Reg. No. MAH/544/ANR/82

DR. VITHALRAO VIKHE PATIL FOUNDATION

Vadgaon Gupta (Vilad Ghat), P. O. - M.I.D.C., Ahmednagar - 414 111. (Maharashtra)

Ph. No. : (0241) 2778206, 2779895 Email : vikhef@rediffmail.com

Tel.Fax No. : (0241) 2778043 Website : pdvvpfa.org

# Retrio : DUNPER PS COE 255/149

Bosch Limited, Regd Off P.B. No.3000, Citadel 3rd Floor, Hosur Road, Adugodi, Bangalore 560030

### Purchase Order for Engineering, Procurement and Construction of 300 kWp Grid Tied Solar **PV** Power Plant.

Kind Attn: Mr. Chandan Singh (Regional Manager)

Subject: Supply of Solar PV Components for 300Kwp Roof Top Solar PV System

Ref: Binding Commercial offer submitted by Bosch limited (your offer letter, dated: 20th Jan 2018 & quotation, dated: 18th Jan 2018)

Dear Sir.

Referring to the offer please find the purchase order for Supply of Components for 300kWp RCC Roof Top Solar PV System as per the Annexure 1-5 enclosed.

Kindly provide the signed copy of the Purchase Order as a token of acceptance.

Delivery Address:

Dr. Vithalrao Vikhe Patil Foundation's College of Engineering, Vadgaon Gupta, Vilad Ghat, Post: MIDC, Ahmednagar-414 111

#### Invoicing Address:

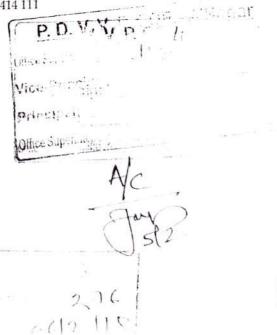
The Principal, Dr. Vithalrao Vikhe Patil Foundation's College of Engineering, Vadgaon Gupta, Vilad Ghat, Post: MIDC, Ahmednagar-414 111

Your's taithfully,

Authorised Signatory and Seal De Vithairad Vikha Patil Foundation Voogaan Cupia/Vilia Ghal), Ahmednagar Enclosures:-Annexure 1 : Breakup of Purchase Order Annexure 2 Payment Terms Annexure 3 Scope of Purchase Order

Annesure 4 : Preliminary Bill of material Annexure 5 : Warranty Terms and Conditions

-1814 AL 181





Date: 31 01 2018

B.P.T. Act/F-490 (Ahmednagar)

Vadgaon Gupta (Vilad Ghat), P. O. - M.I.D.C., Ahmednagar - 414 111. (Maharashtra)

Ph. No. : (0241) 2778206, 2779895 Email : vikhef@rediffmail.com

Tel.Fax No. : (0241) 2778043 Website : pdvvpfa.org

Ref. No. : Purchase Order No. : Annexure 1 : Breakup of Purchase Order

Supply Price for 300 KWpRoof Top Solar PV System Components

ITEMS/ DESCRIPTION	CODE	AMOUNT	Subsidy Amount	After Subsidy	GST %	GST INR	Customer Payable
Solar Power Generating System- Solar PV Modules	85414011	7,036,179	2,179,574	4,856,605	5.0%	242,830	5,099,435
Solar Power Generating System- Solar Inverters	85044010	2,937,691	909,999	2,027,692	5.0%	101,385	2,129,077
Solar Power Generating System- Balance of System and Electrical Accessories	8502	2,581,950	799,802	1,782,148	5.0%	89,107	1,871,255
Solar Power Generating System- MS/HDG Structure and Accessories	73089090	742,971	230,148	512,823	18.0%	92,308	615,131
Solar Power Generating System- Other Accessories	39269099	614,038	190,209	423,830	28.0%	118,672	542,501 1,216,884
Installation, Testing and commissioning of Solar Power Generating System	998732	1,494,070	462,813	1,031,257	18.0%	103,020	1,210,004
Total Prog.	Lon See	15,406,899		10,532,355		3/40,3/50	114242402

Customer Payable After Subsidy (Including Taxes) :- Rs. One Crore Fourteen Lakh Sixty Four Thousand Two Hundred & Eighty three only.

Other terms & conditions (Inclusive in above price)

1. One person for M/s. BOSCH for plant operation & maintenance for one year.

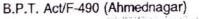
2.Performance Bank Gaurantee for 10% of generation at current tariff for period of one year 3.Structure Galvanization upto 100 micron, but we will be using galvium sheets which are per

galvanized as discussed. 4. One Signage/Digital Display Board at one location displaying plant generation and details on real time basis.

Bank	Details:-

Account Name	BOSCH LIMITED
Bank :	DEUTSCHE Bank
Bank Address :	No. 2-17, Raheja Towers, M G Road, Bangalore-560001
Current Account No.	2050300004
IFSC code for RTGS/NEFT	DEUT0797BGL

Date :



Socretary Gener v.Vilinaireo Vikhe Patti F Authorised Signatory and Seal

#### B.P.T. Act/F-490 (Ahmednagar)

Date :

# DR. VITHALRAO VIKHE PATIL FOUNDATION

Vadgaon Gupta (Vilad Ghat), P. O. - M.I.D.C., Ahmednagar - 414 111. (Maharashtra)

Ph. No. : (0241) 2778206, 2779895 Email : vikhef@rediffmail.com Tel.Fax No. : (0241) 2778043 Website : pdvvpfa.org



Ref. No. :

(

Purchase Order No. :

Annexure 2 : Payment Terms

The General payment terms are proposed below

O here		
Sr.No.		Our Proposed Payment Terms
		1. Amount Equivalent to 10% of the Order value as Project advance through
		Cheque/Demand Draft/RTGs infavour of Bosch Limited.
		2. 90% LC (Letter Of Credit) from Nationalized Bank
一種製作		Terms of LC disbursement :
1	Payment Terms	a. Amount equivalent to 80% of the Order Value on pro-rate basis against
		material readiness and Proforma Invoice/Commercial invoice.
		b. Amount equivalent to 10% of the total Order Value against
		i. Commissioning of Solar PV System.
		ii.CEIG Certificate
		a) Solar PV Modules : 5% GST
百姓 燕		b) MMS : 18% GST
		c) BOS : Components of solar power generating system :5%
		d) Other BOS components not falling under the ambit of solar power
		generating system: 28%
		e) Service: 18% is applicable on the service component
	Taxes and	Taxes are considering GST rates as per applicability with the current
2	Duties	understanding and data available. We have taken up with MNRE for GST of
	Duties	5% on Solar Power Generating System but clarity is yet to come. Based on
		clarification which emerges later, actual GST will be charges at the time
		billing
		The price offered is based on prevailing rates, taxes and duties. Any impact
		in price increase/decrease due to change in rates, taxes, duties, antidumping
1. 1. 1		duties, change infresh law, statutory rule or order shall be borne by the
		Customer.
2 · · · · §j		Solar PV Components shall be delivered within 3 months from the Effective
		Date as defined above.
		We agree that within seven (7) working days from the Effective Date
		(Agreement signing date) the following actions (Prerequisites) shall be
	Time of	concluded in sequence failing which revised dates of commissioning of the
3		Project will be mutually agreed to between the Parties :
	Completion	a) Release of advance amount of Rs. 1146428.50 Or 10% of consideration
		amount by the Customer.
1 美国教育		b) Issuance of ' Notice to Proceed' (NTP) by the Project Owner to Contractor.
		c) Access to unencumbered dispute free root/land is provided to
	2 m	Contractor by the Customer.

Authorised/Big Hitor Fand Sealstk

#### B.P.T. Act/F-490 (Ahmednagar)

# DR. VITHALRAO VIKHE PATIL FOUNDATION

Vadgaon Gupta (Vilad Ghat), P. O. - M.I.D.C., Ahmednagar - 414 111. (Maharashtra)

Ph. No. : (0241) 2778206, 2779895 Email : vikhef@rediffmail.com Tel.Fax No. : (0241) 2778043 Website : pdvvpfa.org

Date :

#### Ref. No. : Purchase Order No. : <u>Annexure 3 : Scope of Purchase Order</u>

### The broad scope of work under M/s. Bosch Limited includes the following:

a. Supply of the Solar PV Modules and arrays with associated components comprising of DC cables, String Inverters, Mounting Structures, AC Cables, Communiction Cables, Remote Monitoring, Weather Monitoring System, Earthing System and Lightnign Arrestorat power plant with necessary packaging and transportation.

- b. Supply of the suitable fire protection equipment's as per the statutory requirements.
- c. Supply of danger board, sign-boards etc. as per the statutory needs.
- d. Water piping for Module cleaning from the nearest water availability point on roof.

### Exclusion to the Purchase Order :

- e. Car Port Structure/Elevated Structure on the rooftop.
- f. Construction of Stair/Ladder to access roofs' terrace, Walkway and Handrails.
- g. Any modification in the Existing LT Panels for evacuating Solar Power Plant
- h. Spare Feeder supply for connecting solar power plant.Reverse Power Relay/Protection System to avoid reverse power flow to Diesel Genset.
- i. Fencing, control room, access roads and drainage.

### The broad scope of work under our scope includes the following:

- j. Fees in form of DD/Bank Guarantees towards all the Statuaries Approvals shall be paid by us.
- k. All the Statutory approvals are on our account.

1. We shall provide unhindered roof access to install and operate solar roof top system with clear approach for 5 years

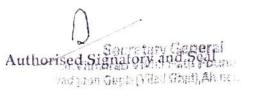
- m. We agree that there is no obstacle for the shadow free area to install solar
- n. We shall provide the approach road for material movement.
- o. Identification and procurement/lease of roof/land for setting up of power plant including tree cutting and any other existing infrastructure removal on roof.
- p. Identification of nearest LT-Panel for Power evacuation and connectivity approvals
- q. NOC from Gram Panchayat/statutory authority wherever required
- r. Approach roads for transport of goods from the nearest motorable road to Project Site.
- s. Construction Power and Water on each terrace for installation & Operational maintenance for 5 years.

t. Provision of Water Source on Roof Terrace with 4 to 5 Bar Pressure including pressure pump for module cleaning system.

u. Any Modification in the Existing Infrastructure like roof strengthening, step-up transformer, associated switchgears, cables, CT, PT's.

v. Internet Connection and associated cost to be provided by Project Owner along with Static IP for remote monitoring of Solar PV System.

- w. Net Metering to be done by Bosch but payment not linked to Net-metering
- x. AC cabling above 100 mtrs is in customer scope.



# DR. VITHALRAO VIKHE PATIL FOUNDATION

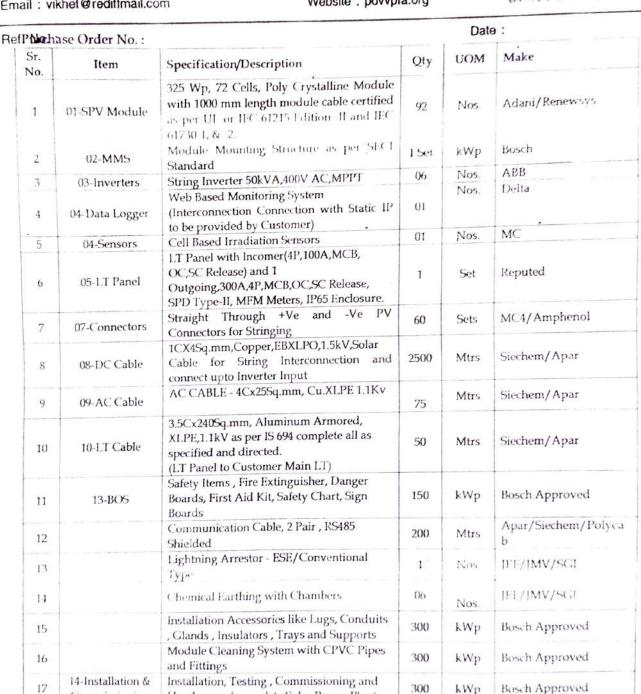
Vadgaon Gupta (Vilad Ghat), P. O. - M.I.D.C., Ahmednagar - 414 111. (Maharashtra)

Ph. No. : (0241) 2778206, 2779895 Email : vikhef@rediffmail.com

Commissioning

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Tel.Fax No. : (0241) 2778043 Website : pdvvpfa.org



Note : The specification and make of the components and quantity shall change during Detailed Engineering as per the requirement

Hand over of complete Solar Power Plant

Authorised Signatory and Seal

Secretary General Dr.Vithalmo Vikhe Patil Foundation Vadgaon Gupta(Vilad Ghat), Ahmednigar



Ph. No. : (0241) 2778206, 2779895 Email : vikhef@rediffmail.com

Tel.Fax No. : (0241) 2778043 Website : pdvvpfa.org

### Ref. No. : Purchase Order No. : Annexure 5 : Warranty Conditions

Date :

Bosch Limited provides warranty for material and workmanship of various components supplied as a part of the solar PV power plant, whereas System warranty for workmanship of installation and performance of the system. The conditions of these warranties are elaborated in this document:

#### A) Product Warranty : Warranty for PV Module :

- 5 years product warranty
- 25 years performance guarantee (90% up to 10 years, 80% up to 25 years)

Warranty for Solar Inverter :

• 10 years product warranty

B) Warranty for Balance of System items

- 5 year from the date of supply in accordance with the warranty conditions of the used inverters.
- Warranty for the structural safety and stability of the mounting system for a period of 5 year.

Until the end of the warranty period plus the operating period of the Project, Bosch shall have access right to all parts of the plant and to the reports on its work and output.

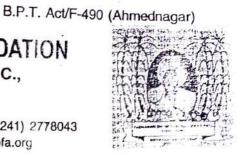
- Parts and components, which are repaired or replaced during such period, are warranted for the original warranty period only and will not carry any extended warranty. If the equipment is not repairable at site the same has to be sent at the workshop on freight prepaid basis after obtaining consent from Bosch in writing and Bosch shall make good the defect and return back to the Customer.
- For the components which are bought out by Bosch and supplied to the project, the warranty shall be applicable as per the original manufacturer's warranty only and shall be transferred to the final customer upon supply of the components.

#### C) Workmanship Warranty:

Workmanship related warranties are as below:

- 1. Electric installation works such as interconnection of strings, connection of string combiner boxes, AC/DC Cables, power evacuation infrastructure shall carry warranty for 60 months.
- 2. Structural safety and stability of the mounting system shall be covered for a period of 60 months.

Authorised Signatory and Seal 11.1 Collimation Mane Built Pour des Vangaon Gupta(Vilad Ghat , Jonudo).



# DR. VITHALRAO VIKHE PATIL FOUNDATION Vadgaon Gupta (Vilad Ghat), P. O. - M.I.D.C., Ahmednagar - 414 111. (Maharashtra)

Ph. No. : (0241) 2778206, 2779895 Email : vikhef@rediffmail.com

Tel.Fax No. : (0241) 2778043 Website : pdvvpfa.org

### Ref. No. : Purchase Order No. : D) Conditions of Warranty

#### 1. General Conditions :

- 1. Claimsarising from or in connection with this warranty must be filed inwriting within the applicable warranty period. No extension of warranty period shall be provided, regardless of legal basis.
- 2. Until the end of the warranty period, Bosch Limited shall have an access right to all parts of the plant, reports on its working and output.
- 3. The final customer shall be responsible to ascertain any warranty claims directly with the original manufacturer as per the limited warranty certificate from original manufacturer. However if -Bosch Limited has been contracted for operation and maintenance services, then under the contract period, Bosch Limited shall liaise between the final customer and original equipment manufacturer for valid warranty claims.
- 4. The disputes pertaining to this project shall be subjected to Bangalore Jurisdition only.

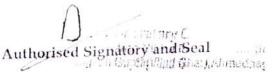
#### E) Disclaimers/Limitations of Liability :

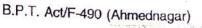
- These warranties are valid for normal use and only undernormal operating conditions. The 1. warranties assume that the performance of the system has not been reduced by actions or events outside the sphere of influence of Bosch Limited, in particular.
- 2. Modifications/damage as a consequence of force majeure (storms, hail, fire, power outage, lightning, flood, snow damage, avalanches, frost, earthquakes, tornadoes, volcanic eruptions, landslides, plagues of insects and other detrimental effects by animals, acts of war etc.) or damage caused by third parties due to vandalism or theft.
- 3. Unprofessional operation, improper removal and/or re-installation of modules, willful damage or negligence, normal wear and tear, improper installation and/ or maintenance by final customer or a third party, misuse or abuse of equipment, modifications or alterations made by customer or a third party without consent from Bosch.
- 4. Impairment due to external influences (e.g. :dirt, smoke, salt, chemicals and other impurities)
- 5. Warranty cannot be transferred to a third party without prior consent from Bosch Limited.
- 6. Notwithstanding anything contained in this Agreement or any of its annexures and schedules, the liability of Bosch for any loss suffered by the Customer and or any breach of conditions of this Agreement and its annexures and or the termination of this Agreement shall not exceed 2% of the total order value.

#### F) Warranty Claims :

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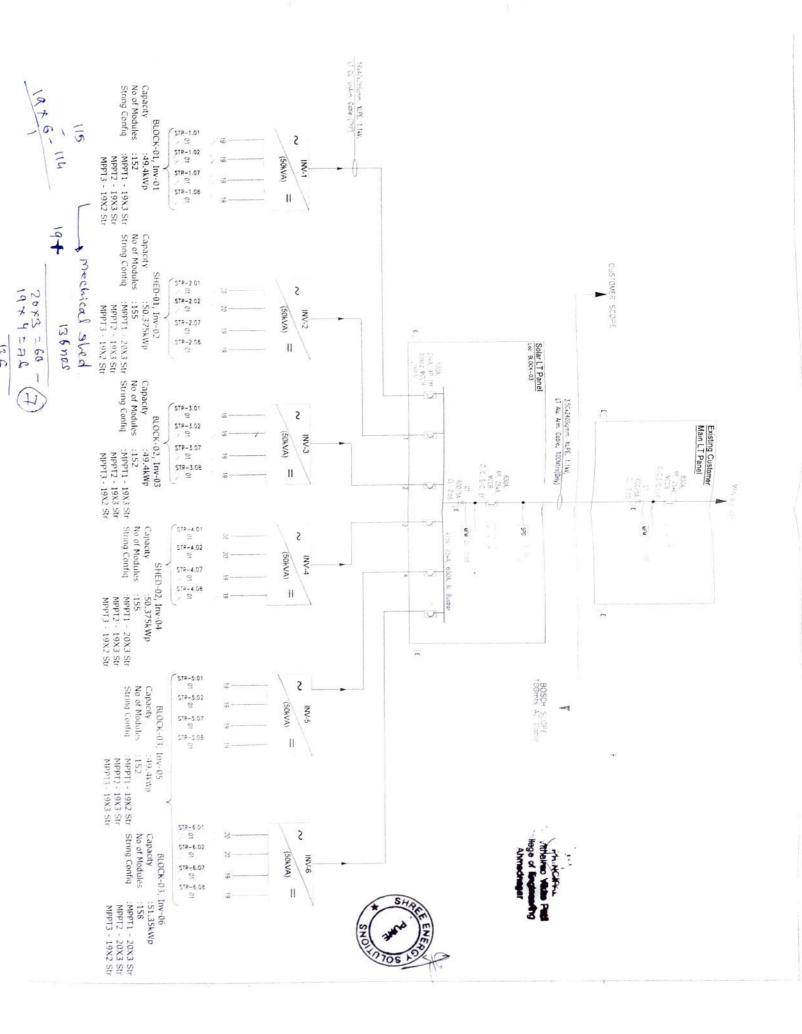
- 7. In case of warranty claims, Bosch Limited shall remedy the defects, co-ordinate without original manufacturers for replacement of components with functional ones or repair the same component, as per the limited warranty conditions of the original manufacturer.
- No other claim shall be derived from this warranty.
- 9 For components newly supplied for repaired, only remaining time of original time of original warranty shall be applicable







Date :



Date: 11<sup>th</sup> August 2018

DVVPFA/DDTECH/2018/18

To,

The Secretary General,

Dr Vithalrao Vikhe Patil Founation,

Ahmednagar, MS - 414111

# Sub: 300Kwp Solar Power Generating System.

Ref: 1: Purchase Order: DVVPFA/PS/COE/255 dated 31<sup>ST</sup> Jan 2018.

2: Invoice No: 180016955 dated 26<sup>th</sup> June 2018.

Invoice No: 180017651 dated 29<sup>th</sup> June 2018.

Sir,

X

Reference to purchase order, received the tax invoices for the aforementioned work. We have paid advance as per the terms of the purchase order. The tax invoices be adjusted accordingly and balance paid to the party, as per terms of PO.

Request to kindly inform the concerned department accordingly.

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Sunil Kalhapure Dy Director (Tech) Dr Vithalrao Vikhe Patil Foundation,

Ahmednagar

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Annekel	ly, Bangalore - 562106 In	dia					Page 1 of 1
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Dr Vith, Vadgao P O Mit Ahmedi GS HN	alrao Vikhe Patil Found on Guota(Vilad Ghat)			Supplier Code Customer Code Your PAN P.O. No. & Date :		170265 AAATE DVVPI	951 22304C A/PS/COE/255 /31 01 2018
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Header	Note	300kWp Solar Power Gener	ating system.				
Silo	Material / Descri	ption	Quantity	Unit	Rate/U	nit	Taxable Value/INR
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	In Words	vo Lakh Forty Two Thousar	nd Eight Hundre	d Thirty Rupees	Total Taxable Va Tax Amount Total Value		4,856,602.68 242,830.00 5,099,432.68
	ount-INR: Tv Iue-INR: Fif	vo Lakh Forty Two Thousar ty Lakh Ninety Nine Thous	and Four Hundr	ed Thirty Two Rupee	s Sixty Eight Paise	:	/

		and	- All your
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	3.	43 .	

For Bosch Limited

Authorised Signatory

icablefrom the date of displich of materials

ATHETHER	TAX IS PAYABL	E ON REVERSE	CHARGE BASIS: NO
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Cheques should be made payable to Bosch Limited. Duly crossed "AccountPayee Only" Payment should be made within due date as applie BANKERS:State Bank of India, Canara Bank, Citi Bank, Deutsche Bank, Art

BANKER5:State Bank of India,Canara Bank,Citi Bank,Deutsche Bank AG

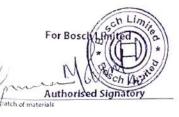
Registered Office : HosurRoad, Adugodi, Bangalore - 560030, IndiaPhone:080-22220088,22992111, Telefax 080-22272728

E OSCH Limited Plot no 263 Bommasandra-Jigani Link Road Industrial Area, Rajeų: ira Viliage, Jigani Hobli, Annekel Tq, Bangalore - 562106 India

Page 1 of 1

Detail	s of Consignee(Sh	in-to)	TZ	X INVOICE			
Dr Vithalrao Vikhe Patil Foundation Vadgaon Gupta(Vilad Ghat) P.O MIDC Ahmednagar-414111 GSTIN-27AAATP2304C125 State Code:27#Maharashtra Details of Receiver(Bill-to) Dr Vithalrao Vikhe Patil Foundation Vadgaon Gupta(Vilad Ghat)			Dat CIN PAI GS Col	Tax Invoice Number Date of Tax Invoice CIN PAN GSTIN Contact person of Acc.		180017651 29.06.2018 L85110KA1951PLC000761 AAACM9840P 29AAACM9840P1ZP	
			Bosch Document Number 15			5500461	
Ahmedn GSTIN-2	n Gupta(Vilad Ghat) DC Dagar-414111 27AAATP2304C125 ode:27#Maharashtra		Cus You	pplier Code stomer Code ur PAN 9. No. & Date :	AA	026951 ATP2304C VPFA/PS/COE/255 /31.01.2018	
Peliver	y Terms	DAP-Delivered at place	Payme	ent Terms	P298-10% Adv,80%	% Prorate,5% on install,5%on	
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No	Material / Descri	ption Qua	ntity	Unit	Rate/Unit	Taxable Value/INR	
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WHETHER TAX IS PAYABLE ON REVERSE CHARGE BASIS: NO



He payable to Bosch Limited, Duly crossed" Account Payee Only" Payment should be made within due date as applicable from Canara Bank, Citi Bank, Deutsche Bank AG

ad, Adugodi, Bangalore - 560030, IndiaPhone:080-22220088,22992111,Telefax:080-22272728

### osch Limited

ų,

st no 263, Bommasandra-Jigani Link Road Industrial Area, japura Village, Jigani Hobli,

nekel Tq, Bangalore - 562106 India

### **BOSCH**

Page 1 of 1

TAX INVOICE

etails	of Consignee(Ship-to)	TAX INVOICE					
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WHET	THER TAX IS PAYABLE ON RE	VERSE CHARGE BASIS: NO					For Bosch Limited
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made within due date as applicable from the date of dispatch of materials Cheques should be made payable to Bosch Limited, Duly crossed "AccountPayee Only" Payment should be m Authorised Signatory BANKERS:State Bank of India, Canara Bank, Citi Bank, Deutsche Bank AG

Registered Office : Hosur Road, Adugodi, Bangalore - 560030, IndiaPhone:080-22220088,22992111, Telefax:080-22272728

## **Bosch Limited**

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Plot no 263, Bommasandra-Jigani Link Road Industrial Area, Rajapuza Village, Jigani Hobli, Annekel Tq, Bangalore - 562106 India

Details of Receiver(Bill-to)

BOSCH 

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For Bosch Limited

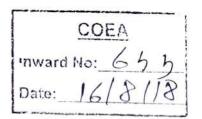
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Page 1 of 1

TAX INVOIC	E
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ndation India DAP-D	l Pelivered at place	Date of CIN PAN GSTIN Conta Bosci Suppl Custo Your	act person of <i>I</i> h Document N lier Code omer Code PAN No. & Date :	Acc. lumber	AAACM 29AAA 144914 170269 AAATP DVVPF Adv,80% Pro	018 KA1951PLC000761 19840P CM9840P1ZP 124
DAP-D	l Delivered at place	Custo Your P.O. M	omer Code PAN No. & Date :		AAATP DVVPF Adv,80% Pro	2304C A/PS/COE/255 /31.01.2018
DAP-D	elivered at place	Payment	Terms			prate,5% on install,5%on
				commissio		
-				00111113310	ni-	
300KW	p Solar Power Generating System	Invoic	e Date	00.0	00.000	
cription	Quant	ity	Unit	Rate/	Unit	Taxable Value/INR
	1.000		PC	1 404	070.00	1 404 070 00
						1,494,070.09 462,813.00-
ption No	Installation & Commissioning				18.00%	185,626.00
2						
One Lakh Twelve La	Eighty Five Thousand Six Hund Ikh Sixteen Thousand Eight Hur	dred Twenty adred Eighty		Tax Amount Total Value	Value	1,031,257.00 185,626.00 1,216,883.00
	otion No One Lakh	1.000 Installation & Commissioning No 998732 One Lakh Eighty Five Thousand Six Hung	1.000 ntion Installation & Commissioning No 998732 One Lakh Eighty Five Thousand Six Hundred Twent	1.000 PC Subsidy Integrate No 998732 One Lakh Eighty Five Thousand Six Hundred Twenty Six Purpose	1.000 PC 1,494, Subsidy Integrated GST No 998732 Total Taxable Tax Amount	1.000 PC 1,494,070.00   Subsidy 0.00   Integrated GST 18.00%   No 998732   One Lakh Eighty Five Thousand Six Hundred Twenty Six Bunness

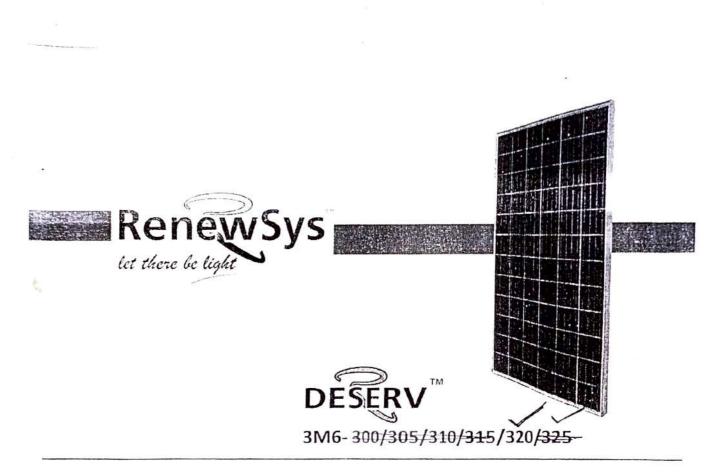
cores & ALC for n



WHETHER TAX IS PAYABLE ON REVERSE CHARGE BASIS: NO

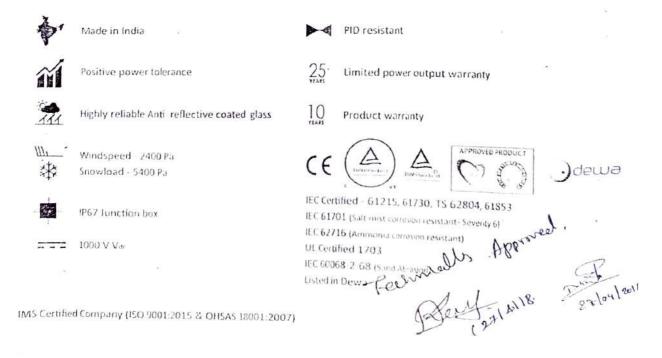
Kied Cheques should be made payable to Bosch Limited, Duly crossed "Account Payee Only" Payment should be made within due date as applicable from the date of dispatch of materials Authorised Signatory BANKERS:State Bank of India, Canara Bank, Citi Bank, Deutsche Bank AG

Registered Office : Hosur Road, Adugodi, Bangalore - 560030, IndiaPhone:080-22220088,22992111, Telefax: 080-22272728



DESERV 3M6 72 cells PV Modules Series are offered with power ratings ranging from 300 Wp to 325 Wp. The high performance Multi Crystalline Silicon Modules are designed for on-grid as well as off-grid applications.

### **KEY FEATURES**



#### Performance under standard test conditions (1000W/m² AM 1.5, 25°C)

DESERV

300

36.52

12.72

35.50

15.48

DESERV

305

36.75

03.30

43.43

15.71

DESERV

310

36.86

08 /5

16.00

DESERV DESERV

36.92

08.91

120

37.20

69.05

16 51

DESERV

325

37.41

09 18

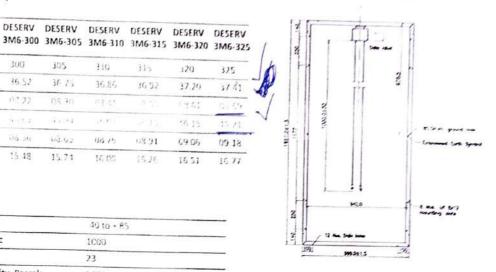
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15

### 72 Cells PV Solar Module Dimensions



### **Operating Conditions**

Rated power (Pmax), Wp

Max power voltage (Vmp), V

Mar power current (Imp), A

Open circuit voltage (Voc), V

Short circuit current (isc), A

Module efficiency (%)

Ambient temperature, "C	40 to + 85	
Maximum system voltage,Vdc	1000	
Hail impact velocity, m/sec	73	
Maximum surface load capacity, Pascals	5400	

#### PV modules: RenewSys, DESERV 3M6- 325

#### **Cell Temperature Coefficients**

Open circuit voltage	- 0.30 % / <sup>0</sup> C
Short circuit current	+ 0.05 % / °c
Nominal power	- 0.40 % / <sup>0</sup> C

#### **Physical Parameters**

No. of cells	72	
Module dimensions (mm)	1957 X 990	
Module thickness (mm)	40	
Approximate weight (kg)	21.5	

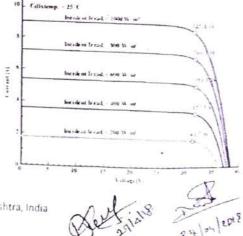
#### **Mechanical Characteristics**

Cable	NO. 12 AWG, 4mm <sup>2</sup> Omstanders 1 dis warante of requests		
Pv connectors	MC4/MC4 (Compatible)/TYCO		
Frame	Anodized Aluminum Alloy		
Junction box	IP67 Junction Box With 4 Rail		
Glass	3.2mm Thick Low Iron Tempered		

### PV modules: RenewSys, DESERV 3M6-325

24 Valage[V]

32



#### **Registered** Office

98, Jolly Maker Chambers No.2, 225 Nariman Point, Mumbai - 400 021, Maharashtra, India Tel.: ± 91 22 30040500

#### Factory

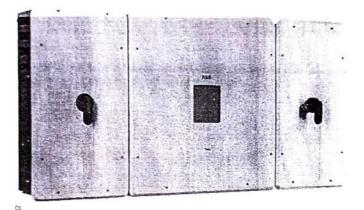
Plot No.6, Survey # 114/P, Srinagar Village, Maheshwaram Mandal, Dist-Rangareddy, Hyderabad - 501 359, Telangana, India Tel.: + 91 40 67303000 Fax: + 91 40 67303003

# ABB

#### SOLAR INVERTERS

# **ABB** string inverters

# TRIO-TM-50.0-400 / TRIO-TM-60.0-480 50 to 60 kW



The TRIO-TM-50.0/60.0 is ABB's latest three-phase string solution for cost efficient large decentralized photovoltaic systems for both commercial and utility applications.

This new addition to the TRIO family, with 3 independent MPPT and power ratings of up to 60 kW (480 V version), has been designed with the objective to maximize the ROI in large systems with all the advantages of a decentralized configuration for both rooftop and ground-mounted installations.

#### Modular design

The TRIO-TM-50.0/60.0 has a modular design to guarantee maximum flexibility, thanks to the different versions available.

The separate and configurable AC and DC compartments increase the ease of installation and maintenance with their ability to remain separately wired from the inverter module inside the system. The TRIO comes with the most complete wiring box configurations available including up to 15 DC inputs with fast connectors, string protection fuses, AC and DC switches and type II AC and DC surge arresters.

#### **Design flexibility**

The double stage conversion topology offers the advantage of a wide input voltage range for maximum flexibility of system design.

The TRIO-TM comes with a forced air cooling system, used also in the previous TRIO products, designed for a simple and fast maintenance, allowing a maximum flexibility of plant design. The inverter comes with mounting supports for both horizontal and vertical installations, which allow for the best use of space available beneath the solar panels.

Embedded multi communication interfaces (WLAN,

Ethernet, RS485) combined with a Sunspec compliant Modbus protocol (RTU/TCP) allow the inverter to be easily integrated with any third party monitoring and control systems.

#### Improved commissioning and maintenance

Thanks to the build-in Web User Interface (WUI) the installer can commission the inverter wirelessly and change advanced parameters by using any standard WLAN enabled device (smartphone, tablet or PC). Integrated logging capability allows remote monitoring of the plant without the need of any additional external loggers.

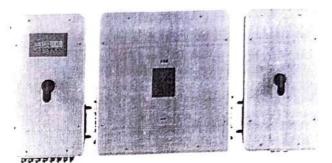
Remote firmware update of the inverter system and components via Aurora Vision\*.

#### Highlights

- 3 Independent MPPT
- Transformerless inverter
- · Double stage topology for a wide input range
- Large set of specific grid codes available which can be selected directly in the field
- SeparateAC and DC compartments are available in different configurations
- · Both vertical and horizontal installation
- 2 available sizes, 50 and 60 kW with 400 and 480 Vac of output voltage, respectively
- · Wireless access to embedded user interfaces
- Ethernet daisy chain enabled
- Modbus TPC/RTU Sunspec compliant
- Remote monitoring and firmware update via Aurora Vision\* (logger free)

PRODUCT FLYER FOR TRIO-TM-50.0-400 / TRIO-TM-60.0-480 ABB SOLAR INVERTERS

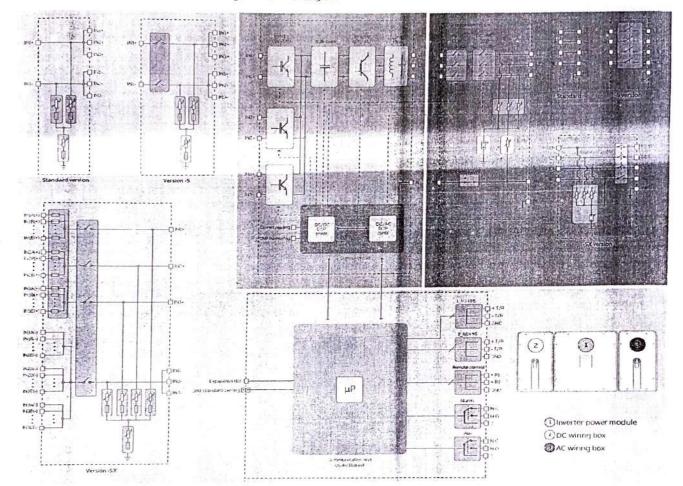
# ABB string inverters TRIO-TM-50.0-400 TRIO-TM-60.0-480 50 to 60 kW



Technical	data and	types
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Technical data and types	TRIO-TM-50.0-400	TRIO-TM-60 0-480
Type code		
Input side	1000 V	
Absolute maximum DC input voltage (Vmax abs)	420700 V (Default 420 V)	20700 V (Default 500 V
Start-up DC input voltage (Viter)	0,7xVstart950 V (min 300 V) 0,	7xV
Operating DC input voltage range (V <sub>dcmm</sub> ,V <sub>dcmax</sub> )	610 Vdc	720 Vd
Rated DC input voltage (Ver)	52000 W	61800 V
Rated DC input power (Par)	3	
Number of independent MPPT	17500 W	21000 W
Maximum DC input power for each MPPT (P	480-800 Vdc	570-800 Vde
MPPT input DC voltage range (VMPPTmin VMPPTmax) at Pact	36 A	
Maximum DC input current (Idemax) for each MPPT	55 A (165 A in case of parallel MPPT)	
Maximum input short circuit current for each MPPT	5	
Number of DC input pairs for each MPPT	Screw terminal block (Standard and -S ver	sion)
DC connection type	or PV quick fit connector »(-SX and SX2 ve	rsion)
Input protection	Yes, from limited current source	
Reverse polarity protection	Yes, 1 for each MPPT	
Input over voltage protection for each MPPT - varistor		
Input over voltage protection for each MPPT - plug In modular	Type 2 (option) with monitoring	
surge arrester	According to local standard	
Photovoltaic array isolation control	60 A / 1000 V for each MPPT (180 A in case of par	allel MPPT)
DC switch rating for each MPPT (version with DC switch)	15 A / 1000 V	
Fuse rating (version with fuses)		
Outputside	Ihree-phase (3W+PE or 4W+PE)	
AC grid connection type	50000 W	60000 W
Rated AC power (P++ @cos¢=1)	50000 W	60000 W
Maximum AC output power (P. max @coso=1)	50000 VA	60000 VA
Maximum apparent power (Smax)	400 V	480 V
Rated AC grid voltage (V.,)	320480 V <sup>D</sup>	384. 571 V <sup>10</sup>
AC voltage range	77A	
Maximum AC output current (Iac.max)	92 A	
Contributory fault current	50 Hz / 60 Hz	
Rated output frequency (f.)	and the second se	
Output frequency range (fminfmax)	4753 Hz / 5763 Hz <sup>a</sup>	and the second
Nominal power factor and adjustable range	> 0.995; 01 inductive/capacitive with maxim	Ium Smax
Total current harmonic distortion	<3%	
Maximum AC cable	95 mm <sup>2</sup> copper only (150 mm <sup>2</sup> copper/alluminum with TR	
AC connection type	Screw terminal block, cable gland PG42	2
Output protection		
Anti-islanding protection	According to local standard	
Maximum external AC overcurrent protection	100 A	
Output overvoltage protection - varistor	Yes	
Output overvoltage protection - plug In modular surge arrester	Type 2 (option) with monitoring	
Operating performance		
Maximum efficiency (ijmax)	98.3%	98.5%
Weighted efficiency (EURO)	98.0% / -	98.0% / -
Communication		
Embedded communication interfaces	2x RS485, 2x Ethernet (RJ45), WLAN (IEEE802.11 b/g	1/n @ 2.4 GHz)
Communication protocols	Modbus RTU / TCP (Sunspec compliant); Aurora	and the second se
Remote monitoring services	Standard level access to Aurora Vision monitori	
Advanced features	Integrated Web User Interface; Display (opti	on),
Invironmental	Embedded logging and direct transferring of data	a to Cloud
	-25+60*C (-13140 *F)	-25+60*C (-13140 *F)
Ambient temperature range		ting above 45 °C (113 °F)
telative humidity	4% 100% condensing	ang doore is a second of
ound pressure level, typical	75 dB(A) @1 m	
faximum operating altitude	2000m / 6561ft	
hysical	coosin / osuit	
- Contraction of the second seco	IP65 (IP54 for cooling section)	
nvironmental protection rating		
nvironmental protection rating	Econodiale	
ocling	Forced air	1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -
imension (H x W x D)	725 mm x 1491 mm x 315 mm / 28 5" x 58 7" x	12.4"
ooling imension (H x W x D) fainht		moortment

ABB TRIO-TM-50.0-400 / TRIO-TM-60.0-480 string inverter block diagram



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#### -Technical data and types

Type code	TRIO-TM-50.0-400	TRIO-TM-60.0-480	
Safety			
Isolation level	Transformerless		
Marking	CE		
Safety and EMC standard	IEC/EN 62109-1, IEC/EN 62109-2, EN 61000-6-2, EN 61000-6-3, EN 61000-3-11, EN 61000-3-12		
Grid standard (check your sales channel for availability)	CEI 0-21, CEI 0-16, DIN V VDE V 0126-1-1, VDE-AR-N 4105, G59/3, EN 50438 (not for all national appendices), RD 1699, RD 413, RD 661, P.O. 12, 3, BDEW, NRS-097-2-1, MEA, PEA, IEC 61727, IEC 60068, IEC 61683, VFR-2014, IEC		
Available product variants		in the states, in the state of the	
Inverter power module	TRIO-TM-50.0-400-POWER MODULE	TRIO-TM-60.0-480-POWER MODULE	
DC wiring box options 4)		the fore for tother tother	
Input connections with terminal blocks	DCWB-TRIO-TM-50.0-400	DCWB-TRIO-TM-60.0-480	
Input connections with terminal blocks + DC switch	DCWB-S-TRIO-1M-50.0-400	DCW8-S-TRIO-TM-60.0-480	
15 quick input connections + fuses (single pole) + DC switch <sup>sy</sup>	DCWB-SX-TRIO-TM-50.0-400	DCWB-SX-TRIO-TM-60.0-480	
15 quick input connections + fuses (both poles) + DC switch <sup>51</sup>	DCWB-5X2-TRIO-TM-50.0-400	DCWB-SX2-TRIO-TM-60.0-480	
AC wiring box options		OCTIO-SAZ-TRIG-TIT US	
AC output connections with terminal blocks	ACWB-TRIO-TM-50.0-TL-OUTD	ACWB-TRIO-TM-60.0-TL-OUTD	
AC output connections with terminal blocks + AC switch <sup>51</sup>	ACWB-SX-TRIO-TM-50.0-TL-OUTD	ACWB-SX-TRIO-TM-60.0-TL-OUTD	
Optional available		AC WD-5X-1RIO-1M-00.012 0010	
TRIO-GROUNDING-KIT	Available	Available	
TRIO-AC-WIRING-KIT	Available	Available	

The AC voltage range may vary depending on specific country guid standards

The Frequency range may vary depending on specific country you standards. Hease refer to the document "String inverters – Product manual appendix - available at www.abb.com/-solarinverters for information on the quick-fit connector brand and model used in the inverter " DCWB with display is available as optional, with di-dicated wining box version " type 2 surge arresters available as optional, with idedicated wining box version Remark. Features not specifically listed in the present data sheet are not included in the product. (Subject to Ahmednagar Jurisdiction only)

Dr. Vithalrao Vikhe Patil Foundation

(Vadgaon Gupta), Vilad Ghat, P.O.:- M.I.D.C., Ahmednagar-414 111 Ph. No. (0241) 2778042/2779895 Fax. 2779782

## PURCHASE ORDER

		130
sal laternational Electricate	Ref:- DVVPFA/ PS/COE-Hostel A&B/2021-22/ 122	150
Nagar Manmad road, Ahmednagar-414111.	Date :- 10 / 01 / 2022 Delivery Period :- Immediate	
0241-2344454,2353954 Our Enquiry No.:- DVVPFA/ PS/COE/2021-22	Date :- 20 /12 / 2021	-
		-
P.C.M. :- 651	Date:- 28 / 12 / 2021	

Dear Sir,

upply the following material as per terms & conditions mentioned overleaf.

Ple	ase arrange to supply the following material up per		Unit	Rate	Per
r.	Description of Material	Quantity	Unit	Rs. Ps.	
No.			~ 1	174.00	Set
	Supply of:	100	Set		No.
1	20W LED Tube Light Set	90	Nos.	36.40	
2	36 W Tube Light Bar	55	Nos.	25.00	No.
3	36W PL Tube Side Holder- 4 pin	35	Nos.	170.00	No.
4	Fan Dimer (socket type)	150	Nos.	24.60	No.
5	6 A 5 Pin Socket (Anchor Penta)	60	Nos.	39.75	No.
6	2 Switch + 2 Socket PVC Gang Box	07	Pkt.	55.00	Pkt
7	Screw 35/8 SWG	70	Pkt.	8.00	No
8	Rawal Plug (grip)	40	Nos.	20.00	No
9	Fan Clamps Pin With Nut		Nos.	55.00	No.
	Fan Clamps Fin Vinit Id	05		560.00	Bundle
10	Drill Bit 5mm Concrete Plain 1.5 sgmm PVC AI. 2 Core Service Wire 90 Mtr.	05	Bundle	560.00	Duridie
11	1.5 samm PVC AI. 2 Core Service will directly to	The Principa	d.		

Please send above Material & bill directly to The Principal, Dr. Vithalrao Vikhe Patil Foundation's College of Engineering, Vilad Ghat, Ahmednagar. Note :-

1. The above quoted prices are F.O.R.:- Ex- shop, Ahmednagar

- :- 18% GST extra Taxes
- 3. Delivery
- Against delivery. 4. Payment
- 5. Discount
- 7. Please sign. The enclosed acceptance No. ---against this order & return the same to us immediately

Purchas )fficer 1

Accountant

rincipa Secretary

tor Technical

O/c. Purchase /Store/ Elect. dept. /Account/Account Foundation/Meeting Section