Chapter 4

TUMBLER SWITCHES, C.W.C. EQUIPMENT LTD.

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Introduction

1. Three groups of tumbler switches are covered in this chapter, a range of single-pole switches, a corresponding range of double-pole switches and a range of 3-way single-pole switches in double-pole cases. They vary in the switch action as indicated in Appendix 1, Table 2.

DESCRIPTION

2. A typical switch of each group is illustrated in fig. 1. The mechanism of each is identical, the double-pole version consisting essentially of two single-pole switches in one moulded case, with the two operating levers strapped together. The 3-way single-pole switches are essentially double-pole switches with an internal link (*Appendix* 1, *fig.* 1).

3. The bottom of the spring-loaded operating lever rides on a pivoted cam which carries the spring contacts. The shape of this cam varies from switch to switch to give the appropriate switch action, either maintaining the position selected or returning to the central position, as indicated in Appendix 1, Table 3.

4. Switches having the prefix L in the type number are identical in action with the basic type, but instead of a grey dolly, have a fully luminous dolly. An example is L/XD779 (*Ref. No.* 5*CW*/6551).

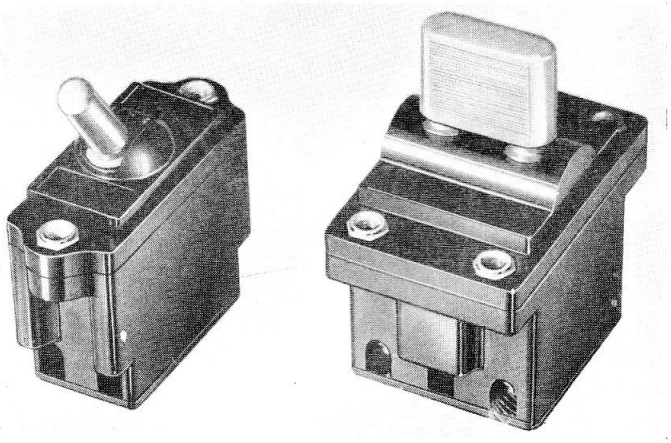

Fig. 1. Typical single and double-pole switches

5. Electrical connection is made by means of screw-type terminals; the wiring channels and terminal space allow the fitting of approved crimped tag terminations. Tapped holes in the mounting flange are suitable for 4 B.A. fixing screws.

SERVICING

6. Since these switches are sealed during manufacture, no dismantling is possible. They should be examined for cracks and any signs of damage; the terminal cover should be removed, and the leads checked for loose connections and corrosion.

Testing

Insulation resistance

7. Test the insulation resistance with the operating lever in all positions, using a standard 250 volt insulation resistance tester; the reading should be not less than 50,000 ohms between unmade contacts.

Millivolt drop

8. Test the millivolt drop across pairs of contacts in the made position, with a current of 20 amp. flowing; the drop should not exceed 40 millivolts. In three-way, single-pole switches, across two pairs of contacts in series, the drop should not exceed 80 millivolts.

Appendix 1

LEADING PARTICULARS

Table 1

Current rating	20 *amp. at* 28 *volts d.c.*
Overall dimensions of mounting flange	
Single pole	2 *in.* × $\frac{3}{4}$ *in.*
Double pole	2 *in.* × $1\frac{3}{8}$ *in.*
Fixing centres	
Single pole	1·58 *in.* (2 *hole*)
Double pole	1·58 *in.* × 0·86 *in.* (4 *hole*)
Weight	
Single pole	$1\frac{5}{8}$ *oz.*
Double pole	3 *oz.*

Table 2
Range of tumbler switches

No. 1		No. 2		No. 3		No. 4		
Type	Ref. No. (5CW/)	Type	Ref. No. (5CW/)	Type	Ref. No. (5CW/)	Type	Ref. No. (5CW/)	Switch Action
Single-pole								
XD441	4178	XD734	5822	XD777	6428	XD777	7539	Changeover, centre "off" (spring return, both positions)
XD442	4179	XD735	5823	XD778	6429	XD778	7540	Changeover, no centre "off"
XD443	4184	XD736	5825	XD779	6430	XD779	7541	"On–off" single throw
XD399	4197	XD733	5826	XD776	6431	XD776	7542	Changeover, centre "off"
XD444	4220	XD737	5829	XD780	6432	XD780	7543	Changeover, centre "off" (spring return, one position)
XD445	4221	XD738	5830	XD781	6433	XD781	7544	"On–off" (spring return "off") single throw
XD494	4323	XD739	5835	XD782	6434	XD782	7545	Changeover (spring return centre "on") single throw
3-way single-pole								
XD801	4612							Three-way, "on"
XD802	4816							Three-way, "on" (spring return both positions, centre "on")

Table 2—*continued*

No. 1		No. 2		No. 3		No. 4		
Type	Ref. No. (5CW/)	Type	Ref. No. (5CW/)	Type	Ref. No. (5CW/)	Type	Ref. No. (5CW/)	Switch action
Double-pole								
XD491	4182	XD757	5824	XD789	6435	XD789	7748	Changeover, no centre "off"
XD446	4198	XD751	5827	XD783	6436	XD783	7547	"On–off", single throw
XD447	4199	XD752	5828	XD784	6437	XD784	7548	Changeover, centre "off"
XD448	4223	XD753	5831	XD785	6438	XD785	7549	Changeover, centre "off" (spring return one position)
XD492	4224	XD755	5832	XD787	6439	XD787	7550	Changeover, centre "off" (spring return both positions)
XD449	4225	XD754	5833	XD786	6440	XD786	7551	"On–off" (spring return centre "off") single throw
XD493	4226	XD756	5834	XD788	6441	XD788	7552	Changeover (spring return centre "on") single throw

The four columns in the table, No. 1, 2, 3, and 4, indicate different stages of modification, and No. 4 will eventually supersede earlier types. No. 2 differs from the now obsolete No. 1 in various minor details of design, while No. 3 incorporates a neoprene type seal between the operating lever and the top plate, to prevent the ingress of water and dust into the switch mechanism. In the No. 4 series the neoprene seal has been made thinner, allowing the dolly to float, as in the No. 3 the dolly movement was stiff.

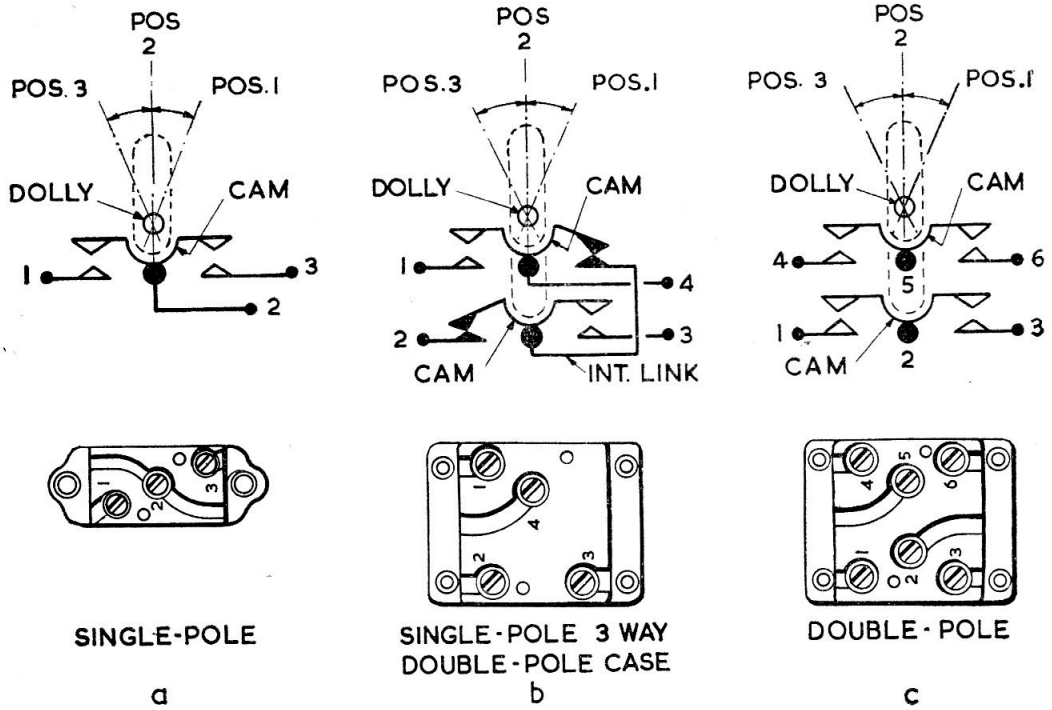

Fig. 1. View of operating positions and terminal arrangements

◄ **Table 3**

Special double-pole switch assemblies

Type	Ref. No.	Basic switch
XD800	5CW/8053	XD787
XD804	—	XD784
XD805	—	XD789

In each of these special switch assemblies, the dollies have been modified and twin grey plastic dolly extensions fitted, thus converting a double-pole switch to a twin single-pole arrangement. ►

Table 4

Details of switch operation

Fig. 1				Position of switch, terminals made		
				Pos. 1	Pos. 2	Pos. 3
A	XD441	XD734	XD777	*1–2	OFF	*2–3
A	XD442	XD735	XD778	1–2		2–3
A	XD443	XD736	XD779	1–2	OFF	
A	XD399	XD733	XD776	1–2	OFF	2–3
A	XD444	XD737	XD780	*1–2	OFF	2–3
A	XD445	XD738	XD781	*1–2	OFF	
A	XD494	XD739	XD782	*1–2	2–3	
B	XD801			1–4	2–4	3–4
B	XD802			*1–4	2–4	*3–4
C	XD491	XD757	XD789	1–2, 4–5		2–3, 5–6
C	XD446	XD751	XD783	1–2, 4–5	OFF	
C	XD447	XD752	XD784	1–2, 4–5	OFF	2–3, 5–6
C	XD448	XD753	XD785	*1–2, 4–5	OFF	2–3, 5–6
C	XD492	XD755	XD787	*1–2, 4–5	OFF	*2–3, 5–6
C	XD449	XD754	XD786	*1–2, 4–5	OFF	
C	XD493	XD756	XD788	*1–2, 4–5	2–3, 5–6	

* Denotes spring return to position 2

P31720 235174/1915 5/62 2000 C & P Gp 375

Appendix 2

SWITCH ACCESSORIES

The following accessories are available for use with the single- and double-pole switches listed in Chap. 1.

	Ref. No.
Locking guards—	
3-position, single-pole ...	5CW/4222
Centre position only, single-pole	5CW/4320
One side only, single-pole...	5CW/4860
3-position, double-pole ...	5CW/5765
Luminous tabs—	
Single-pole switches ...	5CW/4325
Double-pole switches ...	5CW/4326
Coupling bars—	
Two single-pole switches ...	5CW/4324
Three single-pole switches	5CW/4363
Four single-pole switches	5CW/4364

Marking transfers—

Marking	*Ref. No.*
On	5CW/4327
Off	5CW/4328
High...	5CW/4329
Low	5CW/4330
Open	5CW/4331
Shut	5CW/4332
Test	5CW/4333
Manl	5CW/4334
Auto	5CW/4335
Trip	5CW/4336
Close	5CW/4337
Stop	5CW/4338
Run	5CW/4339
Up	5CW/4340
Down	5CW/4341
Hot	5CW/4342
Cold	5CW/4343
Dim	5CW/4344
Bright	5CW/4345
In	5CW/4346
Out	5CW/4347
L.V.	5CW/4348
M.V.	5CW/4349
A	5CW/4350
B	5CW/4351
C	5CW/4352
D	5CW/4353
E	5CW/4354
F	5CW/4355
G	5CW/4356
H	5CW/4357
J	5CW/4358
K	5CW/4359
Port	5CW/4481
Stbd.	5CW/4482
Flt	5CW/4483
Grd	5CW/4484
Normal	5CW/4485
C/O	5CW/4486
Eng	5CW/4487
Neut...	5CW/4488
Half	5CW/4489
Full	5CW/4490
Oxy	5CW/5000

Marking	*Ref. No.*	*Marking*	*Ref. No.*
Steady	5CW/6727	Light	5CW/6996
Flash	5CW/6728	Heavy	5CW/6997
No. 1	5CW/6989	Kill	5CW/6998
No. 2	5CW/6990	Rich	5CW/6999
No. 3	5CW/6991	Weak	5CW/7000
No. 4	5CW/6992	A.D.F.	5CW/7001
Reset	5CW/6993	V.O.R.	5CW/7002
P and S	5CW/6994	Decrease	5CW/7272
Increase	5CW/6995		