LICENSE LIGHT WITH OPEN SWITCH

SPECIFICATION

FOR **TBA**

MFR	WITTE/ADAC/VAST	PREPD BY	RESPON-SIBLE
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REFERENCE

PC SPEC 2010

0

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					04-JUN-14			
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					T R U N K S W A S S Y 30			
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	REVISION RECORD		DATE	DR	CHK			

List of content

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1 LEGAL REGULATIONS

Homologations markets:

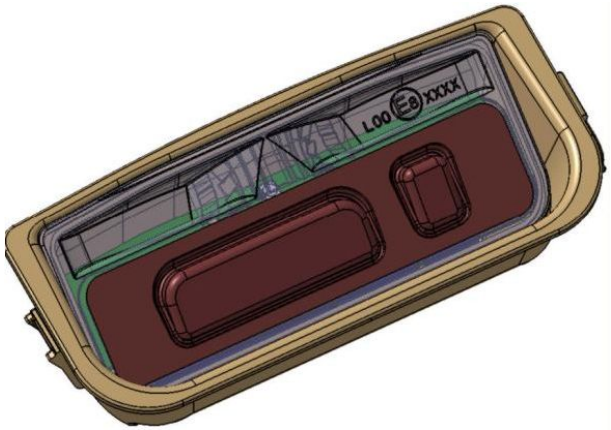
Country	Standard	CAR VARIANT
EUROPE /	ECE R-4	Acc to position DRW
USA , CND	FMVSS/CMVSS 206	
CHINA	GB18408-2001	
INDIA /	AIS	
AUSTRALIA	ADR 48	
KOREA	KMVSS 106	

TAB.1

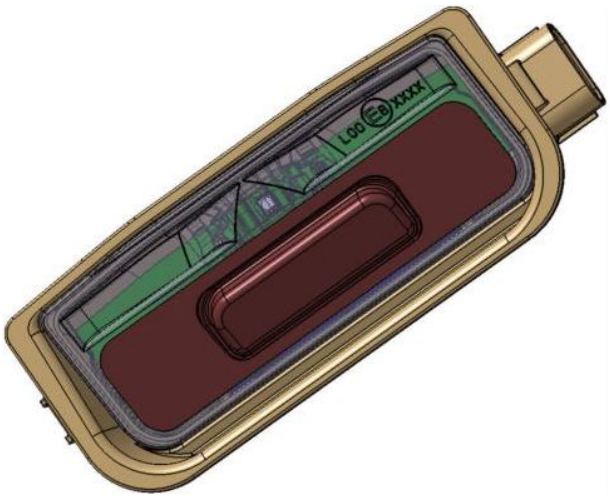
2 PRODUCT DESCRIPTION, APPEARANCE

The exterior tailgate/bootlid garnish shall have an integrated softtouch unit. The unit is designed as tailgate/bootlid outer grip with integrated mechanical button providing actuating electronic signal for TG latch and lightning for the registration plate. The softtouch unit is designed as interchangeable watertight component of the tailgate/bootlid garnish. Service replacement of the damaged softtouch unit is possible after dismounting of the garnish from bootlid/tailgate

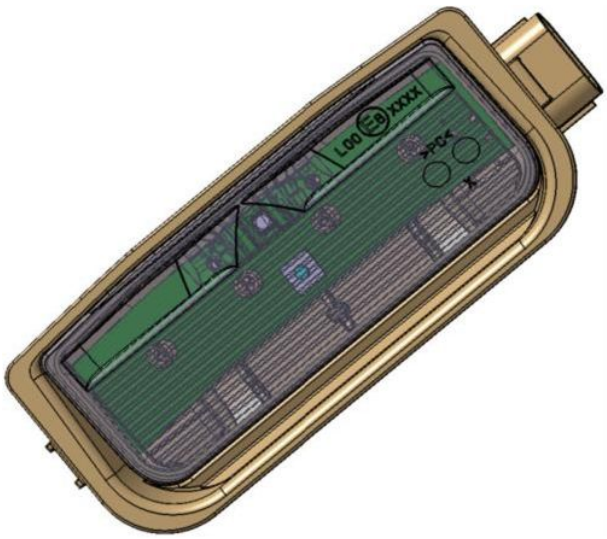
OPEN LOCK SW:



OPEN SW:



LIGHT ONLY:



3 GENERAL STATEMENTS, USED PHRASES & TERMS

- If not expressly written – testing voltage = 12.0±0.2 VDC
- All below mentioned tests are performed at RT (room temperature /humidity) (23±5°C/ 65±20%RH) if not otherwise specified

4 SERVICE CONDITIONS

4.1 Service condition

Installation location:	Tailgate garnish – wet area
Installation environment:	Subject to deposits such as water drops (rain, car-wash solvent), dust, dirt and an impact by opening and closing of the tailgate.
Installing posture:	Condition installed to an actual vehicle. (Refer to the drawing)
Ambient temperature:	-40°C to +80°C - the part must satisfy the instantaneous requirement of 100°C for 5 min
Storage temperature:	-40°C to +85°C

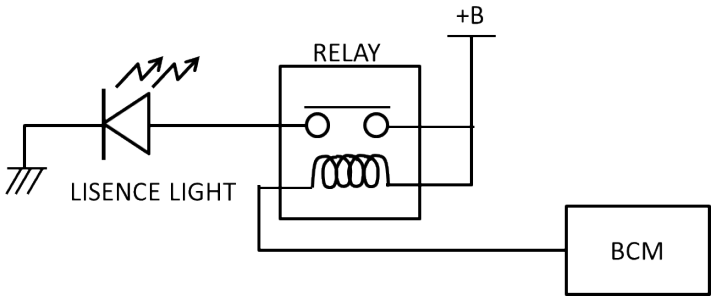
Service voltage range LED:	8.0 V DC to 16.0 V DC
Minimum operating voltage:	8.0 V DC
Power source (nominal voltage):	12.0 V DC (Battery for vehicle)
Current range LED:	120 ± 10 mA @12V

Service voltage / current range - Switch:

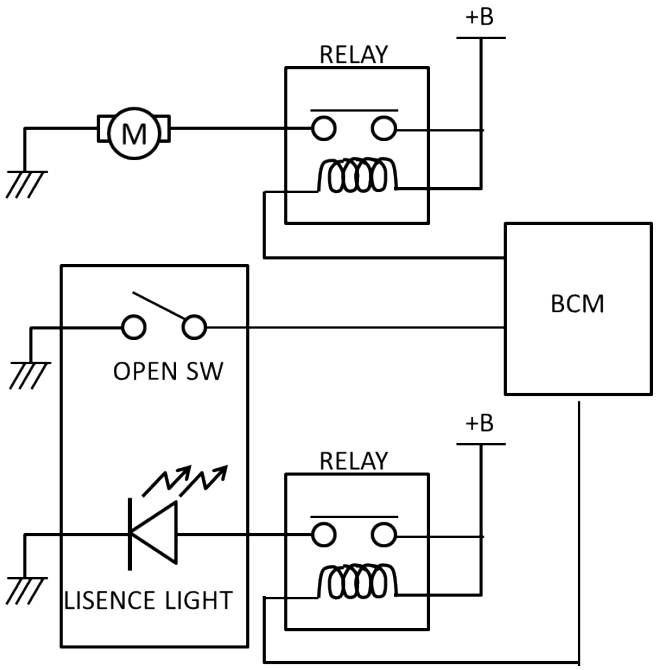
Nominal / testing voltage /current for open switch:	12V / 20mA
Nominal / testing current for lock switch:	5V/ 1 mA (Max3mA)
Max current for open and lock switch:	50 mA

4.2 GENERAL Circuit diagram

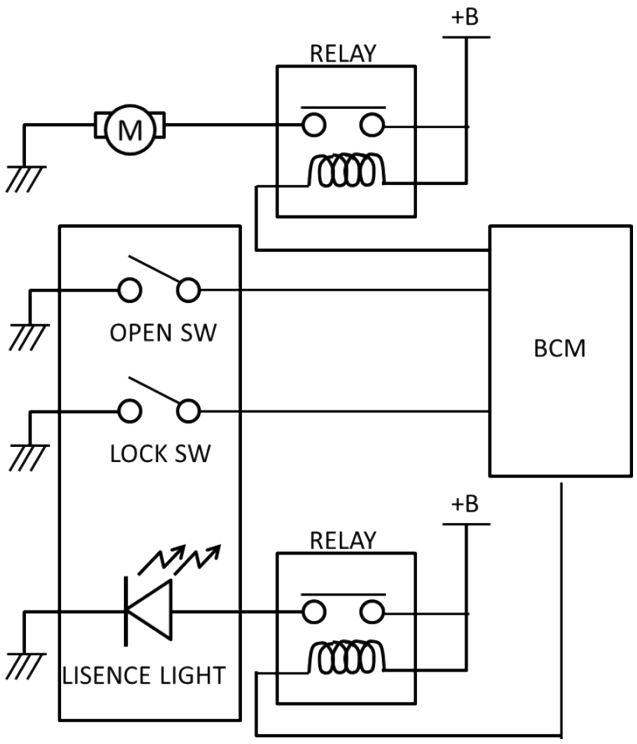
Light only



Open SW



Open and Lock SW



DWG.NO.
3410Z-TBAA-A010-M1

4.3 GENERAL PERFORMANCE - characteristic test - LED

1. Definition of the LED light source is Lighting and Non-illuminated
   (Requirements)
   ・H-V luminosity of the lamp is greater than or equal to 0.3cd are assumed to be lit.
   ・H-V luminosity of the lamp is greater than or equal to 0.3cd are assumed to be off

Measuring method: measuring will be executed inthesamewayasmeasurementofilluminationbasedonECER4, the measured values cd/m2 will be divided with surface of 25mm circle.

The lamp must emit light if load terminal voltage is 7V.
Measuring method: visual check

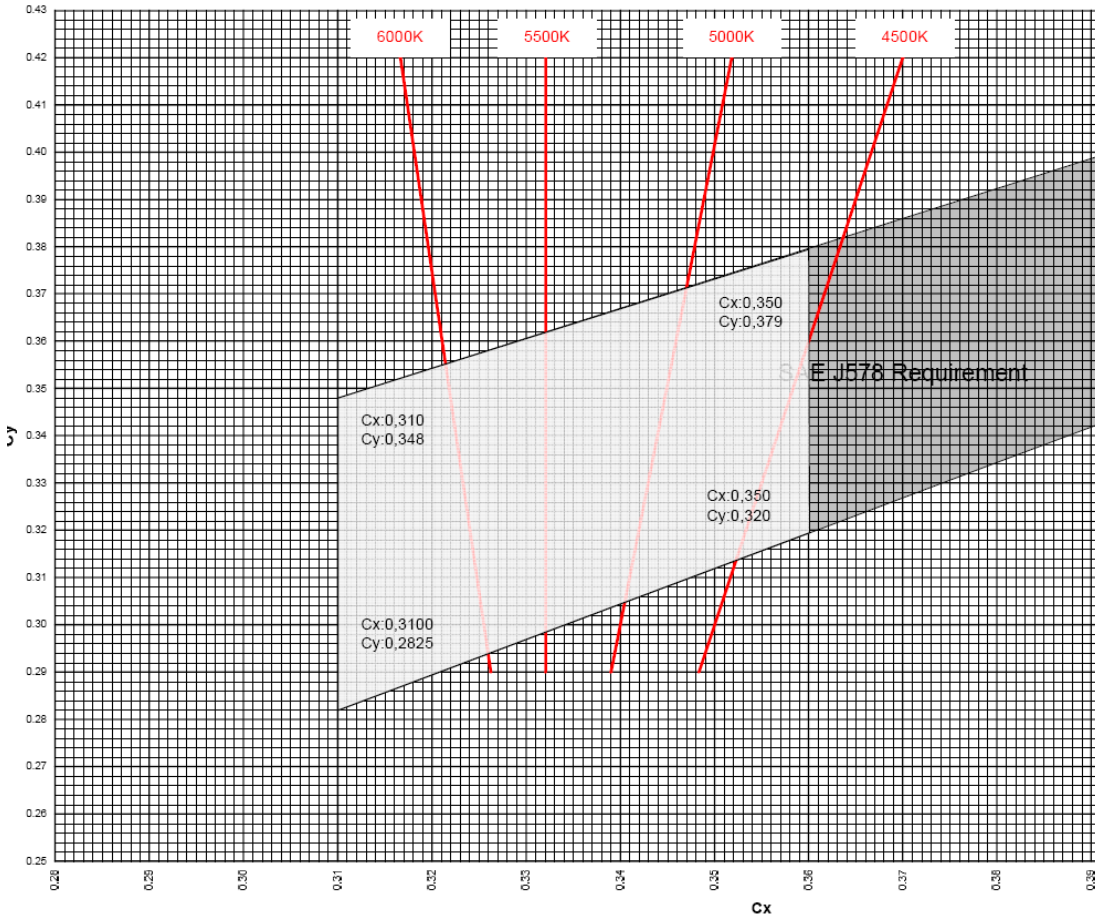
1). Luminous-intensity distribution test

Measuring instrument:	Photometer, ammeter, black chamber
Measuring method:	Based on the worst case number plate variant
Measuring Item:	Illumination
Check Item:	Luminous intensity distribution
Requirement::	for the license-plate lamp, the domestic minimum requirement is 20 lx or greater (Honda requested countries = America, Japan, Korea) . The uniformity ratio of illumination for all countries intensity of illumination must be must not exceed 8.5 and the average 30 lx or greater (Honda requested countries America, Japan, Korea
Measuring method:	the worst case number plate (from intensity of illumination and uniformity point of view) will be selected based on the real measurement and appropriate requirement will be applied (for lux countries as above for cd countries – Illumination ≥ 2,5cd/m2 and Gradient 2xBo/cm)

2). Chromaticity

Measuring instrument:	Spectrophotometer, black chamber
Measuring method:	The Chromaticity of the reflected light is measured with using Spectrophotometer
Measuring Item:	Chromaticity of the reflected light
Check Item:	Chromaticity of the reflected light

Requirement:



3). Appearance - External view

Measuring instrument: ---

Measuring method: Visually inspect the external shape and lens

Measuring Item: Appearance

Checked Item: Appearance

Requirement: The surface designs of lenses and housings must not have any deformities, sink marks or damage which would ruin the external view.

Appearance check: Conduct evaluation through lens and use points described below

0 point	Recognizable from 2 meters away
1 point	Not recognizable from 2 meters away
2 points	Not recognizable from 1 meter away
3 points	Not recognizable from 50 cm away
4 points	Not recognizable from 30 cm away
5 points	Not recognizable at all

4). Airtightness test – The Test 1 only

Measuring instrument: Visually inspect

Measuring method: Examine the air tightness of the welded area. Apply a specified level of air pressure with the lamp (welded area) completely immersed in water, and examine the sealed joint for evidence of air leakage.Air tightness test time: 5 seconds:

Testing pressure: 0.2 bar (19.6kpa)

Measuring Item: Airtightness
Checked Item: Airtightness
Requirement: There shall be no evidence of air bubbles

5). Insulation resistance test

Measuring instrument: 500 VDCmegger
Measuring method: Among each terminal and housing
Measuring Item: Insulation resistance
Requirement: The insulation resistance value among each terminal and each housing must be 5 MΩ or greater at 500-V megger.

6). Lighting feeling

Measuring method: Stand the lamp in the normal mounted position and visually observe the lighting feeling. Observing distance 3 m
Measuring Item: Lighting feeling – visual evaluation
Requirement: Unevenness of lighting, darkness or leakage of light must not cause a feeling that damages product quality. When the light is projected upon the license plate, the distribution of luminous intensity must be even and the characters on the plate must be recognizable.
Definition of environment (Black chamber)theluminousintensityonthelamp'ssurface must not exceed 3 lx

7). Light leakage – N/A (**light leakage is covered with EU homologation (ECE R4 - no direct white light is allowed to be seen behind the car)**

8). Current value

Measuring instrument: Ammeter
Measuring method: Measure the consumption current value by 12 V.
Measuring Item: Current value
Requirement: the Current consumption value of the LED circuit has to lie within tolerance limits (mentioned on the PCB drawing)

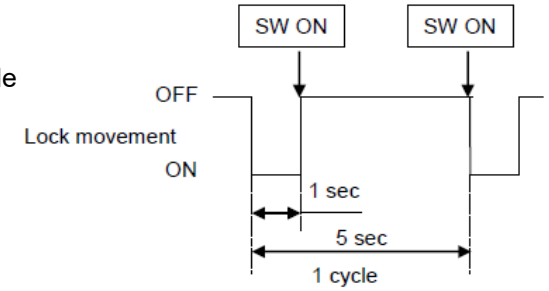
4.4 GENERAL PERFORMANCE Characteristic test - Switch

Unless otherwise specified in each test, the following conditions shall be applied.

Test conditions

・Test temperature:23±5°C(Normal temperature)
・Test humidity: 65±20%
・Installing posture: Equivalent to installation in an actual vehicle
・ Number of samples: n=3 or more

Conditions for sequential operation



Checked points for General characteristic test

1) ON Load / ON Stroke

Measuring /Test methods:	Set to a Stroke-Load measuring device and operate measuring points with a jig, and check Stroke-Load characteristics.
Measuring points:	Center position of OPEN SW and LOCK SW
Measuring Item:	ON Load / ON Stroke
Measuring instrument:	Force sensor, displacement indicator
Requirement:	4.0 – 8.8N / 0.2-2.5mm The range for ambient conditions TBD

2) Sense of fitting

Measuring /Test methods:	Check if there is any dispersion or discomfort in a sense of fitting with a click when operating measuring positions. Subjective evaluation
Measuring points :	Center position of OPEN SW and LOCK SW
Measuring Item:	Sense of fitting
Measuring instrument:	Manual verification
Requirement:	Sense of fitting Refer to Feeling master (Sense of fitting with a click shall be identified without any discomfort)

3) Voltage drop at contact point:

Measuring /Test methods:	Turn ON SW for 1 sec in every 5 sec and check voltage drop after the 1st and the 10th operation
Switch position:	ON-position
Measuring Item:	Voltage drop
Measuring points:	Voltage between terminals (SW to GND)
Measuring instrument:	Digital voltmeter, ammeter
Requirement:	Voltage drop at a contact point: OPEN SW - 0.2 V Max. (at 10 mA) LOCK SW – 0.1 V Max. (at 1 mA)

4) Chattering at a contact point

Measuring /Test methods:	Electrify SW with test current and operate SW. Turn ON SW for 1 sec in every 5 sec and check chattering after the 1st and the 10th operation.
Measuring Item:	Chattering
Measuring points:	Signal between terminals (SW to GND)
Measuring instrument:	Digital osciloscope, loading resistor, lab power supply
Requirement:	Chattering at a contact point: OPEN SW – 20 msec Max. LOCK SW – 10 msec Max.

5) Insulation resistance

Measuring /Test methods:	Turn ON SW for 1 sec in every 5 sec and check insulation resistance with a 500V mega gauge after the 1st and the 10th operation.
Measuring points:	Between terminals at a contact point
Measuring instrument:	500V megger
Switch position:	OFF-position
Requirement:	Insulation resistance 3 MΩ Min.

4.5 Judgment criteria for characteristic test

2)Recovery

Measuring Item:	Recovery
Measuring / Test method:	Subjective evaluation
Measuring points:	---
Measuring instrument:	---
Requirement:	The final controlling element of a switch shall be recovery after operating a switch (Visual confirmation)

3) Breaking strength and deformation

Measuring Item:	---
Measuring / Test method:	Visual inspection
Measuring points:	---
Measuring instrument:	---
Requirement:	Free of cracks, breakage or abnormality that affects the function. Potting shall not peel off. SW shall not come off.

4) Appearance and shape

Measuring Item:	---
Measuring / Test method:	Visual inspection in light cabinet in comparison with untested sample/master sample
Measuring points:	---
Measuring instrument:	5 grade gray scale
Requirement:	Free of remarkable abnormality such as whitening, discoloration, cracks etc.

5) Malfunction

Measuring Item:	Malfunction of the switch (inadvertent switching etc..)
Measuring / Test method:	Continual monitoring of logical state /response during exposition/test
Measuring points:	---
Measuring instrument:	Oscilloscope, monitoring box
Requirement:	The switch shall not be turned ON arbitrarily during the test.

6) Noise and abnormal sound

Measuring Item: ---
Measuring/ Test method: Hand shaking with DUT
Measuring points: ---
Measuring instrument: Subjective evaluation
Requirement: Free of rattling or squeaking sound. Free of abnormal sound.

6) Corrosion, galvanic corrosion

Measuring Item: Corrosion appearance
Measuring/ Test method: Visual evaluation
Measuring points: ---
Measuring instrument: Salt chamber
Requirement: Free of non-operation by corrosion, galvanic corrosion.

7) Intrusion of water and dust

Measuring Item: Water intrusion
Measuring/ Test method: Visual evaluation
Measuring points: ---
Measuring instrument: ---
Requirement: No intrusion of water or dust into SW area and SW stroke area is allowed.

8)Water proof property

Measuring Item: Insulating resistance, water intrusion
Measuring/ Test method: After completing each test item, exposure the test piece in 85°C atmosphere for 1 hour. With an actual vehicle installing condition, immerse the test piece in 5% salt water of temperature normal to a depth of 100 mm for 15 minutes. Considering this as 1 cycle,conduct 3 cycles. Then measure insulating resistance with the sample submerged in the water upon completion of the 3rdcycle,and check the appearance (only peeling-off of potting). The interior side should be water-proofing.
Measuring points: ---
Measuring instrument: Megger 500V, visual evaluation
Requirement: Insulation resistance within the requested limit, no water intrusion is allowed

9) Play and looseness in each area

Measuring Item: ---
Measuring/ Test method: Visual evaluation

Measuring points: ---
Measuring instrument: Visual evaluation

Requirement: Free of any detrimental play and looseness in function.

10) Wear in each area

Measuring Item: ---
Measuring/ Test method: Visual evaluation
Measuring points: ---
Measuring instrument: Visual evaluation
Requirement: Free of detrimental wear in function. Free of tear and cracks of rubber.

11) Electrical output

Measuring Item: ---
Measuring/ Test method: Loaded switch is manually 10 times actuated while the signal response is monitored
Measuring points: Signal response (rectangular signal) of the switch
Measuring instrument: Digital oscilloscope
Requirement: Switch shall be OFF→ON→OFF without fail. (Electrical output)

5 TESTING OF LED LIGHTNING AND SWITCH

5.1 Low temperature operation durability test

Test method:

Installing posture: Equivalent to installation in an actual vehicle
Operation cycle conditions: Same as cycle operation durability
Push Load: 78.4N (OPEN SW)
9.8 N (LOCK SW)
Test temperature: -30°C

After completing test, expose to room temperature and normal humidity for 2 more hours, and verify in accordance with General performance test.

Acceptance criteria:

- General characteristics
- Appearance and shape
- Water proof property
- Play and looseness in each area
- Wear in each area
- Operation
- ON Load: 14.5 ~ 23N

5.2 High temperature operation durability test

Test method:

Installing posture: Equivalent to installation in an actual vehicle

Operation cycle conditions: Same as cycle operation durability
Push Load: 78.4N (OPEN SW)
9.8 N (LOCK SW)
Test temperature: +80°C

After completing test, expose to room temperature and normal humidity for 1 more hour, and verify in accordance with General performance test.

Acceptance criteria:

- General characteristics
- Appearance and shape
- Water proof property
- Play and looseness in each area
- Wear in each area
- Operation
- ON Load: 5 ~ 7.6N

5.3 Cycle operation durability test

Test method:
Installing posture: Equivalent to installation in an actual vehicle
Load: 78.4N (OPEN SW)
9.8 N (LOCK SW)
Operation cycle: 50,000 times
Spray of dust water: Spraying water after spraying dust 0.1g (JIS Z 8901 Type 7, 8)
(Every 5,000 times and Inject at the first time) to a final controlling element

Acceptance criteria:

- General characteristics
- Appearance and shape
- Noise and abnormal sound
- Water proof property
- Play and looseness in each area
- Wear in each area
- Operation

5.4 Heat resistance test

Test 1

Test method:
Testing temperature: 20°C normal temp
Testing voltage: 14,5V

Testing duration: 1000h
Testing condition: If any lamps are used within the same compartment, these lamps can be turned on in combination. Otherwise, turn on each lamp individually as a single function based on the following lighting conditions:
Lighting condition: Continuous activation of the lamp

Acceptance criteria:

- Luminous intensity distribution value (LED specification: 13.5 V)
- Deformation and dissolved loss of each part
- Appearance
- Airtightness
- Luminous intensity value
- Current value
- LED breakage

Test 2

Test method:
Testing temperature: 100°C
Testing duration: More than 1 minute
Air blowing less than 1.5 m/s
When the temperature of the constant-temperature bath reaches to 100°C put the lamp assy in.
Check the test sample after 1 min and 5 min.
(The test sample after 1 min should meet the photometric specification)

Acceptance criteria:

- Luminous intensity distribution value (LED specification: 13.5 V)
- Deformation and dissolved loss of each part
- Appearance
- Airtightness
- Luminous intensity value
- Current value
- LED breakage

5.5 Dust test

Test 2

Test method:
SAE J575e August 1970 (Do not plug up the draining holes.)

Fix the subject in the dust box specified below:

- Length of internal wall: 3 feet (91.5 cm)
- Pour 10 lbs. (4.54 kg) of Portland cement into the box.
- The stand position: Set the stand at least six inches (15.2 cm) away from the wall.
- Scatter the dust by spraying the air for 2 seconds at 15-minute intervals.
- Testing duration: 5 h
- Testing voltage: 13.5 V

Acceptance criteria:

- Luminous intensity
- Appearance

5.6 High-pressure car wash test

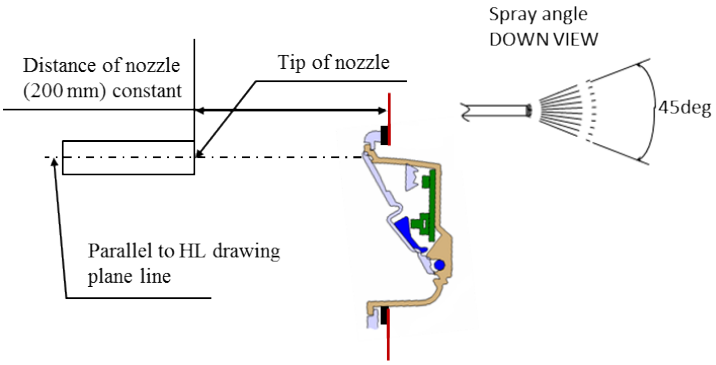
Test method:

Mount the test sample on the normal position of the test stand and conduct the test based on the condition listed below.

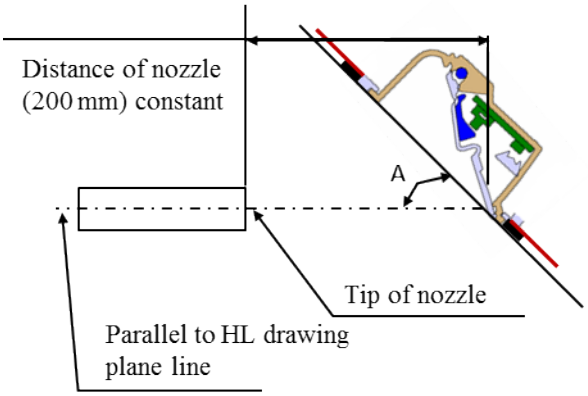
Spray water pressure:	7.85 MPa (80 kgf/cm2)
Nozzle distance:	20 cm
Spray time:	20 s each
Spray method:	As described below
Lighting condition:	Not lit
Gasket tightening condition:	After tightening, dissipate the gasket reaction force for 72 hours.

Spray method

[1] Move the spray nozzle back and forth two times, starting with the front of the lamp assembly to the body joint section and along the perimeter of joint section of the rear combination lamp.



[2] Move the spray nozzle back and forth two times, starting with the front top of the lamp assembly to the body joint section and along the perimeter of joint section of the rear combination lamp.



*Set the most severe angle against the water hitting the surface for the upper angle A, based on the actual vehicle's mounting layout.

Acceptance criteria:

- Water entering into the lamp
- Appearance
- Insulation resistance
- Sealability of grommet part

5.7 Drop impact/open-close impact test(Slam test)

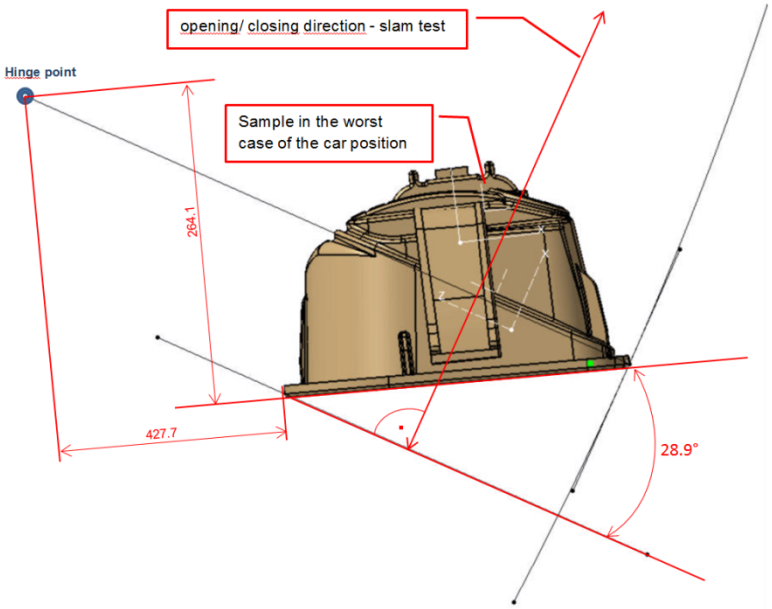
Test method: Shock test machine

Mounting style: the sample is positioned in such a way to apply the inertia forces (in X axis) in the same direction as during the real slam (the final position will be approved between Honda and Witte engineer based on Catia analysis)

Lightning voltage LED is powered during the test U =13.5 V
Number of impact: 50 000
Load application: 30G

Acceptance criteria:

- No unwanted switching
- Fully functional after the test



5.8 Resonance characteristics test

Test method:

Testing voltage:	13.5 V
Vibration frequency:	20 to 2000 Hz
Resonance acceleration:	44.1 m/s^2 (4.5 G) constant
Vibrating direction:	Up/down, right/left, and fore/aft directions
Vibrating duration:	Round-trip 10 min Log sweep/1 cycle
Testing condition:	Continuous activation of the lamp

Acceptance criteria:

- Lamp resonance - No resonance that affects its functionality allowed.
- Abnormal noise - Noise must not occur.
- Deformation or falling off of each part - Deformation and breakage of the lens and housing must not occur.
- Looseness, Disconnection - The LED and socket cover must not fall out. Must not occur.
- Appearance - External view evaluation: 4 points or above

Test with the above vibration conditions, check resonance in each area and movement of SW after the test. If any point with resonance found, apply vibration to the point for 10 million times. (Observe if any ON chattering of SW at a contact point is found or not during the test.)

5.9 Humidity resistance operation durability test

Test method:
Testing voltage: 13.5 V
Lighting condition: Same as the heat resistance durability test
Testing temperature: +60°C
Testing humidity: 90%
Testing duration: 1,000 h

After completing the test written above, leave the sample in room temperature and normal humidity for 2 more hours, and check items listed in the right.

Acceptance criteria:

- Luminous intensity value
- Airtightness
- Appearance
- Looseness
- Insulation resistance
- Current value
- LED breakage
- Conductivity

The amount of generation of Whisker is less than 1/2 length of electrode interval distance.

5.10 Vibration resistance test

Testing method: Based on JIS D1601 (vibration test type 1 class B)
Testing voltage: Design voltage
Vibration frequency: 33Hz
Vibration acceleration: 44.1 m/s^2 (4.5G)
Total amplitude: 2 mm
Lighting condition: Turn them on in all vibrating directions – X,Y,Z

Vibrating direction and vibrating duration:
Up/down directions for 4 hours
Right/left directions for 4 hours
Fore/aft directions for 2 hours
Lighting direction:
Continuous activation of the lamp

Acceptance criteria:

- Deformation of each part
- Falling out, detachment
- Appearance
- Airtightness
- Insulation resistance
- Looseness
- Abnormal noise

5.11 Weather resistance test

Check item/Condition and method
Testing method (1): Based on JIS D0205 (the accelerated weathering test)
Testing condition: Conduct the test with the subject on an actual vehicle condition.
Testing device: Accelerated weathering machine
Sunshine carbon weather meter or ultraviolet carbon weather meter
Black panel:
Specified thermometer reading: 63±5° C
Purified water spray duration: Spray duration 12 minutes, rest for 48 minutes.
Testing duration: 2,000 h (transparent optical part), 1,500 h (exterior housing)
After completing the test, wipe off any debris from the surface and verify it.

Accepted criteria:

- Changes in light color,
- Chromaticity and glossiness

6 TESTING OF SWITCH

6.1 General performance

6.1.1 Temperature voltage characteristics test

Test method:

Test voltage:	4.5 V, 5 V, 5.5 V (LOCK SW)
	10 V, 12 V, 16 V (OPEN SW)
Test temperature:	-30°C, 25°C, +80°C
Test methods:	Check SW performance after 2 hours exposure at each temperature.

For measurements of low temp.(-30°C) and high temp.(+80°C), right after taking the sample out of a constant temperature bath, install it in a measuring device and measure in room temperature.

Acceptance criteria:

- General characteristics
- Malfunction

6.1.2 Strength characteristics test

Test method:

Test temperature:	-30°C, room temperature, +80°C
Where to apply load:	an entire surface of operating area
Load to be applied:	F=392 N (OPEN SW)
	F=98 N (LOCK SW)

After 2 hours exposure in each temperature, apply a load in SW indenting direction, and check general characteristics of SW after the test. For measurements of low temperature (-30°C) and high temperature

(80°C), right after taking the sample out of a constant temperature bath, install it in a measuring device and measure in room temperature.

Acceptance criteria:

- General characteristics
- Breaking strength and deformation
- Appearance and shape

6.2 Durability performance test

6.2.1 Thermal shock durability test

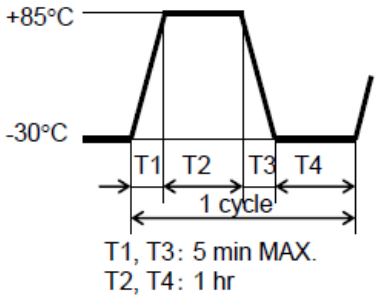
Test method:

Installing posture:	Equivalent to installation in an actual vehicle
Test voltage:	N/A
Thermal cycle:	Refer to the right diagram
Testing temperature:	-30°C up to +85°C
Frequency of test cycle:	500 cycles
Test methods:	After completing the test written above, expose to room temperature and normal humidity for 2 more hours, and check items listed in the right.

The amount of generation of Whisker is less than 1/2 length of electrode interval distance

Acceptance criteria:

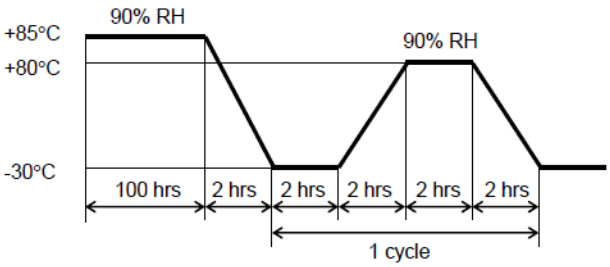
- General characteristics
- Appearance and shape
- Strength of electrical junction
- Water proof property
- Play and looseness in each area
- Operation



6.2.2 Thermo-cycle durability test

Test method:

Installing posture:	Equivalent to installation in an actual vehicle
Test voltage:	N/A
Operating cycle conditions:	As follows -30°C/+80°C/90%RH



+85°C, 90%RH:	After leaving for 100 hours
Thermal 10 cycles:	Exposure

Thermal 10 cycles: Operation
Operating cycle shall conform to Cycle operation durability test.

After completing the test written above, expose to room temperature and normal humidity for 1 more hour, and check items listed in the right.

Acceptance criteria:

- General characteristics
- Appearance and shape
- Water proof property
- Play and looseness in each area
- Wear in each area
- Operation

6.2.3 Thermal and humidity cycle vibration electrification durability test

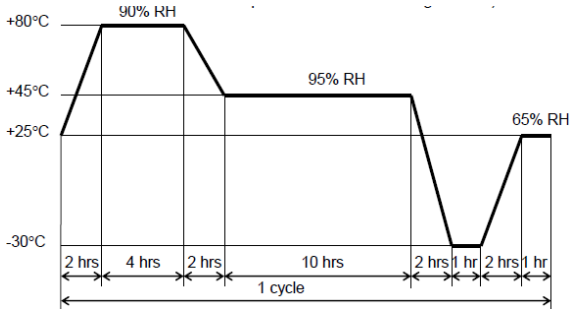
Test method:

Installing posture: Equivalent to installation in an actual vehicle
SW state: OFF
Vibrating conditions: Vibration frequency 20 to 200 Hz
Vibration acceleration: 21.56m / sec2 (2.2G)
Sweep time: 15 min, log sweep (reciprocation)
Apply vibration sequentially during the test.
Acceleration control: The jig side nears the SW ASSY attachment portion.
Number of test cycles: 5 cycles

After completing the test written above, check items listed in the right as it is (Observe if any ON chattering of SW at a contact point is found or not during the test.)

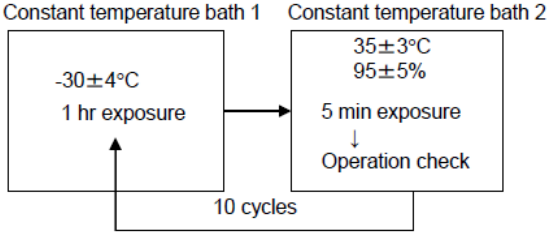
Acceptance criteria:

- General characteristics
- Appearance and shape
- Corrosion, galvanic corrosion
- Intrusion of water, dust
- Water proof property
- Play and looseness in each area
- Operation



6.2.4 Condensation durability test

Installing posture: Equivalent to installation in an actual vehicle
Durability mode:



Test method:

1. Set one constant temperature bath to 35±3°C of temperature, 95%±5% of humidity, and leave for 1 hour or more.
2. Put a test sample into the other constant temperature bath, leave for 1 hour at -30°C±4°C.
3. Then take out the test sample and leave it in the constant temperature bath provided in 1. for 5 minutes.
4. After that, operate the sample promptly. (The sample shall operate normally)
5. Repeat the above 2. to 4. for 10 cycles sequentially.
6. Right after completion of the test, check items listed in the right as it is. (Without removing water drops.) Then leave it in room temperature and normal humidity for 12 more hours and check those items again.

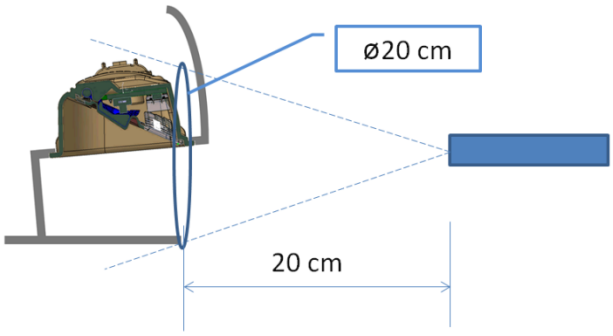
Acceptance criteria:

- General characteristics
- Appearance and shape
- Operation

6.2.5 Water spray test

Installing posture: Equivalent to installation in an actual vehicle
Test voltage: N/A
Water spraying conditions:

Spray water using a high pressure washer.
Discharging pressure: 5884KPa /58.84 bar
Discharging volume: 25~30L/min
Distance from the nozzle: 20cm
Amount of diffusion from the nozzle: ø20cm
Spray time：20sec



Test method:
After completing the test written above, check items listed in the right.
Test 1. and Test 2. is performed respectively.
(The coupler should be water-proofing.)

Acceptance criteria:

- General characteristics
- Appearance and shape
- Corrosion, galvanic corrosion
- Intrusion of water, dust
- Play and looseness in each area