



Vidya Prasarak Mandal's
Maharshi Parshuram College of Engineering, Velneshwar
 Hedvi-Guhagar road, At: Velneshwar, Taluka: Guhagar,
 Dist: Ratnagiri (Maharashtra) 415 729
 (AICTE & DTE approved and affiliated to University of Mumbai)

Tel No. 02359-243102/3/4
 Fax No. 02359-243102
 E-mail:
mpcoe@vpmpmcoe.org
[URL:www.vpmpmcoe.org](http://www.vpmpmcoe.org)

7.1.3 Alternate Energy initiatives such as:

1. Percentage of annual power requirement of the Institution met by the renewable energy Sources

7.1.3 Alternate Energy initiatives such as: Percentage of annual power requirement of the Institution met by the renewable energy sources (1)			
Power requirement met by renewable energy sources	Total power requirement	Renewable energy source	Renewable energy generated and used
40 kWp	1071 kW (Entire connected load)	Solar Energy (40 kWp)	32.7 kWp

Solar:

- We are having rooftop solar generation system installed on Shripati building terrace.
- One system is of 30KWp installed on framework type structure above terrace and another system is of 10KWp installed on the terrace.
- Generated DC is converted into AC by three 15KVA Fronius IG Plus inverters installed in faculty cabin on the first floor of Shripati building.
- Generated energy is used in Shripati building.
- Approximately it generate 150-200 units daily.

Calculations:-

Solar Energy generated by 10 kwp system = 60.7 MWh,

Solar Energy generated by 30 kwp system = 28 MWh,

Total Energy consumed from MSEDCL up till yet = 226578 kWh

Therefore,

Percentage of annual power requirement met by Solar Energy

= (Solar Energy generated by 10 & 30 kwp systems / Total Energy consumed from MSEDCL till yet)*100

= (88.7 MWh / 226578 kWh)*100

= 39.14 %

Related documents:

Ver 1.19.08 1 of 1

MAHAVITARAN Maharashtra State Electricity Distribution Co. Ltd.

BILL OF SUPPLY FOR THE MONTH OF JUL 2018 201807150005911

GSTIN:27AAECM233K1ZB Website:www.mahadiscom.in HSN CODE:27160000

RATNAGIRI CIRCLE 560 CHIPLUN O&MD 561 B GUHAGAR SUB-DIVISION 179 1

Consumer No.:	22509011790	THE CHAIRM	BILL DATE	02-08-2018	2,55,550.00
Consumer Name:	THE CHAIRMAN MAHARSHI PARSHURAM COLLEGE OF ENG		DUE DATE	16-08-2018	
Address:	Sr.no.989,992,993,994,995 Near Nandan Agrotech		IF PAID UPTO	08-08-2018	2,53,470.00
Village:	VELNESHWAR	Pin Code: 415729	IF PAID AFTER	16-08-2018	2,58,740.00
Email ID:	gokhalehrishi@gmail.com		Last Receipt No./Date:	0006178071 / 06-07-2018	
Mobile No.:	9623322735	Meter No.:	076 - 00219866	Last Month Payment :	2,02,810.00
Tariff:	146 HT-IX B	Connected Load (KW):	1,071.00	Scale/Sector :	Medium Scale Private Sector
Contract Demand (KVA):	250	50% of Con. Demand(KVA):	125.00		
DTC	1111111	old trf	HT-IX B		

Date of Connection:	18-07-2013	Category:	PUBL. SERVICES OTH	GSTIN:	
Supply at:	HT	Elec. Duty:	07 PART B	PAN:	
Prev. Highest (Mth):	SEP	Bill Demand (KVA):	71		
Security Deposit Held Rs.:	8,91,300.00	Addl. S.D. Demanded Rs.	0.00		
Bank Guarantee Rs.:	0.00	S.D. Arrears Rs.:	0.00		

Bill Month	Units	Bill Demand(KVA)	Bill Amount
JUN-18	13,747	125	2,04,485
MAY-18	15,556	125	2,22,367
APR-18	18,157	125	2,51,582

CUSTOMER CARE Toll Free No.
1912, 1800-233-3435,
1800-102-3435

IGRC: PRESIDENT EX. ENG. (ADM), O&M
CIRCLE OFFICE, NEW, ADM. BUILDING

Maintain Harmonics distortion within limit as prescribed by IEEE STANDARD 519-1992 to avoid penalty

Avail Power factor incentives up to 7% maintaining power factor above 95% to 100%
Avail load factor



Incoming feeder of solar.





Solar on Sripati A1 Building

Tel No. : 2542 6270
Tel Fax : 2544 8768
Website : www.vpmthane.org
Email : vpm@vpmthane.org



VIDYA PRASARAK MANDAL

Estd. : 1-8-1935

Public Trust Regn. No. F-5(T)

DR. BEDEKAR VIDYAMANDIR, NAUPADA, THANE (WEST) - 400 602.

Ref. : VPM/ Vel/ 189

Date : 02/04/2012

To,
Adiurja Consultancy Pvt Ltd.
254 A/N-3 CIDCO,
Aurangabad 431003

Sub.: Installation of Soalr System in our Velneshwar College Campus.

Dear Sirs,

With reference to your proforma invoice No. 201203 V1P dated 25.03.2012, we are pleased to place an order for installation of Soalr System in our Velneshwar College Campus, Taluka Guhagar, Dist. Ratnagiri, as follows:

Sr No	Description	Qty	Unit	Amt (Rs)
1	Solar PV modules, made in Germany MPV120M	10800	Wp	Included
2	Grid connected inverter, made in Austria Fronius IG Plus120	1	Set	Included
3	Soalr PV Module mounting structure for flat roof	1	Set	Included
4	Cable and connectors for inter connection of modules and inverter	1	Set	Included
	Access to 3 phase connection point for feeding solar electricity in our network is assumed to be present within 50m of solar modules. Extra cabling will be billed at cost			
	Lightning protection for solar plant as well as building will be provided by us			
5	Installation as well as commissioning of modules and inverter	-	-	Included
6	Sr No. 1 to 5 on turn key basis	1	Set	17,82,000.00
			Total	17,82,000.00

Terms and conditions:

- 1 Payment : 50% advance and Balance on installation
- 2 You will complete the installation within 1 month of this order.
- 3 Taxes extra, as applicable
- 4 Warranty on backtoback basis, as provided by the manufacturers
- 5 Adiurja will have right to gather performance data from the installation and use it for promotion of products and services offered. Adiurja will also have right to invite prospective customers to the installation site for inspection of installed system with permission from us in advance
- 6 Site Address: **VPM's Maharshi Parashuram College of Engineering**
Hedavi Guhagar Rd; At Velneshwar, Tal.: Guhagar, Dist. Ratnagiri.
6. **Billing : in favour of VPM's Maharshi Parashuram College of Engineering (Proposed),**

In this connection, we enclose herewith a Cheque No. 490944 dated 02.04.2012 for Rs. 8,91,000/- being 50% advance towards the same.


Chairman

Vidya Prasarak Mandal, Thane

Received
with Thanks
M.M. [Signature]

We will try to complete the work
in one month but our standard term
is 45 days for completion. Please note.
M.M. [Signature]

Dr. V.V. Bedekar
Chairman
Vidya Prasarak Mandal

India

Proforma Invoice

Number: 201203V1P

Customer number 2012V1
Date of offer 25 March 2012
Valid until 07 April 2012
Date of delivery Within 8 weeks of full payment

#	Description	Quantity	Unit	Amount
01	Solar PV modules, made in Germany MPV120-M (Datasheet attached)	10,800	Wp	Included
02	Grid connected inverter, made in Austria Fronius IG Plus120 (Datashæet attached)	1	Set	Included
03	Solar PV module mounting structure for flat roof	1	Set	Included
04	Cables and connectors for interconnection of modules and inverter Important: - Access to 3 phase connection point for feeding solar electricity in your network is assumed to be present within 50m of solar modules. Any extra cabling will be billed at cost - Lightaig protection for the solar plant as well as the building is strongly recommended and is not in the scope of our delivery	1	Set	Included
05	Installation as well as commissioning of modules and inverter	-	-	Included
06	#01 to #05 on turn key basis	1	Set	₹ 17,82,000.00
			Total	₹ 17,82,000.00

Terms and conditions:

1. Payment to be made 100% in advance and in one part. Partial payments or payments in cash are not acceptable. Only cheque, demand draft or direct bank transfer will be accepted
2. Currently, there is no VAT or duty on solar components, however local taxes such as octroi regulations vary from time to time, therefore such taxes paid by us to bring the material to your site will be charged to you at actual. These extra charges to be paid by you in full within one week of the delivery
3. Warranty on back-to-back basis, as provided by the manufacturers
4. Adiurja will have right to gather performance data from the installation and use it for promotion of products and services offered by us. We will also have right to invite prospective customers to the installation site for inspection of installed system with permission from you in advance

Thank you

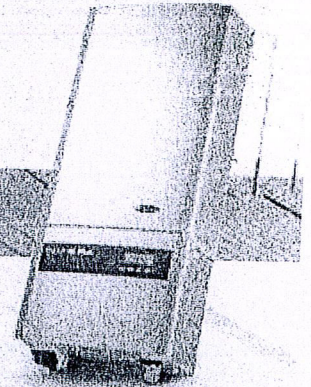
M.M.Raut
Adiurja Consultancy Pvt. Ltd.



SHIFTING THE LIMITS

FRONIUS IG PLUS

/ The allrounder with maximum yield.



/ Fronius
MLX™ technology

/ IHF transformer
switchover

/ PC board replace-
ment process

/ WLAN interface

/ Smart Grid
Ready

/ The Fronius IG Plus generation of inverters represents an evolution of the proven Fronius IG product family. Power categories from 2.6 to 12 kW promise suitability for every possible system size. With a maximum efficiency of 95.9 %, the Fronius IG Plus range achieves one of the highest values for transformer inverters.

TECHNICAL DATA: FRONIUS IG PLUS (25 V-1, 30 V-1, 35 V-1, 50 V-1, 55 V-1, 60 V-1)

INPUT DATA	25 V-1	30 V-1	35 V-1	50 V-1	55 V-1	60 V-1
DC maximum power at $\cos \varphi = 1$	2,740 W	3,170 W	3,710 W	4,260 W	5,260 W	6,320 W
Max. input current ($I_{dc \max}$)	17.9 A	20.7 A	24.3 A	27.9 A	34.4 A	41.3 A
Max. array short circuit current	17.9 A	20.7 A	24.3 A	27.9 A	34.4 A	41.3 A
MPPT input voltage ($U_{dc \min}$)				230 V		
Feed-in start voltage ($U_{dc \text{ start}}$)				260 V		
Non-boost input voltage ($U_{dc \text{ boost}}$)				370 V		
Max. input voltage ($U_{dc \text{ max}}$)				600 V		
MPPT voltage range ($U_{mppt \text{ min}}$ - $U_{mppt \text{ max}}$)				230 - 500 V		
Number of DC inputs				6		

OUTPUT DATA	25 V-1	30 V-1	35 V-1	50 V-1	55 V-1	60 V-1
AC-Nameleistung (P_{ac})	2,600 W	3,000 W	3,500 W	4,000 W	5,000 W	6,000 W
Max. output power	2,600 VA	3,000 VA	3,500 VA	4,000 VA	5,000 VA	6,000 VA
Max. output current ($I_{ac \text{ max}}$)	11.3 A	13.0 A	15.2 A	17.4 A	21.7 A	26.1 A
Grid connection (U_{ac})				230 V		
Min. output voltage ($U_{a \text{ min}}$)				160 V		
Max. output voltage ($U_{a \text{ max}}$)				270 V		
Frequency (f_r)				50 Hz / 60 Hz		
Frequency range (f_{min} - f_{max})				10 - 65 Hz		
Distortion factor				< 3 %		
Power factor ($\cos \varphi_{\text{ac}}$)				0.75 - 1 (ind./cap.)		

GENERAL DATA	25 V-1	30 V-1	35 V-1	50 V-1	55 V-1	60 V-1
Dimensions (height x width x depth)		673 x 434 x 250 mm			966 x 434 x 250 mm	
Weight		23.8 kg			36.9 kg	
Degree of protection				IP 54 ²⁾		
Protection class				2 / 3		
Overvoltage category (DC / AC)				ca. L/W		
Night-time consumption				IHF transformer		
Inverter concept				Regulated air cooling		
Cooling				Indoor and outdoor installation		
Installation				from 20 °C to -55 °C		
Ambient temperature range				0 % to 95 %		
Permitted humidity				Pin terminal connection 1.5 mm ² - 16 mm ²		
DC connection technology				Screw terminal connection 2.5 mm ² - 35 mm ²		
AC connection technology						

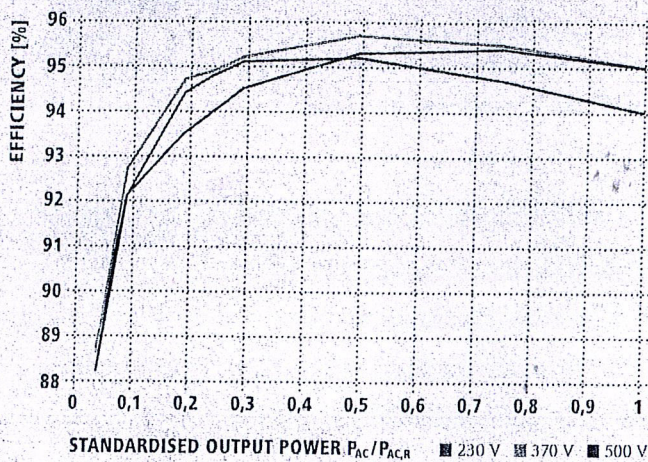
Certificates and compliance with standards: DIN V VDE V 0126-1-1 / VDE / ONORM E 8011-4-712, UL 1741-1, EN 50438, G83, G59, C 10 / 11, CBR 06-190, CEI 0-21, AS 4777-1, AS 4777-2, AS 4777-3, VDE AR N 4105, Generating systems on the medium-voltage network (BDEW)

Fronius IG Plus 25 V-1, Fronius IG Plus 55 V-1 and Fronius IG Plus 60 V-1 devices do not comply with the German medium-voltage directive. Fronius IG Plus 35 V-1 and Fronius IG Plus 60 V-1 are not certified in accordance with the German low-voltage directive.

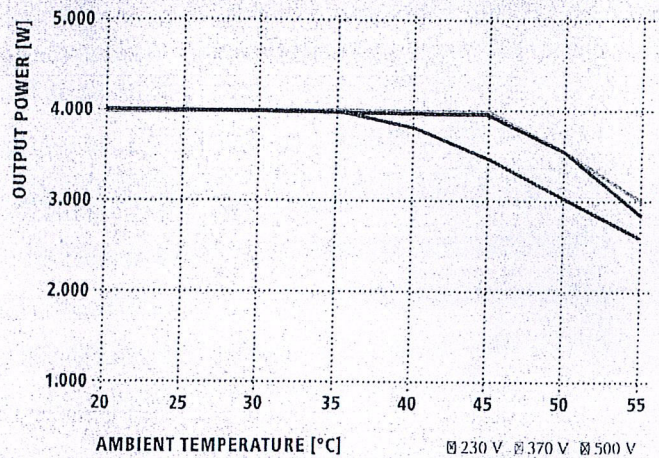
Further information regarding the availability of the inverters in your country can be found at www.fronius.com.

²⁾country-specific ³⁾Please refer to the information in the operating instructions regarding correct installation of the inverter (e.g. IP 44 applies to Australia).

FRONIUS IG PLUS 50 V-1 EFFICIENCY CURVE



FRONIUS IG PLUS 50 V-1 TEMPERATURE DERATING



TECHNICAL DATA: FRONIUS IG PLUS (25 V-1, 30 V-1, 35 V-1, 50 V-1, 55 V-1, 60 V-1)

EFFICIENCY	25 V-1	30 V-1	35 V-1	50 V-1	55 V-1	60 V-1
Max. efficiency	95.7 %	95.7 %	95.7 %	95.7 %	95.7 %	95.7 %
European efficiency (η _{EP})	94.6 %	94.8 %	95.0 %	95.0 %	94.9 %	95.0 %
η at 5 % P _{nom} ¹⁾	87.5 / 87.3 / 86.8 %	87.9 / 87.6 / 87.2 %	88.2 / 88.1 / 87.4 %	88.7 / 88.6 / 88.2 %	89.7 / 90.3 / 89.6 %	90.2 / 91.0 / 90.0 %
η at 10 % P _{nom} ¹⁾	89.7 / 89.8 / 89.4 %	90.4 / 90.8 / 90.2 %	91.6 / 92.3 / 91.5 %	92.1 / 92.7 / 92.1 %	91.4 / 91.8 / 90.8 %	92.3 / 92.7 / 91.6 %
η at 20 % P _{nom} ¹⁾	93.0 / 93.6 / 92.8 %	93.6 / 94.2 / 93.2 %	94.1 / 94.6 / 93.4 %	94.4 / 94.7 / 93.5 %	93.9 / 94.1 / 92.9 %	94.6 / 94.5 / 93.7 %
η at 25 % P _{nom} ¹⁾	93.8 / 94.3 / 93.5 %	94.3 / 94.6 / 93.5 %	94.6 / 94.6 / 93.7 %	94.8 / 94.9 / 94.0 %	94.3 / 94.6 / 93.6 %	94.8 / 94.9 / 93.2 %
η at 30 % P _{nom} ¹⁾	94.4 / 94.8 / 93.6 %	94.7 / 94.9 / 93.8 %	94.9 / 95.0 / 94.1 %	95.1 / 95.2 / 94.5 %	94.6 / 94.6 / 94.0 %	95.0 / 95.2 / 94.7 %
η at 50 % P _{nom} ¹⁾	95.2 / 95.4 / 94.7 %	95.2 / 95.5 / 94.9 %	95.3 / 95.7 / 95.3 %	95.2 / 95.7 / 95.3 %	94.9 / 95.3 / 94.7 %	95.3 / 95.5 / 94.9 %
η at 75 % P _{nom} ¹⁾	95.2 / 95.7 / 95.3 %	95.1 / 95.7 / 95.4 %	94.9 / 95.6 / 95.4 %	94.7 / 95.5 / 95.4 %	95.0 / 95.6 / 94.9 %	95.1 / 95.7 / 95.3 %
η at 100 % P _{nom} ¹⁾	94.9 / 95.0 / 94.4 %	94.7 / 95.6 / 95.4 %	94.4 / 95.2 / 95.1 %	94.0 / 95.0 / 95.0 %	95.1 / 95.7 / 95.2 %	94.7 / 95.5 / 95.4 %
MPP adaptation efficiency	> 99.9 %					

PROTECTIVE EQUIPMENT	25 V-1	30 V-1	35 V-1	50 V-1	55 V-1	60 V-1
DC insulation measurement	Warning/shutdown (depending on country setup) at R _{ISO} < 600 kOhm					
Overload behaviour	Operating point shift, power limitation					
DC circuit breaker	Integrated					

INTERFACES	25 V-1	30 V-1	35 V-1	50 V-1	55 V-1	60 V-1
Optional with Fronius Datamanager	WLAN, Ethernet, Modbus TCP, 6 digital inputs, 4 digital inputs/outputs, Datalogger, Webserver					

Further information regarding the availability of the inverters in your country can be found at www.fronius.com.
¹⁾ and at U_{mp} min / U_{dc,r} / U_{mp} max.

TECHNICAL DATA: FRONIUS IG PLUS (55 V-2, 60 V-2, 70 V-2, 100 V-2)

INPUT DATA	55 V-2	60 V-2	70 V-2	100 V-2
DC maximum power at $\cos \varphi = 1$	5,260 W	6,320 W	6,850 W	8,520 W
Max. input current ($I_{dc \max}$)	22.9 A	27.5 A	30.0 A	32.1 A
Max. array short circuit current	34.4 A	41.3 A	45.0 A	55.7 A
Min. input voltage ($U_{dc \min}$)	230 V			
Feed-in start voltage ($U_{dc \text{ start}}$)	260 V			
Nominal input voltage ($U_{dc \text{ n}}$)	370 V			
Max. input voltage ($U_{dc \max}$)	600 V			
MPP voltage range ($U_{mpp \min}$ - $U_{mpp \max}$)	230 - 500 V			
Number of DC inputs	6			

OUTPUT DATA	55 V-2	60 V-2	70 V-2	100 V-2
AC nominal output ($P_{ac \text{ n}}$)	5,000 W	6,000 W	6,500 W	8,000 W
Max. output power	5,000 VA	6,000 VA	6,500 VA	8,000 VA
Max. output current ($I_{ac \max}$)	10.9 A	13.0 A	14.1 A (28.3 A) ¹⁾	17.4 A (34.8 A) ¹⁾
Grid connection ($U_{ac \text{ n}}$)	2-NPE 400 V / 230 V ²⁾			
Min. output voltage ($U_{ac \min}$)	180 V			
Max. output voltage ($U_{ac \max}$)	270 V			
Frequency (f_i)	50 Hz / 60 Hz			
Frequency range (f_{\min} - f_{\max})	46 - 65 Hz			
Distortion factor	< 3 %			
Power factor ($\cos \varphi_{ac}$) ²⁾	0.75 - 1.00 / 0.90 ²⁾			

GENERAL DATA	55 V-2	60 V-2	70 V-2	100 V-2
Dimensions (height x width x depth)	968 x 434 x 250 mm			
Weight	36.9 kg			
Degree of protection	IP 54 ³⁾			
Protection class	I			
Overvoltage category (DC / AC)	2 / 3			
Night-time consumption	ca. 1 W			
Inverter concept	HF transformer			
Cooling	Regulated air cooling			
Installation	Indoor and outdoor installation			
Ambient temperature range	from -20°C to +55°C			
Permitted humidity	0 % to 95 %			
DC connection technology	Screw terminal connection 1.5 mm ² - 10 mm ²			
AC connection technology	Screw terminal connection 2.5 mm ² - 35 mm ²			
Certificates and compliance with standards	DIN V VDE V 0126-1-1, VDE / ONORM E 8001-4-712, VDE G15712-1, EN 50438, G83, G59, G10/11, CER DG 190, GEI 0-21, AS 4777-1, AS 4777-2, AS 4777-3, VDI, AR N 4105, Generating systems on the medium voltage network (BDEW)			

Fronius IG Plus 55 V 2 and Fronius IG Plus 60 V 2 devices do not comply with the German medium voltage directive.

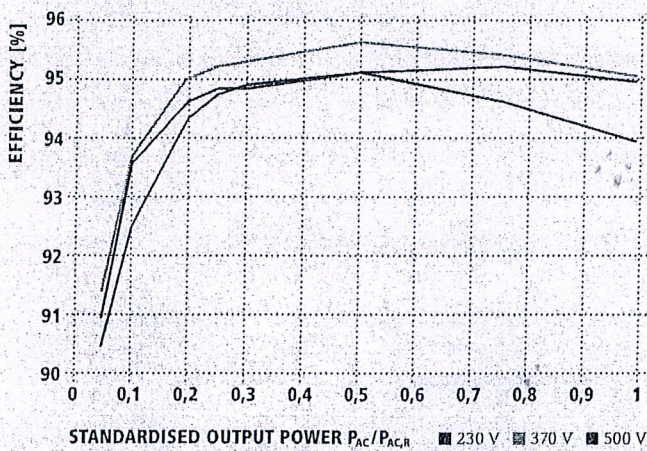
Further information regarding the availability of the inverters in your country can be found at www.fronius.com.

¹⁾ Single phase (opt.)

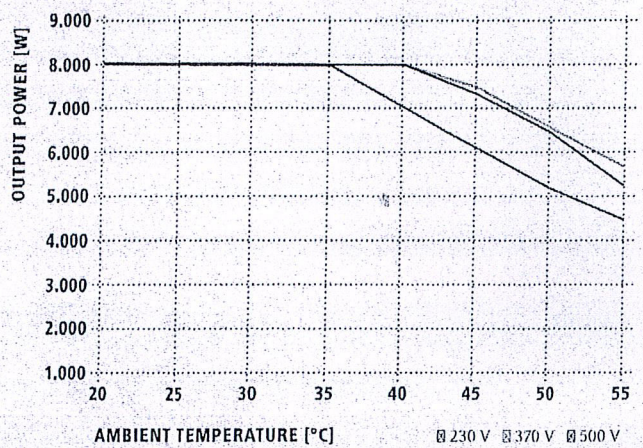
²⁾ country-specific

³⁾ Please refer to the information in the operating instructions regarding correct installation of the inverter (e.g. IG 44 applies to Australia).

FRONIUS IG PLUS 100 V-2 EFFICIENCY CURVE



FRONIUS IG PLUS 100 V-2 TEMPERATURE DERATING



TECHNICAL DATA: FRONIUS IG PLUS (55 V-2, 60 V-2, 70 V-2, 100 V-2)

EFFICIENCY	55 V-2	60 V-2	70 V-2	100 V-2
Max. efficiency	95.7 %	95.7 %	95.7 %	95.7 %
European efficiency (fin)	94.9 %	95.0 %	95.1 %	95.2 %
η at 5 % $P_{AC,R}^{II}$	89.7 / 90.3 / 89.6 %	90.2 / 91.0 / 90.0 %	90.4 / 91.1 / 90.3 %	90.9 / 91.4 / 90.5 %
η at 10 % $P_{AC,R}^{II}$	91.4 / 91.8 / 90.8 %	92.3 / 92.2 / 91.6 %	93.0 / 93.2 / 92.0 %	93.6 / 93.7 / 92.5 %
η at 20 % $P_{AC,R}^{II}$	93.9 / 94.1 / 92.9 %	94.6 / 94.5 / 93.7 %	94.7 / 94.7 / 94.0 %	94.7 / 95.1 / 94.4 %
η at 25 % $P_{AC,R}^{II}$	94.4 / 94.6 / 93.6 %	94.8 / 94.9 / 94.2 %	94.9 / 95.0 / 94.4 %	94.9 / 95.3 / 94.8 %
η at 30 % $P_{AC,R}^{II}$	94.6 / 94.6 / 94.0 %	95.0 / 95.2 / 94.7 %	95.0 / 95.3 / 94.8 %	94.9 / 95.4 / 95.0 %
η at 50 % $P_{AC,R}^{II}$	94.9 / 95.5 / 94.7 %	95.3 / 95.5 / 94.9 %	95.3 / 95.5 / 94.9 %	95.2 / 95.7 / 95.2 %
η at 75 % $P_{AC,R}^{II}$	95.0 / 95.6 / 94.9 %	95.1 / 95.7 / 95.3 %	95.0 / 95.7 / 95.3 %	94.7 / 95.5 / 95.3 %
η at 100 % $P_{AC,R}^{II}$	95.1 / 95.7 / 95.2 %	94.7 / 95.5 / 95.3 %	94.5 / 95.4 / 95.2 %	94.0 / 95.1 / 95.0 %
MPP adaptation efficiency	> 99.9 %			

PROTECTIVE EQUIPMENT	55 V-2	60 V-2	70 V-2	100 V-2
DC insulation measurement	Warning/shutdown (depending on country setup) at $R_{ISO} < 600 \text{ k}\Omega$			
Overload behaviour	Operating point shut, power limitation			
DC circuit breaker	Integrated			

INTERFACES	55 V-2	60 V-2	70 V-2	100 V-2
Optional with Fronius Datamanager	WLAN, Ethernet, Modbus TCP, 6 digital inputs, 4 digital inputs/outputs, Datalogger, Webserver			

Further information regarding the availability of the inverters in your country can be found at www.fronius.com.

^{II}and at $U_{mpv \text{ min}} / U_{dc,r} / U_{mpv \text{ max}}$.

TECHNICAL DATA: FRONIUS IG PLUS (55 V-3 / 60 V-3 / 80 V-3 / 100 V-3 / 120 V-3 / 150 V-3)

INPUT DATA	55 V-3	60 V-3	80 V-3	100 V-3	120 V-3	150 V-3
DC maximum power at $\cos \varphi = 1$	5,250 W	6,300 W	7,360 W	8,430 W	10,590 W	12,770 W
Max. input current ($I_{dc,max}$)	22.6 A	27.5 A	32.0 A	36.7 A	46.2 A	55.6 A
Max. array short circuit current	34.2 A	41.3 A	48.0 A	55.1 A	69.3 A	84.4 A
Min. input voltage ($U_{dc,min}$)				230 V		
Feed-in start voltage ($U_{dc,start}$)				260 V		
Nominal input voltage ($U_{dc,n}$)				370 V		
Max. input voltage ($U_{dc,max}$)				600 V		
MPP voltage range ($U_{mpp,min}$ - $U_{mpp,max}$)				230 - 500 V		
Number of DC inputs				6		
OUTPUT DATA	55 V-3	60 V-3	80 V-3	100 V-3	120 V-3	150 V-3
AC nominal output ($P_{ac,n}$)	5,000 W	6,000 W	7,000 W	8,000 W	10,000 W	12,000 W
Max. output power	5,000 VA	6,000 VA	7,000 VA	8,000 VA	10,000 VA	12,000 VA
Max. output current ($I_{ac,max}$)	7.3 A	8.7 A	10.2 A	11.6 A	14.5 A	17.4 A
Grid connection ($U_{ac,n}$)				3-NPE 300 V / 230 V		
Min. output voltage ($U_{ac,min}$)				180 V		
Max. output voltage ($U_{ac,max}$)				270 V		
Frequency (f_n)				50 Hz / 60 Hz		
Frequency range (f_{min} / f_{max})				40 - 60 Hz		
Distortion factor				< 3 %		
Power factor ($\cos \varphi_{ac}$)				0.75 - 1 Ind. / cap.		
GENERAL DATA	55 V-3	60 V-3	80 V-3	100 V-3	120 V-3	150 V-3
Dimensions (height x width x depth)				1,263 x 434 x 250 mm		
Weight				19.2 kg		
Degree of protection				IP 54 ²⁾		
Protection class				II		
Overvoltage category (DC / AC)				2 / 3		
Night time consumption				ca. 1 W		
Inverter concept				III transformer		
Cooling				Regulated air cooling		
Installation				Indoor and outdoor installation		
Ambient temperature range				-20 - +55 °C		
Permitted humidity				0 % to 95 %		
DC connection technology				Screw terminal connection, 1.5 - 16 mm ²		
AC connection technology				Screw terminal connection, 2.5 - 35 mm ²		
Certification and compliance with standards	DIN V VDE V 0126-1-1, VDE / ONORM E 8001-4-712, UL 1547-1, EN 50438, GB 3, GB 9, G 10 / 11, CER 04390, CEI 0-21, AS 4777-1, AS 4777-2, AS 4777-3, VDE AR N 4105, Generating systems on the medium-voltage network (BDEW)					

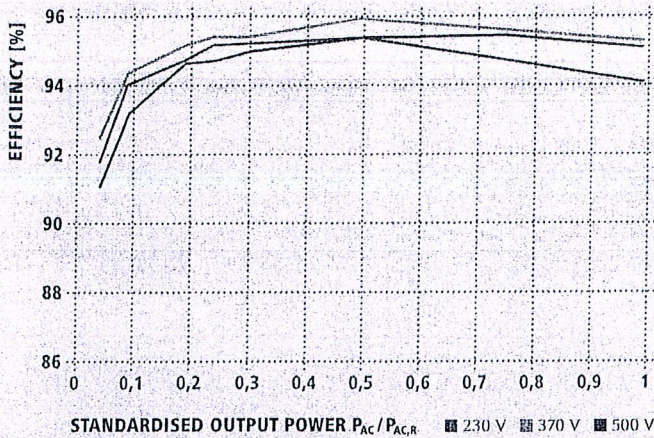
Fronius IG Plus 55 V-3, Fronius IG Plus 60 V-3 and Fronius IG Plus 80 V-3 devices do not comply with German medium-voltage directive. Further information regarding the availability of the inverters in your country can be found at www.fronius.com.

¹⁾ country-specific

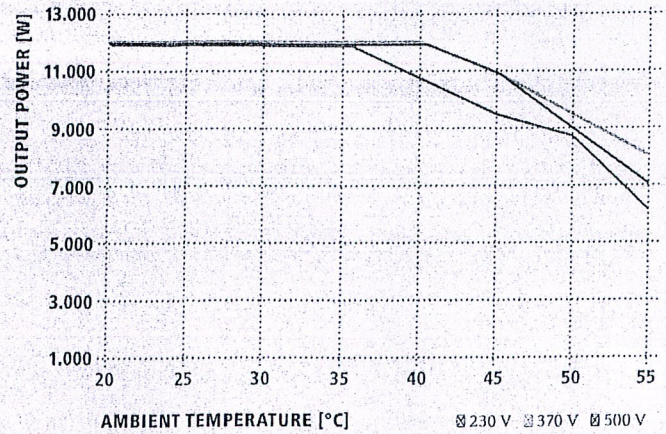
²⁾ Please refer to the information in the operating instructions regarding correct installation of the inverte (e.g. IP 44 applies to Australia).

**BROAD 3-PHASE INVERTER
RANGE FROM 5 TO 12 KW!**

FRONIUS IG PLUS 150 V-3 EFFICIENCY CURVE



FRONIUS IG PLUS 150 V-3 TEMPERATURE DERATING



TECHNICAL DATA: FRONIUS IG PLUS (55 V-3 / 60 V-3 / 80 V-3 / 100 V-3 / 120 V-3 / 150 V-3)

EFFICIENCY	55 V-3	60 V-3	80 V-3	100 V-3	120 V-3	150 V-3
Max. efficiency	95.9 %	95.9 %	95.9 %	95.9 %	95.9 %	95.9 %
European efficiency (η ₆₀)	94.9 %	95.0 %	95.1 %	95.1 %	95.1 %	95.4 %
η at 5% P _{AC,R} ¹⁾	90.5 / 91.6 / 89.9 %	90.7 / 91.6 / 90.1 %	90.8 / 91.8 / 90.2 %	91.7 / 91.9 / 90.3 %	91.5 / 92.2 / 90.7 %	91.8 / 92.5 / 91.1 %
η at 10% P _{AC,R} ¹⁾	91.5 / 92.2 / 90.8 %	91.8 / 92.9 / 91.1 %	92.1 / 92.8 / 91.5 %	93.1 / 93.1 / 92.0 %	93.4 / 93.7 / 92.6 %	94.0 / 94.3 / 93.2 %
η at 20% P _{AC,R} ¹⁾	93.4 / 93.6 / 93.3 %	94.1 / 94.3 / 93.2 %	94.2 / 94.5 / 93.6 %	94.3 / 94.9 / 94.2 %	94.6 / 95.2 / 94.5 %	94.7 / 95.1 / 94.6 %
η at 25% P _{AC,R} ¹⁾	94.1 / 94.2 / 93.8 %	94.4 / 94.7 / 94.8 %	94.6 / 94.9 / 94.3 %	94.6 / 95.2 / 94.5 %	94.7 / 95.3 / 94.7 %	95.1 / 95.4 / 94.7 %
η at 30% P _{AC,R} ¹⁾	94.4 / 94.5 / 93.8 %	94.5 / 95.0 / 94.4 %	94.6 / 95.2 / 94.6 %	94.7 / 95.2 / 94.5 %	95.0 / 95.4 / 94.7 %	95.1 / 95.3 / 94.9 %
η at 50% P _{AC,R} ¹⁾	94.7 / 95.4 / 94.7 %	95.1 / 95.4 / 94.6 %	95.1 / 95.5 / 94.9 %	95.3 / 95.8 / 95.0 %	95.3 / 95.9 / 95.1 %	95.3 / 95.7 / 95.3 %
η at 75% P _{AC,R} ¹⁾	95.2 / 95.7 / 95.0 %	95.3 / 95.7 / 95.0 %	95.3 / 95.9 / 95.1 %	95.3 / 95.9 / 95.3 %	95.0 / 95.5 / 95.4 %	94.7 / 95.6 / 95.4 %
η at 100% P _{AC,R} ¹⁾	95.3 / 95.9 / 95.2 %	95.1 / 95.9 / 95.3 %	95.1 / 95.7 / 95.4 %	94.9 / 95.7 / 95.4 %	94.6 / 95.9 / 95.3 %	94.0 / 95.2 / 95.1 %
MPP adaptation efficiency	> 99.9 %					

PROTECTIVE EQUIPMENT	55 V-3	60 V-3	80 V-3	100 V-3	120 V-3	150 V-3
DC insulation measurement	Warning/shutdown (depending on country setup) at R _{ISO} < 600 kOhm					
Overload behaviour	Operating point shift, power limitation					
DC circuit breaker	Integrated					

INTERFACES	55 V-3	60 V-3	80 V-3	100 V-3	120 V-3	150 V-3
Optional with Fronius Datamanager	WLAN, Ethernet, Modbus TCP, 6 digital inputs, 4 digital inputs/outputs, Datalogger, Webserver					

Further information regarding the availability of the inverters in your country can be found at www.fronius.com.

¹⁾ and at U_{mpp min} / U_{dc,r} / U_{mpp max}.

/ Battery Charging Systems / Welding Technology / Solar Electronics

WE HAVE THREE DIVISIONS AND ONE PASSION: SHIFTING THE LIMITS.

/ Whether Battery Charging Systems, Welding Technology or Solar Electronics - our goal is clearly defined: to be the technology and quality leader. With around 3,000 employees worldwide, we shift the limits of what's possible - our more than 850 active patents are testimony to this. While others progress step by step, we innovate in leaps and bounds. Further information about all Fronius products and our global sales partners and representatives can be found at www.fronius.com



Fronius Australia Pty Ltd.
90-92 Lambeck Drive
Tullamarine VIC 3043
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www.fronius.com.au

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Maidstone Road, Kingston
Milton Keynes, MK10 0BD
United Kingdom
pv-sales-uk@fronius.com
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Fronius International GmbH
Froniusplatz 1
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MPV-S - Our a-Si Thin-Film PV Module

Innovation on 1.43 m²

Masdar PV's thin-film based PV modules are specially designed for use in ground mounted solar parks and in large roof applications.

Quality and Performance

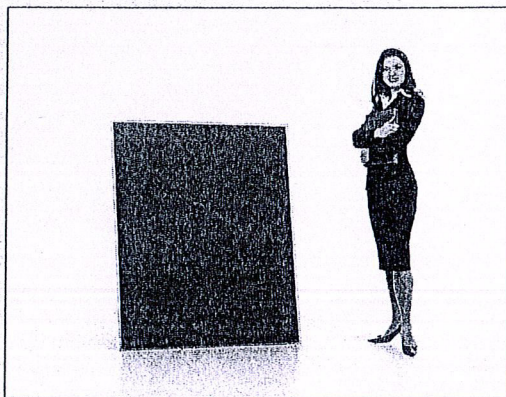
- Stable and uniform high quality module manufactured with state of the art thin-film technology
- Superior performance at higher temperature or lower irradiation compared to traditional crystalline modules
- Best in class performance tolerance offered, additionally secured by a positive sorting within each power class (-0 W/+5 W)
- Robust and reliable frameless glass-glass module
- Built with recyclable and widely available materials
- 100% final insulation test

Reliability, Warranty and Safety

- High reliability certified according to IEC61646 and IEC61730
- Limited product warranty of 5 years on material and workmanship
- Performance guarantee:
 - 10 years (90% of minimum stabilized rated power output)
 - 25 years (80% of minimum stabilized rated power output)

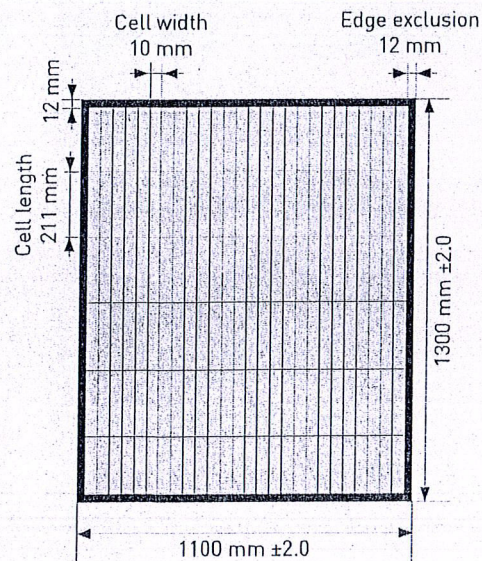
Module Design

- Front and back cover made of float glass
- PVB foil
- Junction box with integrated bypass diode
- Junction box in IP protection class 67 design
- Junction Box with MC4 plug and socket (without cable)



Dimensions

Front View

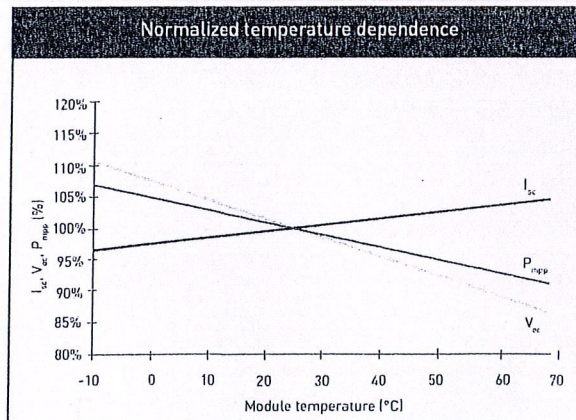
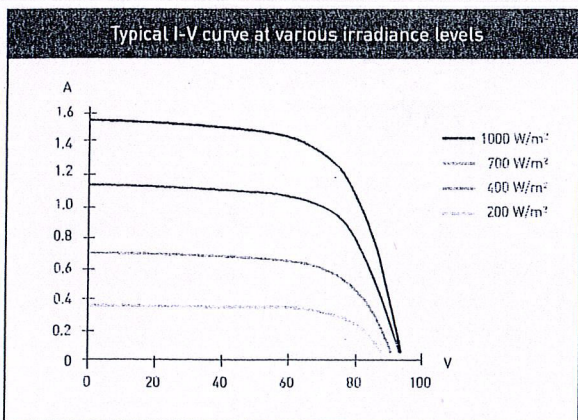


All drawings not to scale

a-Si Thin-Film PV Module

Parameter	Unit	MPV95-S	MPV100-S	MPV105-S
Nominal peak power ($\pm 5\%$) (P_{mpp})	W	95	100	105
Nominal voltage* (V_{mpp})	V	74	75	76
Nominal current* (I_{mpp})	A	1.29	1.34	1.39
Open circuit voltage* (V_{oc})	V	95	96	96
Short circuit current* (I_{sc})	A	1.53	1.58	1.63
Maximum system voltage (V_{max})	V		1000	
Maximum reverse current (I_R)	A		3	
Bypass diode current (I_B)	A		10	
Temperature coefficient (P_{mpp})	%/K		-0.2	
Temperature coefficient (V_{oc})	%/K		-0.3	
Temperature coefficient (I_{sc})	%/K		0.1	
Length	mm		1300	
Width	mm		1100	
Area	m ²		1.43	
Thickness of module (incl. backrails)	mm		7 (32)	
Weight	kg		29.5	
Operating temperature range	°C		-40 to +85	

Negative grounding required



All values at STC. STC = 1000 W/m², 25°C, AM 1.5
 * All values $\pm 10\%$ unless otherwise indicated.

Contact:
 Masdar PV GmbH | Wolf-Knippenberg-Str. 4 | 99334 Ichtershausen | Germany
 Phone +49 (0) 3628-58 68-0 | Fax +49 (0) 3628-58 68-265 | E-mail sales@masdarpv.com

www.masdarpv.com

MPV-M - Our a-Si/ μ c-Si Thin-Film PV Module Innovation on 1.43 m²

Masdar PV's thin-film based PV modules are specially designed for use in ground mounted solar parks and in large roof applications. These modules are based on a tandem junction of amorphous silicon and microcrystalline silicon.

Quality and Performance

- Stable and uniform high quality module manufactured with state of the art thin-film technology
- Superior performance at higher temperature or lower irradiation compared to traditional crystalline modules
- Best in class performance tolerance offered, additionally secured by a positive sorting within each power class (-0 W/+5 W)
- Robust and reliable frameless glass-glass module
- Built with recyclable and widely available materials

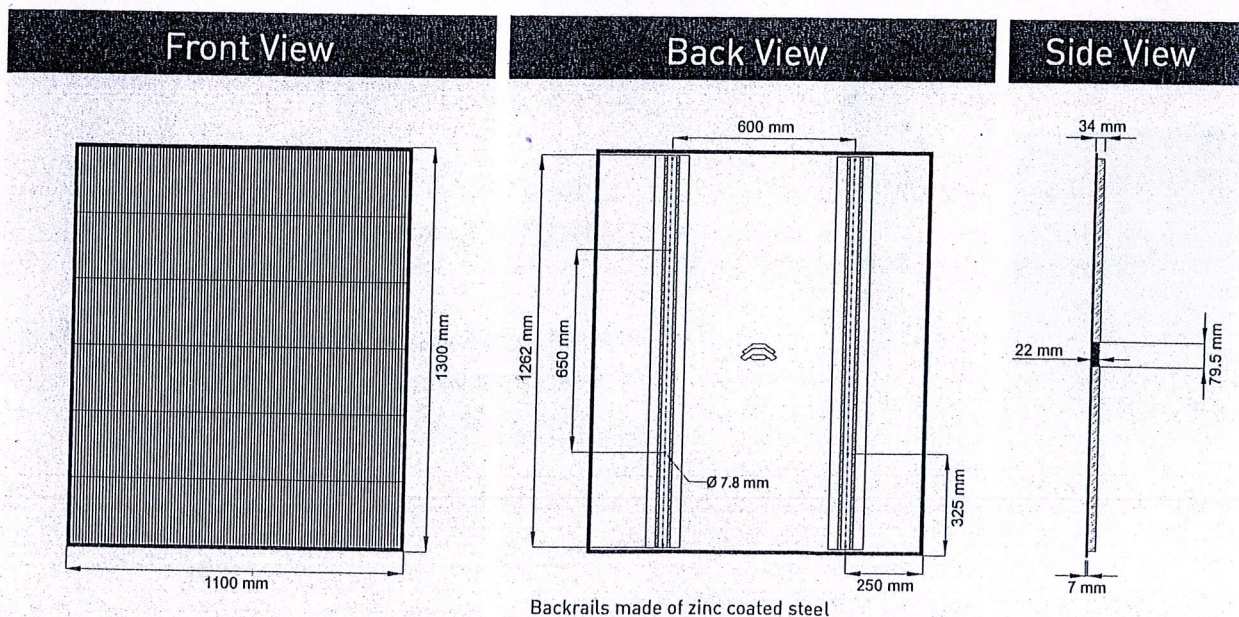
Reliability, Warranty and Safety

- High reliability certified according to IEC 61646 and IEC 61730
- Limited product warranty of 5 years on material and workmanship
- Performance guarantee:
 - 10 years (90% of minimum stabilized rated power output)
 - 25 years (80% of minimum stabilized rated power output)

Module Design

- Front and back cover made of float glass
- PVB foil
- Junction box with integrated bypass diode
- Junction box in IP protection class 67 design
- Junction Box with MC4 plug and socket (without cable)

Dimensions

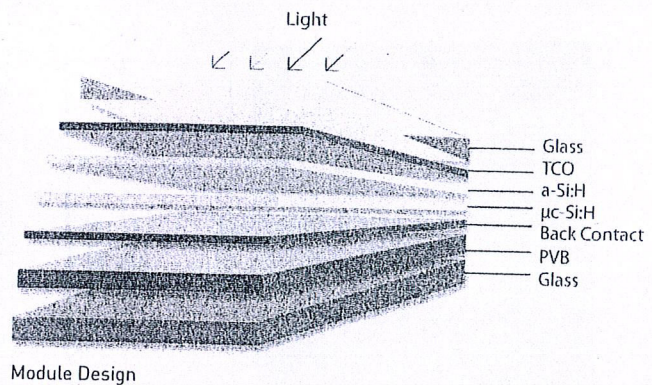
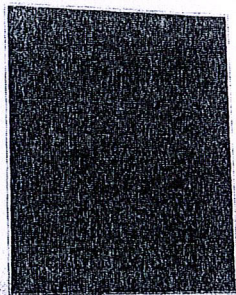


All drawings not to scale. For legally valid dimensions referred to installation manual!

a-Si/ μ c-Si Thin-Film PV Module

Parameter	Unit	MPV115-M	MPV120-M	MPV125-M	MPV130-M	MPV135-M
Nominal peak power ($\pm 5\%$) (P_{mpp})	W	115	120	125	130	135
Nominal voltage* (V_{mpp})	V	107	109	111	112	114
Nominal current* (I_{mpp})	A	1.07	1.10	1.13	1.15	1.18
Open circuit voltage* (V_{oc})	V	141.3	142.2	143.0	143.9	144.8
Short circuit current* (I_{sc})	A	1.30	1.34	1.37	1.40	1.44
Maximum system voltage (V_{max})	V			1000		
Maximum reverse current (I_R)	A			5		
Bypass diode current (I_B)	A			10		
Temperature coefficient (P_{mpp})	%/K			-0.3		
Temperature coefficient (V_{oc})	%/K			-0.37		
Temperature coefficient (I_{sc})	%/K			0.1		
Length	mm			1300		
Width	mm			1100		
Area	m ²			1.43		
Thickness of module (incl. backrails)	mm			7 (34)		
Weight	kg			29.5		
Operating temperature range	°C			-40 to +85		
Negative grounding required						

STC = 1000 W/m², 25°C, AM 1.5
All values at STC. Data derived from AMAT production line.
* All values $\pm 10\%$ unless otherwise indicated.



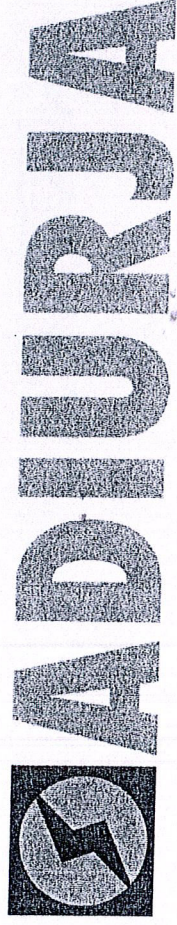
Information is subject to change without prior notice.

Contact:

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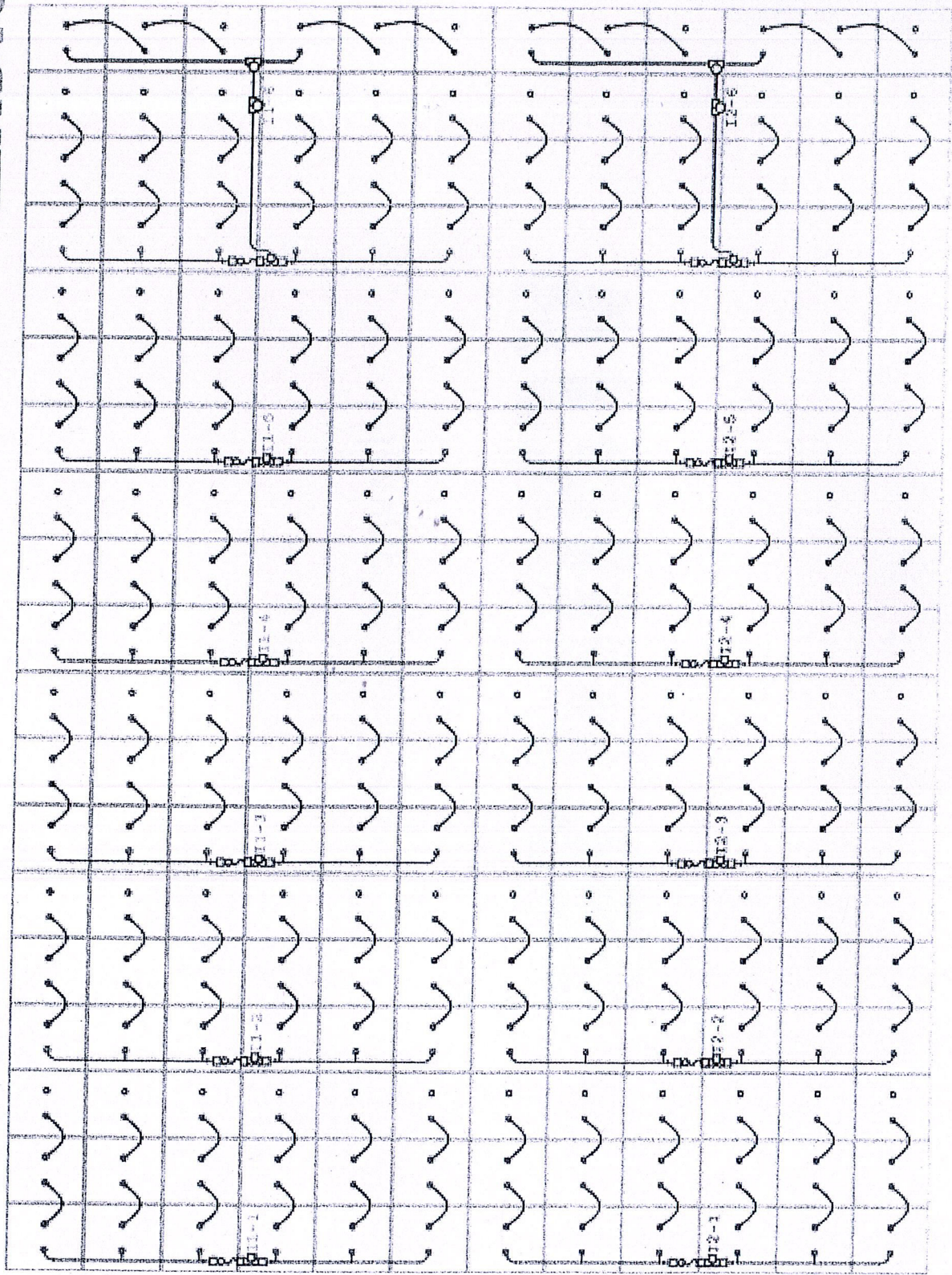
DA_M0SPEN_1.7



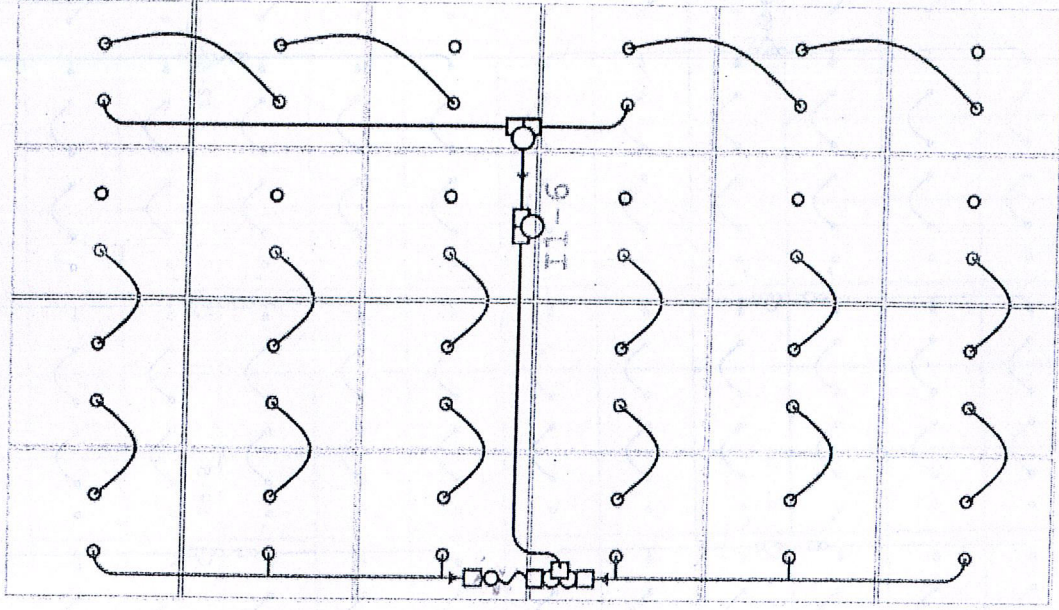
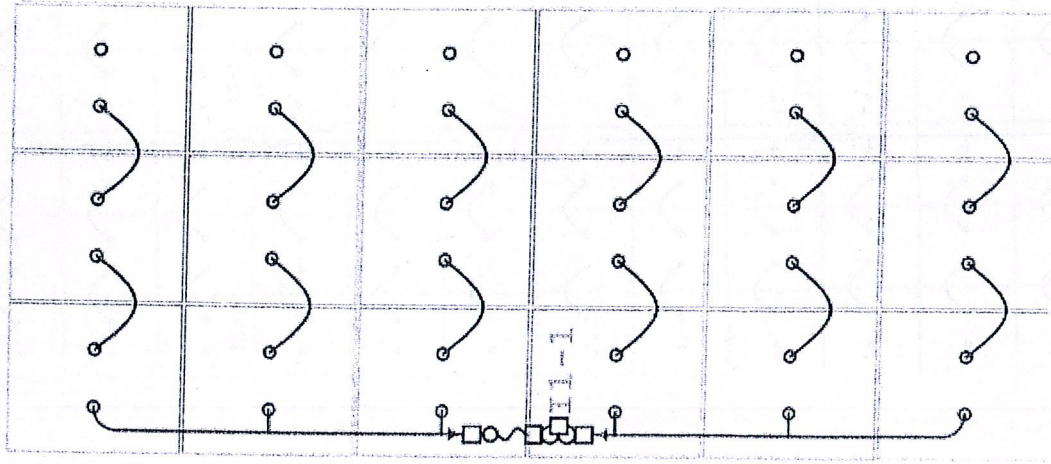
Velneshwar 30kWp

Wiring

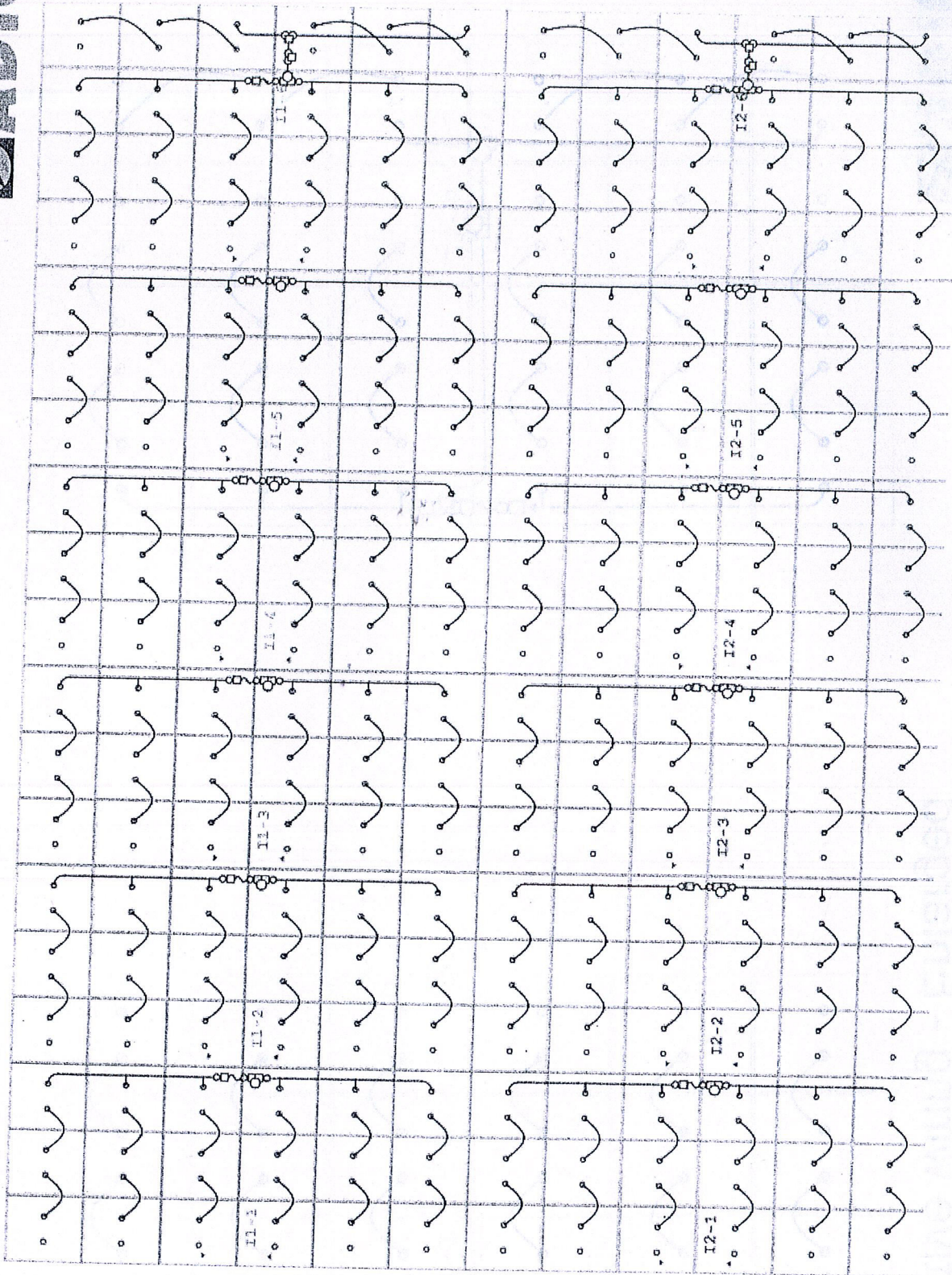
Positive wiring



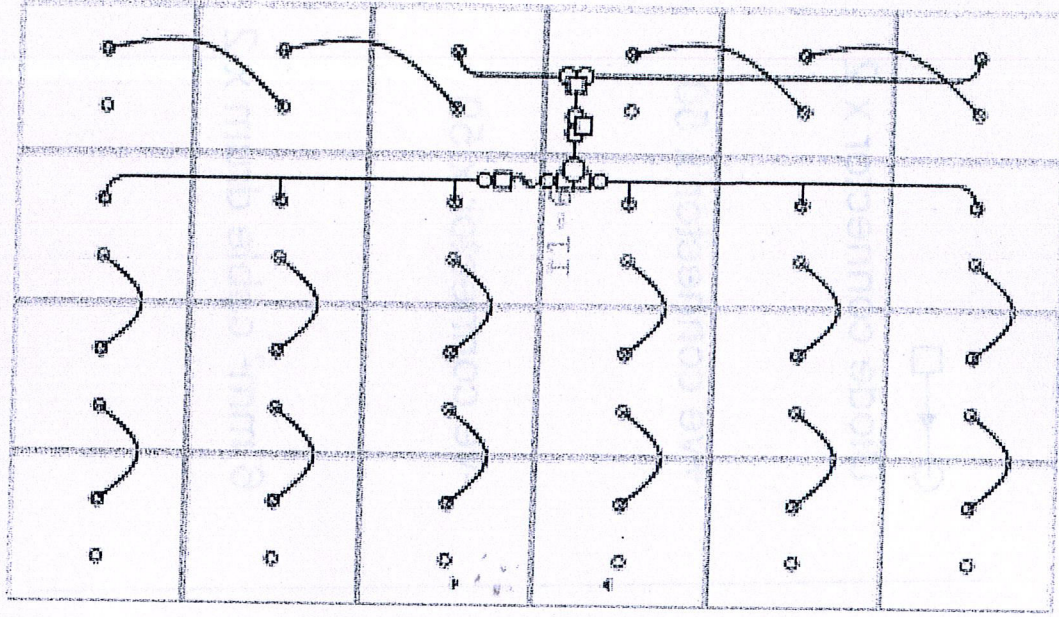
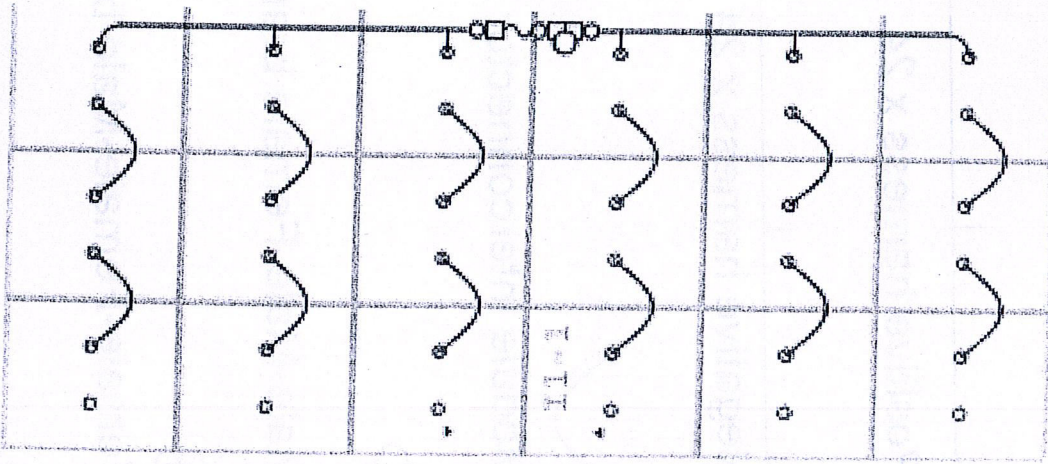
Positive wiring - Enlarged



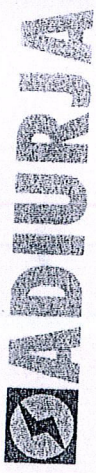
Negative wiring



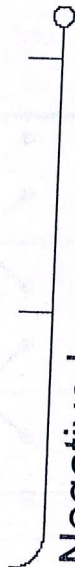
Negative wiring - Enlarged



Components



Positive harness x 24



Negative harness x 24



Module interconnector x 166



Male-Male-Female branch connector x 16



Female-Female-Male branch connector x 16

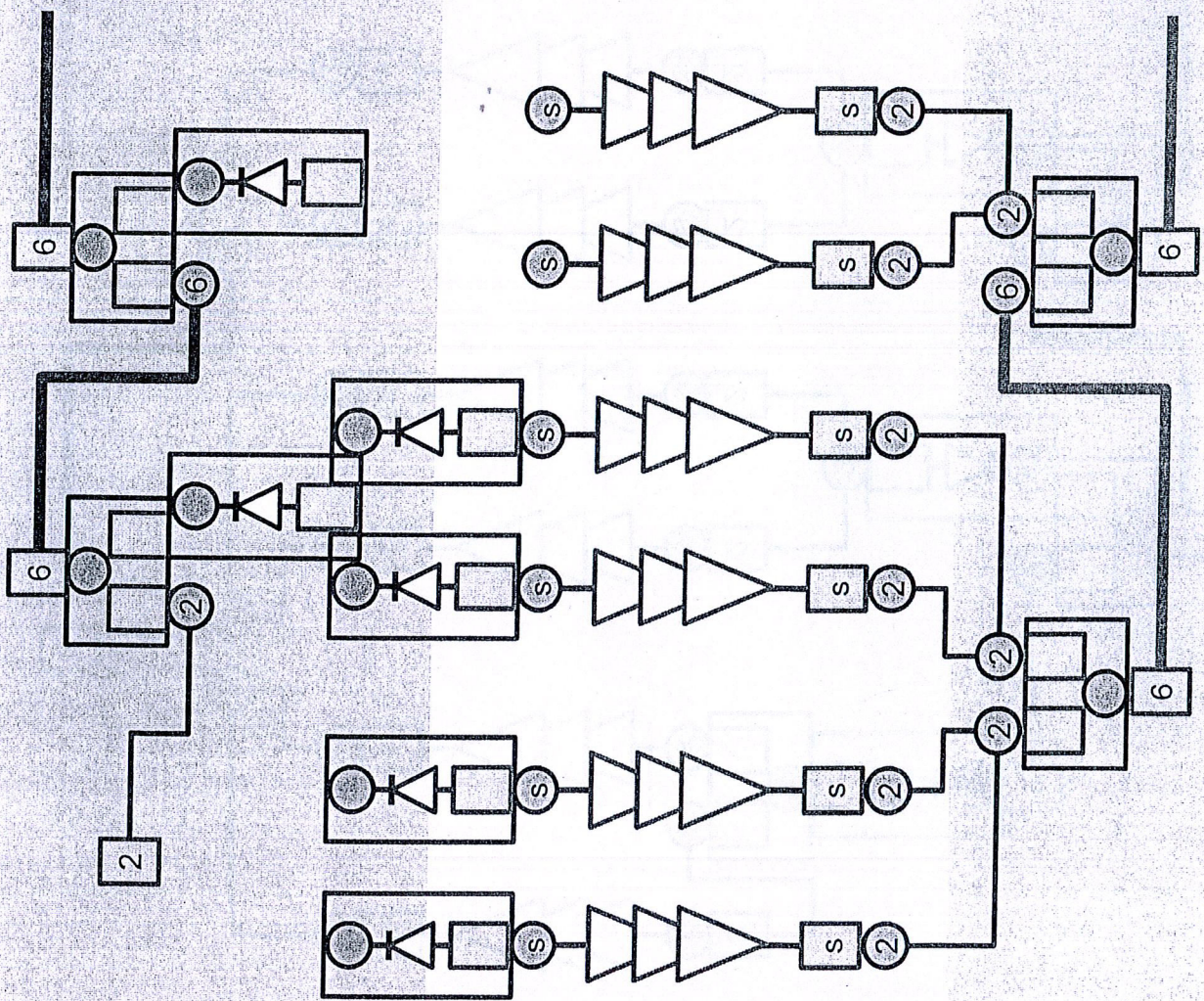


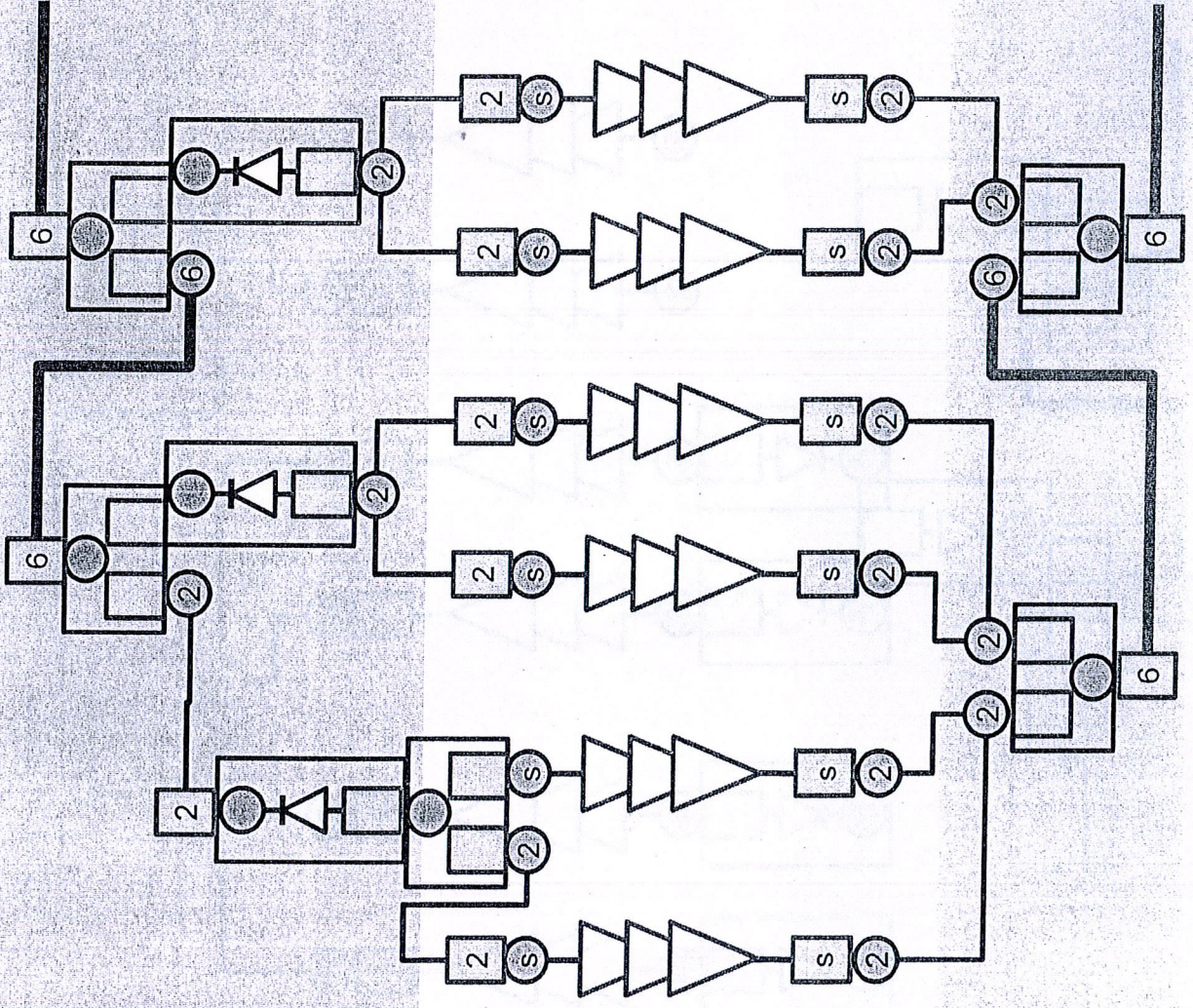
Diode connector x 2

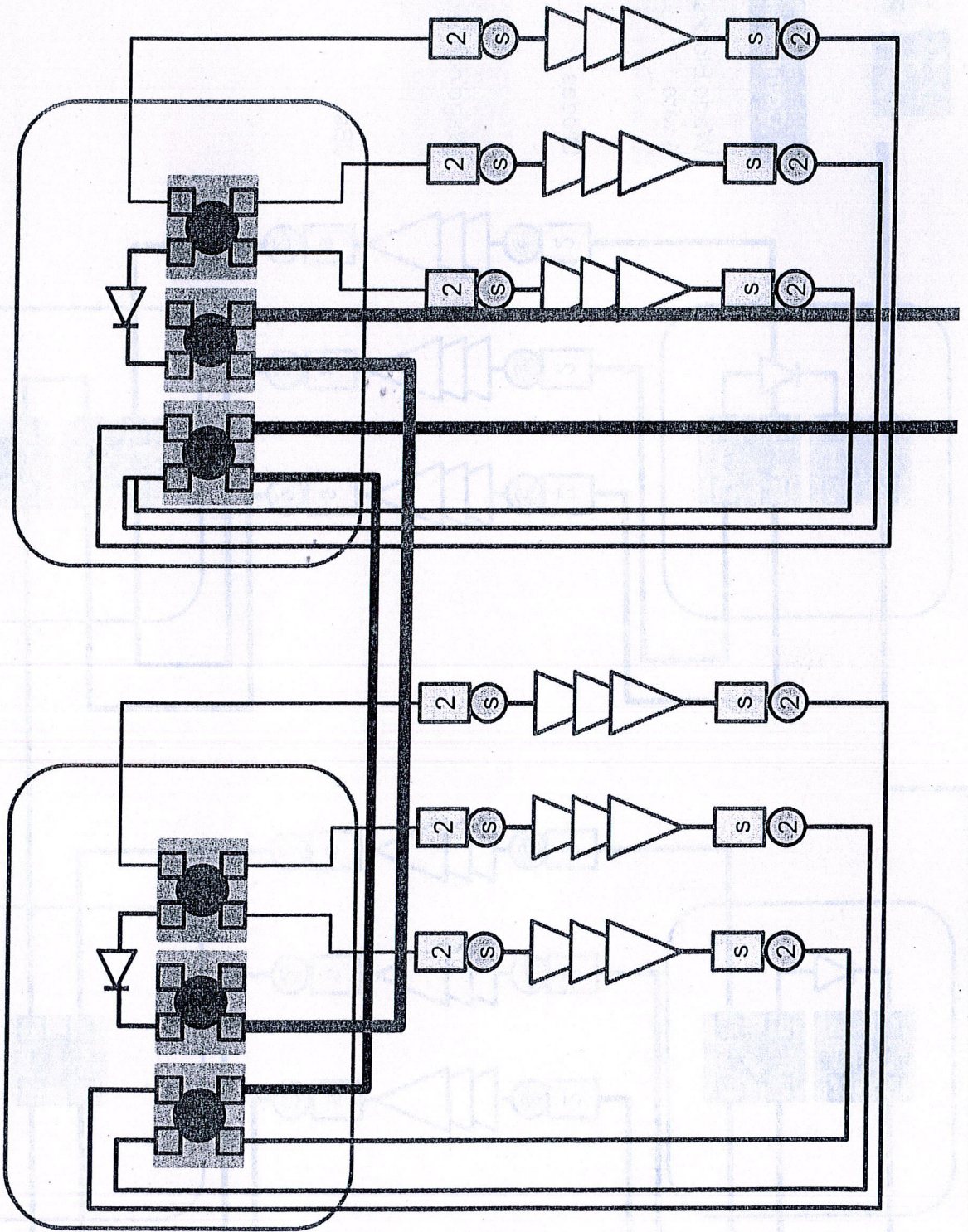
+ve connector x 50

-ve connector x 50

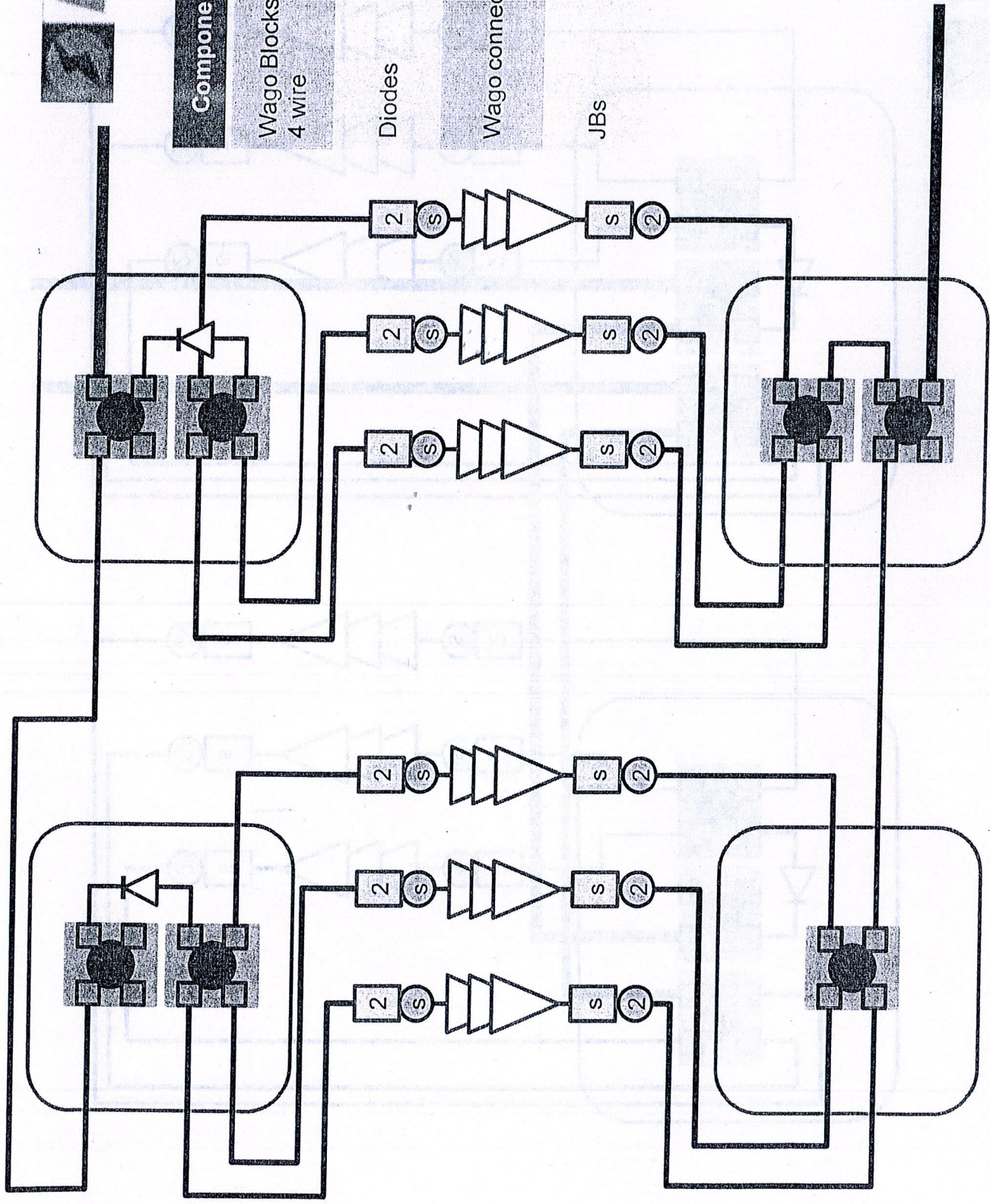
6 mm² cable drum x 2

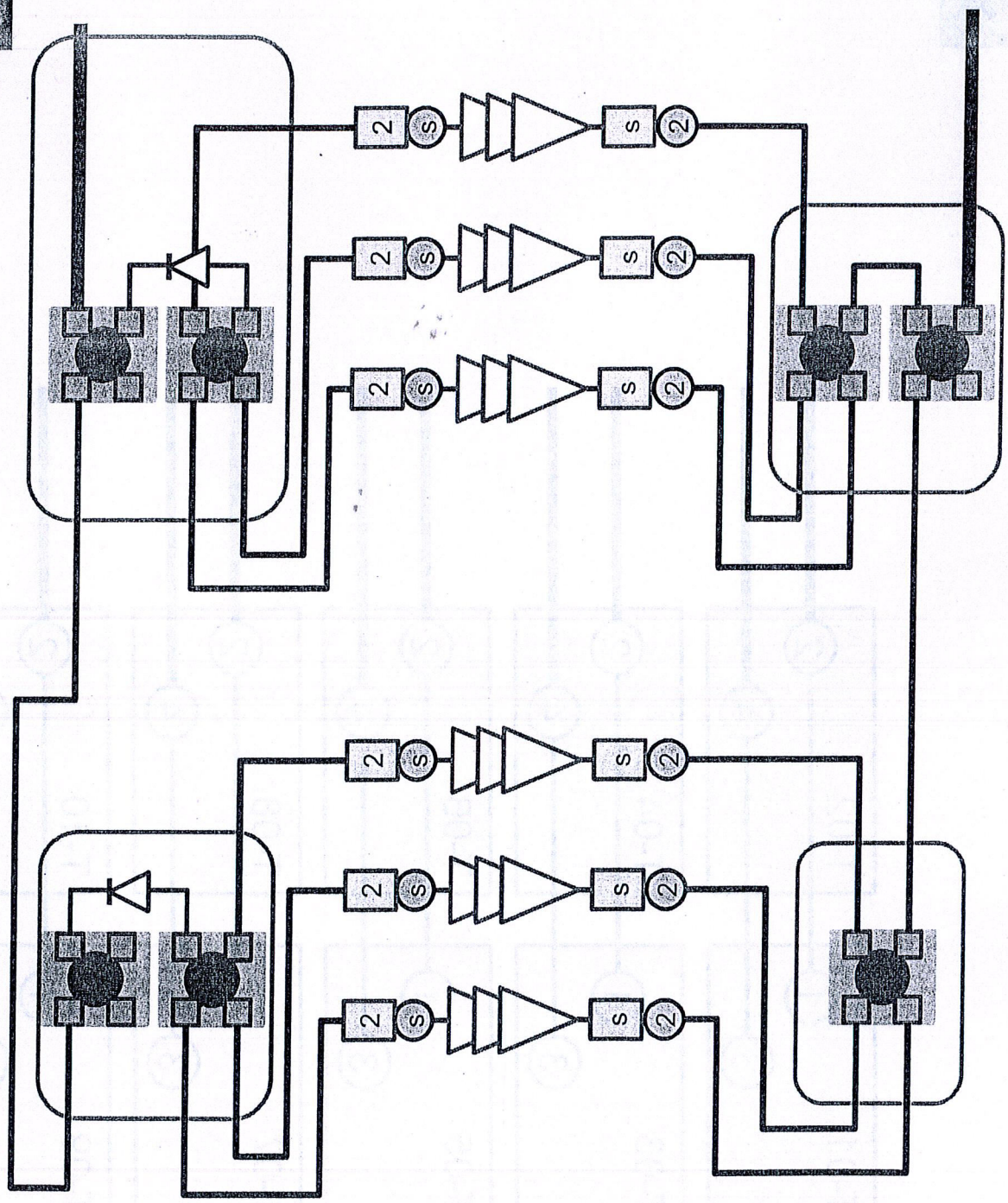


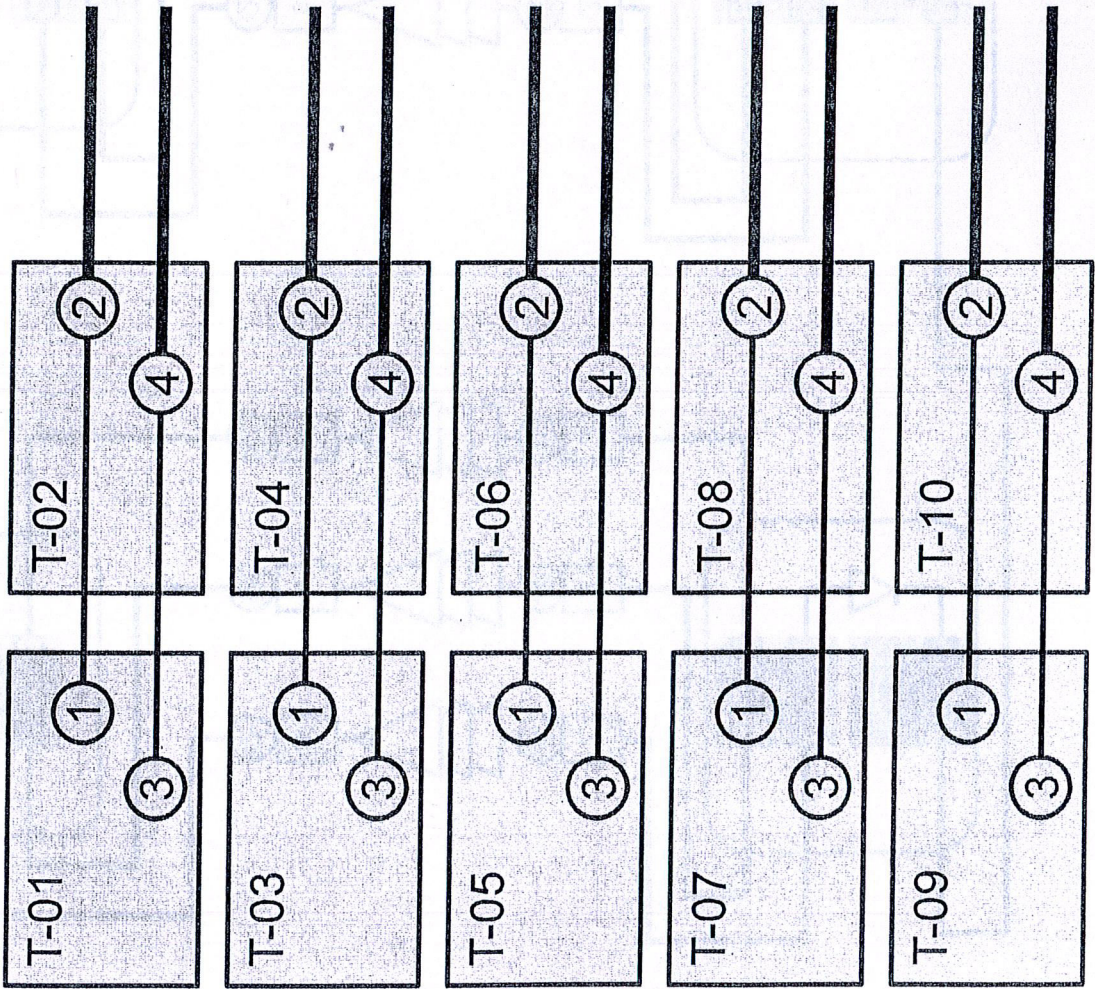
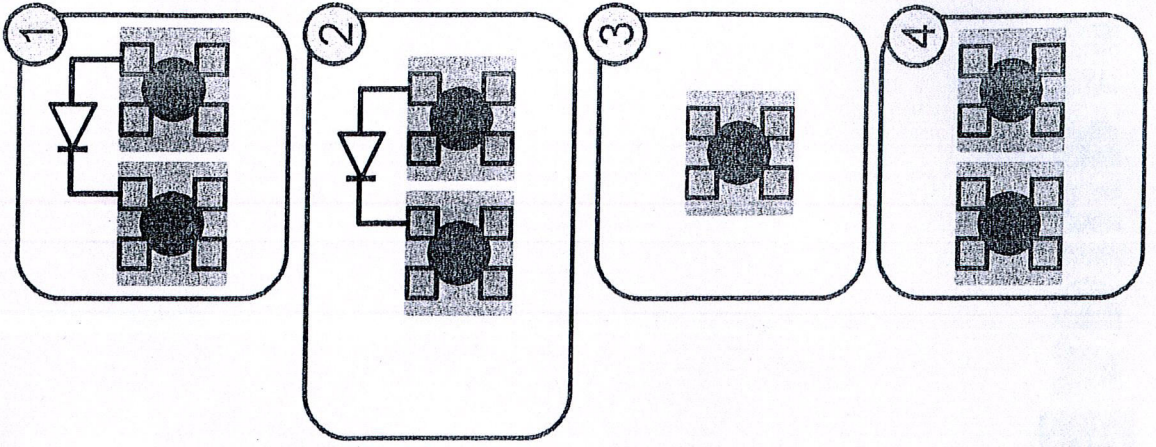




Component	For 18 modules
Wago Blocks 4 wire	7
Diodes	2
Wago connectors	1
JBs	4







MASDAR * PV

Model Type : MPV-M

ORIGIN - Germany

Electrical Rating

at 1000 W/M² SOLAR IRRADIANCE AND 25° CELL TEMPERATURE

Open Circuit Votage (Voc)	137.65V	Operating Voltage (Vmp)	106.94V
Short circuit Current (Isc)	1.38A	Operating Current (Imp)	1.16 A
Maximum Power (Pmax)	124.47(+/-)5%w	Maximum System Voltage	1000 V
Bypass Diode	10 . A	Maximum Series Fuse	3:00 AM P



FRONIUS INDIA PRIVATE LIMITED

Gate No. 312, Nanekarwadi Chakan, Taluka-Khed, District Pune - 410501, Pune, INDIA.

940532462

PAN NO. AACCF1743L | GST NO. 27AACCF1743L1ZK | STATE CODE: 27 | STATE: MAHARASHTRA

Place of Supply: Head of Electrical Engg Dept. Maharashtra Sansuram College of engineering, At-post-Velneswar Hedvi-Guhagar road, Guhagar. Dist. Ratnagiri - 415729.	Contact Person: Satish Ghopade	Delivery Note No. FIPL/17-18/128
	GST Number: 27AAHCA8417D125	Date: 26/3/18
	State Code: 27	
Reason for Delivery: Sending for Demo purpose, does not have any commercial value.		
Mode of Despatch: By Road.		

PLEASE RECEIVE THE FOLLOWING AND RETURN THE YELLOW COPY DULY SIGNED TO US

ITEM NO.	DESCRIPTION	UNIT NO.	QUANTITY
①	Fronius IQ 150V-3 Inverter. (Serial No. 23403131)	No.	01.

Stayed Recd. in stores 31/3/18
100%

Does Material Belong to Fronius	Will Material Come Back	Value of Material	Expected Date of Return	Remarks
YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	NA	—	
Type & Number of Packages 1 pallet		Whether Insured	Received the Above in Good Condition	
		YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Date		

Fronius India Pvt. Ltd.

GAT No. 312, Nanekarwadi, Chakan, Tal. Khed, District Pune, 410501 Pune

PAN No. AACCF1743L | VAT TIN No. 27540998654V | CST TIN No. 27540998654C | Service Tax Registration No. AACCF1743LSD001
 ECC No. AACCF1743LED001 / AACCF1743LEI002 | Range-V (Chakan-V), Division-III (Chakan I), Commissionerate-Pune-II (Kolhapur)



201706691

DELIVERY NOTE-No: 9243 Original
 from 19-06-2017

DELIVERY ADDRESS
 Dr. Avinash M. Chincholkar
 Vidya Prasarak Mandal (VPM's)
 Maharshi Parshuram College of
 Engineering Velneshwar, Taluka
 Taluka:Guhagar 415727 RATNAGIR
 9004690479 / 8275072488

Customer-No: 500011
 Your LST No.: 27220012728V
 Your CST No.: 27220012728C
 Your ECC No.:
 Division:
 Range:

INVOICE ADDRESS
 MASS-TECH CONTROLS PVT LTD
 2/7 MEGHAL INDUSTRIAL ESTATE
 DEVIDAYAL ROAD, MULUND WEST
 IN-MUMBAI 400 080
 Bitte K-Nr. 51056 verwenden

Customer P.O. No.:
 23241625-Exchange
 CAS-443608-F1J9K3/2
 Our Order-No: 590970
 from 19-06-2017

Dispatch-No 0
 Shipment:

Delivery Terms
 FOR Mumbai
 Off. Mngr.: Davari Arjun Balu
 Repr.: 545010 Mukund Shendge

1 Piece

Solar Energy

Pos	Item code / Description	Ordered Qty.	Delivered Qty	Back Order
	Replacement device for a faulty inverter with the serial number ***** The faulty inverter should be available for pick-up at the same address after 10 days about.			
10	4,210,014,633A Fronius IGPlus 150V-3 Repl INT Repl. Inverter Setup Region 2 Serial No. : 23403131 Count. of Origin : AT_038_Austria Statistical No : 85044088 Weight : 49.000 kg Warehouse : 399 Central Warehouse non RG23D	1.00/pc	1.00/pc	0.00/pc
Built in options:				
11	44,0210,0147 Setup IG Plus V EXC Int. Count. of Origin : AT_038_Austria Statistical No : 85049099	1.00/pc	1.00/pc	0.00/pc

With this delivery note all shipments related to your purchase order are completed.

*Received
 Checked found OK
 24/06*

*24/6/17
 n Box Recd*

INWARD
 Inward No... 408
 Date: 24/6/2017

Fronius India Pvt. Ltd.

GAT No. 312, Nanekarwadi, Chakan, Tal. Khed, District Pune, 410501 Pune

PAN No. AACCF1743L | VAT TIN No. 27540998654V | CST TIN No. 27540998654C | Service Tax Registration No. AACCF1743LSD001
ECC No. AACCF1743LED001 / AACCF1743LEI002 | Range-V (Chakan-V), Division-III (Chakan I), Commissionerate-Pune-II (Kolhapur)



TAX INVOICE-No 218 /17000246 Original
from 19-06-2017

MASS-TECH CONTROLS PVT LTD
2/7 MEGHAL INDUSTRIAL ESTATE
DEVIDAYAL ROAD, MULUND WEST
IN-MUMBAI 400 080
Bitte K-Nr. 51056 verwenden

Customer-No: 500011
Your LST No.: 27220012728V
Your CST No.: 27220012728C
Your ECC No.:
Division:
Range:

DELIVERY ADDRESS

Dr. Avinash M. Chincholkar
Vidya Prasarak Mandal (VPM's)
Maharshi Parshuram College of
Engineering Velneshwar,
Taluka : Guhagar 415727
9004690479 / 8275072488

Customer P.O. No.:
23235202-Exchange
CAS-443608-F1J9K3/3
Our Order-No: 590971
from 19-06-2017

Shipment:

Term of Delivery
FOR Mumbai
Off. Mngr.: Davari Arjun Balu
Repr.: 545010 Mukund Shendge

Solar Energy

Pos	Item code / Description	Qty/Unit	Price/pc	Discount	net
-----	-------------------------	----------	----------	----------	-----

delivery date = date of delivery note

Replacement device for a faulty inverter with the serial number

The faulty inverter should be available for pick-up at the same address
after 10 days about.

DELIVERY NOTE-No: 9247 from 19-06-2017

10	4,210,014,633A Fronius IGPlus 150V-3 Repl INT Repl. Inverter Setup Region 2 Serial No. : 24173486 Count. of Origin : AT_038_Austria Statistical No : 85044088 Weight : 49.000 kg Tax rate: : VAT 13.5%	1.00 pc	259,000.00 pc	100.00%	0.00
----	---	---------	---------------	---------	------

Carry Forward INR: 0.00



SPOTON
for accuracy

510938065

STARTREK LOGISTICS PVT. LTD
Regd. Office : Thanavan , 23 / 24 Infantry Road,
Bangalore - 560001
PAN : AAQCS5845Q TIN : 29580660360
www.spoton.co.in

SENDER'S NAME & ADDRESS				PRODUCT ROAD EXPRESS		BOOKING DATE		BKG TIME						
Cust. Code	11669			Floor No.		190617		BKG BR CD.						
Cust. Name	Frontus India (Id)			DC ACKN		ODA LOC.NAME		DLY BR CODE						
Ref / Inv. No.	chakan / hankegal			SPL. SERVICES		SHIPMENT DIMENSION (In Cms.)			SHIPMENT DETAILS					
Add.				FTL		No of Pcs.		Dimensions		No. Of Pkgs.				
STATE/UT:				W/H		1		162 X 108 X 46		Actual Weight (Kg)				
City:	Mangaluru		Pin code:	VTC/FTC		L		B		H				
Tel. No.:				DACC/DC		L		B		H				
TIN/ST/VAT No.				PPWK RECEIVED		L		B		H				
Modvat	Permit Validity date				Invoice		L		B		H			
RECEIVER'S NAME & ADDRESS				PO/STN		Total		L		B		H		
Cust. Code				Permit		AMOUNT (In ₹)		AMT to be collected						
Cust. Name	Dr. Avinash Kumar Chinnal			Declaration		Connote Charge		VTC						
Ref / Inv. No.	Ker vidya prasarale			MODVAT		Basic Freight		FTC						
Add.	mandal			OTHERS		FOV		CASH		<input type="checkbox"/>		Credit <input type="checkbox"/>		
STATE/UT:				LIABILITY		ODA Charges		FTC		<input type="checkbox"/>		FOC <input type="checkbox"/>		
City:	Kalamangiri		Pin code:	Owners Risk		FTC Charges		VALUE OF CARGO						
Tel. No.:				Carrier's Risk		VTC / DACC Charges		₹						
TIN/ST/VAT No.						DC Ack Charges		DETAILS OF FREIGHT RECEIPT		CASH		<input type="checkbox"/>		
Modvat	Permit Validity date						Handling Charges		CHQ		<input type="checkbox"/>			
Content :	101669466					Misc. Charges		AMOUNT IN WORDS :						
Special Instructions / Paste Sticker (if any)						SUB TOTAL								
						Service Tax								
						GRAND TOTAL								



510938065



RECEIVER'S REMARKS: I hereby agree to the terms & conditions set forth on the reverse of this sender's copy of this non negotiable 'CONNOTE' & warrant that the information contained on this 'CONNOTE' is true & correct