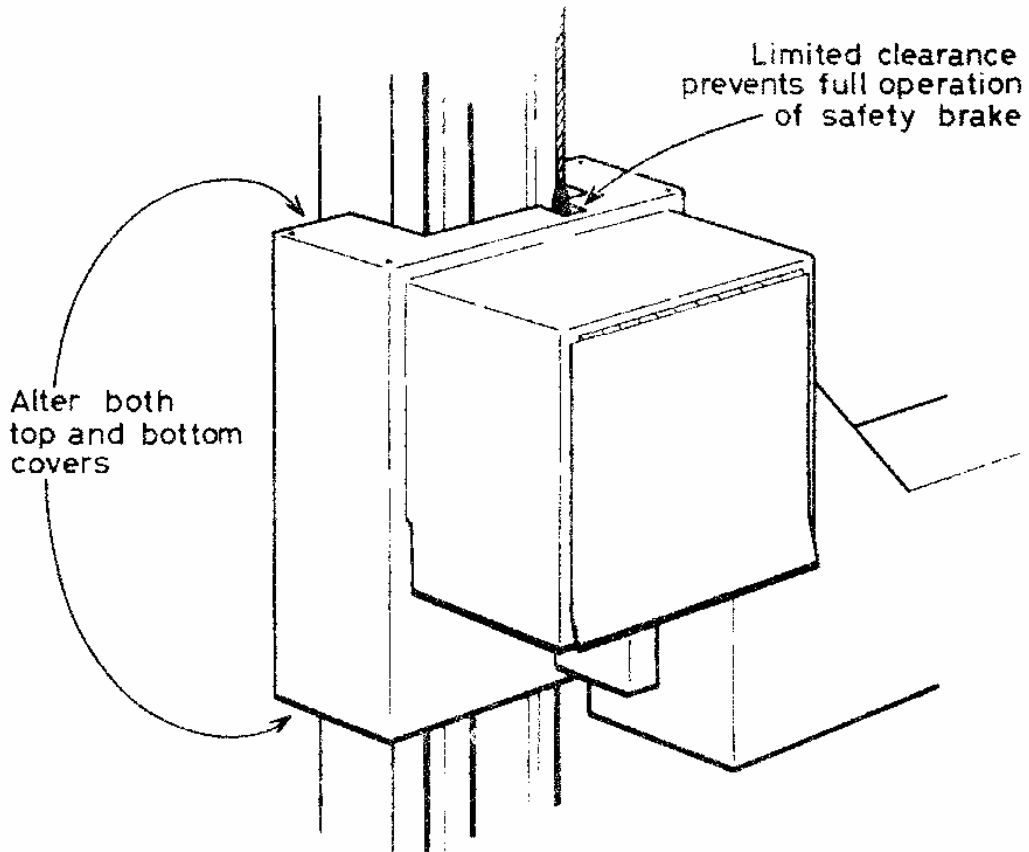
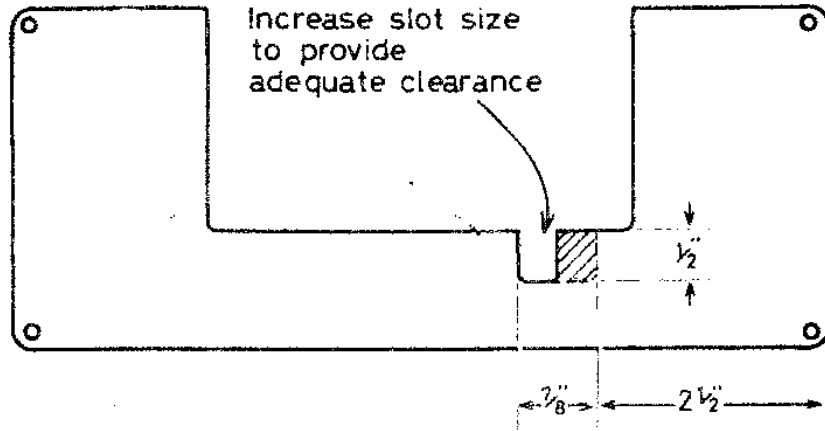
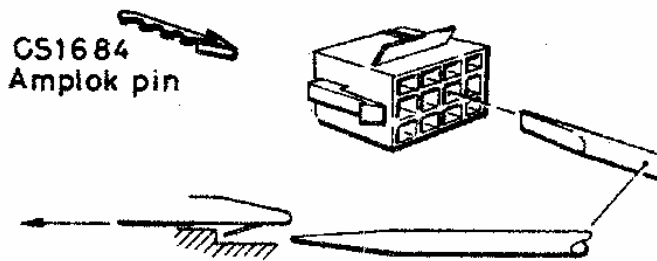
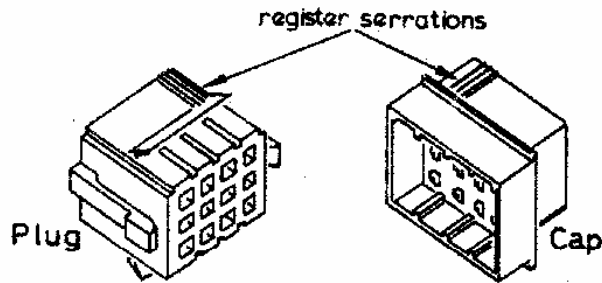
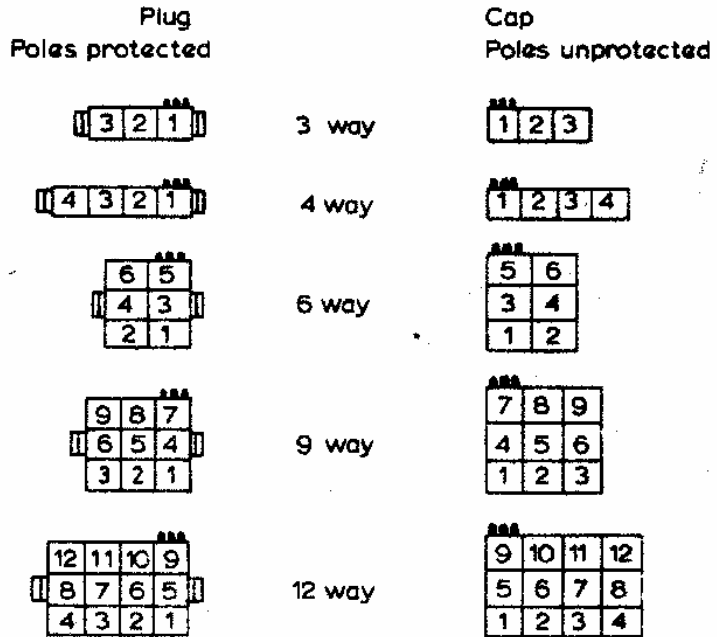


**IMPORTANT....** On Stylos Tubestands, Serial No:-  
XW201 to XW950  
and  
BQ201 to BQ400

Check that there is clearance for  
the Safety Brake Cable as illustrated  
below.



Plug & Cap are shown looking at connectors, i.e opposite to the cable entry & with register serrations at the top



Numbering Convention for AMP-LOK Plugs & Caps

929/1306/1358/494/1528/1532/1534/1617

GEC Medical Equipment Limited  
East Lane Wembley  
Middlesex HA9 7PR England

Supplement No 1884/3  
(to Inst No 1358  
ref TP246/3/1172)

STYLOS TUBESTAND and SECTOGRAPH 4

(This Supplement No 1884/3 supersedes Supplement No 1884/2).

Change in title of Sectograph

In the text of the installation instructions and service notes, No 1358, reference is made to Sectograph 3; this has been re-numbered Sectograph 4 and it can be recognised by reference to the sketch overleaf.

References to Sectograph 1 and 2 are correct.

The Sectograph 4 cannot be used on Stylos Tubestands prior to Serial No XW651. When an MDU control box prior to Serial No ZP341 is used with a Sectograph 4, a diode must be fitted in the MDU, as described below.

Fitting Diode to MDU box for Sectograph 4

A diode D2 (Type BYX36/600, Stock No X316-003) must be fitted in series with line F in the Stylos MDU boxes prior to serial No ZP341 when a Sectograph 4 with a brake release relay BR is used.

The circuit is shown in Dia Inst 2806 B3 sheets 2 and 3 attached. If the diode is not fitted and relay BR is used, a "back-door" circuit exists and the BR relay buzzes. The buzz is eliminated when diode D2 is connected.

Note that if, by error on installation, the DC supply to BS (+) and BR (-) terminals has been reversed, the diode connection as shown on sheet 3 will not eliminate the buzzing. In such a case, either the polarity of the supply connections must be corrected, or the diode connections reversed.

Amendments (The following amendment have been printed as part of Issue 5 of Instruction No 1358).

Please bring up-to-date the Sectograph 4 circuits in the current Installation Instructions and Service Notes, No 1358 [which has the reference (TP246/3/1172) or (TP246/4/374) in the bottom left hand corner of page 1].

Discard Supplement No 1884/2 from the front of Inst No 1358 and substitute this Supp No 1884/3.

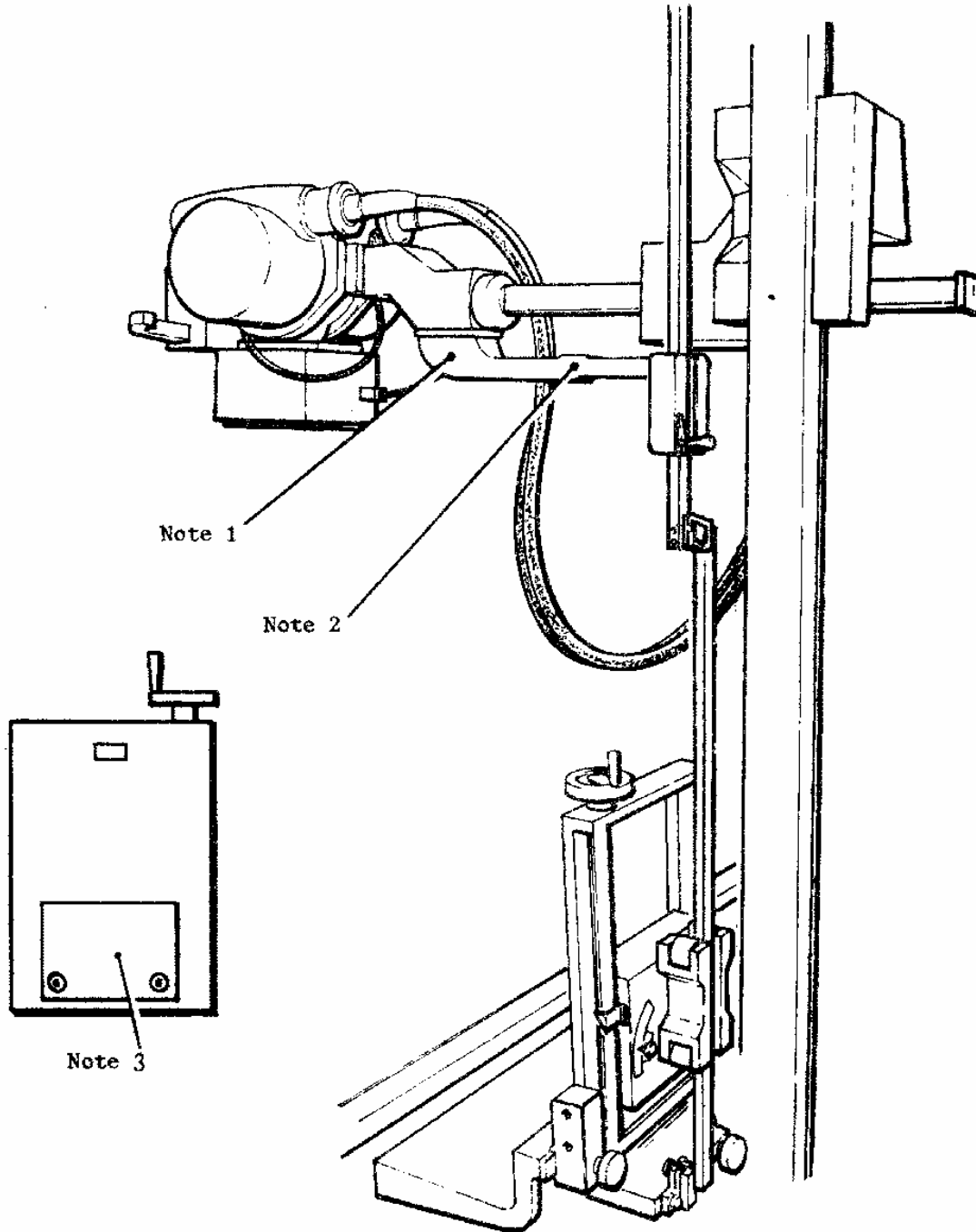
Discard the existing pink pages 40 and 41 and fit new white paper pages 40, 41 and 42 attached.

Discard the existing three sheets of Dia Inst 2603B3 (November 1973) and fit the attached four sheets dated (September 1974).

On Dia Inst 2806C (Issue 3) Sheet 3 of 4, change SECTO 3 to SECTO 4 in the title and under the switch symbols.

Notes.

1. BR relay inside casting (Sectograph 4).
2. Long arm shown - as used with Escort table. Short arm used with other tables.
3. Identify switch mechanism of Sectograph 4 by cover plate indicated.



GEC Medical Equipment Limited  
East Lane Wembley  
Middlesex HA9 7PR England

Supplement No 1822  
to Inst Nos:-  
1354 for Escort  
1358 for Stylos  
1410 for Sectograph

NOTIFICATION of CHANGES      ESCORT TABLE

Addition of Bucky Brake Release Relay and Change in Connector Type

On Escort tables from Serial No XU 461 a relay ES has been added to ensure that, when the Sectograph is used, the Potter Bucky brake is de-energised.

The circuit, Dia Inst 2791, Issue 2 April 1973 overleaf, shows the 12V DC ES relay circuit.

Terminals BR/351 to be connected to terminal BR on the Stylos; on the Apollo to terminal 351.

A 12-pole connector with a retaining clip has been fitted to the Escort in place of the original 8-pole connector.

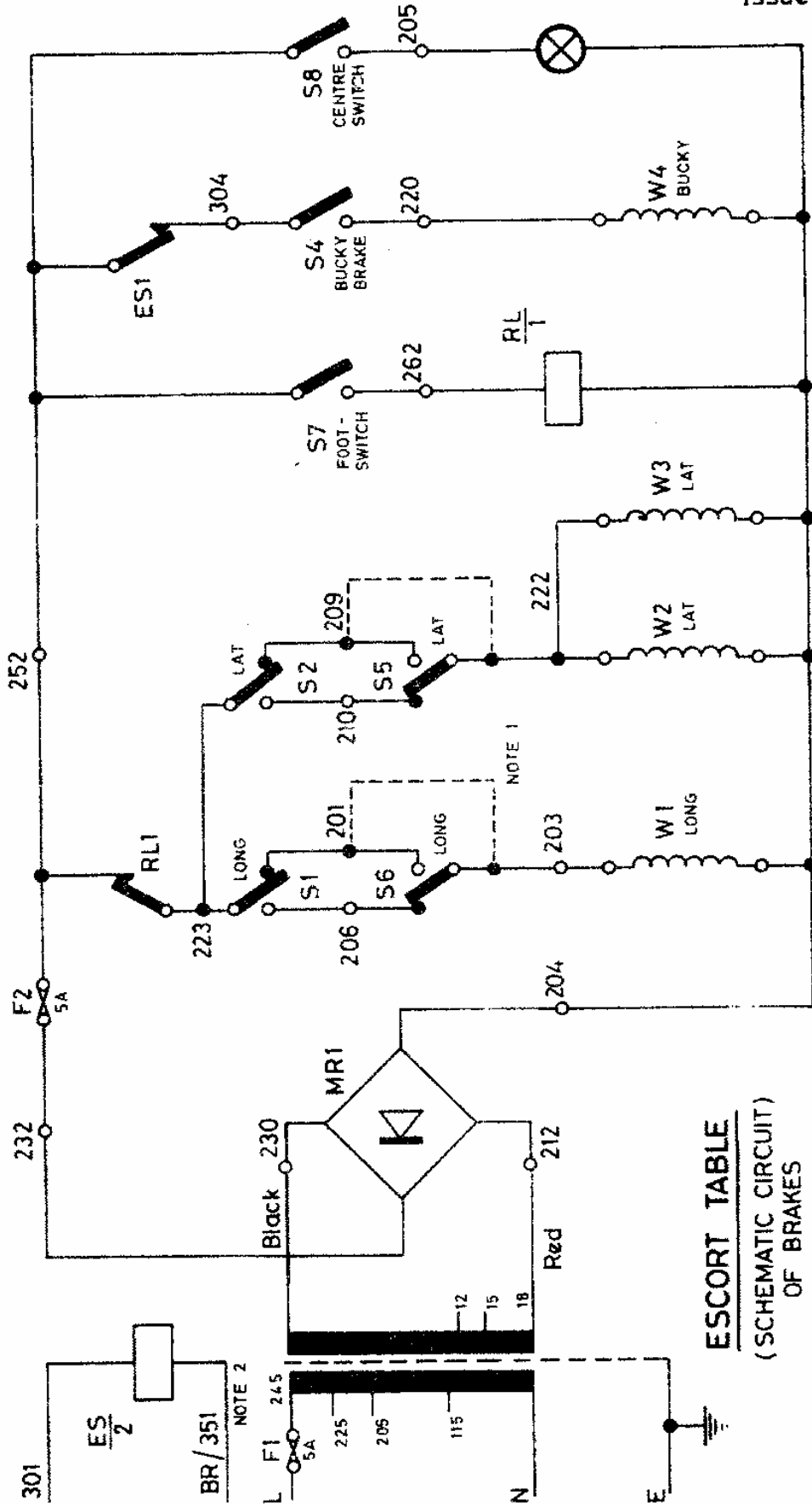
References

Add a note this Supplement No 1822 to the index of each of the following Instructions:-

Escort Inst No 1354  
Stylos Inst No 1358  
Sectograph Drive Inst No 1410

Fix a copy of the supplement into the front of the installation instructions.

The information will be incorporated in the instructions on the next reprint.



NOTE 1 BROKEN LINE LINKS WHEN ONE SWITCHBOX ONLY USED  
NOTE 2 ES RELAY FROM SERIAL No. XU461 ONWARDS. ES2 CONTACT NOT USED  
BR TERMINAL ON STYLOS. 351 TERMINAL ON APOLLO

**ESCORT TABLE**  
(SCHEMATIC CIRCUIT)  
OF BRAKES

GEC Medical Equipment Ltd.  
East Lane Wembley  
Middx. HA9 7PR England

INSTRUCTION No. 1358  
(Issue 5)

STYLOS TUBESTAND

INSTALLATION INSTRUCTIONS

and

SERVICE NOTES

IMPORTANT:-

This installation instruction relates to  
Stylos Tubestands XW550 to XW650 and XW651  
onwards.

Stylos Tubestands from XW651 onwards  
have a Sectograph coupling relay mounted in  
the control box part 24 in Fig 1 in place of  
the two micro switches and actuator part 21 in  
Fig 1.

WARNING .... FULL PRECAUTIONS MUST BE TAKEN TO  
GUARD AGAINST THE POSSIBILITY OF  
ELECTRIC SHOCK AND/OR EXPOSURE TO  
X-RADIATION AND/OR OTHER INJURY TO  
PERSONNEL.

Refer to page 7 for further information.

NOTICE .... If any part or parts have been damaged  
in transit, inform Watsons or Agents  
within 24 hours of the discovery and  
retain the packing material for subsequent  
inspection by insurance assessor.





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Supplementary Information

Supplement No 1822 (at the front of manual)  
Potter Bucky on Escort Table

Supplement No 1884 (at the front of manual)  
Notes on MDU Boxes prior to Serial No ZP341  
when used with Bucky Brake Release Relay

Numbering Convention on Ampliok  
See Dia Inst 2517 at front of manual

1. INVENTORY OF COMPONENTS, for STYLOS TUBESTAND

- 1 off Base Assembly
- 1 off Column complete with Crossarm Carriage Assembly
- 1 off 50 feet length of Cable for Brake and LBD supply
- 1 off Sheet of Lead (approximately 1 sq. foot)
- 1 off Block of Lead (approximately 9 inch x 2 inch x 7/8 inch - 61b)
- \* 1 off Block of Lead (approximately 7 inch x 2 inch x 1/8 inch - 61b)
- \* 1 off Block of Lead (approximately 5 inch x 2 inch x 1/2 inch - 21b)
- 1 off Auxiliary Counterweight (painted blue, for use with slide in light beam diaphragm)
- 1 off Scale for DX 25 and DX 40 long-axis rotation
- 1 off Scale for DX 50 long-axis rotation
- 1 off Scale with black coloured figures marked 48/120 to 24/60 for Vertical Column
- 1 off Scale marked 15-0-15 for Crossarm
- 1 off Bucky Coupling Assembly
- 1 off X-radiation Tube Manipulating Handle Assembly complete with brake control switches, connecting lead, tube short-axis Angulation Scale and Plate for attachment to X-radiation tube.
- 1 off Small bag containing 2 "Cowcatcher" brackets for attachment to base, 6 tablets (marked with a line, a cross, and figures 3/90, 4/120, 5/150 & 6/180).
- 1 off Strip of adhesive material for fixing markers
- 10 off Wood screws for fixing markers (alternative to adhesive material).
- 4 off 1/4inch whit x 1/2inch 1g ch hd screws for fixing manipulating handle assembly.
- 2 off Main floor tracks 9 foot length, End Stops and Fixing Screws.

\* Some lead weights may be in the crossarm carriage.

For Floor to Ceiling Tubestands Only

- 2 off Ceiling Track 7 foot 3 inch length with Brackets, End Stops and Fixing Screws.
- 1 off Ceiling Extension Tube with Bearing Bar
- 1 off Plastic Cap for the end of the Ceiling Tube Extension.

For Floor Mounted Tubestand Only

- 1 off Rear Floor Track Member 8 foot 7 inch length with Fixing Screws
- 2 off Rear Floor Track Member 3 foot 7 inch with End Stops and Fixing Screws
- 1 off Out rigger and 4 fixing screws

DEMARCATOR LIGHT BEAM DIAPHRAGM

INVENTORY of COMPONENTS for CAT No 119/2

- 1 off Connector plug (Not shown)
- 1 off Mounting plate (Item E)
- 4 off Mounting screws (Item C)
- 4 off Mounting washers (Item D)
- 4 off Screws 1/4 inch Whit x 3/4 inch long (Item F)
- 4 off Screws 1/4 inch Whit x 1/2 inch 1g. (Alternative to 3/4 inch 1g screws) (Item F)
- 4 off Lockwashers 1/4 inch (For Item F)
- 4 off 1/4 inch half nuts (Discard. Used for transit only) (Not shown)
- 4 off Aluminium filter disc 2.7/8 inch dia x 1/2mm thick (Item H)
- 2 off packing plates (Items B and J)

## 2 SAFETY PRECAUTIONS

### General

Ionising radiations such as X-radiation can be a source of danger to patients, operators, engineers and other personnel.

All protective facilities available must be used to prevent unnecessary exposure.

Some form of radiation detector should be used by each person when working with X-radiation apparatus.

### Recording Radiation Dosage

A simple method of recording dose rate is by one or more monitor films, each placed in a special radiation-filter holder and worn on the body clothing usually at chest and/or gonad level. Periodically, each film is processed and the amount of radiation received is estimated from the blackening on the film.

### Protection of the Operator

Protective screens must be used during the exposure wherever possible. Alternatively or additionally, wear lead rubber apron and gloves.

Personnel not directly involved in X-radiation work must leave the room or vicinity of the X-radiation at the time of the exposure.

### Presence of Anaesthetics

It is dangerous to use X-radiation apparatus in the proximity of inflammable anaesthetics. If it is essential for X-radiation equipment to be used in these conditions, the control unit should be sited as far as possible from the area of anaesthetic vapour and qualified assessment made of the conditions present.

### Electrical Hazard

Always switch off before making connections or adjustments to apparatus.

3. GENERAL INFORMATION

The Pre-installation and Installation Instructions sections of this manual, should be read through in detail before attempting any installation.

When carrying out service work it may be advantageous to refer also to the installation instructions sections of this manual.

Installation Instruction No. 1410 for the Motor Drive Unit and Sectograph 4 is supplied with the motor drive apparatus, Cat No 578/17. The instructions are not enclosed in this manual. The Sectograph may be fitted at the time of installation of the main tube column or at a later date.

**IMPORTANT**

The electrical supply to the floor brake is via a slip ring assembly at the bottom of the vertical column and a brush assembly on the base. Before fitting or removing the vertical column the brush assembly must be removed from the base fixings.

***WARNING! . . .***

Full precautions must be taken to guard against the possibility of Electric Shock and/or exposure to X-radiation and/or other injury to personnel.

Refer to paragraph 2 on page 7 for further details.

# GENERAL REQUIREMENTS.

## PRE-INSTALLATION INSTRUCTIONS

The following instructions are to be read in conjunction with the layout drawing prepared by GEC Medical Equipment Ltd.

### GENERAL ELECTRICAL REQUIREMENTS

All electrical wiring, interconnection etc. must be strictly in accordance with the recommendations contained in "The regulations for the Electrical Equipment of Buildings" published by the Institute of Electrical Engineers or other appropriate National Wiring Regulations. Special care must be taken to ensure that all conduits are properly bonded and connected to earth.

All metal parts of tables, tubestands, tracks, etc., must be securely earthed at the points indicated in the Pre-installation Schedules and Layout drawings, then returned to the Main Earth Point at the Mainswitch in the X-ray room. A stranded conductor of suitable cross sectional area may be used or alternatively a copper strip of not less than 16mm x 2.5mm. A tail of 0.5 metres should be left for connection by the Installation Engineer. The resistance between any earthed metal part and the Main Earth Point must not exceed 0.1ohm as specified by paragraph 7 of DHSS General Technical Clauses 1973. All leads must be enclosed in steel conduit or trunking.

Normally all connections to terminals will be made by GEC Medical Equipment Engineers.

| CSA<br>□mm | Metric Sizes       |          | Imperial Sizes |           | Amp<br>Rating |    |
|------------|--------------------|----------|----------------|-----------|---------------|----|
|            | Stranded           | Flexible | Stranded       | Flexible  |               |    |
| 1.0        | } 3/.74<br>nominal | 32/0.20  | 3/.029         | 40/.0076  | 10            |    |
| 1.25       |                    |          |                |           |               | 10 |
| 1.5        |                    | 30/0.25  |                |           |               | 15 |
| 2.0        |                    |          | 3/.036         | 70/.0076  | 15            |    |
| 3.0        |                    |          | 7/.029         | 110/.0076 | 20            |    |
| 2.5        |                    | 50/0.25  |                |           | 20            |    |
| 4.0        | 7/0.85             | 56/0.30  |                |           | 25            |    |
| 4.5        |                    |          | 7/036          | 162/.0076 | 25            |    |
| 5.3        |                    |          |                | 105/.010  | 30            |    |
| 6.0        | 7/1.04             |          |                |           | 30            |    |
| 6.8        |                    |          | 7/.044         |           | 36            |    |
| 10.0       | 7/1.35             |          | 7/052          |           | 42            |    |
| 15.0       | 7/1.70             |          | 7/.064         |           | 53            |    |
| 20.0       |                    |          | 19/.044        |           | 62            |    |
| 25.0       | 7/2.14             |          | 19/.052        |           | 73            |    |
| 35.0       | 19/1.53            |          |                |           | 90            |    |
| 40.0       |                    |          | 19/.064        |           | 97            |    |
| 50.0       | 19/1.78            |          |                |           | 145           |    |
| 65.0       |                    |          | 19/.083        |           | 160           |    |
| 70.0       | 19/2.14            |          |                |           | 185           |    |

The metric sizes quoted are nominal, some variations are made by Suppliers.

NOTE:

Solid conductors are NOT suitable. Stranded or Flexible cables MUST be used



## GENERAL STRUCTURAL REQUIREMENTS

Each installation must be investigated by an Architect or Surveyor to determine the size of girders and other bearers required to support the weight of equipments installed.

### PREPARATION OF CEILING

Ceiling tracks can be fixed directly to the ceiling but, normally, a board is required which must be of hardwood not less than 40mm thick. For width, length and positions, refer to layout drawing. Ceiling boards must be level and capable of supporting the moving load stated in the relative pre-installation instruction and must be firmly bolted to the ceiling or other fixings. Access to the upper side of the board should be possible for the Installation Engineer to bolt the tracks in position.

### CEILING MOUNTED TUBE SUPPORTS

The lateral movement of ceiling tracks must not be greater than 3mm, if necessary fit cross-members between girders or use some other method to prevent excessive lateral movement.

### FLOOR TO CEILING MOUNTED TUBE SUPPORTS - MOBILE

The ceiling board and floor track must be plumb level to within a tolerance of 3mm in the position shown on the layout drawing.

### FLOOR TO CEILING/WALL MOUNTED TUBE SUPPORTS & BUCKY STANDS

Provide and fit a hardwood fixing board to the ceiling or wall. The board should be a minimum size of 230mm x 230mm x 40mm. Fixings for the board must not coincide with the fixings on the extension tube plate or ceiling tracks. For the maximum loading on the extension tube plate fixings, refer to the pre-installation instructions.

### CEILING SUPPORT FOR HT CABLES

A ceiling board 50mm wide is normally required to support the Capitol Track and fittings, together with the HT cables. For length and position refer to the layout drawing.

### PREPARATION OF FLOOR

A level floor surface must be provided for all equipments. No part of the floor area concerned may be more than 3mm from the nominal floor level. The areas over which the equipments are to be fixed must be checked with the aid of a Straight Edge, and any high spots removed until the areas are within tolerance. If the floor cannot be improved or is too weak, bearers of the type as shown in the pre-installation Instruction should be let into the floor. The upper surface of the bearers must be level in all directions and the bearing surface must not be lower than the highest point of the adjacent floor.

In rooms where a new concrete or composition floor is being laid, built in bearers may be considered.

### FLOOR TRACKS

When a flush floor track is to be used a suitable channel must be made in the floor, or a channelled bearer provided. (See pre-installation schedules).

## STYLOS TUBESTAND

### FLOOR-TO-CEILING MODEL

### Pre-Installation Instructions

When a Tomograph is to be used with a Stylos Tubestand, refer to Schedule No WS 246-C.

The following instructions are to be read in conjunction with the layout drawing prepared by GEC Medical Equipment Limited, and the GENERAL REQUIREMENTS WS 226.

This schedule is intended as a general guide. The work detailed must be completed prior to the delivery of the major items of equipment and before work is started on any necessary interior decorations.

When carrying out the work described in the following schedule, it is important that the dimensions given on the figures attached and the layout drawing are strictly adhered to, as these dimensions greatly affect the alignment of the items of equipment.

#### STRUCTURAL REQUIREMENTS

The floor track may be raised (Surface Mounted) type or flush (Sunken) type. See page II.

The ceiling board must be capable of supporting a load of approximately 22 kg (50 lb). The shear stress is approximately 120kg (250 lb).

#### SCHEDULE OF WIRING

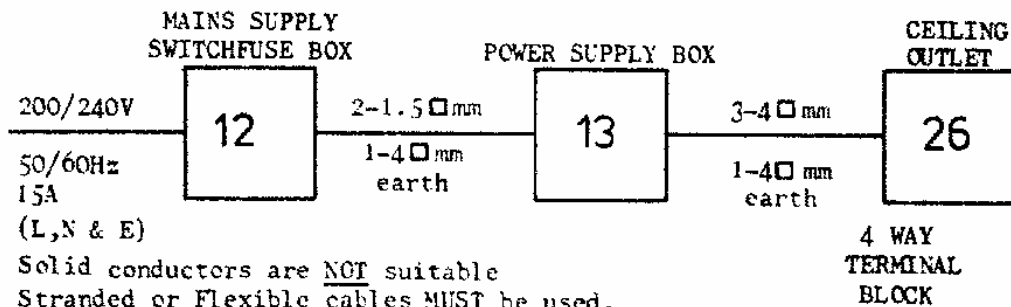
Provide and fit mains switch fuse box, ceiling outlet with 4 way terminal block, trunking or conduit and wiring as shown in the block diagram below.

The mounting panel for the Stylos power supply box will be supplied by GEC for fixings by the wiring Contractor. The power supply box will be fitted by the X-ray Engineer.

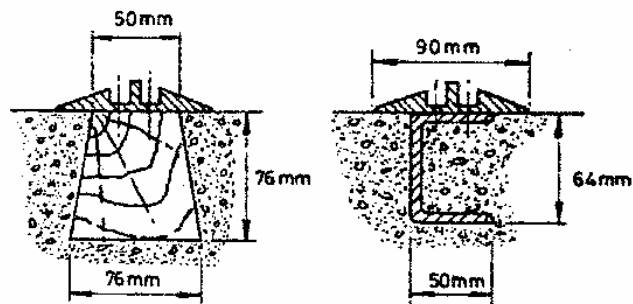
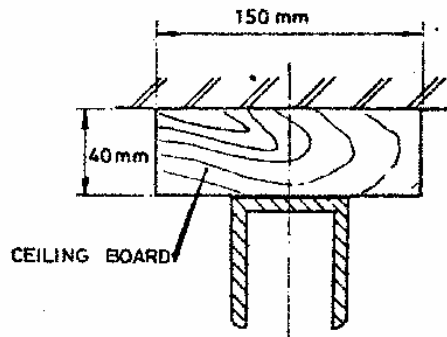
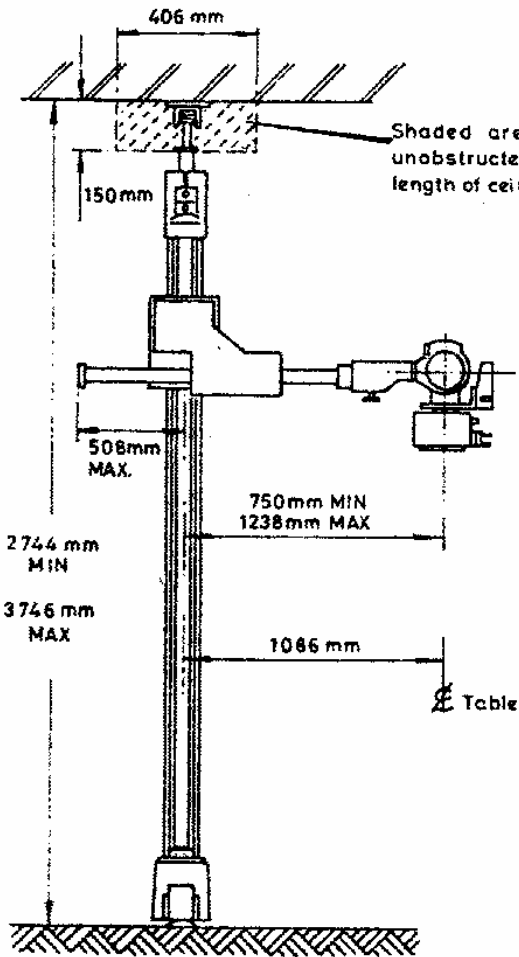
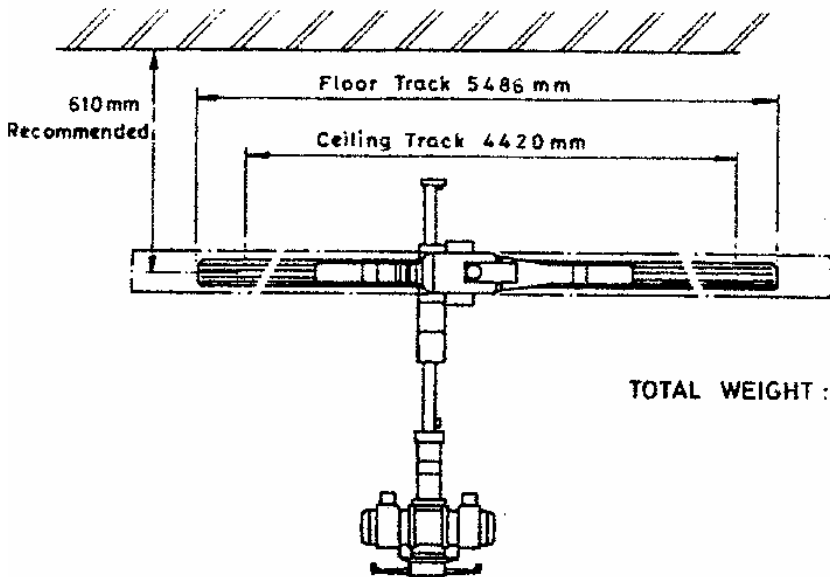
Dimensions of the mounting panel and power supply box are given on page IV. Fix the mounting panel to the position shown in the layout drawing. The outlets of the trunking or conduit must NOT extend over the mounting panel.

The wiring Contractor must leave conductor 'tails' of approximately 1 metre for the X-ray Engineer to make connections in the power supply box and the ceiling outlet point 26.

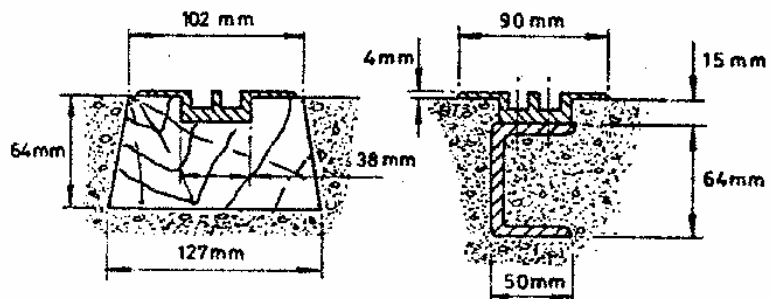
A fixed, engraved label marked 'STYLOS TUBESTAND' must be supplied and positioned near switch fuse box 12.



**STYLOS  
FLOOR to CEILING  
TUBESTAND**



**BEARERS FOR RAISED TRACK**

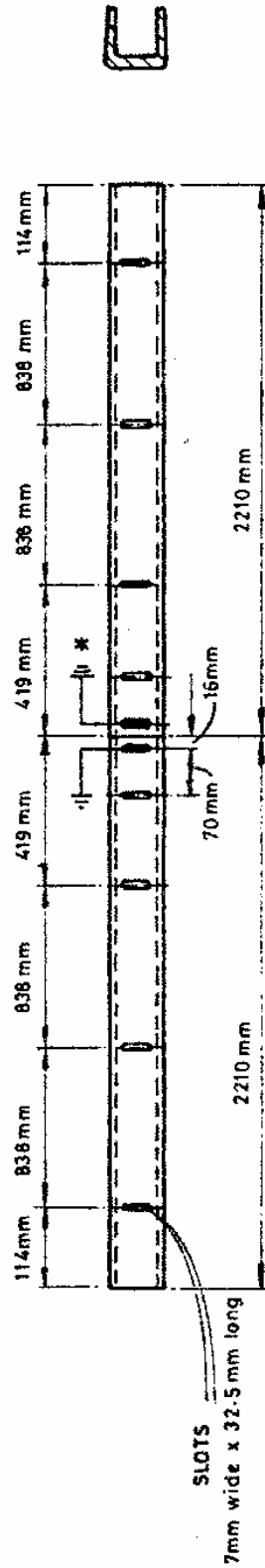


**BEARERS FOR FLUSH TRACK**

**STYLOS  
FLOOR to CEILING  
TUBESTAND**

**'A' - CEILING TRACK**

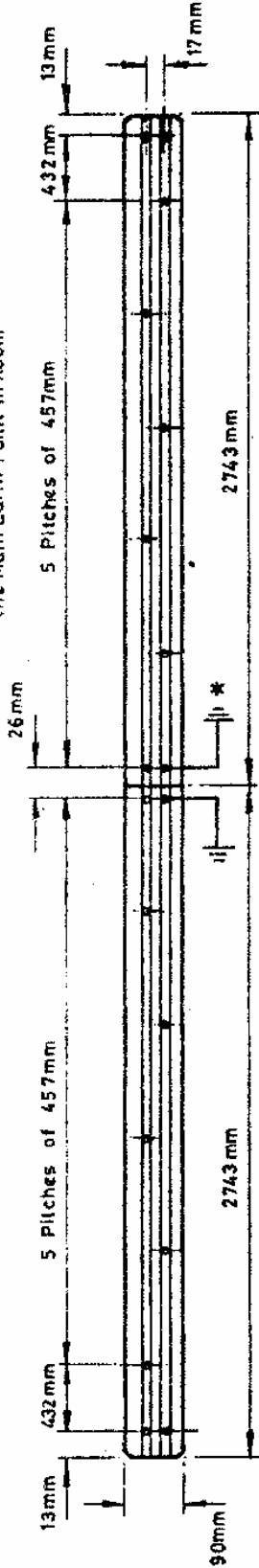
**WEIGHT : 18 kg per 4420 mm length of track**



\* Earth Anchor Points :  
Earth to be returned to  
the Main Earth Point in Room

**'B' or 'C' - FLOOR TRACK**

**WEIGHT : 22.7 kg per 5486 mm length of track**

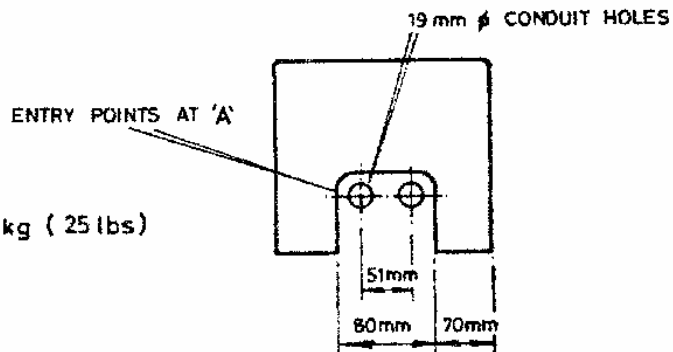
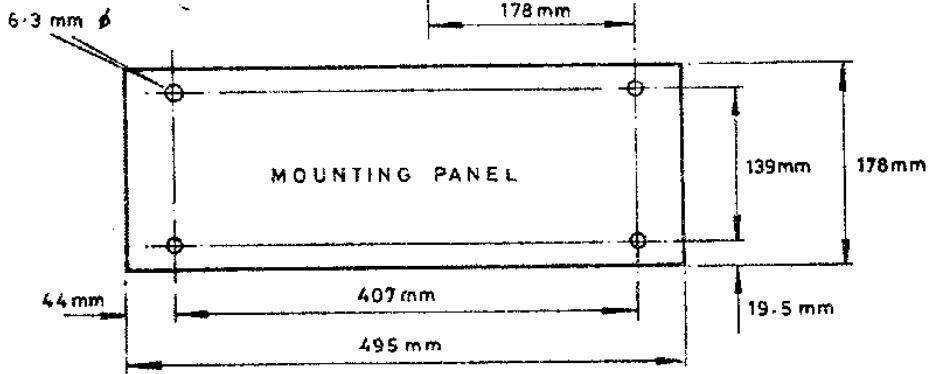
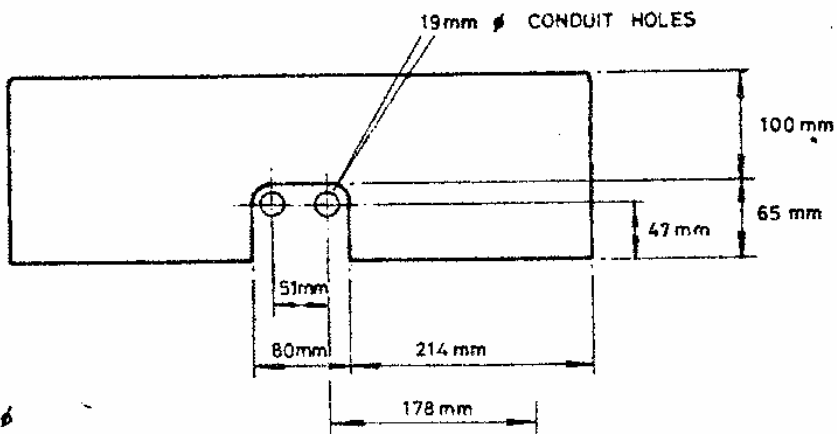
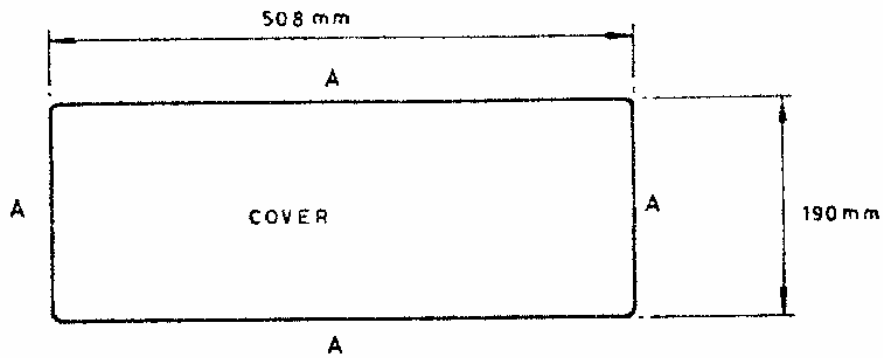


A Floor-to-ceiling mounted Stylos can have:

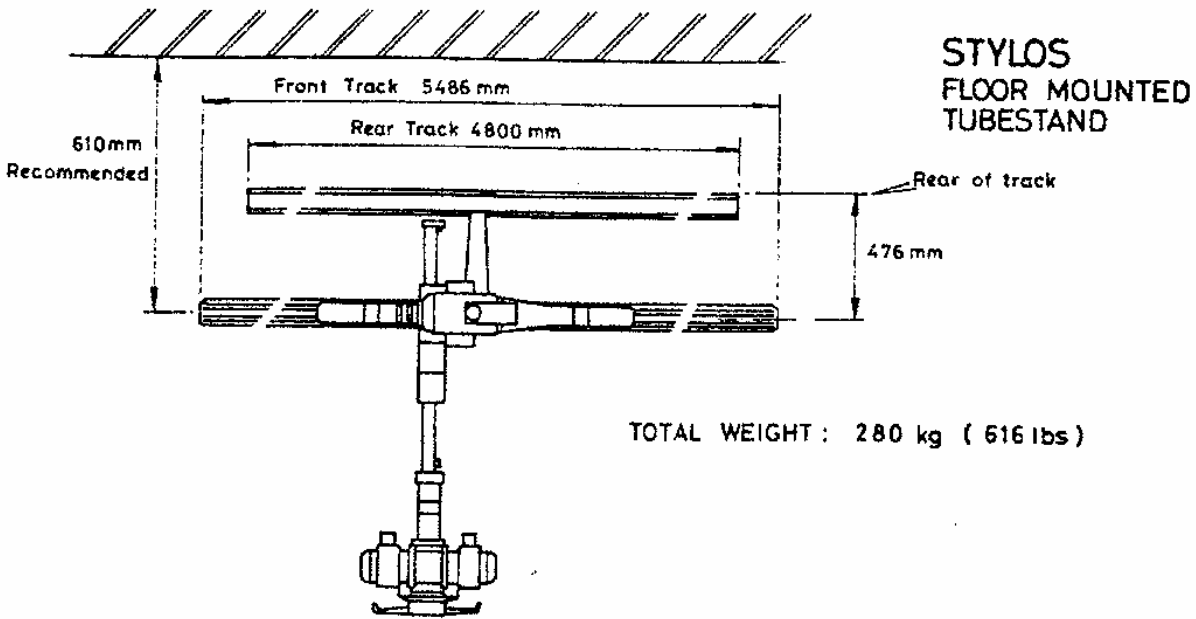
- Either the ceiling rail (A) with sunken floor track (B)
- or the ceiling rail (A) with surface mounted floor track (C)

Track length may be reduced by cutting on installation.

STYLOS  
POWER SUPPLY BOX  
(ZU Series)

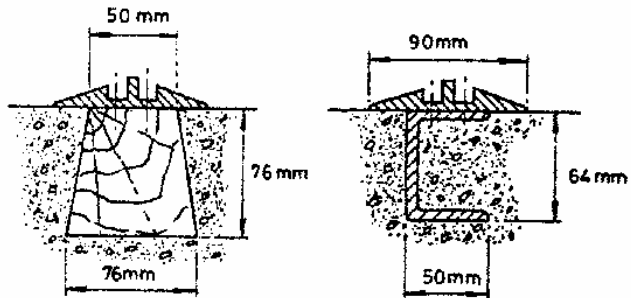
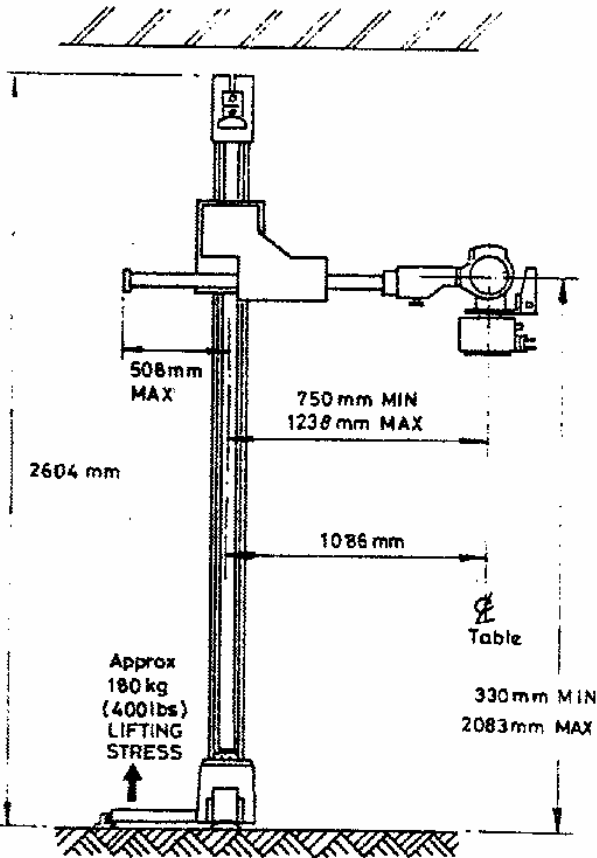


WEIGHT: Approx 11.3 kg (25 lbs)

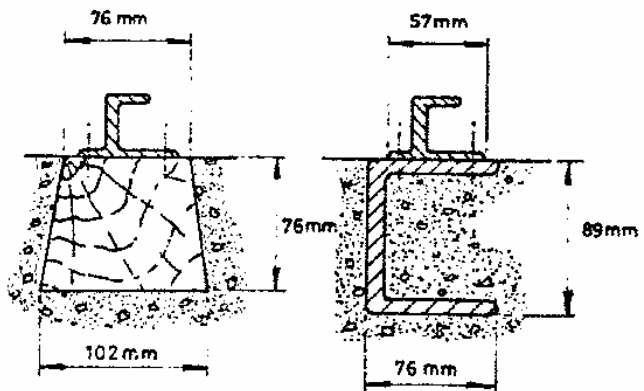


**BEARERS FOR FLOOR TRACKS**

**FRONT TRACK**



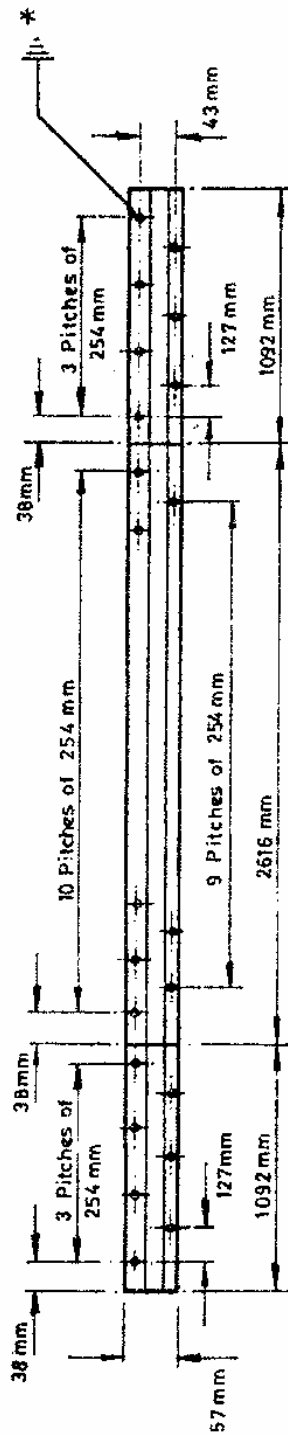
**REAR TRACK**



**STYLOS  
FLOOR MOUNTED  
TUBESTAND**

**REAR TRACK**

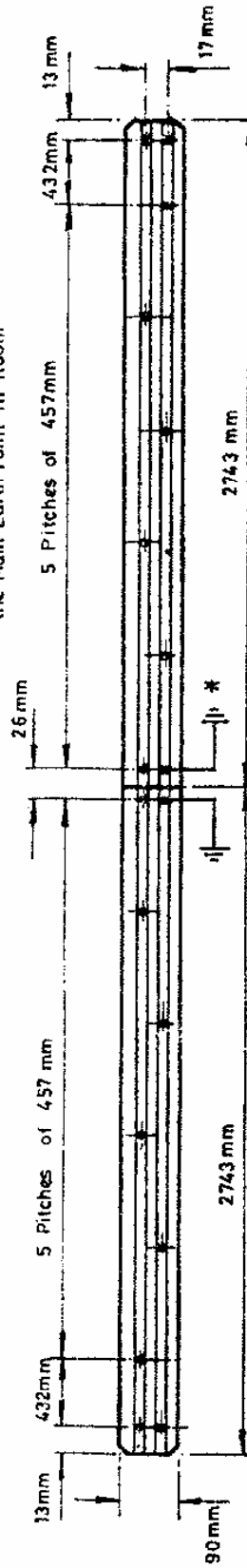
**WEIGHT : 18 kg per 4420 mm length of track**



\* Earth Anchor Points :  
Earth to be returned to  
the Main Earth Point in Room

**FRONT TRACK**

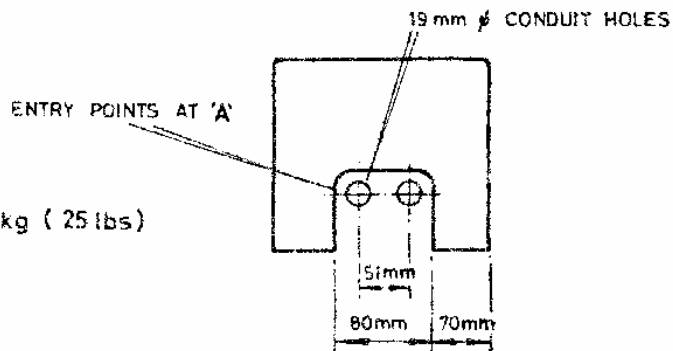
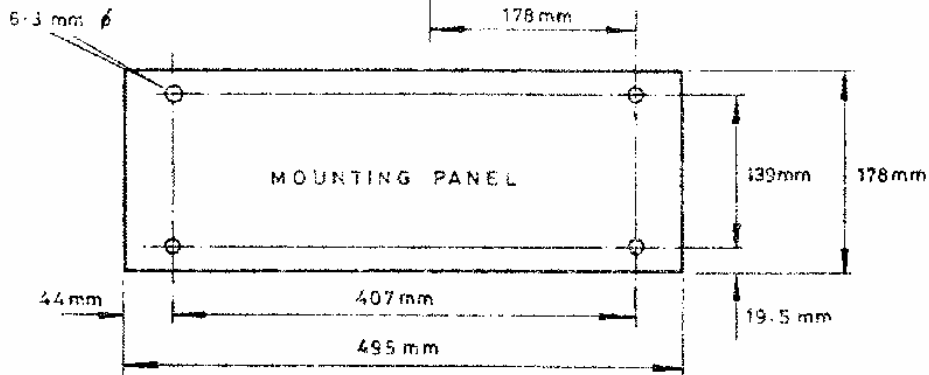
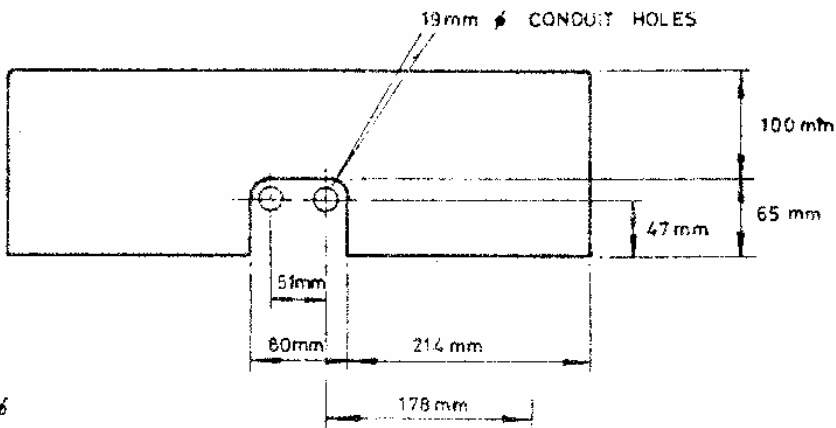
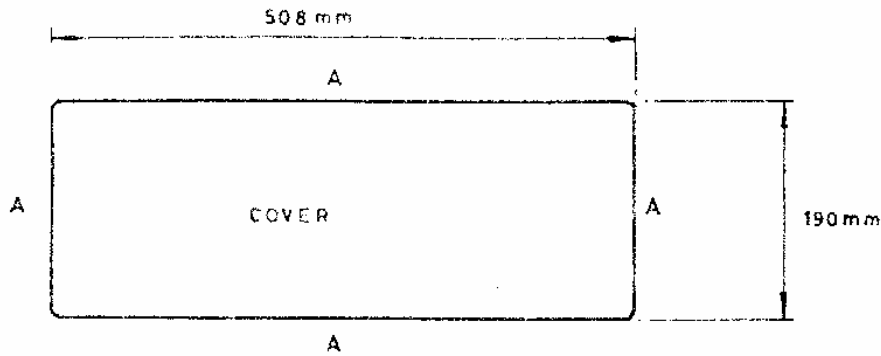
**WEIGHT : 22.7 kg per 5486 mm length of track**



A Floor mounted Stylos must  
have only the surface mounted tracks

Track length may be reduced by cutting on installation

STYLOS  
 POWER SUPPLY BOX  
 (ZU Series)





# STYLOS TUBE STAND with sectograph

## Pre-Installation Instructions

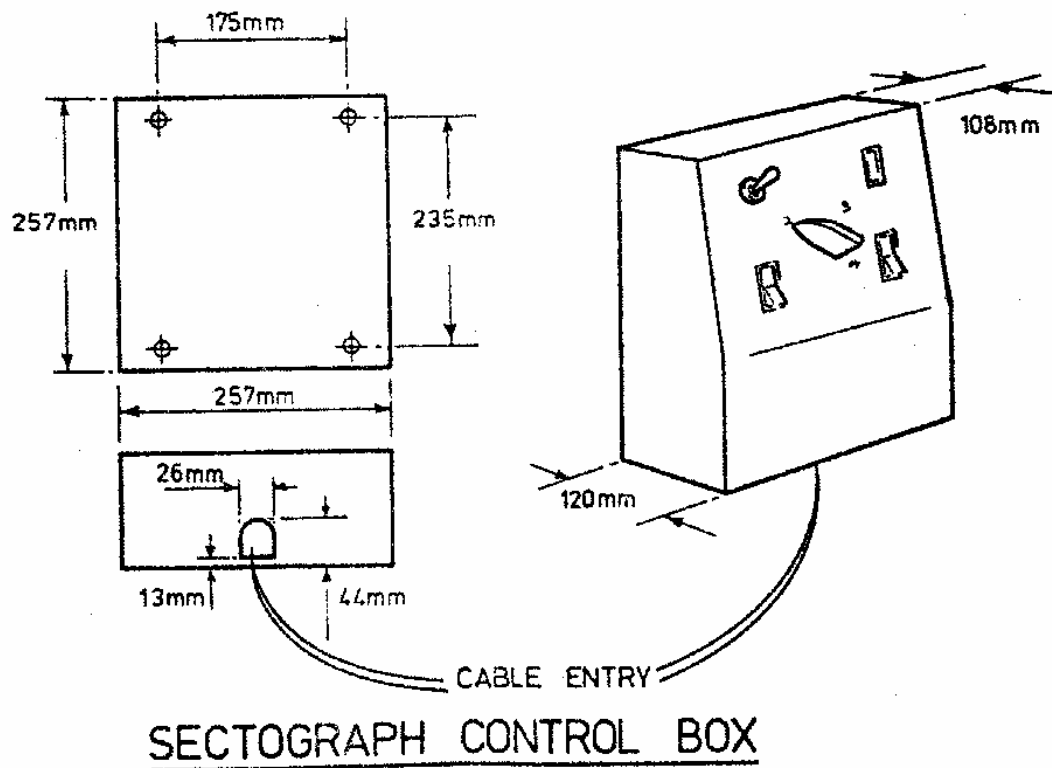
This Schedule gives information for the wiring required when the Sectograph is used with the Stylos tubestand.

All other pre-installation work must be carried out by reference to:-

WS 246-A for Floor-to-Ceiling Stylos

or

WS 246-B for Floor mounted Stylos.



SCHEDULE of WIRING for SECTOGRAPH

The wiring diagram below replaces the wiring shown on the front page of Schedule No WS 246-A and WS 246-B.

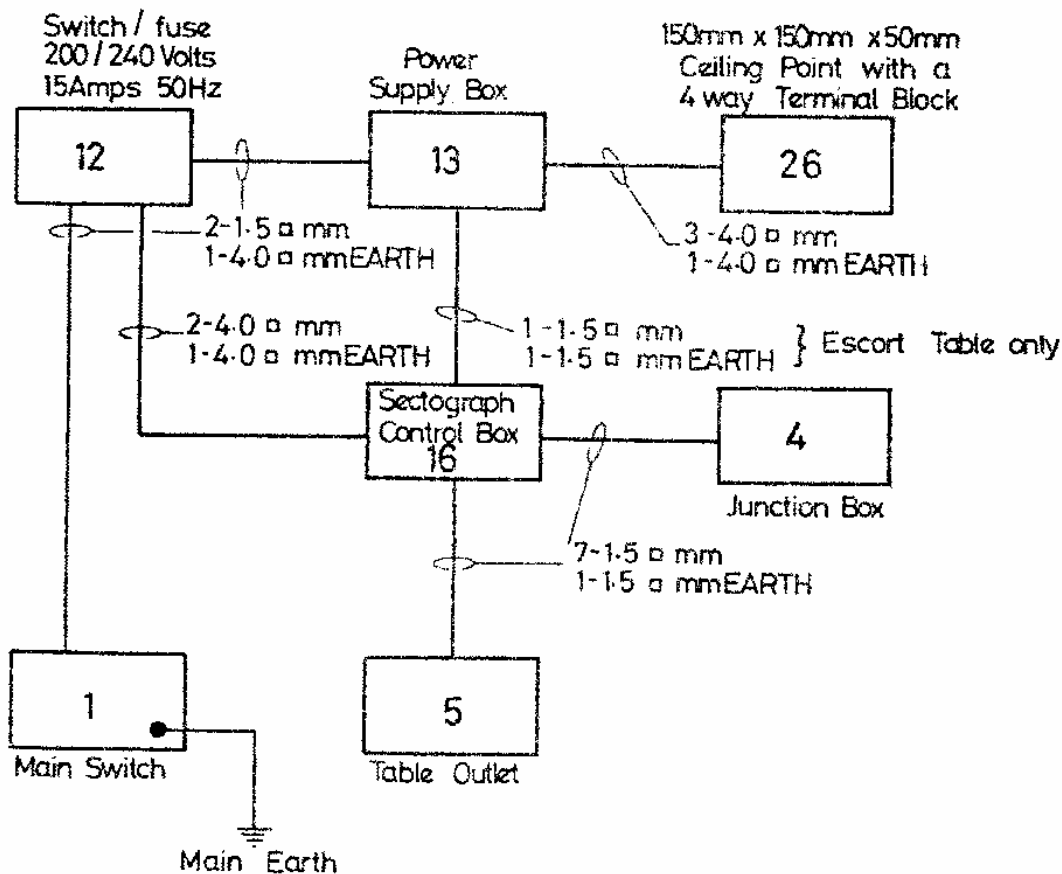
The Sectograph requires a supply of 200/240, 50/60Hz, 15A.

Provide and fit mains supply switch fuse box, trunking or conduit and wiring as shown in the block wiring diagram below.

The switch fuse box (12) for the Sectograph is the same as the switch fuse box nominated for the basic tubestand. (See layout drawing).

Wiring tails of approximately 1 metre must be left at the end of the trunking or conduit for the GEC Installation Engineer to connect the control box (16).

A fixed, engraved label marked 'STYLOS & SECTO' must be supplied and positioned near switch fuse box 12.



Note: Solid conductors are NOT suitable  
Stranded or Flexible cables MUST be used

---

INSTALLATION  
INSTRUCTIONS

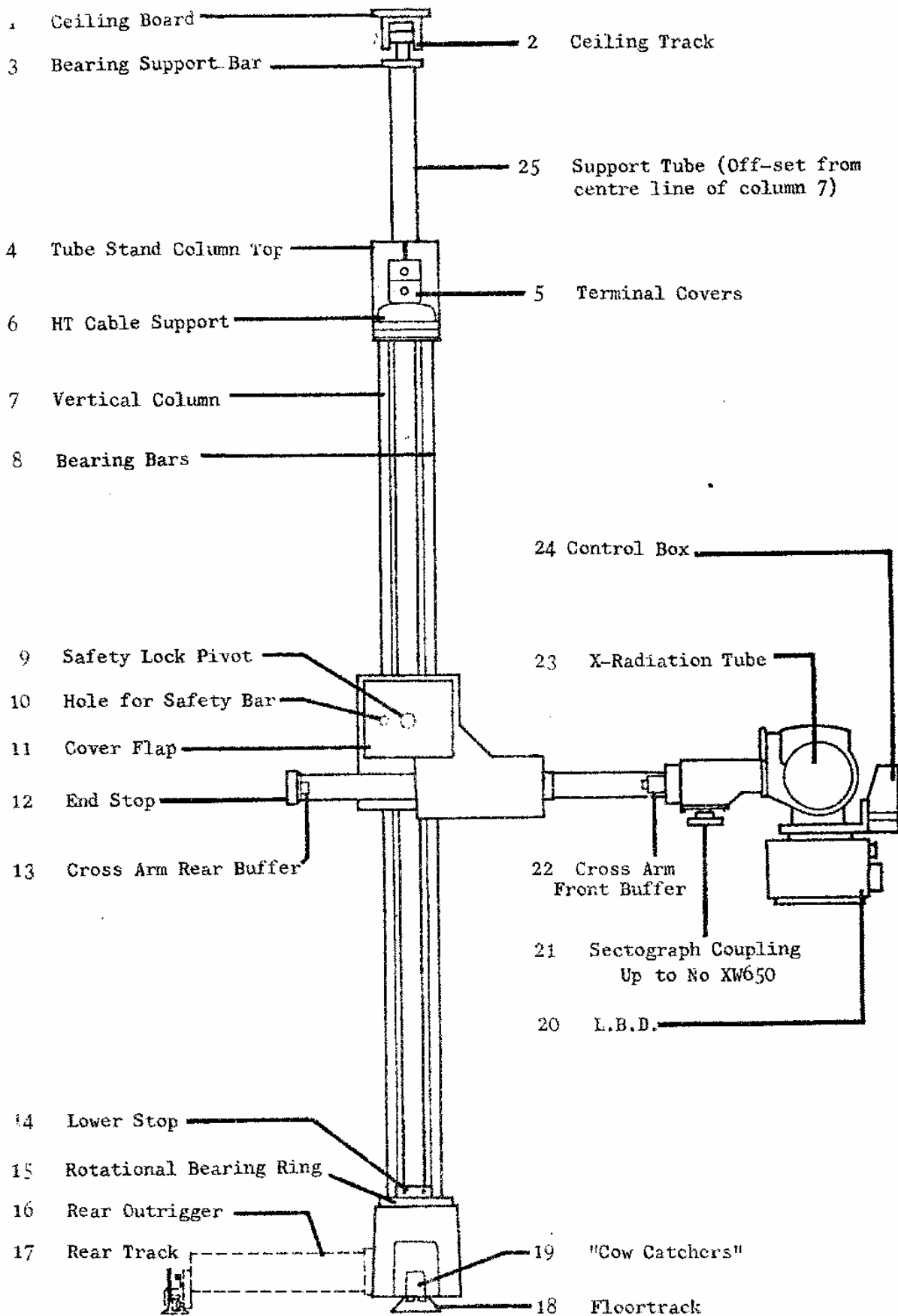


Fig 1 GENERAL ARRANGEMENT OF STYLOS TUBESTAND

#### 4. MECHANICAL ASSEMBLY.

Before attempting to assemble the tubestand read through the whole of the installation instructions and pre-installation instructions.

Refer to the general assembly Fig 1 on the facing page and follow the assembly outline in paragraph A4.1 or B4.1 below depending on the type of tubestand to be installed.

##### A4.1 Floor to Ceiling-Mounted Tubestand Assembly

**IMPORTANT ....** To allow the tubestand to rotate, there must be no obstruction below the ceiling track so that the ceiling bearing support bar (3) and support tube (25) can rotate. This is necessary as the tube (25) is offset from the centre line of the tubestand column.

Fix the floortrack (18) into the previously prepared position in the department.

##### Earthing of Floortrack

Each section of the floortrack must be earthed. Future production parts of the floortrack will incorporate an aluminium bridging strap to interconnect each section of the floortrack.

##### THE BRIDGING STRAPS MUST BE FITTED ONLY TO THE TABLE SIDE OF THE FLOORTRACK

so that the rear side of the track is clear for the Sectograph drive. (When the drive is disengaged, the V-belt rubs lightly on the rear side of the floortrack).

Until earthing straps are provided, each section of the floortrack must be interconnected by an aluminium earthing strap, or alternatively a tinned copper strap, so that there is a complete earth continuity circuit through the length of the floortrack. Copper strapping **MUST** be tinned to prevent electrolytic action at the joints. (The aluminium floortracks are not anodised).

Fit the ceiling track (2) to the ceiling board (1), with the screws and screw cups provided, directly above the floortrack. To prevent lateral movement of the track on the board, drill through the aluminium track into the ceiling board at intervals of approximately 2 ft. and fix a close-fitting wood screw directly through the aluminium into the ceiling board to act as a dowel pin. Where the alternative side-mounting method is used to fix the ceiling track, the track and bracket must be drilled through and HT steel 2BA screws and aero nuts fitted to act as dowel pins also the bracket and mounting should be drilled and pinned in a manner depending on the supporting beam material.

Continue the assembly as detailed in paragraph A4.2 below.

##### A4.2 Column and Ceiling Support Extension

**REMOVE THE BRUSH ASSEMBLY FROM THE BASE CASTING. ENSURE THAT THE BRUSH ASSEMBLY AND WIRING IS NOT DAMAGED.** Measure the height of the ceiling track and cut off the unwanted length of the ceiling extension tube (25). The cut can be made at one of the witness marks at a point below the final fixing point on the bracket.

Fit the ceiling extension tube and bracket to the top of the vertical column, with the ceiling extension tube temporarily fixed in a position lower than its final fixing point, ready for the roller to be engaged in the track after the column is raised.

One of the two methods can be used to assemble the tubestand.

- i) Either; place the base casting on the floortrack with the wheels engaged on the central rail, block up and stabilize the base, and fit the vertical column by carefully lowering it into the base casting.
- ii) Or; place the vertical column on boxes or trestles, carefully fit the base to the column and, holding the base and column together, lift the assembly onto the floortrack.

Raise the ceiling extension tube assembly and engage the roller in the ceiling track and support the assembly until the ceiling extension is fixed.

The exact depth of entry of the ceiling bearing into the ceiling track will depend on the variation in the level of the floor. As the tubestand is moved from one end of the track to the other, the ceiling bearing must not be permitted to come close to the lower edge of the track but the bearing support bar must be clear of the lower edge of the track to permit rotation of the column. The bearing must be positioned in exactly vertical alignment above the column so that, when the column is rotated, the column remains vertical throughout the 360° rotation.

Fit the brushes to the base casting.

When the correct vertical alignment of the ceiling bearing has been achieved and clamping screws on the extension support bracket have been fully tightened, drill and tap a hole in the extension tubing through the hole provided in the extension bracket and fit a cap-headed or other suitable HT steel screw to fix the extension tube. Fit the plastic cap over the lower end of the tube.

Fit and adjust the position of each of the forked 'cowcatchers' (19) so that the fork just clears the floor rail throughout the full movement of the base.

The buffer stop on each end of the main floortrack is fixed. The position of each end stop on the ceiling track must be set to exactly coincide with the stop on the floortrack.

Check the movement of the tubestand assembly throughout the length of the track and also check the rotational movement of the vertical column.

Continue the assembly after referring to paragraph 4.3. page 12.

**B4.1 Floor-Mounted Tubestand Base Assembly**

Fix the floortrack in the previously prepared position.

N.B. .... Up to 400lbs lifting stress is applied to the rear rail.  
Ensure that the fixings are adequate.

**Earthing of Floortrack**

Each section of the floortrack must be earthed. Future production parts of the floortrack will incorporate an aluminium bridging strap to interconnect each section of the floortrack.

**THE BRIDGING STRAPS MUST BE FITTED ONLY TO THE TABLE SIDE OF THE FLOORTRACK**

so that the rear side of the track is clear for the Sectograph drive.  
(When the drive is disengaged, the V-belt rubs lightly on the rear side of the floortrack).

Until earthing straps are provided, each section of the floortrack must be interconnected by an aluminium earthing strap, or alternatively a tinned copper strap, so that there is a complete earth continuity circuit throughout the length of the floortrack. Copper strapping MUST be tinned to prevent electrolytic action at the joints. (The aluminium floortracks are not anodised).

Remove the covers from the outrigger and bearings.

Fit the outrigger extension to the rear of the base casting. Lift the base assembly over the tracks, carefully enter the outrigger into the rear track and lower the base casting onto the main floortrack.

**B.4.2. Column Assembly**

REMOVE THE BRUSH ASSEMBLY FROM THE BASE CASTING and block the base to prevent movement when the column is fitted.

Lift the vertical column assembly into alignment over the base casting and carefully lower the column into the base. Refit the brushes on the base casting.

Refit the covers to the outrigger extension and bearings.

Fit and adjust the position of the forked 'cowcatcher' at each end of the base casting and check the movement of the tubestand assembly throughout the length of the track and also check the rotational movement of the vertical column.

Continue the assembly after referring to paragraph 4.3. On page 13.

#### 4.3 Safety Lock On Vertical Column Carriage

The safety lock is normally held off by the tension (load of the vertical carriage, tube etc.) on the counterweight cable. If the cable breaks, a compression spring tilts a bar pivotted on the pin (9) and the bar wedges in the channel on the vertical column to prevent the carriage running down the column.

IMPORTANT .... Some Stylos Tubestands may be fitted with a temporary security bolt, screw or pin obstructing the safety lock. Any obstruction **MUST** be removed when the Tubestand is installed so that, should the counterweight cable break, the safety lock can operate.

The safety lock is mounted on the vertical column carriage casting and access to the hole is via the compartment for the auxiliary counterweight, under the flap on the side of the casting.

Refer to the sketch below and remove any obstruction in the security hole indicated.

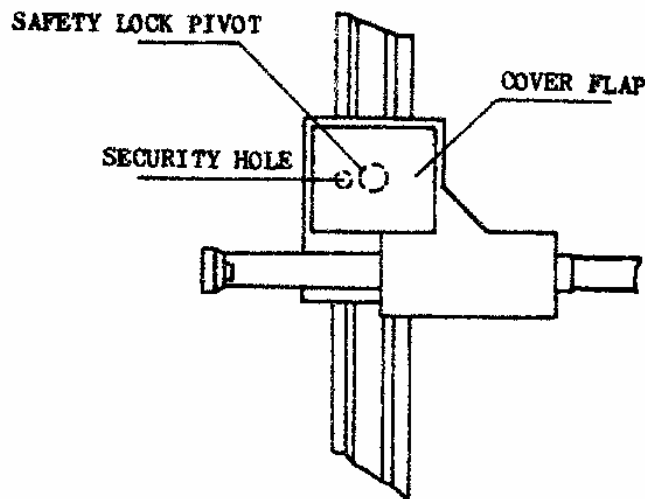


Fig.1A SAFETY LOCK

The safety lock may become wedged on by inadvertant momentary slackening of the cable when the crossarm carriage hits the top stop on the column.

To free a wedged safety lock, where the counterweight cable is intact, apply tension to the cable by hand and, holding the carriage under control, allow the carriage to rise slightly; free the lock and gradually release the counterweight cable so that only the counterpoise spring applies tension to the cable - maintain control over the carriage to prevent re-engagement of the safety lock.

An alternative method of freeing the safety lock is by partially releasing the compression spring. Remove the cover plate from the top of the carriage and whilst supporting or controlling the carriage assembly, gradually unscrew the two  $\frac{1}{4}$  inch BSF hex. headed screws holding the cap-plate of the compression spring. The lock bar can then be levered free and the cap-plate re-fixed --- ensure that the screws are tight.



#### 4.4 Crossarm

Pull down the vertical column carriage and secure it at a height suitable for easy assembly of the crossarm. Ensure that the rope securing the carriage is sound and cannot be damaged at point where it passes over sharp edges.

On tubestands up to Serial No XW550, the crossarm rotational brake is free only when the brake coil is energised. DO NOT USE FORCE, to rotate the X-ray tube holder on the crossarm — wait until the brake is energised.

On tubestands from Serial No XW551 onwards the crossarm rotational brake is free until energised.

With the front buffer (22) on the left hand side of the crossarm when facing the tubestand carriage and the crossarm directly in line with the bearings in the crossarm carriage, carefully enter the crossarm into the bearings. N.B. ... The crossarm MUST be correctly aligned with the bearings. If the crossarm is raised, lowered or moved to one side or the other when the crossarm is entered into the front bearings, the bearings can be damaged. Connect the supply cable for the crossarm brake and fit the end stop (12) and rear buffer (13). Check the crossarm front-to-rear movement but not the rotational movement on units up to Serial No XW550.

If required, the crossarm movement can be restricted in a rearward direction by fixing the front buffer (22) at the alternative fixing point, where two threaded holes are provided.

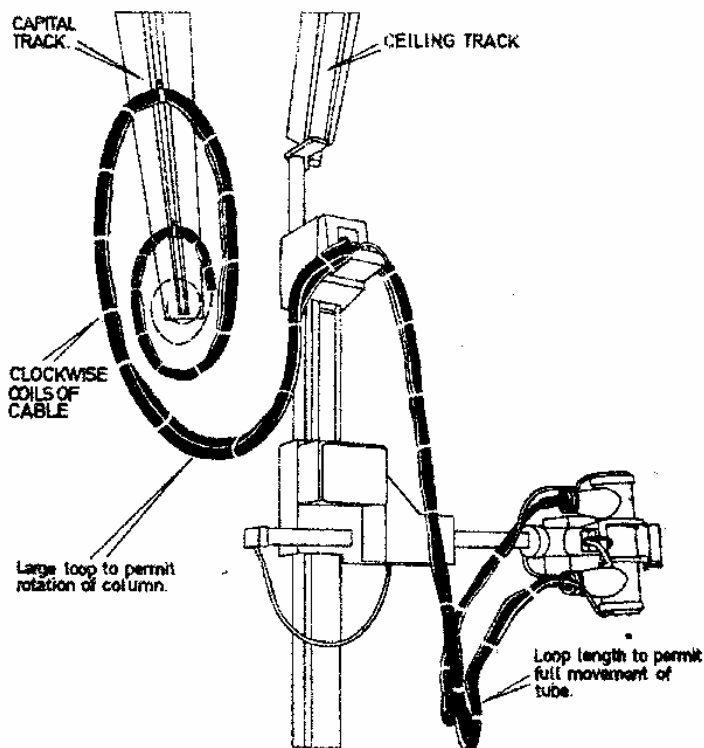


Fig 2. HT CABLE LAYOUT USING CAPITAL CEILING TRACK

#### 4.5 X-radiation Tube. HV and Brake Supply Cables

Fit the X-radiation tube to the holder.

Refer to the installation instructions supplied with the associated X-radiation generator for treatment of the HV cable plug and X-radiation tube socket electrical connections.

Where Capital tracking is used to support the HV cable, the cable run should be arranged as illustration Fig 2 above.

Note that all other connecting cables for the brakes, LBD and Sectograph drive motors are secured to the HV cable run, and the loops of cable must be of sufficient length to permit the full range of movement of the tube-stand.

Connect the brake supply plug to the cap in the tube holder casting and fit the cover plate attached to the lead.

#### 4.6 Switch Box

When the light beam diaphragm is not supplied, fit the switch box to the X-radiation port platform with the  $\frac{1}{4}$  inch WHIT x  $\frac{1}{2}$  inch long ch. hd. screws and Grover washers supplied. Any additional components can be fixed to the adaptor plate. Ensure that the screws do not "bottom" in the threaded holes.

Connect the switch cable cap to the socket in the tube holder casting and fit cover attached to the lead.

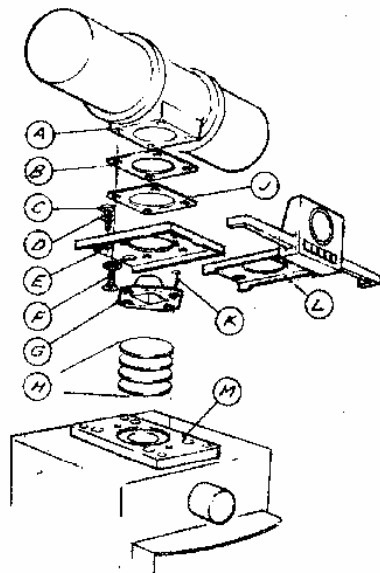


Fig 3. FITTING DEMARCATOR TO X-RAY TUBE

4.7 Preparation of LBD for Installations Refer to Fig 3.

Remove four mounting screws (C) and washers (D). Take off mounting plate (E) complete with packing plates.

Remove four countersunk screws (K) and lift off the cone (G).  
Remove all Aluminium discs (H).

Refer to List below and refit the number of discs (H) required by the DOH to provide a total filtration of not less than 2.0mm Al equivalent, depending on the X-ray tube type in use. Alternatively, refit the number of discs to provide total filtration required by the department.

Refit the cone (G).

Set indicator on LBD body depending on number of filters fitted.

LIST 1 (Inherent filtration of Demarcator, approx 0.8mm Al)

| <u>X-ray Tube Type</u> | <u>Approx Inherent Filtration</u> | <u>Additional Filters for DOH</u> | <u>Approx. Total Filtration</u> |
|------------------------|-----------------------------------|-----------------------------------|---------------------------------|
| DX25                   | 0.5                               | 1                                 | 2.3                             |
| DXHD25                 | 0.4                               | 1                                 | 2.2                             |
| DX40                   | 0.7                               | 0.5                               | 2.0                             |
| DXHD40                 | 0.4                               | 1                                 | 2.2                             |
| DX43                   | 0.7                               | 0.5                               | 2.0                             |
| DX48                   | 0.7                               | 0.5                               | 2.0                             |
| DX50                   | 1.0                               | 0.5                               | 2.3                             |
| DXHD50                 | 0.7                               | 0.5                               | 2.0                             |
| DXS 50                 | 1.0                               | 0.5                               | 2.3                             |
| DXHD51                 | 0.7                               | 0.5                               | 2.0                             |

4.8 Fixing Demarcator to X-ray Tube Port Platform

Where a combined LBD and switch mounting plate [the same or similar to (L)] is used on the tubestand, discard the plate (E) supplied with the LBD and use the combined mounting plate (L).

Refer to List 2 below for the number of packing plates (B) and (J) to be fitted between the mounting plate and the X-ray tube port platform.

LIST 2

| Machlett<br>X-ray<br>Tube | Focal Spot<br>Position |      | Packing<br>Plates<br>Required |
|---------------------------|------------------------|------|-------------------------------|
|                           | min                    | mm   |                               |
| DX20                      | 2.1/16                 | 52.4 | 2                             |
| DX25                      | 2.1/16                 | 52.4 | 2                             |
| DXHD25                    | 2.1/16                 | 52.4 | 2                             |
| DX40                      | 2.1/16                 | 52.4 | 2                             |
| DXHD40                    | 2.1/16                 | 52.4 | 2                             |
| DX43                      | 2.1/16                 | 52.4 | 2                             |
| DX48                      | 2                      | 50   | 2                             |
| DX50                      | 2.3/16                 | 55.6 | 1                             |
| DXHD50                    | 2.3/16                 | 55.6 | 1                             |
| DXS50                     | 2.3/16                 | 55.6 | 1                             |
| DXHD51                    | 2.3/16                 | 55.6 | 1                             |
| DXS50-60                  | 2.3/16                 | 55.6 | 1                             |
| DXS50-61                  | 2.3/16                 | 55.6 | 1                             |
| DX125                     | 2.3/16                 | 55.6 | 1                             |
| DX150                     | 2.3/16                 | 55.6 | 1                             |

**IMPORTANT**

Ensure that screws do not "bottom" in threaded holes.

Use both plates and  $\frac{3}{4}$  inch long screws.

Discard one packing plate and use  $\frac{1}{2}$  in long screws.

Fit the LBD to the mounting plate and connect the supply.

4.9 Power Supply Box for Brakes

Fix the power supply box to the wall if this has not already been fitted by the electrical engineering contractor on pre-installation work. The brake transformer supplies only the tubestand; the table supply must not be used as an alternative.

4.10 Sectograph 1, 2 or 3 Control Box and Drive Motor

Refer to the separate Installation Instruction No 1410 Issue 4 supplied with the Sectograph apparatus.

The circuit diagrams for the Sectographs and control unit are in the Service Notes section of this instruction.

4.11 Counterbalancing

No adjustment to the counterpoise spring should be necessary as the spring has been set to counterbalance the heaviest normal weight of a DX Super 50 tube and LBD.

After the X-ray tube, cables and LBD have been fitted, adjust the counterbalancing by adding lead weights to the interior of the crossarm support casting.

Note that the blue painted auxiliary counterweight is fitted into the crossarm carriage to maintain balance only when a slide-in type LBD has been removed from the tube mounting. Where the LBD is a permanent fixture, the blue painted counterweight should be retained in the X-ray department for subsequent use if a slide-in adaptor is fitted to the LBD at a later date.

Remove the cover plate from inside the crossarm support casting and set the counterbalancing by reference to the table below when using the standard tube holder supplied. Additional counterweight lead sheet can be fitted inside the crossarm but do not damage the crossarm brake supply cable.

| <u>X-radiation<br/>Tube Type</u> | <u>Weights used<br/>in carriage</u>           |
|----------------------------------|---|
| DX 25<br>or<br>DX 40             | 2 weights of 6lb each and<br>1 weight of 2 lb |
| DX 50                            | 1 weight of 6 lb<br>1 weight of 2 lb          |
| DX Super 50                      | No weights required.                          |

## 5. ELECTRICAL CONNECTIONS

### 5.1 Basic Tubestand. Refer to Dia Inst 3230 Sheet 1 and 2.

The 50ft. length of brake and LBD cable must be secured to the HV cables. See Fig 2 Page 15.

Note that where a Sectograph and motor drive is used an additional cable also must be secured to the HV cables.

Connect the cables according to the colours shown on Dia Inst 3230. Note that two sets of leads are used for the LBD supply and that one side of the lamp is earthed to the body of the LBD. Ensure that the LBD supply transformer is earthed on the same side of the circuit as the LBD lamp. Cut off unwanted cable.

If a Demarcator LBD is not used, remove the short lead from the side of the tube mounting casting and fit a blanking plug. Alternatively, cut off the short rubber extension and retain the grommet as a plug.

### 5.2 Sectograph 1, 2 or 3 Control and Motor Drive

For installation of the Sectograph 1, 2 or 3 and the control and drive motor, refer to the separate Installation Instruction No. 1410 Issue 4 supplied with each set of components.

**IMPORTANT ....** Note that there is not earth continuity conductor in the multicore cable interconnecting the control box and tubestand. The tubestand must be earthed via the brake and LBD supply cable and the control box must be earthed via a separate conductor to the mains supply switch casting.

## 6. FINAL TEST AND ADJUSTMENTS

### 6.1 Fixing Scales

The self-adhesive backing is very efficient and with even only light contact, it is difficult to reposition the scale. The scale must therefore be correctly positioned on the first attempt.

Before removing the cover strip from the adhesive backing on the scales, locate and temporarily mark the position of the scales on the vertical column. Carefully remove the cover strip and fix the scale.

The crossarm scale is fixed by the adhesive backing. The front edge of the crossarm support casting is used as a reference for the scale.

Fit and adjust the short-axis scale of the X-radiation tube.

### 6.2 Mechanical Tests and Electrical Adjustments

Check and/or connect the input to the brake supply box. .

SWITCH ON THE POWER SUPPLY BEFORE ATTEMPTING TO ROTATE THE  
TUBE HOLDER ON THE CROSSARM on tubestands up to Serial  
No XW550.

Check the mechanical movement of the tubestand throughout the full range of movement on track, vertical column carriage, crossarm, and X-radiation tube movements.

The tapping on the LBD transformer may require adjustment  
--- the voltage at the LBD bulb must be 10 volts ON-load.

Check that the light and X-radiation beams are correctly aligned.

Check that each brake operates correctly over the full range of movement.

Where fitted, check that the centring light operates when the tube is positioned in vertical alignment over the centre line of the table top.

### 6.3 Sectograph

Details of the adjustments and tests for the Sectograph 1, 2 or 3 and the motor drive are given in the separate installation instruction.

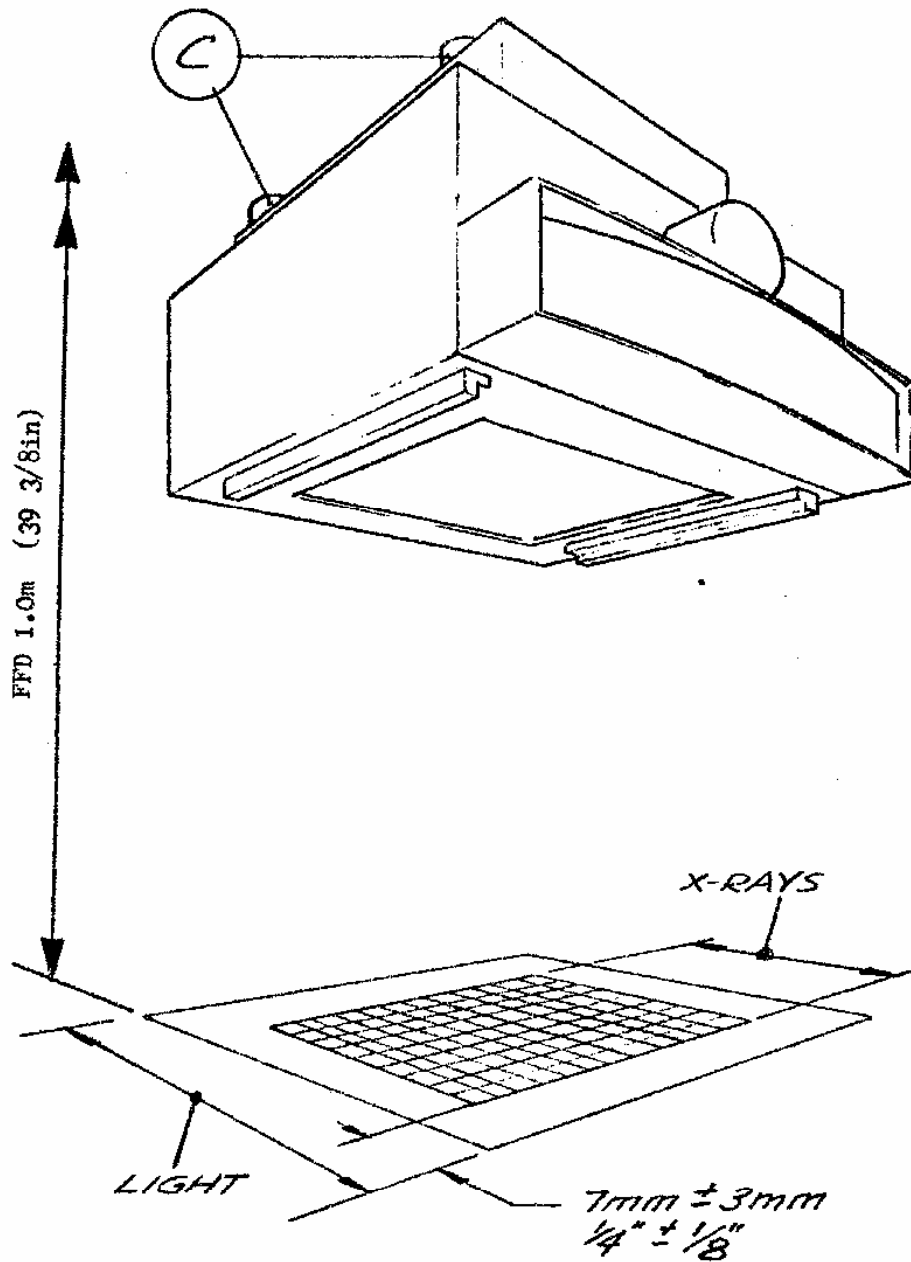


Fig 4. LBD X-RAY & LIGHT COVERAGE

6.4 Alignment of X-ray and Light beam Refer to Fig4.

FULL PRECAUTIONS MUST BE TAKEN TO GUARD AGAINST EXPOSURE TO X-RADIATION.

The X-ray beam should be approximately  $7\text{mm} \pm 3\text{mm}$  ( $1/4 \text{ inch} \pm 1/8\text{inch}$ ) inside the light area. Tighten screws (C) before each check when adjusting the LED.

### 6.5 Centering Lamp

Before fitting the 4BA screw, as the actuator for the centering micro switch the LBD must be adjusted.

The tube and LBD must be at 0 degrees tilt on the longitudinal axis.

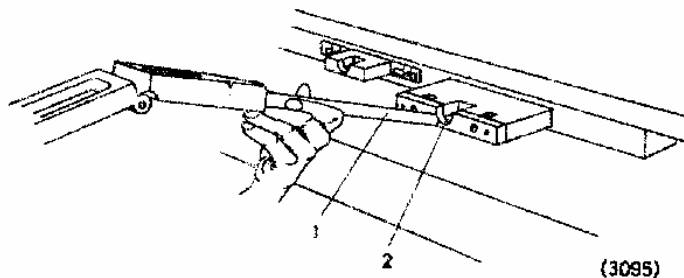
The micro switch is above the crossarm on the inside of the crossarm carriage.

**IMPORTANT ....** There is no adjustment for the micro-switch, therefore the screw must be positioned accurately.

With the LBD over the centre line of the table top make a mark on the top face of the crossarm level with the rear cover. The crossarm must be withdrawn from over the table top and a hole drilled, with a No 32 drill,  $6 \frac{1}{16}$  inches from the mark previously made. This hole must be central in the width of the crossarm. Tap the hole 4BA and fit the round headed screw provided. Check that the alignment indicator is ON when the LBD is correctly centered over the table.

### 6.6 Adjusting Bucky Coupling

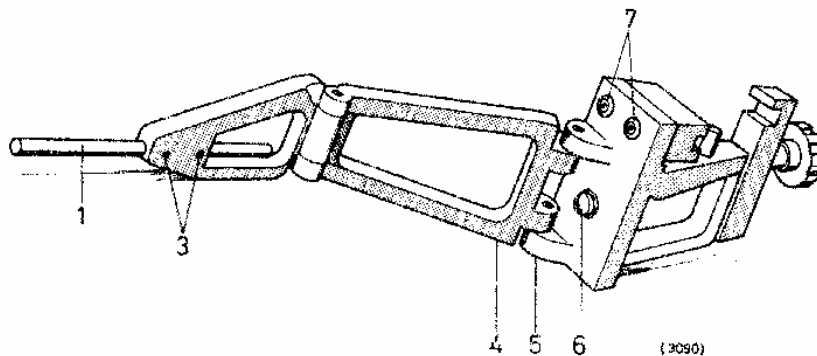
Clamp the coupling to the bearing bars on the side of the tube column, about 750cm (30in) from the floor level. The round bar (1) must fit into the slot (2) in the bracket at the centre-rear of the Bucky, as illustrated below, so that the Bucky centre and X-ray tube are in line.



Adjust the length of the bar (1) by the two grub screws (3). Shorten bar (1) if necessary. Ensure that the two grub screws (3) are tight.

Adjust setting of stop screw (6). If necessary file away part of bracket (5) and/or the lower edge of arm at point (4).

Adjust alignment of X-ray tube and Bucky by screws (7). Ensure that tube and tube angulation scales are positioned correctly, and that the adjustment screws (7) are tight.





# STYLOS

## SERVICE NOTES

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## 7. EARTHING and NOTIFICATION of CHANGES.

### 7.1 Earthing of Floortrack

Each section of the floortrack must be earthed. The floortrack will incorporate an aluminium bridging strap to interconnect each section of the floortrack.

THE BRIDGING STRAPS MUST BE FITTED ONLY TO THE TABLE SIDE OF THE FLOORTRACK so that the rear side of the track is clear for the Sectograph drive. (When the drive is disengaged, the V-belt rubs lightly on the rear side of the floortrack.)

If earthing straps are not provided, each section of the floortrack must be interconnected by an aluminium earthing strap, or alternatively a tinned copper strap, so that there is a complete earth continuity circuit throughout the length of the floortrack. Copper strapping MUST be tinned to prevent electrolytic action at the joints. (The aluminium floortracks are not anodised).

### 7.2 General Earthing

ALL exposed metallic parts must be earthed. See pre-installation Instructions General Requirements.

### 7.3 Ceiling Support Tube Fixing

1970 production models will have a hole drilled in the support casting for the ceiling support tube so that a 2 BA screw can be fitted to lock the tube in the casting after the clamp fixing has been tightened.

The hole in the casting is 0.328 inches in diameter (21/64in). The hole is clearance size for the head of a 2BA socket headed cap screw. Spot through the hole in the casting using a 21/64in drill. Drill through the support tube using a 0.147 in (No 26 drill), and tap 2BA thread. Fit the 2BA screw supplied so that the head rests close against the support tube inside the support casting.

If a tube is not locked, fit suitable screw, by drilling and tapping on early models, during a maintenance visit.

### 7.4 Power Supply Unit Boxes

The original Stylos brake PSU box required a separate transformer for the LBD (see Dia Inst 2806A). This box has been replaced by a module box, size 508mm x 190mm x 165mm (20inches x 7½inches x 6½inches). The brake transformer has tappings for the LBD supply. (See Dia Inst 3225).

### 7.5 Crossarm Rotational Brake

On tubestands up to Serial No XW550 the crossarm rotational brake will be free only when energised (see Dia Inst 2806A or 3225 for circuit and pages 36 and 37 for service adjustments).

On tubestands from Serial No XW551 onwards a different brake will be fitted and will be ON when energised (see Dia Inst 3230 for circuit and pages 38 and 39 for service adjustments).

## 7.6 Summary of Changes of Circuits for Servicing Information

Dia Inst 2806A shows original Stylos brake of LBD circuit. Original and later type motor brake for Sectograph drive is also shown.

Details of the motor brake are given in Dia Inst 3212, Sheets 1 and 2.

Dia Inst 2806B shows original circuit of control box for Sectograph. A link is required between the two terminals marked "123".

The box is for use with 230V AC brake on drive motor for the Sectograph.

Dia Inst 2806B1 Minor circuit change in control box to eliminate link for line 123.

Dia Inst 2806B2 Change in control circuit for brake supply on Sectograph drive motor. 12V DC motor brake fitted in place of unobtainable 230V AC brake. See Dia Inst 3212 Sheets 1 and 2 for identification of brake and differences in wiring and supply.

There is no change in the drive motor type.

Dia Inst 2806B3 Sheet 1 gives notes on serial numbers. Sheets 2 and 3 show the circuit for the Stylos tubestand from Serial No XW651 and MDU Serial No ZP341.

Dia Inst 2806C has been changed to four sheets and brought up to date to include references to terminals on plugs and sockets of Escort Series 2, Carlton, Congress, Olympic and Sparta Tables and show the difference between the Sectograph 2 and 3.

Dia Inst 2843 Issue 2 has added references for interconnection of X-ray control and Stylos motor drive for Sectograph.

Dia Inst 3212 shows wiring and identification of the two types of motor brake.

The 220/220V AC series connected drive motor is used on a DC supply circuit to provide a high starting torque. Only the brake type has changed.

Motors with different brake are not directly interchangeable. If a different brake is used, the control box circuit must be changed and the connections at the top of the tubestand column must be changed. Details are given on sheet 1 and 2 of Dia Inst 3212.

## 8. SPARE PARTS LISTS.

IMPORTANT .... When requesting spare parts, always quote the full description and part No. of the item.  
For items not listed give the fullest description, including a rough sketch if possible.

### 8.1 Parts List for Basic Stylos Tubestand.

| <u>Symbol</u> | <u>Description</u>   | <u>Part No.</u>    |
|---------------|--|--------------------|
| FB            | Magnetic brake (XB41162) for base.   | BS1203             |
| HB            | Magnetic brake (XB41162) for crossarm travers  | BS1203             |
| RB            | Magnetic brake for X-ray tube rotation on crossarm:-<br>for tubestands up to Serial No XW650<br>for tubestands from Serial No XW651  | XB37044<br>XB37110 |
| VB            | Magnetic brake (XB41162) for vertical carriage   | BS1203             |
|               | Single pole unbiased change-over switch (X560-917) for control box.  | SS1848             |
|               | Single pole biased change-over switch (X560-919) for control box.  | SS1866             |
| S1 S2         | Micro switch (V4T7-ZV4A1) (X551-220) for Sectograph coupling for Stylos tubestands up to Serial No XW650. (On tubestands NoXW651 onwards a relay is used; for part No see Sectograph 3). | SS1838             |
|               | Roller for ceiling track comprising standard ballrace (X810-914) and mould tyre (XB60979).   | TS1376             |
|               | Plastic cap (XB60972) for ceiling extension tube   | PS1388             |
|               | Ballrace BRE 3/8 x 7/8 x 7/32 inch (X810-204) for outrigger used on floor mounted tubestands only.   | BS1235             |
|               | Ballrace LJ8DD 8 x 22 x 7mm (X810-911) for crossarm  | BS1268             |
|               | Ballrace LDJ15 15 x 35 x 14mm (X810-915) for carriage  | BS1272             |
|               | Ballrace LJ12DD 12 x 32 x 10mm (X810-937) for crossarm   | BS1307             |
|               | Bearing wheel LDJ15 15 x 35 x 14mm (X810-915) for base   | BS1272             |

Counterweight cables:- spring cable XA60924  
carriage cable XA76306  
CS1968

IMPORTANT .... When one cable becomes faulty ALWAYS replace BOTH cables.

6 core 23/0076 or equivalent metric cable, grey PVC covered (1343-926) for brake and LBD supply (State length required).  
CS1507

Single core 40/0076 (1343-2602) or equivalent metric cable for floor brake supply.  
CS1961

## 8.2 Sectograph 1.

|   |        |
|---|--------|
| Micro switch BRL (2off)   | SS1063 |
| Ratchet for above switches XA23024  | RS1425 |
| 6core 23/0076 or metric equivalent cable, grey PVC cover (State length required)  | CS1507 |
| 6 pole Cannon EPCG-6-16 type plug connector   | CS1848 |
| 6 pole Cannon EP-6-13 type socket connector   | CS1849 |
| Single core 40/0076 (1343-2602) or equivalent metric cable for floor brake supply   | CS1961 |
| 8 core 14/0076 or equivalent metric cable grey PVC covered (1343-921) for supply down column to drive motor (10 1/2 feet required).     | CS1624 |
| 8 core 14/0076 or equivalent metric cable grey PVC covered (1343-921) for Sectograph, Tubestand to Control box. (State length required) | CS1624 |

## 8.3 Sectograph 2.

|  |         |
|--|---------|
| S7 Open bladed micro switch S.P.C.O. Non biased (X556-002) for directional trip  |         |
| S15 V3 microswitch (X551-201) for exposure circuit   | SS1308  |
| S20 Open bladed microswitch SP. ON/OFF. Biased ON  |         |
| S21 (X553-004) for limit control.  | SS1734  |
| 6 pole Cannon EPCG-6-16 type plug connector  | CS1848  |
| 6 pole Cannon EP-6-13 socket   | CS1849  |
| Single core 40/0076 (1343-2602) or equivalent metric cable for floor brake supply  | CS1961  |
| 8 core 14/0076 (1343-921) or equivalent metric cable grey for supply down column to drive motor (10 1/2 ft required)       | CS1624  |
| 8 core 14/0076 (1343-921) or equivalent metric cable grey for Sectograph, Tubestand to Control Box. State length required. | CS 1624 |

## 8.4 Sectograph 3

S7, S15 and S20, S21 are the same as on Sectograph 2 above. The cable and connectors are different and there is an additional relay; see below. (The centre switch S307 is not used with the Stylos drive).

|   |          |
|---|----------|
| 12 core cable 12/7/0076 Grey cable (1343-746) | CS-2163  |
| 12 pole cable connected end entry plug male   | X422-321 |
| 12 pole panel mounted socket female           | X422-322 |
| BR Sectograph coupling relay                  | X510-962 |

### 8.5 MOTOR DRIVE and CONTROL BOX.

Refer to Diagram INST. 2806B, 2806B1, B2 or B3.

| <u>SYMBOL</u> | <u>DESCRIPTION</u>  | <u>STOCK No</u> |
|---------------|---|-----------------|
| MR1           | Rectifier Type PJ. 16.BA (X314-104)   | RS 1826         |
| DR            | Drive Relay 590 Series Spec 5808 (X511-124)                                 | RS 1730         |
| EX            | Exposure Relay (used with Sectograph 1 only)<br>590 Series Relay (X511-111) | RS 1451         |
| FS 1          | Supply Fuse 5 amp moulded type (X572-005)                                   | FS 1052         |
| S 3           | Mains ON Rocker Switch, 2 position (X531-029)                               | SS 1862         |
| S 5           | Biased Test Switch (X531-030)   | SS 1863         |
| S 4           | Direction Toggle Switch, 2 position (X531-028)                              | SS 1864         |
| S 2           | Speed Control Switch, Rotary, 4 position (X531-101)                         | SS 1865         |
|               | Knob for S2 Rotary Switch (X930-322)  | PS 1390         |
| LP            | Mains ON Indicator Neon (X350-935)  | LS 1158         |
| W 4           | Mains Auto transformer, NS4 type (X630-143)                                 | TS 1375         |
|               | 'V' belt (X890-169)   | BS 1324         |

Motor assembly complete with electro machanic brake  
for Stylos tubestand drive.

#### IMPORTANT CHANGE IN BRAKE OPERATING VOLTAGE

Up to MDU Serial No XY245 a 230V AC brake is used.

From MDU Serial No ZP246 and onwards a 12V DC brake is used.

For differences in wiring of MDU control box and Stylos Tube stand refer  
to Dia Inst 3212 sheet 1 and 2 which is issued with each replacement motor.

Motor assembly with 230V AC brake MS1226

Motor assembly with 12V DC brake MS1239

When MS1226 is out of stock, MS1239 will be supplied in lieu and  
modification instruction on Dia Inst 3212 MUST be followed.

## 9. COUNTERWEIGHT CABLES

### 9.1 Maintenance Checks of Cables

When checking counterweight cables for fraying, wrap a piece of cloth around the cable and frayed ends will be felt as the cloth is caught. DO NOT USE BARE HANDS.

The spring cable inside the column can be checked through the top of the tubestand.

**IMPORTANT ....** When one cable has become worn or damaged, **BOTH CABLES MUST BE REPLACED.**

Read through all of Section 9.2 before starting work

Parts required, counterweight cables (Spring and Carriage)  
Part No CS 1468.

### 9.2 Replacing Counterweight Cables

A 1/4 inch diameter bar or screwdriver can be used to hold-off the safety lock on the vertical column carriage to prevent damage to the paintwork when tension on the counterweight cables has been relieved. The hold-off bar fits into the security hole indicated on Fig 7 below.

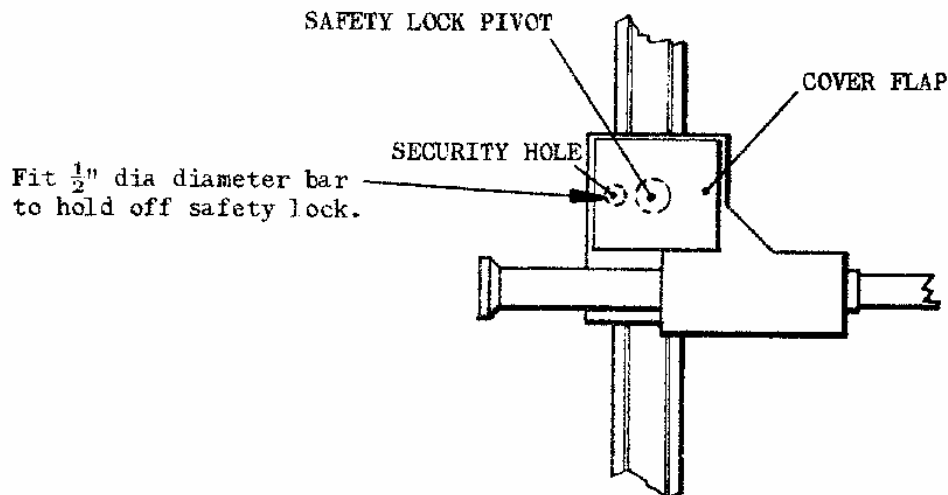


Fig 7 - SAFETY LOCK

Because the column must be separated from the base, REMOVE THE BRUSHES AND ENSURE THAT NEITHER THE BRUSHES NOR SLIPRINGS ARE DAMAGED.

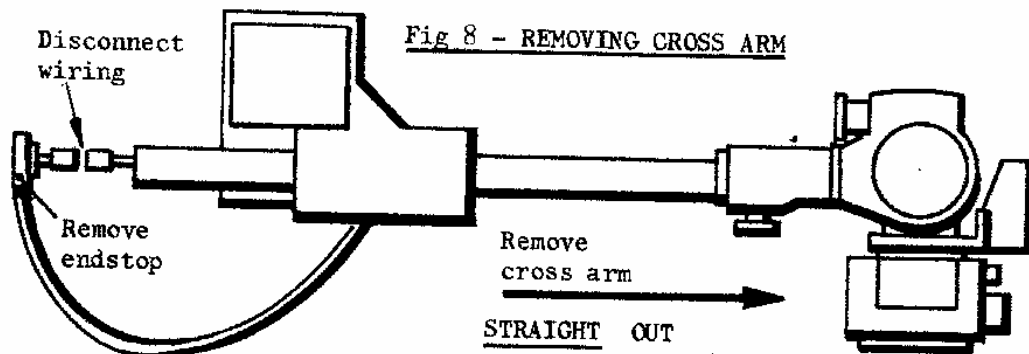
The tubestand must be dismantled so that the inner spring-cable can be replaced. Prepare boxes or trestles on which to lay the vertical column and crossarm assembly. Separate the HT and other cables from the tubestand without disturbing the connections if possible.

SECURELY tie-down the crossarm carriage.

Remove endstop and withdraw the crossarm STRAIGHT OUT complete with



tube and cables, ENSURING THAT CORRECT ALIGNMENT IS MAINTAINED so that the bearings will not be damaged; see Fig 8 below.



Remove the bearing cover plate from the top of the carriage.

Carefully allow the crossarm carriage to rise to the top of the vertical column.

The method of lowering the tubestand will be dependant on local conditions. In general, the tubestand may be lifted off the tracks as a complete assembly or stripped in reverse order to the assembly instructions given in the installation section of this manual.

**IMPORTANT .... DO NOT damage the sliprings on the column of the brushes in the base.**

With the carriage at top of the vertical column, note the number of turns and the arrangement of the counterweight cable on the drums.

Release the tension on the counterpoise spring by anticlockwise rotation of the hexagonal headed screw at the bottom of the column. Count the number of turns of the screw so that the spring can be reset to the same tension.

Release the spring cable from the drum and withdraw the assembly from the bottom of the column. Replace the cable, refit the assembly into the column and fix the cable to the drum in the arrangement previously noted. **ENSURE THAT THE COLLAR RETAINING THE COUNTERWEIGHT CABLE IS FIRMLY REFIXED.**

Reassemble the tubestand taking care that temporary fixings or rope lashings are secure, that no bearings, cables, etc. are damaged, and that there is no injury to personnel.

After assembly, remove the pin or screwdriver from the safety lock, and clear away all temporary fixings or rope lashings.

A slight difference in the length of either cable could change the counterpoise action. Correct any imbalance by adjusting the spring tension.

Make a complete check of all mechanical movements and electrical operations of the tubestand and the associated apparatus.

10. REPAIRS to SECTOGRAPH 2 and 3 SWITCH MECHANISM BOXES.

The Sectograph 2 switch box must be dismantled as detailed in paragraph 10.1 below to gain access to the switches. The Sectograph 2 is used on Stylos tubestands up to Serial No XW650 with Motor Drive Unit up to Serial No ZP340.

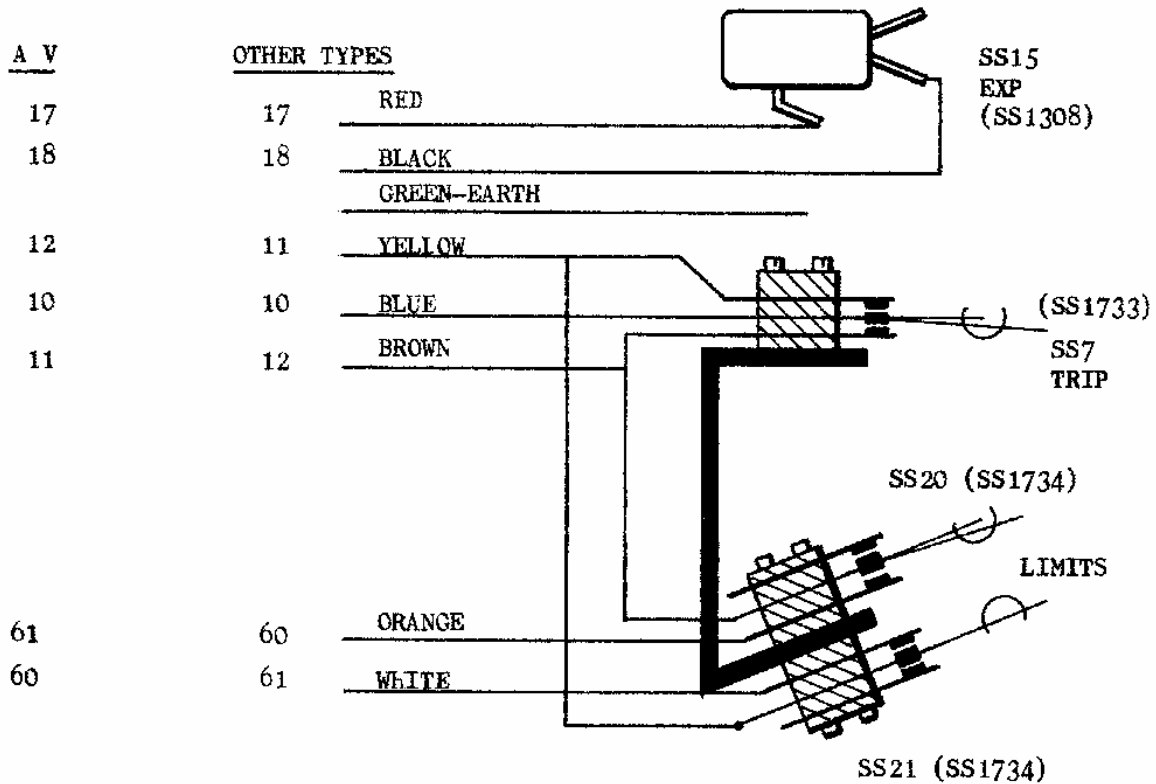
The sectograph 3 is used on Stylos tubestands from Serial No XW651 onwards with MDU from ZP341 onwards. Details are given on page 32.

10.1 Dismantling the Sectograph 2 Mechanism Box.

Remove the two countersunk socket headed screws holding the head-end clamp to the side of the frame. Rotate the hand wheel to set the switch box at the lowest position. Remove the height indicator pointer. Disconnect the spring-loaded fibre block from the switch box. Remove the winding handle and the six screws retaining the height adjustment lead screw.

Lift the switch box clear of the framework. Remove the insulating cover from the back of the switch box.

When the roller pivot is removed from the front of the box the arm inside the box will also be free. Remove the screw securing the cable and remove the microswitch or switches. Replace faulty components. Re-assemble in the reverse order.



View from rear of switchbox.

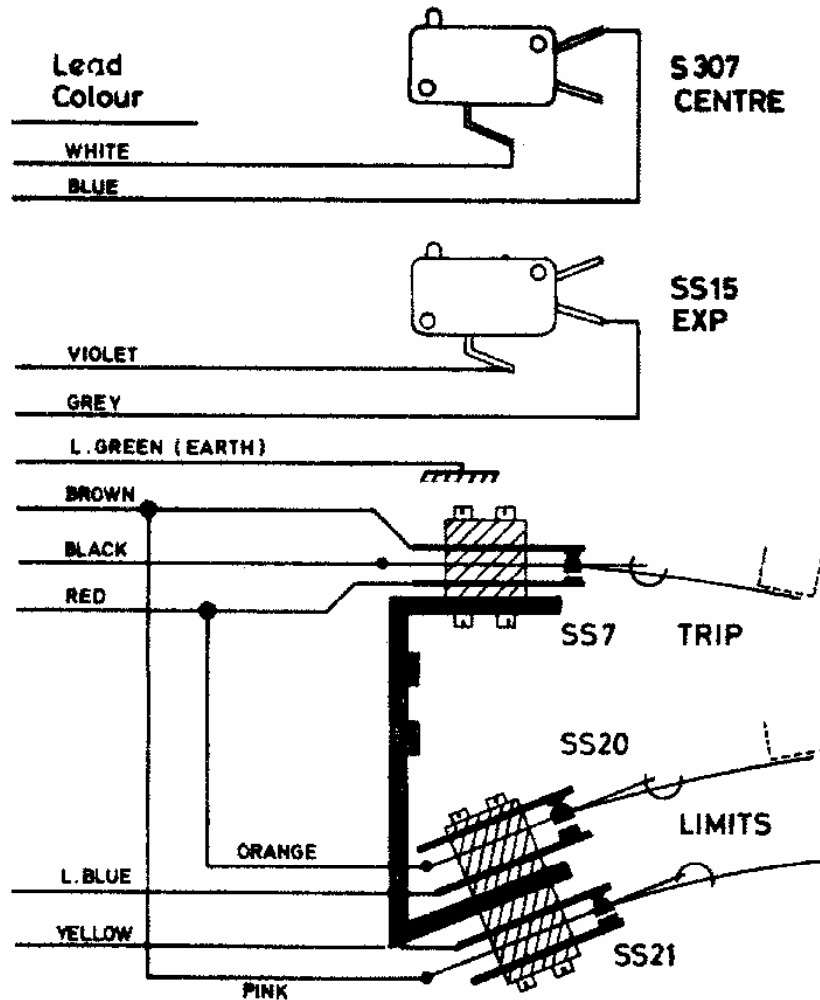
Fig 9 - SECTOGRAPH 2 SWITCHES

10.2 Sectograph 4 Mechanism Box.

For Spare Parts List see page 27

SWITCH OFF.

Wind the mechanism to its lowest position and remove cover to gain access to switches. The micro switch S307 mounted on the front of the pivot arm is NOT used with the Stylos.



**SECTOGRAPH 3 SWITCHES**

View with cover removed.

Arm at head end.

Fig 10 - SECTOGRAPH 4 CIRCUIT

11. NOTES on OPERATION of MOTOR DRIVE UNIT for SECTOGRAPH 1, 2 and 3.

11.1 General

On Stylos Tubestands up to Serial No XW650 a Sectograph 2 was originally used. A Sectograph 3 can be used in place of a Sectograph 2.

On Stylos Tubestands from Serial No XW651 and onwards a Sectograph 3 is used.

Refer to Dia Inst 2806A, B, C and D and subsequent circuits.

When a Sectograph 1 is used with the first production group of control boxes a link lead must be connected inside the control box between the two terminals marked 123. Refer to Dia Inst 2806B. The main input terminal 123 to the directional control switch (S5A) is the fifth terminal from the top on the right hand terminal block. The EX2 exposure contact terminal 123 is the second terminal from the top on the left hand terminal block.

The exposure relay (EX) is required to isolate the X-ray control circuit from the control box line and neutral supply when the test circuit is operated. (For Sectograph 1 circuit only).

On later production models there is only one terminal 123 and the later circuits are shown on Dia Inst 2806B1, 2806B2 and 2806B3. Note changes in wiring for motor brake, and crossarm rotational brake. See Dia Inst 3212 for 230V AC and 12V DC MDU brake.

The main input supply to the control box must be connected to the auto-transformer (W4), by the tap lead 304, depending on the prevailing mains supply.

The switch and relay references and functions are:-

| <u>SYMBOL</u> | <u>DESCRIPTION</u>   |
|---------------|--|
| S3A           | Mains-ON   |
| S3B           | Tubestand floor and motor brake etc.                                       |
| S4A           | Directional control.   |
| S4B & C       | Directional switches for drive motor armature                              |
| S5A           | Test switch. Main input from X-ray control unit or line supply from mains. |
| S5B           | Test switch. Main return to X-ray control or to neutral supply of mains.   |
| DR2           | Drive relay. Tubestand floor and motor brake.                              |
| DR3           | Drive relay. Supply to motor.  |
| EX1           | Exposure relay. Contacts not used.   |
| EX2           | Exposure relay. Contacts used with Sectograph 1 only.                      |

Switch S2 controls the speed of the drive and the speeds can be adjusted by tapping leads, 306, 307, 308 and 309. The table below shows the approximate speed settings.

|                    |           |          |
|--------------------|-----------|----------|
| 1 switch position, | 3/4 secs, | lead 306 |
| 2 switch position, | 2 secs,   | lead 307 |
| 3 switch position, | 3 secs,   | lead 308 |
| 4 switch position, | 4 secs,   | lead 309 |

### 11.2 Operation of Sectograph 3 and Drive

Refer to Dia Inst. 2806B3 Sheets 2 and 3

Only an outline of a typical X-ray control circuit is given, with the Secto and Potter Bucky switches set ON. The brake contact BR1 and associated cross-arm rotational brake and switch are omitted from the outline circuit. (See Dia Inst 3230 Sheet 2 for circuit of BR relay and contacts, if needed).

With the Sectograph fitted, when main supply switch S3 is closed, mains ON lamp glows via S3A. Rotational brake relay BR and Stylos base floorbrake are energised from 12V DC supply terminal BS (positive) and terminal BR (negative), via S3B, and drive relay DR1 contacts.

BR1 Contact (not shown) opens cross-arm rotational brake to allow free rotation of cross-arm if Stylos control switch is left ON.

BR2 Contact opens floor switch circuit so that the brake is controlled by the drive relay DR.

Closure of the exposure switch EXP on the X-ray control energises DR relay.

DR1 Closes supply circuit to autotransformer W4 and motor drives; speed control by S2; direction by S4 and Secto trip.

DR2 Changes over, disconnects Stylos floor brake, and energises motor brake to allow Stylos to be driven.

After the drive movement starts the Secto EXP contacts SS15 close; the Potter Bucky is energised (terminals 123, SS15, 124), and the Bucky exposure switch completes the circuit to terminal 125. The duration of the exposure is controlled by the speed of movement (switch S2) and the setting of the exposure arc for SS15 on the Sectograph. The drive continues until the directional trip switch SS7 on the Sectograph changes over (ready for the return run on the next exposure), DR relay is de-energised and floor and motor brakes re-applied.

### 11.3 Operation of Sectograph 2

The operational sequence is similar to the Sectograph 3.

#### 11.4 Operation of Sectograph 1

Refer to Dia Inst 2806D1 for the Sectograph 1 and Dia Inst 2806B3 Sheet 2 for the control box.

Brake control is similar to the Sectograph 2 operation but the exposure is controlled via relay EX.

With the control box switched ON (Dia Inst 2806B3) and X-ray control and Sectograph 1 switches set as shown, (Dia Inst 2806D1), closure of the exposure button EXP energises drive relay DR (via 123, S5A, 10, S7, 315, DR relay, S5B, to 129). The drive starts, S6 on Secto 1 closes and relay EX is energised (via 123, S7, S6, 302, EX relay, S5B and 129). At end of run, depending on setting of drive speed and Secto arc, S7 opens; drive and exposure stop and brakes are applied.

#### 11.5 Notes on Connection of MDU and Sectograph to X-ray Control Unit

Only an outline circuit of an X-ray control unit is shown on Dia Inst 2843, and the Potter Bucky 1 and Secto switch are set ON.

The block diagram and outline connections of the Sectograph 1 and 2 are also applicable to the Sectograph 3.

Note that some of the Sectograph connections are omitted - only interconnections between X-ray control and relevant Stylos Sectograph drive control box are shown so that relationship with terminals of early production models of X-ray control units can be seen. The notes on Dia Inst 2843 must also be read before making connections.

12. CROSSARM ROTATIONAL BRAKES.

On Stylos tubestands up to and including Serial No XW550 the crossarm rotational brake is free to move only when energised.

On Stylos tubestands from Serial No XW551 onwards the crossarm rotational brake is locked ON only when energised.

12.1.1 Energised-OFF Brake (up to Serial No XW550).

The rotational brake on the crossarm requires a pull of approximately 300lbs to release it. The brake is held ON by spring tension and is free only when the brake coil is energised.

IMPORTANT .... DO NOT forcibly rotate the X-ray tube holder assembly on the crossarm axis.

The normal load current is between 0.7 and 0.9 Amperes at 12 volts.

Grease or oil may enter the brake ring assembly reducing the efficiency of the brake, in which case it will be necessary to strip and clean the brake and surrounding surfaces.

12.1.2 Stripping and Cleaning. Refer to sketch overleaf.

Secure the crossarm carriage at a convenient height so that the X-ray tube and support casting, complete with light beam diaphragm, can be removed from the crossarm without unnecessary disconnection of HF and other cables, and without damaging the apparatus.

Remove the two socket headed cap screws (8) from the ring nut (11). Remove the cover plate at point (3) and disconnect the coil connections of the magnetic brake. Remove the cover plate and switch assembly(15).

Remove the cap headed screw from (14) and remove the mushroom headed screw from the top of the casting at (4).

Take care not to damage the wiring when withdrawing the X-ray tube assembly from the crossarm. A lead wire (5) can be left in position to retrieve the cable in the crossarm when the apparatus is reassembled.

The spring assembly (6) must not be dismantled.

To gain access to the brake surfaces, remove the spigot from the crossarm by taking out the screw (9) and withdraw the spigot.

The ring nut (11) can be removed from the spigot to expose the brake disc, attached to the spigot, and the polyurathene brake ring between the disc and the inside of the nut (11).

Clean the metal surfaces of the brake disc and its surroundings, and also the polyurathene brake rings.

Ensure that the brake ring is set correctly inside the nut (11) when refitting the spigot to the crossarm.

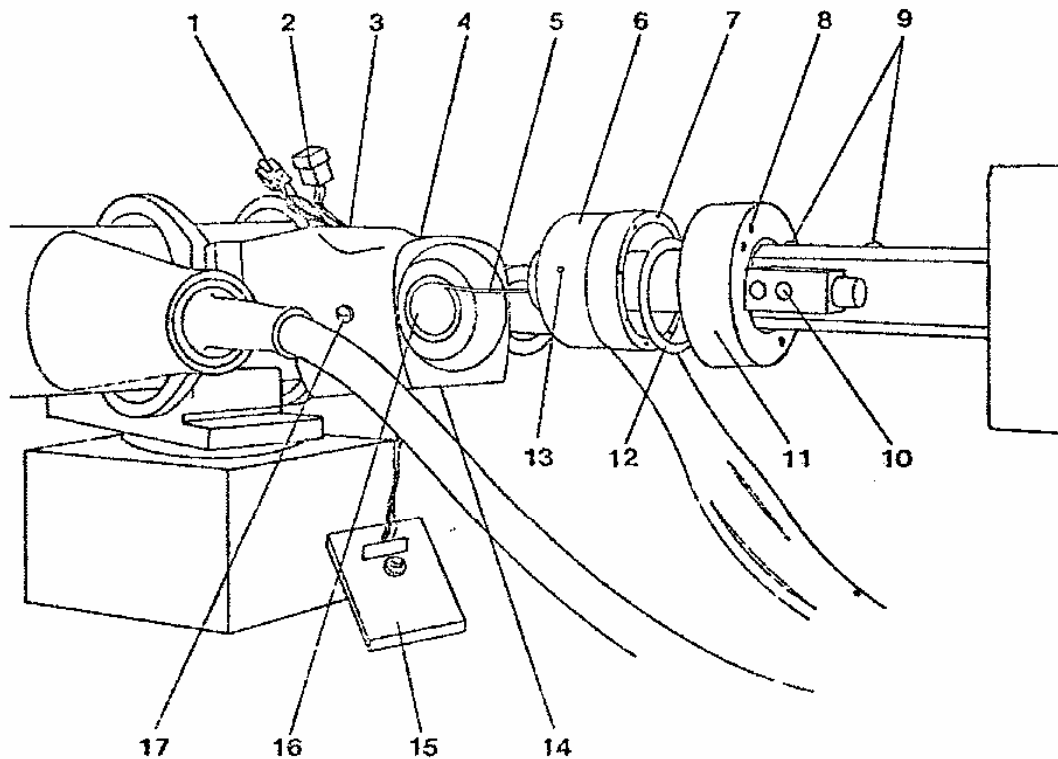


Fig 11 CROSSARM ROTATIONAL ELECTRO-MAGNETIC BRAKE  
(up to Serial No XW550)

#### 12.1.3 Replacement of Brake Coil

To replace the coil, strip the assembly as detailed in the first part of paragraph 2 on page 36.

Remove the screw (17) and the similar screw on the opposite side of the casting and pull out the coil. Fit and secure the replacement coil, ensuring that the wiring is not damaged.

#### 12.1.4 Adjustment of Brake

With the ring nut (11) loose, energise the brake and then tighten up the ring nut (11) until friction is felt on the rotational movement of the X-ray tube casting assembly. (The nut (11) is a Vernier allowing the brake clearances to be adjusted by 1/16 of a turn increments or 0.0025" axial clearance). Then unscrew the nut (11) a small amount to a position where the rotational movement is free when the brake is energised, and is held firmly when the brake is de-energised. Lock the ring nut (11) in the required position by replacing the cap headed screw into the nearest convenient hole (8). The screw (8) fits one of the threaded holes (7) on the spring assembly.

#### 12.1.5 Tests

After cleaning brake or replacing coil make a complete check of all mechanical movements and electrical controls of the tubestand



### 12.2.1 Energised - ON Brake (from Serial No XW551 onwards)

There is no adjustment for the brake tension. Grease or oil may enter the assembly and reduce the efficiency of the brake - strip and clean as detailed below.

### 12.2.2 Stripping, Cleaning and Replacing Brake

Secure the crossarm carriage at a convenient working height so that the X-ray tube and support casting, complete with light beam diaphragm, can be removed from the crossarm without unnecessary disconnections of HT and other cables, and without damaging the apparatus.

Refer to Fig 12. Take off cover (1). Disconnect Amplok (2). If it is necessary to replace the coil, the contacts can be removed from the Amplok holder by using a small screwdriver to lift the locking latch, as indicated in Fig 13, and carefully pull out the contact by the wiring.

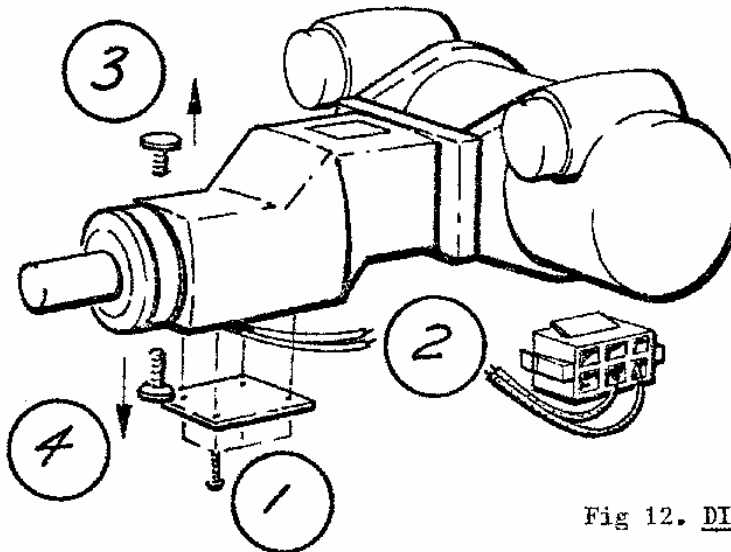
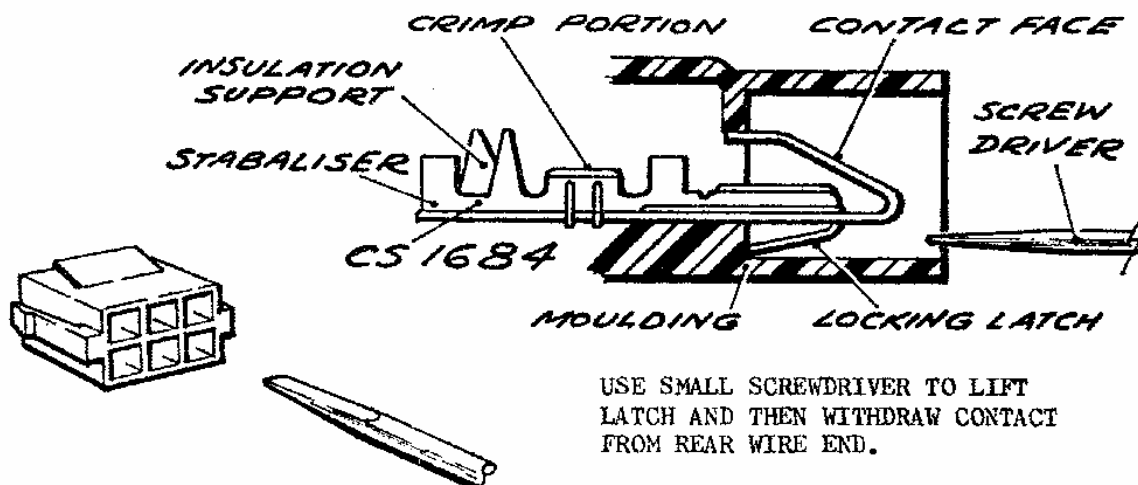


Fig 12. DISCONNECTING TUBE HOLDER



USE SMALL SCREWDRIVER TO LIFT LATCH AND THEN WITHDRAW CONTACT FROM REAR WIRE END.

Fig 13 REMOVING AMPLOK CONTACT

Remove screws (3) and (4) from top and bottom of casting as indicated in Fig 13 and withdraw the tube holder assembly straight out as indicated in Fig 14.

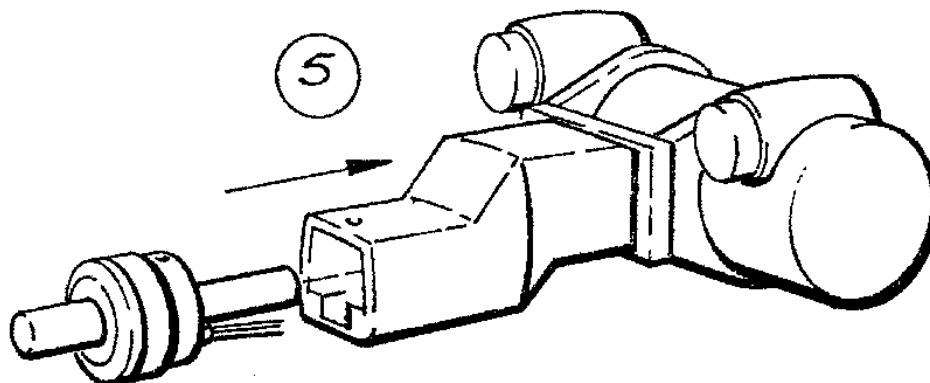


Fig 14. REMOVING TUBE HOLDER

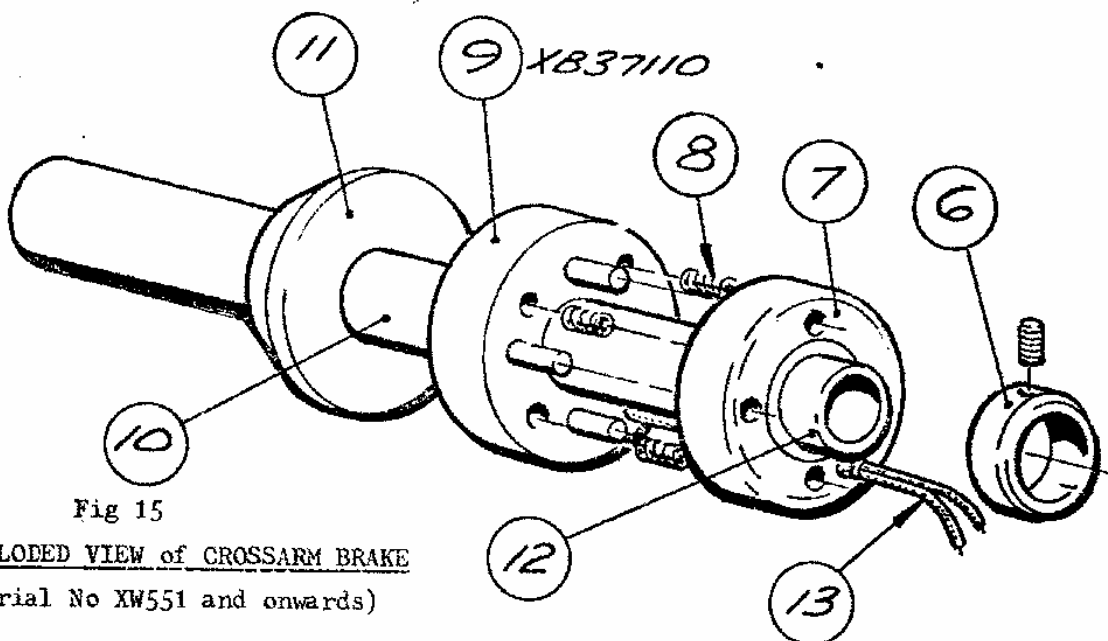


Fig 15

EXPLODED VIEW of CROSSARM BRAKE  
(Serial No XW551 and onwards)

Remove the collar (6). Carefully slide off the bearing ring (7) and do not lose the three springs (8). The brake coil is supplied complete with housing and dowel pins (Part No XB37110).

Before reassembly, clean off all traces of grease and oil from the shaft (10), the face of the brake Flange (11), and the brake ring on the face of the coil assembly (9).

Lightly grease the inside of the bearing (7) before reassembly. Refit collar (6). Before refitting the X-ray tube holder assembly, lightly grease the end of the shaft (12).

If contact is damaged, fit new contact Part No CS1684 before reassembly or replacement of coil. DO NOT bend stabilisers.

Refit retainer screws (3) and (4), connect Amploks; refit cover and make a complete check of all mechanical movements and electrical controls of the tubestand.

# DRAWING SECTION

## STYLOS TUBE STAND and PSU for BRAKES

| <u>Dia Inst</u> | <u>Description</u>   |
|-----------------|--|
| 2806A           | Original Stylos Circuit. For use with Sectograph 1 or 2.<br><br>Stylos crossarm rotational brake OFF when energised. 12in x 8in x 5in Power Supply Unit box for Stylos brakes (note- an additional transformer is fitted inside the PSU box to supply the LBD). When Sectograph 1 or 2 is coupled to the X-Ray tube crossarm, microswitches S1 and S2 change over. (See Note 1, page 42). Control box and Motor Drive Unit with 230V AC brake on motor originally used. (See Note 2, Page 42). |
| 3225            | New PSU box, 508mm x 190mm x 165mm, used for Stylos brakes. An LBD supply winding incorporated in brake transformer.   |
| 3230<br>Sheet 1 | New crossarm brake; ON when energised.<br><br>Change to 12V DC brake on MDU for Stylos and change in wiring of Control Box for MDU to suit 12V DC brake. (See Note 2, Page 42).  |
| 3230<br>Sheet 2 | Sectograph 1 and 2 superseded by Sectograph 4. Change in Stylos crossarm. Microswitches S1 and S2 superseded by brake isolating relay BR when Sectograph 4 fitted. When Sectograph not fitted, Amplok connector has shorting links in cap. Change in wiring of MDU Control Box for use with BR relay of Sectograph 4.  |

## MOTOR DRIVE UNIT and CONTROL BOX

| <u>Dia Inst</u> | <u>Description</u>   |
|-----------------|--|
| 2806B           | Original MDU Control Box circuit used with <u>230V AC brake</u> on MDU and Sectograph 1 or 2. Note link required between two terminals, 123, to complete exposure circuit in MDU box. (Used with MDU Control Box Serial No XY201 to XY212 only). |
| 2806B1          | MDU Control Box circuit from Serial No XY213 to XY245. Link on 123 incorporated in wiring.   |
| 2806B2          | MDU Control Box circuit from Serial No ZP246 to ZP340 for use with Stylos Serial No XW551 to XW650 with <u>12V DC brake on MDU motor.</u>  |

2806D Outline of typical X-Ray control unit circuit showing connections of Sectograph 2 with MDU and Motor Control Box. This circuit can be used with Dia Inst 2806B, 2806B1 or 2806B2. (See Note 3, Page 42).

2806D1 Outline of typical X-Ray Control Unit circuit showing connections of Sectograph 1 with MDU and Motor Control Box. This circuit can be read with Dia Inst 2806B, 2806B1 or 2806B2. (See Note 3 Page 42).

2806B3  
Sheet 1 Notes on Sectograph 4.

2806B3  
Sheet 2 MDU Control Box Serial ZP341 onwards for Stylos XW651 onwards for Sectograph 4. Control box circuit wired for use with brake relay BR on Sectograph 4 attachment. Relay BR changes over brake control circuit. (Coupling microswitches S1 and S2 not fitted to Stylos after Serial No XW651. See Dia Inst 3230 Sheet 1 and 2).

2806B3  
Sheet 3 Outline of X-Ray control unit circuit for connection of Sectograph 4. Use with sheet 2 above. (See Note 3, Page 42).

2806B3  
Sheet 4 Sketch for identification of Sectograph 4.

2806C  
Sheet 2 Sectograph 2 wiring colours and connections.

2806C  
Sheet 3 Sectograph 4 wiring colours and connections.

2806C  
Sheet 4 Sectograph 1 wiring colours and connections. Basic connections of Potter Bucky.

2792 Various Potter Bucky Circuits.

2843 Typical X-Ray Control circuit with Stylos Drive Control Box with notes on connections of various X-Ray controls.

3212  
Sheets 1  
and 2 Details of 230V AC and 12V DC brake on MDU motor and differences in wiring of Stylos Tubestand and MDU Control Box.

Note 1 .... Sectograph 1 or 2 originally used with Stylos. Superseded by Sectograph 4 with Stylos from Serial No XW651 and MDU Serial No ZP341 onwards. The Sectograph 4 has a coupling arm with a roller box permanently fixed to the Stylos. An off-set bar is used to drive the Potter Bucky. (See sketch on Sheet 4 of Dia Inst 2806 B3).

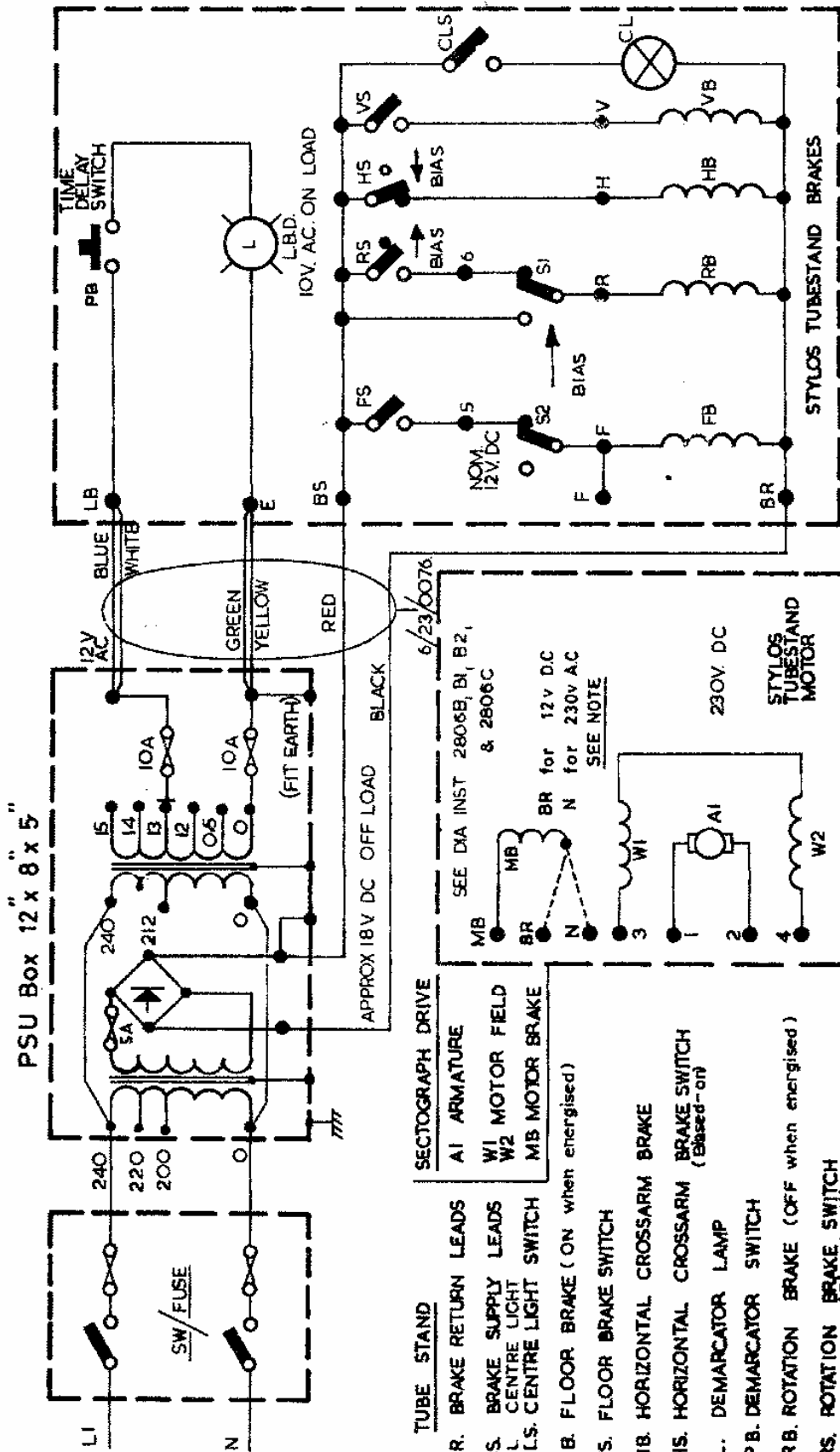
A switchbox mechanism of the Sectograph 4 can be used in place of a Sectograph 2 switchbox. See Dia Inst 2806C Sheet 2 and 3. Other parts of Sectograph 2 and Sectograph 4 are NOT INTERCHANGEABLE.

Note 2 .... From MDU Serial No XY201 to XY245 a 230V AC brake is fitted by the factory.

From Serial No ZP246 onward a 12V DC brake is fitted by the factory.

In some cases on early units, where a motor has been replaced, the brake type may be 12V DC in place of 230V AC. Wiring of Control Box and Stylos MUST relate to the brake type. For identification of brake, refer to Dia Inst 3212 Sheets 1 and 2.

Note 3 .... Some details of Stylos tubestand circuit omitted. Refer to individual Stylos circuits, Dia Inst 2806A, 3225 or sheets 1 or 2 of Dia Inst 3230, for details.



(TP246/7/174)

**TUBE STAND**

- BR. BRAKE RETURN LEADS
- BS. BRAKE SUPPLY LEADS
- CLS. CENTRE LIGHT
- CLS. CENTRE LIGHT SWITCH
- FB. FLOOR BRAKE (ON when energised)
- FS. FLOOR BRAKE SWITCH
- HB. HORIZONTAL CROSSARM BRAKE
- HS. HORIZONTAL CROSSARM BRAKE SWITCH (Biased-on)
- L. DEMARCATOR LAMP
- PB. DEMARCATOR SWITCH
- RB. ROTATION BRAKE (OFF when energised)
- RS. ROTATION BRAKE SWITCH (Biased-off)
- VB. VERTICAL BRAKE
- VS. VERTICAL BRAKE SWITCH
- S1. SECTOGRAPH COUPLING SWITCHES (Biased)

**SECTOGRAPH DRIVE**

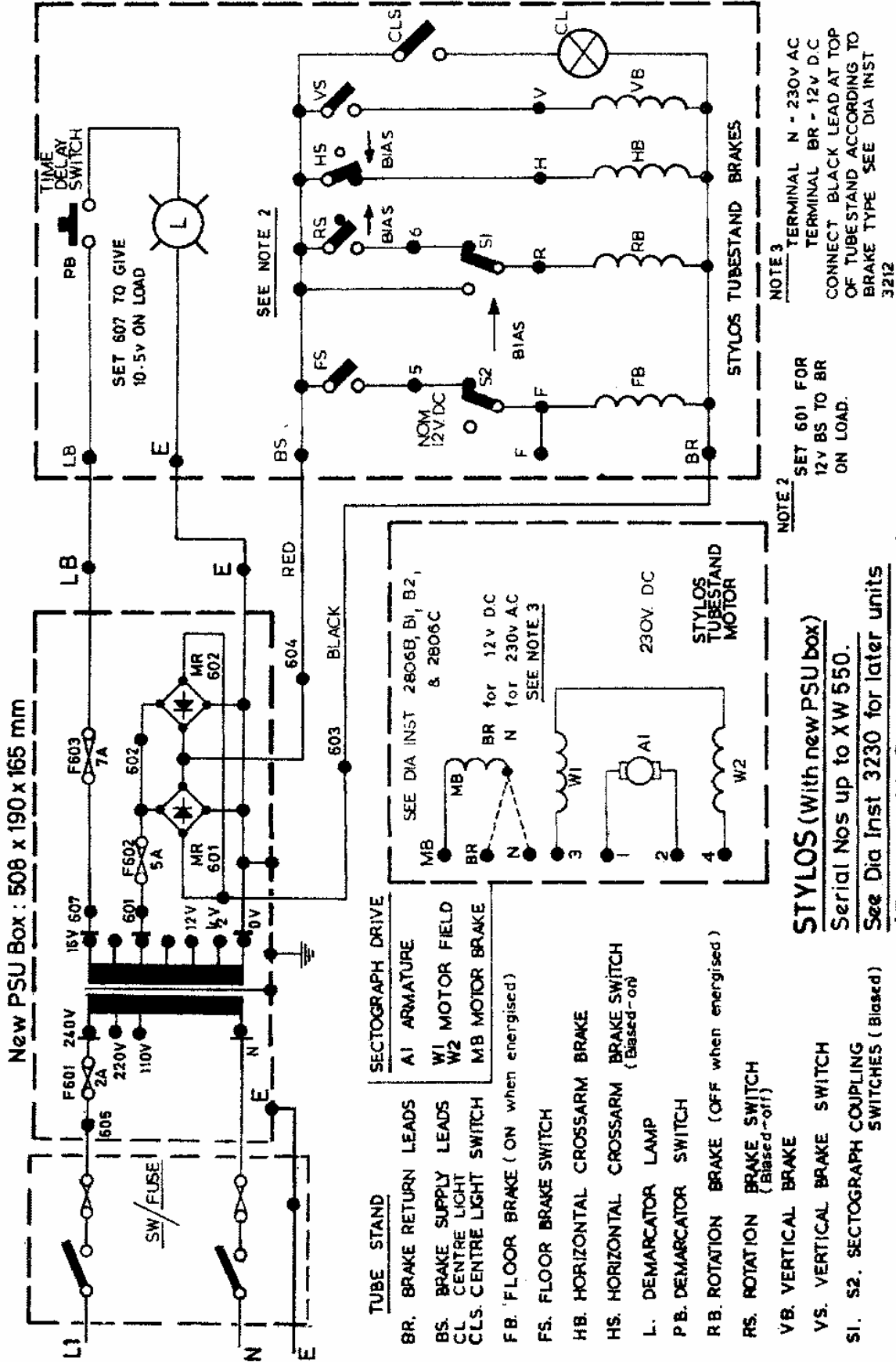
- A1. ARMATURE
- W1. MOTOR FIELD
- W2. MOTOR FIELD
- MB. MOTOR BRAKE

**STYLOS TUBESTAND CIRCUIT**

See Dia Inst 3225 for alternative PSU box  
 " " " 3230 " " RB brake  
 (for use with Section 1 or 2)

**NOTE**  
 TERMINAL N - 230V AC  
 CONNECT BLACK LEAD AT TOP  
 OF TUBESTAND ACCORDING TO  
 BRAKE TYPE. SEE DIA INST  
 3212 or XE 36100

(TP 246/3/1170)



- TUBE STAND**
- BR. BRAKE RETURN LEADS
  - BS. BRAKE SUPPLY LEADS
  - CL. CENTRE LIGHT
  - CLS. CENTRE LIGHT SWITCH
  - FB. FLOOR BRAKE (ON when energised)
  - FS. FLOOR BRAKE SWITCH
  - HB. HORIZONTAL CROSSARM BRAKE
  - HS. HORIZONTAL CROSSARM BRAKE SWITCH (Biased-on)
  - L. DEMARCATOR LAMP
  - P.B. DEMARCATOR SWITCH
  - R.B. ROTATION BRAKE (OFF when energised)
  - RS. ROTATION BRAKE SWITCH (Biased-off)
  - VB. VERTICAL BRAKE
  - VS. VERTICAL BRAKE SWITCH
  - SI. S2. SECTOGRAPH COUPLING SWITCHES (Biased)

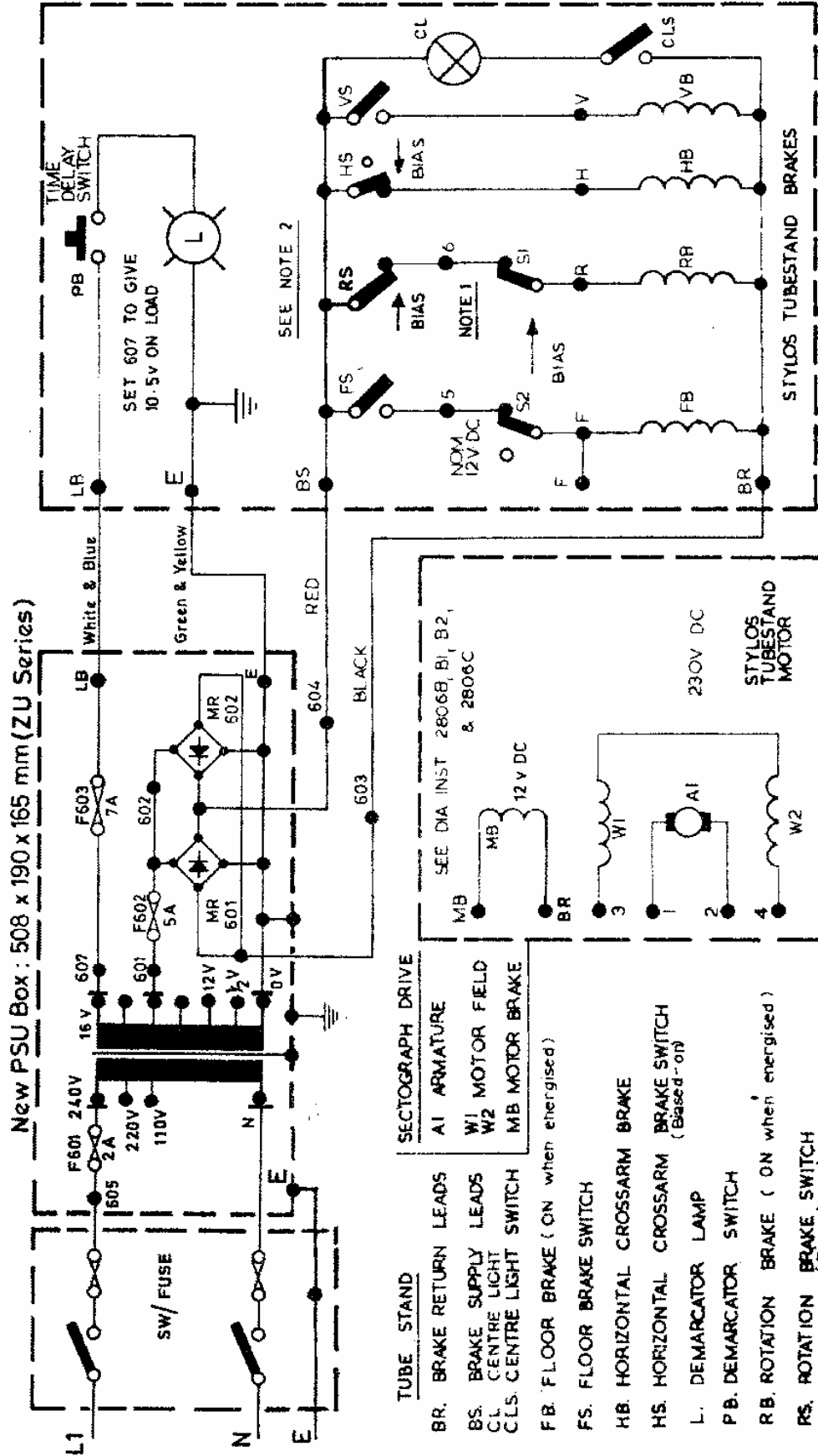
- SECTOGRAPH DRIVE**
- A1. ARMATURE
  - W1. MOTOR FIELD
  - W2. MOTOR FIELD
  - MB. MOTOR BRAKE

**NOTE 2**  
SET 601 FOR 12V BS TO BR ON LOAD.

**NOTE 3**  
TERMINAL N - 230V AC  
TERMINAL BR - 12V D.C  
CONNECT BLACK LEAD AT TOP OF TUBE STAND ACCORDING TO BRAKE TYPE SEE DIA INST 3212

**STYLOS (With new PSU box)**  
Serial Nos up to XW 550.  
See Dia Inst 3230 for later units  
(For use with Sectograph 1 or 2)

(TP 246/3/1174)



**New PSU Box : 508 x 190 x 165 mm (ZU Series)**

- TUBE STAND**
- BR. BRAKE RETURN LEADS
  - BS. BRAKE SUPPLY LEADS
  - CL. CENTRE LIGHT
  - CLS. CENTRE LIGHT SWITCH
  - FB. FLOOR BRAKE (ON when energised)
  - FS. FLOOR BRAKE SWITCH
  - HB. HORIZONTAL CROSSARM BRAKE
  - HS. HORIZONTAL CROSSARM BRAKE SWITCH (Biased-on)
  - L. DEMARCATOR LAMP
  - P.B. DEMARCATOR SWITCH
  - RB. ROTATION BRAKE (ON when energised)
  - RS. ROTATION BRAKE SWITCH (Biased-on)
  - VB. VERTICAL BRAKE
  - VS. VERTICAL BRAKE SWITCH
  - SI. S2. SECTOGRAPH COUPLING SWITCHES (Biased)
- SECTOGRAPH DRIVE**
- A1. ARMATURE
  - W1. MOTOR FIELD
  - W2. MOTOR FIELD
  - MB. MOTOR BRAKE
- STYLOS TUBESTAND MOTOR**
- SEE DIA INST 2806B, B1, B2, & 2806C
- 230V DC
- 12V DC

**NOTE 1**  
 CHANGE IN BRAKE & SWITCH WIRING.

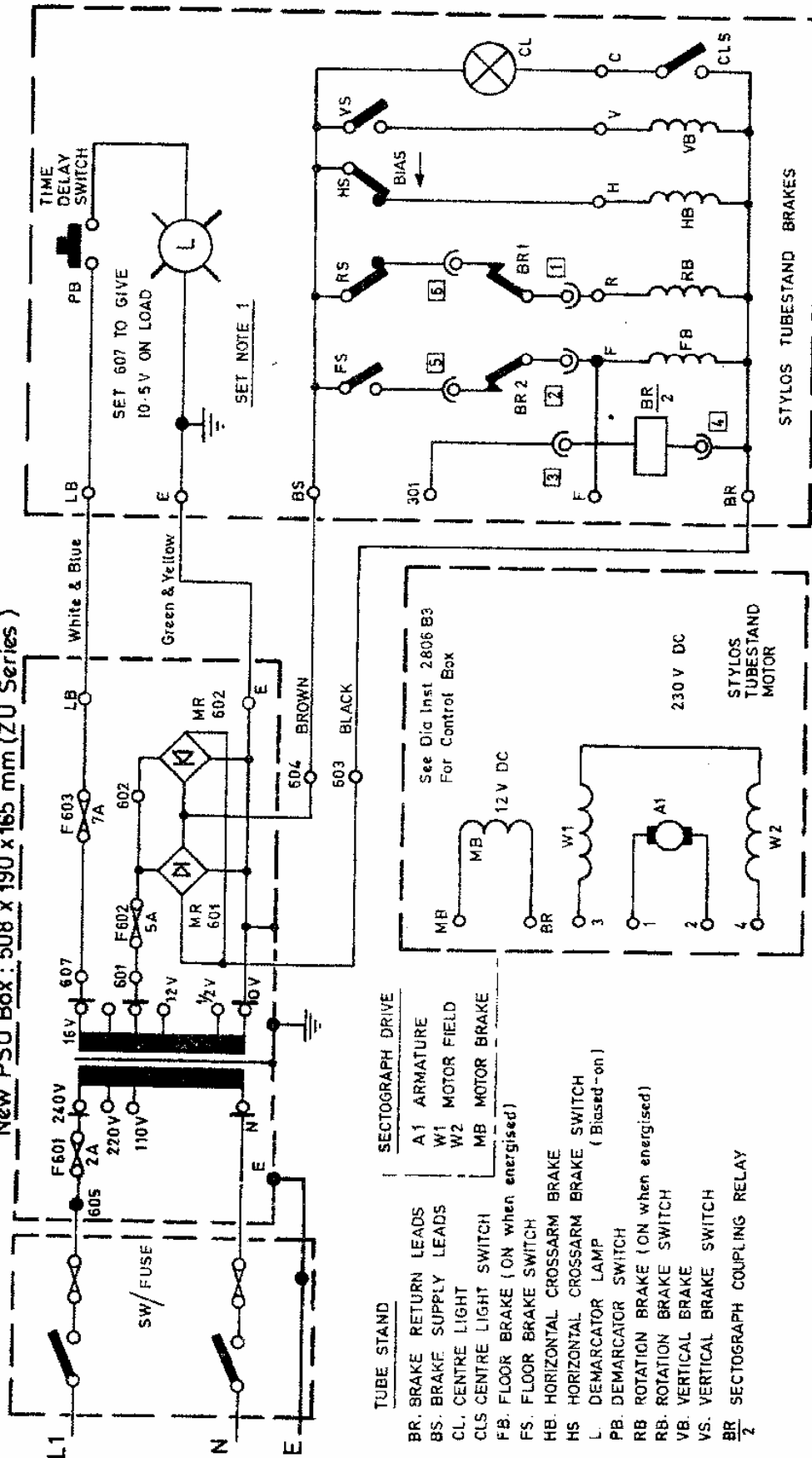
**NOTE 2**  
 SET 601 FOR 12V BS TO BR ON LOAD.

**STYLOS** From Serial No. XW 551 -XW650  
 With new PSU box Serial No. ZU 451 onwards (For use with Sactograph 1 or 2)  
 See Dia Insts 2806A & 3225 for earlier units



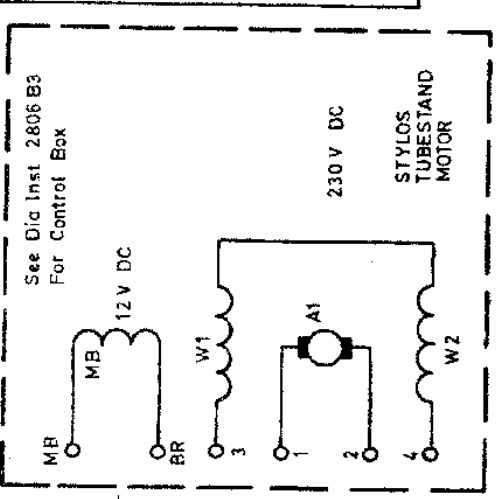
(TP 246/3/1174)

New PSU Box : 508 x 190 x 165 mm (ZU Series)



SECTOGRAPH DRIVE

- BR. BRAKE RETURN LEADS
- BS. BRAKE SUPPLY LEADS
- CL. CENTRE LIGHT
- CLS CENTRE LIGHT SWITCH
- FB. FLOOR BRAKE (ON when energised)
- FS. FLOOR BRAKE SWITCH
- HB. HORIZONTAL CROSSARM BRAKE
- HS. HORIZONTAL CROSSARM BRAKE SWITCH (Biased-on)
- L. DEMARCATOR LAMP
- PB. DEMARCATOR SWITCH
- RB. ROTATION BRAKE (ON when energised)
- RS. ROTATION BRAKE SWITCH
- VB. VERTICAL BRAKE
- VS. VERTICAL BRAKE SWITCH
- BR/2. SECTOGRAPH COUPLING RELAY



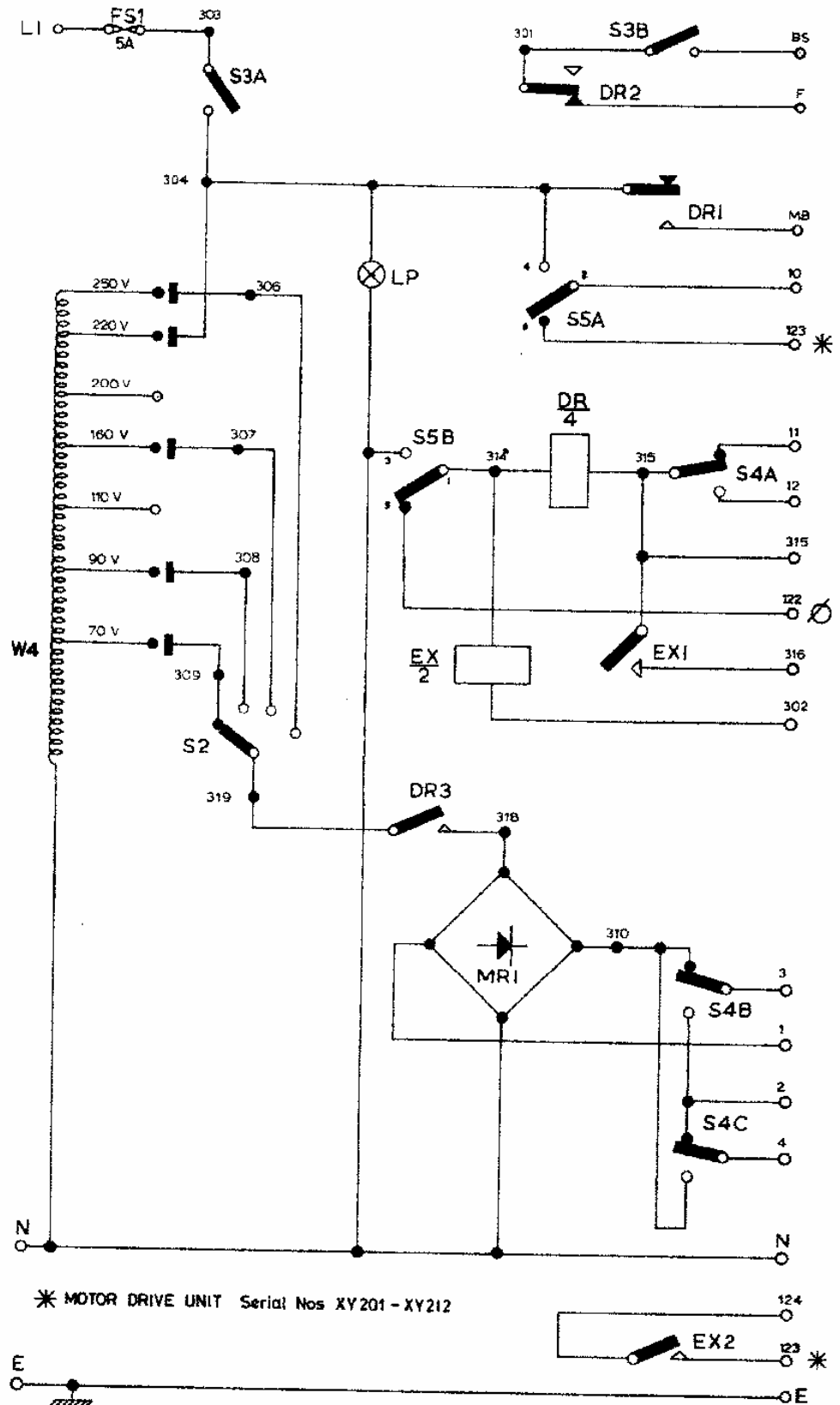
NOTE: 1.....SET 601 FOR 12V BS TO BR ON LOAD

LINK USED WHEN SECTO NOT FITTED



AMPLOK connections thus :-

**STYLOS From Serial No. XW651 ~**  
**With Coupling Relay for Sectograph 4**

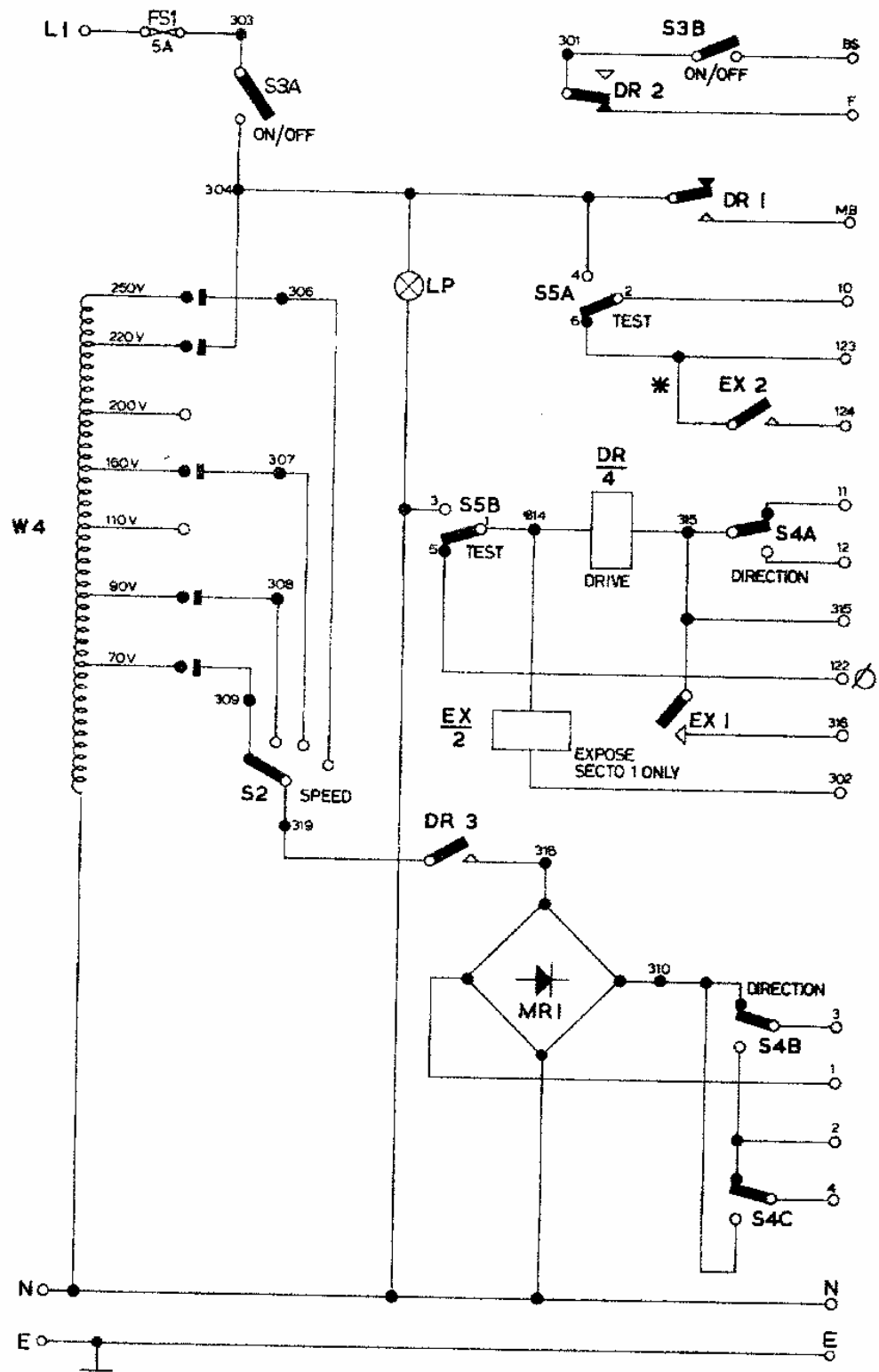


**STYLOS MOTOR DRIVE UNIT CONTROL**  
WITH 230v AC BRAKE ON MOTOR See Dia Inst 2806 A, B1, B2(12v) & C

(TPL-246/4/675)

CONNECT TO 123

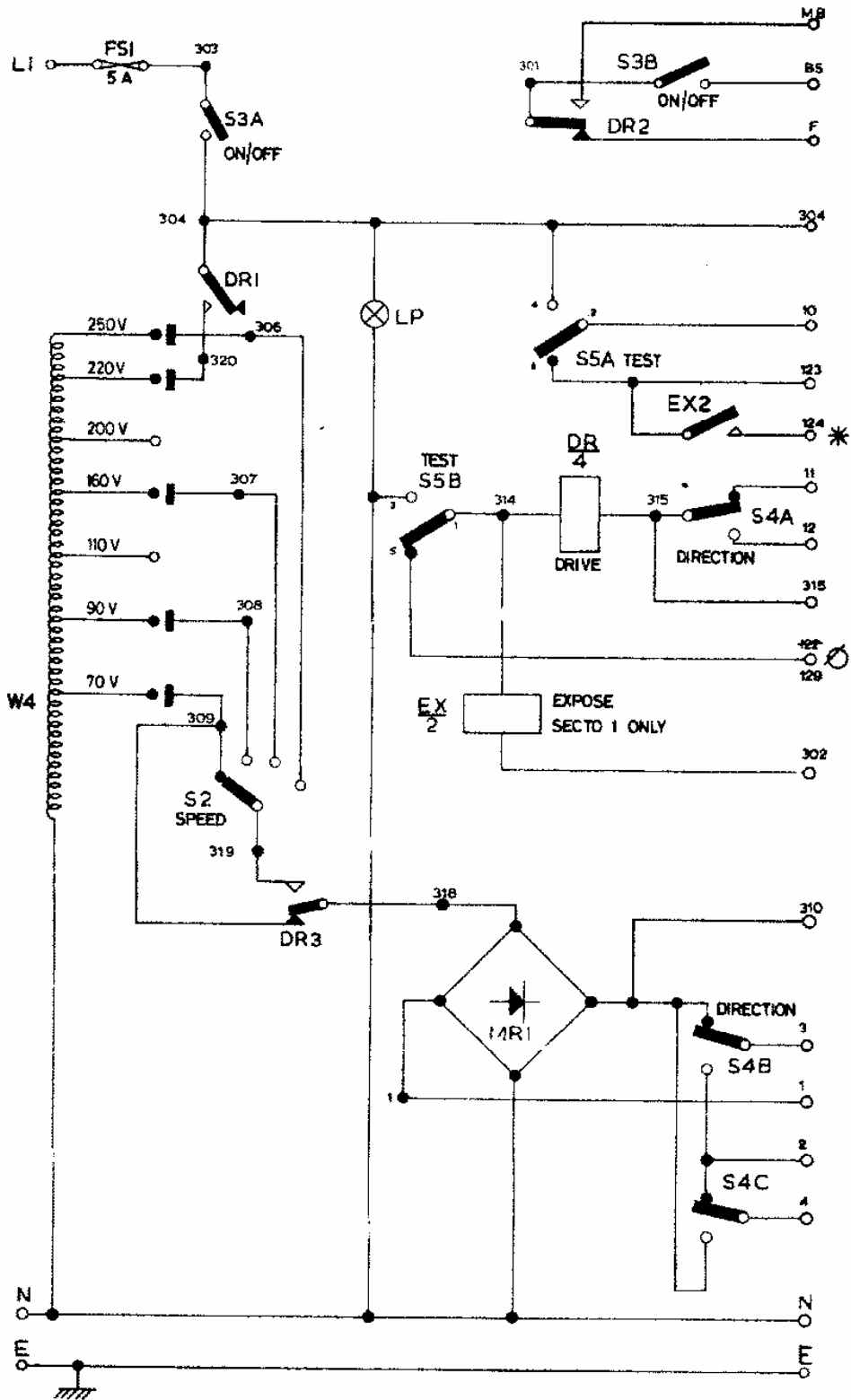
\* LINK 123 TO 123\*



MDU from Serial No...XY212 - XY245, for use with STYLDS ...Serial No...XW401 - XW550

### STYLOS MOTOR DRIVE UNIT CONTROL WITH 230v AC BRAKE ON MOTOR. See Dia Inst 2806A,B,B2 & C

\* External link on early Production Units  
 ⊕ Connect to 129



MDU... Serial No... ZP246 - ZP340, for STYLUS... Serial No... XW551 - XW650

# STYLUS MOTOR DRIVE UNIT CONTROL

WITH 12 v. DC BRAKE ON MOTOR See Dia. Inst 2806A, B, B1 & C

⊘ 129 was 122 on early Production Units

\* External link on early Production Units

The following pages are in the order:-

|                 |   |
|-----------------|---|
| Dia Inst 2806B2 | MDU Control Box                                   |
| Dia Inst 2806D  | Outline X-ray Control circuit and<br>Sectograph 2 |
| Dia Inst 2806D1 | Outline X-ray Control circuit and<br>Sectograph 1 |

By this arrangement Dia Inst 2806B2 and 2806D face one another for easy reference to connections between the basic X-ray control circuit with the Sectograph 2 and the MDU control box circuit.

Dia Inst 2806 B3  
Sheet 1 of 4  
(September 1974)

STYLOS Serial No XW651 and onwards  
and  
SECTOGRAPH 4 MDU Control Unit Serial No ZP341  
and onwards.

These 4 sheets of Dia Inst 2806 B3 (September 1974)  
supersedes the three sheets of (November 1973).

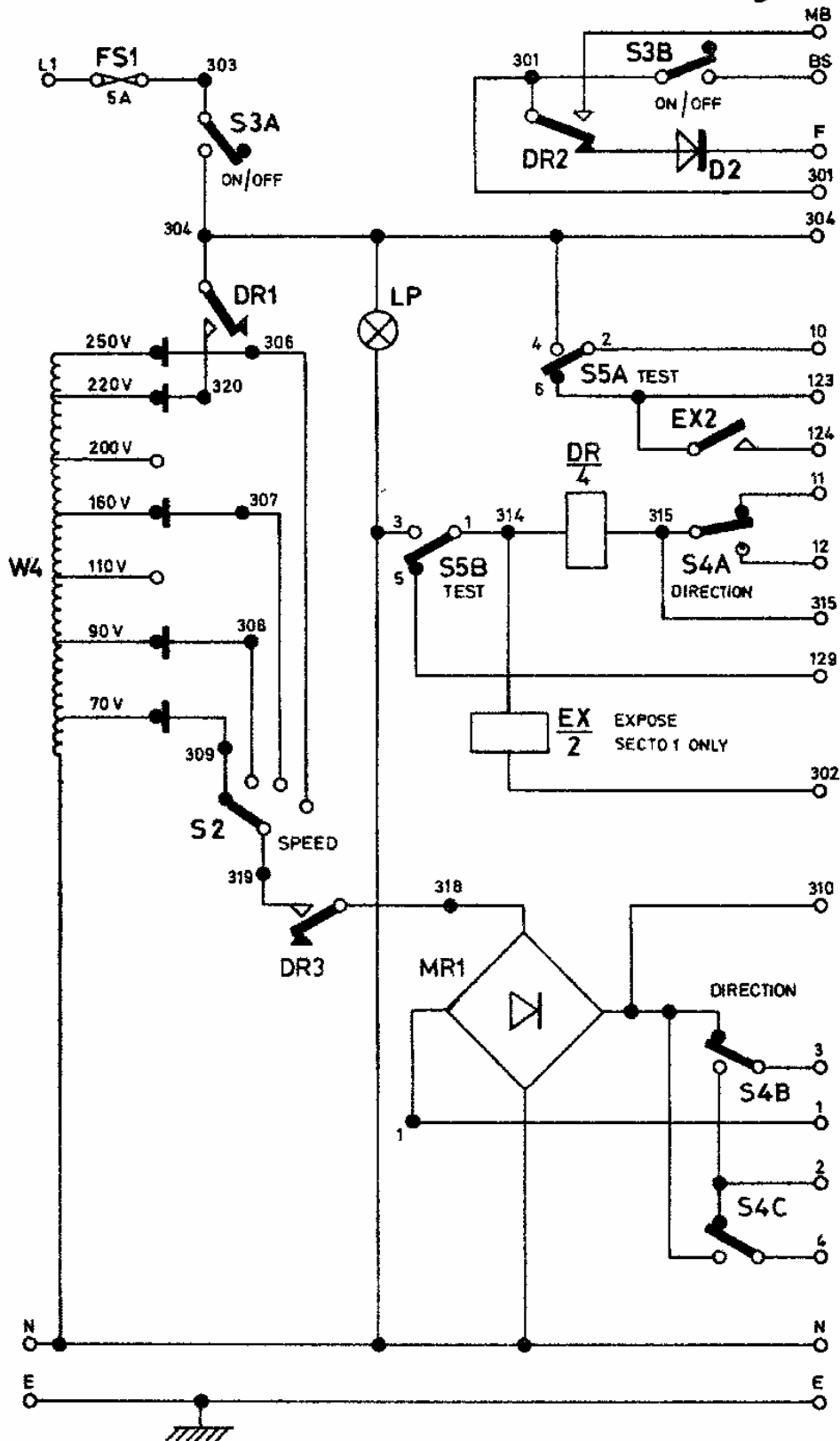
The sheets give details of MDU control box circuit  
Serial No ZP341 onwards for Sectograph 4 Drive on  
STYLOS Tubestand from Serial No XW651 onwards, an  
outline of connections with a basic X-ray control unit,  
and a sketch for recognition of the Sectograph 4  
coupling arm and switch mechanism.

On MDU control boxes up to Serial No ZP365 a diode D2  
must be fitted by the engineer into line F in the MDU  
control box, as illustrated in the circuit overleaf,  
when a Sectograph 4 with brake relay BR is used.

On MDU Serial No ZP366 and onwards the diode will be  
fitted by the factory.

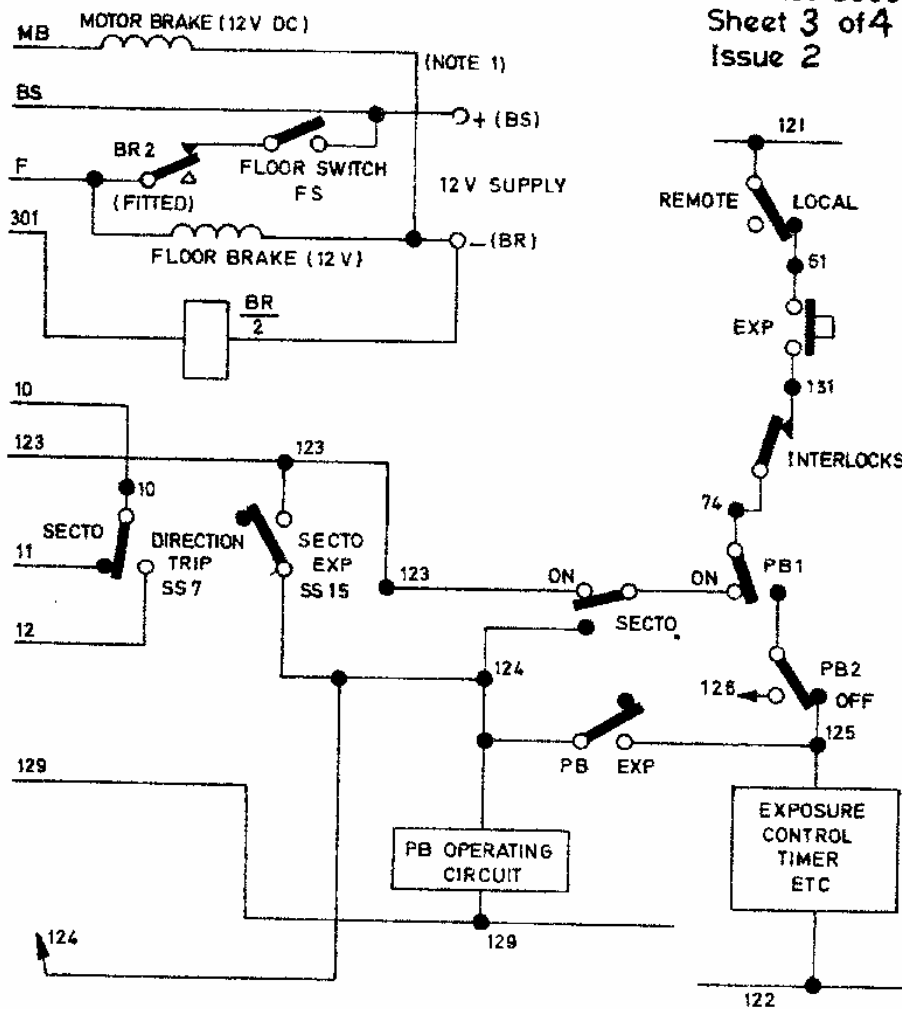
The polarity of the supply from the Stylos PSU must  
be correct or chattering of the BR relay will result  
even though a diode is fitted.

Crossarm rotational brake and RB1 contacts are omitted  
from the outline circuit of the Stylos on sheet 3.  
The centre switch S307 is not used with the Stylos and  
is not shown on the Circuit, Dia Inst 2806 B3.

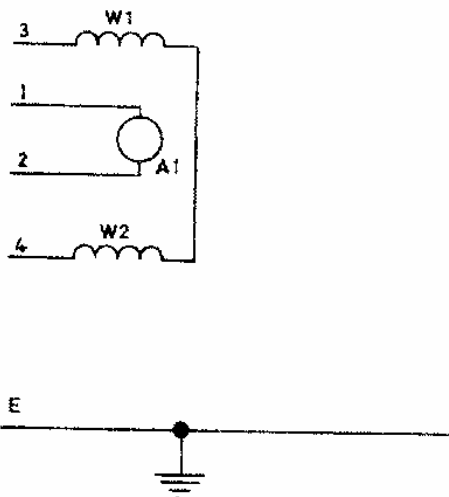


MDU... from Serial No... ZP341 onwards, for STYLOS... Serial No... XW651 onwards  
 See Dia Inst 3230 Sheet 2 for STYLOS circuit

**STYLOS MOTOR DRIVE UNIT CONTROL**  
 WITH 12V.DC BRAKE ON MOTOR  
 (DIODE D2 ADDED FOR USE WITH BR RELAY FOR SECTOGRAPH 4)  
 (TPL 246/3/974)



NOTE 1. SEE DIA INST 3212 FOR  
 REPLACEMENT MOTOR.  
 (BR1 CONTACT AND  
 CROSSARM BRAKE  
 NOT SHOWN)

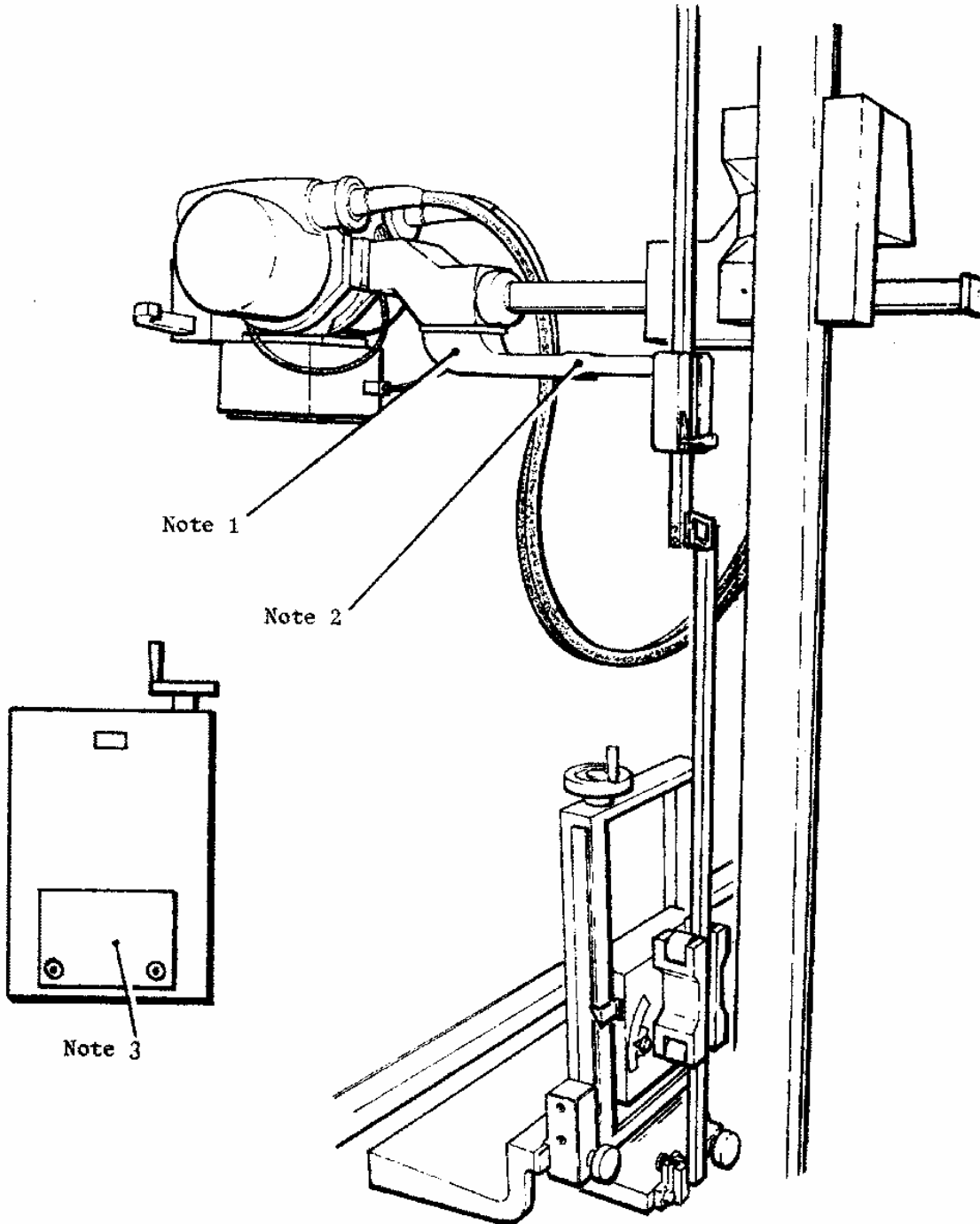


SECTOGRAPH 4  
OUTLINE CIRCUIT  
CONNECTIONS  
WITH TYPICAL  
X-RAY CONTROL  
& STYLOS



Notes.

1. BR relay inside casting (Sectograph 4).
2. Long arm shown - as used with Escort table. Short arm used with other tables.
3. Identify switch mechanism of Sectograph 4 by cover plate indicated.



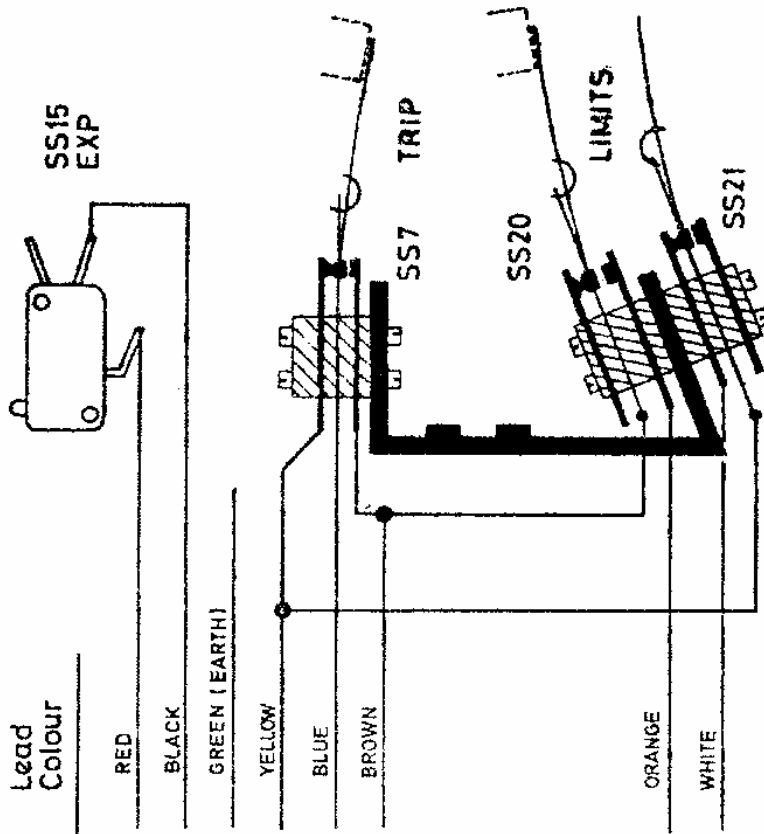
These sheets 1 to 4 replace Dia Inst 2806C sheets 1 to 4, Issue 3, which must be discarded.

The Sectograph 2 switch box was discontinued in 1972 and is now replaced by the Sectograph 4 switchbox which can be identified by the cover plate, 6" x 7", over the switch mechanism. This cover allows direct access to the switches without dismantling the assembly. An extra switch has been fitted for use with the Apollo ceiling tubemount and the extra switch is not used with the Stylos.

See Sheets 2 and 3 overleaf for differences in lead colours.

See Sheet 4 for Sectograph 1 and basic Potter Bucky connections. Details of current YM and earlier types of Potter Buckys are given in Dia Inst 2792.

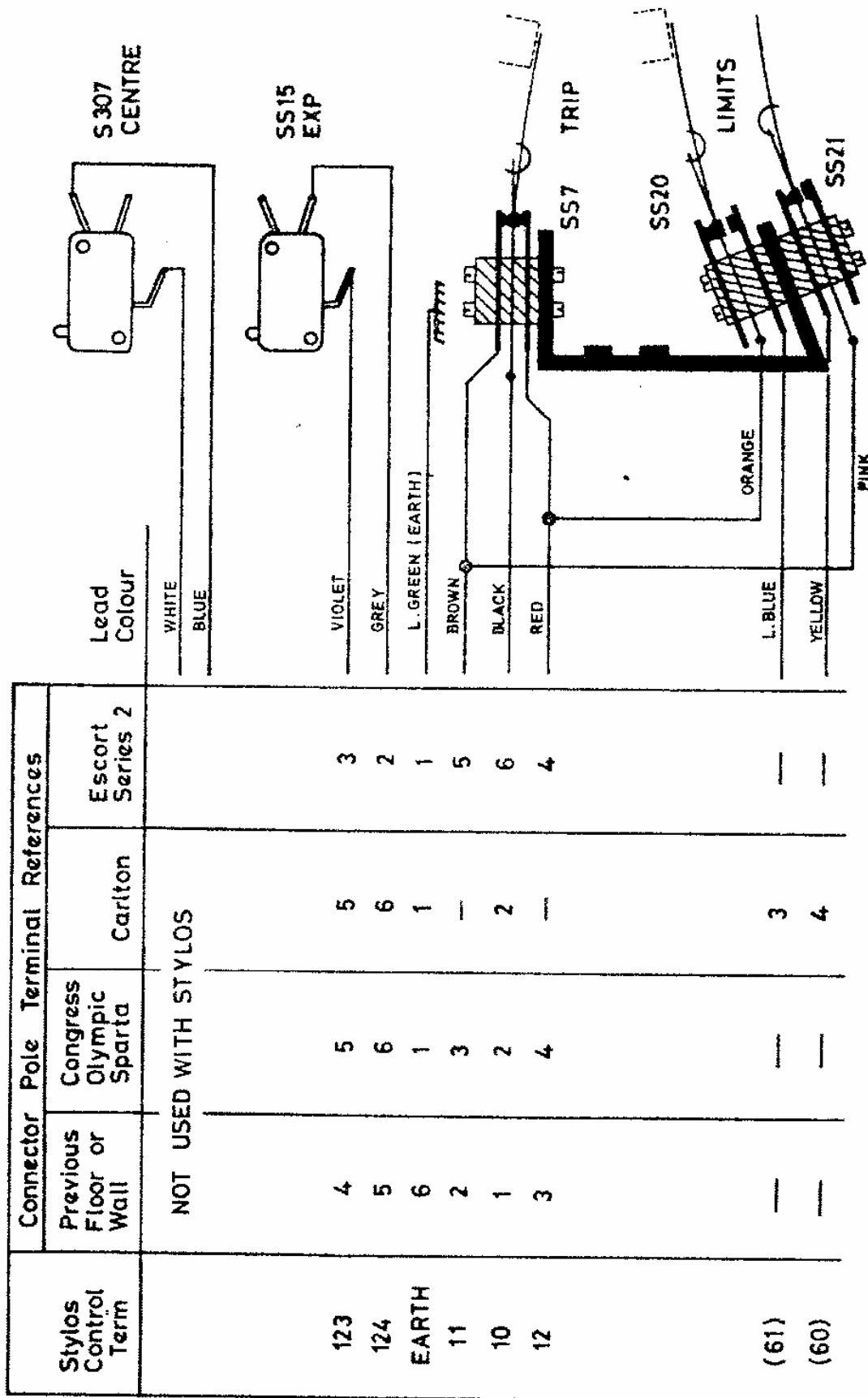
| Stylos Control Term | Connector Pole Terminal References |                         |         |                 |
|---------------------|------------------------------------|-------------------------|---------|-----------------|
|                     | Previous Floor or Wall             | Congress Olympic Sparta | Carlton | Escort Series 2 |
| 123                 | 4                                  | 5                       | 5       | 3               |
| 124                 | 5                                  | 6                       | 6       | 2               |
| EARTH               | 6                                  | 1                       | 1       | 1               |
| 11                  | 2                                  | 3                       | —       | 5               |
| 10                  | 1                                  | 2                       | 2       | 6               |
| 12                  | 3                                  | 4                       | —       | 4               |
| (60)                | —                                  | —                       | 3       | —               |
| (61)                | —                                  | —                       | 4       | —               |



**SECTOGRAPH 2 SWITCHES**

View with cover removed.  
Arm at head end.

**SECTO 2 CONNECTIONS TO STYLOS MOTOR CONTROL**



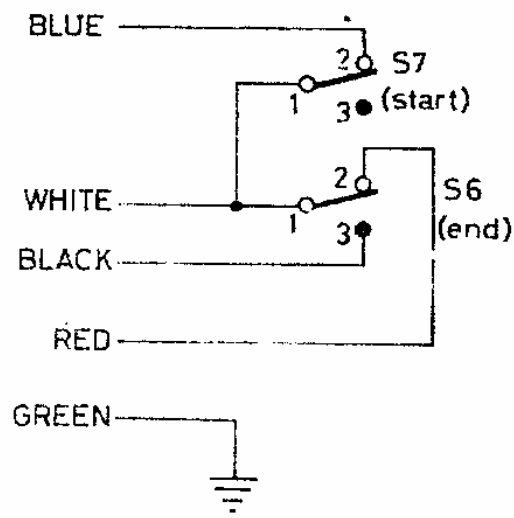
**SECTOGRAPH 4 SWITCHES**

View with cover removed.  
Arm at head end.

**SECTO 4 WIRED FOR SECTO 2 CIRCUIT**

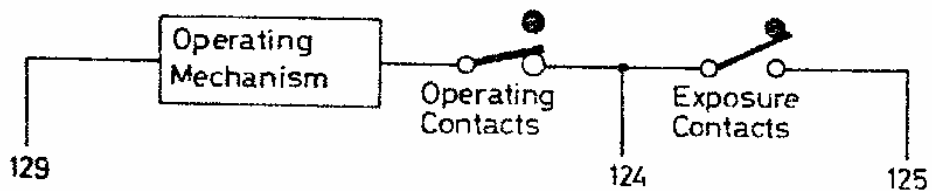
SECTOGRAPH 1 Connections to STYLOS MOTOR CONTROL

| CONTROL TERM | CONNECTOR POLE TERMINAL REFERENCE |                         | LEAD COLOUR |
|--------------|-----------------------------------|-------------------------|-------------|
|              | PREVIOUS FLOOR OR WALL            | CONGRESS OLYMPIC SPARTA |             |
| 10           | 1                                 | 2                       |             |
| 315          | 5                                 | 3                       |             |
| 302          | 2                                 | 4                       |             |
| NOT USED     |                                   |                         |             |
| EARTH        | 6                                 | 1                       |             |



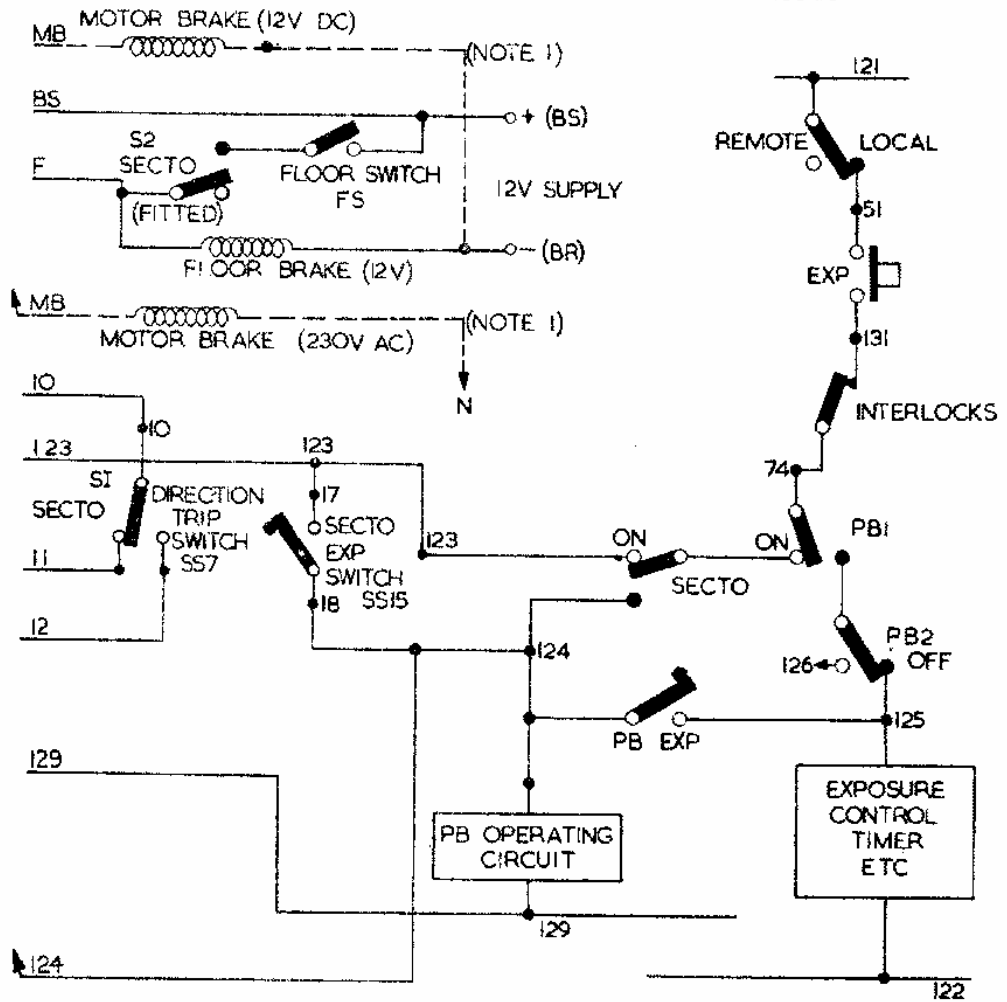
Trip switches S5 and S7 shown set ready for exposure sequence

Potter Bucky Basic Connections. See Dia Inst 2792 for Circuits

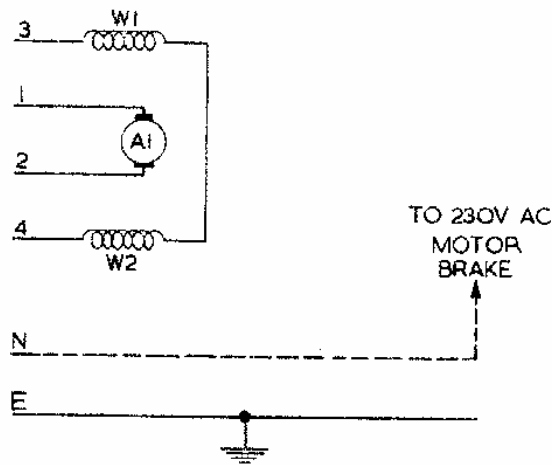


Where the colours are different, the circuit MUST be as shown.

Dia Inst 2806D  
Issue 4

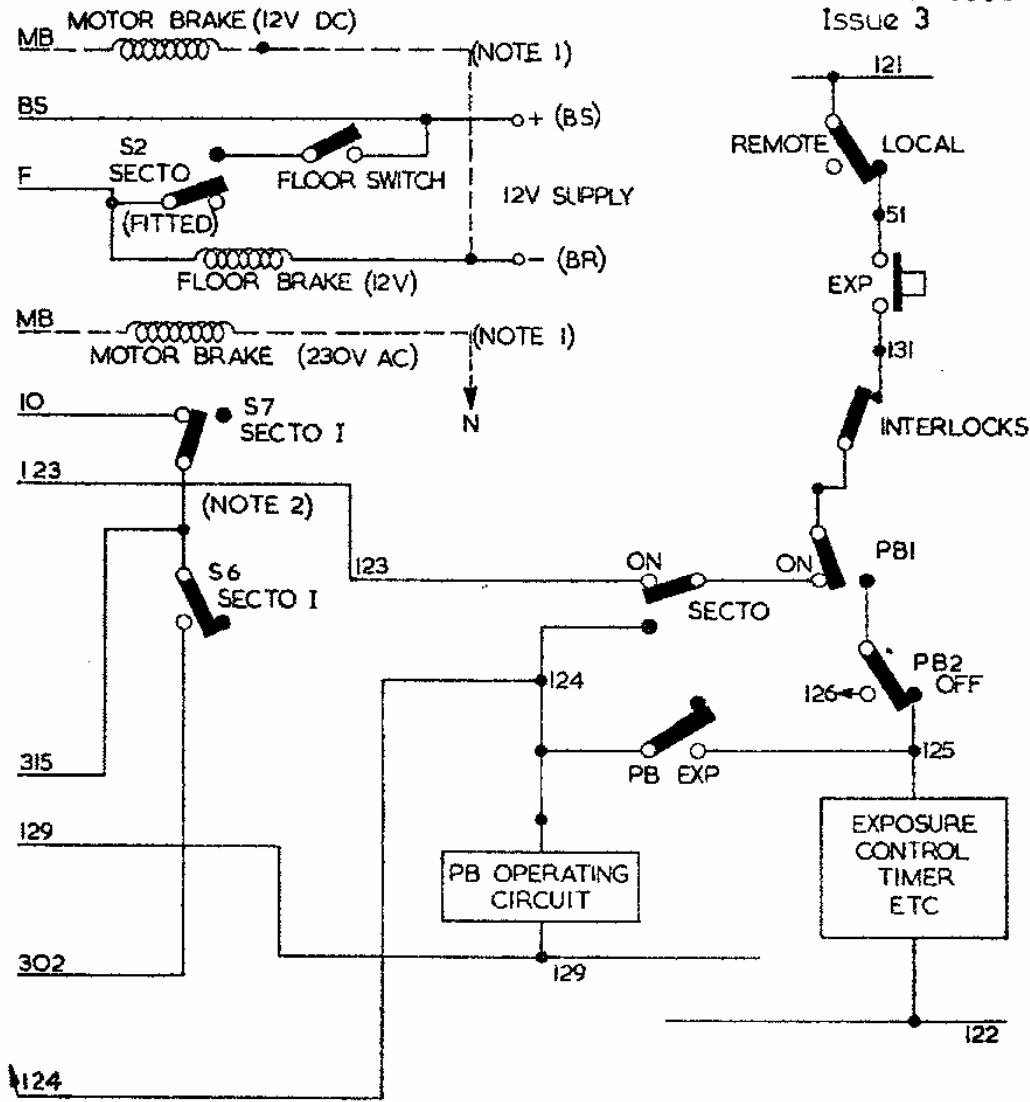


NOTE 1: MDU MOTOR BRAKE  
230V AC or 12V DC



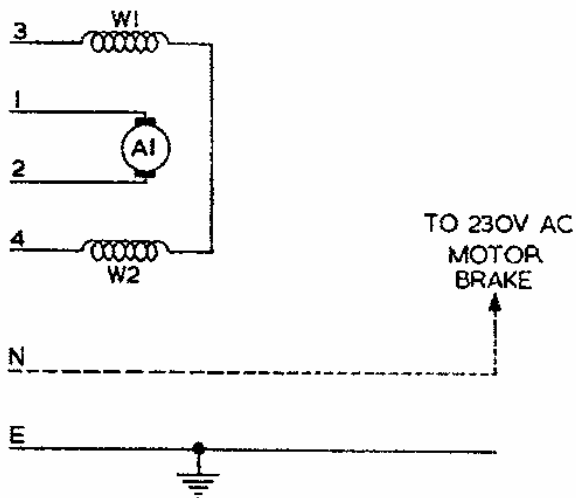
SECTOGRAPH 2  
OUTLINE CIRCUIT  
CONNECTIONS  
WITH TYPICAL  
X-RAY CONTROL  
& STYLOS

(TPL-246/4/675)



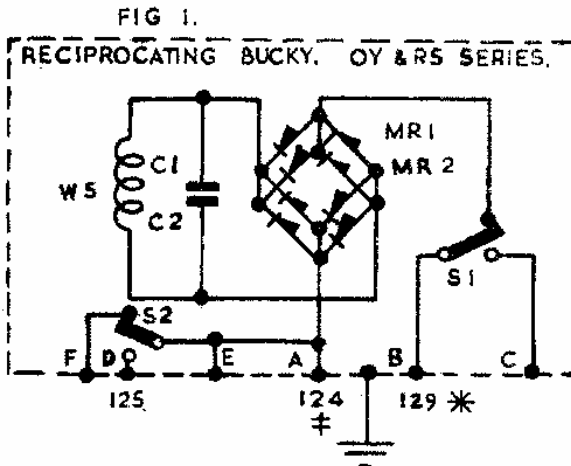
NOTE 1: MDU MOTOR BRAKE  
230V AC or 12V DC

NOTE 2: S6 & S7 set ready.



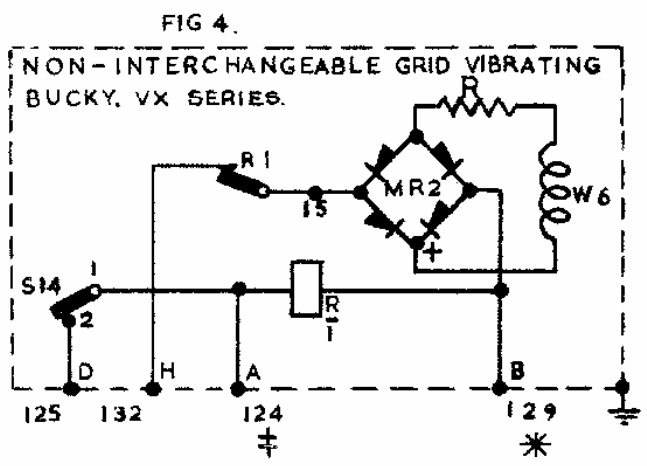
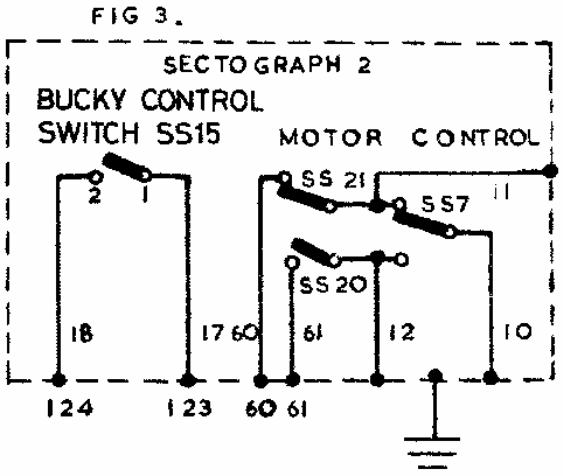
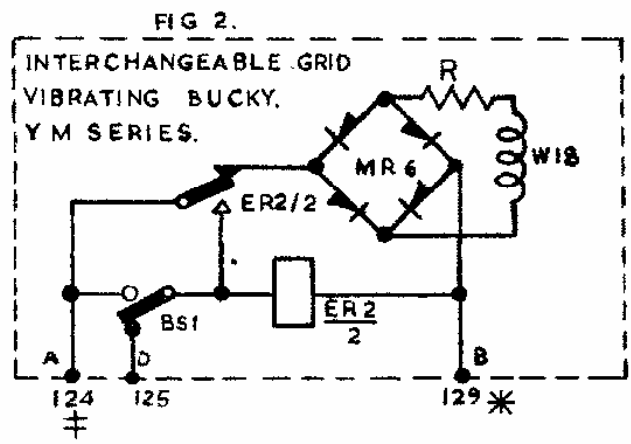
**SECTOGRAPH I  
OUTLINE CIRCUIT  
CONNECTIONS  
WITH TYPICAL  
X-RAY CONTROL**

(See 2806D overleaf)



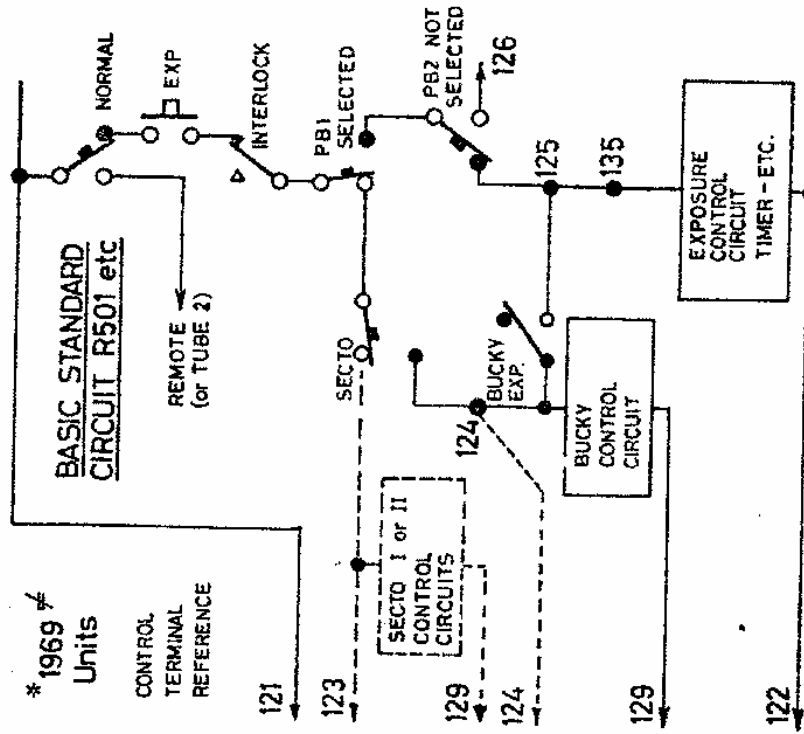
DIA INST. 2792  
(ISSUE 5)

\*RETURN CIRCUIT MAY BE 129, 121 OR 120.  
‡BUCKY 1, TERMINAL 124.  
BUCKY 2, TERMINAL 126.  
N.B. BUCKY FRAME MUST BE  
EARTHED, TERMINAL E IS  
NOT EARTH.



(Resistor R fitted on Vibrating Bucky. See Supp No 1977)





| STYLOS DRIVE CONTROL BOX Terminal Nos.....† |
|---|
| Not used                                    |
| 123   |
| 122   |
| 129   |
| 124   |

\* OTHER X-RAY CONTROL TERMINAL REFERENCES \*

| R4    | R300       | R600 Series† | 1969 Units |
|-------|------------|--------------|------------|
| (120) | (119)      | (129)        | (121)      |
| 123   | 123        | 123          | 123        |
| 121   | 121 or 120 | 121          | 129        |
| 124   | 124        | 124          | 124        |

(121 or 120 or 121) (121) (129)  
in some cases 126)

(121) (120 or 121)(121) (122)

(Equivalent terminals shown in brackets)  
Connect X-ray control terminals to Stylos drive control terminals as shown in table.

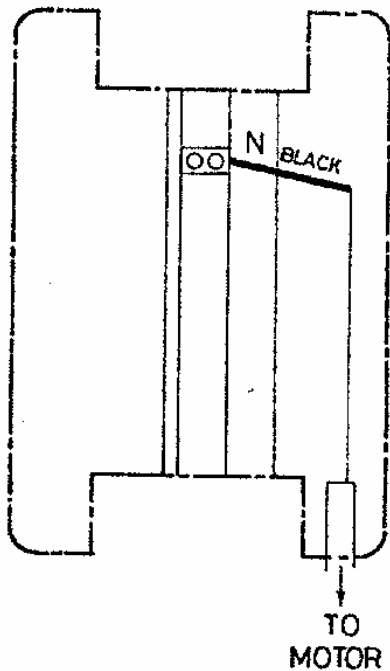
Always check circuit relationship before making connections.

- \* Always check that the X-ray unit is operating correctly before making modifications or interconnecting additional apparatus.
- † 1969 units include R600 Series 2 to 5, R1000, RV, R301, R501.
- ‡ L and N supply to MDU Control box must be the same phase as supply to X-ray control unit.

INTERCONNECTION OF X-RAY CONTROL AND STYLOS MOTOR DRIVE CONTROL FOR SECTOGRAPH

(See Dia Inst 2806 A etc to D1 for control circuits)

STYLOS TOP  
 TERMINALS

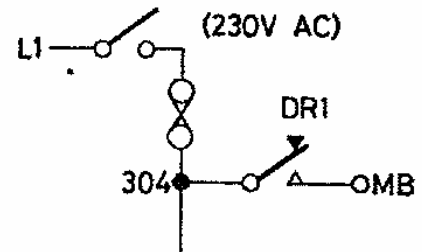


WIRING and IDENTIFICATION

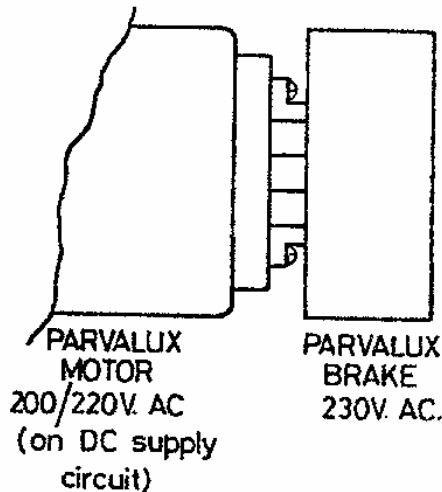
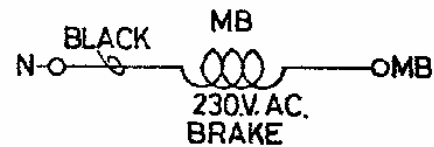
of 230V AC Brake

on 200/220V Motor  
 (Stock No MS 1226)

1. Supply circuit in MDU control box MUST be 230V AC via DR1 as shown in extract from Dia Inst 2806B1 below



2. Connect BLACK lead to terminal N at top of Stylos tubestand.

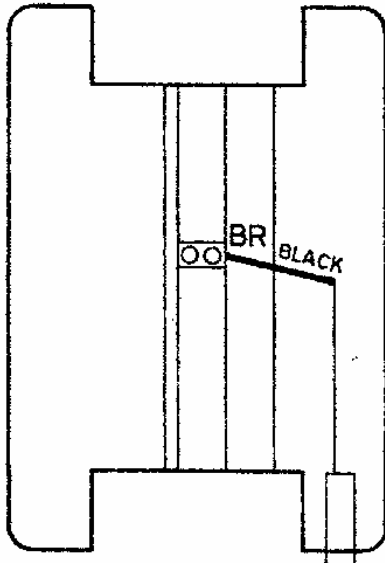


230V AC brake fitted to MDU motors up to units of Serial No XY245. The 230V AC brake is not now available (1971) so a 12V DC brake has been fitted to units from Serial No ZP246 onwards.

When a 230V AC BRAKE and MOTOR is replaced by a motor assembly MS 1226, connection must be as shown above.

When MS 1226 is out of stock, MS 1239 with 12V DC brake will be supplied as replacement and wiring MUST be as shown overleaf on sheet 2.

STYLOS TOP  
 TERMINALS

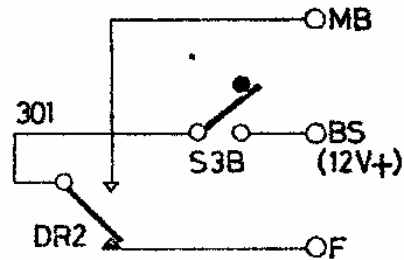


WIRING and IDENTIFICATION

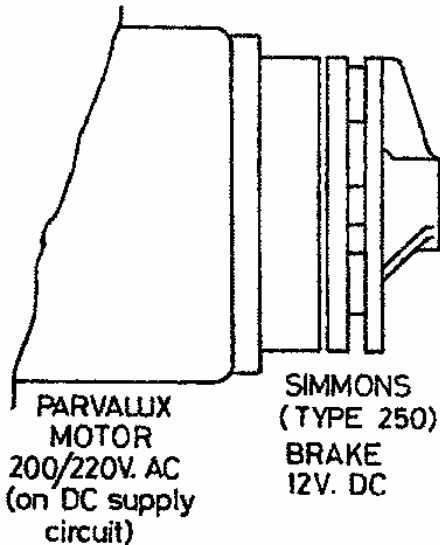
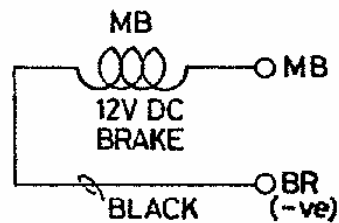
of 12V DC Brake

on 200/220V motor  
 (Stock No MS 1239)

1. Supply circuit MDU control box MUST be 12V DC via DR2 as shown in extract from Dia Inst 2806B2 below.



2. Connect BLACK lead to terminal BR at top of Stylos tubestand.



12V DC brake fitted to MDU motor to units of Serial No ZP246 onwards (because the original 230V AC brake is not available).

When motor assembly with 12V DC brake (Stock No MS 1239) is used to replace the motor assembly with the 230V AC brake, the connections of the BLACK lead at the top of the Stylos tubestand and DR2 contact to MB must be connected as shown above. (See sheet 1 for original 230V AC circuit).