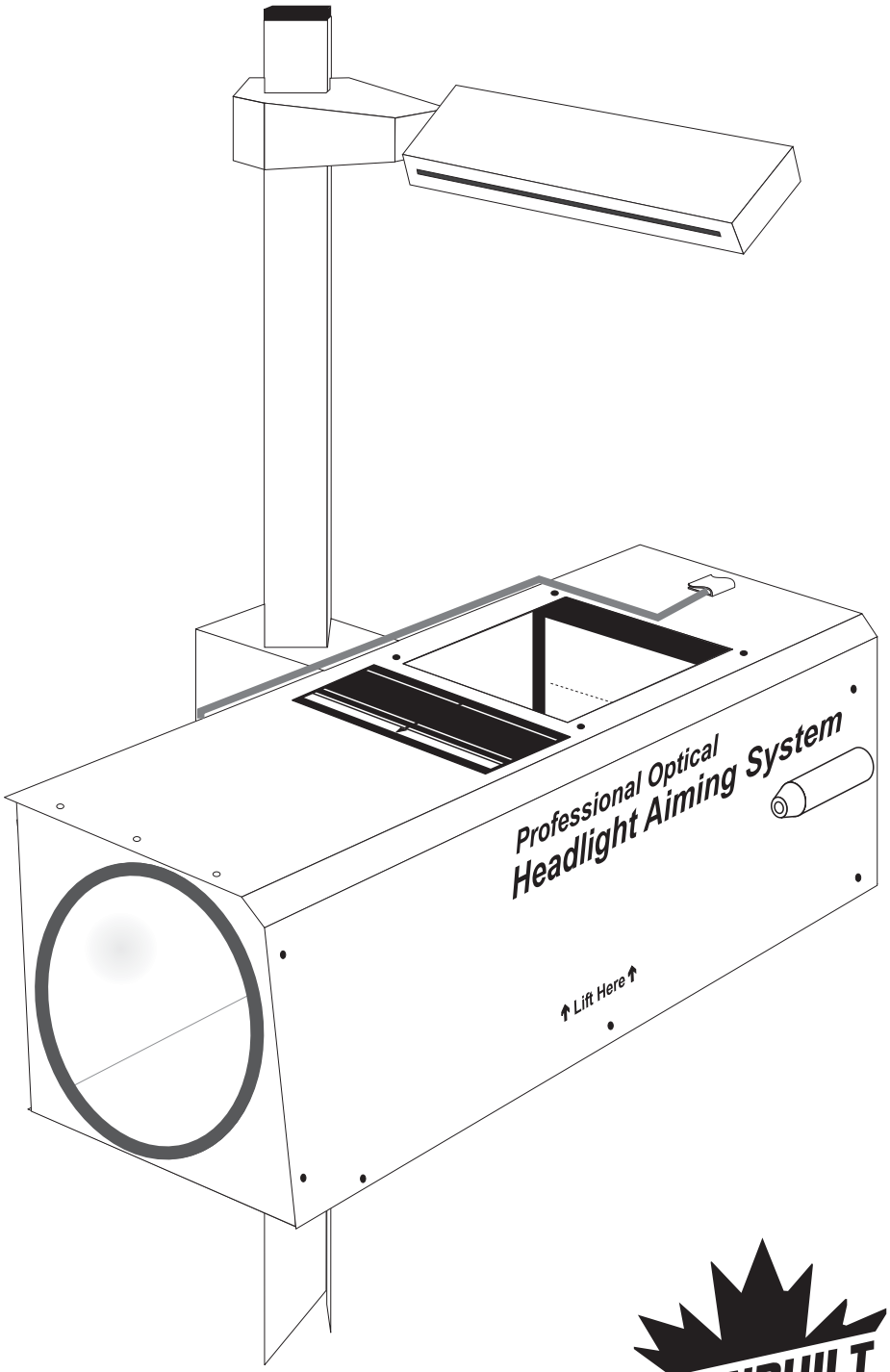
Professional Optical Headlight Aiming System

Perfect Night Vision.....



CANBUILT

Canbuilt Mfg.

Model OPT-5405

Ver 050720

Perfect Night Vision.....

Canbuilt Mfg.

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www.canbuilt.com

Forewords

THE PANTHER OPTICAL HEADLIGHT AIMER MODEL OPT-5405

Thank you for purchasing the Panther OPT-5405 Optical Headlight Aimer.

You have made a wise purchase decision. The OPT-5405 is a high quality, durable piece of equipment that will give you years of trouble free operation.

Your aimer has over 25 years of engineering refinement built-in. It is designed to meet the following requirements:

Designed for compliance with the latest revisions of the Standards SAE J599 (Aug 1997) and J600 (Feb 1993).

Aims all headlights including Domestic, European, and Asian type headlights.

Laser guided floor slope compensation.

Simple operation.

Easily transportable from bay to bay.

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 optical aimer head. The internal screen duplicates the screen required by the SAE standard J599.

This manual is written based on the requirements of the SAE J599 standard for headlight aim.

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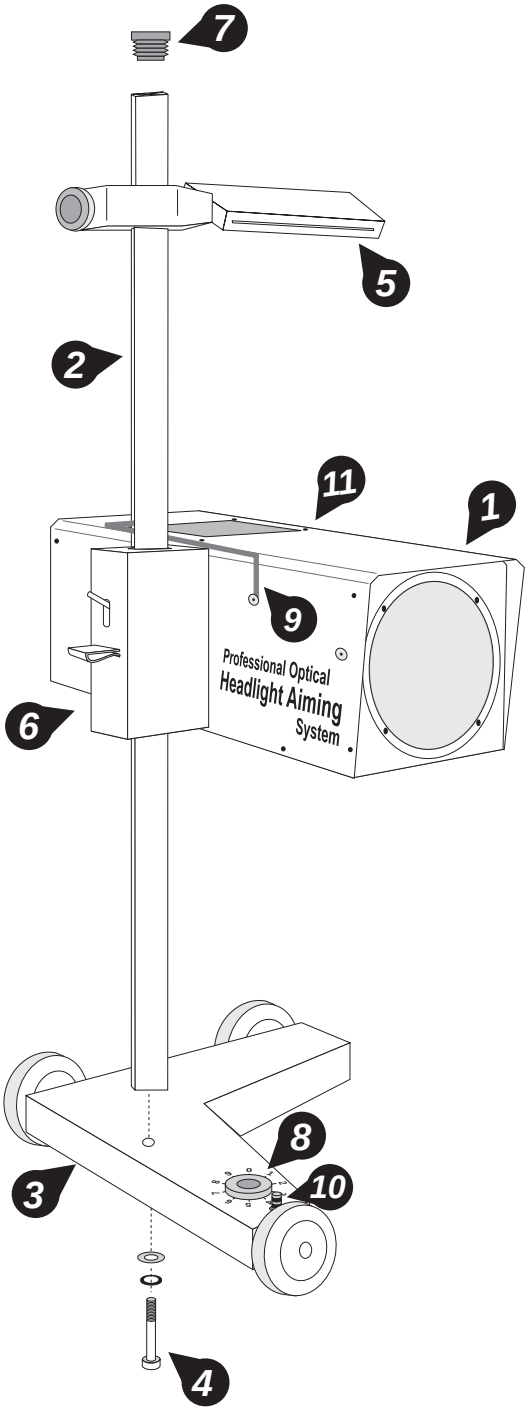
Assembling the Aimer

COMPONENTS:

1. *Optical aimer head*
2. *Heavy-duty mast*
3. *Reinforced base with wheels*
4. *Hardware to attach the mast to the base:*
   1 Bolt DIN 912, M 10 x 50
   1 Washer DIN 7980, 10 mm
   1 Flat washer, 10 mm
5. *Lateral alignment visor*
6. *Lock / unlock mechanism*
7. *Mast cap*
8. *Precision floor slope compensation system*
9. *Aimer positioning system*
10. *Floor slope register*
11. *Laser guided floor slope measurement system (not shown)*



Assembling the Aimer

STEP 1

Bolt the mast to the base aligning the mast as shown in fig. 1.

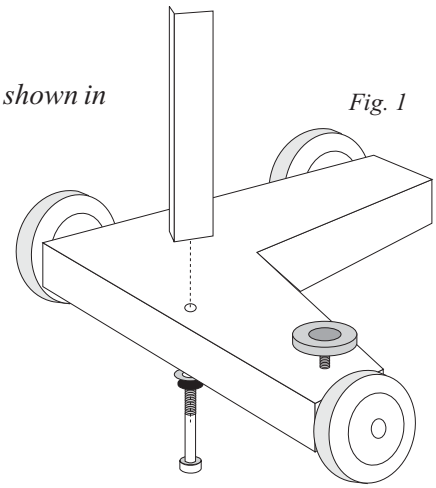


Fig. 1

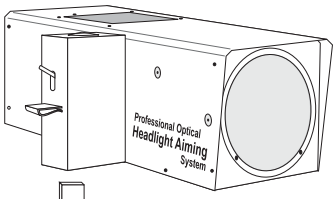
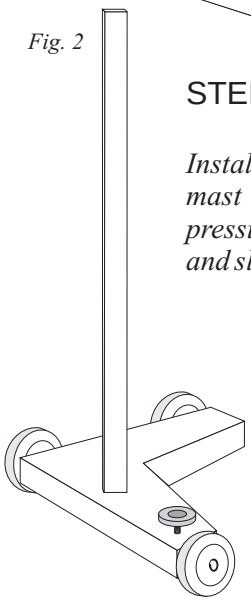


Fig. 2



STEP 2

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

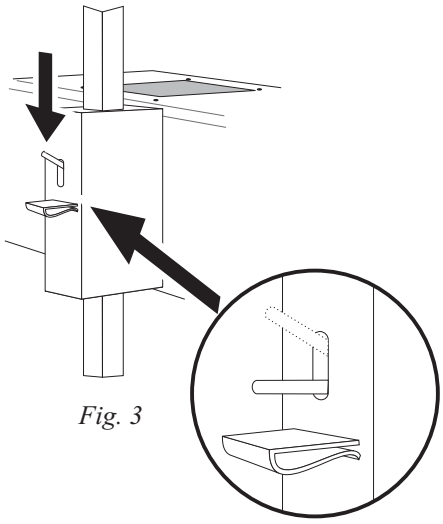


Fig. 3

STEP 3

Check that the mast is correctly positioned. The aimer head should be parallel to the base (fig. 4). Tighten the mast bolt with 10 mm allen wrench.

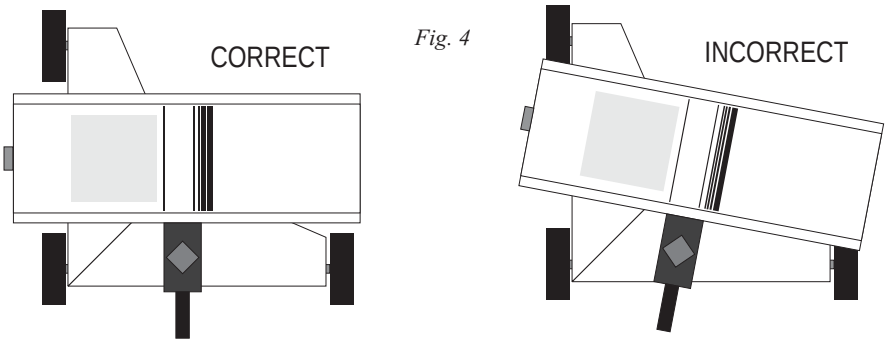


Fig. 4

Assembling the Aimer

STEP 4

Install the lateral alignment visor (fig. 5). The narrow slot in the visor should face the rear of the aimer (the wide slot faces the front).

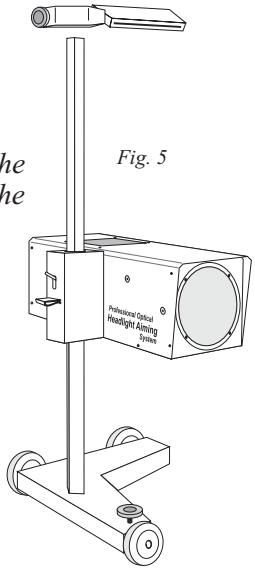


Fig. 5

Hardware for Pointer Positioning System

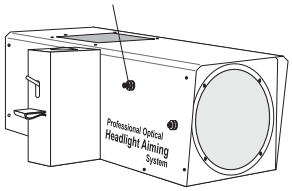


fig. 6

STEP 5

Install the pointer positioning system using hardware as shown in fig. 7. Hardware is attached to the optical aimer head and must be removed for pointer installation fig.6.

Thread nut B *on bolt* A*, insert through eye in pointer system and thread nut* C *on bolt* A*. Install assembly on optical aimer head tightening nut* C *against aimer as shown in fig. 7.*

Repeat the process for stopper pin.

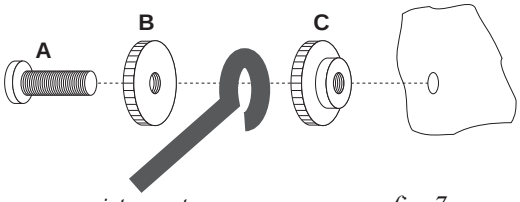
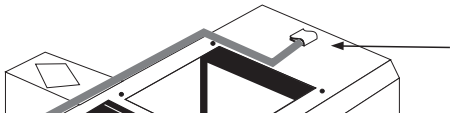


fig. 7



Attach the holder to the middle of the aimer head, at the tip of the pointer.

fig. 8

ASSEMBLY IS COMPLETE

The Panther is factory calibrated for accuracy, to verify calibration of aimer, see section on aimer calibration.

Calibrating the Floor

INITIAL FLOOR SLOPE COMPENSATION

Vehicle and aimer are both located on a flat and level floor.
Floor compensation is required.

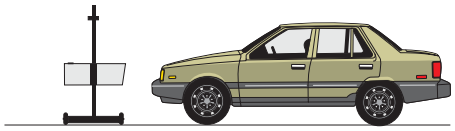


Fig. 12

Vehicle and aimer are both located on a flat floor with a constant slope.
Floor compensation is required.

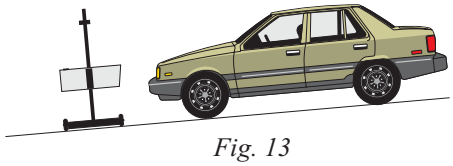


Fig. 13

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

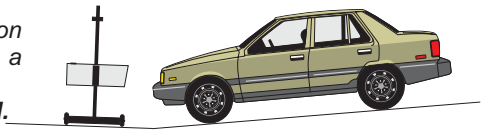


Fig. 14

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

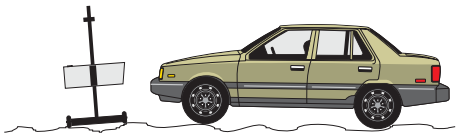


Fig. 15

LASER GUIDED FLOOR SLOPE COMPENSATION SYSTEM

Position aimer at front of bay. Turn on laser by turning knob on laser housing. Measure center of laser beam height from floor at front wheel and at back wheel. The distance from the floor should be the same. If it is not, adjust floor slope knob until they are equal. See fig. 16 and fig. 19.

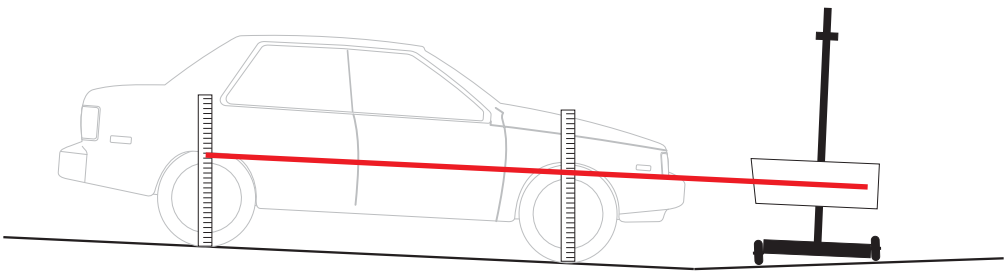
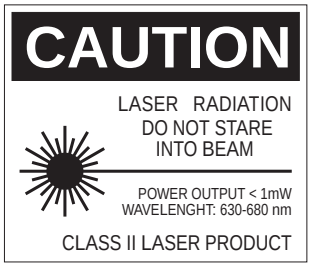


Fig. 16



RECORDING THE FLOOR SLOPE SETTING

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

Floor slope adjustment knob

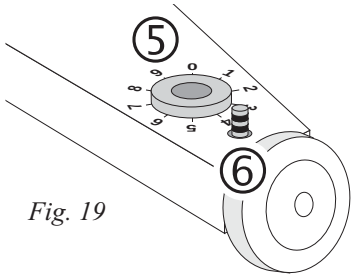


Fig. 19

Note: A decal is included with the aimer. You can record floor slope settings and adhere the decal to aimer for reference. You can also use the matrix below for recording this information.

BAY NUMBER	REGISTER SETTING	KNOB SETTING	DATE

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.*
- *Check for bulb burnout, broken 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.*

POSITIONING THE AIMER TO VEHICLE

Place the aimer in front of one headlamp at a distance between 10 to 14 in. (25 to 35 cm). Most beam patterns are clearest if the optical lens is about 12" from the lamp surface.

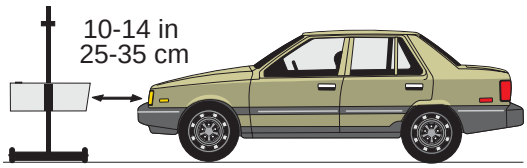
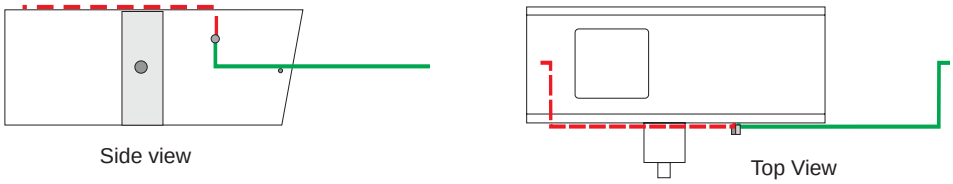


Fig. 20

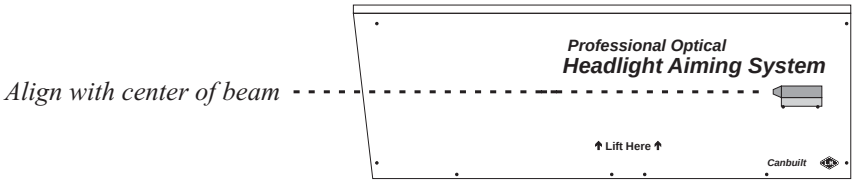
Rotate aimer positioning system (pointer) to front of aimer. Move aimer so that positioning pointer is at center of headlight beam. The pointer can be stored as shown with dashed lines in illustration, when not in use.

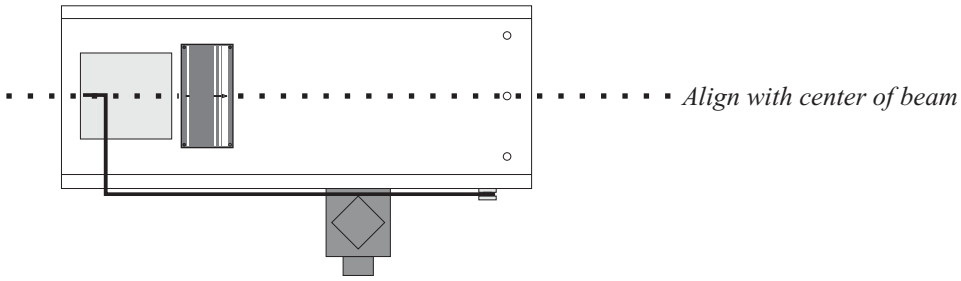


Note: There are several ways to determine the center of the headlight beam. If your headlight has a clear lens and you can see the bulb, it is generally located at the center. Some headlight lenses have a small dot in the lens that indicates the center. Many light beams have a "dark spot" in the center of the beam, this can be easily found by placing a cloth over the light and turning on the headlights.

OPTIONAL METHOD OF POSITIONING AIMER

The Panther has markings drawn on the aimer which can also be used for positioning the aimer at the center of the headlight. These markings can be used instead of the pointer if desired. Laser can also be used for vertical centering. See drawings below.





Aligning Aimer to Vehicle

POSITIONING AIMER TO VEHICLE

With aimer in front of the headlight, 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, such as the vehicles roof, should be avoided: the best accuracy is obtained using lower points.

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

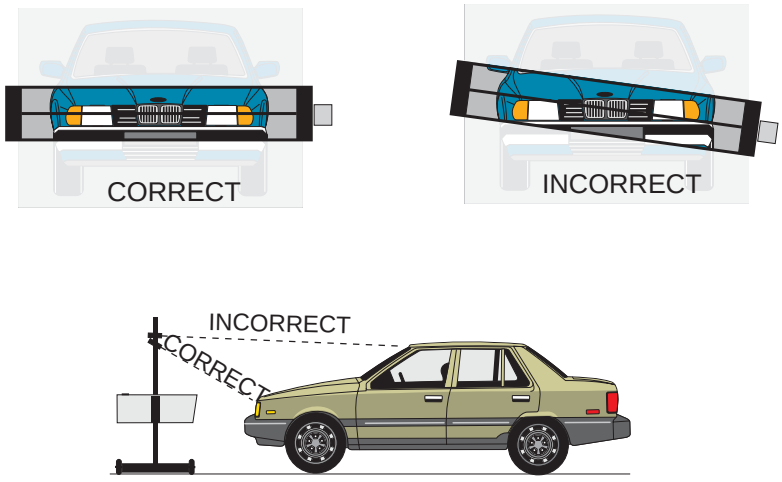


Fig. 21

Aimer is ready to test headlight. Turn on headlights and use internal screen to aim the light. Correct beam positioning on the aiming screen is explained on the following pages. Proper aim for high beams, low beams, Euro beams, driving lights, and fog lights are explained.

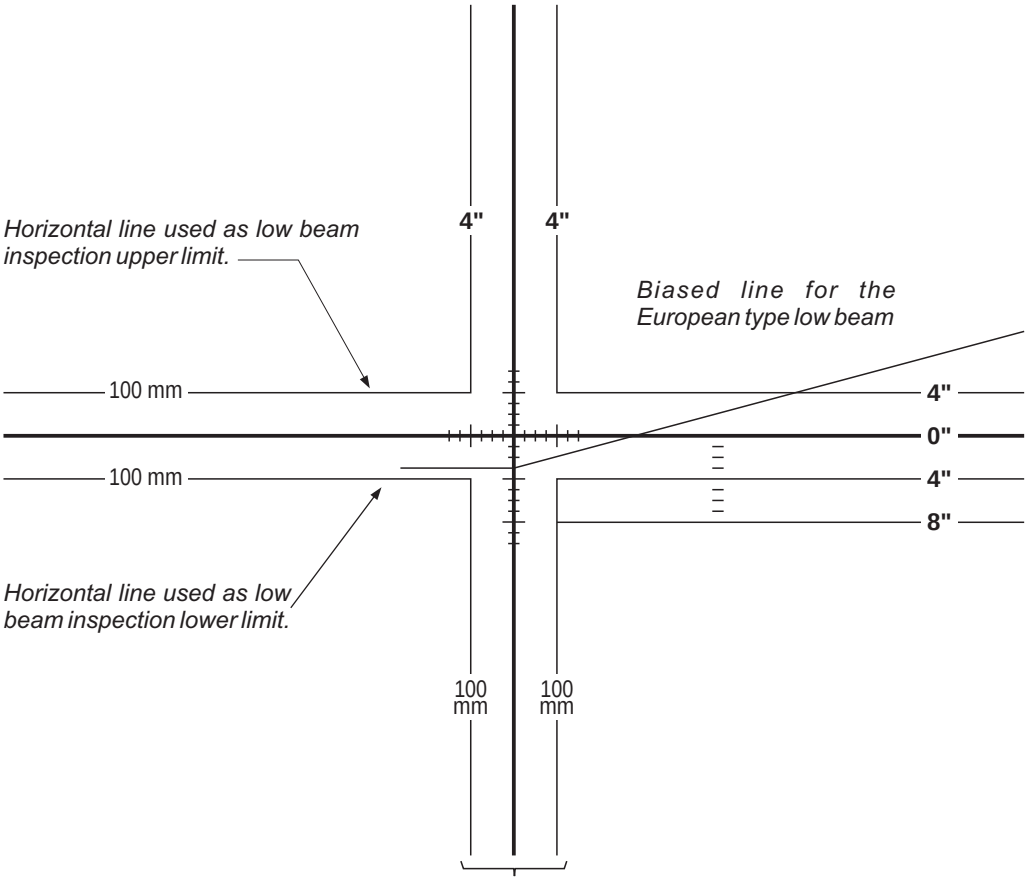
DESCRIPTION OF THE INTERNAL SCREEN OF THE AIMER

The Panther 5405 is designed to reproduce, at a smaller scale, an aiming test screen compliant with the Standard SAE J599 (revised Aug. 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 type lighting can also be aimed.



Two vertical lines used as low beam lateral inspection limits.

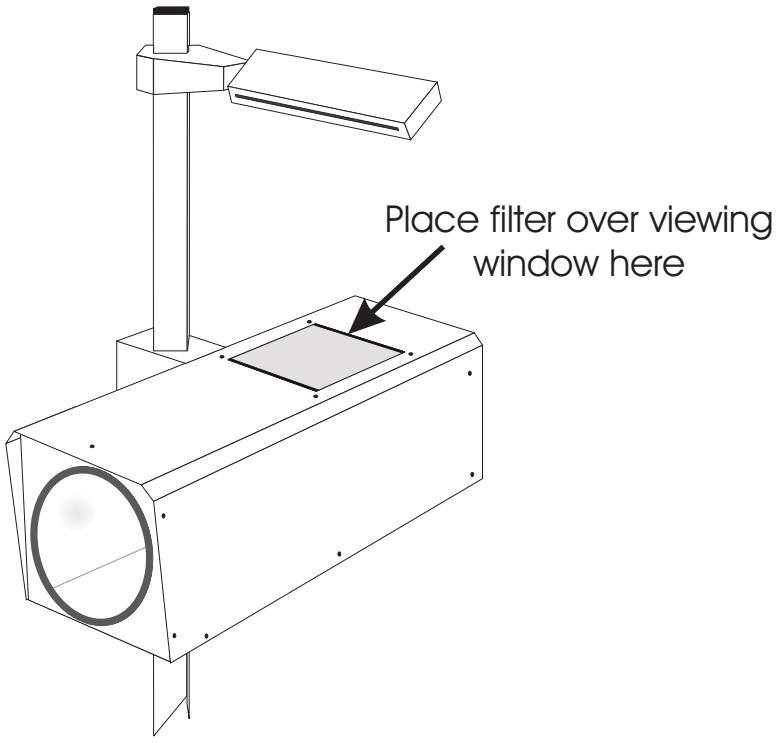
Illustrations on the following pages show more detail for specific types of lamps.

BEAM ELUCIDATION FILTERS

Due to the widely varying light intensity and color of automotive headlights, and different operators sensitivity to light, it is difficult to locate the light beam pattern when adjusting headlights on some vehicles. Canbuilt has developed a beam elucidation filter to make it easier to view these beam patterns. The filters are designed to remove some of the extraneous light from the viewable pattern and enhance the high intensity zone, providing an image that is clearer and easier to see.

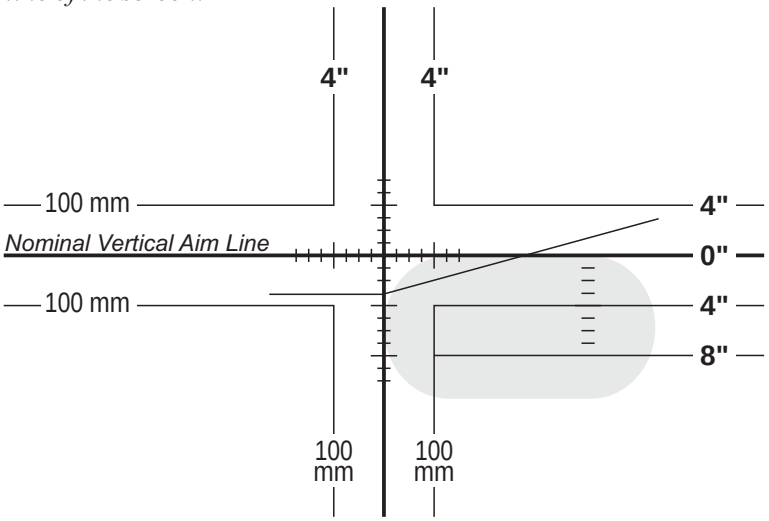
To use the filter, simply set it on top of the aimer body above the viewing window. The magnetic strips will hold it in place. For best operation, the magnetic strips should be toward the front and rear of the aimer. Choose the filter (or filters) that works best for your vision.

The filters can be stored by using the magnetic strips to attach them any place on the metal aimer head.



AIMING LOW BEAM HEADLAMPS

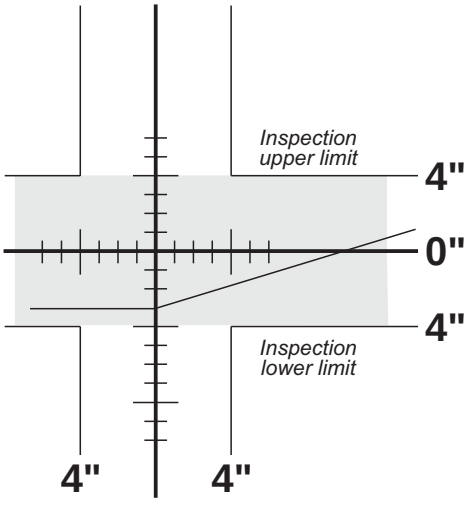
Low Beam Headlamps are aimed so that the top edge of the high-intensity zone is at the ***NOMINAL VERTICAL AIM*** *line, and the left edge of the high-intensity zone is at the vertical center line of the screen.*



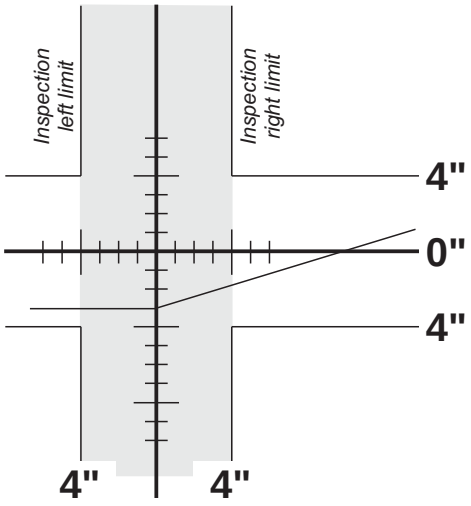
INSPECTION LIMITS FOR LOW BEAM HEADLIGHTS

The inspection limits are a range of 4" at 25'. The illustrations below show the range allowed for vertical and horizontal inspection.

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



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

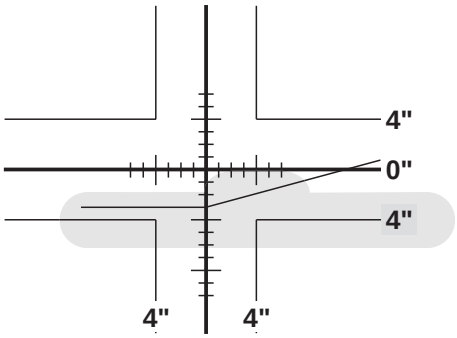


NOTE: Headlights centered more than 36" from the ground require beam slope compensation. *See page 18 for details.*

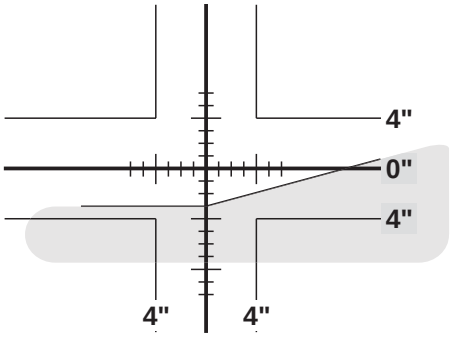
DIFFERENT LOW BEAM PATTERNS

There are many different beam patterns used in domestic vehicles. When checking headlights with complicated beam patterns, you must locate the part of the high intensity zone that shines farthest down the road (is highest on the screen) . 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.

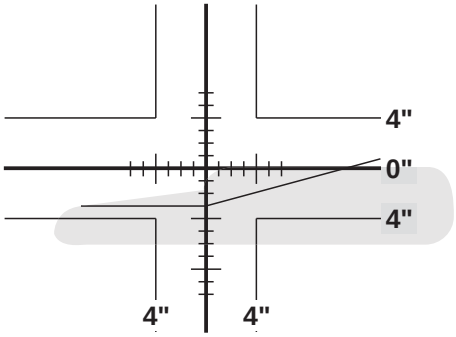
Sample patterns can be seen Beam Pattern Book



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".

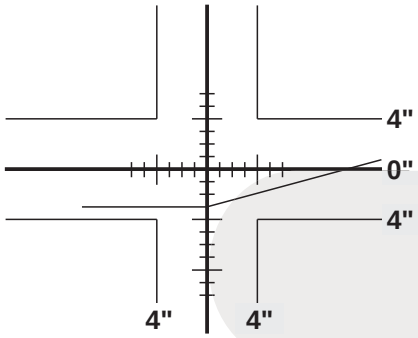


Many late model headlights have patterns similar to the European beam pattern. You should set these headlights using the biased line as shown.

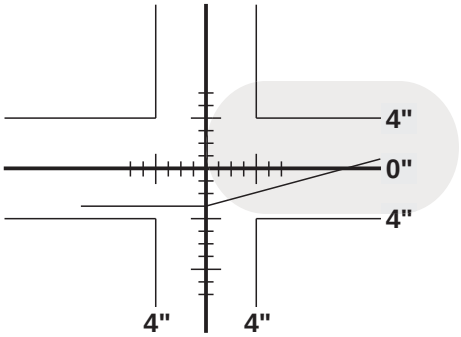


Some patterns do not have a distinct edge on the right side. When aiming this type of headlight, ignore the right side of the pattern. Simply locate the left edge of the high intensity area that shines farthest down the road. This should be adjusted to the centerline on the aiming screen. The top edge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

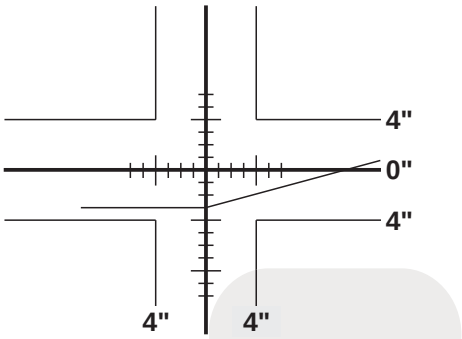
INSPECTION LIMITS FOR LOW BEAM HEADLIGHTS



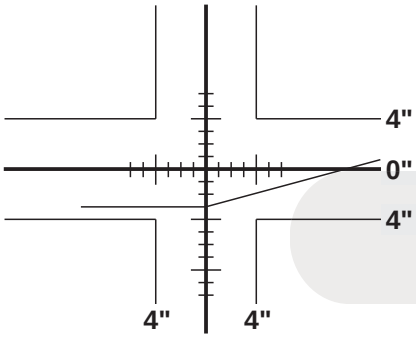
Perfect Adjustment



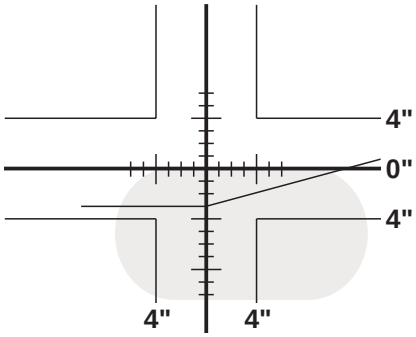
FAIL, too high



FAIL, too low



FAIL, too far right

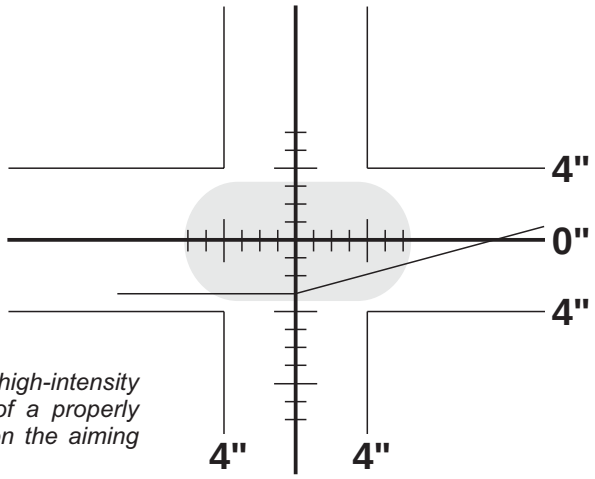


FAIL, too far left

Aiming Procedures

AIMING HIGH BEAM HEADLAMPS AND AUXILIARY DRIVING LIGHTS

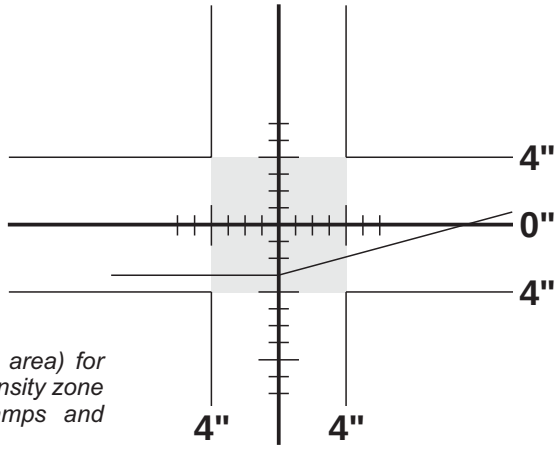
High beam headlamps and auxiliary driving lights are aimed so that the center of the high-intensity zone is located at the horizontal and vertical center of the screen.



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

INSPECTION LIMITS FOR HIGH BEAM HEADLAMPS AND AUXILIARY DRIVING LIGHTS

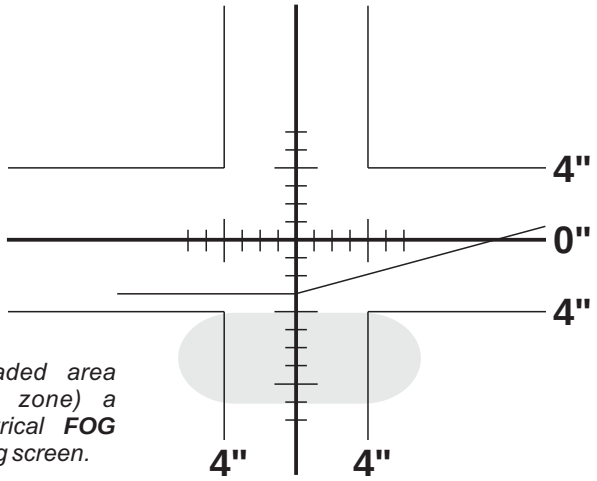
The inspection limits for high-beam headlamps shall be with the center of the high-intensity zone from 100mm (4") up, to 100mm (4") down; and, from 100mm (4") left to 100mm (4") right on a screen at 7.6m (25').



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

AIMING FOG LAMPS

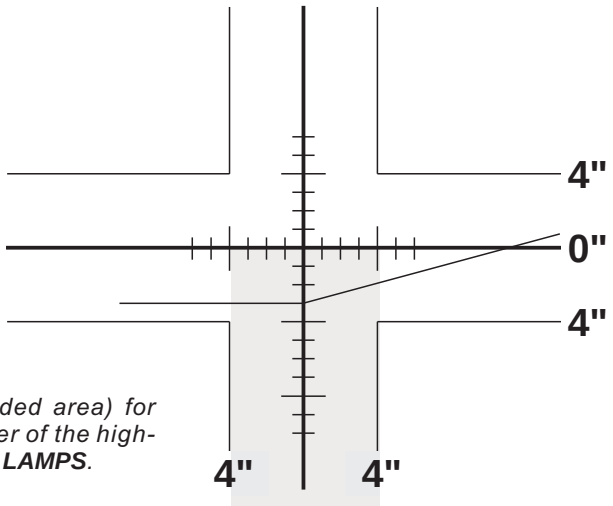
The correct aim for fog lamps with symmetrical beams (as described in SAE J583) is with the top edge of the high-intensity zone at or below the horizontal centerline and the center of the high-intensity zone centered on the screen.



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

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 100 mm (4") left to 100mm (4") right on a viewing screen located at 7.6m (25') from the vehicle.



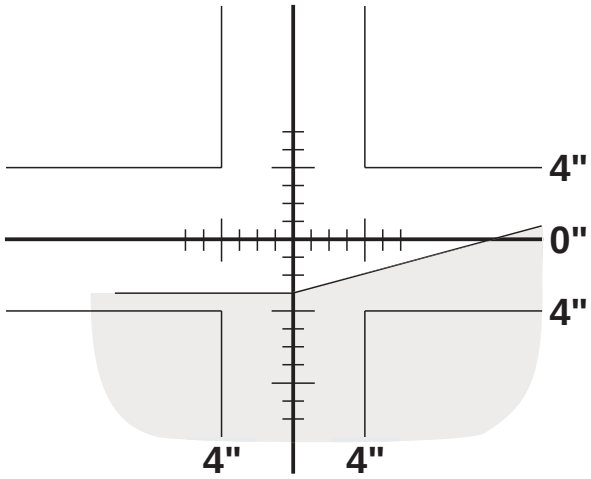
*Inspection limits (shaded area) for the top edge and center of the high-intensity zone of **FOG LAMPS**.*

Aiming Procedures

AIMING EUROPEAN LOW BEAM HEADLAMPS

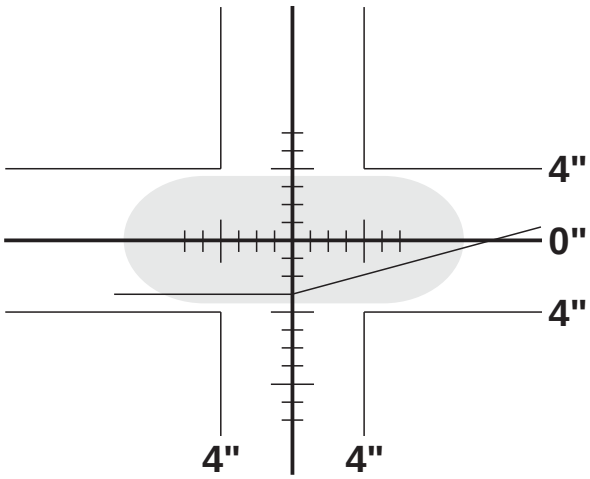
European low beams do not have a high-intensity zone, all the illuminated area has a similar intensity.

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



AIMING EUROPEAN HIGH BEAM HEADLAMPS

European high beams are aimed so that the high-intensity zone is centered on the horizontal and vertical center lines.



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Beam Slope Compensation

BEAM SLOPE COMPENSATION
NOMINAL VERTICAL AIM FOR LOW BEAMS

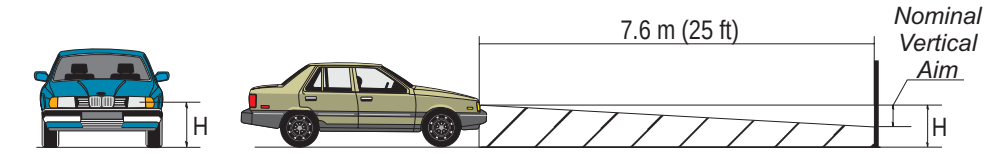
The revised SAE J599 standard (8/97) requires low beam headlight aim to be adjusted based on headlamp height from the ground. The NOMINAL VERTICAL AIM position on low beam headlamps, as introduced in the new revision of the Standard SAE J599, "shall be adjusted based on the headlamp mounting height, 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 states that headlights centered 36"- 48" from the ground must be aimed 2" below the 0 line and headlights mounted 48"- 54" must be aimed 4" below the 0 line. Inspection tolerance is plus or minus 4".

TABLE 1 - VERTICAL AIM GUIDELINES

Headlamp (centerline) mounting height	*Beam slope compensation (nominal vertical aim)*	Aim Inspection Limits for Vertical Aim
22 56 **to** **36** 90 **in** cm	**0**	**4 in** 100 mm **UP** **to** **4 in** 100mm **DOWN**
36 90 **to** **48** 120 **in** cm	**2 in** 50 mm **DOWN**	**2 in** 50 mm **UP** **to** **6 in** 150 mm **DOWN**
48 120 **to** **54** 140 **in** cm	**4 in** 100 mm **DOWN**	**0 in** 0 mm **UP** **to** **8 in** 200mm **DOWN**

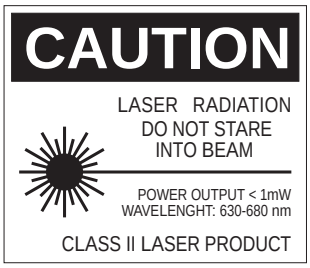


Headlamp centerline mounting height

Calibrating the Aimer

CHECKING CALIBRATION OF THE LASER

Use a ruler with increments of at least 1/16" (or 1 mm) to determine that the laser beam height from the bottom is the same at the laser pointer and at the front of the aimer head, see fig. 27 and fig. 28.



Turn the laser on and measure the height of the beam from the bottom of the optical aimer head, as shown.

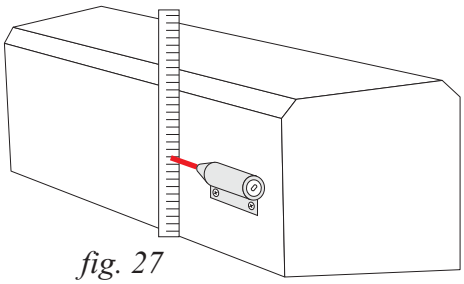


fig. 27

Move the ruler to the end of the optical aimer head to see if the height of the beam is the same.

If there is any deviation, loosen the mounting screws and adjust as needed.

Tighten mounting screws and repeat the measurement to ensure that the laser has not moved when tightening.

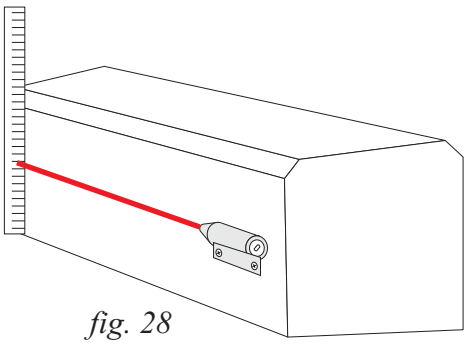
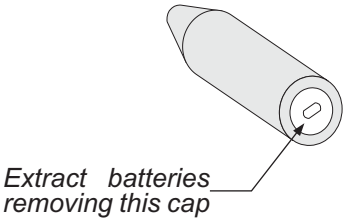


fig. 28



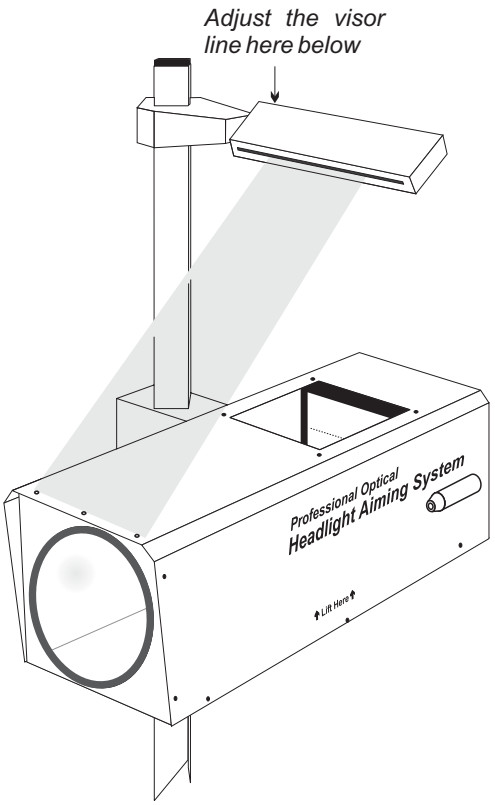
REPLACING BATTERY IN LASER

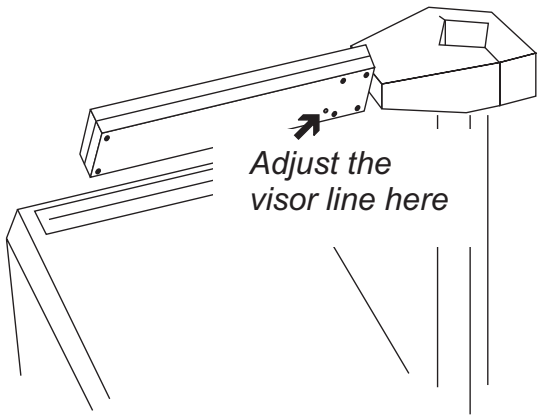
To change laser batteries, remove the cap of the laser pointer as shown in figure below. Use three standard batteries type LR44 1.5V.

Calibrating the Aimer

CHECKING THE LATERAL ALIGNMENT VISOR

Check calibration of the visor by looking through the visor at the lateral calibration points on the aimer head as shown in drawings below. The line in the visor must match the edge of the three aligned holes on the aimer head. If the visor is not perfectly aligned, turn the small allen (1.5 mm) screw at the bottom of the visor until the lines match.





Calibrating the Aimer

CALIBRATING THE SCREEN

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).

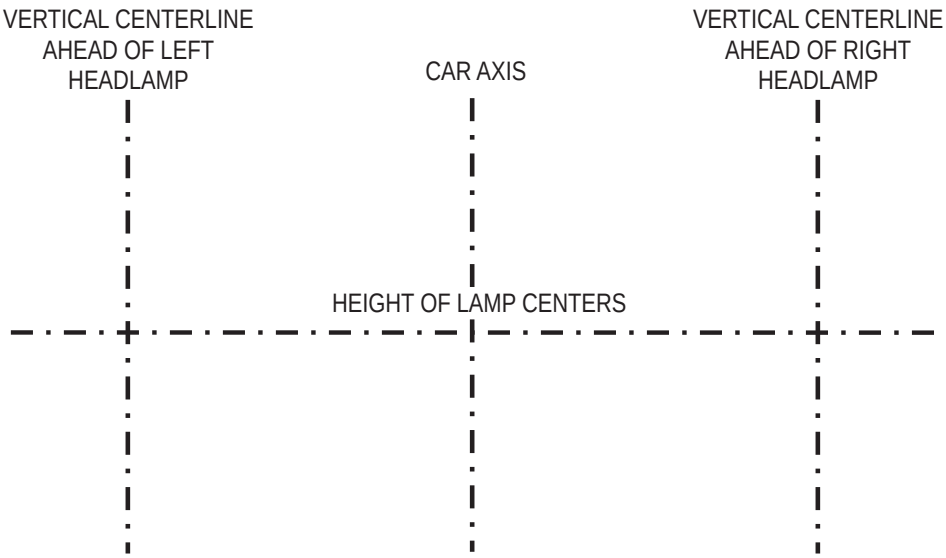
Trace or mark with tape the lines as shown in the figure below.

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.

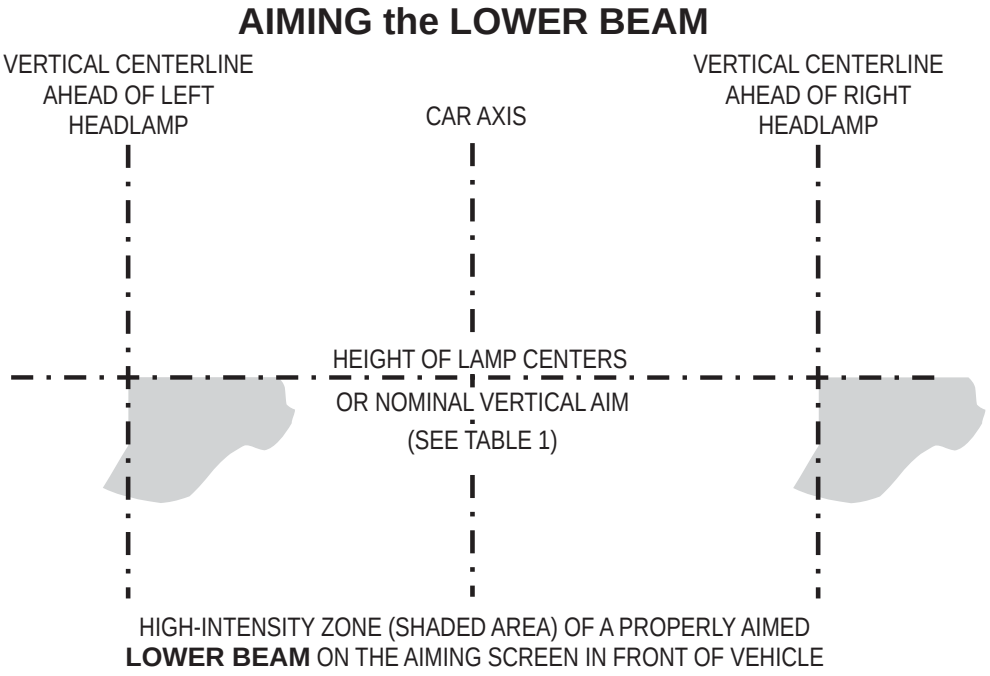
SCREEN MARKING



Calibrating the Aimer

AIMING LOW BEAM HEADLAMPS

Aim Low Beam Headlamps 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.

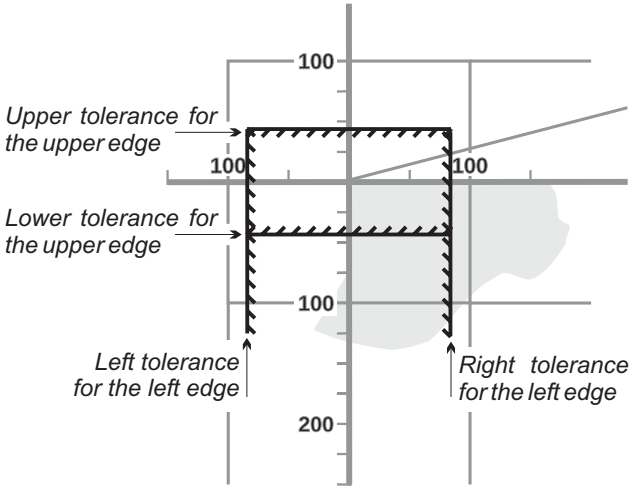


CHECKING THE AIMER

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 ±0.3° (±1.6 in, or ±40mm) for the vertical aim, and ±0.6° (±3.2 in, or ±80mm) for the horizontal.
The tolerance limits are shown in the figure below.



Calibrating the Aimer

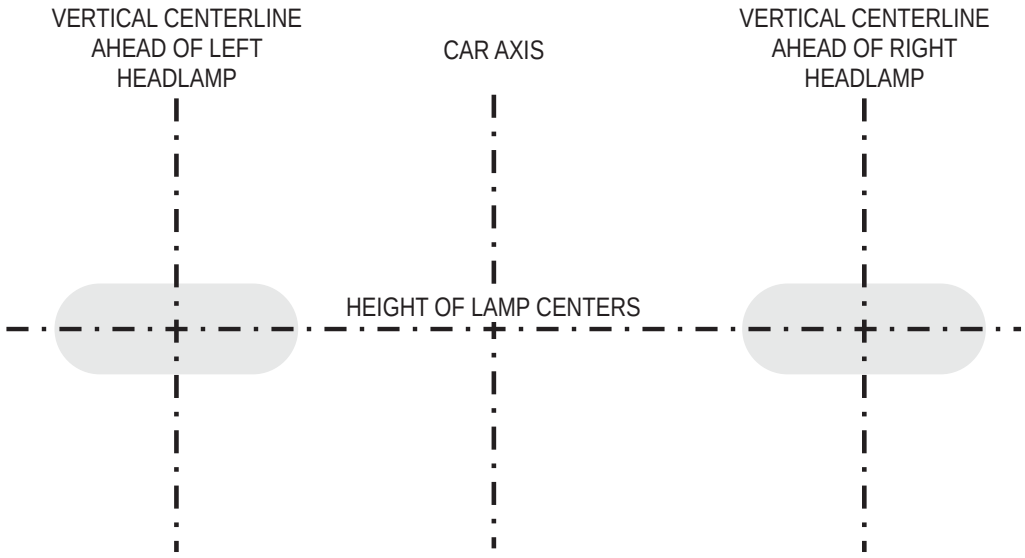
ALTERNATIVE PROCEDURE

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



HIGH-INTENSITY ZONE (SHADED AREA) OF A PROPERLY AIMED **UPPER BEAM** ON THE AIMING SCREEN IN FRONT OF VEHICLE

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 Canbuilt model OPT-5405 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 Canbuilt 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 Canbuilt within 30 days of original purchase.

3) This warranty applies to normal usage and operation, it does not apply to any product that Canbuilt 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 Canbuilt Mfg..

5) Defective parts must be returned to Canbuilt for quality control inspection.

6) Canbuilt will pay for freight charges one way, from Canbuilt to purchaser, purchaser must pay freight to Canbuilt.

7) Proof of purchase must be supplied for all warranty claims.

8) Canbuilt 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 Canbuilt. There are no warranties which extend beyond the description on the face hereof. Canbuilt'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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Thank you for purchasing the Panther model OPT-5405.
Contact your sales representative for information on other high quality automotive repair products from Canbuilt Mfg..

Please visit our web site at ***www.canbuilt.com****.*

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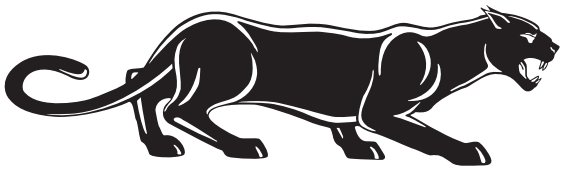
Professional Model
Optical Headlight Aimer



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