

JC Termografía RD


Infra-red Inspections – Pool leak detection, Incoming power systems, Switchgear scanning, Motor/Load testing & analysis, Panelboard/Circuit testing & analysis, Building mechanical systems, Water intrusion in buildings, Computer server farms & Communication equipment, Solar panels/farms and related electrical equipment.


Report for:
Mike's Mountain Saloon
Mountain Top near Moca
Tel : (+49) 173 537 6669
Inspected on: 11/27/2021

Infra-red Electrical Inspection Report

Prepared by Jim Cress

JC Termografía RD

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 [JC Termografía RD/fbook](https://www.facebook.com/JC-Termografia-RD/)

Information Page

Thank You! **JC Termografia RD** has recently performed service at your facility. The following pages of this report contain important information about the possible safety of your personnel and the reliability of your equipment. **JC Termografia RD** has used one or more predictive maintenance tools to assist you in attaining the health status of your equipment. We encourage you to consult with your engineering and/or maintenance staff before making a final determination on repairs. **JC Termografia RD** assumes no liability directly or indirectly as a result of this service.

The **inventory** contains a list of all equipment designated by your facility for inspection. Equipment that was tested will be labeled "TESTED" or "T" on the inventory sheet. If a problem was noted with this equipment, it will list a page number that corresponds with a defect page contained in this report. Some items on the list may have not been tested due to: accessibility to equipment, equipment offline, or other barrier. Testing lightly loaded equipment may produce inconclusive results. The overall responsibility of knowing the equipment loading and status falls upon facility personnel.

The **defect** pages are listed directly after the inventory pages. Any anomaly(s) noted during the course of your service will be recorded on the defect pages. Each defect page will contain the data gathered, recommendations, and the criticality rating (see table).

<u>Criticality Table</u>	
****	100°F (55.5 deg C) and > ΔT (Temperature Difference) Failure Imminent, Repair Immediately or ASAP
***	65°F - 99°F (36.1 – 55.4 deg C) ΔT (Temperature Difference) Failure Likely, Repair ASAP
**	45°F - 64°F (25 – 36.0 deg C) ΔT (Temperature Difference) Failure Possible, Schedule Repair
*	20°F - 44°F (11.1 – 24.9 deg C) ΔT (Temperature Difference) Immediate Failure Unlikely, Repair as Time Permits

The **criticality rating** of your equipment was assigned by your technician based on a number of factors which may include some or all of the following: industry standard temperature scale, loading, significance of asset, safety, technicians experience, and other predictive maintenance technologies.

We appreciate the opportunity to serve you. If you have any questions regarding this report, we are happy to assist in any way.

Jim Cress - President

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Technicians Notes

Thank you for having me out to your saloon. The scan and electrical investigation went smoothly and took about 4 hours to complete. Your staff was readily available, and we had no problem accessing all your panels and spaces.

We discovered a 27 - 55V difference between the ground bar and the neutral bar in the breaker distribution panel behind the bar of the saloon. We also spent a couple of hours tracing the distribution from the breaker panel and noting which breakers power which lights and plugs. In our investigation it was noted that there are 2 outputs from the 6000W inverter, 1 - 3000w output goes to the panel behind the bar, the second goes directly to the water pump. The reason this is important to know is the breaker panel at the bar seems fairly full whereas the 2nd leg at the water pump has plenty of capacity. As well as performing a full thermal scan, voltages and currents were measured and are listed below in a table for your reference. A series of handwritten notes are included at the bottom also for reference.

On the roof the 6 (3 x 2) solar panels were inspected no visible or thermal anomalies were detected.

Under the saloon the 2 battery banks 8 batteries, (4 – 12v batteries per bank, 2 banks in parallel) were inspected no visible or thermal anomalies were detected. Each battery was tested for voltage, and they ranged between 12 and 12.8 VDC (completely normal) the 2 individual banks were measured 51VDC each (completely normal) All posts and connections were tight and free of excessive oxidation. All interconnecting battery cables were scanned no thermal issue with hot cables.

Under the saloon the borrowed inverter was analyzed and tested with water pump running and water pump off, the entire charging system was verified that when required the solar panels charged the batteries and when batteries were full charge the system rested.


The panel behind the bar of the saloon, all breakers were tested for tightness and thermal anomalies, none were found. Each breaker was cycled on and off to identify what it is feeding as well as voltage and current recorded, see table page 12.


Facility recommendation: Have original electrician that has completed all work to date check grounding and bonding of inverter and all electrical equipment. This should resolve the 27 - 55VAC differential between neutral and ground. Note in a properly grounded system the Neutral should equal the ground and measured from hot – neutral = 120V and hot to ground 120V and Neutral – ground 0V. within 5%

Thank You,

Jim Cress

Lead Technician: Jim Cress
Equipment: FLIR E6-XT

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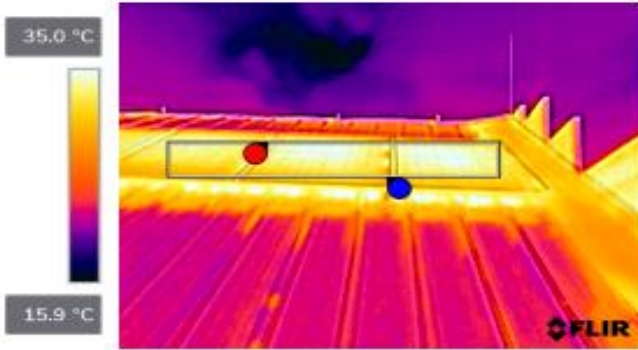
 [JC Termografia RD/fbook](#)

Location / Name: Mike's Mountain Saloon, Main Building

Location	Equipment	Equipment Name	Status	Anomaly
Main roof of Saloon	Main solar panels	Roof solar panels 3 sections on the right	Tested	None – page 5
Main roof of Saloon	Main solar panels	Roof solar panels 4 sections on the left	Tested	None – page 6
Main roof of Saloon	Main solar panels	Roof solar panels 4 sections on the left 2nd shot	Tested	None – page 7
Electrical/Pump room under Saloon	Solar storage batteries	Solar storage batteries 1st row #1 & #2	Tested	None - page 8
Electrical/Pump room under Saloon	Solar storage batteries	Solar storage batteries 2nd row batteries #3 and #4	Tested	None - page 9
Electrical/Pump room under Saloon	Solar storage batteries	Solar storage batteries 2nd row batteries #3 and #4 front face	Tested	None – page 10
Main floor behind bar	Breaker panel	Breaker panel in saloon area	Tested	None – page 11
Main floor behind bar	Breaker panel	Table of Voltages and Currents	Information	None – page 12
Handwritten note	Page 1	Sketch of Neutral – ground voltage	Tested	Yes – page 13
Handwritten note	Page 2	Sketch of 2 options for adding an inverter to the system	Information	None – page 14
Handwritten note	Page 3	Electrical basics to aid in understanding inverter screens	Information	None - page 15
Handwritten note	Page 4	Inverter specs and battery layout	Information	None – page 16
Handwritten note	Page 5	Panel #1 breakers handwritten notes	Information	None – page 17
Handwritten note	Page 6	Notes from testing charge with and without water pump running	Information	None – page 18



2021-11-27 3:00:25 PM



FLIR0203.jpg

Roof solar panels 3 sections on the right



639122303

Parameters

Emissivity	0.95
Distance	3.0 m
Reflected temp.	29.0 °C
Atmospheric temp.	29.0 °C
Relative humidity	50.0%
Ext. optics temp.	29.0 °C
Ext. optics trans.	1.00

File information

File name	FLIR0203.jpg
File size	239 KB
Width	240
Height	180
Minimum temp.	15.8 °C
Maximum temp.	36.5 °C

Camera information

Camera model	FLIR E6xt Wifi
Lens	FOL7
Camera serial	639122303
Filter	
Range max.	250.0 °C
Range min.	-20.0 °C
Field of view	44.98

Measurements

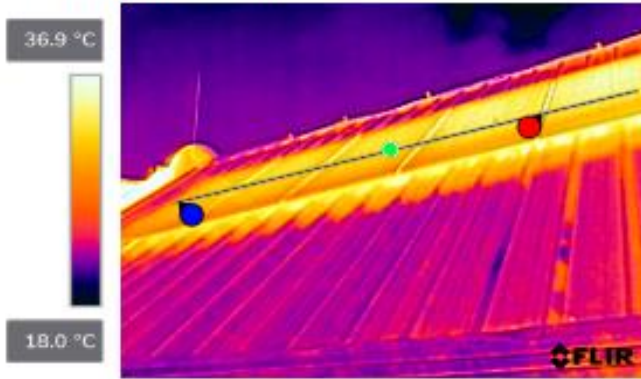
Bx1	
Max	35.3 °C
Avg	33.0 °C
Min	27.8 °C
Dt1	
Bx1.Max- Bx1.Min	7.6 °C

Target Temperature	Reference Temperature	Temperature Difference	Criticality Rating
35.3° C	29° C	6.3° C	N/A
Amperage	Voltage	Apparent power - VA	
2.2A during charge	250V	550VA	

Comments: 7.6° C difference is due to placement of the sun, no hot spots or other anomalies detected.
 Recommendations: short term –None
 Recommendations: long term – Add more solar panels as facility grows and requires.



2021-11-27 3:00:25 PM



FLIR0205.jpg

Roof solar panels 4 sections on the left



639122303

Parameters

Emissivity	0.95
Distance	3.0 m
Reflected temp.	29.0 °C
Atmospheric temp.	29.0 °C
Relative humidity	50.0%
Ext. optics temp.	29.0 °C
Ext. optics trans.	1.00

File information

File name	FLIR0205.jpg
File size	263 KB
Width	240
Height	180
Minimum temp.	17.3 °C
Maximum temp.	39.5 °C

Camera information

Camera model	FLIR E6xt Wifi
Lens	FOL7
Camera serial	639122303
Filter	
Range max.	250.0 °C
Range min.	-20.0 °C
Field of view	44.98

Measurements

Li1	
Max	34.0 °C
Avg	32.5 °C
Min	30.5 °C

Target Temperature	Reference Temperature	Temperature Difference	Criticality Rating
34.0° C	29° C	5.0° C	N/A
Amperage	Voltage	Apparent power - VA	
2.2A during charge	250V	550VA	

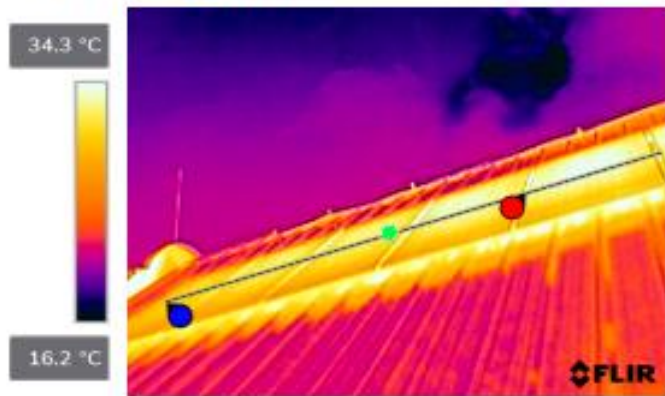
Comments: 5.0° C difference is due to placement of the sun, no hot spots or other anomalies detected.

Recommendations: short term –None

Recommendations: long term – Add more solar panels as facility grows and requires.

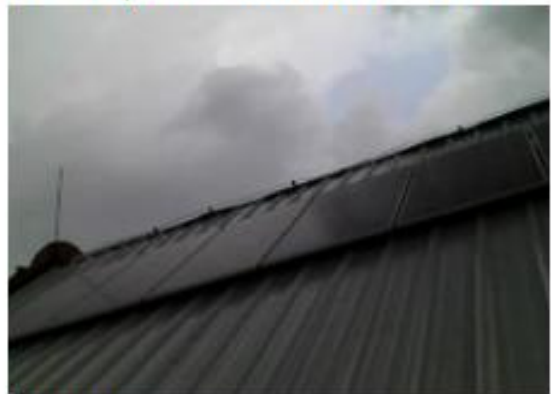


2021-11-27 3:00:25 PM



FLIRD207.jpg

Roof solar panels 4 sections on the left 2nd shot



639122303

Parameters

Emissivity	0.95
Distance	3.05 m
Reflected temp.	29.0 °C
Atmospheric temp.	29.0 °C
Relative humidity	50.0%
Ext. optics temp.	29.0 °C
Ext. optics trans.	1.00

File information

File name	FLIRD207.jpg
File size	234 KB
Width	240
Height	180
Minimum temp.	16.1 °C
Maximum temp.	37.8 °C

Camera information

Camera model	FLIR E6xt Wifi
Lens	FOL7
Camera serial	639122303
Filter	
Range max.	250.0 °C
Range min.	-20.0 °C
Field of view	44.98

Measurements

U1	
Max	34.3 °C
Avg	32.2 °C
Min	30.5 °C

Target Temperature	Reference Temperature	Temperature Difference	Criticality Rating
34.3° C	29° C	5.3° C	N/A
Amperage	Voltage	Apparent power - VA	
2.2A during charge	250V	550VA	

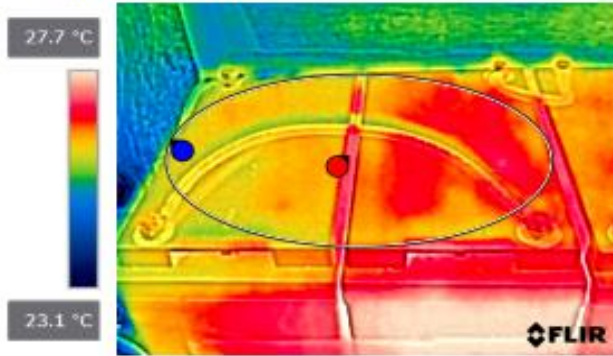
Comments: 5.3° C difference is due to placement of the sun, no hot spots or other anomalies detected.

Recommendations: short term –None

Recommendations: long term – Add more solar panels as facility grows and requires.



2021-11-27 3:25:25 PM



FLIR0209.jpg

Solar storage batteries 1st row #1 & #2



639122303

Parameters

Emissivity	0.95
Distance	1.05 m
Reflected temp.	29.0 °C
Atmospheric temp.	29.0 °C
Relative humidity	50.0%
Ext. optics temp.	29.0 °C
Ext. optics trans.	1.00

File information

File name	FLIR0209.jpg
File size	287 KB
Width	240
Height	180
Minimum temp.	22.9 °C
Maximum temp.	27.9 °C

Camera information

Camera model	FLIR E6xt Wifi
Lens	FOL7
Camera serial	639122303
Filter	
Range max.	250.0 °C
Range min.	-20.0 °C
Field of view	44.98

Measurements

E11	
Max	27.2 °C
Avg	26.3 °C
Min	25.4 °C
Dt1	
E11.Max-E11.Min	1.8 °C

Target Temperature	Reference Temperature	Temperature Difference	Criticality Rating
27.2° C	29° C	-1.8° C	N/A
Amperage	Voltage	Apparent power - VA	
2.2A during charge	12V - 12.8V		

Comments: -1.8° C difference is due to placement of the Electrical/Pump room under the Saloon, no hot spots or other anomalies detected. All connections tight, cables no signs of heat. String V – 48V – 51.8V

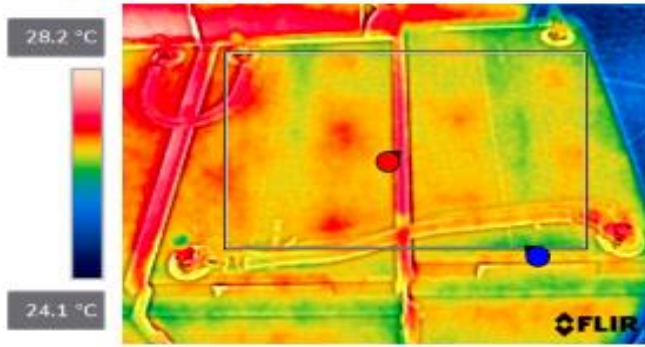
Recommendations: short term –None

Recommendations: long term – Add more batteries as facility grows and requires.



2021-11-27 3:25:25 PM

Solar storage batteries 2nd row batteries #3 and #4



FLIR0215.jpg



639122303

Parameters

Emissivity	0.95
Distance	1.05 m
Reflected temp.	29.0 °C
Atmospheric temp.	29.0 °C
Relative humidity	50.0%
Ext. optics temp.	29.0 °C
Ext. optics trans.	1.00

File information

File name	FLIR0215.jpg
File size	258 KB
Width	240
Height	180
Minimum temp.	24.7 °C
Maximum temp.	28.0 °C

Camera information

Camera model	FLIR E6xt Wifi
Lens	FOL7
Camera serial	639122303
Filter	
Range max.	250.0 °C
Range min.	-20.0 °C
Field of view	44.98

Measurements

Bx1	
Max	27.2 °C
Avg	26.7 °C
Min	26.2 °C
Dt1	
Bx1.Max-	1.0 °C
Bx1.Min	

Target Temperature	Reference Temperature	Temperature Difference	Criticality Rating
27.2° C	29° C	-1.8° C	N/A
Amperage	Voltage	Apparent power - VA	
2.2A during charge	12V - 12.8V		

Comments: -1.8° C difference is due to placement of the Electrical/Pump room under the Saloon, no hot spots or other anomalies detected. All connections tight, cables no signs of heat. String V – 48V – 51.8V

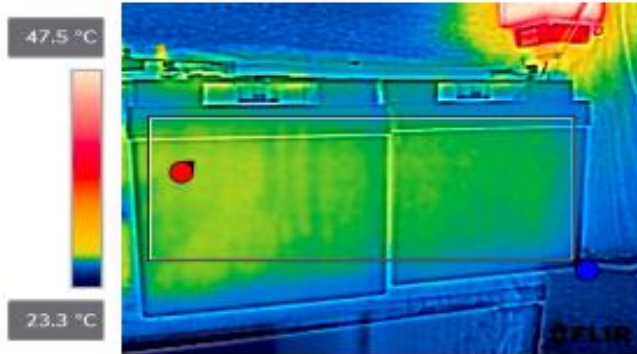
Recommendations: short term –None

Recommendations: long term – Add more batteries as facility grows and requires.



2021-11-27 3:25:25 PM

Solar storage batteries 2nd row batteries #3 and #4 front face



FLIR0219.jpg



639122303

Parameters

Emissivity	0.95
Distance	1.05 m
Reflected temp.	29.0 °C
Atmospheric temp.	29.0 °C
Relative humidity	50.0%
Ext. optics temp.	29.0 °C
Ext. optics trans.	1.00

File information

File name	FLIR0219.jpg
File size	264 KB
Width	240
Height	180
Minimum temp.	23.2 °C
Maximum temp.	48.7 °C

Camera information

Camera model	FLIR E6xt Wifi
Lens	FOL7
Camera serial	639122303
Filter	
Range max.	250.0 °C
Range min.	-20.0 °C
Field of view	44.98

Measurements

Bx1	
Max	27.1 °C
Avg	26.6 °C
Min	25.0 °C
Dt1	
Bx1.Max-	2.1 °C
Bx1.Min	

Target Temperature	Reference Temperature	Temperature Difference	Criticality Rating
27.1C	29° C	-1.9° C	N/A
Amperage	Voltage	Apparent power - VA	
2.2A during charge	12V - 12.8V		

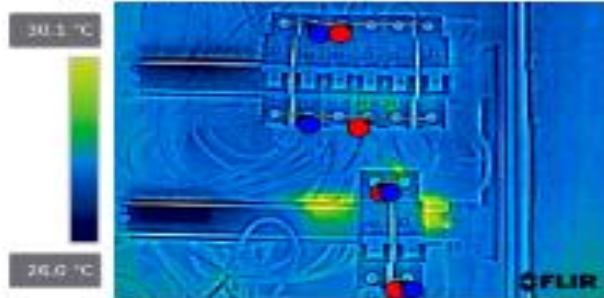
Comments: -1.9° C difference is due to placement of the Electrical/Pump room under the Saloon, no hot spots or other anomalies detected. All connections tight, cables no signs of heat. String V – 48V – 51.8V

Recommendations: short term –None

Recommendations: long term – Add more batteries as facility grows and requires.



2021-11-27 5:27:25 PM



FLIR0221.jpg

Breaker panel in saloon area



639122303

Parameters

Emissivity	0.95
Distance	1.05 m
Reflected temp.	29.0 °C
Atmospheric temp.	29.0 °C
Relative humidity	50.0%
Ext. optics temp.	29.0 °C
Ext. optics trans.	1.00

File information

File name	FLIR0221.jpg
File size	309 KB
Width	240
Height	180
Minimum temp.	26.2 °C
Maximum temp.	30.5 °C

Camera information

Camera model	FLIR E6xt WiFi
Lens	F0L7
Camera serial	639122303
Filter	
Range max.	250.0 °C
Range min.	-20.0 °C
Field of view	44.98

Measurements

LI2	
Max	27.7 °C
Avg	27.5 °C
Min	27.4 °C
LI3	
Max	28.0 °C
Avg	27.9 °C
Min	27.8 °C
LI4	
Max	27.8 °C
Avg	27.7 °C
Min	27.7 °C
LI5	
Max	27.5 °C
Avg	27.4 °C
Min	27.4 °C

Target Temperature	Reference Temperature	Temperature Difference	Criticality Rating
28.0° C	29° C	-1.0° C	N/A
Amperage	Voltage	Apparent power - VA	
See next table	114	See next table	

Comments: -1.0 difference is due to breeze at the Electrical panel. No hot spots or other anomalies detected. All connections tight, cables no signs of heat. All voltages balanced 114V

Recommendations: short term –None

Recommendations: long term – None panel almost at capacity.

Measurement Table

Location / Name: Mike's Mountain Saloon, Main Building

Location	Equipment	Equipment Controlled	Voltage	Amperage
Main floor behind bar	Breaker #1	Kitchen lights and storage room lights	114V	0.3A
Main floor behind bar	Breaker #2	Office and saloon	114V	0.4A
Main floor behind bar	Breaker #3	Office plugs, outside lights and bunkhouse	114V	0.5A
Main floor behind bar	Breaker #4	Unidentified	114V	0.2A
Main floor behind bar	Breaker #5	Unidentified	114V	0.0A no current draw
Main floor behind bar	Breaker #6	LED bar lights	114V	0.1A
Main floor behind bar	Breaker #7	Kitchen plugs	114V	0.2A
Main floor behind bar	Breaker #8	saloon and outside lights	114V	0.5A
Electrical/Pump room	Main Inverter	Bar panel and water pump	207V – 2 legs of 114V	2.2A = all above breaker loads

PLUGS

KITCHEN - 7
Saloon Wash - 3
Saloon Table - outside 8

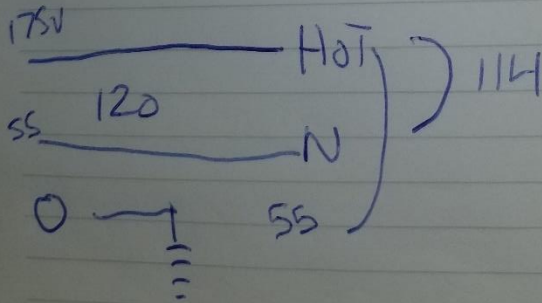
* IN DISTRIBUTION PANEL

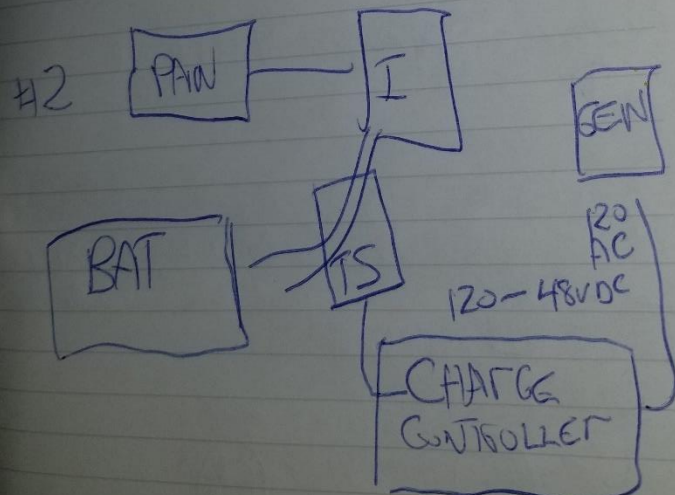
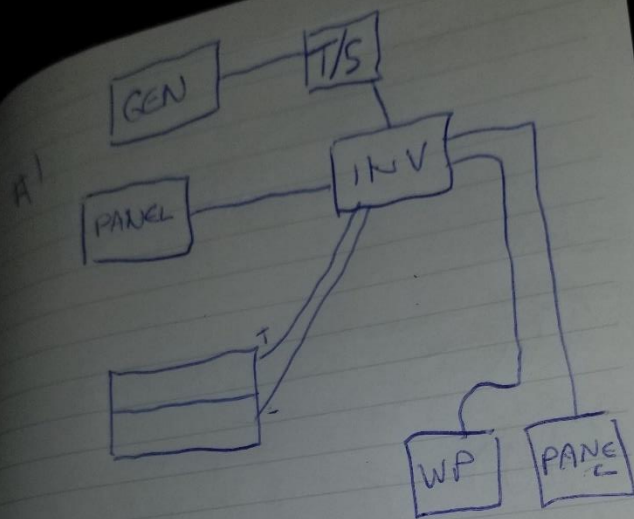
IN SALOON

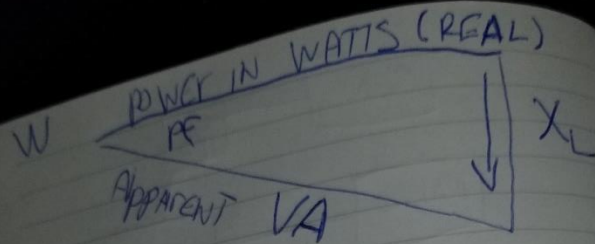
230V From BLUE NEUTRAL

↓ To GND

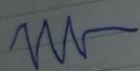
55V

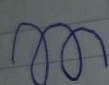


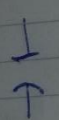




3BAC

 OPPOSES FLOW ENERGY

 OPPOSES THE FLOW OF CURRENT

 OPPOSES VOLTAGE

$V = 120$ ELECTRICAL PRESSURE

$I =$ flow

DC



AC

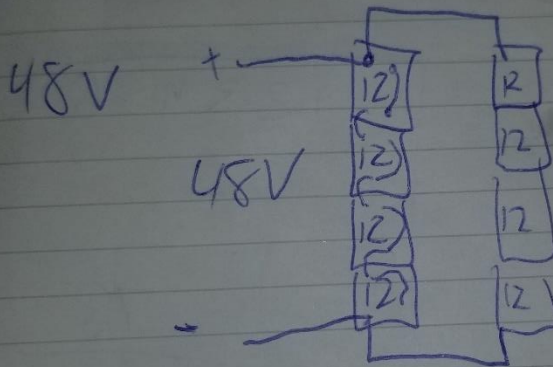


$$P = V \cdot I$$

$$356W = 230V \cdot 1.52A$$

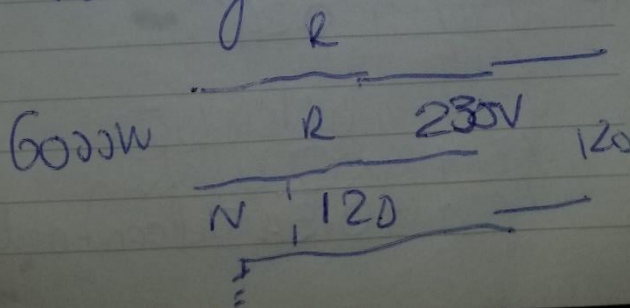
$$6000W \cdot 6\% = 360W$$

BATTERIES



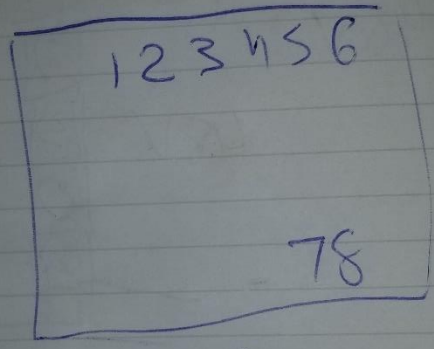
2 banks of 48V

WxH rating



- Containo ^{Zipper + 8H}
- Star Enk?
- Muko

PANEL SALOON



- 1 V=114 A 0.3A Kitchen + Storage LT
- 2 V=114 A 0.4A Office + Saloon
- 3 V=114 A 0.5A Plus Office + outside
- 4 V=114 A 0.2A
- 5 V=114 A
- 6 V=114 A 0.1 Bar Lits
- 7 V=114 A 0.2 Kitchen
- 8 V=114 A 0.5A Saloon + outside Lts

BEFORE

6% usage

BAT 52.3V

12V 60AH

720WH

5760WH

Pump on

Solar I/P

1.6A

207V

320W

inverter load -
11%

320VA No Pump
601 VA pump

Panel chg
Pump on 2.2A
250V

INVERTER PAN POWER

MC YBM 5500VA - 48

model YBM 5 5KW-11m-Plus

1-705-280 9076

Jim. CRESS. SDSC. CLUB

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