TERMINATING, CABLE COLOUR CODES AND SOLDERING

This E.I. details methods of terminating and soldering wires to tags, and gives colour codes. See also the allied Internal Plant E.Is.:- Wires and Cables T 3012 - Terminal Block Appropriation, T 3013 - Terminating Sequence, T 3014 - Wiring Connections, T 3015 - Terminating Wires on Resistors.

INDEX.

1. GENERAL.

1.1 This E.I. details the sequences of terminating which must be used as standard Australian Post Office methods. For example, the sequence which must be used in 2000 type installations provides for the termination of the wires for the main interconnection between ranks of equipment in the order:-

P - +

All practices now in use which vary from this sequence must stop and the standard order used.

1.2 For old standard cables the colour codes for the private, negative and positive wires are as shown in Tables A, B and C. Tables D to G are the Australian Post Office standards for new cable.

1.3 Terminating must be arranged as detailed in this E.I. and must not be departed from. The allowance for subsequent reterminating during maintenance is stated and reference to other E.Is. in this series will detail the variations which apply in special circumstances.

1.4 The general conditions, of code, length of stringer, etc., must be followed wherever practicable for jobs not specifically mentioned in this E.I.

2. TERMINATING METHODS.

2.1 A wire stripper, which includes a projecting blade with a small V shaped slot may be used for stripping and terminating wires. The projecting blade may be marked to give stripping lengths for each row of tags on a block etc. Fig. 1 shows a typical stripper.

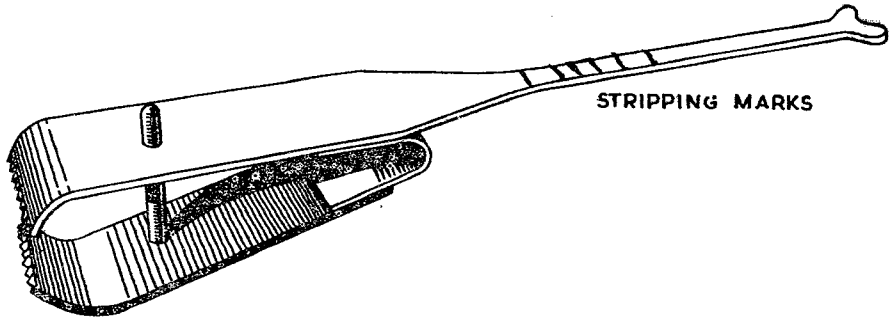


FIG. 1. WIRE STRIPPER FOR INSTALLATION STAFFS.

2.2 The length of spare wire allowed for breakages and reterminating when fault finding is detailed under each type of terminating practice.

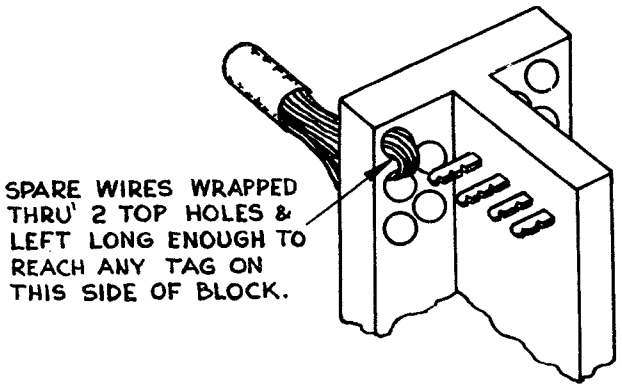
2.3 When terminating:-

(i) on textile covered wires, remove the enamel and covering from where the wire takes its first bend around the tag (see Fig. 3a).

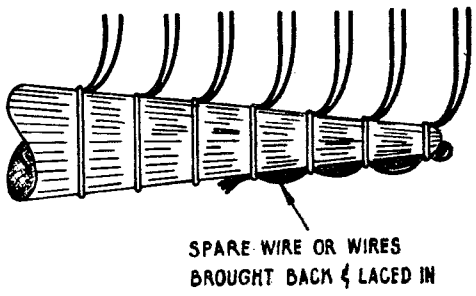
(ii) on P.V.C. covered wires, remove this from just short of the edge of the tag (see Fig. 3b).

2.4 When each block or strip of equipment has been terminated remove all loose ends of wire and insulation. Use cover sheets to protect apparatus and to collect wire and solder droppings immediately below the terminating point. On any rack or frame, start terminating at the highest shelf or block, so that ends of wire and insulation will not fall into terminated and cleaned positions.

2.5 Spare wires must be positioned as shown in Fig. 2.



(a) On Terminal Blocks.



(b) On Shelf Forms.

FIG. 2. POSITIONING SPARE WIRES.

2.6 Before soldering the terminal block or shelf, etc. should be examined if necessary by the Senior Technician, particularly when inexperienced staff is employed, for correctness of the technique and quality of workmanship.

2.7 Wiring of Terminal Strips, Shelf Jacks, Key Strips, etc. The approved method of wiring terminal strips, shelf jacks, key strips, uniselector multiples, resistors, rectifiers, condensers and relays is described under suitable headings in the following text.

2.8 Terminal Blocks and Strips. Except where otherwise specified on the rack layout drawings or relevant rack specifications, where double-sided tag blocks are mounted vertically, the permanent cabling and wiring must be terminated on the left-hand side of the tag blocks and the non-permanent wiring, i.e., jumpers and strapping, on the right-hand side viewed from the front. Where tag blocks are mounted horizontally, the permanent wiring of cabling must be terminated on the underside of the tags.

When terminating on blocks or strips, a length of spare wire is left to facilitate subsequent maintenance. This length is provided:-

(i) By an allowance in laced forms.

(ii) In the angle set into the corner of the block between the fanning strip and the tag assembly.

(iii) By forming over a dowel stick in the case of single sided moulded tag blocks.

The number of $9\frac{1}{4}$ lb. insulated wires through any one hole in the fanning strip must not exceed 24.

Single-sided Moulded Blocks. The number of $9\frac{1}{4}$ lb. insulated wires through any one fanning hole of these blocks must not exceed 40.

Terminating. Use the wire stripper when terminating on a block as follows:-

(i) Textile covered wires.

With the projecting blade, push the wire into the corner of the terminal block.

Bend the wire over the terminal on which it is to be terminated. The bend indicates the point from which the insulation will be stripped.

Strip all enamel and textile covering out from this point. Take care not to break the wire by gripping too hard with the wire stripper.

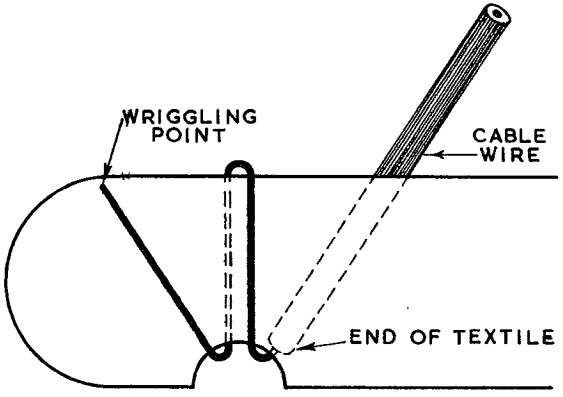
Twist up the ragged ends to give a neat appearance. The wax in the textile covering will keep the ends firmly in place.

With the projecting blade, twist the bare wire around the terminal for $1\frac{1}{2}$ turns.

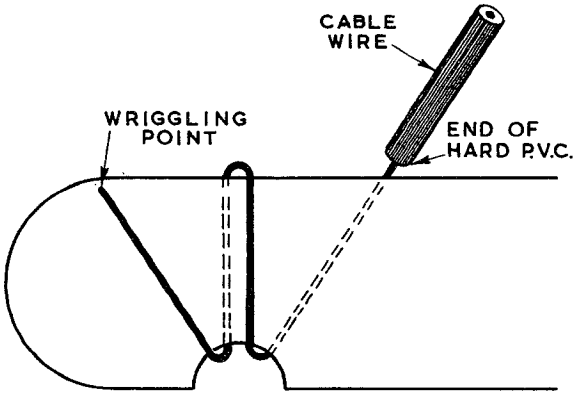
Remove excess wire by wriggling it against the edge of the terminal.

(ii) Hard P.V.C. Wires.

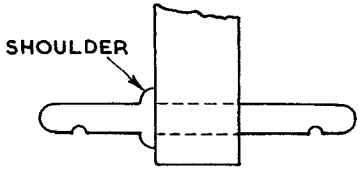
Use the same method as for textile covered wires except that the covering is brought to the first edge of the tag only. Take care that the P.V.C. covering is not stretched as it is liable to run back when soldering.



(a) TEXTILE



(b) HARD P.V.C.



(C) NOTE- CABLE WIRE MUST TERMINATE ON TAG WITH SHOULDER.

TAG BLOCK TERMINATION.

FIG. 3.

Terminal Strips (I.D.F. Type) Wiring. Fig. 3 shows the terminating method. Fig. 4 shows how the wires fit snugly into the shape formed by the mounting base and the blocks; to do this a forming rod is used. The rod is placed over the wires, before connecting to the terminals and pressed into the angle formed by the mounting base and the terminal blocks. The wires are then drawn tightly up to the terminals and looped resulting in the desired form when the rod is removed.

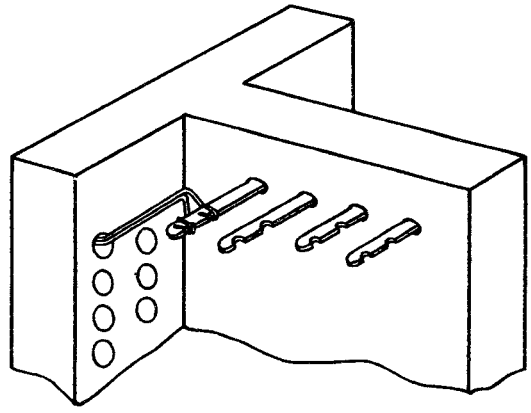
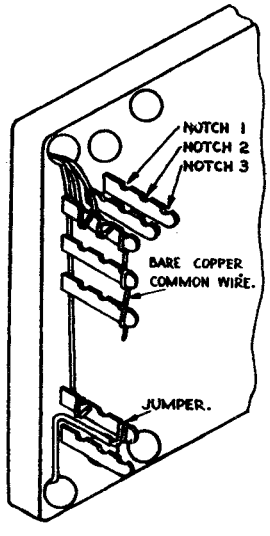


FIG. 4. WIRES ON A TERMINAL STRIP.

Terminal Strips (Moulded Type). Only one loop of wire is placed around each terminal in the contractor's wiring of moulded terminal blocks.

The loop is formed around the notch nearest the block. The remaining notches are used in the installation of the equipment and terminated as in Fig. 3.

Fig. 5 shows the method of wiring.



A Typical Arrangement

NOTCH 1	Bank Wiring (Contractors)
NOTCH 2	External Switchboard Cable
NOTCH 3	Jumpers and Bare Commons

FIG. 5. TERMINATIONS ON MOULDED TYPE BLOCK.

2.9 Jack Strips and Lamp Strips. First strip the wires as for terminal blocks. The bare wire is then cut to length, fed through the hole in the tag and bent back as in Fig. 6.

Spare wire is provided by forming the stringer as shown in Fig. 7.

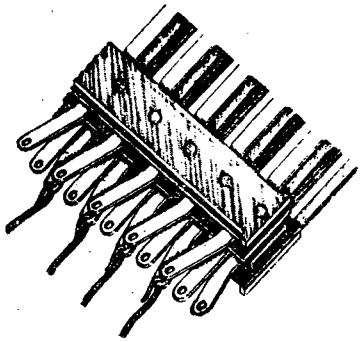


FIG. 6. JACK OR LAMP STRIP TERMINATION.

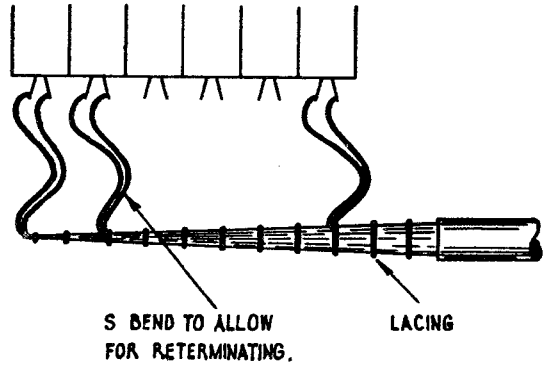


FIG. 7. FORMING SPARE WIRE ON LAMP AND JACK STRIP TERMINATION.

2.10 Key Strips. Wires are terminated on key tags as for jack and lamp strips.

The stringers are brought from the cable form at the centre point opposite the key.

The laced form must be located parallel and directly in line with the keys. The stringer must be shaped to allow any key to be removed separately (see Fig. 8).

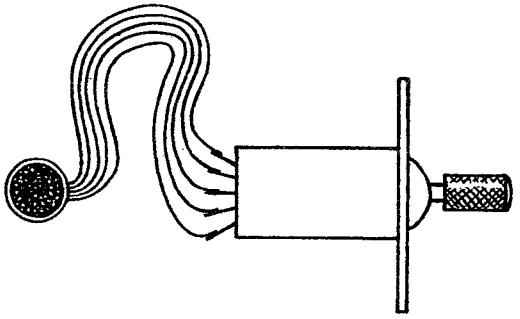


FIG. 8. FORMING SPARE WIRE ON KEY STRIP TERMINATIONS.

2.11 Shelf Jacks. Use the marking on the projecting blade of the wire stripper when terminating shelf jacks.

All wires for a switch position must be terminated as follows:-

(i) Mark the first wire to the correct length by using the appropriate position on the projecting blade of the wire stripper.

(ii) Strip the wire to this mark.

(iii) Strip all other wires of the group to the same length by using the first wire as a guide.

(iv) Twist the ragged ends of insulation on wires.

(v) Terminate all wires.

When terminating textile covered wires, bring the wire to the far face of the tag from the direction of feed of the wire so that the insulation will be firm against the tag. This prevents unravelling of the textile covering when soldering. For P.V.C. wires, bring the insulation to the edge of the tag only.

Take care to see that none of the loops project beyond the equivalent length of a 32 point jack base. This applies to 16 point jacks as well as 32 point jacks. Each wire should only be looped once round a tag. To avoid the tendency of "pile up", the jack lacings have been divided into two points, centrally situated, with a dimension of 1" between them (see Fig. 9). This dimension of 1" must be maintained in all circumstances and the stringer length provided to match the conditions shown in Fig. 9.

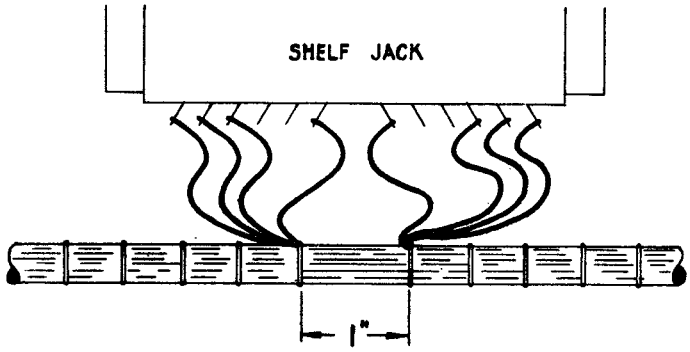


FIG. 9. TERMINATING SHELF JACKS.

2.12 Wiring of Uniselector Multiples. This should be done as shown in Fig. 10.

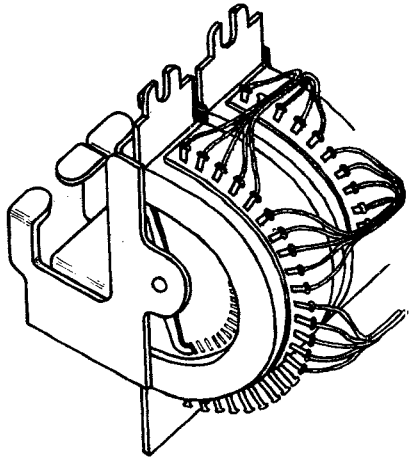


FIG. 10. UNISELECTOR MULTIPLE WIRING.

2.13 Resistor Wiring. The method of making terminations on resistors is in E.I. INTERNAL PLANT INSTALLATION Wires and Cables T 3015.

2.14 Rectifiers. Details as for resistors.

2.15 Condenser Wiring. Where flat type spark quench resistance spools are associated with condenser tags, loops must be kept small and all wiring kept away from the heat area (see Fig. 11). All such resistance spools must be of the ceramic type.

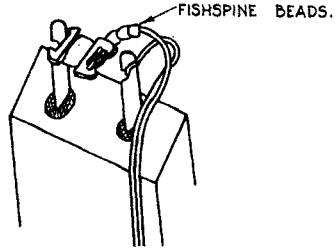


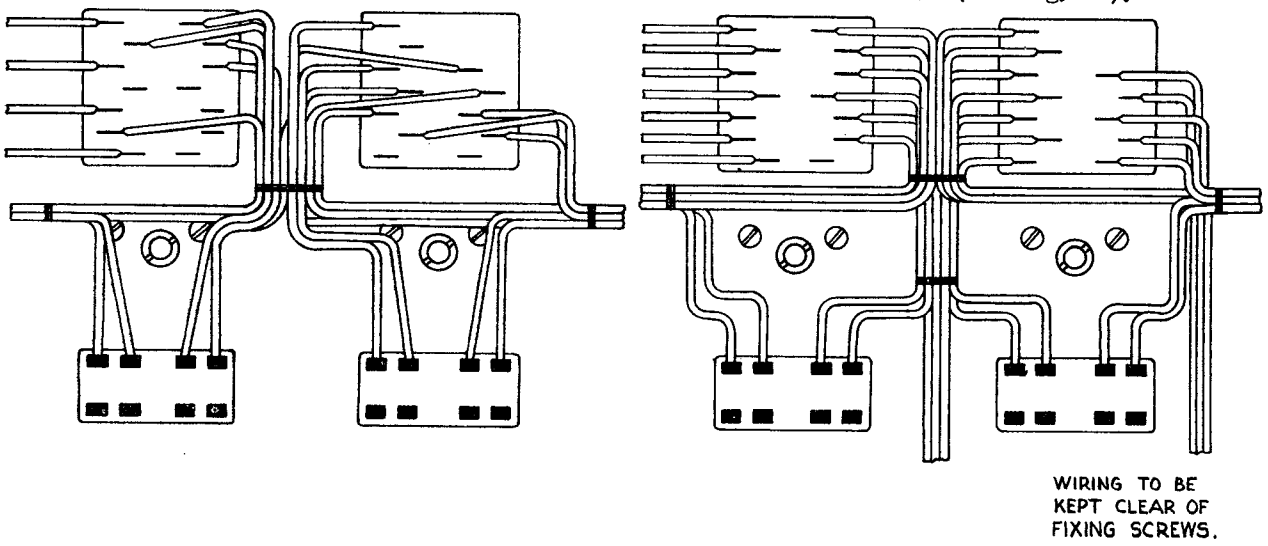
FIG. 11. CONDENSER WIRING.

2.16 Relay Wiring. Owing to the large range of relay combination and variation of mountings, it is impossible to give a standard applicable to all types. The following essentials, however, must be observed in all cases:-

(i) Relay mounting screws must not be obscured by wiring. See Fig. 12 showing correct and incorrect method.

(ii) Avoid feeding wires through build-ups; keep wires in the same alignment as the tag to which wire is connected. It is inadvisable to pass wires through tags and reference to Fig. 12 will show the method to be used.

(iii) Tie leads only when the bulk of wires necessitates it. This tie is made by two turns of a suitable thread ending in a reef knot. (See Fig. 12).



(a) Incorrect Method. (b) Correct Method.

FIG. 12. RELAY WIRING.

2.17 Miscellaneous Terminations. Figs. 13-21 indicate the methods of terminating various items of equipment. Fig. 21(b) shows a tool which facilitates commoning.

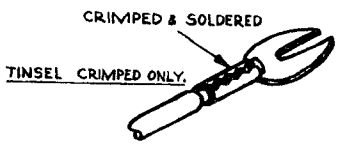


FIG. 13. SWITCHBOARD CORD CONDUCTOR TERMINAL.

FIG. 14. SWITCHBOARD CORD STRAINER TERMINAL.

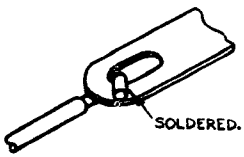


FIG. 15. JACK AND KEY SPRING TYPE TERMINAL.

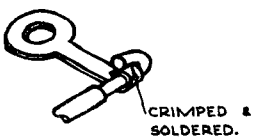


FIG. 16. POWER TYPE TERMINAL.

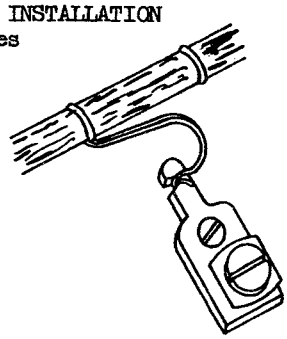


FIG. 17. PLATE, CONNECTION TERMINAL.

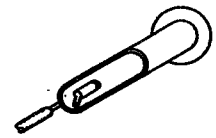


FIG. 18. UNISELECTOR TYPE TERMINAL.

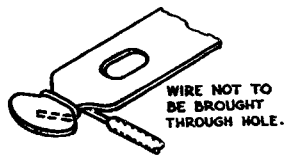


FIG. 19. 3000 TYPE RELAY SPRING.

NOTE: The wire must not be brought through the hole.

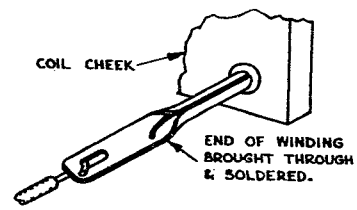
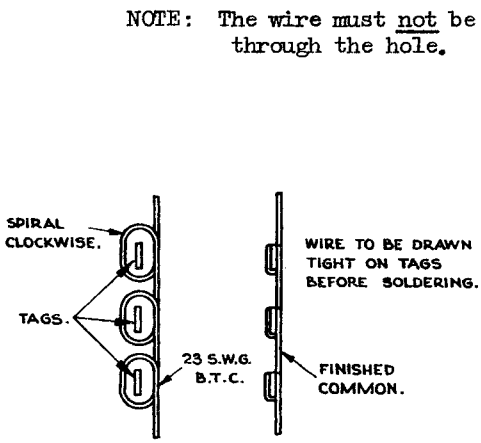
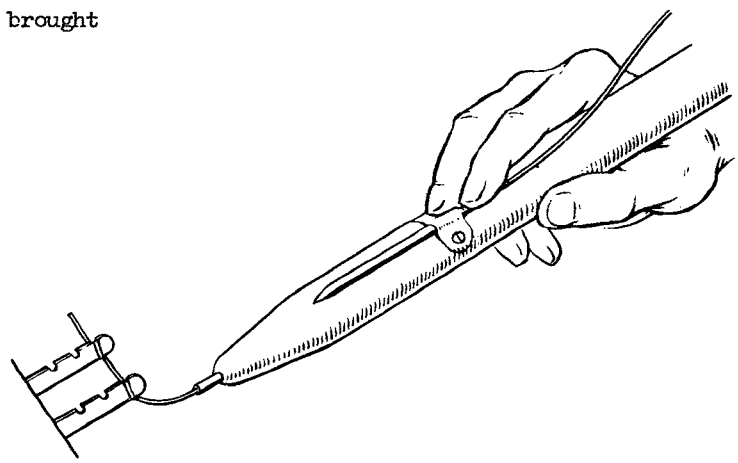


FIG. 20. 3000 TYPE RELAY COIL.



(a) Looping B.T.C. Commons on Moulded Type Rack Terminal Strips.



(b) Using tool for Commoning.

FIG. 21. COMMONING AND TOOL.

3. STANDARD CABLE COLOUR CODES.

3.1 The colour codes of the standard size cables now in general use and the allocation of the colours for various circuits are shown in Tables A-C.

Future supplies of cable will use the colour codes in Tables D-G and will be made up as shown in the associated diagrams.

3.2 Colour code tables of new type cables are printed in blue and existing cable colour code tables in black.

TABLE A - 2 WIRE CIRCUITS (TWISTED PAIRS).

Size of Cable	Cct. Number	Colour Allocation + M1	Colour Allocation - M
84 wire: 51 pr. (10 pr. + 21 pr.)	1	White	Blue
	2	"	Orange
	3	"	Green
	4	"	Brown
	5	"	Slate
	6	"	Blue white
	7	"	Blue orange
	8	"	Blue green
	9	"	Blue brown
	10	"	Blue slate
	11	"	Orange white
	12	"	Orange green
	13	"	Orange brown
	14	"	Orange slate
	15	"	Green white
	16	"	Green brown
	17	"	Green slate
	18	"	Brown white
	19	"	Brown slate
	20	"	Slate white
	21	Red white	Blue
	22	" "	Orange
	23	" "	Green
	24	" "	Brown
	25	" "	Slate
	26	" "	Blue white
	27	" "	Blue orange
	28	" "	Blue green
	29	" "	Blue brown
	30	" "	Blue slate
	31	" "	Orange white
	32	" "	Orange green
	33	" "	Orange brown
	34	" "	Orange slate
	35	" "	Green white
	36	" "	Green brown
	37	" "	Green slate
	38	" "	Brown white
	39	" "	Brown slate
	40	" "	Slate white
	41	Red Blue	Blue
	42	" "	Orange
	43	" "	Green
	44	" "	Brown
	45	" "	Slate
	46	" "	Blue white
	47	" "	Blue orange
	48	" "	Blue green
	49	" "	Blue brown
	50	" "	Blue slate

NOTE: Spare wire has not been included in Tables A, B and C colour codes.

TABLE B

3 WIRE CIRCUITS.

(TWISTED PAIRS WITH SEPARATE TRIPLES)

78 WIRE.

Cct. Number	Colour Allocation +	-	P
1	White	Blue	Black blue
2	"	Orange	" orange
3	"	Green	" green
4	"	Brown	" brown
5	"	Slate	" slate
6	"	Blue white	" blue white
7	"	Blue orange	" blue orange
8	"	Blue green	" blue green
9	"	Blue brown	" blue brown
10	"	Blue slate	" blue slate
11	"	Orange white	" orange white
12	"	Orange green	" orange green
13	"	Orange brown	" orange brown
14	"	Orange slate	" orange slate
15	"	Green white	" green white
16	"	Green brown	" green brown
17	"	Green slate	" green slate
18	"	Brown white	" brown white
19	"	Brown slate	" brown slate
20	"	Slate white	" slate white
21	Red	Blue	Red Black blue
22	"	Orange	" " orange
23	"	Green	" " green
24	"	Brown	" " brown
25	"	Slate	" " slate

TABLE C

5 WIRE CIRCUITS (2 TWISTED PAIRS WITH SEPARATE SINGLE WIRE).

154 WIRE

Cct. Number	Wire Allocation +	-	M1	M	P
1	White	Blue	Red	Blue	Black blue
2	"	Orange	"	Orange	" orange
3	"	Green	"	Green	" green
4	"	Brown	"	Brown	" brown
5	"	Slate	"	Slate	" slate
6	"	Blue white	"	Blue white	" blue white
7	"	Blue orange	"	Blue orange	" blue orange
8	"	Blue green	"	Blue green	" blue green
9	"	Blue brown	"	Blue brown	" blue brown
10	"	Blue slate	"	Blue slate	" blue slate
11	"	Orange white	"	Orange white	" orange white
12	"	Orange green	"	Orange green	" orange green
13	"	Orange brown	"	Orange brown	" orange brown
14	"	Orange slate	"	Orange slate	" orange slate
15	"	Green white	"	Green white	" green white
16	"	Green brown	"	Green brown	" green brown
17	"	Green slate	"	Green slate	" green slate
18	"	Brown white	"	Brown white	" brown white
19	"	Brown slate	"	Brown slate	" brown slate
20	"	Slate white	"	Slate white	" slate white
21	"	Red blue	"	Red blue	" red blue
22	"	" orange	"	" orange	" " orange
23	"	" green	"	" green	" " green
24	"	" brown	"	" brown	" " brown
25	"	" slate	"	" slate	" " slate
26	"	" blue white	"	" blue white	" " blue white
27	"	" Blue orange	"	" blue orange	" " blue orange
28	"	" blue green	"	" blue green	" " blue green
29	"	" blue brown	"	" blue brown	" " blue brown
30	"	" blue slate	"	" blue slate	" " blue slate

TABLE D - SWITCHBOARD CABLES (PAIRS) GROUP 1.

21 PAIR.
SERIAL 7 ITEM 39 (P.V.C. 323/31)
COLOUR ALLOCATION.

WIRE 1	MATE	+
WIRE 2	COLOUR	−

Pair No.	Wire 1	Wire 2
1	White	Blue
2	"	Orange
3	"	Green
4	"	Brown
5	"	Slate
6	"	Bl-Wh
7	"	Bl-Or
8	"	Bl-Gn
9	"	Bl-Bn
10	"	Bl-Sl
11	"	Or-Wh
12	"	Or-Gn
13	"	Or-Bn
14	"	Or-Sl
15	"	Gn-Wh
16	"	Gn-Bn
17	"	Gn-Sl
18	"	Bn-Wh
19	"	Bn-Sl
20	"	Sl-Wh
Spare	"	Blue-Orange-White

6 PAIR.
SERIAL 7 ITEM 41 (P.V.C. 323/25A)
COLOUR ALLOCATION.

WIRE 1	MATE	+
WIRE 2	COLOUR	−

1	White	Blue
2	"	Orange
3	"	Green
4	"	Brown
5	"	Slate
6	"	Blue-White

TABLE E - SWITCHBOARD CABLES QUAD.

80 WIRE.
SERIAL 7 ITEM 45 (P.V.C. 323/37)
COLOUR ALLOCATION.

WIRE 1	COLOUR	−1
WIRE 2	COLOUR	−2
WIRE 3	MATE	+1
WIRE 4	MATE	+2

Quad	Wire 1	Wire 2	Wire 3	Wire 4
1	Blue	Orange	White	Red
2	Green	Brown	"	"
3	Slate	Blue-White	"	
4	Bl-Or	Bl-Gn	"	"
5	Bl-Bn	Bl-Sl	"	"
6	Or-Wh	Or-Gn	"	"
7	Or-Bn	Or-Sl	"	"
8	Gn-Wh	Gn-Bn	"	"
9	Gn-Sl	Bn-Wh	"	"
10	Bn-Sl	Sl-Wh	"	"
11	Red-Blue	Red-Orange	"	"
12	Rd-Gn	Rd-Bn	"	"
13	Rd-Sl	Rd-Bl-Wh	"	"
14	Rd-Bl-Or	Rd-Bl-Gn	"	"
15	Rd-Bl-Bn	Rd-Bl-Sl	"	"
16	Rd-Or-Wh	Rd-Or-Gn	"	"
17	Rd-Or-Bn	Rd-Or-Sl	"	"
18	Rd-Gn-Wh	Rd-Gn-Bn	"	"
19	Rd-Gn-Sl	Rd-Bn-Wh	"	"
20	Rd-Bn-Sl	Rd-Sl-Wh	"	"

TABLE F - SWITCHBOARD CABLES (PAIRS) GROUP 2.

51 PAIR.
SERIAL 7 ITEM 35 (P.V.C. 323/29)
COLOUR ALLOCATION.

WIRE 1	MATE	+
WIRE 2	COLOUR	−

Pair No.	Wire 1	Wire 2
1	Red-White	Blue
2	" "	Orange
3	" "	Green
4	" "	Brown
5	" "	Slate
6	" "	Blue-White
7	" "	Blue-Orange
8	" "	Blue-Green
9	" "	Blue-Brown
10	" "	Blue-Slate
11	Red	Blue
12	"	Orange
13	"	Green
14	"	Brown
15	"	Slate
16	"	Blue-White
17	"	Blue-Orange
18	"	Blue-Green
19	"	Blue-Brown
20	"	Blue-Slate
21	"	Orange-White
22	"	Orange-Green
23	"	Orange-Brown
24	"	Orange-Slate
25	"	Green-White
26	"	Green-Brown
27	"	Green-Slate
28	"	Brown-White
29	"	Brown-Slate
30	"	Slate-White
31	White	Blue
32	"	Orange
33	"	Green
34	"	Brown
35	"	Slate
36	"	Blue-White
37	"	Blue-Orange
38	"	Blue-Green
39	"	Blue-Brown
40	"	Blue-Slate
41	"	Orange-White
42	"	Orange-Green
43	"	Orange-Brown
44	"	Orange-Slate
45	"	Green-White
46	"	Green-Brown
47	"	Green-Slate
48	"	Brown-White
49	"	Brown-Slate
50	"	Slate-White
Spare	"	Blue-Orange-White

TABLE G - SWITCHBOARD CABLES (TRIPLE)

63 WIRE.
SERIAL 7 ITEM 38 (P.V.C. 323/35)
COLOUR ALLOCATION.

WIRE 1	MATE	+
WIRE 2	COLOUR	−
WIRE 3	TRIPLE	P

Triple	Wire 1	Wire 2	Wire 3
1	White	Blue	Red-Blue
2	"	Orange	Red-Orange
3	"	Green	Red-Green
4	"	Brown	Red-Brown
5	"	Slate	Red-Slate
6	"	Bl-Wh	Rd-Bl-Wh
7	"	Bl-Or	Rd-Bl-Or
8	"	Bl-Gn	Rd-Bl-Gn
9	"	Bl-Bn	Rd-Bl-Bn
10	"	Bl-Sl	Rd-Bl-Sl
11	"	Or-Wh	Rd-Or-Wh
12	"	Or-Gn	Rd-Or-Gn
13	"	Or-Bn	Rd-Or-Bn
14	"	Or-Sl	Rd-Or-Sl
15	"	Gn-Wh	Rd-Gn-Wh
16	"	Gn-Bn	Rd-Gn-Bn
17	"	Gn-Sl	Rd-Gn-Sl
18	"	Bn-Wh	Rd-Bn-Wh
19	"	Bn-Sl	Rd-Bn-Sl
20	"	Sl-Wh	Rd-Sl-Wh
Spare	"	Bl-Or-Wh	Rd-Blk-Bl

78 WIRE.
SERIAL 7 ITEM 37 (P.V.C. 323/34)
COLOUR ALLOCATION.

WIRE 1	MATE	+
WIRE 2	COLOUR	−
WIRE 3	TRIPLE	P

1	Red	Blue	Black-Blue
2	"	Orange	Black-Orange
3	"	Green	Black-Green
4	"	Brown	Black-Brown
5	"	Slate	Black-Slate
6	"	Blue	Red-Blue
7	"	Orange	Red-Orange
8	"	Green	Red-Green
9	"	Brown	Red-Brown
10	"	Slate	Red-Slate
11	"	Bl-Wh	Rd-Bl-Wh
12	"	Bl-Or	Rd-Bl-Or
13	"	Bl-Gn	Rd-Bl-Gn
14	"	Bl-Bn	Rd-Bl-Bn
15	"	Bl-Sl	Rd-Bl-Sl
16	"	Or-Wh	Rd-Or-Wh
17	"	Or-Gn	Rd-Or-Gn
18	"	Or-Bn	Rd-Or-Bn
19	"	Or-Sl	Rd-Or-Sl
20	"	Gn-Wh	Rd-Gn-Wh
21	"	Gn-Bn	Rd-Gn-Bn
22	"	Gn-Sl	Rd-Gn-Sl
23	"	Bn-Wh	Rd-Bn-Wh
24	"	Bn-Sl	Rd-Bn-Sl
25	"	Sl-Wh	Rd-Sl-Wh
Spare	"	Bl-Or-Wh	Rd-Blk-Bl

4. SOLDERING TERMINALS.

4.1 Telecommunication circuits include a very large number of soldered joints. For good transmission, all soldered connections made by Installation Technicians must be perfect, otherwise the quality of service, as viewed by subscribers and as reflected by reported faults, will be poor.

There are two main types of faulty soldered connection -

(i) The unsoldered joint usually called a "dry" joint; this fault can cause unlimited trouble although it is usually visible to the naked eye. This fault is not due to the soldering process or the materials involved but the human element.

(ii) The high resistance joint. This is caused by imperfect amalgamation between the applied solder, the wire and the tag. It is usually due to poor materials (solder etc.), dirty conditions or a soldering tool not hot enough. This fault can not always be seen.

4.2 Soldered Joints. When a connection is made between two or more wires, or between a wire and soldering terminal, the joint must be soldered.

4.3 Soldering Flux. Pure resin only must be used, as a soldering flux, for soldering or tinning soldering tools. Soldering fluids or compounds must not be used.

4.4 Resin-Cored Solder of 65% tin and 35% lead composition must be used in the installation of Internal Plant.

4.5 Soldering Operation. Cleanliness of the parts to be soldered is of first importance in all soldering operations. To ensure ease of soldering, all tags are tinned ready for soldering before leaving the manufacturers. Tags which have been used previously, and are covered with solder or wrapped with pieces of wire from previous connections, must be properly cleaned before further wires are terminated.

Tags can be cleaned in many ways but the best way is to use a hot soldering tool and more solder. If the tag is horizontal, the tool must be applied underneath the tag; when the tag is hot, a touch of solder applied to tag and tool will cause all the solder on the tag to become fluid, a process which is aided by the flux supplied by the additional touch of solder. If the tool is lowered gradually, all surplus solder on the tag will be drawn off, leaving the tag clean and smooth ready for reterminating (see Fig. 22). If the tag is vertical, take more care because surplus solder if not prevented, will flow down into the tag holes of the block. The thick solder, therefore, must be melted, using a soldering tool, and drawn upwards from the tag, using a scraper. A scraper may be made from a piece of old hacksaw blade suitably shaped (see Fig. 23).

FIG. 22. CLEANING A HORIZONTAL TAG.

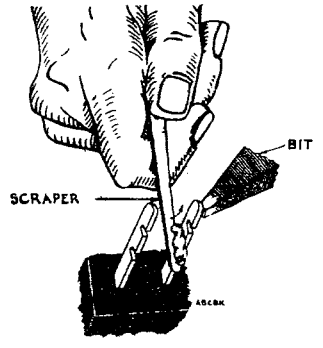


FIG. 23. CLEANING A VERTICAL TAG WITH SOLDERING TOOL AND SCRAPER.

Take care to avoid throwing the molten solder upwards, should the scraper foul the tag and suddenly become free again. In such circumstances, there is a risk of hot solder entering the technician's eye.

Having removed the surplus, a further application of the soldering tool and a small touch of solder will make the tag clean and ready for reuse.

If connection strips, jacks, etc., are to be cleaned before being mounted in position, that is, on the work-bench, surplus solder can be removed by heating the tags individually and brushing away the melted solder with a suitable brush. This method scatters solder splashes widely and must never be used on apparatus already mounted; for the same reason, the method of "flicking" solder from a tag using a hot soldering tool must never be used near equipment.

When terminating wires for soldering, the following points must be watched -

(i) Wires must be terminated in the order shown in E.Is. INTERNAL PLANT INSTALLATION Wires and Cables T 3012, 3013, 3014.

(ii) Remove all traces of enamel from enamelled wires. Soldering must not be delayed because the cleaned copper soon tarnishes.

(iii) When stripping insulation, take care not to stretch the wire as this tends to make it brittle.

To make a well soldered connection the temperature of the tool and also the tag and wire must be about 50° Centigrade above the melting point of the solder, particularly if the wire is not pretinned. On the other hand, if the tool is too hot, the wire becomes brittle and part of the tin content of the solder is burnt out; the result is a mechanically weak joint. Because it is almost impossible in the field to judge, between narrow limits, the temperature of a soldering tool, it is emphasised that it is far better to use a tool that is too hot than one that is too cold. As a general guide, the tool is not ready for use until, when withdrawn from the furnace, it changes colour rapidly; this effect is not quite as pronounced with an old soldering tool as with a new one.

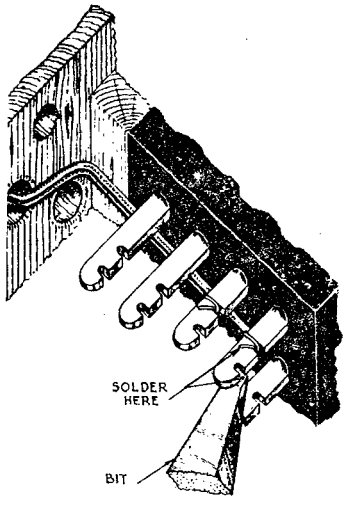


FIG. 24. SOLDERING A HORIZONTAL TAG.

The crude and dangerous practice of holding a hot soldering tool close to the cheek to assess its temperature must not be used.

When soldering on the horizontal surface of a tag, the relative positions of a tool, tag and solder must be as shown in Fig. 24. Solder must be applied to the tool first to gain rapid heat transfere, then to the wire to ensure that, before the solder flows, the wire and that postion of the tag close to it are at a sufficiently high temperature. The tool must not be moved until the solder has flowed evenly over the wire and tag; then it should be lowered slowly from the tag. This method of removing the tool ensures that all surplus solder is drained from the joint.

When soldering a vertical tag, the relative positions of tool, tag and solder must be as shown in Fig. 25.

In this case, the most important point is not to apply too much solder, because once applied it cannot easily be drawn off. The tag should, therefore, be given time to get properly heated by the tool before solder is applied; then the minimum amount of solder consistent with a good joint should be allowed to

flow. Take care not to use excessive solder because this may result in a short-circuit between adjacent tags.

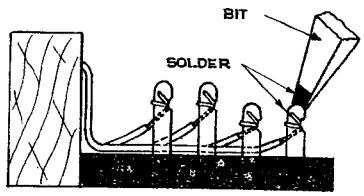


FIG. 25. SOLDERING VERTICAL TAGS.

When soldering wires to 3000 Type relay-spring tags, the hole in the tag must not be used, because the resulting blobs of solder tend to cause contact faults. The wires must be laid close to the relay-mounting plate, led up the spring, and the bared wire wrapped once round the slot at the end of the tag. Use only the minimum quantity of solder consistent with good soldering because there is very little space to spare between the tags.

When soldering wires to jacks, the relative position of tool, tags and solder must be as shown in Fig. 26. The wires must be terminated on the bottom row of tags first, the whole row soldered, and surplus wire clipped off before the second and subsequent rows are wired. Just sufficient solder should be applied to solder the wire firmly and fill the hole in the tag.

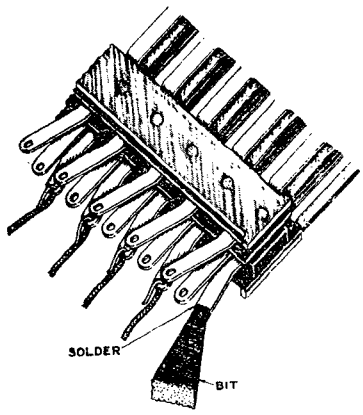


FIG. 26. SOLDERING WIRES TO A JACK.

END.