

This document is applicable to all Motech photovoltaic modules. Motech modules are listed to UL Standard 1703, ULC/ORD-C1703-01, EN/IEC-61730, and EN/IEC-61215 by Intertek ETL are certified application Class A, Safety Class II.

This manual provides important safety and maintenance information. Failure to follow these instructions may result in severe injury, death, and/or property damage. The information contained herein is subject to change without prior notice.

Important Safety Information



Electric Shock and Burn Hazard

Photovoltaic modules produce electricity when exposed to the sun or other light sources.

Risque de choc électrique et de brûlure

Ce module photovoltaïque produit de l'électricité lorsqu'il est exposé au soleil ou à d'autres sources lumineuses.



Fragile

Photovoltaic modules are easily damaged 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.

Fragile

Les modules photovoltaïques sont facilement endommagés par une mauvaise manipulation. Ne s'applique pas flexion ou de torsion des forces pour le module. Ne marchez pas sur le module ou frapper la face avant ou arrière; ces actions peuvent entraîner des fissures des cellules solaires. Ne pas soulever ou transporter le module par les câbles boîte de jonction.

For your safety and the safety of others, please read the entire Installation and Assembly Instruction 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.

Safe Work Practices

Be knowledgeable with the principles of electricity and electrical equipment. Use properly insulated tools and appropriate protective equipment.

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. Always transport and store the module in the shipping container or stacking system provided. Do not store a module unsecured prior to installation. Do not apply bending or twisting forces to the module. Do not step on the module or subject it to impact. Do not lift or carry the module by the junction box cables. 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 worn when handling solar modules. Gloves will protect against sharp objects and hot surfaces.



Solar modules weigh up to 60 lb [27 kg]. Multiple people or proper equipment should be used to transport the modules safely and without injury.

Les modules solaires pèsent jusqu'à 27 kg. Plus d'une personne ou un équipement approprié doit être utilisé pour transporter les modules en toute sécurité et sans dommage.

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. 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. In actual usage, a photovoltaic module may experience conditions that result in more current and/or voltage than reported at standard test conditions. This increased current and/or voltage must be taken into account when determining PV system component voltage ratings, conductor current ratings, fuse sizes and the size of controls. The module's short circuit current (Isc) rating should be multiplied by a factor of 1.25 when determining component ratings. In the US, NEC 690.8 requires an additional multiplying factor of 1.25 for conductor and fuse sizing. In the US, the module's open circuit voltage (Voc) should be adjusted by the voltage correction factors found in NEC Table 690.7. The appropriate voltage correction factor is selected based upon the lowest ambient air temperature recorded at the installation site. If the system is intended for installation in a region not governed by the US NEC, the module open circuit voltage should be multiplied by a factor of 1.25.

Motech modules meet the fire resistance requirements for a Class C fire application in accordance with UL 1703 (2003) with no limitation on slope. All Motech modules must be installed over a roof of appropriate fire resistance. Consult the local building department or building code to determine approved roofing materials. Do not install this module integral with a roof or wall of a habitable structure.

DO NOT artificially concentrate sunlight onto a module.

Do not install or use modules in corrosive areas, under abnormal environmental conditions, or on mobile units. Doing so will void product warranty. These 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*.

Electrical and Physical Ratings

Appendix A shows the electrical ratings and Appendix B 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 Isc and Voc under standard test conditions (irradiance of 1000 W/m², AM 1.5 spectrum, cell temperature of 25°C). The maximum power of each Motech module is within -3% / +5% of the indicated values of rated power under standard test conditions. Tighter 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. Each bypass diode is rated at 40 Vdc reverse voltage. Each bypass diode is connected to 1/3rd 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 8.9 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 daylight and discharged at night.

Equipment Ground

The aluminum frame of the module must be earth grounded in North American installations. 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.

Traditional grounding means: Ground wires ranging from 12 AWG to 10 AWG [3.3 mm² to 5.3 mm²] 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 two 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 anodization 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.

Alternate grounding means 1: grounding means listed to UL467 or UL1703 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.

Alternate grounding means 2: SolarDock 304 S.S. Large Grounding Clip part no.SDU-Z-011L have been tested to UL1703/IEC61730 with Motech Panels and can be used as a grounding means when panels 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 used to engage the SolarDock grounding clip to the solar module. Refer to the SolarDock Installation Manual for further details.

Alternate grounding means 3: 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 C 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 for final approval before commencing work to avoid inspection issues.

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

Module Mounting

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

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 from 9 AM to 3 PM 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 parallel to the roof or wall with an adequate air gap for cooling (greater than 2" [51mm]). DO NOT mount modules integral with a roof or wall.

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.

Field Wiring

Each Motech module is factory equipped with two lengths of 4.0mm² UL-Recognized "PV Wire" (90°C rated, sunlight resistant). Factory wires are terminated with Tyco SOLARLOK® electrical connectors.

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 SOLARLOK connector 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.



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.

Maintenance

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 very soft bristle brush.

Appendix A: Module Electrical Ratings

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

Table A1: IM72C2, IM72D2, IM72B2

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
295	36.63	8.05	45.12	8.64
290	36.24	8.00	44.89	8.60
285	35.88	7.94	44.40	8.53
280	35.52	7.88	44.25	8.48
275	35.10	7.84	43.71	8.44
270	34.67	7.79	43.64	8.40

Table A2: IM72C3, IM72D3, IM72B3

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
300	37.25	8.05	45.22	8.63
295	36.97	7.98	45.10	8.56
290	36.57	7.93	44.73	8.51
285	36.24	7.86	44.33	8.44
280	35.99	7.78	44.21	8.36
275	35.56	7.73	44.07	8.31
270	35.28	7.65	43.86	8.24

Table A3: XS72C3, XS72D3, XS72B3

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
315	38.06	8.28	45.77	8.85
310	37.64	8.24	45.65	8.82
305	37.24	8.19	45.35	8.77
300	36.85	8.14	45.00	8.73
295	36.38	8.11	44.53	8.70
290	35.86	8.09	44.37	8.69
285	35.37	8.06	44.35	8.67
280	34.91	8.02	44.30	8.64

Table A4: IM60C2, IM60D2, IM60B2

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
250	30.79	8.12	37.62	8.68
245	30.41	8.06	37.52	8.62
240	29.96	8.01	37.28	8.58
235	29.66	7.92	36.91	8.50
230	29.24	7.87	36.67	8.44
225	28.79	7.81	36.37	8.40
220	28.48	7.73	36.16	8.32

Table A5: IM60C3, IM60D3, IM60B3

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
250	30.93	8.08	37.68	8.63
245	30.65	7.99	37.53	8.55
240	30.27	7.93	37.14	8.48
235	29.96	7.84	36.86	8.40
230	29.62	7.77	36.73	8.32
225	29.28	7.68	36.65	8.25
220	29.03	7.58	36.37	8.15

Table A6: XS60C3, XS60D3, XS60B3

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
260	31.40	8.28	38.04	8.83
255	30.97	8.23	37.89	8.79
250	30.62	8.16	37.44	8.73
245	30.11	8.14	37.09	8.70
240	29.67	8.09	36.96	8.68
235	29.20	8.05	36.98	8.65

Table A7: IM54C2, IM54D2, IM54B2

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
220	27.28	8.06	33.81	8.62
215	26.89	7.99	33.48	8.55
210	26.53	7.91	33.18	8.48
205	26.11	7.85	32.81	8.42
200	25.72	7.77	32.58	8.34
195	25.39	7.68	32.40	8.26

Table A8: IM54C3, IM54D3, IM54B3

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
225	27.82	8.09	33.91	8.63
220	27.47	8.01	33.78	8.55
215	27.16	7.91	33.40	8.46
210	26.85	7.82	33.10	8.36
205	26.49	7.74	33.05	8.28
200	26.18	7.64	32.69	8.19
195	25.83	7.55	32.53	8.10

Table A9: XS54C3, XS54D3, XS54B3

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
235	28.35	8.29	34.32	8.84
230	27.93	8.23	34.08	8.79
225	27.52	8.18	33.65	8.72
220	27.05	8.13	33.37	8.70
215	26.55	8.10	33.26	8.67
210	26.11	8.04	33.26	8.64

Table A10: IM48C2, IM48D2, IM48B2

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
200	24.56	8.14	30.07	8.68
195	24.23	8.05	29.99	8.61
190	23.81	7.98	29.66	8.54
185	23.46	7.89	29.34	8.45

Table A11: IM48C3, IM48D3, IM48B3

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
200	24.69	8.10	30.13	8.63
195	24.38	8.00	29.92	8.54
190	24.03	7.91	29.62	8.44
185	23.74	7.79	29.39	8.32

Table A12: XS48C3, XS48D3, XS48B3

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
210	25.22	8.33	30.52	8.85
205	24.80	8.27	30.35	8.80
200	24.45	8.18	29.96	8.73
195	23.95	8.14	29.62	8.69
190	23.46	8.10	29.55	8.67

Table A13: IM42C2, IM42D2, IM42B2

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
175	21.49	8.14	26.38	8.68
170	21.07	8.07	26.25	8.61
165	20.72	7.96	25.83	8.51
160	20.32	7.87	25.59	8.43

Table A14: IM42C3, IM42D3, IM42B3

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
175	21.56	8.12	26.38	8.63
170	21.23	8.01	26.15	8.53
165	20.91	7.89	25.83	8.41
160	20.59	7.77	25.70	8.30

Table A15: XS42C3, XS42D3, XS42B3

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
180	21.73	8.28	26.59	8.82
175	21.36	8.19	26.18	8.72
170	20.89	8.14	25.91	8.69
165	20.41	8.08	25.89	8.66

Table A16 : IM36C2,IM36D2,IM36B2

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
150	18.38	8.16	22.56	8.68
145	17.95	8.08	22.45	8.60
140	17.60	7.95	22.10	8.48
135	17.21	7.85	21.83	8.40

Table A17: IM36C3, IM36D3, IM36B3

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
150	18.48	8.12	22.60	8.63
145	18.14	7.99	22.34	8.51
140	17.85	7.84	22.10	8.37
135	17.51	7.71	22.00	8.25

Table A18: XS36C3, XS36D3, XS36B3

Pmp (W)	Vmp (V)	Imp (A)	Voc (V)	Isc (A)
155	18.63	8.32	22.78	8.83
150	18.29	8.20	22.49	8.73
145	17.81	8.14	22.19	8.68
140	17.36	8.06	22.19	8.64

Appendix B: Module Physical Properties

In the below tables, the module power level is replaced with XXX. For power range available for a given model, consult Tables A1-A17 above.

Table B1: Physical Properties for 72 cell module types

Model Number	No. Cells	Motech Cell Type	Backsheet Color	Frame Color	Frame Style	Frame Height (mm)	Width (mm)	Length (mm)	Connector Type	Pigtail Length (m)	mass (kg)
IM72C2-XXX-T12B50	72	IM156	White	Clear	Box	50	992	1966	Solarlok	1.2	27.2
IM72C3-XXX-T12B50	72	IM156B3	White	Clear	Box	50	992	1966	Solarlok	1.2	27.2
XS72C3-XXX-T12B50	72	XS156B3-200R	White	Clear	Box	50	992	1966	Solarlok	1.2	27.2
IM72C2-XXX-T12B45	72	IM156	White	Clear	Box	45	992	1966	Solarlok	1.2	27.1
IM72C3-XXX-T12B45	72	IM156B3	White	Clear	Box	45	992	1966	Solarlok	1.2	27.1
XS72C3-XXX-T12B45	72	XS156B3-200R	White	Clear	Box	45	992	1966	Solarlok	1.2	27.1

Table B2: Physical Properties for 60 cell module types

Model Number	No. Cells	Motech Cell Type	Backsheet Color	Frame Color	Frame Style	Frame Height (mm)	Width (mm)	Length (mm)	Connector Type	Pigtail Length (m)	mass (kg)
IM60C2-XXX-T10B50	60	IM156	White	Clear	Box	50	992	1650	Solarlok	1.0	19.9
IM60D2-XXX-T10B50	60	IM156	White	Black	Box	50	992	1650	Solarlok	1.0	19.9
IM60B2-XXX-T10B50	60	IM156	Black	Black	Box	50	992	1650	Solarlok	1.0	19.9
IM60C3-XXX-T10B50	60	IM156B3	White	Clear	Box	50	992	1650	Solarlok	1.0	19.9
IM60D3-XXX-T10B50	60	IM156B3	White	Black	Box	50	992	1650	Solarlok	1.0	19.9
IM60B3-XXX-T10B50	60	IM156B3	Black	Black	Box	50	992	1650	Solarlok	1.0	19.9
XS60C3-XXX-T10B50	60	XS156B3-200R	White	Clear	Box	50	992	1650	Solarlok	1.0	19.9
XS60D3-XXX-T10B50	60	XS156B3-200R	White	Black	Box	50	992	1650	Solarlok	1.0	19.9
XS60B3-XXX-T10B50	60	XS156B3-200R	Black	Black	Box	50	992	1650	Solarlok	1.0	19.9
IM60C2-XXX-T10B40	60	IM156	White	Clear	Box	40	992	1650	Solarlok	1.0	19.9
IM60D2-XXX-T10B40	60	IM156	White	Black	Box	40	992	1650	Solarlok	1.0	19.9
IM60B2-XXX-T10B40	60	IM156	Black	Black	Box	40	992	1650	Solarlok	1.0	19.9
IM60C3-XXX-T10B40	60	IM156B3	White	Clear	Box	40	992	1650	Solarlok	1.0	19.9
IM60D3-XXX-T10B40	60	IM156B3	White	Black	Box	40	992	1650	Solarlok	1.0	19.9
IM60B3-XXX-T10B40	60	IM156B3	Black	Black	Box	40	992	1650	Solarlok	1.0	19.9
XS60C3-XXX-T10B40	60	XS156B3-200R	White	Clear	Box	40	992	1650	Solarlok	1.0	19.9
XS60D3-XXX-T10B40	60	XS156B3-200R	White	Black	Box	40	992	1650	Solarlok	1.0	19.9
XS60B3-XXX-T10B40	60	XS156B3-200R	Black	Black	Box	40	992	1650	Solarlok	1.0	19.9
IM60C2-XXX-T12B50	60	IM156	White	Clear	Box	50	992	1650	Solarlok	1.2	19.9
IM60D2-XXX-T12B50	60	IM156	White	Black	Box	50	992	1650	Solarlok	1.2	19.9
IM60B2-XXX-T12B50	60	IM156	Black	Black	Box	50	992	1650	Solarlok	1.2	19.9
IM60C3-XXX-T12B50	60	IM156B3	White	Clear	Box	50	992	1650	Solarlok	1.2	19.9
IM60D3-XXX-T12B50	60	IM156B3	White	Black	Box	50	992	1650	Solarlok	1.2	19.9
IM60B3-XXX-T12B50	60	IM156B3	Black	Black	Box	50	992	1650	Solarlok	1.2	19.9
XS60C3-XXX-T12B50	60	XS156B3-200R	White	Clear	Box	50	992	1650	Solarlok	1.2	19.9
XS60D3-XXX-T12B50	60	XS156B3-200R	White	Black	Box	50	992	1650	Solarlok	1.2	19.9
XS60B3-XXX-T12B50	60	XS156B3-200R	Black	Black	Box	50	992	1650	Solarlok	1.2	19.9
IM60C2-XXX-T12B40	60	IM156	White	Clear	Box	40	992	1650	Solarlok	1.2	19.6
IM60D2-XXX-T12B40	60	IM156	White	Black	Box	40	992	1650	Solarlok	1.2	19.6
IM60B2-XXX-T12B40	60	IM156	Black	Black	Box	40	992	1650	Solarlok	1.2	19.6
IM60C3-XXX-T12B40	60	IM156B3	White	Clear	Box	40	992	1650	Solarlok	1.2	19.6
IM60D3-XXX-T12B40	60	IM156B3	White	Black	Box	40	992	1650	Solarlok	1.2	19.6
IM60B3-XXX-T12B40	60	IM156B3	Black	Black	Box	40	992	1650	Solarlok	1.2	19.6
XS60C3-XXX-T12B40	60	XS156B3-200R	White	Clear	Box	40	992	1650	Solarlok	1.2	19.6
XS60D3-XXX-T12B40	60	XS156B3-200R	White	Black	Box	40	992	1650	Solarlok	1.2	19.6
XS60B3-XXX-T12B40	60	XS156B3-200R	Black	Black	Box	40	992	1650	Solarlok	1.2	19.6

Table B3: Physical Properties for 54 cell module types

Model Number	No. Cells	Motech Cell Type	Frame Color	Backsheet Color	Frame Style	Frame Height (mm)	Width (mm)	Length (mm)	Connector Type	Pigtail Length (m)	mass (kg)
IM54C2-XXX-T10B50	54	IM156	Clear	White	Box	50	992	1492	Solarlok	1.0	18.2
IM54D2-XXX-T10B50	54	IM156	Black	White	Box	50	992	1492	Solarlok	1.0	18.2
IM54B2-XXX-T10B50	54	IM156	Black	Black	Box	50	992	1492	Solarlok	1.0	18.2
IM54C3-XXX-T10B50	54	IM156B3	Clear	White	Box	50	992	1492	Solarlok	1.0	18.2
IM54D3-XXX-T10B50	54	IM156B3	Black	White	Box	50	992	1492	Solarlok	1.0	18.2
IM54B3-XXX-T10B50	54	IM156B3	Black	Black	Box	50	992	1492	Solarlok	1.0	18.2
XS54C3-XXX-T10B50	54	XS156B3-200R	Clear	White	Box	50	992	1492	Solarlok	1.0	18.2
XS54D3-XXX-T10B50	54	XS156B3-200R	Black	White	Box	50	992	1492	Solarlok	1.0	18.2
XS54B3-XXX-T10B50	54	XS156B3-200R	Black	Black	Box	50	992	1492	Solarlok	1.0	18.2
IM54C2-XXX-T10B40	54	IM156	Clear	White	Box	40	992	1492	Solarlok	1.0	17.9
IM54D2-XXX-T10B40	54	IM156	Black	White	Box	40	992	1492	Solarlok	1.0	17.9
IM54B2-XXX-T10B40	54	IM156	Black	Black	Box	40	992	1492	Solarlok	1.0	17.9
IM54C3-XXX-T10B40	54	IM156B3	Clear	White	Box	40	992	1492	Solarlok	1.0	17.9
IM54D3-XXX-T10B40	54	IM156B3	Black	White	Box	40	992	1492	Solarlok	1.0	17.9
IM54B3-XXX-T10B40	54	IM156B3	Black	Black	Box	40	992	1492	Solarlok	1.0	17.9
XS54C3-XXX-T10B40	54	XS156B3-200R	Clear	White	Box	40	992	1492	Solarlok	1.0	17.9
XS54D3-XXX-T10B40	54	XS156B3-200R	Black	White	Box	40	992	1492	Solarlok	1.0	17.9
XS54B3-XXX-T10B40	54	XS156B3-200R	Black	Black	Box	40	992	1492	Solarlok	1.0	17.9

Table B4: Physical Properties for 48 cell module types

Model Number	No. Cells	Motech Cell Type	Frame Color	Backsheet Color	Frame Style	Frame Height (mm)	Width (mm)	Length (mm)	Connector Type	Pigtail Length (m)	mass (kg)
IM48C2-XXX-T10B50	48	IM156	Clear	White	Box	50	992	1334	Solarlok	1.0	16.5
IM48D2-XXX-T10B50	48	IM156	Black	White	Box	50	992	1334	Solarlok	1.0	16.5
IM48B2-XXX-T10B50	48	IM156	Black	Black	Box	50	992	1334	Solarlok	1.0	16.5
IM48C3-XXX-T10B50	48	IM156B3	Clear	White	Box	50	992	1334	Solarlok	1.0	16.5
IM48D3-XXX-T10B50	48	IM156B3	Black	White	Box	50	992	1334	Solarlok	1.0	16.5
IM48B3-XXX-T10B50	48	IM156B3	Black	Black	Box	50	992	1334	Solarlok	1.0	16.5
XS48C3-XXX-T10B50	48	XS156B3-200R	Clear	White	Box	50	992	1334	Solarlok	1.0	16.5
XS48D3-XXX-T10B50	48	XS156B3-200R	Black	White	Box	50	992	1334	Solarlok	1.0	16.5
XS48B3-XXX-T10B50	48	XS156B3-200R	Black	Black	Box	50	992	1334	Solarlok	1.0	16.5
IM48C2-XXX-T10B40	48	IM156	Clear	White	Box	40	992	1334	Solarlok	1.0	16.2
IM48D2-XXX-T10B40	48	IM156	Black	White	Box	40	992	1334	Solarlok	1.0	16.2
IM48B2-XXX-T10B40	48	IM156	Black	Black	Box	40	992	1334	Solarlok	1.0	16.2
IM48C3-XXX-T10B40	48	IM156B3	Clear	White	Box	40	992	1334	Solarlok	1.0	16.2
IM48D3-XXX-T10B40	48	IM156B3	Black	White	Box	40	992	1334	Solarlok	1.0	16.2
IM48B3-XXX-T10B40	48	IM156B3	Black	Black	Box	40	992	1334	Solarlok	1.0	16.2
XS48C3-XXX-T10B40	48	XS156B3-200R	Clear	White	Box	40	992	1334	Solarlok	1.0	16.2
XS48D3-XXX-T10B40	48	XS156B3-200R	Black	White	Box	40	992	1334	Solarlok	1.0	16.2
XS48B3-XXX-T10B40	48	XS156B3-200R	Black	Black	Box	40	992	1334	Solarlok	1.0	16.2

Table B5: Physical Properties for 42 cell module types

Model Number	No. Cells	Motech Cell Type	Frame Color	Backsheet Color	Frame Style	Frame Height (mm)	Width (mm)	Length (mm)	Connector Type	Pigtail Length (m)	mass (kg)
IM42C2-XXX-T10B50	42	IM156	Clear	White	Box	50	992	1176	Solarlok	1.0	14.8
IM42D2-XXX-T10B50	42	IM156	Black	White	Box	50	992	1176	Solarlok	1.0	14.8
IM42B2-XXX-T10B50	42	IM156	Black	Black	Box	50	992	1176	Solarlok	1.0	14.8
IM42C3-XXX-T10B50	42	IM156B3	Clear	White	Box	50	992	1176	Solarlok	1.0	14.8
IM42D3-XXX-T10B50	42	IM156B3	Black	White	Box	50	992	1176	Solarlok	1.0	14.8
IM42B3-XXX-T10B50	42	IM156B3	Black	Black	Box	50	992	1176	Solarlok	1.0	14.8
XS42C3-XXX-T10B50	42	XS156B3-200R	Clear	White	Box	50	992	1176	Solarlok	1.0	14.8
XS42D3-XXX-T10B50	42	XS156B3-200R	Black	White	Box	50	992	1176	Solarlok	1.0	14.8
XS42B3-XXX-T10B50	42	XS156B3-200R	Black	Black	Box	50	992	1176	Solarlok	1.0	14.8
IM42C2-XXX-T10B40	42	IM156	Clear	White	Box	40	992	1176	Solarlok	1.0	14.5
IM42D2-XXX-T10B40	42	IM156	Black	White	Box	40	992	1176	Solarlok	1.0	14.5
IM42B2-XXX-T10B40	42	IM156	Black	Black	Box	40	992	1176	Solarlok	1.0	14.5
IM42C3-XXX-T10B40	42	IM156B3	Clear	White	Box	40	992	1176	Solarlok	1.0	14.5
IM42D3-XXX-T10B40	42	IM156B3	Black	White	Box	40	992	1176	Solarlok	1.0	14.5
IM42B3-XXX-T10B40	42	IM156B3	Black	Black	Box	40	992	1176	Solarlok	1.0	14.5
XS42C3-XXX-T10B40	42	XS156B3-200R	Clear	White	Box	40	992	1176	Solarlok	1.0	14.5
XS42D3-XXX-T10B40	42	XS156B3-200R	Black	White	Box	40	992	1176	Solarlok	1.0	14.5
XS42B3-XXX-T10B40	42	XS156B3-200R	Black	Black	Box	40	992	1176	Solarlok	1.0	14.5

Table B6: Physical Properties for 36 cell module types

Model Number	No. Cells	Motech Cell Type	Frame Color	Backsheet Color	Frame Style	Frame Height (mm)	Width (mm)	Length (mm)	Connector Type	Pigtail Length (m)	mass (kg)
IM36C2-XXX-T10B50	36	IM156	Clear	White	Box	50	992	1018	Solarlok	1.0	13.0
IM36D2-XXX-T10B50	36	IM156	Black	White	Box	50	992	1018	Solarlok	1.0	13.0
IM36B2-XXX-T10B50	36	IM156	Black	Black	Box	50	992	1018	Solarlok	1.0	13.0
IM36C3-XXX-T10B50	36	IM156B3	Clear	White	Box	50	992	1018	Solarlok	1.0	13.0
IM36D3-XXX-T10B50	36	IM156B3	Black	White	Box	50	992	1018	Solarlok	1.0	13.0
IM36B3-XXX-T10B50	36	IM156B3	Black	Black	Box	50	992	1018	Solarlok	1.0	13.0
XS36C3-XXX-T10B50	36	XS156B3-200R	Clear	White	Box	50	992	1018	Solarlok	1.0	13.0
XS36D3-XXX-T10B50	36	XS156B3-200R	Black	White	Box	50	992	1018	Solarlok	1.0	13.0
XS36B3-XXX-T10B50	36	XS156B3-200R	Black	Black	Box	50	992	1018	Solarlok	1.0	13.0
IM36C2-XXX-T10B40	36	IM156	Clear	White	Box	40	992	1018	Solarlok	1.0	12.8
IM36D2-XXX-T10B40	36	IM156	Black	White	Box	40	992	1018	Solarlok	1.0	12.8
IM36B2-XXX-T10B40	36	IM156	Black	Black	Box	40	992	1018	Solarlok	1.0	12.8
IM36C3-XXX-T10B40	36	IM156B3	Clear	White	Box	40	992	1018	Solarlok	1.0	12.8
IM36D3-XXX-T10B40	36	IM156B3	Black	White	Box	40	992	1018	Solarlok	1.0	12.8
IM36B3-XXX-T10B40	36	IM156B3	Black	Black	Box	40	992	1018	Solarlok	1.0	12.8
XS36C3-XXX-T10B40	36	XS156B3-200R	Clear	White	Box	40	992	1018	Solarlok	1.0	12.8
XS36D3-XXX-T10B40	36	XS156B3-200R	Black	White	Box	40	992	1018	Solarlok	1.0	12.8
XS36B3-XXX-T10B40	36	XS156B3-200R	Black	Black	Box	40	992	1018	Solarlok	1.0	12.8

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Appendix C: Module Mounting Positions and Load Ratings

The PV system designer must determine if the mounting hardware and related mounting structure have sufficient strength to support the maximum design load transferred from the module.

Span	Distance
A-D	593.6mm
B-D	316 mm
W-X	248 mm

Each module must be affixed to the array structure at a minimum of four symmetric 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). Support/clamping locations must be chosen in accordance to Figure C1. For 72 and 60 cell modules any location between and including positions A and D or between points W and X can be selected for a ±2400 Pa load rating. For 54 cell and smaller models any location between and including positions B and D or between points W and X can be selected for a ±2400 Pa load rating. The positive value indicates downward pressure as from accumulated snow. The negative value indicates uplift pressure as from wind suction.

In locations following UL Standard 1703, ULC/ORD-C1703-01 the tested load information contained within Tables C1 through C9 must be divided by a safety factor of 1.5 to obtain the *design load* rating. This translates to a design load of ±33.4 lb/ft² for 2400Pa test load and +75.2 / -33.4 lb/ft² for 5400Pa rated locations [±163 kg/m² to +367 / -163 kg/m²].

In locations following IEC-61730 please note that IEC testing provides certification to a maximum **tested** load as indicated in Tables C1 through C11 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 system designer or end user

A high load rating of +5400Pa is only applicable to modules supported at point B for frames heights of 45mm or 50mm as indicated in Tables C1-C11 (40mm frames are not offered with a high snow load rating) .

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.

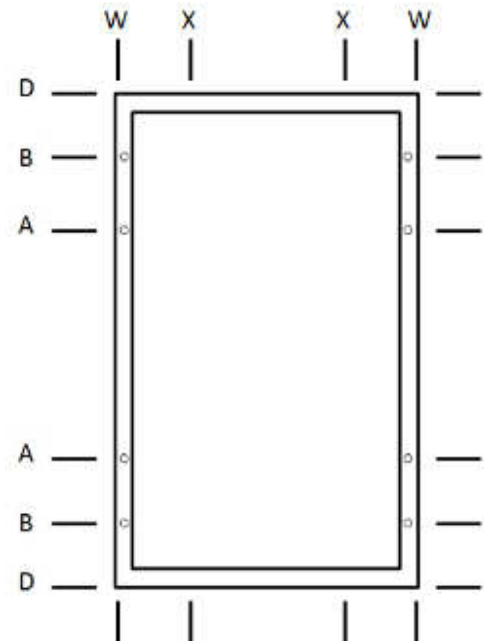


Figure C1: Mounting Locations

Table C1: IM72 & XS72 50mm or 45mm Frame Tested Load

Mounting Position	2400 Pa downward pressure	2400 Pa Uplift Pressure	5400 Pa downward pressure
A	✓	✓	NA
B	✓	✓	✓
D	✓	✓	NA
W*	✓	✓	NA
X*	✓	✓	NA

Table C2: IM60 & XS60 50mm Frame Tested Load

Mounting Position	2400 Pa downward pressure	2400 Pa Uplift Pressure	5400 Pa downward pressure
A	✓	✓	NA
B	✓	✓	✓
D	✓	✓	NA
W*	✓	✓	NA
X*	✓	✓	NA

Table C3: IM60 & XS60 40mm Frame Tested Load

Mounting Position	2400 Pa downward pressure	2400 Pa Uplift Pressure	5400 Pa downward pressure
A	✓	✓	NA
B	✓	✓	NA
D	✓	✓	NA
W*	✓	✓	NA
X*	✓	✓	NA

Table C4: IM54 & XS54 50mm Frame Tested Load

Mounting Position	2400 Pa downward pressure	2400 Pa Uplift Pressure	5400 Pa downward pressure
A	NA	NA	NA
B	✓	✓	✓
D	✓	✓	NA
W*	✓	✓	NA
X*	✓	✓	NA

Table C5: IM54 & XS54 40mm Frame Tested Load

Mounting Position	2400 Pa downward pressure	2400 Pa Uplift Pressure	5400 Pa downward pressure
A	NA	NA	NA
B	✓	✓	NA
D	✓	✓	NA
W*	✓	✓	NA
X*	✓	✓	NA

Table C6: IM48 & XS48 50mm Tested Load

Mounting Position	2400 Pa downward pressure	2400 Pa Uplift Pressure	5400 Pa downward pressure
A	NA	NA	NA
B	✓	✓	✓
D	✓	✓	NA
W*	✓	✓	NA
X*	✓	✓	NA

Table C7: IM48 & XS48 40mm Frame Tested Load

Mounting Position	2400 Pa downward pressure	2400 Pa Uplift Pressure	5400 Pa downward pressure
A	NA	NA	NA
B	✓	✓	NA
D	✓	✓	NA
W*	✓	✓	NA
X*	✓	✓	NA

Table C8: IM42 & XS42 50mm Tested Load

Mounting Position	2400 Pa downward pressure	2400 Pa Uplift Pressure	5400 Pa downward pressure
A	NA	NA	NA
B	✓	✓	✓
D	✓	✓	NA
W*	✓	✓	NA
X*	✓	✓	NA

Table C9: IM42 & XS42 40mm Frame Tested Load

Mounting Position	2400 Pa downward pressure	2400 Pa Uplift Pressure	5400 Pa downward pressure
A	NA	NA	NA
B	✓	✓	NA
D	✓	✓	NA
W*	✓	✓	NA
X*	✓	✓	NA

Table C10: IM36 & XS36 50mm Frame Tested Load

Mounting Position	2400 Pa downward pressure	2400 Pa Uplift Pressure	5400 Pa downward pressure
A	NA	NA	NA
B	✓	✓	✓
D	✓	✓	NA
W*	✓	✓	NA
X*	✓	✓	NA

Table C11: IM36 & XS36 40mm Frame Tested Load

Mounting Position	2400 Pa downward pressure	2400 Pa Uplift Pressure	5400 Pa downward pressure
A	NA	NA	NA
B	✓	✓	NA
D	✓	✓	NA
W*	✓	✓	NA
X*	✓	✓	NA

*Note: tested without supporting rails in positions W and X