



EXPLORER AUTONOMOUS SYSTEMS

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Marine Vehicle Diagnostics System Initial Informative Release

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EAS is proudly based in the United States of America

Introduction

The Marine Vehicle Diagnostic System (abbr. EAS-MVDS) is a standardized connector/electrical standard for marine vehicles created by Explorer Autonomous Systems in Q4 of 2024. This standard is designed specifically for unmanned surface vessels, although it can be adapted to any marine vehicle. The standard is meant to extend from propeller driven boats with multiple engines to smaller watercraft such as jet-skis. This system is meant to work with pre-existing systems or work in a new installation. The lack of a standard such as OBD-II (automotive) in marine applications allows manufacturers to make their own standards, leading to the user either having to buy an expensive tool or pay for a costly diagnosis by a dealer. The beauty of OBD-II is the connector is openly available and standardized, allowing for tool prices to be pushed down and information being made readily available. The EAS-MVDS hopes to get rid of this problem and help lessen these costs, this standard shall be readily available under the GNU General Public License Version 3.0 (<https://www.gnu.org/licenses/gpl-3.0.en.html>).

Electrical Standard

The Explorer Autonomous Systems Marine Vehicle Diagnostics System shall use the following pinout on a Duetsch DT04-12PA-L012 receptacle as well as on a Duetsch DT06-12SA-P012 plug.

Pin 1 – AWG:16 – Color: Red 11vDC-29.4vDC Diagnostic port power, constant on	Pin 12 – AWG:20 – Color: White w/ Red Stripe CAN High Auxiliary CAN bus high line
Pin 2 – AWG:16 – Color: Black Chassis/Primary ground Diagnostic port ground	Pin 11 – AWG:20 – Color: Green w/ Red Stripe CAN Low Auxiliary CAN bus low line
Pin 3 – AWG:20 – Color: White CAN High Primary CAN bus high line	Pin 10 – AWG:20 – Color: Gray Sync 3.3v @ 50ms pulse high 50ms pulse low
Pin 4 – AWG:20 – Color: Green CAN Low Primary CAN bus low line	Pin 9 – AWG:18 – Color: Purple Reserved for manufacturer specific functions. High speed data transfer, i2c or other data.
Pin 5 – AWG:20 – Color: Blue Diagnostic RX Serial connection for diagnostics	Pin 8 – AWG:18 – Color: Orange Reserved for manufacturer specific functions. High speed data transfer, i2c or other data.
Pin 6 – AWG:20 – Color: Yellow Diagnostic TX Serial connection for diagnostics	Pin 7 – AWG:18 – Color: Pink Reserved for manufacturer specific functions. High speed data transfer, i2c or other data.

Wires coming from the connector shall be loomed and wrapped with a durable electrical tape such as 3M Super 88+ to prevent damage to wires.

An alternate wire color scheme may be that of solid white wires, gauges still apply.

American Wire Gauge – AWG

Diagnostic Codes

The Explorer Autonomous Systems Marine Vehicle Diagnostics System shall use the following standard codes, additional codes per manufacturer can be added. This is a sample of what EAS EXPL boats use.

Prefix	Subsystem			
P	Power System (batteries)			
M	Motor Control Unit			
N	Navigation (GPS/Compass)			
S	Solar System			
G	Generator/Engine (if applicable)			
F	Fuel System			
D	Diagnostic System			
C	Camera System (if applicable)			
A	Charging System			
Code	Subsystem	Error Description	Severity	Suggested Action
P0100	Power System	Low battery voltage	Warning	Check battery and charging system.
P0101	Power System	Overcharging detected	Critical	Stop charging; inspect charger.
P0102	Power System	Battery temperature too high	Critical	Shut down system; inspect cooling.
M0200	Motor Control Unit	Motor communication failure	Critical	Inspect CAN Bus and motor unit.
M0201	Motor Control Unit	Motor overheating	Critical	Reduce load; inspect motor cooling.
M0202	Motor Control Unit	Propulsion torque imbalance	Warning	Check propeller or motor shaft.
N0300	Navigation (GPS)	GPS signal lost	Warning	Verify GPS antenna and signal.
N0301	Navigation (GPS)	GPS accuracy degraded	Warning	Check GPS module and calibration.
N0302	Navigation (Compass)	Compass calibration error	Warning	Recalibrate compass.
S0400	Solar System	Low solar panel output voltage	Warning	Check panel connection.
S0401	Solar System	Solar panel short circuit	Critical	Disconnect panel; inspect wiring.
S0402	Solar System	Solar controller overheating	Warning	Allow the system to cool down.
G0500	Generator	Generator output low	Warning	Inspect fuel or mechanical issues.
G0501	Generator	Generator overheating	Critical	Shut down generator immediately.
G0502	Generator	Crank/start warning	Warning	Engine did not crank/start
F0600	Fuel system	Low fuel level warning	Critical	Refuel the tank immediately to avoid system shutdown.
F0601	Fuel system	Fuel line pressure	Critical	Check for leaks, clogged filters, or pump malfunctions.
F0602	Fuel system	Fuel contamination detected	Critical	Drain and replace fuel, clean fuel system components
D0700	Diagnostic System	CAN Bus communication failure	Critical	Inspect CAN Bus wiring and devices.
D0701	Diagnostic System	Fault code memory full	Warning	Clear memory or increase capacity.
D0702	Diagnostic System	PC connection lost	Warning	Check PC and diagnostic system.
C0800	Camera DVR System	No video input	Warning	Check camera connection and DVR.
C0801	Camera DVR System	DVR recording error	Warning	Verify storage and DVR health.
C0802	Camera DVR System	Capture card overheating	Warning	Inspect cooling or reduce workload.

Code	Subsystem	Error Description	Severity	Suggested Action
A0900	DC Charger Port	Charger not detected	Critical	Verify the connector is properly seated.
A0901	DC Charger Port	Low charging current	Warning	Check charger and cable for faults.
A0902	DC Charger Port	Overvoltage detected	Critical	Stop charging; inspect charger output.
A0903	DC Charger Port	High port temperature	Critical	Shut down charging; inspect port and surroundings for overheating.
A0904	DC Charger Port	Loose or corroded connection	Warning	Clean connector contacts and ensure a tight fit.
A0905	DC Charger Port	Voltage mismatch	Critical	Confirm charger output voltage matches system requirements.
A0906	DC Charger Port	Reverse polarity detected	Critical	Disconnect and correct cable polarity.
A0907	DC Charger Port	Current draw exceeds port limit	Critical	Stop charging; inspect system for excessive load.
A0908	DC Charger Port	Environmental contamination detected	Warning	Inspect and clean the connector for dirt or moisture.