HIKOTERRA®

Built better to power what matters.

Who is HikoTerra

We have been quietly developing a Hybrid Power System to help vessel & vehicle builders, installers & users by reducing complexity & cost with a battery-first approach, that reduces reliance on generators and supports cleaner, quieter and more sustainable operation.

Founder story

Our **founder** & CTO Chris Fotherby is one of New Zealand's leading engineers.

Chris was CTO at Navman for many years and solved complex engineering problems to allow Navman to bring market leading technology to the world, critically at a cost that was able to transform the GPS & marine electronics industry.

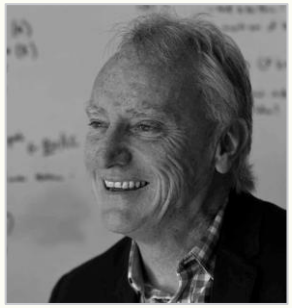
Over the last decade Chris has been applying his talent to making power electronics simply better & more efficient, while also providing critical technical solutions for Fusion & Invenco. His designs are revolutionary and will create change in a market that has been stagnant in its core power conversion fundamentals.

Chris Fotherby
Founder & CTO

Strong team with proven industry track records

Chris Fotherby
Founder & CTO

Chris is one of NZ's most accomplished, respected and skilled engineers.
Over the last decade Chris has been applying his talent to making power electronics simply better & more efficient



Sir Peter Maire
Investor & Board

Sir Peter is a significant shareholder and director of Power Concepts. He has successfully founded and developed leading tech companies in New Zealand, including Navman & Fusion,

John Scott
Board

John is a seasoned and accomplished leader in the marine and technology sectors. John spent 14 years in executive roles at Navico, one of the world's largest marine electronics companies

Mark Harnett
CEO

With 20 years of service at Navico Group in various roles, Mark brings extensive experience in marine & mobile Product Management, Digital Product Ownership and GTM

Mark Griffith
Engineering Lead

Mark is an accomplished product development leader with over 20 years of experience in the consumer electronics and marine technology sectors.

Matt Forbes
Sales Director

Matt is a seasoned marine industry expert with over 20 years of experience in marine & mobile sales channel development

Credible engineering, market and channel setup experience

- Internationally recognised & trusted team
- History of marine & mobile industry success with Navman, Fusion, Navico, BEP & Czone
- Well connected to industry talent pool to attract the best & brightest
- The experience needed to get products engineered, compliant and into production
- Proven reputations to get access at key OEM's
- Extensive experience in nuanced global sales channels

HIKOTERRA

Key Contacts

Mark Harnett
CEO

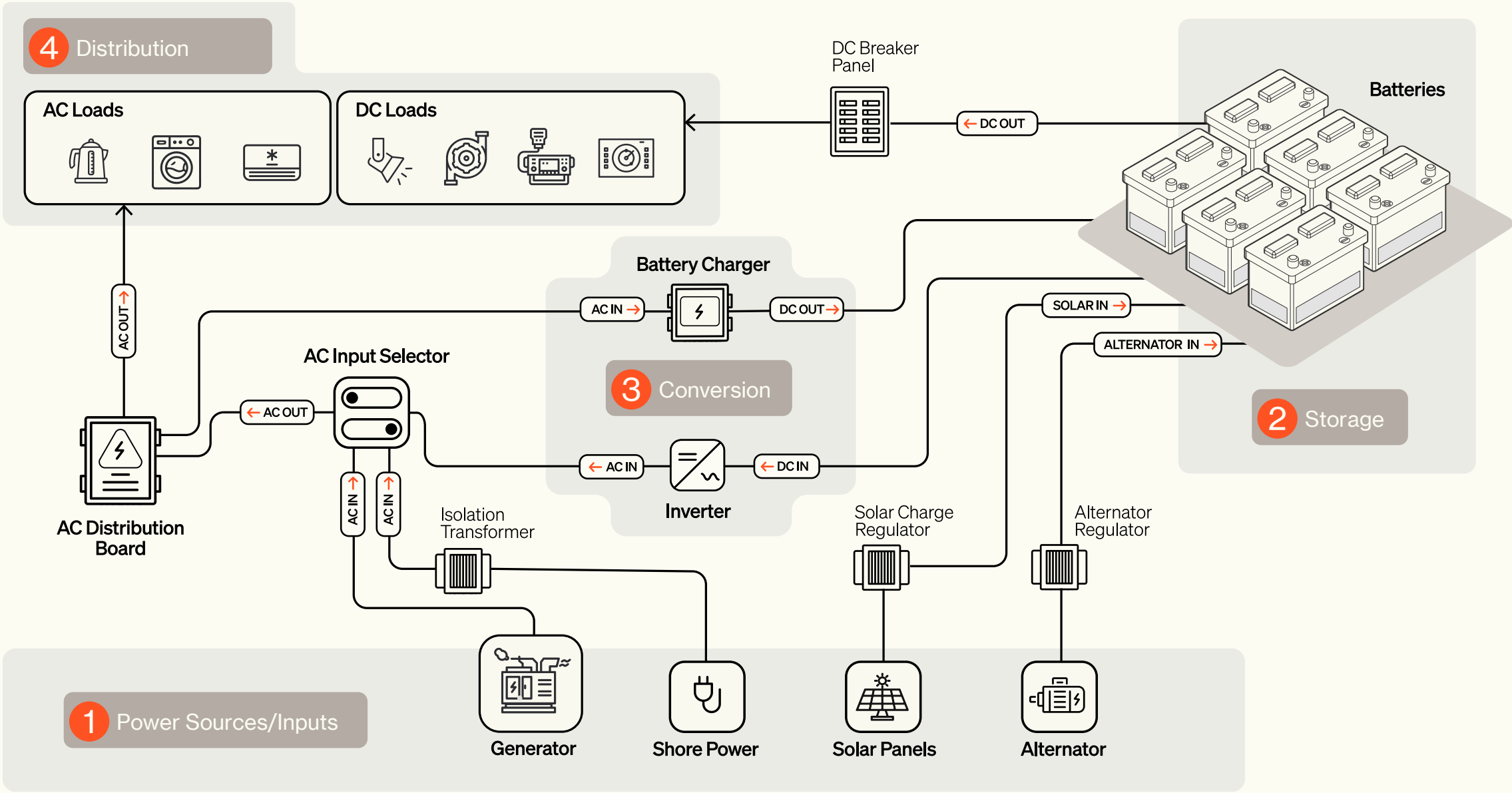
Phone: +64 (0) 21 493 274
Email: mark.harnett@hikoterra.com

Matt Forbes
Sales Director

Phone: +44 7766 056911
Email: matt.forbes@hikoterra.com

HikoTerra doesn’t feel like managing a power system – it feels like using one. And that makes all the difference.

Traditional power system 101



HIKOTERRA

Why now?

Stagnation

INNOVATOR'S DILEMMA

victron energy

MASTERVOLT

Innovation

LIFESTYLE

Onboard energy demand

BATTERY TECHNOLOGY

Storage capacity ↑

Storage cost ↓

SUSTAINABILITY

Sustainable is standard.

INDUSTRY

> **The future of boating will not look like the past.** So, it's imperative for the boating industry to appeal to a younger, more diverse group of potential future boaters"

NMMA National Marine Manufacturers Association

INDUSTRY

Generator replacement is trending.

GREENLINE YACHTS

FATHOM e-power system

HIKOTERRA

USE CASE SPOTLIGHT:

Overnight Air Conditioning - no diesel, vibrations or noise.

For the end-user

Problem

I want to run my air conditioning overnight without the noise & vibration of a diesel generator.

Solution

A battery-first power system with enough capacity to deliver a home like experience.

For the installer

Problem

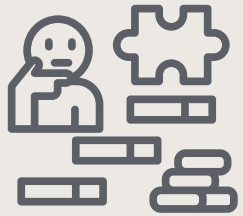
Currently available battery-first power systems are too complex and expensive to design, install & integrate as electrification intensifies.

Solution

A fit for purpose integrated power system with fewer components & cables that takes up less space and can be installed in less than half the time.

Problems to solve

Complex onboard systems for users



- Multiple systems to operate & balance, genset, inverter, charger system & shore power
- Users have to manually manage & juggle inputs & loads
- User demographics are changing with less experienced and more diverse users
- Shore power breaker trips due to overload

Noise & vibrations from Gensets

- Often gensets run continuously
- Gensets can be noisy & cause vibrations
- Often power is needed when quiet is desired i.e. at anchor
- Fumes & exhaust can circulate back into the boat
- Some marinas and anchorages prohibit or restrict genset use

Complex System design, install & service

- Multiple components from multiple vendors
- Time consuming & complex design, install & commission
- Integration headaches and trouble shooting
- Space required for gensets & tanks
- Additional through hull fittings required

Ongoing cost & sustainability

- Oversize genset required to satisfy peak demand but rarely used to capacity
- Old inverter tech is less efficient with a smaller temp range which requires more capacity
- High cost of fuel to feed constantly running genset
- Oil changes & servicing of another ICE component
- Additional emissions

Product Introduction - H⁴ Hybrid Power System

The H⁴ Hybrid Power System offers an unparalleled level of efficiency, scalability, integration, and ease of installation for marine and mobile power requirements.

These components work together to create a fully integrated system that is more compact, easy to install, and maintain. This enables the removal or reduction of the generator, resulting in a simpler, more familiar user experience for the consumer.

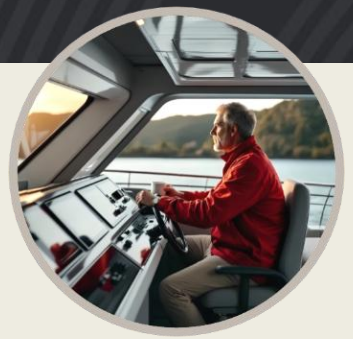
HIKOTERRA

System Advantages

For builders & installers

- The system will reduce the design, mechanical & electrical installation time and cost by more than 50%
- The rack and module design significantly reduces overall weight and size of the power system resulting in space & interior volume saving
- Single system supplier reducing integration & commissioning headaches and simplifying service
- Modules can be plugged into the rack immediately prior to delivery; this reduces cash flow and eliminates accidental damage to expensive modules during build.
- System works with any standard AC generator
- Generators are run less, but at optimal load, meaning fewer or smaller generators required
- A simpler & better experience for their customers that will lead to fewer support calls

For users



- Battery-first design with enough storage and inverter capacity to deliver a home like experience
- Delivering all power through the inverter even when connected to shore power ensures appliances receive clean and stable supply, even when shore power voltage sags
- Alternators can fast charge the battery when the vessel is underway, removing the need to run the generator while the main engines are running
- Generator run time is much reduced, giving long period of silent running with no noise, vibration, or fumes, AC can run overnight for better sleep
- Less fuel required, reduced maintenance and running costs

H⁴ Hybrid Power System Components-Deep Dive

High-Efficiency 10kW Bi-directional Inverter

- Designed from the beginning to be compact, lightweight, highly efficient (97%), and with a low self consumption
- Uses surface mount technology to simplify production
- Will run in parallel with generator and start it if required
- 10kW output at 40°C continuous
- 16kW surge output for three seconds
- Superior full load efficiency means longer run times
- Built in solar input

Advanced LiFePO4 8kWh Battery

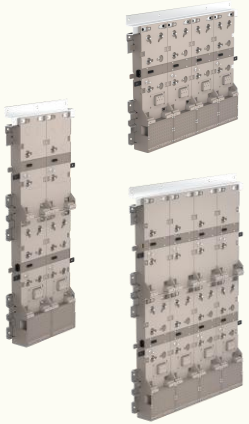
- High 8kWh or 314Ah at 26V capacity
- Latest generation, high quality LiFePO4 prismatic cells
- Built in internal BMS, shunt, fuses and safety disconnect switches simplifying install
- Auto-disconnect from rack in case of fault, allowing the system to operate using remaining batteries
- Active cooling & ventilation option
- Battery logs every degree of temperature change for its lifetime for fault tracking

Intelligent 200A Battery Charger

- Multi voltage shore power input
- Built in isolation transformer
- 200A battery charging
- Dual 250A alternator inputs for charging off main engines
- Can restart completely discharged batteries from shore power or alternator, no technician required
- 95% commonalty with inverter for optimised production

Rack installation and mounting system

- Reduces installation time by 50%
- Boat builder orders on vessel & consumer power requirements
- Configures physical rack layout depending on installation requirements, space & location
- Multiple layout options from 1x4 to 2x8
- Reduces space required for power system
- Rack eliminates many external fuses & switches
- Internal backplane means most heavy gauge cables, lugs and bolts are not required



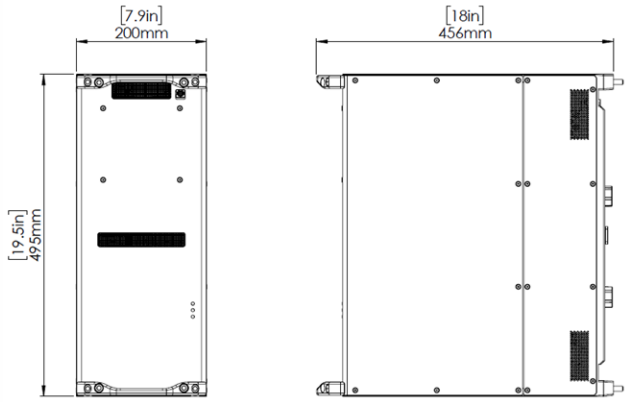
HIKOTERRA

10kW Inverter tech specs

H⁴V10000

Category	Specification	Unit	Value	Notes
Inverter	Input voltage range	V DC	20-30	
	Nominal battery voltage	V DC	25.6	
	Output voltage	V AC	230	±2%
	Output frequency	Hz	50	±0.01%
	Continuous output at 25℃	W	10000	At unity power factor
	Continuous output at 40℃	W	10000	At unity power factor
	Continuous output at 65℃	W	TBA	At unity power factor
	Peak power	W	16000	3 secs
	Input current	A DC	404	
	Maximum continuous Output current	A AC	44	
	Power factor range		-1 to 1	
	Maximum output fault current	A	100	
	Maximum efficiency	%	97	
	Zero load power	W	20	Ideally, TBA
	AC Output Connector		Proprietary	Connection to Rack
	Solar charge input voltage	V DC	100	
	Solar charge input max current	A	250	
	Solar charge input connector		Proprietary	
	Fan speed	RPM	0-13000	Automatically controlled
Communications	NMEA2000		Yes	Micro-C
	USB		Yes	USB-A
	Ethernet		Yes	10/100
	Fibre Optic		Yes	IF-D91B “Connector less” Generator controller
Physical	Dimensions	HxWxD mm	495x200x456	Does not include rack
	Weight	kg	24	
Environmental	Protection		IP20	
	Operating temp - Full power	℃	-30 to +45	
	Operating temp	℃	-30 to +60	
	Operating humidity	%	TBA	
	Storage temp	℃	-40 to +80	
Standards & Compliance	Safety		IEC 62477-1	
	Emissions		IEC 60945	
	RoHS		IEC 63000	
	ABYC		E-11, A-31	
	RCM		EESS AS/NZS 4417.2 – Level 1 equipment	

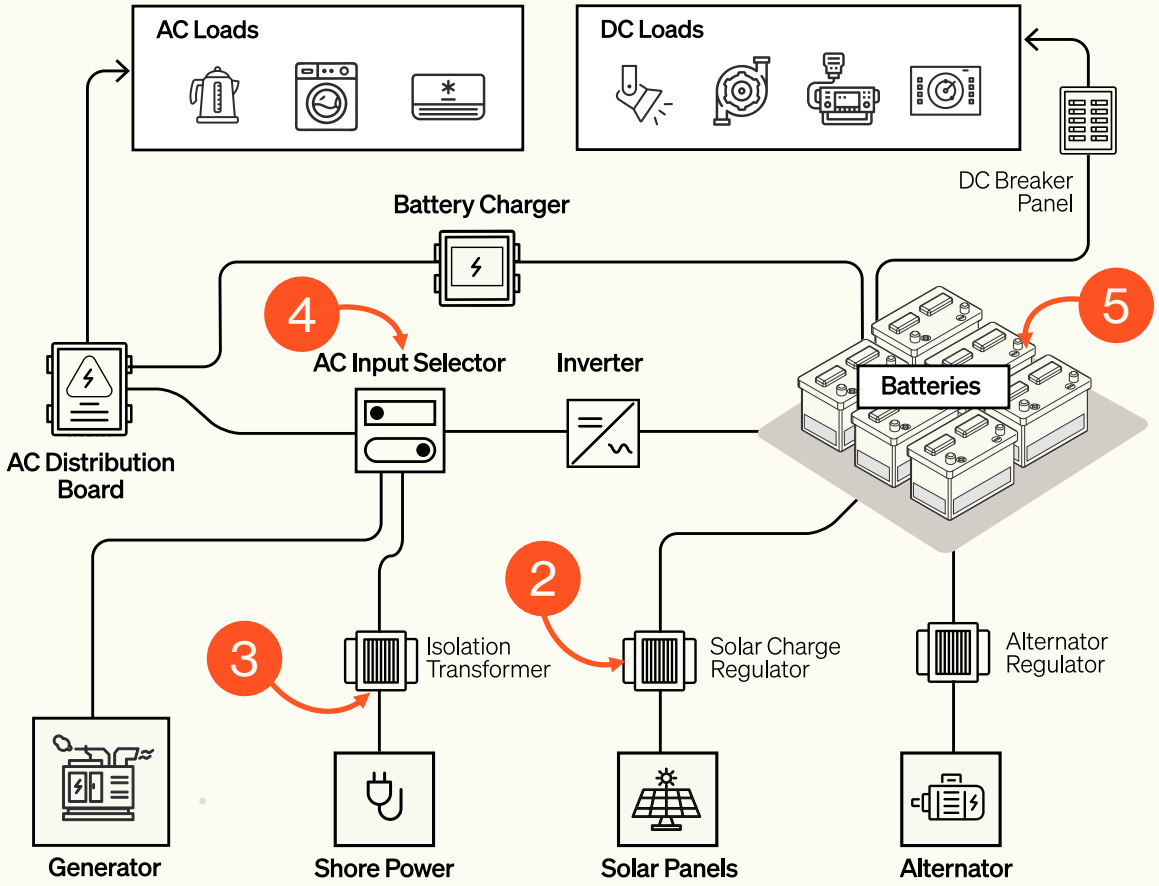
Dimensional Drawing



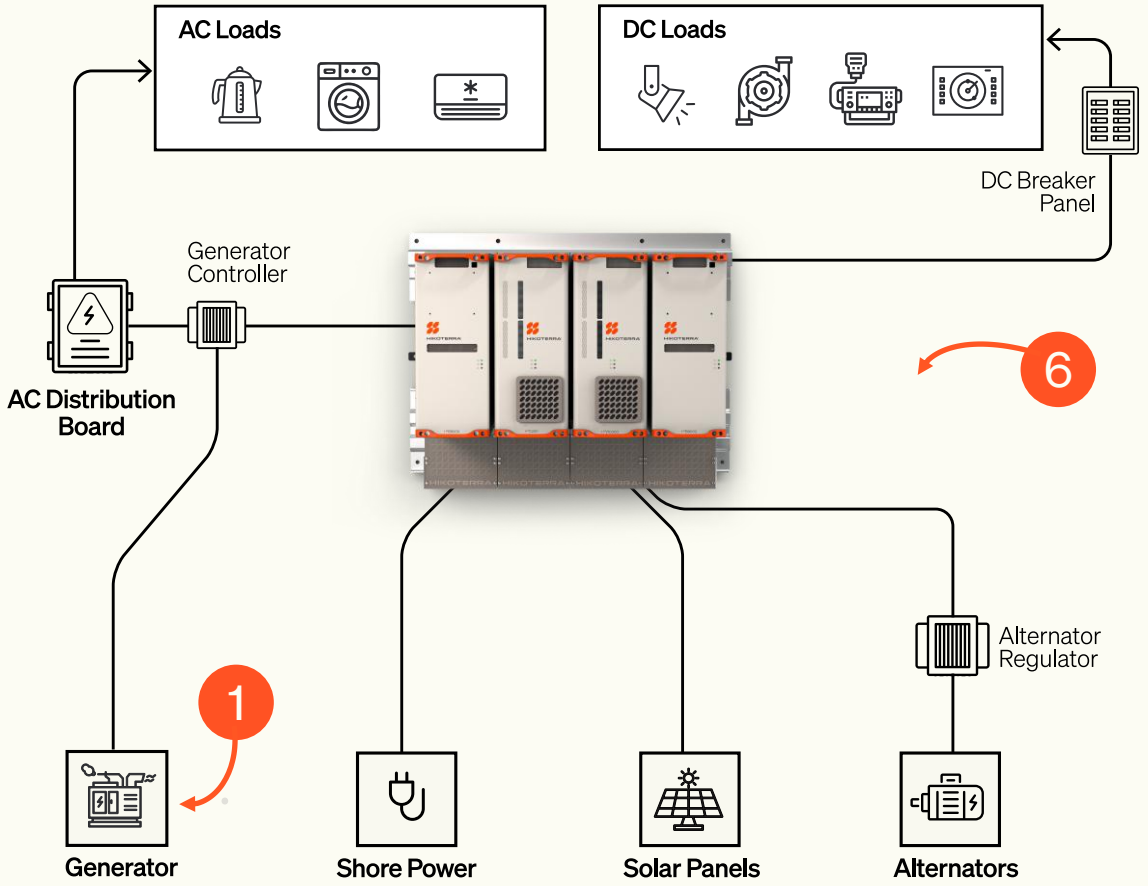
Placeholder (this is the battery)

HIKOTERRA

Traditional System



H⁴ Hybrid Power System



1. Fewer or smaller generator(s)
2. Solar charge regulator not always required
3. Isolation transformer not required
4. AC Input selector not required
5. Heavy Guage DC connections not required
6. Fewer modules to mount & wire

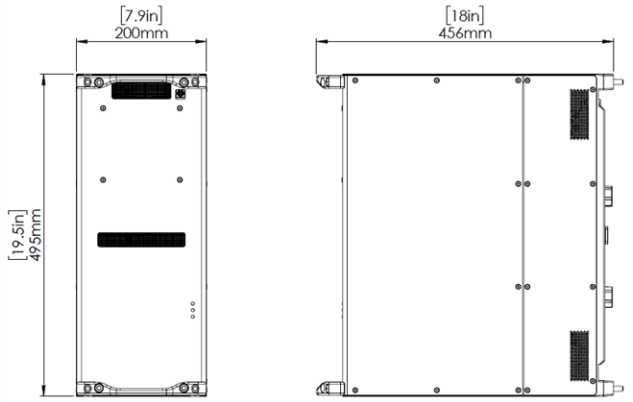
HIKOTERRA

200A battery charger tech specs

H⁴C200

Category	Specification	Unit	Value	Notes
Charger	Max Charge Current	A DC	200	
	Max Alternator Input current (x2)	A	250	
	Full load consumption	W	5000	
	Alternator Input disconnect switches		Yes	
	Alternator Input load dump protection		Yes	
	Alternator input needs extrnal protection module		Yes	
	Alternator Input connector			Note the connector type
	Fan speed	RPM	0-13000	Automatically controlled
Shore Power Input	Input Voltage	V AC	85-264	
	Input Frequency	Hz	50/60	
	Max input current	A	22	
	Shore power input connector		Proprietary	Connection to Rack
	Isolation transformer		Built in	External transformer not required
Physical	Dimensions	HxWxD mm	495x200x456	Does not include rack
	Weight	kg	24	TBD
Environmental	Protection		IP20	
	Operating temp - Full power	℃	-30 to +45	
	Operating temp	℃	-30 to +60	
	Operating humidity	%	TBA	
	Storage temp	℃	-40 to +80	
Standards & Compliance	Safety		IEC 62477-1	
	Emissions		IEC 60945	
	RoHS		IEC 63000	
	ABYC		E-11, A-31	

Dimensional Drawing



Placeholder (this is the battery)

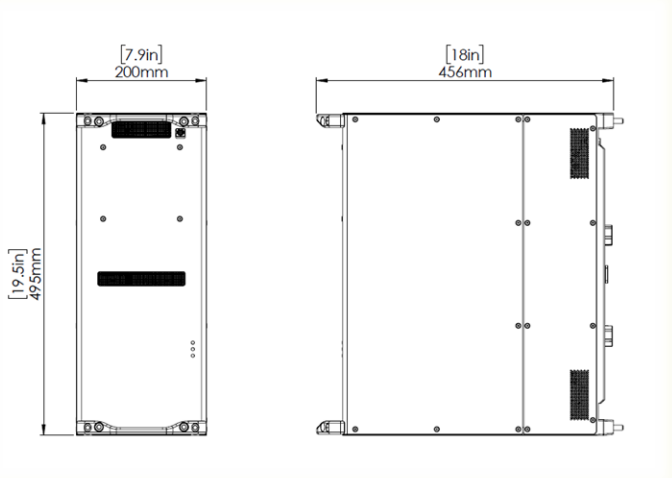
HIKOTERRA

8kWh battery tech specs

H⁴B8000

Category	Specification	Unit	Value	Notes
Category	**Specification**	**Unit**	**Value**	**Note**
Battery	Nominal voltage	V	25.6	
	No load voltage, fully charged	V	26.4	
	Nominal capacity (Cn)	Ah	314	
	Nominal energy	Wh	8000	
	Chemistry		LiFePO4	
	Cell type		Prismatic	
	BMS		Yes	Built in
	Battery fuse		Yes	Built in
	Safety Disconnect switch (x2)		Yes	Built in, one MOSFET, one mechanical
	Current measurement shunt		Yes	Built in
Physical	Dimensions	HxWxD mm	495x200x456	Does not include rack
	Weight	kg	65	
Environmental	Protection		IP55	
	Operating temp (discharge)	℃	-30 to +60	
	Operating temp (charge)	℃	0 to +60	
	Operating humidity	%	TBA	
	Storage temp (recommended)	℃	-20 to +35	
Logging	Temperature logging	℃		Log temp per degree change for lifetime of battery
Standards & Compliance	Batteries		IEC 62619, IEC 62620	
	Small Craft Lithium Ion Batteries		ISO 23625	
	Emissions		IEC 60945	
	Transport		UN38.3	
	RoHS		IEC 63000	
	ABYC		E-10, E-11, E13	
	RCM		AS/NZS 3004.2:2014 – Section 2.9.3	

Dimensional Drawing



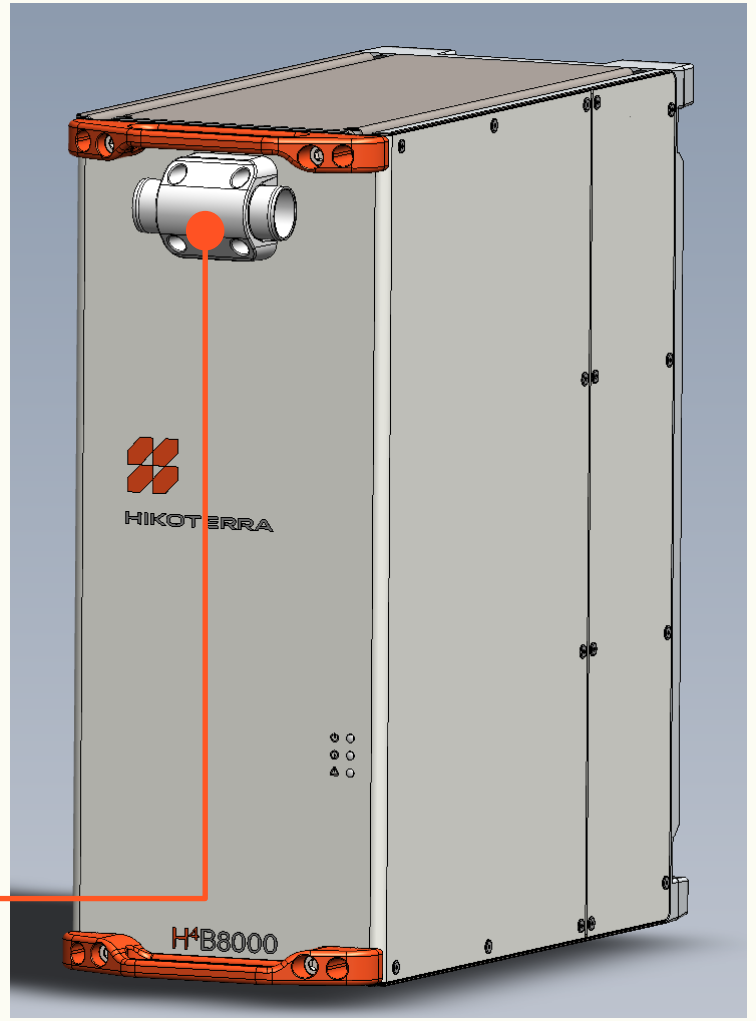
HIKOTERRA

Important Battery Updates

Battery updates-Waterproofing
Now IP55 for compliance to ISO 23625:2025 & MGN550 guidance.

Battery updates-Venting
Venting option added for ISO 23625:2025
Battery will ship with waterproof breather and cover plate attached.

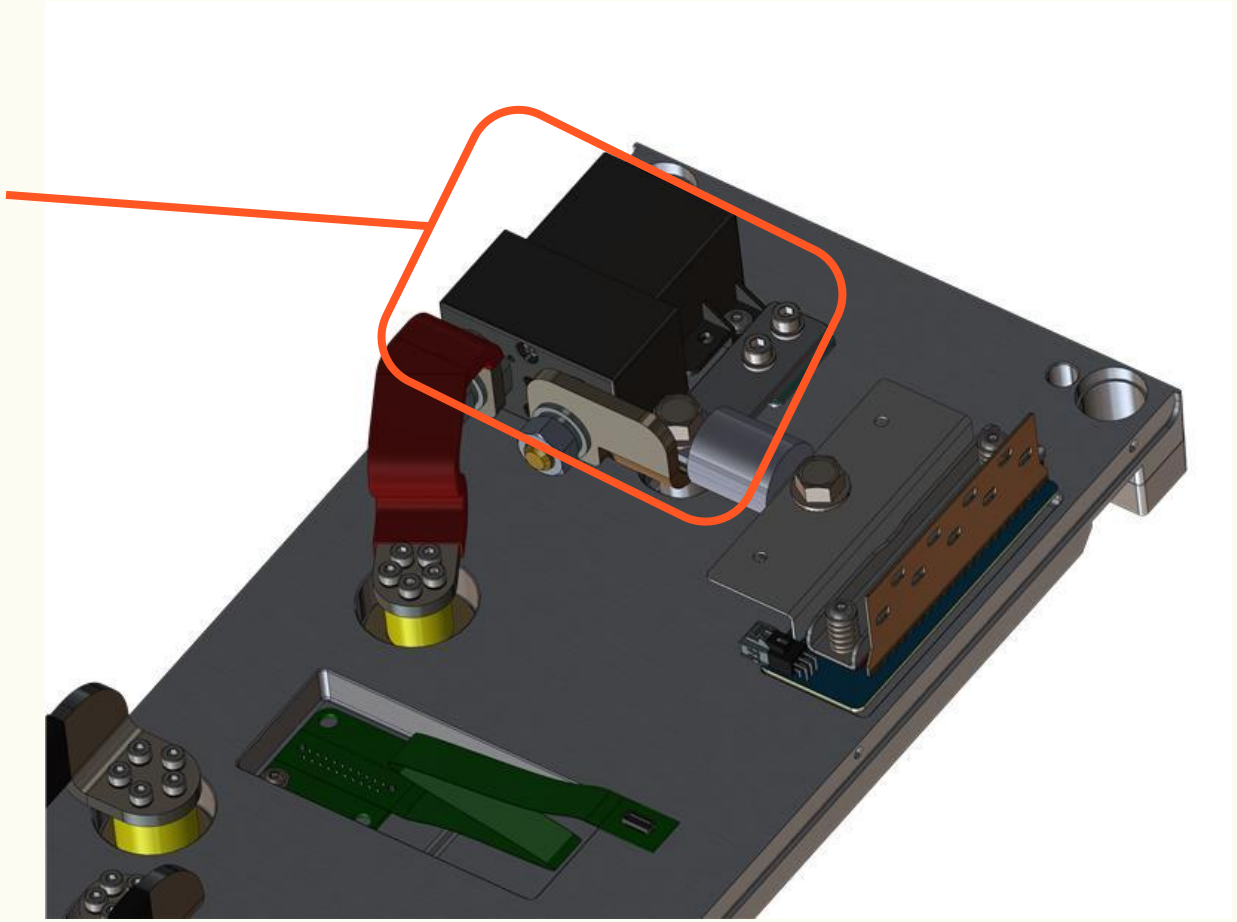
Breather cover plate can be removed during installation and optional venting spigot attached allowing the battery to be connected to appropriate exhaust ducts as required.



HIKOTERRA

Important Battery Updates

Battery updates-Safety Switch
Added magnetic latching relay for compliance to ABYC E-13 as existing MOSFET switch did not satisfy requirements. (Mechanical required)
Battery now contains 2 safety switches, plus a fuse.



HIKOTERRA

Innovation highlight- H⁴ Battery

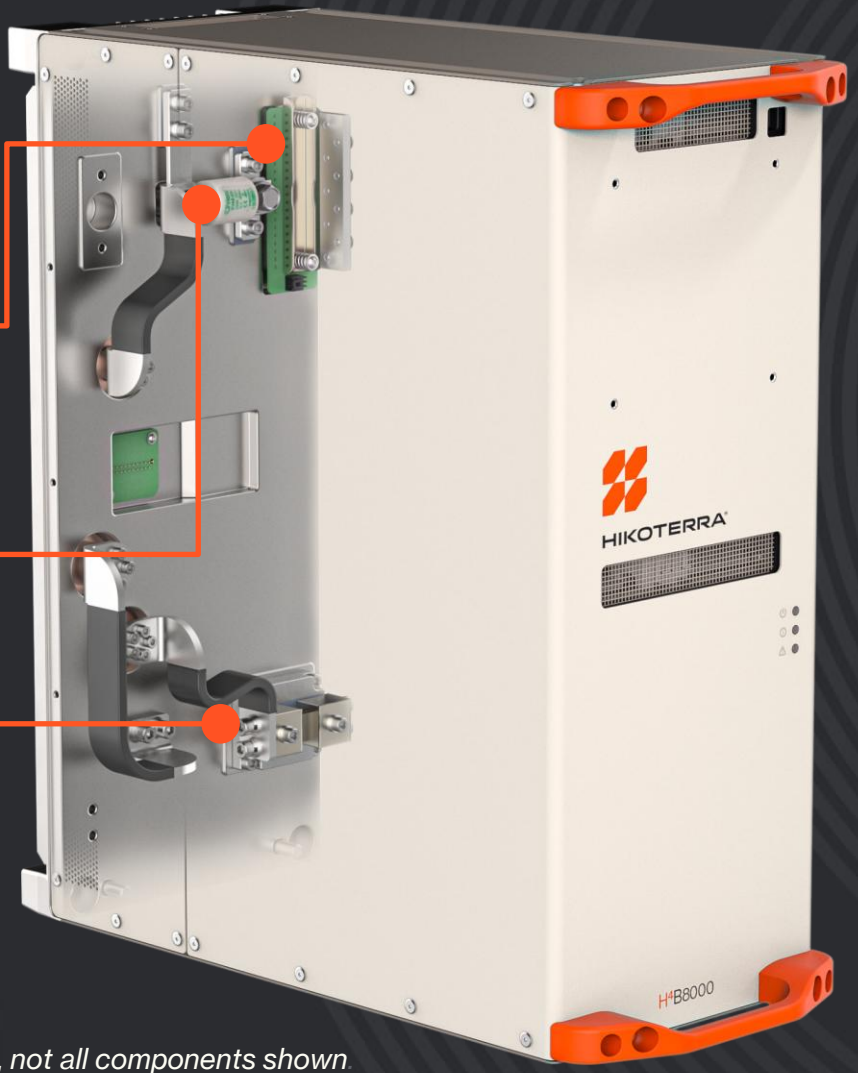
By building in key system components, the **H⁴** battery not only reduces install time & effort but also ensures safety.

Most of these safety switches, fuses and connections required in a typical competitor installation are built in with the **H⁴** system

Switch connects and disconnects the battery from the rack

Fuse protects the battery and rack

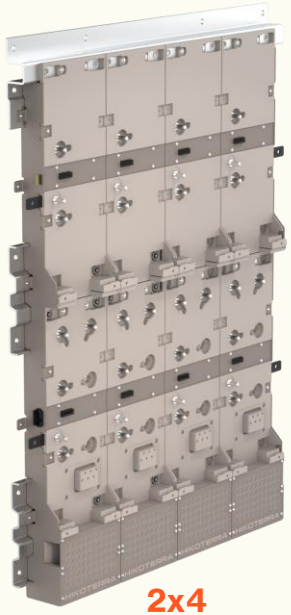
Shunt measures current flow into and out of the battery



Simplified view, not all components shown

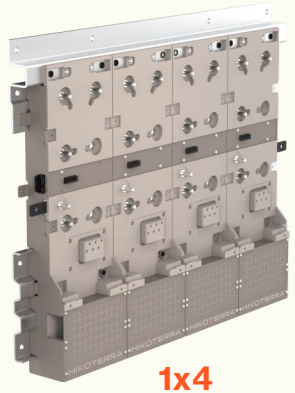
Mounting rack configs & tech specs

Category	Specification	Unit	Value	Notes
Capacity	Minimum height		1 slots	
	Maximum height		2 slots	
	Minimum width		3 slots	
	Maximum width		8 slots	
	Minimum Capacity 5kW inverter		3 slots	1x 5kW inverter, 1x charger, 1x battery
	Minimum Capacity 10kW inverter		4 slots	1x 10kW inverter, 1x charger, 2x battery
	Maximum capacity		16 slots	
	Minimum Inverters		1	
	Max inverters single phase		2	
	Max inverters three phase		3	
	Minimum charger		1	
	Maximum charger		2	
	Minimum batteries per 5kW inverter		1	
	Minium batteries per 10kW inverter		2	
	Maximum batteries		12	96 kWh
	DC Connection studs		M6/M8/M10	
	AC Connection		M4 ring terminals	One pair per 5kW
Dimensions	2x2 Rack (incl. Modules)	HxWxD mm	1319x522x512	Some clearances for heat and cable bend radius will be required
	1x4 Rack(incl. Modules)	HxWxD mm	746x946x512	Some clearances for heat and cable bend radius will be required
	Additional width per rack slot	mm	212	
	Other rack configurations	TBA	TBA	Other rack configuration dimensions pending
Standards & Compliance				
	Safety		IEC 60335-1	
	Emissions		IEC 60945	
	RoHS		IEC 63000	
	ABYC		E-11	
	RCM		EESS AS/NZS 4417.2 – Level 1 equipment	
			AS/NZS 60335.1	
			AS/NZS 3004.2:2014	



2x4

2x2



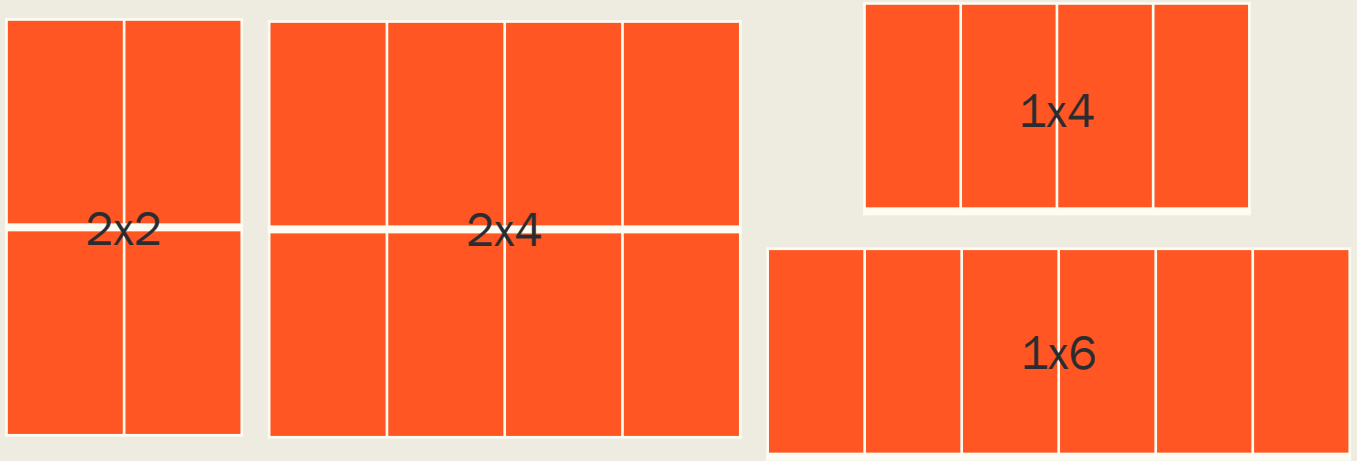
1x4

HIKOTERRA

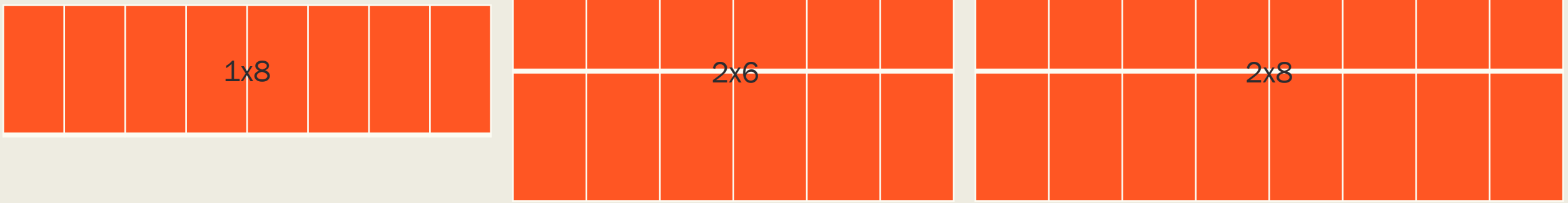
Initial rack configuration availability

Height	Width	Positions	MVP for SOP/Status
2	2	4	Available on release
1	6	6	Available on release
2	4	8	Available on release
1	4	4	Available on release
1	8	8	Within 3 months of release
2	6	12	Within 3 months of release
2	8	16	Within 3 months of release
Other sizes and configurations considered on request			

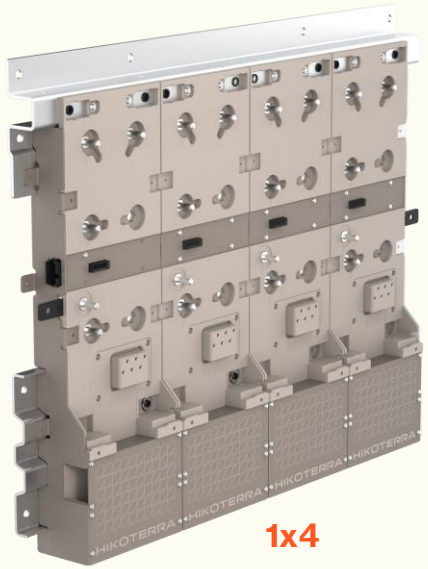
Available on release



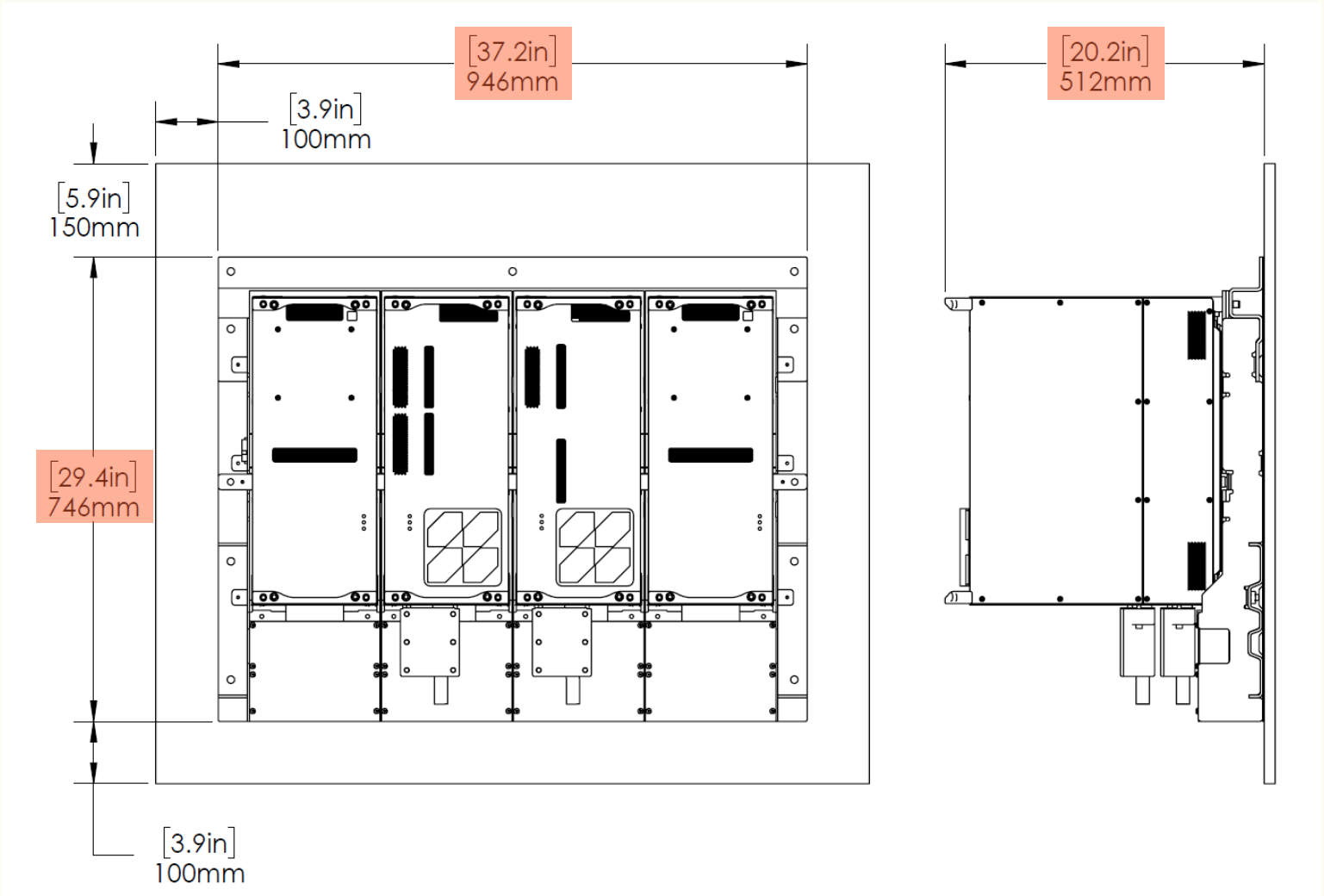
Available on within 3 months of release



Example system dimensions 1x4



1x4

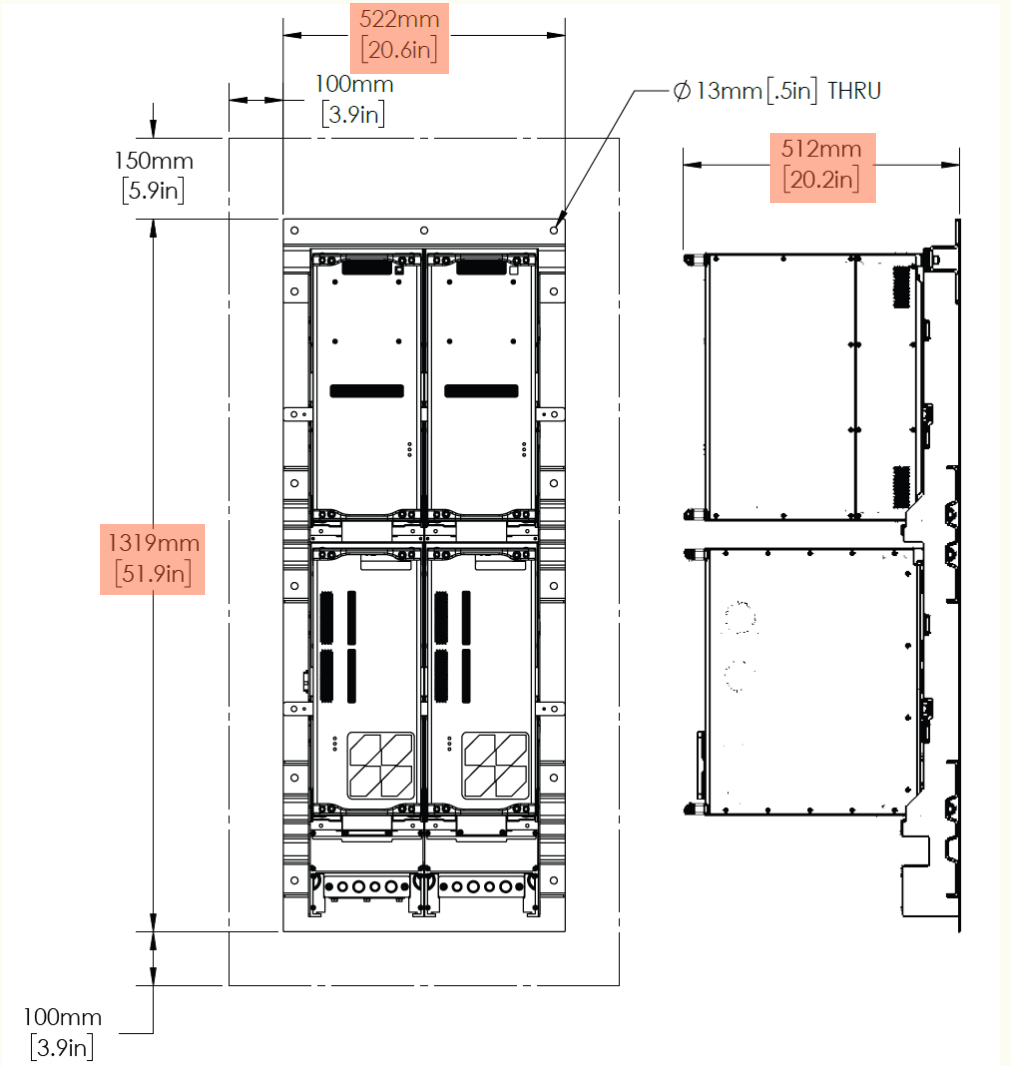


1x4 Rack(incl. Modules)	HxWxD mm	746x946x512

HIKOTERRA

Example system dimensions 2x2

2x2



2x2 Rack(incl. Modules)	HxWxD mm	1319x522x512

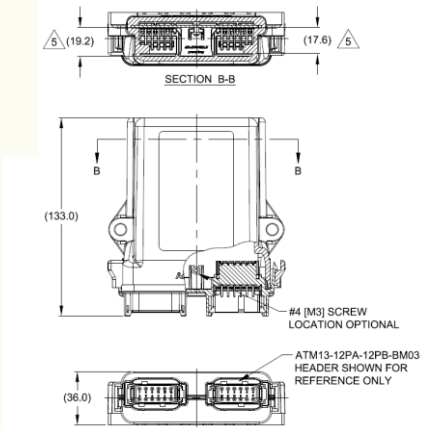
HIKOTERRA

Alternator Regulator tech specs

Category	Specification
Nominal battery voltage	24 V
Operating ambient temp range	-15°C to 60°C (5°F to 140°F)
Delivered with	Alternator temperature sensor with 8mm (5/16") lug and 3 m cable
Compliance	CE
Charge characteristic	Automatic / 3-step+ for Lithium Ion
Field current	Up to 8 amps
Dedicated Reg-On Wire	From start ignition key (optional via pressure switch)
Regulation	P-Type
Alternator thermal protection	Alternator body mounted sensor
Waterproof	IP 68, IP69K
Enclosure Dimensions	117mm(W) x 133mm(L) x 35mm(H)
	4.61"(W) x 5.24"(L) x 1.38"(H)
Weight	
Protection features	Alternator overtemperature protection Alternator excessive field current protection Broken B+ wire detection
Other features	Alternator output current limiting (derating)
Connector	Waterproof Deutsch DTM06-12SA or Amphenol ATM06-12SA
Connections	B+, B-
	Stator
	Field
	Reg-On
	Temp sensor x 2
	Control
Warranty	2 Years

Product Image

Product Label



Dimensional Drawing

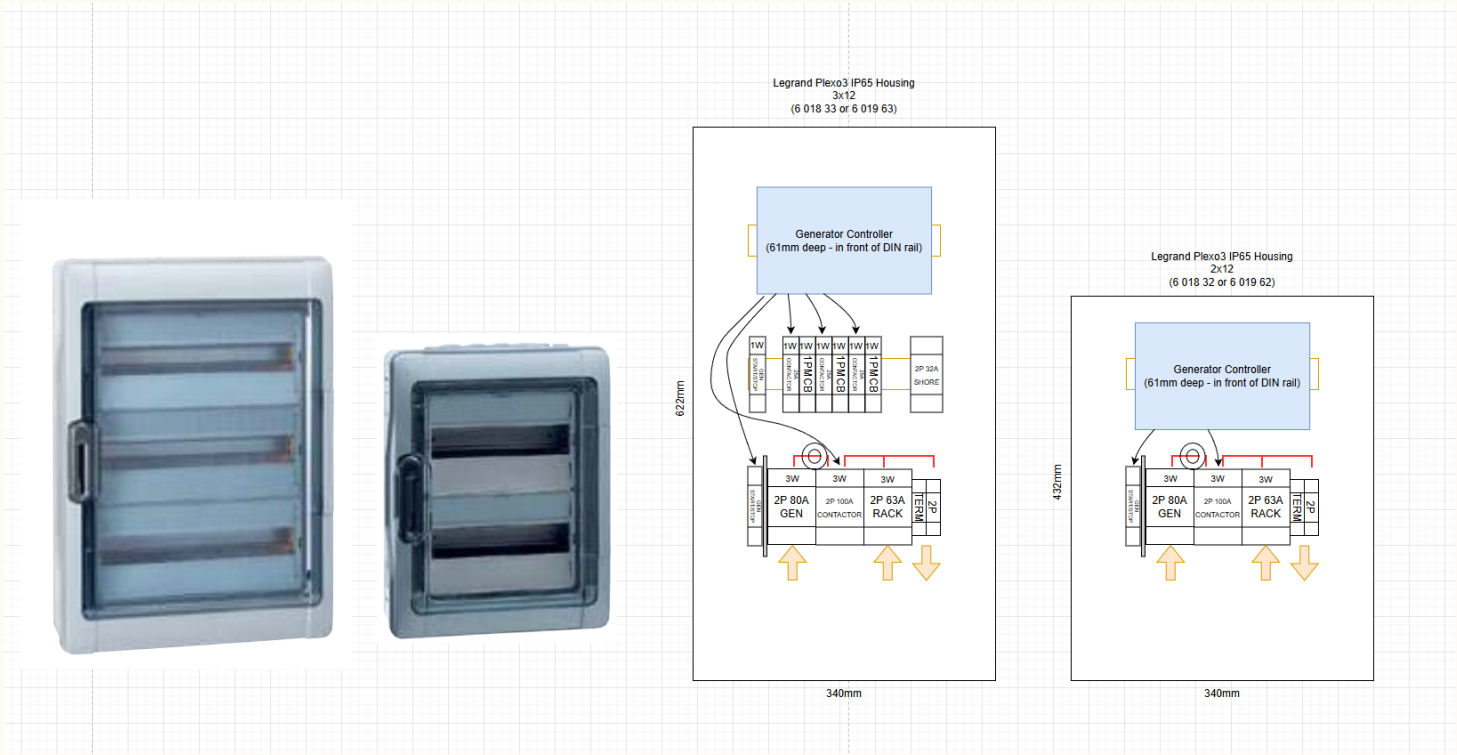
HIKOTERRA

Generator controller & AC panels

Category	Specification
Mounting	DIN rail mount
Enclosure dimensions	196 x 119 x 57 (7.72" x 4.72" x 2.25")
AC input	100-240V AC 50/60Hz
	Fused @ 5A
Metering Channels	2 x 3 phase generator voltage inputs (6 channels)
	3 x current sensor inputs
AC outputs	8 x 0.5A AC outputs, thermal & current protected
	Peak inrush 1A
Comms	2 x fibre optic (Tx,Rx)
Compliance	CE

3 options for AC integration

1. A full cabinet with AC inputs and 6 outputs with load shedding
2. An AC input cabinet with just inputs, OEM will house the outputs in their own cabinets (likely for larger boats)
3. Controller only to integrate into existing cabinet, for more advance builders that have their own harnessing or panelisation etc.



HIKOTERRA

Suggested Contactors & Relays

Genset parallel contactor:

Contactor	Schneider Acti9 iCT A9C20882
Rating	100A, 2NO
Coil Voltage	220-240V AC 50Hz
Coil inrush	53VA, ~230mA
Coil Hold-in	6.5VA, ~28mA

AC Load shedding contactor:

Contactor	Schneider Acti9 iCT A9C20721
Rating	25A, 1NO
Coil Voltage	220-240V AC 50Hz
Coil inrush	9.2VA, ~40mA
Coil Hold-in	2.7VA, ~11.7mA

Genset Start/Stop control relay:

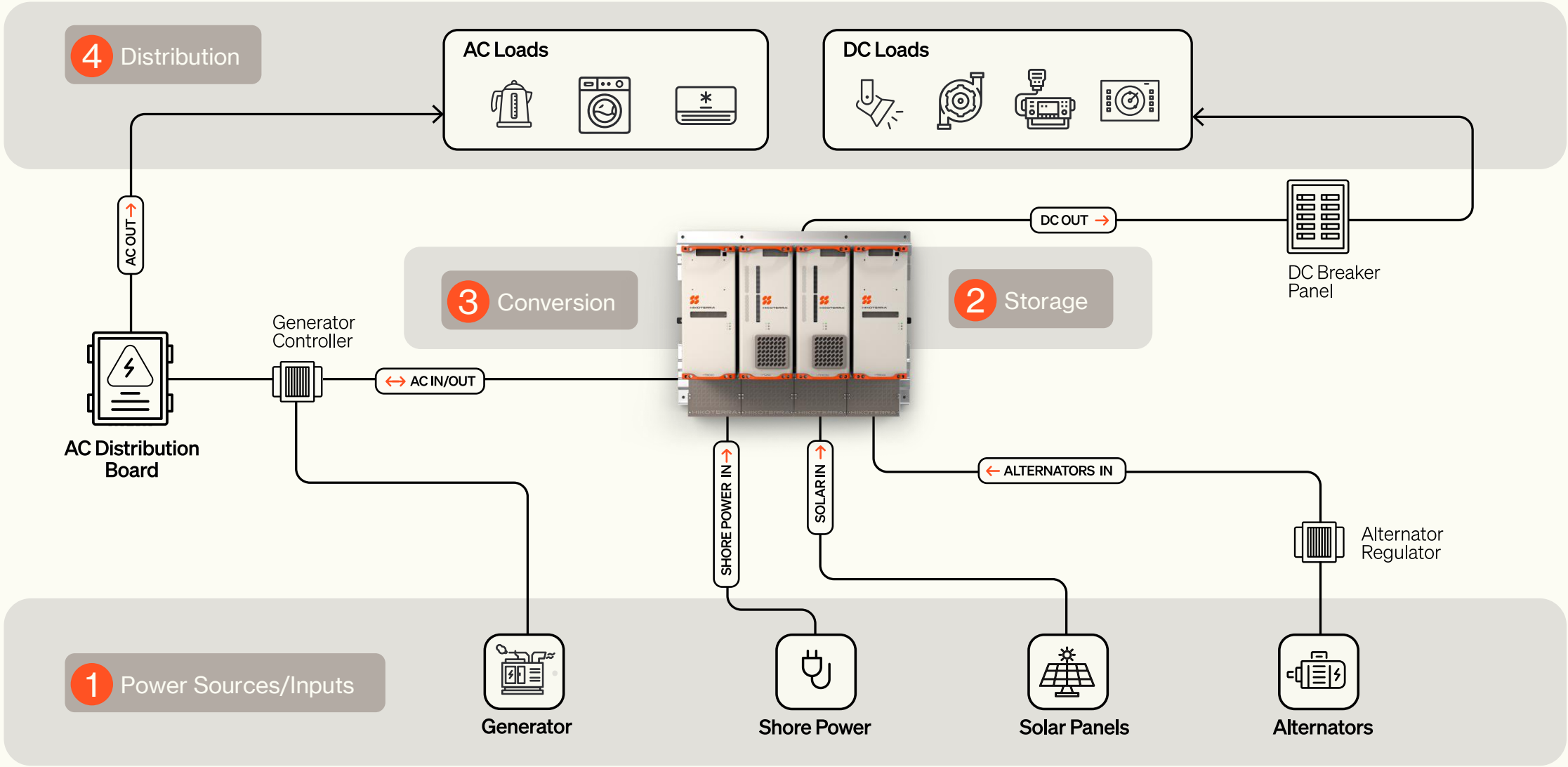
Contactor	Phoenix Contact RIFLINE set, 2903339
Rating	6A AC, 2A @ 24V DC
Coil Voltage	230V AC 50/60Hz
Coil inrush	Unknown
Coil Hold-in	6mA

3-phase genset or shore power :

Contactor	Schneider TeSys Deca
Rating	125A, 4NO
Coil Voltage	230V AC 50Hz
Coil inrush	200VA, 870mA
Coil Hold-in	20VA, 87mA

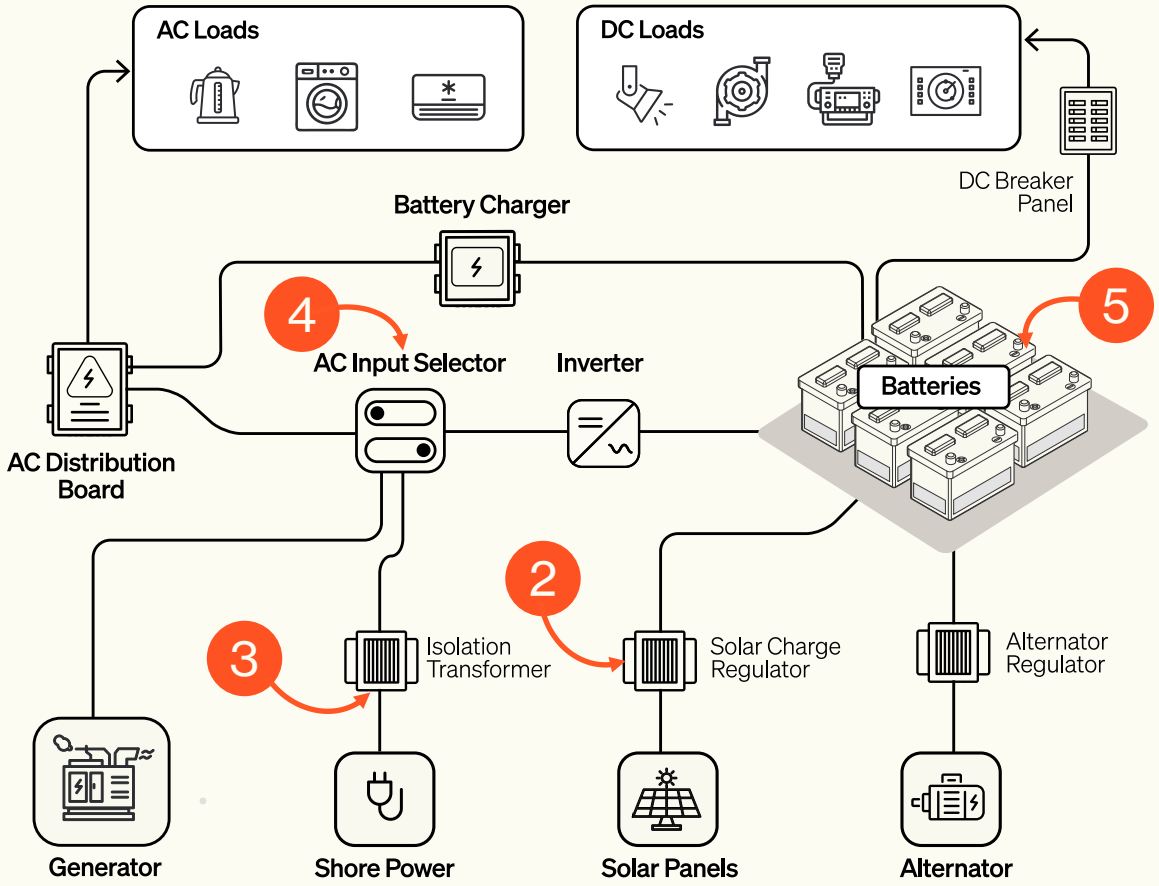
HIKOTERRA

HikoTerra System Diagram

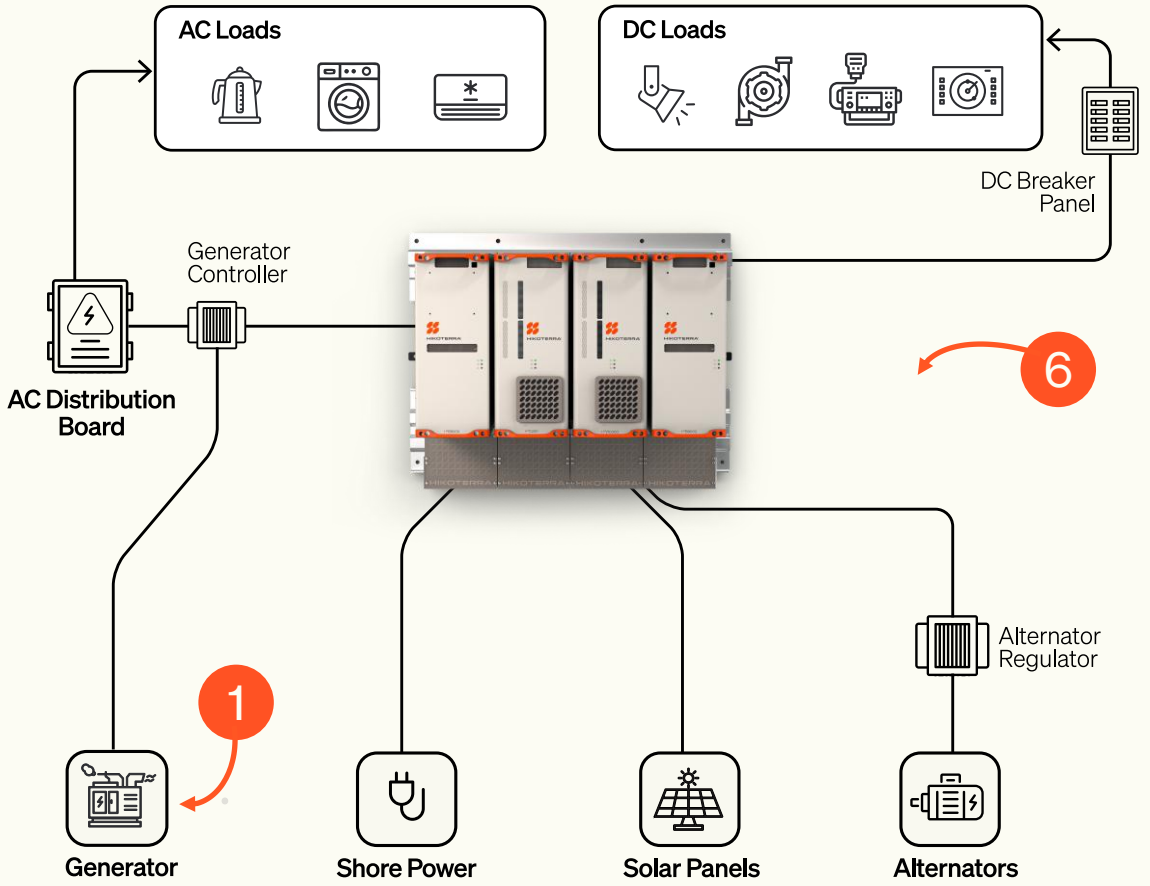


HIKOTERRA

Traditional System



H⁴ Hybrid Power System



1. Fewer or smaller generator(s)
2. Solar charge regulator not always required
3. Isolation transformer not required
4. AC Input selector not required
5. Heavy Guage DC connections not required
6. Fewer modules to mount & wire

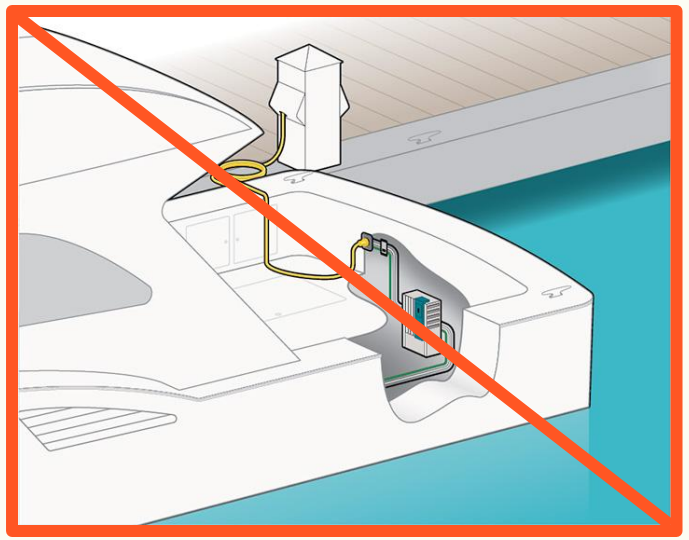
HIKOTERRA

Key Operational Differences

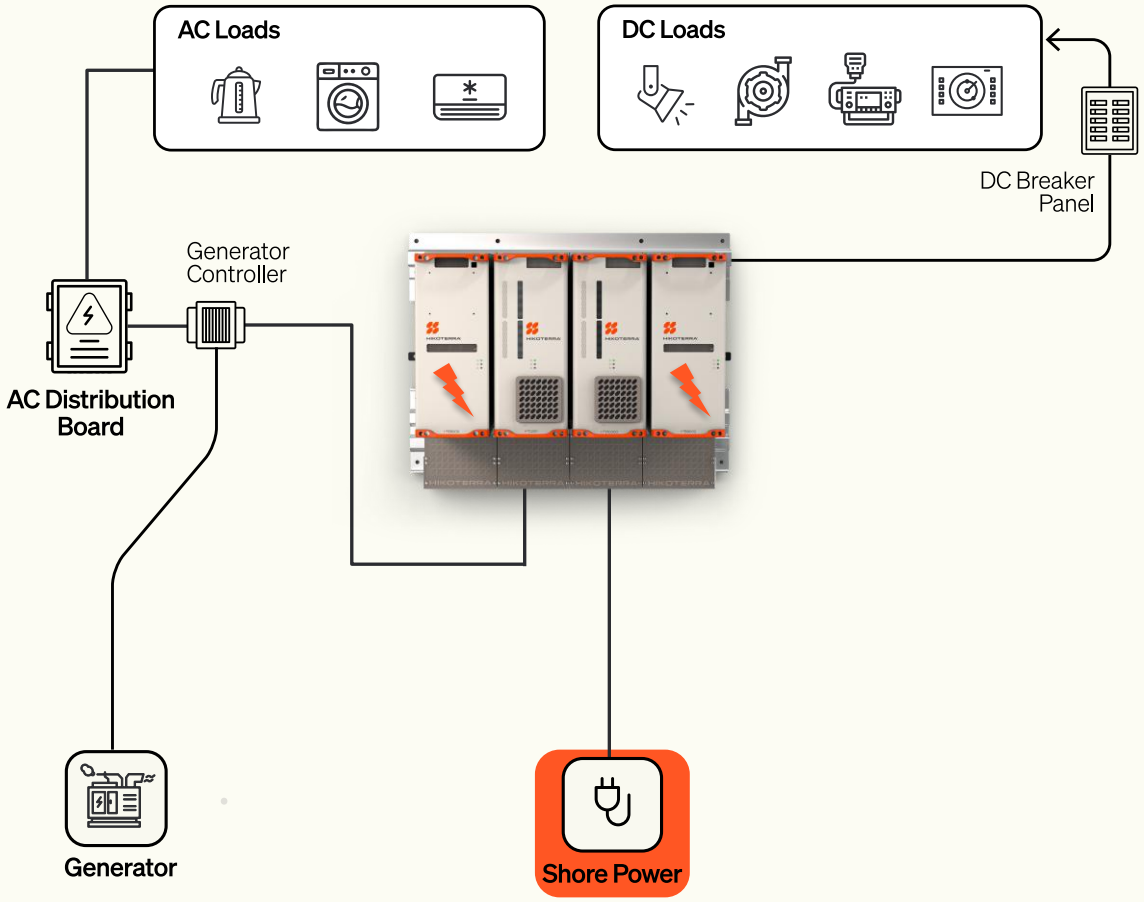
- All AC power for on-board appliances is delivered either from the inverter, or from the inverter operating in parallel with the generator.
- Having the inverter in parallel with the generator results in an improved waveform and much reduced sags and surges compared with running direct from the generator.
- The generator always runs at its most efficient operating point, near full load.
- The parallel combination results in an increase in the total available AC power capacity. A 10kW inverter combined with a 10kW generator provides a maximum power capability of 20kW.
- Shore power is only connected to the battery charger and doesn’t directly power any appliances on the boat. The appliances receive clean, constant power, even when the shore power voltage sags.
- The battery charger eliminates the need for a shore power isolation transformer.
- Being able to operate the AC systems from just the power provided by the alternators provides a back-up if the generator fails.

Integration highlight-Shore Power

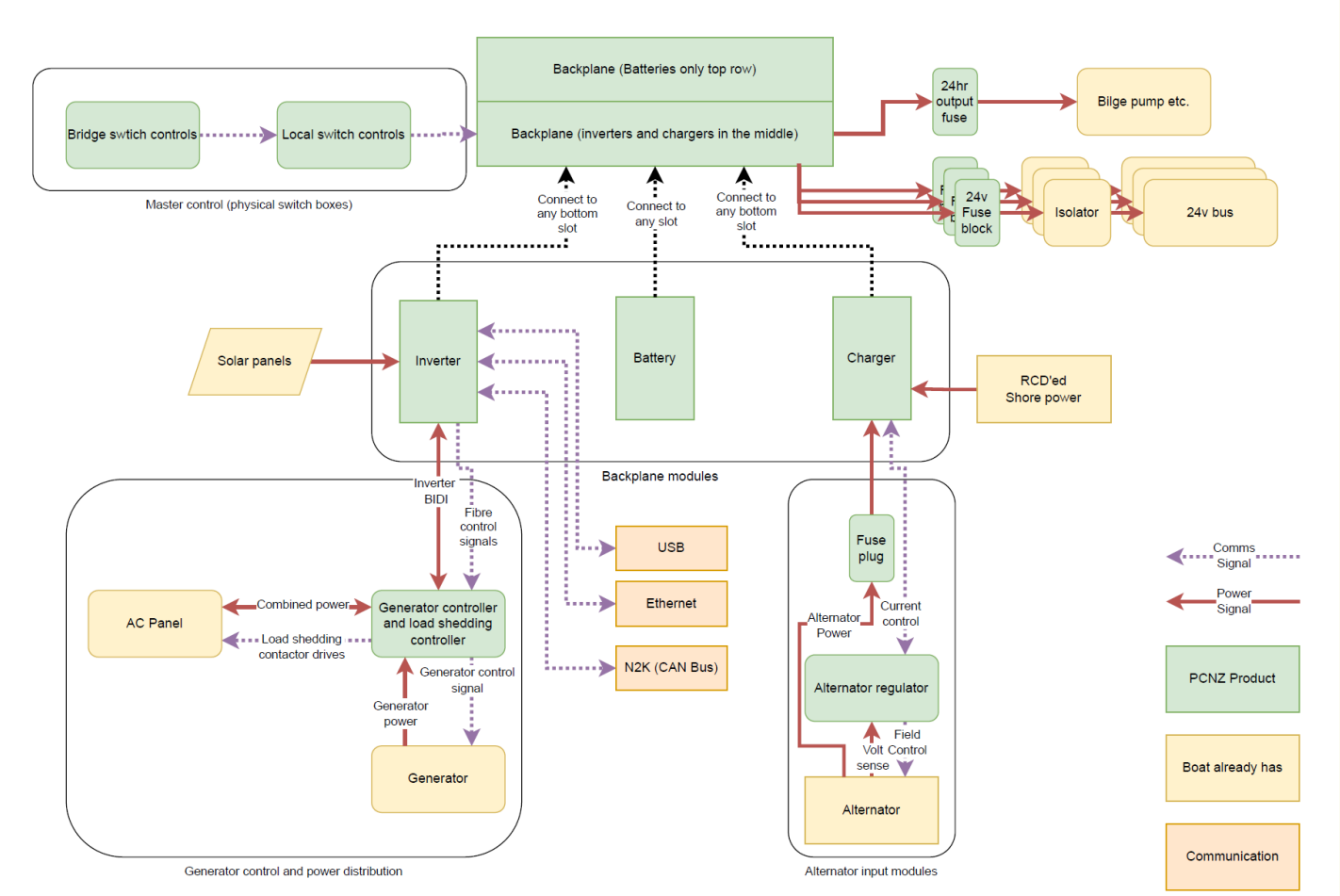
Shore power is only connected to the battery charger and doesn't directly power any appliances on the boat. The appliances receive clean, constant power, even when the shore power voltage sags.
The battery charger eliminates the need for a shore power isolation transformer.



Installing an isolation transformer on any boat with a shore power connection prevents galvanic corrosion, reverse polarity issues, and protects swimmers near your boat from electric shock drowning. | Photo: ©2019 Erich Stevens

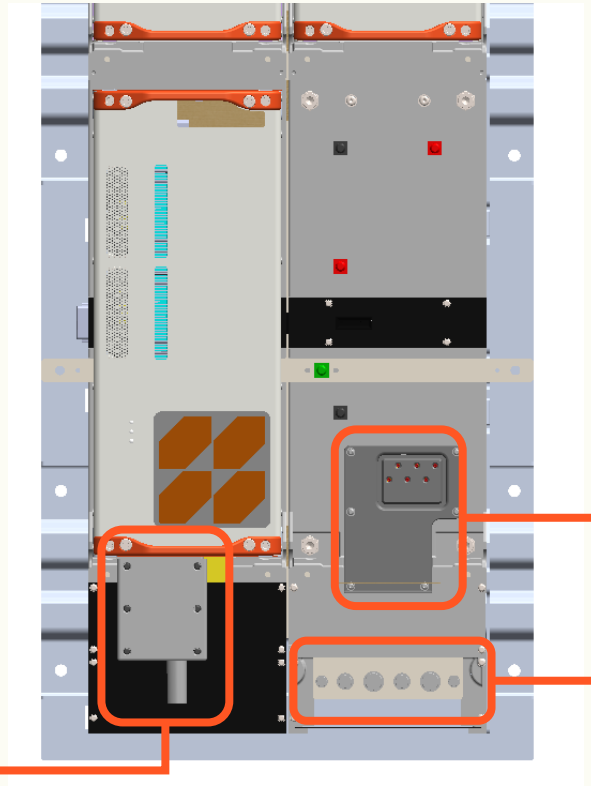


Functional Block Diagram



HIKOTERRA

AC & DC Connections



Shore power &
Alternator to
charger.
Solar to inverter

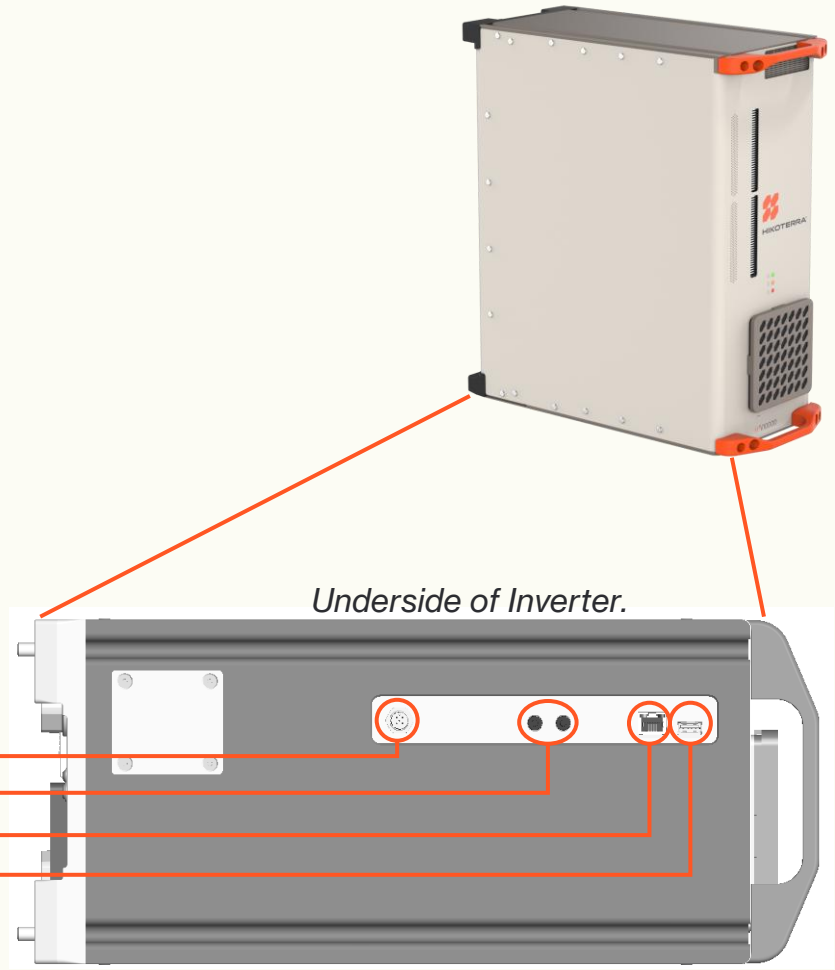
AC

DC (6/8/10mm)

Comms & I/O

All accessible comms on Inverter.

Port	Connector	Function
NMEA2000	Micro C	NMEA2000 communication for MFD Integration
Fibre Optic	IF-D91B	“Connector less” Generator controller
Ethernet	RJ45 10/100	Configuration & connection to comms gateway
USB	USB-A	SW Updates via USB stick, configuration, logging



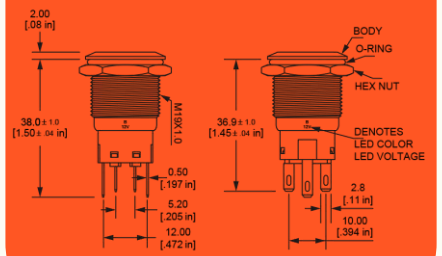
Underside of Inverter.

Control panel & switches

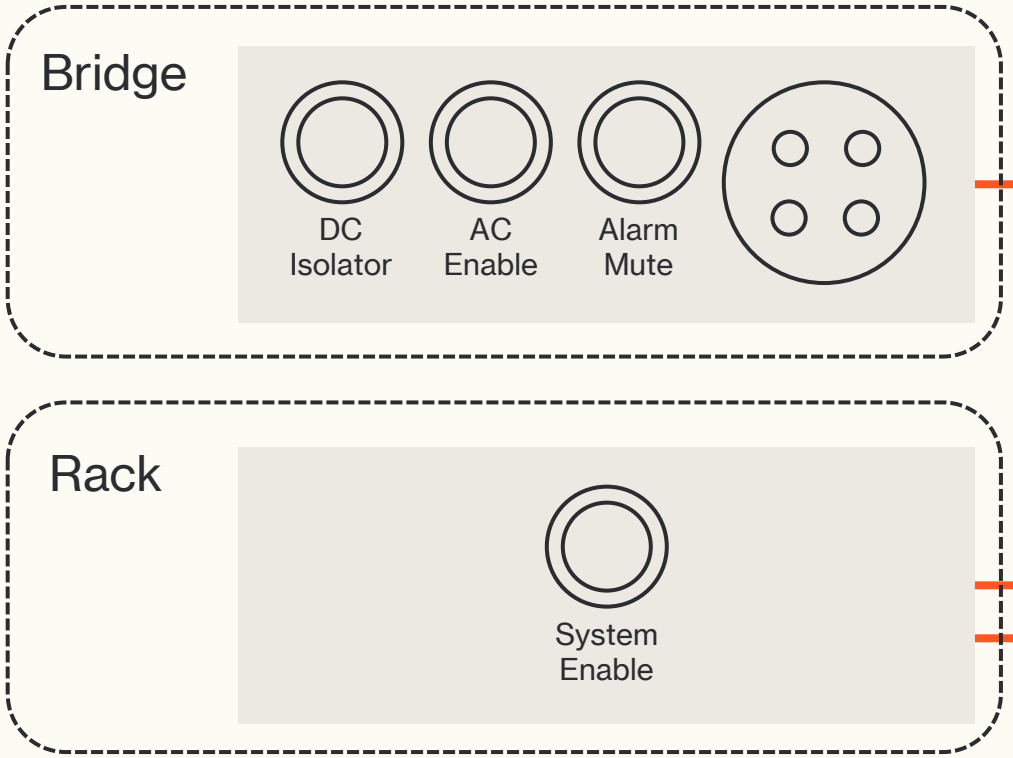
Function	Control	Location	Note
System Enable	AC&DC	Rack	Within 1m of rack
DC Isolator	DC	Bridge	Controls an ML downstream of 24hr circuit
AC Enable	AC&DC	Bridge	Controls inverter output, on/off
Alarm Mute	Alarm	Bridge	Mutes alarm
Alarm buzzer	Alarm	Bridge	

Recommended Switch

Langir L19A



Gold contacts required



HIKOTERRA

System Configuration & Commissioning

pcnzl-enigma@raspberrypi: ~/PowerRack

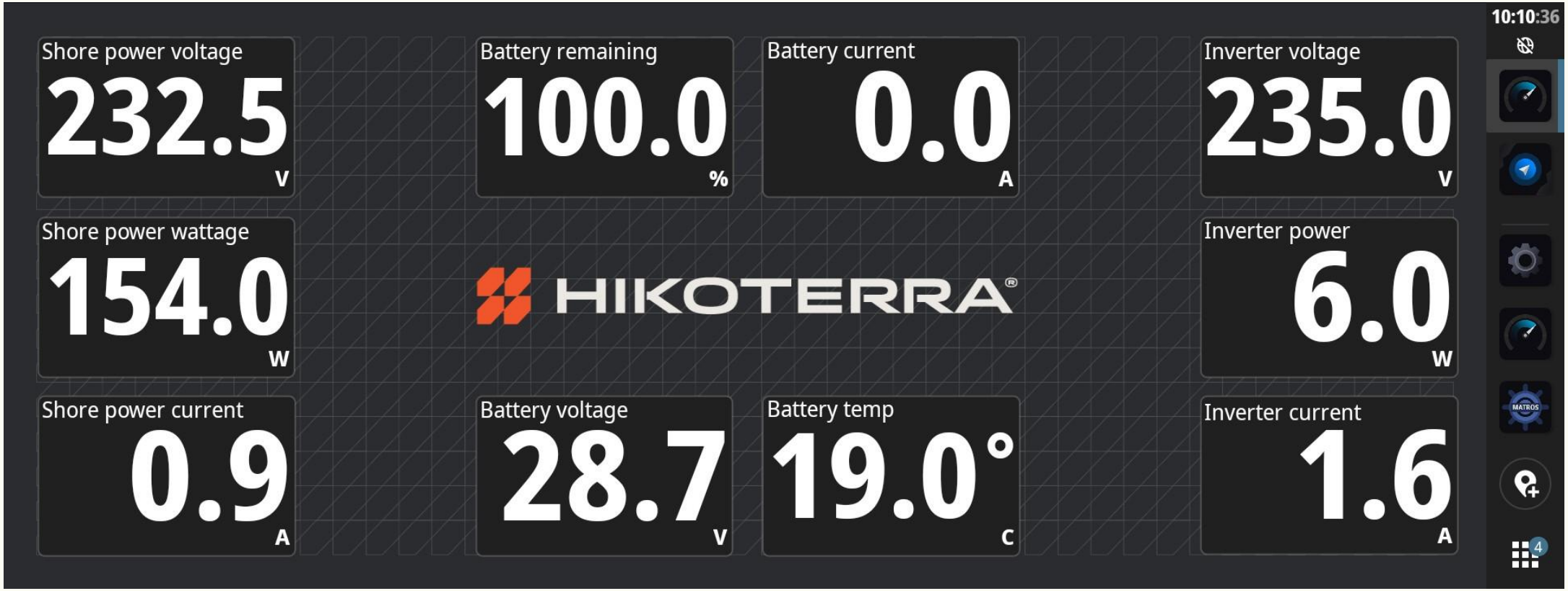
```
          PCNZL Inverter Debug          |                                AC Master Screen                                |        Active Displays: 1/3 \ (+)
-----------------------------------------------------------------------------------------------------------------------------------------------------------
            Runtime ACM Data            |         Generator Configuration         |            ACM Configuration            |            Runtime DCM Data
----------------------------------------|-----------------------------------------|-----------------------------------------|----------------------------------------
FC State:               FCS_BOOT 13 days |Magnitude Kp:                   11.500   |Is AC Master:                      true  |Quiet State:                    None
Prev FC:                      FCS_BOOT  |Magnitude Ki:                   10.500   |Gen Auto Mode:                     false |SOC:                            37.5%
Fibre Gen RX                         0  |Frequency Kp:                    1.000   |Nominal Channel Current:        20.000A  |Gen Max Charge Ampacity (DC):    600A
Fibre Inv RX                         0  |Frequency Ki:                    1.000   |Min SOC Pref QT:                   10%   |fastfilt:                       4.0A
Fibre retries                        0  |Generator Type:             Synchronous  |Min SOC No QT:                     30%   |slowfilt:                       4.0A
Fibre CRC err                        0  |Nominal Gen Max I:               0.000A  |Target SOC No QT:                  80%   |avId:                           35.9A
Gen Fault:                         0x0  |Nominal Gen V:                 230.000V  |Target SOC Pref QT:                80%   |BoundedId:                      43.3A
ACM State:                 ACM_RUNNING  |Min Voltage:                   180.000V  |Final SOC Pre QT:                  90%   |DCMaxGenId:                      0.0A
ACM Gen State:  ACM_GEN_OFFLINE 13 days |Max Voltage:                   300.000V  |Load Trigger Fast:                 80%   |invId:                          7.3A
Manual Gen:                        OFF  |Min Frequency:                  40.000Hz |LT Fast tc:                         1s   |genId:                          0.0A
Gen Connection:            Disconnected |Max Frequency:                  70.000Hz |Load Trigger Slow:                 50%   |DCM State:                  DCM_BULK
Manual Target setpoint:           0.000 |Generator Signaling:       Pulse ON/OFF  |LT Slow tc:                        60s   |Target:                      27.194V
Id Target:                         0.00 |Pulse on time:                     10s  |Gen Min On Time:                  120s   |Measured:                    26.188V
Iq Target:                         0.00 |Pulse off time:                     5s  |Cold Ramp Time:                   300s   |Warm up Limit:                0.5A
Id measured:                       0.00 |Load Shed 1 polarity:      Normally Open |Cfg saved:                        true  |
Iq measured:                       0.00 |Load Shed 2 polarity:      Normally Open |                                        |
Load Shed 1:               Disconnected |Load Shed 3 polarity:      Normally Open |                                        |
Load Shed 2:               Disconnected |Load Shed 4 polarity:      Normally Open |                                        |
Load Shed 3:               Disconnected |Config up to date:                 false |                                        |
Load Shed 4:               Disconnected |                                         |                                        |
Gen Voltage:                       0.0V |                                         |                                        |
Gen Freq:                       55.00Hz |                                         |                                        |
-----------------------------------------------------------------------------------------------------------------------------------------------------------
'help' for list of test commands
-------------------------------------------------
list  -List Devices on the rack.
exit  -Switch back to the system overview screen, alternatively press 'esc'.
gstart  -Starts the generator.
gstop  -Stops the generator.
setid  -Set ID.
setiq  -Set IQ.
setinvr  -Set inverter output resistance.
setinvl  -Set inverter output inductance.
ld  -Configure Loads for shedding, multiple loads can be toggled at once.
prntgenflt  -Prints the generator faults.
gclrflt  -Clear generator faults.
setqt  -Set a Quiet Time.
enableqt  -Enable a specific quiet time.
lsqt  -Print the Quiet Times.
qtcfgsave  -Save qt config data to rack eeprom.
csvgen  -Begin a stream of the gen debug data over the ethernet stream
gencfg  -Change a gencfg parameter.
acmcfg  -Change an acmcfg parameter.
acmcfgsave  -Save configs for acm.
gsetacm  -Toggle ACM
```

HIKOTERRA

MFD Integration, NMEA2000-Supported PGN's

PGN	Description
59392	ISO_ACKNOWLEDGEMENT
59904	ISO_REQUEST
60416	ISO_TRANSPORT_PROTOCOL
60928	ADDRESS_CLAIMED
65240	ISO_COMMANDED_ADDRESS
126208	COMMAND_GROUP_FUNCTION
126464	PGN_LIST
126983	ALERT
126984	ALERT_RESPONSE
126992	SYSTEM_TIME
126993	CONFIGURATION_INFORMATION
127491	ELECTRIC_ENERGY_STORAGE_STATUS_DYNAMIC
127503	AC_INPUT_STATUS
127504	AC_OUTPUT_STATUS
127506	DC_DETAILED_STATUS
127507	CHARGER_STATUS
127508	BATTERY_STATUS
127509	INVERTER_STATUS
127510	CHARGER_CONFIGURATION_STATUS
127511	INVERTER_CONFIGURATION_STATUS
127512	AGS_CONFIGURATION_STATUS
127513	BATTERY_CONFIGURATION_STATUS
127514	AGS_STATUS
127744	AC_POWER_CURRENT_PHASE_A
127747	AC_VOLTAGE_FREQUENCY_PHASE_A
127750	CONVERTER_STATUS
127751	DC_VOLTAGE_CURRENT
129033	LOCAL_TIME_OFFSET
130060	LABEL
130567	WATERMAKER
127502	SWITCH BANK CONTROL (backlog)
127501	BINARY STATUS REPORT (backlog)

MFD Integration, NMEA2000, Simrad NSX

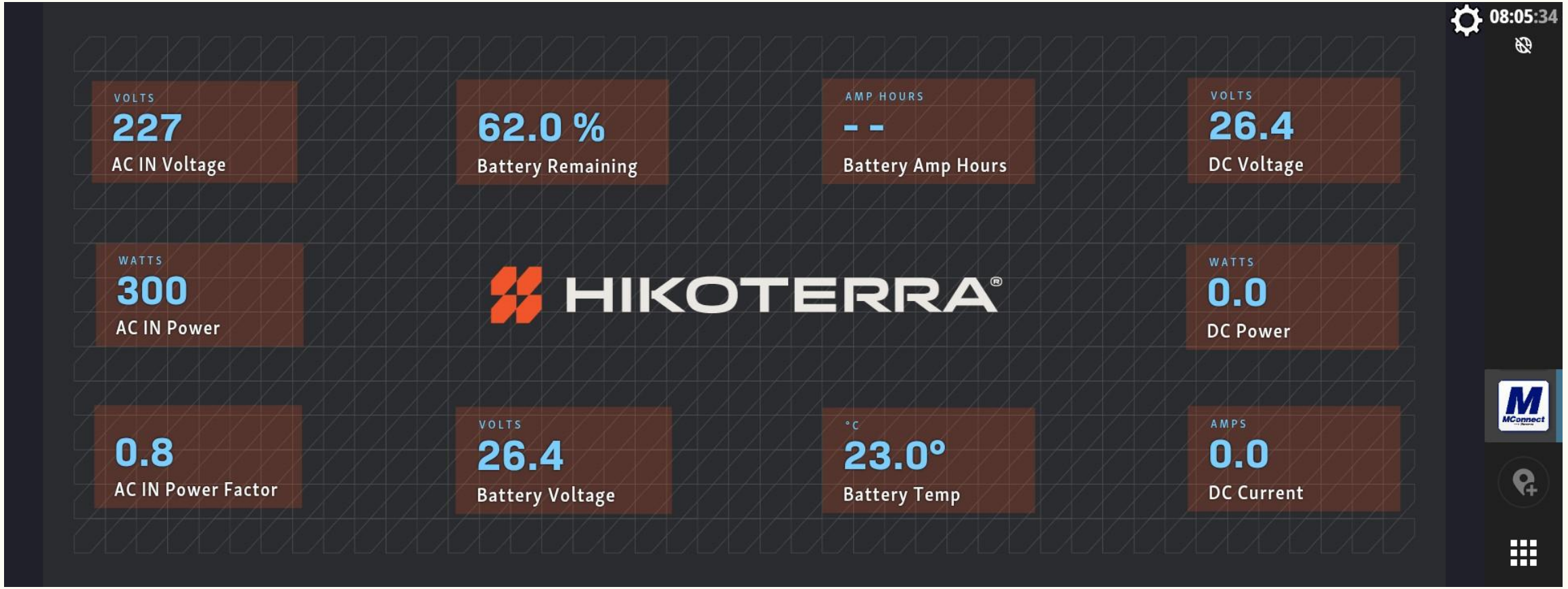


Screenshot taken from H⁴ system & Simrad NSX 15UW

HIKOTERRA

MFD Integration-HTML5-Maretron MConnect

Maretron MConnect, connected via ethernet to Simrad NSX, also compatible with most MFD's



Screenshot taken from H⁴ system & Simrad NSX 15UW

***System configuration**-H4 system connected via NMEA2000 to MConnect WSV100, MConnect connected to Simrad MFD via ethernet. Gauges & graphics on M-Connect editable by installer using Maretron built in editor. Richer graphics are available over our basic example. More info at https://www.maretron.com/products/mconnect/*

HIKOTERRA

Installation Simplified

Get rid of the cabling chaos, and replace it with a more powerful, cleaner, and easier to install system

	Victron System	H⁴ Hybrid Power System
Inverter capacity (W)	6000	10000
Charger Capacity (A)	240	200
Battery Capacity (Wh)	13440	16000
Solar capacity (W)	2900	6000

H⁴ Hybrid Power System

Heavy gauge cables 4
Lugs to crimp 8
Modules to mount 1

1 module to mount

Key Takeaway

12 Modules to mount

Shore Power In

AC Out

Solar In

DC Out

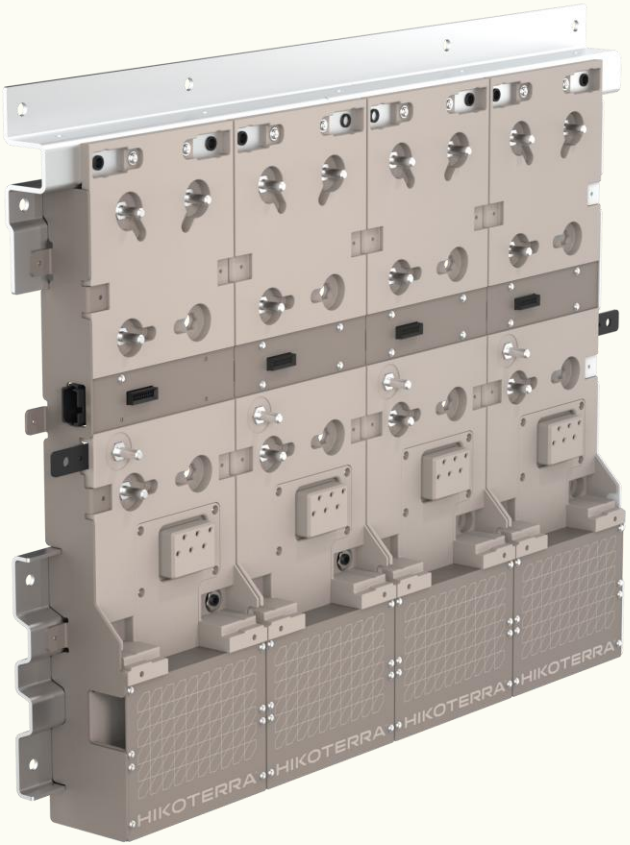
Heavy gauge cables 26
Lugs to crimp 50
Modules to mount 12

HIKOTERRA

Builder advantages: Recap

H4 Hybrid Power System

- ✓ 50% reduction in time & cost through the entire builder value chain of defining, designing & delivering an onboard power system
- ✓ Reduction in wall & floor space required, freeing up space for other systems or improving access
- ✓ More efficient inverter technology with a wider temp window means optimised systems - current systems are over designed due to continuous run time temperature constraints
- ✓ Modules are only plugged into the rack prior to delivery
  - Reduces cash flow and opens up working capital
  - Tight working spaces are opened up during build
  - No accidental damage to expensive modules during build
- ✓ All system components come from one supplier meaning fewer integration headaches and one place to call for service
- ✓ Smaller, lower cost generators required as generator is run less, but at optimal load
- ✓ Fewer modules to mount due to high system capacity and built in functionality
- ✓ With reduced complexity, less training required & lower consumer interaction with a self managing system the builder can expect fewer calls from their customers
- ✓ Dealers and service agents can replace modules easily with little training due to rack memory and battery balancing functionality
- ✓ Upgrades in minutes if spare slots are left on the rack for future expandability
- ✓ **A more familiar home like experience for the builders consumer, which helps differentiate from competitors in a crowded market**



HIKOTERRA

Problems solved

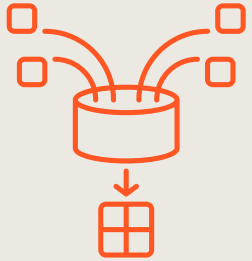
Reduced complexity for users

- Home like experience familiar to everyone
- Single self-managing system to interact with
- No more load juggling due to available battery capacity and seamless generator parallel (if required)
- Eliminated issue of shore power trips as shore power never directly supplies the loads

A quieter life

- Reduced or eliminated generator depending on config
- Reduced run time as batteries & alternators fill the gap
- If genset remains, it can be smaller and run at optimum load for less time
- Charge fast while underway using main engines due to system & battery charge capacity

Simpler system design, install & service



- One partner to call
- System design is simplified with fewer components, integration points & reduced cabling
- 50% less design, install & setup time
- Reduced overall system weight & space to use for other things
- Reduced or eliminated through hull fittings

Ongoing cost & sustainability

- Rightsized genset (if required at all) run at optimum load
- More efficient new technology with a wider temp window means optimised systems
- Lower running hours means less fuel
- More time between service intervals
- Reduced emissions

Test system in place

Test system in place for 2 years.

Connected to Starlink for external access & monitoring

System has recently been powering a vessel refit with continual shore power disruption.

Feedback from the market

"I think your approach of everything going through the batteries and the new racking system is genius and will shake up the market"

Owner of a 23-metre vessel, Auckland NZ

"100% agree on the philosophy and product direction."

System integrator & Technical Dealer, Gold Coast, Australia

Impressed on inverter specs, capability, and battery capacity, plus reduction of other system components. Validated the labour saving of 50% for a new build installation.

Technical Dealer, Auckland NZ

Warranty & Service-Key Points

2 Year Warranty

2-year warranty on all Hybrid Power System components, incl. batteries

Training & Certification

Program for distributors, dealers, OEM’s & technicians beginning Q1-26

Compliance & Approvals-Battery

CE (Europe)

Directive 2011/65/EU (RoHS)

- IEC 63000 - Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Directive 2014/30/EU (EMC)

- IEC 60945 - Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results

Regulation (EU) 2023/1542 (Batteries Regulation)

- IEC 62619 - Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications
- IEC 62620 - Secondary cells and batteries containing alkaline or other non-acid electrolytes - Secondary lithium cells and batteries for use in industrial applications

ISO 23625 - Small craft – Lithium-ion batteries

- We are designing H4B8000 to ISO 23625 & will provide documentation & reports for the boat builders RCD records.

ABYC (US)

E-10 - Storage Batteries
E-11 - AC and DC Electrical Systems on Boats
E-13 – Lithium-Ion Batteries

RCM (Australia/NZ)

IEC 62619 & 62620
IEC 60945
AS/NZS 3004.2:2014 – Section 2.9.3

Compliance & Approvals-Inverter/Charger

CE (EMEA)

Directive 2011/65/EU (RoHS)

- IEC 63000 - Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Directive 2014/30/EU (EMC)

- IEC 60945 - Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results

Directive 2014/35/EU (LVD)

- IEC 62477-1 - Safety requirements for power electronic converter systems and equipment

ABYC (US)

E-11 - AC and DC Electrical Systems on Boats
A-31 – Battery chargers and inverters

RCM (Australia/NZ)

AS/NZS IEC 62477.1
IEC 60945
EESS AS/NZS 4417.2 – Level 1 equipment

Compliance & Approvals-Rack

CE (EMEA)

Directive 2011/65/EU (RoHS)

- IEC 63000 - Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Directive 2014/30/EU (EMC)

- IEC 60945 - Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results

Directive 2014/35/EU (LVD)

- IEC 60335-1 - Household and similar electrical appliances - Safety - Part 1: General requirements

ABYC (US)

E-11 - AC and DC Electrical Systems on Boats

RCM (Australia/NZ)

AS/NZS 60335.1
IEC 60945
AS/NZS 3004.2:2014
EESS AS/NZS 4417.2 – Level 1 equipment

End

Thank You!

HIKOTERRA®

Built better to power what matters.