TELETYPEWRITER APPARATUS
GENERAL REQUIREMENTS
LUBRICATION

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1. GENERAL

Caution: All teletypewriter apparatus must be lubricated just before placing it in service and just before placing it in storage. Refer to the related section(s) for proper lubrication procedures.

1.01 This section contains general information relative to lubrication of teletypewriter apparatus and is intended to supplement the lubrication procedures detailed in the individual 9-digit sections covering lubrication.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 Lubrication Intervals: Teletypewriter apparatus should be lubricated on the following basis and in the order shown.

(a) Just prior to placing the equipment into service or into storage.

(b) One to several weeks after placing the equipment into service, dependent on the type of equipment and daily utilization. Refer to the appropriate lubrication 9-digit section for the specific interval for newly installed equipment.

(c) At regular intervals, dependent on the type of equipment, speed of operation and daily utilization. Refer to the appropriate lubrication 9-digit section for the specific lubrication interval.

1.04 Sequence of Lubrication: The lubrication sequence detailed in the individual lubrication sections should be followed in order to minimize the shifting or handling of the teletypewriter apparatus.

1.05 References to Position of Apparatus: References to left or right, up or down, and front or back, as used in this section and in

the individual lubrication sections, refer to the apparatus or its component mechanisms as viewed from the operator's position in front of the machine.

1.06 Locator Photographs and Line Drawings:

In the individual lubrication sections, locator photographs are used to supplement the line drawings. These locator photographs show the location of the mechanisms illustrated in the line drawings. Unless otherwise indicated, the apparatus shown in the illustrations are to be lubricated in their normal upright position.

1.07 Tools and Materials: The tools and materials recommended in Part 2 of this section are considered to be satisfactory and safe when used as directed. In performing the lubrication operations, special care should be taken to follow general safety practices, as well as the special recommendations given herein and in the individual lubrication sections.

Note: Care should be taken to keep grease guns, containers, oilers, and tools clean.

1.08 Disconnecting Power: Power should be disconnected before the apparatus is separated from its protective housing. Should operation of the apparatus be required after it has been separated from its protective housing, appropriate precautionary measures should be taken to avoid accident.

1.09 Polarized Electrolytic Capacitors: When working near polarized electrolytic capacitors, special care should be taken to avoid electrical shock or short circuits.

1.10 Area Protection: The immediate and adjacent furniture and floor covering should be protected from oil, grease, and dirt during lubrication. The TP124828 oilproof maintenance pad, which should always be used with the same side down, is intended for this purpose.

1.11 Care of Removed Parts: The cover of the equipment, or any other part removed, should be set aside in some location where it will not be damaged.

1.12 Cleaning: Before teletypewriter apparatus or associated equipment is lubricated, it should be cleaned by wiping sufficiently with a TP107162 cloth to remove any oily dirt, caked or dirty grease in the area to be lubricated.

2. TOOLS AND MATERIALS

A. List of Tools, Materials and Lubricants

2.01 The following tools, materials and lubricants are recommended for use in lubricating teletypewriter apparatus. Items other than those listed should be used only when specifically noted in the individual lubrication sections.

TOOLS	DESIGNATION
Brush (Type Cleaning)	TP151394
Brush (Flat, 3/8 inch wide)	—
Brush (Round Sash)	No. 6
Grease Gun	TP88975
Oiler	TP345779
Orange Stick	TP94646

MATERIALS	DESIGNATION
Cotton Twill Cloth	TP107162
Maintenance Pad	TP124828
Petroleum Spirits	—

LUBRICANTS	DESIGNATION
Grease	TP97116 (4 oz can)
Grease (Note 1)	TP108805
Grease (Note 2)	TP143484 (3 lb can)
Grease (Note 2)	TP145807 (4 oz tube)
Grease (Note 3)	TP196298
Oil	TP88970 (1 qt can)
Oil	TP318775

Note 1: Alternate designations, TK8102, Lubriplate 105

Note 2: Alternate designation, Mobil no. 2

Note 3: Alternate designations, TK8103, Beacon 325

B. Use of Lubricating Oils

2.02 TP88970 Oil: This lubricant is specified for general oil lubrication of teletypewriter apparatus operated in ambient temperatures above 40 degrees F. For operation at ambient temperatures consistently below 40 degrees F, consult Teletype Corporation for recommended lubricating information.

2.03 TP318775 Oil: This lubricant is specified only for escapement wheel lubrication of the DX high speed tape reader and is in addition to the TP88970 oil specified for general lubrication on this apparatus.

C. Use of Lubricating Grease

2.04 TP97116 Grease: This lubricant is specified for all grease lubrication of teletypewriter apparatus except the applications stated in 2.05 through 2.07.

2.05 TP108805 Grease: This lubricant is specified for lubricating certain cabinets and also for lubricating specific areas of Model 37 keyboard and Model 40 monitor units.

2.06 TP143484 Grease: This lubricant is specified for lubricating the CX high speed tape reader, the BRPE and DRPE high speed tape punches.

2.07 TP195298 Grease: This lubricant is specified for lubricating motor units equipped with ball bearings.

D. Use of TP88975 Grease Gun

2.08 General: The TP88975 grease gun is used to apply TP97116 grease in strip form for lubrication of teletypewriter apparatus. This device is approximately 2 inches in diameter, and 4 inches high. It is designed to be held and operated with one hand. The slender elongated nozzle facilitates access to the areas to be lubricated. The TP88975 grease gun is shown in Fig. 1.

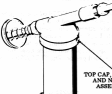

Fig. 1—TP88975 Grease Gun

2.09 Operation: The TP88975 grease gun delivers a cylindrical strip of TP97116 grease approximately 1/8 inch in diameter and 1 inch long for each full stroke of the thumb operated plunger. When less grease is desired, the stroke length should be decreased accordingly.

2.10 Filling the TP88975 Grease Gun: The grease gun should be filled as follows:

(1) Grasp the top cap, plunger, and nozzle assembly and remove the cylindrical grease retainer barrel. Use any convenient rod shaped tool, having a blunt end, to push the internal piston to the closed end of the grease retainer barrel.

(2) Fill the grease retainer barrel with grease using a spatula shaped tool such as a putty knife. After filling, replace the grease retainer barrel to the top cap, plunger and nozzle assembly.

(3) Insert a screwdriver through the opening in the grease retainer barrel bottom and push the piston toward the top cap, plunger and nozzle assembly, to remove any air pockets and to charge the plunger mechanism with grease. Operate the plunger several times until the grease is extruded from the nozzle. It may be necessary to alternately apply pressure to the grease cylinder piston and follow with several operations of the plunger to start a smooth flow of grease after a filling.

E. Use of TP345779 Oiler

2.11 General: The TP345779 oiler is a squeeze-type oilcan designed to deliver oil in drops or in a steady stream. The oiler consists of a flexible bottle 1-3/8 inch in diameter and 3 inches long, a removable valve fitting the bottle neck, and a screw cap, plunger and nozzle assembly. All parts are of molded plastic. The TP345779 oiler is shown in Fig. 2.

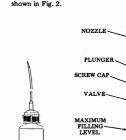

Fig. 2—TP345779 Oiler

2.12 Operation of the TP345779 Oiler: When filled and stored in other than a nozzle-up vertical position, the plunger should be moved down toward the bottle to engage the oil shut-off plug of the valve. For normal use the plunger is grasped and pulled up and away from the bottle, allowing oil to enter the nozzle when the bottle is squeezed. The amount of oil released at the nozzle tip is determined by the pressure applied to the bottle.

2.13 Filling the TP345779 Oiler: The oiler should be filled as follows:

(1) Remove the screw cap, plunger and nozzle assembly.

(2) Remove the valve from the bottle neck.

(3) Fill the oiler bottle to the level indicated in Fig. 2.

(4) Replace the valve and the screw cap, plunger and nozzle assembly.

3. LUBRICATION SYMBOLS AND PRINCIPLES OF LUBRICATION

A. General

3.01 Where detailed lubrication routines are given in the individual 9-digit sections on particular teletypewriter apparatus, such routines should be carefully followed. In general, those routines are based on the lubrication principles given herein. Where specific routines are not available in individual 9-digit sections, the principles herein should be used as a guide for lubrication.

3.02 Overlubrication, which would permit oil or grease to drip or be thrown on other parts, should be avoided.

Caution: Special care should be taken to prevent any lubricant from getting between all magnet armatures and their magnet pole faces, and from between electrical contact surfaces.

B. Lubrication Symbols and Meanings

3.03 The following are the lubrication symbols and their meanings as used in individual 9-digit lubrication sections:

SYMBOL	MEANING
O	Oil (one or two drops)
OS	Oil Sparingly
OF	Oil Freely
SAT	Saturate with oil
F	Fill with oil
G	Grease
GS	Grease Sparingly
OG	Oil and Grease
OGO	Oil — Grease — Oil

3.04 Sparingly applies where a surplus of lubricant might be harmful. A film of oil or grease should be applied to the surface requiring lubrication. Any surplus which might spread to adjoining surfaces should be removed.

3.05 Freely means that a moderate surplus of lubricant is desirable on the surface being lubricated and that some overflow of lubricant to adjacent parts is not harmful.

3.06 Saturate means either to soak or immerse the specific parts, usually felt lubricating wicks or washers, in oil.

3.07 Grease means that a film of grease should be applied to a particular surface to provide total lubrication.

3.08 Oil — Grease — Oil should be applied as above under alternate treatments in this order. This method is ordinarily specified where two surfaces will be in contact under considerable pressure and speed. The initial application of oil provides the desired lubrication, but the duration of its retention is limited. The application of grease, followed by the second application of oil, holds the initial oil on the surface where it is required. It also tends to give the grease a higher oil content than normally used, so as to replenish the supply of oil to the contacting surfaces.

C. General Oil-lubrication Principles

3.09 Oil should usually be applied to points where it will adhere or where pressure is nominal. In lubricating small parts, only a single drop of oil should be applied so that the oil remains on the part and does not run off.

Note: Excessive oil tends to work onto contacts and pole faces where it has a harmful effect. It also tends to cause deterioration of platens, pressure rollers, and wiring insulation. Capillary action and vaporization due to heat of the motor tend to keep a film of oil on the machine, preventing rust and giving sufficient lubrication to many minor points, such as the ends of small springs.

3.10 In general, oil should be used in such locations as hollow shafts, oil reservoirs, felt washers, and in most locations where parts rub, slide, rotate, or move with respect to each other. In particular, and unless otherwise specified in the individual lubrication sections, oil should be used in the following applications.

(a) Lightly oil all cam surfaces, sliding surfaces, and pivot points.

(b) Lubricate all spring eyes with one drop of oil.

(c) Fill all oil reservoirs.

(d) Saturate all felt lubricating washers and wicks.

Note: Felt washers for which no lubrication is specified in the individual lubrication 9-digit sections are considered barrier washers intended to prevent oil migration and should be replaced if they become oil soaked.

(e) Replace felt lubricating washers and wicks that do not readily absorb oil.

Note: New felt lubricating washers and wicks should be thoroughly saturated with oil, and the excess oil removed before installation by pressing the washer or wick between clean cloths.

D. General Grease-lubrication Principles

3.11 Grease should usually be applied (with the nozzle of a TP88975 grease gun, a 3/8 inch wide wood or metal stick) to all parts where oil will not remain for the periods between lubrications or where the pressure is too great for effective lubrication with oil. Old grease should be removed and fresh grease applied.

3.12 In general, grease should be used on gears, worms, rods or points of heavy pressure, and most ball bearings. Unless otherwise specified in the individual lubrication 9-digit sections, a film of grease should be applied to all gears.

E. Removing Excess Lubricant

3.13 After lubrication, excess oil or grease which may have run onto surfaces not requiring lubrication should be removed. Platens, pressure rollers, and wiring insulation should be cleaned of any oil or grease by wiping them first with a clean, dry TF107162 cloth dampened with petroleum spirits and then wiping them dry with a clean, dry TF107162 cloth.

F. Verifying Adjustments

3.14 Adjustments which might have been disturbed during lubrication of the teletypewriter apparatus should be verified and remade if necessary in accordance with the procedures given in the 9-digit section covering teletypewriter apparatus general requirements, requirements and adjustments, and in the individual 9-digit sections containing the specific requirements for the particular apparatus.

A. LUBRICATION OF MOTORS AND MOTOR UNITS

A. General

Caution: Power should be disconnected. Where procedures specify that power not be disconnected, caution should be observed to avoid accident.

4.01 Oil Lubrication: Motors equipped with open oil holes (NOT ball and fittings) should periodically be lubricated with TP88970 oil in accordance with the individual lubrication 5-digit schedule. These motors have sleeve type bearings and are generally marked with a TP (Teletype) number in lieu of coded designations, such as LMU3, LMU12, etc.

4.02 Grease Lubrication: Motors and motor units, without oil holes, and including older styles having ball end fittings, are equipped with ball bearings packed with a long term supply of high temperature grease and do not require periodic lubrication. As repacked ball bearings requires motor disassembly, motors inspected of having lubrication problems are best serviced at a shop location.

4.03 Overlubrication Troubles: Care should be taken not to avoid excess oiling of motor units. More motor trouble will be caused by overlubrication than by underlubrication.

B. Cleaning and Lubricating Motor Ball Bearings

4.04 * On-the-job disassembly of a motor unit to clean and repack the ball bearings is not recommended. However, if the motor must be disassembled for other reasons, the ball bearings may be inspected and repacked, if necessary, in accordance with the following procedure.

4.05 When the rotor with bearings has been removed, the bearings should be examined.

(a) If the motor bearings appear to be adequately packed with CLEAN grease they should not be repacked. However, any grease extending beyond the ball races and any dirt, excess grease or old grease on adjacent parts, should be carefully removed with a clean TP01762 cloth dampened with petroleum spirits. Grease the rotor and slowly rotate each bearing outer race. If the bearing rotates smoothly, the motor may be reassembled and placed into service. Any roughness indicates a defective bearing which should be removed with a bearing puller tool and replaced with a bearing press, normally a shop operation.

(b) If the motor bearings are inadequately packed with CLEAN grease and are otherwise in good condition, sufficient TP186298 grease should be worked into the bearings with a clean TP06466 orange stick to fill at least 50 percent of the space between the ball rollers. After removal of any excess grease, the motor may be reassembled and placed into service.

(c) If the motor ball bearings contain dirt, and/or caked lubricant, the bearings should be cleaned (4.06) and inspected. If found in good condition, the bearings should be repacked (4.07) after which the motor may be reassembled and placed into service.

4.06 Cleaning Motor Ball Bearings: Motor ball bearings should be cleaned by brushing and rinsing with a TP11394 cleaning brush kept saturated with petroleum spirits. The brush should be periodically rinsed in petroleum spirits to wash out dirt and old lubricant removed from the bearings. Armatures should be protected during bearing cleaning by wrapping after clean, dry TP01762 cloth. After cleaning, the bearings should be drained, then wiped dry with a clean TP01762 cloth and left to dry for one hour before repacking with grease.

4.07 Repacking Motor Ball Bearings: Motor ball bearings shall be repacked only with TP192298 (TKS103, Beacon 325) high temperature type grease. Repacking may be accomplished by using a blunt spatula shaped tool, such as a narrow putty knife, to apply the grease to the bearing. The applied grease should be worked into the bearing with a clean TP06466 orange stick until at least 50 percent of the unoccupied space is filled. Distribution of grease throughout the bearing should be reasonably uniform. Excess grease should be wiped from the bearing with a clean TP01762 cloth.

C. Record the Repacking or Installation of Motor Bearings

4.08 Whenever motor bearings are cleaned and repacked with grease, or whenever new grease-packed motor bearings are installed, the date of rehabrication or installation should be marked on the motor in a conspicuous location.

D. Cleaning Relubricated Motor Units

4.09 After relubrication of the motor unit has been completed, the unit should be wiped clean in accordance with the applicable cleaning procedures given in the section covering the general cleaning requirements.

5. LUBRICATION OF BALL BEARINGS (OTHER THAN MOTOR BEARINGS)

A. General

5.01 Shielded Ball Bearings: Shielded, or, sealed bearings are precision close tolerance type bearings equipped with a lifetime supply of lubricant. These bearings are not to be lubricated in any way, or cleaned, other than by wiping with a clean TP107162 cloth. Areas in which sealed bearings are encountered are the Model 37 typing unit positioning mechanisms and the Model 40 printer impeller shaft.

5.02 Unshielded Ball Bearings: Ball bearings without shields are found extensively in teletypewriter apparatus and should be cleaned and lubricated in accordance with the procedure detailed in 5.03.

B. Cleaning and Lubricating Unshielded Ball Bearings

5.03 The ball bearings should be carefully examined.

(a) If the bearings appear to be at least 50 percent filled with CLEAN grease, additional grease is not required. However, any grease extending beyond the ball races and any dirt, excess grease or old grease on adjacent areas should be carefully removed with a clean TP107162 cloth dampened with petroleum spirits.

(b) If the bearings are inadequately packed with CLEAN grease, sufficient TP97116 grease should be applied with the TP88975 grease gun and worked into the bearings with a clean TP94646 orange stick to fill at least 50 percent of the space between the ball rollers. Excess grease extending beyond the ball races should be carefully removed with a clean TP107162 cloth dampened with petroleum spirits.

(c) If the bearings contain dirty and/or caked lubricant, the bearing should be cleaned (4.06) preferably after removal from the associated mechanism. They may, however, be cleaned without removal if care is taken to prevent dirt and lubricant or petroleum spirits from running into adjacent areas. Bearings determined to be in good condition after cleaning should be repacked with TP97116 grease as detailed in 5.03(b).

6. LUBRICATION OF NEEDLE BEARINGS

6.01 The needle rollers and bearing sleeves shall be thoroughly lubricated only with TP88970 oil. Grease of any type is NOT permissible.

6.02 Maintenance lubrication shall be performed as follows:

(a) Apply a liberal amount of TP88970 oil to the needle rollers at the ends of the bearing sleeve.

(b) If the TP156250 cam is used, apply oil through the oil hole in the bearing sleeve.