TECHNICAL SPECIFICATION FOR CIRCUIT BREAKERS SB-1 & 2 FOR 3 PHASE ELECTRIC LOCOMOTIVES

SPECIFICATION NO.- CLW/ES/3/0037 ALT. I

DATE OF ISSUE :- 06.03.2003

ENCLOSURES :

1. **DRAWING OF CIRCUIT BREAKER**
2. **PLOT QX1 6A-DH9598**
3. **PLOT QX1 16A-DH8538**
4. **PLOT QX1 10A 9538**
5. **PLOT QX1 20A 8538**

ISSUED BY:
DY. CHIEF ELECTRICAL ENGINEER/D-II
CHITTARANJAN LOCOMOTIVE WORKS
P.O. CHITTARANJAN – 713331
DIST. BARDHAMAN (WEST), WEST BENGAL (INDIA)

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ALTERATION RECORD SHEET

Sl. No.	Date of Amendment	Page No.	Alteration	Reason	Authority
1.	06.03.2003	5	A	Flammability test included.	SD/-
2.	20.04.2005	5, 6	B	i) ABB Ident. No. corrected as per Category Book of Schem. Pos Nos: 127.3; 127.11; 310.4; 48.1; ii) This specification covered both WAG-9 & WAP-5 Locos. iii) One No. 6ADH9538 Circuit Breaker Load Distribution for BUR-1/2 included as per Category Book.	SD/-
3.	22.07.2010	6	C	As per Modification Sheet No. RDSO/2009/EL/MS/0375 (Rev.0) dtd. 27.03.2009. MCB (128.1) for AIR DRYER has been included in Sheet No. 6.	SD/-
4	08.11.2010	6, 10	D	Two nos. 6 Amps MCB has been provided for speed sensor monitoring as per Letter No. C-D&D/T/07 dtd. 01.10.2010.	SD/-
5	16.04.2014	5, 10	E	As per Letter No. ELE/T/5 dtd. 11.02.2014, Letter No. ELE/E/4 dtd. 14.03.2014 & Letter No. ELDD/3621 DTD. 24.03.2014 (I) 3 NOS. 10A MCB has been included for Aux. Converter in place of 3 nos. 6A MCB (ii) 2 nos. 10A MCB & one no. 10A MCB has been included for Hotel Load Converter & CCB Panel, (iii) 2 nos. 6A MCB has been included for SR Cooling Pump.	SD/-
6	09.01.2019	5	F	Use of 10A MCB in place of 6A for pneumatic panel as per Letter No. Nil dtd. 26.12.2018.	SD/-
7	27.03.2019	5, 6 & 10	G	i) As per Letter No. ELDD/3220 dtd. 19.03.2019, 01 no. of 10A MCB has been replaced by 02 nos. for Hotel Load and 01 no. of 10A MCB for CCB panel has been deleted. 02 nos. of 6A MCB for SR cooling pump has been deleted. ii) 02 nos. of 6A MCB for speed sensor has been deleted vide Letter No. ELE/T/16 dtd. 16.03.2019.	SD/-

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				iii) ABB new series of circuit is included vide Letter No. ELDD/QF/3 phase/155 dtd. 07.03.2019.	
8	22.03.2021	4, 5, 6, 9, 11, 12 to 15	H	i) Para 4.0 only deleted from Page No. 4. ii) 'For reference only', is added with Type at Page No. 5 & 6. iii)Para 12.0 and Note is deleted from Page No. 9. iv)'Mounting & overall dimensions shall be as per above drawing. The other dimensions of drawing are for guidance only', is included in Page No. 11. v) 'For guidance only', is included at Page No. 12 to 15. This has an approval as per Note No. ELDD/Misc. dtd. 26.02.2021	SD/-
9	24.12.2024	7	I	i) MCB 2 pole, 2A DC is added at page no. 7 for implementation of TMDDS as per RDSO MS 496 Rev '0'. ii) MCB 1 pole, 2A DC is added at page no. 7 for implementation of Signal interchanger Light as per RDSO MS 470	SD/-

Note:- Specifications have been digitized and all alterations have been incorporated.

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SPECIFICATION FOR CIRCUIT BREAKER FOR 3 PHASE ELECTRIC LOCOMOTIVES

1. SCOPE :-

This specification covers the manufacture and supply of CIRCUIT BREAKER for 3-Phase Electric Locomotive for 25 KV, 50 Hz system.

2. CLIMATIC AND ENVIRONMENTAL CONDITION:-

Maximum atmospheric temperature	+ 70°C (in sun) & + 50°C (in shade)
Humidity	100% saturation during rainy season
Reference site condition :	
Ambient Temperature	max. 55°C, min. : 0°C
Humidity	60%
Altitude	1000 in above mean sea level
Rain fall	Very heavy in certain areas. The locomotive will be designed in such a way as to permit its running at 10 Km/ hour in flood water level of 102 mm above rail level.
Atmosphere during hot weather	Extremely dusty and desert terrain in certain areas.
Coastal area	Locomotive and equipment will be designed to work in coastal areas in humid and salty laden atmosphere.
Vibration	The equipment sub-system and their mounting arrangement will be designed to withstand vibrations and shocks encountered in service as specified in corresponding IEC publication unless otherwise prescribed.

3. STANDARD : As per relevant IS/IEC VDE-0660, VDE-0641, VDE-0106, IEC : 60157-1, DIN-EN50022.
Flammability test as per IS: 11731 (Pt-I & II) :1986 or relevant standard for plastic components.

4. Drawings: The relevant drawings are given with the specification.

5. SUBMISSION OF TENDER QUOTATION:-

5.1 The tenderer shall give sufficient information to prove that his factory has adequate facilities and capacity to manufacture the above equipment.
5.2 Clause-wise comments on the specification and test programme.
5.3 Detailed drawings.
5.4 Past experience with supporting papers (if any).

6. This specification gives details of following Circuit Breakers:-

.**Circuit Breaker for SB1 & SB2**

SCH. No.	DESCRIPTION	LOCATION/ ABB IDENT NO.	QTY	SUB-ASSLY	TYPE (For Ref. only	RATING
127.3	CIRCUIT BREAKER DRIVER'S CAB	SB1 & SB2 HBTB 585555 R1023	05 No.	CIRCUIT BREAKER DC	DH 9538 S801X-10	10A 250V DC, 1POLE
127.12	CIRCUIT BREAKER PANTO/VCB CONTROL	SB1 HBTB 585555 R1013	1	CIRCUIT BREAKER DC	DH9538 S801X-6	6A 250V DC, 1 POLE
127.91	CIRCUIT BREAKER 24V/48V POWER SUPPLY	SB1 & SB2 HBTB 585555 R1013	2	CIRCUIT BREAKER DC	DH 9538 S801X-6	6A, 250V DC, 1 POLE
310.1	CIRCUIT BREAKER FRONT LIGHTING	SB1 & SB2 HBTB 585555 R1013	2	CIRCUIT BREAKER DC	DH 9538 S801X-6	6A, 250V DC, 1 POLE
127.1	CIRCUIT BREAKER ELECTRONIC TRACTION CONVERTER	SB1 & SB2 HBTB 585555 R1013	2	CIRCUIT BREATER DC	DH 9538 S801X-6	6A, 250V DC, 1 POLE
127.11	CIRCUIT BREAKER POWER SUPPLY GATE UNITS	SB1 & SB2 HBTB 585555 R1043	2	CIRCUIT BREAKER DC	DH 8538 S801X-20	20V, 250V DC, 1 POLE
127.2	CIRCUIT BREAKER BREAK MONITORING	SB1 & SB2 HBTB 585555 R1013	2	CIRCUIT BRERAKER DC	DH 9538 S801X-6	6A, 250V DC, 1 POLE
127.22	CIRCUIT BREAKER ELECTRONIC AUX. CONVERTER	SB1 & SB2 HBTB 585555 R1013	NIL	CIRCUIT BRREAKER DC	DH 9538 S801X-6	6A, 250V DC, 1 POLE
127.9	CIRCUIT BREAKER CONTROL ELECTRONICS	SB1 & SB2 HBTB 585555 R1013	4	CIRCUIT BREAKER DC	DH 9538 S801X-6	6A, 250V DC, 1 POLE

127.81	CIRCUIT BREAKER MONITORING 1	SB2 HBTB 585555 R1013	1	CIRCUIT BREAKER DC	DH 9538 S801X-6	6A, 250V DC, 1 POLE
127.75	CIRCUIT BREAKER VIGILANCE CONTROL	SB2 HBTB 585555 R1013	1	CIRCUIT BREAKER DC	DH9598 S801X-6	6A, 250V DC, 1 POLE
127.7	CIRCUIT BREAKER PNEUMATIC PANEL	SB2 HBTB 585555 R1023	1	CIRCUIT BREAKER DC	DH 9538 S801X-10	10A, 250V DC, 1 POLE
127.24	CIRCUIT BREAKER LOAD DISTRIBUTION FOR BUR ½	SB2 HBTB 585555 R1013	1	CIRCUIT BREAKER DC	DH 9538 S801X-6	6A, 250V DC, 1 POLE
127.82	CIRCUIT BREAKER COMMISSIONING-2	SB2 HBTB 585555 R1013	1	CIRCUIT BREAKER DC	DH 9538 S801X-6	6A, 250V DC, 1 POLE
310.7	CIRCUIT BREAKER MARKER LIGHT	SB2 HBTB 585555 R1013	1	CIRCUIT BREAKER DC	DH 9538 S801X-6	6A, 250V DC, 1 POLE
310.4	CIRCUIT BREAKER MR LIGHTING	SB2 HBTB 585555 R1033	1	CIRCUIT BREAKER DC	DH 8538 S801X-16	16A, 250V DC, 1 POLE
127.92	CIRCUIT BREAKER MEMOTEL SPEEDOMETER	SB2 HBTB 585555 R1013	1	CIRCUIT BREAKER DC	DH 9538 S801X-6	6A, 250V DC
48.1	CIRCUIT BREAKER AUXILIARY COMPRESSOR	SB2 HBTB 585555 R1033	1	CIRCUIT BREAKER DC	DH 8538 S801X-16	16A, 250V DC, 1 POLE
48.1	ACCESSORIES FOR CIRCUIT BREAKER AUXILIARY COMPRESSOR	SB2 HBTB 585557 R1200	1	ACCESSORIES	HK SS S800-AUX.	2 NO.
128.1	CIRCUIT BREAKER FOR AIR DRYER		1	CIRCUIT BREAKER DC		2 POLE, 3A, 220V DC , ICU-3KA, DIN Rail mounted.
129.1	CIRCUIT BREAKER FOR HOTEL LOAD (WAP-7 ONLY)	HBTB 58555R1033	1	CIRCUIT BREAKER DC	S 8013-10- DH 9538	10 A, 250 V DC, 1 POLE
For TMDDS	MCB FOR WAP-7 AND WAG-9/9H/9HC ONLY		1	CIRCUIT BREAKER DC	A9N61522	2 POLE,2A, 110V
For Signal interchanger Light	MCB for 3Ph loco		1	CIRCUIT BREAKER DC		1pole 2A 110V

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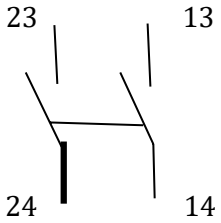
7. Auxiliary Contact HK

DCH 1A, 220 V DC

Technical Data HK

Rated voltage : 690 V AC
Rated current I_{th} : 10 A



Switching capacity

Operating life:	mech. 20000 operating cycles electr. 20000 operating cycles (AC 4 at 6A, 380 V AC)
Connection	1 x 0.5 …2 x 2.5 mm^2 single wire or 2x1.5 mm^2 fine wire
Connection screw	M3 pozidrive with self lifting clamping disc.
Installation	can be snapped to the side of Q at any time

Operating Life

Mechanical	: 20,000 operating cycles
Electrical	: 20,000 operating cycles
Connection	: 2 x 1.5 sqmm, Fine Wire
Connecting Screw	: M3 Pozidrive with self lifting clamp disc.
Installation	: Can be snapped to the side of Ckt. Breaker at any time.

8. Design, Constructional and Operation:

In the event of fault in electrical low voltage energy distribution systems, enormous energies may be released which have to be controlled in terms of safety reliability and continuity of the power supply by using circuit breakers.

Heavy duty circuit breakers are extremely energy limiting and are provided with thermal and Electromagnetic releases, protect against excessive heat in the event of over current due to overload short-circuit or earth leakage, hazardous current in the event of excessive contact Voltage due to insulation faults.

The heavy-duty circuit breakers are switched on by moving the operating handle into the upper position (related to the lettering level). The switch position "I" visible on handle. If the heavy-duty circuit breaker can be switched on again after tripping (switch position "O" visible), it must be assumed that an overload is the cause of the tripping. If the heavy-duty circuit breaker trips suddenly again when an attempt is made to switch it on, there is a full short circuit or earth leakage.

There is no point in making several attempts to switch on the circuit breaker if a short circuit or earth leakage exists. The heavy-duty circuit breaker will also trip in the event of an overload and short circuit or earth leakage if the lever is held in position "I" (trip free – release).

The ELCB part is switched off if both handles are in the bottom position (related to the lettering on the label). The switch position indication "O" is then visible on the handles.

Switching of : first move the right hand handle of the ELCB part into the upper position ("I" visible). Then move the left-hand handle of the breaker section into the upper position ("I" visible).

Indication of cause of tripping: In case of a short circuit or overload the breaker section trips (left-hand handle). If an earth leakage current causes the circuit breaker to trip the right-hand handle will also be in the OFF position.

MOUNTING: Snap on mounting on standard 35 mm rail in any position.

CONNECTION: Conductors are to be properly and tightly connected with the terminals. Maximum tightening torque 2 NM, for terminals of auxiliary and signal contacts 0.5 NM.

The tenderer shall submit design and constructional features of the item quoted in their tender quotation.

9. TESTS:

The Circuit Breaker shall be tested according to IEC-60157-I, P2.

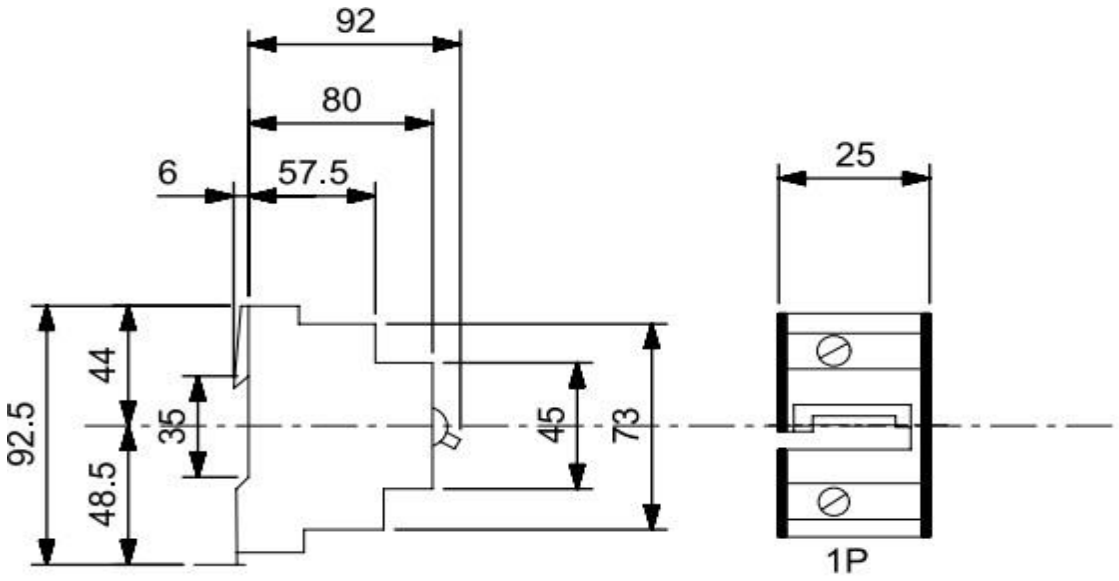
Alternatively, supplier may offer tests as per relevant IS/IEC at the time of submission of tender documents which shall be mutually agreed upon.

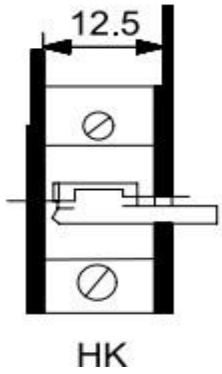
10. REFERENCE:

Supplier: CMC/Carl Maier & Cie AG,
Elektrische Schutzapparate,Postfach
CH-8201
Schaaffhausen, Switzerland Phone: 053 838 111, Telefax: 053 838 222

OPERATING CHARACTERISTICS CMC CIRCUIT BREAKER CLASS WAG-9

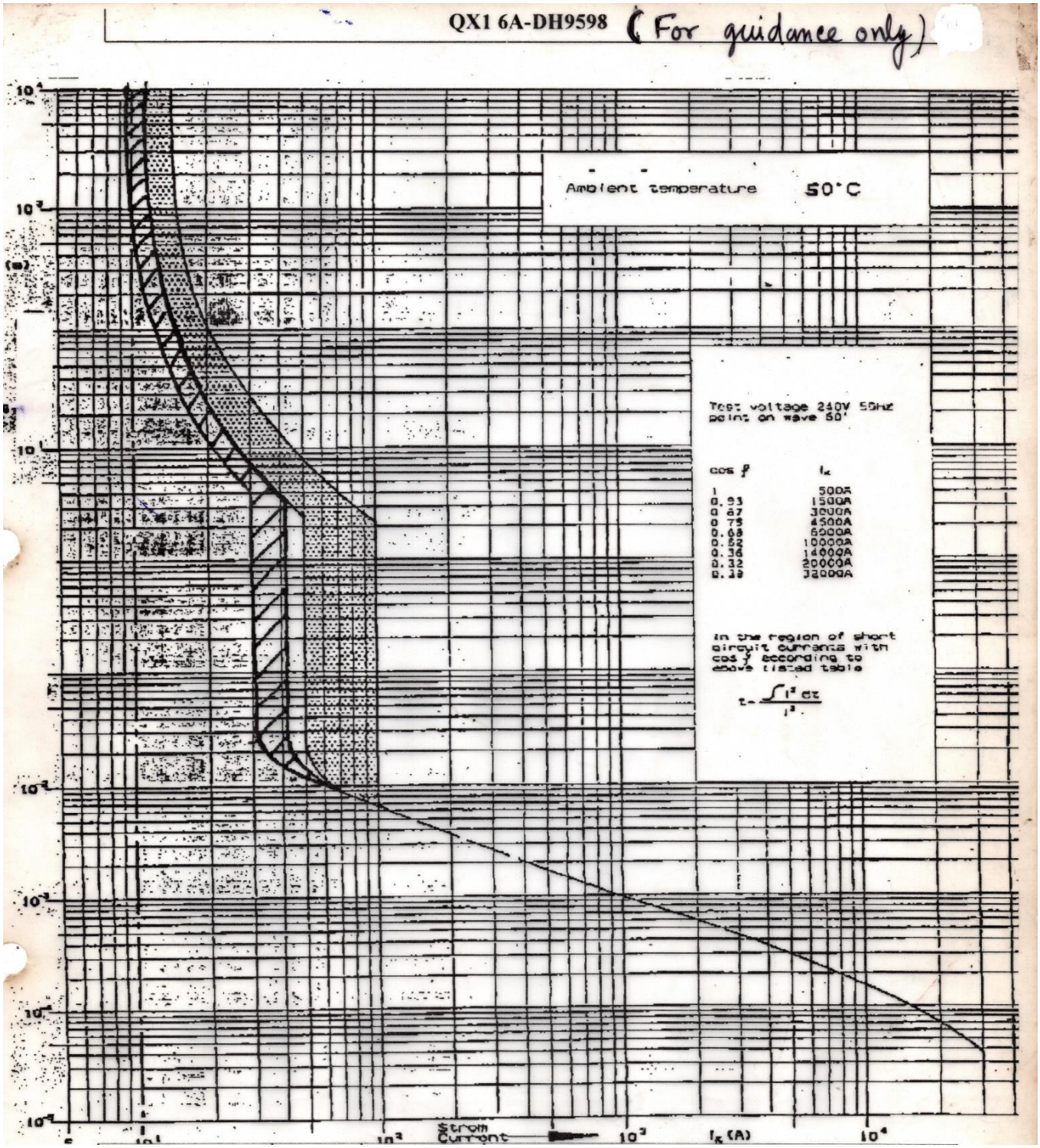
QX IDENT. NO.	NO. OF POLES	RATED CURRENT	SUPPLY	REF. CALIB TEMP	THERMAL TRIP	MAGNETIC TRIP	INT. RESISTANCE	S.C. CAPACITY	QTY./ Loo
QXI 16A DH 8538	1	16A	DC	50°C	1.4….1.75 X In	5….7 X In	0.0065 Ω	30 KA	2
QXI 6A DH 9538	1	6A	DC	50°C	1.5….1.9 X In	5….7 X In	0.0152 Ω	30 KA	19
QXI 20A DH 8538	1	20A	DC	50°C	1.4….1.75 X In	5….7 X In	0.0045 Ω	30 KA	2
QXI 10A DH 9538	1	10A	DC	50°C	1.5….1.9 X In	5….7 X In	0.0120 Ω	30 KA	6+1 (WAP-7)





NOTE:-MOUNTING & OVERALL DIMENSIONS SHALL BE AS PER ABOVE DRAWING.
THE OTHER DIMENSIONS OF DRAWING ARE FOR GUIDANCE ONLY.

ALL DIMENSIONS ARE IN mm.



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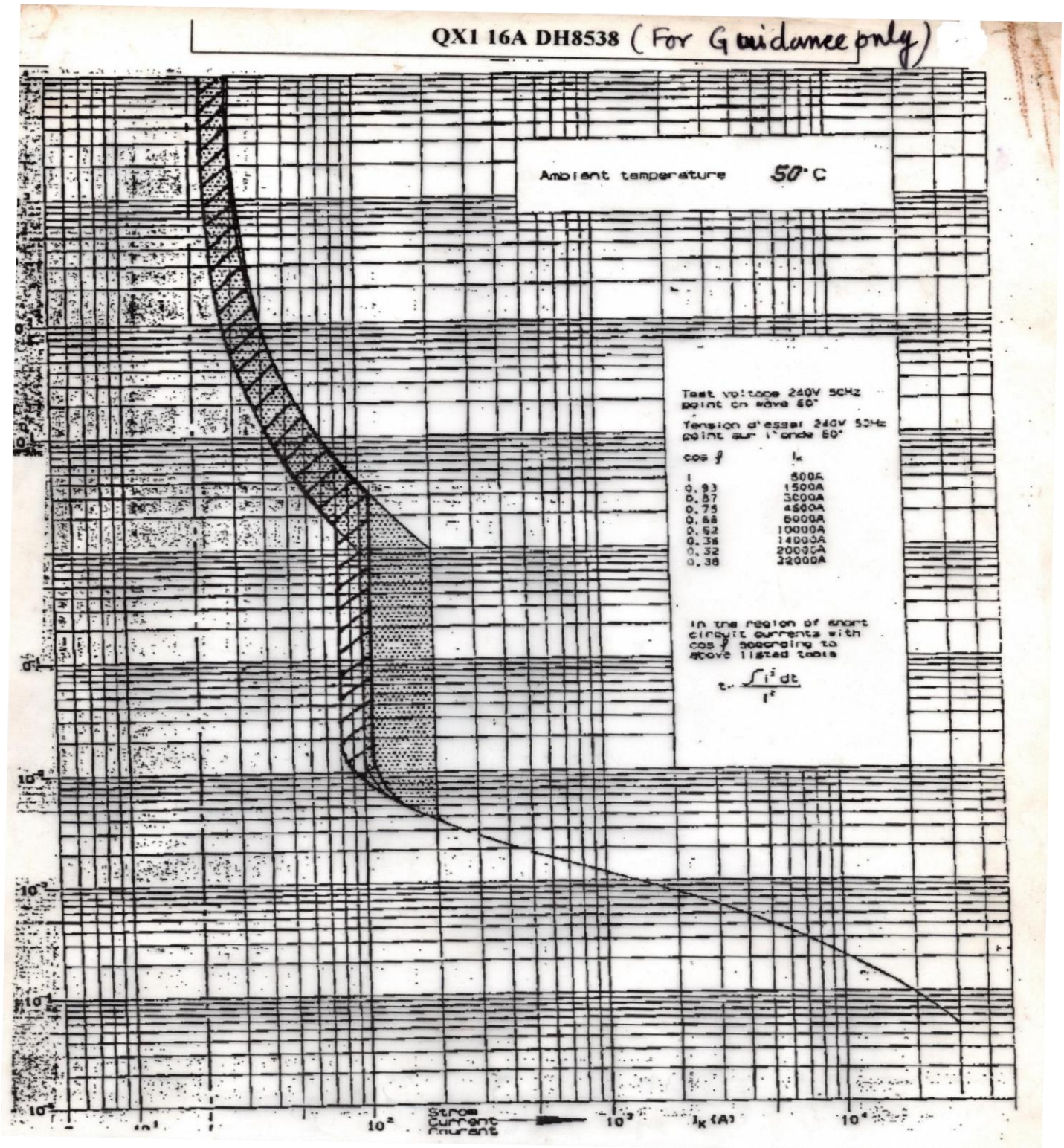

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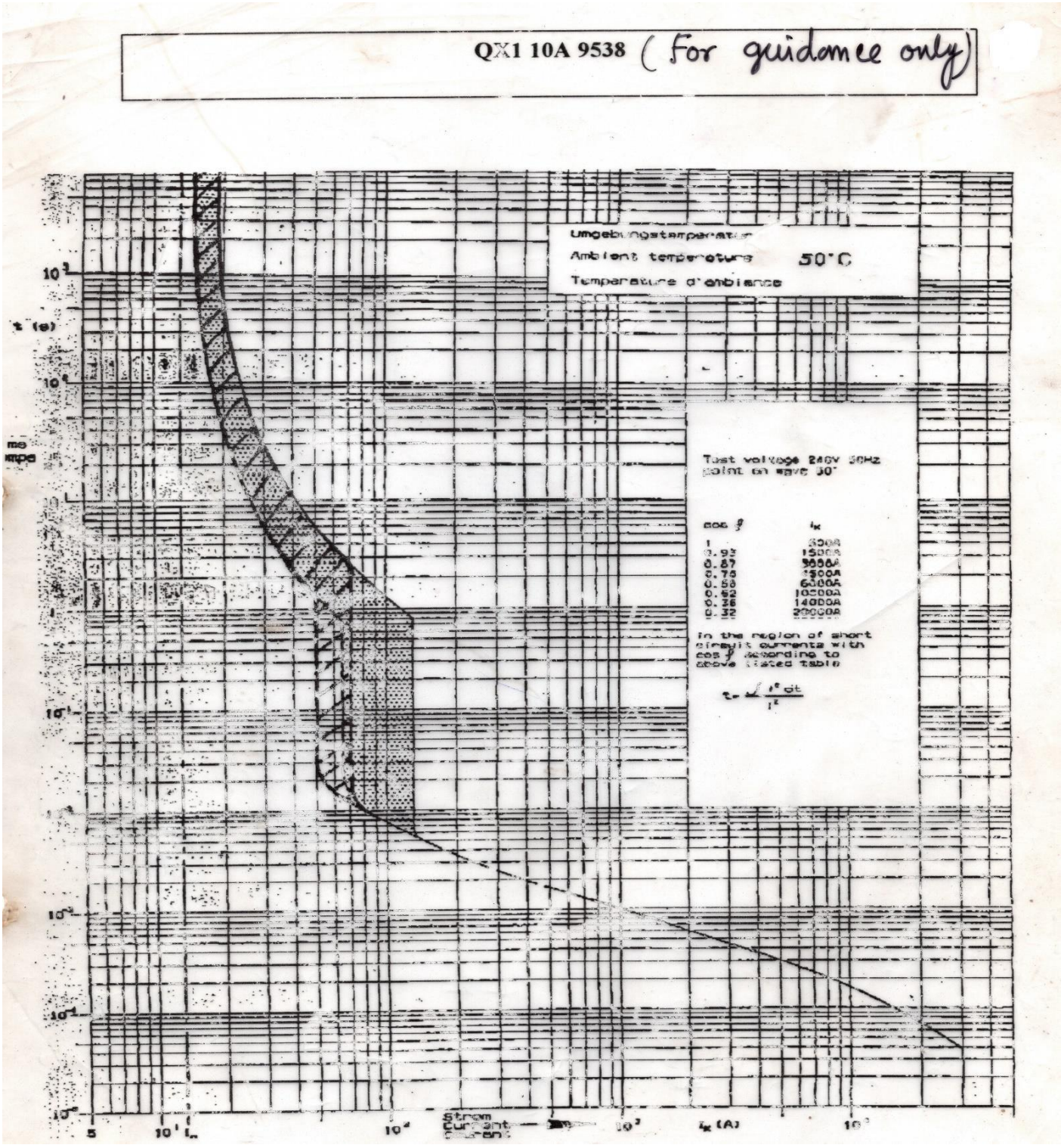

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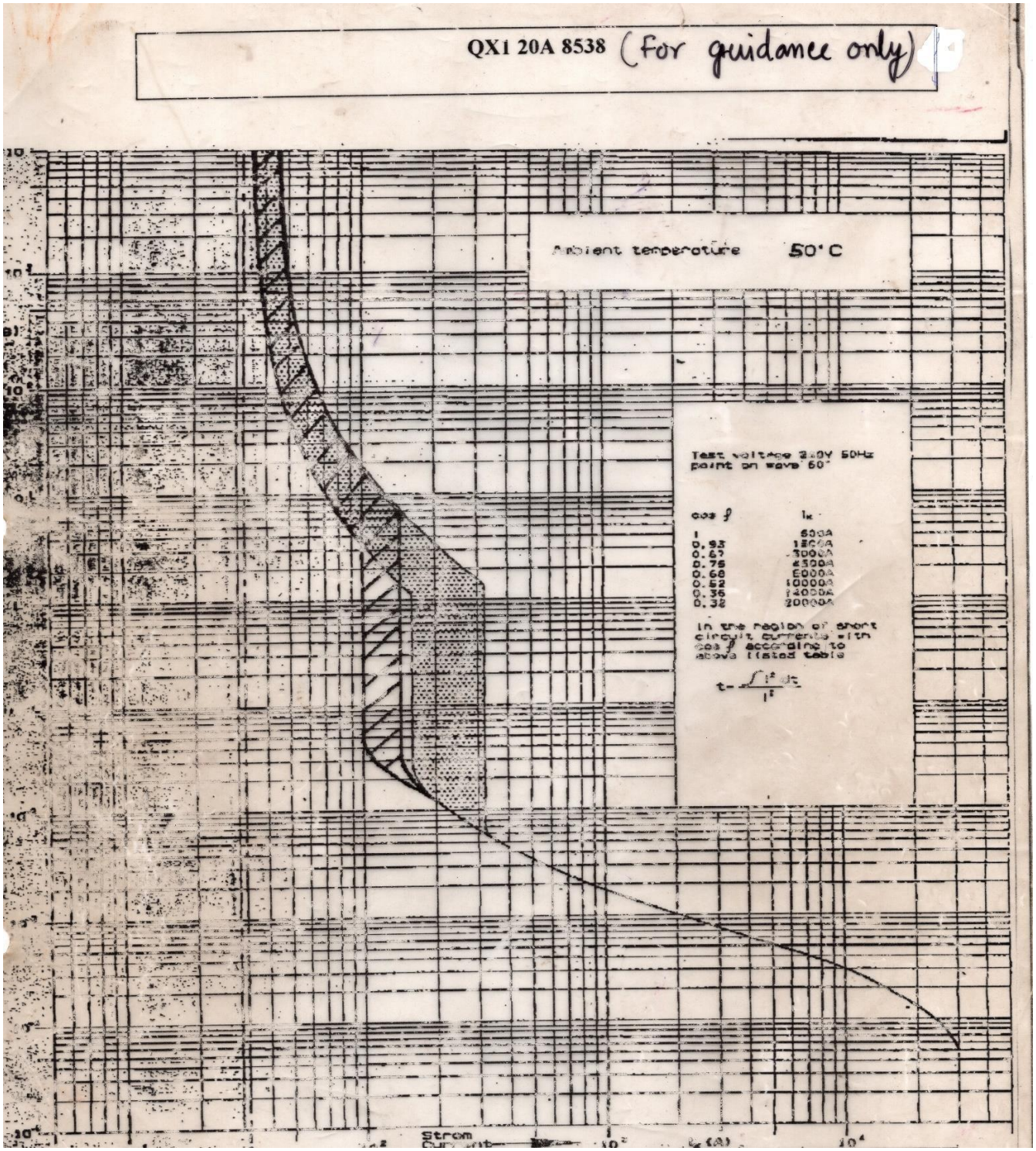

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