



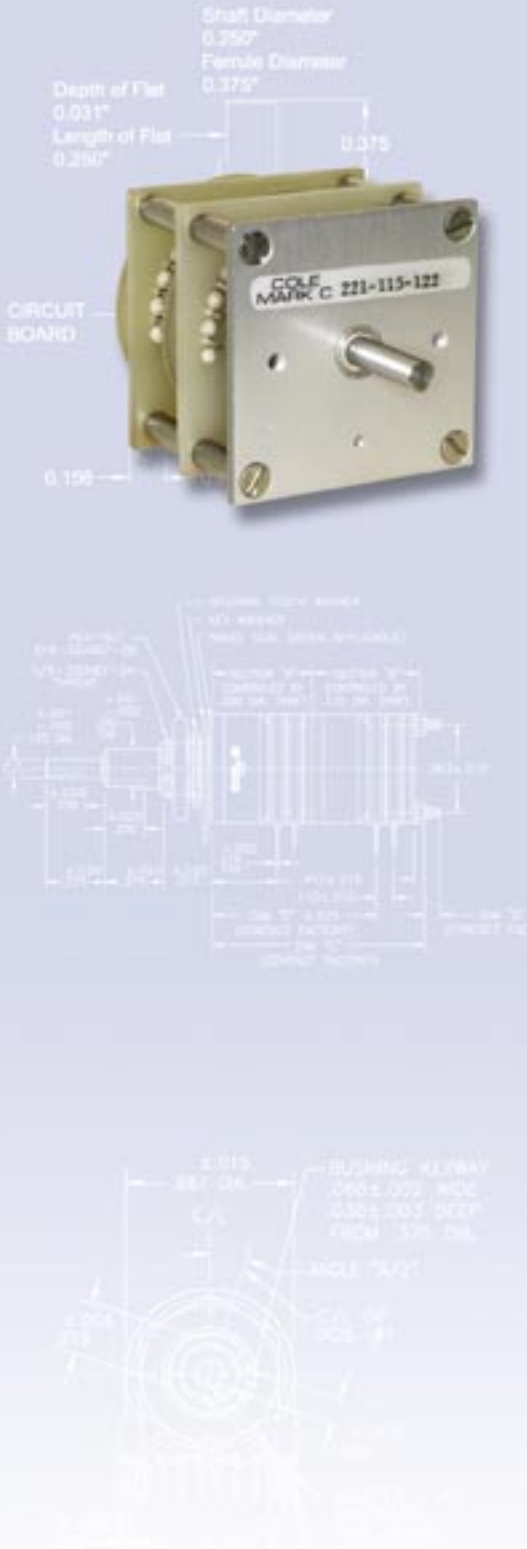
# OPEN FRAME SERIES

## Open Frame Instrument Switches

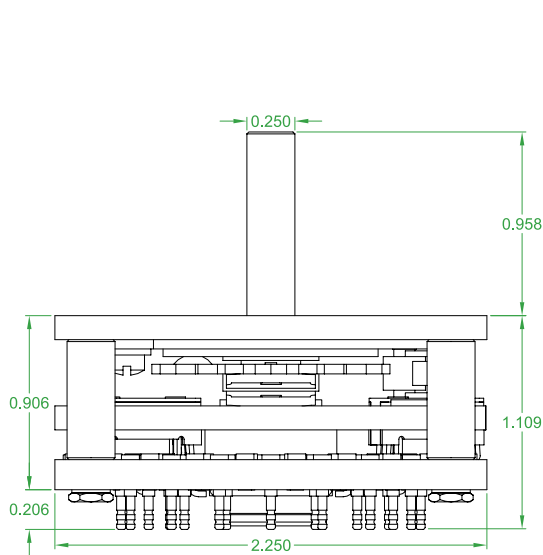
**C**ole's quality Open Frame Instrument Rotary Switch provides low contact resistance (.005W), very high contact reliability, smooth action with positive positioning, precision design, and trouble free construction of glass epoxy insulators and silver conductors.

Rated for 100,000 cycles minimum, the contact mechanism is a bifurcated brush, promising 100% redundancy and avoidance of contact failure. In addition, it has been designed and manufactured to meet or exceed all applicable requirements of MIL-S-3786, MIL-T-945, QQ-P416, MIL-S-13282, MIL-STD-202, MIL-A-8625, and MIL-STD-167. All Open Frame Series switches are available pre-wired to terminal boards or connectors.

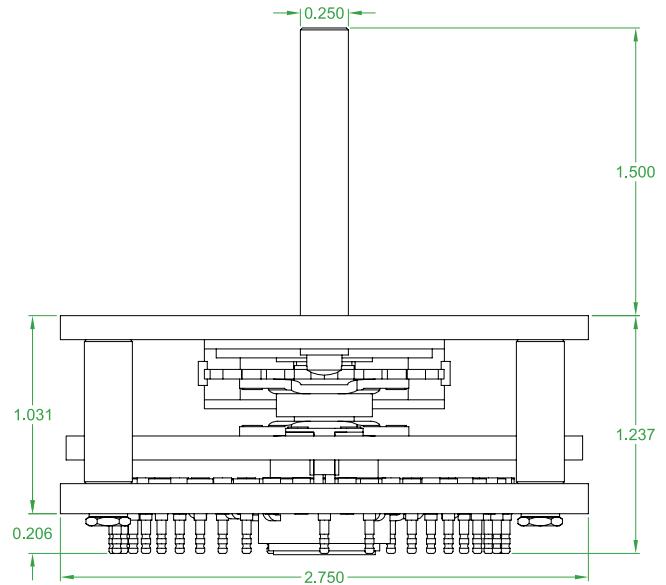
Cole's Open Frame switches are ideal for high voltage, high current, and low resistance applications.



Very Low Electrical Resistance, Very Stable Electrical Contacts, 64 Positions Max



Open Frame  
2.25 inch. square deck  
(See Page 4)



Open Frame  
2.75 inch. square deck  
(See Page 3)

**NOTES:**

Open Frame - .250 Shaft Dia., 2.25 inch. square deck, (See Page 4).

Open Frame - .250 Shaft Dia., 2.75 inch. square deck, (See Page 3).

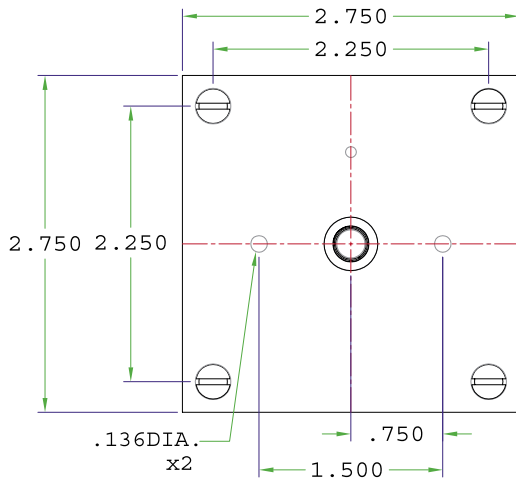


Very Low Electrical Resistance, Very Stable Electrical Contacts, 64 Positions Max

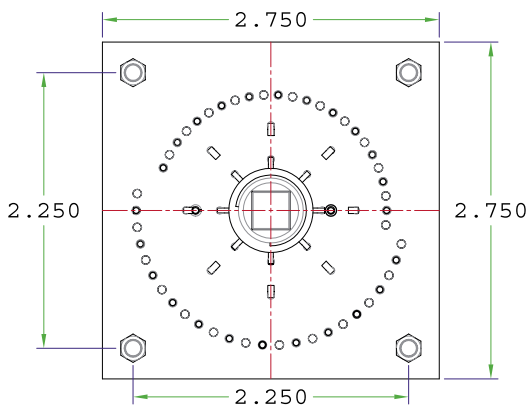
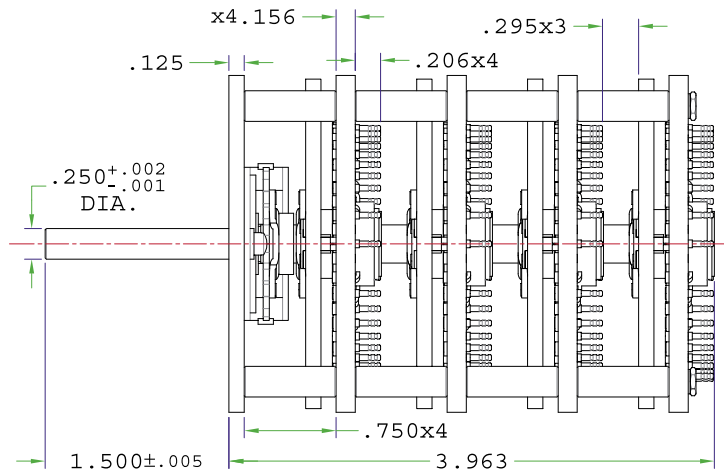
Features

- \* Solid Silver and Silver Plated Conductors.
- \* Very Low Resistance (.005W).
- \* High Current Capacity.
- \* User Adjustable Stop.
- \* Pre-Wired Option for Ease of Installation.
- \* Glass Epoxy as Strong Stable Insulator.
- \* Bifurcated Brush Contacts for high reliability.
- \* 13+ Decks as Special Order.
- \* Up to 12 Decks as Standard.
- \* 8 Poles Maximum Available.
- \* 64 Positions Maximum Available.

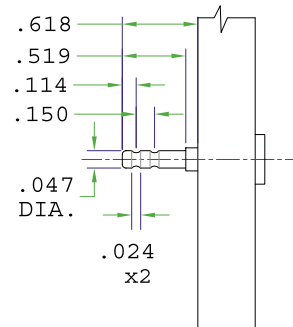
Front View



Side View

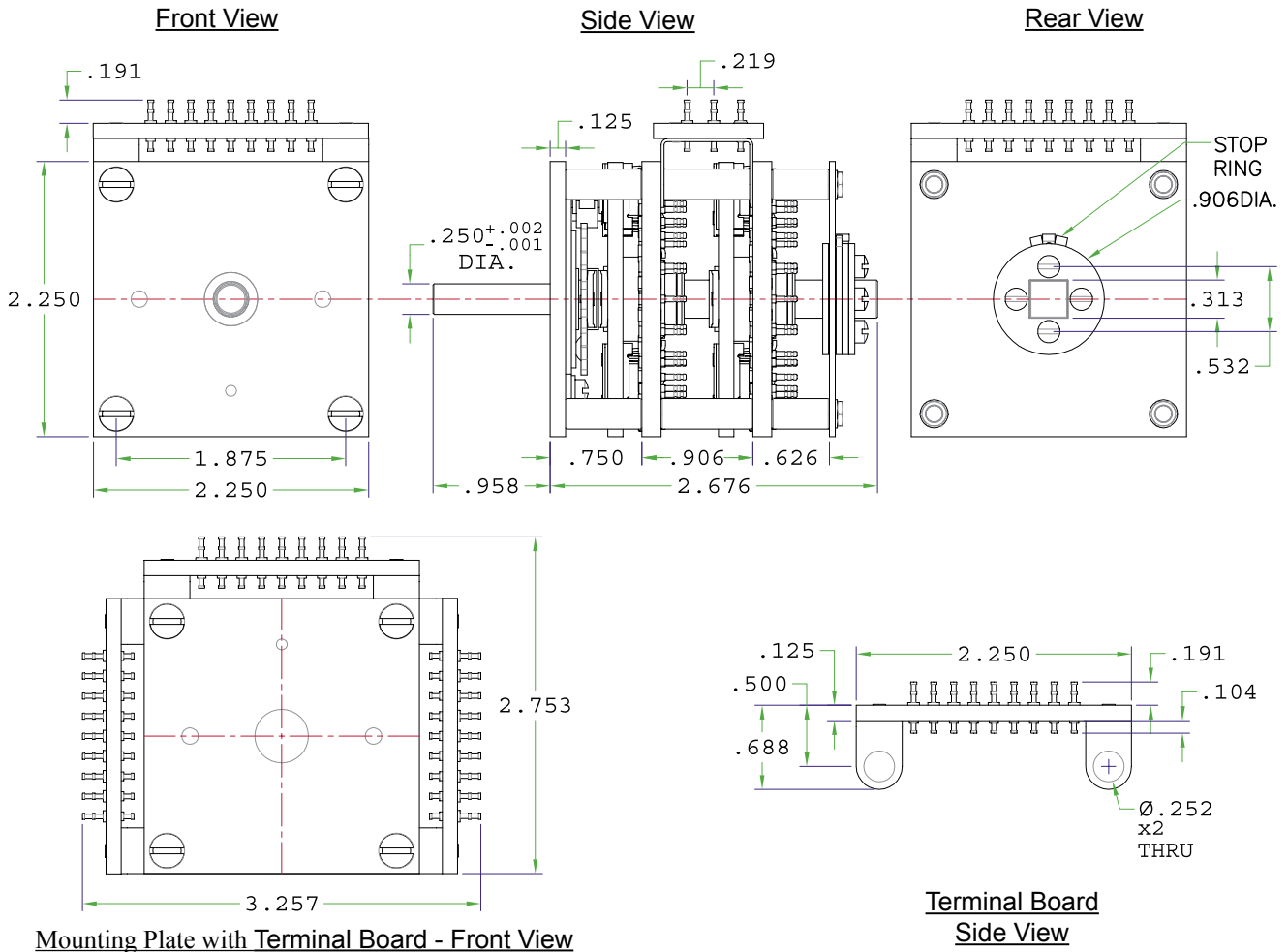


Rear View



Contact Silver Detail





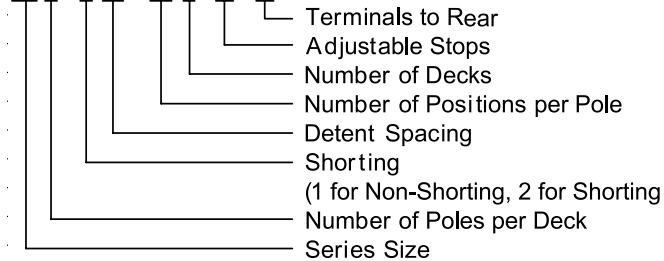
Mounting Plate with Terminal Board - Front View

Terminal Board Side View

### ORDERING INFORMATION

Sample Code

22 2 - 2 11 31 3 - A - R



Switch shown in the sample code is a 2-1/4 Square, 2 Poles per Deck, Shorting, 11-1/4 Detent, 31 positions per Pole, 3 Decks, Adjustable Stop, Terminals to Rear.

### OPTIONS

The following options can be added to the standard switch. When ordering, simply add the letters after the basic part number.

- A = Adjustable stops.
  - D = Screwdriver slot.
  - F = Fixed stop between the first and last position on a full-turn switch.
  - G = RFI-EMI shielding.
  - L = Low Level.
  - P = Panel and shaft seals.
  - S = Shorting (Available in all Configurations).
  - Y = Optional .432 Non-Turn Washer.
- Screw Terminals Available (Contact Factory for Special Part Number).



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ISO9001 CERTIFIED

INSTRUMENT SERIES SWITCH SELECTION GUIDE - Positions Available for Maximum Rotation

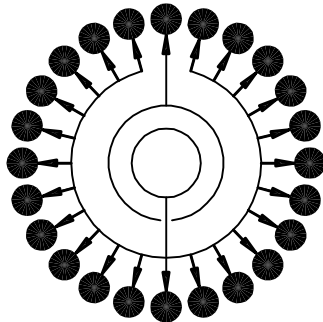
DETENT SPACING	SWITCH SERIES	1 POLE		2 POLE		3 POLE		4 POLE		5 POLE		6 POLE		7 POLE		8 POLE	
		NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S
5 5/8°	26		64		31				15								
6°	26		60		29		19		11		11						
7.2°	26		50		50		24		24								
7 1/2°	22		48		48		23		23		15		15				
	26		48		48		23		23		15		15		11		11
9°	16		40		19		9		9								
	22		40		40		19		19		12		12				
	26		40		40		19		19		12		12		9		9
10°	14		36		17		11										
	16		36		17		11		8								
	22		36		36		17		17		11		11				
	26		36		36		17		17		11		11				
11 1/4°	14		32		15												
	16		32		15		7		7								
	22		32		32		15		15		9		9				
	26	32	32	16	16		15	8	15		9		9		7		7
12°	26	30	30	15		10		6									
14.4°	22	25		12													
	26	25		25		12		12									
15°	14		24		11		7										
	16		24		12		8		6								
	22	24	24	24	24	12	12	12	12	8	8	8	8				
	26	24	24	24	24	12	12	12	12	8	8	8	8	6	6	6	6
18°	16	20		10		5		5									
	22	20		20		10		10		6		6					
	26	20		20		10		10		6		6		5		5	
20°	14	18		9		6											
	16	18		9		6		4									
	22	18		18		9		9		6		6					
	26	18		18		9		9		6		6					
22 1/2°	14	16		8													
	16	16		8		4		4									
	22	16		16		8		8		5		5					
	26	16		16		8		8		5		5		4		4	
30°	14	12		6		4											
	16	12		6		4		3									
	22	12		12		6		6		4		4					
	26	12		12		6		6		4		4		3		3	

NOTES: Series Size: 14=1-1/2" Square. 16=1-3/4" Square. NS=Non-Shorting. 22=2-1/4" Square. 26=2-3/4" Square. S=Shorting.

- Position listed are maximum available, full rotation, within configuration parameters.
- Non-Shorting contacts will be furnished unless otherwise specified.
- Refer to series configuration specifications for complete details and proper identification.
- Larger deck sizes, detent spacing variation available for special applications.



## SIMULTANEOUS PARALLELING SWITCH



SIMULTANEOUS PARALLELING

SIMULTANEOUS PARALLELING SWITCH				
Non-Shorting Basic I.D.	Detent(°) Spacing	Position Full Rotation	Positions Maximum With Stop	Shorting Basic I.D.
26SP-111	11 1/4	32	31	26SP-211
26SP-112	12	30	29	26SP-212
26SP-115	15	24	23	26SP-215
26SP-120	20	18	18	26SP-220
26SP-122	22 1/2	16	16	26SP-222
26SP-130	30	12	12	26SP-230
26SP-140	40	9	9	26SP-240
26SP-145	45	8	8	26SP-245

\*Where it is required to have no open circulating between positions, including the independent contact when the switch is rotated, use these SHORTING Basic I.D. numbers.

**FUNCTION:** The typical schematic left, is 24 positions, 15 degrees, 23 of the positions are shorted together by 23 finger brushes connected in common to one collector ring. The 24th position is contacted by an entirely separate finger brush which is connected to a separate collector ring. As the switch is rotated, the separate brush makes contact with each switch position while simultaneously all other

positions are shorted together. No second one pole deck is required to perform this function, thus overall length is reduced and wiring time costs are reduced.

**ONE PIECE FINGER BRUSHES:** No mechanically or solder joined sections in the solid, stress-free

one piece finger brush assembly. Solid fine silver finger brush contacts, stator contacts and collector rings.

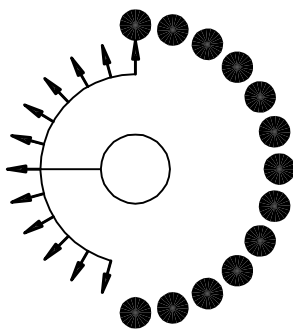
**BINARY CODING OR POSITION SELECTION:** Paralleling decks singly or in tandem are used for binary coding or position selection allowing minimum amount of interconnecting circuit and remote control.

**APPLICATION EXAMPLES:**

- 1) Low voltage signal testing.
- 2) Multiple circuit cable testing, both continuity and voltage breakdown.
- 3) Current testing circuits to ground or common.
- 4) Solid state testing where it is desirable to connect all circuits to eliminate transients causing erroneous test data.
- 5) One or more paralleling decks can be included in a standard multi-deck switch to meet all types of requirements.



**PROGRESSIVELY PARALLELING (SHORTING) SWITCH**



PROGRESSIVELY PARALLELING

PROGRESSIVELY PARALLELING (SHORTING) SWITCH		
Shorting Basic I.D.	Detent(°) Spacing	Positions Maximum With Stop
26PP-211	11 1/4	16
26PP-212	12	15
26PP-215	15	12
26PP-220	20	9
26PP-222	22 1/2	8
26PP-230	30	6
26PP-240	40	4
26PP-245	45	4

MAXIMUM ROTATION: 180 Degrees.

FUNCTION: The one piece finger brush assembly progressively connects (or shorts) together the switch positions sequentially as the switch is rotated.

ONE PIECE FINGER BRUSHES: No mechanically or solder joined section in the solid, stress-free one piece finger brush assembly. Solid fine silver finger brush contacts, stator contacts and collector rings.

APPLICATION EXAMPLES: This type of switch is utilized for paralleling capacitors in capacitance decade units, for varying capacity values in multiple fixed frequency generators, receivers, transmitters, etc. It is used in many resistance bridge, strain gage and transducer applications, synchro systems, remote controlling, and computer systems. One or more progressively paralleling decks can be included in a standard multi-deck switch to meet all types of requirements, providing it does not rotate over 180 degrees.

**NOTES**

Current Rating: 1 1/2 amp with standard finger brush. Resistance: 0.005 ohms.





**Open Frame Technical Data**

Specification	Unit	Value	Note:
Military Specifications		MIL-S-3786	
Continuous (Non-Switching) Current Carrying Capacity	Amps	15	at 28 VDC, with max. contact temperature rise of 20°C
Switching Current Capacity at 28 VDC resistive	Amps	5	at Atmospheric pressure with 85°C and at reduced Barometric pressure with 25°C
Switching Current Capacity at 115 VAC resistive	Amps	5	
Switching Current Capacity at 28 VDC inductive (2.8 H.)	Amps	3	
Switching Current Capacity at 28 VDC Lamp Load	Amps	3	
Low Level max. capacity	mA	10	at 30 millivolts DC max.
Dielectric Strength, min.	VRMS	1,500	
Contact resistance, max. (initial)	milliohms (mΩ)	0.5	
Contact resistance, max. (after life)	milliohms (mΩ)	20	
Insulation resistance, min. (initial)	megaohms (MΩ)	100,000	at 100 VAC
Insulation resistance, min. (after life)	megaohms (MΩ)	50,000	at 100 VAC
Switching Life, min	cycles	25,000	at rated loads, sea-level, 25°C, 68% relative humidity
Mechanical Life, min	cycles	100,000	
Rotational Torque, min.	inch pounds	24	
Rotational Torque, max.	inch pounds	80	
Stop Strength, max.	inch pounds	50	
Mounting Ferrule Strength	inch pounds	N/A	
Withstanding Shaft Push Force	pounds	200	
Weight	grams	140	2 inch. Square
Molded Parts		Glass Epoxy-Mil P 18177	
Contact Surfaces		Pure, Solid Silver	Gold plate is an option
Altitude	feet	80,000	Typical pressure at 80,000 feet: 0.4 psi
Temperature, min.	degrees Celsius	-55	
Temperature, max.	degrees Celsius	125	
Vibration Tested		Meets	Per MIL-S-3786, MIL-STD-202, Method 204, test condition "B", vibration grade 3
Impact Shock, Medium		Meets	MIL-STD 202; Method 213
Impact Shock, High		Meets	at 100g, MIL-STD 202, Method 207
Moisture Resistant		No	
Salt Spray Resistant		No	
Explosion Proof		No	
Immersion		No	
EMI/RFI		Meets	MIL-S-3786, 2 ohms Shaft to ground max.
Capacitance, min	picofarad (pF)	2-1/2	measured between contacts and between ring and contacts
Capacitance, max	picofarad (pF)	4	measured between contacts and between ring and contacts

