

MOTOR DRIVEN INTERRUPTERS

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1. GENERAL1.1 Scope

1.11 This section covers installation of the following motor driven interrupters:

KS-5458	KS-15881
KS-5545	KS-15900
KS-15547	KS-15984
KS-15634	KS-19444
KS-15757	KS-19825

1.2 Associated Information

1.21 Coordinate the information in this section with test of the power plant in accordance with Handbook 21.

1.3 Precautions1.31 KS-15881, KS-15900, KS-15984KS-19444 and KS-19825 Interrupters.

These interrupters are completely adjusted and lubricated at the factory. There are no requirements to be checked at the time of installation except a visual inspection for obvious defects. No attempt should be made to lubricate or adjust these machines. If defects are found by visual inspection or trouble is encountered during the operating tests of the interrupter in the plant, the interrupter should be replaced.

1.32 KS-5545, KS-15634 and KS-15757

Interrupters. These interrupters are shipped by the manufacturer with no oil in the gear box. Upon installation make sure that the gear box is lubricated per Paragraph 3.

1.33 KS-5458 and KS-5545 Interrupters.

These interrupters are shipped by the manufacturer without lubricating the motor bearing, worm and worm wheel. Upon installation make sure that the necessary lubrication is performed per Paragraph 3.

1.34 All Interrupters.

Never work on interrupter contacts without first manually removing power from the appropriate side of the plant.

1.4 Inspection

1.41 Inspect each interrupter for damage, missing parts, defects of finish, etc. Remove covers for this inspection. Check nameplate data against job specification. If defects are found originate a J.I.M. in accordance with the Job Clerical Handbook.

1.5 Description

1.51 KS-5458 interrupter has a dc motor driving a slow speed shaft through a worm gear and worm wheel. Cams mounted on the slow-speed shaft operate interrupter spring pile-ups. This unit is used for master busy signal in toll tandem or for 30, 60, and 120 IPM signals in toll switching circuits.

1.52 KS-5545 interrupter has an ac motor which drives a slow-speed shaft through a reduction gear box. Cams on the slow-speed shaft operate spring pile-ups to provide 10-, 60- and 120- IPM signals, according to the list number provided. A motor capacitor is required. This is furnished loose on List 1 machines but is mounted and wired by the supplier on other list numbers.

1.53 KS-15547 interrupter has a single-phase ac motor driving a tone commutator to provide about 480 IPS, or howler tone, for central office use.

1.54 KS-15634 and KS-15757 interrupters have ac motors driving a slow-speed shaft through a reduction gear box. Cams on the slow-speed shaft operate spring pile-ups. Capacitors are furnished with these machines and are mounted on the interrupter bracket.

1.55 KS-15881, KS-15900, KS-19444 and KS-19825 are ac motor-driven spring and cam-type interrupters. The mechanism is enclosed in a protective removable transparent cover and the entire interrupter is a "plug in" device.

2. INSTALLING EQUIPMENT2.1 Tools and Test Equipment

<u>Code</u>	<u>Description</u>
265C	Burnisher, Contact
R-2969	Brush, Typewriter
KS-6015	Pliers, Duckbill
R-2705	Tachometer
R-9572	Test Receiver

2.2 Supplies

Code	Description
KS-2423	Cloth, Twill Jean
R-3288	Grease, Lubriplate, High Temperature
KS-16326	Oil, 220-260, S100
Obtain Locally	Paper, Abrasive, 4/0
R-3429	Trichloroethane

3. LUBRICATION

NOTE: Refer to the Lubrication Chart below and perform only the operation indicated. Cams, cam followers, and interrupter shaft bearings shall not be lubricated.

LUBRICATION CHART

KS No.	Gear Box	Worm and Worm Wheel	Motor Bearings
5458	-	Par. 3.31	Par. 3.111
5545	Par. 3.113	Par. 3.31	Par. 3.113
15547	-	Par. 3.31	Par. 3.112
15634	Par. 3.22	-	-
15757	Par. 3.22	-	-
15881	-	-	-
15900	-	-	-
15984	-	-	-
19444	-	-	-
19825	-	-	-

3.1 Motor Bearings

3.11 Lubricate the motor bearing with KS-16326 oil as directed for the following interrupters:

3.111 KS-5458 interrupter with wool packed motor bearing (CWD-2215 Motor) is oiled through the fitting at the top of the bearing. A trace of oil should appear at the drain hole in the bottom of the bearing housing. This will probably occur within a day or two after oiling but may be delayed until some time before the next oiling. The oil should be wiped away when observed.

3.112 KS-5458 (CBD-2215 Motor) and KS-15547 interrupters with double-sealed motor bearings cannot be relubricated. If necessary, replace the bearings in accordance with Section 163-675-811.

3.113 KS-5545 interrupter has two locations for lubricating its motor bearings. The hole for oiling one motor bearing is on the end opposite the interrupter. The hole for oiling the other bearing and the gears is located on top of the gear box. Remove the screw from the oil hole before oiling. Remount the screw after oiling. Oil may continue to appear around the oil overflow hole for a few days after oiling. All excess oil should be wiped off.

NOTE: The overflow hole in the bottom or near the bottom of the gear box is plugged initially to prevent leakage of oil during shipment. This plug or screw should be removed and discarded when the motor is installed.

3.2 Gear Box

3.21 The gear trains are usually enclosed in the gear box that serves as an oil reservoir although some gear trains may be lubricated with grease and do not require addition of grease at installation. If two or three holes are provided in the gear box, oil is used for lubrication and must be added at installation. In some cases oil holes and overflow holes are equipped with external pipes.

3.22 Add KS-16326 oil to the gear box as follows:

3.221 Remove screws from oil and overflow holes if these were provided for shipment.

3.222 If the gear box has two oil holes plus an overflow hole, the overflow hole will be on the bottom side. Add the oil to the upper oil hole, or to the lower oil hole if the upper hole is not accessible, until oil overflows from either of the other two holes.

3.223 If only one oil hole plus an overflow hole is provided add the oil to the upper hole until oil flows out of the overflow or bottom hole.

3.224 After filling the gear box with oil, replace the screw in the lower or overflow hole of the gear box. Be sure to leave the upper filler hole open.

3.3 Worm and Worm Wheel

3.31 Lubricate worm and worm wheel with R-3288 Lubriplate grease. Avoid getting grease on interrupter contact spring, cams or cam followers.

3.311 Cleaning is recommended before applying R-3288 grease. Use R-3429 Trichloroethane and R-2969 Typewriter Brush, to clean off old grease. Allow gear teeth to dry, apply grease, and wipe off excess. Run machine for a few minutes to spread grease. Stop machine and remove excess from sides of worm wheel.

4. FREEDOM OF OPERATION

4.1 All shafts shall rotate freely in their bearings. Gauge by feel.

NOTE: Due to construction KS-5545 interrupters cannot be checked manually for freedom of rotation.

5. SPRING INTERRUPTERS

5.1 Remove dirt, oil, etc. from contact surfaces.

5.11 Clean contacts by wet brushing, using a clean KS-14208 brush dampened with R-3429 Trichloroethane. If this does not clean the contacts satisfactorily use a 265C Contact Burnisher except on the KS-15634-L7 and L8 interrupters. Insert the burnisher blade between the contacts and close the contacts by turning the shaft with a crank, where provided. Draw the burnisher back and forth until the contact surfaces are clean.

close contacts by turning shaft with a crank when provided and draw the burnisher back and forth until contact surfaces are clean.

NOTE: Disconnect contacts from power supply before using the burnisher. If contacts cannot be disconnected, it will be necessary to use 4/0 abrasive paper for the burnishing operation.

5.12 If contacts are badly worn or pitted replace the entire spring pile-up.

5.13 If springs need adjustment they should be adjusted with the KS-6015 Duckbill Pliers. Springs that cannot be properly adjusted or that are bent should be replaced.

5.2 Spring pile-ups shall be tight. Tighten mounting screws as necessary.

5.3 Each contact spring shall have some follow after making with its associated actuating spring.

5.4 The point of contact shall fall entirely within the circumference of the opposing contact disc.

5.5 Interrupter timing shall be as indicated in Timing Charts on schematic drawings. Apply crank furnished with the machine, or borrow a crank from the telephone company, to the high-speed shaft and turn the shaft manually to check timing. Be sure to remove crank before running the machine.

5.6 Transfer contact shall not touch either upper or lower contact springs for at least the number of high-speed shaft revolutions indicated below in Column A. One contact shall close within the number of high-speed shaft revolutions indicated in Column B after the opening of the associated transfer contact.

	A	B
KS-5458	1/4	1
KS-15634, KS-15757	1	2 1/4

5.7 Where spring pile-ups have more than one make combination, contacts adjacent to the cam shall make first and those not adjacent to the cam shall make within 1/2 revolution of the high-speed shaft afterward for the second layer and within one revolution of the high-speed shaft for the third layer.

5.8 The KS-5545 interrupter motor shaft is not exposed and contact closures cannot be measured in terms of revolutions of the high-speed shaft. The R-9572 Test Receiver may be used to check open and closed periods with the motor running.

6. COMMUTATORS, MOTOR AND TONE

6.1 Surfaces of motor commutators and tone commutators shall be clean and free from scoring, pits, and other deformations.

6.2 A dark bronze or chocolate colored film on a commutator is very desirable. Whether or not such a film is present, the surface is satisfactory if it is clean, smooth and good commutation is obtained on the motor commutator, or if tone commutator surfaces and brushes are not burned or injured during test to the extent that maintenance is required.

6.3 Remove dirt and oil from the surfaces with a clean dry KS-2423 cloth.

6.4 If surfaces are sufficiently roughened or pitted to cause poor commutation or excessive sparking it may be necessary to have the commutator resurfaced. In this case report the matter to the supervisor.

NOTE: Any degree of sanding is considered resurfacing. BSP 171-110-801 covers resurfacing materials and methods.

7. COMMUTATION

7.1 The dc motors shall commute satisfactorily. This condition is met if brushes and commutators are not burned or injured during test. Presence of some visible sparking is not necessarily evidence of unsatisfactory sparking.

8. NOISE AND VIBRATION

8.1 Noise or vibration of the machine shall not be excessive.

Gauge vibration by feel. If noise or vibration appear to be excessive report the matter to the supervisor.

9. SPEED

9.1 Speed of the ac motor driven interrupters is fixed by power line frequency and will be anywhere from 1725-1800 rpm. It need not be checked.

9.2 For KS-5458, the dc motor speed shall stay within the limits of 1130-1280 rpm. Measure with R-2705 Tachometer.

10. STARTING SWITCH (KS-15547)

10.1 The centrifugal starting switch on the KS-15547 machine shall disconnect the starting winding after starting and reconnect it on stopping.

10.2 The starting switch of the KS-15547 machine is located on the armature shaft at the end opposite to the tone commutator. Its contacts are closed when the motor is stopped. They

open as the motor comes up to speed. Failure of the motor to start, accompanied by a humming sound, indicates that the contacts are not closed. Rapid overheating of the motor after starting indicates failure of the contact to open.

➔ Arrowed lines indicate new or changed information.

[Vertical line at side of paragraphs indicates requirements.

Manager, Product Engineering