

# BRC Cassette tape decks

# 3012

## Mains operated types DG210 & DG213

## Battery operated type DG219

### Introduction

The three BRC cassette tape decks covered by this *Service Sheet* provide two track (mono) operation at a tape speed of  $1\frac{1}{8}$  in i.p.s.

Types DG210 and DG213 are designed to operate from 240V 50Hz mains supplies. Type DG219 for 9V d.c. operation, usually six 1.5V cells type HP11 or their equivalent.

### Service notes

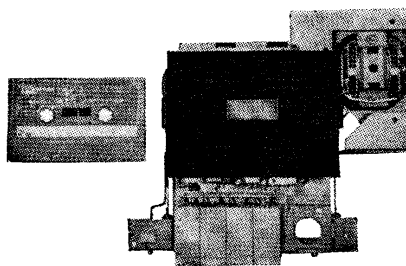
**Except where otherwise stated, information applies to all three deck types. Figures in parentheses refer to item numbers in the exploded view drawings.**

**Access to upper side.** – Remove the cassette moulded well and envelope, (5) and (1); take off two tension springs (57) and damping spring (3). Open and remove the envelope, then remove screw (6) from centre of well and lift off the well.

**Belt changing.** – With care, the drive belt can be removed or refitted without disturbing the capstan end float adjustments. The flywheel retaining bracket is sufficiently springy to obtain the small extra clearance required for withdrawing the belt (the end float leaf spring can be deflected in mains driven decks). Note, however, that the belt may pick up some lubricant when changed in this manner, and this must be cleaned off immediately with methylated spirits. When refitting, ensure that the belt is not twisted and that it is correctly located on the pulleys.

**Removal of flywheel and capstan assembly.** – Although the assemblies differ between battery and mains operated decks (capstan drive clutch and different pattern take up clutch fitted in mains operated decks), the method of removal is basically similar for both types.

The flywheel assembly is retained in position by a bracket (74) (119 in battery powered deck). It is advisable to remove the take-up clutch assembly



General exploded view of cassette tape deck, type DG210.

(71) before withdrawing the flywheel to avoid risk of bending the capstan spindle. The tie bar (59) can be moved sufficiently for access to the flywheel retaining bracket fixing screws after pressing the cassette release button. (An access hole for one of the screws is provided in the motor bracket on mains operated decks).

The assembly arrangement of components is shown in the appropriate exploded view drawing. When refitting, ensure that the small thrust washer is fitted to the capstan shaft between the flywheel and the capstan bearing assembly. Before refitting the flywheel retaining bracket, ensure that the drive belt is correctly located in the motor drive pulley. When refitting the bracket, set end float clearance as described under Mechanical Adjustments.

**Top plate removal.** – The head plate assembly (22) moves on six ballbearings (10) and when dismantling care is necessary to avoid losing them.

Two of these ballbearings are on top of the head plate and lie under the ball-retainer assemblies (8, 9) which are each secured by a single self-tapping screw (11); four lie in indentations in the deck.

Before removing the head plate from the DG210 or DG213 it will be necessary to release the muting switch coupling link (69) from the head plate. Additionally, on the DG213, the pause lever must be released from the capstan bearing (53).

Unsolder the erase and play head connections, then remove the ball-retainer assemblies and ball bearings. Take out two screws (27) which secure the head plate to studs on the pulley release arm (93). The head plate assembly and the four ballbearings beneath can now be removed.

**Note:** The holes through which the two head plate fixing screws pass are slotted to provide a fore and aft adjustment in order to achieve the correct penetration of the record/play head into the cassette – see Mechanical Adjustments.

**Piano key replacement.** – To avoid damage to the mechanism, it is advisable to release the appropriate key lever (46) from the machine before attempting to pull off a press key. Take out two self-tapping screws from each end of the key support bracket (48) to release the complete piano key assembly, then remove the appropriate circlip to permit the withdrawal of the key pivot shaft (40) sufficiently to release the faulty key. When fitting the replacement, ensure that the key levers engage correctly in or against the associated levers under the chassis.

**Spool carrier replacement.** – To remove a spool carrier assembly, first unclip the cone-shaped moulded retaining cap (12). Once removed, this cap is ineffective and should be replaced by a new part. The spool carrier assembly can now be withdrawn from its support spindle.

Reassemble in the reverse order, but note that one or two washers should be fitted below the spool carrier assembly (as on the original assembly) and a similar washer should be fitted at the top before fitting the replacement conical retaining cap. When applying pressure to fit the new cap, support the chassis underneath, as near as possible to the spindles, to avoid bending the chassis. Check that there is sufficient end float to allow the spool carrier to spin freely. If necessary, remove one of the washers to obtain this clearance.

**Cleaning and lubrication.** – The use of cleaning fluids such as petrol or

carbontetrachloride, which might damage plastics surfaces or rubber drives, should be avoided. A soft cloth dampened with methylated spirit should be used to clean drive surfaces and head faces.

All moving parts are lubricated during manufacture and further lubrication during service should rarely be necessary. If, however, it becomes necessary to replace any of the moving parts, only the slightest amount of a very light machine-oil should be applied to the bearing surfaces, ensuring that it does not find its way on to the drive surfaces. Over-lubrication can also attract dust which may cause excessive drag on parts of the mechanism.

**Mechanical adjustments**

The following mechanical tolerances and clearances are provided as a guide for use when clearing a mechanical fault. A correctly operating deck need not necessarily be within the stated limits.

However, if a part has been replaced or subjected to mechanical strain, one or

more of the following adjustments may be necessary.

**Flywheel end float – Fig. A.** – On battery driven decks the fixing holes in the retaining bracket are slotted to permit adjustment for end float. A grub screw provides adjustment on mains driven decks. After the end float has been correctly set, seal the adjustment with paint or locking varnish.

**Head plate fore and aft adjustment – Fig. B.** – The distance from the front face of the record/play head to the back edge of the cassette locator should be  $.120\text{in} \pm .005\text{in}$  with the Play key engaged. Reseal the screw heads following this adjustment.

**Pinch wheel bracket clearance, and pressure – Fig. C.** – With the Play key engaged, the clearance between the arm of the pinch wheel bracket and the stop lug on the head plate should be  $.030\text{in}$ . This can be adjusted by bending the stop lug.

*An additional adjustment, which applies to DG213 deck only, is to bend the lug*

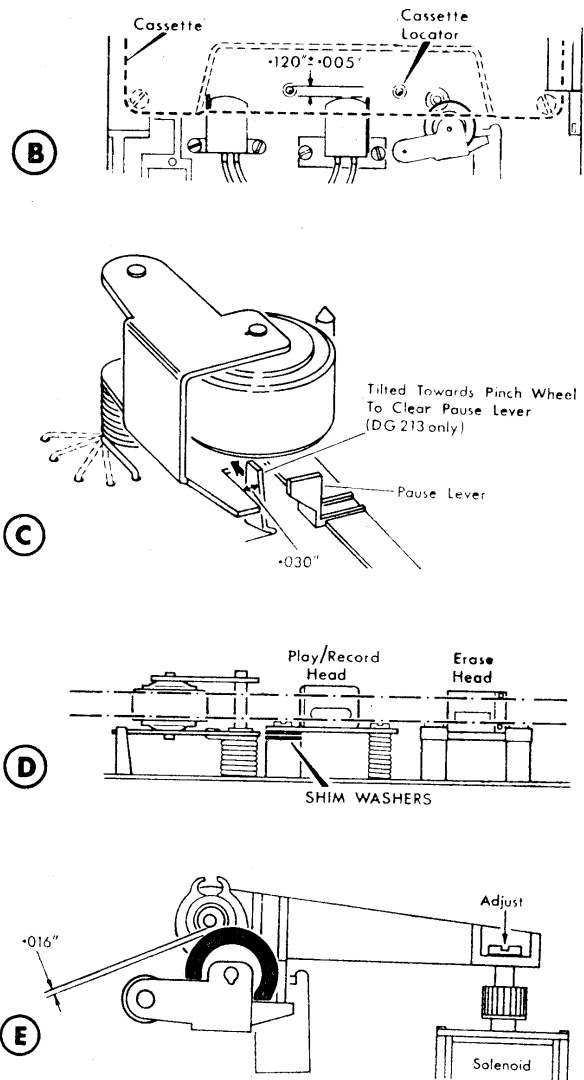
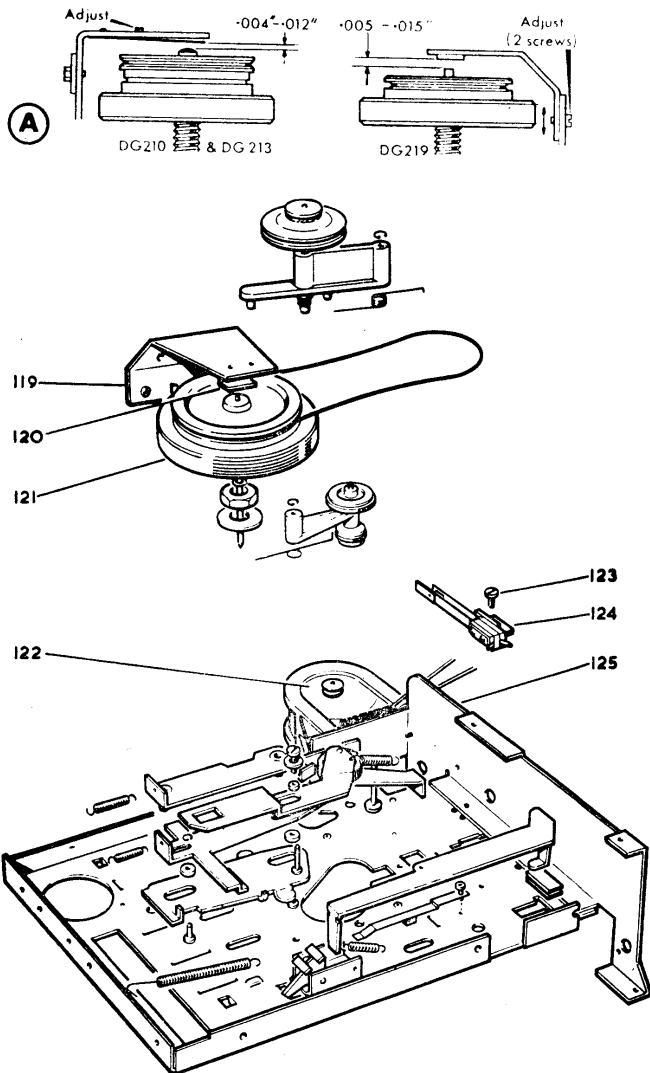
*towards the pinch wheel to clear the Pause lever (when Pause lever is engaged).*

To check pinch wheel pressure, engage Play key and, with a spring balance attached to the pinch wheel bracket, check the pull required to lift the pinch wheel away from the capstan, i.e. when the pressure roller just fails to turn. This should be 320gm-400gm at pinch wheel spindle and may be adjusted, when necessary, by transferring the spring end into any of the five spring fixing holes in the head plate, i.e. clockwise to reduce pressure and anti-clockwise to increase pressure.

**Head and pinch wheel alignment – Fig. D.** – When replacing a record/play head it may be necessary to add or remove one or two fibre shim washers to maintain alignment between erase head, record/play head and pinch wheel.

**Pause solenoid adjustment (DG213) – Fig. E.** – With Play key engaged and Pause solenoid energised, the clearance

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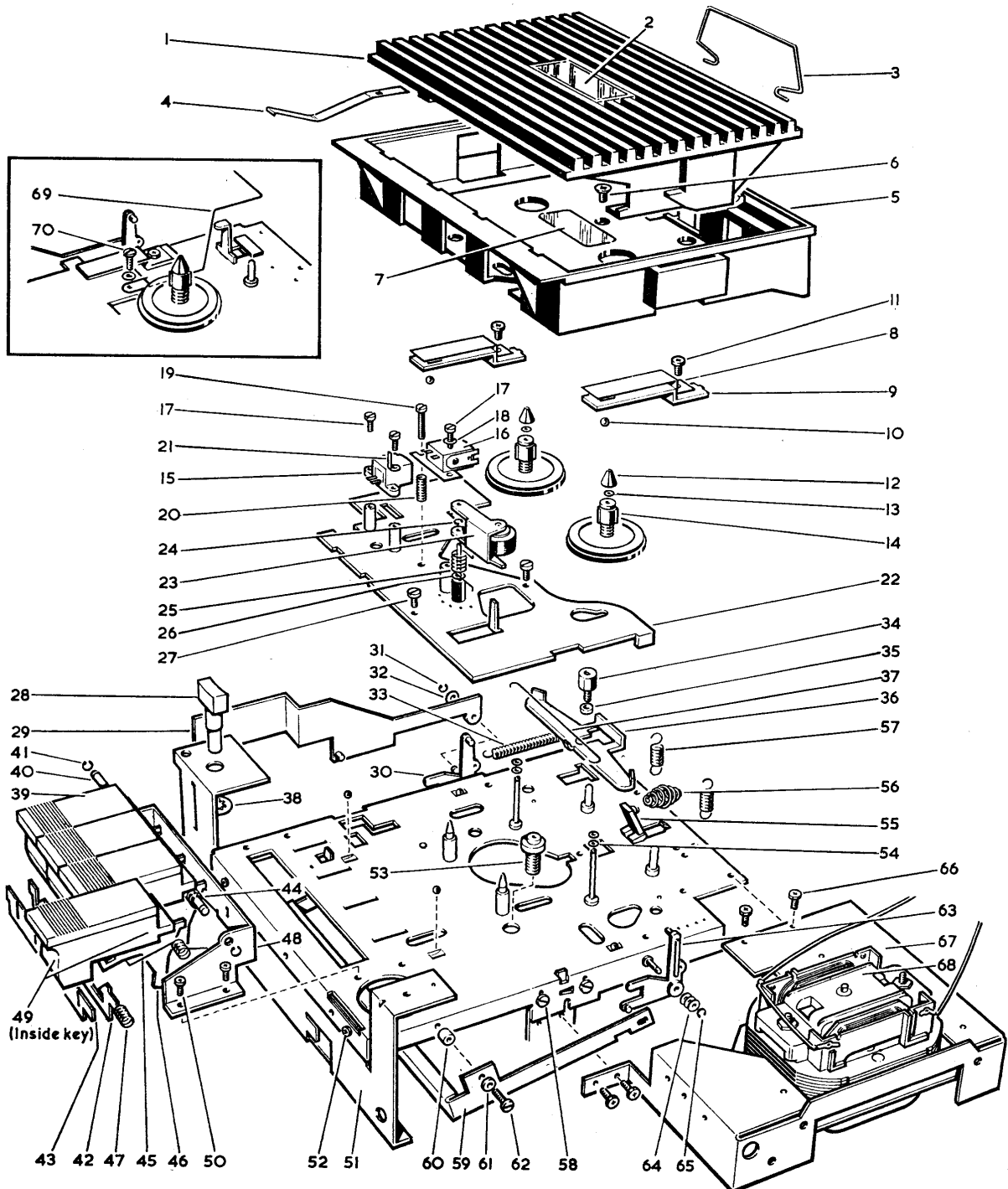
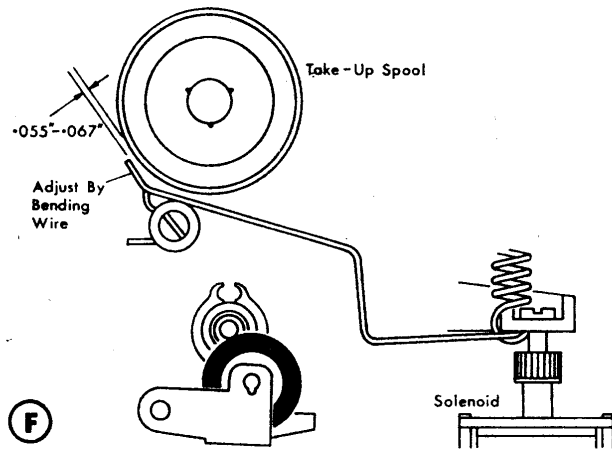


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between capstan and pinch wheel is set to .016in by adjusting the screw into the solenoid plunger. After adjustment, the screw thread should be sealed with locking paint.

Pause brake clearance (DG213) — Fig. F. — The clearance between the pause break wire and take-up spool tyre should be .055in-.067in (Play key engaged). If necessary, adjust by bending the brake wire at the point indicated in the illustration.



**Take-up clutch assembly – Fig. G. –**  
Before checking the pressure of the take-up pulley against the spool carrier tyre, thoroughly clean both drive surfaces.

Insufficient tension of take-up arm spring (72) will cause take-up pulley to slip, whereas too much tension will result in defective operation of the take-up clutch. The tension of spring (72) should be 40-55gm as measured with a spring balance at the centre of the take-up spindle clutch disc. Engage

Play key and note the spring balance reading when the take-up reel just fails to drive. If incorrect, move spring end to alternative anchor hole in chassis.

Take-up torque at the spool carrier should be 35gm/cm-55gm/cm. A high take-up torque can cause the tape to ride out of the guides and cause damage to the tape. Very low take-up torque may cause defective take-up particularly with a stiff or badly worn cassette. To rectify, it is necessary to replace complete assembly (71).

**General exploded view – DG210 & DG213**

- 1 Cassette envelope (black)
- 2 Cassette envelope window
- 3 Cassette envelope damping spring
- 4 Cassette holding spring
- 5 Cassette moulded well
- 6 Screw securing cassette moulded well
- 7 Tape spooling indicator
- 8 Ballbearing retaining spring
- 9 Ballbearing retaining bracket
- 10 Ballbearing (2.5mm) (6 off)
- 11 Screw securing bracket and spring assembly
- 12 Spool carrier cap
- 13 Washer under spool carrier cap
- 14 Spool carrier assembly
- 15 Erase head (Ikejiri ME36)
- 16 Signal head (Ikejiri R783)
- 17 Head securing screw (6mm)
- 18 Shakeproof washer (2mm)
- 19 Azimuth screw (12mm)
- 20 Azimuth tension spring
- 21 Solder tag
- 22 Head Plate
- 23 Pinchwheel carrier assembly
- 24 'E' clip securing pinchwheel carrier assembly
- 25 Pinchwheel carrier return spring
- 26 \*Plastic washer (2.5mm)
- 27 †Head plate fixing screw (5mm)
- 28 Shakeproof washer
- 28 Cassette release button
- 29 Cassette release lever
- 30 Cassette release latch (LH)
- 31 'E' clip
- 32 Red plastic washer
- 33 Latch return spring
- 34 Brake stop and Cassette well support bush
- 35 Brake stop spacer
- 36 Brake
- 37 Brake spring
- 38 Spire nut securing cassette release button
- 39 Piano key
- 40 Key pivot shaft
- 41 'C' clip securing shaft
- 42 Latch plate
- 43 Latch guide
- 44 Key return spring (8 turns)
- 45 Play key return spring (3 turns)
- 46 Key lever
- 47 Latch return spring
- 48 Key assembly support bracket
- 49 Key fixing clip
- 50 Screw securing key support bracket
- 51 Front chassis bracket
- 52 Screw securing front chassis bracket
- 53 Capstan bearing assembly
- 54 Washer under spool carrier
- 55 Cassette thrust
- 56 Cassette thrust spring
- 57 Cassette tension spring
- 58 Screw securing flywheel bracket (2 off)
- 59 Tie bar
- 60 Bush for tie bar
- 61 Washer under tie bar screw
- 62 Screw securing tie bar
- 63 Cassette release latch (RH)
- 64 Red plastic washer
- 65 'E' clip
- 66 Screws (motor bracket) (4 off)
- 67 Motor bracket rivetted assembly
- 68 Motor assembly
- 69 Muting switch coupling link
- 70 Screw securing link
- Washer

**Underside view – DG210 & DG213**

- 71 Take-up clutch assembly (DG210, DG213, DG219)

- 72 Spring for take-up arm
- 73 'E' clip securing take-up arm
- 74 Flywheel shaft retaining bracket
- 75 Grub screw, 6BA x  $\frac{1}{8}$ in
- 76 Drive clutch
- 77 Clutch spring
- 78 Red washer
- 79 'E' clip securing drive clutch
- 80 Drive belt
- 81 Clutch lining (DG210, DG213)
- 82 Flywheel assembly
- Thrust washer fitted over capstan spindle
- 83 Washer for capstan bearing assembly
- 84 Nut securing capstan bearing assembly
- 85 Rewind arm assembly
- 86 Return spring on rewind arm assembly
- 87 'E' clip securing rewind arm
- 88 Motor pulley
- 89 Grub screw securing pulley
- 91 Felt washer
- 92 Red plastic washer
- 93 Pulley release arm assembly
- 94 Pulley release arm tension spring
- 95 Screw securing rewind bracket
- 96 Washer on securing screw
- 97 Spacer on securing screw
- 98 Grommet on motor plate
- 99 Washer
- 100 'C' clip securing motor plate
- 101\*\* Switch actuating arm
- 102 Tension spring
- 103 'E' clip securing switch arm
- 104 Spacer
- 105 Forward wind bracket riveted assembly
- 106 Rewind bracket riveted assembly
- 107 Rewind jockey
- 108 Rewind tension spring
- 109 Bracket interlock
- 110 Back tension brake (omitted in some decks)
- 111 Brake pad
- 112 Bracket interlock tension spring
- 113 Grommet
- 114 Unit plate riveted assembly
- 115 Switch lever pin
- 116 Record/Play switch lever
- 117 Record/Play switch return spring
- 118 Screw securing back tension brake

**Underside view – DG219**

- 119 Flywheel bracket
- 120 Flywheel shaft bearing
- 121 Flywheel and capstan assembly
- 122 Motor assembly
- Motor housing
- 123 On-Off switch securing screw
- 124 On-Off switch
- 125 Rear and motor mounting panel

**Pause mechanism – DG213**

- 126 Grip ring
- 127 Spacer
- Washer
- 128 Pause brake (wire)
- 129 Tension spring
- 130 Solenoid assembly
- 131 Plunger
- 132 Self-tapping screw
- 133 Pause lever
- 134 Screw
- Washer (plain)

\* Fitted as required.

† On the DG213 deck one of the head fixing screws is also used to secure one end of the pause brake spring.

\*\* Actuating switch on battery models only.

