

	PURCHASE SPECIFICATION	BDC1718-47002	
Rudrapur	GROUP : BDC	Rev no	00

BDC1718-47002

SPECIFICATIONS FOR SUPPLY OF STRING INVERTER, DCDB/AJB, ACDB WITH MFM AND WEATHER MONITORING SYSTEM WITH WEB BASED DATE LOGGING SYSTEM FOR TOTAL 470 KWp ROOF TOP GRID CONNECTED SPV POWER PLANT ON SEVENTEEN BUILDINGS OF MUNICIPAL CORPORATION OF LUDHIANA UNDER SMART CITY PROJECT AT LUDHIANA.



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1 INTRODUCTION:

This specification defines the scope of the Bidder in **supply of string inverter, DCDB/AJB, ACDB with MFM and weather monitoring system with web based data logging system with all accessories, testing and 05-year warranty of all supplied materials.**

1.1 Site Details:

Site is located at Ludhiana and well connected through road and railway.

Sr. NO	Description	Details
1	Ambient Temperature	Minimum= 2 DegC Maximum= 47 DegC
2	Atmospheric Condition	Humid subtropical climate
3	Latitude	30.9010° N
4	Longitude	75.8573° E

Total 470 KWp system at seventeen Nos. of roof tops as per below mentioned capacity are to be installed:

Sl. No	Location	Area(SQ M)	No of Floors	SPV Capacity kWp
1	MCL ZONE-A OFFICE	1035	GF+3	50
2	SUB ZONE DARESI BUILDING	120		10
3	CENTRAL FIRE STATION	250	GF+2	20
4	MCL ZONE-B OFFICE	433	GF +2	35
5	SUBZONE-B KIDWAI NAGAR	250	-	8
6	SUNDER NAGAR FIRE STATION	400	GF+2	8
7	MCL ZONE-C OFFICE	1080	GF+2	55
8	OCTROI BUILDING GILL ROAD	300	GF+2	10
9	FIRE STATION GILL ROAD	258	GF+2	10

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10	SUBZONE DHOLEWAL BUILDING	83	-	5
11	MCL ZONE-D OFFICE	514	GF+3	55
12	FIRE STATION HUMBRA ROAD/NIGHT SHELTER	612	-	8
13	MULTISTOREY PARKING ZONE-A	1280	GF+4	75
14	SUBZONE D-4 FOUNTAIN CHOWK	126	-	8
15	ZONE-D DOG STERILIZATION CENTRE	80	-	5
16	SHASTRI BADMINTON HALL		-	25
17	GURU NANAK STADIUM		-	81



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2 BIDDER'S SCOPE:

- Supply of string Inverters of different ratings with 05-year warranty.
- Supply of DCDB, AJB and ACDB with MFM.
- Weather monitoring system with Web Enabled Data Logging system and with 5 year services along with all accessories.
- Freight & Transit insurance FOR BHEL CFP Rudrapur.
- Onsite Maintenance warranty contract for 05 years.

List of Items for Supply & Installation for System 470 KWp System at Ludhiana

Sl. No.	ITEM DESCRIPTION	Qty	SUPPLY	INSTALLATION	MAKE/ REMARKS
1.(a)	String Inverter -50 Kwp	05 Nos.	✓		Make; Power One Microsystems/ SMA / ABB / SCHNEIDER / Delta / Refusol / Smart Power/ Ingeteam or reputed make. Test reports confirming to relevant standers shall be submitted
1.(b)	String Inverter -30 Kwp	04 Nos.	✓		----do---
1.(c)	String Inverter -20 Kwp	1 Nos.	✓		----do---
1.(d)	String Inverter -10 Kwp	07 Nos.	✓		----do---
1.(e)	String Inverter -05 Kwp Note: Single phase inverter is required for this rating.	02 Nos.	✓		----do---
2	Weather monitoring system with web Enabled Data Logging service for 5 years	8 set.	✓		Data logger should be compatible with the string inverter used in the RTS preferable same make as of String inverter.
3	DCDB	10 Nos.	✓		Reputed makes only.
4	AJB	09 Nos.	✓		Reputed makes only.
4	ACDB with MFM	17 Nos.	✓		Reputed makes only.
5	Miscellaneous Equipment (Control cables, insulation tapes, , ferrules, Lugs, Cable Glands etc.)	1 set	✓		Quantities as required for project completion, Bidder has to organize without any additional cost.

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Note:

- a. Bidder 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.
- b. Inverter shall be jointly inspected by BHEL and Customer in assembled condition prior to dispatch as per approved QAP.
- c. Each instrument supplied with weather monitoring system shall be with all necessary cables, Assy. Etc. Calibration certificate with calibration traceability to World Radiation Reference (WRR) or World Radiation Centre (WRC) shall be furnished along with the equipment.
- d. All material shall be supplied to BHEL CFP Rudrapur.



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3 Technical Specification

3.1 String Inverter :

String inverter of following ratings is required as mentioned below. Bidder should ensure compatibility of inverter with SPV modules (300Wp, data sheet attached) system.

Sl. No.	ITEM DESCRIPTION	Qty
1	String Inverter -50 Kwp	05 Nos.
2	String Inverter -30 Kwp	04 Nos.
3	String Inverter -20 Kwp	1 Nos.
4	String Inverter -10 Kwp	07 Nos.
5	String Inverter -05 Kwp	02 Nos.
Note: Single phase inverter is required for this rating.		

The technical particulars of the inverter have to be submitted to BHEL for approval before procurement.

Sl. No	Technical parameter	Specification
1.	Type	Grid Connected String Inverter (transformer less).
2.	Make	Microsystems/ SMA / ABB / SCHNEIDER / Delta / Refusol / Smart Power/ Ingeteam or reputed make.
3.0	Standards	
3.1	Efficiency Measurement	IEC 61683/ Equivalent BIS Std.
3.2	Environmental testing	IEC 60068-2 (1,2,14,30) / Equivalent BIS Std.
3.3	Interfacing with utility grid , EMC	IEC 61727, IEC 61000-6-2
3.4	Islanding Prevention Measurement	IEC 62116
3.5	MPPT	IEC 62093
3.5	Type Test certificate issuing authority (for Sl. No. 3.1 , 3.2,3.3,3.4 and 3.5)	NABL/ IEC Accredited Testing Laboratories or MNRE approved test centers.
4.0	Input DC	
4.1	Voltage range	Min 250-1000
4.2	MPP voltage range	Min 420-850
4.3	Power Control	MPPT
5.0	Output AC	

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5.1	Output voltage and phase	Sine wave 3 Phase 415 V $\pm 10\%$ 50Hz AC, minimum 4 wire output RYBN or RYBN+PE Single phase, 230V for 05 KWp inverters.
5.2	Reactive power	0.8 lagging to 0.8 leading
5.3	Total Harmonic Distortion (THD)	< 1.8 % at rated power
5.4	Power factor at rated current	0.98-1.00
5.5	Phase Load Imbalance at least 30 %	at least 30 %
5.6	Grid frequency synchronization range	+/- 3 Hz
5.7	Grid frequency tolerance range	+/-2 or more
5.8	Grid voltage tolerance range	+/- 20%
5.9	Standby power consumption	Standby power consumption of Inverter shall not exceed 20 Watts
6.0	Efficiency	Min 94% at 100% load as per IEC 61683
7.0	Protection	
7.1	DC Side	1. Disconnection device 2. Reverse polarity protection 3. Reverse current to PV array protection over voltage, under voltage over current protection. 4. Short circuit protection: PV fuse 5. Surge protection: SPD type II
7.2	AC Side	1. Short circuit protection 2. Over voltage, under voltage over current protection over and under Grid frequency protection. 3. Anti-Islanding protection 4. AC surge protection
7.3	Ground fault / Grid Monitoring	Yes
7.4	Over Temperature protection	Yes
8.0	Display	
8.1	Display type	LCD/LED
8.2	Display parameter	Voltage, current, power, line status, grid voltage grid frequency, export power and export energy.
9.0	Communication	

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9.1	Communication port	Ethernet , RS485, port for web based remote monitoring system and should match with data logger.
10.0	General	
10.1	Operating Temperature	-20 Deg. C to + 60 De. C
	Humidity	95% non-condensing.
10.2	Dimensions	Shall be provided by the Bidder.
10.3	Weight	Shall be provided by the Bidder.
10.4	Cooling	Cooling arrangement (if any) details shall be furnished by the Bidder.
10.5	Ingress protection (IP)	IP 65 or better (Out Door Installation)
10.6	Maximum altitude	Bidder to mention up to what altitude above sea level inverters will work without de-rating.
10.7	Noise level	<45dBA

Note:

Bidder shall provide assistance for installation of the string inverters. Bidder shall depute their service engineer to site during E&C of the string inverters.

if short circuit and surge protection of AC/DC side is not inbuilt in the string inverter same can be provided in ACDB and DCDB or AJB.

3.2 Weather monitoring system with web Enabled Data Logging Service-

Bidders has to supply Weather Monitoring system with web enabled data logging system with all accessories and services for 05 years. The plant monitoring parameter shall include.

- Data Logging Provision for plant control and monitoring, time and date stamped system data logs for analysis **with the high quality, suitable PC**. Metering and Instrumentation for display of systems parameters and status indication to be provided.
- **Solar Irradiance:** An integrating Pyranometer / Solar cell based irradiation sensor (along with calibration certificate) provided, with the sensor mounted in the plane of the array. Readout integrated with data logging system.
- **Temperature:** Temperature probes for recording the Solar panel temperature and/or ambient temperature to be provided complete with readouts integrated with the data logging system

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- The following parameters are accessible via the operating interface display in real time separately for solar power plant:
 - a) AC Voltage.
 - b) AC Output current.
 - c) Output Power.
 - d) Power factor.
 - e) DC Input Voltage.
 - f) DC Input Current.
 - g) Time Active.
 - h) Time disabled.
 - i) Time Idle.
 - j) Power produced
- Protective function limits (Viz.-AC Over voltage, AC Under voltage, over frequency, under frequency ground fault, PV starting voltage, PV stopping voltage).
- All major parameters available on the digital bus and logging facility for energy auditing through the internal microprocessor and read on the digital front panel at any time) and logging facility (the current values, previous values for up to a month and the average values) should be made available for energy auditing through the internal microprocessor and should be read on the digital front panel. vii. PV array energy production: Digital Energy Meters to log the actual value of AC/ DC voltage, Current & Energy generated by the PV system provided. Energy meter along with CT/PT should be of 0.5 accuracy class.
- Computerized DC String/Array monitoring and AC output monitoring shall be provided as part of the inverter and/or string/array combiner box or separately.
- String and array DC Voltage, Current and Power, Inverter AC output voltage and current (All 3 phases and lines), AC power (Active, Reactive and Apparent), Power Factor and AC energy (All 3 phases and cumulative) and frequency shall be monitored.
- Computerized AC energy monitoring shall be in addition to the digital AC energy meter.
- The data shall be recorded in a common work sheet chronologically date wise. The data file shall be MS Excel compatible. The data shall be represented in both tabular and graphical form.

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- All instantaneous data shall be shown on the computer screen.
- Software shall be provided for USB download and analysis of DC and AC parametric data for individual plant.
- Provision for instantaneous Internet monitoring and download of historical data shall be also incorporated.
- Remote Server and Software for centralized Internet monitoring system shall be also provided for download and analysis of cumulative data of all the plants and the data of the solar radiation and temperature monitoring system.
- Ambient / Solar PV module back surface temperature shall be also monitored on continuous basis.
- Simultaneous monitoring of DC and AC electrical voltage, current, power, energy and other data of the plant for correlation with solar and environment data shall be provided.
- Remote Monitoring and data acquisition through Remote Monitoring System software at the owner with latest software/hardware configuration and service connectivity for online / real time data monitoring / control complete to be supplied and operation and maintenance / control to be ensured by the bidder.
- The bidders shall be obligated to push real-time plant monitoring data on a specified interval (say 15 minute) through open protocol at receiver location (cloud server) in XML/JSON format, preferably. Suitable provision in this regard will be intimated to the bidders.

Web based Remote Monitoring system must be compatible with data logger. The system shall be provided with required accessories and **required SIM card** for wireless communication. The server shall be arranged by the bidder. The rental and other costs of the SIM cards, IP address, Server charge (storage, access charge and other charges if any), and Rental charge of data communication for remote monitoring system for a period of Five (05) years shall be in bidder's scope.

Note: The data logger facility of INVERTER can be used. Overall data of each INVERTER system shall be available for analysis on login ID.

All data of weather monitoring system including inverter is required to be bring in one central location for analysis/recording by data logger.

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3.3 ACDB with MFM

AC power output of inverters shall be fed to ACDB panel consisting of surge arresters, suitable no of incoming MCCBs (depending upon the string inverter rating) & outgoing MCCB as per following rating:

- 1 System-1, 50KWp at MCL ZONE-A OFFICE: 70 Amperes
- 2 System-2, 10KWp at SUB ZONE DARES BUILDING: 15 Amperes
- 3 System-3, 20KWp at CENTRAL FIRE STATION: 30 Amperes
- 4 System-4, 35KWp at MCL ZONE-B OFFICE: 50 Amperes
- 5 System-5, 8KWp at SUBZONE-B KIDWAI NAGAR: 12 Amperes
- 6 System-6, 8KWp at SUNDER NAGAR FIRE STATION: 12 Amperes
- 7 System-7, 55KWp at MCL ZONE-C OFFICE: 80 Amperes
- 8 System-8, 10KWp at OCTROI BUILDING GILL ROAD: 15 Amperes
- 9 System-9, 10KWp at FIRE STATION GILL ROAD: 15 Amperes
- 10 System-10, 5KWp at SUBZONE DHOLEWAL BUILDING: 7 Amperes
- 11 System-11, 55KWp at MCL ZONE-D OFFICE: 80 Amperes
- 12 System-12, 8KWp at FIRE STATION HUMBRA ROAD/NIGHT SHELTER: 12 Amperes
- 13 System-13, 75KWp at MULTISTOREY PARKING ZONE-A: 110 Amperes
- 14 System-14, 8KWp at SUBZONE D-4 FOUNTAIN CHOWK: 12 Amperes
- 15 System-15, 5KWp at ZONE-D DOG STERILIZATION CENTRE: 7 Amperes
- 16 System-16, 25KWp at SHASTRI BADMINTON HALL: 40 Amperes
- 17 System-17, 81KWp at GURU NANAK STADIUM: 120 Amperes

ACDB shall be floor mounted type, Panel should confirm IP65 and shall be made of min.16 Gauge powder coated MS Sheet metal, totally enclosed, rigid, floor mounted, and cubical type suitable for operation on three phase 415 V, 50 Hz.

All power cables shall be taken through top or bottom of panel as per site requirement.

Distribution Board shall be fitted with suitable rating and size Al/Cu bus, lugs, cable glands, MCBs, ferrules, indicating lamps Accessories etc.

Outgoing of ACDB panel shall feed to Distribution panel on ground floor which in turn shall feed to existing supply panel of respective building.

All switches and the circuit breakers, connectors should confirm to IEC 60947, part I, II and III or EN 50521 standards

3.4 DCDB and AJB

DCDB and AJB are to be provided in the PV yard for connecting cables from solar string to string inverter. DCDB and AJB shall be dustproof, vermin and weatherproof and shall be made of FRP/ ABS plastic of IP 66 rating.

DCDB and AJB shall have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables.

Terminals shall be connected to copper bus bar arrangement of proper sizes. Suitable

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markings shall be provided on Bus bar for easy identification and cable ferrules shall be fitted at the cable termination points for identification.

DCDB and AJB must comprise of following:

- Arrangement for group array isolation.
- Test point for subgroup fault location.
- DC breaker, surge (Type II SPD, MOV) and fuse protection device
- Should have DC disconnect switch
- Should have installed Type II SPD and proper earthing arrangements.

The design and components of DCDB and AJB must be approved by BHEL prior to ordering.

Note: if short circuit and surge protection of DC side is not inbuilt in the string inverter same can be provided in DCDB and AJB

3.5 Miscellaneous Equipment

Miscellaneous Equipment (Control cables, insulation tapes, ferrules, Lugs, Cable Glands, cable ties, Clamps, etc.) shall be provided by the bidder.

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4 **Special Terms and conditions:**

4.1 **Freight & Transit insurance:**

Price quoted by the bidder for each system is inclusive of the freight FOR BHEL CFP Rudrapur.

The Bidder shall take Transit insurance of materials up to BHEL CFP Rudrapur.

4.2 **System Warranty**

The bidder must ensure that the goods supplied under the contract are new, unused and of most recent or current models and incorporate all recent improvements in design and materials unless provided otherwise in the contract.

The complete items supplied, workmanship for each item shall be under onsite warranty of 60 **calendar** months from the date of successful installation at Ludhiana. The equipments or components, or any part thereof of supplied items, if so found defective during warrantee period, the bidder will remain liable to repair or replace immediately under warrantee obligation to the satisfaction of the Purchaser in order to ensure trouble free operation of the Power Plant.

4.3 **Inspection**

All items shall be jointly inspected by BHEL and customer in assembled condition prior to dispatch as per approved QAP.

15 days' advance Intimation to be given for joint inspection to BHEL.

4.4 **Testing and commissioning**

The testing and commissioning for all electrical equipment at site shall be according to the procedures listed below:

- All electrical equipment shall be tested, installed and commissioned in accordance with the latest relevant standards and code of practices published by Indian Standards Institution wherever applicable and stipulations made in relevant general specifications.
- BHEL or its authorized representative reserves the right to witness tests conducted by the contractor using contractor's own calibrated instruments, testing equipment as well as qualified testing personnel.
- The results of all tests shall conform to the specification requirements as well as any specific performance data guaranteed during finalization of the contract.
- After completion of the installation at site and for the preparation of plant commissioning, the contractor shall check all the equipment and installation in accordance with the agreed standards, latest relevant code of practices of Indian Standards and specific instructions furnished by the particular equipment manufacturer as well as BHEL Engineer In-Charge.

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4.5 O&M Manual and TEST CERTIFICATES

- 03 copy of O&M Manual shall be submitted within 10 days of Supply.
- Test certificates/Test Reports for all supplied items.
- Equipment shall not be dispatched until BHEL issues a "Dispatch clearance" to Bidder.
- Warranty certificates shall be submitted for all supplied items.

Note:

- Installation shall be carried out at different location of Ludhiana as listed above.
- All tools and tackles during installation of string inverter and weather monitoring system have to be organized by the bidder.

4.6 Delivery Schedule

The total time period for Supply is within 30 days from the date of PO.

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5 GENERAL TERMS AND CONDITIONS:

- a) All the materials brought to Rudrapur should have proper paper work like Dispatch certificate, Invoice etc. duly verified & signed by BHEL representative to be submitted to BHEL for payment.
- b) Bidder shall ensure deployment of at least one person who should have the skill, knowledge and experience during the installation of supplied item.
- c) In case of items are not supplied as per BHEL scope due to reasons arising out of materials from BHEL end/Bidder's end, bidder has to complete the job at later stage without any extra charges. No overrun charges shall be paid in case of extension of project schedules.
- d) Any miscellaneous materials that have not been mentioned specifically in the specification/tender which are required for Installation of Invertor or Weather monitoring system shall be deemed to be included in the specification and shall be supplied by the Bidder without any extra charges. Any scope of activities which are not specifically mentioned in this specification but required for the Installation of Invertor or Weather monitoring system for safe, trouble free, normal operation shall be provided at no extra cost by the Bidder, unless explicitly excluded in the specification.
- e) The design and operational features of the equipment offered shall also comply with the provisions of latest issue of the Indian Electricity Rules and other statutory regulations.
- f) The installation should strictly conform to this specification. All the works shall be executed strictly as per the direction of BHEL engineer at site.

6 LIST OF ENCLOSURES:

Following enclosure makes the part of BDC1718-47002.

- 6.1 SPV Module drawing- 3-988-00-001-10
- 6.2 SPV Module Data Sheet – EP-901-01-00001
- 6.3 Annexure – A includes Qualifying Criteria.
- 6.4 Annexure – B format for certificate by chartered accountant

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	PURCHASE SPECIFICATION Annexure A	BDC1718-47002	
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Annexure A

1. Qualifying Criteria

Sl. No	Description	Required
1	Acceptance to BDC1718-47002, Annexure-A, and B. Submit signed & stamped/digital signature on each page of all tender documents.	Applicable
2	Copy of proof of supply of string inverter, ACDB, DCDB, Weather monitoring system of Minimum 05 Nos of tendered items in last three years.	Applicable
3.	The Average financial turnover of last Three year should be minimum 15 lakhs. Bidder have to submit audited balance sheet & profit and loss account of last three financial years.	Applicable
4	EMD of Rs.1,00,000/- (One lakh Only) shall be submitted in form of cash, pay order or demand draft/ NEFT/RTGS to BHEL account in favor to BHEL along with Offer. EMD is exempted for micro & small scale enterprises (MSE) Included. Note: submit attested documentary Evidence/ Govt. Certificate etc. in support of the same along with their Techno-commercial offer. MSE suppliers can avail the intended benefits only if they submit along with the offer, attested copies of either EM – II certificate having deemed validity (Five years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or EM-II certificate along with attested copy of a CA certificate (Format enclosed as per Annexure- B) where deemed validity of EM-II certificate of five years has expired) applicable for the relevant financial year (last audited). EMD to unsuccessful bidders shall be returned after finalisation of PO. EMD to successful bidder shall be returned only after submission of PBG as per Clause 8 of NIT terms & conditions of annexure-A.	Applicable Bank Details are as follow: Bank: HDFC Bank Beneficiary Name: Bharat Heavy Electricals Limited A/C NO: 02830310000080 Account Type: Cash Credit BRANCH: Shop 1 & 2, NAINITAL ROAD RUDRAPUR, U. S. Nagar PIN CODE-263153 Tel: 05944 - 241756 / 241368 MICR CODE: 263240002 IFSC CODE: HDFC0000283

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NIT Terms & Condition

1. **Price basis:** Firm.
2. **Delivery:** The total time period for Supply is within 30 days from the date of PO.
3. **Term of Delivery:** FOR BHEL Rudrapur
4. **Inspection:** All items shall be jointly inspected by BHEL and customer in assembled condition prior to dispatch as per approved QAP.
15 days' advance Intimation to be given for joint inspection to BHEL.
5. **Payment terms:**

The payment shall be made by BHEL in the following manner:

a. Supply Part:

- i. **On Supply:** 90% of the PO value within 45 days after receipt of material along with all documents like (Test certificate, Invoice etc.) at BHEL Rudrapur.
- ii. **On successful E&C:** 10 % of the PO value will be released within 30 days after successfully installation of supplied items.

Payment shall be released on furnishing performance Bank Guarantee.

All payments to be made to the bidder under the contract will be in Indian rupees only.

6. **Liquidity Damage:** An unconditional penalty of 0.5% (Half percent) in arrears per week subject to maximum of 10% of PO value for delayed period.
7. **Warranty:**
The bidder must ensure that the goods supplied under the contract are new, unused and of most recent or current models and incorporate all recent improvements in design and materials unless provided otherwise in the contract.
The complete items supplied, workmanship for each item shall be under onsite warranty of 60 **calendar** months from the date of successful installation at Ludhiana.
The equipments or components, or any part thereof of supplied items, if so found defective during warrantee period, the bidder will remain liable to repair or replace immediately under warrantee obligation to the satisfaction of the Purchaser in order to ensure trouble free operation of the Power Plant.
8. **PBG:** A performance bank Guarantee of 10% of PO value valid for warranty period of 05 years from the date of PO with a claim period of 6 months thereafter by the successful Tenderer shall be furnished within 10 days of PO date to the Employer (BHEL). The performance Guarantee can be in the form of a Bank Guarantee (B.G) as per BHEL format, from a Nationalized/ Scheduled Bank. The Bank Guarantee towards Performance Guarantee will be released after completion of onsite warranty period.

Note: Non acceptance/submission of any of the above requirements will render the offer for rejection.

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DECLARATION BY THE BIDDER

I/We

(Hereinafter referred to as Bidder) being desirous of participating for tender, having fully understood the scope of tender and having carefully noted all the terms and conditions, specifications etc. as mentioned in the tender document (BDC1718-47002) do hereby declare that-

1. The Bidder is fully aware of all the requirements of the tender document (BDC1718-47002) and agrees with all provisions of the tender document and accepts all risks, responsibilities and obligations directly or indirectly connected with the performance of the tender.
2. The Bidder is fully aware of all the relevant information for proper execution of the proposed scope of work, with respect to the proposed place of works/ site, its local environment, approach road and connectivity etc. and is well acquainted with actual and other prevailing working conditions, availability of required materials and labour etc. at site.
3. The Bidder is capable of executing and completing the work as required in the tender and is financially solvent and sound to execute the tendered work. The Bidder is sufficiently experienced and competent to perform the contract to the satisfaction of BHEL The Bidder gives the assurance to execute the tendered work as per specifications, terms and conditions of the tender on award of work.
4. The Bidder has no collusion with other Bidders, any employee of BHEL or with any other person or firm in the preparation of the tender.
5. The Bidder has not been influenced by any statement or promises by BHEL or any of its employees but only by the tender document.
6. The Bidder is familiar with all general and special laws, acts, ordinances, rules and regulations of the Municipal, District, State and Central Government that may affect the work, its performance or personnel employed therein.
7. The Bidder has never been debarred from similar type of work by any Government undertaking /Department. (An undertaking on Stamp paper in this regard shall have to be submitted)
8. The Bidder accepts that the earnest money may be absolutely forfeited by BHEL if the Bidder fails to sign the contract or to undertake the work within stipulated time.
9. All the information and the statements submitted with the tender are true.

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Details of Bidder

Name of the Party: _____

Address of the Party: _____

Email ID: _____

Bank A/c No: _____

Bank Name: _____

Bank Address: _____

IFS Code: _____

Contact Person (Name of a suitable qualified person who will act as project manager during execution of system & shall be single point contact for BHEL.): _____

Phone No of
Contact Person: _____

Signature and seal of Bidder

CERTIFICATE BY CHARTERED ACCOUNTANT ON LETTER HEAD

This is to certify that M/s
(Hereinafter referred to as 'Company') having
 its registered office at is registered under MSMED Act 2006, (Entrepreneur
 Memorandum No ((Part-II) dtd Category:
 (Micro/Small). (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company as per the
 latest audited financial year **as per MSMED Act 2006 is as follows:**

1. For Manufacturing Enterprises: Investment in plant and machinery (i.e., original cost excluding land
 and building and the items specified by the Ministry of Small Industries vide its notification No.S.O.1722
 (E) dated October 5, 2006:
 Rs.Lacs.

2. For Service Enterprises: Investment in equipment (original cost excluding land and building
 and furniture, fittings and other items not directly related to the service rendered or as may be
 notified under the MSMED Act, 2006:
 Rs.Lacs.
 The above investment of Rs. Lacs in within permissible limit of Rs..... Lacs
 for.....Micro / Small (Strike off which is not applicable) Category under MSMED
 Act 2006.

(or)

The company has been graduated from its original category (Micro/Small) (Strike off which is not
 applicable) and the date of graduation of such enterprise from its original category is
(dd/mm/yy) which is within the period of 3 years from the date of graduation of such enterprise
 from its original category as notified vide S.O.No.3322(E) dated 01.11.2013 published in the gazette
 notification dated 04.11.2013 by Ministry of MSME.

Date:
 (Signature)
 Name -
 Membership Number -

Seal of Chartered Accountant





**DATASHEET FOR
SOLAR PHOTOVOLTIC MODULE
LSCL-LUDHIANA (0.47 MW)**

DOC. NO: EP-901-01-00001

REV. 00 JOB NO.- SP1011

PAGE 01 OF 02

SPV MODULE TYPE: L24270P (MULTI - 24 V, 300 WATTS)

1. PV MODULE TYPE NO. : L24270P
2. CONFIGURATION : SINGLE GLASS LAMINATED TYPE WITH
72 NOS. OF 156-mm (Typ.) MULTI CRYSTALLINE
SILICON SOLAR CELLS (12*6) IN SERIES
CONFIGURATION.
3. OVERALL SIZE : 1966 (±3) * 986 (±2) * 35 (±1) mm
4. WEIGHT : 22.5 Kg. (Typ.)
5. RFID Tag : As per MNRE Guidelines
6. MAJOR BILL OF MATERIAL

SL NO.	BILL OF MATERIAL	DETAILS
1	SOLAR CELL	MULTI/ MONO CRYSTALLINE
2	SOLAR GLASS	ANTI REFLECTION COATED, LIGHT TRANSMISSION $\geq 93\%$
3	EVA SHEET	THERMAL CONDUCTIVITY - 0.27 (W/ m.k.) OPTICAL TRANSMITTANCE $> 91\%$, PID RESISTANT, UV & WEATHER STABLE
4	BACK SHEET	THREE LAYERED STRUCTURE, FLUOROPOLYMER BASED, THICKNESS MIN. 300 MICRONS
5	PV MODULE FRAME MATERIAL	ANODISED ALUMINIUM FRAME (COATING THICKNESS 18 ± 3 MICRONS)
6	JUNCTION BOX	IP 67/ IP 65 GRADE JUNCTION BOX WITH CABLES AND CONNECTORS (TUV CERTIFICATED)

7. CERTIFICATION ON SPV MODULE:

- IEC 61215: DESIGN QUALIFICATION AND TYPE APPROVAL FOR CRYSTALLINE SI MODULES
- IEC 61730-1: PV MODULE REQUIREMENTS FOR CONSTRUCTION
- IEC 61730-2: PV MODULE REQUIREMENTS FOR TESTING
- IEC 61701: SALT MIST CORROSION TESTING FOR HIGHLY CORROSIVE ENVIRONMENT
- IEC 62804: SYSTEM VOLTAGE DURABILITY TEST (PID) CRYSTALLINE PV MODULES

REVISION (00): 1ST ISSUE DTD. 19.08.2017

PREPARED BY:

RKP

REVIEWED BY:

NAR

APPROVED

CNP

ISSUED

SPV ENGG.

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BHEL-EPD

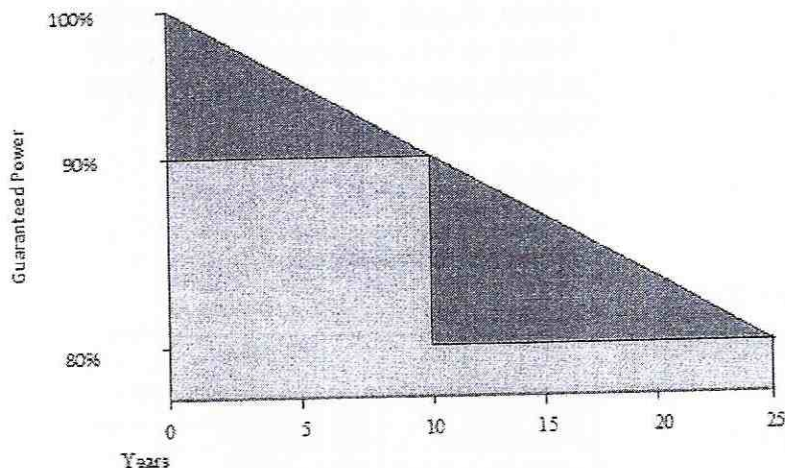
**DATASHEET FOR
SOLAR PHOTOVOLTIC MODULE
LSCL-LUDHIANA (0.47 MW)**

DOC. NO: EP-901-01-00001

REV. 00

JOB NO.- SP1011

PAGE 02 OF 02

8. PERFORMANCE WARRANTY:**10** Guarantee for product
Years material and workmanship**25** Linear Power
Years output warranty**9. TYPICAL ELECTRICAL CHARACTERISTICS:**

Type No.	Voc (V)	Isc (A)	Vmp (V)	Imp (A)	Pmax (Wp) Min.	Fill Factor (FF) Min.
L24270P-300W	45.0	8.70	36.0	8.33	300	≥ 0.70

NOTE:

- 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.
- Measurement repeatability of peak power output: ±3%.

Abbreviation:

- OPEN CIRCUIT VOLTAGE (Voc), SHORT CIRCUIT CURRENT (Isc)
- VOLTAGE AT PEAK POWER POINT (Vmp)
- CURRENT AT PEAK POWER POINT (Imp)
- PEAK POWER OUTPUT (P max.)

REVISION (00): 1ST ISSUE, DTD. 19.08.2017

PREPARED BY:

RKP

REVIEWED BY:

NAR

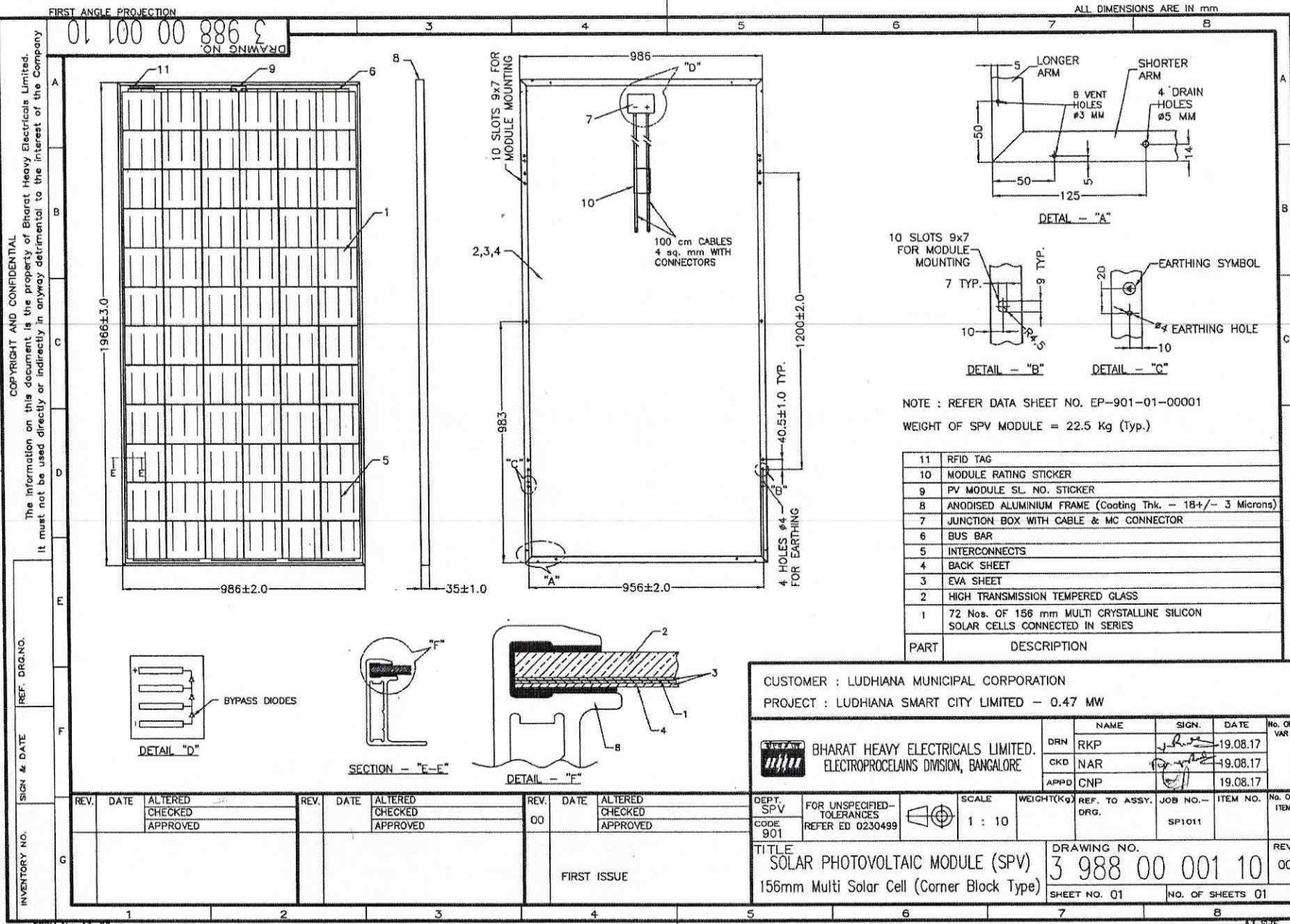
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SPV ENGG

Handwritten signature/initials.



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INVENTORY NO.

SIGN & DATE

REF. DRG. NO.

REV.	DATE	ALTERED	CHECKED	APPROVED	REV.	DATE	ALTERED	CHECKED	APPROVED	REV.	DATE	ALTERED	CHECKED	APPROVED
1					2					3				
4					5					6				
7					8					9				
10					11					12				

CUSTOMER : LUDHIANA MUNICIPAL CORPORATION

PROJECT : LUDHIANA SMART CITY LIMITED - 0.47 MW

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTROPROCELAINS DIVISION, BANGALORE

DRN	NAME	SIGN.	DATE	No. OF VAR
RKP			19.08.17	
NAR			19.08.17	
CNP			19.08.17	

DEPT. SPV	FOR UNSPECIFIED-TOLERANCES	SCALE	WEIGHT(Kg)	REF. TO ASSY. DRG.	JOB NO.-	ITEM NO.	No. OF ITEM
CODE 901	REFER ED 0230499	1 : 10			SP1011		

TITLE
SOLAR PHOTOVOLTAIC MODULE (SPV)
156mm Multi Solar Cell (Corner Block Type)

DRAWING NO.
3 988 00 001 10

REV.
00

SHEET NO. 01
NO. OF SHEETS 01