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

CERTIFICATE
Nº VTÚPV – 089/ 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: **Automatic Reclosing Devices**

Tested Model: MT53RA+ML50H
Derived Models: MT53RAN+ML60-B, MT53RA+MRO50, MT53RA+MM50H, MT53RA+MM60H, MT53RA, MT51RA, MT51RA+ML50H, MT51RAN+ML60-B, MT51RA+MRO50, MT51RA+MM50H, MT51RA+MM60H

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

Rating and principal characteristics: Rated Voltage Ue: 400 V AC; Frequency: 50 Hz; 4 poles
Rated Current: 6, 10, 16, 20, 25, 32, 40, 50, 63 A

Test results are described in the Test Reports No.:
B-S2206A1955 (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 61008-1:2012+A11:2015+A1:2014+A12:2017+A2:2014
- EN 63024: 2018

This certificate is valid until: **05. 09. 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

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

Vyškov 05. 09. 2022

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Milan Bezděk
Certification Head

APPLICATION FOR LOW VOLTAGE DIRECTIVE

On Behalf of

SHANGHAI MATIS ELECTRIC CO.,LTD.

Automatic Reclosing Devices

Model : **MT53RA+ML50H, MT53RAN+ML60-B, MT53RA+MRO50, MT53RA+MM50H, MT53RA+MM60H, MT53RA, MT51RA, MT51RA+ML50H, MT51RAN+ML60-B, MT51RA+MRO50, MT51RA+MM50H, MT51RA+MM60H**

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-S2206A1955

LVD Report

EN 63024
Requirements for automatic reclosing devices (ARDs) for circuit-breakers, RCBOs and RCCBs for household and similar uses
EN 61008
Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) — 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.....:	CA2143
Report Query.....:	CERTIFICATEQUERY
Standard ..... :	EN 63024:2018
	EN 61008-1:2012+A11:2015+A1:2014+A12:2017+A2:2014
Test Result ..... :	Compliance with
	EN 63024:2018
	EN 61008-1:2012+A11:2015+A1:2014+A12:2017+A2:2014
Procedure deviation ..... :	N.A.
Non-standard test method ..... :	N.A.
Type of test object ..... :	Automatic Reclosing Devices
Trademark ..... :	/
Model/type reference ..... :	MT53RA+ML50H
Rating ..... :	Rated Voltage Ue: 230/400VAC,50Hz Rated Current: 6A,10A,16A,20A,25A,32A,40A,50A,63A Residual Current: 10mA, 30mA, 100mA, 300mA; Type: AC, A, B Curve: B, C, D Poles: 1P, 2P, 3P, 4P
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 : Signature / Austin.Zhong — Date: 2022-06-22

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

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

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.		P
4.2.3	ARD for RCBOs.		N
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.		P
4.5.2	ARD without FE connection.		N
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.	400V	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.	50Hz	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		N
4.1.1	RCCB functionally independent of line voltage		N
4.1.2	RCCB functionally dependent on line voltage		N
4.2	According to the type of installation		P
4.3	According to the number of poles and current paths		P
	– two-pole RCCB;		N
	– three-pole RCCB;		N
	– four-pole RCCB.		P
4.4	According to the possibility of adjusting the residual operating current		-
4.5	According to resistance to unwanted tripping due to voltage surges		-
	– RCCBs with normal resistance to unwanted tripping (general type as in table 1);		P
	– RCCBs with increased resistance to unwanted tripping (S type as in table 1).		N
4.6	According to behaviour in presence of d.c. components		P
	– RCCBs of type AC;		N
	– RCCBs of type A.		P
4.7	According to time-delay (in presence of a residual current)		P
	– RCCB without time-delay: type for general use;		P
	– RCCB with time-delay: type S for selectivity.		N
4.8	According to the protection against external influences		P
	– enclosed-type RCCB (not requiring an appropriate enclosure);		P
	– unenclosed-type RCCB (for use with an appropriate enclosure).		N
4.9	According to the method of mounting		P
	– surface-type RCCB;		P
	– flush-type RCCB;		N
	– panel board type RCCB, also referred to as distribution board type.		N
4.10	According to the method of connection		P
	– RCCBs the connections of which are not associated with the mechanical mounting;		P

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Clause	Requirement – Test	Result - Remark	Verdict
	– RCCBs the connections of which are associated with the mechanical mounting		N
4.11	According to the type of terminals		P
5	CHARACTERISTICS OF RCCBs		P
5.1	Summary of characteristics		P
	The characteristics of a RCCB shall be stated in the following terms:		P
	– number of poles and current paths		P
	– rated current I_n		P
	– rated residual operating current $I_{\Delta n}$		P
	– rated residual non-operating current		P
	– rated voltage U_n		P
	– rated frequency		P
	– rated making and breaking capacity I_m		P
	– rated residual making and breaking capacity $I_{\Delta m}$		P
	– time-delay, if applicable		N
	– operating characteristics in case of residual currents with d.c. components		P
	– insulation coordination including clearances and creepage distances		P
	– degree of protection		P
	– ranges of ambient air temperature		P
	– rated conditional short-circuit current I_{nc}		P
	– rated conditional residual short-circuit current $I_{\Delta c}$		P
	– behaviour of the RCCB in case of failure of line voltage (for RCCBs functionally dependent on line voltage)		P
5.2	Rated quantities and other characteristics		P
5.2.1	Rated voltage		P
5.2.1.1	Rated operational voltage (Ue)		P
	The rated operational voltage (hereafter referred to as "rated voltage") of a RCCB is the value of voltage, assigned by the manufacturer, to which its performance is referred.		P
5.2.1.2	Rated insulation voltage (Ui)		P

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Clause	Requirement – Test	Result - Remark	Verdict
	The rated insulation voltage of a RCCB is the value of voltage, assigned by the manufacturer, to which dielectric test voltages and creepage distances are referred.		P
	Unless otherwise stated, the rated insulation voltage is the value of the maximum rated voltage of the RCCB. In no case shall the maximum rated voltage exceed the rated insulation voltage.		P
5.2.2	Rated current (In)		P
	The value of current, assigned to the RCCB by the manufacturer, which the RCCB can carry in uninterrupted duty.		P
5.2.3	Rated residual operating current (IΔn)		P
	The value of residual operating current (see 3.2.4), assigned to the RCCB by the manufacturer, at which the RCCB shall operate under specified conditions.		P
5.2.4	Rated residual non-operating current (IΔno)		
	The value of residual non-operating current (see 3.2.5), assigned to the RCCB by the manufacturer, at which the RCCB does not operate under specified conditions.		P
5.2.5	Rated frequency		P
	The rated frequency of a RCCB is the power frequency for which the RCCB is designed and to which the values of the other characteristics correspond.		P
5.2.6	Rated making and breaking capacity (Im)		P
	The r.m.s. value of the a.c. component of prospective current (see 3.4.4), assigned by the manufacturer, which a RCCB can make, carry and break under specified conditions.		P
5.2.7	Rated residual making and breaking capacity (IΔm)		P
	The r.m.s. value of the a.c. component of residual prospective current (3.2.3 and 3.4.4), assigned by the manufacturer, which a RCCB can make, carry and break under specified conditions.		P
5.2.8	RCCB type S		N
5.2.9	Operating characteristics in case of residual currents with d.c. components		P
5.2.9.1	RCCB type AC		N
	A RCCB for which tripping is ensured for residual sinusoidal alternating currents, whether suddenly applied or slowly rising.		N
5.2.9.2	RCCB Type A		P
	A RCCB for which tripping is ensured for residual sinusoidal alternating currents and residual pulsating direct currents, whether suddenly applied or slowly rising.		P
5.2.10	Insulation coordination including clearances and creepage distances		--
5.3	Standard and preferred values		P
5.3.1	Standard values of rated voltage (Un)		P
5.3.2	Preferred values of rated current (In)		P

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Clause	Requirement – Test	Result - Remark	Verdict
5.3.3	Standard values of rated residual operating current (IΔn)		P
5.3.4	Standard value of residual non-operating current (IΔno)		P
5.3.5	Standard minimum value of non-operating overcurrent in case of a multiphase balanced load through a multipole RCCB		N
5.3.6	Standard minimum value of the non-operating overcurrent in case of a single-phase load through a three-pole or four-pole RCCB	Minimum value shall be 6 I_n	P
5.3.7	Preferred values of rated frequency	50Hz	P
5.3.8	Minimum value of the rated making and breaking capacity (Im)	Minimum value shall be 10 I_n or 500A	P
5.3.9	Minimum value of the rated residual making and breaking capacity (IΔm)	Minimum value shall be 10 I_n or 500A	P
5.3.10	Standard and preferred values of the rated conditional short-circuit current (Inc)		P
5.3.11	Standard values of the rated conditional residual short-circuit current (IΔc)		P
5.3.12	Standard values of break time and non-actuating time		P
	Standard ranges of ambient air temperature	-5 °C to +40 °C	P
	Standard value of rated impulse withstand voltage (Uimp)		P
5.3.13	Standard value of rated impulse withstand voltage		P
5.4	Coordination with short-circuit protective devices (SCPDs)		P
5.4.1	General		P
5.4.2	Rated conditional short-circuit current (Inc)		P
5.4.3	Rated conditional residual short-circuit current (IΔc)		P
6	MARKING AND OTHER PRODUCT INFORMATION		P
	Each RCCB shall be marked in a durable manner with all or, for small apparatus, part of the following data:	See marking label	--
	a) the manufacturer's name or trade mark;		P
	b) type designation, catalogue number or serial number;		P
	c) rated voltage with the symbol ~		P
	d) rated frequency, if the RCCB is designed for frequencies other than 50 Hz		P
	e) rated current;		P
	f) rated residual operating current in A or mA		P
	g) *Deleted*		--
	h) rated making and breaking capacity		P

EN 61008-1			
Clause	Requirement – Test	Result - Remark	Verdict
	j) the degree of protection (only if different from IP20);		N
	k) the position of use (symbol according to IEC 60051), if necessary;		P
	l) rated residual making and breaking capacity ($I_{\Delta m}$) , if different from rated making and breaking capacity		P
	m) the symbol (S in a square) for type S devices;		N
	n) symbol of the method of operation according to Table Z1 of 4.1 if the RCCB is functionally dependent on the line voltage;		N
	o) operating means of the test device, by the letter T;		N
	p) wiring diagram unless the correct mode of connection is evident;		P
	r) operating characteristic in presence of residual currents with d.c. components		N
	– RCCBs of type AC with the symbol		N
	– RCCBs of type A with the symbol		P
	The marking shall be on the RCCB itself or on a nameplate or nameplates attached to the RCCB and shall be located so that it is legible when the RCCB is installed.		P
	The manufacturer shall give the reference of one or more suitable SCPDs in his catalogues and in a sheet accompanying each RCCB.		P
	For RCCBs operated by means of two push-buttons, the push-button designed for the opening operation only shall be RED and/or be marked with the symbol “O”.		N
	Red shall not be used for any other push-button of the RCCB. If a push-button is used for closing the contact and is evidently identified as such, its depressed position is sufficient to indicate the closed position.		P
	Terminals exclusively intended for the connection of the neutral circuit shall be indicated by the letter N.		P
	Terminals intended for the protective conductor, if any, shall be indicated by the symbol (IEC 60417-5019 a)).		N
	The marking shall be indelible, easily legible and not be placed on screws, washers or other removable parts.		P
7	STANDARD CONDITIONS FOR OPERATION IN SERVICE AND FOR INSTALLATION		P
7.1	Standard conditions		P
	Ambient temperature	-5°C to +40°C	P
	Altitude	<2000m	P
	Relative humidity maximum value 40°C	50%	P

EN 61008-1			
Clause	Requirement – Test	Result - Remark	Verdict
7.2	Conditions of installation	RCCBs shall be installed in accordance with the manufacturer's instructions.	P
7.3	Pollution degree	Pollution degree 2	P
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION		P
8.1	Mechanical design		P
8.1.1	General		P
8.1.2	Mechanism		P
8.1.3	Clearances and creepage distances		P
	Group IIIa		--
	Rated voltage		--
	Working voltage		--
	between live parts which are separated when the main contacts are in the open position		P
	between live parts of different polarity		P
8.1.4	Screws, current-carrying parts and connections		P
8.1.4.1	Connections, whether electrical or mechanical, shall withstand the mechanical stresses occurring in normal use.		P
	Screws operated when mounting the RCCB during installation shall not be of the threadcutting type.		P
8.1.4.2	For screws in engagement with a thread of insulating material and which are operated when mounting the RCCB during installation, correct introduction of the screw into the screw hole or nut shall be ensured.		P
8.1.4.3	Current-carrying parts including parts intended for protective conductors, if any, shall be of		--
	– copper;		P
	– an alloy containing at least 58 % copper for parts worked cold, or at least 50 % copper for other parts;		N
	– other metal or suitably coated metal, no less resistant to corrosion than copper and having mechanical properties no less suitable.		N
8.1.5	Terminals for external conductors		P
8.2	Protection against electric shock		P
	RCCBs shall be so designed that, when they are mounted and wired as for normal use, live parts are not accessible.		P
	It shall be possible to replace plug-in RCCBs easily without touching live parts.		P

EN 61008-1			
Clause	Requirement – Test	Result - Remark	Verdict
8.3	Dielectric properties and isolating capability		P
	RCCBs shall have adequate dielectric properties and shall ensure isolation.		P
	Control circuits connected to the main circuit shall not be damaged by high d.c. voltage due to insulating measurements which are carried out after RCCBs are installed.		P
8.4	Temperature-rise		P
8.5	Operating 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		--
8.12	Requirements for RCCBs functionally dependent on line voltage		N
8.13	Behaviour of RCCBs in case of overcurrents in the main circuit		P
8.14	Behaviour of RCCBs in the case of current surges caused by impulse voltages		P
8.15	Behaviour of RCCBs in case of earth fault currents comprising a d.c. component		P
8.16	Reliability		P
8.17	Electromagnetic compatibility (EMC)		N
9	Tests		P
9.1	General		P
9.1.1	The characteristics of RCCBs are checked by means of type tests		P
9.1.2	For the purpose of verification of conformity with the standard, type tests are carried out in test sequences.		P
9.1.3	Routine tests to be carried out by the manufacturer on each device are given in Annex D.		P
9.2	Test conditions		P
9.3	Test of indelibility of marking		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

EN 61008-1			
Clause	Requirement – Test	Result - Remark	Verdict
9.7	Test of dielectric properties and isolating capability		P
9.7.1	Resistance to humidity		P
9.7.2	Insulation resistance of the main circuit		P
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
9.8	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 characteristics		P
9.9.1	Test circuit and test procedure		P
9.9.2	Tests for all RCCBs		P
9.9.3	Additional verification of correct operation at residual currents with d.c. components for type A RCCBs		P
9.9.4	Particular test conditions for RCCBs functionally dependent on line voltage		P
9.9.5	Particular test conditions for RCCBs functionally dependent on line voltage		N
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 RCCB after test		P
9.11	Verification of the behaviour of the RCCB under short-circuit conditions		P
9.11.1	List of the short-circuit tests		P
9.11.2	Short-circuit tests		P
9.11.2.1	General conditions for test		P
9.11.2.2	Verification of the rated making and breaking capacity (*I*m)		P

EN 61008-1			
Clause	Requirement – Test	Result - Remark	Verdict
9.11.2.3	Verification of the rated residual making and breaking capacity (*I*Δm) of RCCBs and their suitability for use in IT systems		P
9.11.2.4	Verification of the coordination between the RCCB and the SCPD		P
9.12	Verification of resistance to mechanical shock and impact		P
9.12.1	Mechanical shock		P
9.12.1.1	Test device		P
9.12.1.2	Test procedure		P
9.12.2	Mechanical impact		P
9.13	Test of resistance to heat		P
9.14	Test of resistance to abnormal heat and to fire		P
9.15	Verification of the trip-free mechanism		P
9.15.1	General test conditions		P
9.15.2	Test procedure		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 RCCBs functionally dependent on line voltage, classified under 4.1.2.1, in case of failure of the line voltage		N
9.17.1	Determination of the limiting value of the line voltage (*U*x)		N
9.17.2	Verification of the in case of failure of the line voltage		N
9.17.3	Verification of the correct operation, in presence of a residual current, for RCCBs opening with delay in case of failure of the line voltage		N
9.18	Verification of limiting values of the non-operating current under overcurrent conditions		P
9.18.1	Verification of the limiting value of overcurrent in case of a load through an RCCB with two poles		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		P
9.19	Verification of behaviour of RCCBs in case of current surges caused by impulse voltages		P
9.19.1	Current surge test for all RCCBs (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 RCCBs		N
9.19.2.3	Test results for RCCBs of the general type		P
9.20	Verification of resistance of the insulation against an impulse voltage		P

EN 61008-1			
Clause	Requirement – Test	Result - Remark	Verdict
9.21.1	Type A residual current devices		P
9.21.1.1	Verification of correct operation in case of a continuous rise of the residual pulsating direct current		P
9.21.1.2	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents		P
9.21.1.3	Verification at the reference temperature of the correct operation with load		P
9.21.1.4	Verification of the correct operation in case of residual pulsating direct currents superimposed by smooth direct current of 0,006 A		N
9.22	Verification of reliability		P
9.22.1	Climatic test		P
9.22.2	Test with temperature of 40℃		P
9.23	Verification of ageing of electronic components		P
9.24	Electromagnetic compatibility (EMC)		N
9.25	Test of resistance to rusting		P

EN 61008-1			
Clause	Requirement – Test	Result - Remark	Verdict

	TABLE: Heating test		P
	Test Voltage (V)..... :	400V	—
	Ambient (C)..... :	24.1°C	—

Thermocouple locations:	**Max. temperature rise measured, ∆ T (K)**	**Max. temperature rise limit, ∆ T (K)**
Terminal	28.9	65
Enclosure	4.7	60
Switch	8.5	60
Supplementary information:		

	TABLE: Dielectric strength		P
Test voltage applied between:		**Test potential applied (V)**	**Breakdown / flashover (Yes/No)**
Between the phase and the path connected together		1600VAC	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

EN 61008-1			
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 - 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

Automatic Reclosing Devices
Model: MT53RA+ML50H

Rated Voltage Ue: 400VAC,50Hz
Rated Current: 63A
Poles: 4P

SHANGHAI MATIS ELECTRIC CO.,LTD.

CE

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: **Automatic Reclosing Devices**
Models: **MT53RA+ML50H, MT53RAN+ML60-B, MT53RA+MRO50, MT53RA+MM50H, MT53RA+MM60H, MT53RA, MT51RA, MT51RA+ML50H, MT51RAN+ML60-B, MT51RA+MRO50, MT51RA+MM50H, MT51RA+MM60H**

Having been examined to the requirements of the following standards:

EN 63024: 2018，EN 61008-1:2012+A11:2015+A1:2014+A12:2017+A2:2014

CE

Representative: _____
(signature & stamp)

Place/Date: 2022.07.18

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

CERTIFICATE
Nº VTÚPV – 105/ 2022 / ZAHR

Applicant: **Shanghai Matis Electric Co., Ltd.**
上海麦豆电气有限公司
Room 320, No. 83 Huanhu West Third Road, Pudong, Shanghai, China

Product: **Automatic Reclosing Devices**

Tested Model: MT53RS+ML50H

Derived Models: MT53R, MT53RW, MT53RC, MT53RS, MT53RA, MT53RAsx, MT53RNAsx, MT53RNAix, MT53RNAsx+ML60-B, MT53RS+MM50H, MT53RAsx+MM60H, MT53RNAsx+MM20H

Manufacturer: **Shanghai Matis Electric Co., Ltd.**
Room 320, No. 83 Huanhu West Third Road, Pudong, Shanghai, China

Rating and principal characteristics:
Rated Voltage Ue: 400 V AC;
Rated Current: 63 A;
Frequency: 50 Hz;
Poles: 4 P

Test results are described in the Test Reports No.:
B-S2209A3322 (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 61008-1:2012+A11:2015+A1:2014+A12:2017+A2:2014

This certificate is valid until: **17. 10. 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 17. 10. 2022

Tel./Fax: +420 910 105 580
e-mail: milan.bezdek@vtusp.cz
http://www.vtusp.cz

VTÚPV odštěpný závod VOJENSKÝ TECHNICKÝ ÚSTAV, s.p.

Milan Bezděk
Certification Head

APPLICATION FOR LOW VOLTAGE DIRECTIVE

On Behalf of

SHANGHAI MATIS ELECTRIC CO.,LTD.

Automatic Reclosing Devices

Model : **MT53R, MT53RW, MT53RC, MT53RS, MT53RA, MT53RAsx, MT53RNAsx, MT53RNAix, MT53RNAsx+ML60-B, MT53RS+MM50H, MT53RAsx+MM60H, MT53RNAsx+MM20H**

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	**:**	**2022-09-20 to 2022-09-29**
Date of Report	**:**	**2022-09-29**
Report Number	**:**	**B-S2209A3322**

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 61008
Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) — 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.....:	CA4366
Report Query.....:	CERTIFICATEQUERY
Standard ..... :	EN 63024:2018
	EN 61008-1:2012+A11:2015+A1:2014+A12:2017+A2:2014
Test Result ..... :	Compliance with
	EN 63024:2018
	EN 61008-1:2012+A11:2015+A1:2014+A12:2017+A2:2014
Procedure deviation ..... :	N.A.
Non-standard test method ..... :	N.A.
Type of test object ..... :	Automatic Reclosing Devices
Trademark ..... :	/
Model/type reference ..... :	MT53RS+ML50H
Rating ..... :	Rated Voltage Ue: 400VAC Rated Current: 63A Poles: 4P
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 — 2022-09-29
Signature / Austin.Zhong — Date

Checked by : Anna Deng — 2022-09-29
Signature / Anna.Deng — Date

Approved by : — 2022-09-29
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.		P
4.2.3	ARD for RCBOs.		N
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.		P
4.5.2	ARD without FE connection.		N
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.	400V	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.	50Hz	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

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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

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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

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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

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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, 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

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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

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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

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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		N
4.1.1	RCCB functionally independent of line voltage		N
4.1.2	RCCB functionally dependent on line voltage		N
4.2	According to the type of installation		P
4.3	According to the number of poles and current paths		P
	– two-pole RCCB;		N
	– three-pole RCCB;		N
	– four-pole RCCB.		P
4.4	According to the possibility of adjusting the residual operating current		-
4.5	According to resistance to unwanted tripping due to voltage surges		-
	– RCCBs with normal resistance to unwanted tripping (general type as in table 1);		P
	– RCCBs with increased resistance to unwanted tripping (S type as in table 1).		N
4.6	According to behaviour in presence of d.c. components		P
	– RCCBs of type AC;		N
	– RCCBs of type A.		P
4.7	According to time-delay (in presence of a residual current)		P
	– RCCB without time-delay: type for general use;		P
	– RCCB with time-delay: type S for selectivity.		N
4.8	According to the protection against external influences		P
	– enclosed-type RCCB (not requiring an appropriate enclosure);		P
	– unenclosed-type RCCB (for use with an appropriate enclosure).		N
4.9	According to the method of mounting		P
	– surface-type RCCB;		P
	– flush-type RCCB;		N
	– panel board type RCCB, also referred to as distribution board type.		N
4.10	According to the method of connection		P
	– RCCBs the connections of which are not associated with the mechanical mounting;		P

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Clause	Requirement – Test	Result - Remark	Verdict
	– RCCBs the connections of which are associated with the mechanical mounting		N
4.11	According to the type of terminals		P
5	CHARACTERISTICS OF RCCBs		P
5.1	Summary of characteristics		P
	The characteristics of a RCCB shall be stated in the following terms:		P
	– number of poles and current paths		P
	– rated current I_n		P
	– rated residual operating current $I_{\Delta n}$		P
	– rated residual non-operating current		P
	– rated voltage U_n		P
	– rated frequency		P
	– rated making and breaking capacity I_m		P
	– rated residual making and breaking capacity $I_{\Delta m}$		P
	– time-delay, if applicable		N
	– operating characteristics in case of residual currents with d.c. components		P
	– insulation coordination including clearances and creepage distances		P
	– degree of protection		P
	– ranges of ambient air temperature		P
	– rated conditional short-circuit current I_{nc}		P
	– rated conditional residual short-circuit current $I_{\Delta c}$		P
	– behaviour of the RCCB in case of failure of line voltage (for RCCBs functionally dependent on line voltage)		P
5.2	Rated quantities and other characteristics		P
5.2.1	Rated voltage		P
5.2.1.1	Rated operational voltage (Ue)		P
	The rated operational voltage (hereafter referred to as "rated voltage") of a RCCB is the value of voltage, assigned by the manufacturer, to which its performance is referred.		P
5.2.1.2	Rated insulation voltage (Ui)		P

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Clause	Requirement – Test	Result - Remark	Verdict
	The rated insulation voltage of a RCCB is the value of voltage, assigned by the manufacturer, to which dielectric test voltages and creepage distances are referred.		P
	Unless otherwise stated, the rated insulation voltage is the value of the maximum rated voltage of the RCCB. In no case shall the maximum rated voltage exceed the rated insulation voltage.		P
5.2.2	Rated current (In)		P
	The value of current, assigned to the RCCB by the manufacturer, which the RCCB can carry in uninterrupted duty.		P
5.2.3	Rated residual operating current (IΔn)		P
	The value of residual operating current (see 3.2.4), assigned to the RCCB by the manufacturer, at which the RCCB shall operate under specified conditions.		P
5.2.4	Rated residual non-operating current (IΔno)		
	The value of residual non-operating current (see 3.2.5), assigned to the RCCB by the manufacturer, at which the RCCB does not operate under specified conditions.		P
5.2.5	Rated frequency		P
	The rated frequency of a RCCB is the power frequency for which the RCCB is designed and to which the values of the other characteristics correspond.		P
5.2.6	Rated making and breaking capacity (Im)		P
	The r.m.s. value of the a.c. component of prospective current (see 3.4.4), assigned by the manufacturer, which a RCCB can make, carry and break under specified conditions.		P
5.2.7	Rated residual making and breaking capacity (IΔm)		P
	The r.m.s. value of the a.c. component of residual prospective current (3.2.3 and 3.4.4), assigned by the manufacturer, which a RCCB can make, carry and break under specified conditions.		P
5.2.8	RCCB type S		N
5.2.9	Operating characteristics in case of residual currents with d.c. components		P
5.2.9.1	RCCB type AC		N
	A RCCB for which tripping is ensured for residual sinusoidal alternating currents, whether suddenly applied or slowly rising.		N
5.2.9.2	RCCB Type A		P
	A RCCB for which tripping is ensured for residual sinusoidal alternating currents and residual pulsating direct currents, whether suddenly applied or slowly rising.		P
5.2.10	Insulation coordination including clearances and creepage distances		--
5.3	Standard and preferred values		P
5.3.1	Standard values of rated voltage (Un)		P
5.3.2	Preferred values of rated current (In)		P

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Clause	Requirement – Test	Result - Remark	Verdict
5.3.3	Standard values of rated residual operating current (IΔn)		P
5.3.4	Standard value of residual non-operating current (IΔno)		P
5.3.5	Standard minimum value of non-operating overcurrent in case of a multiphase balanced load through a multipole RCCB		N
5.3.6	Standard minimum value of the non-operating overcurrent in case of a single-phase load through a three-pole or four-pole RCCB	Minimum value shall be 6 I_n	P
5.3.7	Preferred values of rated frequency	50Hz	P
5.3.8	Minimum value of the rated making and breaking capacity (Im)	Minimum value shall be 10 I_n or 500A	P
5.3.9	Minimum value of the rated residual making and breaking capacity (IΔm)	Minimum value shall be 10 I_n or 500A	P
5.3.10	Standard and preferred values of the rated conditional short-circuit current (Inc)		P
5.3.11	Standard values of the rated conditional residual short-circuit current (IΔc)		P
5.3.12	Standard values of break time and non-actuating time		P
	Standard ranges of ambient air temperature	-5 °C to +40 °C	P
	Standard value of rated impulse withstand voltage (Uimp)		P
5.3.13	Standard value of rated impulse withstand voltage		P
5.4	Coordination with short-circuit protective devices (SCPDs)		P
5.4.1	General		P
5.4.2	Rated conditional short-circuit current (Inc)		P
5.4.3	Rated conditional residual short-circuit current (IΔc)		P
6	MARKING AND OTHER PRODUCT INFORMATION		P
	Each RCCB shall be marked in a durable manner with all or, for small apparatus, part of the following data:	See marking label	--
	a) the manufacturer's name or trade mark;		P
	b) type designation, catalogue number or serial number;		P
	c) rated voltage with the symbol ~		P
	d) rated frequency, if the RCCB is designed for frequencies other than 50 Hz		P
	e) rated current;		P
	f) rated residual operating current in A or mA		P
	g) *Deleted*		--
	h) rated making and breaking capacity		P

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Clause	Requirement – Test	Result - Remark	Verdict
	j) the degree of protection (only if different from IP20);		N
	k) the position of use (symbol according to IEC 60051), if necessary;		P
	l) rated residual making and breaking capacity ($I_{\Delta m}$) , if different from rated making and breaking capacity		P
	m) the symbol (S in a square) for type S devices;		N
	n) symbol of the method of operation according to Table Z1 of 4.1 if the RCCB is functionally dependent on the line voltage;		N
	o) operating means of the test device, by the letter T;		N
	p) wiring diagram unless the correct mode of connection is evident;		P
	r) operating characteristic in presence of residual currents with d.c. components		N
	– RCCBs of type AC with the symbol		N
	– RCCBs of type A with the symbol		P
	The marking shall be on the RCCB itself or on a nameplate or nameplates attached to the RCCB and shall be located so that it is legible when the RCCB is installed.		P
	The manufacturer shall give the reference of one or more suitable SCPDs in his catalogues and in a sheet accompanying each RCCB.		P
	For RCCBs operated by means of two push-buttons, the push-button designed for the opening operation only shall be RED and/or be marked with the symbol “O”.		N
	Red shall not be used for any other push-button of the RCCB. If a push-button is used for closing the contact and is evidently identified as such, its depressed position is sufficient to indicate the closed position.		P
	Terminals exclusively intended for the connection of the neutral circuit shall be indicated by the letter N.		P
	Terminals intended for the protective conductor, if any, shall be indicated by the symbol (IEC 60417-5019 a)).		N
	The marking shall be indelible, easily legible and not be placed on screws, washers or other removable parts.		P
7	STANDARD CONDITIONS FOR OPERATION IN SERVICE AND FOR INSTALLATION		P
7.1	Standard conditions		P
	Ambient temperature	-5°C to +40°C	P
	Altitude	<2000m	P
	Relative humidity maximum value 40°C	50%	P

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Clause	Requirement – Test	Result - Remark	Verdict
7.2	Conditions of installation	RCCBs shall be installed in accordance with the manufacturer's instructions.	P
7.3	Pollution degree	Pollution degree 2	P
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION		P
8.1	Mechanical design		P
8.1.1	General		P
8.1.2	Mechanism		P
8.1.3	Clearances and creepage distances		P
	Group IIIa		--
	Rated voltage		--
	Working voltage		--
	between live parts which are separated when the main contacts are in the open position		P
	between live parts of different polarity		P
8.1.4	Screws, current-carrying parts and connections		P
8.1.4.1	Connections, whether electrical or mechanical, shall withstand the mechanical stresses occurring in normal use.		P
	Screws operated when mounting the RCCB during installation shall not be of the threadcutting type.		P
8.1.4.2	For screws in engagement with a thread of insulating material and which are operated when mounting the RCCB during installation, correct introduction of the screw into the screw hole or nut shall be ensured.		P
8.1.4.3	Current-carrying parts including parts intended for protective conductors, if any, shall be of		--
	– copper;		P
	– an alloy containing at least 58 % copper for parts worked cold, or at least 50 % copper for other parts;		N
	– other metal or suitably coated metal, no less resistant to corrosion than copper and having mechanical properties no less suitable.		N
8.1.5	Terminals for external conductors		P
8.2	Protection against electric shock		P
	RCCBs shall be so designed that, when they are mounted and wired as for normal use, live parts are not accessible.		P
	It shall be possible to replace plug-in RCCBs easily without touching live parts.		P

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Clause	Requirement – Test	Result - Remark	Verdict
8.3	Dielectric properties and isolating capability		P
	RCCBs shall have adequate dielectric properties and shall ensure isolation.		P
	Control circuits connected to the main circuit shall not be damaged by high d.c. voltage due to insulating measurements which are carried out after RCCBs are installed.		P
8.4	Temperature-rise		P
8.5	Operating 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		--
8.12	Requirements for RCCBs functionally dependent on line voltage		N
8.13	Behaviour of RCCBs in case of overcurrents in the main circuit		P
8.14	Behaviour of RCCBs in the case of current surges caused by impulse voltages		P
8.15	Behaviour of RCCBs in case of earth fault currents comprising a d.c. component		P
8.16	Reliability		P
8.17	Electromagnetic compatibility (EMC)		N
9	Tests		P
9.1	General		P
9.1.1	The characteristics of RCCBs are checked by means of type tests		P
9.1.2	For the purpose of verification of conformity with the standard, type tests are carried out in test sequences.		P
9.1.3	Routine tests to be carried out by the manufacturer on each device are given in Annex D.		P
9.2	Test conditions		P
9.3	Test of indelibility of marking		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

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Clause	Requirement – Test	Result - Remark	Verdict
9.7	Test of dielectric properties and isolating capability		P
9.7.1	Resistance to humidity		P
9.7.2	Insulation resistance of the main circuit		P
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
9.8	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 characteristics		P
9.9.1	Test circuit and test procedure		P
9.9.2	Tests for all RCCBs		P
9.9.3	Additional verification of correct operation at residual currents with d.c. components for type A RCCBs		P
9.9.4	Particular test conditions for RCCBs functionally dependent on line voltage		P
9.9.5	Particular test conditions for RCCBs functionally dependent on line voltage		N
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 RCCB after test		P
9.11	Verification of the behaviour of the RCCB under short-circuit conditions		P
9.11.1	List of the short-circuit tests		P
9.11.2	Short-circuit tests		P
9.11.2.1	General conditions for test		P
9.11.2.2	Verification of the rated making and breaking capacity (*I*m)		P

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Clause	Requirement – Test	Result - Remark	Verdict
9.11.2.3	Verification of the rated residual making and breaking capacity ($I\Delta m$) of RCCBs and their suitability for use in IT systems		P
9.11.2.4	Verification of the coordination between the RCCB and the SCPD		P
9.12	Verification of resistance to mechanical shock and impact		P
9.12.1	Mechanical shock		P
9.12.1.1	Test device		P
9.12.1.2	Test procedure		P
9.12.2	Mechanical impact		P
9.13	Test of resistance to heat		P
9.14	Test of resistance to abnormal heat and to fire		P
9.15	Verification of the trip-free mechanism		P
9.15.1	General test conditions		P
9.15.2	Test procedure		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 RCCBs functionally dependent on line voltage, classified under 4.1.2.1, in case of failure of the line voltage		N
9.17.1	Determination of the limiting value of the line voltage (Ux)		N
9.17.2	Verification of the in case of failure of the line voltage		N
9.17.3	Verification of the correct operation, in presence of a residual current, for RCCBs opening with delay in case of failure of the line voltage		N
9.18	Verification of limiting values of the non-operating current under overcurrent conditions		P
9.18.1	Verification of the limiting value of overcurrent in case of a load through an RCCB with two poles		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		P
9.19	Verification of behaviour of RCCBs in case of current surges caused by impulse voltages		P
9.19.1	Current surge test for all RCCBs (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 RCCBs		N
9.19.2.3	Test results for RCCBs of the general type		P
9.20	Verification of resistance of the insulation against an impulse voltage		P

EN 61008-1			
Clause	Requirement – Test	Result - Remark	Verdict
9.21.1	Type A residual current devices		P
9.21.1.1	Verification of correct operation in case of a continuous rise of the residual pulsating direct current		P
9.21.1.2	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents		P
9.21.1.3	Verification at the reference temperature of the correct operation with load		P
9.21.1.4	Verification of the correct operation in case of residual pulsating direct currents superimposed by smooth direct current of 0,006 A		N
9.22	Verification of reliability		P
9.22.1	Climatic test		P
9.22.2	Test with temperature of 40℃		P
9.23	Verification of ageing of electronic components		P
9.24	Electromagnetic compatibility (EMC)		N
9.25	Test of resistance to rusting		P

EN 61008-1			
Clause	Requirement – Test	Result - Remark	Verdict

	TABLE: Heating test		P
	Test Voltage (V)..... :	400V	—
	Ambient (C)..... :	24.3°C	—

Thermocouple locations:	**Max. temperature rise measured, ∆ T (K)**	**Max. temperature rise limit, ∆ T (K)**
Terminal	27.5	65
Enclosure	4.5	60
Switch	7.9	60
Supplementary information:		

	TABLE: Dielectric strength	P
Test voltage applied between:	**Test potential applied (V)**	**Breakdown / flashover (Yes/No)**
Between the phase and the path connected together	1600VAC	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

EN 61008-1			
Clause	Requirement – Test	Result - Remark	Verdict

Supplementary information:

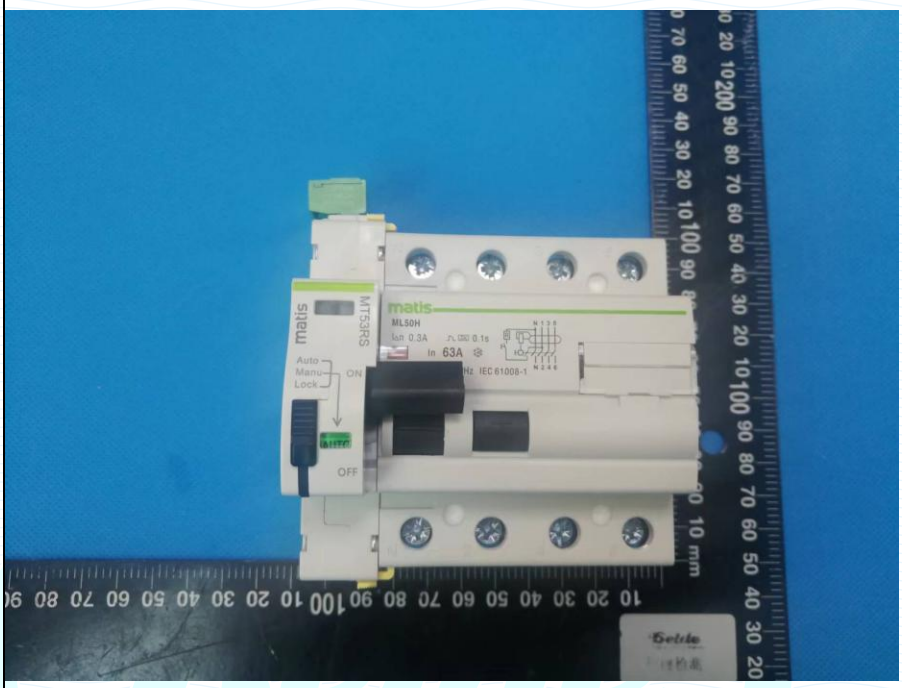
- 550 °C GWT not relevant (or applicable) to parts of material classified at least HB40 or if relevant HBF
- The GWIT pre-selection option, the 850 °C GWFI pre-selection option, and the 850 °C GWT are not relevant (or applicable) for attended appliances

	TABLE - 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

Automatic Reclosing Devices
Model: MT53RS+ML50H

Rated Voltage Ue: 400VAC,50Hz
Rated Current: 63A
Poles: 4P

SHANGHAI MATIS ELECTRIC CO.,LTD.

CE

EU Declaration of Conformity

We, **Shanghai Matis Electric Co., Ltd.**

Room 320,No.83Huanhu West Third Road, Pudong, Shanghai, China

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

2014/35/EU Low Voltage Directive

Product: **Automatic Reclosing Devices**
Models: **MT53RS+ML50H, MT53R, MT53RW, MT53RC, MT53RS, MT53RA, MT53RAsx, MT53RNAsx, MT53RNAlx, MT53RNAsx+ML60-B, MT53RS+MM50H, MT53RAsx+MM60H, MT53RNAsx+MM20H**

Having been examined to the requirements of the following standards:

EN 63024: 2018，EN 61008-1:2012+A11:2015+A1:2014+A12:2017+A2:2014

CE

Representative: _____
(signature & stamp)

Place/Date: 2022.09.23

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

CERTIFICATE
Nº VTÚPV – 046 / 2025 / ZAHR

Applicant: **Shanghai Matis Electric Co., Ltd.**
上海麦豆电气有限公司
Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306

Product: **Auto Reclosing Device (ARD)**

Tested Model: MT53AS
Derived Models: MT53AI, MT53AW, MT53RA, MT53RS, MT53RI, MT53RV, MT53PV, MT53AR, MT53RW, MT51AI, MT51AS, MT51RA, MT51SD

Manufacturer: **Shanghai Matis Electric Co., Ltd.**
Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306

Rating and principal characteristics: Rated Voltage: 230 V AC;
Current: In 63 A;
Frequency: 50/60 Hz

Test results are described in the Test Reports No.:
STE04232535S (tests made by STE Testing Laboratory Co., Ltd.)

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

- EN 63024: 2018

This certificate is valid until: **04. 06. 2030**

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

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

Vyškov 04. 06. 2025

Tel./Fax: +420 910 105 580
e-mail: milan.bezdek@vtusp.cz
http://www.vtusp.cz

Milan Bezděk
Certification Head

CE

TEST REPORT

Report No.:	**STE04232535S**
Product:	Auto Reclosing Device (ARD)
Model No.:	MT53AS, (others refer to page 2)
Prepared for:	**Shanghai Matis Electric Co., Ltd**
Address:	Room 318-320, No. 83, West Huanghu Road, Pudong, Shanghai, China 201306
Prepared by:	**Shenzhen STE Testing Laboratory Co., Ltd.**
Lab Location:	3/F, Building 9, Hongde Factory, No. 63 Yuchang Road, Niuhu Community, Guanlan Street, Longhua District, Shenzhen, China
Tel. :	+86-755-2373 0717
Fax. :	+86-755-2373 0717
Website:	http://www.stecert.com

TEST REPORT
EN 63024
Requirements for automatic reclosing devices (ARDs) for circuit-breakers, RCBOs and RCCBs for household and similar uses

Report Number.....:	STE04232535S
Tested by (name + signature).....:	Plum Xiao / Test engineer
Approved by (name + signature).....:	Allen Huang / Project manager
Date of issue.....:	May 23, 2025
Total number of pages.....:	40
Testing Laboratory .....:	**Shenzhen STE Testing Laboratory Co., Ltd.**
Address .....:	3/F, Building 9, Hongde Factory, No. 63 Yuchang Road, Niuhu Community, Guanlan Street, Longhua District, Shenzhen, China
Applicant's name.....:	**Shanghai Matis Electric Co., Ltd**
Address.....:	Room 318-320, No. 83, West Huanghu Road, Pudong, Shanghai, China 201306
Manufacturer's name.....:	**Shanghai Matis Electric Co., Ltd**
Address.....:	Room 318-320, No. 83, West Huanghu Road, Pudong, Shanghai, China 201306
Test specification:	
Standard.....:	EN 63024: 2018
Test procedure.....:	CE-LVD
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC63024A
Test Report Form(s) Originator.....:	STE
Master TRF.....:	Dated 2023-05

Test item description.....:	Auto Reclosing Device (ARD)
Model/Type reference.....:	**MT53AS,** MT53AI, MT53AW, MT53RA, MT53RS, MT53RI, MT53RV, MT53PV, MT53AR, MT53RW, MT51AI, MT51AS, MT51RA, MT51SD
Trade Mark.....:	Matis/ Matismart
Ratings.....:	230Vac, 50/60Hz, In: 63A Associated Device: RCCB: ML50H, ML60, ML60-B MCB: MB60, MM50H RCBO: MR50, MRO50

Summary of testing:

Testing location:

Shenzhen STE Testing Laboratory Co., Ltd.

3/F, Building 9, Hongde Factory, No. 63 Yuchang Road, Niuhu Community, Guanlan Street, Longhua District, Shenzhen, China

Tests performed (name of test and test clause):

The submitted samples were found to comply with the requirements of:

- EN 63024: 2018

Copy of marking plate:

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

Matis

Auto Reclosing Device (ARD)

Model: MT53AS

Rating: 230Vac, 50/60Hz, In: 63A

Associated Device:

RCCB: ML50H, ML60, ML60-B

MCB: MB60, MM50H

RCBO: MR50, MRO50

According to EN 63024

Shanghai Matis Electric Co., Ltd

Room 318-320, No. 83, West Huanghu Road,

Pudong, Shanghai, China 201306

Importer: xxxx

Address: xxxx

Made in China

Remarks:

1. Name and address of the Importer and Manufacturer must be affixed on the product when the product placed on the EU market.
2. Minimum height of CE mark is 5mm, minimum height of WEEE mark is 7mm.

Test item particulars	:	Terminal Blocks
According to the method of construction	:	ARD assembled in factory by the manufacturer.
According to the associated MPD	:	ARD for circuit-breakers
According to the type of assessment means	:	ARD with means of assessment of the prospective residual current
Degree of Protection	:	IPX0

POSSIBLE TEST CASE VERDICTS:

- test case does not apply to the test object	:	N or N/A (Not Applicable)
- test object does meet the requirement	:	P (Pass)
- test object does not meet the requirement	:	F (Fail)

TESTING:

Date of receipt of test item	:	April 23, 2025
Date (s) of performance of tests	:	April 23, 2025 to May 23, 2025

General remarks:

The test results presented in this report relate only to the object tested.

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

Clause numbers between brackets refer to clauses in IEC 61347-1.

"(see Enclosure #)" refers to additional information appended to the report.

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

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

General product information

1. The evaluation of electric shock depended on the end product.

2, All models are same except the appearance.

3, The laboratory tests and evaluates the main model.
Adding models based on the guarantee letter provided by the Applicant.
STE takes no responsibility for any mistakes and the problems of product consistency caused by inaccurate and/or invalid information submitted by the Applicant.

EN 63024			
Clause	Requirement + Test	Result - Remark	Verdict
4	**Classification**		**--**
4.1	**According to the method of construction**		--
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**		--
4.2.1	ARD for circuit-breakers.		P
4.2.2	ARD for RCCBs.		P
4.2.3	ARD for RCBOs		P
4.3	**According to the type of assessment means**		--
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:		P
	a) operation blocked after assessment of an excessive residual current in the installation (see Annex B);		P
	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:		P
	a) operation blocked after assessment of an overcurrent in the installation (see Annex B);		P
	b) remains in tripped condition after the assessment of an overcurrent in the installation (see Annex C).		P
4.4	**According to the safety means during the assessment**		--
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**		--
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**		--

EN 63024			
Clause	Requirement + Test	Result - Remark	Verdict
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
4.7	**According to mechanical interlock between MPD operating means and ARD enabling/ disabling system**		--
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**		**--**
5.1	**Summary of characteristics**		--
	The characteristics of the MPD standards and the following apply:		--
	– protection against external influences;		P
	– method of mounting;		P
	– method of connection;		P
	– value of rated operational voltage;		P
	– value of rated frequency;		P
	– values of operating and non-operating rated resistance to earth, if applicable;		P
	– values of operating and non-operating rated resistance between live parts, if applicable;		P
	– range of ambient air temperature.		P
5.2	**Rated quantities**		P
5.2.1	**Rated voltage**		P
	Preferred values o f rated voltage are: 120 V, 230 V, 400 V.	230V	P
5.2.2	**Rated operational voltage (Ue)**		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.	230V	P

EN 63024			
Clause	Requirement + Test	Result - Remark	Verdict
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.		P
	Preferred values of rated frequency are: 50 Hz, 60 Hz and 50/60 Hz.	50/60 Hz	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.		N
	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.		P
	The R_d value is stated by the manufacturer under the test conditions in this product document.		P
	The R_d shall be rounded up to the two significant digits.		P
	The minimum R_d value shall be not less than the values specified in Table 1:	8000Ω	P
5.2.6	**Rated non-operating resistance between live parts (R_{cc0})**		N
	The R cc0 is the rated value of resistance between live parts below which the reclosing of the MPD is not permitted.		N
	The R cc0 value is stated by the manufacturer under the test conditions in this product document.		N
	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.		N
	The R_{cc} value is stated by the manufacturer under the test conditions in this product document.		N

EN 63024			
Clause	Requirement + Test	Result - Remark	Verdict
	The R_{cc} shall be rounded up to the last two more significant digits.		N
6	**Marking and other product information**		--
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;		P
	b) type designation, catalogue number or serial number;		P
	c) wiring diagram, except if the connection mode is self-evident;		P
	d) rated voltage(s) with the symbol (IEC 60417-5032);		P
	e) ARD or according to the IEC reference standard;		P
	f) protection degree (only if different from IP20).		N
	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;		P
	h) the rated non-operating resistance between live parts and earth Rd0 , if applicable;		N
	i) the rated operating resistance between live parts and earth Rd , if applicable;		P
	j) the rated non-operating resistance between live parts R cc0 , if applicable;		N
	k) the rated operating resistance between live parts R cc , if applicable;		N
	l) assembling method if applicable;		P
	m) earthing system in which the devices may be used;		P
	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.		P

EN 63024			
Clause	Requirement + Test	Result - Remark	Verdict
	o) instructions about the reset of the ARD and the need for checking the MPD and the installation in case of blocked condition.		P
	If a degree of protection higher than IP20 is marked on the device, it shall comply with it, whichever the method of installation.		N
	Information on how to reach the isolation of the installation shall be given in the instruction sheet accompanying the product.		P
	The information under a) and b) shall be visible when the ARD is installed		P
	The information under l) is only applicable to products classified under 4.1.2.		N
	The information under h), i), j) and k) are only applicable to products classified under 4.3.2.		P
	For devices classified according to 4.7.2, the information under n) shall be on the product or on a label to be installed on the board close to the ARD and in a position visible after the ARD has been installed.		P
	ARDs, classified according to 4.3.1, 4.3.2.1a) or 4.3.2.2 a) with a reclosing time, measured according to 9.3, and higher than 2 s, shall be provided with indicating means showing the tripped condition of the MPD.		P
	ARDs shall be provided with indicating means showing the blocked condition.		P
	ARDs, classified according to 4.3.2.1b) or 4.3.2.2 b) shall be provided with indicating means showing the tripped condition that is maintained after the fault detection in the installation.		N
	The blocked condition and the tripped condition shall be clearly explained by the manufacturer and instructions shall be given about how to reset the ARD and the need for checking the MPD and the installation in case of blocked condition.		P
	Marking shall be indelible, easily legible and not be placed on screws, washers or other removable parts.		P
	Compliance is checked by inspection and by the test of 9.4.		P
	If auxiliary contacts are present, it is necessary to provide the following indication:		N

EN 63024			
Clause	Requirement + Test	Result - Remark	Verdict
	– rated operational current, rated operational voltage and utilisation category if the reference standard is IEC 62019; or		N
	– rated current and rated voltage, if the reference standard is IEC 60947-5-1.		N
	For additional contacts intended for communication purpose, the reference according to IEC 60950-1 shall be used.		N
	For the ARD classified according to 4.5.1, the FE-wire or terminal shall be identified by the marking “FE”. The following colours are not permitted for the FE-wire: green, yellow, blue and green-and-yellow.		N
	The manufacturer's instruction shall state that the FE should be connected directly to the PE, and looping in is not allowed.		N
	The manufacturer shall provide the ARD power consumption data.		P
6.2	**Instructions for assembly and operation**		P
	The manufacturer shall provide adequate instructions with the ARD.		P
	If the ARD is classified according to 4.1.2, these instructions shall cover at least the following:		N
	– 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;		N
	– method of assembly;		N
	– need for checking operation after assembly to verify the mechanical operation;		N
	– ambient air temperature of the combination (MPD and ARD).		N
	Compliance is checked by inspection.		N
7	**Standard conditions for operation in service**		P
7.1	**General**		P
	The ARD complying with this document shall be capable of operating under the standard conditions given by the relevant MPD standard(s).		P

EN 63024			
Clause	Requirement + Test	Result - Remark	Verdict
	For the ARD and MPD, the relevant clauses of the MPD standards apply:		--
	a) IEC 60898-1:2015, Clause 7 and IEC 60898-2:2016, Clause 7, for ARDs classified according to 4.2.1(circuit- breakers);		P
	b) IEC 61008-1:2010, Clause 7, for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1:2010, 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.		P
	The ARD classified according to 4.1.2 shall only be installed together with the circuit-breakers, RCBOs and RCCBs declared by the manufacturer.	Associated Device: RCCB: ML50H, ML60, ML60-B MCB: MB60, MM50H RCBO: MR50, MRO50	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).	PD 2	P
8	**Requirements for construction and operation**		P
8.1	**Mechanical design**		P
8.1.1	**General**		P
	The ARD shall be so designed and constructed that, in normal use when it is assembled with the MPD, their individual and combined performance is reliable and without danger to the user or surrounding.		P
	The ARD shall not impair safety characteristics and functions of the associated MPD.		P
	In case of an ARD classified according to 4.1.2, this device and the MPD shall be of the same manufacturer.		P
	Compliance is checked by carrying out all the relevant tests specified.		P

EN 63024			
Clause	Requirement + Test	Result - Remark	Verdict
	The ARD may be provided with a communication interface. Test requirements are under consideration.		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.		P
	Compliance is checked by inspection and by the test of 9.5.1.		P
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.		P
	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.		N
	It is permitted that the enabling system of the ARD may also cause the closing of the MPD during the same manual operation.		N
8.1.2.4	The ARD shall be provided with an enabling and disabling system.		P
	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.		P
	The enabling and disabling system shall be able to correctly operate for a suitable number of operating cycles.		P
8.1.2.5	Manual opening of the MPD shall be possible at every time.		P
	This condition is considered as fulfilled if the manual opening is not possible without the disabling of the ARD.		P
	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.		N
	Compliance is checked by inspection and by the test of 9.5.2.	See clause 9.5.2	P

EN 63024			
Clause	Requirement + Test	Result - Remark	Verdict
	For devices according to 4.7.2, the enabling/disabling of the ARD shall be obtained by a separate enabling/disabling means. The enabled condition shall be clearly indicated (e.g. light indicator, mechanical indicator).		P
8.1.2.6	When the ARD is disabled:		P
	a) the MPD shall operate independently from the ARD, in particular it shall be possible to activate the test device, if any;		P
	b) it shall be possible to see the symbol (IEC 60417-5008) when the contacts of the MPD are in isolating condition.		P
	Compliance to the point a) is checked by manual test.		P
	Compliance to the point b) is checked by visual inspection and the dielectric tests according to 9.11.	See clause 9.11	P
8.1.2.7	When the ARD is enabled:		--
	For devices according to 4.7.1:		N
	a) it shall not be possible to see on the MPD the symbol (IEC 60417-5008) which shows the position of the contacts;		N
	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;		N
	c) the marking stated in the reference standard of the MPD shall be visible with the exception of the symbol		N
	Compliance to points a) and c) is checked by visual inspection.		N
	For devices according to 4.7.2, the enabled condition shall be clearly indicated (e.g. light indicator, mechanical indicator).		N
	Compliance is checked by visual inspection.		N
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.		P
	For devices according to 4.6.1, the maximum number of operations shall not be greater than 3.		N

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Clause	Requirement + Test	Result - Remark	Verdict
	Compliance is checked by the test of 9.5.4.		N
	For devices according to 4.6.2, the maximum number of operations shall be declared by the manufacturer.		P
	Compliance is checked by the test of 9.5.4.	See clause 9.5.4	P
8.1.3	**Clearances and creepage distances**		P
	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.	See appended table 8.1.3	P
	However, the clearances of items 2 and 4 may be reduced provided that the tests at rated impulse voltage are withstood.		P
	The values of Table 2 shall be verified for the ARD and the interface with the MPD.		P
	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**		P
	For electronic circuits connected between live parts, or between live parts and the earth 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**		P
	For the ARD and MPD, the relevant subclause(s) of the MPD standard(s) applies:		--
	a) IEC 60898-1:2015, 8.1.4 for ARD classified according to 4.2.1(circuit-breakers);		P
	b) IEC 61008-1 +A1, 8.1.4 for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1:2010 and IEC 61008-1 +A1, 8.1.4 for ARD classified according to 4.2.3 (RCBOs).		P
8.1.6	**Terminals for external conductors**		P
	For the ARD and MPD, the relevant subclause(s) of the MPD standard(s) applies:		--
	a) IEC 60898-1:2015, 8.1.5 for ARD classified according to 4.2.1(circuit-breakers);		P

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Clause	Requirement + Test	Result - Remark	Verdict
	b) IEC 61008-1 +A1, 8.1.5 for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1:2010 and IEC 61008-1 +A1, 8.1.5 for ARD classified according to 4.2.3 (RCBOs).		P
	The range of nominal cross-section for wires clamped to the FE terminal, if any, shall be between 1mm^2 and 2,5 mm^2 .		N
	Compliance is checked by the tests of 9.9.	See clause 9.9	P
	In case of ARD classified according to 4. 1. 2, if supply cables to be associated to the MPD are provided, suitable indications for preventing wrong connections shall be given.		P
8.2	**Protection against electric shock**		P
	For the ARD and MPD, the relevant subclause of the MPD standard applies:		--
	a) IEC 60898-1:2015, 8.2 for ARD classified according to 4.2.1(circuit-breakers);		P
	b) IEC 61008-1:2010, 8.2 for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1:2010, 8.2 for ARD classified according to 4.2.3 (RCBOs).		P
	Compliance is checked by the tests of 9.10.	See clause 9.10	P
8.3	**Dielectric properties and isolating capability**		P
	The ARD and MPD shall not influence the suitability for isolation of the MPD.		P
	Compliance is checked by the tests of 9.11.	See clause 9.11	P
8.4	**Temperature rise**		P
	For the ARD and MPD, the corresponding subclause of the MPD standard applies:		--
	a) IEC 60898-1:2015, 8.4 for ARD classified according to 4.2.1(circuit-breakers);		P
	b) IEC 61008-1:2010, 8.4 for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1:2010, 8.4 for ARD classified according to 4.2.3 (RCBOs).		P
	Compliance is checked by the tests of 9.12.	See clause 9.12	P
8.5	**Mechanical and electrical endurance**		P
	ARD and MPD shall be capable of performing an adequate number of cycles of operations.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Compliance is checked by the tests of 9.13.	See clause 9.13	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.		P
	Performances of the ARD shall not be influenced by short-circuits occurring in the installation.		P
	Compliance is checked by the tests of 9.14.	See clause 9.14	P
8.7	**Resistance to mechanical shock and impact**		P
	The relevant subclause of the MPD standard applies:		--
	a) IEC 60898-1:2015, 8.9 for ARD classified according to 4.2.1(circuit-breakers);		P
	b) IEC 61008-1:2010, 8.8 for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1:2010, 8.8 for ARD classified according to 4.2.3 (RCBOs).		P
	Compliance is checked by the tests of 9.15.	See clause 9.15	P
8.8	**Resistance to heat**		P
	The relevant subclause of the MPD standard applies:		--
	a) IEC 60898-1:2015, 8.10 for ARD classified according to 4.2.1(circuit-breakers);		P
	b) IEC 61008-1:2010, 8.9 for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1:2010, 8.9 for ARD classified according to 4.2.3 (RCBOs).		P
	Compliance is checked by the tests of 9.16.	See clause 9.16	P
8.9	**Resistance to abnormal heat and to fire**		P
	The relevant subclause of the MPD standard applies:		--
	a) IEC 60898-1:2015, 8.11for ARD classified according to 4.2.1(circuit-breakers);		P
	b) IEC 61008-1:2010, 8.10 for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1:2010, 8.10 for ARD classified according to 4.2.3 (RCBOs).		P
	Compliance is checked by the tests of 9.17.	See clause 9.17	P
8.10	**Operating characteristics**		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.10.1	The ARD classified according to 4.3.1, after tripping of the MPD, shall reclose it.		N
	Compliance is checked by the tests of 9.13.	See clause 9.13	N
8.10.2	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.		P
	Compliance is checked by the tests of 9.18.2.	See clause 9.18.2	P
8.10.3	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.		N
	Compliance is checked by the tests of 9.18.3.	See clause 9.18.3	N
8.10.4	The ARD classified according both to 4.3.2.1and 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		P
	Compliance is checked by the tests of 9.18.2 and 9.18.3	See clause 9.18.2	P
8.10.5	The ARD shall never perform a number of consecutive reclosing operations greater than those declared by the manufacturer,		P
	and For devices according to 4.6.1, the maximum number of operation shall not be greater than 3.		N
	Compliance is checked by the tests of 9.18.2 and 9.5.4	See clause 9.5.4 & 9.18.2	P
8.10.6	The ARD shall operate independently of the influence of distributed capacities in the installation		P
	Compliance is checked by the test of 9.18.4.1 (for ARDs classified according to 4.3.2.1) and		P
	9.18.4.2 (for ARDs classified according to 4.3.2.2).		N
8.10.7	The admissible behaviour of the ARD, depending on line voltage and on MPD condition, is described in Table 3.		P
	Compliance is checked by the tests of 9.5.2, 9.5.4, 9.1 8.2 and 9.1 8.3.		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.10.8	The standing current from the FE to the protective conductor shall not exceed 1,0 mA under normal supply conditions.		P
8.11	**Assessment means for ARD according to 4.3.2**		P
8.11.1	**General**		P
	ARDs according to 4.3.2 shall be so designed that the assessment shall only be performed under safe conditions for the user.		P
	The assessment shall be performed using a circuit in which one of the following protective provisions is provided.		P
8.11.2	**Assessment means operating by limitation of the test voltage**		P
	The limitation of voltage shall be provided by a transformer with a reinforced insulation between the primary and the secondary circuit.		P
	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,		P
	and 600 V for ARD for a transformer supplied by a rated voltage equal to 400 V.		N
	Compliance of the transformer is checked by the requirements of 9.7.4.		P
	The maximum voltage used to provide the assessment shall be lower than 24 V r.m.s.		P
	Compliance is checked by the test of 9.19.1 .	See clause 9.19.1	P
8.11.3	**Assessment means operating by limitation of the test current**		P
	The ARD shall be so designed that the steady-state current shall not exceed 1.0 mA AC or 2,0 mA DC. under normal operation in tripping conditions.		P
	Compliance is checked by the test of 9.19.2	See clause 9.19.2	P
8.12	**Safety in blocked condition**		P
	The ARD shall be so designed that in blocked condition, the safety of the user is ensured.		P
	Compliance is checked by the test of 9.19.3		P
8.13	**Test device**		P
	The relevant subclause of the MPD document applies:		--

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Clause	Requirement + Test	Result - Remark	Verdict
	a) IEC 61008-1:2010, 8.11for ARD classified according to 4.2.2 (RCCBs);		P
	b) IEC 61009-1:2010, 8.11for ARD classified according to 4.2.3 (RCBOs).		P
	Compliance is checked by the test of 9.20	See clause 9.20	P
8.14	**Ageing**		P
	The relevant subclause of the MPD document applies:		--
	a) IEC 61008-1:2010, 8.16 for ARD classified according to 4.2.2 (RCCBs);		P
	b) IEC 61009-1:2010, 8.16 for ARD classified according to 4.2.3 (RCBOs).		P
	Compliance is checked by the test of 9.21	See clause 9.21	P
8.15	**Electromagnetic compatibility (EMC)**		P
	The ARD shall operate reliably in presence of electromagnetic disturbances and shall comply with relevant EMC requirements.		P
	Compliance is checked by the test of 9.22	See EMC report	P
9	**Tests**		P
9.1	**General**		P
	The MPD to be fitted with the ARD shall comply with its relevant product document:		--
	a) IEC 60898-1or IEC 60898-2, as applicable for ARDs classified according to 4.2.1(circuit-breakers);		P
	b) IEC 61008-1for ARDs classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1for ARDs classified according to 4.2.3 (RCBOs).		P
	In addition, the following tests shall be carried out to verify the whole assembly of the MPD with the ARD (ARD and MPD) mounted as for normal use.		P
	These tests are carried out according Table D.1, where the tests in each sequence are carried out in the order indicated.		P
	If the ARD is designed to be assembled to different MPDs, according to the classification in 4.2, it shall be tested according to Table D.3.		P

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Clause	Requirement + Test	Result - Remark	Verdict
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.		P
	ARDs designed for installation in individual enclosures are tested in the smallest of such enclosures specified by the manufacturer.		N
	Unless otherwise specified, the ARD is wired with the appropriate cable of cross-section specified in the relevant standard of the MPD and is fixed on a dull black painted plywood board of about 20 mm thickness, the method of fixing being in compliance with the requirements relating to the indications of the manufacturer concerning mounting.		P
	Where tolerances are not specified, type tests are carried out at values not less severe than those specified in this document.		P
	Unless otherwise specified, tests are carried out at the rated voltage and rated frequency ± 5 %.		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.		P
	The MPD is caused to open automatically (e.g. by means of a tripping release).		P
	After the opening of the MPD, the ARD shall reclose.		P
	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 15 s with a piece of cotton soaked with water and again for 15 s with a piece of cotton soaked with aliphatic solvent hexane with a content of aromatics of maximum 0,1% by volume, a kauributanol 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 .		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Marking made by impression, moulding, or engraving is not subjected to this test.		N
	After this test, the marking shall be easily legible.		P
	The marking shall also remain easily legible after all the tests of this document	remain easily legible	P
	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
	For the ARD and MPD, the relevant subclause(s) of the MPD standard(s) applies:		P
	a) IEC 60898-1:2015, 8.1.2 1, 9.10.2 and 9.10.3 (only at the upper limit of instantaneous tripping current) or IEC 60898-2:2016 as applicable, 9.10.3 (only at the upper limit of instantaneous tripping current), for ARD classified according to 4.2.1(circuit-breakers);		P
	b) IEC 61008-1 +A2, 8.1.2 1, 9.9.2.1, 9.9.2.2, 9.9.2.3 a), 9.15, for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1 +A1 +A2, 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), 9.11, for ARD classified according to 4.2.3 (RCBOs).		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.		P
	The ARD is assembled as in normal use and supplied at rated voltage.		P
	The MPD is manually opened.		P
	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.		P
	The force is applied for 1min in the direction of normal actuation.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	During the test the ARD shall not reclose the MPD.		P
	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.		P
	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.		P
	The test is carried out by means of 1000 cycles of the enabling system with an operation frequency not less than 2 cycles per minute.		P
	At the end of the test, the enabling system shall be able to work correctly.		P
	The ARD being in the enabled position, the MPD is caused to open automatically. It shall be reclosed automatically.		P
	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 1min or a time given by the manufacturer.		P
9.5.4	Verification of the maximum number of consecutive reclosings		P
	The MPD is caused to open automatically. 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.		P
	Reclosing time should be declared by manufacturer to testing laboratory as some products may have a reclosing time up to several hours.		P
	The test is repeated for a maximum number of times as declared by the manufacturer.		P
	Each test shall be separated from the previous reclosing by an interval less than 5 s.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	At the end of the maximum number of consecutive reclosing operations as declared by the manufacturer, the ARD shall be in blocked condition and show the appropriate signal according to the manufacturer's instructions.		P
	The supply voltage is switched off and then restored after 3 min: the ARD shall not reclose and it shall show the appropriate signal according to the manufacturer's instructions.		P
	The maximum number of consecutive reclosing operations shall be equal to 3 For devices according to 4.6.1or equal to the declaration of the manufacturer For devices according to 4.6.2.		P
	The ARD is then reset according to the manufacturer's instruction and the test is repeated once.		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.		P
	The ARD shall not create fire and/or shock hazards under abnormal conditions likely to occur in service.		P
	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.		P
	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
	Examination of the ARD and its circuit diagram will show the fault conditions that shall be applied.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Generally, one separate sample is submitted for each fault condition to be tested.		P
	Each of the following fault conditions a) to e) shall be applied in turn, one test only being carried out for		P
	a) short-circuit across clearances and creepage distances smaller than those given by curve A of Figure 1,		P
	with the following exception. In the case of a printed-board complying with the pull-off and peel strength requirements specified in IEC 61189-2, the creepage distances and clearances between conductors, one of which may be connected to one pole of the supply mains, the values resulting from Figure 1are replaced by the values calculated from the formula:		N
	b) short-circuit across insulation coating consisting, for example, of lacquer or enamel;		P
	c) short-circuit or interruption of semiconductors devices;		P
	d) short-circuit of electrolytic capacitors;		P
	e) short- circuit or disconnection of capacitors, resistors and inductors that do not comply with the requirements of 9.7.2, 9.7.3 and 9.7.4.		P
	The temperatures resulting from the fault conditions are measured for the parts mentioned in Table 4 after steady-state has been reached, or after 4 h (whichever is the shorter time) under each of the fault conditions a) to e).		P
9.7	**Requirements for capacitors, specific resistors and inductors used in electronic circuits**		P
9.7.1	**General**		P
	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.		P
9.7.2	**Capacitors**		P

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Clause	Requirement + Test	Result - Remark	Verdict
	– the short-circuiting or disconnection of which would cause an infringement of the requirements under fault conditions with regard to shock or fire hazard;		P
	– the short-circuiting of which would cause a current of 0,5 A or more through the terminals of the capacitor;		P
	– for suppression of electromagnetic interference,shall comply with IEC 60384 (all parts).		P
	These capacitors shall be marked with their rated voltage in volts (V), their rated capacitance in microfarads (μF) and their reference temperature in degrees Celsius (°C).		P
9.7.3	**Resistors**		P
	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.		P
	These resistors shall comply with the requirements of 14.1of IEC 60065:2014.		N
	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**		P
	Inductors and windings shall comply with the requirements of IEC 61558 (all parts) and the relevant parts of IEC 61558 (all parts), as applicable.		P
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 60898-1:2015, 9.4 for ARD classified according to 4.2.1(circuit- breakers);		P
	b) IEC 61008-1:2010, 9.4 for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1:2010, 9.4 for ARD classified according to 4.2.3 (RCBOs)		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The test is repeated on terminals for screws, current carrying parts and connection of the MPD only if they are used to connect them to ARDs and only if the cross-section area of these conductors is different, as stated in Table 5 of IEC 60898-1:2015, in Table 4 of IEC 61008- 1:2010 or in Table 6 of IEC 61009-1:2010.		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 60898-1:2015, 9.5 for ARD classified according to 4.2.1(circuit-breakers);		P
	b) IEC 61008-1 +A1, 9.5 for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1:2010+A1, 9.5 for ARD classified according to 4.2.3 (RCBOs).		P
	If types or sizes of terminals are used, which are not considered in the MPD standard a), b) or c), generic standards for terminals shall apply (for example, piercing terminals according to IEC 60998-2-3).		P
	The test is repeated on terminals for external conductors of the MPD only if they are used to connect the MPD to the ARD and only if the cross section area of these conductors is different as stated in Table 5 of IEC 60898-1:2015, or in Table 4 of IEC 61008-1:2010, or in Table 6 of IEC 61009-1:2010.		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 60898-1:2015, 9.6 for ARD classified according to 4.2.1(circuit-breakers); b) IEC 61008-1:2010, 9.6 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61009-1:2010, 9.6 for ARD classified according to 4.2.3 (RCBOs)		P
9.11	**Test of dielectric properties and isolating capability**		P
	The following subclauses of the standard for the MPD apply:		P
	a) IEC 60898-1:2015, 9.7 for ARD classified according to 4.2.1(circuit-breakers);		P

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Clause	Requirement + Test	Result - Remark	Verdict
	b) IEC 61008-1:2010, IEC 61008-1 +A1 and IEC 61008-1:2010+A2, 9.7 for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1 +A1 +A2, 9.7 for ARD classified according to 4.2.3 (RCBOs),		P
	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;		P
	– where the standard requires that the protective device is in open position, the test is carried out with the ARD in isolation condition;		P
	– if the ARD is provided with a terminal intended for the connection of protective conductors, this is connected to the frame;		N
	– if the ARD is provided with a terminal intended for the connection of functional earthing conductors, this is not connected to the frame.		N
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:		P
	a) IEC 60898-1:2015, 9.8 for ARD classified according to 4.2.1(circuit-breakers);		P
	b) IEC 61008-1:2010, 9.8 for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1:2010, 9.8 for ARD classified according to 4.2.3 (RCBOs).		P
	The test current in the MPDs may be generated at reduced voltage but the ARD shall be supplied at their rated voltage.		P
	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 the reclosing system of the ARD**		P
9.13.1	General test conditions		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The ARD assembled with the MPD is installed as in normal use and supplied at rated voltage.		P
	The MPD is caused to open automatically and after tripping the ARD shall reclose.		P
	The operating frequency shall be 12 operating cycles per hour or at t h e highest frequency compatible with the reclosing time and with the reset time to avoid the blocked condition.		P
9.13.2	Test procedure		P
	The ARD is subjected to 500 operating cycles, each operation cycle consisting of a tripping operation of the MPD followed by a closing operation		P
9.13.3	Condition of the ARD after the test		P
	After the tests, the ARD shall not show any damage, which could impair further use.		P
	After the test, compliance with 9.5.4 is checked.		P
9.14	**Short-circuit test**		P
9.14.1	General conditions for short-circuit test		P
	The ARD and MPD shall be in a new and clean condition.		P
9.14.2	Test circuit and test quantities		P
	For the ARD and MPD, the relevant subclause of the MPD standard applies:		P
	a) IEC 60898-1:2015, 9.12.2 and 9.12.4 for ARD classified according to 4.2.1(circuit-breakers);		P
	b) IEC 61008-1 +A1, 9.11.2.1for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1:2010+A1, 9.12.2 and 9.12.3 for ARD classified according to 4.2.3 (RCBOs).		P
9.14.3	Test procedure		P
	For the ARD and MPD, the relevant subclause(s) of the MPD standard(s) applies:		--
	a) IEC 60898-1:2015, 9.12.11.4.2, or IEC 60898-2:2016, 9.12.11.4.2, as applicable, for ARD classified according to 4.2.1(circuit-breakers);		P
	b) IEC 61008-1 +A1, 9.11.2.4 a) for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61008-1 +A1, 9.11.2.3 b) for ARD classified according to 4.2.2 (RCCBs);		P

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	d) IEC 61009-1:2010+A1, 9.12.11.4 b) for ARD classified according to 4.2.3 (RCBOs);		P
	e) IEC 61009-1:2010+A1, 9.12.13 for ARD classified according to 4.2.3 (RCBOs).		P
	In case of ARDs classified according to 4.3.1and 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.		P
	In case of ARDs classified according to 4.3.2 , the ARD shall be disabled and the MPD shall be closed manually.		P
	After the tests, the ARD shall be verified according to 9.1 4.4.		P
9.14.4	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 60898-1:2015, 9.12.12.1for ARD classified according to 4.2.1(circuit-breakers);		P
	b) IEC 61008-1:2010, 9.11.2.1i) for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1:2010, 9.12.12.1for ARD classified according to 4.2.3 (RCBOs).		P
9.15	**Resistance to mechanical shock and impact**		P
	For the ARD and MPD, the following subclauses of the MPD standard apply:		--
	a) IEC 60898-1:2015, 9.13 for ARD classified according to 4.2.1(circuit-breakers);		P
	b) IEC 61008-1:2010, 9.12 for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1:2010, 9.13 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 60898-1:2015, 9.14 for ARD classified according to 4.2.1(circuit-breakers);		P
	b) IEC 61008-1:2010, 9.13 for ARD classified according to 4.2.2 (RCCBs);		P

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	c) IEC 61009-1:2010, 9.14 for ARD classified according to 4.2.3 (RCBOs).		P
	In case of ARD according to 4.1.2, the test is carried out only on the ARD part.		N
9.17	**Resistance to abnormal heat and to fire**		P
	For the ARD and MPD, the following subclauses of the MPD standard apply:		--
	a) IEC 60898-1:2015, 9.15 for ARD classified according to 4.2.1(circuit-breakers);		P
	b) IEC 61008-1 +A1, 9.14 for ARD classified according to 4.2.2 (RCCBs);		P
	c) IEC 61009-1:2010+A1, 9.15 for ARD classified according to 4.2.3 (RCBOs).		P
	In case of ARD according to 4.1.2, the test is carried out only on the ARD part.		N
9.18	**Verification of the operating characteristics**		P
9.18.1	**General**		P
	This verification is not performed for the ARD according to 4.3.1.		P
9.18.2	**Verification of the reclosing subordinated to the measurements of the resistance to earth**		N
	a) The test circuit shall correspond to Figure 3 or Figure 4 as applicable.		N
	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.		N
	b) The test circuit shall correspond to Figure 3 or Figure 4 as applicable.		N
	After this test, the resistor R2 is removed and the ARD classified according to 4.3.2.1a) shall not reclose; the ARD classified according to 4.3.2.1b) shall reclose according to the manufacturer's instructions.		N
9.18.3	**Verification of the reclosing subordinated to the measurements of the resistance between live parts**		P
	a) The test circuit shall correspond to Figure 5.		P
	The resistor R_1 shall be adjusted to the value equal to R_{cc}.		

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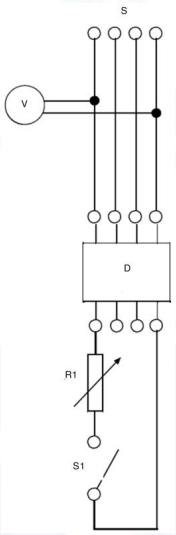
Clause	Requirement + Test	Result - Remark	Verdict
	The MPD is caused to open automatically, and immediately after the tripping of the ARD and MPD, the switch S1shall be closed. The ARD shall reclose		
	 D ARD under the test R1 variable resistor S supply S1 switch V voltmeter Figure 5 – Verification of the reclosing subordinated to the measurements of the resistance between live parts (9.1 8.3 a) and 9.1 8.3 b))		
	b) The test circuit shall correspond to Figure 5.		P
	The resistor R1shall be adjusted to the value equal to R_{cc0}.		P
	The MPD is caused to open automatically; immediately after the tripping of the ARD and MPD, the switch S1shall be closed.		P
	The ARD shall not reclose and the ARD shall show the appropriate signal according to the manufacturer's instructions.		P
	After this test the resistor R2 is removed and the ARD classified according to 4.3.2.2 a) shall not reclose; the ARD classified according to 4.3.2.2 b) shall reclose according to the manufacturer's instructions.		P
	The test is repeated three times on one possible combination of live parts taken at random.		P
	Each test shall be separated from the previous reclosing by the reset of the ARD.		P
9.18.4	**Verification of the influence of the distributed capacities in the installation on the operating characteristic**		P
9.18.4.1	Verification of the reclosing subordinated to the measurements of the resistance between live parts to earth		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The test conditions specified in 9.18.2 a) and 9.18.2 b) apply by inserting a capacitor of 100 nF in parallel to the resistor R2		P
	The test shall be carried out at 0,85 and 1,1times the rated voltage at the following temperatures: (−5 ± 2) °C, (20 ± 2) °C, (40 ± 2) °C after the steady state is reached.		P
9.18.4.2	Verification of the reclosing subordinated to the measurements of the resistance between live parts		P
	The test conditions specified in 9.18.3 a) and 9.18.3 b) apply by inserting a capacitor of 100 nF in parallel to the resistor R1.		P
	The test shall be carried out at 0,85 and 1,1times the rated voltage at the following temperatures: (−5 ± 2) °C, (20 ± 2) °C, (40 ± 2) °C after the steady state is reached.		P
9.18.5	**Verification of the maximum current in FE under normal condition**		N
	The ARD is installed as in normal use and supplied at a voltage 1,1times its rated voltage.		N
	The test circuit shall be in accordance with Figure 6.		N
	The resistor R1shall be adjusted at a value of 1Ω. The test current in the resistor R1 is measured by the use of an appropriate mean		N
9.19	**Verification of the safety during the assessment**		P
9.19.1	**Verification of the limitation of the voltage**		P
	The ARD and the MPD are installed as in normal use, supplied at 1,1rated voltage and without any load.		P
	The MPD is made to trip and the voltage on the load terminals of the ARD and MPD is measured by an appropriate means before the ARD recloses.		P
	The voltage shall not exceed 24 V r.m.s.		P
	In case of an ARD provided with an FE, the following test shall be carried out.		N
9.19.2	**Verification of the limitation of the test current**		P
	The ARD is installed as in normal use and supplied at a voltage 1,1times its rated voltage.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The test circuit shall correspond to Figure 3 or Figure 4 as applicable. The resistor R1shall be adjusted at any convenient value which leads the ARD to trip.		P
	The resistor R2 shall be replaced by a connection of negligible value.		P
	The test current in the resistor R2 is measured by the use of an appropriate means		P
	The test current shall not exceed 1,0 mA r.m.s or 2,0 mA DC.		P
	In case of an ARD provided with an FE, the following test shall be carried out.		N
	The ARD and the MPD are installed as in normal use, supplied at 1,1rated voltage and without any load		P
	The MPD is made to trip. The test current in the FE is measured by the use of an appropriate means		P
9.19.3	**Verification of the safety in blocked condition**		P
	The ARD is installed as in normal use and supplied at a voltage 1,1times its rated voltage.		P
	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.		P
	For ARDs classified as 4.4.1, the verification is made by repeating the test of 9.19.1.		N
	For ARDs classified as 4.4.2, the verification is made by repeating the test of 9.19.2.		P
	For ARDs classified as 4.3.1, the relevant subclause of the MPD standard applies, without the humidity treatment: a) IEC 60898-1:2015, 9.7.3 for ARD classified according to 4.2.1(circuit-breakers); b) IEC 61008-1:2010, 9.7.3 for ARD classified according to 4.2.2 (RCCBs); c) IEC 61009-1:2010, 9.7.3 for ARD classified according to 4.2.3 (RCBOs)		N
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:		P

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Clause	Requirement + Test	Result - Remark	Verdict
	a) IEC 61008-1:2010, 9.16 for ARD classified according to 4.2.2 (RCCBs);		P
	b) IEC 61009-1:2010, 9.16 for ARD classified according to 4.2.3 (RCBOs)		P
9.21	**Verification of ageing**		P
	The ARD and MPD are placed for a period of 168h in an ambient temperature of (40 ± 2) °C and loaded with the rated current.		P
	The voltage on the electronic parts shall be 1,1 times the rated voltage.		P
	After this test, the ARD and MPD in the cabinet are allowed to cool down to approximately room temperature without current passing. The electronic parts shall show no damage.		P
	After the test, compliance with 9.5.4 is checked.		P
	Compliance with 9.18.2 or 9.18.3 as applicable is also checked For devices classified according to 4.3.2.		P
9.22	**Electromagnetic compatibility**	See EMC report	P
9.22.1	**General**		P
9.22.2	**Low-frequency electromagnetic phenomena**		P
	The data for the low-frequency immunity to be applied are set out in Table 5.		P
9.22.3	**High-frequency immunity**		P
	The data for the high-frequency immunity to be applied are set out in Table 6.		P
9.22.4	**Electrostatic discharges**		P
	The data for the electrostatic discharge tests to be applied are set out in Table 7.		P
9.22.5	**Electromagnetic emission of ARDs**		P
	Emission tests are required only for ARDs containing a continuously operating oscillator.		P
	They shall be carried out according to CISPR 14-1.		P
9.22.6	**Performance criteria**		P
	After the test, compliance with 9.5.4 is checked.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Compliance with 9.18.2 and/or 9.18.3 as applicable is also checked For devices classified according to 4.3.2		P

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Clause	Requirement + Test	Result - Remark	Verdict
Annex A	**Classification of ARDs according to 4.3.1**		**--**
Annex B	**Classification of ARDs according to 4.3.2.1 a) and/or 4.3.2.2 a)**		**--**
Annex C	**Classification of ARDs according to 4.3.2.1 b) and/or 4.3.2.2 b)**		**--**
Annex D	**Test sequences and number of samples to be submitted for verification of conformity**		P
D.1	Test sequences		P
D.2	Number of samples to be submitted for full test procedure		P

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Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Enclosure	Zhejiang Chimei Chemical Co., Ltd.	ABS	V-0	UL 94	UL
Enameled copper wire	JIANGSU DARTONG M&E CO.,LTD	Q (ZY/XY) BP-2/200	Class E, 120℃	UL1446	UL E237377
Inside plastic parts	Interchangeable	Interchangeable	V-0	UL 94	UL
Supplementary information: [1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

9.6	TABLE: Clearance and Creepage Distance Measurements					P
clearance cl and creepage distance dcr at/of:	**Up (V)**	**U r.m.s. (V)**	**Required cl (mm)**	**cl (mm)**	**required dcr (mm)**	**dcr (mm)**
Between live parts that are separated when the ARD is in the isolation condition	250	230	4	7.6	4	7.6
Between live parts of different polarity	250	230	3	3.6	3	6.4
Between circuits supplied from different sources, one of which being PELV or SELV	250	230	8	8.4	8	8.6
Between live parts and accessible surfaces of operating means	250	230	3	6.4	4	6.6
Between live parts and screws or other means for fixing covers which have to be removed when mounting the ARD	250	230	3	6.4	4	6.6
Between live parts and surface on which the ARD is mounted	250	230	3	6.4	4	6.6
Between live parts and screws or other means for fixing the ARD	250	230	3	6.5	4	6.5
Between live parts and other Accessible metal parts	250	230	3	6.5	4	6.5
Supplementary information:						

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Clause	Requirement + Test	Result - Remark	Verdict

9.11	TABLE: Dielectric Strength		N
Test voltage applied between:		**Test potential applied (V)**	**Breakdown / flashover (Yes/No)**
Between live parts that are separated when the ARD is in the isolation condition		2500V~	No
Between live parts of different polarity		2500V~	No
Between circuits supplied from different sources, one of which being PELV or SELV		2500V~	No
Between live parts and accessible surfaces of operating means		2500V~	No
Between live parts and screws or other means for fixing covers which have to be removed when mounting the ARD		2500V~	No
Between live parts and surface on which the ARD is mounted		2500V~	No
Between live parts and screws or other means for fixing the ARD		2500V~	No
Between live parts and other Accessible metal parts		2500V~	No
Supplementary information:			

9.12	TABLE: Temperature rise		P
	Test voltage (V):	230V~	—
	Ambient (°C):	23.2	—

Thermocouple Locations	max. temperature measured, (K)	max. temperature limit, (K)
Terminals for external connections	38.2	60
Knob of manual operation part	13.8	40
Enclosure	26.5	60
Supplementary information:		

Product Photos

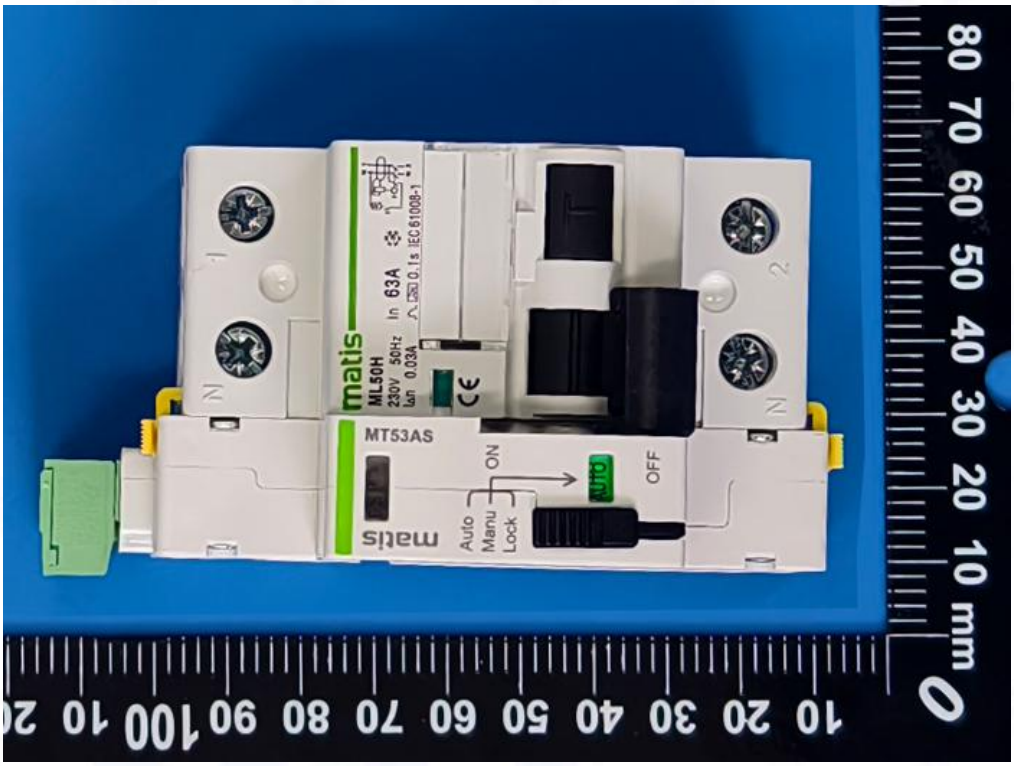

Fig. 1

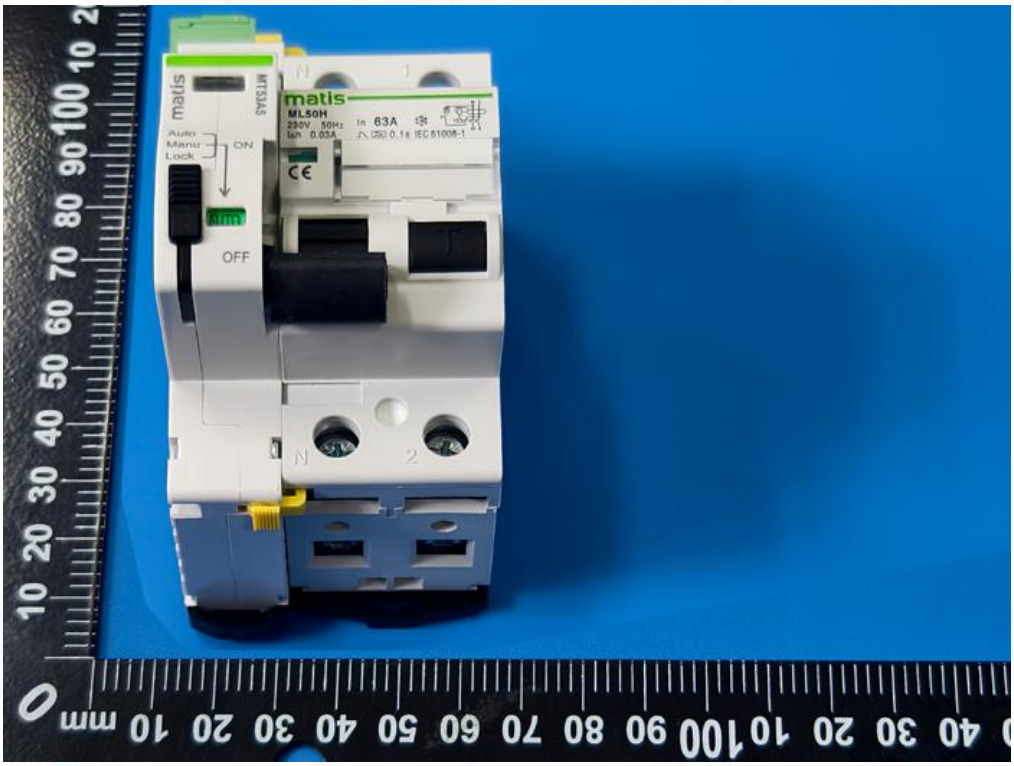

Fig. 2

Product Photos

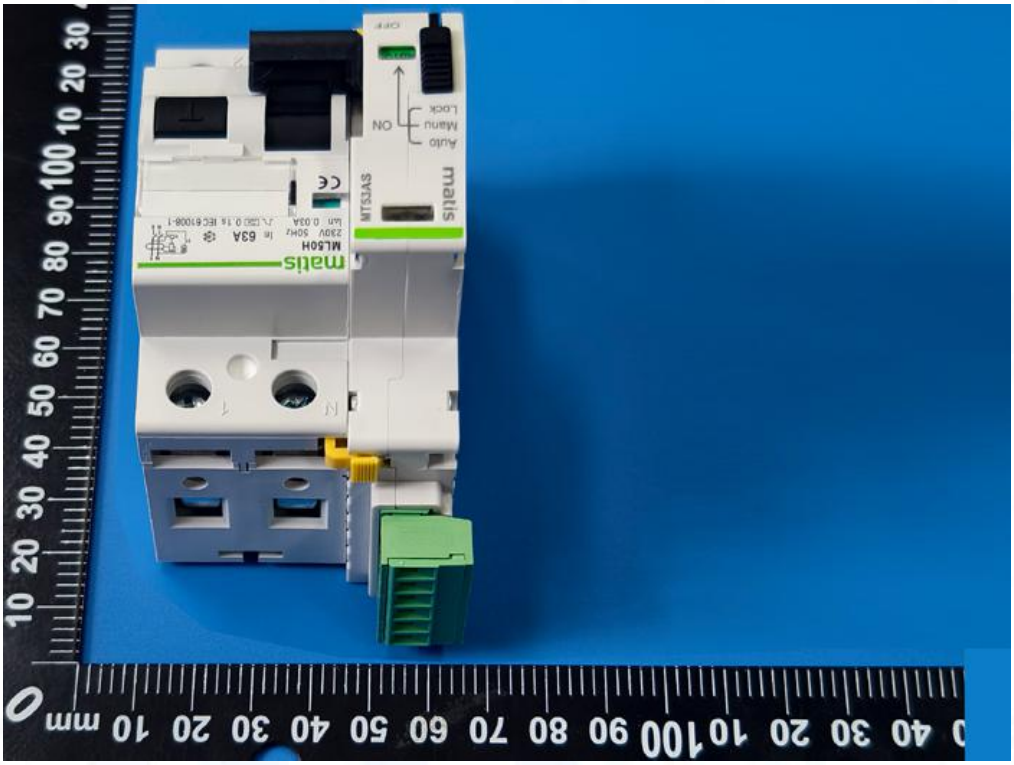

Fig. 3

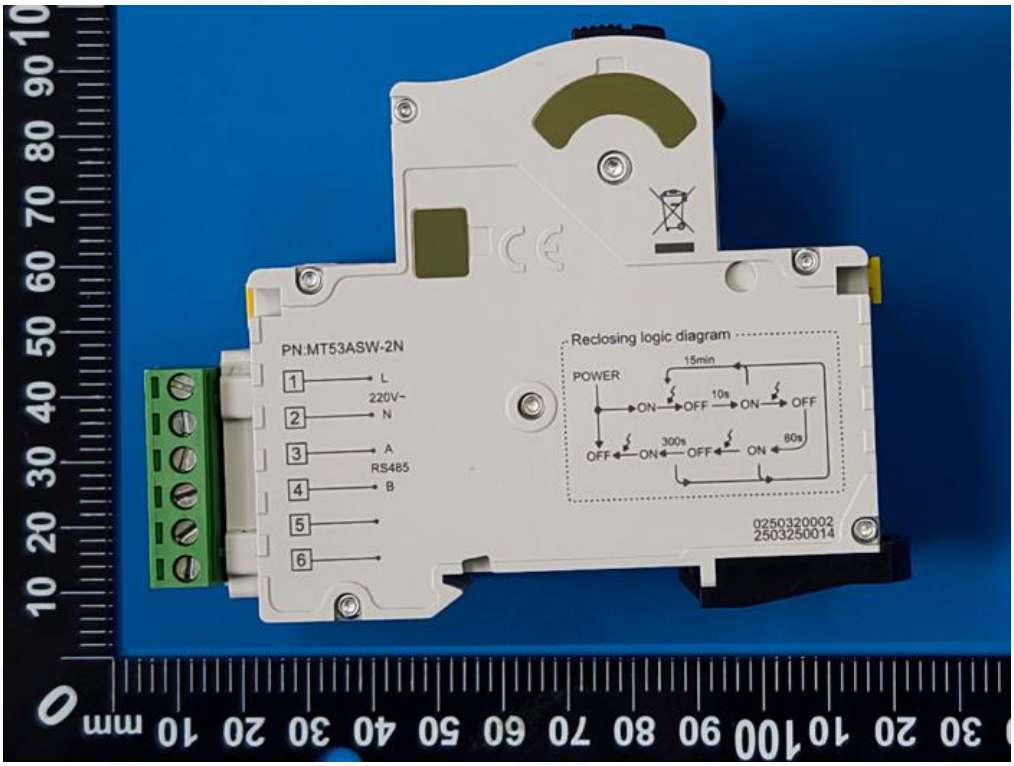

Fig. 4

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