

Lubrication of Automatic Switching Equipment

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AUTOMATIC  ELECTRIC

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LUBRICATION OF AUTOMATIC SWITCHING EQUIPMENT

1. GENERAL

The general design of Strowger Automatic Systems is such that extensive and frequent lubrication of the switching equipment is unnecessary. However, such lubrication as is needed is important for successful operation and economic maintenance.

This bulletin outlines the practices recommended by Automatic Electric Company for the lubrication of Automatic equipment and lists Standard Adjustment sheets which detail not only the bearing surfaces that require lubrication but also the correct lubricant and method of application for each bearing.

The purpose of lubrication is to provide a film of oil between the bearing (fixed part) and the shaft (moving part) so that there will be a minimum of friction or rubbing. In practice, therefore, it is necessary to apply only that amount of lubricant which is necessary to produce this film. Excessive lubrication should be avoided.

The proper lubricant to be employed for a particular kind of bearing is dependent upon a number of factors, such as size and type of bearing, kind of metals employed for both the fixed and movable parts, speed of operation, temperature, humidity, etc. The choice of lubricant most suited for the particular application is best determined by exhaustive tests over long periods of time, involving all the various conditions which are apt to be encountered in actual operation.

The lubricants recommended in this bulletin are the results of both exhaustive tests and extensive observations made by the technicians of this company. Therefore, before making any departure from these recommendations, which may in some cases become necessary due to market, economic or unusual local conditions, cooperation with the manufacturer is solicited.

In order to provide adequate lubrication and to avoid its excessive use, simple quantitative units have been employed herein. Definitions of these amounts are as follows:

(a) Drop - A drop of oil is considered to be the amount released from the end of a No. 22 E&S gauge, bare, tinned, copper wire after it has been dipped into the lubricant 1/2 in. and then quickly withdrawn.

(b) Dip - A dip of oil is considered to be the amount retained in the bristles of a No. 4 artist's sable rigger brush, after being dipped into the lubricant to a depth of 3/8 in. and then drawn across the edge of the container to remove the surplus oil.

(c) Small Quantity - A small quantity of oil is considered to be the amount retained on a strip of paper or thin fiber after being immersed in the lubricant, withdrawn, and the free oil removed by wiping. Oiled strips of paper or thin fiber are used for lubricating tips of wipers and similar brushes. This is done by passing the oiled strip between the tips of each pair of wipers.

Whenever practicable, bearings should be cleaned before applying lubricant. This is particularly applicable to exposed bearing surfaces.

The shaft of Strowger switches should be cleaned with cotton tape before applying lubricant to the bearings. This is done by wrapping the tape once around the shaft and pulling it from side to side. The lower portion of the shaft is cleaned with the shaft resting at normal. The upper portion of the shaft is cleaned while the shaft is raised to the tenth vertical step.

Additional lubricant containing graphite should not be placed on a bearing or upon a bearing surface, if such bearing or surface is sufficiently covered with graphite. In case the existing graphite appears to be excessively dry apply a small amount of spindle oil. If the graphite is caked or seems to contain grit, the bearing should be thoroughly cleaned and relubricated.

After switches or similar apparatus have been properly lubricated, they should be operated a few times so as to work the lubricant into the bearings. Any excess oil, on adjacent surfaces, should be removed by wiping.

2. PERIOD OF LUBRICATION

All lubricating operations on equipment in service should be performed in accordance with the maintenance routines assigned to the individual installation and the Adjustment sheets which apply to the particular switching units. See Section 5.

3. GRADES OF LUBRICANTS AND THEIR USES

Exhaustive tests with respect to the effects of temperature, humidity, and age on the viscosity of lubricants plus the satisfactory results obtained by actual operation in all kinds of climates for long periods of time have shown the following lubricants to be the most suitable in the particular use for which they are recommended.

3.1 Watch Oil

This classification covers a highly refined grade of sperm or fish oil commonly employed for the lubrication of chronometers, watches, and similar

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delicate machinery. Ezra Kelly's Chronometer Oil, which is regularly supplied in 2-dram and 2-ounce bottles, is recommended. It is used as a lubricant for equipment such as the dial.

3.2 Spindle Oil

Spindle oil is a highly refined, neutral petroleum oil commonly used for the lubrication of spindles of textile machines. Eagle Spindle Oil No. 3 is recommended. It is used as a lubricant for the following equipment:

- (a) Dial
- (b) Master-Switch
- (c) Rotary Lineswitch
- (d) Strowger Switches
- (e) Minor Switch (Frequency Selector)
- (f) Message Registers (Traffic Meters)
- (g) Rotor Relays
- (h) Tone, Impulse, and Interrupter Machines
- (i) Automatic Voltage Regulating and Rectifier Tilting Equipment

3.3 Switch Lubricant

Switch lubricant is composed of one part (by volume) of spindle oil and one part of concentrated oildag. The spindle oil and oildag are heated separately to approximately 60° C. (140 F.), and then mixed by gradually adding the oildag to the spindle oil. The recommended ingredients are Eagle Spindle Oil No. 3 and Acheson Oildag Co's. Concentrated Oildag. Switch lubricant is supplied in 2-dram and 5-ounce bottles.

This lubricant is used for lubricating the following equipment:

- (a) Rotary Lineswitch
- (b) Minor Switch
- (c) Strowger Switches (Selector, Connector, etc.)

3.4 Dashpot Oil

This lubricant is straight run, well refined, petroleum oil having a flash point not lower than 350° F. It is supplied in 5-c.c., 13-c.c., and 56-c.c. bottles. The 5-c.c. (cubic centimeter) bottle is slightly less than a 1/4 fluid ounce, the 13-c.c. bottle slightly less than 1/2-ounce, and the 56-c.c. bottle slightly less than two fluid ounces.

Dashpot oil is used for lubricating switch banks and for charging the dashpot of the following equipment:

- (a) Internally Adjusted Dashpot Relay
- (b) Externally Adjusted Dashpot Relay
- (c) Solenoid-Type Ringing Interrupter

3.5 Machine Oil - Grade "A"

Grade "A" machine oil is a highly refined, neutral, filtered, straight run petroleum oil. It is commonly employed as a lubricant for small motors, sewing machines, machinery having ball bearings, etc. Eureka Stainless Sewing Machine Oil is recommended, and is supplied in 2-ounce and 1-pint bottles.

It is used for lubricating the ball bearings of the following machines:

- (a) Small Ringing Machines
- (b) Tone Machines
- (c) Interrupter Machine
- (d) Impulse (Varying) Machine

3.6 Machine Oil - Grade "B"

Grade "B" machine oil is a light grade, refined, petroleum oil, such as is commonly employed for the lubrication of internal combustion engines. Light Engine Oil is supplied in 1-pint bottles and 1-gallon cans.

Grade "B" oil is used for lubricating the bearing of the following machines:

- (a) Motors (5 H.P. or smaller, having ring oil feed)
- (b) Dynamos (Generators, 5 KW or less, having ring oil feed)
- (c) Dynamotors (Ring oil feed)

3.7 Machine Oil - Grade "C"

Grade "C" machine oil is a medium grade, refined, petroleum oil, such as is commonly used for the lubrication of internal combustion engines. Medium Engine Oil is supplied in 1-pint bottles and 1-gallon cans. It is used on the following machines:

- (a) Motors (Over 5 H.P.)
- (b) Generators (Over 5 KW)
- (c) Tone Machine, Gear Case
- (d) Impulse Machine, Gear Case
- (e) Interrupter Machine, Gear Case

3.8 Grease - Grade "E"

Grade "E" grease is a carefully selected graphite grease capable of withstanding all temperature changes. It is commonly employed as a lubricant for bearings of small motors and generators equipped with under-hung cup wick-oilers. Holtzer Cabot Electric Co's. No. 1 Grease supplied in 4-ounce tubes, is recommended for use in under-hung cup wick-oilers.

3.9 Grease - Grade "F"

Grade "F" grease is also a graphite grease,

carefully selected to withstand all changes in temperature. It is suitable for use in the top-cup wick-oilers on bearings of small motors and generators. Holtzer Cabot Electric Co's. No. 2 grease, supplied in 4-ounce tubes, is recommended for use in top-cup wick-oilers.

3.10 Grease - Oneida

This item covers a cup grease which contains no graphite. It is employed as a lubricant for the ball bearings of Holtzer Cabot Type Q.D. ringing machine. Oneida grease, a product of the Standard Oil Co., is recommended for this purpose.

4. SUPPLYING LUBRICANTS

All of the oils and greases described in this bulletin can be supplied by Automatic Electric Company under the following specification numbers:

<u>Lubricant</u>	<u>Spec. No.</u>
Watch Oil (Ezra Kelly's Chronometer Oil)	5226
Spindle Oil (Eagle Spindle No. 3)	5231
Switch Lubricant	5232
Dashpot Oil	5273
Machine Oil - Grade "A" (Eureka Stainless Sewing Machine Oil)	5227
Machine Oil - Grade "B" (Light Engine Oil)	5222
Machine Oil - Grade "C" (Medium Engine Oil)	5223
Grease - Grade "E" (Holtzer Cabot Elec. Co's. No. 1)	5224
Grease - Grade "F" (Holtzer Cabot Elec. Co's. No. 2)	5225
Grease - Oneida	5431

5. LUBRICATION

Detailed information on the lubricating of switching equipment may be found in the appropriate "Standard Adjustment" sheets.

- 5.1 Dial - See A-805
- 5.2 Master-Switch - See A-160
- 5.3 Rotary Lineswitch - See A-151
- 5.4 Minor Switch - See A-136
- 5.5 Service Meters (Traffic Meters) - See A-119
- 5.6 Strowger Switches - See A-141
- 5.7 Strowger Switch Bank Contacts - See Mfg. Spec. H-5360 and also "Cleaning Switch Bank Contacts" Bulletin 506

5.8 Rotor Relay - See A-55535

5.9 Automatic Voltage Regulating and Rectifier Tilting Equipment

Switch Shafts, Bearing	Spindle Oil	As Req.
Worm and Worm Wheel	Spindle Oil	As Req.

5.10 Dashpot Equipment

Dashpot Relays - See A-113

Solenoid Type Ringing Interrupter - See A-880.

5.11 Machines

	<u>Eureka Sewing Machine Oil</u>
Small Motors, Ball Bearings	Grade "A" As Req.
Ringing Machines, Ball Bearings	Grade "A" As Req.
Tone Machines, Ball Bearings	Grade "A" As Req.
Interrupter Machines, Ball Bearings	Grade "A" As Req.
Impulse (Varying) Machine, Ball Bearings	Grade "A" As Req.
	<u>Light Engine Oil</u>
Small Motors (5 H.P. or less) Ring Feed Bearings	Grade "B" As Req.
Small Generators (5 KW or less) Ring Feed Bearings	Grade "B" As Req.
Ringing Machines, Ring Feed Bearings	Grade "B" As Req.
	<u>Med. Engine Oil</u>
Large Motors (over 5 H.P.) Ring Feed Bearings	Grade "C" As Req.
Large Generators (over 5 KW) Ring Feed Bearings	Grade "C" As Req.
Tone Machines, Gear Case	Grade "C" 1/8" of Top
Interrupter Machines, Gear Case	Grade "C" 1/8" of Top
Impulse (Varying) Machine, Gear Case	Grade "C" 1/8" of Top
Tone Machines, Assembly Bearings	Spindle Oil 1 Drop
Interrupter Machines, Assembly Bearings	Spindle Oil 1 Drop
Impulse (Varying) Machine, Assembly Bearings	Spindle Oil 1 Drop
	<u>Grease</u>
Small Motors, Under-Hung Wick-Oilers	Grade "E" As Req.
Small Generators, Under-Hung Wick-Oilers	Grade "E" As Req.

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Small Motors, Upper-Cup Wick-Oilers	Grade "F" As Req.	5.21	<u>Rotary Cam Interrupter</u> - See A-55200, A-55217, A-55220
Small Generators, Upper-Cup Wick-Oilers	Grade "F" As Req.	5.22	<u>Rotary Cam Interrupter</u> - See A-157
Ringing Machines Type QD Grease Plug Hole	Oneida As Req.	5.23	<u>Code Interrupter</u> - See A-55190
Ringing Machines Type QD Worn Gear	Oneida *1/3 Full	5.24	<u>Isolated Code Call</u> - See A-55304, A-55330
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* Approximately one-fifth cubic in. which is equal to two-thirds of a turn for an Edelman "Gem" oil and grease gun which is recommended for this purpose.			
5.12	<u>Auto-Com</u> - See A-895	5.25	<u>Motor-Driven End-Cell Switch</u> - See A-912
5.13	<u>Discriminating Tone Machine</u> - See A-861, A-862, A-863	5.26	<u>Multiple Pen Recorder</u> - See A-907
5.14	<u>Impulse Machine</u> - See A-55101	5.27	<u>Multiple Time Recorder</u> - See A-55215, 55362
5.15	<u>Impulse Machine</u> - See A-55143	5.28	<u>Pendulum Type Dial Speed Indicator</u> - See A-55100
5.16	<u>Impulse Machine</u> - See A-55165	5.29	<u>Radio Program Selector</u> - See A-55203
5.17	<u>Impulse Machine</u> - See A-55168	5.30	<u>A.C. Mercury Contact Relay</u> - See A-55516
5.18	<u>Interrupter Machine</u> - See A-55006	5.31	<u>D.C. Mercury Contact Relay</u> - See A-55506, A-55546
5.19	<u>Interrupter Machine</u> - See A-55095	5.32	<u>Type 12 Metal Clad Mercury Contact Relay</u> - See A-55538
5.20	<u>Interrupter Machine</u> - See A-55131	5.33	<u>Electrical Interlock Relay</u> - See A-55555
		5.34	<u>Twin Coil Relay</u> - See A-55508, A-55509
		5.35	<u>Type 31 Monophone Desk Set</u> - See A-896

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