

Technical Construction File EN 62423:2012+A12:2022 Type F and type B residual current operated circuit-breakers with and without integral overcurrent protection for household and similar uses EN 61008-1:2012+A12:2017 Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) , Part 1: General rules	
Report reference No.....	TLZJ25062672469
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Applicant.....	ZHEJIANG GEYA ELECTRICAL CO., LTD
Address.....	Wenzhou Bridge Industrial Zone, Beibaixiang Town, Yueqing, Zhejiang, China
Manufacturer.....	ZHEJIANG GEYA ELECTRICAL CO., LTD
Address.....	Wenzhou Bridge Industrial Zone, Beibaixiang Town, Yueqing, Zhejiang, China
Factory.....	The same as manufacturer
Address.....	The same as manufacturer
Standard.....	<input checked="" type="checkbox"/> EN 62423:2012+A12:2022, EN 61008-1:2012+A12:2017
Review Report Form No.....	62423, 61008-1
TRF originator.....	GTS
Master TRF.....	Reference No. EN 62423, EN 61008-1
Review procedure	GTS
Type of Review object.....	RCCB
Trademark.....	/
Model/type reference.....	GYL9M
Main model.....	GYL9M
Rating.....	In(A): 16A, 25A, 40A, 63A, 80A, 100A, I Δ n (A): 30mA, 100mA, 300mA, Total number of poles: 1P+N, 3P+N, Inc=6000, Inc=10000, I Δ c=10000, Type AC, Type A, Type B



EN 62423:2012+A12:2022																																				
Clause	Requirement – Review	Result - Remark	Verdict																																	
5	Characteristics		-																																	
5.1	Type F residual current device		-																																	
	Residual current device for which tripping is ensured as for Type A according to IEC 61 008-1, as applicable, and in addition		N/A																																	
	– for composite residual currents, whether suddenly applied or slowly rising intended for circuit supplied between phase and neutral or phase and earthed middle conductor (see 8.1);		N/A																																	
	– and for residual pulsating direct currents superimposed on smooth direct current of 0,01 A (see 8.3.3).		N/A																																	
5.2	Type B residual current device		-																																	
5.2.1	General		-																																	
	Residual current device for which tripping is ensured as for Type F and in addition		N/A																																	
	– for residual sinusoidal alternating currents up to 1 000 Hz (see 8.2.1 .1)		P																																	
	– for residual alternating currents superimposed on a smooth direct current of 0,4 times the rated residual current ($I_{\Delta n}$) (see 8.2.1 .2)		P																																	
	– for residual pulsating direct currents superimposed on a smooth direct current of 0,4 times the rated residual current ($I_{\Delta n}$) or 1 0 mA, whichever is the highest value (see 8.2.1 .3),		P																																	
	– for residual direct currents which may result from rectifying circuits, i.e., – two-pulse bridge connection line to line for 2-, 3- and 4-pole devices (see 8.2.1 .4), – three-pulse star connection or six-pulse bridge connection for 3- and 4-pole devices (see 8.2.1 .5)		P																																	
	– for residual smooth direct currents (see 8.2.1 .6).		P																																	
5.2.2	Standard values of break time and non-actuating time for residual direct currents which result from rectifying circuits and for residual smooth direct current.		P																																	
	<p>Table 1 – Type B RCDs – Standard values of break time and non-actuating time for residual direct currents which result from rectifying circuits and for residual smooth direct current</p> <table border="1"> <thead> <tr> <th rowspan="2">Type</th> <th rowspan="2">I_n A</th> <th rowspan="2">$I_{\Delta n}$ A</th> <th colspan="4">Standard values of break time and non-actuating time at a residual operating current (I_n) equal to</th> <th rowspan="2">s</th> </tr> <tr> <th>$2 I_{\Delta n}$</th> <th>$4 I_{\Delta n}$</th> <th>$10 I_{\Delta n}$</th> <th>5 A, 10 A, 20 A, 50 A, 100 A, 200 A a</th> </tr> </thead> <tbody> <tr> <td>General</td> <td>Any value</td> <td>Any value</td> <td>0,3</td> <td>0,15</td> <td>0,04</td> <td>0,04</td> <td>Maximum break times</td> </tr> <tr> <td rowspan="2">S</td> <td rowspan="2">≥ 25</td> <td rowspan="2">$> 0,030$</td> <td>0,5</td> <td>0,2</td> <td>0,15</td> <td>0,15</td> <td>Maximum break times</td> </tr> <tr> <td>0,13</td> <td>0,06</td> <td>0,05</td> <td>0,04</td> <td>Minimum non-actuating times</td> </tr> </tbody> </table>	Type	I_n A	$I_{\Delta n}$ A	Standard values of break time and non-actuating time at a residual operating current (I_n) equal to				s	$2 I_{\Delta n}$	$4 I_{\Delta n}$	$10 I_{\Delta n}$	5 A, 10 A, 20 A, 50 A, 100 A, 200 A a	General	Any value	Any value	0,3	0,15	0,04	0,04	Maximum break times	S	≥ 25	$> 0,030$	0,5	0,2	0,15	0,15	Maximum break times	0,13	0,06	0,05	0,04	Minimum non-actuating times		P
Type	I_n A				$I_{\Delta n}$ A	Standard values of break time and non-actuating time at a residual operating current (I_n) equal to				s																										
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5.2.3	Values of tripping current according to frequencies which differ from the rated frequency 50 Hz		P																																	
	Table 2 – Type B RCDs – Residual non-operating and operating current according to		P																																	

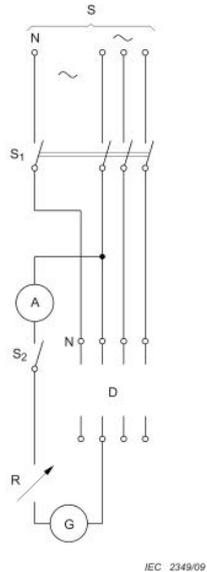
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Clause	Requirement – Review			Result - Remark	Verdict
	frequencies which differ from the rated frequency 50 Hz				
	Frequency Hz	Residual non- operating current /Δn	Residual operating current /Δn		P
	1 50	0,5 /Δn	2,4 /Δn		
	400	0,5 /Δn	6 /Δn		
	1000	/Δn	1 4 /Δn		
6	Marking and other product information				-
6.1	Marking for Type F RCDs				-
	Add the symbol				N/A
	adjacent to the symbol for Type A, e.g.				N/A
	Alternatively the symbol may be used				N/A
6.2	Marking for Type B RCDs				-
	Add the symbol				P
	adjacent to the symbol for Type F, e.g.				P
	Alternatively the symbol may be used				P
7	Standard conditions for operation in service and for installation			According to IEC 61008-1 as applicable	P
8	Conditions for construction and operation				-
8.1	Conditions for Type F and Type B RCDs – Requirements for operation in case of sinusoidal residual currents comprising of multi-frequency components resulting from control equipment supplied from single phase				P
	a) Type F and Type B RCDs shall operate in response to a steady increase of residual current within the limits given in Table 4.				P
	b) Type F and Type B RCDs shall operate in response to a sudden appearance of the residual operating current.				P
8.2	Conditions for Type B RCDs				-
8.2.1	Operation in response to the type of residual current				-
8.2.1.1	Residual sinusoidal alternating currents up to 1 000 Hz				-
	Type B RCDs shall operate in response to a sudden appearance of the residual operating current given in Table 2. The maximum break time of RCDs of the general type shall be 0,3 s, and for RCDs type S the minimum non-actuating time shall be equal to or not lower than 0,1 3 s and the maximum break time shall not exceed 0,5 s				P

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Clause	Requirement – Review	Result - Remark	Verdict
8.2.1.2	Residual alternating current superimposed on a residual smooth direct current		P
	Type B RCDs shall operate in case of residual alternating currents of the rated frequency superimposed on a residual smooth direct current of 0,4 times the rated residual current ($I_{\Delta n}$) or 10 mA whichever is the highest value.		P
8.2.1.3	Residual pulsating direct current superimposed on a smooth direct current		-
	Type B RCDs shall operate in case of residual pulsating direct currents superimposed on a residual smooth direct current of 0,4 times the rated residual current ($I_{\Delta n}$) or 10 mA, whichever is the highest value		P
8.2.1.4	Residual pulsating direct currents which may result from rectifying circuits supplied from two phases		-
	Type B RCDs shall operate in response to a steady increase of residual pulsating direct current resulting from rectifying circuits within the limits of $0,5 I_{\Delta n}$ to $2 I_{\Delta n}$		P
	Type B RCDs shall operate in response to a sudden appearance of residual pulsating direct current resulting from rectifying circuits according to the limits specified in Table 1		P
8.2.1.5	Residual pulsating direct currents which may result from rectifying circuits supplied from three phases		-
	Type B RCDs shall operate in response to a steady increase of residual pulsating direct current resulting from rectifying circuits within the limits of $0,5 I_{\Delta n}$ to $2 I_{\Delta n}$		P
	Type B RCDs shall operate in response to a sudden appearance of residual pulsating direct current resulting from rectifying circuits according to the limits specified in Table 1 .		P
8.2.1.6	Residual smooth direct current		-
	Type B RCDs shall operate in response to a steady increase of smooth direct residual current within the limits of $0,5 I_{\Delta n}$ to $2 I_{\Delta n}$		P
	Type B RCDs shall operate in response to a sudden appearance of smooth direct residual current according to the limits specified in Table 1 of this standard		P
8.2.1.7	Behaviour of the correct operation for three- and four- pole Type B RCDs powered on two poles only		P
8.3	Behaviour of Type F and Type B RCDs		-
8.3.1	Behaviour of RCDs in the case of surge residual currents		-
	RCDs shall show adequate resistance against unwanted tripping in case of current surges to earth due to the loading of the capacitances of the installation and the current surges to earth due to flashover in the installation		P
8.3.2	Behaviour of RCDs in the case of inrush residual currents		-
	RCDs shall adequately withstand inrush residual currents with a maximum duration of 10 ms which can occur in case of switching on electronic equipment or EMC-filters		P

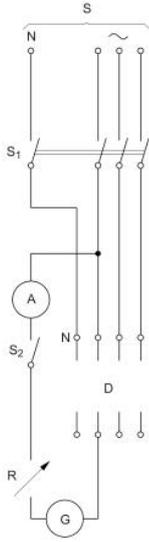
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Clause	Requirement – Review	Result - Remark	Verdict
8.3.3	Behaviour in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A		P
	RCDs shall operate in case of residual pulsating direct currents superimposed on a residual smooth direct current of 0,01 A		P
9	Tests		-
9.1	Tests for Type F and Type B RCDs		-
9.1.1	General	made according to Figure 1	-
9.1.2	Verification of the correct operation in case of a steady increase of composite residual current		P
	Table 3 provides frequency component values for calibration purposes as well as the starting current values to verify the RCD operation in case of a steady increased residual current.		P
	Table 4 provides the limit operating values of the composite residual current.		P
	The test frequency has a tolerance of $\pm 2\%$		P
9.1.3	Verification of the correct operation in case of sudden appearance of composite residual current		P
	Tests are carried out to verify the break time of the RCD, the test current being calibrated at 5 times the upper limit value given in Table 4		P
	The test switch S1 and the RCD being in the closed position, the residual current is suddenly established by closing the test switch S2.		P
	Three measurements of the break time are made		P
	For general type RCDs, the break times shall be less than 0,04 s		P
	For RCDs Type S the break time shall be less than 0,15 s.		P
	RCDs Type S shall be tested additionally with the test current which is suddenly established by closing the test switch S 2 for the minimum non-actuating time of 0,05 s, with a tolerance of 0/-5 %		P
9.1.4	Verification of the correct operation for four-pole Type F RCD powered on two poles only		-
	Tests shall be performed with a four-pole RCD according to 9.1.2, but the RCD is only supplied between the neutral terminal and one-phase terminal chosen at random with rated frequency and without load		P
9.1.5	Verification of behaviour at surge currents up to 3 000 A (8/20 μ s surge current test)		P
9.1.5.1	Test conditions		-
	The test conditions are given in IEC 61008-1 Subclause 9.19.2.1, as applicable.		P
9.1 .5.2	Test results		-
	After the surge current tests the correct operation of RCCBs is verified by a test according to IEC 61008-1 Subclause 9.9.2.3 or for RCBOs according), at / Δ n only, with the measurement of the break time.		P

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Clause	Requirement – Review	Result - Remark	Verdict
9.1.6	Verification of behaviour in the case of inrush residual currents	according to Figure 2	-
	A pulse with a peak current of 10 times / Δn is established on one pole chosen at random. Six measurements are made 3 times in positive and 3 times in negative polarity. The polarity is changed after each test. The time between two pulses shall be 30 s		P
9.1.7	Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A	The RCD is tested according to 9.21.1.4 of IEC 61008-1	P
9.2	Tests for Type B RCDs		P
9.2.1	Verification of the operating characteristic at the reference temperature (20 ± 5) °C		-
9.2.1 .1	General	The RCD is installed as for normal use	-
9.2.1 .2	Verification of the correct operation in case of residual sinusoidal alternating currents up to 1 000 Hz	Performed according to Figure 3	-
9.2.1 .3	Verification of the correct operation in the case of a residual alternating current superimposed on a residual smooth direct current	performed according to Figure 4	-
9.2.1 .4	Verification of the correct operation in the case of a residual pulsating direct current superimposed on a residual smooth direct current	performed according to Figure 5	-
9.2.1 .5	Verification of the correct operation in case of residual direct currents which may result from rectifying circuits supplied from two phases	performed according to Figure 6a	-
9.2.1 .6	Verification of the correct operation in case of residual direct currents which may result from rectifying circuits supplied from three phases	not apply to 2-pole Type B RCDs	-
9.2.1 .7	Verification of the correct operation in case of residual smooth direct current		-
9.2.1 .7.1	Verification of the correct operation in case of residual smooth direct current without load	performed according to Figure 7	-
9.2.1 .7.2	Verification of the correct operation in case of residual smooth direct current with load		-
9.2.2	Tests at the temperature limits		-
9.2.3	Verification of the correct operation for three- and four-pole Type B RCDs powered on two poles only		-
9.2.4	Verification of the RCD after test sequences		-

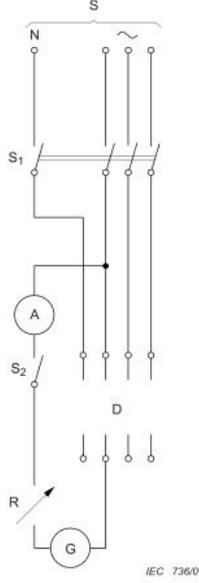
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Clause	Requirement – Review	Result - Remark	Verdict
	<div style="text-align: center;">  </div> <p style="margin-left: 20px;"> S supply S₁ all-pole switch (optional) S₂ single-pole switch D RCD under test R e.g. 10 Ω (any suitable value) G arbitrary waveform generator (combination of 10 Hz, 50 Hz and 1 kHz) A amperemeter </p> <p style="text-align: center;">Figure 1 – Example of a test circuit for the verification of correct operation in case of residual sinusoidal alternating currents composed of multi-frequency components resulting from single-phase supplied speed motor control equipment</p>		—

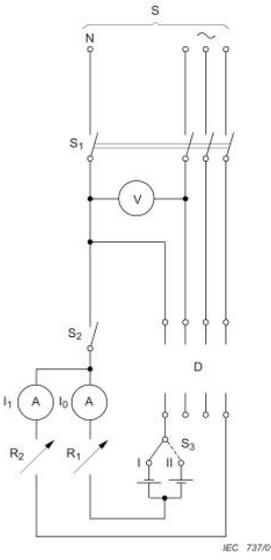
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Clause	Requirement – Review	Result - Remark	Verdict
	<div style="text-align: center;">  <p style="text-align: right; font-size: small;">IEC 2350/09</p> </div> <div style="margin-top: 20px;"> <p>S supply</p> <p>S₁ all-pole switch</p> <p>S₂ single-pole switch</p> <p>D RCD under test</p> <p>R e.g. 10 Ω (any suitable value)</p> <p>G single half-wave pulse generator (50 Hz Text deleted)</p> <p>A amperemeter</p> </div> <div style="text-align: center; margin-top: 20px;"> <p>Figure 2 – Test circuit for the verification of the behaviour of the RCD in case of inrush residual currents</p> </div>		<p>–</p>

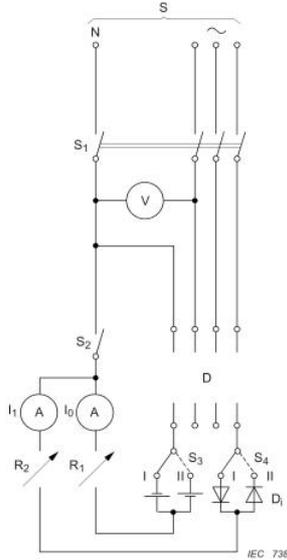
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Clause	Requirement – Review	Result - Remark	Verdict
	<div style="text-align: center;">  <p style="text-align: right; font-size: small;">IEC 736/07</p> </div> <p>Components</p> <ul style="list-style-type: none"> S supply A ammeter (measuring r.m.s. values) S₁ all-pole switch S₂ single-pole switch D RCD under test R variable resistor G generator <p>Figure 3 – Test circuit for the verification of correct operation in case of residual sinusoidal alternating current up to 1 000 Hz</p>		<p>–</p>

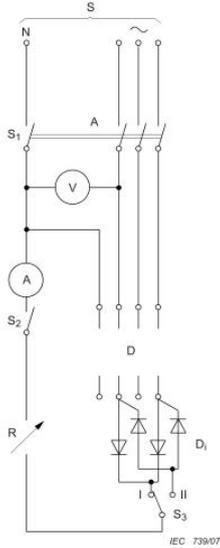
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Clause	Requirement – Review	Result - Remark	Verdict
	<div style="text-align: center;">  <p>Components</p> <ul style="list-style-type: none"> S supply V voltmeter A ammeter (measuring r.m.s. values) D RCD under test R₁, R₂ variable resistor S₁ multipole switch S₂ single-pole switch S₃ two-way switch </div> <p style="text-align: center;">Figure 4 – Test circuit for 2-, 3- and 4-pole Type B RCD to verify the correct operation in case of a residual alternating current superimposed on a smooth direct current</p>		—

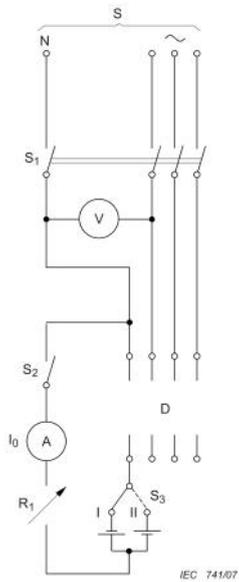
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Clause	Requirement – Review	Result - Remark	Verdict
	 <p>Components</p> <ul style="list-style-type: none"> S supply V voltmeter A ammeter (measuring r.m.s. values) D RCD under test D₁ diodes R₁, R₂ variable resistor S₁ multipole switch S₂ single-pole switch S₃ and S₄ two-way switch <p>Figure 5 – Test circuit for 2-, 3- and 4-pole Type B RCD to verify the correct operation in case of a residual pulsating direct current superimposed on a smooth direct current</p>		<p>–</p>

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Clause	Requirement – Review	Result - Remark	Verdict
	 <p>Components</p> <ul style="list-style-type: none"> Point A supply by 2 phases chosen at random S supply V voltmeter A ammeter (measuring r.m.s. values) D RCD under test D₁ diodes R variable resistor S₁ multipole switch S₂ single-pole switch S₃ two-way switch <p>Figure 6a – Test circuit for 2-, 3- and 4-pole Type B to verify the correct operation in case of residual pulsating direct currents which may result from rectifying circuits supplied from two phases</p>		<p>–</p>

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Clause	Requirement – Review	Result - Remark	Verdict
	 <p>Components</p> <ul style="list-style-type: none"> S supply V voltmeter A ammeter (measuring r.m.s. values) D RCD under test R₁ variable resistor S₁ multipole switch S₂ single-pole switch S₃ two-way switch <p>Figure 7 – Test circuit for 2-, 3- and 4-pole Type B RCD to verify the correct operation in case of a residual smooth direct current</p>		<p>–</p>

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Clause	Requirement – Review	Result - Remark	Verdict
6.	Marking		-
	a) manufacturer's name or trademark	ZHEJIANG GEYA ELECTRICAL CO., LTD	P
	b) type designation, catalogue number or serial number :		P
	c) rated voltage(s) (V)		P
	d) rated frequency (Hz)		P
	e) rated current (A)		P
	f) rated residual operating current (A)		P
	h) rated making and breaking capacity (A)		P
	j) degree of protection		N/A
	k) position of use		N/A
	l) rated residual making and breaking capacity 0A(A) :		P
	m) symbol S for type S	S	N/A
	n) symbol of the method of operation		P
	o) operating means of Review device	T	P
	p) wiring diagram		N/A
	r) operating characteristic		P
	Marking on the RCCB itself or on nameplate or nameplates attached to the RCCB and located so that for small devices at least e), f) and o) are legible when the RCCB is installed		P
	Joule integral withstand capacity (A ² s)		P
	Peak current withstand capacity (A)		P
	Time delay when opening in case of failure of the line voltage (s)		P
	Open position indicated by "0" and closed position by "I" :	O / I	P
	For push-buttons the OFF push-button shall either be red or marked with "0"		P
	If necessary to distinguish between supply and load terminals they shall be clearly marked		P
	Terminals for neutral circuit marked by "N"		P
	Terminals for protective conductor marked by [symbol IEC 417-5019 a]		P
	Marking indelible, easy legible and not on removable parts		P
9.3	Review: 15 s with water, 15 s with hexane		P

	Review SEQUENCE D (3 samples)		-
	Reviews "D0"		-
9.5	Operating characteristics		-
	For multiple settings of I _{dn} Reviews are made for each setting		N
9.9.1	RCCB installed as for normal use, Review circuit according to fig. 4a		P
9.9.5	For RCCB's functionally dependent on line voltage, each Review is made at 1,1 and 0,85 times the rated line voltage; voltage (V) :		N
9.9.2	Off-load Reviews made at a temperature of 20 ± 2 °C		P
9.9.2.1	Verification of the correct operation in case of a steady increase residual current:		-
	- steady increase from 0,2 I _{dn} to I _{dn} within 30 s (mA) :	-	P
	- tripping current between I _{dno} and I _{dn} (150 to 300 mA) :		P
9.9.2.2	Verification of the correct operation at closing on residual current		
	- the RCCB closes on I _{dn} : no value exceeds the specified limiting value of Table 1(130 to 500 ms) :		P
	For RCCB's functionally dependent on line voltage according to 4.1.2.2. a) I _{dn} is established by closing S1	-	N
9.9.2.3	Verification of the correct operation in case of sudden appearance of residual current by dosing S2 (see Table 1):		-
	- maximum break time (130 to 500 ms) at: I _{dn} :	325ms	P
	- maximum break time (60 to 200 ms) at: 2 I _{dn} :	116ms	P
	- maximum break time (50 to 150 ms) at: 5 I _{dn} :	87ms	P
	No value exceeds the relevant specified limiting value		-
	Additional Review for type S:		-
	- minimum non actuating time (ms) at: I _{dn} ; 0,13s :	no tripping	P
	- minimum non actuating time (ms) at: 2 I _{dn} ; 0,06 s :	no tripping	P
	- minimum non actuating time (ms) at: 5 I _{dn} ; 0,05 s :	no tripping	P
	- minimum non actuating time (ms) at: 500 A; 0,04 s :	no tripping	P
	No tripping during Reviews	-	P
9.9.2.4	Verification of the correct operation in case of sudden appearance of residual currents of values between 5I _{dn} and 500A by closing S2 (see Table 1):		
	- break time (40 to 150 ms) at 5A :		N/A
	- break time (40 to 150 ms) at: 10A :		N/A
	- break time (40 to 150 ms) at: 20A :		N/A
	- break time (40 to 150 ms) at: 50A :		N/A
	- break time (40 to 150 ms) at: 100A :	83ms	P
	- break time (40 to 150 ms) at: 200A :		N/A
9.9.4	a) Reviews repeated at a temperature of -5°C:		P

	- maximum break time (130 to 500 ms) at: t _{dn}	314ms	P
	- maximum break time (60 to 200 ms) at: 2 I _{dn}	98ms	P
	- maximum break time (50 to 150 ms) at: 5 I _{dn} :	107ms	P
	- maximum break time (40 to 150 ms) at: 500 A :	123ms	P
	No value exceeds the relevant specified limiting value	-	P
	Additional Review for type S:		
	- minimum non actuating time (ms) at: I _{dn} ; 0,13s :	no tripping	P
	- minimum <i>non</i> actuating time (ms) at: 2 I _{dn} ; 0,06 s:	no tripping	P
	- minimum non actuating time (ms) at: 5 I _{dn} ; 0,05 s:	no tripping	P
	- minimum non actuating time (ms) at: 500 A; 0,04 s:	no tripping	P
	No tripping during the Reviews		P
9.9.3	Reviews repeated with the RCCB loaded with rated current:		
	- Review current (A): I _n , until steady state conditions are reached		-
	- cross-sectional area (mm ²):		-
	- the RCCB closes on I _{dn} : no value exceeds the specified limiting value of Table 1 (130 to 500 ms) :		P
	For RCCB's functionally dependent on line voltage according to 4.1.2.2. a) I _{dn} is established by closing S1:		
	- maximum break time (130 to 500 ms) at: I _{dn} :	352ms	P
	- maximum break time (60 to 200 ms) at: 2 I _{dn} :	104ms	P
	- maximum break time (50 to 150 ms) at: 5 I _{dn} :	117ms	P
	- maximum break time (40 to 150 ms) at: 500 A :	118ms	P
	No value exceeds the relevant specified limiting value	-	P
	Additional Review for type S:		
	- minimum non actuating time (ms) at: I _{dn} ; 0,13 s:	no tripping	P
	- minimum non actuating time (ms) at: 2 I _{dn} ; 0,06 s:	no tripping	P
	- minimum non actuating time (ms) at: 5 I _{dn} ; 0,05 s:	no tripping	P
	- minimum non actuating time (ms) at: 500 A; 0,04 s:	no tripping	P
	No tripping during the Reviews	-	P
9.9.4	b) Reviews repeated with the RCCB loaded with rated current:		
	- Review current (A): I _n at a temperature of +40 °C: until steady state conditions are reached :		
	- cross-sectional area (mm ²) :		
	- maximum break time (130 to 500 ms) at: I _{dn} :	349ms	P
	- maximum break time (60 to 200 ms) at: 2 I _{dn} :	126ms	P
	- maximum break time (50 to 150 ms) at: 5 I _{dn} :	125ms	P
	- maximum break time (40 to 150 ms) at: 500 A:	95ms	P

	No value exceeds the relevant specified limiting value	-	P
	Additional Review for type S:		P
	- minimum non actuating time (ms) at: I_{dn} ; 0,13 s:	no tripping	P
	- minimum non actuating time (ms) at: 2 I_{dn} for 0,06 s :	no tripping	P
	- minimum non actuating time (ms) at: 5 I_{dn} ; 0,05 s:	no tripping	P
	- minimum non actuating time (ms) at: 500 A; 0,04 s:	no tripping	P
	No tripping during the Reviews	-	P
9.17.3	Verification of the correct operation, in presence of a residual current, for RCCB's opening with delay in case of failure of the line voltage		N
	RCCB connected according to fig. 4a at the rated voltage (U_n) :		N
	All phases but one switched off by means of S3		N
	During the delay: Review of 9.9.2:		N
9.2.2	- steady increase from 0,2 I_{dn} to I_{dn} within 30 s (mA):		N
	- tripping current between I_{dno} and I_{dn} (mA) (only if delay is > 30 s) :		N
	The RCCB closes <i>on</i> I_{dn} : <i>no</i> value exceeds the specified limiting value of Table 1 (ms) ..		N
	For RCCB's functionally dependent on line voltage according to 4.1.2.2. a) I_{dn} is established by closing S1 :		N
	- maximum break time (ms) at; I_{dn} :		N
	- maximum break time (ms) at: 2 I_{dn}		N
	- maximum break time (ms) at: 5 I_{dn} :		N
	- maximum break time (ms) at: 500 A :		N
	No value exceeds the relevant specified limiting value	-	N
	Additional Review for type S:		N
	- minimum non actuating time (ms) at: I_{dn} ; 0,13 s:		N
	- minimum non actuating time (ms) at: 2 I_{dn} ; 0,06 s:		N
	- minimum non actuating time (ms) at: 5 I_{dn} ; 0,05 s:		N
	- minimum non actuating time (ms) at: 500 A; 0,04 s:		N
	No tripping during Reviews	-	N
9.17.4	Verification of the correct operation of RCCB's with 3 or 4 current paths, neutral and one line terminal only being energized in turn:		
	RCCB connected according to fig. 4	-	N
9.9.2.3	- maximum break time (ms) at: I_{dn} :		N
	- maximum break time (ms) at: 2 I_{dn} :		N
	- maximum break time (ms) at: 5 I_{dn} :		N
	- maximum break time (ms) at: 500 A :		N
	No value exceeds the relevant specified limiting value	-	N

	Additional Review for type S:		N
	- minimum non actuating time (ms) at: I _{dn} ; 0,13s :		N
	- minimum non actuating time (ms) at: 2 I _{dn} ; 0,06 s:		N
	- minimum non actuating time (ms) at: 5 I _{dn} ; 0,05 s:		N
	- minimum non actuating time (ms) at: 500 A; 0,04 s:		N
	No tripping during Reviews	-	N
9.17.5	Verification of the reclosing function of automatically reclosing RCCB's (under consideration)		N
8.14	Resistance of RCCB's against unwanted tripping	-	N
9.19	Verification of behaviour of RCCB's in case of current surges caused by impulse voltages		N
9.19.1	Current surge Review for all RCCBs (0,5 p.s/100kHz ring wave Review)		N
	One pole of the RCCB is submitted to 10 applications of a surge current according to the following requirements:		N
	- peak value: 200 A + 10/0%	-	N
	- virtual front time: 0,5 ms ± 30%	-	N
	- period of the following oscillatory wave: 10 ^ ±20%	-	N
	- each successive peak: about 60% of the preceding peak	-	N
	The polarity shall be inverted after every two applications	-	N
	The interval between two consecutive applications shall be about 30 s	-	N
	During the Review the RCCB shall not trip :		N
	The RCCB shall trip with a Review current of I _{dn} (ms) :		N
9.19.2	Verification of behaviour at surge currents up to 3000A (8/20 j/s surge current Review)		N
9.19.2.1	One pole of the RCCB is submitted to 10 applications of a surge current according to the following requirements:		N
	- peak value: 3000 A + 10/0%	-	N
	- virtual front time: 8 ^s ± 20%	-	N
	- virtual time to half value: 20 us ± 20%	-	N
	- peak of reverse current: less than 30% of peak value	-	N
	The polarity shall be inverted after every two applications	-	N
	The interval between two consecutive applications shall be about 30 s	-	N
9.19.2.2	Reviews for S-type RCCB's		N
	During the Review the RCCB shall not trip		N
	The RCCB shall trip with a Review current of I _{dn} (ms) :		N
9.19.2.3	Reviews for RCCB's of the general type	-	N
	During the Review the RCCB may trip :		N
	The RCCB shall trip with a Review current of I _{dn} (ms) :		N

8.15	Behaviour of RCCB's in case of earth fault currents comprising a d.c. component		N
9.21	Verification of the correct operation at residual currents with d.c. components for RCCB's type A		N
9.21.1	RCCB installed as for normal use, Review circuits according to fig. 4b and 4c	-	N
9.9.5	For RCCB's functionally dependent on iine voltage, each Review is made at 1,1 and 0,85 times the rated line voltage; voltage (V) ..	-	N
9.21.1.1	Verification of the correct operation in case of a continuous rise of the residual pulsating direct current (see Table 17):		N
	- steady increase from zero to: 1,4 I _{dn} for I _{dn} > 0,01 A with 1,4 I _{dn} /30 A/s (mA)	-	N
	- steady increase from zero to: 2 I _{dn} for I _{dn} < 0,01 A with 2 I _{dn} /30 A/s (mA)	-	N
	- angle $\alpha = 0^\circ$ (+/-):		N
	- angle $\alpha = 90^\circ$ (+/-):		N
	-angle $\alpha = 135^\circ$ (+/-):		N
	No value exceeds the relevant specified imiting values	-	N
9.21.1.2	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S2 (angle a = 0°)		N
	For RCCB's functionally dependent on line voltage according to 4.1.2.2 a) the residual current is established by closing S1		N
	RCCB's with I _{dn} >0,01 A:		N
	- maximum break time (ms) at: 1,4 I _{dn} (+/-)....:		N
	- maximum break time (ms) at: 2,8 I _{dn} (+/-) ...:		N
	- maximum break time (ms) at: 7 I _{dn} (+/-) :		N
	- maximum break time (ms) at: 700 A peak (+/-):		N
	RCCB's with I _{dn} < 0,01 A:		N
	- maximum break time (ms) at: 2 I _{dn} (+/-) :		N
	- maximum break time (ms) at: 4 I _{dn} (+/-).		N
	- maximum break time (ms) at: 10 I _{dn} (+/-) .. :		N
	- maximum break time (ms) at: 700 A peak (+/-) :		N
	No value exceeds the relevant specified limiting value	-	N
9.21.1.3	Verification of the correct operation with the pole under Review and one other pole loaded with rated current		N
	- Review current (A): I _n :	-	

	- steady increase from zero to: 1,4 Idn for Idn > 0,01 A with 1,4 Idn/30 A/s (mA)		N
	- steady increase from zero to: 2 Idn for Idn < 0,01 A with 2 Idn/30 A/s (mA)	-	N
	- angle $\alpha = 0^\circ$ (+/-) :		N
	- angle $\alpha = 90^\circ$ (+/-) :		N
	- angle $\alpha = 135^\circ$ (+/-) :		N
	No value exceeds the relevant specified limiting values	-	N
9.21.1.4	Verification of the correct operation in case of residual pulsating d.c. currents with angle $a = 0^\circ$ superimposed by smooth direct current of 0,006 A:		N
	- steady increase of pulsating d.c. current from zero to: 1,4 Idn for Idn > 0,01 A with 1,4 Idn/30 A/s (mA)	-	N
	- steady increase of pulsating d.c. current from zero to: 2 Idn for idn < 0,01 A with 2 Idn/30 A/s (mA)	-	N
	- angle $a = 0^\circ$ (+/-) (+/- 6 mA) :		N
	No value exceeds the relevant specified limiting values + 6 mA	-	N
9.11.2.3	Verification of the rated residual making and breaking capacity (A): Idm :		-
	Review circuit according to figure :		-
	Point of Review circuit which is directly earthed ...:	-	-
	Grid distance "a" (mm) :	-	-
	Copper wire grid diameter F'(mm) :	-	-
	Prospective current (A) :	-	-
	Prospective current obtained (A):	-	-
	Power factor :	-	-
	Power factor obtained :	-	-
	Point of initiation: $45^\circ \pm 5^\circ$	-	N
	Review sequence: O-t-CO-t-CO on each pole in turn excluding the switched neutral pole	-	N
	During Reviews no endangering of operator, no permanent arcing, no flashover and no melting of fuses F and F'	-	N
	After the Reviews no damage impairing further use	-	N
9.7.3	Dielectric strength of the main circuit measured with an a.c. voltage (45- 65 Hz) for 1 min:		P
	a)..... :		N
	b):		N
	c):		N
	d):		N
	e):		N

	No flashover or breakdown		P
	Making and breaking In at U_n :		P
	The RCCB shall trip with a Review current of $1,25 I_{dn}$ (ms) :		P
	The polyethylene sheet shows no holes		P
9.17.1	Additional Reviews for RCCB's functionally depending on line voltage if applicable		N
	Limiting value of the line voltage (U_x):		N
	- rated voltage applied to the line terminals and progressively lowered to attain zero within about 30 s until automatic opening occurs; voltage (V):		N
	- all values less than 0,85 times the rated voltage (ms) :		N
	- tripping Review at Review voltage (V): i_{dn} (ms) :		N
	No value exceeds the specified limiting values		N
	Not possible to close the apparatus by manual operating means below U_x :		N
9.17.2	Verification of automatic opening in case of failure of the line voltage		N
	RCCB supplied with rated voltage, and the line voltage then switched off		N
	Time (ms) interval between switching off and opening of the main contacts		N
	a) RCCB's opening without delay: no value exceeds 0,5 s	-	N
	b) RCCB's opening with delay: max. and min. values within the range indicated by the manufacturer	-	N
9.17.3	Verification of the correct operation, in presence of a residual current, for RCCB's opening with delay in case of failure of the line voltage		N
	RCCB connected according to fig. 4a at the rated voltage (U_n) :	-	N
	All phases but one switched off by means of S3	-	N
	During the delay: Review of 9.9.2:		N
9.2.2	- steady increase from $0,2 I_{dn}$ to I_{dn} within 30 s (mA):		N
	- tripping current between I_{dno} and I_{dn} (mA) (only if delay is > 30 s) :		N
	The RCCB closes on I_{dn} : no value exceeds the specified limiting value of Table 1 (ms)		N
	For RCCB's functionally dependent on line voltage according to 4.1.2.2. a) I_{dn} is established by closing S1:		N
	- maximum break time (ms) at: I_{dn} :		N
	- maximum break time (ms) at: $2 I_{dn}$:		N
	- maximum break time (ms) at: $5 I_{dn}$:		N
	- maximum break time (ms) at: 500 A :		N
	No value exceeds the relevant specified limiting value		N

	Additional Review for type S:		N
	- minimum non actuating time (ms) at: I _{dn} ; 0,13s:		N
	- minimum non actuating time (ms) at: 2 I _{dn} ; 0,06 s:		N
	- minimum non actuating time (ms) at: 5 I _{dn} ; 0,05 s:		N
	- minimum non actuating time (ms) at: 500 A; 0,04 s:		N
	No tripping during Reviews	-	N
9.17.4	Verification of the correct operation of RCCB's with 3 or 4 current paths, neutral and one line terminal only being energized in turn:		N
	RCCB connected according to fig. 4		N
9.9.2.3	- maximum break time (ms) at: I _{dn} :		N
	- maximum break time (ms) at: 2 I _{dn} :		N
	- maximum break time (ms) at: 5 I _{dn} :		N
	- maximum break time (ms) at: 500 A		N
	No value exceeds the relevant specified limiting value		N
	Additional Review for type S:		N
	- minimum non actuating time (ms) at: I _{dn} ; 0,13s:		N
	- minimum non actuating time (ms) at: 2 I _{dn} ; 0,06 s:		N
	- minimum non actuating time (ms) at: 5 I _{dn} ; 0,05 s :		N
	- minimum non actuating time (ms) at: 500 A; 0,04 s....:		N
	No tripping during Reviews		N
9.17.5	Verification of the reclosing function of automatically reclosing RCCB's (under consideration)		N
8.11	Review device		N
	RCCB's shall be provided with a Review device	-	N
	Ampere-turns produced when operating the Review device do not exceed 2,5 times the ampere-turns produced by I _{dn}	-	N
	Not possible to energize the circuit on the load side by operating the Review device when the RCCB is in the open position	-	N
9.16	Verification of the operation of the Review device at the limits of rated voltage:		N
	a) RCCB at 0,85 times the rated voltage, Review device actuated 25 times at intervals of 5 s ...		N
	b) Review a) repeated at 1,1 times the rated voltage:		N
	c) Review b) repeated, but only once, the operating means of the Review device being held in the closed position for 30 s:		N
	RCCB operated at each Review		N
	No change impairing further use :		N
8.8	Resistance to mechanical shock and impact		N
	RCCB's shall have adequate mechanical behaviour so as	-	N

	to withstand the stresses imposed during installation and use		
9.12.1.2	Mechanical shock		N
	Mechanical shock: 50 falls of 40 mm on one side; 50 falls on opposite side C turned through 90° 50 falls on one side; 50 falls on opposite side		N
	No opening of RCCB during the Review		N
9.12.2	Mechanical impact		N
9.12.2.1	Impact Review (10 blows, height 10 cm): no damage :		N
9.12.2.2	RCCB's for rail mounting downward vertical force of 50 N for 1 min, upward vertical force of 50 N for 1 min		N
	RCCB shall not become loose during Review and no damage impairing its further use		N
9.12.2.3	RCCB's of plug-in type (under consideration)	-	N
8.13	Behaviour of RCCB's in case of overcurrents in the main circuit		N
	RCCB's shall not operate under specified conditions of overcurrent	-	N
9.18.1	Verification of the limiting value of overcurrent in case of a load through a RCCB with two current paths		N
	RCCB connected as for normal use with a load equal to (A): 6 In switched on using a two-pole Review switch for 1 s :	-	N
	Review repeated three times with an interval of at least 1 min	-	N
	The RCCB shall not open :		N
	RCCB's functionally dependent on the line voltage at rated voltage (Un) :		N
9.18.2	Verification of the limiting value of overcurrent in case of a single phase load through a three-pole or four-pole RCCB		N
	RCCB connected according to fig. 19		N
	Review current (A): 6 In closed by S1 for 1 s :		-
	Review repeated three times for each possible combination of current paths with an interval of at least 1 min :		N
	The RCCB shall not open :		N
	RCCB's functionally dependent on the line voltage at rated voltage	-	N

Photo documentation:

Type of equipment:	RCCB
Model:	GYL9M

Details of:	
View: <input checked="" type="checkbox"/> general <input type="checkbox"/> front <input type="checkbox"/> rear <input type="checkbox"/> right <input type="checkbox"/> left <input type="checkbox"/> top <input type="checkbox"/> bottom	

Details of:	
View: <input checked="" type="checkbox"/> general <input type="checkbox"/> front <input type="checkbox"/> rear <input type="checkbox"/> right <input type="checkbox"/> left <input type="checkbox"/> top <input type="checkbox"/> bottom	