



**RDW**

Vehicle Technology Division

**THE NETHERLANDS  
(N E D E R L A N D)**



**COMMUNICATION**



Concerning:

- approval granted
- ~~approval extended~~
- ~~approval refused~~
- ~~approval withdrawn~~
- ~~production definitely discontinued~~

of a type of device pursuant to Regulation number 7.

**Approval number: E4-7R-02 18717**

**Extension number: 00**

1. Trade name or mark of the device : HL
2. Manufacturer's name for the type of device : 2960
3. Manufacturer's name and address : HANMA CO., LTD.  
No. 8 Jianye Middle Road, Taihe Town, Baiyun District, Guangzhou, Guang Dong, P.R.China
4. If applicable, name and address of the manufacturer's representative : --
5. Submitted for approval on : 10 July 2014
6. Technical service responsible for conducting approval tests : DEKRA Certification B.V.
7. Date of report issued by that service : 8 October 2014
8. Number of report issued by that service : 2172916-PHO 14-163-23
9. Concise description:
- 9.1. By category of lamp: A
- For mounting ~~either outside or inside~~ ~~or both~~ : Outside



Colour of light emitted : ~~red~~/white

Number, category and kind of light source(s) : 1x non replaceable LED module (48 x LEDs)

Voltage and wattage : 12/24V ; 3W

Light source module specific identification code : MD E4 18717-1

Only for installation on M1 and/or N1 category vehicles : ~~yes~~/no

Only for limited mounting height of equal to or less than 750 mm above the ground : ~~yes~~/no

Geometrical conditions of installation and relating variations, if any : --

Application of an electronic light source control gear/variable intensity control:

(a) Being part of the lamp : ~~yes~~/no

(b) Being not part of the lamp : ~~yes~~/no

Input voltage(s) supplied by an electronic light source control gear/variable intensity control : 6.5V

Electronic light source control gear/variable intensity control manufacturer and identification number (when the light source control gear is part of the lamp but is not included into the lamp body) : --

Variable luminous intensity : ~~yes~~/no

9.2. Function(s) produced by an interdependent lamp forming part of an interdependent lamp system:

Front position lamp : ~~yes~~/no

R1 Rear position lamp : ~~yes~~/no

R2 Rear position lamp : ~~yes~~/no

S1 Stop lamp : ~~yes~~/no

S2 Stop lamp : ~~yes~~/no

S3 Stop lamp : ~~yes~~/no

S4 Stop lamp : ~~yes~~/no

End-outline marker lamp : ~~yes~~/no

10. Position of the approval mark : See annexed drawing

11. Reason(s) for extension (if applicable) : --

12. Approval : granted/~~extended~~/~~refused~~/~~withdrawn~~



**Approval number: E4-7R-02 18717**

**Extension number: 00**

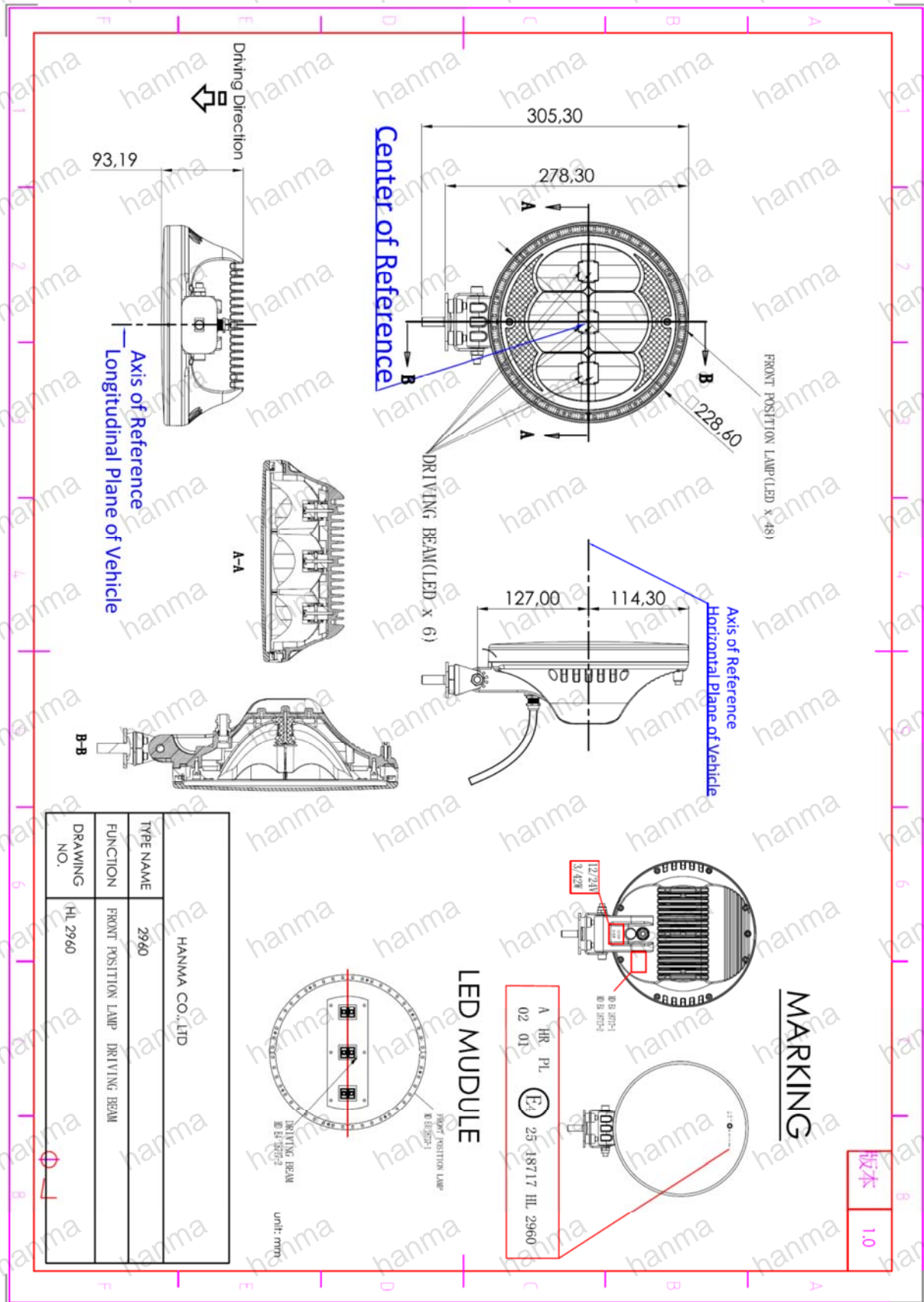
13. Place : Zoetermeer  
14. Date : 16-OCT-2014  
15. Signature :

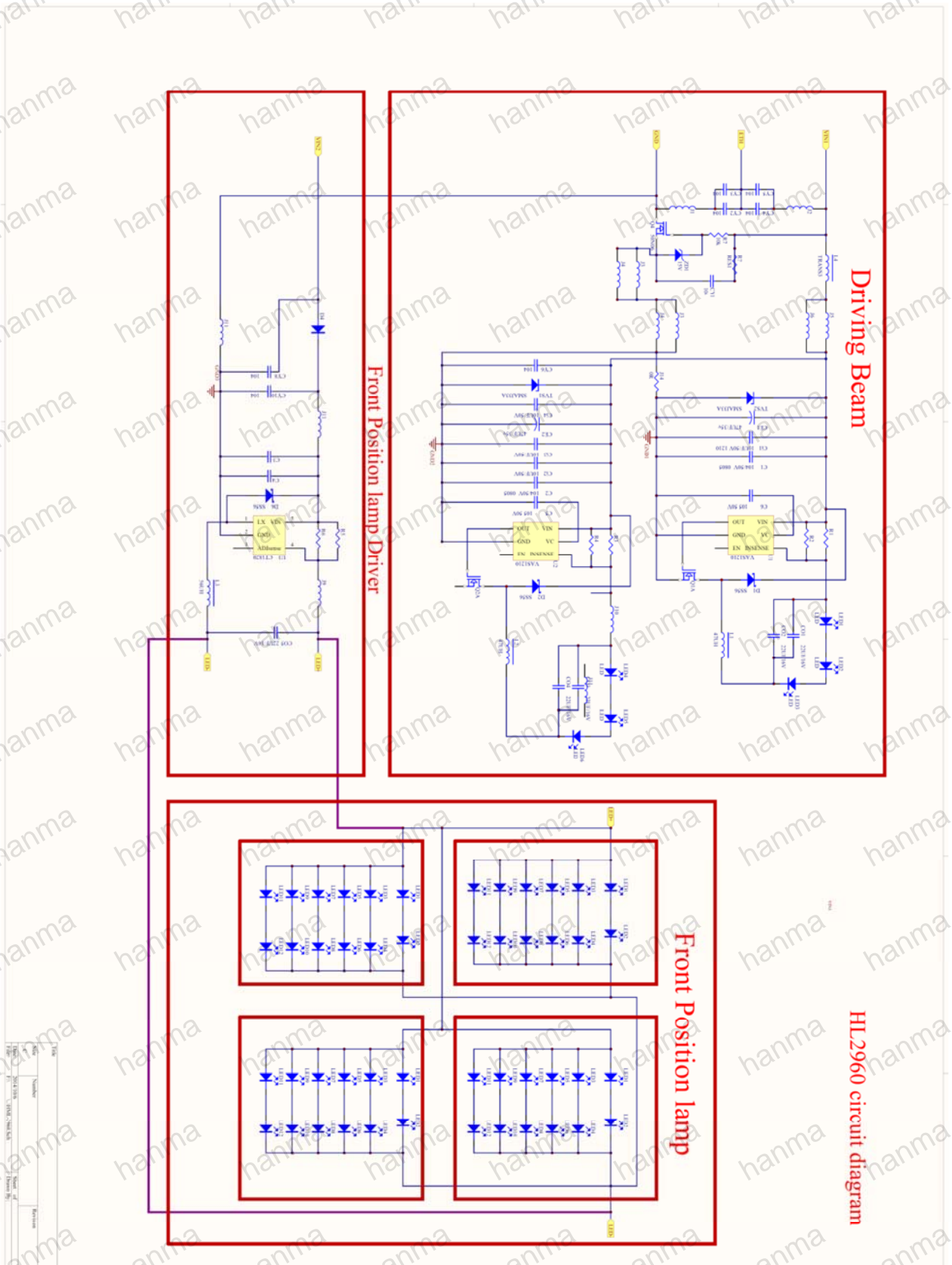
  
Uwe Löbig



16. The list of documents deposited with the Administrative Service which has granted approval, is annexed to this communication and may be obtained on request.

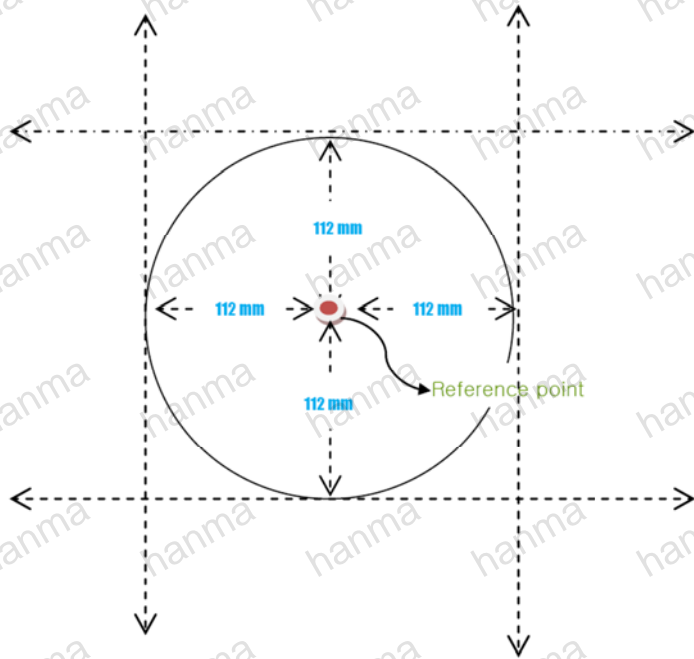
- 3 Drawing: Drawing No. HL2960, HL2960 circuit diagram and Determination of the apparent surface
- Test report as mentioned in item 8.





Determination of the apparent surface

2960 Front Position Lamp





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(N E D E R L A N D)**



**COMMUNICATION**



Concerning

- approval granted
- ~~approval extended~~
- ~~approval refused~~
- ~~approval withdrawn~~
- production definitely discontinued

of a type of headlamp pursuant to Regulation number 112.

**Approval number: E4-112R-01 18717**

**Extension number: 00**

1. Trade name or mark of the device : HL
2. Manufacturer's name for the type of device : 2960
3. Manufacturer's name and address : HANMA CO., LTD.  
No. 8 Jianye Middle Road, Taihe Town, Baiyun District, Guangzhou, Guang Dong, P.R.China
4. If applicable, name and address of manufacturer's representative : --
5. Submitted for approval on : 10 July 2014
6. Technical service responsible for conducting approval tests : DEKRA Certification B.V.
7. Date of report issued by that service : 8 October 2014
8. Number of report issued by that service : 2172916-PHO 14-163-23
9. Brief description:  
Category as described by the relevant marking : HR PL



P.O. Box 777  
2700 AT Zoetermeer  
The Netherlands

Tel. + 31 (0)79 345 81 43  
Fax + 31 (0)79 345 80 43  
www.rdw.nl

*Vehicle Approval and Information*

**Approval number: E4-112R-01 18717**

**Extension number: 00**

- Number and category(s) of filament lamp(s) : --
- Reference luminous flux used for the principal passing beam (lm) : --
- Principal passing beam operated at approximately (V) : --
- Measures according to paragraph 5.8 of this Regulation : --
- Number and specific identification code(s) of LED module(s) and for each LED module a statement whether it is replaceable or not : ~~yes/no~~  
1 x non replaceable LED module (6 x LEDs for driving beam)  
MD E4 18717-2
- Number and specific identification code(s) of electronic light source control gear(s) : One control gear, part of the LED Module and included into the lamp body
- Total objective luminous flux as described in paragraph 5.9. exceeds 2,000 lumens : ~~yes/no~~/does not apply
- The adjustment of the cut-off has been determined at : ~~10 m/25 m~~/does not apply
- The determination of the minimum sharpness of the 'cut-off' has been carried out at : ~~10 m/25 m~~/does not apply
10. Approval mark position : See annexed drawing
11. Reason(s) for extension of approval : --
12. Approval : granted/~~extended/refused/withdrawn~~





**Approval number: E4-112R-01 18717**

**Extension number: 00**

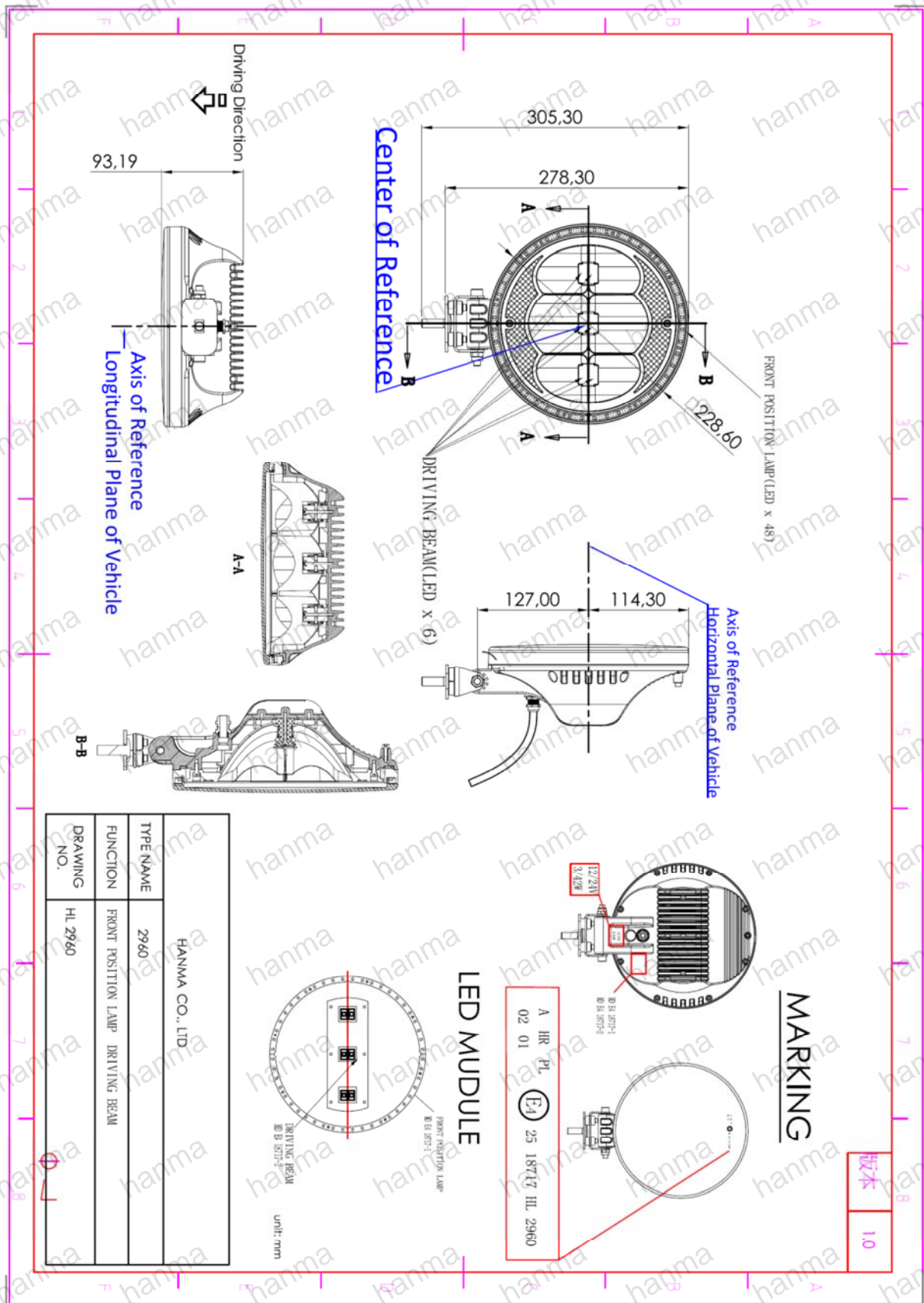
13. Place : Zoetermeer
14. Date : 16-OCT-2014
15. Signature :

  
Uwe Löbig



16. The list of documents deposited with the Administrative Service which has granted approval is annexed to this communication and may be obtained on request.

- 2 Drawing: Drawing No. HL2960 and HL2960 circuit diagram (annexed)
- Test report as mentioned in item 8







ISOQA Technical Service Co., Ltd.

Website: [www.isoqa.org](http://www.isoqa.org)

E-mail: [isoqa@isoqa.org](mailto:isoqa@isoqa.org)



2172916-PHO 14-163-23

**Approval testing of LED headlamps trade  
mark HL, type name 2960.**

Arnhem, 8 October 2014

Author H.M. van der Kolk

DEKRA Certification B.V.- Photometry

By order of Guangzhou HANMA CO., LTD., Baiyun District, Guangzhou, China

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author : H.M. van der Kolk 8-10-2014 reviewed : G.C. Muda 8-10-2014  
B 28 pages 4 annexes HVDK



ISOQA Technical Service Co., Ltd.

Website: [www.isoqa.org](http://www.isoqa.org)

E-mail: [isoqa@isoqa.org](mailto:isoqa@isoqa.org)



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ISOQA Technical Service Co., Ltd.  
Website: [www.isoqa.org](http://www.isoqa.org)  
E-mail: [isoqa@isoqa.org](mailto:isoqa@isoqa.org)



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Website: [www.isoqa.org](http://www.isoqa.org)

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-4-

2172916-PHO 14-163-23

## SUMMARY

The tested samples of the class B LED headlamps, marked HL type 2960 were found to comply with the requirements of ECE Regulations No. 07-02 and 112-01.

## 1 APPLICATION FOR APPROVAL TESTING

On 10 July 2014, HANMA CO., LTD., Baiyun District, Guangzhou, China submitted samples of a LED headlamps, trade name HL type 2960. All tests including UV and Red content measurement were performed in the laboratory of ISOQA in Taichung, Taiwan.

The Driving beam headlamp is equipped with 1 non replaceable LED module (6 x LEDs) emitting uncoloured light. The front position lamp is equipped with 1 non replaceable LED module (48 x LEDs) emitting uncoloured light.

According to the manufacturer's technical description, all light sources of front position lamp are connected in parallel, when one LED failed, at most 2 LEDs will fail. The compliance of the n-1 rule was checked by calculation.

The lenses are made of plastic material GE Lexan LS2-111 with UVHC3000 coating.

A brief technical description and a drawing which were sufficiently detailed to permit identification of the model can be found in Annex 1 and 2 respectively.

The applicant desired an examination to check whether the LED headlamps are in compliance with the requirements of the ECE Regulation No. 07-02 and 112-01.

## 2 EXAMINATION

The examination was carried out in accordance with the relevant clauses of the regulation concerned. The tests were performed taking into consideration the manufacturer's information concerning centre and axis of reference.

For the photometric tests of the LED driving beam a test voltage of 13.2V for 12V system or 28V for 24V system was applied. For the photometric tests of the LED front position lamp a test voltage of 13.5V or 28.0V was applied.

For the tests concerning the stability of photometric performance the test voltage of 13.2V and 28V were used.



The approval tests on lenses and/or samples of plastic material GE Lexan LS2-111 with UVHC3000 coating, in accordance with paragraphs 2.1 up to and including 2.5 of Annex 6 of Regulation No. 112-01 are described in LTIK report no. PMT 060 dated 06 September 1999. The results of the test 2.1.1. Resistance to temperature changes, are described in ISOQA report 04-0686 dated 28-12-2004.

The distance of measurement was 25m for driving beam, 3.2m for front position lamp.

### **3 RESULTS OF EXAMINATION**

The results of the tests are summarised in Annex 3. Detailed results of the tests of the lamps are presented in Annex 4, tables 1 up to 14.

### **4 SUPPLEMENTARY REMARKS**

The approval number 18717 was assigned. The approval marking is shown in the drawing of Annex 2. The reference number is 25

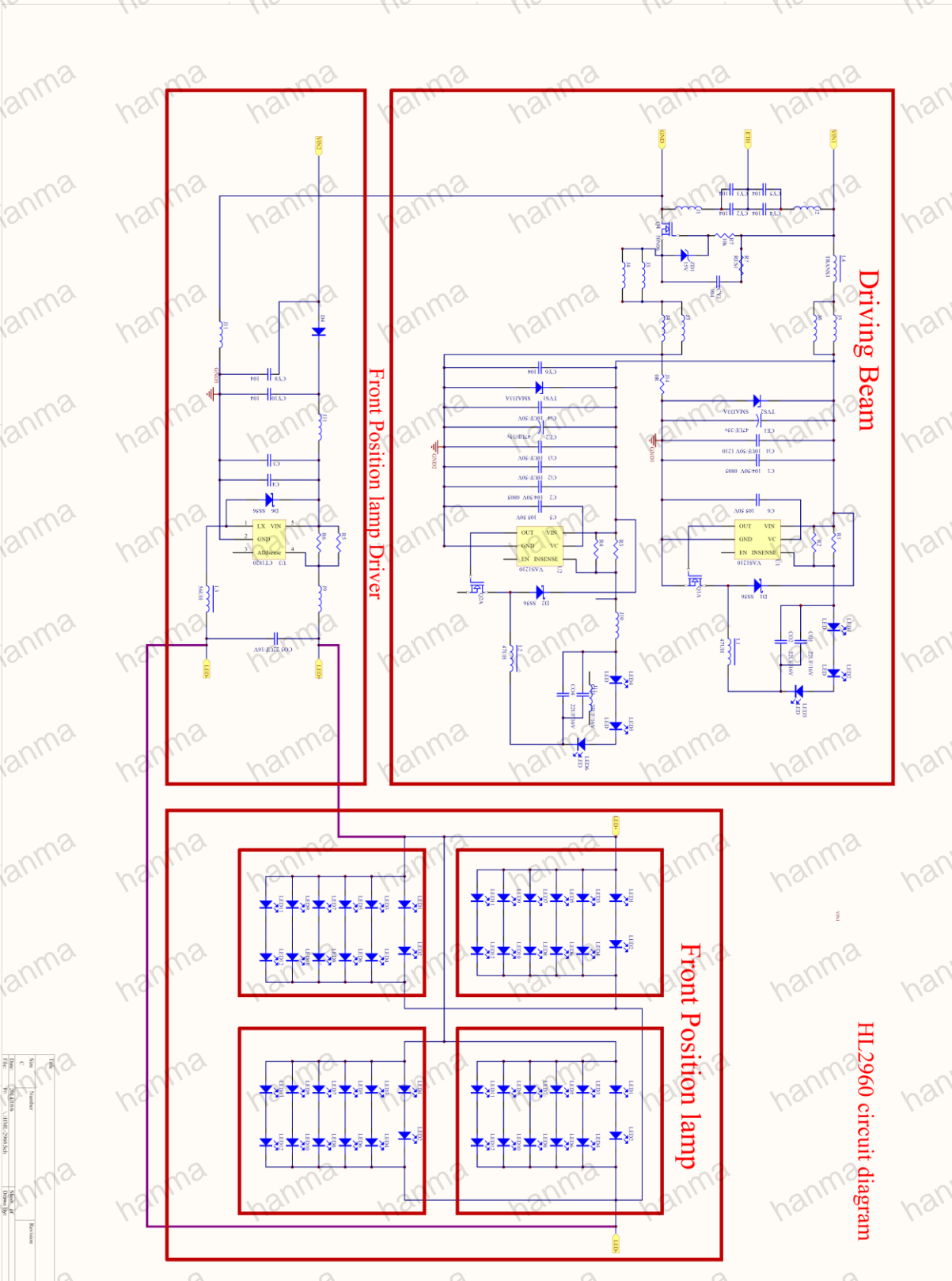
# Information Document

of Model Number - 2960

Approval Number: 18717

Manufacturer		
Name	HANMA CO., LTD.	
Address	No. 8 Jianye Middle Road, Taihe Town, Baiyun District, Guangzhou, Guang Dong, P.R.China	
Trade name or mark	HL	
Model Number	2960	
Material of lens	GE Lexan LS2-111 with UVHC3000 coating	
Front position lamp (Reg. 7)	Category	A
	Light Source	1 x LED module (48 x LEDs), 12/24V, 3W (if one LED fails at most 2 LEDs will fail)
	LED Module	HANMA CO., LTD. Identification code : MD E4 18717-1
	Electronic light source control gear	Output Voltage:6.2V (part of the LED Module and included into the lamp body)
	Color of light emit	White
	Color of lens	Clear
Driving Beam (Reg.112)	Class	B
	Category	HR
	Light Source	1 x LED module (6 x LEDs), 12/24V, 42W
	LED Module	HANMA CO., LTD. Identification code : MD E4 18717-2 Objective Luminous: 2432 lm
	Electronic light source control gear	Output Voltage:9.5V (part of the LED Module and included into the lamp body)
	Color of light	White
Color of lens	Clear	





Driving Beam

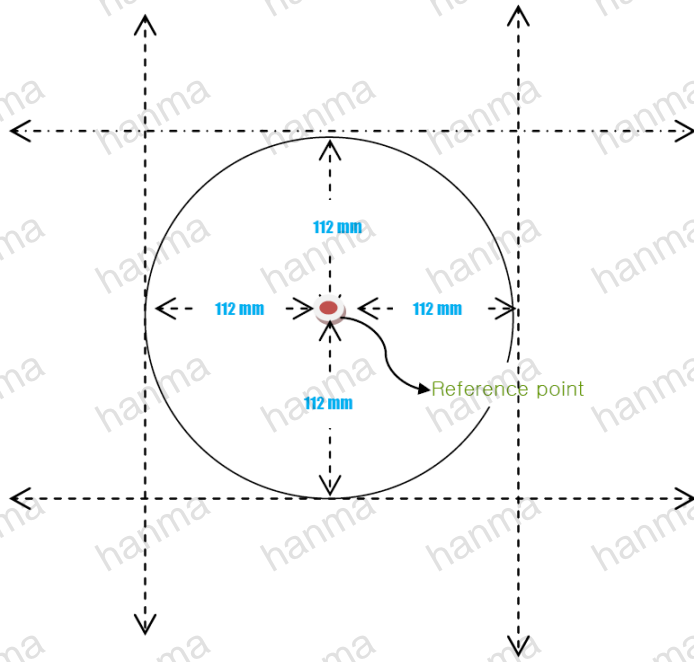
Front Position lamp Driver

Front Position lamp

HL2960 circuit diagram

## Determination of the apparent surface

- 2960 - Front Position Lamp



Examination of the class B LED headlamps 2960 carried out according to the relevant clauses of Regulation No. 112-01.

Clause No.	Subject of the relevant clause	Judgement of the headlamp	Remark
3	<p>Markings:</p> <p>a trade name or mark</p> <p>b space reserved for approval mark, including symbols and number</p> <p>c indication of setting positions</p> <p>d LED module</p> <p>e light source control gear</p>	<p>complies</p> <p>complies</p> <p>does not apply</p> <p>complies</p> <p>does not apply</p>	<p></p> <p></p> <p></p> <p>1</p> <p></p>
4	<p>Marking of the number 24 crossed out by an oblique cross</p>	<p>does not apply</p>	<p>applies for 12 and 24V</p>
5	<p>General specifications</p> <p>a illumination, dazzle, colour and discomfort of the beam(s)</p> <p>b maintenance of satisfactory operation and photometric characteristics</p> <p>c fixation and changing of the light sources</p> <p>d unambiguousness of settings and maintenance of them during use</p> <p>e stability of photometric performance and change of cut-off line</p> <p>f requirements on lenses of plastic material</p>	<p>see below</p> <p>complies</p> <p>complies</p> <p>does not apply</p> <p>complies</p> <p>complies</p>	<p></p> <p>by visual inspection only</p> <p></p> <p></p> <p>see annex 4</p> <p>see annex 4</p>

<sup>1</sup> LED Module identification code is MD E4 18717-1 for front position lamp, MD E4 18717-2 for driving beam.

Clause No.	Subject of the relevant clause	Judgement of the headlamp	Remark
g	Illumination configuration for different traffic conditions	does not apply	
6	Photometric test		
	a road illumination and dazzle produced by the passing beam	does not apply	
	b road illumination produced by the driving beam	complies	see annex 4
	c lateral variations in illumination in any of the zones	does not apply	
	d appearance of the cut-off line	does not apply	
	e adjustment of the headlamps during the test	does not apply	
	f illumination values in zones "A" and "B"	does not apply	

Clause No.	Subject of the relevant clause	Judgement of the headlamp	Remark
7	Colour of the light emitted	complies	
8	Discomfort caused by the passing Beam	does not apply	
A10.3.2	Operating conditions	complies	
A10.3.3	Ageing	complies	2
A10.4.1	Colour rendering	complies	3
A10.4.2	UV-radiation	complies	4
A10.4.3	Temperature stability		
	a Illuminance	complies	see annex 4 <sup>5</sup>
	b Colour	complies	6
A10.5	objective luminous flux of LED module	complies	7

<sup>2</sup> LED module shall be operated for 15 h and cooled down to ambient temperature before starting the tests

<sup>3</sup> Driving beam: K red = 0.076 (> 0.05)

<sup>4</sup> Driving beam: K uv =  $3.99 \times 10^{-10}$  (<  $10^{-5}$  W/lm)

<sup>5</sup> The illuminance values measured after one minute and until photometric stability has occurred, shall comply with the minimum and maximum requirements. In this case, the variation of the photometric value was less than 3 per cent within 30 minute.

<sup>6</sup> Driving beam emitted White Light:

12V	1 minute	S1	x = 0.3192,	y = 0.3444	S2	x = 0.3238,	y = 0.3444
	30 minutes	S1	x = 0.3187,	y = 0.3440	S2	x = 0.3153,	y = 0.3415
24V	1 minute	S1	x = 0.3186	y = 0.3439	S2	x = 0.3227,	y = 0.3434
	30 minutes	S1	x = 0.3185	y = 0.3439	S2	x = 0.3223,	y = 0.3432

<sup>7</sup> Driving beam (LED Module identification code MD E4 18717-2) : 2432 lm



Examination of the front position lamp as part of the headlamps type 2960 carried out in accordance with the relevant clauses of Regulations No. 7-02.

Clause No.	Subject of the relevant clause	Judgement of the device	Remark
3	Markings: a trade name or mark b indication of the recommended lamp type c space reserved for the approval mark, including number and symbol	complies complies complies	
5	General specifications: a intensity and colour of the light emitted b maintenance of satisfactory operation and of photometric characteristics	complies complies	see below 6 and 8 by visual inspection only
6	Intensity of the light emitted	complies	see annex 4 <sup>8</sup>
8	Colour of the light	complies	<sup>9</sup>

<sup>8</sup> All light sources of front position lamp, if one LED fails at most 2 LEDs will fail. The compliance of the n-1 rule was checked by calculation.

<sup>9</sup> Front Position lamp emitting white light :  
 12V : S1: x=0.3228, y=0.3332      S2: x=0.3266, y=0.3401  
 24V : S1: x=0.3223, y=0.3328      S2: x=0.3268, y=0.3407

Front Position Lamp - 12V- Sample 1(S141891)

ISOQA

**PHOTOMETRIC RESULTS**

<b>Program:</b>	02 (2005.01.12)	R 7.02 FrontPositionLamp LED	
Front Position Lamp & Incorporated in headlamp 2011 LED			
<b>Name:</b>	140507 L140628 HANMA HML-2960 S141891 R7 Front Position LHM 12V		
<b>Number:</b>			
<b>Test distance:</b>	3.182 m		
<b>X-offset:</b>	0.00°	<b>Y-offset:</b>	0.00°
<b>Lamp type:</b>	LED 13.5V		
<b>Number:</b>	LED		
<b>Flux:</b>	0.000 lm	<b>Operator:</b>	Jason
<b>Voltage:</b>	13.498 V	<b>Date:</b>	7/10/2014 4:15:18 PM
<b>Current:</b>	0.150 A	<b>Set value:</b>	Const. voltage
<b>Comment:</b>			

R 7.02\_FrontPositionLamp LED

Function	Min	Max	Value	H	V	Unit	N.O.K.
H - V (1min)	4	140	70.550	0.00°	0.00°	cd	
H - V (30min)	4	140	70.910	0.00°	0.00°	cd	
10U - 5L	0.8	140	77.490	-5.00°	10.00°	cd	
10U - 5R	0.8	140	72.100	5.00°	10.00°	cd	
5U - 20R	0.4	140	73.160	20.00°	5.00°	cd	
5U - 10R	0.8	140	70.340	10.00°	5.00°	cd	
5U - V	2.8	140	69.570	0.00°	5.00°	cd	
5U - 10L	0.8	140	78.140	-10.00°	5.00°	cd	
5U - 20L	0.4	140	57.960	20.00°	5.00°	cd	
H - 10L	1.4	140	79.590	-10.00°	0.00°	cd	
H - 5L	3.6	140	75.860	-5.00°	0.00°	cd	
H - 5R	3.6	140	68.950	5.00°	0.00°	cd	
H - 10R	1.4	140	70.090	10.00°	0.00°	cd	
5D - 20R	0.4	140	69.630	20.00°	-5.00°	cd	
5D - 10R	0.8	140	71.510	10.00°	-5.00°	cd	
5D - V	2.8	140	75.040	0.00°	-5.00°	cd	
5D - 10L	0.8	140	78.880	-10.00°	-5.00°	cd	
5D - 20L	0.4	140	53.760	20.00°	-5.00°	cd	
10D - 5L	0.8	140	79.540	-5.00°	10.00°	cd	
10D - 5R	0.8	140	73.620	5.00°	10.00°	cd	
Visibility	0.05	140	(1.645) 80.254	(-80.00°) 18.50°	(-15.00°) 5.00°	cd	

Front Position Lamp –12V-Sample 2 (S141892)

ISOQA

**PHOTOMETRIC RESULTS**

<b>Program:</b>	02 (2005.01.12)	<b>R 7.02</b>	FrontPositionLamp LED
Front Position Lamp & Incorporated in headlamp 2011 LED			
<b>Name:</b>	140507 L140628 HANMA HML-2960 S141892 R7 Front Position RHM 12V		
<b>Number:</b>			
<b>Test distance:</b>	3.182 m		
<b>X-offset:</b>	0.00°	<b>Y-offset:</b>	0.00°
<b>Lamp type:</b>	LED 13.5V		
<b>Number:</b>	LED		
<b>Flux:</b>	0.000 lm	<b>Operator:</b>	Jason
<b>Voltage:</b>	13.498 V	<b>Date:</b>	7/11/2014 10:45:34 AM
<b>Current:</b>	0.156 A	<b>Set value:</b>	Const. voltage
<b>Comment:</b>			

**R 7.02\_FrontPositionLamp LED**

Function	Min	Max	Value	H	V	Unit	N.O.K.
H - V (1min)	4	140	77.340	0.00°	0.00°	cd	
H - V (30min)	4	140	77.750	0.00°	0.00°	cd	
10U - 5L	0.8	140	82.300	-5.00°	10.00°	cd	
10U - 5R	0.8	140	87.100	5.00°	10.00°	cd	
5U - 20R	0.4	140	64.230	20.00°	5.00°	cd	
5U - 10R	0.8	140	83.100	10.00°	5.00°	cd	
5U - V	2.8	140	81.400	0.00°	5.00°	cd	
5U - 10L	0.8	140	85.400	-10.00°	5.00°	cd	
5U - 20L	0.4	140	73.850	-20.00°	5.00°	cd	
H - 10L	1.4	140	84.600	-10.00°	0.00°	cd	
H - 5L	3.6	140	79.100	-5.00°	0.00°	cd	
H - 5R	3.6	140	77.780	5.00°	0.00°	cd	
H - 10R	1.4	140	80.810	10.00°	0.00°	cd	
5D - 20R	0.4	140	69.200	20.00°	-5.00°	cd	
5D - 10R	0.8	140	79.240	10.00°	-5.00°	cd	
5D - V	2.8	140	76.880	0.00°	-5.00°	cd	
5D - 10L	0.8	140	85.000	-10.00°	-5.00°	cd	
5D - 20L	0.4	140	77.620	-20.00°	-5.00°	cd	
10D - 5L	0.8	140	81.660	-5.00°	10.00°	cd	
10D - 5R	0.8	140	80.050	5.00°	10.00°	cd	
Visibility	0.05	140	(3.854) 87.615	(80.00°) -13.50°	(-15.00°) 3.00°	cd	

Front Position Lamp –24V- Sample 1 (S141891)

ISOQA

**PHOTOMETRIC RESULTS**

<b>Program:</b>	02 (2005.01.12)	R 7.02 FrontPositionLamp LED	
Front Position Lamp & Incorporated in headlamp 2011 LED			
<b>Name:</b>	140507 L140628 HANMA HML-2960 S141891 R7 Front Position LHM 24V		
<b>Number:</b>			
<b>Test distance:</b>	3.182 m		
<b>X-offset:</b>	0.00°	<b>Y-offset:</b>	0.00°
<b>Lamp type:</b>	LED 28V		
<b>Number:</b>	Light Source 1		
<b>Flux:</b>	0.000 lm	<b>Operator:</b>	Jason
<b>Voltage:</b>	27.994 V	<b>Date:</b>	7/10/2014 5:01:13 PM
<b>Current:</b>	0.077 A	<b>Set value:</b>	Const. voltage
<b>Comment:</b>			

R 7.02\_FrontPositionLamp LED

Function	Min	Max	Value	H	V	Unit	N.O.K.
H - V (1min)	4	140	72.720	0.00°	0.00°	cd	
H - V (30min)	4	140	72.750	0.00°	0.00°	cd	
10U - 5L	0.8	140	79.420	-5.00°	10.00°	cd	
10U - 5R	0.8	140	73.910	5.00°	10.00°	cd	
5U - 20R	0.4	140	75.060	20.00°	5.00°	cd	
5U - 10R	0.8	140	72.130	10.00°	5.00°	cd	
5U - V	2.8	140	71.380	0.00°	5.00°	cd	
5U - 10L	0.8	140	80.130	10.00°	5.00°	cd	
5U - 20L	0.4	140	59.450	20.00°	5.00°	cd	
H - 10L	1.4	140	81.650	10.00°	0.00°	cd	
H - 5L	3.6	140	77.850	-5.00°	0.00°	cd	
H - 5R	3.6	140	70.710	5.00°	0.00°	cd	
H - 10R	1.4	140	71.900	10.00°	0.00°	cd	
5D - 20R	0.4	140	71.460	20.00°	-5.00°	cd	
5D - 10R	0.8	140	73.330	10.00°	-5.00°	cd	
5D - V	2.8	140	77.010	0.00°	-5.00°	cd	
5D - 10L	0.8	140	80.960	10.00°	-5.00°	cd	
5D - 20L	0.4	140	55.130	20.00°	-5.00°	cd	
10D - 5L	0.8	140	81.670	-5.00°	10.00°	cd	
10D - 5R	0.8	140	75.580	5.00°	10.00°	cd	
Visibility	0.05	140	(1.694) 82.125	(-) 80.00° ) - 9.25°	(-) 15.00° ) - 2.00°	cd	

Front Position Lamp - 24V-Sample 2(S141892)

ISOQA

**PHOTOMETRIC RESULTS**

<b>Program:</b>	02 (2005.01.12)	R 7.02_FrontPositionLamp LED	
Front Position Lamp & Incorporated in headlamp 2011 LED			
<b>Name:</b>	140507 L140628 HANMA HML-2960 S141892 R7 Front Position RHM 24V		
<b>Number:</b>			
<b>Test distance:</b>	3.182 m		
<b>X-offset:</b>	0.00°	<b>Y-offset:</b>	0.00°
<b>Lamp type:</b>	LED 28V		
<b>Number:</b>	Light Source 1		
<b>Flux:</b>	0.000 lm	<b>Operator:</b>	Jason
<b>Voltage:</b>	27.995 V	<b>Date:</b>	7/11/2014 11:24:30 AM
<b>Current:</b>	0.081 A	<b>Set value:</b>	Const. voltage
<b>Comment:</b>			

R 7.02\_FrontPositionLamp LED

Function	Min	Max	Value	H	V	Unit	N.O.K.
H - V (1min)	4	140	80.000	0.00°	0.00°	cd	
H - V (30min)	4	140	80.020	0.00°	0.00°	cd	
10U - 5L	0.8	140	84.600	-5.00°	10.00°	cd	
10U - 5R	0.8	140	89.600	5.00°	10.00°	cd	
5U - 20R	0.4	140	66.050	20.00°	5.00°	cd	
5U - 10R	0.8	140	85.600	10.00°	5.00°	cd	
5U - V	2.8	140	83.800	0.00°	5.00°	cd	
5U - 10L	0.8	140	87.900	10.00°	5.00°	cd	
5U - 20L	0.4	140	75.900	20.00°	5.00°	cd	
H - 10L	1.4	140	87.100	10.00°	0.00°	cd	
H - 5L	3.6	140	81.400	-5.00°	0.00°	cd	
H - 5R	3.6	140	80.100	5.00°	0.00°	cd	
H - 10R	1.4	140	83.200	10.00°	0.00°	cd	
5D - 20R	0.4	140	71.180	20.00°	-5.00°	cd	
5D - 10R	0.8	140	81.560	10.00°	-5.00°	cd	
5D - V	2.8	140	79.100	0.00°	-5.00°	cd	
5D - 10L	0.8	140	87.400	10.00°	-5.00°	cd	
5D - 20L	0.4	140	79.900	20.00°	-5.00°	cd	
10D - 5L	0.8	140	84.100	-5.00°	10.00°	cd	
10D - 5R	0.8	140	82.400	5.00°	10.00°	cd	
Visibility	0.05	140	(4.075 90.124	(80.00° )- 14.00°	(- 15.00° ) 3.00°	cd	

Driving Beam -12V-Sample 1 (S141891)

ISOQA

**PHOTOMETRIC RESULTS**

<b>Program:</b>	01 (26 Jul 2012)	R112.01 Class B Driving LED	
R112 Headlamp Test for Right Hand Traffic Class B Headlamp			
<b>Name:</b>	140507 L140628 HANMA HML-2960 S141891 Driving Beam LHM 12V		
<b>Number:</b>			
<b>Test distance:</b>	25.004 m		
<b>X-offset:</b>	0.00°	<b>Y-offset:</b>	0.00°
<b>Lamp type:</b>	LED 13.2V		
<b>Number:</b>	LED		
<b>Flux:</b>	0.000 lm	<b>Operator:</b>	Jason
<b>Voltage:</b>	13.197 V	<b>Date:</b>	7/10/2014 10:24:04 AM
<b>Current:</b>	3.124 A	<b>Set value:</b>	Const. voltage
<b>Comment:</b>			

R112.01\_Class B\_Driving LED

Function	Min	Max	Value	H	V	Unit	N.O.K.
E <sub>max</sub>	40500	215000	110796.700	0.05°	-0.05°	cd	
H - V(1 min)	0.8 x E <sub>max</sub>	-	112836.100	0.00°	0.00°	cd	
H - V(30 min)	0.8 x E <sub>max</sub>	-	110335.300	0.00°	0.00°	cd	
Point H-5L (0.0, 5L)	5100	215000	53997.270	-5.00°	0.00°	cd	
Point H-2.5L (0.0, -2.5L)	20300	215000	89428.610	-2.50°	0.00°	cd	
Point H-2.5R (0.0, 2.5R)	20300	215000	91229.190	2.50°	0.00°	cd	
Point H-5R (0.0, 5.0R)	5100	215000	56568.100	5.00°	0.00°	cd	

Driving Beam –12V-Sample 1 (S141891) \_ratio calculated

POINT	Requirement		Sample 1		Sample 1 - Result	
	MIN	MAX	1 min	30 min	1 min	30 min
H - V	0.8 x Emax	/	112836.10	110335.30	PASS	PASS
Emax	40500	215000	113307.96	110796.70	PASS	PASS
Point H-5L	5100	215000	55221.14	53997.27	PASS	PASS
Point H-2.5L	20300	215000	91455.55	89428.61	PASS	PASS
Point H-2.5R	20300	215000	93296.94	91229.19	PASS	PASS
Point H-5R	5100	215000	57850.24	56568.10	PASS	PASS

Driving Beam -12V-Sample 2(S141892)

ISOQA

**PHOTOMETRIC RESULTS**

<b>Program:</b>	01 (26 Jul 2012)	R112.01 Class B Driving LED	
R112 Headlamp Test for Right Hand Traffic Class B Headlamp			
<b>Name:</b>	140507 L140628 HANMA HML-2960 S141892 Driving Beam RHM 12V		
<b>Number:</b>			
<b>Test distance:</b>	25.004 m		
<b>X-offset:</b>	0.00°	<b>Y-offset:</b>	0.00°
<b>Lamp type:</b>	LED 13.2V		
<b>Number:</b>	LED		
<b>Flux:</b>	0.000 lm	<b>Operator:</b>	Jason
<b>Voltage:</b>	13.197 V	<b>Date:</b>	7/11/2014 8:54:10 AM
<b>Current:</b>	3.041 A	<b>Set value:</b>	Const. voltage
<b>Comment:</b>			

R112.01\_Class B\_Driving LED

Function	Min	Max	Value	H	V	Unit	N.O.K.
E <sub>max</sub>	40500	215000	87991.040	-0.15°	-0.10°	cd	
H - V(1 min)	0.8 x E <sub>max</sub>	-	90428.930	0.00°	0.00°	cd	
H - V(30 min)	0.8 x E <sub>max</sub>	-	87728.060	0.00°	0.00°	cd	
Point H-5L (0.0, 5L)	5100	215000	49465.820	-5.00°	0.00°	cd	
Point H-2.5L (0.0, -2.5L)	20300	215000	76294.410	-2.50°	0.00°	cd	
Point H-2.5R (0.0, 2.5R)	20300	215000	72993.350	2.50°	0.00°	cd	
Point H-5R (0.0, 5.0R)	5100	215000	45884.680	5.00°	0.00°	cd	



Driving Beam -12V-Sample 2 (S141892) \_ratio calculated

POINT	Requirement		Sample 2		Sample 2 - Result	
	MIN	MAX	1 min	30 min	1 min	30 min
H - V	0.8 x Emax	/	90428.93	87728.06	PASS	PASS
Emax	40500	215000	90700.01	87991.04	PASS	PASS
Point H-5L	5100	215000	50988.72	49465.82	PASS	PASS
Point H-2.5L	20300	215000	78643.27	76294.41	PASS	PASS
Point H-2.5R	20300	215000	75240.58	72993.35	PASS	PASS
Point H-5R	5100	215000	47297.32	45884.68	PASS	PASS

Driving Beam – 24V-Sample 1 (S141891)

ISOQA

**PHOTOMETRIC RESULTS**

<b>Program:</b>	01 (26 Jul 2012)	R112.01 Class B Driving LED	
R112 Headlamp Test for Right Hand Traffic Class B Headlamp			
<b>Name:</b>	140507 L140628 HANMA HML-2960 S141891 Driving Beam LHM 24V		
<b>Number:</b>			
<b>Test distance:</b>	25.004 m		
<b>X-offset:</b>	0.00°	<b>Y-offset:</b>	0.00°
<b>Lamp type:</b>	LED 28V		
<b>Number:</b>	Light Source 1		
<b>Flux:</b>	0.000 lm	<b>Operator:</b>	Jason
<b>Voltage:</b>	27.993 V	<b>Date:</b>	7/10/2014 11:02:01 AM
<b>Current:</b>	1.488 A	<b>Set value:</b>	Const. voltage
<b>Comment:</b>			

**R112.01\_Class B\_Driving LED**

Function	Min	Max	Value	H	V	Unit	N.O.K.
E <sub>max</sub>	40500	215000	110543.600	0.05°	-0.05°	cd	
H - V(1 min)	0.8 x E <sub>max</sub>	-	111135.600	0.00°	0.00°	cd	
H - V(30 min)	0.8 x E <sub>max</sub>	-	109935.200	0.00°	0.00°	cd	
Point H-5L (0.0, 5L)	5100	215000	53747.200	-5.00°	0.00°	cd	
Point H-2.5L (0.0, -2.5L)	20300	215000	89028.480	-2.50°	0.00°	cd	
Point H-2.5R (0.0, 2.5R)	20300	215000	90729.020	2.50°	0.00°	cd	
Point H-5R (0.0, 5.0R)	5100	215000	56207.980	5.00°	0.00°	cd	

Driving Beam –24V-Sample 1 (S141891) \_ratio calculated

POINT	Requirement		Sample 1		Sample 1 - Result	
	MIN	MAX	1 min	30 min	1 min	30 min
H - V	0.8 x Emax	/	111135.6	109935.2	PASS	PASS
Emax	40500	215000	111750.64	110543.6	PASS	PASS
Point H-5L	5100	215000	54334.07	53747.20	PASS	PASS
Point H-2.5L	20300	215000	90000.60	89028.48	PASS	PASS
Point H-2.5R	20300	215000	91719.70	90729.02	PASS	PASS
Point H-5R	5100	215000	56821.72	56207.98	PASS	PASS

Driving Beam –24V-Sample 2(S141892)

ISOQA

**PHOTOMETRIC RESULTS**

<b>Program:</b>	01 (26 Jul 2012)	R112.01 Class B_Driving LED	
R112 Headlamp Test for Right Hand Traffic Class B Headlamp			
<b>Name:</b>	140507 L140628 HANMA HML-2960 S141892 Driving Beam RHM 24V		
<b>Number:</b>			
<b>Test distance:</b>	25.004 m		
<b>X-offset:</b>	0.00°	<b>Y-offset:</b>	0.00°
<b>Lamp type:</b>	LED 28V		
<b>Number:</b>	Light Source 1		
<b>Flux:</b>	0.000 lm	<b>Operator:</b>	Jason
<b>Voltage:</b>	27.993 V	<b>Date:</b>	7/11/2014 9:36:49 AM
<b>Current:</b>	1.474 A	<b>Set value:</b>	Const. voltage
<b>Comment:</b>			

R112.01\_Class B\_Driving LED

Function	Min	Max	Value	H	V	Unit	N.O.K.
E <sub>max</sub>	40500	215000	88942.760	-0.15°	-0.20°	cd	
H - V(1 min)	0.8 x E <sub>max</sub>	-	89028.480	0.00°	0.00°	cd	
H - V(30 min)	0.8 x E <sub>max</sub>	-	88328.260	0.00°	0.00°	cd	
Point H-5L (0.0, 5L)	5100	215000	49615.870	-5.00°	0.00°	cd	
Point H-2.5L (0.0, -2.5L)	20300	215000	76564.490	-2.50°	0.00°	cd	
Point H-2.5R (0.0, 2.5R)	20300	215000	73453.500	2.50°	0.00°	cd	
Point H-5R (0.0, 5.0R)	5100	215000	46054.730	5.00°	0.00°	cd	

Driving Beam –24V-Sample 2 (S141892) \_ratio calculated

POINT	Requirement		Sample 2		Sample 2 - Result	
	MIN	MAX	1 min	30 min	1 min	30 min
H - V	0.8 x Emax	/	89028.48	88328.26	PASS	PASS
Emax	40500	215000	89647.85	88942.76	PASS	PASS
Point H-5L	5100	215000	50009.20	49615.87	PASS	PASS
Point H-2.5L	20300	215000	77171.45	76564.49	PASS	PASS
Point H-2.5R	20300	215000	74035.80	73453.5	PASS	PASS
Point H-5R	5100	215000	46419.83	46054.73	PASS	PASS

Stability of photometric performance on headlamps marked 2960; sample no. S141969

Illumination in cd on measuring points		
$E_{max}$		
A	Clean headlamp	
	Prior to the test	101441
	After 12 hours-12V <sup>1)</sup>	99884
B	Dirty headlamp	
	After 1 hour-12V <sup>1)</sup>	96547
C	Clean headlamp	
	Prior to the test	102258
	After 12 hours-24V <sup>1)</sup>	100847
D	Dirty headlamp	
	After 1 hour-24V <sup>1)</sup>	97456

<sup>1)</sup> Using the following cycle during 12 hours for driving beam:

- Driving beam continuously operating for 12 hours.

After both tests the headlamp was inspected visually. No distortion, deformation, cracking or change in colour of the headlamp lens was noticeable.

The discrepancy of the photometric characteristics prior and after each test was not more than 10 per cent.

Test on the complete headlamp incorporating a lens of plastic material on headlamps for left-hand traffic,

§ 2.6.1 Mechanical deterioration - sample no. S140508

Point on measuring screen	Illumination in cd on measuring points	
	After mechanical deterioration	Required min. or permissible max. value
HV -12V	82418	29160 min
HV -24V	85625	29160 min

§ 2.6.2 Adherence of coatings - sample no. S140508

The impaired area was 2%, and did not exceed the permitted 15% of the gridded area.