

How to Select a Tap Switch



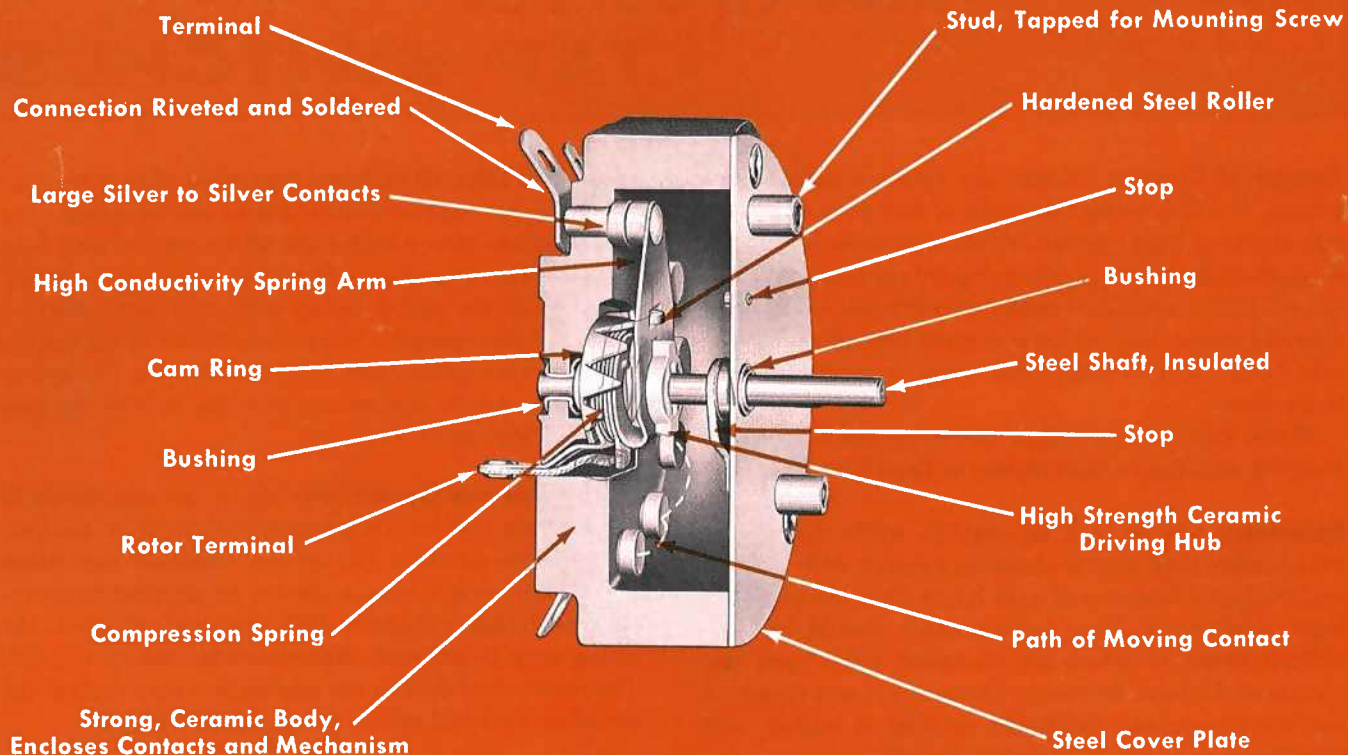


Fig. 189—Cut-away View of Typical Tap Switch

Compactness for the current rating combined with high insulation value is the basis of the design. Ideal switch insulation is provided by the ceramic material used in the heavy one-piece bodies, as the ceramic is permanent in nature and unaffected by arcing. Switch shafts are electrically “dead”—insulated by strong hubs of ceramic or, in some instances, of reinforced plastic. Contacts and mechanism are enclosed and protected (except for the Model 111).

The fixed contacts are large diameter, thick, silver-alloy disks permanently welded to copper studs. These, in turn, are fastened to the sturdy terminal lugs by riveting and soldering which assures a permanent mechanical and electrical joint. The rotor (moving) contact is of solid silver-alloy, also large in diameter and thick, riveted and soldered to the contact arm. The face of the rotor contact is slightly rounded assuring a perfect seating of the contacts with a slight rubbing, self-cleaning motion on every operation.

Silver is acknowledged as the finest material for high current use because it is the best conductor of electricity, withstands sparking well and develops negligible surface resistance. The silver-to-silver contact feature of the Ohmite tap switch reduces contact resistance to a minimum and requires no maintenance.

The contact arm is of high conductivity non-ferrous spring metal; it carries the current to the rotor terminal and provides strong pressure at the contacts. An independent coil spring maintains the pressure between the contact arm and the rotor terminal. Rubbing conducting surfaces are plated to assure continued good conductivity.

Some Ohmite Tap Switches are listed by the Underwriters' Laboratories, Inc. Reexamination Service, as follows, for use where the acceptability of the combination has been determined by them: Model 111, Model 212, Model 312 and Model 412. Variations from the basic switch design, identified by suffixes A, B, C or X, are also Underwriters' approved. Write for specific information. When an Underwriters' approved unit is required, specify this on the order.

“SLOW-BREAK” MECHANISM SPECIALLY DESIGNED FOR A.C. USE

A positive, cam-and-roller mechanism provides “slow-break quick-make” action—the action proved best for the applications of these switches. The operating time is only a small fraction of a second, but is “slow” relative to conventional fast-acting switches. The relatively slow separation of the contacts permits the circuit to open at about the instant when the alternating current wave reaches the zero point, hence minimizing sparking. This greatly increases the life of the contacts over that of conventional switches.

The contact arm carries a hardened steel roller which follows the contour of a fixed cam ring as the arm is moved by the rotation of the shaft. This lifts the spring arm (contact arm) so that the moving contact lifts from the fixed contact as it is rotated, in either direction, and descends under strong spring pressure with a slight wiping, self-cleaning action. The cam-ring and roller also index the moving contact on the fixed contact at each tap position.

Range of Choice: Ohmite tap switches include two classes, the first being the group of five sizes of power, non-shorting, high current switches available from stock in single and tandem (2 pole or 3 pole) construction. The second group consists of open type switches, either non-shorting or shorting, of lower current ratings and available from stock in single pole designs; made-to-order in tandem.

Many variations in design can be provided in made-to-order switches in both classes as described hereafter.

Selection: Choice of a tap switch, while simple, involves more than merely choosing a switch with current and voltage ratings equal to or larger than the expected load. Among the other factors which should be considered (some of which are discussed below) are the nature of the load, frequency of operation and expected life, environmental conditions, method of wiring, and requirements of specifications to be met.

The Load: When the load consists of tungsten filament lamps, there is a starting surge which may be ten times the normal current. While Ohmite tap switches will withstand large surges, this factor should be allowed for in some measure, if operation is to be very frequent.

Expected Life: All switches, regardless of type or manufacturer, are subject to mechanical and electrical wear and therefore have a useful life which may be very long but is obviously limited. The ratio between the actual current and the switch rating will have some effect on the life of the contacts. When the number of operations becomes very great, mechanical fatigue in the spring materials may be the determining factor. Special long life switches can be supplied.

Environmental Conditions: The maximum standstill (or carrying current) of a switch is limited by the permissible temperature rise of the contacts and other parts. If the switch is to be used at an ambient temperature much higher than the 40°C standard reference, the rating may be affected. Recommendations on request. The presence of dust in the application may dictate the use of an enclosed switch or special provisions.

HOW TO ORDER

Order tap switches by Model, Cat. No., and number of taps (and number in tandem when applicable). List knobs or other accessories as separate items. Provide full details on special designs.

GUIDE TO OHMITE TAP SWITCHES

MODEL	TYPE	RATINGS (4)				Max. No. of Contacts	Max. No. of Sw. in Tandem	DIMENSIONS		LISTED ON PAGES
		A.C.		D.C.	Dia.			Depth		
		Standard (1)	Extended (2)	Non-Ind. Load						
STOCK OR MADE-TO-ORDER										
111	POWER	NON-SHORTING	10A., 150V.	5A., 300V.	10A., 20V.	11	2	1 3/4"	1 1/8"	121
212			15A., 150V.	7.5A., 300V.	15A., 20V.	12	3	2 1/4"	1 1/8"	121
312			25A., 300V.	12.5A., 600V.	25A., 20V.	12	3	3 3/8"	2 3/8"	122
412			50A., 300V.	25A., 600V.	50A., 20V.	12	3	4 3/8"	2 3/8"	122
608			100A., 300V.	50A., 600V.	100A., 20V.	8	3	6"	3 3/8"	123
STOCK										
			Standstill	Load Break						
T-50	OPEN	NON-SHORTING	7A.	3A., 120V.	3A., 20V.	8	—	2 5/8"	1 3/8"	128
T-100			7A.	3A., 120V.	3A., 20V.	12	—	3 1/8"	1 3/4"	128
T-50-S		SHORTING	10A.	3A., 120V.	3A., 20V.	8	—	2 5/8"	1 3/8"	128
T-100-S			10A.	3A., 120V.	3A., 20V.	12	—	3 1/8"	1 3/4"	128
MADE-TO-ORDER										
T-25 to T-1000	OPEN	NON-SHORTING	5A. to 32A.	Note (3)	3A., 20V.	6 to 58	8	1 1/8" to 12"	1 3/8" to 3"	127
T-25-S to T-1000-S		SHORTING	5A. to 32A.	Note (3)	3A., 20V.	11 to 77	8	1 1/8" to 12"	1 3/8" to 3"	127

NOTE: (1)—Standard rating is also U.L. rating for Models 111, 212, 312, and 412.

(2)—See page 124 for explanation of ratings.
(3)—Ratings depend on contacts used.

(4)—Ratings are load break unless otherwise marked.

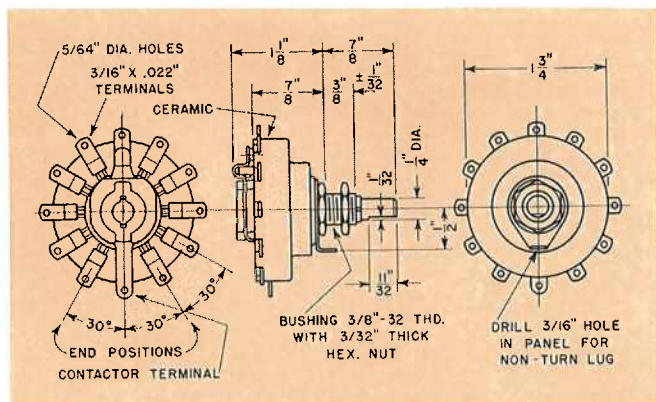


Fig. 190—Model 111

MODEL 111 TAP SWITCH

10 Amps., 150 Volts
Alternating Current Rating

Diameter: $1\frac{3}{4}$ " **Shaft:** $\frac{1}{4}$ " Diameter

Standard Mounting: For $\frac{1}{4}$ " panel, maximum, by means of $\frac{3}{8}$ "-32 bushing and hex. nut. A $\frac{3}{16}$ " hole is required for the Non-turn Washer No. 5050.

Maximum Number of Taps: 11. **Weight:** 16 lbs. approx.

Standard Knob: No. 5116A. Specify on order if desired.

Torque: 2.5 to 3.5 lb. in. approx.

Terminals: Soldering Type.

Model 111 differs in type from the other switches in this series only by not being enclosed.

Cat. No.	No. of Taps	†Total Rotation	Cat. No.	No. of Taps	†Total Rotation
111-2	2	30°	111-7	7	180°
111-3	3	60°	111-8	8	210°
111-4	4	90°	111-9	9	240°
111-5	5	120°	111-10	10	270°
111-6	6	150°	111-11	11	300°

†Rotation of knob is symmetrical about center line.

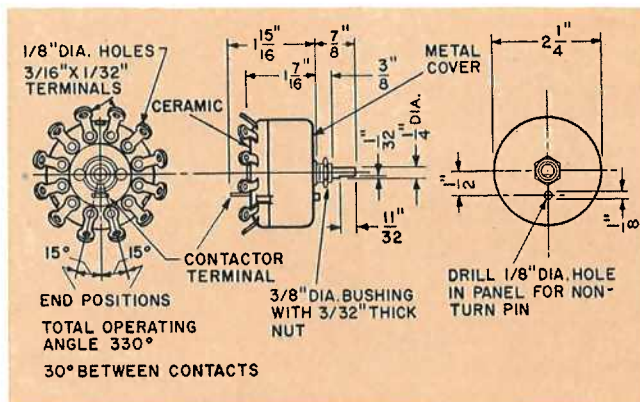


Fig. 192—Model 212

MODEL 212 TAP SWITCH

15 Amps., 150 Volts
Alternating Current Rating

Diameter: $2\frac{1}{4}$ " **Shaft:** $\frac{1}{4}$ " Diameter

Standard Mounting: For $\frac{1}{4}$ " panel, maximum, by means of $\frac{3}{8}$ "-32 threaded bushing and hex. nut. A $\frac{1}{8}$ " hole is required for the non-turn pin.

Maximum Number of Taps: 12. **Weight:** 4 lbs. approx.

Standard Knob: No. 5116A. Specify on order if desired.

Torque: 2.5 to 5.5 lb. in. approx.

Terminals: Soldering Type.

Model 212 differs in type from the larger switches by having a cup-shaped metal cover.

Cat. No.	No. of Taps	†Total Rotation	Cat. No.	No. of Taps	†Total Rotation
212-2	2	30°	212-8	8	210°
212-3	3	60°	212-9	9	240°
212-4	4	90°	212-10	10	270°
212-5	5	120°	212-11	11	300°
212-6	6	150°	212-12	12	330°
212-7	7	180°			

†Rotation of knob is symmetrical about center line.

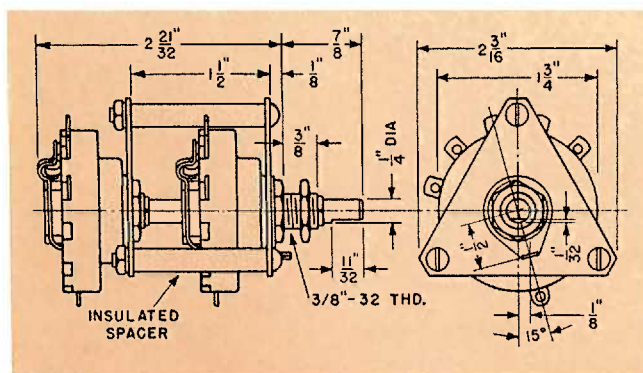


Fig. 191—Model 111-T2 Tandem Assembly.

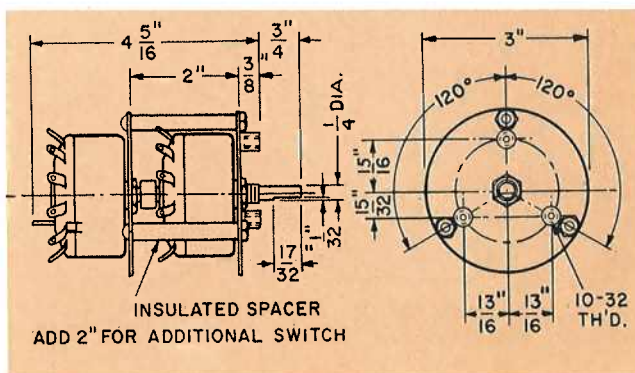


Fig. 193—Model 212-T2 Tandem Assembly.

IN STOCK
For Immediate Shipment

TO ORDER

STOCK SWITCHES—Specify by Cat. No.
SPECIAL SWITCHES—Specify by Model, Number of Taps and Description of Special Features
KNOBS and DIALS—Specify separately by Cat. No.

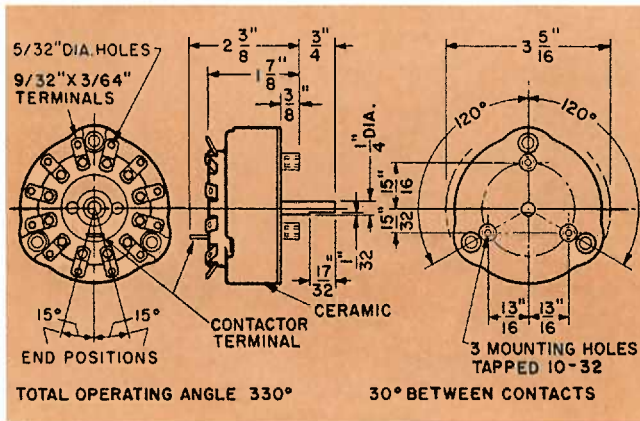


Fig. 194—Model 312.

MODEL 312 TAP SWITCH

25 Amps., 300 Volts

150 V. Between Taps—Alternating Current

Diameter: $3\frac{5}{16}$ " **Shaft:** $\frac{1}{4}$ " Diameter.

Standard Mounting: For $\frac{1}{4}$ " panel, maximum. Three No. 10-32 flat-head machine screws $\frac{3}{8}$ " long are supplied. Drill $\frac{5}{16}$ " hole in panel for shaft.

Maximum Number of Taps: 12. **Weight:** .75 lb. approx.

Standard Knob: No. 5109A. Specify on order if desired.

Torque: 2.5 to 4.5 lb. in. approx.

Terminals: For use with soldering lugs, No. 6 screws or direct soldering.

Cat. No.	No. of Taps	†Total Rotation	Cat. No.	No. of Taps	†Total Rotation
312-2	2	30°	312-8	8	210°
312-3	3	60°	312-9	9	240°
312-4	4	90°	312-10	10	270°
312-5	5	120°	312-11	11	300°
312-6	6	150°	312-12	12	330°
312-7	7	180°			

†Rotation of knob is symmetrical about center-line.

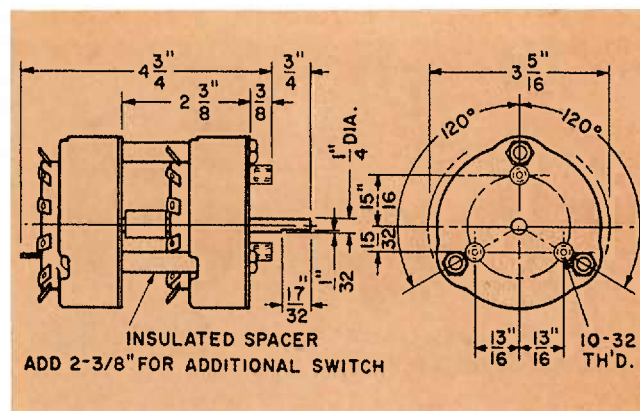


Fig. 195—Model 312-T2 Tandem Assembly.

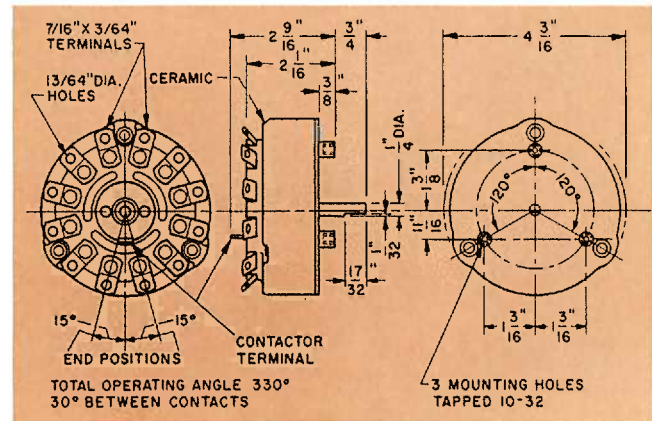


Fig. 196—Model 412.

MODEL 412 TAP SWITCH

50 Amps., 300 Volts

150 V. Between Taps—Alternating Current

Diameter: $4\frac{3}{16}$ " **Shaft:** $\frac{1}{4}$ " Diameter.

Standard Mounting: For $\frac{1}{4}$ " panel, maximum. Three No. 10-32 flat-head machine screws $\frac{3}{8}$ " long are supplied. Drill $\frac{5}{16}$ " hole in panel for shaft.

Maximum Number of Taps: 12. **Weight:** 1.4 lbs. approx.

Standard Knob: No. 5111A. Specify on order if desired.

Torque: 2.5 to 4.5 lb. in. approx.

Terminals: For use with soldering lugs, No. 10 screws or direct soldering of wires.

Cat. No.	No. of Taps	†Total Rotation	Cat. No.	No. of Taps	†Total Rotation
412-2	2	30°	412-8	8	210°
412-3	3	60°	412-9	9	240°
412-4	4	90°	412-10	10	270°
412-5	5	120°	412-11	11	300°
412-6	6	150°	412-12	12	330°
412-7	7	180°			

†Rotation of knob is symmetrical about center-line.

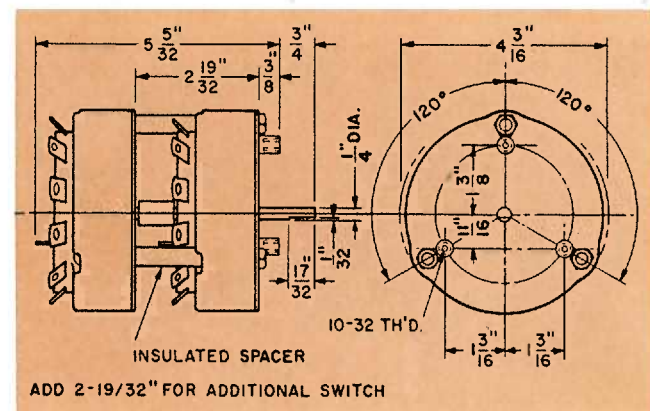


Fig. 197—Model 412-T2 Tandem Assembly.

IN STOCK

For Immediate Shipment

TO ORDER

STOCK SWITCHES—Specify by Cat. No.
SPECIAL SWITCHES—Specify by Model, Number of Taps and Description of Special Features
KNOBS and DIALS—Specify separately by Cat. No.

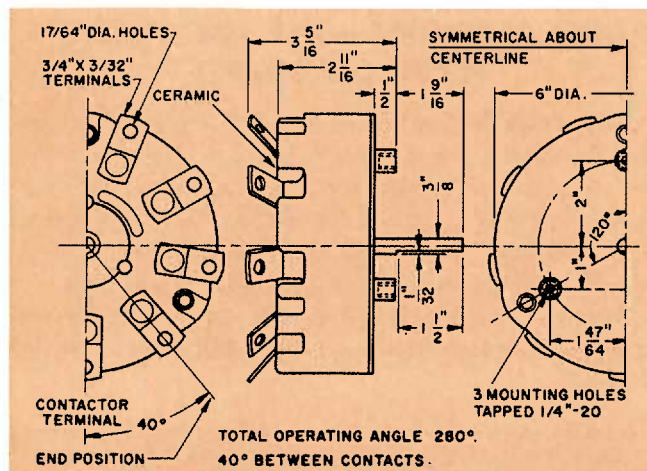


Fig. 198—Model 608.

MODEL 608 TAP SWITCH

100 Amps., 300 Volts

Alternating Current Rating

Diameter: 6". **Shaft:** $\frac{3}{8}$ " Diameter.

Standard Mounting: For 1" panel, maximum. Three flat-head machine screws $\frac{1}{4}$ "-20x1 $\frac{1}{4}$ " long are supplied. Drill $\frac{7}{16}$ " hole in panel for shaft.

Maximum Number of Taps: 8. **Weight:** 5 lbs. approx.

Standard Knob: No. 5104A. Specify on order if desired.

Torque: 25 to 35 lb. in. approx.

Terminals: For use with soldering lugs or $\frac{1}{4}$ " bolts.

Cat. No.	No. of Taps	†Total Rotation	Cat. No.	No. of Taps	†Total Rotation
608-2	2	40°	608-6	6	200°
608-3	3	80°	608-7	7	240°
608-4	4	120°	608-8	8	280°
608-5	5	160°			

†Rotation of knob is symmetrical about center-line.

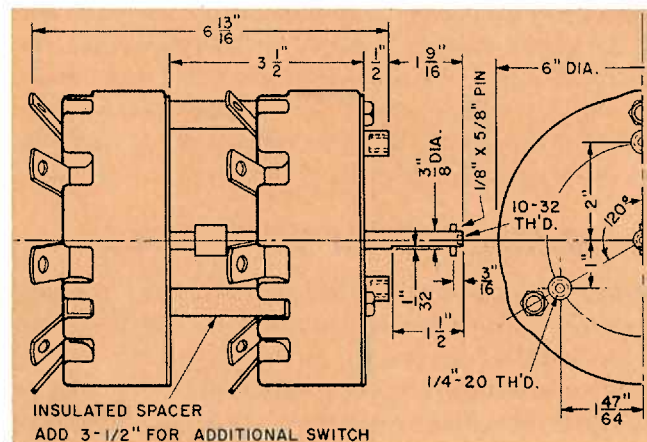


Fig. 199—Model 608-T2 Tandem Assembly.

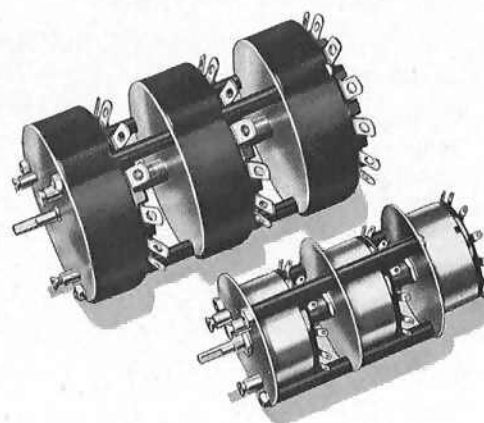


Fig. 200—Typical Tandem Assemblies.

TANDEM MOUNTED SWITCHES

Application: Tandem assemblies are used to form multi-pole arrangements. Two or three Ohmite Power Tap Switches can be ordered assembled in tandem. Such switches are provided with extended shafts and are coupled together for single knob control, as shown in the illustrations. Specify the panel thickness when ordering if greater than $\frac{1}{4}$ " for Models 111, 212, 312 or 412, or greater than 1" for Model 608. Mixed Tandems; Models 412, 312, 212 or 111 can be combined in a single tandem (3 switches max.).

Model Number	CATALOG NUMBERS		Recommended Knobs
	2 in Tandem	3 in Tandem	
111	111-11-T2		5109A-5110A
212	212-12-T2	212-12-T3	5111A-5112A
312	312-12-T2	312-12-T3	5111A-5112A
412	412-12-T2	412-12-T3	5111A-5112A
608	608- 8-T2	608- 8-T3	5115

For switches with less than the maximum number of taps insert the desired number after Model Number. Example: Two 6-position Model 312 Tap Switches in tandem are specified as Stock No. 312-6-T2.

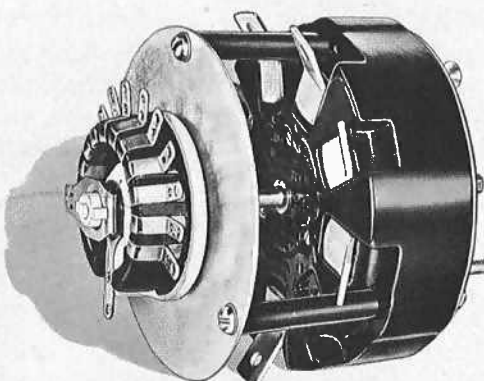


Fig. 201—Special Tandem; Model 608 and Shorting Switch.

IN STOCK
For Immediate Shipment

TO ORDER

STOCK SWITCHES—Specify by Cat. No.
SPECIAL SWITCHES—Specify by Model, Number of Taps and Description of Special Features
KNOBS and DIALS—Specify separately by Cat. No.

ELECTRICAL RATINGS

The ratings given for Ohmite Power Tap Switches are interrupting (and standstill) ratings, according to Underwriters' Laboratories spacings for use only on alternating current circuits, either inductive or non-inductive, i.e., at any power factor. Switches can be used, however, on higher voltages, (300 V. for Model 111 or 212 and 600 V. for 312, 412 or 608), with reduced current where load-break is involved. Load-break switches for 440 or 600 V. use are provided with additional internal insulation. Current ratings are reduced on the basis of a fixed load wattage. The formula is:

$$I_{HI-V} = \frac{\text{RATED VOLTS}}{\text{HIGH VOLTS}} \times \text{RATED AMPS.}$$

Somewhat higher currents can be handled where load-break is not involved. Considerably greater currents can be handled where extremely short pulses are to be handled, without load-break. Switches can be used also with rated line voltage between taps. Use at conditions other than standard is not U. L. listed, except where special arrangements are made.

The switches may be used on direct current *non-inductive circuits* up to 20 volts at full current ratings; recommendations for other conditions will be supplied on request.

SWITCH INSULATION

All models of these switches withstand testing at 2000 volts A.C. with the voltage applied either between taps or to ground (between contacts and shaft), but such voltages should not be considered as the working voltage. The ceramic insulation is permanent in nature, unaffected by age and resistant to arcing.

SWITCHES WITH SPECIAL ROTATION

Switches with less than the maximum number of taps are furnished ordinarily with the standard contact spacing of 30° (40° for Model 608). However, switches of limited number of taps, as shown in the table, can be supplied (at increased cost) with the contacts spaced 2 or 3 times standard. Switches can be made, also, without a stop so that there are no end positions to the shaft rotation.

Model	Maximum No. of Taps	Tap Spacing	Total Rotation (Maximum)
212, 312, 412	6	60°	300°
212, 312, 412	4	90°	270°
608	4	80°	240°
608	3	120°	240°

PANEL MARKING—TAP LOCATIONS—FLATS ON SHAFTS

Panels should be marked so first and last positions are equally spaced counter-clockwise and clockwise from the top center-line, with the switch mounted with the center-lead down. Flats on the shafts of switches having odd or even numbers of taps are located differently so as to make this possible. Dials are listed on page 126.

Viewed from the terminal side, the terminals are always divided around the switch top center-line, as follows:

Model	Contact Arrangement
111	One more contact to left of top on even-numbered switches.
212, 312, 412, 608	One more contact to left of top on odd-numbered switches.

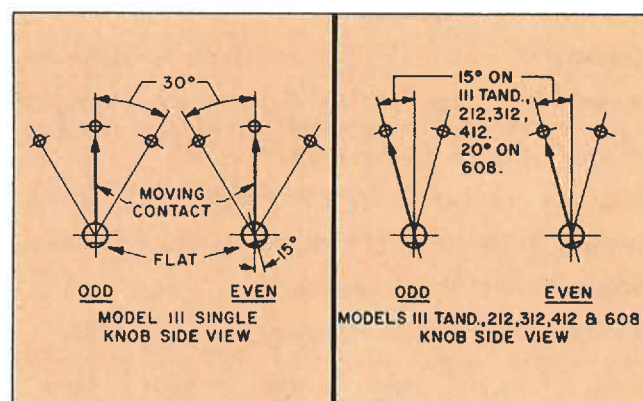


Fig. 202—Relative Location of Flat on Shaft.

SWITCHES FOR SPECIAL PANELS—SPECIAL SHAFTS

Standard switches can be mounted on any thickness of panel up to the maximum specified. Switches can be had at increased cost with shafts or bushings made for mounting on any one of the following panel thicknesses: 1/8", 1/2", 3/4", 1", 1 1/2", and 2". Special length shafts can be provided also, as well as shafts without flat or with slot for screw driver adjustment, or with rear extension.

SWITCHES WITH OFF-POSITION

Model 608 can be supplied with 320° rotation, including eight contacts and an off-position at the contactor terminal location. In general, on switches where an off-position is desired, it is more economical for the user to leave one contact unwired than to call for an off-position on the switch. The latter requires special work, as the contact must be mounted in any case.

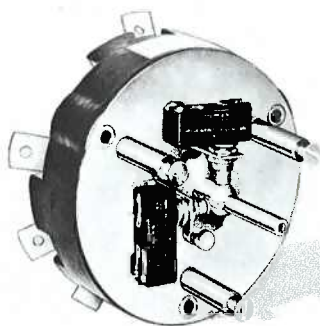


Fig. 203—Special Model 608 with Two Auxiliary Switches.

TAP SWITCHES WITH AUXILIARY SWITCH OPERATED AT EACH POSITION

All models of tap switches can be supplied with a sensitive switch which must be operated by pushing on the knob before the tap switch shaft can be rotated to another position. The sensitive switch (a "Micro Switch" or similar unit) is automatically restored to its normal position when the knob is released.

This auxiliary switch arrangement can be used in two general ways. In the first method, the auxiliary switch is connected in series with the tap switch common lead and serves to hold the circuit open while the knob is being rotated, so that any tap can be selected without operating intermediate taps, and without requiring use of a separately operated load switch.

In the second method, the auxiliary switch controls a separate electro-magnetic contactor which opens and closes the load circuit. This arrangement extends the use of the tap switch, as a selector, for use on line voltage D.C. applications.

Orders or inquiries should give complete description of the tap-switch, auxiliary switch (including its load) operating requirements, and whether the auxiliary switch is to be supplied wired to the tap-switch center lead.

ILLUSTRATIONS OF TYPICAL TAP SWITCHES

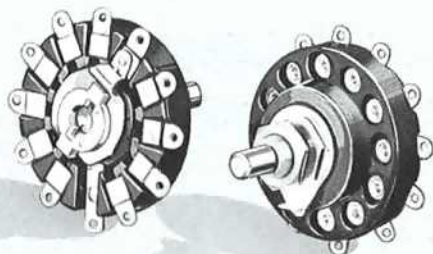


Fig. 206—Typical Model 111 Tap Switches.

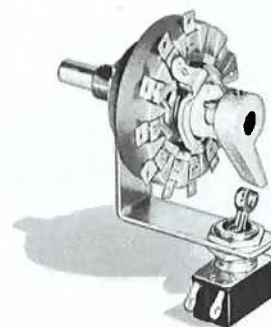


Fig. 204—Model 111 with Toggle Switch.

TAP SWITCHES WITH AUXILIARY SWITCH OPERATED AT ONE POSITION ONLY

All models of tap switches can be supplied with a toggle switch or sensitive switch mounted on the tap switch and arranged so the auxiliary switch is operated when the tap switch shaft is rotated between a prescribed pair of contacts.

Toggle switches and sensitive switches as listed in the rheostat section, pages 94 and 95, can be supplied. Orders and inquiries should give complete description of tap switch, auxiliary switch and operating location.

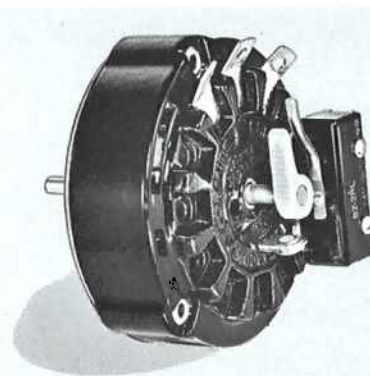


Fig. 205—Model 412 with "Micro Switch."

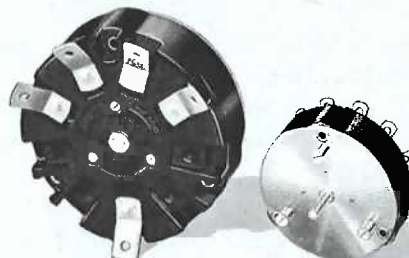
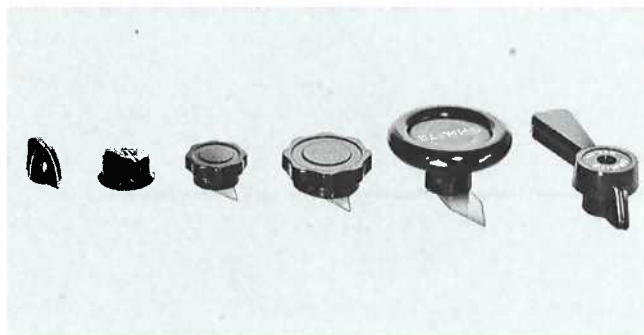


Fig. 207—Cat. No. 608-4 and No. 412-5 Switches.

TAP SWITCH KNOBS



5116A 5150A 5109A 5111A 5104A 5105A 5115
5110A 5112A 5106A 5107A 5152A

Fig. 208—Knobs for Tap Switches.

The knobs are made of black bakelite. They fasten by means of two hexagon socket set screws except No. 5150A which has only one, and No. 5115 which requires a tapped hole and a driving pin as illustrated on the shaft of the Model 608 Tandem Assembly (Fig. 199). Pointers are nickel-plated.

Numbers 5150A, 5109A, 5110A, and 5116A are for use with Models 111, 212, and 312; the larger knobs are preferred for Model 412. See recommendations with switch listings and with dial description.

Ordering: Specify knobs desired as a separate item.

Description	Knob Dia.	Hole Dia.	Pointer Radius	Cat. No.
Handwheel with Pointer	3 1/4"	3/8"	2 1/2"	5104-A
Handwheel without Pointer	3 1/4"	3/8"	—	5105-A
Handwheel with Pointer	3 1/4"	1/4"	2 1/2"	5106-A
Handwheel without Pointer	3 1/4"	1/4"	—	5107-A
Finger-Grip with Pointer	1 3/8"	1/4"	1 1/2"	5109-A
Finger-Grip without Pointer	1 3/8"	1/4"	—	5110-A
Finger-Grip with Pointer	2 3/8"	1/4"	1 1/2"	5111-A
Finger-Grip without Pointer	2 3/8"	1/4"	—	5112-A
Bar Knob, 4 3/4" long	—	3/8"	1 1/8"	5115
Bar Knob, 1 1/2" long	—	1/4"	3/4"	5116-A
Finger-Grip Knob	1 1/2"	1/4"	—	5150-A
Handwheel with Pointer	3 1/4"	1/4"	1 1/8"	5152-A

TAP SWITCH DIALS

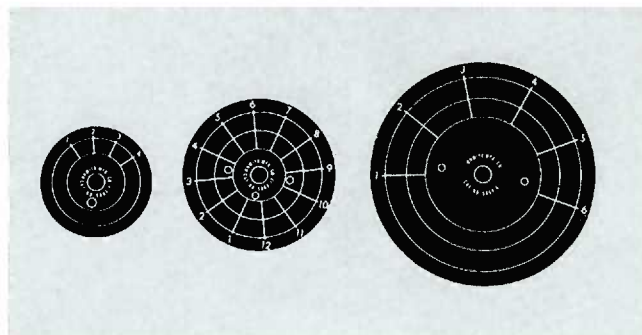


Fig. 209—Typical Tap Switch Dials.

Dials are made with different numbers of taps from 2 to 12 to agree with the rotations of the various switches and in three diameters to properly coordinate with appropriate knobs. They are made of aluminum with the markings bright on a black background. Dials used with a single Model 111 or 212 are secured by the switch mounting nut. Other dials fasten by No. 6 screws (or the switch mounting screws, provided holes are pierced in the dials). Number of positions must be specified as a suffix to the Cat. No.

For Model	Angle Between Taps	Positions	For Use With Knob	Dial Dia.	Cat. No. Specify Positions as a Suffix
111*	30°	2 to 11	5109A	2 3/4"	5002-..
212 (Single) 312 (Single)	30°	2 to 12	5116A 5150A		
212 (Tandem) 312 (Tandem) 412	30°	2 to 12	5111A 5152A	3 3/4"	5003-..
608	40°	2 to 8	5104A 5115	5 1/2"	5004-..

*When Dial No. 5002 is used with Model 111 Tandem, the non-turn nib on the switch is not used to locate the dial.

TAP SWITCHES WITH PUSH-ON TERMINALS

The Model 111 or 212 tap switches can be supplied with special terminal tabs to mate with push-on type wire connectors, such as the AMP "Faston" No. 41202. This provides for very rapid wiring when assembled in equipment using this method of wiring. The illustration shows an example of a switch equipped with 1/4" wide tabs.

This type of wiring is popular in apparatus requiring many connections or occasional servicing. Its use is limited by the current rating of the available wire connectors.

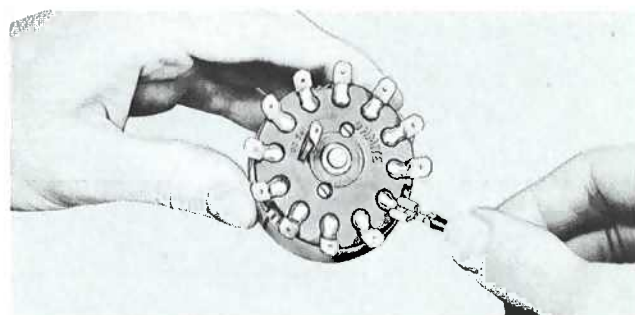


Fig. 210—Model 212 Tap Switch with Push-on Terminals.

STOCK OPEN-TYPE TAP SWITCHES

In Stock for Immediate Shipment

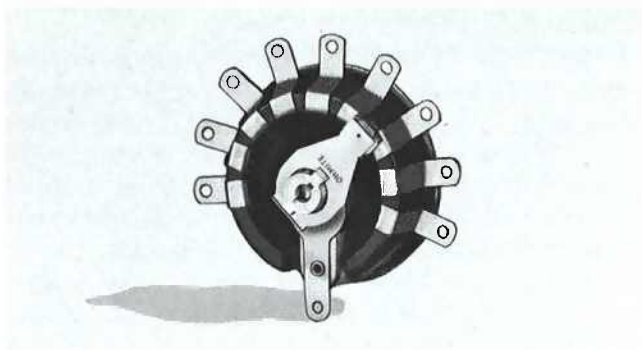


Fig. 213 - A Shorting Type Switch (T-1009-S).

SHORTING TYPE TAP SWITCHES

These switches have the taps set close together so that the contact brush smoothly bridges or shorts from one tap to the next as it is rotated. Thus the circuit is made with each succeeding tap before it is broken with the previous one. The switch arm is not indexed in any way and is free to stop in any position.

Maximum *standstill* current is 10 amperes. Maximum current which should be *interrupted* is 3 amperes at 120 V.A.C. Current ratings are less for all direct current circuits above 20 volts, for inductive circuits and high voltages. Refer to page 127.

SHORTING TYPE					
No. of Contacts	Approx. Degrees Rotation	Cat. No.	No. of Contacts	Approx. Degrees Rotation	Cat. No.
4	90	T-504-S	9	210	T-1009-S
5	120	T-505-S	10	236	T-10010-S
6	150	T-506-S	11	262	T-10011-S
7	180	T-507-S	12	288	T-10012-S
8	210	T-508-S			

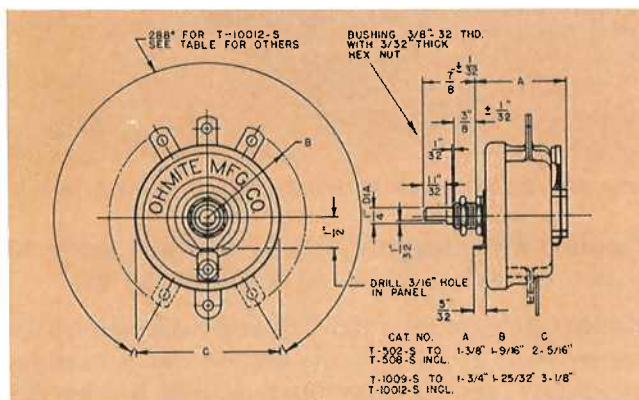


Fig. 214 - Dimensions of Shorting Switches.



Fig. 215 - A Non-Shorting Type Switch (T-508).

NON-SHORTING TYPE TAP SWITCHES

Ridges, smoothly glazed with vitreous enamel, are located between the taps. The spacing between the taps decreases as the number of contacts increases (for a given total rotation). The circuit is opened as the contact leaves the tap. Indexing, and a modified snap action, is provided as the contact glides down over the ridge and onto the tap.

Maximum *standstill* current is 7 amperes. Maximum current which should be *interrupted* is 3 amperes at 120 V.A.C. Current ratings are less for all direct current circuits above 20 volts, for inductive circuits and high voltages. Refer to page 127.

NON-SHORTING TYPE					
No. of Contacts	Approx. Degrees Rotation	Cat. No.	No. of Contacts	Approx. Degrees Rotation	Cat. No.
3	180	T-503	8	296	T-508
4	180	T-504	9	288	T-1009
5	180	T-505	10	288	T-10010
6	296	T-506	11	288	T-10011
7	270	T-507	12	288	T-10012

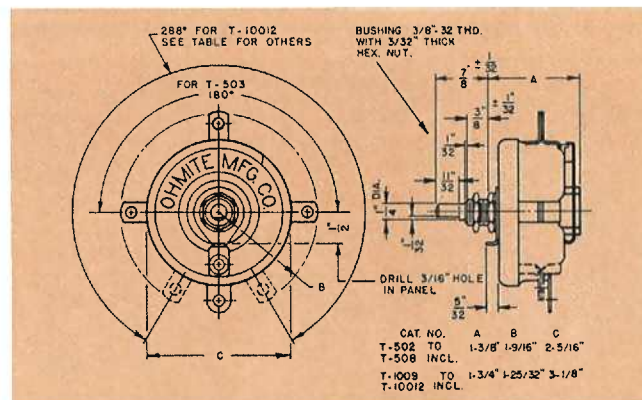


Fig. 216 - Dimensions of Non-Shorting Tap Switches.

ALL PORCELAIN OPEN- TYPE TAP SWITCHES

OHMITE

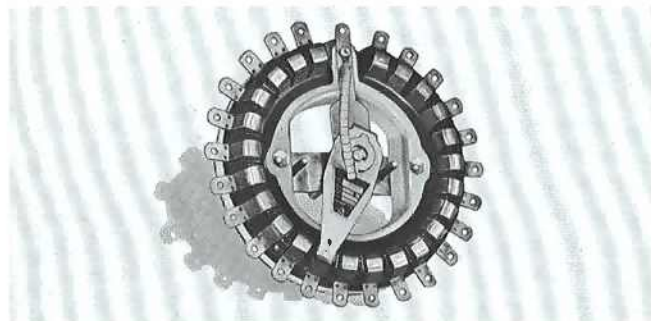


Fig. 211—A Special Open Type Tap Switch.

Ohmite open-type selector tap switches, because of their all porcelain and metal construction and their versatility of design, find many applications. The freedom from carbonization and permanence of the ceramic insulation provides lasting performance. They have been frequently used in radio-frequency circuits.

Description: The body of these single-pole, multi-tap, switches, as illustrated, consists of a porcelain base to which a porcelain ring, carrying the fixed contacts, is vitreous enameled. Contact is made to the monel metal taps by a silver-graphite brush of very low resistance. The moving arm on non-shorting switches is indexed by ridges between the fixed contacts. The bushing and shaft are insulated from the electrical circuit by ceramic parts which will withstand a test voltage of 3000 V. AC. Stock switches and made to order T-25 to T-150 have $\frac{1}{4}$ " diameter shafts and mount by means of a $\frac{3}{8}$ "-32 threaded bushing. Larger switches have a $\frac{3}{8}$ " diameter shaft and mount by two screws.

Stock Switches: Listed on next page.

Made-to-Order: Ten diameters from $1\frac{9}{16}$ " to 12" with the maximum possible number of contacts increasing with the diameter. The maximum voltage to be applied between adjacent contacts determines the minimum practicable spacing between the contacts.

Angular Spacing and Rotation: The angle between taps on the non-shorting switches and the total rotation (up to the maximum) generally can be made as desired.

Switch Model	Base Dia.	MAXIMUM NO. OF CONTACTS*				Max. Angle of Rotation	
		Shorting		Non-Shorting			
		$\frac{3}{16}$ "	$\frac{1}{8}$ "	$\frac{3}{16}$ "	$\frac{1}{2}$ "		
T-25	1 $\frac{1}{16}$ "	11	8	—	6, 5	—	300°
T-50	2 $\frac{1}{16}$ "	15	11	—	9, 8	—	300°
T-75	2 $\frac{3}{4}$ "	19, 14	11	—	11, 9, 8	—	300°
T-100	3 $\frac{1}{8}$ "	21, 15	12	—	17, 12	11	300°
T-150	4"	27, 20	16	—	22, 18	15	300°
T-225	5"	—	28, 22	17	—	25, 20	310°
T-300	6"	—	35, 28	21	—	28, 24	315°
T-500	8"	—	48, 37	29	—	37, 31	325°
T-750	10"	—	63, 50	38	—	47, 40	330°
T-1000	12"	—	77, 61	47	—	58, 49	335°

*Number of contacts depends on width of contact lugs as listed.

Shorting type switches must have the contacts close together so the moving contact can bridge from one to the other in passing. The total angle of rotation increases with the number of contacts.

Current and Voltage Ratings: The maximum *stand-still* current varies with the model and lug width from 5A. on a T-25 to 32A. on T-225 to T-1000 models. Solid silver-alloy fixed contacts may be used on the higher currents and for better interrupting capacity. Interrupting currents vary with circuit conditions. Nominal maximum is 3A. at 120 V. AC. Current ratings are less for all direct current circuits above 20 volts, for inductive circuits and for high voltages. Recommendations given on receipt of details. The load break rating is also somewhat dependent upon the desired life. While the stock switches are nominally insulated for 300 V. and the larger switches (T-225 and up) are insulated for 600 V., they are both frequently used at higher voltage, depending upon the application.

Ratchet Mechanism: A ratchet action indexing mechanism, primarily for shorting type switches (which have no integral indexing feature), definitely positions the moving contact over each tap. The mechanism adds $\frac{9}{32}$ " to the depth behind the panel. The switch then mounts by two No. 10-32 screws located $\frac{3}{4}$ " on each side of the shaft (as illustrated). Pairs of contacts can be bridged by a variation of the design. Ratchet mechanisms should be used on all shorting switches where sparking might otherwise occur, on all tandems and on other non-shorting, single pole switches where increased indexing action is desired.

Code Word

Ratchet Action—Stopping on Lugs RATAP

Ratchet Action—Bridging between Lugs RATEB



Fig. 212—Ratchet Action Mechanism in Place on a Tap Switch.

Tandem Mountings: By means of frames similar to those used on rheostats. See pages 90 and 91.

Knobs: Refer to page 126. The larger diameter knobs are preferred for tandems, for use with ratchet action, or wherever the apparent effort required to turn the switches must be low.

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