

Bharat Heavy Electricals Ltd
Electronics Division
Mysore Road, Bangalore – 560 026

**Tender Document for SUPPLY OF BOS &I&C for
HLL, PEROORKADA
RFQ REF: HBSBOS007**

Technical Bid Opening Date: 15th September, 2014

This Tender Document Contains:

General Terms and Conditions, Technical Specification, Unpriced Bid Formats & Price
Bid Formats

Note: Part – I: To be submitted in a separate sealed cover

Part – II: To be submitted in a separate sealed cover.

And Part-I & Part-II sealed covers should be put in outer envelope and super scribing the Name of work and Name & Address of the tenderer. Tender document along with EMD should be dropped in Tender drop box super scribed, “Monday” kept in reception area of BHEL – EDN, Bangalore.

Contact Person at BHEL:

- 1. Mr. H.B. Srinivasa : Sr.Manager (SC&PV-MM)
Ph: 080-26988495, Mob: 09449869655**
- 2. Ms. Mrinalini Gupta: Sr.Engineer (SC&PV-MM)
Ph: 080-26988198**

REQUEST FOR QUOTATION

	BHARAT HEAVY ELECTRICALS LIMITED Electronics Division PB No. 2606, Mysore Road Bangalore - 560026 INDIA	RFQ NUMBER: HBSBOS007 RFQ DATE : 01.SEP.2014	Due Date 15.SEP.2014 Time: 13:00 HRS VENUE : NEW ENGG. BLDG
MMI:PU:RF:003			

	(for all correspondence) Purchase Executive : SRINIVAS H B Phone : 26998452 Fax : 00918026989217 E-mail: srinivasahb@bheledn.co.in
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Please submit your lowest quotation subject to our terms and conditions attached for the material mentioned below. The quotation must be enclosed in a sealed envelope / Fax superscribed with RFQ no.and due date, should reach us on or before the due date by **13.00** hours IST and will be opened on the same day at **13.30** hours at the venue mentioned above. **PLEASE DROP THE OFFER IN THE BOX PROVIDED AT RECEPTION.**

RFQ TERMS:

1. Bid has to be submitted as Two Part - in two sealed covers-Techno Commercial Bid(Part-1) & Price Bid (Part-II)- clearly written on each cover both put in a single sealed envelope super-scribed with RFQ No. and Due date.
2. Annexures B (Commercial Compliance) & B1 (Unpriced Bid) to be submitted along with Technical Bid (Part-1) & Annexure B2 to be submitted along with Price Bid (Part-II).
3. Please note that any offer which states Taxes extra will not be considered for evaluation. All inclusive value has to be quoted in Price Bid.
4. Kindly quote on FOR BASIS to HLL, PEROORKADA.
5. Delivery Date mentioned in RFQ is tentative. Actual Requirement is as below:

 Supply: 8 Weeks from PO Date.
 I&C: 2 Weeks from Supply Date.
6. Unloading: Vendor's Scope.
7. The percentage of Supply & I&C values shall be in the range indicated below (approximately, with overall tallying to 100%):

 (a) Supply: 85-90%
 (b) I&C: 10-15%

SI No.	Description	Qty	Unit	Delivery qty	Delivery Date
1	PS0679042660 Module mounting structure With epoxy grouting. As per specs.PS-439-921 For 25KW HLL Peroorkada Test Certificate	1	ST	1	03.NOV.2014
2	PS0679042679 25-30KVA string inverter, 3 Ø,415V, 50Hz As per specs.PS-439-921 For 25KW HLL Peroorkada Test Certificate	1	ST	1	03.NOV.2014
3	PS0679042687 Cables- DC & AC As per specs.PS-439-921 For 25KW HLL Peroorkada Test Certificate	1	ST	1	03.NOV.2014
4	PS0679042695 BOS items consisting of ACDB, MC4 connectors, hardware, PVC pipes, LA, Earthing, Fire extinguisher, sand bucket, tools etc. As per specs.PS-439-921 For 25KW HLL Peroorkada	1	ST	1	03.NOV.2014

For and On behalf of BHEL. Page 1 OF 2

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Sl No.	Description	Qty	Unit	Delivery qty	Delivery Date
	Test Certificate				
5	PS0679042709 I&C of 25KWp SPV plant including shifting of materials As PER SPEC PS-439-921	1	AU	1	01.NOV.2014

Total Number of Items - 5

Please note that the tender will be opened in the presence of the bidders or his authorised representatives (maximum two per organisation) who choose to be present with authorisation letters. Refer annexure for the terms and conditions.
 Preference will be given to vendors who accepts our standard payment terms i.e.100% payment - 30 days after receipt of material at our works subject to acceptance. Please specify Terms of delivery, Excise duty, sales tax, Ex-BHEL, Ex-works surcharge, Insurance,P&F, Freight and other taxes very clearly .
 For evaluation,exchange rate(TT selling rate of SBI) as on scheduled date of tender opening (Part-I bid incase of two part bid) shall be considered.
 The offers of the bidders who are on the banned list as also the offer of the bidders, who engage the services of the banned firms, shall be rejected.The list of banned firms is available on BHEL web site www.bhel.com

- i). This is only RFQ not an order.
- ii). In all correspondence quote RFQ No. & due date.
- iii). In Quotation BHEL material code / RFQ Sl. No. should be mentioned clearly.
- iv). Quotation Envelope / Fax not superscribed with RFQ No.and due date is liable for rejection.
- v). Quotation should remain valid for a minimum peiod of 90 days from due date.
- vi). In case of non-receipt of Quotation or regret letter for 3 consecutive RFQs you are liable to be removed from our vendors list.
- vii). All Prices should be written in words and numbers.
- viii). Excise Chapter Heading should be mentioned for all items where VAT is applicable .

COMMERCIAL TERMS & CONDITIONS				
RFQ No.HBSBOS007 RFQ DATE : 01.09.2014 DUE DATE : 15.09.2014				
Sl No.	Terms	BHEL Term	Confirmation	Deviation / Remarks
1	Bidding	(a) Bid has to be submitted as Two Part – in two sealed covers-Techno Commercial Bid(Part-1) & Price Bid (Part-II)- clearly written on each cover both put in a single sealed envelope super-scribed with RFQ No. and Due date.	Agree / Not agree	
		(b) Annexures B & B1 to be submitted along with technical bid (Part-1) & Annexure B2 to be submitted along with Price bid (Part-II).	Agree / Not agree	
		(c) Clause-wise compliance to BHEL Purchase specification along with all documents as called in Technical specification to be submitted along with Technical bid(Part-1).	Agree / Not agree	
2	Price Basis	Firm i.e., from the date of PO to completion of supply if I&C is not applicable. If I&C is in supplier's scope, then the prices shall remain Firm till commissioning & handing-over of the complete system. (PVC clause not acceptable).	Agree / Not agree	
3	Terms of Delivery	Free On Road Basis to Project site : HLL Life care Limited Peroorkada	Agree / Not agree	
4	Delivery Period	(a) Supply : 8 Weeks from PO Date	Agree / Not agree	
		(b) I&C : 2 weeks from Supply Date.	Agree / Not agree	
5	Payment Term	(a)Supply : 80% payment of Supply value + 100% Taxes shall be made with 45 days credit from the date of receipt of material at site. 10% on completion of I&C and certification. Balance 10% on execution of PBG valid for warranty period + 6 months claim period from any of the BHEL Consortium banks.	Agree / Not agree	
		(b)I&C : 100% on completion of I&C and certification.	Agree / Not agree	
		(c) For any deviation in payment term, the offer will be liable for loading as per Clause 25.A(ii) of Enquiry-General Terms & conditions (Doc Ref : SCPV/BOS/01-Rev 00)	Agree / Not agree	
6	Excise Duty	(a) To confirm whether applicable. If applicable, indicate prevailing rate of Excise duty.	Applicable / Not applicable	Prevailing rate of Excise duty : %
		(b) BHEL is trying to avail Customs Duty & Excise duty exemption. Successful bidder shall support with all relevant documents.	Agree / Not agree	NA
7	Sales Tax	(a) To confirm whether applicable. If applicable, indicate prevailing rate of Sales Tax against Form c.	Applicable / Not applicable	Prevailing rate of Sales Tax : %
		(b) For issue of form "C", vendor has to furnish "E1/E2" form. Please confirm that "E1/E2 Sale form" will be submitted.	Agree / Not agree	
8	Value Added Tax	Since it is inter-state movement of goods, VAT is not applicable. Only CST against form C is applicable	Applicable / Not applicable	Prevailing rate of VAT : %
		OR Both are in the same State, VAT is applicable please indicate VAT applicable.	Applicable / Not applicable	

AUTHORISED SIGNATORY WITH SEAL

COMMERCIAL TERMS & CONDITIONS				
RFQ No.HBSBOS007 RFQ DATE : 01.09.2014 DUE DATE : 15.09.2014				
Sl No.	Terms	BHEL Term	Confirmation	Deviation / Remarks
9	Octroi	To confirm whether applicable, if applicable indicate current rate of Octroi.	Applicable / Not applicable	Octroi_____ %
10	Service Tax	To confirm whether applicable, if applicable indicate current rate of Service Tax.	Applicable / Not applicable	Prevailing rate of Service Tax %
		Furnish following : Service Tax Regn. No. Confirmation that Service Tax register is maintained.	Applicable / Not applicable	Service Tax Regn. No.....
11	Freight	If Freight is quoted extra, original money receipt from Transporter has to be submitted for payment of freight. Please indicate a lumpsum value for Freight charges in Price bid if quoted extra.	Agree / Not agree	
12	Insurance	Transit Insurance will be in vendor's scope.	Agree / Not agree	
13	Evaluation of L1 vendor	Over all L1 of Supply + I&C on "FOR" basis to site will only be considered.	Agree / Not agree	
14	Warranty/GUARANTEE	Warranty for Supply : For PCU: 60 months from date of Commissioning. For Balance items: 18 months from the date of Supply or 12 months from the date of I&C whichever is earlier. WARRANTY/GUARANTEE FOR WORKMAN SHIP & I&C : 12 months from I&C	Agree / Not agree	
15	Pre Shipment Inspection	Pre Shipment Inspection will be carried out by BHEL/Customer for which test report shall be sent one week in advance.	Agree / Not agree	
16	Penalty	(a) Penalty of 0.5% per week at the basic price of the good for undelivered quantity of supply portion, subject to a maximum of 10%. For Supply, Pre Shipment Inspection Call Letter Date (Receipt of test report) will be treated as delivery for purpose of penalty.	Agree / Not agree	
		(b)For any deviation in penalty term, the offer will be liable for loading as per Clause 25.B of Enquiry-General Terms & conditions (Doc Ref : SCPV/BOS/01-Rev 00)	Agree / Not agree	
17	Road Permit	Road permit if applicable will be given by BHEL before Dispatch of ordered Items	BHEL	
18	Despatch Documents	Complete set of despatch documents in 3 sets shall be forwarded to BHEL directly. Despatch documents include Commercial Invoice, Excise Invoice (if ED is applicable), Lorry receipt (L/R), Packing list, Warranty certificate, Insurance intimation letter, & Original Performance Bank Guarantee (Directly from issuing bank to BHEL). One set of Invoice, Packing list and L/R shall be faxed immediately after despatch to BHEL-EDN, Bangalore.	Agree / Not agree	
19	Other terms & conditions	For any other Terms and Conditions, kindly refer to the enclosed Enquiry-General Terms & Conditions of BHEL (Doc Ref : SCPV/BOS/01-Rev 00)	Agree / Not agree	
20	Shipment	Kindly indicate the state/Place from where the shipment will take place.	State/Place	
21	Terms	Please note that any offer which states Taxes extra will not be considered for evaluation. All inclusive value has to be quoted in Price Bid.	Read & Noted	

AUTHORISED SIGNATORY WITH SEAL

Annexure B1

TECHNICAL BID ENCLOSURE FOR COMPLIANCE OF QUOTE									
RFQ No.HBSBOS007 RFQ DATE : 01.09.2014 DUE DATE : 15.09.2014									
SI No.	DESCRIPTION	QTY	UNIT	QUOTED	TAXES				Remarks
					ED %	CST%	VAT %	SERVICE TAX %	
1	PS0679042660: Supply of Module Mounting Structure as per spec PS-439-921	1	ST	YES/NO				NA	Taxes Included
2	PS0679042679: Supply of 25-30 KVA String Inverter, 3-Phase, 415 V, 50 Hz as per spec PS-439-921	1	ST	YES/NO				NA	Taxes Included
3	PS0679042687: Supply of Cables DC & AC as per spec PS-439-921	1	ST	YES/NO				NA	Taxes Included
4	PS0679042695: Supply of BOS items consisting of ACDB, MC4 Connectors, Hardware, PVC Pipes, LA, Earthing, fire extinguisher, sand bucket, tools etc., HLL as per Spec PS-439-921	1	ST	YES/NO				NA	Taxes Included
5	PS0679042709: I&C of 25 KWp SPV Plant as per Spec PS-439-921	1	AU	YES/NO	NA	NA	NA		Taxes Included
6	**Freight Charge including Service Tax on Freight(12.36% on 25% of Freight Value)	LUMPSUM		YES/NO	NA	NA	NA	NA	Included/Extra
7	**Insurance	LUMPSUM		YES/NO	NA	NA	NA	NA	Included/Extra

NOTE: 1.YOUR QUOTED PRICES SHALL BE on "FREE ON ROAD" basis to HLL PEROORKADA.

2.PL INDICATE TAXES : ED,VAT/CST,SERVICE TAX CLEARLY APPLICABLE AS ON DATE.

3.USE THIS FORMAT FOR COMPLIANCE(REPRODUCING ON YOUR LETTER HEAD IS ACCEPTABLE).

4.**INDICATE WHETHER FREIGHT CHARGE & INSURANCE CHARGE IS INCLUDED IN QUOTED RATE OR WILL BE CHARGED EXTRA.

IN ABSENCE OF CLARITY, QUOTED RATE WILL BE CONSIDERED AS INCLUSIVE OF FREIGHT & INSURANCE CHARGES. .If the offer states Freight at actuals, then Freight will be considered as All Inclusive. If Freight & Insurance is quoted extra, Original Money Receipt of the transporter and Insurance Policy copy / declaration is to be furnished for payment of the same.

5. Kindly make a note that RFQ has been called for all inclusive value; Any offer which states Taxes extra will not be considered for evaluation.

AUTHORISED SIGNATORY WITH SEAL

PRICE BID ENCLOSURE									
RFQ No.HBSBOS007 RFQ DATE : 01.09.2014 DUE DATE : 15.09.2014									
SI No.	DESCRIPTION	QTY	UNIT RATE (Rs.)	TOTAL RATE(Rs.) (QTY*UNIT RATE)	TAXES				Remarks
					ED %	CST%	VAT %	SERVICE TAX %	
1	PS0679042660: Supply of Module Mounting Structure as per spec PS-439-921 Unit Rate in Words Rs.	1 ST						NA	TAXES INCLUDED
2	PS0679042679: Supply of 25-30 KVA String Inverter, 3-Phase, 415 V, 50 Hz as per spec PS-439-921 Unit Rate in Words Rs.	1 ST						NA	TAXES INCLUDED
3	PS0679042687: Supply of Cables DC & AC as per spec PS-439-921 Unit Rate in Words Rs.	1 ST						NA	TAXES INCLUDED
4	PS0679042695: Supply of BOS items consisting of ACDB, MC4 Connectors, Hardware, PVC Pipes, LA, Earthing, fire extinguisher, sand bucket, tools etc., HLL as per Spec PS-439-921 Unit Rate in Words Rs.	1 ST						NA	TAXES INCLUDED
5	PS0679042709: I&C of 25 KWp SPV Plant as per Spec PS-439-921 Unit Rate in Words Rs.	1 AU			NA	NA	NA		TAXES INCLUDED
6	Freight Charge including Service tax on Freight (12.36% on 25% of Freight Value) Freight charge in Words Rs.	Lumpsum		Rs.					**Freight : Included/Extra
7	Insurance Insurance charge in words Rs.	Lumpsum		Rs.					**Insurance : Included/Extra

NOTE: 1.YOUR QUOTED PRICES SHALL BE on "FREE ON ROAD" basis to HLL PEROORKADA.

2.PL INDICATE TAXES : ED,VAT/CST,SERVICE TAX CLEARLY APPLICABLE AS ON DATE.

3.USE THIS FORMAT FOR COMPLIANCE(REPRODUCING ON YOUR LETTER HEAD IS ACCEPTABLE).

4.**INDICATE WHETHER FREIGHT CHARGE & INSURANCE CHARGE IS INCLUDED IN QUOTED RATE OR WILL BE CHARGED EXTRA.

IN ABSENCE OF CLARITY, QUOTED RATE WILL BE CONSIDERED AS INCLUSIVE OF FREIGHT & INSURANCE CHARGES. .If the offer states Freight at actuals, then Freight will be considered as All Inclusive. If Freight & Insurance is quoted extra, Original Money Receipt of the transporter and Insurance Policy copy / declaration is to be furnished for payment of the same.

5. Kindly make a note that RFQ has been called for all inclusive value; Any offer which states Taxes extra will not be considered for evaluation.

AUTHORISED SIGNATORY WITH SEAL

Bharat Heavy Electricals Ltd.,
(A Government of India undertaking)
Electronics Division
PB No.2606, Mysore Road, Bangalore-560026, India

Enquiry - General Terms & Conditions (Two part bid)

I. Enquiry / Request for Quotation (RFQ):

- (a) Any Purchase Order resulting from this enquiry shall be governed by **these general terms and conditions listed below and special terms and conditions, if any, along with this enquiry** of Bharat Heavy Electricals Limited, Electronics Division, Bangalore-560026 (**hereinafter referred to as BHEL EDN**).
- (b) Any of the terms and conditions not acceptable to vendor, shall be explicitly mentioned in the quotation. Otherwise, it will be treated as that all terms and conditions of this enquiry are acceptable.
- (c) If counter terms and conditions are offered by vendor, BHEL EDN shall not be governed by such terms and conditions, unless it is agreed and incorporated in the Purchase Order of BHEL EDN.
- (d) Any deviation to the terms and conditions not mentioned in the quotation by vendor in response to this enquiry will not be considered, if put forth subsequently or after issue of order, unless clarification is sought for by BHEL EDN and agreed upon in the Purchase Order of BHEL EDN.
- (e) BHEL EDN reserves the right to adopt Reverse Auction for the enquiry sent, at its discretion.
- (f) BHEL EDN shall be at liberty to cancel the tender at any time, before ordering, without assigning any reason.
- (g) Any specific terms and conditions to be complied will be mentioned in RFQ.

II. General Terms and conditions:

1. **TWO PART BID:** Quotation shall be submitted in two part bid i.e.

(a) Techno-commercial i.e., Un-priced Bid (in one sealed envelope):

Techno-commercial bid shall be submitted with complete description of the equipment, specification compliances to the enquired specification and all the commercial terms & conditions indicated in the **COMMERCIAL TERMS (ANNEXURE-A for Foreign Purchase and ANNEXURE-B for Indigenous Purchase)**. Any other enclosure, which the vendor wishes to submit like product catalogue, technical literature etc., may also be submitted in a sealed envelope super scribed clearly as **"TECHNO-COMMERCIAL BID" with RFQ No. and DUE DATE**. An un-priced copy of price bid (without price) as per **ANNEXURE A-1 for Foreign Purchase and ANNEXURE B-1 for Indigenous Purchase** shall also be enclosed with the techno-commercial bid for evaluation of commercial terms. The vendor shall not give the price in the technical bid.

Confirmation to BHEL specifications shall be indicated by the vendor in the respective columns provided in the purchase specification wherever applicable. Deviations to the specification / item description, if any shall be brought out clearly indicating **"DEVIATION TO BHEL SPECIFICATION"** without fail as a part of technical offer.

Compliance to Pre-qualification criteria (if applicable) shall also be enclosed with the Techno-commercial bid.

Manufacturer's name, their trade mark and brand, part number, alternate material to the one asked in enquiry, if any, should be mentioned in quotation and illustrative leaflets giving technical particulars etc. are to be attached to facilitate consideration and technical evaluation of the quotation. BHEL EDN material code number (as in enquiry) shall be indicated for each item quoted.

(b) Price Bid (in one sealed envelope):

Price bid should contain basic unit prices, discount if any, applicable taxes & duties, packing & forwarding charges (if applicable), Freight & insurances (if applicable), FOB charge (if applicable) etc., in a sealed envelope super scribed clearly as **"PRICE BID" with RFQ No. and DUE DATE**.

It is preferred to indicate the rates in both figures and words. In such case, if there is a difference / discrepancy

Signature of tenderer / with seal
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between the rates in figures and words, the **least of the two** rates will be considered. **Price bid shall be quoted as per ANNEXURE A-2 for Foreign Purchase and ANNEXURE B-2 for Indigenous Purchase.**

(c) Tender Offer (above two envelopes inside another sealed envelope):

Both these sealed envelopes [(a) Techno-commercial i.e., un-priced Bid and (b) Price Bid] shall be kept in a single sealed envelope and super scribed clearly with **RFQ No. and DUE DATE.**

2. The above sealed envelope (Tender) shall reach our office on or before the due date by 13:00 hrs. Quotations are to be dropped in the tender box marked for the OPENING ON respective days i.e., MONDAY / WEDNESDAY / FRIDAY kept at BHEL-EDN's Reception area of our works with caption "CE, SC & PV, DEFENCE". **Quotations also can be dispatched by Couriers / Registered post / FAX / e-mail to the Purchase Executive indicated in the RFQ at the risk of vendor / bidder.**

Quotation through courier / register post / fax / email when addressed to the specific fax number and email address given in the enquiry, to be sent well in advance to enable BHEL EDN purchase personnel to drop in the tender box before the scheduled opening date and time. Vendor is fully responsible for lack of secrecy on information of such quotations. Vendor shall confirm with the concerned purchase executive after sending the offer regarding such delivery mode to ensure participation. BHEL EDN is not responsible for any delay in receipt of quotation sent by vendor through post/fax/email.

Late Tenders i.e., Tenders received after due date & time will be rejected.

3. The rate quoted shall be in units stated in the enquiry. Where quotation is in terms of unit other than that in enquiry, relationship between the two units must be furnished in the quotation.
4. As far as possible, the quotations shall be free from corrections / overwriting. Corrections / overwriting, if any should be signed by authorized person with the company seal. Any typographical errors, totaling mistakes, currency mistakes, multiplication mistakes, summary mistakes observed in your priced bids, BHEL may consider whichever is beneficial to BHEL for evaluation. Vendor shall doubly ensure that the quote is correct and complete. The corrections / overwriting if any shall be signed with the seal.
5. Quotations are to be duly signed. Unsigned bids/offers are liable for rejection.
6. Tenders will be opened at **13:30 hrs** & the venue is New Engineering Building, 2nd floor, MM conference hall, BHEL EDN, Bangalore. All the tenderers or their authorized representatives (with authorization letter from their principals) may witness opening of techno-commercial bid on the due date.
7. After evaluation of techno-commercial bids, price bids of only those which are technically & commercially accepted, will be opened on a subsequent date, which will be intimated to the concerned in advance for witnessing of price bid opening.
8. The quantity in each item to be purchased may vary from quantity enquired according to the actual requirement at the time of placing the purchase order.

9. DUN & BRADSTREET REPORT (for Foreign purchase):

In case of foreign vendors, BHEL reserves the right to verify the Dun & Bradstreet report during techno-commercial scrutiny. Please mention DUN Number in **Techno-Commercial bid.**

10. Payment of Agency Commission to Indian Agent (for Foreign purchase):

- a. BHEL shall deal directly with foreign vendors, wherever required, for procurement of goods. However, if the foreign principal desires to avail of the services of an Indian agent, then the foreign principal should ensure compliance to regulatory guidelines - which require mandatory submission of an Agency Agreement.
- b. It shall be incumbent on the Indian agent and the foreign principal to adhere to the relevant guidelines of Government of India, issued from time to time.

Signature of tenderer / with seal
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- c. The Agency Agreement should specify the precise relationship between the foreign OEM / foreign principal and their Indian agent and their mutual interest in the business. All services to be rendered by agent/ associate, whether of general nature or in relation to the particular contract, must be clearly stated by the foreign supplier/ Indian agent. Any payment, which the agent or associate receives in India or abroad from the OEM, whether as commission or as a general retainer fee should be brought on record in the Agreement and be made explicit in order to ensure compliance to laws of the country.
 - d. Any agency commission to be paid by BHEL to the Indian agent shall be in Indian currency only.
 - e. Tax deduction at source is applicable to the agency commission paid to the Indian agent as per the prevailing rules.
 - f. In the absence of any agency agreement, BHEL shall not deal with any Indian agent (authorized representatives / associate / consultant, or by whatever name called) and shall deal directly with the foreign principal only for all correspondence and business purposes.
 - g. The "Guidelines for Indian Agents of Foreign Suppliers" shall apply in all such cases.
 - h. The supply and execution of the Purchase Order (including indigenous supplies/ service) shall be in the scope of the OEM/ foreign principal. The OEM/ foreign principal should submit their offer inclusive of all indigenous supplies/ services and evaluation will be based on 'total cost to BHEL'. In case OEM/ foreign principal recommends placement of order(s) towards indigenous portion of supplies/ services on Indian supplier(s)/ agent on their behalf, the credentials/ capacity/ capability of the Indian supplier(s)/ agent to make the supplies/ services shall be checked by BHEL as per the extant guidelines of Supplier Evaluation, Approval & Review Procedure (SEARP), before opening of price bids. It will be the responsibility of the OEM/ foreign principal to get acquainted with the evaluation requirements of Indian supplier/ agent as per SEARP available on www.bhel.com.
- The responsibility for successful execution of the contract (including indigenous supplies/ services) lies with the OEM/ foreign principal. All bank guarantees to this effect shall be in the scope of the OEM/ foreign principal.
- i. **Installation & Commissioning:** Scope will be as per RFQ.E&C value should be quoted separately by bidders.
11. **TOTAL COST TO BHEL:** Purchase order will be placed on the lowest quotation (L1) only among the technically & commercially accepted quotations. Lowest quotation (L1) is determined on the basis of the total cost to BHEL.

For Foreign offers, the Exchange rate(TT selling rate of SBI) shall be taken as under.

Single part bids	Date of Tender opening
Two/Three part bid	Date of Part-1 bid opening
Reverse Auction	Date of Part-1 bid opening

If the relevant day happens to be a bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken.

- (1) If Freight is quoted extra, original money receipt from Transporter shall be submitted for payment of Freight charges.
- (2) C-form : For issue of form "C", vendor has to furnish "E1/E2" form.

12. FIRM PRICE:

Rates quoted should be firm from the date of offer, till completion of supply. No enhancement in the rates and changes in the techno-commercial terms will be allowed once the quotation is accepted and order is placed.

If Installation & Commissioning is in vendor's scope, then the price shall remain FIRM till commissioning & handing over of the complete system.

13. TERMS OF PAYMENT:

1. SUPPLY

A. : FOR FOREIGN PURCHASE

Payment will be made against “**SIGHT DRAFT**” on presentation of documents to our bankers . Payment through LC is also made subject to loading factors as per Clause 25 (A). For LC payment bank charges within India will be borne by BHEL and outside India will be to vendor’s account.

The payment terms are as follows:

SIGHT DRAFT PAYMENT (direct payment):

SUPPLY :

(a) **I&C not included in vendor’s scope** : 90% payment of Supply value + 100% Taxes shall be made with 45 days credit from the date of receipt of material at site. Balance 10% on execution of PBG valid for warranty period + 6 months claim period from any of the BHEL Consortium banks.

(b) **Supply & I&C in vendor’s scope** : 80% payment of Supply value + 100% Taxes shall be made with 45 days credit from the date of receipt of material at site. 10% on completion of I&C and certification line item wise on pro-rata basis. Balance 10% on execution of PBG valid for warranty period + 6 months claim period from any of the BHEL Consortium banks..

(B) FOR INDIGENOUS PURCHASE (DIRECT PAYMENT):

SUPPLY :

(a) **I&C not included in vendor’s scope** : 90% payment of Supply value + 100% Taxes shall be made with 45 days credit from the date of receipt of material at site. Balance 10% on execution of PBG valid for warranty period + 6 months claim period from any of the BHEL Consortium banks.

(b) **Supply & I&C in vendor’s scope** : 80% payment of Supply value + 100% Taxes shall be made with 45 days credit from the date of receipt of material at site. 10% on completion of I&C and certification line item wise on pro-rata basis. Balance 10% on execution of PBG valid for warranty period + 6 months claim period from any of the BHEL Consortium banks.

2. For I&C: 100% on completion of I&C and certification line item wise on pro-rata basis.

3. Civil Works : 90% on completion of activity milestone and certification line item wise from site-in charge. Balance 10% against PBG for 10% of basic Civil value valid warranty period + 6 months claim period from any of the BHEL Consortium banks.

4.O&M: 100% O&M charges are payable as per RFQ terms against report certified by BHEL.

If PBG cannot not be submitted, vendors can also accept for the final 10% payment, payable after the warranty period + 6 months of claim period against supplementary invoice subject to the completion of commissioning (if applicable).

For any deviation in payment term, the offer will be loaded as per Clause 25.00.

5.ADVANCE PAYMENT: Quotations with “Advance payment” shall be liable for rejection.

For Indigenous Vendors, Advance Payment/ Local LC terms will be liable for rejection.

14. PENALTY:

Failure to supply within the delivery time as per purchase order will make the vendor liable to an unconditional penalty of 0.5 % (half percent) per week at the basic price of the goods for the undelivered quantity, subject to a maximum of 10%.

Supply : Date of issue of pre-shipment inspection/ call letter with supporting documents like test reports/conformance to test carried by the vendor will be treated as date of dispatch for the purpose of penalty calculation wherever Pre-Inspection Call is carried out.

Signature of tenderer / with seal
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For all other activities, the actual date of completion of activity as certified by concerned site-incharge will be considered for the purpose of penalty calculation.

15. PBG:

Performance Bank Guarantee (PBG) to be submitted on non-judicial stamp paper as per the BHEL prescribed format given in **ANNEXURE-E for Foreign Purchase and Annexure-F for Indigenous Purchase** for 10% of the total supply value obtained from any BHEL member (consortium) banks indicated in **ANNEXURE-G**.

The Bank Guarantee shall be submitted directly to the concerned Purchase Executive by the issuing Bank with their forwarding letter. BHEL will verify independently with the bank to establish the authenticity. Alternately, standby LC issued from approved banker can also be considered.

16. TERMS OF DELIVERY:

(a) FOR IMPORTED PURCHASE:

Price offered shall be for goods packed and delivered **FOB** Seaport,/FCA International Airport including packing, forwarding, Handling, Ancillary charges like processing of Sight Draft, negotiation charges of bank, Export declaration, Certificate of origin etc.

Packing shall be Air/Sea worthy, best suitable for trans-shipment and to take care of transit damages. If containerized, no. of containers & size of container shall be mentioned. Packing weight (gross & net) Packing dimensions shall be given prior to shipment to ascertain whether the consignment can be carried on standard cargo in contract or as ODC.

Wooden packing material for all the foreign consignments should be treated as per ISPM-15 & **Fumigation / Phytosanitary certificate** to be submitted to the freight forwarders/ BHEL along with the invoice, B/L, packing list etc.

Vendors shall indicate the name of International Airport/Seaport. Approved Airports are as per **Annexure-C**. The consignment shall be handed over to BHEL approved freight forwarder as mentioned in PO.

17. DELIVERY REQUIREMENT:

Delivery date mentioned in RFQ is tentative. Actual requirement is as per RFQ terms & conditions.

18. VALIDITY:

Quotation should remain valid for a period of **90 days** from the date of technical bid opening.

19. POST-ORDER REQUISITES:

- a. Vendor shall give an Order Acknowledgement indicating the delivery date within one week of receipt of PO.
- b. Pre-shipment inspection at vendor's works, if required, will be carried out by BHEL. Required assistance will have to be provided by the vendor at the time of pre-shipment inspection.
- c. Test certificates, Calibration certificates and warranty certificates as stipulated at the time of ordering shall be furnished.
- d. Items shall be dispatched by Air worthy /Sea worthy/ Road worthy packing. Any damage and later rejection, due to poor / improper packing shall be to vendor's account.
- e. Any damage/rejection should be made good or replaced immediately without any extra cost to BHEL such as freight, duties, taxes etc. The liability is restricted to the value of the order.
- f. Wherever commissioning is involved, it shall be carried out by the vendor's qualified engineers. Scope of work includes installation, commissioning and start-up trials till satisfactory performance level is reached as certified by BHEL.
- g. BHEL will not be responsible for any loss, damage or injuries to vendor's personnel sustained during

- h. installation / commissioning / start-up trials. Vendor shall ensure compliance with all statutory requisites as laid down by local bodies, state & Central Government. Vendor shall indemnify BHEL for all damages/ losses to various personnel during their presence in BHEL"s premises for whatever purpose.
- i. Suitable markings & damage control indicating devices shall be provided where applicable.
- j. Equipment shall comply with the standard requirements of ISO 14001 & OHSAS 18001.

20. RISK PURCHASE:

The purchaser at his discretion may also make purchase of the materials NOT supplied in time at the RISK & COST of the supplier. In this event, it will be obligatory on the part of the supplier who fails to supply the goods in time to make good to BHEL any loss due to such risk purchase.

21. GENERAL TERMS AND CONDITIONS GOVERNING REVERSE AUCTION (RA):

- (a) In case of RA, BHEL will communicate business rules governing the RA to the bidders through a service provider.
- (b) BHEL EDN reserves the right to adopt Reverse Auction for the enquiry sent, at its discretion.
- (c) Confirm acceptance for RA in **ANNEXURE A/B**.

22. REGRET LETTER: In case any vendor is unable to quote, vendor shall send a regret letter.

23. Any dispute arising out of this, shall be referred to the sole arbitration of Head of Dept. Materials Management of group concerned, BHEL EDN or any other officer nominated by him and his award shall be final and binding on the parties. The venue of the arbitration in all cases shall be Bangalore, India.

24. Any legal suit in respect of this enquiry lies in the court of Jurisdiction of Bangalore (India) only.

25. LOADING FACTORS:

Loading factors as detailed below will be added to the quoted price (basic) to evaluate the lowest quote for non compliance of BHEL standard commercial term.

A (i). For non compliance of standard Terms of payment (For Foreign Purchase Orders)

Sl. No.	BHEL standard term	If you quote	Loading factor in % for non-compliance
1	80% against "SIGHT DRAFT" + 20% after commissioning and against PBG(where both commissioning & PBG are applicable)	Payment through Letter of Credit (LC)	10% of quoted value

In general, if the quote is through L/C, it shall be opened 30 days prior to dispatch and valid for 3 months.

A(ii).For non compliance of standard Terms of payment (For Indigenous Purchase Orders)

Sl. No.	BHEL standard term	If you quote	Loading factor in % for non-compliance
1	As per RFQ Terms	Any other Payment term	10% of quoted value

A(ii).For non compliance of standard Terms of Penalty

Sl. No.	BHEL standard term	If you quote	Loading factor for non-compliance
1	Penalty of 0.5% per week	Other than the above.	Loading Factor 10%-Quoted Max %
	subject to max. of 10% on the		
	basic value of the items not		
	supplied /delayed		

LIST OF INTERNATIONAL AIRPORTS

Sl. No	Country	Air Ports
1	Austria	Vienna, Linz, Graz
2	Australia	Sydney, Melbourne, Perth
3	Belgium	Antwerp, Brussels
4	Canada	Toronto, Montreal
5	China	Shanghai
6	Cyprus	Lamaca
7	Czech Republic	Prague (Via Frankfurt)
8	Denmark	Copenhagen
9	Egypt	Cairo
10	Finland	Helsinki
11	France	Paris (Rosy), Lyon
12	Germany	Darmstadt, Mannheim, Nurnberg, Hamburg, Stuttgart, Munich, Koln, Dusseldorf & Hannover, Frankfurt, Berlin
13	Hong Kong	Hong Kong
14	Italy	Rome, Milan, Turin, Bologna, Florence
15	Ireland	Dublin
16	Israel	Telaviv
17	Japan	Tokyo, Osaka
18	Malaysia	Kuala lumpur, Penang
19	Netherlands	Amsterdam, Rotterdam
20	New Zealand	Auckland
21	Norway	Oslo
22	Oman	Muscat
23	Philippines	Manila
24	Romania	Bucharest
25	Russia	Moscow
26	Saudi Arabia	Riyad
27	Singapore	Singapore
28	Slovakia	Bartislowa
29	South Africa	Johannesburg, Durban
30	South Korea	Kimpo
31	Spain	Barcelona
32	Sweden	Stockholm, Gothenburg, Milano
33	Switzerland	Basle, Zurich, Geneva
34	Taiwan	Taipei
35	U.A.E.	Dubai
36	U.K.	Landon (Heathrow), Newcastle, Oxford, Cheltham, Bristol, Welling borough, Birmingham, East Midland, Manchester, Leeds, Glasgow.
37	U.S.A.	New York, Chicago, San Francisco, Los Angeles, Atlanta
38	Ukraine	Kiev

BHEL EDN APPROVED TRANSPORTERS FOR INLAND ROAD TRANSPORTATION

1. M/s Awagaman Road Carriers ltd., Bangalore. (AWG)
2. M/s BLR India Pvt. Ltd., Bangalore. (BLR)
3. M/s Delhi Assam Roadways corporation ltd., Bangalore. (DRL)
4. M/s Indo Arya Central transport ltd., Bangalore. (IACT)
5. M/s Prakash parcel Services, Bangalore. (PPS)
6. M/s Road Carrier of India, Bangalore. (RCI)
7. M/s Union Roadways ltd., Bangalore. (URL)

PERFORMANCE BANK GUARANTEE
(FOR FOREIGN PURCHASE ORDERS)
BANK NAME AND ADDRESS

Bharat Heavy Electricals Limited (BHEL),
Electronics Division,
PB No. 2606,
Mysore Road,
BANGALORE- 560 026
INDIA

Dear Sir,
Ref: CONTRACT PERFORMANCE GUARANTEE.

WHEREAS you have entered into a contract reference No PO NO. _____

wit

h M/s

_____ having its registered office _____

at _____ for the supply of _____ as
detailed in your purchase order No. _____ which is hereinafter referred to as "the said contract" and
whereas M/s _____

has undertaken to produce a Bank Guarantee for 10% (Ten Percent) of _____ the contract price
amounting to _____ (_____

_____) to secure its obligations to Electronics Division, BHEL having its registered office at New Delhi
for the performance of the contract including the warranty of the equipment supplied, We _____
Bank _____ hereby expressly, irrevocably and unreservedly undertake and guarantee as
principal obligors on behalf of M/s _____ that in the event Bharat Heavy Electricals Ltd. (B.H.E.L.)
declares to us in writing that M/s _____ has not fulfilled any obligation according to the
contractual obligation of the said contract, to pay you on demand and without demur to Bharat Heavy Electricals Ltd.,
Electronics Division , Mysore Road, P.B. No. 2606, Bangalore-560 026, India an amount of _____ (in words

- _____) subject to as may be determined below:
- 1) Notwithstanding any right M/s. _____ may have directly against you or any disputes raised by M/s _____, Your written demand shall be conclusive evidence to us that repayment is due under the terms of the said contract and shall be binding on us.
 - 2) We shall not be discharged or released from this undertaking and Guarantee by any arrangements, variations made between you and M/s. _____ with or without our consent and Knowledge or by any alterations in the obligations of M/s. _____ by any forbearance whether as to payment, time, performance or otherwise.
 - 3) This guarantee shall remain valid until the end of twenty four weeks after the close of the warranty period or until the same is reported by BHEL to us whichever is earlier.
 - 4) We agree and undertake not to revoke this guarantee during its validity unless discharged in writing by you subject to the provision of clause (7) below.
 - 5) This guarantee shall be a continuing guarantee subject to the foregoing and shall not be discharged by any change in the constitution of the Bank or M/s. _____.
 - 6) This guarantee shall be governed by and constructed in accordance with the Laws of India.
 - 7) At any time _____ Bank may render this guarantee null and void by paying to Bharat Heavy Electricals Ltd. the full amount being _____ (in words _____)

For and on behalf of Bank
by its Authorized
Signatory

Note:

Signature of tenderer / with seal
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- (1) To be executed in Non-Judicial stamp paper by any authorized Indian Bank.
- (2) To be submitted directly by banker to concerned executive in purchase dept., Please give BHEL address to banker.
- (3) Do not enclose with Bank document.
- (4) Any Modification & omissions to this are not permitted

PERFORMANCE BANK GUARANTEE
(FOR INDIGENOUS PURCHASE ORDERS)

THIS DEED OF GUARANTEE made and executed on the _____ day of _____(year), by the _____ (Bank), registered under the Companies Act 1956/Nationalized Bank constituted under the Banking Companies (acquisition and transfer of undertakings) Act constituted under the State Bank of India Act / Subsidiary Banks Act, having its registered / head office at _____ represented herein by its Branch Manager / authorized representative Sri. _____ & Sri. _____(Hereinafter called 'guarantor ' which term shall mean and include its successors and assigns)

IN FAVOUR OF BHARAT HEAVY ELECTRICALS LIMITED

_____ (Buyer's Name), a company registered under the companies Act, 1956 having its registered office at BHEL House at Siri Fort , New Delhi-100 049 and its Electronics Division at Mysore road, Bangalore-26 (hereinafter referred to as the 'Company' Which term shall include its successors and assigns):

Whereas the company has placed an order on _____ (State the name of the company / firm and its address) (hereinafter referred to as the 'Supplier' which term shall mean and include its liquidators, successors and assign) for the supply of system under order / Contract No _____ Dt _____.

AND WHEREAS the supplier has agreed to supply the materials and carryout the works as detailed and in accordance with the terms set out in the said order/contract.

AND WHEREAS the company is not required to pay to the supplier a sum of Rupees _____ being the 10% of the value of the goods supplied / Works performed / Services rendered under the said order / contract between the supplier and the company, till the company is satisfied with the mechanical Warranties and the performance standards stipulated in the said order / contract between the company and the supplier has been duly fulfilled, except against a Bank Guarantee for the said sum of Rs _____ in favour of the company by reputed Bank, in which case the company has agreed to make payment to the supplier of the said sum of Rupees _____ being (...%) of the value of the goods supplied / Works performed / Services rendered under the agreement between the supplier and the company and the Guarantor has at the request of the supplier, agreed to furnish this Guarantee subject to the terms and conditions stated below:

NOW THIS DEED WITNESSES THAT IN pursuance of the above said agreement, the guarantor hereby agrees and covenants With company is as follows :-

- 1) That during the period this contract of Guarantee remains effectual, the guarantor shall be liable in respect of the amount due and owing to the company in respect of the payments to the extent of Rs _____ (in words) _____ against any loss or damage caused to or suffered by the company by reasons of any breach of the terms of the said order / contract / Agreement by the supplier.
- 2) The Guarantor hereby undertakes to pay the amounts due and payable under this guarantee without any demur, merely on demand from the company intimating that the amount claimed is due by way of loss or damage caused to or suffered or would be caused or suffered by the supplier of any terms contained in the said order / contract. Any such demand made on the guarantor shall be conclusive as regards the amount due and payable by the Guarantor irrespective of the fact whether the Contractor / supplier admits or denies.
- 3) The Guarantor further agrees that the agreement herein contained shall remain in force and effect till all the supplies to be made / Works to be performed / Services to be rendered under the said order / contract / agreement are completed to the entire satisfaction of the company or till company certifies that the terms and conditions of the said order / contract / agreement have been fully and properly carried out by the said supplier and accordingly discharges the Guarantee. Unless a demand or claim under this guarantee is made on the guarantor in writing on or before the expiry of claim period indicated in clause 6 below, the guarantor shall be discharged from all the liability under this guarantee thereafter.
- 4) The guarantor further agrees with the company that the company shall have the fullest liberty without the consent of the guarantor and without effecting in any manner the obligations of the guarantor hereunder to vary any of the terms of the said order / contract / agreement or extend the time of performance by the said supplier from time to time or refrain from exercising the power exercisable by the company against the said supplier or to forebear or omit to enforce any of the terms and conditions relating to the said order / contract / agreement, and the guarantor shall not be relieved of its liability in whole or in part , by reason of any act, commission or forbearance on the part of the company or by reason of any such variation, or extension being granted to the said

Signature of tenderer / with seal
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supplier or by reason of any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving the guarantor.

- 5) The guarantor undertakes not to revoke this guarantee during its currency except with the previous consent of the company in writing.
- 6) Notwithstanding anything herein above contained, the liability of the guarantor under these presents is restricted to Rs_____. The guarantee shall be in force till its expiry on _____ unless a demand is made on the guarantor within SIX months from the date of expiry, all the liability of the guarantor under this guarantee shall stand fully discharged. The decision of the claimant in regard to breach of contract is final and binding on the Bank.

IN WITNESS whereof, the guarantor, acting through its authorized representative has executed this deed of Guarantee on the day, month and year first above written.

(Seal of the Bank to be affixed)

WITNESS

- 1.
- 2.

Note:

- (1) To be executed in INR 100 Non-Judicial stamp paper by any authorized Indian Bank.
- (2) To be submitted directly by banker to concerned executive in purchase dept., Please give BHEL address to banker.
- (3) Do not enclose with Bank document.
- (4) Any Modification & omissions to this are not permitted.

BHEL MEMBER BANKS (CONSORTIUM BANKS)

PBG SHALL BE ISSUED FROM THE FOLLOWING BANKS OR THEIR BRANCH OFFICES ONLY

1	STATE BANK OF INDIA
2	PUNJAB NATIONAL BANK
3	HDFC BANK
4	SYNDICATE BANK
5	CANARA BANK
6	INDIAN BANK
7	ST. BANK OF HYDERABAD
8	ICICI BANK
9	STANDARD CHARTERED BANK
10	UCO BANK
11	KOTAK MAHINDRA
12	ORIENTAL BANK OF COMMERCE
13	STATE BANK OF TRAVANCORE
14	CENTRAL BANK
15	IDBI BANK
16	FEDERAL BANK
17	HSBC LTD
18	DEUTSCHE BANK
19	CORPORATION BANK
20	CITI BANK
21	BANK OF BARODA
22	ABN AMRO BANK
23	UNITED BANK OF INDIA
24	VIJAYA BANK
25	UNION BANK OF INDIA
26	PUNJAB & SIND BANK
27	ANDHRA BANK
28	BANK OF INDIA
29	AXIS BANK



PURCHASE SPECIFICATION
GROUP : PHOTOVOLTAICS

PS-439 -921
REV NO: 00
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**SUPPLY OF BOS, ERECTION & ASSISTANCE IN COMMISSIONING FOR 25 kW_p
ROOF TOP GRID CONNECTED SPV POWER PLANT AT HLL LIFECARE LTD,
PEROORKADA, THIRUVANANTHAPURAM**

Revision details :R 00	Prepared <i>[Signature]</i>	Approved <i>[Signature]</i>	Date 26-08-14



PURCHASE SPECIFICATION
GROUP : PHOTOVOLTAICS

PS-439 -921

REV NO: 00

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1.0 INTRODUCTION:

BHEL EDN Bangalore is setting up a 25 kWp grid connected SPV power plant on roof top of HLL Lifecare Ltd, Peroorkada factory. This specification defines the scope of the vendor in **Supply of Balance of System (BOS) items and Erection & Assistance in Commissioning (E&C) of 25 kW_p Power Plant.**

The site address is HLL

Lifecare Limited, Peroorkada factory, PB NO. 2, Peroorkada, Thiruvananthapuram, Kerala, India.

The 25 kWp plant shall be installed on electrical room roof top at HLL Lifecare Ltd, Peroorkada as per the site layout drawing enclosed as 3-679-05-00715 – Annexure 2.

Vendor should visit the site before quoting to fully understand the site conditions. Vendor is required to furnish clause-wise response for this specification furnished below.

1.1 Pre-qualification criteria (PQC):

Vendor should have done supply, installation and commissioning of rooftop systems of 25KWp or above within last 2 years in India. Evidence shall be furnished in the form of copies of purchase orders or completion certificates.

2.0 VENDOR'S SCOPE :

Sl. No.	ITEM DESCRIPTION	Qty	SUPPLY	E&C	MAKE/ REMARKS
1	Type-1: Galvanized MS Module Mounting Structures	3 set	✓	✓	As per the Structure drawing (Drg. No: 3-679-05-00717, Sheet 1 of 4) attached – Annexure 3. BOM as per clause 3.0 of PS-439-921.
	Type-2: Galvanized MS Module Mounting Structures	3 set	✓	✓	As per the Structure drawing (Drg. No: 3-679-05-00717, Sheet 2 of 4) attached – Annexure 3. BOM as per clause 3.0 of PS-439-921.



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	Type-3: Galvanized MS Module Mounting Structures	1 set	✓	✓	As per the Structure drawing (Drg. No: 3-679-05-00717, Sheet 3 of 4) attached– Annexure 3. BOM as per clause 3.0 of PS-439-921.
	Type-4: Galvanized MS Module Mounting Structures	1 set	✓	✓	As per the Structure drawing (Drg. No: 3-679-05-00717, Sheet 4 of 4) attached – Annexure 3. BOM as per clause 3.0 of PS-439-921.
3	Foundation Fasteners – Hilti anchoring – M10 x 100 mm with nut spring washer and plain washers.	248 set	✓	✓	Make: Hilti
4	Module mounting Fasteners – M6X25mm with nut and washer	360 set	✓	✓	SS 304 grade
5	Cross Member/Purlin – M8 x 35 mm with Nut & Washer.	596 set	✓	✓	SS 304 grade
6	Grid Connected Solar String Inverter with capacity 25-30 kVA with mounting accessories, DC fuses and AC side SPD, AC output 3Ø, 415V, 50 Hz	1 No	✓	✓	Make: Refusol/ Delta/ Sungrow/ABB
7	1.1kV grade heavy duty PVC insulated, Double sheathed, UV protected FRLS stranded copper cables as per IS 1554				Reputed makes viz., Polycab/KEI/LAPP/Advance Cables/Top cables or equivalent.
	(a). 1 core 4 sq. mm Unarmored red cable from series string to string inverter for +ve side	250 Mtrs	✓	✓	Test reports confirming to IS should be submitted
	(b). 1 core 4 sq. mm Unarmored black cable from series string to string inverter for -ve side	250 Mtrs	✓	✓	



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8	1.1kV grade heavy duty PVC insulated strip/wire armoured FRLS copper conductor cables 3.5 C x 25 sq.mm cable (from PCU to ACDB panel and ACDB panel to LT DB)	15 Mtrs	✓	✓	Reputed makes viz., Polycab/KEI/LAPP/Advance Cables/equivalent.
9	PVC Pipe 10 kgf/cm ² 1" pipe for 2R X 4 sq.mm series wiring & earthing strip with necessary connectors L, T, flexible bends, clamps & fixtures for proper routing.	200 Mtrs	✓	✓	Length is indicative. Vendor to supply any excess length to complete the project if required. Make: Supreme/Finolex/Flow guard/equivalent make
10	Weather proof Male / Female Snap-on(MC4 type) Connectors 4 sq.mm along with suitable crimping tool, lugs etc. for connection from PV module string to string inverter	20 nos of male & 20 nos of female	✓ ✓	✓ ✓	(Make: Bizilink/Hensel /Tyco/Weidmueller/Multicont act) Excess connectors should be kept stored at site as a regular spares after the completion of installation.
11	Pipe earthing for Structures, String inverter and LA earthing as per IS3043	3 Nos	✓	✓	As per drg No 3-679-05-00228 (Annexure-7)
12	Miscellaneous items viz., 200 mm length Cable ties (UV protected), insulation tapes, ferrules, Lugs for termination along with contact compound tube, cable glands	1 Set	✓	✓	Quantities as required for project completion, vendor has to organize without any additional cost.
13	Lightning Arrestor (Globe type) for roof top system along with mounting arrangement and pedestal casting	1 set	✓	✓	As per the drg 3-679-05-00037 (Annexure 6)



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14	8 SWG GI wire for Structures, LA ,PCU earthing with necessary clamp fixtures for proper routing	100 mtr	✓	✓	
15	ACDB with Multi-function meter EM 6400 and MCCB, 4P, 63 A for grid connection with poly-carbonate mounting enclosure	1 No.,	✓	✓	MFM make – Conserv EM6400. MCCB make- ABB / Schneider / L&T / equivalent reputed make
16	Plant Name Board – 4 ft x 2 ft	1 No.,	✓	✓	Plant Description should be approved by BHEL.

Note:

- 1. The technical particulars, installation procedures and drawings of the bought out items like String inverter, Earthing kits, Snap-On-Connectors, MCCBs etc. shall be submitted for approval to BHEL before procuring.**
- 2. Vendor has to procure materials as per listed make. Whenever equivalent make has to be procured prior approval has to be taken from BHEL submitting the make and technical particulars of the component.**
- 3. Test Certificates of raw material and dimensional test reports of structures confirming to IS should be submitted to BHEL for PSI.**

3.0 MODULE MOUNTING STRUCTURE:

Please refer to the annexure 3 for structure drawing. Structures has to be anchored to the existing building roof slabs without causing any water leakage problem and strength issues The module mounting structure should be in line with the drawing enclosed. Array support structure shall be fabricated using corrosion resistant GI metal sections. Array support structure welded joints shall be adequately treated to resist corrosion and fasteners should be SS304. The support structure shall be free from corrosion when installed. PV modules shall be secured to support structure using screw fasteners. Screw fasteners shall use existing mounting holes provided by module manufacturer. No additional holes shall be drilled on module frames. Please refer to annexure 4 for PV module drawing. Module fasteners/clamps shall be adequately treated to resist corrosion. Adequate spacing shall be provided between any two modules secured on PV panel for improved wind resistance.



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As per the array layout attached, there are 4 varieties of module mounting structures envisaged.
1) 18 module structure 2) 8 module structure 3) 9 module structure 4) 3 panel structure.

The detailed BOM with material specification is attached type wise. Vendor has to supply and install the module mounting structure as per the structure BOM. Any extra structure members or hardware required for completing the work have to be arranged by vendor without any extra cost to BHEL.

BOM Type 1: 18 module structure- 3 Sets

Sl. No.	PART NAME	MATERIAL SPECIFICATION	GRADE	QTY/SET (Nos)	TOTAL QTY (Nos)
1	Front Leg	Hot Rolled C Channel 75 x 40 mm	Hot Dip Galvanization 70 – 80 Microns	5	15
2	Rear Leg	Hot Rolled C Channel 75 x 40 mm	Hot Dip Galvanization 70 – 80 Microns	5	15
3	Cross Member	Hot Rolled L Angle 50 x 50 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	5	15
4	Purlin 1	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	8	24
5	Purlin 2	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	8	24
6	Purlin connector 1	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	8	24
7	Purlin connector 2	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	12	36
8	Front Cross Bracing	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	5	15
9	Rear Cross Bracing	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	5	15
10	Base Plate	Hot Rolled Plate 150 x 150 x 5 mm welded with legs	Hot Dip Galvanization 70 – 80 Microns	10	30



PURCHASE SPECIFICATION
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BOM Type 2: 8 module structure- 3 Sets

Sl. No.	PART NAME	MATERIAL SPECIFICATION	GRADE	QTY/SET (Nos)	TOTAL QTY (Nos)
1	Front Leg	Hot Rolled C Channel 75 x 40 mm	Hot Dip Galvanization 70 – 80 Microns	3	9
2	Rear Leg	Hot Rolled C Channel 75 x 40 mm	Hot Dip Galvanization 70 – 80 Microns	3	9
3	Cross Member	Hot Rolled L Angle 50 x 50 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	3	9
4	Purlin	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	8	24
5	Purlin connector 1	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	8	24
6	Purlin connector 2	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	4	12
7	Front Cross Bracing	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	3	9
8	Rear Cross Bracing	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	3	9
9	Base Plate	Hot Rolled Plate 150 x 150 x 5 mm welded with legs	Hot Dip Galvanization 70 – 80 Microns	6	18

BOM Type 3: 9 module structure- 1 Set

Sl. No.	PART NAME	MATERIAL SPECIFICATION	GRADE	QTY/SET (Nos)	TOTAL QTY (Nos)
1	Front Leg	Hot Rolled C Channel 75 x 40 mm	Hot Dip Galvanization 70 – 80 Microns	5	5
2	Rear Leg	Hot Rolled C Channel 75 x 40 mm	Hot Dip Galvanization 70 – 80 Microns	5	5
3	Cross	Hot Rolled L Angle 50 x	Hot Dip Galvanization 70 –	5	5



PURCHASE SPECIFICATION
GROUP : PHOTOVOLTAICS

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	Member	50 x 5 mm	80 Microns		
4	Purlin 1	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	4	4
5	Purlin 2	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	4	4
6	Purlin connector 1	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	4	4
7	Purlin connector 2	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	6	6
8	Base Plate	Hot Rolled Plate 150 x 150 x 5 mm welded with legs	Hot Dip Galvanization 70 – 80 Microns	10	10

BOM Type 4: 3 module structure- 1 Set

Sl. No.	PART NAME	MATERIAL SPECIFICATION	GRADE	QTY/SET (Nos)	TOTAL QTY (Nos)
1	Front Leg	Hot Rolled C Channel 75 x 40 mm	Hot Dip Galvanization 70 – 80 Microns	2	2
2	Rear Leg	Hot Rolled C Channel 75 x 40 mm	Hot Dip Galvanization 70 – 80 Microns	2	2
3	Cross Member	Hot Rolled L Angle 50 x 50 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	2	2
4	Purlin	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	2	2
5	Purlin connector	Hot Rolled L Angle 40 x 40 x 5 mm	Hot Dip Galvanization 70 – 80 Microns	4	4
6	Base Plate	Hot Rolled Plate 150 x 150 x 5 mm welded with legs	Hot Dip Galvanization 70 – 80 Microns	4	4



PURCHASE SPECIFICATION
GROUP : PHOTOVOLTAICS

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4.0 STRING INVERTER:

String inverter should cater to the following requirements. The technical particulars of the inverter have to be submitted to BHEL for approval before procurement.

Sl.No	Technical parameter	Specification
1	Make	Make and Model No. shall be furnished by the vendor
DC Parameters		
2	DC Input Voltage	BHEL make SPV Module of 290Wp (L24220-290) shall be used in this system as per attached data sheet. Hence, vendor shall suitably decide the no. of PV modules shall be connected in series so as to suit with Inverter DC Input parameters and the MPPT parameters.
3	MPPT Feature	MPPT feature shall be available. Details of MPPT shall be furnished.
4	MPPT range	MPPT range of voltages shall be furnished by the vendor.
5	DC side connection arrangement	Details of No. of DC input connections and type of DC side connections shall be furnished by the vendor. DC fuses for strings shall be provided in the inverter (In built or in separate box).
6	DC disconnecter switch	Integrated Disconnecter switch shall be provided on DC side
AC Parameters		
7	AC Output Voltage	3 Phase 400 V AC, minimum 4 wire output
8	No. of phases/wires	RYBN or RYBN+PE



PURCHASE SPECIFICATION
GROUP : PHOTOVOLTAICS

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9	Grid voltage range	Output grid voltage range shall be furnished by the vendor. However, offered Inverter shall work within the range of nominal voltage $\pm 15\%$
10	Grid frequency & its range	50 Hz with $\pm 5\%$
11	Total Harmonic Distortion (THD)	< 3%
12	AC side connection	AC side connection arrangement and output cable size details shall be furnished by the vendor.
13	Remote & Local Monitoring	Remote and Local monitoring of Inverters shall be available. Vendor shall furnish the communication protocol details.
14	Standby power consumption	Standby power consumption of Inverter shall be furnished by the vendor.
15	Maximum inverter efficiency and rated power factor	Vendor to mention
16	Maximum overload capacity	Vendor to mention
Protection Features		
17	Anti-Islanding Protection	Shall be provided.
18	DC Reverse polarity protection	Shall be provided.
19	AC side short circuit protection	Shall be provided.
20	Output side SPD	Class II shall be provided
21	Governing Standards	Shall be provided.
Mechanical Features		



PURCHASE SPECIFICATION
GROUP : PHOTOVOLTAICS

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22	Operating Temperature	-20 Deg. C to + 55 Deg. C
23	Dimensions	Shall be provided by the vendor.
24	Weight	Shall be provided by the vendor.
25	Cooling	Cooling arrangement (if any) details shall be furnished by the vendor.
26	Ingress protection (IP)	IP 65 or better (outdoor installation)
27	Maximum altitude	Vendor to mention up to what altitude above sea level inverters will work without de-rating.
28	Noise level	Shall be <60dB

Vendor shall provide assistance/supervision at the site for erection & commissioning of the string inverters. Vendor shall depute their service engineer to site during E&C of the string inverters. If vendor engineers are not competent, vendor has to arrange engineers from Inverter supplier during commissioning of the plant.

5.0 EARTHING SYSTEM:

GOVERNING STANDARD: IS 3043 – 1987

The earthing for array, lightning arrestor, plant equipment and LT power system shall be required as per provisions of IS: 3043. The requirement of earthing system for the Plant shall be as furnished in the above table under clause 2.0

Installation of earth stations:

The electrode has to be completely buried in to the earth pit. Vendor has to supply and fill all around the electrode earth enhancing mixture i.e., coal and salt. Vendor has to organize the required machines & tools for earthing installation. There should be a test point provided for each earth pit for regular testing. Masonry enclosure (identified with labels) with cast iron cover plate shall be provided for each earth pit.

The structures, string inverter shall be inter-connected by means of GI wire/strip and finally connected through GI wire/strip to the respective earth pits from roof top. This GI wire/strip is to be properly routed from terrace to corresponding earthing pit properly by clamping to wall at regular intervals. There shall be a separate pit for the lightning arrestor.



PURCHASE SPECIFICATION
GROUP : PHOTOVOLTAICS

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PAGE : 12 OF 15

Vendor has to make necessary arrangements to ensure proper routing and maintain the aesthetic look of the building.

Earth resistance of the earth pits shall be tested in presence of the representative of BHEL as per applicable IS before commissioning and value to be less than 3Ω for structures and to be less than 1Ω for equipment body earthing for acceptance.

6.0 ERECTION & TESTING OF 25KWp SYSTEM:

A) Vendor has to arrange for receiving and unloading 90 Nos of SPV modules supplied by BHEL at the site. The storage, watch & ward responsibility of all the materials including BHEL supplies at site will be in vendor's scope until the commissioning of the plant. Any deficit occurring due to misplacement/mishandling will be borne by the vendor at no extra cost. The shifting of all the materials to the roof-top from storage location for erection will be in the scope of the vendor and he has to make necessary arrangements for the same.

B) Vendor has to assemble all the structures on the roof top as per the structure drawing and PV array layout drawings enclosed. Vendor has organize the hilti anchoring specialist's supervision at the time of structure anchoring. Special care should be taken for avoiding water leakage of RCC slab in the future.

Any activities requiring hole drilling, cutting of structures for completing the installation and mounting of PV modules on the structures is in the vendor's scope. Vendor has to make necessary arrangement for the drilling machine/gas cutting machine, if required.

C) Each module will be fitted at four locations on to the structure by using SS 304 grade screws.

D) 90 Nos of 290Wp SPV modules have to be assembled using structure materials as per drawing 3-679-05-00715 enclosed.

E) Approx., 18 numbers of PV modules of each 290 Wp are to be connected in series using quick connects with cables supplied along with PV modules. +ve & -ve terminals of each string has to be routed to string inverter + ve & - ve inputs through the PVC pipes. Vendor shall supply the MC4 type male / female connectors and the suitable crimping tool required for making interconnection. From the end terminals of each string, 4 sq. mm cable shall be drawn to string inverter. On either side and throughout the routing of the cables through pipes marking has to be done.

Special crimping tools required for crimping to be arranged by Vendor as per this specification, have to be used to crimp 4 sq.mm cables to quick connects for connecting output of series strings to inverter inputs.

F) Each string Open circuit Voltage & Short Circuit Current (with a testing jig having appropriate load) to be checked and recorded as directed by the BHEL site engineer at site.

G) Mounting of string inverter on wall or galvanized MS support structure at site is in the scope of vendor.



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H) Cable laying and termination at all areas shall be carried out in such a way that there shall be no stress on the cables / lugs at the entry / exit points.

I) 1 run of 3.5CX25 mm² armoured cable from the 3Ø AC output of inverter have to be terminated on to Multi-Function Meter (MFM) and from there to a 63 A MCCB. The mounting of the MCCB and MFM in ACDB box is in the vendor scope. The output of MCCB has to be routed through PVC pipe, to the customer LT panel. Marking of the cables has to be done on either ends and throughout the routing of the cable through PVC pipes for easy tracing of the cable. Appropriate cable lugs and crimping tools for terminations have to be arranged by vendor.

J) Pipes on the terrace have to be routed on cement brick work to ensure no water logging later. The necessary clamp fixtures required for routing pipes on the walls have to be procured and used by the vendor to ensure aesthetic look.

K) All the terminations required for SPV plant viz., at the inverter and LT panel etc., will be in the scope of the vendor. The necessary lugs and hardware required for the termination have to be arranged by the vendor. Vendor has to ensure that terminations have been made without any stress on the cable.

For 4 mm² termination appropriate marking with red and black insulation tapes have to be done by the vendor. The necessary tapes have to be arranged by the vendor.

The DC cables from the array have to be terminated on the inverter with proper labeling.

L) The installation of the Lightning arrestors and earthing pits will be in the scope of vendor. The necessary arrangements of digging and running the earthing wire/strip from terrace to the bottom will be in the scope of vendor. Vendor has to neatly clamp the wire/strip at regular intervals with necessary drum insulators/clamps and should ensure aesthetic look of the building.

M) Vendor is required to assist BHEL and associate with the other vendor's technical team during pre-commissioning checks and in commissioning of the power plant.

Note:

1. Vendor can visit HLL Lifecare Limited, Peroorkada factory, PB NO. 2, Peroorkada, Thiruvananthapuram, Kerala and ascertain what type of equipment/machines needed at site for execution.
2. **Vendor has to organize for unloading of all the materials including BHEL supplied PV modules at site and should arrange for safe storage. BHEL will inform in advance, the date of dispatch of PV modules.**
3. The shifting of all the materials viz., BHEL supplied material and vendor supplied materials from stores/storage location to the site (building rooftop) also lies in the scope of vendor.
4. All the arrangements for shifting modules and other materials to the rooftop have to be organized by the vendor.
5. All tools and tackles, like power drilling machine, cutting machine, digging tools, complete set of crimping tools etc, required for installation, wiring, crimping, assembly, digging of cable trenches, if required, earth pits & megger for checking insulation resistance of cable prior to commissioning etc., have to be organized by the vendor.



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GROUP : PHOTOVOLTAICS

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7.0 TEST CERTIFICATES

- a) Routine test certificates/Test Reports for structures, string inverters & Earthing kits to be furnished by the VENDOR. BHEL, if required will inspect the materials at vendor place.
- b) Equipment shall not be dispatched until BHEL issues a "Dispatch clearance" to vendor.
- c) Warranty certificates shall be submitted for all bought-out items.

8.0 GENERAL TERMS AND CONDITIONS:

- 1) Vendor's responsibility, right and liabilities under this project will commence from the date of acceptance of the purchase order.
- 2) The installation activity will have to be carried out in such a manner that will not cause any inconvenience to the other agencies working in the site. Any permits from the customer, if required, are to be arranged by the vendor for his personnel.
- 3) After completion of the E&C, the entire site/area will be cleaned of debris etc. by the vendor prior to handing over of the site to BHEL.
- 4) All the materials brought to site has to have proper paper work like DC, Invoice etc. duly verified & signed by BHEL/BHEL's customer to be submitted to BHEL for payment.
- 5) Any damage to the buildings/structures/area made by vendor's work men or by vendor's agent will be made good by vendor at vendor's cost.
- 6) Vendor shall take work permit before commencement of all types of non-routine works as per the statutory procedures followed at the work place.
- 7) Vendor shall explain the job, associated hazards and precautions to his workmen.
- 8) Vendor shall ensure one person who should have the skill, knowledge and experience of performing the allotted task and shall be able to guide his team.
- 9) Vendor shall ensure safe procedure is followed during execution of the job.
- 10) Vendor shall ensure that his workmen wear appropriate safety personal protective Equipment.
- 11) Vendor shall ensure adequate supervision of the activity by his supervisor.
- 12) Vendor has to adhere to necessary legal/safety requirements and BHEL shall be kept indemnified against any untoward events taking place during the course of work.
- 13) No child labour should be employed for executing the project.
- 14) In case project is not completed as per BHEL scope due to reasons arising out of materials from BHEL end/vendor's end, contractor has to complete the job at later stage without any extra charges. No over run charges shall be paid in case of extension of project schedules.
- 15) Any miscellaneous materials that have not been mentioned specifically in the specification/tender which are required for E&C of the plant, shall be deemed to be included in the specification and shall be supplied by the vendor without any extra charges. Any scope of activities which are not specifically mentioned in this specification but required for the completion of the I&C of the SPV plant for safe, trouble free, normal operation shall be provided at no extra cost by the vendor, unless explicitly excluded in the specification. Any charges for the electricity/water used for the construction work at site will be in the scope of vendor.
- 16) Scaffolding: Vendor have to employ scaffolding, belts/safety accessories for safety of personnel working on high rise building during erection, routing of earthing strips and cabling through PVC pipes from roof top of the terrace to control room.
- 17) **Statutory obligation:** Vendor is required to meet all the statutory obligations/ legal



PURCHASE SPECIFICATION
GROUP : PHOTOVOLTAICS

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requirement with regard to workmen deployed by vendor for the project such as ESI, PF, Minimum wage act, Work man compensation act//Accident/medical insurance, Income Tax act, Employees Insurance act etc.

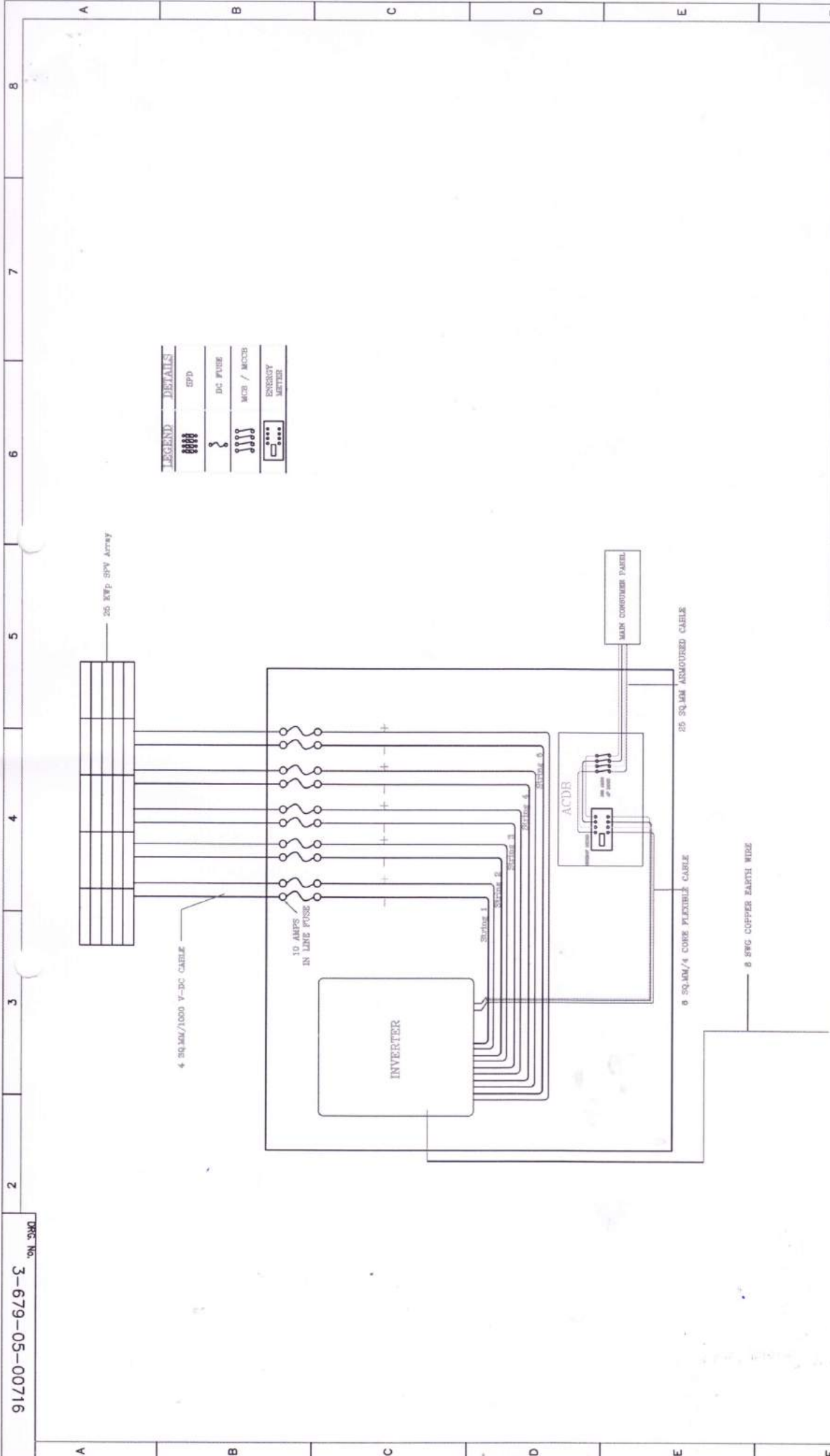
- 18) The installation should strictly conform to this specification. All the works shall be executed strictly as per the direction of BHEL engineer at site.

9.0 WARRANTY:

The warranty period for the string inverter should be 5 years and all other supplied items and work-man ship shall be for 1 year from the date of commissioning. Any defective parts/ activities shall be replaced/ rectified during warranty period on free of cost basis by the Vendor within 5 days from the complaint from BHEL. This warranty duration applies to all bought-out items by the vendor also. Warranty certificate shall be supplied for all supplied items.

10.0 LIST OF ANNEXURES:

1. Line Diagram of the typical 25 kW roof top SPV system- 3-679-05-00716
2. 25 kWp SPV Array Layout- 3-679-05-00715
3. Module mounting structure- 3-679-05-00717
4. SPV Module drawing- 3-679-02-00352
5. SPV Module Data Sheet – CD- 4-4001-106
6. Schematic of Lightning Arrestor – 3-679-05-00037
7. Pipe earthing details – 3-679-05-00228



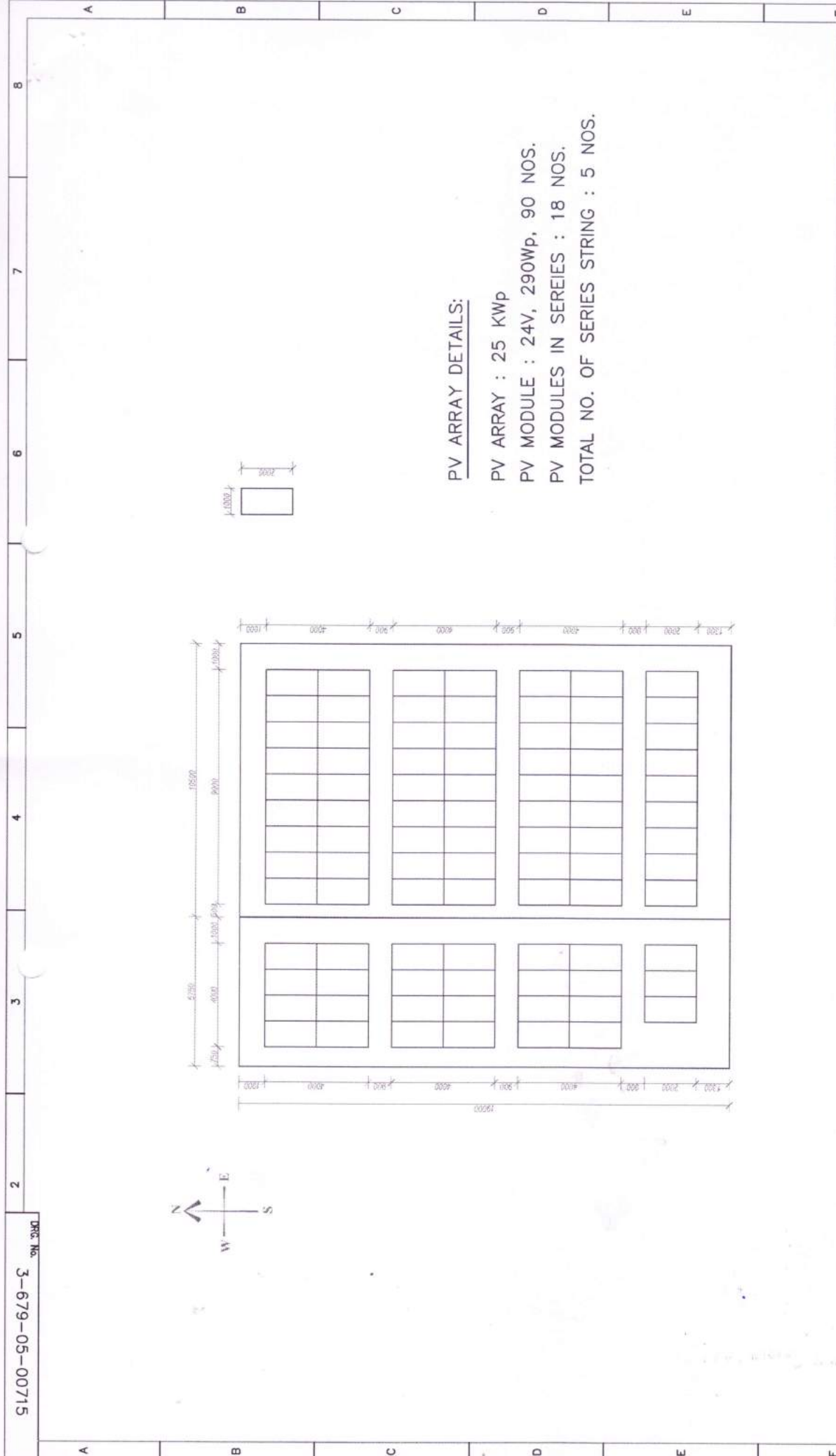
LEGEND DETAILS	
	SPD
	DC FUSE
	MCB / MCCB
	ENERGY METER

PRODUCT : 25kWp ROOFTOP SPV PLANT
 CUSTOMER: HLL LIFECARE LTD, PEROORKADA


BHARAT HEAVY ELECTRICALS LIMITED.
 ELECTRONICS DIVISION, BANGALORE

TITLE:	LINE DIAGRAM	
WBS. No.	DRG. No.	REV
	3-679-05-00716	00
No. OF SHEETS	01	
SHEET No.	01	

REV.	DATE	ALTERED CHECKED APPROVED	DATE	ALTERED CHECKED APPROVED	NAME	SIGN	DATE	DEPT.	CODE
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					VCP		JULY'14		
					BNR		JULY'14		

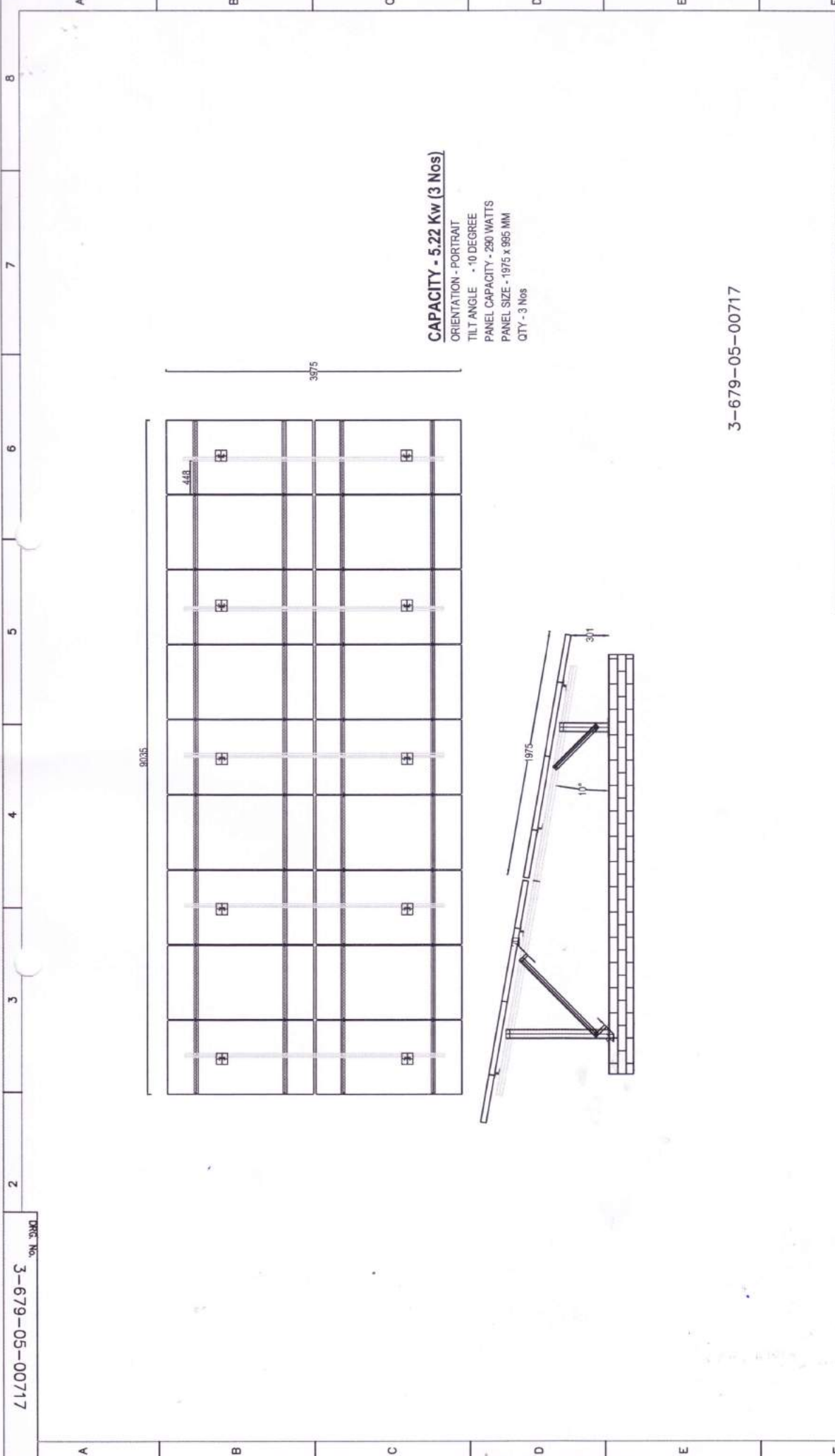


PV ARRAY DETAILS:
 PV ARRAY : 25 KWp
 PV MODULE : 24V, 290Wp, 90 NOS.
 PV MODULES IN SERIES : 18 NOS.
 TOTAL NO. OF SERIES STRING : 5 NOS.

REV. DATE		ALTERED	DATE	ALTERED	DATE	NAME	SIGN	DATE	 DEPT. SCVP CODE 439		No. OF SHEETS 01 SHEET No. 01	
REV. DATE		CHECKED		CHECKED		RA		JULY'14			TITLE: 25KWp SPV ARRAY LAYOUT	
REV. DATE		APPROVED		APPROVED		VCP	<i>[Signature]</i>	JULY'14			DRG. No. 3-679-05-00715	
REV. DATE		APPROVED		APPROVED		BNR	<i>[Signature]</i>	JULY'14			REV 00	
SIGN. & DATE										WBS. No.		00
REF. DRG. No.										3-679-05-00715		
INVENTORY No.										3-679-05-00715		

PRODUCT : 25KWp ROOFTOP SPV PLANT
 CUSTOMER: HILL LIFECARE LTD, PEROORKADA
 BHARAT HEAVY ELECTRICALS LIMITED.
 ELECTRONICS DIVISION, BANGALORE

1100-50-679-3



3-679-05-00717

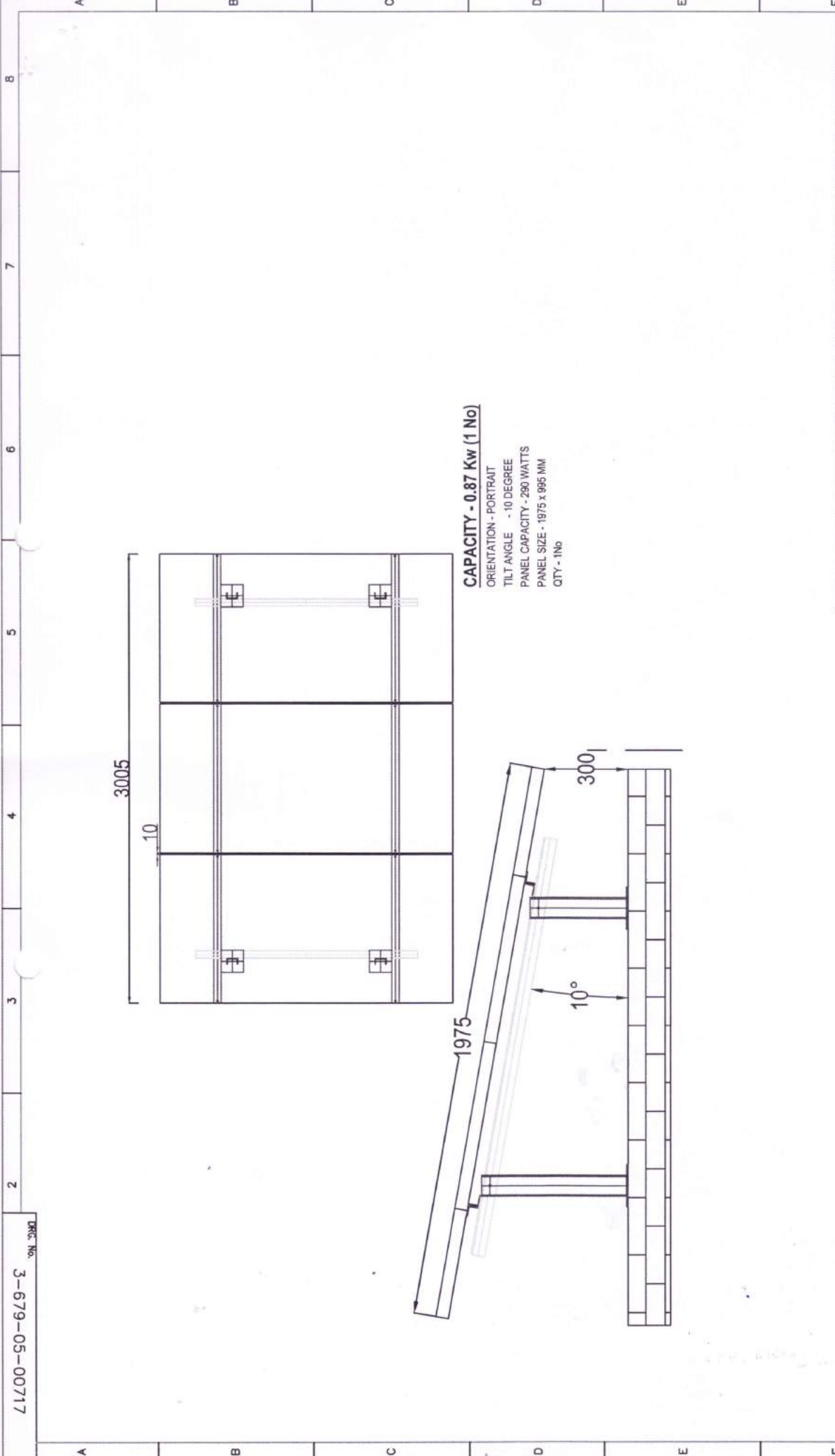
PRODUCT : 25KWp ROOFTOP SPV PLANT
 CUSTOMER: HLL LIFECARE LTD,PEROORKADA

BHARAT HEAVY ELECTRICALS LIMITED.
 ELECTRONICS DIVISION, BANGALORE

MODULE MOUNTING STRUCTURE

No. OF SHEETS	04
	SHEET No.
WBS. No.	3-679-05-00717
	DRG. No.
REV	00
REV	01

REV.	DATE	ALTERED	DATE	ALTERED	DATE	NAME	SIGN	DATE	DEPT.	CODE
		CHECKED		CHECKED	JUL '14	RA		JUL '14	SCPV	439
		APPROVED		APPROVED	JUL '14	VCP	<i>[Signature]</i>	JUL '14		
					JUL '14	BNR	<i>[Signature]</i>	JUL '14		



CAPACITY - 0.87 Kw (1 No)

ORIENTATION - PORTRAIT
 TILT ANGLE - 10 DEGREE
 PANEL CAPACITY - 290 WATTS
 PANEL SIZE - 1975 x 995 MM
 QTY - 1No

PRODUCT : 25KWp ROOFTOP SPV PLANT
 CUSTOMER: HLL LIFECARE LTD,PEROORKADA

BHARAT HEAVY ELECTRICALS LIMITED.
 ELECTRONICS DIVISION, BANGALORE

TITLE:
 MODULE MOUNTING STRUCTURE

No. OF SHEETS	04
SHEET No.	04
REV	00

WBS. No. 3-679-05-00717

REV.	DATE	ALTERED CHECKED APPROVED	REV.	DATE	ALTERED CHECKED APPROVED	NAME	SIGN	DATE	DEPT.	CODE
						RA	<i>[Signature]</i>	JUL '14	SCPV	4-39
						VCP	<i>[Signature]</i>	JUL '14		
						BNR	<i>[Signature]</i>	JUL '14		

INVENTORY No.	
REF. DRG. No.	
SIGN. & DATE	

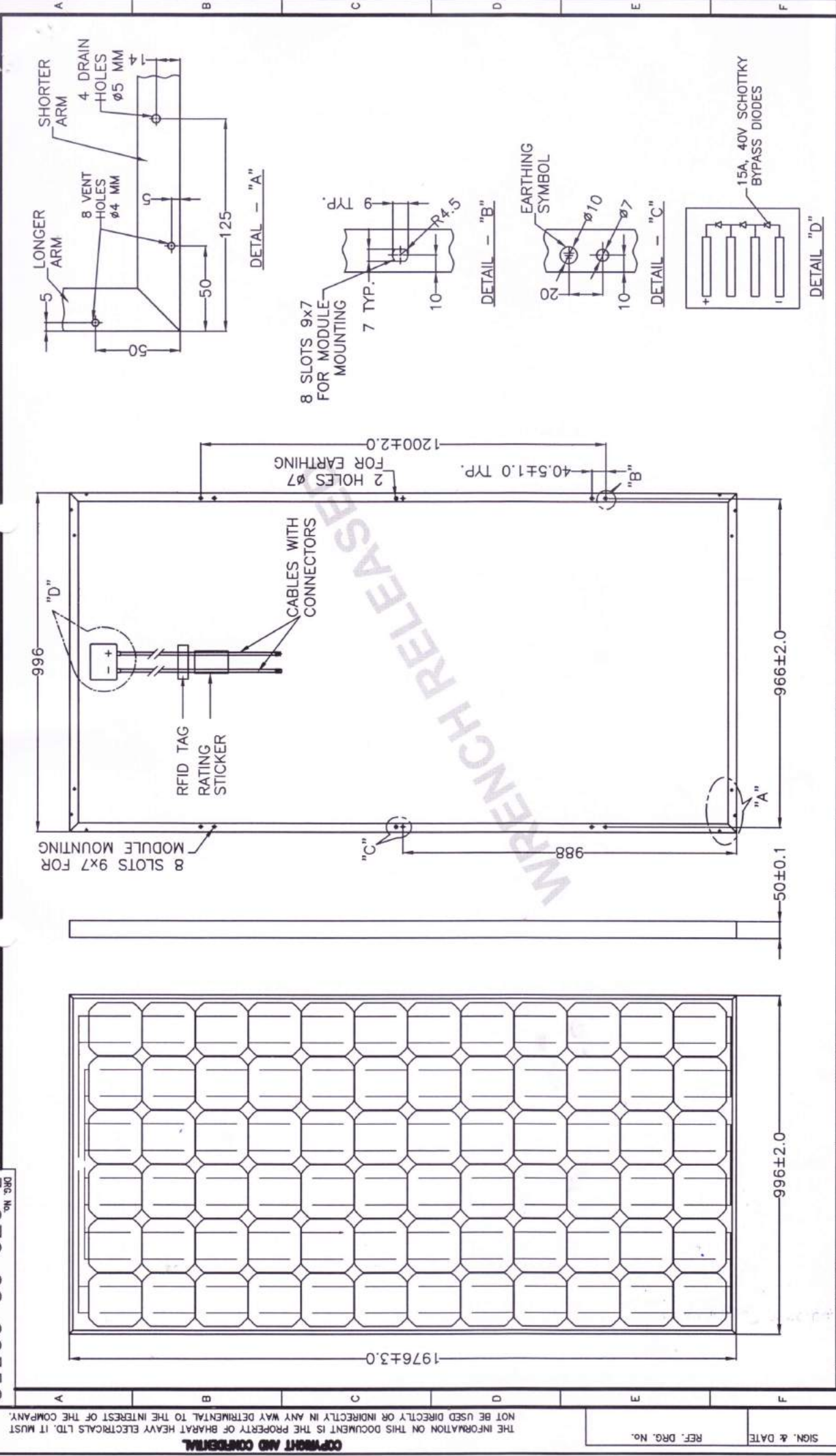
25500 20 679 02

FIRST ANGLE PROJECTION

ON 3RD

ALL DIMENSIONS ARE IN (mm)

8 7 6 5 4 3 2 1



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SIGN. & DATE

INVENTORY No.

REV.	DATE	ALTERED	DATE	ALTERED
00		CHECKED		CHECKED
		APPROVED		APPROVED
FIRST ISSUE				

DRAWN	SAN	NAME	SIGN	DATE
CHECKED	NAR		Sd/-	020911
APPROVED	SR		Sd/-	020911
			Sd/-	020911

CARD CODE		No. OF SHTS	01
SHIT No.			
REV		DRG. No.	3 679 02 00352
00			

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTRONICS DIVISION, BANGALORE

TITLE: PHOTOVOLTAIC MODULE - L24270
 156 mm MONO SOLAR CELLS (Corner Block Type)

M.O. No.

3 679 02 00352

FORM No. AS-04

A3 SIZE



**PRODUCT STANDARD
ELECTRONICS DIVISION**

CD-4-4001- 106

REV. 01

A4-10

PAGE 01 OF 01

TECHNICAL SPECIFICATION FOR PV MODULE L24270 (24 V, 290 WATTS)

- 1. PV MODULE TYPE NO. : L24270
- 2. CONFIGURATION : SINGLE GLASS LAMINATED TYPE WITH WITH 72 NOS. OF 156-mm MONO CRYSTALLINE SILICON SOLAR CELLS (12*6) IN SERIES CONFIGURATION.
- 3. OVERALL SIZE : 1976 (±3) * 996 (±2) * 50 (±1) mm
- 4. WEIGHT : 25 Kg. (Typ.)
- 5. PV MODULE FRAME MATERIAL : ANODISED ALUMINIUM
- 6. JUNCTION BOX : IP65 GRADE JUNCTION BOX WITH CABLES AND CONNECTORS
- 7. RFID Tag : As per JNNSM Guidelines
- 8. TYPICAL ELECTRICAL CHARACTERISTICS :
 - 8.1 OPEN CIRCUIT VOLTAGE (Voc) : 42.0 V
 - 8.2 SHORT CIRCUIT CURRENT (Isc) : 8.5 A
 - 8.3 VOLTAGE AT PEAK POWER POINT (Vmp) : 35 V
 - 8.4 CURRENT AT PEAK POWER POINT (Imp) : 8.29 A
 - 8.5 PEAK POWER OUTPUT (Pmax.) : 290 W ± 5 %
 - 8.6 MODULE EFFICIENCY : 14.7 %
 - 8.7 FILL FACTOR : 0.75

NOTE :

- 1. Electrical specifications mentioned above are at Standard Test Conditions of 100 mW/sq. cm solar insolation (AM 1.5) and at 25 deg C temperature.
- 2. Measurement repeatability of peak power output: ± 3 %

REFER MODULE DRAWING NO. : 3-679-02-00352

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REVISION : (01)
Electrical characteristics

APPROVED BY :

SR

PREPARED

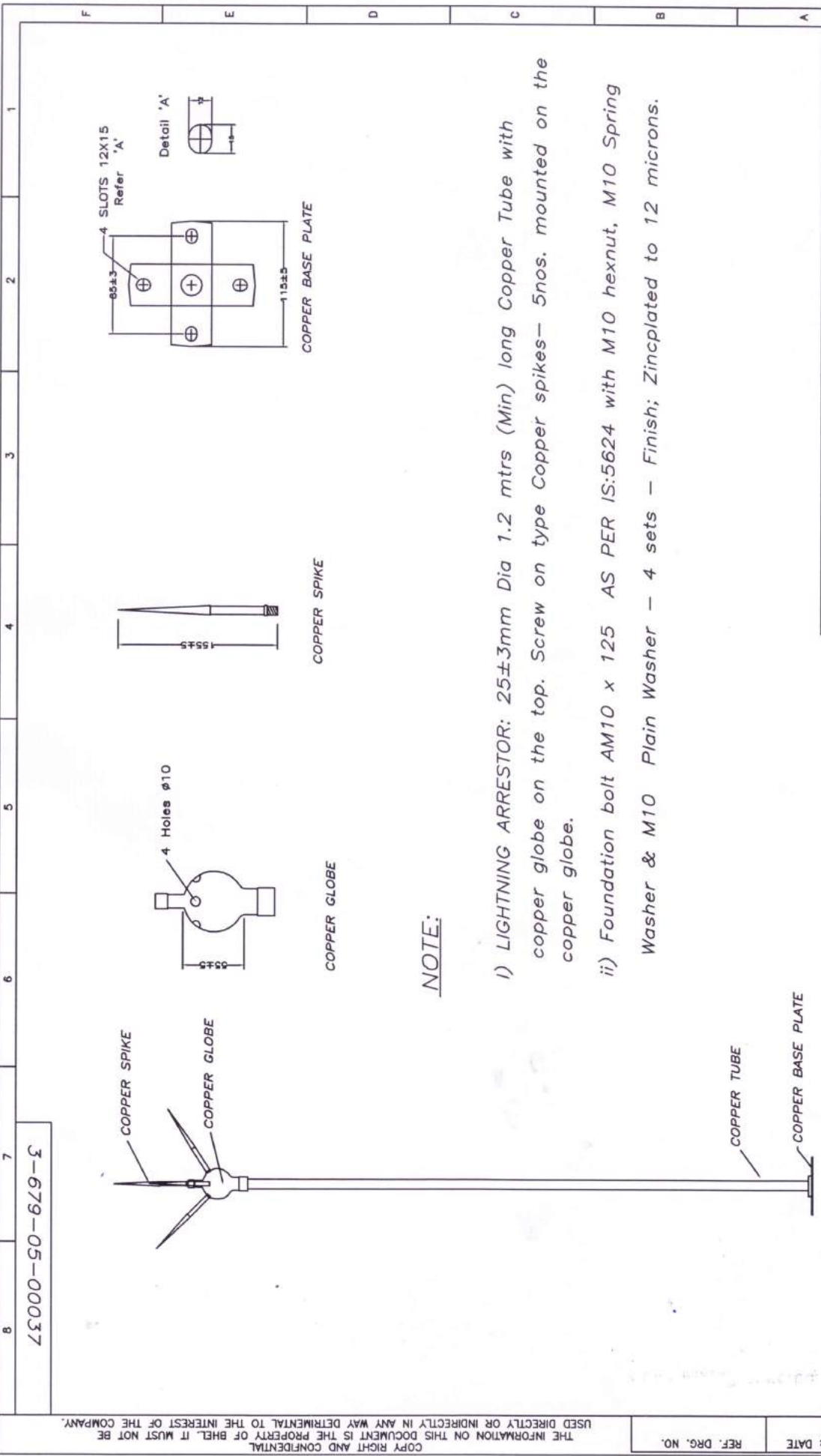
ISSUED

DATE

PJ

Engg.

24.11.2012



3-679-50-679

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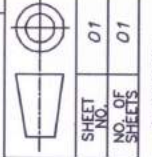
NOTE:

- i) LIGHTNING ARRESTOR: 25±3mm Dia 1.2 mtrs (Min) long Copper Tube with copper globe on the top. Screw on type Copper spikes— 5nos. mounted on the copper globe.
- ii) Foundation bolt AM10 x 125 AS PER IS:5624 with M10 hexnut, M10 Spring Washer & M10 Plain Washer – 4 sets – Finish; Zincplated to 12 microns.

PROJECT : SPV POWER PLANT

BHARATH HEAVY ELECTRICALS LIMITED
ELECTRONIC DIVISION - BANGALORE.

TITLE LIGHTNING ARRESTOR



SHEET NO.	01
NO. OF SHEETS	01

SCALE :-
DEPT. SCPV CODE 439

NAME	ASIN	SIGN.	DATE
CHECKED	ENR		9.01.01
APPROVED	CVSN		10.01.01

REV. DATE	ALTERED CHECKED	REV. DATE	ALTERED CHECKED

INVENTORY NO.

REF. DRG. NO.

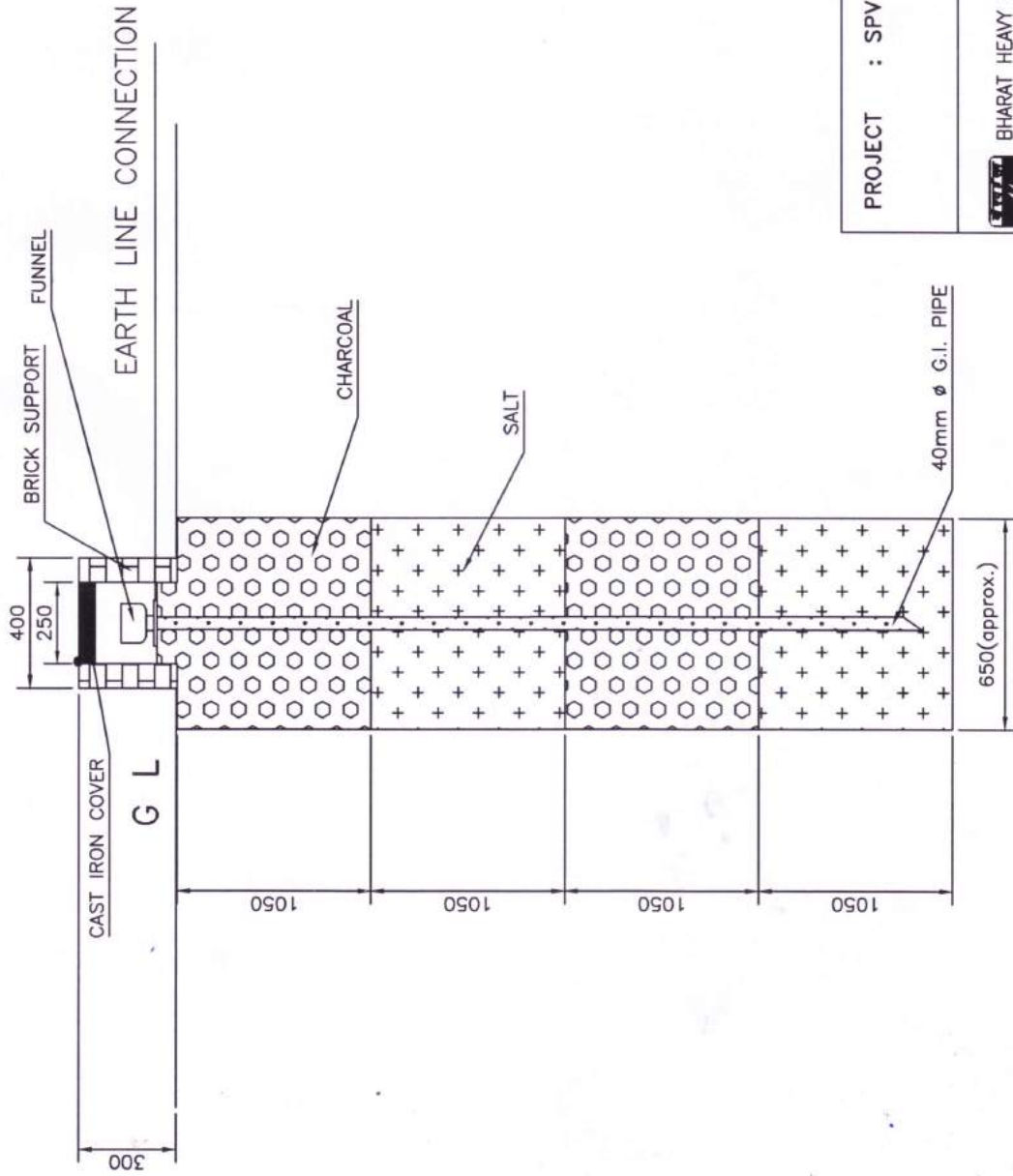
SIGN & DATE

DRG. NO. 3-679-05-00037

FIRST ANGLE PROJECTION

82200-50-679-3
DRAWING NO.

ALL DIMENSIONS ARE IN mm



PROJECT : SPV POWER PLANT

DRN	NAME	SIGN.	DATE	NO. OF VAR
CKD	VCP	[Signature]	JUL'14	
APPD	BNR	[Signature]	Aug'14	
WEIGHT(Kg)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEM	
SCALE				
NTS				
DEPT. SCVP CODE 4-38				
TITLE				
PIPE EARTHING DETAILS				
DRAWING NO. 3-679-05-00228				
REV. 00				
SHEET NO. 01				
NO. OF SHEETS 01				

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INVENTORY NO.	SIGN & DATE	REF. DRG.NO.

FORM No. A3-02

A3 SIZE