REQUEST FOR QUOTATION

MMI:PU:RF:003

BHARAT HEAVY ELECTRICALS LIMITED
Electronics Division
PB No. 2606, Mysore Road Bangalore - 560026
INDIA

RFQ NUMBER: AKSPROP008

RFQ DATE : 13.06.2022

Due Date/Day: 27.06.2022 MON
Time : 13:00 HRS
[redacted]

(address for communication) :

(for all correspondence)
Purchase Executive : ABHISHEK
Phone : 26998102
Fax : 00918026989215
E-mail: singh.abhishek@bhel.in

Sl No.	Description	Qty	Unit	Delivery qty	Delivery Date
1	TI0668104430 MINIATURE CIRCUIT BREAKER 2A 220VDC 6kA * HSN/SAC : 3921 MINIATURE CIRCUIT BREAKER 2A 220VDC 6kA [redacted]	250	NO	250	10.10.2022

Total Number of Items - 1

1.
2.

[redacted]

NOTES:
1. This RFQ is governed by:
a) INSTRUCTIONS TO BIDDERS/SELLERS and GENERAL CONDITIONS OF CONTRACT FOR PURCHASE available at **http://edn.bhel.com (RFQ-PO Terms & Conditions)**
b) Any other specific Terms and Conditions mentioned.
[redacted]

* The HSN/SAC no mentioned against the line items in the RFQ are indicative only.

For and On behalf of BHEL.

ABHISHEK
Control Equipment

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Revision History Sheet

Rev. No.	Date	Nature of Issue	Reasons	Prepared By	Approved By
00	01.02.2021	First issue		L Sunitha	Agosh Chandran R S

Revisions	00	Approved by: AGOSH CHANDRAN R S MANAGER/ TE		
		Prepared By:	Issue By:	Date:
		L SUNITHA DY.MANAGER/TE	TRACTION ENGINEERING	01-02-2021

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1. SCOPE OF PURCHASE SPECIFICATION

This purchase specification is intended to specify the requirements of Miniature Circuit Breakers upto 16Amp rating (henceforth will be abbreviated as MCB in this document) for Rolling Stocks Applications only.

The requirement of MCBs specified in this purchase specification will be used inside Control Panels of Rolling Stock Projects for protection of Power and Control Circuits.

The vendor has to confirm in writing his complete compliance with this specification (where ever required the respective test certificate also to be provided) and associated techno-commercial terms. If the vendor has any queries regarding specifications, it is his responsibility to get the same clarified from the purchaser before submitting the offer. If during approval stage any deficiency is found in the equipment offered, vendor has to provide the additional required components (if any) or make necessary modifications to comply with the specifications, without any cost and time implications to BHEL.

Vendors shall be fully responsible for the supplied item(s). The compliance to this specification does not absolve the vendor of his responsibility towards contractual obligations with regards to completeness, proper selection, satisfactory operation and maintenance.

Item supplied shall be of proven quality both with respect to design and materials.
Prototype item of an experimental nature shall not be offered or supplied. The system shall have well proved system records. In the event of any conflict with the specifications, datasheets, related standards, codes etc. the vendor shall refer the matter to the purchaser for the clarification and only after obtaining the approval/concurrence from the Purchaser vendor should proceed with the manufacture/engineering and supply of the item in question.

2. DEFINITION

MCBs or Miniature Circuit Breakers are electromechanical devices which protect an electric circuit from an overcurrent. The overcurrent, in an electrical circuit, may result from short circuit, overload or faulty design.

3. WORKING PRINCIPLE

Whenever continuous over current flows through MCB, the bimetallic strip is heated and deflects by bending. This deflection of bimetallic strip releases mechanical latch. As this mechanical latch is attached with operating mechanism, it causes to open the miniature circuit breaker contacts, and the MCB turns off thereby stopping the current to flow in the circuit. To restart the flow of current the MCB must be manually turned ON. This mechanism protects from the faults arising due to over current or over load.

But during short circuit condition, current rises suddenly, causing electromechanical displacement of plunger associated with a tripping coil or solenoid. The plunger strikes the trip lever causing immediate release of latch mechanism consequently open the circuit breaker contacts.

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4. GENERAL INFORMATION

A. Category: Low voltage product and system.
B. Should be a current limiting device.
C. Should have unique bus connection system on the input side
D. Product should be IEC, EN or CE certified.
E. Mounting should be on DIN rail (35mm size).
F. It should have finger safe terminals.

5. TECHNICAL REQUIREMENTS:

Sl.No.	Characteristics	Acceptance Criteria
A.	Standards	IEC61373 (Resistance to Shock & Vibration)
B.	Min. operating voltage	12V
C.	Trip Characteristic	Min. 5 to Max. 15 times of the rated current. (Tripping Char. C or K is acceptable) (Kindly refer figure-1 on the next page for the trip characteristic)
D	Application Voltage	690Vac, 3ph / 110V dc / 220 V dc Same MCB should be suitable for use in both AC & DC Circuits. Vendor has to give compliance certificate in this regard.
E.	Rated current (In):	2A - 16 A (based on the type of MCB)
F.	Voltage interrupting capacity for nominal voltage 110Vdc/110Vac,1ph	10kA
G.	Frequency (for 110Vac 1Ph)	50 / 60 Hz
H.	Protection category:	Minimum IP20
I.	Combination with auxiliary contact	To be compulsorily provided for Type-B.
J.	Wire Size for Main (power) terminal	Terminal shall be suitable for copper cables of conductor cross section 1.0 sq.mm. to 35 sq.mm. and should be suitable for standard bus bar connection on Input terminals.
K.	Wire Size for Auxiliary contact terminal	Max. 2.5 sq.mm. and less
L.	Mounting of MCB	On DIN rail 35 mm, acc. to EN 60715
M.	Storage temperatures	-5°C to + 55°C
N.	Working Ambient temperatures:	-5°C to +55°C Ambient temperature may go upto +70°C. The technical offer shall specify the design temperature. (Supplier to provide de-rating curve from the design temperature)
O.	Maximum Dimension (including Auxiliary Contact	Max. Length: 120 mm Max. Width: 50 mm Max. Depth: 90 mm.

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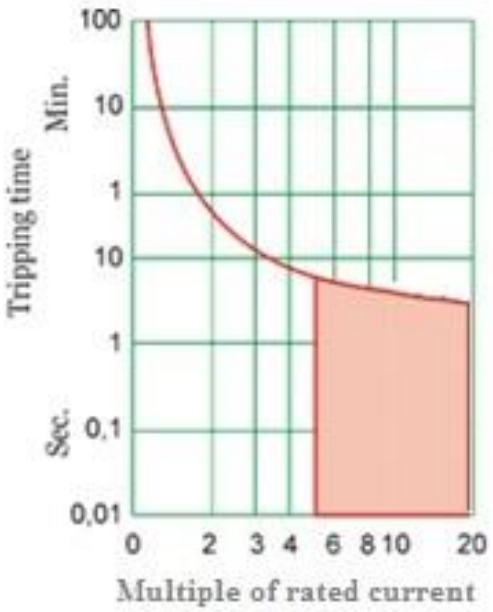

Figure-1: Tripping Characteristics of MCB required under this specification

6. ENVIRONMENTAL CONDITIONS

a. **Relative Humidity:** >90% saturation during rainy season.
b. **Ambient Temperature:** -5°C to +55°C, which may go upto +70°C.
c. **Altitude:** MCBs and accessories should work satisfactorily at any altitude between 0 and 1776m above mean sea level.

Note: Supplier to mandatorily provide conformance certificate (along with Technical Offer) of the offered items complying to the Environmental conditions as above.

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7. SCOPE OF SUPPLY

TYPE No.	Brief Description	Material Code
MCBs for Universal AC & DC Application		
TYPE-A	Single Pole MCB, **2 Amp** for AC/DC Circuit. (Nominal operational voltage: 253Vac / 220Vdc) Rated Ultimate Short-Circuit Breaking Capacity (220Vdc) – 6 kA Tripping Char: As described in Section-5, Sl. No. C of this document.	**TI0668104430**
TYPE-B	Three Pole MPCB over load release, **4-6/6.3 Amp** for AC Circuit **with Auxiliary Contact #** **(Auxiliary Contact may be in-built with the Main MCB or may be removable. Supplier can provide Auxiliary Contact on either left, right or bottom side of the Main MCB).** (OPERATIONAL VOLTAGE:690VAC Aux Contact:1NO+1NC) Tripping Char: As described in Section-5, Sl. No. C of this document. *(Item to be supplied in assembled condition, i.e., Auxiliary Contact should be fixed with MCB)*	**TI0668127497**

8. WARRANTY

The material should be warranted against any defect arising out of the prescribed criterion for 18 months from the date of supply.

9. DOCUMENTATION

Bidder is required to be provided following documents compulsorily along with the technical offer otherwise the offer is liable to be rejected:

A. Compliance to the all the technical terms & conditions of this purchase specification.
B. Compliance to Section 5(D): Bidder should give written compliance that the offered MCB is suitable for both AC & DC application.
C. Compliance to Environmental Conditions as per Section-6.
D. Offered Part nos. of all items (MCB, Auxiliary Contact, End Caps, etc.) against each Type (Type-A to B) along with datasheet and dimensional drawing.
E. De-rating Chart/Curve of the MCB with respect to temperature, as per Section 5(N).
F. Type test certificate OR COC (Certificate of Compliance) of the offered items in compliance to IEC 61373 or EN61373 (resistance to shock & vibration).