



SP6T 0.03 dB Low Insertion Loss Repeatability  
 Relay Latching Switch, Terminated, DC to 20 GHz,  
 70W, 24V, Indicators, Self Cut Off, SMA

## Electromechanical Relay Switches Technical Data Sheet

PE71S6331

### Features

- DC to 20 GHz SP6T Switch
- Guaranteed Low Insertion loss Repeatability: 0.03 dB max over 10 Million Lifecycles
- Insertion Loss: 0.6 dB max
- Isolation: up to 80 dB min
- +24 Vdc Nominal Voltage
- Hot Switching: 1W CW max
- Latching Self Cutoff Actuator
- Position Indicators
- Guaranteed to meet MIL-STD-202 Environmental Conditions
- SMA connectors
- HE10 receptacle with ribbon cable and HE10 connector
- -25°C to +75°C Operating Temperature
- 10 Million Lifecycles Minimum

### Applications

- Electronic Warfare
- Electronic Countermeasures
- Microwave Radio
- VSAT
- Radar
- Space Systems
- Test Instrumentation
- Research and Development
- Signal Monitoring Devices

### Description

The PE71S6331 is a single pole six throw (SP6T) terminated electromechanical switch that operates across a wide frequency range from DC to 20 GHz and has guaranteed insertion loss repeatability of 0.03 dB max over a life span of 10 million switching cycles in a Break Before Make condition. Maximum Insertion loss is 0.2 dB and Isolation is rated up to 85 dB minimum. The model also supports a hot switching limit of up to 1W CW maximum. The Latching Self Cut-Off actuator design includes indicators, a +24 Vdc operating voltage, and operates over a temperature range of -25°C to +75°C. The rugged and compact package assembly supports SMA connectors and an HE10 receptacle, ribbon cable, and HE10 connector for command control capability. And for highly reliable operation, the model is guaranteed to meet MIL-STD-202 environmental test conditions that include temperature cycle, vibration, and shock.

### Electrical Specifications

Switch Type	SP6T, Terminated
Actuator Type	Latching
Switching Sequence	Break Before Make
Actuator Options	Indicators, Self Cut Off, Reset
Polarity	Positive Common

Description	Minimum	Typical	Maximum	Units
Frequency Range	DC		20	GHz
Impedance		50		Ohms
Operating Voltage	20	24	32	Volts
Actuating Current @ 24 Volts		200		mA
Insertion Loss			0.6	dB
Insertion Loss Repeatability			0.03	dB
Coil Resistance		120		Ohms
Third Order Intermodulation		-120		dBc
Input Power (CW)			70	Watts

Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: [SP6T 0.03 dB Low Insertion Loss Repeatability Relay Latching Switch, Terminated, DC to 20 GHz, 70W, 24V, Indicators, Self Cut Off, SMA PE71S6331](#)



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Switching Time	15	ms Max
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### Performance by Frequency

Description	F1	F2	F3	F4	F5	Units
Frequency Range	DC to 6	6 to 12.4	12.4 to 18	18 to 20		GHz
VSWR, Max	1.2:1	1.35:1	1.45:1	1.7:1		
Insertion Loss, Max	0.39	0.486	0.57	0.6		dB
Isolation, Min	100	90	80	80		dB

Electrical Specification Notes:  
 Insertion Loss Repeatability at 25° is 0.03 dB

### Mechanical Specifications

#### Size

Length	1.25 in [31.75 mm]
Width/Diameter	1.25 in [31.75 mm]
Height	0.5 in [12.7 mm]
Weight	0.587 lbs [266.26 g]
Body Material and Plating	Aluminum, Nickel
Package Type	Connectorized
Operating Life	10,000,000 Cycles

#### Connectors

RF Connector Type	SMA Female
RF Connector Contact Material and Plating	Beryllium Copper, Gold
RF Connector Body Material and Plating	Passivated Stainless Steel
Control Connector	HE 10

### Environmental Specifications

#### Temperature

Operating Range	-25 to +75 deg C
Storage Range	-55 to +85 deg C
Humidity	MIL-STD-202, Method 106E, Condition E, 65°C, 95% RH, 10 days
Shock	MIL-STD-202, method 213B, Condition G, 50g, 6 ms, 1/2 Sine, Operating
Vibration	MIL-STD-202, Method 204D, Condition D, 10-2000 Hz, 10g, Operating
Altitude	MIL-STD-202-Method 105C, Condition B, 50,000 feet (15,240 meters)

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## Electromechanical Relay Switches Technical Data

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Temperature Cycling

MIL-STD-202, Method 107D, Condition A, -55oC to +85oC, 10 cycles

EMI/RFI

MIL-STD-1344, Method 3008, or IEC 61726, 55 dB at 20 GHz

Magnetic Field  
ESD Sensitivity

< 5x10<sup>-5</sup> gauss at 1 meter  
ESD Sensitive Material, Transport material in Approved ESD bags. Handle only in ESD Workstation.

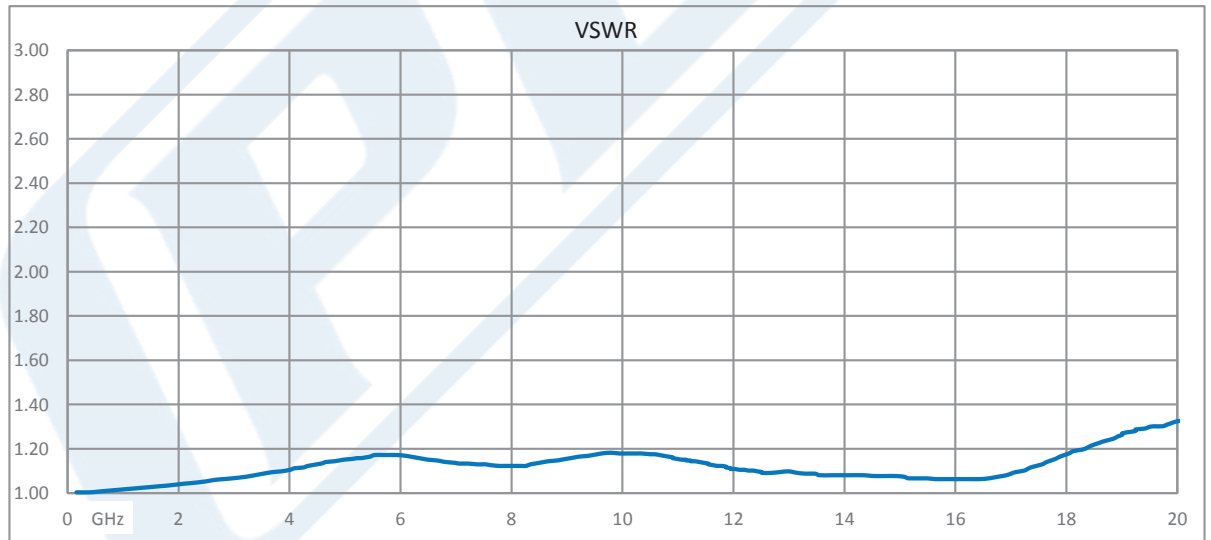


**Compliance Certifications** (see [product page](#) for current document)

### Plotted and Other Data

Notes:

### Typical Performance Data



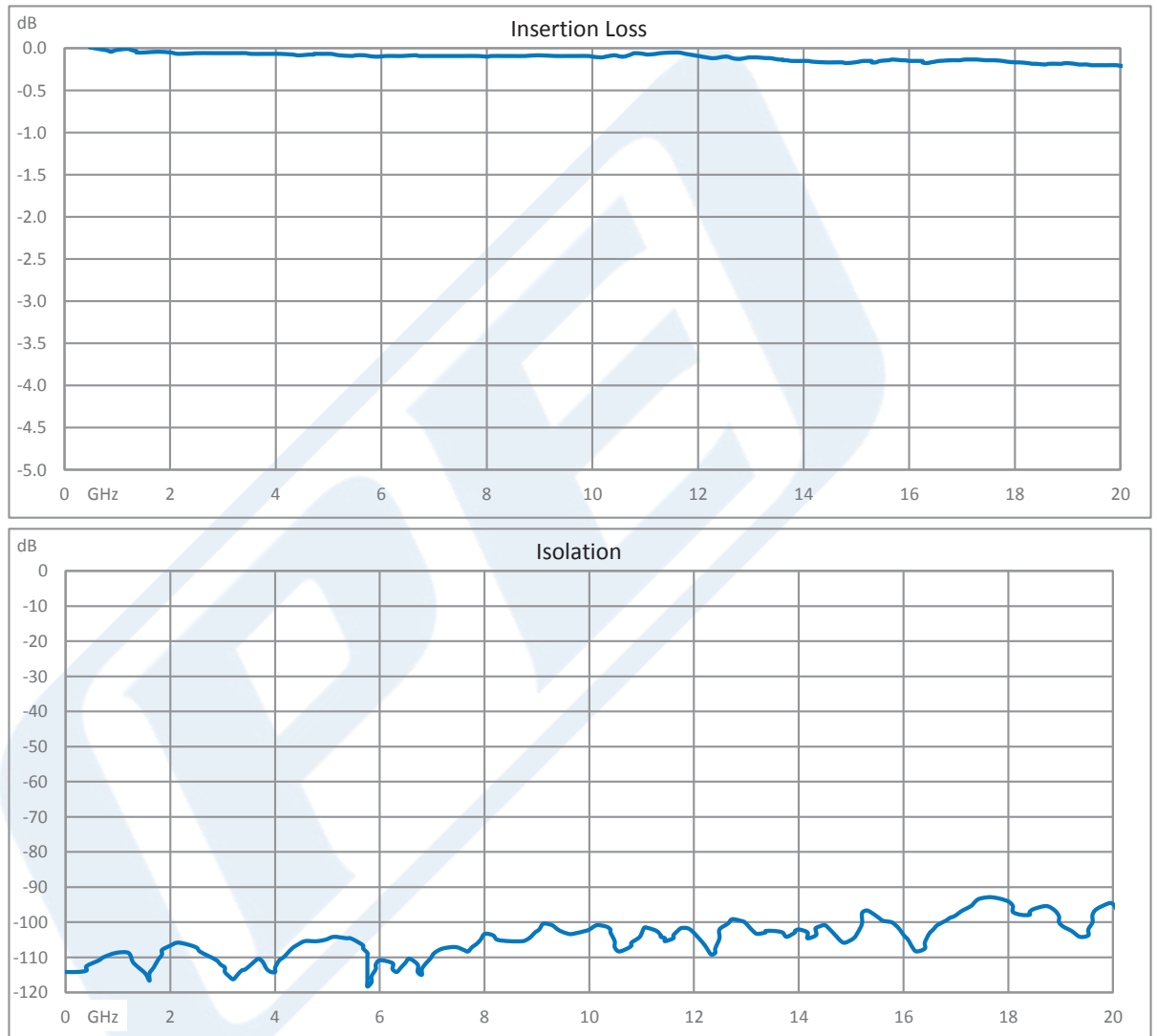
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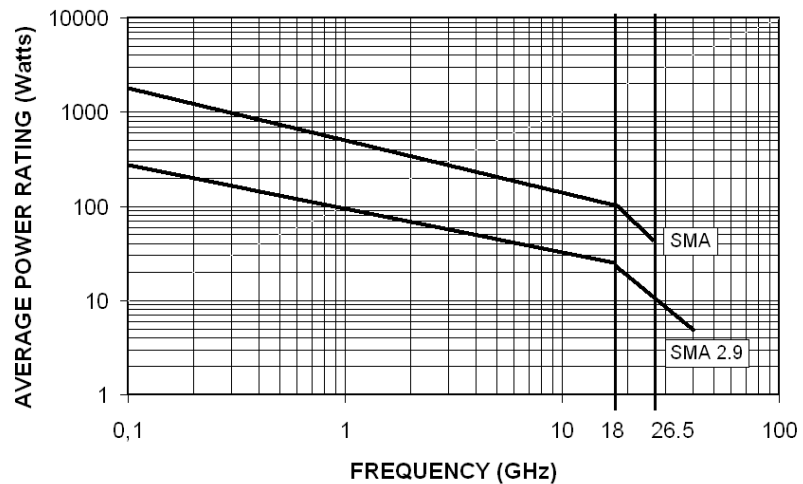
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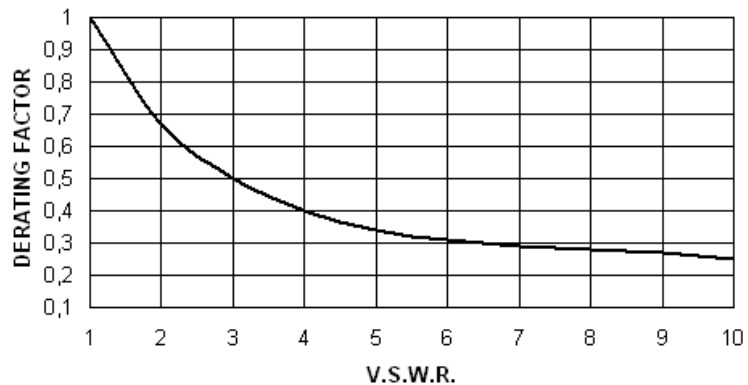
### POWER RATING CHART

This graph is based on the following conditions :  
- Ambient temperature : + 25°C  
- Sea level  
- V.S.W.R. : 1 and cold switching



### DERATING FACTOR VERSUS V.S.W.R.

The average power input must be reduced for load V.S.W.R. above 1.



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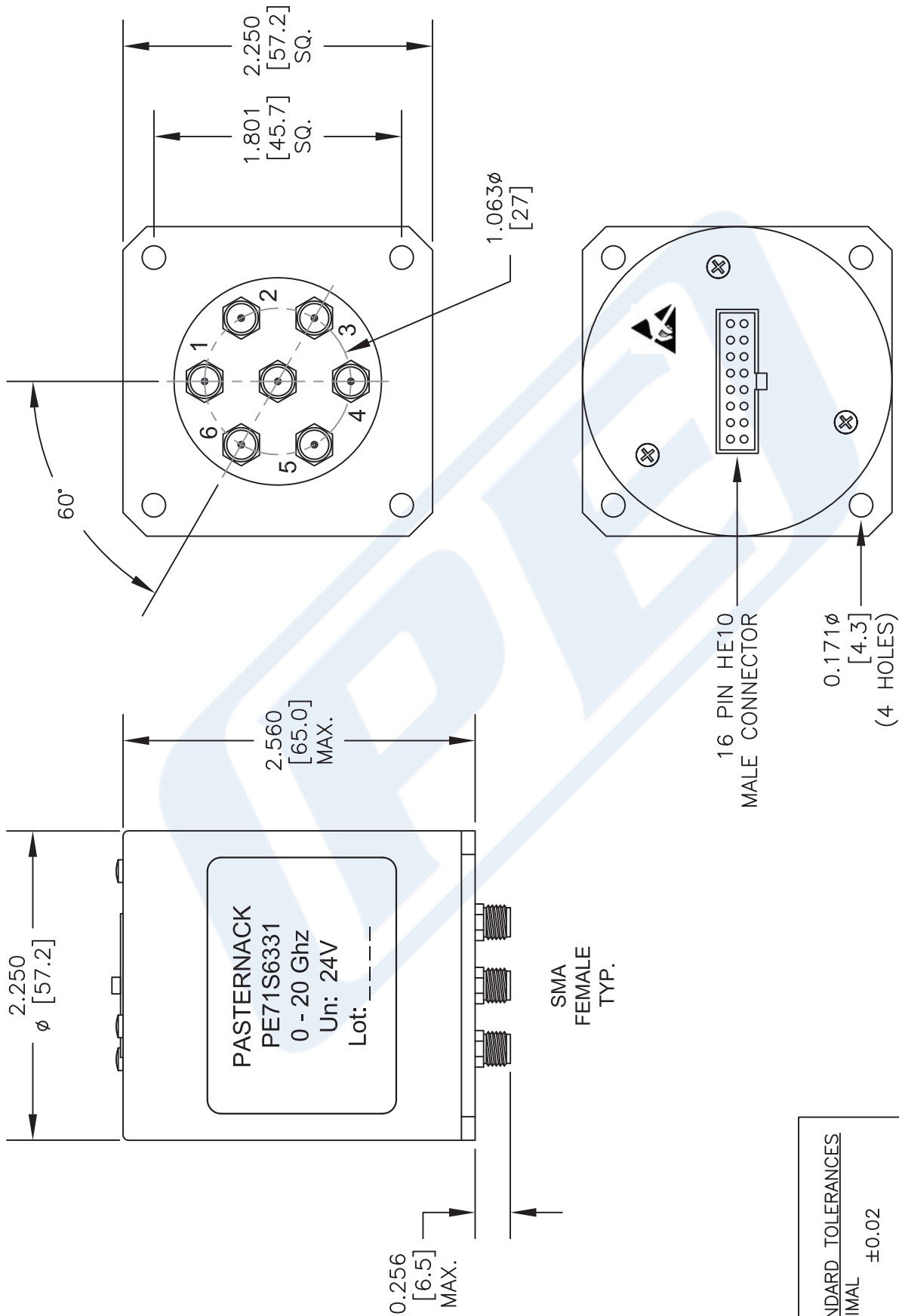
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The information contained in this document is accurate to the best of our knowledge and representative of the part described herein. It may be necessary to make modifications to the part and/or the documentation of the part, in order to implement improvements. Pasternack reserves the right to make such changes as required. Unless otherwise stated, all specifications are nominal. Pasternack does not make any representation or warranty regarding the suitability of the part described herein for any particular purpose, and Pasternack does not assume any liability arising out of the use of any part or documentation.

# PE71S6331 CAD Drawing

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STANDARD TOLERANCES  
DECIMAL ±0.02

\*STANDARD TOLERANCES APPLY ONLY TO DIMENSIONS IN INCHES

DWG TITLE

**PE71S6331**

NOTES:  
1. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE NOMINAL.  
2. ALL SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE AT ANY TIME.  
3. DIMENSIONS ARE IN INCHES [mm].

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CAGE CODE 53919

CAD FILE 031717

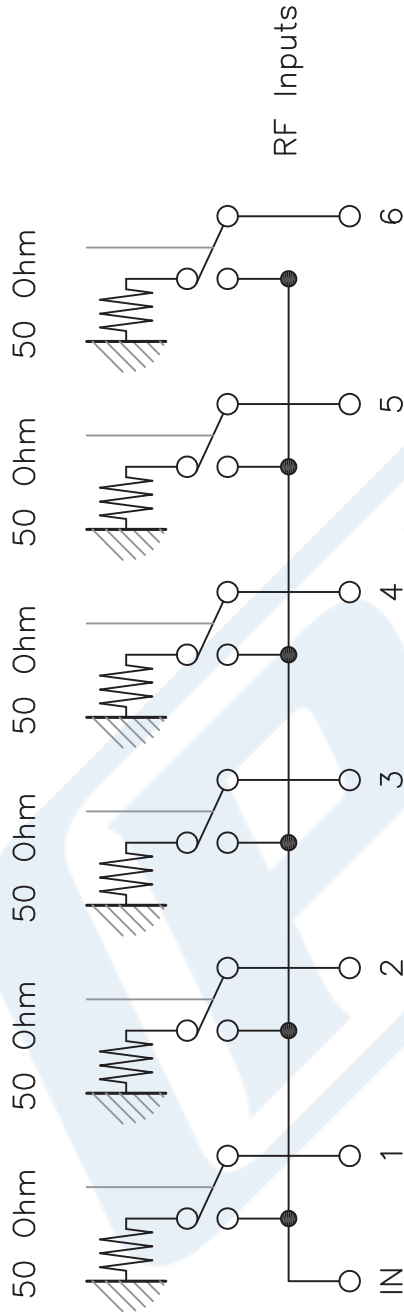
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SIZE A

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## SINGLE POLE 6 THROW TERMINATED

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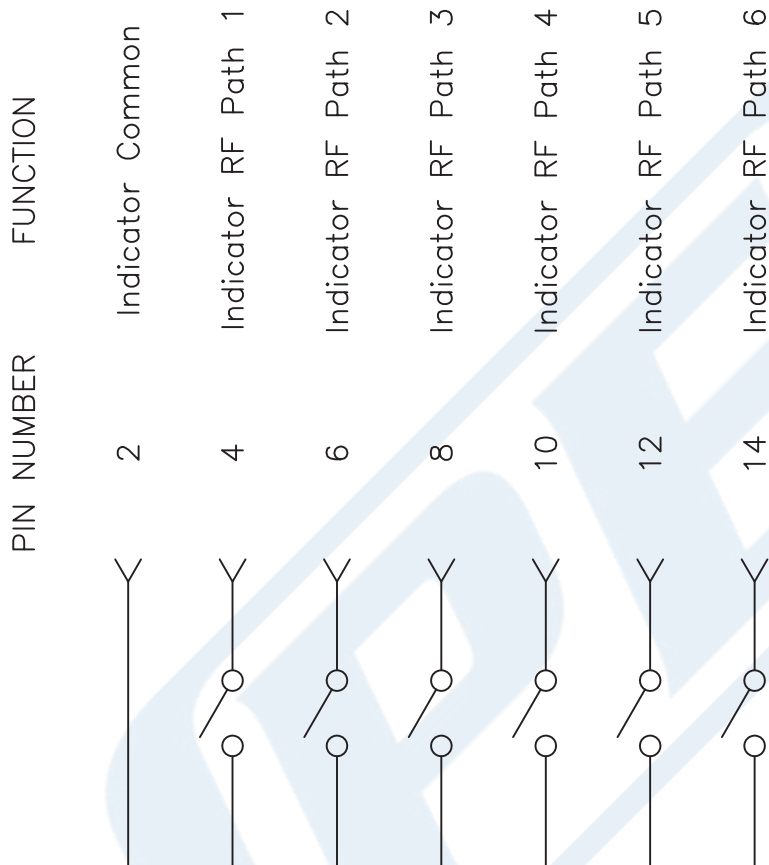
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## ELECTRONIC POSITION INDICATORS

The electronic position indicators use photo-MOS transistors which are driven by the mechanical position of the RF paths moving elements. The circuitry consists of a common which can be connected to an output corresponding to selected RF path. If one or several RF paths are closed, the corresponding indicators are connected to the common. The photo-MOS transistors are configured for AC and/or DC operation. The electronic position indicators require the supply (20 to 32 VDC) to be connected to pin 1 and ground connected to pin 15.

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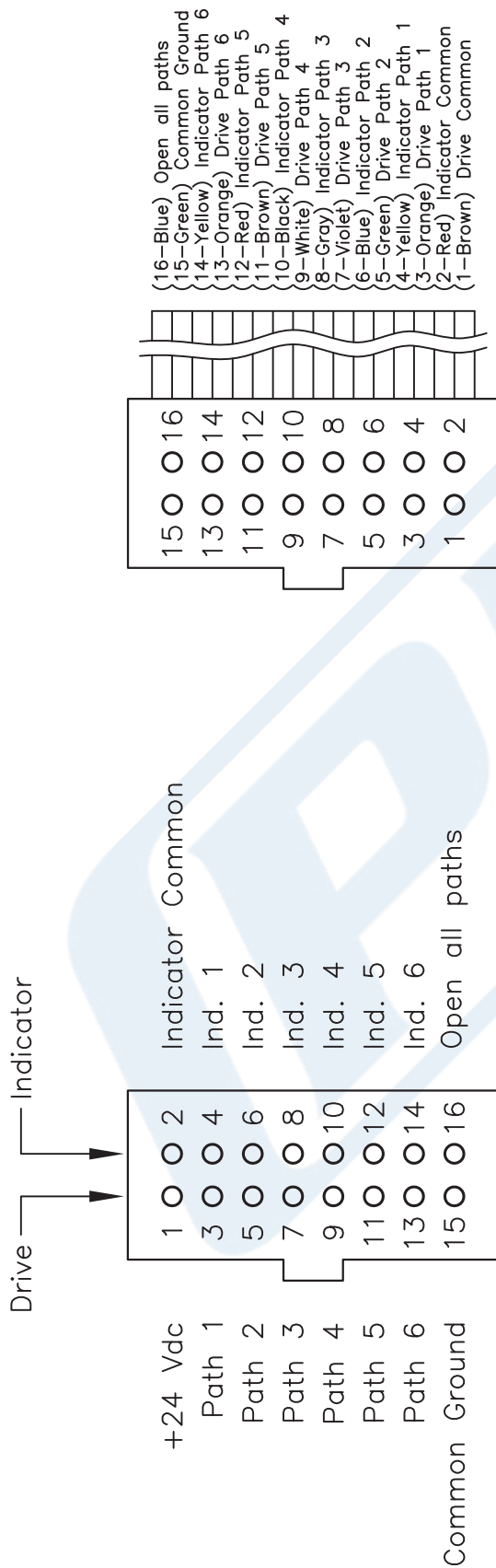
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Switch Connector

Mating Cable Connector

### Standard drive

- Connect pin 15 to ground.
- Connect pin 1 to supply (+20 VDC to +32 VDC)
- Select (close) desired RF path by applying Ground to the corresponding "drive" pin (Ex: apply Ground to pin 3 to close RF path 1).
- To select another path, ensure that all unwanted RF path "drive" pins are disconnected from Ground (to prevent multiple RF path engagement). Apply Ground to the "drive" pin which corresponds to the desired RF path.
- To open all RF paths, ensure that all RF path "drive" pins are disconnected from Ground. Complete the operation by applying Ground to pin 16.

### Break-Before-Make

Open the undesired RF path. After 15 ms (minimum), close the new RF port.

### Make-Before-Break

Ensure that the previously selected RF path "drive" is connected to Ground then close the new RF path.

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