



**MANUAL DE INSTALAÇÃO  
DE MÓDULOS SOLARES  
PADRÃO**

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## 1.0 INFORMAÇÕES GERAIS

Este manual geral fornece informações importantes de segurança relacionadas à instalação, manutenção e manuseio de módulos solares da série CS. O instalador profissional deve ler atentamente estas diretrizes e seguir rigorosamente estas instruções. O não cumprimento destas instruções pode resultar em morte, lesões ou danos materiais. A instalação e o manuseio de módulos fotovoltaicos requerem habilidades profissionais e devem ser realizados apenas por profissionais qualificados. Os instaladores devem informar aos usuários finais (consumidores) as informações mencionadas acima. A palavra "módulo" ou "módulo fotovoltaico" usada neste manual refere-se a um ou mais módulos solares da série CS. Este manual é válido apenas para os tipos de módulos padrão CS1V-MS, CS1VL-MS, CS1U-MS, CS1H-MS, CS1KMS, CS3U-P, CS3U-MS, CS3K-P, CS3K-MS, CS6A-P, CS6A-M, CS6V-P, CS6V-M, CS6K-P, CS6K-M, CS6K-MS, CS6V-MS, CS6VL-MS, CS6A-MS, CS6U-P, CS6U-M, CS3W-P, CS3L-P, CS3W-MS, CS3L-MS e CS1HA-MS. (Observação: Para o KuLite CS3K-P, uma opção especial de peso leve para o CS3K-P padrão se aplica apenas à região do Japão. Consulte o Anexo E separado: Método de Montagem com Grampos para o KuLite para obter seus métodos de montagem.) Por favor, guarde este manual para referência futura. Recomendamos verificar regularmente o site [www.canadiansolar.com](http://www.canadiansolar.com) para a versão mais atualizada.

### 1.1 ISENÇÃO DE RESPONSABILIDADE DO MANUAL DE INSTALAÇÃO

As informações contidas neste manual estão sujeitas a alterações pela Canadian Solar Inc. sem aviso prévio. A Canadian Solar Inc. não oferece garantia de qualquer tipo, explícita ou implícita, em relação às informações contidas neste documento. Em caso de inconsistência entre as diferentes versões deste documento em diferentes idiomas, prevalecerá a versão em inglês. Consulte nossas listas de produtos e documentos publicados em nosso site: <http://www.canadiansolar.com>, pois essas listas são atualizadas regularmente.

## 1.2 LIMITAÇÃO DE RESPONSABILIDADE

A Canadian Solar Inc. não será responsável por danos de qualquer tipo, incluindo - sem limitação - lesões corporais, danos ou prejuízos materiais, relacionados ao manuseio de módulos fotovoltaicos, instalação de sistemas ou conformidade ou não conformidade com as instruções contidas neste manual.

## 2.0 PRECAUÇÕES DE SEGURANÇA



### AVISO

Antes de tentar instalar, conectar, operar e/ou fazer a manutenção do módulo e de outros equipamentos elétricos, todas as instruções devem ser lidas e compreendidas. Os conectores dos módulos fotovoltaicos conduzem corrente contínua (CC) quando expostos à luz solar ou outras fontes de luz. O contato com partes eletricamente ativas do módulo, como terminais, pode resultar em lesões ou morte, independentemente de o módulo e os outros equipamentos elétricos estarem conectados.



### AVISO

Todas as instruções devem ser lidas e compreendidas antes de proceder à instalação, conexão, operação e/ou manutenção dos módulos. Os conectores dos módulos conduzem corrente contínua (CC) quando o módulo é exposto à luz solar ou outras fontes de luz. O contato com partes energizadas do módulo, como terminais de saída, pode resultar em ferimentos ou morte, independentemente de o módulo estar conectado ou não.

### SEGURANÇA GERAL

- Todos os módulos devem ser instalados por eletricitas licenciados de acordo com os códigos elétricos aplicáveis, como o mais recente Código Elétrico Nacional (EUA) ou Código Elétrico Canadense (Canada) ou outros códigos elétricos nacionais ou internacionais aplicáveis.



Roupas de proteção (luvas antiderrapantes, roupas, etc.) devem ser usadas durante a instalação para evitar o contato direto com 30 V CC ou mais e proteger as mãos.

Antes da instalação.



Remova todas as joias metálicas para evitar exposição acidental a circuitos energizados.



Durante a instalação dos módulos em chuva leve ou orvalho matinal, tome medidas apropriadas para evitar a entrada de água no conector.



**Não permita** a presença de crianças ou pessoas não autorizadas perto do local de instalação ou área de armazenamento dos módulos.

- Não instale os módulos em locais com ventos fortes.
- Utilize ferramentas com isolamento elétrico para reduzir o risco de choque elétrico.
- Se os disjuntores e dispositivos de proteção contra corrente excessiva (OCPD) não puderem ser abertos ou o inversor não puder ser desligado, cubra a frente dos módulos na matriz de painéis solares com um material opaco para interromper a produção de eletricidade durante a instalação ou manutenção de um módulo ou fiação.
- Não utilize ou instale módulos danificados.
- O contato com as superfícies ou estruturas dos módulos pode causar choque elétrico se o vidro frontal estiver quebrado ou a camada traseira estiver rasgada.
- O módulo fotovoltaico não contém peças reparáveis. Não tente reparar nenhuma parte do módulo.
- Mantenha a tampa da caixa de junção sempre fechada.

- **Não desmonte** um módulo ou remova qualquer parte dele.
- **Não concentre** artificialmente a luz solar em um módulo.
- **Não conecte** ou desconecte os módulos quando houver corrente proveniente dos módulos ou de uma fonte externa.

### 3.0 ESPECIFICAÇÕES MECÂNICAS / ELÉTRICAS

As classificações elétricas dos módulos são medidas sob Condições de Teste Padrão (STC) de irradiância de 1000 W/m<sup>2</sup>, com um espectro AM1.5 e temperatura da célula de 25°C. As características elétricas e mecânicas detalhadas dos módulos de silício cristalino da Canadian Solar Inc. podem ser encontradas no Anexo C (Classificações Mecânicas e Elétricas) em [www.canadiansolar.com](http://www.canadiansolar.com). As principais características elétricas em STC também são indicadas em cada rótulo do módulo. Consulte a ficha técnica ou a placa de identificação do produto para obter a tensão máxima do sistema. Em certas condições, um módulo pode produzir mais corrente ou tensão do que a potência nominal sob as Condições de Teste Padrão. Como resultado, a corrente de curto-circuito do módulo sob STC deve ser multiplicada por 1,25, e um fator de correção deve ser aplicado à tensão de circuito aberto (consulte a Tabela 1 abaixo) ao determinar as classificações e capacidades dos componentes. Dependendo das regulamentações locais, um multiplicador adicional de 1,25 para a corrente de curto-circuito (totalizando um multiplicador de 1,56) pode ser aplicável ao dimensionar condutores e fusíveis.

**Tabela 1: Fatores de correção de baixa temperatura para a tensão de circuito aberto**

Menor temperatura ambiente esperada (°C/°F)	Fator de correção
24 a 20 / 76 a 68	1.02
19 a 15 / 67 a 59	1.04
14 a 10 / 58 a 50	1.06
9 a 5 / 49 a 41	1.08
4 a 0 / 40 a 32	1.10
-1 a -5 / 31 a 23	1.12
-6 a -10 / 22 a 14	1.14
-11 a -15 / 13 a 5	1.16
-16 a -20 / 4 a -4	1.18
-21 a -25 / -5 a -13	1.20
-26 a -30 / -14 a -22	1.21
-31 a -35 / -23 a -31	1.23
-36 a -40 / -32 a -40	1.25

Fatores de correção mais precisos para a tensão de circuito aberto podem ser calculados usando a seguinte fórmula:

$$C_{VOC} = 1 - \alpha_{VOC} \times (25 - T)$$

T é a temperatura ambiente mais baixa esperada no local de instalação do sistema.

$\alpha_{VOC}$  (%/°C) é o coeficiente de temperatura da tensão do módulo selecionado (consulte a ficha técnica correspondente).

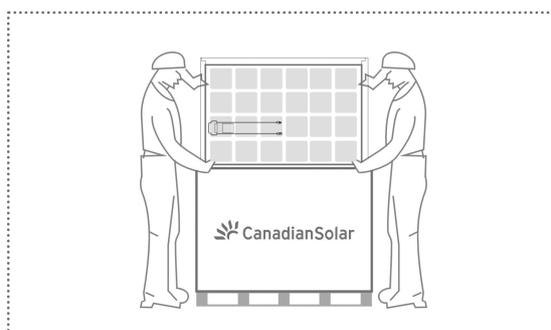
Cálculos elétricos e projetos devem ser realizados por engenheiros ou consultores competentes.

#### 4.0 DESEMPACOTAMENTO E PRECAUÇÕES DE ARMAZENAMENTO

### NOTICE

#### PRECAUÇÕES

- Os módulos devem ser armazenados em um ambiente seco e ventilado, evitando luz solar direta e umidade. Se os módulos forem armazenados em um ambiente não controlado, o tempo de armazenamento deve ser inferior a 3 meses e precauções extras devem ser tomadas para evitar que os conectores fiquem expostos à umidade ou luz solar, como o uso de tampas para conectores.
- Desembale os paletes de módulos com cuidado, seguindo as etapas indicadas no palete. Desembale, transporte e armazene os módulos com cuidado.
- Os módulos devem sempre ser desembalados e instalados por duas pessoas. Sempre use as duas mãos ao manusear os módulos.



- Não fique em pé, pise, ande e/ou pule em cima dos módulos em nenhuma circunstância. Cargas localizadas pesadas

podem causar microfissuras graves no nível das células, o que pode comprometer a confiabilidade do módulo e anular a garantia da Canadian Solar Inc.



Não apoie o módulo pelo verso ao manusear ou instalar o módulo.

- Não transporte módulos em cima da cabeça.
- Não deixe cair ou colocar objetos (como ferramentas) nos módulos.
- Não levante os módulos pelos fios ou caixa de junção, levante-os pelo quadro.
- Pilhas de módulos não devem conter mais do que 12 módulos, e os quadros devem estar alinhados.
- Não coloque cargas excessivas no módulo ou torça o quadro do módulo.
- Não use instrumentos afiados nos módulos. Deve-se ter cuidado especial para evitar danos nas partes traseiras dos módulos causados por objetos pontiagudos, pois arranhões podem afetar diretamente a segurança do produto.
- Não deixe os módulos sem suporte ou não fixados.
- Não altere a fiação dos diodos de bypass.
- Mantenha todos os conectores limpos e secos o tempo todo.
- Não exponha os módulos e seus conectores a substâncias químicas não autorizadas (como óleo, lubrificante, pesticida, etc.).

#### IDENTIFICAÇÃO DO PRODUTO

- Cada módulo possui três códigos de barras idênticos (um na laminação sob o vidro frontal, o segundo na parte traseira do módulo e o terceiro no quadro) que atuam como um identificador único. Cada módulo possui um número de série exclusivo contendo 13 (pré











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HBVWHMMPGHYLGDPHQWDFRSODGDVVERQHFWRU

IRWRYROWDLFRQRGHYHWHUWXEPHWLGRDBVWUHVH

HWHUQRVERQHFWRUHVGHYHPVHUVDGRVDSHQDVSUD

FRQHFWDURELUFXLWR[DHVQXQFDGHYHPVHUVDGRVSDUD

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FRQHFWRUHV

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PGXORVGGDDQDGLDQ6RODU[QFGHYHWHUEHUWLILFDGR  
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· y2V[QVWDODGRUHV]SRGHPVDUEBERGHERQGXWRU  
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PULFDGR]RUWHH]BERGHERQGXWRUQLFR  
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· yHYHWHU]XWLOL]DGRD]SHQD]VBDWHULDOGHERQGXWRU  
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DGHTXDGDSDUDBLQLPL]DUD]TXHG]DGHW]HQVRH  
JDUDQWLUTXHD]EDSD]FLGDGH]GHERU]UHQWH]GRERQGXWRU  
HVWHMDGH]DFRUGRERPDV]UHJXODPHQWD[IVDRFDLV  
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RSURFHVVVRGHSURYDRIRUPDO  
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H]PERUDR]VPGXORV]HMDPEHUWLILFDGRVERPRD]VH  
,,GH]HXUDQD]H]FRPHQGDPRV]TXH]HMDP  
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SRUXPHOHWULFLVWD]TXDOLILFDGR  
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GHILRGHEREUH]GH]Bpt]VIXURV  
IRUQHFLGRVSDUDHV]HILPVR]LGHQWLILFDGRVERPXP  
VPERORGH]DWHUUDPHQWR[[]

1. Todas as junções de conexão condutivas devem ser firmemente fixadas.

· Não perfure nenhum furo adicional no solo por conveniência, pois isso invalidará a garantia dos módulos.

Todos os parafusos, porcas, arruelas planas, arruelas de pressão e outros elementos de fixação relevantes devem ser feitos de aço inoxidável, a menos que especificado de outra forma.

· A Canadian Solar Inc. não fornece hardware de aterramento.

· Um método de aterramento é recomendado para todos módulos padrão da Canadian Solar Inc., conforme descrito abaixo. Para métodos de aterramento alternativos, consulte o Anexo B (Métodos Alternativos de Aterramento) deste manual de instalação. Pode não ser possível utilizar métodos de aterramento padrão para certas

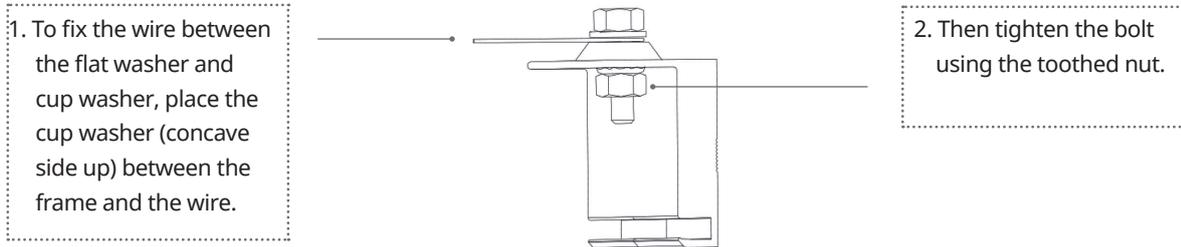
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FRORFDQGR]BV]GH]QWUR]GH]X]P]ERQGXWH]BHWOLF  
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OX]VRODU

· QHFHVULR]XP]DLR]BQLPR]GHEXUYD]WXUD]GHD  
PP]RODR

faixas de módulos. Consulte o Anexo B para mais detalhes.

**GROUNDING METHOD:  
BOLT + TOOTHED NUT + CUP WASHER.**



- A grounding kit containing an M5 (3/16") SS cap bolt, an M5 (3/16") SS flat washer, an M5 (3/16") SS cup washer, and an M5 (3/16") SS nut (with teeth) is used to attach copper grounding wire to a pre-drilled grounding hole on the frame (see image below).
- Place the wire between the flat washer and the cup washer. Ensure that the cup washer is positioned between the frame and the wire with the concave side up to prevent galvanic corrosion. Tighten the bolt securely using the SS toothed nut. A wrench may be used to do this. The tightening torque is 3-7 Nm (2.2-5.2 ft-lbs).

## 6.0 MOUNTING INSTRUCTIONS



The applicable regulations pertaining to work safety, accident prevention and securing the construction site must be observed. Workers and third party personnel shall wear or install fall arrest equipment. Any third party need to be protected against injuries and damages.

- The mounting design must be certified by a registered professional engineer. The mounting design and procedures must comply with all applicable local codes and requirements from all relevant authorities.
- The module is considered to be in compliance with UL 1703 and IEC 61215 only when the module is mounted in the manner specified by the mounting instructions included in this installation manual.
- Any module without a frame (laminated) shall not be considered to comply with the requirements of UL

1703 unless the module is mounted with hardware that has been tested and evaluated with the module under this standard or by a field inspection certifying that the installed module complies with the requirements of UL 1703.

- Canadian Solar Inc. does not provide mounting hardware.
- Standard modules can be mounted onto a support structure using one of several approved methods. One of such methods is described below. For details of other mounting methods and the methods recommended by Canadian Solar Inc. for special module ranges, please refer to the Annex A (Alternative Mounting Methods) of this installation manual. For information about other installation methods, please contact your local representative. Failure to use a recognized installation method will void the Canadian Solar Inc. warranty.
- Use appropriate corrosion-proof fastening materials. All mounting hardware (bolts, spring washers, flat washers, nuts) should be hot dip galvanized or stainless steel.
- Use a torque wrench for installation.
- Do not drill additional holes or modify the module frame. Doing so will void the warranty.
- Standard modules can be installed in either landscape or portrait orientations. Refer to the detailed instructions for further guidance. Please note that in areas with heavy snowfall (> 2400 Pa) further countermeasures such the use of additional support bars should be considered to avoid snow loads damaging the lowest row of modules.

- In cases where an additional support bar is recommended to improve both mechanical stability and long-term module performance, we recommend selecting a sufficiently resistant material. Canadian Solar Inc. recommends bars with a minimum thickness of 50 mm (1.97 in). The support bar centerline should be positioned within 100 mm (3.94 in) of the side frame centerline (slight shifts may be necessary to access module grounding holes).
- The loads described in this manual correspond to test loads. For installations complying with IEC 61215-2: 2016 and UL 1703, a safety factor of 1.5 should be applied for calculating the equivalent maximum authorized design loads. Project design loads depend on construction, applicable standards, location and local climate. Determination of the design loads is the responsibility of the racking suppliers and / or professional engineers. For detailed information, please follow local structural code or contact your professional structural engineer.

## 6.1 MOUNTING METHOD: BOLTING

- This mounting method has been qualified by Canadian Solar Inc. as well as certified by VDE. and CSA.
- Modules should be bolted to supporting structures through the mounting holes in the rear frame flanges only.
- Each module must be securely fastened at a minimum of 4 points on two opposite sides.

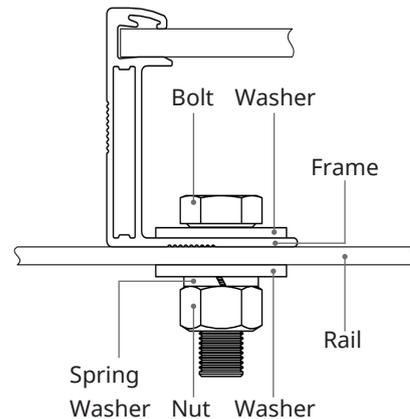
M8 X 1.25 - Grade 8.8 (5/16"-18 Grade B7) galvanized or A2-70 stainless steel bolt and nut should be used.

The yield strength of bolt and nut should not be less than 450 MPa.

- Tightening torques should be 17~23 Nm (12.5~17.0 ft-lbs) respectively for M8 (5/16"-18) coarse thread bolts, depending on bolt class.
- In areas with heavy wind loads, additional mounting points should be used. The system designer and the installer are responsible for

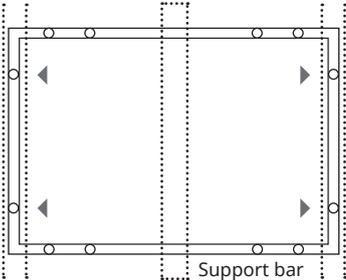
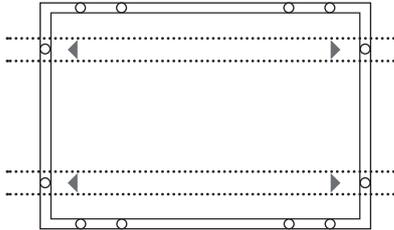
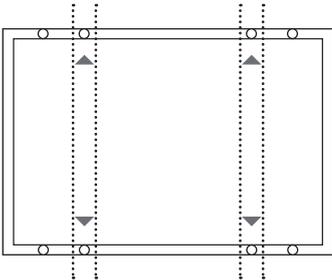
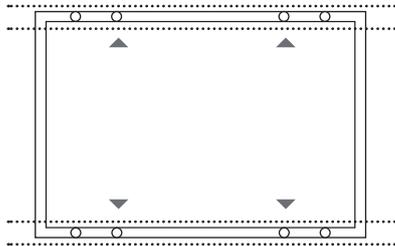
correctly calculating the loads and ensuring that the supporting structure meets all the applicable requirements.

### Mounting method: Bolting

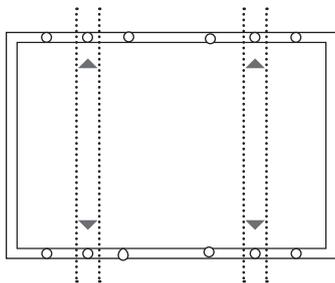


- Modules should be bolted at the following hole locations depending on the configuration and loads:

**Table 5: Approved bolting methods**

<p>Bolting on the short frame side using four standard mounting holes. Mounting rails run perpendicularly to the long frame side. An additional support bar should be placed below the module as shown below.</p>  <p>Support bar</p> <p>Maximum Load: Uplift load <math>\leq</math> 2400 Pa Downforce load <math>\leq</math> 5400 Pa</p> <p>Compatible module types: CS6A-P, CS6A-M and CS6A-MS</p>	<p>Bolting on the short frame side using four standard mounting holes. Mounting rails run parallel to the long frame side.</p>  <p>Maximum Load: Uplift load <math>\leq</math> 2400 Pa Downforce load <math>\leq</math> 2400 Pa</p> <p>Compatible module types: CS6A-P, CS6A-M and CS6A-MS</p>
<p>Bolting on the long frame side using four innermost mounting holes. Mounting rails run perpendicularly to the long frame side.</p>  <p>Maximum Load: Uplift load <math>\leq</math> 2400 Pa Downforce load <math>\leq</math> 5400 Pa</p> <p>Compatible module types: CS1V-MS, CS1VL-MS, CS3K-P, CS3K-MS, CS6A-P, CS6A-M, CS6V-P, CS6V-M, CS6K-P, CS6K-M, CS6K-MS, CS6V-MS, CS6VL-MS, CS6A-MS and CS1HA-MS</p> <p>(Please refer to the separate manual for the KuLite CS3K-P which is a lightweight option for standard CS3K-P only for Japan region)</p>	<p>Bolting on the long frame side using four innermost mounting holes. Mounting rails run parallel to the long frame side.</p>  <p>Maximum Load: Uplift load <math>\leq</math> 2400 Pa Downforce load <math>\leq</math> 4000 Pa</p> <p>Compatible module types: CS1V-MS, CS1VL-MS, CS3K-P, CS3K-MS, CS6A-P, CS6A-M, CS6A-MS, CS6V-P, CS6V-M, CS6V-MS, CS6K-P, CS6K-M, CS6K-MS and CS1HA-MS</p> <p>(Please refer to the separate manual for the KuLite CS3K-P which is a lightweight option for standard CS3K-P only for Japan region)</p>

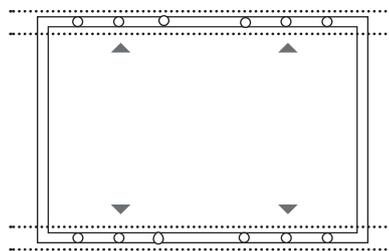
Bolting on the long frame side using four middle mounting holes. Mounting rails run perpendicularly to the long frame side.



Maximum Load:  
Uplift load ≤ 2400 Pa  
Downforce load ≤ 5400 Pa

Compatible module types: CS3U-P, CS3U-MS, CS6U-P, CS6U-M, CS3W-P and CS3W-MS

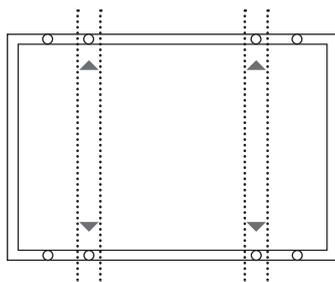
Bolting on the long frame side using four middle mounting holes. Mounting rails run parallel to the long frame side.



Maximum Load:  
Uplift load ≤ 2400 Pa  
Downforce load ≤ 5400 Pa

Compatible module types: CS3U-P, CS3U-MS, CS6U-P and CS6U-M

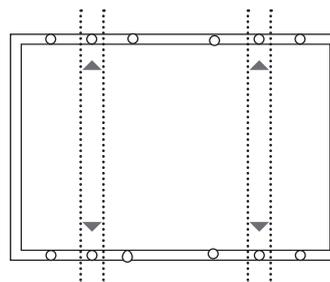
Bolting on the long frame side using four innermost mounting holes. Mounting rails run perpendicularly to the long frame side.



Maximum Load:  
Uplift load ≤ 2400 Pa  
Downforce load ≤ 5400 Pa

Compatible module types: CS3L-P, CS3L-MS, CS1H-MS and CS1K-MS

Bolting on the long frame side using four middle mounting holes. Mounting rails run perpendicularly to the long frame side.



Maximum Load:  
Uplift load ≤ 2400 Pa  
Downforce load ≤ 5400 Pa

Compatible module types: CS1U-MS

## 7.0 MAINTENANCE

- **Do not** make modifications to any components of the PV module (diode, junction box, plug connectors or others).
- Regular maintenance is required to keep modules clear of snow, bird droppings, seeds, pollen, leaves, branches, dirt spots, and dust.
- Modules with sufficient tilt (at least 15°), generally may not require cleaning (rain will have a self-cleaning effect). If the module has become soiled, wash with water and a non-abrasive cleaning

implement (sponge) during the cool part of the day. Do not scrape or rub dry dirt away, as this may cause micro scratches.

- Snow should be removed using a soft brush.
- Periodically inspect the system to check the integrity of all wiring and supports.
- To protect against electric shock or injury, electrical or mechanical inspections and maintenance should be performed by qualified personnel only.
- Please refer to Annex D (Module Cleaning Guide) for additional information on this topic.

## ANNEX A: ALTERNATIVE MOUNTING METHODS

All the basic requirements of the main installation manual should apply to the alternative mounting methods, unless otherwise specified.

The loads described in this manual corresponds to test loads. For installations complying with IEC 61215-2: 2016 and UL 1703, a safety factor of 1.5 should be applied for calculating the equivalent maximum authorized design loads.

Project design loads depend on construction, applicable standards, location and local climate. Determination of the design loads is the responsibility of the racking suppliers or professional engineers. For detailed information, please follow local structural code or contact your professional structural engineer.

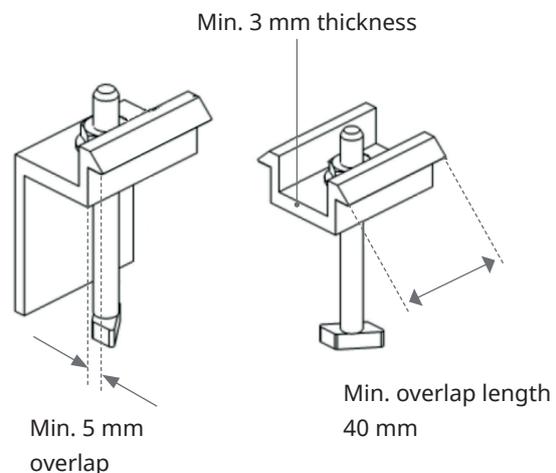
### MOUNTING METHOD A CLAMPING

- The mounting method has been qualified by Canadian Solar Inc. as well as certified by VDE and CSA.
- Top or bottom clamping methods will vary and are dependent on the mounting structures. Please follow the mounting guidelines recommended by the mounting system supplier.
- Each module must be securely fastened at a minimum of four points on two opposite sides. The clamps should be positioned symmetrically. The clamps should be positioned according to the authorized position ranges defined in table A.
- Install and tighten the module clamps to the mounting rails using the torque stated by the mounting hardware manufacturer. M8 X 1.25 (5/16") bolt and nut are used for this clamping method.
- Tightening torques should be within 17~23 Nm (12.5~17.0 ft-lbs) for M8 (5/16") coarse thread bolts, depending on the bolt class. For the bolt grade, the technical guideline from the fastener suppliers should be followed. Different recommendations from specific clamping hardware suppliers should prevail.
- The system designer and installer are responsible for load calculations and for proper design of sup-

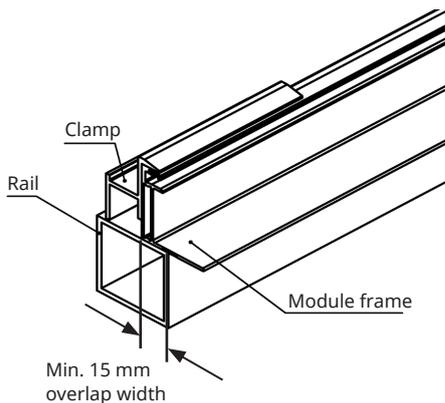
port structure.

- Canadian Solar Inc.'s warranty may be void in cases where improper clamps or unsuitable installation methods are found. When installing inter-modules or end-type clamps, please take the following measures into account:

- ① Do not bend the module frame.
- ② Do not touch or cast shadows on the front glass.
- ③ Do not damage the surface of the frame (to the exception of the clamps with bonding pins).
- ④ Ensure the clamps overlap the module frame by at least 5 mm (0.2 in)
- ⑤ Overlap in length by at least
  - a) 80 mm (3.15 in) when  $2400 \text{ Pa} < \text{uplift load} \leq 4000 \text{ Pa}$  is required.
  - b) 40 mm (1.57 in) when uplift load  $\leq 2400 \text{ Pa}$  is required.
- ⑥ Ensure the clamp's thickness is at least 3 mm (0.12 in).

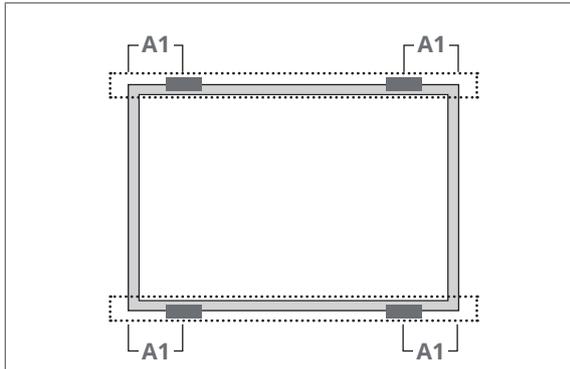


- Clamp material should be anodized aluminum alloy or stainless steel.
- Clamp positions are of crucial importance for the reliability of the installation. The clamp centerlines must only be positioned within the ranges indicated in table A, depending on the configuration and load.
- For configurations where the mounting rails run parallel to the frame, precautions should be taken to ensure the bottom flange of the module frame overlaps the rail by 15 mm (0.59 in) or more.



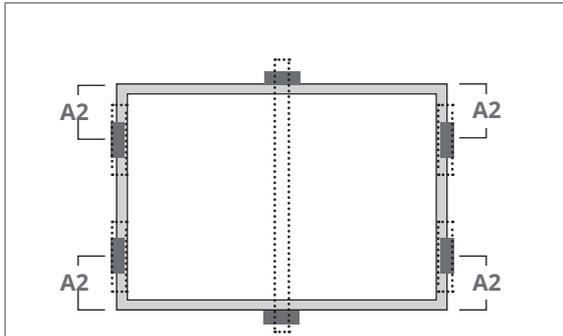
**Table A**  
**CS3U-P, CS3U-MS, CS6U-P and CS6U-M**

<p>Use four clamps on the long side. Mounting rails run perpendicularly to the long side frame.</p>	<p>Use two clamps on the long side and two clamps on the short side. Mounting rails run perpendicular to the long side frame.</p>
<p>A1 range = (340 – 550) mm                      Maximum Load:                      Uplift load <math>\leq</math> 2400 Pa                      Downforce load <math>\leq</math> 2400 Pa</p>	<p>A1 range = (300 – 550) mm                      A2 range = (200 – 250) mm                      Maximum Load:                      Uplift load <math>\leq</math> 2400 Pa                      Downforce load <math>\leq</math> 2400 Pa</p>
<p>A1 range = (410 – 490) mm                      Maximum Load:                      Uplift load <math>\leq</math> 3600 Pa                      Downforce load <math>\leq</math> 5400 Pa</p>	



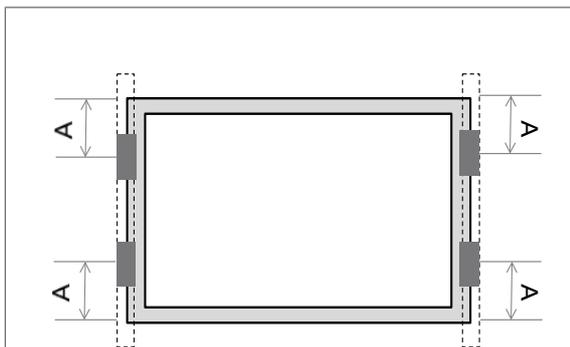
Use four clamps on the long side. Mounting rails run parallel to the long side frame.

A1 range = (410 – 490) mm  
 Maximum Load:  
 Uplift load  $\leq$  2400 Pa  
 Downforce load  $\leq$  5400 Pa



Use four clamps on the short side and two clamps on the long side. An additional support bar should be placed below the center of the module.

A2 range = (200 – 250) mm  
 Maximum Load:  
 Uplift load  $\leq$  2400 Pa  
 Downforce load  $\leq$  5400 Pa

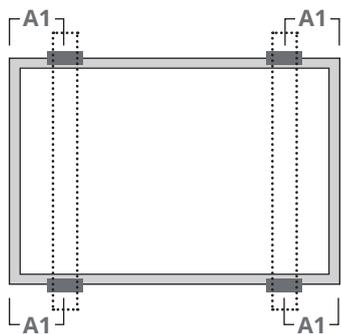


Use four clamps on the short side. Mounting rails run perpendicular to the long side frame.

A range = (200 - 250) mm  
 Maximum Load:  
 Uplift load  $\leq$  1400 Pa  
 Downforce load  $\leq$  1400 Pa

A range = ( 0 - 200) mm  
 Maximum Load:  
 Uplift load  $\leq$  1200 Pa  
 Downforce load  $\leq$  1200 Pa

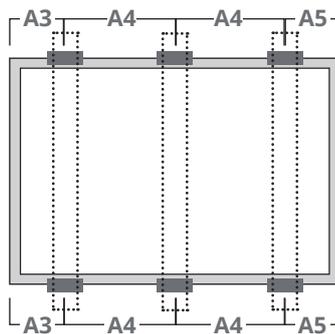
CS1U-MS



Use four clamps on the long side. Mounting rails run perpendicularly to the long side frame.

A1 range = (340 - 550) mm  
 Maximum Load:  
 Uplift load  $\leq$  2400 Pa  
 Downforce load  $\leq$  2400 Pa

A1 range = (410 - 490) mm  
 Maximum Load:  
 Uplift load  $\leq$  2400 Pa  
 Downforce load  $\leq$  5400 Pa

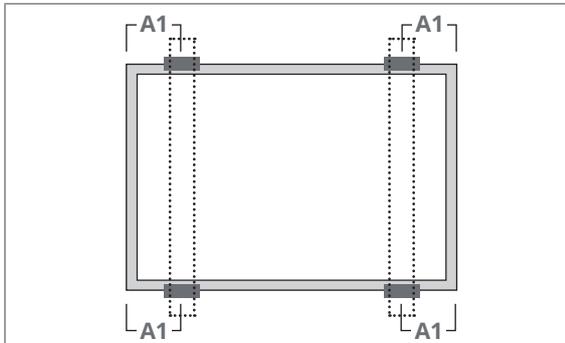


Use six clamps on the long side. Mounting rails run perpendicularly to the long side frame.

A3 range = (250- 350) mm  
 A5 range = (250- 350) mm  
 Maximum Load:  
 Uplift load  $\leq$  2400 Pa  
 Downforce load  $\leq$  5400 Pa  
 Notice: This method is recommended for better reliability.

**CS3K-P, CS3K-MS, CS6K-P, CS6K-M and CS6K-MS**

(Please refer to the separate manual for the KuLite CS3K-P which is a lightweight option for standard CS3K-P only for Japan region)

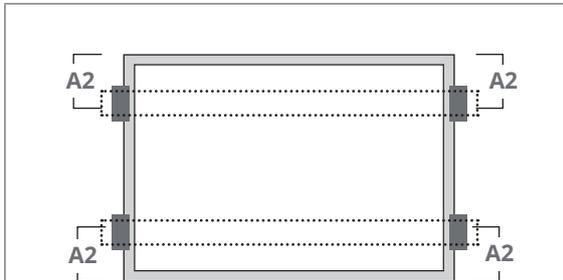


Use four clamps on the long side. Mounting rails run perpendicularly to the long side frame.

A1 range = (0 - 239) mm  
 Maximum Load:  
 Uplift load ≤ 2000 Pa  
 Downforce load ≤ 2000 Pa

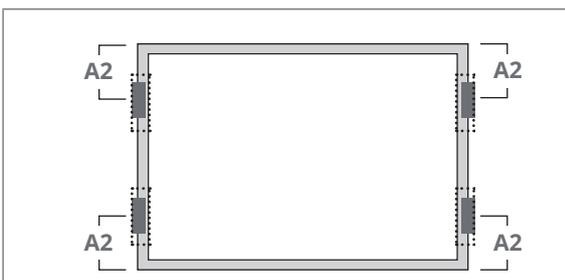
A1 range = (240 - 330) mm  
 Maximum Load:  
 Uplift load ≤ 3600 Pa  
 Downforce load ≤ 5400 Pa

A1 range = (331 - 550) mm  
 Maximum Load:  
 Uplift load ≤ 2400 Pa  
 Downforce load ≤ 2400 Pa



Use four clamps on the short side. Mounting rails run parallel to the long side frame.

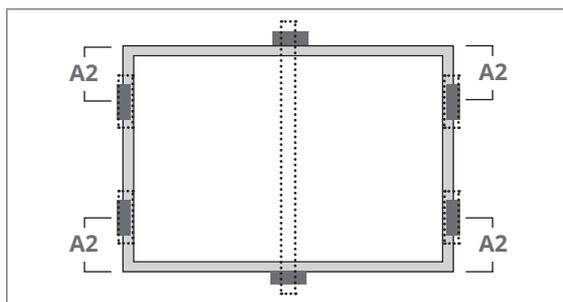
A2 range = (200 - 250) mm  
 Maximum Load:  
 Uplift load ≤ 2000 Pa  
 Downforce load ≤ 2000 Pa



Use four clamps on the short side.

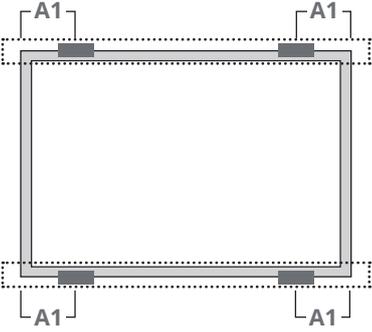
A2 range = (200 - 250) mm  
 Maximum Load:  
 Uplift load ≤ 2200 Pa  
 Downforce load ≤ 2200 Pa

A2 range = (0 - 200) mm  
 Maximum Load:  
 Uplift load ≤ 2000 Pa  
 Downforce load ≤ 2000 Pa



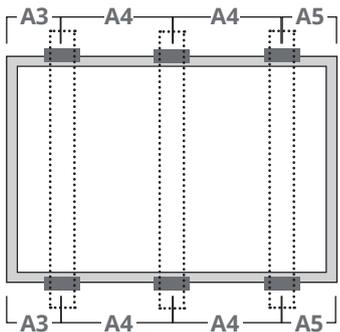
Use four clamps on the short side and two clamps on the long side. An additional support bar should be placed below the center of the module.

A2 range = (200 - 250) mm  
 Maximum Load:  
 Uplift load ≤ 2400 Pa  
 Downforce load ≤ 5400 Pa



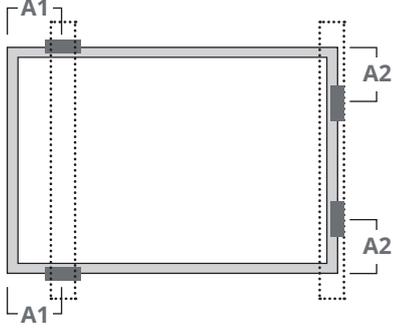
Use four clamps on the long side. Mounting rails run parallel to the long side frame.

A1 range = (240 - 330) mm  
 Maximum Load:  
 Uplift load  $\leq$  2400 Pa  
 Downforce load  $\leq$  4000 Pa



Use six clamps on the long side. Mounting rails run perpendicularly to the long side frame.

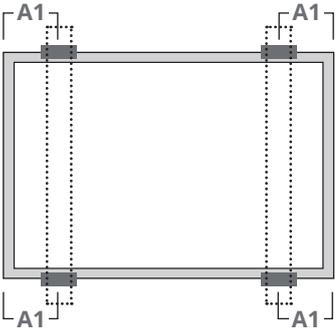
A3 range = (80 - 380) mm,  
 A5 range = (80 - 380) mm  
 Maximum Load:  
 Uplift load  $\leq$  4000 Pa  
 Downforce load  $\leq$  6000 Pa



Use two clamps on the long side and two clamps on the short side. Mounting rails run perpendicular to the long side frame.

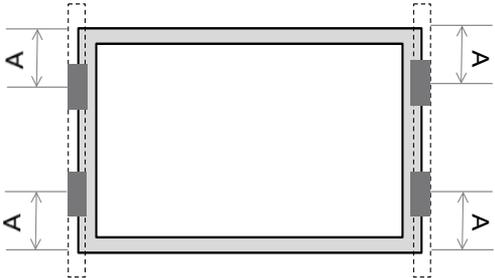
A1 range = (100 - 550) mm  
 A2 range = (200 - 250) mm  
 Maximum Load:  
 Uplift load  $\leq$  2400 Pa  
 Downforce load  $\leq$  2400 Pa

**CS3W-P, CS3W-MS**



Use four clamps on the long side. Mounting rails run perpendicularly to the long side frame.

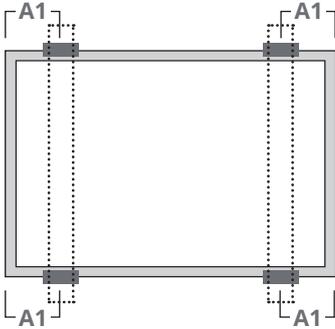
<p>A1 range = (340 - 550) mm                  Maximum Load:                  Uplift load <math>\leq</math> 2400 Pa                  Downforce load <math>\leq</math> 2400 Pa</p>
<p>A1 range = (410 - 490) mm                  Maximum Load:                  Uplift load <math>\leq</math> 3600 Pa                  Downforce load <math>\leq</math> 5400 Pa</p>



Use four clamps on the short side. Mounting rails run perpendicular to the long side frame.

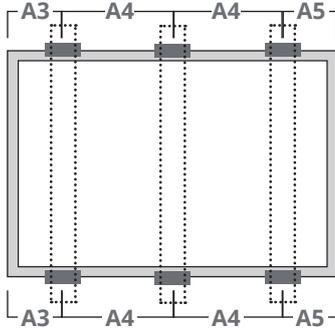
<p>A range = (200 - 250) mm                  Maximum Load:                  Uplift load <math>\leq</math> 1200 Pa                  Downforce load <math>\leq</math> 1200 Pa</p>
<p>A range = (0 - 200) mm                  Maximum Load:                  Uplift load <math>\leq</math> 1000 Pa                  Downforce load <math>\leq</math> 1000 Pa</p>

**CS3L-P, CS3L-MS**



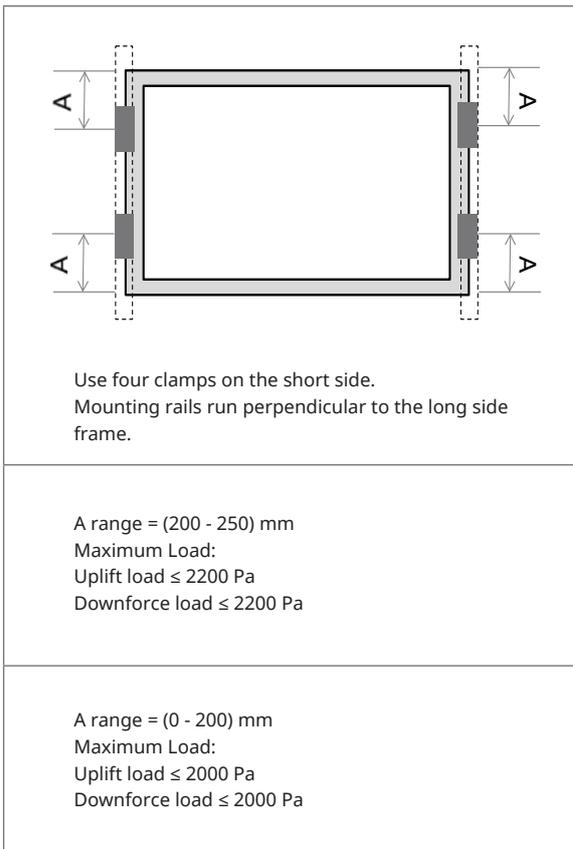
Use four clamps on the long side. Mounting rails run perpendicularly to the long side frame.

<p>A1 range = (240 - 330) mm                  Maximum Load:                  Uplift load <math>\leq</math> 3600 Pa                  Downforce load <math>\leq</math> 5400 Pa</p>
<p>A1 range = (331 - 550) mm                  Maximum Load:                  Uplift load <math>\leq</math> 2400 Pa                  Downforce load <math>\leq</math> 2400 Pa</p>



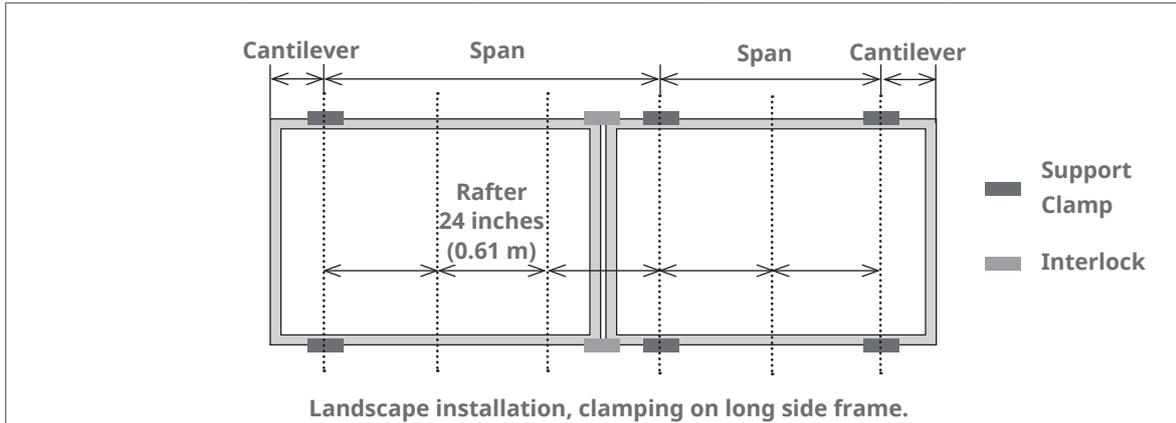
Use six clamps on the long side. Mounting rails run perpendicularly to the long side frame.

<p>A3 range = (140 - 440) mm,                  A5 range = (140 - 440) mm                  Maximum Load:                  Uplift load <math>\leq</math> 3600 Pa                  Downforce load <math>\leq</math> 5400 Pa</p>
<p>Notice: this method is recommended for better reliability.</p>



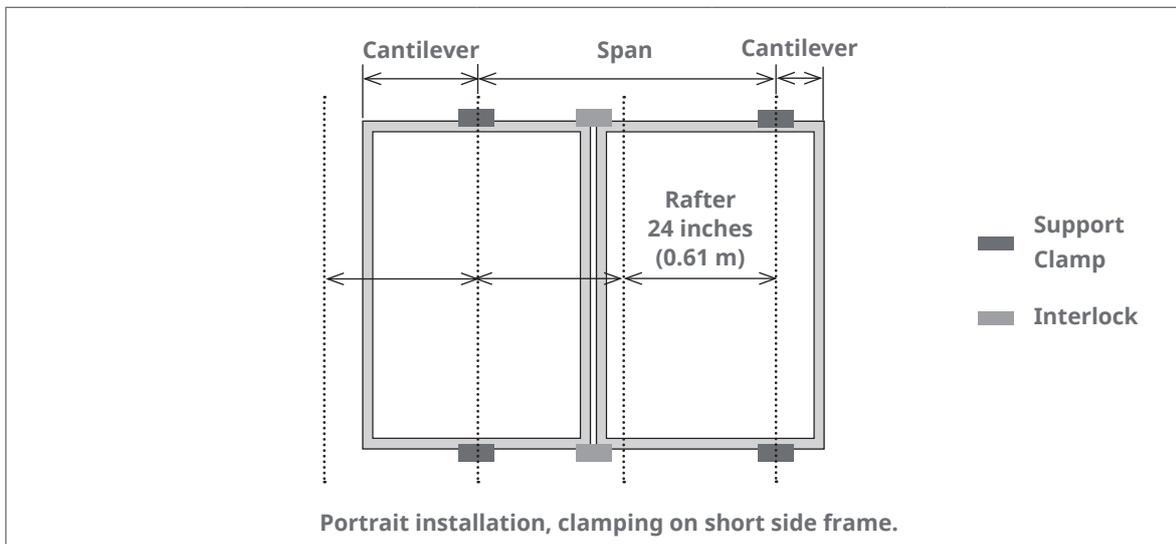
**Rail-less clamping for CS3K-P, CS3K-MS, CS6K-P,  
CS6K-M, CS6K-MS, CS1K-MS, CS1H-MS**

(Please refer to the separate manual for the KuLite CS3K-P which is a lightweight option for standard CS3K-P only for Japan region)



**Landscape installation, clamping on long side frame.**

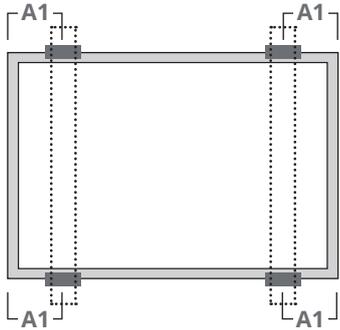
Mounting Orientation	Max Span	Max Cantilever length	Downforce	Uplift
Landscape	72 inches (1.83 m)	24 inches (0.61 m)	2200 Pa	1400 Pa
	64 inches (1.63 m)	21.3 inches (0.54 m)	2400 Pa	1400 Pa
	48 inches (1.22 m)	16 inches (0.41 m)	3400 Pa	1800 Pa
	32 inches (0.81 m)	10.7 inches (0.27 m)	4800 Pa	2400 Pa



**Portrait installation, clamping on short side frame.**

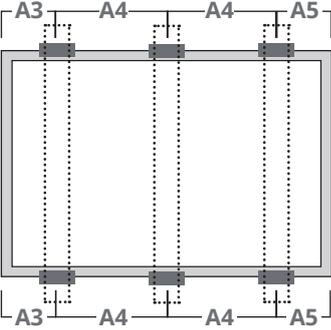
Mounting Orientation	Max Span	Max Cantilever length	Downforce	Uplift
Portrait	48 inches (1.22 m)	16 inches (0.41 m)	1800 Pa	800 Pa
	32 inches (0.81 m)	10.7 inches (0.27 m)	1800 Pa	1200 Pa
	24 inches (0.61 m)	8 inches (0.2 m)	1800 Pa	1800 Pa

CS1K-MS and CS1H-MS



Use four clamps on the long side. Mounting rails run perpendicular to the long side frame.

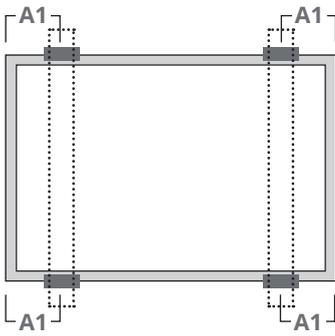
<p>A1 range = (0 - 239) mm                  Maximum Load:                  Uplift load <math>\leq</math> 2000 Pa                  Downforce load <math>\leq</math> 2000 Pa</p>
<p>A1 range = (240 - 550) mm                  Maximum Load:                  Uplift load <math>\leq</math> 2400 Pa                  Downforce load <math>\leq</math> 2400 Pa</p>
<p>A1 range = (240 - 330) mm                  Maximum Load:                  Uplift load <math>\leq</math> 3600 Pa                  Downforce load <math>\leq</math> 5400 Pa</p>



Use six clamps on the long side. Mounting rails run perpendicular to the long side frame.

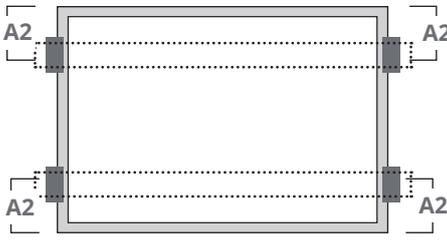
<p>A3 range = (80 - 380) mm                  A5 range = (80 - 380) mm                  Maximum Load:                  Uplift load <math>\leq</math> 2400 Pa                  Downforce load <math>\leq</math> 5400 Pa                  Notice: This method is recommended for better reliability.</p>
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CS6A-P, CS6A-M, CS6VL-MS and CS6A-MS



Use four clamps on the long side. Mounting rails run perpendicularly to the long side frame.

<p>A1 range = (0 - 219) mm                      Maximum Load:                      Uplift load <math>\leq</math> 2000 Pa                      Downforce load <math>\leq</math> 2000 Pa</p>
<p>A1 range = (220 - 440) mm                      Maximum Load:                      Uplift load <math>\leq</math> 2400 Pa                      Downforce load <math>\leq</math> 2400 Pa</p>
<p>A1 range = (270 - 330) mm                      Maximum Load:                      Uplift load <math>\leq</math> 2400 Pa                      Downforce load <math>\leq</math> 5400 Pa</p>



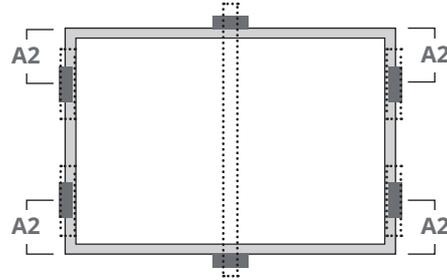
Use four clamps on the short side. Mounting rails run parallel to the long side frame.

<p>A2 range = (200 - 250) mm                      Maximum Load:                      Uplift load <math>\leq</math> 2400 Pa                      Downforce load <math>\leq</math> 2400 Pa</p>
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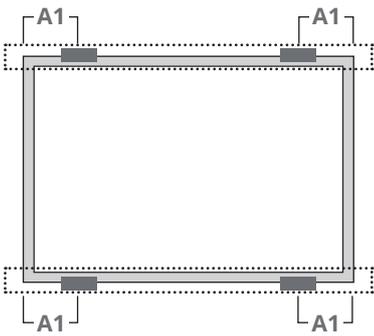
Use four clamps on the short side.

<p>A2 range = (0 - 250) mm                      Maximum Load:                      Uplift load <math>\leq</math> 2400 Pa                      Downforce load <math>\leq</math> 2400 Pa</p>
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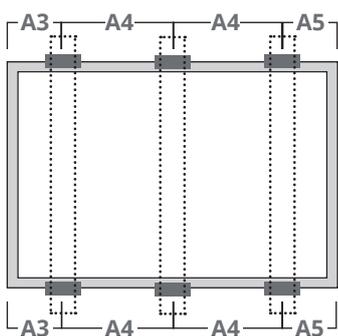
Use four clamps on the short side and two clamps on the long side. An additional support bar should be placed below the center of the module.

<p>A2 range = (200 - 250) mm                      Maximum Load:                      Uplift load <math>\leq</math> 2400 Pa                      Downforce load <math>\leq</math> 5400 Pa</p>
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Use four clamps on the long side. Mounting rails run parallel to the long side frame.

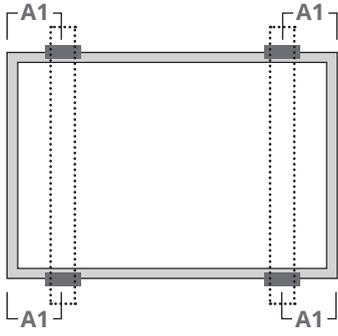
A1 range = (270 - 330) mm  
 Maximum Load:  
 Uplift load ≤ 2400 Pa  
 Downforce load ≤ 4000 Pa



Use six clamps on the long side. Mounting rails run perpendicularly to the long side frame.

A3 range = (80 - 380) mm  
 A5 range = (80 - 380) mm  
 Maximum Load:  
 Uplift load ≤ 4000 Pa  
 Downforce load ≤ 6000 Pa

**CS6V-P, CS6V-M and CS6V-MS**

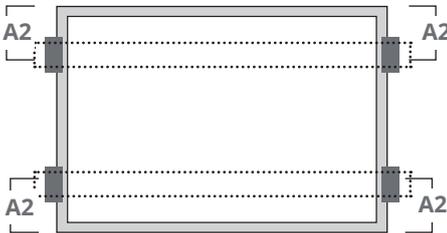


Use four clamps on the long side. Mounting rails run perpendicularly to the long side frame.

A1 range = (0 - 239) mm  
 Maximum Load:  
 Uplift load ≤ 2000 Pa  
 Downforce load ≤ 2000 Pa

A1 range = (240 - 550) mm  
 Maximum Load:  
 Uplift load ≤ 2400 Pa  
 Downforce load ≤ 2400 Pa

A1 range = (240 - 330) mm  
 Maximum Load:  
 Uplift load ≤ 2400 Pa  
 Downforce load ≤ 5400 Pa



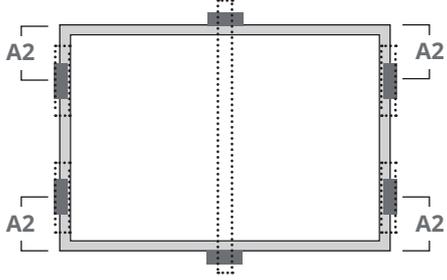
Use four clamps on the short side. Mounting rails run parallel to the long side frame.

A2 range = (170 - 210) mm  
 Maximum Load:  
 Uplift load ≤ 2400 Pa  
 Downforce load ≤ 2400 Pa



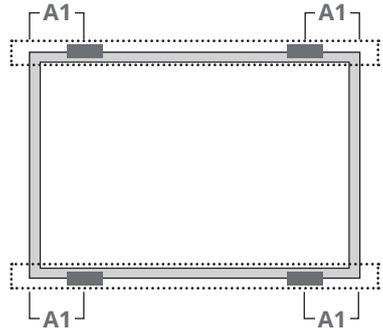
Use four clamps on the short side.

A2 range = (0 - 210) mm  
 Maximum Load:  
 Uplift load  $\leq$  2000 Pa  
 Downforce load  $\leq$  2000 Pa



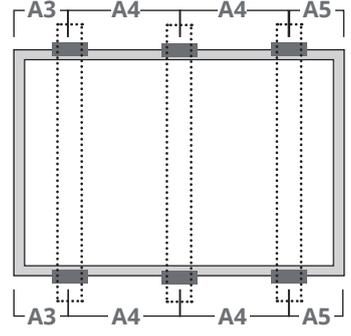
Use four clamps on the short side and two clamps on the long side. An additional support bar should be placed below the center of the module.

A2 range = (170 - 210) mm  
 Maximum Load:  
 Uplift load  $\leq$  2400 Pa  
 Downforce load  $\leq$  5400 Pa



Use four clamps on the long side. Mounting rails run parallel to the long side frame.

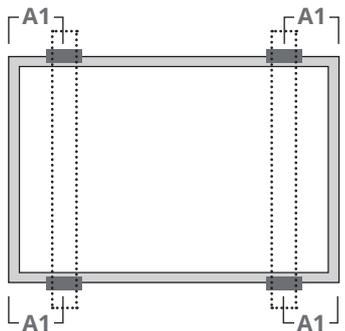
A1 range = (240 - 330) mm  
 Maximum Load:  
 Uplift load  $\leq$  2400 Pa  
 Downforce load  $\leq$  4000 Pa



Use six clamps on the long side. Mounting rails run perpendicularly to the long side frame.

A3 range = (80 - 380) mm  
 A5 range = (80 - 380) mm  
 Maximum Load:  
 Uplift load  $\leq$  4000 Pa  
 Downforce load  $\leq$  6000 Pa

CS1V-MS

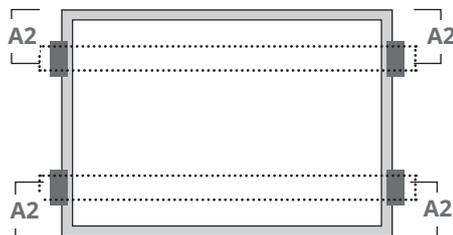


Use four clamps on the long side. Mounting rails run perpendicularly to the long side frame.

A1 range = (0 – 239) mm  
 Maximum Load:  
 Uplift load ≤ 2000 Pa  
 Downforce load ≤ 2000 Pa

A1 range = (240 – 550) mm  
 Maximum Load:  
 Uplift load ≤ 2400 Pa  
 Downforce load ≤ 2400 Pa

A1 range = (240 – 330) mm  
 Maximum Load:  
 Uplift load ≤ 2400 Pa  
 Downforce load ≤ 5400 Pa



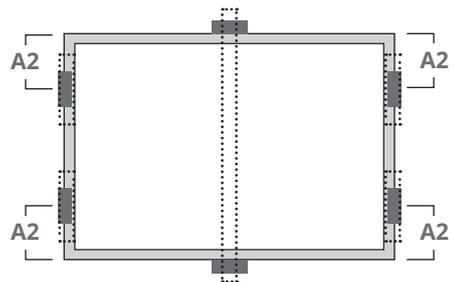
Use four clamps on the short side. Mounting rails run parallel to the long side frame.

A2 range = (170 – 210) mm  
 Maximum Load:  
 Uplift load ≤ 2400 Pa  
 Downforce load ≤ 2400 Pa



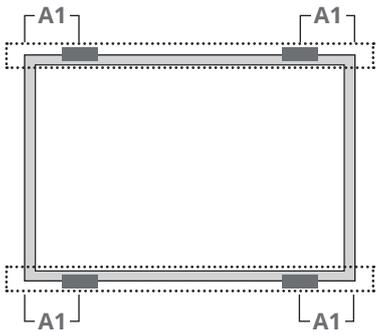
Use four clamps on the short side.

A2 range = (0 – 210) mm  
 Maximum Load:  
 Uplift load ≤ 2000 Pa  
 Downforce load ≤ 2000 Pa



Use four clamps on the short side and two clamps on the long side. An additional support bar should be placed below the center of the module.

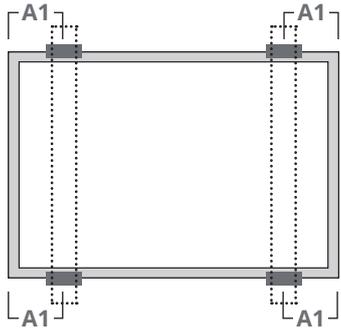
A2 range = (170 – 210) mm  
 Maximum Load:  
 Uplift load ≤ 2400 Pa  
 Downforce load ≤ 5400 Pa



Use four clamps on the long side. Mounting rails run parallel to the long side frame.

A1 range = (240 - 330) mm  
 Maximum Load:  
 Uplift load  $\leq$  2400 Pa  
 Downforce load  $\leq$  4000 Pa

**CS1VL-MS, CS1A-MS, CS1HA-MS**

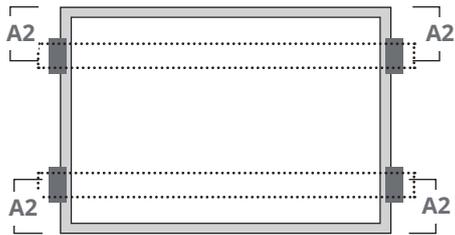


Use four clamps on the long side. Mounting rails run perpendicular to the long side frame.

A1 range = (0 - 219) mm  
 Maximum Load:  
 Uplift load  $\leq$  2000 Pa  
 Downforce load  $\leq$  2000 Pa

A1 range = (220- 440) mm  
 Maximum Load:  
 Uplift load  $\leq$  2400 Pa  
 Downforce load  $\leq$  2400 Pa

A1 range = (270 - 330) mm  
 Maximum Load:  
 Uplift load  $\leq$  2400 Pa  
 Downforce load  $\leq$  5400 Pa



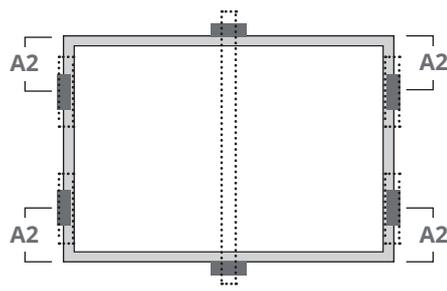
Use four clamps on the short side. Mounting rails run parallel to the long side frame.

A2 range = (200 - 250) mm  
 Maximum Load:  
 Uplift load  $\leq$  2400 Pa  
 Downforce load  $\leq$  2400 Pa



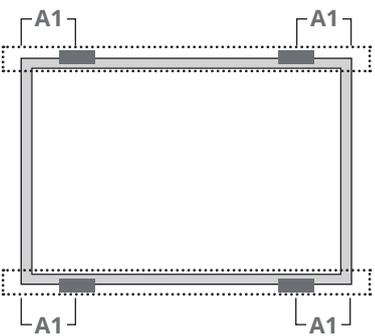
Use four clamps on the short side.

A2 range = (0 - 250) mm  
 Maximum Load:  
 Uplift load ≤ 2400 Pa  
 Downforce load ≤ 2400 Pa



Use four clamps on the short side and two clamps on the long side. An additional support bar should be placed below the center of the module.

A2 range = (200 - 250) mm  
 Maximum Load:  
 Uplift load ≤ 2400 Pa  
 Downforce load ≤ 5400 Pa



Use four clamps on the long side. Mounting rails run parallel to the long side frame.

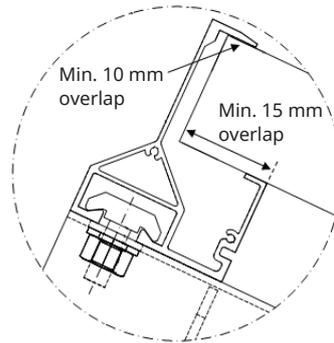
A1 range = (270 - 330) mm  
 Maximum Load:  
 Uplift load ≤ 2400 Pa  
 Downforce load ≤ 4000 Pa

**MOUNTING METHOD B:  
INSERTION SYSTEMS**

- The mounting method has been qualified by Canadian Solar Inc. as well as certified by VDE and CSA.
- Insertion methods can vary and depend on the mounting structures. The installer needs to follow the mounting guidelines recommended by the mounting system supplier. Each module must be securely maintained through all its length on two opposite sides. Install and tighten the insertion profiles to the support structure using the hardware and instructions provided by the mounting system manufacturer. The system designer and installer are solely responsible for load calculations and for the proper design of support structure.
- Canadian Solar Inc. warranty may be void in cases where improper insertion systems or unsuitable installation methods are found. When installing insertion profiles, please take the following measu-

res into account:

- ① Do not bend the module frame.
- ② Do not touch the front glass or cast shadow onto it.
- ③ Do not damage the surface of the frame.
- ④ Ensure that the insertion profiles overlap the module frame by at least 10 mm (0.39 in).
- ⑤ Ensure that the module frame (C-shape) overlaps the insertion profiles by at least 15 mm (0.59 in).
- ⑥ Ensure insertion profile thickness and tolerances suit module thickness.



**CS3U-P, CS3U-MS, CS6U-P and CS6U-M**

Use two insertion profiles running parallel to the long side frame.

Maximum Load:  
Uplift load ≤ 2400 Pa  
Downforce load ≤ 5400 Pa

Use two insertion profiles running perpendicularly to the long side frame. An additional support bar should be placed below the module. Use two clamps on the support bar.

Maximum Load:  
Uplift load ≤ 2400 Pa  
Downforce load ≤ 5400 Pa

Use two insertion profiles running perpendicularly to the long side frame.

Maximum Load:  
Uplift load ≤ 1400 Pa  
Downforce load ≤ 1400 Pa

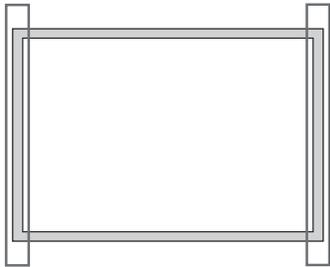
**CS3K-P, CS3K-MS, CS6K-P, CS6K-M, CS6K-MS, CS6V-P, CS6V-M and CS6V-MS**

(Please refer to the separate manual for the KuLite CS3K-P which is a lightweight option for standard CS3K-P only for Japan region)



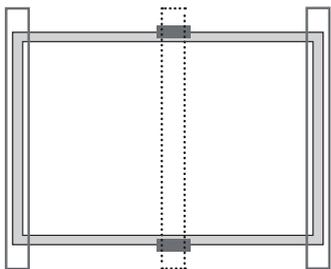
Use two insertion profiles running parallel to the long side frame.

Maximum Load:  
Uplift load  $\leq$  2400 Pa  
Downforce load  $\leq$  4000 Pa



Use two insertion profiles running perpendicularly to the long side frame.

Maximum Load:  
Uplift load  $\leq$  2000 Pa  
Downforce load  $\leq$  2000 Pa



Use two insertion profiles running perpendicularly to the long side frame. An additional support bar should be placed below the module. Use two clamps on the support bar.

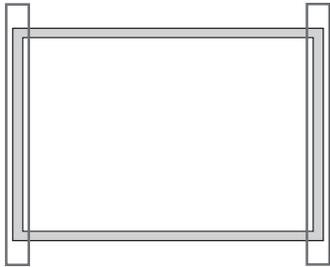
Maximum Load:  
Uplift load  $\leq$  2400 Pa  
Downforce load  $\leq$  5400 Pa

**CS6A-P, CS6A-M, CS6VL-MS and CS6A-MS**



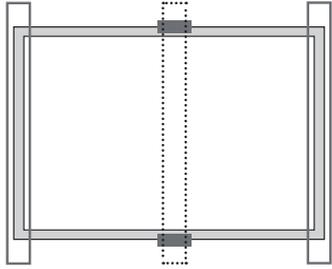
Use two insertion profiles running parallel to the long side frame.

Maximum Load:  
Uplift load  $\leq$  2400 Pa  
Downforce load  $\leq$  4000 Pa



Use two insertion profiles running perpendicularly to the long side frame.

Maximum Load:  
Uplift load  $\leq$  2400 Pa  
Downforce load  $\leq$  2400 Pa



Use two insertion profiles running perpendicularly to the long side frame. An additional support bar should be placed below the module. Use two clamps on the support bar.

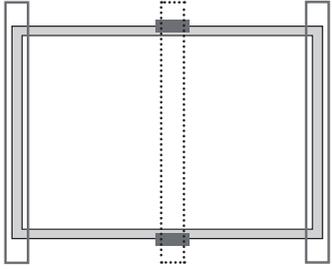
Maximum Load:  
Uplift load  $\leq 2400$  Pa  
Downforce load  $\leq 5400$  Pa

**CS1K-MS, CS1H-MS**



Use two insertion profiles running parallel to the long side frame.

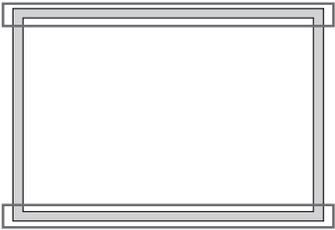
Maximum Load:  
Uplift load  $\leq 2400$  Pa  
Downforce load  $\leq 2400$  Pa



Use two insertion profiles running perpendicularly to the long side frame. An additional support bar should be placed below the module. Use two clamps on the support bar.

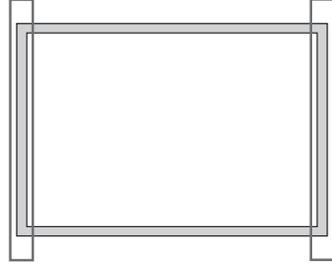
Maximum Load:  
Uplift load  $\leq 2400$  Pa  
Downforce load  $\leq 5400$  Pa

**CS1V-MS, CS1VL-MS**



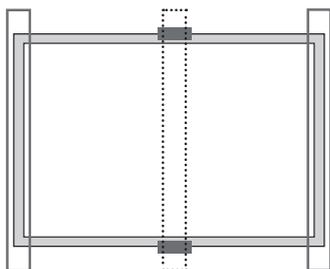
Use two insertion profiles running parallel to the long side frame.

Maximum Load:  
Uplift load  $\leq 2400$  Pa  
Downforce load  $\leq 4000$  Pa



Use two insertion profiles running perpendicularly to the long side frame.

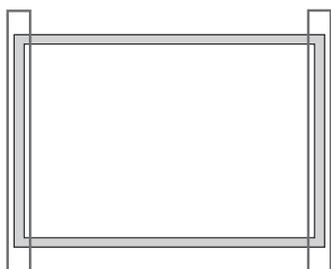
Maximum Load:  
Uplift load  $\leq 2000$  Pa  
Downforce load  $\leq 2000$  Pa



Use two insertion profiles running perpendicularly to the long side frame. An additional support bar should be placed below the module. Use two clamps on the support bar.

Maximum Load:  
 Uplift load  $\leq$  2400 Pa  
 Downforce load  $\leq$  5400 Pa

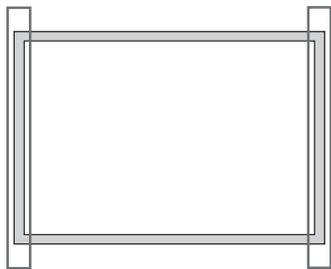
**CS3W-P, CS3W-MS**



Use two insertion profiles running perpendicularly to the long side frame.

Maximum Load:  
 Uplift load  $\leq$  1200 Pa  
 Downforce load  $\leq$  1200 Pa

**CS3L-P, CS3L-MS**

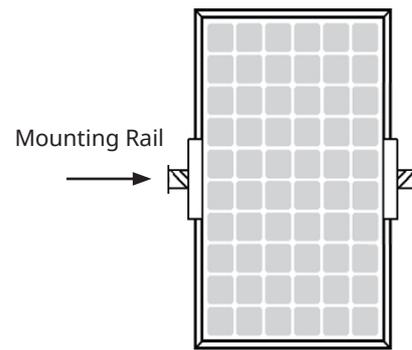


Use two insertion profiles running perpendicularly to the long side frame.

Maximum Load:  
 Uplift load  $\leq$  2200 Pa  
 Downforce load  $\leq$  2200 Pa

## MOUNTING METHOD C: MOUNTING METHODS WITH (SINGLE-AXIS TRACKER)

- Canadian Solar Inc. modules can be mounted on single-axis trackers using center clamps or mounting holes as described below. All the requirements of the standard module installation manual and specific tracker detailed installation instructions should apply.
- The following tracker manufacturers and types are approved with Canadian Solar modules.



Module Type	Compatible Tracker	Mounting Hardware	Maximum Load (Pa)	Reference Manual (Version No.)
CS3U-P, CS3U-MS, CS6U-P, CS6U-M, CS3W-P and CS3W-MS	ATI DuraTrack™HZ Tracking System(V3)	Standard 300 mm clamp 20751 Hi-rise 300 mm clamp 20822	Uplift load $\leq$ 2400 Pa Downforce load $\leq$ 2400 Pa	DuraTrack™HZ Solar Tracker Installation Guide (January 2017, Rev. B-01)
CS3U-P, CS3U-MS, CS6U-P and CS6U-M	NEXTracker NX Horizon	V2.4.1 Rails (400 mm mounting holes) + 4x bobtails (head O.D. 13 mm)	Uplift load $\leq$ 2400 Pa Downforce load $\leq$ 2400 Pa	NEXTracker NX Horizon 2.4.1 Installation Manual (PDM-000176 Rev. B)
CS3W-P, CS3W-MS	NEXTracker NX Horizon	Uses V2.4.1 rail + 1180 supplemental rail* (400 mm+ 1155 mm mounting holes) + 8x bobtails (head O.D. 16.8 mm)	2200 Pa < Uplift load $\leq$ 2800 Pa 2200 Pa < Downforce load $\leq$ 2800 Pa	NEXTracker NX Horizon 2.4.1 Installation Manual (PDM-000176 Rev. B) Note*: Technical Bulletin covering supplemental rail will be given additional to the installation manual on specific project from Nextracker.
		V2.4.1 Rails (400 mm mounting holes) + 4x bobtails (head O.D. 16.8 mm)	1600 Pa < Uplift load $\leq$ 2200 Pa 1600 Pa < Downforce load $\leq$ 2200 Pa	
		V2.4.1 Rails (400 mm mounting holes) + 4x bobtails (head O.D. 13 mm)	Uplift load $\leq$ 1600 Pa Downforce load $\leq$ 1600 Pa	
CS3U-P	Arctech single-axis tracker Portrait two rows	3438 mm rail (bolting method / M8 bolt + M8 plain washer (O.D. = 24 mm) / 1155 mm holes position) Rail drawing No: CS2018002	Uplift load $\leq$ 2400 Pa Downforce load $\leq$ 2400 Pa	SSMFIM-rev01 (SkySmart-Module Fixing Installation Manual)

CS3W-P, CS3W-MS	Arctech single-axis tracker Portrait two rows	3588 mm rail (bolting method / M8 bolt + M8 plain washer (O.D. = 24 mm) / 1155 mm holes position) Rail drawing No: CS2018007	Uplift load $\leq$ 2400 Pa Downforce load $\leq$ 2400 Pa	SSMFIM-rev01 (SkySmart-Module Fixing Installation Manual)
CS3U-P	Soltec SF7 Single-Axis Tracker	2454 mm rail (Bolting method / M6 bolt + M6 plain washer (O.D.= 18 mm) / 1300 mm + 400 mm holes position) Rail drawing No: SF7-MR-04-101_Dr_P00 SF7-MR-06-102_Dr_P00	Uplift load $\leq$ 1800 Pa Downforce load $\leq$ 1800 Pa	SF7QG-1500V-en, revision 1.0
CS3W-P, CS3W-MS	Soltec SF7 Single-Axis Tracker	2542 mm rail (Bolting method / M6 bolt + M6 plain washer (O.D. = 18 mm) / 1300 mm + 400 mm holes position) Rail drawing No: SF7-MR-04-018_Dr	Uplift load $\leq$ 1200 Pa Downforce load $\leq$ 1200 Pa	SF7QG-1500V-en, revision 1.0
CS3U-P	Soltec SF7 Single-Axis Tracker	long rail (bolting method / M8 bolt + M8 plain washer (O.D. = 24 mm) / 1155 mm holes position)	Uplift load $\leq$ 2400 Pa Downforce load $\leq$ 2400 Pa	SF7QG-1500V-en, revision 1.0
CS3W-P, CS3W-MS	Soltec SF7 Single-Axis Tracker	3297 mm rail (bolting method / M8 bolt + M8 plain washer (O.D. = 24 mm) / 1155 mm holes position) Rail drawing No: SF7-MR-04-017_Dr	Uplift load $\leq$ 2400 Pa Downforce load $\leq$ 2400 Pa	SF7QG-1500V-en, revision 1.0

- The allowable maximum twist angle of the module is 0.5 degree.
- For any single axis tracker installation method with portrait one row, bearing house cannot be allowed to locate in junction box position under CS3W-P, CS3W-MS, CS3U-P and CS3U-MS.
- Please contact the tracker manufacturer and Canadian Solar Inc.'s technical support department for details in regard to specific projects.

## ANNEX B: ALTERNATIVE GROUNDING METHODS

Canadian Solar modules can be grounded using third party grounding devices as described below. The grounding methods are certified by CSA according to UL 1703. All the basic requirements of the main installation manual should apply to the

alternative grounding methods. For detailed grounding instructions, please refer to related third party installation manuals.

Company	Grounding hardware	Compatible Mounting System	Reference Manual (Version No.)
Variety	Lay-in-Lug + Star Washer (UL 2703 & UL 467 certified)	Variety	Related reference installation manual
Schletter GmbH	Schletter Rapid2+ Grounding Clamps	Schletter Rapid2+	Schletter Rapid2+ Clamp installation instructions
Array Technologies Inc.	Grounding Strip	ATI Duratrack HZ Solar Tracker (V3)	DuraTrack™HZ Solar Tracker Installation Guide (January 2017, Rev. B-01)
IronRidge Inc.	grounding mid clamps (integrated grounding)	standard (XRS) and light (XRL) rails	Standard (XRS) and Light (XRL) Rails with Integrated Grounding Installation Manual (2013 Edition v1.13)
DYNORAXX Inc.	DynoRaxx® DynoBond spring clips	-----	DynoRaxx® DynoBond Installation Manual (publication no 090413)
RBI Solar Inc.	Raised Zee purlin integrated with pre-punched grounding holes	RBI Solar Ground Mount System Model GM-I	Ground Mount System Model GM-I Module Installation Manual (14 April 2014, version 21)
Quick Rack PV Inc.	Clamp integrated with grounding pins	Quick Rack Rail-Free Mounting System	Quick Rack Rail-Free Mounting System for Composition/Asphalt Shingle Roofs Installation Manual (May 2014, Rev F)
Cantsink Mfg Inc.	1/4" serrated flange bolt & serrated flange nut	Brilliant Rack Ground Mount System	Brilliant Rack Ground Mount System Installation Manual (Revision 12/05/2014)
Everest Solar Systems, LLC	WEEB-KMC Clips	Crossrail 36, Crossrail 48 And Crossrail 80 Mounting Systems	WEEB Installation Instructions For Everest Solar Crossrail 36, Crossrail 48 And Crossrail 80 Mounting Systems Only (50015303 Rev H)
Unirac Inc.	Mid clamp retention teeth	SOLAR MOUNT (SM)	Solar Mount Installation Guide (Revision PUB15MAR02)
Sunlink Inc.	Center Clamps & End Clamps with pre-punched teeth	Ballasted Ground Mount System and Core Roof Mount System	Assembly Instructions for Core RMS (Rev 03-14-2014) and Assembly Instructions for Ballasted GMS (Rev 02/02/2014)
Roof Tech Inc.	Bonding Plate	RT-[E] Mount E Mount AIR	RT-[E] Mount E Mount AIR Installation Manual (March 2015)
NEXTracker Inc.	1/4-in collar and 1/4-in pin	NX Horizon 2.2.1	NEXTracker NX Horizon 2.2.1 Short Rail Installation Manual (PDM-000103 Rev. )
BURNDY LLC.	WEEB-UIR	RBI Solar Ground-mount	WEEB Installation Instructions For RBI Solar Groundmount Only (104-0404-000074-003)

## ANNEX C: MECHANICAL AND ELECTRICAL RATINGS

Standard Test Conditions are: Irradiance of 1000 W/m<sup>2</sup>, AM1.5 spectrum, and cell temperature of 25°C. The electrical characteristics are respectively within

±10% or [0; +5 W] of the indicated values for Isc, Voc and Pmax. Specifications are subject to change without notice.

**Table C: Mechanical And Electrical Ratings under STC**

Module Type	Maximum Power Pmax <W>	Operating voltage Vmp <V>	Operating current Imp <A>	Open Circuit Voltage Voc <V>	Short Circuit Current Isc <A>	Max. Series Fuse Rating <A>	Overall Dimension <mm>	Weight <kg>
CS6A-195M	195	24.2	8.04	29.9	8.56	15.00	1324 x 984 x 40 (52.1 x 38.7 x 1.57 in)	15.5 (34.2 lbs)
CS6A-200M	200	24.3	8.22	30.0	8.74	15.00		
CS6A-205M	205	24.5	8.38	30.2	8.90	15.00		
CS6A-210M	210	24.6	8.54	30.3	9.06	15.00		
CS6A-215M	215	24.7	8.70	30.4	9.22	15.00		
CS6A-220M	220	24.8	8.87	30.6	9.31	15.00		
CS6A-205MS	205	24.5	8.37	30.6	9.21	15.00		
CS6A-210MS	210	24.7	8.50	30.8	9.29	15.00		
CS6A-215MS	215	24.9	8.63	31.0	9.37	15.00		
CS6A-220MS	220	25.1	8.76	31.2	9.45	15.00		
CS6A-225MS	225	25.3	8.91	31.4	9.53	15.00		
CS6A-230MS	230	25.5	9.02	31.6	9.61	15.00		
CS6A-235MS	235	25.7	9.14	31.8	9.68	15.00		
CS6A-240MS	240	25.9	9.27	32.0	9.76	15.00		
CS6A-245MS	245	26.1	9.39	32.2	9.84	15.00		
CS6A-195P	195	24.0	8.13	29.6	8.69	15.00	1324 x 984 x 40 (52.1 x 38.7 x 1.57 in)	15.5 (34.2 lbs)
CS6A-200P	200	24.1	8.30	29.8	8.87	15.00		
CS6A-205P	205	24.2	8.47	29.9	9.03	15.00		
CS6A-210P	210	24.3	8.63	30.0	9.19	15.00		
CS6A-215P	215	24.5	8.78	30.2	9.35	15.00		
CS6A-220P	220	24.6	8.95	30.4	9.45	15.00		
CS6V-200M	200	25.2	7.95	31.1	8.46	15.00	1638 x 826 x 40 (64.5 x 32.5 x 1.57 in)	16.0 (35.3 lbs)
CS6V-205M	205	25.3	8.11	31.2	8.63	15.00		
CS6V-210M	210	25.4	8.27	31.3	8.79	15.00		
CS6V-215M	215	25.5	8.43	31.5	8.94	15.00		
CS6V-220M	220	25.7	8.56	31.6	9.08	15.00		
CS6V-225M	225	26.0	8.67	31.8	9.19	15.00		
CS6V-230M	230	26.1	8.81	31.9	9.33	15.00		
CS6V-235M	235	26.4	8.91	32.1	9.45	15.00		
CS6V-240M	240	26.7	9.00	32.2	9.55	15.00		
CS6V-245M	245	27.0	9.09	32.4	9.66	15.00		
CS6V-210MS	210	25.4	8.27	31.5	9.19	15.00		
CS6V-215MS	215	25.6	8.40	31.7	9.27	15.00		
CS6V-220MS	220	25.8	8.53	31.9	9.35	15.00		
CS6V-225MS	225	26.0	8.66	32.1	9.43	15.00		
CS6V-230MS	230	26.2	8.78	32.3	9.51	15.00		
CS6V-235MS	235	26.4	8.91	32.5	9.59	15.00		
CS6V-240MS	240	26.6	9.03	32.7	9.67	15.00		
CS6V-245MS	245	26.8	9.15	32.9	9.75	15.00		
CS6V-250MS	250	27.0	9.26	33.1	9.83	15.00		

Module Type	Maximum Power Pmax <W>	Operating voltage Vmp <V>	Operating current Imp <A>	Open Circuit Voltage Voc <V>	Short Circuit Current Isc <A>	Max. Series Fuse Rating <A>	Overall Dimension <mm>	Weight <kg>
CS6V-255MS	255	27.2	9.38	33.3	9.91	15.00		
CS6VH-115MS	115	13.1	8.78	16.2	9.59	15.00	844 × 826 × 40 (33.2 × 32.5 × 1.57 in)	9.0 (19.8 lbs)
CS6VH-120MS	120	13.3	9.03	16.4	9.67	15.00		
CS6VH-125MS	125	13.5	9.26	16.6	9.75	15.00		
CS6VL-150MS	150	19.5	7.7	24.6	9.11	15.00		
CS6VL-155MS	155	19.7	7.87	24.8	9.19	15.00	1322 × 826 × 40 (52.05 × 32.5 × 1.57 in)	12.6 (27.8 lbs)
CS6VL-160MS	160	19.9	8.05	25	9.27	15.00		
CS6VL-165MS	165	20.1	8.21	25.2	9.35	15.00		
CS6VL-170MS	170	20.3	8.38	25.4	9.43	15.00		
CS6VL-175MS	175	20.5	8.54	25.6	9.51	15.00		
CS6VL-180MS	180	20.7	8.7	25.8	9.59	15.00		
CS6VL-185MS	185	20.9	8.86	26	9.67	15.00		
CS6VL-190MS	190	21.1	9.01	26.2	9.75	15.00		
CS6VL-195MS	195	21.3	9.16	26.4	9.83	15.00		
CS6VL-200MS	200	21.5	9.31	26.6	9.91	15.00		
CS6VL-205MS	205	21.7	9.45	26.8	9.99	15.00		
CS6VL-210MS	210	21.9	9.59	27.6	10.17	15.00		
CS6V-190P	190	24.6	7.73	30.6	8.28	15.00	1638 × 826 × 40 (64.5 × 32.5 × 1.57 in)	16.0 (35.3 lbs)
CS6V-195P	195	24.8	7.87	30.7	8.44	15.00		
CS6V-200P	200	24.9	8.03	30.8	8.59	15.00		
CS6V-205P	205	25.0	8.19	30.9	8.76	15.00		
CS6V-210P	210	25.1	8.35	31.1	8.92	15.00		
CS6V-215P	215	25.3	8.51	31.2	9.07	15.00		
CS6V-220P	220	25.5	8.64	31.4	9.21	15.00		
CS6V-225P	225	25.7	8.75	31.6	9.32	15.00		
CS6V-230P	230	25.9	8.90	31.7	9.47	15.00		
CS6V-235P	235	26.1	8.99	31.8	9.58	15.00		
CS6K-240P	240	29.9	8.03	37.0	8.59	15.00	1650 × 992 × 40 / 35 (65.0 × 39.1 × 1.57 / 1.38 in)	18.2 (40.1 lbs)
CS6K-245P	245	30.0	8.17	37.1	8.74	15.00		
CS6K-250P	250	30.1	8.30	37.2	8.87	15.00		
CS6K-255P	255	30.2	8.43	37.4	9.00	15.00		
CS6K-260P	260	30.4	8.56	37.5	9.12	15.00		
CS6K-265P	265	30.6	8.66	37.7	9.23	15.00		
CS6K-270P	270	30.8	8.75	37.9	9.32	15.00		
CS6K-275P	275	31.0	8.88	38.0	9.45	15.00		
CS6K-280P	280	31.3	8.95	38.2	9.52	15.00		
CS6K-285P	285	31.4	9.06	38.3	9.64	15.00		
CS6K-290P	290	31.6	9.18	38.5	9.72	15.00		
CS6K-295P	295	31.8	9.28	38.6	9.81	15.00		
CS6K-300P	300	32.0	9.38	38.8	9.92	15.00		
CS6K-305P	305	32.1	9.50	38.9	10.03	15.00		
CS6K-310P	310	32.3	9.60	39.8	10.22	15.00		
CS6K-315P	315	32.5	9.70	40.0	10.32	15.00		
CS6K-320P	320	32.7	9.79	40.2	10.41	15.00		
CS6K-325P	325	32.9	9.88	40.4	10.50	15.00		
CS6K-330P	330	33.1	9.97	40.6	10.59	15.00		
CS6K-335P	335	33.3	10.07	40.8	10.69	15.00		

Module Type	Maximum Power Pmax <W>	Operating voltage Vmp <V>	Operating current Imp <A>	Open Circuit Voltage Voc <V>	Short Circuit Current Isc <A>	Max. Series Fuse Rating <A>	Overall Dimension <mm>	Weight <kg>		
CS6K-250M	250	30.4	8.22	37.5	8.74	15	1650 x 992 x 40 / 35 (65.0 x 39.1 x 1.57 / 1.38 in)	18.2 (40.1 lbs)		
CS6K-255M	255	30.5	8.35	37.7	8.87	15				
CS6K-260M	260	30.7	8.48	37.8	8.99	15				
CS6K-265M	265	30.9	8.61	37.9	9.11	15				
CS6K-270M	270	31.1	8.67	38.2	9.19	15				
CS6K-275M	275	31.3	8.80	38.3	9.31	15				
CS6K-280M	280	31.5	8.89	38.5	9.43	15				
CS6K-285M	285	31.7	8.98	38.6	9.51	15				
CS6K-290M	290	31.9	9.09	38.7	9.59	15				
CS6K-255MS	255	30.7	8.31	37.9	9.11	15				
CS6K-260MS	260	30.9	8.42	38.1	9.19	15				
CS6K-265MS	265	31.1	8.53	38.3	9.27	15				
CS6K-270MS	270	31.3	8.63	38.5	9.35	15				
CS6K-275MS	275	31.5	8.74	38.7	9.43	15				
CS6K-280MS	280	31.7	8.84	38.9	9.51	15				
CS6K-285MS	285	31.9	8.94	39.1	9.59	15				
CS6K-290MS	290	32.1	9.05	39.3	9.67	15				
CS6K-295MS	295	32.3	9.14	39.5	9.75	15				
CS6K-300MS	300	32.5	9.24	39.7	9.83	15				
CS6K-305MS	305	32.7	9.33	39.9	9.91	15				
CS6K-310MS	310	32.9	9.43	40.1	9.99	15				
CS6K-315MS	315	33.1	9.52	40.3	10.07	15				
CS6K-320MS	320	33.3	9.61	41.3	10.18	15				
CS6K-325MS	325	33.5	9.71	41.5	10.28	15				
CS6K-330MS	330	33.7	9.80	41.7	10.37	15				
CS6K-335MS	335	33.9	9.89	41.9	10.46	15				
CS6U-290P	290	35.9	8.08	44.4	8.64	15			1960 x 992 x 40 / 35 (77.2 x 39.1 x 1.57 / 1.38 in)	22.4 (49.4 lbs)
CS6U-295P	295	36.0	8.19	44.5	8.76	15				
CS6U-300P	300	36.1	8.30	44.6	8.87	15				
CS6U-305P	305	36.3	8.41	44.8	8.97	15				
CS6U-310P	310	36.4	8.52	44.9	9.08	15				
CS6U-315P	315	36.6	8.61	45.1	9.18	15				
CS6U-320P	320	36.8	8.69	45.3	9.26	15				
CS6U-325P	325	37.0	8.78	45.5	9.34	15				
CS6U-330P	330	37.2	8.88	45.6	9.45	15				
CS6U-335P	335	37.4	8.96	45.8	9.54	15				
CS6U-340P	340	37.6	9.05	45.9	9.62	15				
CS6U-345P	345	37.8	9.13	46.0	9.69	15				
CS6U-350P	350	38.1	9.21	46.2	9.79	15				
CS6U-355P	355	38.2	9.30	46.4	9.84	15				
CS6U-360P	360	38.3	9.40	47.0	10.04	15				
CS6U-365P	365	38.5	9.49	47.2	10.13	15				
CS6U-370P	370	38.7	9.57	47.4	10.21	15				
CS6U-375P	375	38.9	9.65	47.6	10.29	15				
CS6U-380P	380	39.1	9.72	47.8	10.36	15				
CS6U-385P	385	39.3	9.80	48.0	10.44	15				
CS6U-390P	390	39.5	9.88	48.2	10.52	15				
CS6U-395P	395	39.7	9.95	48.4	10.59	15				
CS6U-400P	400	39.9	10.03	48.6	10.67	15				
CS6U-405P	405	40.1	10.10	48.8	10.74	15				

Module Type	Maximum Power Pmax <W>	Operating voltage Vmp <V>	Operating current Imp <A>	Open Circuit Voltage Voc <V>	Short Circuit Current Isc <A>	Max. Series Fuse Rating <A>	Overall Dimension <mm>	Weight <kg>
CS6U-290M	290	36.3	8.00	44.7	8.51	15	1960 × 992 × 40 / 35 (77.2 × 39.1 × 1.57 / 1.38 in)	22.4 (49.4 lbs)
CS6U-295M	295	36.4	8.11	44.9	8.63	15		
CS6U-300M	300	36.5	8.22	45	8.74	15		
CS6U-305M	305	36.6	8.33	45.2	8.84	15		
CS6U-310M	310	36.7	8.44	45.3	8.95	15		
CS6U-315M	315	36.9	8.53	45.5	9.04	15		
CS6U-320M	320	37.2	8.61	45.6	9.13	15		
CS6U-325M	325	37.4	8.69	45.8	9.21	15		
CS6U-330M	330	37.5	8.8	45.9	9.31	15		
CS6U-335M	335	37.8	8.87	46.1	9.41	15		
CS6U-340M	340	37.9	8.97	46.2	9.48	15		
CS6U-345M	345	38.1	9.06	46.4	9.56	15		
CS6U-350M	350	38.3	9.14	46.6	9.67	15		
CS3U-350MS	350	38.8	9.03	46.6	9.53	30		
CS3U-355MS	355	39	9.11	46.8	9.61	30		
CS3U-360MS	360	39.2	9.19	47	9.69	30		
CS3U-365MS	365	39.4	9.27	47.2	9.77	30		
CS3U-370MS	370	39.6	9.35	47.4	9.85	30		
CS3U-375MS	375	39.8	9.43	47.6	9.93	30		
CS3U-380MS	380	40	9.5	47.8	10.01	30		
CS3U-385MS	385	40.2	9.58	48	10.09	30		
CS3U-390MS	390	40.4	9.66	48.2	10.17	30		
CS3U-395MS	395	40.6	9.73	48.4	10.25	30		
CS3U-400MS	400	40.8	9.81	48.6	10.33	30		
CS3U-405MS	405	41.0	9.88	49.3	10.44	30		
CS3U-410MS	410	41.2	9.96	49.5	10.52	30		
CS3U-310P	310	37.2	8.34	44.7	8.88	30	2000 × 992 × 40 / 35 (78.7 × 39.1 × 1.57 / 1.38 in)	22.6 / 22.5 (49.8 / 49.6 lbs)
CS3U-315P	315	37.4	8.43	44.9	8.96	30		
CS3U-320P	320	37.6	8.52	45.1	9.04	30		
CS3U-325P	325	37.8	8.6	45.3	9.12	30		
CS3U-330P	330	38	8.69	45.5	9.2	30		
CS3U-335P	335	38.2	8.77	45.7	9.28	30		
CS3U-340P	340	38.4	8.86	45.9	9.36	30		
CS3U-345P	345	38.6	8.94	46.1	9.44	30		
CS3U-350P	350	39.2	8.94	46.6	9.51	30		
CS3U-355P	355	39.4	9.02	46.8	9.59	30		
CS3U-360P	360	39.6	9.10	47.0	9.67	30		
CS3U-365P	365	39.8	9.18	47.2	9.75	30		
CS3U-370P	370	40.0	9.26	47.4	9.83	30		
CS3U-375P	375	40.2	9.34	47.6	9.91	30		
CS3U-380P	380	40.4	9.42	47.8	9.99	30		
CS3U-385P	385	40.6	9.50	48.0	10.07	30		
CS3U-390P	390	40.8	9.56	48.6	10.17	30		
CS3U-395P	395	41.0	9.64	48.8	10.24	30		
CS3U-400P	400	41.2	9.71	49.0	10.30	30		
CS3U-405P	405	41.4	9.79	49.2	10.37	30		
CS3U-410P	410	41.6	9.86	49.4	10.43	30		
CS3U-415P	415	41.8	9.93	49.6	10.49	30		
CS3U-420P	420	42.0	10.00	49.8	10.55	30		

Module Type	Maximum Power Pmax <W>	Operating voltage Vmp <V>	Operating current Imp <A>	Open Circuit Voltage Voc <V>	Short Circuit Current Isc <A>	Max. Series Fuse Rating <A>	Overall Dimension <mm>	Weight <kg>
CS3K-280MS	280	31.7	8.84	38.5	9.49	30	1675 x 992 x 40 / 35 (65.9 x 39.1 x 1.57 / 1.38 in)	18.5 (40.8 lbs)
CS3K-285MS	285	31.9	8.94	38.7	9.57	30		
CS3K-290MS	290	32.1	9.04	38.9	9.65	30		
CS3K-295MS	295	32.3	9.14	39.1	9.73	30		
CS3K-300MS	300	32.5	9.24	39.3	9.82	30		
CS3K-305MS	305	32.7	9.33	39.5	9.9	30		
CS3K-310MS	310	32.9	9.43	39.7	9.98	30		
CS3K-315MS	315	33.1	9.52	39.9	10.06	30		
CS3K-320MS	320	33.3	9.61	40.1	10.14	30		
CS3K-325MS	325	33.5	9.71	40.3	10.22	30		
CS3K-330MS	330	33.7	9.8	40.5	10.3	30		
CS3K-250P	250	30	8.34	36.7	8.98	30	1675 x 992 x 40 / 35 (65.9 x 39.1 x 1.57 / 1.38 in)	18.5 (40.8 lbs)
CS3K-255P	255	30.2	8.45	36.9	9.06	30		
CS3K-260P	260	30.4	8.56	37.1	9.14	30		
CS3K-265P	265	30.6	8.66	37.3	9.22	30		
CS3K-270P	270	30.8	8.77	37.5	9.3	30		
CS3K-275P	275	31	8.88	37.7	9.38	30		
CS3K-280P	280	31.2	8.98	37.9	9.47	30		
CS3K-285P	285	31.4	9.08	38.1	9.56	30		
CS3K-290P	290	32.3	8.98	38.9	9.49	30		
CS3K-295P	295	32.5	9.08	39.1	9.57	30		
CS3K-300P	300	32.7	9.18	39.3	9.65	30		
CS3K-305P	305	32.9	9.28	39.5	9.73	30		
CS3K-310P	310	33.1	9.37	39.7	9.81	30		
CS3K-315P	315	33.3	9.46	39.9	9.89	30		
CS3K-320P	320	33.5	9.56	40.1	9.97	30		
CS3K-325P	325	33.7	9.65	40.9	10.21	30		
CS3K-330P	330	33.9	9.74	41.1	10.29	30		
CS3K-335P	335	34.1	9.83	41.3	10.37	30		
CS3K-340P	340	34.3	9.92	41.5	10.45	30		
CS3K-345P	345	34.5	10.00	41.7	10.52	30		
CS3K-350P	350	34.7	10.09	41.9	10.60	30		
CS1V-240MS	240	28.3	8.48	34.7	9.15	15	1638x826x40 (64.5 x 32.5 x 1.57 in)	15.4 (34.0 lbs)
CS1V-245MS	245	28.6	8.58	34.9	9.22	15		
CS1V-250MS	250	28.8	8.68	35.1	9.29	15s		
CS1V-255MS	255	29.0	8.79	35.3	9.37	15		
CS1V-260MS	260	29.2	8.89	35.5	9.44	15		
CS1V-265MS	265	29.4	9.00	35.7	9.51	15		
CS1V-270MS	270	29.6	9.11	35.9	9.59	15		
CS1V-275MS	275	29.8	9.22	36.1	9.66	15		
CS1V-280MS	280	30.0	9.33	36.3	9.74	15		
CS1V-285MS	285	30.2	9.44	36.5	9.82	15		
CS1VL-190MS	190	22.5	8.45	27.6	9.10	15	1322x826x35 (52.05 x 32.5 x 1.38 in)	12.6 (27.8 lbs)
CS1VL-195MS	195	22.7	8.58	27.8	9.22	15		
CS1VL-200MS	200	22.9	8.73	28.0	9.34	15		
CS1VL-205MS	205	23.1	8.88	28.2	9.46	15		
CS1VL-210MS	210	23.3	9.01	28.4	9.58	15		
CS1VL-215MS	215	23.5	9.15	28.6	9.70	15		
CS1VL-220MS	220	23.7	9.28	28.8	9.82	15		
CS1VL-225MS	225	23.9	9.41	29.0	9.97	15		

Module Type	Maximum Power Pmax <W>	Operating voltage Vmp <V>	Operating current Imp <A>	Open Circuit Voltage Voc <V>	Short Circuit Current Isc <A>	Max. Series Fuse Rating <A>	Overall Dimension <mm>	Weight <kg>
CS1K-310MS	310	35.2	8.82	43.1	9.37	20	1675x992x35 (65.9 x 39.1 x 1.38 in)	18.5 (40.8 lbs)
CS1K-315MS	315	35.4	8.91	43.2	9.44	20		
CS1K-320MS	320	35.6	9.00	43.3	9.51	20		
CS1K-325MS	325	35.8	9.09	43.4	9.58	20		
CS1K-330MS	330	36.0	9.18	43.5	9.65	20		
CS1K-335MS	335	36.2	9.27	43.6	9.73	20		
CS1K-340MS	340	36.4	9.35	43.7	9.81	20		
CS1K-345MS	345	36.6	9.43	43.8	9.88	20		
CS1K-350MS	350	36.8	9.51	43.9	9.95	20		
CS1K-355MS	355	37.0	9.60	44.0	10.02	20		
CS1H-325MS	325	36.6	8.88	44.1	9.64	16	1700x992x35 (66.9 x 39.1 x 1.38 in)	19.2 (42.3 lbs)
CS1H-330MS	330	37.0	8.92	44.2	9.68	16		
CS1H-335MS	335	37.4	8.96	44.3	9.72	16		
CS1H-340MS	340	37.8	9.00	44.5	9.76	16		
CS1H-345MS	345	38.2	9.04	44.6	9.80	16		
CS1U-385MS	385	43.5	8.86	53.1	9.45	15	2078x992x35 (81.8 x 39.1 x 1.38 in)	23.4 (51.6 lbs)
CS1U-390MS	390	43.7	8.93	53.2	9.50	15		
CS1U-395MS	395	43.9	9.01	53.3	9.55	15		
CS1U-400MS	400	44.1	9.08	53.4	9.60	15		
CS1U-405MS	405	44.3	9.16	53.5	9.65	15		
CS1U-410MS	410	44.5	9.23	53.6	9.70	15		
CS1U-415MS	415	44.7	9.30	53.7	9.75	15		
CS1U-420MS	420	44.9	9.37	53.8	9.80	15		
CS1U-425MS	425	45.1	9.44	53.9	9.85	15		
CS1U-430MS	430	45.3	9.51	54.0	9.90	15		
CS3W-385P	385	38.1	10.11	46.6	10.66	20	2108 x 1048 x 40 (83.0 x 41.3 x 1.57 in)	24.9 (54.9 lbs)
CS3W-390P	390	38.3	10.1s9	46.8	10.74	20		
CS3W-395P	395	38.5	10.26	47.0	10.82	20		
CS3W-400P	400	38.7	10.34	47.2	10.90	20		
CS3W-405P	405	38.9	10.42	47.4	10.98	20		
CS3W-410P	410	39.1	10.49	47.6	11.06	20		
CS3W-415P	415	39.3	10.56	47.8	11.14	20		
CS3W-420P	420	39.5	10.64	48.0	11.26	20		
CS3W-425P	425	39.7	10.71	48.2	11.29	20		
CS3W-430P	430	39.9	10.78	48.4	11.32	20		
CS3W-435P	435	40.1	10.85	48.6	11.35	20		
CS3W-440P	440	40.3	10.92	48.7	11.40	20		
CS3W-445P	445	40.5	10.99	48.8	11.45	20		
CS3L-320P	320	31.8	10.07	38.8	10.66	20	1765 x 1048 x 40 (69.5 x 41.3 x 1.57 in)	20.6 (45.4 lbs)
CS3L-325P	325	32.0	10.16	39.0	10.74	20		
CS3L-330P	330	32.2	10.24	39.2	10.82	20		
CS3L-335P	335	32.4	10.34	39.4	10.90	20		
CS3L-340P	340	32.6	10.43	39.6	10.98	20		
CS3L-345P	345	32.8	10.52	39.8	11.06	20		
CS3L-350P	350	33.0	10.61	40.2	11.24	20		
CS3L-355P	355	33.2	10.70	40.4	11.31	20		
CS3L-360P	360	33.4	10.78	40.6	11.37	20		
CS3L-365P	365	33.6	10.87	40.8	11.44	20		

Module Type	Maximum Power Pmax <W>	Operating voltage Vmp <V>	Operating current Imp <A>	Open Circuit Voltage Voc <V>	Short Circuit Current Isc <A>	Max. Series Fuse Rating <A>	Overall Dimension <mm>	Weight <kg>
CS3W-415MS	415	39.7	10.46	47.7	11.22	20	2108 x 1048 x 40 (83.0 x 41.3 x 1.26 in)	24.9 (54.9 lbs)
CS3W-420MS	420	39.9	10.53	47.9	11.27	20		
CS3W-425MS	425	40.1	10.60	48.1	11.32	20		
CS3W-430MS	430	40.3	10.68	48.3	11.37	20		
CS3W-435MS	435	40.5	10.75	48.5	11.42	20		
CS3W-440MS	440	40.7	10.82	48.7	11.48	20		
CS3W-445MS	445	40.9	10.89	48.9	11.54	20		
CS3W-450MS	450	41.1	10.96	49.1	11.60	20		
CS3W-455MS	455	41.3	11.02	49.3	11.66	20		
CS3W-460MS	460	41.5	11.09	49.5	11.72	20		
CS3W-465MS	465	41.7	11.16	49.7	11.78	20		
CS3W-470MS	470	41.9	11.22	49.9	11.84	20		
CS3L-345MS	345	33.1	10.43	39.8	11.23	20	1765 x 1048 x 40 (69.5 x 41.3 x 1.57 in)	21.1 (46.5 lbs)
CS3L-350MS	350	33.3	10.52	40.0	11.28	20		
CS3L-355MS	355	33.5	10.61	40.2	11.33	20		
CS3L-360MS	360	33.7	10.69	40.4	11.40	20		
CS3L-365MS	365	33.9	10.78	40.6	11.47	20		
CS3L-370MS	370	34.1	10.86	40.8	11.54	20		
CS3L-375MS	375	34.3	10.94	41.0	11.61	20		
CS3L-380MS	380	34.5	11.02	41.2	11.68	20		
CS3L-385MS	385	34.7	11.10	41.4	11.75	20		
CS3L-390MS	390	34.9	11.18	41.6	11.82	20		
CS1HA-265MS	265	29.9	8.86	36.1	9.45	15	1395 x 992 x 35 (54.9 x 39.1 x 1.38 in)	15.8 (34.8 lbs)
CS1HA-270MS	270	30.3	8.92	36.3	9.49	15		
CS1HA-275MS	275	30.6	8.99	36.5	9.53	15		
CS1HA-280MS	280	30.9	9.07	36.8	9.57	15		
CS1HA-285MS	285	31.2	9.14	37.2	9.61	15		

· The recommended maximum series fuse rating is stated in table C above.

## ANNEX D: MODULE CLEANING GUIDELINE

This manual covers requirements for the cleaning procedure of Canadian Solar Inc. photovoltaic modules. The purpose of these cleaning guidelines is to provide general information for cleaning Canadian Solar modules. Professional installers should read these guidelines carefully and strictly follow these instructions.

Failure to follow these instructions may result in death, injury or property damage to the photovoltaic module. Damages induced by inappropriate cleaning procedures will void Canadian Solar Inc. warranty.



### SAFETY WARNING

- Cleaning activities create risk of damaging the modules and array components, as well as increasing the potential electric shock hazard.
- Cracked or broken modules represent an electric shock hazard due to leakage currents, and the risk of shock is increased when modules are wet. Before cleaning, thoroughly inspect modules for cracks, damage, and loose connections.
- The voltage and current present in an array during daylight hours are sufficient to cause a lethal electrical shock.
- **Do not** immerse the module, partially or totally, in water or any other cleaning solution.
- Ensure that the circuit is disconnected before starting the cleaning procedure as contact with leakage of electrically active parts can result in injury.
- Ensure that the array has been disconnected from other active components (such as inverter or combiner boxes) before starting with the cleaning.
- Wear suitable protection (clothes, insulated gloves, etc.).

### HANDLING NOTICE

- Use a proper cleaning solution and suitable cleaning equipment.

- **Do not** use abrasive or electric cleaners on the module.
- Particular attention should be taken to avoid the module backsheet or frame to come in contact with sharp objects, as scratches may directly affect product safety.
- **Do not** use abrasive cleaners, de-greasers or any unauthorized chemical substance (e.g. oil, lubricant, pesticide, etc.) on the module.
- **Do not** use cleaning corrosive solutions containing hydrofluoric acid, alkali, acetone, or industrial alcohol. Only substances explicitly approved by Canadian Solar are allowed to be used for cleaning modules.
- Canadian Solar Inc. recommends to avoid rotating brush cleaning methods, as they could create micro-cracks in the PV modules.
- Dirt must never be scraped or rubbed away when dry, as this will cause micro-scratches on the glass surface.

### OPERATION PREPARATION

- Noticeable dirt must be rubbed away by gentle cleaning-implementation (soft cloth, sponge or brush with soft bristles).
- Ensure that brushes or agitating tools are not abrasive to glass, EPDM, silicone, aluminum, or steel.
- Conduct the cleaning activities avoiding the hottest hours of the day, in order to avoid thermal stress on the module.

We recommend the following to be used:

- Water with low mineral content
- Near neutral pH water
- The maximum water pressure recommended is 4 MPa (40 bar)

## CLEANING METHODS

### Method A: Compressed Air

Canadian Solar Inc. recommends cleaning the soft dirt (like dust) on modules just with compressed air. This technique can be applied as long as the method is efficient enough considering the existing conditions.

### Method B: Wet cleaning

If excessive soiling is present on the module surface, a non-conductive brush, sponge, or other mild agitating method may be used with caution.

- Ensure that any brushes or agitating tools are constructed with non-conductive materials to minimize risk of electric shock and that they are not abrasive to the glass or the aluminum frame.
- If grease is present, an environmentally friendly cleaning agent may be used with caution.

## AMENDED EDITIONS AND DATES

- The first edition Rev 1.0 was released in June, 2017.
- Rev 1.1 was released in October, 2017.
- Rev 1.2 was released in April 11<sup>th</sup>, 2018.
- Rev 1.3 was released in April 20<sup>th</sup>, 2018.
- Rev 1.4 was released in July, 2018.
- Rev 1.5 was released in November, 2018.
- Rev 1.6 was released in April, 2019.
- Rev 1.7 was released in August, 2019.
- Rev 1.8 was released in September, 2019.
- Rev 1.9 was released in October, 2019.
- Rev 2.0 was released in December, 2019.
- Rev 2.1 was released in April, 2020.
- Rev 2.2 was released in July, 2020.

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