

Contents

1. General Information.....	2
2. Important Safety Information.....	2
3. Safe Work Practices.....	2
4. Unpacking and storage.....	3
5. Array Design Safety.....	3
6. Electrical and Physical Ratings.....	4
7. Equipment Ground.....	4
8. Module Mounting.....	5
9. Field Wiring.....	6
10. Maintenance.....	6
Appendix A: Module Model Number Scheme.....	7
Appendix B: Module Electrical Ratings.....	8
Appendix C: Module Physical Properties.....	9
Appendix D: Module Mounting Positions and Load Ratings.....	10

1. General Information

Thank you for choosing Motech Photovoltaic modules. This document is applicable to all Motech photovoltaic modules. Motech modules are qualified for application Class A, and modules qualified for safety through IEC 61730 within this application Class are considered to meet the requirements of Safety Class II referring to IEC61140. And Motech modules are listed to UL Standard 1703, ULC/ORD-C1703-01, EN/IEC-61730, and EN/IEC-61215.

This manual provides important safety and maintenance information. Failure to follow these instructions may result in severe injury, death, and/or property damage. Motech does not assume any responsibility for loss, damage, injury or expense resulting from the improper installation, handling, use or failure to follow MOTECH's operation or installation manual.

The information contained herein is subject to change without prior notice.

2. Important Safety Information



Electric Shock and Burn Hazard

Photovoltaic modules produce electricity when exposed to the sun or other light sources. The voltage of a single module is less than 45 VDC, but when connected together in series, the total voltage can be dangerously high. When handling the module, must be followed to avoid the fire and electric shock. Do not expose the artificially concentrated sunlight to a module or panel.



Fragile

Photovoltaic modules are easily damage by mishandling. Do not apply bending or twisting forces to the module. Do not step on the module or strike the front or back; these actions may result in cracked solar cells. Do not lift or carry the module by the junction box cables.

For your safety and the safety of others, please read the entire Installation Manual carefully prior to product installation and retain this manual for future reference. Installing a photovoltaic system requires specialized knowledge; system design, module mounting and wiring should only be performed by trained, qualified and authorized personnel.

3. Safe Work Practices



Solar modules weight range from 15.0 to 27.2kg(cell quantity from 48 to 72 pcs). Multiple people or proper equipment should be used to transport the modules safely and without injury.

Be knowledgeable with the principles of electricity and electrical equipment. Use properly insulated tools and appropriate protective equipment. Do not disconnect during load connection for a removable connector.

Cover module face(s) completely with opaque material to halt the production of electricity when working with module wiring. Disconnect module(s) from other sources of electricity, such as batteries and the electrical grid, before working on the system.

Solar modules have a tempered glass front and a polymeric back surface. Although robust materials are used in the construction, the solar cells, glass, and backsheet may be damaged if the module is not properly handled and installed. Do not attempt to install or use a module with broken front cover glass or a perforated backsheet as such damage represents an electrical safety hazard (electric shock and fire). Broken modules cannot be repaired and should be replaced immediately. Protective gloves should be always worn when handling solar modules. Especially for modules with AR glass, do not touch modules with bare hands. Gloves will protect against sharp objects and hot surfaces.

4. Unpacking and storage

Always transport and store the module in the shipping container or stacking system provided. Always keep the package in a clean, dry room on horizontal or even ground with ambient temperatures between

-20 ~ +40°C and relative humidity between 45 ~ 80% RH.



If pallets are stored temporarily outside then place a protective covering over the pallet to protect it from direct weathering or broken and do not stack more than 1 pallet high.

Do not stack packing boxes (pallets) more than 2 boxes high. Do not place unpacking boxes under the others.

Keep the module packed in the original package until installation. Do not leave a module unsupported or unsecured.

Do not lift or carry the module by the junction box cables. Always carry a module with two or more people.

Do not apply bending or twisting forces to the module.

Do not stand, step, walk and/or jump on the module or subject it to impact.

5. Array Design Safety

Determine local permit, installation and inspection requirements before beginning installation. For installations in the United States, follow the U.S. National Electrical Code (NEC). For installations in Canada, follow the Canadian Electrical Code (CEC). In all other areas, follow local electrical installation codes and regulations.

Series connections in Regions Following UL Standard 1703, ULC/ORD-C1703-01: Motech modules are limited to series connections up to a maximum system voltage of 600 Vdc or 1,000 Vdc when approved junction boxes are used. Do not exceed the maximum system voltage.

Series Connections in Regions Following IEC-61730: Motech modules may be connected in series up to a maximum system voltage of 1000 Vdc. Do not exceed the maximum system voltage.

Parallel Connections and Overcurrent Protection: Motech modules may be connected in parallel to produce desired current output. Each series string or module must be fused prior to combining with additional parallel strings if the resulting maximum reverse current exceeds the module series fuse rating of 15 Amps or other equipment may potentially back feed current into the panels. In the US, refer to NEC 690.9 for additional detail. In other regions, refer to the local electrical code on limitations to parallel connections and overcurrent protection.

When designing a PV system, ensure the modules are arranged such that the current and voltage characteristics of the array are within the tolerances of the device to which the array will connect. Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at standard test conditions. The requirements of the National Electrical Code (NEC) in Article 690 shall be followed to address these increased outputs. In installations not under the requirements of the NEC, the values of I_{sc} and V_{oc} marked on the module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor ampacities, overcurrent device ratings, and size of controls connected to the PV output.

Motech modules meet the fire resistance requirements for a Class C fire application in accordance with UL1703/IEC61730 with no limitation on slope. The fire rating of Motech modules is valid only when mounted in the manner specified in the mechanical mounting instructions. All Motech modules must be installed over a fire resistant roof covering rated for the application. Consult the local building department or building code to determine approved roofing materials. Do not install Motech modules integral with a roof or wall of a habitable structure.

Limitations of Use: Motech modules are intended for use in general open climates as defined in IEC60721-2-1 entitled *Classification of Environmental Conditions – Part 2-1: Environmental Conditions Appearing in Nature – Temperature and Humidity*. Do not install modules where they may become immersed in water or are continuously exposed to spray or mist. Do not install or use modules in corrosive areas, under abnormal environmental conditions, or on mobile units (except solar tracking mounting systems are allowed). Do not use panels in systems without a system ground (i.e. floating or ungrounded systems) or in systems in which the positive string output (+) is tied to ground. Doing so will void the product warranty.

6. Electrical and Physical Ratings

Appendix B shows the electrical ratings and Appendix C shows the physical properties of Motech modules. The current and voltage characteristics of Motech modules are within -5%/+10% percent of the indicated values of I_{sc} and V_{oc} under standard test conditions (irradiance of 1000 W/m^2 , AM 1.5 spectrum, cell temperature of 25°C). The maximum power of each Motech module is within -0% / +3% of the indicated values of rated power under standard test conditions. Other tolerances may be available upon special request.

Bypass diodes are pre-installed in the junction box of each Motech PV module. Depending on junction box type, each module is supplied with (3) 11 Amp Shottky diodes or (3) 16 Amp Shottky diodes or (3) 20 Amp Shottky diodes. Each bypass diode is rated at 40 Vdc reverse voltage. Each bypass diode is connected to $1/3^{\text{rd}}$ the total number of cells for a given module type. Bypass diodes are NOT user-serviceable components. DO NOT remove bypass diodes or operate a module without bypass diodes.

The limiting reverse current of Motech modules is 15 Amps.

In solar battery-charging arrays, blocking diodes are required to prevent the solar module from discharging the battery bank at night. Motech modules do not include blocking diodes. It is recommended that a charge controller be used to prevent system batteries from being overcharged during the day and discharged at night.

7. Equipment Ground

A module with exposed conductive parts (i.e. aluminum frame) is considered to be in compliance with UL 1703/IEC61730 only when it is electrically grounded in accordance with the instructions presented below and the requirements of the National Electrical Code. Earth grounding the module frame is highly recommended in all other regions, even where not required by local electrical code. Size the equipment grounding conductor in accordance with NEC, CEC or local electrical code.

Where common grounding hardware (nuts, bolts, star washers, split-ring lock washers, flat washers, and the like) is used to attach a listed grounding/bonding device, the attachment must be made in conformance with the grounding device manufacturer's instructions.

Common hardware items such as nuts, bolts, star washers, lock washers, and the like have not been evaluated for electrical conductivity or for use as grounding devices and should be used only for maintaining mechanical connections and holding electrical grounding devices in the proper position for electrical conductivity. Such devices, where specified or supplied with the module and evaluated through the requirements of UL1703/IEC61730, may be used for grounding connections in accordance with the instructions below.

UL 1703/IEC61730 Compliant Grounding Method 1: Ground wires ranging from 12 AWG to 10 AWG [3.3 mm^2 to 5.3 mm^2 , Temperature Rating -40°C to $+90^\circ\text{C}$] can be attached via the 0.2" [5mm] frame grounding holes using the following hardware set for each module: (1) #10-32 304SS Bolt; (1) #10 304SS Washer (Flat or Cup); (1) #10 304SS Star Washer; (1) #10 304SS Nut. Create a "U" shaped loop in the bare copper ground wire. Place the wire loop under the head of the #10 bolt. Place the #10 washer on the bolt under the copper wire. The stainless steel washer is required between the copper ground wire and the aluminum module frame to avoid galvanic corrosion due to contact of dissimilar metals. Insert the resulting bolt assembly into one of the 0.2" [5mm] holes marked for earth grounding. Place a #10 star washer over the bolt threads such that it contacts the aluminum frame, then thread on a #10 nut. The star washer between the nut and the aluminum frame is necessary to pierce the anodized surface and provide a low resistance electrical connection to the aluminum frame. Note that a #10 stainless steel Keps nut may replace the #10 star washer and #10 nut. Complete the ground connection by tightening the bolt and nut to 20-25 in-lbf using a calibrated torque driver and wrench. Take care not to damage the polymer backsheet of the module with the wrench.

UL 1703/IEC61730 Compliant Grounding Method 2: grounding means listed to UL467 or UL1703/IEC61730 for grounding PV panels (such as a lay-in grounding lug) may be used in place of the system described above, provided it is installed according to the manufacturer's instructions and with due consideration to prevention of galvanic corrosion at the connection to the module frame.

UL 1703/IEC61730 Compliant Grounding Method 3: SolarDock 304 S.S. Large Grounding Clip part no.SDU-Z-011L have been tested to UL1703/IEC61730 with Motech modules and can be used as a grounding means when modules are mounted in SolarDock part groups SDU-XX-001, where XX=5, 10, 15, 20, 25, 30, or 35 depending on tilt angle. Minimum Torque of 60 in-lbf shall be used to engage the SolarDock grounding clip to the solar module. Refer to the SolarDock Installation Manual for further details.

UL 1703/IEC61730 Compliant Grounding Method 4: WEEB/racking structure combinations are permitted for grounding Motech Modules provided the following four criteria are met:

- 1) The WEEB washer and racking structure combination must be listed together on Wiley Electronics, LLC compatibility listing;
- 2) The assembly must be able to be installed according to the NRTL approved installation instructions to maintain UL467 compliance of the WEEB washer;
- 3) The racking structure must support the solar module in accordance with Appendix D of this manual to maintain UL1703 compliance;
- 4) WEEB “teeth” should be positioned to avoid the drainage holes of the module frame since there is no material for the WEEB “teeth” to engage in these regions of the Motech Module Frame.

If any of the above pre-conditions are not met, the WEEB is not a valid grounding solution for your chosen application. If all four of these conditions are met it is highly recommended that details pertaining to your chosen WEEB/Rail/Module combination be submitted to the Authority Having Jurisdiction (AHJ) for final approval before commencing work to avoid inspection issues.

It is highly recommended that any grounding means be clearly communicated to the AHJ early in the system planning process to avoid approval issues during commissioning.

8. Module Mounting

See Appendix D for a complete listing of module mounting locations and load ratings for the various module model numbers.

Generally, in the Northern Hemisphere, the modules should face south, and in the Southern Hemisphere, the modules should face north. In fixed (non-tracking) arrays, installing the modules with a tilt angle equal to your latitude will optimize the annual energy production of your system. For best performance, the location selected should be free of shade throughout the year.

If the module is to be mounted to a roof or wall of a building, use a standoff method whereby the module is secured to the roof or wall with an air gap of 2” [51mm] or greater for cooling. DO NOT mount modules integral with a roof or wall.

The module is in a minimum fire resistance rating of Class C, and the fire rating of this module is valid only when mounted in the manner specified in the mechanical mounting instructions.

The solar module is only one element of a properly designed solar array. The module support structure must provide a means of supporting the module against all live and dead loads expected at the array site, including those imposed by wind and snow.

9. Field Wiring



Keep connectors clean and dry prior to installation. Dirt and moisture may inhibit proper latching of the connector, which may lead to reduced system performance or failure of the connector.

Gardez connecteurs nettoyer et sécher avant l'installation. La saleté et l'humidité peuvent inhiber bon verrouillage du connecteur, ce qui peut conduire à la performance du système de réduction ou d'échec de la connexion.

Each Motech module is factory equipped with two lengths of 4.0mm² UL-Recognized “PV Wire” (90°C rated, sunlight resistant). Factory cables are terminated with UL/TUV Recognized electrical connectors. Always use mating connectors of the same manufacturer to ensure compatibility. DO NOT modify or replace the connectors provided with the module; doing so will void the product warranty.

In accordance with the NEC article 300.34, the minimum bending radius of the module cables is 8X the outer diameter of the cable or approximately 45mm. To avoid water ingress where the module cables enter the junction box, forces on the cables shall be minimized or strain relief shall be provided to reduce deformation of the water tight seal between the cable and junction box. Where possible, cables should be secured in a manner that will shed water away from the junction box.

10. Maintenance



There are no user-serviceable parts in the junction boxes. Do not open the junction box or change intra-module wiring as all wiring connections are performed in the factory. The electrical connectors cannot be used as a live disconnect. Modules may only be connected and disconnected when current is not flowing (open circuit voltage conditions). Always observe proper precautions when connecting or disconnecting modules exposed to light since hazardous voltage may be present.

Modules should be inspected annually for loose electrical connections, poor grounding connections, and loosened mechanical fastening to the racking structure. A module tilt of at least 10 degrees will help rainfall clean the modules naturally. Should cleaning of the modules become necessary, wet the glass surface before wiping with a soft sponge to prevent micro-scratches. Snowfall may be cleared using a soft bristle brush. If hand cleaning is not possible, pressure washer cleaning of module glass is permitted only when complying with all of the following restrictions:

1. Cleaning fluid: water at ambient temperature
2. Do not clean it with chemical.
3. Do it in the morning or in the evening.
4. Machine pressure rating: ≤ 1900 PSI (13.1 MPa)
5. Machine flow rating: ≤ 2.0 gallons per minute (7.57 liters per minute)
6. Output nozzle distance to solar panel: ≥ 12 " (30 cm)
7. Spray tip water divergence: $\geq 15^\circ$

Appendix A: Module Model Number Scheme

Motech Model Number Format is **AANNCK-PPP** where:

AA is a code for the type of wafer, where AA can have the following values:

IM for 156mm x 156mm, 156.75mm x 156.75mm multicrystalline wafers

XS for 156mm x 156mm-200R\210R, 156.75mm x 156.75mm-200R\210R semi-square single crystal wafers

NN is the number of cells in the module, where NN can have the following values:

48 for a forty-eight cell module

54 for a fifty-four cell module

60 for a sixty cell module

72 for a seventy-two cell module

C is a code for module color combination, where C can have the following values:

C for clear anodized frame with white backsheet

B for black anodized frame with black backsheet

D for black anodized frame with white backsheet

K is a code for the number of bus bars used to interconnect the cells to one another, where K can be:

2 for two busbars interconnecting adjacent cells

3 for three busbars interconnecting adjacent cells

4 for four busbars interconnecting adjacent cells

PPP is module output power in watts, see electrical ratings table for listing

Example: Model Number IM72C2-295 describes a module with multicrystalline **IM** wafer type with **72** cells in a **C**olor combination of clear frame anodization/white backsheet with **2** busbars connecting adjacent cells.

Appendix B: Module Electrical Ratings

Installations in regions governed by UL Standard 1703, ULC/ORD-C1703-01 the maximum system voltage is either 1000V or 600V depending upon junction box/connector selection. In regions governed by EN/IEC-61730 the maximum system voltage is 1000V. The series fuse rating for all modules is 15 A.

Table B1: IM72C3, IM72D3, IM72B3

Pmp (W)	Voc (V)	Isc (A)	Vmp (V)	Imp (A)
305	45.00	8.84	36.96	8.25
310	45.23	8.91	37.23	8.33
315	45.45	8.97	37.59	8.38
320	45.68	9.04	37.87	8.45
325	45.50	9.19	37.46	8.68

Table B2: IM72C4, IM72D4, IM72B4

Pmp (W)	Voc (V)	Isc (A)	Vmp (V)	Imp (A)
305	45.01	8.94	36.45	8.37
310	45.31	9.00	36.70	8.45
315	45.61	9.06	36.94	8.53
320	45.91	9.12	37.18	8.61
325	46.21	9.18	37.41	8.69

Table B3: XS72C3, XS72D3, XS72B3

Pmp (W)	Voc (V)	Isc (A)	Vmp (V)	Imp (A)
340	46.82	9.59	37.61	9.04
345	47.15	9.65	37.91	9.10
350	47.48	9.70	38.25	9.15

Table B4: XS72C4, XS72D4, XS72B4

Pmp (W)	Voc (V)	Isc (A)	Vmp (V)	Imp (A)
345	47.62	9.49	38.81	8.89
350	47.92	9.55	39.02	8.97
355	48.22	9.61	39.23	9.05
360	48.52	9.67	39.43	9.13

Table B5: IM60C3, IM60D3, IM60B3

Pmp (W)	Voc (V)	Isc (A)	Vmp (V)	Imp (A)
250	37.68	8.63	30.93	8.08
255	37.54	8.85	30.78	8.29
260	37.76	8.93	31.06	8.37
265	37.99	9.01	31.36	8.45

Table B6: IM60C4, IM60D4, IM60B4

Pmp (W)	Voc (V)	Isc (A)	Vmp (V)	Imp (A)
255	37.23	9.00	30.14	8.46
260	37.63	9.03	30.66	8.48
265	38.03	9.06	31.18	8.50
270	38.43	9.09	31.69	8.52

Table B7: XS60C3, XS60D3, XS60B3

Pmp (W)	Voc (V)	Isc (A)	Vmp (V)	Imp (A)
265	37.89	9.05	31.27	8.47
270	38.14	9.09	31.67	8.53
275	38.49	9.49	30.74	8.95
280	38.80	9.55	31.11	9.00

Table B8: XS60C4, XS60D4, XS60B4

Pmp (W)	Voc (V)	Isc (A)	Vmp (V)	Imp (A)
285	39.42	9.49	33.78	8.51
290	39.76	9.54	34.15	8.54
295	40.10	9.59	34.52	8.57
300	40.44	9.64	34.88	8.60

Table B9: IM54C3, IM54D3, IM54B3

Pmp (W)	Voc (V)	Isc (A)	Vmp (V)	Imp (A)
225	33.91	8.63	27.82	8.09
230	33.81	8.86	27.69	8.31
235	34.03	8.95	27.98	8.40

Table B10: IM54C4, IM54D4, IM54B4

Pmp (W)	Voc (V)	Isc (A)	Vmp (V)	Imp (A)
230	33.20	9.12	25.77	8.91
235	33.62	9.16	26.13	8.96
240	34.03	9.20	26.48	9.01

Table B11: XS54C3, XS54D3, XS54B3

Pmp (W)	Voc (V)	Isc (A)	Vmp (V)	Imp (A)
235	34.32	8.84	28.35	8.29
240	34.18	9.07	28.18	8.52
245	34.48	9.46	27.52	8.90

Table B12: XS54C4, XS54D4, XS54B4

Pmp (W)	Voc (V)	Isc (A)	Vmp (V)	Imp (A)
260	35.39	9.39	28.65	9.08
265	35.79	9.42	29.04	9.13
270	36.19	9.45	29.43	9.18

Table B13: IM48C3, IM48D3, IM48B3

Pmp (W)	Voc (V)	Isc (A)	Vmp (V)	Imp (A)
205	30.08	8.87	24.64	8.32
210	30.30	8.97	24.92	8.43
215	30.53	9.07	25.21	8.53

Table B14: IM48C4, IM48D4, IM48B4

Pmp (W)	Voc (V)	Isc (A)	Vmp (V)	Imp (A)
205	29.71	9.09	23.98	8.55
210	30.04	9.12	24.48	8.58
215	30.37	9.15	24.97	8.61

Table B15: XS48C3, XS48D3, XS48B3

Pmp (W)	Voc (V)	Isc (A)	Vmp (V)	Imp (A)
210	30.52	8.85	25.22	8.33
215	30.46	9.08	25.20	8.53
220	30.79	9.49	24.63	8.93

Table B16: XS48C4, XS48D4, XS48B4

Pmp (W)	Voc (V)	Isc (A)	Vmp (V)	Imp (A)
230	31.60	9.24	26.14	8.80
235	31.96	9.27	26.61	8.83
240	32.33	9.30	27.09	8.86

Table B17

72 module	Recommended maximum series/parallel module configurations	10/1	
60 module		12/1	
54 module		14/1	
48 module		16/1	
Bypass Diode [A]	11	Series Fuse [A]	15
Nominal Operating Cell Temperature (NOCT)	45°C±2°C	Pmax temperature coefficient[%/°C]	-0.46±0.02%/°C
Current temperature coefficient [%/°C]	+0.07±0.02%/°C	voltage temperature coefficient[%/°C]	-0.34±0.02%/°C
Maximum System Voltage (IEC/UL)	1000V		

Appendix C: Module Physical Properties

Reference Appendix A for model number scheme..

Physical Properties for all module types

Model Number	No. Cells	Width (mm)	Length (mm)	Frame Height (mm)	mass (kg)
AA72CK-PPP	72	992	1966	50	26.7
AA72CK-PPP	72	992	1966	45	26.4
AA72CK-PPP	72	992	1966	40	26.0
AA60CK-PPP	60	992	1650	50	19.4
AA60CK-PPP	60	992	1650	45	19.1
AA60CK-PPP	60	992	1650	40	18.8
AA60CK-PPP	60	992	1650	35	18.0
AA54CK-PPP	54	992	1492	50	17.7
AA54CK-PPP	54	992	1492	45	17.4
AA54CK-PPP	54	992	1492	40	17.1
AA54CK-PPP	54	992	1492	35	16.5
AA48CK-PPP	48	992	1334	50	16.0
AA48CK-PPP	48	992	1334	45	15.7
AA48CK-PPP	48	992	1334	40	15.5
AA48CK-PPP	48	992	1334	35	15.0

Appendix D: Module Mounting Positions and Load Ratings

Module testing used rigid mounting structures. The mounting positions and load ratings below are based on the assumption that mounting hardware and mounting structures will support the module with little or no deformation. The PV system designer must determine if the mounting hardware and related mounting structure have sufficient strength to support the maximum service load transferred from the module without significant deflections.

Each module frame has numerous drain holes to prevent accumulation of water and ice within the frame cross section. Do not allow the mounting structure to block the frame drainage features. Buildup of ice within the frame may lead to failure of the module frame.

Motech modules are considered to be in compliance with UL 1703 only when the module is mounted in the manner specified by the mounting instructions below.

Each module must be affixed to the array structure at a minimum of four (4) points. If using pressure clamps, the clamp must engage an area of at least 1.5" x 0.18" [38mm x 4.5mm] along the top edge of the aluminum frame (glass side). The listed module types have been certified using the mounting positions and tested loads shown in Figures D1 and D2 and Tables D1 through D4 below. Positive (+) values indicate downward pressure as from accumulated snow; negative (-) values indicate uplift pressure as from wind. Please note that the module's rating depends upon the frame type, module size, and mounting points.

In locations following UL Standard 1703 or ULC/ORD-C1703-01 the tested load information contained within Tables D1 through D4 must be divided by a safety factor of 1.5 to obtain the **design load** rating. This translates to a design load rating of $\pm 33.4 \text{ lb/ft}^2$ [$\pm 163 \text{ kg/m}^2$] for 2,400Pa tested load and $+75.2 / -33.4 \text{ lb/ft}^2$ [$+367 / -163 \text{ kg/m}^2$] for 5,400Pa tested load.

In locations following IEC-61730, please note that IEC testing provides certification to a maximum **tested load** as indicated in Tables D1 through D4 below. Design load ratings stated with respect to the IEC-61730 standard should be considered to have a safety factor of 1.0. Determination of an applicable safety factor to the tested load is the responsibility of the PV system designer or end user.

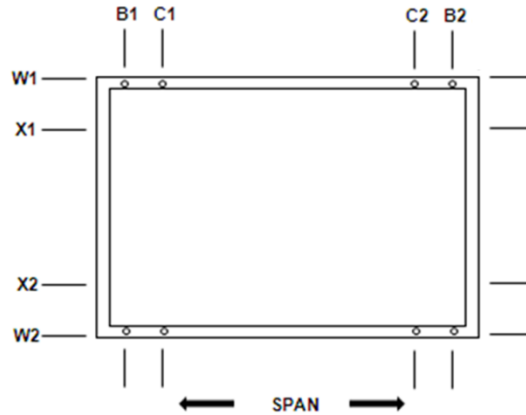


Figure D1: 72-cell and 60-cell Mounting Points

			Frame Height		
			50mm	45mm	40mm
72-cell	Mounting Points	Span (mm)	Tested Load (Pa)	Tested Load (Pa)	Tested Load (Pa)
	B ₁ -B ₂	1,360	+5400/-2400	+5400/-2400	+5400/-2400
	C ₁ -C ₂	860	+5400/-2400	+5400/-2400	+5400/-2400
	W ₁ -W ₂	992	+/- 2400**	+/- 2400	not permitted
	X ₁ -X ₂	496	+/- 2400**	+/- 2400	not permitted
rails as W ₁ -W ₂ clamped at C ₁ -C ₂		860	+5400/-2400	+5400/-2400	+5400/-2400

			Frame Height			
			50mm	45mm	40mm	35mm
60-cell	Mounting Points	Span (mm)	Tested Load (Pa)	Tested Load (Pa)	Tested Load (Pa)	Tested Load (Pa)
	B ₁ -B ₂	1,360	+5400/-2400	+5400/-2400	+5400/-2400	+5400/-2400
	C ₁ -C ₂	860	+5400/-2400	+5400/-2400	+5400/-2400	+5400/-2400
	W ₁ -W ₂	992	+5400/-2400**	+5400/-2400	+5400/-2400	+5400/-2400
X ₁ -X ₂	496	+5400/-2400**	+5400/-2400	+5400/-2400	+5400/-2400	

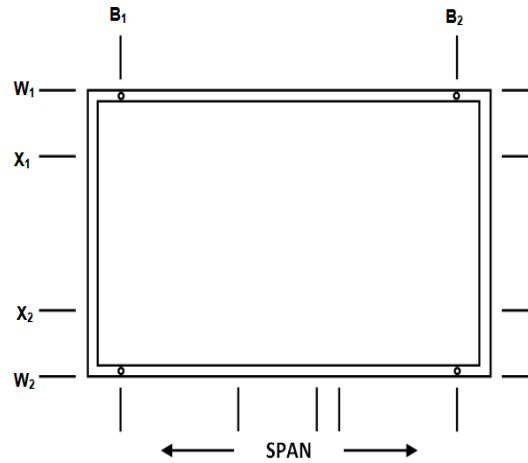


Figure D2: 54-cell, 48-cell Mounting Points

Table D3

			Frame Height			
			50mm	45mm	40mm	35mm
	Mounting Points	Span (mm)	Tested Load (Pa)	Tested Load (Pa)	Tested Load (Pa)	Tested Load (Pa)
54-cell	B ₁ -B ₂	860	+5400/-2400	+5400/-2400	+5400/-2400	+5400/-2400
	W ₁ -W ₂	992	+5400/-2400**	+5400/- 2400	+5400/- 2400	+5400/- 2400
	X ₁ -X ₂	496	+5400/-2400**	+5400/- 2400	+5400/- 2400	+5400/- 2400

Table D4

			Frame Height			
			50mm	45mm	40mm	35mm
	Mounting Points	Span (mm)	Tested Load (Pa)	Tested Load (Pa)	Tested Load (Pa)	Tested Load (Pa)
48-cell	B ₁ -B ₂	702	+5400/-2400	+5400/-2400	+5400/-2400	+5400/-2400
	W ₁ -W ₂	992	+5400/-2400**	+5400/- 2400	+5400/- 2400	+5400/- 2400
	X ₁ -X ₂	496	+5400/-2400**	+5400/- 2400	+5400/- 2400	+5400/- 2400

REVISION HISTORY

Revision	Description	ECN	Date
A	Internal draft	-	20120309
B	Initial Release Public Release – new Motech model number convention started. document replaces MA000456	-	20120328
C	Updated electrical and mechanical ratings	-	20120510
D	Updated electrical and mechanical ratings. Updated “Limitations of Use” of ungrounded and +’ve grounded systems	-	20121019
E	Updated electrical and mechanical ratings. Updated to comply with Section 48 of UL1703 May 8, 2012 revisions	1304024	20130205
F	Updated mechanical ratings Added S and Z junction boxes and connector types Added minimum bend radius and strain relief requirement Added requirement to use like connectors ; do not modify connectors Added UL 1703 required paragraphs under “Equipment Ground”	1309064	20131018
G	Updated cleaning instructions to allow pressurize water cleaning method. Updated “Limitations of Use” to specify no immersion or continuous water exposure.	MECR_1402077	20140220
H	Updated Motech model number electrical ratings to include additional wafer. Added TE PV4-A1/B1 connector types.	MECR_1402076	20140604
I	Updated appendix A new Motech model number. Updated appendix B: Module Electrical Ratings. Updated appendix C physical properties mounting positions and appendix. Updated appendix D: Module Mounting Positions and Load Ratings.	MECR_1608175	20160817