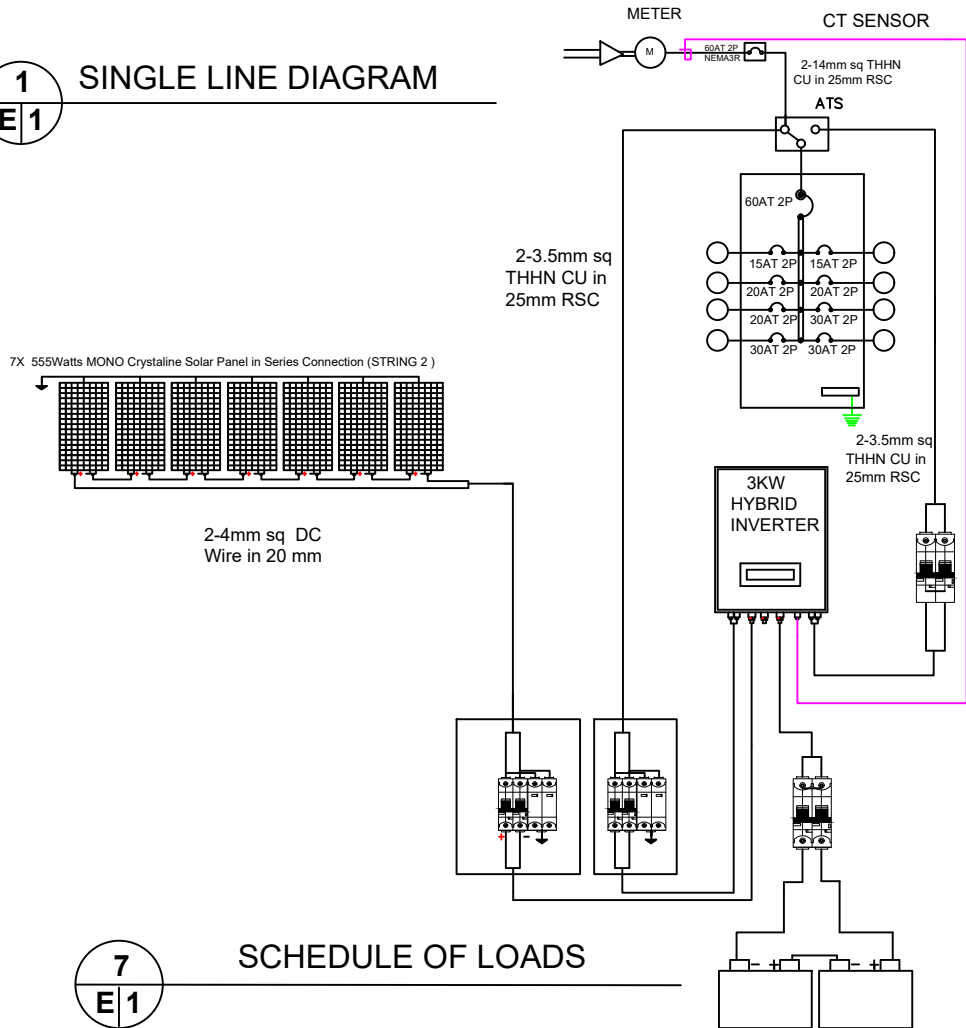


1 SINGLE LINE DIAGRAM



2 LONGI SOLAR PANEL

MODULE NUMBER	LR5-72HPH 555M
RATED MAXIMUM POWER	555W
CURRENT AT PMAX	13.19 A
VOLTAGE AT PMAX	42.1 V
SHORT CIRCUIT CURRENT	14.04 A
OPEN CIRCUIT VOLTAGE	49.95V

3 3KW SUOER HYBRID INVERTER

MODEL	VMS-3K-24
Rated Power	3200VA/3200W
INPUT	
Voltage	230 VAC
Selectable Voltage Range	170-280 VAC
Frequency Range	50 Hz/60 Hz (Auto sensing)
OUTPUT	
AC Voltage Regulation (Batt.Mode)	230VAC ± 5%
Surge Power	6000VA
Efficiency(Peak) PV to INV	97%
Efficiency(Peak) Battery to INV	94%
Transfer Time	10 ms (For Pers on al Computers) 20 ms
Waveform	Pure sine wave
BATTERY & AC CHARGER	
Battery Voltage	24 VDC
Floating Charge Voltage	27 VDC
Overcharge Protection	33 VDC
Maximum Charge Current	80A
SOLAR CHARGER	
Maximum PV Array Power	4000W
MPPT Range @ Operating Voltage	120-450VDC
Maximum PV Array Open Circuit Voltage	500VDC
Maximum Charging Current	80A
Maximum Efficiency	98%

4 ELECTRICAL NOTES

- ALL ELECTRICAL WORKS INDICATED SHALL BE DONE IN ACCORDANCE WITH THE LATEST PROVISION OF THE PHILIPPINES ELECTRICAL CODE RULES AND REGULATION.
- ALL MATERIALS TO BE USED SHALL BE NEW AND APPROVED TYPE FOR ALL LOCATION AND PURPOSES.
- ALL INSTALLATION SHALL BE DONE IN GOOD AND NEAT WORKMANSHIP.
- ALL ELECTRICAL WORKS SHALL BE DONE UNDER THE DIRECT SUPERVISION OF PROFESSIONAL ELECTRICAL / ELECTRONICS ENGINEER / REGISTERED ELECTRICAL ENGINEER OR MASTER ELECTRICIAN.

5 SOLAR ELECTRICAL NOTES

- UTILITY HAS 24HRS UNRESTRICTED ACCESS TO ALL PV SYSTEM COMPONENTS LOCATED AT SERVICE ENTRANCE.
- MODULES CONFORM TO AND ARE LISTED UNDER UL 1703
- CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANCE AS PER PEC
- CONDUCTORS EXPOSED TO WET LOCATION SHALL BE SUITABLE FOR USE WET LOCATION AS PER PEC
- NEW REC METER SHALL BE INSTALLED NEAR TO NEW BI DIRECTIONAL METER
- TAPPING POINT OF REC METER LOAD SIDE CONDUCTORS SHALL BE AT THE LOAD VISIBLE, DISCONNECT DEVICE BEFORE SERVICE EQUIPMENT, REC METERS LOAD SIDE CONDUCTORS SHOULD BE SHORT AS POSSIBLE
- THE LINE SIDE CONDUCTORS OF THE REC METER BETWEEN THE GRID TIE INVERTER REC METERS SHALL BE AN EXPOSED RIGID METALLIC CONDUIT OR INTERMEDIATE METALLIC CONDUIT.
- WARNING SHOULD BE MOUNTED ON OR ADJACENT TO THE VISIBLE DISCONNECTION DEVICE AND SHALL BE READ PROMINENTLY.

6 DESIGN ANALYSIS

SOLAR PANEL PER STRING

ISC = (14.04A) X 1.25 = 14.98A
USE : 16AT DC BREAKER , 600V SPD
2-4mm sq DC Wire in 20 mm sq
Liquitlight Conduit or uPVC

VOLTAGE DROP

Cable Loss:
Ppv_cable = 2*3.39ohms/km*0.02km*(13.19)²
Ppv_cable = 23.59W (per string)

Ppv_input = Ppv_peak - Ppv_cable
Ppv_input = 555*7*1.03*0.912 - 23.59
Ppv_input = 3625.82W (Per String)

Vpv_input = 42.1*7units
Vpv_input = 295.19V (Per String)

Voltage Drop:
Vdrop_cable = 2*3.39ohms/km*0.02km*13.19
Vdrop_cable = 1.79V

INVERTER

PMAX = 3000W / 230V = 13.04A
USE : 20AT AC BREAKER
2- 3.5mm sq THHN Cu Wire in 25mm RSC/IMC

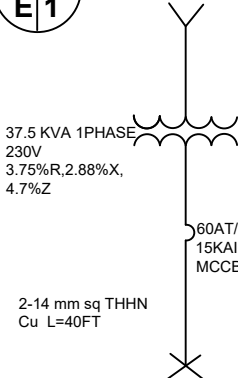
BATTERY PROTECTION

PMAX = 3000W / 24V = 125A
USE : 125 AT DC BREAKER
2-38 mm sq DC Wire

7 SCHEDULE OF LOADS

PANELBOARD: PB									
MOUNTING: FLUSH									
TYPE: FLUSH MAIN : 60AT/100AF, 2P, 230V, 25KAIC BOLT-ON TYPE									
CKT. NO.	DESCRIPTION	VA LOAD	AMPS	CIRCUIT BREAKER				WIRE & CONDUIT SIZE	
				VOLT	POLE	AT	AF		
1	LIGHTING OUTLET 10 X 100W	1000	4.25	230	2	15	50	2 - 2.0 mm ² THHN	25mm Ø PVC
2	LIGHTING OUTLET 10 X 100W	1000	4.25	230	2	15	50	2 - 2.0 mm ² THHN	25mm Ø PVC
3	CONVENIENCE OUTLET 10 X 180W	2250	9.78	230	2	20	50	2 - 3.5 mm ² THHN + 1-3.5mm ² TW(G) IN 20mm Ø PVC	
4	CONVENIENCE OUTLET 10 X 180W	2250	9.78	230	2	20	50	2 - 3.5 mm ² THHN + 1-3.5mm ² TW(G) IN 20mm Ø PVC	
5	ACU 1HP	1840	8	230	2	30	50	2 - 5.5 mm ² THHN + 1-3.5mm ² TW(G) IN 20mm Ø PVC	
6	ACU 1HP	1840	8	230	2	30	50	2 - 5.5 mm ² THHN + 1-3.5mm ² TW(G) IN 20mm Ø PVC	
7	ACU 1HP	1840	8	230	2	30	50	2 - 5.5 mm ² THHN + 1-3.5mm ² TW(G) IN 20mm Ø PVC	
8									
TOTAL		11780 VA							
I _L = (11750 VA/230V) X 80% = 38.87A I _{SC} = 38.87A + 25%(8) = 40.87A I _{CB} = 38.87A + 100%(8) = 46.87A									
FEEDER : 2 - 14mm ² THHN + 1 - 5.5 mm ² TW (G) IN 25mm Ø RSC PROTECTION : MAIN : 60AT/100AF, 2P, 230V, 25KAIC, BOLT-ON BRANCHER : 2 x 15AT, 2 X 20AT, 3 X 30AT 2P, BOLT-ON IN NEMA 1 ENCLOSURE									

8 SHORT CIRCUIT



$$I_{FLA} = (KVA \times 1000) / X V_{LL}$$
$$I_{FLA} = (37.5 \times 1000) / (230V) = 163.04A$$

$$M = 100 / \%Z$$
$$M = 100 / 4.7 = 21.28$$

$$I_{SCF} = 163.04A \times 21.28 = 3469.49A$$

$$I_{SCM} = 4 \times 12 = 48A$$

$$I_{SCRMS} = 3469.49 + 48 = 3517$$
$$= 3.5 KAIC$$

$$f = (2 \times 40 \times 3517) / (22,185 \times 230)$$
$$= 0.06$$
$$M = 1 / (1 + f)$$
$$= 1 / (1 + 0.06) = 0.94$$

$$I_{SCP} = I_{SCF} \times M$$
$$3469.49 \times 0.94 = 3261.32$$
$$I_{TOTAL SCRMS} = 3261.32 + 48 = 3309.32$$
$$= 3.31KAIC$$

USE : 10 KAIC RATING

9 VOLTAGE DROP

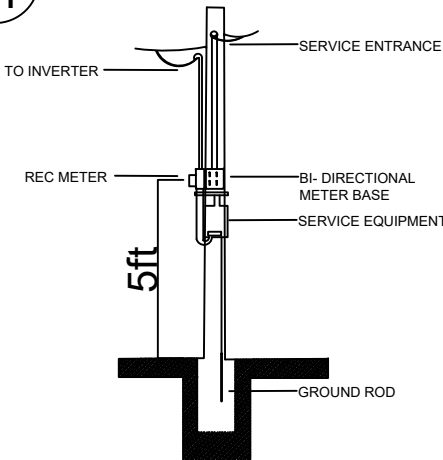
$$VD = (2 \times L \times R \times I) / 1000$$

$$\%VD = VD / 230$$

$$VD = (2 \times 40 \times 0.321 \times 38.87) / 1000 = 0.998$$

$$\%VD = (0.998 / 230) \times 100\% = 0.429V \text{ PASS}$$

10 SERVICE ENTRANCE



CONTRACTOR/DRAWN	PRC REQD.	PROJECT TITLE:	APPROVE BY	LOCATION	SHEET CONTENTS :	SHEET NO.
SOLARAMP	PTR NO.	3.89KWP HYBRID SOLAR PHOTOVOLTAIC SYSTEM			AS SHOWN	I
	DATE ISS.					
	PLACE ISS.					
	T.J.N.		OWNER			
PROFESSIONAL ELECTRICAL ENGINEER						