



Excellence in Compliance Testing

5015 B. U. Bowman Dr.
Buford, GA 30518

Wednesday, February 24, 2016

Johnson Outdoors Marine Electronics, Inc.:
678 Humminbird Lane
Eufaula, AL 36027
USA
Seth Bergman
sbergman@johnsonoutdoors.com

Our investigation of the PiranhaMAX4 DI has concluded. The results of the investigation are listed below.

Customer requested tests from the following test standard(s) and/or specification(s):

HD SI COMBO	TEST DESCRIPTION	RESULT
EN 60945:2002	Section 11.2 Compass Safe Distance	PASSED

Testing was concluded on January 7, 2016 at our facility in Buford, GA.

This letter accompanies the test data for this product and any other supporting documentation of the testing performed. As always, let me know if you have any questions about the project or specific data. Thank you.

If you have any additional questions, please contact me.

Kind Regards,

Wayne Orwig
EMC Technician



Excellence in Compliance Testing

5015 B. U. Bowman Dr.
Buford, GA 30518

Test Results

The minimum Compass Safe Distance of this device is 70 CM to the Standard Compass and 51 CM to the Steering Compass.

Test Equipment

Test Equipment

AssetID	Manufacturer	Model #	Equipment Type	Serial #	Last Calibration Date	Calibration Due Date
350	Cammenga	3H	General Lab Equipment	21-26460-02E	NCR	NCR
456	ACS	MG1-1	Antennas	456	NCR	NCR
239	Walker Scientific	ELF-50D	Sensors	K72387-4	12/21/2015	12/21/2016

NCR = No Calibration Required

Test Methodology

Each unit of the EUT shall be tested in the position and altitude relative to the compass or magnetometer which the error produced at the compass would be a maximum, provided the item can be fitted in this way.

The compass safe distance of any unit of the EUT is defined as the distance between the nearest point of the unit and the center of the compass or magnetometer at which it will not produce a deviation in the standard compass of more than 5.4 degree/H where H is the Horizontal component of the magnetic flux density in uT (microtesla) at the place of testing.

For steering compass, the standby steering compass and the emergency compass, the permitted deviation is 18 degree/H, H being defined as above.

Each unit of the EUT shall be tested:

- In the magnetic condition in which it is received with the EUT un-powered;
- After normalizing with the EUT un-powered;
- In the power condition, if the unit is capable of being energized electrically.

Normalizing means a procedure to maximize the homogeneity of the magnetic flux in the EUT by placing it in Helmholtz coils or by other adequate means.

In each of the above tests, the unit shall be rotated to determine the direction in which it produced the maximum deviation.



Excellence in Compliance Testing

5015 B. U. Bowman Dr.
Buford, GA 30518

Test Setup Photographs



Compass Safe Distance Test Setup



Compass Safe Distance Test Setup



Excellence in Compliance Testing

5015 B. U. Bowman Dr.
Buford, GA 30518

Compass Safe Distance Test

Test Parameters:

Test Date:	January 7, 2016	Temperature (°C)	23
Technician:	Art Sumner/Chris O'Steen	Humidity (%)	29
Equipment Tested:	PiranhaMAX 4 DI	Barometric Pressure (mBar)	1016
Tested Modes:	Unpowered and powered as per test method		
AC Input Power:	N/A		
DC Input Power:	12V		

Orientation	Angle of Deflection (0.25/0.8)	Standard Compass Distance	Steering Compass Distance	Mode
0	(0.25/0.8)	36	21	As received, EUT unpowered
90	(0.25/0.8)	50	30	As received, EUT unpowered
180	(0.25/0.8)	44	20	As received, EUT unpowered
270	(0.25/0.8)	68	41	As received, EUT unpowered
0	(0.25/0.8)	55	34	Unpowered, normalized on X axis
90	(0.25/0.8)	65	36	Unpowered, normalized on X axis
180	(0.25/0.8)	40	20	Unpowered, normalized on X axis
270	(0.25/0.8)	56	38	Unpowered, normalized on X axis
0	(0.25/0.8)	50	25	Unpowered, normalized on Y axis
90	(0.25/0.8)	47	20	Unpowered, normalized on Y axis
180	(0.25/0.8)	44	25	Unpowered, normalized on Y axis
270	(0.25/0.8)	38	22	Unpowered, normalized on Y axis
0	(0.25/0.8)	63	38	Unpowered, normalized on Z axis
90	(0.25/0.8)	70	51	Unpowered, normalized on Z axis
180	(0.25/0.8)	64	38	Unpowered, normalized on Z axis
270	(0.25/0.8)	65	41	Unpowered, normalized on Z axis
0	(0.25/0.8)	70	40	EUT powered
90	(0.25/0.8)	70	45	EUT powered
180	(0.25/0.8)	70	39	EUT powered
270	(0.25/0.8)	57	28	EUT powered

Notes:

Normalizing was performed with 139A/m @ DC for 1 minute in each of three axis.