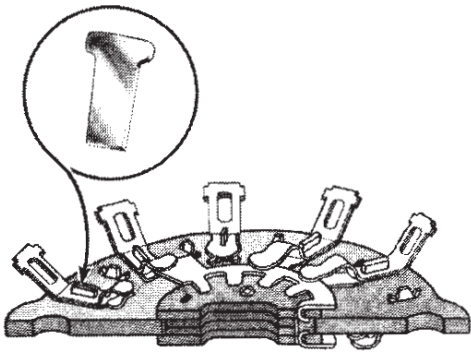


Selector Guide

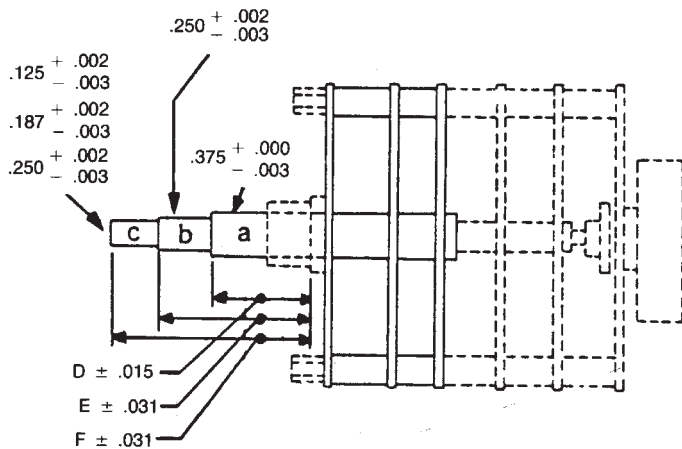
Selector Guide - Additional Open Frame Rotary Switches

CHARACTERISTICS	A - Type	F - Type	SK - Type	4M - Type	7M - Type	LK - Type	RK - Type	SMLR	6MLR
Product ID	SGI	SGI	SGI	SGI	SGI	SGI	SGI	SGI	SGI
Manufacturing Code	SGI	SGI	SGI	SGI	SGI	SGI	SGI	SGI	SGI
Catalog Page Number	4	5	6	7	8	9	9	10	11
Construction Type	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN
Body Diameter - Nominal O.D.	1"	1.25	1.281	1.563	1.875	1.875*	1.875	1.47	1.875
Positions	2-12	2-12	2-12	2-12	2-24	2-18	2-20	2-4	3 & 5
Electrical Characteristics									
Rated AC Current and Voltage	0.5A @ 110 VAC	1.0A @ 110 VAC	.230A @ 115 VAC	.230A @ 115 VAC	.230A @ 115 VAC	0.5A @ 110 VAC	0.5A @ 110 VAC	0.17A @ 115 VAC	0.23A @ 115 VAC
Rated DC Current and Voltage	1.0A @ 28 VDC	2.0A @ 28 VDC	1.5A @ 28 VDC	1.5A @ 28 VDC	1.5A @ 28 VDC	1.0A @ 28 VDC	1.0A @ 28 VDC	0.55A @ 28 VDC	1.5A @ 28 VDC
Current (Continuous Capacity)	5A	5A	12A	12A	12A	12A	12A	9A	9A
Dielectric Strength	750 VAC	1000 VAC	1000 VAC	1500 VAC	1500 VAC	1000 VAC	1000 VAC	750 VAC	1500 VAC
Insulation Resistance (min) (megohms)									
Contact Resistance (initial) (millohms)	3 To 15	3 To 15	2	2	3	3 To 15	3 To 15	5	3
Insulation									
Glass Epoxy	available	available	available	available	n/a	available	available	available	available
Diallyl Phthalate	STANDARD	available	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Ceramic	n/a	available	n/a	available	n/a	n/a	n/a	n/a	n/a
Phenolic	available	available	available	available	available	available	available	available	available
Contacts - Silver Alloy *	available	available	available	available	available	available	available	available	available
Brass/Silver Plate	available	available	available	available	available	available	available	available	available
Mechanical Characteristics									
Mechanical Life (min)	25,000 CYCLES	25,000 CYCLES	25,000 CYCLES	25,000 CYCLES	25,000 CYCLES	25,000 CYCLES	25,000 CYCLES		
Stop Strength (min)	15 IN LB.	15 IN LB.	25 IN. LB.	25 IN. LB.	25 IN. LB.	25 IN. LB.	25 IN. LB.		
Additional* Available Options:									
Indexing Angles:									
12.85 degrees					available				
15 degrees					available				
18 degrees					available		available		
20 degrees					available	available			
22.5 degrees					available			available	
25.7 degrees				available	available				
30 degrees	STANDARD	STANDARD	available	available	available			available	available
36 degrees	available	available	available	available			available		
40 degrees						available			
45 degrees	available	available	available	available					
60 degrees	available	available	available	available					
90 degrees		available	available	available					
Quick Connect	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rear PC Mount	available	available	available	available	available	available	available	n/a	available
Vertical PC Mount *	available	available	available	n/a	n/a	n/a	n/a	n/a	n/a
Front PC Mount *	available	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Dual Concentric Designs *	available	available	available	available	available	available	available	n/a	n/a
Keylock *	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Spring Return *	available	available	available	available	available	available	available	available	n/a
Water Resistant Seals *	available	available	available	available	available	available	available	n/a	n/a
Originally Designed to Meet Mil 3786/	SR05	SR03	SR03	SR02	SR09 & SR10	SR11	SR11		
Unidex Housing*	STANDARD	available	n/a	n/a	n/a	n/a	n/a	n/a	n/a
T-Slug Terminals*	n/a	n/a	available	available	available	n/a	n/a	n/a	STANDARD
Tri-Concentric Designs*	n/a	n/a	n/a	n/a	available	available	available	n/a	n/a
* Contact factory									



Wedgelock Construction/"T" Slug Terminals

The Wedgelock method of clip assembly, commonly called "T" slug assembly, uses a flat strip of metal to securely fasten the clips to the stator. This superior method of assembly is a patented process. Because the flat strip of metal is "wedged" into the clip slot, the clip suffers almost none of the loosening associated with assembly soldering when conventional rivets or eyelets are used. The unique shape of the "T" slug design also eliminates rotation and twisting of contacts thus assuring maintenance of accurate timing throughout switch life. Electroswitch "Wedgelock" constructed "T" slugs easily pass a five pound load test and are available in unplated brass or tin plated brass finish.



Triple Concentric Shafts

Shafts 7M, LK and RK may be made with triple concentric shafts. The assembly may consist of three switches in one frame or two switches and a potentiometer, with the same general frame limitations as the dual-shaft combinations.

Unidex Housing

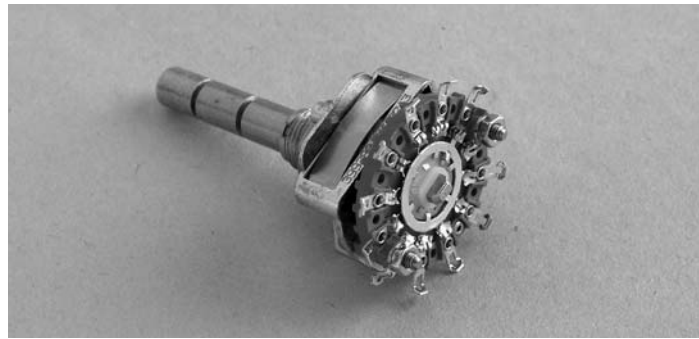
Unidex is a major improvement in indexing switches.

Its advantages are:

- Torque feel is tailored to customer's requirements
- Simple construction
- High reliability
- Long life - surpasses present indexes by thousands of operations
- Clear tolerances - a specific torque is available within closer limits than possible with other indexes
- Greater uniformity of indexing - a more precise feeling is provided on every index
- Greater protection from dust and abrasives by shielded housing
- Guaranteed electric continuity between the mounting bushing and front plate - housing is simple casting
- Torque range accommodates most applications - 8 inch-ounces to 69 inch-ounces - higher range on request
- Speedy delivery - simplification of design reduces production problems

A Type

1 inch diameter switches with Electroswitch patented Unidex® detent for positive action, feel and torque control. Double-wiping, self-cleaning contacts in silver plated brass, or silver alloy. Unique protective coating guards against tarnish and corrosion, extends shelf life.



Specifications

Size

1" diameter nominal, with up to 3 sections
Max. depth, 1.281

Mounting

Clearance holes for a .375-32 bushing and a .120 diameter locating key on a .375" radius

Shaft

.250 diameter (+000 -.003); or .125 diameter (+000 -.003)

Indexing

Unidex® dual ball, 30

Terminal Strength

2.5 lb. pull

Stator Insulation

Diallyl phthalate per MIL-M-14
Glass silicone

Rotor Insulation

Thermoplastic

Section Thickness

Type AM - .078

Type AE - .062

Contacts

Silver-plated brass or silver alloy.

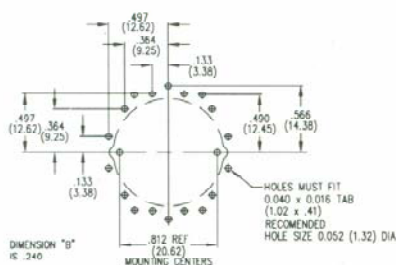
Contact Resistance

.003 to .015 ohms between adjacent clips

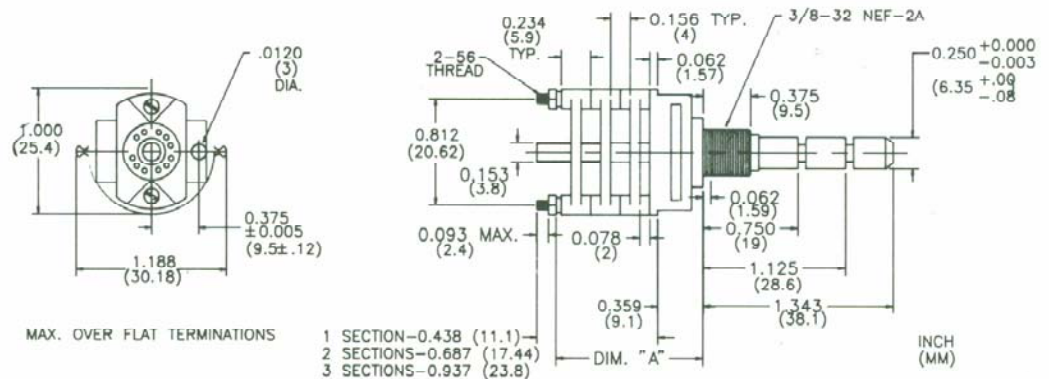
Electrical Rating

Break .5 amp at 28 volts DC, .25 amp at 110 volts AC, resistive. Carry 5 amps

PCB Layout



A Type Drawing



A Type Switch Assemblies

With Silver - Plated Brass Contacts and Solder Terminals

Total Poles	Active Positions	Poles/Section	Figure Number*	Number of Sections
1	2-12	1	1	1
2	2-6	2	2	1
2	2-12	1	1	2
3	2-5	3	7	1
3	2-12	1	1	3

A Type Section

Total Poles	Active Positions	Section Type	Figure Number*
1	2-12	Standard	1
2	2-6	Standard	2
3	2-5	Standard	7
1	2-12	Notched Blade	9
1	2-10	Conductive Shorting	10
1	-	Capacitor Decade	12
1	-	Resistor Decade	13
1	-	Binary Coded 0-11	11

With Printed Circuit Terminals

Total Poles	Active Positions	Section Type	Figure Number*
1	2-12	Standard PC	1
2	2-6	Standard PC	2
3	2-5	Standard PC	7

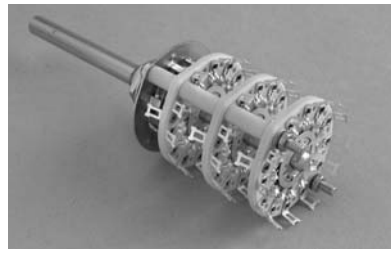
TYPE A 'PCB' Sections with Silver Alloy

Printed Circuit Terminations, Glass Epoxy Insulation

Total Poles	Active Positions	Section Type	Figure Number*
1	2-12	APCB	21
2	2-6	APCB	20

F Type

1.312 inch diameter switch with dual ball-type indexing for a positive feel and uniform torque. Double-wiping, silver-plated brass contacts, or silver alloy. Unique protective coating guards against tarnish and corrosion, extends shelf life. Type F, phenolic insulation; Type FC, ceramic insulation.



Specifications

Size

Type F: 1.281 width x 1.312 height.
Type FC: 1.25 width

Mounting

Clearance holes for a .375-32 bushing and a .125" x .037" locating key on a .531" radius

Shaft

.250" diameter (+000 -.003)

Indexing

Hill and valley dual ball type, 30°

Terminal Strength

5 lb. pull

Rotor Insulation

Type F, phenolic PBE-P per LP-513 or thermoplastic; Type FC, ceramic

Stator Insulation

Type F: phenolic PBE-P per LP-513;
Type FC: ceramic

Section Thickness

Type F: .062"

Type FC: .120"

Contacts

Silver-plated brass, or silver alloy.

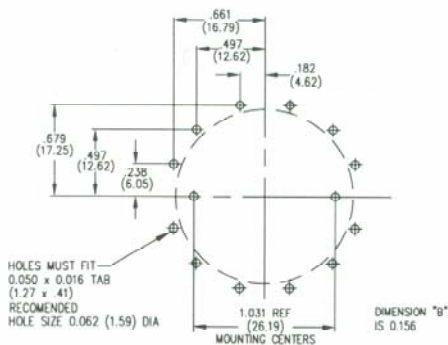
Contact Resistance

.003 to .015 ohms between adjacent clips

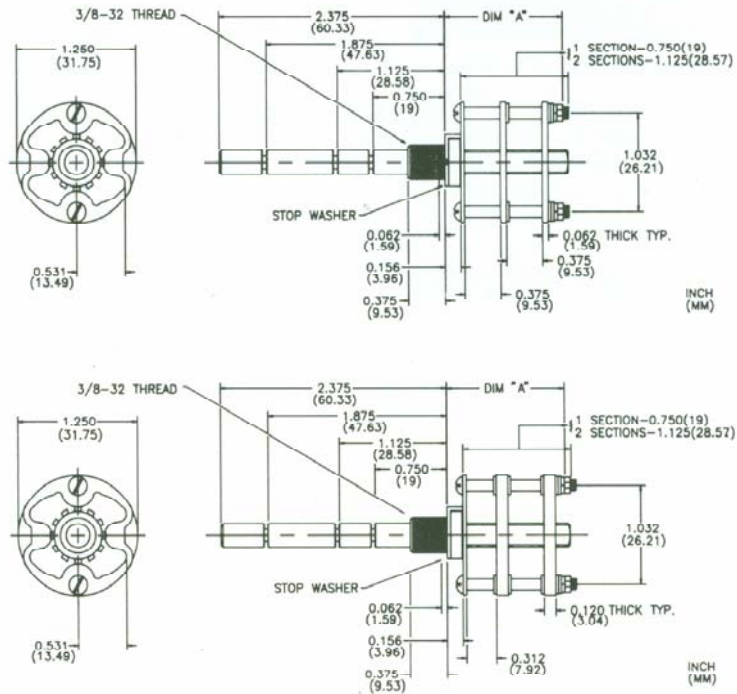
Electrical Rating

Break 1 amp at 28 volts DC, .5 amp at 110 volts AC, resistive. Carry 5 amps

PCB Layout



F Type Drawing



F Type Switch Assemblies

With Silver - Plated Brass Contacts and Solder Terminals

Total Poles	Active Positions	Poles/Section	Figure Number *	Number of Sections
1	2-11	1	6	1
2	2-5	2	4	1
2	2-11	1	6	2
3	2-3	3	5	1

With Silver - Plated Brass Contacts and Printed Circuit Terminals

1	2-11	1	6	1
2	2-5	2	4	1
3	2-3	3	5	1

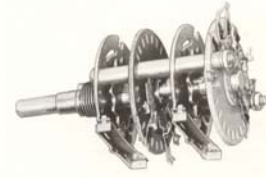
F Type Section

With Silver - Plated Brass Contacts and Solder Terminals

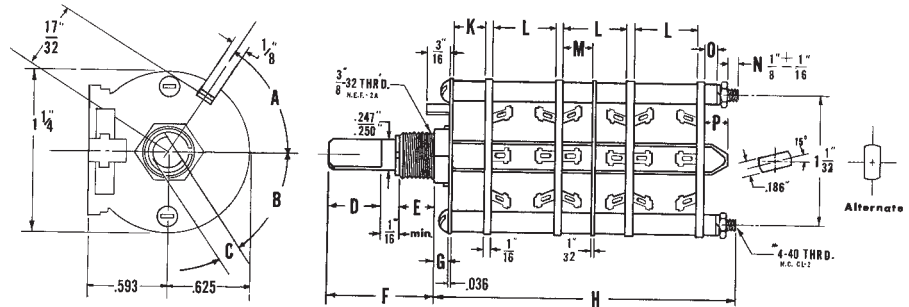
Total Poles	Active Positions	Section Type	Figure Number *
1	2-11	Standard	6
2	2-5	Standard	4
3	2-3	Standard	5
1	2-11	Notched Blade	8
1	2-11	Standard	6
2	2-5	Standard	4
3	2-3	Standard	5
1	2-11	Notched Blade	8

SK Type

SK type is a miniature switch designed for multi-circuit application where space is limited. The actual chassis mounting area is only 1-9/32" in diameter and the maximum distance across its 60° contacts is but 1-5/16" in diameter. It is constructed by means of the strut screw and spacer method making possible the use of any number of wafers per switch section. Contact locations are of the standard radial type and the stators provide for contacts on either the front or insulated side.



SK Type Drawing



- A. Angle of locating Key 0°, 45°, 315°.
- B. Flat angle Per Customer Specification. Tolerance ± 2°.
- C. Thickness of Flat Per Customer Specification Tolerance ± .002".
- D. Flat Length - Any, as Required. Tolerance ± 1/64".
- E. Bushing Thread Length - Any, as Required. Standard 1/4" or 3/8".
- F. Shaft Length From Mounting Surface. Any, As Required. Tolerance ± 1/32".
- G. Bushing Shoulder - Any, as Required. Standard 1/8". Tolerance ± .005".
- H. Maximum Overall Length Behind Mounting Surface. Per Customer Specification. Indicate if Important.
- K. Detent Spacer - Minimum 1/4" if No Contacts Are Used On Front Side of Section. Minimum 3/8" With Contacts On Front Side of Section. Tolerance ± 1/64".
- L. Spacers - Minimum 7/16" with Bent Contacts Opposed. Minimum 3/16" with No Contacts Opposed. Minimum 1/4" with Flat Contacts Opposed.
- M. Spacer Between Electro-Static Shield and Section Minimum 1/8". Tolerance ± 1/64". Shields May Be Located Where Desired.
- N. Strut Screw Extension 1/8" ± 1/16" unless otherwise specified.
- O. Spacer Required on Rear of Section. Minimum 3/32". Standard 1/8".
- P. Shaft Extension - Any, as Required. Normally 1/8".

Specifications

Size

1.281" diameter nominal

Mounting

Shaft
.250 diameter (+000 -.003)

Stator Insulation

Glass epoxy or Phenolic

Rotor Insulation

Glass epoxy or Phenolic

Section Thickness

.062

Contacts

Silver-plated brass or silver alloy.

Contact Resistance

.002 ohms between adjacent clips

Electrical Rating

.230A @ 115 VAC

1.5A @ 28 VDC

Contact Staking

Solder-lug clips are secured to the stator using Electroswitch's patented "T" slugs

Terminal Type Construction

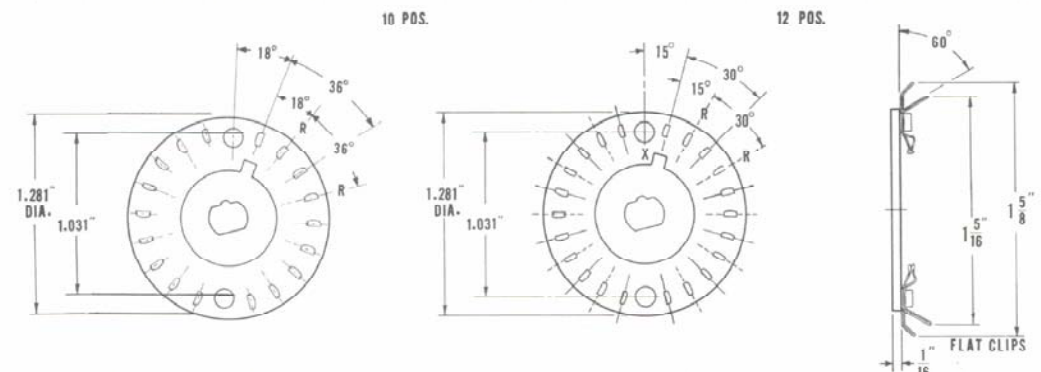
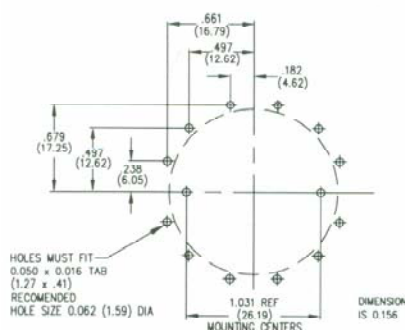
"T" slug or Wedgelock construction

SK Type Switch Assemblies

MAXIMUM SWITCHING PER SECTION

Poles	30° Index 12 Position	36° Index 10 Position	45° Index 8 Position	60° Index 6 Position	90° Index 4 Position
1	2 to 12 Pos.	2 to 10 Pos.	2 to 8 Pos.	2 to 6 Pos.	2 to 4 Pos.
2	2 to 9 Pos.	2 to 7 Pos.	2 to 7 Pos.	2 to 6 Pos.	2 to 4 Pos.
3	2 to 5 Pos.	2 to 4 Pos.	2 to 3 Pos.	2 to 3 Pos.	2 Pos.
4	2 to 4 Pos.	2 to 3 Pos.	2 to 3 Pos.	2 to 3 Pos.	2 Pos.
5	2 to 3 Pos.	2 Pos.	2 Pos.	2 Pos.	
6	2 Pos.			2 Pos.	

SK Type Section

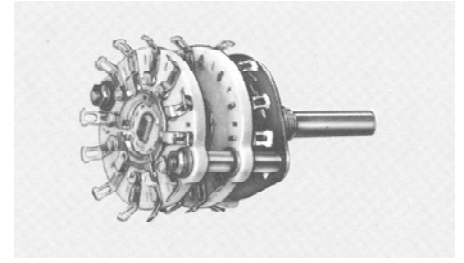
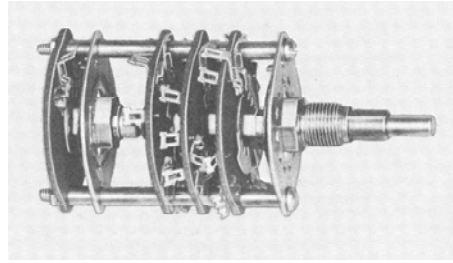


4M Type

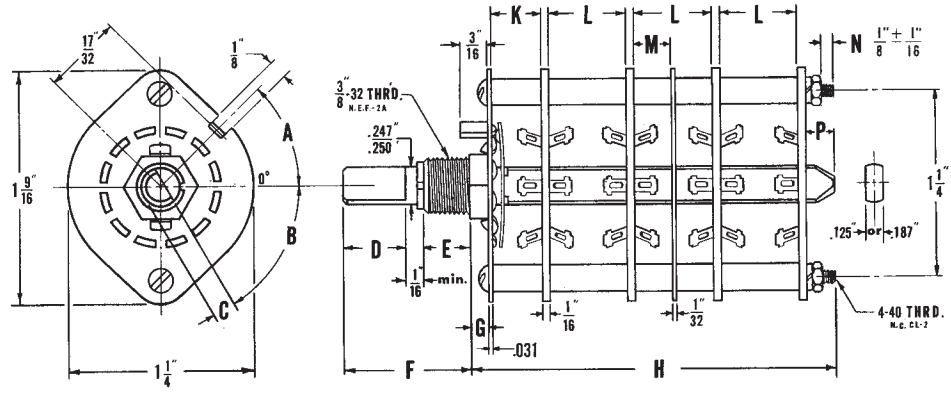
Type 4M switches are ideally suited for all multi-circuit switching applications. These switches may be supplied to commercial, military specifications.

Characteristics of Electroswitch's double wiping contact switches is the patented "Wedglock" design which is used to fasten the contacts to the stator, the most stable method of contact fastening available.

The 4M has many detent angles and circuits available. A starwheel, springs and single ball are used to provide positive detent action for the following variations: 22.5°, 25.7°, 30°, 36°, 45°, 60° and 90° detent angles.



4M Type Drawing



A. Angle of Locating Key 0°, 45°, 135°, 180°, 225° & 315°. Tolerance ± 2°.

B. Flat angle Per Customer Specification. Tolerance ± 2°.

C. Thickness of Flat Per Customer Specification. Tolerance ± .002°.

D. Flat Length - Any, as Required. Tolerance ± 1/64".

E. Bushing Thread Length - Any, as Required. Standard 1/4" or 3/8".

F. Shaft Length From Mounting Surface. Any, As Required. Tolerance ± 1/32".

G. Bushing Shoulder - Any, as Required. Standard 1/8". Tolerance ± .005".

H. Maximum Overall Length Behind Mounting Surface. Per Customer Specification. Indicate if Important.

K. Detent Spacer - Minimum 1/4" If No Contacts Are Used On Front Side of Section. Minimum 3/32" With Contacts On Front Side of Section. Tolerance ± 1/64".

L. Spacers - Minimum 7/16" with Bent Contacts Opposed. Minimum 3/16" with No Contacts Opposed. Minimum 1/4" with Flat Contacts Opposed.

M. Spacer Between Electro-Static Shield and Section Minimum 1/8". Tolerance ± 1/64". Shields May Be Located Where Desired.

N. Strut Screw Extension 1/8" ± 1/16" unless otherwise specified.

P. Shaft Extension - Any, as Required. Standard 1/8".

Specifications

Size

1.560" diameter nominal

Mounting

Shaft

.250 diameter (+000 -.003)

Stator Insulation

Phenolic or Ceramic treated with Dow Corning 200 for moisture resistance.

Rotor Insulation

Phenolic or Ceramic

Section Thickness

.062 Phenolic - .203 ceramic

Contacts

Silver-plated brass or silver alloy.

Contact Resistance

.002 ohms between adjacent clips

Electrical Rating

.230A @ 115 VAC

1.5A @ 28 VDC

Contact Staking

Solder-lug clips are secured to the stator using Electroswitch's patented "T" slugs

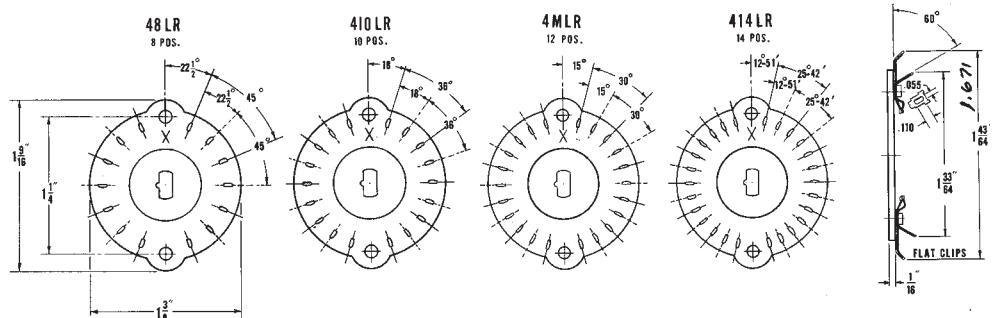
Terminal Type Construction

"T" slug or Wedglock construction

4M Type Switch Assemblies

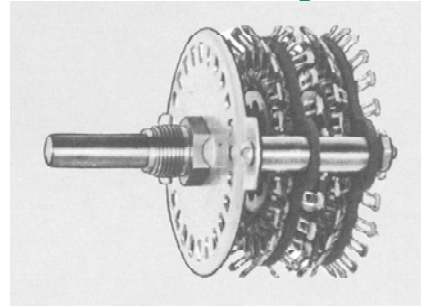
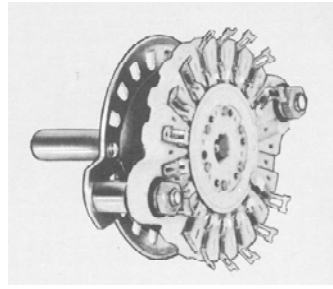
MAXIMUM SWITCHING PER SECTION					
Type	48 LR	410 LR	4 MLR	4 MLR	414 LR
Poles	45° Index (8 pos.)	36° Index (10 pos.)	30° Index (12 pos.)	60° Index (6 pos.)	25.7° Index 14 pos.
1	2 to 8 Pos.	2 to 10 Pos.	2 to 12 Pos.	2 to 6 Pos.	2 to 14 Pos.
2	2 to 4 Pos.	2 to 5 Pos.	2 to 6 Pos.	2 to 6 Pos.	2 to 7 Pos.
3	2 to 3 Pos.	2 to 4 Pos.	2 to 5 Pos.	2 to 3 Pos.	2 to 6 Pos.
4	2 Pos.	2 to 3 Pos.	2 to 4 Pos.	2 to 3 Pos.	2 to 5 Pos.
5	-	2 Pos.	2 to 3 Pos.	2 Pos.	2 to 3 Pos.
6	-	-	2 Pos.	2 Pos.	2 Pos.
10	-	-	on-off, off-on	-	-

4M Type Section

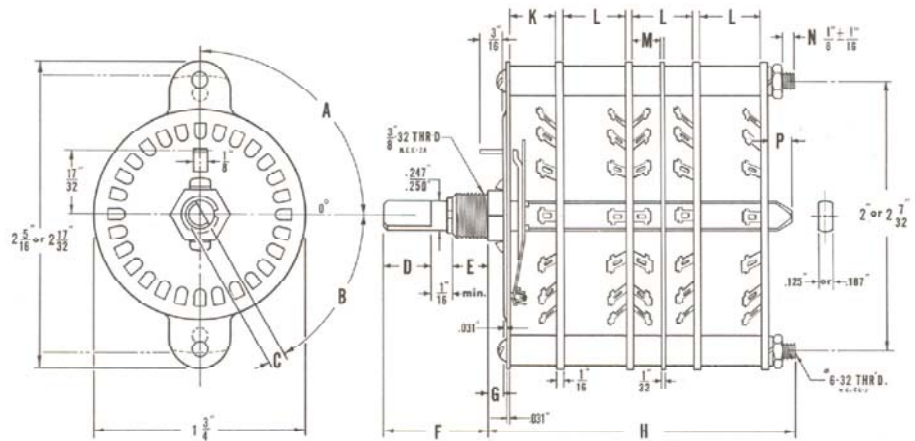


7M Type

7M type switches are ideally suited for instrument and special purpose uses or for heavy duty multi-circuit applications. The contact arrangement is similar to standard rotary switching in radial form. Several of the 7M types are available with either 2" or 2 7/32" strut centers (see illustrations below for those available in both sizes). Switches having 2 7/32" strut centers provide greater space at contact locations for component wiring. Those having 2" strut centers require 90° bent clip at contact locations in line with, and adjacent to, the strut centers.



7M Type Drawing



- A- Angle of locating Key 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°.
- B. Flat angle Per Customer Specification. Tolerance ±2°.
- C. Thickness of Flat Per Customer Specification. Tolerance ±.002".
- D. Flat length - Any, as Required. Tolerance ±1/64".
- E. Bushing Thread Length - Any, as Required. Standard 1/4" or 3/8".
- F. Shaft Length From Mounting Surface. Any, As Required. Tolerance ±1/32".
- G. Bushing Shoulder - Any, as Required. Standard 1/8". Tolerance ±.005".
- H. Maximum Overall Length Behind Mounting Surface. Per Customer Specification. Indicate if Important.
- K. Detent Spacer - Minimum 9/32" If No Contacts Are Used
- L. Spacers - Minimum 7/16" with Bent Contacts Opposed. Minimum 3/16" with No Contacts Opposed. Minimum 1/4" with Flat Contacts Opposed.
- M. On Front Side of Section. Minimum 5/16" With Contacts On Front Side of Section. Tolerance ±1/64".
- N. Spacer Between Electro-Static Shield and Section Minimum 1/8". Tolerance ±1/64". Shields May Be Located Where Desired.
- P. Shaft Extension - Any as Required. Standard 1/8".

Specifications

Size

2" or 2 7/32" diameter nominal

Mounting

Shaft

.250 diameter (+000 -.003)

Stator Insulation

Glass epoxy or Phenolic

Rotor Insulation

Glass epoxy or Phenolic

Section Thickness

.062 Phenolic

Contacts

Silver-plated brass or silver alloy.

Contact Resistance

.003 ohms between adjacent clips

Electrical Rating

.230A @ 115 VAC

1.5A @ 28 VDC

Contact Staking

Solder-lug clips are secured to the stator using Electroswitch's patented "T" slugs

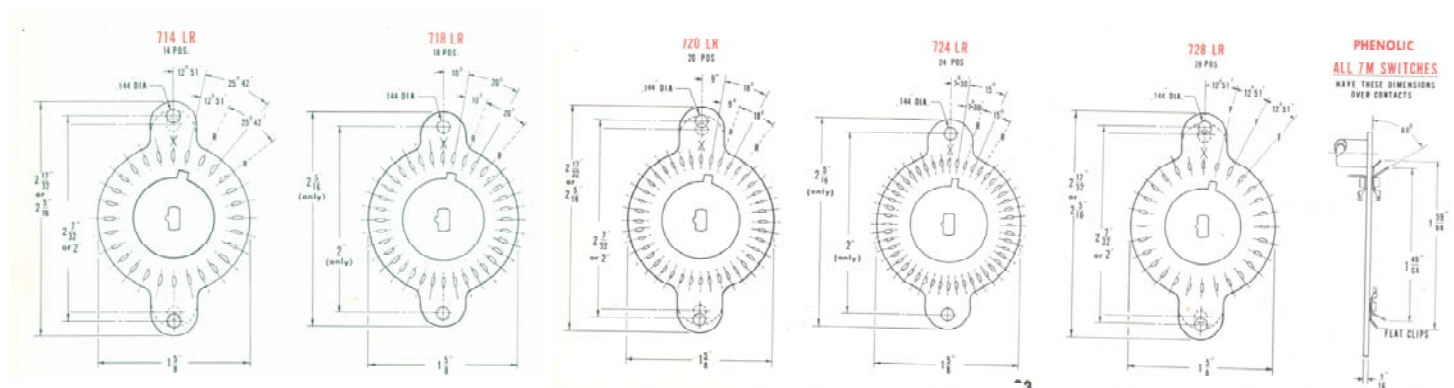
Terminal Type Construction

"T" slug or Wedglock construction

7M Type Switch Assemblies

MAXIMUM SWITCHING PER SECTION					
Type	714 LR	718 LR	720 LR	724 LR	728 LR
	25.7° Index 14 positions	20° Index 18 positions	18° Index 20 positions	15° Index 24 positions	12.85° Index 28 pos.
Poles	2 to 14 Pos.	2 to 18 Pos.	2 to 20 Pos.	2 to 24 Pos.	27 Active Plus 1 (off)
1	2 to 14 Pos.	2 to 18 Pos.	2 to 19 Pos.	2 to 23 Pos.	2 to 13 Pos.
2	2 to 13 Pos.	2 to 17 Pos.	2 to 9 Pos.	2 to 11 Pos.	2 to 8 Pos.
3	2 to 6 Pos.	2 to 8 Pos.	2 to 9 Pos.	2 to 11 Pos.	2 to 6 Pos.
4	2 to 6 Pos.	2 to 8 Pos.	2 to 5 Pos.	2 to 7 Pos.	2 to 4 Pos.
5	2 to 3 Pos.	2 to 5 Pos.	2 to 5 Pos.	2 to 7 Pos.	2 to 3 Pos.
6	2 to 3 Pos.	2 to 5 Pos.	2 to 5 Pos.	2 to 7 Pos.	2 to 3 Pos.

7M Type Section



LK/RK Type

Type LK provides a 1.875" diameter switch over 75° terminals for 18 position, 20° throw switching. Type RK provides 20 position, 18° throw switching in the same size.

Specifications

Size

1.875" diameter nominal

Mounting

Shaft

.250 diameter (+000 -.003)

Stator Insulation

Glass epoxy or Phenolic

Rotor Insulation

Glass epoxy or Phenolic

Section Thickness

.062

Contacts

Silver-plated brass or silver alloy.

Contact Resistance

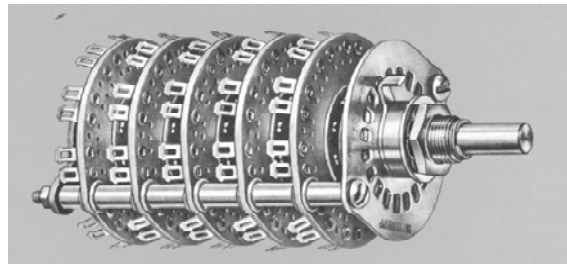
.003 TO .015 ohms between adjacent clips

clips

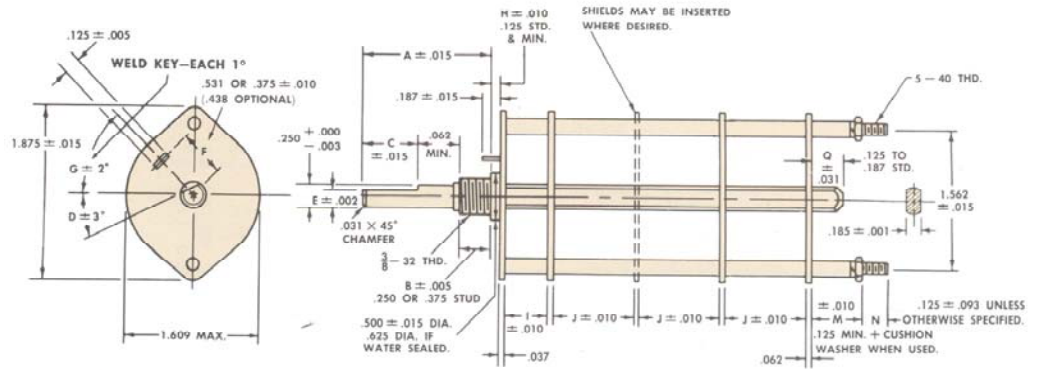
Electrical Rating

.5A @ 110 VAC

1.0A @ 28 VDC



LK/RK Type Drawing



DIM I = .281 MIN. IF CONTACTS NOT ON FRONT SIDE; .312 MIN. IF CONTACTS ON FRONT.

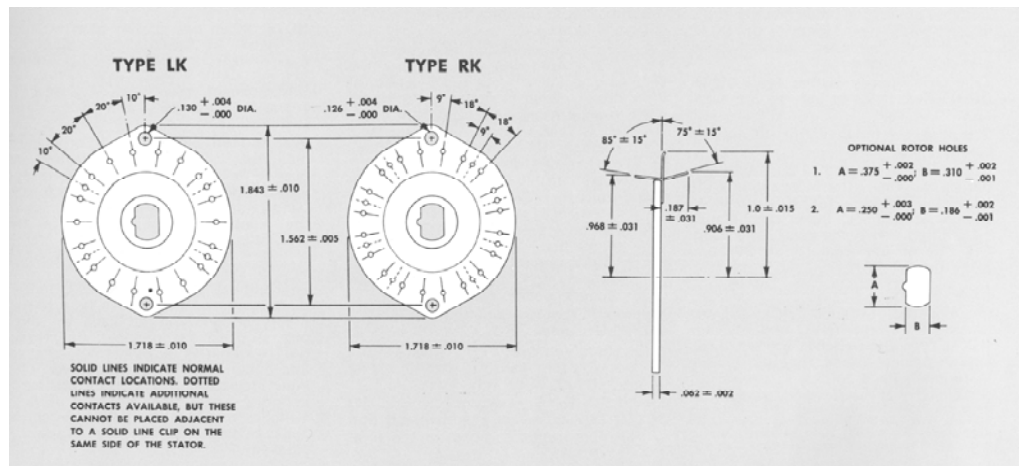
DIM. J = .187 MIN. IF CONTACTS DO NOT FACE EACH OTHER; .437 MIN. IF THEY DO; .250 MIN. IF FLAT TERMINALS ARE USED.

DIMENSIONS AT A, B, C, D, E, F, G, H, I, J, M, N, AND Q ARE DETERMINED BY CUSTOMERS' SPECIFICATIONS.

LK/RK Type Switch Assemblies

MAXIMUM SWITCHING PER SECTION				
Poles	18° Throw (RK) (positions)	20° Throw (LK) (positions)	36° Throw (RK) (positions)	40° Throw (LK) (positions)
1	2 to 20	2 to 18	2 to 10	2 to 10
2	2 to 10	2 to 9	2 to 9	2 to 9
3	2 to 5	2 to 5	2 to 5	2 to 5
4	2 to 4	2 to 4	2 to 4	2 to 4
5	2 to 3	2 to 3	2 to 3	2 to 3
6	2	2	2	2

LK/RK Type Section



SMLR Type

SMLR switches are the smallest and most compact of all lever type switches available. They are classed in the sub-miniature category and were designed for multi-circuit applications where space is an important factor. In spite of their smallness in size the design in this series ensures a rugged and accurate construction. They are available as either 2, 3 or 4 position switches and employ standard 8SM or 12SM stators in their construction. Electrical contacts are available in all but a few locations on the rear side of the wafer section making available a greater selection of electrical circuits. SMLR switches can also be assembled with multi-wafer sections per switch driven by a common shaft. They are adaptable for commercial or government applications and can be furnished to either specification.

Specifications

Size

1.469

Mounting

Lever

.187 or .125

Stator Insulation

Glass epoxy or Phenolic

Rotor Insulation

Glass epoxy or Phenolic

Section Thickness

.062

Contacts

Silver-plated brass or silver alloy

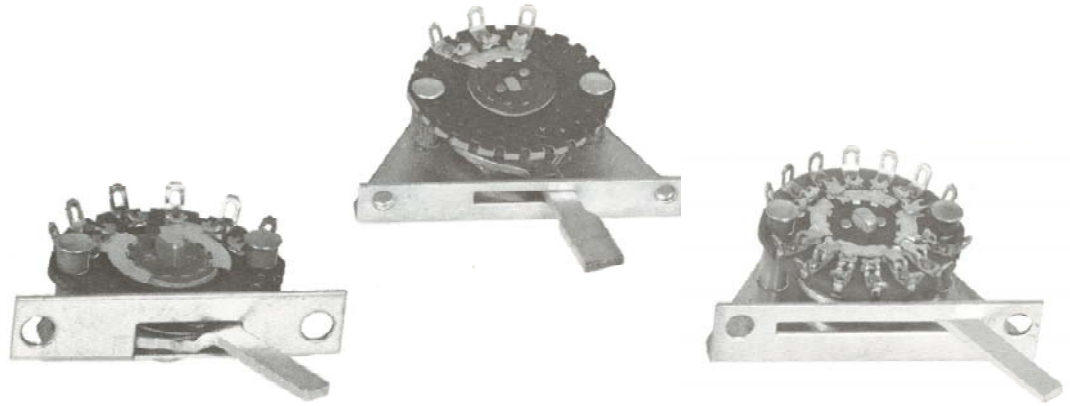
Contact Resistance

.002 ohms between adjacent clips

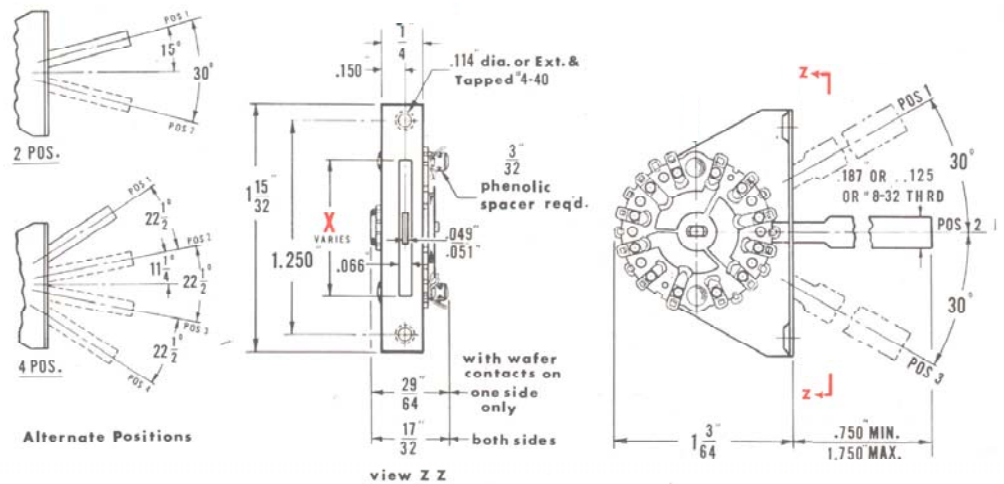
Electrical Rating

.230A @ 115 VAC

1.5A @ 28 VDC



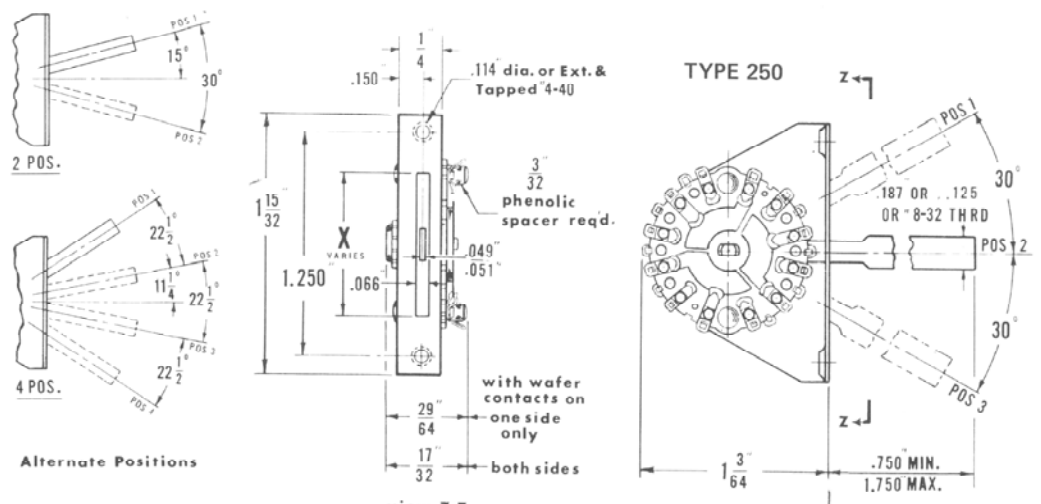
SMLR Type Drawing



SMLR Type Switch Assemblies

Positions	MAXIMUM SWITCHING PER SECTION		Type 1300LR	
	Type 328LR and Type 250LR 30° Index	22-1/2° Index	30° Index	22-1/2° Index
2	6 Poles	-	4 Poles	-
3	4 Poles	-	3 Poles	-
4	-	2 Poles	-	1 Pole

SMLR Type



6MLR Type

Electroswitch realizes the importance of the "right" feel required by guitarists and has continually designed and developed lever switches to provide a superior product.

For over three decades, our three and five position lever switches have been tested and refined to meet the needs and desires of guitar players all over the world. Electroswitch's patented "T" slugs secure solder-lug clips to the stator.

Specifications

Electrical Characteristics

Current and Voltage Ratings

Resistive load. Silver plated brass, make and break;
1.5 amp at 28 VDC, .230 amp at 115 VAC RMS
.22 amp at 100 VDC, 1.75 amp at 24 VAC RMS

Current Carrying Capacity

Silver plated brass: 9 amps

Dielectric Strength

1,500 VAC between critical parts and ground

Contact Resistance

Silver plated parts: average initial 3 milliohms

Mechanical Characteristics

Index

The frame uses indexing bumps of the Hill & Valley type to ensure positive indexing at each of the positions available. A single roller type bearing of Type 303 stainless steel to ensure positive engagement with the indexing valleys of the frame.

Contact Staking

Solder-lug clips are secured to the stator using Electroswitch's patented "T" slugs

Insulation/Temperature/Levers

Insulation

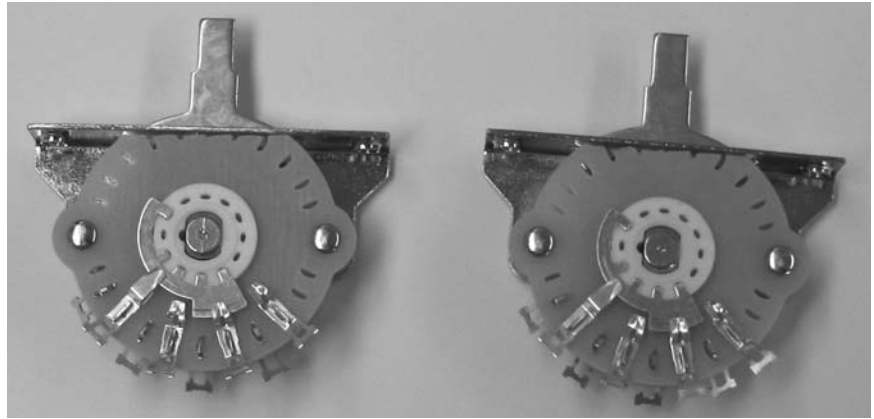
Glass epoxy

Temperature

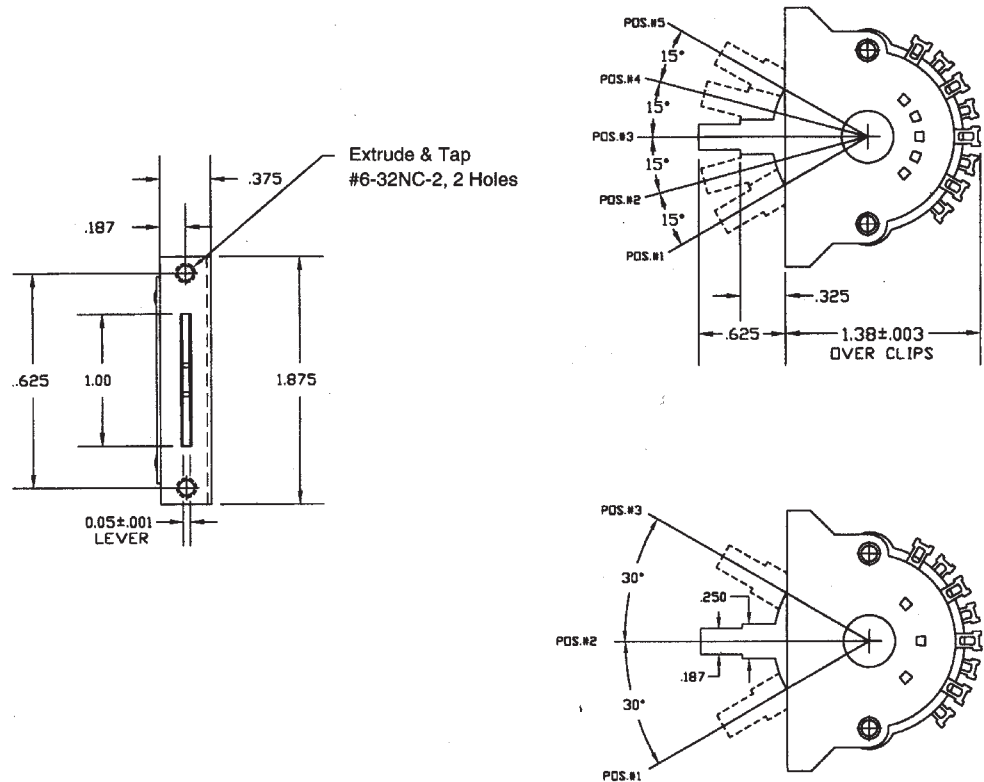
Standard commercial -25°C to +85°C

Levers

Uses standard push button switch knobs that fit a .187" x .050" dimension



6MLR Type Drawing



6MLR Type Switch Assemblies

Part Number	Positions	Poles	Detent Angle	Lever Length
51992	3	2	30°	.625"
51993	5	2	15°	.625"
51973	4	2	22.5°	.625"

T05 Type

T05 Series offers a customized product at economical prices. Only .362 in diameter, this series offers definite detent switching action with options that include a boot seal which prohibits contamination of contacts during cleaning. T05 enclosed rotary switch offers distinctive options and customization at competitive prices.

Specifications

Electrical Characteristics

Voltage

10 mA @ 1 VDC (resistive load)
500 mA @ 125 VAC (resistive load)

Contact Resistance

100 milliohms max. after life, (50 milliohms initial) Break Before Make (non-shorting) Contacts

Insulation Resistance

10,000 megohms mm. (50,000 megohms mm initial @100 Volts)

Dielectric Breakdown Voltage

500 VAC mm.

Life Expectancy

2500 Cycles

Current Carrying Capacity

.5 amps

Mechanical Characteristics Rotational Torque - 2 to 4 inch-ounces initial room ambient

Detent Angles

450

Stops

Fixed, from 2 to 8 positions as required Terminals - See mechanical drawing for contact arrangement

Materials

Switch Base/Index Polyester, glass filled

Shaft

Acetal, homopolymer

Detent Balls

Steel, Nickel Plated

Rotor Contact

Brass, hard Gold Plate over Nickel Plate

Common Ring

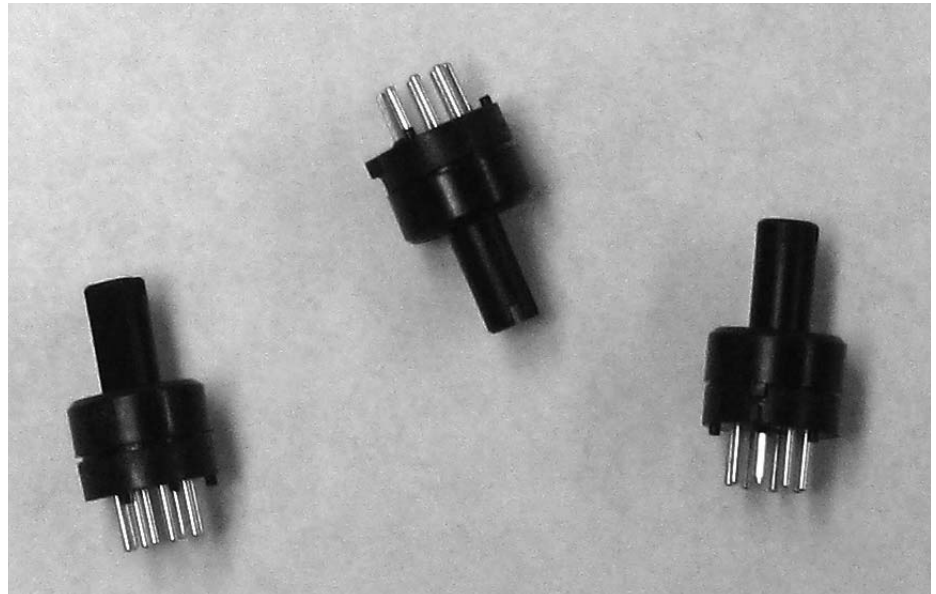
Phosphor Bronze, hard Gold Plate over Nickel Plate

Terminals

Copper Alloy, hard Gold Plate over Nickel Plate
Shaft and Panel Seal Ethylene Propylene

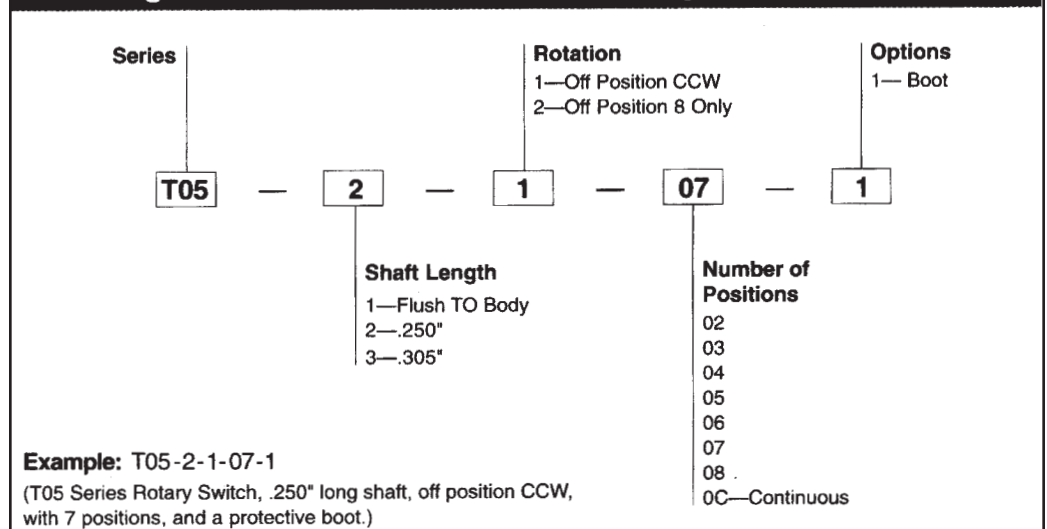
Options

- Screwdriver or Knob Actuated
- 2 to 8 Positions or Continuous
- Off Position at 1 or B



Rotation	Number of Positions	Travel
Continuous	Off, 1, 2, 3, 4, 5, 6, 7	360°
Stops: Off Position @ CCW	Off, 1, 2, 3, 4, 5, 6, 7 Off, 1, 2, 3, 4, 5, 6 Off, 1, 2, 3, 4, 5 Off, 1, 2, 3, 4 Off, 1, 2, 3 Off, 1, 2 Off, 1	315° 270° 225° 180° 135° 90° 45°
Stops: Off Position @ 8 Only	1, 2, 3, 4, 5, 6, 7, Off 1, 2, 3, 4, 5, 6, 7 No Off 1, 2, 3, 4, 5, 6, No Off 1, 2, 3, 4, 5, No Off 1, 2, 3, 4, No Off 1, 2, 3 No Off 1, 2, No Off	315° 270° 225° 180° 135° 90° 45°

Ordering the T05 Series Enclosed Rotary Switches



Contact Materials and Definitions

To provide economical switches without sacrificing reliability, *ELECTROSWITCH* has developed contact materials with precious metal inlays and overlays. These are being used in many applications, replacing solid precious metals which were the industry standard. In keeping with our philosophy, new contact materials must meet or exceed all existing standards and must not adversely affect switch performance.

Contact materials that are not gold plated have a protective anti-tarnish coating applied after plating to inhibit oxidation during assembly, shipping, and storage.

The contact materials described provide for a full range of switching applications, from dry circuitry to 1 amp at 110 VAC. Current and voltage ratings on resistive loads at room ambient operating temperatures should not exceed those shown.

ELECTROSWITCH developed double wiping contacts for their rotary switches which are self-cleaning and require no maintenance during life under normal operating conditions. The self-cleaning action assures a clean, positive contact capable of wiping through accumulated particles or dust, oxides, and other contaminants.

Non Shorting Type Switch—also called “break before make.” When switching from one position to the next, the first contact fully breaks before the second contact is made.

Shorting Type Switch—also called “make before break.” When switching from one position to the next, the second contact is closed before the first is opened.

Cycle—is defined as a rotation from one stop to the other and return or 330° rotation for a 12 position switch. An operation is normally defined as the making and breaking of an electrical contact.

Contact Materials

Contact Material	Suggested Maximum Operating Temperature	Typical Life Cycles (No load, room ambient)	Suggested Application
Brass, silver plated with protective anti-tarnish coating (OMS106, CMS237, CMS80)	+100°C	10,000 cycles	Commercial
Special spring base material with silver alloy rolled on contact surface (CMS333)	+100°C	100,000 cycles Silver-to-silver contact	Commercial
	See MIL-S-3786 & QPL List	100,000 cycles Silver-to-silver contact	Military
Spring silver alloy (OMS132)	+100°C	200,000 cycles Silver-to-silver contact	Commercial & Military Increased life

Insulation Materials

The table below lists the types of stator and rotor insulation now available for *ELECTROSWITCH*'s rotary switches.

Insulation Material	MIL Specification	Temperature Range (Non-Military)
Phenolic	L-P-513 Type PBE-P	-65°C to +100°C
Glass Silicone	MIL-P-997 Type GSG	-65°C to +85°C
Ceramic	MIL-1-10 Grade L-422	-65°C to +150°C
Diallyl Phthalate	MIL-M-14	-65°C to +85°C
Glass Epoxy	MIL-P-18177 Grade GEE	-65°C to +85°C

OPEN FRAME SWITCHES

Lubrication of Contacts

All switch sections are lubricated using a process which deposits a very thin film on the rotor blades. This film is of sufficient thickness to provide lubrication for the life of a normally hand-operated switch. The film of lubricant will not readily collect dust and dirt, which could lead to reduced switch life.

Various lubricants that are compatible chemically and electrically are used. Lubricant used is dependent on switch specification and operation. If customer switch specification specifically calls for no lubricant, none will be applied.

Soldering to OakGrigsby Switches

Care must be exercised when soldering to *ELECTROSWITCH*'s switches. Soldering irons, which can produce temperatures above 600°F should not be used. Excessive heat or prolonged periods of heating (above 5 seconds) can cause clips to loosen, and contribute to an increase in contact resistance due to a loss of contact pressure.

Never clean rosin from soldered connections on a switch or any other contacting device with solvent. Rosin dissolved by a solvent may float down onto the contacts where it cannot be removed easily, and no amount of contact pressure can cope with a rosin coating.

Type of Detent

Unidex—a dual ball detent indexing on a starwheel. This detent offers 100,000 cycles of mechanical life, with the torque remaining constant and crisp throughout the life of the switch. It should be used in place of ball index where possible.

Ball Index—single, dual or tri-ball indexing with ball bearing indexing over a hill and valley or punched hole plate. This index is common to the Type L and MF switches. The tri-ball index must be used for military switches.

Detenting Torque

Proper detenting torque is necessary to give the right feel to the switch. An approximate torque figure can be obtained by adding all the clips which are in contact with the rotor blade(s), and then adding the maximum number of clips entering in any one detented position. This figure, multiplied by 1 inch-ounce, will give an approximate but usable torque value. In order to mask out this drag, the detent mechanism itself must have at least 1½ times the torque of the section(s). This means that the total switch torque should be at least 2½ times the section torque for a crisp feel. The typical tolerance on the torque requirement is ±40%. If a closer torque tolerance is required, adjustments will be necessary (at additional cost).

In cases where clip and blade drag is greater than can be accommodated by a specific index, definite feel of index position becomes vague and there is a tendency to skip positions. Thus, in order to obtain a definite detent "feel," it is necessary to reduce section drag by using a thinner clip material or special slotted, low torque clips. (Consult our Application Engineering Department. They will gladly provide any information or assistance you might request.)

Maximum torque is related to the size and type of knob being used on the front panel. For a comfortable turning force, the following torque values are recommended:

½ in. dia. knob	8 to 15 in.-oz.
¾ in. dia. knob	10 to 20 in.-oz.
1 in. dia. knob	15 to 35 in.-oz.
1½ in. dia. knob	20 to 50 in.-oz.

(Bar knobs or deeply knurled knobs can be used with higher torques for the same size knob.)

Identification Marking of Switches

Oak switches are marked "249," our registered trademark, or "Oak." Our manufacturer's federal identification code number is 76854. These numbers do not identify any particular switch or item.

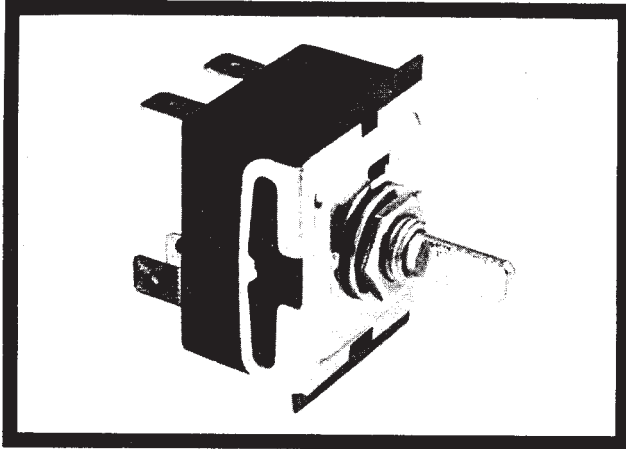
When specified, rotary switches may be marked with either the Oak part number or customer's part number. Since changes made in production might cause obsolescence of parts already marked, it is impractical to stamp revision letters.

Rotary Switches

Series 240 & 390



ELECTROSWITCH
• ELECTRONIC PRODUCTS
UNIT OF ELECTRO SWITCH CORP.



DESIGNED FOR APPLICATIONS REQUIRING COMPACTNESS, HIGH CAPACITY AND LONG SERVICE LIFE.

Our capability in the development of electrical switches over the past 40 years has transcended almost every possible application within the electrical and electronic industry. None has met greater acceptance or achieved more universal popularity than the Series 240 & 390 Rotary Switches. Designed for applications where space limitations require compactness, both are electrically and mechanically interchangeable. They are available single pole or double pole with indexing, in steps of 45, 51, 60, 72, 90, 120 or 180 degrees, operating full rotary or stops as required. Standard A.C. Rating — U.L. approved — range from 7-1/2 amperes to 38 amperes, including motor ratings of 1/4 H.P. to 1 H.P., 120 V., 2 H.P., 240 V. Typical applications include: Air conditioners, X-ray machines, medical, dental and other laboratory equipment, ranges, ovens, battery charges, kilns, space heaters, vending machines, washers, dryers, and a multitude of appliances or devices.

MANUAL MOTOR CONTROLLERS

Many 390 Series Switches are now classified as Manual Motor Controls and recognized under the component programs of Underwriters' Laboratories, Inc. and Canadian Standards Association.

These devices are open type manual motor controls and are rated single phase, same polarity with contact ratings to 38 amps total input and horsepower ratings to 2 H.P., at 240 VAC (resistive) plus locked rotor ratings to 125 amperes at 240 VAC.

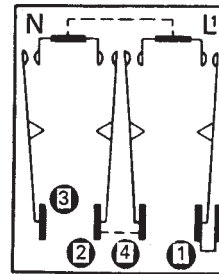
Mounting arrangements, circuitry details, and physical dimensions are the same as those described in this bulletin for 390 Series Rotary Switches.

TYPICAL CIRCUITS

Hundreds of circuit variations are possible

SINGLE POLE CIRCUITS AS USED IN AIR CONDITIONERS

Terminals L1 and N shunted internally. Line Terminal may connect with terminals 1, 2, 3, and 4 in any position with 45, 60, 72 and 90 degrees of throw.



REAR VIEW

DOUBLE POLE CIRCUITS AS USED IN ELECTRIC RANGES

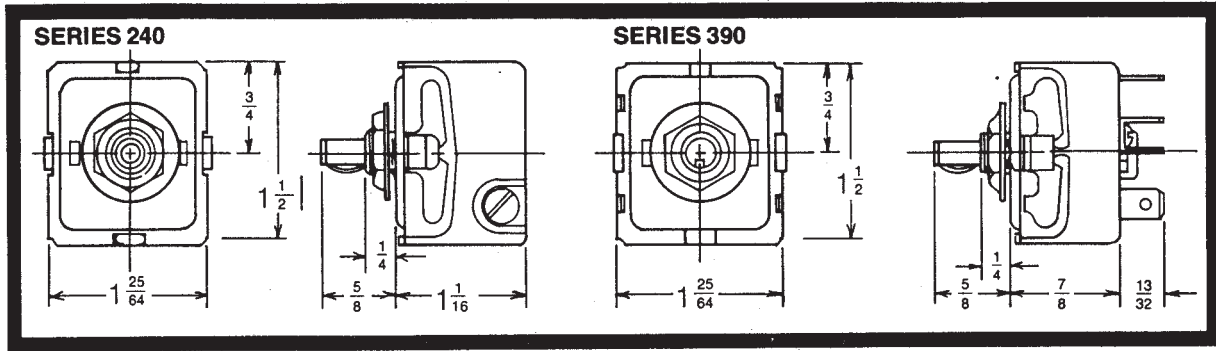
Terminal N may connect with terminals 2 and 3 only, in any position. Terminal L1 may connect with terminals 1 and 4 only, in any position. Available with 45, 51, 60, 72, 90 and 180 degrees of throw.

Electrical ratings vary as to application, and are available to 38 A. 120/240 V. rating with 20 amps. max. on inside terminals (2 & 4) and 25 amps. max. on outside terminals (1 & 3) resistive load. Double pole applications can have 30 amps. max. rating with 20 amps. max. on any one circuit.

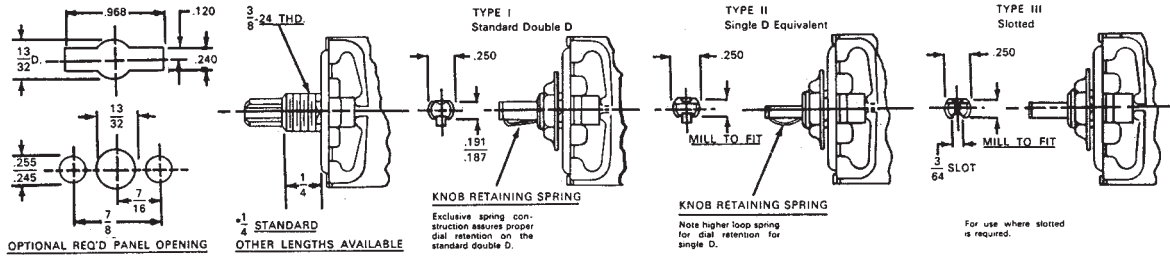
DUMMY AND AUXILIARY TERMINALS

Series 390 Switches may be provided with two, four or six dummy terminals, eliminating the need for auxiliary terminal blocks. Auxiliary terminals can be provided to permit additional connections on load or line terminals. Through the use of many standard cams and both internal and external shunts, the Series 240 and Series 390 small rotary switches can be designed to accommodate a vast number of different circuits.

Illustration shows coaxial spindle arrangement with outer hollow spindle (A) operating the switch itself, while the inner solid spindle (B) provides independent coaxial control of the auxiliary function.

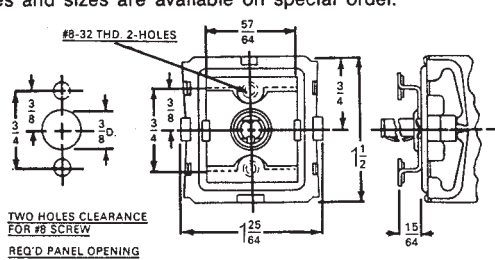


STANDARD MOUNTING ARRANGEMENTS

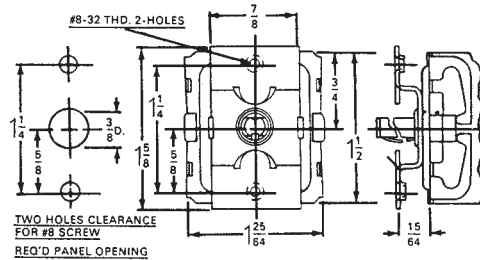


SINGLE HOLE MOUNTING

An exclusive spring arrangement of Types I and II gives uniform tension to hold knobs firmly in place. Various lengths are available. For spindle lengths exceeding 2", nylon back bearings will be supplied for added strength and rigidity. Other types and sizes are available on special order.

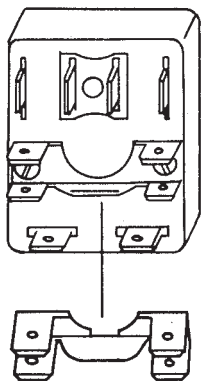


TWO HOLE 3/4" MOUNTING

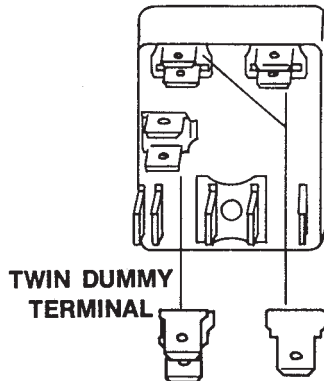


TWO HOLE 1-1/4" MOUNTING

DUMMY AND AUXILIARY TERMINALS



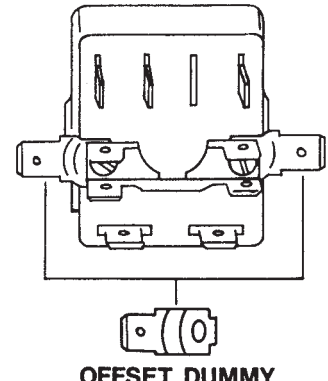
4 PRONG DUMMY TERMINAL



TWIN DUMMY TERMINAL



AUXILIARY TAB TERMINAL



OFFSET DUMMY TERMINAL

T05 Mechanical Drawings

