Test Report issued under the responsibility of:

DEKRA

TEST REPORT
IEC 60898-1
Circuit-breakers for over current protection for household and similar installations
Part 1 - Circuit-breakers for a.c. operation

Report Number. ..... :	3317040.50
Date of issue..... :	2020-10-29
Total number of pages ..... :	31
Name of Testing Laboratory preparing the Report ..... :	DEKRA Testing Services (Zhejiang) Co., Ltd.
Applicant's name..... :	GACIA ELECTRICAL APPLIANCE CO., LTD.
Address..... :	No.1 Nanxijiang Road, Daqiao Industrial Zone, Beibaixiang Town, Yueqing, 325603 Zhejiang, China
Test specification:	
Standard ..... :	IEC 60898-1:2015, AMD1:2019
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC60898_1E
Test Report Form(s) Originator.... :	DEKRA Certification B.V.
Master TRF..... :	Dated 2020-04-17

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

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 CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description .....:	Circuit-breakers for overcurrent protection
Trade Mark(s) .....:	GACIA
Manufacturer .....:	GACIA ELECTRICAL APPLIANCE CO., LTD. No.1 Nanxijiang Road, Daqiao Industrial Zone, Beibaixiang Town, Yueqing, 325603 Zhejiang, China
Model/Type reference .....:	PB8H, PB8HN, PB8HQ, PB8H2, PB8N, PB8NN, PB8NQ, PB8N2, PB8LN, M80H, M100, M80, N8BH, VB8H, DB10H
Ratings .....:	1P, 2P, 3P, 4P Ue: 230 / 400 Vac for 1P, 400 Vac for 2P, 3P and 4P In: 1, 2, 3, 4, 5, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63 A B, C and D type, 50 / 60 Hz Ics = 7,5 kA, Icn = Icn1 = 10 kA Energy limiting class 3 for B and C type according to EN 60898-1

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	DEKRA Testing Services (Zhejiang) Co., Ltd.	
Testing location/ address .....:		No.5, Changjiang Road, Great Bridge Industrial Park, North Baixiang, Wenzhou, Zhejiang, 325603, P.R. China	
Tested by (name, function, signature) .....:		Ray Zhu	
Approved by (name, function, signature) ..:		Eric Wang	
☐	**Testing procedure: CTF Stage 1:**	N/A	
Testing location/ address .....:		N/A	
Tested by (name, function, signature) .....:		N/A	
Approved by (name, function, signature) ..:		N/A	
☐	**Testing procedure: CTF Stage 2:**	N/A	
Testing location/ address .....:		N/A	
Tested by (name + signature).....:		N/A	
Witnessed by (name, function, signature) .:		N/A	
Approved by (name, function, signature) ..:		N/A	
☐	**Testing procedure: CTF Stage 3:**	N/A	
☐	**Testing procedure: CTF Stage 4:**	N/A	
Testing location/ address .....:		N/A	
Tested by (name, function, signature) .....:		N/A	
Witnessed by (name, function, signature) .:		N/A	
Approved by (name, function, signature) ..:		N/A	
Supervised by (name, function, signature) :		N/A	

List of Attachments (including a total number of pages in each attachment):

Summary of testing:

The following samples were chosen for the type test according to annex C of IEC/EN 60898-1.

Tests performed (name of test and test clause):

No.	Model	Current	Number of poles	Type	Voltage	Test sequence
1#	M80	63 A	1P	D	230 / 400 Vac	A1 (cl. 6)
2#	M80	63 A	4P	D	400 Vac	
23#-25#	M80	63 A	1P	D	230 / 400 Vac	B (cl. 9.9)
26#-28#	M80	63 A	4P	D	400 Vac	
9#-11#	M80	63 A	1P	D	230 / 400 Vac	D0
29#-31#	M80	63 A	1P	D	230 / 400 Vac	E2
15#-17#	M80	63 A	2P	D	400 Vac	
32#-34#	M80	63 A	4P	D	400 Vac	

Notes:

1. This report is based on and shall be read in conjunction with test report no. 3307943.50 issued on 2015-11-19, 3305490.50 issued on 2013-11-15, 3303230.50 issued on 2012-05-02, 3302398.50 issued on 2011-06-27 and W0807018.50 issued on 2008-09-08.
2. This report is issued due to that:
   - The address of applicant / manufacturer / factory is changed to “No.1 Nanxijiang Road, Daqiao Industrial Zone, Beibaixiang Town, Yueqing, 325603 Zhejiang, China”.
   - A1: 2019 of IEC 60898:2015 and EN 60898-1:2019 are considered, the above tests were carried out to verify the compliance.
3. The type references PB8H, PB8HN, PB8HQ, PB8H2, PB8N, PB8NN, PB8NQ, PB8N2, PB8LN, M80H, M100, N8BH, VB8H and DB10H are identical to M80 except model references. All tests are performed on the model M80 to cover all other models.

Testing location:

All tests were conducted in:

DEKRA Testing Services (Zhejiang) Co., Ltd.

No.5, Changjiang Road, Great Bridge Industrial Park, North Baixiang, Wenzhou, Zhejiang, 325603, P. R. China

Summary of compliance with National Differences (List of countries addressed):

EN 60898-1:2019, the test results refers to annex 1 of this report.

☒ **The product fulfils the requirements of**

IEC 60898-1:2015 + A1:2019,

EN 60898-1:2019

Statement concerning the uncertainty of the measurement systems used for the tests

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

☒ **Statement not required by the standard used for type testing**

Test item particulars.....:	Circuit-breakers for overcurrent protection
Classification of installation and use .....:	fixed
Supply Connection .....:	single phase or 3 phases system
Possible test case verdicts:	
- test case does not apply to the test object .....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement .....:	F (Fail)
Testing .....:	
Date of receipt of test item .....:	2020-07
Date (s) of performance of tests.....:	2020-07 - 2020-10

General remarks:

"(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.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ **Yes** ☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

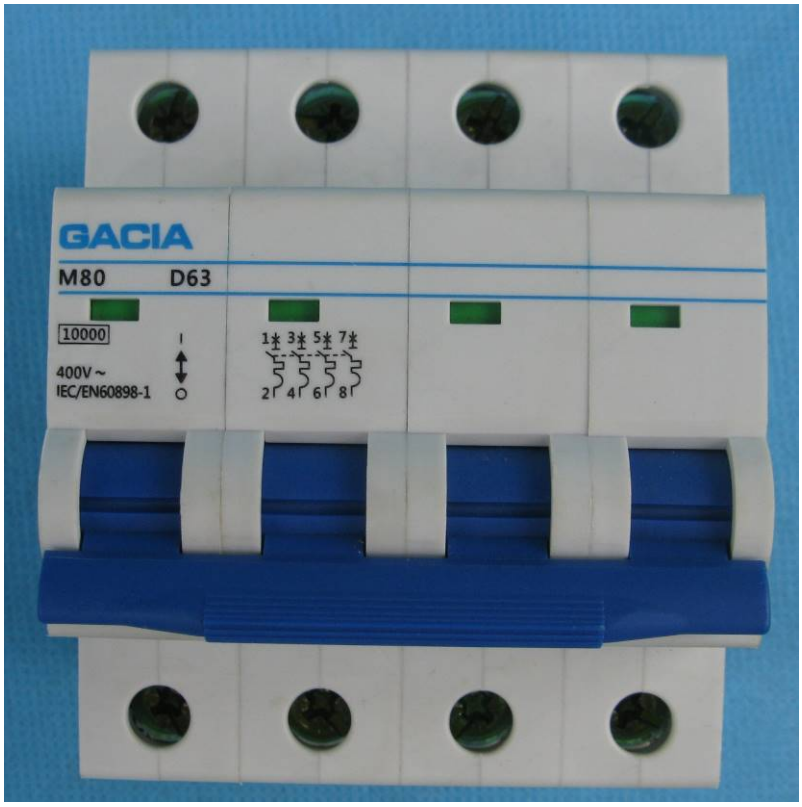
Name and address of factory (ies) .....:	GACIA ELECTRICAL APPLIANCE CO., LTD. No.1 Nanxijiang Road, Daqiao Industrial Zone, Beibaixiang Town, Yueqing, 325603 Zhejiang, China

General product information and other remarks:

All poles are protected.
The grid distance "a": 45 mm.

Copy of marking plate:

M80, 1P, D63



M80, 4P, D63

Copy of marking plate:

PB8H, 1P, C63

PB8H, 4P, B63

Test item particulars.....:	Circuit-breakers for overcurrent protection
Classification of installation and use .....:	fixed
Supply Connection .....:	single phase or 3 phases system
Possible test case verdicts:	
- test case does not apply to the test object .....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement .....:	F (Fail)
Testing .....:	
Date of receipt of test item .....:	2020-07
Date (s) of performance of tests.....:	2020-07 - 2020-10

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Name and address of factory (ies) .....:	GACIA ELECTRICAL APPLIANCE CO., LTD. No.1 Nanxijiang Road, Daqiao Industrial Zone, Beibaixiang Town, Yueqing, 325603 Zhejiang, China

General product information and other remarks:

All poles are protected.
The grid distance "a": 45 mm.

Test item particulars .....:	Circuit-breakers for overcurrent protection
Type of circuit-breaker .....:	PB8H, PB8HN, PB8HQ, PB8H2, PB8N, PB8NN, PB8NQ, PB8N2, PB8LN, M80H, M100, M80, N8BH, VB8H, DB10H
Number of poles .....:	☒ 1-P ☐ 1-P+N ☒ 2-P ☒ 3-P ☐ 3-P+N ☒ 4-P
Protection against external influences .....:	☐ enclosed ☒ unenclosed
Method of mounting .....:	☐ surface ☒ flush ☒ panel board
Method of connection .....:	☒ not associated with the mechanical mounting ☐ associated with the mechanical mounting
Type of terminal .....:	☒ screw [a) b)] ☒ pillar [a) b)] ☐ cage [a) b)] ☐ lug ☐ screw less [a)] ☐ flat quick connect [a)] ☐ plug-in ☐ screw-in [a)] copper conductors [b)] aluminium conductors
Instantaneous tripping current .....:	☒ B ☒ C ☒ D
I^2t characteristic .....:	Energy limiting class 3 for B and C type
Value of rated operational voltage (Ue).....:	☐ 120 V ☐ 230 V ☐ 240 V ☐ 120/240 V ☒ 230/400 V for 1P ☒ 400 V for 2P, 3P and 4P ☐ 240/415 V ☐ 415 V
Value of rated current (In).....:	1, 2, 3, 4, 5, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63 A
Value of rated frequency .....:	☒ 50 Hz ☒ 60 Hz
Ambient air temperature (°C) .....:	☒ 30°C ☐ 40°C ☐ Other _____°C
Rated short-circuit capacity (Icn) .....:	☐ 1,5 kA ☐ 3 kA ☐ 4,5 kA ☐ 6 kA ☒ 10 kA ☐ 15 kA ☐ 20 kA ☐ 25 kA
Rated impulse withstand voltage (Uimp)	☐ 2,5 kV ☒ 4 kV ☐ declared ___kV

IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TESTS „A_1“ 1 SAMPLE	M80, D63, 1P 1#	--
6	**MARKING AND OTHER INFORMATION**		
	Circuit-breaker marked with:		--
	a) Manufacturer’s name or trade mark.....:	GACIA	P
	b) Type designation, catalogue number or other serial number.....:	M80	P
	c) Rated voltage (V).....:	230 / 400 V~	P
	d) Rated current without symbol "A", preceded by the symbol of instantaneous tripping.....:	D63	P
	e) Rated frequency (Hz).....:		N/A
	f) Rated short circuit capacity (A).....:	10000 in a rectangle	P
	g) Wiring diagram		P
	h) Ambient air temperature, if different from 30°C		N/A
	i) Degree of protection, if different from IP20		N/A
	j) For D-type circuit-breakers: the maximum instantaneous tripping current, if higher than 20 In see table 2)		N/A
	k) Rated impulse withstand voltage Uimp if it is 2,5 kV		N/A
	l) Making and breaking capacity on an individual protected pole of multipole circuit-breakers (Icn1), if different from Icn		N/A
	Marking d) shall be readily visible when the CB is installed		P
	If, for small devices, the available space is insufficient, markings a), b), c), e), f), h), j) and l) may be put on the side or on the back of the CB	a), b), c) and f) are marked on the front	P
	Marking g) may be on the inside of any cover which has to be removed in order to connect the supply wires but shall not be on a label loosely attached to the CB	on the front	P
	Any other information not marked shall be given in the manufacturer’s documentation		P
	The suitability for isolation, which is provided by all circuit-breakers of this standard, may be indicated by the symbol on the device		P
	I^2t characteristic (documentation)		P
	Symbols on supply and load terminal		N/A
	Terminal for neutral conductor N		N/A
	Earthing terminal if any (IEC 60417-5019)		N/A

IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict
	On - off position shall be clearly indicated - 0 I -		P
	For push-button CB the off push-button shall either be red or be marked with the symbol ´0´		N/A
	Red not used for other push-button		N/A
	For CB with multiple current ratings, the maximum value is marked, the adjusted value indicated without ambiguity		N/A
	For rail-mounted circuit-breakers, appropriate rail(s) shall be indicated in the manufacturer's documentation		P

IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TESTS „A_1“ 1 SAMPLE	M80, D63, 4P 2#	--
6	**MARKING AND OTHER INFORMATION**		
	Circuit-breaker marked with:		--
	a) Manufacturer’s name or trade mark.....:	GACIA	P
	b) Type designation, catalogue number or other serial number.....:	M80	P
	c) Rated voltage (V).....:	400 V~	P
	d) Rated current without symbol "A", preceded by the symbol of instantaneous tripping.....:	D63	P
	e) Rated frequency (Hz).....:		N/A
	f) Rated short circuit capacity (A).....:	10000 in a rectangle	P
	g) Wiring diagram		P
	h) Ambient air temperature, if different from 30°C		N/A
	i) Degree of protection, if different from IP20		N/A
	j) For D-type circuit-breakers: the maximum instantaneous tripping current, if higher than 20 In see table 2)		N/A
	k) Rated impulse withstand voltage Uimp if it is 2,5 kV		N/A
	l) Making and breaking capacity on an individual protected pole of multipole circuit-breakers (Icn1), if different from Icn		N/A
	Marking d) shall be readily visible when the CB is installed		P
	If, for small devices, the available space is insufficient, markings a), b), c), e), f), h), j) and l) may be put on the side or on the back of the CB	a), b), c) and f) are marked on the front	P
	Marking g) may be on the inside of any cover which has to be removed in order to connect the supply wires but shall not be on a label loosely attached to the CB	on the front	P
	Any other information not marked shall be given in the manufacturer’s documentation		P
	The suitability for isolation, which is provided by all circuit-breakers of this standard, may be indicated by the symbol on the device		P
	I^2t characteristic (documentation)		P
	Symbols on supply and load terminal		N/A
	Terminal for neutral conductor N		N/A
	Earthing terminal if any (IEC 60417-5019)		N/A

IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict
	On - off position shall be clearly indicated - 0 I -		P
	For push-button CB the off push-button shall either be red or be marked with the symbol ´0´		N/A
	Red not used for other push-button		N/A
	For CB with multiple current ratings, the maximum value is marked, the adjusted value indicated without ambiguity		N/A
	For rail-mounted circuit-breakers, appropriate rail(s) shall be indicated in the manufacturer's documentation		P

IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TESTS „B“ 3 samples	M80, D63, 1P			--
		23#	24#	25#	
9.9	**28 day test**				P
	28 cycles - 21 h with current - 3 h without current Cross-sectional area. ____ mm²	63 A 16 mm²			P
	During the first period of current flow the temperature of the terminals shall be measured				P
	Ambient air temperature	23,5 °C			P
	Parts ..... Temperature rise [K]	23#	24#	25#	P
	Terminals for external connections ..... Terminal L1, up side Terminal L1, down side	 43 K 39 K	 44 K 40 K	 43 K 37 K	P
	During the last period of current flow the temperature of the terminals shall be measured				P
	Ambient air temperature ..... :	23,2 °C			P
	Parts ..... Temperature rise [K]	23#	24#	25#	P
	Terminals for external connections ..... Terminal L1, up side Terminal L1, down side	 48 K 42 K	 49 K 44 K	 47 K 39 K	P
	The temperature rise does not exceed the value measured during the first period by more than 15 K				P
	Test current 1,45 I_N =_____A	91,4 A			P
	- Tripping within	23#	24#	25#	--
	- 1h (≤ 63 A)	98 s	165 s	110 s	P
	- 2h (> 63 A)				N/A

IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TESTS „B“ 3 samples	M80, D63, 4P			--
		26#	27#	28#	
9.9	**28 day test**				P
	28 cycles - 21 h with current - 3 h without current Cross-sectional area. ____ mm²	63 A 16 mm²			P
	During the first period of current flow the temperature of the terminals shall be measured				P
	Ambient air temperature	23,5 °C			P
	Parts ..... Temperature rise [K]	26#	27#	28#	P
	Terminals for external connections ..... Terminal L1, up side Terminal L2, up side Terminal L3, up side Terminal L1, down side Terminal L2, down side Terminal L3, down side	 51 K 52 K 51 K 48 K 49 K 47 K	 51 K 52 K 49 K 47 K 47 K 45 K	 50 K 51 K 49 K 46 K 47 K 45 K	P
	During the last period of current flow the temperature of the terminals shall be measured				P
	Ambient air temperature ..... :	23,2 °C			P
	Parts ..... Temperature rise [K]	26#	27#	28#	P
	Terminals for external connections ..... Terminal L1, up side Terminal L2, up side Terminal L3, up side Terminal L1, down side Terminal L2, down side Terminal L3, down side	 54 K 56 K 53 K 52 K 51 K 50 K	 55 K 55 K 54 K 50 K 52 K 48 K	 53 K 55 K 53 K 50 K 51 K 50 K	P
	The temperature rise does not exceed the value measured during the first period by more than 15 K				P
	Test current 1,45 I_N =_____A	91,4 A			P
	- Tripping within	26#	27#	28#	--
	- 1h (≤ 63 A)	148 s	194 s	127 s	P
	- 2h (> 63 A)				N/A

IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TESTS „D“ 3 samples	M80, D63, 1P			--
		9#	10#	11#	
8.6	**Automatic operation**				P
8.6.1	Standard time-current zone				P
	Tripping characteristic of CB ensures adequate protection of the circuit, without premature operation.				P
9.10	**Tests „D_0“**				--
	I_N (A)	63 A			--
	Sect. (mm²)	16 mm²			--
	Instantaneous tripping current	☐ B ☐ C ☒ D			--
9.10.2	Test of time-current characteristic				P
9.10.2.1	Test current 1,13 I_N (A) starting from cold for:	71,2 A			P
	- 1 h ($I_N \leq 63$ A)				P
	- 2 h ($I_N > 63$ A)				N/A
	No tripping				P
	Then steadily increased within 5 s to 1,45 I_N (A)	91,4 A			P
	- Tripping within	9#	10#	11#	--
	- 1h (≤ 63 A)	265 s	217 s	503 s	P
	- 2h (> 63 A)				N/A
9.10.2.2	Test current 2,55 I_N (A) starting from cold for:	160,6 A			P
	opening time not less than 1 s or more than	9#	10#	11#	--
	- 60 s (≤ 32 A)				N/A
	- 120 s (> 32 A)	23 s	34 s	41 s	P
9.10.3	Test of instantaneous tripping and of correct opening of the contacts				P
9.10.3.1	General test conditions				P
	For the lower values of the test current the test is made once, at any convenient voltage.				P
	For the upper values of the test current the test is made at rated voltage Un(phase to neutral) with a power factor between 0,95 and 1.				P
	The sequence of operation is : O-CO-CO-CO Interval time: > 3 min				P
	The tripping time of the O operation is measured				P
	After each operation the indicating means shall show the open position of the contacts				P
9.10.3.2	☐ For circuit-breakers of the B – Type				N/A
	Test current 3I_N (A), starting from cold				--

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Clause	Requirement + Test	Result - Remark	Verdict

	Opening time:				--
	≥ 0,1 s				N/A
	Test current 5 I_N (A), starting from cold				N/A
	Tripping less than 0,1 s				N/A
9.10.3.3	☐ For circuit-breakers of the C – Type				N/A
	Test current 5I_N (A), starting from cold				N/A
	Opening time:				--
	≥ 0,1 s				N/A
	Test current 10 I_N (A), starting from cold				N/A
	Tripping less than 0,1 s				N/A
9.10.3.4	☒ For circuit-breakers of the D – Type				P
	Test current 10I_N (A), starting from cold	630 A			P
	Opening time:	9#	10#	11#	--
	- 0,1 s ≤ t ≤ [8 s (In ≤ 10 A and In > 32 A) *) acc. EN 60898]	2 s	2 s	3 s	P
	Test current 20 I_N (A) or to the maximum instantaneous tripping current(see cl. 6, item j), starting from cold	231,5 V, 1265 A			P
	Tripping less than 0,1 s	9#	10#	11#	P
	L1	7,2 ms	8,8 ms	7,1 ms	
9.10.4	Test of effect of single pole loading on the tripping characteristic of multi-pole circuit-breakers:				N/A
	Test current 1,1 It (A), (two pole) starting from cold				N/A
	Tripping within				--
	- 1h (≤ 63 A)				N/A
	- 2h (> 63 A)				N/A
	Test current 1,2 It (A), (three pole or four pole) starting from cold				N/A
	Tripping within				--
	- 1h (≤ 63 A)				N/A
	- 2h (> 63 A)				N/A
9.10.5	Test of effect of ambient temperature on the tripping characteristics				P
	a) Ambient temperature of (35 ± 2) K below the ambient air reference temperature	-5 °C			P
	Test current 1,13 I_N (A)	71,2 A			P
	- Passed for 1h				P

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Clause	Requirement + Test	Result - Remark			Verdict
	- Passed for 2h				N/A
	Current is then steadily increased to 1,9 I_N (A) within 5s	119,7 A			P
	Tripping within	9#	10#	11#	--
	- 1h (≤ 63 A)	137 s	188 s	336 s	P
	- 2h (> 63 A)				N/A
	b) Ambient temperature of (10 ± 2) K above the ambient air reference temperature	40 °C			P
	Test current I_N (A)	63,0 A			P
	No tripping within				--
	- 1h (≤ 63 A)				P
	- 2h (> 63 A)				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	TESTS „E_2“ 3 samples	M80, D63, 1P			--
		29#	30#	31#	
9.12.11.4.3	**Test: E2 (Test at rated short-circuit capacity)**				P
	Rated short-circuit capacity (Icn).....:	10000 A			--
	Test circuit: figure .....:	Figure 3			--
	Test voltage 1,05 Un	243,2 V			--
	Prospective current.....:	10000 A			--
	Prospective current obtained.....:	10150 A			--
	Power factor .....:	0,45 - 0,5			--
	Power factor obtained.....:	0,48			--
	Sequence .....:	O - CO			--
	T (min).....:	3 min			--
9.12.9.2	Test in free air copper wire F': ☒ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	“a” = 45 mm			P
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm				N/A
	I_{Peak} (A) max. value .....:	29#	30#	31#	--
		4,9 kA	4,9 kA	5,0 kA	
	Max. I²t	29#	30#	31#	--
	L	62,2 kA^2s	63,6 kA^2s	55,7 kA^2s	P
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				--
9.12.12.2	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				P
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	253 V			P

IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
	The leakage current shall not exceed 2 mA	29#	30#	31#	P
	L	< 1,4 mA	< 1,4 mA	< 1,4 mA	P
	Electric strength test:				P
	Test voltage 1500 V (see 9.7.3)	900 V			P
	a)				P
	b)				N/A
	c)				P
	d)				N/A
	e)				N/A
	Test current 2,8 I_N	176,4 A			P
	Tripping within > 0,1 s up to	29#	30#	31#	--
	- 60 s				N/A
	- 120 s	55 s	46 s	40 s	P

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Clause	Requirement + Test	Result - Remark	Verdict

	TESTS „E2“ 3 samples	M80, D63, 2P			--
		15#	16#	17#	
9.12.11.4.3	**Test: E2 (Test at rated short-circuit capacity)**				P
	Rated short-circuit capacity (Icn).....:	10000 A			--
	Test circuit: figure .....:	Figure 3			--
	Test voltage 1,05 Un	424,2 V			--
	Prospective current.....:	10000 A			--
	Prospective current obtained.....:	10150 A			--
	Power factor .....:	0,45 - 0,5			--
	Power factor obtained.....:	0,48			--
	Sequence .....:	O - CO			--
	T (min).....:	3 min			--
9.12.9.2	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	“a” = 45 mm			P
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm				N/A
	I_{Peak} (A) max. value .....:	15#	16#	17#	--
		5,2 kA	4,9 kA	5,0 kA	
	Max. I²t	15#	16#	17#	--
	L1/L2	69,9 kA^2s	63,8 kA^2s	44,5 kA^2s	P
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				--
9.12.12.2	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				P
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	440 V			P

IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
	The leakage current shall not exceed 2 mA	15#	16#	17#	P
	L1 L2	< 1,4 mA < 1,4 mA	< 1,4 mA < 1,4 mA	< 1,4 mA < 1,4 mA	P
	Electric strength test:				P
	Test voltage 1500 V (see 9.7.3)	900 V			P
	a)				P
	b)				P
	c)				P
	d)				N/A
	e)				N/A
	Test current 2,8 I_N	176,4 A			P
	Tripping within > 0,1 s up to	15#	16#	17#	--
	- 60 s				N/A
	- 120 s	34 s	28 s	39 s	P

IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TESTS „E2“ 3 samples	M80, D63, 4P			--
		32#	33#	34#	
9.12.11.4.3	**Test: E2 (Test at rated short-circuit capacity)**				P
	Rated short-circuit capacity (Icn).....:	10000 A			--
	Test circuit: figure .....:	Figure 3			--
	Test voltage 1,05 Un	423,4 V			--
	Prospective current.....:	10000 A			--
	Prospective current obtained.....:	10130 A			--
	Power factor .....:	0,45 - 0,5			--
	Power factor obtained.....:	0,48			--
	Sequence .....:	O - CO			--
	T (min).....:	3 min			--
9.12.9.2	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	“a” = 45 mm			P
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm				N/A
	I_{Peak} (A) max. value .....:	32#	33#	34#	--
	L1	4,0 kA	4,2 kA	4,5 kA	
	L2	4,8 kA	4,2 kA	4,4 kA	
	L3	2,4 kA	5,0 kA	4,4 kA	
	Max. I²t	32#	33#	34#	--
	L1	46,8 kA^2s	42,9 kA^2s	39,6 kA^2s	P
	L2	45,2 kA^2s	30,5 kA^2s	44,1 kA^2s	
	L3	9,0 kA^2s	57,4 kA^2s	43,4 kA^2s	
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				--
9.12.12.2	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				P

IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	440 V			P
	The leakage current shall not exceed 2 mA	32#	33#	34#	P
	L1 L2 L3 L4	< 1,4 mA < 1,4 mA < 1,4 mA < 1,4 mA	< 1,4 mA < 1,4 mA < 1,4 mA < 1,4 mA	< 1,4 mA < 1,4 mA < 1,4 mA < 1,4 mA	P
	Electric strength test:				P
	Test voltage 1500 V (see 9.7.3)	900 V			P
	a)				P
	b)				P
	c)				P
	d)				N/A
	e)				N/A
	Test current 2,8 I_N	176,4 A			P
	Tripping within > 0,1 s up to	32#	33#	34#	--
	- 60 s				N/A
	- 120 s	46 s	39 s	40 s	P

IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Annex E		--
	Special requirements for auxiliary circuits for safety extra-low voltage		N/A
	Annex J		--
	Particular requirements for circuit-breakers with screwless- type terminals for external copper conductors (In not exceeding 40 A, cross-sectional area up to 10 mm^2		N/A
	Annex K		--
	Particular requirements for circuit-breakers with flat quick-connect terminations		N/A
	Annex L		--
	Specific requirements for circuit-breakers with screw-type terminals for external untreated aluminium conductors and with aluminium screw-type terminals for use with copper or with aluminium conductors		N/A

IEC60898_1D - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

Annex 1

ATTACHMENT TO TEST REPORT IEC 60898-1
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES
Circuit-breakers for over current protection for household and similar installations
Part 1 - Circuit-breakers for a.c. operation

Differences according to..... : EN 60898-1:2019

Attachment Form No..... : EU_GD_IEC60898_1D

Attachment Originator ..... : DEKRA Certification B.V.

Master Attachment..... : 2019-06-18

	CENELEC COMMON MODIFICATIONS (EN)	P
Test item particulars:	Circuit-breakers for overcurrent protection	P
Type of circuit-breaker ..... :	PB8H, PB8HN, PB8HQ, PB8H2, PB8N, PB8NN, PB8NQ, PB8N2, PB8LN, M80H, M100, M80, N8BH, VB8H, DB10H	P
Energy limiting class ..... :	☐ Class 1 ☒ Class 3 for B and C type	P
Value of rated operational voltage (Ue) and number of poles ..... :	☐ 230 V ☒ 230/400 V ☒ 400 V ☒ 1 P ☐ 1 P + N ☒ 2 P ☒ 3 P ☐ 3 P + N ☒ 4 P	P
Value of rated short-circuit capacities above 10 000 A up to and including 25 000 A..... :	☐ 15000 A ☐ 20000 A ☐ 25000 A	N/A
Rated impulse withstand voltage (Uimp)	4 kV	P

IEC60898_1D - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	Sequence A_1		--
6	**MARKING AND OTHER INFORMATION**		--
6.1	**Standard marking:**		--
	f) Rated short circuit capacity in A within a rectangle, without symbol “A”.....	10000 in a rectangle	P
	h) calibration temperature, if different from 30°C		N/A
	m) ..... Energy limiting class in a square in accordance with annex ZA.	3 in a rectangle (checked on C63)	P
	Icn and the energy limiting class, when applied, marked both on the device and combined		P
	Irrespective of type (B, C or D), the manufacturer published in his literature the I^2t characteristic		P
	For rail mounting circuit-breakers, appropriate rail(s) are indicated in manufacturer’s documentation.		P
6.2	**Additional marking**		N/A
	Additional marking to other standards (EN or IEC or other) is allowed under the follow conditions:		--
	- the circuit-breaker complies with all the requirements of the additional standard;		--
	- the relevant standard to which the additional marking refers is indicated adjacent to this marking and is clearly differentiated or separated from the standard marking according to cl. 6.1		--
6.3	Guidance table for marking		--
	Each CB shall be marked in a durable manner with all or, for small apparatus, according the guidance table for marking.		P

	Short-circuit tests		
9.12	General		--
9.12.2	Value of the power frequency recovery voltage shall be equal to 110 % of the rated voltage.	Refer to main part of this report	P
9.12.3	Tolerances on test quantities		--
	Voltage (including recovery voltage) : 0, -5%		P
9.12.9.1	A circuit-breaker tested according to 9.12.9.2 needs not be tested according to 9.12.9.3.		P
9.12.9.2	In case no information is available, two grids, one above and one below the circuit-breaker, shall be used.		P
	For test currents up to and including 3000 A, the distance “a” is 35 mm.		P

IEC60898_1D - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

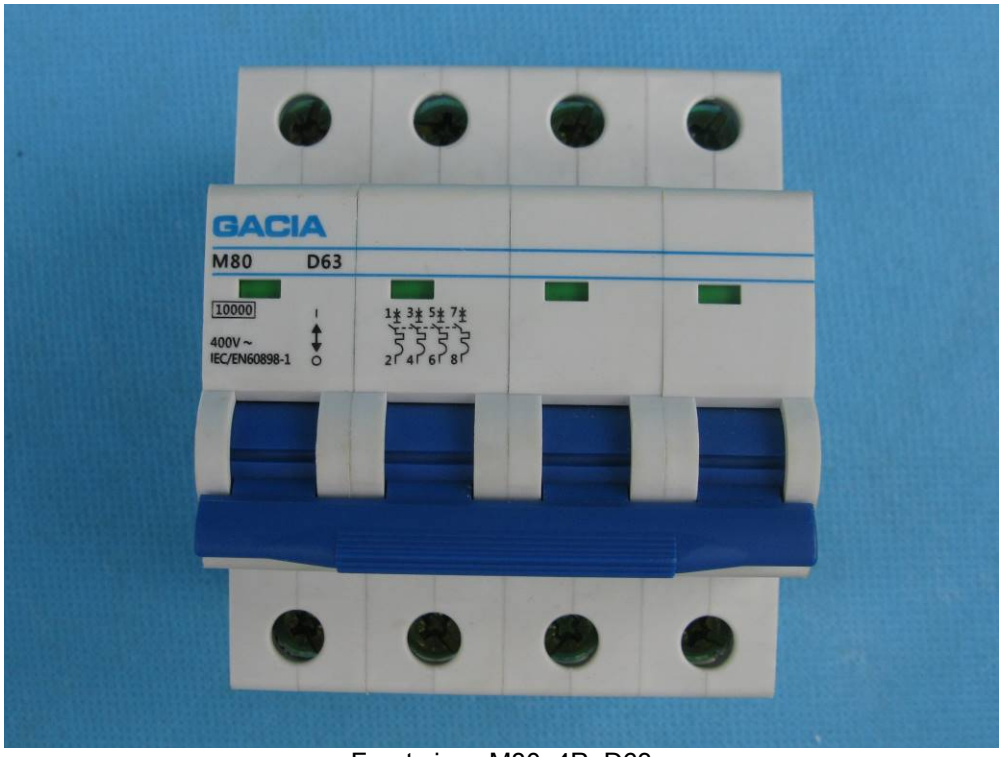
	Sequence D	M80, D63, 1P			--
		9#	10#	11#	
9.10	**Tests: D_O**				P
	If the tests are made in a test chamber, it shall be made in still air; the volume of the chamber shall not affect the test results.				P
9.10.3.4	☒ For circuit-breakers of the D – Type	See main part of this report			P
	Test current $10I_N$ (A), starting from cold				P
	Opening time:				P
	- 0,1 s ≤ t ≤ 4 s (10 A < In ≤ 32 A)				N/A
	- 0,1 s ≤ t ≤ 8 s (10 A ≥ In > 32 A)				P
9.10.2.2	Test current 2,55 IN (A) starting from cold for:	160,6 A			--
	opening time not less than 1 s or more than	9#	10#	11#	P
	- 60 s (≤ 32 A)				N/A
	- 120 s (> 32 A)	25 s	30 s	39 s	P

IEC60898_1D - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

	Annex ZC	--
	EN 60898-1 **Special national conditions**	--
	For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.	--
J.1	**Austria, Czech Republic, Netherlands, Norway and Switzerland**	--
	The upper limit of current for use of screwless terminals is 16 A	--
J.3.3	**Austria, Belgium, Denmark, France, Germany, Italy, Portugal, Spain and Sweden**	--
	Only universal screwless type terminals are accepted.	--
K.1	**Belgium, Italy and Spain**	--
	The use of circuit-breakers with flat quick-connect terminations for rated currents up to and including 20 A is accepted.	--
K.8.2.2	**Belgium, Italy and Spain**	--
	The use for rated currents up to and including 20 A is accepted	--

Photographs

Front view, M80, 1P, D63



Front view, M80, 4P, D63