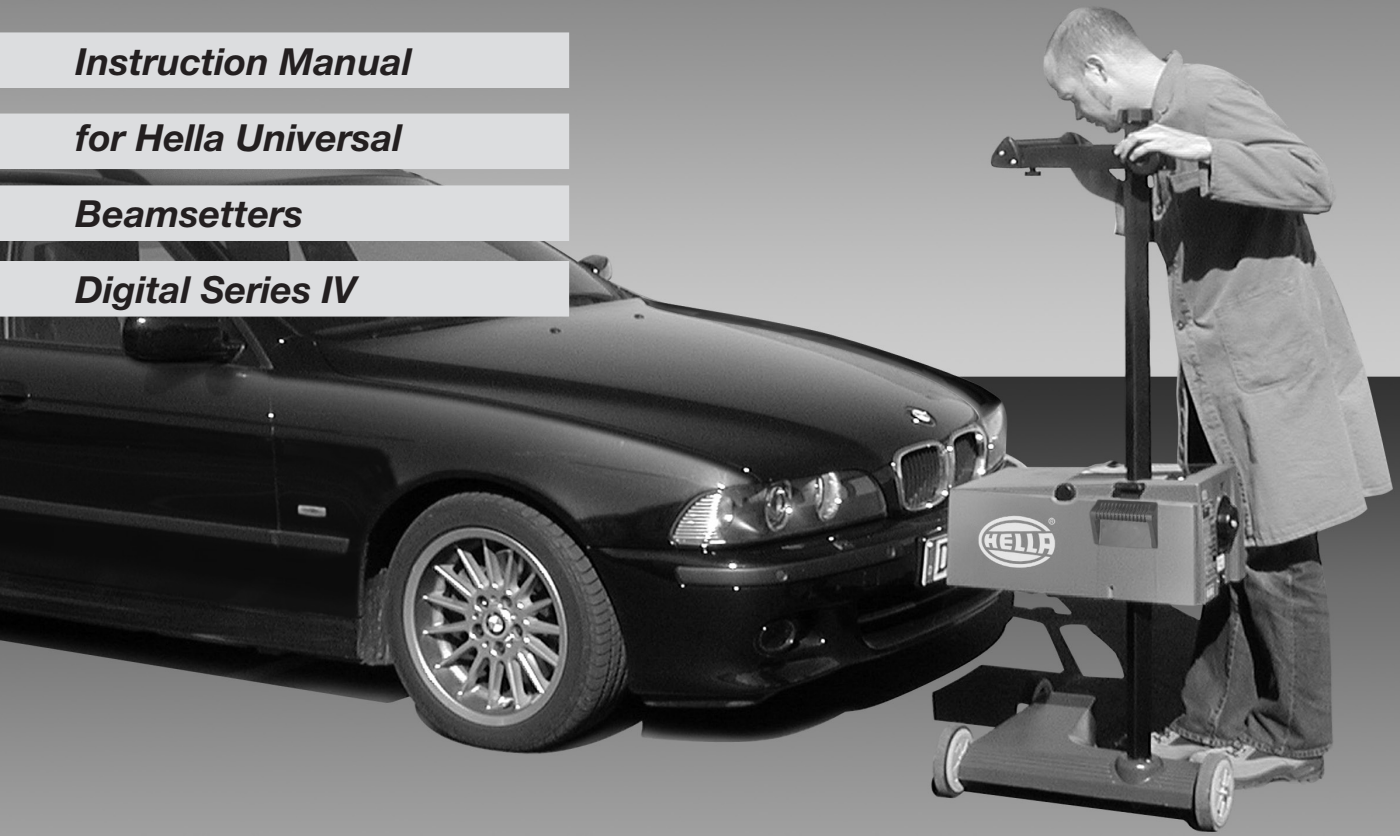
Instruction Manual

for Hella Universal

Beamsetters

Digital Series IV



HELLA®

Ideas today for the cars of tomorrow

Instruction Manual for 8PA 007 732-...
Hella Universal Beamsetters Series IV

Table of contents

1.0 Assembly

1. Insert the column ① with the pressure disc ② and the clamping piece ③ into the bush ④.

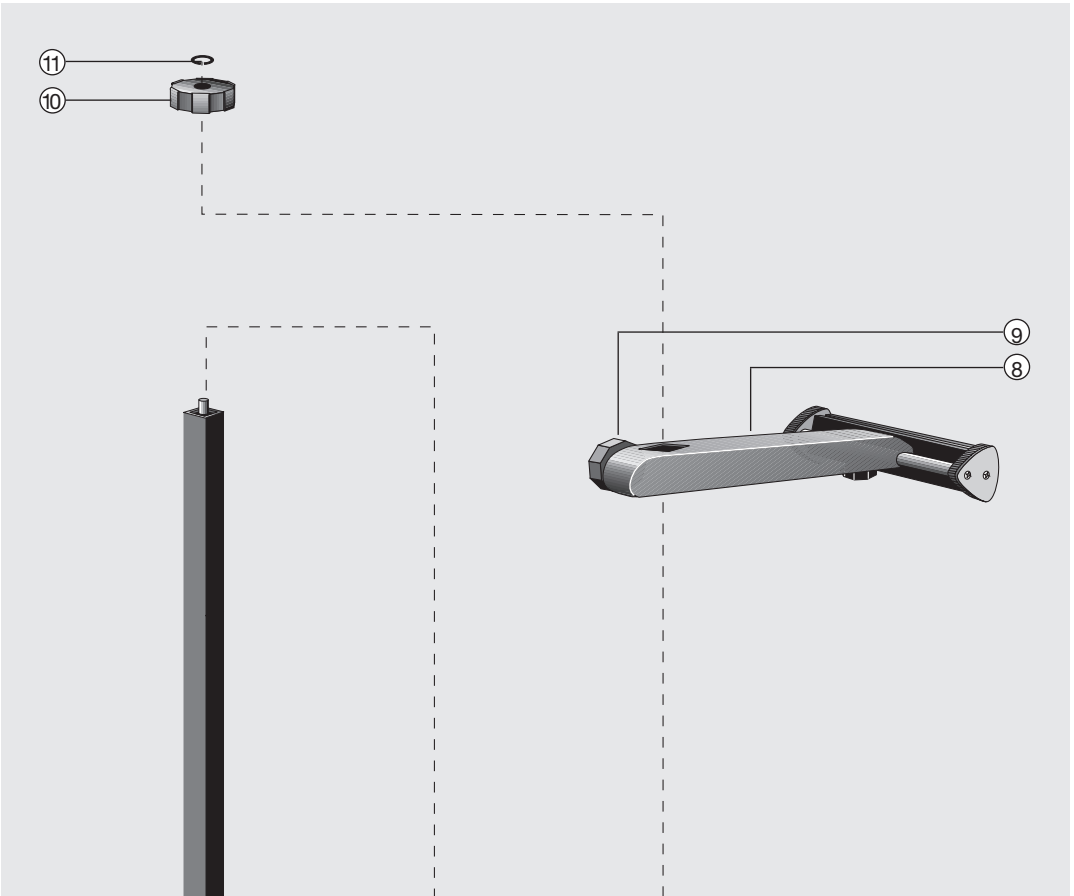
The coloured markings on the column and the base must be in line with one another.

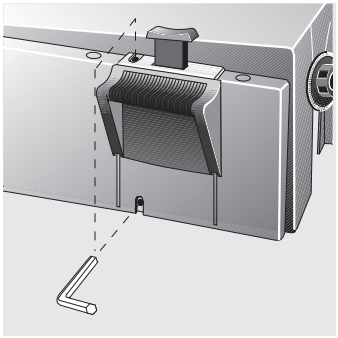
Tap the fixing pin ⑤ (fastened to the base of the unit with adhesive tape) into the drilled hole in the column until the two ends project the same distance at either side.

2. Place the beamsetter box ⑥ as shown in the illustration, with the operating lever ⑦ pressed down, and lower it to the normal working height.

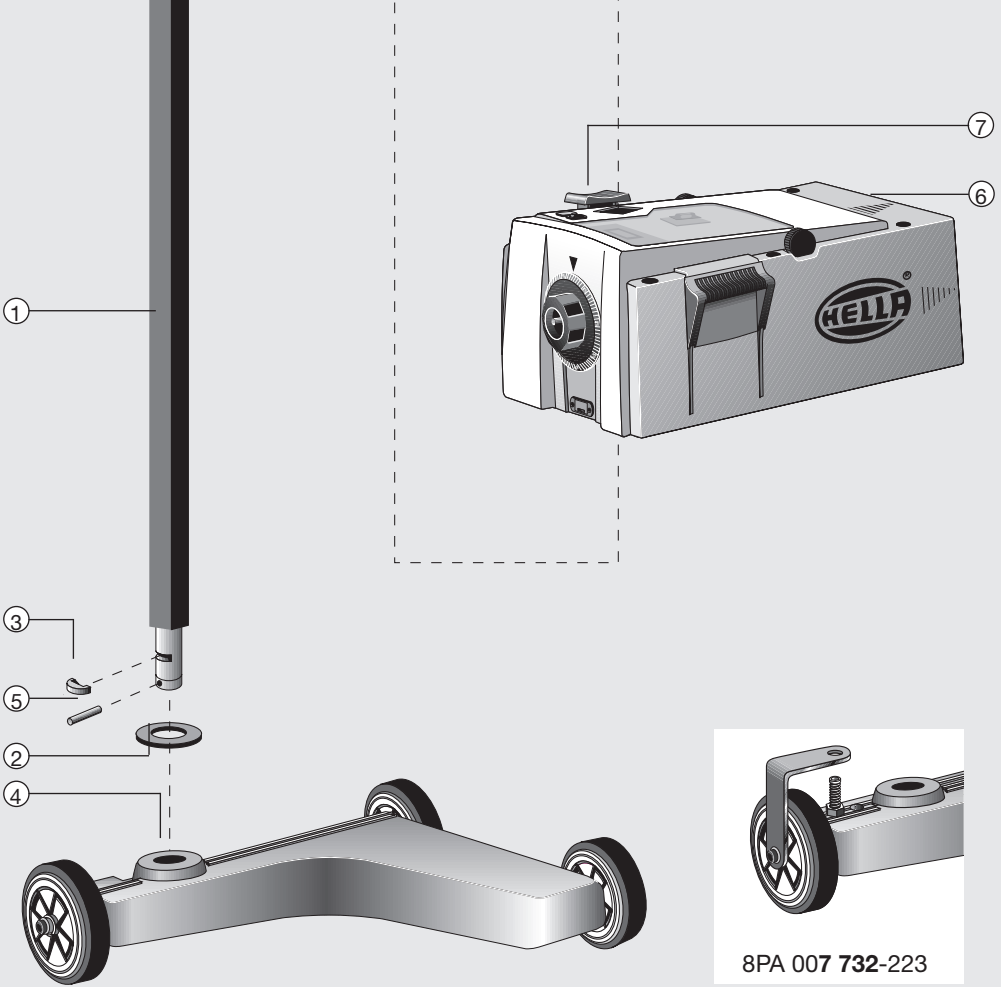
3. Set the sight holder ⑧ onto the column and fasten it using the locking wheel ⑨.

4. Press the hand-wheel ⑩ down firmly onto the hexagonal bar at the top end of the column and secure it with the knurled ring ⑪.





Opening for adjusting the column guide, with 6 mm internal socket spanner.



8PA 007 **732**-223

2.0 Description of parts

Type 8PA 007 732-223

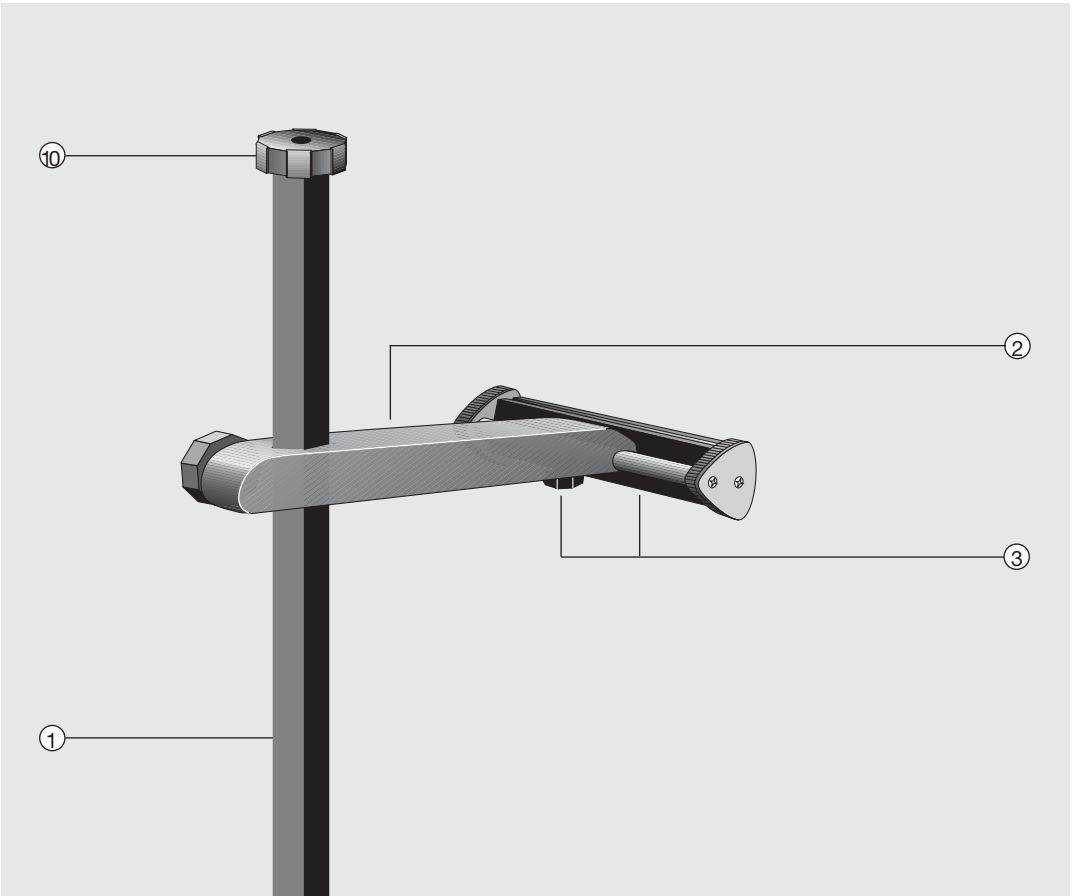
Beam setter with rubber-covered wheels, broad-band sight, digital Luxmeter, laser positioning aid and horizontal adjustment.

Type 8PA 007 732-213

Beam setter with rubber-covered wheels, broad-band sight, digital Luxmeter and laser positioning aid.

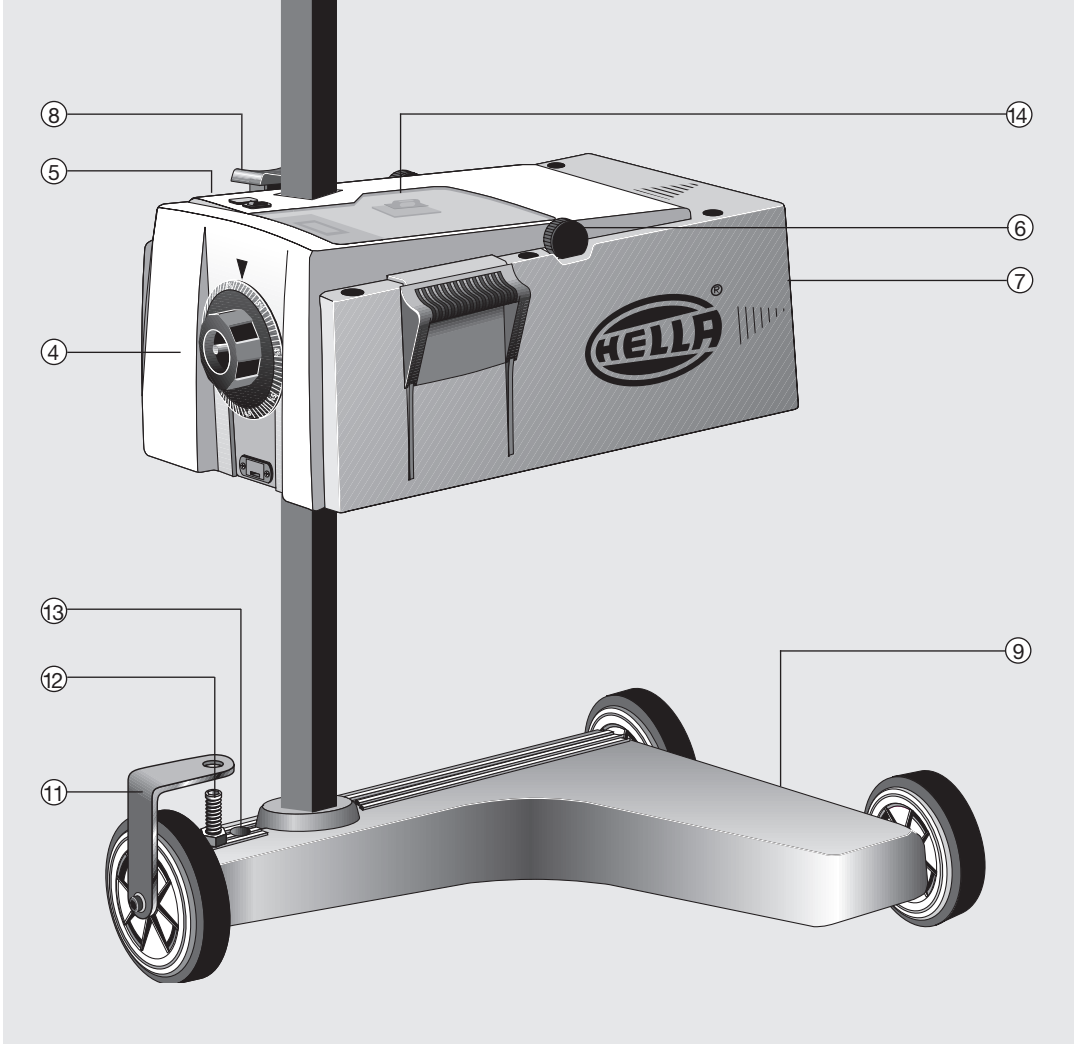
Type 8PA 007 732-203

Beam setter with rubber-covered wheels, broad-band sight and digital Luxmeter



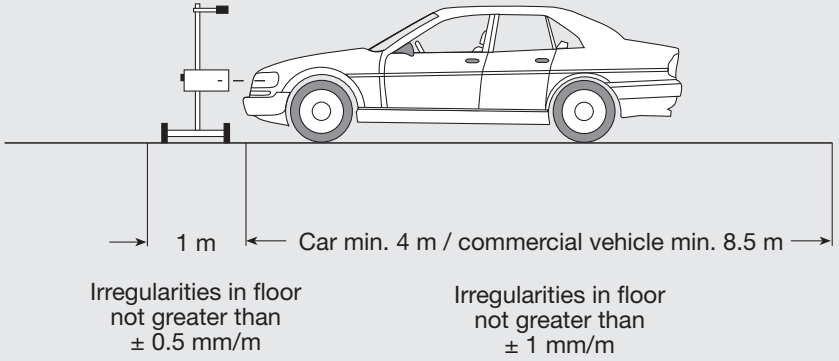
① Column
② Sight holder
③ Broad-band sight with clamping screw
④ Scaled wheel
⑤ Switch for photoelectric Luxmeter
⑥ Diagnosis mirror with setting wheel
⑦ Fresnel lens
⑧ Operating lever for raising and lowering the beamsetter box
⑨ Base with rubber-covered wheels for use on suitable floors
⑩ Hand-wheel for locking column in position
⑪ Adjustment lever for horizontal alignment (8PA 007 732-223 only)
⑫ Set screw with lock nut for the temporary fixing of the horizontal alignment (8PA 007 732-223 only)
⑬ Set screw for permanent fixing of the horizontal alignment (8PA 007 732-223 only)
⑭ Spirit level for horizontal alignment (8PA 007 732-223 only)

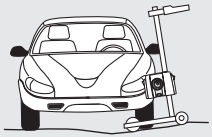
Caution!
If lenses become scratched they must be replaced (see Spare parts). The image projected onto the inspection screen could be distorted. Always clean the lens with a soft cloth and glass-cleaning liquid.



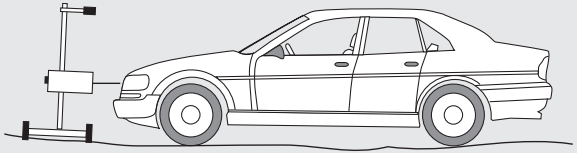
3.0 Floor area

3.1 Even floor surface (in compliance with ISO 10 604) for mobile beamsetters 8PA 007 732-203/-213/ -223 in zero position





Wrong



Wrong

Caution:

The construction and condition of the floor areas are of vital importance for correct headlamp setting.

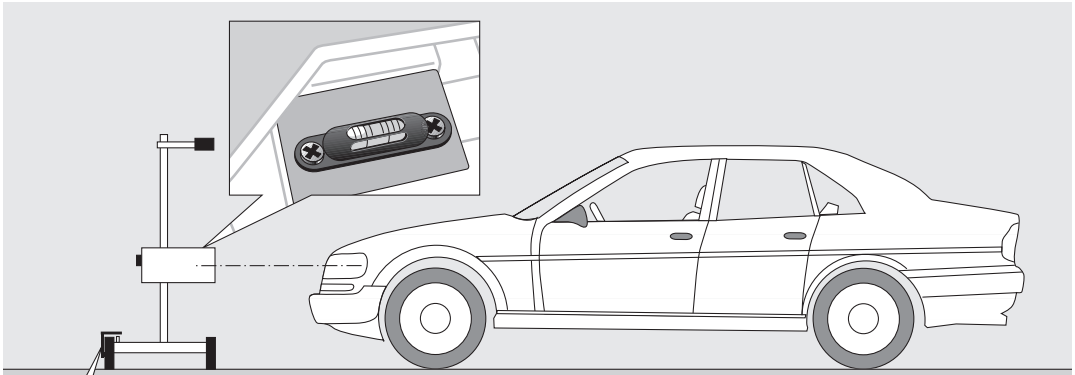
3.2 Level, horizontal floor space for SEG 4 DLX 8PA 007 732-223

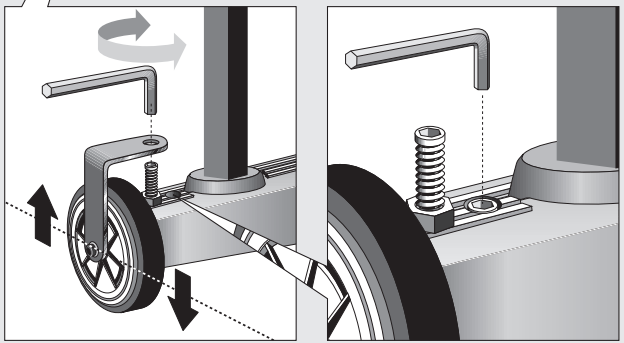
To achieve an exact headlamp adjustment with the **SEG 007 732-223**, the following requirements for the floor space apply:

The bubble level in the SEG optics box must be adjusted to a central position of the air bubble by means of the hand lever (for each headlamp side, if necessary). To this end, both axle fixing screws must be slackened. After the adjustment, the short fixing screw is fixed by means of a SW5 hexagon wrench.

For measurements on a level surface – according to DIN ISO 10604 – the hand lever must be checked to ensure that the zero-position has been set.

Zero-position:
Slacken axle fixing screws. Bring hand lever to the central position, so that the set screw for the axle fixing can be seen through the bore in the hand lever directly from above. Screw down the set screws using a SW5 hexagon socket screw key and counter the M10 nut.





Flatness of the floor
To ISO 10604
Inclination toward the horizontal line preferably ≤ 1mm/m

Caution!

The SEG floor area should meet the ISO 10604 standard.

3.3 Floor surface for permanently installed beamsetters

Hella beamsetters have also been designed for permanent installation.

The rails are mounted firmly on the floor.

If the Hella beamsetter is to be used together with its rails, one set of rails must be ordered for each beamsetter (Hella part no. 9XS 861 736-001). The rails themselves can be used as the stencil for marking out the drill holes.

The same instructions apply to the preparation of the floor area as described in Section 3.1.

In order to be able to check and align the beamsetter accurately, the following must be taken into account when laying the rails:

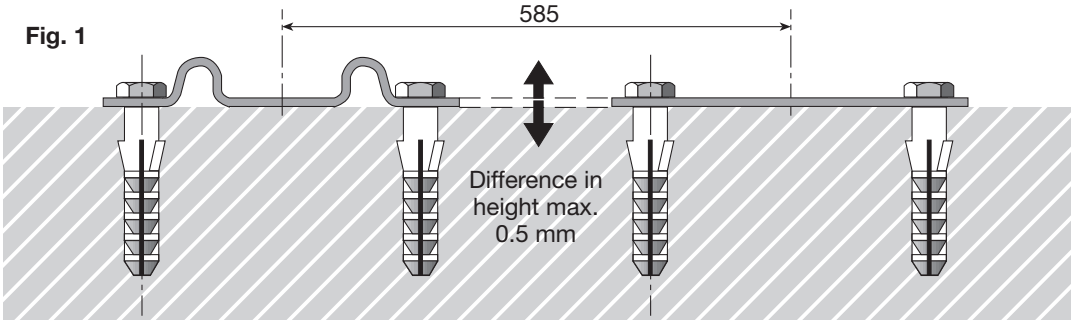
The floor area on which the vehicle is to stand and the beamsetter's rails must be parallel in both directions.

The difference in height between the part of the floor on which one rail is laid and the part on which the other is laid must not be greater than 0.5 mm (see Fig. 1).

The rails must lie in contact with the floor along their whole length so that they cannot bend.

The rails are laid in pairs and at 90° to the longitudinal axis of the vehicle.
There must be no offset sideways at the rail joints (see Fig. 2).

Fig. 1


585
Difference in
height max.
0.5 mm

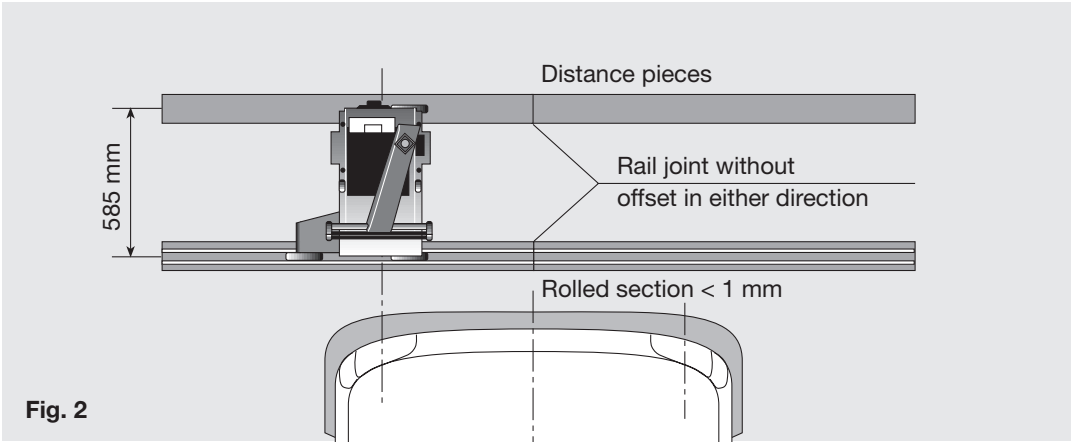

Distance pieces
585 mm
Rail joint without
offset in either direction
Rolled section < 1 mm

Fig. 2

4.0 Setting up the beamsetter and aligning it in front of the vehicle

4.1 Preparation of the vehicle

The vehicle tyres must have the prescribed pressure! The vehicle should be loaded as follows:

a) Cars with one person, or an object weighing 75 kg in the driver's seat with no other load.

b) Commercial vehicles and any vehicle with two or more axles should not be loaded.

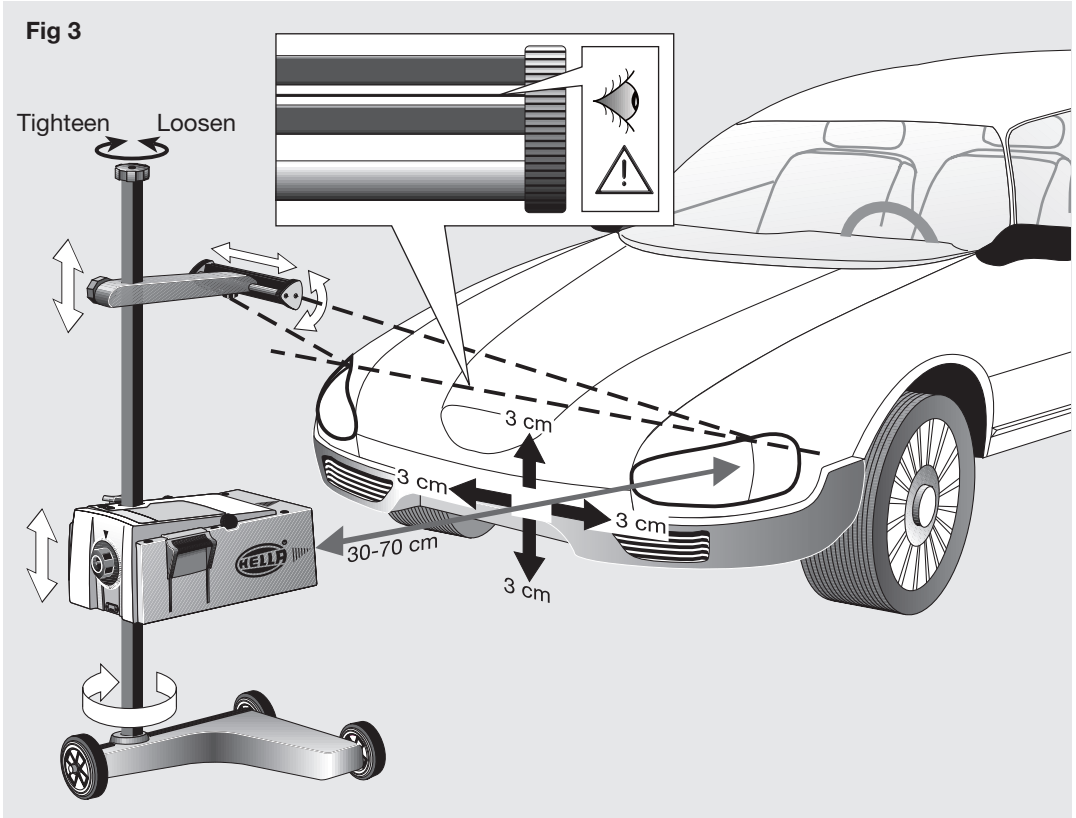
c) Single-track vehicles and single-axle towing or utility machines (with seat bogy or trailer) should have one person or an object weighting 75 kg in the driver's seat.

If the vehicle has hydraulic or air suspension the engine must be left running at medium speed until there is no further change in the vehicle's height off the ground.

If the vehicle is fitted with automatic headlamp adjustment or with an infinitely variable or 2-stage adjustment mechanism, the manufacturer's instructions should be followed.

National road traffic regulations must always be heeded.

Fig 3



4.2 Setting up

Move the beamsetter into position in front of the headlamp to be checked and align the beamsetter box with the middle of the headlamps. It must not be more than 3 cm out of line horizontally or vertically. If the beamsetter has a positioning aid, please turn to Section 6.3. The distance between the front edge of the beamsetter box and the headlamp should be between 30 and 70 cm (Fig. 3).

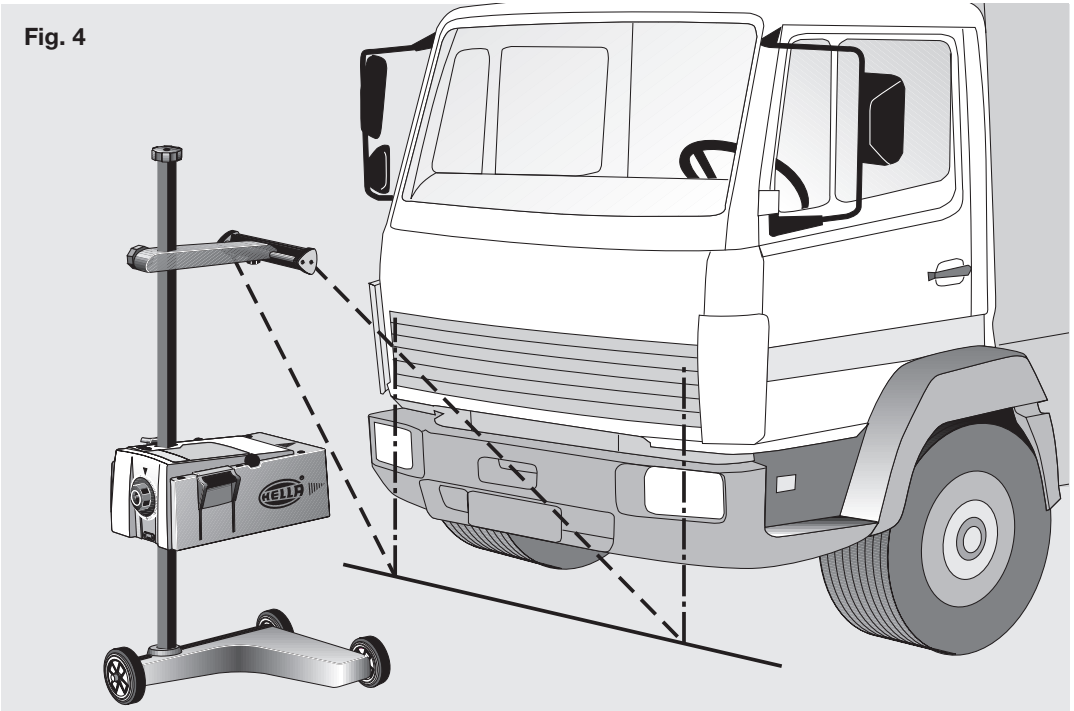
Aligning the housing of the beamsetter box to the vehicle
(using the broad-band sight)

Beamsetters with a wheeled base must be aligned to each headlamp separately, but those on rails only need to be aligned once for each vehicle. Loosen the column clamp. Use the broad-band sight to align the beamsetter box in such a way that the sight line (slit) touches two points lying at the same height and symmetrically to the vehicle's longitudinal axis (Fig. 3). Tighten the column clamp without altering the alignment.
When the clamping screw has been loosened, the broad-band sight can be moved to the left or the right in order to make sighting easier.

Vertical adjustment of the broad-band sight.
The points aimed for on the vehicle must be clearly below the sighting height.

After loosening the hand-wheel (by turning it anti-clockwise) the sight holder on the column can be adjusted for height.
If alignment proves difficult, for instance with certain makes of trucks or buses with a deeply curved front end, the centre line of the headlamps can be extrapolated to the floor by means of a plumb-line or similar and then picked up from there with the sight (fig. 4).

Fig. 4



5.0 Checking and setting headlamps (National regulations must be observed)

If the vehicle is fitted with an automatic mechanism to compensate for movements in the bodywork or headlamps caused by changes in the load, the characteristics of this mechanism as described in the manufacturer's instructions must be taken into account.

To set the headlamps, if they can be adjusted by hand on this particular vehicle, the adjustment mechanism must be in the exact prescribed position for the basic setting.

If the adjustment mechanism only provides for two positions for the headlamps, and the exact position is not specially marked, the procedure is as follows:

If the light beam rises as the vehicle's load is increased, the setting must be carried out with the adjustment mechanism in its end position and the light beam in its highest position.

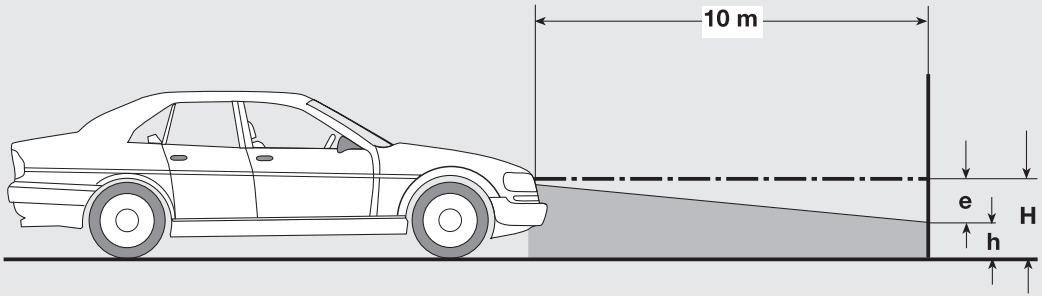
If the light beam falls as the vehicle's load is increased, the setting must be carried out with the adjustment mechanism in its end position and the light beam in its lowest position.

e = Distance in cm by which the cut-off line must be inclined at a distance of 10 metres

H = Height of the centre of the headlamp above the floor, in cm

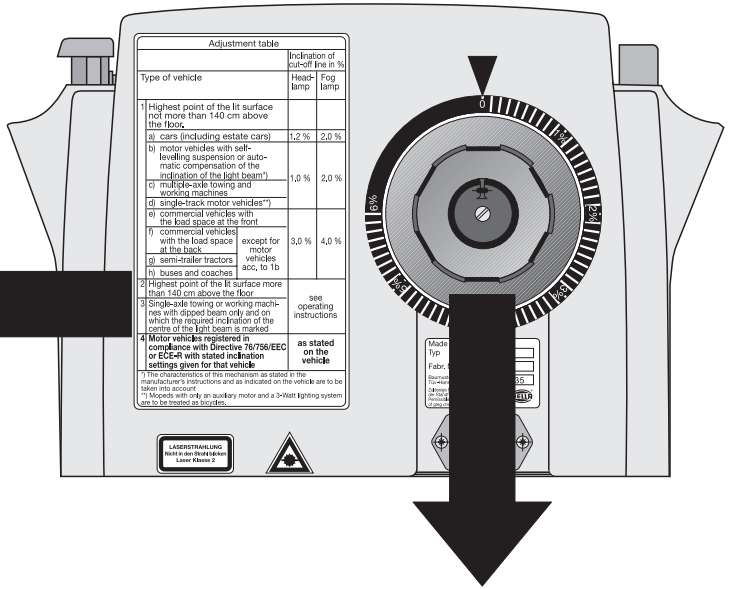
h = Height of the dividing line of the test area above the floor, in cm.

Fig. 5



Adjustment table				
			Inclination of cut-off line in %	
Type of vehicle			Head-lamp	Fog lamp
1	Highest point of the lit surface not more than 140 cm above the floor.			
	a) cars (including estate cars)		1.2 %	2.0 %
	b) motor vehicles with self-levelling suspension or automatic compensation of the inclination of the light beam*)		1.0 %	2.0 %
	c) multiple-axle towing and working machines			
	d) single-track motor vehicles**)			
	e) commercial vehicles with the load space at the front		3.0 %	4.0 %
	f) commercial vehicles with the load space at the back	except for motor vehicles acc. to 1b		
	g) semi-trailer tractors			
	h) buses and coaches			
2	Highest point of the lit surface more than 140 cm above the floor		see operating instructions	
3	Single-axle towing or working machines with dipped beam only and on which the required inclination of the centre of the light beam is marked			
4	**Motor vehicles registered in compliance with Directive 76/756/EEC or ECE-R with stated inclination settings given for that vehicle**		**as stated on the vehicle**	

*) The characteristics of this mechanism as stated in the manufacturer's instructions and as indicated on the vehicle are to be taken into account
**) Mopeds with only an auxiliary motor and a 3-Watt lighting system are to be treated as bicycles.



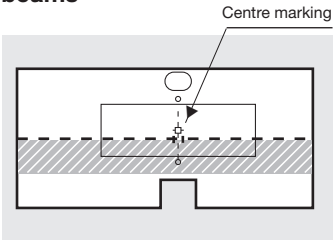
Another adjustment table on page 22 !

Scaled wheel

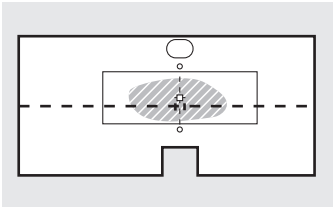
Various different angles of inclination of the cut-off line expressed in % are prescribed for the various types of vehicle (see adjustment table - cut-off line in % x10 corresponds to dimension „e").

Checking and setting headlamps (National regulations must be observed)

a) Headlamps with symmetrical dipped beams



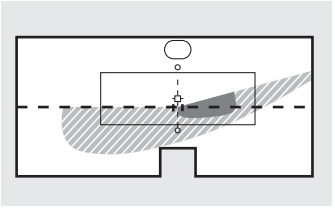
Dipped beam



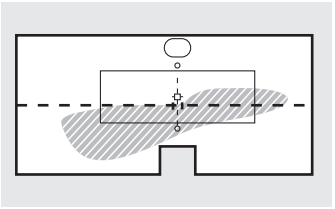
Main beam

Align the beamsetter as described in Section 4.0.
Set the scale wheel as shown on the adjustment table.

b) Headlamps with asymmetrical dipped beams



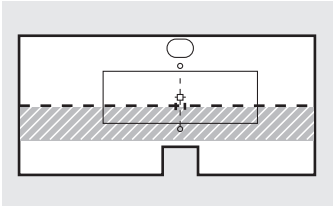
Dipped beam



Dipped beam bi-xenon

Align the beamsetter as described in Section 4.0.
Set the scale wheel as shown on the adjustment table (note point 4).

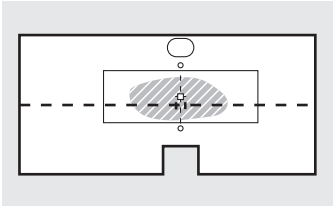
c) Fog lamps



Fog light

Align the beamsetter as described in Section 4.0.
Set the scale wheel as shown on the adjustment table (note point 4).

d) Special long-range headlamps (e.g. auxiliary driving lamps)



Main beam

Align the beamsetter as described in Section 4.0.
Set the scale wheel as shown on the adjustment table.

Switch on dipped beam:
The cut-off line must run as near as possible to the horizontal along the whole of the dividing line and the whole width of the screen. Correct the headlamp setting as necessary by means of the adjustment screws.

Turn on the main beam. The middle of the main beam must lie on the centre marking - correct if necessary with the adjustment screws.

If the same adjustment screws are used for both main and dipped beams, recheck the dipped beam.

Switch on dipped beam:
In the case of headlamps with asymmetrical dipped beams, the cut-off line must run along the dividing line on the test surface. The sharp angle dividing the left-hand and the right-hand sloping parts of the cut-off line must run vertically through the centre marking (upper cross). The bright centre of the light beam must lie closer to the near side than the vertical line running through the centre marking. In order to determine the position of the sharp angle more easily, cover and then uncover the offside half of the headlamp a few times. Then recheck the dipped beam.

Main beam:
Following the prescribed setting of the cut-off line of the dipped beam, the middle of the light beam must lie on the centre marking (upper cross).

Switch on the fog lamp:
The cut-off line must run as near as possible to the horizontal along the whole of the dividing line and the whole width of the screen. Correct the headlamp setting as necessary by means of the adjustment screws.

Switch on main beam:
The middle of the light beam must lie on the centre marking, correct if necessary using the adjustment screws.

In the case of separate main beam modules (e.g. in combination with bi-xenon headlamps), the main beam should be set according to the manufacturer's instructions, since different settings are possible in this case.

Note:
The Hella beamsetter can be used for setting all types of headlamp systems, including DE, FF, and XENON headlamps.

The rectangle drawn on the test screen corresponds to the size of the test surface which is mandatory under the Directive for the adjustment of vehicle headlamps.

After headlamps have been adjusted, they must be fastened on the vehicle in such a way that it is not possible for them to be accidentally moved out of alignment.

Headlamp settings should be checked whenever repairs have been carried out to a vehicle's suspension.
This is also recommended whenever a headlamp bulb has been replaced.

6.0 Using the Luxmeter and positioning aid

6.1 Photoelectric Luxmeter

Following adjustment of the lamp, the photoelectric Luxmeter can be used to check that the maximum permissible glare value on dipped beam is not exceeded and the main beam is within the minimum / maximum illuminance levels.

Set the scale wheel in accordance with the adjustment table.

Luxmeter:

a) Dipped beam:
Touch the button on the Luxmeter and read off the value.

Reference values:
Main headlamp < =1.2 Lux

b) Main beam:
Touch the button on the Luxmeter and read off the value.

Reference values:
48 – 240 Lux for halogen headlamps or main headlamps.
70 – 180 Lux for xenon main headlamps.

The light values for combined headlamps with several integrated light modules must be evaluated according to the vehicle manufacturer's specifications due to the different setting possibilities. Before the light values are checked, a visual inspection of the headlamps must be carried out.

If these values are not attained, consult the following table for possible causes:

6.2 Faults and causes

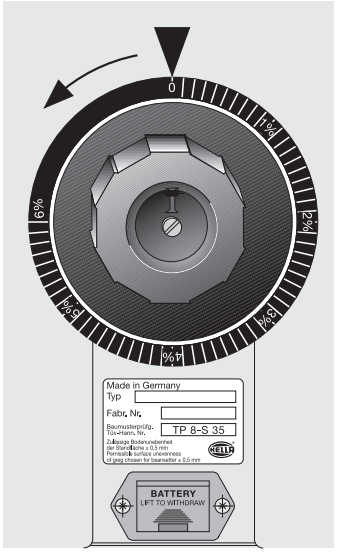
Fault	*Cause*
Battery voltage drops considerably	Battery is empty, alternator is not working
Substantial difference between battery voltage and voltage at the bulb	Defective leads and/or connections, leads too small in cross-section, poor ground connection, poor contact at switch, oxidised or rusty contacts in the fuse box
Reflectors are cloudy on the inside or corroded	Water has penetrated the headlamps through leak caused by tension in the cover lens, insufficient ventilation, mechanical damage and age
Cut-off line not definable	Bulb socket broken, bulb not firmly in the holder (fastener has become loose)
Headlamp cannot be set	Headlamp adjustment faulty, reflector has become loose from the adjustment screws (due to vibration)
Weak reddish-coloured light in xenon headlamps	Faulty ballast or gas discharge lamp
Brief flickering when switching on xenon headlamps	Power supply to the ballast is insufficient, e.g. cross-section of the supply lead is too small

Using the Luxmeter and positioning aid

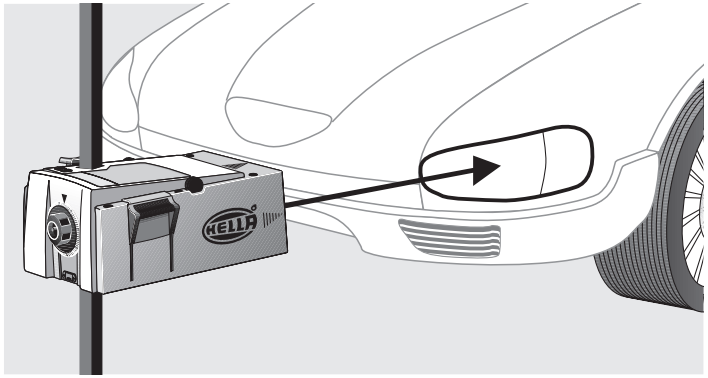
6.3 Positioning aid

Switching on the laser

Laser voltage supply:
Customary trade monoblock 9V battery (not supplied).



Turn the scaled wheel anti-clockwise as far as it will go and hold it there.
The laser will be switched on for approx. 15 seconds.



Align the beamsetter box in such a way that the red laser dot visible on the cover lens is projected onto the middle of the headlamp or in the case of transparent cover lenses directly onto the bulb.

The laser dot is not clearly visible on some cover lenses. In such cases, the laser dot can be made visible, e.g. by holding one hand in front of it.

The height of the laser dot can also be determined by rotating the beamsetter box next to the headlamp.

If the vehicle has multiple headlamp systems, direct the laser dot onto the system being checked.

7.0 Additional instructions

7.1 Vehicles on which the upper edge of the headlamps is more than 140 cm above the floor

The vehicle is placed on a level surface, which does not have to be horizontal, and at a distance of 10 metres from a vertical, light-coloured wall.

The following lines have to be drawn on the wall:

Line A:
Extrapolate the longitudinal axis of the vehicle to the test wall and mark it with a vertical line.

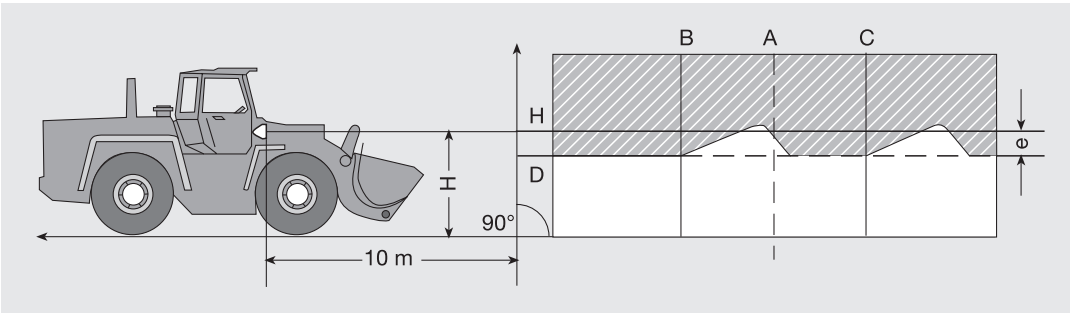
Lines B and C:
Measure the distance X (centre-to-centre distance between the vehicle headlamps) and mark it on the wall symmetrically to Line A.

Line D:
Draw this line at a distance 'e' below Line H.

For headlamps
„e" = $\frac{H}{3}$ cm,
For fog lamps
„e" = $\frac{H}{3}$ + 7 cm

Line H:
Measure height of centre of headlamps above the surface the vehicle is standing on - draw a line at this height on the test wall parallel to the ground.

Adjusting headlamps
Cover the nearside headlamp and adjust the offside one so that the horizontal part of the cut-off line touches Line D. Then adjust the headlamp left to right. The angle separating the horizontal from the sloping part of the cut-off line must lie on Line B.
Then adjust the nearside headlamp in the same way. The angle in the cut-off line must lie on Line C in this case. (The wall illustrated is correct for left-hand drive - mirror-image applies for right-hand drive.)



7.2 Checking the beamsetter

Hella beamsetters are fully adjusted and calibrated before they leave the factory. However, when they are in use in a garage, it can happen that they come out of calibration if not handled properly, e.g. by being knocked over). It is therefore advisable to have the beamsetter checked using the Hella adjusting machine 8 PD 860 757-001 at regular intervals, e.g. through wholesalers.

Notes for the user

7.2 Adjustment table for headlamps for motorcycles and for agricultural and forestry road tractors and tractors

Vehicle type		Adjustment values	
		Headlamp for dipped beam	Front fog lamp
2	Motorcycles and similar vehicles		
2.1	93/92/EWG as basis for testing		
a)	2-wheel small-capacity motorcycles	No requirements	
b)	3-wheel small-capacity motorcycles and 4-wheel small-capacity vehicles		
c)	Motorcycle without/ with sidecar	0.5 to 2.5%	2.0%
d)	3-wheel motor vehicles		
2.2	ECE-R 53 as basis for testing	Setting values marked on the vehicle	2.0%
2.3	StVZO (German Road Traffic Regulations) as basis for testing	1.0%	2.0%
3	Agricultural and forestry road tractors and tractors and similar motor vehicles		
3.1	EWG (EG)/ECE as basis for testing		
a)	Headlamp height: 500 mm < h ≤ 1200 mm	0.5 to 4.0%	2.0 %
b)	Headlamp height: 1200 mm < h ≤ 1500 mm	0.5 to 6.0%	2.0 %
c)	Additional headlamps for road tractors which are equipped for front mounting	H/3	
3.2	StVZO (German Road Traffic Regulations) as basis for testing		
a)	Single-axle road tractors and tractors with permanently dipped beams with marking of the required inclination of the light beam center	2 x N	2.0 %
b)	Multi-axle road tractors and tractors	1.0 %	2.0 %

7.3 Checking of the beamsetter

Hella beamsetters are delivered in an adjusted condition. During use in a workshop it may happen, that the beamsetter gets out of adjustment due to improper handling, e.g. when it is overturned. Therefore it is advisable to have the beamsetter checked for correct adjustment at regular intervals, depending on the frequency of use, e.g. through a wholesaler by means of the Hella chekking unit 8PD 860 755-001.

8.0 Spare parts

① Hand-wheel for sight holder 9SG 855 498-001

② Hand-wheel for locking column in position 9SG 855 454-011

③ Button
9ST 861 074-001

④ Sight
8PV 861 112-001

⑤ Sight with holder
8PV 861 078-021

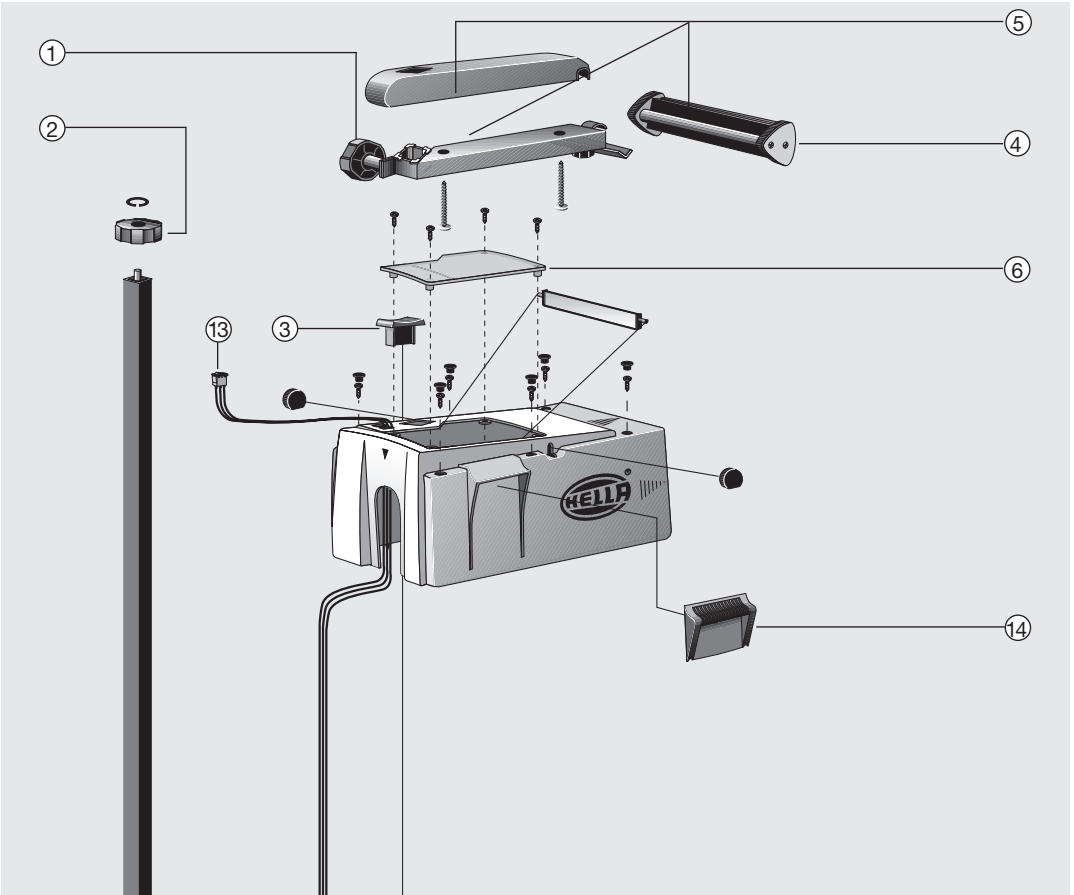
⑥ Window
9EV 861 038-001

⑦ Luxmeter
8PL 863 005-001

⑧ Fresnel lens
9EL 857 597-001

⑨ Protective glass panel
9EV 857 067-011

⑩ Set of three spare wheels
9XS 862 004-001



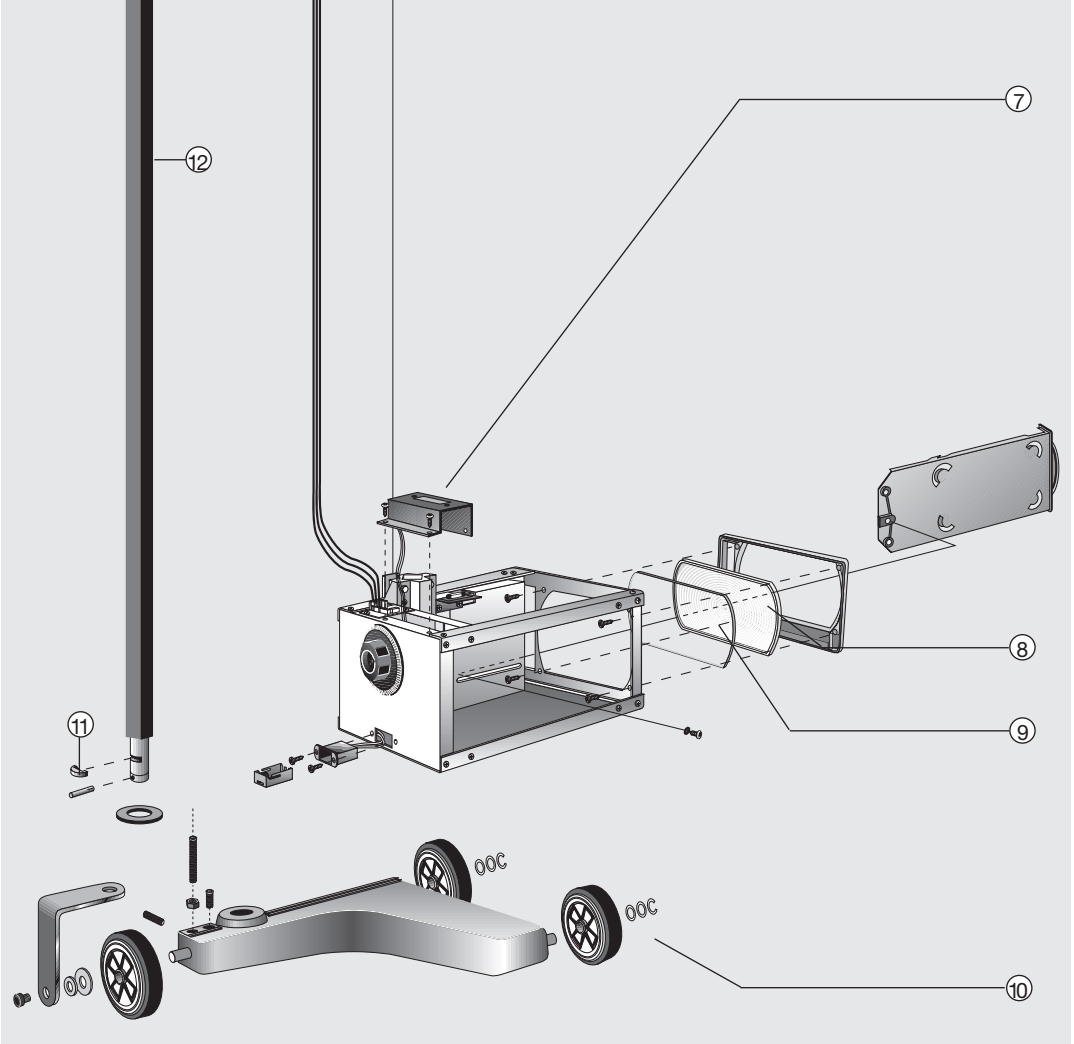
⑪ Clamping piece for column
9XD 857 744 -001

⑫ Column with arrest
8XT 861 234-021

⑬ Switch for Luxmeter
9ST 863 241-001

⑭ Rubber handle
9GH 181 713-801

Further spare parts on request



Notes

If you have any questions:

Phone the Hella Customer Service Department:

In Deutschland

01 80 / 5 25 00 02

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the cars of tomorrow