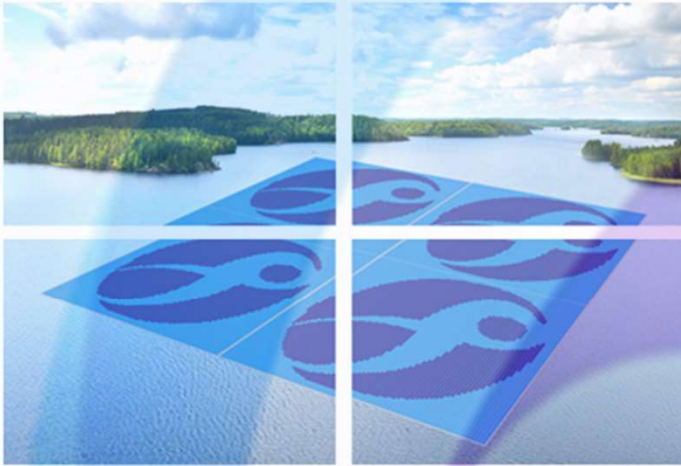


# WORLD-CLASS FLOATING SOLAR SOLUTION PROVIDER

By dedicating to the research and development of solar photovoltaic floating mounting systems, technological innovation and manufacturing. Floating systems are modular in design, made of high density polyethylene, pollution free and environmentally friendly, with excellent weather resistance and over 25 years of real life. Bosch strives to become the leading supplier of floating solar solutions.





With lots of patents:

Varieties of production equipment:

ISO 9001 : 2015 quality system:

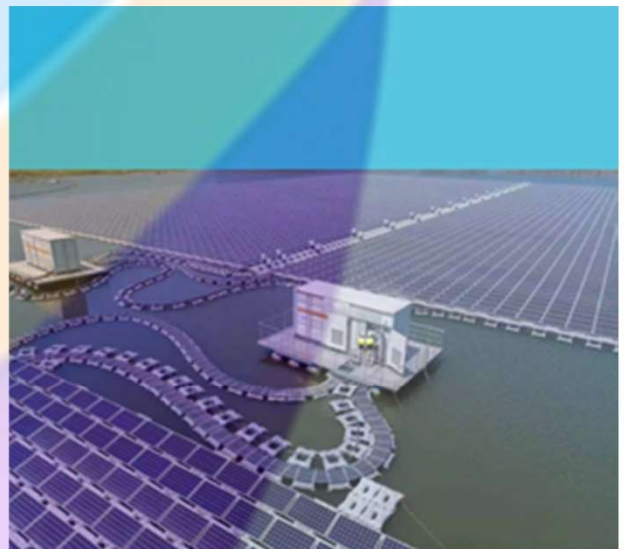
TUV certification (with REACH & ROHS );

CPVT certification on material and product

Factory was founded in 2014, devoted to solar photovoltaic floating platform and docking system solution, with full R&D, manufacture, sales and service.

## FEATURES

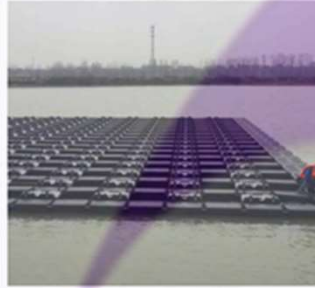
- Modular design, Easy to assemble
- 15% - 20% more power output
- 100% Recyclable floats
- 25 – year service life
- Self-Adapt to water level fluctuation
- Save lands
- Over 12 Beaufort scale Typhoon Resistance



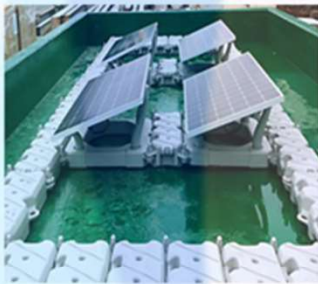
# FOATING SOLAR TECHNOLOGY

## INTRODUCTION

Pond



Subsidence  
water area  
of coal  
mineral



Industrial  
wastewater  
pond



Reservoir  
&  
Lake

## FEATURES

Modular design, Easy to assemble

15% - 20% more power output

100% Recyclable floats

25 – year service life

Self-Adapt to water level fluctuation

Save lands

Over 12 Beaufort scale Typhoon Resistance



# Advantages

## Modular Design

Simple And Fast Installation.  
Low O & M

PV Module 15o Angle

Adapt To different latitude  
High Power Output

UV Free Structure Design

Long Life Time  
Low OPEX

## Enhanced HDPE

Double Glass Compatible

Double Glass Compatible

High Power Output  
Low Deterioration

# Product Performance

Anti-seepage and hydrolysis resistant

Anti - UV, anti - aging, anti - stress cracking

Food grade material, eco - friendly material

Strong anti-fatigue and anti - wind performance

10 years quality warranty

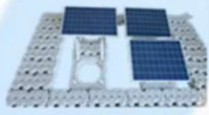
Over 25 years of actual lifetime

Strong bearing capacity, stab resistance

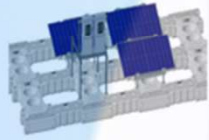
Non - skid, non - slip surface, non - loosen modular connecting



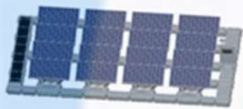
# I ROADMAP IN BOSCH



BC-001F



BC-002F



BC-003F

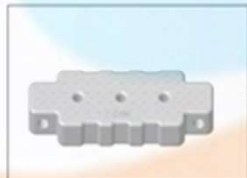
SUNLIGHT

## INNOVATION ADVANTAGES

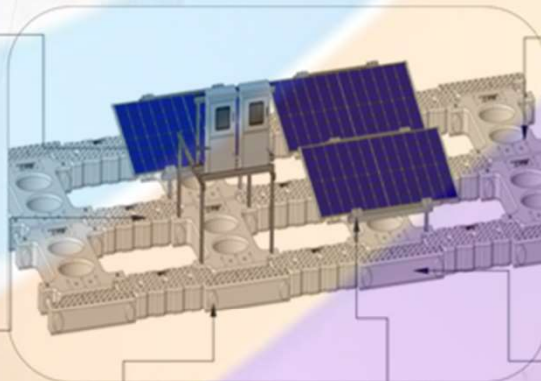
### BC-002F



Combiner box



Aisle floating body  
(L1380\*450\*180mm)  
Buoyancy: 750N



Main Floating body  
(L1496\*1220\*180mm)  
Buoyancy: 1600N



Edge-closing walkway  
(L1220\*285\*180mm)  
Buoyancy: 500N



Bolt kit  
(φ65\*630)



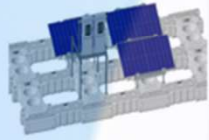
Clamp kit



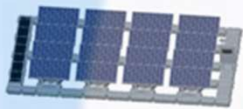
# I ROADMAP IN BOSCH



BC-001F



BC-002F



BC-003F

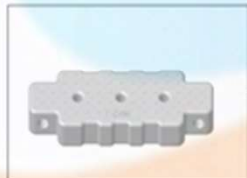
SUNLIGHT

## INNOVATION ADVANTAGES

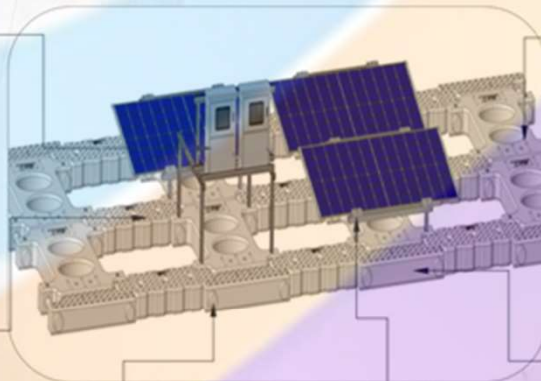
### BC-002F



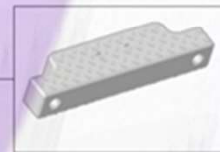
Combiner box



Aisle floating body  
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Buoyancy: 750N



Main Floating body  
(L1496\*1220\*180mm)  
Buoyancy: 1600N



Edge-closing walkway  
(L1220\*285\*180mm)  
Buoyancy: 500N



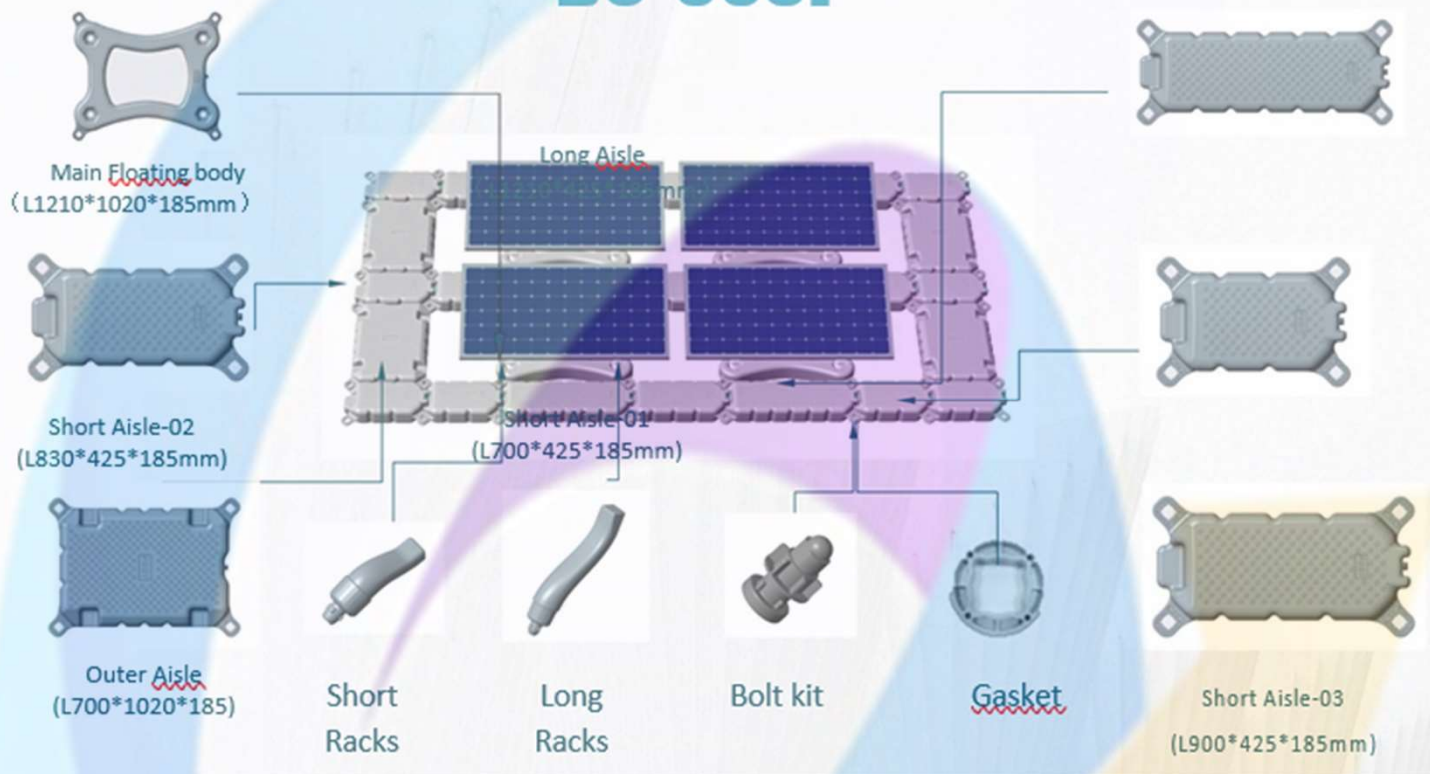
Bolt kit  
(φ65\*630)



Clamp kit



# BC-003F

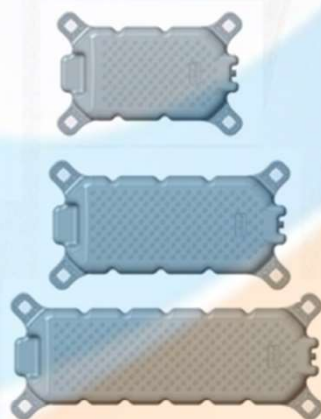


## Details of BC-003F



### Main Floating Body

Dimension : L1210\*1020mm  
 Façade Height : 185mm  
 Buoyancy : 1010N



### Aisles

Dimension: L700\*425\*185mm  
 L830\*425\*185mm  
 L900\*425\*185mm  
 Buoyancy : 650N



### Racks

Dimension :  
 Front Rack: L341\*W195\*H102mm  
 Rear Rack: L587\*W212\*H115mm

### Bolt

Dimension : DØ75\*H140mm  
 Connection diameter : D44.5mm

Dimension : DØ85\*H36mm  
 Connection thickness : 3.0-mm

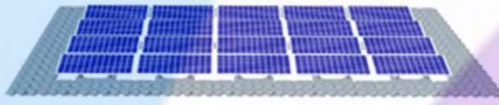


### Nut



# INNOVATION

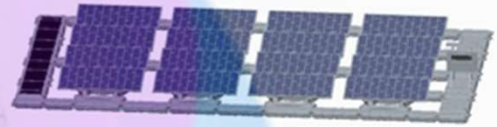
## BC-001F



- Modular Design, Easy to Assemble.
  - High adaptability. Meets the different layout requirements.
  - PV Module 300mm higher than water surface.
- The nozzle of the float be designed on 1/4~1/3 of the total height, and is protected by ultrasonic welding + rubber cover is adopted to reduce the risk of water leaking into the float.



## BC-003F



- Long and short aisle matching, meets the different length of PV modules.
- The spacing between two racks much wider, reduce the risk that the PV modules crashing.
- The crossover between the aisles reduces the force on the connecting lug and increases the surface strength of the float.
- Effectively optimize the control cost.

# HDPE

Item (acc. to standard for classification)	Specification
Base Specification: (Mix with base HDPE)	The floating material: HDPE Density (test acc. to ISO 1183.1): 0.946 g/cm <sup>3</sup> MFR, Condition 190 °C/ 5.00kg: 0.390 g/ 10 min
Mechanical Characteristics of Initial materials	Stress at break: 29.8 Mpa Elongation at break: 660 % Charpy impact properties: 82.0 KJ/m <sup>2</sup> Determination of flexural properties: 831 Mpa
Shore D Hardness:	63 IRHD
Flame Class:	HB
Liquid chemical species for test for the determination of the effects of immersions in liquid chemicals (Soak for 168h):	Mineral oil; Ethanol(97%); Sodium hydroxide saturated solution; 5% hydrochloric acid.
Environmental Stress-Cracking of Ethylene Plastics:	F <sub>50</sub> =1000
ROHS:	Technical Indicator (mg/kg): Cadmium (Cd) ≤ 100, Lead (Pb) ≤ 1000, Mercury (Hg) ≤ 1000, Hexavalent Chromium (Cr VI) ≤ 1000, Polybrominated biphenyls (PBBs) ≤ 1000, Sum of PBDEs ≤ 1000
Safety evaluation of equipment in drinking water system:	(Soak for 720h): Pass
Weather resistance test items:	Damp heat (85°C, 85%RH, 1500h) UV test, cumulative irradiation: 1600 kWh/m <sup>2</sup> acc. to IEC 61215:2005.
The oxidation induction time:	>200.0 min (Aging resistant HDPE) 155.58 min (Mix with base HDPE)
Glow-wire flammability Index:	850°C/3.0
Process type and technical data of Polymeric material used in Floating Body:	See "remark"
Remark:	The test material was mixed with aging resistant HDPE and base HDPE. Detailed formula information are as follows.

ZERTIFIKAT • CERTIFICATE • CERTIFICADO • CERTIFICAT • CERTIFICATE



### Verification of Conformity

**Holder:** Molelec Material Technology (Guangdong) Co., Ltd.  
100 Floor, 110 Shuang Road, Guangzhou 510020, P. R. China

**Product(s):** Polymeric material used in Floating Body (aging resistant HDPE)

**Type(s):** Floating PV 200

**Trademark:** Molelec

**Parameters:**  

Base Specification	Density (test acc. to ISO 1183.1): 0.946 g/cm <sup>3</sup>
(Mix with base HDPE)	MFR, Condition 190 °C/ 5.00kg: 0.390 g/ 10 min
Flame Class	HB
Weather resistance test items:	Damp heat (85°C, 85%RH, 1500h) UV test, cumulative irradiation: 1600 kWh/m <sup>2</sup> acc. to IEC 61215:2005

**Verification**  
**Report Number(s):** 73 407 18 228 01-00

**Tested according to:** IFF 90073A, 2018 only clause 1, 2, 3, 4 & 5.

The product was tested on a laboratory basis and complies with the essential requirements. This verification is for the exclusive use of our Client and is provided pursuant to the agreement between TUV SUD and its Client. TUV SUD assumes no liability to any party other than the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this verification. Only the Client is authorized to copy or distribute this Verification. The observations and test results addressed from this Verification are relevant only to the sample tested.

**Date:** 2019-05-13 (Peng ZHANG) 

Page 1 of 1

TUV SUD Product Service Dept. | Durlachstraße, | 70539 Wülfersheim | Germany | TUV



















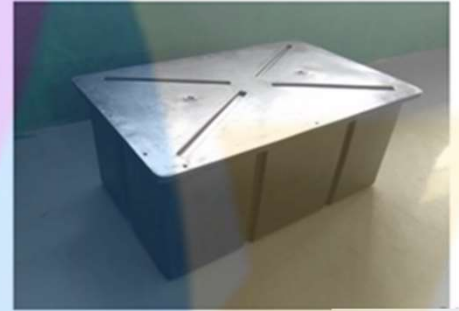
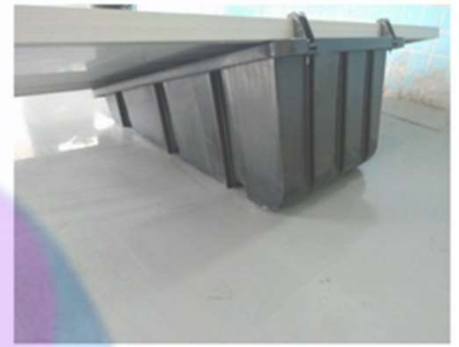

# OTHER PRODUCTS

Walkway float

Floating box

Floating cylinder

Rooftop



## Floating Solar System

1

### Floating Subsystem

Floating For PV Module, Walkway And Cable Route

Floating for Electrical And Control Equipment

2

### Mooring Subsystem

Mooring For PV Module, Walkway And Cable Route

Mooring For Electrical And Control Equipment

3

### Wiring Subsystem

LV AC / DC Cable Wiring

MV/ HV Cable Wiring

4

### Grounding Subsystem

Solar Array Grounding

Electrical And Control Equipment Grounding

5

### Substation Subsystem

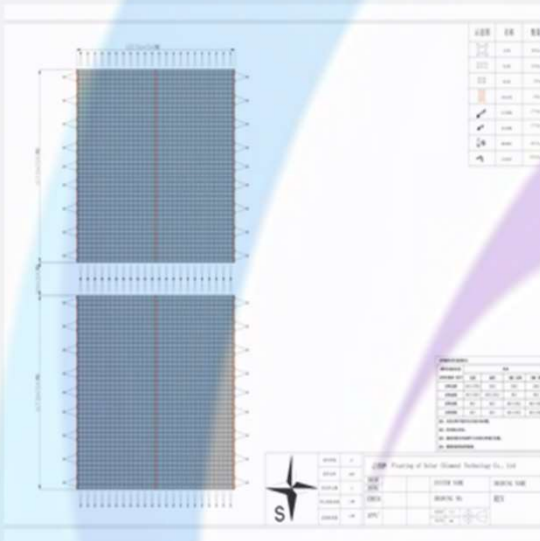
Central inverter float platform

String inverter



# Floating Solar System Design

## 3.6 MW Project Reference Design



No	Category	Parameter
1	Array Capacity	3.6MW
2	PV Module Specification	405WP, 27piece modules chained in to one line
3	PV Module Quantity	8856PCS
4	Pontoon	N/A
5	Equipment Stand	N/A

## DESIGN CONDITION

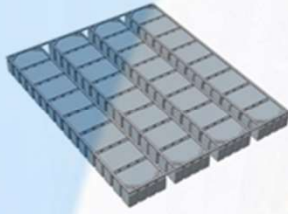
Waters Survey	Highest Water Level m	23		
	Lowest Water Level m	17.8		
	Averaged Water Level m	20.4		
=	Water Level Change	5.2	Water Level Change Frequency	
	Max Water level (Past 50 Years)		Max Water Flow Velocity m/s	1
Geological Condition	Max Wave Height m	0.2	Waters Condition	
	Sedimentation Height		Waters Topography	
Weather Condition	Max Wind Speed m/s	36.1	Max Snow Cover	
	Highest and Lowest Temperature °C		Annual Rainfall mm	

- 25 Year Life Time
- O & M
- Hydrologic and Sink Date
- Economic and Reliable
- Easy to Installation and Maintenance
- Adjustable to Water Level Fluctuation
- Suitable Grounding Equipment



# ELECTRICAL EQUIPMENT

## Floating box platform



For large water area and subsidence area

Floating box platform

Pre-formed concrete floating platform

## Pre-formed concrete floating platform



For large water area and subsidence area

- Bearing capacity

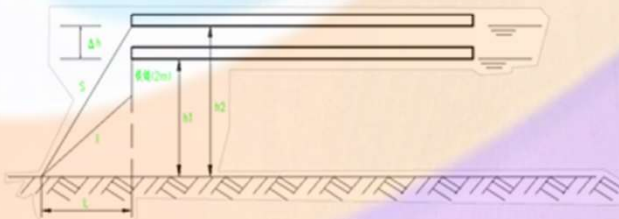
Overturning force

Anchorage connection force, etc.

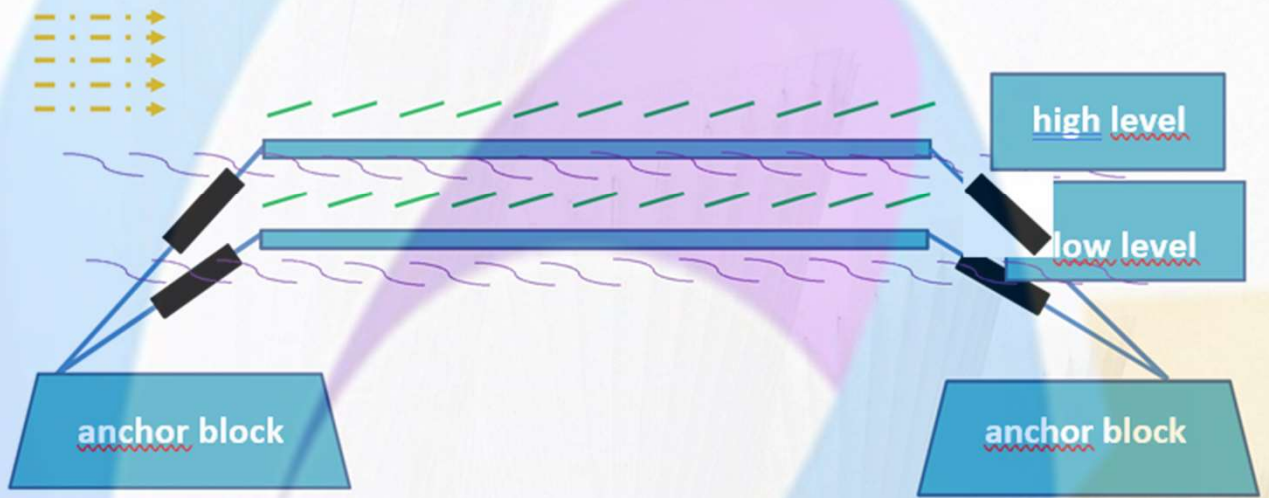


# MOORING SUBSYSTEM

- Extreme Historical water level within 50 years (m)
  - Capacity < 30MW, research water level in 30 years.
  - Capacity > 30MW, research water level in 50 years.
- Water level variation



# MOORING SUBSYSTEM



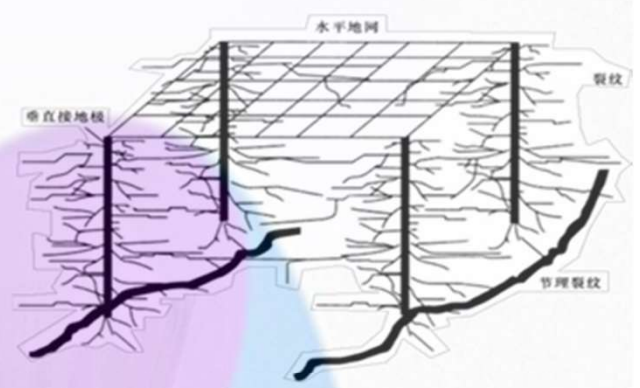
## WIRING SUBSYSTEM

Cable preferred to be fixed on the floats with cable tray

Water level fluctuation should be considered

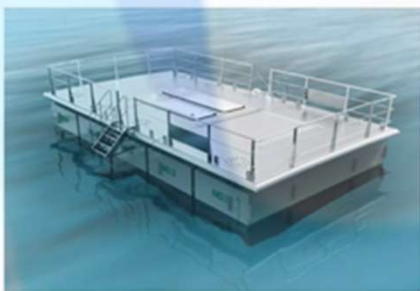
Reliable flame retardant measures





# GROUNDING SUBSYSTEM

- True ground and protective grounding in one grounding network
- Reliable grounding measures
- Anti corrosion measures for high temperature and high humidity



Central inverter float platform

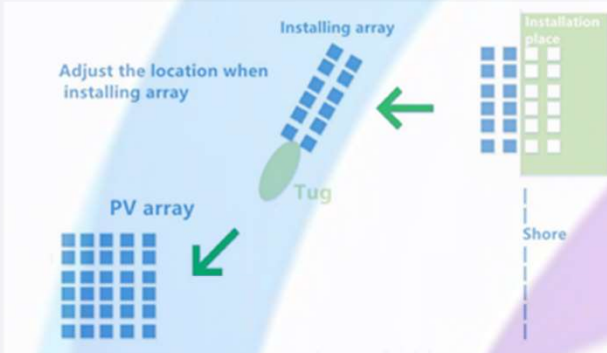


String inverter

- PI D protec tion
- RC D protec tion
- Cut- off switch
- High reliability
- A nti elec tric al sh oc k d esig n and measures
- Suitable for high temperature, high humidity, even salt mist condition

# INVERTER EQUIPMENT





# Floating Solar system Installation



LAYOUT



## FLOATING



6KW floating system + 1MW ground system in Thailand



40MW floating system in Shandong, China

## ROOFTOP



148KW roof system in Hongkong



3MW roof system in Australia



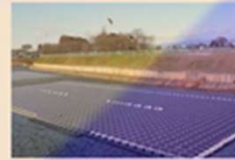
5MW floating solar farm in Shandong China



20MW floating solar farm in Anhui China



4.2MW floating solar farm in Shandong China



1MW floating solar farm in Saitama, Japan



800KW rooftop solar farm in China



1.48KW floating solar farm on waste pond in Jiangsu China

