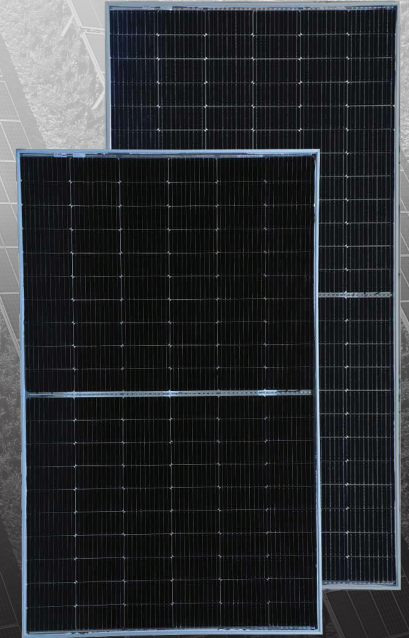




YOUR RELIABLE  
PARTNER FOR  
SOLAR ENERGY  
SINCE 1992



# QUARTZ

## TRANSPARENT BACK SHEET MODULE

### DESIGNED TO DELIVER MAXIMUM POWER OUTPUT

EMMVEE IS INDIA'S FIRST INTEGRATED SOLAR SOLUTIONS COMPANY, WITH 30 YEARS OF EXPERTISE IN DEVISING HIGHLY INNOVATIVE AND EFFICIENT SOLAR POWER SOLUTIONS, FROM SOLAR WATER HEATING SYSTEMS TO PHOTOVOLTAIC MODULES AND SOLAR WATER PUMPS.

Since our inception in 1992, we have dedicated ourselves to developing smart and innovative solar energy solutions using cutting edge technology. As always, our promise is to maintain enviable standards of excellent quality, timely delivery and reliable support to our customers as they explore and adopt environmentally friendly solar power solutions.

Today, we are proud of our robust presence in some of the most pioneering green energy projects across India and Europe. Our path-breaking photovoltaic modules have provided valuable and sustainable alternative power solutions in the field for over 15 years, and we continue to innovate with our new range of higher WP modules that combine exceptional quality and unbeatable efficiency.

Our goal is simple: to provide clean and reliable energy that saves our natural resources and reduces our carbon footprint, while ensuring that our diverse range of domestic and commercial solar power-related products and services always keep the needs of our customers at the forefront.

## FEATURES



AR COATED HIGH  
TRANSMISSION GLASS



MC4 COMPATIBLE  
CONNECTORS



PID  
RESISTANCE



ANODISED  
ALUMINIUM FRAME



MECHANICAL  
LOAD OF 5400 Pa

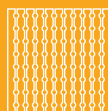
## BENEFITS



LOW LCOE,  
FASTER  
PAYBACK PERIOD



BEST IN CLASS  
EFFICIENCY  
UPTO 21.5%



MULTI-BUS BAR  
TECHNOLOGY FOR  
BETTER CURRENT  
COLLECTION



LOWEST  
GUARANTEED FIRST  
YEAR AND ANNUAL  
DEGRADATION



WELL-COMPOSED  
COMPONENTS  
STRESS TO REDUCE  
MICRO CRACKS

# TECHNICAL SPECIFICATION

## 144 CUT CELL TRANSPARENT BACK SHEET MODULE

Electrical data at 1000W/m<sup>2</sup>, 25°C and A.M1.5(STC in accordance with IEC 60904-3)

MODEL NAME	E530HCBT144	E535HCBT144	E540HCBT144	E545HCBT144
RATED POWER AT STC	530	535	540	545
POWER TOLERANCE	+5W	+5W	+5W	+5W
MODULE EFFICIENCY AT STC	20.52%	20.71%	20.90%	21.10%
OPEN CIRCUIT VOLTAGE - VOC(VOLTS) (±10%)	49.2	49.35	49.5	49.75
SHORT CIRCUIT CURRENT - ISC (AMPS) (±10%)	13.56	13.59	13.62	13.88
MAX POWER VOLTAGE - VPM (VOLTS)	41.1	41.32	41.54	41.61
MAX POWER CURRENT - IPM (AMPS)	12.9	12.95	13	13.1
AT LOW IRRADIANCE (200W/M <sup>2</sup> , 25°C AND AM1.5) THE MODULE YIELDS AT LEAST 95% OF THE STC EFFICIENCY.				

Test uncertainty for Pmax ±3%

### Thermal data

TEMP. COEFFICIENT OPEN-CIRCUIT VOLTAGE	-0.28%/°C
TEMP. COEFFICIENT SHORT CIRCUIT CURRENT	0.05%/°C
TEMP. COEFFICIENT RATED POWER	-0.35%/°C
NOCT (NORMAL OPERATING CELL TEMPERATURE)	45°C ± 2°C

### Mechanical data

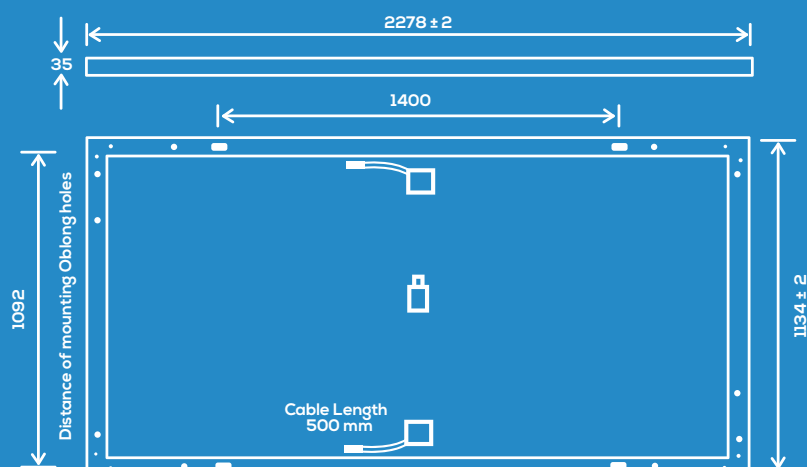
NUMBER OF CELLS AND CELL TYPE	144 MONO PERC SOLAR CELLS (182X91MM)
DIMENSIONS: (L X W X H)	2278 mm X 1134 mm X 35 mm
WEIGHT	26 Kg
FRONT GLASS	3.2 mm HIGH TRANSMISSION, SOLAR GLASS
EMBEDDING	EVA
BACK SHEET	TRANSPARENT BACK SHEET
JUNCTION BOX	3 SPLIT JUNCTION BOX IP68
NUMBER OF BYPASS DIODES	3
CABLES	4mm <sup>2</sup> SOLAR CABLES, LENGTH 500±10mm
CONNECTORS	MC4 COMPATIBLE

### Permissible operating conditions

OPERATING TEMPERATURE RANGE	-40°C TO 85°C
MAX.SYSTEM VOLTAGE	1500V DC
MAXIMUM SNOW LOAD CAPACITY	5400PA
RESISTANCE AGAINST HAIL	MAX Ø24 MM WITH IMPACT SPEED OF 83KM/H
PROTECTION CLASS AGAINST ELECTRICAL SHOCK	II
MAXIMUM REVERSE CURRENT	25 A

### Warranty

PRODUCT WARRANTY	12 YEARS
PERFORMANCE WARRANTY	25 YEARS
ANNUAL DEGRADATION	1ST YEAR DEGRADATION, 2%, FROM 2ND YEAR 0.55% ANNUAL DEGRADATION AND 84.8% AT THE END OF 25 YEARS.



# TECHNICAL SPECIFICATION

## 132 CUT CELL TRANSPARENT BACK SHEET MODULE

Electrical data at 1000W/m<sup>2</sup>, 25°C and A.M1.5(STC in accordance with IEC 60904-3)

MODEL NAME	E485HCBT132	E490HCBT132	E495HCBT132	E500HCBT132
RATED POWER AT STC	485	490	495	500
POWER TOLERANCE	+5W	+5W	+5W	+5W
MODULE EFFICIENCY AT STC	20.40%	20.61%	20.82%	21.03%
OPEN CIRCUIT VOLTAGE - VOC(VOLTS) (±10%)	44.43	44.65	44.79	44.92
SHORT CIRCUIT CURRENT - ISC (AMPS) (±10%)	13.00	13.09	13.15	13.24
MAX POWER VOLTAGE - VPM (VOLTS)	38.81	38.94	39.14	39.27
MAX POWER CURRENT - IPM (AMPS)	12.50	12.58	12.65	12.73

AT LOW IRRADIANCE (200W/M<sup>2</sup>, 25°C AND AM1.5) THE MODULE YIELDS AT LEAST 95% OF THE STC EFFICIENCY.

Test uncertainty for Pmax ±3%

### Thermal data

TEMP. COEFFICIENT OPEN-CIRCUIT VOLTAGE	-0.28%/°C
TEMP. COEFFICIENT SHORT CIRCUIT CURRENT	0.05%/°C
TEMP. COEFFICIENT RATED POWER	-0.35%/°C
NOCT (NORMAL OPERATING CELL TEMPERATURE)	45°C ± 2°C

### Mechanical data

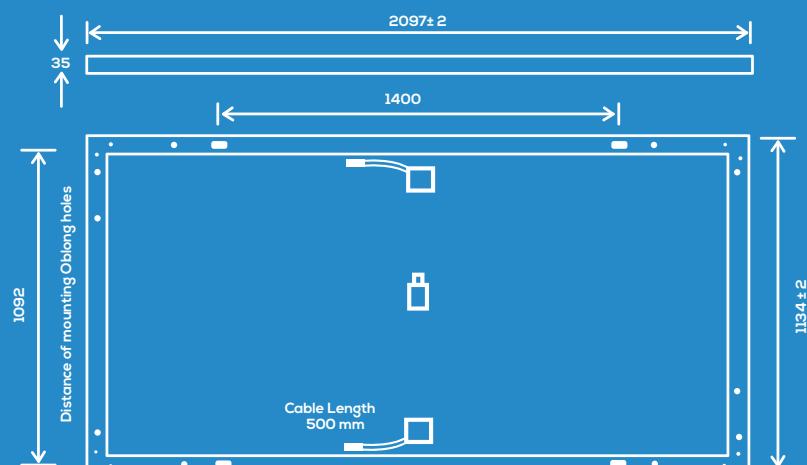
NUMBER OF CELLS AND CELL TYPE	132 MONO PERC SOLAR CELLS (182 X 91mm)
DIMENSIONS (L X W X H)	2097 mm x 1134 mm x 35 mm
WEIGHT	25 Kg
FRONT GLASS	3.2 mm HIGH TRANSMISSION, SOLAR GLASS
EMBEDDING	EVA
BACK SHEET	TRANSPARENT BACK SHEET
JUNCTION BOX	3 SPLIT JUNCTION BOX IP68
NUMBER OF BYPASS DIODES	3
CABLES	4mm <sup>2</sup> SOLAR CABLES, LENGTH 500 ± 10mm
CONNECTORS	MC4 COMPATIBLE

### Permissible operating conditions

OPERATING TEMPERATURE RANGE	-40°C TO 85°C
MAX. SYSTEM VOLTAGE	1500V DC
MAXIMUM SNOW LOAD CAPACITY	5400PA
RESISTANCE AGAINST HAIL	MAX Ø24 MM WITH IMPACT SPEED OF 83KM/H
PROTECTION CLASS AGAINST ELECTRICAL SHOCK	II
MAXIMUM REVERSE CURRENT	25 A
BIFACIALITY	70 ± 5%

### Warranty

PRODUCT WARRANTY	12 YEARS
PERFORMANCE WARRANTY	25 YEARS
ANNUAL DEGRADATION	1ST YEAR DEGRADATION, 2%, FROM 2ND YEAR 0.55% ANNUAL DEGRADATION AND 84.8% AT THE END OF 25 YEARS.



# TECHNICAL SPECIFICATION

## 120 CUT CELL TRANSPARENT BACK SHEET MODULE

Electrical data at 1000W/m<sup>2</sup>, 25°C and A.M1.5(STC in accordance with IEC 60904-3)

MODEL NAME	E440HCBT120	E445HCBT120	E450HCBT120
RATED POWER AT STC	440	445	450
POWER TOLERANCE	+5W	+5W	+5W
MODULE EFFICIENCY AT STC	20.28%	20.51%	20.74%
OPEN CIRCUIT VOLTAGE - VOC(VOLTS) (±10%)	41.44	41.46	41.56
SHORT CIRCUIT CURRENT - ISC (AMPS) (± 10%)	13.55	13.75	13.81
MAX POWER VOLTAGE - VPM (VOLTS)	34.21	34.28	34.31
MAX POWER CURRENT - IPM (AMPS)	12.87	12.99	13.12
AT LOW IRRADIANCE (200W/M <sup>2</sup> , 25°C AND AM1.5) THE MODULE YIELDS AT LEAST 95% OF THE STC EFFICIENCY.			

Test uncertainty for Pmax ±3%

### Thermal data

TEMP. COEFFICIENT OPEN-CIRCUIT VOLTAGE	-0.28%/°C
TEMP. COEFFICIENT SHORT CIRCUIT CURRENT	0.05%/°C
TEMP. COEFFICIENT RATED POWER	-0.35%/°C
NOCT (NORMAL OPERATING CELL TEMPERATURE)	45°C ± 2°C

### Mechanical data

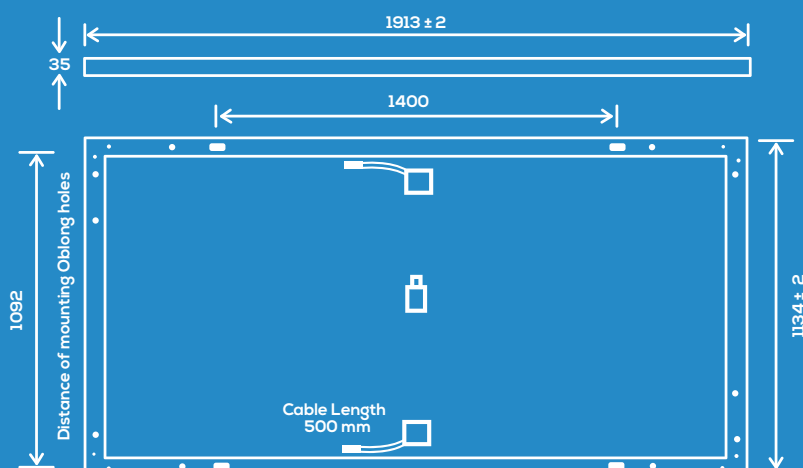
NUMBER OF CELLS AND CELL TYPE	120 MONO PERC SOLAR CELLS (182 X 91mm)
DIMENSIONS: (L X W X H)	1913 mm X 1134 mm X 35 mm
WEIGHT	24 Kg
FRONT GLASS	3.2 mm HIGH TRANSMISSION, SOLAR GLASS
EMBEDDING	EVA
BACK SHEET	TRANSPARENT BACK SHEET
JUNCTION BOX	3 SPLIT JUNCTION BOX IP68
NUMBER OF BYPASS DIODES	3
CABLES	4mm <sup>2</sup> SOLAR CABLES, LENGTH 500 ± 10mm
CONNECTORS	MC4 COMPATIBLE

### Permissible operating conditions

OPERATING TEMPERATURE RANGE	-40°C TO 85°C
MAX.SYSTEM VOLTAGE	1500V DC
MAXIMUM SNOW LOAD CAPACITY	5400PA
RESISTANCE AGAINST HAIL	MAX Ø24 MM WITH IMPACT SPEED OF 83KM/H
PROTECTION CLASS AGAINST ELECTRICAL SHOCK	II
MAXIMUM REVERSE CURRENT	25 A

### Warranty

PRODUCT WARRANTY	12 YEARS
PERFORMANCE WARRANTY	25 YEARS
ANNUAL DEGRADATION	1ST YEAR DEGRADATION, 2%, FROM 2ND YEAR 0.55% ANNUAL DEGRADATION AND 84.8% AT THE END OF 25 YEARS.





# TECHNICAL SPECIFICATION

## 108 CUT CELL TRANSPARENT BACK SHEET MODULE

Electrical data at 1000W/m<sup>2</sup>, 25°C and A.M1.5(STC in accordance with IEC 60904-3)

MODEL NAME	E395HCBT108	E400HCBT108	E405HCBT108
RATED POWER AT STC	395	400	405
POWER TOLERANCE	+5W	+5W	+5W
MODULE EFFICIENCY AT STC	20.25%	20.51%	20.76%
OPEN CIRCUIT VOLTAGE - VOC(VOLTS) (±10%)	36.34	36.61	36.77
SHORT CIRCUIT CURRENT - ISC (AMPS) (±10%)	13.15	13.21	13.24
MAX POWER VOLTAGE - VPM (VOLTS)	31.54	31.81	32.13
MAX POWER CURRENT - IPM (AMPS)	12.53	12.58	12.61
AT LOW IRRADIANCE (200W/M <sup>2</sup> , 25°C AND AM1.5) THE MODULE YIELDS AT LEAST 95% OF THE STC EFFICIENCY.			

Test uncertainty for Pmax ±3%

### Thermal data

TEMP. COEFFICIENT OPEN-CIRCUIT VOLTAGE	-0.28%/°C
TEMP. COEFFICIENT SHORT CIRCUIT CURRENT	0.05%/°C
TEMP. COEFFICIENT RATED POWER	-0.35%/°C
NOCT (NORMAL OPERATING CELL TEMPERATURE)	45°C ± 2°C

### Mechanical data

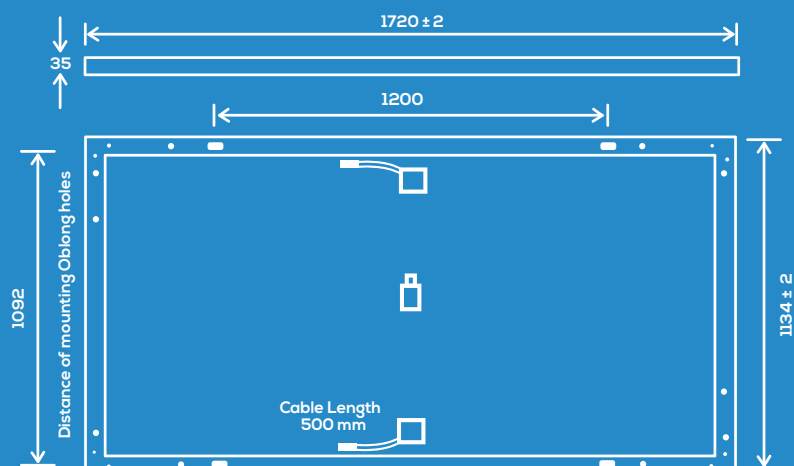
NUMBER OF CELLS AND CELL TYPE	108 MONO PERC SOLAR CELLS (182x91mm)
DIMENSIONS: (L X W X H)	1720 mm x 1134 mm x 35 mm
WEIGHT	20 Kg
FRONT GLASS	3.2 mm HIGH TRANSMISSION, SOLAR GLASS
EMBEDDING	EVA
BACK SHEET	TRANSPARENT BACK SHEET
JUNCTION BOX	3 SPLIT JUNCTION BOX IP68
NUMBER OF BYPASS DIODES	3
CABLES	4mm <sup>2</sup> SOLAR CABLES, LENGTH 500±10mm
CONNECTORS	MC4 COMPATIBLE

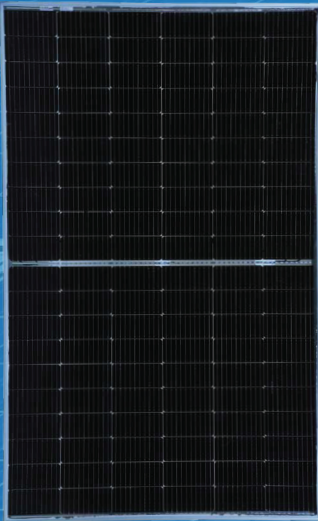
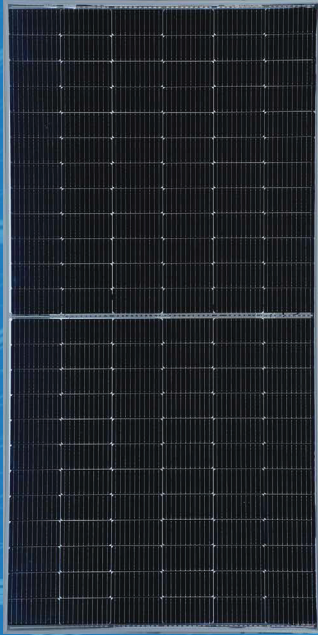
### Permissible operating conditions

OPERATING TEMPERATURE RANGE	-40°C TO 85°C
MAX.SYSTEM VOLTAGE	1500V DC
MAXIMUM SNOW LOAD CAPACITY	5400PA
RESISTANCE AGAINST HAIL	MAX Ø24 MM WITH IMPACT SPEED OF 83KM/H
PROTECTION CLASS AGAINST ELECTRICAL SHOCK	II
MAXIMUM REVERSE CURRENT	25 A

### Warranty

PRODUCT WARRANTY	12 YEARS
PERFORMANCE WARRANTY	25 YEARS
ANNUAL DEGRADATION	1ST YEAR DEGRADATION, 2%, FROM 2ND YEAR 0.55% ANNUAL DEGRADATION AND 84.8% AT THE END OF 25 YEARS.





## BI-FACIAL MODULE

Positive power tolerance +5W

- Half Cut Cell Technology
- Best Warranty
- 10BB instead of 5BB
- Enhanced Mechanical Load
- Higher lifetime Power Yield
- Multi Busbar Technology
- Longer Life-time Power Yield
- PID Resistance
- Excellent Low-light Performance
- Higher Power Output



### EMMVEE PHOTOVOLTAIC POWER PRIVATE LIMITED

Corporate Office: No. 13/1, International Airport Road, Bettahalasur Post, Bengaluru - 562 157, India

Phone: +91 80 2217 4328, +91 80 2217 4333 | info@emmvee.in | www.emmvee.com

(An ISO 9001:2015, ISO 14001:2015 & OHSAS 45000:2018 Certified Company)