



Test Report issued under the responsibility of:



TEST REPORT IEC 60947-5-1

Part 5: Control circuit devices and switching elements Electromechanical control circuit devices

Report Number..... 11CA60677

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CB Testing Laboratory UL INTERNATIONAL DEMKO A/S

Address Borupvang 5A, 2750 Ballerup, Denmark

Applicant's name..... LSIS Co., Ltd.

Address CHEONG JU PLANT 1, Song Jung-Dong, Hung Duk-Ku, Cheong Ju-Shi, Chung Cheong Buk-Do, 361-720, Korea

Test specification:

Standard..... IEC 60947-5-1: 2003 (3rd Edition) + A1: 2009 / IEC 60947-1:2007

Test procedure CB Scheme

Non-standard test method..... N/A

Test Report Form No. IEC60947_5_1D

Test Report Form(s) KEMA Quality BV

Originator

Master TRF..... Dated 2010-01

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Test item description Auxiliary Devices -
Auxiliary contactors, Mechanical Interlock Unit, Separate Mounting Unit

Trade Mark.....



Manufacturer LSIS Co., Ltd.

CHEONG JU PLANT 1, Song Jung-Dong, Hung Duk-Ku, Cheong Ju-Shi, Chung Cheong Buk-Do, 361-720, Korea

Factory..... LSIS Co., Ltd.

CHEONG JU PLANT 1, Song Jung-Dong, Hung Duk-Ku, Cheong Ju-Shi, Chung Cheong Buk-Do, 361-720, Korea

Model/Type reference Contactor Relays;

GMR-4M, GMR-4MD (GMR-4M : AC Coil, GMR-4MD : DC Coil)

GMR-4MC, GMR-4MDC, GMR-4MF, GMR-4MDF, GMR-4MP, GMR-4MDP

GMR-5M , GMR-5MD : GMR-4M + AU-1M

GMR-5MC, GMR-5MDC, GMR-5MF, GMR-5MDF, GMR-5MP, GMR-5MDP

GMR-6M, GMR-6MD : GMR-4M + AU-2M

GMR-6MC, GMR-6MDC, GMR-6MF, GMR-6MDF

GMR-8M, GMR-8MD : GMR-4M + AU-4M

GMR-8MC, GMR-8MDC, GMR-8MF, GMR-8MDF

Auxiliary Contacts : AU-1M, AU-2M, AU-4M

Mechanical Interlock Unit : AR-12M

Separate Mounting Unit : AZ-12M

Ratings GMR-4M, GMR-4MD, AU-1M : AC-15, DC-13

See Table 1A and 1B

AU-2M, AU-4M : AC-15, DC-13 rated upto 250 V, See Table 1A and 1B

Table 1A

Type			GMR-4M, GMR-4MD		GMR-6M, GMR-6MD		GMR-8M,GMR-8MD	
Conventional free air thermal current (Ith)			10					
Short circuit protection			Fuse	gL-gG 10A *1				
			Ue/"r"	600V / 1kA				
Current	AC-15 (A600)	Rated Operationa Current (A)	120V	6	6		6	
			240V	3	3		3	
			380V	1.9	1.9		1.9	
			480V	1.5	1.5		1.5	
			500V	1.4	1.4		1.4	
			600V	1.2	1.2		1.2	
	DC-13 (Q600 for GMR-4M, Q300 for AU-2M, AU-4M)	Rated Operationa Current (A)			GMR-4M	AU-2M	GMR-4M	AU-4M
			125V	0.55	0.55	0.55	0.55	0.55
			250V	0.27	0.27	0.27	0.27	0.27
			400V	0.15	0.15	-	0.15	-
			500V	0.13	0.13	-	0.13	-
			600V	0.1	0.1	-	0.1	-

*1. Fuse : Model gL-gG, 10 A

Table 1B

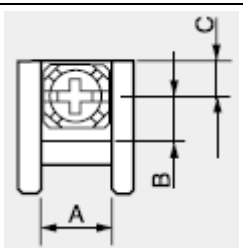
Type			AU-1M	AU-2M	AU-4M
Conventional free air thermal current (Ith)			10		
Short circuit protection		Fuse	gLgG 10A *2		
		Ue/"r"	600V / 1kA		
Current	AC-15 (A600)	Rated Operational Current (A)	120V	6	6
			240V	3	3
			380V	1.9	1.9
			480V	1.5	1.5
			500V	1.4	1.4
			600V	1.2	1.2
	DC-13 (Q600 for AU-1M, Q300 for AU-2M, AU-4M)	Rated Operational Current (A)	125V	0.55	0.55
			250V	0.27	0.27
			400V	0.15	-
			500V	0.13	-
			600V	0.1	-

*2. Fuse : Model gL-gG, 10 A

Rated Insulation Voltage (U_i) : 690 VacRated Impulse Withstand Voltage (U_{imp}) : 6 kV

Contactor Relay & Auxiliary Contacts:

a) Tightening Torque & Wire Size

	Screw	Wire Size (mm ²)	Torque (kgf · cm)	AXBXC (mm)	
Auxiliary Contact	M3.5	0.75 – 1.5	8	7.6X4X4.5	
Coil Terminal					


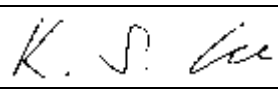

b) IP rating for terminals : IP20

c) All Coil voltages and frequency for the contactor relays

	Frequency / Power Consumption	Coil Control voltages
AC	50 Hz	24, 36, 42, 48, 110, 115, 120, 127, 200, 220, 230, 256, 277, 380, 400, 440, 480, 500, 550
	60 Hz	24, 36, 42, 48, 110, 115, 120, 127, 208, 220, 230, 240, 256, 277, 380, 400, 440, 480, 500, 550
DC	3W	12, 20, 24, 36, 42, 48, 60, 72, 110, 120, 125, 220, 240, 250
	2W	12, 20, 24, 48, 72, 110, 120
	1.2W	12, 20, 24, 48, 72, 110, 120

d) Contact element (figure / form) / no. of contacts

No. of Poles (No. of Contacts)	Composition of Contacts (Figure / Form)	Type Designation		Remarks
		AC- Operating Type	DC- Operating Type	
4 Pole	4b) 4X 4b) 3X 1Y 4b) 2X 2Y 4b) 1X 3Y 4b) 4Y	GMR-4M	GMR-4MD	
6 Pole	4b) 6X 4b) 5X 1Y 4b) 4X 2Y 4b) 3X 3Y 4b) 2X 4Y	GMR-6M	GMR-6MD	Combination of Contactor Relay GMR-4M and Auxiliary Contact Unit AU-2M.
8 Pole	4b) 8X 4b) 7X 1Y 4b) 6X 2Y 4b) 5X 3Y 4b) 4X 4Y	GMR-8M	GMR-8MD	Combination of Contactor Relay GMR-4M and Auxiliary Contact Unit AU-4M.

Testing procedure and testing location:		
<input type="checkbox"/>	CB Testing Laboratory:	UL INTERNATIONAL DEMKO A/S
Testing location/ address		Borupvang 5A, 2750 Ballerup, Denmark
<input type="checkbox"/>	Associated CB Laboratory:	N/A
Testing location/ address		N/A
Tested by (name + signature)		N/A
Approved by (+ signature)		N/A
<input type="checkbox"/>	Testing procedure: TMP	N/A
Testing location/ address		N/A
Tested by (name + signature)		N/A
Approved by (+ signature)		N/A
<input checked="" type="checkbox"/>	Testing procedure: WMT	LSIS Co., Ltd.
Testing location/ address		CHEONG JU PLANT 1, Song Jung-Dong, Hung Duk-Ku, Cheong Ju-Shi, Chung Cheong Buk-Do, 361-720, Korea
Tested by (name + signature) :		Jae-Kyu Park 
Witnessed by (+ signature) :		KangSik Lee 
Approved by (+ signature) :		S. Chandrakumar 
<input type="checkbox"/>	Testing procedure: SMT	N/A
Testing location/ address		N/A
Tested by (name + signature)		N/A
Approved by (+ signature)		N/A
Supervised by (+ signature)		N/A
<input type="checkbox"/>	Testing procedure: RMT	N/A
Testing location/ address		N/A
Tested by (name + signature)		N/A
Approved by (+ signature)		N/A
Supervised by (+ signature)		N/A

Summary of testing:	
<p>Tests performed (name of test and test clause):</p> <p>Sequence I;</p> <p>Test No. 1 – Operating limits of contactor relays (8.3.3.2), if applicable</p> <p>Test No. 2 – Temperature rise (8.3.3.3)</p> <p>Test No. 3 – Dielectric properties (8.3.3.4)</p> <p>Test No. 4 – Mechanical properties of terminals (8.2.4 of IEC 60947-1)</p> <p>Sequence II;</p> <p>Test No. 1 – Making and breaking capacities of switching elements under normal conditions (8.3.3.5.2)</p> <p>Test No. 2 – Dielectric verification (8.3.3.5.5 b))</p> <p>Sequence III;</p> <p>Test No. 1 – Making and breaking capacities of switching elements under abnormal conditions (8.3.3.5.3)</p> <p>Test No. 2 – Dielectric verification (8.3.3.5.5 b))</p> <p>Sequence VI;</p> <p>Test No. 1 – Performance under conditional short-circuit current (8.3.4)</p> <p>Test No. 2 – Dielectric verification (8.3.3.5.5 b))</p> <p>Sequence V;</p> <p>Test No. 1 – Degree of protection of enclosed control circuit devices (annex C of IEC 60947-1)</p> <p>Test No. 2 – Verification of actuation force or moment (8.2.5)</p> <p>Sequence VI;</p> <p>Test No. 1 – Measurement of clearances and creepage distances, if applicable (7.1.3)</p> <p>Test No. 2 – Verification of limitation of rotation of a rotary switch (8.2.6)</p>	<p>Testing location:</p> <p>LSIS Co., Ltd.</p>

Testing items reference Table with representative samples

Table 2A

Seq	Test Condition	GMR-4M	GMR-6M	GMR-8M	Remark
I	1) Operating limits of contactor relays (8.3.3.2), if applicable 2) Temperature-rise (8.3.3.3 and 8.3.3.3 of Part 1) 3) Dielectric properties (8.3.3.4 and 8.3.3.4 of Part 1) 4) Mechanical properties of terminals (8.2.4 of Part 1)	○	N/A	○	GMR-6M (GMR-4M+AU-2M) GMR-8M (GGMR-8M+AU-4M)
II	1. Making and breaking capacities of switching elements under normal conditions (8.3.3.5.2) 2. Dielectric verification (8.3.3.5.5.b)	○	N/A	N/A	
	Making and breaking capacities: AC-15, 120V, 6A (NO)	6A			
	Making and breaking capacities: AC-15, 120V, 6A (NC)	6A			
	Making and breaking capacities: AC-15, 380V, 1.9A (NO)	1.9A			
	Making and breaking capacities: AC-15, 380V, 1.9A (NC)	1.9A			
	Making and breaking capacities: AC-15, 600V, 1.2A (NO)	1.2A			
	Making and breaking capacities: AC-15, 600V, 1.2A (NC)	1.2A			
	Making and breaking capacities: DC-13, 125V, 0.55A (NO)	0.55A			
	Making and breaking capacities: DC-13, 125V, 0.55A (NC)	0.55A			
	Making and breaking capacities: DC-13, 600V, 0.1A (NO)	0.1A			
	Making and breaking capacities: DC-13, 600V, 0.1A (NC)	0.1A			
III	1. Making and breaking capacities of switching elements under abnormal conditions (8.3.3.5.3) 2. Test of dielectric properties (8.3.3.5.5.b)	○	N/A	N/A	
	Making and breaking capacities: AC-15, 120V, 6A (NO)	6A			
	Making and breaking capacities: AC-15, 120V, 6A (NC)	6A			
	Making and breaking capacities: AC-15, 380V, 1.9A (NO)	1.9A			
	Making and breaking capacities: AC-15, 380V, 1.9A (NC)	1.9A			
	Making and breaking capacities: AC-15, 600V, 1.2A (NO)	1.2A			
	Making and breaking capacities: AC-15, 600V, 1.2A (NC)	1.2A			
	Making and breaking capacities: DC-13, 125V, 0.55A (NO)	0.55A			
	Making and breaking capacities: DC-13, 125V, 0.55A (NC)	0.55A			
	Making and breaking capacities: DC-13, 600V, 0.1A (NO)	0.1A			
	Making and breaking capacities: DC-13, 600V, 0.1A (NC)	0.1A			
IV	1. Performance under conditional short-circuit current (8.3.4) 2. Dielectric properties (8.3.3.5.5.b) (AC600V)	○	N/A	N/A	600 Vac, 1 kA
V	1. Degree of protection of enclosed control circuit devices (Annex C of Part 1)	○	N/A	○	8.2.5 not applicable
	2. Verification of actuation force or moment (8.2.5)	N/A	N/A	N/A	
VI	1. Measurement of clearances and creepage distances, if applicable (7.1.3)	○	N/A	○	8.2.6 not applicable
	2. Verification of limitation of rotation of a rotary switch (8.2.6)	N/A	N/A	N/A	

Additional Information :

Test Sequence I : 24 Vac and 48 Vdc coils with both NO and NC are tested to represent the other coil voltages and it was based on the coil power consumption data provided by the manufacturer.

Test Sequence II and III : Contact material and dimension are same for all models. See the test voltage and current below.

Table 2B

Seq	Test Condition	AU -1M	AU -2M	AU -4M	AR -12	AZ -12M	Remark
I	1) Operating limits of contactor relays (8.3.3.2), if applicable 2) Temperature-rise (8.3.3.3 and 8.3.3.3 of Part 1) 3) Dielectric properties (8.3.3.4 and 8.3.3.4 of Part 1) 4) Mechanical properties of terminals (8.2.4 of Part 1)	○	N/A	N/A	○	N/A	
II	1. Making and breaking capacities of switching elements under normal conditions (8.3.3.5.2) 2. Dielectric verification (8.3.3.5.5.b)	N/A	N/A	○	○	○	
	Making and breaking capacities: AC-15, 120V, 6A (NO)			6A			
	Making and breaking capacities: AC-15, 120V, 6A (NC)			6A			
	Making and breaking capacities: AC-15, 380V, 1.9A (NO)			1.9A			
	Making and breaking capacities: AC-15, 380V, 1.9A (NC)			1.9A			
	Making and breaking capacities: AC-15, 600V, 1.2A (NO)			1.2A			
	Making and breaking capacities: AC-15, 600V, 1.2A (NC)			1.2A			
	Making and breaking capacities: DC-13, 125V, 0.55A (NO)			0.55A			
	Making and breaking capacities: DC-13, 125V, 0.55A (NC)			0.55A			
	Making and breaking capacities: DC-13, 600V, 0.27A (NO)			0.27A			
	Making and breaking capacities: DC-13, 600V, 0.27A (NC)			0.27A			
III	1. Making and breaking capacities of switching elements under abnormal conditions (8.3.3.5.3) 2. Test of dielectric properties (8.3.3.5.5.b)	N/A	N/A	○	○	○	
	Making and breaking capacities: AC-15, 120V, 6A (NO)			6A			
	Making and breaking capacities: AC-15, 120V, 6A (NC)			6A			
	Making and breaking capacities: AC-15, 380V, 1.9A (NO)			1.9A			
	Making and breaking capacities: AC-15, 380V, 1.9A (NC)			1.9A			
	Making and breaking capacities: AC-15, 600V, 1.2A (NO)			1.2A			
	Making and breaking capacities: AC-15, 600V, 1.2A (NC)			1.2A			
	Making and breaking capacities: DC-13, 125V, 0.55A (NO)			0.55A			
	Making and breaking capacities: DC-13, 125V, 0.55A (NC)			0.55A			
	Making and breaking capacities: DC-13, 600V, 0.27A (NO)			0.27A			
	Making and breaking capacities: DC-13, 600V, 0.27A (NC)			0.27A			
IV	1. Performance under conditional short-circuit current (8.3.4) 2. Dielectric properties (8.3.3.5.5.b) (AC600V)	N/A	N/A	○	○	○	
V	1. Degree of protection of enclosed control circuit devices (Annex C of Part 1) 2. Verification of actuation force or moment (8.2.5)	○	N/A	N/A	○	○	
VI	1. Measurement of clearances and creepage distances, if applicable (7.1.3) 2. Verification of limitation of rotation of a rotary switch (8.2.6)	○	N/A	N/A	○	○	

Glow Wire Test : Waived because the same materials and minimum thickness were passed the glow wire test in 11CA60674. See Report # NC10517-D3-CB-1 for test results.

Additional Information :

- 1) AR-12 Test Sequence : Tests were done with Magnetic Contactor. See the TRF of 11CA60674.
- 2) AZ-2M Test Sequence : Tests were done with Thermal overload relay. See the TRF of 11CA60676.
- 3) Ir : Prospective current 1 kA
- 4) Iq : Conditional short-circuit current - None

Annexure**Annexure 1 - Photographs of All Models (Assembled)****Annexure 2 - Photographs of All Models (Disassembled)****Annexure 3 - Wire Connection Type****Annexure 4 - Composition of Auxiliary contact****Annexure 5 - short circuit withstand oscillograms****Annexure 6 - Short-Circuit Test Details****Annexure 7 - Installation Instructions or manufacturer published literature****Annexure 8 - Product / Circuit diagram / Component Drawings****Summary of compliance with National Differences : N/A**

Copy of Marking Plate

LS CONTROL RELAY 보조계전기					
GMR-4M(D)					
AC15		DC13		IEC60947-5-1 JISC4531	
Ue(V)	Ie(A)	Ue(V)	Ie(A)	VDE0660	IP20
120	6	125	0.55	Ui=690V	Ith=10A
240	3	250	0.27		
380	1.9				
480	1.5	440	0.15		
500	1.4	500	0.13		
600	1.2	600	0.1		
AWG12-18 60/75°C Cu-wire only Torque: 7lb.in(0.8Nm) When protected by 10A time delay fuses Short circuit 1kA RMS Sym.,690V Max.					
MADE IN KOREA 79611621029					

LS CONTROL RELAY 보조계전기					
GMR-6M(D)					
AC15		DC13		IEC60947-5-1 JISC4531	
Ue(V)	Ie(A)	Ue(V)	Ie(A)	VDE0660	IP20
120	6	125	0.55	Ui=690V	Ith=10A
240	3	250	0.27		
380	1.9	Contacts			
480	1.5	접점구성			
500	1.4				
600	1.2				
AWG12-18 60/75°C Cu-wire only Torque: 7lb.in(0.8Nm) When protected by 10A time delay fuses Short circuit 1kA RMS Sym.,690V Max.					
MADE IN KOREA 79611621030					

LS CONTROL RELAY 보조계전기					
GMR-8M(D)					
AC15		DC13		IEC60947-5-1 JISC4531	
Ue(V)	Ie(A)	Ue(V)	Ie(A)	VDE0660	IP20
120	6	125	0.55	Ui=690V	Ith=10A
240	3	250	0.27		
380	1.9	Contacts			
480	1.5	접점구성			
500	1.4				
600	1.2				
AWG12-18 60/75°C Cu-wire only Torque: 7lb.in(0.8Nm) When protected by 10A time delay fuses Short circuit 1kA RMS Sym.,690V Max.					
MADE IN KOREA 79611621030					

LS AUX. UNIT 보조접점유닛					
AU-1M					
AC15		DC13		IEC60947-5-1 JISC4531	
Ue(V)	Ie(A)	Ue(V)	Ie(A)	VDE0660	IP20
120	6	125	0.55	Ui=690V	Ith=10A
240	3	250	0.27	Uimp=6kV	
380	1.9				
480	1.5	A600,Q300			
500	1.4	AWG12-18 Cu			
600	1.2	Wire only 60/75°C			
For use only with: GMC(D)-6M, 9M, GMC(D)-12M, 16M					
When protected by 10A time delay fuses Short circuit 1kA RMS Sym.,690V Max.					
MADE IN KOREA 79611621053					




LS AUX. UNIT 보조접점유닛					
AU-2M					
AC15		DC13		IEC60947-5-1 VDE0660	
Ue(V)	Ie(A)	Ue(V)	Ie(A)	VDE0660	Ith=10A Ui=690V Uimp=6kV
120	6	125	0.55		
240	3	250	0.27		
380	1.9				
480	1.5				
500	1.4				
600	1.2				
A600,Q300 AWG12-18 Cu wire only 60/75°C Torque: 7Lb.in For use only with: GMC(D)-6M, 9M, GMC(D)-12M, 16M					
MADE IN KOREA 79611621052					

LS AUX. UNIT 보조접점유닛					
AU-4M					
AC15		DC13		IEC60947-5-1 VDE0660	
Ue(V)	Ie(A)	Ue(V)	Ie(A)	VDE0660	Ith=10A Ui=690V Uimp=6kV
120	6	125	0.55		
240	3	250	0.27		
380	1.9				
480	1.5				
500	1.4				
600	1.2				
A600,Q300 AWG12-18 Cu wire only 60/75°C Torque: 7Lb.in For use only with: GMC(D)-6M, 9M, GMC(D)-12M, 16M					
MADE IN KOREA 79611621051					

The artwork below is only a draft. The use of certification marks and corresponding ratings on a product must be authorized by the respective NCBs that own these marks.

Test item particulars	:	
		N/A
Classification of installation and use	:	
		N/A
Supply Connection.....	:	
		N/A
- kind of control circuit device	:	
		<input type="checkbox"/> manual control switches, e.g. push-buttons, rotary switches, foot switches, ect. <input checked="" type="checkbox"/> electromagnetically operated control switches, either time delayed or instantaneous, e.g. contactor relays <input type="checkbox"/> pilot switches, e.g. pressure switches, temperature sensitive switches (thermostats) <input type="checkbox"/> position switches <input type="checkbox"/> associated control equipment, e.g. indicator lights, etc.
- kind of switching elements.....	:	
		<input checked="" type="checkbox"/> auxiliary contacts of a switching device (e.g. contactor, circuit-breaker, etc) which are not dedicated exclusively for use with the coil of that device <input type="checkbox"/> interlocking contacts of enclosure doors <input type="checkbox"/> control circuit contacts of rotary switches <input type="checkbox"/> control circuit contacts of overload relays
- number of poles	:	
		4, 6 or 8 based on Product catalog number
- kind of current	:	
		<input checked="" type="checkbox"/> ac and/or <input checked="" type="checkbox"/> dc
- interrupting medium	:	
		<input checked="" type="checkbox"/> air, <input type="checkbox"/> oil, <input type="checkbox"/> gas, <input type="checkbox"/> vacuum, <input type="checkbox"/> _____
- operating conditions	:	
- method of operations	:	<input type="checkbox"/> manual <input checked="" type="checkbox"/> electromagnetic <input type="checkbox"/> pneumatic <input type="checkbox"/> electro-pneumatic
- method of control.....	:	<input checked="" type="checkbox"/> automatic <input type="checkbox"/> non-automatic <input type="checkbox"/> semi-automatic

- rated and limiting values for switching elements:	
- voltages:	
- rated operational voltage U_e (V)..... :	600 (See Table 1A and 1B for rating in detail)
- rated insulation voltage U_i (V) :	690
- rated impulse withstand voltage U_{imp} (kV)..... :	6
- currents:	
- conventional free air thermal current I_{th} (A) :	10 A
- conventional enclosed thermal current I_{the} (A).... :	N/A
- rated operational current I_e (A) :	See Table 1A and 1B for rating in detail
- rated frequency (Hz) :	50/60
- utilization category :	AC-15 and DC-13
- short-circuit characteristic:	
- rated conditional short-circuit current (kA) :	1 kA
- kind of protective device..... :	Fuse (gL-gG) rated 600 Vac, 10 A
- electrically separated contact elements..... :	N/A
- actuating quantities for pilot switches..... :	N/A
- pilot switches having two or more contact elements :	N/A
- indication of contact elements of same polarity	N/A
- IP code, in case of an enclosed control device	
	IP 20 for terminals only
- pollution degree	
	3
- Suitability for isolation, with the symbol 07-13-06 of IEC 60617-7	N/A

Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing CHEONG JU PLANT 1, Song Jung-Dong, Hung Duk-Ku, Cheong Ju-Shi, Chung Cheong Buk-Do, 361-720, Korea	
Date of receipt of test item	2012/02/07
Date (s) of performance of tests.....:	2012/02/13 - 2012/05/24
General remarks: The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(see Enclosure #)" refers to additional information appended to the report. "(see appended Table)" refers to a Table appended to the report. Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.	
Manufacturer's Declaration per Sub-clause 6.2.5 of IEC60947-2: The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:	
When differences exist; they shall be identified in the General Product Information section.	
Name and address of factory (ies).....: LSIS Co., Ltd. CHEONG JU PLANT 1, Song Jung-Dong, Hung Duk-Ku, Cheong Ju-Shi, Chung Cheong Buk-Do, 361-720, Korea	
General product information: 1. Contactor relay	
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>GMR-4M</p> </div> <div style="text-align: center;">  <p>GMR-6M</p> </div> <div style="text-align: center;">  <p>GMR-8M</p> </div> </div>	

2. Auxiliary contacts



AU-1M

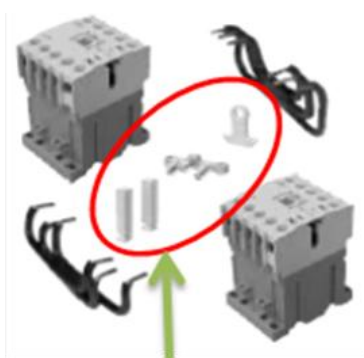


AU-2M



AU-4M

3. Mechanical Interlock Unit




AR-12M

4. Separate Mounting Unit (For TOR)



AZ-12M

5.2	MARKING			
5.2.1	Data shall be preferably marked on the equipment:			
	a - manufacturer's name or trademark			P
	b - type designation or serial number	See the Model/Type references in Page 2		P
	Data shall be included on the nameplate, or on the equipment, or in the manufacturer's published literature:			
	c - number of this standard	IEC 60947-5-1		P
	d - rated operational voltages	600V		P
	e - utilization category and rated operational currents, at the rated operational voltages of the control circuit device	AC-15 and DC-13		P
	f - rated insulation voltage:	690 Vac		P
	g - rated impulse withstand voltage	6 kV		P
	h - switching overvoltages, if applicable			N/A
	i - IP code, in case of enclosed control circuit device	IP 20 for terminals only mentioned in the Manufacturer's Published Literature		P
	j - pollution degree	Pollution degree 3		P
	k - type and maximum ratings of short-circuit protective device	Short-circuit protective device mentioned in the Manufacturer's Published Literature		P
	l - conditional short-circuit current if less than 1000 A			N/A
	m - suitability for isolation, where applicable, with the symbol 07-13-06 of IEC 60617-7			N/A
	n - indication of contact elements of same polarity			N/A
5.2.2	Terminal identification and marking	(See 7.1.8.4 of IEC 60947-1)		P
	Clearly and permanently identified according IEC 60445 and Annex L, unless superseded by relevant standard.	Marked on the product		P
	Neutral terminal identified by letter :			N/A
	Protective earth terminal identified by letter			N/A
5.2.3	Functional markings			N/A
	Actuators may be identified by symbols in the form of engravings, but if a stop button carries any symbol engraved or marked this symbol shall be a circle or oval			N/A

	Letters or words may used where space is available		N/A
	Symbols shall be in accordance with IEC 60417		N/A
5.2.4	Emergency stop		N/A
	Actuator shape and colour, background colour and direction of unlatching for emergency stop devices with mechanical latching function shall be in accordance with 4.2 of IEC 60947-5-5		N/A
5.2.5	Operating diagram		N/A
	As rotary switches may have multiplicity of contacts elements and a multiplicity of actuator positions, it necessary that the manufacturer indicates the relationship between the actuator positions and the associated contact elements position		N/A
5.2.5.1	The position indication shall be clear, and the associated text or symbols shall be indelible and easily legible	Mentioned in the manufacturer's Published Literature	P
5.2.5.2	Terminal markings for operating diagrams	Marked on the product	P
	Terminal markings shall be clearly identifiable with respect to the operating diagram (see also Annex M)		P
5.2.6	Time delay markings		N/A
	The manufacturer shall indicate, for each time-delay contact element, the characteristic of the delay, according to 2.4.1.1 or 2.4.1.2		
5.3	Instructions for installation, operation and maintenance	Mentioned in the manufacturer's Published Literature	P
	The manufacture shall specify, in his documents or catalogues:		P
	- the conditions for installation, operation and maintenance, if any, of the equipment during operation and after a fault	See the annexure 5	P
	- the specify the measures to be taken with regard to EMC, if any,		N/A
	- equipment only suiTable in environment A shall provided with the following notice	NOTICE This product has been designed for environment B may cause unwanted electromagnetic disturbances in which case the user may be required to taken adequate mitigation measures.	N/A
	- if necessary, the instructions for transport, installation and operation of the equipment shall indicate the measures that are particular importance for the proper and correct installation, commissioning and operation of the equipment.		N/A

6	Normal service, mounting and transport conditions		
6.1.1	Ambient temperature	Mentioned in the manufacturer's Published Literature	P
	Ambient air temperature does not exceed +40 °C and its average over 24 hours does not exceed +35°C and the lower limit is –5°C	Storage - Mentioned in the Manufacturer's Published Literature	
6.1.2	Altitude of side of installation does not exceed 2000m		P
6.1.3.1	Relative humidity does not exceed 50 % at max temp +40 °C, higher rel. hum may at lower temperatures e.g. 90% at +20 °C		P
6.1.3.2	Pollution degree	3	P
	Unless otherwise stated, equipment for: - industrial use shall have a degree 3, depending upon micro-environment - household and similar shall have degree 2		P
6.1.4	Shock and vibration		N/A
	Under consideration		N/A
6.2	Conditions during transport and storage	Storage - Mentioned in the Manufacturer's Published Literature	
	Under consideration		N/A
6.3	Mounting	Mentioned in the Manufacturer's Published Literature	P
	Accordinging manufacturer's instruction	See the annexure 5	P
6.3.1	Mounting of single hole mounted devices		N/A
	Dimensions according Table 2		N/A
6.3.1.1	Location of key recess(if any)		N/A
	Dimensions according Table 3		N/A
6.3.1.2	Range of panel thickness		N/A
	The device shall be capable of being mounted on any thickness between 1 and 6 mm		N/A
6.3.1.3	Grouping of devices		N/A
	The distances a between the mounting centres in the same row and b between the centre lines of the rows shall be not less than those given in Table 3. Distances a and b may be interchanged		N/A
7.1	CONSTRUCTION		
7.1.1	Materials	See material Table 7	P

7.1.2	Current-carrying parts and their connection	See material Table 7	P
	No contact pressure through insulating materials		P
7.1.3	Clearances		P
	Clause 7.1.3 of IEC 60947 applies		P
	Minimum values are given in Table 13 and Table 15 of IEC 60947-1		P
	Rated impulse withstand voltage	6 kV	P
	Case B (mm)	Required : 2.0 mm	P
	Case A (mm)	Required : 5.5 mm	P
		Measured: 12.8 mm, See Table 6 (live parts to dead metals parts) for Models GMR-4M, GMR-8M and AU-1M	P
	Creepage distances		P
	Pollution degree	: 3	P
	Comparative tracking index (V)	:	P
	Material group	: IIIa	P
	Rated insulation voltage U_i (V)	: 690	P
	Minimum creepage distances (mm)	: 12.8 mm	P
	Measured creepage distances (mm)	: 12.8 mm, See Table 6 (live parts to dead metals parts) for Models GMR-4M, GMR-8M and AU-1M	P
7.1.4	Actuator		N/A
7.1.4.1	Insulation		N/A
7.1.4.2	Direction		N/A
7.1.4.3	Actuating force (or moment) :		N/A
7.1.4.4	Limitation of rotation (of rotary switch)		N/A
7.1.4.5	Emergency stop		N/A
7.1.5	Indication of the contact position		N/A
7.1.5.1	Indication means		N/A
7.1.5.2	Indication by the actuator		N/A
7.1.6	Conditions for control switches suitable for isolation		N/A
7.1.7	Class II control circuit devices		N/A
	Not provided with means for protective earthing and insulated by encapsulation	See annex F	N/A
7.1.8	Requirements for control devices with integrally connected cables	See annex G	N/A

7.1.11	Degree of protection of enclosed equipment		P
	Degree of protection: IP20 for terminals only		P
	Test for first characteristic		P
	Test for first numeral: <input type="checkbox"/> 1: <input checked="" type="checkbox"/> 2: <input type="checkbox"/> 3: <input type="checkbox"/> 4: <input type="checkbox"/> 5: <input type="checkbox"/> 6:		
	Test for second characteristic		P
	Test for second numeral: <input checked="" type="checkbox"/> 0: <input type="checkbox"/> 1: <input type="checkbox"/> 2: <input type="checkbox"/> 3: <input type="checkbox"/> 4: <input type="checkbox"/> 5: <input type="checkbox"/> 6: <input type="checkbox"/> 7: <input type="checkbox"/> 8:		-
7.2	Performance requirements		P
	Subclauses 7.2.1.1 and 7.2.2 of IEC 60947-1 apply with the following additions:		P
7.2.1.2	Limits of operation of contactor relays		P
	The limits of operation for contactor relays shall be in accordance with IEC 60947-4-1	See clause 8.3.3.2	P
7.2.3	Dielectric properties		P
	Subclause 7.2.3 of IEC 60947-1 applies with the following addition	See clause 8.3.3.4	P
	For class II control circuit devices insulated by encapsulation		N/A
7.2.4	Ability to make and break under normal and abnormal load conditions		P
7.2.4.1	Making and breaking capacities		P
	Making and breaking capacities under normal conditions as state in Table 4	See clause 8.3.3.5.2	P
	Making and breaking capacities under abnormal conditions as state in Table 5	See clause 8.3.3.5.3	P
7.2.4.2	Vacant		N/A
7.2.4.3	Durability		N/A
	Sub-clause 7.2.4.3 of IEC 60947-1 applies with the following additions:		N/A
	Mechanical durability	See Annex C	N/A

	Electrical durability	See Annex C	N/A
7.2.5	Conditional short-circuit current	See clause 8.3.4	P
	The switching element shall withstand the stresses resulting from short-circuit current under the conditions specified in 8.3.4		P
7.2.6	Switching overvoltage		N/A
	Subclause 7.2.6 of IEC 60947-1 applies		
7.2.7	Additional requirements for control switches suiTable for isolation		N/A
	Control switches suiTable for isolation shall be tested according to 8.3.3.4 of IEC 60947-1 with a value of test voltage as specified in Table 14 or IEC 60947-1 corresponding to the rated impulse withstand voltage Uimp declared by the manufacturer.		N/A
	Other additional requirements applicable to such control switches are under consideration		N/A
7.3	Electromagnetic compatibility (EMC)		N/A
	Subclause 7.3 of IEC 60947-1 applies unless otherwise specified in this standard		N/A

8.3.1.a	TEST SEQUENCE I	
Test No. 1	- operating limits of contactor relays (8.3.3.2)	
Test No. 2	- temperature rise (Clause 8.3.3.3.)	
Test No. 3	- dielectric properties (Clause 8.3.3.4)	
Test No. 4	- mechanical properties of terminals (8.2.4 of IEC 60947-1)	

8.3.3.2	Operating limits of contactor relays - Model GMR-8M AC 240V		
9.3.3.2.1	Power-operated equipment:		
8.2.1.2.1	Electromagnetic contactors and starters		
	rated control supply voltage U_s (V)	AC 240 V	P
	frequency (Hz)	60 Hz	P
	declared ambient temperature(>40 °C) for 100% U_s	Close satisfactory at +40 °C	P
	limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage U_s :	See Table 5	P
	limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c. :	See Table 5	P
	ambient temperature(-5 °C) for 100% U_s	Close satisfactory at -5 °C	P
	limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage U_s :	See Table 5	P
	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c. :	See Table 5	P
8.2.1.2.2	Contactors and starters with electronically controlled electromagnet		
	Rated control supply voltage U_s (V)	AC 240 V	P
	Frequency (Hz)	60 Hz	P
	Declared ambient temperature(>40 °C) for 100% U_s		P
	Limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage U_s :	Close satisfactory at +40°C 204.0 V / 60Hz 264.0 V / 60Hz	P
	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c. :	Drop out at +40°C 105.5 V / 60Hz	P
	Ambient temperature(-5 °C) for 100% U_s		P
	Limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage U_s :	Close satisfactory at -5°C 204.0 V / 60Hz 264.0 V / 60Hz	P

	Limits of drop out and open fully are: 75% to 20% for a.c. and 75% to 10% for d.c. :	Drop out at -5°C 101.2 V / 60Hz	P
8.2.1.2.3	Electro-pneumatic contactors and starters		N/A
8.3.3.3	Temperature rise - Model		
	ambient temperature 10-40 C		
	test enclosure W x H x D (mm x mm x mm)	Without enclosure	
	material of enclosure		
	NO-contacts, test conditions:		
	- rated operational current I _e (A)		N/A
	- cable cross-section (mm ²)		N/A
	- temperature rise of NO terminals (K)		N/A
	NC-contacts, test conditions:		
	- rated operational current I _e (A)		N/A
	- cable cross-section (mm ²)		N/A
	- temperature rise of NC terminals (K)		N/A
	Coils and electromagnets, test conditions:		
	- rated control supply voltage U _s (V)		N/A
	- Class of insulating material		N/A
	- temperature rise of coil and electromagnets (K)		N/A
8.3.3.3	Temperature rise : Model GMR-8M, AC 240 V coil		
	ambient temperature 10-40 C	21.3 °C	
	test enclosure W x H x D (mm x mm x mm)	Without enclosure	
	material of enclosure		
	NO-contacts, test conditions:		
	- rated operational current I _e (A)	10 A	P
	- cable cross-section (mm ²)	0.75	P
	- temperature rise of NO terminals (K)	See Table 3	P
	NC-contacts, test conditions:		
	- rated operational current I _e (A)		P
	- cable cross-section (mm ²)		P
	- temperature rise of NC terminals (K)		P
	Coils and electromagnets, test conditions:		
	- rated control supply voltage U _s (V)	AC 240 V	P
	- Class of insulating material	E	P
	- temperature rise of coil and electromagnets (K) :	See Table 3	P

8.3.3.4	Test of dielectric properties, impulse withstand voltage (Uimp indicated):		
	- verification by measurement of clearances instead of testing		N/A
	- rated impulse withstand voltage (V)	6 kV	P
	- test Uimp auxiliary circuits (kV)	7.3 kV	P
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		N/A
	- rated insulation voltage (V)		N/A
	- control and auxiliary circuits, test voltage (V) for 5 sec :		N/A
8.2.4	Mechanical properties of terminals		
8.2.4.2	Mechanical strength of terminals		
	maximum cross-sectional area of conductor (mm ²) :	0.75 mm ² , solid wire	P
	diameter of thread (mm)	6.4 mm	P
	torque (Nm)	0.8 Nm	P
	5 times on 2 separate clamping units		P
	maximum cross-sectional area of conductor (mm ²) :	1.5 mm ² , stranded wire	P
	diameter of thread (mm)	2.2 mm	P
	torque (Nm)	1.13 Nm (1.243 Nm applied)	P
	5 times on 2 separate clamping units		P
8.2.4.3	Testing for damage to and accidental loosening of conductor (flexion test)		
	conductor of the smallest cross-sectional area (mm ²) :	0.75 mm ² , solid wire	P
	number of conductor of the smallest cross section :	1	—
	diameter of bushing hole (mm)	6.4 mm	—
	height between the equipment and the platen (mm) :	260 mm	—
	mass at the conductor(s) (kg) :	0.4 kg	—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	conductor of the smallest cross-sectional area (mm ²) :	0.75 mm ² , stranded	P
	number of conductor of the smallest cross section :	1	—
	diameter of bushing hole (mm)	6.5 mm	—
	height between the equipment and the platen (mm) :	260 mm	—
	mass at the conductor(s) (kg)	0.4 kg	—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P

	conductor of the largest cross-sectional area (mm ²) :	1.5 mm ² , solid wire	P
	number of conductor of the smallest cross section :	1	—
	diameter of bushing hole (mm)	9.5 mm	—
	height between the equipment and the platen (mm) :	280 mm	—
	mass at the conductor(s) (kg)	0.7 kg	—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	conductor of the largest cross-sectional area (mm ²) :	1.5 mm ² , stranded	P
	number of conductor of the smallest cross section :	1	—
	diameter of bushing hole (mm)	9.5 mm	—
	height between the equipment and the platen (mm) :	280 mm	—
	mass at the conductor(s) (kg)	0.7 kg	—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P

8.2.4.4	flexion test - 1 mm ² , solid		
	force (N)	30 N	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
8.2.4.4	Pull-out test - 1 mm ² , stranded		
	force (N)	35 N	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
8.2.4.4	Pull-out test – 2.5 mm ² , solid		
	force (N)	50 N	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
8.2.4.4	Pull-out test – 2.5 mm ² , stranded		
	force (N)	50 N	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P

8.3.1.a	TEST SEQUENCE II	
Test No. 1	- Making and breaking capacities of switching elements under normal conditions (8.3.3.5.2)	
Test No. 2	- Dielectric verification (8.3.3.5.5.b)	

8.3.3.5	TEST SEQUENCE II			
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions – Model GMR-4M, AC-15, 120V, 6A, NO, NC			
	contact element (figure / form)	4b, X (Figure 4)	4b, Y (Figure 4)	
	contact polarity	NO	NC	
	utilization category	AC-15, A600	AC-15, A600	
	rated operational voltage U _e (V)	AC 120 V	AC 120 V	
	rated operational current I _e (A) or power (kW) :	6 A	6 A	
Test No.1	- test voltage U/U _e = 1,1 (V)	L1: 136.3 V L2: ____ V L3: ____ V	L1: 136.3 V L2: ____ V L3: ____ V	P
	- power factor/ time constant	L1: 0.30 L2: ____ L3: ____	L1: 0.30 L2: ____ L3: ____	P
	- make operations: test current I/I _e (A)	L1: 66.1 A L2: ____ A L3: ____ A	L1: 66.1 A L2: ____ A L3: ____ A	P
	- break operations: test current I/I _e (A)	L1: 6.61 A L2: ____ A L3: ____ A	L1: 6.61 A L2: ____ A L3: ____ A	P
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	50	50	P
	- test voltage U/U _e = 1,0 (V)	L1: 126.6 V L2: ____ V L3: ____ V	L1: 126.6 V L2: ____ V L3: ____ V	P
	- power factor/ time constant	L1: 0.32 L2: - L3: -	L1: 0.32 L2: - L3: -	P
	- make operations: test current I/I _e (A)	L1: 60.4 A L2: ____ A L3: ____ A	L1: 60.4 A L2: ____ A L3: ____ A	P

	- break operations: test current I/le (A)	L1: 6.04 A L2: ____ A L3: ____ A	L1: 6.04 A L2: ____ A L3: ____ A	P
Test No. 2	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	Rapidly	Rapidly	P
	- number of operating cycles	10	10	P
Test No. 3	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	60	60	P
	- number of operating cycles	990	990	P
Test No. 4	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	5000	5000	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			
	dielectric test voltage (V) 2 xUe with a min.of 1000V:	1 890 V	1 890 V	P
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions – Model GMR-4M, AC-15, 380V, 1.9A, NO, NC			
	contact element (figure / form)	4b, X (Figure 4)	4b, Y (Figure 4)	
	contact polarity	NO	NC	
	utilization category	AC-15, A600	AC-15, A600	
	rated operational voltage Ue (V)	AC 380 V	AC 380 V	
	rated operational current Ie (A) or power (kW) :	1.9 A	1.9 A	
Test No.1	- test voltage U/Ue = 1,1 (V)	L1: 418.2 V L2: ____ V L3: ____ V	L1: 418.2 V L2: ____ V L3: ____ V	P
	- power factor/time constant	L1: 0.32 L2: L3:	L1: 0.32 L2: L3:	P
	- make operations: test current I/le (A)	L1: 21.53 A L2: ____ A L3: ____ A	L1: 21.53 A L2: ____ A L3: ____ A	P

	- break operations: test current I/Ie (A)	L1: 2.094 A L2: ____ A L3: ____ A	L1: 2.094 A L2: ____ A L3: ____ A	P
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			
	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	50	50	P
	- test voltage U/Ue = 1,0 (V)	L1: 380.9 V L2: ____ V L3: ____ V	L1: 380.9 V L2: ____ V L3: ____ V	P
	- power factor/ time constant	L1: 0.31 L2: - L3: -	L1: 0.31 L2: - L3: -	P
	- make operations: test current I/Ie (A)	L1: 19.59 A L2: ____ A L3: ____ A	L1: 19.59 A L2: ____ A L3: ____ A	P
	- break operations: test current I/Ie (A)	L1: 1.927 A L2: ____ A L3: ____ A	L1: 1.927 A L2: ____ A L3: ____ A	P
Test No. 2	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	Rapidly	Rapidly	P
	- number of operating cycles	10	10	P
Test No. 3	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	60	60	P
	- number of operating cycles	990	990	P
Test No. 4	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	5000	5000	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			

	dielectric test voltage (V) 2 xUe with a min.of 1000V :	1 890 V	1 890 V	P
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions – Model GMR-4M, AC-15, 600V, 1.2A, NO, NC			
	contact element (figure / form)	4b, X (Figure 4)	4b, Y (Figure 4)	
	contact polarity	NO	NC	
	utilization category	AC-15, A600	AC-15, A600	
	rated operational voltage Ue (V)	AC 600 V	AC 600 V	
	rated operational current Ie (A) or power (kW) :	1.2 A	1.2 A	
Test No.1	- test voltage U/Ue = 1,1 (V)	L1: 675.7 V L2: ____ V L3: ____ V-	L1: 675.7 V L2: ____ V L3: ____ V-	P
	- power factor/ time constant	L1: 0.31 L2: L3:	L1: 0.31 L2: L3:	P
	- make operations: test current I/Ie (A)	L1: 14.28 A L2: ____ A L3: ____ A	L1: 14.28 A L2: ____ A L3: ____ A	P
	- break operations: test current I/Ie (A)	L1: 1.323 A L2: ____ A L3: ____ A	L1: 1.323 A L2: ____ A L3: ____ A	P
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	50	50	P
	- test voltage U/Ue = 1,0 (V)	L1: 616.4 V L2: ____ V L3: ____ V	L1: 616.4 V L2: ____ V L3: ____ V	P
	- power factor/ time constant	L1: 0.31 L2: - L3: -	L1: 0.31 L2: - L3: -	P
	- make operations: test current I/Ie (A)	L1: 12.60 A L2: ____ A L3: ____ A	L1: 12.60 A L2: ____ A L3: ____ A	P

	- break operations: test current I/le (A)	L1: 1.20 A L2: ____ A L3: ____ A	L1: 1.20 A L2: ____ A L3: ____ A	P
Test No. 2	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	Rapidly	Rapidly	P
	- number of operating cycles	10	10	P
Test No. 3	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	60	60	P
	- number of operating cycles	990	990	P
Test No. 4	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	5000	5000	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			
	dielectric test voltage (V) 2 xUe with a min.of 1000V:	1 890 V	1 890 V	P
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions – Model GMR-4M, DC-13, Q600, 125V, 0.55A, NO, NC			
	contact element (figure / form)	4b, X (Figure 4)	4b, X (Figure 4)	
	contact polarity	NO	NC	
	utilization category	DC-13, Q600	DC-13, Q600	
	rated operational voltage Ue (V)	DC 125 V	DC 125 V	
	rated operational current Ie (A) or power (kW) :	0.55 A	0.55 A	
Test No.1	- test voltage U/Ue = 1,1 (V)	L1: 137.6 V L2: ____ V L3: ____ V	L1: 137.6 V L2: ____ V L3: ____ V	P
	- power factor /time constant	L1: 297 ms L2: L3:	L1: 297 ms L2: L3:	P
	- make operations: test current I/le (A)	L1: 0.614 A L2: ____ A L3: ____ A	L1: 0.614 A L2: ____ A L3: ____ A	P

	- break operations: test current I/le (A)	L1: 0.614 A L2: ____ A L3: ____ A	L1: 0.614 A L2: ____ A L3: ____ A	P
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	500 ms	1000 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	50	50	P
	- test voltage U/Ue = 1,0 (V)	L1: 125.0 V L2: ____ V L3: ____ V	L1: 125.0 V L2: ____ V L3: ____ V	P
	- power factor /time constant	L1: 302 ms L2: - L3: -	L1: 302 ms L2: - L3: -	P
	- make operations: test current I/le (A)	L1: 0.557 A L2: ____ A L3: ____ A	L1: 0.557 A L2: ____ A L3: ____ A	P
	- break operations: test current I/le (A)	L1: 0.557 A L2: ____ A L3: ____ A	L1: 0.557 A L2: ____ A L3: ____ A	P
Test No. 2	- on-time (ms)	400 ms	400 ms	P
	- operating cycles per minute	Rapidly	Rapidly	P
	- number of operating cycles	10	10	P
Test No. 3	- on-time (ms)	500 ms	500 ms	P
	- operating cycles per minute	60	60	P
	- number of operating cycles	990	990	P
Test No. 4	- on-time (ms)	500 ms	500 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	5000	5000	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			

	dielectric test voltage (V) 2 xUe with a min.of 1000V :	1 890V	1 890V	P
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions – Model GMR-4M, DC-13, Q600, 600V, 0.1A, NO, NC			
	contact element (figure / form)	4b, X (Figure 4)	4b, X (Figure 4)	
	contact polarity	NO	NC	
	utilization category	DC-13, Q600	DC-13, Q600	
	rated operational voltage Ue (V)	DC 600 V	DC 600 V	
	rated operational current Ie (A) or power (kW) :	0.1 A	0.1 A	
Test No.1	- test voltage U/Ue = 1,1 (V)	L1: 660.1 V L2: ____ V L3: ____ V	L1: 660.1 V L2: ____ V L3: ____ V	P
	- power factor /time constant	L1: 298 ms L2: _____ L3: _____	L1: 298 ms L2: _____ L3: _____	P
	- make operations: test current I/Ie (A)	L1: 0.112 A L2: ____ A L3: ____ A	L1: 0.112 A L2: ____ A L3: ____ A	P
	- break operations: test current I/Ie (A)	L1: 0.112 A L2: ____ A L3: ____ A	L1: 0.112 A L2: ____ A L3: ____ A	P
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	500 ms	500 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	50	50	P
	- test voltage U/Ue = 1,0 (V)	L1: 600.6 V L2: ____ V L3: ____ V	L1: 600.6 V L2: ____ V L3: ____ V	P
	- power factor /time constant	L1: 296 ms L2: - L3: -	L1: 296 ms L2: - L3: -	P
	- make operations: test current I/Ie (A)	L1: 0.101 A L2: ____ A L3: ____ A	L1: 0.101 A L2: ____ A L3: ____ A	P

	- break operations: test current I/le (A)	L1: 0.101 A L2: ____ A L3: ____ A	L1: 0.101 A L2: ____ A L3: ____ A	P
Test No. 2	- on-time (ms)	400 ms	400 ms	P
	- operating cycles per minute	Rapidly	Rapidly	P
	- number of operating cycles	10	10	P
Test No. 3	- on-time (ms)	500 ms	500 ms	P
	- operating cycles per minute	60	60	P
	- number of operating cycles	990	990	P
Test No. 4	- on-time (ms)	500 ms	500 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	5000	5000	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			
	dielectric test voltage (V) 2 xUe with a min. of 1000V:	1 890 V	1 890 V	P
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions – Model AU-4M, AC-15, A600, 120V, 6A, NO, NC			
	contact element (figure / form)	4b, X (Figure 4)	4b, X (Figure 4)	
	contact polarity	NO	NC	
	utilization category	AC-15, A600	AC-15, A600	
	rated operational voltage Ue (V)	AC 120 V	AC 120 V	
	rated operational current Ie (A) or power (kW) :	6 A	6 A	
Test No.1	- test voltage U/Ue = 1,1 (V)	L1: 136.3 V L2: ____ V L3: ____ V	L1: 136.3 V L2: ____ V L3: ____ V	P
	- power factor/time constant	L1: 0.30 L2: L3:	L1: 0.30 L2: L3:	P
	- make operations: test current I/le (A)	L1: 66.1 A L2: ____ A L3: ____ A	L1: 66.1 A L2: ____ A L3: ____ A	P

	- break operations: test current I/le (A)	L1: 6.61 A L2: ____ A L3: ____ A	L1: 6.61 A L2: ____ A L3: ____ A	P
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	50	50	P
	- test voltage U/Ue = 1,0 (V)	L1: 126.6 V L2: ____ V L3: ____ V	L1: 126.6 V L2: ____ V L3: ____ V	P
	- power factor/ time constant	L1: 0.32 L2: - L3: -	L1: 0.32 L2: - L3: -	P
	- make operations: test current I/le (A)	L1: 60.4 A L2: ____ A L3: ____ A	L1: 60.4 A L2: ____ A L3: ____ A	P
	- break operations: test current I/le (A)	L1: 6.04 A L2: ____ A L3: ____ A	L1: 6.04 A L2: ____ A L3: ____ A	P
Test No. 2	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	Rapidly	Rapidly	P
	- number of operating cycles	10	10	P
Test No. 3	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	60	60	P
	- number of operating cycles	990	990	P
Test No. 4	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	5000	5000	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			

	dielectric test voltage (V) 2 xUe with a min. of 1000V :	1 890 V	1 890 V	P
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions – Model AU-4M, AC-15, A600, 380V, 1.9A, NO, NC			
	contact element (figure / form)	4b, X (Figure 4)	4b, Y (Figure 4)	
	contact polarity	NO	NC	
	utilization category	AC-15, A600	AC-15, A600	
	rated operational voltage Ue (V)	AC 380 V	AC 380 V	
	rated operational current Ie (A) or power (kW) :	1.9 A	1.9 A	
Test No.1	- test voltage U/Ue = 1,1 (V)	L1: 418.2 V L2: ____ V L3: ____ V	L1: 418.2 V L2: ____ V L3: ____ V	P
	- power factor/ time constant	L1: 0.32 L2: L3:	L1: 0.32 L2: L3:	P
	- make operations: test current I/Ie (A)	L1: 21.53 A L2: ____ A L3: ____ A	L1: 21.53 A L2: ____ A L3: ____ A	P
	- break operations: test current I/Ie (A)	L1: 2.094 A L2: ____ A L3: ____ A	L1: 2.094 A L2: ____ A L3: ____ A	P
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	50	50	P
	- test voltage U/Ue = 1,0 (V)	L1: 380.9 V L2: ____ V L3: ____ V	L1: 616.4 V L2: ____ V L3: ____ V	P
	- power factor/ time constant	L1: 0.31 L2: - L3: -	L1: 0.31 L2: - L3: -	P
	- make operations: test current I/Ie (A)	L1: 19.59 A L2: ____ A L3: ____ A	L1: 12.60 A L2: ____ A L3: ____ A	P

	- break operations: test current I/le (A)	L1: 1.927 A L2: ____ A L3: ____ A	L1: 1.20 A L2: ____ A L3: ____ A	P
Test No. 2	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	Rapidly	Rapidly	P
	- number of operating cycles	10	10	P
Test No. 3	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	60	60	P
	- number of operating cycles	990	990	P
Test No. 4	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	5000	5000	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm dia meter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			
	dielectric test voltage (V) 2 x Ue with a min. of 1000V:	1 890 V	1 890 V	P
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions – Model AU-4M, AC-15, A600, 600V, 1.2A, NO, NC			
	contact element (figure / form)	4b, X (Figure 4)	4b, Y (Figure 4)	
	contact polarity	NO	NC	
	utilization category	AC-15, A600	AC-15, A600	
	rated operational voltage Ue (V)	AC 600 V	AC 600 V	
	rated operational current Ie (A) or power (kW) :	1.2 A	1.2 A	
Test No.1	- test voltage U/Ue = 1,1 (V)	L1: 675.7 V L2: ____ V L3: ____ V-	L1: 675.7 V L2: ____ V L3: ____ V-	P
	- power factor/ time constant	L1: 0.31 L2: L3:	L1: 0.31 L2: L3:	P
	- make operations: test current I/le (A)	L1: 14.28 A L2: ____ A L3: ____ A	L1: 14.28 A L2: ____ A L3: ____ A	P

	- break operations: test current I/Ie (A)	L1: 1.323 A L2: ____ A L3: ____ A	L1: 1.323 A L2: ____ A L3: ____ A	P
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	50	50	P
	- test voltage U/Ue = 1,0 (V)	L1: 616.4 V L2: ____ V L3: ____ V	L1: 616.4 V L2: ____ V L3: ____ V	P
	- power factor/ time constant	L1: 0.31 L2: - L3: -	L1: 0.31 L2: - L3: -	P
	- make operations: test current I/Ie (A)	L1: 12.60 A L2: ____ A L3: ____ A	L1: 12.60 A L2: ____ A L3: ____ A	P
	- break operations: test current I/Ie (A)	L1: 1.20 A L2: ____ A L3: ____ A	L1: 1.20 A L2: ____ A L3: ____ A	P
Test No. 2	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	Rapidly	Rapidly	P
	- number of operating cycles	10	10	P
Test No. 3	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	60	60	P
	- number of operating cycles	990	990	P
Test No. 4	- on-time (ms)	50 ms	50 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	5000	5000	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			

	dielectric test voltage (V) 2 x Ue with a min.of 1000V :	1 890 V	1 890V	
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions – Model AU-4M, DC-13, Q300, 125V, 0.55A, NO, NC			
	contact element (figure / form)	4b, X (Figure 4)	4b, X (Figure 4)	
	contact polarity	NO	NC	
	utilization category	DC-13, Q600	DC-13, Q600	
	rated operational voltage Ue (V)	DC 125 V	DC 125 V	
	rated operational current Ie (A) or power (kW) :	0.55 A	0.55 A	
Test No.1	- test voltage U/Ue = 1,1 (V)	L1: 137.6 V L2: ____ V L3: ____ V	L1: 137.6 V L2: ____ V L3: ____ V	P
	- power factor /time constant	L1: 297 ms L2: _____ L3: _____	L1: 297 ms L2: _____ L3: _____	P
	- make operations: test current I/Ie (A)	L1: 0.614 A L2: ____ A L3: ____ A	L1: 0.614 A L2: ____ A L3: ____ A	P
	- break operations: test current I/Ie (A)	L1: 0.614 A L2: ____ A L3: ____ A	L1: 0.614 A L2: ____ A L3: ____ A	P
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	500 ms	500 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	50	50	P
	- test voltage U/Ue = 1,0 (V)	L1: 125.0 V L2: ____ V L3: ____ V	L1: 125.0 V L2: ____ V L3: ____ V	P
	- power factor /time constant	L1: 302 ms L2: - L3: -	L1: 302 ms L2: - L3: -	P
	- make operations: test current I/Ie (A)	L1: 0.557 A L2: ____ A L3: ____ A	L1: 0.557 A L2: ____ A L3: ____ A	P

	- break operations: test current I/le (A)	L1: 0.557 A L2: ____ A L3: ____ A	L1: 0.557 A L2: ____ A L3: ____ A	P
Test No. 2	- on-time (ms)	400 ms	400 ms	P
	- operating cycles per minute	Rapidly	Rapidly	P
	- number of operating cycles	10	10	P
Test No. 3	- on-time (ms)	500 ms	500 ms	P
	- operating cycles per minute	60	60	P
	- number of operating cycles	990	990	P
Test No. 4	- on-time (ms)	500 ms	500 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	5000	5000	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			
	dielectric test voltage (V) 2 xUe with a min.of 1000V:	1 890V	1 890V	P
8.3.3.5.2	Making and breaking capacities of switching elements under normal conditions – Model AU-4M, DC-13, Q300, 250V, 0.27A, NO, NC			
	contact element (figure / form)	4b, X (Figure 4)	4b, X (Figure 4)	
	contact polarity	NO	NC	
	utilization category	DC-13, Q300	DC-13, Q300	
	rated operational voltage Ue (V)	DC 250 V	DC 250 V	
	rated operational current Ie (A) or power (kW) :	0.27 A	0.27 A	
Test No.1	- test voltage U/Ue = 1,1 (V)	L1: 275.2 V L2: ____ V L3: ____ V	L1: 275.2 V L2: ____ V L3: ____ V	P
	- power factor /time constant	L1: 301 ms L2: L3:	L1: 301 ms L2: L3:	P
	- make operations: test current I/le (A)	L1: 0.31 A L2: ____ A L3: ____ A	L1: 0.31 A L2: ____ A L3: ____ A	P

	- break operations: test current I/Ie (A)	L1: 0.31 A L2: ____ A L3: ____ A	L1: 0.31 A L2: ____ A L3: ____ A	P
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	500 ms	500 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	50	50	P
	- test voltage U/Ue = 1,0 (V)	L1: 250.4 V L2: ____ V L3: ____ V	L1: 250.4 V L2: ____ V L3: ____ V	P
	- power factor /time constant	L1: 299 ms L2: - L3: -	L1: 299 ms L2: - L3: -	P
	- make operations: test current I/Ie (A)	L1: 0.281 A L2: ____ A L3: ____ A	L1: 0.281 A L2: ____ A L3: ____ A	P
	- break operations: test current I/Ie (A)	L1: 0.281 A L2: ____ A L3: ____ A	L1: 0.281 A L2: ____ A L3: ____ A	P
Test No. 2	- on-time (ms)	400 ms	400 ms	P
	- operating cycles per minute	Rapidly	Rapidly	P
	- number of operating cycles	10	10	P
Test No. 3	- on-time (ms)	500 ms	500 ms	P
	- operating cycles per minute	60	60	P
	- number of operating cycles	990	990	P
Test No. 4	- on-time (ms)	500 ms	500 ms	P
	- operating cycles per minute	6	6	P
	- number of operating cycles	5000	5000	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			

	dielectric test voltage (V) 2 xU _e with a min.of 1000V:	1 890V	1 890V	P
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8.3.1.a	TEST SEQUENCE III	
Test No. 1	- Making and breaking capacities of switching elements under abnormal conditions (8.3.3.5.3)	
Test No. 2	- Dielectric verification (8.3.3.5.5.b)	

8.3.3.5		TEST SEQUENCE III		
8.3.3.5.3		Making and breaking capacities of switching elements under abnormal cond itions: Model GMR-4M, AC-15, 120V, 6A, NO, NC		
	contact element (figure / form)	4b, X	4b, Y	
	contact polarity	NO	NC	
	utilization category	AC-15	AC-15	
	rated operational voltage Ue (V)	120 V	120 V	
	rated operational current Ie (A) or power (kW) :	6 A	6 A	
	Conditions, make/break operations:			
	- test voltage U/Ue = 1,1 (V)	L1: 136.3 V L2: ____ V L3: ____ V	L1: 136.3 V L2: ____ V L3: ____ V	—
	- power factor/time constant	L1: 0.30 L2: L3:	L1: 0.30 L2: L3:	—
	- make operations: test current I/Ie (A)	L1: 66.1 A L2: ____ A L3: ____ A	L1: 66.1 A L2: ____ A L3: ____ A	—
	- break operations: test current I/Ie (A)	L1: 66.1 A L2: ____ A L3: ____ A	L1: 66.1 A L2: ____ A L3: ____ A	—
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	50 ms	50 ms	—
	- operating cycles per minute :	6	6	—
	- number of operating cycles	10	10	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P

	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			
	dielectric test voltage (V) 2 x Ue with a min.of 1000V	1 890 V	1 890 V	P
8.3.3.5.3	Making and breaking capacities of switching elements under abnormal conditions: Model GMR-4M, AC-15, 380V, 1.9A, NO, NC			
	contact element (figure / form)	4b, X	4b, Y	
	contact polarity	NO	NC	
	utilization category	AC-15	AC-15	
	rated operational voltage Ue (V)	380 V	380 V	
	rated operational current Ie (A) or power (kW) :	1.9 A	1.9 A	
	Conditions, make/break operations:			
	- test voltage U/Ue = 1,1 (V)	L1: 418.2 V L2: ____ V L3: ____ V	L1: 418.2 V L2: ____ V L3: ____ V	—
	- power factor/ time constant	L1: 0.32 L2: ____ L3: ____	L1: 0.32 L2: ____ L3: ____	—
	- make operations: test current I/Ie (A)	L1: 21.53 A L2: ____ A L3: ____ A	L1: 21.53 A L2: ____ A L3: ____ A	—
	- break operations: test current I/Ie (A)	L1: 21.53 A L2: ____ A L3: ____ A	L1: 21.53 A L2: ____ A L3: ____ A	—
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	50 ms	50 ms	—
	- operating cycles per minute :	6	6	—
	- number of operating cycles	10	10	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			

	dielectric test voltage (V) 2 x Ue with min.of 1000V	1 890 V	1 890 V	P
8.3.3.5.3	Making and breaking capacities of switching elements under abnormal conditions: Model GMR-4M, AC-15, 600V, 1.2A, NO, NC			
	contact element (figure / form)	4b, X	4b, Y	
	contact polarity	NO	NC	
	utilization category	AC-15	AC-15	
	rated operational voltage Ue (V)	600 V	600 V	
	rated operational current Ie (A) or power (kW) :	1.2 A	1.2 A	
	Conditions, make/break operations:			
	- test voltage U/Ue = 1,1 (V)	L1: 675.7 V L2: ____ V L3: ____ V	L1: 675.7 V L2: ____ V L3: ____ V	—
	- power factor/ time constant	L1: 0.31 L2: ____ L3: ____	L1: 0.31 L2: ____ L3: ____	—
	- make operations: test current I/Ie (A)	L1: 14.28 A L2: ____ A L3: ____ A	L1: 14.28 A L2: ____ A L3: ____ A	—
	- break operations: test current I/Ie (A)	L1: 14.28 A L2: ____ A L3: ____ A	L1: 14.28 A L2: ____ A L3: ____ A	—
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	50 ms	50 ms	—
	- operating cycles per minute :	6	6	—
	- number of operating cycles	10	10	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			
	dielectric test voltage (V) 2 x Ue with min.of 1000V :	1 890 V	1 890 V	P
8.3.3.5.3	Making and breaking capacities of switching elements under abnormal conditions: Model GMR-4M, DC-13, Q600, 125V, 0.55A, NO, NC			

	contact element (figure / form)	4b, X	4b, Y	
	contact polarity	NO	NC	
	utilization category	DC-13, Q600	DC-13, Q600	
	rated operational voltage Ue (V)	125 V	125 V	
	rated operational current Ie (A) or power (kW) :	0.55 A	0.55 A	
	Conditions, make/break operations:			
	- test voltage U/Ue = 1,1 (V)	L1: 137.6 V L2: ____ V L3: ____ V	L1: 137.6 V L2: ____ V L3: ____ V	—
	- power factor /time constant	L1: 297 ms L2: ____ L3: ____	L1: 297 ms L2: ____ L3: ____	—
	- make operations: test current I/Ie (A)	L1: 0.614 A L2: ____ A L3: ____ A	L1: 0.614 A L2: ____ A L3: ____ A	—
	- break operations: test current I/Ie (A)	L1: 0.614 A L2: ____ A L3: ____ A	L1: 0.614 A L2: ____ A L3: ____ A	—
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	500 ms	500 ms	—
	- operating cycles per minute :	6	6	—
	- number of operating cycles	10	10	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			
	dielectric test voltage (V) 2 x Ue with min.of 1000V :	1 890 V	1 890 V	P
8.3.3.5.3	Making and breaking capacities of switching elements under abnormal conditions: Model GMR-4M, DC-13, Q600, 600V, 0.1A, NO, NC			
	contact element (figure / form)	4b, X	4b, Y	
	contact polarity	NO	NC	
	utilization category	DC-13, Q600	DC-13, Q600	

	rated operational voltage U_e (V)	600 V	600 V	
	rated operational current I_e (A) or power (kW) :	0.1 A	0.1 A	
	Conditions, make/break operations:			
	- test voltage $U/U_e = 1,1$ (V)	L1: 660.1 V L2: ____ V L3: ____ V	L1: 660.1 V L2: ____ V L3: ____ V	—
	- power factor /time constant	L1: 298 ms L2: ____ L3: ____	L1: 298 ms L2: ____ L3: ____	—
	- make operations: test current I/I_e (A)	L1: 0.112 A L2: ____ A L3: ____ A	L1: 0.112 A L2: ____ A L3: ____ A	—
	- break operations: test current I/I_e (A)	L1: 0.112 A L2: ____ A L3: ____ A	L1: 0.112 A L2: ____ A L3: ____ A	—
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	500 ms	500 ms	—
	- operating cycles per minute :	6	6	—
	- number of operating cycles	10	10	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			
	dielectric test voltage (V) 2 x U_e with min.of 1000V:	1 890 V	1 890 V	P
8.3.3.5.3	Making and breaking capacities of switching elements under abnormal conditions: Model AU-4M, AC-15, 120V, 6A, NO, NC			
	contact element (figure / form)	4b, X	4b, Y	
	contact polarity	NO	NC	
	utilization category	AC-15	AC-15	
	rated operational voltage U_e (V)	120 V	120 V	
	rated operational current I_e (A) or power (kW) :	6 A	6 A	
	Conditions, make/break operations:			

	- test voltage $U/U_e = 1,1$ (V)	L1: 136.3 V L2: ____ V L3: ____ V	L1: 136.3 V L2: ____ V L3: ____ V	—
	- power factor/ time constant	L1: 0.30 L2: ____ L3: ____	L1: 0.30 L2: ____ L3: ____	—
	- make operations: test current I/I_e (A)	L1: 66.1 A L2: ____ A L3: ____ A	L1: 66.1 A L2: ____ A L3: ____ A	—
	- break operations: test current I/I_e (A)	L1: 66.1 A L2: ____ A L3: ____ A	L1: 66.1 A L2: ____ A L3: ____ A	—
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	50 ms	50 ms	—
	- operating cycles per minute :	6	6	—
	- number of operating cycles	10	10	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			
	dielectric test voltage (V) 2 x U_e with min.of 1000V :	1 890 V	1 890 V	P
8.3.3.5.3	Making and breaking capacities of switching elements under abnormal conditions: Model AU-4M, AC-15, 380V, 1.9A, NO, NC			
	contact element (figure / form)	4b, X	4b, Y	
	contact polarity	NO	NC	
	utilization category	AC-15	AC-15	
	rated operational voltage U_e (V)	380 V	380 V	
	rated operational current I_e (A) or power (kW) :	1.9 A	1.9 A	
	Conditions, make/break operations:			
	- test voltage $U/U_e = 1,1$ (V)	L1: 418.2 V L2: ____ V L3: ____ V	L1: 418.2 V L2: ____ V L3: ____ V	—

	- power factor/ time constant	L1: 0.32 L2: ____ L3: ____	L1: 0.32 L2: ____ L3: ____	—
	- make operations: test current I/le (A)	L1: 21.53 A L2: ____ A L3: ____ A	L1: 21.53 A L2: ____ A L3: ____ A	—
	- break operations: test current I/le (A)	L1: 21.53 A L2: ____ A L3: ____ A	L1: 21.53 A L2: ____ A L3: ____ A	—
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	50 ms	50 ms	—
	- operating cycles per minute :	6	6	—
	- number of operating cycles	10	10	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			
	dielectric test voltage (V) 2 x Ue with min.of 1000V :	1 890 V	1 890 V	P
8.3.3.5.3	Making and breaking capacities of switching elements under abnormal conditions: Model AU-4M, AC-15, 600V, 1.2A, NO, NC			
	contact element (figure / form)	4b, X	4b, Y	
	contact polarity	NO	NC	
	utilization category	AC-15	AC-15	
	rated operational voltage Ue (V)	600 V	600 V	
	rated operational current Ie (A) or power (kW) :	1.2 A	1.2 A	
	Conditions, make/break operations:			
	- test voltage U/Ue = 1,1 (V)	L1: 675.7 V L2: ____ V L3: ____ V	L1: 675.7 V L2: ____ V L3: ____ V	—
	- power factor/ time constant	L1: 0.33 L2: ____ L3: ____	L1: 0.33 L2: ____ L3: ____	—

	- make operations: test current I/le (A)	L1: 14.28 A L2: ____ A L3: ____ A	L1: 14.28 A L2: ____ A L3: ____ A	—
	- break operations: test current I/le (A)	L1: 14.28 A L2: ____ A L3: ____ A	L1: 14.28 A L2: ____ A L3: ____ A	—
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	50 ms	50 ms	—
	- operating cycles per minute :	6	6	—
	- number of operating cycles	10	10	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			
	dielectric test voltage (V) 2 x Ue with min. of 1000V	1 890 V	1 890 V	P
8.3.3.5.3	Making and breaking capacities of switching elements under abnormal conditions: Model AU-4M, DC-13, Q300, 125V, 0.55A, NO, NC			
	contact element (figure / form)	4b, X	4b, Y	
	contact polarity	NO	NC	
	utilization category	DC-13, Q300	DC-13, Q300	
	rated operational voltage Ue (V)	125 V	125 V	
	rated operational current Ie (A) or power (kW) :	0.55 A	0.55 A	
	- test voltage U/Ue = 1,1 (V)	L1: 137.6 V L2: ____ V L3: ____ V	L1: 137.6 V L2: ____ V L3: ____ V	—
	- power factor/time constant	L1: 297 ms L2: ____ L3: ____	L1: 297 ms L2: ____ L3: ____	—
	- make operations: test current I/le (A)	L1: 0.614 A L2: ____ A L3: ____ A	L1: 0.614 A L2: ____ A L3: ____ A	—

	- break operations: test current I/le (A)	L1: 0.614 A L2: ____ A L3: ____ A	L1: 0.614 A L2: ____ A L3: ____ A	—
	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	500 ms	500 ms	—
	- operating cycles per minute :	6	6	—
	- number of operating cycles	10	10	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			
	dielectric test voltage (V) 2 x Ue with min.of 1000V	1 890 V	1 890 V	P
8.3.3.5.3 Making and breaking capacities of switching elements under abnormal conditions: Model AU-4M, DC-13, Q300, 250V, 0.27A, NO, NC				
	contact element (figure / form)	4b, X	4b, Y	
	contact polarity	NO	NC	
	utilization category	DC-13, Q300	DC-13, Q300	
	rated operational voltage Ue (V)	250 V	250 V	
	rated operational current Ie (A) or power (kW) :	0.27 A	0.27 A	
	- test voltage U/Ue = 1,1 (V)	L1: 275.2 V L2: ____ V L3: ____ V	L1: 275.2 V L2: ____ V L3: ____ V	—
	- power factor /time constant	L1: 301 ms L2: ____ L3: ____	L1: 301 ms L2: ____ L3: ____	—
	- make operations: test current I/le (A)	L1: 0.309 A L2: ____ A L3: ____ A	L1: 0.309 A L2: ____ A L3: ____ A	—
	- break operations: test current I/le (A)	L1: 0.309 A L2: ____ A L3: ____ A	L1: 0.309 A L2: ____ A L3: ____ A	—

	- a.c. test: Inductor shunted by a resistor taking 3% of the total power consumed - d.c. test: test current increase from zero to steady-state value within limits of figure 9			P
	- on-time (ms)	500 ms	500 ms	—
	- operating cycles per minute :	6	6	—
	- number of operating cycles	10	10	P
	Behaviour and condition during and after the test:			
	- no electrical or mechanical failures			P
	- no contact welding or prolonged arcing			P
	- no blowing of the fusible element in the earth circuit	0.8 mm diameter copper wire	0.8 mm diameter copper wire	P
	Dielectric verification:			
	dielectric test voltage (V) 2 x Ue with min.of 1000V	1 890 V	1 890 V	P

8.3.1. TEST SEQUENCE IV
Test No. 1 - Performance under conditional short-circuit current (8.3.4)
Test No. 2 - Dielectric verification (8.3.3.5.5.b)

TEST SEQUENCE IV			
8.3.4	Performance under conditional short-circuit current – Model GMR-4M		
	contact element (figure / form)	4b, X	
	contact polarity	NO	
	type of SCPD	Fuse, Bussmann, Model gL-gG	
	ratings of SCPD	10A	
	prospective current	1kA	—
	test voltage (V) $U/U_e = 1,1$ (V)	686.7	—
	r.m.s. test current obtained (kA)	1.01	—
	power factor (max. 0,7)	0.62	
	first CO operation by closing the separate making switch: test (I_p / I^2dt (A / A ² s)	0.619	—
	time interval between test (min. 3 min)		—
	second CO operation by closing the separate making switch: test (I_p / I^2dt (A / A ² s) :	0.45	—
	time interval between test (min. 3 min)		—
	third making operation to closed switching elements: test I^2dta (A ² s) :	0.34	—
	Behaviour of the equipment during the test:		
	switching elements open by the normal actuating system		P
	Dielectric verification:		
	dielectric test voltage (V) 2 x U_e with min.of 1000V:	2 500	P
8.3.4	Performance under conditional short-circuit current - Model GMR-4M		
	contact element (figure / form)	4b, Y	
	contact polarity	NC	
	type of SCPD	Fuse, Bussmann, Model gL-gG	
	ratings of SCPD	10A	
	prospective current	1kA	
	test voltage (V) $U/U_e = 1,1$ (V)	686.7	
	r.m.s. test current obtained (kA)	1.01	
	power factor (max. 0,7)	0.62	

	first CO operation by closing the separate making switch: test (I_p / I^2dt (A / A ² s) :	0.406	
	time interval between test (min. 3 min)		
	second CO operation by closing the separate making switch: test (I_p / I^2dt (A / A ² s) :	0.395	
	time interval between test (min. 3 min)		
	third making operation to closed switching elements: test I^2dta (A ² s) :	0.429	
	Behaviour of the equipment during the test:		
	switching elements open by the normal actuating system		P
	Dielectric verification:		
	dielectric test voltage (V) 2 x Ue with min. of 1000V:	1 890	P
8.3.4 Performance under conditional short-circuit current - Model AU-4M			
	contact element (figure / form)	4b, X	
	contact polarity	NO	
	type of SCPD	Fuse, Bussmann, Model gL-gG	
	ratings of SCPD	10A	
	prospective current	1kA	
	test voltage (V) U/Ue = 1,1 (V)	686.7	
	r.m.s. test current obtained (kA)	1.01	
	power factor (max. 0,7)	0.62	
	first CO operation by closing the separate making switch: test (I_p / I^2dt (A / A ² s) :	0.53	
	time interval between test (min. 3 min)		
	second CO operation by closing the separate making switch: test (I_p / I^2dt (A / A ² s) :	0.35	
	time interval between test (min. 3 min)		
	third making operation to closed switching elements: test I^2dta (A ² s) :	0.57	
	Behaviour of the equipment during the test:		
	switching elements open by the normal actuating system		P
	Dielectric verification:		
	dielectric test voltage (V) 2 x Ue with min. of 1000V:	1 890	P
8.3.4 Performance under conditional short-circuit current - Model AU-4M			
	contact element (figure / form)	4b, Y	
	contact polarity	NC	
	type of SCPD	Fuse, Bussmann, Model gL-gG	

	ratings of SCPD	10A	
	prospective current	1kA	
	test voltage (V) $U/U_e = 1,1$ (V)	686.7	
	r.m.s. test current obtained (kA)	1.01	
	power factor (max. 0,7)	0.62	
	first CO operation by closing the separate making switch: test (I_p / I^2dt) (A / A ² s) :	0.52	
	time interval between test (min. 3 min)		
	second CO operation by closing the separate making switch: test (I_p / I^2dt) (A / A ² s) :	0.46	
	time interval between test (min. 3 min)		
	third making operation to closed switching elements: test I^2dta (A ² s) :	0.32	
	Behaviour of the equipment during the test:		
	switching elements open by the normal actuating system		P
	Dielectric verification:		
	dielectric test voltage (V) $2 \times U_e$ with min. of 1000V :	1 890	P
8.3.2.1 (Part 1)	Details, including distance from the equipment under test to the metallic screen, shall be stated in the test report		P
8.3.2.4 (Part 1)	The details of test arrangements such as type and size of the enclosure, if any, size of conductors, distance from the live parts to the enclosure or to parts normally earthed in service, method of operation of the actuating system, etc., shall be given in the test report		P
8.3.3.5.1	The test circuit applied shall be stated in the test report		P

8.3.1. TEST SEQUENCE V			
Test No. 1 - Degree of protection of enclosed control circuit-devices (Annex C of IEC 60947-1)			
Test No. 2 - Verification of actuation force or moment (8.2.5)			
8.3.4 TEST SEQUENCE V Degree of protection of enclosed control circuit-devices – Model GMR-4M+AU-1M			
	The enclosed control circuit devices shall comply with the requirements of Annex C of IEC60947-1	The access probe of 12.5 mm did not penetrate	P
	Verification of actuation force or moment		
8.2.5	When required in 7.1.4.3, the minimum actuating force or moment shall be tested during sequence V of 8.3.1. The performance shall be as stated in 7.1.4.3		N/A
7.1.4.3	Actuating force (or moment)		
	The force (or moment) required to operate the actuator shall be compatible with the intended application, taking into account the size of the actuator, the type of enclosure or panel, the environment of the installation and the use for which it is intended		N/A
	The minimum starting force (or moment) shall be sufficiently large to prevent inadvertent operation; e.g. push-buttons and rotary switches to be used with enclosures complying with degrees of protection IPX5 or IPX6 shall not become actuated when hit by the jet of water applied during the test of the enclosed equipment.		N/A
8.3.4 Degree of protection of enclosed control circuit-devices – Model GMR-4M+AU-4M			
	The enclosed control circuit devices shall comply with the requirements of Annex C of IEC60947-1	The access probe of 12.5 mm did not penetrate	P
	Verification of actuation force or moment		
8.2.5	When required in 7.1.4.3, the minimum actuating force or moment shall be tested during sequence V of 8.3.1. The performance shall be as stated in 7.1.4.3		N/A
7.1.4.3	Actuating force (or moment)		
	The force (or moment) required to operate the actuator shall be compatible with the intended application, taking into account the size of the actuator, the type of enclosure or panel, the environment of the installation and the use for which it is intended		N/A

	The minimum starting force (or moment) shall be sufficiently large to prevent inadvertent operation; e.g. push-buttons and rotary switches to be used with enclosures complying with degrees of protection IPX5 or IPX6 shall not become actuated when hit by the jet of water applied during the test of the enclosed equipment.		N/A
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8.3.1. TEST SEQUENCE VI
Test No. 1 - Measurement of clearances and creepage distances (7.1.3)
Test No. 2 - Verification of limitation of rotation of a rotary switch (8.2.6)

8.3.4 TEST SEQUENCE VI	Measurement of clearances and creepage distances (7.1.3)		
	Clearances and creepage distances	See clause 7.1.3	
	Verification of limitation of rotation of a rotary switch (8.2.6)		
8.2.6	When this test is required in 7.1.4.4, it shall be tested during sequence VI of 8.3.1 The test sample shall be mounted according to the manufacturers instructions	See clause 7.1.3	N/A
7.1.4.4	Limitation of rotation (of a rotary switch)		
	When actuators with limited or unidirectional movement are used, they shall be fitted with robust means of limitation, capable of withstanding five times the actual maximum actuating moment		N/A
8.2.6	The operating moment shall be measured five times and the maximum value recorded.		N/A
	The maximum moment value, multiplied by five, shall be applied to the actuator by forcing it against the means of limitation. The moment shall be applied for 10 s.		N/A
	Means of limitation has not moved, become loose or prevented the actuator's normal operation		N/A

	Annex C of IEC 60947-1	

Annex C	Degree of protection of enclosed control circuit-devices	N/A
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	Annex C	
Annex C	Special tests ----- Durability tests	N/A

Annex E

Annex E	Items subject to agree between manufacturer and user	N/A
	Annex J of IEC 60947-1 applies, as far as covered by clauses and of this standard, with the following additions	

Annex F		
Annex F	Class II control circuit devices insulated by encapsulation Requirements and tests	N/A

Annex G		
Annex G	Additional requirements for control circuit devices with integrally connected cables	N/A

Annex H		
Annex H	Additional requirements for semiconductor switching elements for control circuit devices	N/A

Annex J

Annex J	Special requirements for indicator lights and indicating towers	N/A
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Annex K

Annex K	Special requirements for control switches with direct opening action	N/A
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	Annex L	

Annex L	Special requirements for mechanically linked contact elements	N/A
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Annex M		
Annex M	Terminal marking, distinctive number and distinctive letter for control circuit devices	
M.1	General	
	This annex applies to control switches and contactor relays irrespective of their construction, having terminal marking.	
M.2	Terminal marking rule	
M.2.1	General	
	Terminal marking in accordance with this annex is based, in principle, on a two-digit number.	
M.2.2	Function digit	
	Sub clause L.3.2.1 of IEC 60947-1 applies.	
M.2.3	Sequence digit	
	The tens digit is a continuous sequence number beginning with 1 (except for control switches designated 01 and contactor relays designated 01E), independent of the contact function	P
	Terminals belonging to the same contact are marked with the same sequence digit.	P
	For contactor relays having 10 contact elements, the sequence digit 0 is used instead of 10.	P
	The sequence digit may be omitted from the terminal marking only if additional information provided by the manufacturer or the user clearly gives such digit.	P
M.2.4	Numbering method	
	The contact terminals shall be numbered sequentially from left to right on the device; for devices with tiers of terminals, the numbering shall begin with the tier nearest to the mounting level.	P
M.3	Distinctive number distinctive letter	
M.3.1	General	
	The quantity and type of the contact elements of a control switch according to this annex are indicated by a distinctive number. Contacts of contactor relays are indicated by a distinctive number followed by a distinctive letter.	P
M.3.2	Distinctive number	

	The first digit of the distinctive number gives the quantity of make contact elements and the second digit the quantity of break contact elements. The third digit, if any, shall give the quantity of change-over contact elements in control switches.		P
M.3.2	Distinctive letter		
	The distinctive letter indicates the location of the contact elements of a contactor relay in relation to each other and their terminal marking.		P
M.4	Terminal numbering sequence		
	For control switches having the same distinctive number, the terminal marking is specified in Table M.1.		P
	The position of the contact elements of the control switch need not correspond to that shown on diagrams of Table M.1.		P
M.5	Contactor relays designated by the distinctive letter E		
	For contactor relays having the same distinctive number and the distinctive letter E, independently of their construction, the sequence of the contact elements within the device is specified in accordance with the diagrams of Table M.2.		P
M.6	Contactor relays designated by the distinctive letter X, Y or Z		
M.6.1	Contactor relays designated by the distinctive letter Z		
	If the location of the contact elements within the device (but not the terminal marking) differs from the provisions of Clause M.5, the device shall be designated by the distinctive letter Z instead of the distinctive letter E.		P
M.6.2	Contactor relays designated by the distinctive letter X		
	If the location of the contact elements within the device and the terminal marking both differ from the requirements of Clause M.5, the device shall be designated by the distinctive letter X instead of the distinctive letter E.		P
	The device shall comply with the requirements of Clauses M.2 and M.3.		
M.6.2	Contactor relays designated by the distinctive letter Y		
	Devices consisting of combinations of contact elements and terminal marking in accordance with Table M.3 shall be designated by the distinctive letter Y instead of the distinctive letter E.		P

	TABLE 1: Heating Test : Model GMR-4M With AU-1M NO		P
	Test voltage (V)..... :	240 Vac	—
	Ambient, t1 (°C)..... :	22.9	—
Thermocouple Locations		max. temperature measured, (°C)	Temperature-rise limit, (°C)
Terminal (NO) - 13		7.8	65
Terminal (NO) - 43		9.2	65
Terminal (NO) - 14		6.9	65
Terminal (NO) - 44		8.6	65
Terminal (NO) - 33		8.6	65
Terminal (NO) - 34		6.9	65
Surface of side wall		6.0	50
Surface of top cover		4.0	50
AU-1M Surface of side wall		4.4	50
AU-1M Surface of top cover		3.2	50
Ambient temperature (Ta)		22.9	-
supplementary information:			
Terminal material : Refer Table 7			

	TABLE 1: Heating test, resistance					P
	Test voltage (V)..... :			240 Vac		—
	Ambient, t ₁ (°C)..... :			22.9		—
Temperature rise of winding		R ₁ (Ω)	R ₂ (Ω)	dT (K) observed	Max. dT (K) allowed	Insulation class
240 Vac		1 286	1 405	23.8	100	E
supplementary information:						
T2=R2/R1 (T1+234.5)-234.5=46.7						
Terminal material : Refer Table 7						

	TABLE 2 : Heating Test : Model GMR-4M With AU-1M NC		P
	Test voltage (V)..... :	-	—
	Ambient, t1 (°C)..... :	25.4	—
Thermocouple Locations	max. temperature measured, (°C)	max. temperature limit, (°C)	
Terminal (NC) - 21	11.6	65	
Terminal (NC) - 31	10.2	65	
Terminal (NC) - 22	12.6	65	
Terminal (NC) - 32	12.5	65	
Surface of side wall	5.5	50	
Surface of top cover	5.0	50	
Ambient temperature (Ta)	25.4	-	
supplementary information:			
Terminal material : Refer Table 7			

	TABLE 3: Heating Test : Model GMR-8M NO		P
	Test voltage (V)..... :	240 Vac	—
	Ambient, t1 (°C) :	21.3	—
Thermocouple Locations	max. temperature measured, (°C)	max. temperature limit, (°C)	
Terminal (NO) - 13	10.3	65	
Terminal (NO) - 43	15.8	65	
Terminal (NO) - 14	8.3	65	
Terminal (NO) - 44	10.4	65	
Terminal (NO) - 53	12.8	65	
Terminal (NO) - 83	10.8	65	
Terminal (NO) - 54	11.9	65	
Terminal (NO) - 84	10.2	65	
Surface of side wall	7.6	50	
AU-4M Surface of side wall	9.1	50	
AU-4M Surface of top cover	6.0	50	
Ambient temperature (Ta)	21.3	-	
supplementary information:			
$T_2 = R_2/R_1 (T_1 + 234.5) - 234.5 = 43.0$			
Terminal material : Refer Table 7			

	TABLE 3: Heating test, resistance method					P
	Test voltage (V)..... :		240 Vac			—
	Ambient, t ₁ (°C)..... :		21.3			—
Temperature rise of winding		R ₁ (Ω)	R ₂ (Ω)	dT (K) observed	Max. dT (K) allowed	Insulation class
240 Vac		1 440	1 562	21.7	100	E
supplementary information:						

	TABLE 4 : Heating Test : Model GMR-8M NC		P
	Test voltage (V)..... :	-	—
	Ambient, t1 (°C) :	24.2	—
Thermocouple Locations		max. temperature measured, (°C)	max. temperature limit, (°C)
Terminal (NC) - 21		15.6	65
Terminal (NC) - 31		15.0	65
Terminal (NC) - 22		14.4	65
Terminal (NC) - 32		16.1	65
Terminal (NC) - 61		19.0	65
Terminal (NC) - 71		18.5	65
Terminal (NC) - 62		16.9	65
Terminal (NC) - 72		16.4	65
Surface of side wall		8.5	50
AU-4M Surface of side wall		10.2	50
AU-4M Surface of top cover		9.3	50
Ambient temperature (Ta)		24.2	-
supplementary information:			
Terminal material : Refer Table 7			

	TABLE 5 : Pick-up and Drop Out Voltage Values			P
Control Relay	GMR-4M With AU-1M	GMR-8M	Results	
Coil Voltage	240 V ac	240 V ac		
Pick-up Voltage (Picked up 85% And 110%)	204.0 264.0	204.0 264.0	Pass	
Drop Out Voltage	103.5	110.5	Pass	

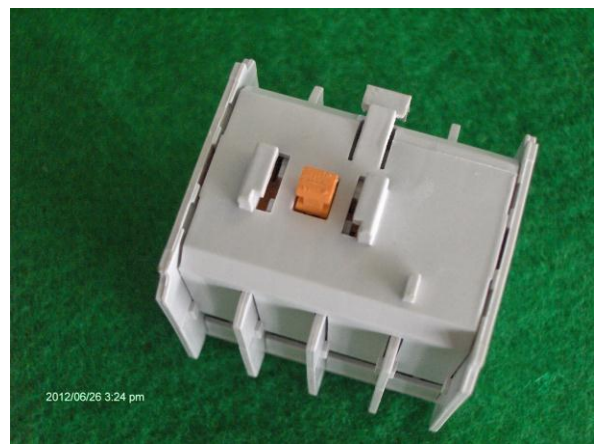
	TABLE 6: Clearance And Creepage Distance Measurements						P
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)	
Between Main Terminals		600	5.5	*1	9.0	9.5	
Between Main Terminals and Coil Terminals		600	5.5	*1	9.0	9.5	
Between Main Terminals and Auxiliary Terminals		600	5.5	*1	9.0	9.5	
supplementary information: *1. Impulse Test was done instead of measuring the clearance. Models tested : GMR-4M, GMR-8M, AU-1M							

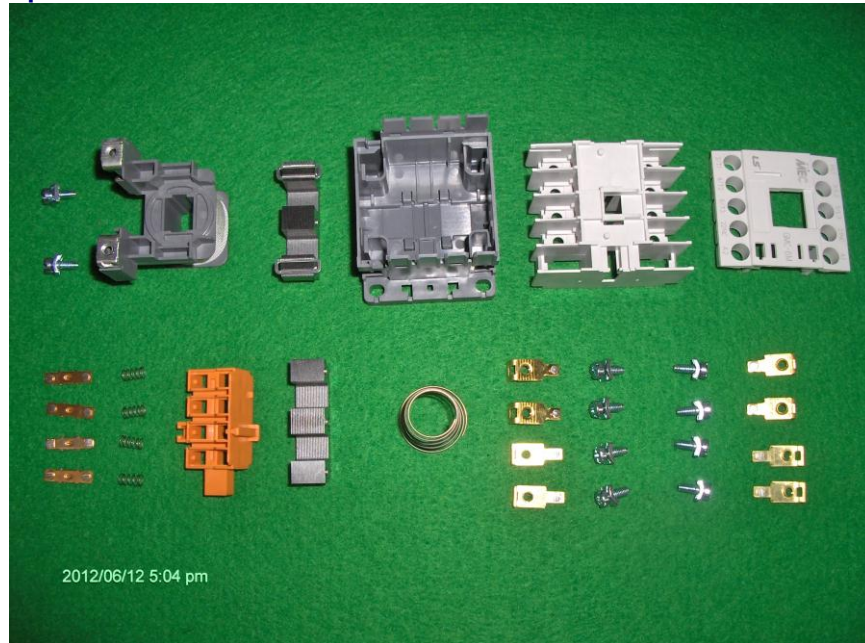
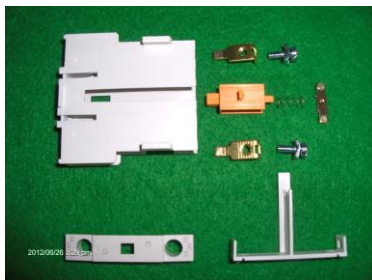
TABLE 7 : Material List for Model GMR-4M						P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard (UL File No.)	Mark(s) of conformity * ¹	
Top Cover	BASF Corp Polymers Div	8231GHS FR	V-0, 105°C	E36632	UL 746C	
	BASF Corp Polymers Div	8233GHS	HB, 105 °C	E36632	UL 746C	
	Rhodia Polyamide Co Ltd	1021GF	HB, 105 °C	E78648	UL 746C	
	LG CHEMICAL LTD	LUPON GP-2251A-F	V-0, 105°C	E67171	UL 746C	
	Korea Engineering Plastics Co Ltd	1325GVS	V-2, 105°C	E120354	UL 746C	
	BASF Corp Polymers Div	8232G HSFR	V-0, 105°C	E36632	UL 746C	
Upper Frame	Rhodia Polyamide Co Ltd	2413GW	V-0, 120°C	E78648	UL 746C	
	BASF Corp Polymers Div	5232GHSFR	V-0, 105°C	E36632	UL 746C	
	LG CHEMICAL LTD	GP2251BFH	V-0, 120°C	E67171	UL 746C	
	Korea Engineering Plastics Co Ltd	2325GVS	V-0, 130°C	E120354	UL 746C	
	Lanxess AG	DP2851/30H+	V-0, 125°C	E245249	UL 746C	
Lower Frame	BASF Corp Polymers Div	8233GHS	HB, 105 °C	E36632	UL 746C	
	Rhodia Polyamide Co Ltd	1021GSW	V-0, 105°C	E78648	UL 746C	
	BASF Corp Polymers Div	8232G HSFR	V-0, 105°C	E36632	UL 746C	
	LG CHEMICAL LTD	GP-2259AFL	V-2, 90°C	E67171	UL 746C	
	Korea Engineering Plastics Co Ltd	2325GVS	V-0, 130°C	E120354	UL 746C	
	Rhodia Engineering Plastics	C 52G3 MZ25	V-2, 105°C	E44716	UL 746C	
Bobbin	Rhodia Polyamide Co Ltd	2413GW	V-2, 120°C	E78648	UL 746C	
	LG CHEMICAL LTD	GP2251BFH	V-0, 120°C	E67171	UL 746C	
	Korea Engineering Plastics Co Ltd	2325GVS	V-0, 130°C	E120354	UL 746C	
	Rhodia Engineering Plastics	C52G3MZ25	V-2, 65°C	E44716	UL 746C	
	LG CHEMICAL LTD	GP-2259AFL	V-2, 90°C	E67171	UL 746C	
	Lanxess AG	DP2851/30H+	V-0, 125°C	E245249	UL 746C	
Moving contact terminal	-	Phosphor Bronze 0.6 t	-		-	
Fixed contact terminal	-	Copper Alloy 1.0 t	-	-	-	
supplementary information:						
¹⁾ Provided evidence ensures the agreed level of compliance. See OD-CB2039.						

		TABLE 8 : Glow Wire Test Results				N/A
No.	Component	Glow Wire Temperature °C	Part - Touching Live part	Time to Ignite / Total Flaming and Glowing Time After Glow Wire Tip Removal	Comments (Ignition of tissue paper)	Results
	Glow Wire Test was waived because the same materials and minimum thickness were passed the glow wire test in 11CA60674. See Report # NC10517-D3-CB-1 for test results.					



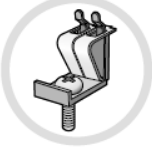

	TABLE 9: TEST EQUIPMENT INFORMATION			P
Inst. ID No.	Instrument Type, Manufacturer, Model, Serial No.	Function/Range	Last Cal. Date	Next Cal. Date
18-744	STOP WATCH	1/100 s	2010-06-02	2012-06-02
70-219	Hybrid Recorder	0~200 °C, 20 Ch, 60 mm/hr	2011-11-10	2012-11-10
82-447	OVER CURRENT Tester	MAX. 1000 A	2011-08-11	2012-08-11
04-352	Vernier Caliper	0~150 mm	2011-11-12	2012-05-12
13-1124	Torque Meter	4.9 Nm	2012-03-13	2012-08-13
70-105	TEMPERATURE CHAMBER	-30 °C ~ 120 °C	2011-08-12	2012-08-12
70-35	Hygrometer	60 °C, 100 %	2011-04-23 2012-04-08	2012-04-23 2013-04-08
31-68	DIELECTRIC VOLTAGE TEST	AC/DC 5 kV	2011-06-13	2012-06-13
25-87	DIGITAL POWER METER	MAX. 600 V, 600 A	2011-06-13	2012-06-13
68-0184 ~ 0186	POTENTIAL TRANSFORMER	660 V/ 5 V	2011-05-26	2013-05-26
33-0131 ~ 0133	CURRENT SHUNT	5000 A / 50 mV	2011-05-12 2012-05-04	2012-05-12 2013-05-04
20-553	DIGITAL MULTIMETER	MAX. 1000 V, 10 A	2011-10-12	2012-10-12
55-013	OSCILLOGRAPH RECORDER	1000 V	2012-01-06	2013-01-06
82-429	OVER CURRENT Tester	MAX. 100 A	2011-08-11	2012-08-11
46-0004	Lighting Surge Simulator	12 kV, 1.2 µs/50 µs	2011-12-09	2012-12-09
18 - 0369	PUSH-PULL GAUGE	10 kgf	2011-12-13	2012-12-13
13 - 0909	TORQUE DRIVER	26 kgf.cm	2011-06-13	2012-06-13
13-984	Dial Torque Wrench	11.77 Nm	2012-03-13	2013-03-13

Annexure 1 - Photographs of All Models (Assembled)**1. Pictures of the products assembled – Model GMR-4, GMR-4M+AU-1M, GMR-6 and GMR-8****GMR-4M Front view****GMR-4M Rear view****GMR-4M + AU-1M Front view****GMR-4M + AU-1M Rear view****GMR-6M Front view****GMR-6M Rear view****GMR-8M Front view****GMR-8M Rear view**

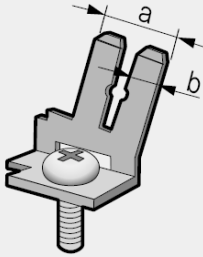
2. Pictures of the products assembled – Model GMR-4, GMR-4M+AU-1M, GMR-6 and GMR-8**AU-1M Front view****AU-1M Rear view****AU-2M Front view****AU-2M Rear view****AU-4M Front view****AU-4M Rear view**

Annexure 2 – Photographs of All Models (disassembled)**1. Pictures of the products disassembled – Model AZ-12M and AR-12M)****AZ-12M view****AR-12M view****2. Pictures of the products disassembled – Model GMR-4M****3. Pictures of the products disassembled – Model AU-1M, AU-2M, AU-4M)****AU-1M view****AU-2M view****AU-4M view**

Annexure 3 - Wire Connection Type

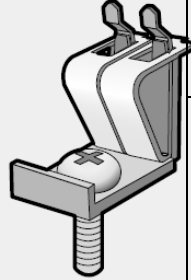
	Screw Terminal Standard Terminal which can be connected by using wire, Ring Terminal, U Terminal. (M3.5)
	Fast-on Terminal Plug-In Terminal which can be connected by using Quick-Connects (2.8X0.8t / 6.3X0.8t combined use)
	Cage clamp Terminal Terminal which can be directly connected without using Ring Terminal for Screw, U Terminal and Quick Terminal to connect wire
	Solder Pin Terminal Terminal which can be used by directly soldering to PCB(Printed Circuit Board)

a) Fast-on terminal

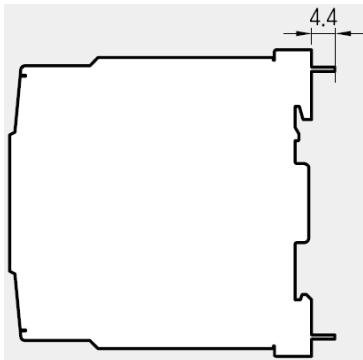
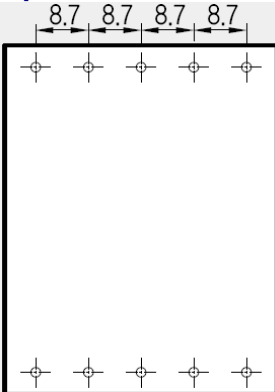
	Dimensions (mm)	
	a X t	6.3 X 0.8
	b X t	2.8 X 0.8

Note) t=Thickness











b) Cage clamp terminal

	Connecting Wire (mm ²)	
		0.75
		2.5

C) solder pin

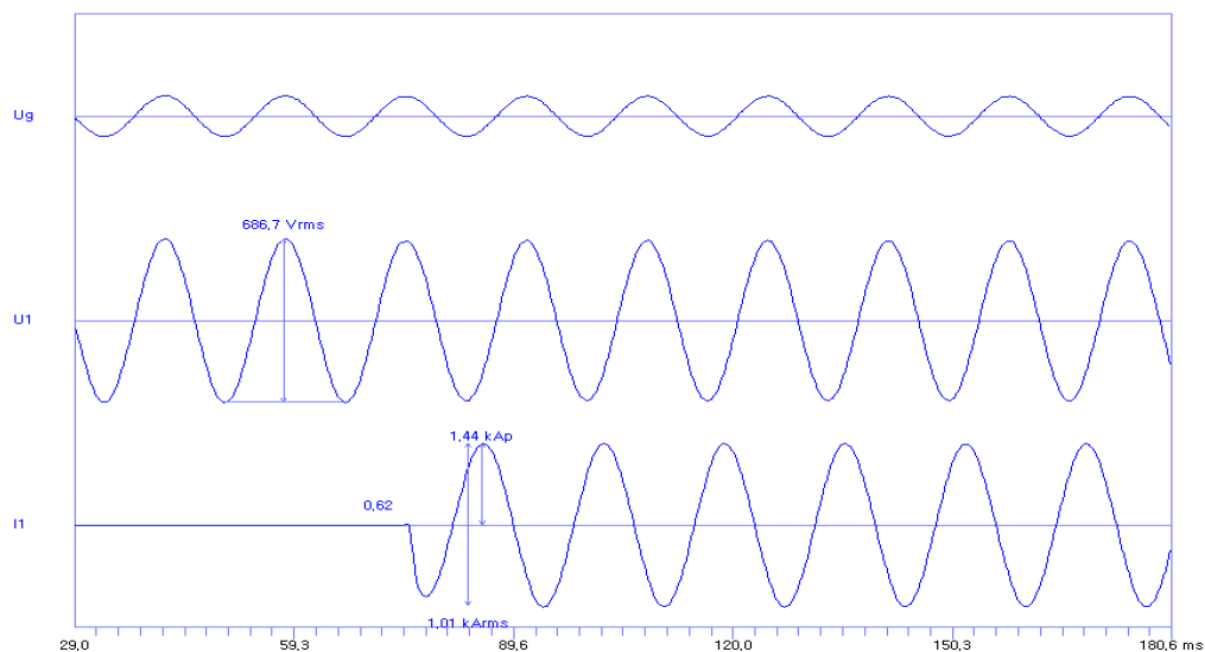
	On printed circuit board		Dimensions(mm)
			4.4mm Ø1.6

Annexure 4 - Composition of Auxiliary contact

Division	Screw	Fast-on	Cage clamp	Solder Pin
Side-Mounted				
2Pole, Upper-Mounted				X
4Pole, Upper-Mounted				X

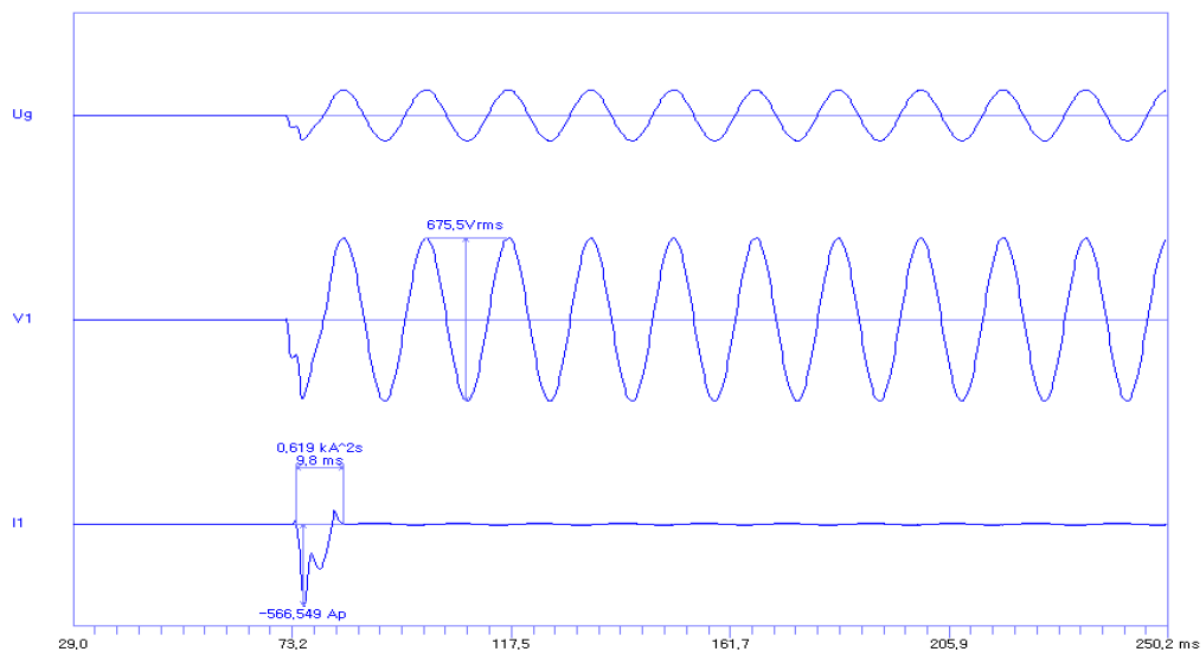
Annexure 5 - short circuit withstand oscillograms

Conditional short circuit withstand oscillograms: GMR-4M Calibration of 1 kA, 686.7 Vac



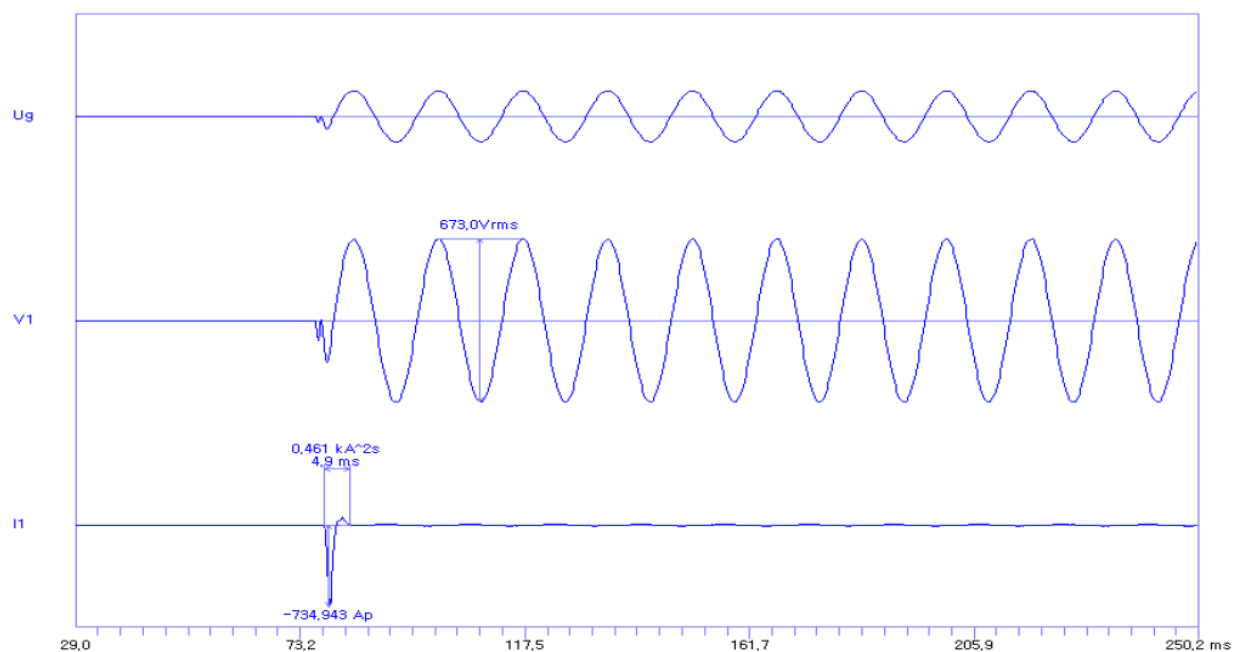
Date : 2012:5:24, Time : 10:26:14
Rec. No. : R412-686.7V 1.01kA PF0.62

Conditional short circuit withstand oscillograms: GMR-4M (NO)+Fuse (gL-gG10A), 660 V 1.0 kA (First)



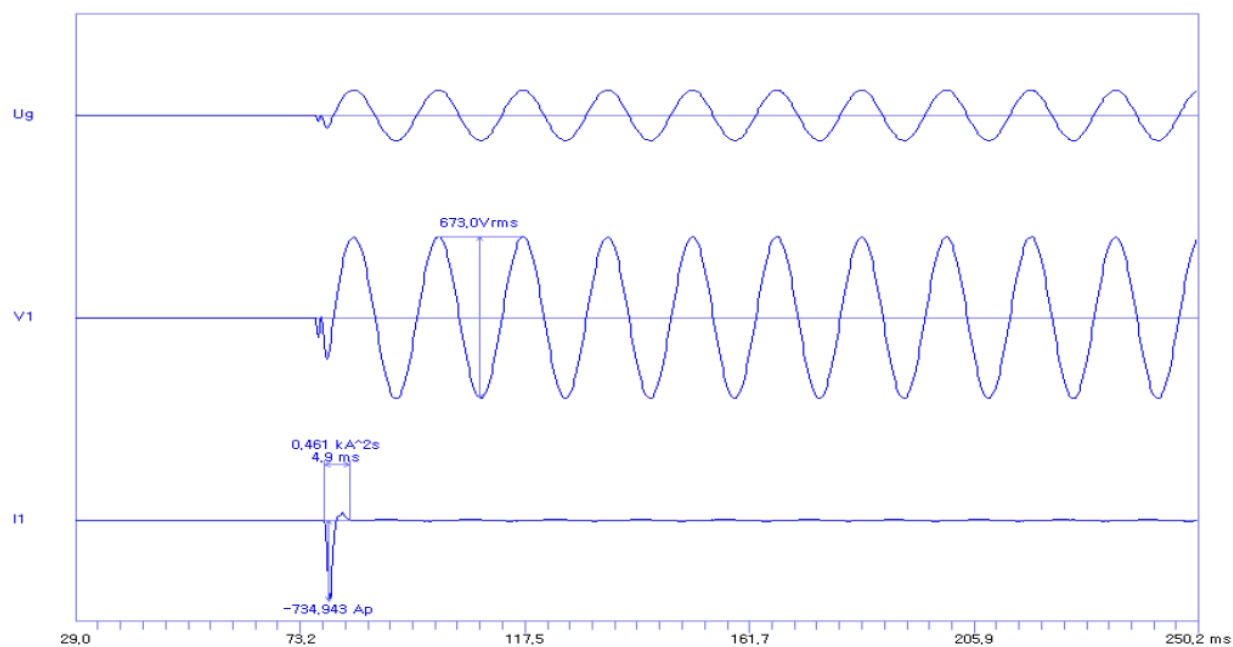
Date : 2012:5:24, Time : 10:58:38
Rec. No. : R412-0087-01
GMR-4M(NO) + Fuse (gL/gG)10A 660V 1.0kA

Conditional short circuit withstand oscillograms: GMR-4M (NO)+Fuse(gL-gG10A), 660V 1.0kA(Second)

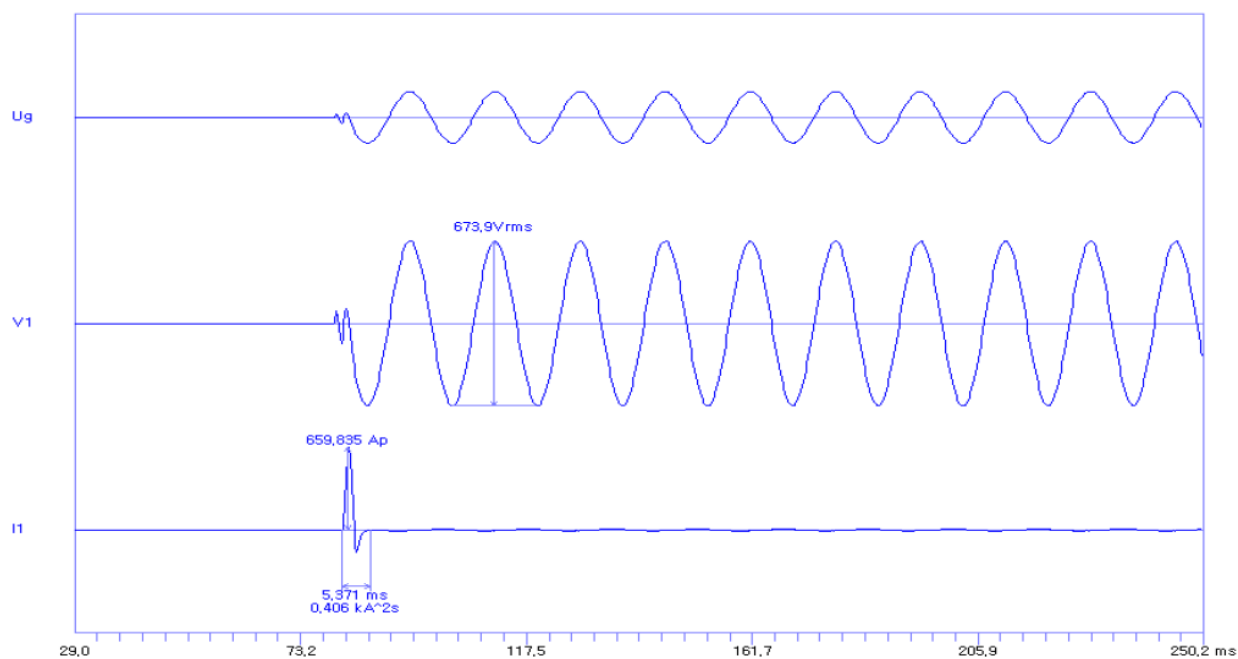


Date : 2012/5/24, Time : 11:0:26
 Rec. No. : R412-0087-02
 GMR-4M(NO) + Fuse (gL/gG)10A 660V 1.0kA

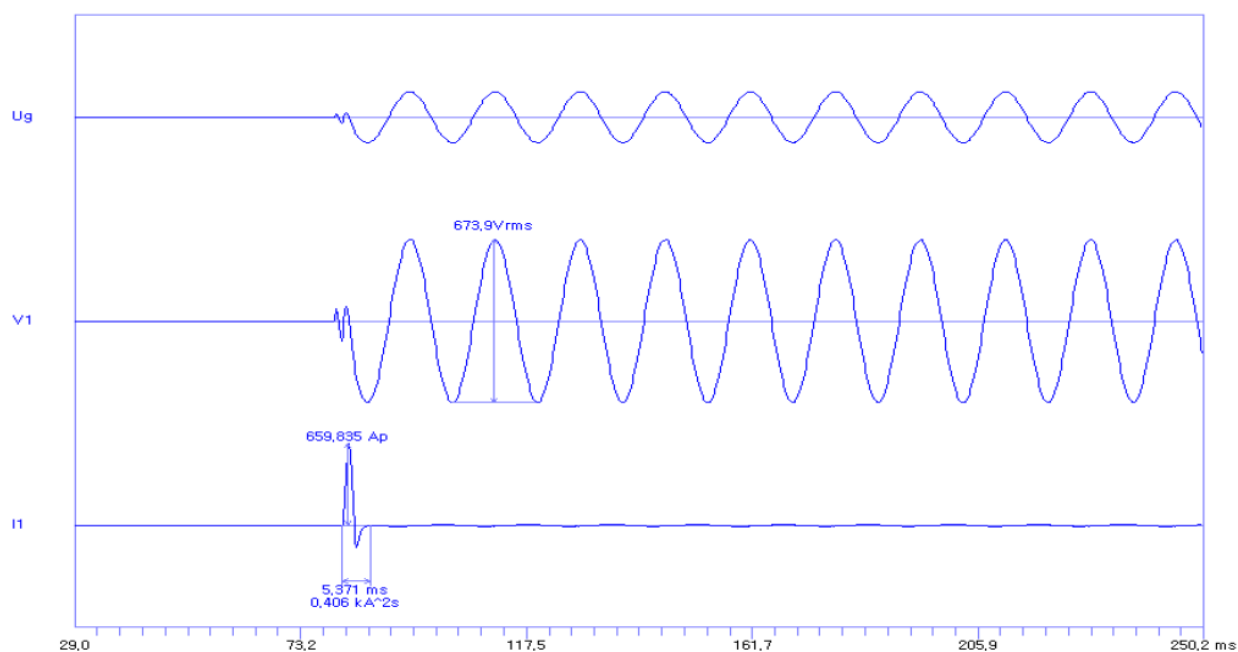
Conditional short circuit withstand oscillograms: GMR-4M (NO)+Fuse (gL-gG10A), 660 V 1.0 kA (Third)



Date : 2012/5/24, Time : 11:0:26
 Rec. No. : R412-0087-02
 GMR-4M(NO) + Fuse (gL/gG)10A 660V 1.0kA

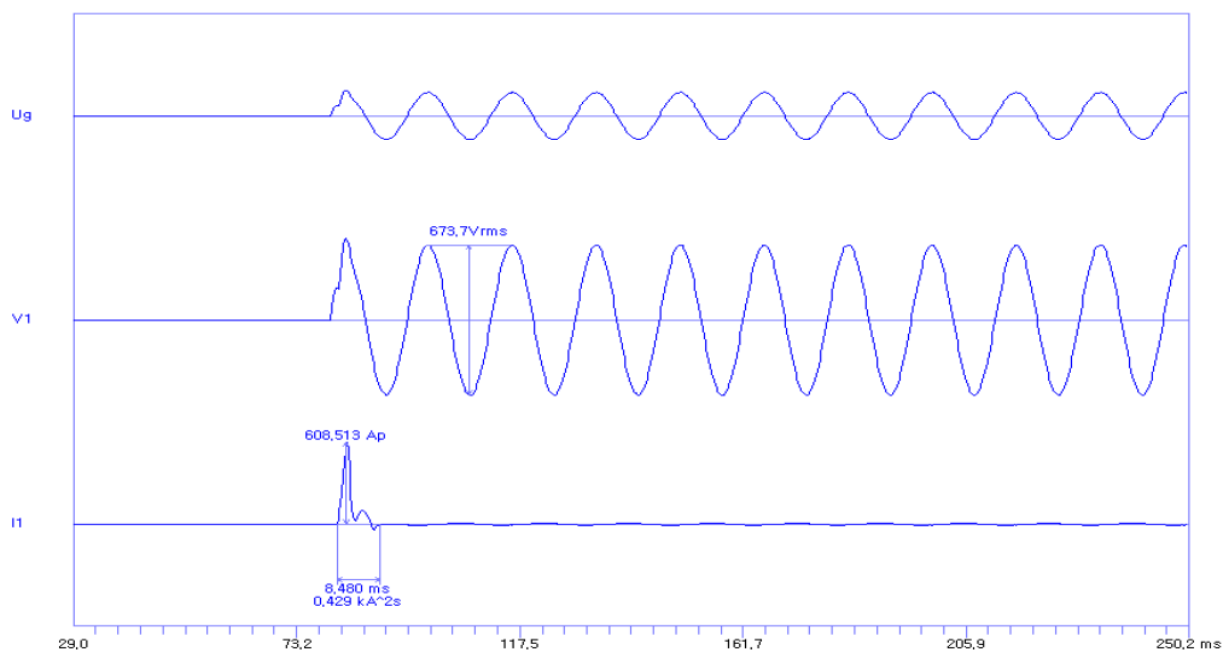
Conditional short circuit withstand oscillograms: GMR-4M (NC)+Fuse (gL-gG10A), 660 V 1.0 kA (First)


Date : 2012:5:24, Time : 11:4:50
 Rec. No. : R412-0087-NC-O1
 GMR-4M(NC) + Fuse (gL/gG)10A 660V 1.0kA

Conditional short circuit withstand oscillograms: GMR-4M (NC)+Fuse(gL-gG10A), 660V 1.0kA(Second)


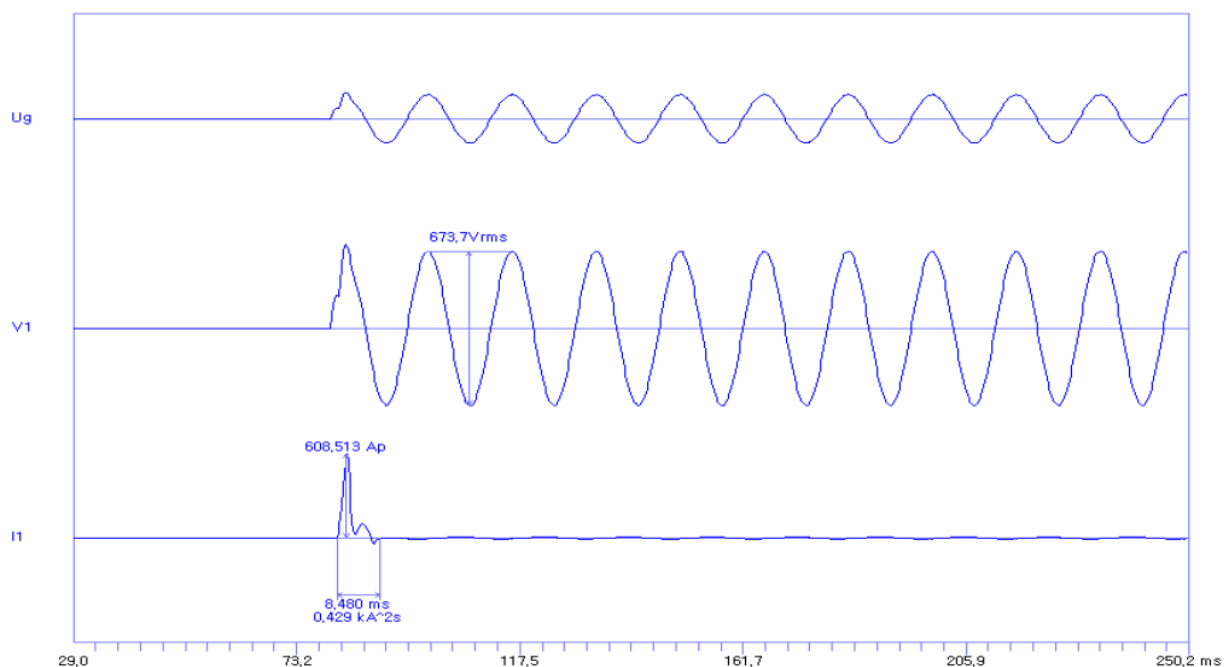
Date : 2012:5:24, Time : 11:4:50
 Rec. No. : R412-0087-NC-O1
 GMR-4M(NC) + Fuse (gL/gG)10A 660V 1.0kA

Conditional short circuit withstand oscillograms: GMR-4M(NC)+Fuse (gL-gG10A), 660V 1.0 kA (Third)

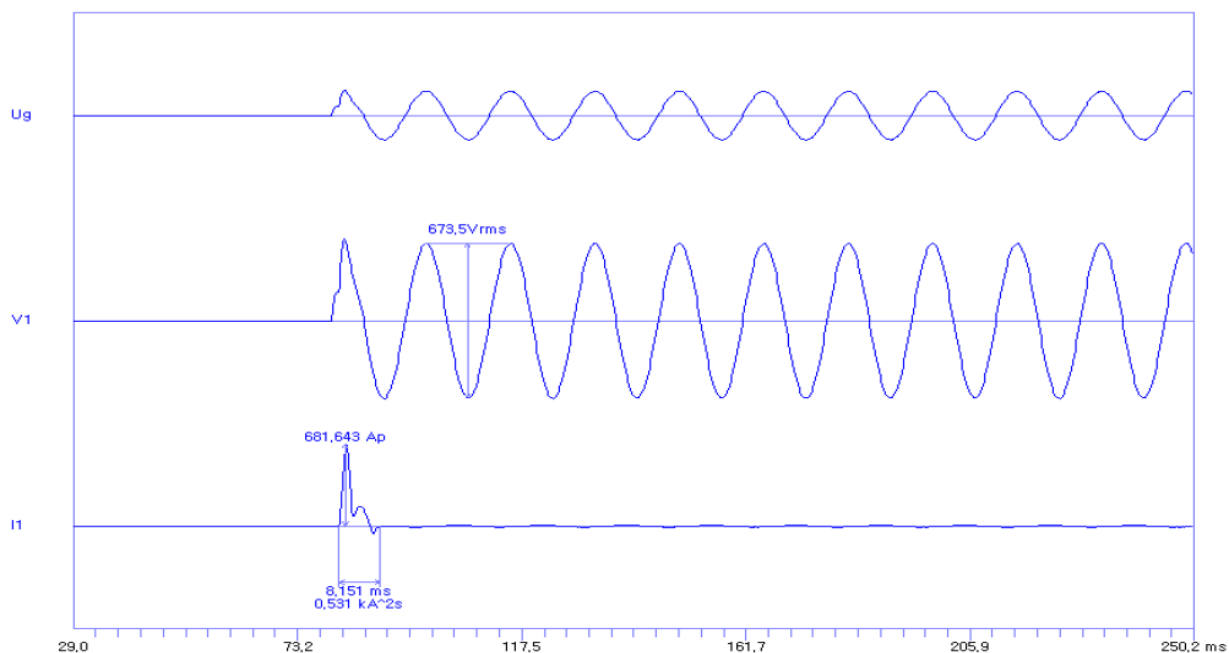


Date : 2012:5:24, Time : 11:6:52
 Rec. No. : R412-0087-NC-O3
 GMR-4M(NC) + Fuse (gL/gG)10A 660V 1.0kA

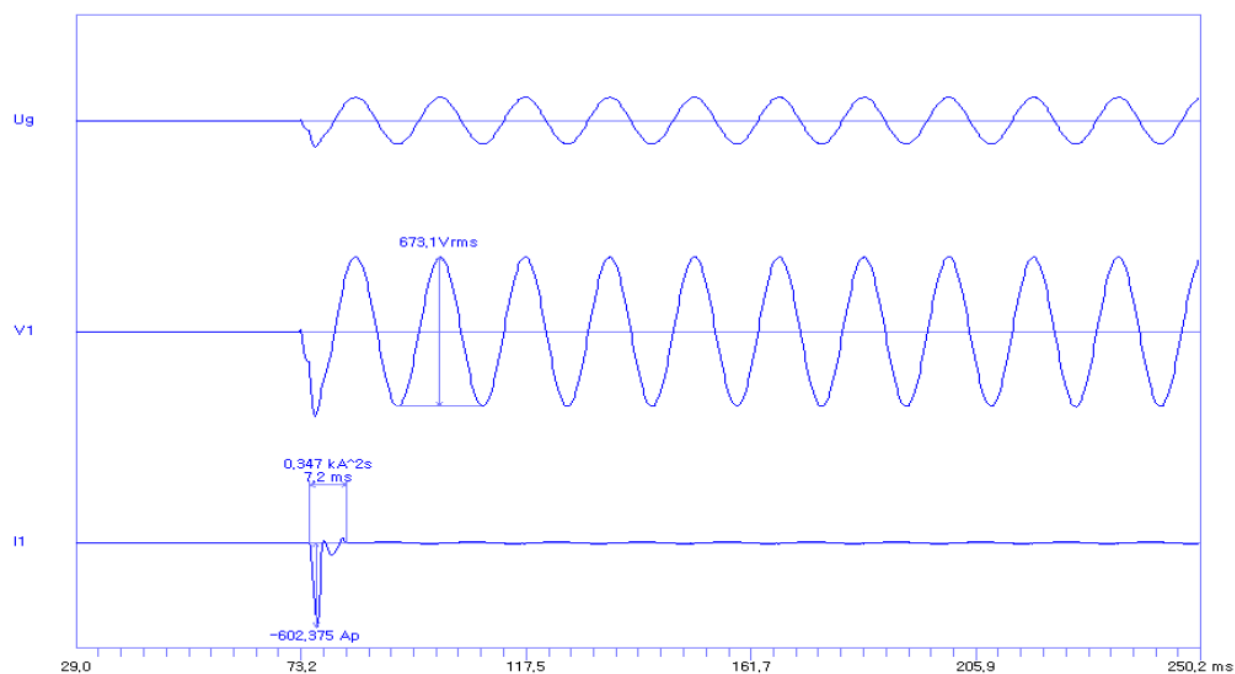
Conditional short circuit withstand oscillograms: AU-4M Calibration of 1 kA, 686.7 Vac



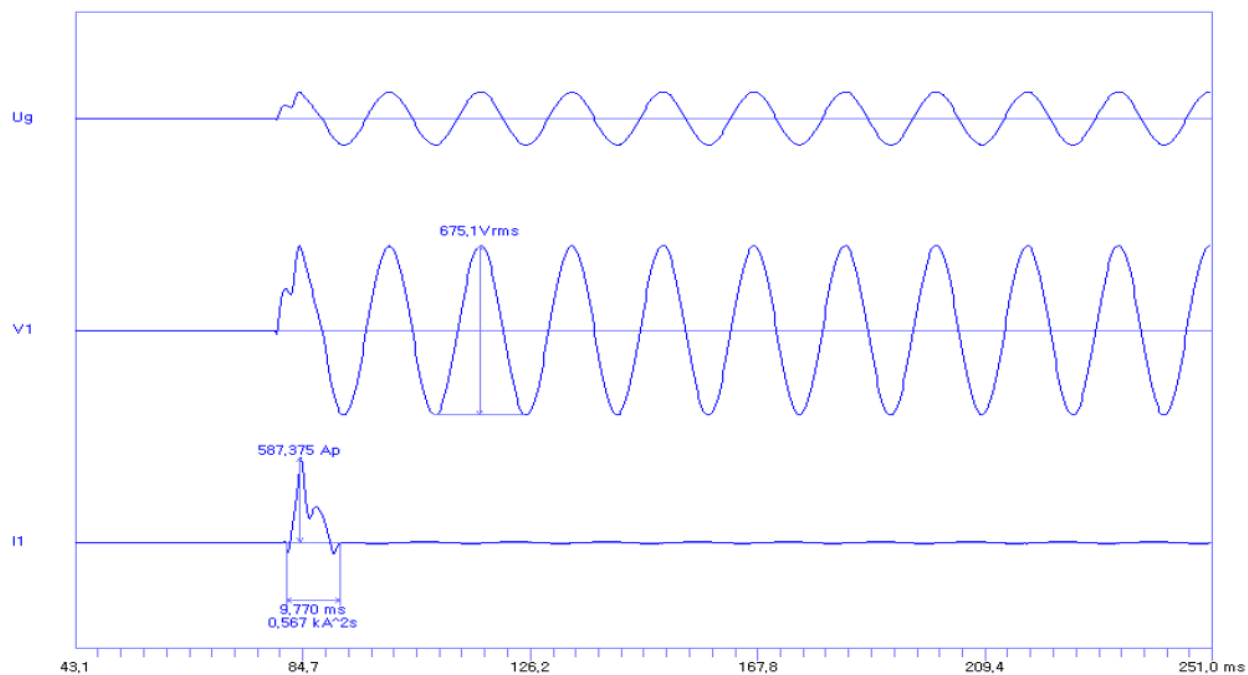
Date : 2012:5:24, Time : 11:6:52
 Rec. No. : R412-0087-NC-O3
 GMR-4M(NC) + Fuse (gL/gG)10A 660V 1.0kA

Conditional short circuit withstand oscillograms: AU-4M(NO)+Fuse (gL-gG10A), 660 V 1.0 kA (First)


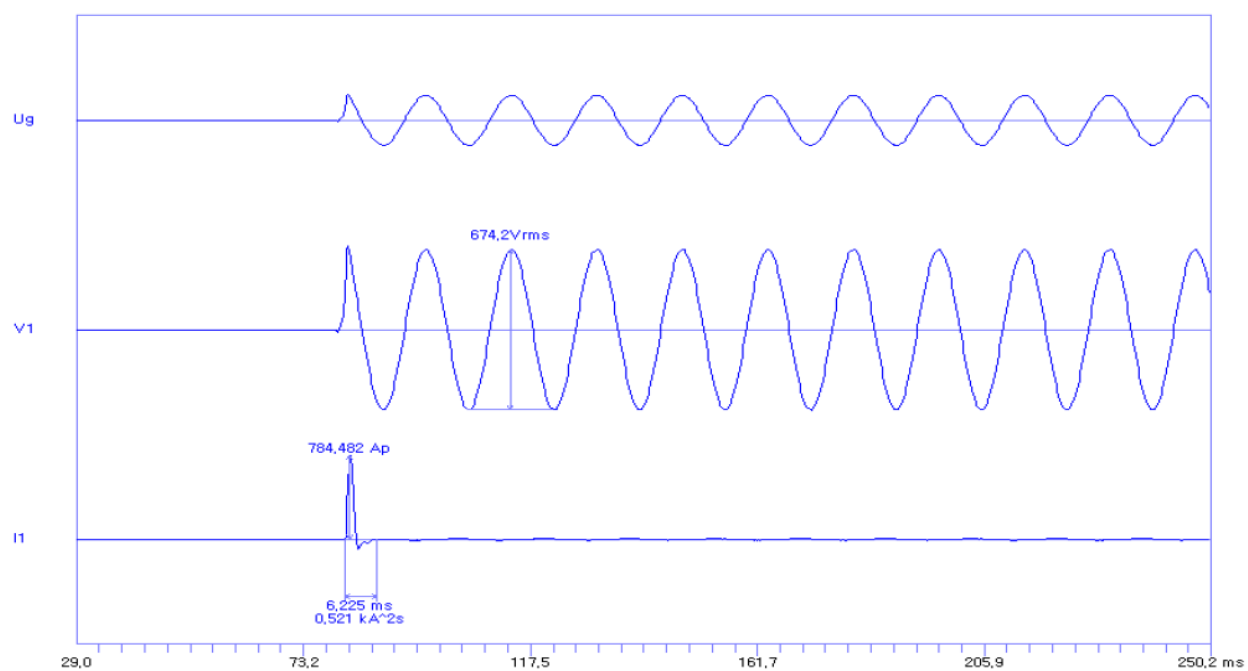
Date : 2012:5:24, Time : 11:9:28
 Rec. No. : R412-0252-NO-01
 AU-4M(NO) + Fuse (gL/gG)10A 660V 1.0kA

Conditional short circuit withstand oscillograms: AU-4M(NO)+Fuse(gL-gG10A), 660V 1.0kA(Second)


Date : 2012:5:24, Time : 11:11:11
 Rec. No. : R412-0252-NO-02
 AU-4M(NO) + Fuse (gL/gG)10A 660V 1.0kA

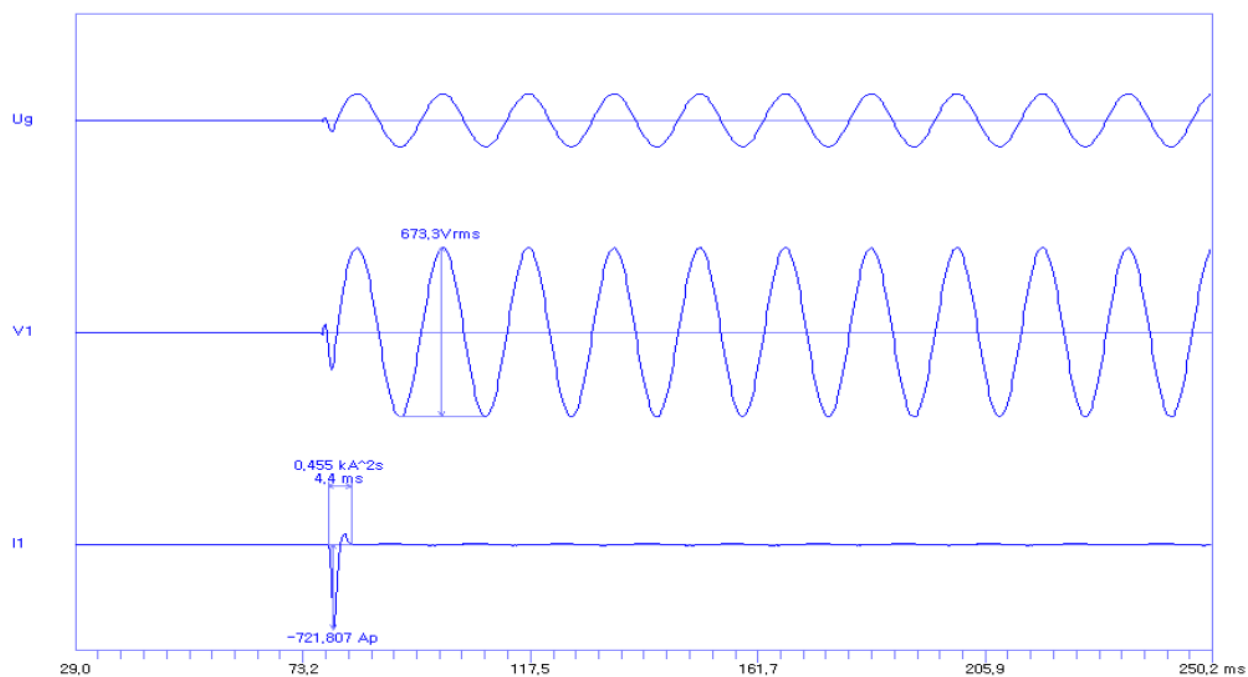
Conditional short circuit withstand oscillograms: AU-4M(NO)+Fuse (gL-gG10A), 660V 1.0 kA (Third)


Date : 2012:5:24, Time : 11:13:12
 Rec. No. : R412-0252-NO-03
 AU-4M(NO) + Fuse(gL/gG)10A 660V 1.0kA

Conditional short circuit withstand oscillograms: AU-4M(NC)+Fuse (gL-gG10A), 660 V 1.0 kA (First)


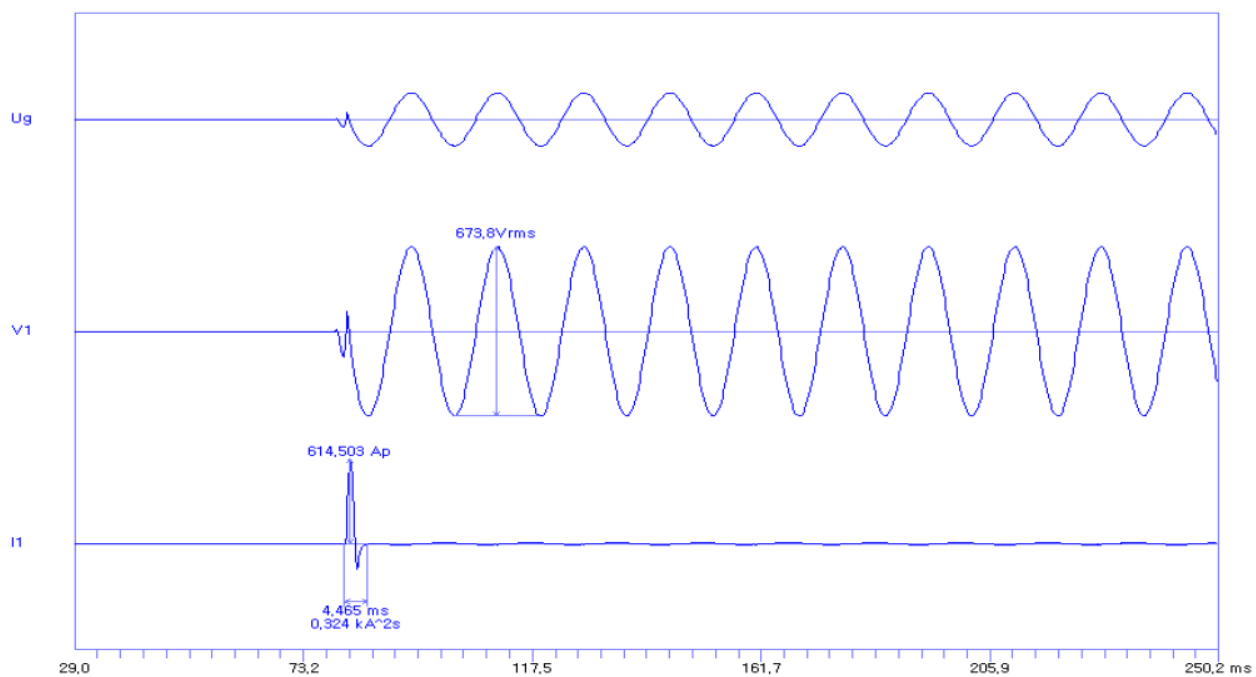
Date : 2012:5:24, Time : 11:13:51
 Rec. No. : R412-0252-NC-01
 AU-4M(NC) + Fuse (gL/gG)10A 660V 1.0kA

Conditional short circuit withstand oscillograms: AU-4M(NC)+Fuse(gL-gG10A), 660V 1.0kA(Second)



Date : 2012:5:24, Time : 11:15:45
 Rec. No. : R412-0252-NC-02
 AU-4M(NC) + Fuse (gL/gG)10A 660V 1.0kA

Conditional short circuit withstand oscillograms: AU-4M(NC)+Fuse (gL-gG10A), 660V 1.0 kA (Third)



Date : 2012:5:24, Time : 11:16:49
 Rec. No. : R412-0252-NC-03
 AU-4M(NC) + Fuse (gL/gG)10A 660V 1.0kA

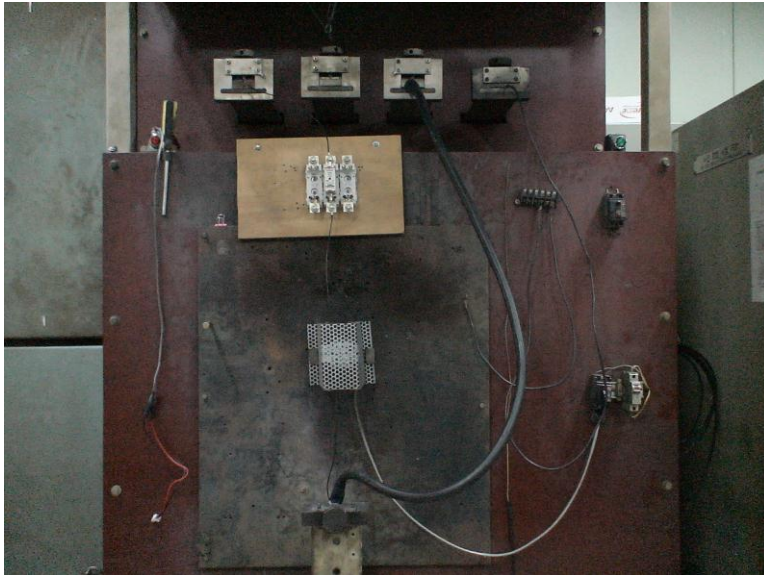
Annexure 6 - Short-Circuit Test Details

Clause 8.3.4 : Performance under conditional short-circuit current

Enclosure and fusible element wire details :

Enclosure : Metallic enclosure, dimension (WXHXD) = 80 mm X 150 mm X 100 mm

Fusible element : 0.8 mm dia, Copper.



- structure: perforated metal
- material: steel
- thickness or diameter of material: 1,5 mm
- ratio hole area/total area: 0.5
- size of hole: not exceeding 30 mm²
- coating: bare

Annexure 7 - Installation Instructions or manufacturer published literature

Instruction manual I

■ COIL

The No. of Aux.contact is different according to the Power Consumption

FRAME SIZE	Type	Consumption power		AUX. Contacts
		Inrush	Sealed	
GMC-6M~16M	AC	32VA	6VA	6
GMD-6M~16M	DC	3W	3W	6
		2W	2W	2
		1.2W	1.2W	-

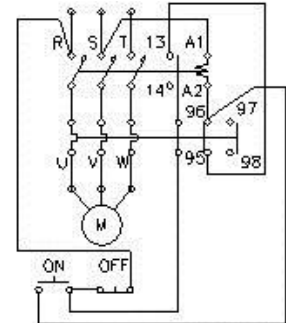


Fig.6 Protection circuit

■ Thermal Overload Relay

In order to set dial ampere, open the safely cover.

- 1) Wire the trip contacts to the appropriate circuit protection device.(See Fig.6)
- 2) Turn the current setting dial arrow to the appropriate amperage setting.(See Fig.7. 1) For service factors other than 1.00, increase the current setting by the service factor percentage. Relays may be set up to 30% greater than the maximum motor amperage.
- 3) Select either manual overload reset (H) or automatic reset (A) by depressing and rotating the selection button so that the arrow points to the desired mode.(See Fig.7. 2)
- 4) To test trip the overload relay, lift the red trip indicator (manual reset mode only)(See Fig.7. 3)
- 5) Remove the causes of overload and reset a tripped relay by depressing the reset button.
Relay will only reset after sufficient cooling time has elapsed

■ Cautions

- 1) The pre-wiring of inside Tor is shown in Fig.8. If pre-wiring is not required, break off the link located on the thermal overload relay.(See Fig.9)
- 2) In case of using in electronic device to receive the trip signal from 95 and 96 the breakdown may occur in the electronic device.

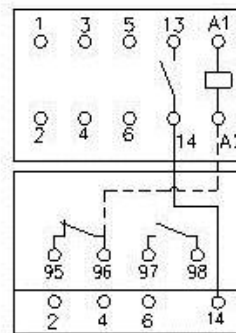
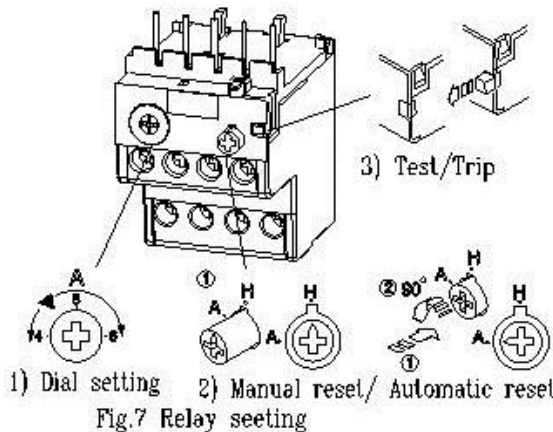


Fig.8 Connecting diagram

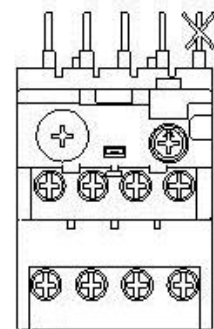
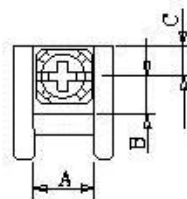


Fig.9 Caution

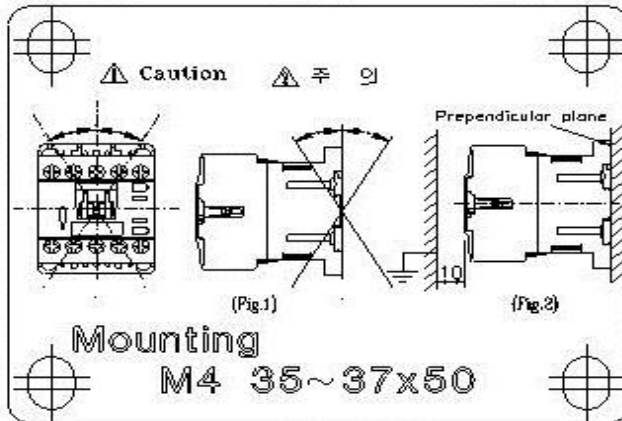
■ Size of wire and connecting torque

Screw	Wire (mm ²)	Torque (kgf.cm)	AXBXC (mm)
M3.5	0.75~1.5	8	7.6x4.x4.5



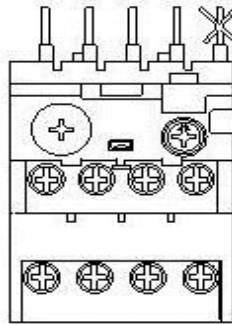
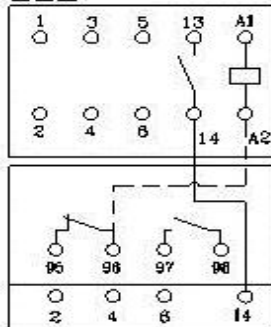
Instruction manual II

배선시 결선도에 따라 주의하여 작업하며
반드시 Top Cover를 조립하여 사용하십시오



⚠ 주 의

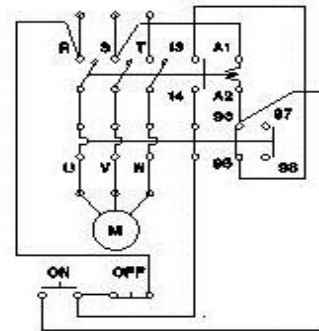
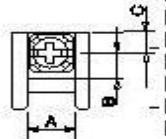
1. 제품을 설치 하기 전 본 사용 설명서를 반드시 읽고 설명에 따라 설치 하여 주십시오
잘못된 설치로 인한 오동작 및 사고가 발생합니다
2. 전선 접속시 제품에 적합한 전선을 사용하고
규정된 체결 토크로 전선을 접속하되 규정된
체결 토크를 유지하여 주십시오.
과밀 및 헐림의 위험이 있습니다.
3. 제품 설치 및 보수시 전문 자격자에 의해 설치
하여 주십시오
잘못된 설치로 인한 오동작 및 사고가 발생 합니다.
4. Top Cover를 제거 후 사용 하지 마세요
디지거나 감전의 원인이 됩니다.
5. 제품 내각시 산업 폐기물로 처리하여 주십시오
6. Fig 1과 같이 수직면에 30° 이내로 부착하여
주십시오
Fig.2와 같이 여크소호 공간을 10mm 이상 유지하여
주십시오

Pre-wiring
결선도

Note)
If pre-wiring is not required, break off
the link located on the thermal overload relay
주요)

연결 전선이 필요하지 않으면 열등형 과부하
계전기의 연결 전선을 자르고 사용하세요.

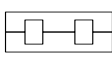
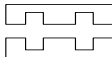
Type	Screw	Wire (mm ²)	Torque (kgf.cm)	AxBxC (mm)
Main				
Aux	M3.5	0.75~1.5	8	7.2x4x1.5
Coil				

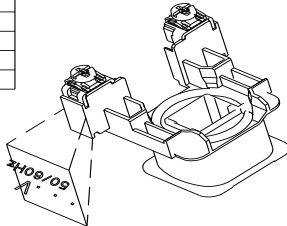


Instruction manual III

AC		DC		
50Hz	60Hz	3W	2W	1.2W
24V		12V	12V	12V
36V		20V	20V	20V
42V		24V	24V	24V
48V		36V	48V	48V
110V		42V	72V	72V
115V		48V	110V	110V
120V		60V	120V	120V
127V		72V		
200V	208V	110V		
220V	230V	120V		
230V	240V	125V		
256V		220V		
277V		240V		
380V	400V	250V		
400V				
440V				
480V				
500V				
550V				

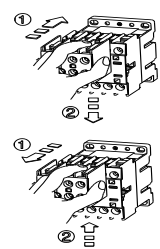
■기타 코일은 문의바랍니다.
■Other voltages on request

	AC (VA)	DC (W)
	6	1.2 2 3
	32	1.2 2 3



⚠ Caution

1. Install the product assuring a space of at least that which is specified in the instruction manual.
Failure to do so may result in fire and scorching.
2. For wiring, select wire sizes suitable for the applied voltage and current. Tighten wires with the tightening torque specified in the instruction manual, and, maintain tighten torque.
Failure to do so may result in fire.
3. Installation, maintenance and inspection of the product should be performed by qualified engineers special knowledge.
Failure to do so may result in fire and scorching.
4. Do not use the product after removing its top-cover.
Electric shock or burning may result.
5. Treat the product as industrial waste when discarding.
6. Even the installing direction takes the direction of Fig.1 to the perpendicular plane, up to the direction of 30°.
Keep the distance more than 10mm with arc space shown in Fig.2



주의
Caution

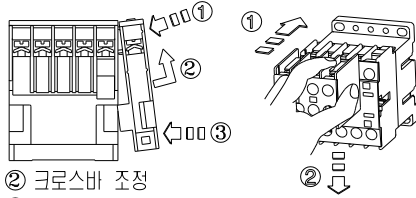
Type	Aux. Contacts
AC Coil	6
DC Coil	3W 6 2W 2 1.2W 0

주의)
소비전력에 따라
보조 접점수가 제한됩니다.

Note)
In DC coils, the
consumptions limits
attached Aux. contacts.

Instruction manual IV (Auxiliary Contacts, Mechanical Interlock Unit)

보조 접점 유닛(AUX. CONTACT UNIT)



② 크로스바 조정

② Adjust the crossbar

AU-1M

AU-2M, 4M

그림과 같은 방법으로 조립하여 주십시오.

Please, attach as though in figure.

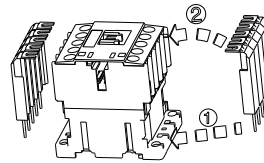
⚠ AU-1M, 2M, 4M 조립 후 수동으로 Crossbar를 눌러서 동작이 원활한지 확인 바랍니다.

⚠ After assembling 'AU-1M, AU-2M and AU-4M' on the GMC, Check the operational condition by pressing the crossbar
배선후 TOP COVER를 꼭 조립하여 사용할 것.

LS Industrial Systems

MADE IN KOREA 80361621501

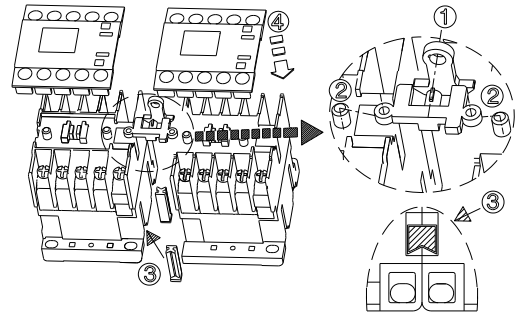
AU-1M, 2M, 4M



PIN CASE UNIT

⚠ 그림과 같은 방법으로 조립하여 주십시오.

⚠ Please, attach as though in figure.

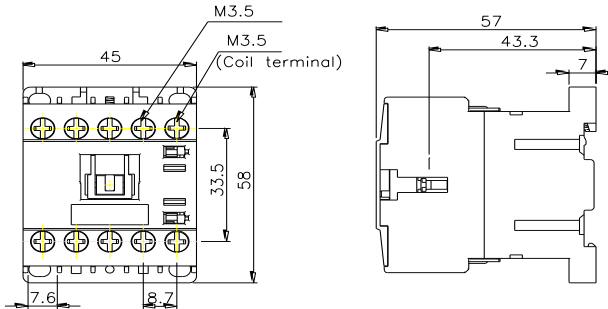
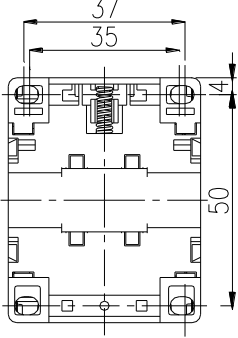
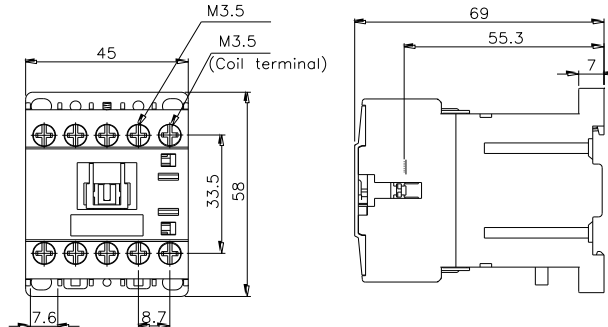
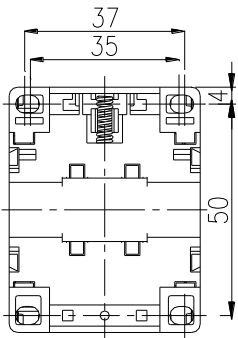
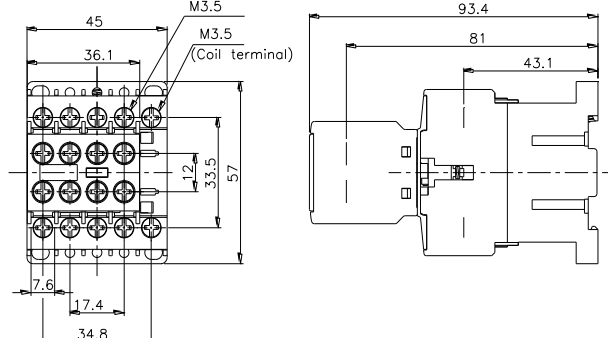
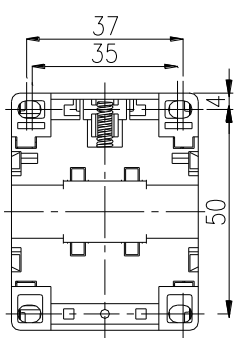
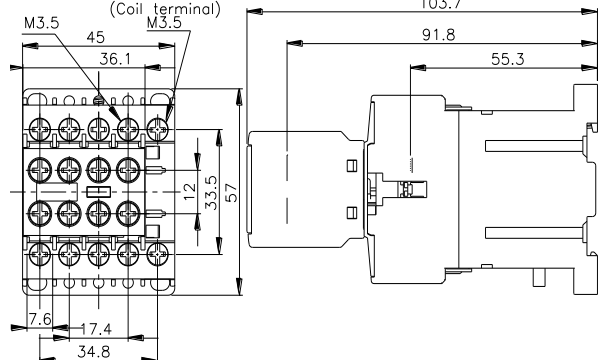
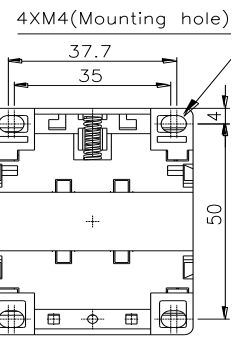


MECHANICAL INTERLOCK

AR-12M

Annexure 8 - Product / Circuit diagram / Component Drawings

1. Screw Terminals Type Contactor relay

	Out side Dimensions	Mounting Dimensions
GMR-4M		
GMR-4MD		
GMR-6M GMR-8M		
GMR-6MD GMR-8MD		

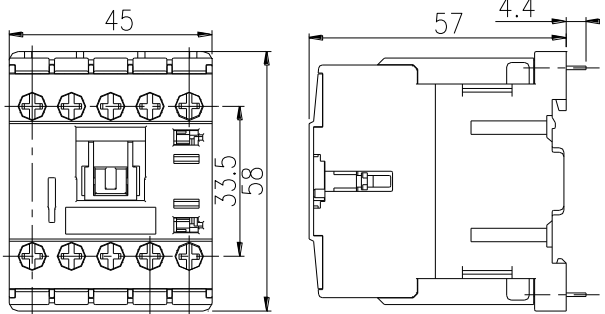
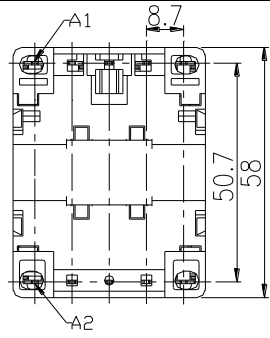
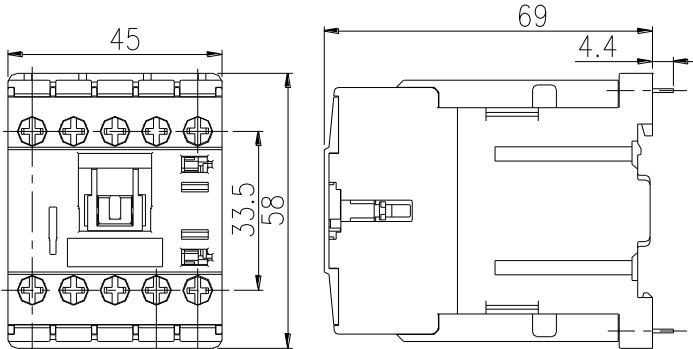
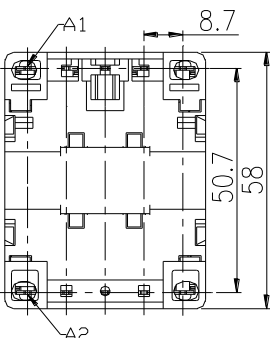
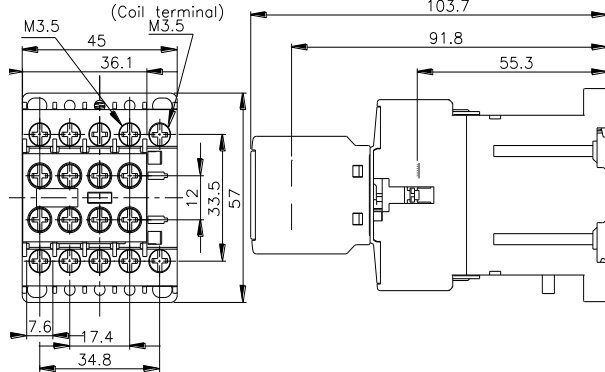
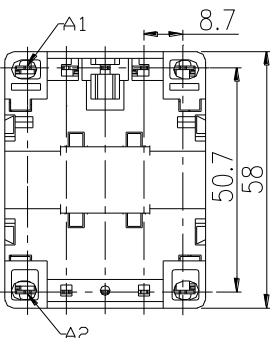
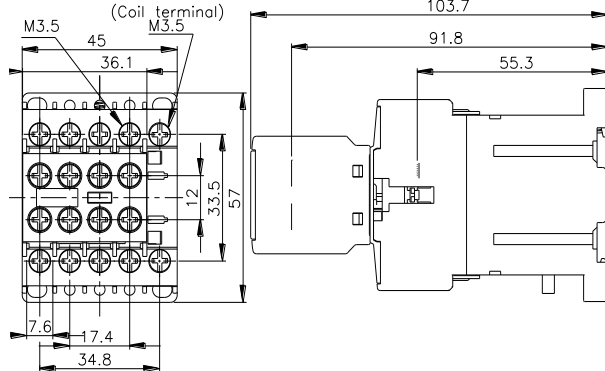
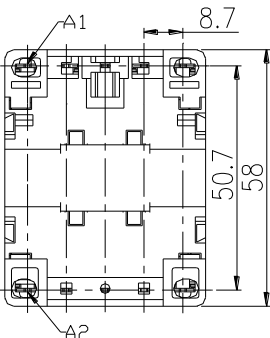
2. Cage Terminal Type Contactor relay

	Out side Dimensions	Mounting Dimensions
GMR-4MC		
GMR-4MDC		
GMR-6MC GMR-8MC		
GMR-6MDC GMR-8MDC		

3. Fasten Terminal Type Contactor relay

	Out side Dimensions	Mounting Dimensions
GMR-4MF		
GMR-4MDF		
GMR-6MF GMR-8MF		
GMR-6MDF GMR-8MDF		

4. Solder pin Terminal Type Contactor relay

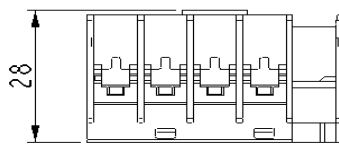
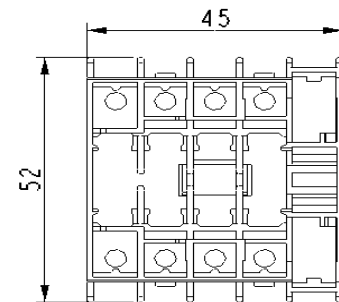
	Out side Dimensions	Mounting Dimensions
GMR-4MP		
GMR-4MDP		
GMR-6MP GMR-8MP		
GMR-6MDP GMR-8MDP		

5. Circuit diagram

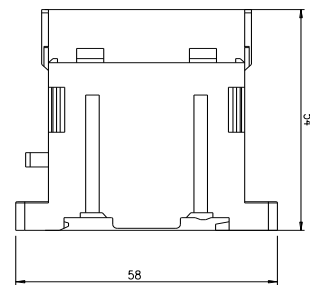
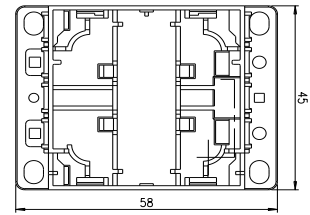
GMR-6M GMR-6MD	6a	5a1b	4a2b
	3a3b	2a4b	
GMR-8M GMR-8MD	8a	7a1b	6a2b
	5a3b	4a4b	

6. Component Drawings

(1) GMR-4M Upper Frame / Lower Frame

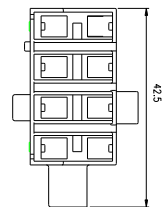
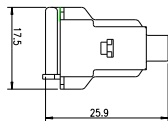


Upper Frame

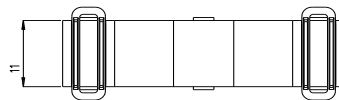
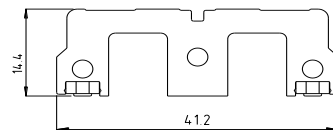


Lower Frame

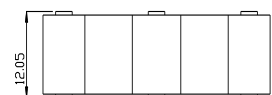
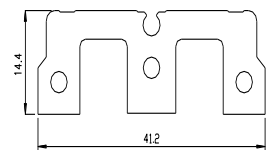
(2) GMR-4M Cross Bar / Moving Core Assembly / Fixed Core Assembly



Cross Bar

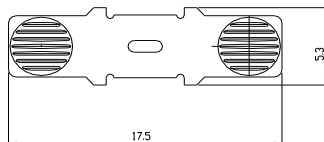
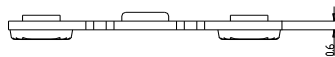


Moving Core Assembly

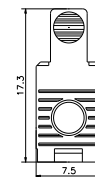


Fixed Core Assembly

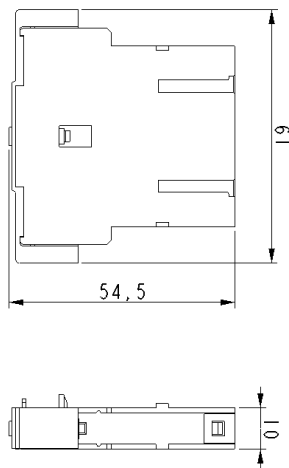
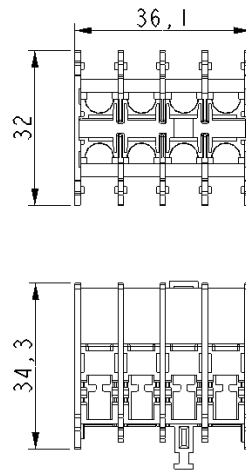
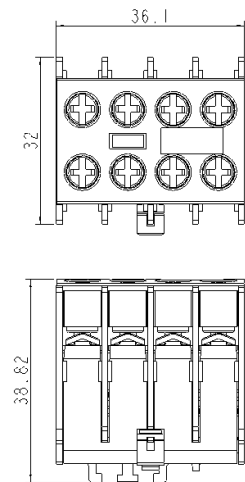
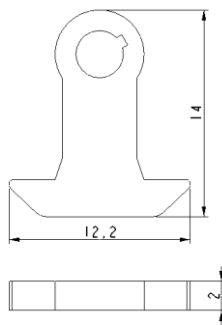
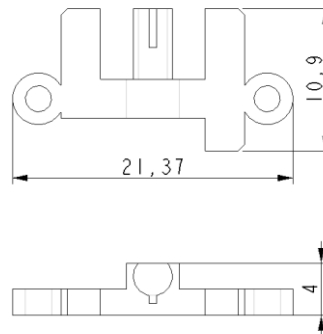
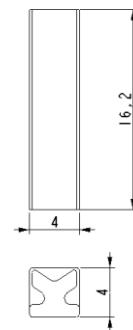
(3) GMR-4M Moving Contact Assembly / Fixed Assembly



Moving Contact Assembly



Fixed Assembly

(4) Auxiliary Contacts : AU-1M, AU-2M, AU-4M CASE**AU-1M Case****AU-2M Case****AU-4M Case****(5) Mechanical Interlock Unit : AR-12M****AR-12M, Lev****AR-12M, sup****AR-12M, holder****(6) Seperate Mounting Unit : AZ-12M**