



Hyperloop Cord Winder for 6' x 3/16" Braided
Cords

HCW6316B-T101

04/29/2020

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PURPOSE

The purpose of test T101 is to determine the functionality of the first iteration (iteration # 041420) of HCW6316B.

INITIAL CONDITIONS

Initial conditions for the test are: device is assembled and lubricated within tolerances, test cord is on standby, test rig is set up.

MATERIALS

- Test Rig
- Camera
- Test Cord
- Data Sheet

PASS OR FAIL CRITERIA

Criteria for PASS

- Empty device
 - Winding mechanism turns easily with little to no friction.
 - Case opens, closes and locks as intended
- Loaded device
 - Winding mechanism turns relatively easily, little to moderate friction.
 - Device winds up cord by twisting the winding knob.
 - Device unwinds cord by pulling on both ends of the cord

Criteria for FAIL

- Empty device
 - Winding mechanism does not turn easily with moderate to severe friction, or difficult to impossible to turn by hand.
 - Case cannot be opened, closed, or locked as intended.
 - If any of the parts break during the test.
- Loaded device
 - Winding mechanism does not turn relatively easily with severe friction, or difficult to impossible to turn by hand.
 - Device cannot fit the entire wound cord into the case after winding.
 - Device jams or breaks.

PROCEDURES

Procedures for empty device

- Hook device into test rig.
- Use force meter to measure force of winding mechanism while motor turns the knob.
- Document findings in Data Sheet.

Procedures for loaded device

- Hook device into test rig.
- Use force meter to measure force of winding mechanism while motor turn the knob for rewinding.
- Use force meter to measure force for unwinding the device.
- Document findings in Data Sheet.

SAFETY CONSIDERATIONS

The test rig is encased behind Plexiglas, if anything breaks, all shrapnel will be enclosed in the test rig.

DATA

All collected measured data is in units of force. It can be displayed on a force/time graph.

RESULTS

- Winding mechanism turned with severe friction, in some cases getting stuck. Tolerance between winding mechanism and case are too low.
- Parts required significant sanding and lubricant to get close to intended operation.
- Hinges were 1/8" too small. Problem with design.
- Screw caps came out as flat disks, determined they are too small with too small of details to be effectively printed.

- Loaded device rewound relatively easily.
- Unwinding the device broke the case walls on the WCL. Requires further investigation for reason.

Final assessment:

- Production and assembly: FAIL
 - Increase tolerance on winding mechanism.
 - Redesign hinges.
 - Omit screw caps
- Empty operation: PASS
- Loaded operation: FAIL
 - Investigate case wall failure. Redesign WCL and WCU accordingly.