



Model 7J and 7K Switch Circuit Controllers

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Model 7J and 7K Switch Circuit Controllers

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Operation and Maintenance Manual
ALSTOM Signaling Inc.

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2-1 thru 2-6	Mar/06
3-1 thru 3-2	Mar/06
4-1 thru 4-8	Mar/06
5-1 thru 5-2	Mar/06
6-1 thru 6-12	Mar/06
7-1 thru 7-10	Mar/06
A-1 thru A-4	Mar/06

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PREFACE

NOTICE OF CONFIDENTIAL INFORMATION

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WWW.ALSTOMSIGNALINGSOLUTIONS.COM**

**ALSTOM SIGNALING INC.
1025 JOHN STREET
WEST HENRIETTA, NY 14586**

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ABOUT THE MANUAL

This manual is intended to provide the necessary information to maintain and ensure proper operation of Model 7J and Model 7K Switch Circuit Controllers.

The information in this manual is arranged into sections. The title and a brief description of each section follow:

Section 1 – GENERAL DESCRIPTION: This section gives general information on the components of Model 7J and Model 7K Switch Circuit Controllers.

Section 2 – THEORY OF OPERATION: This section gives general information on the operation of Model 7J and Model 7K Switch Circuit Controllers. Safety precautions are also provided in this section.

Section 3 – INSTALLATION: This section describes the installation and setup of Model 7J and Model 7K Switch Circuit Controllers.

Section 4 – PREVENTIVE MAINTENANCE: This section describes the preventive maintenance procedures performed on Model 7J and Model 7K Switch Circuit Controllers.

Section 5 – TROUBLESHOOTING: This section describes possible failures/symptoms along with the corrective action for Model 7J and Model 7K Switch Circuit Controllers.

Section 6 – CORRECTIVE MAINTENANCE: This section describes the testing and adjustment procedures associated with corrective maintenance of Model 7J and Model 7K Switch Circuit Controllers.

Section 7 – PARTS CATALOG: This section identifies and lists the spare parts associated with Model 7J and Model 7K Switch Circuit Controllers.

Appendix A – DRAWINGS: This section has the circuit drawing for Model 7J and Model 7K Switch Circuit Controllers.

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MANUAL SPECIAL NOTATIONS

In the ALSTOM manuals, there are three methods used to convey special informational notations to the reader. These notations are warnings, cautions, and notes. Both warnings and cautions are readily noticeable by boldface type two lines beneath the caption.

Warning

A warning is the most important notation to heed. A warning is used to tell the reader that special attention needs to be paid to the message because if the instructions or advice is not followed when working on the equipment then the result could be either serious harm or death. The sudden, unexpected operation of a switch machine, for example, or the technician contacting the third rail could lead to personal injury or death. An example of a typical warning notice follows:

WARNING

DISCONNECT THE MOTOR ENERGY WHENEVER THE GEAR COVER IS REMOVED. OTHERWISE, THE SWITCH MACHINE MAY OPERATE UNEXPECTEDLY AND POSSIBLY CAUSE PERSONAL INJURY.

Caution

A caution statement is used when an operating or maintenance procedure, practice, condition, or statement, which if not strictly adhered to, could result in damage to or destruction of equipment. A caution statement is also used when personnel could be surprised if shocked by a circuit operating at a low current. A typical caution found in a manual is as follows:

CAUTION

Turn power off before attempting to remove or insert circuit boards into a module. Boards can be damaged if power is not turned off.

Note

A note is normally used to provide minor additional information to the reader to explain the reason for a given step in a test procedure or to just provide a background detail. An example of the use of a note follows:

NOTE

A capacitor may be mounted on the circuit board with a RTV adhesive. Use the same color RTV.

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TABLE OF CONTENTS

Topic	Page
1. SECTION 1 – GENERAL DESCRIPTION	1-1
1.1. SCOPE OF MANUAL	1-1
1.2. GENERAL	1-1
1.3. FUNCTION	1-2
1.3.1. Hardware Description	1-3
2. SECTION 2 – THEORY OF OPERATION	2-1
2.1. GENERAL	2-1
2.2. OPERATION	2-1
2.2.1. Model 7J Operation	2-2
2.2.2. Model 7K Operation.....	2-3
2.2.3. Centering Attachment.....	2-4
3. SECTION – INSTALLATION	3-1
3.1. GENERAL	3-1
3.2. APPLICATIONS	3-1
3.3. EXAMPLE INSTALLATION CIRCUIT DIAGRAMS.....	3-1
4. SECTION 4 – SCHEDULED MAINTENANCE	4-1
4.1. GENERAL	4-1
4.2. REQUIRED TEST EQUIPMENT	4-1
4.3. PREVENTIVE MAINTENANCE INDEX	4-2
4.4. LUBRICATION	4-3
4.5. LAYOUT CHECK.....	4-6
4.6. CENTERING ATTACHMENT CHECK.....	4-8
5. SECTION 5 – TROUBLESHOOTING	5-1
5.1. GENERAL PHILOSOPHY	5-1
5.2. TROUBLESHOOTING	5-1
6. SECTION 6 – CORRECTIVE MAINTENANCE	6-1
6.1. GENERAL PURPOSE	6-1
6.2. REQUIRED TEST EQUIPMENT	6-1
6.3. REMOVAL AND REPLACEMENT PROCEDURES.....	6-2
6.3.1. Front and Back Contact Removal and Replacement.....	6-3
6.3.2. Contact Finger Removal (Model 7J)	6-5
6.3.3. Contact Finger Removal (Model 7K)	6-7
6.4. OBSTRUCTION TEST	6-9
6.5. SPARE PARTS FOR MODEL 7 CONTROLLERS	6-10

TABLE OF CONTENTS (CONT.)

TOPIC	PAGE
7. SECTION 7 - PARTS CATALOG	7-1
7.1. GENERAL	7-1
7.1.1. PARTS LISTS AND DRAWINGS	7-1
A. APPENDIX A - DRAWINGS	A-1
A.1. OVERVIEW	A-1

LIST OF FIGURES

Description	Page
Figure 1–1. Model 7J Cam and Roller Mechanism.....	1–2
Figure 1–2. Model 7K Push Pull Mechanism.....	1–2
Figure 1–3. Models 7J and 7K Switch Circuit Controllers.....	1–3
Figure 1–4. Contact Assembly	1–4
Figure 1–5. Camshaft and Cam Assembly.....	1–5
Figure 2–1. Model 7J Operation	2–2
Figure 2–2. Model 7K Operation	2–3
Figure 2–3. Centering Attachment, Location	2–4
Figure 2–4. Centering Attachment Front and Side Views.....	2–5
Figure 7–1. Model 7J Controller Contact Assembly and Crank Arms.....	7–2
Figure 7–2. Model 7K Controller Contact Assembly and Crank Arms	7–4
Figure 7–3. Centering Attachment (Optional Component) Parts	7–6
Figure 7–4. Controller Accessories	7–8
Figure A–1. Controller Applications, Model 7J	A–2
Figure A–2. Controller Applications, Model 7K.....	A–3

LIST OF TABLES

Description	Page
Table 1–1. Throw of Controller Crank Arms	1–6
Table 4–1. Preventive Maintenance Equipment.....	4–1
Table 4–2. Preventive Maintenance Index	4–2
Table 4–3. Lubrication Procedure	4–3
Table 4–4. Layout Check Procedure	4–6
Table 4–5. Centering Attachment Check Procedure	4–8
Table 6–1. Corrective Maintenance Equipment	6–1
Table 6–2. Front and Back Contact Removal and Replacement Procedure	6–3
Table 6–3. Model 7J Contact Finger Removal and Replacement Procedure.....	6–5
Table 6–4. Model 7K Contact Finger Removal and Replacement Procedure	6–7
Table 6–5. Obstruction Test Procedure.....	6–9
Table 6–6. Model 7J Spare Parts.....	6–10
Table 6–7. Model 7K Spare Parts	6–11
Table 7–1. ALSTOM Model 7J Switch Circuit Controller, 53530-030-01 Parts List....	7–3
Table 7–2. ALSTOM Model 7K Switch Circuit Controller, 53530-031-01 Parts List ...	7–5
Table 7–3. Centering Attachment 53231-002-01 Parts List.....	7–7
Table 7–4. Controller Accessories Parts List.....	7–9

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1. SECTION 1 – GENERAL DESCRIPTION

1.1. SCOPE OF MANUAL

This manual describes controller hardware, operation, preventive and corrective maintenance, and replaceable parts of the ALSTOM Model 7J (P/N 53530-030-00) and 7K (P/N 53530-031-00) Switch Circuit Controllers.

1.2. GENERAL

This section contains the general description and application of the ALSTOM Model 7J and 7K Switch Circuit Controllers.

Model 7 Switch Circuit Controllers are mechanically actuated controllers that may be used to integrate the positions of various devices with suitable control circuits. They are used to electrically detect the following:

- Switch Point Position (normal or reverse)
- Switch Point Locking
- Bridge Locking and Bridge Position
- Derail Operation
- Tunnel Door Position
- Slide Detector Actuation

In addition, the Model 7J and Model 7K can be used to shunt track circuits or control relay circuits.

1.3. FUNCTION

ALSTOM Model 7 Switch Circuit Controllers can provide “circuit-open” or “circuit-closed” indications for any two-position device. The 7J and 7K can control relay circuits and shunt track circuits.

The Model 7J has a cam and roller mechanism as shown in Figure 1–1, while the Model 7K uses a push pull mechanism shown in Figure 1–2.

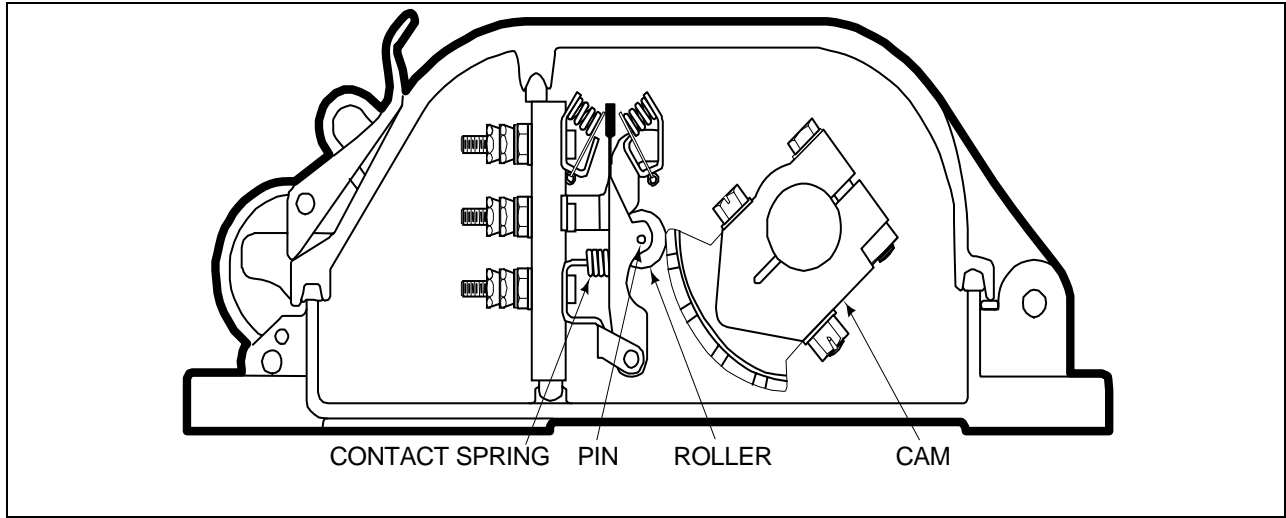


Figure 1–1. Model 7J Cam and Roller Mechanism

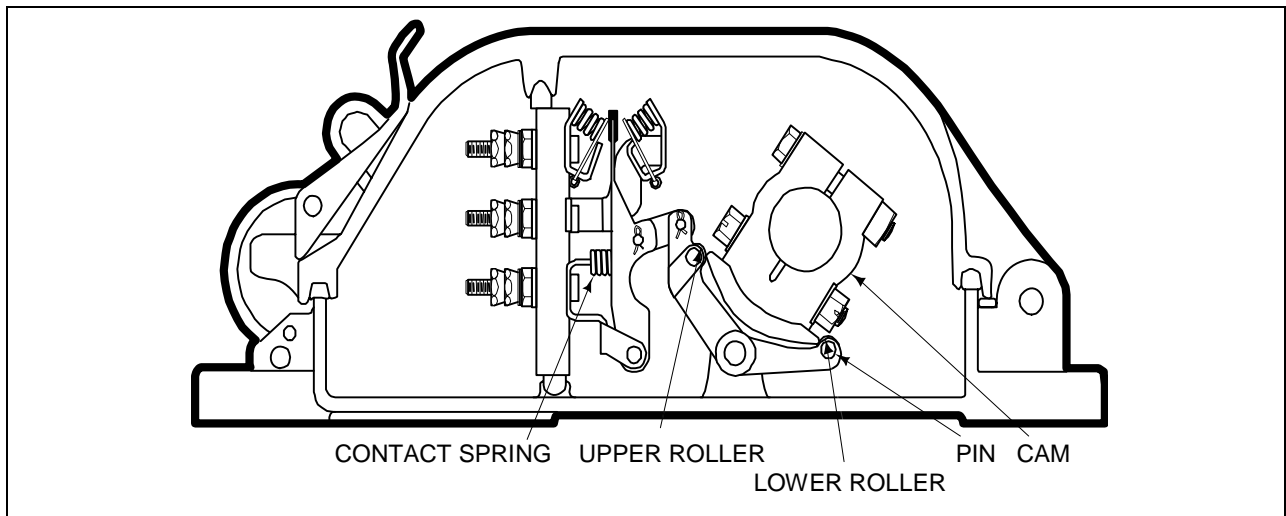


Figure 1–2. Model 7K Push Pull Mechanism

1.3.1. Hardware Description

Model 7 Switch Circuit Controllers are housed in a 7 in. high by 8 3/16 in. wide by 17 in. deep cast iron case as shown in Figure 1-3. Average weight of a controller complete with cover is 53 pounds. The case has a cast aluminum cover that is hinged for ease of maintenance. Gaskets in the cover seal the controller against dirt and moisture, and prevent grease and oil from collecting on wires and terminals in the terminal compartment. Screened ventilators in the case equalize internal and external temperatures to prevent the formation of internal condensation.

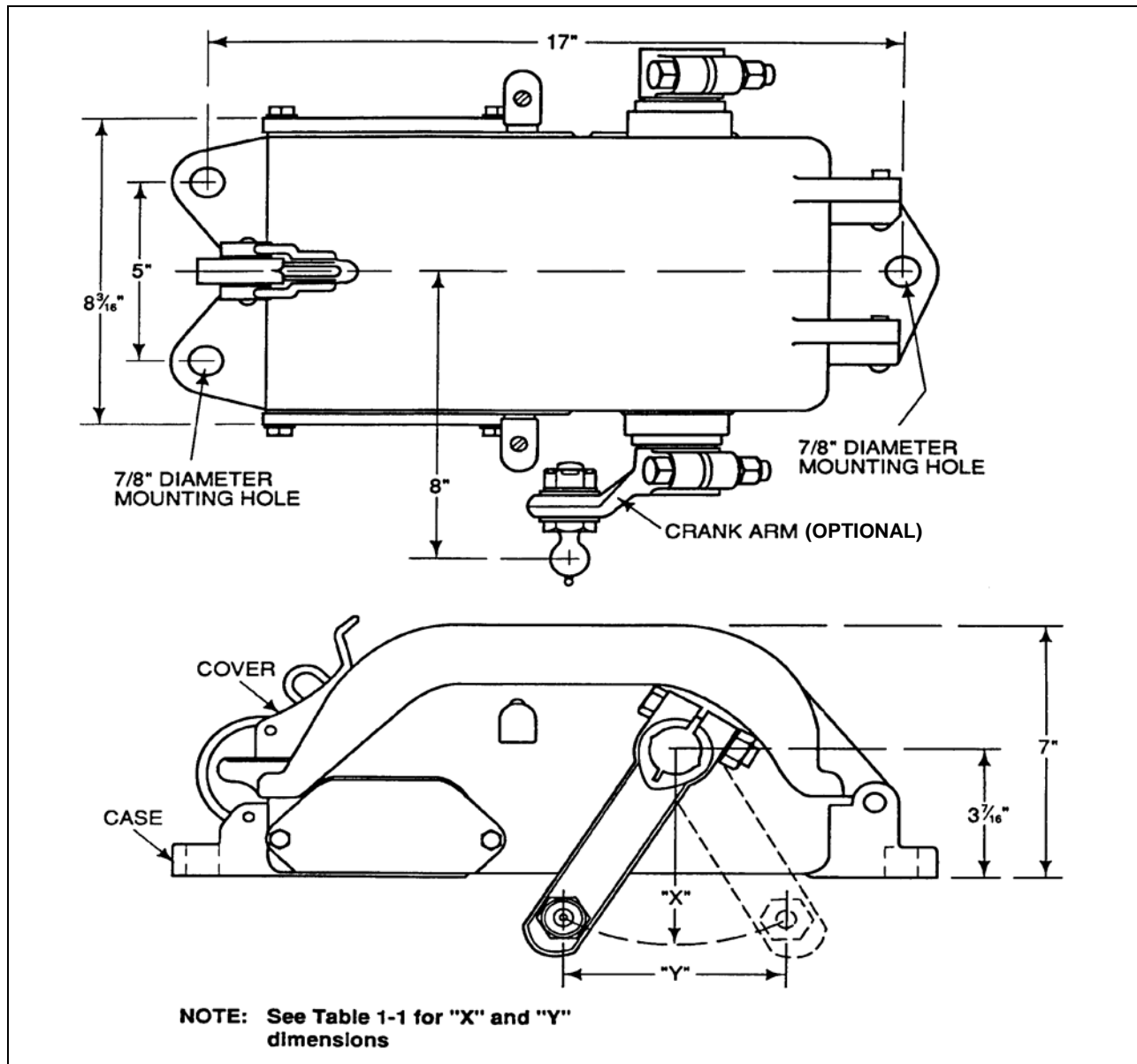


Figure 1-3. Models 7J and 7K Switch Circuit Controllers

Each of the four contact assemblies includes articulated contacts with silver contact surfaces. The contacts are mounted in adjustable contact supports as shown in Figure 1–4, and electrically bonded to the supports by flexible copper braid. The contact fingers also have silver contact surfaces and are mounted in a finger bracket. The contact supports and finger bracket are mounted on the terminal board. Contact alignment is maintained by the contact supports and springs. The contact finger is held against the contacts by the contact spring. Rollers in the contact assemblies transfer motion from the crank-arm and the cam assemblies to the contact fingers.

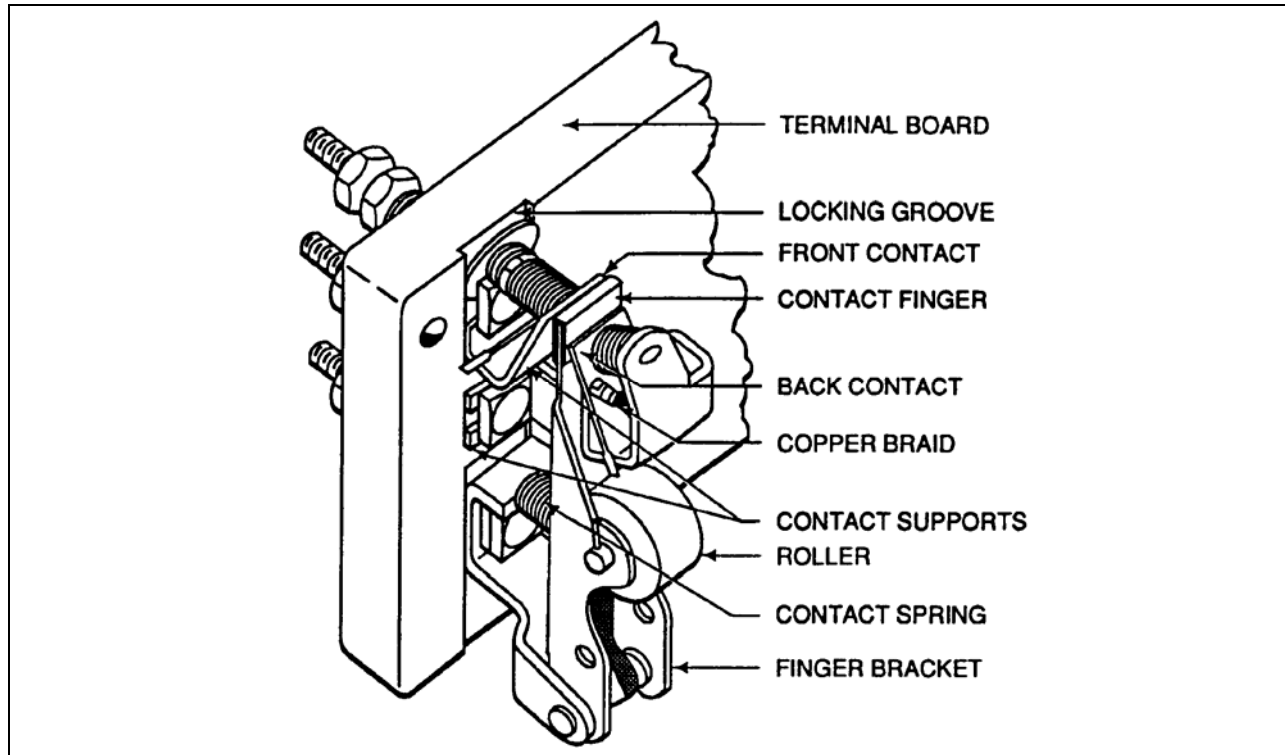


Figure 1–4. Contact Assembly

Model 7 camshaft and cam assemblies consist of a zinc plated, chromate conversion finish steel camshaft; four cast aluminum adjustable cams, with hardened steel inserts; and a camshaft mounted crank arm (optional). A Model 7J camshaft and cam assembly is shown in Figure 1–5. The camshaft is pressure lubricated and supported by bronze bearings. The camshaft is square at each end for mounting the optional crank arm (right- or left-hand operation) and an optional centering attachment. Cams are mounted on, and rotate with, the camshaft.

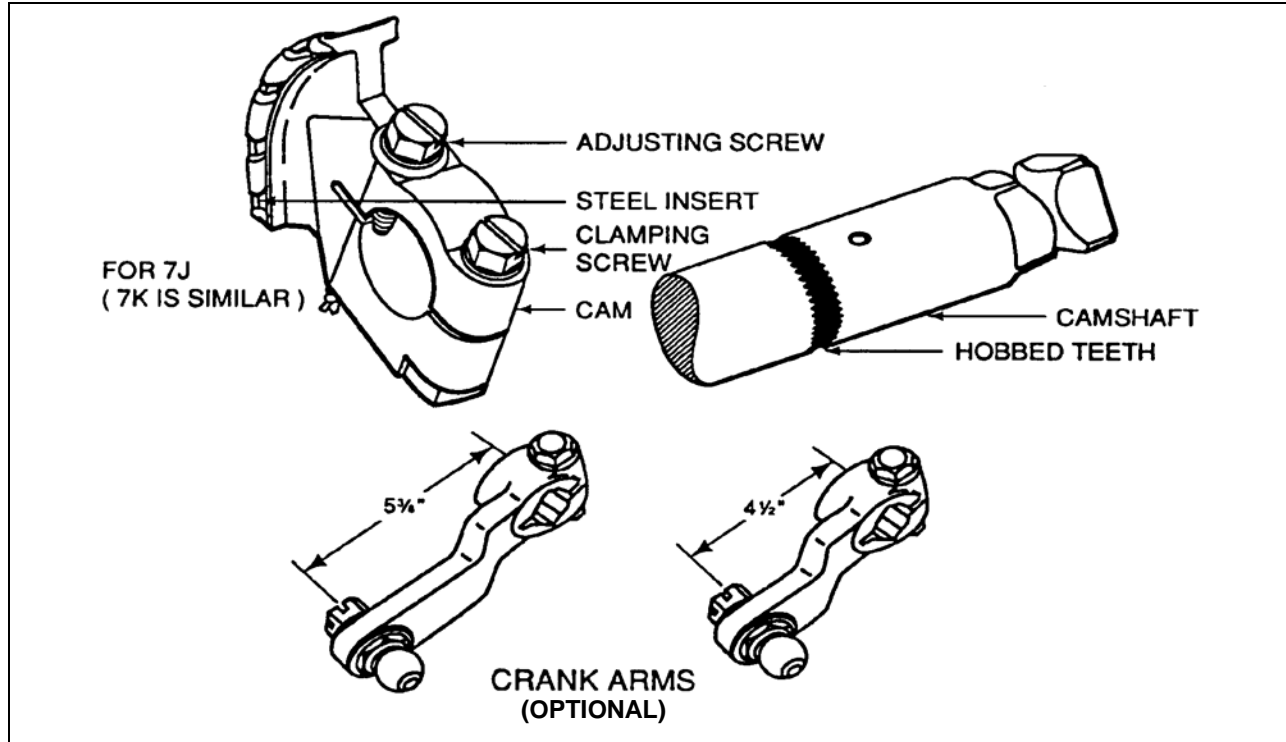


Figure 1-5. Camshaft and Cam Assembly

The cams have hardened steel roller surfaces and are equipped with adjusting and clamping screws. The crank arm (optional) mounts on the camshaft and transfers motion from a mechanical linkage to the camshaft. Crank arm throw (stroke) dimensions are listed in Table 1-1.

The optional centering attachment can be mounted on the side of the controller with a rubber, circular gasket, and is used to help in the detection of a broken switch rod or disconnected linkage.

Table 1–1. Throw of Controller Crank Arms

Model	Crank Arm Offset (X)	Maximum Throw* (Y)	With Optional Centering Attachment	
			Minimum Throw (Y)	Maximum Throw (Y)
7J	5.375 in./ 13.67 cm	6.0 in./ 15.24 cm	3.5 in./ 8.89 cm	5.5 in./ 13.97 cm
7J	4.5 in./ 11.43 cm	5.0 in./ 12.70 cm	3.0 in./ 7.62 cm	4.6 in./ 11.76 cm
7K	5.375 in./ 13.67 cm	7.0 in./ 17.78 cm	3.5 in./ 8.89 cm	5.5 in./ 13.97 cm
7K	4.5 in./ 11.43 cm	5.875 in./ 14.94 cm	3.0 in./ 7.62 cm	4.6 in./ 11.76 cm

* The Maximum permissible connecting rod movement.

2. SECTION 2 – THEORY OF OPERATION

2.1. GENERAL

This section contains the Theory of Operation of the ALSTOM Model 7J and 7K Switch Circuit Controllers.

ALSTOM Model 7 Switch Circuit Controllers consist of four sets of mechanically actuated, front-back contacts. The Model 7J controller uses a cam and roller actuation arrangement and the Model 7K controller uses a push-pull actuation arrangement to actuate the contacts.

2.2. OPERATION

ALSTOM Model 7 Switch Circuit Controllers are designed to provide “circuit-open” or “circuit-closed” indications for two-position devices.

Model 7 controllers operate with as little as a 5-degree movement of the crank arm, but are protected from spurious actuation from vibrations. They can be set up for right-hand or left-hand operation and for simultaneous or progressive cam operation.

Operational descriptions of the Model 7J and 7K controllers, including those with an optional centering attachment, follow.

2.2.1. Model 7J Operation

ALSTOM Model 7J Switch Circuit Controllers use a cam and roller actuation arrangement as shown in Figure 2–1. With the switch controller in the normal position, the pressure of the contact spring holds the contact finger firmly against the back contact.

When the crank arm is moved toward reverse, the hardened steel cam face contacts the insulated roller attached to the contact finger. As the cam continues to rotate, the contact finger moves against the pressure of the contact spring. This opens the back contact and closes the front contact.

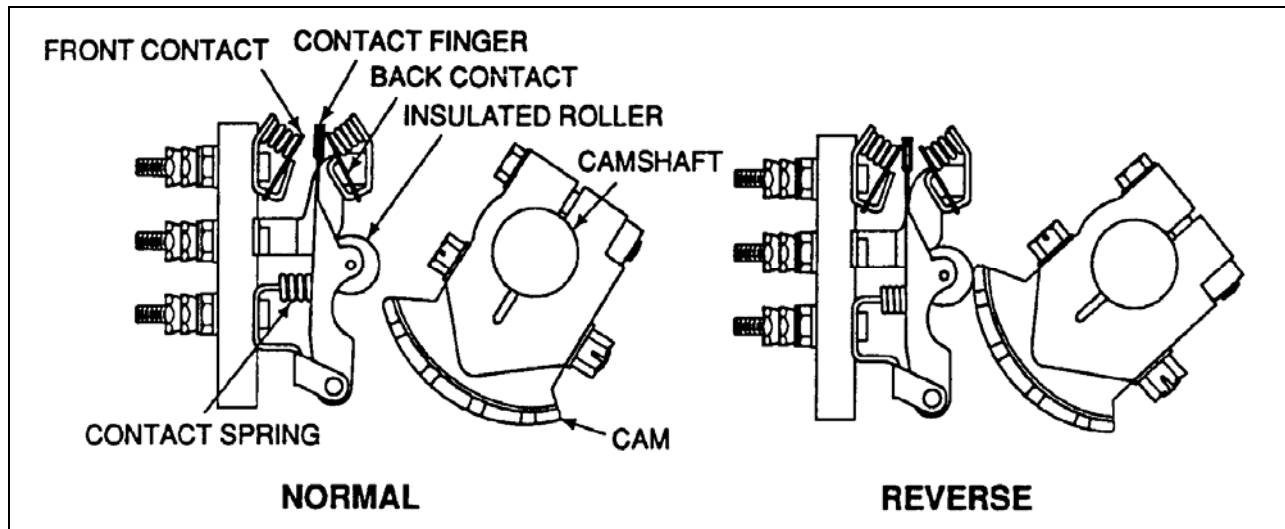


Figure 2–1. Model 7J Operation

2.2.2. Model 7K Operation

ALSTOM Model 7K Switch Circuit Controllers use a push-pull actuation arrangement shown in Figure 2–2. With the crank arm in the position to rotate the camshaft counterclockwise, the cam is in contact with the lower roller as shown in Detail A. This holds the rocker down, which positions the contact finger against the back contact.

When the crank arm is moved such that it causes the camshaft to rotate clockwise, the rotation causes the cam to contact the upper roller as shown in Detail B. As the camshaft continues to rotate, the cam moving against the upper roller causes the rocker to pivot. This moves the contact finger against the pressure of the contact spring, opening the back contact and closing the front contacts.

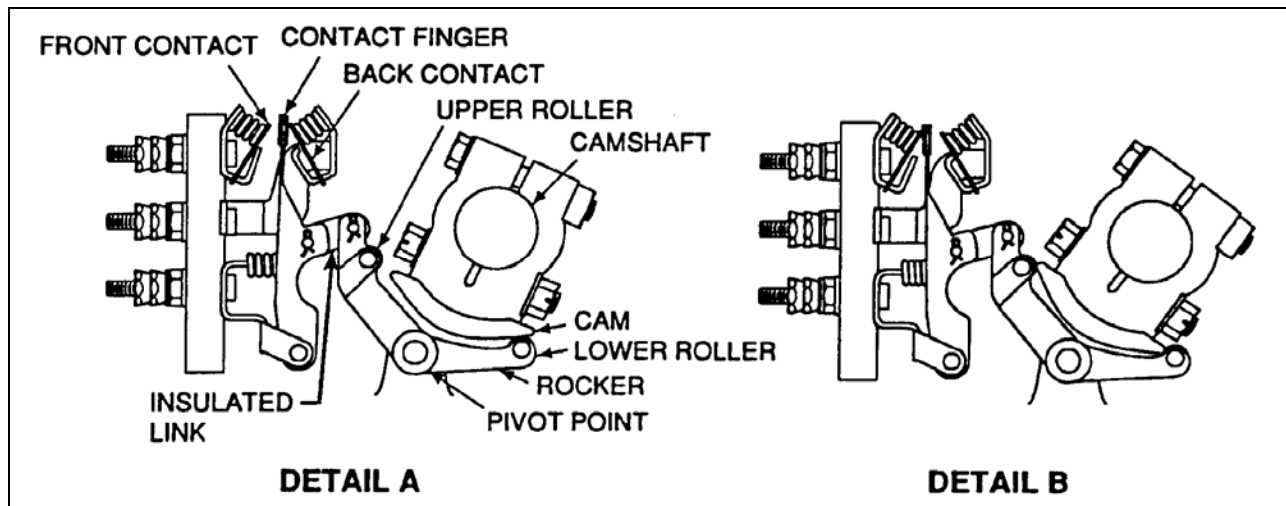


Figure 2–2. Model 7K Operation

2.2.3. Centering Attachment

The centering attachment drives the crank shaft to a position between extremes of crank arm travel, if the connection between the controller and the device whose position is to be determined is lost. For instance, when clearing signals, the attachment helps to prevent a false clear condition when the contacts are adjusted to change state near the end of the travel of the crank arm.

WARNING

NEVER USE THE CENTERING ATTACHMENT WITH A CONTROLLER THAT HAS A 5 3/8 INCH ARM AND A MAXIMUM STROKE EXCEEDING 5 1/2 INCHES. OTHER LENGTHS OF CRANKS REQUIRE PROPORTIONAL THROWS. NORMAL MINIMUM THROW IS 0.636 OF THE MAXIMUM THROW.

WARNING

THE FUNCTION OF THE CENTERING ATTACHMENT CAN BE DEFEATED IF THE BROKEN LINKAGE JAMS TO HOLD THE SHAFT NEAR THE END OF THE STROKE.

With the centering attachment fastened to a shaft that has been rotated away from its dead centering position, a trapped spring in the attachment is further compressed to create a “restoring” torque of over 160 inch-pounds on the shaft. This torque is reduced somewhat by friction in the switch circuit controller end of the attachment. Figure 2–3 shows the centering attachment location and Figure 2–4 shows front and side views of the attachment.

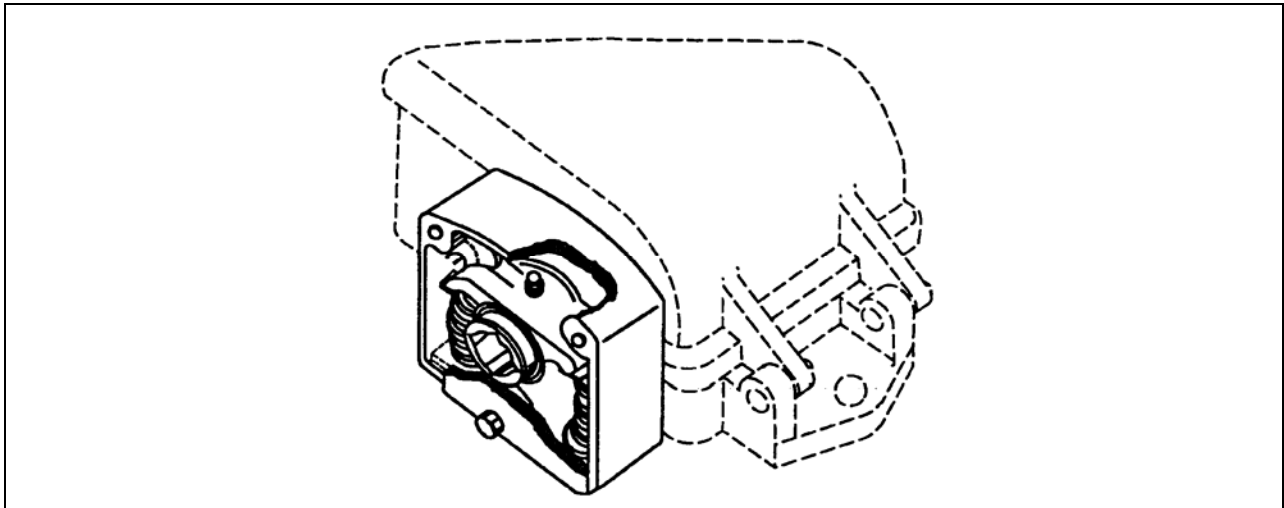


Figure 2–3. Centering Attachment, Location

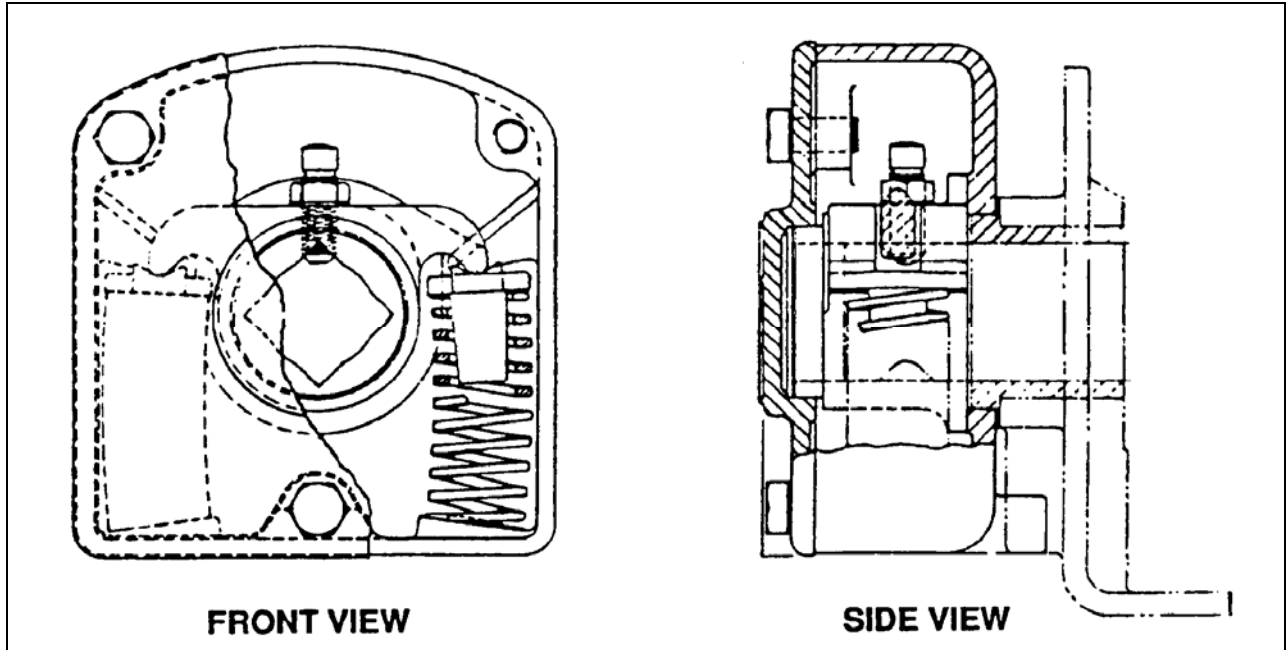


Figure 2-4. Centering Attachment Front and Side Views

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3. SECTION – INSTALLATION

3.1. GENERAL

This section contains the installation information for the ALSTOM Model 7J and 7K Switch Circuit Controllers.

3.2. APPLICATIONS

ALSTOM Model 7 Switch Circuit Controllers can be used for multiple applications, as discussed in Section 1. The configuration of the Model 7 Switch Circuit Controllers installation is determined by the intended application. Therefore, installation configurations vary.

The location Book of Plans details the component location and wiring information. Always refer to the Book of Plans for installation reference.

3.3. EXAMPLE INSTALLATION CIRCUIT DIAGRAMS

Example layouts and accompanying simplified circuit diagrams of typical Model 7 Switch Circuit Controllers are provided in Appendix A, Wiring Diagrams. Example Model 7J applications are provided in Figure A-1. Figure A-2 shows similar examples for typical Model 7K applications.

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4. SECTION 4 – SCHEDULED MAINTENANCE

4.1. GENERAL

This section contains information the maintainer needs to know to perform preventive maintenance on the ALSTOM Model 7J and 7K Switch Circuit Controllers. It includes a list of the required test equipment, lubrication procedures, and checks and adjustments.

4.2. REQUIRED TEST EQUIPMENT

The materials the maintainer will need to perform routine preventive maintenance on the ALSTOM Model 7J and 7K controllers are provided in Table 4–1.

Table 4–1. Preventive Maintenance Equipment

Equipment	Manufacturer/Model
Spring Force Gauge: 0-30 Pounds or More	Any
Grease: Lithium-Based, All-Temperature, All-Pressure	ALSTOM 91A0006 or Equivalent
Oil: Low Temperature Mineral BaseOil	ALSTOM 91A0007 (P/N 81379-005-08) or Equivalent

4.3. PREVENTIVE MAINTENANCE INDEX

Table 4–2 lists the suggested preventive maintenance for the Model 7J and 7K controllers. The interval column contains the recommended interval for all scheduled maintenance actions covered in this section. The maintenance action column lists the maintenance action to be performed. The table number column indicates the table that contains the associated procedure(s).

Table 4–2. Preventive Maintenance Index

Interval	Maintenance Action	Table Number
Quarterly	Lubrication Procedure	4-3
Quarterly	Layout Check Procedure	4-4
Annually	Centering Attachment Check Procedure (if the optional centering attachment is installed)	4-5

CAUTION

Before attempting preventive or corrective maintenance on the controller, ensure that all mechanical linkages have been disconnected. Do this by verifying crank arm is positioned vertically and unloaded.

Make sure linkage to arm cannot move. Remove cover for centering attachment, if installed. Loosen setscrew on arm. Remove attachment before doing any maintenance. After maintenance is complete, reassemble parts and restore controller layout to its normal function.

4.4. LUBRICATION

The following describe lubrication procedures for the ALSTOM Model 7J and 7K Switch Circuit Controllers.

It is best to always lubricate the controller before placing it into service. During normal operation, the controller should be lubricated every three months, or whenever it has been flooded, in accordance with the following information. Lubrication of controller parts prevents galling and excessive wear, reduces internal forces, excludes contaminants, and prevents corrosion.

To perform Model 7 lubrication follow the procedure in Table 4–3. Avoid the use of too much grease or oil. Clean any surfaces that have an excess accumulation of lubricant. By not permitting grease or oil to collect, or drop on wires, contact surfaces, or terminals, minimum unscheduled maintenance may be expected.

Table 4–3. Lubrication Procedure

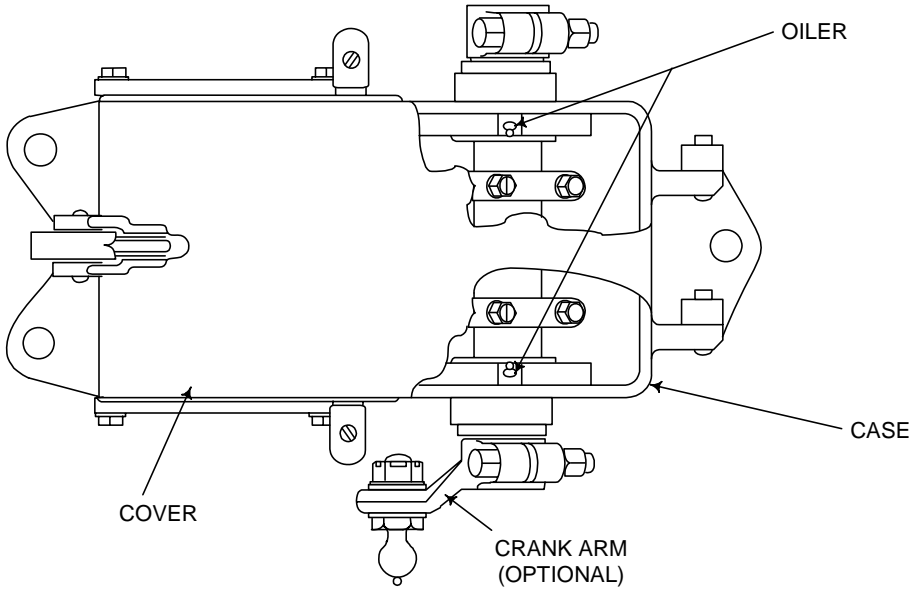
Step	Procedure
1	If the optional centering attachment is installed, remove the 3 screws on the centering attachment cover and remove the cover.
2	Open the top cover of the switch circuit controller.
3	Visually inspect the condition of all internal controller parts.
4	Lubricate camshaft bearings with an all-pressure, lithium-based grease, such as ALSTOM 91A0006. Use this grease on all moving parts. 

Table 4–3. Lubrication Procedure (Cont.)

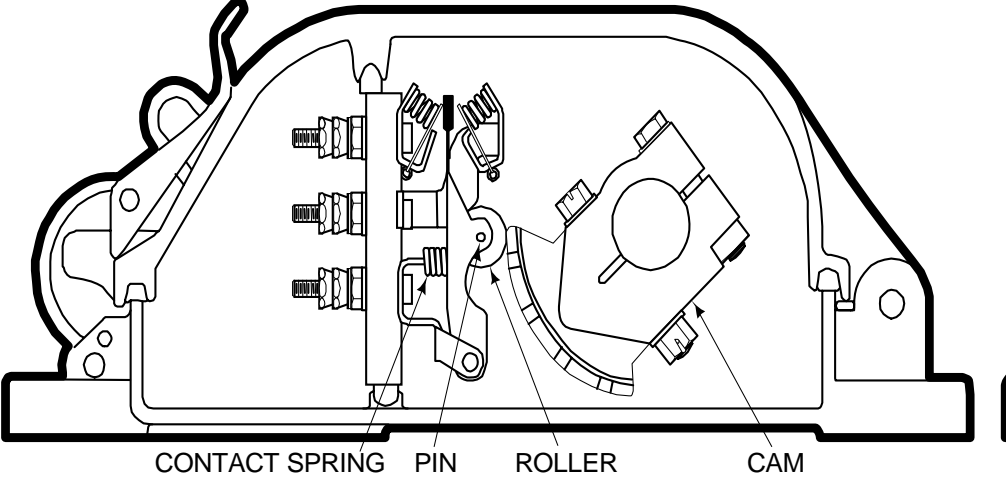
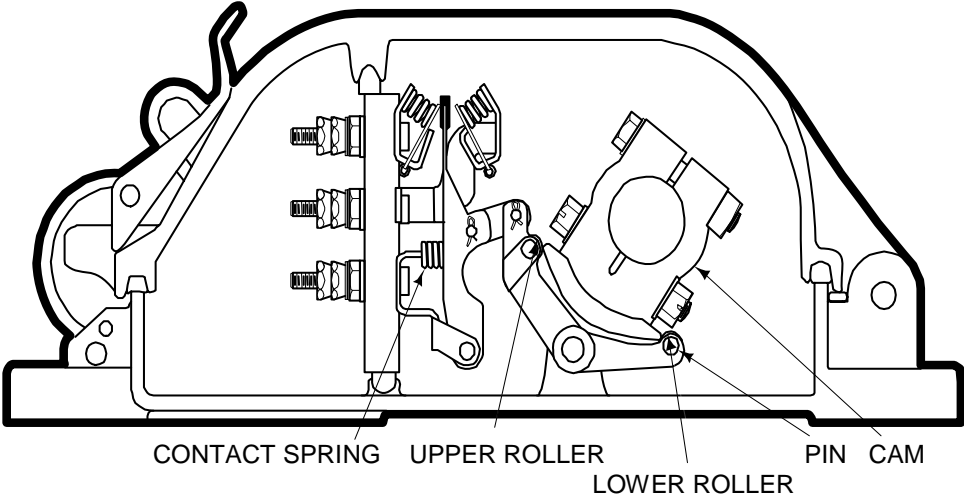
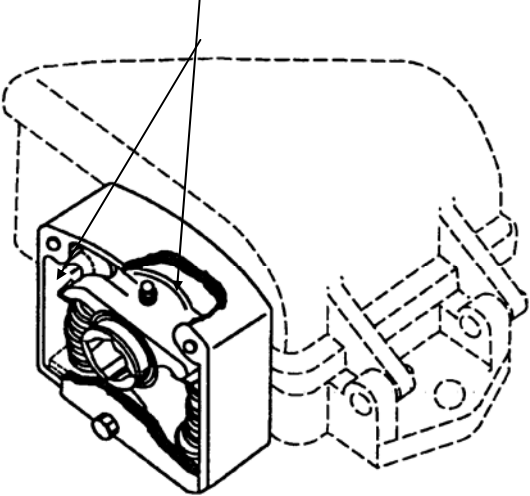
Step	Procedure
5	<p>Lubricate contact assembly rollers, pins, and bearings with ALSTOM 91A0007 Low Temperature Mineral Base Oil. Wipe off any excess oil.</p> <p>The Model 7J has one roller:</p>  <p>The Model 7K has two rollers:</p> 

Table 4–3. Lubrication Procedure (Cont.)

Step	Procedure
6	<p>Lubricate 2 surfaces of rocker arm in the centering attachment (if present) with grease as shown. Lubricate surfaces where the rocker arm contacts the spring seats (pivots).</p> <p style="text-align: center;">Lubricate both sides of the rocker arm.</p> 
7	Close controller cover.
8	If the centering attachment option is present, use the 3 screws to reinstall its cover.

4.5. LAYOUT CHECK

The Layout Check Procedure is an inspection procedure for the Model 7 controllers. Perform the procedure provided in Table 4–4 a minimum of every 3 months (quarterly).

Table 4–4. Layout Check Procedure

Step	Procedure	Indication
1	Verify the screws, nuts, and bolts are tight.	Tighten all screws, nuts, and bolts. Torque cam clamping screws to 15 pounds-feet.
2	Verify the hinges, hasp, and padlock are undamaged. Tension of cover hasp spring should be such that cover will close tightly.	If hinges, hasp, or padlock are damaged, replace as necessary.
3	Verify the ventilator screens are unblocked.	If ventilator screens are blocked, clean screens to ensure proper temperature equalization and minimize condensation.
4	Inspect inside of the case for the presence of water and debris.	If water or debris is found inside controller case, clean and dry inside of case and lubricate in accordance with procedures in this section.
5	Verify that the cover, base, and terminal board are undamaged. Gaskets are in place and undamaged.	If cover, base, terminal board, or gaskets are damaged, replace as necessary.
6	Verify the internal pins and cotters are in place and secure.	If internal pins or cotters are missing or broken, replace missing/faulty part and secure.
7	Inspect the rod, crank arm, and shaft for excessive lost motion (slop).	If rod, crank arm, or shaft has excessive lost motion (slop), tighten securing hardware.
8	Verify the bronze camshaft bearings are properly lubricated.	If cams, camshaft, or bearings require lubrication, apply grease in accordance with Table 4–3.
9	Verify the rollers move freely and have no flat spots. Rollers must rotate when in contact with cam. Rollers must be centered (widthwise) on cam face. Lubricate rollers at their axle shafts.	Tighten or replace as necessary If contact assembly rollers, pins, or bearings require lubrication, apply oil in accordance with Table 4–3.

Table 4–4. Layout Check Procedure (Cont.)

Step	Procedure	Indication
10	Verify the copper braid straps around each contact hinge, front contact, back contact, and heel contact are in place and undamaged.	If copper braid around contact arm is damaged or missing, replace the affected contact.
11	Verify the contacts are not contaminated, burned, or excessively worn.	If contacts are contaminated, burned, or excessively worn, clean and polish with fine sandpaper, and wipe with a light film of oil. If this does not correct problem, replace the contact.
12	Verify the rail connections are secure (shunt applications).	If rail connections are not tight, tighten securing hardware.
13	Verify the optional centering attachment is operating properly (if installed).	Tighten or replace as necessary.
14	Verify the controller overall operation is good.	To check the operation of the controller, conduct an obstruction test in accordance with customer or authority procedure.
<p style="text-align: center;"><u>NOTE</u></p> <p>If preventive maintenance checks turn up faulty components other than those covered in Section 6, "Corrective Maintenance," replace the entire controller.</p>		

4.6. CENTERING ATTACHMENT CHECK

The Centering Attachment Check Procedure consists of a spring pressure check and an optional spring replacement procedure. Perform the pressure check portion of the procedure provided in Table 4–5 at least once a year. Perform the replacement part of the procedure as required.

CAUTION

If centering attachment is present or points were thrown, heed the following warning.

Before attempting preventive or corrective maintenance on the controller, ensure that all mechanical linkages have been disconnected. Disconnect linkages with crank arm vertical. Failure to do so may result in damage to the equipment and personal injury.

Table 4–5. Centering Attachment Check Procedure

Step	Procedure
1	Move switch points to mid-stroke position and verify controller shaft is vertical.
2	Disconnect link to operating arm of switch circuit controller.
3	With the spring force gauge on ball of operating arm and being pulled perpendicular to arm, confirm a reading of 15 pounds or more in both directions of arm motion.
4	If a reading of 15 pounds is obtained, this procedure is complete. If a reading of 15 pounds cannot be attained, continue this procedure.
5	Remove 3 screws in cover of centering attachment and remove cover. Verify that the springs are intact and not broken. Replace any broken springs. <u>WARNING</u> CONTROLLER SPRINGS ARE COMPRESSED WHEN THE CONTROLLER SHAFT IS IN THE NEUTRAL POSITION. USE CARE IN CONTROLLING THE SPRINGS WHEN REPLACING THEM TO AVOID PERSONAL INJURY.
6	Replace attachment cover and 3 screws.
7	Use the spring force gauge to confirm 15 pound reading on replaced springs.
8	Reconnect link to operating arm of switch circuit controller.

5. SECTION 5 – TROUBLESHOOTING

5.1. GENERAL PHILOSOPHY

This section discusses troubleshooting ALSTOM Model 7J and 7K Switch Circuit Controllers.

Procedures for contact and contact finger removal and replacement, controller obstruction test, and spare parts are found in this Section 6, Corrective Maintenance.

5.2. TROUBLESHOOTING

When a controller is not functioning properly during normal use:

- Perform preventive maintenance procedures
- Verify external power connections
- Verify wiring

Damaged and faulty components can be identified during routine maintenance. Follow the corrective steps included or referenced in the preventive maintenance procedures provided in Section 4.

Refer to the location Book of Plans to verify all external power connections and wiring.

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6. SECTION 6 – CORRECTIVE MAINTENANCE

6.1. GENERAL PURPOSE

This section describes how to perform field or shop corrective maintenance on the ALSTOM Model 7J and 7K Switch Circuit Controllers. Procedures for contact and contact finger removal and replacement, controller obstruction test, and spare parts are found in this section.

6.2. REQUIRED TEST EQUIPMENT

The materials the maintainer will need to perform corrective maintenance the ALSTOM Model 7J and 7K controllers are provided in Table 6–1.

Table 6–1. Corrective Maintenance Equipment

Equipment	Manufacturer/Model
Spring Balance: 0-10 pound minimum	Any
Thickness Gauge: 27/32 in.	Any
Thickness Gauge: 29/32 in.	Any
Thickness Gauge: 31/32 in.	Any
Feeler Gauge: 0.065 in.	Any
Obstruction Gauge	Any
Oil: Low Temperature Mineral BaseOil	ALSTOM 91A0007 (P/N 81379-005-08) or Equivalent

6.3. REMOVAL AND REPLACEMENT PROCEDURES

Corrective maintenance for ALSTOM Model 7 Switch Circuit Controllers is limited to the removal and replacement of the front and back contacts, and contact fingers. This section presents the necessary removal and replacement procedures.

Because of minor differences in models, the following procedures cover both models.

WARNING

IF CENTERING ATTACHMENT IS PRESENT OR POINTS WERE THROWN, HEED THE FOLLOWING:

BEFORE ATTEMPTING PREVENTIVE OR CORRECTIVE MAINTENANCE ON THE CONTROLLER, ENSURE THAT ALL MECHANICAL LINKAGES HAVE BEEN DISCONNECTED. DISCONNECT LINKAGES WITH CRANK ARM VERTICAL. FAILURE TO DO SO MAY RESULT IN DAMAGE TO THE EQUIPMENT AND PERSONAL INJURY.

WARNING

DISCONNECT MOTOR ENERGY WHENEVER MAKING ADJUSTMENTS TO THE SWITCH LAYOUT OR SWITCH MACHINE. UNEXPECTED OPERATION OF THE MACHINE COULD CAUSE INJURY FROM OPEN GEARS, ELECTRICAL SHOCK, OR MOVING PARTS.

6.3.1. Front and Back Contact Removal and Replacement

To remove and replace a front or back contact from either a Model 7J or 7K controller follow the procedure provided in Table 6–2.

Table 6–2. Front and Back Contact Removal and Replacement Procedure

Step	Procedure
1	Disengage hasp and open cover.
2	Loosen (not remove) nuts on terminal screw associated with contact to be removed. <div style="text-align: center; margin-top: 20px;"> </div>
3	Rotate shaft to open contact to be removed.
4	Slide contact support from behind terminal screw head.
5	Remove contact from case and discard.
6	Get a replacement contact and inspect contact surface. Also, inspect contact surface of contact finger.
7	Slide contact support behind associated terminal screw head and line up with contact finger.
8	Tighten nuts on associated terminal screw.

Table 6–2. Front and Back Contact Removal and Replacement Procedure (Cont.)

Step	Procedure
9	Rotate camshaft so that cam forces associated contact finger against back contact (extreme back position).
10	Measure distance between forward contact and recess in the block. It should be 31/32 in. If it is not, bend the forward contact stop (support) until 31/32 in. is measured.
11	Rotate camshaft so that cam forces associated contact fingers against front contact (extreme forward position).
12	Remove front contact pressure from movable finger and place a 29/32 in. (27/32 in., Model 7K) gauge between recess in terminal board and movable contact surface 1/8 in. from top of contact. A very slight drag force should be on the 29/32 in. (27/32 in., Model 7K) gauge.
13	<p>If there is a very slight drag force on the 29/32 in. (27/32 in., Model 7K) gauge, go to step 16.</p> <p>If there is too much drag on the the 29/32 in. (27/32 in., Model 7K) gauge , then rotate camshaft until contact finger no longer exerts pressure on front contact and continue to Step 14.</p> <p>If there is no drag on the the 29/32 in. (27/32 in., Model 7K) gauge, continue to Step 14.</p>
14	Carefully bend movable contact finger.
15	Repeat steps 11 through 14 until movable finger contact surface measured 1/8 in. from top of contacts exerts a very slight drag force on the 29/32 in. (27/32 in., Model 7K) gauge.
16	Rotate camshaft so the contact finger just touches front contact.
17	Using a 0.065 in. feeler gauge, measure distance between contact finger and back contact.
18	If measured distance is not 0.065 in. (+ 0.010 - 0.000), carefully bend back contact support slightly.
19	Repeat steps 16 through 18 until the proper distance is achieved.
20	Close cover and secure hasp.
21	Conduct obstruction test provided in Table 6–5.

6.3.2. Contact Finger Removal (Model 7J)

To remove and replace a contact finger from a Model 7J controller follow the procedure provided in Table 6–3.

WARNING

DISCONNECT MOTOR ENERGY WHENEVER MAKING ADJUSTMENTS TO THE SWITCH LAYOUT OR SWITCH MACHINE. UNEXPECTED OPERATION OF THE MACHINE COULD CAUSE INJURY FROM OPEN GEARS, ELECTRICAL SHOCK, OR MOVING PARTS.

Table 6–3. Model 7J Contact Finger Removal and Replacement Procedure

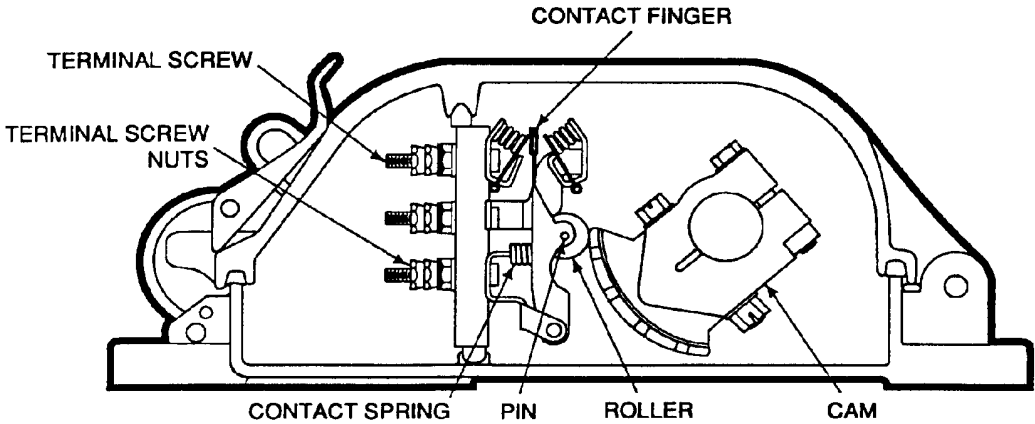
Step	Procedure
1	Disengage hasp and open cover.
2	Rotate camshaft so cam is not touching roller.
3	Loosen (not remove) nuts on terminal screw associated with contact finger to be removed. <div style="text-align: center; margin-top: 10px;">  <p>The diagram shows a cross-section of the contact mechanism. A contact finger is positioned at the top, supported by a contact spring. The contact finger is connected to a terminal screw, which is secured with terminal screw nuts. A pin is attached to the contact spring. A roller is positioned below the contact finger, and a cam is positioned to the right, which can rotate to engage or disengage the roller from the contact finger.</p> </div>
4	Slide contact finger support from behind terminal screw head.
5	Remove contact finger from case and discard.
6	Get replacement contact finger and inspect contact surfaces.
7	Slide contact finger support behind associated terminal screw head, then line up contact finger with front and back contacts.
8	Tighten nuts on terminal screw.

Table 6–3. Model 7J Contact Finger Removal and Replacement Procedure (Cont.)

Step	Procedure
9	Using the spring balance, check that the contact spring exerts 3 lbs. 8 oz. minimum force against back contact.
10	If contact spring pressure is not correct, replacement contact finger may be faulty. Repeat steps 3 through 9 until proper pressure is achieved.
11	Using Low Temperature Mineral Base Oil, lubricate roller in replacement contact finger support.
12	Close cover and secure hasp.
13	Conduct obstruction test provided in Table 6-5 to verify the proper operation of the controller.

6.3.3. Contact Finger Removal (Model 7K)

To remove and replace a contact finger from a Model 7K controller follow the procedure provided in Table 6–4.

WARNING

DISCONNECT MOTOR ENERGY WHENEVER MAKING ADJUSTMENTS TO THE SWITCH LAYOUT OR SWITCH MACHINE. UNEXPECTED OPERATION OF THE MACHINE COULD CAUSE INJURY FROM OPEN GEARS, ELECTRICAL SHOCK, OR MOVING PARTS.

Table 6–4. Model 7K Contact Finger Removal and Replacement Procedure

Step	Procedure
1	Disengage hasp and open cover.
2	Rotate camshaft until cam is not exerting force on rocker assembly. <div style="text-align: center; margin-top: 10px;"> </div>
3	Carefully remove cotter and pin from contact finger end of connecting link.
4	Loosen (not remove) nuts on terminal screw associated with contact finger to be removed.
5	Slide contact finger support from behind terminal screw head.
6	Remove contact finger from case and discard.
7	Get replacement contact finger and inspect contact surfaces.
8	Slide contact finger support behind associated terminal screw head, then line up contact finger with front and back contacts.
9	Tighten nuts on terminal screw.
10	Using the spring balance, check that contact spring exerts 3 lbs. 8 oz. minimum force against back contact.

Table 6–4. Model 7K Contact Finger Removal and Replacement Procedure (Cont.)

Step	Procedure
11	If spring pressure is not correct, replacement contact finger is not in adjustment. Repeat steps 4 through 10 until proper pressure is achieved.
12	Engage connecting link in contact finger.
13	Reinstall cotter and pin.
14	Close cover and secure hasp.
15	Conduct obstruction test provided in Table 6–5 to verify the proper operation of the controller.

6.4. OBSTRUCTION TEST

An obstruction test should be conducted following corrective maintenance to check the overall operation of the controller. Due to the diversity of applications in which the controller can be used, the test procedure in Table 6–5 is necessarily generic. To conduct the obstruction test, proceed as follows:

WARNING

DISCONNECT MOTOR ENERGY WHENEVER WORKING ON THE SWITCH LAYOUT OR SWITCH MACHINE. UNEXPECTED OPERATION OF THE MACHINE COULD CAUSE INJURY FROM OPEN GEAR, ELECTRICAL SHOCK, OR MOVING SWITCH POINTS.

Table 6–5. Obstruction Test Procedure

Step	Procedure
1	With controller installed, mechanical and electrical connections made, and cam roller adjusted, obstruct the operation of device being monitored. <p style="text-align: center;"><u>NOTE</u></p> For example, place an obstruction gauge between switch points and stock rail.
2	Operate monitored device.
3	Check for correct indication.
4	If correct indication is observed, remove obstruction gauge and configure system for normal operation. If correct indication is not observed, perform preventive maintenance checks. Then repeat steps 1 through 3.
5	If correct indication is observed, remove obstruction gauge and configure system for normal operation. If correct indication is not observed, replace controller.

6.5. SPARE PARTS FOR MODEL 7 CONTROLLERS

Tables 6–6 and 6–7 list the spare parts requirements for both controller models. The tables reflect the Lowest Replaceable Unit for a field maintainer or shop repair person to replace. Each list is compiled from the list of parts shown in the exploded views provided in Section 7, Parts List.

Table 6–6. Model 7J Spare Parts

Component	Catalog No.	Drawing No.
Model 7J Controller Complete	A81-0100	53530-030-01
Front Contact Complete	P81-0158	35467-010-01
Back Contact Complete	P81-0157	35466-011-01
Contact Finger Complete	P81-0161	35490-008-01
Terminal Screw	P81-0105	00352-011-00
Terminal Screw Nut (Tapered)	P76-0131	42843-001-00
Terminal Screw Nut (Hex)	P62-0333	42839-005-00
Terminal Screw Washer (Flat)	P76-0108	01225-00-ON
Terminal Screw Washer (Lock)	P81-0206	53029-022-00
Crank Arm, 4 1/2 in. Centers	P81-0137	38660-020-02
Crank Arm, 5 3/8 in. Centers	P81-0135	38660-015-01
Centering Attachment	P81-0151	53231-002-01

Table 6–7. Model 7K Spare Parts

Component	Catalog No.	Drawing No.
Model 7K Controller Complete	A81-0105	53530-031-01
Front Contact Complete	P81-0158	35467-010-01
Back Contact Complete	P81-0157	35466-011-01
Contact Finger Complete	P81-0161	35490-008-01
Pin (Contact Finger-to-Connecting Link)	P81-0142	20254-001-00
Cotter (for Pin, Above)	---	00652-001-ON
Terminal Screw	P81-0105	00352-011-00
Terminal Screw Nut (Tapered)	P76-0131	42843-001-00
Terminal Screw Nut (Hex)	P62-0333	42839-005-00
Terminal Screw Washer (Flat)	P76-0108	01225-00-ON
Terminal Screw Washer (Lock)	P81-0206	53029-022-00
Crank Arm, 4 1/2 in. Centers	P81-0137	38660-020-02
Crank Arm, 5 3/8 in. Centers	P81-0135	38660-015-01
Centering Attachment	P81-0151	53231-002-01

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7. SECTION 7 - PARTS CATALOG

7.1. GENERAL

This section contains the illustrated parts lists for the ALSTOM Model 7J and 7K Switch Circuit Controllers. The information in this section includes:

- Exploded view illustrations of the Model 7J and Model 7K controllers and the Centering Attachment
- Parts Lists referenced to the exploded view illustrations

7.1.1. PARTS LISTS AND DRAWINGS

Note that each illustrated parts list (Tables 7-1 through 7-4) contains the component reference number, name, catalog number and drawing number. This information should be used to order replacement parts for the Model 7J and 7K Switch Circuit Controllers. If a catalog number is not assigned for a particular part, three horizontal dashes will be found in the column. In this instance, use the ALSTOM drawing number for ordering repair parts.

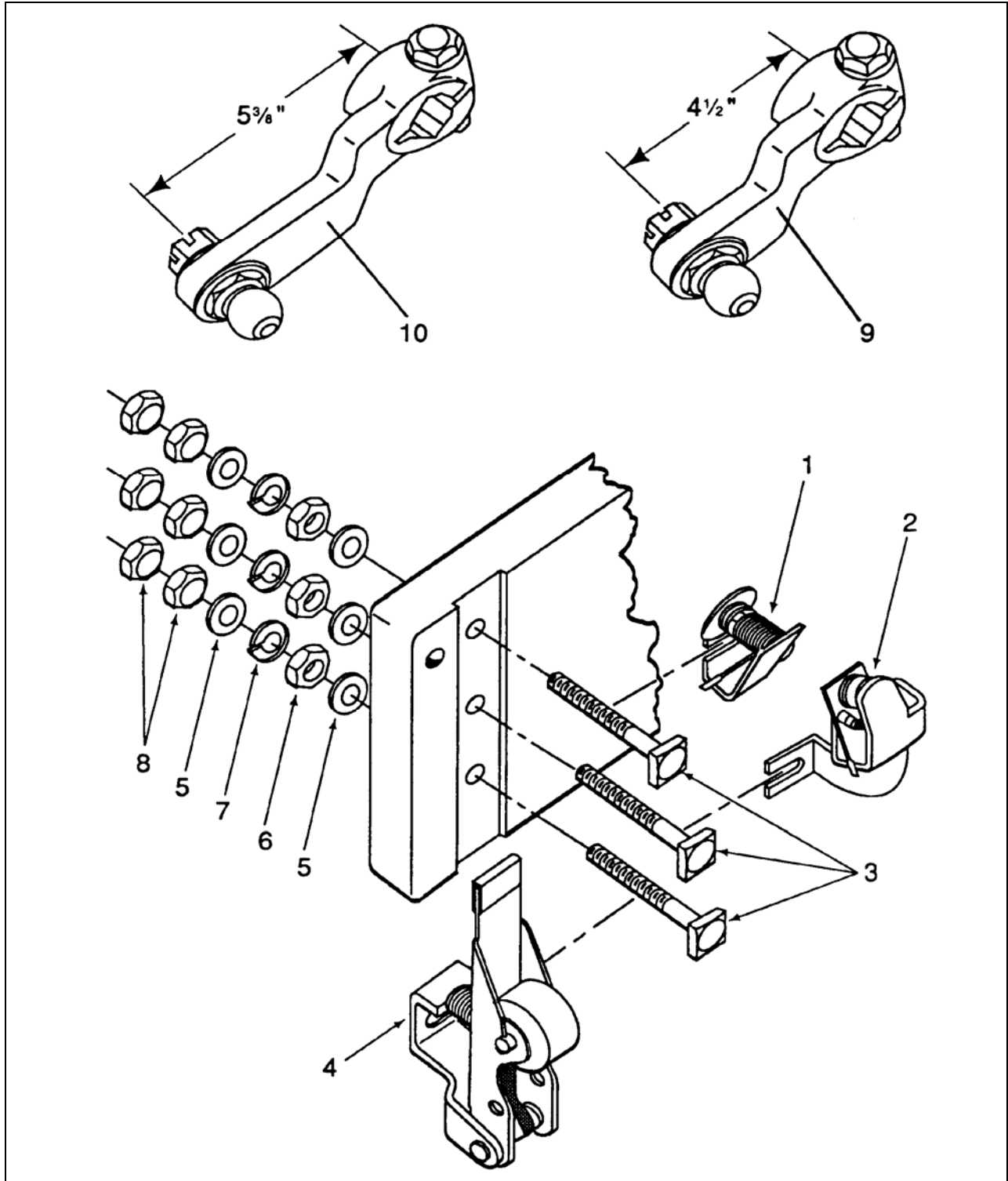


Figure 7-1. Model 7J Controller Contact Assembly and Crank Arms

Table 7-1. ALSTOM Model 7J Switch Circuit Controller, 53530-030-01 Parts List

Ref.	Description	Catalog No.	Drawing No.
1	Contact, front	P81-0158	35467-010-01
2	Contact, back	P81-0157	35466-011-01
3	Screw for terminal post	P81-0105	00352-011-00
4	Contact Finger	P81-0161	35490-008-01
5	Flat Washer for screw (Ref. 3)	P76-0108	01225-002-ON
6	Hex Nut for terminal screw	P62-0333	42839-005-00
7	Lock Washer for terminal screw	P81-0206	53029-022-00
8	Tapered Nut for terminal screw	P76-0131	42843-001-00
9	Crank Arm, for 4 1/2" centers	P81-0137	38660-020-02
10	Crank Arm, for 5 3/8" centers	P81-0135	38660-015-01
--	Controller Complete	A81-0100	53530-030-01
--	Case, includes bushings installed for shaft	P81-0175	38497-006-01
--	Case Complete, includes case, cover, strap, hasp, gaskets and bushings for shaft	P81-0178	38638-012-07

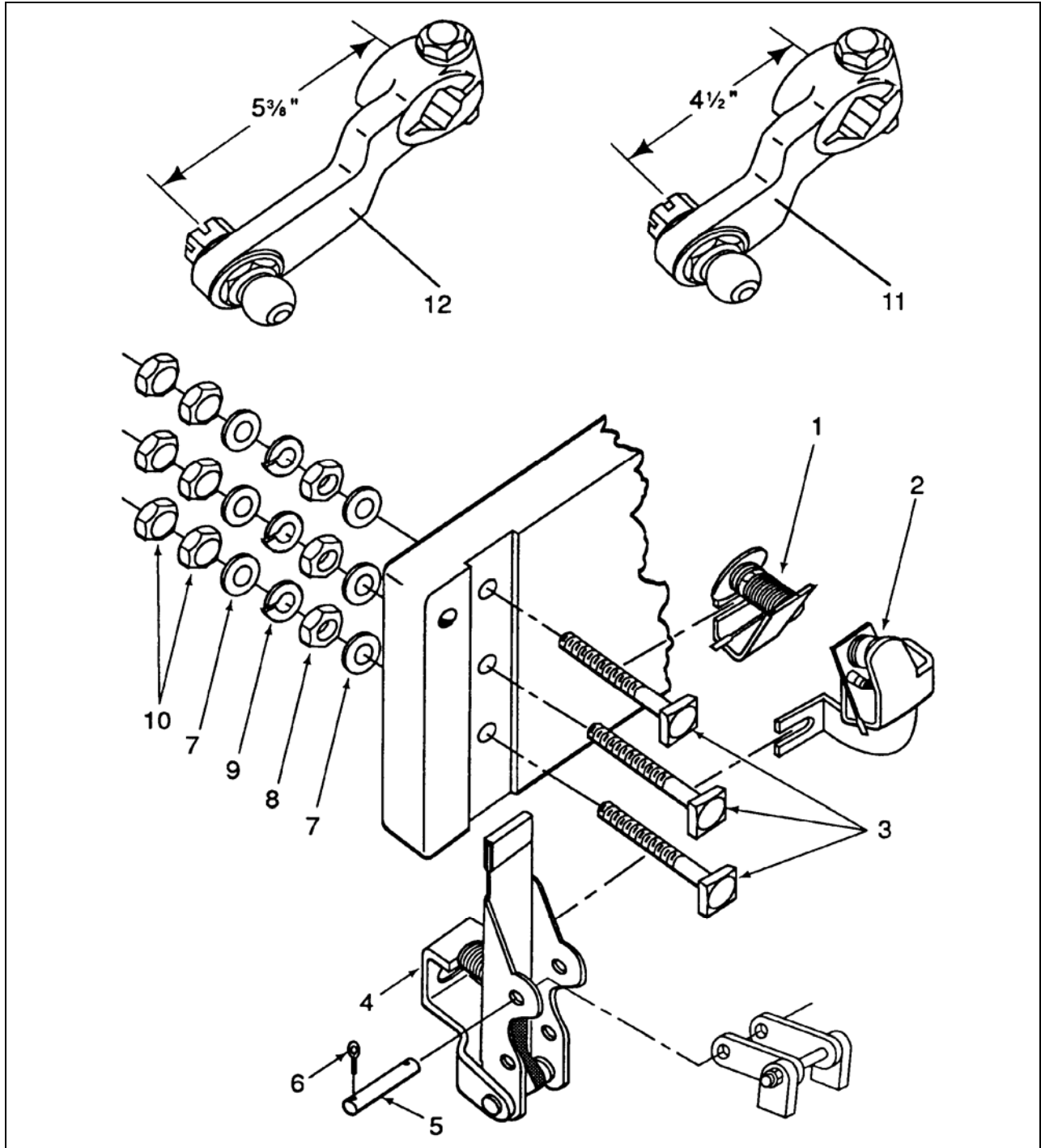


Figure 7-2. Model 7K Controller Contact Assembly and Crank Arms

Table 7-2. ALSTOM Model 7K Switch Circuit Controller, 53530-031-01 Parts List

Ref.	Description	Catalog No.	Drawing No.
1	Contact, front	P81-0158	35467-010-01
2	Contact, back	P81-0157	35466-011-01
3	Screw, for terminal post	P81-0105	00352-011-00
4	Contact Finger	P81-0161	35490-008-01
5	Pin, for support link	P81-0142	20254-001-00
6	Cotter, for support link	---	00652-001-ON
7	Flat Washer, for terminal screw	P76-0108	01225-002-ON
8	Hex Nut, terminal screw	P62-0333	42839-005-00
9	Lock Washer, terminal screw	P81-0206	53029-022-00
10	Tapered Nut, terminal screw	P76-0131	42843-001-00
11	Crank Arm, for 1/2" centers	P81-0137	38660-020-02
12	Crank Arm, for 5 3/8" centers	P81-0135	38660-015-01
--	Controller Complete	A81-0105	53530-031-01
--	Case, includes bushings installed for shaft	P81-0176	38497-006-02
--	Case Complete, includes case, cover, strap, hasp, gaskets and bushings for shaft	P81-0179	38638-012-08

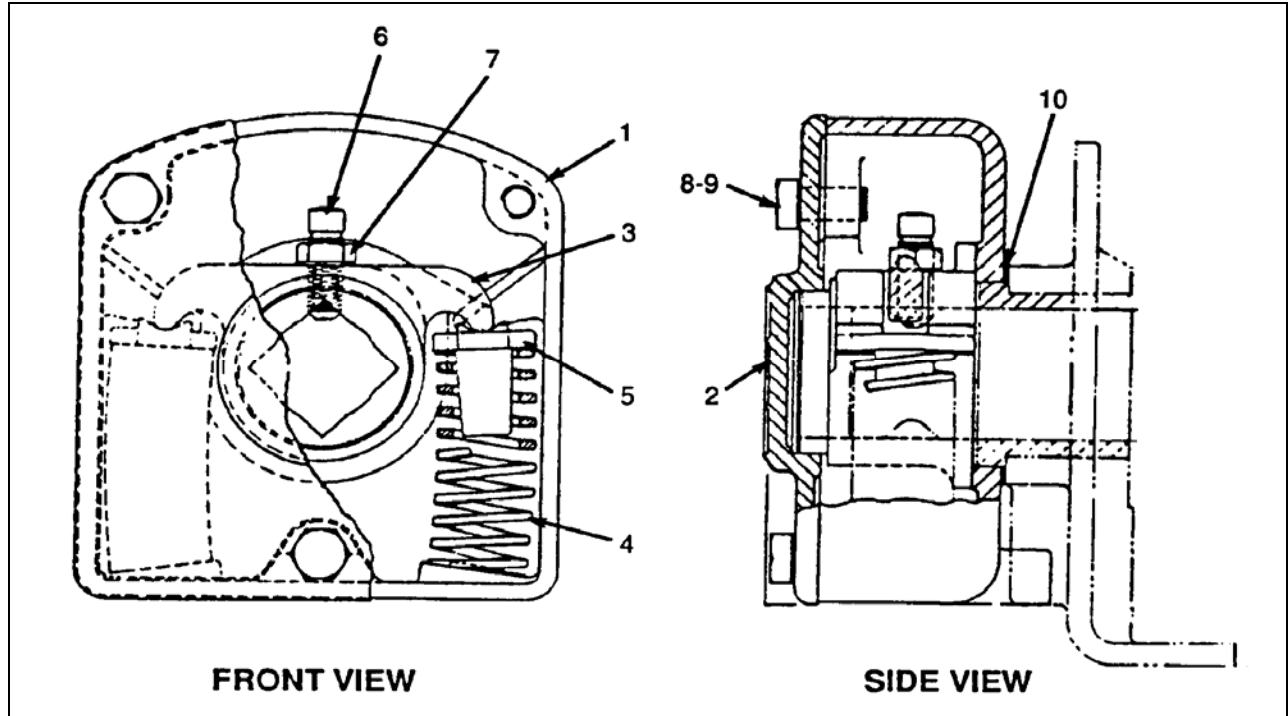


Figure 7-3. Centering Attachment (Optional Component) Parts

Table 7-3. Centering Attachment 53231-002-01 Parts List

Ref.	Description	Catalog No.	Drawing No.
1	Case	P81-0209	53683-004-00
2	Cover	P81-0208	53684-003-00
3	Arm	P81-0210	53685-001-00
4	Spring	P81-0112	00786-303-00
5	Pivot	P81-0211	53687-001-00
6	Screw, 3/8"-24x1" long square head	P81-0131	03169-002-00
7	Hex Nut, 3/8"-24	P81-0203	52822-006-00
8	Lock Washer, 3/8" for screw (Ref. 6)	P81-0122	01273-008-ON
9	Hex Head Screw, 3/8" -- 24/3/4"	P81-0198	50566-001-00
10	Rubber Gasket, 2 3/16" ID (used between controller case and centering attachment)	P81-0137	13014-299-00
--	Centering Attachment Complete	A81-0151	53231-002-01

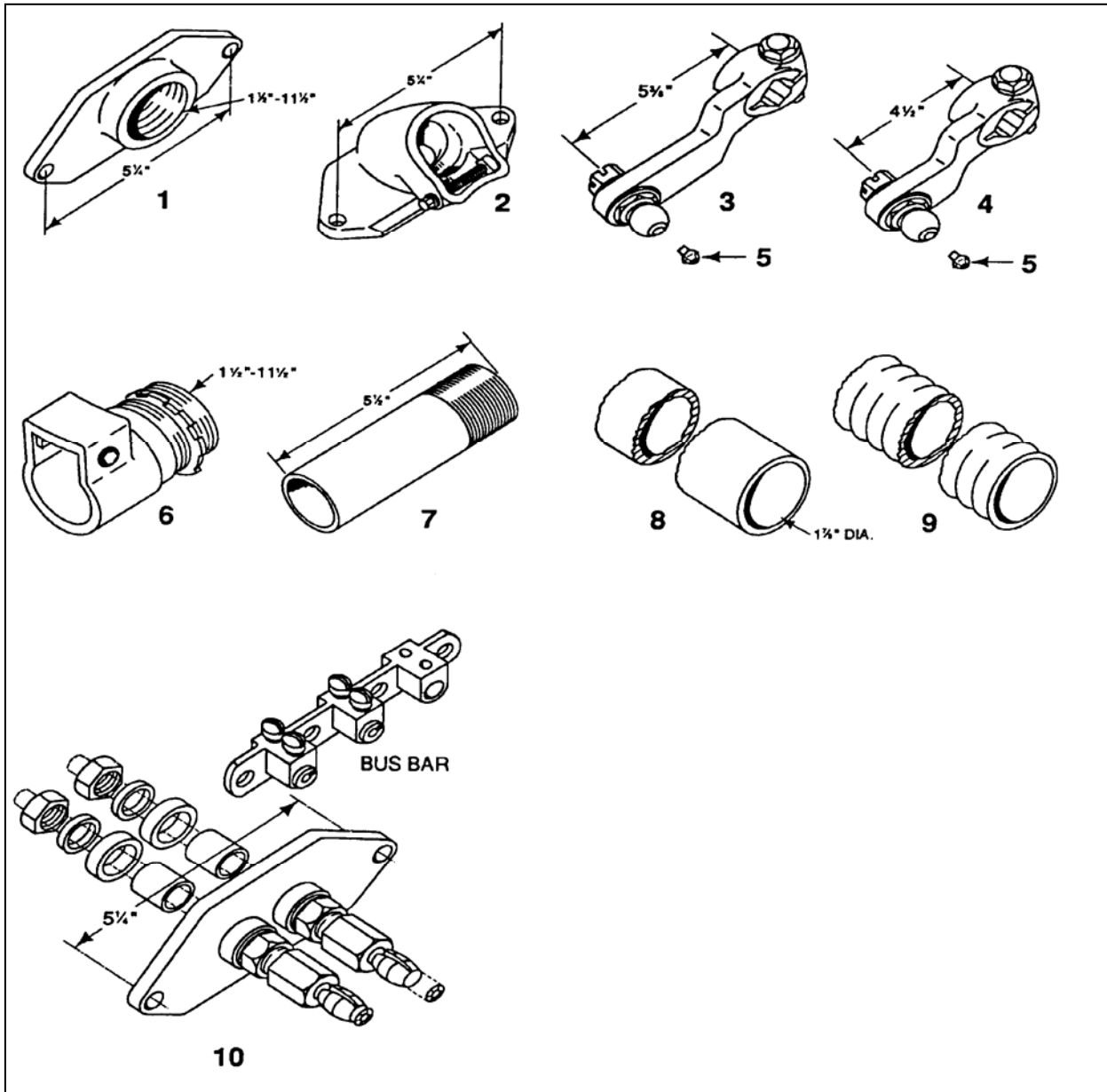


Figure 7-4. Controller Accessories

Table 7-4. Controller Accessories Parts List

Ref.	Description	Catalog No.	Drawing No.
1	Wire Outlet Cap, with 1-1/2" pipe tapped hole	A81-0130	35491-004-00
2	45° Coupling, for 1-1/2" flexible conduit	A81-0131	45688-092-02
3	Crank, with insulated ball, 1" offset, 5-3/8" Center	A81-0135	38660-015-01
4	Crank, with insulated ball, 1" offset, 4-1/2" Center	A81-0137	38660-020-02
5	Oiler, Crank	P81-0140	34232-031-00
6	Coupling, for 1-1/2" flexible conduit and with 1-1/2" pipe threads	A85-0866	56353-033-00
7	Pipe Nipple, 1-1/2" pipe threads, for 1-7/8" id rubber conduit	P85-1003	49034-005-00
8	Conduit, 1-7/8" ID solid rubber (3' length recommended)	A85-0520	55274-024-00
9	Conduit, 1-1/2" flexible (3' length recommended)	A85-0868	81086-020-01
10	Cap (2), for terminating shunt wires, for 2 .243" diam. cables, includes 1 Bus bar	A81-0147	56607-001-03 57549-000-03
10A	Cap (2), for terminating shunt wires, for 2 .190" diam. cables, includes 1 Bus bar	A81-0149	56607-001-04 57549-000-05

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A. APPENDIX A - DRAWINGS

A.1. OVERVIEW

This section contains example layouts and accompanying simplified circuit diagrams of typical Model 7J and 7K applications.

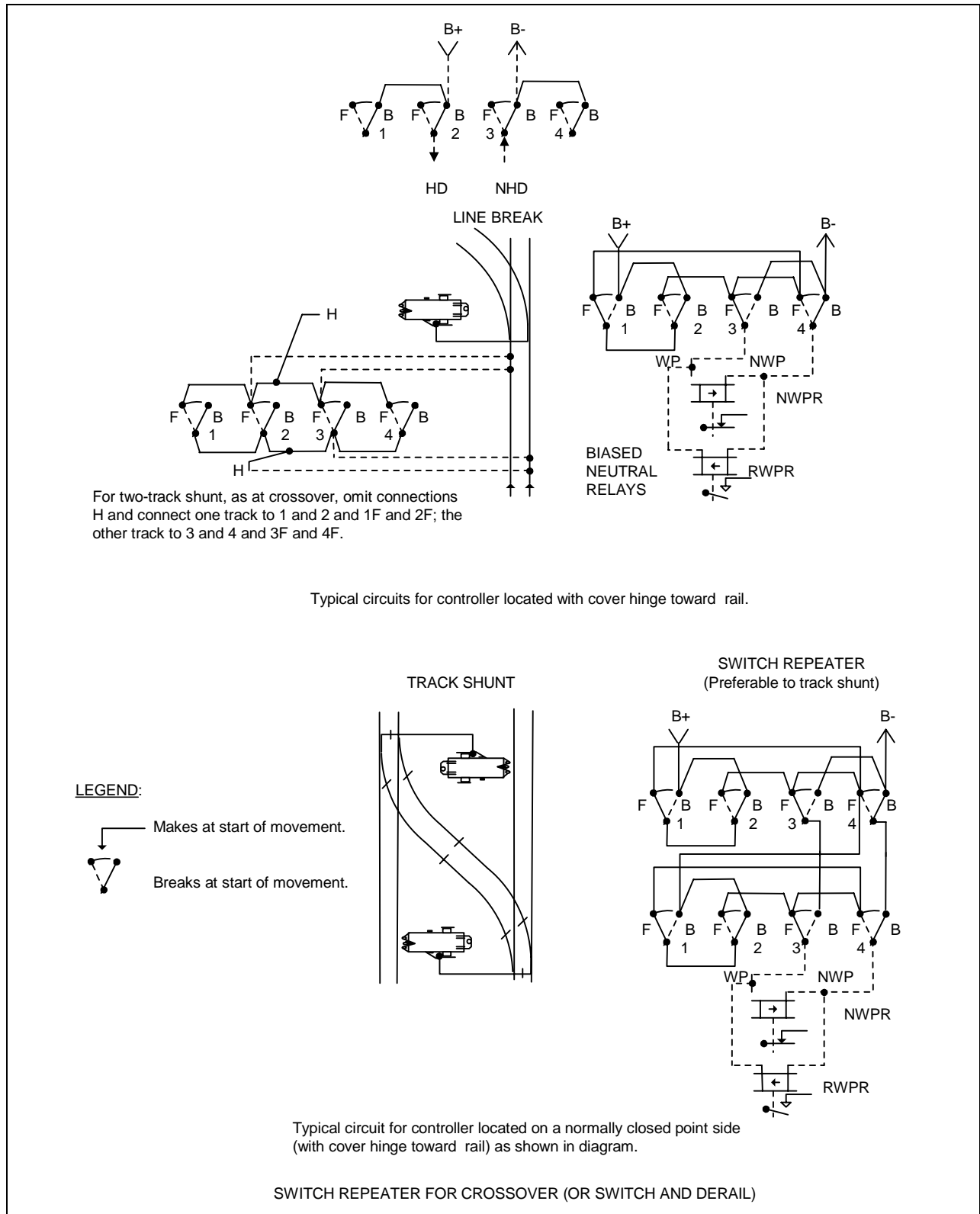


Figure A-1. Controller Applications, Model 7J

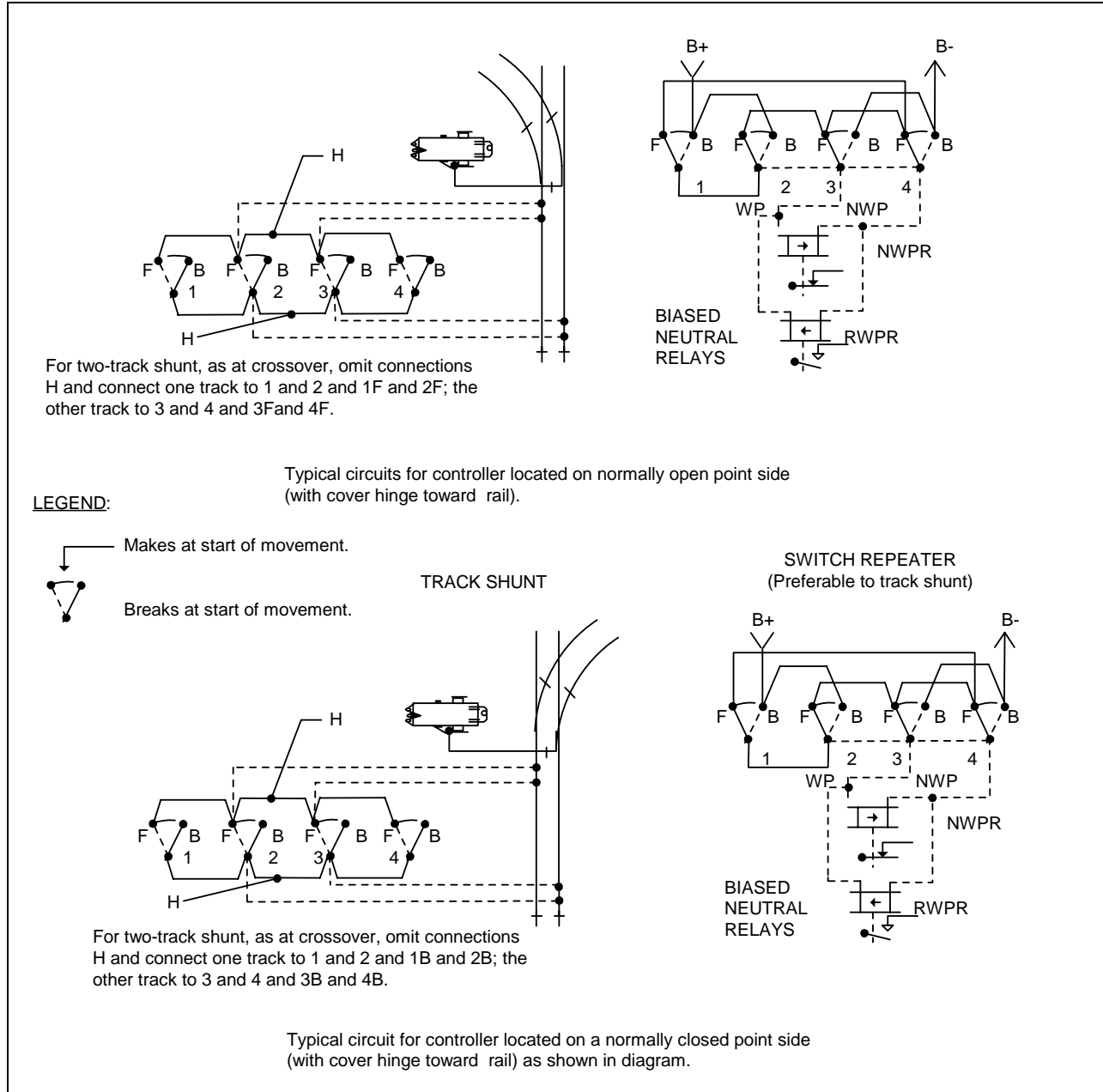


Figure A-2. Controller Applications, Model 7K (Sheet 1 of 2)

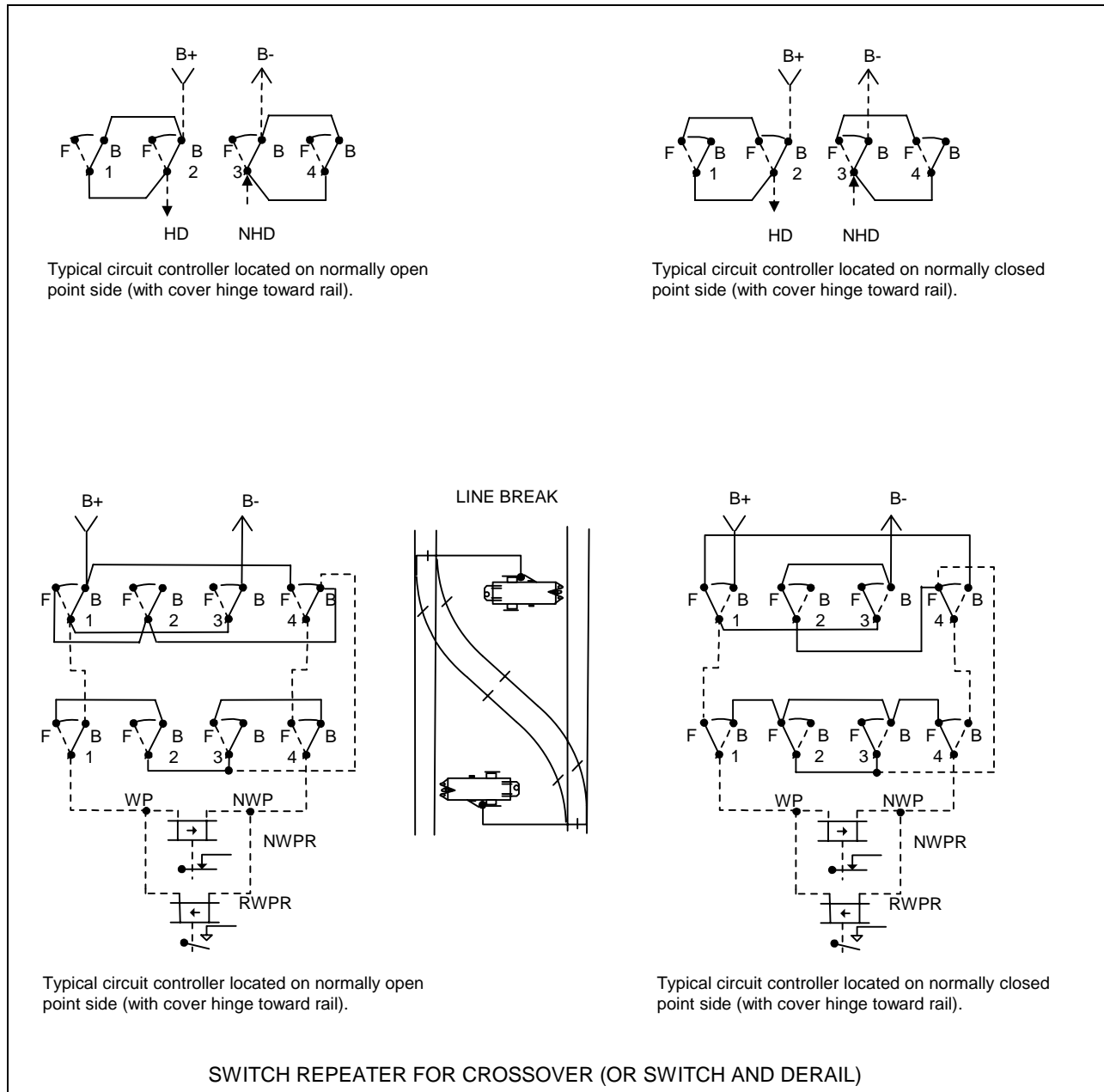


Figure A-2. Controller Applications, Model 7K (Sheet 2 of 2)

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**ALSTOM SIGNALING INC.
1025 JOHN STREET
WEST HENRIETTA, NY 14586**