Vojenský technický ústav, s.p.
odštěpný závod VTÚPV
Víta Nejedlého 691, 682 01 Vyškov, Czech Republic

CERTIFICATE
Nº VTÚPV – 082/ 2022 / ZAHR

Applicant: **Shanghai Matis Electric Co., Ltd.**
上海麦豆电气有限公司
Room 320, 83 Huanhu West Third Road, Pudong New Area, Shanghai, China

Product: **Smart Reclosed RCBO**

Tested Model: MT61SR
Derived Models: MT84SR, MT51RA+MRO50, MT51RA+ML50H, MT51RAN+ML60-B, MT51RAN+MM22

Manufacturer: **Shanghai Matis Electric Co., Ltd.**
Room 320, 83 Huanhu West Third Road, Pudong New Area, Shanghai, China

Rating and principal characteristics: Power supply: 400 V;
Rated Current: 125 A;
Frequency: 50/60 Hz

Test results are described in the Test Reports No.:
B-S2206A1957 (tests made by Beide (Shenzhen) Product Service Limited)

The sample of tested product conforms with the requirements of the following standards harmonized with LVD Directive No. 2014/35/EU

- EN 63024:2018
- EN 61009-1:2012+A1:2014+A11:2015+A2:2014+A12:2016

This certificate is valid until: **18. 08. 2027**

After preparation of the necessary technical documentation as well as the conformity declaration, the required CE marking can be affixed on the product. Other relevant directives have to be observed.
The CE mark shall appear according to this sample:

CE

Vyškov 18. 08. 2022

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odštěpný závod VTÚPV VOJENSKÝ TECHNICKÝ ÚSTAV, s.p. VTÚPV

Milan Bezděk
Certification Head

EU Declaration of Conformity

We, **Shanghai Matis Electric Co., Ltd.**
Room 320, 83 Huanhu West Third Road, Pudong New Area, Shanghai, China

Declare that the product described below is in conformity with the Directive:

2014/35/EU Low Voltage Directive

Product: **Smart Reclosed RCBO**
Models: **MT61SR, MT84SR, MT51RA+MRO50, MT51RA+ML50H, MT51RAN+ML60-B, MT51RAN+MM22**

Having been examined to the requirements of the following standards:

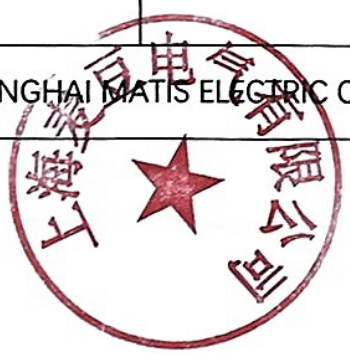
EN 63024:2018, EN 61009-1:2012+A1:2014+A11:2015+A2:2014+A12:2016

CE

Representative: _____
(signature & stamp)

Place/Date: 2022.07.12

TYPE	Power supply （V）	Standard Input Power (W)	Rated Current (A)	Dia (mm)
MT61SR	230/400VAC	1VA	125	
MT84SR	230/400VAC	1VA	100	
MT51RA+ MRO50	230/400VAC	1VA	40	
MT51RA+ ML50H	230/400VAC	1VA	63	
MT51RAN +ML60-B	230/400VAC	1VA	50	
MT51RAN +MM22	230/400VAC	1VA	40	
SHANGHAI MATIS ELECTRIC CO.,LTD.				



APPLICATION FOR LOW VOLTAGE DIRECTIVE

On Behalf of

SHANGHAI MATIS ELECTRIC CO.,LTD.

Smart Reclosed RCBO

Model : **MT84SR,MT51RA+MRO50,MT51RA+ML50H, MT51RAN+ML60-B,MT51RAN+MM22,MT61SR**

Prepared For : **SHANGHAI MATIS ELECTRIC CO.,LTD.**
Room 320, 83 Huanhu West Third Road, Pudong New Area, Shanghai

Prepared By : **Beide (Shenzhen) Product Service Limited**
China: 6F, Bldg E, Hourui 3rd Ind Zone, Xixiang, Bao'an Dist, Shenzhen, China

Date of Test	**:**	**2022-06-13 to 2022-06-22**
Date of Report	**:**	**2022-06-22**
Report Number	**:**	**B-S2206A1957**

Beide
Compliance Laboratory

LVD Report

EN 63024
Requirements for automatic reclosing devices (ARDs) for circuit-breakers, RCBOs and RCCBs for household and similar uses
EN 61009-1
Residual Current Circuit Breakers with integral overcurrent protection for household and similar uses (RCBOs)
Part 1: General rules

Testing laboratory ……..... :	Beide (Shenzhen) Product Service Limited
Address ……..... :	6F, Bldg E, Hourui 3rd Ind Zone, Xixiang, Bao'an Dist, Shenzhen, China
Report body..... ……..... :	Beide (Shenzhen) Product Service Limited
Address (China)……..... :	6F, Bldg E, Hourui 3rd Ind Zone, Xixiang, Bao'an Dist, Shenzhen, China
Applicant …….. :	SHANGHAI MATIS ELECTRIC CO.,LTD.
Address …….. :	Room 320, 83 Huanhu West Third Road, Pudong New Area, Shanghai
Client ID……:	CA2180
Report Query……:	CERTIFICATE QUERY
Standard …….. :	EN 63024:2018, EN 61009-1:2012+A1:2014+A11:2015+A2:2014+A12:2016
Test Result …….. :	Compliance with EN 63024:2018 EN 61009-1:2012+A1:2014+A11:2015+A2:2014+A12:2016
Procedure deviation ……... :	N.A.
Non-standard test method …… :	N.A.
Type of test object …….. :	Smart Reclosed RCBO
Trademark ……... :	/
Model/type reference ……..... :	MT61SR
Rating ……... :	Rated Voltage Ue: 230/415VAC,50/60Hz Rated Current: 6A,10A,16A,20A,25A,32A,40A,50A,63A,80A,100A,125A Curve: B, C, D Poles: 2P, 4P Residual Current: 10mA, 30mA, 100mA, 300mA; Type: AC, A, B
Manufacturer ……... :	SHANGHAI MATIS ELECTRIC CO.,LTD.
Address …….. :	Room 320, 83 Huanhu West Third Road, Pudong New Area, Shanghai

General remarks

This report shall not be reproduced except in full without the written approval of the testing laboratory.

The test results presented in this report relate only to the item(s) tested.

"(see appended table)" refers to a table appended to the report.

“(see remark #)” refers to a remark appended to the report.

“(see Annex #)” refers to an annex appended to the report.

Throughout this report a comma (point) is used as the decimal separator.

Remark:

1. Photos view:

(See appendix 1)

2. Copy of marking plate:

(See appendix 2)

Possible test case verdicts :	
test case does not apply to the test object …….. :	N (.A.)
test object does meet the requirement …….. :	P(ass)
test object does not meet the requirement ……. :	F(ail)

Name and address of the testing laboratory : **Beide (Shenzhen) Product Service Limited**
6F, Bldg E, Hourui 3rd Ind Zone, Xixiang,
Bao'an Dist, Shenzhen, China

Reported by : Austin.Zhong — 2022-06-22
Signature / Austin.Zhong — Date

Checked by : Anna Deng — 2022-06-22
Signature / Anna.Deng — Date

Approved by : — 2022-06-22
Signature / Martin Wang — Date

BEIDE (SHENZHEN) PRODUCT SERVICE LIMITED Beide Compliance Laboratory CERTIFICATION

EN 63024			
Clause	Requirement – Test	Result - Remark	Verdict
4	Classification		P
4.1	According to the method of construction		P
4.1 .1	ARD assembled in factory by the manufacturer.		P
4.1 .2	ARD assembled on site.		N
4.2	According to the associated MPD		P
4.2.1	ARD for circuit-breakers.		N
4.2.2	ARD for RCCBs.		N
4.2.3	ARD for RCBOs.		P
4.3	According to the type of assessment means		N
4.3.1	ARD without assessment means (see Annex A).		N
4.3.2	ARD with assessment means.		N
4.3.2.1	ARD with means of assessment of the prospective residual current: a) operation blocked after assessment of an excessive residual current in the installation (see Annex B); b) remains in tripped condition after the assessment of an excessive residual current in the installation (see Annex C).		N
4.3.2.2	ARD with means of assessment of the prospective line current: a) operation blocked after assessment of an overcurrent in the installation (see Annex B);b) remains in tripped condition after the assessment of an overcurrent in the installation (seeAnnex C).		N
4.4	According to the safety means during the assessment		P
4.4.1	ARD with assessment means operating by using a method based on the limitation of the test voltage.		N
4.4.2	ARD with assessment means operating by using a method based on the limitation of the test current.		P
4.5	According to the connection to FE		P
4.5.1	ARD with FE connection for assessment means.		N
4.5.2	ARD without FE connection.		P
4.6	According to maximum number of reclosing operations		P
4.6.1	ARD with maximum number of reclosing operations declared by manufacturer and lower than or equal to 3.		N
4.6.2	ARD with maximum number of reclosing operations declared by manufacturer and higher than 3		P

EN 63024			
Clause	Requirement – Test	Result - Remark	Verdict
4.7	According to mechanical interlock between MPD operating means and ARD enabling/disabling system		P
4.7.1	ARD with mechanical interlock between MPD operating means and ARD enabling/disabling system.		N
4.7.2	ARD without mechanical interlock between MPD operating means and ARD enabling/disabling system.		P
5	Characteristics		P
5.1	Summary of characteristics The characteristics of the MPD standards and the following apply: – protection against external influences; – method of mounting; – method of connection; – value of rated operational voltage; – value of rated frequency; – values of operating and non-operating rated resistance to earth, if applicable; – values of operating and non-operating rated resistance between live parts, if applicable; – range of ambient air temperature.		P
5.2	Rated quantities		P
5.2.1	Rated voltage		N
	Preferred values o f rated voltage are: 1 20 V, 230 V, 400 V. Wherever in this document there is a reference to 230 V or 400 V, they can be read as 220 V or 240 V, 380 V or 41 5 V, respectively.		N
5.2.2	Rated operational voltage (U e)		P
	The rated operational voltage (hereafter referred to as rated voltage) of an ARD is the value of voltage assigned by the manufacturer to which its performance is referred.	415V	P
5.2.3	Rated frequency		P
	The rated frequency of an ARD is the power frequency for which the ARD is designed and to which the values of the other characteristics correspond. Preferred values of rated frequency are: 50 Hz, 60 Hz and 50/60 Hz.	50/60Hz	P
5.2.4	Rated non-operating resistance to earth (R d0)		N
	The R d0 is the rated value of resistance between live parts and earth below which the re- closing of the MPD is not permitted. The R d0 value is stated by the manufacturer under the test conditions in this product document.		N
5.2.5	Rated operating resistance to earth (R d)		P
	The R d is the rated value of resistance between live parts and earth above which the re- closing of the MPD is permitted. The R d value is stated by the manufacturer under the test conditions in this product document. The R d shall be rounded up to the two significant digits.		P
5.2.6	Rated non-operating resistance between live parts (R cc0)		N

EN 63024			
Clause	Requirement – Test	Result - Remark	Verdict
	The R cc0 is the rated value of resistance between live parts below which the reclosing of the MPD is not permitted. The R cc0 value is stated by the manufacturer under the test conditions in this product document. The R cc0 value shall be rounded up to the two significant digits.		N
5.2.7	Rated operating resistance between live parts (R cc)		N
	The R cc is the rated value of resistance between live parts above which the reclosing of the MPD is permitted. The R cc value is stated by the manufacturer under the test conditions in this product document. The R cc shall be rounded up to the last two more significant digits.		N
6	Marking and other product information		P
6.1	Standard marking Each ARD shall be marked in a durable manner with all the following data: a) manufacturer's name or trade mark; b) type designation, catalogue number or serial number; c) wiring diagram, except if the connection mode is self-evident; d) rated voltage(s) with the symbol (IEC 6041 7-5032); e) ARD or according to the IEC reference standard; f) protection degree (only if different from IP20). Moreover, the following markings shall be placed on the products or in the instruction sheets accompanying the product: g) the rated frequency; ARDs with more than one rated frequency (e.g. 50/60 Hz) shall be marked accordingly; h) the rated non-operating resistance between live parts and earth R d0 , if applicable; i) the rated operating resistance between live parts and earth R d , if applicable; j) the rated non-operating resistance between live parts R cc0 , if applicable; k) the rated operating resistance between live parts R cc , if applicable; l) assembling method if applicable; m) earthing system in which the devices may be used; n) "warning: before accessing active parts, disable the automatic reclosing function and switch off the main protective device" or other warning having the same meaning. It is recommended that the text be written in the appropriate language(s); o) instructions about the reset of the ARD and the need for checking the MPD and the installation in case of blocked condition. p) for ARD classifed according to 4.Z1 .2, ambient air temperature with the symbol (the value -25 included in the snow fake symbol according to ISO 7000:201 4, Figure 0027). For devices according to 4.1 .2, the information of the ambient air temperature shall not be visible after assembly.	See lable	P

EN 63024			
Clause	Requirement – Test	Result - Remark	Verdict
6.2	Instructions for assembly and operation The manufacturer shall provide adequate instructions with the ARD. If the ARD is classified according to 4.1 .2, these instructions shall cover at least the following: – reference to the type(s) and catalogue number(s), covering current and voltage ratings, number of poles, etc. of the MPD with which the ARD is designed to be assembled; – method of assembly; – need for checking operation after assembly to verify the mechanical operation; – ambient air temperature of the combination (MPD and ARD). Compliance is checked by inspection.		P
7	Standard conditions for operation in service		P
7.1	General The ARD complying with this document shall be capable of operating under the standard conditions given by the relevant MPD standard(s). For the ARD and MPD, the relevant clauses of the MPD standards apply: a) IEC 60898-1 :201 5, Clause 7 and IEC 60898-2:201 6, Clause 7, for ARDs classified according to 4.2.1 (circuit- breakers); b) IEC 61 008-1 :201 0, Clause 7, for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0, Clause 7, for ARD classified according to 4.2.3 (RCBOs).		P
7.2	Conditions of installation		P
	The ARD shall be installed in accordance with the manufacturer's instructions. The ARD classified according to 4 . 1 . 2 shall only be installed together with the circuit- breakers, RCBOs and RCCBs declared by the manufacturer.		P
7.3	Pollution degree		P
	ARDs accordin g to this document are intended for an environment with pollution degree 2 (only non-conductive pollution occurs except that, occasionally, a temporary conductivity caused by condensation is to be expected).		P
8	Requirements for construction and operation		P
8.1	Mechanical design		P
8.1.1	General		P
8.1.2	Mechanism		P
8.1.2.1	The ARD shall be so designed and constructed as not to change the functional characteristic of the MPD. Compliance is checked by inspection and by the test of 9.5.1.		P

EN 63024			
Clause	Requirement – Test	Result - Remark	Verdict
8.1 .2.2	The ARD and the MPD shall be associated in a proper way and the association shall be made in such way to avoid uncorrected matching. Compliance is checked by inspection and with information detailed in 6.2.		P
8.1.2.3	For devices according to 4. 7. 1 , it shall not be possible to enable the ARD if the MPD has been previously manually opened by the actuator. It is permitted that the enabling system of the ARD may also cause the closing of the MPD during the same manual operation. Compliance is checked by visual inspection and test of 9.5.2.		P
8.1.2.4	The ARD shall be provided with an enabling and disabling system.The enabling and disabling system shall be manufactured in such a way that it can be directly operated by the user or by means of a tool of common usage. The enabling and disabling system shall be able to correctly operate for a suitable number of operating cycles. Compliance is checked by visual inspection and the test of 9.5.3		P
8.1.2.5	Manual opening of the MPD shall be possible at every time. This condition is considered as fulfilled if the manual opening is not possible without the disabling of the ARD. For devices according to 4.7.1, if the ARD is enabled, manual opening of the MPD using the actuator shall always disable the automatic reclosing. Compliance is checked by inspection and by the test of 9.5.2.		P
8.1.2.6	When the ARD is disabled: a) the MPD shall operate independently from the ARD, in particular it shall be possible to activate the test device, if any; b) it shall be possible to see the symbol (IEC 6041 7-5008) when the contacts of the MPD are in isolating condition. Compliance to the point a) is checked by manual test. Compliance to the point b) is checked by visual inspection and the dielectric tests according to 9.1 1 .		N
8.1.2.7	When the ARD is enabled: For devices according to 4.7.1 : a) it shall not be possible to see on the MPD the symbol (IEC 6041 7-5008) which shows the position of the contacts; b) it shall be possible to activate the test device with the exception of ARD with a reclosing time higher than 3 s where it is not accepted; c) the marking stated in the reference standard of the MPD shall be visible with the exception of the symbol (IEC 6041 7-5008) as stated in a). Compliance is checked by visual inspection.		N

EN 63024			
Clause	Requirement – Test	Result - Remark	Verdict
8.1.2.8	The ARD shall never perform a number of consecutive reclosing operations greater than those declared by the manufacturer within its reset time. The reset time (see 3.20) shall not be less than 5 s. For devices according to 4.6.1 , the maximum number of operations shall not be greater than 3. Compliance is checked by the test of 9.5.4. For devices according to 4.6.2, the maximum number of operations shall be declared by the manufacturer. Compliance is checked by the test of 9.5.4.		P
8.1.3	Clearances and creepage distances The minimum required clearances and creepage distances are given in Table 2 which is based on the ARD being designed for operating in an environment with pollution degree 2. However, the clearances of items 2 and 4 may be reduced provided that the tests at rated impulse voltage are withstood. The values of Table 2 shall be verified for the ARD and the interface with the MPD. The insulating materials are classified into material groups on the basis of their comparative tracking index (CTI) according to 4.8.1 .2 and 4.8.1 .3 of IEC 60664-1 :2007.		P
8.1.4	Clearances and creepage distances for electronic circuits connected between live parts or between live parts and the earth For electronic circuits connected between live parts, or between live parts and the eart circuit when the contacts are in the closed position, the verification of the clearances and creepage distances is replaced by the tests of 9.6 and 9.7.		P
8.1.5	Screws, current-carrying parts and connections For the ARD and MPD, the relevant subclause(s) of the MPD standard(s) applies: a) IEC 60898-1 :201 5, 8.1 .4 for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0 and IEC 61 008-1 :201 0/AMD1 :201 2, 8.1 .4 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0 and IEC 61 008-1 :201 0/AMD1 :201 2, 8.1 .4 for ARD classified according to 4.2.3 (RCBOs). Compliance is checked by the tests of 9.8.		P
8.1.6	Terminals for external conductors For the ARD and MPD, the relevant subclause(s) of the MPD standard(s) applies: a) IEC 60898-1 :201 5, 8.1 .5 for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0 and IEC 61 008-1 :201 0/AMD1 :201 2, 8.1 .5 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0 and IEC 61 008-1 :201 0/AMD1 :201 2, 8.1 .5 for ARD classified according to 4.2.3 (RCBOs). The range of nominal cross-section for wires clamped to the FE terminal, if any, shall be between 1 mm 2 and 2,5 mm 2 . Compliance is checked by the tests of 9.9. Compliance is checked by inspection.		P
8.2	Protection against electric shock		P

EN 63024			
Clause	Requirement – Test	Result - Remark	Verdict
	For the ARD and MPD, the relevant subclause of the MPD standard applies: a) IEC 60898-1 :201 5, 8.2 for ARD classified according to 4.2.1 (circuit-breakers); b) b) IEC 61 008-1 :201 0, 8.2 for ARD classified according to 4.2.2 (RCCBs); c) c) IEC 61 009-1 :201 0, 8.2 for ARD classified according to 4.2.3 (RCBOs). Compliance is checked by the tests of 9.1 0.		P
8.3	Dielectric properties and isolating capability		P
	The ARD and MPD shall not influence the suitability for isolation of the MPD. Compliance is checked by the tests of 9.1 1 .		P
8.4	Temperature rise		P
	For the ARD and MPD, the corresponding subclause of the MPD standard applies: a) IEC 60898-1 :201 5, 8.4 for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0, 8.4 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0, 8.4 for ARD classified according to 4.2.3 (RCBOs). Compliance is checked by the tests of 9.1 2.		P
8.5	Mechanical and electrical endurance		P
	ARD and MPD shall be capable of performing an adequate number of cycles of operations. Compliance is checked by the tests of 9.1 3.		P
8.6	Performance at short-circuit currents		P
	Performances in case of short-circuit currents of the MPD shall not be influenced by the ARD. Performances of the ARD shall not be influenced by short-circuits occurring in the installation. Compliance is checked by the tests of 9.1 4.		P
8.7	Resistance to mechanical shock and impact		P
	The relevant subclause of the MPD standard applies: a) IEC 60898-1 :201 5, 8.9 for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0, 8.8 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0, 8.8 for ARD classified according to 4.2.3 (RCBOs). Compliance is checked by the tests of 9.1 5.		P
8.8	Resistance to heat		P

EN 63024			
Clause	Requirement – Test	Result - Remark	Verdict
	The relevant subclause of the MPD standard applies: a) IEC 60898-1 :201 5, 8.1 0 for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0, 8.9 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0, 8.9 for ARD classified according to 4.2.3 (RCBOs). Compliance is checked by the tests of 9.1 6.		P
8.9	Resistance to abnormal heat and to fire		P
	The relevant subclause of the MPD standard applies: a) IEC 60898-1 :201 5, 8.1 1 for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0, 8.1 0 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0, 8.1 0 for ARD classified according to 4.2.3 (RCBOs). Compliance is checked by the tests of 9.1 7.		P
8.10	Operating characteristics		P
8.1 0.1	The ARD classified according to 4.3.1 , after tripping of the MPD, shall reclose it. Compliance is checked by the test of 9.1 3.		N
8.1 0.2	The ARD classified according to 4.3.2.1 , after tripping of the MPD, shall perform the prospective earth-fault current assessment, and it shall reclose only if the prospective residual current does not exceed a given value. Compliance is checked by the tests of 9.1 8.2.		N
8.1 0.3	The ARD classified according to 4.3.2.2, after tripping of the MPD, shall perform the prospective line current assessment, and it shall reclose only if the line current does not exceed a given value. Compliance is checked by the tests of 9.1 8.3.		N
8.1 0.4	The ARD classified according both to 4.3.2.1 and 4.3.2.2, after tripping of the MPD, shall perform both the prospective earth-fault current and line current assessment and it shall reclose only if prospective residual current and line current do not exceed a given value. Compliance is checked by the tests of 9.1 8.2 and 9.1 8.3.		N
8.1 0.5	The ARD shall never perform a number of consecutive reclosing operations greater than those declared by the manufacturer, and for devices according to 4.6.1 , the maximum number of operation shall not be greater than 3. Compliance is checked by the test of 9.5.4. 8.1 0.8 The standing current from the FE to the protective conductor shall not exceed 1 ,0 mA under normal supply conditions. Compliance is checked by the test of 9.1 8.5.		N

EN 63024			
Clause	Requirement – Test	Result - Remark	Verdict
8.1 0.6	The ARD shall operate independently of the influence of distributed capacities in the installation. Compliance is checked by the test of 9. 1 8. 4. 1 (for ARDs classified according to 4. 3. 2. 1) and 9. 1 8. 4. 2 (for ARDs classified according to 4.3.2.2).		P
8.1 0.7	The admissible behaviour of the ARD, depending on line voltage and on MPD condition, is described in Table 3.		N
8.11	Assessment means for ARD according to 4.3.2		N
8.1 1.1	General		N
8.1 1.2	Assessment means operating by limitation of the test voltage		N
	The limitation of voltage shall be provided by a transformer with a reinforced insulation between the primary and the secondary circuit. The reinforced isolation shall be designed for a working voltage equal to 300 V for a transformer supplied by a rated voltage equal to 230 V, and 600 V for ARD for a transformer supplied by a rated voltage equal to 400 V. Compliance of the transformer is checked by the requirements of 9.7.4. The maximum voltage used to provide the assessment shall be lower than 24 V r.m.s. Compliance is checked by the test of 9.1 9.1 .		N
8.1 1.3	Assessment means operating by limitation of the test current		N
	The ARD shall be so designed that the steady-state current shall not exceed 1 ,0mA AC or 2,0 mA DC. under normal operation in tripping conditions. Compliance is checked by test of 9.1 9.2.		N
8.12	Safety in blocked condition		P
	The ARD shall be so designed that in blocked condition, the safety of the user is ensured. Compliance is checked by test of 9.1 9.3.		P
8.13	Test device		P
	The relevant subclause of the MPD document applies: a) IEC 61 008-1 :201 0, 8.1 1 for ARD classified according to 4.2.2 (RCCBs); b) IEC 61 009-1 :201 0, 8.1 1 for ARD classified according to 4.2.3 (RCBOs). Compliance is checked by the tests of 9.20.		P
8.14	Ageing		N
	The relevant subclause of the MPD document applies: a) IEC 61 008-1 :201 0, 8.1 6 for ARD classified according to 4.2.2 (RCCBs); b) IEC 61 009-1 :201 0, 8.1 6 for ARD classified according to 4.2.3 (RCBOs). Compliance is checked by the tests of 9.21 .		N

EN 63024			
Clause	Requirement – Test	Result - Remark	Verdict
8.15	EMC		N
	The ARD shall operate reliably in presence of electromagnetic disturbances and shall comply with relevant EMC requirements. Compliance is checked according to 9.22		N
9	Test		P
9.1	General		P
	The MPD to be fitted with the ARD shall comply with its relevant product document: a) IEC 60898-1 or IEC 60898-2, as applicable for ARDs classified according to 4.2.1 (circuit- breakers); b) IEC 61 008-1 for ARDs classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 for ARDs classified according to 4.2.3 (RCBOs).		P
9.2	Test condition		P
	The ARD assembled with its MPD is mounted individually according to the manufacturer's instructions and in free air, at an ambient temperature as required by the standard for the MPD unless otherwise specified. ARDs designed for installation in individual enclosures are tested in the smallest of such enclosures specified by the manufacturer.		P
9.3	Measurement of the reclosing time after the tripping of the MPD		P
	The ARD assembled with the MPD is supplied at rated voltage. The MPD is caused to open automatically (e.g. by means of a tripping release). After the opening of the MPD, the ARD shall reclose. The test is carried out by measuring the time interval for which the supply voltage is not present downstream.		P
9.4	Test of indelibility of marking		P
	The test is made by rubbing the marking by hand for 1 5 s with a piece of cotton soaked with water and again for 1 5 s with a piece of cotton soaked with aliphatic solvent hexane with a content of aromatics of maximum 0,1 % by volume, a kauri butanol value of 29, an initial boiling-point approximately 65 °C, a dry-point of approximately 69 °C and a density of approximately 0,68 g/cm 3 . Marking made by impression, moulding, or engraving is not subjected to this test. After this test, the marking shall be easily legible. The marking shall also remain easily legible after all the tests of this document. It shall not be easily possible to remove labels and they shall show no curling.		P
9.5	Verification of the non-influence of the ARD on the correct operation of the MPD		P
9.5.1	Verification of the operating characteristics of the MPD		P

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Clause	Requirement – Test	Result - Remark	Verdict
	For the ARD and MPD, the relevant subclause(s) of the MPD standard(s) applies: a) IEC 60898-1 :201 5, 8.1 .2 1 , 9.1 0.2 and 9.1 0.3 (only at the upper limit of instantaneous tripping current) or IEC 60898-2:201 6 as applicable, 9.1 0.3 (only at the upper limit of instantaneous tripping current), for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0 and IEC 61 008-1 :201 0/AMD2:201 3, 8.1 .2 1 , 9.9.2.1 , 9.9.2.2, 9.9.2.3 a), 9.1 5, for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0, IEC 61 009-1 :201 0/AMD1 :201 2 and IEC 61 009-1 :201 0/AMD2:201 3, 8.1 .2 1 , 9.9.1 .2 a), 9.9.1 .2 b), 9.9.1 .2 c) 1), 9.9.2.1 , 9.9.2.2 a) (only at the upper limit of instantaneous tripping current), 9.1 1 , for ARD classified according to 4.2.3 (RCBOs). Verification has to be carried out with enabled as well as with disabled ARD.		P
9.5.2	Verification of the impossibility of the activation of the ARD when the MPD has been manually opened		P
	This test procedure only applies to devices according to 4.7.1 . The ARD is assembled as in normal use and supplied at rated voltage. The MPD is manually opened. If the enabling and disabling system is accessible and if it is independent from the main actuator, the test is carried out by applying a force equal to 20 N to the enabling /disabling system according to the manufacturer's instruction. The force is applied for 1 min in the direction of normal actuation. During the test the ARD shall not reclose the MPD. The supply voltage is then switched off with the ARD in open position and then restored after 3 min: the ARD shall not reclose the MPD. The ARD is then reset according to the manufacturer's instruction and the test is repeated once.		P
9.5.3	Verification of the enabling/disabling system of the ARD		P
	The ARD assembled with the MPD is installed as in normal use and supplied at rated voltage. The test is carried out by means of 1 000 cycles of the enabling system with an operation frequency not less than 2 cycles per minute. At the end of the test, the enabling system shall be able to work correctly. The ARD being in the enabled position, the MPD is caused to open automatically (e.g., by means of a tripping release or by a residual current). It shall be reclosed automatically. The ARD being in the disabled position, the MPD is caused to open automatically (e.g., by means of a tripping release or by a residual current). The ARD being supplied as in normal use, no automatic reclosing shall occur during at least 1 min or a time given by the manufacturer.		P

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Clause	Requirement – Test	Result - Remark	Verdict
9.5.4	Verification of the maximum number of consecutive reclosing		P
	The MPD is caused to open automatically (e.g. by means of a tripping release or by a residual current). After the tripping and reclosing time (reclosing time may vary depending on number of reclosing operations), the ARD shall reclose and show the appropriate signal according to the manufacturer's instructions. Reclosing time should be declared by manufacturer to testing laboratory as some products may have a reclosing time up to several hours.		P
9.6	Tests of creepage distances and clearances for electronic circuits (abnormal conditions)		P
9.6.1	These tests replace the verifications of creepage distances and clearances of electronic circuits connected between live parts (phases and neutral) and/or between live parts and the earth circuit. The ARD shall not create fire and/or shock hazards under abnormal conditions likely to occur in service. The conditions under which a component is used within an ARD unit shall be in accordance with the operating characteristics marked on the component and/or given in the data provided by the manufacturer.		P
9.6.2	When the ARDs are exposed to abnormal conditions, no part shall reach temperatures likely to cause danger of fire to the surroundings of the ARD, and no live parts shall become accessible. Compliance is checked by subjecting the ARD to a heating test under fault conditions as described in 9.6.3.		P
9.6.3	Unless otherwise specified, the tests are made on ARD, connected and loaded as in normal use.		P
9.7	Requirements for capacitors, specific resistors and inductors used in electronic circuits		N
9.7.1	General		N
	These requirements apply for capacitors (see 9.7.2), specific resistors and inductors (see 9.7.3), and inductors and windings (see 9.7.4) used in electronic circuits connected between live parts (phases and neutral) and/or between live parts and the earth circuit when the contacts are in the closed position.		N
9.7.2	Capacitors		N
	Capacitors, – the short-circuiting or disconnection of which would cause an infringement of the requirements under fault conditions with regard to shock or fire hazard; – the short-circuiting of which would cause a current of 0,5 A or more through the terminals of the capacitor; – for suppression of electromagnetic interference, shall comply with IEC 60384 (all parts).		N
9.7.3	Resistors		N

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Clause	Requirement – Test	Result - Remark	Verdict
	Resistors, the short-circuiting or interruption of which would cause an infringement of the requirements with regard to the protection against fire and electric shock in case of a defect, shall have an adequately constant value under the overload conditions prevailing in the electronic switch. These resistors shall comply with the requirements of 1 4.1 of IEC 60065:201 4. Tests already carried out on resistors and inductors complying with IEC 60065 are not required to be repeated.		N
9.7.4	Inductors and windings		N
	Inductors and windings shall comply with the requirements of IEC 61 558 (all parts) and the relevant parts of IEC 61 558 (all parts), as applicable.		N
9.8	Test of reliability of screws, current-carrying parts and connections		P
	For the ARD and MPD, the relevant subclause of the MPD standard applies: a) IEC 60898-1 :201 5, 9.4 for ARD classified according to 4.2.1 (circuit- breakers); b) IEC 61 008-1 :201 0, 9.4 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0, 9.4 for ARD classified according to 4.2.3 (RCBOs).		P
9.9	Test of reliability of terminals for external conductors		P
	For the ARD and MPD, the relevant subclause(s) of the MPD standard(s) applies: a) IEC 60898-1 :201 5, 9.5 for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0 and IEC 61 008-1 :201 0/AMD1 :201 2, 9.5 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0 and IEC 61 009-1 :201 0/AMD1 :201 2, 9.5 for ARD classified according to 4.2.3 (RCBOs).		P
9.10	Verification of protection against electric shock		P
	For the ARD and MPD, the relevant subclause of the MPD standard applies: a) IEC 60898-1 :201 5, 9.6 for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0, 9.6 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0, 9.6 for ARD classified according to 4.2.3 (RCBOs).		P
9.11	Test of dielectric properties and isolating capability		P

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Clause	Requirement – Test	Result - Remark	Verdict
	The following subclauses of the standard for the MPD apply: a) IEC 60898-1 :201 5, 9.7 for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0, IEC 61 008-1 :201 0/AMD1 :201 2 and IEC 61 008-1 :201 0/AMD2:201 3, 9.7 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0, IEC 61 009-1 :201 0/AMD1 :201 2 and IEC 61 009-1 :201 0/AMD2:201 3, 9.7 for ARD classified according to 4.2.3 (RCBOs), with the following modifications: – where the standard requires that the protective device is in open position, the test is carried out with the MPD and ARD in manually opened condition according to the manufacturer's instructions. All the other tests are carried out with the ARD in all possible conditions; – where the standard requires that the protective device is in open position, the test is carried out with the ARD in isolation condition (e.g. the symbol (IEC 6041 7-5008) is visible); – if the ARD is provided with a terminal intended for the connection of protective conductors, this is connected to the frame; – if the ARD is provided with a terminal intended for the connection of functional earthing conductors, this is not connected to the frame.		P
9.12	Temperature rise		P
	For the ARD and MPD, the following subclauses of the MPD standard apply, a current equal to its rated current is passed simultaneously through all the poles of the MPD and the ARD supplied as for normal use with rated voltage: a) IEC 60898-1 :201 5, 9.8 for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0, 9.8 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0, 9.8 for ARD classified according to 4.2.3 (RCBOs). The test current in the MPDs may be generated at reduced voltage but the ARD shall be supplied at their rated voltage. For this reason, tests shall be made on samples specially prepared by the manufacturer or according to its instructions.		P
9.13	Verification of the mechanical and electrical endurance – Verification of thereclosing system of the ARD		N
9.1 3.1	General test conditions		N
9.1 3.2	Test procedure		N
9.1 3.3	Condition of the ARD after the test		N
9.14	Short-circuit test		P
9.1 4.1	General conditions for short-circuit test		P
	The ARD and MPD shall be in a new and clean condition.		P
9.1 4.2	Test circuit and test quantities		P

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Clause	Requirement – Test	Result - Remark	Verdict
	For the ARD and MPD, the relevant subclause of the MPD standard applies: a) IEC 60898-1 :201 5, 9.1 2.2 and 9.1 2.4 for ARD classified according to 4.2.1 (circuit- breakers); b) IEC 61 008-1 :201 0 and IEC 61 008-1 :201 0/AMD1 :201 2, 9.1 1 .2.1 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0 and IEC 61 009-1 :201 0/AMD1 :201 2, 9.1 2.2 and 9.1 2.3 for ARD classified according to 4.2.3 (RCBOs).		P
9.1 4.3	Test procedure		P
	For the ARD and MPD, the relevant subclause(s) of the MPD standard(s) applies: a) IEC 60898-1 :201 5, 9.1 2.1 1 .4.2, or IEC 60898-2:201 6, 9.1 2.1 1 .4.2, as applicable, for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0 and IEC 61 008-1 :201 0/AMD1 :201 2, 9.1 1 .2.4 a) for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 008-1 :201 0 and IEC 61 008-1 :201 0/AMD1 :201 2, 9.1 1 .2.3 b) for ARD classified according to 4.2.2 (RCCBs); d) IEC 61 009-1 :201 0 and IEC 61 009-1 :201 0/AMD1 :201 2, 9.1 2.1 1 .4 b) for ARD classified according to 4.2.3 (RCBOs); e) IEC 61 009-1 :201 0 and IEC 61 009-1 :201 0/AMD1 :201 2, 9.1 2.1 3 for ARD classified according to 4.2.3 (RCBOs). In case of ARDs classified according to 4.3.1 and 4.6.2, the CO operation shall be performed for a number of times equal to the maximum number of reclosing operations, and the time interval between the consecutive CO operations shall be that stated by the manufacturer with the ARD operating as in normal use. In case of ARDs classified according to 4 . 3 . 2 , the ARD shall be disabled and the MPD shall be closed manually. After the tests, the ARD shall be verified according to 9.1 4.4.		P
9.1 4.4	Condition of the ARD after the test		P
	After the test, the ARD and MPD shall perform the following test of the relevant subclause of the MPD standard under the test conditions of Clause 9: a) IEC 60898-1 :201 5, 9.1 2.1 2.1 for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0, 9.1 1 .2.1 i) for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0, 9.1 2.1 2.1 for ARD classified according to 4.2.3 (RCBOs). After the test, compliance with 9.5.4 is checked. Compliance with 9.1 8.2 and/or 9.1 8.3 as applicable is also checked for devices classified according to 4.3.2.		P
9.15	Resistance to mechanical shock and impact		P

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Clause	Requirement – Test	Result - Remark	Verdict
	For the ARD and MPD, the following subclauses of the MPD standard apply: a) IEC 60898-1 :201 5, 9.1 3 for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0, 9.1 2 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0, 9.1 3 for ARD classified according to 4.2.3 (RCBOs).		P
9.16	Test of resistance to heat		P
	For the ARD and MPD, the following subclauses of the MPD standard apply: a) IEC 60898-1 :201 5, 9.1 4 for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0, 9.1 3 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0, 9.1 4 for ARD classified according to 4.2.3 (RCBOs). In case of ARD according to 4.1 .2, the test is carried out only on the ARD part.		P
9.17	Resistance to abnormal heat and to fire For the ARD and MPD, the following subclauses of the MPD standard apply: a) IEC 60898-1 :201 5, 9.1 5 for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0 and IEC 61 008-1 :201 0/AMD1 :201 2, 9.1 4 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0 and IEC 61 009-1 :201 0/AMD1 :201 2, 9.1 5 for ARD classified according to 4.2.3 (RCBOs). In case of ARD according to 4.1 .2, the test is carried out only on the ARD part.		P
9.18	Verification of the operating characteristics		N
9.1 8.1	General.		N
9.1 8.2	Verification of the reclosing subordinated to the measurements of the resistance to earth		N

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Clause	Requirement – Test	Result - Remark	Verdict
	a) The test circuit shall correspond to Figure 3 or Figure 4 as applicable. The resistor R1 shall be adjusted at any convenient value which leads the ARD and MPD to trip. The resistor R2 shall be adjusted to the value equal to R d . The MPD is made to trip by closing the test switch S1 , and immediately after the tripping of the ARD, the switch S1 shall be opened. The ARD shall reclose. The test is repeated three times on a pole taken at random which shall not be the switched neutral. Each test shall be separated from the previous reclosing by an interval of at least 30 s. b) The test circuit shall correspond to Figure 3 or Figure 4 as applicable. The resistor R1 shall be adjusted at any convenient value which leads the ARD and MPD to trip. The resistor R2 shall be adjusted to the value equal to R d0. The MPD is made to trip by closing the test switch S1, and immediately after the tripping of the ARD and MPD, the switch S1 shall be opened. The ARD shall not reclose and ARD shall show the appropriate signal according to the manufacturer's instructions. After this test, the resistor R2 is removed and the ARD classified according to 4. 3. 2. 1 a) shall not reclose; the ARD classified according to 4.3.2.1 b) shall reclose according to the manufacturer's instructions. The test is repeated three times on a pole taken at random which shall not be the switch neutral. Each test shall be separated from the previous reclosing by the reset of the ARD.		N
9.1 8.3	Verification of the reclosing subordinated to the measurements of the resistance between live parts		N
	a) The test circuit shall correspond to Figure 5. The resistor R1 shall be adjusted to the value equal to R cc. The MPD is caused to open automatically (e.g. by means of a tripping release), and immediately after the tripping of the ARD and MPD, the switch S1 shall be closed. The ARD shall reclose. The test is repeated three times on one possible combination of live parts taken at random. Each test shall be separated from the previous one by an interval of at least 3 min. b) The test circuit shall correspond to Figure 5. The resistor R1 shall be adjusted to the value equal to R cc0. The MPD is caused to open automatically (e.g. by means of a tripping release); immediately after the tripping of the ARD and MPD, the switch S1 shall be closed. The ARD shall not reclose and the ARD shall show the appropriate signal according to the manufacturer's instructions.		N
9.1 8.4	Verification of the influence of the distributed capacities in the installation on the operating characteristic		N
9.1 8.4.1	Verification of the reclosing subordinated to the measurements of the resistance between live parts to earth		N

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Clause	Requirement – Test	Result - Remark	Verdict
	The test conditions specified in 9.1 8.2 a) and 9.1 8.2 b) apply by inserting a capacitor of 1 00 nF in parallel to the resistor R2. The test shall be carried out at 0,85 and 1 ,1 time the rated voltage at the following temperatures: (−5 ± 2) °C, (20 ± 2) °C, (40 ± 2) °C after the steady state is reached.		N
9.1 8.4.2	Verification of the reclosing subordinated to the measurements of the resistance between live parts		N
	The test conditions specified in 9.1 8.3 a) and 9.1 8.3 b) apply by inserting a capacitor of 1 00 nF in parallel to the resistor R1. The test shall be carried out at 0,85 and 1 ,1 times the rated voltage at the following temperatures: (−5 ± 2) °C, (20 ± 2) °C, (40 ± 2) °C after the steady state is reached.		N
9.1 8.5	Verification of the maximum current in FE under normal condition		N
	The ARD is installed as in normal use and supplied at a voltage 1 ,1 times its rated voltage. The test circuit shall be in accordance with Figure 6. The resistor R1 shall be adjusted at a value of 1 Ω. The test current in the resistor R1 is measured by the use of an appropriate mean (e.g., oscilloscope, ammeter). The test current shall not exceed 1 ,0 mA r.m.s. The device is then made to trip, and the measurement is performed again.		N
9.19	Verification of the safety during the assessment		P
9.1 9.1	Verification of the limitation of the voltage		N
	The ARD and the MPD are installed as in normal use, supplied at 1,1 rated voltage and without any load. The MPD is made to trip and the voltage on the load terminals of the ARD and MPD is measured by an appropriate means (e.g. oscilloscope, voltmeter) before the ARD recloses. The voltage shall not exceed 24 V r.m.s. In case of an ARD provided with an FE, the following test shall be carried out.		N
9.1 9.2	Verification of the limitation of the test current		P

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Clause	Requirement – Test	Result - Remark	Verdict
	The ARD is installed as in normal use and supplied at a voltage 1 ,1 times its rated voltage. The test circuit shall correspond to Figure 3 or Figure 4 as applicable. The resistor R1 shall be adjusted at any convenient value which leads the ARD to trip. The resistor R2 shall be replaced by a connection of negligible value. The test current in the resistor R2 is measured by the use of an appropriate means (e.g.oscilloscope, ammeter). The test current shall not exceed 1 ,0 mA r.m.s or 2,0 mA DC. In case of an ARD provided with an FE, the following test shall be carried out. The ARD and the MPD are installed as in normal use, supplied at 1,1 rated voltage and without any load. The MPD is made to trip. The test current in the FE is measured by the use of an appropriate means (e.g. oscilloscope, ammeter). The test current shall not exceed 1 ,0 mA r.m.s or 2,0 mA DC.		P
9.1 9.3	Verification of the safety in blocked condition		P
	The ARD is installed as in normal use and supplied at a voltage 1 ,1 times its rated voltage. The MPD shall be made to trip for the maximum number of consecutive reclosing operations as declared by the manufacturer in order to get the ARD in blocked condition. For ARDs classified as 4.4.1 , the verification is made by repeating the test of 9.1 9.1 . For ARDs classified as 4.4.2, the verification is made by repeating the test of 9.1 9.2. For ARDs classified as 4.3.1 , the relevant subclause of the MPD standard applies, without the humidity treatment: a) IEC 60898-1 :201 5, 9.7.3 for ARD classified according to 4.2.1 (circuit-breakers); b) IEC 61 008-1 :201 0, 9.7.3 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61 009-1 :201 0, 9.7.3 for ARD classified according to 4.2.3 (RCBOs).		P
9.20	Verification of the operation of the test device at the limits of rated voltage		P
	For the ARD and MPD, the relevant subclause of the MPD standard applies: a) IEC 61 008-1 :201 0, 9.1 6 for ARD classified according to 4.2.2 (RCCBs); b) IEC 61 009-1 :201 0, 9.1 6 for ARD classified according to 4.2.3 (RCBOs). It may be necessary to increase the interval time between two consecutive operations up to the reset time.		P
9.21	Verification of ageing		N

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Clause	Requirement – Test	Result - Remark	Verdict
	The ARD and MPD are placed for a period of 1 68 h in an ambient temperature of (40 ± 2) °Cand loaded with the rated current. The voltage on the electronic parts shall be 1 ,1 times the rated voltage. After this test, the ARD and MPD in the cabinet are allowed to cool down to approximatelyroom temperature without current passing. The electronic parts shall show no damage. After the test, compliance with 9.5.4 is checked. Compliance with 9.1 8.2 or 9.1 8.3 as applicable is also checked for devices classified according to 4.3.2.		N
9.22	Electromagnetic compatibility		N
9.22.1	General		N
9.22.2	Low-frequency electromagnetic phenomena		N
9.22.3	High-frequency immunity		N
9.22.4	Electrostatic discharges		N
9.22.5	Electromagnetic emission of ARDs		N
9.22.6	Performance criteria		N

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Clause	Requirement – Test	Result - Remark	Verdict

4	**Classification**		P
4.1	According to the method of operation		P
4.1.1	RCBO functionally independent of line voltage		P
4.1.2	RCBO functionally dependent on line voltage		P
4.2	According to the type of installation		N
4.3	According to the number of poles and current paths		P
4.4	According to the possibility of adjusting the residual operating current		N
4.5	According to resistance to unwanted tripping due to voltage surges		P
4.6	According to behaviour in presence of d.c. components		N
4.7	According to time-delay (in presence of a residual current)		P
4.8	According to the protection against external influences	enclosed-type RCBO	P
4.9	According to the method of mounting	surface-type RCBO;	P
4.10	According to the methods of connection	screw-in type.	P
4.11	According to the instantaneous tripping current	C-Type	P
4.12	According to the I2t characteristic		P
4.13	According to the type of terminals		P
4.Z1	According to the range of ambient air temperature		P

5	**Characteristics of RCBOs**		P
5.1	Summary of characteristics		P
5.2	Rated quantities and other characteristics		P
5.2.1	Rated voltage		P
5.2.1.1	Rated operational voltage (*U*e)		P
5.2.1.2	Rated insulation voltage (*U*i)		P
5.2.1.3	Rated impulse withstand voltage (*U*imp)		P
5.2.2	Rated current (*I*n)		P
5.2.3	Rated residual operating current (*I*_n)		P

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Clause	Requirement – Test	Result - Remark	Verdict
5.2.4	Rated residual non-operating current (*I*_no)		P
5.2.5	Rated frequency	50/60Hz	P
5.2.6	Rated short-circuit capacity (*I*cn)		P
5.2.7	Rated residual making and breaking capacity (*I*_m)		P
5.2.8	RCBO type S		N
5.2.9	Operating characteristics in case of residual currents with d.c. components		N
5.2.9.1	RCBO type AC		N
5.2.9.2	RCBO type A		N
5.3	Standard and preferred values		P
5.3.1	values of rated voltage (*U*n)		P
5.3.2	Preferred values of rated current (*I*n)		P
5.3.3	Standard values of rated residual operating current (*I*_n)		P
5.3.4	Standard value of residual non-operating current (*I*_no)		P
5.3.5	Value of rated frequency	50/60Hz	P
5.3.6	Values of rated short-circuit capacity (*I*cn) and of rated residual making and breaking capacity (*I*Δm)		P
5.3.6.1	Standard values up to and including 10 000 A		P
5.3.6.2	Values above 10 000 A up to and including 25 000 A		N
5.3.8	Limiting values of break time and non-actuating time for RCBO of type AC and A		N
5.3.8.1	Limiting values of break time and non-actuating time for alternating residual currents (r.m.s. values) for type AC and A		N
5.3.8.2	Maximum values of break time for half-wave residual currents (r.m.s. values) for type A		N
5.3.9	Standard ranges of overcurrent instantaneous tripping	Type C	P
5.3.10	Standard values of rated impulse withstand voltage (*U*imp)		P
5.3.Z1	Standard ranges of ambient air temperature		P
6	**Marking and other product information**		P
6.Z1	Standard marking		P
6.Z2	Additional marking		P
7	**Standard conditions for operation in service and for installation**		P
7.1	Standard conditions		P
7.2	Conditions of installation		P

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Clause	Requirement – Test	Result - Remark	Verdict
7.3	Pollution degree		P
8	**Requirements for construction and operation**		P
8.1	Mechanical designs		P
8.1.1	General		P
8.1.2	Mechanism		P
8.1.3	Clearances and creepage distances		P
8.1.4	Screws, current-carrying parts and connections		P
8.1.5	Terminals for external conductors		P
8.1.6	Non-interchangeability		P
8.1.Z1	Mechanical mounting of plug-in type RCBOs		N
8.1.Z1.1	Plug-in type RCBOs, the holding in position of which does not depend solely on their plug-in connection(s)		N
8.1.Z1.2	Plug-in type RCBOs, the holding in position of which depends solely on their plug-in connection(s)		N
8.2	Protection against electric shock		P
8.3	Dielectric properties and isolating capability		P
8.4	Temperature-rise		P
8.4.1	Temperature-rise limits		P
8.4.2	Ambient air temperature		P
8.5	Operating characteristics		P
8.5.1	Under residual current conditions		P
8.5.2	Under overcurrent conditions		P
8.5.2.1	Standard time-(over)current zone		P
8.5.2.2	Conventional quantities		P
8.5.2.3	Overcurrent tripping characteristic		P
8.5.2.4	Effect of the ambient air temperature on the overcurrent tripping characteristic		P
8.5.2.Z1	Effect of single phase loading of multi-pole RCBO on the tripping characteristic		P
8.6	Mechanical and electrical endurance		P
8.7	Performance at short-circuit currents		P
8.8	Resistance to mechanical shock and impact		P
8.9	Resistance to heat		P
8.10	Resistance to abnormal heat and to fire		P
8.11	Test device		P

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Clause	Requirement – Test	Result - Remark	Verdict
8.12	Requirements for RCBOs functionally dependent on line voltage		P
8.14	Behaviour of RCBOs in case of current surges caused by impulse voltages		P
8.15	Behaviour of RCBOs in case of earth fault currents comprising a d.c. component		P
8.16	Reliability		P
8.17	Electromagnetic compatibility		N
8.Z1	Behaviour of RCBOs at low ambient air temperatures		P
9	**Tests**		P
9.1	General		P
9.2	Test conditions		P
9.3	Test of indelibility of marking	rubbing the marking by hand for 15 s with a piece of cotton soaked with water and again for 15 s with a piece of cotton soaked with aliphatic solvent After test, the marking easily legible. The marking also remain easily legible	P
9.4	Test of reliability of screws, current-carrying parts and connections		P
9.5	Tests of reliability of screw-type terminals for external copper conductors		P
9.6	Verification of protection against electric shock		P
9.7	Test of dielectric properties and isolating capability		P
9.7.1	Resistance to humidity		P
9.7.1.1	Preparation of the RCBO for test		P
9.7.1.2	Test conditions	93%,25°C. 48H	P
9.7.1.3	Test procedure		P
9.7.1.4	Condition of the RCBO after the test		P
9.7.2	Insulation resistance of the main circuit		P

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Clause	Requirement – Test	Result - Remark	Verdict
9.7.3	Dielectric strength of the main circuit		P
9.7.4	Insulation resistance and dielectric strength of auxiliary circuits		P
9.7.5	Secondary circuit of detection transformers		P
9.7.6	Capability of control circuits connected to the main circuit withstanding high d.c. voltages due to insulation measurements		P
9.7.7	Verification of impulse withstand voltages (across clearances and across solid insulation) and of leakage current across open contacts		P
9.7.7.1	General testing procedure for the impulse withstand voltage tests		P
9.7.7.2	Verification of clearances with the impulse withstand voltage		P
9.7.7.3	Verification of leakage currents across open contacts (suitability for isolation		P
9.7.7.4	Verification of resistance of the insulation of open contacts and basic insulation against an impulse voltage in normal conditions		P
9.7.7.5	Verification of the behaviour of components bridging the basic insulation		P
9.8	Test of temperature-rise		P
9.8.1	Ambient air temperature		P
9.8.2	Test procedure		P
9.8.3	Measurement of the temperature of parts		P
9.8.4	Temperature-rise of a part		P
9.9	Verification of the operating characteristic		P
9.9.1	Verification of the operating characteristic under residual current conditions		P
9.9.1.1	Test circuit and test procedure		P
9.9.1.2	Tests for all RCBOs		P
9.9.1.3	Verification of correct operation at residual currents with d.c. components		P
9.9.1.4	Particular test conditions for RCBOs functionally dependent on line voltage		P
9.9.2	Verification of the operating characteristic under overcurrent conditions		P
9.9.2.1	Test of time-(over)current characteristic		P
9.9.2.2	Test of instantaneous tripping and of correct opening of the contacts		P
9.9.2.3	Test of effect of ambient temperature on the tripping characteristic		P

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Clause	Requirement – Test	Result - Remark	Verdict
9.9.2.Z1	Test of effect of single phase loading on the over-current tripping characteristic of RCBO with three or four current paths		P
9.10	Verification of mechanical and electrical endurance		P
9.10.1	General test conditions		P
9.10.2	Test procedure		P
9.10.3	Condition of the RCBO after test		P
9.11	Verification of the trip-free mechanism		P
9.11.1	General test conditions		P
9.11.2	Test procedure		P
9.12	Short-circuit tests		P
9.12.1	General conditions for test		P
9.12.2	Test circuit for short-circuit performance		P
9.12.3	Values of test quantities		P
9.12.4	Tolerances on test quantities		P
9.12.5	Power factor of the test circuit		P
9.12.6	Measurement and verification of *I*2*t* and of the peak current (*I*p)		P
9.12.7	Calibration of the test circuit		P
9.12.8	Interpretation of records		P
9.12.9	Condition of the RCBO for test		P
9.12.9.1	Test in free air		P
9.12.9.2	Test in enclosures		P
9.12.10	Behaviour of the RCBO during short-circuit tests		P
9.12.11	Test procedure		P
9.12.11.1	General		P
9.12.11.2	Test at reduced short-circuit currents		P
9.12.11.3	Test at 1500A		P
9.12.11.4	Test above 1 500 A		N
9.12.12	Verification of the RCBO after short-circuit test		P
9.13	Mechanical Stresses		P
9.13.1	Mechanical shock		P
9.13.1.1	Test device		P
9.13.1.2	Test procedure		P
9.13.2	Resistance to mechanical stresses and impact		P
9.14	Test of resistance to heat		P

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Clause	Requirement – Test	Result - Remark	Verdict
9.15	Test of resistance to abnormal heat and to fire		P
9.16	Verification of the operation of the test device at the limits of rated voltage		P
9.17	Verification of the behaviour of RCBOs functionally dependent on line voltage, classified under 4.1.2.1, in case of failure of the line voltage		P
9.17.1	Determination of the limiting value of the line voltage (*U*x)		P
9.17.2	Verification of the behaviour in case of failure of the line voltage		P
9.17.3	Verification of the correct operation, in presence of a residual current, for RCBOs opening with delay in case of failure of the line voltage		P
9.17.4	Verification of correct operation of RCBOs with three or four in presence of a residual current, the neutral and one line terminal only being energized		N
9.19	Verification of behaviour of RCBOs in case of current surges caused by impulse voltages		P
9.19.1	Current surge test for all RCBOs (0,5 µs/100 kHz ring wave test)		P
9.19.2	Verification of behaviour at surge currents up to 3 000 A (8/20 µs surge current test)		P
9.19.2.1	Test conditions		P
9.19.2.2	Test results for S-type RCBOs		N
9.19.2.3	Test results for RCBOs of the general type		P
9.20	Verification of resistance of the insulation against an impulse voltage		P
9.21.1	Type A residual current devices		N
9.22	Verification of reliability		P
9.22.1	Climatic test		P
9.22.1.1	Testing chamber		P
9.22.1.2	Severity		P
9.22.1.3	Test procedure		P
9.22.1.4	Recovery		P
9.22.1.5	Final verification		P
9.22.2	Test with temperature of 40 °C		P
9.23	Verification of ageing		P
9.24	Electromagnetic compatibility		N
9.24.1	Tests covered by the present standard		N
9.24.2	Additional tests		N
9.25	Test of resistance to rusting		P
9.Z1	Verification of the correct operation at low ambient air temperatures for RCBOs for use at temperatures between -25 °C and +40 °C		P

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Clause	Requirement – Test	Result - Remark	Verdict

	TABLE: Heating test		P
	Test Voltage (V)..... :	400V	—
	Ambient (C)..... :	23.7°C	—

Thermocouple locations:	**Max. temperature rise measured, ∆ T (K)**	**Max. temperature rise limit, ∆ T (K)**
Terminal	38.5	65
Enclosure	9.6	40
Switch	14.8	60
Supplementary information:		

	TABLE: Dielectric strength		P
Test voltage applied between:		**Test potential applied (V)**	**Breakdown / flashover (Yes/No)**
Between each pair of the terminal		2000VAC	No
Supplementary information:			

	TABLE: Resistance to heat and fire - Glow wire tests							P
Object/ Part No./ Material	**Manufacturer / trademark**	**Glow wire test (GWT); (°C)**						**Verdict**
		550	**650**		**750**		**850**	
			te	**ti**	**te**	**ti**		
Enclosure	/	--	0	0	--	--	--	P

Object/ Part No./ Material	**Manufacturer / trademark**	**Glow-wire flammability index (GWFI), °C**				**GW ignition temp. (GWIT), °C**		**Verdict**
		550	**650**	**750**	**850**	**675**	**775**	
--	--	--	--	--	--	--	--	--

The test specimen passed the glow wire test (GWT) with no ignition [(te – ti) ≤ 2s] (Yes/No):	Yes
If no, then surrounding parts passed the needle-flame test of annex E (Yes/No) .....:	N/A
The test specimen passed the test by virtue of most of the flaming material being withdrawn with the glow-wire (Yes/No)? .....:	No
Ignition of the specified layer placed underneath the test specimen (Yes/No).....:	No

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Clause	Requirement – Test	Result - Remark	Verdict

Supplementary information:

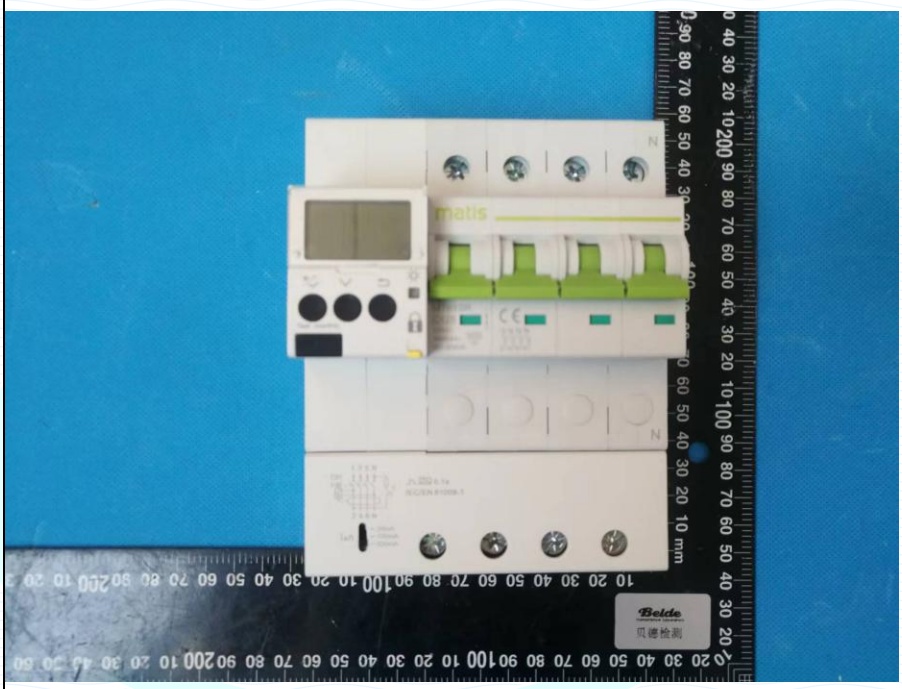
- 550 °C GWT not relevant (or applicable) to parts of material classified at least HB40 or if relevant HBF
- The GWIT pre-selection option, the 850 °C GWFI pre-selection option, and the 850 °C GWT are not relevant (or applicable) for attended appliances

	TABLE: 1 - List of components and circuits relied on for safety	P

Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Mark(s) of conformity[1)]**
Enclosure	ANHUI KÜAIJIEELECTRONICS CO LTD	PC-1	V-0,	UL

Appendix 1

Whole views of EUT

Photo 1 View: [√] front [ ] rear [ ] right side [ ] left side [ ] top [ ] bottom [ ] internal	

Appendix 2

Product marking of EUT

Smart Reclosed RCBO
Model: MT61SR

Rated Voltage Ue: 400VAC,50/60Hz
Rated Current: 125A
Poles: 4P

SHANGHAI MATIS ELECTRIC CO.,LTD.

CE