VALHALLA DE TORTUGA

ELECTRICAL SYSTEM - EQUIPMENT-LEVEL PICTORIAL

48V HOUSE BACKBONE / ISOLATED 24V & 12V / INDEPENDENT ENGINE START

REVISION G.1

NOT FOR CONSTRUCTION

COLOR LEGEND / POWER & DATA

- 48V positive
- 48V return
- 24V pair
- 12V pair
- AC L / N
- AC PE
- Data / control

SYSTEM SUMMARY

DC: 48V primary; isolated 24V / 12V
Solar: 8 panels / 4.4-4.8 kWp target
AC: exact format / kVA open
HVAC: 3 zones / 48V seawater-cooled

MONITORING & SYSTEM CONTROL



CERBO GX + GX TOUCH

EM-12 / EM-13 | Simarine remains a separate candidate.

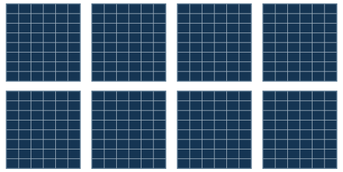
GX / MONITORING

Battery, charging, alarms and approved BMS interface.

CONTROL INTENT

Protocols / gateways confirmed by equipment selection.

SOLAR CHARGING - 4.4 TO 4.8 kWp TARGET



8 x 550-600W | 6 fixed + 2 sliding

PV PROTECTION

String fuses as required
Combiner / DC isolator
Cable entry / support

Cold Voc, Isc and final stringing set ratings.



SMARTSOLAR FAMILY

Model / quantity TBD

ENGINE START & HOUSE-CHARGE INTERFACE

EXISTING ENGINE + ALTERNATOR

Make / voltage: survey

ENGINE / ALTERNATOR

ALT → **START BANK**

FUTURE 48V CHARGE INTERFACE

Independent engine-start bank.
Regulated charging / BMS limits.
Existing native voltage: inventory.
No direct start-to-house parallel.

START-BANK BOUNDARY

House loads do not consume start-bank reserve.

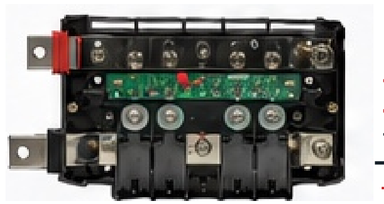
MODEL / VOLTAGE HOLD

Inventory engine instruments and alternator.

48V HOUSE BANK - BMS / DC DISTRIBUTION



BMS / CONTACTOR - FAMILY REFERENCE



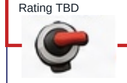
PROTECTED 48V POSITIVE + RETURN BUSES

EM-02 / EM-11 | Actual ecosystem and ratings TBD

INVERTER / CHARGER & 48V FEED

DC ISOLATOR

Rating TBD



DC FAULT-RATED FUSE



QUATTRO 48V ARCHITECTURE

Exact model / kVA / AC format: TBD



SIZING HOLD

Load study, cable routes, temperature and fault current set cable / fuse / inverter sizes.

48V system negative; battery shunt: EL-001

Protected 48V feeders - return paths shown

QUATTRO SOURCE / OUTPUT LOGIC

IN-1: generator
IN-2: shore
OUT-1: inverter-backed loads
OUT-2: source-present loads
Source / neutral switching: detail.

SYSTEM CONTROL

GX and BMS integration.
Charge/discharge limits and shutdown logic.
No rating selection is implied by product photograph.

ISOLATED 48 > 24V SERVICE DISTRIBUTION

48 > 24V ISOLATED



Converter model / current rating TBD

24V SERVICE BUS - EM-07

- Fridge #1 - D24-08 / independent fuse
- Fridge #2 - D24-09 / independent fuse
- Other verified 24V service loads
- Separate from essential bilge reserve
- High-current drives: dedicated design

ISOLATED 48 > 12V DISTRIBUTION

48 > 12V ISOLATED



12V SERVICE / ELECTRONICS

- 8068 purchased: 13 positions / 50A max
- Additional protected electronics branches
- Nav / mast lights; fans; cabin outlets
- VHF / AIS / GNSS / instruments / radar

48V LiFePO4 HOUSE BANK



Module count illustrative - bank capacity TBD

HOUSE VOLTAGE

48V nominal.
Module voltage / topology TBD.
No intermediate taps.

BATTERY HOLD

BMS ecosystem,
capacity and surge capability TBD.

MODULE COUNT

Quantity and Ah follow energy / endurance study.

AC SOURCES & DISTRIBUTION

SHORE INLET

Rating / AC format TBD

TO QUATTRO IN-2



TRI-FUEL GENERATOR

Owned record; output to verify

TO IN-1

FROM QUATTRO OUT-1 / OUT-2

AC DISTRIBUTION PANEL



Panel photograph is illustrative

AC INPUTS

IN-1 generator
IN-2 shore

AC OUT-1

Inverter-backed priority circuits

AC OUT-2

Source-present heavy loads

PE / neutral switching and source protection: EL-003 / EL-010

LOCAL LOADS / REFRIGERATION / HVAC / ESSENTIAL BILGE

TWO ICECO VL75ProD



D24-08 / 09 | See EL-012

48V MARINE HVAC

3 seawater-cooled zones
40-50k BTU/h target
Forward / saloon / aft
D48-01 / 02 / 03 feeders
Flow interlocks: EL-012
Mabru preferred

24V ESSENTIAL BILGE

3 pumps + 3 alarms owned
Dedicated battery charger
Proposed 24V reserve bank
Separate protected branches
Auto / manual controls
D24-01..06 | See EL-012

LOFRANS TIGRES | EM-57



1500 W / 12V.
Owned; boxed.
EL-013 / 014.

GALLEY / ICE

Cooktop, microwave, oven, coffee, ice, TV / audio.
Models / loads: EL-003.

NAVIGATION / MAST EQUIPMENT

GNSS = SOG / COG. Separate STW / heading.
Wind, depth, VHF antenna, radar, mast lights, lower deck and upper spot lights.
NMEA data is not motor / radar power.

ELECTRICAL BILL OF MATERIALS - MASTER SUMMARY / FULL 61-ITEM BOM ATTACHED

BOM	Equipment group	Quantity	Status / design basis
EM-01-16	Battery / BMS / solar / Quattro / DC conversion / panels	8 PV / 1 x 8068	8068 purchased; bank / converter / protection ratings TBD
EM-17-31	Fridges / HVAC / pumps / alarms / lights / fans / outlets	2 fridges / 3 zones	3 pumps + 3 alarms owned; lamps / outlets by zone inventory
EM-32-41	GNSS / instruments / VHF / AIS / radar / network / autopilot	By system inventory	SOG separate from STW / heading; future autopilot reserved
EM-42-55	AC supply / galley / watermaker / ice / TV / food preservation	By equipment list	Exact nameplates and simultaneous-use plan govern sizing
EM-56-61	Tank sensors / deck drives / start / cables / bonding / future	Survey / allowances	High-current drives on dedicated design; no general converter feed

TORTUGA ELECTRICAL SYSTEM - EQUIPMENT-LEVEL PICTORIAL

OWNER / CAPTAIN	Raul Silvas, Master and Captain
DRAWING / ISSUE	VDT-EL-000 / REV G.1
DATE / SCALE	19 SEP 2026 / NTS
STATUS	DESIGN DEVELOPMENT - NOT FOR CONSTRUCTION

EL-012 load paths / EL-013 windlass: Rev G.1. Supporting sheets: individual revisions govern.

Photos are illustrative, not model selections. Colored paths are functional; 12/24V and AC lines group their conductors. No junction at crossings without a dot. Source / branch ratings remain open.

VALHALLA DE TORTUGA

ESSENTIAL SUPPLY / REFRIGERATION / HVAC / NAVIGATION

Functional single-line: each DC path includes positive AND dedicated return. Boxes contain required source/branch protection; ratings remain TBD.

VDT-EL-012 | REV G.1

19 SEP 2026 | NTS

24V BILGE / ALARM RESERVE - PROPOSED ARCHITECTURE; PUMPS AND ALARMS RECORDED OWNED

48V HOUSE DISTRIBUTION

Protected 48V feeder.
BMS-controlled house bank.
EM-02 / EM-11

48V + / -

ISOLATED BATTERY CHARGER

48 > 24V, matched to reserve chemistry.
EM-09: model / current TBD.

24V charge

24V RESERVE / ESSENTIAL BUS

EM-10 proposed battery.
Local fuse + service isolation.
Dedicated + / - buses.

24V + / -

3 PUMPS + 3 HIGH-WATER ALARMS

D24-01 / 02 / 03: individual pump fuses, AUTO/MAN.
D24-04 / 05 / 06: independent alarm fuses/sensors.
Alarm power independent of pump switches.

HOUSE-OFF CONTINUITY: proposed reserve supplies bilge/alarm circuits when the 48V BMS disconnects. Size for all-pump emergency current and required endurance. Verify charger fault behavior, low-voltage alarm and automatic operation; cabin-service switch must not disable automatic pumping.

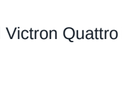
24V REFRIGERATION - SEPARATE SERVICE SUPPLY; EXACT UNIT NAMEPLATES STILL REQUIRED

48V HOUSE DISTRIBUTION

Own protected 48V feeder.
Does not share bilge reserve.

48V + / -

ISOLATED 48 > 24V SERVICE



EM-07
Model / output rating TBD.

24V + / -

24V SERVICE DISTRIBUTION

Two independent fused branches.
D24-08 fridge 1 / D24-09 fridge 2.
Each with dedicated return.

24V + / -

TWO ICECO VL75ProD

EM-17 + EM-18
Two units; each independently fed.
AC backup is optional.

12/24V capability is a historical product reference; accept actual unit manual. Do not count AC backup and DC operation as simultaneous full loads.

48V SEAWATER-COOLED HVAC - THREE SEPARATE PROTECTED ZONE FEEDERS

48V BUS + BRANCH FUSES

Dedicated positive / return per zone.
Pump supply per selected model.

Independent fused 48V pairs

D48-01 | FORWARD

12-17k BTU/h target.
EM-19; run/start watts TBD.

48V BUS > own fuse > zone

D48-02 | SALOON / MID

About 17k BTU/h target.
EM-20; run/start watts TBD.

48V BUS > own fuse > zone

D48-03 | AFT CABIN

12-17k BTU/h target.
EM-21; run/start watts TBD.

48V BUS > own fuse > zone

PUMP / FLOW CONTROL

D48-04 allowance.
Flow proving / compressor interlock.
EM-22 / EM-23

12V NAVIGATION / MAST / SERVICES - CIRCUIT AND DATA BOUNDARIES

48V > isolated 12V converter > protected 12V distribution
EM-08 feeds purchased 8068 service panel plus separate electronics distribution. Panel: 13 positions / 50A maximum; actual breakers sized by branch. Proposed slot schedule: EL-002.

GNSS / GPS > SOG + COG + position
Plotter, VHF/DSC and AIS get data via compatible interfaces; each has its own required power feed. Wind / depth / STW / heading remain distinct inputs. NMEA network: EL-008.

Mast and high-current boundaries
Wind sensor, VHF coax, navigation/anchor lamps; lower deck lights D12-08 and upper spots D12-09. Radar and future autopilot drive have dedicated power. Windlass has dedicated native-voltage design.

COORDINATION / RELEASE STATUS

Read with EL-000 Rev G.1 and EL-001 through EL-011, mixed F/G. This sheet clarifies existing proposed paths and does not select equipment ratings.

Primary references checked 19 Sep 2026: Blue Sea 8068 specifications and Victron Quattro input/output functions. Watermaker and ice-maker supply remain model-dependent. No unsupported wattage or system total is assigned.

Raul Silvas
Master and Captain

Fair Winds, Strong Rigging, Safe Passages

ELECTRICAL SYSTEM

DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Models / ratings / cable sizes OPEN

VALHALLA DE TORTUGA

FOREDECK WINDLASS - POWER / CONTROL / EQUIPMENT RECORD

Owner confirmed 19 Sep 2026: Lofrans Tigres, 1500 W, 12V DC. Owned, new in box; not installed. Proposed foredeck location; exact SKU and supplied accessories pending.

VDT-EL-013 | REV G.1

19 SEP 2026 | NTS

LOFRANS TIGRES / EM-57



LOFRANS TIGRES
1500 W / 12V DC
Manufacturer product photo.

LOCATION
Proposed foredeck; layout to measure.

CONFIRMED: 1500 W / 12V DC
Catalogue working-load current: 160A reference.
Owned NEW IN BOX; serial / SKU pending.
Final breaker, cable and contactor: manual / survey.

PROPOSED DEDICATED MOTOR POWER PATH - SINGLE-LINE, NOT TERMINAL WIRING

DEDICATED 12V SOURCE
High-current 12V supply, or local 12V bank + approved 48-to-12V charger.
Final source arrangement OPEN.

12V pair →

PROTECTION / ISOLATION
Source overcurrent protection + reachable service isolator.
Ratings per actual unit.

12V pair →

CONTACTOR / CONTROL
Compatible motor switching.
Polarity / terminal arrangement follows actual manual.

motor →

TIGRES 1500 W / 12V
Dedicated positive and return.
Motor terminals / supplied box to inventory.

Do not connect the windlass motor to the Blue Sea 8068 service panel or a general 12/24V converter. If a local battery is selected, include its own protection and a chemistry-compatible charger. Motor return is a conductor, not the hull.

48V house architecture retained. This windlass is 12V, not 24V or 48V. Catalogue 160A is a working-load reference, not startup/stall current or a breaker selection.

PROPOSED CONTROL FUNCTIONS - INVENTORY BOX CONTENTS / SELECT STATIONS

BOW UP / DOWN
Footswitches / pendant proposed.
Check box contents before buying.

HELM UP / DOWN
Remote station provision.
Control enable / isolation to be defined.

WIRELESS REMOTE - OPTIONAL
Only if compatible receiver is selected.
Not recorded purchased or installed.

FUSED CONTROL / CONTACTOR INTERFACE
Control box / coil must match the 12V system.
Compatible interlocking prevents conflicting commands.
Station wiring and emergency-stop method: unit manual.

Control stations shown as functions; final shared control circuit and terminal scheme remain open.

EM-57 COMPONENT BREAKDOWN / MEASUREMENT RECORD - INCLUDED UNDER EM-57, NOT EXTRA TOP-LEVEL BOM ITEMS

ID	COMPONENT / FUNCTION	QUANTITY BASIS	REQUIRED INFORMATION
WL-01	Lofrans Tigres 1500 W / 12V	1 owned; new in box	Not installed. Photograph SKU / serial, 12V motor label and gypsy chain marking.
WL-02	Dedicated 12V supply / local bank alternative	1 system; parts TBD	Select high-current source and cable route; approved 48-to-12V battery charger if a local bank is chosen.
WL-03	Source protection + service isolator	1 function each; exact parts TBD	100A 187333 candidate; verify exact SKU/manual, curve and interrupt rating. EL-014.
WL-04	Motor contactor / control box	1 expected in package; verify	Control box is listed in maker package contents; verify included model before ordering.
WL-05	Bow + helm control provisions	Stations / switches TBD	Inventory included switches; select bow / helm stations and fused control wiring.
WL-06	Wireless receiver / handset	Optional; not committed	Only if selected and compatible with contactor/control scheme.
WL-07	Motor and control cables / terminations	Measured quantities TBD	35 mm2 / 2 AWG maker reference for loop under 15m; final route / sizing OPEN. EL-014.
WL-08	Identification / commissioning record	1 record	Loaded voltage, current, switching, isolation, reset and operating checks per actual manual.

COORDINATION / RELEASE STATUS

Owner confirmed Lofrans Tigres, 1500 W / 12V, on 19 Sep 2026. Lofrans current Tigres table lists 160A at working load for 12V / 1500W variants; use as a reference pending serial/manual match.

Electrical input cannot be assumed to equal the motor wattage. Capture actual duty/current for EL-005; size protection and cable from the correct manual and measured routes. Bow/helm controls remain proposed; wireless is optional.

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ELECTRICAL SYSTEM

DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Models / ratings / cable sizes OPEN

VALHALLA DE TORTUGA

WINDLASS - MANUFACTURER REFERENCES / BOX INVENTORY / INSTALLATION INPUTS

EM-57 | Lofrans Tigres 1500 W / 12V DC | OWNED, BRAND NEW IN BOX | Foredeck installation proposed | 19 Sep 2026

RESEARCHED DATA - REFERENCES TO MATCH AGAINST THE SUPPLIED UNIT

TOPIC	MANUFACTURER REFERENCE	APPLICATION / OPEN INPUT
Current / duty	160A at working load in current 12V/1500W product tables.	Catalogue reference only; startup, stall and actual run duty remain unmeasured.
Motor protection	187333: 100A standard breaker; linked by current 12V rope-kit Tigres SKUs.	Candidate only until exact box SKU/manual matches; curve and fault rating matter.
Cable reference	Manual p6: 35 mm2 / 2 AWG at positive + negative length below 15m.	No longer-run value given for this row. Final ampacity / drop / route review required.
Cable / box environment	Manual specifies copper, insulation rated at least 105 C; dry control-box location.	Keep power cables separate from other supply cables; protect terminals from water.
Expected package	Maker manual lists windlass, control box and handle.	Raul confirms boxed unit; individual accessories have NOT yet been inventoried.
Control-box candidates	600018: 12V, 3-terminal motor; 600021: 12V, 2/4-terminal motor.	Match motor terminals and supplied box label; do not purchase both.
Deck / chain locker	Minimum 300mm clear fall above fully heaped chain per manual p4.	Measure with all chain stowed; verify bow-roller alignment and deck support.
Gypsy / template	Exact chain diameter AND standard must match the installed gypsy.	Use manufacturer drilling template; check printed scale and actual unit before cutting.

BOX INVENTORY - PHOTO / RECORD BEFORE PROCUREMENT

1. Outer box product code, serial number and purchase receipt.
2. Motor nameplate showing 12V / 1500W and terminal arrangement.
3. Gypsy marking: chain size, standard, rope-kit version if any.
4. Control-box label; breaker, handle, switches and cables actually supplied.
5. Included manual revision and mounting hardware / gasket inventory.

One owned windlass; zero additional windlass units to buy. Missing installation parts remain unpriced. Store boxed equipment dry and protected.

VESSEL MEASUREMENTS / DESIGN DECISIONS STILL NEEDED

Record one-way source-to-control-box and box-to-motor cable routes, plus dedicated return. Choose existing high-current 12V source or local battery with matched 48-to-12V charger.

Measure deck thickness, backing/support, footprint clearance, chain lead and locker fall. Confirm chain inventory. Select bow / helm controls and accessible isolation.

Commission only after exact wiring diagram, protection, cables and source are resolved; record loaded voltage/current and switching tests.

PRIMARY MANUFACTURER DOCUMENTS - CLICK TO OPEN; RETRIEVED 19 SEP 2026

Tigres product / SKU table	https://www.lofrans.com/products/windlasses/tigres-horizontal-windlass
Horizontal windlass manual - package p4 / electrical p6	https://www.lofrans.com/download/01KFJM465Q3S1ZHF19H3P28PKD
Circuit breaker product codes	https://www.lofrans.com/products/lofrans-deck-hardware-accessories/circuit-breaker-standard
Control-box product codes	https://www.lofrans.com/products/lofrans-deck-hardware-accessories/control-boxes-solenoids-for-dc
Control wiring reference - match supplied hardware	https://www.lofrans.com/download/01KFJM466BY7XRAP8NEMFTTGXG
Tigres drilling template - check scale / unit	https://www.lofrans.com/download/01KFJM457EVJCN34MAK15E7EDN

COORDINATION / RELEASE STATUS

Reference conflict / version check: the manual table labels its 100A column "Contactor"; this sheet does not silently reinterpret it. The breaker candidate comes from the product SKU and breaker tables. The current multi-model manual includes a Tigres 48V wiring figure, which is not adopted for this 12V unit.

General control diagrams also carry older control-box codes. Exact supplied-unit documentation governs terminal wiring; no terminal scheme is released here.

Raul Silvas
Master and Captain

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ELECTRICAL SYSTEM

DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Models / ratings / cable sizes OPEN

VALHALLA DE TORTUGA

Power generation, storage and distribution

Functional single-line: DC pairs and AC L/N/PE are grouped where labeled; all final ratings remain subject to load and fault studies

SHORE - FORMAT OPEN

Inlet > main / leakage protection
Neutral / PE design; AC IN-2

TRI-FUEL GENERATOR - OWNED

Actual model and per-fuel output TBD
Dedicated source breaker; AC IN-1

SOLAR - PLANNED

8 x 550-600 W = 4.4-4.8 kWp
6 fixed aft + 2 sliding

ENGINE START - INDEPENDENT

Start battery / alternator / starter
Dedicated fuses and disconnect

L / N / PE

L / N / PE

PV + / -

VICTRON QUATTRO 48V - SELECTED ARCHITECTURE

AC IN-1 generator / IN-2 shore; compatible voltage and frequency required.
Out-1 inverter-backed; Out-2 source-present. Exact model, kVA, transfer limits and BMS compatibility OPEN. [S2]

MPPT CHANNELS

PV disconnects and OCPD as required; protected DC outputs. Fixed/sliding grouping and strings TBD.

HOUSE CHARGE - RESERVED

Only via selected regulated charger/interface with BMS control. No direct start/house parallel.

AC outputs L / N / PE

DC + / -

48V LiFePO4 HOUSE BANK

Individual battery protection as required; BMS, precharge, main disconnect and fault-rated fuse. Capacity and battery ecosystem TBD.

\+

\- / shunt

48V POSITIVE + NEGATIVE BUSES

Battery negative > shunt > system negative; all normal house charge/load returns on system side. Branch source protection to every outgoing feeder. No center tap.

PE / CASE BONDING

Separate protective conductor; final AC source N-PE arrangement and DC bonding detail OPEN. No hull load return.

48V LOAD BRANCHES

HVAC forward / mid / aft
Pump/control voltage per equipment
See EL-009

ISOLATED 48 > 24V

Bilge reserve charger: EL-004
Service loads / fridge proposal
See EL-002 / EL-009

ISOLATED 48 > 12V

8068 service panel + additional electronics distribution
See EL-002 / EL-008

AC OUT-1 / OUT-2

Separate L/N/PE panels
See EL-003
AC circuit voltage must match load

VALHALLA DE TORTUGA

DC circuits and proposed 8068 allocation

Circuit IDs preserve Rev D where possible; breaker sizes and converter ratings are not assigned from panel slot count

Distribution	Branch IDs / functions	Revision E allocation
48V main	D48-01/02/03 HVAC zones; D48-04 pump/control allowance	Dedicated protected feeders; pump supply voltage still model-dependent. Converter inputs protected separately.
24V essential	D24-01/02/03 pumps; D24-04/05/06 alarms	Three pump + three independent alarm branches; proposed protected reserve system EL-004.
24V service - proposed	D24-08 fridge 1; D24-09 fridge 2	New proposed 24V allocation from supported 12/24V product reference. Retire D12-15/16 only after actual model acceptance; separate from bilge reserve.
12V navigation/electronics	D12-01a sailing lamps; 01b steaming/masthead; 01c anchor; 02a plotter; 02b network; 02c sensors; 03a VHF; 03b AIS	Additional dedicated distribution, not all on 8068. Radar D12-21 and future autopilot D12-22 provisional IDs; voltage relocation if required.
12V service panel	D12-04 through 14; D12-19 audio	Proposed 8068 slot list below, each subject to verified branch load.
Model-dependent / reserve	D12-17 accessories; D12-18 reserve; D12-20 food-vacuum charging; D12-23 connectivity	USB/AC adapter load follows selected supply. No independent wattage assigned to passive speakers or SOG data.

8068 slot	Proposed circuit	8068 slot	Proposed circuit
1 / 2	D12-04 forward / D12-05 saloon-hall lights	8	D12-11 shower/head pump
3 / 4	D12-06 galley / D12-07 aft lights	9	D12-12 aft-head exhaust
5	D12-08 lower-spreader deck lights	10	D12-13 cabin fans, downstream zone fuses
6	D12-09 upper-spreader spots	11	D12-14 cabin/saloon outlets, zone fuses
7	D12-10 freshwater pressure pump	12 / 13	D12-19 audio / D12-18 spare

8068 purchased: manufacturer lists 12V nominal, 13 positions, 50A maximum and ten supplied 15A breakers. Supplied breakers are not automatically correct for these circuits. Check aggregate current, meter/shunt wiring and each wire/OCPD; add distribution or split loads if needed. [S1]

VALHALLA DE TORTUGA

AC source selection and galley branches

120V appliance intent retained; watermaker 220V/50Hz compatibility remains a separate design hold

SHORE > PROTECTION > IN-2

Inlet, source main, leakage protection; PE and neutral switching per final design.

QUATTRO INPUTS / TRANSFER

No external source paralleling. Verify final 120V or split-phase system and source limits. [S2]

GENERATOR > BREAKER > IN-1

Verify nameplate / neutral configuration and continuous power on chosen fuel.

Branch / bus	Load	Allocation / operating rule
A1-01 through A1-07 / Out-1	Galley, forward, saloon, mid, aft, head, engine-room outlets	Location/GFCI and equipment-environment review. Final outlet count and circuit grouping by measured installation.
A1-08 / A1-09	Microwave / toaster oven (Ninja Flip candidate)	Separate model loads; no duplicate toaster/air-fryer allowance if one combination appliance chosen.
A1-10	55-in TV / entertainment	Nameplate, standby and actual AC/DC power path TBD. Audio head unit remains D12-19.
A1-11 / HOLD	WTEYA SW4021 watermaker or Schenker alternative	Historical WTEYA extraction: 220V 50Hz, 200-240V, supply >=10A; 60Hz by prior factory arrangement. Not a released 120V branch.
A1-12 / optional	Two ICECO AC backup inputs	Backup supply only per manufacturer instructions; no double count with normal DC operation.
A1-13	Coffee machine	Keurig K-Supreme Gen 2 preference; Ninja/other coffee alternatives not cumulative by default.
A1-14a/b/c	Ninja pressure cooker / CREAMi / CrushBOSS candidate	Portable appliance use on rated outlets; branch grouping and simultaneous use require actual nameplates.
A1-15 / HOLD	Ice maker, about 20 lb/day	BODEGA purchase / SnoMaster sponsor preferences; select AC or DC model before allocation.
A2-01 / Out-2	120V electric cooktop	Source-present concept retained; replaces propane cooking. If off-grid electric cooking desired, inverter-backed redesign required.
A2-02 / reserved	Old 2-ton mini-split	Superseded; no active load. Current HVAC is direct 48V, EL-009.
A2-03 / 04 / 05	Future water heater / workshop / spare	Reserved only. No unselected equipment counted as installed.

All final AC branches include line, neutral and protective earth where required. Current limits must include battery charging plus appliances. A transformer changes voltage, not frequency; the watermaker hold requires model-level resolution.

VALHALLA DE TORTUGA

24V bilge pumps, alarms and reserve supply

Three pumps and three high-water alarms recorded owned; forward/mid/aft locations are proposed pending survey

48V HOUSE / BMS

Protected 48V feed > isolated 48-to-24V charger, selected for reserve-battery chemistry. Charger model and current OPEN.

24V charge + / -

24V RESERVE - PROPOSED

Battery > local fault-rated fuse > labeled service isolation > essential bus. Capacity TBD; not recorded owned.

ESSENTIAL + / - BUSES

Dedicated negative return; alarm circuits independent of pump switches. Loss-of-supply indication at helm.

D24-01 / FORWARD PUMP

Branch fuse > AUTO / MAN control
Float/level sensor; run indication
Interlocked switching per pump maker

D24-04 / FORWARD HIGH WATER

Separate branch fuse + level sensor
Audible/visual alarm at helm
Test and managed silence/reset

D24-02 / MIDSHIP PUMP

Branch fuse > AUTO / MAN control
Float/level sensor; run indication
Interlocked switching per pump maker

D24-05 / MIDSHIP HIGH WATER

Separate branch fuse + level sensor
Audible/visual alarm at helm
Test and managed silence/reset

D24-03 / AFT PUMP

Branch fuse > AUTO / MAN control
Float/level sensor; run indication
Interlocked switching per pump maker

D24-06 / AFT HIGH WATER

Separate branch fuse + level sensor
Audible/visual alarm at helm
Test and managed silence/reset

CONTINUITY / TEST REQUIREMENTS

Proposed reserve battery supports essential circuits when the 48V house BMS opens. A normal converter alone does not provide that reserve.
Do not parallel an ordinary converter with a battery unless approved for charging/load-sharing.
Test house-off operation, each AUTO/MAN mode, sensor faults, alarm supply loss, charger failure and reserve low voltage.
Cabin-service switch must not disable automatic pumping.

Reserve sizing: sum all three pump currents for simultaneous flooding duty plus alarms; choose required endurance and usable battery capacity. Hydraulic head, hose routing and discharge capacity remain separate checks. Do not size from average dry-bilge duty alone.

Grouped 24V + / - feeders; individual source fuses shown in each branch

VALHALLA DE TORTUGA

Daily energy and simultaneous-power worksheet

No full-system energy total is claimed while HVAC, pump, instrument and appliance nameplates remain unknown

Load group	Current supported basis	Budget treatment / missing input
Two ICECO fridges	Historical screenshot: 0.636 kWh/day each	Reference pair = 1.272 kWh/day at unspecified test conditions; not a tropical boat guarantee. DC converter loss added separately.
Three HVAC zones + seawater pumps	40-50k BTU/h overall target; zone targets total 41-51k	BTU/h is cooling output, not electric watts. Obtain each zone run/peak watts, pump watts and duty/operating hours.
Navigation / lights / communications	Inventory on EL-008 and EL-011	Underway day/night duty; VHF receive/transmit split; radar duty and autopilot motor use. SOG itself is data, not an extra load.
Galley / ice / watermaker	Equipment and alternatives on EL-003	Nameplate watts x run hours; daily water production / actual L/h; ice-maker measured kWh for target output.
Bilge / freshwater / fans / outlets	Quantity and branch scope retained	Normal energy and emergency reserve calculated separately. Quantify each cabin and accessory.
Conversion / background loads	Quattro, DC converters, BMS, GX, network	Add idle power and losses once. Avoid adding both input and output energy for same load.
Solar array	8 x 550-600 W = 4.4-4.8 kWp	Illustration only: 4 equivalent sun-hours x 0.75 combined derating = 13.2-14.4 kWh/day. Neither factor is site-verified.

REV G.1 ADDITION: Tigres 1500W / 12V windlass, OWNED NEW IN BOX; catalogue 160A working-load reference. Actual run minutes, motor input and surge remain to be measured; see EL-013.

ENERGY / BATTERY CALCULATION

For each appliance: E = quantity x watts x hours x duty / 1000.
Battery-side E = direct-DC E + converted E / efficiency + idle losses.
Nominal bank kWh = required battery-side daily kWh x autonomy days / usable fraction (then reserve policy).
Bank Ah = 1000 x bank kWh / actual nominal battery voltage.
No battery capacity is selected by this issue.

SIMULTANEOUS POWER / CONVERTERS

Check HVAC zones + pump start, cooking combination, watermaker start, radio transmit and emergency pumping.
48V bus demand includes inverter DC input + 24/12V converter inputs + direct 48V loads.
Converter output current = concurrent branch watts / minimum service voltage, with surge and derating.
Generator allowance includes charger draw, fuel derating and active AC loads. Solar nameplate is not firm emergency capacity.

VALHALLA DE TORTUGA

Mast lighting, antenna and instrument cabling

Mast stations now referenced to historical mast base; deck penetration and cable lengths require onboard measurement

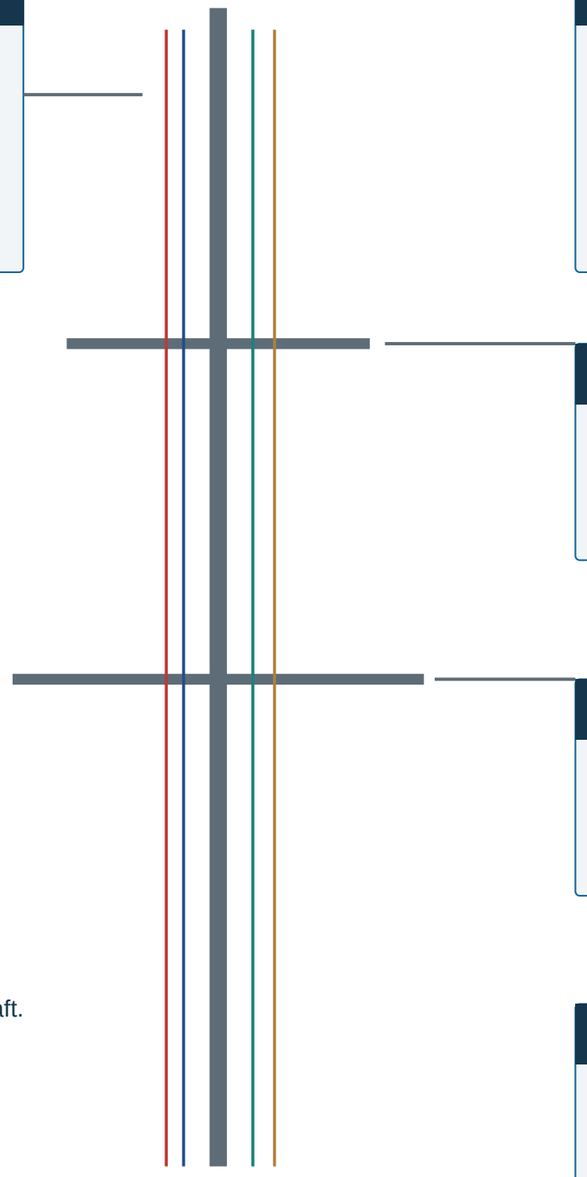
TOP SERVICES

Wind sensor; VHF antenna; anchor light and navigation fixtures as designed. RF separation / mounting offsets and lamp sectors to be checked.

ROUTING DETAIL

Red = positive; blue = return; teal = data; gold = RF.
Separate, support and protect conduits from halyards, sheaves and chafe.
No RF coax on NMEA bus. No assumed lightning path through instrument shield.
Mast bonding/lightning detail requires separate review.

70 ft 1 in overall mast / 68 ft upper rig attachment.
Neither value establishes deck-to-top height or air draft.
Lower/upper arm records: 4 ft 9 in / 3 ft 9 in each.



Mast base (historical datum)

M-01 / M-02 / M-03

M-01: VHF coax from D12-03a radio to mast antenna; cable loss/connectors TBD.
M-02: wind data + supply; protocol/interface chosen with instrument system.
M-03: individually switched lamp feeds + dedicated returns for legal operating modes.

UPPER SPREADER / M-04

49 ft 1 in from mast base; spotlights at upper spreaders. D12-09; quantity and lamp watts TBD. Separate from navigation lamps.

LOWER SPREADER / M-05

28 ft 9.5 in from mast base; deck lights beneath lower spreaders. D12-08; quantity and watts TBD. Keep clear of shrouds/sails.

MAST BASE / DECK INTERFACE

Labeled accessible plugs, glands, drip loops, strain relief and service loops for mast removal. Record actual below-deck and up-mast route lengths. Verify disconnect sealing and contacts. No normal current return through aluminum mast.

VALHALLA DE TORTUGA

Panel migration and commissioning sequence

Legacy circuit functions preserved; labels alone do not establish conductor size, voltage or actual destination

Legacy label / item	Rev E disposition	Verification
FWD CABIN / HALLWAY / GALLEY / AFT	D12-04 / 05 / 06 / 07 lighting	Trace each conductor, return and load before reconnecting.
STERN LTS / INSTRUMENTS	D12-01 lamp modes / D12-02 subcircuits	Split lights from network/instruments. Verify supply and navigation modes.
REFER BOX	New independent fridge branches D24-08/09 proposed	Old D12-15/16 held as cross-reference until 24V model acceptance.
SHOWER / FRESH WATER / EXHAUST AFT HEAD	D12-11 / 10 / 12	Verify motor voltage, rated/stall current and cable routes.
FWD / AFT BILGE AUTO	D24-01 / 03 plus new mid D24-02	New 24V controls; identify old wiring before any reuse.
PROPAN / STOVE	Retire; cooktop A2-01	No energized abandoned propane branch.
Cabin / galley / head / engine outlets	A1-01 through 07	Physical outlet and protection map; insulation/continuity checks.
12V rotary main / old meters	New voltage-specific distribution	New 8068 is a 12V service branch panel only.
Old AC meters / GEN selector	Replace with rated monitoring/transfer design	Onan START/STOP/PREHEAT labels do not establish tri-fuel-generator connections.
Unreadable / damaged labels	Isolate, trace and tag	No energization based on guessed identity.

POWER / PROTECTION COMMISSIONING

Prove de-energized before tracing. Validate insulation, polarity, voltage drop, protective earth, protection/transfer operation, BMS shutdown, source current limits and converter behavior. Record actual settings and as-built routes.

FUNCTIONAL COMMISSIONING

Test all pumps/alarms with house off; confirm SOG/COG/GNSS loss alarms, depth offset, wind calibration, heading alignment, AIS/VHF position input, radar and future autopilot interfaces. Test fridge supply and HVAC flow/overtemp shutdown.

VALHALLA DE TORTUGA

Navigation instruments, speed over ground and data network

Proposed NMEA 2000 architecture; device selection, interoperability, network load and final installation manual review OPEN

GNSS/GPS supplies position, SOG and COG. Water-speed sensor supplies STW; heading comes from a heading sensor.

GNSS RECEIVER

Position / speed over ground
Course over ground / time
Internal or external: select one primary

WIND / DEPTH / WATER SPEED

Mast wind + hull transducer(s)
Interface modules as needed
Depth offset and STW calibration

HEADING SENSOR

Heading / rate / attitude as supported
Clear of magnetic interference
Not replaced by GNSS COG

CHARTPLOTTER / HELM

Displays and selected data sources
D12-02a separate supply
GNSS-loss alert; reserve supply TBD

TERMINATOR

T-connected backbone / short drops / correct termination at both ends / no star wiring

TERMINATOR

D12-02b NETWORK POWER

Dedicated fused switched 12V feed. One designed feed in this concept; prevent unintended backfeed from devices. LEN, voltage drop and cable limits TBD.

VHF / DSC + AIS

D12-03a / 03b own power feeds. GNSS position to DSC; AIS targets to plotter via supported NMEA interface. Antenna/splitter selection separate.

FUTURE AUTOPILOT

Computer/control network as supported. Dedicated motor drive power; hydraulic pump matched to Capilano/Wagner system. No NMEA motor-power feed.

RADAR

Own rated DC feed; radar imagery to plotter over manufacturer network / Ethernet. Do not carry radar imagery or scanner power on NMEA backbone.

SOG DISPLAY IS NOW EXPLICIT

SOG is speed relative to earth, derived from GNSS; it is not a separate powered speed sensor. STW measures motion through water. COG is travel direction; heading is where the bow points. Select displayed units and source labels, and test data-loss behavior.

KEEP VICTRON / SIMARINE NETWORKS DISTINCT

GX power monitoring, VE.Bus, VE.Direct, VE.Can and BMS CAN are not interchangeable with NMEA 2000. Only connect through a documented compatible interface/gateway. PICO is a candidate, not an assumed NMEA/GX bridge.

VALHALLA DE TORTUGA

HVAC, refrigeration and high-current services

Latest equipment intent; allocations labeled proposed where exact products or voltages are not yet selected

48V MAIN DISTRIBUTION

Fault-rated branch protection
Separate source feeder per zone
Dedicated positive/return

D48-01 FORWARD

12-17k BTU/h target
48V DC seawater-cooled intent
Actual run/start watts TBD

D48-02 MIDSHIP

~17k BTU/h target
48V DC seawater-cooled intent
Actual run/start watts TBD

D48-03 AFT

12-17k BTU/h target
48V DC seawater-cooled intent
Actual run/start watts TBD

D48-04 / SEAWATER PUMP + CONTROLS

Allowance ID retained; actual pump voltage follows selected unit. Pump(s), flow proving, zone call and compressor enable must be coordinated. Loss of required seawater flow inhibits compressors. Condensate pump allowance if gravity drain cannot be achieved.
Mabru preferred; Cruise N Comfort secondary. Production model and heat-load selection remain OPEN.

FRIDGE 1 / FRIDGE 2 - PROPOSED 24V SERVICE

48V > protected isolated 24V service converter > two independent fuses/disconnects > D24-08 and D24-09. Do not consume the bilge reserve for refrigerators.
Historical ICECO VL75ProD reference supports 12/24V DC. Accept actual unit voltage/nameplate before implementing this allocation.

FRIDGE ENVELOPE / ENERGY REFERENCE

Recovered screenshot: 36.5 x 18.5 x 18.1 in per unit, 75 L, 69.6 lb. Corrects earlier 19.4-in height memory. Lid/handle travel, tie-downs, ventilation and access are additional. Reference 0.636 kWh/day per unit is not tropical measured usage.

WINDLASS / FUTURE THRUSTER

WINDLASS: Lofrans Tigres, 1500 W / 12V DC, OWNED NEW IN BOX; not installed. Dedicated 12V high-current feed or local bank/charger; controls and protection: EL-013 Rev G.1. Thruster remains separate future scope.

OPERATING PRIORITIES

Essential bilge/alarm reserve and navigation continuity first; refrigeration preserved where feasible. HVAC, ice-making, watermaking and discretionary cooking/charging are load-managed against battery state and verified source capacity. Automatic shedding must not silently disable essential pumps or alarms.

VALHALLA DE TORTUGA

Protection, controls and engineering release schedule

OCPD = overcurrent protection device | No wire size, breaker current or battery capacity is fabricated to fill a drawing

Feeder / interface	Power path and protection	Data required for release
BAT-48 > BUS-48	Battery positive fuse / BMS / main isolation; negative via shunt	Battery voltage extremes, fault current, BMS trip behavior, precharge, parallel balance, fuse interrupt and DC voltage rating.
BUS-48 > Quattro / MPPT	Individual branch protection and isolation; dedicated return	Model continuous/surge limits, conductor length, terminals, source/charger currents and fault coordination.
BUS-48 > 24V / 12V conversion	Separate protected inputs and outputs; intentional return/bonding design	Isolation rating, low-input behavior, efficiencies, output current limiting, backfeed, thermal derating and service voltage.
24V reserve > pumps / alarms	Independent pump and alarm fuses; labeled service disconnect	All-pump emergency current, motor starts, selected endurance, battery reserve and alarm quiescent load.
12V bus > 8068 / electronics	Feeder OCPD within panel and cable rating; branch-specific OCPD	Installed breaker inventory, 50A panel limit, per-load surge, cable ampacity/voltage drop and subbranch protection.
Solar fixed / sliding groups	String/combiner protection as required; PV disconnect; MPPT DC output fuses	Panel Voc cold, Isc, series/parallel limits, shading; protected moving cable loops and strain relief.
AC source / outputs	Source breakers, transfer/neutral design, leakage protection; L/N/PE	Shore/gen format, neutral bonding, transfer rating, wet-location protection and final load combinations.
BMS / GX control	Approved ATC/ATD or digital limits; Quattro, MPPT, chargers respond	Exact battery/CAN protocol; hardwired protective shutdown where needed. Monitoring/cloud is not primary protection.

CABLE SCHEDULE FIELDS - ALL FEEDERS

Record from/to, voltage, continuous/start amps, one-way and round-trip length, conductor material/size, insulation/environment, bundling, allowable drop, fuse/rating, lugs, torque and label at both ends.

RELEASE SEQUENCE

Nameplates + measured routes > energy/concurrent load model > cable/voltage-drop and fault study > protection/terminal schedule > qualified marine review > commissioning > as-built issue. Current sheets support coordination and supplier review.

VALHALLA DE TORTUGA

Complete equipment scope and source record

Owned, planned, candidate and future are distinct; TBD watts means unknown, never zero

Equipment group	Included scope	Status / remaining input
Bilge / freshwater / sanitation	3 x 24V pumps + 3 alarms; pressure pump; shower/head pump; aft-head exhaust; two independent tank level senders	Bilge items recorded owned. Other motors/senders inventory and watts TBD; tank capacity about 2 x 50 US gal.
Lighting / cabin comfort	Port/starboard/stern, steaming/masthead, anchor; lower deck / upper spots; cabin/saloon/galley/head lights; 12V fans/outlets by cabin	Count every fixture/fan/outlet and define lamp modes; no assumed cabin count.
Navigation / steering	GNSS SOG/COG, wind, depth, STW, heading, plotter, VHF/DSC, AIS, radar; future autopilot and second helm	Inventory existing instruments first; model, supply watts and data ports TBD. Manual hydraulic helm is not assigned a motor load.
Refrigeration / food preservation	2 ICECO VL75ProD; ice maker about 20 lb/day; ZWILLING Fresh & Save charger	Planned. Food-vacuum pump is not a cleaning vacuum. Ice maker voltage and adapters TBD.
Galley	Cooktop, microwave, toaster oven, coffee; Ninja HyperHeat, CREAMi, CrushBOSS / Flip / coffee alternatives	Wish list/candidates; consolidate overlapping functions before adding concurrent watts.
HVAC / watermaker	3 x 48V zones, seawater pumps/controls, possible condensate pumps; WTEYA or Schenker watermaker	Models and start/run currents OPEN. Watermaker voltage/frequency hold retained.
Entertainment / connectivity / media	55-in TV; audio head/speakers; iPhone/iPad/DJI charging; Starlink/router future; underwater ROV charging future	Phone, tablet and DJI Air 2 recorded owned; avoid duplicate USB/AC energy. CHASING/QYSEA candidates; optional loads separately counted.
System parasitics / propulsion	BMS, GX/GX Touch, converter/inverter idle, network interfaces; engine instruments/alarms; reserve charger	Separate engine-start circuit inventory; engine/alternator identity TBD. Simarine PICO optional; no assumed Xantrex substitution.

Sources: [P1] Rev D electrical/rigging PDFs and refit register, 18 Sep 2026. [P2] Navigator continuity review, 19 Sep. [P3] Photo Measurement Review, 19 Sep (original 2025 images/captions, Rigworks estimate, equipment screenshots). [P4] Owner request, 19 Sep: all equipment and speed over ground. No newly received supplier reply or onboard survey is claimed.

Manufacturer checks, 19 Sep 2026: [S1] Blue Sea 8068 specifications - panel voltage/current/positions. [S2] Victron Quattro - two inputs, inverter-backed main output, source-present second output. [S3] ICECO VL75ProD product page - product family and AC/DC provision; exact supplied-unit manual still required.

VALHALLA DE TORTUGA

ELECTRICAL BILL OF MATERIALS - POWER GENERATION / STORAGE / CONVERSION

61 coordinated items | quantities are planning requirements unless marked owned | unit prices / totals: supplier quote pending

VDT-EL-BOM-01 | REV G.1

19 SEP 2026 | NTS

EQUIPMENT REFERENCE - PICTURES SHOW FUNCTION / FAMILY; PRINTED RATINGS DO NOT SELECT A MODEL



EM-01 | House bank

Exact model / installation compatibility: confirm.



EM-02 | BMS

Exact model / installation compatibility: confirm.



EM-05 | MPPT

Exact model / installation compatibility: confirm.



EM-06 | Quattro

Exact model / installation compatibility: confirm.



EM-07 | DC conversion

Exact model / installation compatibility: confirm.

ID	EQUIPMENT / MATERIAL	QUANTITY BASIS	STATUS	CIRCUIT / INTERFACE	SPECIFICATION / RELEASE REQUIREMENT
EM-01	48V LiFePO4 house battery system	1 bank; modules/Ah TBD	PLANNED	BAT-48	Cell ecosystem, energy, discharge/surge/fault current and enclosure.
EM-02	Battery BMS / fuse / disconnect / precharge	1 engineered set; parts TBD	PLANNED	BAT-48 > BUS-48	Interrupt/DC ratings, contactor logic and compatible monitoring.
EM-03	Solar modules / fixed + sliding	8 = 6 fixed + 2 sliding	PLANNED	PV array	550-600W target each; exact panel, Voc/Isc, weight and mounting.
EM-04	PV rails / slides / locks / cable travel	1 mounting system; parts TBD	PLANNED	Hardtop	Structure, swept envelope, shading, drainage and wind loads.
EM-05	MPPTs / PV disconnects / combiner protection	Quantity and ratings TBD	PLANNED	PV > BUS-48	SmartSolar family; string topology and cold Voc before selecting model.
EM-06	48V inverter/charger / Quattro architecture	System quantity/model TBD	SELECTED ARCHITECTURE	AC IN-1/2; OUT-1/2	AC format, continuous/surge kVA, source ratings and BMS interface.
EM-07	Isolated 48-to-24V service converter(s)	Quantity/rating TBD	PLANNED	24V SERVICE	Fridge and verified 24V service loads; no general deck-drive feed.
EM-08	Isolated 48-to-12V converter(s)	Quantity/rating TBD	PLANNED	12V SERVICE	Electronics plus panel demand, surge, loss and thermal derating.
EM-09	Isolated 48-to-24V bilge reserve charger	Quantity/rating TBD	PROPOSED	24V ESSENTIAL	Battery-compatible charger; ordinary converter is not automatically suitable.
EM-10	24V essential reserve battery	1 bank; capacity TBD	PROPOSED	Bilge/alarm bus	All-pump duty and reserve endurance; chemistry, protection and service access.
EM-11	Voltage-specific buses / fuses / disconnects / shunt	1 distribution system; parts TBD	PLANNED	48V / 24V / 12V	Dedicated returns, fault coordination, panel feeders and labels.

OWNED / PLANNED / CANDIDATE

Existing purchase records and future wishes remain distinct. Pictures are references; no additional purchase is inferred.

ENERGY / PROTECTION

Unknown watts are TBD, never zero. Actual loads, routes, voltage drop and fault studies govern wires and protection.

ALTERNATIVES / COSTS

Alternative products are not additive. AC/DC backup inputs are not duplicate loads. No unsupported cost total.

COORDINATION / RELEASE STATUS

Sheet 1 of 6. Coordinated with EL-000 / EL-012 / EL-013 Rev G.1 and supporting EL-001 through EL-011, mixed F/G. All EM-01 through EM-61 entries are retained.

Revision G.1 updates the pictorial presentation and power-path clarity. Lofrans Tigres 1500W / 12V is OWNED, NEW IN BOX; not installed. No new battery capacity, converter current, inverter kVA, cable size or breaker rating is released. Measured routes and unit manual remain required.

Raul Silvas
Master and Captain

Fair Winds, Strong Rigging, Safe Passages

ELECTRICAL SYSTEM

DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Models / ratings / cable sizes OPEN

VALHALLA DE TORTUGA

ELECTRICAL BILL OF MATERIALS - MONITORING / PANELS / REFRIGERATION / HVAC

61 coordinated items | quantities are planning requirements unless marked owned | unit prices / totals: supplier quote pending

VDT-EL-BOM-02 | REV G.1

19 SEP 2026 | NTS

EQUIPMENT REFERENCE - PICTURES SHOW FUNCTION / FAMILY; PRINTED RATINGS DO NOT SELECT A MODEL



EM-12 | Cerbo GX

Exact model / installation compatibility: confirm.



EM-13 | GX Touch

Exact model / installation compatibility: confirm.



Panel reference only

Exact model / installation compatibility: confirm.



EM-17/18 | Two fridges

Exact model / installation compatibility: confirm.



Isolation hardware

Exact model / installation compatibility: confirm.

ID	EQUIPMENT / MATERIAL	QUANTITY BASIS	STATUS	CIRCUIT / INTERFACE	SPECIFICATION / RELEASE REQUIREMENT
EM-12	Cerbo GX system controller	1	PLANNED	Control / monitoring	Power supply, BMS protocol and interface inventory.
EM-13	GX Touch display	1	PLANNED	EM-12	Size/location and cable route; Simarine is a separate optional candidate.
EM-14	Blue Sea Systems 8068 service panel	1	PURCHASED	12V; EL-002 slots	13 positions / 50A listed max; verify installed breakers and each branch.
EM-15	Additional electronics / service panels	Quantity TBD	PLANNED	D12-01/02/03 etc.	Separate navigation and protected branches beyond the 8068.
EM-16	Branch breakers / fuse blocks / holders	Quantity/rating TBD	PLANNED	All panels	Cable sizing and nameplates before branch protection selection.
EM-17	ICECO VL75ProD dual-zone fridge #1	1	PLANNED	D24-08 proposed	Accept nameplate; cabinet envelope plus ventilation, lid and tie-down space.
EM-18	ICECO VL75ProD dual-zone fridge #2	1	PLANNED	D24-09 proposed	Independent protected circuit; DC primary and optional AC backup not double-counted.
EM-19	Forward 48V seawater-cooled HVAC	1 zone	PLANNED	D48-01	12-17k BTU/h target; actual model, watts and heat load.
EM-20	Midship 48V seawater-cooled HVAC	1 zone	PLANNED	D48-02	About 17k BTU/h target; Mabru preferred, alternative subject to availability.
EM-21	Aft 48V seawater-cooled HVAC	1 zone	PLANNED	D48-03	12-17k BTU/h target; reconcile overall 40-50k target with heat load.
EM-22	Seawater pump(s) / flow controls	Quantity/rating/voltage TBD	PLANNED	D48-04 allowance	Hydraulic flow/head, zone interlocks and shared intake review.
EM-23	Condensate pumps / HVAC thermostats	Controls by zone; pumps if needed	ALLOWANCE	HVAC	Actual drainage scheme and accessory power; avoid uncontrolled bilge discharge.

OWNED / PLANNED / CANDIDATE

Existing purchase records and future wishes remain distinct. Pictures are references; no additional purchase is inferred.

ENERGY / PROTECTION

Unknown watts are TBD, never zero. Actual loads, routes, voltage drop and fault studies govern wires and protection.

ALTERNATIVES / COSTS

Alternative products are not additive. AC/DC backup inputs are not duplicate loads. No unsupported cost total.

COORDINATION / RELEASE STATUS

Sheet 2 of 6. Coordinated with EL-000 / EL-012 / EL-013 Rev G.1 and supporting EL-001 through EL-011, mixed F/G. All EM-01 through EM-61 entries are retained.

Revision G.1 updates the pictorial presentation and power-path clarity. Lofrans Tigres 1500W / 12V is OWNED, NEW IN BOX; not installed. No new battery capacity, converter current, inverter kVA, cable size or breaker rating is released. Measured routes and unit manual remain required.

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ELECTRICAL SYSTEM

DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Models / ratings / cable sizes OPEN

VALHALLA DE TORTUGA

ELECTRICAL BILL OF MATERIALS - BILGE / LIGHTING / CABIN SERVICES / GNSS

61 coordinated items | quantities are planning requirements unless marked owned | unit prices / totals: supplier quote pending

VDT-EL-BOM-03 | REV G.1

19 SEP 2026 | NTS

EQUIPMENT REFERENCE - PICTURES SHOW FUNCTION / FAMILY; PRINTED RATINGS DO NOT SELECT A MODEL



Branch protection

Exact model / installation compatibility: confirm.



Service isolation

Exact model / installation compatibility: confirm.



Distribution buses

Exact model / installation compatibility: confirm.



Display family reference

Exact model / installation compatibility: confirm.



Separate service load

Exact model / installation compatibility: confirm.

ID	EQUIPMENT / MATERIAL	QUANTITY BASIS	STATUS	CIRCUIT / INTERFACE	SPECIFICATION / RELEASE REQUIREMENT
EM-24	24V bilge pumps	3	OWNED RECORD	D24-01 / 02 / 03	Models, start/run amps, hydraulic head and final forward/mid/aft placement.
EM-25	24V high-water alarms / sensors	3 alarm systems	OWNED RECORD	D24-04 / 05 / 06	Independent sensor/supply; audible/visual annunciation and test behavior.
EM-26	Pump AUTO/MAN controls / indicators	3 station functions	PLANNED	EM-24	Pump-maker wiring, switching interlock and labeled service isolation.
EM-27	Freshwater pressure pump / shower-head pumps	Existing inventory; count TBD	SURVEY	D12-10 / D12-11	Confirm motor voltage, count, start current and plumbing duty.
EM-28	Aft-head exhaust / cabin fans	1 exhaust function; fan count TBD	PLANNED / SURVEY	D12-12 / D12-13	One fan requirement per cabin; confirm cabin count and motors.
EM-29	Interior lights / 12V cabin + saloon outlets	Count by zone TBD	PLANNED	D12-04..07 / D12-14	Fixture count, loads and downstream branch grouping.
EM-30	Navigation / anchor / mast lights	Fixture set; count TBD	PLANNED	D12-01a/b/c	Legal lamp modes/sectors; individual switching and voltage.
EM-31	Lower deck / upper spreader lights + mast wiring	Two levels; fixture count TBD	PLANNED	D12-08 / D12-09; EL-006	Dedicated returns, glands, service disconnect, antenna/data separation.
EM-32	GNSS receiver / source for SOG and COG	1 primary source; integrated or external	PLANNED / SURVEY	D12-02c / NMEA	Do not buy duplicate external receiver if accepted plotter provides required source.
EM-33	Chartplotter / helm instrument display(s)	Count TBD	PLANNED / SURVEY	D12-02a	Actual equipment inventory, power, GNSS source and display location.

OWNED / PLANNED / CANDIDATE

Existing purchase records and future wishes remain distinct. Pictures are references; no additional purchase is inferred.

ENERGY / PROTECTION

Unknown watts are TBD, never zero. Actual loads, routes, voltage drop and fault studies govern wires and protection.

ALTERNATIVES / COSTS

Alternative products are not additive. AC/DC backup inputs are not duplicate loads. No unsupported cost total.

COORDINATION / RELEASE STATUS

Sheet 3 of 6. Coordinated with EL-000 / EL-012 / EL-013 Rev G.1 and supporting EL-001 through EL-011, mixed F/G. All EM-01 through EM-61 entries are retained.

Revision G.1 updates the pictorial presentation and power-path clarity. Lofrans Tigres 1500W / 12V is OWNED, NEW IN BOX; not installed. No new battery capacity, converter current, inverter kVA, cable size or breaker rating is released. Measured routes and unit manual remain required.

Raul Silvas

Master and Captain

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ELECTRICAL SYSTEM

DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Models / ratings / cable sizes OPEN

VALHALLA DE TORTUGA

ELECTRICAL BILL OF MATERIALS - INSTRUMENTS / COMMUNICATIONS / AC SOURCES

61 coordinated items | quantities are planning requirements unless marked owned | unit prices / totals: supplier quote pending

VDT-EL-BOM-04 | REV G.1

19 SEP 2026 | NTS

EQUIPMENT REFERENCE - PICTURES SHOW FUNCTION / FAMILY; PRINTED RATINGS DO NOT SELECT A MODEL



Gateway family reference

Exact model / installation compatibility: confirm.



EM-43 | Shore inlet

Exact model / installation compatibility: confirm.



EM-42 | Generator

Exact model / installation compatibility: confirm.



EM-44 | AC panel

Exact model / installation compatibility: confirm.



Circuit protection

Exact model / installation compatibility: confirm.

ID	EQUIPMENT / MATERIAL	QUANTITY BASIS	STATUS	CIRCUIT / INTERFACE	SPECIFICATION / RELEASE REQUIREMENT
EM-34	Wind sensor / interface	1 sensing function	PLANNED	M-02 / D12-02c	Mast attachment, protocol, interface module and cable run.
EM-35	Depth / speed-through-water transducer(s)	1 each function; combined unit possible	PLANNED / SURVEY	D12-02c	Hull mounting, transducer compatibility; no double-count of combined units.
EM-36	Heading / rate sensor	1 sensing function	PLANNED / SURVEY	D12-02c	Autopilot/radar needs and magnetic-clearance survey.
EM-37	NMEA 2000 backbone / tees / drops / power	1 network; component count TBD	PROPOSED	D12-02b; EL-008	Two end terminations; network length/LEN; single designed power feed.
EM-38	VHF/DSC / mast antenna / coax	1 radio system	PLANNED / SURVEY	D12-03a / M-01	Transmit/receive watts, coax loss and GNSS position input.
EM-39	AIS unit / antenna or approved splitter	1 AIS function	PLANNED / SURVEY	D12-03b	Class/model, independent GNSS requirements and RF compatibility.
EM-40	Radar scanner / data cable	1 radar function	PLANNED / SURVEY	D12-21 provisional	Actual voltage/current; manufacturer data network to plotter.
EM-41	Autopilot computer / drive / feedback	1 future system; parts TBD	FUTURE	D12-22 provisional	Drive voltage/current, cylinder displacement and hydraulic compatibility.
EM-42	Tri-fuel generator	1	OWNED RECORD	Quattro AC IN-1	Actual make/model, fuel-specific output, frequency, neutral and installation.
EM-43	Shore inlet / cord / source protection	1 shore system; ratings TBD	PLANNED	Quattro AC IN-2	AC format, leakage protection, neutral/PE and isolation design.
EM-44	AC panels / breakers / outlets / GFCI	2 output groups; parts TBD	PLANNED	A1 / A2	Final count and device ratings, PE/neutral bars and location review.

OWNED / PLANNED / CANDIDATE

Existing purchase records and future wishes remain distinct. Pictures are references; no additional purchase is inferred.

ENERGY / PROTECTION

Unknown watts are TBD, never zero. Actual loads, routes, voltage drop and fault studies govern wires and protection.

ALTERNATIVES / COSTS

Alternative products are not additive. AC/DC backup inputs are not duplicate loads. No unsupported cost total.

COORDINATION / RELEASE STATUS

Sheet 4 of 6. Coordinated with EL-000 / EL-012 / EL-013 Rev G.1 and supporting EL-001 through EL-011, mixed F/G. All EM-01 through EM-61 entries are retained.

Revision G.1 updates the pictorial presentation and power-path clarity. Lofrans Tigres 1500W / 12V is OWNED, NEW IN BOX; not installed. No new battery capacity, converter current, inverter kVA, cable size or breaker rating is released. Measured routes and unit manual remain required.

Raul Silvas

Master and Captain

Fair Winds, Strong Rigging, Safe Passages

ELECTRICAL SYSTEM

DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Models / ratings / cable sizes OPEN

VALHALLA DE TORTUGA

ELECTRICAL BILL OF MATERIALS - GALLEY / ICE / WATERMAKER / ENTERTAINMENT

61 coordinated items | quantities are planning requirements unless marked owned | unit prices / totals: supplier quote pending

VDT-EL-BOM-05 | REV G.1

19 SEP 2026 | NTS

EQUIPMENT REFERENCE - PICTURES SHOW FUNCTION / FAMILY; PRINTED RATINGS DO NOT SELECT A MODEL



AC branch panel

Exact model / installation compatibility: confirm.



Inverter supply

Exact model / installation compatibility: confirm.



12V service supply

Exact model / installation compatibility: confirm.



DC / optional AC boundary

Exact model / installation compatibility: confirm.



Local isolation

Exact model / installation compatibility: confirm.

ID	EQUIPMENT / MATERIAL	QUANTITY BASIS	STATUS	CIRCUIT / INTERFACE	SPECIFICATION / RELEASE REQUIREMENT
EM-45	Electric cooktop	1	PLANNED	A2-01	120V intent; source-present concept; model and concurrent load.
EM-46	Microwave	1	PLANNED	A1-08	Actual input watts, surge and ventilation.
EM-47	Toaster oven / Ninja Flip alternative	1 function	PLANNED / CANDIDATE	A1-09	Avoid counting separate oven and same-function combination appliance twice.
EM-48	Coffee machine / Keurig or Ninja alternative	1 function	PREFERENCE	A1-13	Final model, warm-up power and outlet requirements.
EM-49	Ninja HyperHeat / CREAMi / CrushBOSS wishes	Up to 3 functions; selection TBD	CANDIDATE	A1-14 group	Not all approved or purchased; nameplates and simultaneous-use assumptions.
EM-50	Ice maker / BODEGA or SnoMaster preference	1 function	CANDIDATE	A1-15 hold or DC branch	About 20 lb/day target; exact AC/DC model, daily energy and drain/water.
EM-51	ZWILLING Fresh & Save charger	1 food-vacuum system	PREFERENCE	D12-20 / adapter TBD	USB/AC supply per actual charger; not a cleaning vacuum.
EM-52	Watermaker / WTEYA or Schenker alternative	1 system	CANDIDATE	A1-11 HOLD	Voltage/frequency/start-run watts; do not use old 600W as verified.
EM-53	55-inch television	1	PLANNED	A1-10	Actual AC/DC supply, standby and mounts.
EM-54	Audio head / amplifier / speakers	1 system; speaker count TBD	PLANNED	D12-19	Amplifier/head load; passive speakers are not separate DC loads.
EM-55	Device charging / optional fridge AC backup	Count/ports TBD	ALLOWANCE	AC outlets / D12-14	Owned iPhone/iPad/DJI charging; no double-count of AC and DC fridge operation.

OWNED / PLANNED / CANDIDATE

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ENERGY / PROTECTION

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ALTERNATIVES / COSTS

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COORDINATION / RELEASE STATUS

Sheet 5 of 6. Coordinated with EL-000 / EL-012 / EL-013 Rev G.1 and supporting EL-001 through EL-011, mixed F/G. All EM-01 through EM-61 entries are retained.

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ELECTRICAL SYSTEM

DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

Models / ratings / cable sizes OPEN

VALHALLA DE TORTUGA

ELECTRICAL BILL OF MATERIALS - TANK MONITORING / DECK DRIVES / INSTALLATION

61 coordinated items | quantities are planning requirements unless marked owned | unit prices / totals: supplier quote pending

VDT-EL-BOM-06 | REV G.1

19 SEP 2026 | NTS

EQUIPMENT REFERENCE - PICTURES SHOW FUNCTION / FAMILY; PRINTED RATINGS DO NOT SELECT A MODEL



EM-57 | Tigres 1500W / 12V

Exact model / installation compatibility: confirm.



Distribution reference

Exact model / installation compatibility: confirm.



Protection reference

Exact model / installation compatibility: confirm.



Monitoring interfaces

Exact model / installation compatibility: confirm.



Isolation reference

Exact model / installation compatibility: confirm.

ID	EQUIPMENT / MATERIAL	QUANTITY BASIS	STATUS	CIRCUIT / INTERFACE	SPECIFICATION / RELEASE REQUIREMENT
EM-56	Tank senders / monitoring sensors	2 water-tank level channels	PLANNED	GX/PICO interface TBD	Two independent tanks; sensor type and calibration.
EM-57	Lofrans Tigres windlass - 1500 W / 12V DC	1 owned; installation parts TBD	OWNED - NEW IN BOX	WL-01..08 / EL-013 / 014	Dedicated 12V high-current feed. Catalogue working-load reference: 160A; not breaker sizing. New in box, not installed. No windlass repurchase. Inventory accessories; cable, source and breaker release: EL-013 / 014.
EM-58	Engine-start / alternator / instruments	Existing system inventory TBD	SURVEY	Independent start bank	Confirm engine/alternator identity; controlled house charging remains future.
EM-59	Cables / lugs / glands / mounts / labels	Measured quantities TBD	PLANNED	All circuits	Route schedule, drop/ampacity, environment, segregation, torque and spare allowance.
EM-60	PE / bonding / shore-isolation hardware	1 engineered system; parts TBD	PLANNED	AC cases / vessel bonds	Final neutral/PE scheme, galvanic isolation strategy and lightning coordination.
EM-61	Optional PICO / Starlink / ROV / thruster / water heater	Not counted in committed quantity	FUTURE / CANDIDATE	Separate optional schedule	No model, award or installation inferred; account for later accepted loads.

WINDLASS EM-57 - INCLUDED COMPONENTS / PROVISIONS; NOT ADDITIONAL TOP-LEVEL QUANTITIES

ID	COMPONENT / FUNCTION	QUANTITY BASIS	REQUIRED INFORMATION
WL-01	Lofrans Tigres 1500 W / 12V	1 owned; new in box	Not installed. Photograph SKU / serial, 12V motor label and gypsy chain marking.
WL-02	Dedicated 12V supply / local bank alternative	1 system; parts TBD	Select high-current source and cable route; approved 48-to-12V battery charger if a local bank is chosen.
WL-03	Source protection + service isolator	1 function each; exact parts TBD	100A 187333 candidate; verify exact SKU/manual, curve and interrupt rating. EL-014.
WL-04	Motor contactor / control box	1 expected in package; verify	Control box is listed in maker package contents; verify included model before ordering.
WL-05	Bow + helm control provisions	Stations / switches TBD	Inventory included switches; select bow / helm stations and fused control wiring.
WL-06	Wireless receiver / handset	Optional; not committed	Only if selected and compatible with contactor/control scheme.
WL-07	Motor and control cables / terminations	Measured quantities TBD	35 mm2 / 2 AWG maker reference for loop under 15m; final route / sizing OPEN. EL-014.
WL-08	Identification / commissioning record	1 record	Loaded voltage, current, switching, isolation, reset and operating checks per actual manual.

OWNED / PLANNED / CANDIDATE

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ALTERNATIVES / COSTS

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COORDINATION / RELEASE STATUS

Sheet 6 of 6. Coordinated with EL-000 / EL-012 / EL-013 Rev G.1 and supporting EL-001 through EL-011, mixed F/G. All EM-01 through EM-61 entries are retained.

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Models / ratings / cable sizes OPEN