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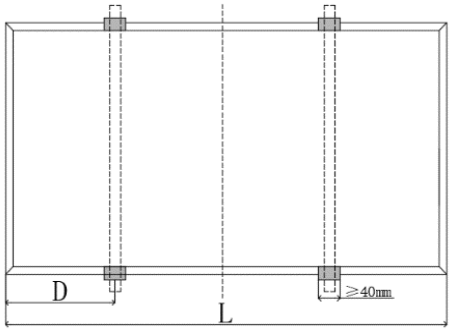
January 25th, 2021

Additional mounting methods (monofacial modules)

Amendment 1 Version 1.92 to "20210115 LONGI Solar Installation Manual for PV Modules V10 [..].pdf"

The following methods describe achievable loads to LONGi photovoltaic modules by methods. Pressure (+) indicate push/snow loads while negative pressure (-) indicate pull/wind loads. These static loads are test loads. Required safety factors for systems should be in line with EN 1991-X-X standard series. Outside Europe or if EN 1991-X is not applicable you may use safety factor 1.5 as indicated in IEC 61215-X for system design loads.

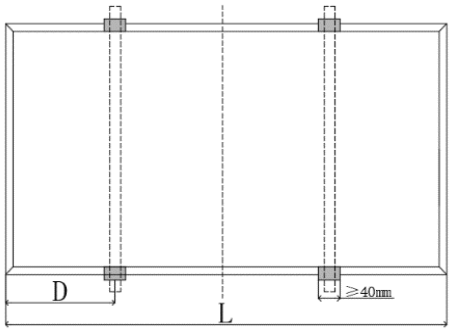
Method 1a (4 clamps long frame):



Dimension D [mm]	Loads [Pa.]
20 ≤ D ≤ L/4 - 50	+2.400 -2.400
L/4 – 50 ≤ D ≤ L/4 + 50 (recommended)	+5.400 -2.400
L/4 + 50 ≤ D ≤ 625mm	+2.400 -2.400

Applicable for modules

LR4-**60** YYY ZZZ M YYY=HPH, HPB, HIH, HIB ZZZ=Nominal Power



Dimension D [mm]	Standard Frame Loads [Pa.]	Enforced Frame* Loads [Pa.]
20 ≤ D ≤ 150	+1.200 -1.200	+1.600 -1.600
150 ≤ D ≤ 350	+2.400 -2.400	+2.400 -2.400
350 ≤ D ≤ 450 (recommended)	+5.400 -2.400	+5.400 -2.400
L/4+50 ≤ D ≤ 778	+2.400 -2.400	+2.400 -2.400

*** optimized product / needs to be ordered explicitly**

Applicable for modules

LR4-**72** YYY ZZZ M YYY = HPH, HIH ZZZ=Nominal Power

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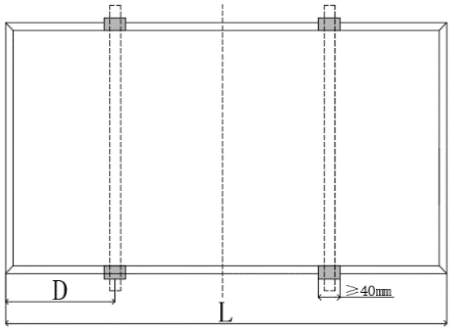
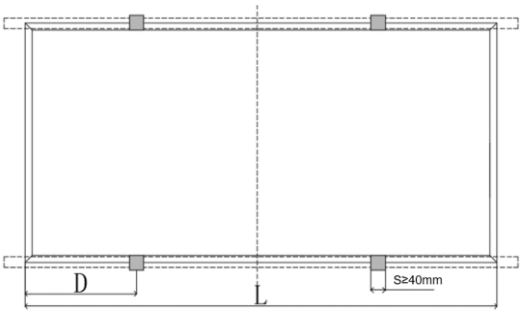


Dimension D [mm]	Loads [Pa.]
250 ≤ D ≤ 350	+2.400 -1.800
350 ≤ D ≤ 450 (recommended)	+5.400 -2.400
450 ≤ D ≤ 550	+2.400 -1.800

Applicable for modules

LR5-**66** YYY ZZZ M YYY = HPH, HIH ZZZ=Nominal Power
LR5-**72** YYY ZZZ M

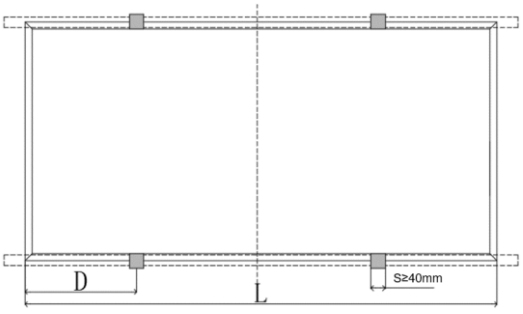
Method 1b (4 clamps long frame):



Dimension D [mm]	Loads [Pa.]
20 ≤ D ≤ 625	+2.400 -2.400

Applicable for modules

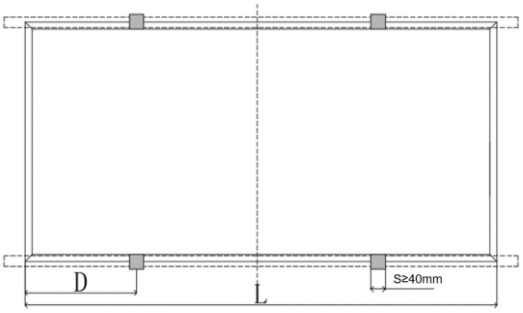
LR4-**60** YYY ZZZ M YYY=HPH, HPB, HIH, HIB ZZZ=Nominal Power



Dimension D [mm]	Loads [Pa.]
20 ≤ D ≤ 150	+1.200 -1.200
150 ≤ D ≤ 350	+2.400 -2.400
350 ≤ D ≤ 450 (recommended)	+2.400 -2.400
450 ≤ D ≤ 778	+2.400 -2.400

Applicable for modules

LR4-**72** YYY ZZZ M YYY=HPH, HIH ZZZ=Nominal Power

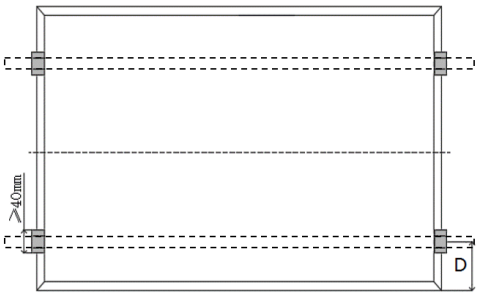


Dimension D [mm]	Loads [Pa.]
250 ⩽ D ⩽ 350	+2.400 -1.800
350 ⩽ D ⩽ 450 (recommended)	+2.400 -2.400
450 ⩽ D ⩽ 600	+2.400 -1.800

Applicable for modules

LR5-**66** YYY ZZZ M YYY=HPH, HIH ZZZ=Nominal Power
LR5-**72** YYY ZZZ M

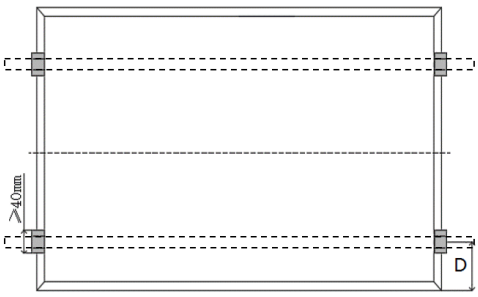
Method 2a (4 clamps short frame):



Dimension D [mm]	Loads [Pa.]
20 ⩽ D ⩽ 150	+2.400 -1.800
150 ⩽ D ⩽ 250 (recommended)	+2.400 -2.400

Applicable for modules

LR4-**60** YYY ZZZ M YYY=HPH, HPB, HIH, HIB ZZZ=Nominal Power



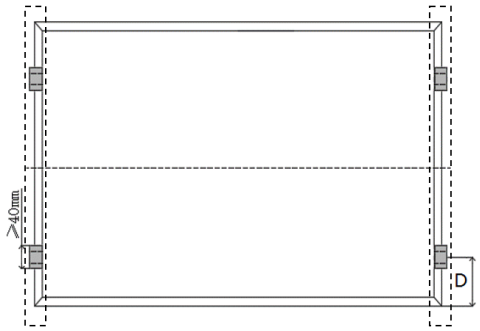
Dimension D [mm]	Standard Frame Loads [Pa.]	Enforced Frame* Loads [Pa.]
20 ⩽ D ⩽ 150	Not supported	+1.600 -1.600
150 ⩽ D ⩽ 250 (recommended)	Not supported	+1.600 -1.600

*** optimized product / needs to be ordered explicitly**

Applicable for modules

LR4-**72** YYY ZZZ M YYY=HPH, HIH ZZZ=Nominal Power

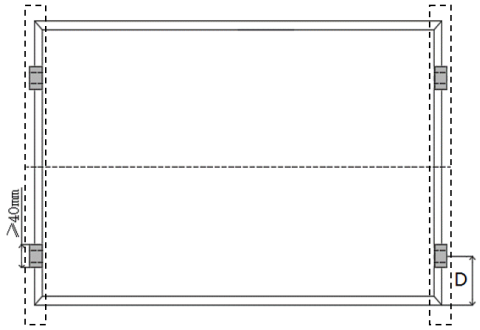
Method 2b (4 clamps short frame):



Dimension D [mm]	Loads [Pa.]
20 ≤ D ≤ 150	+1.800 -1.800
150 ≤ D ≤ 250 (recommended)	+2.400 -2.400

Applicable for modules

LR4-**60** YYY ZZZ M YYY=HPH, HPB, HIH, HIB ZZZ=Nominal Power



Dimension D [mm]	Standard Frame Loads [Pa.]	Enforced Frame* Loads [Pa.]
20 ≤ D ≤ 150	Not supported	+1.600 -1.600
150 ≤ D ≤ 250 (recommended)	Not supported	+1.600 -1.600

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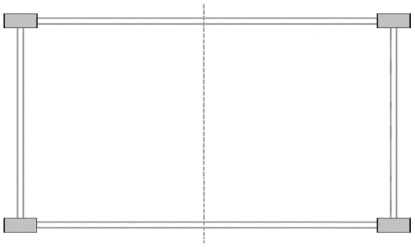
Applicable for modules

LR4-**72** YYY ZZZ M YYY=HPH, HIH ZZZ=Nominal Power

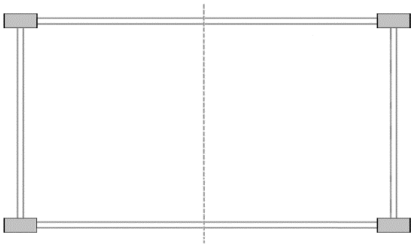
Method 3 (4 clamps long frame edge):



Dimension D [mm]	Loads [Pa.]
0 (min. clamp contact 100mm)	+2.400 -1.800

Applicable for modules

LR4-**60** YYY ZZZ M YYY=HPH, HPB, HIH, HIB ZZZ=Nominal Power



Dimension D [mm]	Standard Frame Loads [Pa.]	Enforced Frame* Loads [Pa.]
0 (min. clamp contact 100mm)	Not supported	+1.600 -1.600

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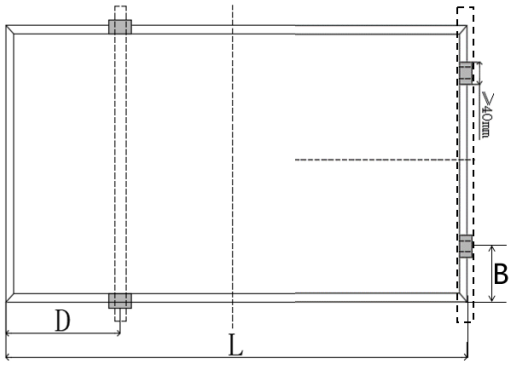
Applicable for modules

LR4-**72** YYY ZZZ M YYY=HPH, HIH ZZZ=Nominal Power

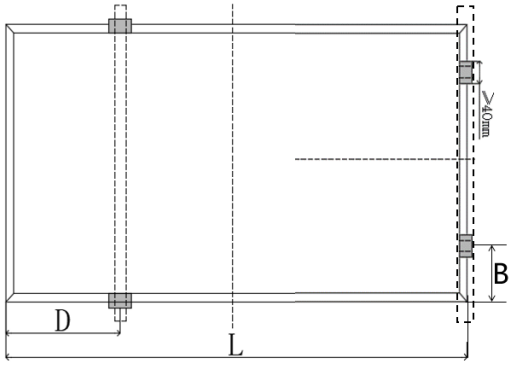
Method 4 (2 clamps each long and short frame):



Dimension D [mm]	Dimension B [mm]	Loads[Pa.]
L/4-50 ≤D≤ L/4+50	150 ≤ B ≤ 250	+2.400 -2.400

Applicable for modules

LR4-**60** YYY ZZZ M YYY=HPH, HPB, HIH, HIB ZZZ=Nominal Power

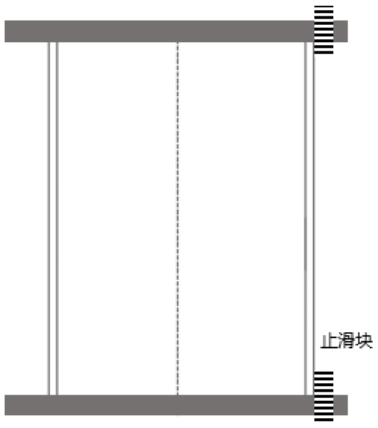


Dimension D [mm]	Dimension B [mm]	Loads [Pa.]
L/4-50 ≤D≤ L/4+50	150 ≤ B ≤ 250	+2.400 -2.400

Applicable for modules

LR4-**72** YYY ZZZ M YYY=HPH, HIH ZZZ=Nominal Power

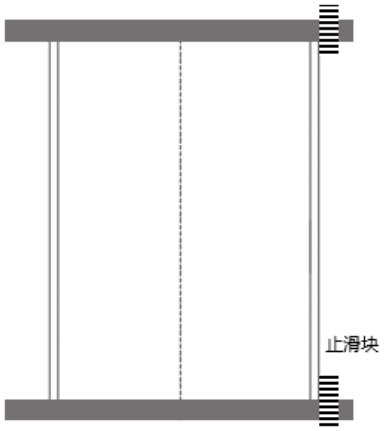
Method 5a (lay in system short frame):



Dimension D [mm]	Loads [Pa.]
n/a (lay-in system)	+2.400 -2.400

Applicable for modules

LR4-**60** YYY ZZZ M YYY=HPH, HPB, HIH, HIB ZZZ=Nominal Power



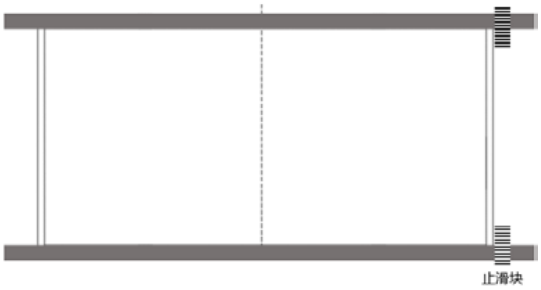
Dimension D [mm]	Standard Frame Loads [Pa.]	Enforced Frame* Loads [Pa.]
n/a (lay-in system) (not recommended)	Not supported	+1.600 -1.600

*** optimized product / needs to be ordered explicitly**

Applicable for modules

LR4-**72** YYY ZZZ M YYY=HPH, HIH ZZZ=Nominal Power

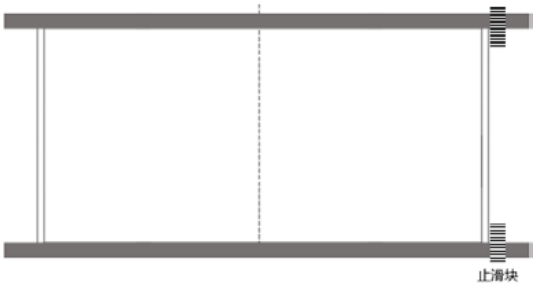
Method 5b (lay in system long frame):



Dimension D [mm]	Loads [Pa.]
n/a (lay-in system)	+2.400 -2.400

Applicable for modules

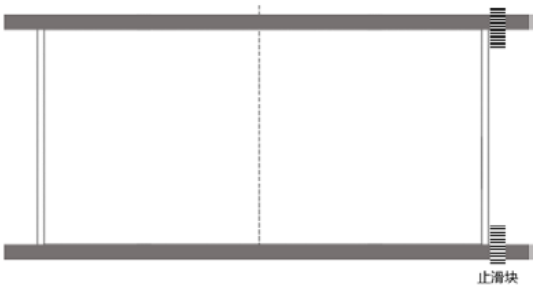
LR4-**60** YYY ZZZ M YYY=HPH, HPB, HIH, HIB ZZZ=Nominal Power



Dimension D [mm]	Loads [Pa.]
n/a (lay-in system)	+2.400 -2.400

Applicable for modules

LR4-**72** YYY ZZZ M YYY=HPH, HIH ZZZ=Nominal Power

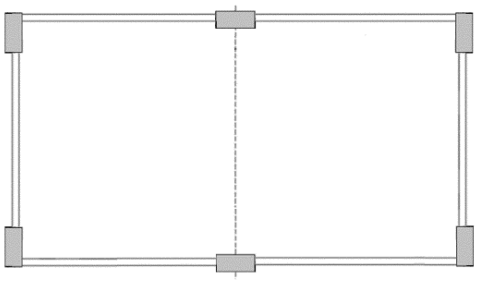


Dimension D [mm]	Loads [Pa.]
n/a (lay-in system)	+2.400 -2.400

Applicable for modules

LR5-**66** YYY ZZZ M YYY=HPH, HIH ZZZ=Nominal Power
LR5-**72** YYY ZZZ M

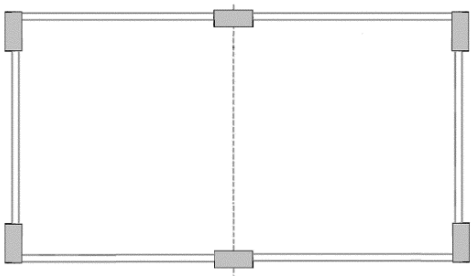
Method 6 (six point clamping, 2 clamps each short side corner plus 1 clamps each long center):



Short Side Clamp [mm]	Long Side Clamp [mm]	Loads [Pa.]
0 ⩽ D ⩽ 250	L/2-50 ⩽D⩽ L/2+50	+3.600 -2.400

Applicable for modules

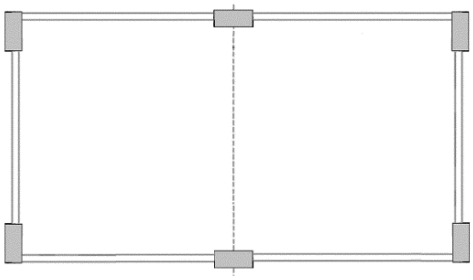
LR4-**60** YYY ZZZ M YYY=HPH, HPB, HIH, HIB ZZZ=Nominal Power



Short Side Clamp [mm]	Long Side Clamp [mm]	Loads [Pa.]
0 ⩽ D ⩽ 250	L/2-50 ⩽D⩽ L/2+50	+2.400 -2.400

Applicable for modules

LR4-**72** YYY ZZZ M YYY=HPH, HIH ZZZ=Nominal Power



Short Side Clamp [mm]	Long Side Clamp [mm]	Loads [Pa.]
0 ⩽ D ⩽ 250	L/2-50 ⩽D⩽ L/2+50	+2.400 -2.400

Applicable for modules

LR5-**66** YYY ZZZ M YYY=HPH, HIH ZZZ=Nominal Power
LR5-**72** YYY ZZZ M

Important note for method 6:

Middle support must be clamped / fixed to the PV module frame. A loose middle support is insufficient and would reduce pull forces as described in method 2 to 1.200 Pa.

General Notes:

- **Given loads are test loads the product physically withstands. Design loads are test loads divided by 1.5 (safety factor).**
- **This document applies to framed glass-foil constructions with 3.2 mm glass only!**
- **For HiMO4 72 Cell modules there is two frame versions available! Please check your mounting load requirements.**
- **For bifacial mounting methods please refer to Amendment 2.**
- **Clamp length of minimum 60mm is recommended.**
- **Photovoltaic modules are in process of permanent optimization. Please make sure you always have latest version of installation manual and amendments on hand when designing a system.**

i.A. Winfried Wahl

Chief Engineer, Head of Product Management