Specification for Rewireable Porcelain Cut Out Fuse Unit

Technical Specification for Rewire able Porcelain Cut Out Fuse Unit

Electrical Characteristics & Performance:

- The rated currents of fuse carriers & fuse bases are 16A, 32A, 63A, 100A, 200A, 300A, 400A & 500A.
- The re- wire able fuses shall comply with IS : 2086 as amended from time to time up to date unless otherwise stated elsewhere in this specification.
- The rated breaking capacity of the fuses up to 16A rating is 2 KA and for above 16A rating the same shall be 4 KA, at a p.f. not exceeding 0.4 (lag).
- The fuses wire shall conform to IS: 9962:1981 or latest amendment thereof, if any.
- The fuses wire shall be surrounded by an asbestos/porcelain tube for tending distribution of temperature symmetrically. However, it may not be necessary for rating up to 100Amps.
- The ends of the tubes shall be baffled by the construction of the body & holder so that flame cannot emit.
- The length of the fuse wire & mass of the terminals shall be so designed to give desired current- time characteristics of the fuse wire.
- The continuous rating of tinned-copper fuse wire in semi-enclosed fuses shall not be greater than 60% of their minimum fusing current.
- The fuse shall glow within 30 minutes when carrying 1.9 times its rated current.
- The fuse shall carry 1.6 times rated current for at least 30 minutes.
- The fuses unit shall be capable of withstanding the let through fault current corresponding to prospective fault current.
- The fuse carrier shall be capable to carry following size of fuse wires(tinned Copper Wire):
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Rated Current	Size of Fuse (mm)	Fusing Current
16Amps	0.5 mm	25 Amp
32Amps	0.9 mm	50 Amp
63Amps	1.6 mm	100 Amp
100Amps	2.0 mm	160 Amp
200Amps	2X2.3 mm	300 Amp

300Amps	2X3.2 mm	480 Amp
400Amps	2X3.66 mm	600 Amp
500Amps	2X4.0mm	800 Amp

Technical Specification for L.T Rewire able Porcelain Fuse Unit

Mounting-of Fuse Unit:

- The Fuse Unit can be mounted in an enclosed or open state at any angle on a vertical plain without impairing their performance.

Contacts:

- The contacts of Fuse Unit shall be robust construction and securely fixed on porcelain fuse base/ carrier and shall conform to the ; provision of IE Rule,1956 with latest amendments.
- Fixed and Moving Contact materials & other requirements: Annealed Electrolytic Copper duly electroplated with tin or silver to avoid oxidization above 500 C . For fuse up to 100A tin plating shall be used with 8-10 micron thickness of plating.
- Fixed contacts shall be of spring loaded reversible loop type for base & that for Moving contact (carrier) is knife contact type of 'U'SHAPE.
- The current density of contact material shall not exceed limit as per IS;2086;1993 or other applicable standard .
- The resistivity of contact material shall be less than0.017 micro ohm/meter.
- The melting point and specific heat of contact shall be 10800C & 375 J/KGK respectively.
- The magnitude of temperature rise of contacts at maximum ambient temperature of 400C for fixed & for carrier is 550C.
- The voltage drop cross contacts with carrier fully engaged with contacts shall not exceed the limit as stated in IS; 2086; 1993 or other applicable standards.
- The spring material of reversible loop base shall be of phosphor bronze.

Terminal Blocks:

- The terminal blocks shall be made of solid brass/solid copper alloy block of adequate mass to keep down the temperature of the fuse unit. The temperature rise of fuse contacts and terminals need be limited to lower values as far as possible up to 100% rated current for continuous operation to keep down the rate of contacts.
- Terminal blocks shall be of following sectional area and lengths to take cable connections by means of standard terminal screws up to 100A only. Above termination of Incoming/outgoing cables will be made extended copper strips of thickness not below the size specified as follows and also as stated in Annexure.

Rating	Min Acceptable Section Area(Including	Length (Min)	Dia of hole in Terminal Block and in extended Plate	Size of Extended Terminal Plate

	area of Hole)			
16 Amps	60 mm2	9 mm.	4.5 mm	Nil
32 Amps	80 mm2	9 mm.	5.5 mm	Nil
63 Amps	200 mm2	9 mm.	9.5 mm	Nil
100Amps	300 mm2	9 mm.	12.6 mm	Nil
200 Amps	700 mm2	9 mm.	10 mm (In Ex.Plate)	5 x31 mm2
300 Amps	1000 mm2	9 mm.	12 mm (In Ex.Plate)	6 x41 mm2
400 Amps	1100 mm2	9 mm.	12 mm (In Ex.Plate)	6 x46 mm2
500 Amps	1200 mm2	9 mm.	16 mm (In Ex.Plate)	7 x50 mm2

- The hole in the Terminal Block shall be of appropriate diameter to receive Aluminum Conductor of rated current carrying capacity.
- The brass socket of alum cable should have identical curre4nt carrying capacity of that of the cable. The extended plates should be adequately electro-tinned and provided with hole/brass bolts and nuts/washer for termination of Incoming/outgoing cable.
- To eliminate hazards of accidentally touching live parts, the extended terminals may be either provided with protective enclosure (for extended pert only)or duly insulated with heat shrinkage PVC Tube.
- The heat shrinkage PVC covering should be of 1.1 KV Grade.
- The following are the recommended cable size for different current rating of fuse.

Fuse Rating	Size of Aluminum	Overall Dia of Conductor
16Amp	1X6 mm2	2.80 mm
16Amp	1X6 mm2	5.10 mm
32Amp	1X35 mm2	7.50 mm
100Amp	1X70 mm2	11.2 mm

200Amp	1X95 mm2	12.50 mm
300Amp	1X120 mm2 (2 No Parallel)	14.5 mm
400Amp	1X185 mm2 (2 No Parallel)	17.5 mm
500Amp	1X300 mm2 (2 No Parallel)	22.5 mm

Withdrawal Force:

Fuse Rating	Withdrawal Force
16Amp	0.5 To 2.5 Kg
32Amp	1.5 To 5.5 Kg
63Amp	3 To 10 Kg
100Amp	4 To 10 Kg
200Amp	15 To 70 Kg
300Amp	15 To 70 Kg
400Amp	20 To 80 Kg
500Amp	20 To 80 Kg

Insulation Resistance:

- The insulation resistance of the fuse carrier & base contacts measured at a voltage of 500V D.C. between the following parts shall be as under;
- Between live terminals and exposed metal parts-10 Meg.Ohm.
- Between live terminals and outgoing terminals-10 Meg.Ohm
- The power frequency withstand value shall be 2 KV r. m. s. for 1 minute for 1-phase 240V, 16A & for all rating of 500A, 3- Ph. ,4- Wire shall be 2.5 KV r. m. s. for 1 minute.

Constructional Features of the Fuse Unit:

- The Fuse unit can be mounted in enclosed or open state at any angle on a vertical plain without comparing their performance.
- The fuse unit shall be manufactured from the best quality of materials available indigenous.
- The constructional features of the fuse unit shall be in accordance with the following stipulations in general.
- One Fuse base made of porcelain containing fixed contact which shall be connected to fixed terminal and shall be so constructed to engage suitably with the carrier contact.

- The fixed contacts shall be of reverse loop type to prevent any tendency to throughout the fuse carrier under service conditions specified in IS; 2086;1993.
- The phosphor bronze leaf shall be used to achieve the desired pressure of contacts.
- One Fuse base made of porcelain containing contacts with fuse element. The carrier contacts shall be suitable for engaging with fixed contact and capable of having a fuse element attached to it.
- The fuse holder shall be of grip type. The carrier contacts shall be 'U' shaped and of knife contact design.

Porcelain:

- The fuse and carrier shall be made from good quality porcelain which is made from felspar (It serves as the fluxing or melting constituents), Quarts and chins clay.
- The thickness of porcelain shall be 15 mm. minimum at fuse base and 20 mm. minimum for the grip of the handle for the fuse carrier.

Thickness of Porcelain:

- The fuse base and carrier shall be of robust design so as to impart sufficient mechanical endurance strength and withdrawal force to sustain impact from blown fuse and handling throughout its life.
- The thickness of porcelain shall be 15 mm. minimum at fuse base and 20 mm. minimum for the grip of the handle for the fuse carrier.

Marking On Ceramics:

- Every fuse carrier shall have marking clearly and indelibly cast, attached or permanently marked in the intended manner outside surface visible to operator.
- Rated Current.
- Rated voltage.
- Size of Fuse Wire.
- Nature of Supply.
- Manufacturers Trade/ Brand Name Mark.

Sealing:

- The holes in fuse carriers for fixing contacts shall be filled up with insulating grad ligur/epoxy based compounds to avoid accidental contact with the live parts.
- Live parts on the underside of the fuse base shall be either covered by a shield or barrier 3mm. below the surface of the base and covered with a water-proof insulating sealing compound which will not deteriorated or flow at a temperature lower than 1000C.

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