

E R T

**SERVICE
CHART
1543
New Series**

TK120

TWO-TRACK single-speed mains operated portable recorder.

Mains. 115V and 230V 50c/s only.
Consumption. 44W (200mA) measured at 230V.

Valves. V1 ECC83, V2 ECL86, V3 EM84.

Rectifiers. B250 C100 (EC401) mains rectifier, D1 E20 C3 modulation rectifier.

Tape speed. 3 $\frac{1}{2}$ i/s.

Recording sense. International half-track.

Frequency response. 40-12,500c/s.

Speaker. 6x4in. high flux.

Output. 2.5W.

Bias frequency. 55kc/s.

Fuses. Mains 0.8A surge resisting, HT 80mA surge resisting.

Wow and flutter. Less than 0.2 per cent.

Signal to noise. Better than 48dB.

Maximum spool size. 5 $\frac{1}{2}$ in.

Fast rewind. Approximately 4 $\frac{1}{2}$ mins. for 1200ft.

Input. 2-100mV at 1.5megohms.

Outlet. 500mV at 15K.

Dimensions. 15 $\frac{1}{2}$ x11 $\frac{1}{2}$ x6 $\frac{1}{2}$ in.

Weight. 17 $\frac{1}{2}$ lb. approx.

Manufacturer. Grundig (Great Britain) Ltd.

Service department. Newlands Park, Sydenham, London SE26. Tel.: Sydenham 2211.

SERVICE NOTES

Replacing drive belts. Remove four screws on sound channel plate and lift off, making sure head leads are clear. In some cases, when connecting wires are tight, it may be necessary to lower flywheel by removing bottom bearing. Drive belts may now be replaced.

Re-assemble in reverse order, making sure sound channel plate fits squarely on the four pillars.

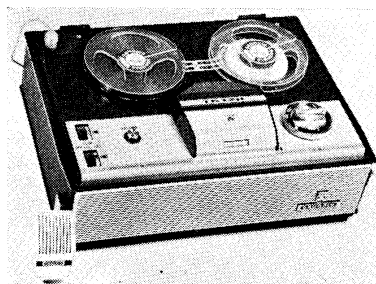
Motor pulley. Adjust height so the groove lines up with groove in flywheel.

Flywheel. In Start position, with tape fitted and running, adjust top bearing until the tape runs freely through the tape guides. Lubricate lower and upper bearings with petroleum jelly.

Motor rubbers. When fitting new motor mountings, moisten or apply glycerine to ease rubbers into position.

Brakes. In Start position brakes must clear by approximately 1mm. In Stop position brakes must clear end stops by approximately 0.6mm.

Idler wheel. In Fast Forward position the idler wheel should ride up lightly against circlip, adjust by bending operating arm. In Start position, the gap between motor pulley, idler wheel and



righthand clutch should be 0.5mm in each case.

Pressure roller. Pressure against capstan spindle should be approximately 160z. in Playback or Record position. Whilst in the Pause position, adjust roller bracket to obtain parallel gap between pressure roller and capstan shaft.

Slider switch. Adjust whilst in Stop position with top deck fitted. Slider should be in position but if necessary bend operating flange so it is central in the operating fork.

ELECTRICAL TESTS

Playback amplifier. Turn volume and tone controls to maximum. Place selector in Start position. Feed in test signal via 1K/10ohms potential divider with 10ohms in parallel with head (test points A-B). Measure output across pins 2-3 of connecting socket. With input signal of 40mV \pm 1dB at 1kc/s, an output level of 56mV should be obtained.

Frequency response. Adjust input level as previously described to obtain output of 56mV at 1kc/s. Response at other frequencies should be:

Frequency	Output	dBs
60c/s	303mV	+14.6dB
333c/s	131mV	+7.4dB
1kc/s	56mV	0dB
6kc/s	46mV	-1.6dB
12kc/s	82mV	+3.3dB

Tolerance should be \pm 1dB.

Output stage. Inject input signals as previously described. Measure output across 5ohm resistor connected in place of speaker. At a frequency of 333c/s the input signal should be adjusted so that an output of 2.75V is obtained.

At this level the distortion factor should not exceed 6.5 per cent and under these conditions there should be 400mV \pm 1dB across pins 2-3 of connecting socket. Turning tone control to maximum top cut should reduce HF response at 12kc/s by 18dB.

Hum and noise voltage measured across the 5ohm resistor should not exceed 25mV with volume control at maximum, 5mV with control at minimum.

Record amplifier. Turn volume control to maximum, depress Record button and set selector to Start. Measure input levels prior to 1K/10ohms divider, with 100K in series connected to microphone socket. Measure output levels across 100ohm resistor connected in parallel with the record head (test points A-C).

Adjust input voltage so that a head voltage of 3.4mV is obtained at 1kc/s, this should correspond to an input voltage of 185mV. If necessary adjust R21 to obtain hair-line gap between illuminated sectors of the magic eye.

To check frequency response, reduce input to obtain a head voltage of

GRUNDIG

TK120: PROVISIONAL DATA TK400: DECK ADJUSTMENTS

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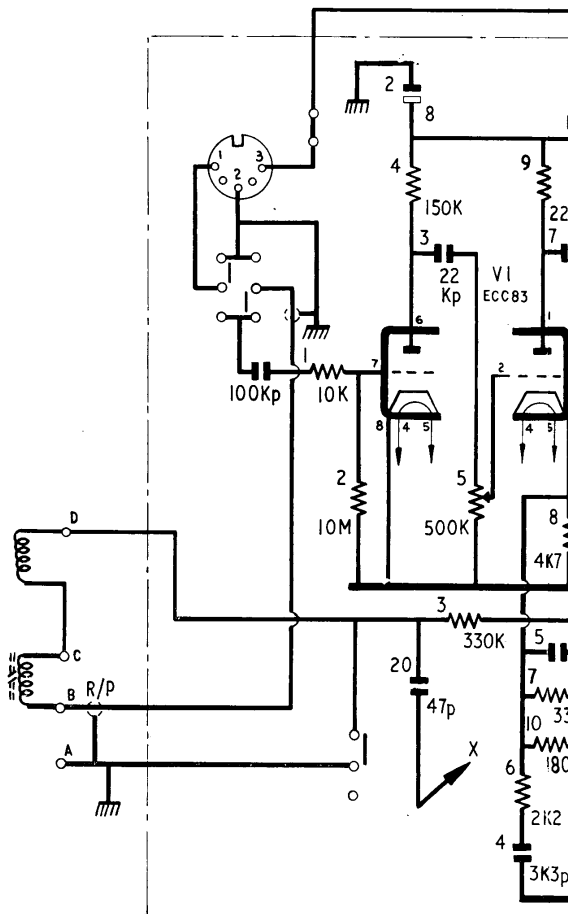
0.5mV. Tolerance at other frequencies should be:

Frequency	Output	dBs
60c/s	0.62mV	+1.8dB
333c/s	0.46mV	-0.7dB
1kc/s	0.5mV	0dB
6kc/s	1.15mV	+7.2dB
12kc/s	1.33mV	+8.5dB

Noise level measured across contact ST2 with input shorted and volume control at maximum should not exceed 6mV, with volume control at minimum noise should not exceed 1mV.

NOTE: For record amplifier checks the oscillator stage should be made inoperative by short circuiting erase head (test points F-E).

R	1	2	3	4	5	6	7	8	10	15	11	
C	1		20		2		3		4		5	
L												



Record/playback tape test. Feed in signal of approximately 50mV at 1kc/s to microphone socket, 100K in series, and adjust recording level. Reduce input by 20dB (10 : 1) and record following frequencies: 60c/s, 125c/s, 333c/s, 1kc/s, 2kc/s, 4kc/s, 6kc/s, 8kc/s, 10kc/s, 12kc/s. Playback output must be within +3dB - 5dB.

Head alignment. When adjusting azimuth of record/playback head avoid overtightening of alignment screw as this may deform head bridge.

Head gap must not protrude more than 0.7mm above the tape.

Bias oscillator. Depress Record button and set selector to Start. Measure record and erase currents with AC valve voltmeter directly across heads. Record bias across test points B-C should be 82V, erase head reading across test points E-F should be 39-48V. If necessary adjust R31 for correct readings. Check oscillator frequency approximately 55kc/s.

Using Avo 8 on 100V AC range readings should be 50V at test points E-F and 60V at test points B-C.

Hum level. Hum level measured across pins 2-3 of connecting socket with volume control at maximum should not exceed 3mV, with control at minimum level it should not exceed 0.5mV.

TK400

A SEVEN-INCH spool of tape (TLP3) and spare spool of similar size and hub diameter are necessary for all tests. The complete sequence must be strictly adhered to since all adjustments are interdependent and therefore single alterations must NOT be attempted.

The recorder should first be switched on and allowed to run for not less than 30 minutes. Switch off, remove top deck and then, after carefully reading each paragraph in turn, proceed with the following adjustments referring to the diagram as necessary.

(A) Check the axial play of the clutches (3) (13) by up and down movement of approximately 0.3mm (0.013in) (lefthand clutch in Fast Rewind position). This movement may be adjusted by releasing the locking screw which secures the brake pulley to the clutch shaft located on the underside of the chassis.

(B) Check that the brake spring (25), is under tension against the brake cord. There should be a gap of approximately 2mm (0.08in.) between the spring and the rear of the cut out. If necessary bend the anchor bracket under the printed circuit panel, to which the end of the brake cord is fitted, to bring the spring into tension.

(C) The amount of play of the Fast

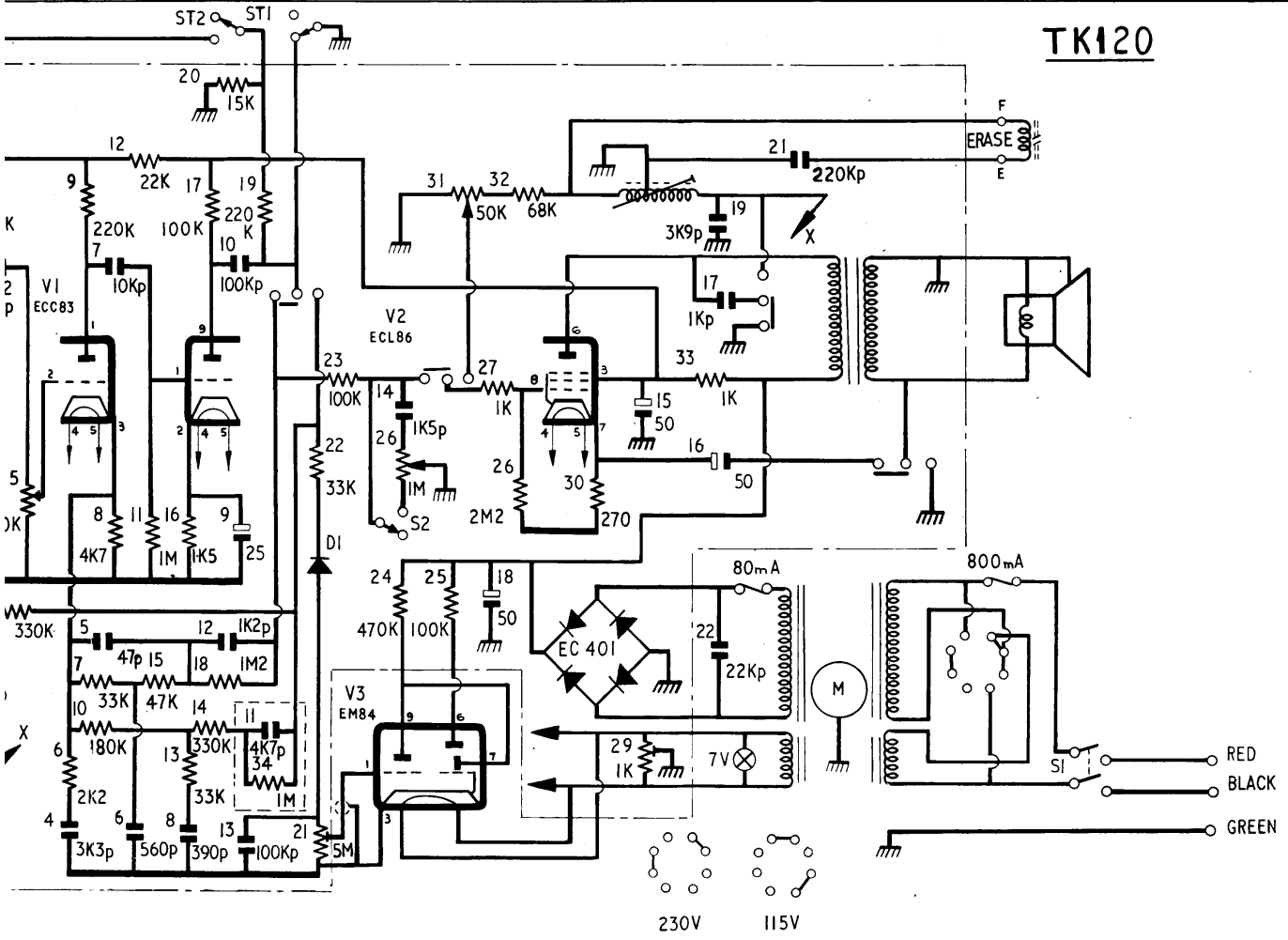
Wind control, in the neutral position, must be within $\pm 1\text{mm}$ (0.04in.). Any small movement of the Fast Wind control should also cause a similar movement of the operating brackets between the motor and chassis, but there should be sufficient clearance so the control can be moved very slightly without moving the operating brackets.

Adjustment must be made by slackening both the screw (23), through the Fast Wind lever at the rear of the sound channel, and the screw holding the locating bracket on the underside of the chassis. This locating bracket on the underside of the chassis should then be moved to bring the large spring under further tension and the screws then retightened. Now switch on.

(D) After fitting the tape and spare spool wind approximately 30 feet of tape on the empty spool. The Fast Wind control should then be moved *slowly* to the left. The tape should begin to move when the trailing edge of the Fast Wind arm is approximately half way to the locking bracket. Maximum acceleration of the tape should be reached when the trailing edge is approximately 1mm (0.04in.) before the locking position. If necessary adjust the lefthand belt pulley by the large-headed screw (22).

(E) Remove tape and spools and move

6	7	8	10	15	11	12	16	13	18	17	20	34	19	21	22	23	26	24	31	25	26	32	27	30	29	33
4	5	7	6	8,12,9,10,13,11				14	18				15	19 17 16 22 21												



the Fast Wind control to the Fast Forward position. The lefthand belt pulley arm assembly should then be operated slowly by hand to the full extent of travel to ensure the pulley and bracket move smoothly to the rest position.

The small bracket (2) situated at the rear lefthand side of the clutch should be adjusted so that with the machine switched to the Fast Rewind position there should be a gap of $11/64$ in. approximately between the bracket and the small lever to which the return spring is fitted underneath the lefthand clutch.

(F) The full seven-inch spool of tape should now be transferred to the righthand clutch and the empty spool to the lefthand clutch. Identical adjustments should be carried out to the Fast Forward mechanism as explained for the Fast Wind mechanism.

When operating the righthand belt

pulley arm in the Fast Wind position, great care should be taken to ensure that this operates smoothly, the tension spring arm should not foul on the cable form on the sound channel, the righthand clutch push rod should be free and not bent.

Any jerkiness in the return of this pulley will result in varying take-up tension and will upset rewind efficiency. It can also cause false adjustments to be made to the compensating roller (7).

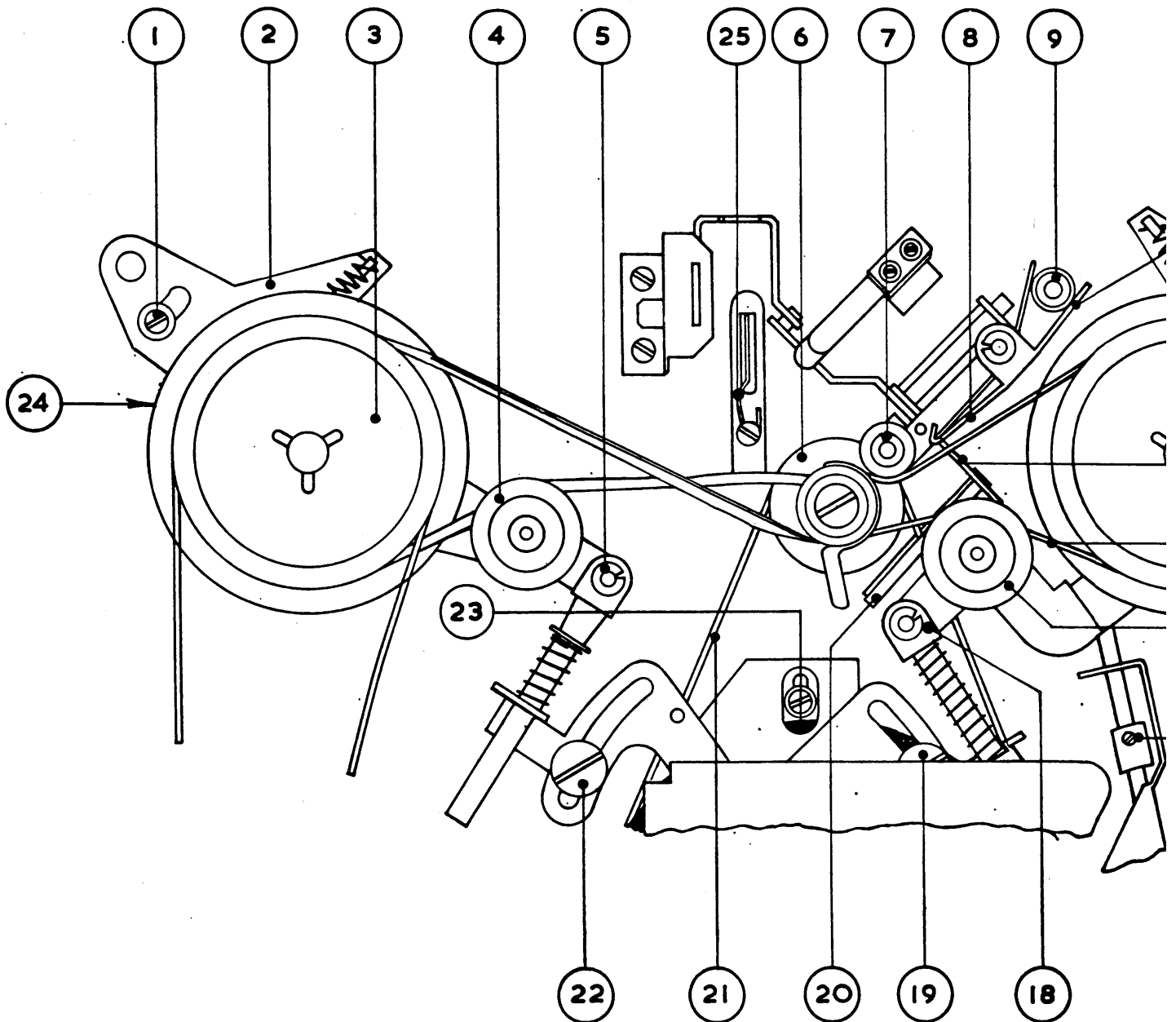
(G) With the machine switched to the Playback position the collar (17) on the push rod to the righthand clutch (13) should be adjusted so that the Fast Forward belt pulley spring is just clear of any tension. The gap between spring and bracket should be 0-2mm (0.08in.).

The record playback switch should be returned to the neutral position and the tail on the bracket (10) of the compensating roller should be adjusted so that it is resting on the stop pillar (9).

With the machine switched to Playback the compensating roller should operate so that there is approximately 0.5mm-1mm (0.02-0.04in.) gap between the tail (10) and the stop pillar (9). Bend the tail (10) so that both the above conditions are met.

(H) With the full spool of tape on the righthand clutch and the empty spool on the lefthand clutch the tension of the torsion spring on the compensating roller should now be adjusted so that when the instrument is switched smartly to the Playback position at a tape speed of $7\frac{1}{2}$ ips a tape loop of approximately 16mm ($\frac{5}{8}$ in.) should be formed at the righthand side of the sound channel.

At a tape speed of $3\frac{3}{4}$ ips a tape loop of approximately 8mm ($\frac{1}{3}$ in.) should be formed. The tension of the torsion spring should be adjusted until these conditions are met on both speeds. (This tension can be reduced by adjusting either or both tails of the torsion spring.)



The tails should be bent close to the centre and in the same direction in which the spring is wound to give the result of an additional part turn.

The lower the tension the larger the tape loop. (A large reduction in the spring tension will only have a small effect on the size of the tape loops.) It is recommended that this tension be adjusted as close as possible to the limits stated above because the friction of the drive belt tends to increase as it completes a "bedding in" period.

Drive belts supplied for use with the TK400 tape recorder have been specially treated with Myline to reduce the possibility of humidity effects. Should the clutch surface require cleaning drive belts must be removed to avoid damage from the cleaning fluid.

Due to the construction of the machine and the adjustments necessary, drive belts should not be replaced unless they have been damaged by fluid, or the edge of

the belts damaged by poor adjustment.

(J) The axis of the compensating roller (7) should then be adjusted so the righthand drive belt tends to move up and down within the flanges of the motor pulley. If necessary bend the bracket. The positioning of the Fast Forward belt pulley (16) should also be examined to ensure the belt is running on the centre of the roller and not binding on either of the flanges. Mis-alignment of this pulley will lead to rapid ageing of the drive belt.

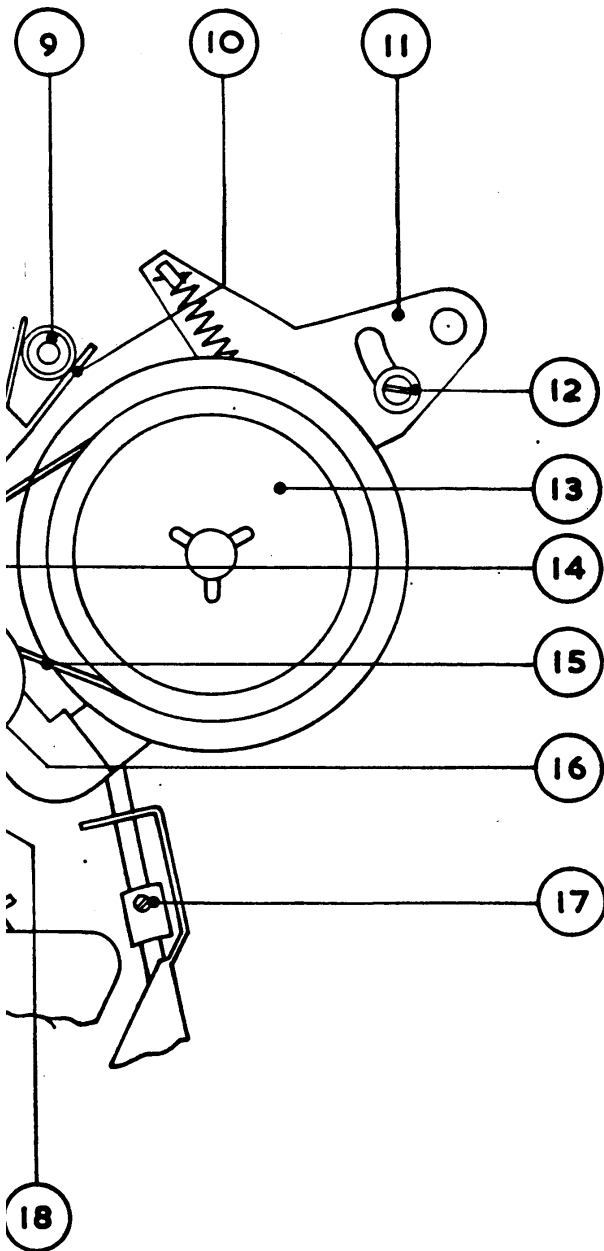
Should it be necessary to adjust this pulley it is essential to recheck the compensating roller. The machine should then be switched to the Playback position and the righthand drive belt pushed on to the lower edge of the compensating roller (7). If the belt remains on the lower edge of the compensating roller it should return to the neutral position when the machine is switched to the Fast Forward position. Recheck adjustments

made under paragraph (H).

(K) With no tape fitted and the machine switched to the Playback position the compensating roller bracket should be operated by hand so that it is removed from contact with the belt. Drive to the righthand clutch *must then cease*. This ensures the tension applied to the drive belt in the Playback position is only supplied by the compensating roller (7). The compensating roller will then automatically adjust to any variation in the take-up tension.

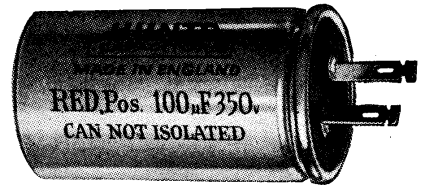
(L) If tape tensioning meters are available the tape tension should be measured with the full spool of tape on the left-hand clutch and an empty spool on the righthand clutch. Provided the adjustments have been carried out correctly the tape tension will be between 55 and 75 grams.

(M) Top deck should now be fitted to the machine and the Fast Wind positions and the starting loops rechecked.



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Type 'L32' Electrolytics

Housing –
Cylindrical aluminium case with
tag terminations at one end.
External clip mounting.

Performance –
Capacitance tolerance –20% to +50%.
Temperature range –25°C to +85°C.
Ripple rating, see details below.

Capacitance Microfarads	Voltage D.C. WKG.	* Ripple Current Milliamps	List Number	Type Reference	Dimensions Nominal L (ins) D	
50 + 50	275	400	KB258A	L32/3	2	1 1/2
60 + 250	275	500	KB260A	L32/3	4	1 1/2
100 + 200	275	700	KB261A	L32/3	4	1 1/2
50 + 50 + 8	275	400	KB2252	L32/5	2	1 1/2
100 + 400 + 16	275	700	KB299	L32/5	4 1/2	1 1/2
100	350	800	KB411C	L32/1	2 1/2	1 1/2
32 + 32	350	260	KB417	L32/3	2	1 1/2
50 + 50	350	450	KB418	L32/3	2 1/2	1 1/2
100 + 200	350	800	KB423C	L32/3	4 1/2	1 1/2
200 + 200 + 100	350	1150	KB482	L32/5	4 1/2	1 1/2

* Ripple Rating applies to first section only in dual capacitance units.

Hunts Catalogue C275 gives full details of the L32 and other replacement ranges, laid out in easily-scanned form, and is available freely on request.



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