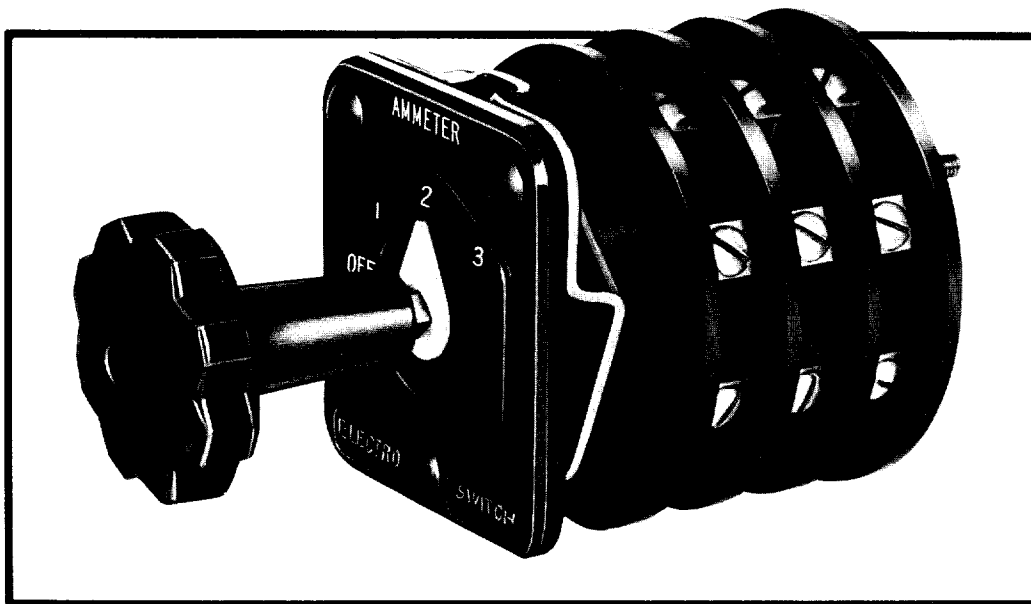


Technical Publication

24-1

Effective 2/98

**SERIES 24
INSTRUMENT AND CONTROL
SWITCHES
FOR POWER INDUSTRY AND
HEAVY DUTY INDUSTRIAL APPLICATIONS**



ELECTROSWITCH
• SWITCHES & RELAYS

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SERIES 24 INSTRUMENT AND CONTROL SWITCHES
FOR POWER INDUSTRY APPLICATIONS
AND HEAVY-DUTY INDUSTRIAL APPLICATIONS

ELECTROSWITCH
Weymouth, Massachusetts

ABSTRACT

The series 24 Instrument and Control Switch is a heavy-duty rotary switch that satisfies the most stringent requirements of industrial control and power industry applications. The switches are rated 600 volts and are UL listed and CSA certified. The units are also qualified to ESC-STD-1000 which includes aging and seismic testing to ANSI/IEEE-STD-323-1984 and IEEE-STD-344-1987 for Class IE uses in nuclear power generating stations.

INTRODUCTION

The power industry has widespread need for versatile heavy-duty instrument and control switches. Some uses are:

Circuit-breaker control
Motor-control
Voltmeter selector and transfer
Ammeter selector and transfer
Volt-ammeter selector and transfer
Wattmeter selector and transfer
Synchroscope control

The series 24 Instrument and Control Switch has the design features to satisfy all the different requirements simply and reliably. Some of these features are:

- . Standard 3-hole mount
- . #8-32 terminal screws for easy installation of #12AWG wire
- . Insulating Materials -- NEMA Class A (105°C)
- . Silver contact surfaces for long reliable life
- . Double-sided, double-wiping knife-type rotary contacts
- . Special features for control switches including
 - * mechanical red/green target
 - * slip-contacts for alarm and indicator circuits
 - * pull-to-lock mechanism for a safety lock-out
 - * spring-return mechanism to return the switch handle to the normal (vertical) position

Special features for meter control switches including

- * make-before-break (shorting) contacts for ammeter control (designed with physically overlapping contacts)
- * common-input tap-switch arrangement whereby the meter may be sequentially connected to several lines using the same switching deck
- * Positive "snappy" positioning detent mechanism
- * pre-wired jumpers

. Special features for Synchroscope applications including

- * removeable-oval handles
- * keyed arrangements

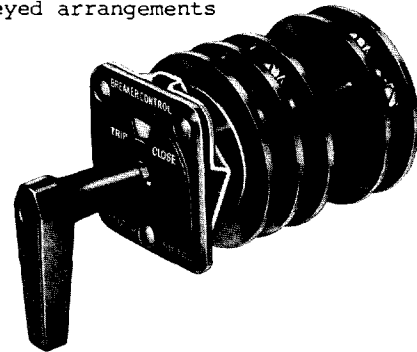


Fig. 1. Typical series 24 Instrument and Control Switch

Many power industry applications also require stringent quality assurance, design control, and qualification testing. The series 24 Instrument and Control Switches comply with all known requirements for Class IE components. Qualification testing is in accordance with ANSI/IEEE-STD-323-1984 entitled Standard for Qualifying Class IE Equipment for Nuclear Power Generating Stations. The testing includes electro-mechanical and environmental aging, which simulates a forty year service life, and then concludes with a seismic event. The seismic testing is in accordance with IEEE-STD-344-1987 entitled IEEE Recommended Practices for Seismic Qualification of Class IE Equipment for Nuclear Power Generating Stations. Biaxial broadband repeatable multi-frequency inputs are used as outlined in ANSI/IEEE C37.98-1987 entitled IEEE Standard for Seismic Testing of Relays. In addition, the quality control system of ELECTROSWITCH is in conformance with NRC regulation 10CFR50 Appendix B which outlines the Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants.

This bulletin describes the features and shows the designs and how they are used. Also detailed is complete operational information including electrical, environmental, and mechanical data plus the qualification information. Ordering information, drawing masters, and contact charts are also included.

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THE MECHANICAL DESIGN

The series 24 Instrument and Control Switch is modular in design whereby several subassemblies are stacked together to form a rigid rugged device. Figure 2 shows a cut-away view exposing the basic components.

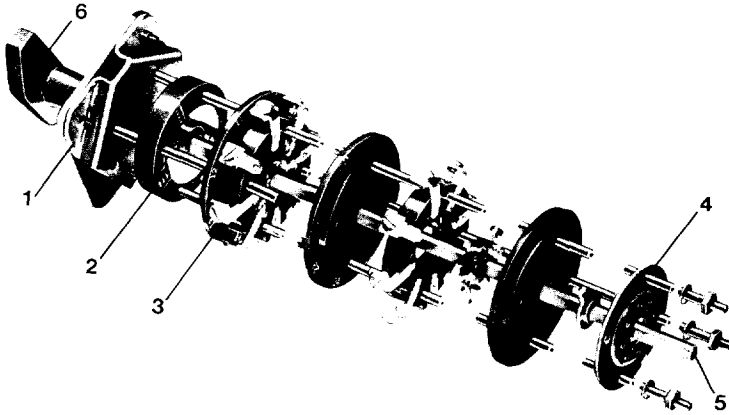
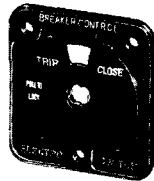


Fig. 2. Cut-away view of series 24 Instrument and Control Switch

The mounting plate (1) connects a detent assembly (2) to one or more contact decks (3) and finally a position limiting stop plate (4). These assemblies are bolted together along with a steel shaft (5) and a handle (6).

The Nameplate

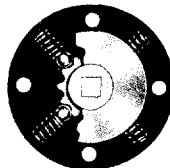
The nameplate is standard black molded phenolic or nylon. The nameplate may also include white engraving. The title can have up to fourteen characters and each position location can contain up to five characters for best size and legibility.



The control switch nameplate also includes a mechanical target (as shown). A green target shows that the last activated position was to the left (generally engraved TRIP) and a red target shows that the last activated position was to the right (generally CLOSE).

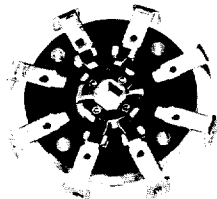
The Detent Assembly

The detent assembly contains a specially designed star-wheel and up to four spring-loaded ball bearings providing snappy positive indexing. Spring-return switches use a coil spring in place of the star-wheel/spring/ball bearing arrangement.

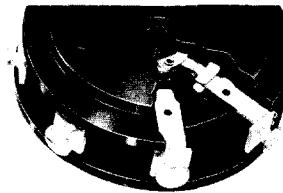


The Contact Deck Assembly

The electrical parts are contained within sturdy phenolic moldings that provide individual insulated compartments where all



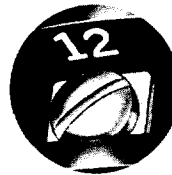
switching takes place. An insulating barrier completes the contact deck assembly. The barrier not only separates one contact assembly from another but also provides a tight insulating compartment. With this construction there is no need to add a dust cover.



Positive reliable maintenance free operation results from the double-sided, double-wiping, self-cleaning knife-blade moveable contacts.



The barrier next to the stationary terminals is clearly marked with the terminal number that corresponds with the wiring diagrams.

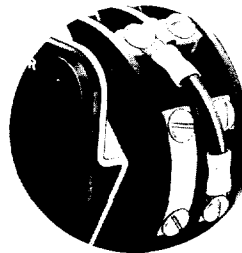


Large #8-32 binding-head terminal screws secure the external wiring to the terminals. The screws are more than adequate for the traditional #12AWG wires used in the power industry.



Jumpering may be done right on the switch providing a simple and neat arrangement.

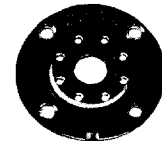
Silver-plated brass strap jumpers are available for adjacent contacts--either between adjacent contacts on the same deck or the same terminal location on adjacent decks. Wire and lug jumpers are also available.



Jumpers are already supplied on the meter and control switches illustrated in this bulletin (where shown) simplifying field wiring. All you need to do is connect the instrument leads and the line wires.

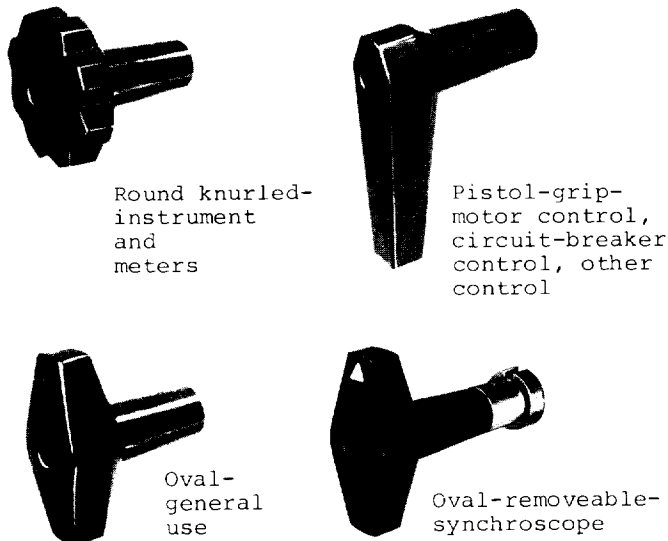
The Stop Plate

The steel stop plate assembly includes a steel stop arm that is connected to the shaft and a steel stop plate the contains eight holes. Stop screws may be inserted in the field to limit the positions to the number and location desired. This externally adjustable position limiting feature allows the use of standard switches for many customized applications. The limit screws are factory assembled in the standard meter and control switches illustrated in this bulletin.



The Handles

The traditional choice of handle shapes are available and are interchangeable with the exception of the oval removeable version. The general use of the different shapes are:



The oval-removeable handle can also be keyed so that it can only be inserted and removed when the switch is in a certain position. As an example, in a three position arrangement designated RUN (R) and INCOMING (I) with a spring-return arrangement to return the switch to the normal vertical position; an R handle can only rotate the switch to the R position and the I handle can only rotate the switch to the I position. These handles are removeable only in the normal vertical position.

The Pull-to-Lock Mechanism

Control switches generally have positions both 45° left and right of the normal vertical position. The handle spring-returns to the normal position. The pull-to-lock mechanism enables an operator to turn the handle beyond the left (normally TRIP) position to the 90° location, pull out the handle and thereby lock the switch into this position. This precludes the possibility of someone inadvertently closing a circuit-breaker when it is desired that it stay in the tripped position.

The Slip-Contacts

Because control switches return to the normal vertical position after performing their function, the control contacts in these positions open. It is often desirable to have alarm or indicator contacts stay on and show what the last active position was. The slip-contacts do this. A slip coupling is connected to the back of the switch shaft; a positive detent mechanism is attached, and then one or more slip-contact decks are attached to provide this function. The contacts are closed when the switch is turned to its commanded position, the slip coupling enables the handle to return to normal without disturbing the slip-contact decks, and the slip-contacts will only open when the switch is turned to the other control position.

THE ELECTRICAL DESIGN

The series 24 Instrument and Control Switch contacts operate on the original, reliable principle of knife switches--double-sided, double-wiping, spring-wiper blades closing on both sides of a terminal. This design is shock-proof and virtually bounce-proof. Figure 3 shows a typical contacting arrangement.

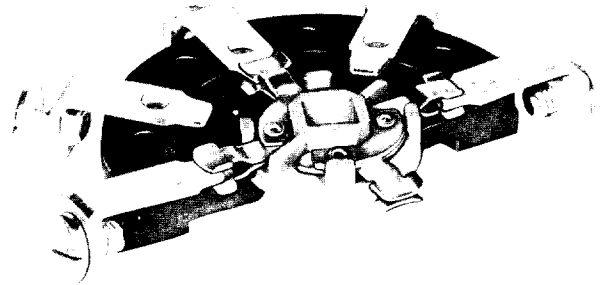


Fig. 3. Double-sided, double-wiping knife-type contact configuration

Contact Materials

The wiper blades are made from a phosphor-bronze alloy with a silver alloy overlay that combines superior spring qualities with good electrical conductivity. This material and blade design has been proven by extensive laboratory testing as well as more than thirty years of field use and experience. Initially used in rugged naval ship applications, it is also used in industrial applications such as railroad locomotives and earth moving equipment. It has been used for more than fifteen years in power industry applications, as well.

The blades are formed, assembled, and riveted nearly closed. The gap is machine adjusted to provide a uniform high pressure. The gap does not change with time and use. Normal use tends to improve the contact surfaces due to the rubbing action. This provides a burnishing as well as cleaning action.

The contact surface conductivity is enhanced by a silver overlay that lasts the life of the unit. This ensures a good contact even in those cases where the switch is not operated for long periods of time.

The terminals are made of electrically and environmentally compatible copper material with a silver overlay at the contact area plus an overall silver-plate to ensure a lastingly good contact surface for customer wiring purposes. Similarly, the terminal screws are made from silver-plated brass.

Contact Deck Arrangements and Contact Charts

The blade and terminal configurations enable the use of multicontacts in the same deck, and simple stacking procedures enable the fabrication of up to ten decks in one switch.

Two standard blade configurations are available (shown in Fig. 4 and Fig. 8). Figure 4 illustrates the most common arrangement whereby two separate and independent contacts are provided

in each deck. This arrangement is used in all control switches and any other application of two or three positions. Deck 1 is shown. Terminal numbers repeat for multideck switches. The first number indicates the deck number; the second indicates the terminal location around the deck.

For the illustration shown a typical deck is used to show contact choice for popular position arrangements. Position 2 contact choices should not be used in the same deck as position 1 choices because of the overlap of terminals. One position 1 contact (upper) can be combined with one position 2 contact (lower), though--and other combinations can also be made by a careful choice, avoiding using the same terminal number for two contacts.

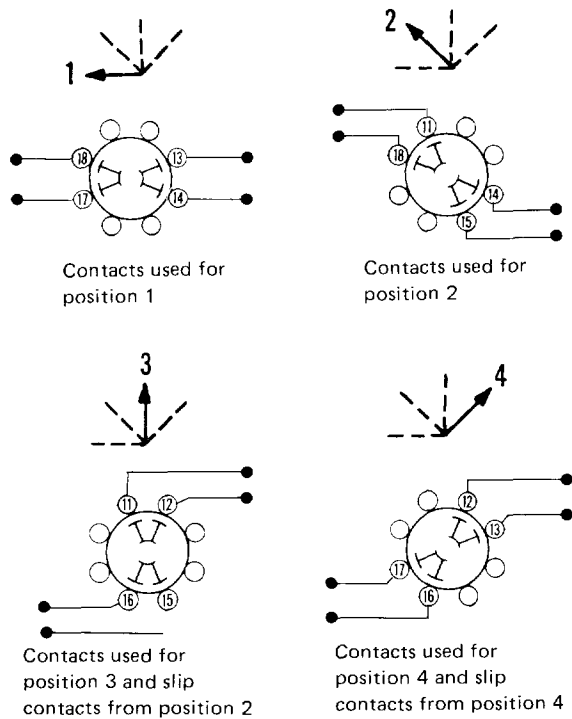


Fig. 4. Basic Two Contact Deck Layout

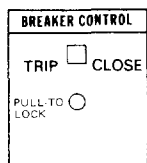
A typical application using the two contact-per-deck design is illustrated in a contact chart arrangement in Figure 5.

CIRCUIT BREAKER CONTROL SWITCH

Handle: Pistol-grip

UNIVERSAL CIRCUIT

Cat. No. 2458D



DECK	CONTACTS HANDLE END	POSITIONS				
		PULL-TL	TRIP	nat	nac	CLOSE
1	12-13, 16-17					X
2	21-28, 24-25		X			
3	33-34, 37-38	X				
4	41-42, 45-46			X	X	
5	52-53, 56-57				X	X
6	61-62, 65-66	X	X			

Fig. 5. Typical Contact Chart Using Two Independent Contacts Per-Deck Design

Another useful application for the two contact-per-deck design is the double-throw with OFF arrangement. A jumper is assembled between "11" and "12" and "15" and "16" to provide a common input to the adjacent positions. This is illustrated in Figure 6.

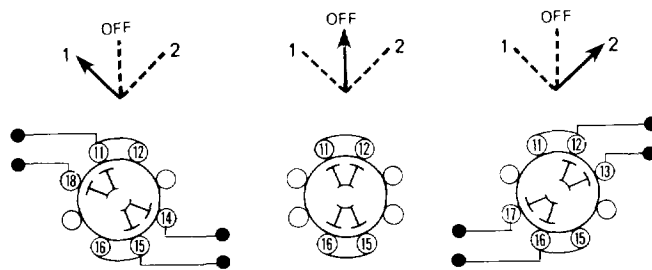


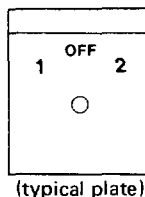
Fig. 6. Double-Throw (with OFF) Configuration Two Contact-Per-Deck Design

A typical contact chart of this double-throw with "OFF" arrangement is shown in Figure 7.

DOUBLE-THROW SWITCH WITH OFF

Handle: Oval

Cat. No. 24210B (10 deck)



DECK	CONTACTS HANDLE END	POSITIONS		
		1	OFF	2
1	11-18, 12-13, 15-14, 16-17	X		X
2	21-28, 22-23	X		X
10	93-94, 96-97, 101-108, 102-103, 105-104, 106-107	X		X

Fig. 7. Typical Contact Chart for Double-Throw Application Using Two-Contact-Per-Deck Design with Optional Strap Jumpers

The standard tap-switch contact arrangement is illustrated in Figure 8. This is very useful in meter applications and any other application having three or more "ON" positions. The common input is to terminal "11" which feeds through an integral slip-ring and sequentially connects the circuit to the other seven terminals.

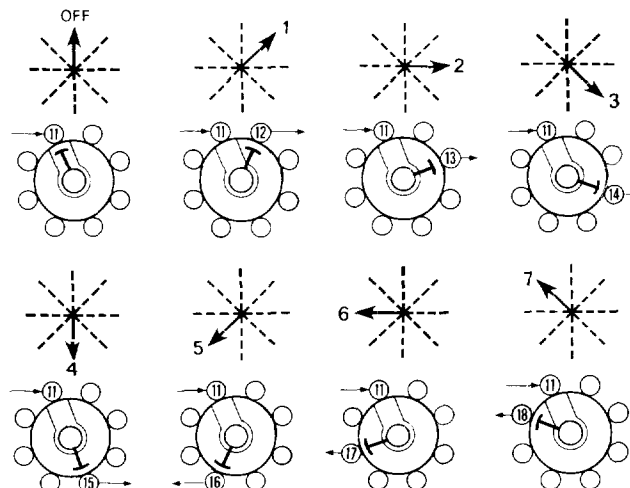


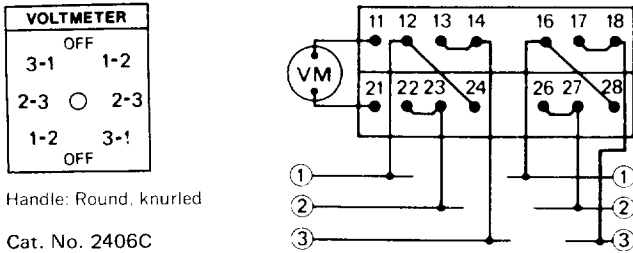
Fig. 8. Typical Tap-Switch Contact Deck Layout

A contact chart layout of the tap-switch arrangement is shown in Figure 9. Up to ten decks of this arrangement are available.

DECK	CONTACTS HANDLE END	POSITIONS							
		OFF	1	2	3	4	5	6	7
1	11 ○								
	12		×						
	13			×					
	14				×				
	15					×			
	16						×		
	17							×	
18								×	

Fig. 9. Contact Chart Using Tap-Switch Contact Design

The most common use of the tap-switch contact arrangement is the metering application. Figure 10 illustrates a simple wiring diagram of a two deck switch to transfer two three-phase systems sequentially to one voltmeter. The contact chart is the same as Figure 9 except there are two decks. The terminal numbers on deck two are the same as the first deck except they start with "2".



Handle: Round, knurled
Cat. No. 2406C

Fig. 10. Wiring diagram of a typical voltmeter transfer switch, 2-3 ϕ ckts, ϕ to ϕ

The tap-switch arrangement is also very useful in ammeter transfer applications. Shorting or make-before-break overlapping contacts are used to ensure that the CT's are never "open". The sequence is:

1. short the CT's to "ground"
2. connect the CT to the ammeter
3. open the CT "ground" (read "amp")
4. reconnect the CT to "ground"
5. remove the CT from the ammeter

A typical ammeter transfer switch uses two decks. The first deck is like Figure 9 except with shorting contacts and the second deck has seven shorting contacts and has an open only where the first deck is closed. The first deck selects the ammeter and the second deck controls the grounding of the CT. The deck arrangement is shown in Figure 11.

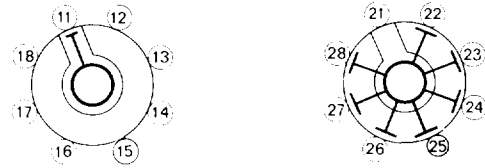
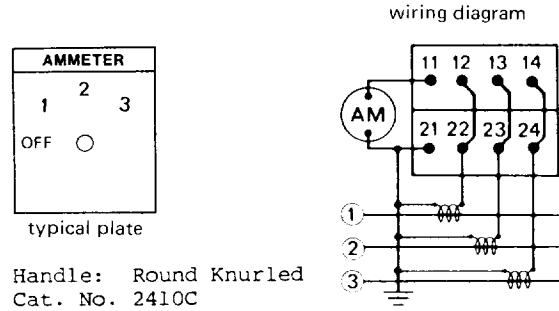


Fig. 11. Typical deck layout of an Ammeter Transfer Switch using shorting Contacts

A contact chart and wiring diagram of an ammeter transfer switch used in a three-phase, three CT application is illustrated in Figure 12.



Handle: Round Knurled
Cat. No. 2410C

*Indicates shorting contacts

DECK	CONTACTS HANDLE END	POSITIONS					
		OFF	* 1	* 2	* 3		
1	11 ○						
	12		×	×	×		
	13				×	×	×
	14						×
2	21 ○						
	22	×	×	×	×	×	×
	23	×	×	×	×	×	×
	24	×	×	×	×	×	×

Fig. 12. Ammeter transfer switch, 3 ϕ , 3CT

Shorting contacts are often shown in another manner. For illustration purposes, the contact chart of Figure 12 is repeated using this method.

DECK	CONTACTS HANDLE END	POS.			
		OFF	1	2	3
1	11 ○				
	12		×		
	13			×	
	14				×
2	21 ○				
	22	×	×	×	×
	23	×	×	×	×
	24	×	×	×	×

DECKS 1 & 2 SHORTING CONTACTS

Fig. 13. Alternate method of illustrating shorting contacts

Contact charts, wiring diagrams, and escutcheon plate engravings for the most common instrument and control applications are detailed on pages 14 to 20 along with catalog numbers and other ordering information. Additionally, the design flexibility enables the user to specify literally millions of contacting arrangements using the standard design and stocked parts to exactly satisfy his switching needs. A "DESIGN GUIDE" is included on pages 21 and 22 to aid the user in specifying these needs.

Contact Ratings

The series 24 Instrument and Control Switch has been tested to many different circuit conditions. The interrupting ratings are based on 10,000 operations of life, using suddenly applied and removed rated voltage, with no extensive burning of contacts. Inductive ratings are based on tests using standard inductance L/R=0.04 for DC and $\cos\theta=0.4$ for AC. The Interrupting Rating column headed "double contacts" means two contacts in series. Short-time, and continuous ratings are based on temperature rise in contact members and supporting parts not exceeding 50°C above ambient.

TABLE I

CONTACT RATINGS FOR TWO CONTACTS/DECK DESIGN

CONTACT CIRCUIT VOLTS	INTERRUPTIVE RATING (AMPS)				SHORT TIME RATING (AMPS)**	CON- TINUOUS RATING (AMPS)
	RESISTIVE		INDUCTIVE*			
	SINGLE CONTACT	DOUBLE CONTACT	SINGLE CONTACT	DOUBLE CONTACT		
125VDC	5	10	2	5	60	30
250VDC	3	5	1	2	60	30
120VAC	20	30	20	30	60	30
240VAC	15	20	10	15	60	30
480VAC	7.5	10	5	5	60	30
600VAC	6	6	5	5	60	30

TABLE II

CONTACT RATINGS FOR TAP-SWITCH CONTACT DESIGN

CONTACT CIRCUIT VOLTS	INTERRUPTIVE RATING (AMPS)				SHORT TIME RATING (AMPS)**	CON- TINUOUS RATING (AMPS)
	RESISTIVE		INDUCTIVE*			
	SINGLE CONTACT	DOUBLE CONTACT	SINGLE CONTACT	DOUBLE CONTACT		
125VDC	3	5	2	5	60	30
250VDC	3	3	1	2	60	30
120VAC	20	25	20	30	60	30
240VAC	15	20	10	15	60	30
480VAC	7.5	10	5	5	60	30
600VAC	6	6	5	5	60	30

*AC PF = 0.4; DC L/R = 0.04

**Short time current for one minute

Circuit-breaker control switches must "make" the circuit, but independent means (such as breaker auxiliary contacts) "break" the circuit. In these and similar applications, a "make" rating is useful (the switch "breaks" on no-load). Make ratings are: 95A-125VDC.

Allowable Variation from Rated Voltage

Series 24 Instrument and Control Switches are not sensitive to normal variations in voltage. The interrupting capacity is important as indicated in Table I. Variations of plus and minus 20% in rated voltage need not be considered as long as the interrupting current is not exceeded.

VERIFICATION TESTING

The series 24 Instrument and Control Switch has undergone extensive laboratory testing to verify its ruggedness and reliability under a variety of power industry applications. The most important tests include aging since experience with similar electro-mechanical devices shows that failure will most likely occur after electro-mechanical endurance tests. These aging tests accelerate mechanical wear and electrical contact erosion and pitting due to arcing.

The aging tests are conducted in conformance with the following specifications and standards:

- . ANSI/IEEE-STD-323-1984- IEEE Standard for Qualifying Class IE Equipment for Nuclear Power Generating Stations
- . IEEE-STD-344-1987-IEEE Recommended Practices for Seismic Qualification of Class IE Equipment for Nuclear Power Generating Stations
- . ANSI/IEEE C37.90-1978 Standard for Relays and Relay Systems Associated with Electric Power Apparatus
- . ANSI/IEEE C37.98-1987 Standard for Seismic Testing of Relays

The testing is performed in accordance with ESC-STD-1000-General Specifications for Rotary Switches and Auxiliary Relays for Utility Applications including Class IE Equipment Requirements for Nuclear Power Generating Stations. The tests include ratings evaluation tests, aging tests to simulate forty years operating life, and seismic tests.

Aging Tests

Aging tests are run in accordance with ANSI-IEEE-STD-323-1984 and ESC-STD-1000 and consist of the following (run in sequence):

1. Visual and mechanical examination
2. Circuit configuration and operation
3. Dielectric withstanding voltage - 2200VRMS, 60Hz for one minute
4. Insulation resistance - 100 megohms minimum at 500VDC
5. Contact resistance - 10 milliohms maximum at rated current
6. Radiation aging - 10 megarads, CO⁶⁰ gamma
7. Elevated Humidity - 46 hours at 95% RH
8. Temperature rise (contacts) - 50°C maximum at maximum continuous current rating
9. Elevated Temperature - 120 hours at 80°C
10. Aging - 10,000 cycles under electrical load
11. Seismic vibration - ZPA=5g
12. After test measurements (in order) - items 3 (1000 VRMS after aging), 4,5,8,2,1

Details on the background of these tests plus the methods and procedures are outlined in ESC-STD-1000.

Seismic Tests

The series 24 Instrument and Control Switch is subjected to fragility testing in a seismic environment after aging to an accelerated life estimated to be forty years. This sequence is outlined under Aging Tests. The seismic tests are in accordance with IEEE-STD-344-1987 and ANSI-IEEE C37.98-1987. The tests are performed in accordance with ESC-STD-1000. Broadband repeatable multi-frequency input motions are used. The Fragility Response Spectrum (FRS) envelopes the Standard Response Spectrum (SRS) shown in Figure 14 using a biaxial input motion.

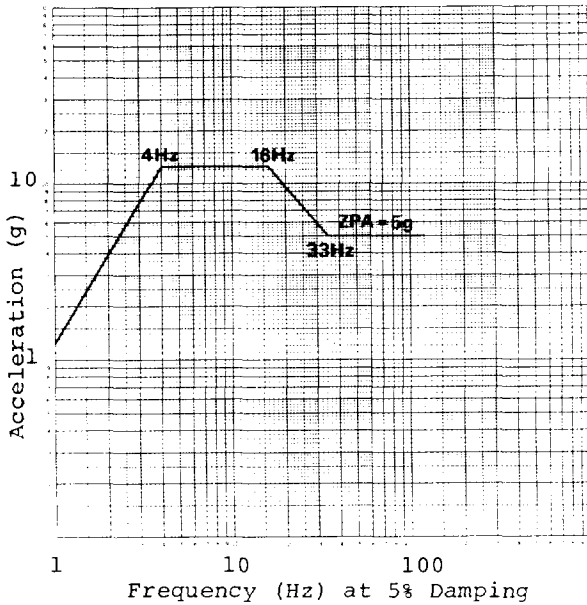


Fig. 14. Multi-frequency Broadband Standard Response Spectrum (SRS)

ORDERING DATA

Standard Instrument and Control Switches

The standard series 24 Instrument and Control switches are ordered by catalog number. Each catalog number identifies a specific switch that is furnished complete with the contact arrangement, terminal-to-terminal prewiring, handle, and engraved escutcheon plate shown in the description that accompanies the switch listing. The listings are on pages 15 to 20. Each switch is supplied with complete mounting hardware for panels up to 3/16 inch thick. **The most common circuits are stocked for immediate delivery.**

Standard General Purpose Switches

The standard tap, transfer, and selector switches are ordered by catalog numbers. Each catalog number identifies a specific switch that is furnished with an oval handle and a blank nameplate. The catalog numbers are listed on pages 14 and 15. Each switch is supplied with complete mounting hardware for panels up to 3/16 inch thick. **The most common arrangements are stocked for immediate delivery.**

The round-knurled or pistol-grip handles may be substituted for the oval handle without affecting the availability of the switch since the handles are interchangeable. Order by exception, e.g. Catalog No. 24205B except with round-knurled handle or Catalog No. 24205B except with pistol-grip handle.

Nameplates are available in four standard styles. Generally, the factory will automatically supply the appropriate one. When ordering engraved plates, however, it is important to use the correct prefix number and specify engraving.

PREFIX	NAMEPLATE
10	Standard
11	Removeable handle or waterproof-mount
18	Standard target
19	Target with pull-to-lock.

Prefix numbers have already been assigned to the standard nameplates listed in this bulletin.

Engraving for nameplates is available upon request. Standard engravings are ordered by engraving code, e.g. Catalog No. 24205B with engraving 10C-3B12 or the engraving code can be shown on the DESIGN GUIDE. Standard engravings are listed on pages 8 to 13. Engravings different from those listed are also available on request. The title is limited to fourteen characters and the positions are limited to five characters each.

The standard engraving codes are broken down in two ways to aid in selecting the most appropriate one, as follows:

1. There are many common position arrangements but with different titles. These are detailed on pages 8 to 11. The position arrangements shown are:

OFF-ON	ON-OFF
MAN-AUTO	AUTO-MAN
OFF-TEST	
RAISE-LOWER	LOWER-RAISE
LOCAL-REMOTE	REMOTE-LOCAL
STOP-START	START-STOP
SUPV-LOCAL	
TRIP-CLOSE	
OPEN-CLOSE	CLOSE-OPEN
1-2-3	1-OFF-2
LOWER-OFF-RAISE	RAISE-OFF-LOWER
AUTO-OFF-MAN	MAN-OFF-AUTO

2. The rest of the standard engravings are listed alphabetically by title, e.g. AMMETER, SYNCHROSCOPE, etc. These engravings are listed on pages 11 to 13.

Nonstandard Switches

The modular flexible design feature of the series 24 Instrument and Control Switch enables literally millions of combinations while utilizing only a few standard stocked parts and subassemblies. These may be specified by filling out the DESIGN GUIDE included on pages 21 or 22 or by any other means that conveniently conveys the requirements to us. Some nonstandards may be:

panels greater the 3/16 inch thick

- colored handles or nameplates (most colors can be made available using epoxy paint)
- a separation barrier for combination nuclear class IE and nonclass IE use
- removeable handles
- pull-to-lock
- special drawing or document control
- waterproof-mount

A DESIGN GUIDE (see pages 21 and 22) will be prepared by an Electro Switch applications engineer and a specific drawing number will be assigned for customer use and control. The number may be one of two types depending on whether the basic switch is modified, e.g.

24205B-001 The basic switch is standard, the -001 is a specific three digit number assignment to show what is added or changed without affecting the basic switch, e.g. we can take a standard or stock switch and add or subtract something to make this switch.

24205LE There is a modification to the basic switch, the uncoded series LB, LC, LD, etc. is a specific assignment to show the modification. The switch is fabricated special to order.

Jumpers

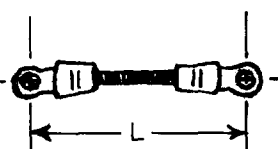
Strap jumpers are available for adjacent contacts, and wire and lug assemblies are available for other terminal jumpering. The strap jumpers are available in packages of ten or twenty-five. The wire and lug assemblies are ordered individually. Data is as follows:

Strap jumpers are silver-plated brass

CATALOG NO.	DESCRIPTION
02011-10-C3	Jumper, adjacent terminals on the same deck
02011-12-C3	Jumper, same terminal location on adjacent deck

Wire and lug assemblies have #10AWG wire and insulated ring lugs.

CATALOG NO.	LENGTH (L)
002012-1	3-1/16"
002012-2	4-1/4"
002012-3	5-5/8"

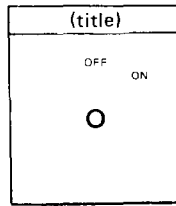


Engravings by Standard Position Arrangements

OFF-ON position arrangement

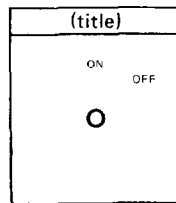
Title	Engr. Code
NONE (BLANK).....	10D-2X5
AMMETERS.....	10D-2A13A
CUTOFF.....	10D-2C11B

OFF-ON position arrangement (continued)



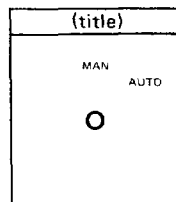
Title	Engr. Code
CUTOUT SWITCH.....	10D-2C17E
CURRENT BALANCE.....	10D-2C19B
DC VOLTS.....	10D-2D12A
ENGINE CONTROL.....	10D-2E18
FREQUENCY METER.....	10D-2F19A
FREQUENCY CONTROL....	10D-2F21
GROUND RELAY.....	10D-2G16C
GROUND DETECTOR.....	10D-2G19E
GENERATOR HEATER.....	10D-2G20C
HEATER CONTROL.....	10D-2H18
KVAR METER.....	10D-2K14A
LAMPS.....	10D-2L10
LOAD SHED.....	10D-2L13
MAINTENANCE SAFETY...	10D-2M22G
P.F. METER.....	10D-2P14
POWER DISCONNECT.....	10D-2P20D
RECLOSER.....	10D-2R13
REGULATOR.....	10D-2R14
REMOTE ALARM.....	10D-2R16A
REGULATOR SW.....	10D-2R16B
REGULATOR SWITCH....	10D-2R20E
RECLOSER CUTOFF.....	10D-2R19B
RECLOSER CUTOUT.....	10D-2R19
RECLOSER SWITCH.....	10D-2R19F
REVERSE POWER RELAY..	10D-2R22B
SPACE HEATER.....	10D-2S16
SYNCHROSCOPE.....	10D-2S17
SUPV'Y CONTROL.....	10D-2S18H
SUPERVISORY CTL.....	10D-2S19A
TRIP CUT-OFF.....	10D-2T16A
TRANSFER TRIP.....	10D-2T17C
TURBINE CONTROL.....	10D-2T19
VOLTAGE REG.....	10D-2V15C
VOLTAGE CONTROL.....	10D-2V19
VOLTAGE REGULATOR....	10D-2V21
VOLTMETER.....	10D-2V14
WATTMETER.....	10D-2W14
UNIT PARALLEL.....	10D-2U17
VARMETER.....	10D-2V13

ON-OFF position arrangement



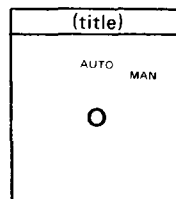
Title	Engr. Code
NONE (BLANK).....	10D-2X5A
MOTOR CONTROL.....	10D-2M17H
RECLOSER.....	10D-2R13C
REGULATOR.....	10D-2R14E

MAN-AUTO position arrangement



Title	Engr. Code
NONE (BLANK).....	10D-2X7B
AUTO MAN.....	10D-2A14
CONTROL TRANSFER.....	10D-2C22H
EXITER CONTROL.....	10D-2E20B
MASTER CONTROL.....	10D-2M20E
REGULATOR.....	10D-2R16
SELECTOR.....	10D-2S15
SYNCHRONIZING.....	10D-2S20E
TRANSFER SWITCH.....	10D-2T21E
VOLTAGE REGULATOR....	10D-2V23C

AUTO-MAN position arrangement



Title	Engr. Code
NONE (BLANK).....	10D-2X7A
AUTO-MAN SWITCH.....	10D-2A21E
CONTROL SWITCH.....	10D-2C20C
EXCITATION.....	10D-2E17A
MODE SELECTOR.....	10D-2M19D
PITCH SELECTOR.....	10D-2P20

AUTO-MAN position arrangement (continued)

(title)	Title	Engr. Code
	SELECTOR.....	10D-2S15H
	SYNCHRONIZE.....	10D-2S18F
	SYNCHRONIZING.....	10D-2S20C
	THROTTLE SELECT.....	10D-2T21B
	TRANSFER MODE.....	10D-2T19L
	TRANSFER SWITCH.....	10D-2T21F
	VOLTAGE CONTROL.....	10D-2V21A
	VOLTAGE REGULATOR.....	10D-2V23
	VOLT. REGULATOR.....	10D-2V21C

OFF-TEST position arrangement

(title)	Title	Engr. Code
	NONE (BLANK).....	10D-2X7K
	GND TEST SW.....	10D-2G16D
	GROUND FAULT.....	10D-2G18J
	LAMP TEST.....	10D-2L15B
	LOAD TEST TRANSFER...	10D-2L23
	TEST SWITCH.....	10D-2T17F

SUPV-LOCAL position arrangement

(title)	Title	Engr. Code
	NONE (BLANK).....	10D-2X9BL
	MASTER CONTROL.....	10D-2M22B
	SUPERVISORY.....	10D-2S20D
	SYNCHRONIZING.....	10D-2S22E
	TRANSFER.....	10D-2T17

RAISE-LOWER position arrangement

(title)	Title	Engr. Code
	NONE (BLANK).....	10D-2X10R
	ENGINE CONTROL.....	10D-2E23
	ENGINE SPEED.....	10D-2E21
	FIELD RHEOSTAT.....	10D-2F23A
	FREQUENCY CONTROL.....	10D-2F26
	GEN. VOLTS.....	10D-2G19B
	GOVERNOR.....	10D-2G18
	GOVERNOR CONTROL.....	10D-2G25A
	GOVERNOR SWITCH.....	10D-2G24
	LOAD CONTROL.....	10D-2L21
	MOTOR CONTROL.....	10D-2M22
	PUMP.....	10D-2P19B
	POWER SUPPLY.....	10D-2P21C
	RHEOSTAT CONTROL.....	10D-2R25
	SPEED CONTROL.....	10D-2S22
	SPEED ADJUST.....	10D-2S21B
	VOLTAGE.....	10D-2V17
	VOLTAGE CONTROL.....	10D-2V24

RAISE-LOWER position arrangement with target

(title)	Title	Engr. Code
	NONE (BLANK).....	18B-2X10R
	ENGINE CONTROL.....	18B-2E23
	ENGINE SPEED.....	18B-2E21
	FREQUENCY CONTROL.....	18B-2F26
	GOVERNOR.....	18B-2G18
	GOVERNOR CONTROL.....	18B-2G25A
	MOTOR CONTROL.....	18B-2M22
	PUMP.....	18B-2P19B
	POWER SUPPLY.....	18B-2P21C
	SPEED CONTROL.....	18B-2S22

RAISE-LOWER position arrangement with target (continued)

(title)	Title	Engr. Code
	VOLTAGE.....	18B-2V17
	VOLTAGE CONTROL.....	18B-2V24
	FREQUENCY CONTROL....	18B-2F26B
	TURBINE SPEED.....	18B-2T22L
	TURBINE VOLTAGE.....	18B-2T24K
	VOLTAGE ADJUST.....	18B-2V23D

LOWER-RAISE position arrangement

(title)	Title	Engr. Code
	NONE (BLANK).....	10D-2X10G
	GOVERNOR.....	10D-2G18H
	GOVERNOR CONTROL.....	10D-2G25
	MOTOR CONTROL.....	10D-2M22A
	VOLTAGE CONTROL.....	10D-2V24A
	TAP CHANGER CONTROL..	10D-2T27A

LOWER-RAISE position arrangement with target

(title)	Title	Engr. Code
	NONE (BLANK).....	18B-2X10G
	GOVERNOR.....	18B-2G18H
	GOVERNOR CONTROL.....	18B-2G25
	MOTOR CONTROL.....	18B-2M22A
	VOLTAGE CONTROL.....	18B-2V24A
	TAP CHANGER CONTROL..	18B-2T27A
	ENGINE SPEED.....	18B-2E21D
	REGULATOR.....	18B-2R19L
	SPEED CONTROL.....	18B-2S22AC
	VOLTAGE REGULATOR....	18B-2V26C

LOCAL-REMOTE position arrangement

(title)	Title	Engr. Code
	NONE (BLANK).....	10D-2X11B
	BREAKER CONTROL.....	10D-2B25B
	COMPUTER MASTER.....	10D-2C25A
	ENGINE CONTROL.....	10D-2E24
	EXCITER CONTROL.....	10D-2E27
	LOCAL REMOTE SW.....	10D-2L24A
	UNIT OPERATION.....	10D-2U24

REMOTE-LOCAL position arrangement

(title)	Title	Engr. Code
	NONE (BLANK).....	10D-2X11
	CONTROL SELECTOR SW..	10D-2C28
	MASTER TRANSFER.....	10D-2M25A
	MODE.....	10D-2M15C
	TRIP SW.....	10D-2T18D
	TRANSFER SWITCH.....	10D-2T25A
	VALVE.....	10D-2V16

STOP-START position arrangement with target

(title)	Title	Engr. Code
	NONE (BLANK).....	18B-2X9H
	ENGINE.....	18B-2E15
	MOTOR CONTROL.....	18B-2M21E
	BREAKER CONTROL.....	18B-2B23H
	MODE CONTROL.....	18B-3M21C
	OIL PUMP CONTROL.....	18B-2O23

START-STOP position arrangement with target

(title)	Title	Engr. Code
	NONE (BLANK).....	18B-2X9S
	MOTOR CONTROL.....	18B-2M21C
	TIME RECORD.....	18B-2T19D
	TURB. MAN. CONT.....	18B-2T23D
	FEEDER.....	18B-2F15E
	GENERATOR.....	18B-2G18L
	MASTER CONTROL SW.....	18B-2M24G

1-2-3 position arrangement

(title)	Title	Engr. Code
	NONE (BLANK).....	10C-3X3A
	AMMETER.....	10C-3A10A
	AMMETER-VOLTMETER.....	10C-3A19
	VOLTMETER.....	10C-3V12

STOP-START & PULL-TO-LOCK position arrangement with target

(title)	Title	Engr. Code
	NONE (BLANK).....	19C-3X19B
	CONTROL SWITCH.....	19C-3C29K
	BREAKER CONTROL.....	19C-3B33C
	FIRE PUMP.....	19C-3F27H
	MOTOR CONTROL.....	19C-3M31D

1-OFF-2 position arrangement

(title)	Title	Engr. Code
	NONE (BLANK).....	10C-3X5
	AMMETER.....	10C-3A12A
	BATTERY.....	10C-3B12
	FREQUENCY.....	10C-3F14
	FREQUENCY METER.....	10C-3F19
	STANDBY UNIT.....	10C-3S16E
	SYNCHRONIZING.....	10C-3S18
	UNIT CONTROL.....	10C-3U16B
	VOLTMETER.....	10C-3V14

OPEN-CLOSE position arrangement with target

(title)	Title	Engr. Code
	NONE (BLANK).....	18B-2X9
	DISCONNECT SWITCH.....	18B-2D25
	GROUNDING SWITCH.....	18B-2G24A
	LOAD SHED.....	18B-2L17A
	MAN BREAKER CONTROL.....	18B-2M26
	MOAB CONTROL SWITCH.....	18B-2M26B
	OCB CONTROL.....	18B-2O19
	SHUT OFF VALVE.....	18B-2S21G
	SWITCH CONTROL.....	18B-2S22A
	VALVE CONTROL.....	18B-2V21G

LOWER-OFF-RAISE position arrangement

(title)	Title	Engr. Code
	NONE (BLANK).....	10C-3X13AL
	FREQUENCY ADJUSTER.....	10C-3F26B
	GOVERNOR CONTROL.....	10C-3G28D
	SPEED CONTROL.....	10C-3S25L
	TAP CHANGER.....	10C-3T23B
	VOLTAGE CONTROL.....	10C-3V27C

TRIP-CLOSE position arrangement with target

(title)	Title	Engr. Code
	NONE (BLANK).....	18B-2X9P
	BREAKER CONTROL.....	18B-2B23
	CKT BKR CONT.....	18B-2C19D
	CONTROL SWITCH.....	18B-2C22
	CIRCUIT BREAKER.....	18B-2C23E
	RECLOSER CONTROL.....	18B-2R24A

RAISE-OFF-LOWER position arrangement

(title)	Title	Engr. Code
	NONE (BLANK).....	10C-3X13G
	GOVERNOR.....	10C-3G21
	GOVERNOR CONTROL.....	10C-3G28A
	GOVERNOR SPEED.....	10C-3G27
	GOVERNOR SPEED CONTROL.....	10C-3G33
	MOTOR CONTROL.....	10C-3M25
	UNIT SPEED.....	10C-3U22
	VOLTAGE.....	10C-3V20C

TRIP-CLOSE & PULL-TO-LOCK position arrangement with target

(title)	Title	Engr. Code
	NONE (BLANK).....	19C-3X19A
	BREAKER CONTROL.....	19C-3B33
	BUS TIE BKR.....	19C-3B28B
	I. D. FAN.....	19C-3D26A
	MAIN OIL PUMP.....	19C-3M30J
	STANDBY OIL PUMP.....	19C-3S33A

AUTO-OFF-MAN position arrangement

(title)	Title	Engr. Code
	NONE (BLANK).....	10C-3X10E
	BRAKE CONTROL.....	10C-3B22E
	CONTROL SWITCH.....	10C-3C23
	ENGINE CONTROL.....	10C-3E23
	EXCITATION.....	10C-3E20A
	EXCITATION SWITCH.....	10C-3E26C
	MODE SELECTOR.....	10C-3M22B
	REGULATOR.....	10C-3R19

AUTO-OFF-MAN position arrangement (continued)

(title)	Title	Engr. Code
	SYNCHRONIZING.....	10C-3S23D
	SYNCHROSCOPE.....	10C-3S22B
	SYNCH. SELECTOR.....	10C-3S24D
	START-UP MODE.....	10C-3S22F
	VOLTAGE CONTROL.....	10C-3V24
	VOLTAGE REGULATOR....	10C-3V26A

MAN-OFF-AUTO position arrangement

(title)	Title	Engr. Code
	NONE (BLANK).....	10C-3X10A
	ACTUATOR FIRING.....	10C-3A24
	BREAKER CONTROL.....	10C-3B24
	ENGINE.....	10C-3E16
	ENGINE CONTROL.....	10C-3E23A
	EXCITATION.....	10C-3E20
	FUEL TRANSFER.....	10C-3F22
	MODE SELECTOR.....	10C-3M22
	REGULATOR.....	10C-3R19A
	SYNCH. MODE.....	10C-3S19
	SYNCHRONIZE.....	10C-3S21
	SYNCHROSCOPE.....	10C-3S22A
	VOLTAGE REGULATOR....	10C-3V26

Standard Nameplate Engravings Listed by Title

 Code 10C-3A22A	 Code 10D-2A21	 Code 10D-2A19F
 Code 10C-3A10D	 Code 10C-3A12C	 Code 10C-4A13
 Code 10D-4A13	 Code 10C-4A11	 Code 10C-4A13D
 Code 10D-4A13D	 Code 10E-5A12	 Code 10C-5A16

Standard Nameplate Engravings Listed by Title

 Code 10E-6A19	 Code 10E-7A20	 Code 10E-7A16A
 Code 10E-7A16	 Code 10E-8A17	 Code 10C-4A23C
 Code 10C-5A26	 Code 10C-5A24	 Code 10D-2A19
 Code 10D-4B16	 Code 10D-1B18	 Code 10C-3B27C
 Code 10D-2B21A	 Code 10D-2B18D	 Code 10C-4C27
 Code 10C-3C23B	 Code 10C-3C24F	 Code 10C-3C26E
 Code 10C-3D20	 Code 10D-2D22	 Code 10D-2D24
 Code 10D-3D27	 Code 10C-3D25A	 Code 10C-3D16

Standard Nameplate Engravings Listed by Title

Standard Nameplate Engravings Listed by Title

DOOR
AUTO
OPEN CLOSE
○
Code 10C-3D17A

EMERG. SHUT DOWN
EMERG STOP
○
Code 10D-1E24

ENGINE
STOP RUN
○
Code 10D-2E13A

MASTER SWITCH
OFF AUTO
HAND ○
Code 10C-3M23C

MODE SELECTOR
OFF
RUN EMERG ○
Code 10C-3M22F

MODE SELECTOR
LOCAL
REMOTE TEST ○
Code 10C-3M27

ENGINE CONTROL
START
OFF RUN ○
Code 10C-3E24A

ENGINE CONTROL
OFF START
RUN ○
Code 10D-3E24C

ENGINE CONTROL
NORM
STOP START ○
Code 10C-3E26B

MODE SELECTOR
AUTO
OFF NORM EMERG ○
Code 10C-4M28

MODE SELECTOR
LOCAL
LOCKOUT REMOTE ○
Code 10C-3M30G

MODE SELECTOR
RESET
LOAD OIL GAS ○
Code 10C-4M27C

ENGINE CONTROL
OFF TEST
MAN ○ AUTO
Code 10D-4E27

ENGINE SELECTOR
AUTO
STOP RUN ○
Code 10C-3E25A

FAULT SELECTOR
B
A C G ○
Code 10C-4F17

MODE SWITCH
AUTO
MAN RESET ○ STOP
Code 10C-4M26C

MOTOR CONTROL
STOP
FOR REV ○
Code 10C-3M22A

MOTOR CONTROL
NEUT
STOP START ○
Code 10C-3M25A

FREQUENCY
OFF
GEN BUS ○
Code 10C-3F18

FREQUENCY METER
OFF
GEN BUS ○
Code 10C-3F23

FREQUENCY METER
OFF
1 2 3 ○
Code 10D-4F20

MOTOR CONTROL
AUTO
STOP START ○
Code 10C-3M25C

MOTOR CONTROL
NORMAL
RAISE LOWER ○
Code 10C-3M28

MOTOR CONTROL
AUTO
STOP START ○
PULL-TO LOCK
Code 10C-4M35

FREQUENCY METER
GEN 1
BUS GEN 2 OFF ○
Code 10C-4F28

FREQUENCY METER
GEN 2
GEN 1 GEN 3 OFF ○
Code 10C-4F29

FREQUENCY METER
GEN 2
GEN 1 GEN 3 OFF ○ BUS
Code 10C-5F32

OPERATION SELECTOR
AUTO
MAN TEST OFF ○
Code 10C-4031

PARALLELING SW
NORM
RRL ○
Code 10D-2P20E

P. F. METER
OFF
G1 02 ○
Code 10C-3P16C

FREQUENCY METER
GEN 2
GEN 1 GEN 3 GEN 4 OFF ○
Code 10C-5F33

FUEL SELECTOR
GAS LIQUID
○
Code 10D-2F21J

GOVERNOR
NORM
LOWER RAISE ○
Code 10C-3G22A

PHASE FAULT SELECTOR
OFF
AB BC CA ○
Code 10D-4P27A

PHASE SELECTOR
2 3 4
1 ○
Code 10C-4P17A

PILOT WIRE
STBY NORM
○
Code 10D-2P17D

GOVERNOR CONTROL
NORM
RAISE LOWER ○
Code 10C-3G29A

GOVERNOR TRANSFER
OFF
TEST MAN AUTO ○
Code 10C-4G31

GROUND FAULT SELECTOR
OFF
AG BG CG ○
Code 10D-4G28

PUMP CONTROL
MAN AUTO
OFF ○
Code 10C-3P21

PUMP SELECTOR
1-2 2-1
○
Code 10D-2P18A

PUMP SEQUENCE
2-3-1
1-3-2 2-1-3
1-2-3 3-1-2
3-2-1
○
Code 10E-6P42A

KW/KVAR SWITCH
KW KVAR
○
Code 10D-2K19

LEAD BOILER
OFF 1 2 3
○
Code 10D-4L16

LEAD PUMP SELECTOR
1 2
○
Code 10D-2L18C

PUMP SEQUENCE SELECTOR
1 2 3 4 5 6
○
Code 10E-6P26

RAM
AUTO
UP DOWN ○
Code 10C-3R13

RAM
OFF FLOAT
UP DOWN ○
Code 10C-4R17

LUBE PUMP
HAND OFF AUTO
○
Code 10C-3L19

MANUAL OIL PUMP
PUMP OFF AUTO
○
Code 10C-3M24C

MASTER CONTROL
AUTO OFF TEST
○
Code 10C-3M24

RECORDER
OFF RECORD
○
Code 10D-2R17C

RECORDER
NORMAL SERVICE
○
Code 10D-2R21E

REGULATOR
DROOP ISOC
○
Code 10D-2R18A

Standard Nameplate Engravings Listed by Title

Standard Nameplate Engravings Listed by Title

REGULATOR CONTROL
TEST
OFF ON
○
Code 10C-3R25

REGULATOR MODE
DIFF DROOP
○
Code 10D-2R22C

RELAY BYPASS
AUTO
COMM EMERG
○
Code 10C-3R24A

TEMP METER
OFF TEST
○ 1
4 3 2
Code 10E-6T21

TEMP METER
TEST 1
6 ○ 2
5 4 3
Code 10E-7T20

TEMP METER
TEST
7 1
6 ○ 2
5 4 3
Code 10E-8T20

SELECTOR SWITCH
OFF TEST
AUTO ○
Code 10C-3S25H

SELECTOR SWITCH
MAN OFF AUTO
○ TEST
Code 10C-4S28

SELECTOR SWITCH
OFF MAN
AUTO ○ TEST
Code 10C-4S28B

TEMP METER
OFF TEST
6 ○ 1
5 4 3 2
Code 10E-8T23

TEST SELECTOR
OFF AUTO
○
Code 10D-2T19K

TEST SWITCH
NORM TEST
○
Code 10D-2T18A

SELECTOR SWITCH
OFF AUTO
CRANK ○ TEST
Code 10C-4S30

SELECTOR SWITCH
2 3 4
1 ○ 5
6
Code 10E-6S20

SELECTOR SWITCH
OFF 1
6 ○ 2
5 4 3
Code 10E-7S23

TEST SWITCH
NORM
TEST 1 TEST 2
○
Code 10C-3T24B

TEST TRANSFER
NORM TEST
○
Code 10D-2T20A

TRANSFER TRIP
NORM BYPASS
○
Code 10D-2T22F

SEQUENCE SELECTOR
2-3-1
1-2-3 ○ 3-1-2
Code 10C-3S31

SOURCE SELECTOR
LINE 1
○ LINE 2
Code 10D-2S24

SPEED CONTROL
ISOCHR DROOP
○
Code 10B-2S23

TURBINE CONTROL
AUTO MAN
RESET ○ OFF
Code 10C-4T29C

VALVE CONTROL
AUTO OPEN
CLOSE ○
Code 10C-3V25B

VOLTAGE
LOW HIGH
○
Code 10D-2V14G

SPEED CONTROL
1 2
○ 3
5 4
Code 10D-5S17A

SYNCH SWITCH
OFF
GEN 1 ○ GEN 2
Code 10C-3S22K

SYNCHRONIZER
OFF TEST
MAN ○ AUTO
Code 10C-4S26A

VOLTAGE REG
UNIT PARA
○
Code 10D-2V19A

VOLTMETER
2-3
1-2 ○ 3-1
Code 10C-3V18

VOLTMETER
OFF BUST/E
GEN ○
Code 10C-3V21

SYNCHRONIZING
OFF MAN
AUTO ○
Code 10C-3S23D

SYNCHROSCOPE
R 1
○
Code 10C-2S14

SYNCHROSCOPE
OFF GEN 2
GEN 1 ○ GEN 2
Code 10C-3S23B

VOLTMETER
1 2 3
OFF ○
Code 10C-4V15A

VOLTMETER
A B C
OFF ○
Code 10C-4V15D

VOLTMETER
1-2 2-3 3-1
OFF ○
Code 10C-4V21

SYNCHROSCOPE
GEN 2
GEN 1 ○ GEN 3
Code 10C-4S26

SYNCHROSCOPE
GEN 2 GEN 3
GEN 1 ○ GEN 4
Code 10C-5S31

SYSTEM ISOLATION
CLOSED OPEN
○
Code 10D-2S25A

VOLTMETER
A-B B-C C-A
OFF ○
Code 10C-4V21A

VOLTMETER
OFF 1-2
○ 2-3
BUS 3-1
Code 10D-5V24A

VOLTMETER
1 2
1-2 ○ 3
2-3 3-1
Code 10E-6V21

TEMPERATURE TEST
NORM TEST
○
Code 10C-2T23

TEMP METER
TEST 1
○ 2
3
Code 10D-4T16

TEMP METER
OFF TEST
○ 1
2
Code 10D-4T19A

VOLTMETER
1-2 OFF 1
2-3 ○ 2
3-1 3
Code 10E-7V24

VOLTMETER
A-B OFF A
○ B
C-A C
Code 10E-7V24A

VOLTMETER
OFF 1
1-2 ○ 2
2-3 3
3-1 OFF
Code 10E-8V24A

TEMP METER
OFF TEST
○ 1
3 2
Code 10D-5T19

TEMP METER
1 2
○ 3
6 5 4
Code 10E-6T16


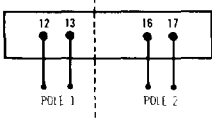

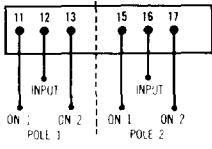

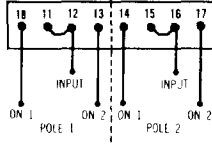
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TEST 1
○ 2
5 4 3
Code 10E-6T19

WATTMETER
W RVA
○
Code 10D-2W13


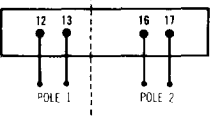

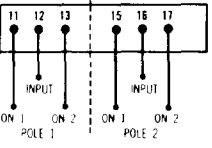

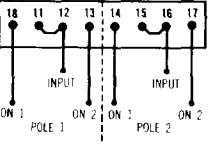
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○
Code 10C-3W16

WATTMETER
1 2 3
OFF ○
Code 10C-4W15

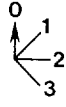
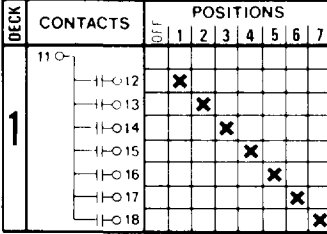
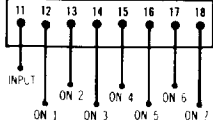
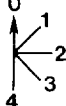
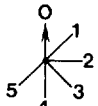
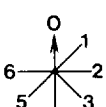
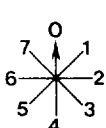
DETENT ACTION ROTARY SWITCHES

DESCRIPTION	STOPS	CONTACTING AND WIRING DIAGRAMS	CATALOG NUMBERS																																														
<p>OFF - ON SWITCH SINGLE-THROW</p> 	1 & 7	<p>This first deck is shown. Contacting is identical for all decks. The contact number changes. The first digit is the deck number; e.g. <u>1</u>1 is deck <u>1</u>, <u>2</u>1 is deck <u>2</u>, etc.</p> <table border="1" style="font-size: small;"> <tr><th>DECK</th><th>CONTACTS</th><th>POS.</th></tr> <tr><td rowspan="2">1</td><td>12 ○ — — — ○ 13</td><td>OFF ON</td></tr> <tr><td>16 ○ — — — ○ 17</td><td>OFF ON</td></tr> </table> 	DECK	CONTACTS	POS.	1	12 ○ — — — ○ 13	OFF ON	16 ○ — — — ○ 17	OFF ON	<p>The catalog numbers are for universal switches that provide all contacting shown. Oval handle supplied.</p> <p>To limit switches to positions shown put limit screws in holes in rear stop plate shown as "STOPS".</p>																																						
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	16 ○ — — — ○ 17	OFF ON																																															
<p>DOUBLE THROW SWITCH (NO OFF)</p> 	1 & 7	<table border="1" style="font-size: small;"> <tr><th>DECK</th><th>CONTACTS</th><th>POS.</th></tr> <tr><td rowspan="2">1</td><td>12 ○ — — — ○ 11</td><td>1 2</td></tr> <tr><td>12 ○ — — — ○ 13</td><td>1 2</td></tr> <tr><td rowspan="2">16</td><td>16 ○ — — — ○ 15</td><td>1 2</td></tr> <tr><td>16 ○ — — — ○ 17</td><td>1 2</td></tr> </table> 	DECK	CONTACTS	POS.	1	12 ○ — — — ○ 11	1 2	12 ○ — — — ○ 13	1 2	16	16 ○ — — — ○ 15	1 2	16 ○ — — — ○ 17	1 2	<table border="1" style="font-size: small; width: 100%;"> <thead> <tr> <th>Decks</th> <th>Catalog Numbers</th> <th>inches*</th> </tr> </thead> <tbody> <tr><td>1</td><td>24201B</td><td>2.4</td></tr> <tr><td>2</td><td>24202B</td><td>2.9</td></tr> <tr><td>3</td><td>24203B</td><td>3.6</td></tr> <tr><td>4</td><td>24204B</td><td>4.3</td></tr> <tr><td>5</td><td>24205B</td><td>4.8</td></tr> <tr><td>6</td><td>24206B</td><td>5.4</td></tr> <tr><td>7</td><td>24207B</td><td>6.2</td></tr> <tr><td>8</td><td>24208B</td><td>6.6</td></tr> <tr><td>9</td><td>24209B</td><td>7.4</td></tr> <tr><td>10</td><td>24210B</td><td>8.0</td></tr> </tbody> </table> <p>*depth behind panel</p>	Decks	Catalog Numbers	inches*	1	24201B	2.4	2	24202B	2.9	3	24203B	3.6	4	24204B	4.3	5	24205B	4.8	6	24206B	5.4	7	24207B	6.2	8	24208B	6.6	9	24209B	7.4	10	24210B	8.0
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<p>DOUBLE THROW SWITCH (WITH OFF)</p> 	2 & 7	<table border="1" style="font-size: small;"> <tr><th>DECK</th><th>CONTACTS</th><th>POS.</th></tr> <tr><td rowspan="4">1</td><td>11 ○ — — — ○ 18</td><td>1 OFF 2</td></tr> <tr><td>12 ○ — — — ○ 13</td><td>1 OFF 2</td></tr> <tr><td>15 ○ — — — ○ 14</td><td>1 OFF 2</td></tr> <tr><td>16 ○ — — — ○ 17</td><td>1 OFF 2</td></tr> </table>  <p>Order the jumpers for this arrangement separately (2 per deck P/N 02011-10)</p>	DECK	CONTACTS	POS.	1	11 ○ — — — ○ 18	1 OFF 2	12 ○ — — — ○ 13	1 OFF 2	15 ○ — — — ○ 14	1 OFF 2	16 ○ — — — ○ 17	1 OFF 2																																			
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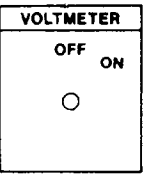
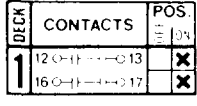
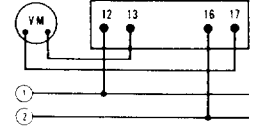
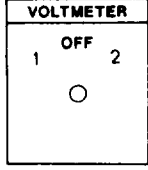
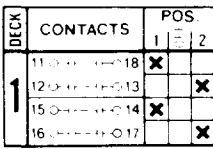
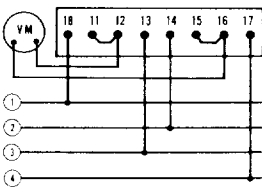
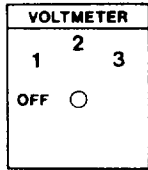
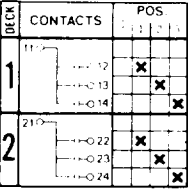
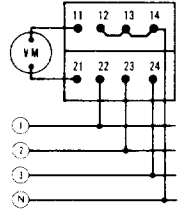
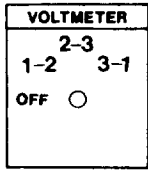
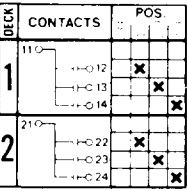
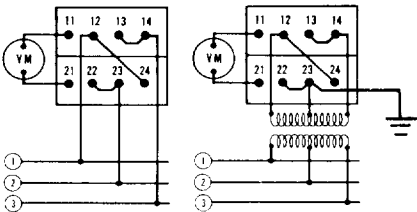
MOMENTARY (spring-return) ACTION ROTARY SWITCHES

DESCRIPTION	STOPS	CONTACTING AND WIRING DIAGRAMS	CATALOG NUMBERS																															
<p>OFF - ON SWITCH SINGLE-THROW</p> 	1 & 7	<p>This first deck is shown. Contacting is identical for all decks. The contact number changes. The first digit is the deck number; e.g. <u>1</u>1 is deck <u>1</u>, <u>2</u>1 is deck <u>2</u>, etc.</p> <table border="1" style="font-size: small;"> <tr><th>DECK</th><th>CONTACTS</th><th>POS.</th></tr> <tr><td rowspan="2">1</td><td>12 ○ — — — ○ 13</td><td>OFF ON</td></tr> <tr><td>16 ○ — — — ○ 17</td><td>OFF ON</td></tr> </table> 	DECK	CONTACTS	POS.	1	12 ○ — — — ○ 13	OFF ON	16 ○ — — — ○ 17	OFF ON	<p>The catalog numbers are for universal switches that provide all contacting shown. Oval handle supplied.</p> <p>To limit switches to positions shown put limit screws in holes in rear stop plate shown as "STOPS".</p>																							
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1	12 ○ — — — ○ 13	OFF ON																																
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<p>DOUBLE THROW SWITCH (NO OFF)</p> 	1 & 7	<table border="1" style="font-size: small;"> <tr><th>DECK</th><th>CONTACTS</th><th>POS.</th></tr> <tr><td rowspan="2">1</td><td>12 ○ — — — ○ 11</td><td>1 2</td></tr> <tr><td>12 ○ — — — ○ 13</td><td>1 2</td></tr> <tr><td rowspan="2">16</td><td>16 ○ — — — ○ 15</td><td>1 2</td></tr> <tr><td>16 ○ — — — ○ 17</td><td>1 2</td></tr> </table> 	DECK	CONTACTS	POS.	1	12 ○ — — — ○ 11	1 2	12 ○ — — — ○ 13	1 2	16	16 ○ — — — ○ 15	1 2	16 ○ — — — ○ 17	1 2	<table border="1" style="font-size: small; width: 100%;"> <thead> <tr> <th>Decks</th> <th>Catalog Numbers</th> <th>inches*</th> </tr> </thead> <tbody> <tr><td>1</td><td>74201B</td><td>2.4</td></tr> <tr><td>2</td><td>74202B</td><td>2.9</td></tr> <tr><td>3</td><td>74203B</td><td>3.6</td></tr> <tr><td>4</td><td>74204B</td><td>4.3</td></tr> <tr><td>5</td><td>74205B</td><td>5.3</td></tr> </tbody> </table> <p>*depth behind panel</p>	Decks	Catalog Numbers	inches*	1	74201B	2.4	2	74202B	2.9	3	74203B	3.6	4	74204B	4.3	5	74205B	5.3
DECK	CONTACTS	POS.																																
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	12 ○ — — — ○ 13	1 2																																
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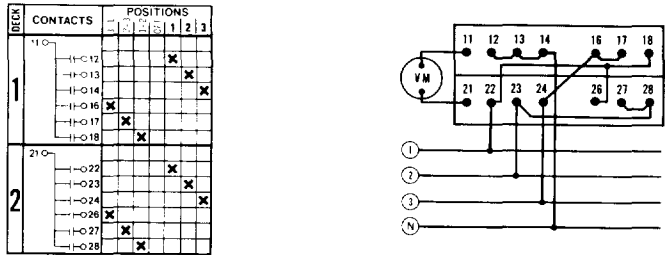
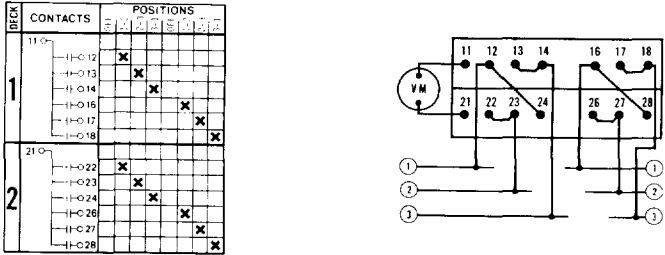
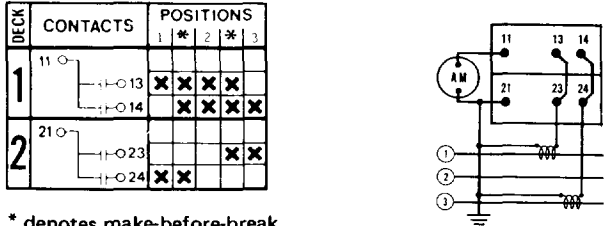
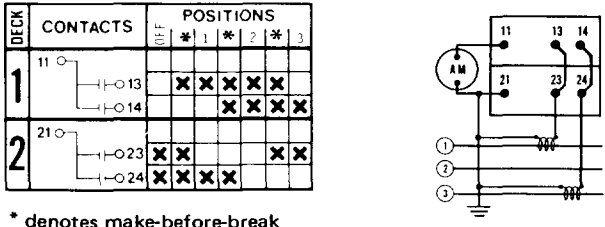
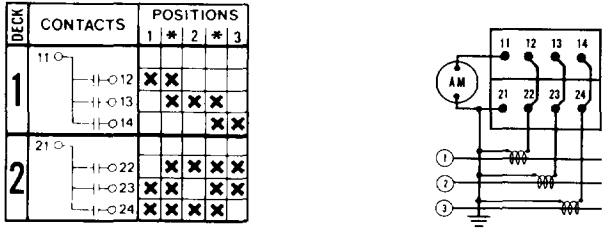
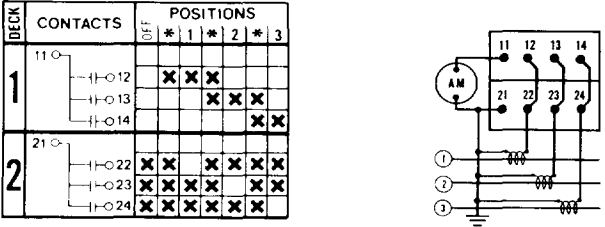
ROTARY TAP SWITCHES

DESCRIPTION	STOPS	CONTACTING AND WIRING DIAGRAMS	CATALOG NUMBERS																																	
TRIPLE-THROW SWITCH (with off) 	1 & 5	This first deck is shown. Contacting is identical for all decks. The contact number changes. The first digit is the deck number; e.g. <u>1</u> 1 is deck <u>1</u> , <u>2</u> 1 is deck <u>2</u> , etc.  	The catalog numbers are for universal switches that provide all contacting shown. Oval handle supplied. To limit switches to positions shown put limit screws in holes in rear stop plate shown as "STOPS". <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Decks</th> <th>Catalog Numbers</th> <th>inches*</th> </tr> </thead> <tbody> <tr><td>1</td><td>24301B</td><td>2.4</td></tr> <tr><td>2</td><td>24302B</td><td>2.9</td></tr> <tr><td>3</td><td>24303B</td><td>3.6</td></tr> <tr><td>4</td><td>24304B</td><td>4.3</td></tr> <tr><td>5</td><td>24305B</td><td>4.8</td></tr> <tr><td>6</td><td>24306B</td><td>5.4</td></tr> <tr><td>7</td><td>24307B</td><td>6.2</td></tr> <tr><td>8</td><td>24308B</td><td>6.6</td></tr> <tr><td>9</td><td>24309B</td><td>7.4</td></tr> <tr><td>10</td><td>24310B</td><td>8.0</td></tr> </tbody> </table>	Decks	Catalog Numbers	inches*	1	24301B	2.4	2	24302B	2.9	3	24303B	3.6	4	24304B	4.3	5	24305B	4.8	6	24306B	5.4	7	24307B	6.2	8	24308B	6.6	9	24309B	7.4	10	24310B	8.0
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8	24308B	6.6																																		
9	24309B	7.4																																		
10	24310B	8.0																																		
4-THROW SWITCH (with off) 	1 & 4																																			
5-THROW SWITCH (with off) 	1 & 3																																			
6-THROW SWITCH (with off) 	1 & 2																																			
7-THROW SWITCH (with off) 	none																																			

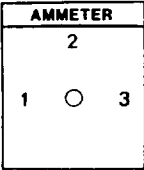
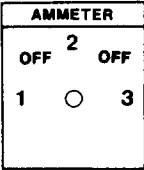
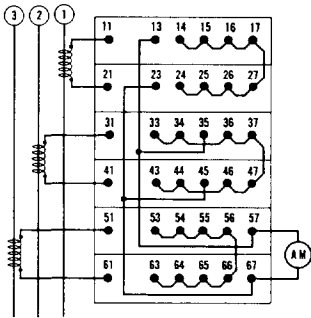
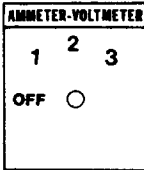
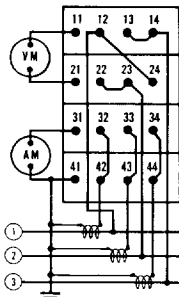
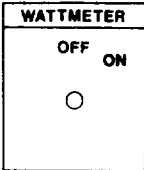
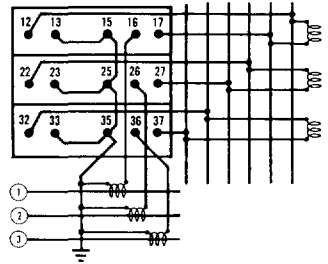
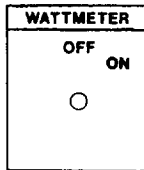
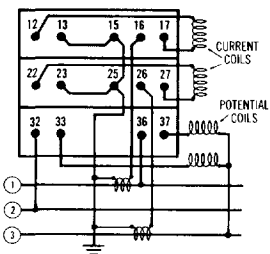
ROTARY SWITCHES for INSTRUMENT and CONTROL

APPLICATION	ESCUTCHEON	CONTACTING AND WIRING DIAGRAMS
VOLTMETER TRANSFER SWITCH 2-wire. Single phase or d-c Double-pole single-throw Handle: Round, knurled Cat. No. 2401C Depth behind panel - 2.4	 Code 10D-2V14	 
VOLTMETER TRANSFER SWITCH 4-wire. Two-phase or two separate d-c circuits Double-pole double-throw Handle: Round, knurled Cat. No. 2402C Depth behind panel - 2.4	 Code 10C-3V14	 
VOLTMETER TRANSFER SWITCH 3-phase, phase-to-neutral Double-pole triple-throw Handle: Round, knurled Cat. No. 2403C Depth behind panel - 2.9	 Code 10C-4V15A	 
VOLTMETER TRANSFER SWITCH 3-phase, phase-to-phase Double-pole triple-throw Handle: Round, knurled Cat. No. 2404C Depth behind panel - 2.9	 Code 10C-4V21	 

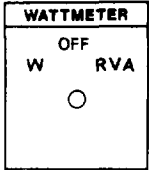
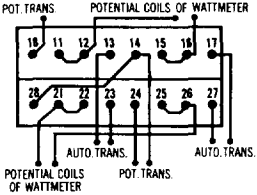
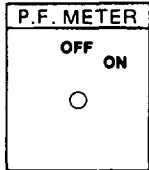
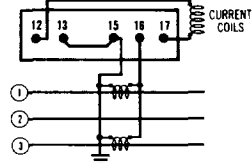
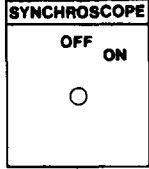
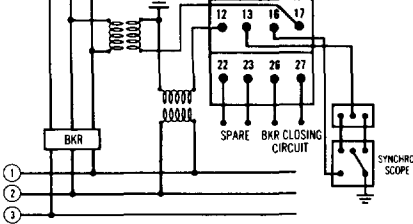
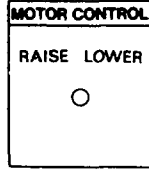
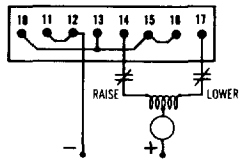
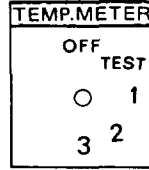
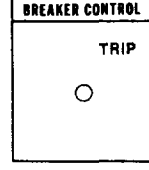
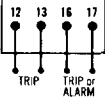
ROTARY SWITCHES for INSTRUMENT and CONTROL

APPLICATION	ESCUTCHEON	CONTACTING AND WIRING DIAGRAMS
<p>VOLTMETER TRANSFER SWITCH</p> <p>3-phase, phase-to-phase and phase-to-neutral Double-pole six-throw</p> <p>Handle: Round, knurled</p> <p>Cat. No. 2405C</p> <p>Depth behind panel — 2.9</p>	<p>VOLTMETER</p> <p>OFF</p> <p>1-2 1</p> <p>2-3 ○ 2</p> <p>3-1 3</p> <p>Code 10E-7V24</p>	
<p>VOLTMETER TRANSFER SWITCH</p> <p>6-wire. Two 3-phase circuits; phase-to-phase Double-pole six-throw</p> <p>Handle: Round, knurled</p> <p>Cat. No. 2406C</p> <p>Depth behind panel — 2.9</p>	<p>VOLTMETER</p> <p>OFF</p> <p>3-1 1-2</p> <p>2-3 ○ 2-3</p> <p>1-2 3-1</p> <p>OFF</p> <p>Code 10E-8V33</p>	
<p>AMMETER TRANSFER SWITCH</p> <p>3-phase, two current-transformers</p> <p>Handle: Round, knurled</p> <p>Cat. No. 2407C</p> <p>Depth behind panel — 2.9</p>	<p>AMMETER</p> <p>1 2 3</p> <p>○</p> <p>Code 10C-3A10A</p>	 <p>* denotes make-before-break</p>
<p>AMMETER TRANSFER SWITCH</p> <p>3-phase, two current-transformers</p> <p>Handle: Round, knurled</p> <p>Cat. No. 2408C</p> <p>Depth behind panel — 2.9</p>	<p>AMMETER</p> <p>1 2 3</p> <p>OFF ○</p> <p>Code 10C-4A13</p>	 <p>* denotes make-before-break</p>
<p>AMMETER TRANSFER SWITCH</p> <p>3-phase, three current-transformers</p> <p>Handle: Round, knurled</p> <p>Cat. No. 2409C</p> <p>Depth behind panel — 2.9</p>	<p>AMMETER</p> <p>1 2 3</p> <p>○</p> <p>Code 10C-3A10A</p>	 <p>* denotes make-before-break</p>
<p>AMMETER TRANSFER SWITCH</p> <p>3-phase, three current-transformers</p> <p>Handle: Round, knurled</p> <p>Cat. No. 2410C</p> <p>Depth behind panel — 2.9</p>	<p>AMMETER</p> <p>1 2 3</p> <p>OFF ○</p> <p>Code 10C-4A13</p>	 <p>* denotes make-before-break</p>

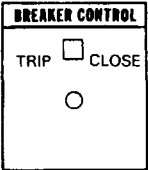
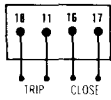
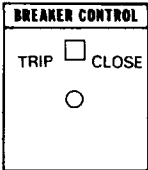
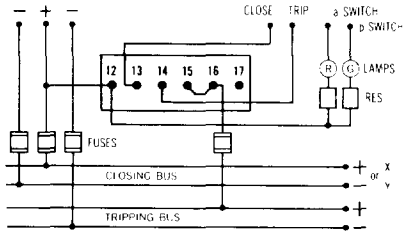
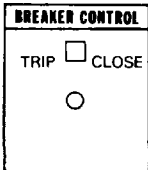
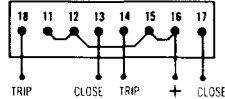
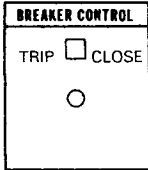
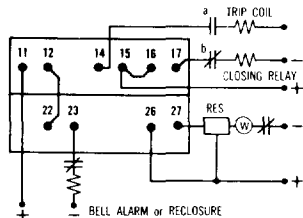
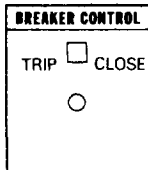
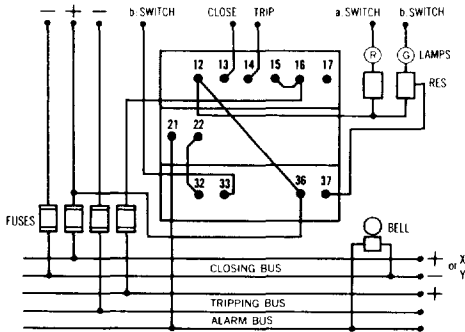
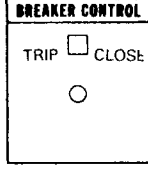
ROTARY SWITCHES for INSTRUMENT and CONTROL

APPLICATION	ESCUTCHEON	CONTACTING AND WIRING DIAGRAMS																																																																																																																																																
<p>AMMETER TRANSFER SWITCH</p> <p>3-phase three current-transformers three independent circuits</p> <p>Handle: Round, knurled</p> <p>NO OFF Cat. No. 2411C</p> <p>WITH OFF Cat. No. 2412C</p> <p>Depth behind panel — 5.4</p>	<div style="text-align: center;">  <p>Code 10A-3A10</p> </div> <div style="text-align: center; margin-top: 20px;">  <p>Code 10C-5A16</p> </div>	<table border="1" style="font-size: small;"> <thead> <tr> <th>DECK</th> <th>CONTACTS</th> <th>POSITIONS</th> </tr> <tr> <th></th> <th></th> <th>1 * 2 * 3</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>11 O 11-O13 11-O14 11-O15 11-O16 11-O17</td> <td><table border="1"><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr></table></td> </tr> <tr> <td>2</td> <td>21 O 21-O23 21-O24 21-O25 21-O26 21-O27</td> <td><table border="1"><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr></table></td> </tr> <tr> <td>3</td> <td>31 O 31-O33 31-O34 31-O35 31-O36 31-O37</td> <td><table border="1"><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr></table></td> </tr> <tr> <td>4</td> <td>41 O 41-O43 41-O44 41-O45 41-O46 41-O47</td> <td><table border="1"><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr></table></td> </tr> <tr> <td>5</td> <td>51 O 51-O53 51-O54 51-O55 51-O56 51-O57</td> <td><table border="1"><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr></table></td> </tr> <tr> <td>6</td> <td>61 O 61-O63 61-O64 61-O65 61-O66 61-O67</td> <td><table border="1"><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr></table></td> </tr> </tbody> </table> <div style="text-align: right; margin-top: 20px;">  </div> <p style="text-align: center; margin-top: 10px;">* denotes make-before-break</p>	DECK	CONTACTS	POSITIONS			1 * 2 * 3	1	11 O 11-O13 11-O14 11-O15 11-O16 11-O17	<table border="1"><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr></table>		X	X	X		X	X	X		X	X	X		X	X	X		X	X	X	2	21 O 21-O23 21-O24 21-O25 21-O26 21-O27	<table border="1"><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr></table>		X	X	X		X	X	X		X	X	X		X	X	X		X	X	X	3	31 O 31-O33 31-O34 31-O35 31-O36 31-O37	<table border="1"><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr></table>		X	X	X		X	X	X		X	X	X		X	X	X		X	X	X	4	41 O 41-O43 41-O44 41-O45 41-O46 41-O47	<table border="1"><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr></table>		X	X	X		X	X	X		X	X	X		X	X	X		X	X	X	5	51 O 51-O53 51-O54 51-O55 51-O56 51-O57	<table border="1"><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr></table>		X	X	X		X	X	X		X	X	X		X	X	X		X	X	X	6	61 O 61-O63 61-O64 61-O65 61-O66 61-O67	<table border="1"><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td></td><td>X</td><td>X</td><td>X</td></tr></table>		X	X	X		X	X	X		X	X	X		X	X	X		X	X	X
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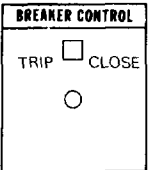
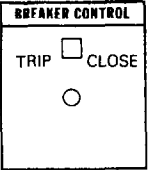
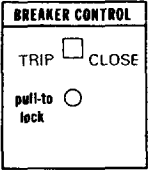
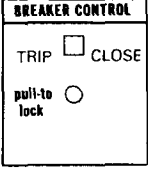
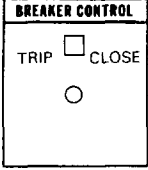
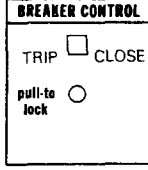
ROTARY SWITCHES for INSTRUMENT and CONTROL

APPLICATION	ESCUTCHEON	CONTACTING AND WIRING DIAGRAMS																																										
<p>WATTMETER REVERSING SWITCH</p> <p>Handle: Round, knurled</p> <p>Cat. No. 2421C</p> <p>Depth behind panel — 2.9</p>	 <p>Code 10C-3W16</p>	<table border="1" data-bbox="818 296 992 520"> <thead> <tr> <th rowspan="2">DECK</th> <th rowspan="2">CONTACTS</th> <th colspan="2">POS.</th> </tr> <tr> <th>W</th> <th>RVA</th> </tr> </thead> <tbody> <tr> <td rowspan="4">1</td> <td>11-12</td> <td>X</td> <td></td> </tr> <tr> <td>12-13</td> <td></td> <td>X</td> </tr> <tr> <td>15-14</td> <td></td> <td>X</td> </tr> <tr> <td>16-17</td> <td></td> <td>X</td> </tr> <tr> <td rowspan="4">2</td> <td>21-22</td> <td>X</td> <td></td> </tr> <tr> <td>22-23</td> <td></td> <td>X</td> </tr> <tr> <td>25-24</td> <td></td> <td>X</td> </tr> <tr> <td>26-27</td> <td></td> <td>X</td> </tr> </tbody> </table> 	DECK	CONTACTS	POS.		W	RVA	1	11-12	X		12-13		X	15-14		X	16-17		X	2	21-22	X		22-23		X	25-24		X	26-27		X										
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<p>POWER-FACTOR SWITCH</p> <p>3-phase two current-transformers one or two current-coils</p> <p>Handle: Round, knurled</p> <p>Cat. No. 2422C</p> <p>Depth behind panel — 2.4</p>	 <p>Code 10D-2P14</p>	<table border="1" data-bbox="818 611 1073 772"> <thead> <tr> <th rowspan="2">DECK</th> <th rowspan="2">CONTACTS</th> <th colspan="2">POS.</th> </tr> <tr> <th>OFF</th> <th>ON</th> </tr> </thead> <tbody> <tr> <td rowspan="2">1</td> <td>12-13</td> <td></td> <td>X</td> </tr> <tr> <td>16-17</td> <td>X</td> <td></td> </tr> </tbody> </table> 	DECK	CONTACTS	POS.		OFF	ON	1	12-13		X	16-17	X																														
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<p>SYNCHRONIZING SWITCH</p> <p>Machine-to-bus with interlocks</p> <p>Handle: Oval, removable</p> <p>Cat. No. 2424E</p> <p>Depth behind panel — 2.9</p>	 <p>Code 11D-2S17</p>	<table border="1" data-bbox="818 909 1073 1098"> <thead> <tr> <th rowspan="2">DECK</th> <th rowspan="2">CONTACTS</th> <th colspan="2">POS.</th> </tr> <tr> <th>OFF</th> <th>ON</th> </tr> </thead> <tbody> <tr> <td rowspan="2">1</td> <td>12-13</td> <td></td> <td>X</td> </tr> <tr> <td>16-17</td> <td>X</td> <td></td> </tr> <tr> <td rowspan="2">2</td> <td>22-23</td> <td>X</td> <td></td> </tr> <tr> <td>26-27</td> <td>X</td> <td></td> </tr> </tbody> </table> 	DECK	CONTACTS	POS.		OFF	ON	1	12-13		X	16-17	X		2	22-23	X		26-27	X																							
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<p>MOTOR CONTROL SWITCH GOVERNOR OR RHEOSTAT</p> <p>Split-field motor Handle: Pistol-grip Spring-return</p> <p>Cat. No. 2427D</p> <p>Depth behind panel — 2.4</p>	 <p>Code 10B-2M22</p>	<table border="1" data-bbox="818 1171 1101 1413"> <thead> <tr> <th rowspan="2">DECK</th> <th rowspan="2">CONTACTS</th> <th colspan="3">POS.</th> </tr> <tr> <th>RAISE</th> <th>normal</th> <th>LOWER</th> </tr> </thead> <tbody> <tr> <td rowspan="2">1</td> <td>11-12</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td>15-16</td> <td>X</td> <td></td> <td>X</td> </tr> </tbody> </table>  <p>• Contacts 11-12 & 15-16 connected internally in Normal Position</p>	DECK	CONTACTS	POS.			RAISE	normal	LOWER	1	11-12	X			15-16	X		X																									
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<p>TEMPERATURE METER TRANSFER SWITCH</p> <p>Transfers two wires to three coils with TEST and OFF</p> <p>Handle: Round, knurled</p> <p>Cat. No. 2432C</p> <p>Depth behind panel — 2.9</p>	 <p>Code 10D-5T19</p>	<table border="1" data-bbox="818 1476 992 1696"> <thead> <tr> <th rowspan="2">DECK</th> <th rowspan="2">CONTACTS</th> <th colspan="3">POSITIONS</th> </tr> <tr> <th>OFF</th> <th>TEST</th> <th>1 2 3</th> </tr> </thead> <tbody> <tr> <td rowspan="4">1</td> <td>11-12</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td>13-14</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>14-15</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>15-16</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td rowspan="4">2</td> <td>21-22</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td>22-23</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>23-24</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>24-25</td> <td></td> <td></td> <td>X</td> </tr> </tbody> </table> <p>*Deck #2 MBB (shorting) contacts</p>	DECK	CONTACTS	POSITIONS			OFF	TEST	1 2 3	1	11-12	X			13-14		X		14-15			X	15-16			X	2	21-22	X			22-23		X		23-24			X	24-25			X
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<p>CIRCUIT BREAKER TRIP SWITCH</p> <p>Double-pole single-throw contacts normally open</p> <p>Handle: Pistol-grip Spring-return</p> <p>Cat. No. 2436D</p> <p>Depth behind panel — 2.4</p>	 <p>Code 10D-1B18</p>	<table border="1" data-bbox="818 1780 1073 1959"> <thead> <tr> <th rowspan="2">DECK</th> <th rowspan="2">CONTACTS</th> <th colspan="2">POS.</th> </tr> <tr> <th>normal</th> <th>TRIP</th> </tr> </thead> <tbody> <tr> <td rowspan="2">1</td> <td>12-13</td> <td></td> <td>X</td> </tr> <tr> <td>16-17</td> <td>X</td> <td></td> </tr> </tbody> </table> 	DECK	CONTACTS	POS.		normal	TRIP	1	12-13		X	16-17	X																														
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<p>CIRCUIT BREAKER CONTROL SWITCH</p> <p>Handle: Pistol-grip Spring-return</p> <p>Cat. No. 2438D</p> <p>Depth behind panel — 2.4</p>	 <p>Code 18B-2B23</p>	<table border="1" data-bbox="708 268 992 464"> <thead> <tr> <th rowspan="2">DECK</th> <th rowspan="2">CONTACTS</th> <th colspan="3">POS.</th> </tr> <tr> <th>TRIP</th> <th>normal</th> <th>CLOSE</th> </tr> </thead> <tbody> <tr> <td rowspan="2">1</td> <td>11-18</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td>16-17</td> <td></td> <td></td> <td>X</td> </tr> </tbody> </table> 	DECK	CONTACTS	POS.			TRIP	normal	CLOSE	1	11-18	X			16-17			X																		
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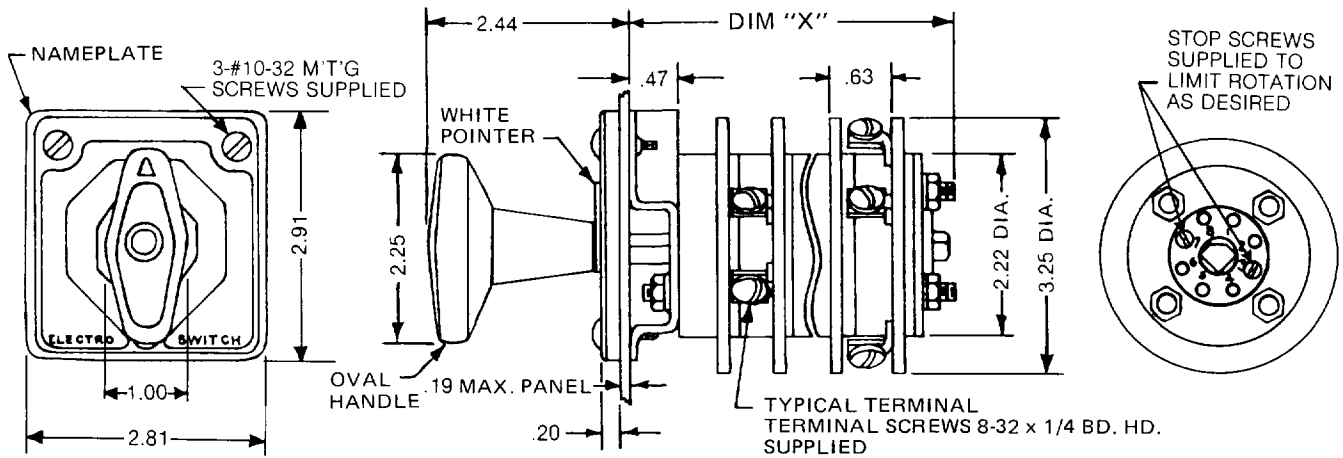
ELECTROSWITCH
SWITCHES & RELAYS
 UNIT OF ELECTRO SWITCH CORP.

WEYMOUTH, MA 02188 TEL: (781) 335-5200 FAX: (781) 335-4253

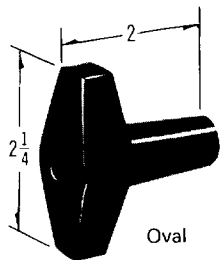
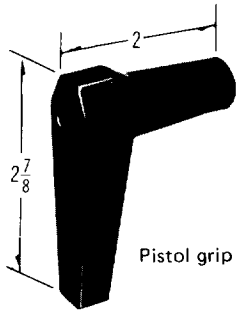
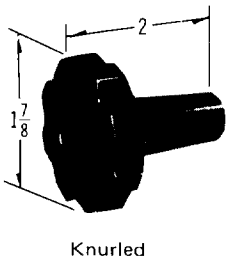
SERIES 24
INSTRUMENT & CONTROL
SWITCH

CATALOG NUMBERS

24 SERIES (DETENT ACTION)
74 SERIES (SPRING RETURN)



Handles for Series 24 Switches



DECKS	DIM. X (inches)
1	2.4
2	2.9
3	3.6
4	4.3
5	4.8
6	5.4
7	6.2
8	6.6
9	7.4
10	8.0

Slip Contacts - add 1.5"
 Pull-to-lock - add 1"
 (These are approximate dimensions. Actual dimensions are on a separate sheet.)



UL File No. E18174

INTERRUPTING RATINGS:

UND. LAB. INC. RECOGNIZED

- 20A-120VAC
- 15A-240VAC
- 6A-600VAC
- 3A-125VDC
- 1A-250VDC

CSA CERTIFIED

- 20A-600VAC (res)
- 15A-600VAC (ind)
- 2A-125VDC
- 2HP-240/480VAC

OTHER RATINGS:

- Momentary Current (thermal)
- 3 SEC-200A
- 30 SEC- 75A
- 60 SEC- 60A

Overload (50 Operations)

- 95A-120VAC
- 65A-240VAC
- 35A-600VAC

Making ability for
 Circuit Breaker Coils

- 95A-125VDC

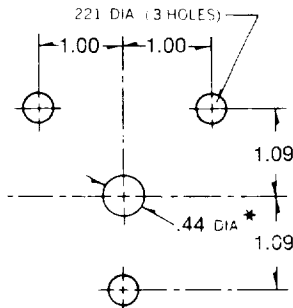
- Dielectric Strength - 2200VRMS
- Insulation Resistance - 100 megohms
- Contact Resistance - 10 milliohms
- Continuous Rating - 30A-600V

OTHER TECHNICAL DATA
 IN BULLETIN 24-1

TESTED TO ESC-STD-1000

CONTACTING & CATALOG NUMBERS
 ON SEPARATE SHEET

PANEL DRILLING (INCHES)



* .81 CLEARANCE HOLE FOR REMOVABLE HANDLE

REVISIONS:

MADE BY: **JM** DATE: **10/4/78**
 APPR. BY: **m m R** DATE: **10/4/78**

DRAWING MASTER

DWG. NO: **24 & 74 SERIES**
 SHEET **1** OF **1**

REV **0**