

ATW 22001

• SYMBOLS • RULES & CONVENTIONS

(Incorporating B.S.I. Standards)

for use on
Line Telecommunication Equipment
WIRING DIAGRAMS



ALPHABETICAL INDEX

TO

ATW 22001

ALPHABETICAL INDEX TO ATW 22001 ISSUE 3

Abbreviations - see Standard Phrases		Capacitor, (Contd.)	
A.C. - see Alternating Current		General	1.10.1 3.2.4
Access Point - see Plugs & Jacks			3.6.8(a)
Alloy Contacts - see Relay Contacts		Three Terminal	1.10.4 1.10.6
Alternating Current		Values	1.10.11
Symbol	1.27.2	Variable	1.10.3
Generator - see Generator		with intentional Inherent Resistance	1.10.5 1.10.6
Motor - see Motor		Cathode - see Valve	
Alternative		Cathode Ray Tube	1.29.2 1.29.3
Connexions - see Connexion			3.2.4 3.6.8(b)
Conventions - see Conventions		Chassis - see Frame	
Jumper - see Jumper		Chargeable Time Clock - see Clock 44	
Voltage - see Voltage		Circuits, Two or more on same Plug-in Unit or Strip Mounted set	3.7.8(k)
Amendments to ATW 22001 - see Introduction		Clip	
Ammeter	1.30.2	Connexion	1.16.7
Ampere Hour Meter	1.30.3	Test, Fuse	1.16.8
Anode-see Valve		Clock 44	1.18.11 2.7.1
Apparatus, Layout of.	4.3.15		3.2.4
Application of ATW 22001 - see Introduction		Coder - see Director	
Auxiliary Screw Arc	1.20.7 3.5.6	Coil,	
		Heat	1.26.2 3.2.4
		Induction	1.8.6 3.2.4
			3.6.8(d)
		Relay - see Relay Coil	
		Repeating - see Transformer, Line	
		Retard - see Inductor	
		Colour of Wires - see wire	
Balanced Inductor - see Inductor		Common	
Ballast Resistor - see Resistor		Connexions - see Connexions	
Bank & Jack Multiple Connexion	1.33.8	Services	1.36.1 - 1.36.3 ³
Bank contacts in wiring runs	3.7.8(b)		6.1.4 7.1.3
Banks & Wipers,		Component Designations,	
Motor Uniselector	1.21.3 1.22.5	General	3.2.4
	1.23.1 1.24.1	In Pots	3.6.8 (e)
	1.24.4 3.5.6	Principles	3.1.1
Selector	1.20.6 1.24.1	Relays	3.3.5 3.4.5
	1.24.5	Rules for	3.1.2 3.1.3
Uniselector	1.20.1 to 1.20.3	Condensers - see Capacitors	
	1.20.5 1.23.1	Conductor,	
	1.24.1 to 1.24.3	Crossing	1.32.6
	2.6.6 3.5.6	Symbol for	1.32.1
	3.7.8(j)	Lead covered	1.32.13 1.33.4
Vertical marking	1.21.1 1.24.6		1.33.5
	3.5.6	Screened	1.32.10
25 pt Bank	1.20.2	Size - see Wire	
Battery		Tapping	1.32.7
Supply - see Common Services		Type - See Wire	
Connections to simple make and simple break contacts	5.2.15	Connexion,	
Bell	1.26.8 3.2.4	Alternative	1.32.2
Brackets on Diagrams - see Diagrams		Cabled	4.2.14
Break Contact Relay - see Relay Contacts		Clip - see Clip Conn.	
Break Jack - see Jack		Common	1.32.8
Bridge Rectifier - see Rectifier		Shelf Jack 'U' points	8.1.4
Bulb Resistor - see Resistor		Strip - see Strip Conn.	
Buzzer	1.26.9 1.26.10	Variable	1.34.1
	2.7.3 3.2.4	to wiring Tags - see Wiring	
		Contact,	
		Interrupter - see Interrupter	
		Mechanically operated, Motor	
		Uniselector - see Motor Uniselector	
		Mechanically operated - (see also Spring Sets)	1.18.1 to 1.18.3
		Pulse spring	1.18.10
		Relay - see Relay	
		Resetting Plunger & Marked Code Pin.	1.18.9 3.5.6
		Units, Numbering	5.1.6 to 5.1.8
		Conventions	5.2.17
Cable,			
Lead covered - see Conductor			
Signs on diagrams	1.32.11 1.32.12		
Switchboard	1.33.2 1.33.3		
	5.2.16		
& Wires Screened	1.33.7 5.2.16		
Cabled Connexions - see Connexions			
Capacitor,			
Electrolytic	1.10.2		
Four Terminal triple	1.10.10		

Conventions, Alternative	8.1.3	Earth,	
Cord	1.33.1	Symbol - see Common Services	
Cradle Switch - see Switch		Connexion to simple make and simple break contacts	5.2.15
Cross Connexions on Diagrams - see Diagrams		Electrolytic Capacitor - See Capacitor	
Cross References on Diagrams - see Diagrams		Element with symmetrical, non-linear current/voltage characteristic	1.12.3 3.2.4
		Envelope, Valve - see Valve	
		Explanatory Figures on Dgms - see Diagrams	
D.C. - see Direct Current			
Designation of components - see Component			
Diagrams,			
Alternative voltages	5.1.5	Figures on Diagrams - see Diagrams	
Brackets etc., Use of,	5.2.17 5.3.17	Filament - see Valve, Cathode	
Boundary Line	4.1.5	Flag Indicator - see Indicator	
Colour of wires on - see Wire		Flexible Cord - see Cord	
Cross Connexion	9.1.1 to 9.1.6	Fore end Slugs on Relays - see Relay	
" " Layout & sign writing	9.1.5	Four windings on Relays - see Relay	
" " References	4.1.9	Four unit Rectifier - see Rectifier	
Dimensions of	4.1.1 6.1.1	Frame (chassis)	1.27.8
	7.1.1 8.1.1	Fuse	1.26.1 3.2.4
	9.1.1		3.6.8(c) 6.1.2
Explanatory Figures	5.1.4	Fuse, MDF	7.1.4
Figure numbers, changes to	5.1.3	Fuse Test Clip - see Clip	1.26.4
Figures on	5.1.2 7.1.3		
	8.1.2 9.1.2		
Filing Margin	4.1.2		
Insets for Contact Units	5.1.7 to 5.1.9		
Layout of	5.1.1		
Main Body of	4.1.3	Gas Discharge Tube - See Discharge Tube	
Notes on	4.1.8 7.1.2	Generator,	
Pre-2000 type Routed Schematic	4.2.10	Alternating Current	1.27.4
Printing on	4.1.7	Direct Current	1.27.3
Rules for all Routed Schematic	Sect. 5	Hand	1.26.7 3.2.4
" other than Common Service	" 6	Voice Frequency	1.27.5
" Rack Common Service	" 7		
" Shelf Jack	" 8	Grid, Valve - see Valve	
" Cross Connexion	" 9		
Shelf Jacks	8.1.1 to 8.1.5		
Space for Manufacturers Code	4.1.6		
Specimen	0.2.6		
Sub-Division of,	5.1.2 to 5.1.4		
Tees, use of	5.3.17(c) to 5.3.17(e)	Hand Generator - see Generator	
	4.1.2 4.1.4 4.5	Heat Coil - see Coil, Heat	
Title Box on.		Heater - see Valve, Cathode	
wires, colours of - see wire		High Impedance Relays - see Relay	
wires entering or leaving	6.1.3	High Speed Relays - see Relay	
Dial,		Homing Arc U/S - see Banks & Wipers	
Auto	1.19.3 1.19.4	Howler,	
	3.2.4	Designation	3.2.4
Spring Layout	2.7.2	Symbol	1.26.10
Trigger " "	2.7.2		
Differentially connected Relays - see Relay			
Dimensions of Diagrams - see Diagram			
Diode - see Valve			
Direct current			
Symbol	1.27.1	Indicator,	
Generator - see Generator		Drop type	1.2.8
Motor - see Motor		Flag or Doll's Eye	1.2.12
Director, Coder & Sender	6.2.9	Induction Coil - see Coil Induction	
Discharge Tube, Gas filled	1.28.9(g)	Inductor,	
Dolls Eye Indicator - see Indicator		Balanced	1.8.8
Drive Magnets - see Magnet		General	1.8.7 3.2.4
Drop Type Indicator - see Indicator		Iron Core	1.8.8
Dust Core Transformer - see Transformer		Intentional Inherent Resistance in Capacitor - see Capacitor	
		Interrupter,	
		U/S Motor - see Motor U/S	
		Cam operated	1.18.8
			Issue 2

Interrupter (Contd.)			
Rotary	1.18.8 3.2.4		Make before Break Contacts, Relay - see Relay Contacts
Slr's, U/S & Pulse Regenerator	3.5.6		Make Contacts, Relay - see Relay Contacts
Introduction to ATW 22001,			Margin on Diagrams - see Diagrams
General	0.1.1		Marked Code Pin - see Contact, Resetting Plunger, etc.
Diagrams Covered	0.1.2		Marking Bank, Vertical - see Banks and Wipers
Composition of document	0.1.3		M.D.F. Fuse - see Fuse
Application " "	0.1.4 0.2.4		" Protector - see Protector
Amendments to "	0.2.5		Mechanically Operated Contacts - see Contacts
Specimen diagrams - see diagram			Mechanically " Spring Sets - see Spring sets
Iron Core Inductor - see Inductor			Mercury Contacts - see Relay Contacts
" " Transformer - see Trans-former			Mercury Switch Layout - see Relay Switch
Isolation Jack - see Jack Test			Meter
			Meter 10 Step - see Relay Ten Step
			Microphone
			Motor,
Jack,			Alternating Current
Break	1.14.3		Direct "
Layouts	2.3.4 2.3.5 2.9.1 to 2.9.4		U/S, Abridged Symbol
Multi point	1.14.1 1.14.2 1.14.5		" Banks & Wipers - see Banks & Wipers
Multiples - see Bank and Jack			U/S Designation
Operator	1.14.4 3.2.4		" Drive Magnet - see Magnets
Routine Test	1.14.2		" Latch Magnet and Test Key
Selector & R/S	1.14.11 3.2.4		" Magnet Interrupter
Shelf, Dgms. - see Diagrams			" Mechanical Contacts
Test, Isolation	1.14.9 3.2.4 3.6.8(f)		" Layout
U Point - see Plugs & Jacks			" Symbol Application
Uniselector, Test	1.14.10 3.2.4		
Jumper,			Mutual Conductance, Variable - see Valve
General Symbol	1.32.3		Multi point Jack - see Jack
Alternative	1.32.4		" " Plug - see Plug
			" pole switch - see Switch
			Multiple on Banks and Jacks - see Bank and Jack
Key Units			
Lever Type	1.13.1 to 1.13.8 2.3.1 3.2.4 3.6.8(g)		Non Inductive Resistors - see Resistor
Numbering in Insets - see Diagrams Inset			Non Inductive Shunt Integral on Relays - see Relay
Plunger Type	1.13.9 to 1.13.14 2.3.2 3.2.4 3.6.8(g)		Non Inductive Winding on Relays - see Relay
			Notes on Diagrams - see Diagrams
Lamp	1.26.11 3.2.4		
Lamp Resistor - see Resistor			
Latch Magnet, Motor U/S - see Motor U/S			
Latching Relay - see Relay			
Layouts - also see under component	Sect. 2		One Winding on Relay - see Relay
Layout of Apparatus - see Apparatus			Operators Induction Coil - see Coil Induction
" " Diagrams - see Diagrams			Operators Jack - see Jack
Lead Covered Cable - see Conductor			" Plug - see Plug
Lever Keys - see Key Units			
Line Transformer - see Transformer			
Link U or Wire - see U Link			
Magnet,			Pentode - see Valve, Various Types
Drive, Motor U/S	1.22.1 3.5.6		Phrases, Standard
Drive, Selector & U/S	1.19.9 2.7.7 3.5.6		Pin and Socket, Test Type
Mechanical Pulse Regenerator	3.5.6		Platinum Contacts - see Relay Contacts
			Plug,
			Multi Point
			Operators'
			Shelf, looping on
ATW 22001 index			

ATW 22001

• SYMBOLS • RULES & CONVENTIONS

(Incorporating B.S.I. Standards)

for use on
Line Telecommunication Equipment
WIRING DIAGRAMS



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CONTENTS AND CURRENT ISSUE NUMBERS OF PAGES

Page No.	Issue No.	Contents	Page No.	Issue No.	Contents
Facing	-	Agreement Page			LAYOUTS
		INTRODUCTION	2.1	2	Relays
0.1	3	General, Diagrams covered by, Composition and Application of Document	2.2	2	"
			2.3	3	Keys and Jacks
0.2	3	Amendments, References (Specimen diagrams)	2.4	3	Mechanically operated spring sets (selectors)
		SYMBOLS	2.5	3	Mechanically operated spring sets (selectors)
1.1	2	Relay Coils - 600 & 3000 Type	2.6	3	Selectors
1.2	2	Relay Coils Miscellaneous	2.7	3	Clock 44, Dials, Buzzer No. 23, Resistors, Two Motion selector magnet
1.3	2	" " "			
1.4	2	" " Notes	2.8	3	Valve Holders
1.5		Spare	2.9	1	Jacks and Lamp Jack
1.6	2	Relay Contacts	2.10	1	Switch Rotary
1.7	2	" " Notes etc.			COMPONENT DESIGNATIONS
1.8	2	Transformers and Inductors	3.1	3	Principles, Rules, Application of rules
1.9	3	" " "			
1.10	3	Capacitors	3.2	3	General designations (Table 1)
1.11	3	Resistors	3.3	1	Relay designations (Table 2)
1.12	1	Elements with non-Linear Characteristics	3.4	1	Relay designations (")
1.13	3	Key Units	3.5	3	Two-motion selector, Uniselector, Motor Uniselector and Pulse regenerator designations (Table 3)
1.14	3	Jacks and Test Jacks			
1.15		Spare	3.6	3	Teleprinter-designations, (Table 4)
1.16	2	Plugs, Clips etc.			Additional rules
1.17	3	Plugs and Jacks (U points)	3.7	3	Additional rules
1.18	3	Mechanically operated contacts. Clock 44	3.8		Spare
1.19	2	Telephone Instrument items, Selector Magnets			RULES APPLICABLE TO ALL ROUTED SCHEMATIC, SHELF JACK AND CROSS CONNEXION DIAGRAMS
1.20	2	Selector wipers and banks	4.1	2	Dimensions, Filing margin and title box, Main body of diagram, Standard title box, Space for Manufacturers code, Printing, Notes, Connexions by cross reference, Boundary Line
1.21	3	Vertical Marking Bank Motor Uniselector			
1.22	3	Motor Uniselector (Contd.)	4.2	2	Pre 2000 type diagrams, Wire colours, Colour abbreviations, Size of conductor and type of insulation, Cabled connexions
1.23	3	Uniselector and Motor Uniselector Application of bank symbol			
1.24	3	Banks and Wipers, Notes on	4.3	3	Layout of apparatus, Standard phrases
1.25		Spare			
1.26	2	Protectors & Guards, Calling Equipt.	4.4	3	Standard phrases
1.27	2	Power, Motors and Generators	4.5	2	Standard title box with dimensions, typical entries
1.28	2	Valve Components	4.6		Spare
1.29	2	Cathode Ray Tube, Valve Notes			
1.30	2	Electrical Measuring Instruments			
1.31		Spare			
1.32	3	Conductors and Connexions			
1.33	3	" " " (Contd.)			
1.34	3	Variable connexions			
1.35	3	Switches			
1.36	3	Common Services			

Continued overleaf.

CONTENTS AND CURRENT ISSUE NUMBERS OF PAGES (cont'd)

Page No.	Issue No.	Contents	Page No.	Issue No.	Contents
		<u>RULES APPLICABLE TO ALL ROUTED SCHEMATIC DIAGRAMS</u>			<u>RULES APPLICABLE TO CROSS CONNEXION DIAGRAMS</u>
5.1	3	General, Sub-division of diagrams, Changes to Fig. numbering on amended diagrams, Explanatory Figs. Alternative voltages, Contact unit numbering, Contacts not associated with relays, magnets etc. Typical insets, Typical insets for diagrams that include keys	9.1	2	Sizes, Figures, Equivalent routed schematic diagrams, Associated routed schematic diagrams, Layout and signwriting information, Notes
			9.2		Spare
5.2	3	Distance between symbols, Wiring routes, Order of wiring on relays, Uniselectors bank wiring, Connexions to wiring tags, Connexions to simple make or simple break contacts, Pairs, triples and screened wiring, Conventions			
5.3	3	Conventions, Resistor and Spark Quench connexions, Layout Sketch			
5.4		Spare			
6.1	2	<u>RULES APPLICABLE TO ROUTED SCHEMATIC OTHER THAN RACK COMMON SERVICE DIAGRAMS</u> Sizes, Fuse provision, Leads entering/leaving a diagram, Common services, Order of Wiring two-motion selectors			
6.2	2	Order of wiring on plug-in relay sets, Uniselectors on plug-in relay set, "U" points which make contact, Directors, coders and senders on channel type bases, Looping on shelf plugs			
7.1	2	<u>RULES APPLICABLE TO RACK COMMON SERVICE DIAGRAMS</u> Sizes, Notes, Fig. per common service, fuse and tag allocations			
7.2		Spare			
8.1	3	<u>RULES APPLICABLE TO SHELF JACK DIAGRAMS</u> Sizes, Fig. numbers, Alternative conventions, Connexions to "U" points, "U" points which make contact			
8.2		Spare			

INTRODUCTION TO ATW 22001

- 1. General.** This document is issued to show the symbols, rules and conventions which have been agreed by the Exchange Wiring Information Sub-Committee (W.S.C.) of the British Telephone Technical Development Committee (B.T.T.D.C.), for the preparation of standardized and semi-standardized wiring diagrams, for use in the manufacture and maintenance of line telecommunication equipment.

In this document, the component designations are in accordance with methods now common in the radio and telecommunications industry.

In ATW 22000, component designations are in accordance with the practices in general use by telephone engineers prior to the adoption by radio and telephone engineers of a common method of designating components [B.S. 530(1948) supplement No. 1(1950)]

The methods adopted in designating components in basic documents will, in general, determine whether the equivalent wiring diagrams are to be in accordance with ATW 22000 or ATW 22001.

- 2. Diagrams Covered.** The diagrams to which this document applies are:-

- (a) Routed schematic diagrams, including rack common service diagrams, which show the schematic circuit arrangement with wiring routing details. These diagrams may be either standardized or semi-standardized. (Specimen diagrams see item O.2.6).
- (b) Shelf jack diagrams. These show a conventional view of the shelf jack of the circuit to which they apply and include the rack wiring and cabled connexions that are terminated on that item. This type of diagram may also be prepared for strip mounted sets, in which case the conventional view of the shelf jack is replaced by one of the strip connexion.

These diagrams may be either standardized or semi-standardized. (Specimen diagrams see item O.2.6).

- (c) Cross connexion diagrams. These show the connexions from the circuit to which they apply to the T.D.F., I.D.F. and M.D.F. together with the jumpering required to connect that circuit to associated circuits. They also include strip connexion layout information for the circuit to which they apply.

These diagrams are standardized. (Specimen diagrams see item O.2.6).

- 3. Composition of document.** This document is composed of nine sections. Each section carries decimal numbering of the individual pages, designed to permit expansion (if necessary), and may be identified by the first figure of the numbering scheme.

- (a) Section 1. Symbols and conventions. (Designations, tag numbering or lettering, values etc. typical only).
- (b) Section 2. Layouts (not to scale) of items of apparatus.
- (c) Section 3. Component designations.
- (d) Section 4. Rules applicable to all Routed Schematic, Shelf Jack and Cross Connexion diagrams.
- (e) Section 5. Rules applicable to all Routed Schematic diagrams.
- (f) Section 6. Rules applicable to Routed Schematic other than Rack Common Service diagrams.
- (g) Section 7. Rules applicable to Rack Common Service diagrams.
- (h) Section 8. Rules applicable to Shelf Jack diagrams.
- (j) Section 9. Rules applicable to Cross Connexion diagrams.

- 4. Application.** Details of the circuit arrangement, equipment layout, relay information etc., are contained in basic documents prepared by the G.P.O. The basic diagram (e.g. TL, AT, TG, TP, SA) shows the schematic circuit arrangement, the associated specification (e.g. T, TG, S) gives details of items of equipment to be used, layout of items, cabling terminations etc.

4. (Continued)

Details of wiring, routing, colour codes etc., conforming to the rules of this document together with the basic information are combined for the production of wiring diagrams. Rearrangement of the layout of the diagram and sub-division of figures may, however, be necessary for clarity.

In the symbols section, the symbols and designations are shown full size. When dimensions are given they are for guidance only. Minor variations in size are permissible, in particular when stencils are used. The figures in the small box insets refer to B.S. 530 item numbers. The application of symbols, rules, conventions etc. is illustrated in the specimen diagrams to which reference is made in item 6. The specimen diagrams are issued separately and are full size.

5. Amendments. The document and individual pages will be advanced in issue as each change is made.

When the matter on one page of a sheet which is printed both sides is amended, the complementary page will be advanced in issue also, and recorded as "no amendment".

New and amended items will be starred, the star being removed at the next advance in issue.

Record of all changes is shown in the change sheets.

*6. References

SPECIMEN DIAGRAMS

ATW 51010	SPECIMEN DIAGRAM FOR PLUG IN APPARATUS (RELAY SET WITH REGENERATOR)
ATW 51030	" " " " " (1st. CODE SELECTOR)
ATW 51050	" " " STRIP MOUNTED EQUIPMENT (POSITION CIRCUIT, MANUAL POSITION, ETC.)
ATW 51070	" " " A STRIP MOUNTED SET (UNIT AUTO No. XX OUTGOING JUNCTION)
ATU 51080	" SHELF JACK DIAGRAM (2000 TYPE SELECTOR)
AU 51090	" " " " (PRE-2000 TYPE RELAY SET)
51091	
ATU 51100	" ROUTINER UNIT STRIP CONNEXION DIAGRAM
51101	
ATX 51110	" CROSS CONNEXION DIAGRAM (SUBSCRIBERS LINE CIRCUIT)
ATX 52450	" " " " (RELAY SET)
SAW 80110	" WIRING DIAGRAM FOR PLUG IN APPARATUS (RELAY SET WITH MORE THAN ONE CIRCUIT PER BASE)
TGW 50990	" WIRING DIAGRAM FOR A TELEGRAPH RELAY SET
TLW 31010	" DIAGRAM CHARGEABLE TIME CLOCK CIRCUIT (EQUIPMENT ON M.A.R. AND MANUAL POSITION)
TPW 33010	" " RACK COMMON SERVICES (WIRING COMMON TO APPARATUS ON RACK)

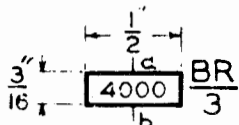
Other basic documents
B.S. 530

SYMBOLS

RELAY COILS 600 TYPE

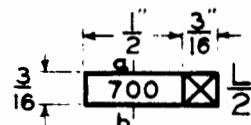
FOR LAYOUTS SEE P. 2.1 ETC.
FOR GENERAL NOTES SEE P. 1.4.

1
WITH ONE
WINDING



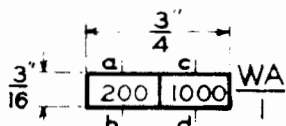
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3
WITH FORE
END SLUG



37.2

2
WITH TWO
WINDINGS



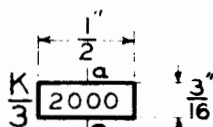
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4

RELAY COILS 3000 TYPE

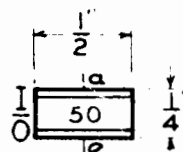
FOR LAYOUTS SEE P. 2.1 ETC.
FOR GENERAL NOTES SEE P. 1.4

5
WITH ONE
WINDING



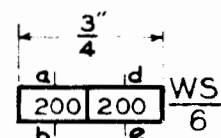
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11
HIGH IMPEDANCE
(IN SPEECH
CIRCUITS ETC)



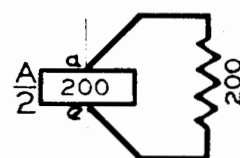
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6
WITH TWO
WINDINGS

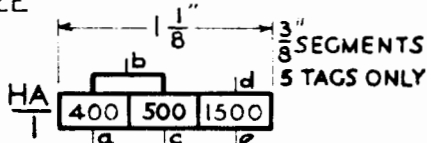


37.6

*12
WITH INTEGRAL
NON-INDUCTIVE
SHUNT

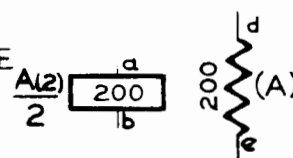


*7
WITH THREE
WINDINGS

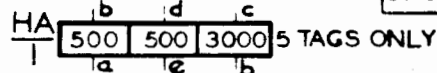


37.6

13
WITH SECOND
WINDING
NON-INDUCTIVE

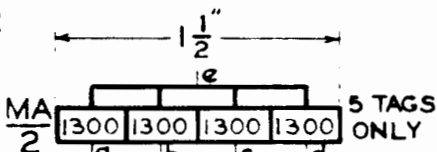


(b)



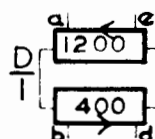
NOTE:-
THE COMMON TAG MAY BE SHOWN
SEPARATELY FOR EACH WINDING
WHEN NECESSARY FOR CLARITY IN
DRAFTING, AS IN (b) ABOVE

*8
WITH FOUR
WINDINGS



NOTE:-
THE COMMON TAG MAY BE SHOWN
SEPARATELY FOR EACH WINDING
WHEN NECESSARY FOR CLARITY IN
DRAFTING (AS ITEM 7b)

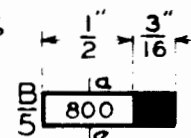
14
SHUNT
FIELD



LINE WINDING a-e.
NON-OPERATE WITH
CURRENT IN
DIRECTION OF
ARROWS.
POLARISING
WINDING b-d

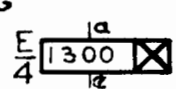
NOTE:-
COIL TAG LETTERS & ARROWS OF
EITHER COIL MAY BE REVERSED FOR
DRAFTING CONVENIENCE.

9
SLOW RELEASING
(HEEL END SLUG)



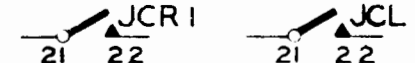
37.1

10
SLOW OPERATING
(FORE END SLUG)



37.2

15
LATCHING

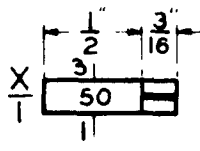
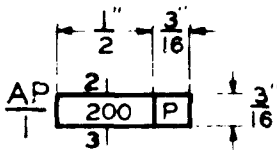
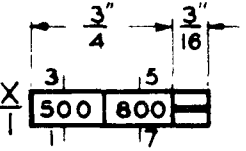
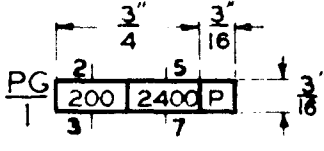
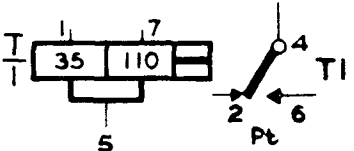
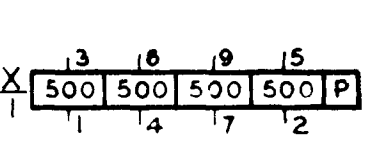
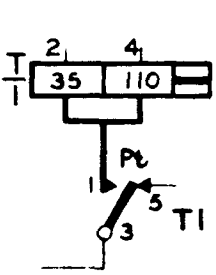
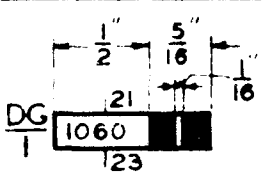
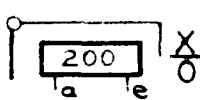
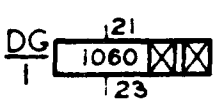
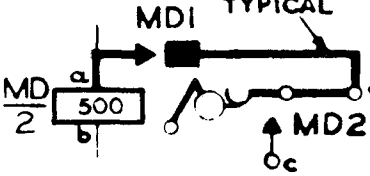
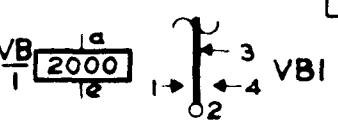


NOTE:-
R IS RELEASE COIL
L IS LATCH COIL

SYMBOLS

RELAY COILS MISCELLANEOUS

FOR LAYOUTS SEE P.2.1 ETC.
FOR GENERAL NOTES SEE P.1.4.

1. HIGH SPEED WITH SINGLE COIL  OTHER REFERENCE - 2.1.3 & 7	9 POLARISED WITH ONE WINDING  OTHER REFERENCE - 2.2.3
2 HIGH SPEED WITH DOUBLE COIL  OTHER REFERENCE - 2.1.4 & 8	10 POLARISED WITH TWO WINDINGS  OTHER REFERENCE - 2.2.4
*3 HIGH SPEED P.O. TYPE SINGLE COIL WITH TAPPING  OTHER REFERENCE - 2.1.6	11 POLARISED WITH FOUR WINDINGS  OTHER REFERENCE - 2.2.4
*4 HIGH SPEED SIEMENS TYPE SINGLE COIL WITH TAPPING  OTHER REFERENCE - 2.1.9	12 INDICATOR FLAG OR DOLL'S EYE TYPE  OTHER REFERENCE - 2.2.4
5 VERY SLOW RELEASING  NOTE:- USED FOR THERMAL RELAYS ETC.. OTHER REFERENCE - 2.2.5.	13 TRIP COIL OR SOLENOID  OPENS THE LATCH WHEN ENERGISED
6 VERY SLOW OPERATING  NOTE:- USED FOR THERMAL RELAYS ETC OTHER REFERENCE - 2.2.5.	14 10 STEP RELAY  OTHER REFERENCE - 2.2.6
7 VIBRATOR  WHEN 1 & 4 ARE NOT FITTED 2 & 3 BECOME 1 & 2 OTHER REFERENCE - 2.2.8	15 METER  OTHER REFERENCE - 2.2.7
8 INDICATOR DROP TYPE 	

SYMBOLS

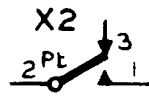
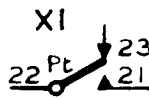
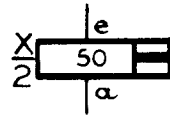
RELAY COILS MISCELLANEOUS (CONT'D)

FOR LAYOUTS SEE P. 2·1 ETC,
FOR GENERAL NOTES SEE P.1·4.

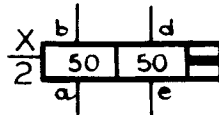
* 1

HIGH SPEED WITH TWO
CHANGE-OVERS.

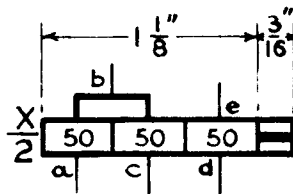
WITH ONE
WINDING



WITH TWO
WINDINGS



WITH THREE
WINDINGS



OTHER REFERENCES — 1·1·7, 1·4·10 & 2·1·5

NOTES CONCERNING RELAY COILS

Coils with separate N.I. windings

1. When a relay includes an N.I. winding brought out to separate tags, that winding is indicated by "(2)" adjacent to the relay designation as in item 1.1.13.

Coil Windings

2. On 3000 type relays all coils are wound in the same direction. The inner (start) end of any winding is connected to the tag first in the alphabetical sequence of tag designations allocated for the particular winding. The outer (finish) end is connected to the second tag allocated for the winding in the alphabetical sequence. Relays with three or more coils require two or more winding-ends brought to a common tag or tags. Any tag may be used as a common, depending on constructional design.
3. On 600 type relays all coils are wound in the same direction. On a relay with one winding tag "a" is the inner (start) end and tag "b" the outer (finish) end of the winding. On a relay with two windings, tags "a" and "c" are inner (start) ends and tags "b" and "d" are outer (finish) ends of the windings.
4. When the function of the relay permits, earth shall be wired to the inner end and battery to the outer end of the winding.

Tag Allocation

5. Allocation of tags shall comply with the relevant relay card.

Coil Resistances

6. The resistance in ohms shall be inserted in the rectangle.
7. If the resistance of a coil is varied (to suit varying conditions) the different values of resistance shall be shown as detailed in 5.1.5.

Differentially Connected relays

8. Differentially connected relays to be indicated by note on Routed Schematic Diagrams.

Slow Relays etc.

9. The convention indicating that relays are Slow Operating, Slow Release, High Speed and Polarised etc. may be shown at either end of the coil symbol as may be necessary in drafting.

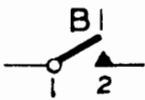
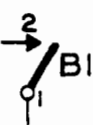
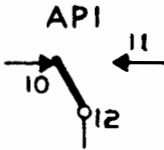
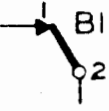
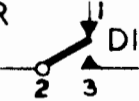
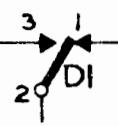
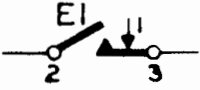
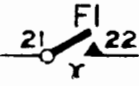
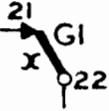
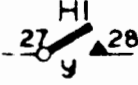
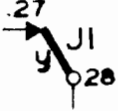
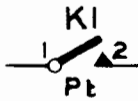
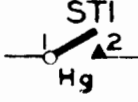
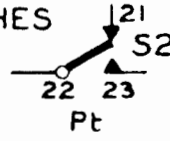
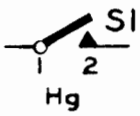
High Speed Relays with Two Change-overs

10. On this relay, coil tags are designated in alphabetical sequence as for 3000 type relays, but when a relay has two coils, tags "a" and "e" are inner (start) end of windings.

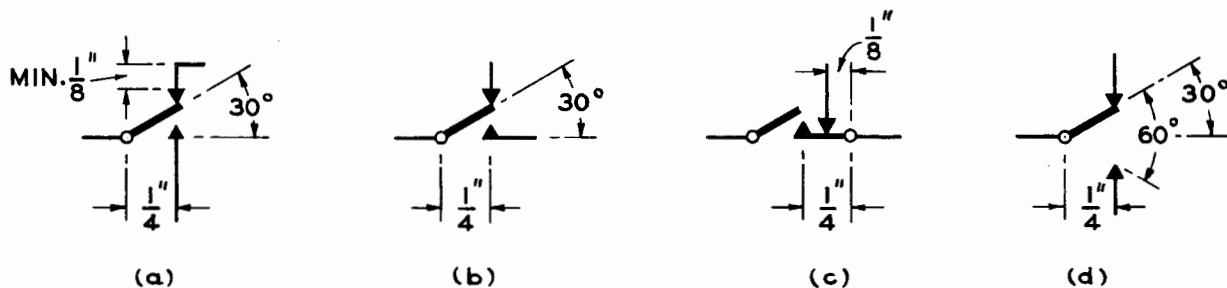
SPARE

SYMBOLS

RELAY CONTACTS

1 MAKE   36.2	* 12 CHANGE OVER SYMMETRICAL OTHER REFERENCES 1.7.1 
2 BREAK  36.1	
3 CHANGE OVER GENERAL USE   36.4	
4 MAKE BEFORE BREAK  36.3	
5 'X' CONTACT   OTHER REFERENCES:- 1.7.4 36.5	
6 'y' CONTACT   OTHER REFERENCES:- 1.7.5 36.6	
* 7 PLATINUM CONTACT  OTHER REFERENCES:- 1.7.7 36.7	
* 8 MERCURY CONTACT  OTHER REFERENCES:- 1.7.7 36.8	
* 9 TUNGSTEN CONTACT  OTHER REFERENCES:- 1.7.7	
* 10 RELAY SWITCHES PLATINUM & MERCURY CONTACTS   OTHER REFERENCES:- 1.7.7	
* 11 SPECIAL ALLOY CONTACT  OTHER REFERENCES:- 1.7.7	

RELAY CONTACT CONSTRUCTIONAL DETAILS



- * 1. Contact units of make, break, change-over or make-before-break types shall conform in size to the examples (a), (b) or (c). Symmetrical contact units shall conform in size to example (d) which shall be used for polarized relays having symmetrical operating characteristics.
- * 2. The conductors shall be drawn as shown and shall not be turned at an angle until at least $\frac{1}{8}$ " from the contact.
- * 3. Any make spring conductor, except of a symmetrical contact, may be drawn as shown in either example (a) or (b).

NOTES CONCERNING RELAY CONTACTS

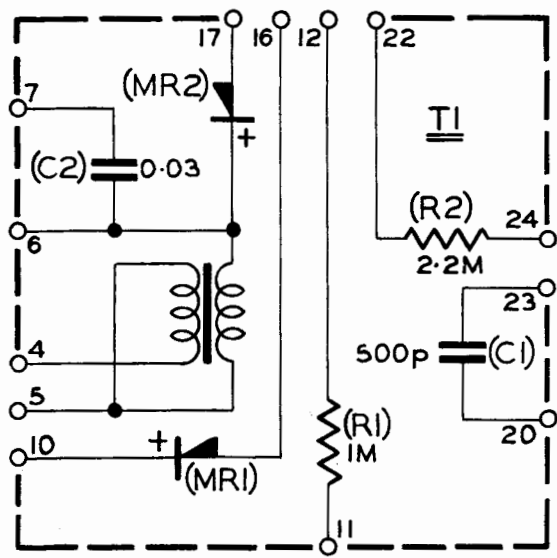
- 4. A relay "x" contact is one which, by mechanical design of the relay, is arranged to operate before all other contact units on the relay, and to release after all other contact units on the relay.
- 5. A relay "y" contact is one which, by mechanical design of the relay, is arranged to operate after all other contact units on the relay, and to release before all other contact units on the relay.
- * 6. *Transferred to item 5.2.15.*
- 7. Relay spring contacts of material other than P.G.S. or silver shall be indicated by the chemical symbol or other special designation.
- 8. When only one springset is fitted on a relay the spare position may be occupied by a terminal assembly the tags of which shall be numbered in a manner similar to a normal spring pile.
- 9. All spare springs shall be shown and numbered on the diagram.
- * 10. *Deleted.*
- * 11. *Included in item 1.7.1.*

SYMBOLS	
TRANSFORMERS & INDUCTORS (RETARDS & CHOKES)	
1 TRANSFORMER WITH IRON CORE 29	7 INDUCTOR 27
2 TRANSFORMER WITH DUST CORE	8a INDUCTOR WITH IRON CORE (FOR RELAY USED AS RETARD. SEE ITEM 1-1-11) 27-2
3 TRANSFORMER WITH SCREENED WINDING 29-1	8b BALANCED INDUCTOR.
* 9 DELETED	
* 10 DELETED	
4a REPEATING COIL OR LINE TRANSFORMER OTHER REFERENCE - 3. 6. 8(d)	
4b LINE TRANSFORMER WITH TONE COIL OTHER REFERENCE - 3. 6. 8(d)	
5 TRANSFORMER WITH MULTI-TAPPED WINDING OTHER REFERENCE - 1. 34.1	
6 OPERATOR'S INDUCTION COIL P.O. No. 3/16 OTHER REFERENCE - 3. 6. 8(d)	

SYMBOLS

TRANSFORMERS & INDUCTORS (RETARDS & CHOKES)
(CONTINUED)

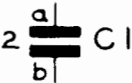
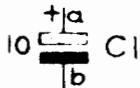
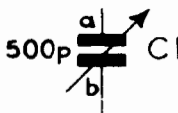
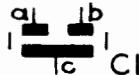
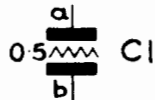
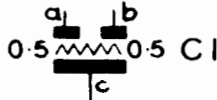
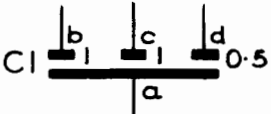
* 1
TRANSFORMER ASSEMBLY



OTHER REFERENCES:- 3·6·8(e)

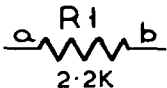
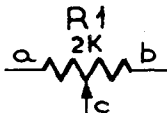
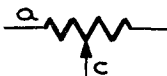
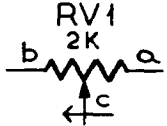
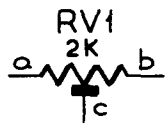
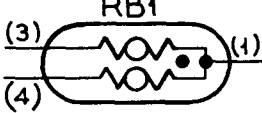
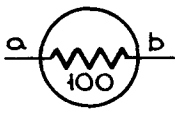
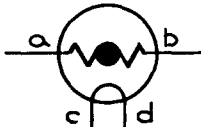
SYMBOLS

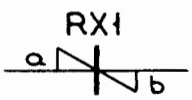
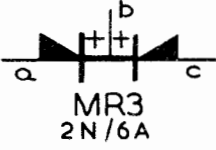
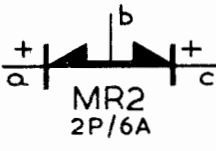
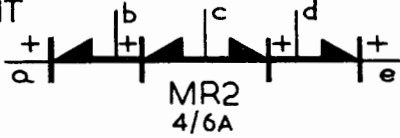
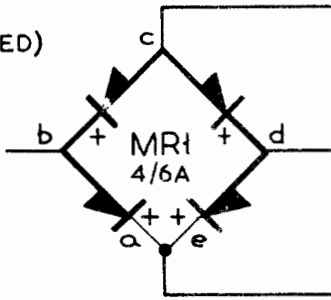
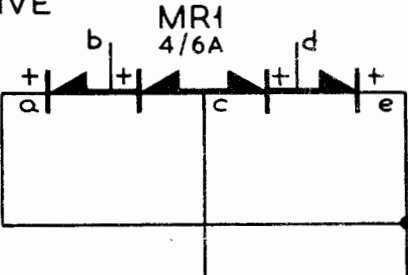
CAPACITORS

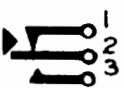
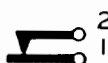
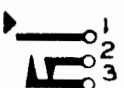
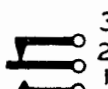
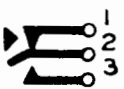
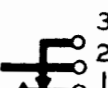
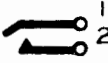
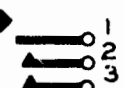
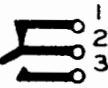
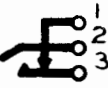
1 GENERAL SYMBOL		26
2 ELECTROLYTIC		26.5
3 VARIABLE		26.1
4 THREE-TERMINAL TWIN		26.3
5 WITH INTENTIONAL INHERENT SERIES RESISTANCE		26.4
6 THREE-TERMINAL TWIN WITH INTENTIONAL INHERENT SERIES RESISTANCE		26.41
7 DELETED		
8 DELETED		
9 DELETED		
10 FOUR TERMINAL TRIPLE		
11 VALUES	CAPACITANCE VALUES SHOULD BE SHOWN THUS:- UP TO 999pF. — THE NUMBER OF pF FOLLOWED BY p, e.g. 220p. 1000pF UPWARDS — THE NUMBER OF μF., e.g. 0.5, 2.5.	

SYMBOLS

RESISTORS

1. GENERAL SYMBOL	25 	*10. RENUMBERED 1.12.1
2. VARIABLE	25.11 (a)  (b) THE LETTER b IS OMITTED WHEN THIS END OF THE RESISTOR IS NOT TERMINATED ON A WIRING TAG, VIZ.,  (c) WHEN NECESSARY THE EFFECT OF CLOCK WISE ROTATION OF THE OPERATING CONTROL IS INDICATED BY AN ARROW DRAWN ACROSS THE VARIABLE CONNEXION. THE EXAMPLE SHOWN INDICATES AN INCREASE IN RESISTANCE ACROSS TAGS a AND c IF CLOCKWISE ROTATION PRODUCES A DECREASE IN RESISTANCE ACROSS TAGS a AND c THE ARROW WOULD BE DRAWN POINTING TO THE RIGHT. 	*11. RENUMBERED 1.12.2
3. PRE-SET VARIABLE	25.12 	*12. DEVICE WITH PRONOUNCED POSITIVE RESISTANCE / TEMPERATURE CHARACTERISTIC e.g. BALLAST RESISTOR
4. SPECIALLY NON-REACTIVE FOR PURPOSE FOR WHICH IT IS USED	25.2 	(a) SINGLE FILAMENT  25.31
		(b) TWO FILAMENTS  25.32
		(c) TAPPED FILAMENT 
		NOTE:- WHERE BALLAST RESISTOR IS PLUG-IN TYPE, HOLDER TAG NUMBERS REPLACE RESISTOR TAG LETTERS e.g. AS IN (c) ABOVE OTHER REFERENCES:- 1.28.1 (a), 2.7.4 & 2.8.1.
*5. RENUMBERED 1.11.12 (a)		*13. DEVICE WITH PRONOUNCED NEGATIVE RESISTANCE / TEMPERATURE CHARACTERISTIC e.g. THERMISTOR
*6. RENUMBERED 1.11.12 (b)		(a) DIRECTLY HEATED 
*7. RESISTOR BULB OR LAMP	505 	(b) INDIRECTLY HEATED  25.4
*8. RENUMBERED 1.12.3		
9. VALUES:- RESISTANCE VALUES SHOULD BE SHOWN THUS:- UP TO 999 OHMS: THE NUMBER OF OHMS. e.g. 220. 1.000 TO 999,999 OHMS: THE NUMBER OF THOUSANDS FOLLOWED BY K, e.g. 27K, 1.15K. 1 MEGOHM UPWARDS: THE NUMBER OF MEGOHMS FOLLOWED BY M, e.g. 2.2M.		

SYMBOLS	
ELEMENTS WITH NON-LINEAR CURRENT / VOLTAGE CHARACTERISTICS	
ASYMMETRICAL (RECTIFIER ELEMENTS)	SYMMETRICAL
*1. GENERAL SYMBOL  HIGHER CONDUCTIVITY IS OBTAINED WHEN THE TRIANGLE IS POSITIVE WITH RESPECT TO THE PLATE.	3. GENERAL SYMBOL 
2. TYPICAL EXAMPLES OF MULTI-UNIT TYPES. (a) TWO UNIT (SAME SENSE)  (b) TWO UNIT (OPPOSING SENSE)  (c) TWO UNIT (OPPOSING SENSE)  (d) FOUR UNIT  (e) FOUR UNIT (BRIDGE CONNECTED)  (f) ALTERNATIVE FOR (e) 	

SYMBOLS	
KEY UNITS	
FOR LAYOUTS SEE PAGE 2-3	
LEVER TYPE	PLUNGER TYPE
1 NON-LOCKING MAKE KRAI 	9 NON-LOCKING CHANGE-OVER KPPI 
2 NON-LOCKING BREAK KDAI 	10 NON-LOCKING MAKE BEFORE BREAK KFCI 
3 NON-LOCKING CHANGE-OVER KFLI 	11 LOCKING CHANGE-OVER KTPI 
4 NON-LOCKING MAKE BEFORE BREAK KSAI 	12 LOCKING MAKE BEFORE BREAK KSAI 
5 LOCKING MAKE KEFI 	13 NON-LOCKING DOUBLE MAKE (BUNCHING) KASI 
6 LOCKING BREAK KRCI 	14 SYMBOLS FOR OTHER UNITS OF PLUNGER TYPE KEYS ARE AS FOR LEVER TYPE BUT WITH THE ADDITION OF THE SOLID TRIANGLE ADJACENT TO THE MOVING SPRING CONVENTION.
7 LOCKING CHANGE-OVER KSTI 	15
8 LOCKING MAKE BEFORE BREAK KSAI 	16

SYMBOLS

JACKS

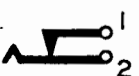
FOR SHELF JACKS SEE P. 1-17
FOR LAYOUTS SEE P. 2-3. FOR GENERAL NOTES SEE P. 1-17.

TEST JACKS

1
TWO POINT
JACK

JKA 

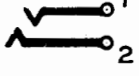
9
ISOLATION
JACK

TJA 

2
THREE POINT
JACK

JKA 

10
UNISELECTOR
TEST JACK

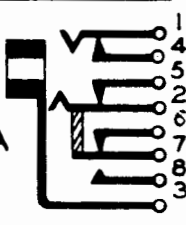
JH tj 

3
BREAK
JACKS

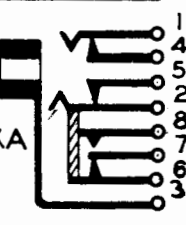
P.O. No. 500

JKA 

P.O. No. 800

JKA 

P.O. No. 810

JKA 

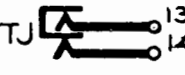
11
SELECTOR &
RELAY-SET
TEST JACK

PRE 2000 TYPE

TJ  TJ 

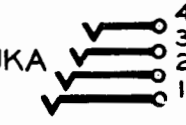
2000 TYPE

(a) SINGLE TJ 

(b) WITH LINK TJ 

OTHER REFERENCES: 1-17-9.

4
OPERATORS
JACK

JKA 

No. 4 IS TIP SPRING.

* 12
ROUTINE TEST JACK

(a) WITH BREAK
CONTACTS TJ 

(b) WITHOUT BREAK
CONTACTS TJ 

5
MULTI-POINT
JACK
(EXAMPLE:
FIVE WAY)

JKA 

6

7

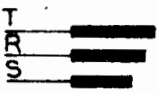
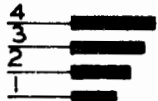
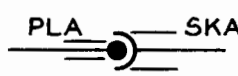
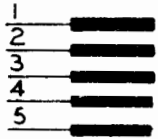
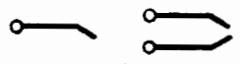
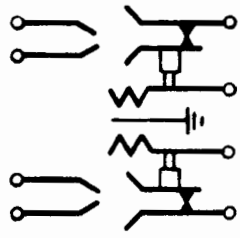
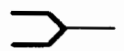
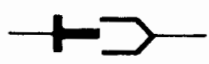
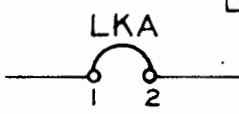
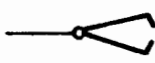
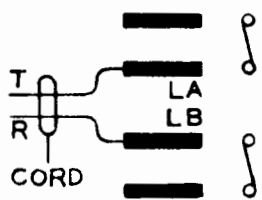
8

SPARE

SYMBOLS

PLUGS, CLIPS, ETC.

FOR SHELF PLUGS SEE P.1-17.

1 SWITCHBOARD 	34.1	* 9 PLUG & SOCKET (POWER TYPE) (a) PLUG & SOCKET 
2 OPERATORS PLUG  NO. 4 IS TIP	34.1	(b) PLUG & SOCKET SHROUDED 
3 MULTI-POINT (EXAMPLE:-FIVE WAY) 	34.2	
* 4 PROTECTOR TEST PLUG (a) SINGLE (b) TWIN  (c) (EXAMPLE OF USE) 	56.2	
* 5 PIN & SOCKET (TEST TYPE) PIN  SOCKET  PIN & SOCKET 	35.2	
6 'U' LINK OR WIRE LINK 	8.1	
* 7 CONNEXION CLIP 	56.3	
* 8 FUSE TEST CLIPS (a)  (b) EXAMPLE OF USE 		

SYMBOLS	
PLUG & JACK CONNEXIONS	
FOR LAYOUT SEE SECTION 2	
*1 9.1,9.2 PLUG-IN POINT (U POINT) FOR RELAY SETS AND SELECTORS (a) SYMBOL (i) FOR REGULAR ACCESS $\frac{2}{V}$ (ii) FOR ROUTINER ACCESS $\frac{Y_2}{V}$ (b) DESIGNATION CONVENTIONS. (i) WHERE MORE THAN ONE PLUG-IN UNIT PER FIG. APPEARS ON THE DIAGRAM. 1ST. UNIT $\frac{2}{V}$ 2ND. UNIT $\frac{(2)}{V}$ 3RD. UNIT $\frac{(2)}{V}$ (ii) WHERE MORE THAN ONE CIRCUIT PER BASE IS PROVIDED. THE U-POINT NUMBERS ARE ARRANGED OUTWARD FROM THE SYMBOL, COMMENCING WITH THAT OF THE 1ST. CIRCUIT. e.g. $\frac{20}{16}$ OR 20.16.8.4 > $\frac{8}{4}$ $\frac{V}{V}$ OTHER REFERENCES: 1.32.9 (a), 1.17.10.	*5. 9.1 PLUG-IN POINT FOR REGENERATORS, DIAL MOUNTINGS AND MECHANICAL KEYSENDERS, PLUG-IN RELAYS, MACHINES, KEY UNITS, CHARGEABLE TIME CLOCKS. $\frac{2}{V}$ OTHER REFERENCE: 1.17.10 6.
*2. TRANSFERRED TO 2.9.1.	
*3. TRANSFERRED TO 2.9.1.	
*4. TRANSFERRED TO 1.17.10	

NOTES CONCERNING JACKS & PLUGS

7 THE SLEEVE CONNEXION IN THE SYMBOL FOR SWITCHBOARD TYPE JACKS MAY BE SHOWN ABOVE THE SPRINGS IF NECESSARY FOR CONVENIENCE IN DRAFTING. 8 WHEN EARTH IS REQUIRED ON U/S TEST JACKS IT SHALL BE CONNECTED TO SPRING No.1. 9 SPRINGS OF TEST JACKS & PLUGS SHALL BE NUMBERED IN ACCORDANCE WITH P.O. SPECIFICATION T1545 & T1565 FOR CHANNEL TYPE & TP3009 & TP 3010 FOR 2000 TYPE. ALL SPARE SPRINGS SHALL BE SHOWN & NUMBERED. ALL SPARE UNITS SHALL BE LOCATED NEAR THE INSET BOX. *10 (a) SHELF JACK & PLUG NUMBERS ARE PREFIXED BY THE LETTER U IN WIRING RUNS e.g. U2. (b) OTHER JACK & PLUG NUMBERS ARE PREFIXED BY THE APPROPRIATE COMPONENT DESIGNATION IN WIRING RUNS e.g. ADA 2.	
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SYMBOLS

MECHANICALLY OPERATED CONTACTS

FOR MOTOR UNISELECTOR CONTACTS SEE p.1-22

1
MAKE
CONTACT

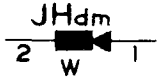


62-2

*9
RESETTING PLUNGER & MARKED
CODE PIN
(PULSE REGENERATOR)

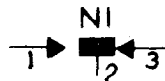


2
BREAK
CONTACT



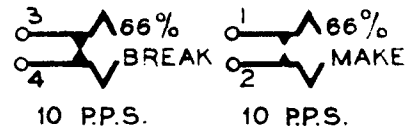
62-1

3
CHANGE OVER
OTHER THAN
2000 TYPE
INTERRUPTER



62-4

*10
PULSING
SPRINGS

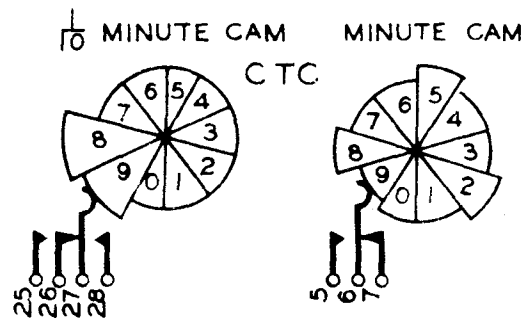


61

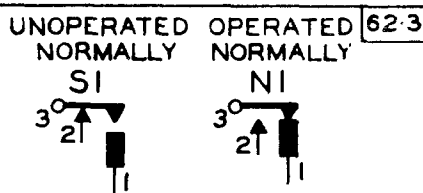
4
CHANGE OVER
2000 TYPE
INTERRUPTER



11
CLOCK 44

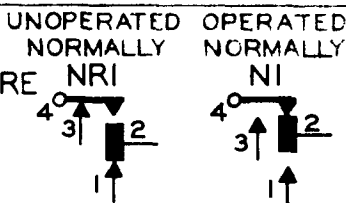


5
MAKE
BEFORE
BREAK
CONTACT



62-3

6
BREAK &
MAKE BEFORE
BREAK
CONTACT

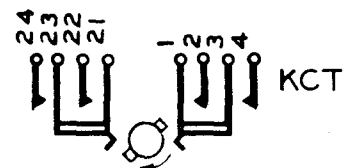


USED WITH EITHER

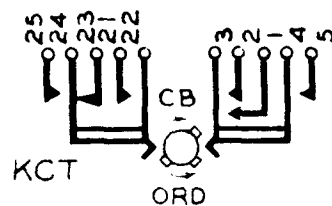
(a) TWO POSITION START KEY

7 NOTES ON ITEMS 1-6

- FOR LAYOUT OF MECHANICALLY OPERATED SPRING SETS SEE p.2-4
- MECHANICAL SPRING CONTACT MATERIAL IS P.G.S. FOR SINGLE CONTACTS & SILVER FOR TWIN CONTACTS UNLESS OTHERWISE INDICATED BY CHEMICAL SYMBOL, e.g., ITEMS 2 & 4 ABOVE.
- CONTACT UNITS SHALL BE SHOWN IN THE POSITION THEY ASSUME WITH THE SWITCH IN THE NORMAL (UNSEIZED) CONDITION.
- MOVING SPRING OF MECHANICALLY OPERATED CONTACTS IS ALWAYS REPRESENTED BY THE RECTANGLE.



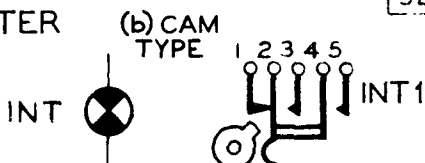
(b) THREE POSITION (UNIVERSAL)
START KEY



8
INTERRUPTER

52

(a) ROTARY
TYPE



(b) CAM
TYPE



FOR CONVENIENCE IN DRAFTING, SPRING
-SETS MAY BE DETACHED.
CAMS SHALL BE SHOWN FOR EACH
DETACHED UNIT.

NOTES:-

- IF NECESSARY KEY UNITS MAY BE SHOWN DETACHED.
- FOR CONVENIENCE IN DRAFTING, SPRINGSETS MAY BE SHOWN DETACHED. CAMS SHALL BE SHOWN FOR EACH DETACHED UNIT SEE LAYOUT 2-7-1

SYMBOLS

TELEPHONE
INSTRUMENT ITEMS

SELECTORS

1

CRADLE
SWITCH

57.2

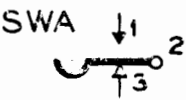


THE CONTACTS ARE SHOWN IN THE NORMAL POSITION I.E., WITH THE HANDSET ON THE CRADLE. SPRINGS MAY BE SHOWN DETACHED.

2

SWITCH-HOOK

57.1

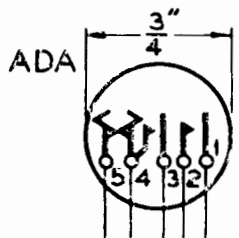


THE CONTACT IS SHOWN IN THE NORMAL POSITION I.E., WITH THE RECEIVER ON THE REST.

3

DIAL

63.3



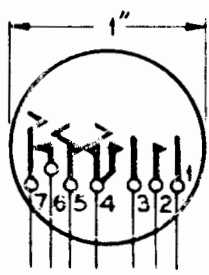
THE OFF-NORMAL SPRINGS MAY BE SHOWN DETACHED FOR CONVENIENCE IN DRAFTING.

OTHER REFERENCES:- 2.7.2

4

DIAL WITH
AUXILIARY
SPRINGS

ADA



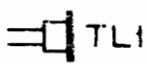
THE OFF-NORMAL SPRINGS MAY BE SHOWN DETACHED FOR CONVENIENCE IN DRAFTING.

OTHER REFERENCES:- 2.7.2

5

RECEIVER

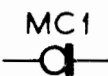
59



6

MICROPHONE

58



7

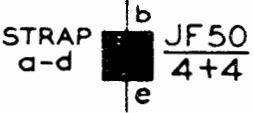
8

* 9

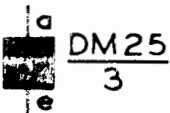
DRIVE MAGNETS

66.4

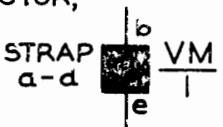
(a) UNISELECTOR,
TWIN COIL



(b) UNISELECTOR,
SINGLE COIL



(c) TWO MOTION SELECTOR,
TWIN COIL



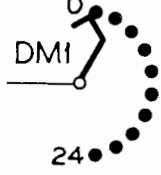
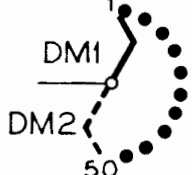
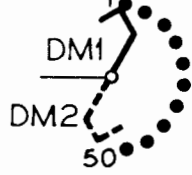
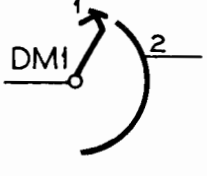
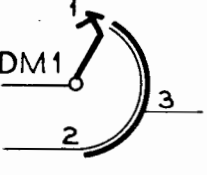
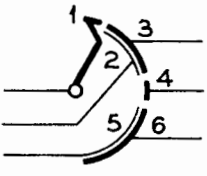
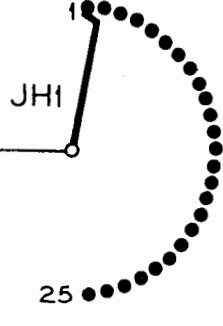
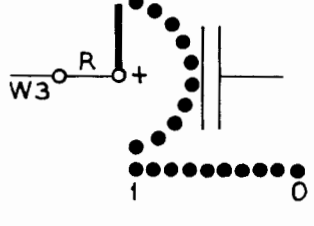
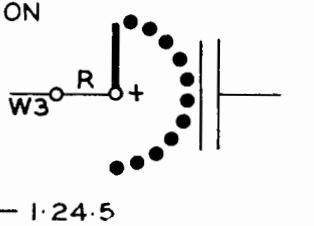
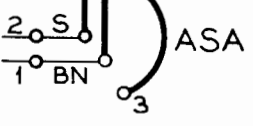
(d) TWO MOTION SELECTOR,
SINGLE COIL



* 10. INCLUDED IN 1.19.9

SYMBOLS

SELECTORS (CONTINUED)

64.1 64.2 64.11	64.31 64.3
*1. UNISELECTOR BANKS & WIPERS (a) WITH ONE DOUBLE-ENDED WIPER PASSING OVER ONE ARC. (i) NON BRIDGING  (ii) BRIDGING  (b) WITH PAIR OF SINGLE-ENDED WIPERS PASSING CONSECUTIVELY OVER TWO ARCS. (i) NON BRIDGING  (ii) BRIDGING  OTHER REFERENCES - 1-24.2 & 3	*5. UNISELECTOR WITH HOMING ARC. (a) WITH SOLID METAL SEGMENTS  (b) WITH DOUBLE METAL SEGMENTS  (c) WITH SECOND HOME POSITION 
2. BANK ARC, 25 POINT. (FULL SYMBOL)  OTHER REFERENCES - 1-24.2 & 3	*6. TWO MOTION SELECTOR BANKS & WIPERS (a) WITH WIRING ON 11TH. CONTACTS.  (b) WITHOUT WIRING ON 11TH. CONTACTS.  OTHER REFERENCES - 1-24.5
*3. BANK ARC ALTERNATIVE TO 1 ABOVE  OTHER REFERENCES - 1-24.2	*7. AUXILIARY SCREW ARC 
4.	8.

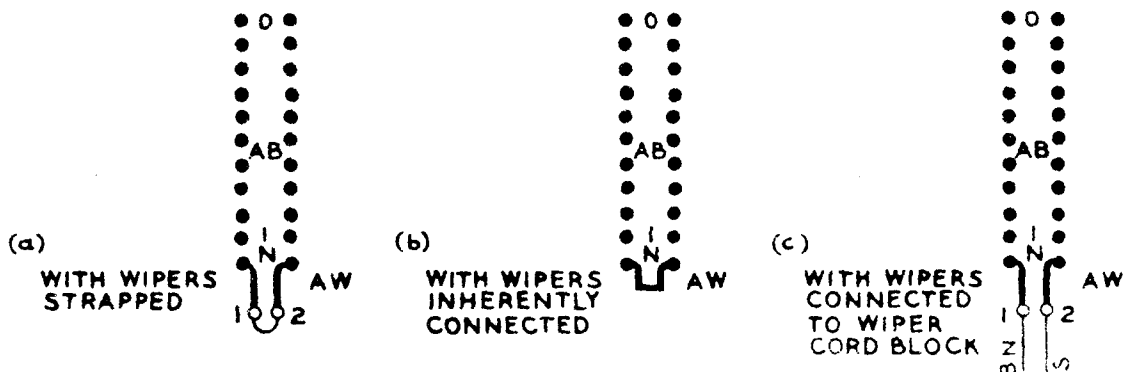
SYMBOLS

SELECTORS (CONTINUED)

1

65.4

VERTICAL MARKING BANK & WIPER



OTHER REFERENCES:— 1.24.6

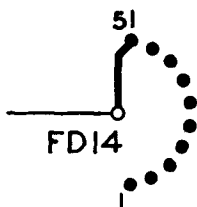
2

MOTOR UNISELECTOR

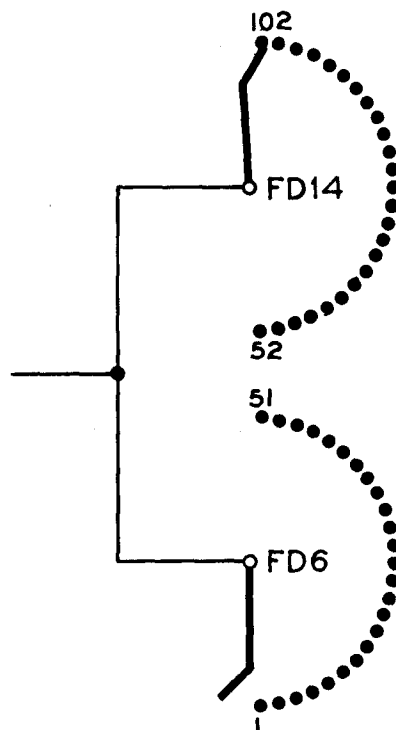
* 3

BANKS AND WIPERS (ABRIDGED SYMBOLS)

(a)



(b) PAIR OF SINGLE ENDED WIPERS PASSING OVER TWO ARCS CONSECUTIVELY.



(c) ALTERNATIVE TO (a)

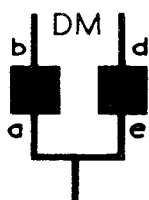


OTHER REFERENCES:— 1.24.4

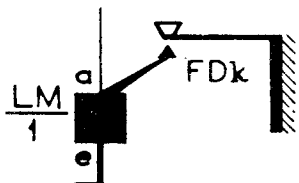
SYMBOLS

MOTOR UNISELECTOR (CONTINUED)

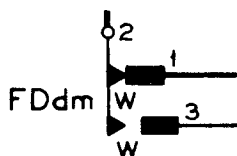
1
DRIVE MAGNET



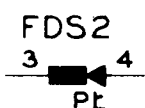
2
LATCH MAGNET
& TEST KEY



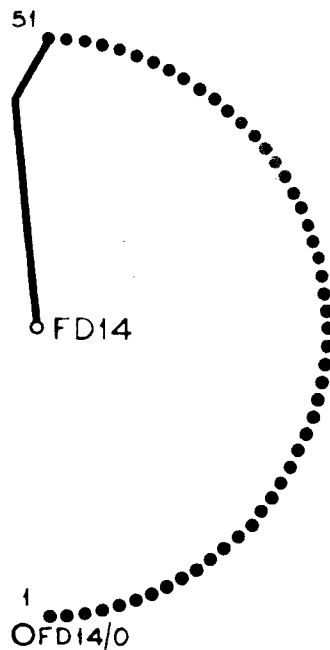
3
DRIVE MAGNET
INTERRUPTER



4
MECHANICAL CONTACTS



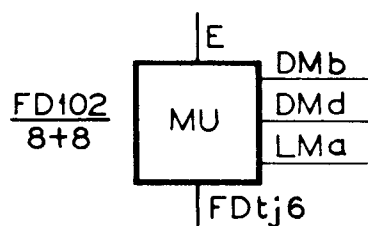
* 5
BANK ARC 51 POINT
(FULL SYMBOL)



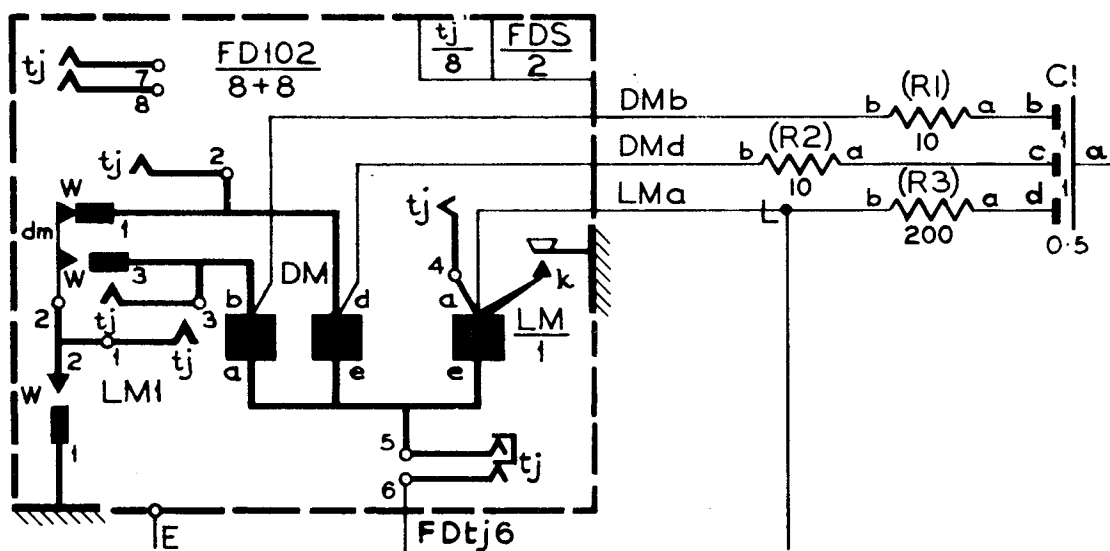
OTHER REFERENCES:-
1-24-4

1
OFD14/0

6
ABRIDGED SYMBOL



7
TYPICAL APPLICATION



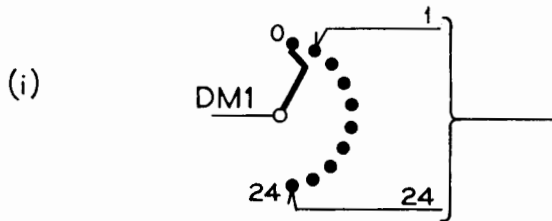
THICK LINES INDICATE INTERNAL WIRING OR INHERENT CONNEXIONS,
ALL OTHER WIRING TYPICAL ONLY.

OTHER REFERENCES - 2-6-5

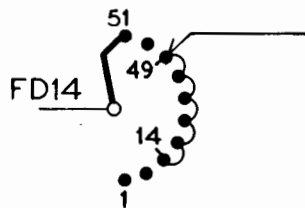
SELECTORS (CONTINUED)

* 1. UNISELECTOR & MOTOR
UNISELECTOR. TYPICAL METHODS
OF SHOWING CONNEXIONS TO
ABRIDGED BANK SYMBOLS.

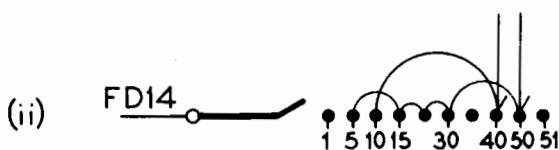
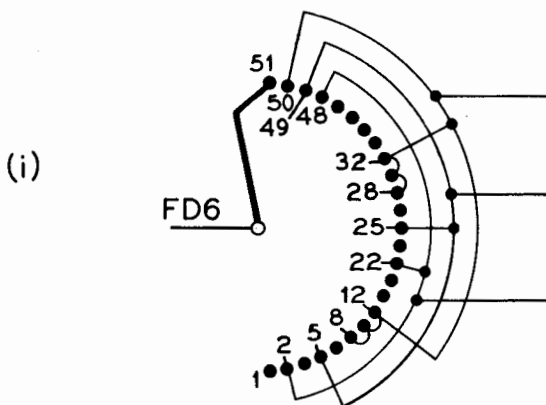
(a) SIMILAR CONNEXIONS TO A NUMBER
OF CONSECUTIVE CONTACTS.



(b) SINGLE CONNEXION COMMONED TO
A NUMBER OF CONSECUTIVE
CONTACTS.



(c) CONNEXIONS, EACH COMMONED TO
CONSECUTIVE OR NON-CONSECUTIVE
CONTACTS.



N.B. THE 'MULTIPLE' CONNEXION IS
INCLUDED ONLY WHEN REQUIRED.

SELECTORS (Continued)

NOTES ON BANKS AND WIPERS OF UNISELECTORS, TWO MOTION SELECTORS, MOTOR UNISELECTORS, AND VERTICAL MARKING BANKS

General

- * 1. Spare banks, arcs and wipers shall be shown and numbered on the diagram.

Uniselectors

- * 2. Unselector Banks shall, in general, be represented by items 1.20.1 and 1.20.3 but when it is necessary to show the full complement of bank contacts the banks shall be represented by item 1.20.2.
- * 3. Bank contacts are numbered 1 to 25 or 1 to 50 except where the 1st working outlet is on the 2nd physical contact, then the numbering is 0 to 24 or 0 to 49.

Wipers and arcs are numbered from the number wheel.

Motor Uniselectors

- * 4. Motor unselector banks shall, in general, be represented by item 1.21.3 but when it is necessary to show the full complement of contacts item 1.22.5 shall be used. Bank contacts are numbered 1 to 51 or 1 to 102. Bank tags are numbered 0 to 51 or 0 to 51, 0, 52 to 102, the arc numbers being used to identify the particular 0 tags. Bank tag 0 has no corresponding contact. The 26 marking tags, arranged in an arc to the left hand, rear view, of the bank contact tags, are divided into a lower group numbered 1-10 and an upper group numbered 11-26 numbering being from the bottom upwards.

Wipers and arcs are numbered from the number wheel.

Two Motion Selectors

- * 5. For Two Motion Selector banks and wipers the cord block numbers and wiper cord colours shall be to T 1545 for channel type and to TP 602 for 2000 type.

Banks and wipers are numbered upwards.

Vertical Marking Bank and Wiper

- 6. Wiper No. 2 of the Vertical Marking Bank is at the rear of the bank. Commoning is done on the rear bank.
- * 7. Deleted.

SPARE

SYMBOLS

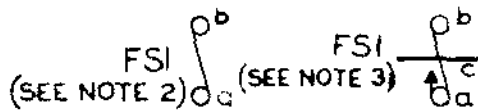
PROTECTORS & GUARDS

* 1 53 & 53.1

FUSE

(a)

(b) WITH ALARM CONTACT



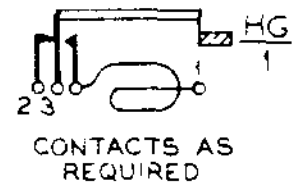
NOTES:-

1. COMPONENT & TAG DESIGNATIONS SHOULD BE OMITTED EXCEPT WHEN CONFUSION MAY ARISE.
2. TAG DESIGNATION: 'a' ON BATTERY OR SUPPLY END AND 'b' ON FEED END.
3. TAG DESIGNATION: 'a' ON ALARM CONTACT END, 'b' ON NON-CONTACT END AND 'c' ON ALARM BAR.

AUDIBLE & VISIBLE CALLING EQUIPMENT

7 45 21

HAND GENERATOR



* 8 40.1, 40.2 & 40.11

BELL

(a) D.C. BLI

(b) A.C. BLI



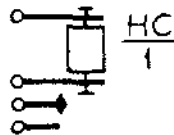
(c) SINGLE STROKE BLI



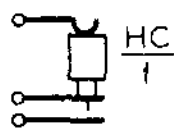
2 54.1 & 54.2

HEAT COIL

(a) BREAK TYPE



(b) COMPRESSION TYPE



* 9 41.1 & 41.2

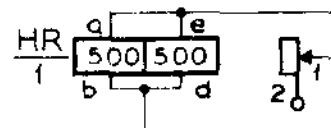
BUZZER

(a) D.C. BZI

(b) A.C. BZI



10 BUZZER, DETAILED FORM

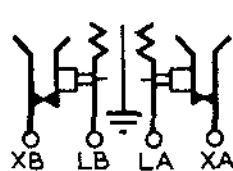
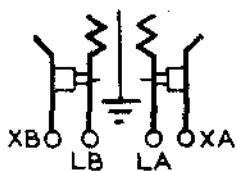


* 3 56 & 56.1

M.D.F. PROTECTOR

(a) PROTECTOR & H.C.

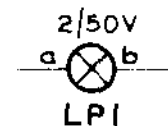
(b) PROTECTOR, H.C. & TEST



OTHER REFERENCES - 2.7.3

11 42

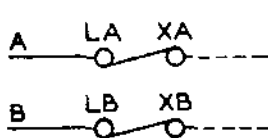
LAMP



USE G.P.O. RATE BOOK DESCRIPTION, (MODIFIED) e.g., 2/50V COLOUR INDICATED IF REQUIRED.

* 4

M.D.F. FUSE



5

PROTECTORS, GAS FILLED

FOR GAS FILLED PROTECTORS SEE SYMBOL p.1.28.9(g)

6

POWER, MOTORS, GENERATORS, ETC.,

1 DIRECT CURRENT D.C. or — IF SYMBOL — IS NOT SUITABLE e.g., WHERE IT MAY BE CONFUSED WITH MINUS SIGN USE ---	1
2 ALTERNATING CURRENT A.C. or ~ or ~ ₅₀ NUMERALS INDICATE FREQUENCY	2
3 D.C. GENERATOR 	
4 A.C. GENERATOR 	
5 VOICE FREQUENCY GENERATOR 	
6 D.C. MOTOR 	
7 A.C. MOTOR 	
8 FRAME OR CHASSIS 	11-1

SYMBOLS

VALVE COMPONENTS & EXAMPLES OF USE

*1
VACUUM OR
GAS FILLED ENVELOPE



NOTES:-

(a) WHEN THE ENVELOPE IS GAS FILLED A LARGE SPOT IS INSERTED AS SHOWN. THIS IS USED FOR OTHER COMPONENTS IN ADDITION TO VALVES, e.g., BALLAST RESISTOR (SEE ITEMS 111-5 & 6) THE CHEMICAL SYMBOL OF THE GAS MAY BE SHOWN ADJACENT TO THE ENVELOPE.



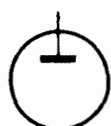
(b) INTERNAL CONDUCTING COATING (IF DESIRED)



(c) EXTERNAL METALLISED SCREEN COATING

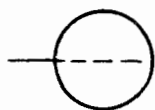


2
ANODE



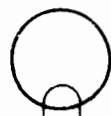
SEE NOTES p. 1-29

3
GRID



SEE NOTES p. 1-29

4
FILAMENT OR DIRECTLY HEATED CATHODE OR HEATER
SEE NOTES p. 1-29



5
CATHODE

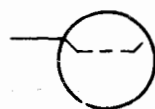


SEE NOTES p. 1-29

6
INDIRECTLY HEATED CATHODE
SEE NOTES p. 1-29

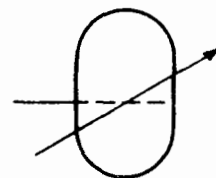


7
SCREEN GRID



SEE NOTES p. 1-29

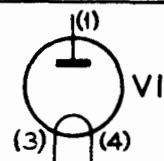
8
VARIABLE MUTUAL CONDUCTANCE



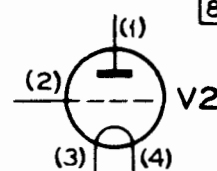
SEE NOTES p. 1-29

9. EXAMPLES OF USE OF SYMBOLS

(a) DIODE
(SYMBOLS 1, 2 & 4)

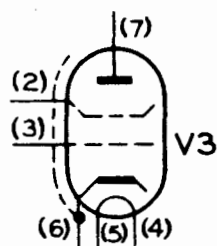


(b) TRIODE,
DIRECTLY HEATED
(SYMBOLS 1, 2, 3 & 4)

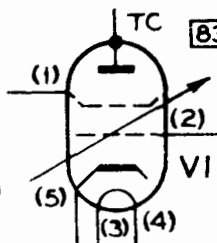


NOTE:-
IF INDIRECTLY HEATED
SUBSTITUTE SYMBOL 6
FOR SYMBOL 4.

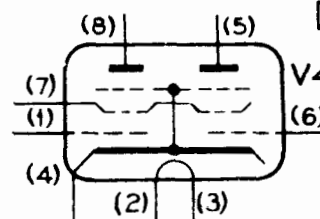
(c) SCREEN GRID
WITH METALLISED
SCREEN ENVELOPE,
INDIRECTLY HEATED
(SYMBOLS 1c, 2, 3, 6 & 7)



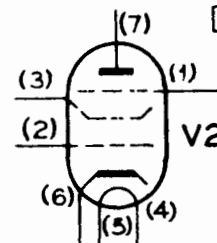
(d) SCREEN GRID WITH
VARIABLE MUTUAL
CONDUCTANCE,
INDIRECTLY HEATED
(SYMBOLS 1, 2, 3, 6, 7 & 8)
SEE NOTES ITEM 1-29-1(e)



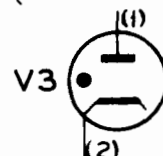
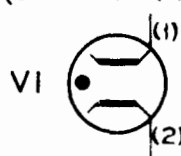
(e) DOUBLE
PENTODE,
INDIRECTLY
HEATED
(SYMBOLS
1, 2, 3, 6 & 7)



(f) PENTODE,
INDIRECTLY
HEATED
(SYMBOLS 1, 2, 3, 6 & 7)



(g) GAS FILLED DISCHARGE TUBE
(a) SYMMETRICAL (SYMBOLS 1(a) & 5) (b) ASYMMETRICAL (SYMBOLS 1(a), 2 & 5)



VALVE COMPONENTS

EXAMPLES OF USE

(CONTINUED)

SHOWING TYPICAL DESIGNATIONS & PIN NUMBERING

1. VALVES - GENERAL NOTES

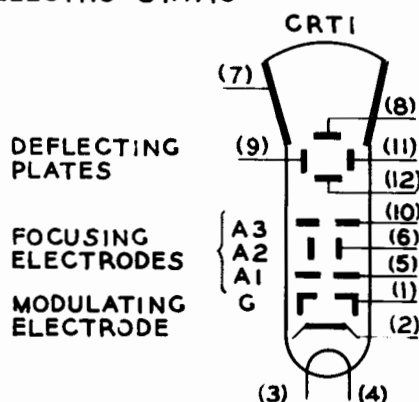
- Symbols for multi-electrode valves can be built up by combining the symbols for the component parts.
- Connexions to the electrodes may be shown on either side of the envelope.
- Except for filaments or heaters, connexions shall not be shown at both ends of the same electrode.
- All electrodes, shields, heaters etc., having external connexions and all connexions to each electrode shall be shown, except where omission would lead to greater clarity.
- Connexions made to electrodes otherwise than through the base of the valve may be indicated by a dot. (See item 1.28.9d).

2

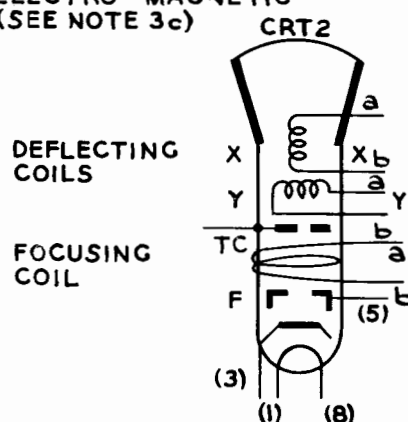
92.1 & 92.2

CATHODE-RAY TUBE

(a) ELECTRO-STATIC



(b) ELECTRO-MAGNETIC (SEE NOTE 3c)



3. CATHODE-RAY TUBE. NOTES

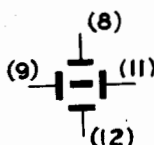
- Unless otherwise specified, the following convention will apply to the designation of cathode-ray deflector plates:-

With the tube held with its axis of symmetry horizontal and with the base locating key uppermost, the X-axis is horizontal and the Y-axis vertical. Looking at the screen in the opposite direction to the electron stream X1 is on the left, X2 on the right, Y1 is at the top and Y2 at the bottom.

Thus under stated conditions, positive potentials on the X1 and Y1 plates will deflect the spot to the left and upwards.

Further, the X plates in general will be nearer the screen and the Y plates nearer the "gun."
- In view of the fact that the tube may be mounted in a position other than that defined above, the deflector plate system in circuit diagrams should be drawn so as to represent graphically the system as seen by the observer.

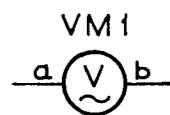
Thus a positive potential applied to the plate drawn on top in the diagram will deflect the spot upwards or away from the observer.
- Similarly, in circuit diagrams where the deflector coil system is used, the system should be drawn so that a current in the coil with its axis horizontal will deflect the spot upward or downward.
- With double beam tubes the deflector plate system is drawn thus:-



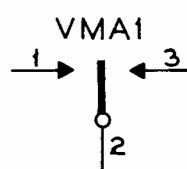
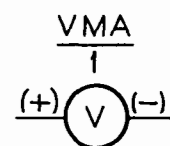
ELECTRICAL MEASURING INSTRUMENTS.

*1
VOLTMETER

(a) WITHOUT CONTACTS

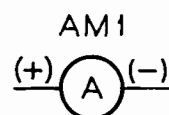


(b) WITH CONTACTS

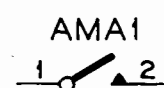
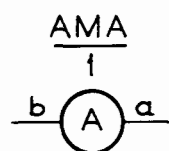


*2
AMMETER

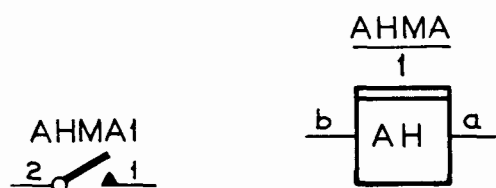
(a) WITHOUT CONTACTS



(b) WITH CONTACTS



3
AMP/HOUR METER



4

SPARE

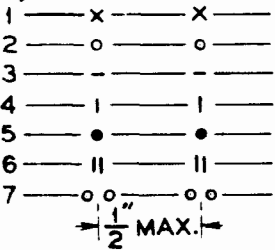
SYMBOLS

CONDUCTORS & CONNEXIONS

*1
CONDUCTOR

THE THICKNESS OF A LINE MAY BE VARIED:
FOR EXAMPLES SEE SPECIMEN DIAGRAMS.

2
ALTERNATIVE CONNEXIONS
(PRIORITY AS SHOWN)

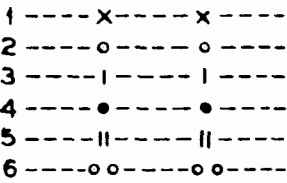


OTHER REFERENCES - 8.1.3

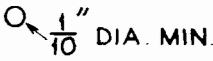
3
JUMPER



4
ALTERNATIVE JUMPERS
(PRIORITY AS SHOWN)



5
TAG OR TERMINAL



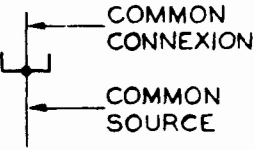
6
CROSSING OF CONDUCTORS
NOT IN CONTACT



7
TAPPINGS
(SEPARATE POINT
FOR EACH TAPPING)



*8
COMMON CONNEXIONS
TO GROUPED
APPARATUS



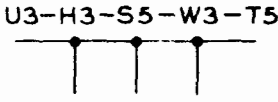
9
WIRING DATA INDICATED
ON SCHEMATIC

(a)



FOR WIRING BETWEEN THREE TAGS "L" INDICATES LOOP WIRE, THE SYMBOL TO BE DRAWN CLOSE TO THE TEE CONNEXION. U POINTS WILL BE SHOWN ON A SHORT SPUR WHERE NECESSARY TO AVOID AMBIGUITY.

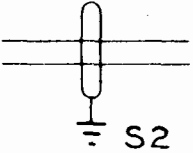
(b)



FOR WIRING BETWEEN FOUR OR MORE TAGS POINT TO POINT WIRING WILL BE GIVEN.

10
SCREENED CONDUCTORS

THE WIRING POINT BELOW THE EARTH INDICATES THE POINT TO WHICH THE SCREEN IS CONNECTED ON JACKED-IN UNITS ONLY. THE SHEATH SHALL NOT BE INCLUDED IN THE EARTH RUN.



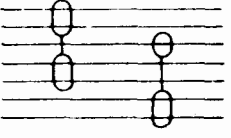
11
CABLE

ALTERNATIVE WHEN USE OF CABLE OR WIRE IS PERMITTED.

NOTE:- UNLESS OTHERWISE SPECIFIED ON-DIAGRAM ALL WIRING ENCLOSED IN CABLE SIGN IS 23 S.W.G.

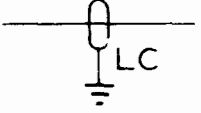
OTHER REFERENCES - 4.2.14

12
TWO CABLES
(WHERE IT IS
INCONVENIENT TO
SEPARATE WIRING ON
DIAGRAMS INTO TWO
GROUPS). SEE NOTE 11.



OTHER REFERENCES - 4.2.14

13
LEAD COVERED
SINGLE
(SHEATH EARTHED)

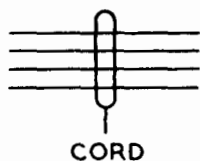


SYMBOLS

CONDUCTORS & CONNEXIONS (CONTINUED)

1

CORD
(NUMBER OF
CONDUCTORS
TYPICAL ONLY)

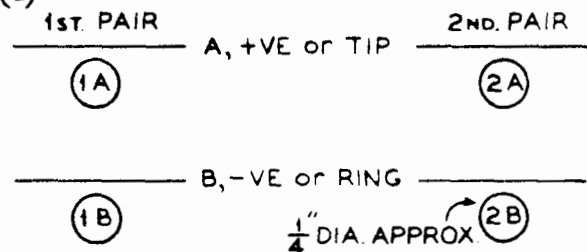


CORD

* 6. DELETED

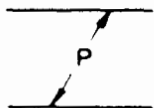
* 2 SWITCHBOARD CABLE
OR WIRE PAIRS

(a)



EXCEPT ON SHELF JACK AND CROSS
CONNEXION DIAGRAMS ON WHICH:-

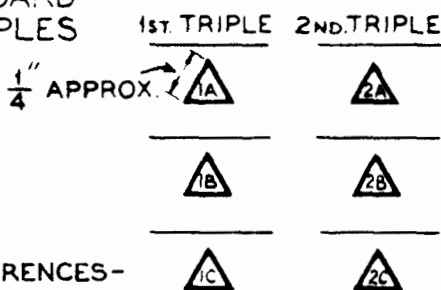
(b)



SHALL BE USED FOR TWISTED PAIRS
OTHER REFERENCES - 5.2.16

3

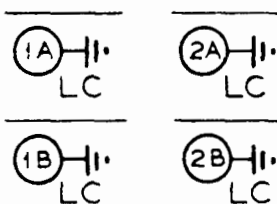
SWITCHBOARD
WIRE TRIPLES



OTHER REFERENCES -
5.2.16

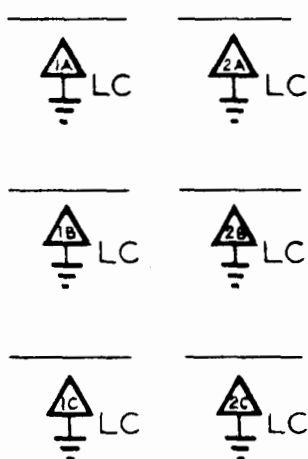
4

LEAD COVERED
PAIRS
(SHEATH EARTHED)



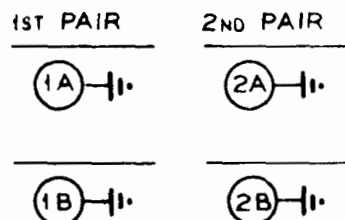
5

LEAD COVERED
TRIPLES
(SHEATH EARTHED)



7

SCREENED
WIRE PAIRS
(SCREEN
EARTHED)

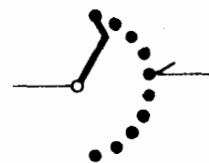


8

BANK & JACK
MULTIPLES CONNEXIONS

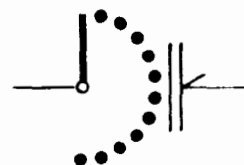
(a)

UNISELECTOR



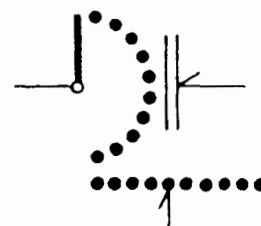
(b)

TWO MOTION
SELECTOR WITHOUT
11TH CONTACTS
WIRED.



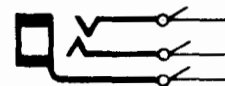
(c)

TWO MOTION
SELECTOR WITH
11TH CONTACTS
WIRED



(d)

SWITCHBOARD
JACK



9

(a) STRIP CONNEXION



(b) "GHOST" STRIP
CONNEXION



OTHER REFERENCES - 9.1.3 & 4

SYMBOLS

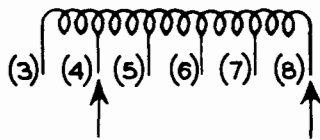
CONDUCTORS & CONNEXIONS (CONTINUED)

1

VARIABLE
CONNEXION



EXAMPLE OF USE



NOTE:-
VARIABLE TAP TO BE SHOWN
CONNECTED TO NORMAL CONNEXION.

SYMBOLS

SWITCHES

*1. RENUMBERED 1.35.7

*2. INCLUDED IN 1.35.5

*3. RENUMBERED 1.35.8

*4. COMPONENTS

(a) CONTACT



(b) NON-BRIDGING ARM OR WIPER



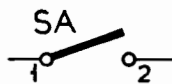
(c) BRIDGING ARM OR WIPER



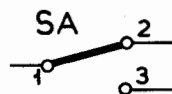
NOTE:— ACTION OF OTHER TYPES OF ARM OR WIPER TO BE COVERED BY A NOTE ON DIAGRAM.
RADIUS OF CONTACT ARC MAY BE INCREASED IF REQUIRED BY COMPLEXITY OF WIRING.

*5. EXAMPLES OF USE OF COMPONENTS

(a) SINGLE WAY

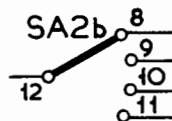


(b) 2 WAY

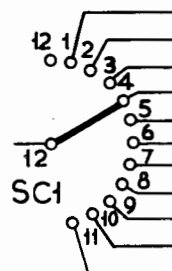


(c) MULTI-WAY ROTARY

(i) WIPER CONTACT NOT SWEEPED BY WIPER

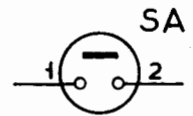


(ii) WIPER CONTACT SWEEPED BY WIPER

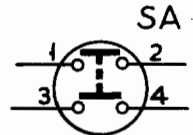


6 TUMBLER

(a) SINGLE-POLE



(b) DOUBLE-POLE



*7. PRESS BUTTON

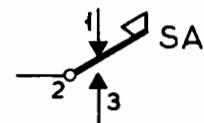
(a) MAKE



(b) BREAK



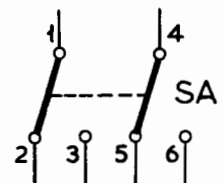
(c) CHANGE-OVER (d) MAKE BEFORE BREAK



*8. MULTI-POLE

EXAMPLE:—

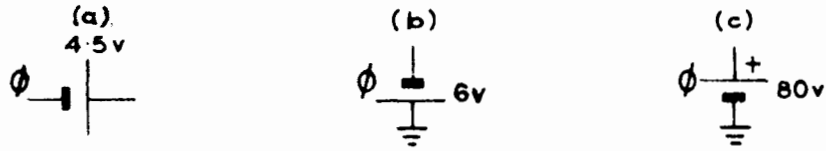
DOUBLE-POLE TWO-WAY



SYMBOLS

COMMON SERVICES

1
BATTERY OR EQUIVALENT POWER SUPPLY
(DIRECT OR VIA FUSE AND/OR TERMINAL ONLY)



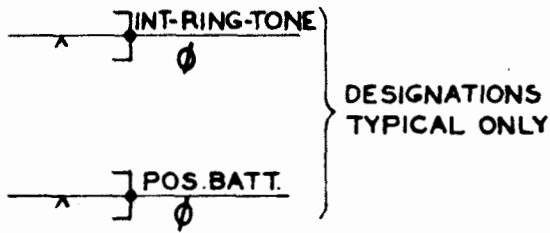
VOLTAGE VALUE SHALL BE SHOWN ONLY WHEN IT DIFFERS FROM THAT IN THE TITLE BOX OF THE ROUTED SCHEMATIC DIAGRAM.
THE ϕ SIGN SHALL BE SHOWN ONLY WHEN IT IS NECESSARY TO REFER TO A RACK COMMON SERVICE DIAGRAM FOR WIRING INFORMATION
NEGATIVE SIGN MAY BE SHOWN WHEN NECESSARY.

2
EARTH
(DIRECT)



THE ϕ SIGN SHALL BE SHOWN ONLY WHEN IT IS NECESSARY TO REFER TO A RACK COMMON SERVICES DIAGRAM FOR WIRING INFORMATION.

3
ALL OTHER COMMON SERVICES
(INCLUDING BATTERIES FED THROUGH GUARDING EQUIPMENT)

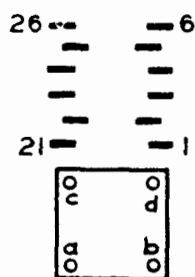


LAYOUTS

RELAYS

AS SEEN
FROM REAR

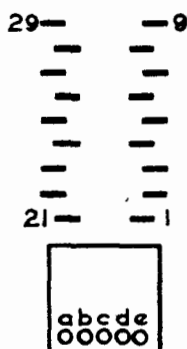
1
600 TYPE



LEVER SPRING TAGS
ARE THOSE NEAREST
CENTRE LINE

STAGGERING OF TAGS TYPICAL ONLY

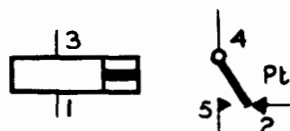
2
3000 TYPE



LEVER SPRING TAGS
ARE THOSE NEAREST
CENTRE LINE

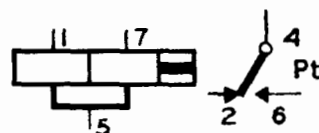
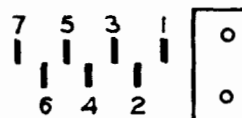
STAGGERING OF TAGS TYPICAL ONLY

* 3
HIGH SPEED
P.O. STANDARD
SINGLE COIL



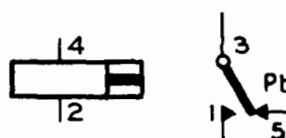
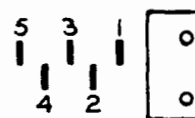
1 IS INNER (START) END OF WINDING.

6
HIGH SPEED
P.O. STANDARD
SINGLE COIL
WITH TAPPING



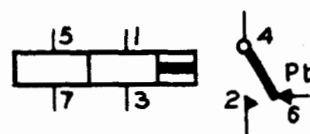
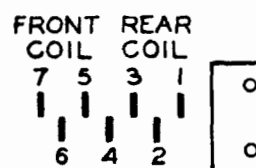
1 IS INNER (START) END OF WINDING.

* 7
HIGH SPEED
SIEMENS
TYPE
SINGLE COIL
(SUPERSEDED
BY ITEM 3)



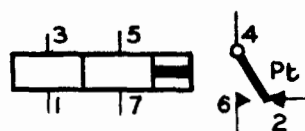
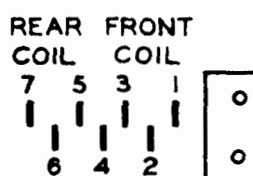
4 IS INNER (START) END OF WINDING.

8
HIGH SPEED
SIEMENS
TYPE
DOUBLE COIL
(SUPERSEDED
BY ITEM 4)



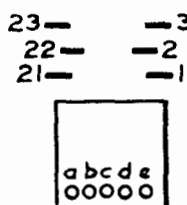
1 & 7 ARE INNER (START) ENDS OF WINDINGS.

4
HIGH SPEED
P.O. STANDARD
DOUBLE
COIL



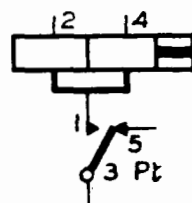
1 & 7 ARE INNER (START) ENDS OF WINDINGS

5
HIGH SPEED
WITH TWO
CHANGE-OVERS



NOTE:-
a & e ARE INNER (START) ENDS
OF WINDINGS

9
HIGH SPEED
SIEMENS
TYPE
SINGLE COIL
WITH TAPPING
(SUPERSEDED
BY ITEM 6)

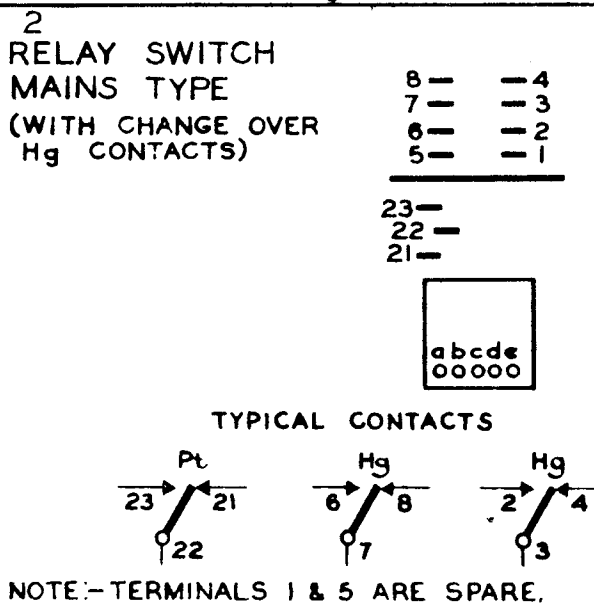
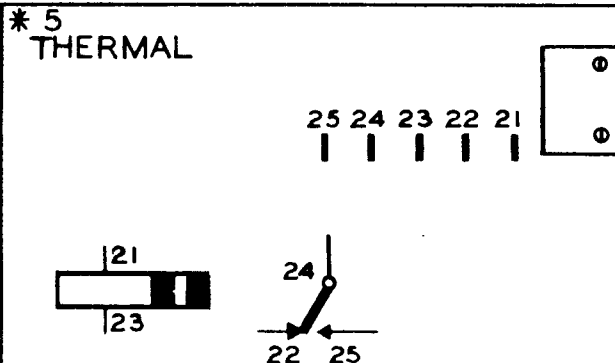
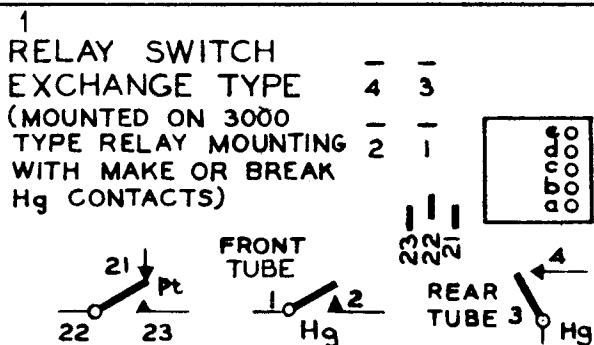


2 IS INNER (START) END OF WINDING.

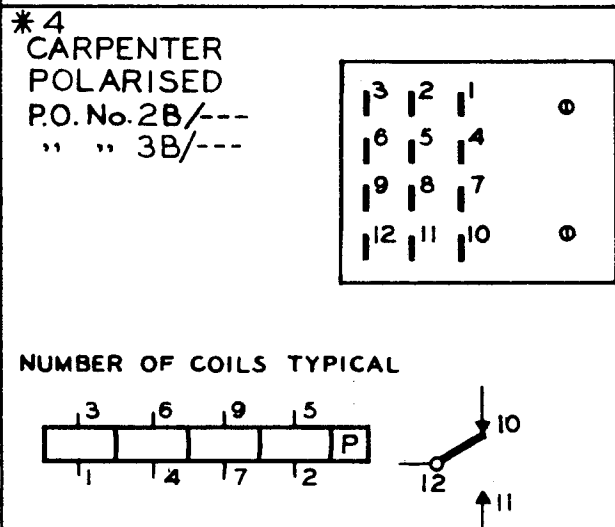
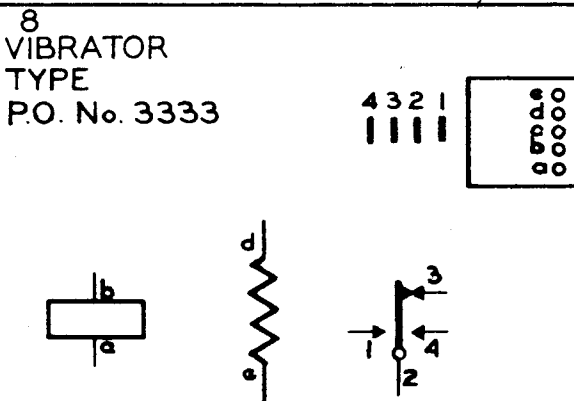
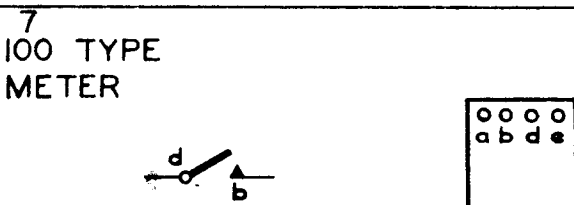
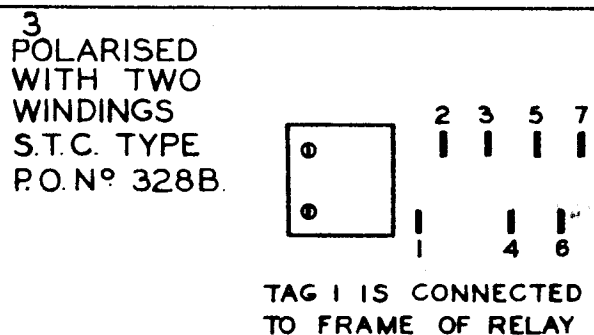
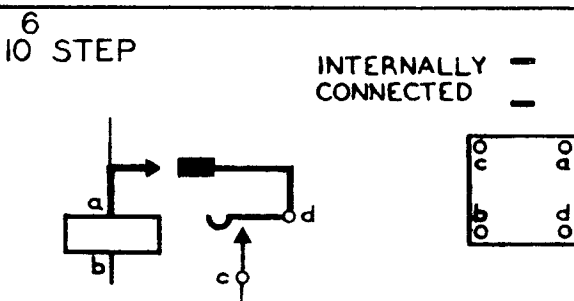
LAYOUTS

RELAYS (CONTINUED)

AS SEEN
FROM REAR



NOTE:- CAN BE MOUNTED IN PLACE OF
LEFT HAND (FROM REAR) SPRING SET
ON 3000 TYPE RELAY.



LAYOUTS	
KEYS	JACKS SWITCHBOARD TYPE
AS SEEN FROM REAR	AS SEEN FROM REAR (FOR OTHER JACKS SEE P. 2·9)
* 1. LEVER TYPE SINGLE THROW OR DOUBLE THROW FRAME 1 21 15 35 TIP OR + TO BE WIRED TO SPRINGS 21-35 & RING OR - TO SPRINGS 1-15. DRAWING SD 22 SHOWS NUMBERING OF P.O. CODED KEYS.	* 4. STRIP MOUNTED (B GAUGE) 2 1 3 PLATE P.O. No. 310 P.O. No. 320 2 5 4 1 3 PLATE P.O. No. 510 P.O. No. 520 6 7 8 2 5 4 1 3 PLATE P.O. No. 810
* 2 PLUNGER TYPE 24 23 22 21 (PLUNGER) 1 2 3 4 24 23 22 21 (PLUNGER) 1 2 3 4 FOR SINGLE SIDED KEYS SPRINGS 21 ETC., ARE NOT FITTED.	* 5 INDIVIDUALLY MOUNTED (B GAUGE) 2 1 FRAME P.O. No. 200 3 2 1 FRAME P.O. No. 300 3 2 1 FRAME P.O. No. 500 3 7 6 2 5 FRAME P.O. No. 700 8 7 6 2 5 FRAME P.O. No. 800
	* 6. TRANSFERRED TO 2·9·2
	* 7. TRANSFERRED TO 2·9·3
	8.

MECHANICALLY OPERATED SPRINGSETS LAYOUT

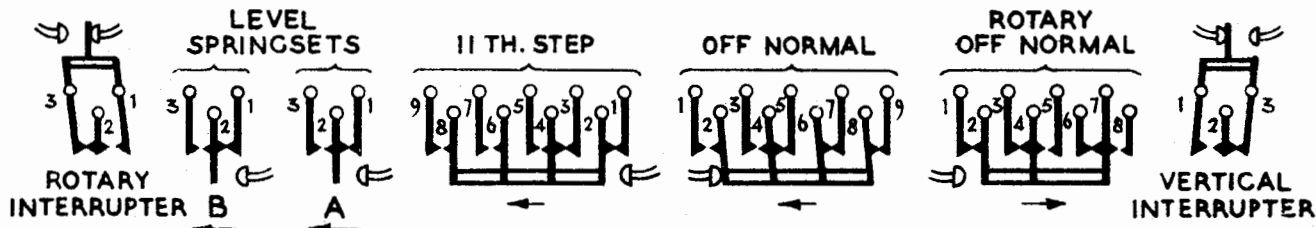
1. TWO MOTION SELECTOR - CHANNEL TYPE

NO UNIFORM ARRANGEMENT OF SPRINGSETS EXISTS AND THEREFORE NO LAYOUT IS GIVEN.

NOTES:-

- (a) Where two similar contact units appear in the same spring set platinum contacts (if required) are first in the order of numbering.
- (b) Full battery shall never be connected to the outer spring of any spring set.
- (c) Sequence of contact units from operating lever is B^S, C^S, M^S, J^S & K^S. The "N" spring set being normally operated functions as M^S, C^S, B^S, J^S & K^S.
On selectors manufactured by Messrs. Ericsson & S.T.C. the "NR" spring sets and on those manufactured by Messrs. Siemens the "NR" & "Z" spring sets are also normally operated and the functional sequence of contact units from the operating lever is K^S, J^S, M^S, C^S & B^S. The springs are numbered in the direction of travel, i.e. spring 1 is remote from the operating lever.
- (d) For designation see p.3.5. For maximum number of springs per assembly see p.2.5.

2. TWO MOTION SELECTOR - 2000 TYPE WITH TYPE 1 SPRINGSETS



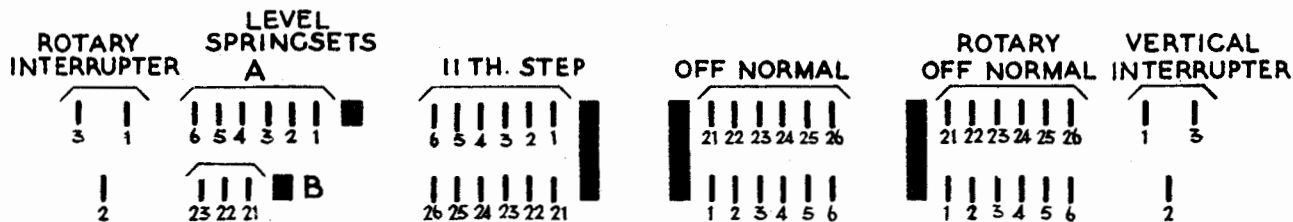
TYPICAL SPRINGSETS WITH SELECTOR IN THE NORMAL (UNSEIZED) CONDITION. TAG POSITIONS AS SEEN FROM THE REAR.

NOTES.

- (a) Order of contact units of any springset: B^S, C^S and M^S from the operating lever. The "N" springset being normally operated, functions as M^S, C^S & B^S.
- (b) If a "K" unit is required, this shall be obtained by a special adjustment of the "C" unit.
- (c) Where two similar contact units appear in the same springset, platinum contacts (if required) are first in order of numbering.
- (d) Full battery shall never be connected to the outer spring of any springset.
- (e) N R Springset operates on the 1st. rotary step and restores on leaving the 11th contact.
- (f) For designation see p.3.5. For maximum number of springs per assembly see p.2.5.

3. TWO MOTION SELECTOR - 2000 TYPE WITH TYPE 2 SPRINGSETS

LAYOUT OF WIRING TAGS AS SEEN FROM REAR



N SPRINGS ARE OPERATED WHEN THE SELECTOR IS IN THE NORMAL (UNSEIZED) CONDITION.

NOTES:-

- (a) Starting from spring number one and continuing through the second springset when fitted, the order of the contact units is M^S, B^S and C^S.
- (b) The Vertical and Rotary Interrupters are toggle operated as in 2 above.
- (c) Where practicable, Battery and Earth should not be connected to adjacent springs.
- (d) When a break combination is fitted to the vertical or rotary interrupter, the lower (and inner) tag is numbered 1 and the upper (and outer) tag is numbered 2.

MECHANICALLY OPERATED SPRING SETS

Maximum Capacities and Functions

Two Motion Selector - Channel Type

Function of Assembly	Maximum Number of Springs	Remarks
1 Vertical off normal springs (N)	8	
2 Rotary off normal springs (NR)	3 Contact units	
3 11th. Step springs (S)	9	Less "NR" springs when required. "S" springs and auxiliary screw arc cannot be used simultaneously.
4 Release magnet springs (Z)	4	
5 Vertical detent springs (DD)	3	Cannot be used simultaneously with "Z" springs.
6 Vertical magnet springs (VM)	2	
7 Rotary magnet springs (RM)	4	If "RM" has 4 springs a left hand test jack cannot be fitted.
8 Normal post springs (NP)	4	
9 Rotary release magnet springs (RZ)	2	
10 NOTE:- The maximum capacities for spring sets, shown in the Table, are those that apply to selectors made by all Manufacturers. The same maximum capacities do not always apply to selectors made by only one Manufacturer. It does not follow that the maxima can be used simultaneously in a number of spring sets on the same selector.		

Two Motion Selector - 2000 Type with Type 1 Spring sets.

Function of Spring set	Maximum number of springs
11 Vertical interrupter springset (VM)	3
12 Rotary off normal springset when vertical interrupter springset is fitted (NR)	8
13 Rotary off normal springset when vertical interrupter springset is not fitted. (NR)	12
14 Off normal springset (N)	9 (3 change overs cannot be fitted)
15 11th. Step springset when level springset is fitted in NPA position. (S)	9
16 11th. Step springset with no level springset fitted in NPA position (S)	12
17 Level springset (NP)	6
18 Level springset when two level springsets are fitted (NPA) & (NPB)	3
19 Rotary interrupter springset (RM)	3

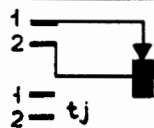
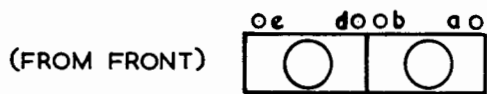
Two Motion Selector - 2000 Type with Type 2 Springsets.

Spring Set	Maximum Number of Springs	Arrangement of Contact Units in Spring Assemblies
20 Vertical Interrupter (VM) Rotary Interrupter. (RM)	3 springs each (Non relay type)	Total Number of contact units in Assembly (N, NR or S)
21 Rotary OFF Normal (NR) OFF normal (N) 11th step (S)	12 springs each (5 contact units)	Number of contact units in springset numbered 1-6
22 Level springs (NP) (one set only)	3 springs in NPB posn. or 6 springs, in NPA posn. (2 contact units)	1 1 2 2 3 2 4 1 5 2
23 Level springs (NPA) & (NPB) (Two sets)	6 springs (excluding bias spring of a single break contact) 3 contact units, of these not more than 3 springs (1 contact unit) may be fitted in NPB position.	Where two similar contact units appear in the same springset assembly, platinum contacts, when used, are first in the order of numbering.

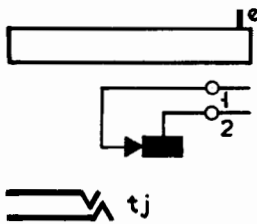
LAYOUTS

SELECTORS

1. UNISELECTOR - TYPE 1.

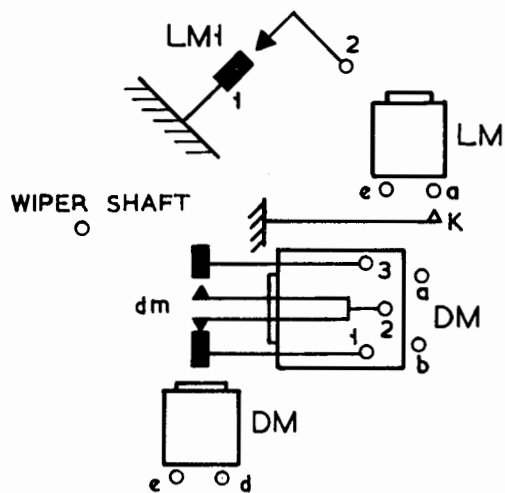


(FROM LEFT)

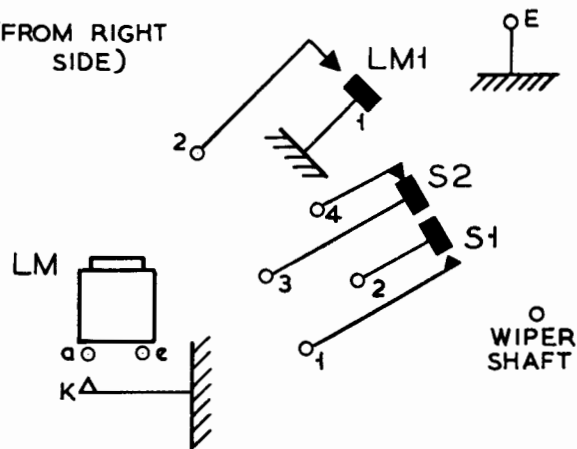


5. MOTOR UNISELECTOR

(a) (FROM LEFT SIDE)

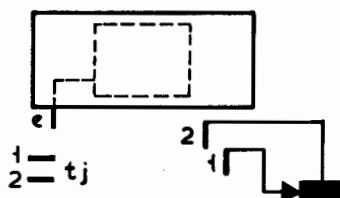


(b) (FROM RIGHT SIDE)

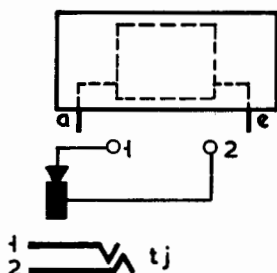


2. UNISELECTOR - TYPE 2 (SINGLE COIL)

(FROM FRONT)

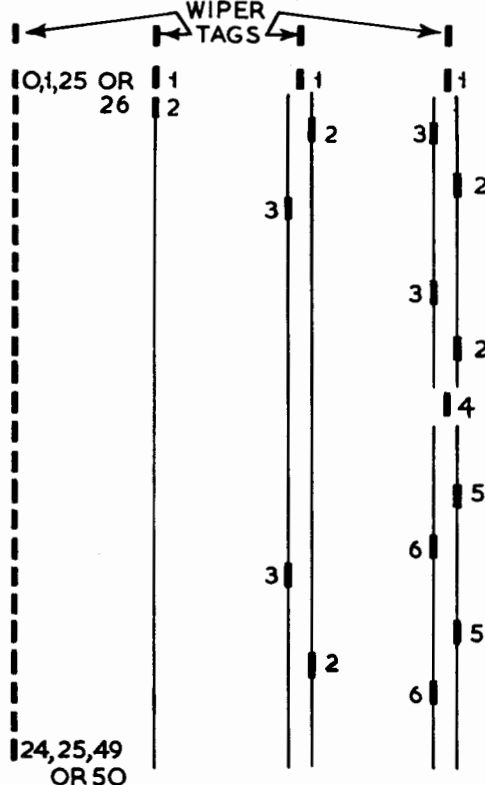


(FROM LEFT)



* 6. UNISELECTOR - TYPE 1, 2 & 3 BANK TAGS (REAR VIEWS)

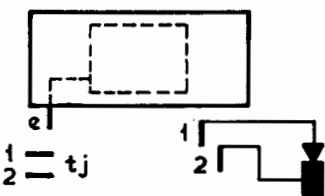
(a) (b) (c) (d)



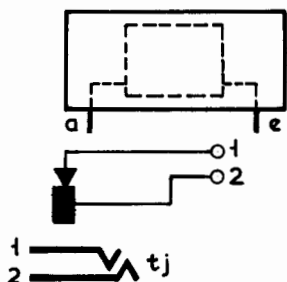
(a) 25 POINT ARC.
 (b) HOMING ARC WITH SOLID METAL SEGMENT.
 (c) " " " DOUBLE " "
 (d) " " " SECOND HOME POSITION.

3. UNISELECTOR - TYPE 3 (SINGLE COIL)

(FROM FRONT)



(FROM LEFT)



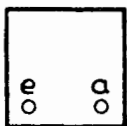
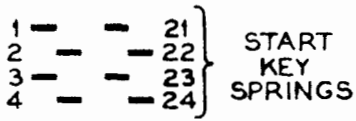
4. NOTE:- THE MECHANISM OF TYPES 2 & 3 ARE INTERCHANGEABLE WITH THAT OF TYPE 1. WHEN INSTALLED AS MAINTENANCE REPLACEMENT, COIL TAGS 'a' & 'e' SHALL BE WIRED AS FOR 'b' & 'e' RESPECTIVELY, AS INDICATED ON EXISTING WIRING DIAGRAMS.

LAYOUTS

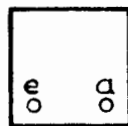
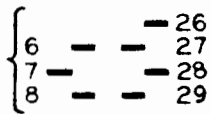
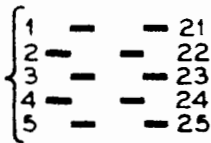
MISCELLANEOUS APPARATUS

1. CLOCK 44. AS SEEN FROM REAR.

(a) WITH TWO
POSITION
START KEY



(b) WITH THREE
POSITION
(UNIVERSAL)



2. DIAL. AS SEEN FROM REAR

(a) WITHOUT
AUXILIARY
SPRINGS



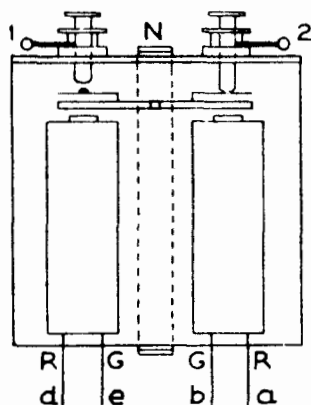
(b) WITH
AUXILIARY
SPRINGS



(c) TRIGGER

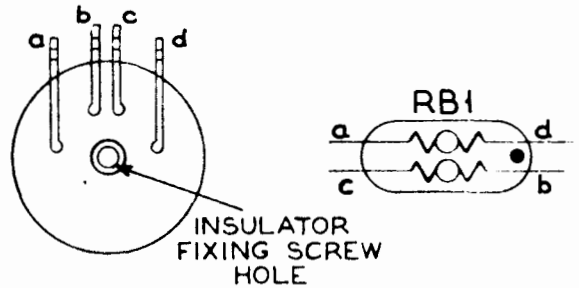


3. BUZZER No. 23A. UNMOUNTED.



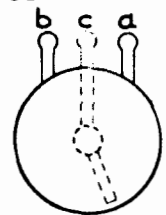
*4. RESISTOR BARRETT No 1.

VIEW OF BASE FROM
BELOW WITH
INSULATOR REMOVED.



*5. RESISTOR VARIABLE POTENTIOMETER Nos. 26 & 30

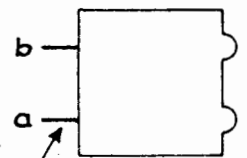
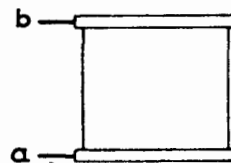
AS SEEN
FROM REAR



6. RESISTOR COILS

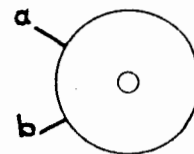
(a) P.O. No. 9.

(b) P.O. No. 25



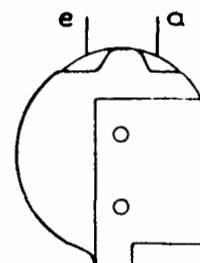
TAG NEAREST MTG. PLATE

(c) PO NoS 12 & 15
(VIEWED FROM TAG END OF COIL)



7. TWO MOTION SELECTOR 2000 TYPE

VERTICAL OR ROTARY MAGNET.



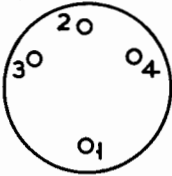
(VIEWED FROM TAG END OF COIL)

LAYOUTS

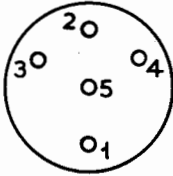
MISCELLANEOUS APPARATUS
(CONTINUED)

*1. VALVE HOLDERS

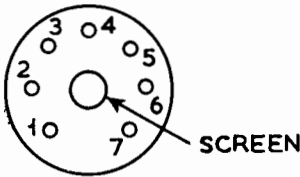
(a) BRITISH 4 PIN



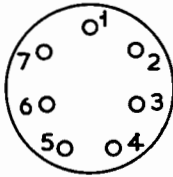
(b) BRITISH 5 PIN



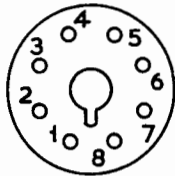
(c) B7G



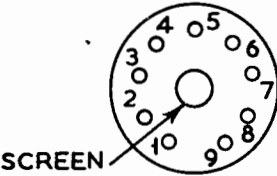
(d) BRITISH 7 PIN



(e) INTERNATIONAL
OCTAL
MAZDA OCTAL

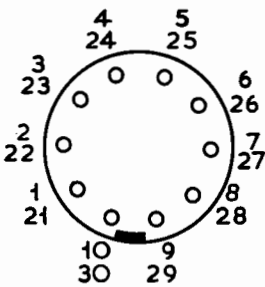


(f) B9A



(VIEWED FROM REAR OF VALVE HOLDER)

(g) VALVEHOLDER No.35 AND ADAPTOR
D 90021 (AUXILIARY TAG RING)



(VIEWED FROM TOP OF
VALVEHOLDER)

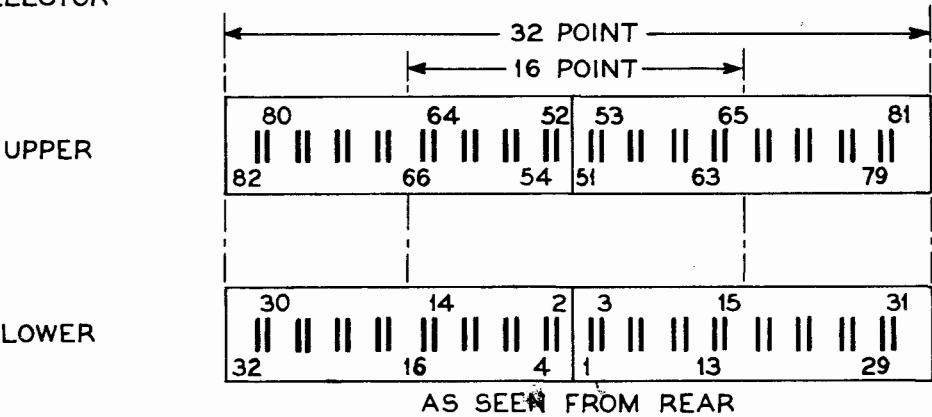
THE HIGHER NUMBER IN EACH PAIR
REFERS TO THE TAG ON THE ADAPTOR
CORRESPONDING TO THE TAG ON THE
VALVEHOLDER BEARING THE LOWER NUMBER

LAYOUTS

MISCELLANEOUS APPARATUS
(CONTINUED)

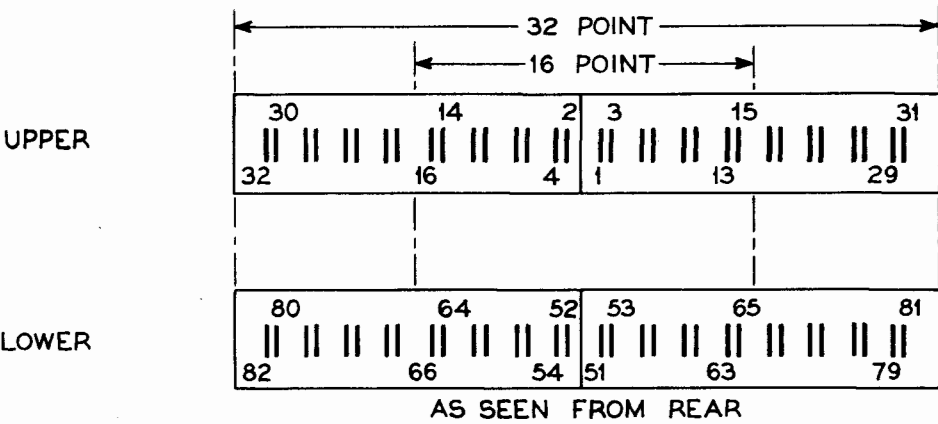
JACKS (FOR SWITCHBOARD TYPE SEE P. 2.3)

1.
SHELF
(a) 2000 TYPE SELECTOR



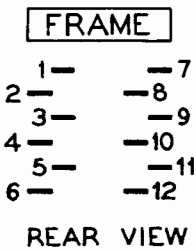
- (b) PRE-2000 TYPE EQUIPMENT AND 2000 TYPE EQUIPMENT OTHER THAN SELECTORS

(i)

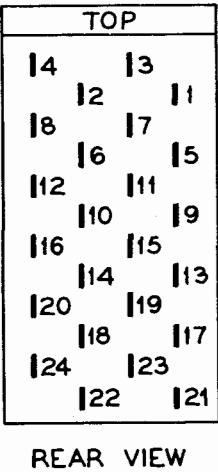


- (ii) WHEN A THIRD SHELF JACK AND PLUG ARE PROVIDED ON 2000 TYPE EQUIPMENT THEY ARE FITTED IN THE LOWEST POSITION AND ARE NUMBERED 132 ← 102/101 → 131 AS SEEN FROM REAR.

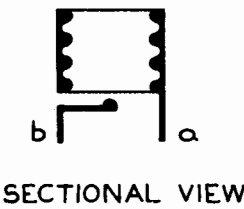
2.
12 POINT
(AS USED FOR
METER ROUTINE
TEST)



3.
24 POINT TEST
(P.O. No. 51)
(P.O. No. 58)



4.
LAMP, P.O.No. 45 (OR EQUIVALENT
EDISON SCREW TYPE)



- 5.

MISCELLANEOUS APPARATUS

(CONTINUED)

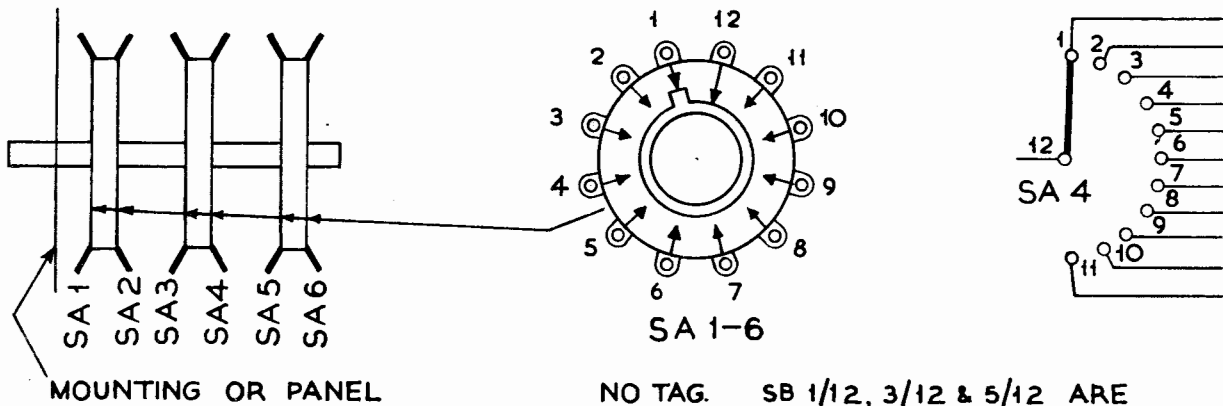
1. ROTARY SWITCH (WAFER TYPE)

SIDE VIEWS

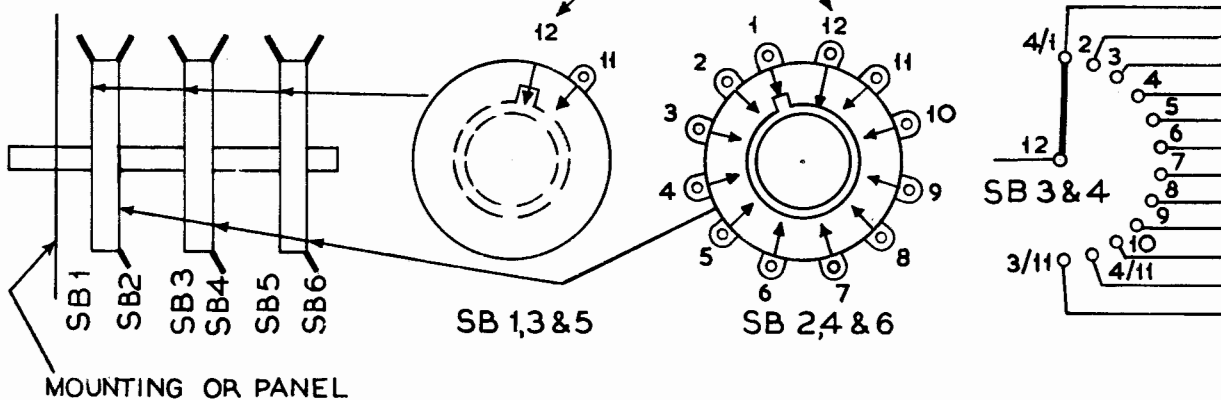
REAR VIEWS

SYMBOLS

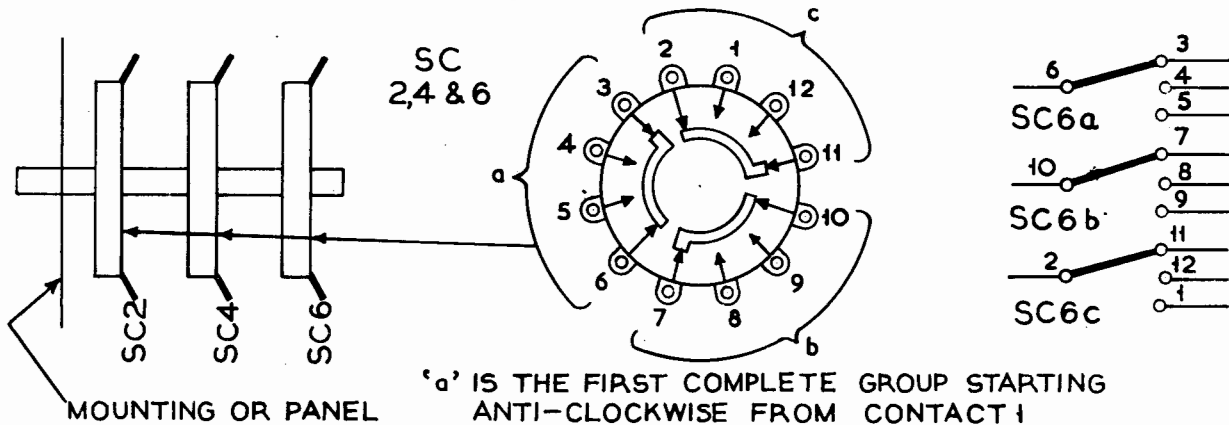
(Q) 3 WAFER 6 POLE 11 POSITION



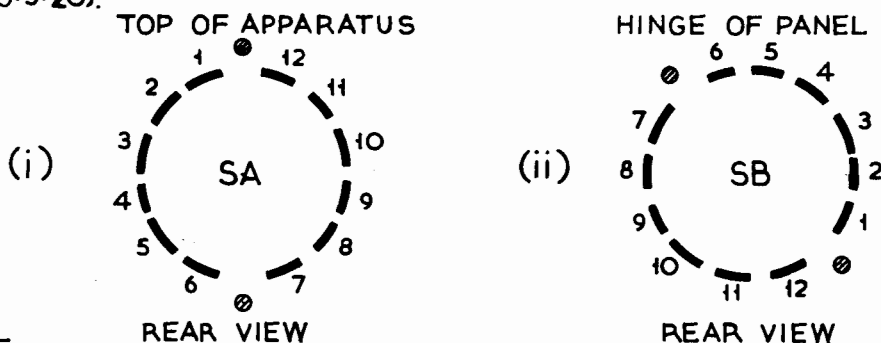
(b) 3 WAFER 3 POLE 12 POSITION



(C) 3 WAFER 9 POLE 3 POSITION



(d) EXAMPLES OF LAYOUT SKETCHES USED ON DIAGRAMS TO INDICATE TAG NUMBERING IN RELATION TO MOUNTING POSITION OF SWITCH (SEE 5-3-20).



NOTE:-

THE POSITION OF THE LOCATING LUG OR ANY OTHER FEATURE WHICH MAY BE USED AS A REFERENCE POINT SHOULD BE SHOWN IN SKETCH.

COMPONENT DESIGNATIONS

1. Principles

Components are divided into two classes:-

- (a) Class "a". Switches, relays and similar devices.

This class includes any device for discontinuously changing the configuration of an electrical circuit by mechanical movement.

- (b) Class "b". All other components.

2. Rules

- (a) Class "a" Components

These shall be designated by one or more letters e.g. JK (Jack).

Components with the same letter code shall be distinguished by the addition of upper case letters, e.g. JKB (the second jack).

Contact units and spring tags of contact units shall be numbered.

Coil tags shall be lettered (lower case) except that when the coil tags are in the same assembly as the springs they shall be numbered.

- (b) Class "b" Components

These shall be designated by one or more letters, e.g., FS (fuse). Components with the same letter code shall be distinguished by the addition of numbers, e.g., FS3 (the third fuse).

Tags or terminals shall be lettered (lower case).

- (c) Designation of pins and tags

The following departures from the above rules have been authorised.

- (i) Engraved Components

Where tag or terminal designations are engraved on a component, the standard reference letter or number may be replaced on diagrams by the actual marking shown in brackets, e.g., C10(2). The brackets shall be omitted in wiring runs.

- (ii) Valves

Tags of valve holders shall be numbered and the number shall be shown in brackets, e.g. V1(8). The brackets shall be omitted in wiring runs.

3. Application of the Rules

- (a) The general application of component and tag designations is illustrated in the symbol and layout sections of this document.

- (b) Designations on routed schematic diagrams shall follow those on the equivalent P.O. schematics or other basic documents, being amplified where necessary.

Details of the designations applicable to particular components are set out in tables 1 to 4.

- (c) Where information given in the tables has been amplified by notes a reference is made in the table to the relevant item number under which the additional rules are to be found.

- (d) Components with contact units shall be designated in the form of a fraction, of which the numerator is the component designation and the denominator the total number of contacts units, e.g. $\frac{A}{2}$ (The contact units are then designated A1 & A2).

COMPONENT DESIGNATIONS (contd.)

4. TABLE 1 - GENERAL

Component	Designation	See Item
Bell	BL1, BL2, etc.	
Buzzer	BZ1, BZ2, "	
Capacitor	C1, C2, " (Note 1)	3.6.8 (a)
Cathode Ray Tube	CRT1, CRT2 "	3.6.8 (b)
Chargeable Time Clock	CTC	
Dial, Automatic	ADA, ADB, etc.	
Element, Symmetrical, with non-linear current/voltage characteristic	RX1, RX2, etc.	
Fuse	FS1, FS2, "	3.6.8 (c) & 1.26.1
Generator, hand	HGA, HGB, "	
Heat Coil	HCA, HCB, "	
Howler	HR	
Inductor	L1, L2, etc. (Note 1)	3.6.8 (e)
Induction Coil, Oper's.	IC1, IC2, etc.,	3.6.8 (d)
Interrupter, Rotary	INT	
Jack, Isolation	TJA, TJB, etc.	
" , Operators & Swbd.	JKA, JKB, "	
" , Test, (Selector, Relay Set etc.)	TJ	3.6.8 (f)
Key	X followed by single or two letter functional code	3.6.8 (g)
Lamp	LP1, LP2, etc.	
Link (U or Wire)	LKA, LKB, "	
Meter	M prefixed by functional code	
* Microphone	MIC.1, MIC2, etc.	
Receiver	TL1, TL2, "	
Rectifier (Metal)	MR1, MR2, " (Note 1)	
Resistor	R1, R2, " (")	3.6.8 (h)
Resistor, Ballast	RB1, RB2, "	
* Resistor, Bulb or Lamp	RLP1, RLP2, "	
Resistor, Variable or Pre-set	RV1, RV2, "	
Strip, Connexion	SCA, SCB, "	
* Switch	SA, SB, "	
* Transformer	T1, T2, " (Note 1)	3.6.8 (d & e)
Valve	V1, V2, " (")	3.6.8 (b)

*Notes:-
1. The Designations marked with a reference to Note 1 shall be used only for the components specified. The remainder may be used for components other than those specified only when no ambiguity can arise e.g. as a functional code for a relay in a diagram in which the component specified does not itself appear.
2. The letters "I" and "O" shall not be used as the last letter of a designation for the components listed in the table above.

3. Any of the following components whose designation is not shown on the item itself or, in the case of resistor coils, on the designation washer, will have the designation shown in brackets on wiring diagrams. The brackets shall be omitted in wiring runs.

Capacitor
Element, Symmetrical, with
non linear current/voltage
characteristic

Metal Rectifier
Resistor

COMPONENT DESIGNATIONS (contd.)

5. TABLE 2 - RELAYS

Relays are designated by one or more letters on a functional basis. The normal functional designations for relays are shown in the table.

Relay springs shall be numbered.

Coil tags shall be lettered except that when the coil tags are in the same assembly as the springs they shall be numbered.

DESIGNATION	FUNCTION	DESIGNATION	FUNCTION
A	Impulse accepting	GB	Group busy
AL	Alarm	H	Wiper connecting
AS	Key-send answer	HR	H relief
B	Guard	HA	First wiper connecting
BA	Additional guard (B relief)	HB	Second wiper connecting
BB	Busy back	HD	Hold
BF	Busy flash	HS	Hunt start
BR	Busy release Busy relay	I	High Impedance bridging coil (bridge impedance)
CD	Impulse control or steering	IR	I relief
CA	CD Relief	IA	Bridge impedance (ans)
CB	Coin box discrimination	IC	Bridge impedance (call)
CC	Call count Counting control	IL	Bridge impedance (line)
CK	Cancel	J	Meter control
CO	Cut off Change over	JD	Junction discrimination
CR	Hundreds register	JH	Junction hunt
CS	Key send call	JR	Junction release guard
CT	Cord test Connect through	K	Cut drive
CW) CX) CY) CZ)	Hundreds storage	KA	K relief
		KK	K relief
		KR	K relief
		LS	Line signalling
		LL	LS relief
D	Called-party, supervisory	LA	Supervisory (Ans) "A" Line signal
DA	Dial (Ans) Meter Control (S & Z metering) Supervisory (Ans)	LB	"B" Line signal
DB	Meter Control (S & Z metering)	LC	Supervisory (call)
DC	Dial call Supervisory (call) Decode control Drive control	LD	Local discrimination
DD	Digit distributor D relief	LO	Lock out
DR	Tens register	M	2nd sleeve relay (out-going) bothway circuits. Forced release
DS	Distributor stepping	MM	M relief
DW) DX) DY) DZ)	Tens storage	MC	Meter control
		MD	Meter delay
		MH	Manual hold
		MN	Monitor
E	Rotary Impulse control	MRR	Thousands register
ES	Emergency switching	MS	Motor start
ET	Engaged test (manual)	MW) MX) MY) MZ)	Thousands storage
F	Ring trip		
FA	Fuse alarm	PR	Operator's circuit primary feed
FB	Finder busy		
G	Outlet busy test Rotary hunt control	RA	Release Alarm

COMPONENT DESIGNATIONS (contd.)

5. (contd.)

<u>DESIGNATION</u>	<u>FUNCTION</u>
RG	Release guard
RR	Ring or Flash
RT	Routine test
S	Sleeve relay
SS	S relief
SA	Start send Supervisory alarm
SB	Sender busy
SC	Sender control Spare code
SF	Sender find
SK	Speak
SL	SK relief
ST	Start
SZ	Stop send
TA	Tertiary switching (Ans)
TB	Tertiary switching (call)
TP	Time pulse
TS	Through Signal
UR	Units register
UW) UX) UY) UZ)	Units storage
WS	Wiper selecting

COMPONENT DESIGNATIONS (contd.)

6. TABLE - 3

Functional designations for components of two motion selectors, uniselectors, motor uniselectors and mechanical pulse regenerators.

	Component	Designation	See Item
Two Motion Selector	MAGNETS		
	Vertical	VM	
	Rotary	RM	
	Release	Z	
	Rotary Release	RZ	
	MECHANICALLY OPERATED SPRINGSETS		
	Vertical Magnet Interrupter	VM	
	Rotary " "	RM	
	Release Magnet	Z	
	Rotary Release Magnet	RZ	
Uniselector	Level	NP or NPA & NPB	
	11th Step Rotary	S	
	Off-Normal or Vertical Off-Normal	N	
	Rotary Off-Normal	NR	
	Vertical Detent	DD	
	Vertical Wiper	AW	
	Vertical Bank	AB	
	Auxiliary Screw Arc.	ASA	
	Magnets	DM or Functional Code	3.7.8(j)
	Interrupter	dm } Prefixed by } DM or functional	
Motor Uniselector	Test Jack	tj } code	
	Wiper	DM or Functional Code	
	Bank Arc	suffixed by Wiper/Arc number	3.7.8(j)
	Complete	Functional Code	3.7.8 (j)
	MAGNETS		
	Drive	DM	
	Latch	LM	
	MECHANICALLY OPERATED SPRING SETS		
	Ratchet operated	LM	
	Cam	S prefixed by functional code	
* Mechanical Pulse Regenerator	Interrupter	dm } Prefixed by } functional code	
	Test Jack	tj } when shown out-	1.22.7
	Drive Test Key	k } side the box.	
	Wiper	{ DM or Functional code suffixed by Wiper/Arc number	3.7.8(j)
	Bank Arc }		
	MAGNETS		
	Transmitting	TM	
	Marking	MM	
	Receive	RM	
	Mechanically operated off-normal springset	N	
	Interrupter	dm prefixed by designation of associated magnet	
	Marking Pin	SP	

COMPONENT DESIGNATIONS (contd.)

7. TABLE - 4

Designations for mechanically operated contacts of Teleprinter and allied apparatus.

Mechanically operated Contacts	Designation
Transmitter	T
"Who are you"	WRU
Paper Failure	PF
Answer Back	AB
"J" Bell	J
Send Receive Switch	SR

8. TABLES 1 to 4 Additional Rules

(a) Capacitor

Where a capacitance is made up of more than one capacitor all component capacitors shall be shown and an additional suffix letter used to identify each, e.g. C1A, C1B, C1C etc.,

Capacitors mounted on other apparatus shall be designated in the normal capacitor range but the designation shall be enclosed in brackets to indicate that the component is not signwritten. The brackets shall be omitted in wiring runs.

(b) Valve & Cathode Ray Tube

Where an electrode of these components is brought out to a terminal on the glass envelope the terminal shall be designated TC.

(c) Fuse

Component and tag designations for fuses shall be shown only when it is necessary to refer to them in wiring information.

(d) Transformer & Operator's Induction Coil

Terminals may be designated by the actual marking shown on the component in place of the normal lower case letters, in which case the designation shall be enclosed in brackets. The brackets shall be omitted in wiring runs.

* (e) Components in Pots

A transformer pot or similar container which accommodates a number of components shall be designated as a unit. The unit will take the designation of the main component e.g. T1, L1 etc. The designations for the other components within the pot shall be shown, but enclosed in brackets to indicate that they are not signwritten, e.g. (R1), (C1) etc. see item 1.9.1.

(f) Test Jack (Strip Mounted Set)

Where two test jacks are fitted on a strip mounted set they shall be designated TJA & TJB respectively and the spring numbering for each jack shall commence at 1.

(g) Key

Individual keys bearing the same functional code shall be distinguished by the addition of a further suffix letter, e.g. KRCA, KRCB, etc.,

(h) Resistor

Where a resistance is made up of more than one resistor all component resistors shall be shown and an additional suffix letter used to identify each, e.g. R1A, R1B, R1C etc.,

COMPONENT DESIGNATIONS (Continued)

Tables 1 to 4 Additional Rules (Continued)

8.

(h) Contd.

Resistors mounted on other apparatus shall be designated in the normal resistor range but the designation shall be enclosed in brackets to indicate that the component is not sign-written. The brackets shall be omitted in wiring runs.

*(j) Uniselector

Uniselectors, both ratchet and motor driven, are designated by a functional code of one or two letters except when the function is indicated by the complete circuit in which case the designation DM shall be used. The functional code or DM shall be associated with the number of wipers and bank outlets to form the complete designation as shown in the following typical examples!+

DM25 - Uniselector with 25 outlets and 3 wipers
3

FD102 - Motor uniselector, with 102 outlets and 8 pairs of wipers (16 single ended wipers)
8+8 functioning as a Finder.

DM51 - Motor uniselector, with 51 outlets and 16 double ended wipers
16

To identify two or more uniselectors having similar functions use shall be made of additional suffix letters, e.g.

FDA102 FDB102 etc.,
8 + 8 8 + 8

*(k) Two or more circuits on the same plug-in unit or strip mounted set

Where two or more identical circuits are mounted on the same base and neither numerals nor suffix letters are included in the component designation to identify the individual circuits, the components are marked as shown below. The same markings shall be used on diagrams where it is necessary to distinguish between circuits e.g. in battery and earth wiring runs, otherwise basic designations shall be used.

1st Cct.	2nd Cct.	10th Cct.
1A, 1C1, 1R1 etc.	2A, 2C1, 2R1 etc.	10A, 10C1, 10R1 etc.

*(l) Bank contacts in wiring runs

In wiring runs bank contacts shall be identified by the bank or bank arc designation or bank designation and level number followed by oblique stroke and contact number or letter thus:-

AB2/N - Vertical bank contacts
DM2/24 - Uniselector bank contacts
FD14/96 - Motor uniselector bank contacts
P2 9/11 - 2 Motion selector bank contacts

SPARE

RULES APPLICABLE TO ALL ROUTED SCHEMATIC, SHELF JACK AND CROSS CONNEXION DIAGRAMS

1. Dimensions

All diagrams shall be drawn on 13" x 8" sheets or sheets that are a multiple of 13" x 8". The standard sizes for the various types of diagram are listed in sections 6, 7, 8 and 9. The dimensions given shall be defined by continuous lines, which are required for trimming purposes. There shall be a $\frac{3}{16}$ " margin along all sides and inside the trimming lines. The inner limits of the $\frac{3}{16}$ " margin shall be defined by continuous lines.

The dimensions given do not include the 1" filing margin that is required along one of the 13" or 26" sides.

2. Position of Filing Margin and Title Box

When the diagram is placed so that the filing margin is at the left hand side, the title box shall be right way up at the bottom of the diagram. The right hand and bottom boundaries of the title box shall coincide with the $\frac{3}{16}$ " margin lines.

3. Main Body of Diagrams

The main body of the diagram and all component designations shall be right way up either when the filing margin is at the left or when the filing margin is at the top of the diagram. All other printing and designations shall be right way up either when the main body of the diagram is right way up or when it is turned clockwise through 90° from that position.

4. Standard Title Box

The standard title box which is shown in Figs. 1 and 2 page 4.5 shall be used on all diagrams.

Spaces "A" are for signature by the originating manufacturer.

Space "B" is left blank on the master tracing and used on each copy tracing for the name of holding party.

Spaces "C" are left blank on the master tracing and used on each copy tracing for signatures of the holding party.

Space "D" is for G.P.O. approval signature and date.

5. Boundary Line

When diagrams are divided into figures, or figures are sub-divided, the figures so formed shall be outlined by a heavy chain dot boundary line, the long lines of which shall be $\frac{1}{4}$ " minimum in length.

* 6. Space for Manufacturers Code

A space approximately 1" x $\frac{1}{2}$ " should be left in a convenient position, e.g. top right hand corner, to permit a box to be inserted for manufacturer's code etc.

* 7. Printing

All printing shall be upright.

Figure numbers or letters and suffix letters and the abbreviation "FIG" shall be in $\frac{1}{4}$ " characters.

Spring numbers, tag letters and numbers, wiring runs and notes shall be in characters corresponding to an upper case alphabet $\frac{3}{32}$ " high. Values, stores references etc. to be in $\frac{3}{32}$ " characters.

Designations shall be in $\frac{1}{8}$ " characters.

Note: Upper case letters shall be used except that designations shall be as shown in symbols pages.

* 8. Notes

Notes on diagrams shall be numbered and grouped together. Wherever practicable the notes shall be placed so as to leave room for additional notes. Any relevant notes that appear on the equivalent P.O. diagram shall be included. Supersession notes shall not appear on wiring diagrams.

9. Connexions by Cross References

Connexions within a diagram shall be represented by a line (see pages 1.32 items 1 to 4) whenever it is practicable to do so.

When required connexions between different Figs. of the same diagram or between points in the same Fig. may be indicated by cross-references except that cross-references shall not be used within a Fig. relating to a plug-in item.

**RULES APPLICABLE TO ALL ROUTED SCHEMATIC,
SHELF JACK AND CROSS CONNEXION DIAGRAMS (Contd.)**

9. (Cont'd)

Connexions between different diagrams shall be indicated by cross references which shall specify the diagram that the connexions are to be extended to e.g. "To Group Selector ATW 38210 or equivalent." Suffix "O" diagram numbers shall be used for cross-references unless there are special reasons for quoting a later suffix number. Any lead interconnecting two diagrams should have the same designation on each diagram.

***10. Pre 2000 Type Diagrams**

On pre-2000 type routed schematic diagrams wiring information shall be given only for plug-in equipment. Pre-2000 type shelf jack diagrams shall not indicate the colour or size of the conductors.

***11. Wire Colours**

- (a) Wire colours shall always be shown for battery and earth connexions.
- (b) Wire colours shall not be shown for:-
 - i Plug in apparatus (Selectors, Relay sets)
 - ii Strip mounted sets
 - iii Equipment mounted on the M.A.R.
 - iv Strip mounted equipment connexions between items of apparatus mounted on the same plate except for connexions which are part of the rack cable form [(c) ii refers]
 - v Machine made cable connexions which are not part of the rack cable form.
 - vi Cross Connexion Diagrams
- *vii Connexions associated with a ϕ sign (see 6.1.4)
- (c) Wire colours shall be shown for:-
 - i Connexions which are part of the rack cable form.
 - * ii Because of differences between the wiring methods followed by the various manufacturers, and because some diagrams cater for alternative layouts, certain connexions will be included in a rack cable form on some equipment and in the local plate wiring on other equipment; the wire colours for these connexions shall be shown in brackets unless the connexion is a continuation of one that is always included in a rack cable form, when it shall be sufficient to show a wire colour for the connexion that is always included in the rack cable form. Wire colours shall also be enclosed in brackets when associated with the alternative cable or wire symbol item 1.32.11.
- *(d) When practicable, for connexions in the same size wire, a different colour shall be used for each wiring point on:-
 - i Individual relays, test jacks, keys, transformers etc.
 - ii The "odd" numbered side of the shelf jack
 - iii The "even" " " " " " "
 - iv Tags served by the same fanning hole of strips connexion.
 - v Horizontal rows of uniselector bank contacts.
 - vi Resistors mounted on the same post.
- (e) Wire colours shall be shown adjacent to the wire or wiring to which they apply.
- (f) Colours available are listed in T 5241.

***12. Colour Abbreviations**

Where colours are used on a diagram they may be abbreviated as follows:-

Colour	Abbreviation	Example of Use
Blue	B	
Orange	O	
Green	G	
Brown	BN	Blue White B-W
Slate	S	
White	W	Red Blue Brown R-B-BN
Black	BK	
Red	R	

***13. Size of Conductor and Type of Insulation of wire**

Normally, diagrams shall indicate the size of conductor but not the type of insulation that is to be used for the various connexions. Under exceptional conditions the type of insulation may be indicated, e.g. when a diagram includes low and high voltage connexions.

On each diagram there shall be one comprehensive note concerning wire sizes. The sizes of wire required for connexions not covered by the note shall be indicated adjacent to those connexions.

***14. Cabled Connexions**

All cabled connexions, in the same size of conductor, passing from one circuit to the same destination shall, as far as is practicable, be enclosed within the same cable symbol, or linked cable symbol. See items 1.32.11 and 12.

RULES APPLICABLE TO ALL ROUTED SCHEMATIC, SHELF JACK AND CROSS CONNEXION DIAGRAMS (Contd.)

*15. Layout of Apparatus

The wiring information shall be suitable for the apparatus layout shown on the appropriate P.O. information.

*16. Standard Phrases

The following abbreviations shall be used for the designation of Common Services etc.

Amplifier Alarm	Amp. Alm.
Alarm Classification Strip Conn.	Alm. Class. Strip Conn.
Busy Hold Battery	B.H. Batt.
Busying Resistor Battery	Busy. Res. Batt.
Busy Tone and Flash	Busy T & F.
Busy Tone Earth	Busy Tone.
Called Subscriber Held	C.S.H.
* Congestion Announcement	Cngn. Ann.
Continuous Ringing	Cont. Ring.
Continuous Ringing Tone Earth	Cont. Ring. Tone.
Dial Tone Earth	Dial Tone
Deferred Alarm	Alm. D.
Earth	Eth.
Earth Pulses:-	
Controlled by Exch. clock	Give periodicity of pulse e.g. 30 Sec. Eth.
Not controlled by Exch. clock	Give periodicity followed by on & off periods, e.g. C-5 sec. Eth. (0.14 on 0.36 off)
Flicker Earth (from ringer)	FL. Eth.
Flicker Contact Earth (from contact of FL rel).	FL. Contact Eth.
Flicker-Start to FL relay	FL. Rel. Batt.
Fuse Alarm	Fuse Alm. or FA.
Interrupted Battery & Earth	Int. Batt. & Eth.
Interrupted Earth	Int. Eth.
Interrupted Ringing	Int. Ring
Interrupted Ringing Tone Earth	Int. Ring. Tone.
Main Release Alarm	Main Rlse. Alm.
Main Supervisory Alarm.	Main Supy. Alm.
Metering Pulses	Meter Z, Meter S, Meter IU, Meter 2U etc.
Night Alarm	Night Alm. or N.A.
Negative Battery	Neg. Batt.
Number Unobtainable Tone - Battery	N.U.T. Batt.
Number Unobtainable Tone - Earth	N.U.T. Eth.
Overflow Meter	O.F.M.
Permanent Glow Alarm	P.G. Alm.
Permanent Glow Alarm-Batt.	P.G. Alm. Batt.
Positive Battery	Pos. Batt.
Prompt Alarm	Pulse M/C St. Batt.
* Pulse Machine Start Battery	Rlse. Alm. Batt.
Release Alarm Bagtery	Rlse. Alm. Eth.
Release Alarm Earth	Rlse. "S"
Release Alarm "S" Lead	Rlse. "ST"
Release Alarm "ST" Lead	Rlse. "Z"
Release Alarm "Z" Lead	Ring, Ret. Batt.
Ringing Return Battery	Ring. Ret. Eth.
Ringing Return Earth	Give periodicity of pulse e.g. 6 sec. "Z", 30 sec. "S" etc.
"S" & "Z" Pulses (except those described on a functional basis)	

16. Standard Phrases (Contd.)

17. Standard Phrases (for use on Telegraph Diagrams)

Immediate Release Start (Spare lines and levels)	IR. ST.
" " Signal(" " " ")	IR. Sig.
Station Busy Signal (OCC) Start	OCC. ST.
" " " "	OCC. Sig.
" Fault Pulse	SFP
" Out of Order signal (DER S) start	DER S.ST.
" " " " " "	DER S. Sig.
Teleprinter Speed Test Start	TST. ST.
" " " Signal	TST. Sig.
Test Message ('x' % Distorted) Start	TM 'x'% ST.
" " ('x'% ") Signal	TM 'x'% Sig.
" " (switched) Start	TM 'SW'. ST.
" " " Signal	TM 'SW'. Sig.
" " Phasing Pulse	TM. P.P.
Trunks Busy Signal (NC) Start	NC. ST.
" " " "	NC. Sig.
Trunk Circuit Hold and Retest Start	TCHR. ST.
" " " " " Signal	TCHR. Sig.
" Out of Order Signal (DER T) Start	DER T. ST.
" " " " " "	DER T. Sig.
Wait Signal (MOM) Start	MOM. ST.
" " "	MOM. Sig.
Who Are You Signal Start	WRU. ST.
" " " "	WRU. Sig.
" " " Phasing Pulse	WRU. P.P.

FIG.1. STANDARD TITLE BOX WITH DIMENSIONS

THIS COLUMN ONLY REQUIRED FOR ROUTED SCHEMATICS				3"	1"	3"	☐ SLOW RELEASE ☒ SLOW OPERATE	
							1 1/8"	
							3"	
							1/2"	
							1/4"	
AMENDMENT PARTICULARS				ISSUE	DATE	APPD	REF:-	
G.P.O. APPROVED AS STANDARD				D 1 1/4"				
B 7/8"		C 1 1/4"		A 2 1/2"				
						5/8"		

THIS BOX WITH SLOW OPERAT & RELEASE SYMBOLS ONLY REQUIRED FOR ROUTED SCHEMATIC DIAGRAMS

FIG.2. STANDARD TITLE BOX WITH TYPICAL ENTRIES

				☐ SLOW RELEASE ☒ SLOW OPERATE		NUMBER OF ASSOCIATED P.O. SPECIFICATION	
						TITLE, AS PER EQUIVALENT P.O. DIAGRAM.	
B WIRING AMENDED. (ASN 643/50)				3	21.10.50	RAS	ORIGINATOR'S CODE LETTER AT & E. Co. - H E.T. - E G.E.C. - C S.B. - S S.T.C. - W G.P.O. - P.O.
A B RELAY CHANGED. (ASN 752/49)				2	11.11.49	RWS	
-				1	4.4.48	RIS	
AMENDMENT PARTICULARS				ISSUE	DATE	APPD	REF:- T 5432
G.P.O. APPROVED AS STANDARD				4.4.48		50V H	
		DRAWN		CHECKED	WIRING	CIRCUIT	ATW 51050 51052 51051 51053
						SHEET 1-2	

ISSUES OF EQUIVALENT P.O. DIAGRAM (ON ROUTED SCHEMATICS ONLY)

INSERT 'Z' ON DIAGRAMS ISSUED ONLY FOR P.O. USE

TYPICAL PREFIX LETTERS 3/16" CHARACTERS

NOT REQUIRED ON SINGLE SHEET DIAGRAMS

SYSTEM VOLTAGE OMIT ON 'X' DIAGRAMS

DIAGRAM NUMBERS TYPICAL 3/16" CHARS.

POSITION FOR 1ST. NUMBER ON TRACING

2ND " " "

3RD " " "

4TH " " "

SPARE

RULES APPLICABLE TO ALL ROUTED SCHEMATIC DIAGRAMS

1. General

Where practicable diagrams shall adopt a layout similar to that of the P.O. Schematic which will, in general, be drawn so that the main sequence of cause to effect is from left to right or from top to bottom.

All apparatus shall be shown in the unoperated position. Where a particular component is operated whilst the circuit is normal (unseized) there shall be a note on the diagram drawing attention to this condition. For the purposes of this rule, the unoperated position of mechanically actuated spring sets shall be the position they assume when the item of which they form a part is in the normal (unseized) condition.

2. Sub-division of Diagrams

The Figure numbers shall agree with those on the basic diagram. The Figures may be subdivided, where necessary, to cover (a) varying rates of provision, (b) alternative wiring or equipment, (c) manufacturing convenience. Each sub-division of a Figure shall be designated by a suffix letter in addition to the Figure number e.g. Fig. 1A, Fig. 1B, Fig. 1C, etc. In cases where the basic diagram employs suffix letters in addition to Figure numbers, it may be necessary to depart from this rule.

3. Changes to Figure Numbers (or Letters) on amended diagrams

When changes have to be made involving any alteration to existing Figure Numbers (or letters), a note shall be added to the diagram, clearly explaining the relationship between the old and new figuring and stating on which issue of the diagram the changes were made.

A reference to the note shall be placed against each Figure number which has been changed.

4. Explanatory Figs. etc.

For explanatory purposes, it may be necessary to reproduce on some diagrams part of another diagram.

The part that is shown for explanatory purposes shall be made a separate Figure of the diagram on which it is reproduced and marked "Part of, For Explanatory Purposes Only". Explanatory Figures shall include only such information as is essential for understanding the diagram, e.g. wiring information shall always be omitted, relay coil resistance, resistor values, relay spring numbers, contact unit numbers, etc. will only be included when they are necessary. Explanatory Figures shall be numbered only when the equivalent Figure on the basic diagram is numbered.

5. Alternative Voltages

On diagrams that cater for more than one system voltage, any corresponding alternatives of apparatus items shall be shown by means of a Table, with references to the Table adjacent to each item that is affected. This rule need not be followed if three or less items are affected when the alternative resistance values or codes may be shown adjacent to the affected items.

6. Contact Unit Numbering

Contact unit numbers shall be shown adjacent to detached contacts of relays, keys, mechanical contact etc. units to which they refer. They shall not be shown in wiring runs.

* 7. Contact Units not associated with Relays, Magnets, Shelf and Switchboard Jacks, Plugs, Dials etc.

Where the number of contact units associated with a particular component is not indicated by the component designation, an inset shall be included on the diagram. In the inset the number of contact units shall be indicated below the component designation of each item. Each TJ spring is considered to be a unit, except that the contact type changeover comprising three springs is considered to be one unit. All spare contact units and springs shall be shown and numbered on the diagram.

8. Typical Insets

(a) Two Motion Selector.

$\frac{N}{2}$	$\frac{NR}{1}$	$\frac{S}{3}$	$\frac{NPA}{1}$	$\frac{NPB}{1}$	$\frac{TJ}{14}$
---------------	----------------	---------------	-----------------	-----------------	-----------------

(b) Relay Set

$\frac{TJ}{8}$

9. Typical Insets for Diagrams that include Keys

(a) All the key insets in the same Figure of a diagram shall be grouped together.

RULES APPLICABLE TO ALL ROUTED SCHEMATIC DIAGRAMS (continued)

9. (contd.)

The contact units on the two sides of double throw keys shall be numbered independently.

(b) Single Throw Key.

$$\frac{\text{CONTROL (KC)}}{3}$$

(c) Double Throw Key

$$\frac{\text{TEST LINE (KTL)}}{2} + \frac{\text{TEST EXCH. (KTE)}}{2}$$

(d) For keys where it is necessary to indicate that the normal position has a circuit function.

$$\frac{\text{SPEAK (KSP)}}{4} + \text{MONITOR (NORMAL)} + \frac{\text{CALL (KCA)}}{4}$$

$$\frac{\text{SPEAK (KSP)}}{3} + \text{MONITOR (NORMAL)}$$

(e) Mechanically Coupled Keys.

$$\frac{\text{TEST LINE (KTLA+KTLB+KTLC)}}{4 + 6 + 6} + \frac{\text{TEST EXCHANGE (KTEA+KTEB+KTEC)}}{2 + 4 + 2}$$

* 10. Distance between Symbols

Any line connecting two symbols, or a symbol and a tapping point, shall not be less than $\frac{1}{4}$ " long.

* 11. Wiring Routes

The wiring routes shall be arranged to give the shortest practicable runs. (See items 6.1.5 and 6.2.6 for selectors and relay sets respectively.)

* 12. Order of Wiring on Relays

When two or more tags on a relay are included in the same wiring run the order of wiring shall be

- (a) Springs 21 to 29
- (b) Coil tags a - e
- (c) Springs 1 to 9

13. Unselector Bank Wiring

When wiring runs are not given the diagram shall show the physical connexions. When wiring runs are given the diagram need not show the physical connexions. When a wiring run is used it shall include every point in the run, i.e. the connexions in a particular wiring sequence shall not be covered partly by physical representation and partly by a wiring run.

14. Connexions to Wiring Tags

In so far as is practicable, wiring shall be routed so that not more than two wires are terminated on a tag; this rule, however, does not apply to tags which make special provision for terminating a number of wires.

15. Connexions to Simple Make or Simple Break Contacts.

When conditions permit, the moving spring of all simple make or simple break contacts shall be connected either directly or indirectly to earth; the non-moving spring either directly or indirectly to positive battery, negative battery, A.C. or Tone supply. The initial circuit conditions shall determine the contact connexions.

* 16. Pairs, Triples and Screened Wiring

Pairs, Triples and Screened wiring shall always be indicated by the appropriate symbols (items 1.33.2 to 7). Pair or triple symbols bearing the same number shall be used throughout the wiring run of any particular wire colour on one diagram; when the run extends to another diagram a different pair number may be used on that diagram. Wherever practicable, pairs and triples should start and should finish on an item that is connected to both wires in the pair or the three wires in the triple.

17. Conventions

(a) Round Brackets are used:

- (i) in wiring runs to indicate an optional connexion, e.g. BR3 - (A2) - Fa indicates

17. (Contd.)

(ii) When enclosing a wire colour, to indicate that the colour applies only to wires that are included in the rack or position cable form (see item 4.2.11(c)).

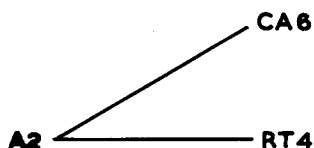
(iv) As part of a component designation for a relay, to indicate that the relay has a separate N.I. winding, e.g. $\frac{A(2)}{2}$ has an N.I. in addition to an inductive winding. The N.I. winding is designated (A) (see item 1.1.13)).

* (b) Square Brackets

(i) (A) TAG 2-PP2] [PP1-PS2 ——— GT4
(B) TAG 3-PP22 ——— PS22] [PS21-GT26

(ii) TAG M-MI-SK 21- (KC 31] [KC 30)-MN2.

(c) Parallel Feed



(d) Tee



(e) Combined Parallel Feed and Tee

Battery and earth connexions to resistors shall be terminated on tags b and a respectively.

On spark quenches consisting of a single unit capacitor in series with a resistor, the resistor shall be shown connected to tag b of the capacitor.

A layout sketch shall be used for Rotary Switches and for other items where the tags cannot easily be identified.

SPARE

RULES APPLICABLE TO ROUTED SCHEMATIC OTHER THAN RACK COMMON SERVICE DIAGRAMS

1. Sizes

The normal diagram sizes are:-

13" x 8"	} Exclusive of filing margin (see item 4.1.1)
13" x 16"	
13" x 24"	
26" x 16"	
26" x 24"	

The exceptional diagram sizes are:-

13" x 32"	} Exclusive of filing margin (see item 4.1.1)
13" x 40"	
26" x 32"	
26" x 40"	
26" x 48"	

2. Provision of Fuses

Note 1 on the diagram shall state the scale of provision of fuses and their rated values.

3. Leads Entering or Leaving a Diagram

All leads entering or leaving a diagram shall be shown and designated, except that when a routiner access lead is terminated on the same "U" point as another I/C or O/G lead, the routiner access lead shall be indicated only by the routiner access symbol (item 1.17.1).

*4. Common Services

In general each diagram shall show the battery and earth wiring from the fuse post and earth bar respectively. For plug-in items and strip mounted sets the internal battery and earth wiring shall be shown in the figure to which it applies, and shall not be shown as a continuation of the rack wiring. In wiring runs to relay plates that include battery and earth terminals, separate leads shall be shown from the terminals to each row of relays. Wiring runs that apply to only one figure of a diagram shall, when practicable, appear at the bottom right hand corner of the figure. In those cases where it is necessary to refer to another diagram for battery and earth wiring information "Ø" signs shall be used in accordance with items 1.36.1 and 2 and a note - "Ø" For wiring see TPW XXXXO or equivalent".

Wiring information for the distribution of common services, other than battery and earth, shall not be shown on the diagrams that use the common services but the connexions to the common services shall be indicated in accordance with item 1.36.3 and a note "Ø For wiring see TPW XXXXO or equivalent". The Ø sign shall only be used as a reference to Rack Common Service Diagrams.

On diagrams that require the same common services to be connected to a number of points on the diagram the wiring between these points shall be shown by means of a wiring run.

*5. Order of Wiring on Two Motion Selectors

*The wiring shall progress from the first to the last item that is applicable in the list shown below:- (see 6.2.10)

- | | |
|--|---|
| (a) "U" points lower or upper plug | } For pre 2000 type selectors the order of wiring shall be modified to give the shortest practicable route. |
| (b) Bottom L.H. relay position (as seen from rear) | |
| (c) Up and round plate clockwise to bottom R.H. relay position (as seen from rear) | |
| (d) Vertical magnet coil | |
| (e) Vertical magnet springs | |
| (f) Normal rotary springs | |
| (g) Off-normal springs | |
| (h) 11th Step springs | |
| (j) Normal Post Springs (1st Set) | |
| (k) Normal Post springs (2nd Set) | |
| (l) Rotary magnet springs | |
| (m) Rotary magnet coil | |

RULES APPLICABLE TO ROUTED SCHEMATIC

OTHER THAN RACK COMMON SERVICE DIAGRAMS (Continued)

5. (Continued)

- (n) Wiper Cord block
 - (p) Lower rear cover or capacitor box
 - (q) Upper rear cover or capacitor box
 - (r) Spark quench capacitor in rear clip
 - (s) Test jack
 - (t) Lamp jack.
- } Within the capacitor boxes the order shall be
(i) Capacitors (ii) Rectifiers (iii) Resistors
(iv) Ballast Resistors

*6. Order of Wiring on Plug-In Relay Sets

The wiring shall progress from the first to the last item that is applicable in the list shown below. (see 6.2.10 below)

- (a) "U" points upper plug to top R.H. relay (as seen from rear)
 - (b) "U" points lower or middle plug to bottom L.H. relay (as seen from rear)
 - (c) Top R.H. or bottom L.H. relay round plate clockwise to top L.H. relay or to bottom R.H. relay respectively (as seen from rear)
 - (d) Lower rear cover or capacitor box
 - * (e) Middle rear cover
 - (f) Upper rear cover or capacitor box
 - (g) Test Jack (except unselector test jacks)
 - (h) Lamp jack
- Within the capacitor boxes the order will be
(i) Capacitors (ii) Rectifiers (iii) Resistors
(iv) Ballast Resistors

7. Uniselectors on Plug-in Relay Set

The order of the wiring points shall be:-

- (a) When the unselector starts the point to point wiring:- interrupter springs, magnet, wipers, contacts 1 to 25, test jack.
- (b) When the unselector is intermediate in, or finishes the point to point wiring:- Test jack, contacts 25 to 1, wipers, magnet, interrupter springs.

8. "U" Points which make contact

All "U" points which make contact when a plug-in item is removed shall be listed in a note on the diagram e.g. "Shelf jack U points 2 and 4, 9 and 11, 1 and 3, 17 and 19 make contact when relay set is removed".

9. Directors, Coders and Senders On Channel Type Bases

These are made up of two plates fixed together. The order of wiring on each plate shall be in accordance with item 6.2.6. Connexions between the two plates shall be via a cable form at the top of the plates.

*10. Looping on Shelf Plugs

As far as possible looping on shelf plug points shall be avoided. This may make it necessary to depart from the order of wiring given in items 6.1.5 and 6.2.6 above.

RULES APPLICABLE TO RACK COMMON SERVICE DIAGRAMS

1. Sizes

The normal diagram sizes are:-

13" x 8"	} Exclusive of filing margin (see item 4.1.1)
13" x 16"	
13" x 24"	
13" x 32"	

2. Notes

On multi-sheet diagrams all notes shall appear on sheet 1.

3. Figure Per Common Service

Each particular common service shall be in a separate Figure, each separate Figure may be sub-divided but all sub-divisions of the same Figure shall have the same Figure numbers e.g. Fig. 2A, 2B, 2C.

The fuse Alarm arrangement for the system voltage fuses mounted on the rack shall be Figure 1.

4. Allocation of Fuses

Fig. 1 (Fuse Alarm) shall show the allocation of fuses to the supervisory relays, lamps etc. that are part of the diagram. Battery and earth wiring information for these items shall be given. When practicable, the information should appear at the bottom of the figure to which it applies.

Fig. 1 shall not show the allocation of fuses for circuits that are not a part of the diagram.

* 5. Table of Tag Allocations.

Each diagram shall include a table showing the allocation of rack miscellaneous strip connexion terminals. On multi-sheet diagrams the table shall appear on sheet 1.

SPARE

RULES APPLICABLE TO SHELF JACK DIAGRAMS

1. Sizes

Diagrams should be drawn on 13" x 8" sheets when practicable, but 13" x 16", 13" x 24" or 26" x 16" sheets may be used when necessary (All sizes are exclusive of filling margin, see item 4.1.1).

2. Figure Numbers

The figure numbers used on shelf jack diagrams shall be the same as those used for the corresponding item on the equivalent routed schematic e.g. if on the routed schematic Figs. 1, 3, and 4 are for strip mounted items and Figs. 2 and 5 for plug-in items, then the shelf jack diagram will consist only of Figs. 2 and 5.

If this is not practicable, e.g. because the shelf jack diagram has to include alternative Figs. for one Fig. of the routed schematic, the Figs. on the shelf jack diagram shall be given suffix letters that are not used on the equivalent Fig. of the routed schematic.

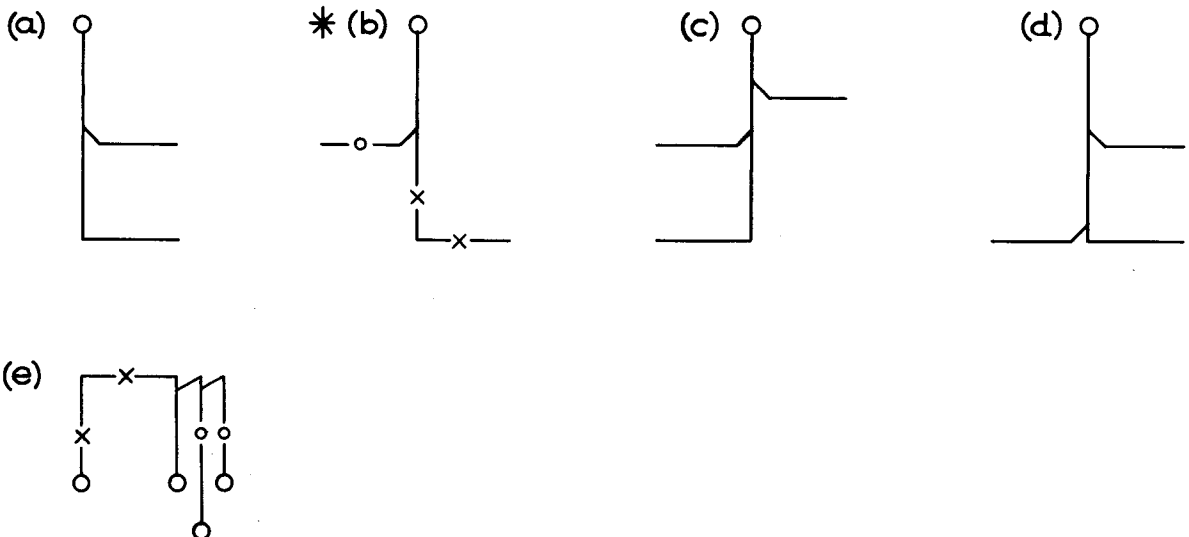
3. Alternative Conventions

When the shelf jack and the routed schematic diagram show the same connexions as alternatives, the shelf jack diagram shall use the same conventions as the routed schematic.

*4. Connexions to 'U' points on Shelf Jack

One single line only from above and one only from below shall be shown to any one 'U' point on the shelf jack.

When the circuit calls for more than one connexion, the additional connexions shall be shown as in examples (a) to (e) below.



*5. 'U' Points which make contact.

All 'U' points which make contact when a plug-in item is removed shall be listed in a note, e.g. "Shelf-Jack 'U' Points 2 & 4, 9 & 11, 1 & 3, 17 & 19 make contact when relay set is removed."

SPARE

RULES APPLICABLE TO CROSS CONNEXION DIAGRAMS

1. Sizes

All diagrams shall be 13" x 8" (sizes exclusive of filing margin, see item 4.1.1) unless P.O. agreement to the use of a larger sheet has been obtained.

2. Figures

Each alternative arrangement for cabling or jumpering shall be shown in a separate Figure. To avoid confusion with the Figure numbers of the equivalent routed schematic, the Figs. shall be lettered e.g. Fig. A, Fig. B etc.

*3. Equivalent Schematic Diagram

The equivalent routed schematic shall be represented by a full line box or boxes which shall show the title, abbreviated if necessary, and the diagram number e.g. Group Selector ATW 47270 Fig. 1A or equiv.

The strips connexion which are provided for terminating the cabling from the equivalent routed schematic, shall be represented by item 1.33.9(a). The connexions from the equivalent routed schematic to the T.D.F., I.D.F. and M.D.F. shall be indicated and enclosed in cable symbols (item 1.32.11). Paired conductors shall be indicated by the explanatory pair symbol [item 1.33.2(b)].

*4. Associated Routed Schematic Diagrams

Associated routed schematics to which jumpering is shown, shall be represented by broken line (Ghost) boxes which shall include the title, abbreviated if necessary, of the associated diagram e.g. Group Selector. The strips connexion on which the cabling from the associated diagrams is terminated shall be represented by item 1.33.9(b). Cable and pair symbols shall not be shown on the cabling from associated diagrams.

*5. Layout and Signwriting Information

The tag layout of the I.D.F. strips connexion for the equivalent circuit, together with signwriting information shall be shown. Diagrams that show T.D.F. terminals shall include the note "For arrangement of terminals on T.D.F. see TP 2029", except that when a diagram includes T.D.F. terminals which are not covered by TP 2029, it shall show the tag layout of the T.D.F. strips connexion.

*6. Notes

Notes shall be numbered separately on each sheet of a multi-sheet diagram e.g. 1.1, 1.2, 1.3 etc. on sheet 1; 2.1, 2.2, 2.3 on sheet 2 etc. (item 4.1.8 refers).

SPARE