



Fax Cover Sheet

To:

Fax Number: 13018165151

Subject: 10CFR Part 21 Notification for Curtiss-Wright Supplied RCS-Dresser Actuator P/N: SURE-24-10-4

From: "Hover, Margie" <mhover@curtisswright.com>

Fax#: 855-305-6216

Date: 04/07/22 01:57:51 PM

Total Pages: 19 including this cover page

Memo: Good afternoon,

Attached is the above supporting documentation for 10CFR Part 21 Notification for Curtiss-Wright Supplied RCS-Dresser Actuator P/N: SURE-24-10-4.

Please provide proof of receipt.

Sincerely,

Margie Hover

Document Control Technician

Curtiss-Wright

4600 East Tech Drive, Cincinnati, OH 45245 UNITED STATES

T: 513.201.2101

mhover@curtisswright.com | www.curtisswright.com/NuclearDivision

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DOCUMENT TRANSMITTAL

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N/A

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Purchase Order Number
N/A

Originated By
Hover, Margie

Originated Date
4/7/2022

Project
10CFR Part 21 Notification

Name	Company	Email	Acknowledgment Received/Date
Headquarters Operation Officer	U.S. Nuclear Regulatory Commission	hoo.hoc@nrc.gov	<input type="checkbox"/>

Document Number	Rev	Document Type	Qty	For...
10CFR Part 21 Notification	N/A	Report	1	Final Record

Remarks

Contact Information for Originator of Part-21 Notification:
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Notification Report for Potential Part 21 Update:
10CFR Part 21 Notification for Curtiss-Wright Supplied RCS-Dresser
Actuator P/N: SURE-24-10-4
 U.S. Nuclear Regulatory Commission
 ATTN: NRC Document Control Desk
 Washington, DC 20555-0001
 Phone: (301) 816-5100
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tfranchuk@curtisawright.com

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Transmitted By: Hover, Margie
 Transmitted Date: 4/7/2022

Status

Transmittal sent via hard copy



QualTech NP
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April 6, 2022

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: 10CFR Part 21 Notification for a Curtiss-Wright supplied RCS/Dresser Actuator, P/N SURE-24-10-4

Dear Sir or Madam:

QualTech NP is providing this notification as a potential 10 CFR Part 21 issue. The TVA Browns Ferry Plant notified us of two separate RCS/Dresser actuator failures which we had provided as safety related components. According to TVA the first failure occurred on February 7, 2022, after being installed for approximately 167 days. The 2nd failure occurred on February 9, 2022 and was in service for approximately 24 hours when it failed.

According to TVA in both cases the actuator's brake assembly wire harness shorted out to the frame, causing the on-board fuse to blow, disabling the actuator. The electrical short was caused by the wire harness laying against a sharp edge of the metal frame which over time led to fraying of the wire insulation and subsequent bare wire to frame contact.

Both units were returned to QualTech NP for evaluation and our findings confirmed TVA's assessment.

The root cause of the issue is friction between the wires and the sharp metallic edge that over time cut through the insulation via vibration, which in turn shorted the power leads to the frame. This shorting effect was due to poor positioning and restraint of the wire harness/bundle by the manufacturer during assembly. It is not considered a design flaw but a workmanship issue caused by the factory assembler.

The corrective action taken with the two units was to install new brake assemblies and reposition the wire harness to prevent contact with the sharp edge. In addition, wire ties were added to restrain the wire's movement and keep it away from the sharp edge. As a follow up action, the associated dedication plan will be revised to inspect for this workmanship issue and correct as needed.

Additional details are provided in the attached failure evaluation. QualTech NP has only sold this part to TVA and could not find any additional failures of this type reported by the industry. Identification of the customer's orders and hardware involved are provided in the table which follows.

Please phone (513) 528-7900 if you should have any questions.

Sincerely,

Tim Franchuk
Quality Assurance Director
QualTech NP, Curtiss-Wright Nuclear Division
Office: 513-528-7900, ext. 176

Attachment: QualTech NP (Curtiss-Wright) Failure Evaluation Report # CJ18111.FE, Revision 2



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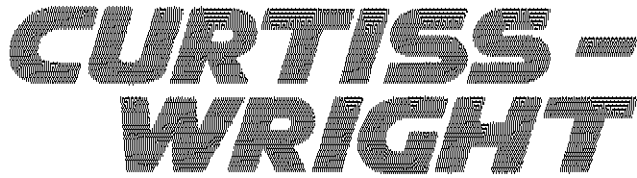
Identification of affected Orders

TVA PO #	QualTech NP C of C#	QualTech NP Tag & S/N	Qty sold	TVA notification date to QualTech NP
7140421 Rev.1	CJ18111.1	CJ1811101, S/N 01 and 02	2	2/11/2022
6527129 Rev.1	CJ17034.1	CJ1703401, S/N 01 and 02	2	3/9/22



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Attachment- QualTech NP Failure Evaluation Report
CJ18111.FE, Revision 2



Evaluation Report No. CJ18111.FE
Revision 2

Failure Evaluation

for

RCS/Dresser Actuator

SURE-24-10-4

for

TVA / Browns Ferry Nuclear Plant

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The signatures below certify that this report complies with the Curtiss-Wright Nuclear Division Corporate Quality Assurance Manual, Revision 5 dated 08/01/2020, 10 CFR Part 21, 10 CFR Part 50 Appendix B, ASME NQA-1, & ANSI/ASME N45.2-1977.

Prepared by/ Date: Mike Bell 4/7/2022
Mike Bell, CGD Manager

Independent Design Review & Approval by/ Date: Mike Wooldridge 4/7/22
Mike Wooldridge, Sr. Principal Engineer CGD/EQ

Report No. CJ18111.FE
Revision 2



Record of Revision

Revision Number	Issue Date	Prepared By	Approved By	Pages Revised and Description
0	3/7/2022	MJW	MWB	Original issue.
1	3/15/2022	MJW	MWB	Revised pages 1-4, 10-12, addressed customer's comments on CW sales history, reference to EGS reports, effects of vibration, and added photograph details
2	4/6/22	MWB	MJW	Complete reissue to add 2 nd failed unit, updated conclusion

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THE TOTAL NUMBER OF PAGES CONTAINED IN THIS REPORT IS 13.



Report No. CJ18111.FE
Revision 2

Failure Evaluation Report

1.0 INTRODUCTION

The purpose of this report is to document the results of a Failure Evaluation involving two Curtiss-Wright (CW) supplied RCS/Dresser PN: SURE-24-10-4 actuators per TVA email/correspondence dated 2/11/2022 and 3/9/2022. These units were originally qualified under EGS Reports EGS-TR-927700-48 Rev. C and EGS-TR-927700-47 Rev. H.

Failure Details:

Failure 1: The CW supplied Actuator was identified as Tag # CJ1811101; Serial Number 02. The item has a manufacturer's serial number of 7127870602. The Actuator was originally dedicated by Curtiss-Wright for TVA against their Purchase Order # 7140421 Rev.1, and originally shipped on February 8th, 2022 under C of C # CJ18111.1.

According to TVA personnel the Actuator's motor brake failed within 24 hours of operation. They noted the heat shrink tubing had a burn mark and removed it to find that the surface mounted fuse was blown and the wire insulation had exposed wiring where wiring was attached to the frame via a tie wrap. The item was then returned to Curtiss-Wright for evaluation under RA-CC10711-1. See TVA provided photos in Attachment A.

Failure 2: The CW supplied Actuator was identified as Tag # CJ1703401; Serial Number 02. The item has a manufacturer's serial number of 7003810902. The Actuator was originally dedicated by Curtiss-Wright for TVA against their Purchase Order # 6527129 Rev.1, and originally shipped on 1/22/2021 under C of C # CJ17034.1.

According to TVA personnel the Actuator was installed on 8/24/2021 and failed in service on 2/7/2022, experiencing the same type failure as the first failed unit, that being frayed wire insulation in the Actuator's brake assembly resulting in an electrical short. The item was then returned to Curtiss-Wright for evaluation under RA-CC9683-1.

2.0 CURTISS-WRIGHT FINDINGS

Upon receipt of the returned Actuators, Curtiss-Wright performed a visual inspection which confirmed wire damage. The wiring had two issues:



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- 1) Wires were tension tight to a metal edge instead of having slack as shown in TVA photos.
- 2) Wires were located next to a cut edge of the metal. It is permissible to tie adjacent to a bent edge or a flat surface, but not wire touching a cut edge or a hole that has not been countersunk or otherwise deburred.

Root cause of the failure is friction between wire insulation & the sharp metallic edge that cut through the insulation via vibration which in turn shorted the power leads to the frame. The blown fuse was a secondary failure to the insulation failure in the wire bundle affected.

Discussion with the OEM indicated that the current SURE 24 model has been in production since the 1970's. The only thing that has changed is the brake assembly, which has been in production since the 1990's. The OEM stated that complaints of this type are extremely rare and not a common issue. CW sales history includes two sales from our Huntsville office (total qty of 11) going back to February 2010, and two sales from our Cincinnati office (total qty of 4) going back to 2020. Other than the two recent issues noted by TVA we have had no other complaints of this nature and TVA is the only customer we have sold these units to.

3.0 RESOLUTION and CONCLUSION

The leads must be pathed in such a way as to avoid cut/sheared edges without being able to touch or interfere with moving parts. If such a path is not possible, then the wires will require additional protection such as a fiberglass sleeve or wire mesh sleeve to protect the insulation from abrasion. In reviewing the EGS qualification Reports (see Section 1.0) if the wire path were to be in close proximity or touching a cut/sheared metallic edge there is the potential that vibration over time or a seismic event could cause fraying of the wire insulation, resulting in a short as previously noted. If the wire path is led away from these sharp surfaces there is little to no risk of wire fraying from in service vibration or a seismic event.

The returned actuators were corrected by CW with installation of a new brake assembly and with wire bundle placed/positioned as noted to prevent the issue. Following brake assembly installation each actuator was rededicated to the original requirements. For future orders the



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applicable dedication plan will be revised to inspect for wire placement and will include instructions on correcting the issue if found.

Although this type of failure appears to be rare it has occurred twice in the past two years, indicating it was not an isolated event. The failure itself is not considered a design flaw but more of a workmanship issue with OEM assemblers not properly locating or restraining the wire bundle in question.

With the past two CW sales of this model having a 50% failure rate (2 of 4 failed), this issue is considered a 10CFR Part 21 reportable condition.

Additional details for these failures are contained in CW Condition Reports CR 22-6238 and CR 22-6333 on file at Curtiss-Wright.

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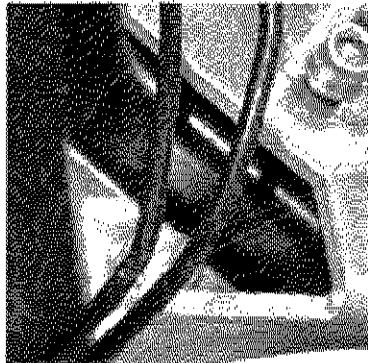
APPENDIX A

Customer's Photos & Notations

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Method used by the manufacturer to secure the wires leads to damage and operational failure.



Damaged wires from being improperly secured by the manufacturer

Photos of Tag # CJ1811101: Serial Number 02

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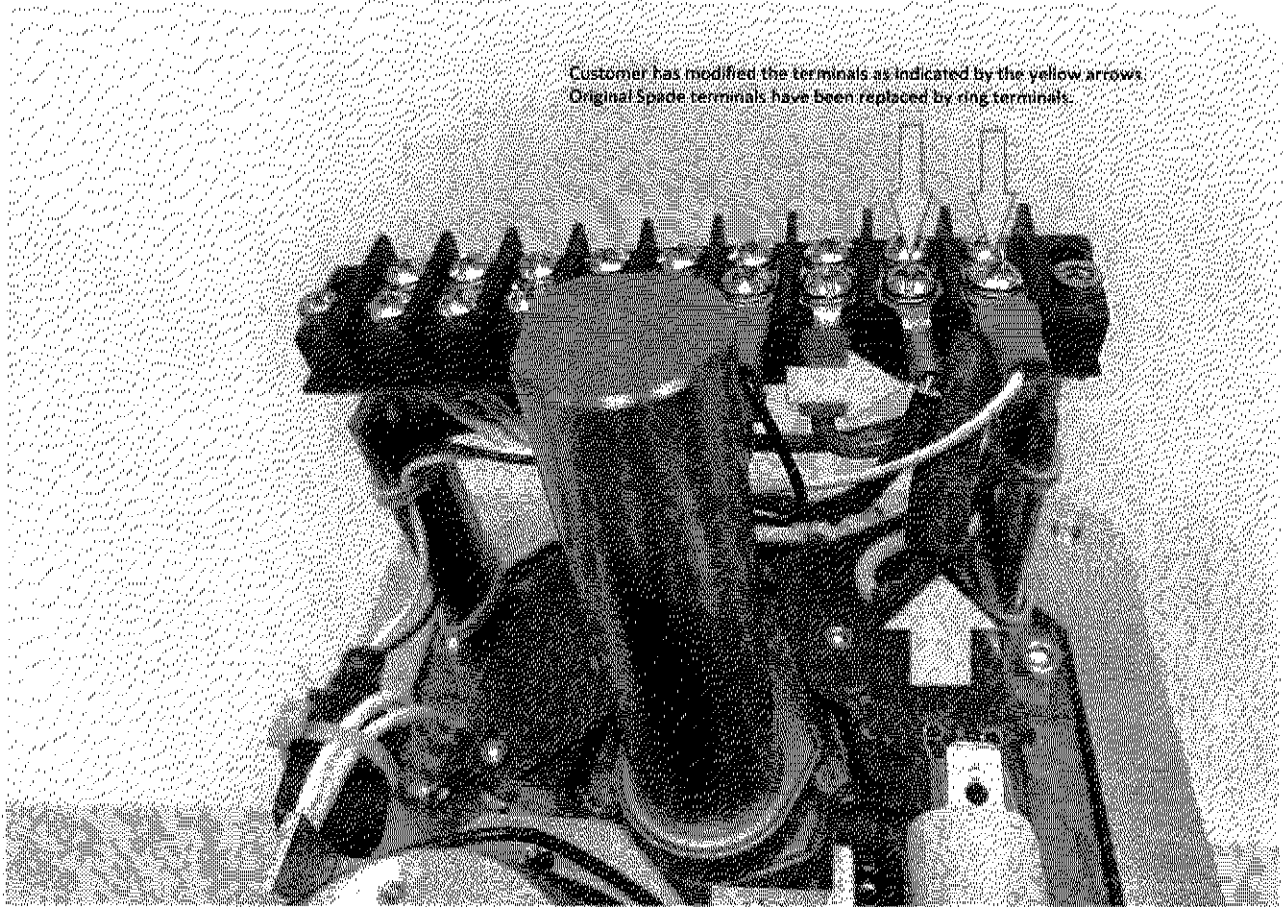
APPENDIX B

Photos of Replaced Brake Assembly Avoiding Cut Edges

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Customer has modified the terminals as indicated by the yellow arrows.
Original Spade terminals have been replaced by ring terminals.

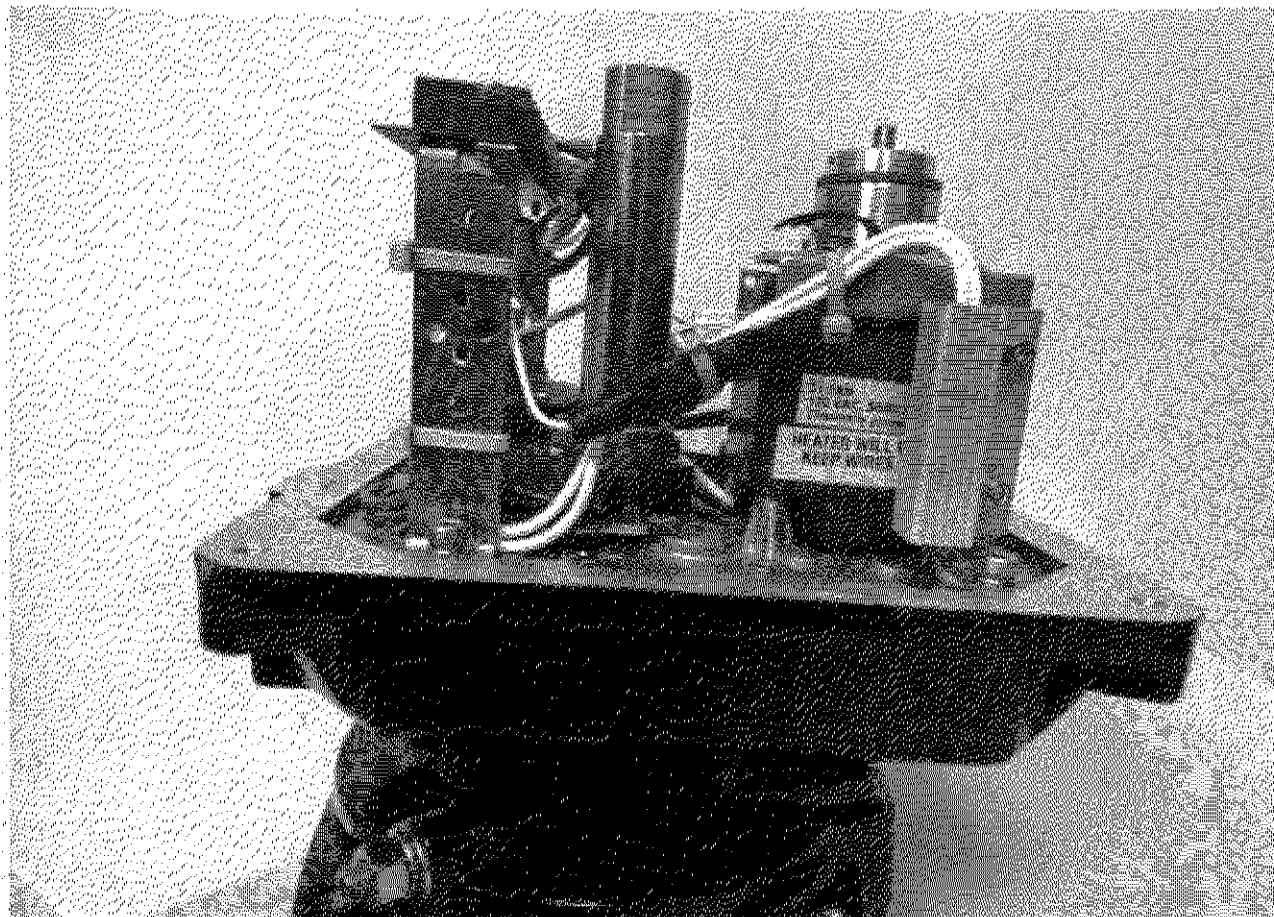


Customer modification: spade to ring lugs

Tag # CJ1811101; Serial Number 02 shown

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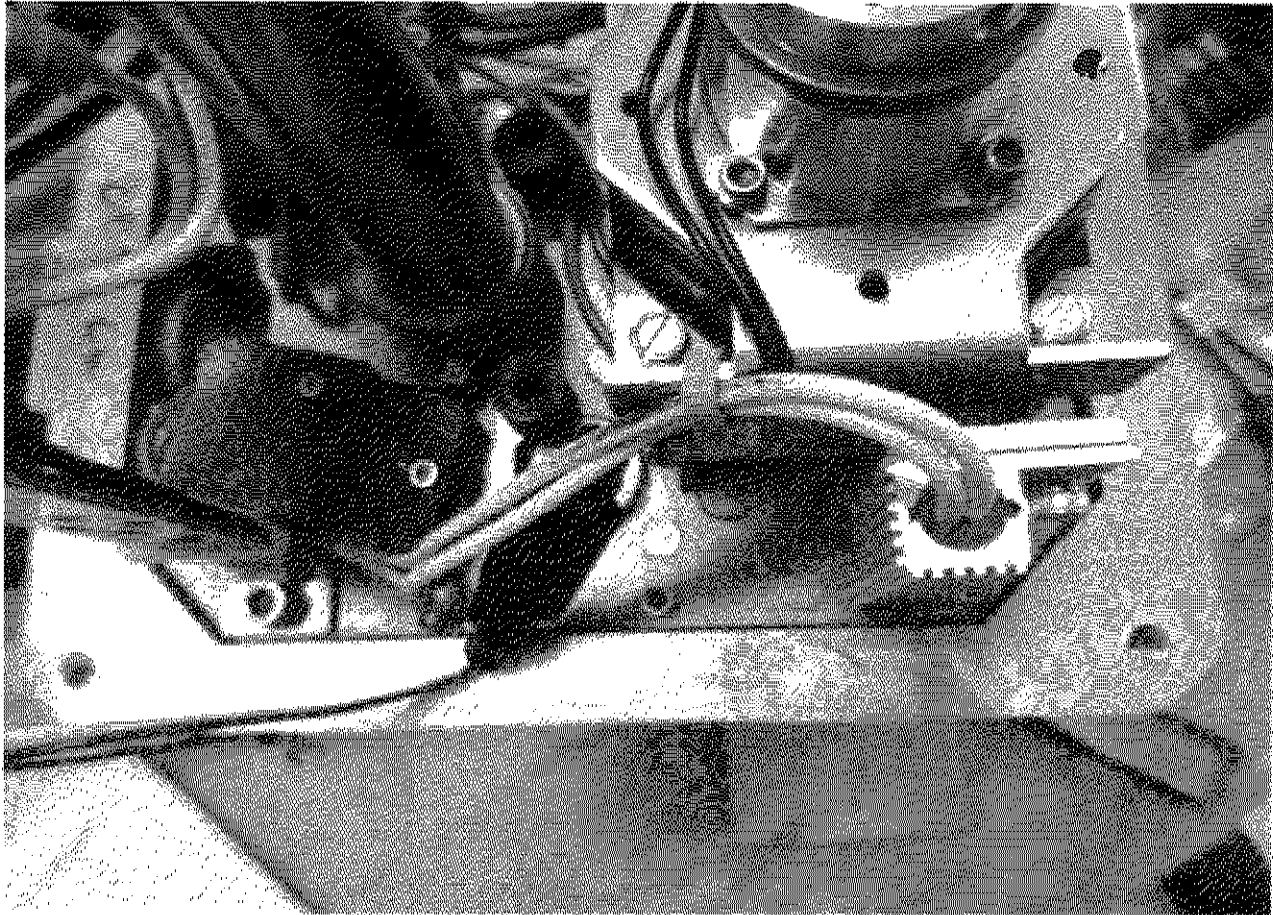


Similar view to as found condition

Tag # CJ1811101; Serial Number 02 shown

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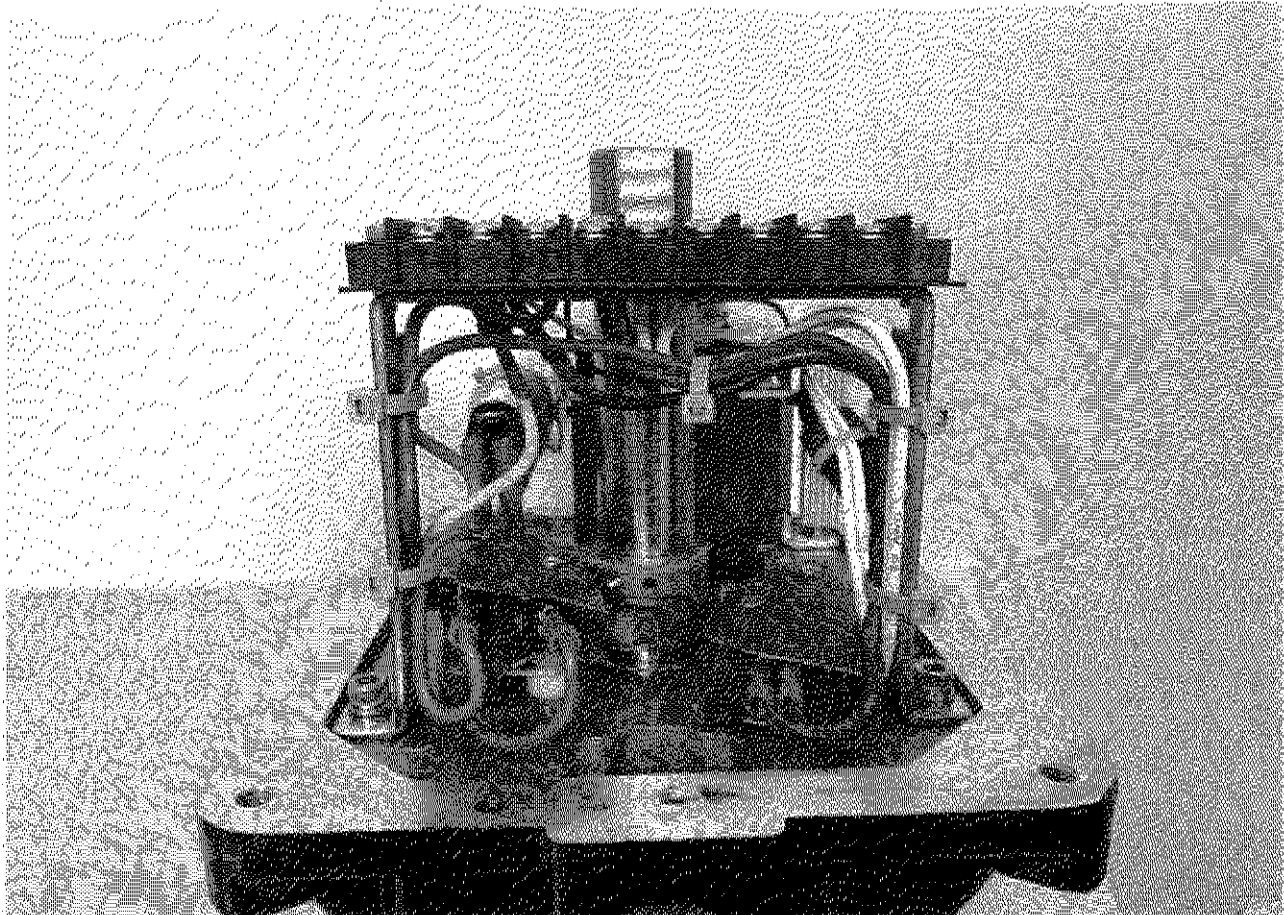


Wires repositioned by CW personnel to avoid sharp edges,
black wires over bent metal surface

Tag # CJ1811101; Serial Number 02 shown

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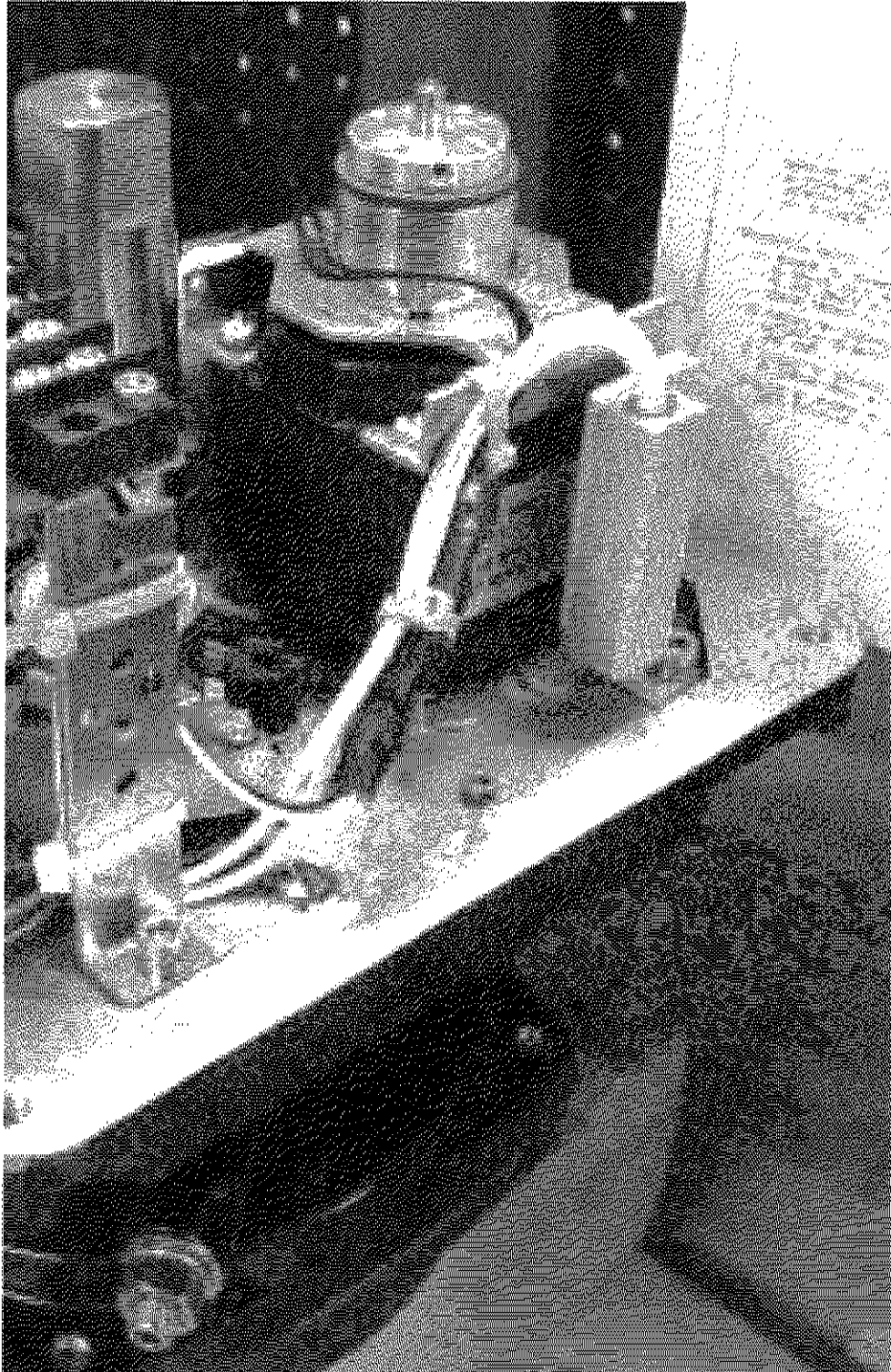


Additional view, wires repositioned by C.W personnel to avoid sharp edges, tie wraps added to keep bundle away from shaft

Tag # CJ1811101; Serial Number 02 shown

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View of heat shrink over PCB assembly, additional view of wire repositioned by CW personnel

Tag # CJ1811101; Serial Number 02 shown