



Recd. in
request from
Mr. [unclear]
6/20/55
[unclear]

switchgear
devices

instrument, control, and auxiliary switches • type W

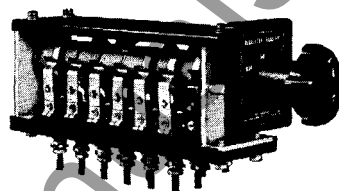
descriptive
bulletin

34-250

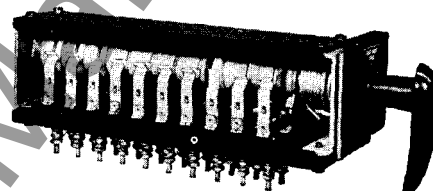
page 1

600 volts • 20-ampere continuous capacity

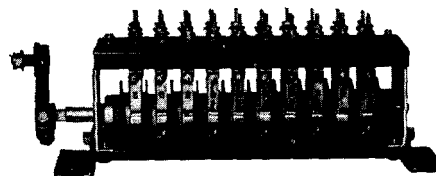
instrument switches: Maintained contact type for use with all classes of electrical instruments, relays, meters, and for performing various circuit combinations. Designed for panel mounting and equipped with handles for manual operation.



control switches: Momentary contact type being spring return to the original or "off" position. Used for circuit breakers and other electrically controlled apparatus. Panel mounting. Handles for manual operation.



auxiliary switches: Lever-operated maintained type, positioned and controlled by an operating mechanism of any electrical device or switch. Not panel mounted nor handle operated.



ratings

600-volt insulation; 20-ampere continuous capacity

circuit	momentary interrupting amperes*	
	inductive circuit	non-inductive circuit
alternating current		
125-volt	30	50
250-volt	15	25
600-volt	3	5
direct current		
125-volt	4	8
250-volt	1	2
600-volt	0.2	0.5

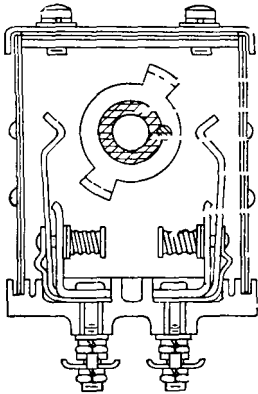
* for current in excess of these ratings, control relays are recommended for use in conjunction with the control switch

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construction



- top cover
- segment (moving contact)
- insulating tube
- operating shaft
- stationary contact-finger
- finger spring
- side plate
- terminal base
- terminal stud

Circuits to a type W switch are generally connected from a stud on one side of the terminal base, through a segment on the rotor, to a stud on the other side; this constitutes a single contact, or stage. In the simplest form, a stage is a single-pole, double-break, single-throw contact. In other forms, involving various sequences or connections to the same circuit, the whole switch may serve as a single-pole unit.

From the front, the switch presents a pleasing appearance on the panel, with convenient moulded handle and uniform dial plates. From the rear, the black side plates and light color zinc end plate and top cover make a neat appearance.

An operating shaft, made of cold-rolled steel rod, rotates in bronze bearings riveted on steel end plates. The end plates provide ample support for the base and the zinc plated steel top, which is channel-shaped to secure strength. This arrangement assures permanent alignment of the contacts.

Both the moving and stationary contacts are faced with a thick layer of silver to insure low contact drop throughout the life of the switch, even under adverse conditions of oxidation or other corrosion.

The moving contacts are separated by spacers of high-arc resistant moisture-proof composition. They are keyed to an insulating Micarta® tube, covering the steel operating shaft, by numbered key notches. Spacers and contacts are securely clamped to the shaft.

The stationary contacts are self-aligning and are made of high conductivity copper alloy. Good contact pressure is obtained by the use of compression springs which do not carry current. This contact construction operates with self-aligning wiping action, insuring clean, low-resistance contact, with long life.

Multiple laminated copper shunts conduct the current from the contacts to the terminal studs. These studs are mounted on the terminal base in such a manner that they positively will not turn or become loose.

The terminal base is made of high-grade moulded material which has very high mechanical and dielectric strength and is ribbed to give creepage distance between studs. Each stud hole is numbered for identifying the connection from the wiring diagram.

Sheet laminated phenolic side plates slide in grooves in the top and bottom of the switch, snapping snugly into the closed position. This arrangement provides immediate access to the contacts for inspection.

instrument switch

1. operating shaft
2. Micarta insulating tube
3. notch key
4. star wheel stop
5. star wheel stop pin
6. insulating spacer
7. metal spacer
8. moving contact segment
9. end spacer
10. locking clip
11. end clamp nut
12. contact finger terminal screw
13. starwheel stop finger
14. stationary contact finger
15. terminal base
16. front end-plate, with bearing
17. rear end-plate, with bearing
18. front end-plate
19. removable key bearing
20. side plate
21. top cover
22. top cover liner
23. dial plate
24. dial nameplate
25. heavy duty round handle
26. modern round handle
27. heavy duty oval handle
28. modern oval handle
29. heavy duty pistol grip handle
30. modern pistol grip handle
31. heavy duty round key
32. modern round key
33. heavy duty oval key
34. modern oval key
35. heavy duty pistol grip key
36. modern pistol grip key

control switch

1. operating shaft
2. Micarta insulating tube
3. notch key
4. centering spring spacer
5. centering spring spacer pin
6. centering spring
7. centering spring stop
8. stop spacer
9. insulating spacer
10. insulating washer
11. bevel washer
12. slip stop washer
13. slip spacer
14. moving contact segment
15. lamp contact segment
16. slip contact segment
17. end spacer
18. locking clip
19. end clamp nut
20. contact finger terminal screw
21. lamp circuit contact finger
22. stationary contact finger
23. terminal base
24. front end-plate, with bearing
25. rear end-plate, with bearing
26. side plate
27. top cover
28. top cover liner
29. dial plate
30. nameplate
31. target indicator and spring
32. heavy duty round handle
33. heavy duty oval handle
34. heavy duty pistol grip handle
35. modern round handle
36. modern oval handle
37. modern pistol grip handle

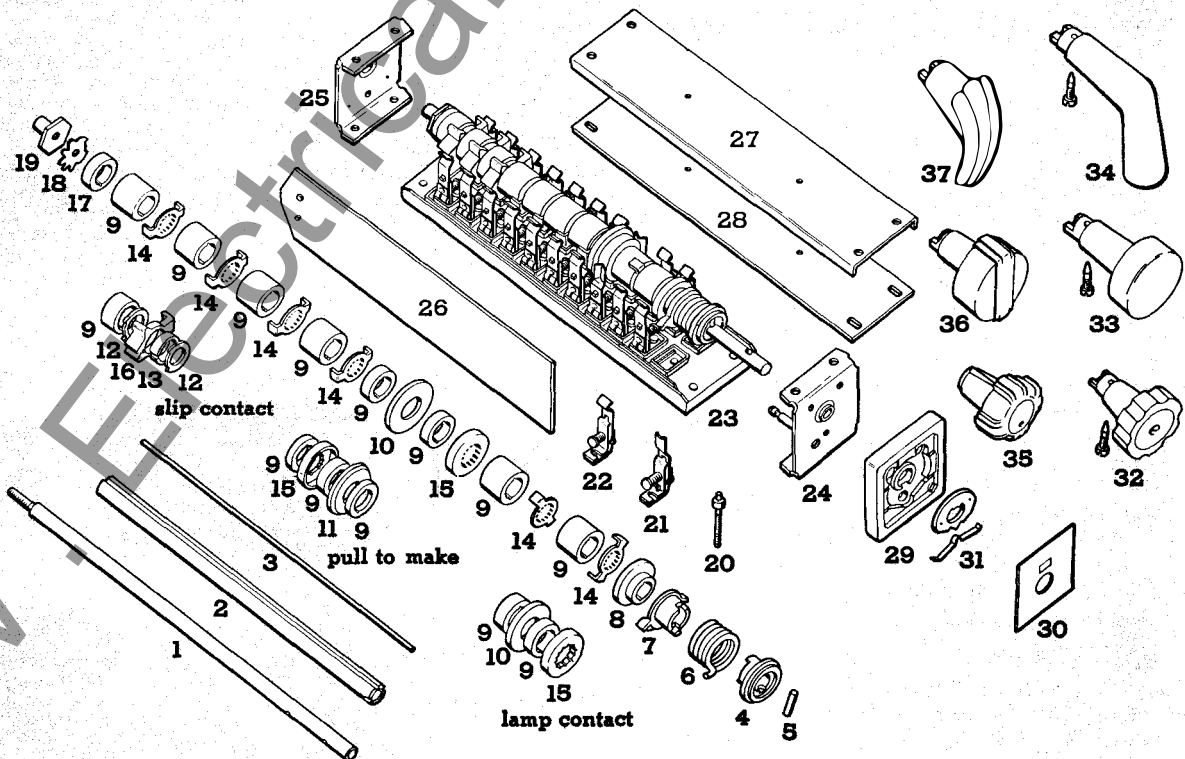
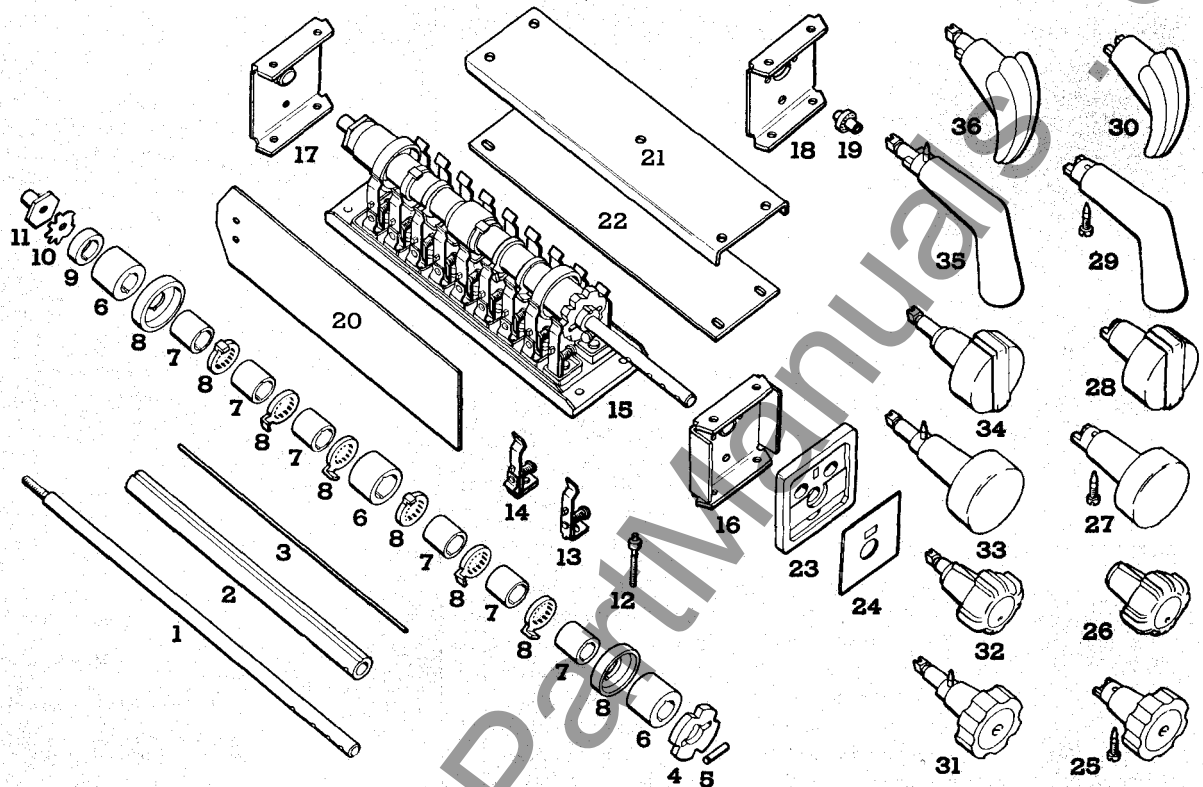
instrument, control, and auxiliary
switches • type W

descriptive
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34-250

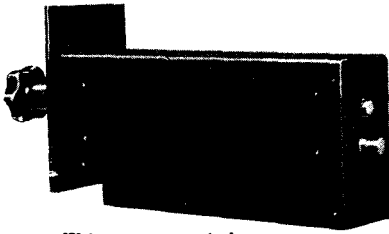
600 volts • 20 amperes continuous

page 3





protective covers



type W instrument switch
with protective cover in place

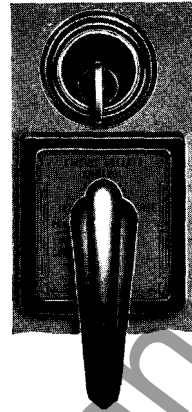
Formed Micarta covers can be supplied to protect the entire switch on the rear of the panel. The side plates are then omitted.

The studs, sides and top of the switch are completely enclosed by the cover, except for a small space underneath, next to the panel, for the entrance of connecting wires. The covers are held in place by a single screw in the rear end plate of the switch.

style numbers

points on base	style numbers (cover only)	
	instrument switch	control switch
2	1247 412	1649 400
3	1247 413	1649 401
4	1247 414	1649 402
5	1247 415	1649 403
6	1247 416	1649 404
8	1247 417	1649 405
10	1247 418	1649 406
11	1649 408	1649 407

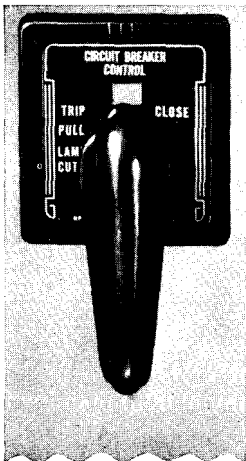
tumbler pin key locks



tumbler pin key lock with
type W control switch

To limit operation of switches to certain operators, or to interlock with other apparatus, both instrument and control switches can be supplied with tumbler pin key locks. These are mounted directly adjacent to the switch and can be arranged to lock the switch in certain positions and to prevent locking in other positions.

dial plates



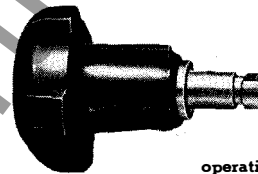
type W control switch
dial plate

All instrument and control switches are secured to the panel by three screws. The heads of the screws are countersunk in the dial plate, which also serves as the container for the red and green target indicators of the control switches. (The former round plates have been superseded by the rectangular plates, modern in design. The switch itself is essentially the same.) Only one drilling plan is used for mounting all type W instrument and control switches. (See page 25.)

Black nameplates with white letters are inserted in top slot of the dial plate and snapped into position by pressing in and down on the bottom of the nameplate. To remove the nameplate, the procedure is reversed (i.e., by pressing in at the top and pushing upwards). No screws are used.

Standard listed switches have nameplates with suitable titles and markings. Special nameplates with special titles and markings can be supplied on request.

keys



operating key and handle for
type W instrument switch

handle
key shaft
key bearing
set screw

Keys are generally described as a handle complete with key-bearing, operating shaft, hand grip, and nameplate, designed for operation of one or more switches. Keys can be used with all instrument switches. Ammeter, regulator transfer and temperature indicator switches are not normally key operated but can be ordered special for such operation. Synchronizing switches for synchronizing between machines require two keys, one for the running and one for the incoming machine; each can be turned in only one direction.

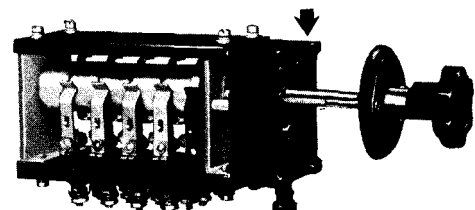
Keys are constructed to be inserted only in the proper switch, and can be withdrawn only when in the "off" position. This prevents the possibility of trouble when more than one circuit is to be connected to the same instrument through similar switches, provided only one key is used for all similar switches.

special switches

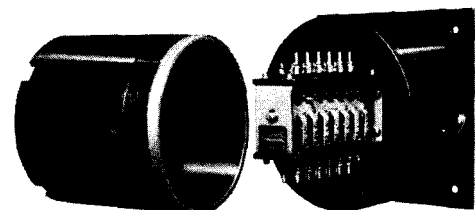
Standard single switches are made for 2, 3, 4, 5, 6, 8, and 10 points, or stages. Modifications can be made for special switches to secure a maximum of 11 stages. For a greater number of stages, two, three, or more units are geared together to operate from one handle.

A single-break, single-pole, double-throw feature on each stage is obtained by the insertion of a single contact mounted on an inverted base. This base replaces the top cover.

four-stage type W switch
with adapter (note arrow)
for use with RS and CS
handles



seven-stage double base
type W switch in explosion-
proof enclosure

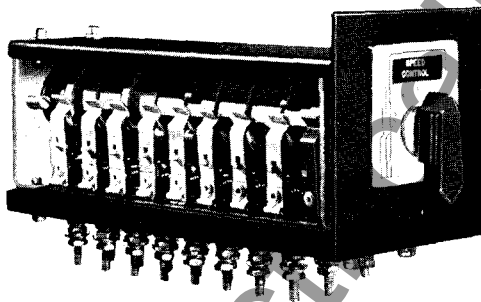


handles

Handles are available in oval, pistol grip, and round notched shapes, both modern and heavy duty design. Standard circuit breaker control switches are supplied with pistol grip handles; voltage, motor, and speed control switches with oval handles; and standard instrument switches with round notched handles. Round notched handles can also be supplied, if specified, for speed control switches. Special pistol grip and round notched handles are available at extra cost. To replace a fixed handle for any reason, it is necessary only to remove a small indicator screw.

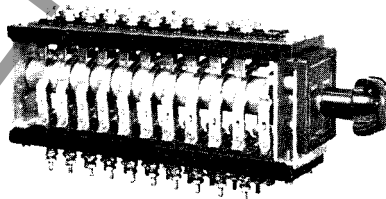
Minatrol® type handles: Can be adapted to type W instrument switches in combination with Minatrol face plates. This arrangement, however, cannot be adapted to the momentary contact type W control switches.

colored handles: All standard handles are of black moulded composition. Colored handles (red, green, yellow, blue, gray, orange, and brown) can be supplied on order, at increased prices with longer delivery.

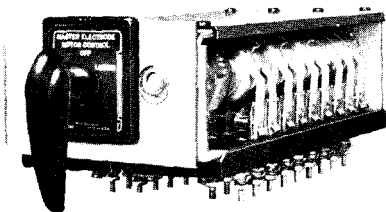


type W instrument switch with rectangular nameplate and Minatrol handle

type W control switch with double base to provide double-throw operation



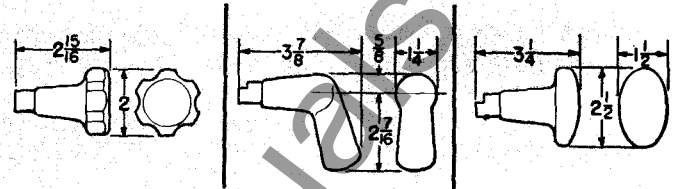
two nine-stage type W switches side by side geared to common handle



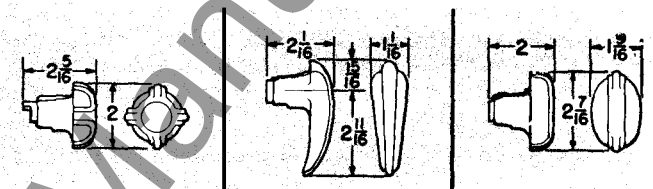
dimensions of keys and handles

round notched | pistol grip | oval

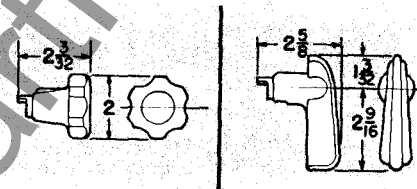
heavy duty handles



modern handles

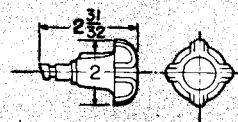


modern-special handles

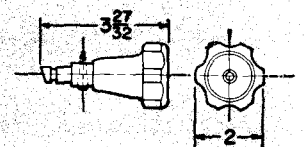


removable keys

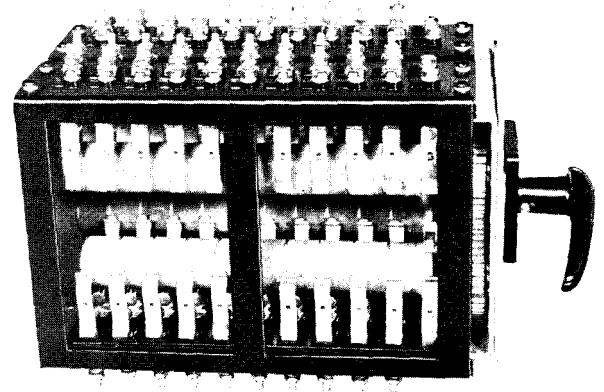
modern



heavy duty



four ten-stage type W switches geared to common handle





operation

Instrument switches are made for partial or full 360° rotation, from two to ten radial positions. Hence, these switches serve best with round notched handles and these are regularly supplied. Oval and pistol grip handles can also be supplied, although the latter are not conveniently manipulated at 180°.

Control switches are made standard for three positions, being generally spring-return from either side to the center. They can be made for a maximum of five positions, although the decrease in travel between positions reduces the interrupting capacity accordingly.

All circuit breaker control switches have a hole in the nameplate for a red and green target indicator to show the last manual operation of the switch. In the trip position, the signal lamp circuit can be opened by pulling the handle forward. The handles can be latched in this position, and when so latched the "blackout" of the lamp indicates that the circuit controlled by the breaker is not in use. Voltage control, speed control, and motor control switches do not have the target indicator.

Bell alarm or auxiliary lamp circuits, used to indicate the automatic operation of apparatus, are controlled by the use of slip contact segments. These set up the circuit for the automatic indicator when the switch is operated in one direction and opens when operated in the other direction. In each case, the segment remains in the position to which it has been turned when the rotor and handle return to the center or neutral position. It is applicable to the three-position momentary contact control switches only.

When more than four contacts make in the neutral position, a longer, heavier return spring is used. This sacrifices the first point or stage, studs 1 and 2, and allowance should be made for it when determining the number of stages for the circuits involved.

auxiliary switches: Refer to page 26.

ordering information

If switches listed by style numbers meet all conditions, even though some contacts are not used, order by style number. If special switches are required, indicate by exceptions to a standard switch, by a connection diagram, contact arrangement, or a full description. Furnish a wiring diagram if available.

Form 21707, shown on page 8, shows the information required when special switches are involved. With this information, errors will be minimized and shipment expedited. Form 21707 is available at nearest Westinghouse office.

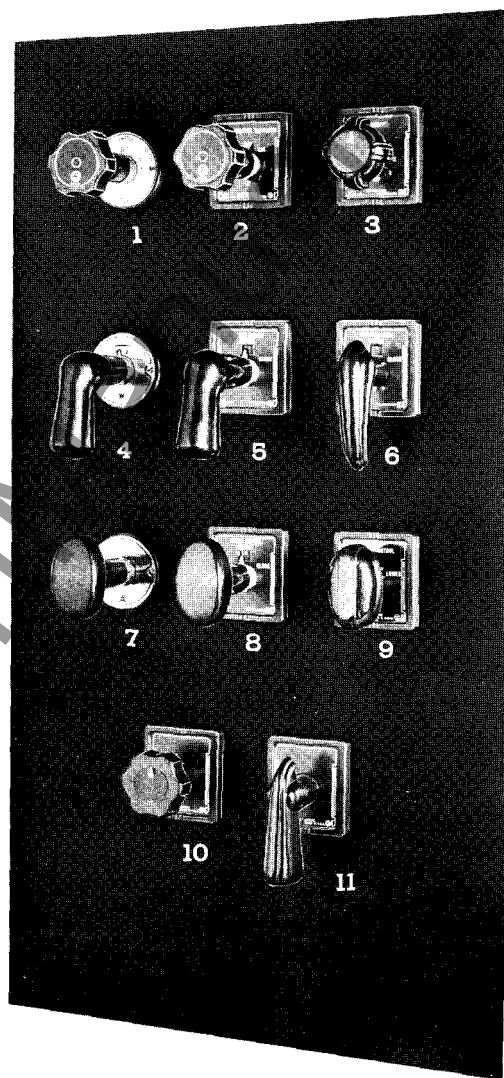
These switches are normally supplied with mounting screws for $\frac{1}{8}$ or $\frac{1}{4}$ -inch panel. Style numbered switches with heavy-duty handles can be mounted on 1, 1½ and 2-inch thick panels by changing the length of the mounting screws. Style numbered switches with modern handles have a shorter shaft and can not be mounted on 1, 1½ or 2-inch thick panels *unless* style is marked for 2-inch thick panel, in which case the length of the mounting screws can be changed. For other panel thickness, order switch similar to a style number and specify panel mounting thickness desired.

Mounting screws for different thicknesses of panels are as follows:

panel thickness: inches	instrument switch		control switch	
	length of screw— inches	style number*	length of screw— inches	style number*
$\frac{1}{8}$ - $\frac{1}{4}$	1¼	555 658	$\frac{5}{8}$	519 479
1	2	519 477	1½	1735 870
1½	2½	1332 470	2	1735 871
2	3	1332 469	2½	1735 872

* style number includes three $\frac{1}{4}$ -20 flat head machine screws per switch

dials and handles



1. heavy duty round handle, round dial
2. heavy duty round handle, rectangular dial
3. modern round handle, rectangular dial
4. heavy duty pistol grip handle, round dial
5. heavy duty pistol grip handle, rectangular dial
6. modern pistol grip handle, rectangular dial
7. heavy duty oval handle, round dial
8. heavy duty oval handle, rectangular dial
9. modern oval handle, rectangular dial
10. modern-special round handle, rectangular dial
11. modern-special pistol grip handle, rectangular dial

600 volts • 20 amperes continuous

instrument switches round notched handles • maintained type

no. of con- tact stages	switch	description	fig. no.	style numbers+					
				modern handle†				heavy duty handle	
				1/8 & 1/4-inch panel		2-inch panel		1/8 & 1/4-inch panel*	
				switch	key	switch	key	switch	key
3	ammeter	two phase	1	1151 500*	.....	1151 522*	.....	1040 744*	.....
3	ammeter	three phase	2	1151 501*	.....	1151 523*	.....	1040 745*	.....
5	ammeter	three independent circuits	3	1151 878*	.....	1481 698*	.....	1151 877*	.....
1	voltmeter	single-phase, one stage	4	1040 747†	1151 533	.....	.....	1040 747†	1105 144
2	voltmeter	single-phase, two stage	5	1040 748†	1151 534	1040 748†	1151 558	1040 748†	1105 145
2	frequency	two stage	5	1040 753†	1151 537	1040 753†	1151 561	1040 753†	1105 149
4	voltmeter	two phase a-c, two pole d-c, double throw	6	1040 749†	1151 535	1040 749†	1151 559	1040 749†	1105 146
4	voltmeter	two phase a-c, two pole d-c, double throw	6	1251 247*	.....	1481 699*	.....	1254 746*	.....
4	voltmeter	three phase, three wire	7	1040 750†	1151 536	1040 750†	1151 560	1040 750†	1105 148
4	voltmeter	three phase, three wire	7	1173 014*	.....	1481 700*	.....	1418 722*	.....
4	voltmeter	three phase, four wire	8	1040 762†	1151 544	1040 762†	1151 568	1040 762†	1105 147
4	voltmeter	three phase, four wire	8	1247 751*	.....	1481 701*	.....	1529 816*	.....
6	voltmeter	four-circuit, two wire, a-c or d-c	9	1151 503*	.....	1151 525*	.....	1040 751*	.....
8	voltmeter	six-circuit, two wire, a-c or d-c	10	1404 865*	.....	1481 702*	.....	1404 864*	.....
6	voltmeter	three-phase, three-wire or three-phase, four wire	11	1481 431*	.....	.....	.....	1736 221*	.....
6	voltmeter	three-phase, three-wire or three-phase, four-wire	11	1736 222†	1151 536	1736 222†	1151 560	1736 222†	1105 148
6	wattmeter	polyphase two element	12	1170 858†	1151 538	1170 858†	1151 562	1170 858†	1105 150
5	power factor	three potential, one current	13	1170 859†	1151 539	1170 859†	1151 563	1170 859†	1105 151
2	power factor	one current	14	1251 547†	1151 539	1251 547†	1151 563	1251 547†	1105 151
3	synchronizing	three stage, machine to bus	15	1040 758†	1151 540	1040 758†	1151 564	1040 758†	1105 152
4	synchronizing	four stage, machine to bus	15	1040 759†	1151 541	1040 759†	1151 565	1040 759†	1105 153
2	synchronizing	one stage between machines without interlock	16	1040 760†	1151 542R	1040 760†	1151 566R	1040 760†	1105 154R
3	synchronizing	one stage between machines with interlock	16	1040 761†	1151 505†	.....	1151 527†	1040 761†	1105 155†
					1151 543R	1040 761†	1151 567R	1040 761†	1105 156R
					1124 232†	.....	1124 234†	.....	1105 157†
6	temperature indicator ■	five exploring coils, one switch per indicator	17	1176 899*	.....	1649 209†	.....	1649 210*	.....
8	temperature indicator ■	five exploring coils, several switches per indicator	18	1481 737†	1176 901	1481 737†	1649 208	1481 737†	1649 211
10	temperature indicator ♦	five exploring coils, one switch per indicator	19	1482 066*	.....	1649 206†	.....	1649 212*	.....
11	temperature indicator ♦	five exploring coils, several switches per indicator	20	1481 738†	1176 904	1481 738†	1649 198	1481 738†	1649 213
6	regulator cutout	three pole double throw	21	1151 507*	.....	1151 529*	.....	1040 763*	.....
8	regulator cutout	for type BJ-30 regulators	22	1534 482*	.....	1534 483*	.....	1534 481*	.....
6	regulator cutout	for Silverstat regulators	23	1173 289*	.....	.....	.....	1173 288*	.....

* for mounting screws for adapting heavy duty switches to panels of other thicknesses, refer to "ordering information", page 6

♦ accurate lead compensation

■ approximate lead compensation

† for panels of other thicknesses, see ordering information page 6

+ for stock style breakdown, see pages 15 and 16 of price list 37-120.

• switch has fixed handle

I switch has no handle: operate with key

□ order S # 1332 469 mounting screws in addition to switch style number

control switches pistol grip or oval handles • momentary type

no. of con- tact stages	application	fig. no.	style numbers+					
			modern handle†				heavy duty handle*	
			1/8 & 1/4-inch panel		2-inch panel		1/8 & 1/4-inch panel	
			oval	pistol grip	oval	pistol grip	oval	pistol grip
3	circuit breaker control.....	24	1645 820	1645 840	1645 860	1645 880	1645 900	1645 920
4	circuit breaker control.....	25	1645 821	1645 841	1645 861	1645 881	1645 901	1645 921
4	circuit breaker control.....	26	1645 822	1645 842	1645 862	1645 882	1645 902	1645 922
5	circuit breaker control.....	27	1645 823	1645 843	1645 863	1645 883	1645 903	1645 923
6	circuit breaker control.....	28	1645 824	1645 844	1645 864	1645 884	1645 904	1645 924
7	circuit breaker control.....	29	1645 825	1645 845	1645 865	1645 885	1645 905	1645 925
5	circuit breaker control.....	30	1645 826	1645 846	1645 866	1645 886	1645 906	1645 926
4	circuit breaker control.....	31	1645 827	1645 847	1645 867	1645 887	1645 907	1645 927
7	circuit breaker control.....	32	1645 828	1645 848	1645 868	1645 888	1645 908	1645 928
4	voltage control.....	33	1645 829	1645 849	1645 869	1645 889	1645 909	1645 929
6	voltage control.....	34	1645 830	1645 850	1645 870	1645 890	1645 910	1645 930
6	voltage control, automatic pullout.....	35	1645 831	1645 851	1645 871	1645 891	1645 911	1645 931
4	electrode control, arc furnace.....	36	1645 832	1645 852	1645 872	1645 892	1645 912	1645 932
5	electrode control, arc furnace.....	37	1645 833	1645 853	1645 873	1645 893	1645 913	1645 933
6	motor control, stop pullout.....	38	1645 834	1645 854	1645 874	1645 894	1645 914	1645 934
4	speed control.....	39	1645 835	1645 855	1645 875	1645 895	1645 915	1645 935
6	motor control, breaker elevating device, main- tained contact.....	40	1241 725	.....	.....	.....	.....	.....
9	master electrode motor control.....	41	.....	.....	.....	.....	.....	1257 804

* for mounting screws for adapting heavy duty switches to panels of other thicknesses, refer to "ordering information", page 6

† for panels of other thicknesses, see ordering information page 6

+ for stock style breakdown, see pages 15 and 16 of price list 37-120.

**form 21707** | **for ordering special switches****SWITCH POSITION TABULATION**TYPE "W" SWITCHES
WESTINGHOUSE FORM 21707 C

One copy of this form to be attached to switch S.O. reading

SWITCH S.O. _____

DATE _____

PURCHASER JOHN DOEG.O. A2YZ

ENG. _____

PLAN VIEW
* SINGLE BASE

2	1
4	3
6	5
8	7
10	9
12	11
14	13
16	15
18	17
20	19

DOUBLE BASE

22	22'	21
4	4'	3
6	6'	5
8	8'	7
10	10'	9
12	12'	11
14	14'	13
16	16'	15
18	18'	17
20	20'	19

TYPE "W" SWITCH POSITION TABULATION (F.V. Reading clockwise)

CONTACT	POSITION				
	PULL	TRIP	OFF	OFF	CLOSE
	OUT		AFTER	AFTER	
			TRIP	CLOSE	
1-2					X
3-4	X	X			
5-6	X	X	X		
7-8	X	X			X
9-10			X	X	
11-12					X
13-14			X	X	
15-16		X	X	X	X
17-18				X	X
19-20				X	X

NAMEPLATE (F.V.)
SPECIFY ENGRAVING
(TITLE ACROSS TOP)**CIRCUIT BREAKER
CONTROL**

TRIP CLOSE
↑
PULL ●
LAMP
CUTOUT

CONTACTS: Momentary - ~~XXXXXX~~**HANDLE:** Fixed - ~~XXXXXX~~~~XXXXXX~~ Heavy DutyPistol Grip - ~~XXXXXX~~Color: Black - ~~XXXX~~**FACEPLATE:** Rectangular - ~~XXXX~~Black - ~~XXXX~~**MOUNTING:** 1/8 inch Steel Panel - ~~XXXXXX~~**MECH. TARGET:** Yes - ~~XX~~**NOTES:** X - Contact closed in position shown

* - When more than four circuits are made in the off position on the momentary contact type, a long spring is required and terminals 1 - 2 are not used. Terminals 21 - 22 are used only on eleven stage units. On double base units the prime numbers represent the terminals on the top base.

REMARKS:

LOCATION _____

DEPT. _____

NAME _____

ordering information for modified style number switchesIf a standard style number switch is to be slightly modified, the order may be written as follows:
"Item (quantity) switches similar to style number 0000 000 type W switches except to have . . . (Note the differences.)"

position tabulations

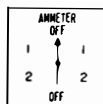
fig. description
no.

nameplate and
position tabulation X

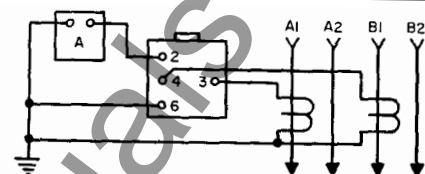
typical basic diagram

Switches shown viewed from above, handle end at top. Instruments shown rear view.

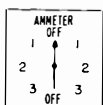
- 1 ammeter switch**
two phase • three-stage
- type of handle style no.
- heavy duty.....1040 744⁺
modern.....1151 500⁺
modern.....1151 522 ●



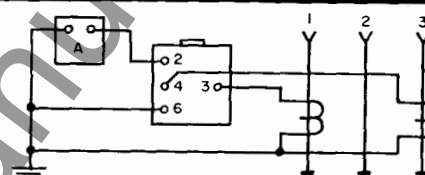
CONT	POSITION			
	OFF	INT 1	INT 2	2
3-4-6	X	X	X	X
2-3	X	X	X	X
4-6	X	X	X	X
2-4	X	X	X	X
3-6	X	X	X	X



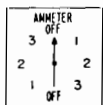
- 2 ammeter switch**
three phase • three-stage
- heavy duty.....1040 745⁺
modern.....1151 501⁺
modern.....1151 523 ●⁺



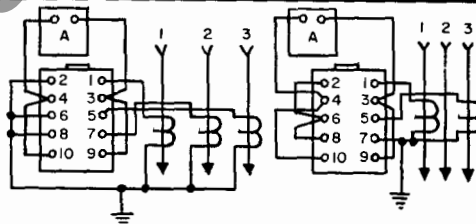
CONT	POSITION			
	OFF	INT 1	INT 2	3
3-4-6	X	X	X	X
2-3	X	X	X	X
4-6	X	X	X	X
2-3-4	X	X	X	X
3-6	X	X	X	X



- 3 ammeter switch**
three independent circuits-five-stage
- heavy duty.....1151 877⁺
modern.....1151 878⁺
modern.....1481 698 ●



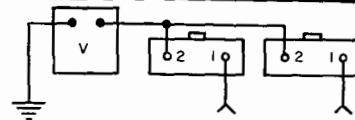
CONT	POSITION			
	OFF	INT 1	INT 2	3
1-2	X	X	X	X
1-3	X	X	X	X
2-4	X	X	X	X
5-6	X	X	X	X
4-6	X	X	X	X
3-5	X	X	X	X
7-8	X	X	X	X
8-10	X	X	X	X
7-9	X	X	X	X



- 4 voltmeter switch**
single phase a-c,
one pole d-c • one-stage
- without handle—use key.....1040 747⁺
heavy duty key only.....1105 144⁺
modern key only.....1151 533⁺



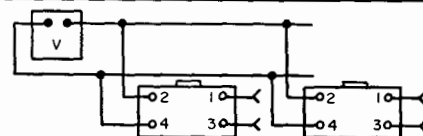
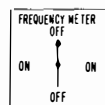
CONT	POSITION
1-2	X



- 5 voltmeter switch**
single phase a-c,
two pole d-c • two-stage
- without handle—use key.....1040 748⁺
heavy duty key only.....1105 145⁺
modern key only.....1151 534⁺
modern key only.....1151 558 ●

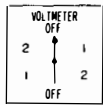


CONT	POSITION
1-2	X
3-4	X

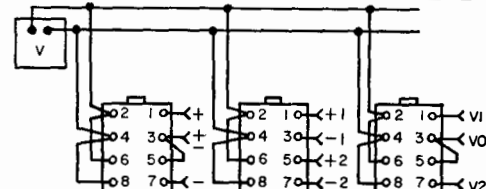


- frequency meter switch**
two-stage
- without handle—use key.....1040 753⁺
heavy duty key only.....1105 149⁺
modern key only.....1151 537⁺
modern key only.....1151 561 ●

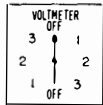
- 6 voltmeter switch**
two phase a-c, two pole d-c,
double throw • four-stage
- heavy duty.....1254 746⁺
modern.....1251 247⁺
modern.....1481 699 ●⁺
without handle—use key.....1040 749⁺
heavy duty key only.....1105 146⁺
modern key only.....1151 535⁺
modern key only.....1151 559 ●



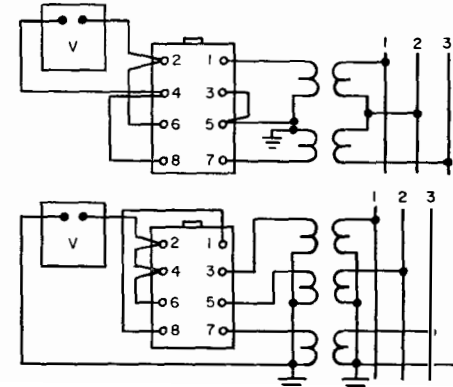
CONT	POSITION
1-2	X
3-4	X
5-6	X
7-8	X



- 7 voltmeter switch**
three phase, three wire
four-stage
- heavy duty.....1418 722⁺
modern.....1173 014⁺
modern.....1481 700 ●
without handle—use key.....1040 750⁺
heavy duty key only.....1105 148⁺
modern key only.....1151 536⁺
modern key only.....1151 560 ●



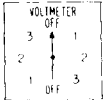
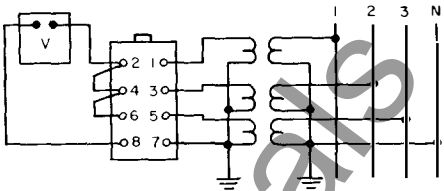
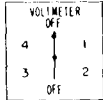
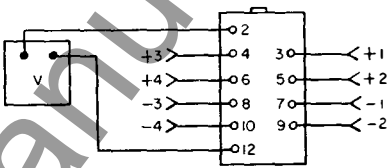
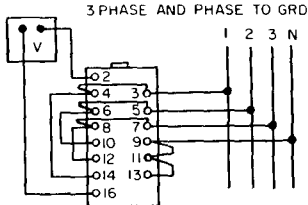
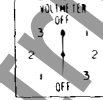
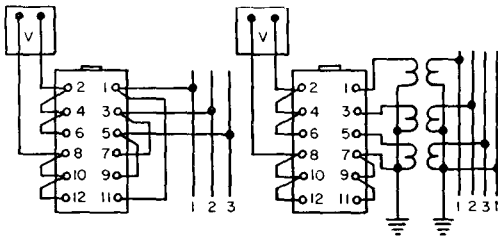
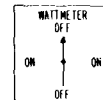
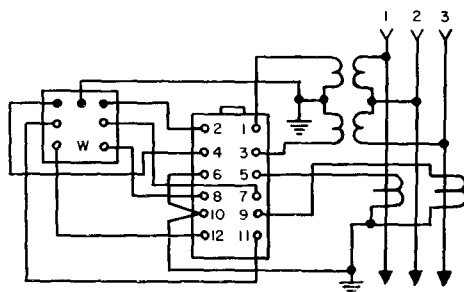
CONT	POSITION
1-2	X
3-4	X
5-6	X
7-8	X



⁺ for 1/8-1/4-inch panel mounting
● for 2-inch panel mounting
⁺ for stock style breakdown, see pages 15 and 16 of price list 37-120.

X indicates contacts closed in position shown



fig. no.	description	nameplate and position tabulation X	typical basic diagram																																																																																																								
8	voltmeter switch three phase, four wire • four-stage type of handle style no. heavy duty.....1529 816 ⁺⁺ modern.....1247 751 ⁺ modern.....1481 701 ^{⊙+} without handle—use key.....1040 762 ⁺ heavy duty key only.....1105 147 ⁺ modern key only.....1151 544 ⁺ modern key only.....1151 568 [⊙]	 <table border="1"> <thead> <tr> <th>CONT</th><th>POSITION</th><th>1</th><th>2</th><th>3</th></tr> </thead> <tbody> <tr><td>1-2</td><td>OFF</td><td>X</td><td></td><td></td></tr> <tr><td>3-4</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>5-6</td><td></td><td></td><td></td><td>X</td></tr> <tr><td>7-8</td><td></td><td>X</td><td>X</td><td>X</td></tr> </tbody> </table>	CONT	POSITION	1	2	3	1-2	OFF	X			3-4			X		5-6				X	7-8		X	X	X																																																																																
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9	voltmeter switch four circuit, two wire, a-c or d-c • six-stage heavy duty.....1040 751 ⁺ modern.....1151 503 ⁺ modern.....1151 525 [⊙]	 <table border="1"> <thead> <tr> <th>CONT</th><th>POSITION</th><th>1</th><th>2</th><th>3</th><th>4</th></tr> </thead> <tbody> <tr><td>2-3</td><td>OFF</td><td>X</td><td></td><td></td><td></td></tr> <tr><td>2-5</td><td></td><td></td><td>X</td><td></td><td></td></tr> <tr><td>2-4</td><td></td><td></td><td></td><td>X</td><td></td></tr> <tr><td>2-6</td><td></td><td></td><td></td><td></td><td>X</td></tr> <tr><td>12-7</td><td></td><td>X</td><td></td><td></td><td></td></tr> <tr><td>12-9</td><td></td><td></td><td>X</td><td></td><td></td></tr> <tr><td>12-8</td><td></td><td></td><td></td><td>X</td><td></td></tr> <tr><td>12-10</td><td></td><td></td><td></td><td></td><td>X</td></tr> </tbody> </table>	CONT	POSITION	1	2	3	4	2-3	OFF	X				2-5			X			2-4				X		2-6					X	12-7		X				12-9			X			12-8				X		12-10					X																																																			
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10	voltmeter switch six circuit, two wire, a-c or d-c • eight-stage heavy duty.....1404 864 ⁺ modern.....1404 865 ⁺ modern.....1481 702 [⊙]	 <table border="1"> <thead> <tr> <th>CONT</th><th>POSITION</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th></tr> </thead> <tbody> <tr><td>2-3</td><td>OFF</td><td>X</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>2-5</td><td></td><td></td><td>X</td><td></td><td></td><td></td><td></td></tr> <tr><td>2-7</td><td></td><td></td><td></td><td>X</td><td></td><td></td><td></td></tr> <tr><td>2-4</td><td></td><td></td><td></td><td></td><td>X</td><td></td><td></td></tr> <tr><td>2-6</td><td></td><td></td><td></td><td></td><td></td><td>X</td><td></td></tr> <tr><td>2-8</td><td></td><td></td><td></td><td></td><td></td><td></td><td>X</td></tr> <tr><td>16-9</td><td></td><td>X</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>16-11</td><td></td><td></td><td>X</td><td></td><td></td><td></td><td></td></tr> <tr><td>16-13</td><td></td><td></td><td></td><td>X</td><td></td><td></td><td></td></tr> <tr><td>16-10</td><td></td><td></td><td></td><td></td><td>X</td><td></td><td></td></tr> <tr><td>16-12</td><td></td><td></td><td></td><td></td><td></td><td>X</td><td></td></tr> <tr><td>16-14</td><td></td><td></td><td></td><td></td><td></td><td></td><td>X</td></tr> </tbody> </table>	CONT	POSITION	1	2	3	4	5	6	2-3	OFF	X						2-5			X					2-7				X				2-4					X			2-6						X		2-8							X	16-9		X						16-11			X					16-13				X				16-10					X			16-12						X		16-14							X	
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11	voltmeter switch three phase, three wire three phase, four wire • six-stage heavy duty handle.....1736 221 ⁺ modern handle.....1481 431 ⁺ without handle—use key.....1736 222 ⁺ heavy duty key only.....1105 148 ⁺ heavy duty key only.....1151 536 ⁺ modern key only.....1151 560 [⊙]	 <table border="1"> <thead> <tr> <th>CONT</th><th>POSITION</th><th>1</th><th>2</th><th>3</th></tr> </thead> <tbody> <tr><td>1-2</td><td>OFF</td><td>X</td><td></td><td></td></tr> <tr><td>3-4</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>5-6</td><td></td><td></td><td></td><td>X</td></tr> <tr><td>7-8</td><td></td><td>X</td><td>X</td><td>X</td></tr> <tr><td>9-10</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>11-12</td><td></td><td></td><td></td><td>X</td></tr> </tbody> </table>	CONT	POSITION	1	2	3	1-2	OFF	X			3-4			X		5-6				X	7-8		X	X	X	9-10			X		11-12				X																																																																						
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11-12				X																																																																																																							
12	wattmeter switch polyphase, 2-element • six-stage without handle—use key.....1170 858 ⁺ heavy duty key only.....1105 150 ⁺ modern key only.....1151 538 ⁺ modern key only.....1151 562 [⊙]	 <table border="1"> <thead> <tr> <th>CONT</th><th>POSITION</th><th>1</th><th>2</th><th>3</th></tr> </thead> <tbody> <tr><td>1-2</td><td>OFF</td><td>X</td><td></td><td></td></tr> <tr><td>3-4</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>5-6</td><td></td><td></td><td></td><td>X</td></tr> <tr><td>5-7</td><td></td><td>X</td><td>X</td><td>X</td></tr> <tr><td>6-8</td><td></td><td>X</td><td>X</td><td></td></tr> <tr><td>9-10</td><td></td><td>X</td><td>X</td><td></td></tr> <tr><td>9-11</td><td></td><td></td><td>X</td><td>X</td></tr> <tr><td>10-12</td><td></td><td></td><td></td><td>X</td></tr> </tbody> </table>	CONT	POSITION	1	2	3	1-2	OFF	X			3-4			X		5-6				X	5-7		X	X	X	6-8		X	X		9-10		X	X		9-11			X	X	10-12				X																																																												
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⁺ for 1/8-1/4-inch panel mounting
[⊙] for 2-inch panel mounting
⁺ for stock style breakdown, see pages 15 and 16 of price list 37-120.

X indicates contacts closed in position shown

Switches shown viewed from above, handle end at top. Instruments shown rear view.

fig.
no.

description

nameplate and
position tabulation X

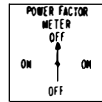
typical basic diagram

13 power factor meter switch

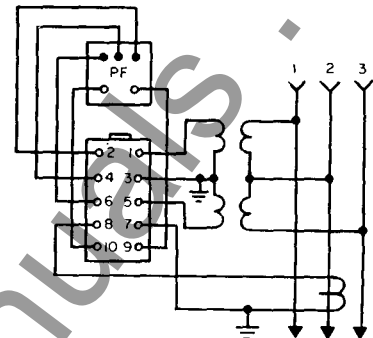
three potential,
one current • five-stage

type of handle style no.

without handle—use key 1170 859[▲]
heavy duty key only 1105 151[▲]
modern key only 1151 539[▲]
modern key only 1151 563[●]



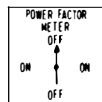
CONT	POSITION	OFF	INT	ON
1-2		X		X
3-4			X	
5-6				X
7-8	X	X		
7-9	X	X		
8-10	X	X		



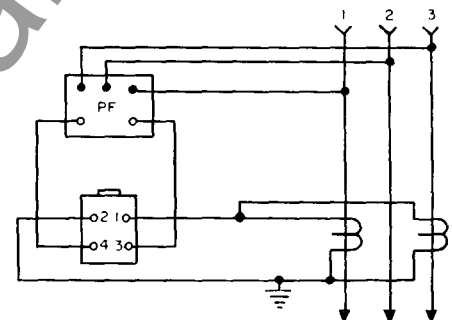
14 power factor meter switch

single current • two-stage

without handle—use key 1251 547[▲]
heavy duty key only 1105 151[▲]
modern key only 1151 539[▲]
modern key only 1151 563[●]



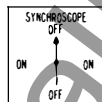
CONT	POSITION	OFF	INT	ON
1-2		X	X	
1-3		X	X	
2-4		X	X	



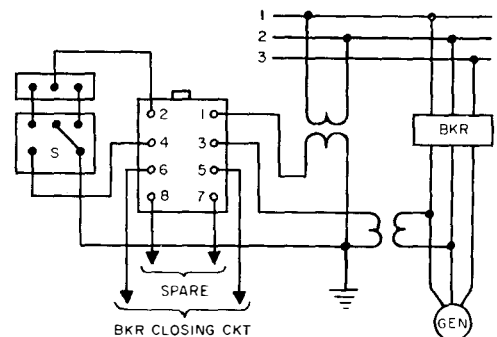
15 synchronizing switch

machine to bus • three-stage
(two for synchroscope, one for inter-
lock)

without handle—use key 1040 758[▲]
heavy duty key only 1105 152[▲]
modern key only 1151 540[▲]
modern key only 1151 564[●]



CONT	POSITION	OFF	INT	ON
1-2		X		X
3-4		X		X
5-6		X		X



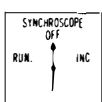
machine to bus • four-stage
(two for synchroscope, one for inter-
lock, one spare)

without handle—use key 1040 759[▲]
heavy duty key only 1105 153[▲]
modern key only 1151 541[▲]
modern key only 1151 565[●]

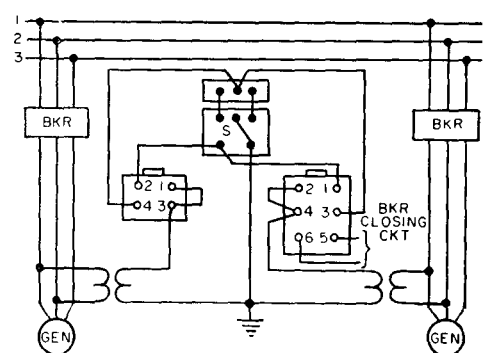
16 synchronizing switch

between machines • two-stage
(single pole, double throw, without
interlocks. Contact 5-6 omitted.)

without handle—use key 1040 760[▲]
heavy duty key (running) 1105 154[▲]
heavy duty key (incoming) 1105 155[▲]
modern key (running) 1151 542[▲]
modern key (incoming) 1151 505[▲]
modern key (running) 1151 566[●]
modern key (incoming) 1151 527[●]



CONT	POSITION	OFF	INT	ON
1-2		X		X
3-4		X		X



between machines • three-stage
(single pole, double throw, with inter-
locks)

without handle—use key 1040 761[▲]
heavy duty key (running) 1105 156[▲]
heavy duty key (incoming) 1105 157[▲]
modern key (running) 1151 543[▲]
modern key (incoming) 1124 232[▲]
modern key (running) 1151 567[●]
modern key (incoming) 1124 234[●]

[▲] for 1/8-1/4-inch panel mounting
[●] for 2-inch panel mounting

X indicates contacts closed in
position shown

■ Switches shown viewed from above, handle
end at top. Instruments shown rear view.



fig. description
no.

nameplate and
position tabulation X

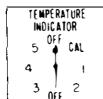
typical basic diagram

17 temperature indicator switch†

five exploring coils, one switch
per indicator • six-stage

type of handle style no.

heavy duty.....1649 210[▲]
modern.....1176 899[▲]
modern.....1649 209 ●



CONT	OFF	CAL	1	2	OFF	3	4	5
1-2	X	X	X	X	X	X	X	X
2-3		X						
2-5			X					
2-7				X				
2-4					X			
2-6						X		
2-8							X	
* 9-10	X	X	X	X	X	X	X	X
11-12	X	X	X	X	X	X	X	X

Ø contacts overlap
between positions

* contact 9-10 makes
after 2-3 and 11-12

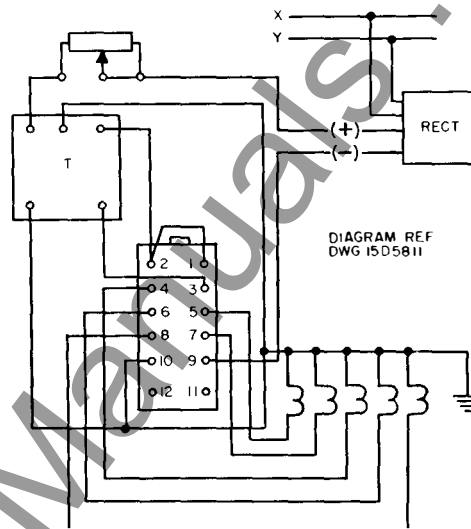
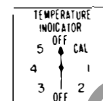


DIAGRAM REF
DWG 15D5811

18 temperature indicator switch†

five exploring coils, several
switches per indicator • eight-stage

without handle—use key.....1481 737[▲]
heavy duty key only.....1649 211[▲]
modern key only.....1176 901[▲]
modern key only.....1649 208 ●



CONT	OFF	CAL	1	2	OFF	3	4	5
1-2	X	X	X	X	X	X	X	X
2-3		X						
2-5			X					
2-7				X				
2-4					X			
2-6						X		
2-8							X	
* 9-10	X	X	X	X	X	X	X	X
11-12	X	X	X	X	X	X	X	X
13-15	X	X	X	X	X	X	X	X

Ø contacts overlap
between positions

* contact 9-10 makes
after contacts 2-3,
11-12 and 13-15 make

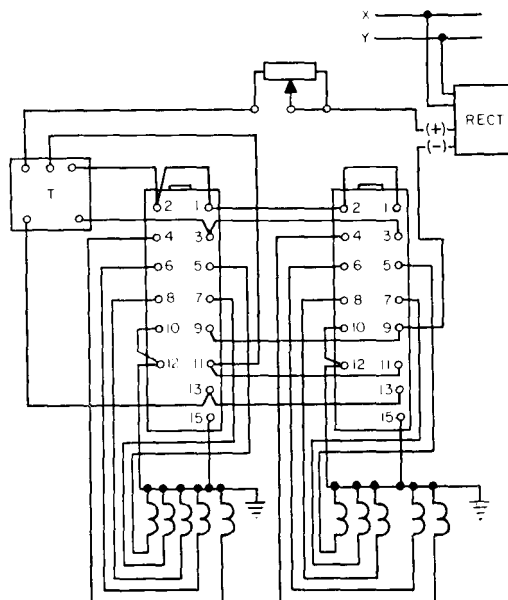


DIAGRAM REF
DWG 15D5685

[▲] for 1/8-1/4-inch panel mounting
● for 2-inch panel mounting
† approximate lead compensation

X indicates contacts closed in
position shown

■ Switches shown viewed from above, handle
end at top. Instruments shown rear view.

fig. description
no.

nameplate and
position tabulation X

typical basic diagram*

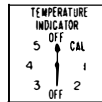
19 temperature indicator switch*

five exploring coils, one switch
per indicator • nine-stage

type of handle

style no.

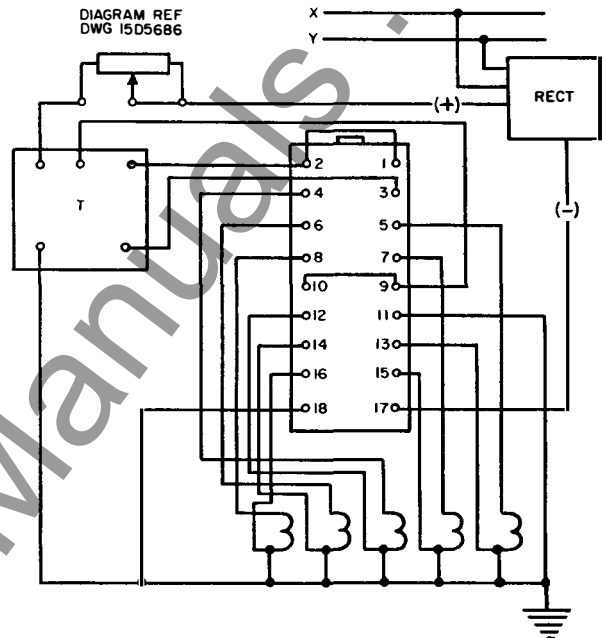
heavy duty handle.....1649 212[▲]
modern.....1482 066[▲]
modern.....1649 206[●]



CONT	OFF	CAL	1	2	OFF	3	4	5
1-2	X	X	X	X	X	X	X	X
2-3								
2-5								
2-7								
2-4								
2-6								
2-8								
9-10	X	X	X	X	X	X	X	X
10-11								
10-13								
10-15								
10-12								
10-14								
10-16								
17-18	X	X	X	X	X	X	X	X

Ø contacts overlap
between positions

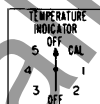
* contact 17-18 makes
after contacts 2-3, 2-4,
10-11, 10-12 make



20 temperature indicator switch*

five exploring coils, several
switches per indicator • eleven-stage

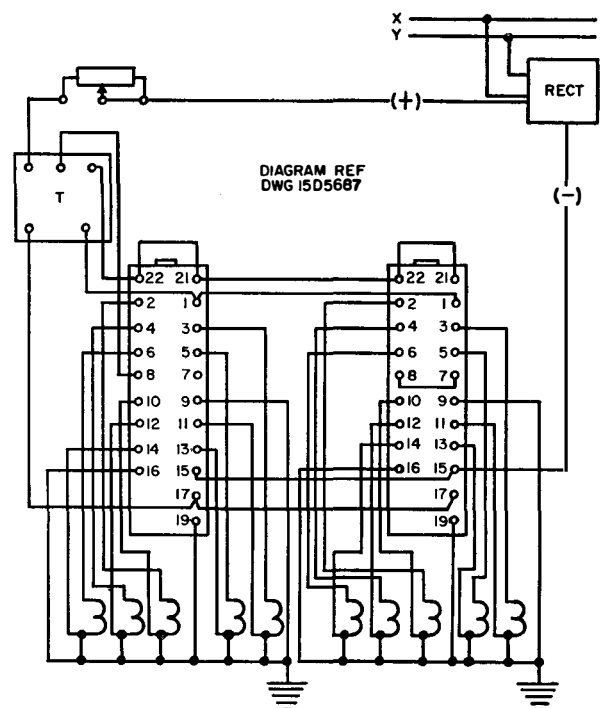
without handle—use key.....1481 738[▲]
heavy duty key only.....1649 213[▲]
modern key only.....1176 904[▲]
modern key only.....1649 198[●]



CONT	OFF	CAL	1	2	OFF	3	4	5
21-22	X	X	X	X	X	X	X	X
22-1								
22-3								
22-5								
22-2								
22-4								
22-6								
7-8	X	X	X	X	X	X	X	X
8-9								
8-11								
8-13								
8-10								
8-12								
8-14								
15-16	X	X	X	X	X	X	X	X
17-19	X	X	X	X	X	X	X	X

Ø contacts overlap
between positions

* contact 15-16 makes
after contacts 21-1,
22-2, 8-9, 17-19 make



[▲] for 1/8-1/4-inch panel mounting
[●] for 2-inch panel mounting
[●] accurate lead compensation

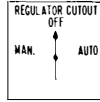
X indicates contacts closed in
position shown

■ Switches shown v ewed from above, handle
end at top. Instruments shown rear view.

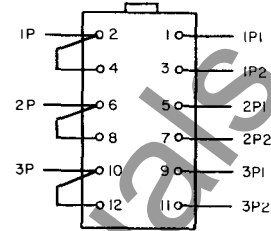


fig. no.	description	nameplate and position tabulation X	typical basic diagram*
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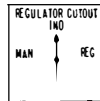
21 regulator cutout switch
three-pole, double throw • six-stage
type of handle *style no.*
 heavy duty.....1040 763[▲]
 modern.....1151 507[▲]
 modern.....1151 529[●]



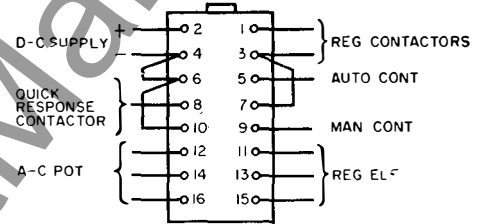
CONT	POSITION		
	MAN	OFF	AUTO
1-2			X
3-4	X		
5-6			X
7-8	X		
9-10			X
11-12	X		



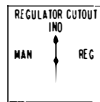
22 regulator cutout switch
for type BJ-30 regulator • eight-stage
 heavy duty.....1534 481[▲]
 modern.....1534 482[▲]
 modern.....1534 483[●]



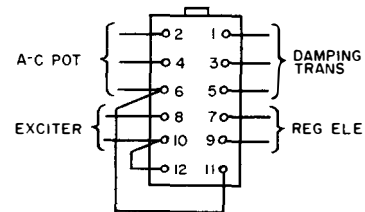
CONT	POSITION		
	MAN	IND	REG
1-2		X	X
3-4		X	X
5-6			X
7-8			X
9-10	X	X	
11-12		X	X
13-14		X	X
15-16		X	X



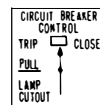
23 regulator cutout switch
for Silverstat regulators • six-stage
 heavy duty.....1173 288[▲]
 modern.....1173 289[▲]



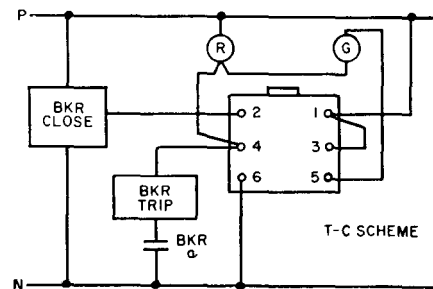
CONT	POSITION		
	MAN	IND	REG
1-2		X	X
3-4		X	X
5-6			X
7-8			X
9-10	X	X	
11-12		X	X



24 circuit breaker control switch
three-stage
 modern, oval.....1645 820[▲] +
 modern, pistol grip.....1645 840[▲] +
 modern, oval.....1645 860[●] +
 modern, pistol grip.....1645 880[●] +
 heavy duty, oval.....1645 900[▲] +
 heavy duty, pistol grip.....1645 920[▲] +



CONT	POSITION			
	PULL	TRIP	OFF	CLOSE
1-2				X
3-4	X	X		
5-6		X	X	X



[▲] for 1/8-1/4-inch panel mounting
[●] for 2-inch panel mounting
 + for stock style breakdown, see pages 15 and 16 of price list 37-120.

X indicates contacts closed in position shown

* Switches shown viewed from above, handle end at top. Instruments shown rear view.

fig. no. description

nameplate and
position tabulation X

typical basic diagram

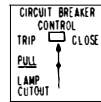
25 circuit breaker control switch

four-stage

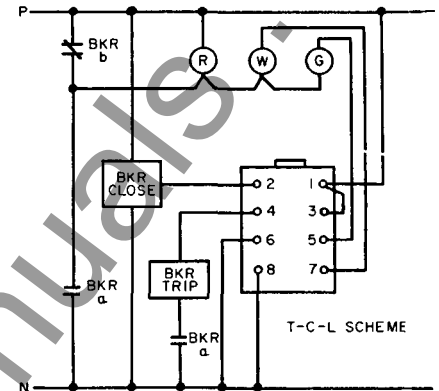
type of handle

style no.

modern, oval. 1645 821⁺⁺
modern, pistol grip. 1645 841⁺⁺
modern, oval. 1645 861^{⊙+}
modern, pistol grip. 1645 881^{⊙+}
heavy duty, oval. 1645 901⁺⁺
heavy duty, pistol grip. 1645 921⁺⁺



CONT	POSITION				
	PULL	TRIP	OFF TRIP	AFTER CLOSE	CLOSE
1-2					X
3-4	X	X			
5-6		X	X	X	X
7-8				X	X



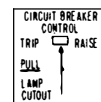
26 circuit breaker control switch

four-stage

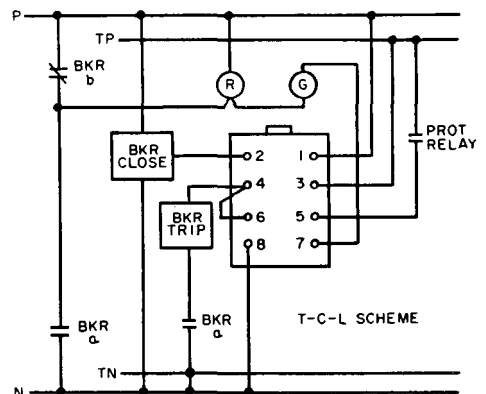
type of handle

style no.

modern, oval. 1645 822⁺
modern, pistol grip. 1645 842⁺
modern, oval. 1645 862[⊙]
modern, pistol grip. 1645 882[⊙]
heavy duty, oval. 1645 902⁺
heavy duty, pistol grip. 1645 922⁺



CONT	POSITION				
	PULL	TRIP	OFF TRIP	AFTER CLOSE	CLOSE
1-2					X
3-4	X	X			
5-6		X	X	X	X
7-8			X	X	X



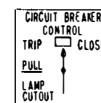
27 circuit breaker control switch

five-stage

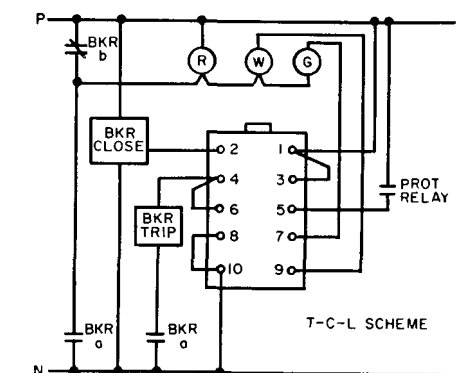
type of handle

style no.

modern, oval. 1645 823⁺
modern, pistol grip. 1645 843⁺
modern, oval. 1645 863[⊙]
modern, pistol grip. 1645 883[⊙]
heavy duty, oval. 1645 903⁺
heavy duty, pistol grip. 1645 923⁺



CONT	POSITION				
	PULL	TRIP	OFF TRIP	AFTER CLOSE	CLOSE
1-2					X
3-4	X	X			
5-6		X	X	X	X
7-8		X	X	X	X
9-10				X	X



⁺ for 1/8-1/4-inch panel mounting
[⊙] for 2-inch panel mounting
⁺ for stock style breakdown, see pages 15 and 16 of price list 37-120.

X indicates contacts closed in position shown

Switches shown viewed from above, handle end at top. Instruments shown rear view.



fig. description
no.

nameplate and
position tabulation X

typical basic diagram*

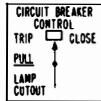
28 circuit breaker control switch

six-stage

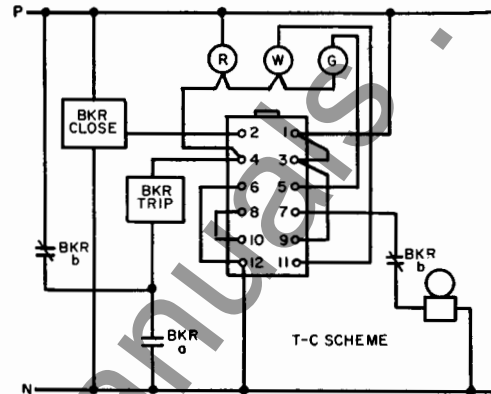
type of handle

style no.

modern, oval.....1645 824* +
modern, pistol grip.....1645 844* +
modern, oval.....1645 864* +
modern, pistol grip.....1645 884* +
heavy duty, oval.....1645 904* +
heavy duty, pistol grip.....1645 924* +



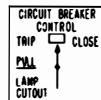
CONT	POSITION				
	PULL	TRIP	OFF AFTER TRIP	CLOSE	CLOSE
1-2					X
3-4	X	X			
5-6		X	X	X	X
7-8			X	X	X
9-10				X	X
11-12				X	X



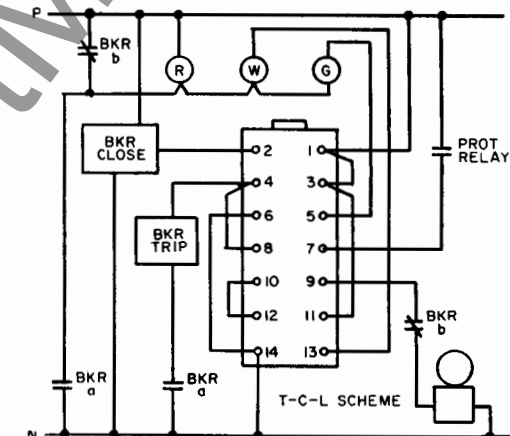
29 circuit breaker control switch

seven-stage

modern, oval.....1645 825* +
modern, pistol grip.....1645 845* +
modern, oval.....1645 865* +
modern, pistol grip.....1645 885* +
heavy duty, oval.....1645 905* +
heavy duty, pistol grip.....1645 925* +



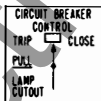
CONT	POSITION				
	PULL	TRIP	OFF AFTER TRIP	CLOSE	CLOSE
1-2					X
3-4	X	X			
5-6		X	X	X	X
7-8			X	X	X
9-10			X	X	X
11-12				X	X
13-14				X	X



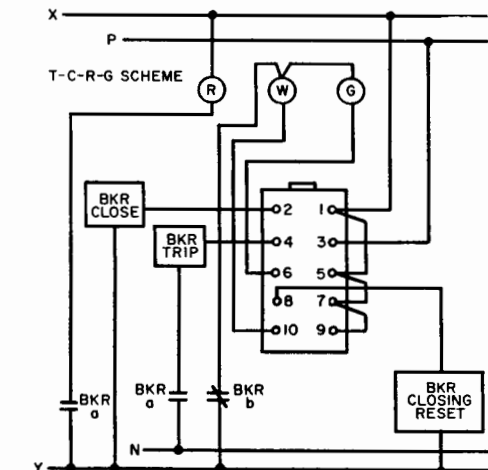
30 circuit breaker control switch

five-stage

modern, oval.....1645 826* +
modern, pistol grip.....1645 846* +
modern, oval.....1645 866* +
modern, pistol grip.....1645 886* +
heavy duty, oval.....1645 906* +
heavy duty, pistol grip.....1645 926* +



CONT	POSITION				
	PULL	TRIP	OFF AFTER TRIP	CLOSE	CLOSE
1-2					X
3-4	X	X			
5-6		X	X	X	X
7-8			X	X	X
9-10				X	X



* for 1/4-1/4-inch panel mounting
+ for 2-inch panel mounting
+ for stock style breakdown, see pages 15 and 16 of price list 37-120.

X indicates contacts closed in position shown

Switches shown viewed from above, handle end at top. Instruments shown rear view.

fig. description
no.

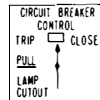
nameplate and
position tabulation X

typical basic diagram

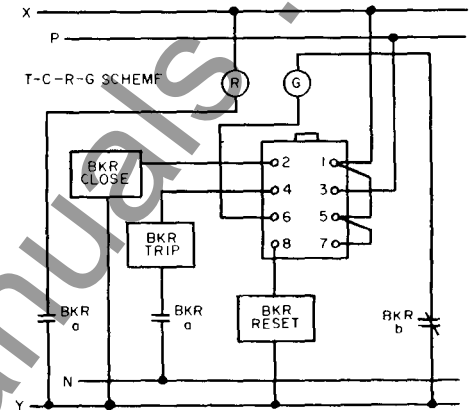
31 circuit breaker control switch

four-stage

type of handle style no.
modern, oval.....1645 827⁺
modern, pistol grip.....1645 847⁺
modern, oval.....1645 867⁺
modern, pistol grip.....1645 887⁺
heavy duty, oval.....1645 907⁺
heavy duty, pistol grip.....1645 927⁺



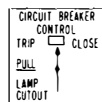
CONT	POSITION			
	PULL	TRIP	OFF	CLOSE
1-2				X
3-4	X	X		
5-6		X	X	X
7-8			X	



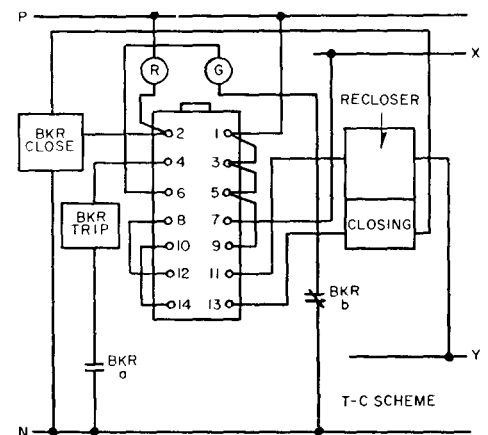
32 circuit breaker control switch

seven-stage

modern, oval.....1645 828⁺ +
modern, pistol grip.....1645 848⁺ +
modern, oval.....1645 868⁺ +
modern, pistol grip.....1645 888⁺ +
heavy duty, oval.....1645 908⁺ +
heavy duty, pistol grip.....1645 928⁺ +



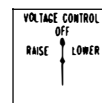
CONT	POSITION			
	PULL	TRIP	OFF	CLOSE
1-2				X
3-4	X	X		
5-6		X	X	X
7-8		X	X	
9-10		X	X	X
11-12			X	X
13-14			X	



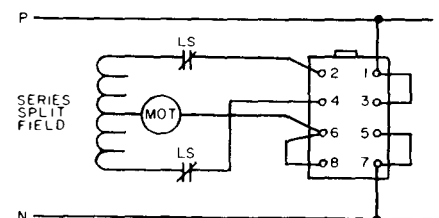
33 voltage control switch

motor-operated rheostat or induction regulator • four-stage

modern, oval.....1645 829⁺
modern, pistol grip.....1645 849⁺
modern, oval.....1645 869⁺ +
modern, pistol grip.....1645 889⁺ +
heavy duty, oval.....1645 909⁺ +
heavy duty, pistol grip.....1645 929⁺ +



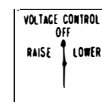
CONT	POSITION		
	RAISE	OFF	LOWER
1-2			X
3-4	X		
5-6		X	X
7-8	X		



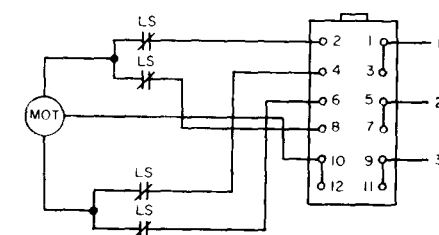
34 voltage control switch

motor-operated rheostat or induction regulator • six-stage

modern, oval.....1645 830⁺ +
modern, pistol grip.....1645 850⁺ +
modern, oval.....1645 870⁺
modern, pistol grip.....1645 890⁺
heavy duty, oval.....1645 910⁺
heavy duty, pistol grip.....1645 930⁺



CONT	POSITION		
	RAISE	OFF	LOWER
1-2			X
3-4	X		
5-6		X	X
7-8	X		
9-10		X	X
11-12	X		



⁺ for 1/8-1/4-inch panel mounting
• for 2-inch panel mounting
+ for stock style breakdown, see pages 15 and 16 of price list 37-120.

X Indicates contacts closed in position shown

■ Switches shown viewed from above, handle end at top. Instruments shown rear view.



fig. no. **description** **nameplate and position tabulation X** **typical basic diagram**

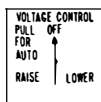
35 voltage control switch

motor-operated rheostat or induction regulator with contacts for automatic operation • six-stage

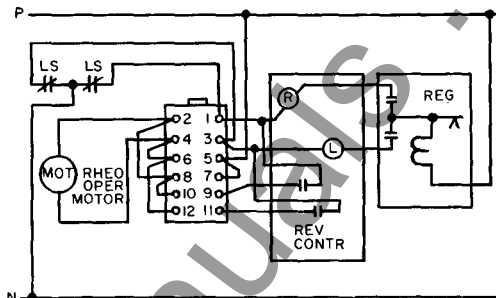
type of handle

style no.

modern, oval	1645 831 [▲]
modern, pistol grip	1645 851 [▲]
modern, oval	1645 871 [●]
modern, pistol grip	1645 891 [●]
heavy duty, oval	1645 911 [▲]
modern, pistol grip	1645 931 [▲]

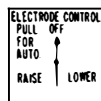


CONT	POSITION			
	RAISE	PULL	OFF	LOWER
1-2				X
3-4	X			
5-6				X
7-8	X			
9-10		X		
11-12		X		

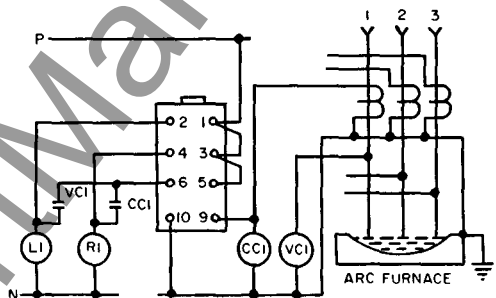
**36 electrode control switch**

arc furnace electrode • four-stage

modern, oval	1645 832 [▲]
modern, pistol grip	1645 852 [▲]
modern, oval	1645 872 [●]
modern, pistol grip	1645 892 [●]
heavy duty, oval	1645 912 [▲]
heavy duty, pistol grip	1645 932 [▲]

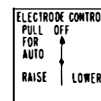


CONT	POSITION			
	RAISE	PULL	OFF	LOWER
1-2				X
3-4	X			
5-6				X
7-8	X			
9-10		X		

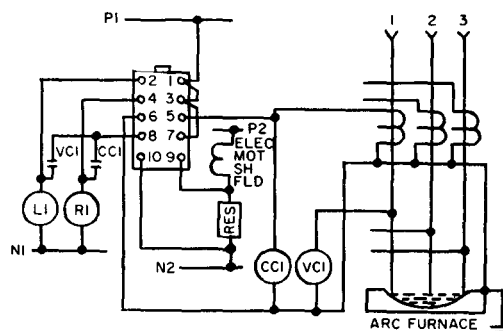
**37 electrode control switch**

arc furnace electrode • five-stage

modern, oval	1645 833 [▲]
modern, pistol grip	1645 853 [▲]
modern, oval	1645 873 [●]
modern, pistol grip	1645 893 [●]
heavy duty, oval	1645 913 [▲]
heavy duty, pistol grip	1645 933 [▲]

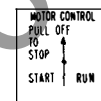


CONT	POSITION			
	RAISE	PULL	OFF	LOWER
1-2				X
3-4	X			
5-6				X
7-8	X			
9-10		X		

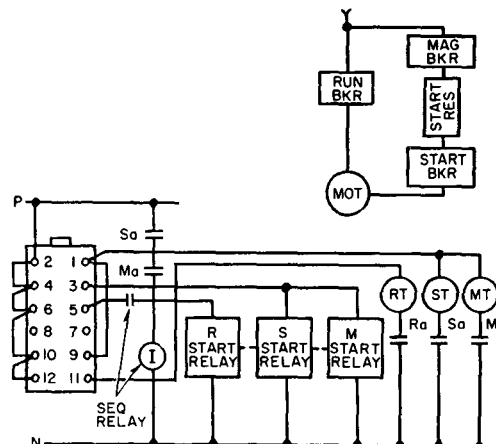
**38 motor control switch**

stop pullout • six-stage

modern, oval	1645 834 [▲]
modern, pistol grip	1645 854 [▲]
modern, oval	1645 874 [●]
modern, pistol grip	1645 894 [●]
heavy duty, oval	1645 914 [▲]
heavy duty, pistol grip	1645 934 [▲]



CONT	POSITION			
	START	PULL	OFF	RUN
1-2				X
3-4	X			
5-6				X
7-8	X			
9-10		X		
11-12		X		



[▲] for 1/8-1/4-inch panel mounting
[●] for 2-inch panel mounting

X indicates contacts closed in position shown

■ Switches shown viewed from above, handle end at top. Instruments shown rear view.

fig. description
no.

nameplate and
position tabulation X

typical basic diagram

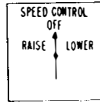
39 speed control switch

four-stage

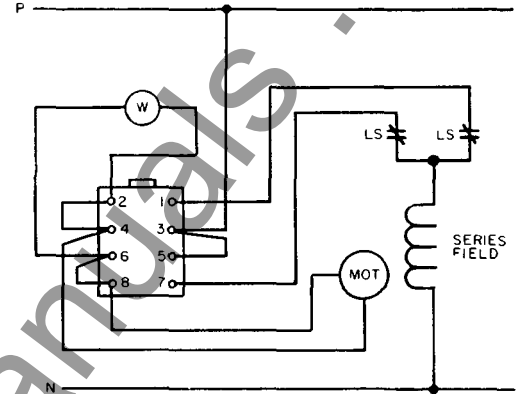
type of handle

style no.

modern, oval.....1645 835⁺
modern, pistol grip.....1645 855⁺
modern, oval.....1645 875⁺
modern, pistol grip.....1645 895⁺
heavy duty, oval.....1645 915⁺
heavy duty, pistol grip.....1645 935⁺

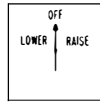


CONT	POSITION		
	RAISE	OFF	LOWER
1-2			X
3-4	X		
5-6			X
7-8	X		

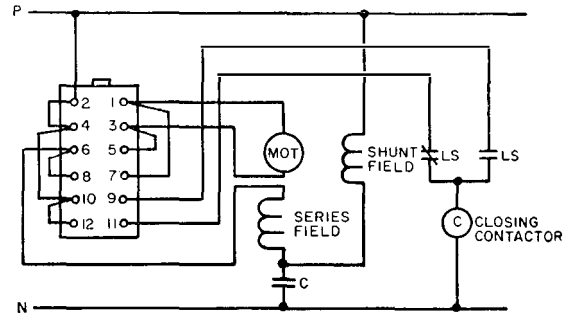


40 motor control switch

breaker elevating device,
maintained contact • six-stage
modern, oval.....1241 725⁺



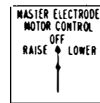
CONT	POSITION		
	LOWER	OFF	RAISE
1-2			X
3-4	X		
5-6			X
7-8	X		
9-10			X
11-12	X		



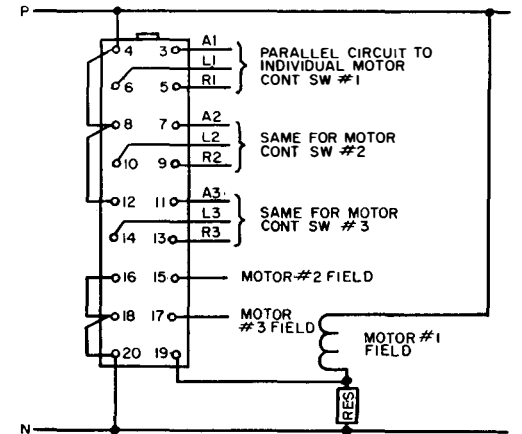
41 master electrode motor control switch

nine-stage

heavy duty, pistol grip.....1257 804⁺



CONT	POSITION		
	RAISE	OFF	LOWER
4-3			X
4-5	X		
4-6			X
8-7			X
8-9	X		
8-10			X
12-11			X
12-13	X		
12-14			X
15-16			X
17-18	X		
19-20			X



⁺ for 1/8-1/4-inch panel mounting
[•] for 2-inch panel mounting
⁺ for stock style breakdown, see pages 15 and 16 of price list 37-120.

X indicates contacts closed in position shown

Switches shown viewed from above, handle end at top. Instruments shown rear view.



additional position tabulations for circuit breaker control switches

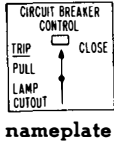


Fig. 42

CONTACT	POSITIONS				
	PULL OUT	TRIP	OFF AFTER TRIP	CLOSE	CLOSE
1-2					X
3-4	X	X			
5-8		X	X	X	X
7-8			X	X	
8-10			X	X	
11-12				X	X
13-14				X	X
15-18				X	X

Fig. 43

CONTACT	POSITIONS				
	PULL OUT	TRIP	OFF AFTER TRIP	CLOSE	CLOSE
1-2					X
3-4					X
5-8	X	X			
7-8		X	X	X	X
8-10			X	X	
11-12			X	X	
13-14			X	X	
15-18				X	X
17-18				X	X

Fig. 44

CONTACT	POSITIONS				
	PULL OUT	TRIP	OFF AFTER TRIP	CLOSE	CLOSE
1-2					X
3-4	X	X			
5-8	X	X	X	X	
7-8		X	X	X	X
9-10				X	X
11-12			X	X	

Fig. 45

CONTACT	POSITIONS				
	PULL OUT	TRIP	OFF AFTER TRIP	CLOSE	CLOSE
1-2					X
3-4					X
5-8	X	X			
7-8		X	X	X	X
9-10				X	X
11-12				X	X
13-14				X	X

Fig. 46

CONTACT	POSITIONS				
	PULL OUT	TRIP	OFF AFTER TRIP	CLOSE	CLOSE
1-2					X
3-4	X	X			
5-8		X	X	X	X
7-8			X	X	
9-10			X	X	
11-12				X	X
13-14					X

Fig. 47

CONTACT	POSITIONS				
	PULL OUT	TRIP	OFF AFTER TRIP	CLOSE	CLOSE
1-2					X
3-4	X	X			
5-8		X	X	X	X
7-8			X	X	
9-10				X	X
11-12				X	X
13-14				X	X
15-18				X	X
17-18				X	X

Fig. 48

CONTACT	POSITIONS				
	PULL OUT	TRIP	OFF AFTER TRIP	CLOSE	CLOSE
1-2					X
3-4					X
5-8	X	X			
7-8	X	X			
9-10		X	X	X	X
11-12			X	X	
13-14			X	X	
15-18				X	X

Fig. 49

CONTACT	POSITIONS				
	PULL OUT	TRIP	OFF AFTER TRIP	CLOSE	CLOSE
1-2					X
3-4	X	X			
5-8		X	X	X	X
7-8			X	X	
9-10			X	X	
11-12			X	X	
13-14				X	X
15-18				X	X

Fig. 50

CONTACT	POSITIONS				
	PULL OUT	TRIP	OFF AFTER TRIP	CLOSE	CLOSE
1-2					X
3-4	X	X			
5-8	X	X	X	X	
7-8		X	X	X	X
8-10				X	X

Fig. 51

CONTACT	POSITIONS			
	PULL OUT	TRIP	OFF	CLOSE
1-2				X
3-4	X	X		
5-8			X	X
7-8		X	X	X
9-10	X			

Fig. 52

CONTACT	POSITIONS				
	PULL OUT	TRIP	OFF AFTER TRIP	CLOSE	CLOSE
1-2					X
3-4	X	X			
5-8		X	X	X	X
7-8			X	X	
9-10				X	X
11-12				X	X
13-14				X	X
15-18				X	X
17-18			X	X	
19-20			X	X	

Fig. 53

CONTACT	POSITIONS				
	PULL OUT	TRIP	OFF AFTER TRIP	CLOSE	CLOSE
1-2					X
3-4	X	X			
5-8	X	X	X	X	
7-8		X	X	X	X
9-10				X	X
11-12				X	X

Fig. 54

CONTACT	POSITIONS				
	PULL OUT	TRIP	OFF AFTER TRIP	CLOSE	CLOSE
1-2					X
3-4	X	X			
5-8	X	X	X	X	
7-8		X	X	X	X
9-10				X	X
11-12				X	X

Fig. 55

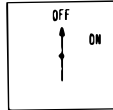
CONTACT	POSITIONS			
	PULL OUT	TRIP	OFF AFTER TRIP	CLOSE
1-2				X
3-4	X	X		
5-8		X	X	X
7-8			X	X
9-10				X

style numbers

fig. no.	modern handle				heavy duty handle	
	1/8 & 1/4-inch panel mounting		2-inch panel mounting		1/8 & 1/4-inch panel mounting	
	oval	pistol grip	oval	pistol grip	oval	pistol grip
momentary						
42	1645 836+	1645 856+	1645 876+	1645 896+	1645 916+	1645 936+
43	1645 837	1645 857	1645 877	1645 897	1645 917	1645 937
44	1645 838	1645 858	1645 878	1645 898	1645 918	1645 938
45	1645 839	1645 859	1645 879	1645 899	1645 919	1645 939
46	1645 940	1645 945	1645 950	1645 955	1645 960	1645 965
47	1645 941	1645 946	1645 951	1645 956	1645 961	1645 966
48	1645 942	1645 947	1645 952	1645 957	1645 962	1645 967
49	1645 943	1645 948	1645 953	1645 958	1645 963	1645 968
50	1645 944	1645 949	1645 954	1645 959	1645 964	1645 969
51	1649 139	1649 140	1649 141	1649 142	1649 143	1649 144
52	1649 145	1649 146	1649 147	1649 148	1649 149	1649 150
53	1649 151	1649 152	1649 153	1649 154	1649 155	1649 156
54	1649 157	1649 158	1649 159	1649 160	1649 161	1649 162
55	.....	1735 715	.....	1649 447	.....	1649 440

* for stock style breakdown, see pages 15 and 16 of price list 37-120.

position tabulations for general application switches



nameplate

Fig. 56

CONT.	POSITION
	OFF ON
1-2	X

Fig. 57

CONT.	POSITION
	OFF ON
1-2	X
3-4	X

Fig. 58

CONT.	POSITION
	OFF ON
1-2	X
3-4	X
5-6	X

Fig. 59

CONT.	POSITION
	OFF ON
1-2	X
3-4	X
5-6	X
7-8	X

Fig. 60

CONT.	POSITION
	OFF ON
1-2	X
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X

Fig. 61

CONT.	POSITION
	OFF ON
1-2	X
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X
13-14	X
15-16	X

Fig. 62

CONT.	POSITION
	OFF ON
1-2	X
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X
13-14	X
15-16	X
17-18	X
19-20	X

Fig. 63

CONT.	POSITION
	OFF ON
1-2	X
3-4	X

Fig. 64

CONT.	POSITION
	OFF ON
1-2	X
3-4	X
5-6	X
7-8	X

Fig. 65

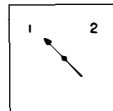
CONT.	POSITION
	OFF ON
1-2	X
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X

Fig. 66

CONT.	POSITION
	OFF ON
1-2	X
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X
13-14	X
15-16	X

Fig. 67

CONT.	POSITION
	OFF ON
1-2	X
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X
13-14	X
15-16	X
17-18	X
19-20	X



nameplate

Fig. 68

CONT.	POSITION
	1 2
1-2	X
3-4	X

Fig. 69

CONT.	POSITION
	1 2
1-2	X
3-4	X
5-6	X
7-8	X

Fig. 70

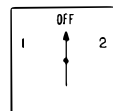
CONT.	POSITION
	1 2
1-2	X
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X

Fig. 71

CONT.	POSITION
	1 2
1-2	X
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X
13-14	X
15-16	X

Fig. 72

CONT.	POSITION
	1 2
1-2	X
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X
13-14	X
15-16	X
17-18	X
19-20	X



nameplate

Fig. 73

CONT.	POSITION
	OFF ON
1-2	X
3-4	X

Fig. 74

CONT.	POSITION
	OFF ON
1-2	X
3-4	X
5-6	X
7-8	X

style numbers
fig.
no.

modern handle			heavy duty handle		
1/8 & 1/4-inch panel mounting			2-inch panel mounting		
oval	pistol grip	round	oval	pistol grip	round
maintained					
56	1581 564+	1581 565+	1581 566+	1581 567	1581 568
57	1530 000+	1530 001+	1530 002+	1530 003+	1530 004+
58	1581 573+	1581 574+	1581 575+	1581 576	1581 577
59	1530 009+	1530 010+	1530 011+	1530 012+	1530 013+
60	1530 018+	1530 019+	1530 020+	1530 021	1530 022
61	1530 027	1530 028	1530 029	1530 030	1530 031
62	1530 036	1530 037	1530 038	1530 039	1530 040
63	1530 045+	1530 046+	1530 047+	1530 048	1530 049
64	1530 054+	1530 055+	1530 056+	1530 057+	1530 058+
65	1530 063+	1530 064+	1530 065+	1530 066	1530 067
66	1530 072	1530 073	1530 074	1530 075	1530 076
67	1530 081	1530 082	1530 083	1530 084	1530 085
68	1530 090+	1530 091+	1530 092+	1530 093+	1530 094+
69	1530 099+	1530 100+	1530 101+	1530 102	1530 103
70	1530 108+	1530 109+	1530 110+	1530 111	1530 112
71	1530 117+	1530 118+	1530 119+	1530 120	1530 121
72	1530 126	1530 127	1530 128	1530 129	1530 130
73	1530 135+	1530 136+	1530 137+	1530 138	1530 139
74	1530 144+	1530 145+	1530 146+	1530 147+	1530 148+
				1530 149+	1530 150+

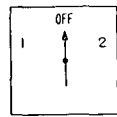
momentary

56	1645 585	1645 586	1645 587	1645 588	1645 589
57	1645 594	1645 595	1645 596	1645 597	1645 598
58	1645 603	1645 604	1645 605	1645 606	1645 607
59	1645 612	1645 613	1645 614	1645 615	1645 616
60	1645 621	1645 622	1645 623	1645 624	1645 625
61	1645 630	1645 631	1645 632	1645 633	1645 634
62	1645 639	1645 640	1645 641	1645 642	1645 643
63	1645 648	1645 649	1645 650	1645 651	1645 652
64	1645 657	1645 658	1645 659	1645 660	1645 661
65	1645 666	1645 667	1645 668	1645 669	1645 670
66	1645 675	1645 676	1645 677	1645 678	1645 679
67	1530 441	1530 442	1530 443	1530 444	1530 445
73	1645 684+	1645 685+	1645 686+	1645 687+	1645 688+
74	1645 693+	1645 694+	1645 695+	1645 696	1645 697
				1645 698	1645 699
				1645 700	1645 701

* for stock style breakdown, see pages 15 and 16 of price list 37-120.



position tabulations for general application switches



nameplate

Fig. 75

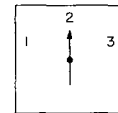
CONT.	POSITION
1-2	1 OFF 2
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X

Fig. 76

CONT.	POSITION
1-2	1 OFF 2
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X
13-14	X
15-16	X

Fig. 77

CONT.	POSITION
1-2	1 OFF 2
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X
13-14	X
15-16	X
17-18	X
19-20	X



nameplate

Fig. 78

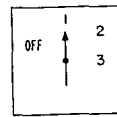
CONT.	POSITION
1-2	1 2 3
3-4	X
5-6	X

Fig. 79

CONT.	POSITION
1-2	1 2 3
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X

Fig. 80

CONT.	POSITION
1-2	1 2 3
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X
13-14	X
15-16	X
17-18	X



nameplate

Fig. 81

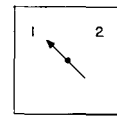
CONT.	POSITION
1-2	1 OFF 2 3
3-4	X
5-6	X

Fig. 82

CONT.	POSITION
1-2	1 OFF 2 3
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X

Fig. 83

CONT.	POSITION
1-2	1 OFF 2 3
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X
13-14	X
15-16	X
17-18	X



nameplate

Fig. 84

CONT.	POSITION
1-2	1 2
2-2'	X
3-4	X
4-4'	X
5-6	X
6-6'	X
7-8	X
8-8'	X
9-10	X
10-10'	X
11-12	X
12-12'	X

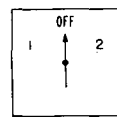
Fig. 85

CONT.	POSITION
1-2	1 2
2-2'	X
3-4	X
4-4'	X
5-6	X
6-6'	X
7-8	X
8-8'	X
9-10	X
10-10'	X
11-12	X
12-12'	X
13-14	X
14-14'	X
15-16	X
16-16'	X

Fig. 86

CONT.	POSITION
1-2	1 2
2-2'	X
3-4	X
4-4'	X
5-6	X
6-6'	X
7-8	X
8-8'	X
9-10	X
10-10'	X
11-12	X
12-12'	X
13-14	X
14-14'	X
15-16	X
16-16'	X
17-18	X
18-18'	X
19-20	X
20-20'	X

2'-4' etc. are upper fingers
on double base switch



nameplate

Fig. 87

CONT.	POSITION
1-2	1 OFF 2
2-2'	X
3-4	X
4-4'	X
5-6	X
6-6'	X
7-8	X
8-8'	X
9-10	X
10-10'	X
11-12	X
12-12'	X

Fig. 88

CONT.	POSITION
1-2	1 OFF 2
2-2'	X
3-4	X
4-4'	X
5-6	X
6-6'	X
7-8	X
8-8'	X
9-10	X
10-10'	X
11-12	X
12-12'	X
13-14	X
14-14'	X
15-16	X
16-16'	X

Fig. 89

CONT.	POSITION
1-2	1 OFF 2
2-2'	X
3-4	X
4-4'	X
5-6	X
6-6'	X
7-8	X
8-8'	X
9-10	X
10-10'	X
11-12	X
12-12'	X
13-14	X
14-14'	X
15-16	X
16-16'	X
17-18	X
18-18'	X
19-20	X
20-20'	X

Fig. 90

CONT.	POSITION
1-2	1 OFF 2
3-4	X

Fig. 91

CONT.	POSITION
1-2	1 OFF 2
3-4	X
5-6	X
7-8	X

Fig. 92

CONT.	POSITION
1-2	1 OFF 2
3-4	X
5-6	X
7-8	X

Fig. 93

CONT.	POSITION
1-2	1 OFF 2
3-4	X
5-6	X
7-8	X

Fig. 94

CONT.	POSITION
1-2	1 OFF 2
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X

Fig. 95

CONT.	POSITION
1-2	1 OFF 2
3-4	X
5-6	X
7-8	X
9-10	X
11-12	X
13-14	X
15-16	X
17-18	X
19-20	X

Fig. 96

CONT.	POSITION
1-2	1 OFF 2
3-4	X
5-6	X
7-8	X

2'-4' etc. are upper fingers
on double base switch

style numbers

fig. no.	modern handle						heavy duty handle		
	1/8 & 1/4-inch panel mounting			2-inch panel mounting			1/8 & 1/4-inch panel mounting		
	oval	pistol grip	round	oval	pistol grip	round	oval	pistol grip	round
maintained									
75	1530 153+	1530 154+	1530 155+	1530 156+	1530 157+	1530 158+	1530 159+	1530 160+	1530 161+
76	1530 162	1530 163	1530 164	1530 165	1530 166	1530 167	1530 168	1530 169	1530 170
77	1530 171	1530 172	1530 173	1530 174	1530 175	1530 176	1530 177	1530 178	1530 179
78	1530 180+	1530 181+	1530 182+	1530 183	1530 184	1530 185	1530 186	1530 187	1530 188
79	1530 189	1530 190	1530 191	1530 192	1530 193	1530 194	1530 195	1530 196	1530 197
80	1530 198	1530 199	1530 200	1530 201	1530 202	1530 203	1530 204	1530 205	1530 206
81	1530 207	1530 208	1530 209	1530 210	1530 211	1530 212	1530 213	1530 214	1530 215
82	1530 216	1530 217	1530 218	1530 219	1530 220	1530 221	1530 222	1530 223	1530 224
83	1530 225	1530 226	1530 227	1530 228	1530 229	1530 230	1530 231	1530 232	1530 233
84	1530 234	1530 235	1530 236	1530 237	1530 238	1530 239	1530 240	1530 241	1530 242
85	1530 243	1530 244	1530 245	1530 246	1530 247	1530 248	1530 249	1530 250	1530 251
86	1530 252	1530 253	1530 254	1530 255	1530 256	1530 257	1530 258	1530 259	1530 260
87	1530 261	1530 262	1530 263	1530 264	1530 265	1530 266	1530 267	1530 268	1530 269
88	1530 270	1530 271	1530 272	1530 273	1530 274	1530 275	1530 276	1530 277	1530 278
89	1530 279	1530 280	1530 281	1530 282	1530 283	1530 284	1530 285	1530 286	1530 287
90	1530 288	1530 289	1530 290	1530 291	1530 292	1530 293	1530 294	1530 295	1530 296
91	1530 297	1530 298	1530 299	1530 300	1530 301	1530 302	1530 303	1530 304	1530 305
92	1530 306	1530 307	1530 308	1530 309	1530 310	1530 311	1530 312	1530 313	1530 314
93	1530 315	1530 316	1530 317	1530 318	1530 319	1530 320	1530 321	1530 322	1530 323
94	1530 324	1530 325	1530 326	1530 327	1530 328	1530 329	1530 330	1530 331	1530 332
95	1530 333	1530 334	1530 335	1530 336	1530 337	1530 338	1530 339	1530 340	1530 341
96	1581 582	1581 583	1581 584	1581 585	1581 586	1581 587	1581 588	1581 589	1581 590
momentary									
75	1645 702	1645 703	1645 704	1645 705	1645 706	1645 707	1645 708	1645 709	1645 710
76	1645 711	1645 712	1645 713	1645 714	1645 715	1645 716	1645 717	1645 718	1645 719
77	1645 720	1645 721	1645 722	1645 723	1645 724	1645 725	1645 726	1645 727	1645 728
78	1645 729	1645 730	1645 731	1645 732	1645 733	1645 734	1645 735	1645 736	1645 737
79	1645 738	1645 739	1645 740	1645 741	1645 742	1645 743	1645 744	1645 745	1645 746
80	1645 747	1645 748	1645 749	1645 750	1645 751	1645 752	1645 753	1645 754	1645 755
81	1645 756	1645 757	1645 758	1645 759	1645 760	1645 761	1645 762	1645 763	1645 764
82	1645 765	1645 766	1645 767	1645 768	1645 769	1645 770	1645 771	1645 772	1645 773
83	1645 774	1645 775	1645 776	1645 777	1645 778	1645 779	1645 780	1645 781	1645 782
84	1645 783	1645 784	1645 785	1645 786	1645 787	1645 788	1645 789	1645 790	1645 791
85	1645 792	1645 793	1645 794	1645 795	1645 796	1645 797	1645 798	1645 799	1645 800
86	1645 801	1645 802	1645 803	1645 804	1645 805	1645 806	1645 807	1645 808	1645 809
87	1645 810	1645 811	1645 812	1645 813	1645 814	1645 815	1645 816	1645 817	1645 818

instrument, control, and auxiliary switches • type W

descriptive
bulletin

34-250

600 volts • 20 amperes continuous

page 23

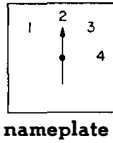


Fig. 97

CONT.	POSITION			
	1	2	3	4
1-2	X			
3-4		X		
5-6			X	
7-8				X

Fig. 98

CONT.	POSITION			
	1	2	3	4
1-2	X			
3-4		X		
5-6			X	
7-8				X
9-10	X			
11-12		X		
13-14			X	
15-16				X

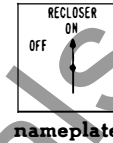


Fig. 99

CONT.	POSITION		
	OFF	ON	RECLOSER
1-2	X	X	
3-4		X	X
5-6		X	X
7-8		X	X

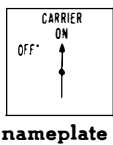


Fig. 100

CONT.	POSITION	
	OFF	ON
1-2		X
3-4		X
5-6		X
7-8		X
9-10		X
11-12		X

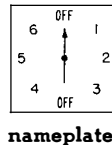


Fig. 101

CONT.	POSITION					
	OFF	1	2	3	OFF	4
2-3		X				
2-5			X			
2-7				X		
2-4					X	
2-6						X
2-8						X

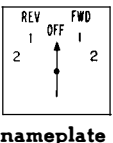


Fig. 102

CONT.	POSITION			
	REV	OFF	FWD	
1-2		X		
3-4	X			X
5-6			X	X
7-8	X	X		

Fig. 103

CONT.	POSITION			
	REV	OFF	FWD	
1-2		X		
3-4	X		X	X
5-6			X	X
7-8	X	X		
9-10	X			X
11-12		X		

Fig. 104

CONT.	POSITION			
	REV	OFF	FWD	
1-2		X		
3-4	X			X
5-6			X	X
7-8	X			
9-10				X

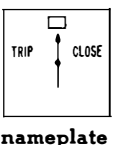


Fig. 105

CONT.	POSITION			
	TRIP	STOP	CLOSE	
1-2			X	
3-4	X			
5-6			X	X
7-8		X		X

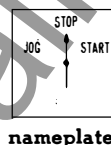


Fig. 106

CONT.	POSITION		
	JOG	STOP	START
3-4			X
5-6			X
7-8	X		
9-10	X		
11-12		X	

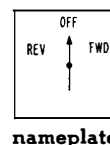


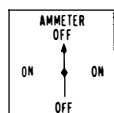
Fig. 107

CONT.	POSITION		
	REV	OFF	FWD
1-2		X	
3-4		X	
5-6			X
7-8	X		
9-10	X		X

Momentary contact jog to stop.
Maintained in stop and start.

style numbers

fig. no.	modern handle						heavy duty handle		
	1/8 & 1/4-inch panel mounting			2-inch panel mounting			1/8 & 1/4-inch panel mounting		
	oval	pistol grip	round	oval	pistol grip	round	oval	pistol grip	round
maintained									
97	1530 342	1530 343	1530 344	1530 345	1530 346	1530 347	1530 348	1530 349	1530 350
98	1530 351	1530 352	1530 353	1530 354	1530 355	1530 356	1530 357	1530 358	1530 359
99	1616 151	1649 216	1649 217	1649 218	1649 219	1649 220	1649 221	1649 222	1649 223
100	1616 150	1649 224	1649 225	1649 226	1649 227	1649 228	1649 229	1649 230	1649 231
101	1649 232	1649 233	1649 234	1649 235	1649 236	1649 237	1649 238	1649 239	1649 240
102	1529 788	1529 789	1529 790	1645 970	1645 971	1645 972	1645 973	1529 791	1645 974
103	1529 792	1529 793	1529 814	1645 975	1645 976	1645 977	1645 978	1529 794	1645 979
104	1533 380	1533 381	1533 382	1645 980	1645 981	1645 982	1645 983	1533 383	1645 984
107	1645 985	1645 986	1645 987	1645 988	1645 989	1645 990	1645 991	1645 992	1645 993
momentary									
102	1645 819	1645 994	.....	1645 995	1645 996	.....	1645 997	1718 815	.....
103	1645 998	1645 999	.....	1649 111	1649 112	.....	1649 113	1649 114	.....
104	1649 115	1649 116	.....	1649 117	1649 118	.....	1649 119	1649 120	.....
105	1649 121	1649 122	.....	1649 123	1649 124	.....	1649 125	1649 126	.....
107	1649 127	1649 128	.....	1649 129	1649 130	.....	1649 131	1649 132	.....
momentary one direction, maintained other direction of rotation									
106	1649 133	1649 134	.....	1649 135	1649 136	.....	1649 137	1649 138	.....

**position tabulations for ammeter switches**

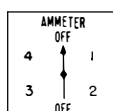
nameplate

Fig. 108

CONT.	POSITION	
	OFF	ON
1-2	X	X
1-3		X
2-4	X	X
5-6	X	X
5-7		X
6-8		X
9-10	X	X
9-11		X
10-12		X

Fig. 109

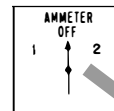
CONT.	POSITION	
	OFF	ON
1-2	X	X
1-3		X
2-4		X



nameplate

Fig. 110

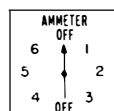
CONT.	POSITION			
	OFF	1	2	3
2-3		X		
2-5			X	
2-4				X
2-6				X
12-7	X	X	X	X
12-9	X	X	X	X
12-8	X	X	X	X
12-10	X	X	X	X



nameplate

Fig. 111

CONT.	POSITION	
	1	2
1-2	X	X
1-3		X
2-4		X
5-6	X	X
5-7	X	X
6-4	X	X



nameplate

Fig. 112

CONT.	POSITION					
	OFF	1	2	3	4	5
2-3		X				
2-5			X			
2-7				X		
2-4					X	
2-6						X
2-8						X
16-9	X	X	X	X	X	X
16-11	X	X	X	X	X	X
16-13	X	X	X	X	X	X
16-10	X	X	X	X	X	X
16-12	X	X	X	X	X	X
16-14	X	X	X	X	X	X

style numbers**fig. no.** **modern handle** $\frac{1}{8}$ & $\frac{1}{4}$ -inch panel mtg. 2-inch panel mounting**heavy duty handle** $\frac{1}{8}$ & $\frac{1}{4}$ -inch panel mtg.

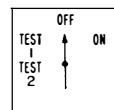
switch style no.	key style no.	switch style no.	key style no.	switch style no.	key style no.
------------------	---------------	------------------	---------------	------------------	---------------

maintained—round notched handle

108	1481 467	1649 169	1649 170
108	1649 171	1649 172	1649 171
109	1649 176	1649 177	1649 173
109	1649 179	1649 180	1649 181
110	1611 494	1649 185	1649 186
110	1649 187	1649 188	1649 187
111	1649 200	1649 201	1649 189
111	1649 203	1649 204	1649 205
112	1649 192	1649 193	1649 202
112	1649 195	1649 196	1649 203
		1649 197	1649 194
			1649 195
			1649 199

□ SW operated by removable key handle

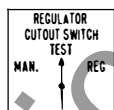
■ order mounting screws S# 1332 469 in addition

position tabulations for special application switches

nameplate

Fig. 113

CONT.	POSITION			
	TEST 1	TEST 2	OFF	ON
1-2				X
3-4	X	X		
5-6	X	X		
7-8			X	X
9-10		X		
11-12		X		
13-14	X			
15-16	X			



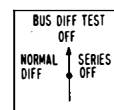
nameplate

Fig. 114

CONT.	POSITION	
	MAN.	REG.
21-22	X	
1-2	X	
3-4	X	
5-6	X	X
7-8	X	X
9-10	X	X
11-12	X	X
13-14	X	X
15-16	X	X
17-18	X	X
19-20	X	X

Fig. 115

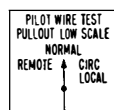
CONT.	POSITION	
	MAN.	REG.
21-22	X	
1-2	X	
3-4	X	
5-6	X	X
7-8	X	X
9-10	X	X
11-12	X	X
13-14	X	X
15-16	X	X
17-18	X	X
19-20	X	X



nameplate

Fig. 116

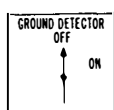
CONT.	POSITION		
	NORM OFF	OFF	SERIES OFF
1-2	X		X
3-4	X		X
5-6	X		X
7-8	X		X
9-10	X	X	
11-12	X	X	
13-14			X
15-16			X



nameplate

Fig. 117

CONT.	POSITION							
	REM.	REM. P.O.	NORM	NORM P.O.	CIRC	CIRC P.O.	LOCAL	LOCAL P.O.
7-8	X	X					X	X
9-10			X	X			X	X
11-12	X	X	X	X	X	X	X	X
13-14	X	X	X	X	X	X	X	X
15-16		X	X	X	X	X		X



nameplate

Fig. 118

CONT.	POSITION	
	OFF	ON
1-2		X
3-4		X
5-6		X

style numbers

fig. no.	description	handle design	modern handle		heavy duty handle
			$\frac{1}{8}$ & $\frac{1}{4}$ -inch panel mounting	$1\frac{1}{2}$ -inch panel mounting	
113	HCB relay test switch	round notch	1584 284	1584 285	
114	regulator cutout switch	round notch	1584 373	.....	1649 214
115	regulator cutout switch	round notch	1616 078	.....	1649 215
116	bus differential switch	oval	1534 632	.....	.....
117	pilot wire test switch	pistol grip	1491 628	1491 627	.....
118	ground detector—momentary	pistol grip	.....	.....	1087 006

dimensions in inches

approximate only: do not use for construction purposes

modern handles

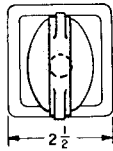


fig. 1 (oval)

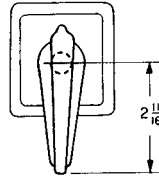


fig. 2 (pistol grip)

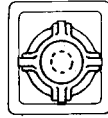


fig. 3 (round notched)

heavy duty handles

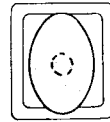


fig. 4 (oval)



fig. 5 (pistol grip)

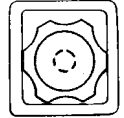
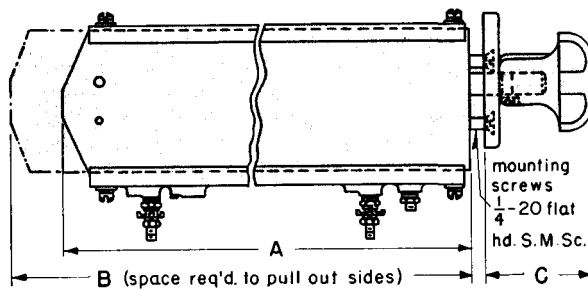


fig. 6 (round notched)



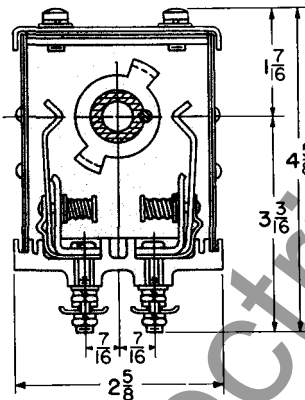
switch dimensions

handle
dimensions

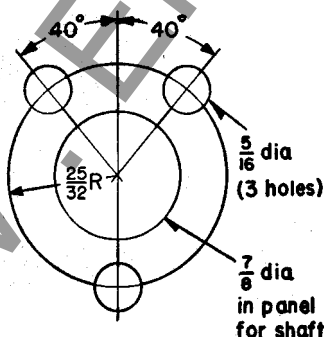
no. of stages per switch	A		B		approx. ship. wt.-lbs.	figure number	C
	instr.	contr.	instr.	contr.			
1 & 2	4 1/4	4 5/8	8 3/8	8 7/8	2.0	1	2 3/16
3	5 1/8	5 7/16	10 1/16	10 1/8	2.5	2	2 1/4
4	5 1/2	6 1/16	11 3/4	11 3/8	3.0	3	2 3/16
5	6 1/16	7 1/8	13 7/16	13 1/2	3.5	4	3 1/4
6	7 5/8	8	15 1/2	15 3/4	4.0	5	3 1/2
7 & 8	9 5/8	9 1/16	18 1/2	18 3/4	5.0	6	3 1/2
9 & 10	11	11 3/8	21 7/8	21 3/4	6.0	..	..
11	11 7/8	12 1/4	23 3/8	23 1/2	6.5	..	..

* weights include handle or key

cross section through contacts



drilling plan



mounting and dismantling instructions

to mount switch on panel: Remove the indicator screw or machine screw and pull handle from shaft. Remove nameplate. Take out mounting screws and remove dial plate. Place switch on rear of panel with shaft extending through panel. Replace dial plate on shaft on front of panel and fasten securely to switch with mounting screws. Replace nameplate. Fasten handle on shaft with indicator screw or machine screw.

To remove rectangular nameplate, remove indicator screw or machine screw and pull handle from shaft. Remove nameplate by pressing in and up at the top, then lift out.

To replace rectangular nameplate, set nameplate in top slot of dial plate, then snap into position by pressing in and down at the bottom

important: Indicator screw or indicator rib on modern handle must point in the same direction as arrow stamped on the end of the shaft.

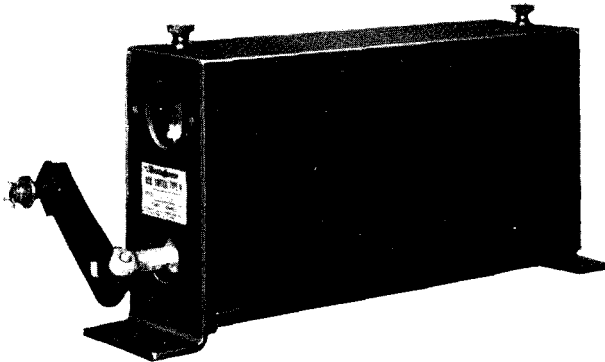
to remove drum: Take out indicator screw or machine screw and pull handle from shaft. Remove rear end plate and pull drum out from the rear.

to dismantle drum: Release locking clip and remove nut from end of shaft. When renewing parts on drum, the various segments must be replaced in their original position. The key-way number on each segment as shown in detailed illustration in the proper Renewal Parts Data section indicates the exact position of segment on drum.

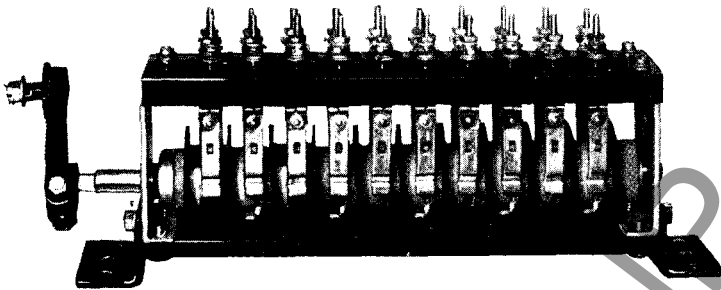


indoor auxiliary switches

auxiliary switch with cover



auxiliary switch without cover



application

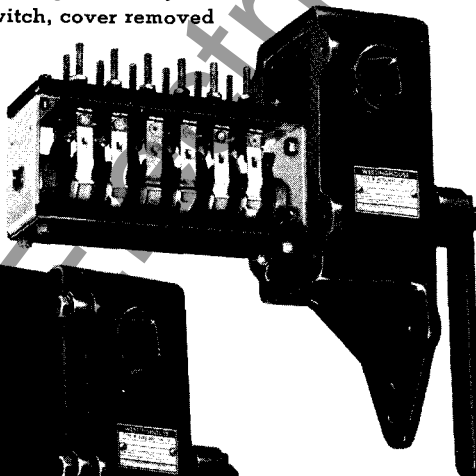
The type W auxiliary switch is similar to the instrument and control switches, having identical control fingers, rotor segments, and moulded base. They are applicable to circuit breakers, operating mechanisms, or other apparatus requiring auxiliary switches. Standard switches are made with 2, 4, 6, and 10 stages or contact circuits. Switches with 8 stages or an odd number of stages are available on special order.

operation

The rotor turns to two positions 90 degrees apart. The rotor segment makes contact with its pair of stationary fingers in one or the other 90-degree position. Any individual segment can be rotated 90 degrees to change from a "make" to a "break" contact or vice versa. Special segments can be supplied for special switching arrangements.

weatherproof auxiliary switches

two-stage auxiliary switch, cover removed



two-stage auxiliary switch, cover in place



application

Type W weatherproof auxiliary switches are completely housed for outdoor applications. They are used with remote-controlled, gang-operated disconnecting switches, or for any other application where it is desired to give a signal or alarm as to the action of a mechanical device. These switches may also be used for relay and interlocking circuits.

construction

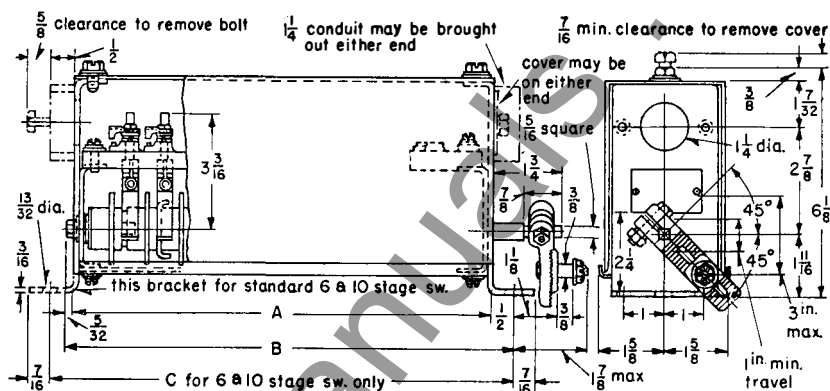
The switch is made in two forms, with and without terminal covers. The switch equipped with a Micarta cover has provision for bringing out terminal leads from either end of the switch through holes provided in the end brackets. A coverplate is supplied for the hole not in use.

The switch without cover is used on applications where the apparatus is otherwise housed, for example with the operating mechanism on outdoor oil circuit breakers.

The operating lever of both types of switches clamps to the squared end of the rotor shaft. Provision is made for changing the length of the operating lever so as to adapt the switch to an operating rod travel of from 1 to 3 inches. The angular travel of the rotor is always 90 degrees.

Where wires are to be carried in conduit, the auxiliary switches are arranged to accommodate a special nut with 1¼-inch pipe threads which can be bolted to the switch bracket. This nut (Style No. 762198), with mounting bolts, is not included in the switch style number, but will be furnished when ordered with the switch without additional charge.

dimensions in inches



style numbers

description					style numbers				
stages	contacts*		dimensions			with cover		without cover	
	"make" ("a")	"break" ("b")	A	B	C				
2	1	1	3¾	4 ¹ / ₃₂	....	676	957	591	816
4	2	2	5 ¹ / ₁₆	6 ³ / ₃₂	....	678	960	591	819
6	3	3	7 ¹ / ₁₆	7 ²⁵ / ₃₂	8 ¹ / ₁₆	676	963	591	822
10	5	5	10 ¹ / ₂	11 ¹ / ₃₂	11 ¹ / ₂	676	966	591	825

^a The letters "a" and "b" designate "make" and "break" as shown in the NEMA handbook on switching equipment.

□ Rear support not included in style number. It can be supplied at no increase in price if specified on order for switch.

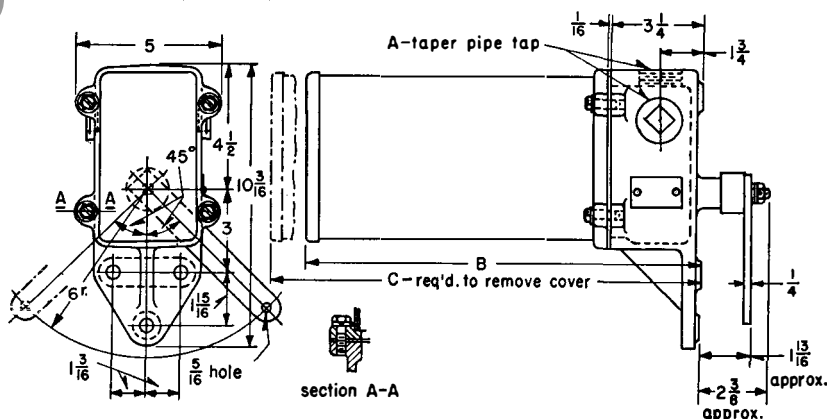
construction

Weatherproof auxiliary switches can be furnished in 2, 4, 6, or 10-stage types, and are made of standard indoor switch parts mounted on a cast brass base to which the cover is bolted. Switches with 8 stages or an odd number of stages are available on special order.

The base contains holes for 3/8-inch mounting bolts. Holes tapped for conduit connection are provided on two sides and the top, two of which are fitted with pipe plugs. These holes are for 1-inch conduit on the 2 and 4-stage switches, 1 1/4-inch conduit on the 6-stage switch, and 1 1/2-inch conduit on the 10-stage switch.

A substantial cover, with a cast alloy flange, is provided to enclose the switch. This cover contains an inner lining of insulating material. All joints are fitted with gaskets to assure weatherproof construction.

dimensions in inches



style numbers

description						style number
stages	contacts ^a		dimensions			
	"make" ("a")	"break" ("b")	A	B	C	
2	1	1	1-11½	7½ ₁₆	11⅛ ₈	599 938
4	2	2	1-11½	9	14½ ₂	599 939
6	3	3	1¼-11½	10⅛ ₁₆	17⅞ ₈	599 940
10	5	5	1½-11½	14⅞ ₁₆	24⅞ ₈	599 941

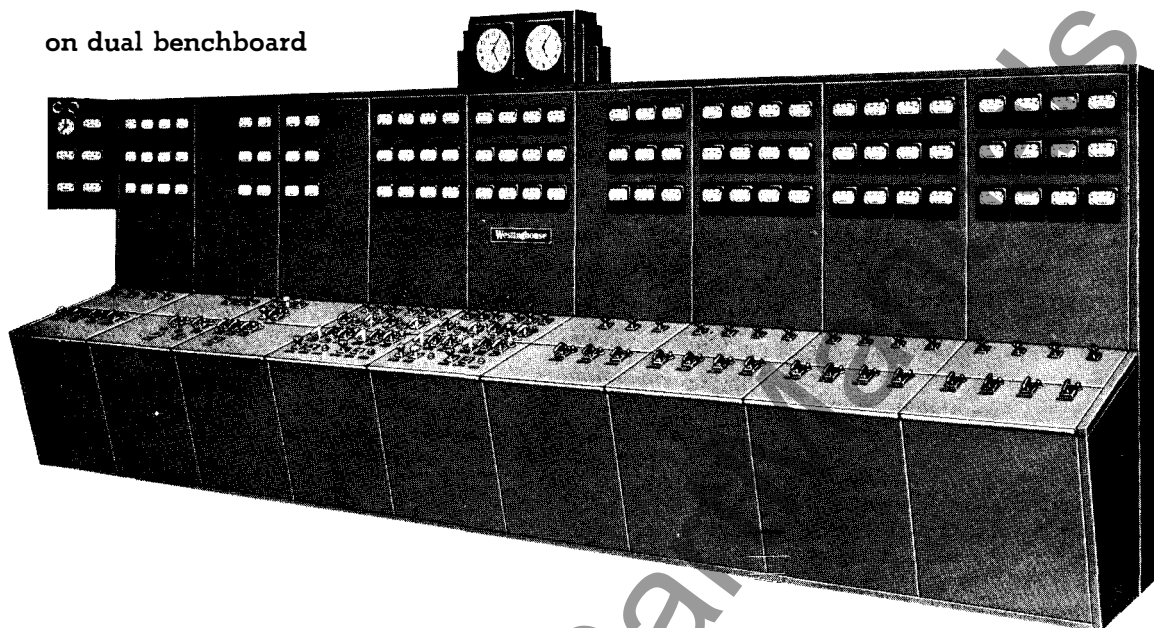
^aThe letters "a" and "b" designate "make" and "break" as shown in the NEMA handbook on switching equipment.



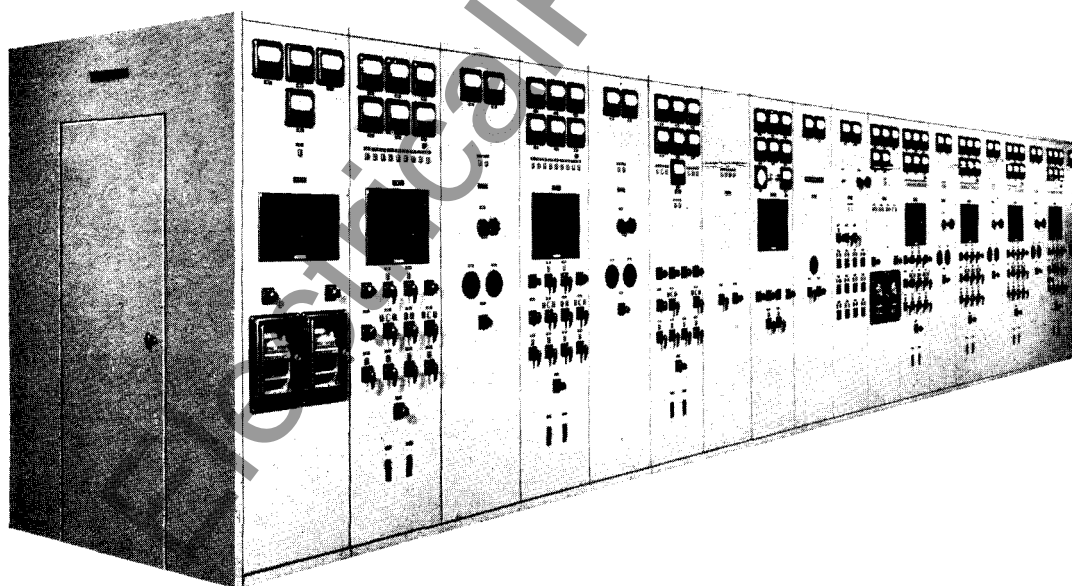
instrument, control, and auxiliary
switches • type W

typical applications

on dual benchboard



and on duplex switchboard



further information

prices, style numbers
instructions, control switches
instructions, instrument switches

price list 37-120
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renewal parts data 37-150. IS

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