

PRODUCT ADVISORY NOTICE

KEEPING YOU INFORMED OF PRODUCT CHANGES

To: All Customers, Sales Representatives and Distributors

Date: September 28, 2016

Subject: Re-tooling 62S Series 32, 20, and 12 Position Bushing

Please forward this notification to the appropriate person(s) in your organization.

Description of Change

Grayhill has re-tooled the 62S series 32, 20, and 12 position die cast bushing due to excessive wear on the existing tool. Grayhill has also made a very slight change to the detent profile to improve torque at the end of encoder life. See attached drawing. This change does not affect the initial torque specifications.

Grayhill has successfully completed qualification testing on encoders built with bushings from the new tool. The qualification consisted of an approved supplier PPAP and rotational life testing to the rated cycle life.

Reason for the Change

The die cast bushing had to be re-tooled since the old tool is reaching its end of life.

Test reports summarizing our qualification testing is attached. No change to the form, fit, or function of the encoders will take place.

Effective Date

Grayhill will begin phasing in the new bushings on 10/21/16.

Part Numbers Affected

62S11-XX-XXX					
62S18-XX-XXX					
62S30-XX-XXX					

Action Required

No action required. Please contact your Grayhill, Inc. customer advocate for further information or to request a sample. The qualification test report can be found on our website at:
<http://www.grayhill.com/about-us/product-advisory-notices/>





Intuitive Human Interface Solutions

Equipment Under Test:
62S11-M5-020C

Environmental Test:

Physical Test:
Rotational Life Cycle Test

Test Report Number:	SP02-1464
Test Start Date:	2/18/2016
Test Completion Date:	4/14/2016
Test Facility:	Grayhill Rotational Life Cycle Lab
Test Requested By:	Eric Tan
Test Performed By:	Jamall Davis Laboratory Technician
Report Written By:	Jamall Davis Laboratory Technician
Report Approved By:	Nicole Jachna Quality Lab Manager

1.0 PURPOSE

62S rotational life with new Inventix bushing design, to ensure the encoders are free from manufacturing defects.

2.0 TESTING PERFORMED

Encoders were tested in accordance with MIL-STD-202G, Method 206.

Test Profile and Setup Details:

- A. Take initial torque readings
- B. Program Smart Motors to rotate encoders at 15 CPM to 1M cycles
- C. Mount encoders 36-45 in the normal orientation in the test fixture
- D. Check for torque at 100, 250, 500, 1K, 2K, 5K, 10K, 100K, 250K, 500K and 1M cycles
- E. Repeat steps C and D
- F. Take final torque readings

Table 1 – Equipment List

Equipment ID	Equipment Type	Model Number	Manufacturer	Calibration Due Date
PAL-7	Torque Sensor	BGI	Mark-10	9-16
GT-400	Torque Wrench	CAL-36/4 Roto Torq	Sturtevant Richmond	4-16
RLS-39 w/fix #41	Rotational Life Cycle Assy.	N/A	Grayhill	N/A
RLS-63 w/fix #16	Rotational Life Cycle Assy.	N/A	Grayhill	N/A
RLS-74 w/fix #40	Rotational Life Cycle Assy.	N/A	Grayhill	N/A

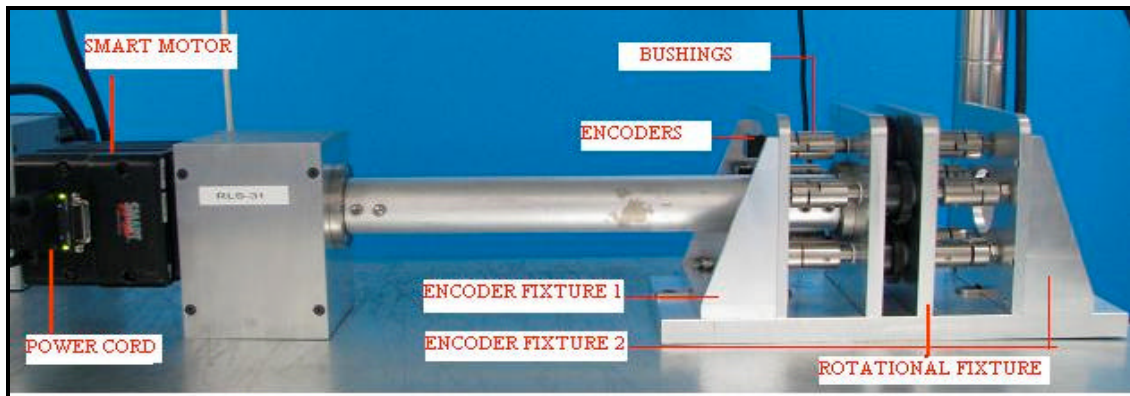


Figure 1 -Test Setup Photo

Table 2 – Test Conditions

Test Condition	Units	Parameters
Quantity	DUT	30
Operational Mode		Unpowered
Cycles		1M cycles in CW/CCW
Rotational Speed	CPM	15
Temperature	?C	23
Relative Humidity	%	30

3.0 TESTING SUMMARY

Acceptance Criteria:

All units under test are subject to the same pass/fail criteria. A test unit is deemed to have failed if the encoder has a bind of the switch shaft or if the spring has failed (no detent). Although torque readings are taken, the failure criterion is easily identified as increased torque, drag or binding of the shaft/bushing interface.

Table 3 – Test Results

All units passed the required cycles of 1000K.

DUT	Test	Specification	Pass	Test Location	Test Date
62S11-M5-020C	Rotational	MIL-STD-202G, Method 206	PASS	Grayhill Inc.	2/18/2016 4/14/2016



Intuitive Human Interface Solutions

Device Under Test:
62S30-H9-020C

Environmental Test:

Physical Test:
Rotational Life

Test Report Number:	SP02-1506
Test Start Date:	05/11/2016
Test Completion Date:	06/19/2016
Test Facility:	Grayhill Inc.
Test Requested By:	Eric Tan
Test Performed By:	Greg Dombrowski Laboratory Technician
Report Written By:	Greg Dombrowski Laboratory Technician
Report Approved By:	Nicole Jachna Quality Lab Manager

1.0 ROTATIONAL LIFE

Test	Specification	DUT Part Number	DUT Serial Number	Test Location	Test Date
Rotational Life	PS62	62S30-H9-020C	1-30	Grayhill Inc.	05/11/2016 – 06/19/2016

1.1. PURPOSE

Rotationally life test DUT with new Inventix bushing design

1.2. TEST SETUP DETAILS

1. Take initial torque readings
2. Program Smart Motors to rotate DUT at 30 RPM to intervals cycles of 100, 250, 500, 1,000, 2,000, 5,000, 10,000, 100,000, 250,000 and 500,000
3. Mount DUT on test fixture using maximum mounting torque.
4. Check torque readings after each specified interval cycles
5. Torque readings should not be more than 50% of initial readings for the duration of testing and final
6. Perform a final visual inspection and a final torque test.

Table 1 – Equipment List

Equipment ID	Equipment Type	Model Number	Manufacturer	Calibration Due Date
PAL-7	Torque Sensor	BGI	Mark-10	08/2016
GT-400	Torque Wrench	CAL-36/4 Roto Torq	Sturtevant Richmond	04/17
RLS-62 w/fix #12	Rotational Life Cycle Assy.	N/A	Grayhill	N/A
RLS-101 w/fix #100	Rotational Life Cycle Assy.	N/A	Grayhill	N/A
RLS-43 w/fix #36	Rotational Life Cycle Assy.	N/A	Grayhill	N/A

Table 2 – Test Conditions

Test Condition	Units	Parameters
Quantity	DUT	30
Operational Mode		Unpowered
Cycles		500K cycles in CW/CCW
Rotational Speed	RPM	30
Temperature	?C	23
Relative Humidity	%	30

1.3. ACCEPTANCE CRITERIA

There shall be no physical damage to the DUT and torque readings shall not exceed 50% of initial during and after test.

1.4. TEST RESULTS

30 out of 30 DUT finished the test with torque with greater than 50% of initial.

Table 3 – Test Results

DUT	100 Cycles Torque	250 Cycles Torque	500 Cycles Torque	1K Cycles Torque	2K Cycles Torque	5K Cycles Torque
1	Pass	Pass	Pass	Pass	Pass	Pass
2	Pass	Pass	Pass	Pass	Pass	Pass
3	Pass	Pass	Pass	Pass	Pass	Pass
4	Pass	Pass	Pass	Pass	Pass	Pass
5	Pass	Pass	Pass	Pass	Pass	Pass
6	Pass	Pass	Pass	Pass	Pass	Pass
7	Pass	Pass	Pass	Pass	Pass	Pass
8	Pass	Pass	Pass	Pass	Pass	Pass
9	Pass	Pass	Pass	Pass	Pass	Pass
10	Pass	Pass	Pass	Pass	Pass	Pass
11	Pass	Pass	Pass	Pass	Pass	Pass
12	Pass	Pass	Pass	Pass	Pass	Pass
13	Pass	Pass	Pass	Pass	Pass	Pass
14	Pass	Pass	Pass	Pass	Pass	Pass
15	Pass	Pass	Pass	Pass	Pass	Pass
16	Pass	Pass	Pass	Pass	Pass	Pass
17	Pass	Pass	Pass	Pass	Pass	Pass
18	Pass	Pass	Pass	Pass	Pass	Pass
19	Pass	Pass	Pass	Pass	Pass	Pass
20	Pass	Pass	Pass	Pass	Pass	Pass
21	Pass	Pass	Pass	Pass	Pass	Pass
22	Pass	Pass	Pass	Pass	Pass	Pass
23	Pass	Pass	Pass	Pass	Pass	Pass
24	Pass	Pass	Pass	Pass	Pass	Pass
25	Pass	Pass	Pass	Pass	Pass	Pass
26	Pass	Pass	Pass	Pass	Pass	Pass
27	Pass	Pass	Pass	Pass	Pass	Pass
28	Pass	Pass	Pass	Pass	Pass	Pass
29	Pass	Pass	Pass	Pass	Pass	Pass
30	Pass	Pass	Pass	Pass	Pass	Pass

DU T	10K Cycles Torque	100K Cycles Torque	250K Cycles Torque	500K Cycles Torque
1	P ASS	P ASS	P ASS	P ASS
2	P ASS	P ASS	P ASS	P ASS
3	P ASS	P ASS	P ASS	P ASS
4	P ASS	P ASS	P ASS	P ASS
5	P ASS	P ASS	P ASS	P ASS
6	P ASS	P ASS	P ASS	P ASS
7	P ASS	P ASS	P ASS	P ASS
8	P ASS	P ASS	P ASS	P ASS
9	P ASS	P ASS	P ASS	P ASS
10	P ASS	P ASS	P ASS	P ASS
11	P ASS	P ASS	P ASS	P ASS
12	P ASS	P ASS	P ASS	P ASS
13	P ASS	P ASS	P ASS	P ASS
14	P ASS	P ASS	P ASS	P ASS
15	P ASS	P ASS	P ASS	P ASS
16	P ASS	P ASS	P ASS	P ASS
17	P ASS	P ASS	P ASS	P ASS
18	P ASS	P ASS	P ASS	P ASS
19	P ASS	P ASS	P ASS	P ASS
20	P ASS	P ASS	P ASS	P ASS
21	P ASS	P ASS	P ASS	P ASS
22	P ASS	P ASS	P ASS	P ASS
23	P ASS	P ASS	P ASS	P ASS
24	P ASS	P ASS	P ASS	P ASS
25	P ASS	P ASS	P ASS	P ASS
26	P ASS	P ASS	P ASS	P ASS
27	P ASS	P ASS	P ASS	P ASS
28	P ASS	P ASS	P ASS	P ASS
29	P ASS	P ASS	P ASS	P ASS
30	P ASS	P ASS	P ASS	P ASS



Intuitive Human Interface Solutions

Equipment Under Test:
62S18-M5-020C

Environmental Test:

Physical Test:
Rotational Life Cycle Test

Test Report Number:	SP02-1382
Test Start Date:	January 23, 2016
Test Completion Date:	February 17, 2016
Test Facility:	Grayhill Rotational Life Cycle Lab
Test Requested By:	Eric Tan
Test Performed By:	Jacob Tilton Laboratory Technician II
Report Written By:	Jacob Tilton Laboratory Technician II
Report Approved By:	Nicole Jachna Quality Lab Manager

1.0

2.0 PURPOSE

The purpose of this effort is to rotationally life test the 62S18-M5-020C rotational life with new Inventix bushing design.

3.0 TESTING PERFORMED

Encoders were tested in accordance with MIL-STD-202G, Method 206.

Test Profile and Setup Details:

1. Take initial torque readings
2. Program Smart Motors to rotate encoders at 30 CPM to test request intervals
3. Mount encoders on test fixtures
4. stop for torque at 100, 250, 500, 1000, 2000, 5000, 10000, 100000, 250000, 500000, 1000000 to verify detent
5. Take final torque readings

Table 1 – Equipment List

Equipment ID	Equipment Type	Model Number	Manufacturer	Calibration Due Date
RLS-84 w/fix #32	Rotational Life Cycle Assy.	N/A	Grayhill	N/A

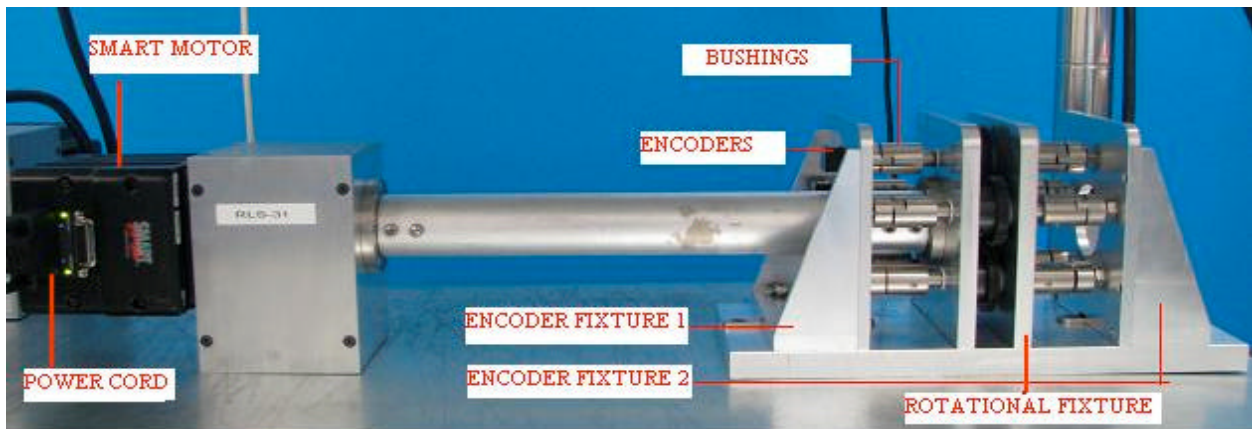


Figure 1 -Test Setup Photo

Table 2 – Test Conditions

Test Condition	Units	Parameters
Quantity	DUT	30
Operational Mode		Unpowered
Cycles		1M cycles in CW/CCW
Rotational Speed	CPM	30
Pass/Fail		See criteria below
Temperature	?C	22.5
Relative Humidity	%	13.8

4.0 TESTING SUMMARY

Acceptance Criteria:

All units under test are subject to the same pass/fail criteria. A test unit is deemed to have failed the test if the encoder has a torque below 50% of initial.

Table 3 – Test Results

30 out of 30 DUT finished the test with torque with greater than 50% of initial.

DUT	Test	Specification	Pass	Test Location	Test Date
30	Rotational	MIL-STD-202G, Method 206	PASS	Grayhill Rotational Life Cycle Lab	1/23/2016 2/17/2016