

**FAX COVER SHEET**

TO	
COMPANY	
FAX NUMBER	13018165100
FROM	RochesterFax
DATE	2019-09-23 12:27:09 EDT
RE	Rotork Part 21 Fax to NRC

**COVER MESSAGE**

**Samantha Frank**  
Administrative Assistant

☎ (585) 247-2304 ext. 10241  
✉ [samantha.frank@rotork.com](mailto:samantha.frank@rotork.com)

Rotork Controls, Inc.  
675 Mile Crossing, Blvd.  
Rochester, NY 14624

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for Future Generations

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**FAX**

**To: NRC Operations Center**

**From: Patrick A Shaw**

**Fax: (301) 816-5100**

**Pages: (including cover) 8**

**Phone: (585) 770-1019**

**Date: 09/23/2019**

**Re:**

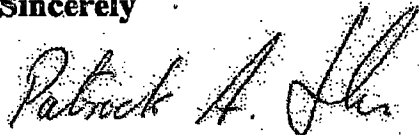
**CC:**

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**Dear Sir/Madame,**

**Please find Attached a Part 21 notification from Rotork Controls Inc.  
concerning a safety related "Outer Clutch Ring", part number N40039.**

**Sincerely**



**Patrick A. Shaw, P.E  
(Quality Manager)**

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To: US NRC Staff  
From: Patrick A. Shaw, P.E.  
Date: 09/20/2019

Subject: NA Actuator, Model NA1, Outer Clutch Ring Anomaly

Rotork has identified a potential concern as defined under 10CFR Part 21 with model NA1 and NA5 nuclear safety related actuators manufactured between January 1<sup>st</sup> 1979 and December 31<sup>st</sup> 1982. Switch mechanism in these actuators utilize an Outer Clutch Ring (N40039) made from beryllium copper. A customer has reported (4) instances of Outer Clutch Ring failure between 2000 and 2019. All failures occurred in Outer Clutch Rings made from beryllium copper.

The Outer Clutch Ring is part of the actuator's control switch mechanism. Failure of the Outer Clutch Ring results in:

- 1) lost travel limit switch operation in open and closed directions.
- 2) lost auxiliary switch operation for open and closed indication limits.
- 3) lost mechanical torque latch operation, if fitted.

Torque limit sensing is not affected. AOP operation is not affected.

Affected products are all NA1 and NA5 actuators and spare switch mechanisms manufactured between January 1<sup>st</sup> 1979 and December 31<sup>st</sup> 1982. In 1982 Rotork Engineering Change P1469 changed to Outer Clutch Ring material to spring steel. The documented reason for change was "To improve setting and operation. Material has been changed to Spring Steel".



Job numbers for NA1 actuators, NA5 actuators and spare switch mechanisms shipped between January 1<sup>st</sup> 1979 and December 31<sup>st</sup> 1982 cannot be provided. The number of affected actuators remaining installed is thought to be low and those still installed are approaching the end of their 40 year service life. The reported failures occurred in 2000 (1 off), 2005 (2 off) and 2019 (1 off). Rotork could not establish the cause of these four failures reported over 19 years in products now more than 37 years old.

Rotork cannot assess the risk further. Rotork recommends licensed operators assess this potential failure mode if actuators from this date range are still installed and should consider risk if affected actuators are to remain in service beyond 40 years.

Sincerely

A handwritten signature in black ink, appearing to read "Patrick A. Shaw", written over a horizontal line.

Patrick A. Shaw, P.E

Quality Manager

Tel (585) 770-1019

[Patrick.Shaw@rotork.com](mailto:Patrick.Shaw@rotork.com)

A handwritten signature in black ink, appearing to read "Jeremy Sharkey", written over a horizontal line.

Jeremy Sharkey

Site Director



Required information as per 10CFR Part 21.21(d)(4) Follows:

- (i) *Name and address of individual or individuals informing the Commission.*

Patrick A. Shaw, P.E  
Rotork Controls Inc.  
675 Mile Crossing Blvd  
Rochester, New York  
14624

- (ii) *Identification of the facility, the activity, or the basic component supplied for such facility or such activity within the United States which fails to comply or contains a defect.*

Rotork part number = N40039. Description = Outer Clutch Ring. Item is incorporated into a basic assembly called the switch mechanism. Switch mechanisms are assembled and calibrated by Rotork Controls Limited.

- (iii) *Identification of the firm constructing the facility or supplying the basic component which fails to comply or contains a defect.*

Rotork Controls Limited  
Brassmill Lane  
Bath, England  
BA1 3JQ

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- (iv) *Nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply.*

The Outer Clutch Ring is part of the Switch Mechanism; an assembly designed to stop the actuator on either travel limit or rated output torque limit. Indication of these limits is provided through the operation of electrical switches within the switch mechanism. The Outer Clutch Ring is part of the mechanism that applies and maintains force to switch plungers once limits are reached. If the Outer Clutch Ring fractures, the force needed to depress and hold the switch plungers cannot be applied causing the observed loss of indication that alerted the licensed operator.

Failure of the Outer Clutch ring prevents the actuator from stopping on travel limit. Should this occur the actuator will over travel and eventually stop on output torque limit set by the customer. The Outer Clutch Ring (Fig1, 120) wraps around a component called the inner traveler (Fig 1, 106) and prevents it rotating until it reaches the set travel limit position (Fig 1, 107 & 121). The Outer Clutch Ring slips on the inner traveler if necessary. Slip in service should not occur. Slip may occur during commissioning and test.

The cause of the component failure is not understood. All failures occurred at the same point in the component. The form of the fractures are similar (Fig 2). The Outer Clutch Ring is seated onto the inner traveler by initially over tightening the cap-screw (Fig 1, 119) used to set the torque at which the Outer Clutch Ring slips on the inner traveler. Over tightening to seat may have introduced a weakness. The same method is used to seat spring steel Outer Clutch Rings. There are no records of

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spring steel Outer Clutch Ring failures by either licensed utilities or from within Rotork's NCR system. No other licensed utility has reported failures in beryllium copper Outer Clutch Rings.

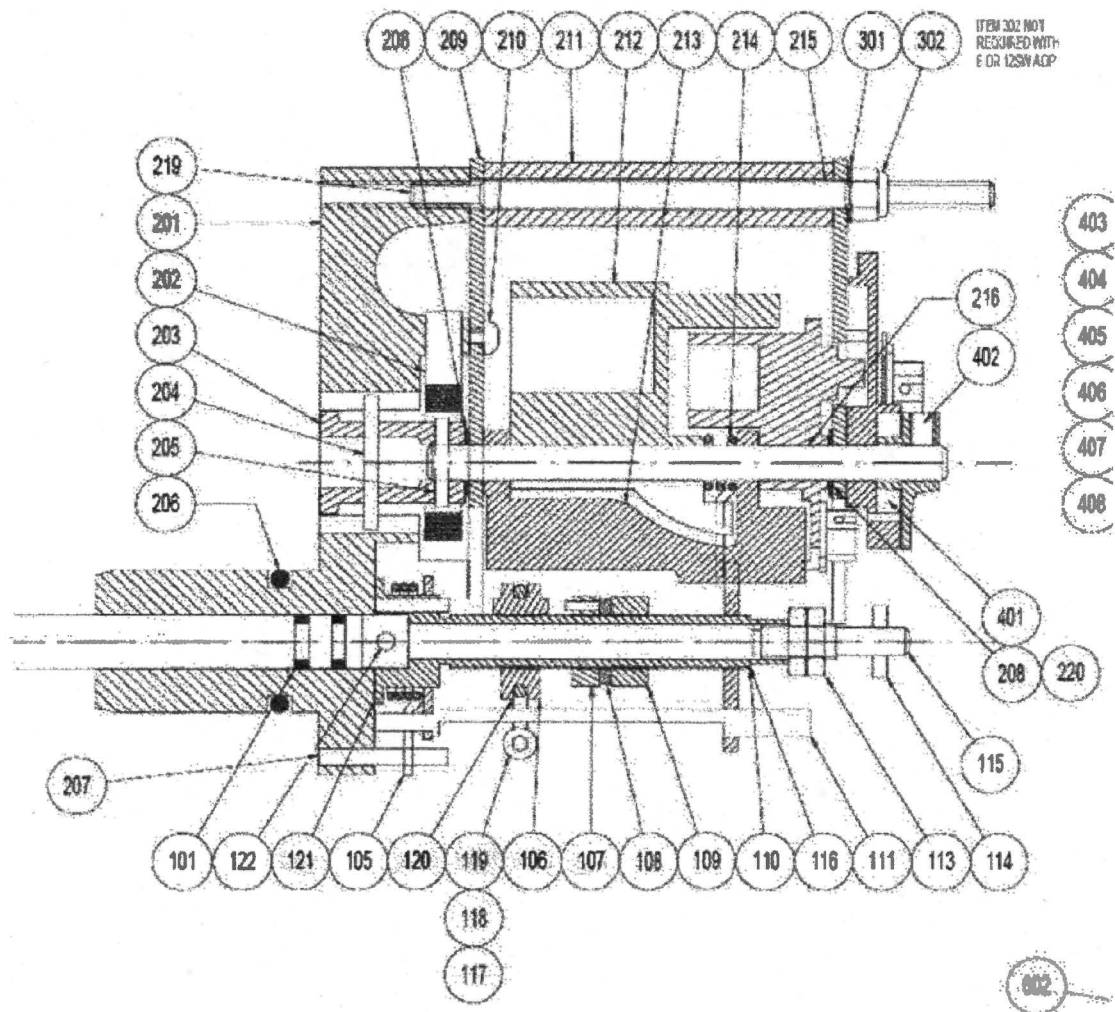


Fig 1

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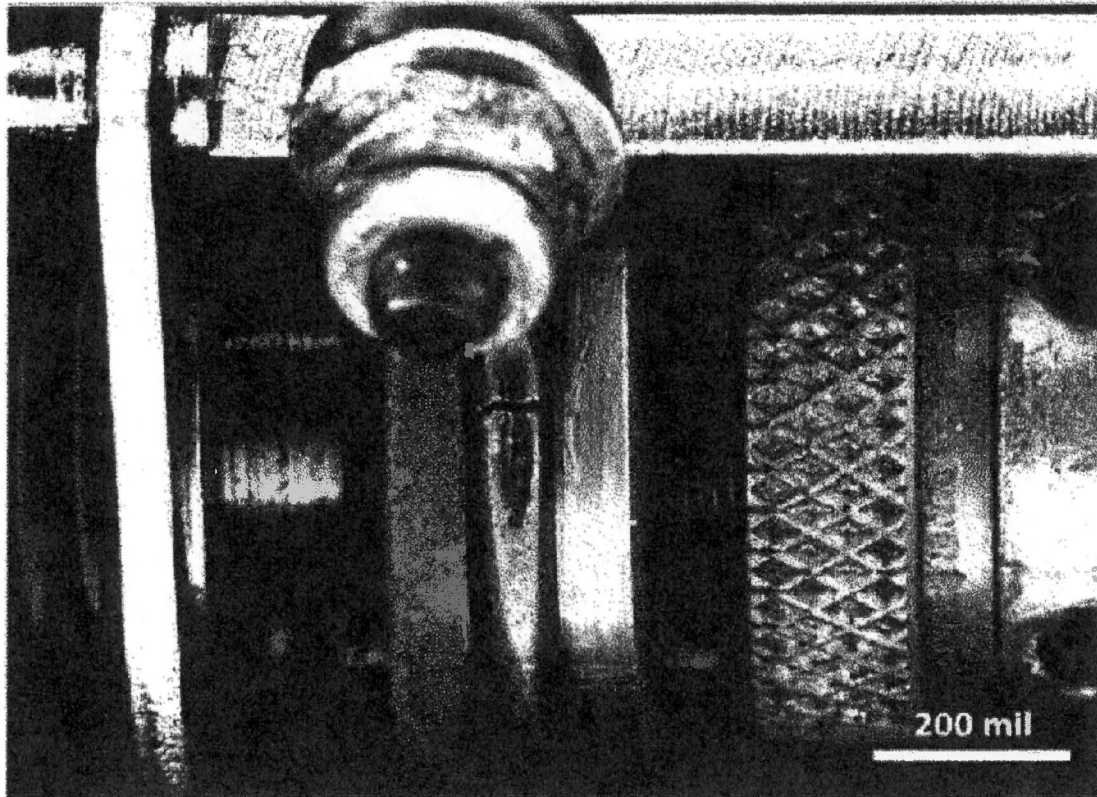


Fig 2

- (v) *The date on which the information of such defect or failure to comply was obtained.*

Rotork NCR221205, opened June 17<sup>th</sup> 2019.

- (vi) *In the case of a basic component which contains a defect or fails to comply, the number and location of these components in use at, supplied for, being supplied for, being supplied for, or may be supplied for, manufactured, or being manufactured for one or more facilities or activities subject to the regulations of this part.*

The information cannot be retrieved for this time period.





- (vii) *The corrective action has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action.*

Rotork have developed a repair kit (WN 84122) which replaces the beryllium copper Outer Clutch Ring with a spring steel version.

- (viii) *Any advice related to the defect or failure to comply about the facility, activity, or basic component that has been, is being, or will be given to purchasers or licensees.*

U.S Licensees with either installed or in storage actuators and spare switch mechanisms provided within the stated dates should evaluate the impact of an Outer Clutch Ring failure on safety related systems.

- (ix) *In the case of an early site permit, the entities to whom an early site permit was transferred.*

Not Applicable