INSTRUCTION TO PROCUREMENT ENTITY

Note:*This document is not a part of the specification. It's only guidance to the procurement entity and this shall not be provided to the bidder with the specification.*

The following information about the requirement has to be mentioned in the price schedule.

1. Requirement of with Enclosure/Without Enclosure (clause 1.0 Scope)
2. Details of Rated Current (clause 5.0 Technical Requirements)
3. No. of Poles (clause 5.0 Technical Requirements)

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CEB
SPECIFICATION

MINIATURE CIRCUIT BREAKER (MCB)

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CONTENTS

SPECIFICATION FOR MINIATURE CIRCUIT BREAKER (MCB)

1.0 SCOPE

This Specification covers the general requirements of the design, manufacture and testing of Miniature Circuit Breaker, to be used in place of Service Cut-outs to provide overcurrent and short circuit protection.

Miniature Circuit Breaker shall be supplied as indicated below.

a) MCB without Enclosure cover
b) MCB complete with Enclosure cover

2.0 SYSTEM PARAMETERS

(a)	Nominal voltage	400/230 V
(b)	System highest voltage	415/240 V
(c)	System frequency	50 Hz
(d)	Method of earthing	Effectively earthed Neutral Solidly earthed at Substation
(e)	System faults level	25 kA

3.0 SERVICE CONDITIONS

(a)	Annual average ambient tempeature	30 °C
(b)	Maximum ambient temperature	40 °C
(c)	Maximum relative humidity	90%
(d)	Environmental conditions	Humid tropical climate with polluted atmosphere
(e)	Operational altitude	From M.S.L. to 1900 m above M.S.L.
(f)	Isokeruanic (Thunder days) level	90 days

4.0 APPLICABLE STANDARDS

The equipment and components supplied shall be in accordance with the latest editions of the standards specified below and amendments thereof.

(a)	IEC 60898-1 (2003)	Electrical accessories – Circuit Breakers for overcurrent protection for household and similar installations. – Part 1: Circuit Breakers for A.C. operation
(b)	IEC 60529	Degrees of protection provided by enclosures (IP Code)
(c)	SLS 1175: 2005	Circuit Breakers for Overcurrent Protection For Household and Similar Installations

However in the event of a discrepancy the order of precedence shall be as follows,

1. CEB Specification
2. SLS Standard
3. IEC Standard

5.0 TECHNICAL REQUIREMENTS

Rated Current (I_n)	6A, 16A, 32A or 63A
Rated voltage (V_n)	(i) 240V AC for single phase (ii) 415V AC for three phase
Rated impulse withstand voltage (1.2/50 µs)	4.0 kV peak
Rated Power frequency withstand voltage	1000V
Rated short circuit capacity	10kA
Clearance between live parts which are separated when the main contacts are in the open position (min.)	4mm
Clearance between live parts of different polarity (min.)	3mm
Tripping Characteristic	i) Overload tripping Conventional no tripping current - 1.13 I_n ii) Conventional Tripping current - 1.45 I_n Instantaneous Tripping - Above 5 I_n up to and including 10 I_n
No. of Poles	Single, Two , Three or Four pole as per clause 6.2 (a) of the specification
Degree of Protection	IP 20
Mechanical and electrical endurance	4,000 Nos. of operating cycles at rated current
Mounting	MCB : DIN rail Enclosure : Surface

6.0. BASIC FEATURES

6.1 Design

The Miniature Circuit Breaker shall be a compact electro-mechanical device for making, breaking and disconnecting a circuit in normal conditions and protecting circuit in abnormal conditions such as those of over-current and short circuit. The circuit breaker time current operating characteristics shall conform to type C, table 7 of IEC 60898-1.

The Miniature Circuit Breaker shall be of wire in, wire out type and basically comprise the following features;

(a) Independent Manually operated latched switching mechanism with trip free release.
(b) Arc-quenching chamber.
(c) Overload protection.
(d) Instantaneous Short circuit protection
(e) Safe Disconnection of load from the source.

The single phase Miniature Circuit Breaker shall be of Single or two pole type suitable for operating on 230V supply and three phase Miniature Circuit Breaker shall be of three or four pole type suitable for operating on 400 V supply.

6.2 Construction

(a) Miniature Circuit Breaker

Miniature Circuit Breaker of following classification shall be supplied with enclosure or without enclosure

(a) Single pole circuit breaker
(b) Two pole circuit breaker with one protected pole
(c) Three pole circuit breaker with three protected poles.
(d) Four pole circuit breaker with three protected poles.

The insulated case of the MCB shall be made out of moulded insulating material possessing high thermal stability and good mechanical strength to reasonably withstand rough usage without any fracture or permanent distortion.
The MCB shall be suitable for DIN rail mounting.

(b) Enclosure

The enclosure shall be made out of moulded insulating material possessing high thermal stability and good mechanical strength to reasonably withstand rough usage without any fracture or permanent distortion.

The material of the enclosure shall be UV protected and fire retardant. It shall be treated to withstand ultra violet radiation to prevent the deterioration of the material due to direct sunlight and shall withstand a temperature of 150°C.

The enclosure shall be suitable to fix MCB and shall be suitable for panel/surface mounting with screws. Necessary screws shall also be provided with the enclosure.

6.3 Terminals

The pillar terminals of the MCB shall have provision for accommodating and securely clamping the incoming and outgoing copper service wires sizes as indicated below;

Current ratings (A)	Sizes of service wire (mm^2)
6, 16, 32	16
63	25

Temperature rise for terminals and accessible parts shall conform to the Table 6 of IEC 60898-1.

6.4 Operating Mechanism

The Operating Mechanism of the MCB shall be of independent manual operation type (for closing and opening operation) and designed for automatic tripping on over-current and short circuit. The MCB Shall be provided with trip free mechanism

Both the "On" and "Off" positions of the Circuit Breaker shall be clearly indicated. The indication shall be clearly visible to the operator when the Circuit Breaker is mounted in the normal manner.

The operating mechanism of all the poles shall be according to the clause 8.1.2 of IEC 60898-1.

6.5 Contacts

The contacts shall comply with clause 8.1.4.4 of IEC 60898-1, be of high current carrying capacity with good arc resistance property.

The breaker shall be provided with arc chutes enclosing the contacts of each pole or a similar device which should serve to quench the arc during breaking.

6.6 Overload Release

A delayed over-current release shall be fitted in each phase with inverse characteristics.

6.7 Short Circuit Release

An instantaneous short circuit release shall be provided to trip the circuit breaker within 0.1 sec. during short circuit condition.

6.8 Mechanical and Electrical Endurance

The mechanical and electrical endurance of the Miniature Circuit Breaker shall not be less than 4,000 operating cycles conforming to IEC 60898-1.

7.0 QUALITY ASSURANCE

The manufacturer shall possess ISO 9001:2008 Quality Assurance Certification valid throughout the delivery period of this bid, for the manufacture of Miniature Circuit Breakers for the plant where the

Miniature Circuit Breaker is being manufactured. The Bidder shall furnish a copy of the ISO certificate certified as true copy of the original by the manufacturer, along with the offer.

8.0 OTHER MANDATORY REQUIREMENTS

8.1 Marking

Each Miniature Circuit Breaker shall be marked in a durable manner with the following particulars conforming to IEC 60898-1 and located in a place such that they are visible and legible when the circuit-breaker is installed.

(a) Manufacturer's name or Trade mark
(b) Type designation , Catalogue Number or serial Number
(c) Rated voltage
(d) Rated current (I_n), and instantaneous tripping type
(e) Rated frequency, if the circuit breaker is designed only for 50Hz
(f) Rated Short-circuit capacity, in amperes
(g) Indication of the open and closed position, with O and I respectively
(h) Applicable Standard & Number
(i) The letters "CEB" shall be engraved on the front side of the MCB cover. Stickers are not acceptable

8.2 Packing

The Miniature Circuit Breaker of same current rating, breaking capacity and number of poles shall be packed together in a box made out of biodegradable material. Each box shall contain a maximum of 100 MCB's of the same Type.

Each box shall be clearly marked with the following information;
(a) Name of Manufacturer
(b) Country of Manufacture
(c) Operating Voltage
(d) Rated Continuous Current
(e) Breaking Capacity
(f) Number of pole (Single phase/Three Phase)
(g) Quantity
(h) Gross Weight

9.0 INFORMATION TO BE SUPPLIED WITH THE OFFER

9.1 The following shall be furnished with the offer;

(a) Catalogue specifically indicating the type, technical literature of the MCB offered
(b) Duly filled schedule of particulars (Annex A)
(c) ISO 9001:2008 quality assurance certification
(d) Dimensional Drawing
(e) Time /current characteristic curve for each type/ rating
(f) Duly filled noncompliance schedule (Annex B). Even if there is no noncompliance, a nil report shall be submitted
(g) Documentary evidence to prove 10 years MCB manufacturing experience
(h) List of utilities outside the country of manufacture with contact details (name, email address, telephone number, etc), to whom the manufacturer has supplied MCB for past 10 years

9.2 Following Type Test Certificates conforming to IEC 60898-1 shall be provided with the offer.

(a) Indelibility of marking
(b) Reliability of screws, current carrying parts and connections
(c) Reliability of terminals for external conductors
(d) Protection against electric shock
(e) Dielectric properties and isolating capability
(f) Temperature rise
(g) 28 days test
(h) Tripping characteristic

(i) Mechanical and electrical endurance
(j) Short Circuit
(k) Resistance to mechanical shock and impact
(l) Resistance to heat
(m) Resistance to abnormal heat and fire
(n) Resistance to rusting

Test Certificates, performance curves, table, etc., based on the type tests conforming to the relevant standard shall be supplied along with the offer for evaluation purpose.

Test certificates referred to shall be from an **accredited independent testing laboratory acceptable to the purchaser**. Proof of accreditation by a national/ international authority shall be forwarded with the offer. Test reports shall be complete including all the pages as issued by the testing authority. Parts of test reports shall not be acceptable.

10.0 SAMPLE

Two samples, for each category of MCB offered shall be submitted with the offer. These samples shall not be return to the Supplier.

11.0 INSPECTION AND TESTING

11.1 Inspection

The Successful bidder shall make necessary arrangements for pre-shipment inspection by an Inspector sent by the CEB or by an Authority acceptable to the CEB to carry out in his presence necessary Sample / Acceptance tests on equipment and material offered. Routine test reports as per IEC 60898-1 shall also be made for the observation of the inspector.

11.2 Acceptance / Sample Test

The following Acceptance /Sample Test as per annex I of IEC 60898-1 shall be witnessed by the representative of the purchaser.

(a) Tripping tests
(b) Verification of clearance between open contacts

12.0 TECHNICAL LITERATURE AND DRAWINGS

In addition to the literature identified in clause 9.0, the followings also have to be submitted.
A minimum of 02 catalogues indicating the technical literature and dimensional drawings of the MCB shall be supplied with the MCB.

13.0 ANNEX

Annex A - Schedule of Particulars - To be filled by the manufacturer.
Annex B - Non Compliance schedule – To be filled by the manufacturer/bidder

Annex- A

SCHEDULE OF PARTICULARS

(Following Information shall be furnished with the offer for each rating)

1.	Applicable Standard	
2.	Manufacturer's name and Trade mark	
3.	Type /Model no.	
4.	No. of Poles	
5.	Rated frequency (Hz)	
6.	Rated operational voltage	
	i) Single Phase (V)	
	ii) Three Phase (V)	
7.	Rated Continuous current (A)	
8.	Rated short time withstand current (kA)	
9.	Type of over current release	
10.	Type of short circuit current release	
11.	Rated short circuit making capacity (peak) (kA)	
12.	Rated short circuit breaking capacity (rms) (kA)	
13.	Reference ambient air temperature (^{o}C)	
14.	Material of contacts	
15.	Type of moulded insulating material	
16.	Whether the switching mechanism is	
	(a) Manual Independent Operation Type	
	(b) Trip Free operation type	
17.	Size of the service wire which can be accommodated by the terminals of MCB	
	(a) Maximum	
	(b) Minimum	
18.	Whether the Arc Chute is provide to quench the arc.	
19.	Warranty period	
20.	Mean Service life (Avg. No. of operation)	

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Signature of the Manufacturer/bidder and seal **Date**

Annex – B

Non Compliance Schedule

On this schedule the bidder shall provide a list of non-compliances with this specification, documenting the effects that such on compliance is likely to have on the equipment's life and operating characteristics. Each non-compliance shall be referred to the relevant specification clause.

Clause No.	Non Compliance

…….. ……..……

Signature of the Manufacturer/bidder and seal **Date**