

# GPR-H600-A SPECIFICATIONS (New)



**TO :**

CAT.NO.	DC RELAY PRODUCT NAME
GPR-H600-A	

**REMARKS :**

ACCEPTABILITY OF SPECIFICATION :

ACCEPTED BY :

ON :

PLEASE CONTACT....

AEC Inc., 1101 Lafayette Street, Elkhart, Indiana 46516, USA. [www.aecensors.com](http://www.aecensors.com)

Toll: 888 847 6552, Tel: +1 574 295 6330, Fax: +1 574-293-8013, [sales@aecensors.com](mailto:sales@aecensors.com)

LS ELECTRIC Co.,Ltd	DATE  Jun. 28. 2021	APPROVED BY
	PREPARED BY	CHECKED BY

DC RELAY SPECIFICATIONS				LS ELECTRIC Co.,Ltd
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- 1) Type ; GPR-H600-A  
 2) Characteristic

2-1. Rating

Frame		GPR-H600-A		
Pole ( P )		1		
Rated insulation voltage ( Ui )		DC1500V		
Rated impulse withstand voltage (Uimp)		8kV		
Rated operational voltage (Ue)		DC1500V		
Rating	Conventional thermal current (Ith)		600A	
	Rated operational Current Ie (A)	L/R<1mS	DC1500V	200A
		L/R<1mS	DC1000V	320A
	Short Time withstand Current	120s		1000A
		6Min		800A

2-2. Coil Data

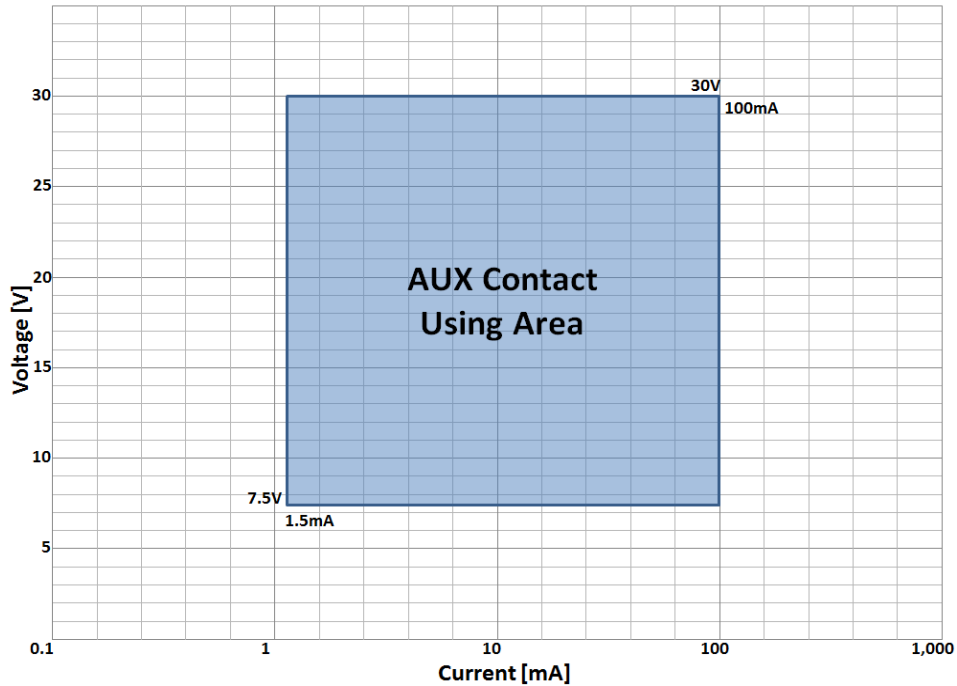
Frame	GPR-H600-A	
Rated Voltage	12VDC	24VDC
Pick-up Voltage (Initial at 20°C)	Max. 9VDC	Max. 18VDC
Drop-out Voltage (Initial at 20°C)	Min. 1.2VDC	Min. 2.4VDC
Max. Allowable Voltage	15VDC	30VDC
Rated Inrush Current (at 20°C)	4.6A	2.3A
Power Consumption (at 20°C)	5.0W	5.0W
Coil Resistance (at 20°C)	2.6Ω/29Ω (±10%)	10Ω/110Ω (±10%)

2-3. Contact Data

1. Max. Continuous current ; 600A (370mm<sup>2</sup> Conductor)
2. Min. Continuous current ; 1A, DC24V
3. Max. switching current ; 1000A(L/R<1mS) at DC1500V 1 Cycles (Breaking Only)  
 ; 800A (L/R<1mS) at DC1500V 1 Cycles  
 ; 200A (L/R<1mS) at DC1500V 1,500 Cycles  
 ; 150A (L/R<1mS) at DC1500V 6,050 Cycles  
 ; 450A (L/R<1mS) at DC 600V 1,000 Cycles  
 ; 300A (L/R<1mS) at DC 600V 6,000 Cycles

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4. Contact Voltage Drop( Initial) ; 0.04V @ 20A  
 5. Aux, Contact Current, Max ; DC30V 100mA  
 6. Aux, Contact Current, Min ; DC7.5V 1.5mA



2-4. Expected Life

1. Electrical Life

- (L/R<1mS, Max Cut Off) ; DC1500V, 1000A, 1ops. ( - Cycles/h, Duty : 1s On)  
 (L/R<1mS) ; DC1500V, 800A, 1ops. ( - Cycles/h, Duty : 1s On)  
 (L/R<1mS) ; DC1500V, 200A, 1,500ops. (360 Cycles/h, Duty : 1s On, 9s Off)  
 - UL Certification (L/R<1mS) ; DC1500V, 150A, 6,050ops. (360 Cycles/h, Duty : 1s On, 9s Off)  
 (L/R<1mS) ; DC600V, 300A, 6,000ops. (360 Cycles/h, Duty : 1s On, 9s Off)  
 (L/R<1mS) ; DC600V, 450A, 1,000ops. (360 Cycles/h, Duty : 1s On, 9s Off)

2. Reverse Direction Switch-off Life ; Same above  
 3. Mechanical ; Min. 200,000ops. (1800 Cycles/h)

2-5. Initial Breakdown Voltage

1. Between Open Contacts ; 4500Vrms/min (Detection current : 10mA)  
 2. Between Contacts and Coil ; 4500Vrms/min (Detection current : 10mA)  
 3. Between Contacts and Frame ; 4500Vrms/min (Detection current : 10mA)  
 4. Between Coil and Frame ; 4500Vrms/min (Detection current : 10mA)

2-6. Initial Insulation Resistance ; Min. 100MΩ (at DC1000V)

(Between Coil and Contacts/Between contacts of the same polarity)

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2-7. Vibration Resistance

1. Functional ; 10 to 1000 Hz @1.0G  
(Detection Time: 250 $\mu$ s, Time of vibration for each X,Y,Z direction : 8 hours)
2. Destructive ; 10 to 200Hz in increments of 10 @Min. 4.5G  
(Time of vibration for each X,Y,Z direction : 4 hours)

2-8. Shock Resistance

1. Functional ; 49m/s<sup>2</sup> (5G)  
(Relay On: 11ms half sine, 250 $\mu$ s detection time)
2. Destructive ; 196m/s<sup>2</sup> (20G)  
(Relay On: 9ms half sine wave)

2-9. Operate time (at 20°C, Main Terminal) ; Max. 35ms

2-10. Release time (at 20°C, Main Terminal) ; Max. 15ms

2-11. Operating time Interval/duty (at 20°C)

1. LV Coil Off  $\rightarrow$  On  $\rightarrow$  Off (On time) ; 1000ms (Min. & Recommended)
2. LV Coil On  $\rightarrow$  Off  $\rightarrow$  On (Off time) ; 1000ms (Min. & Recommended) - No Load  
; 9000ms (Min. & Recommended) - 360Cycle/h, Load  
; 19000ms (Min. & Recommended) - 180Cycle/h, Load  
; 29000ms (Min. & Recommended) - 120Cycle/h, Load

2-12. Tightening torque

1. Mounting Hole (M6) ; 6 to 8 N·m
2. Main Terminal (M8) ; 9 to 12 N·m

2-13. Unit Weight ; Approx. 1.3kg

2-14. Pollution Degree / Material Group ; 2 / II

3) Operation, Transport, Storage

(Following is the condition of ambient temperature and humidity in case of operation, transport and storage.)

- 3-1. Ambient Temperature ; -40 to 85°C
  - Frame : below 120°C ( RTI, Ambient Temperature 70°C)
  - Main Terminal : below 135°C ( below  $\nabla$ T 65°C, Ambient Temperature 70°C)
  - Coil : below 150°C ( below  $\nabla$ T 80°C, Ambient Temperature 70°C)
- 3-2. Ambient Humidity ; 5 to 95%RH
- 3-3. Storage Temperature ; -40 to 85°C
- 3-4. Storage Humidity ; 5 to 95%RH

4) Degrees of protection of enclosed equipment IP ; IP40

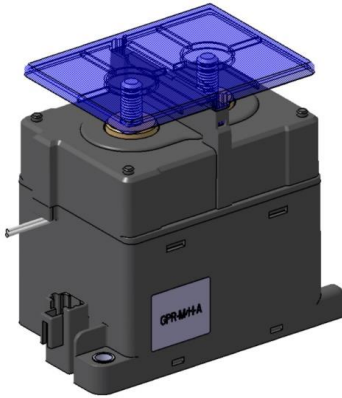
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5) Short-Circuit Current (FUSE Combination) ; 10KA / 200A FUSE DC1500V (Mersen, D72SG120V250QF)

6) Certification of CE & UL (IEC60947-4-1, UL60947-4-1) ※ CCC : Scheduled to be obtained at the end of July 2021 (GB/T14048.4)

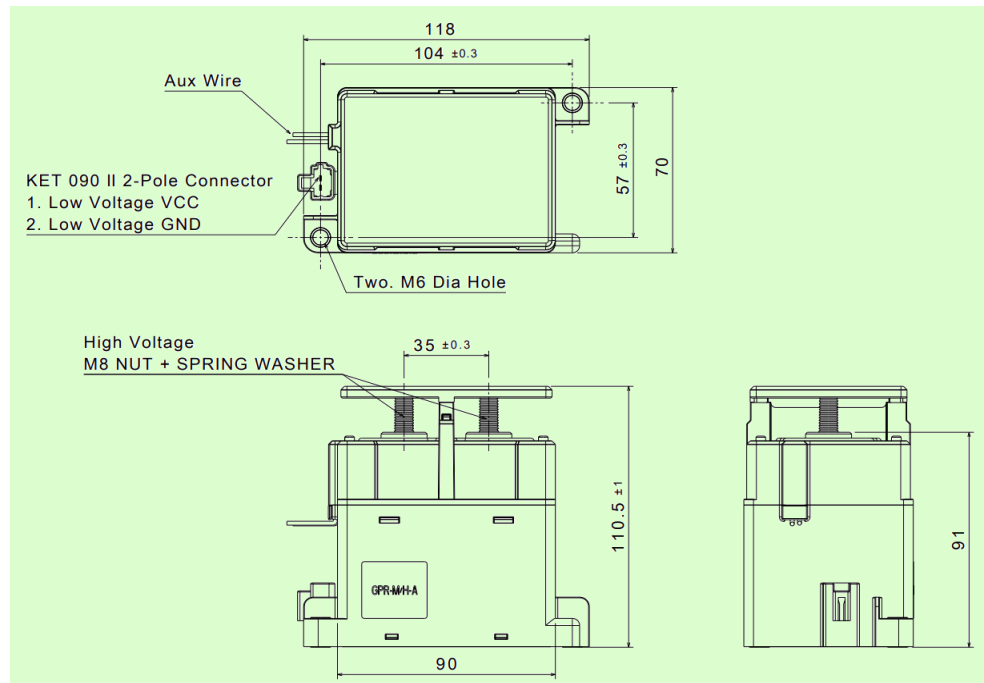
7) Product Design & Accessories

### Coil Terminal Accessory



Housing : MG651026(L)	Terminal : ST730676-3	Accessory(Not included)																	
<table border="1"> <thead> <tr> <th rowspan="2">Part No.</th> <th colspan="2">Wire Range</th> <th rowspan="2">Tab Thick</th> <th colspan="2">Material</th> </tr> <tr> <th>AWG</th> <th>mm<sup>2</sup></th> <th>Thick</th> <th>Finish</th> </tr> </thead> <tbody> <tr> <td>ST730676-3</td> <td>18-16</td> <td>AVSS(CAVS) 0.85-1.25</td> <td>0.64</td> <td>0.25</td> <td>Copper Alloy Pre-Tin</td> </tr> </tbody> </table>	Part No.	Wire Range		Tab Thick	Material		AWG	mm <sup>2</sup>	Thick	Finish	ST730676-3	18-16	AVSS(CAVS) 0.85-1.25	0.64	0.25	Copper Alloy Pre-Tin	<p><b>Components</b>            Coil Terminal Accessory : 1EA            Wire length : 300mm            Nut M8 2EA            Spring-Washer 2EA            Plane-Washer 2EA</p>		
		Part No.	Wire Range		Tab Thick	Material													
AWG	mm <sup>2</sup>		Thick	Finish															
ST730676-3	18-16	AVSS(CAVS) 0.85-1.25	0.64	0.25	Copper Alloy Pre-Tin														

8) Dimension



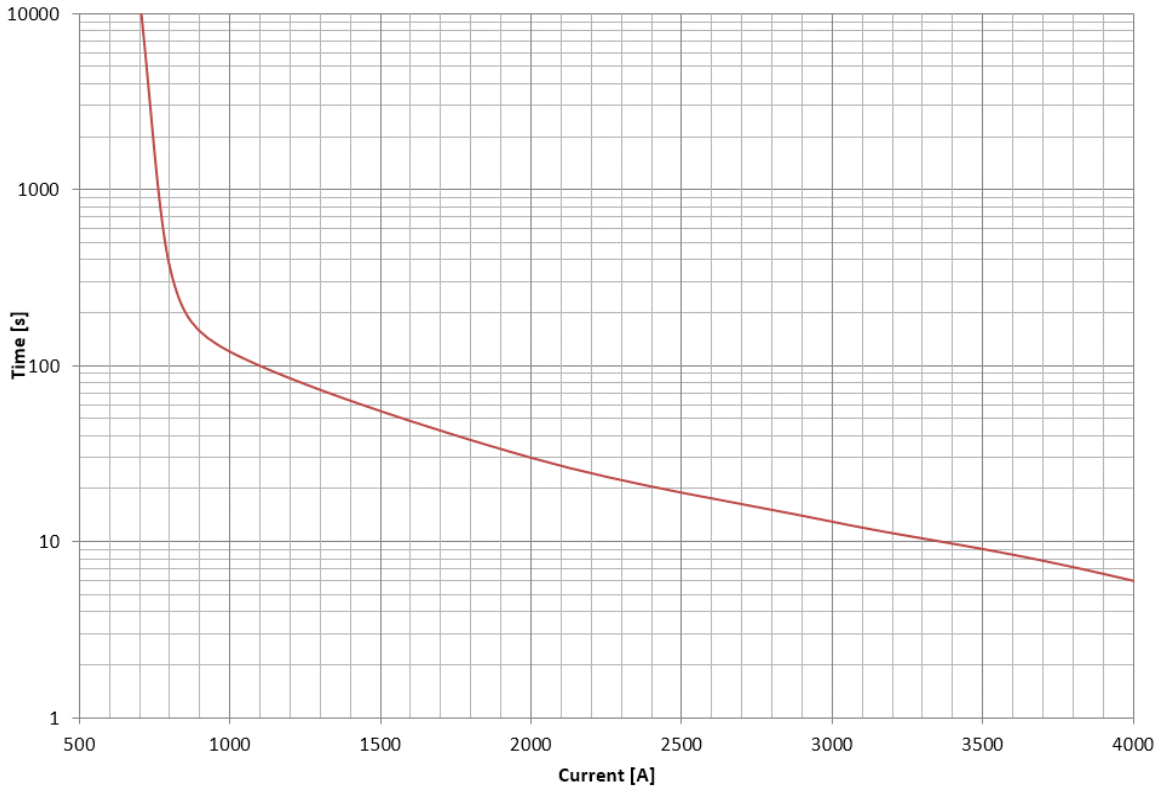
**General Tolerance**  
 Less Than 10: ±0.25 / 10-50: ±0.5  
 More Than 50: ±0.8

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9) Engineering Data

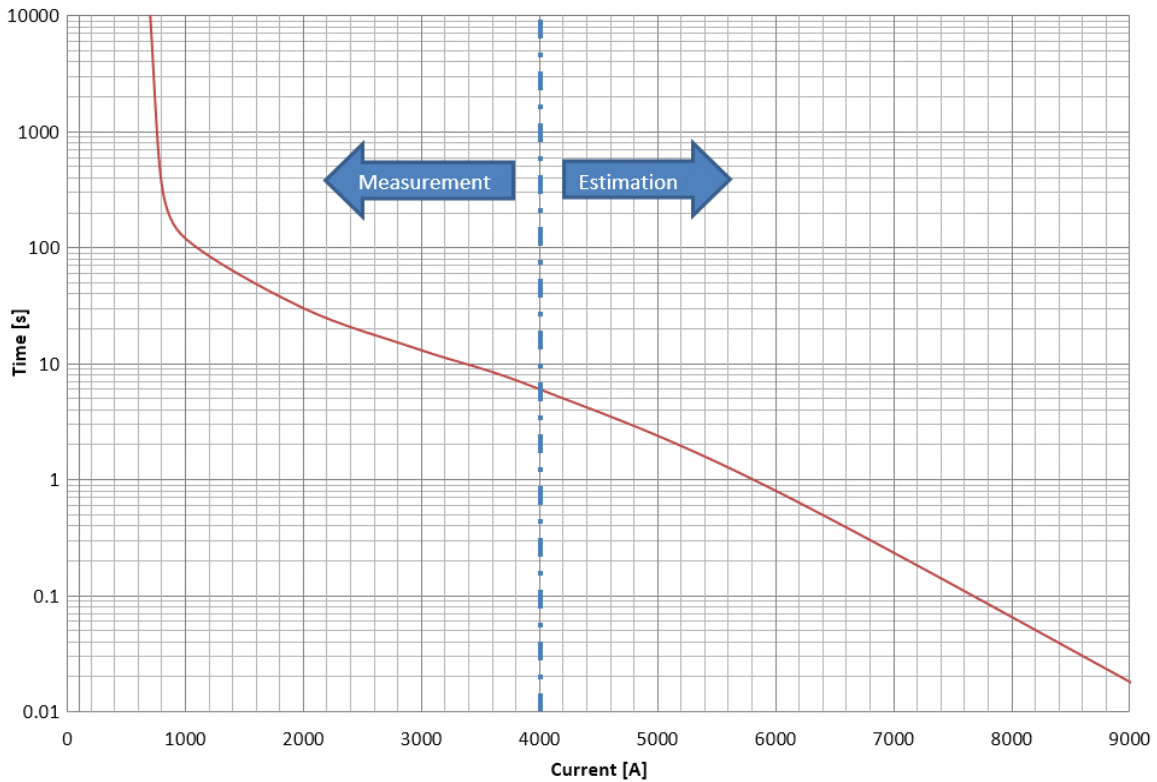
**Carry Current (Continuous, 370mm<sup>2</sup> Conductor) - Measurement**

※ Ambient Temperature : Room (25°C), Criteria :  $\nabla T = 65^\circ C$



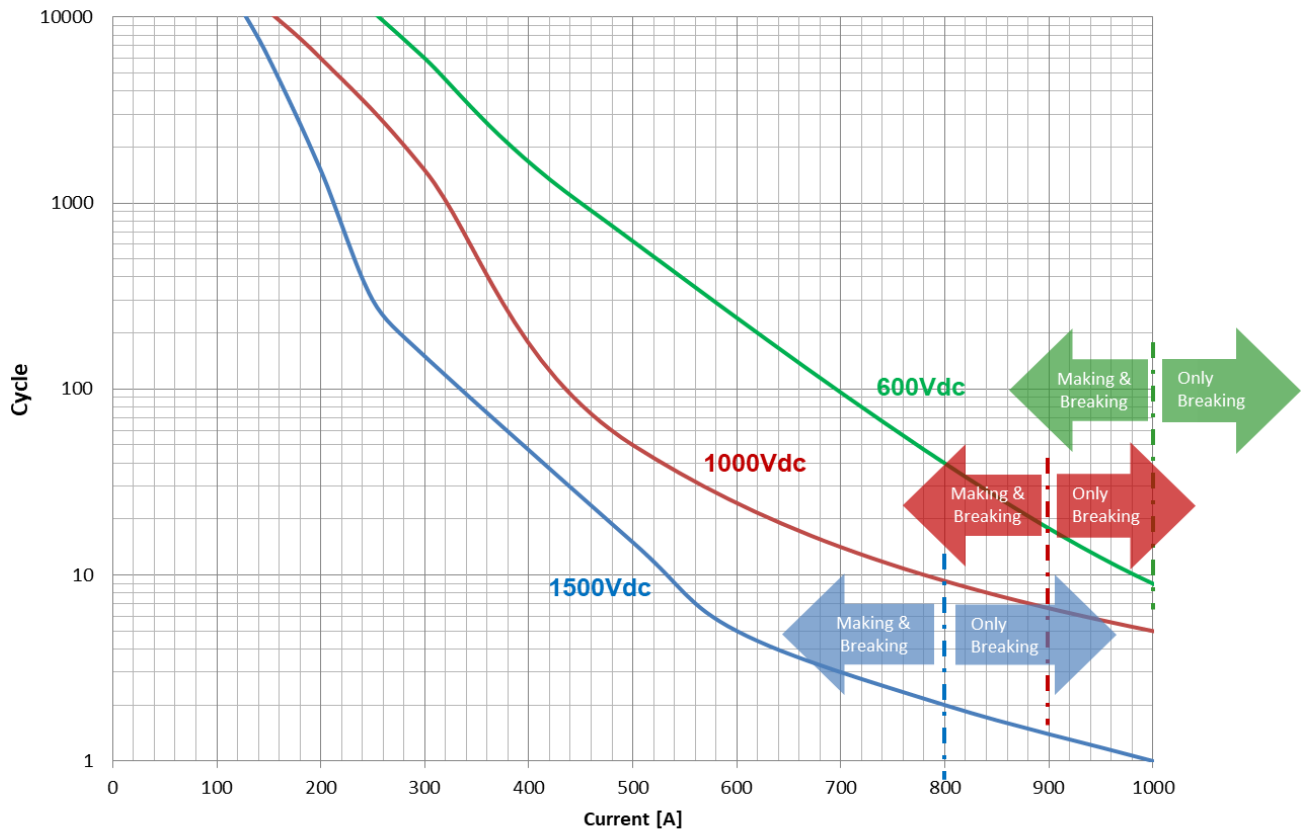
**Carry Current (Continuous, 370mm<sup>2</sup> Conductor) - Measurement & Estimation**

※ Ambient Temperature : Room (25°C), Criteria :  $\nabla T = 65^\circ C$



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### Switching Life (Making & Breaking)



#### 10) Cautions For Use

- Please refer to the general catalog for technical terms and specific cautions for use.
- Pick-up and drop-out voltages should be adjusted to the ambient conditions and temperature for the application of your product.
- The repeated turn-off of the coil (during inrush time or in high coil current) when a relay is powered may cause damage to the relay (built-in electric circuit block).  
So the coil should not be turned off during the process of inrush.
- Lifetime is specified under the standard test conditions (temperature 15 to 35 , humidity 25 to 86%RH) and is determined according to load type, operation frequency, coil driving circuit, and ambient conditions. Also note that contact terminals have polarity.
- The relay which is used in The condition exceeding coil rating, contact rating or cycle lifetime may cause overheating.
- The relay that hits a hard surface may be disabled.
- The slow escalation of the coil voltage may cause the relay unable to be turned on.  
Therefore allow coil the voltage quickly.
- Avoid the cross-connection for it may cause malfunctioning or overheating.

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- The relay that hits a hard surface may be disabled.
- The slow escalation of the coil voltage may cause the relay unable to be turned on.  
Therefore allow coil the voltage quickly.
- Avoid the cross-connection for it may cause malfunctioning or overheating.
- When the screw and nut are tightened to the fixed relay housing or main circuit terminal, it should be used within the range of torque specified in the catalog.
- If relays are closely mounted or placed close to a heat-generating object, carefully check the abnormal temperature rise and the distance of insulation between the terminals outside the relay, and keep the distance between relays to the minimum of 10mm.
- Avoid the sticking of oil and foreign substances to the main terminal part since this may cause the terminal part to emit unusual heat. Also the tightening torque should be applied as recommended when running branches off from the main terminals.
- Be careful in handling the relay when using or storing it in a high temperature environment since the relay contacts are encapsulated in an inert atmosphere.
- If the nominal voltage and current are continuously applied to the coil and a relay is switched off and then on immediately, the coil temperature will rise, leading to the improvement of the relay coil resistance. This will make the pull-in voltage soar to surpass the nominal value. To avoid such situation, it is recommended to take precautions such as increasing load current, restricting time to apply voltage, applying high coil voltage and then nominal voltage, etc.
- In case of using a capacitive load (C-load), take precautions such as pre-charging to the capacitive load in order to prevent the inrush current from exceeding the rated current
- In case of using an inductive load of L/R 1ms, take precautions such as putting surge absorbers in parallel in order to avoid the shortening of electrical life or mis-contact-related problem
- Use the bus bar or wire appropriate to the specific current. For example, the wire with a narrow diameter does not ensure the maximum allowable rated current to contacts.
- Make sure The power supply is disconnected while wiring
- Do not pull with the force of more than 0.5N when pulling a female connector lead wire on the opposite side. Do not give any shock to a relay or it may have some trouble.
- This product is not waterproof. If you want to install it in a place where waterproofing is required, please develop a measure to satisfy the requirement.
- Avoid using the product in the environment in which an organic solvent (e.g. alcohol, benzene, or thinner) and a strong alkali (ammonia or caustic soda) can be easily adhered to the product.
- Additional production should not be implemented on the relay housing.
- AC cut-off relay has no contact polarity, but verify the electrical life by applying the actual load
- The product can be used under 2000m without performance derating by altitude.
- The product can be used under 2000~4000m under DC1500V system.
- And after verification, the product could be used under DC1500V system , but other performance would be derating by altitude (Please refer to the table below)
- Higher than 4000m ,please contact with LSIS(Less than DC1500V system).
- Please consider about the derating by altitude of clearance between the relay and other electrical structure.

Altitude	Derating Factor	
	Rated Operating Voltage	Continuous Current
2000m	1.00	1.00
3000m	0.91	0.98
4000m	0.82	0.96
5000m	0.73	0.94



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11) UL Certification (US)

**CERTIFICATE OF COMPLIANCE**

**Certificate Number** UL-US-L465782-82207102-0  
**Report Reference** E465782-20170228  
**Date** 19-Apr-2021

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements

Model	Category Description
GPR-H, followed by 500 or 600, followed by -A, followed by DC12V or DC24V, maybe followed by alphanumeric suffixes.	Industrial Control Switches

**CERTIFICATE OF COMPLIANCE**

**Certificate Number** UL-US-L465782-82207102-0  
**Report Reference** E465782-20170228  
**Date** 19-Apr-2021

**Issued to:** LS ELECTRIC Co Ltd  
95 Baekbong-ro Heungdeok-gu Cheongju-si ,  
Chungcheongbuk-do,  
Republic of Korea 28439

**This is to certify that representative samples of** NRNT2 - Switches, Industrial Control - Component  
See Addendum Page for Product Designation(s).

Have been investigated by UL in accordance with the component requirements in the Standard(s) indicated on this Certificate. UL Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for installation in complete equipment submitted for investigation to UL LLC.

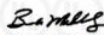
**Standard(s) for Safety:** UL 60947-1, 5th Ed., Issue Date: 2013-07-31, Revision Date: 2019-05-06, UL 60947-4-1, 3rd Ed., Issue Date: 2014-04-04, Revision Date: 2017-10-17


**Additional Information:** See the UL Online Certifications Directory at <https://iq.ulprospector.com> for additional information

This *Certificate of Compliance* does not provide authorization to apply the UL Recognized Component Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Recognized Component Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Recognized Component Mark on the product.

  
Bruce Mahesholz, Director North American Certification Program  
UL LLC



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**Report Reference** E465782-20170228  
**Date** 19-Apr-2021

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GPR-H, followed by 500 or 600, followed by -A, followed by DC12V or DC24V, maybe followed by alphanumeric suffixes.	Industrial Control Switches

UL Certification Program

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12) UL Certification (CA)

## CERTIFICATE OF COMPLIANCE

<b>Certificate Number</b>	UL-CA-L465782-82207102-0
<b>Report Reference</b>	E465782-20170228
<b>Date</b>	19-Apr-2021

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GPR-H, followed by 500 or 600, followed by -A, followed by DC12V or DC24V, maybe followed by alphanumeric suffixes.	Industrial Control Switches

## CERTIFICATE OF COMPLIANCE

<b>Certificate Number</b>	UL-CA-L465782-82207102-0
<b>Report Reference</b>	E465782-20170228
<b>Date</b>	19-Apr-2021

**Issued to:** LS ELECTRIC Co Ltd  
95 Baekbong-ro Heungdeok-gu Cheongju-si ,  
Chungcheongbuk-do,  
Republic of Korea 28439

**This is to certify that representative samples of** NRNT8 - Switches, Industrial Control Certified for Canada - Component  
See Addendum Page for Product Designation(s).

Have been investigated by UL in accordance with the component requirements in the Standard(s) indicated on this Certificate. UL Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for installation in complete equipment submitted for investigation to UL LLC.


**Standard(s) for Safety:** CSA C22.2 NO. 60947-1-13, 2nd Ed., Issue Date: 2013-07-31, CSA C22.2 NO. 60947-4-1-14, 2nd Ed., Issue Date: 2014-04-04


**Additional Information:** See the UL Online Certifications Directory at <https://iq.ulprospector.com> for additional information

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Only those products bearing the UL Recognized Component Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Recognized Component Mark on the product.

  
 Bruce Mahrenholz, Director North American Certification Program



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13) CE/CB Certification

	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="background-color: #0056b3; color: white; padding: 2px;">Ref. Certif. No.</td> </tr> <tr> <td style="text-align: center; padding: 5px;"><b>DK-114551-UL</b></td> </tr> </table>	Ref. Certif. No.	<b>DK-114551-UL</b>
Ref. Certif. No.			
<b>DK-114551-UL</b>			
IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME			
<b>CB TEST CERTIFICATE</b>			
<p><b>Product</b></p> <p><b>Name and address of the applicant</b></p> <p><b>Name and address of the manufacturer</b></p> <p><b>Name and address of the factory</b></p> <p><small>Note: When more than one factory, please report on page 2</small></p> <p><b>Ratings and principal characteristics</b></p> <p><b>Trademark (if any)</b></p> <p><b>Customer's Testing Facility (CTF) Stage used</b></p> <p><b>Model / Type Ref.</b></p> <p><b>Additional information (if necessary may also be reported on page 2)</b></p> <p><b>A sample of the product was tested and found to be in conformity with</b></p> <p><b>As shown in the Test Report Ref. No. which forms part of this Certificate</b></p>	<p>Magnetic Contactor</p> <p>LS ELECTRIC CO LTD 127 LS-RO DONGAN-GU ANYANG-SI, Gyeonggi-do, 14119 REPUBLIC OF KOREA</p> <p>LS ELECTRIC CO LTD 127 LS-RO DONGAN-GU ANYANG-SI, GYEONGGI-DO, 14119 REPUBLIC OF KOREA</p> <p>LS ELECTRIC CO LTD 95 BAEKBONG-RO HEUNGDEOK-GU CHEONGJU-SI, CHUNGCHONGBUK-DO, 28439 REPUBLIC OF KOREA</p> <p><input type="checkbox"/> Additional Information on page 2 See Page 2</p> <p style="text-align: center;"></p> <p>CTF Stage 2</p> <p>GPR-H600-A</p> <p><input type="checkbox"/> Additional Information on page 2</p> <p>IEC 60947-4-1:2018, IEC 60947-1:2007, IEC 60947-1:2007/AMD1:2010, IEC 60947-1:2007/AMD2:2014</p> <p>NC10517-D48-CB-1 issued on 2021-05-20</p>		
This CB Test Certificate is issued by the National Certification Body			
 <p>Date: 2021-06-15</p>	<p><small> <input type="checkbox"/> UL (US), 333 Pfingsten Rd IL 60062, Northbrook, USA  <input checked="" type="checkbox"/> UL (Denmark), Srovgvang SA DK-2750 Ballerup, DENMARK  <input type="checkbox"/> UL (JP), Marunouchi Trust Tower Main Building 6F, 1-8-3 Marunouchi, Chiyoda-ku, Tokyo 100-0005, JAPAN  <input type="checkbox"/> UL (CA), 7 Underwriters Road, Toronto, M1R 3B4 Ontario, CANADA </small></p> <p style="text-align: right;"><small>For full legal entity names see <a href="http://www.ul.com/nbcnames">www.ul.com/nbcnames</a></small></p> <p style="text-align: center;">   Signature:  Jan-Erik Storgaard </p>		