PLEASE READ THIS MANUAL COMPLETELY BEFORE INSTALLING OR USING THE MODULES

INSTALLATION MANUAL

PHOTOVOLTAIC MODULE

ND-N2ECUF

SHARP CORPORATION

1.INTRODUCTION

This manual contains information of electrical and mechanical installation and safety information which you should know before using photovoltaic module **ND-N2ECUF**.
The information in this manual is described on the basis of Sharp's knowledge and experience. But such information and suggestions do not constitute a warranty.
Sharp Corporation reserves the right to make changes to the product, specifications, or to the manual without prior notice.

2.MECHANICAL INSTALLATION

The modules may be fastened to a support using the bolt holes in the bottom of the frame at location "C", as shown in Figure 1 (back view of the module) and Figure 2 (mounting detail). The module should be fastened with four (4) M8 (5/16") bolts. The mounting method is designed to allow module loading of 2400 Pa. Take care during installation to not block the drain holes (D) shown in Figure 1.

3.ELECTRICAL INSTALLATION

To ensure proper system operation and maintain your warranty, be careful to observe the correct cable connection polarity (Figure A) when connecting the modules to a battery or to other modules. If not connected correctly, the bypass diode could be destroyed. This will void your warranty.
All solar modules must be grounded by electrical connection of the module frames to ground. Care must be taken to arrange the system ground so that the removal of one module from the circuit will not interrupt the grounding of any of the other modules.
Each photovoltaic module has a hole in the side frame for either a bolt, nut and washer grounding the module to the frame, a ground lug fastened by bolt or screw, or an appropriate screw (hardware not provided). An example of an acceptable ground connection using a bolt, nut and washer retaining a ground lug is shown in Figure B. In a connection of this type, the hardware (such as a star washer) must score the frame surface to make positive electrical contact with the frame. The ground wire must not be smaller than No.14 AWG (2.1mm^2), and should be sized according to The National Electrical Code.

4.ELECTRICAL RATINGS

Rated electrical characteristics are within ±10 percent of the indicated values of Isc, Voc and +10/-5 percent of Pmax under standard test conditions.
(irradiance of 100 mW/cm^2, AM 1.5 spectrum, and a cell temperature of 25 ℃(77° F)).
The above electrical characteristics are based on the results of out going test. The warranty condition is specified in the warranty card separately issued.
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Maximum Power (Pmax)	142.0 W
Open-Circuit Voltage (Voc)	25.24 V
Short-Circuit Current (Isc)	7.84 A
Operating Voltage (Vpmax)	19.92 V
Current at Vpmax (Ipmax)	7.13 A
Maximum System Voltage	600 V
Maximum Series Fuse	15 A

The above electrical characteristics are based on the results of out going test.
Please do not expose solar module to sunlight concentrated with mirrors, lenses or similar means.

Under normal conditions, a photovoltaic module may experience conditions that produce more current and/or voltage than reported at Standard Test Conditions.
Accordingly, the values of Isc and Voc marked on UL Listed modules should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor capacities, fuse sizes and size of controls connected to the module output. Refer to Sec. 690-8 of the National Electric Code for an additional multiplying factor of 125 percent (80 percent of rating) which may be applicable.

Installation for wiring shall be in accordance with the NEC and grounding method shall comply with the NEC, article 250 (see instruction manual Figure A and B).
In the coverage of Canadian UL listing, installation shall be in accordance with CSA C22.1, Safety Standard for Electrical Installations, Canadian Electrical Code, Part 1.

IMPORTANT SAFETY WARNINGS

(1) Never touch the end of output cables with bare hands when the module is irradiated. Cover the surface of module with cloth or other suitable sufficiently opaque material to isolate the module from incident light and handle the wires with rubber-gloved hands to avoid electric shock.
(2) Do not wear metallic jewelry which may become cause of electric shock during installation.
(3) Do not expose solar module to sunlight concentrated with mirrors, lenses or similar means.
(4) Consult local codes and other applicable laws and statutes concerning required permits, regulations concerning installation, and inspection requirements.
(5) Install modules and ground frames in accordance with applicable codes.
(6) Product should be installed and maintained by qualified personnel.
(7) Do not drop tools or hard objects on the solar module.
(8) Do not scratch the back film by hard objects.
(9) Do not shadow cells, if possible, to avoid causing module hot spots.
(10) Do not pour chemicals on modules when cleaning.
(11) Keep children away from modules.
(12) Do not connect the modules directly to the loads such as motor since the variation of the output power depending on the solar irradiation causes the damage for the connected motor.
1 : In case of brushless motor, the lock function gets active and the hall IC is most likely to be damaged.
2 : In case of the motor with brush, the coil is most likely to be damaged.
(13) Do not block up D-holes on the establishment.

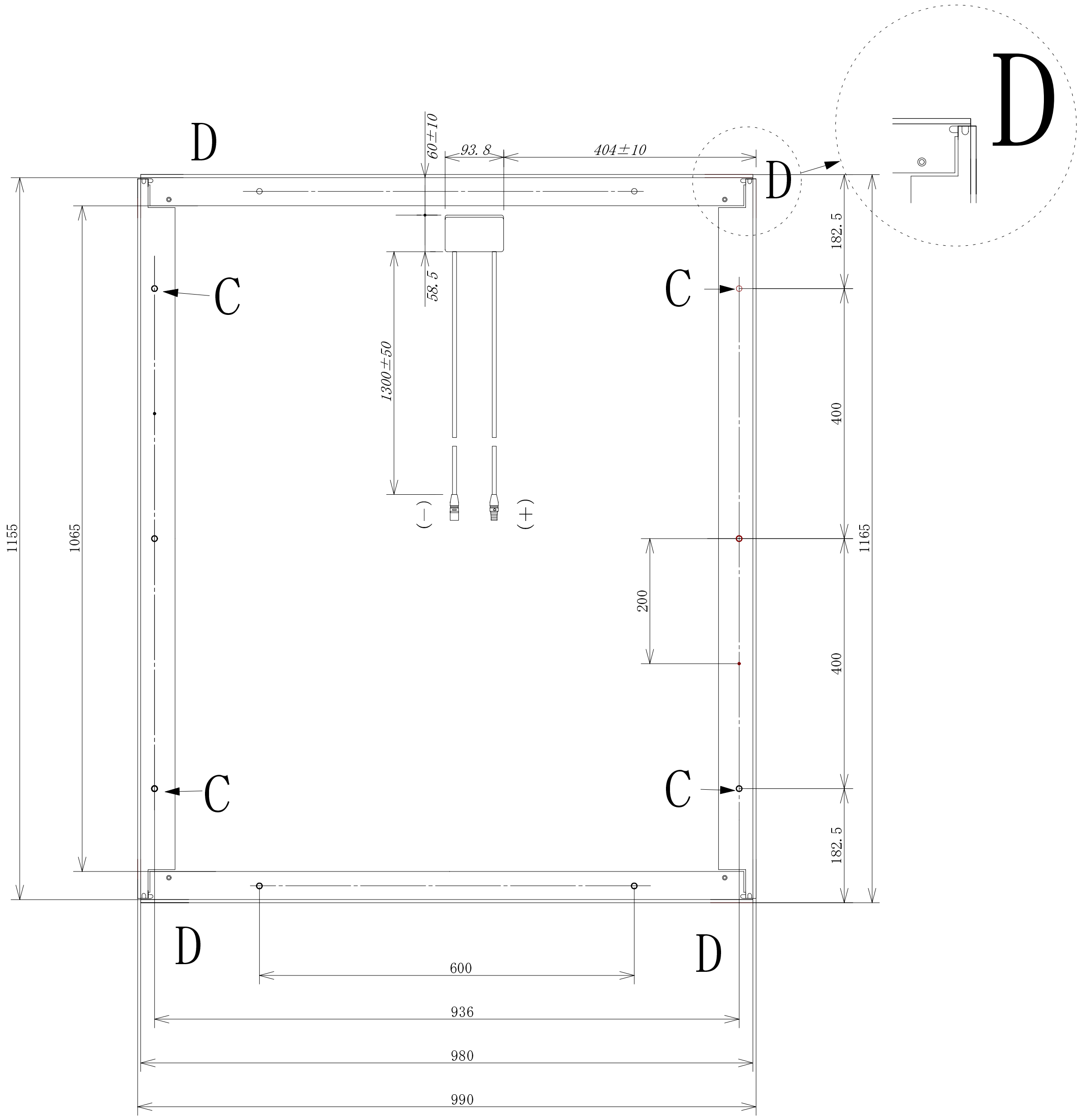


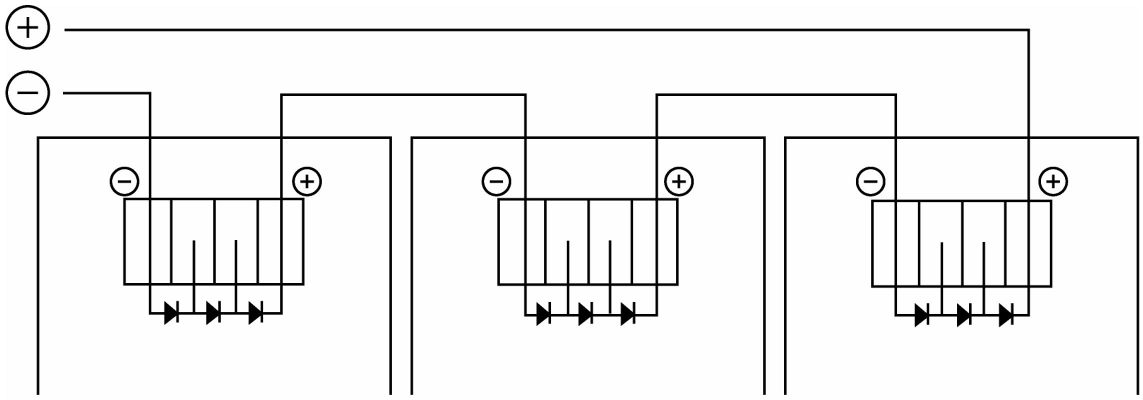
Table A

Dimension ; L	Permissible Deviation
０．５ ＜ Ｌ ＜ ３	＋０．２
３ ＜ Ｌ ＜ ６	＋０．３
６ ＜ Ｌ ＜ ３０	＋０．５
３０ ＜ Ｌ ＜ １２０	＋０．８
１２０ ＜ Ｌ ＜ ４００	＋１．２
４００ ＜ Ｌ ＜ １０００	＋２
１０００ ＜ Ｌ ＜ ２０００	＋３
２０００ ＜ Ｌ ＜ ４０００	＋４

Permissible deviations in dimensions without tolerance indication is shown in table A

Figure 1

Series Wiring (Voltage Additive)



Parallel Wiring (Current Additive)

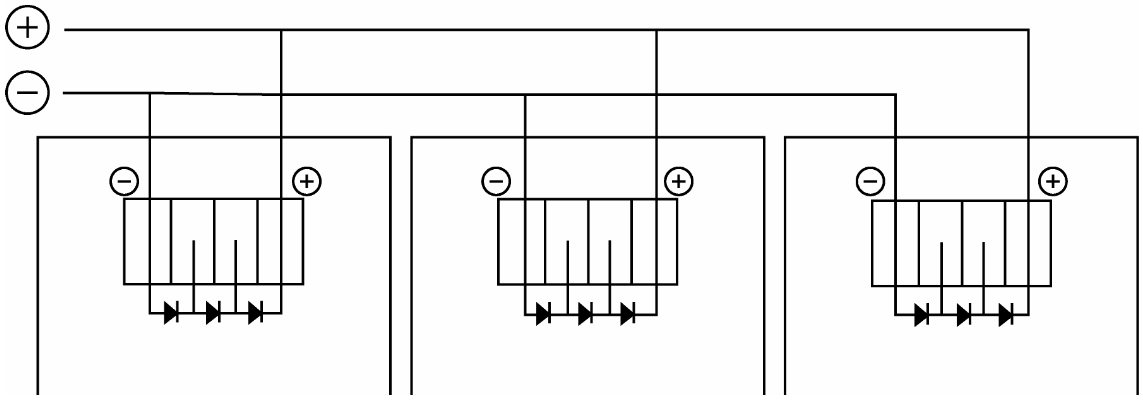


Figure A

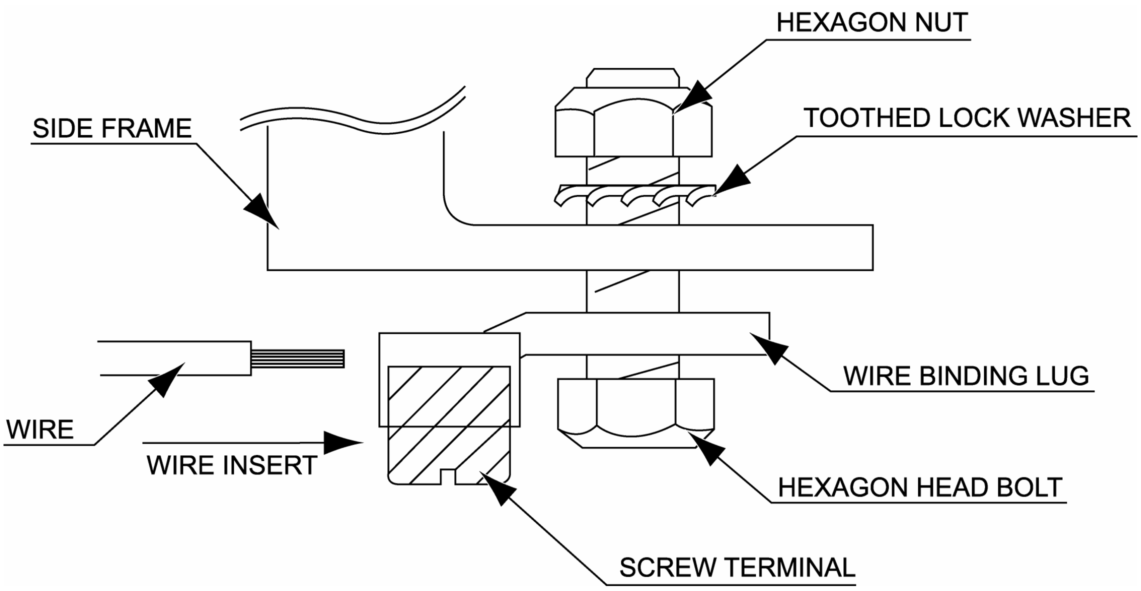
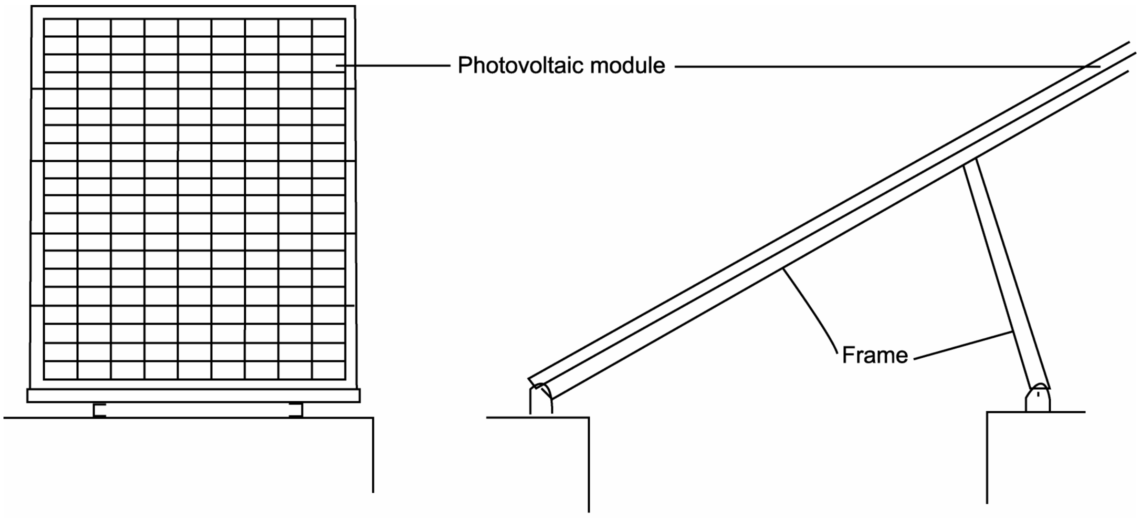

HEXAGON NUT
SIDE FRAME
TOOTHED LOCK WASHER
WIRE BINDING LUG
WIRE
WIRE INSERT
HEXAGON HEAD BOLT
SCREW TERMINAL

Figure B



Photovoltaic module mounting method

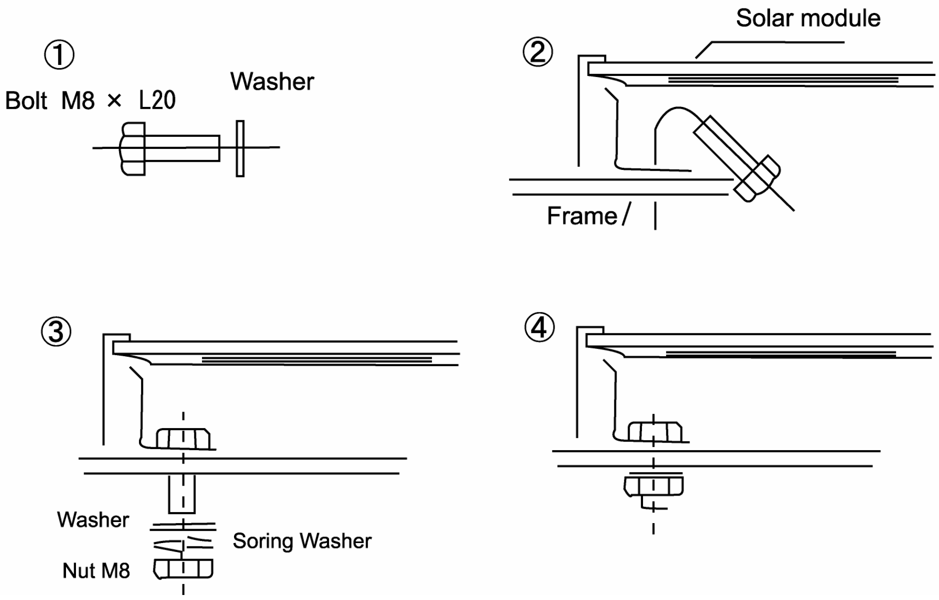


Figure 2