earthing of one secondary circuit shall be removed without disturbing the earthing of other circuit.

3.24 All hinged doors having potential carrying equipment mounted on it shall be earthed by flexible wire/ braid. For doors not having potential carrying equipment mounted on it, earth continuity through scraping hinges/ hinge pins of proven design may also acceptable. The Contractor shall establish earth continuity at site also.

3.25 All switchboards shall be supplied completely wired internally upto the terminals, ready to receive external cables.

3.26 All auxiliary wiring shall be carried out with 650V grade, single core stranded copper conductor, colour coded, PVC insulated wires. Conductor size shall be 1.5 mm2 (min.) for control circuit wiring and 2.5 mm2 (min) for CT and space heater circuits.

3.27 Extra flexible wires shall be used for wiring to devices mounted on moving parts such as hinged doors. The wire bunches from the panel inside to the doors shall be properly sleeved or taped.

3.28 All wiring shall be properly supported, neatly arranged, readily accessible and securely connected to equipment terminals and terminal blocks.

3.29 All internal wiring terminations shall be made with solderless crimping type tinned copper lugs which shall firmly grip the conductor or an equally secure method. Similar lugs shall also be provided at both ends of component to component wiring. Insulating sleeves shall be provided over the exposed parts of lugs to the extent possible. Screw-less (spring loaded) / cage clamp type terminal shall also be provided with lugs.

3.30 Printed single tube ferrules marked to correspond with panel wiring diagram shall be fitted at both ends of each wire. The wire identification marking shall be in accordance with IS: 375. Red Ferrules should be provided on trip circuit wiring.

3.31 Cable termination arrangement for power cables shall be suitable for heavy duty, 1.1 kV grade, stranded aluminium conductor, PVC/ XLPE insulated, armoured / unarmoured and PVC sheathed cables. All necessary cable terminating accessories such as supporting clamps and brackets, hardware etc., shall be provided by the contractor, to suit the final cable sizes.

3.32 All power cable terminals shall be of stud type and the power cable lugs shall be of tinned copper solderless crimping ring type conforming to IS: 8309. All lugs shall be insulated/ sleeved.

3.33 All Switchgears, MCCs, Distribution Boards, Fuse boards, all feeders, local push-button stations etc. shall be provided with prominent, engraved identification plates.

3.34 All name plates shall be of non-rusting metal or 3-ply Lamicoid, with white engraved lettering on black background. Inscription & lettering sizes shall be subject to Employer's approval.

3.35 Caution name plate "Caution Live Terminals" shall be provided at all points where the terminals are likely to remain live and isolation is possible only at remote end.

3.36 The gaskets, wherever specified, shall be of good quality EPDM / neoprene with good ageing, compression and oil resistance characteristics suitable for panel applications.

3.37 The bidder shall, ensure that the equipment offered will carry the required load current at site ambient conditions specified and perform the operating duties without exceeding the permissible temperature as per indian standards / specification. Continuous current rating at 50 deg C ambient in no case shall be less than 90% of the normal rating specified.

3.38 ON/OFF status and protection trip status of incomers and bus coupler (if available) be provided for SCADA system.

3.39 Suitable changeover and interlocking arrangement shall be provided for incomers and bus coupler.

3.40 It shall be the responsibility of the contractor to fully coordinate the overload and short circuit breakers/fuses with the upstream and downstream circuit breakers / fuses, to provide satisfactory discrimination. Further the various equipment supplied shall meet the requirements of type ii class of co-ordination as per IS: 8544.

3.41 All sheet steel work shall be pretreated, in tanks, in accordance with is: 6005. Degreasing shall be done by alkaline cleaning. Rust and scales shall be removed by pickling with acid. After pickling, the parts shall be washed in running water. Then these shall be rinsed in slightly alkaline hot water and dried. The phosphate coating shall be "class-c" as specified in is: 6005. The phosphated surfaces shall be rinsed and passivated. After passivation, electrostatic powder coating shall be used. Powder should meet requirements of is 13871 (powder costing specification). Finishing paint shade for complete panels excluding end covers shall be RAL9002 & RAL5012 for extreme end covers of all boards, unless required otherwise by the employer. The paint thickness shall not be less than 50 microns.

4.0 MCCB

a. MCCB shall be fixed type module, air break type, having trip free mechanism with quick make and quick break type contacts. MCCB shall have current limiting feature. MCCB of identical ratings shall be physically and electrically interchangeable. MCCB shall be provided with 1 NO and 1NC auxiliary contacts.

b. MCCB shall have inbuilt front adjustable releases (overload & short circuit) and shall have adjustable earth fault protection unit also. The protection settings shall have suitable range to achieve the required time & current settings. LED indications shall also be provided for faults, MCCB status (on/off etc).

C. MCCB terminals shall be shrouded and designed to receive cable lugs for cable sizes relevant to circuit rating. Extended cable terminal arrangement for higher size cable may also be offered. ON and OFF position of the operating handle of MCCB shall be displayed and the rotary operating handle shall be mounted on the door of the compartment housing MCCB. The compartment door shall be interlocked mechanically with the MCCB, such that the door can not be opened unless the MCCB is in OFF position. Means shall be provided for defeating this interlock at any time. MCCB shall be provided with padlocking facility to enable the operating mechanism to be padlocked. The MCCBs being offered shall have common/interchangeable accessories for all ratings like aux. switch, shunt trip, alarm switch etc. The MCCBs shall have the current discrimination up to full short circuit capacity and shall be selected as per manufacturer's discrimination table.

5.0 FUSES

5.1 All fuses shall be of HRC cartridge fuse link type. Screw type fuses shall not be accepted. Fuses for AC circuits shall be rated for 80kA rms (prospective) breaking capacity at 415V AC and for DC circuits, 20kA rms breaking capacity at 240V DC.

5.2 Fuse shall have visible operation indicators. Insulating barriers shall be provided between individual power fuses.

5.3 Fuse shall be mounted on insulated fuse carriers, which are mounted on fuse bases. Wherever it is not possible to mount fuses on carriers, fuses shall be directly mounted on plug-in type of bases. In such cases one set of insulated fuse pulling handles shall be supplied with each switchboard.

5.4 The Neutral links shall be mounted on fuse carriers which shall be mounted on fuse bases.

6.0 INDOOR LT SWITCHGEAR FOR STRING INVERTER

In addition to the above clauses (relevant), the following shall also be applicable for switchgear ratings more than 400A

6.1 All switchboards shall be divided into distinct vertical sections (panels), each comprising of the following compartments

(a) BUSBAR COMPARTMENT:- A completely enclosed bus bar compartment shall be provided for the horizontal and vertical busbars. Bolted covers shall be provided for access to horizontal and vertical busbars and all joints for repair and maintenance, which shall be feasible without disturbing any feeder compartment. Auxiliary and power busbars shall be in separate compartments.

(b) SWITCHGEAR / FEEDER COMPARTMENT:- All equipment associated with an feeder of rating above 400A shall be housed in a

separate compartment of the vertical section. ACB shall be provided for feeders of rating 1000A and above. The design of the vertical section for such an arrangement shall ensure ease of termination of power cables of size & quantity as per system requirement. The compartment shall be sheet steel enclosed on all sides with the withdrawable units in position or removed. Insulating sheet at rear of the compartment is also acceptable. The front of the compartment shall be provided with the hinged single leaf door with captive screws for positive closure.

CABLE COMPARTMENT/CABLE ALLEY:- A full-height vertical cable alley of minimum 250mm width shall be provided for power and control cables. Cable alley shall have no exposed live parts and shall have no communication with busbar compartment. Cable terminations located in cable alley of capacity more than 400 A shall be designed to meet the Form IVb and for less than 400A A shall be designed to meet the Form 3b (as per IEC 61439) for safety purpose. Wherever cable alleys are not provided for distribution boards, segregated cable boxes for individual feeders shall be provided at the rear for direct termination of cables. For circuit breaker external cable connections, a separately enclosed cable compartment shall also be acceptable. The contractor shall furnish suitable plugs to cover the cable openings in the partition between feeder compartment and cable alley. Cable alley door shall be hinged.

(d) CONTROL COMPARTMENT:- A separate compartment shall be provided for relays and other control devices associated with a circuit breaker.

6.2 All switchboards shall be of dust-proof and vermin-proof construction and shall be provided with a degree of protection of IP: 5X as per IS/IEC 60947. However, the busbar chambers having a degree of protection of IP: 42 are also acceptable where continuous busbar rating is 1600A and above. Provision shall be made in all compartments for providing IP: 5X degree of protection, when circuit - breaker or module trolley has been removed. All cutouts shall be provided with EPDM / Neoprene gaskets.

6.3 Provision of louvers on switchboards would not be preferred. However, louvers backed with metal screen are acceptable on the busbar chambers where continuous busbar rating is 1600 A and above.

6.4 Sheet steel barriers shall be provided between two adjacent vertical panels running to the full height of the switchboard, except for the horizontal busbar compartment. EPDM / Neoprene gasket shall be provided between the panel sections to avoid ingress of dust into panels.

6.5 The minimum clearance in air between phases and between phases and earth for the entire busbars. and bus-link connections at circuit-breaker shall be 25mm. All busbars and jumper connections shall be of high conductivity aluminum alloy / copper of adequate size.

6.6 After isolation of power and control circuit connections it shall be possible to safely carryout maintenance in a compartment with the busbar and adjacent circuit live. Necessary shrouding arrangement shall be provided for this purpose. Wherever two breaker compartments are provided in the same vertical section insulating barriers and shrouds shall be provided in the rear cable compartment to avoid accidental touch with the live parts of one circuit when working on the other circuit.

6.7 All switchgear (circuit-breaker) panels shall be of single-front type. The covers shall be provided with "DANGER" labels. All panel doors shall open by 90 deg or more.

6.8 All circuit-breaker modules shall be of fully draw out type having distinct 'Service' and 'Test' positions. Suitable arrangement with cradle / rollers, guides along with tool / lever operated racking in / out mechanism shall be provided for smooth and effortless movement of the chassis.

6.9 All switchboards shall be provided with three phase and neutral busbars. Two separate sets of vertical busbars shall be provided in each panel of double front DBs. Interleaving arrangement for busbars shall be adopted for switchboards with a rating of more than 1600A. Entire busbar system shall be insulated with PVC sleeves. Busbar sleeves shall be compliant to UL224 (Extruded insulating tubing), CE/UL certified, having fire retardant properties and working temperature of 105°C.

6.10 ON and OFF position of the operating handle of MCCB shall be displayed and the rotary operating handle shall be mounted on the door of the compartment housing MCCB. The compartment door shall be interlocked mechanically with the MCCB, such that the door cannot be opened unless the MCCB is in OFF position. Means shall be provided for defeating this interlock at any time. MCCB shall be provided with padlocking facility to enable the operating mechanism to be padlocked.

6.11 The module identification plate shall clearly give the feeder number and feeder designation. For single front switchboards, similar panel and board identification labels shall be provided at the rear switchgear also.

6.12 Temperature raise test of LT switchgear of rating more than 400A:- The temperature rise of the horizontal and vertical busbars and main bus links including all power draw out contacts when carrying 90% of the rated current along the full run shall in no case exceed 55 deg C with silver plated joints and 40 deg C with all other types of joints over an outside ambient temperature of 50 deg C. The temperature rise of the accessible parts/external enclosures expected to be touched in normal operation shall not exceed 20deg. C. The temperature rise of manual operating means shall not exceed 10deg. C for metallic & 15 deg. C for insulating material. Temperature rise for the busbars shall be carried out at 90% of the rated current.

6.13 The carriage and breaker frame shall get earthed while being inserted in the panel and positive earthing of the breaker frame shall be maintained in all positions, i.e. SERVICE & ISOLATED, as well as throughout the intermediate travel.

6.14 Electrically controlled circuit breaker boards shall be provided with DC control supply.

7.0 CIRCUIT BREAKERS

7.1 Circuit breakers shall be three pole, air break, horizontal draw out type, and shall have fault making and breaking capacities as specified in "Technical Parameters". The circuit breakers which meet specified.parameters of continuous current rating and fault making / breaking capacity only after provision of cooling fans or special device shall not be acceptable.

7.2 Circuit breakers along with its operating mechanism shall be provided with suitable arrangement for easy withdrawal. Suitable guides shall be provided to minimize misalignment of the breaker.

7.3 There shall be "SERVICE", "TEST" and "FULLY WITHDRAWN" positions for the breakers. In "Test" position the circuit breaker shall be capable of being tested for operation without energising the power circuits i.e. the power contacts shall be disconnected, while the control circuits shall remain undisturbed. Locking facilities shall be provided so as to prevent movement of the circuit breaker from the "SERVICE", "TEST" or "FULLLY WITHDRAWN" position. Circuit Breaker rack-in and rack-out from Service to Test, Test to Isolated position, or vice-versa shall be possible only in the compartment door closed condition.

7.4 Separate limit switches, each having required numbers of contacts shall be provided in both "SERVICE" and "TEST" position of the breaker. All contacts shall be rated for making, continuously carrying and breaking 10 Amp at 240 V AC and 1 Amp (Inductive) at 240 V DC respectively.

7.5 Suitable mechanical indications shall be provided on all circuit breakers to show "OPEN", "CLOSE", "SERVICE ", "TEST" AND "SPRING CHARGED" positions.

7.6 Main poles of the circuit breakers shall operate simultaneously in such a way that the maximum difference between the instants of contacts touching during closing shall not exceed half a cycle of rated frequency.

7.7 Movement of a circuit breaker between "SERVICE" and "TEST" position shall not be possible unless it is in open position. Attempted withdrawal of a closed circuit breaker shall preferably not trip the circuit breaker. In case the offered circuit breaker trips on attempted withdrawal as a standard interlock, it shall be ensured that sufficient contact exists between the fixed and drawout contact at the time of breaker trip so that no arcing takes place even with the breaker carrying its full rated current.

7.8 Closing of a circuit breaker shall not be possible unless it is in "SERVICE" position, "TEST" position or in "FULLY WITHDRAWN" position.

7.9 Circuit-breaker cubicles shall be provided with safety shutters operated automatically by the movement of the circuit breaker carriage, to cover the stationary isolated contacts when the breaker is withdrawn. It shall however be possible to open the shutters intentionally against pressure for testing purposes.

7.10 Breaker of particular rating shall be prevented from insertion in a cubicle of a different rating.

7.11 Circuit breakers shall be provided with coded key / electrical interlocking devices, as per requirements.

7.12 Circuit breaker shall be provided with anti-pumping feature and trip free feature, even if mechanical anti-pumping feature is provided.

7.13 Mechanical tripping shall be possible by means of front mounted Red "trip" push-button. In case of electrically operated breakers these push buttons shall be shrouded to prevent accidental operation.

7.14 Complete shrouding / segregation shall be provided between incoming and outgoing bus links of breakers. In case of bus coupler breaker panels the busbar connection to and from the breaker terminals shall be segregated such that each connection can be approached and maintained independently with the other bus section live. Dummy panels if required to achieve the above feature shall be included in the Bidder's scope of supply.

7.15 Circuit breaker open/close shall be possible from SCADA and open/close status and all other important signal status shall be provided for SCADA monitoring.

7.16 Power operated mechanism shall be provided with a Universal motor suitable for operation on DC Control supply. In case of DC supply motor should satisfactorily operate with voltage variation between 85% to 110% nominal control supply voltage. Motor insulation shall be class "E" or better.

7.17 The motor shall be such that it requires not more than 30 Seconds for fully charging the closing spring at minimum available control voltage.

7.18 Once the closing springs are discharged, after one closing operation of circuit breaker, it shall automatically initiate recharging of the spring.

7.19 The mechanism shall be such that as long as power is available to the motor, a continuous sequence of closing and opening operations shall be possible. After failure of power supply at least one open-close-open operation shall be possible.

7.20 Provision shall be made for emergency manual charging and as soon as this manual charging handle is coupled, the motor shall automatically get mechanically decoupled.

7.21 All circuit breakers shall be provided with closing and trip coils. The closing coil shall operate correctly at all values of voltage between 85% to 110% nominal control supply voltage. The trip coil shall operate satisfactorily at all values of voltage between 70% to 110% nominal control supply voltage.

7.22 Provision for mechanical closing of the breaker only in "Test" and "WITHDRAWN" positions shall be made. Alternately, the mechanical closing facility shall be normally made inaccessible; accessibility being rendered only after deliberate removal of shrouds.

7.23 The ACB Panel door shall not be possible to open in breaker closed condition. Further, the racking mechanism shall be accessible only after opening the breaker panel door.

7.24 Telescopic trolley or suitable arrangement shall be provided for maintenance of circuit-breaker module in a cubicle at each location. The trolley shall be such that the top most breaker module can be withdrawn on the trolley and can be lowered for maintenance purpose. The telescopic trolley shall be such that all type, size and rating of breaker can be withdrawn /inserted of particular switchgear.

7.25 Electrical Parameter of Circuit Breaker

1)	Type	Air break spring charged stored energy type
2)	Operating duty	O-3 MIN-OC-3 MIN-OC
3)	Symmetrical interrupting	As per system fault current (for one sec)
4)	Short circuit rating	2.1 times of System fault current (peak)
5)	Short Circuit Breaking current	
	a) AC Component	As per system fault current (for one sec)
	b) DC Component	As per IS:13947
6)	Short time withstand	As per system fault current

8.0 AC JUNCTION BOXES (for use with string inverters)

8.1 Separate AC Junction box shall be used for string inverters AC output connection. Protection class for AC junction box shall be IP 54 or better protection. All components of junction box shall be suitable for rated output

voltage (with + 10% variation) of string inverter, grid frequency of 50 Hz +/- 5%, ambient temperature 50 deg. C and system fault current for 1 sec.

8.2 AC junction box shall be of metal enclosed type. All frames and load bearing members shall be fabricated using suitable mild steel structural sections or pressed and shaped cold-rolled sheet steel of thickness 2.0 mm. Frames shall be enclosed in cold-rolled sheet steel of thickness 1.6 mm. Doors and covers shall also be of cold rolled sheet steel of thickness 1.6 mm. Stiffeners shall be provided wherever necessary. The gland plate thickness shall be 3.0 mm for hot / cold-rolled sheet steel and 4.0 mm for non-magnetic material. The minimum clearance in air between phases and between phases and earth shall be at least twenty five (25) mm throughout. Wherever it is not possible to maintain these clearances, insulation shall be provided by sleeving or barriers.

8.3 All power cable terminals shall be of stud type and the power cable lugs shall be of tinned copper solderless crimping ring type conforming to IS: 8309. All lugs shall be insulated/ sleeved.

8.4 EPDM / Neoprene gasket shall be used to prevent ingress of dust into panels.

8.5 All non-current carrying metal work of the junction box shall be effectively connected to the system earth bus.

8.6 Finishing paint shade for complete panels excluding end covers shall be RAL9002 & RAL5012 for extreme end covers of all boards, unless required otherwise by the Employer. The paint thickness shall not be less than 50 microns.

9.0 TEMPERATURE-RISE (For LT Switch-gear having capacity more than 400A)

The temperature rise of the horizontal and vertical busbars and main bus links including all power draw out contacts when carrying 90% of the rated current along the full run shall in no case exceed 55 deg C with silver plated joints and 40 deg C with all other types of joints over an outside ambient temperature of 50 deg C. The temperature rise of the accessible parts/external enclosures expected to be touched in normal operation shall not exceed 20deg. C. The temperature rise of manual operating means shall not exceed 10deg. C for metallic & 15 deg. C for insulating material. Temperature rise for the busbars shall be carried out at 90% of the rated current.

10.0 DERATING OF COMPONENTS

The Bidder shall, ensure that the equipment offered will carry the required load current at site ambient conditions specified and perform the operating duties without exceeding the permissible temperature as per Indian Standards / Specification. Continuous current rating at 50 deg C ambient in no case shall be less than 90% of the normal rating specified.

The Bidder shall indicate clearly the derating factors if any employed for each component and furnish the basis for arriving at these derating factors duly considering the specified current ratings and amb. Temperature of 50 deg C.

Purshotam Profiles Private Limited

CONFIDENTIAL

Installation Manual

Contents

Site preparatory works

Project implementation begins with site preparation, when the EPC contractor starts building access roads for equipment delivery, clears the site, and removes objects that might impede construction. Usually all the activities related to site clearance, landfill, evacuation, and debris removal is done during this phase. In addition, the EPC contractor establishes site security and a security office and erects fencing and gates

Delivery of materials and storage

Floats can be unpacked and stored at the launching site with a sufficiently large staging area. Electrical equipment like inverters, LV switchboards, and transformers should be stored indoors or under a canopy to protect them from dust or rain until their deployment.

Preparation of launching area

Before construction begins, identify a suitable launching area by the water body with a gentle slope. This important supporting infrastructure is where the floating structure is assembled and launched. In general, working on land is easier than assembling the components directly on water. The launching area always needs some preparation. A launch ramp can be constructed on the bank's natural slope into the water body. This temporary infrastructure could be built with metal or wooden scaffolding and slats at minimal investment. Although not mandatory in all cases, a launch ramp can ease deployment efforts and reduce float damages; hence, it is highly recommended. Workers can gently push the assembled floats into the water, so lifting machinery is not necessary.

Assembly of floating structures

Once the materials are delivered onsite, the assembly work of the floating structure commences. Assembly is usually done as smaller single blocks of floating units. Single units are assembled first by multiple teams of workers. The construction varies depending on the floating structure design.

The following steps are carried out for the construction of a single block of floating units:

- Layup of floating component
- Assembly of floats together and interconnection of floats, where relevant
- Assembly of module support structures
- Installation of modules Once assembled, the single units are linked together
- Connection of wires to the modules and ready for connection with combiner box
- **After a few units are linked, the entire row is pushed**

Subsequent rows are built and launched until the floating island is completed

The next steps of construction could be outlined as:

- Interconnection of single units/block to a larger row
- Electrical interconnection as per the design
- Launching or sliding into water
- Towing to designated position
- Mooring and anchoring Upon completion, the entire FPV island is towed to its final location by motor boat The system is ready for mooring and anchoring.

Safety considerations

▲ Workers should undergo Mandatory Basic Safety Training for land-based construction work

▲ Job specific safety training and regular refresher training should be provided to workers to enhance/maintain their safety awareness of potential hazards associated with work over water/near water, including those during inclement weather.

▲ Specific safety training should be provided to workers on the use and checking procedures of life jackets, and rescue arrangements for persons who fell into water.

▲ Supervisors/workers should be trained on emergency and evacuation procedures, including the conduct of regular drills, in respect of work over water/near water.

Assembly View

Below is a reference picture of a small floating array. The image highlights the various floats that are combined together to form the floating structure. This installation manual guides the user step by step on how to connect the different floating pontoons to form a bigger array.

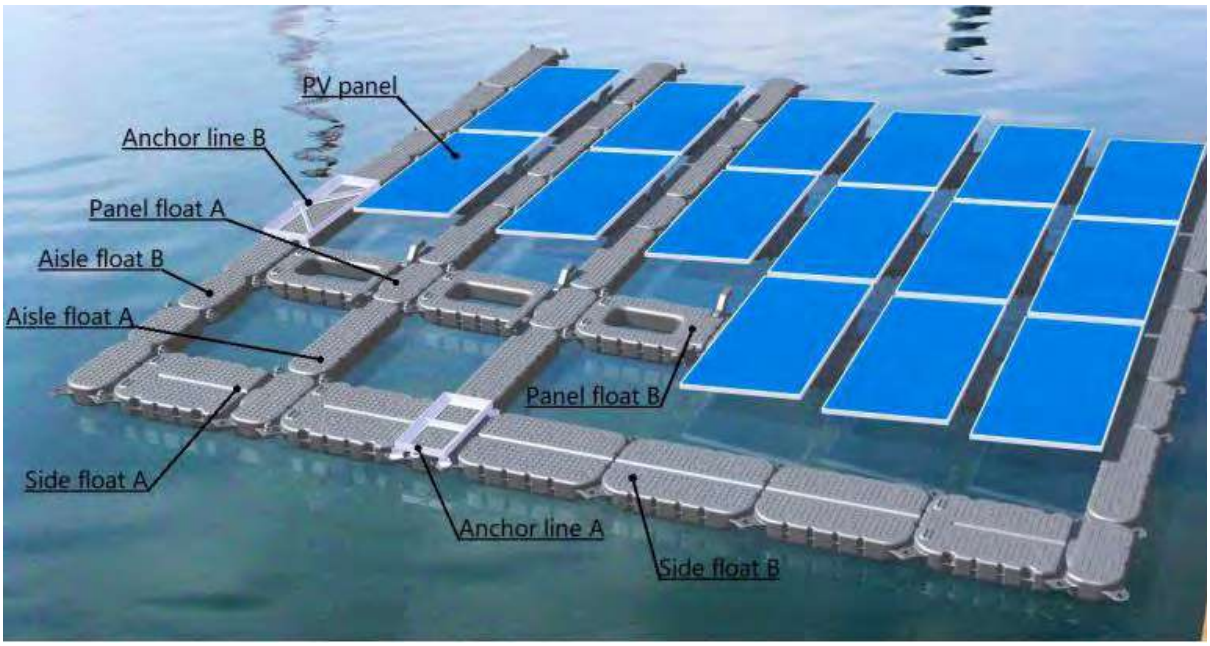


Image 1 : Source: Prabh Dayal Om Parkash Infra Ltd

2) Detailed Specification of Floats

The table below depicts the different type of floats and accessories. These components when joined together form an array (Refer to Image 1). The table highlights the dimensions and material of every item

II. Product information

NO.	PIC	ITEM	Material	Dimension (mm)	unit
1		Aisle Float A	HDPE	1420×520×184	Pcs
2		Aisle Float B	HDPE	1520×520×184	Pcs
3		Side Float A	HDPE	1570×870×200	Pcs
4		Side Float B	HDPE	1270×870×200	Pcs
5		Panel Float A	HDPE	1570×870×200	Pcs
6		panel Float B	HDPE	1270×870×200	Pcs
7		Support Float	HDPE	365×232×70	Pcs
8		Conneting Screw	HDPE	¢75×120	Pcs
9		Nuts	PE	¢78×38	Pcs
10		anchorline A	Q235b+HDG	950×520×150	Set
11		anchorline B	Q235b+HDG	1400×580×150	Set

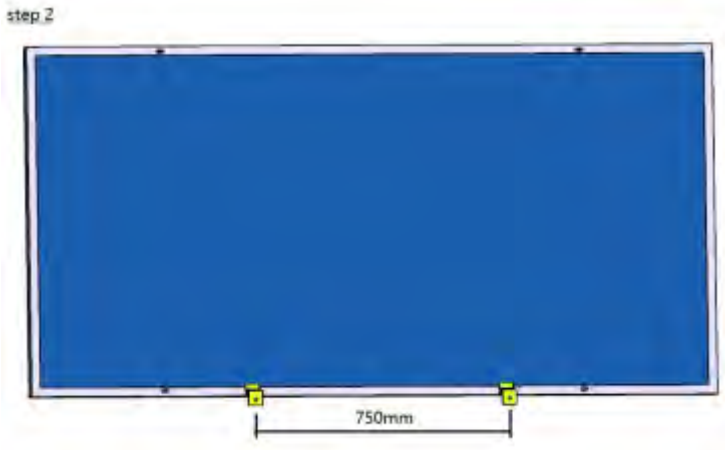
3) Installation Steps

The installation of the floating pontoons requires ample space and a clear area. Please refer to the preparation of launch area and site preparatory work. Before beginning installation, the contractor should ensure they have a spacious area more than 2000m2 for assembly near the site.

Please follow the steps below for installation

Step 1) Place the photovoltaic module on a flat surface

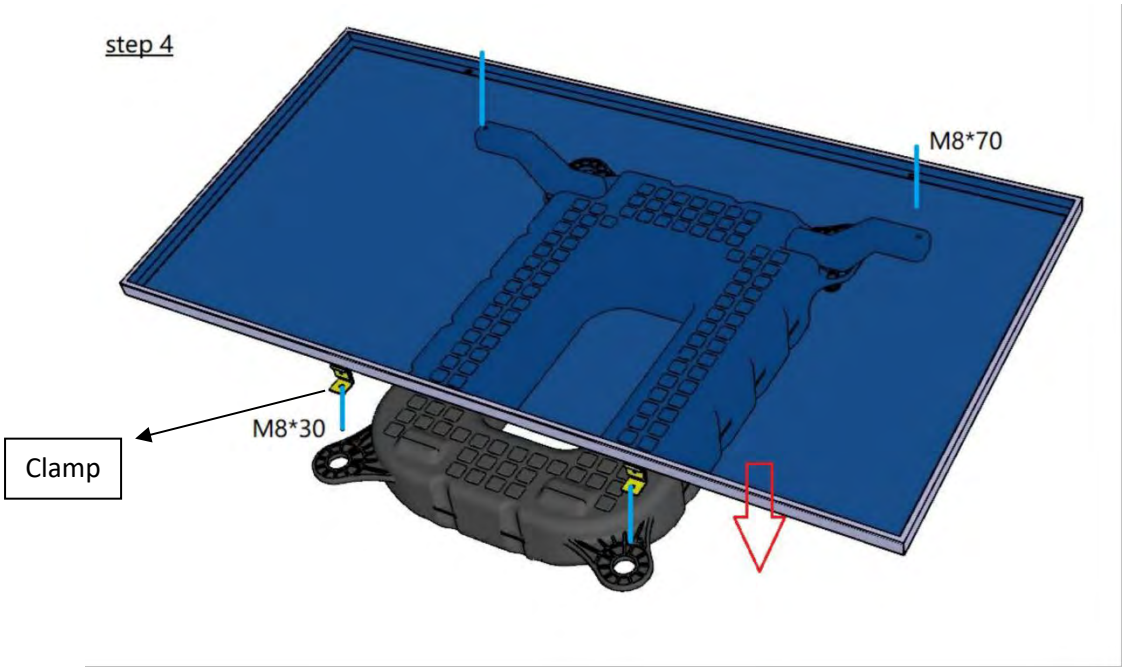
Step 2) Install two clamp（with SS screw) at specific position keeping distance of 750mm on the back face of the panel



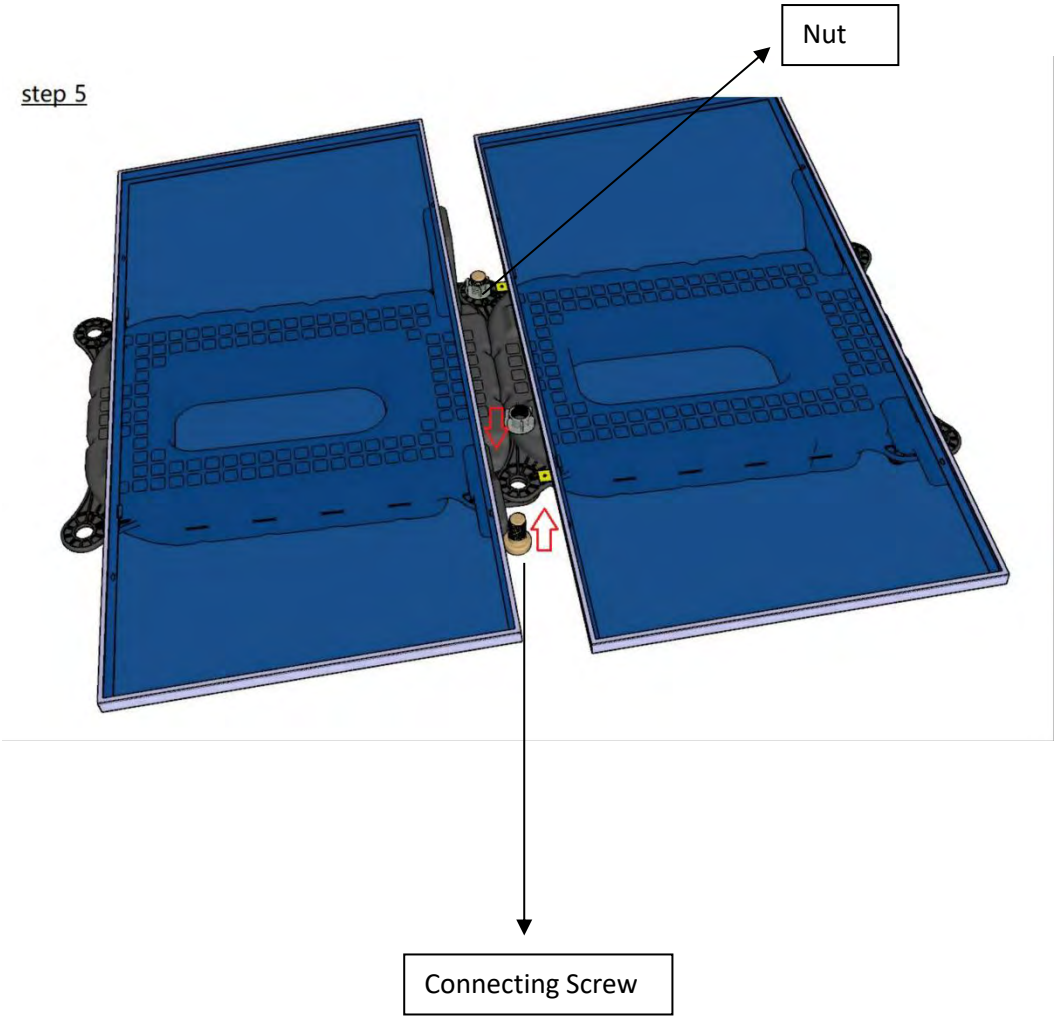
Step 3) Connect a Support float on panel float B on each side and Fasten Nuts under lugs

Refer to the image below

Step 4) Lift the photovoltaic module and place it on panel float B such that they perfectly align together on all fours points， next screw the module with stainless steel screw M8

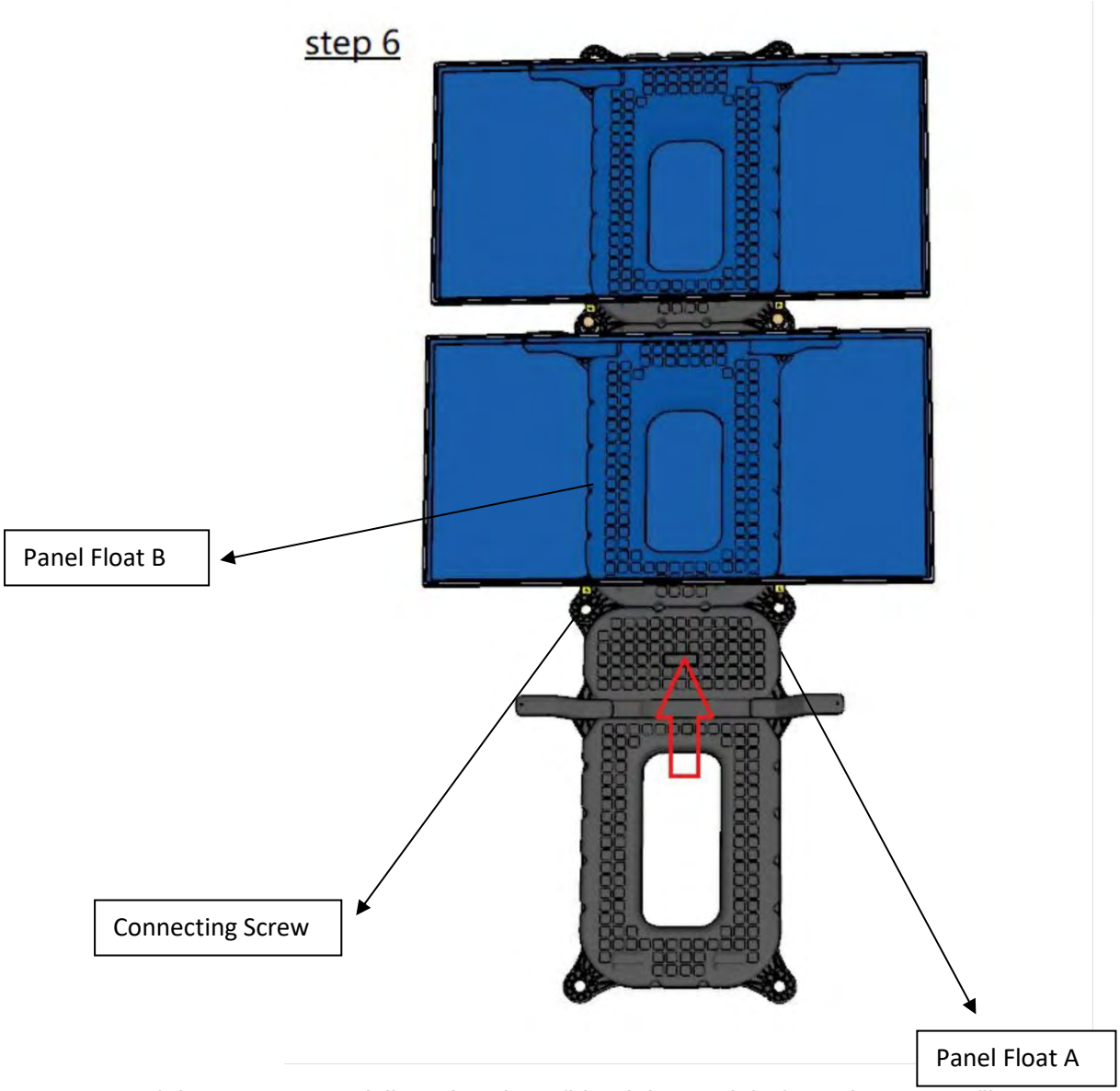


Step 5) Repeat the process to mount another module on panel float B and then using the connecting screw and nuts, join two panel float B on land

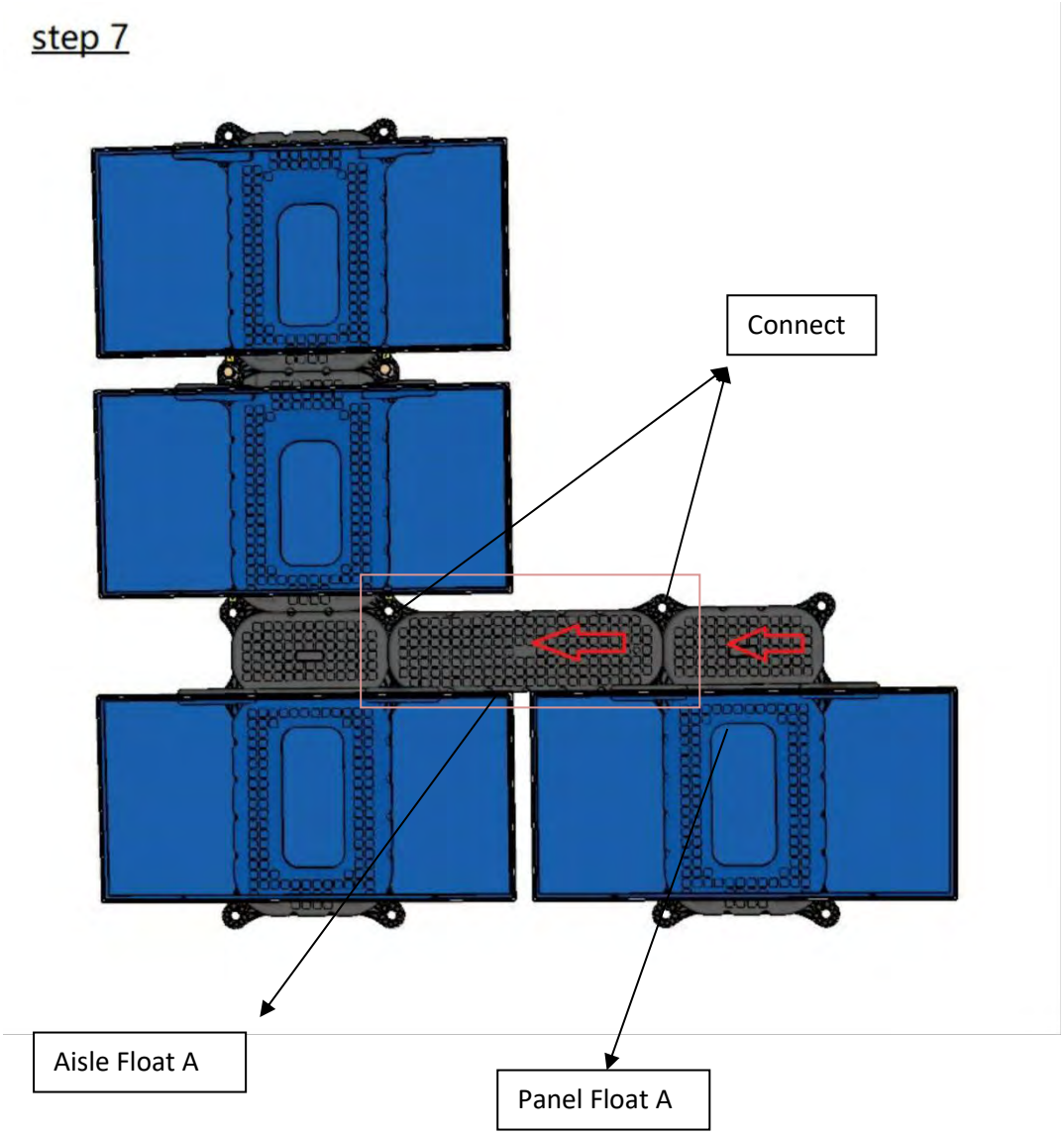


Step 6) Now, follow step 1-3 and mount a photovoltaic module on panel float A

After mounting a module on panel float A, connect panel float A to panel float B as below

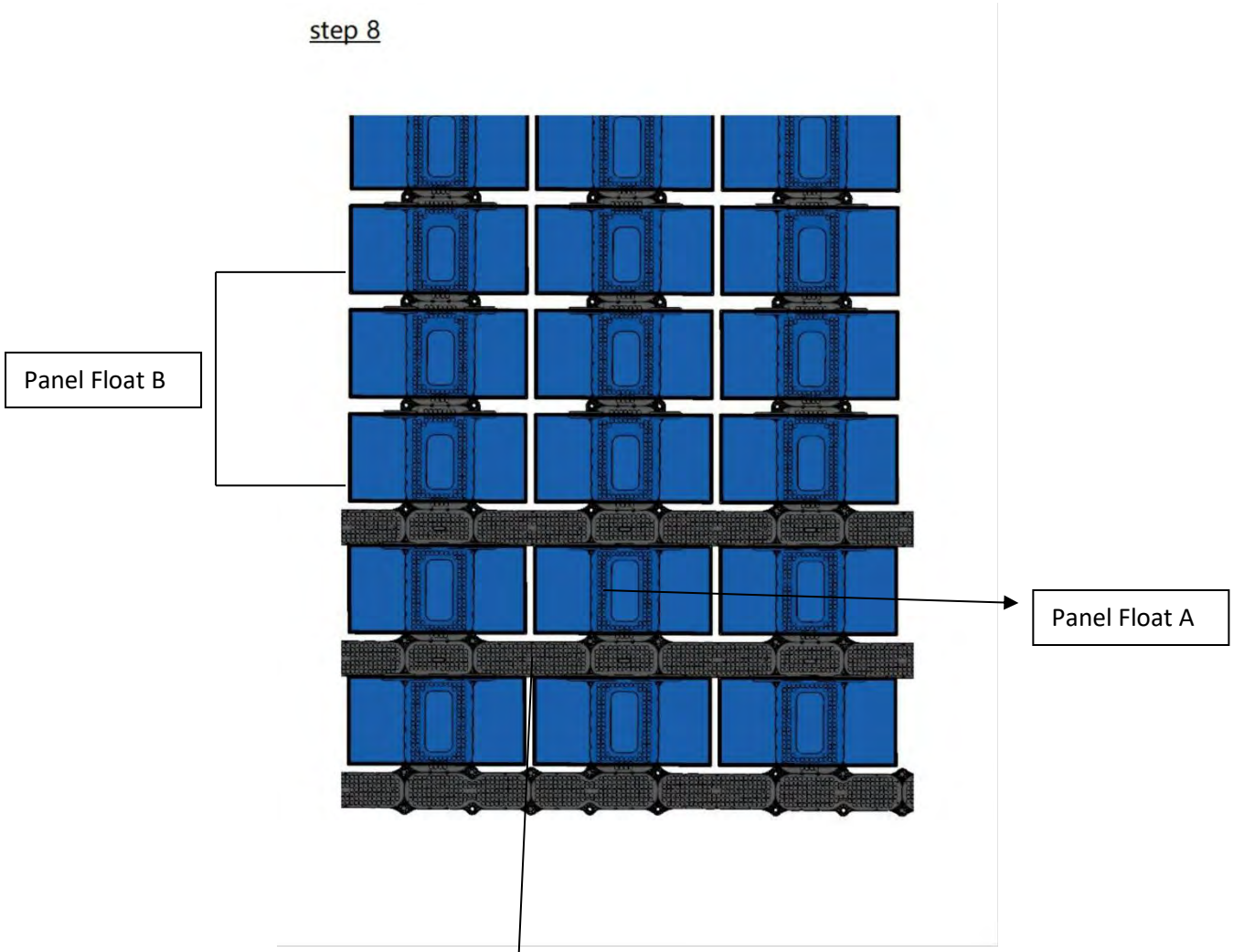


Step 7) After connecting Panel Float A with Panel Float B, Connect an Aisle Float A between two Panel Float A

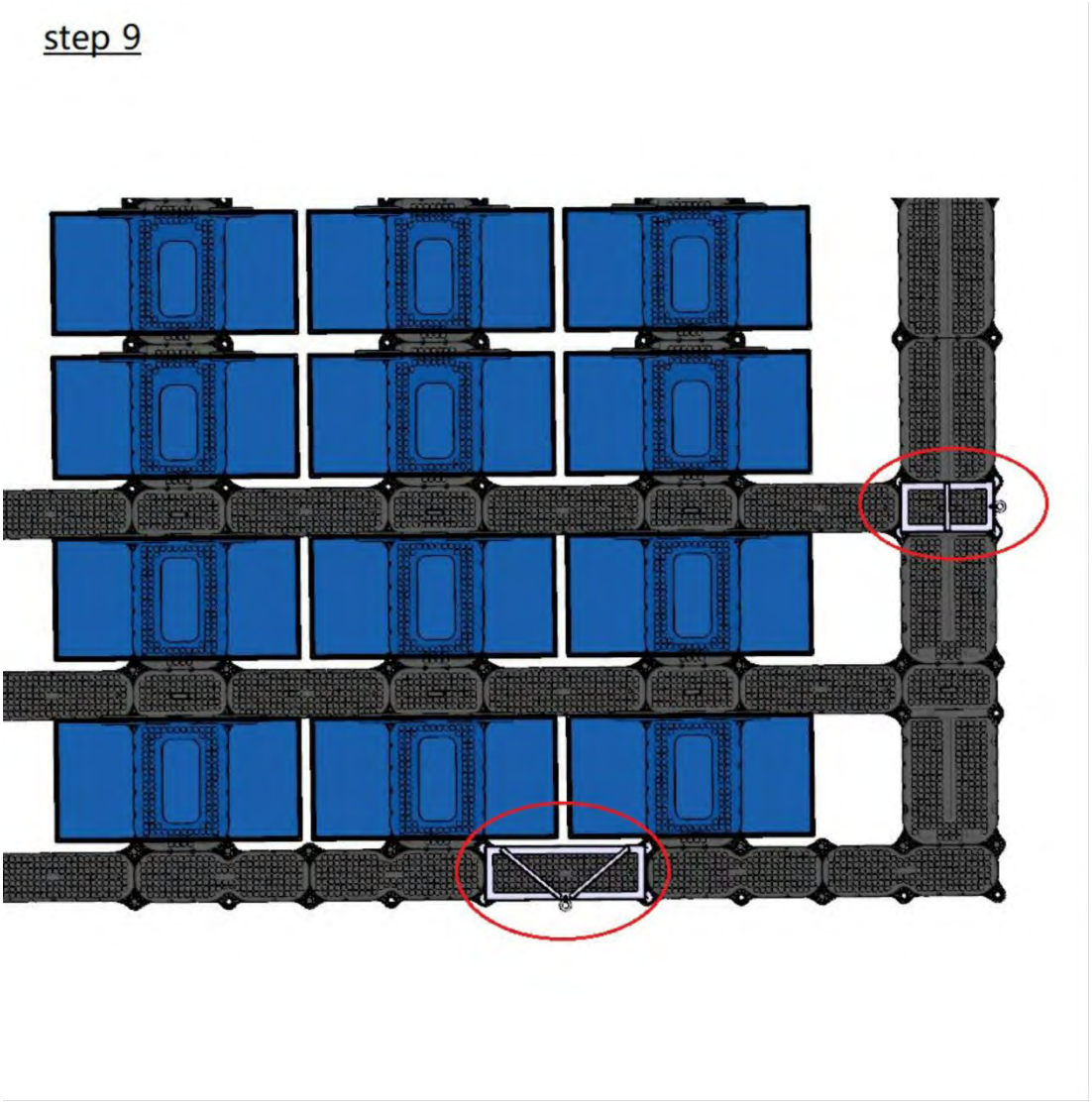


Step 8) The bottom of each array will have two rows with panel float A. After that, each row will have three rows of panel float B, followed by one row of panel float A. This procedure will be followed till the assembly reaches the top of array as per the drawing.

Repeat the steps above 1-7, and form an array as per the drawing. There should be four modules after every walkway. There should be three panel float B after every panel float A in vertical alignment. There should be one aisle float A between each panel float A in horizontal alignment. Refer to image below.



Step 9) Final step is installation of anchor line nuts as per drawing, We need to push float array into water gradually.



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Float Installation Manual - Adtech Systems Ltd

ADTECH
SYSTEMS LIMITED

Version - 2 Date: 02nd December, 2019

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A. Float Specification:

1

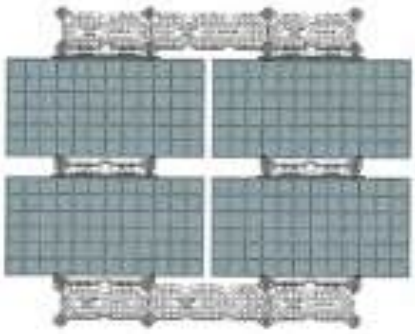


Figure 1

Big Walkway		
	Raw material	High Density Polyethylene (HDPE),with UV stabilizer
	Average Wall Thickness (in mm)	3
	Design Weight (in kg)	4
	Max Use Buoyancy (in kg/sq.m)	180
	Dimension (in mm)	As per approved drawing
	Manufacturing Process	Blow Molding
	Function	• Forms maintenance walkways • Non-Slippery Surface

Small Walkway		
	Raw material	High Density Polyethylene (HDPE),with UV stabilizer
	Average Wall Thickness (in mm)	3
	Design Weight (in kg)	3
	Max Use Buoyancy (in kg/sq.m)	180
	Dimension (in mm)	As per approved drawing
	Manufacturing Process	Blow Molding

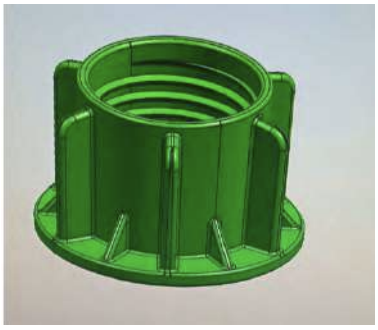
	Function	• Forms maintenance walkways • Non-Slippery Surface

Connecting Float		
	Raw material	High Density Polyethylene (HDPE),with UV stabilizer
	Average Thickness	3mm
	Design Weight	7.5
	Max Design Buoyancy (in kg/sq.m)	180
	Dimension	As per approved drawing
	Manufacturing Process	Blow Molding
	Function	Give Support to the PV module

Support Piece		
	Raw material	High Density Polyethylene (HDPE),with UV stabilizer
	Average Thickness	3mm
	Design Weight	1.2
	Design Buoyancy	-
	Dimension	As per approved drawing
	Manufacturing Process	Blow Molding
	Function	Give an Optimum degree 5 to the panel

Equipment Float		
	Raw material	High Density Polyethylene (HDPE),with UV stabilizer
	Average Thickness	3mm
	Design Weight	8
	Design Buoyancy (in kg/sq.m)	180
	Dimension	As per approved drawing
	Manufacturing Process	Blow Molding
	Function	For the Cable arrangement and junction box location

Note - All dimensions and weights provided have a tolerance of +/- 5%

HDPE Nut		
	Raw material	High Density Polyethylene (HDPE),with UV stabilizer
	Design Weight	55g
	Dimension	D80*50
	Manufacturing Process	Injection Molding
	Function	Holding the Support Float

Sleeve		
	Raw material	High Density Polyethylene (HDPE),with UV stabilizer
	Design Weight	2g
	Dimension	D17*26
	Manufacturing Process	Injection Molding
	Function	Alignment of SS nut&bolt

HDPE Gasket		
	Raw material	High Density Polyethylene (HDPE),with UV stabilizer
	Design Weight	29g
	Dimension	D85*14
	Manufacturing Process	Injection Molding
	Function	Spacer between the walkway.

Note - All dimensions and weights provided have a tolerance of +/- 5%

B. Panel Fixing Hardware:

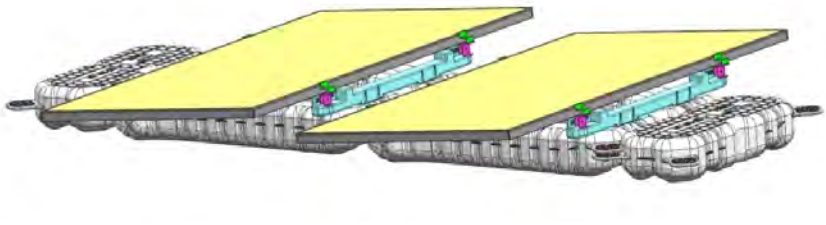


Figure 2

Upper clamp(Top Right and Left)		
	Raw material	Anodized Aluminum
	Count per panel	2 sets
	Technical Features	Length 50 mm Hole Ø9 mm
	Manufacturing Process	Aluminum Extrusion
	Function	Holding the Solar panels and it is connected to the “L” profile of the Support float

Lower clamp(Bottom Left and Right)		
	Raw material	Anodized Aluminum
	Technical Features	Length 50mm Hole Ø9 mm
	Count per Panel	2 sets
	Manufacturing Process	Aluminum Extrusion
	Function	Holding the Solar panels and it is connected to the “L” profile of the Connecting float

Nut ,Bolt and washer		
	Raw material	Stainless steel
	Count / module	Nut 8 Bolt 8 Plain Washer 16 Spring Washer 8

	Type	M8- SS 304
	Function	Holding the Solar panels and it is connected to the “L” profile of the Connecting float

C. Mooring clamps and Lines

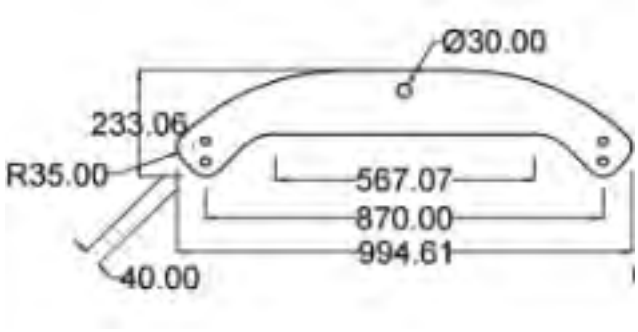


Figure 3

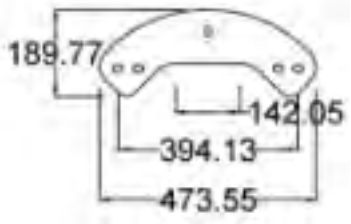


Figure 4

D. Tools and Tackles Required:

1. Injection Nut Wrench (drawing of Injection Nut can be provided on request)
2. M12 and M8 Nut Wrench
3. Drilling Machine

E. Instructions for Installation:

1. **Solar Panel Installation:**

The solar module is connected to the connecting float on the bottom side and support float on the top side. The panels are connected to the floats using Al. extruded clamps connected at the 4 designated points on the float using SS304 - M8 hardware.

The following are the components used for the connection:

A. L clamp (Bridge Clamp)
B. Upper Base Clamp
C. Lower Base Clamp
D. SS304 M8 - Nut, Bolt, Spring Washer and Plain Washer (2)

Installation Recommendations:

A. It is recommended to use a table for the module assembly on the float and to conduct the installation check for the same
B. Ensure the DC cables on the module are opened and loose before mounting the module on the float

Installation Procedure:

A. Place a rubber mat on top of the table
B. Place the Connecting Float on the rubber mat so that the portion where the Support Piece will be connected is exposed from the table
C. Connect the Support Piece on the Connecting Float and use the D80*50 nut to screw the Support Piece to the Connect Float (need to add torque info) (as shown)

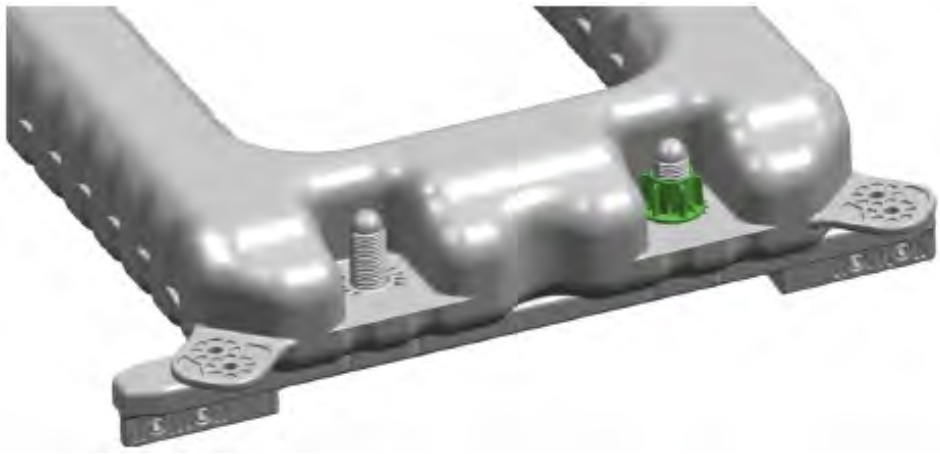


Figure 5

D. Connect the 2 Lower Base Clamps to the bottom of the Connecting Float (as shown) using SS304 M8

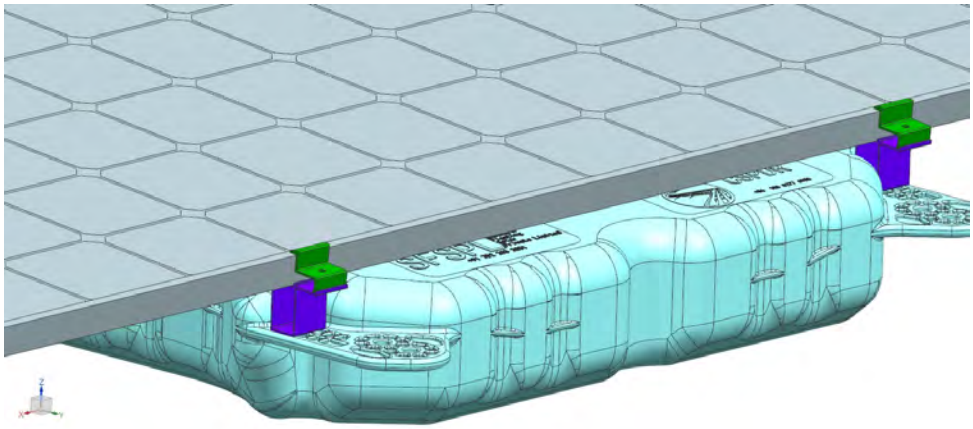


Figure 6

E. Connect the 2 Upper Base Clamps to the top of the Support Float (as shown) SS304 M8

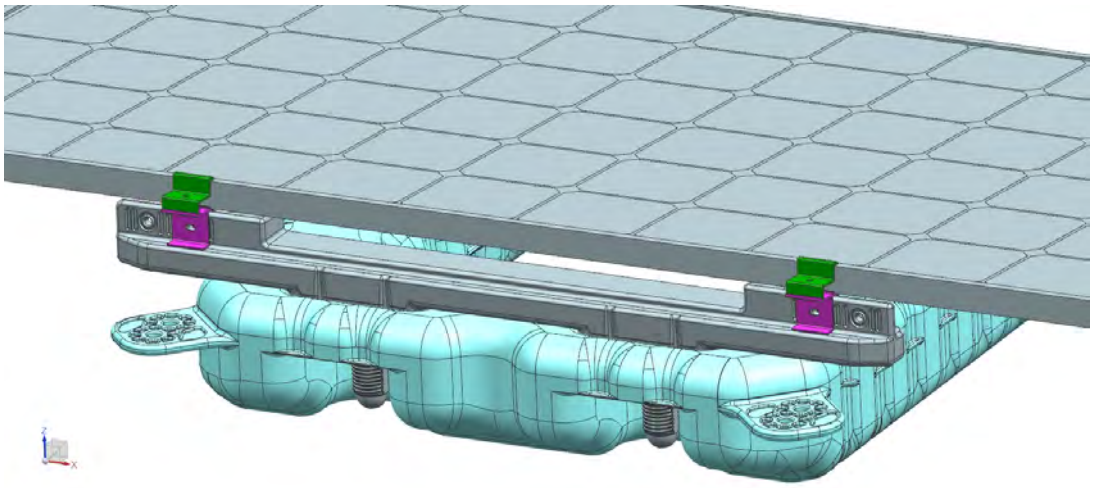


Figure 7

F. Connect the 4 L Clamp (Bridge Clamp) to the Lower Base Clamps and Upper Base Clamps loosely using SS304 M8

G. Take care to mount the panel on the float making sure that the midpoint of the panel is aligned with midpoint of the Connecting Float
H. Tighten the M8 fasters on the L Clamp after placing the module to ensure the module is tightened (mention torque)

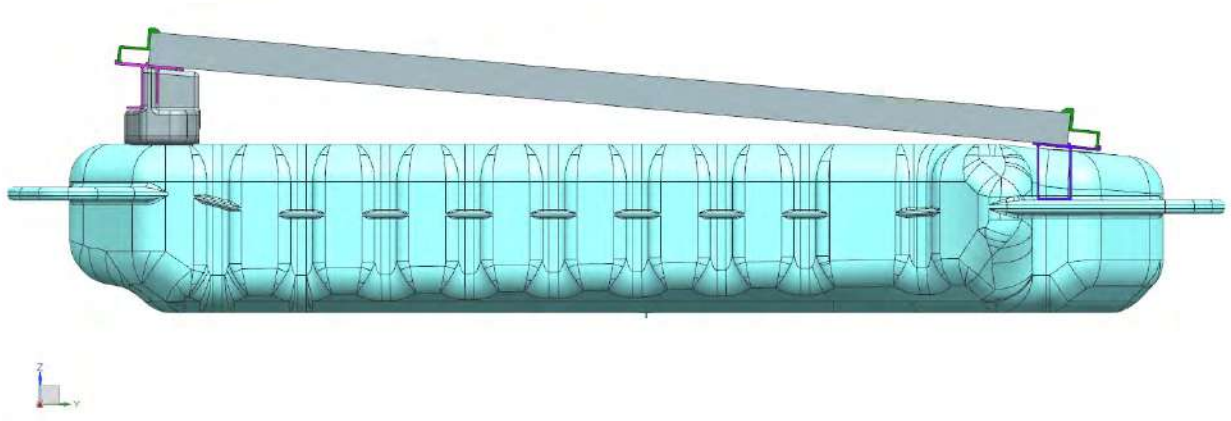


Figure 8

2. **Float Interconnection:**

Typically our floating structures are designed to have one row of Walkways at the periphery on the top and bottom portion and columns of Equipment Float at the periphery on the left and the right of the floating solar system. The Connecting Floats are installed inside the peripheral layers.

The following are the components used:

A. Connecting Float (CF)
B. Equipment Float (EF)
C. Small Walkway Float (SWF)
D. Big Walkway Float (BWF)
E. Support Piece (SP)
F. SS304 M12 - Nut, Bolt, Spring Washer and Plain Washer (2)

Installation Recommendations:

A. Ensure sufficient quantity of all floats are available to complete the portion of the total floating system which you wish to assemble

B. Ensure sufficient quantity of fasteners, sleeves and gaskets are available to complete the portion of the total floating system which you wish to assemble

C. Ensure that anchoring spreader bar is connected correctly to the outer peripheral floats before pushing into the water

D. Start the assembly from the last row onwards to ensure ease of installation while pushing into the water

E. While pushing the floats into the water, ensure not to exert excessive force on the ears of the float which may damage the same

F. Split the total assembly into sections and complete each section on the ground and then connect the completed sections together in the water to ensure proper connectivity. We recommend connecting 2-3 rows at any point of time on the shore and tugging a maximum of 5 rows by connecting both ends to ropes connected to the tug boat (say with a 10 HP motor)

G. Create a smooth surface at an angle of approximately 20 degree to help sliding the connected floats into the water. The platform should be lined with smooth plates or rubber sheets to avoid scratching of the floats with the ground

H. Use the logo on the floats as well as orientation marking on each float to ensure the correct orientation of the floats is followed during interconnection of the same

Float Installation Procedure:

A. Check the design of each float to see the height differences of the ears marked on the side of each float (as marked in orange)

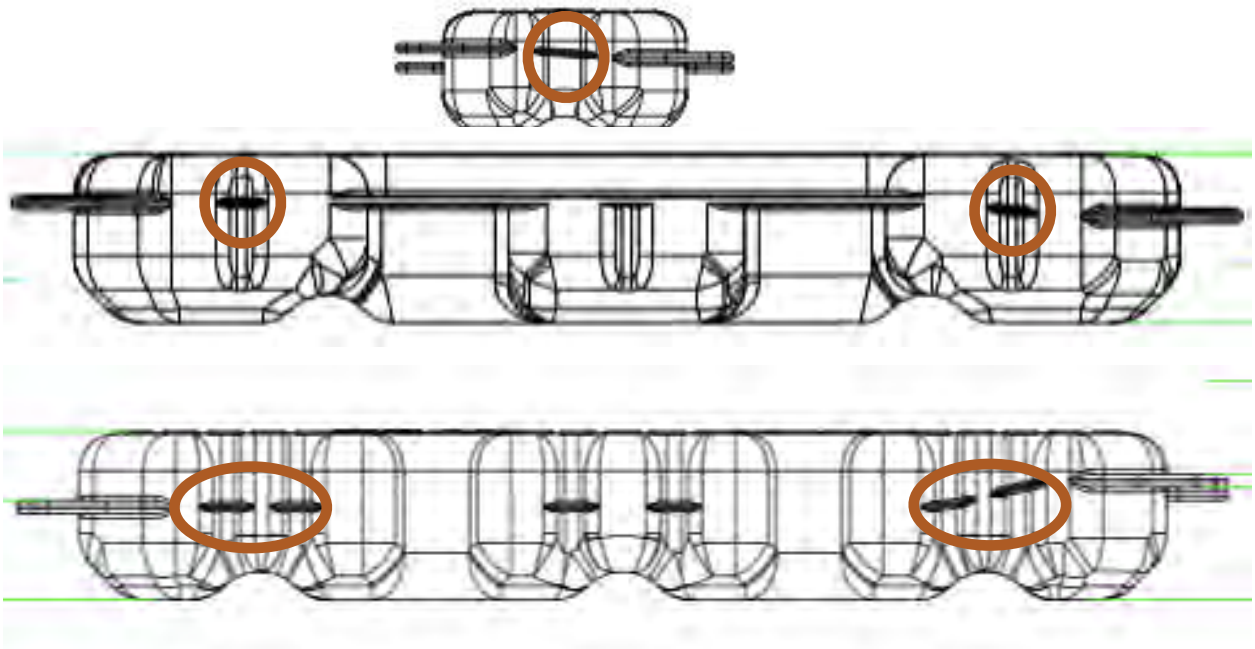


Figure 9

B. The assembly is to be started from the right most corner of the entire plant (with panels facing towards you - assume you are standing on south side facing north side with panels facing south (towards you)).

C. Test assemble 2 to 3 rows of floats first before tightening any fasteners to check alignment and use the sleeve in the holes of the ears to align the holes for inserting M12 nut

D. Connect the SWF such that the bottom right ear and the top right ear of the SWF always come on the bottom of the interconnecting ears. The bottom left ear of the SWF will be in the middle and top left ear of the SWF will be on the top

E. Connect the EF/CF in front of the SWF such that the top ears of EF/CF always come at the top of the interconnection of ears and the bottom ears always come at the middle of the interconnection of ears

F. Keep in mind that when 2 EF/CF are connected together the top ears of the second EF/CF will come on top of the bottom ears of the first EF/CF

G. Connect the BWF such that the right ears are always on the bottom of the interconnection of ears and the bottom left ear is in the middle and top left ear is in the top of the interconnection of ears

Connection Points Table

Small Walkway	**Interconnection Ear Position**		**Interconnection Ear Position**
Top Right Ear	Bottom	**Top Left Ear**	Top
Bottom Right Ear	Bottom	**Bottom Left Ear**	Middle
Big Walkway	**Interconnection Ear Position**		**Interconnection Ear Position**
Top Right Ear	Bottom	**Top Left Ear**	Top
Bottom Right Ear	Bottom	**Bottom Left Ear**	Middle
Panel Float/ Equipment Float	**Interconnection Ear Position**		**Interconnection Ear Position**
Top Right Ear	Top	**Top Left Ear**	Top
Bottom Right Ear	Middle	**Bottom Left Ear**	Middle

H. The above procedure can be repeated to connect all the floats together
I. Take care to align all holes with sleeve before connecting M12 fasters

Figure 10

J. Connect 3 rows on the shore and then push the assembly such that the floats touch the water surface
K. Connect the adjacent rows on the shore and push the assembly into the water
L. Tow the portion of assembly complete to the project location

M. Repeat the steps given above for the next portion of the assembly and then tow this assembly to the project location and interconnect at the location
N. The ears for the interconnecting points will align as provided above during the interconnection of the 2 floating portions
O. These steps may then be repeated to complete the entire assembly

3. Junction Box Installation Procedure:

A. Place the Equipment Float on the table
B. Mount the additional structure on the equipment float using the 4 M12 holes
C. Now mount your junction box on the structure and connect the equipment float on the array as described above