

Summary of Environmental tests performed on Vega reader (with M5e module)
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Low Temperature Operation

Six units powered with 12VDC while running test script. Units then subjected to low temperature test at -40C for 24 hours. All units operated properly before, during, and after completing the low temperature test.

High Temperature Operation

Six units powered with 12VDC while running test script. Units then subjected to low temperature test at +75 C for 24 hours. All units operated properly before, during, and after completing the high temperature test.

Temperature Cycling

Six units subjected to 15 cycles from -40 C to +75C with 2 hour ramps and soaks. Samples were powered with 12 VDC for 5 hours during the high temperature ramp and soak. The samples were powered off after crossing 25 C on the ramp down and during the -40 C soak. The samples were monitored while running an operating test script during all 15 cycles. All units operated properly before, during, and after completing the temperature cycling test.

Powered Vibration Endurance

Six units, operating, were rigidly attached to a test table. The samples were powered with 12 VDC and monitored while running a test script. The samples were subjected to 20 minute sweeps for 6 hours in each of the three mutually perpendicular axes. All six units operated properly before, during, and after completing the endurance vibration in each axis. No visual deformities were observed.

Vibration profile:

Acceleration	Frequency
10mm p-p	5-15 Hz
4.5 g	15-25 Hz
2 g	25-100 Hz
0.5 g	100-200 Hz
20 minutes per sweep; 18 total sweeps per axis	

Medium Mechanical Shock

Six units, non-operating, were rigidly attached to a mechanical shock table and subjected to 1 positive and 1 negative 100g, 10 msec sine wave shock pulses in each of the three mutually perpendicular axis. All units operated properly before and after completing the six half sine shock pulses. No visual deformities were observed.

Temperature and Humidity Cycling

Six units were placed inside an environmental chamber. The samples were powered with 12 VDC for 18 hours during the high temperature/humidity ramps and soaks. The samples were power off during the ramp down to -10 C and remained off until the ramp back to high temperature/humidity. The powered samples were monitored while running a test script during all 5 cycles. All six units operated properly before and during the temperature and humidity cycling. No visual deformities were found after testing.

Water Drip

Unit was subjected to water drip testing with all cables attached. Unit was subjected to 2 drops of water per second for one hour in two orientations. A horizontal position with the flanges up followed by a vertical position with connectors down. No anomalies were noted during testing.

Connector Strength

Connector strength was tested under the following conditions:

- All cables pulled with a force of 98 N for one minute
- All connectors were pushed with a force of 157 N for one minute
- (Connector torque test) 39 N of force applied to all four sides of the harness connector for one minute perpendicular to the direction of mating
- (Connector durability test) Each system connected 11 times by hand, never exceeding 4 seconds per connection