank you for purchasing the Sniper 5412 Optical Headlight Aimer.

You have made a wise purchase decision. The 5412 is a high quality, durable piece of equipment that will give you years of trouble free operation.

Your aimer has been designed to meet the following requirements:

Fully compliant with the latest revisions of the Standards SAE J599 (Aug 1997) and J600 (Feb 1993). This includes the new requirements for setting the beam slope based on the height of the headlamps. This feature is critical for proper adjustment of headlights on pick-up trucks and sport utility vehicles.

Aims all headlights including Domestic and European type headlamps.

Easy floor slope compensation.

Simple operation.

Requires no floor track.

Built-in self-checking for orthogonality of its components.

The aiming is performed based on an image of the headlight beam recreated inside the aimer head. The internal screen duplicates the screen required by the SAE standard J599.

Easily transportable from bay to bay.



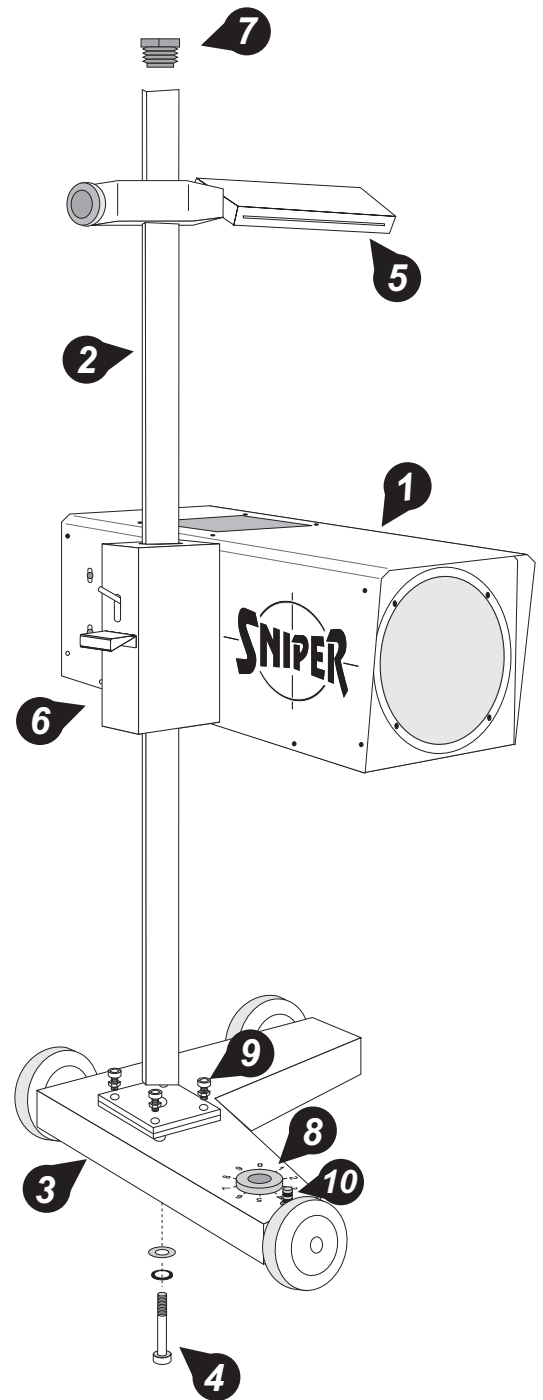
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Assembling the Aimer

COMPONENTS:

1. Aimer body
2. Mast
3. Base with wheels
4. Hardware to attach the bar to the base:
 - 1 Bolt DIN 912, M 10 x 50
 - 1 Washer DIN 7980, 10 mm
 - 1 Flat washer, 10 mm
5. Aligning visor
6. Lock / unlock mechanism
7. Mast cap
8. Slope compensation knob
9. Mast adjuster:
 - 2 Mast adjustment plates
 - 4 Adjustment screws
 - 4 Lock nuts
10. Floor slope register



Assembling the Aimer

STEP 1

Bolt the mast, with adjustment plates, to the base and align the mast as shown in fig. 1. Be sure that the threaded adjustment plate is the top plate. Thread adjustment bolts loosely into the top plate, only one or two turns at this time. Align the adjustment plates parallel to the base, see fig. 1.

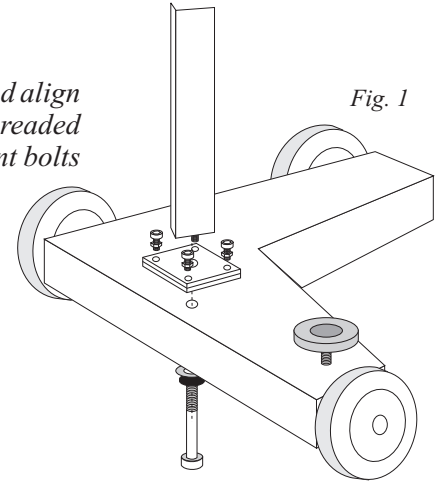


Fig. 1

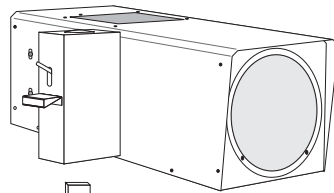


Fig. 2

STEP 2

Install optical aimer body on mast (fig. 2) by pressing trigger lock (fig. 3) and sliding it down the mast.

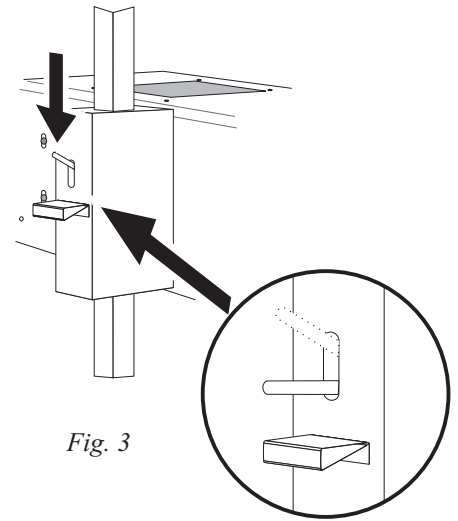
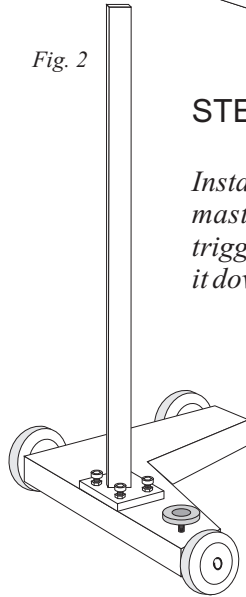
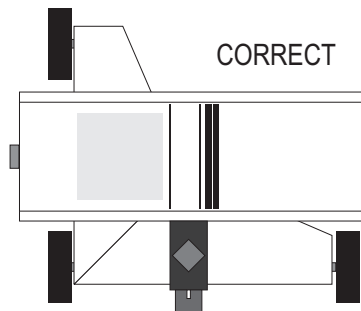


Fig. 3

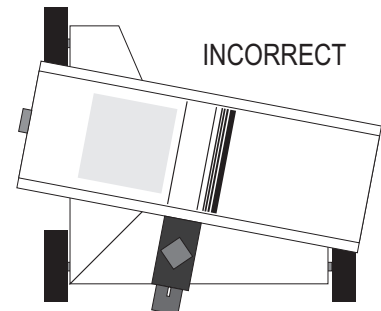
STEP 3

Check that the mast is correctly positioned. The aimer body must be parallel to the base (fig. 4). Tighten the mast bolt.



CORRECT

Fig. 4



INCORRECT



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Assembling the Aimer

STEP 4

Install the visor (fig. 5a). The narrow slot in the visor should face away from the front of the aimer.

Mount the lift handle (fig. 5b).

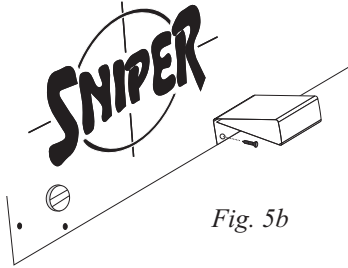
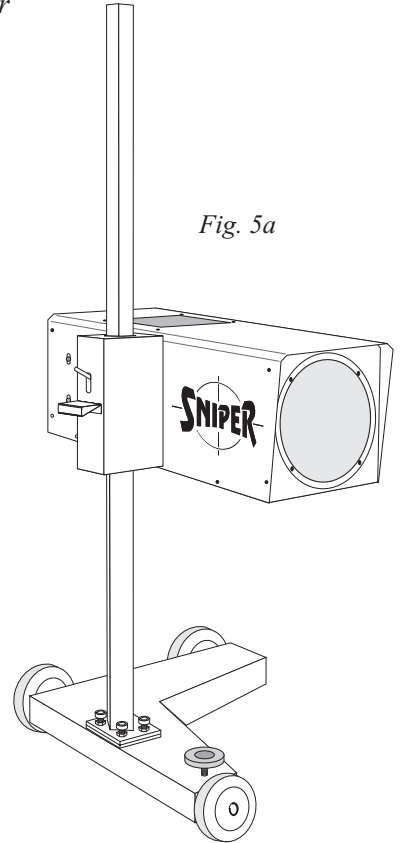


Fig. 5b



Fig. 5a



STEP 5

Check calibration of visor by looking through the visor at the marked line on the aimer body (as shown in fig. 6 and 7 below). The line in the visor must match the line on the aimer head. If the visor is not perfectly aligned with the aimer's head, turn the small allen (1.5 mm) screw at the bottom of the visor until the lines match.

Adjust the visor line here below

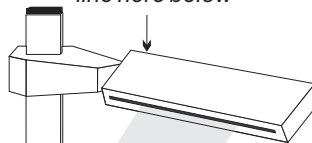
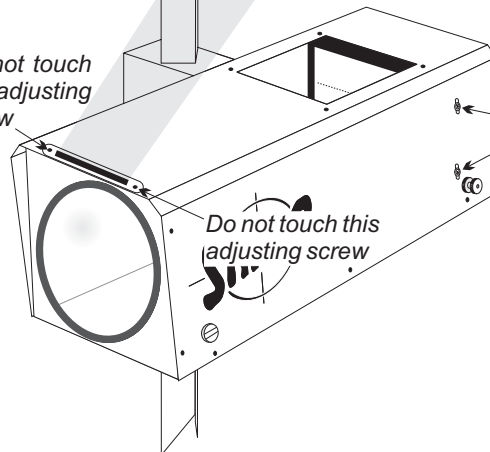


Fig. 6

CAUTION: DO NOT ADJUST THE LINE ON THE AIMER BODY, THIS MUST BE CALIBRATED BY FACTORY MAINTENANCE PERSONNEL ONLY!

Do not touch this adjusting screw



Do not touch this adjusting screw

Do not touch these adjusting screws

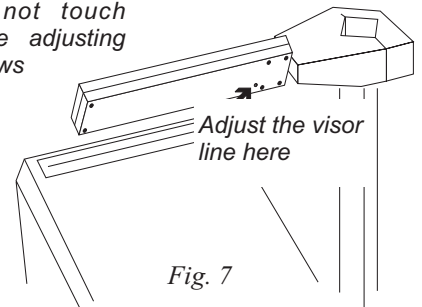


Fig. 7

Assembling the Aimer

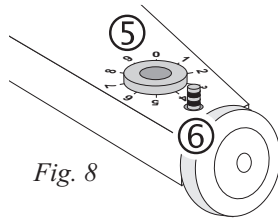


Fig. 8

STEP 6

Adjust the floor slope knob ⑤ until slope register is approximately centered on number 3 ⑥, see fig. 8.

STEP 7

Assembly is complete.

Place the aimer on a flat, level surface. Using a level, check to ensure that the mast is vertical in both directions (fig. 9). If it is not, then correct with mast adjustment screws as needed. Tighten locknuts and recheck with level.

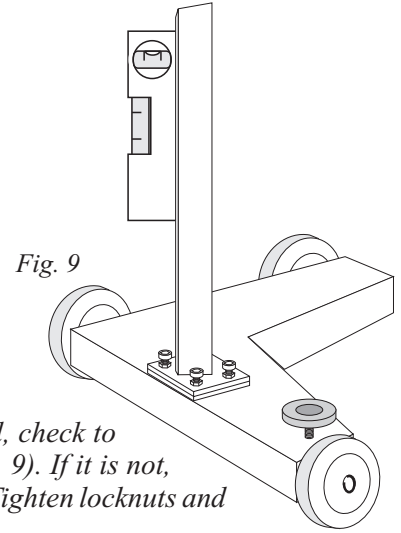


Fig. 9

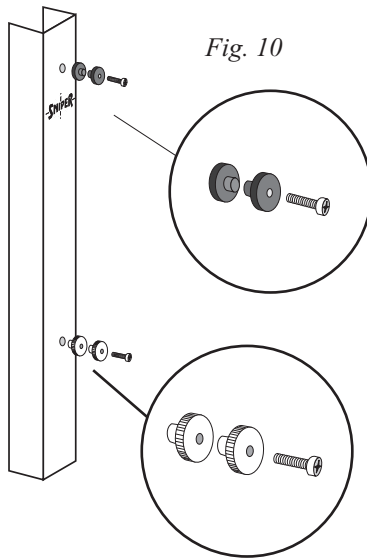


Fig. 10

ASSEMBLING THE FLOOR SLOPE PYLONS

1. Attach the pins to the mast using phillips head bolts as shown. Attach the top bolt with two plastic washers. Attach the bottom bolt with two metal "thumb nuts" (inside nut should be a lock nut allowing outside nut to turn freely), see fig. 10.
2. Attach one short mast on each base using two phillips head bolts (fig. 11a)
3. The line can be stored as shown in fig. 11b.

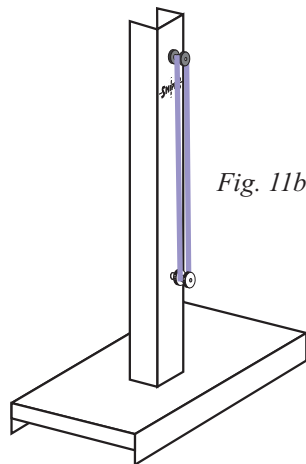


Fig. 11b

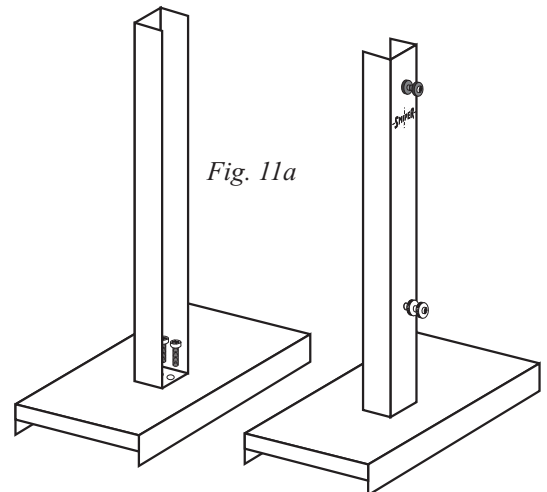


Fig. 11a

Calibrating the Floor

INITIAL FLOOR SLOPE COMPENSATION

The following procedure is required only if the floor is not flat (fig. 12-15).

Vehicle and aimer are both located on a flat and level floor.
No compensation is needed

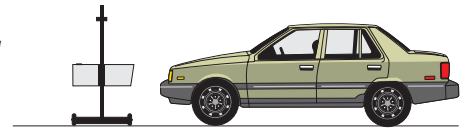


Fig. 12

Vehicle and aimer are both located on a flat floor with a constant slope.
No compensation is needed.

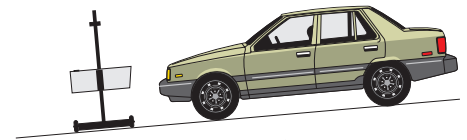


Fig. 13

Vehicle and aimer are located on different flats, both of them with a constant slope.
Floor compensation is required.

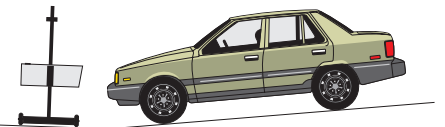


Fig. 14

Vehicle or/and aimer are located on irregular flats.
It is recommended not to aim the headlamps on such floors.

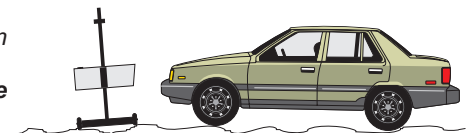


Fig. 15

DETERMINING FLOOR SLOPE COMPENSATION

Place the floor slope pylons and the aimer as shown in fig. 16. Illustrations on the next page show the process in detail.

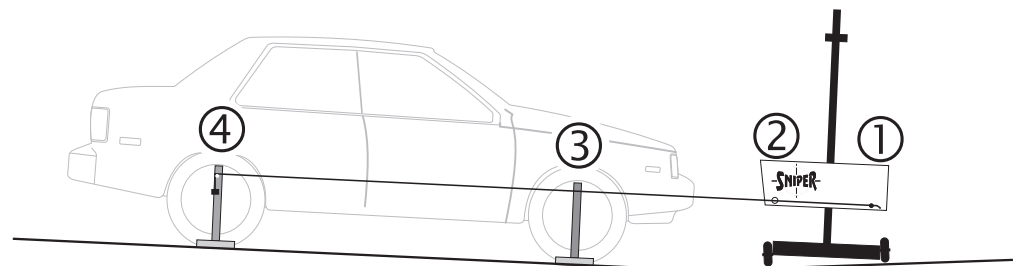


fig. 16

Calibrating the Floor

POSITIONING THE LINE

Position aimer in front of, and next to, the vehicle. Position the pylon ④ (with the pins attached) next to rear wheel. Position the other pylon ③ (with tolerance marks) next to front wheel. Attach the line to the mounting point on aimer body as shown in fig. 18. The line should run over the top of the stud and be held by in place by the nut. Pass the opposite end of the line over the pin on pylon ④ as shown in fig. 17, raise or lower aimer body so that the line passes within the tolerance mark at pylon, fig 17.

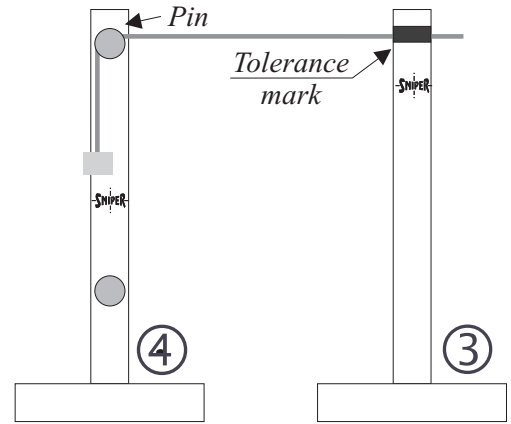


Fig. 17

Adjust aimer slope with the knob, fig.19 ⑤ so that the line aligns with groove ② on aimer head fig. 18. Check to ensure that the line still passes through the tolerance mark on the pylon. If not, repeat the previous steps.

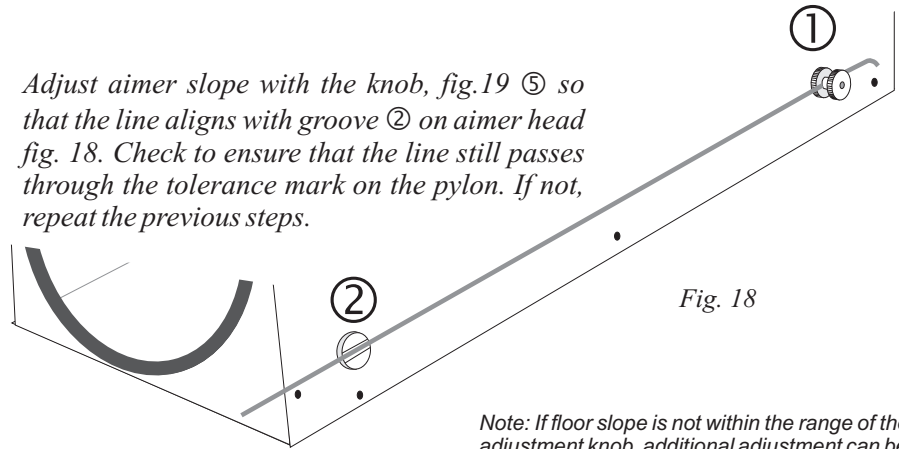


Fig. 18

Note: If floor slope is not within the range of the slope adjustment knob, additional adjustment can be made with the adjustment screws at the base of the mast.

RECORDING THE SLOPE COMPENSATION SETTING

Near the slope compensation knob ⑤, there is a register ⑥ consisting of a small cylinder that can be used to count the turns of the knob ⑤. This register sinks or raises with each turn of the knob fig. 19.

Shops using the aimer in more than one location should record the floor slope settings for each location. Once the setting is recorded, it is not necessary to take the floor slope measurement again for this location.

Use the recorded slope setting for subsequent uses in the same location. Simply set the slope knob to the previously recorded position prior to aiming headlights.

Slope adjustment knob

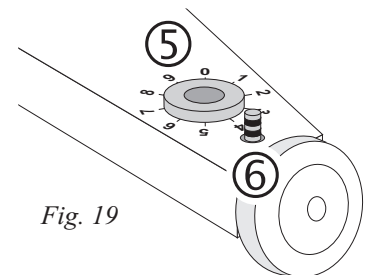


Fig. 19



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Vehicle Preparations

PREPARING THE VEHICLE FOR HEADLAMP AIM OR INSPECTION

Before checking the aim, the inspector shall;

- ☞ Remove ice or mud from under fenders.*
- ☞ Set tire inflation pressures to the values specified on the tire sidewall or information label.*
- ☞ Check car springs for sag or broken leaves.*
- ☞ See that there is no load in the vehicle other than the driver.*
- ☞ Check functioning of any automatic vehicle leveling systems and specific manufacturer's instructions pertaining to vehicle preparation for headlamp aiming.*
- ☞ Clean lenses and aiming pads.*
- ☞ Check for bulb burnout, broken mechanical aiming pads, and proper beam switching.*
- ☞ Stabilize suspension by rocking vehicle sideways.*
- ☞ Measure the vertical height of the center of the headlamp from the ground.*

Aligning Aimer to Vehicle

ALIGNING AIMER TO VEHICLE

Choose two symmetrical points of the vehicle located also at the same height (i.e. the upper part of the lamps, strut bolts, radiator support bolts).

Points located too high (i.e. in the vehicles roof) shall be avoided: the best accuracy is obtained using lower points.

Looking through the visor, make both points lie on the visor's wire, by slightly moving the aimer, fig.21.

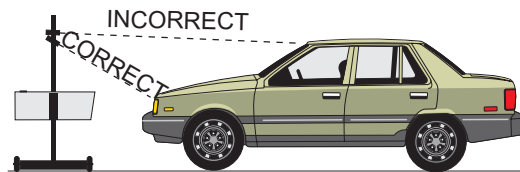
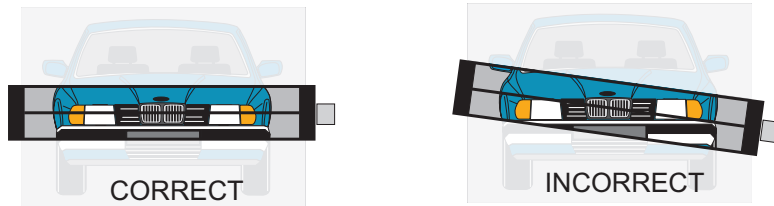
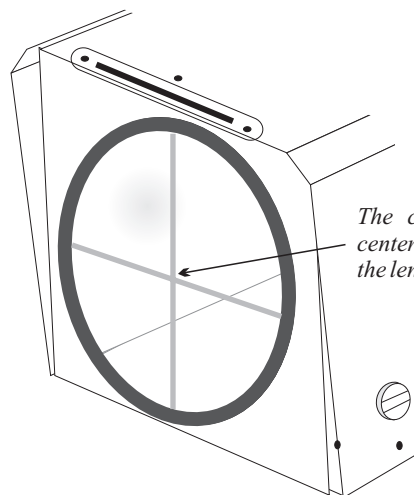


Fig. 21

ALIGNING THE AIMER TO THE HEADLIGHT

Place the aimer in front of one headlamp at a distance between 12 to 20 in. (30 to 50 cm). Turn headlights on low beam and align the center of the light beam with the center of the aimer's lens, within a tolerance of 1 in. (2.5cm) up, down, right or left, Fig.20.



The cross hair mark helps centering the headlamp with the lens.

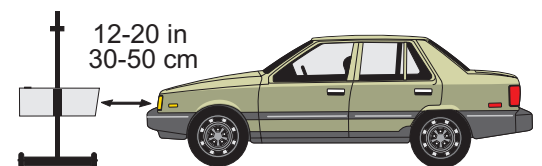


Fig. 20

Aiming Procedures

SET BEAM SLOPE KNOB

These procedures are required by the new SAE J599 (Aug. 97) Standard.

The Beam Slope Knob compensates for different headlamp heights. It must be set prior to aiming headlights. Set the Beam Slope Knob based on the distance from the ground to center of the headlamp. To aim light without beam slope compensation, set the slope knob to HI & Lo⁰.

KNOB SETTINGS

HI & LO⁰ for all high beams and low beams less than 36"

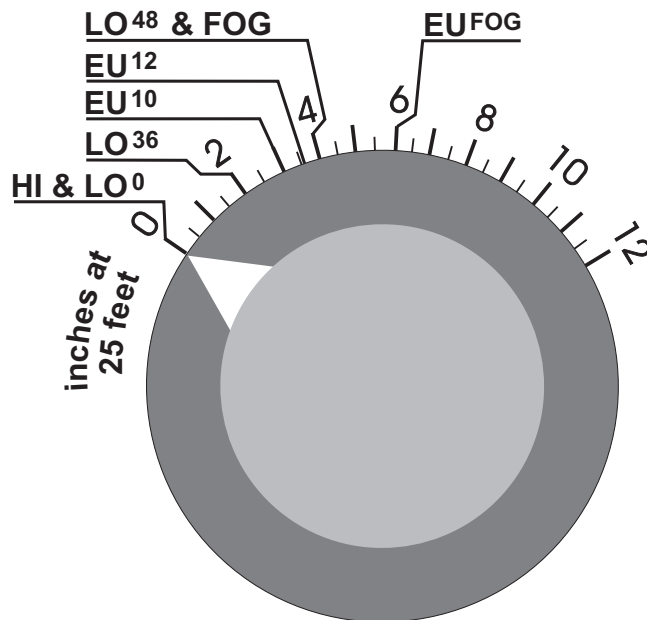
LO³⁶ for low beams from 36" to 48"

LO⁴⁸ for low beams higher than 48"

FOG, for vertical aim of fog lamps.

EU¹⁰, EU¹² and EU^{FOG}, for vertical aim of Euro lamps (see page 18).

The scale is marked in inches of beam inclination at 25 feet.



QUICKLY DETERMINING HEADLAMP HEIGHT

The SNIPER has two marks on its mast to assist in determining the headlamp height. Align the aimer body with the headlamp as described in fig. 20 on the previous page. If the top of the aimer body is lower than the bottom mark, the headlamp is lower than 36". If the aimer body is lower than the top mark and higher than the bottom mark, the headlamp height is between 36" and 48". If the aimer body is higher than the top mark, the headlamp height is higher than 48". Set the beam slope knob accordingly.

Aiming Procedures

DESCRIPTION OF THE INTERNAL SCREEN OF THE AIMER

The SNIPER 5412 is designed to reproduce, at a smaller scale, an aiming test screen compliant with the Standard SAE J599 (revised August 1997). The beam projections appear on the internal screen of the aimer as they would appear on a screen located 25 feet from the headlamps.

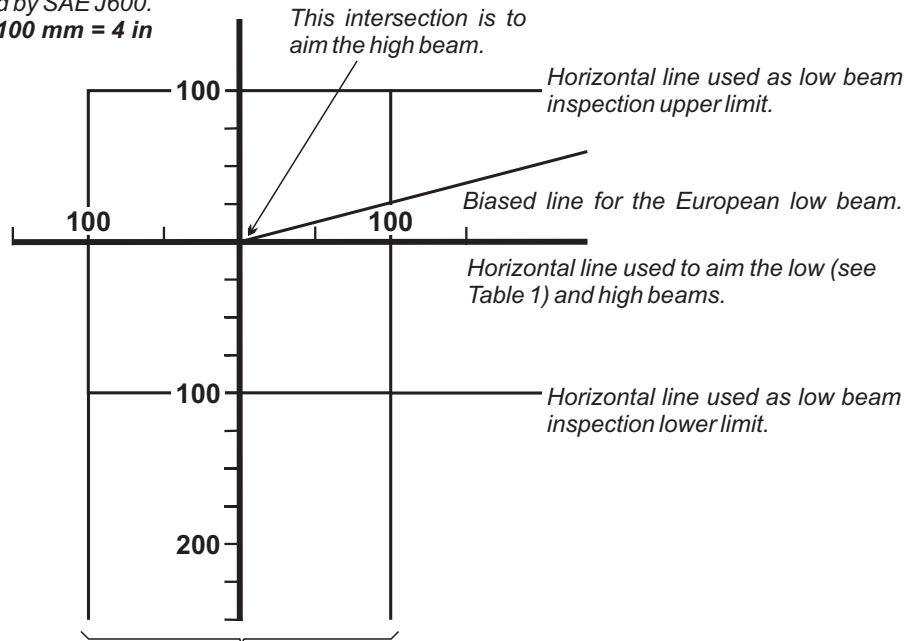
The aiming screen complies with all aiming and inspection requirements of the Standards SAE J599 (revised August 1997) and SAE J600 (revised February 1993).

With the lines drawn on the internal screen of the aimer, all aiming and testing procedures can be performed according to the inspection limits described in the Standards.

In addition, the European lighting type can also be aimed.

The numbered indications are in mm at 7.6 m as required by SAE J600.

100 mm = 4 in



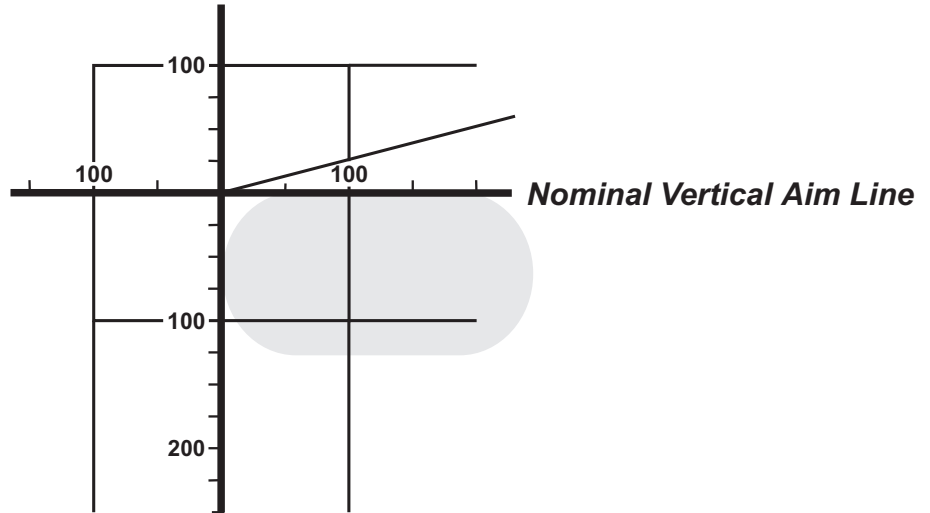
Two vertical lines at 100R and 100L used as inspection limits.

Illustrations on the following pages show more detail.

Aiming Procedures

AIMING LOW BEAM HEADLAMPS

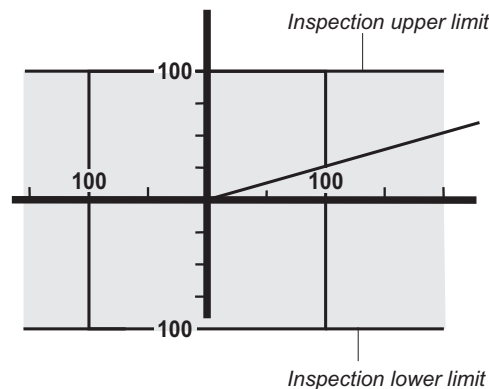
Low Beam Headlamps are aimed so that the top edge of the high-intensity zone is at the NOMINAL VERTICAL AIM line, and the left edge of the high-intensity zone is at the vertical centerline of the screen. Set beam slope knob based on center height of headlight (see table 1, page 19).



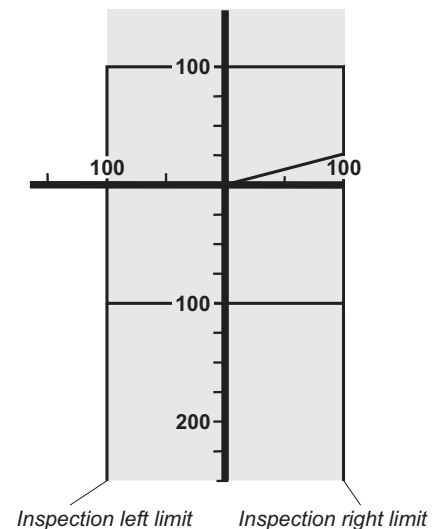
INSPECTION LIMITS FOR LOW BEAM HEADLIGHTS

The inspection limits are a range of 4 in.. The illustrations below show the range allowed for vertical and horizontal inspection. The inspection limits are explained in table 1, page 19.

The top of the "high intensity zone" must fall within the shaded area for proper vertical adjustment.



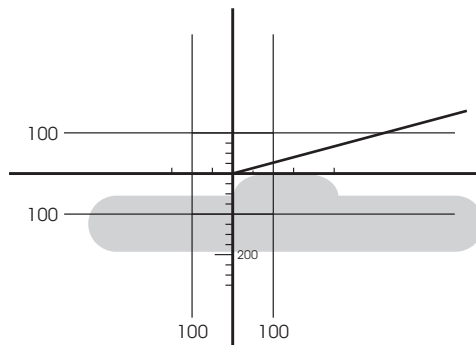
The left side of the "high intensity zone" must fall within the shaded area for proper horizontal adjustment.



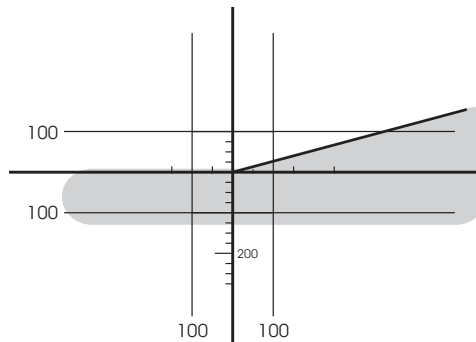
Aiming Procedures

Different Low Beam Patterns

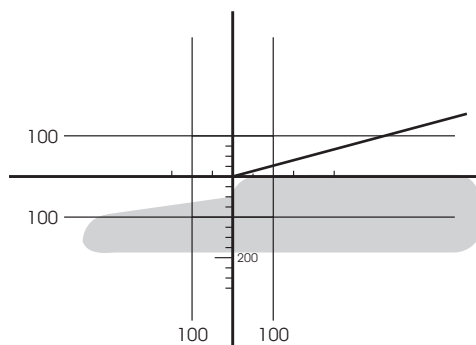
There are many different beam patterns currently used in domestic vehicles. When checking headlights with complicated beam patterns, you must locate the part of the beam that is highest on the screen (shines farthest down the road). This generally appears as a “hump” in the beam pattern. Once this is located, you simply set the left edge of the “hump” to align with the center cross hair on the screen. You set the top of the “hump” with the horizontal cross hair. The bottom of the “hump” typically blends into the lower portion of the beam pattern and is not considered when adjusting the headlight.



Many composite headlights do not have a distinct “high intensity zone”. When adjusting these lights you must locate the area in the beam pattern that rises above the rest of the beam. This part of the pattern shines farthest down the road and is considered the “high intensity zone”.



Some headlights, such as the '99 Toyota Camry, have patterns similar to the European beam pattern. You should set these headlights using the biased line as shown.



Some patterns do not have a distinct edge on the right side. When aiming this type of headlight, ignore the right side of the pattern. Simply locate the left edge of the area that shines farthest down the road. This should be adjusted to the centerline on the aiming screen. The top edge will normally be easy to locate.

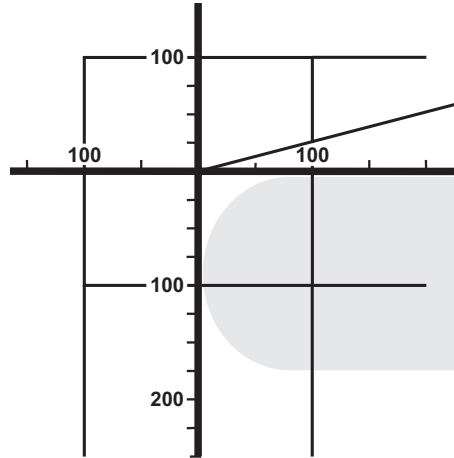


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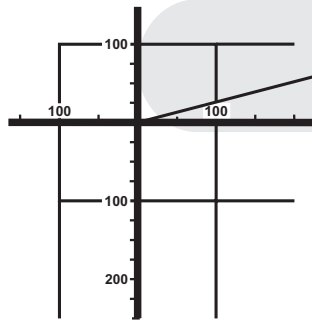


Aiming Procedures

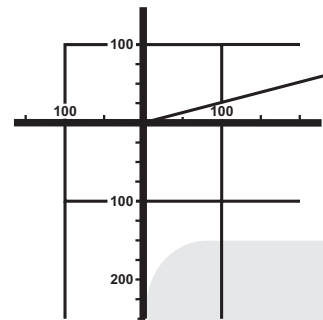
INSPECTION LIMITS FOR LOW BEAM HEADLIGHTS



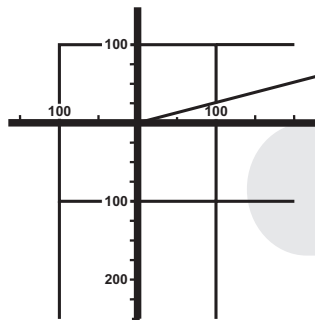
Perfect Adjustment



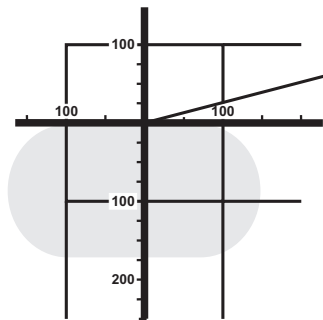
FAIL, too high



FAIL, too low



FAIL, too far right



FAIL, too far left



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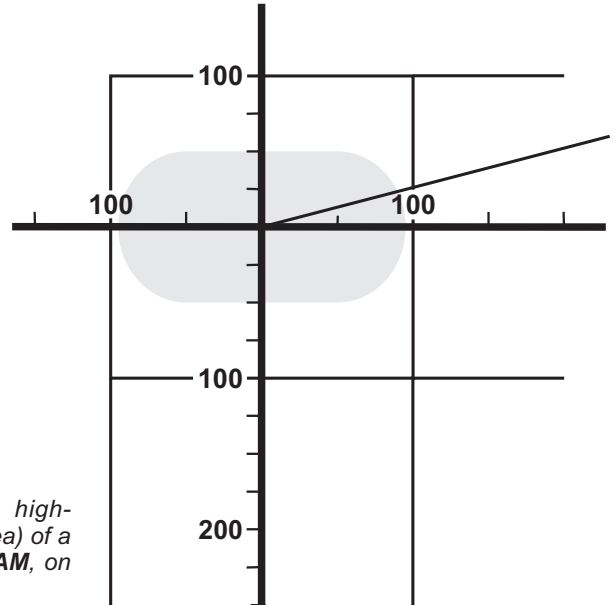


Aiming Procedures

AIMING HIGH BEAM HEADLAMPS AND AUXILIARY DRIVING LIGHTS

High beam headlamps and auxiliary driving lights are aimed so that the center of the high-intensity zone is located at the horizontal and straight ahead vertically.

Select the Beam Slope Knob to the position HI & LO⁰

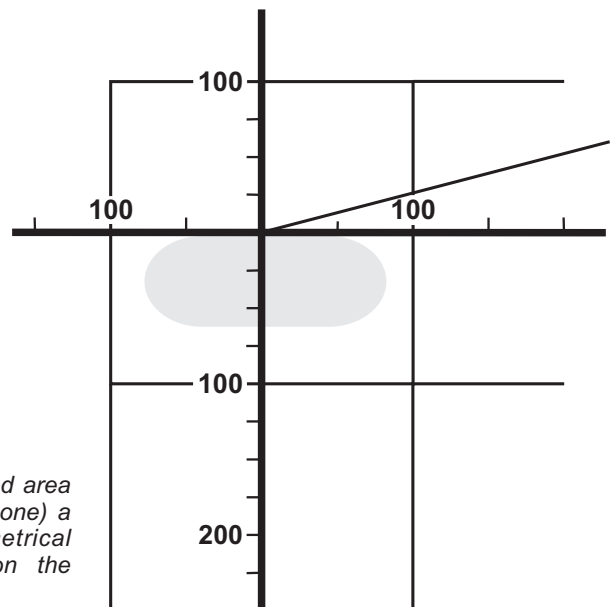


The figure shows the high-intensity zone (shaded area) of a properly aimed **HIGH BEAM**, on the aiming screen.

AIMING FOG LAMPS

The correct aim for fog lamps with symmetrical beams (as described in SAE J583) is with the top edge of the high-intensity zone 10 cm (4 in) below horizontal and the center of the high-intensity zone vertically centered on the screen.

Select the Beam Slope Knob to the position FOG.



The figure shows (shaded area indicates high-intensity zone) a properly aimed symmetrical **FOG LAMP BEAM**, on the aiming screen.



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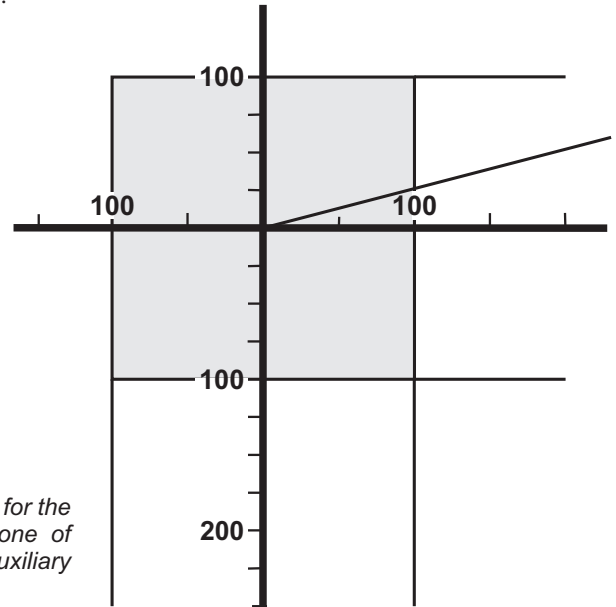


Aiming Procedures

INSPECTION LIMITS FOR HIGH BEAM HEADLAMPS AND AUXILIARY DRIVING LIGHTS

The inspection limits for high-beam headlamps shall be with the center of the high-intensity zone from 10cm (4in) up, to 10cm (4in) down; and, from 10cm (4in) left to 10cm (4in) right on a screen at 7.6m (25ft).

Select the Beam Slope Knob to the position HI & LO⁰

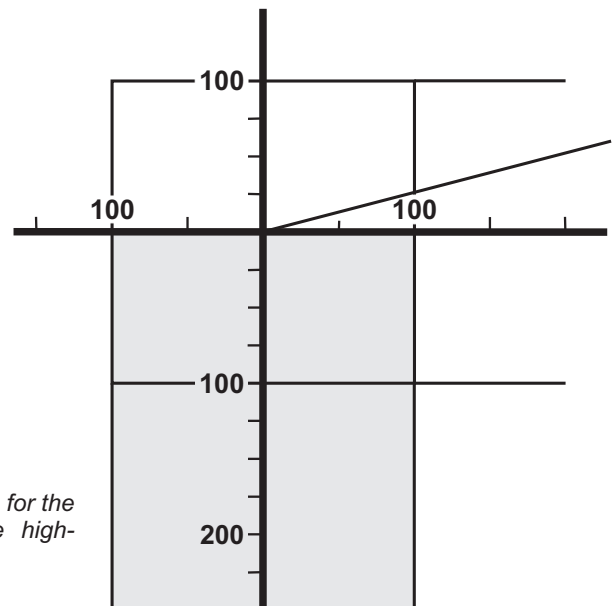


Inspection limits (shaded area) for the center of the high-intensity zone of **HIGH BEAM** headlamps and auxiliary driving lamps.

INSPECTION LIMITS FOR FOG LAMPS

The inspection limits for symmetrical fog lamps installed with universal mounting applications, shall be with the top edge of the high-intensity zone at horizontal or below and with the center of the high-intensity zone from 10cm (4in) left to 10cm (4in) right on a viewing screen located at 7.6m (25ft) from the vehicle.

Select the Beam Slope Knob to the position HI & LO⁰



Inspection limits (shaded area) for the top edge and center of the high-intensity zone of **FOG LAMPS**.



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Aiming Procedures

AIMING EUROPEAN LOW BEAM HEADLAMPS

European low beams do not have a high-intensity zone, all the illuminated area has a similar intensity.

European type low beams are aimed so the cutoff of the illuminated zone is located at the horizontal and biased line.

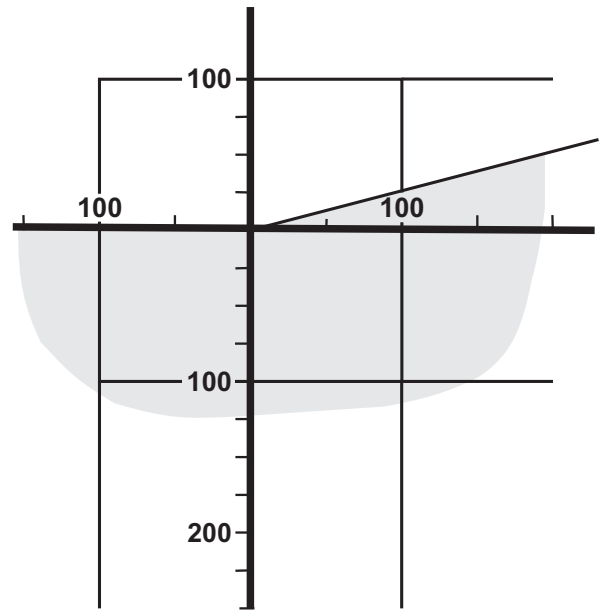
European low beams are normally aimed at 3 in (7.6 cm or 1%) slope.

Set the Beam Slope Knob at:

EU¹⁰ (1%) as a general rule,
and

EU¹² when 1.2% is specified.

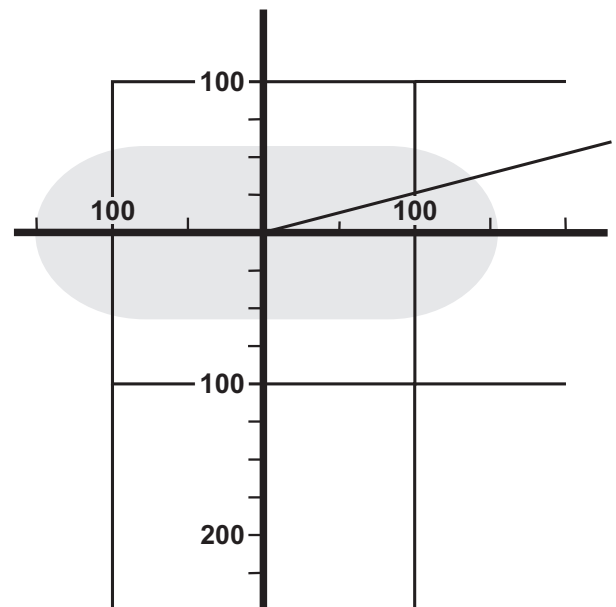
If another slope is specified, then convert as 3 in = 1%, and set the slope knob accordingly.



AIMING EUROPEAN HIGH BEAM HEADLAMPS

European high beams are aimed so that the high-intensity zone is located approximately centered at the horizontal and straight ahead vertically.

Select the Beam Slope Knob to the position HI & LO⁰



Nominal Vertical Aim

NOMINAL VERTICAL AIM FOR LOWER BEAMS

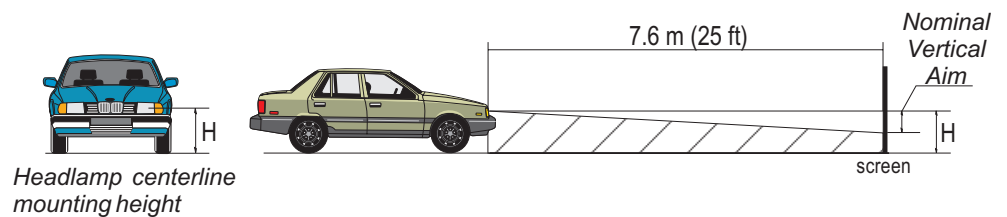
The revised SAE J599 standard (8/97) requires low beam headlight aim to be adjusted differently based on headlamp height. The **NOMINAL VERTICAL AIM** position on lower beam headlamps, as introduced in the new revision of the Standard SAE J599, "shall be adjusted based on the headlamp mounting height, from the ground to the light source center of the headlamp".

The **TABLE 1** shows the **VERTICAL BEAM AIM GUIDELINES** as required in the standard. These apply only for low beam.

The table shows the aiming values (column 2, "Nominal Vertical Aim"), which shall be used for aiming purposes, and the inspection limits (column 3, "Aim Inspection Limits for Vertical Aim"), to be used for inspection tests.

TABLE 1 - VERTICAL AIM GUIDELINES

Headlamp (centerline) mounting height	NOMINAL VERTICAL AIM	Aim Inspection Limits for Vertical Aim
22 to 36 in 56 to 90 cm	0	4 in UP to 4 in DOWN 10 cm UP to 10 cm DOWN
36 to 48 in 90 to 120 cm	2 in DOWN 5 cm DOWN	2 in UP to 6 in DOWN 5 cm UP to 15 cm DOWN
48 to 54 in 120 to 140 cm	4 in DOWN 10 cm DOWN	0 in UP to 8 in DOWN 0 cm UP to 20 cm DOWN



To compensate for vehicle headlamp height, measure from the ground to the center of the headlight and set floor slope knob according to table 1. **HI & LO⁰** for all high beams and low beams less than 36", **LO³⁶** for low beams from 36" to 48", **LO⁴⁸** for low beams higher than 48".

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Checking the Aimer

PREPARING THE TEST

To check the aimer for accuracy, place a car in front of a screen or a flat vertical wall, at a distance of 25 feet (7.6m). This distance is that required by the Standard SAE J599, but for practical purposes can be any suitable other. The dimensions mentioned hereinafter should be in that case assumed proportionally.

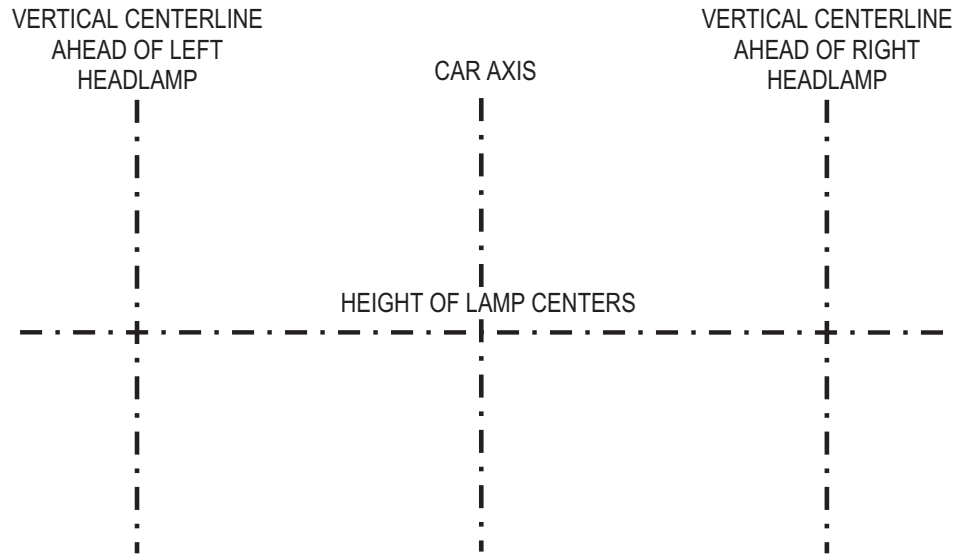
Trace or mark with tape the lines as shown in the figure below.

If the headlamp mounting height of the vehicle used for the test is more than 36in, then a Nominal Vertical Aim line at the distance specified in the Table 1 shall be traced.

Perform the preparation for headlamp aim as detailed.

Proceed to aim the lower beam as explained in next page.

SCREEN MARKING

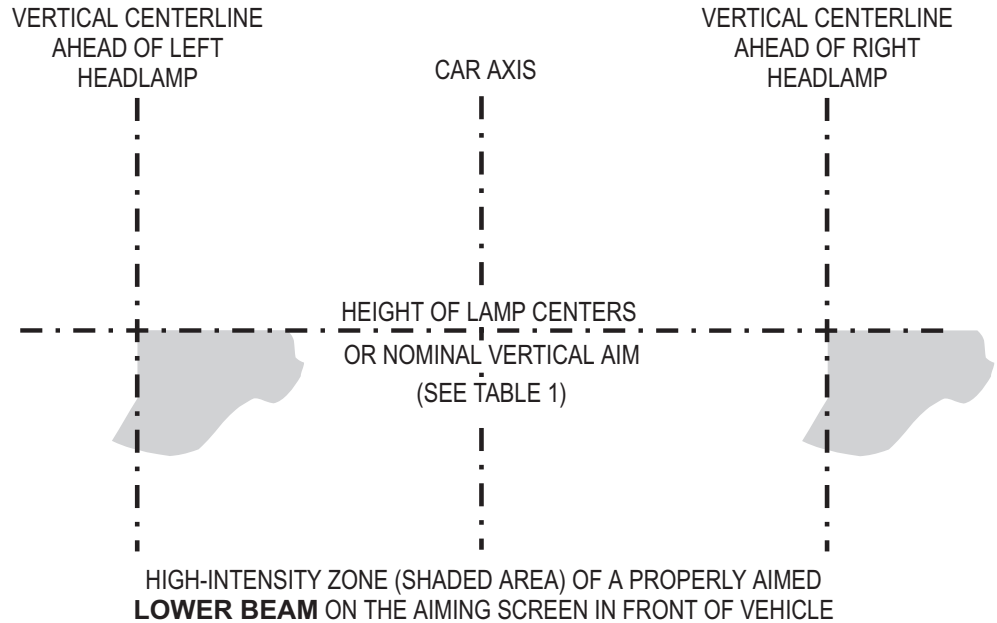


Checking the Aimer

AIMING LOW BEAM HEADLAMPS

Low Beam Headlamps are aimed so that the top edge (the cutoff) of the high-intensity zone is at the NOMINAL VERTICAL AIM line, and the left edge of the high-intensity zone is at the vertical centerline of the headlamp.

AIMING the LOWER BEAM



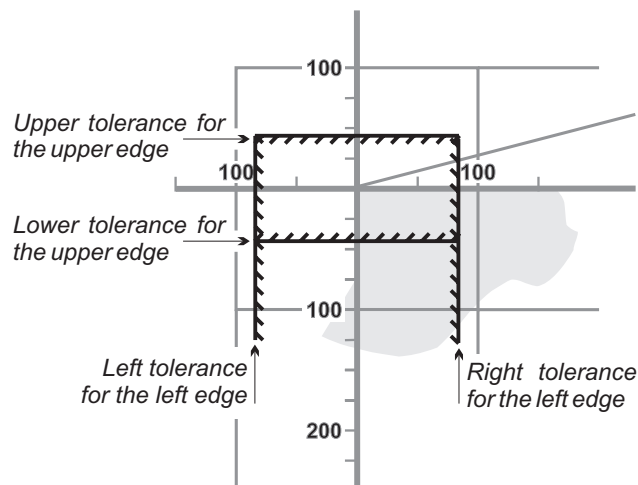
CHECKING THE AIMER

Once the beam is aligned, place the aimer in front of one of the lights, as described in the instructions, and check if the projection of the beam on the internal screen is the same. Following tolerances are allowed:

TOLERANCES

The Standard SAE J600 allows a tolerance of $\pm 0.3^\circ$ (± 1.6 in, or ± 40 mm) for the vertical aim, and $\pm 0.6^\circ$ (± 3.2 in, or ± 80 mm) for the horizontal.

The tolerance limits are shown in the figure below.





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Checking the Aimer

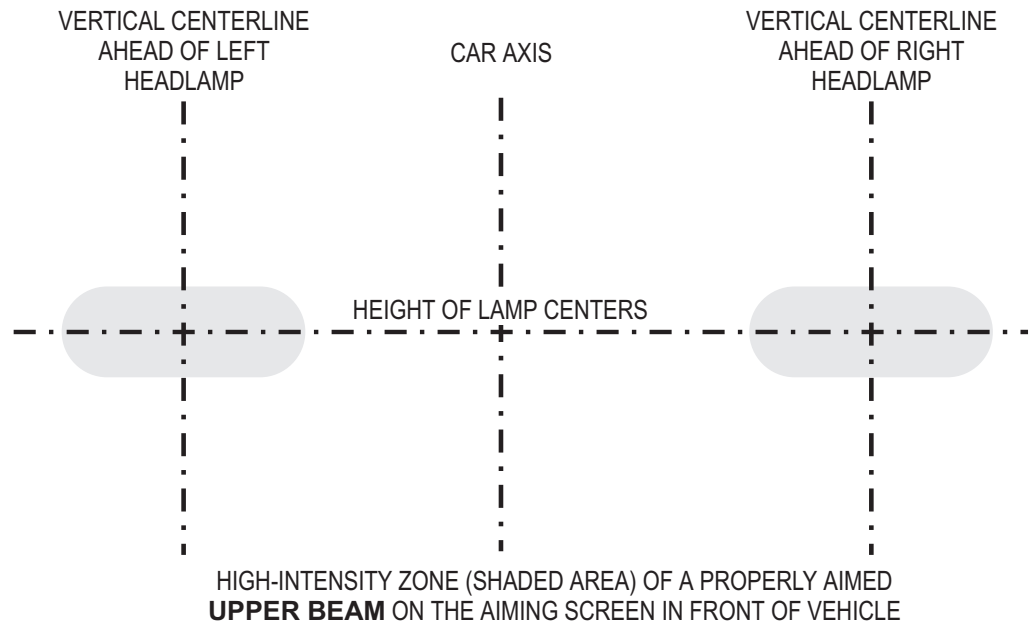
ALTERNATIVE PROCEDURE

The same procedure may be done by checking the aimer using the high beam instead of the low as a reference.

AIMING HIGH BEAM HEADLAMPS

High beam headlamps and auxiliary driving lights are aimed so that the center of the high-intensity zone is located at the horizontal and straight ahead vertically.

AIMING the UPPER BEAM



CHECKING THE AIMER

Once the beam is aligned, place the aimer in front of one of the lights, as described in the instructions, and check if the projection of the beam on the internal screen is the same. Tolerances are the same as described in the previous page.



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Warranty Information

TWO YEAR LIMITED WARRANTY

The Lujan model 4512 headlight aimer is warranted to be free from defects in material and workmanship under normal user operation for a period of TWO YEARS from the date of purchase.

The sole obligation under this warranty shall be to repair or replace any product or parts which are found by Lujan to be defective.

Conditions

- 1) *This warranty applies only to the original purchaser.*
- 2) *The enclosed warranty registration card must be completed and mailed to Lujan usa within 30 days of original purchase. Warranty registration can also be made online at www.headlightaimer.com/warranty/warranty.htm.*
- 3) *This warranty applies to normal usage and operation, it does not apply to any product that Lujan determines to be broken by accident, misused, tampered with, modified, or used for any purpose other than aiming headlights.*
- 4) *If product fails, it will be repaired or replaced at the option of Lujan.*
- 5) *Defective parts must be returned to Lujan for quality control inspection.*
- 6) *Lujan will pay for freight charges one way, from Lujan to purchaser, purchaser must pay freight to Lujan.*
- 7) *Proof of purchase must be supplied for all warranty claims.*
- 8) *Lujan shall not be responsible for any incidental or consequential damages.*

The express warranty set forth herein is in lieu of all other warranties, express or implied, including, but not limited to, any warranties or merchantability or fitness for a particular purpose, and all such warranties are hereby disclaimed and excluded by Lujan. There are no warranties which extend beyond the description on the face hereof. Lujan's liability, if any, shall never exceed the purchase price of this aimer, regardless of whether liability is predicted upon breach of warranty (express or implied), negligence, strict tort, or any other theory.

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