



BHEL-EPD

ELECTROPORCELAINS DIVISION
BENGALURU – 560012, INDIA
Purchase Specification
Group : Photovoltaic Module

SPEC. NO: PS-901-01-0001

REV. 04

JOB NO.-STD.

PAGE 01 OF 02

ALUMINIUM FRAMES & CORNER KEY - 3.2 mm

1.0 SCOPE:

1.1 Supply of Aluminum frame, Corner key with electrolytically formed anodic coatings on Aluminum & Aluminium alloy parts which are exposed to direct action of climatic elements (viz sun, wind, rain, dust, salt, water etc.)

2.0 GENERAL:

- 2.1 Aluminum parts to be anodized are made of Aluminium alloy (63400/6063) as per IS-733 and supplied in W P /T6 (temper condition).
- 2.2 End use of component is for Solar Photovoltaic module framing.
- 2.3 Anodizing process shall be as per Type-I: IS-7088
- 2.4 Type of sealing shall be as per IS-7088 (Clause 7)

3.0 DRAWING:

The Aluminum frame elements shall comply with the dimensional and other requirements given in the drawing as follows:

- a) 3-988-04-002-10 Aluminum Edge Frame
- b) 4-988-04-001-10 Main Extrusion
- c) 4-988-04-006-10 Corner Key

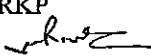
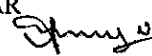

4.0 PACKING:

- 4.1 Frame members are to be wrapped with polythene cover or craft paper to avoid scratches
- 4.2 Frame members to be supplied shall be neatly stacked and packed in carton boxes.
- 4.3 Number of frames per carton box is to be decided so as the weight of the each carton box shall not be more than 30 kg.
- 4.4 The carton boxes as above shall be further neatly palletized for mechanized handling. The total weight of each pallet shall not exceed 1000 kg.

5.0 VISUAL REQUIREMENTS:

5.1 The anodic coating shall be continuous, smooth, adherent, uniform in appearance and shall be free from powdery areas, loose films and discontinuities such as breaks, scratches or other damages.

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Revision (04):	Issued By	Prepared By	Checked By	Approved By	Date
5 th Issue	SPV Eng.	RKP 	NAR 	CNP 	30.03.17



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6.0 SURFACE PREPARATION REQUIREMENTS:

6.1 After anodic coating, the parts shall comply with dimensional requirements of the applicable drawings.

- a) Extent of surface to be anodized : As per drawing
- b) Anodic Coating Thickness: 18±3 microns as per IS:1868 (AC 15 grade), Table 1
- c) Surface Texture: Natural matte finish
- d) Continuity: As per IS-8375
- e) Insulation: As per IS-8554, the break down potential of the coating shall not be less than 1000 V DC.
- f) Corrosion resistance: Each anodized and sealed member when tested as per IS-9000 (part XI) as per procedure 1 (5% salt solution) shall not show more than 5 isolated spots or pits (0.8 mm dia max).

7.0 NOTE:

- 7.1 Supplier shall produce test certificate from reputed labs for Sl. nos. 6.1 (d), (e) and (f) which shall not be older than one year as on the date of material supply.
- 7.2 Supplier shall ensure the clearance between the corner key and rectangular slot provided in the main frame extrusion for an interference fit, before commencement of mass manufacturing and also before dispatch of the material to BHEL.

8.0 TEST METHODS: VISUAL AND DIMENSIONAL

8.1 Parts selected in accordance with the sampling plan and tested for visual and dimensional checks shall comply with the BHEL Specification.

9.0 COATING THICKNESS:

9.1 Parts selected as per sampling plan and tested for coating thickness in accordance with IS-6012 shall comply with clause 6.1 (b).

10.0 SAMPLING PLAN:

10.1 Sampling Size: Single Sampling Plan as per IS-10673, Special Inspection Level S-4, AQL 1.0

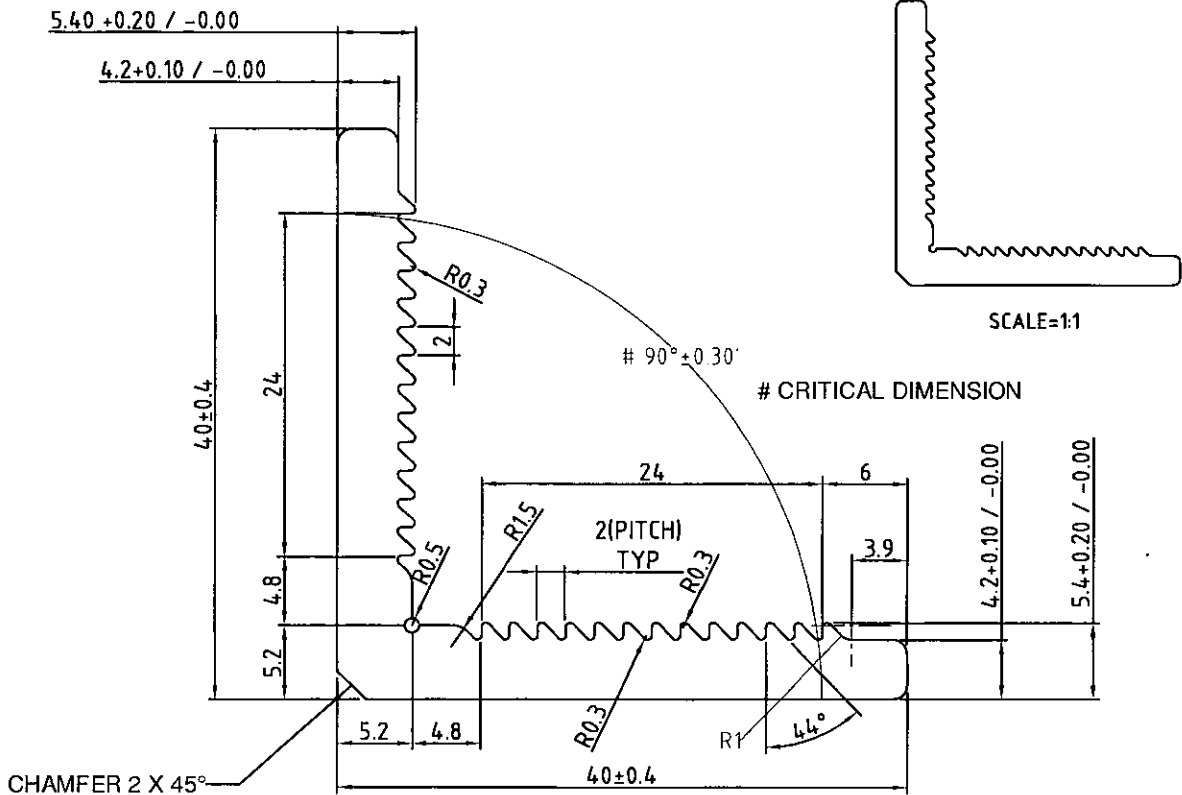
Revision (04):	Issued By	Prepared By	Checked By	Approved By	Date
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FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN MM)

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REV.	DATE	ALTERED	REV.	DATE	ALTERED	ADDITIONAL INFORMATION
		CHECKED	00		CHECKED	
		APPROVED			APPROVED	
FIRST ISSUE						STATUS OF DRAWING
						DISTRIBUTION OF PRINTS



MATERIAL : ALUMINIUM ALLOY - 63400 WP AS PER IS:733 (OR) 6063-T6.

- NOTE :**
1. DIMENSIONAL TOLERANCES FOR EXTRUDED ALUMINIUM AS PER IS:3965.
 2. HEAT TREATMENT CONDITION : WP (OR) T6.
 3. ESTIMATED WEIGHT Kg/m = 0.958
 4. ROUND OFF ALL SHARP CORNERS WITH 0.25 mm RADIUS.

REMARKS	ITEM NO.	DESCRIPTION	STD.	MATERIAL CODE	A	UNIT	UNIT Wt.(Kg)
				MATERIAL SPECN.	C		QUANTITY

SIGN & DATE		BHARAT HEAVY ELECTRICALS LIMITED, ELECTROPROCELAINS DIVISION, BANGALORE	DRN	NAME	SIGN.	DATE	No. OF VAR
			CKD	RKP	Sd/-	28.03.18	
			APPD	NAR	Sd/-	28.03.18	
				CNP	Sd/-	28.03.18	

DEPT. SPV	FOR UNSPECIFIED TOLERANCES		SCALE	WEIGHT (Kg)	REF. TO ASSY. DRG.	ITEM NO.	No. OF ITEM
CODE 901	REFER IS : 2102		2 : 1				

TITLE	DRAWING NO.	REV.
CORNER KEY EXTRUSION FOR SPV MODULE L20260P & L24300P	4-988-04-006-10	00
SHEET NO. 01	NO. OF SHEETS 01	

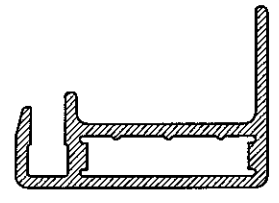
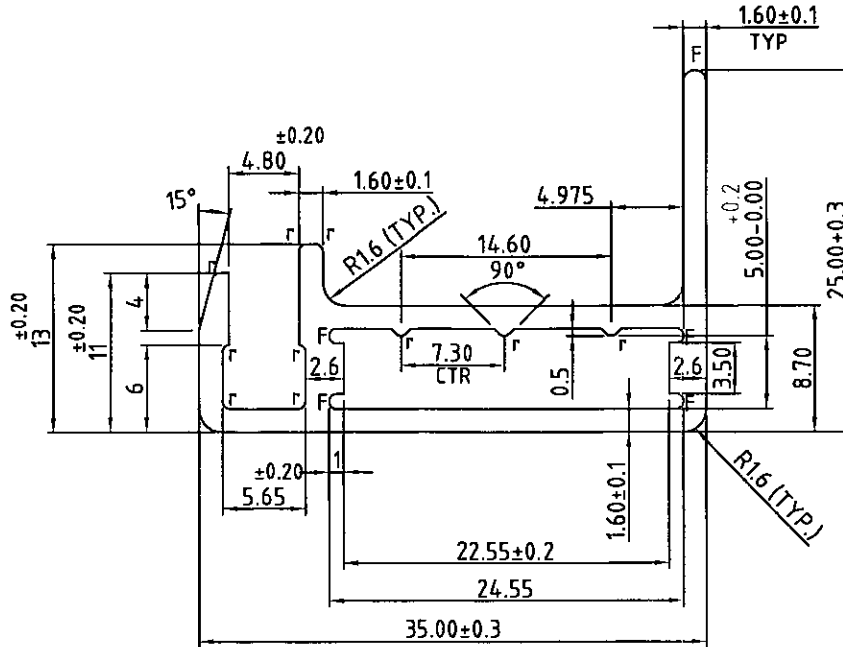
A4 SIZE

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN MM)

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01	280318	CHECKED	NAR	00		CHECKED	
		APPROVED	CNP			APPROVED	
Vendor extrusion Approval by BHEL Deleted Project 0.5 mm Dimension inside corner key cavity included.				FIRST ISSUE			STATUS OF DRAWING
							DISTRIBUTION OF PRINTS



SCALE=1:1

MATERIAL : ALUMINIUM ALLOY - 63400 WP AS PER IS:733 (OR) 6063-T6.

- NOTE :**
1. ALL UNSPECIFIED WALL THICKNESS - 1.6 ± 0.1.
 2. r-0.50, F - FULL RADIUS.
 3. DIMENSIONAL TOLERANCES FOR EXTRUDED ALUMINIUM AS PER IS:3965.
 4. HEAT TREATMENT CONDITION : WP (OR) T6.
 5. ESTIMATED WEIGHT Kg/m = 0.474.
 6. ROUND OFF ALL SHARP CORNERS WITH 0.25 mm RADIUS.

REF. DRG. NO.	REMARKS	ITEM NO.	DESCRIPTION	STD.	MATERIAL CODE	A	UNIT	UNIT Wt.(Kg)
					MATERIAL SPECN.	C		QUANTITY

SIGN & DATE		BHARAT HEAVY ELECTRICALS LIMITED. ELECTRPROCELAINS DIVISION, BENGALURU				DRN	NAME	SIGN.	DATE	No. OF VAR
						CKD	RKP	Sd/-	28.03.18	
							NAR	Sd/-	28.03.18	
						APPD	CNP	Sd/-	28.03.18	

DEPT. SPV	FOR UNSPECIFIED TOLERANCES REFER IS 2102	SCALE	WEIGHT (Kg)	REF. TO ASSY. DRG.	ITEM NO.	No. OF ITEM
CODE 901		2 : 1				

TITLE	DRAWING ND.	REV.
MAIN EXTRUSION FOR SPV MODULE-L20260, L24270P & L24300P	4-988-04-001-10	01
SHEET NO. 01	NO. OF SHEETS 01	

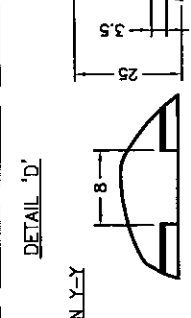
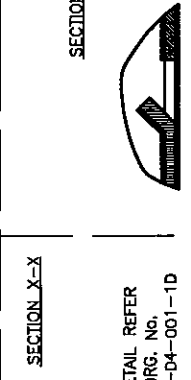
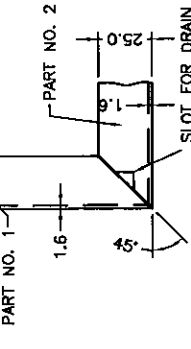
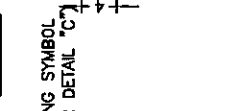
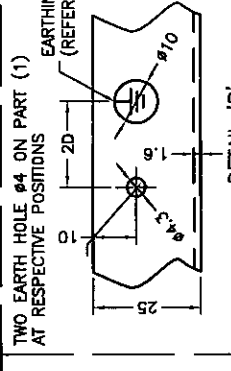
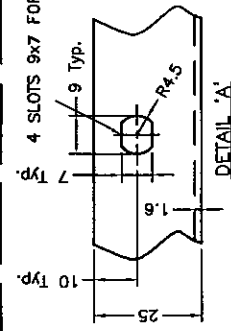
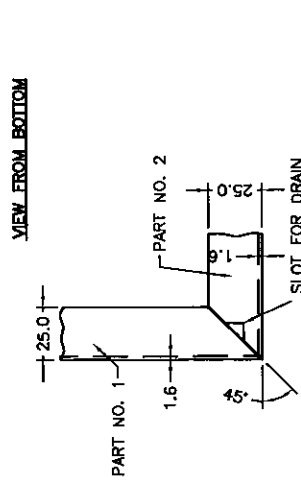
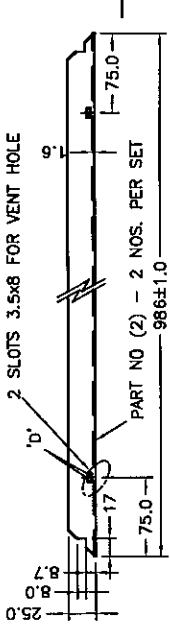
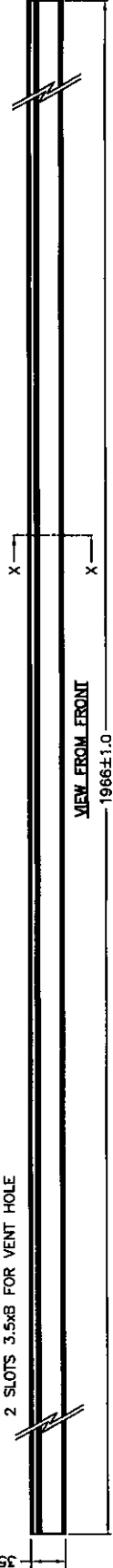
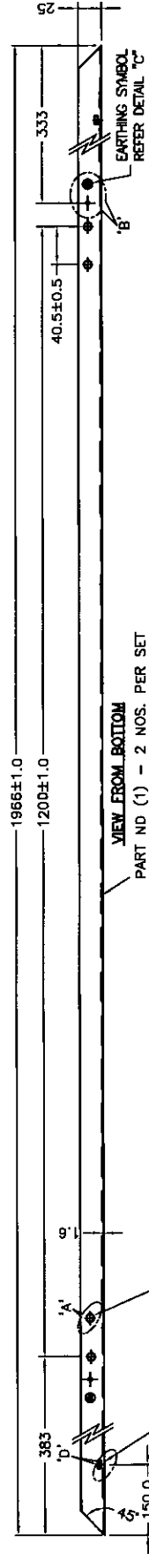
FIRST ANGLE PROJECTION

01-202-002-886-3

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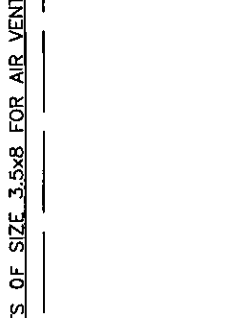
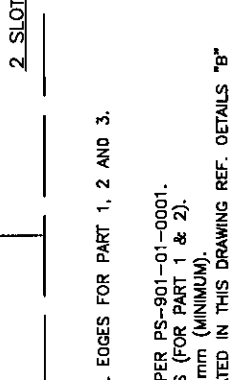
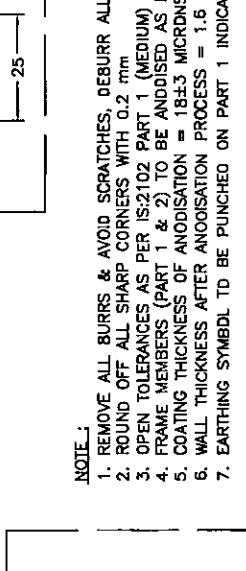
(ALL DIMENSIONS ARE IN mm)

8
7
6
5
4
3
2



REVISIONS
REV. DATE ALTERED CHECKED APPROVED
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FIRST ISSUE

PART NO (3) - 4 NOS. PER SET
FINISH : NATURAL



- NOTE ->
- REMOVE ALL BURRS & AVOID SCRATCHES, DEBURR ALL EDGES FOR PART 1, 2 AND 3.
 - ROUND OFF ALL SHARP CORNERS WITH 0.2 mm
 - OPEN TOLERANCES AS PER IS:2102 PART 1 (MEDIUM)
 - FRAME MEMBERS (PART 1 & 2) TO BE ANODISED AS PER PS-901-01-0001.
 - COATING THICKNESS OF ANODISATION = 18±3 MICRONS (FOR PART 1 & 2).
 - WALL THICKNESS AFTER ANODISATION PROCESS = 1.6 mm (MINIMUM).
 - EARTHING SYMBOL TO BE PUNCHED ON PART 1 INDICATED IN THIS DRAWING REF. DETAILS "B"

2 SLOTS OF SIZE 3.5x8 FOR AIR VENT

REV.	DATE	ALTERED	CHECKED	APPROVED	NAME	SIGN	DATE	DATE	SIGN	DATE	CODE
					DRAWN	RKP	Sd/-	31.03.18			
					CHECKED	NAR	Sd/-	31.03.18			
					APPROVED	CNP	Sd/-	31.03.18			
FIRST ISSUE											

ALTERNATED		CHECKED		APPROVED	

BHARAT HEAVY ELECTRICALS LIMITED. ELECTROPORCELAINS DIVISION, BENGALURU				CARD CODE	
TITLE: ALUMINIUM EDGE FRAME WITH CORNER KEY SPV MODULE NO. - L24300P				No. OF	01
				SHT	DT
INVENTORY NO.		M.O. No.		REV	
		3-988-04-002-10		00	
				AS SIZE	