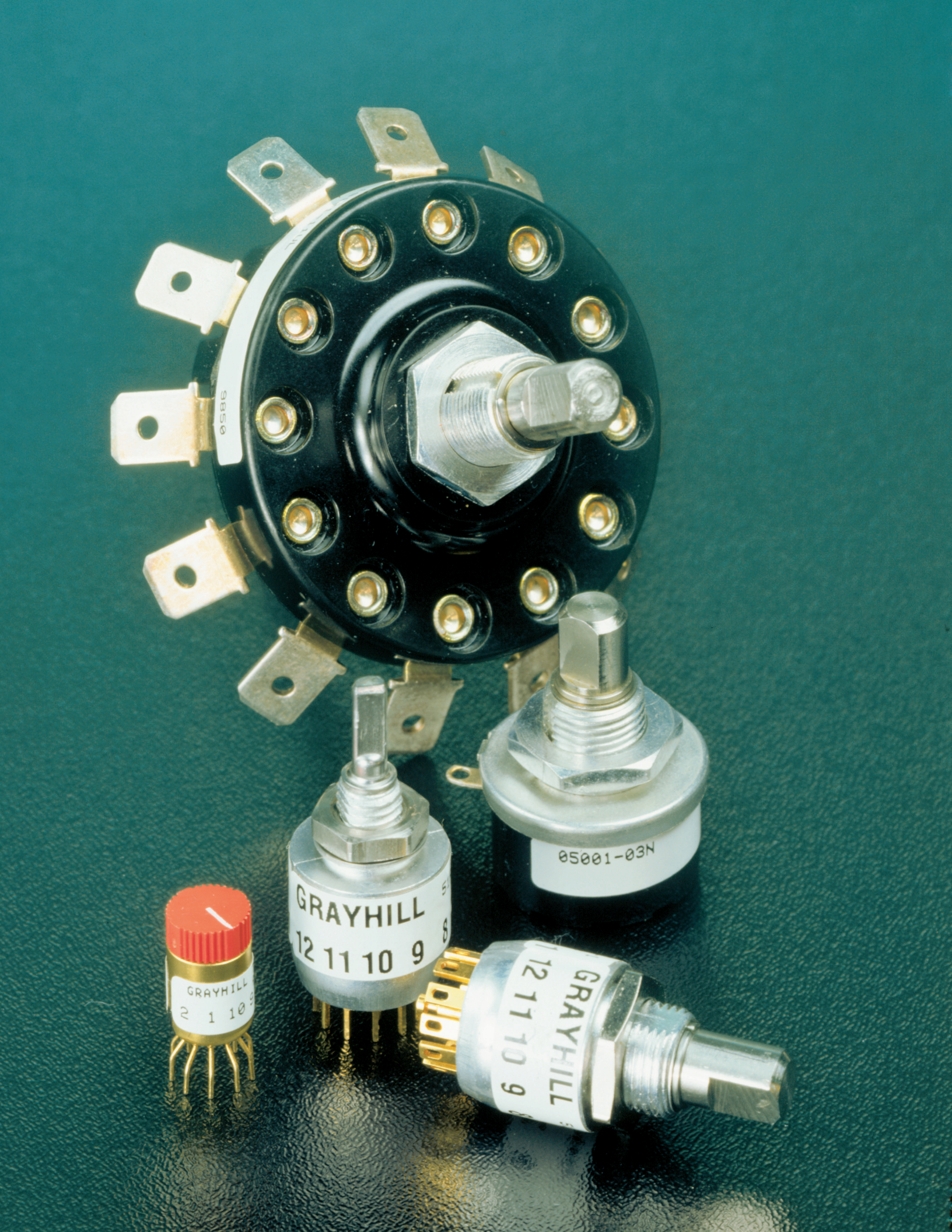
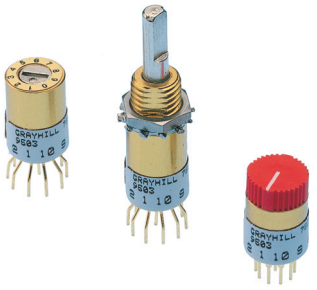

GRAYHILL
12 11 10 9
05001-03N
GRAYHILL
12 11 10 9
GRAYHILL

SINGLE DECK
ROTARY SWITCHES

- Minimal Space Behind Panel .3" up to 1"+ In Diameter
- More Economical Choice Than Multi Deck Rotary Switches
- High Quality, Enclosed Switches Including Military Types
- Low Current, Wiping Contacts

SERIES 75

0.3" Diameter, 200 mA

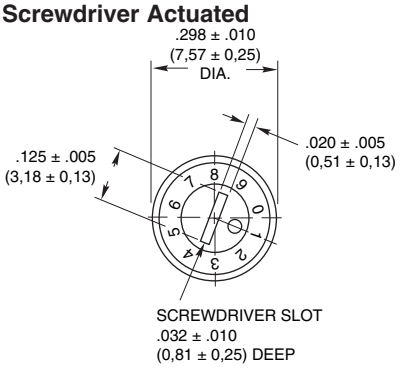


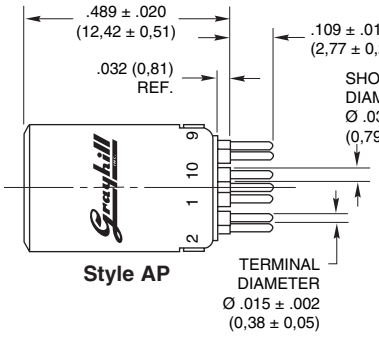
FEATURES

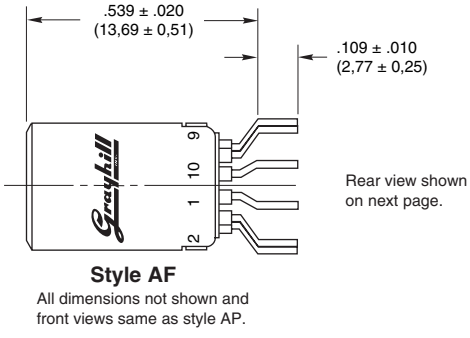
- Small Size
- Flush, Shafted, or Knobbed Shaft

DIMENSIONS In inches (and millimeters)

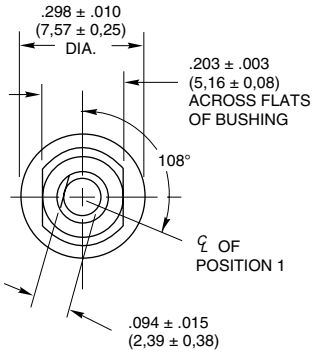
Screwdriver Actuated

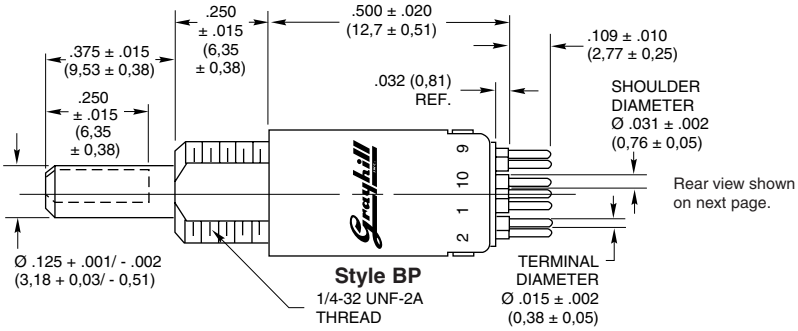


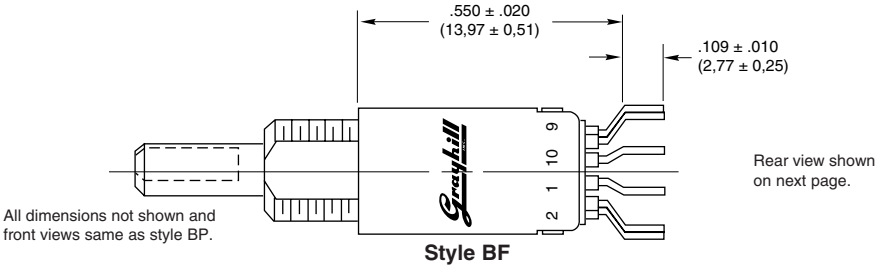




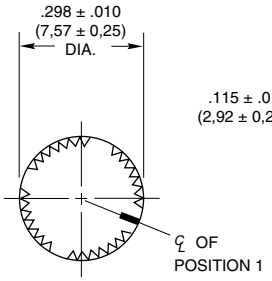
Shaft Actuated

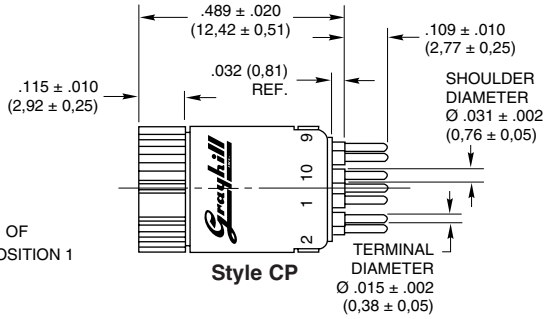


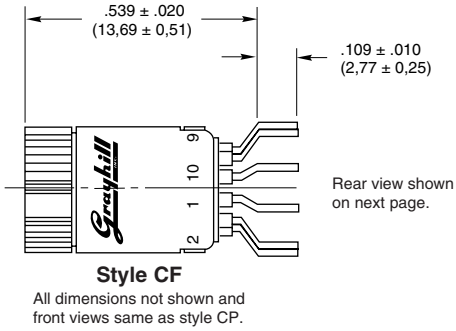




Integral Knob Actuated

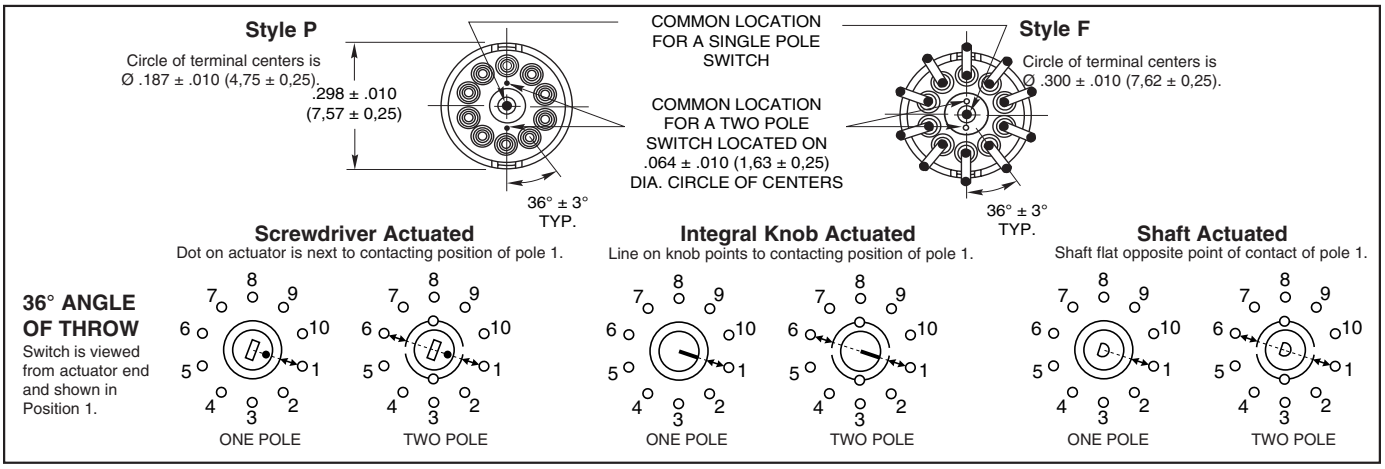






Grayhill part number and date code marked on label.
Customer part number marked on request.

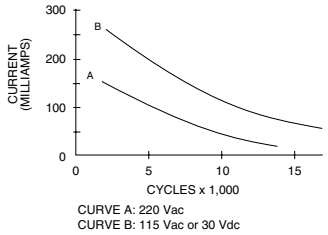
CIRCUIT DIAGRAMS AND REAR VIEWS



SPECIFICATIONS

Electrical Ratings

Chart shown for non-shorting (break before make) contacts, resistive load.



CURVE A: 220 Vac
CURVE B: 115 Vac or 30 Vdc

One cycle is 360° rotation and a return through all switch positions to the starting position. The data for the curve was measured at sea level, 25°C and 68% relative humidity with the following limiting criteria:

Contact Resistance: 50 milliohms maximum (15 milliohms initially).

Insulation Resistance: 10,000 Mohms minimum between mutually insulated parts.

Voltage Breakdown: 500 Vac between mutually insulated parts.

Life Expectancy: 10,000 cycles at 200 milliamps. One cycle is 360° rotation and a return through all switch positions to the starting position.

Low Level Rating: Make and break a 50 mV, 1 milliamp, resistive load for 10,000 cycles with a maximum contact resistance of 50 milliohms.

Contact Grayhill for information if the life limiting criteria is more critical than those listed, if the required cycles of operation are greater than those listed, if a larger make and break current is required than the one listed for the desired number of cycles, or if elevated temperatures or reduced pressures are part of the operating environment.

Materials and Finishes

Switch Base: Diallyl per MIL-M-14

Detent Cover and Detent Rotor in Styles AP, AF, BP, and BF: Phenolic per MIL-M-14

Bushing: Brass, tin zinc plating

Stop Pin: Stainless steel, passivated

Detent Balls: Steel, nickel-plated

Detent and Contact Springs: Tinned music wire

Rotor Contact: Silver cad-oxide, gold-plated

Terminals and Common: Brass, gold plate .00002" minimum thickness over silver plate .0003" minimum.

Shaft in Style BF or BP: Zinc

Integral Knob and Detent Rotor in Style CF or CP: Red Thermoplastic

Mounting Hardware for Style BF or BP: One mounting nut .062" thick by .312" across flats and one external tooth lockwasher supplied with each switch. Mounting nut is brass, zinc plated and lockwasher is spring steel.

Additional Characteristics

Contact Type: Non-shorting, wiping contacts

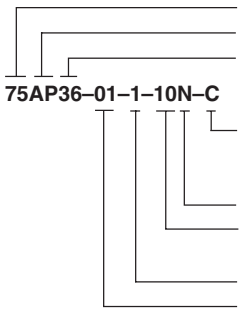
Terminals: Switches are provided with the full circle of terminals regardless of the number of active positions.

Stop Strength: 8 ounce-inches minimum

CHOICES AND LIMITATIONS

Style and Designation		Angle Of Throw	Stops	Terminal	Poles Per Deck	Number of Decks		Number of Positions/Pole
Ø 0.187 (4,75) Circle of Term.	Ø 0.300 (7,62) Circle of Term.					Shorting	Non-Shorting	
AP = Screwdriver Actuated BP = Shaft Operated CP = Integral Knob	AF = Screwdriver Actuated BF = Shaft Operated CF = Integral Knob	36°	Fixed	Printed	1 2	Not Available	1 1	2 thru 10 2 thru 5

ORDERING INFORMATION



Series

Style: Letters from Choices and Limitations Chart

Angle of Throw: 36° only

Stop Arrangement: The suffix C or F must be added to a one pole per deck switch to indicate continuous rotation (C) or fixed stop (F) between position 1 and position 10.

Type of Contacts: N=Non-shorting only

Positions per Pole: requires 02 positions as a minimum to maximum allowable dependent on the poles per deck

Poles per Deck: 1 or 2 poles available

Number of Decks: 1 deck only

Available from your local Grayhill Distributor. For prices and discounts, contact a local Sales Office, an authorized local Distributor, or Grayhill.

SERIES 50 SERIES 51

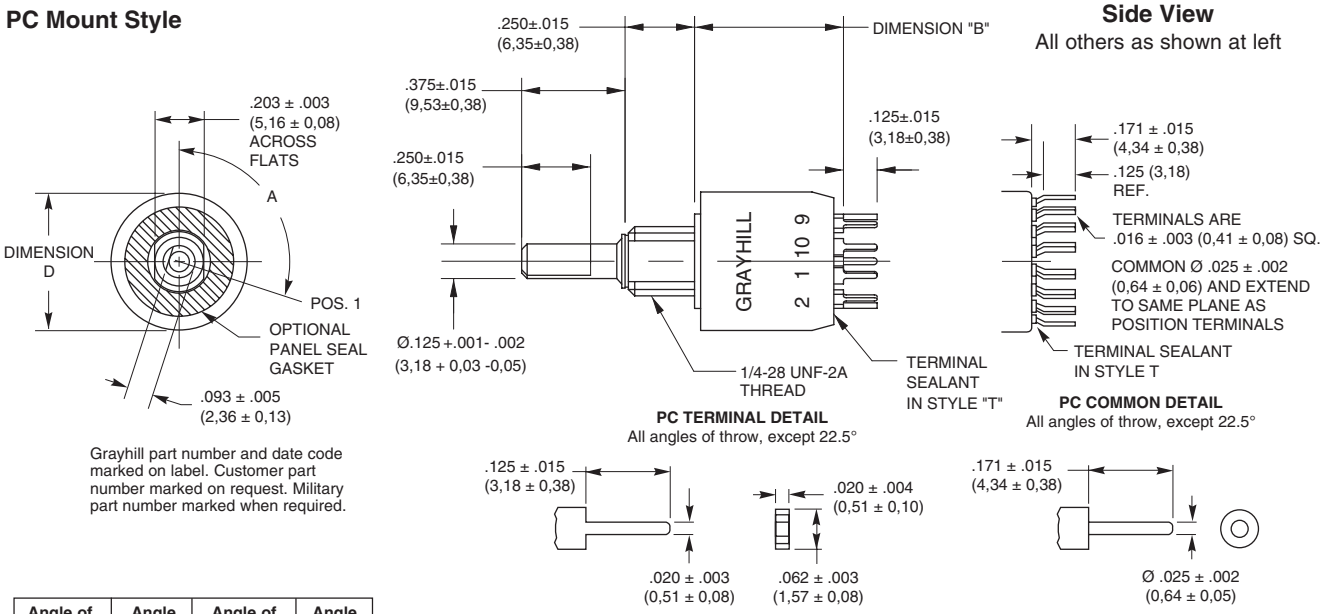
0.5" Diameter, 200mA,
.698" Behind Panel

FEATURES

- Optional Complete Seal for PC Board Assembly and Cleaning
- Small 1/2" Diameter
- Choice of 22.5°, 30°, 36°, 45°, 60° and 90° Angles of Throw
- Up to 4 Poles on 1 Deck
- Up to 16 Positions Per Switch
- PC or Solder Lug Termination
- Positive Shaft Grounding for EMI/RFI Shielding

DIMENSIONS In inches (and millimeters)

PC Mount Style



Side View
All others as shown at left

PC TERMINAL DETAIL
All angles of throw, except 22.5°

PC COMMON DETAIL
All angles of throw, except 22.5°

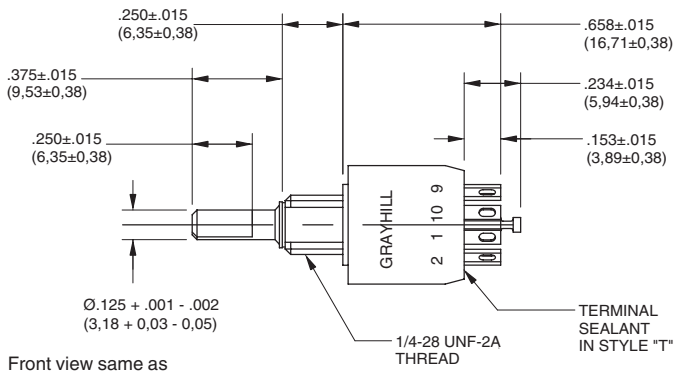
Grayhill part number and date code marked on label. Customer part number marked on request. Military part number marked when required.

Angle of Throw	Angle A	Angle of Throw	Angle A
22.5°	101.25°	**45°**	112.5°
30°	105°	**60°**	120°
36°	108°	**90°**	135°

Dimension	Series 50	Series 51
D	.500 ± .015 (12,70 ± 0,38)	.562 ± .015 (14,27 ± 0,38)

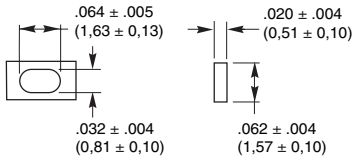
Dimension	Style T	All Others	All 22.5°
B	.576 ± .015 (14,63 ± 0,38)	.537 ± .015 (13,64 ± 0,38)	.537 ± .015 (13,64 ± 0,38)

Solder Lug Style

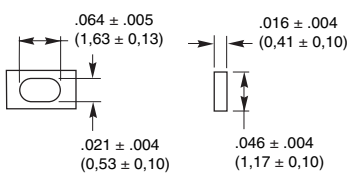


Front view same as PC Mount style.

SOLDER LUG TERMINAL DETAIL
All angles of throw, except 22.5°



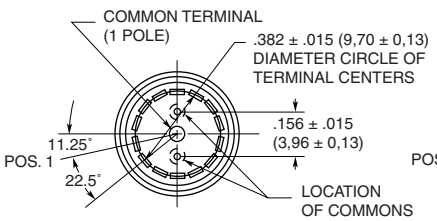
SOLDER LUG TERMINAL DETAIL 22.5°



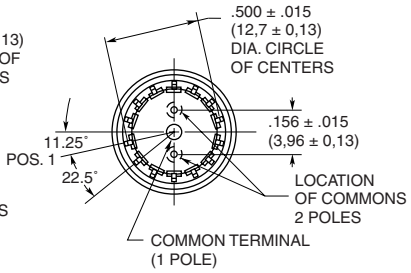
CIRCUIT DIAGRAMS AND REAR VIEWS: Solder Lug and PC Mount

Rear View

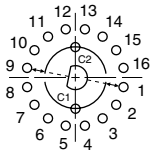
SOLDER LUG

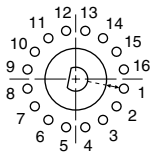


PC MOUNT

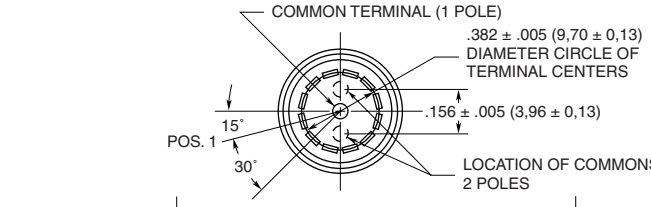


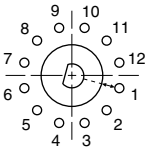
Circuit as Viewed From Shaft End

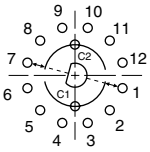




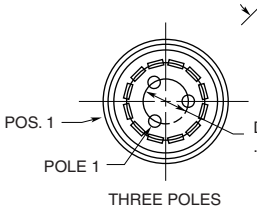
22.5° Angle of Throw

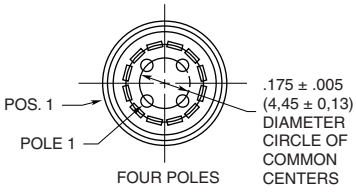




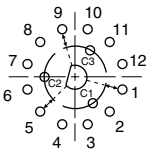


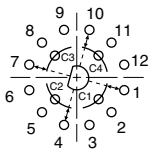
30° Angle of Throw

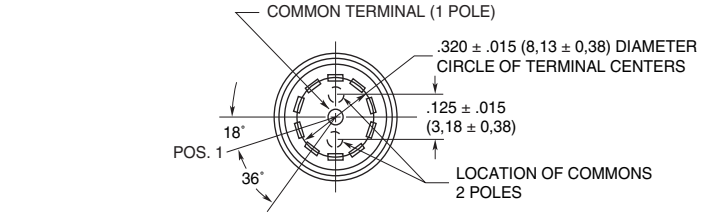


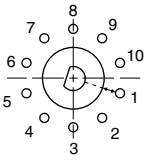


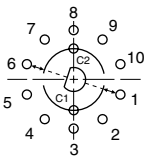
Dimension A, diameter circle of common centers, is .175 (4,45) for Solder Lug and .232 (5,89) for PC.



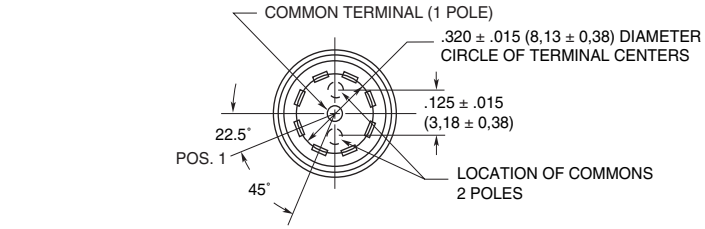


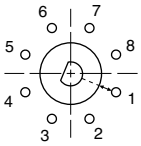


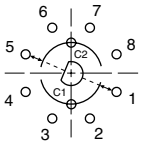




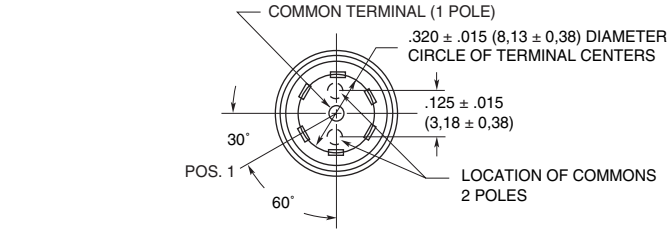
36° Angle of Throw

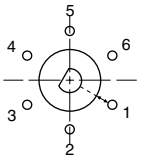


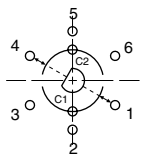




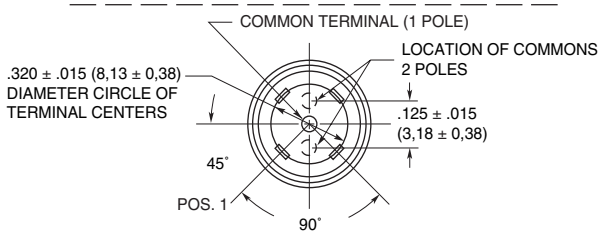
45° Angle of Throw

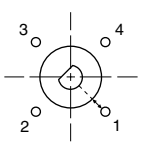


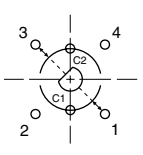




60° Angle of Throw







90° Angle of Throw

SPECIFICATIONS

Military Qualification

The dimensions for qualified switches are the same as those indicated in the drawings of standard switches. Switches with standard variations, such as shaft and bushing length, which do not affect switch performance, can be marked as qualified product. Contact Grayhill for complete information on variations.

36°, 45°, 60°, 90° (Series 50): The C and M style switches are qualified to MIL-S-3786/20. They include the following:

Solder lug or PC terminals
With or without panel seal

Series 50 qualified switches may be ordered by the 'M' number or by the Grayhill part number.

30° (Series 51): The C and M style switches are qualified to MIL-S-3786/35. They include the following:

Solder lug or PC terminals
With or without panel seal

Series 51 qualified switches may be ordered by the 'M' number or by the Grayhill part number.

Electrical Ratings

Life Expectancy: With the limiting criteria stated here, the Series 50 and 51 with non-shorting contacts will switch the following loads at atmospheric and reduced pressures for 25,000 cycles of operations. One cycle is 360° rotation clockwise and 360° return.

At 85°C, atmospheric pressure

200 mA,	28	Vdc resistive
150 mA,	115	Vac resistive
30 mA,	28	Vdc inductive
100 mA,	28	Vdc lamp load
75 mA,	220	Vac lamp load

At 25°C, reduced pressure (70,000 feet)

200 mA,	28	Vdc resistive
150 mA,	115	Vac resistive
75 mA,	220	Vac resistive

Contact Resistance: 20 milliohms maximum, (10 milliohms initially).
Insulation Resistance: 1,000 Mohms minimum between mutually insulated parts.
Voltage Breakdown: 600 Vac minimum between mutually insulated parts at standard atmospheric pressure.
Life Expectancy: Listed for the voltage source and make and break current levels. Contact Grayhill for more information if any of the following is true: the life limiting criteria are more critical than those listed; longer operation is required; a larger make and break current is required; the operating environment includes elevated temperatures or reduced pressures.
Contact Carry Rating: Switch will carry 6 amperes continuously with a maximum contact temperature rise of 20°C.

SPECIFICATIONS: Other

Additional Characteristics

Contact Type and Forces: Shorting or non-shorting wiping contacts with over 80 grams of contact force.
Shaft Flat Orientation: Flat opposite contacting position of pole number one (see circuit diagrams).
Terminals: Switches have the full circle of terminals, regardless of number of active position.
Stop Strength: 7.5 pound-inches minimum
Rotational Torque: 8–24 ounce-inches, depending on the number of poles.

Materials and Finishes

Switch Base: Thermoset
Detent Rotor: Nylon
Shaft, Stop Blades, Stop Arm, Thrust washer, and Retaining Ring: Stainless steel
Detent Balls: Steel, nickel-plated
Bushing: Zinc, tin-zinc plated
Detent and Contact Springs: Stainless steel
Common Ring: Brass, gold-plated over silver plate.
Terminals: Brass, gold-plated over silver plate and nickel plate
Rotor Contact: Precious metal alloy, gold-plated

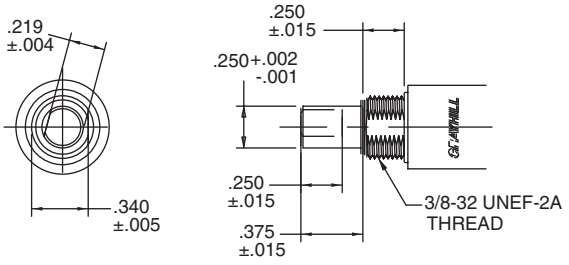
Panel Seal: Silicone rubber
Shaft Seal: Fluorosilicone
Mounting Nuts: Brass, tin-zinc plated
Mounting Hardware: One mounting nut .089" thick by .375" across flats and one internal tooth lockwasher are supplied with the switch.
Maximum Mounting Torque: 15in-lbs

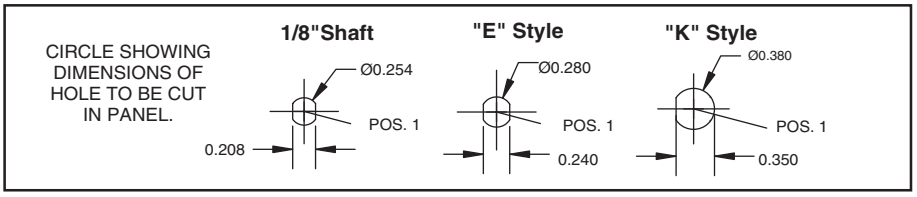
PROCESS SEALED–Style T

Switch can be mounted on PC board with other components and subjected to wave soldering and conventional board cleaning techniques. No secondary wiring or soldering is necessary.

Bushing is o-ring sealed; epoxy potting seals the terminals and the rear of the switch. Designed for PC assembly, this sealing technique can also be applied to solder lug terminal switches. A bushing to panel seal can also be added to the process sealed versions. Military qualified versions are available, see ordering information.

1/4" SHAFT: Style K





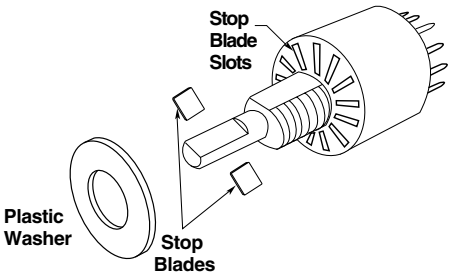
SUGGESTED ADJUSTABLE STOP SUBSTITUTION GUIDE

Fixed Stop Style	Adj. Stop Style Equivalent	Fixed Stop Style	Adj. Stop Style Equivalent
50A	50D	51A	51D
50C	50CD	51C	51CD
50CP	50CDP	51CP	51CDP
50M	50CD*	51M	51CD*
50MP	50CDP*	51MP	51CDP*
50P	50DP	51P	51DP
50S	50D*	51S	51D*
50SP	50DP*	51SP	51DP*

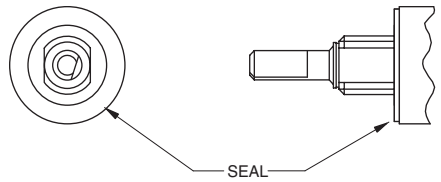
*Form fit and function equivalents, but not watertight sealed to the panel.

ADJUSTABLE STOPS: Style D

Adjustable stops permit the user to set and reset the number of positions per poles. Shown in the diagram, a plastic washer can be removed to reveal slots at the base of the bushing. Stop blades can be inserted into the appropriate slots to limit switch rotation. Positions per pole configuration can thus be changed to meet the needs of the application. Dimensions are the same as the fixed stop version, when plastic washer is in place. Most desirable for prototype work. Readily available from local distributor.

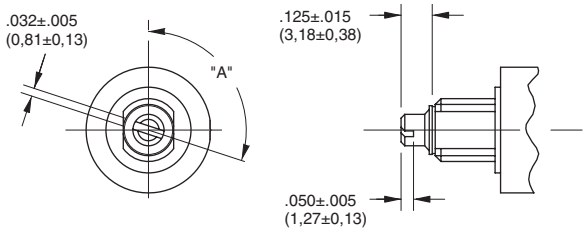


SHAFT AND PANEL SEAL: Styles S and M



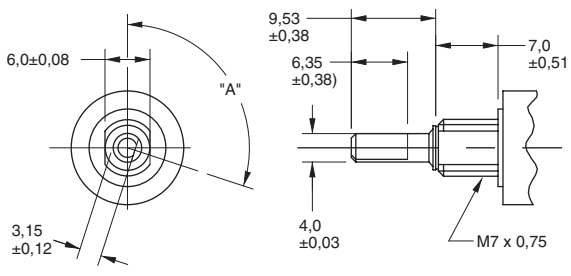
Shaft and panel seal switches are watertight to the panel. They are not totally process sealed like the Style "T". Panel is sealed by a gasket at the base of the bushing. Shaft is sealed by an O-ring inside the bushing. After mounting, seals do not alter switch dimensions. See Style "S" (standard switches) and Style "M" (military switches) in the Choices and Limitations chart.

SCREWDRIVER SLOTTED SHAFT: Style B



Form, fit and function equivalent to standard shaft switches. The dimensions shown have evolved as the most popular for this type of switch. See Style "B" in the Choices and Limitations chart. Previous users may have ordered these switches by a non-descriptive part number containing a "Y". Contact Grayhill, if in doubt about a cross-reference.

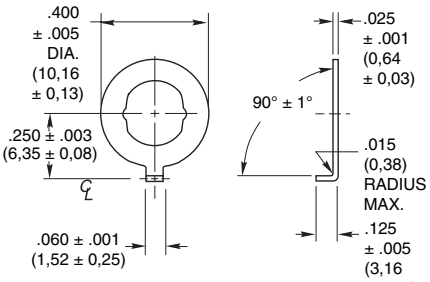
METRIC SHAFT AND BUSHING: Style E



Metric standard dimensions for the shaft and bushing are shown in the drawing. Other dimensions approximately the same as shown in dimensional drawing. Contact Grayhill for exact dimensions. See Style "E" in the Choices and Limitations chart.

ACCESSORY: Non-Turn Washers

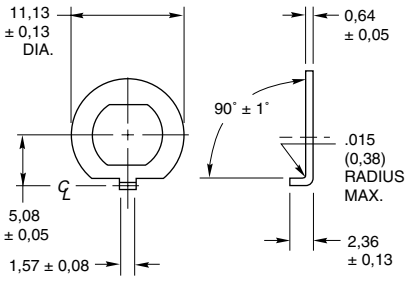
In Inches (and millimeters)



Part No. 50J1066

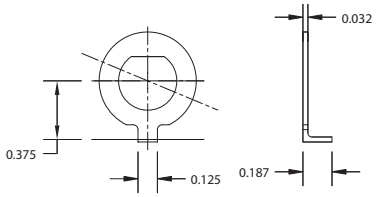
Cut round hole for the bushing and for the non-turn tab. Washer fits the double D bushing flats. Washer is sold only when accompanied by an order for a like number of switches. Washer is 302 stainless steel.

Dimensions are in millimeters



Part No. 71J1103

Designed to fit the double flatted bushing of the metric dimensioned bushing, this non-turn washer permits a round hole for the bushing and the tab while still preventing switch rotation. Washer is only sold when accompanied by a like number of switches. Washer is 302 stainless steel.



Part No. 50J5140-4

Designed to fit the single flatted bushing of the "K" style switches, this non-turn washer prevents switch rotation when using a full round hole in the panel. Washer is only sold when accompanied by a like number of switches. Washer is 302 stainless steel.

CHOICES AND LIMITATIONS: Series 50

A = Standard, 1/8" Shaft
B = Screwdriver Slot Shaft
C = Military, Without Panel Seal
D = Adjustable Stop (Adj. Stop)
E = Metric, 4mm Shaft
K = 1/4" Shaft
M = Military
P = PC Mount Terminals
S = Shaft/Panel Seal (S/P Seal)
T = Process Sealed

Standard Style

Series	Style Choices[1] Std., 1/8" Shaft	1/4" Shaft	Metric, 4mm Shaft	Terminals	Angle of Throw	Number of Poles	Number of Positions Per Pole	Shorting or Non-Shorting Contacts
50	A AT B BS BST BT D S ST	K KS KST KT KB KBS KBST KT	E ES EST ET EB EBS EBST EBT	Solder Lug	36°	1 2	02 thru 10 02 thru 05	N or S N or S
					45°	1 2	02 thru 08 02 thru 04	N N
					60°	1 2	02 thru 06 02 or 03	N N
					90°	1 2	02 thru 04 02	N N
	BP BPT BSP BSPT DP P PT SP SPT	KP KPT KSP KSPT KBP KBSP KBSPT KBT	EP EPT ESP ESPT EBP EBSP KBSPT EBT	PC Mount	36°	1 2	02 thru 10 02 thru 05	N or S N or S
					45°	1 2	02 thru 08 02 thru 04	N N
					60°	1 2	02 thru 06 02 or 03	N N
					90°	1 2	02 thru 04 02	N N

Military Style

Series	Style Choices Std., 1/8" Shaft	1/4" Shaft	Metric, 4mm Shaft	Terminals	Angle of Throw	Number of Poles	Number of Positions Per Pole	Shorting or Non-Shorting Contacts
50	C CB CBT CD CT M MB MBT MT	KM KMB KMBT KMT	EM EMB EMBT EMT	Solder Lug	36°	1 2	02 thru 10 02 thru 05	N or S N or S
					45°	1 2	02 thru 08 02 thru 04	N N
					60°	1 2	02 thru 06 02 or 03	N N
					90°	1 2	02 thru 04 02	N N
	CBP CBPT CDP CP CPT MBP MBPT MP MPT	KMBP KMBPT KMP KMPT	EMBP EMBPT EMP EMPT	PC Mount	36°	1 2	02 thru 10 02 thru 05	N or S N or S
					45°	1 2	02 thru 08 02 thru 04	N N
					60°	1 2	02 thru 06 02 or 03	N N
					90°	1 2	02 thru 04 02	N N

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CHOICES AND LIMITATIONS: Series 51

A = Standard, 1/8" Shaft
B = Screwdriver Slot Shaft
C = Military, Without Panel Seal
D = Adjustable Stop (Adj. Stop)
E = Metric, 4mm Shaft
K = 1/4" Shaft
M = Military
P = PC Mount Terminals
S = Shaft/Panel Seal (S/P Seal)
T = Process Sealed

Standard Style

Series	Std., 1/8" Shaft	Style Choices[1] 1/4" Shaft	Metric, 4mm Shaft[1]	Terminals	Angle of Throw	Number of Poles	Number of Positions Per Pole	Shorting or Non-Shorting Contacts
51	A AT B BT S ST BS BST	SEE BELOW	SEE BELOW	Solder Lug	22.5°	1 2	02 thru 16 02 thru 08	N or S N or S
	A AT B BS BST BT D S ST	K KS KST KT	E ES EST ET	Solder Lug	30°	1 2 3 4	02 thru 12 02 thru 06 02 thru 04 02 or 03	N or S N or S N or S N or S
	P PT BP BPT SP SPT BSP BSPT	SEE BELOW	SEE BELOW	PC Mount	22.5°	1 2	02 thru 16 02 thru 08	N or S N or S
	BP BPT BSP BSPT DP P PT SP SPT	KP KPT KSP KSPT	EP EPT ESP ESPT	PC Mount	30°	1 2 3 4	02 thru 12 02 thru 06 02 thru 04 02 or 03	N or S N or S N or S N or S

Military Style

Series	Std., 1/8" Shaft	Style Choices 1/4" Shaft	Metric, 4mm Shaft	Terminals	Angle of Throw	Number of Poles	Number of Positions Per Pole	Shorting or Non-Shorting Contacts
51	C CB CBT CD CT M MB MBT MT	KM KMB KMBT KMT	EM EMB EMBT EMT	Solder Lug	30°	1 2 3 4	02 thru 12 02 thru 06 02 thru 04 02 or 03	N or S N or S N or S N or S
	CBP CBPT CDP CP CPT MBP MBPT MP MPT	KMBP KMBPT KMP KMPT	EMBP EMBPT EMP EMPT	PC Mount	30°	1 2 3 4	02 thru 12 02 thru 06 02 thru 04 02 or 03	N or S N or S N or S N or S

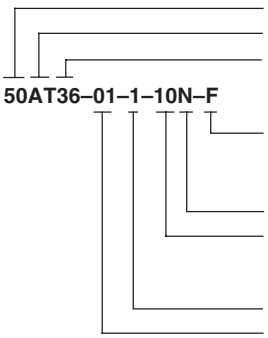
[1] Contact Grayhill if 1/4" or metric shaft required with a 22.5° angle of throw.

ADDITIONAL FEATURES

Economy keylock switch, isolated position, spring return, and coded switches are available in similar series. See Keylock and Special Function Rotary Switch sections.

Available from your local Grayhill Distributor.
For prices and discounts, contact a local Sales Office, an authorized local Distributor, or Grayhill.

ORDERING INFORMATION: Series 50

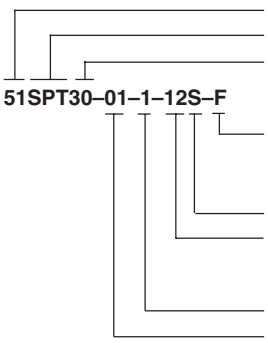


Series: Series 50 (36°, 45°, 60°, or 90°)
Style*: Letters from Choices Chart
Angle of Throw: 36, 45, 60, or 90

Stop Arrangement: *Needed only with 1 pole switches with maximum positions.* Leave blank for continuous rotation; add F for fixed stop.
Type of Contacts: N = Non-shorting, S = Shorting
Positions Per Pole: 02 as a minimum to the maximum allowable for the angle of throw and the number of poles per the Choices Chart. Use Letters AJ in this location if adjustable stop switch is ordered.
Poles per Deck: See chart
Number of Decks: 01 only

* All rotary switches that are required to have military designated markings and testing adhering to MIL-3786 are to be ordered by specifying the military part number identified on the appropriate slash sheet.

ORDERING INFORMATION: Series 51



Series: Series 51 (30°; 22.5°)
Style*: Letters from Choices Chart
Angle of Throw: Use 22 (for 22.5°), 30

Stop Arrangement: *Needed only with 1 pole switches with maximum positions.* Leave blank for continuous rotation; add F for fixed stop.
Type of Contacts: N = Non-shorting, S = Shorting
Positions Per Pole: 02 as a minimum to the maximum allowable for the angle of throw and the number of poles per the Choices Chart. Use Letters AJ in this location if adjustable stop switch is ordered.
Poles per Deck: See chart
Number of Decks: 01 only

* All rotary switches that are required to have military designated markings and testing adhering to MIL-3786 are to be ordered by specifying the military part number identified on the appropriate slash sheet.

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SERIES 56

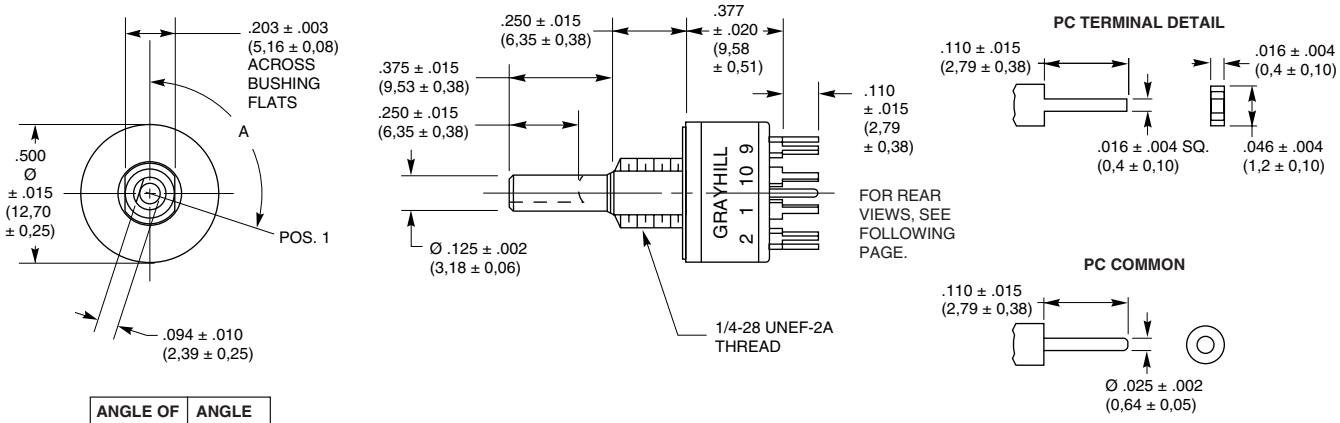
0.5" Diameter, 200mA, .355" Behind Panel

FEATURES

- Requires Minimum Distance Behind the Panel
- Adjustable Stop Types Provide Prototypes Immediately
- Industrial Quality, Economically Priced
- RoHS Compliant

DIMENSIONS In inches (and millimeters)

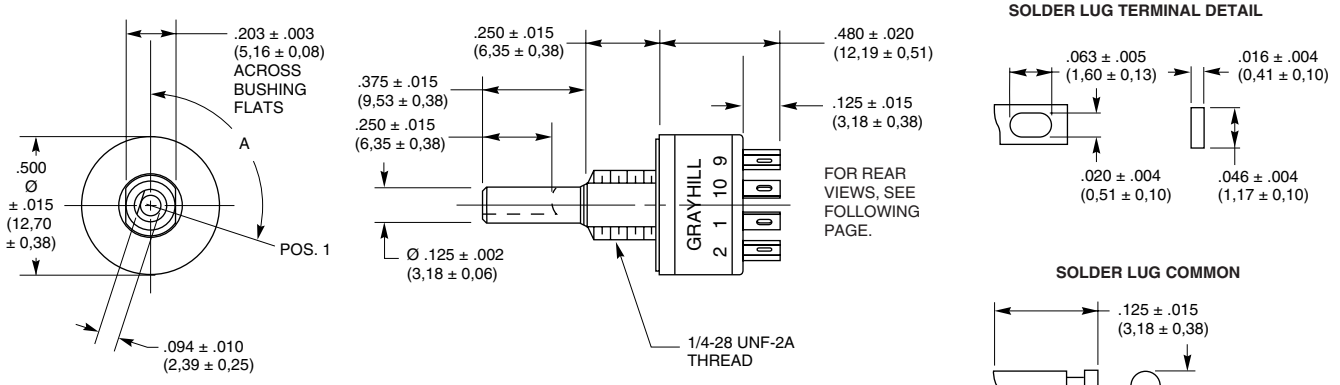
PC Mount Style



ANGLE OF THROW	ANGLE A
30°	105°
36°	108°

Grayhill part number and date code marked on label.
Customer part number marked on request.

Solder Lug Style

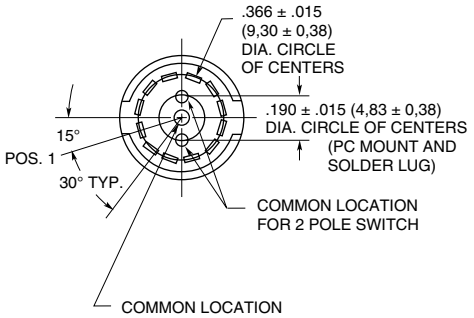


ANGLE OF THROW	ANGLE A
30°	105°
36°	108°

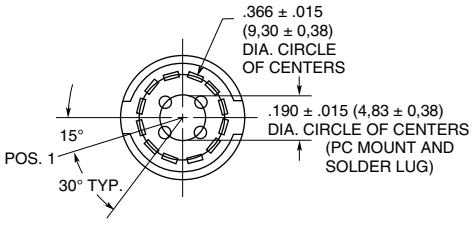
Grayhill part number and date code marked on label.
Customer part number marked on request.

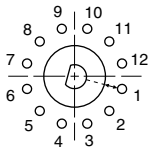
CIRCUIT DIAGRAMS AND REAR VIEWS: PC Mountable AND Solder Lug Terminals

Rear View

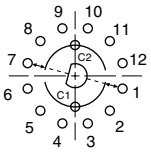


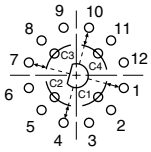
Circuit as Viewed From Shaft End

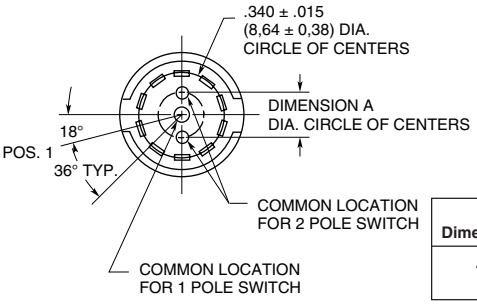




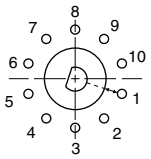
30° Angle of Throw

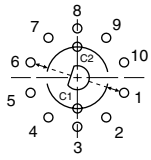






Dimension	PC Mount Terminals	Solder Lug Terminals
A	.184 ± .015 (4,67 ± 0,38)	.126 ± .015 (3,20 ± 0,38)



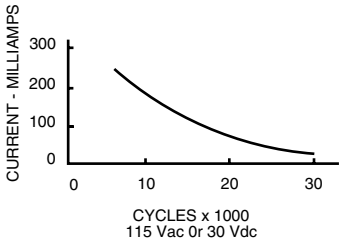


36° Angle of Throw

SPECIFICATIONS

Electrical Ratings

Chart shown for non-shorting (break before make) contacts, resistive load.



One cycle is 360° rotation clockwise and 360° return. The data for the curve was measured at sea level, 25°C and 68% relative humidity with the life limiting criteria which follows.

Contact Resistance: 100 milliohms maximum, (15 milliohms initially).

Insulation Resistance: 10,000 Mohms minimum between mutually insulated parts (50,000 Mohms initially).

Voltage Breakdown: 600 Vac minimum between mutually insulated parts at standard atmospheric pressure.

Life Expectancy: As determined from the load-life curve for the current to be switched. Contact GRAYHILL for more information if any of the following is true: the life limiting criteria are more critical than those listed; longer operation is required; a larger make and break current is required; the operating environment includes elevated temperatures or reduced pressures.

Contact Carry Rating: Switch will carry 6 amperes continuously with a maximum contact temperature rise of 20°C.

Additional Characteristics

Contact Type and Forces: Shorting or non-shorting wiping contacts with over 25 grams of contact force.

Shaft Flat Orientation: Flat opposite contacting position of pole number one (see circuit diagrams).

Terminals: Switches have the full circle of terminals, regardless of number of active positions.

Stop Strength: 7.5 lb-in. minimum

Rotational Torque: 3.5 to 9 oz-in. (21-53 mN-m), depending on the number of poles.

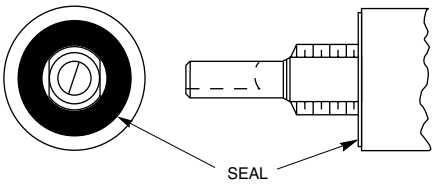
Bushing Mounting: Required for switches with stops, and recommended for switches without stops.

Meets MIL-S-3786 for:
High and medium shock; Vibration (10 to 2,000 Hz); Thermal shock (-65° to 85 ° C); Salt spray; Explosion; Stop strength (7.5 in-lbs. minimum (.85 N-m); Terminal strength; Sealed styles withstand water pressure of 15 PSI minimum (103 KPa) without leakage.

Materials and Finishes

Housing: Zinc die cast, tin zinc plated
Mounting Nut: Brass, tin zinc plated
Lockwasher: Spring steel, zinc plated
Panel Seal: Silicone rubber
Shaft and Stop Arm: Zinc die cast
Retaining Ring: 302 Stainless steel, passivated
Shaft Seal: Silicone rubber
Stop Pins: 303 Stainless steel, passivated
Detent Rotor: Molded thermoplastic
Detent Spring: Tinned music wire
Detent Balls: Steel, nickel-plated
Contact Spring: Stainless steel, passivated
Rotor Contact: Brass, silver over nickel plate
Common Ring: Brass, gold over silver over nickel plate
Terminals: Brass, gold over silver over nickel plate
Switch Base: Molded thermoset plastic
Mounting Hardware: One mounting nut .089" thick by .375" across flats and one internal tooth lockwasher are supplied with the switch.

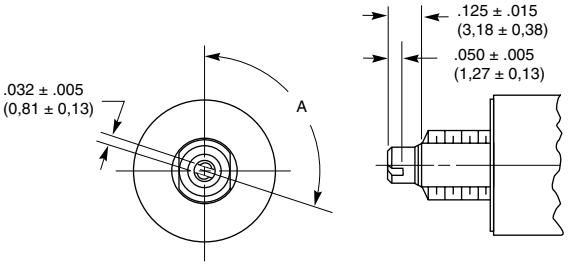
SHAFT AND PANEL SEAL: Style S



Panel is sealed by a flat rubber seal washer at the base of bushing. Shaft is sealed by an O-ring inside the bushing. After the switch is mounted, seals do not alter the dimensions of the unsealed style.

Shaft and Panel Seal

SCREWDRIVER SLOTTED SHAFT: Option

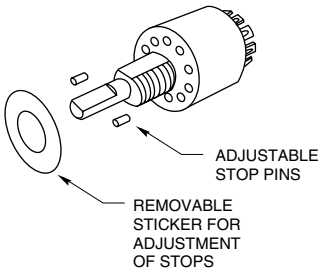


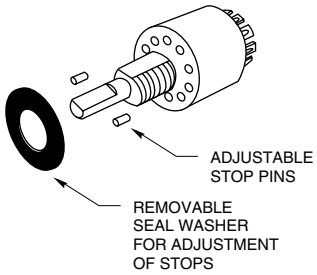
Series 56 rotary switches are available with a screwdriver slotted shaft with dimensions as shown. Available in the styles, angles of throw and pole/positions combinations shown in the choice and limitations chart.

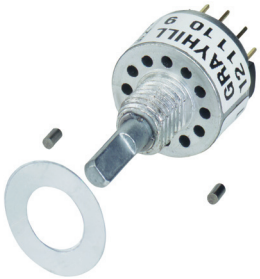
Screwdriver Slotted Shaft

ADJUSTABLE STOP SWITCHES

Two stop pins and an adhesive backed sticker or seal washer are provided. Sticker is temporarily removed to locate stop pins as desired to limit the shaft rotation. All dimensions are identical to the fixed stop switch counterpart.

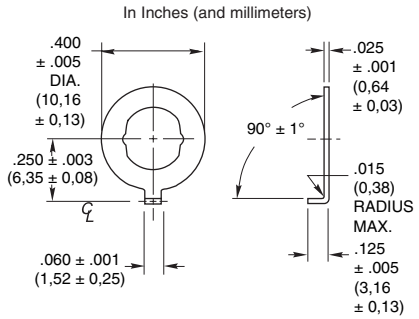






Adjustable Stop

ACCESSORY: Non-Turn Washer



Part No. 50J1066

Cut round hole for the bushing and for the non-turn tab. Washer fits the double D bushing flats. Washer is sold only when accompanied by an order for a like number of switches. Washer is 302 stainless steel.

SUGGESTED ADJUSTABLE STOP SUBSTITUTION GUIDE

Fixed Stop Style	Adjustable Stop Style Equivalent	Fixed Stop Style	Adjustable Stop Style Equivalent
56A	56D	56B	56BD
56S	56SD	56BS	56BSD
56P	56DP	56BP	56BDP
56SP	56SDP	56BSP	56BSDP

CHOICES AND LIMITATIONS: Series 56

A = Standard, 1/8" Shaft
B = Screwdriver Slot Shaft
D = Adjustable Stop (Adj. Stop)
P = PC Mount Terminals
S = Shaft/Panel Seal (S/P Seal)

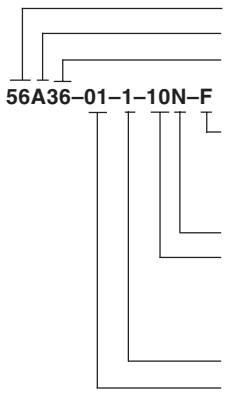
Style Designation	FEATURES: Solder Lug Terminals	PC Mount Terminals	Shaft/Panel Seal	Adjustable Stops[1]	Screwdriver Slotted Shaft Equivalent	Angle Of Throw	Number Of Poles	Number Of Positions Per Pole	Shorting Or Non-Shorting Contacts
A	X				B	30°	1 2 4	02 thru 12 02 thru 06 02 or 03	N or S N or S N or S
S	X		X		BS				
P		X			BP				
SP		X	X		BSP				
D	X			X	BD	36°	1 2	02 thru 10 02 thru 05	N or S N or S
SD	X		X	X	BSD				
DP		X		X	BDP				
SDP		X	X	X	BSDP				

[1] Adjustable stop versions allow selection of 2 positions to the maximum number of positions per pole.

STANDARD OPTIONS

Available from your local Grayhill Distributor
For prices and discounts, contact a local Sales Office, an authorized local Distributor, or Grayhill. Not available thru Distributors when Intermixing of shorting and non-shorting contacts. Contact Grayhill.

ORDERING INFORMATION



Series
Style: Letters from Choices Chart
Angle of Throw: 30 or 36°

Stop Arrangement: The suffix C or F must be added to a one pole per deck switch with the maximum number of positions to indicate continuous rotation (C) or fixed stops (F) between position 1 and the last position.
Type of Contacts: N = Non-shorting, S = Shorting
Positions Per Pole: 02 as a minimum to the maximum allowable for the angle of throw and number of poles per the Choices Chart. Use the letters AJ in this location if adjustable stop switch is to be ordered.
Poles per Deck: Limited by angle of throw. See chart
Number of Decks: 01 only

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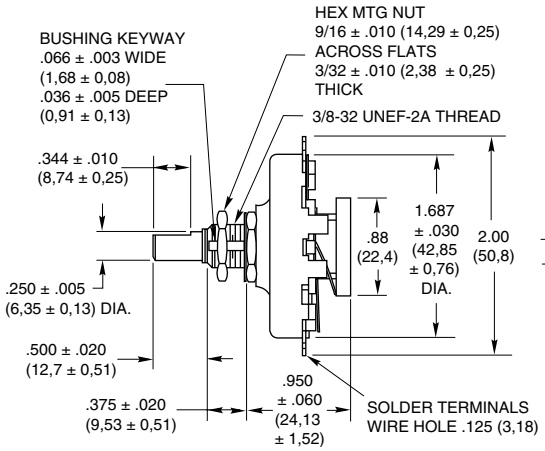
SERIES 19
2" Diameter, 15 Amp

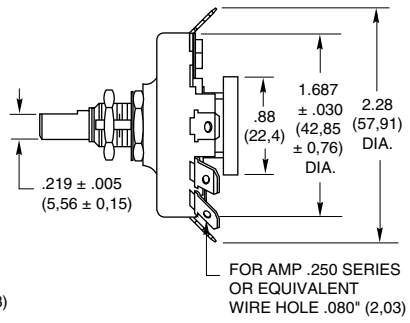
FEATURES
- UL Recognized
- Rugged Construction
- Choice of Termination

DIMENSIONS In inches (and millimeters)

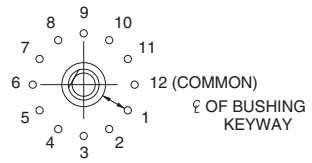
Solder Lug Terminals



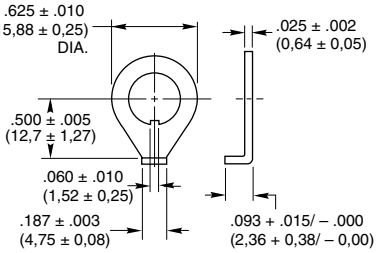
'Faston' Terminals



Circuit Diagram viewed from shaft end with switch in position #1



Non-Turn Washer Detail



Grayhill part number and date code marked on label. Customer part number marked on request.

SPECIFICATIONS

Electrical Rating

Rated: UL Recognition: File Number E35289
15 Amps, 120 Vac, non-inductive load.
One Amp, 120 Vdc, non-inductive load.
Additional Grayhill Rating: 7.5 Amps, 220 Vac, non-inductive load.
This rating is based on the following criteria:
Overload—50 operations at 125% rated ac load and 150% rated DC load.
Endurance—6000 operations at rated load with 900 Vac dielectric strength before and after test.
Temperature Rise—Not to exceed 30°C when carrying rated ac load after endurance test.
Contacts will carry 20 Amps at 115 volts AC with 30°C maximum temperature rise.
Contact Resistance: (Measured at 2 Vdc and approximately 100 mA) for new switch approximately 10 milliohms.
Insulation Resistance: Approximately 100,000 Mohms. Between mutually insulated parts.
Voltage Breakdown: Approximately 2500 Vac between mutually insulated parts.

Materials and Finishes

Rotor Contact: Silver alloy
Stator Contact: Silver alloy
Shaft: 303 Stainless steel
Stop Rivet: Steel, tin/zinc-plated
Mounting Bushing: Brass, tin/zinc-plated
Base and Drive Hub: Heat resistant, electrical grade phenolic.
Mounting Nut: Brass, tin/zinc-plated or stainless steel.
Detent Mechanism: Brass, silver-plated
"Faston" Terminal: Brass, silver-plated
Solder Terminal: Brass, silver-plated
Mounting Hardware: One mounting nut 9/16" across flats, 3/32" thick and one non-turn washer (see detail) are supplied with each switch.

Additional Characteristics

Single Pole, Single Deck: 2 to 11 positions plus common 30° Indexing.
Contacts: Non-shorting type
Stops: A rivet provides the fixed stop on all switches. Minimum number of positions is 2, and maximum is 11. Terminal 12, the common, is isolated from rotation.
Rotational Torque: 30 to 75 ounce-inches on a new switch. Approximately 22 ounce-inches after 25,000 cycles of operation.
Contact Force: Approximately 12 ounces
Shaft Flat Orientation: Opposite point of contact (see circuit diagram).

ACCESSORIES

Screw Terminal Adapter

Spring loaded, plug-in adapters for 'Faston' Terminals provide excellent mechanical fit and electrical contact. Adapter material is brass tin-plated. The terminal adapters are available with a 6-32 thread (-1) or 8-32 thread (-2). A 1/4" panhead screw is provided as part of the adapter.

Part No. SC906-1 .....6-32 Thread
Part No. SC906-2 .....8-32 Thread

Non-Turn Washer

Brass, tin/zinc-plated washer, detailed above may be purchased as a separate item.
Part No. 19C1014.

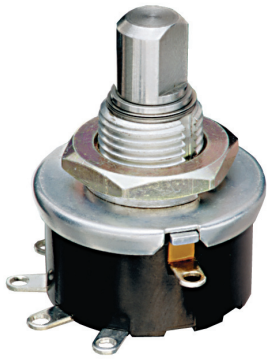
ORDERING INFORMATION

Part Numbers: Designate as follows, using the 2 digits after the dash to indicate the number of positions.
For Faston Terminal:
Use 19101-02UL through 19101-11UL
For Solder Terminal:
Use 19001-02UL through 19001-11UL
Specials: Not available through Distributors. For special shafts, bushings, etc. contact Grayhill.

Available from your local Grayhill Distributor. For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

SERIES 5000

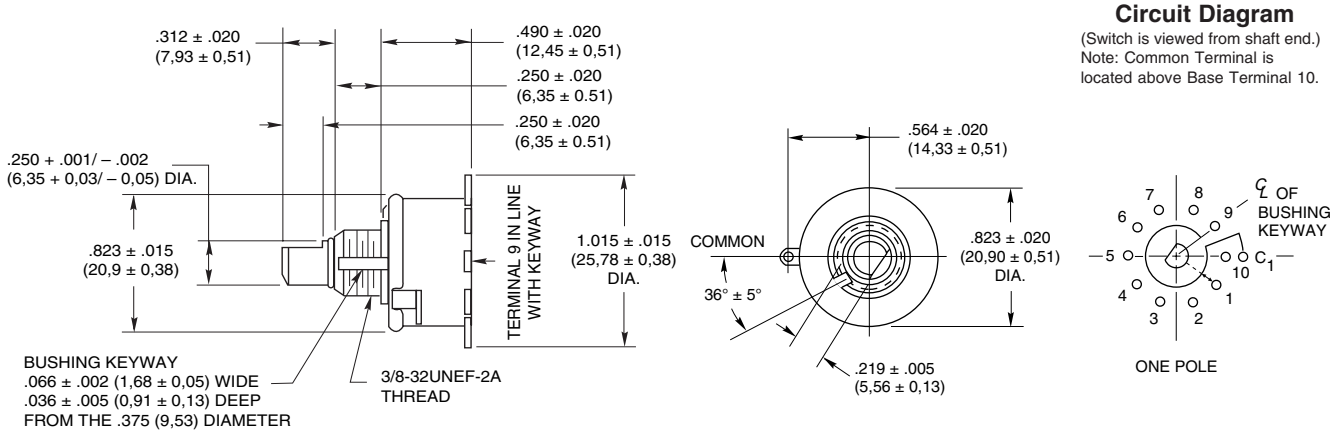
1" Diameter, 1 Amp, .
470" Behind Panel



FEATURES

- High Quality at a Low Price
- High Contact Force Provides Stable Electrical and Mechanical Operation
- Proven Reliability in Thousands of Applications

DIMENSIONS In inches (and millimeters)



Grayhill part number and date code marked on label. Customer part number marked on request.

SPECIFICATIONS

Electrical Rating

Rated: To make and break the following loads: 1 amp at 115 Vac resistive; 0.5 amp at 220 Vac resistive; 1/4 amp, 115 Vac inductive; 1/50 amp, 115 Vdc inductive, 1/10 amp, 6 to 28 Vdc inductive; 1/10 amp, 115 Vdc resistive; 1 amp, 6 to 28 Vdc resistive; to carry 10 amps continuously.
Contact Resistance: 10 milliohms initial. After 25,000 cycles of operation 20 milliohms maximum.
Insulation Resistance: 50,000 Mohms minimum initially
Voltage Breakdown: 1,000 Vac (500 Vac, or better after most environmental tests).
Life Expectancy: 100,000 mechanical cycles of operation normally.
NOTE: Actual life is determined by a number of factors, including electrical loading, rate of rotation, and environment, as well as maximum contact resistance, minimum insulation resistance, and minimum voltage breakdown required at the end of life.

Materials and Finishes

Switch Base: Melamine per MIL-M-14 (ASTM-D-5948)
Cover, Stop Washers, Bushing: Brass, tin/zinc-plated
Mounting Nut: Brass, tin/zinc-plated or stainless steel
Retaining Rings, Stop Arms, and Thrust Washers: Stainless steel
Shaft: Stainless steel
Terminals (except common): Brass, tin plated
Rotor Contact: Phosphor bronze, silver-plated .0003" minimum
Stator (Base) Contact: Brass, silver-plated .0003" minimum
Common Plate: Brass, silver-plated .0003" minimum
Rotor Mounting Plate: Nylon fabric-based laminated Phenolic per MIL-T-1 5047.

Additional Characteristics

Stop Strength: 12 in-lbs
Rotational Torque: 12 in-ozs.
Contacts: Shorting or non-shorting wiping contacts with over 500 grams contact force.
Shaft Flat Orientation: Opposite point of contact (See circuit diagram.)
Environmental: These switches have passed the following environmental testing: Altitude and temperature; 100 hour salt spray; Vibration 10 to 500 cps; Shock 30-G; Humidity; Fungus.
Detent: A formed spring operating against a formed wave washer.

STANDARD OPTIONS

Special Terminals

Not available through distributors.

ORDERING INFORMATION

The Series 5000 switches are single deck, one pole switches of two to 10 positions. Ten position switches have continuous rotation. Ten position fixed stop switches are available by special order.

The part number is 05001-XX with the number of positions required (02,03, etc.) listed in place of the XX. Complete part number by adding N for non-shorting contacts or S for shorting contacts.

Available from your local Grayhill Distributor.
For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

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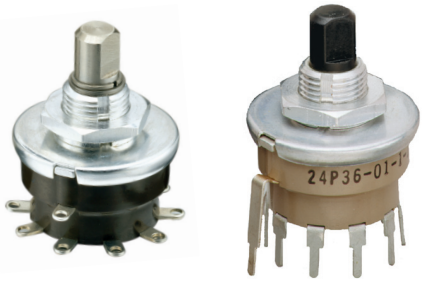
SERIES 24

1" Diameter, 1 Amp, .580" Behind Panel

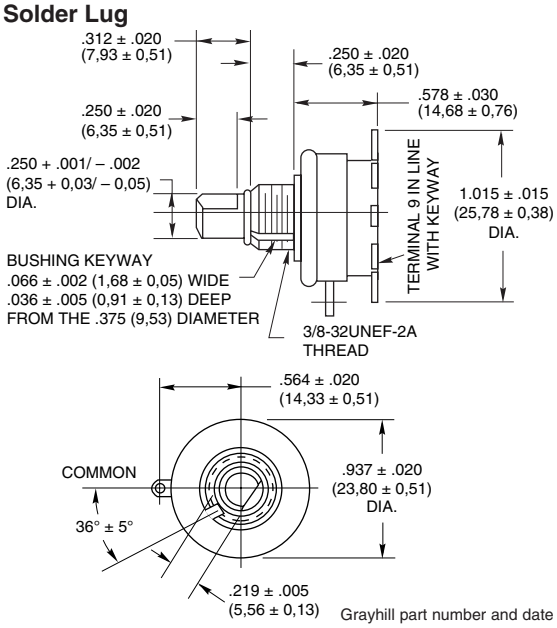
FEATURES

- Positive Detent Provides Operator Feedback
- Stainless Steel or Plastic Shaft Option
- Unsurpassed Performance in Numerous Applications

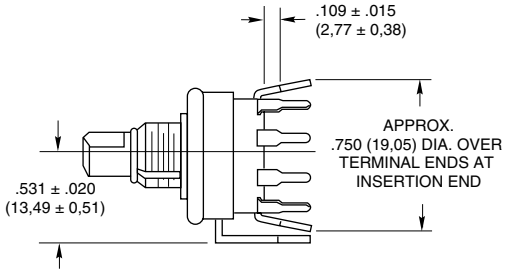


DIMENSIONS In inches (and millimeters)

Solder Lug

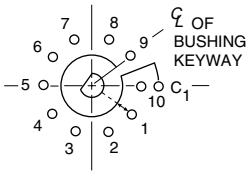


PC Mountable



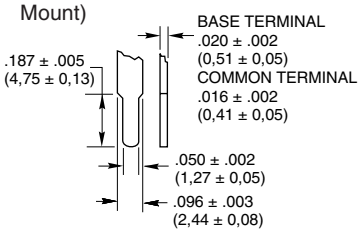
Circuit Diagram

Solder Lug and PC Mount
(Switch is viewed from shaft end.)
Note: Common Terminal is located above Base Terminal 10.

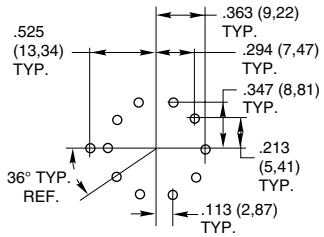


ONE POLE

Typical Terminal Detail (PC Mount)



Terminal Location (PC Mount)



Grayhill part number and date code marked on label. Customer part number marked on request.

SPECIFICATIONS

Electrical Rating

Rated: To make and break the following loads: 1 amp at 115 Vac, resistive; 0.5 amp at 220 Vac resistive; 1/4 amp, 115 Vac inductive; 1/50 amp, 115 Vdc inductive; 1/10 amp, 6 to 28 Vdc inductive; 1/10 amp, 115 Vdc resistive; 1 amp, 6 to 28 Vdc resistive; to carry 10 amps continuously.
Contact Resistance: 10 milliohms initial. After 25,000 cycles of operation 20 milliohms maximum.
Insulation Resistance: 50,000 Mohms minimum initially
Voltage Breakdown: 1,000 Vac, (500 Vac, or better after most environmental tests).
Life Expectancy: 100,000 mechanical cycles of operation normally. NOTE: Actual life is determined by a number of factors, including electrical loading, rate of rotation, and environment, as well as maximum contact resistance, minimum insulation resistance, and minimum voltage breakdown required at the end of life.

Materials and Finishes

Switch Base: Melamine per (MIL-M-14) ASTM-D-5948
Cover, Stop Washers, Bushing: Brass, tin/zinc-plated
Contacts: Both shorting and non-shorting wiping contacts have over 300 grams contact force.
Retaining Rings, Stop Arms, and Thrust Washers: Stainless steel
Detent Balls: Steel, nickel-plated
Shafts: Stainless steel, or plastic
Detent: Opposing spring and ball in a hill and valley raceway.
Detent Springs: Tinned music wire
Terminals (except common): Brass, tin plated.
Rotor Contact: Steel shaft version—phosphor bronze, silver-plated .0003" minimum. Plastic shaft version—silver alloy.
Stator (Base) Contact: Brass, silver-plated .0003" minimum
Common Plate, including Solder Lug or PC Tab: Brass, silver-plated .0003" minimum
Rotor Mounting Plate: Nylon fabric-based laminated phenolic per MIL-T-15047
Mounting Nut: Brass, tin/zinc-plated or stainless steel.

Additional Characteristics

Stop Strength: 12 in-lbs
Rotational Torque: 12 in-ozs
Shaft Flat Orientation: Opposite point of contact (See circuit diagram.)
Environmental: These switches have passed the following environmental testing: Altitude and temperature, 100 hour salt spray; Vibration 10 to 500 cps; Shock 30-G; Humidity; Fungus.
PC Mount: PC Switches are furnished with 10 base terminals for mounting purposes.

STANDARD OPTIONS

Special Terminals
RFI Grounding
Not available through distributors.

ORDERING INFORMATION

Switches are single deck, one pole switches of 2 to 10 positions. They have plastic or steel shaft, with solder lug or PC terminals, with either shorting or non-shorting contacts (plastic shaft PC mount in non-shorting only). Ten position switches have continuous rotation; fixed stop switch with a metal shaft is available by special order. Base part numbers are as follows:
Lug style, steel shaft: 24001-X*
Lug style, plastic shaft: 24B36-01-1-X*
PC style, steel shaft: 24878-X*
PC style, plastic shaft: 24P36-01-1-X*

The X is replaced with the number of positions required (02, 03, etc.) Complete the part number by adding N for non-shorting contacts or S for shorting contacts.

Available from your local Grayhill Distributor. For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.