



Voltage stabilisation



Production figures for 2006



7 370 buses



81 776 trucks

Voltage stabilisation



- Nominal voltage: 24V d.c.
Typical alternator voltage: **28.5V d.c.** (Tk -14mV/K)
- The Central On-board Computer (ZBR, the central unit for controlling the lighting, senses the operating voltage and regulates i.a. the low beam.
- If the operating voltage is > 26.8 V, the effective voltage of the low beam is regulated down to $26.8 (+/- 0.2)$ V_{eff}. Tests during nighttime driving showed that the reduction of the operating voltage to this value is not visible to the driver.
- → If the effective operating voltage is limited to 26.8 V the service life of the H7 bulb used is prolonged by a factor of 2 to 3. Burning lives of over 2000 h have been achieved.

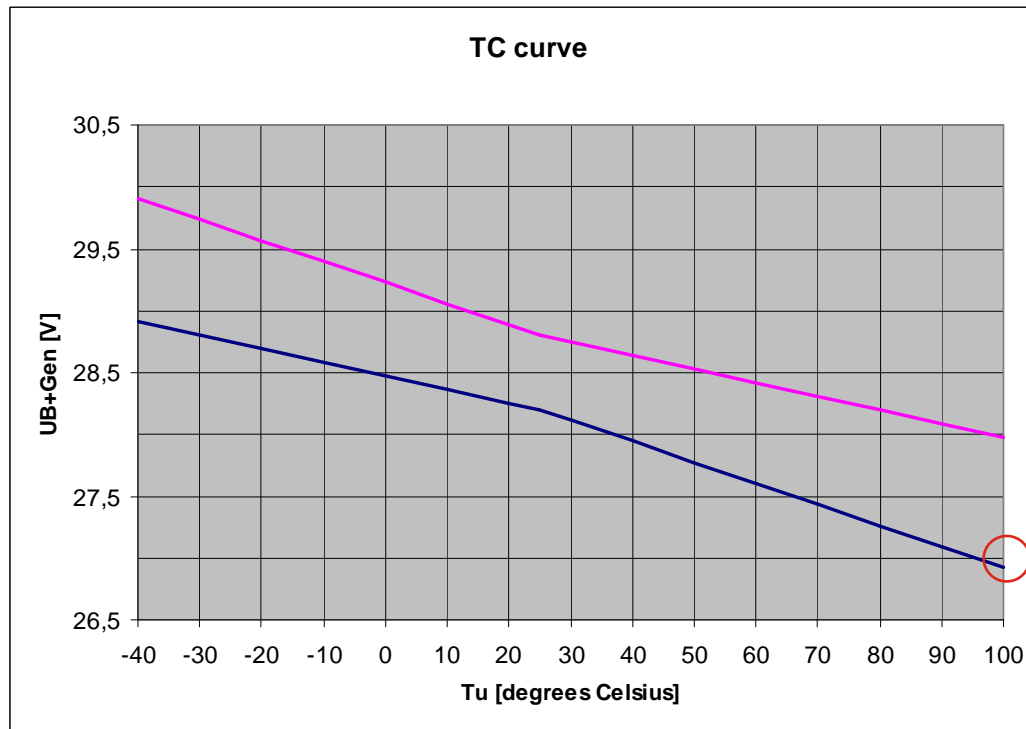
Alternator regulator curve



Control voltage: $U_{B+Gen} = 28.5V$ d.c. $\pm 0,3V$ d.c.

at $n_{Gen} = 6000$ rpm; $I_{Gen} = 5A$ (stab.); $T_u = 25^\circ C$

Temperature compensation (TC): $-14mV/K \pm 0.3mV/K$



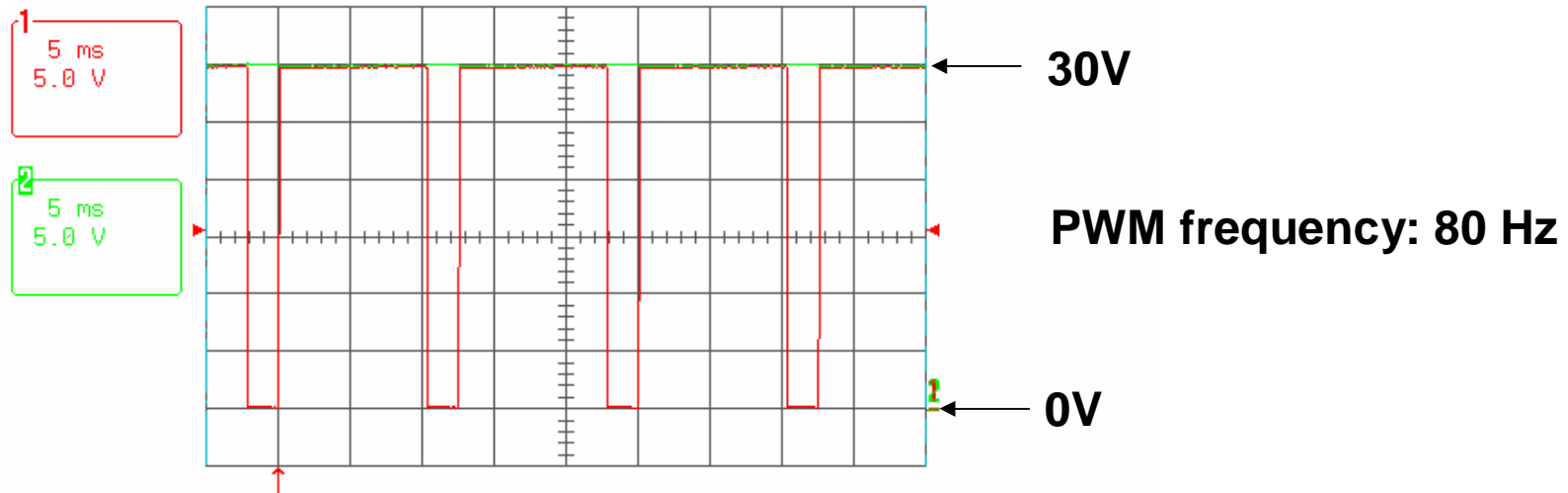
When the engine is running the vehicle's operating voltage does not fall below 26.8V.

Voltage stabilisation



Oscillogram of the operating voltage of the low beam controlled by the Central On-board Computer.

Channel 1 (red line): Low-beam voltage : $U_{Abbl.} = 26.9V_{eff}$
 Channel 2 (green line): Vehicle network voltage: $U_b = 30V \text{ d.c.}$



rms(1) 26.931 V
 duty(1) 82.47 %
 Freq(1) 79.98 Hz

5 ms
 1 5 V DC
 2 5 V DC
 3 5 V DC
 4 5 V DC

1 DC 15.7 V

1 MS/s

STOPPED

Voltage stabilisation



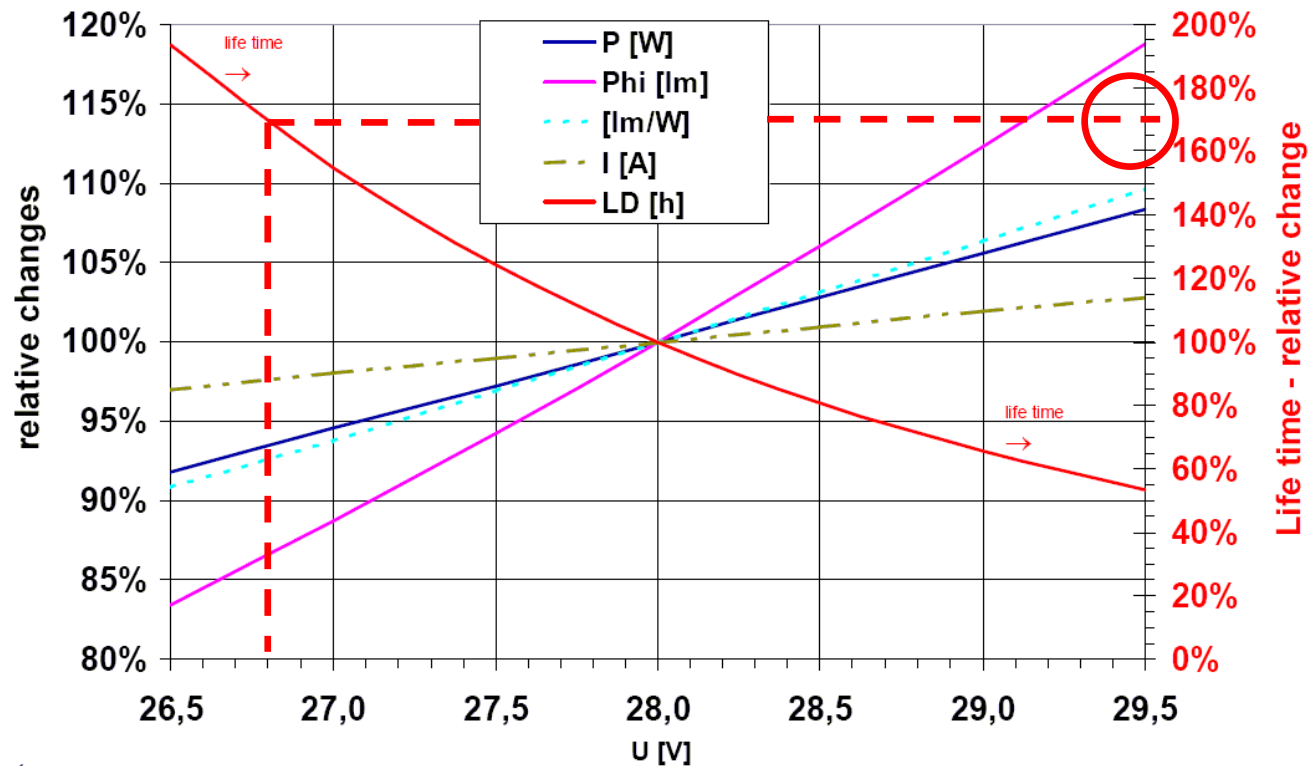
Relative Spannungsabhängigkeit von Glühlampen

Relative dependence of bulbs on voltage

AM D-H

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Änderungen der dargestellten Meßgrößen sind nur für Abweichungen von der regulären Betriebsspannung im Bereich $\pm 5\%$ berechenbar



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Global Automotive Lighting

Last update: 25.06.04



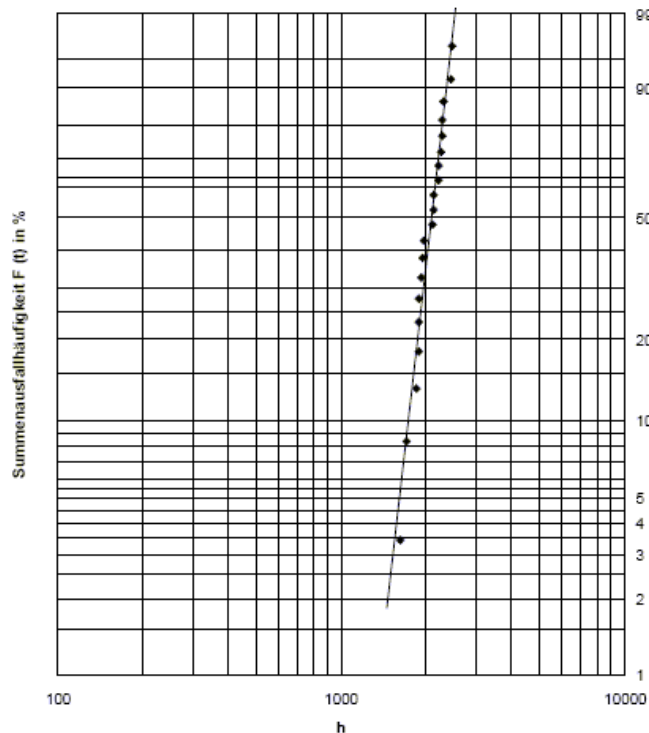
Voltage stabilisation



Bauteil: H7_Longlife Stückl.-Nr.: Getaktet Auftrag: 26,8V

Versuchsergebnisse:	Aggr.-Nr.	Laufzeit	art	Aggr.-Nr.	Laufzeit	art	
1	172	1614,8	j	11	173	2110,3	j
2	163	1705,9	j	12	171	2122,1	j
3	174	1841,9	j	13	162	2199,1	j
4	169	1870,6	j	14	168	2207,1	j
5	161	1875,6	j	15	168	2245,3	j
6	179	1879,8	j	16	176	2268	j
7	164	1923,7	j	17	170	2280,1	j
8	167	1939,1	j	18	165	2297	j
9	180	1965,4	j	19	175	2447,7	j
10	177	2091,4	j	20	178	2459,2	j

Testverfahren : Weibull Charakt. Lebensdauer T: 2.170 h
 Stichprobenzahl n: 20 Formparameter b: 9,9 B10: 1.730 h



Long-time test with H7 Longlife bulb

Operating voltage: 29.5V d.c.

Bulb voltage : 26.8V_{eff}

Clock frequency (PWM): 80Hz

Characteristic

service life: 2170 h

H7 Longlife bulb after long-time test at 26.8V_{eff}



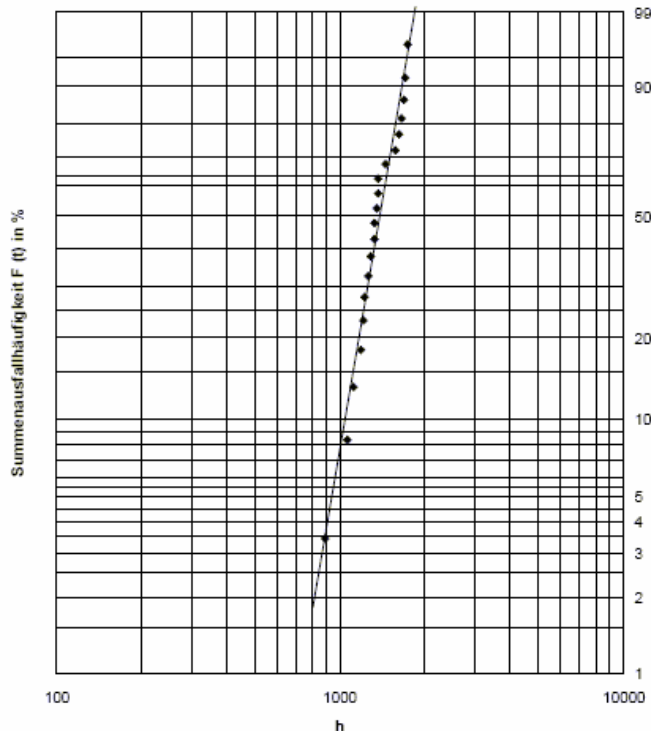
Voltage stabilisation



Bauteil: OSRAM H7 Stückl.-Nr.: getaktet Auftrag: 25,6 V

Versuchsergebnisse:	Aggr.-Nr.	Laufzeit	def.	Aggr.-Nr.	Laufzeit	def.	
1	2	887,7	j	11	18	1345,4	j
2	15	1057,7	j	12	17	1358,6	j
3	16	1115,8	j	13	12	1359,4	j
4	11	1189,1	j	14	6	1446,6	j
5	20	1207,4	j	15	4	1565,9	j
6	8	1228,1	j	16	7	1610,5	j
7	1	1263	j	17	5	1642,2	j
8	10	1279	j	18	14	1690	j
9	19	1319,7	j	19	9	1693,7	j
10	13	1329,1	j	20	3	1733	j

Testverfahren : Lampenprüfstand Charakt. Lebensdauer T: 1.463 h
 Stichprobenzahl n=: 20 Formparameter b=: 6,6 B10: 1.040 h



Long-time test with H7 Longlife bulb

Operating voltage: 29.5V d.c.

Bulb voltage: 25.6V_{eff}

Clock frequency (PWM): 80Hz

Characteristic

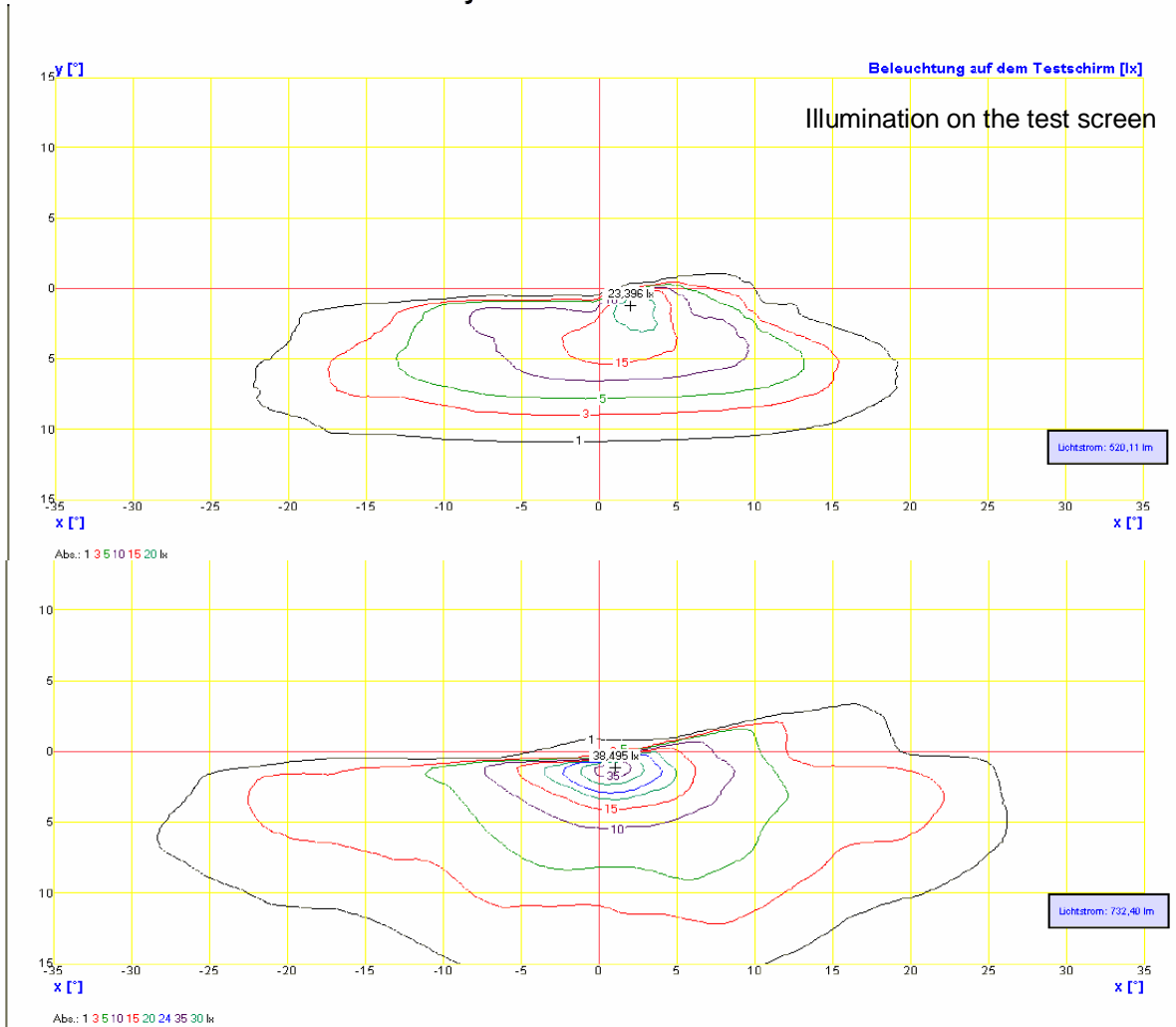
service life: 1463 h

Voltage stabilisation



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**ISO-Lux diagram
H4- 28.0V d.c.;
Hella uniform headlight,
Used in F90 1983**

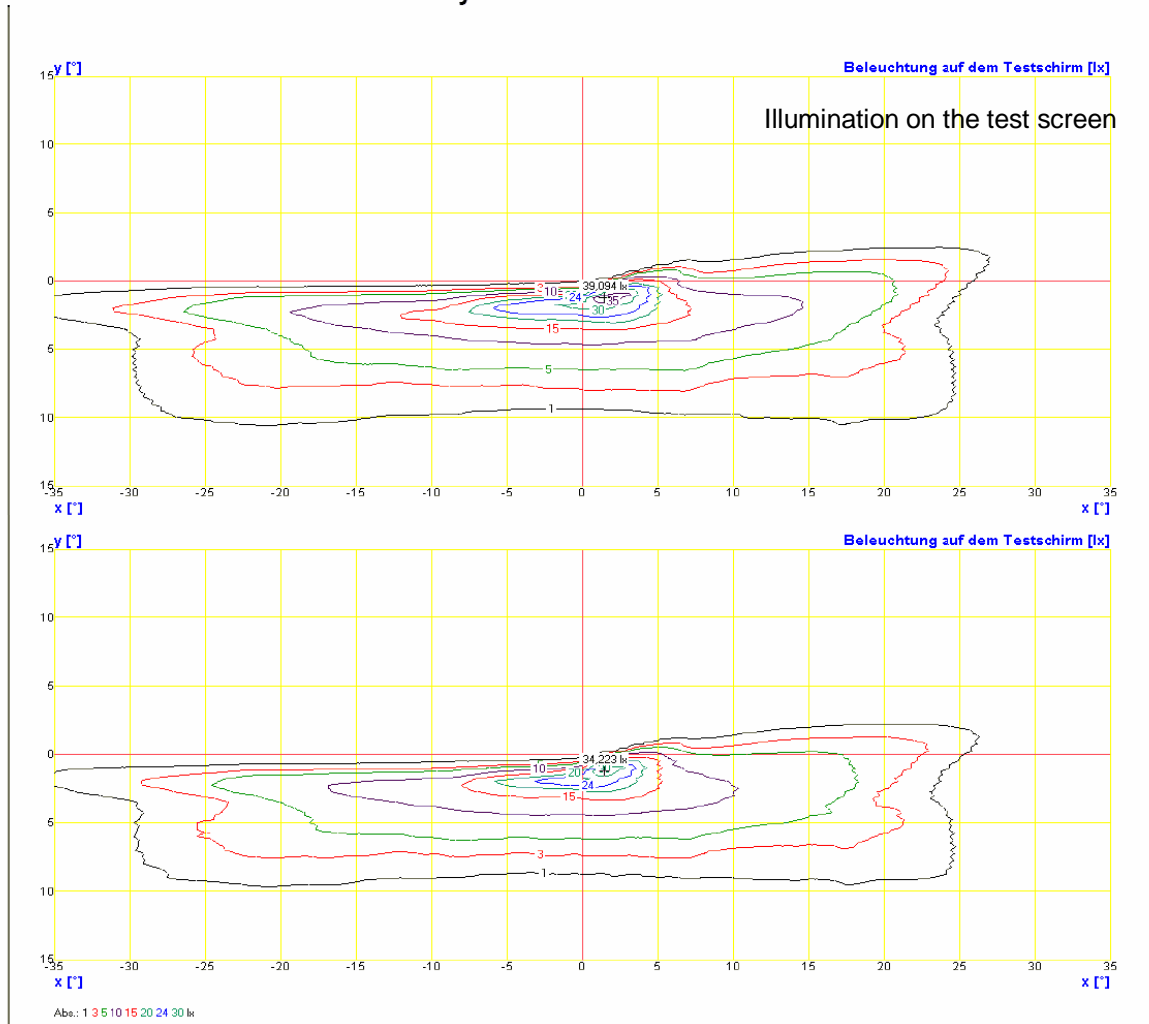
**ISO-Lux diagram
H1- 28.0V d.c.;
Lens headlight
Used in F2000 1994**

Voltage stabilisation



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**ISO-Lux diagram
H7- Longlife 28.0V d.c.;
Used in TGA 2000**

**ISO-Lux diagram
H7- Longlife 26.6V d.c.;
Used in TGA, since
begin of 2006**

Conclusions



- There is no need for an extra light source control unit in our trucks and buses
- Lifetime of bulbs can be increased by using the functionality of our central board computer
 - This is -at the moment- the high end solution for trucks



Thank you.

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