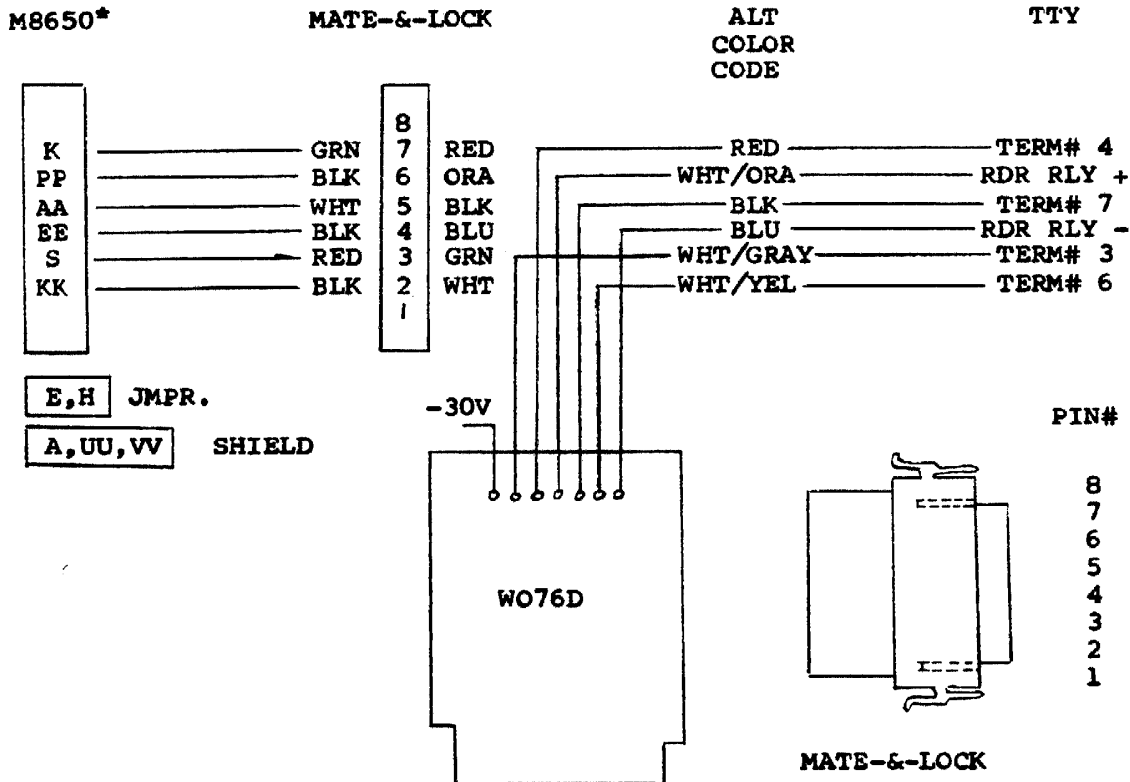


<b>digital</b>	<b>FIELD SERVICE TECHNICAL MANUAL</b>				Option or Designator
	12 Bit <input checked="" type="checkbox"/>	16 Bit <input checked="" type="checkbox"/>	18 Bit <input checked="" type="checkbox"/>	36 Bit <input checked="" type="checkbox"/>	LT33

Title <b>CONVERTING ASR-33 TO PDP-8/E</b>				Tech Tip Number <b>LT33-TT-1</b>	
All Processor Applicability		Author <b>Sweeney/Quinn</b>		Rev <b>B</b>	
X		Approval <b>E. Purcell</b>		Date <b>7/31/73</b>	
Cross Reference					



\* If the Teletype Control Module is an M865, the split lugs are to be connected to the TTY as follows:

- |                    |          |                  |
|--------------------|----------|------------------|
| <b>SPLIT LUG#4</b> | <b>=</b> | <b>RDR RLY -</b> |
| <b>#3</b>          | <b>=</b> | <b>TERM #3</b>   |
| <b>#7</b>          | <b>=</b> | <b>TERM #4</b>   |
| <b>#5</b>          | <b>=</b> | <b>TERM #7</b>   |
| <b>#6</b>          | <b>=</b> | <b>RDR RLY +</b> |
| <b>#2</b>          | <b>=</b> | <b>TERM #6</b>   |

The above chart has been designed to reduce the amount of time you would normally spend cross-referencing several different sets of prints. It is highly recommended that, before applying power to the reconfigured system, you double-check all wiring for correctness. Failure to do so could result in damage to the Teletype Control Module and/or the Teletype.

Title CONVERTING ASR-33 TO PDP 8E (cont)					Tech Tip Number LT33-TT-1	
All X			Processor Applicability		Author Sweeney/Quinn Rev B	
			Approval F. Purcell		Date 7/31/73	
Cross Reference						

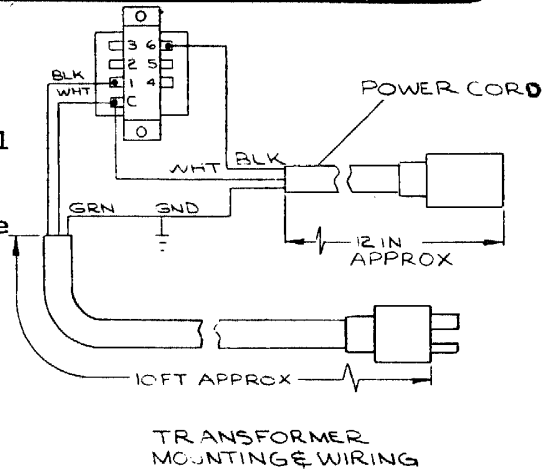
Converting the ASR-33 to the PDP-8/E

Occasionally a customer may request to have an older ASR-33 configured such that it can be used on any 8/E type system.

CAUTION: Prior to performing any rewiring, be certain that the teletype in question has in fact been modified for use on DEC's PDP-8 family of computers. (Reference the field service technical manual, LT33-TT-3)

Title ASR CONVERSION 280V, 50Hz V.S. 115V, 60Hz					Tech Tip Number LT33-TT2	
All X			Processor Applicability		Author J. Blundell K. Quinn Rev C	
			Approval D. Staupe		Date 7/10/74	
Cross Reference						

- 1) Disconnect and remove the step down transformer from the teletype base.
- 2) Remove the AC supply lead from the terminal strip inside the teletype.
- 3) Connect the new AC power cord to those same terminals, white to C, black to #1 and green to a chassis screw.
- 4) If the motor is rated for other than desired Hz rating, it must be replaced with one rated for the proper cycle operation. (Not necessary if motor is already 50/60 Hz).
- 5) Change the fuse to correspond to the motor being used.
- 5) Proper operating speed is determined by the ratio of the belt driving gear and its pinion gear: these must be replaced in this conversion.



The parts required for conversion can be specified as follows:

Part	Vendor Part#		DEC Part#	
	60Hz	50Hz	60Hz	50Hz
Belt driving gear	181420	181855	29-11417	29-11431
Pinion gear	181411	181851	29-11412	29-11428
Motor	181870	182267	29-11432	29-11448
AC power cord	182510		29-16755	
Plug 220V				90-08853
Fuse	MDL 2.25	320246	29-19119	12-11425

Installation charges are based on time and material; there is no fixed charge for this conversion. Price for parts is approximately \$100.

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<b>digital</b>	<b>FIELD SERVICE TECHNICAL MANUAL</b>				Option or Designator
	12 Bit <input checked="" type="checkbox"/>	16 Bit <input checked="" type="checkbox"/>	18 Bit <input type="checkbox"/>	36 Bit <input checked="" type="checkbox"/>	LT33

Title				PRICING POLICY FOR TELETYPE CONVERSIONS		Tech Tip Number		LT33 TT-3			
All X	Processor Applicability				Author		Walter MacKenzie		Rev	0	Cross Reference
					Approval		W. Cummins		Date	7-31-72	

The following policies and prices have been established as of June 1969 for modifying customer owned Teletypes for use with DEC computers.

TELETYPE MODEL	CONVERSION KIT ONLY (A)	DEC CONVERSION - Parts and Labor (B)
KSR-33	\$100.00	\$200.00
ASR-33	\$125.00	\$300.00
KSR-35	\$125.00	\$300.00
ASR-35	NOT AVAILABLE	\$1000.00

#### Conversion Kits - Do It Yourself

Each conversion kit, as listed above in column A, will include all necessary parts and installation instructions.

#### Conversions Done By DEC Personnel

Conversion prices, as listed in column B above, are based upon the assumption that the customer owned Teletype presented to DEC for conversion is in good operating order. Labor and/or parts required to restore a unit to good working condition will be billable at DEC's then prevailing rates.

Field Service mileage rates shall also apply in addition to the installation charges listed above.

DEC will provide a 30 day warranty of the conversion only.

The conversion kit for the ASR-35 shall remain proprietart in nature. This is based upon the fact that DEC has made extensive engineering investments in creating this modification and customers should expect to reimburse us for that effort.

# COMPANY CONFIDENTIAL

CPL

Title						ASR 33 MODIFICATION FOR FANFOLD TAPE		Tech Tip Number		LT33 TT# 4	
All						Processor Applicability		Author		Rev 0	
X								Approval W. Cummins		Date 7-31-72	
										Cross Reference	

At times, the ASR 33 punch will not accept fanfold tape. To correct this, install the 185705 tape guide MOD Kit. These kits are available in the Field Service Stockroom and are priced at \$9.45.

CPL

Title						ASR 35/81/M707 FAILURES		Tech Tip Number		LT33 TT# 5	
All						Processor Applicability		Author		Rev 0	
X								Approval W. Cummins		Date 7-13-72	
										Cross Reference	

### ASR 35/81/M707 FAILURES

Erratic failure of the M707 Teletype transmitter module has been a problem when an ASR 35 is connected to an 81; the M707 output transistor (Q3) (6534) is blown and the ASR 35 runs open. This will occur following rotation of the mode switch through the KT, T positions. Excessive transients were suspected and several ECO's have been suggested and implemented.

1. A D664 diode connected in parallel with the 470 ohm resistor from the base of Q3 to 5V on the M707 (cathode to +5V).
2. On the W076 connector card, pin F, change the 750 ohm resistor to 1K, add 3 D671 diodes, pin H (cathode) to -15V, pin H to -5V (cathode), and pin M to ground (cathode).
3. Use of thyrectors or arc suppressors across the selector magnetic terminals.

The specific problem has now been recognized as a circuit peculiarity in the ASR 35 which was overlooked in the design of the M707. The mode switch on the ASR 35 applies a short circuit to -15V at pin AV2 of the M707 (J12H2) as it is rotated between the KT and T positions. Current limiting circuitry was not provided for the 6534 and the excessive current destroys it.

Engineering first suggested that a 100 ohm resistor be inserted in series with the emitter circuit of the 6534 on the M707 and this was done on about 10 machines. It was discovered with further research that the normal 20 ma. marking current for the ASR 35 had been reduced to 11 ma. by this modification. Because teletype operation becomes marginal at 10 ma., it became obvious that this was unacceptable.

A final solution has been determined and will become an ECO:

1. Cut the etch between the 6534 collector and pin AV2 on the M707 and insert a 120 ohm 1/4W resistor in series.
2. On the W076 change resistor R3 (which is connected between pins B and F) from either 750 or 1000 ohms to 820 ohms 1/2W.

CPL

<b>digital</b>	<b>FIELD SERVICE TECHNICAL MANUAL</b>				Option or Designator
	12 Bit <input checked="" type="checkbox"/>	16 Bit <input checked="" type="checkbox"/>	18 Bit <input checked="" type="checkbox"/>	36 Bit <input checked="" type="checkbox"/>	LT33

Title				SECURING TELETYPE CABLE TO LOGIC FRAME		Tech Tip Number		LT33 TT# 6	
All		Processor Applicability			Author		Rev 0		Cross Reference
		8I			Approval W. Cummins		Date 7-31-72		

The cable from the teletype is dressed under the 8I cabinet, through the large opening and into logic frame slot J12. If the teletype happened to be positioned at the maximum distance which the cable would allow (assuming the logic frame in the normally closed position) or if the cable were to be looped around a caster and an attempt made to pull the logic frame forward, the horizontal stress could easily damage either the block or the W076A connector card. It is necessary that the cable be dressed through the cable clamp at the lower rear corner of the logic frame where the power cables are secured to eliminate this possibility. A second clamp may be desirable at the bottom of the 8I cabinet to assure that sufficient slack exists irrespective of teletype position.

Title				ASR 33 READER SYNCHRONIZATION		Tech Tip Number		LT33 TT#7	
All		Processor Applicability			Author White/Arsenault		Rev 0		Cross Reference
		8I 8L			Approval W. Cummins		Date 7-31-72		

When ASR 33 Part II Program 3 fails roughly once per complete pass, the failure always occurs in the random stall section of test as a result of the reader fetching an extra character.

This problem is a synchronizing problem which exists in M706 modules of Revision J or earlier. It will be fixed in future revisions via an ECO to the M706. Boards of revision J or earlier can be made to work properly by the addition of a 470 PF capacitor from Pin BN2 of the M706 to ground.

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Title TELETYPE READER POWER SUPPLY						Tech Tip Number LT33-TT-8		
All X	Processor Applicability					Author Bill Harrigan	Rev 0	Cross Reference
						Approval W. Cummins	Date 7-31-72	

A poor electrical connection between the 200 MFD capacitor and the circuit board etch has resulted in failures of the Teletype reader power supply. The symptoms will be either a blown 3 amp fuse or a defective rectifier, the latter resolved only by replacement of the power supply.

The poor connection is caused by the stripping away of etch by the teeth on the star washer used to secure the capacitor to the board. A standard washer should be installed between the star washer and the circuit board to eliminate this problem.

Title TELETYPE PRINTS						Tech Tip Number LT33-TT-9		
All X	Processor Applicability					Author Walter MacKenzie	Rev Ø	Cross Reference
						Approval W. Cummins	Date 12/12/73	

A well documented set of prints explaining our modification to teletypes is now available in drafting. You can order these prints under the following numbers:

<u>Number</u>	<u>Revision</u>	<u>Description</u>
7505038-0-0		ASR 33 120V 60HZ
7505039-0-0		ASR 33 340V 50/60HZ
7505040-0-0		KSR 33 240V 50/60HZ
7505041-0-0		KSR 33 120V 60HZ
7505042-0-0		KSR 35 240V 50/60HZ
7505043-0-0		KSR 35 120V 60HZ

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<b>digital</b>	<b>FIELD SERVICE TECHNICAL MANUAL</b>				Option or Designator
	12 Bit <input checked="" type="checkbox"/>	16 Bit <input checked="" type="checkbox"/>	18 Bit <input checked="" type="checkbox"/>	36 Bit <input checked="" type="checkbox"/>	LT33
Title	DIFFERENCES BETWEEN NEW 3300 SERIES TELETYPE AND OLD 33 TS, TU, TBP				Tech Tip Number LT33-TT-10
All	Processor Applicability	Author	Ray Alvarez	Rev	Cross Reference
X		Approval	Dick Russell	Date 6/25/74	

As of September 1973 DEC has been shipping the new style 3300 series teletype. There are some noted differences between these two models, and apparently some confusion has existed in the field. This tech-tip will help clear up the differences between the two models and also help to update documentation that will follow in the near future.

1) Internal Differences:

The reader power pack on the 3300 mounts within the main teletype case (in the call control unit area) rather than in the teletype base (stand). This eliminates the mounting, unmounting, and repacking of the power pack previously required.

2) The 3300 series punch mechanism is always equipped for automatic operation (DC2 and DC4 control) but automatic operation is inhibited by a pair of clips installed at teletype. See teletype manual for details.

3) The 3300 printer mechanism is equipped with mechanism to provide the CR LF function when CR is received but this feature is inhibited by a clip installed at teletype. See teletype manual for details. This feature did not exist on DEC purchased 33 series units.

4) The answerback mechanism (and any other stunt box feature requiring disabling) is disabled (when specified by the DEC construction drawings) by means of an inhibit clip on the 3300. On 33 series units the answerback mechanism was disabled by removing the stunt box pawl associated with it. The 3300 clip can also be used on 33 series units.

5) The 3300 keyboard is equipped to generate even character parity but can be arranged to generate eighth-bit-marking code by swapping quick connect tabs. A 33 series unit either did or did not have a parity keyboard and changing a parity keyboard to non-parity operation required disassembly and modification of contact bars on the keyboard.

NOTE A: 33 series units evolved over the years and details of parts replacement and subtleties of operation varied even for the same model number. Do not construe the above list of differences as implying that all DEC purchased 33 series machines of a particular model number were the same over their entire lifetime.

NOTE B: A complete programming and operating description of all DEC supplied 33 Teletypes (after the PDP-6 and classic LINK) is contained in DEC specification A-SP-LT33-Ø-14 "LT33 Programming Specification" available from reproduction.

Title DIFFERENCES BETWEEN NEW 3300 SERIES TELETYPE AND OLD 33 TS, TU, TBP (Cont.)						Tech Tip Number LT33-TT-10	
Processor Applicability						Author Ray Alvarez Rev 0	
All						Cross Reference	
X						Approval Dick Russell Date 6/25/74	

## 1) Keyboard Differences:

The keyboard key which generates 136<sub>8</sub> will be labelled "▲". It is presently labelled "↑".

2) The keyboard key which generates 137<sub>8</sub> will be labelled "-" (underscore). It is presently labelled "←".

3) The printer mechanism will print "▲" when it receives 136<sub>8</sub>. It presently prints "↑".

4) The printer mechanism will print "-" (underscore) when it receives 137<sub>8</sub>. It presently prints "←".

5) The printer mechanism will print "\", "]", and "▲" when it receives 174<sub>8</sub>, 175<sub>8</sub>, and 176<sub>8</sub> respectively. Presently it prints nothing when receiving these codes. NB: 174<sub>8</sub> was formerly ACK, 175<sub>8</sub> was formerly ALT MODE, and 176<sub>8</sub> was formerly ESC<sub>1</sub>.

6) The keyboard will have a key labelled ESC which will generate the code 033<sub>8</sub>. There will be no key labelled ALT MODE and no way to generate the codes 175<sub>8</sub> or 176<sub>8</sub> from the keyboard.

7) The keyboard key which generates 177<sub>8</sub> will be labelled DELETE. It is presently labelled RUB OUT.

8) These changes are already reflected on the pocket reference card for 8's and 11's.

9) All machines except the LT33-D type machines will generate even parity from the keyboard. At present some other LT33 units have the 8th (parity) bit always "1". It is planned that eventually all machines will generate even parity from the keyboard.

The ALT MODE/ESC change should not affect any properly written program. That is, DEC has in the past shipped model 33 Teletypes which have had either ALT MODE keys (175<sub>8</sub>), ESC<sub>1</sub> keys (176<sub>8</sub>) or ESC<sub>2</sub> keys (033<sub>8</sub>). In addition, non-DEC terminals are variously designed to use 175<sub>8</sub> or 033<sub>8</sub> as ALT MODE/ESC and if not in a "lower case" mode should also accept 175<sub>8</sub> and 176<sub>8</sub>. (On lower case machines 175<sub>8</sub> is "}" and 176<sub>8</sub> is "~"). In addition, ALT MODE/ESC should not be "echoed" by the program unless it is intended to perform some particular function for some particular terminal (e.g. on some model 37 Teletypes the sequence "ESC 3" shifts the machine into red ribbon mode).

It is recommended that user programs which use "←" as a command operator (e.g., to direct a data transfer to one file from another) should be modified to accept "=" for this function as well as "←" since the left arrow will become underscore ("\_").

It is believed that the symbols "↑" and "▲" are sufficiently similar that no program change involving them is needed.



<b>digital</b>	<b>FIELD SERVICE TECHNICAL MANUAL</b>				Option or Designator
	12 Bit <input checked="" type="checkbox"/>	16 Bit <input checked="" type="checkbox"/>	18 Bit <input checked="" type="checkbox"/>	36 Bit <input checked="" type="checkbox"/>	LT33 to LT35

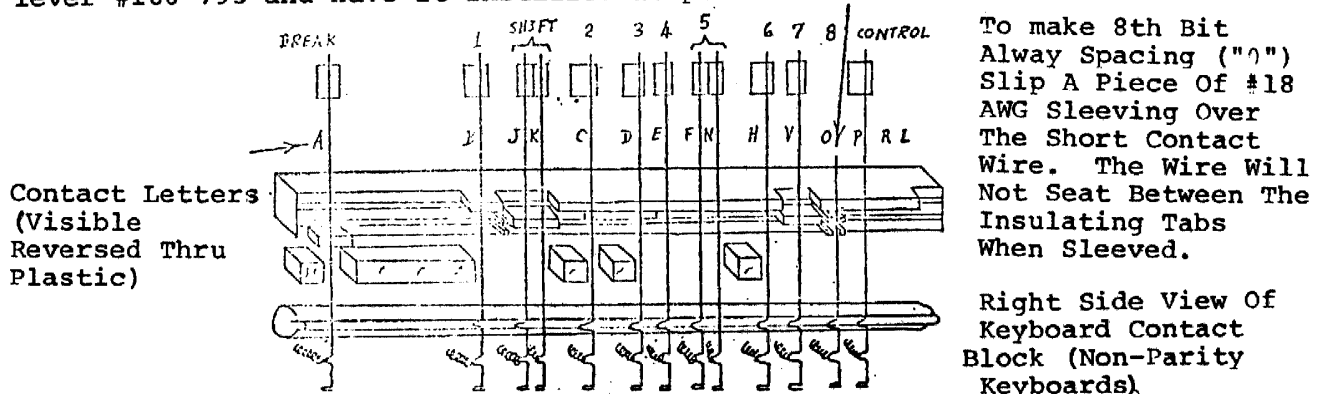
Title	DIFFERENCES BETWEEN NEW 3300 SERIES TELETYPE AND OLD 33 TS, TU, TBP (Cont.)			Tech Tip Number	LT33-TT-10
All	Processor Applicability	Author	Ray Alvarez	Rev	∅
X		Approval	Dick Russell	Date	6/25/74
					Cross Reference

Unrelated to the above described changes, the following programming practices are recommended in dealing with teletypewriter-like devices to ensure compatibility with the largest number of terminals.

1. A program unwilling to deal with lower case input should translate codes 140<sub>8</sub> to 173<sub>8</sub> to the corresponding upper case codes 100<sub>8</sub> thru 133<sub>8</sub>.
2. The eighth bit of each character (the 200<sub>8</sub> bit) should be ignored when received in general purpose programs. This bit is commonly even parity or a "1" but in some terminals can be odd parity or a "∅".
3. The eighth bit of each character (the 200<sub>8</sub> bit) should be transmitted as even parity. This will not confuse 33's or 35's and is necessary on some other terminals.
4. Control characters should not be echoed when some particular action is expected from the teleprinter (e.g. control back slash, "FS" causes the cursor to be returned to the upper left hand corner of the screen on the VT05 and VT06).

In order to verify that software is not sensitive to the eighth bit ("parity bit") from Teletype it is useful to modify selected Teletypes so that keyboard characters always have their 8th bit spacing ("0") instead of the more usual marking ("1") 8th bit. The simple procedure is detailed on the attached sketch. Machines which are modified should be prominently marked "Modified: Keyboard 8th bit zero."

Diagnostics such as PDP8E Teletype and KL8E Asynchronous Data Control Tests, are compatible except with one noted difference. On transmit from CPU to TTY, a 7-hole rub out will appear as "↑" an up arrow. This is due to new 3300 series printers having one less function lever (slot 5) if customer so desires full compatibility he may order function lever #180-793 and have it installed at per call rates.



Title ASR 35 READER FAILURES						Tech Tip Number LT35-TT-1		
All	Processor Applicability					Author Tom Bowman Rev 0		Cross Reference
						Approval W. Cummins		

Intermittent reader problems have resulted from a loosening of the sponge rubber pad which is mounted to the cover plate above the reader pins. Contact cement should be used to secure this pad as is now being done in production.

Title PRICING POLICY FOR TELETYPE CONVERSIONS						Tech Tip Number LT35-TT-2		
All	Processor Applicability					Author Rev 0		Cross Reference
						Approval W. Cummins		
X							LT33-TT-3	

This Tech Tip is issued for cross reference purposes only.

Title KSR-35 LUBRICATION						Tech Tip Number LT35-TT-3		
All	Processor Applicability					Author M. Schwartz Rev 0		Cross Reference
						Approval Lou Nay		
X								

The present PM procedure for KSR-35 Teletypes calls for lubrication on a quarterly basis. However, at most sites the console teletype runs 24 hours a day. The heat generated and centrifugal force will dissipate the lubricants within the clutch bearings, drums and shoes in less than 30 days.

Under the above operating conditions, monthly lubrication should be made - at least in the mainshaft area.

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