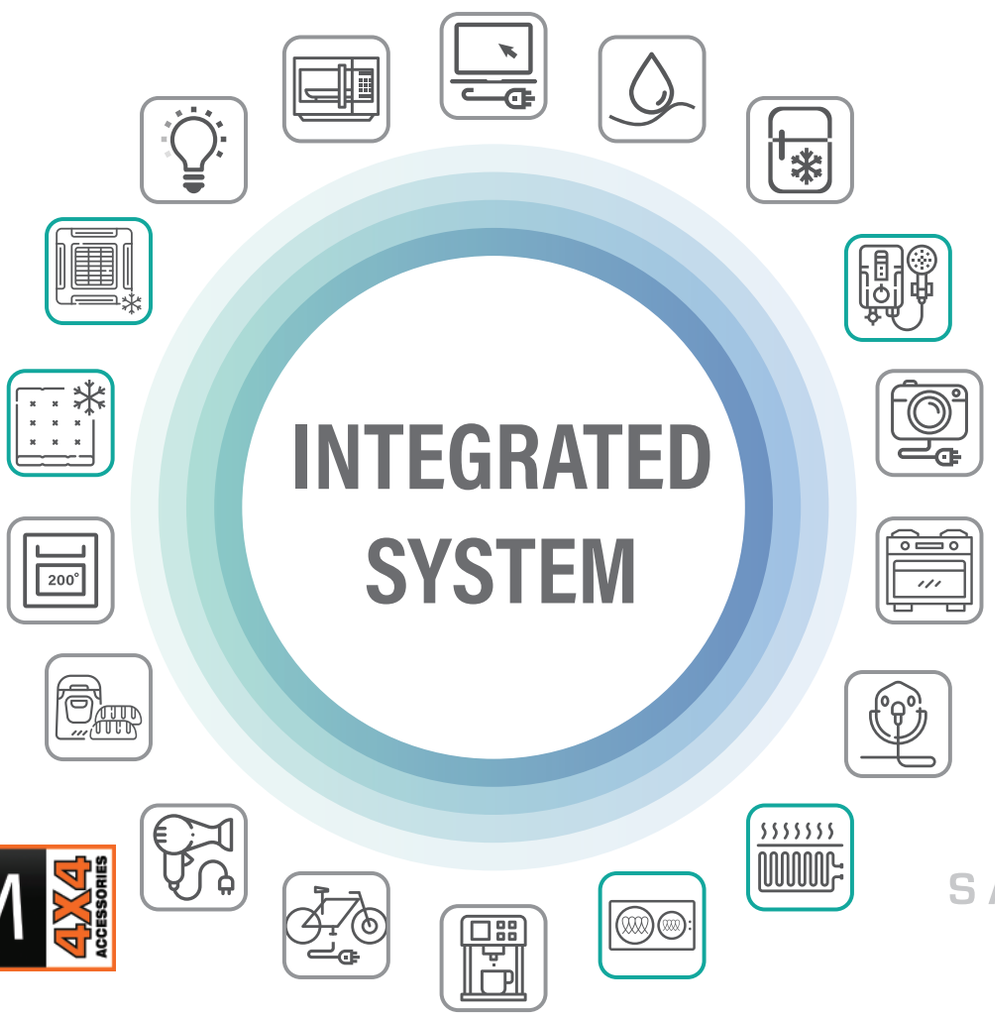
4WD MONITORING SYSTEM

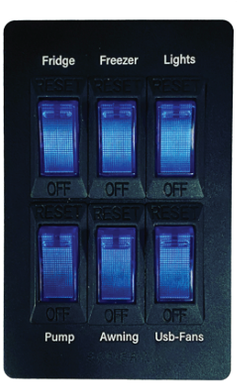
for RV, 4WD's and Marine



OCAM 4X4 ACCESSORIES

SAFIERY

All Matt Alloy Panel Mount: Pico has external screw mount, switches with spring clips for mounting in blind cavity



Breaker Switches
4 or 6 x 10A,15A
Custom Engraved

Smart Switch
RJ 45 to Smart I/O
3 x 10A , 1 x 2A
or 4 x 2A All Dimmable
Two Way Switching
Key Fob Control
Custom Engraved

Simarine 3.5 inch Glass Display
Batteries,
4 Tanks, 4 Temps, Incinometer
3 year Warranty

Classic Switch
1 x 8A non Dimable
3 x 2A Dimable

DC Outlets
Choose from:
2 x 1.4A USB
Engel Outlet
CIG Outlet
Hella Outlet

SAFIERY Magic OCAM 4x4 Customer Service

Safiery are Wizards at power and monitoring in 4WD's, RV's and Marine.
When you team up with Safiery, you get an agile, relentless team that's moving faster
than the pace of change in mobile power for RV's, 4WD's and Marine.
You get a collective of technologists, focused on raising the bar on what's possible – and
what matters. More importantly, you'll work with our "customer advocates" who are committed to converting energy in its many forms into an enjoyable mobile lifestyle. Jeff Crane is your Customer Advocate.
Safiery change the Functional into the Unforgettable.

OCAM 4x4 are dedicated to customer service in 4WD's, RV's and Marine.
When you purchase from OCAM4x4, you get service and support that is second to none for RV's, 4WD's and Marine.
You get an Australian network of warehouses and stock for your immediate needs.
OCAM 4x4 are RESPONSIVE raising the bar on DIY installs by informing the customer in advance of what's possible – and
what matters.
OCAM change the shopping dream into an unforgettable experience.

Links to technical Articles for your education:

Go to https://www.safiery.com/technologies
to learn about technologies used.

Go to https://www.linkedin.com/in/bloxton-lng/detail/recent-activity/posts/
to read posts including 2021 predictions and OCAM/Safiery Vision

After training you will join the Bruce Loxton "Alumni":
"It is not the critic who counts; not the man who points out how the strong man stumbles, or where the doer of deeds could have done them better. The credit belongs to the man who is actually in the arena, whose face is marred by dust and sweat and blood; who strives valiantly; who errs, who comes up short again and again, because there is no effort without error and shortcoming; but who does actually strive to do the deeds; who knows great enthusiasms, the great devotions; who spends himself in a worthy cause; who at the best knows in the end the triumph of high achievement, and who at the worst, if he fails, at least fails while daring greatly, so that his place shall never be with those cold and timid souls who neither know victory nor defeat."

QUICK GUIDE

Why

LITHIUM BATTERIES NEED ADVANCED MONITORING

With Lead Acid/AGM/GELL Batteries they are composed of simple raw materials. They operate as raw chemistry - from the 1940's. No microprocessor; no smart chip; just raw lead, carbon and an electrolyte. The capacity of the battery is roughly linear with voltage. So a volt meter was a safe bet to use.

Lithium batteries have multiple cells and a "BMS" which controls the battery. The voltage of Lithium cells is very "flat" over the load. Determining the remaining capacity is guesswork without a shunt*.
A Simarine System protects the investment in Lithium by giving the user valuable info on the batteries.

Simarine can monitor 6 different battery systems of different voltages, monitor 14 tanks, 12 temperatures and an Inclinometer for "pitch and roll". Manufacturing is in Slovenia, bordering with Italy.

* In CAN-bus Lithium Batteries, the shunt is inside the battery. It is a "hall effect" sensor. These batteries broadcast the desired charge and discharge level and go one step above conventional Lithium. Simarine can't read CAN-bus Lithium (not yet!)

So Easy to Use

1 SIMPLE WAY TO USE EVERY DAY

Easy and hassle free means not having to think about systems. This is how we hope you will operate most days. The system gives you two important "easy to read" information on your battery "State of Charge" (SOC) and "Time to Go" (TTG). This is not TTG to a flat battery. It is until the battery reach a certain % SOC. This is usually set at 20%. Water tanks are expressed as the number of Litres left and % Full. Inclinometer is visual. Alarms and alerts can be set from your smart phone.
One thing to learn is at what time of the day your batteries reach 100%. In a typical system this is between 12-2pm. You will then use this as a guide to how to manage your system.

2 POOR WEATHER - POOR SOLAR POWER

In poor weather, mother nature holds back the solar power. At mid-morning read the TTG till your batteries are full. If you will get to 100% by 3pm you are fine. If not, you have three choices: 1) Deploy portable solar if you have it. 2) Run the batteries lower today (you can safely drop to as low as 20%) if you are confident of more power tomorrow or 3) Reduce power consumption.

3 SOMETHING IS NOT RIGHT

The kids have left the laptop charging all night. (Laptops can use up to 10A continuously). Battery SOC is poor and looks to be falling. A simple process is to turn everything off till you read near zero current flow going out. Then turn on ONLY essential devices like fridge. If there is not enough solar, start the vehicle with it plugged in. Slowly recover. Your system is designed so that it should operate fridge and LED lights (dimmed) from 20% SOC overnight comfortably until the solar kicks in the next day.

PANEL MOUNT or Stand Alone Surface

PICO ONE

PICO ONE: Available in "standalone model" (pic below) in black. Very stylish. This model connects to one "shunt" device for easy installation with no frills. Choose the SCQ50 as the shunt and you get 4 measurement channels and one battery voltage.
If you have an inverter < 1200W then two channels of the SCQ50 can be used. this leaves one channel free for DC/DC/Solar and one for fridge and loads.
Choose SC302T for a simple complete system. Gorilla Glass and Alloy. No Plastic used here. IP67.

PICO PLUS

PICO PLUS: Expandable to maximum number of modules. 6 battery systems 0-48V, 14 tanks and 12 temp plus Digital inclinometer.
Black Panel mount outsells standalone 25:1
Gorilla Glass and Alloy. No Plastic used here. IP67.

SIMARINE BUS

The PICO connects to a "Splitter" with a coax cable 1.5m long. This coax has both power and data.
Power input to the Simarine modules is through the 1A inline fuse to the splitter. This can be 12V to 48V.
Connecting modules can be "Start" connection or "daisy chain" or both.
The Pico shows the communication quality in a 0-100% scale of each module. It is rare that this communication data cabling is a problem.
Each Shunt module comes with 5m of data cable included.

REMOVING Hassles for Customers

SCQ50

SCQ25T

SC301

SC302T

SDI01

Analog Inclinometer
Needs ST107 or SCQ25T
Wiring is complex.

KEEPING THE INSTALLATION SIMPLE FOR DIY

Using an SCQ25T with 30A inputs has the complication of using two channels as they are limited to 25A. The user then needs training on running the merge function. It also leaves just 2 channels for loads.
Running the positive wires through the shunts is easier than the negative for most users. It is simply connected before or after the fuse.
Running a separate shunt for the Inverter keeps it very simple. It is just added to the battery together with the other shunts. Using the SC302T keeps this on the positive wire again.

USING SCQ50 /SCQ25/ SCQ25T

These are the multiple shunt modules that measure 4 channels of load. The direction of current flow through each channel is easily reversed in the software so it does not matter how it is wired. The "25" means 25A and "50" means 50A. Either +ve or -ve flow. When the battery display is configured as "detailed", the channels appear alongside the battery. The "T" version includes combining the ST105 Voltage and Resistance Tank inputs: 3 V - 4 R. Voltage inputs are typically 0-5V and used for Tank Levels (Side or bottom mounted), Old Inclinometer, CO2, Dust, Noise, Air Pressure. Resistance is used for Tank Levels (Top Mounted ONLY) and Temperature.
SCQ50 can measure a complete system if the Inverter is 1200W or less. Use the Bridge Pins for two channels for 1200W Inverter; 1 Ch for 50A Inputs; 1 Ch for all output loads. Very Simple.

USING SC301 or SC302T

These shunts measure up to 300A or Current. They are used as a single simple overall current measurement or for an Inverter. Capacity is 300A x 13V = 3,900W. (Note Watts is not the same as VA (Volt Amps) - Watts is the measurement after taking into account Phase W is ALWAYS<VA.
SC301 also has 2 x V and 1 x T. A small temp sensor is included. SC301 is typically ONLY used on the negative as these is no terminal protection for positive wires.
SC302T also has 2 x V and 2 x T. However, it has a quality clear plastic cover and is suitable for using on a positive wire. This makes installation easy for existing Inverter owners as the negative may already be running through some type of shunt. Disturbing it has to be carefully done. However, placing the SC302T on the positive keeps the install simple.
The V input and T inputs are same application explained above.

USING AN INCLINOMETER

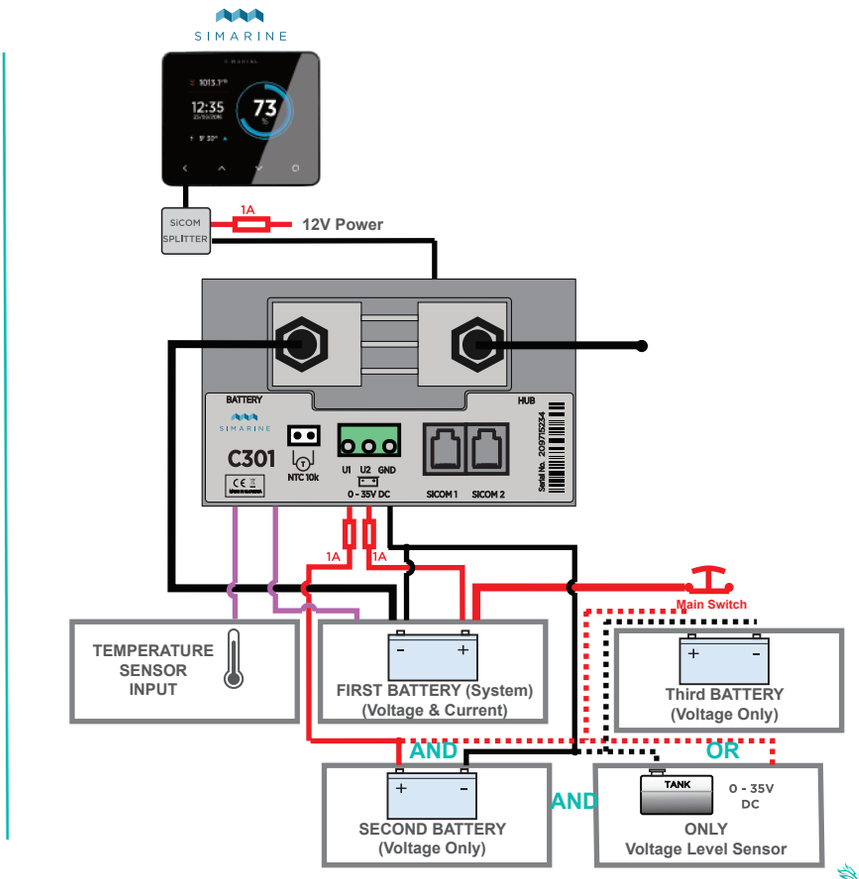
A great addition is the Simarine Digital Inclinometer. It measures the "Pitch and Roll" angles. This is perfect if you have a Roof Top Tent. As you drive into position, open the Smartphone app and check the levels. "Its Truly Level, Darling" will be your cry!
It is so easy to use the SDI101 which is a plug-n-play digital usit. Push to calibrate.

If using SDI101, for water tanks and temperatures, add the pocket size ST107. It is self contained and perfect to add on at a later date.

HOW IT WORKS

SIMARINE

SC301
ACTIVE DIGITAL SHUNT

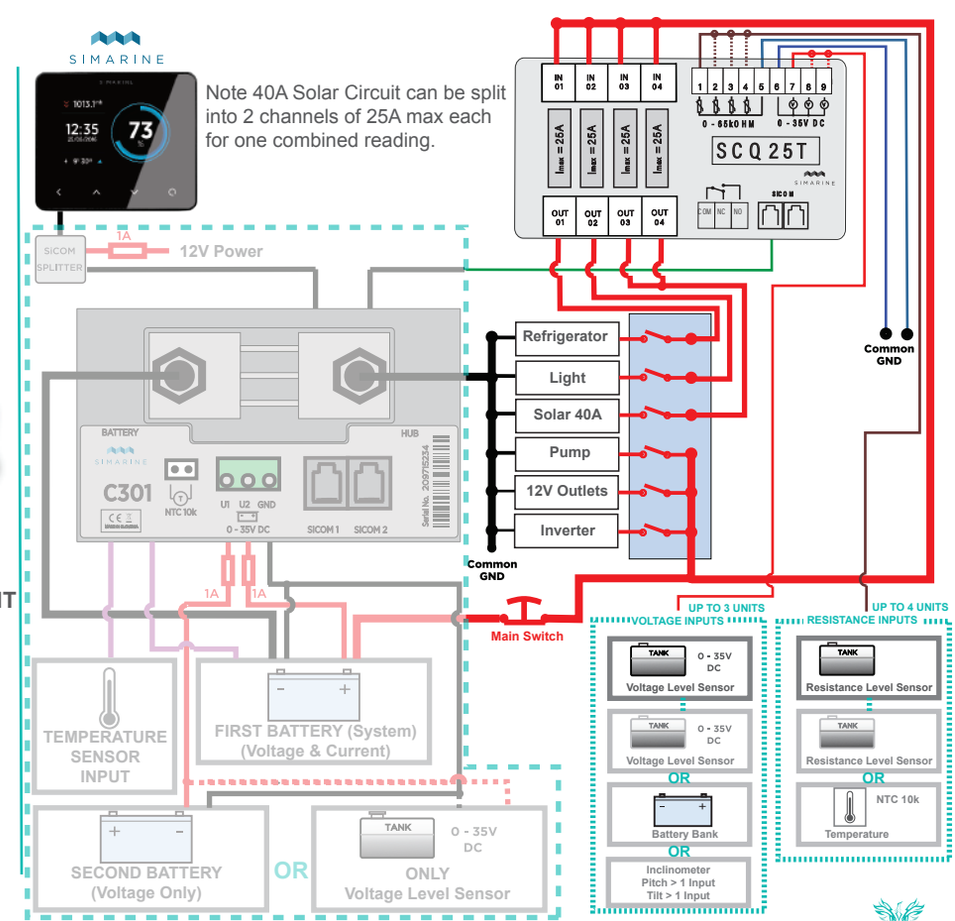


V2.1

SAFIERY

SIMARINE

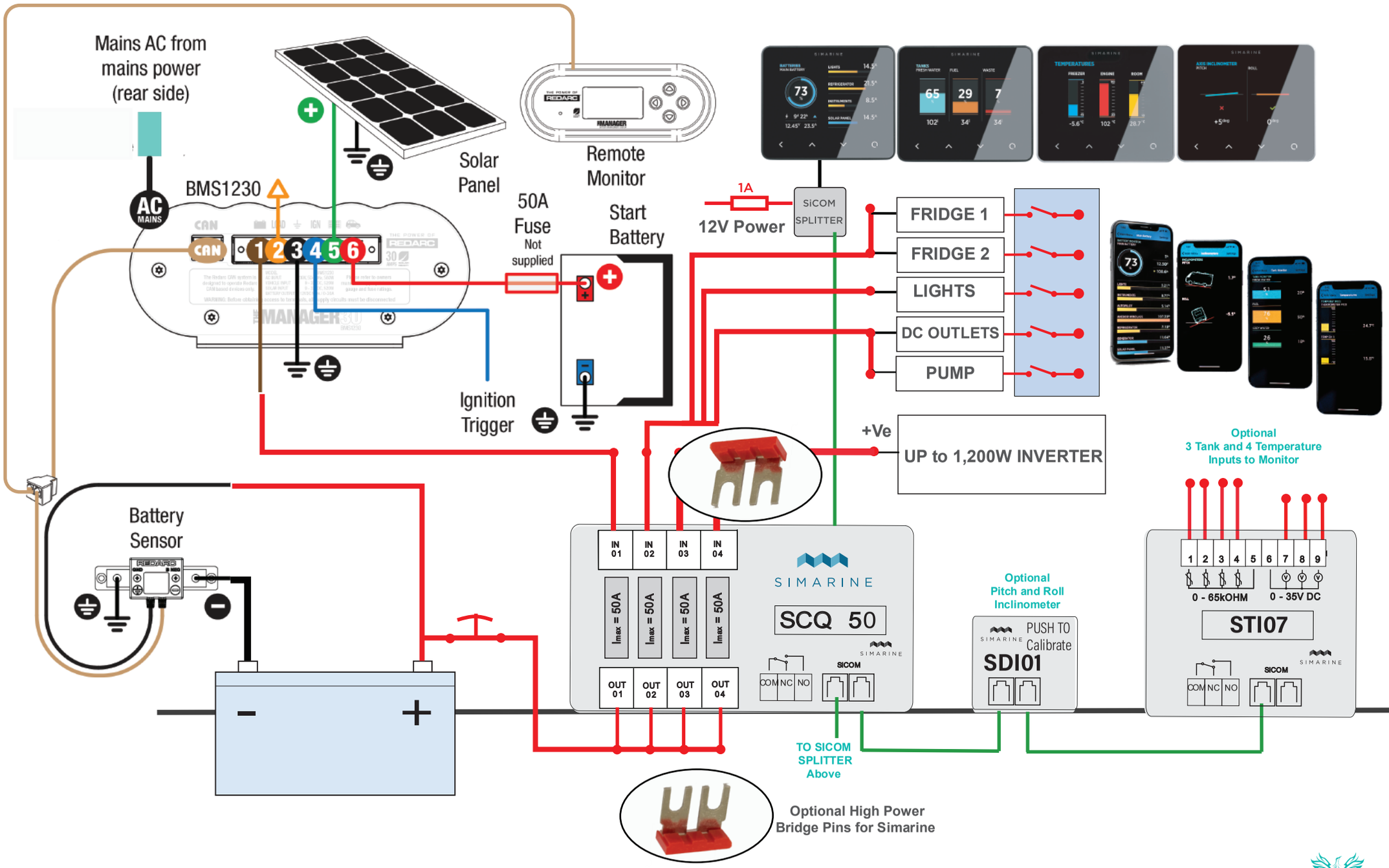
SCQ25T COMBO
QUADRO DIGITAL SHUNT +TANK MODULE



V2.1

SAFIERY

APPLICATION WITH REDARC BMS 1230 with OPTIONAL INVERTER to 1,200W



V3.1

SAFIERY

WIRING Suggestions

1

WIRING UP THE SYSTEM

This is very simple. Wire up on the positive wires. DO NOT DISTURB the negative wires. By wiring this way, the MANAGER 30* still measures power flow on their negative installed shunt. So you get the best of both worlds. Plug n Play the Simarine Sibus data cable. Up to 5m comes standard. Connect the fused 12V power to the Simarine Splitter and you are all set.
The Simarine products are protected which is why you can use on the positive wire.
Use the optional "Bridge Pins" as these are capable for up to 100A to go to a 1,000W-1,200W Inverter.

SIMPLE EVERY DAY USE

Easy and hassle free means not having to think about systems. This is how we hope you will operate most days. The system gives you two important "easy to read" information on your battery "State of Charge" (SOC) and "Time to Go" (TTG). This is not TTG to a flat battery. It is until the battery reach a certain % SOC. This is set at 20%. Water tanks are expressed as the number of Litres left and % Full. Alarms and alerts can be set from your smart phone.
One thing to learn is at what time of the day your batteries reach 100%. In a typical system this is between 12-2pm. You will then use this as a guide to how to manage your system.

2

POOR WEATHER - POOR SOLAR POWER

In poor weather, mother nature holds back the solar power. At mid-morning read the TTG till your batteries are full. If you will get to 100% by 3pm you are fine. If not, you have three choices: 1) Deploy portable solar if you have it. 2) Run the batteries lower today (you can safely drop to as low as 20%) if you are confident of more power tomorrow or 3) Reduce power consumption.

SOMETHING IS NOT RIGHT

The kids have left the laptop charging all night. (Laptops can use up to 10A continuously). Battery SOC is poor and looks to be falling. A simple process is to turn everything off till you read near zero current flow going out. Then turn on ONLY essential devices like fridge. If there is not enough solar, start the vehicle with it plugged in. Slowly recover. Your battery size should be designed so that it should operate fridge and LED lights (dimmed) from 20% SOC overnight comfortably until the solar kicks in the next day.

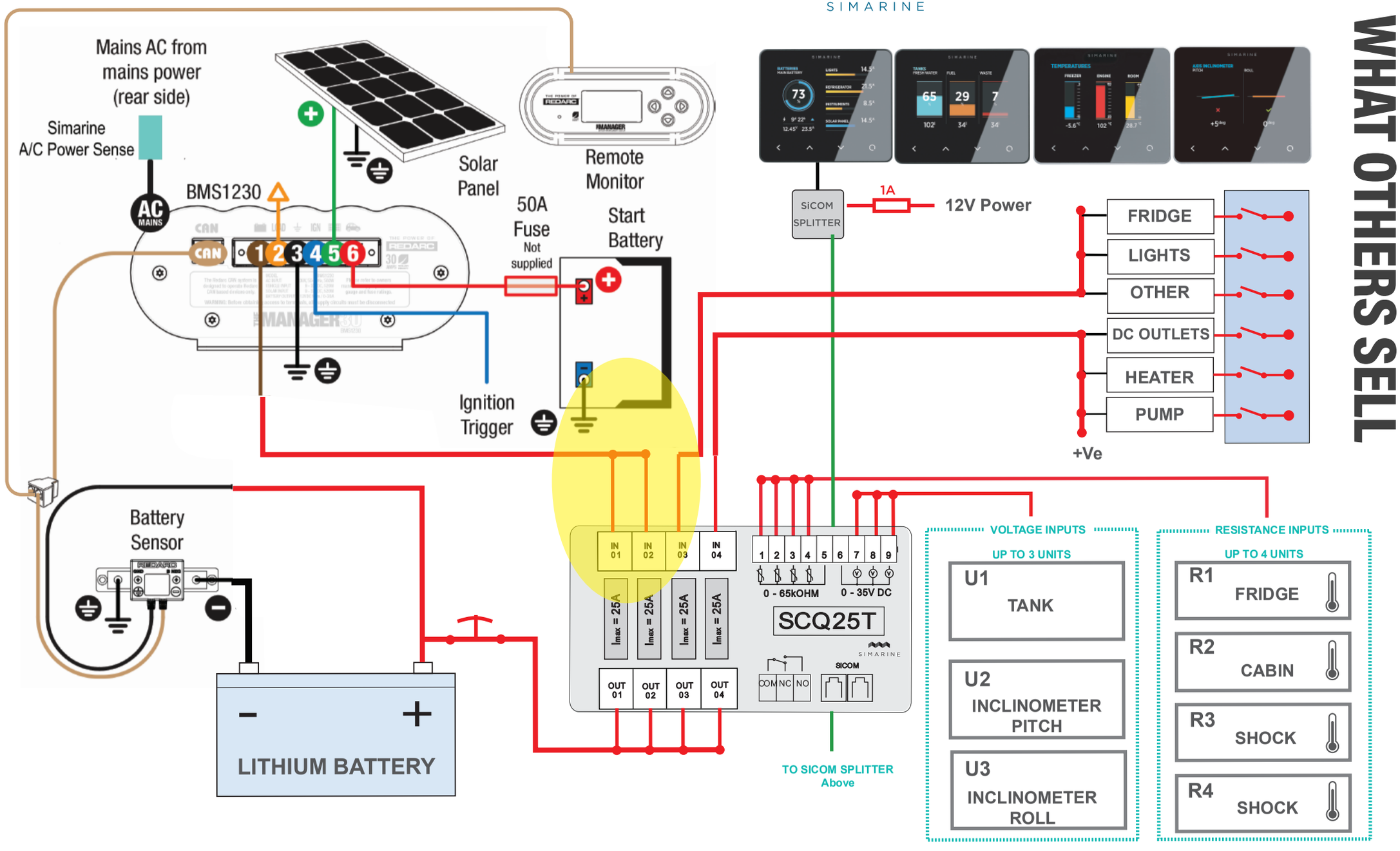
3

OPTIONAL ITEMS YOU CAN ADD NOW OR IN FUTURE

A great addition is the Simarine Digital Inclinometer. It measures the "Pitch and Roll" angles. This is perfect if you have a Roof Top Tent. As you drive into position, open the Smartphone app and check the levels. "Its Truly Level, Darling" will be your cry!
For water tanks and temperatures, add the pocket size ST107. It is self contained and perfect to add on at a later date.

APPLICATION WITH REDARC BMS 1230

SIMARINE

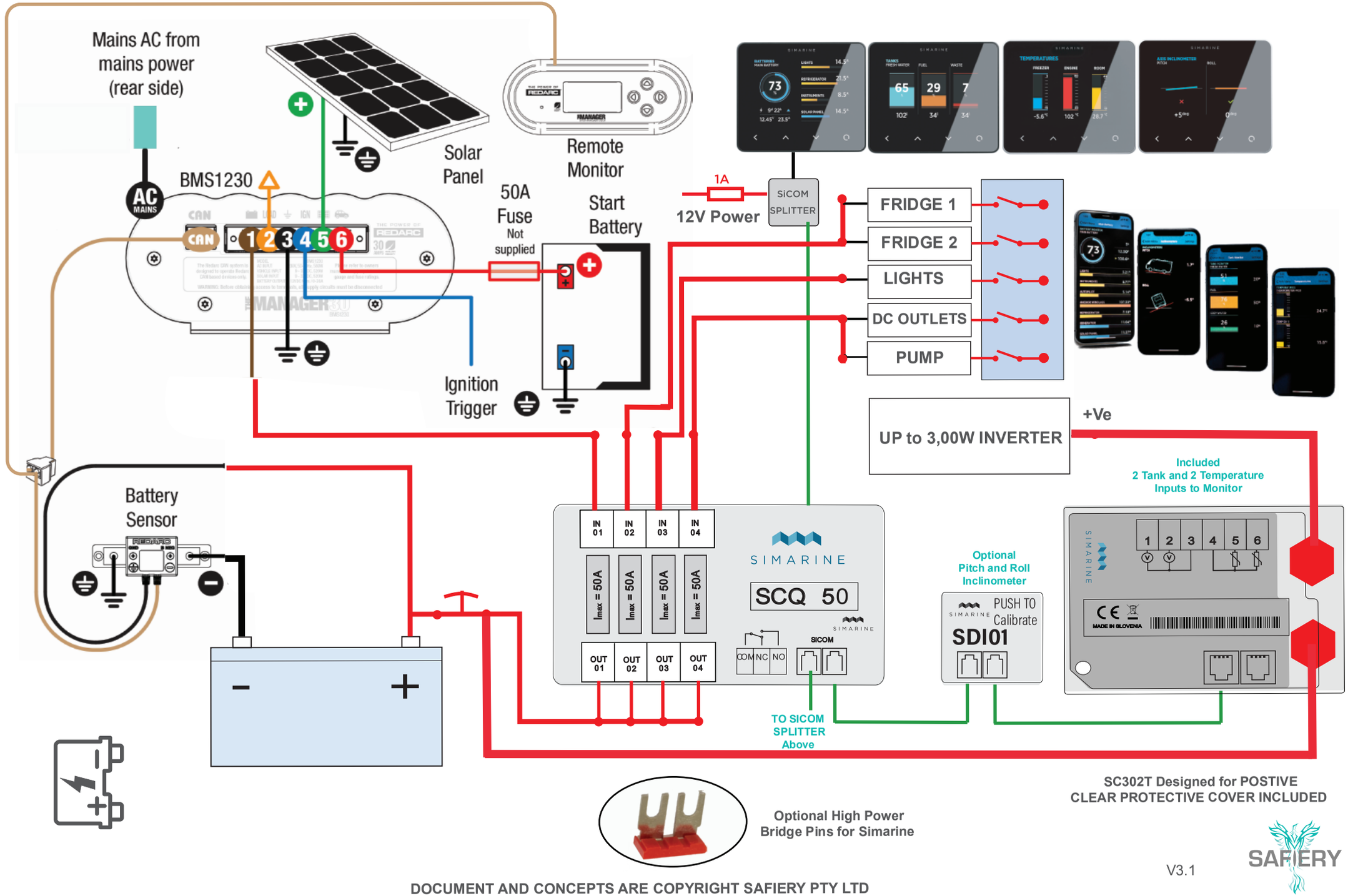


WHAT OTHERS SELL

 V2.1

SAFIERY

APPLICATION WITH REDARC BMS 1230 with OPTIONAL INVERTER to 3,000W



V3.1

Big Inverter Installed Up to 3,000W

1

WIRING UP THE SYSTEM

Once again, this is very simple. Wire up on the positive wires. DO NOT DISTURB the negative wires. By wiring this way, the MANAGER 30* still measures power flow on their negative installed shunt. So you get the best of both worlds. Plug n Play the Simarine Sibus data cable. Up to 5m comes standard. Connect the fused 12V power to the Simarine Splitter and you are all set. The Simarine SC302T has a plastic top cover to protect the positives. This is why we recommend this shunt over the SC301 (used for negatives)
By wiring everything on the positives, we eliminate the confusion of multiple negative shunts

2

MONITOR STARTER BATTERY - LONG RANGE FUEL

Use the "U1" input on the SC302T to monitor the Starter Battery.

This still leaves a voltage input for water or long range fuel tanks.

3

OPTIONAL ITEMS YOU CAN ADD NOW OR IN FUTURE

For water tanks and temperatures, add the pocket size ST107. It is self contained and perfect to add on at a later date.

A great addition is the Simarine Digital Inclinometer. It measures the "Pitch and Roll" angles. This is perfect if you have a Roof Top Tent. As you drive into position, open the Smartphone app and check the levels. "Its Truly Level, Darling" will be your cry!

Packages recommended

1

CLASSIC MONITORING

PICO ONE: Available in "standalone model" (pic below) in black. Very stylish. This model connects to one "shunt" device for easy installation with no frills. Choose the SCQ50 as the shunt and you get 4 measurement channels and one battery voltage.
If you have an inverter < 1200W then two channels of the SCQ50 can be used. this leaves one channel free for DC/DC/Solar and one for fridge and loads.

2

CLASSIC PLUS LEVEL

Because the PICO One handles just one shunt, expansion of any type requires upgrading to the PICO PLUS. Then add the digital inclinometer. 5 mins to install and calibrate.

3

BIG INVERTER < 3,000W

Its easy to add a big inverter and cover all basses: DC to DC, Solar, Fridge, Other loads. Then an inverter up to 3000W. Keep the inclinometer and if you want to add temps and tanks: no sweat, we add a tank and temp module smaller than a pack of cigs.

ADD Ons recommended

1

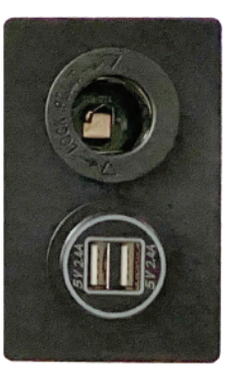
CLASSIC SWITCHES

Matt black alloy & the same material and height as the Simarine screen, These switches have 4 channels: one at 8A and 3 at 2A for dimmable LED's. Select from over 30 different pre-engraved labels. Surround dims with LED.

2

BREAKER SWITCHES

Matt black alloy & the same material and height as the Simarine screen, These switches have 4 channels: one at 8A and 3 at 2A for dimmable LED's. Select from over 30 different pre-engraved labels. Surround dims with LED.

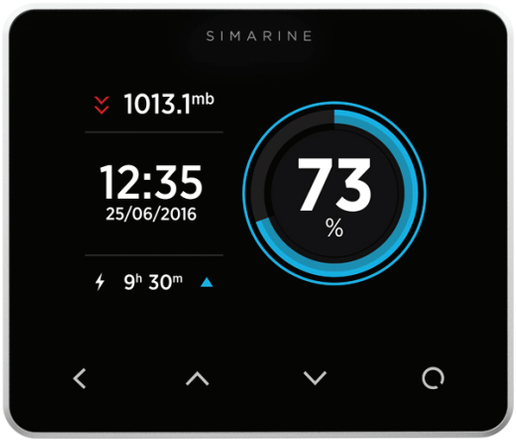


3

USB - TYPE C OUTLETS

Matt black alloy & the same material and height as the Simarine screen, These switches have 4 channels: one at 8A and 3 at 2A for dimmable LED's. Select from over 30 different pre-engraved labels. Surround dims with LED.

Push Up And Down Arrows To Read The Screen

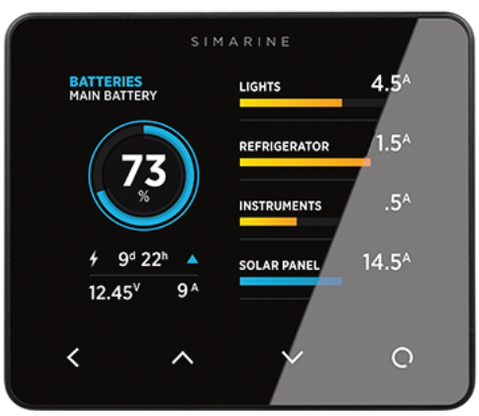


HOME OR SLEEP SCREEN

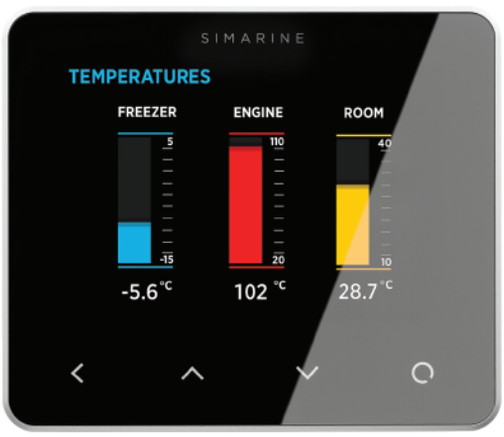
The system gives you two important "easy to read" information on your battery "State of Charge" (SOC) and "Time to Go" (TTG). The screen on the left is 73% SOC, charging with an "up" blue arrow and 9hr and 30min till fully charged. The screen on the right is 33% SOC, discharging with an "down" yellow arrow and 3hr and 3min till it reaches the TTG SOC. This is 20%. So when the TTG reads 0 minutes, your Lithium battery has 20% capacity remaining.

The top value is the barometer reading. Press the "up" arrow to read the barometric pressure. Press the circle button when reading this screen to change the scale.

Press the down arrow for the other Displays: currents, tanks, temperature and Inclinometer.



The current screen shows lights discharging with a yellow bar at4.5A. The Solar panel current is blue (charging) of 14.5A. If you add up the individual currents they will total to the current under the SOC display. This is 9A charging and blue.
The Voltage is shown as 12.45V.
Press the down arrow for the other Displays: currents, tanks, temperature and Inclinometer.



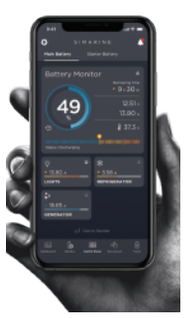
SIMARINE APP

Simarine publish their manual under the settings menu and you can read on your phone directly.
However, as a guide:
1) Connection your Smartphone. Go to App store and search “Simarine” > Download
2) Go to Wifi Settings and Search for PICOXXXX.
3) Beofore Joining you need to know the serial number as the password to join the wifi is picoXXXX (lower case p and XXXX is the first 4 digits of your serial number.
4) To find serial number from screen> Settings> System>Info
ONLY ONE DEVICE CAN BE CONNECTED AT A TIME.
The devices are accessible from the bottom menu.
Touching and holding the “Anchor ” arrow in the top right of each “tile widget” moves it to the “Dashboard Screen” - first opening screen. This allows you to customise the dashboard to only those key items you wish to monitor as you open the phone.

You can switch between “dark mode” and “light mode” in the devices setting by touch the settings wheel in the top right hand corner.

YAfter you configure your system, it is recommended to save the device settings on your smarthone. Follow the manual.

YOU CAN RESTORE ALL THE SETTINGS FROM YOUR SMARTPHONE.



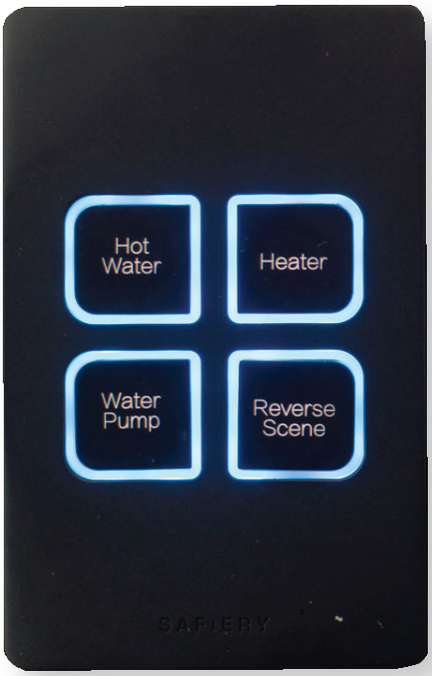
SIMARINE ALARMS

This menu enables you to set up alarms for certain measurements. Here, you can choose the quantity, the device, low and high values for alarm, and you can turn the high/low value alarms on and off.
ALARM LOW: Low value alarm fires when the measured value is lower than the set up alarm value.
ALARM HIGH: High value alarm fires when the measured value is higher than the set up alarm value.

After you select ALARM LOW or ALARM HIGH, the following alarm settings will appear:
ALARM STATE: Used to enable or disable the alarm
ALARM VALUE: Limit value which fires the alarm
SILENT: If this option is enabled, there will be no audible signal when the alarm occurs but will be displayed on the PICO screen.
ALARM DELAY: The time delay with which the alarm is fired. The alarm fires only when the measured value is below (for alarm low) or above (for alarm high) occurs during the delay period.
OUTPUT: The digital output that is turned on during the alarm

Handy for Tanks Temp Inclino-meter Simarine Screen

Smart Switches



PRESS GENTLY

The Smart switches are on/off for everything except LED lights. For LED lights they are dimmable. Each Switch label is very slightly backlit.

For on/off devices, the blue surround LED comes on when on and off when off.

For Dimmable LED's , press the button and hold. It will dim down and stop at off. Pressing the button and holding again, will increas the brightness to 100% and stop.

Double press at any time and the LED goes to full brightness.

DUAL COLOUR LED LIGHTS

When dimming a Dual Colour LED light, at a particular "cut-over" point, the colour changes from colour one to colour two. Depending on this cut-over point, the LED will continue to dim slightly. The cut-over point can be adjusted by the service team and not by the user.

DUAL SWITCHING (TWO WAY) DEVICES/LEDS

When switching a device that has two way feature enabled, the switch light on the other switch will operate in unison to both show identical states.

REMOTE CONTROL SWITCHING WITH KEY FOB

If you have the keyfob remote control, up to 6 functions can be controlled. The keyfob will automatically turn off after 60 seconds to conserve battery capacity. press X and Triangle to turn on. The keyfob will operate up to 40m away.

Smart Auto-mation

INVERTER OFF WHEN BATTERY IS < 20% SOC

If you are running a Victron Smart Inverter in our complete package, it will be programmed to turn off when the battery reaches a "State of Charge" (SOC) of 20%. You can change this level yourself on the Smartphone app.

HOTWATER ON WHEN BATTERY IS > 90% SOC

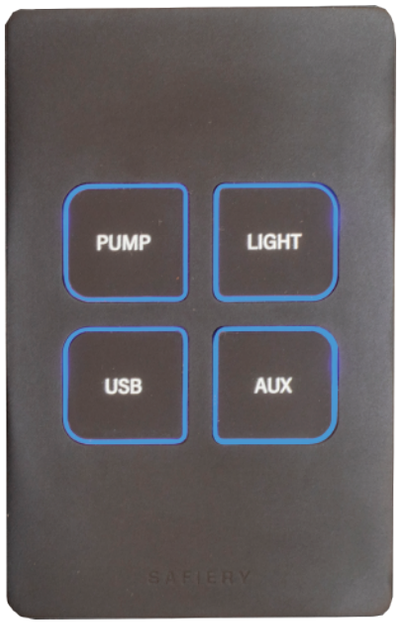
If you are running a Victron Smart Inverter in our complete package, it will be programmed to turn on when the battery reaches a "State of Charge" (SOC) of 90% AND Vehicle Charging is at its max. When you arrive at your campsite that night, a steaming hot shower. is waiting.

MEMBRANE HEATER ON WHEN SOLAR IS MAX

If you are running a Hybrid System, it will be programmed to turn on Membrane Heaters when the inside temperature < 20 degrees AND Vehicle Charging or Solar Charging is high. Your RV is pre-heated from excess solar or vehicle charging during the day.

Classic Switch

Wiring & Operation

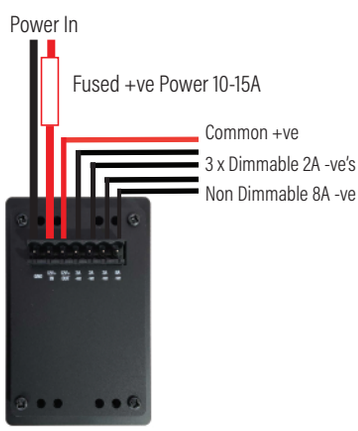


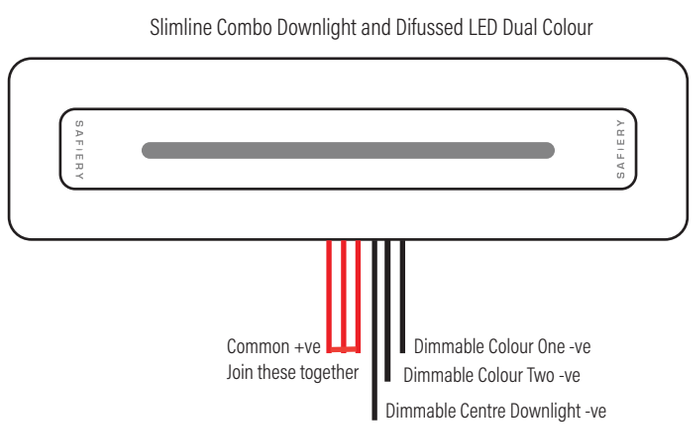
CLASSIC SWITCH - WIRING

The Classic Switch can switch/dim up to 4 devices as follows:

3 LED Lights up to 2A each circuit can be switched and dimmed
1 LED or 12V Devices (eg water pump) can be switch but not dimmed
Total operating power for all circuits operating simultaneously should not exceed 10A.

The Switch ***Dims and Switches on the negative line to the LED. The Positive is common.***





CLASSIC SWITCH - OPERATING

Turning on/off:

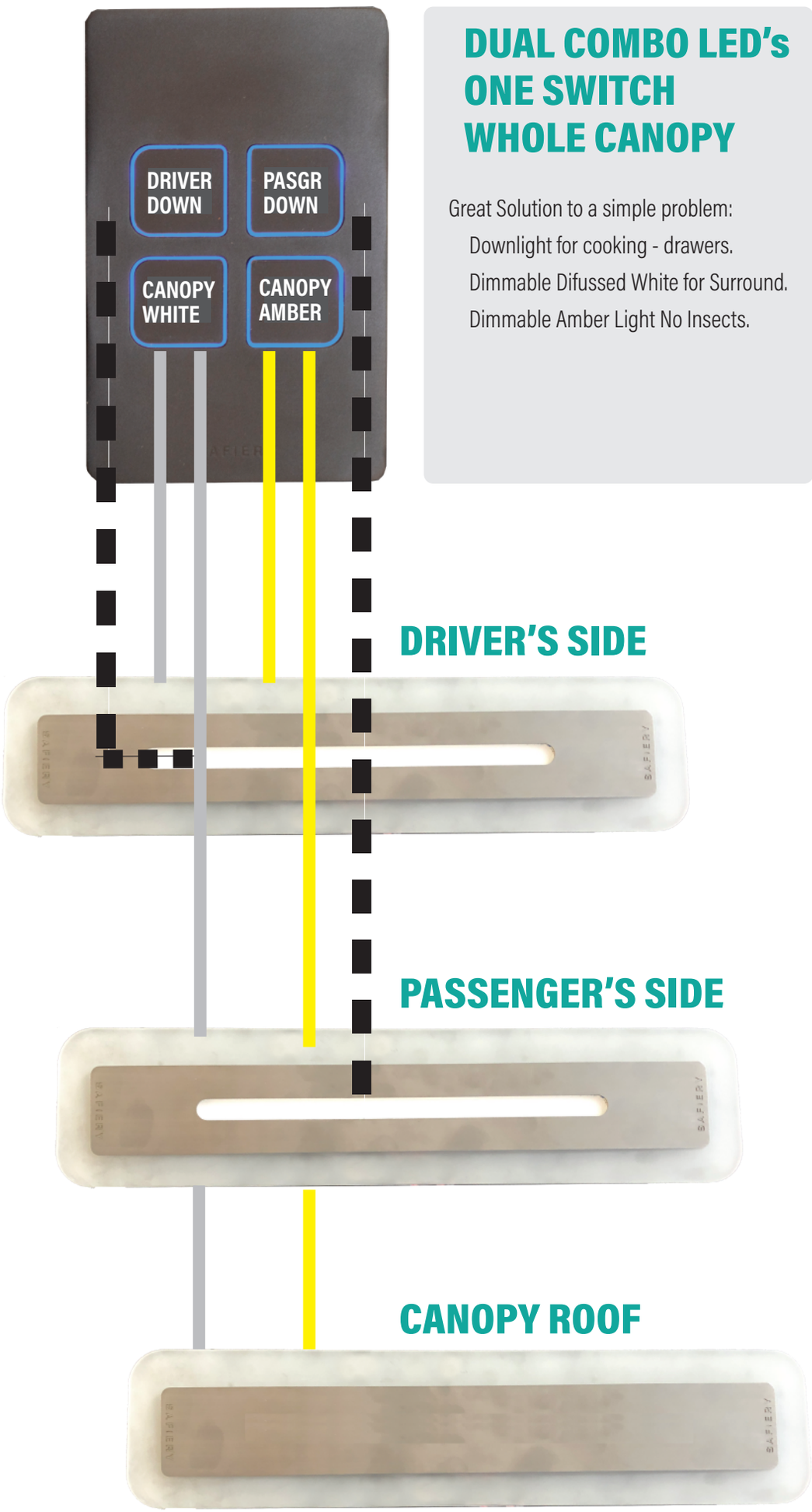
Touch the button for less than 1 second. The LED changes from white to Blue.

Dimming:

When on: Touch the button for more than 1 second and the LED dims. Repeat and it reverses.

Turning off back light:

When off: Touch the button for more than 1 second. The LED changes from white to off.



DUAL COMBO LED's ONE SWITCH WHOLE CANOPY

Great Solution to a simple problem:

Downlight for cooking - drawers.

Dimmable Difussed White for Surround.

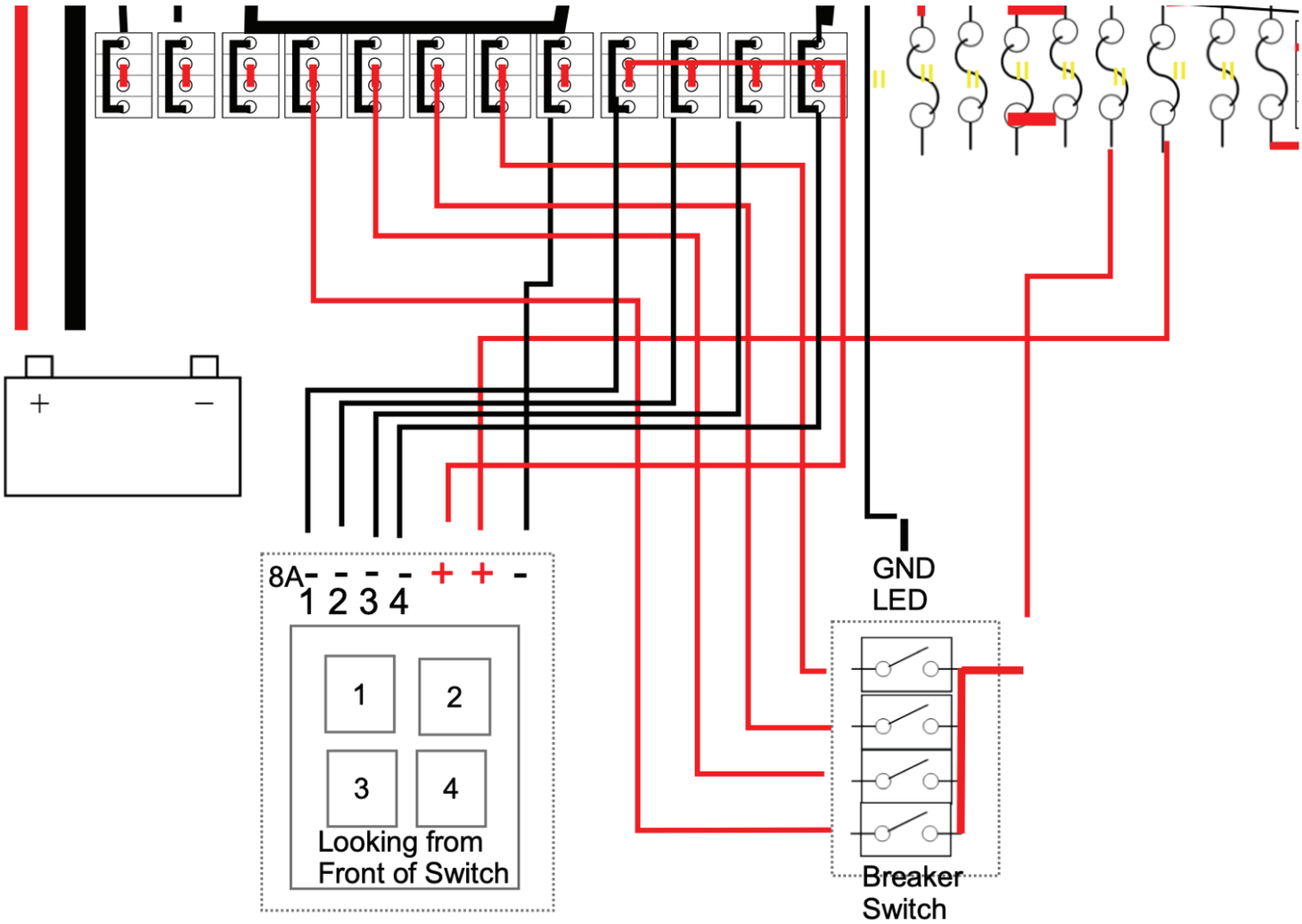
Dimmable Amber Light No Insects.

One Classic Switch

Two Combo Downlight Dual Colour Slimline

One Dual Colour Slimline

Suggested Wiring



CONNECTING UP BLUE HEELER PACK SWITCHES & BREAKERS

Internal Wiring and configuration of the Blue Heeler should be complete.
There are two ways to connect the vehicle/RV field wiring connections of lights and 12V devices to the switch and breakers.
Either:
1) Connect the field devices directly to the switch or breakers or
2) Connect both back to the double layer termination strip.
The Blue Heeler Packs are wired up so you can do it either way.

For 1) Connect the power +ve and -ve to the Switch and Breaker power terminals
for 2) Connect all wires back to the case side of the terminals and use the outgoing terminals for the field wiring.

We are Energy Technologists,
Who change the Functional into the Unforgettable.

When you team up with Safiery, you get an agile, relentless team that's moving faster than the pace of change in mobile power for RV's, 4WD's and Marine.
You get a collective of technologists, focused on raising the bar on what's possible – and what matters. More importantly, you'll work with our "customer advocates" who are committed to converting energy in its many forms into an enjoyable mobile lifestyle.
We change the functional into the unforgettable.

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