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ELECTRIC & PHOTOVOLTAIC DIVISION
BENGALURU – 560012, INDIA
Purchase Specification
Group : Photovoltaic Module

SPEC. NO: PS-901-01-0001
 REV. 05 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 Aluminium 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.

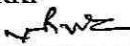
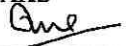
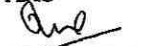
5.0 VISUAL REQUIREMENTS:

- 5.1 The anodic coating shall be continuous, smooth, adherent and 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 (05):	Issued By	Prepared By	Checked By	Approved By	Date
	SPV Eng.	RKP <i>[Signature]</i>	AKS <i>[Signature]</i>	AKS <i>[Signature]</i>	02.05.19

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	ELECTRIC & PHOTOVOLTAIC DIVISION		SPEC. NO: PS-901-01-0001		
BHEL-EPD	BENGALURU – 560012, INDIA		REV. 05	JOB NO.-STD.	
	Purchase Specification		PAGE 02 OF 02		
Group : Photovoltaic Module					
COPY RIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest of the company.	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 ISO: 2859-1 / IS: 10673, Special Inspection Level S-4, AQL 1.0				
Revision (05):	Issued By	Prepared By	Checked By	Approved By	Date
	SPV Eng.	RKP 	AKS 	AKS 	02.05.19

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First Angle Projection

(All dimensions are in mm)

REV.	DATE	ALTERED	RKP	REV.	DATE	ALTERED	RKP	ADDITIONAL INFORMATION	
01	02.05.19	CHECKED	AKS	00	28.03.18	CHECKED	NAR	STATUS OF DRAWING	
		APPROVED	AKS			APPROVED	CNP	DISTRIBUTION OF PRINTS	

CORRECTION IN NOTE
CHANGE IN BHEL UNIT NAME

FIRST ISSUE

5.40 +0.20 / -0.00

4.2+0.10 / -0.00

4.0±0.4

24

4.8

5.2

5.2

4.8

4.0±0.4

24

6

3.9

4.2+0.10 / -0.00

5.4+0.20 / -0.00

R0.3

R0.5

R15

R0.3

R0.3

R1

44°

2(PITCH)
TYP

CHAMFER 2 X 45°

90°+0 30°

CRITICAL DIMENSION

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SCALE=1:1

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 / EDGES.

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

DEPT. SPV

CODE 901

FOR UNSPECIFIED TOLERANCES
REFER IS : 2102

2 : 1

SCALE

WEIGHT (Kg)

REF. TO ASSY. DRG.

ITEM NO.

No. OF ITEM

BHARAT HEAVY ELECTRICALS LIMITED.

ELECTRIC & PHOTOVOLTAIC DIVISION, BANGALORE

DRN

CKD

APPD

RKP

AKS

AKS

SIGN.

SIGN.

SIGN.

02.05.19

02.05.19

02.05.19

No. OF VAR

TITLE

CORNER KEY EXTRUSION FOR
SPV MODULE

DRAWING NO.

4-988-04-006-10

REV.

01

SHEET NO.

01

NO. OF SHEETS

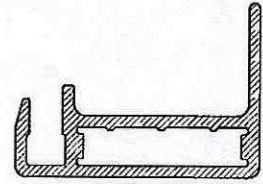
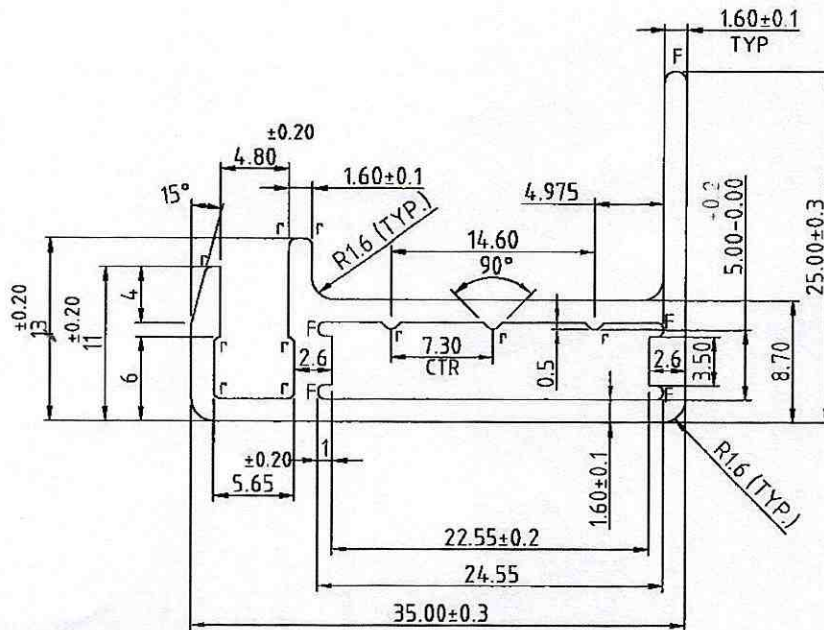
01

A4 SIZE

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN MM)

REV.	DATE	ALTERED	RKP	REV.	DATE	ALTERED	RKP	ADDITIONAL INFORMATION
01	280318	CHECKED	NAR	02	02.05.19	CHECKED	AKS	
		APPROVED	CNP			APPROVED	AKS	
Vendor extrusion Approval by BHEL Deleted				CORRECTION IN NOTE				STATUS OF DRAWING
Project 0.5 mm Dimension inside corner key cavity included.				CHANGE IN BHEL UNIT NAME				DISTRIBUTION OF PRINTS



SCALE=1:1

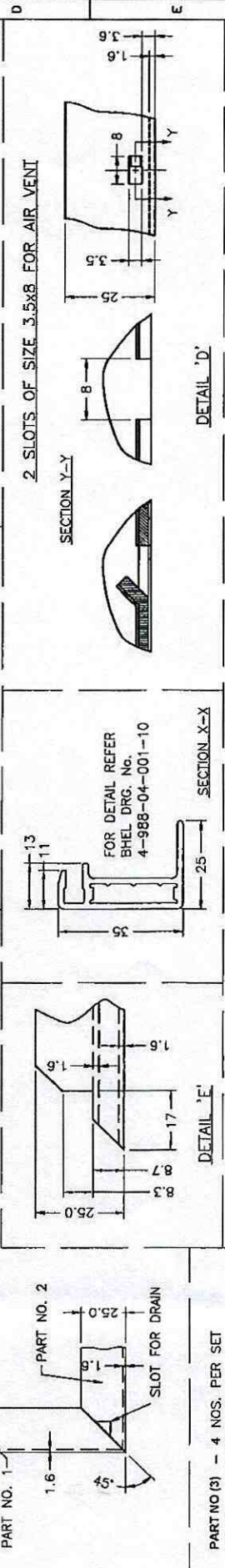
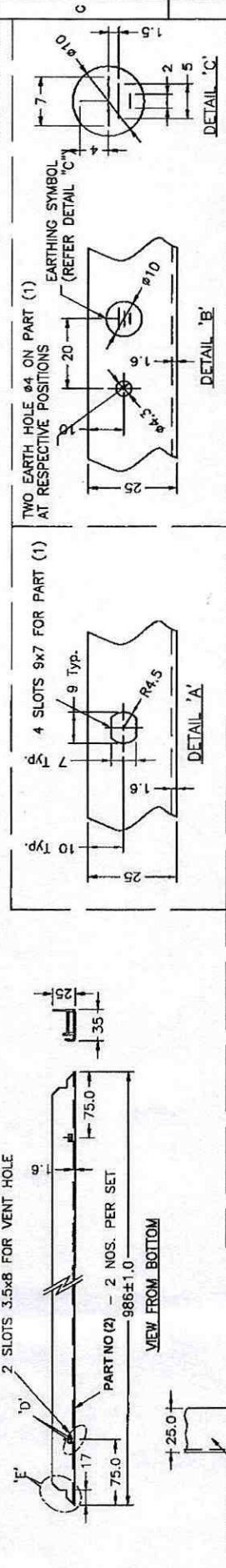
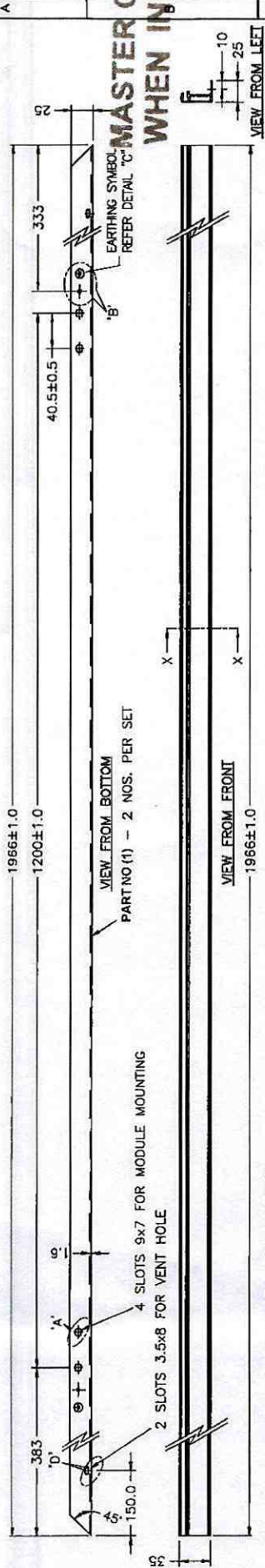
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MATERIAL : ALUMINIUM ALLOY - 63400 WP AS PER IS:733 (OR) 6063-T6.

- 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 / EDGES.

REF. DRG.NO.									
SIGN & DATE	REMARKS	ITEM NO.	DESCRIPTION	STD.	MATERIAL CODE	A	UNIT	UNIT Wt.(Kg)	
					MATERIAL SPECN.	C		QUANTITY	
INVENTORY NO.	BHARAT HEAVY ELECTRICALS LIMITED. ELECTRIC & PHOTOVOLTAIC DIVISION, BENGALURU				DRN	RKP	SIGN.	DATE	No. OF VAR
					CKD	AKS	<i>[Signature]</i>	02.05.19	
					APPD	AKS	<i>[Signature]</i>	02.05.19	
DEPT. SPV	FOR UNSPECIFIED TOLERANCES REFER IS 2102		SCALE 2 : 1	WEIGHT (Kg)	REF. TO ASSY. DRG.		ITEM NO.	No. OF ITEM	
CODE 901	TITLE MAIN EXTRUSION FOR SPV MODULE				DRAWING NO. 4-988-04-001-10				REV. 02
SHEET NO. 01					NO. OF SHEETS 01				

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NOTE :

1. REMOVE ALL BURRS & AVOID SCRATCHES, DEBURR ALL EDGES FOR PART 1, 2 AND 3.
2. ROUND OFF ALL SHARP CORNERS / EDGES.
3. OPEN TOLERANCES AS PER IS : 2102 PART 1 (MEDIUM)
4. FRAME MEMBERS (PART 1 & 2) TO BE ANODISED AS PER PS-901-01-00001.
5. COATING THICKNESS OF ANODISATION = 18 ± 3 MICRONS (FOR PART 1 & 2).
6. EATING SYMBOL TO BE PUNCHED ON PART 1 INDICATED IN THIS DRAWING REF. DETAILS "B".

SCALE NTS

REV.	DATE	ALTERED RKP CHECKED NAR	REV.	DATE	ALTERED RKP CHECKED AKS	SIGN	NAME	DRAWN	RKP	DATE	CARD CODE
01	20.08.18	APPROVED CNP	02	02.05.19	APPROVED SKG						
DIMENSION CORRECTED TO 8.3 FROM 8.0 IN DETAIL "E"			CORRECTION IN NOTE CHANGE IN BHEL UNIT NAME					CHECKED	AKS	02.05.19	BHARAT HEAVY ELECTRICALS LIMITED. ELECTRIC & PHOTOVOLTAIC DIVISION, BENGALURU ALUMINIUM EDGE FRAME WITH CORNER KEY 72 CELL SPV MODULE M.O. No.
								APPROVED	AKS	02.05.19	
						4				DRG. No. 3-988-04-002-10 REV 02	
						3				No. of SHTS 01 SHT No. 01 A3 SIZE	

Annexure -- I

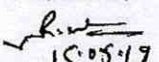
PR No. : 12301586 dt. 03.05.2019

Item : Aluminium Frame and Corner Block 3.2 mm

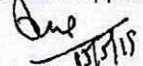
Qty. : 335,000 Sets

A.	PRE-QUALIFICATION CRITERIA	Bidder's Confirmation
		(Please indicate deviations, if any)
1.	The offer shall be quoted only by the original Aluminium Frame and Corner Block Manufacturers. However OEMs can also quote through their authorized channel partners/ dealers / representatives with a valid authorization certificate	Manufacturing Plant Location: (Complete Address & Contact Details)
2.	Vendors should have a minimum of 2,000,000 (Two million) Sets per annum production capacity for Aluminium Frame and Corner Block.	Annual in-house manufacturing capacity for Aluminium Frame and Corner Block.....Sets Vendors should provide Documentary evidence for demonstrating their plant capacity published by the way of published annual reports, business licences, third party certification, consent / authorization Issued by local government authorities etc... (Any one of the above indicated document certifying plant capacity will suffice)
3.	Vendors should have supplied solar Aluminium Frame and Corner Block of minimum 800,000 (Eight hundred thousand) per annum to reputed SPV Module manufacturers. The reputed module manufacturer should have manufactured module of rating 250 Wp or above and shall be IEC certified in the last three years.	Vendors should provide purchase order/ contracts/ delivery documents, performance certificate etc. from their customer's viz., PV module manufacturers for supply of Aluminium Frame and Corner Block.
4.	The vendor shall have established quality assurance system implemented and shall be certified against ISO: 9001:2008 / 2015 for QMS.	Confirm & furnish copy of ISO: 9001 certificate.
5.	Vendor shall have a well-established in-house laboratory and testing facilities with requisite manpower to carry out routine in process and finished product testing	Confirm & provide list of testing facilities.
BHEL RESERVES THE RIGHT FOR INDEPENDENT VERIFICATION OF THE CLAIMS MADE FOR CONFORMANCE TO THE PRE-QUALIFICATION CRITERION. BIDDERS TO ENSURE PROVIDING AUTHENTIC CERTIFICATES / DOCUMENTATION AND CREDENTIALS IN ORDER TO QUALIFY FOR BHEL TENDER PROCESS.		
B. TECHNICAL		
1.	Aluminium Frame and Corner Block offered shall comply with BHEL Technical Specification No. PS-901-01-0001 Rev. 05 and following Drawing Numbers: Al Edge Frame: 3-988-04-002-10 Rev. 02, Corner keys 4-988-04-006-10 Rev. 01, Main Extrusion: 4-988-04-001-10 Rev. 02. Test / Inspection Certificate to be issued for each lot for the following: i) Aluminium extrusion material certificate for aluminium alloy 63400 WP as per IS:733 (OR) 6063-T6 II) Dimensional Inspection report after fabrication as per BHEL Drawing No.3-988-04-002-10 Rev. 00	Acceptable / Not Acceptable

Prepared By


 15.05.19
 Raj Kumar Pradhan

Checked & Approved By


 15/05/19
 Ajay Kumar Sharma

Annexure - I

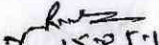
PR No. : 12301586 dt. 03.05.2019

Item : Aluminium Frame and Corner Block 3.2 mm

Qty. : 335,000 Sets

	iii) Anodising thickness of 18 ± 3 microns as per BHEL Specification No.PS-901-01-0001 Rev: 05	
2.	Certificate of conformance to the specification/drawings shall be provided with each lot mentioning BHEL Purchase Order number and quantity supplied.	Acceptable / Not Acceptable
3.	Supplier has to replace defective item found during opening of the package at the time of actual use at BHEL.	Acceptable / Not Acceptable

Prepared By


15.05.19
Raj Kumar Pradhan

Checked & Approved By


15.05.19
Ajay Kumar Sharma