On Site Acceptance Testing | Fathom M7000X+

OEM :

Boat Model :

Insert Boat Picture

Date :

Location :

Navico Group Attendees :

OEM Attendees :

On Site Acceptance Testing | Fathom M7000X+ System

BRAND	Powered by FATHOM e-power system

SCOPE: The intention of this document is to confirm functionality of the Fathom M7000X+ hardware and software. This procedure will not confirm functionality of all electrical elements of the boat. This procedure will not provide guidance on troubleshooting procedures if a step yields a failed result – please see the troubleshooting guide and/or the component manuals.

OSAT documents for optional equipment on Fathom M7000X+ system

Store

Batteries

12V Service batteries Gel	☐
12V Service batteries MLI	☐

Generate

Solar Charge Regulators

MPPT Regulator	☐

Charge & Convert

Combination Units

CombiMaster	☐
Mass Combi Ultra	☐

Chargers

ChargeMaster	☐

Network Reference Documents

MasterBus	☐
CZone Network	☐

Documentation

Please include relevant supporting documentation

XML File	☐	DC Schematic	☐
CZone configuration File	☐	AC Schematic	☐
CZone Commissioning Report*	☐	CanBus Network	☐
Software versions	☐	Other	☐

**Essential for capturing RTM tool version & Device information*

Detail of additional documentation

On Site Acceptance Testing | Fathom M7000X+

General Wiring

Check the application of the basic wiring rules ☐

Do :

Make drip and service loops

Use cable-ties on all cables to keep them secure

Solder/crimp and insulate all wiring connections if extending or shortening the cables

Use the appropriate length of ready-made interconnection cable

Leave room adjacent to device to ease plugging and unplugging of connectors

Do not:

Make sharp bends in the cables

Run cables in a way that allows water to flow down into the connectors

Run the data cables adjacent to radar, transmitter, or large/heavy current carrying cables or high frequency

Run cables so they interfere with mechanical systems

Run cables over sharp edges or burrs

Notes

On Site Acceptance Testing | Engine Start Batteries

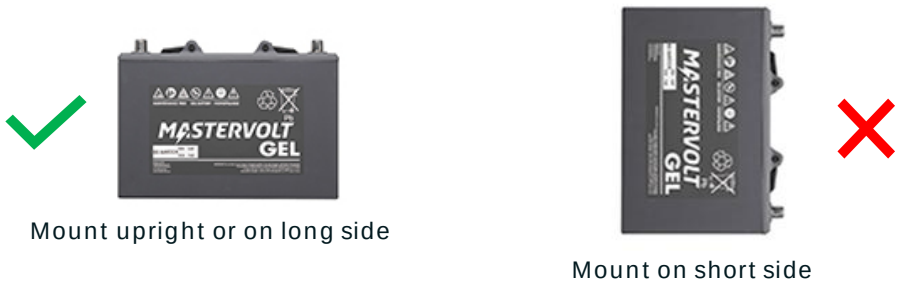
Model	Part Number	
Model: Example	**Part Number: Example**	
AGM Battery 12/130Ah	62001300	

1. Installation of Batteries

Supporting pictures should be labelled in reference to this document

Subject	Data						Picture
1.1 Mounting orientation comply with fig.1	Yes	☐		No	☐		☐
1.2 Positioning fixed (max 1mm movement)	Yes	☐		No	☐		☐
1.3 Spacing between batteries >1cm	Yes	☐		No	☐		☐
1.4 Ambient temp. <40 °C	Yes	☐		No	☐		☐
1.5 Cable pole protection covers	Yes	☐		No	☐		☐
1.6 Type of battery terminals	Clamp	☐	Bolt or Nut	☐	Other		☐
1.7 Battery cable sizing			mm²			AWG	

Fig.1



Mount upright or on long side

Mount on short side

On Site Acceptance Testing | 12V Service Batteries Gel

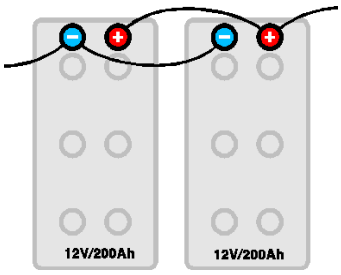
Model	Part Number	
Model: Example	**Part Number: Example**	
MVG Gel Battery 12/140Ah	64001400	

1. Installation of Batteries

Supporting pictures should be labelled in reference to this document

Subject	Data						Picture
1.1 Number of batteries in battery bank				Parallel			☐
1.2 Parallel complies with Cross wiring (refer to fig.1)	Yes	☐		No	☐		☐
1.3 Mounting orientation comply with fig.2	Yes	☐		No	☐		☐
1.4 Positioning fixed (max 1mm movement)	Yes	☐		No	☐		☐
1.5 Spacing between batteries >1cm	Yes	☐		No	☐		☐
1.6 Ambient temp. <40 °C	Yes	☐		No	☐		☐
1.7 Cable pole protection covers	Yes	☐		No	☐		☐
1.8 Type of battery terminals	Clamp	☐	Bolt or Nut	☐		Other	☐
1.9 Battery cable sizing			mm²				AWG

Fig.1



Parallel good example

Fig.2

Mount upright or on long side

Mount on short side

On Site Acceptance Testing | 12V Service Batteries MLI

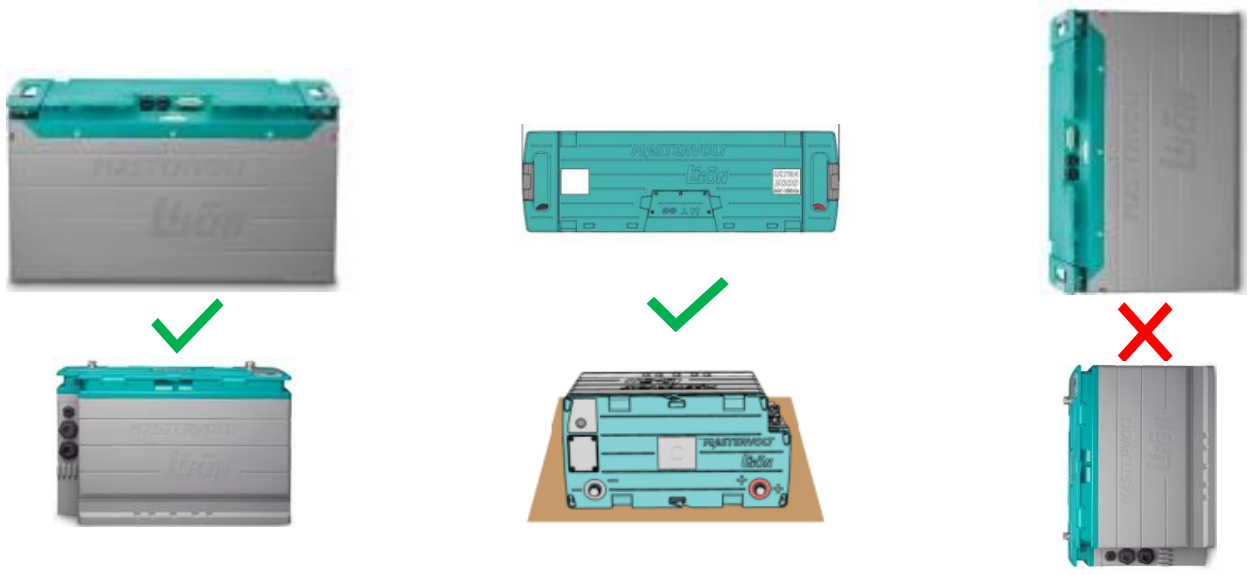
Model	Part Number	
Model: Example	**Part Number: Example**	
MLI Ultra Lithium Battery 12/1250	66011250	

1. Installation of Batteries

Supporting pictures should be labelled in reference to this document

Subject	Data					Picture
1.1 Number of batteries in battery bank				Parallel		☐
1.2 Mounting orientation comply with fig.1	Yes	☐		No	☐	☐
1.3 Positioning fixed (max 1mm movement)	Yes	☐		No	☐	☐
1.4 Spacing between batteries >1cm	Yes	☐		No	☐	☐
1.5 Ambient temp. <40 °C	Yes	☐		No	☐	☐
1.6 Battery cable sizing			mm²			AWG
1.7 Safety Relay installed on each battery fig.2	Yes	☐		No	☐	☐
1.8 Safety fuse installed on each battery fig.3	Yes	☐		No	☐	☐
1.9 Busbar used for parallel sets	Yes	☐		No	☐	☐
1.10 Battery cables are of equal length, type and size	Yes	☐		No	☐	☐
1.11 Check relay functions correctly and provides correct feedback	Yes	☐		No	☐	☐
1.12 Firmware version						

Fig.1



Recommended | Acceptable | Unacceptable

Fig.2

Cont. on next page

Fig.2

Only Applicable for Part no. 66016000 & 66013000

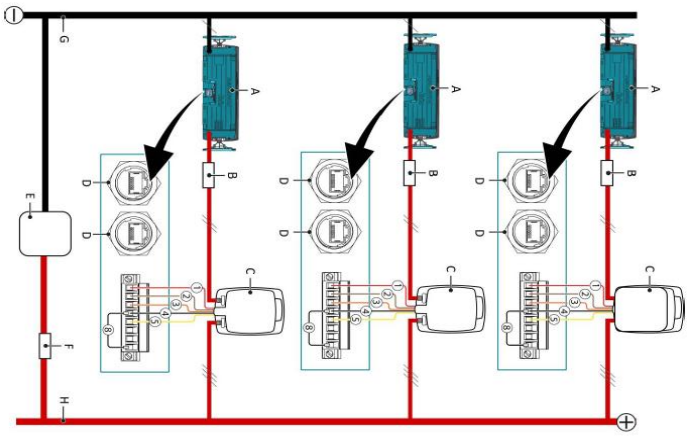


Fig.3

Example for Part # 66016000 & 66013000, using 79007712 & suitable fuse size.

Class T fuse required

Example for Part # 66011250, using BSS-5191 & suitable fuse size.

Class T or MRBF fuse required

On Site Acceptance Testing | MLI Batteries

Model	Part Number	
MLI Ultra Lithium Battery 24/6000	66026000	

1. Installation of Batteries

Supporting pictures should be labelled in reference to this document

Subject	Data					Picture
1.1 Number of batteries in battery bank	Series		Parallel			☐
		Total				
1.2 Mounting orientation comply with fig.1	Yes	☐		No	☐	☐
1.3 Positioning fixed (max 1mm movement)	Yes	☐		No	☐	☐
1.4 Spacing between batteries >1cm	Yes	☐		No	☐	☐
1.5 Ambient temp. <40 °C	Yes	☐		No	☐	☐
1.6 Battery cable sizing			mm²			AWG
1.7 Soft start module installed on each battery cluster fig.2	Yes	☐		No	☐	☐
1.8 Safety fuse installed on each battery cluster, Class T fuse type only	Yes	☐		No	☐	☐
1.9 Busbar used for parallel sets	Yes	☐		No	☐	☐
1.10 Battery cables are of equal length, type and size	Yes	☐		No	☐	☐
1.11 Check relay functions correctly and provides correct feedback	Yes	☐		No	☐	☐
1.12 Firmware version latest available & equal across all batteries within the cluster	Yes	☐		No	☐	

Fig.1

✓ Recommended

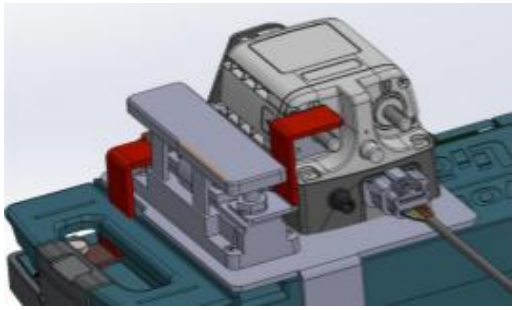
✓ Acceptable

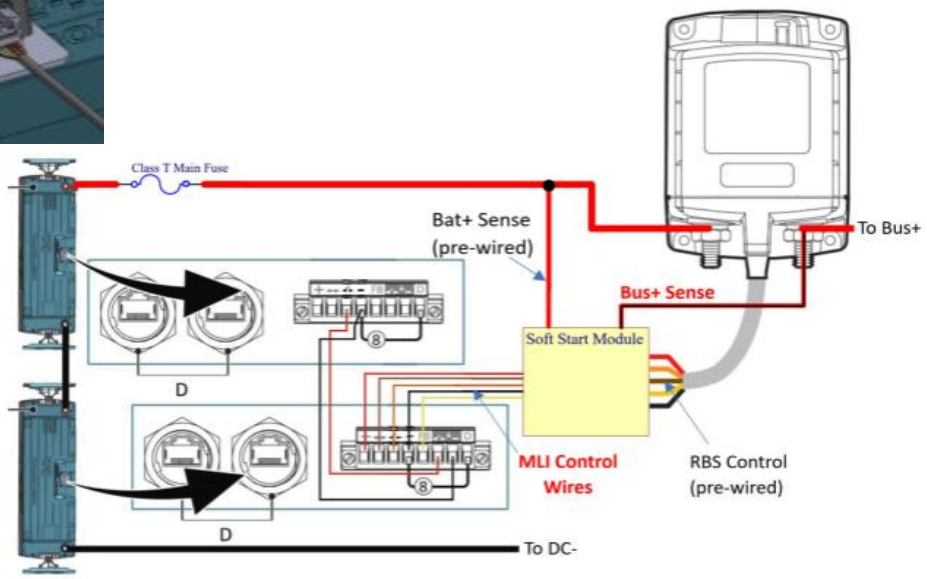
✗ Unacceptable

Fig.2

Cont. on next page

Fig.2




Class T Main Fuse
Bat+ Sense
(pre-wired)
To Bus+
Bus+ Sense
Soft Start Module
D
MLI Control
Wires
RBS Control
(pre-wired)
D
To DC-

On Site Acceptance Testing | DC-DC Converter Mac Plus

Required for each unit installed

Model	Part Number	
Mac Plus 48/12-50 IP23 CZone	81203105	

1. Installation of DC-DC Converter

Supporting pictures should be labelled in reference to this document

Subject	Data				Picture
1.1 Mounting orientation (refer to fig.1)					☐
1.2 Ambient temp. <40 °C	Yes	☐	No	☐	☐
1.3 Clearance on every side			100mm recommended		☐
1.4 Location within application					☐
1.5 Remote switch input used	Yes	☐	No	☐	
1.6 Battery volt sense used	Yes	☐	No	☐	
1.7 Firmware version					
1.8 Quantity of units installed					

2. Cable and Fuse information

Subject	Cable size	Fuse rating	Terminal Tightness	
2.1 DC Wiring Input	min 6mm² ☐	,	☐	
2.2 DC Wiring Output	min 16mm² ☐		☐	

Fig.1

Vertical (best) Horizontal Flat on a surface

On Site Acceptance Testing | CombiMaster

Required for each unit installed

Model	Part Number	
CombiMaster 48/5000-70 120V HT	35545000	

1. Installation of Combination Unit

Supporting pictures should be labelled in reference to this document

Subject	Data	Picture
1.1 Mounting orientation (refer to fig.1)		☐
1.2 Ambient temp. <40 °C	Yes ☐ No ☐	☐
1.3 Clearance on every side	100mm recommended	☐
1.4 Battery temp. sensor installed *N/A MLI	Yes ☐ No ☐	☐
1.5 Location within application		☐
1.6 Above minimum recommended battery capacity	200Ah ☐	
1.6a Connected Ah enter here		
1.7 AC safety grounding activated	Yes ☐ No ☐	☐
1.8 Remote switch input used	Yes ☐ No ☐	☐
1.9 Alarm contact used	N.Open ☐ N.Closed ☐ Not Used	☐
1.10 Units in Series (split phase) and/or parallel	Series ☐ Parallel ☐ Total	☐
1.11 If yes to 1.10, sync cables installed	Yes ☐ Amount used	☐
1.12 Firmware version		

2. Cable and Fuse information

Subject	Cable size	Fuse rating	Terminal Tightness
2.1 AC Wiring Input			☐
2.2 AC Wiring Output			☐
2.3 DC wiring Output 1			☐

Fig.1

Vertical (best)

Horizontal (OK)

Flat on a surface (least recommended position)

On Site Acceptance Testing | Mass Combi Ultra

Required for each unit installed

Model	Part Number	
Mass Combi Ultra 48/3500-50	38343500	

1. Installation of Combination Unit

Supporting pictures should be labelled in reference to this document

Subject	Data				Picture
1.1 Mounting orientation (refer to fig.1)					☐
1.2 Ambient temp. <40 °C	Yes	☐	No	☐	☐
1.3 Clearance on every side		100mm recommended			☐
1.4 Location within application					☐
1.5 Above minimum recommended battery capacity	175Ah	☐			
1.5a Connected Ah enter here					
1.6 Units in parallel and/or three phase	3-phase	☐	Parallel		☐
			Total		
1.7 If yes to 1.6, sync cable installed	Yes	☐	Amount used		☐
1.8 Secondary charger used	Yes	☐	No	☐	☐
1.9 Firmware version					

2. Cable and Fuse information

Subject	Cable size	Fuse rating	Terminal Tightness
2.1 AC Wiring Input Mains			☐
2.2 AC Wiring Input Gen			☐
2.3 AC Wiring Output 1			☐
2.4 AC Wiring Output 2			☐
2.5 DC Wiring Output			☐

Fig.1

Vertical (best) | Horizontal (OK) | Flat on a surface (least recommended position)

On Site Acceptance Testing | ChargeMaster Battery Charger

Required for each unit installed

Model	Part Number	
Model: Example	**Part Number: Example**	
ChargeMaster Plus 12/100-3	44311005	

1. Installation of Battery Charger

Supporting pictures should be labelled in reference to this document

Subject	Data				Picture
1.1 Mounting orientation (refer to fig.1)					☐
1.2 Ambient temp. <40 °C	Yes	☐	No	☐	☐
1.3 Clearance on every side			100mm recommended		☐
1.4 Battery temp. sensor installed *N/A MLI	Yes	☐	No	☐	☐
1.5 Location within application					☐
1.6 Within recommended battery capacity	☐				
1.6a Connected Ah enter here					
1.7 Firmware version					

2. Cable and Fuse information

Subject	Cable size	Fuse rating	Terminal Tightness
2.1 AC Wiring			☐
2.2 DC wiring output 1			☐
2.3 DC wiring output 2			☐
2.4 DC wiring output 3			☐

Fig.1

Vertical IP23 (best) | Horizontal (OK) | Flat on a surface (least recommended position)

On Site Acceptance Testing | Solar Regulator MPPT

Required for each unit installed

Model	Part Number	
Solar ChargeMaster SCM-60 MPPT	13190600	

1. Installation of Solar Regulator MPPT

Supporting pictures should be labelled in reference to this document

Subject	Data				Picture
1.1 Mounting orientation (refer to fig.1)					☐
	Yes	☐	No	☐	☐
1.3 Clearance on every side			100mm recommended		☐
1.4 Location within application					☐
1.5 External DC switch installed, between solar panel & regulator	Yes	☐	No	☐	☐
1.6 Solar panel array Wp within	48V - 3600Wp		Yes	☐	
1.7 Solar panel array max. Voltage	115V		Yes	☐	
1.8 Solar panel array max. Current	50A		Yes	☐	
1.9 Battery volt sense used	Yes	☐	No	☐	☐
1.10 Unit set-up via	MasterBus	☐			
1.11 Firmware version					

2. Cable and Fuse information

Subject	Cable size	Fuse rating	Terminal Tightness	
2.1 DC Wiring Input			☐	
2.2 DC Wiring Output			☐	

Fig.1

✓ Vertical (best)

✓ Horizontal

Flat on a surface (least recommended

On Site Acceptance Testing | Smart Battery Hub

Required for each unit installed

Model	Part Number	Data
BEP Smart Battery Hub Twin Engine	80-716-0030-00	☐
BEP Smart Battery Hub Tripple Engine	80-716-0031-00	☐

1. Installation of Smart Battery Hub

Supporting pictures should be labelled in reference to this document

Subject	Data				Picture
1.1 Smart Battery Hub nominal voltage					
1.2 Unit mounted with terminals at the bottom of unit	Yes	☐	No	☐	☐
1.3 Unit accessible for manual operation	Yes	☐	No	☐	☐
1.4 Cables appropriately rated for length & max. current.	Yes	☐	No	☐	☐
1.5 Location within application					☐
1.6 Location subject to excessive vibration	Yes	☐	No	☐	☐
1.7 Start battery chemistry					
1.8 Service battery chemistry					
1.9 Negative connection on pin 10 Deutsch	Yes	☐	No	☐	
1.10 Remote control switches used	Yes	☐	No	☐	☐
1.10a Remote control switches connected as per Navico Group instructions fig 1	Yes	☐	No	☐	☐
1.8 Firmware version					

Fig.1

BSS-2155 Switches

Engine Sw 12V House switch

Deutsch pin	BSS-2155 switch pin	Switch/Function
1	2	SW 12V House -ve
2	3	SW 12V House -ve
3	2	SW Engines -ve
4	3	SW Engines -ve
5		
6	7	SW 12V House LED -ve
7	7	SW Engines LED -ve
8		
9		
10		Battery Negative
11	8	Both battery SW +ve
12		

On Site Acceptance Testing | Fathom M7000X+

1. System Overview

Supporting pictures should be labelled in reference to this document

Individual product OSAT pages to be completed before this page

Subject	Data				Picture
1.1 Number of Fathom engines installed					☐
1.2 Engine Model					☐
1.3 AMS installed for each Fathom engine	Yes	☐	No	☐	☐
1.4 Mercury Wake Harness installed	Yes	☐	No	☐	☐
1.5 Capacity of 48V battery bank					☐
1.6 No. of batteries in 48V battery bank					
1.7 No. CombiMaster/Mass Combi units installed					
1.8 No. Mac Plus units installed					
1.9 CAN-H & CAN -P MBI units installed	Yes	☐	No	☐	☐
1.10 Products are labelled in alignment with CZone configurations/instructions	Yes	☐	No	☐	☐
1.11 Mastervolt USB Interface installed on CZone network as standard	Yes	☐	No	☐	☐
1.12 Fathom indicator/button installed	Yes	☐	No	☐	☐
1.13 CO2 monitors installed	Yes	☐	No	☐	☐
1.14 DDS installed for Fathom circuit logic	Yes	☐	No	☐	☐
1.15 DDS std. harness used to comply with Navico Group Fathom instructions	Yes	☐	No	☐	☐
1.16 Supply to DDS from 12V 24hr service	Yes	☐	No	☐	☐
1.17 Supply to CZone backbone from 12V 24hr service	Yes	☐	No	☐	☐
1.18 CZone backbone supply from dedicated isolated power supply	Yes	☐	No	☐	☐

2. System Operation Procedure

Mastervolt USB interface connected to CZone network, MasterAdjust & CZone configuration tool are required. All checks will be done with the boat in the water & in an operable state, for best results start process with the 48V battery bank below 80%.

Subject	Data			
2.1 Confirm operation of all Mac Plus engine & AMS units				
2.1a Start Engines in propulsion mode and idle in Neutral				
Confirm each engine AMS is in 12V mode	Yes	☐	No	☐
Confirm each engine Mac Plus is in 12V mode	Yes	☐	No	☐
2.1b Put engines in throttle only mode & increase throttle to 1000 rpm				
Confirm each AMS is in 12V mode	Yes	☐	No	☐
Confirm each engine Mac Plus is in 48V mode	Yes	☐	No	☐
2.1c Increase throttle to 2000 rpm				
Confirm each AMS is in 48V mode	Yes	☐	No	☐
Confirm each engine Mac Plus is in 12V mode	Yes	☐	No	☐
2.1d Return to idle				
Confirm AMS in 12V mode	Yes	☐	No	☐
Confirm each engine Mac Plus is in 12V mode	Yes	☐	No	☐
2.1e Shutdown engine				

2.2 Confirm operation of all CombiMasters/Mass Combi Ultra units

2.2a Switch Off house isolator				
Confirm Inverter is Off	Yes	☐	No	☐
2.2b Switch On house Isolator				
Confirm Inverter is On	Yes	☐	No	☐
Confirm each Combi unit has charger state Off (in MasterAdjust or LEDs)	Yes	☐	No	☐
Confirm AC output within tolerance (in MasterAdjust)	Yes	☐	No	☐
2.2c Plug in Shore lead				
Confirm AC input voltage within tolerance (in MasterAdjust)	Yes	☐	No	☐
Confirm each Combi unit has charger state Bulk (MasterAdjust or LEDs)	Yes	☐	No	☐
Confirm DC charge current on MLI batteries (in MasterAdjust)	Yes	☐	No	☐
Confirm AC output within tolerance (in MasterAdjust)	Yes	☐	No	☐
2.2a Remove shore lead				

2.3 Confirm Fathom functionality

2.3a Key switch to Accessory position				
2.3b Switch on Fathom via Fathom button on dash or MFD Fathom GUI.				
Confirm each engine starts & go to idle	Yes	☐	No	☐
Confirm each engine AMS is in 12V mode 	Yes	☐	No	☐
Confirm each engine Mac Plus is in 12V mode 	Yes	☐	No	☐
2.3c While engines are running at idle, shift throttle lever forward (test to be done within 5 minutes)				
Confirm engines DO NOT shift into gear	Yes	☐	No	☐
2.3d Return throttle to Neutral position				
After 5 min delay Confirm each engine increases rpm to setpoint to 2000 rpm	Yes	☐	No	☐
Confirm each AMS is in 48V mode 	Yes	☐	No	☐
Confirm each Mac Plus is in 12V mode 	Yes	☐	No	☐
2.3e On Fathom GUI, select boost mode from menu				
Confirm engines rpm increase to 2500rpm	Yes	☐	No	☐
2.3f On Fathom GUI, select extend mode from menu				
Confirm engines rpm returns to 2000rpm	Yes	☐	No	☐
For Boost & Extend mode review data in Fathom GUI battery hub & watts on to confirm data is reasonable for appliction.*	Yes	☐	No	☐
**Note: Every application will have different data depending on the setup & options (fig.1 alternator current reference)*				
2.3g Disconnect CO alarm from system (DDS fuse 11 on std harness installations)				
Confirm each engine returns to idle	Yes	☐	No	☐
Confirm each engine turns off	Yes	☐	No	☐
2.3h Key switch to Off				
2.3i Key switch to Accessory position				
2.3j Switch on Fathom via Fathom button on dash or MFD Fathom GUI.				
Confirm each engine /Fathom system will not start	Yes	☐	No	☐
2.3k Key switch to Off				
2.3l Reconnect CO alarm to system (DDS fuse 11 on std harness installations)				
2.3m Key switch to Accessory position				
2.3n Switch on Fathom via Fathom button on dash or MFD Fathom GUI.				
Confirm each engine starts & go to idle	Yes	☐	No	☐
Confirm each engine AMS is in 12V mode 	Yes	☐	No	☐
Confirm each engine Mac Plus is in 12V mode 	Yes	☐	No	☐

2.3o On Fathom GUI, turn Fathom system Off				
Confirm engines return to idle	Yes	☐	No	☐
Confirm engines shut down	Yes	☐	No	☐
2.3p Key switch to Off				
2.3q Key switch to Accessory position				
2.3r Trim engines all the way up				
2.3s Push engine start button				
Confirm engines DO NOT start **	Yes	☐	No	☐
***Note: Shut down engines immediately if engines do start*				
2.3t Key switch to Off				

2.4 Confirm Stop Charge circuitry

Stop Charge button for MLI batteries can be found in MasterAdjust after logging in with code 498. Stop Charge must be completed for each battery within the 48V battery bank. Ensure stop charge button is disabled after the test.

2.4a Start Engines in propulsion mode and idle in Neutral				
2.4b Put engines in throttle only mode & increase throttle to 1000 rpm				
Confirm each engine Mac Plus is in 48V mode 	Yes	☐	No	☐
2.4c Enable Stop Charge button for each battery				
Confirm each engine Mac Plus is in Standby mode 	Yes	☐	No	☐
2.4d Disable Stop Charge button for each battery				
Confirm each engine Mac Plus is in 48V mode 	Yes	☐	No	☐
2.4e Increase throttle to 2000rpm				
Confirm each AMS is in 48V mode (after 5min delay) 	Yes	☐	No	☐
2.4f Enable Stop Charge button for each battery				
Confirm battery voltage decreases from 55-57V to 54V & current drops, visible within MasterAdjust on the MLI	Yes	☐	No	☐
2.4g Disable Stop Charge button for each battery				
Confirm battery voltage increases from 54V to 55-57V & current increases, visible within MasterAdjust on the MLI	Yes	☐	No	☐
2.4h Return throttle to idle				
2.4i Key switch to Off				
2.4j shore lead in				
Confirm each Combi unit has charger state Bulk (MasterAdjust or LEDs)	Yes	☐	No	☐
2.4c Enable Stop Charge button for each battery				
Confirm each Combi unit turns Off (MasterAdjust or LEDs)	Yes	☐	No	☐
2.4d Disable Stop Charge button for each battery				
Confirm each Combi unit has charger state Bulk (MasterAdjust or LEDs)	Yes	☐	No	☐

TEST COMPLETE

Fig.1 Alternator current reference

Continuous alternator current per engine installed (thermally stabilized)

Current	Fathom System Mode
75A-85A	Fathom & Extend mode (2000 rpm)
90A-105A	Boost mode (2500 rpm)

Firmware versions additional information

MFD's		CZone configuration tool	
HTML file		Mercury	

On Site Acceptance Testing | Fathom M7000X+

TECHNICAL DOCUMENTATION

Technical documentation is validated and shared with OEM	☐
Quality control document and operating modes are shared with OEM	☐
XML and/or CZone file is created and labelled in reference to this document	☐

SIGNATURES

Validated	☐
Validated with comments	☐
Rejected	☐

Comments :

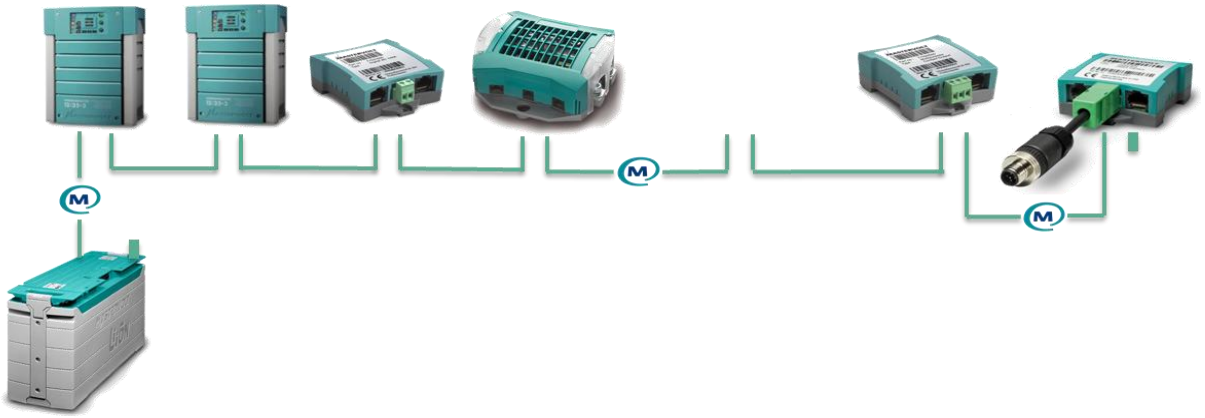
Navico	**OEM**
Date :	Date :
Name :	Name :

MasterBus

The Masterbus network is powered by products with powering capabilities.
Rule for the MasterBus powering: One powering device is required after three non-powering devices.
Products interconnect with CAT5 cable with terminators on either end of the network

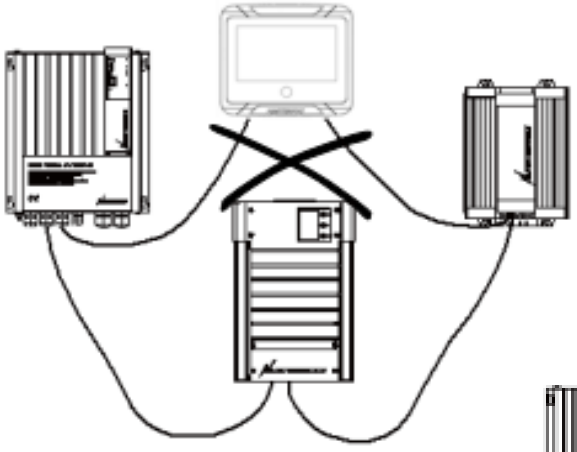
Examples

GOOD

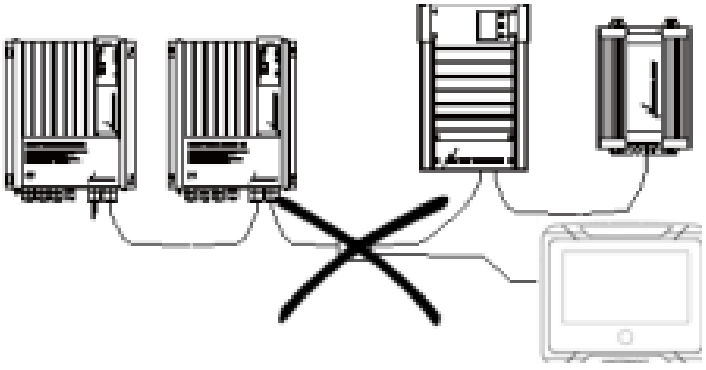


BAD

Do not make ring networks



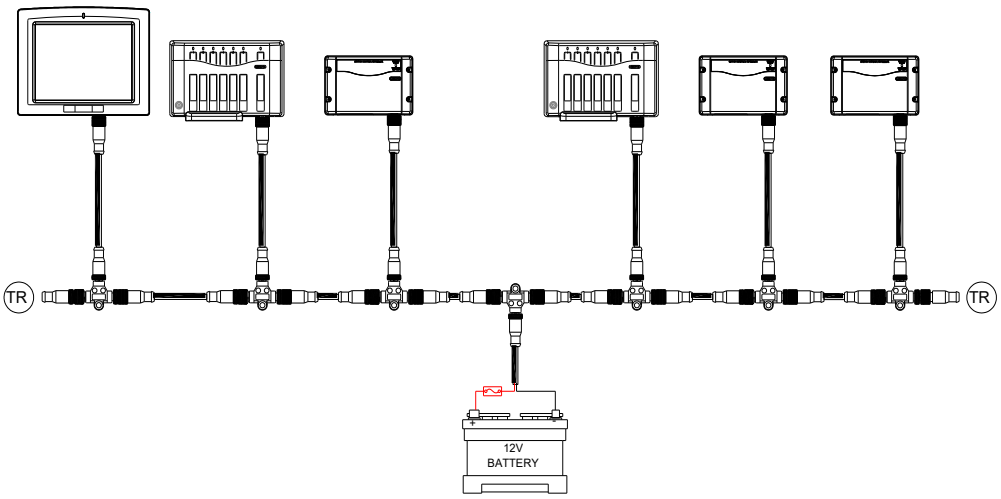
Do not make T connections in the network



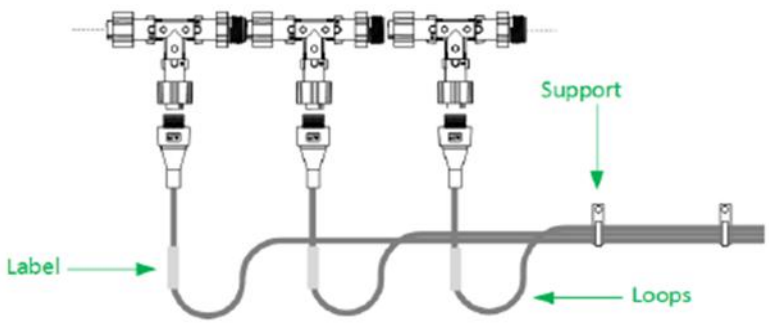
CZONE Network

Ensure the NMEA2000 powerfeed is located in the midpoint of the network.
This reduces the chance of voltage drop on the network.
The CZone NMEA 2000 backbone must be powered by 12VDC.
Stabilized and galvanically isolated is advised.
Drop cables from the backbone to any device must not exceed 6 Meters
Ensure terminating resistors are fitted to each end of the network.
Drops to all modules must be in a T format from the backbone bus, daisy chaining is not allowed.
Maximum size 40 bus nodes or network >100mtr.
Network Bridge Interfacerequired for these large networks

Examples



Good practices



- All cables labeled within 30cm (12inches) of connection point
- Service Loops to allow for Equipment Removal
- Drip Loops in Wet Areas
- Support Wiring every 45cm (18 inches) or less