Switch Catalog

RF/Microwave Products
Coaxial Switches & Switch Matrices

Ducommun LaBarge Technologies
RF Products
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DUCOMMUN RF PRODUCTS

INTRODUCTION

Founded in 1849, Ducommun Incorporated is the oldest registered company in the State of California. A key part of the Ducommun family of businesses, Ducommun RF Products is a leading technology provider with unparalleled design, development, manufacturing, integration, and test capabilities. Our capabilities and products are represented in the areas of missiles, space, sensor, simulation, complex electronic/mechanical assemblies, illuminated cockpit displays, RF to millimeter wave components to sub-systems, and space-qualified motion control devices.

Ducommun's coaxial switch heritage began with Jay-El and Dynatech (DMT), founded in 1969 and acquired by the company in the early 1990's. To further strengthen its product offering, Ducommun subsequently acquired DB Products (DBP) in 2004, WiseWave Technologies in 2006 and LaBarge in 2011.

Today, Ducommun is a powerhouse, serving the avionics, commercial, industrial, defense, medical, telecommunications and space uplink & downlink market sectors with a wide range of coaxial switch products.

Ducommun's customers have chosen Ducommun for our unique, comprehensive understanding of electro-mechanical switch principles, along with our singlular dedication to reliability, quality and focus on providing great customer service.

If it's a standard off-the-shelf commercial switch you are looking for or if your needs are for a highly customized ruggized switch, Ducommun has the ability to design and deliver.

ENGINEERING

Our Engineering Team is committed to and believes in helping our customers select the ***"Right Switch for the Right Application."*** We welcome the opportunity to become involved at the front end and throughout the design phase of your projects to assure optimal switch performance, reliability, and long life. Ducommun continues to develop a strong, competitive position without compromising quality or service levels. Our Engineering Team works continually at enhancing our designs, manufacturing processes, cost reduction, utilization of test equipment, and management techniques. To guarantee your satisfaction our engineers are available to discuss your technical issues and concerns.

RESULTS-ORIENTED CUSTOMER SERVICE

Ducommun is a compelling vendor of choice if your company is driven by development and delivery deadlines.

Our friendly professionals who answer the phones are actively involved in the day to day operation and work closely with the Field Sales Representatives to follow through on the best way to meet your requirements. We take pride in our reputation for prompt responses and doing our best to help our customers reduce costs through APO's, Corporate APO's, and special pricing packages.

WARRANTY

Ducommun's switches are warranted against defects in material or workmanship for one full year (12 months) from date of shipment. Ducommuns' obligation is limited to repair or replacement of defective parts. We assume no liability for defects resulting from improper use, operation beyond ratings or unauthorized repairs. Cosmetic conditions are not covered by this warranty. Ducommun is not responsible for consequential damages. Warranty returns require advance authorization. Please see "RETURNS." No other warranties are expressed or implied. Extended warranties are available at additional cost.

RETURNS

To return a product for warranty or non-warranty service please be sure to obtain prior authorization. Ducommun will issue a Return Material Authorization Number which MUST appear on the paperwork accompanying the return as well as the outside of the shipping container. Please ship any return products prepaid to Ducommun LaBarge Technologies unless prior arrangements have been made. Ducommun does not accept COD freight charges for returned items.

OUR COMMITMENT TO YOU

Ducommun wants to assist you in selecting ***"The Right Switch for the Right Application."*** Please feel free to contact us to discuss any environmental or other application concerns you may have. For the best overall switch value in terms of quality, price and support, Ducommun's engineering and customer service support teams are standing ready to assist you with cost-effective solutions.

UNPARALLELED QUALITY

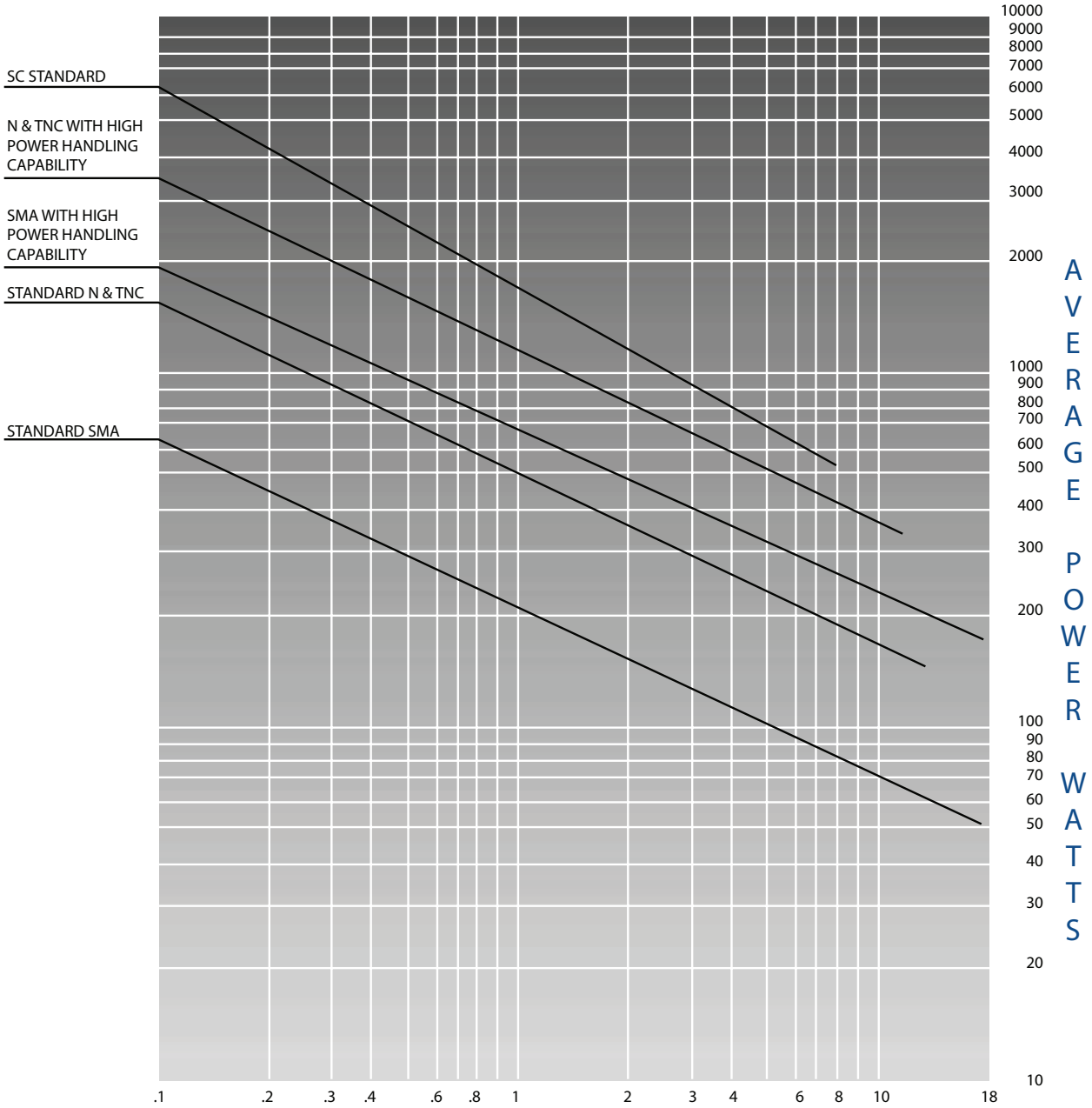
Ducommun's unparalleled commitment to Total Quality assures you that our services and hardware meets or exceeds their most stringent quality expectations. The Quality system is fully approved to the ISO and AS9100 Standards and maintains a fully functional FAA Repair station to assist you with any repair needs. Ducommun is also structured to meet the individual, diverse standards required by its customers, for example, the compliance to the ROHS requirements. Ducommun's stringent quality control measures meet or exceed all relevant standards and the cornerstone of Ducommun's industry leadership has always been its success in producing products that withstand the harshest environments on and off the planet.

CONTACT DUCOMMUN

For sales and additional information please contact us at:

Email: mw-catalog@ducommun.com

Phone: 310.513.7200

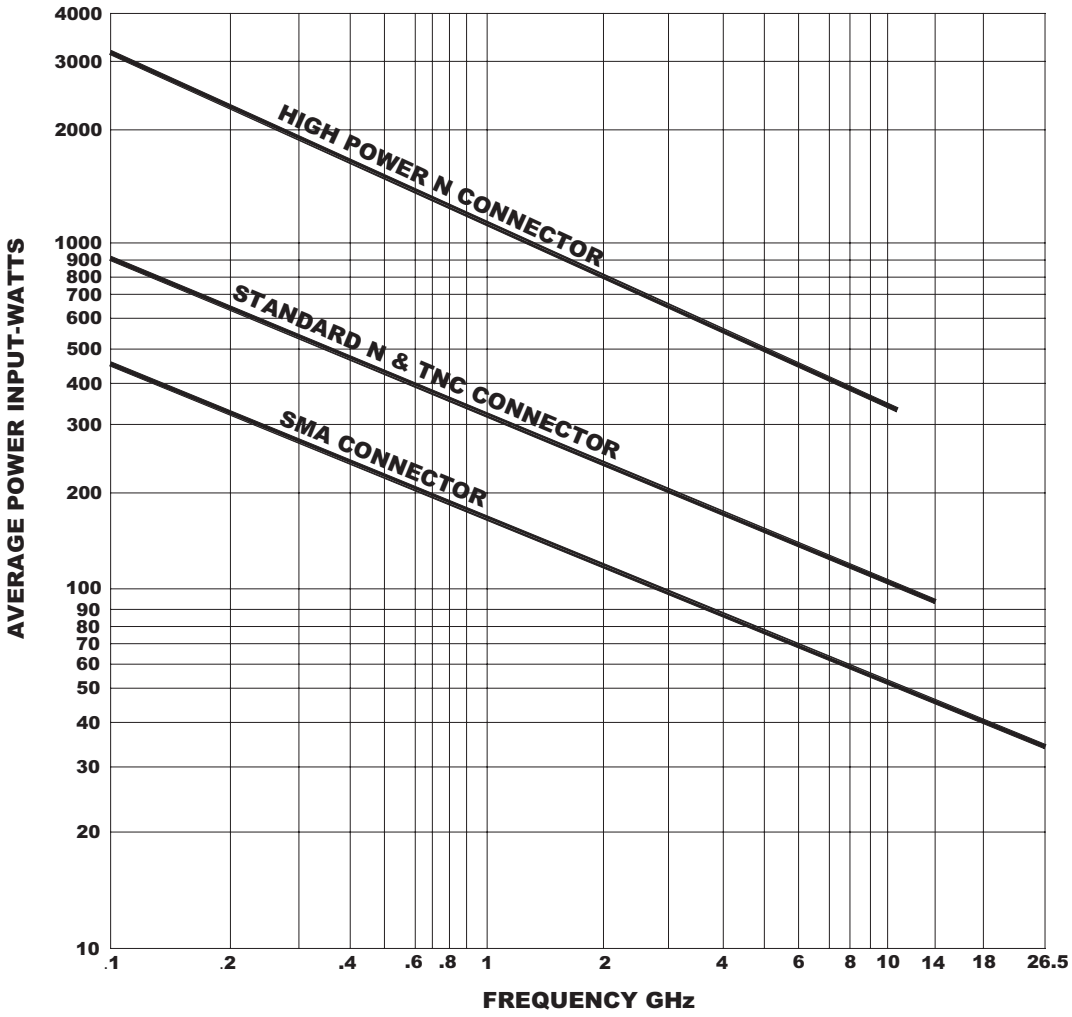


Power rating stated at 25˚C Ambient Temperature, sea level and 1.01:1 VSWR

The Power Charts printed on pages 6 and 7 are general guidelines for estimating product performance. If your application falls within a region of 3dB from the maximum level shown on this chart please contact the factory for assistance. Ducommun LaBarge Technologies will not assume liability for operation in this region unless authorized by the factory.

CW POWER CAPACITY VS. FREQUENCY GRAPH

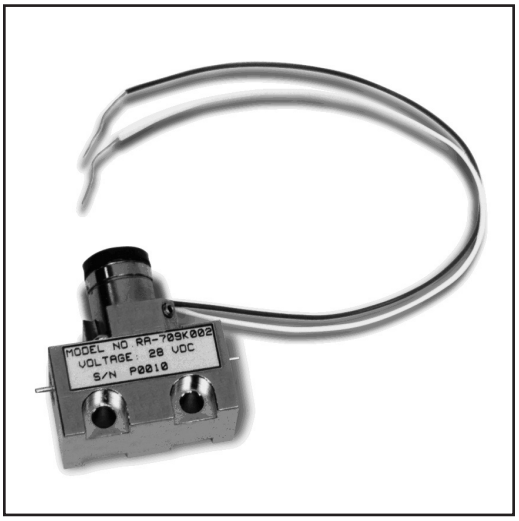
This graph is based on the following conditions: ambient Temperature 40°C, sea level, VSWR 1:1 and cold switching



VSWR	Derating Factor	VSWR	Derating Factor
1.5 : 1	0.96	3.5 : 1	0.70
2.0 : 1	0.88	4.0 : 1	0.64
2.5 : 1	0.84	4.5 : 1	0.60
3.0 : 1	0.75	5.0 : 1	0.56

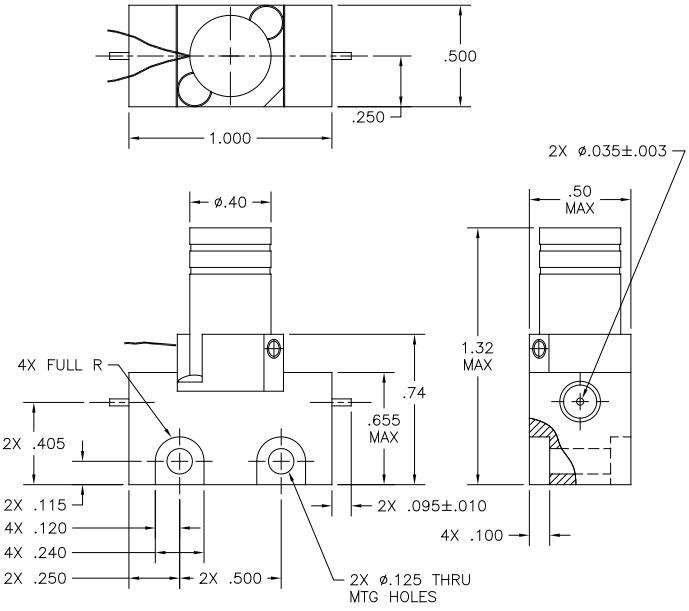
Consult Factory for derating factor when application does not meet the foregoing referenced conditions.

RA SERIES
MINIATURE 1P1T SWITCH
DC-3 GHz ◆ SURFACE MOUNT



The ***RA Series*** features compact, lightweight, surface mount, hot switching at a frequency of DC to 3 GHz.

Weight:	0.5oz
RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	12 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed to meet Mil-DTL-3928



SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)	Power Handling
DC-3 GHz	1.20	0.20	80	80 w cw

Actuator Current (typical)	24-30Vdc
Normally Open	87mA

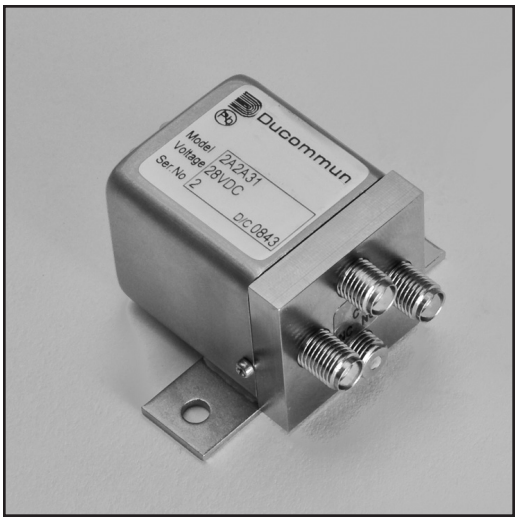
AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS	OPTION 4 VOLTAGE	OPTION 5 ACTUATOR	OPTION 6 FREQUENCY
7 - Special - PIN	**3 -** 24-30 Vdc	**Normally Open**	**1 -** DC to 3 GHz
		K - Standard	
OPTION 3 TERMINALS			**OPTION 7 POLARITY**
0 - Flying Leads			**0 -** Not Applicable

RA	-	7	0	3	K	1	0
Option 1 Series		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity

	Series	RF Connector	Frequency Range	Operating Temperature	Voltage				Circuit Options										DC Power Connector			Page Number
									Fail-safe		Latching				Normally Open							
											Pulse		Self Cut Off									
			GHz	Celsius	12 Vdc	28 Vdc	15 Vdc	5 Vdc	Diodes	Indicators	Diodes	Indicators	Diodes	Indicators	Diodes	Indicators	TTL Low	TTL High	Terminations	Solder Terminals	D-Sub Connector	Circular Connector	
STANDARD	2A/2AE	SMA	DC-26.5	-25 to +65	●	●	●	●	●	●							●	●	●	●		●	10
	2B/2BE	SMA	DC-26.5	-25 to +65	●	●	●	●	●	●		●	●	●			●	●	●	●	●		12
	2C/2CE	SMA	DC-26.5	-25 to +65	●	●	●	●	●	●		●	●	●			●	●	●	●	●		14
	2EL/2ELE	SMA	DC-26.5	-25 to +85	●	●	●	●	●	●		●	●	●			●	●		●	●		16
	2HNV	HN	DC-400	-55 to +85	●	●																	18
	2N/2NH	N	DC-14	-55 to +85	●	●	●	●	●	●	●	●	●	●			●	●		●	●		20
	2S/2SE	SMA	DC-26.5	-25 to +85	●	●	●	●	●	●	●	●	●	●			●	●		●	●		22
	2SB	SMB	DC-3	-25 to +65	●	●	●	●	●	●										●	●		24
	2T	TNC	DC-10	-25 to +65	●	●	●	●	●	●	●	●	●	●			●	●		●	●		26
RUGGEDIZED	D1	SMA	DC-22	-35 to +85	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●		28
	D1	SMA	DC-22	-35 to +85	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		30
	D2	N, BNC, TNC	DC-12.4	-35 to +85	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	32
	D3	SMA	DC-22	-35 to +85	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●		34
	D3	SMA	DC-22	-35 to +85	●	●	●	●	●	●	●	●	●	●			●	●	●	●	●		36
	D4	N, BNC, TNC	DC-12.4	-35 to +85	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	38
	D5	SC	DC-6.5	-35 to +85	●	●	●	●	●	●	●	●	●	●			●	●		●	●	●	40
	D13	SMA	DC-22	-35 to +85	●	●	●	●												●	●		42
	DK1	K	DC-40	-35 to +85	●	●	●	●	●	●	●	●	●	●			●	●		●	●		44
	DK3	K	DC-40	-35 to +85	●	●	●	●	●	●	●	●	●	●			●	●		●	●		46
	TOH	PIN, SMA	DC-2.5	-35 to +85	●	●	●	●												●			48

2A/2AE SERIES
SPDT 50 OHM
TERMINATED SWITCH
DC-26.5 GHz ◆ SMA



The ***2A Series*** features SMA connectors and a frequency range of DC to 18 GHz.

The ***2AE Series*** also features SMA connectors and a frequency range of DC to 26.5 GHz.

Both series are available with failsafe function.

Weight (max.):	5 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-25°C to +65°C ambient
Operating Life:	1,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.20	0.20	80
4-8 GHz	1.30	0.25	75
8-12 GHz	1.35	0.30	70
12-18 GHz	1.40	0.40	60
18-26.5 GHz	1.50	0.50	50

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Fail-safe	455mA	410mA	245mA	225mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	15	35	N/A

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Fail-safe

A -	Standard	**C -**	Indicators
B -	Diodes	**D -**	Diodes, Indicators

Low Input Drivers with:		High Input Drivers with:	
E -	Diodes	**EH -**	Diodes
F -	Diodes, Indicators	**FH -**	Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **3 -** Other (Specify)
- 4 - Sub Miniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

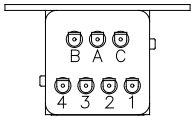
Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

For “Additional Options” please contact Factory for part number

2A/2AE

Option 2	Option 3	Option 4	Option 5	Option 6
Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

DC TERMINAL FUNCTIONS

	FAILSAFE		
PIN	A, C	B, D	E, EH, F, FH
1	N/A	N/A	N/A
2	AV	AV+	CRTN
3	AV	AV-	+V SW
4	N/A	N/A	L

SCHEMATICS

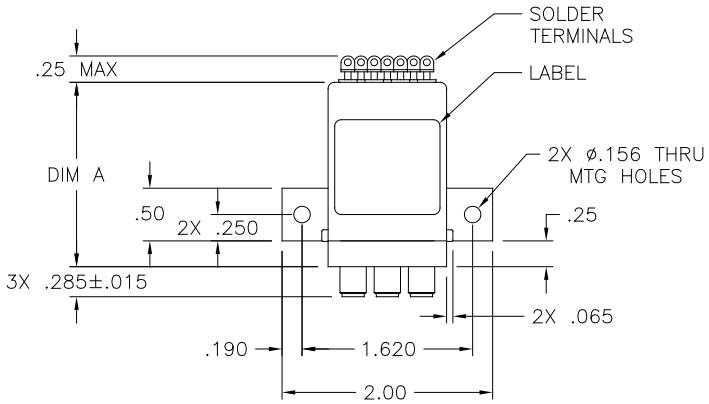
Pages 132–137			
	S10	S11	S12

INDICATORS

PIN	A	B	C
	COM	N/C	N/O

See Page 158 for Legend of Terms and tolerances
See Page 138 for Logic & BCD Truth Table

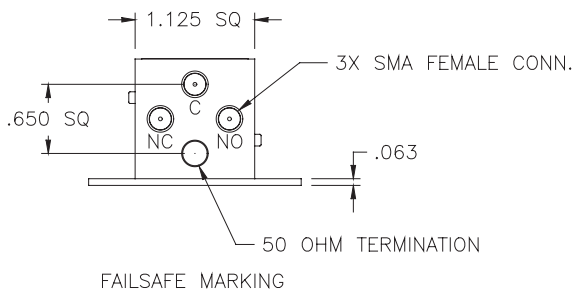
FRONT VIEW
Options A, B, C, D



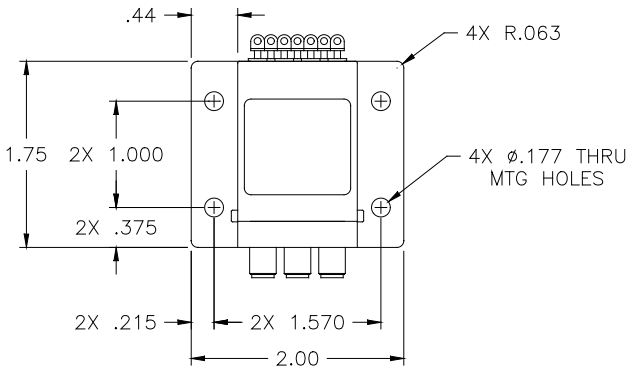
AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, B, C, D	1.42
E, EH, F, FH	1.75

* Consult factory for Dimension "A" when multi pin connector is desired. For the circular connector configuration see page 64.

BOTTOM VIEW



FRONT VIEW
Options E, EH, F, FH



2B/2BE SERIES
SPDT 50 OHM
TERMINATED SWITCH
DC-26.5 GHz ◆ SMA

The ***2B Series*** features SMA connectors and a frequency range of DC to 18 GHz.

The ***2BE Series*** also features SMA connectors and a frequency range of DC to 26.5 GHz.

Both series are available with failsafe, latching self cut-off, or pulse latching functions.

Weight (max.):	5.5 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-25°C to +65°C ambient
Operating Life:	1,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.20	0.20	80
4-8 GHz	1.30	0.30	75
8-12 GHz	1.40	0.40	70
12-18 GHz	1.50	0.50	60
18-26.5 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Fail-safe	375mA	300mA	180mA	170mA
Latching	335mA	270mA	180mA	165mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	15	35	20

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Fail-safe

A -	Standard	**C -**	Indicators
B -	Diodes	**D -**	Diodes, Indicators

Low Input Drivers with:

E -	Diodes	**EH -**	Diodes
F -	Diodes, Indicators	**FH -**	Diodes, Indicators

Latching Self Cut-Off

G -	Diodes	**H -**	Diodes, Indicators

Low Input Drivers with:

J -	Diodes	**JH -**	Diodes
K -	Diodes, Indicators	**KH -**	Diodes, Indicators

Pulse Latching

T -	Standard
U -	Diodes
V -	Indicators
W -	Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **3 -** Other (Specify)
- **4 -** Sub Miniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

OPTION 8 BRACKETS

- **C -** See Page 144

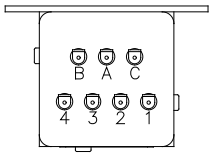
Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

For “Additional Options” please contact Factory for part number

2B/2BE

Option 2	Option 3	Option 4	Option 5	Option 6
Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

DC TERMINAL FUNCTION

PIN	FAILSAFE		LATCHING			
	A, C	B, D	E, EH, F, FH	G, H	J, JH, K, KH,	T, U, V, W
1	N/A	N/A	N/A	C+/-	C RTN	C+/-
2	AV	AV+	C RTN	N/A	+ V SW	N/A
3	AV	AV-	+V SW	AV 2-/+	L 2	PV 2-/+
4	N/A	N/A	L	AV 1-/+	L 1	PV 1-/+

SCHEMATICS

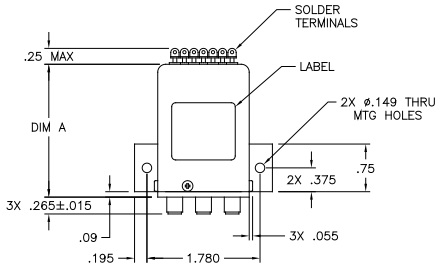
Pages 132–137						
	S10	S11	S12	S13	S14	S15, S16

INDICATORS

PIN	A	B	C
	COM	1 or N/C	2 or N/O

See Page 158 for Legend of Terms and tolerances
See Page 138 for Logic & BCD Truth Table

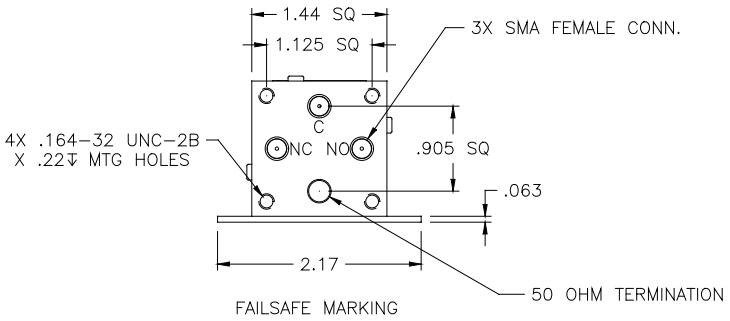
FRONT VIEW

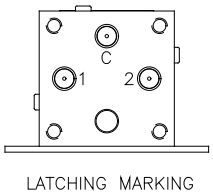


AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, B, C, D	1.87
E, EH, F, FH	2.09
J, JH, K, KH	2.09
G, H, V, W	1.87
T, U	1.46

* Consult factory for Dimension "A" when multi-pin connector is desired.

BOTTOM VIEW





LATCHING MARKING

2C/2CE SERIES
SPDT 50 OHM
TERMINATED SWITCH
DC-26.5 GHz ◆ SMA

The ***2C Series*** features SMA connectors and a frequency range of DC to 18 GHz.

The ***2CE Series*** also features SMA connectors and a frequency range of DC to 26.5 GHz.

Both series are available with fail-safe, latching self cut-off, or pulse latching functions.

Weight (max.):	6 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-25°C to +65°C ambient
Operating Life:	1,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.20	0.20	80
4-8 GHz	1.30	0.30	75
8-12 GHz	1.40	0.40	70
12-18 GHz	1.50	0.50	60
18-26.5 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Fail-safe	375mA	300mA	180mA	170mA
Latching	335mA	270mA	180mA	165mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	15	35	20

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Fail-safe

- **A -** Standard
- **B -** Diodes

Low Input Drivers with:

- **E -** Diodes
- **F -** Diodes, Indicators

- **C -** Indicators
- **D -** Diodes, Indicators

High Input Drivers with:

- **EH -** Diodes
- **FH -** Diodes, Indicators

Latching Self Cut-Off

- **G -** Diodes
- **H -** Diodes, Indicators

Low Input Drivers with:

- **J -** Diodes
- **K -** Diodes, Indicators

High Input Drivers with:

- **JH -** Diodes
- **KH -** Diodes, Indicators

Pulse Latching

- **T -** Standard
- **U -** Diodes
- **V -** Indicators
- **W -** Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **3 -** Other (Specify)
- **4 -** Sub Miniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

OPTION 8 BRACKETS

- **D -** See Page 145
- **E -** See Page 145
- **F -** See Page 145

OPTION 9 BODIES

- **T -** See Page 147

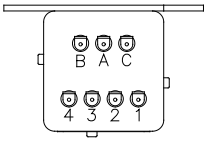
Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

For “Additional Options” please contact Factory for part number

2C/2CE

Option 2	Option 3	Option 4	Option 5	Option 6
Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

DC TERMINAL FUNCTIONS

	FAILSAFE			LATCHING		
PIN	A, C	B, D	E, EH, F, FH	G, H	J, JH, K, KH	T, U, V, W
1	N/A	N/A	N/A	C+/-	C RTN	C+/-
2	AV	AV+	C RTN	N/A	+ V SW	N/A
3	AV	AV-	+V SW	AV 2-/+	L 2	PV 2-/+
4	N/A	N/A	L	AV 1-/+	L 1	PV 1-/+

SCHEMATICS

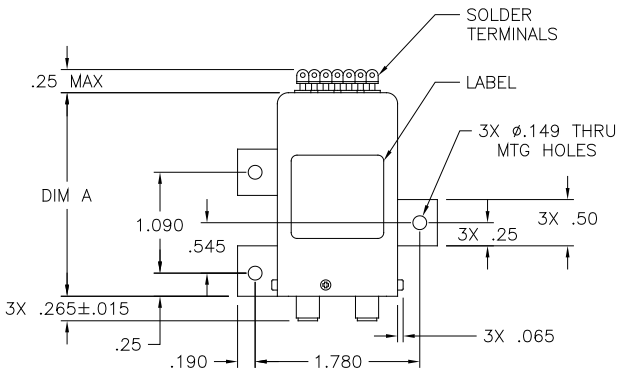
Pages 132–137						
	S10	S11	S12	S13	S14	S15, S16

INDICATORS

PIN	A	B	C
	COM	1 or N/C	2 or N/O

See Page 158 for Legend of Terms and tolerances
See Page 138 for Logic & BCD Truth Table

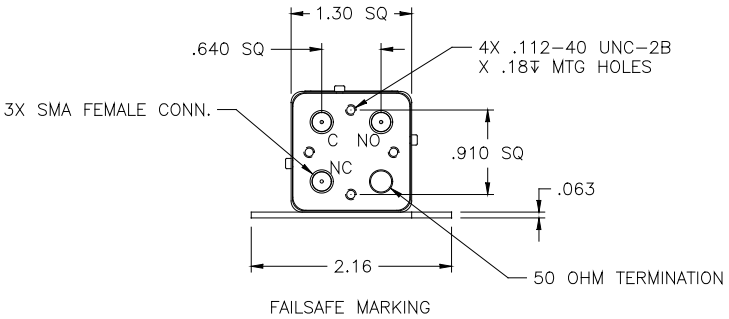
FRONT VIEW

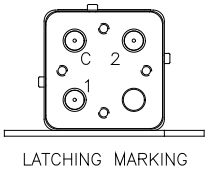


AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, B, C, D	1.75
E, EH, F, FH	2.25
J, JH, K, KH	2.00
G, H, V, W	1.75
T, U	1.50

* Consult factory for Dimension "A" when multi-pin connector is desired.

BOTTOM VIEW





2EL/2ELE SERIES
SPDT SWITCH
DC-26.5 GHz ◆ SMA

The ***2EL/2ELE Series*** features SMA connectors and a frequency range of DC to 18 GHz.

The ***2EL/2ELE Series*** features SMA connectors and a frequency range of DC to 26.5 GHz.

Both series are available with failsafe, latching self cut-off, or pulse latching options. The 2EL/2ELE series has in board and out board mounting holes. Please consult Factory for SPST version.

Weight (max.):	2.1 oz
RF Impedance:	50 ohms nominal
Operating Temperature (fail-safe):	-55°C to +85°C ambient
Operating Temperature (latching):	-25°C to +85°C ambient
Operating Life:	5,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.25	0.20	80
4-8 GHz	1.25	0.25	75
8-12 GHz	1.30	0.30	70
12-18 GHz	1.35	0.40	60
18-26.5 GHz	1.50	0.50	50

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Fail-safe	300mA	240mA	150mA	135mA
Latching	200mA	155mA	100mA	95mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	15	35	20

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Fail-safe

- **A -** Standard
- **B -** Diodes
- **C -** Indicators
- **D -** Diodes, Indicators

Low Input Drivers with:

- **E -** Diodes
- **F -** Diodes, Indicators

High Input Drivers with:

- **EH -** Diodes
- **FH -** Diodes, Indicators

Latching Self Cut-Off

- **G -** Diodes
- **H -** Diodes, Indicators

Low Input Drivers with:

- **J -** Diodes
- **K -** Diodes, Indicators

High Input Drivers with:

- **JH -** Diodes
- **KH -** Diodes, Indicators

Pulse Latching

- **T -** Standard
- **U -** Diodes
- **V -** Indicators
- **W -** Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **3 -** Other (Specify)
- **4 -** Sub Miniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

OPTION 8 BRACKETS

No Additional Brackets Offered

OPTION 9 BODIES

- **R -** See Page 147

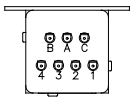
Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

For “Additional Options” please contact Factory for part number

2EL/2ELE

Option 2	Option 3	Option 4	Option 5	Option 6
Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

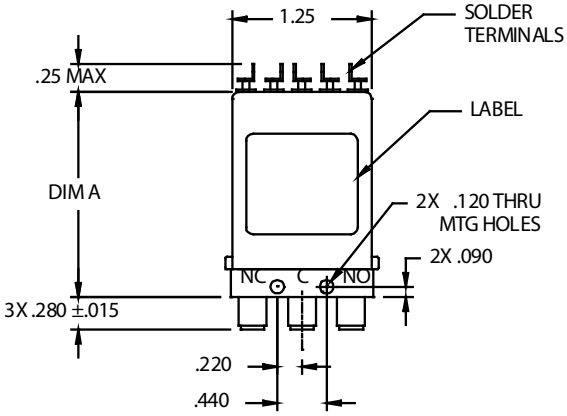
DC TERMINAL FUNCTION

PIN	FAILSAFE			LATCHING		
	A, C	B, D	E, EH, F, FH	G, H	J, JH, K, KH	T, U, V, W
1	N/A	N/A	N/A	N/A	+V SW	N/A
2	N/A	N/A	C RTN	C+/-	C RTN	C+/-
3	AV	AV -	L	AV 1-/+	L 1	PV 1-/+
4	AV	AV +	+ V SW	AV 2-/+	L 2	PV 2-/+

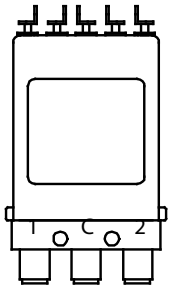
SCHEMATICS

Pages 132–137						
	S1, S2	S3	S4	S5	S6	S8, S9

FRONT VIEW



FAILSAFE MARKING



LATCHING MARKING

INDICATORS

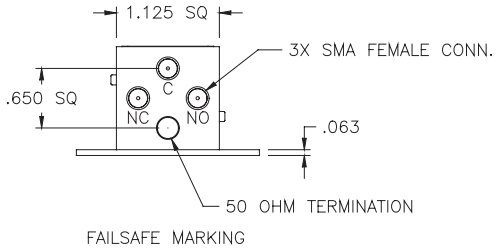
PIN	A	B	C
	COM	1 or N/C	2 or N/O

See Page 158 for Legend of Terms and tolerances
See Page 138 for Logic & BCD Truth Table

AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, B, C	1.25
D	1.50
E, EH, F, FH	1.83
J, JH, K, KH	1.83
G, H, V, W	1.83
T, U	1.25

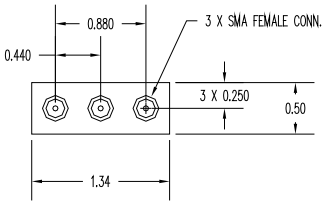
* Consult factory for Dimension "A" when multi-pin connector is desired.

BOTTOM VIEW

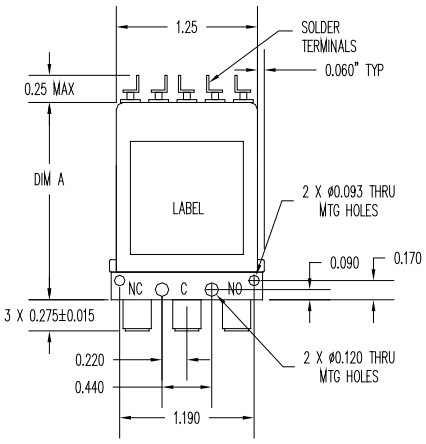


FAILSAFE MARKING

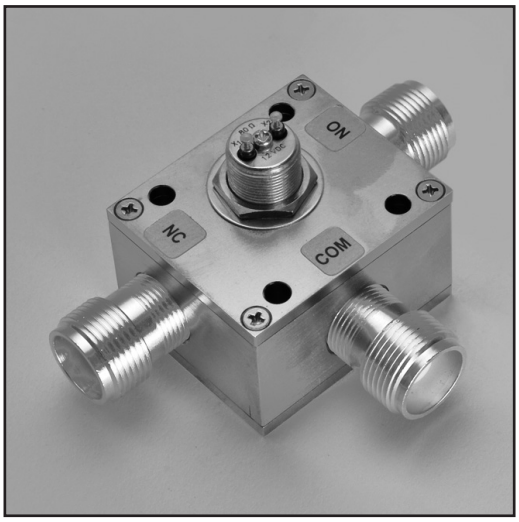
2EL / 2ELE



2EL / 2ELE



2HNV/2NV/2SCV SERIES
SPDT VACUUM SWITCH
DC-400 MHz ◆ HN/N/SC



HN CONNECTOR SHOWN

The ***2HNV/2NV/2SCV Series*** features HN/N/SC connectors and a frequency range of DC to 400 MHz. This switch is capable of "hot" switching 1KW at 30 MHz with optional Tungsten contacts.

Note: "Hot" switching will greatly reduce the operating life of the switch.

Weight (max.):	9 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-55°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-30 MHz	1.05	0.07	35
DC-50 MHz	1.06	0.08	30
DC-100 MHz	1.08	0.09	25
DC-400 MHz	1.10	0.10	17

Actuator Current (typical)	12 Vdc	28 Vdc
Fail-safe	150mA	84mA

Position	NO	NC	Latching
Switching Time - mSec (Max)	N/A	10	N/A

AVAILABLE OPTIONS

OPTION 3 VOLTAGE
1 - 12 Vdc
2 - 28 Vdc

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS
5 - Tungsten Contacts

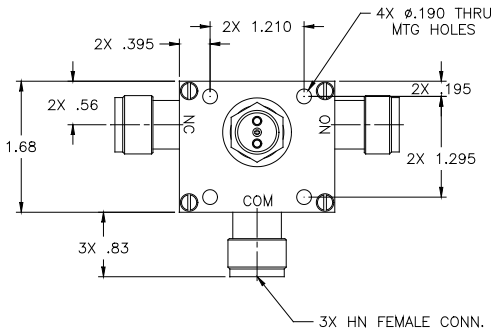
For "Additional Options" please contact Factory for part number

2HNV
2NV
2SCV

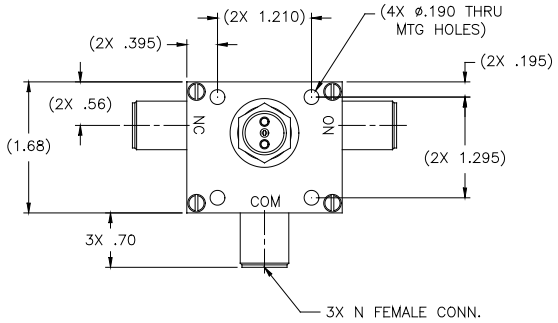
Option 2 Series

Option 3 Voltage

TOP VIEW

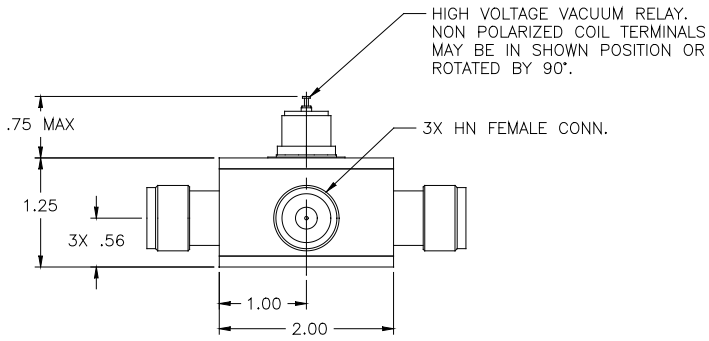


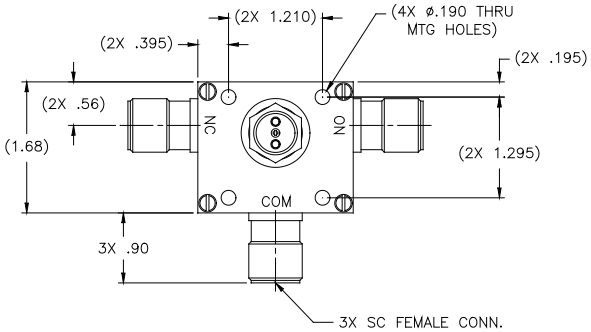
2HNV SWITCH



2NV SWITCH

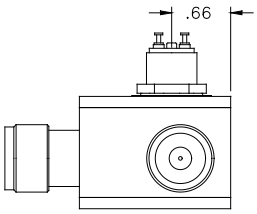
FRONT VIEW

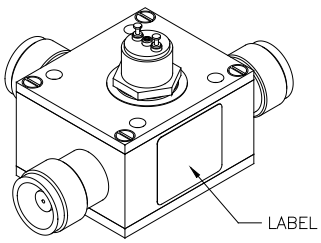




2SCV SWITCH

SIDE VIEW





Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

2N/2NH SERIES
SPDT SWITCH
DC-14 GHz ◆ N

The ***2N Series*** features N connectors and a frequency range of DC to 14 GHz.

The ***2NH Series*** features High Power N connectors and a frequency range of DC to 14 GHz.

Both series are available with fail-safe, latching self cut-off, or pulse latching functions.

Weight (max.):	8.5 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-55°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-2 GHz	1.15	0.20	80
2-4 GHz	1.20	0.25	80
4-14 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Fail-safe	270mA	215mA	135mA	130mA
Latching	200mA	155mA	100mA	95mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	20	50	20

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Fail-safe

- **A -** Standard
- **B -** Diodes
- **C -** Indicators
- **D -** Diodes, Indicators

Low Input Drivers with:

- **E -** Diodes
- **F -** Diodes, Indicators

High Input Drivers with:

- **EH -** Diodes
- **FH -** Diodes, Indicators

Latching Self Cut-Off

- **G -** Diodes
- **H -** Diodes, Indicators

Low Input Drivers with:

- **J -** Diodes
- **K -** Diodes, Indicators

High Input Drivers with:

- **JH -** Diodes
- **KH -** Diodes, Indicators

Pulse Latching

- **T -** Standard
- **U -** Diodes
- **V -** Indicators
- **W -** Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **3 -** Other (Specify)
- **4 -** Sub Miniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

OPTION 8 BRACKETS

No Additional Brackets Offered

OPTION 9 BODIES

- **S -** See Page 147

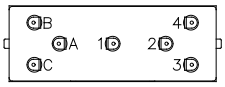
Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

For “Additional Options” please contact Factory for part number

2N/2NH

Option 2	Option 3	Option 4	Option 5	Option 6
Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

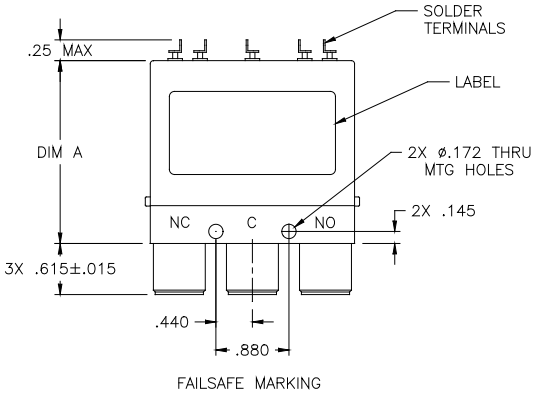
DC TERMINAL FUNCTIONS

	FAILSAFE			LATCHING		
PIN	A, C	B, D	E, EH, F, FH,	G, H	J, JH, K, KH	T, U, V, W
1	N/A	N/A	N/A	N/A	+V SW	N/A
2	N/A	N/A	C RTN	C+/-	C RTN	C+/-
3	AV	AV-	L	AV 1-/+	L 1	PV 1-/+
4	AV	AV+	+V SW	AV 2-/+	L 2	PV 2-/+

SCHEMATICS

Pages 132–137						
	S1, S2	S3	S4	S5	S6	S8, S9

FRONT VIEW



INDICATORS

PIN	A	B	C
	COM	1 or N/C	2 or N/O

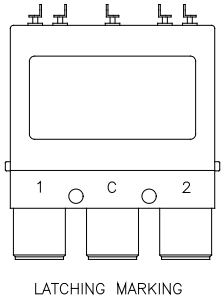
See Page 158 for Legend of Terms and Tolerances

See Page 138 for Logic & BCD Truth Table

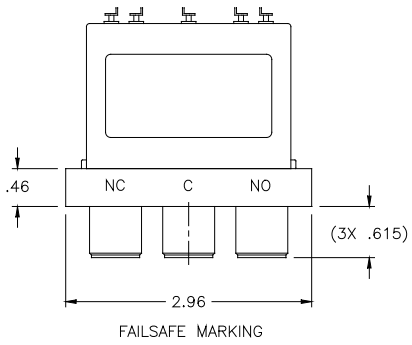
AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, B, C, D	1.61
E, EH, F, FH	2.20
J, JH, K, KH	2.20
G, H, V, W	2.20
T, U	1.61

* Consult factory for Dimension "A" when multi pin connector is desired.

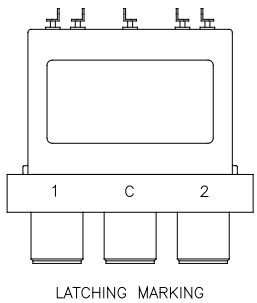
"S" BODY



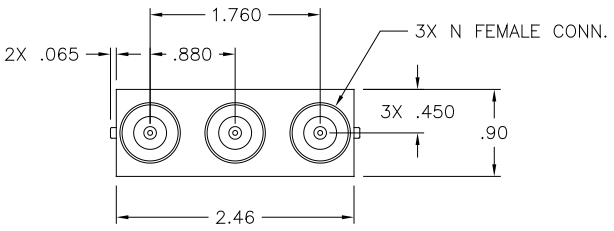
"S" BODY



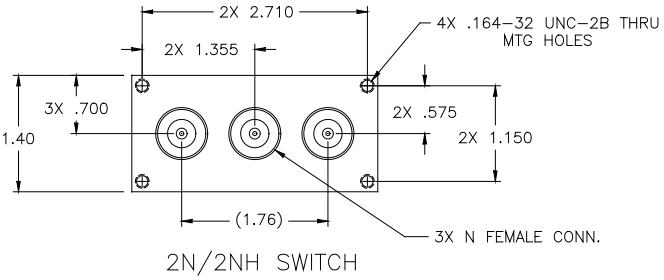
"S" BODY



BOTTOM VIEW



"S" BODY



2N/2NH SWITCH

2S/2SE/2SL/2SLE SERIES
SPDT SWITCH
DC-26.5 GHz ◆ SMA

The ***2S/2SL Series*** features SMA connectors and a frequency range of DC to 18 GHz.

The ***2SE/2SLE Series*** also features SMA connectors and a frequency range of DC to 26.5 GHz.

Both series are available with fail-safe, latching self cut-off, or pulse latching options. The 2SL/2SLE series has in board and out board mounting holes. Please consult Factory for SPST version.

Weight (max.): 2.1 oz
RF Impedance: 50 ohms nominal
Operating Temperature (fail-safe): -55°C to +85°C ambient
Operating Temperature (latching): -25°C to +85°C ambient
Operating Life: 1,000,000 cycles min.
Switching Sequence: Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.25	0.20	80
4-8 GHz	1.25	0.25	75
8-12 GHz	1.30	0.30	70
12-18 GHz	1.35	0.40	60
18-26.5 GHz	1.50	0.50	50

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Fail-safe	300mA	240mA	150mA	135mA
Latching	200mA	155mA	100mA	95mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	15	35	20

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

1 - 12 Vdc
2 - 28 Vdc
3 - 15 Vdc
5 - Other
6 - 24 Vdc
7 - 5 Vdc

OPTION 4 ACTUATOR

Fail-safe

A - Standard
B - Diodes
C - Indicators
D - Diodes, Indicators

Low Input Drivers with:
E - Diodes
F - Diodes, Indicators

High Input Drivers with:
EH - Diodes
FH - Diodes, Indicators

Latching Self Cut-Off

G - Diodes
H - Diodes, Indicators

Low Input Drivers with:
J - Diodes
K - Diodes, Indicators

High Input Drivers with:
JH - Diodes
KH - Diodes, Indicators

Pulse Latching

T - Standard
U - Diodes
V - Indicators
W - Diodes, Indicators

OPTION 5 POLARITY

1 - Negative
2 - Positive
3 - Not Applicable

OPTION 6 TERMINALS

1 - Solder Terminals
3 - Other (Specify)
4 - Sub Miniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

1 - Moisture Seal
2 - High Temperature (125° C)
3 - Moisture Seal & High Temperature (125° C)

OPTION 8 BRACKETS

No Additional Brackets Offered

OPTION 9 BODIES

R - See Page 147

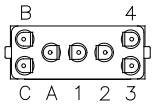
Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

For "Additional Options" please contact Factory for part number

2S/2SE
2SL/2SLE

Option 2 Series	Option 3 Voltage	Option 4 Actuator	Option 5 Polarity	Option 6 Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

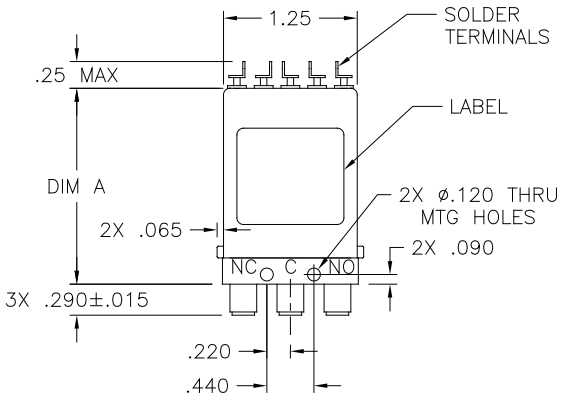
DC TERMINAL FUNCTION

	FAILSAFE			LATCHING		
PIN	A, C	B, D	E, EH, F, FH	G, H	J, JH, K, KH	T, U, V, W
1	N/A	N/A	N/A	N/A	+V SW	N/A
2	N/A	N/A	C RTN	C+/-	C RTN	C+/-
3	AV	AV -	L	AV 1-/+	L 1	PV 1-/+
4	AV	AV +	+ V SW	AV 2-/+	L 2	PV 2-/+

SCHEMATICS

Pages 132–137						
	S1, S2	S3	S4	S5	S6	S8, S9

FRONT VIEW



FAILSAFE MARKING

INDICATORS

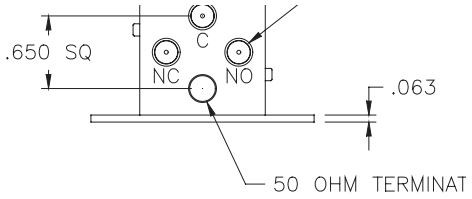
PIN	A	B	C
	COM	1 or N/C	2 or N/O

See Page 158 for Legend of Terms and tolerances
See Page 138 for Logic & BCD Truth Table

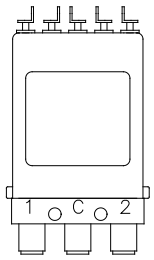
AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, B, C	1.25
D	1.50
E, EH, F, FH	1.83
J, JH, K, KH	1.83
G, H, V, W	1.83
T, U	1.25

* Consult factory for Dimension "A" when multi-pin connector is desired.

BOTTOM VIEW

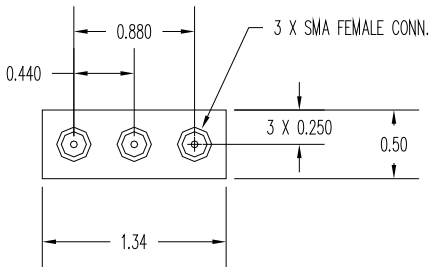


FAILSAFE MARKING

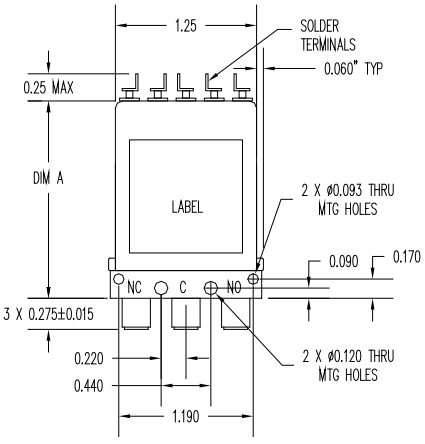


LATCHING MARKING

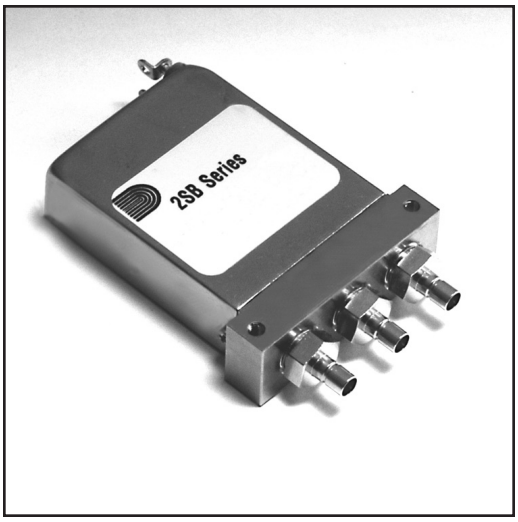
2SL / 2SLE



2SL / 2SLE



2SB SERIES
SPDT 75 OHM SWITCH
DC-3 GHz ◆ MINI SMB



The ***2SB Series*** features Mini SMB connectors and a frequency range of DC to 3 GHz.

This series is available with fail-safe functions. Please contact the factory for latching self cut-off and pulse latching design availability.

Weight (max.):	2 oz
RF Impedance:	75 ohms nominal
Operating Temperature:	-25°C to +65°C ambient
Operating Life:	1,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-1 GHz	1.10	0.15	90
1-2 GHz	1.15	0.20	85
2-3 GHz	1.20	0.30	80

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Fail-safe	210mA	170mA	110mA	95mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	15	35	N/A

AVAILABLE OPTIONS

OPTION 3 VOLTAGE	OPTION 4 ACTUATOR	OPTION 5 POLARITY
1 - 12 Vdc	**Fail-safe**	**1 -** Negative
2 - 28 Vdc	**A -** Standard	**2 -** Positive
3 - 15 Vdc	**B -** Diodes	**3 -** Not Applicable
5 - Other	**C -** Indicators	
6 - 24 Vdc	**D -** Diodes, Indicators	**OPTION 6 TERMINALS**
7 - 5 Vdc		**1 -** Solder Terminals
		3 - Other (Specify)
		4 - Sub Miniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS
1 - Moisture Seal
2 - High Temperature (125° C)
3 - Moisture Seal & High Temperature (125° C)

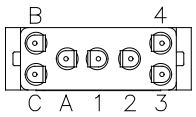
Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

For “Additional Options” please contact Factory for part number

2SB

Option 2	Option 3	Option 4	Option 5	Option 6
Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

DC TERMINAL FUNCTIONS

PIN	FAILSAFE	
	A, C	B, D
1	N/A	N/A
2	N/A	N/A
3	AV	AV-
4	AV	AV+

SCHEMATICS

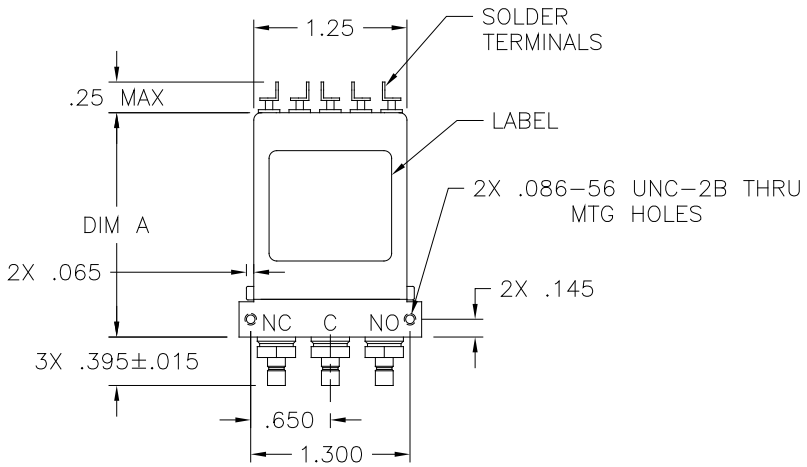
Pages 132–137		
	S1, S2	S3

INDICATORS

PIN	A	B	C
	COM	1 or N/C	2 or N/O

See Page 158 for Legend of Terms and tolerances
See Page 138 for Logic & BCD Truth Table

FRONT VIEW

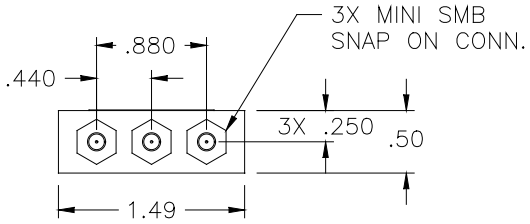


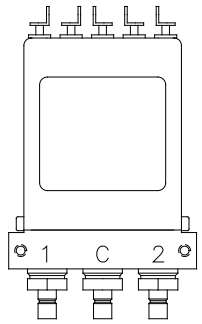
FAILSAFE MARKING

AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, B, C, D	1.90

* Consult factory for Dimension "A" when multi-pin connector is desired.

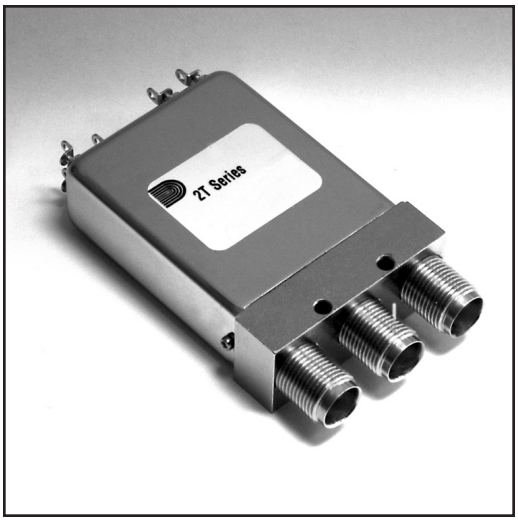
BOTTOM VIEW





LATCHING MARKING

2T SERIES
SPDT SWITCH
DC-10 GHz ◆ TNC



The ***2T Series*** features TNC connectors and a frequency range of DC to 10 GHz.

This series is available with fail-safe, latching self cut-off, or pulse latching functions.

Weight (max.): 5.5 oz
RF Impedance: 50 ohms nominal
Operating Temperature: -25°C to +65°C ambient
Operating Life: 1,000,000 cycles min.
Switching Sequence: Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.20	0.20	80
4-10 GHz	1.60	0.60	60

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Fail-safe	325mA	255mA	160mA	125mA
Latching	200mA	155mA	100mA	95mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - m Sec (Max)	20	50	20

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Fail-safe

- **A -** Standard
- **B -** Diodes
- **C -** Indicators
- **D -** Diodes, Indicators

Low Input Drivers with:

- **E -** Diodes
- **F -** Diodes, Indicators

High Input Drivers with:

- **EH -** Diodes
- **FH -** Diodes, Indicators

Latching Self Cut-Off

- **G -** Diodes
- **H -** Diodes, Indicators

Low Input Drivers with:

- **J -** Diodes
- **K -** Diodes, Indicators

High Input Drivers with:

- **JH -** Diodes
- **KH -** Diodes, Indicators

Pulse Latching

- **T -** Standard
- **U -** Diodes
- **V -** Indicators
- **W -** Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **3 -** Other (Specify)
- **4 -** Sub Miniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

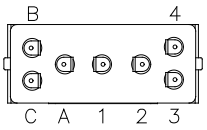
Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

For “Additional Options” please contact Factory for part number

2T

Option 2	Option 3	Option 4	Option 5	Option 6
Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

DC TERMINAL FUNCTIONS

PIN	FAILSAFE			LATCHING		
	A, C	B, D	E, EH, F, FH	G, H	J, JH, K, KH	T, U, V, W
1	N/A	N/A	N/A	N/A	+V SW	N/A
2	N/A	N/A	C RTN	C+/-	C RTN	C+/-
3	AV	AV-	L	AV 1-/+	L 1	PV 1-/+
4	AV	AV+	+V SW	AV 2-/+	L 2	PV 2-/+

SCHEMATICS

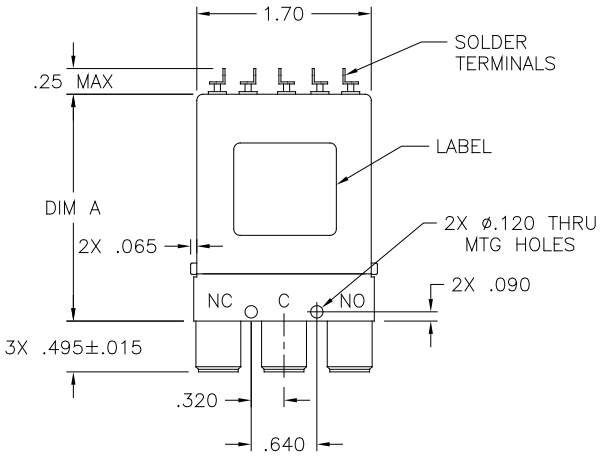
Pages 132–137						
	S1, S2	S3	S4	S5	S6	S8, S9

INDICATORS

PIN	A	B	C
	COM	1 or N/C	2 or N/O

See Page 158 for Legend of Terms and tolerances
See Page 138 for Logic & BCD Truth Table

FRONT VIEW

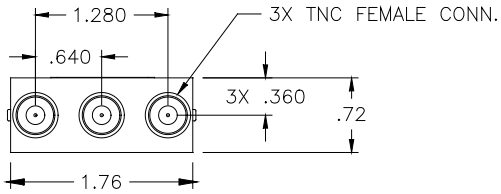


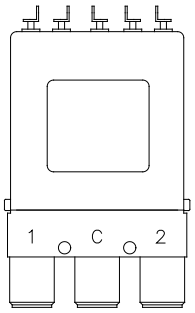
FAILSAFE MARKING

AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, B, C, D	1.71
E, EH, F, FH	1.96
J, JH, K, KH	2.46
G, H, V, W	1.96
T, U	1.71

* Consult factory for Dimension "A" when multi-pin connector is desired.

BOTTOM VIEW





LATCHING MARKING

D1 SERIES
SPDT SWITCH
DC-22 GHz ◆ SMA

The ***D1 Series*** features SMA connectors and a frequency range of DC to 22 GHz.

This series is available with fail-safe, latching self cut-off, or pulse latching functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.30	0.30	70
8-12.4 GHz	1.40	0.40	60
12.4-18 GHz	1.50	0.50	60
18-22 GHz	1.60	0.60	55

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Fail-safe	240mA	240mA	170mA	140mA
Latching	140mA	140mA	90mA	90mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

4 -	SMA

OPTION 3 TERMINALS

1 -	Solder Terminals
4 -	Sub M iniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

Fail-Safe			
A -	Standard	B -	Indicators
M -	Diodes	Q -	Diodes, Indicators
Latching Self Cut-Off			
D -	Diodes		
E -	Diodes, Indicators		
Pulse Latching			
C -	Standard	**F -**	Indicators
Y -	Diodes	**L -**	Diodes, Indicators
Normally Open			
K -	Standard	**H -**	Indicators
J -	Diodes	**G -**	Diodes, Indicators

OPTION 6 FREQUENCY

5 -	DC to 22 GHz

OPTION 7 POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
P -	High Power Handling

D1	-	4				5		
Option 1 Series		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	FAILSAFE								LATCHING							NORMALLY OPEN				
PIN	A	M	A, M w/ TTL	B	Q	B, Q w/ TTL	C, Y	C, Y w/ TTL	D	D w/ TTL	E	E w/ TTL	F, L	F, L w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL
1	N/A	N/A	2	2	2	2	2-/+	N/A	2-/+	N/A	2	2	2	2	2-/+	2	N/A	2	2	2
2	N/A	N/A	-B	1	1	1	1-/+	2	1-/+	2	1	1	1	1	1-/+	1	2	1	1	1
3	N/A	N/A	+A	COM	COM	COM	COM+/-	-B	COM+/-	-B	COM	COM	COM	COM	COM+/-	COM	-B	COM	COM	COM
4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	2	N/A	N/A	N/A	N/A	N/A	2
5	N/A	N/A	N/A	N/A	N/A	2	N/A	N/A	N/A	N/A	2-/+	1	2-/+	1	N/A	N/A	N/A	2-/+	2	1
6	N/A	N/A	N/A	2	-2	-B	N/A	1	N/A	1	1-/+	-B	1-/+	-B	N/A	N/A	1	1-/+	1	-B
7	N/A	N/A	N/A	1	+1	+A	N/A	+A	N/A	+A	COM+/-	+A	COM+/-	+A	N/A	N/A	+A	COM+/-	COM	+A
8	1	+1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	2	-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

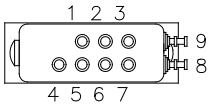
SCHEMATICS

	Pages 139-143																			
FIG.	3	3	4	3	3	4	15	16	9	10	9	10	15	16	21	21	22	21	21	22

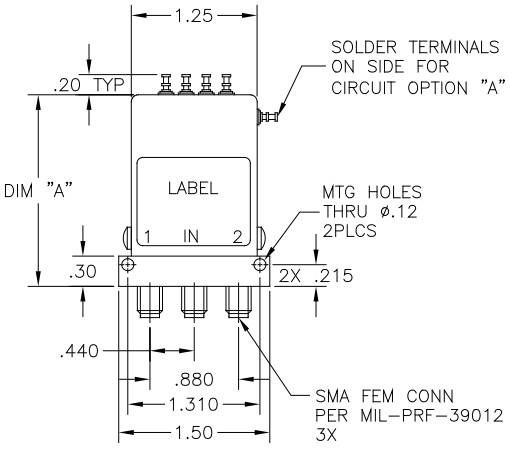
OUTLINE DRAWING DIMENSION "A"

	1.38"	1.38"	1.38"	1.68"	1.68"	1.68"	1.38"	1.88"	1.58"	1.88"	1.58"	1.88"	1.58"	1.88"	1.68"	1.68"	1.88"	1.68"	1.68"	1.88"

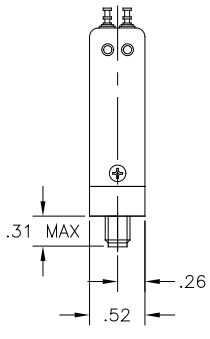
TOP VIEW



FRONT VIEW



SIDE VIEW



D1 SERIES
SPDT 50 OHM
TERMINATED SWITCH
DC-22 GHz ◆ SMA

The ***D1 Series*** features SMA connectors and a frequency range of DC to 22 GHz.

This series is available with fail-safe, latching self cut-off or pulse latching functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.30	0.30	70
8-12.4 GHz	1.40	0.40	60
12.4-18 GHz	1.50	0.50	60
18-22 GHz	1.60	0.60	55

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Fail-safe	480mA	600mA	400mA	280mA
Latching	282mA	353mA	218mA	175mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

4 -	SMA

OPTION 3 TERMINALS

1 -	Solder Terminals
4 -	Sub M iniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

Fail-safe			
A -	Standard	**B -**	Indicators
M -	Diodes	**Q -**	Diodes, Indicators
Latching Self Cut-Off			
D -	Diodes		
E -	Diodes, Indicators		
Pulse Latching			
C -	Standard	**F -**	Indicators
Y -	Diodes	**L -**	Diodes, Indicators
Normally Open			
K -	Standard	**H -**	Indicators
J -	Diodes	**G -**	Diodes, Indicators

OPTION 6 FREQUENCY

5 -	DC to 22 GHz

OPTION 7 POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
T -	External Termination
0T -	Internal Termination

D1	-	4				5		
Option 1 Series		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	FAILSAFE								LATCHING						NORMALLY OPEN					
PIN	A	M	A, M w/ TTL	B	Q	B, Q w/ TTL	C, Y	C, Y w/ TTL	D	D w/ TTL	E	E w/ TTL	F, L	F, L w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	2	N/A	2	N/A	2	N/A	N/A	2	N/A	N/A	2
2	N/A	N/A	2	2	2	2	2-/+	1	2-/+	1	2-/+	1	2-/+	1	2-/+	2	1	2-/+	2	1
3	1	+1	-B	1	1	-B	1-/+	-B	1-/+	-B	1-/+	-B	1-/+	-B	1-/+	1	-B	1-/+	1	-B
4	2	-2	+A	COM	COM	+A	COM+/-	+A	COM+/-	+A	COM+/-	+A	COM+/-	+A	COM+/-	COM	+A	COM+/-	COM	+A
5	N/A	N/A	N/A	N/A	N/A	2	N/A	N/A	N/A	N/A	2	2	2	2	N/A	N/A	N/A	2	2	2
6	N/A	N/A	N/A	2	-2	1	N/A	N/A	N/A	N/A	1	1	1	1	N/A	N/A	N/A	1	1	1
7	N/A	N/A	N/A	1	+1	COM	N/A	N/A	N/A	N/A	COM	COM	COM	COM	N/A	N/A	N/A	COM	COM	COM

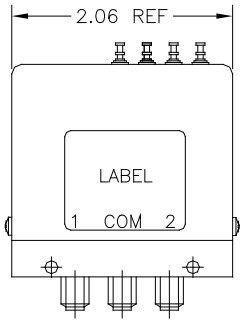
SCHEMATICS

	Pages 139-143																			
FIG.	5	5	6	5	5	6	17	18	11	12	11	12	17	18	23	23	24	23	23	24

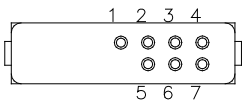
OUTLINE DRAWING DIMENSION "A"

	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"

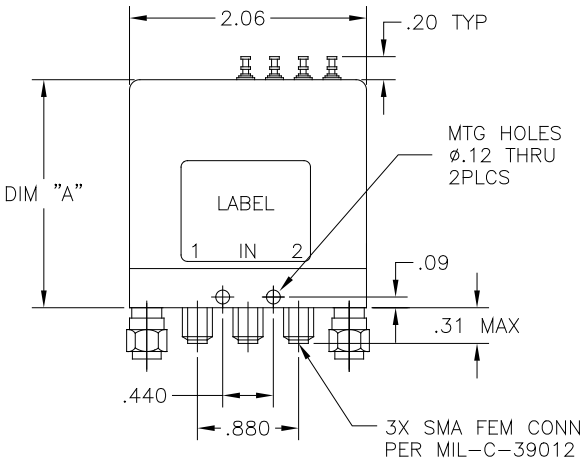
FRONT VIEW
Internal Terminations



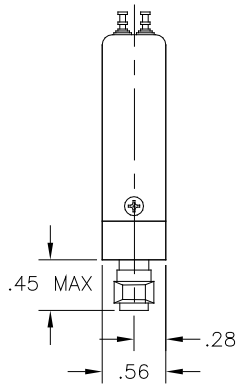
TOP VIEW



FRONT VIEW
External Terminations



SIDE VIEW



D2 SERIES
SPDT SWITCH
DC-12.4 GHz ◆ N, BNC, TNC

The ***D2 Series*** features N, BNC or TNC connectors and a frequency range of DC to 12.4 GHz.

This series is available with fail-safe, latching self cut-off or pulse latching functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

1 -	N
2 -	BNC
3 -	TNC

OPTION 3 TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub M iniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

Fail-safe			
A -	Standard	**B -**	Indicators
M -	Diodes	**Q -**	Diodes, Indicators
Latching Self Cut-Off			
D -	Diodes		
E -	Diodes, Indicators		
Pulse Latching			
C -	Standard	**F -**	Indicators
Y -	Diodes	**L -**	Diodes, Indicators
Normally Open			
K -	Standard	**H -**	Indicators
J -	Diodes	**G -**	Diodes, Indicators

OPTION 6 FREQUENCY

2 -	DC to 12.4 GHz

OPTION 7 POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
P -	High Power Handling

D2	-					2		
Option 1 Series		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	FAILSAFE								LATCHING						NORMALLY OPEN					
PIN	A	M	A, M w/ TTL	B	Q	B, Q w/ TTL	C, Y	C, Y w/ TTL	D	D w/ TTL	E	E w/ TTL	F, L	F, L w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL
1	1	+1	+A	COM	COM	COM	COM+/-	+A	COM+/-	+A	COM	COM	COM	COM	COM+/-	COM	+A	COM	COM	COM
2	N/A	N/A	N/A	1	1	1	N/A	-B	N/A	-B	1	1	1	1	N/A	N/A	-B	1	1	1
3	N/A	N/A	N/A	2	2	2	N/A	N/A	N/A	N/A	2	2	2	2	N/A	N/A	N/A	2	2	2
4	2	-2	-B	1	+1	+A	1-/+	1	1-/+	1	COM+/-	+A	COM+/-	+A	1-/+	1	1	COM+/-	COM	+A
5	N/A	N/A	2	2	-2	-B	2-/+	2	2-/+	2	1-/+	-B	1-/+	-B	2-/+	2	2	1-/+	1	-B
6	N/A	N/A	N/A	N/A	N/A	2	N/A	N/A	N/A	N/A	2-/+	1	2-/+	1	N/A	N/A	N/A	2-/+	2	1
7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	2	N/A	N/A	N/A	N/A	N/A	2

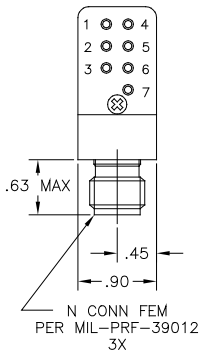
SCHEMATICS

	Pages 139-143																			
FIG.	1	1	2	1	1	2	15	16	9	10	9	10	15	16	21	21	22	21	21	22

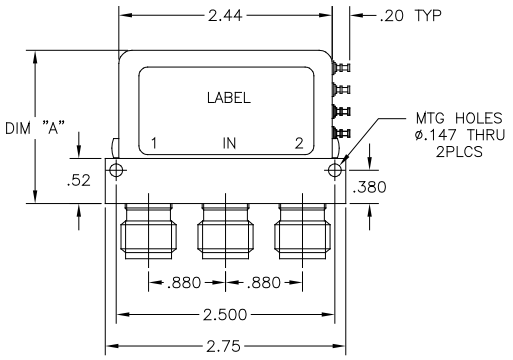
OUTLINE DRAWING DIMENSION "A"

	1.75"	1.75"	1.98"	1.75"	1.75"	1.98"	1.75"	1.98"	1.75"	1.98"	1.75"	1.98"	1.75"	1.98"	1.75"	1.75"	1.98"	1.75"	1.75"	1.98"

SIDE VIEW



FRONT VIEW



D3 SERIES
SPDT SWITCH
DC-22 GHz ◆ SMA

The ***D3 Series*** features SMA connectors and a frequency range of DC to 22 GHz.

This series is available with fail-safe, latching self cut-off or pulse latching functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.30	0.30	70
8-12.4 GHz	1.40	0.40	60
12.4-18 GHz	1.50	0.50	60
18-22 GHz	1.60	0.60	55

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Fail-safe	240mA	240mA	170mA	140mA
Latching	140mA	140mA	90mA	90mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

4 -	SMA

OPTION 3 TERMINALS

1 -	Solder Terminals
4 -	Sub M iniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

Fail-safe			
A -	Standard	**B -**	Indicators
M -	Diodes	**Q -**	Diodes, Indicators
Latching Self Cut-Off			
D -	Diodes		
E -	Diodes, Indicators		
Pulse Latching			
C -	Standard	**F -**	Indicators
Y -	Diodes	**L -**	Diodes, Indicators
Normally Open			
K -	Standard	**H -**	Indicators
J -	Diodes	**G -**	Diodes, Indicators

OPTION 6 FREQUENCY

5 -	DC to 22 GHz

OPTION 7 POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)

D3	-	4				5		
Option 1 Series		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	FAILSAFE								LATCHING						NORMALLY OPEN					
PIN	A	M	A, M w/ TTL	B	Q	B, Q w/ TTL	C, Y	C, Y w/ TTL	D	D w/ TTL	E	E w/ TTL	F, L	F, L w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL
1	N/A	N/A	2	2	2	2	2-/+	N/A	2-/+	N/A	2	2	2	2	2-/+	2	N/A	2	2	2
2	N/A	N/A	-B	1	1	1	1-/+	2	1-/+	2	1	1	1	1	1-/+	1	2	1	1	1
3	N/A	N/A	+A	COM	COM	COM	COM+/-	-B	COM+/-	-B	COM	COM	COM	COM	COM+/-	COM	-B	COM	COM	COM
4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	2	N/A	N/A	N/A	N/A	N/A	2
5	N/A	N/A	N/A	N/A	N/A	2	N/A	N/A	N/A	N/A	2-/+	1	2-/+	1	N/A	N/A	N/A	2-/+	2	1
6	N/A	N/A	N/A	2	-2	-B	N/A	1	N/A	1	1-/+	-B	1-/+	-B	N/A	N/A	1	1-/+	1	-B
7	N/A	N/A	N/A	1	+1	+A	N/A	+A	N/A	+A	COM+/-	+A	COM+/-	+A	N/A	N/A	+A	COM+/-	COM	+A
8	1	+1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	2	-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

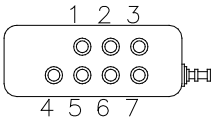
SCHEMATICS

	Pages 139-143																			
FIG.	1	1	2	1	1	2	15	16	9	10	9	10	15	16	21	21	22	21	21	22

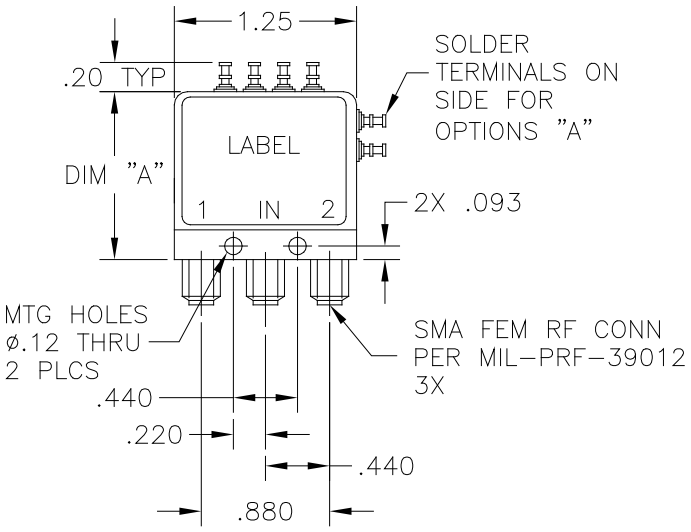
OUTLINE DRAWING DIMENSION "A"

	1.15"	1.15"	1.88"	1.68"	1.68"	1.88"	1.38"	1.88"	1.58"	1.88"	1.58"	1.88"	1.58"	1.88"	1.68"	1.68"	1.88"	1.68"	1.68"	1.88"

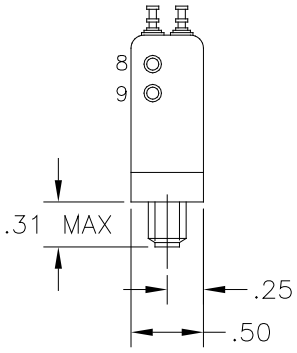
TOP VIEW



FRONT VIEW



SIDE VIEW



D3 SERIES: SPDT 50 OHM TERMINATED SWITCH
DC-22 GHz ◆ SMA

The ***D3 Series*** features SMA connectors and a frequency range of DC to 22 GHz.

This series is available with fail-safe, latching self cut-off or pulse latching functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.30	0.30	70
8-12.4 GHz	1.40	0.40	60
12.4-18 GHz	1.50	0.50	60
18-22 GHz	1.60	0.60	55

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Fail-safe	480mA	600mA	400mA	280mA
Latching	282mA	353mA	218mA	175mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 – RF CONNECTORS

4 -	SMA

OPTION 3 – TERMINALS

1 -	Solder Terminals
4 -	Sub M iniature D-Shell Connector

OPTION 4 – VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 – ACTUATOR

Fail-safe			
A -	Standard	**B -**	Indicators
M -	Diodes	**Q -**	Diodes, Indicators
Latching Self Cut-Off			
D -	Diodes		
E -	Diodes, Indicators		
Pulse Latching			
C -	Standard	**F -**	Indicators
Y -	Diodes	**L -**	Diodes, Indicators
Normally Open			
K -	Standard	**H -**	Indicators
J -	Diodes	**G -**	Diodes, Indicators

OPTION 6 – FREQUENCY

5 -	DC to 22 GHz

OPTION 7 – POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 – SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
T -	External Termination
0T -	Internal Termination

D3	-	4				5		
Option 1 Series		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	FAILSAFE								LATCHING						NORMALLY OPEN					
PIN	A	M	A, M w/ TTL	B	Q	B, Q w/ TTL	C, Y	C, Y w/ TTL	D	D w/ TTL	E	E w/ TTL	F, L	F, L w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	2	N/A	2	N/A	2	N/A	N/A	2	N/A	N/A	2
2	N/A	N/A	2	2	2	2	2-/+	1	2-/+	1	2-/+	1	2-/+	1	2-/+	2	1	2-/+	2	1
3	1	+1	-B	1	1	-B	1-/+	-B	1-/+	-B	1-/+	-B	1-/+	-B	1-/+	1	-B	1-/+	1	-B
4	2	-2	+A	COM	COM	+A	COM+/-	+A	COM+/-	+A	COM+/-	+A	COM+/-	+A	COM+/-	COM	+A	COM+/-	COM	+A
5	N/A	N/A	N/A	N/A	N/A	2	N/A	N/A	N/A	N/A	2	2	2	2	N/A	N/A	N/A	2	2	2
6	N/A	N/A	N/A	2	-2	1	N/A	N/A	N/A	N/A	1	1	1	1	N/A	N/A	N/A	1	1	1
7	N/A	N/A	N/A	1	+1	COM	N/A	N/A	N/A	N/A	COM	COM	COM	COM	N/A	N/A	N/A	COM	COM	COM

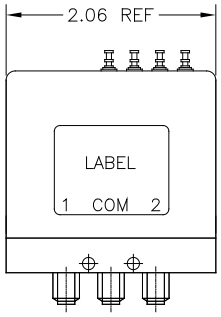
SCHEMATICS

	Pages 139-143																			
FIG.	5	5	6	5	5	6	17	18	11	12	11	12	17	18	23	23	24	23	23	24

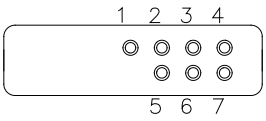
OUTLINE DRAWING DIMENSION "A"

	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"	1.98"

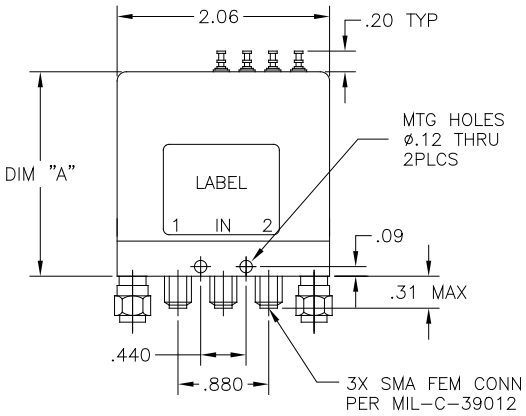
FRONT VIEW
Internal Terminations



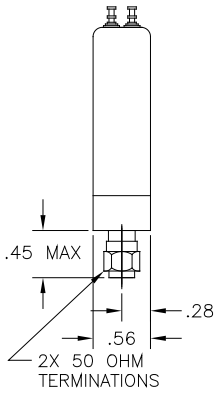
TOP VIEW



FRONT VIEW
External Terminations



SIDE VIEW



D4 SERIES
SPDT SWITCH
DC-12.4 GHz ◆ N, BNC, TNC

The ***D4 Series*** features N, BNC or TNC connectors and a frequency range of DC to 12.4 GHz.

This series is available with fail-safe, latching self cut-off or pulse latching functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.35	0.35	70
8-12.4 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Fail-safe	240mA	240mA	170mA	190mA
Latching	140mA	140mA	130mA	130mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 – RF CONNECTORS

1 -	N
2 -	BNC
3 -	TNC

OPTION 3 – TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub M iniature D-Shell Connector

OPTION 4 – VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 – ACTUATOR

Fail-safe			
A -	Standard	**B -**	Indicators
M -	Diodes	**Q -**	Diodes, Indicators
Latching Self Cut-Off			
D -	Diodes		
E -	Diodes, Indicators		
Pulse Latching			
C -	Standard	**F -**	Indicators
Y -	Diodes	**L -**	Diodes, Indicators
Normally Open			
K -	Standard	**H -**	Indicators
J -	Diodes	**G -**	Diodes, Indicators

OPTION 6 – FREQUENCY

2 -	DC to 12.4 GHz

OPTION 7 – POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 – SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
P -	High Power Handling

D4	-					2		
Option 1 Series		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	FAILSAFE							LATCHING								NORMALLY OPEN				
PIN	A	M	A, M w/ TTL	B	Q	B, Q w/ TTL	C, Y	C, Y w/ TTL	D	D w/ TTL	E	E w/ TTL	F, L	F, L w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL
1	1	+1	+A	COM	COM	COM	COM+/-	+A	COM+/-	+A	COM	COM	COM	COM	COM+/-	C	+A	COM	COM	2
2	N/A	N/A	N/A	1	1	1	N/A	-B	N/A	-B	1	1	1	1	N/A	N/A	-B	1	1	1
3	N/A	N/A	N/A	2	2	2	N/A	N/A	N/A	N/A	2	2	2	2	N/A	N/A	N/A	2	2	COM
4	2	-2	-B	1	+1	+A	1-/+	1	1-/+	1	COM+/-	+A	COM+/-	+A	1-/+	1	1	COM+/-	COM	+A
5	N/A	N/A	2	2	-2	-B	2-/+	2	2-/+	2	1-/+	-B	1-/+	-B	2-/+	2	2	1-/+	1	-B
6	N/A	N/A	N/A	N/A	N/A	2	N/A	N/A	N/A	N/A	2-/+	1	2-/+	1	N/A	N/A	N/A	2-/+	2	1
7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	2	N/A	N/A	N/A	N/A	N/A	2

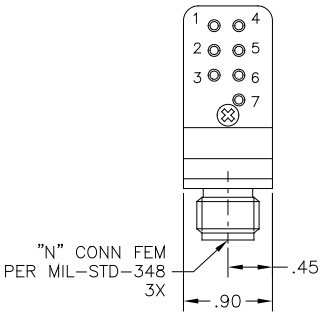
SCHEMATICS

	Pages 139-143																			
FIG.	1	1	2	1	1	2	15	16	9	10	9	10	15	16	21	21	22	21	21	22

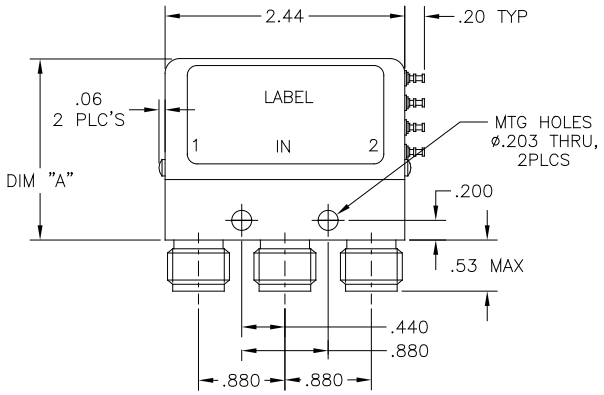
OUTLINE DRAWING DIMENSION "A"

	1.85"	1.85"	1.85"	1.85"	1.85"	1.85"	1.85"	2.10"	1.85"	2.10"	1.85"	2.10"	1.85"	2.10"	1.85"	1.85"	2.10"	1.85"	1.85"	2.10"

SIDE VIEW



FRONT VIEW



D5 SERIES
SPDT SWITCH
HIGH POWER
DC-6.5 GHz ◆ SC

The ***D5 Series*** features SC connectors and a frequency range of DC to 6.5 GHz.

This series is available with fail-safe, latching self cut-off or pulse latching functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-1 GHz	1.15	0.15	60
1-3 GHz	1.35	0.35	60
3-6.5 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Fail-safe	240mA	240mA	200mA	190mA
Latching	140mA	140mA	130mA	130mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

5 -	SC

OPTION 3 TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub M iniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

Fail-safe	
A -	Standard
M -	Diodes
B -	Indicators
Q -	Diodes, Indicators
Latching Self Cut-Off	
D -	Diodes
E -	Diodes, Indicators
Pulse Latching	
C -	Standard
F -	Indicators

OPTION 6 FREQUENCY

2 -	DC to 6.5 GHz

OPTION 7 POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
P -	High Power Handling

D5	-	5				2		
Option 1 Series		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	FAILSAFE							LATCHING						
PIN	A	M	A, M w/ TTL	B	Q	B, Q w/ TTL	C	C w/ TTL	D	D w/ TTL	E	E w/ TTL	F	F w/ TTL
1	1	+1	+A	COM	COM	COM	COM+/-	+A	COM+/-	+A	COM	COM	COM	COM
2	N/A	N/A	N/A	1	1	1	N/A	-B	N/A	-B	1	1	1	1
3	N/A	N/A	N/A	2	2	2	N/A	N/A	N/A	N/A	2	2	2	2
4	2	-2	-B	1	+1	+A	1-/+	1	1-/+	1	COM+/-	+A	COM+/-	+A
5	N/A	N/A	2	2	-2	-B	2-/+	2	2-/+	2	1-/+	-B	1-/+	-B
6	N/A	N/A	N/A	N/A	N/A	2	N/A	N/A	N/A	N/A	2-/+	1	2-/+	1
7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	2

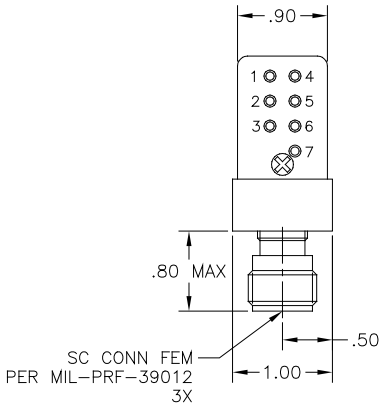
SCHEMATICS

	Pages 139-143													
FIG.	1	1	2	1	1	2	15	16	9	10	9	10	15	16

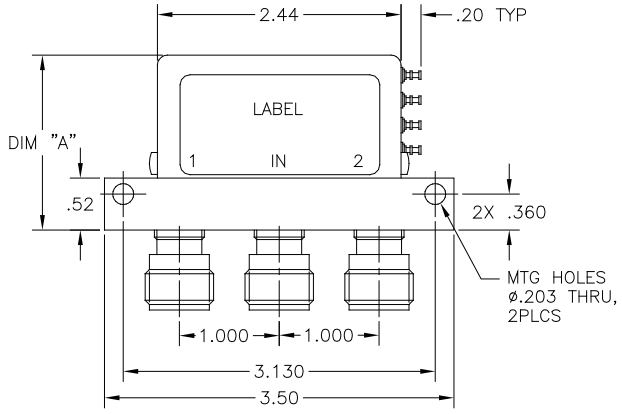
OUTLINE DRAWING DIMENSION "A"

	1.75"	1.75"	1.75"	1.75"	1.75"	1.75"	1.75"	1.98"	1.75"	1.98"	1.75"	1.98"	1.75"	1.98"

SIDE VIEW



FRONT VIEW



D13 SERIES P
SPDT SWITCH
DC-22 GHz ◆ SMA

The ***D13 Series*** features SMA connectors and a frequency range of DC to 18 GHz.

This series is available with fail-safe function only.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.30	0.30	70
8-12.4 GHz	1.40	0.40	60
12.4-18 GHz	1.50	0.50	60
18-22 GHz	1.60	0.60	55

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Fail-safe	330mA	330mA	140mA	160mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

4 - SMA

OPTION 3 TERMINALS

1 - Solder Terminals

4 - Sub Miniature D-Shell Connector

OPTION 4 VOLTAGE

1 - 6 Vdc +/- 10%
2 - 12 Vdc +/- 10%
3 - 24-30 Vdc
4 - 48 Vdc +/- 10%
5 - 110 Vac +/- 10%
6 - 12-15 Vdc
7 - 18-20 Vdc
8 - 20-24 Vdc

OPTION 5 ACTUATOR

Fail-safe

A - Standard

OPTION 6 FREQUENCY

5 - DC to 22 GHz

OPTION 7 POLARITY

0 - Not Applicable

D13	-	4	1		A	5	0
Option 1 Series		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity

DC TERMINAL FUNCTION

	FAIL SAFE
PIN	A
1	2
2	1

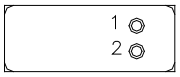
SCHEMATICS

	Pages 139–143
FIG.	1

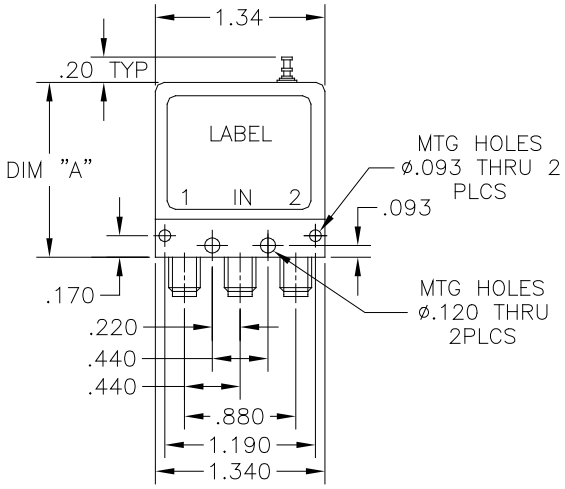
OUTLINE DRAWING DIMENSION "A"

	1.38"

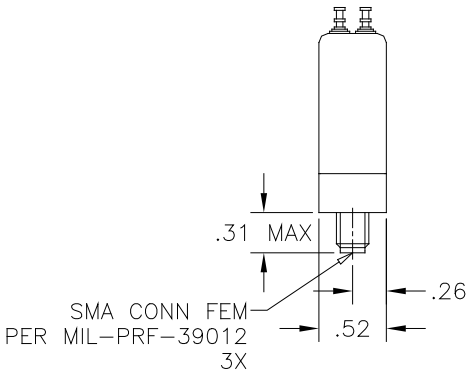
TOP VIEW



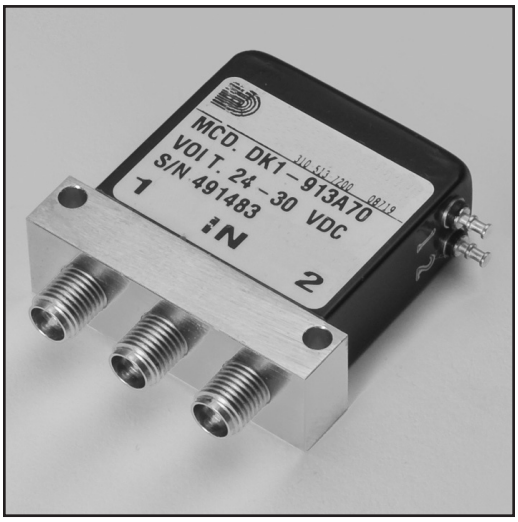
FRONT VIEW



SIDE VIEW



DK1 SERIES
SPDT SWITCH
DC-40 GHz ◆ K



The DK1 Series features K connectors and a frequency range of DC to 40 GHz.

This series is available with fail-safe, latching self cut-off or pulse latching functions.

RF Impedance:	50 ohms nominal
Temperature Range:	–35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-6 GHz	1.30	0.30	70
6-12 GHz	1.40	0.40	60
12-18 GHz	1.50	0.50	60
18-26.5 GHz	1.70	0.70	55
26.5-32 GHz	1.90	0.80	50
32-40 GHz	2.00	1.00	50

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Fail-safe	240mA	300mA	200mA	140mA
Latching	141mA	176mA	109mA	88mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

9 - K

OPTION 3 TERMINALS

1 - Solder Terminals
4 - Sub M iniature D-Shell Connector

OPTION 4 VOLTAGE

1 - 6 Vdc +/- 10%
2 - 12 Vdc +/- 10%
3 - 24-30 Vdc
4 - 48 Vdc +/- 10%
5 - 110 Vac +/- 10%
6 - 12-15 Vdc
7 - 18-20 Vdc
8 - 20-24 Vdc

OPTION 5 ACTUATOR

Fail-safe

A - Standard **B -** Indicators
M - Diodes **Q -** Diodes, Indicators

Latching Self Cut-Off

D - Diodes
E - Diodes, Indicators

Pulse Latching

C - Standard **F -** Indicators
Y - Diodes **L -** Diodes, Indicators

OPTION 6 FREQUENCY

7 - DC to 40 GHz

OPTION 7 POLARITY

0 - Not Applicable
8 - Positive Common
9 - Negative Common

OPTION 8 SPECIAL OPTIONS

L - TTL (High)
LL - TTL (Low)

DK1	-	9				7		
Option 1 Series		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	FAILSAFE								LATCHING					
PIN	A	M	A, M w/ TTL	B	Q	B, Q w/ TTL	C, Y	C, Y w/ TTL	D	D w/ TTL	E	E w/ TTL	F, L	F, L w/ TTL
1	N/A	N/A	2	2	2	2	2-/+	N/A	2-/+	N/A	2	2	2	2
2	N/A	N/A	-B	1	1	1	1-/+	2	1-/+	2	1	1	1	1
3	N/A	N/A	+A	COM	COM	COM	COM+/-	-B	COM+/-	-B	COM	COM	COM	COM
4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	2
5	N/A	N/A	N/A	N/A	N/A	2	N/A	N/A	N/A	N/A	2-/+	1	2-/+	1
6	N/A	N/A	N/A	2	-2	-B	N/A	1	N/A	1	1-/+	-B	1-/+	-B
7	N/A	N/A	N/A	1	+1	+A	N/A	+A	N/A	+A	COM+/-	+A	COM+/-	+A
8	1	+1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	2	-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

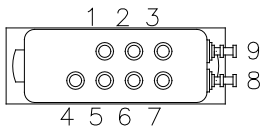
SCHEMATICS

	Pages 139-143													
FIG.	3	3	4	3	3	4	15	16	9	10	9	10	15	16

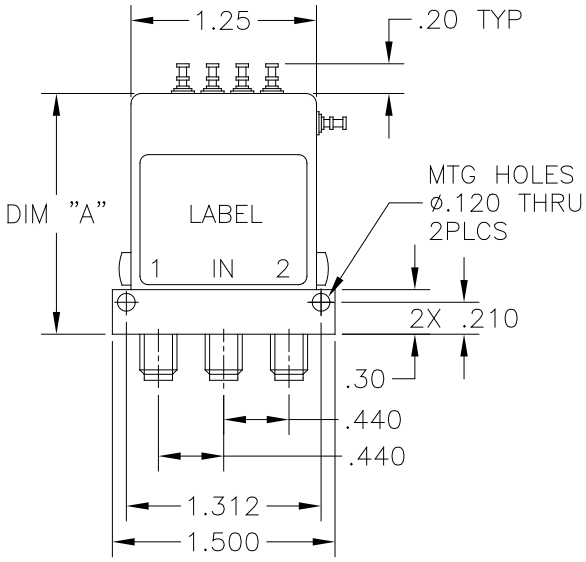
OUTLINE DRAWING DIMENSION "A"

	1.42"	1.42"	1.92"	1.72"	1.62"	1.92"	1.42"	1.92"	1.62"	1.92"	1.62"	1.92"	1.62"	1.92"

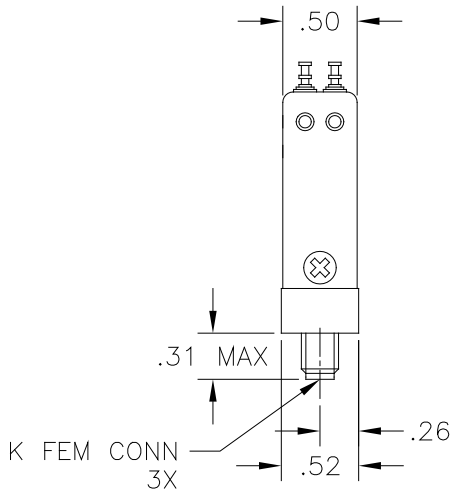
TOP VIEW



FRONT VIEW



SIDE VIEW



DK3 SERIES
SPDT SWITCH
DC-40 GHz ◆ K

The ***DK3 Series*** features K connectors and a frequency range of DC to 40 GHz.

This series is available with fail-safe, latching self cut-off or pulse latching functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-6 GHz	1.30	0.30	70
6-12 GHz	1.40	0.40	60
12-18 GHz	1.50	0.50	60
18-26.5 GHz	1.70	0.70	55
26.5-32 GHz	1.90	0.80	50
32-40 GHz	2.00	1.00	50

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Fail-safe	240mA	300mA	200mA	140mA
Latching	141mA	176mA	109mA	88mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

9 - K

OPTION 3 TERMINALS

1 - Solder Terminals
4 - Sub M iniature D-Shell Connector

OPTION 4 VOLTAGE

1 - 6 Vdc +/- 10%
2 - 12 Vdc +/- 10%
3 - 24-30 Vdc
4 - 48 Vdc +/- 10%
5 - 110 Vac +/- 10%
6 - 12-15 Vdc
7 - 18-20 Vdc
8 - 20-24 Vdc

OPTION 5 ACTUATOR

Fail-safe

A - Standard
B - Indicators
M - Diodes
Q - Diodes, Indicators

Latching Self Cut-Off

D - Diodes
E - Diodes, Indicators

Pulse Latching

C - Standard
F - Indicators
Y - Diodes
L - Diodes, Indicators

OPTION 6 FREQUENCY

7 - DC to 40 GHz

OPTION 7 POLARITY

0 - Not Applicable
8 - Positive Common
9 - Negative Common

OPTION 8 SPECIAL OPTIONS

L - TTL (High)
LL - TTL (Low)

DK3	-	9				7		
Option 1 Series		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	FAIL SAFE								LATCHING					
PIN	A	M	A, M w/ TTL	B	Q	B, Q w/ TTL	C, Y	C, Y w/ TTL	D	D w/ TTL	E	E w/ TTL	F, L	F, L w/ TTL
1	N/A	N/A	2	2	2	2	2-/+	N/A	2-/+	N/A	2	2	2	2
2	N/A	N/A	-B	1	1	1	1-/+	2	1-/+	2	1	1	1	1
3	N/A	N/A	+A	COM	COM	COM	COM+/-	-B	COM+/-	-B	COM	COM	COM	COM
4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	2
5	N/A	N/A	N/A	N/A	N/A	2	N/A	N/A	N/A	N/A	2-/+	1	2-/+	1
6	N/A	N/A	N/A	2	-2	-B	N/A	1	N/A	1	1-/+	-B	1-/+	-B
7	N/A	N/A	N/A	1	+1	+A	N/A	+A	N/A	+A	COM+/-	+A	COM+/-	+A
8	1	+1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	2	-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

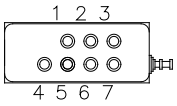
SCHEMATICS

	Pages 139-143													
FIG.	3	3	4	3	3	4	15	16	9	10	9	10	15	16

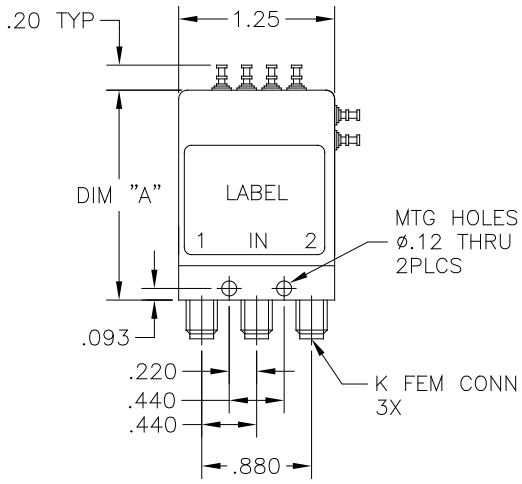
OUTLINE DRAWING DIMENSION "A"

	1.42"	1.42"	1.92"	1.72"	1.62"	1.92"	1.42"	1.92"	1.62"	1.92"	1.62"	1.92"	1.62"	1.92"

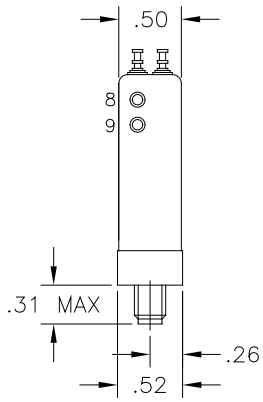
TOP VIEW



FRONT VIEW



SIDE VIEW



TOH SERIES
MINIATURE SPDT SWITCH
DC-2.5 GHz ◆ PIN, SMA

The ***TOH Series*** features Pin Mount or SMA connectors and a frequency range of DC to 2.5 GHz.

This series is available with fail-safe function.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	20 mSec max.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-2.5 GHz - TOH54	1.30	0.25	40
DC-2.5 GHz - TOH55	1.20	0.15	40

Actuator Current (typical)	12Vdc	20-24 Vdc	24-30 Vdc
Fail-safe	230mA	115mA	95mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS	OPTION 4 VOLTAGE	OPTION 5 ACTUATOR	OPTION 6 FREQUENCY
4 - SMA	**1 -** 6 Vdc +/- 10%	**Fail-safe**	**1 -** DC to 2.5 GHz
7 - Pin Mount	**2 -** 12 Vdc +/- 10%	**A -** Standard	
OPTION 3 TERMINALS	**3 -** 24-30 Vdc		**OPTION 7 POLARITY**
1 - Solder Terminals	**8 -** 20-24 Vdc		**0 -** Not Applicable
3 - Flying Leads			

TOH54
TOH55 **-** _____ _____ _____ **A** **1** **0**

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
Series	RF Connectors	Terminals	Voltage	Actuator	Frequency	Polarity

TOH54

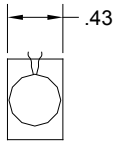
DC TERMINAL FUNCTION

	FAIL-SAFE
PIN	A
Coil In 1	1
Coil In 2	2

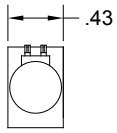
SCHEMATICS

	Pages 139–143
FIG.	37

TOP VIEW

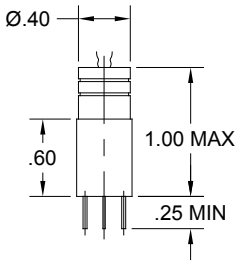


Flying Leads

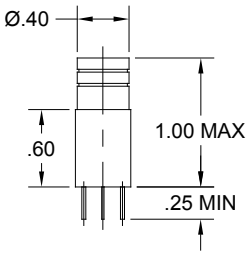


Solder Terminals

FRONT VIEW

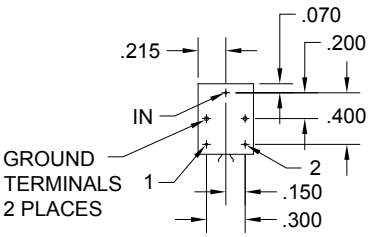


Flying Leads

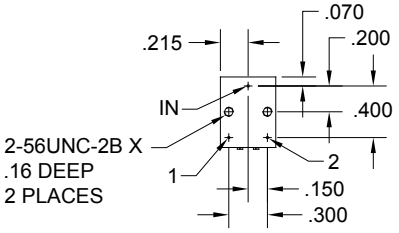


Solder Terminals

BOTTOM VIEW



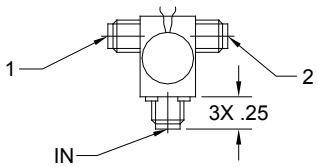
Flying Leads



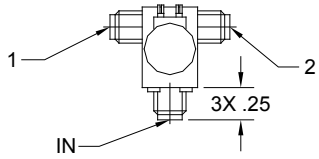
Solder Terminals

TOH55

TOP VIEW

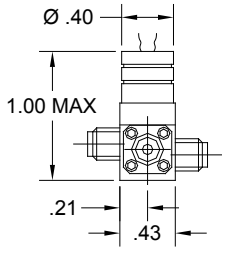


Flying Leads

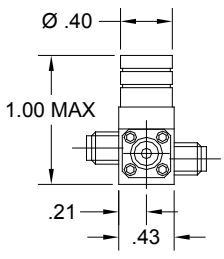


Solder Terminals

FRONT VIEW

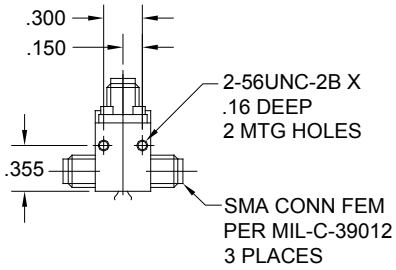


Flying Leads

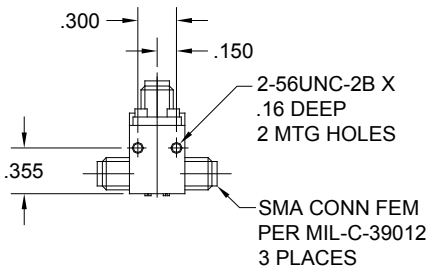


Solder Terminals

BOTTOM VIEW



Flying Leads



Solder Terminals

	Series	RF Connector	Frequency Range	Operating Temperature	Voltage				Circuit Options										DC Power Connector			Page Number
									Failsafe		Latching				Normally Open							
											Pulse		Self Cut Off									
			GHz	Celsius	12 Vdc	28 Vdc	15 Vdc	5 Vdc	Diodes	Indicators	Diodes	Indicators	Diodes	Indicators	Diodes	Indicators	TTL Low	TTL High	Terminations	Solder Terminals	D-Sub Connector	Circular Connector	
STANDARD	TA/TAE	SMA	DC-26.5	-25 to +65	•	•	•	•	•	•	•	•	•	•			•	•		•	•		52
	TEL/TELE	SMA	DC-26.5	-25 to +65	•	•	•	•	•	•	•	•	•	•			•	•		•	•		54
	TF/TFE	SMA	DC-26.5	-25 to +65	•	•	•	•	•	•							•	•		•		•	56
	TN/TNH	N	DC-12.4	-25 to +65	•	•	•	•	•	•	•	•	•	•			•	•		•	•	•	58
	TS/TSE	SMA	DC-26.5	-25 to +65	•	•	•	•	•	•	•	•	•	•			•	•		•	•		60
	TT	TNC	DC-12.4	-25 to +65	•	•	•	•	•	•	•	•	•	•			•	•		•	•	•	62
RUGGEDIZED	T3	N, BNC, TNC	DC-12.4	-35 to +85	•	•	•	•	•	•	•	•	•	•			•	•		•	•	•	64
	T4	SMA	DC-18	-35 to +85	•	•	•	•	•	•	•	•	•	•			•	•		•	•	•	66
	T5	SC	DC-6.5	-35 to +85	•	•	•	•	•	•	•	•	•	•			•	•		•	•	•	68
	TK4	K	DC-40	-35 to +85	•	•	•	•	•	•	•	•	•	•			•	•		•	•	•	70

TA/TAE/TD/TDE SERIES
TRANSFER SWITCH
DC-26.5 GHz ◆ SMA

The ***TA/TD Series*** features SMA connectors and a frequency range of DC to 18 GHz.

The ***TAE/TDE Series*** also features SMA connectors and a frequency range of DC to 26.5 GHz.

TA/TDE series are available with fail-safe, latching self cut-off, or pulse latching functions. ***TD/TDE series*** are available with fail-safe function.

Weight (max.):	6 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-25°C to +65°C ambient
Operating Life:	5,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.20	0.20	80
4-8 GHz	1.30	0.30	75
8-12 GHz	1.40	0.40	70
12-18 GHz	1.50	0.50	60
18-26.5 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Fail-safe	375mA	300mA	180mA	170mA
Latching	335mA	270mA	180mA	165mA
Pulse Latching	470mA	375mA	250mA	225mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	15	35	20

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Failsafe

A -	Standard	**C -**	Indicators
B -	Diodes	**D -**	Diodes, Indicators

Low Input Drivers with:

E -	Diodes	**EH -**	Diodes
F -	Diodes, Indicators	**FH -**	Diodes, Indicators

High Input Drivers with:

Latching Self Cut-Off

G -	Diodes	**H -**	Diodes, Indicators

Low Input Drivers with:

J -	Diodes	**JH -**	Diodes
K -	Diodes, Indicators	**KH -**	Diodes, Indicators

High Input Drivers with:

Pulse Latching

T -	Standard
U -	Diodes
V -	Indicators
W -	Diodes, Indicators

Low Input Drivers with:

High Input Drivers with:

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **3 -** Other (Specify)
- **4 -** Sub Miniature D-Shell Connector

Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

OPTION 8 BRACKETS

- **D -** See Page 146
- **E -** See Page 146
- **F -** See Page 146

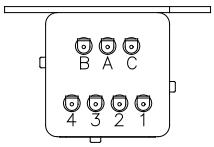
OPTION 9 BODIES

- **T -** See Page 148 TA/TAE Series Only

TA/TAE
TD/TDE

Option 2	Option 3	Option 4	Option 5	Option 6
Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

DC TERMINAL FUNCTIONS

	FAILSAFE			LATCHING		
PIN	**A, C**	**B, D**	**E, EH, F, FH**	**G, H**	**J, JH, K, KH**	**T, U, V, W**
1	N/A	N/A	N/A	C+/-	C RTN	C+/-
2	AV	AV+	C RTN	N/A	+ V SW	N/A
3	AV	AV-	+V SW	AV 2-/+	L 2	PV 2-/+
4	N/A	N/A	L	AV 1-/+	L 1	PV 1-/+

SCHEMATICS

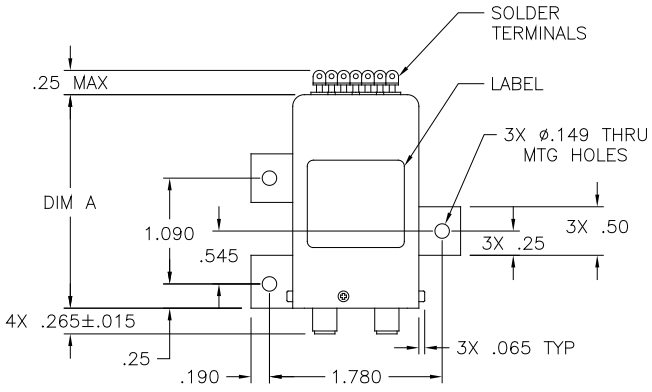
Pages 132–137						
	S17	S18	S19	S20	S21	S22, S23

INDICATORS

PIN	A	B	C
	COM	1 or N/C	2 or N/O

See Page 158 for Legend of Terms and tolerances
See Page 138 for Logic & BCD Truth Table

FRONT VIEW



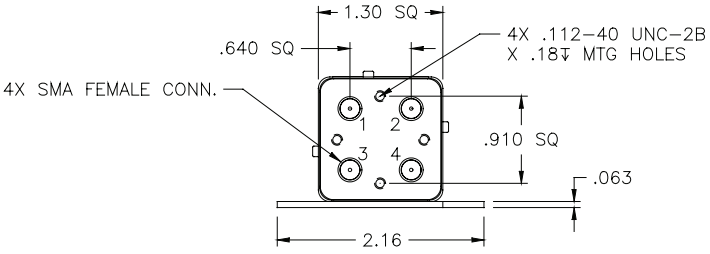
AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, B, C, D	1.75
E, EH, F, FH	2.25
J, JH, K, KH	2.00
G, H, V, W	1.75
T, U	1.50

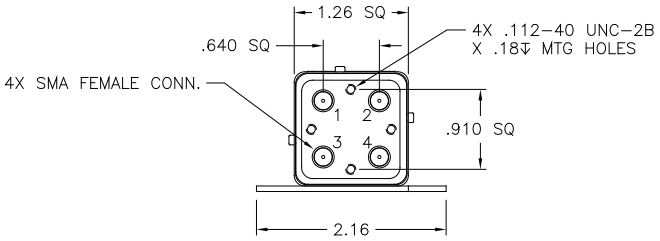
* Consult factory for Dimension "A" when multi pin connector is desired.

RF STATUS

RF	FAILSAFE	LATCHING
1-3, 2-4	DE-ENERGIZED	POSITION 1
1-2, 3-4	ENERGIZED	POSITION 2

BOTTOM VIEW





TEL/TELE SERIES
TRANSFER SWITCH
DC-26.5 GHz ◆ SMA

The ***TEL/TELE Series*** features SMA connectors and a frequency range of DC to 18 GHz.

The ***TEL/TELE Series*** also features SMA connectors and a frequency range of DC to 26.5 GHz.

TEL/TELE Series are available with failsafe, latching self cut-off, or pulse latching functions. ***TEL/TELE Series*** are available with failsafe function.

Weight (max.):	6 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-25°C to +65°C ambient
Operating Life:	5,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.20	0.20	80
4-8 GHz	1.30	0.30	75
8-12 GHz	1.40	0.40	70
12-18 GHz	1.50	0.50	60
18-26.5 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Failsafe	375mA	300mA	180mA	170mA
Latching	335mA	270mA	180mA	165mA
Pulse Latching	470mA	375mA	250mA	225mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	15	35	20

AVAILABLE OPTIONS

OPTION 3 **VOLTAGE**

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 **ACTUATOR**

Failsafe

- **A -** Standard
- **B -** Diodes

Low Input Drivers with:

- **E -** Diodes
- **F -** Diodes, Indicators

- **C -** Indicators
- **D -** Diodes, Indicators

High Input Drivers with:

- **EH -** Diodes
- **FH -** Diodes, Indicators

Latching Self Cut-Off

- **G -** Diodes
- **H -** Diodes, Indicators

Low Input Drivers with:

- **J -** Diodes
- **K -** Diodes, Indicators

High Input Drivers with:

- **JH -** Diodes
- **KH -** Diodes, Indicators

Pulse Latching

- **T -** Standard
- **U -** Diodes
- **V -** Indicators
- **W -** Diodes, Indicators

OPTION 5 **POLARITY**

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 **TERMINALS**

- **1 -** Solder Terminals
- **3 -** Other (Specify)
- **4 -** Sub M iniature D-Shell Connector

Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

ADDITIONAL OPTIONS

OPTION 7 **STANDARD OPTIONS**

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

OPTION 8 **BRACKETS**

- **D -** See Page 146
- **E -** See Page 146
- **F -** See Page 146

OPTION 9 **BODIES**

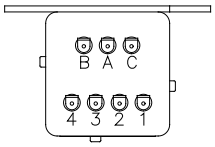
- **T -** See Page 148 TA/TAE Series Only

For "Additional Options" please contact Factory for part number

TEL/TELE

Option 2	Option 3	Option 4	Option 5	Option 6
Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

DC TERMINAL FUNCTIONS

	FAILSAFE			LATCHING		
PIN	A, C	B, D	E, EH, F, FH	G, H	J, JH, K, KH	T, U, V, W
1	N/A	N/A	N/A	C+/-	C RTN	C+/-
2	AV	AV+	C RTN	N/A	+ V SW	N/A
3	AV	AV-	+V SW	AV 2-/+	L 2	PV 2-/+
4	N/A	N/A	L	AV 1-/+	L 1	PV 1-/+

SCHEMATICS

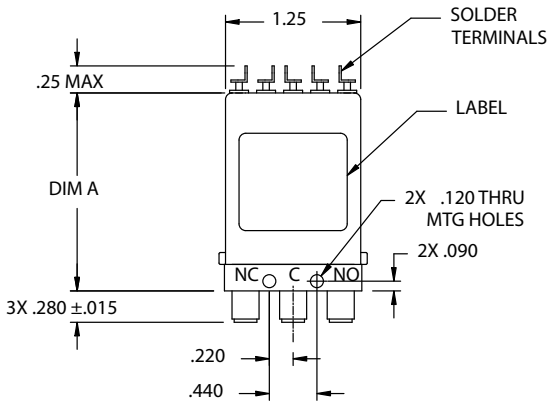
Pages 132–137						
	S17	S18	S19	S20	S21	S22, S23

INDICATORS

PIN	A	B	C
	COM	1 or N/C	2 or N/O

See Page 158 for Legend of Terms and tolerances
See Page 138 for Logic & BCD Truth Table

FRONT VIEW



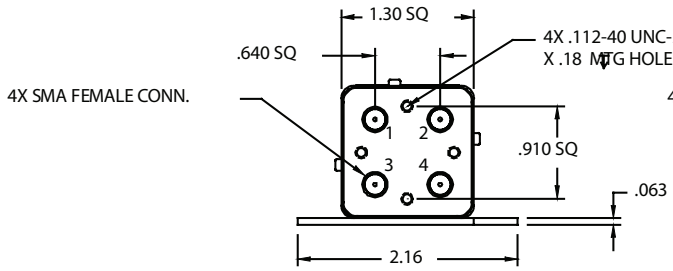
AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, B, C, D	1.75
E, EH, F, FH	2.25
J, JH, K, KH	2.00
G, H, V, W	1.75
T, U	1.50

* Consult factory for Dimension "A" when multi pin connector is desired.

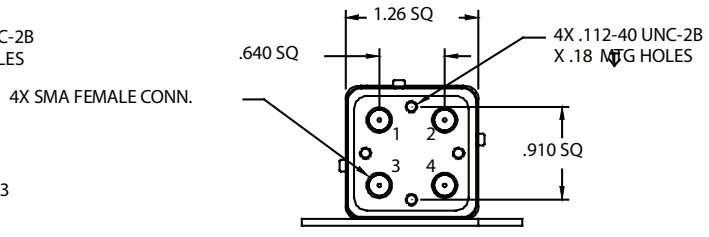
RF STATUS

RF	FAILSAFE	LATCHING
1-3, 2-4	DE-ENERGIZED	POSITION 1
1-2, 3-4	ENERGIZED	POSITION 2

BOTTOM VIEW

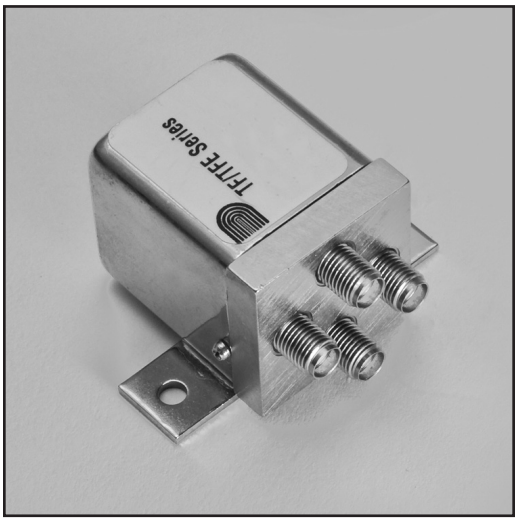


TEL/TELE SWITCH



TEL/TELE SWITCH

TF/TFE SERIES
TRANSFER SWITCH
DC-26.5 GHz ◆ SMA



The ***TF Series*** features SMA connectors and a frequency range of DC to 18 GHz.

The ***TFE Series*** also features SMA connectors and a frequency range of DC to 26.5 GHz.

Both series are available with failsafe function.

Weight (max.): 5 oz
RF Impedance: 50 ohms nominal
Operating Temperature: -25°C to +65°C ambient
Operating Life: 1,000,000 cycles min.
Switching Sequence: Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.20	0.20	80
4-8 GHz	1.30	0.25	75
8-12 GHz	1.35	0.30	70
12-18 GHz	1.40	0.40	60
18-26.5 GHz	1.50	0.50	50

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Failsafe	455mA	410mA	245mA	225mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	15	35	N/A

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Fail-Safe

A -	Standard	**C -**	Indicators
B -	Diodes	**D -**	Diodes, Indicators

Low Input Drivers with:		***High Input Drivers with:***	
E -	Diodes	**EH -**	Diodes
F -	Diodes, Indicators	**FH -**	Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **3 -** Other (Specify)
- **4 -** Micro Miniature CONNECTOR or equivalent

Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

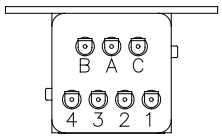
- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

For "Additional Options" please contact Factory for part number

TF/TFE

Option 2	Option 3	Option 4	Option 5	Option 6
Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

DC TERMINAL FUNCTIONS

	FAILSAFE		
PIN	A, C	B, D	E, EH, F, FH
1	N/A	N/A	N/A
2	AV	AV+	C RTN
3	AV	AV-	+V SW
4	N/A	N/A	L

SCHEMATICS

Pages 132–137			
	S17	S18	S19

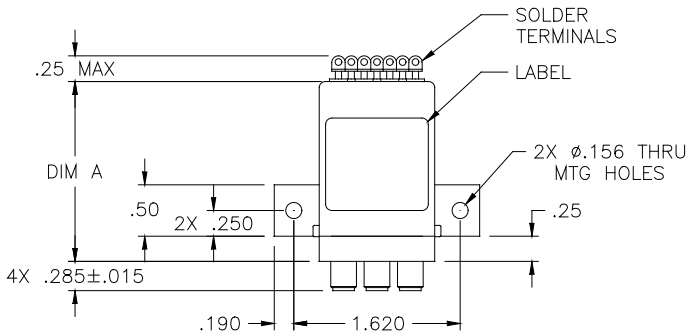
INDICATORS

PIN	A	B	C
	COM	N/C	N/O

See Page 158 for Legend of Terms and Tolerances

See Page 138 for Logic & BCD Truth Table

FRONT VIEW
Options A, B, C, D



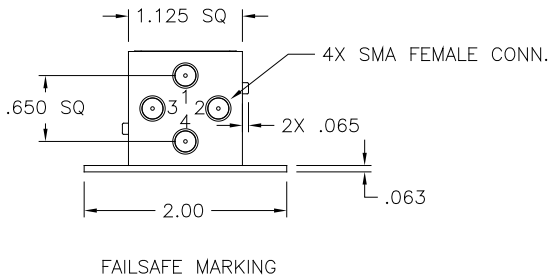
AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, B, C, D	1.42
E, EH, F, FH	1.75

* Consult factory for Dimension "A" when multi pin connector is desired. For the circular connector configuration see page 64

RF STATUS

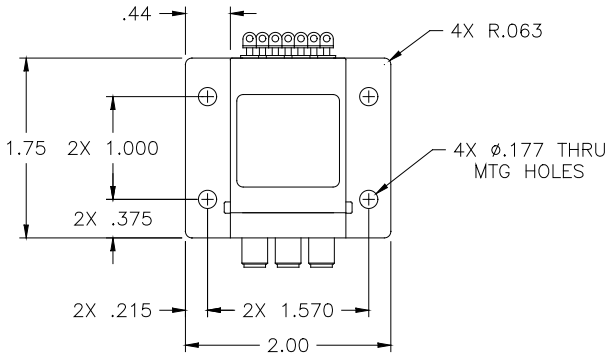
RF	FAILSAFE
1-3, 2-4	DE-ENERGIZED
1-2, 3-4	ENERGIZED

BOTTOM VIEW



FAILSAFE MARKING

FRONT VIEW
Options E, EH, F, FH



TN/TNH SERIES
TRANSFER SWITCH
DC-12.4 GHz ◆ N

The ***TN Series*** features N connectors and a frequency range of DC to 12.4 GHz.

The ***TNH Series*** features High Power N connectors and a frequency range of DC to 12.4 GHz.

Both series are available with fail-safe, latching self cut-off, or pulse latching functions.

Weight (max.):	14 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-25°C to +65°C ambient
Operating Life:	1,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.20	0.20	80
4-8 GHz	1.30	0.30	70
8-12.4 GHz	1.45	0.40	60

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Failsafe	540mA	430mA	270mA	260mA
Latching	320mA	260mA	175mA	135mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	20	50	20

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Failsafe

- **A -** Standard
- **B -** Diodes
- **C -** Indicators
- **D -** Diodes, Indicators

Low Input Drivers with:

- **E -** Diodes
- **F -** Diodes, Indicators

High Input Drivers with:

- **EH -** Diodes
- **FH -** Diodes, Indicators

Latching Self Cut-Off

- **G -** Diodes
- **H -** Diodes, Indicators

Low Input Drivers with:

- **J -** Diodes
- **K -** Diodes, Indicators

High Input Drivers with:

- **JH -** Diodes
- **KH -** Diodes, Indicators

Pulse Latching

- **T -** Standard
- **U -** Diodes
- **V -** Indicators
- **W -** Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **3 -** Other (Specify)
- **4 -** Sub M iniature D-Shell Connector

Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

OPTION 8 BRACKETS

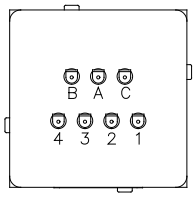
- **A -** See Page 145
- **B -** See Page 145
- **G -** See Page 147

For “Additional Options” please contact Factory for part number

TN/TNH

Option 2	Option 3	Option 4	Option 5	Option 6
Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

DC TERMINAL FUNCTIONS

	FAILSAFE			LATCHING		
PIN	A, C	B, D	E, EH, F, FH	G, H	J, JH, K, KH	T, U, V, W
1	N/A	N/A	N/A	C+/-	C RTN	C+/-
2	AV	AV+	C RTN	N/A	+ VSW	N/A
3	AV	AV-	+V SW	AV 2-/+	L 2	PV 2-/+
4	N/A	N/A	L	AV 1-/+	L 1	PV 1-/+

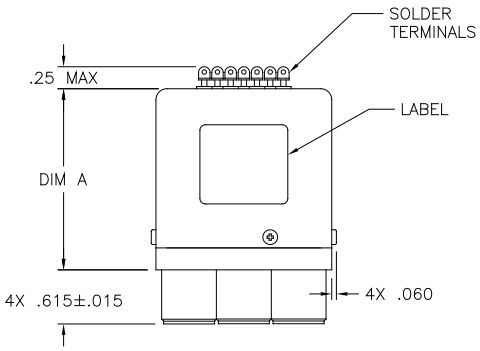
SCHEMATICS

Pages 132–137						
	S17	S18	S19	S20	S21	S22, S23

INDICATORS

PIN	A	B	C
	COM	1 or N/C	2 or N/O

FRONT VIEW



See Page 158 for Legend of Terms and Tolerances

See Page 138 for Logic & BCD Truth Table

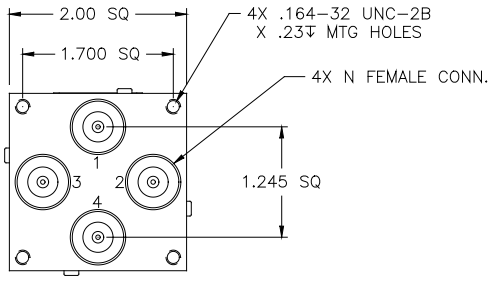
AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, B, C, D	2.06
E, F	2.06
J, K	2.06
G, H, V, W	2.06
T, U	2.06

* Consult factory for Dimension "A" when multi pin connector is desired.

RF STATUS

RF	FAILSAFE	LATCHING
1-3, 2-4	DE-ENERGIZED	POSITION 1
1-2, 3-4	ENERGIZED	POSITION 2

BOTTOM VIEW



TS/TSE SERIES
TRANSFER SWITCH
DC-26.5 GHz ◆ SMA

The ***TS Series*** features SMA connectors and a frequency range of DC to 18 GHz.

The ***TSE Series*** also features SMA connectors and a frequency range of DC to 26.5 GHz.

Both series are available with fail-safe, latching self cut-off, or pulse latching functions.

Weight (max.):	5.5 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-25°C to +65°C ambient
Operating Life:	1,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.20	0.20	80
4-8 GHz	1.30	0.30	75
8-12 GHz	1.40	0.40	70
12-18 GHz	1.50	0.50	60
18-26.5 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Failsafe	375mA	300mA	180mA	170mA
Latching	335mA	270mA	180mA	165mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	15	35	20

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Failsafe

- **A -** Standard
- **B -** Diodes
- **C -** Indicators
- **D -** Diodes, Indicators

Low Input Drivers with:

- **E -** Diodes
- **F -** Diodes, Indicators

High Input Drivers with:

- **EH -** Diodes
- **FH -** Diodes, Indicators

Latching Self Cut-Off

- **G -** Diodes
- **H -** Diodes, Indicators

Low Input Drivers with:

- **J -** Diodes
- **K -** Diodes, Indicators

High Input Drivers with:

- **JH -** Diodes
- **KH -** Diodes, Indicators

Pulse Latching

- **T -** Standard
- **U -** Diodes
- **V -** Indicators
- **W -** Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **3 -** Other (Specify)
- **4 -** Sub M iniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

OPTION 8 BRACKETS

- **C -** See Page 145

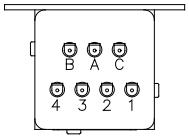
Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

For “Additional Options” please contact Factory for part number

TS/TSE

Option 2	Option 3	Option 4	Option 5	Option 6
Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

DC TERMINAL FUNCTIONS

	FAILSAFE			LATCHING		
PIN	**A, C**	**B, D**	**E, EH, F, FH**	**G, H**	**J, JH, K, KH**	**T, U, V, W**
1	N/A	N/A	N/A	C+/-	C RTN	C+/-
2	AV	AV+	C RTN	N/A	+ V SW	N/A
3	AV	AV-	+V SW	AV 2-/+	L 2	PV 2-/+
4	N/A	N/A	L	AV 1-/+	L 1	PV 1-/+

SCHEMATICS

Pages 132–137						
	S17	S18	S19	S20	S21	S22, S23

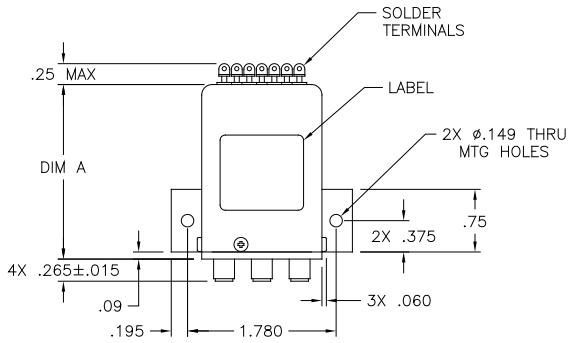
INDICATORS

PIN	A	B	C
	COM	1 or N/C	2 or N/O

See Page 158 for Legend of Terms and Tolerances

See Page 138 for Logic & BCD Truth Table

FRONT VIEW



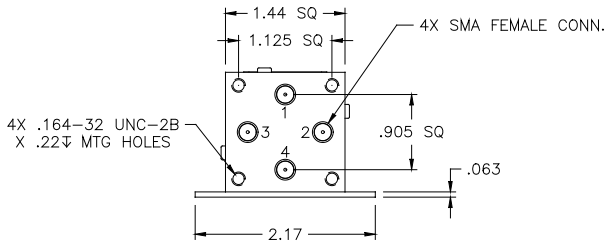
AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, B, C, D	1.87
E, EH, F, FH	2.09
J, JH, K, KH	2.09
G, H, V, W	1.87
T, U	1.46

* Consult factory for Dimension "A" when multi pin connector is desired.

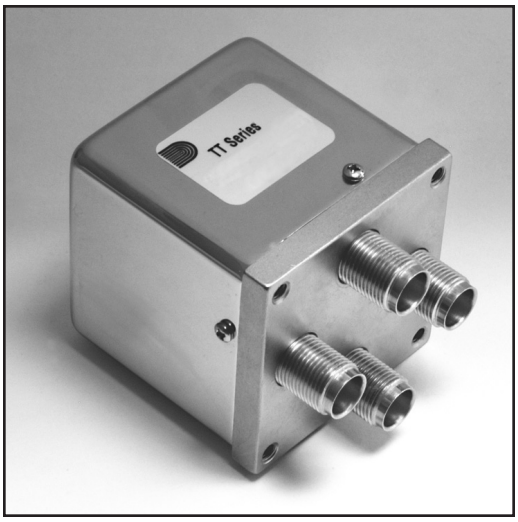
RF STATUS

RF	FAILSAFE	LATCHING
1-3, 2-4	DE-ENERGIZED	POSITION 1
1-2, 3-4	ENERGIZED	POSITION 2

BOTTOM VIEW



TT SERIES
TRANSFER SWITCH
DC-12.4 GHz ◆ TNC



The ***TT Series*** features TNC connectors and a frequency range of DC to 12.4 GHz.

This series is available with fail-safe, latching self cut-off, or pulse latching functions.

Weight (max.):	14 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-25°C to +65°C ambient
Operating Life:	1,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.20	0.20	80
4-8 GHz	1.60	0.50	65
8-12.4 GHz	1.70	0.60	60

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Failsafe	540mA	430mA	270mA	260mA
Latching	320mA	260mA	175mA	135mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - m Sec (Max)	20	50	20

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Failsafe

- **A -** Standard
- **B -** Diodes
- **C -** Indicators
- **D -** Diodes, Indicators

Low Input Drivers with:

- **E -** Diodes
- **F -** Diodes, Indicators

High Input Drivers with:

- **EH -** Diodes
- **FH -** Diodes, Indicators

Latching Self Cut-Off

- **G -** Diodes
- **H -** Diodes, Indicators

Low Input Drivers with:

- **J -** Diodes
- **K -** Diodes, Indicators

High Input Drivers with:

- **JH -** Diodes
- **KH -** Diodes, Indicators

Pulse Latching

- **T -** Standard
- **U -** Diodes
- **V -** Indicators
- **W -** Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **3 -** Other (Specify)
- **4 -** Sub M iniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

OPTION 8 BRACKETS

- **A -** See Page 145
- **B -** See Page 145
- **G -** See Page 147

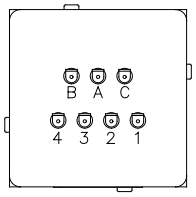
Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

For “Additional Options” please contact Factory for part number

TT

Option 2	Option 3	Option 4	Option 5	Option 6
Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

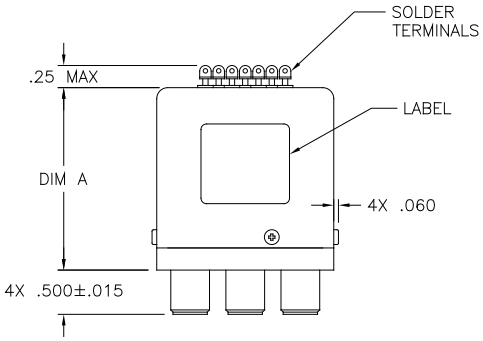
DC TERMINAL FUNCTIONS

	FAILSAFE			LATCHING		
PIN	A, C	B, D	E, EH, F, FH	G, H	J, JH, K, KH	T, U, V, W
1	N/A	N/A	N/A	C+/-	C RTN	C+/-
2	AV	AV+	C RTN	N/A	+V SW	N/A
3	AV	AV-	+V SW	AV 2-/+	L 2	PV 2-/+
4	N/A	N/A	L	AV 1-/+	L 1	PV 1-/+

SCHEMATICS

Pages 132–137						
	S17	S18	S19	S20	S21	S22, S23

FRONT VIEW



INDICATORS

PIN	A	B	C
	COM	1 or N/C	2 or N/O

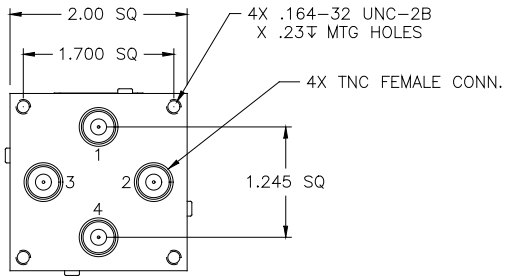
See Page 158 for Legend of Terms and Tolerances

See Page 138 for Logic & BCD Truth Table

AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, B, C, D	2.06
E, F	2.06
J, K	2.06
G, H, V, W	2.06
T, U	2.06

* Consult factory for Dimension "A" when multi pin connector is desired.

BOTTOM VIEW



RF STATUS

RF	FAILSAFE	LATCHING
1-3, 2-4	DE-ENERGIZED	POSITION 1
1-2, 3-4	ENERGIZED	POSITION 2

T3 SERIES
TRANSFER SWITCH
DC-12.4 GHz ◆ N, BNC, TNC

The ***T3 Series*** features N, BNC or TNC connectors and a frequency range of DC to 12.4 GHz.

This series is available with fail-safe, latching self cut-off or pulse latching functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.35	0.35	70
8-12.4 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	15 Vdc	22 Vdc	28 Vdc
Failsafe	480mA	480mA	270mA	280mA
Latching	280mA	280mA	270mA	220mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

1 -	N
2 -	BNC
3 -	TNC

OPTION 3 TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub Miniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

Fail-Safe			
A -	Standard	**B -**	Indicators
M -	Diodes	**Q -**	Diodes, Indicators
Latching Self Cut-Off			
D -	Diodes		
E -	Diodes, Indicators		
Pulse Latching			
C -	Standard	**F -**	Indicators
Y -	Diodes	**L -**	Diodes, Indicators

OPTION 6 FREQUENCY

2 -	DC to 12.4 GHz

OPTION 7 POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
1 -	Bracket
M -	Manual Override
P -	High Power Handling

T3	-					2		
Option 1 Series		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	FAILSAFE								LATCHING					
PIN	A	M	A, M w/ TTL	B	Q	B, Q w/ TTL	C, Y	C, Y w/ TTL	D	D w/ TTL	E	E w/ TTL	F, L	F, L w/ TTL
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	COM	N/A	COM
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	1
3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	2
4	N/A	N/A	N/A	N/A	N/A	+A	N/A	N/A	N/A	N/A	COM	N/A	COM	N/A
5	N/A	N/A	+A	1	+1	-B	COM+/-	+A	COM+/-	+A	1	+A	1	+A
6	1	+1	-B	2	-2	2	1-/+	-B	1-/+	-B	2	-B	2	-B
7	2	-2	2	COM	COM	COM	2-/+	1	2-/+	1	COM+/-	1	COM+/-	1
8	N/A	N/A	N/A	1	1	1	N/A	2	N/A	2	1-/+	2	1-/+	2
9	N/A	N/A	N/A	2	2	2	N/A	N/A	N/A	N/A	2-/+	N/A	2-/+	N/A

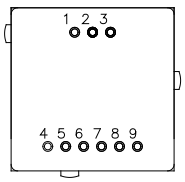
SCHEMATICS

	Pages 139-143													
FIG.	7	7	8	7	7	8	13	14	13	14	13	14	19	20

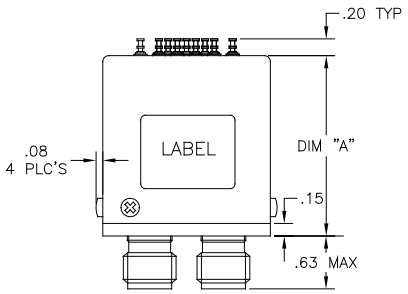
OUTLINE DRAWING DIMENSION "A"

	2.16"	2.16"	2.60"	2.41"	2.41"	2.61"	2.15"	2.15"	2.15"	2.15"	2.15"	2.15"	2.15"	2.15"

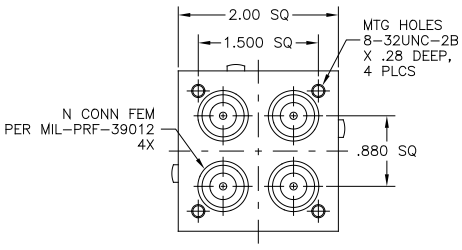
TOP VIEW



FRONT VIEW



BOTTOM VIEW



T4 SERIES
TRANSFER SWITCH
DC-18 GHz ◆ SMA

The ***T4 Series*** features SMA connectors and a frequency range of DC to 18 GHz.

This series is available with fail-safe, latching self cut-off or pulse latching functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.30	0.30	70
8-12.4 GHz	1.40	0.40	60
12.4-18 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Failsafe	480mA	480mA	330mA	280mA
Latching	280mA	280mA	270mA	220mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

4 -	SMA

OPTION 3 TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub M iniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

Failsafe

A -	Standard	**B -**	Indicators
M -	Diodes	**Q -**	Diodes, Indicators

Latching Self Cut-Off

D -	Diodes
E -	Diodes, Indicators

Pulse Latching

C -	Standard	**F -**	Indicators
Y -	Diodes	**L -**	Diodes, Indicators

OPTION 6 FREQUENCY

3 -	DC to 18 GHz

OPTION 7 POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
1 -	Bracket
M -	Manual Override
P -	High Power Handling

T4	-	**4**				**3**		
Option 1 Series		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	FAILSAFE							LATCHING						
PIN	A	M	A, M w/ TTL	B	Q	B, Q w/ TTL	C, Y	C, Y w/ TTL	D	D w/ TTL	E	E w/ TTL	F, L	F, L w/ TTL
1	N/A	N/A	N/A	COM	COM	COM	N/A	+A	N/A	+A	COM	+A	COM	+A
2	1	+1	N/A	1	1	1	N/A	N/A	N/A	N/A	1	-B	1	-B
3	N/A	N/A	N/A	2	2	2	N/A	1	N/A	1	2	1	2	1
4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	2
5	N/A	N/A	+A	N/A	N/A	N/A	COM+/-	N/A	COM+/-	N/A	N/A	N/A	N/A	N/A
6	N/A	N/A	-B	N/A	N/A	N/A	1-/+	N/A	1-/+	N/A	N/A	N/A	N/A	N/A
7	N/A	N/A	2	N/A	N/A	N/A	2-/+	N/A	2-/+	N/A	N/A	N/A	N/A	N/A
8	N/A	N/A	N/A	1	+1	+A	N/A	-B	N/A	-B	COM+/-	COM	COM+/-	COM
9	2	-2	N/A	2	-2	-B	N/A	N/A	N/A	N/A	1-/+	1	1-/+	1
10	N/A	N/A	N/A	N/A	N/A	2	N/A	2	N/A	2	2-/+	2	2-/+	2

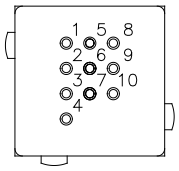
SCHEMATICS

	Pages 139-143													
FIG.	7	7	8	7	7	8	13	14	13	14	13	14	19	20

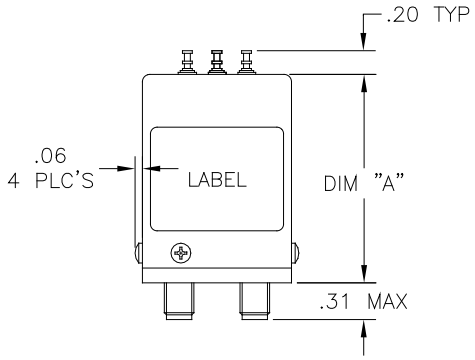
OUTLINE DRAWING DIMENSION "A"

	1.76"	1.76"	1.88"	1.76"	1.76"	1.88"	1.76"	1.88"	1.76"	1.88"	1.76"	1.88"	1.76"	1.88"

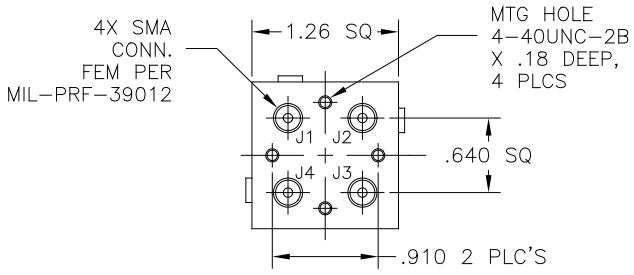
TOP VIEW



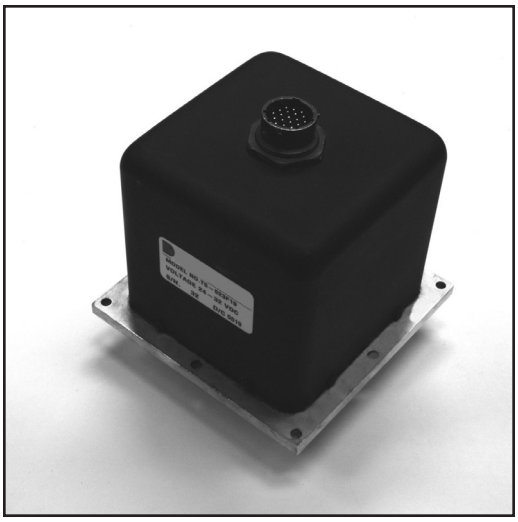
FRONT VIEW



BOTTOM VIEW



T5 SERIES
TRANSFER SWITCH
DC- 6.5 GHz ◆ SC



The ***T5 Series*** features SC connectors and a frequency range of DC to 6.5 GHz.

This series is available with fail-safe, latching self cut-off or pulse latching functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-1 GHz	1.15	0.15	60
1-3 GHz	1.35	0.35	60
3-6.5 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Failsafe	480mA	480mA	270mA	280mA
Latching	280mA	280mA	270mA	220mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

5 -	SC

OPTION 3 TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub M iniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

Failsafe			
A -	Standard	**B -**	Indicators
M -	Diodes	**Q -**	Diodes, Indicators
Latching Self Cut-Off			
D -	Diodes		
E -	Diodes, Indicators		
Pulse Latching			
C -	Standard	**F -**	Indicators
Y -	Diodes	**L -**	Diodes, Indicators

OPTION 6 FREQUENCY

2 -	DC to 6.5 GHz

OPTION 7 POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
1 -	Bracket
M -	Manual Override
P -	High Power Handling

T5	-	5				2		
Option 1 Series		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	FAILSAFE							LATCHING						
PIN	A	M	A, M w/ TTL	B	Q	B, Q w/ TTL	C, Y	C, Y w/ TTL	D	D w/ TTL	E	E w/ TTL	F, L	F, L w/ TTL
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	COM	N/A	COM
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	1
3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	2
4	N/A	N/A	N/A	N/A	N/A	+A	N/A	N/A	N/A	N/A	COM	N/A	COM	N/A
5	N/A	N/A	+A	1	+1	-B	COM+/-	+A	COM+/-	+A	1	+A	1	+A
6	1	+1	-B	2	-2	2	1-/+	-B	1-/+	-B	2	-B	2	-B
7	2	-2	2	COM	COM	COM	2-/+	1	2-/+	1	COM+/-	1	COM+/-	1
8	N/A	N/A	N/A	1	1	1	N/A	2	N/A	2	1-/+	2	1-/+	2
9	N/A	N/A	N/A	2	2	2	N/A	N/A	N/A	N/A	2-/+	N/A	2-/+	N/A

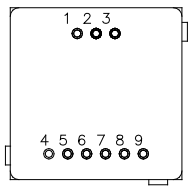
SCHEMATICS

	Pages 139-143													
FIG.	7	7	8	7	7	8	13	14	13	14	13	14	19	20

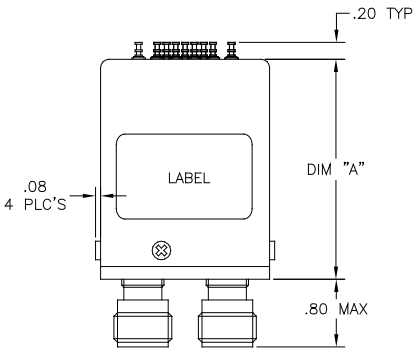
OUTLINE DRAWING DIMENSION "A"

	2.15"	2.15"	2.60"	2.40"	2.40"	2.60"	2.15"	2.15"	2.15"	2.15"	2.15"	2.15"	2.15"	2.15"

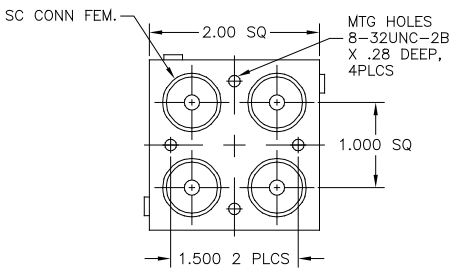
TOP VIEW



FRONT VIEW



BOTTOM VIEW



TK4 SERIES
TRANSFER SWITCH
DC- 40 GHz ◆ K

The ***TK4 Series*** features K connectors and a frequency range of DC to 40 GHz.

This series is available with failsafe, latching self cut-off or pulse latching functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-6 GHz	1.30	0.30	70
6-12 GHz	1.40	0.40	60
12-18 GHz	1.50	0.50	60
18-26.5 GHz	1.70	0.70	55
26.5-40 GHz	2.00	1.00	50

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Failsafe	480mA	480mA	330mA	280mA
Latching	280mA	280mA	270mA	220mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

9 -	K

OPTION 3 TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub M iniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

Failsafe

A -	Standard	**B -**	Indicators
M -	Diodes	**Q -**	Diodes, Indicators

Latching Self Cut-Off

D -	Diodes		
E -	Diodes, Indicators		

Pulse Latching

C -	Standard	**F -**	Indicators
Y -	Diodes	**L -**	Diodes, Indicators

OPTION 6 FREQUENCY

7 -	DC to 40 GHz

OPTION 7 POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
1 -	Bracket

TK4	-	9				7		
Option 1 Series		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	FAILSAFE								LATCHING					
PIN	A	M	A, M w/ TTL	B	Q	B, Q w/ TTL	C, Y	C, Y w/ TTL	D	D w/ TTL	E	E w/ TTL	F, L	F, L w/ TTL
1	N/A	N/A	N/A	COM	COM	COM	N/A	+A	N/A	+A	COM	+A	COM	+A
2	1	+1	N/A	1	1	1	N/A	N/A	N/A	N/A	1	-B	1	-B
3	N/A	N/A	N/A	2	2	2	N/A	1	N/A	1	2	1	2	1
4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	2
5	N/A	N/A	+A	N/A	N/A	N/A	COM+/-	N/A	COM+/-	N/A	N/A	N/A	N/A	N/A
6	N/A	N/A	-B	N/A	N/A	N/A	1-/+	N/A	1-/+	N/A	N/A	N/A	N/A	N/A
7	N/A	N/A	2	N/A	N/A	N/A	2-/+	N/A	2-/+	N/A	N/A	N/A	N/A	N/A
8	N/A	N/A	N/A	1	+1	+A	N/A	-B	N/A	-B	COM+/-	COM	COM+/-	COM
9	2	-2	N/A	2	-2	-B	N/A	N/A	N/A	N/A	1-/+	1	1-/+	1
10	N/A	N/A	N/A	N/A	N/A	2	N/A	2	N/A	2	2-/+	2	2-/+	2

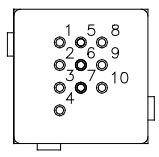
SCHEMATICS

	Pages 139-143													
FIG.	7	7	8	7	7	8	13	14	13	14	13	14	19	20

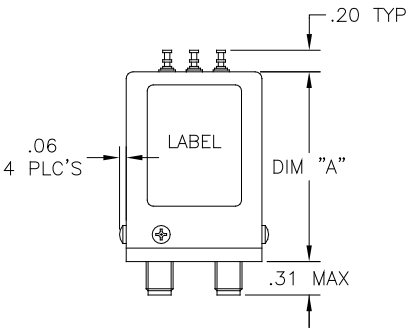
OUTLINE DRAWING DIMENSION "A"

	1.76"	1.76"	1.88"	1.76"	1.76"	1.88"	1.76"	1.88"	1.76"	1.88"	1.76"	1.88"	1.76"	1.88"

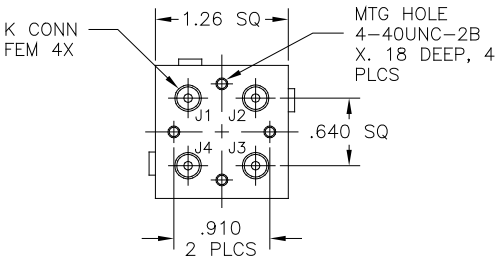
TOP VIEW



FRONT VIEW



BOTTOM VIEW



Series		Positions	RF Connector	Frequency Range	Operating Temperature	Voltage				Circuit Options										DC Power Connector			Page Number
										Failsafe		Latching				Normally Open							
												Pulse		Self Cut Off									
				GHz	Celsius	12 Vdc	28 Vdc	15 Vdc	5 Vdc	Diodes	Indicators	Diodes	Indicators	Diodes	Indicators	Diodes	Indicators	TTL Low and High	Terminations	USB Options	Solder Terminals	D-Sub Connector	Circular Connector	
STANDARD	HN	SP7T-SP10T	N	DC-10	-25 to +65	•	•	•	•	•	•							•		•	•	•	•	74
	HS	SP7T-SP10T	SMA	DC-16	-25 to +65	•	•	•	•	•	•							•		•	•	•	•	76
	HT	SP7T-SP10T	SMA	DC-16	-25 to +65	•	•	•	•									•	•	•	•	•	•	78
	INT/INTE	SP3T-SP6T	SMA	DC-22	-25 to +65	•	•	•	•			•	•	•	•			•		•	•	•	•	80
	IT/ITE	SP3T-SP6T	SMA	DC-22	-25 to +65	•	•	•	•			•	•	•	•			•	•	•	•	•	•	82
	SM/SME	SP3T-SP6T	SMA	DC-26.5	-55 to +85	•	•	•	•	•								•			•	•		84
	SN/SNH	SP3T-SP6T	N	DC-10	-25 to +65	•	•	•	•	•	•							•		•	•	•	•	86
	SS/SSE	SP3T-SP6T	SMA	DC-22	-55 to +85	•	•	•	•	•	•							•		•	•	•	•	88
	ST	SP3T-SP6T	TNC	DC-8	-25 to +65	•	•	•	•	•	•							•		•	•	•	•	90
RUGGEDIZED	L	SP7T-SP8T	N, BNC, TNC	DC-9	-35 to +85	•	•	•	•			•	•	•	•	•	•	•		•	•	•	•	92
	L	SP7T-SP8T	N, BNC, TNC	DC-9	-35 to +85	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	94
	M	SP3T-SP6T	SMA	DC-18	-35 to +85	•	•	•	•			•	•	•	•	•	•	•		•	•	•	•	96
	M	SP3T-SP6T	SMA	DC-18	-35 to +85	•	•	•	•			•	•	•	•	•	•	•	•	•		•	•	98
	MM	4P3T	SMA	DC-18	-35 to +85	•	•	•	•			•	•					•				•	•	100
	N	SP7T-SP8T	SMA	DC-15	-35 to +85	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	102
	N	SP7T-SP8T	SMA	DC-15	-35 to +85	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	104
	N	SP9T-SP10T	SMA	DC-10.5	-35 to +85	•	•	•	•			•	•	•	•	•	•	•		•	•	•	•	106
	N	SP9T-SP10T	SMA	DC-10.5	-35 to +85	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	108
	O	SP3T-SP6T	N, BNC, TNC	DC-12.4	-35 to +85	•	•	•	•			•	•	•	•	•	•	•		•	•	•	•	110
	O	SP3T-SP6T	N, BNC, TNC	DC-12.4	-35 to +85	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	112
	Q	SP3T-SP6T	SMA	DC-18	-35 to +85	•	•	•	•							•	•	•		•	•	•	•	114
	QK	SP3T-SP6T	K	DC-40	-35 to +85	•	•	•	•							•	•	•		•	•	•	•	116
	QK	SP3T-SP6T	K	DC-40	-35 to +85	•	•	•	•			•	•	•	•			•	•	•	•	•	•	118
	S	SP3T-SP6T	SC	DC-6.5	-35 to +85	•	•	•	•			•	•	•	•	•	•	•		•	•	•	•	120
	S	SP7T-SP8T	SC	DC-6.5	-35 to +85	•	•	•	•			•	•	•	•			•		•	•	•	•	122
	W	SP8T-SP10T	SMA	DC-18	-35 to +85	•	•	•	•							•	•	•		•	•	•	•	124
	W	SP8T-SP10T	SMA	DC-18	-35 to +85	•	•	•	•					•	•	•	•	•	•	•	•	•	•	126
NEW	WN	SP7T-SP10T	SMA	DC-22	-35 to +85	•	•	•	•					•	•	•	•	•	•	•	•	•	•	168

HN SERIES
SP7T to SP10T
MULTI POSITION SWITCH
DC-10 GHz ◆ N

The ***HN Series*** features N connectors and a frequency range of DC to 10 GHz.

This series is available with failsafe and normally open functions. Please contact Factory for latching and pulse latching design availability.

Weight (max.): 33 oz
RF Impedance: 50 ohms nominal
Operating Temperature: -25°C to +65°C ambient
Operating Life: 1,000,000 cycles min.
Switching Sequence: Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.30	0.20	80
3-6 GHz	1.50	0.35	75
6-10 GHz	1.70	0.60	65

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Failsafe	500mA	375mA	235mA	225mA
Normally Open	255mA	240mA	160mA	150mA

* If reduced coil current is required, please contact Factory.

Positions	NO	NC	Latching
Switching Time - mSec (Max)	20	50	N/A

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Failsafe

- **A -** Standard
- **B -** Diodes
- **C -** Indicators
- **D -** Diodes, Indicators

Low Input Drivers with:

- **E -** Diodes
- **F -** Diodes, Indicators
- **EB -** B C D, Diodes
- **FB -** B C D, Diodes, Indicators

High Input Drivers with:

- **EH -** Diodes
- **FH -** Diodes, Indicators
- **EBH -** B C D, Diodes
- **FBH -** B C D, Diodes, Indicators

Normally Open

- **L -** Standard
- **M -** Diodes
- **N -** Indicators
- **P -** Diodes, Indicators

Low Input Drivers with:

- **R -** Diodes
- **S -** Diodes, Indicators
- **RB -** B C D, Diodes
- **SB -** B C D, Diodes, Indicators

High Input Drivers with:

- **RH -** Diodes
- **SH -** Diodes, Indicators
- **RBH -** B C D, Diodes
- **SBH -** B C D, Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **3 -** Other (Specify)
- **4 -** Sub Miniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

OPTION 8 BRACKETS

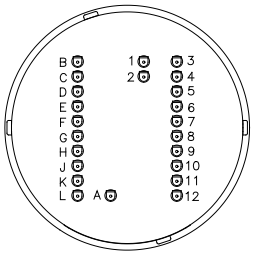
- **J -** See Page 146

For “Additional Options” please contact Factory for part number

HN

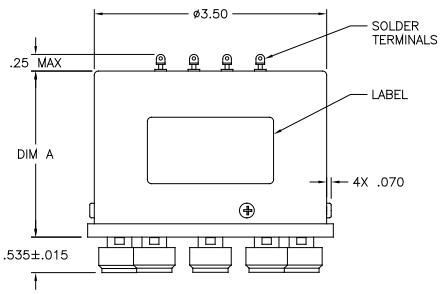
Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Positions	Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW

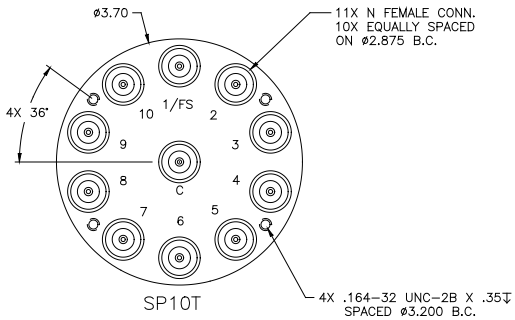


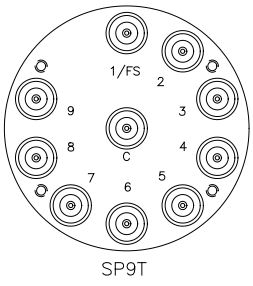
Actual markings will reflect terminal functions, not letter or number designation as shown above.

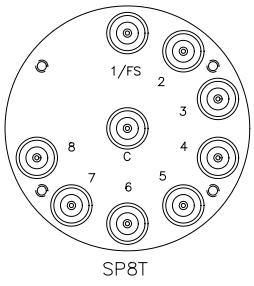
FRONT VIEW

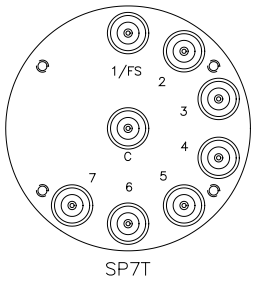


BOTTOM VIEW









DC TERMINAL FUNCTIONS

	FAILSAFE			NORMALLY OPEN		
PIN	A, C	B, D	E, EH, EB, EBH, F, FH, FB, FBH	L, N	M, P	R, RH, RB, RBH, S, SH, SB, SBH
1	C	C+/-	+V SW	C	C+/-	+V SW
2	N/A	N/A	C RTN	N/A	N/A	C RTN
3	N/A	N/A	N/A or BCD 1	AV 1	AV 1-/+	L 1 or BCD 1
4	AV 2	AV 2-/+	L 2 or BCD 2	AV 2	AV 2-/+	L 2 or BCD 2
5	AV 3	AV 3-/+	L 3 or BCD 4	AV 3	AV 3-/+	L 3 or BCD 4
6	AV 4	AV 4-/+	L 4 or BCD 8	AV 4	AV 4-/+	L 4 or BCD 8
7	AV 5	AV 5-/+	L 5	AV 5	AV 5-/+	L 5
8	AV 6	AV 6-/+	L 6	AV 6	AV 6-/+	L 6
9	AV 7	AV 7-/+	L 7	AV 7	AV 7-/+	L 7
10	AV 8	AV 8-/+	L 8	AV 8	AV 8-/+	L 8
11	AV 9	AV 9-/+	L 9	AV 9	AV 9-/+	L 9
12	AV 10	AV 10-/+	L 10	AV 10	AV 10-/+	L 10

SCHEMATICS

Pages 132–137						
	M1	M2	M3, M4	M5	M6	M7, M8

INDICATORS

PIN	A	B	C	D	E	F	G	H	J	K	L
	COM	1 or F/S	2	3	4	5	6	7	8	9	10

See Page 158 for Legend of Terms and Tolerances

See Page 138 for Logic & BCD Truth Table

AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, L	2.20
B, C, M, N	2.45
D, P	2.70
E, EH, R, RH	3.20
EB, EBH, RB, RBH	3.20
F, FH, S, SH	3.45
FB, FBH, SB, SBH	3.45

* Consult factory for Dimension "A" when multi pin connector is desired.

HS SERIES
SP7T to SP10T
MULTI POSITION SWITCH
DC-16 GHz ◆ SMA

The ***HS Series*** features SMA connectors and a frequency range of DC to 16 GHz.

This series is available with failsafe or normally open functions. Please contact Factory for latching and pulse latching design availability.

Weight (max.):	15 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-25°C to +65°C ambient
Operating Life:	Contact Factory for Details
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.25	0.30	75
4-8 GHz	1.30	0.35	70
8-12 GHz	1.40	0.40	65
12-16 GHz	1.60	0.80	60

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Failsafe	600mA	470mA	300mA	280mA
Normally Open	310mA	250mA	155mA	135mA

* If reduced coil current is required, please contact Factory.

Positions	NO	NC	Latching
Switching Time - mSec (Max)	15	35	N/A

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Failsafe				Normally Open			
A -	Standard	**C -**	Indicators	**L -**	Standard	**N -**	Indicators
B -	Diodes	**D -**	Diodes, Indicators	**M -**	Diodes	**P -**	Diodes, Indicators
Low Input Drivers with:		**High Input Drivers with:**		**Low Input Drivers with:**		**High Input Drivers with:**	
E -	Diodes	**EH -**	Diodes	**R -**	Diodes	**RH -**	Diodes
F -	Diodes, Indicators	**FH -**	Diodes, Indicators	**S -**	Diodes, Indicators	**SH -**	Diodes, Indicators
EB -	B C D, Diodes	**EBH -**	B C D, Diodes	**RB -**	B C D, Diodes	**RBH -**	B C D, Diodes
FB -	B C D, Diodes, Indicators	**FBH -**	B C D, Diodes, Indicators	**SB -**	B C D, Diodes, Indicators	**SBH -**	B C D, Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **3 -** Other (Specify)
- **4 -** Sub Miniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

OPTION 8 BRACKETS

- **H -** See Page 146

OPTION 9 BODIES

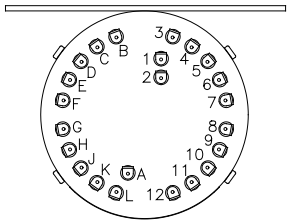
- **V -** See Page 150

For “Additional Options” please contact Factory for part number

HS

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Positions	Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

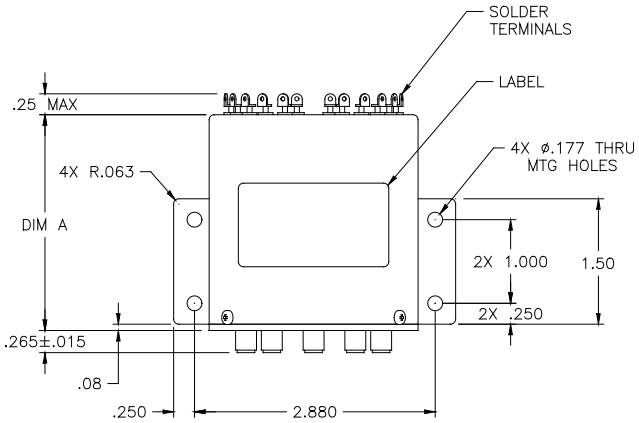
DC TERMINAL FUNCTIONS

	FAILSAFE			NORMALLY OPEN		
PIN	A, C	B, D	E, EH, EB, EBH, F, FH, FB, FBH	L, N	M, P	R, RH, RB, RBH, S, SH, SB, SBH
1	C	C+/-	+V SW	C	C+/-	+V SW
2	N/A	N/A	C RTN	N/A	N/A	C RTN
3	N/A	N/A	N/A or BCD 1	AV 1	AV 1-/+	L 1 or BCD 1
4	AV 2	AV 2-/+	L 2 or BCD 2	AV 2	AV 2-/+	L 2 or BCD 2
5	AV 3	AV 3-/+	L 3 or BCD 4	AV 3	AV 3-/+	L 3 or BCD 4
6	AV 4	AV 4-/+	L 4 or BCD 8	AV 4	AV 4-/+	L 4 or BCD 8
7	AV 5	AV 5-/+	L 5	AV 5	AV 5-/+	L 5
8	AV 6	AV 6-/+	L 6	AV 6	AV 6-/+	L 6
9	AV 7	AV 7-/+	L 7	AV 7	AV 7-/+	L 7
10	AV 8	AV 8-/+	L 8	AV 8	AV 8-/+	L 8
11	AV 9	AV 9-/+	L 9	AV 9	AV 9-/+	L 9
12	AV 10	AV 10-/+	L 10	AV 10	AV 10-/+	L 10

SCHEMATICS

Pages 132–137						
	M1	M2	M3, M4	M5	M6	M7, M8

FRONT VIEW



INDICATORS

PIN #	A	B	C	D	E	F	G	H	J	K	L
	COM	1 or F/S	2	3	4	5	6	7	8	9	10

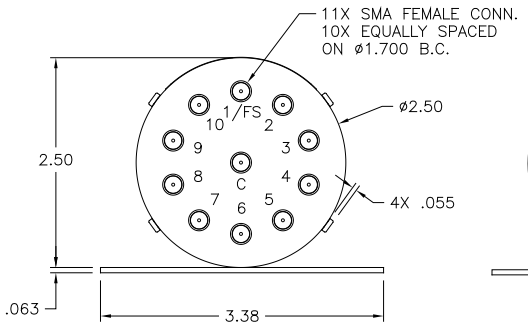
See Page 158 for Legend of Terms and Tolerances

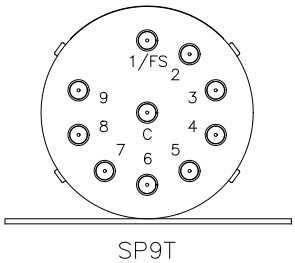
See Page 138 for Logic & BCD Truth Table

AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, L	2.13
B, C, M, N	2.33
D, P	2.33
E, EH, R, RH	3.03
EB, EBH, RB, RBH	3.03
F, FH, S, SH	3.03
FB, FBH, SB, SBH	3.03

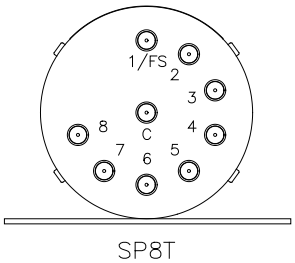
* Consult factory for Dimension "A" when multi-pin connector is desired.

BOTTOM VIEW

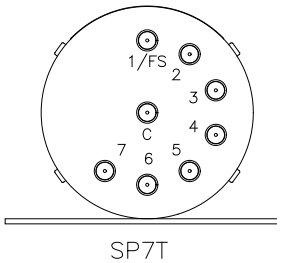




SP9T

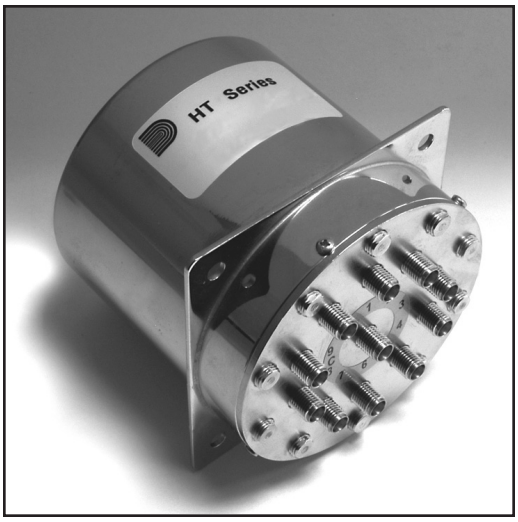


SP8T



SP7T

HT SERIES
SP7T to SP10T MULTI POSITION
50 OHM TERMINATED SWITCH
DC-16 GHz ◆ SMA



The ***HT Series*** features SMA connectors and a frequency range of DC to 16 GHz. Actuation is by individual solenoids and 50 ohm internal terminations.

This series is available with normally open functions. Please contact Factory for latching and pulse latching design availability.

Weight (max):	18.5 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-25°C to +65°C ambient
Operating Life:	Contact Factory for Details
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.25	0.30	75
4-8 GHz	1.30	0.35	70
8-12 GHz	1.40	0.40	65
12-16 GHz	1.60	0.80	60

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Normally Open	380mA	295mA	190mA	170mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	15	35	N/A

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Normally Open

L -	Standard	**N -**	Indicators
M -	Diodes	**P -**	Diodes, Indicators

Low Input Drivers with:		High Input Drivers with:	
R -	Diodes	**RH -**	Diodes
S -	Diodes, Indicators	**SH -**	Diodes, Indicators
RB -	B C D, Diodes	**RBH -**	B C D, Diodes
SB -	B C D, Diodes, Indicators	**SBH -**	B C D, Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **3 -** Other (Specify)
- **4 -** Sub Miniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

OPTION 8 BRACKETS

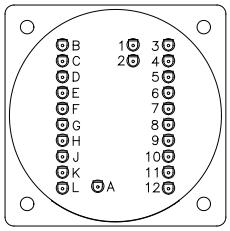
- **A -** See Page 144

For “Additional Options” please contact Factory for part number

HT

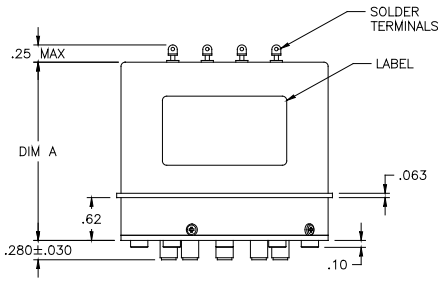
Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Positions	Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW

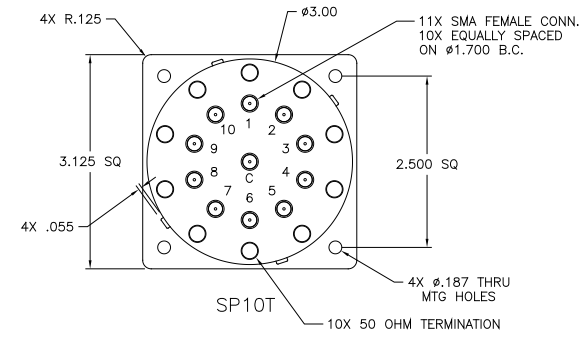


Actual markings will reflect terminal functions, not letter or number designation as shown above.

FRONT VIEW



BOTTOM VIEW



DC TERMINAL FUNCTIONS

	NORMALLY OPEN		
PIN	L, N	M, P	R, RH, RB, RBH, S, SH, SB, SBH
1	C	C+/-	+V SW
2	N/A	N/A	C RTN
3	AV 1	AV 1-/+	L 1 or BCD 1
4	AV 2	AV 2-/+	L 2 or BCD 2
5	AV 3	AV 3-/+	L 3 or BCD4
6	AV 4	AV 4-/+	L 4 or BCD 8
7	AV 5	AV 5-/+	L 5
8	AV 6	AV 6-/+	L 6
9	AV 7	AV 7-/+	L 7
10	AV 8	AV 8-/+	L 8
11	AV 9	AV 9-/+	L 9
12	AV 10	AV 10-/+	L 10

SCHEMATICS

Pages 132–137			
	M14	M15	M16, M17

INDICATORS

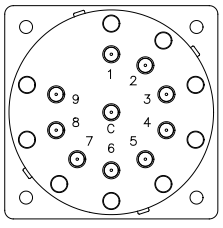
PIN #	A	B	C	D	E	F	G	H	J	K	L
	COM	1 or F/S	2	3	4	5	6	7	8	9	10

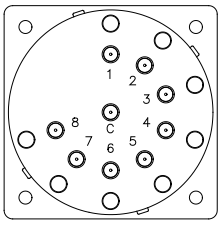
See Page 158 for Legend of Terms and Tolerances

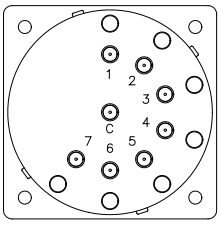
See Page 138 for Logic & BCD Truth Table

AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
L, M, N	2.23
P	2.58
R, RB, RBH, RH	2.95
S, SB, SBH, SH	3.10

* Consult factory for Dimension "A" when multi pin connector is desired.







INT/INTE SERIES
1P3T to 1P6T
MULTI POSITION SWITCH
DC-22 GHz ◆ SMA

The ***INT Series*** features SMA connectors and a frequency range of DC to 18 GHz.

The ***INTE Series*** also features SMA connectors and a frequency range of DC to 22 GHz.

Both series are available with normally open, latching self cut-off, or pulse latching functions.

Weight (max.):	10 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-25°C to +65°C ambient
Operating Life:	1,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.20	0.30	75
4-8 GHz	1.30	0.35	70
8-12 GHz	1.40	0.40	65
12-18 GHz	1.50	0.50	60
18-22 GHz	1.60	0.60	60

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Latching	300mA	240mA	160mA	145mA
Normally Open	380mA	295mA	190mA	170mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	15	35	20

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc*
- **2 -** 28 Vdc
- **3 -** 15 Vdc*
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Latching Self Cut-Off

- **G -** Diodes
- **H -** Diodes, Indicators

Low Input Drivers with:

- **J -** Diodes
- **K -** Diodes, Indicators
- **JB -** B C D, Diodes
- **KB -** B C D, Diodes, Indicators

High Input Drivers with:

- **JH -** Diodes
- **KH -** Diodes, Indicators
- **JBH -** B C D, Diodes
- **KBH -** B C D, Diodes, Indicators

Pulse Latching

- **T -** Standard
- **U -** Diodes
- **V -** Indicators
- **W -** Diodes, Indicators

Normally Open

- **L -** Standard
- **M -** Diodes
- **N -** Indicators
- **P -** Diodes, Indicators

Low Input Drivers with:

- **R -** Diodes
- **S -** Diodes, Indicators
- **RB -** B C D, Diodes
- **SB -** B C D, Diodes, Indicators

High Input Drivers with:

- **RH -** Diodes
- **SH -** Diodes, Indicators
- **RBH -** B C D, Diodes
- **SBH -** B C D, Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **3 -** Other (Specify)
- **4 -** Sub Miniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

OPTION 8 BRACKETS

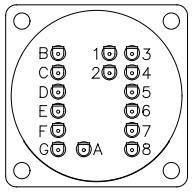
- **A -** See Page 144

For “Additional Options” please contact Factory for part number

INT/INTE

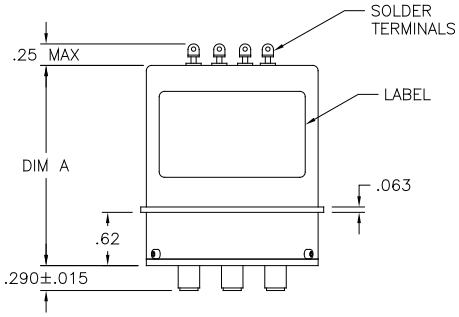
Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Positions	Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW

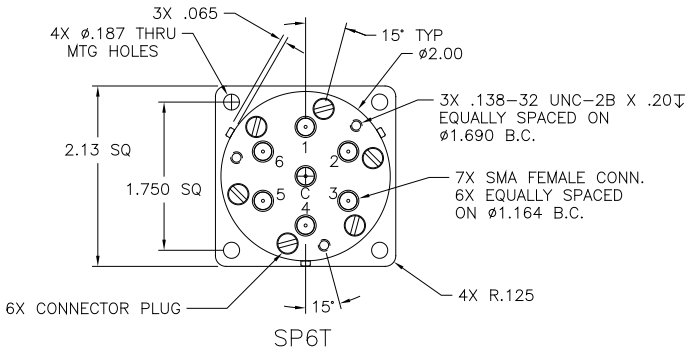


Actual markings will reflect terminal functions, not letter or number designation as shown above.

FRONT VIEW



BOTTOM VIEW



DC TERMINAL FUNCTIONS

	NORMALLY OPEN				LATCHING		
PIN	L, N	M, P	R, RH, RB, RBH, S, SH, SB, SBH	G, H	J, JH, JB, JBH, K, KH, KB, KBH	T, V	U, W
1	C	C+/-	+V SW	C+/-	+V SW	C+/-	C+/-
2	N/A	N/A	C RTN	N/A	C RTN	RESET	N/A
3	AV 1	AV 1-/+	L 1 or B C D 1	AV 1-/+	L 1 or B C D 1	PV 1-/+	PV 1-/+
4	AV 2	AV 2-/+	L 2 or B C D 2	AV 2-/+	L 2 or B C D 2	PV 2-/+	PV 2-/+
5	AV 3	AV 3-/+	L 3 or B C D 4	AV 3-/+	L 3 or B C D 4	PV 3-/+	PV 3-/+
6	AV 4	AV 4-/+	L 4	AV 4-/+	L 4	PV 4-/+	PV 4-/+
7	AV 5	AV 5-/+	L 5	AV 5-/+	L 5	PV 5-/+	PV 5-/+
8	AV 6	AV 6-/+	L 6	AV 6-/+	L 6	PV 6-/+	PV 6-/+

SCHEMATICS

Pages 132–137							
	M14	M15	M16, M17	M18	M19, M20	M21, M22	M21, M22

INDICATORS

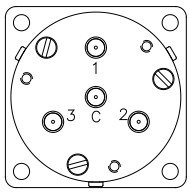
PIN	A	B	C	D	E	F	G
	COM	1	2	3	4	5	6

See Page 158 for Legend of Terms and Tolerances

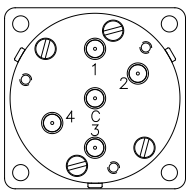
See Page 138 for Logic & BCD Truth Table

AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
L, T	2.08
G, H, W, U, V	2.33
J, JH, K, KH	2.58
JB, JBH, KB, KBH	2.58
M, N	2.33
P	2.58
R, RB, RBH, RH	2.58
S, SB, SBH, SH	2.58

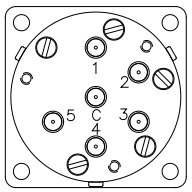
* Consult factory for Dimension "A" when multi pin connector is desired.



SP3T



SP4T



SP5T

IT/ITE SERIES
SP3T to SP6T MULTI POSITION
50 OHM TERMINATED SWITCH
DC-22 GHz ◆ SMA

The ***IT Series*** features SMA connectors and a frequency range of DC to 18 GHz. Operation is by individual solenoids and 50 ohm internal terminations.

The ***ITE Series*** also features SMA connectors and a frequency range of DC to 22 GHz.

Both series are available with normally open, latching self cut-off, or pulse latching functions. This switch is used in systems where RF sources cannot tolerate an open circuit load condition.

Weight (max.):	10 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-25°C to +65°C ambient
Operating Life:	1,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.20	0.30	75
4-8 GHz	1.30	0.35	70
8-12 GHz	1.40	0.40	65
12-18 GHz	1.50	0.50	60
18-22 GHz	1.60	0.60	60

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Latching	300mA	240mA	160mA	145mA
Normally Open	380mA	295mA	190mA	170mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	15	35	20

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Latching Self Cut-Off

- **G -** Diodes
- **H -** Diodes, Indicators

Low Input Drivers with:

- **J -** Diodes
- **K -** Diodes, Indicators
- **JB -** B C D, Diodes
- **KB -** B C D, Diodes, Indicators

High Input Drivers with:

- **JH -** Diodes
- **KH -** Diodes, Indicators
- **JBH -** B C D, Diodes
- **KBH -** B C D, Diodes, Indicators

Pulse Latching

- **T -** Standard
- **U -** Diodes
- **V -** Indicators
- **W -** Diodes, Indicators

Normally Open

- **L -** Standard
- **M -** Diodes
- **N -** Indicators
- **P -** Diodes, Indicators

Low Input Drivers with:

- **R -** Diodes
- **S -** Diodes, Indicators
- **RB -** B C D, Diodes
- **SB -** B C D, Diodes, Indicators

High Input Drivers with:

- **RH -** Diodes
- **SH -** Diodes, Indicators
- **RBH -** B C D, Diodes
- **SBH -** B C D, Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **3 -** Other (Specify)
- **4 -** Sub Miniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

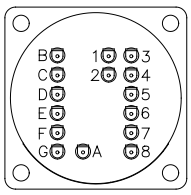
OPTION 8 BRACKETS

- **A -** See Page 144

IT/ITE

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Positions	Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

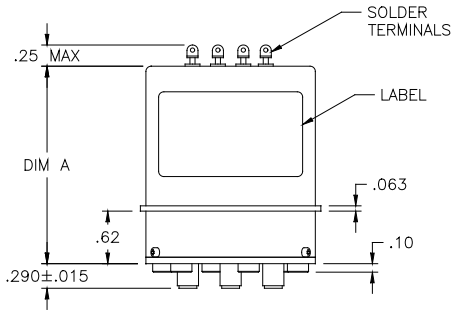
DC TERMINAL FUNCTIONS

	NORMALLY OPEN				LATCHING		
PIN	L, N	M, P	R, RH, RB, RBH, S, SH, SB, SBH	G, H	J, JH, JB, JBH, K, KH, KB, KBH	T, V	U, W
1	C	C+/-	+V SW	C+/-	+V SW	C+/-	C+/-
2	N/A	N/A	C RTN	N/A	C RTN	RESET	N/A
3	AV 1	AV 1-/+	L 1 or B C D 1	AV 1-/+	L 1 or B C D 1	PV 1-/+	PV 1-/+
4	AV 2	AV 2-/+	L 2 or B C D 2	AV 2-/+	L 2 or B C D 2	PV 2-/+	PV 2-/+
5	AV 3	AV 3-/+	L 3 or B C D 4	AV 3-/+	L 3 or B C D 4	PV 3-/+	PV 3-/+
6	AV 4	AV 4-/+	L 4	AV 4-/+	L 4	PV 4-/+	PV 4-/+
7	AV 5	AV 5-/+	L 5	AV 5-/+	L 5	PV 5-/+	PV 5-/+
8	AV 6	AV 6-/+	L 6	AV 6-/+	L 6	PV 6-/+	PV 6-/+

SCHEMATICS

	Pages 132–137						
	M14	M15	M16, M17	M18	M19, M20	M21, M22	M21, M22

FRONT VIEW



INDICATORS

PIN	A	B	C	D	E	F	G
	COM	1	2	3	4	5	6

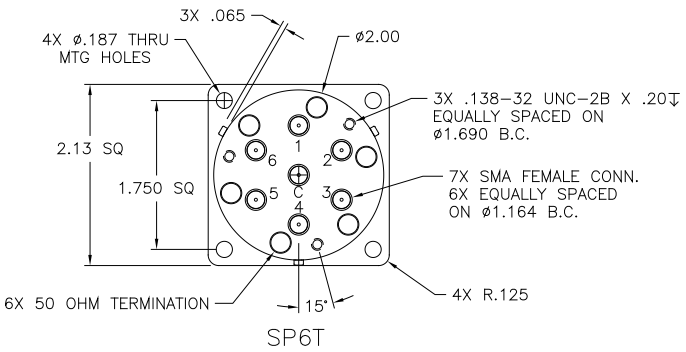
See Page 158 for Legend of Terms and Tolerances

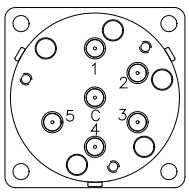
See Page 138 for Logic & BCD Truth Table

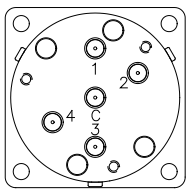
AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
L, T	2.08
G, H, W, U, V	2.33
J, JH, K, KH	2.58
JB, JBH, KB, KBH	2.58
M, N	2.33
P	2.58
R, RB, RBH, RH	2.58
S, SB, SBH, SH	2.58

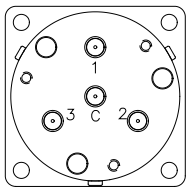
* Consult factory for Dimension "A" when multi pin connector is desired.

BOTTOM VIEW

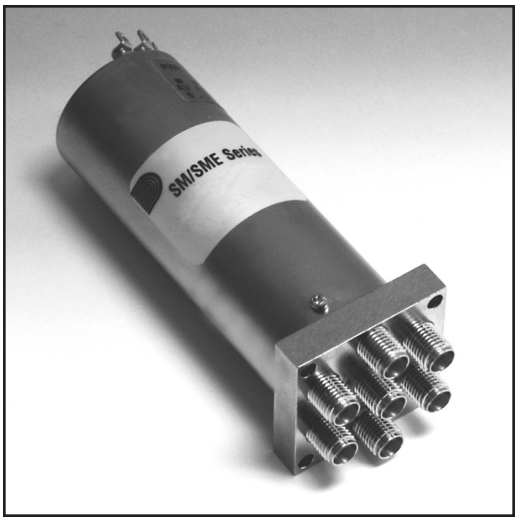








SM/SME SERIES
MINIATURE 1P3T to 1P6T
MULTI POSITION SWITCH
DC-26.5 GHz ◆ SMA



The ***SM Series*** features SMA connectors and a frequency range of DC to 18 GHz.

The ***SME Series*** also features SMA connectors and has a frequency range of DC to 26.5 GHz.

Both series are available with failsafe or normally open functions. Future designs will offer Latching; Logic Driver and Indicators.

Weight:	5.0 oz
RF Imedance:	50 ohms nominal
Operating Temperature:	-55°C to +85°C ambient
Operating Life:	1,000,000+ cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.15	0.25	75
4-8 GHz	1.25	0.30	70
8-12 GHz	1.30	0.35	65
12-18 GHz	1.40	0.45	60
18-26.5 GHz	2.00	1.00	55

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Failsafe	Consult	Consult	205mA	Consult
Normally Open	Factory	Factory	75mA	Factory

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	15	35	N/A

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Failsafe

- **A -** Standard
- **B -** Diodes

Normally Open

- **L -** Standard
- **M -** Diodes

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **3 -** Other (Specify)
- **4 -** Micro Miniature D-Shell Connector

Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

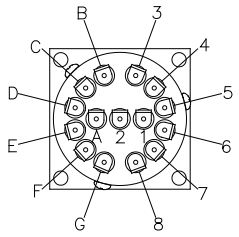
- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

For “Additional Options” please contact Factory for part number

SM/SME

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Positions	Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

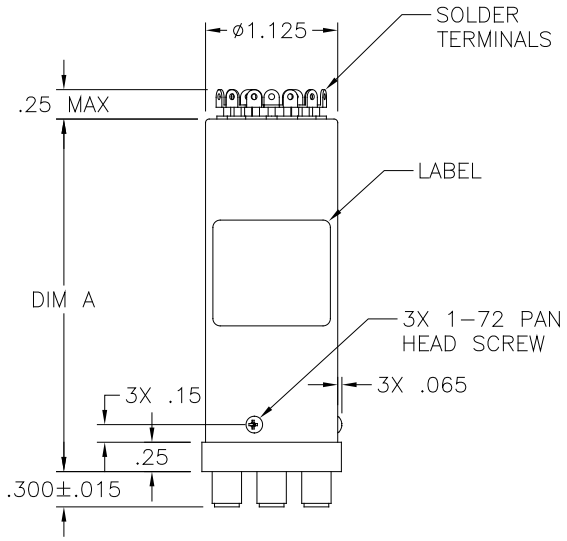
DC TERMINAL FUNCTIONS

	FAILSAFE		NORMALLY OPEN	
PIN	A	B	L	M
1	C	C+/-	C	C+/-
2	N/A	N/A	N/A	N/A
3	N/A	N/A	AV 1	AV 1-/+
4	AV 2	AV 2-/+	AV 2	AV 2-/+
5	AV 3	AV 3-/+	AV 3	AV 3-/+
6	AV 4	AV 4-/+	AV 4	AV 4-/+
7	AV 5	AV 5-/+	AV 5	AV 5-/+
8	AV 6	AV 6-/+	AV 6	AV 6-/+

SCHEMATICS

Pages 132–137				
	M1	M2	M5	M6

FRONT VIEW



INDICATORS

PIN	A	B	C	D	E	F	G
	COM	1 or F/S	2	3	4	5	6

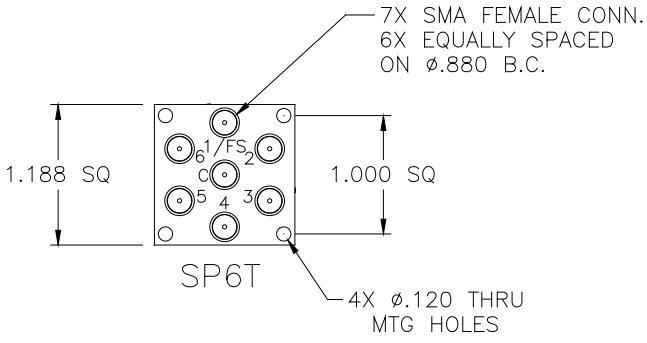
See Page 158 for Legend of Terms and Tolerances

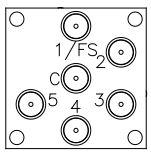
See Page 138 for Logic & BCD Truth Table

AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A" (MAX).
A, L	3.00
B, M	Consult Factory

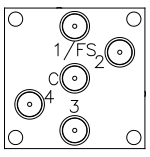
* Consult factory for Dimension "A" when multi pin connector is desired.

BOTTOM VIEW

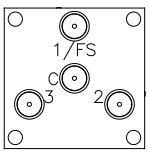




SP5T



SP4T



SP3T

SN/SNH SERIES
SP3T to SP6T
MULTI POSITION SWITCH
DC-10 GHz ◆ N

The ***SN Series*** features N connectors and a frequency range of DC to 10 GHz.

The ***SNH Series*** features High Power N connectors and a frequency range of DC to 10 GHz.

Both series are available with failsafe or normally open functions. Please contact Factory for latching and pulse latching design availability.

Weight (max.):	18.5 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-25°C to +65°C ambient
Operating Life:	1,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.25	0.25	80
4-8 GHz	1.40	0.40	70
8-10 GHz	1.60	0.60	60

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Failsafe	500mA	375mA	235mA	225mA
Normally Open	255mA	240mA	160mA	150mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	20	50	N/A

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Failsafe

- **A -** Standard
- **B -** Diodes
- **C -** Indicators
- **D -** Diodes, Indicators

Low Input Drivers with:

- **E -** Diodes
- **F -** Diodes, Indicators
- **EB -** B C D, Diodes
- **FB -** B C D, Diodes, Indicators

High Input Drivers with:

- **EH -** Diodes
- **FH -** Diodes, Indicators
- **EBH -** B C D, Diodes
- **FBH -** B C D, Diodes, Indicators

Normally Open

- **L -** Standard
- **M -** Diodes
- **N -** Indicators
- **P -** Diodes, Indicators

Low Input Drivers with:

- **R -** Diodes
- **S -** Diodes, Indicators
- **RB -** B C D, Diodes
- **SB -** B C D, Diodes, Indicators

High Input Drivers with:

- **RH -** Diodes
- **SH -** Diodes, Indicators
- **RBH -** B C D, Diodes
- **SBH -** B C D, Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **3 -** Other (Specify)
- **4 -** Sub Miniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

OPTION 8 BRACKETS

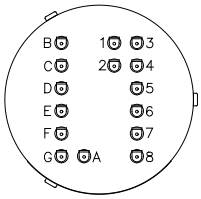
- **A -** See Page 144

For “Additional Options” please contact Factory for part number

SN/SNH

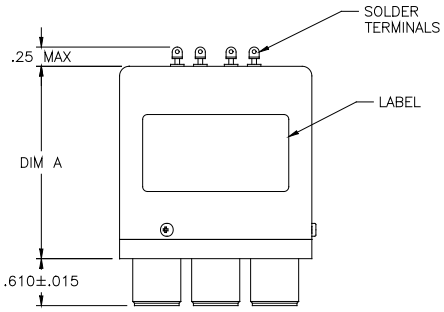
Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Positions	Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

FRONT VIEW



DC TERMINALS FUNCTIONS

	FAILSAFE			NORMALLY OPEN		
PIN	A, C	B, D	E, EH, EB, EBH, F, FH, FB, FBH	L, N	M, P	R, RH, RB, RBH, S, SH, SB, SBH
1	C	C+/-	+V SW	C	C+/-	+V SW
2	N/A	N/A	C RTN	N/A	N/A	C RTN
3	N/A	N/A	N/A or BCD 1	AV 1	AV 1-/+	L 1 or BCD 1
4	AV 2	AV 2-/+	L 2 or BCD 2	AV 2	AV 2-/+	L 2 or BCD 2
5	AV 3	AV 3-/+	L 3 or BCD 4	AV 3	AV 3-/+	L 3 or BCD 4
6	AV 4	AV 4-/+	L 4 or BCD 8	AV 4	AV 4-/+	L 4 or BCD 8
7	AV 5	AV 5-/+	L 5	AV 5	AV 5-/+	L 5
8	AV 6	AV 6-/+	L 6	AV 6	AV 6-/+	L 6

SCHEMATICS

Pages 132–137						
	M1	M2	M3, M4	M5	M6	M7, M8

INDICATORS

PIN	A	B	C	D	E	F	G
	COM	1 or F/S	2	3	4	5	6

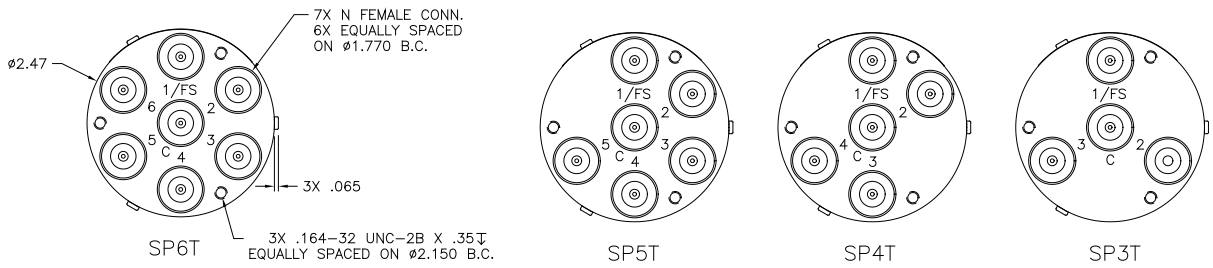
See Page 158 for Legend of Terms and Tolerances

See Page 138 for Logic & BCD Truth Table

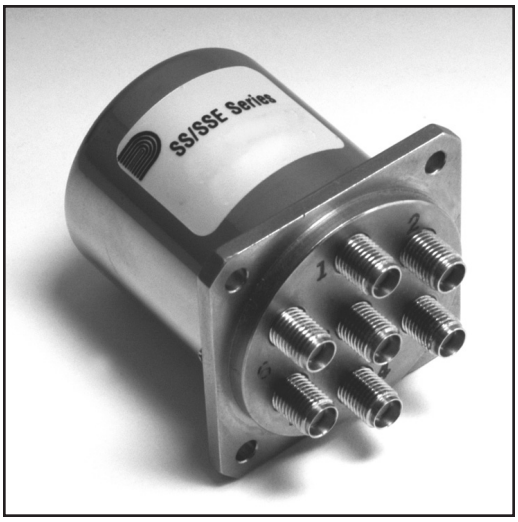
AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, L	2.30
B, C, M, N	2.50
D, P	2.50
E, EH, R, RH	3.21
EB, EBH, RB, RBH	3.21
F, FH, S, SH	3.21
FB, FBH, SB, SBH	3.21

* Consult factory for Dimension "A" when multi pin connector is desired.

BOTTOM VIEW



SS/SSE SERIES
SP3T to SP6T
MULTI POSITION SWITCH
DC-22 GHz ◆ SMA



The ***SS Series*** features SMA connectors and a frequency range of DC to 18 GHz.

The ***SSE Series*** also features SMA connectors and a frequency range of DC to 22 GHz.

Both series are available with failsafe or normally open functions. Please contact Factory for latching and pulse latching design availability.

Weight (max.):	6.5 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-55°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.20	0.30	75
4-8 GHz	1.30	0.35	70
8-12 GHz	1.40	0.40	65
12-18 GHz	1.50	0.50	60
18-22 GHz	1.60	0.60	60

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Failsafe	390mA	310mA	205mA	190mA
Normally Open	310mA	250mA	155mA	135mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - mSec (Max)	15	35	N/A

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Failsafe		Normally Open	
A - Standard	**C -** Indicators	**L -** Standard	**N -** Indicators
B - Diodes	**D -** Diodes, Indicators	**M -** Diodes	**P -** Diodes, Indicators

Low Input Drivers with:		High Input Drivers with:	
E - Diodes		**EH -** Diodes	
F - Diodes, Indicators		**FH -** Diodes, Indicators	
EB - B C D, Diodes		**EBH -** B C D, Diodes	
FB - B C D, Diodes, Indicators		**FBH -** B C D, Diodes, Indicators	

Low Input Drivers with:		High Input Drivers with:	
R - Diodes		**RH -** Diodes	
S - Diodes, Indicators		**SH -** Diodes, Indicators	
RB - B C D, Diodes		**RBH -** B C D, Diodes	
SB - B C D, Diodes, Indicators		**SBH -** B C D, Diodes, Indicators	

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **3 -** Other (Specify)
- **4 -** Sub Miniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

OPTION 8 BRACKETS

- **A -** See Page 144 Requires Body "U"

OPTION 9 BODIES

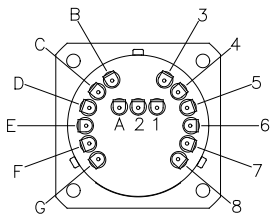
- **U -** See Page 150

For "Additional Options" please contact Factory for part number

SS/SSE

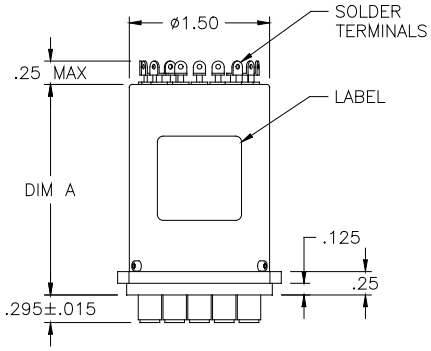
Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Positions	Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW

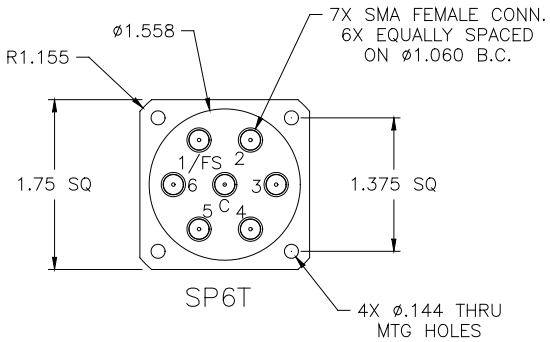


Actual markings will reflect terminal functions, not letter or number designation as shown above.

FRONT VIEW



BOTTOM VIEW



DC TERMINAL FUNCTIONS

	FAILSAFE			NORMALLY OPEN		
PIN	A, C	B, D	E, EH, EB, EBH, F, FH, FB, FBH	L, N	M, P	R, RH, RB, RBH, S, SH, SB, SBH
1	C	C+/-	+VSW	C	C+/-	+V SW
2	N/A	N/A	C RTN	N/A	N/A	C RTN
3	N/A	N/A	N/A or BCD 1	AV 1	AV 1-/+	L 1 or BCD 1
4	AV 2	AV 2-/+	L 2 or BCD 2	AV 2	AV 2-/+	L 2 or BCD 2
5	AV 3	AV 3-/+	L 3 or BCD 4	AV 3	AV 3-/+	L 3 or BCD 4
6	AV 4	AV 4-/+	L 4	AV 4	AV 4-/+	L 4
7	AV 5	AV 5-/+	L 5	AV 5	AV 5-/+	L 5
8	AV 6	AV 6-/+	L 6	AV 6	AV 6-/+	L 6

SCHEMATICS

Pages 132–137						
	M1	M2	M3, M4	M5	M6	M7, M8

INDICATORS

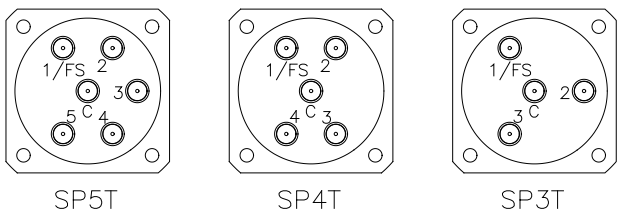
PIN	A	B	C	D	E	F	G
	COM	1 or F/S	2	3	4	5	6

See Page 158 for Legend of Terms and Tolerances

See Page 138 for Logic & BCD Truth Table

AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A" (MAX).
A, L	1.75
B, C, M, N	2.00
D, P	2.25
E, EH, R, RH	2.25
EB, EBH, RB, RBH	2.25
F, FH, S, SH	2.75
FB, FBH, SB, SBH	2.75

* Consult factory for Dimension "A" when multi pin connector is desired.



ST SERIES
SP3T to SP6T
MULTI POSITION SWITCH
DC-8 GHz ◆ TNC

The ***ST Series*** features TNC connectors and a frequency range of DC to 8 GHz.

This series is available with failsafe or normally open functions. Please contact Factory for latching and pulse latching design availability.

Weight (max.):	11.5 oz
RF Impedance:	50 ohms nominal
Operating Temperature:	-25°C to +65°C ambient
Operating Life:	1,000,000 cycles min.
Switching Sequence:	Break Before Make

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-4 GHz	1.20	0.20	80
4-8 GHz	1.60	0.60	70

Actuator Current (typical)	12Vdc	15 Vdc	24 Vdc	28Vdc
Failsafe	500mA	375mA	235mA	225mA
Normally Open	255mA	240mA	160mA	150mA

* If reduced coil current is required, please contact Factory.

Position	NO	NC	Latching
Switching Time - m Sec (Max)	20	50	N/A

AVAILABLE OPTIONS

OPTION 3 VOLTAGE

- **1 -** 12 Vdc
- **2 -** 28 Vdc
- **3 -** 15 Vdc
- **5 -** Other
- **6 -** 24 Vdc
- **7 -** 5 Vdc

OPTION 4 ACTUATOR

Failsafe			
A -	Standard	**C -**	Indicators
B -	Diodes	**D -**	Diodes, Indicators

Normally Open			
L -	Standard	**N -**	Indicators
M -	Diodes	**P -**	Diodes, Indicators

Low Input Drivers with:		High Input Drivers with:	
E -	Diodes	**EH -**	Diodes
F -	Diodes, Indicators	**FH -**	Diodes, Indicators
EB -	B C D, Diodes	**EBH -**	B C D, Diodes
FB -	B C D, Diodes, Indicators	**FBH -**	B C D, Diodes, Indicators

Low Input Drivers with:		High Input Drivers with:	
R -	Diodes	**RH -**	Diodes
S -	Diodes, Indicators	**SH -**	Diodes, Indicators
RB -	B C D, Diodes	**RBH -**	B C D, Diodes
SB -	B C D, Diodes, Indicators	**SBH -**	B C D, Diodes, Indicators

OPTION 5 POLARITY

- **1 -** Negative
- **2 -** Positive
- **3 -** Not Applicable

OPTION 6 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **3 -** Other (Specify)
- **4 -** Sub Miniature D-Shell Connector

ADDITIONAL OPTIONS

OPTION 7 STANDARD OPTIONS

- **1 -** Moisture Seal
- **2 -** High Temperature (125° C)
- **3 -** Moisture Seal & High Temperature (125° C)

OPTION 8 BRACKETS

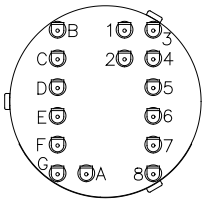
- **A -** See Page 144

For “Additional Options” please contact Factory for part number

ST

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Positions	Series	Voltage	Actuator	Polarity	Terminals

TOP VIEW



Actual markings will reflect terminal functions, not letter or number designation as shown above.

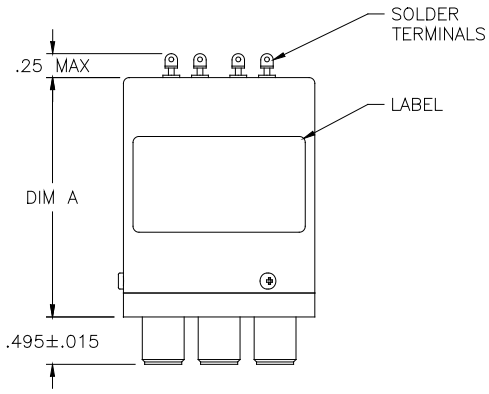
DC TERMINAL FUNCTIONS

PIN	FAILSAFE			NORMALLY OPEN		
	A, C	B, D	E, EH, EB, EBH, F, FH, FB, FBH	L, N	M, P	R, RH, RB, RBH, S, SH, SB, SBH
1	C	C+/-	+V SW	C	C+/-	+V SW
2	N/A	N/A	C RTN	N/A	N/A	C RTN
3	N/A	N/A	N/A or BCD 1	AV 1	AV 1-/+	L 1 or BCD 1
4	AV 2	AV 2-/+	L 2 or BCD 2	AV 2	AV 2-/+	L 2 or BCD 2
5	AV 3	AV 3-/+	L 3 or BCD 4	AV 3	AV 3-/+	L 3 or BCD 4
6	AV 4	AV 4-/+	L4	AV 4	AV 4-/+	L4
7	AV 5	AV 5-/+	L 5	AV 5	AV 5-/+	L 5
8	AV 6	AV 6-/+	L 6	AV 6	AV 6-/+	L 6

SCHEMATICS

Pages 132–137						
	M1	M2	M3, M4	M5	M6	M7, M8

FRONT VIEW



INDICATORS

PIN	A	B	C	D	E	F	G
	COM	1 or F/S	2	3	4	5	6

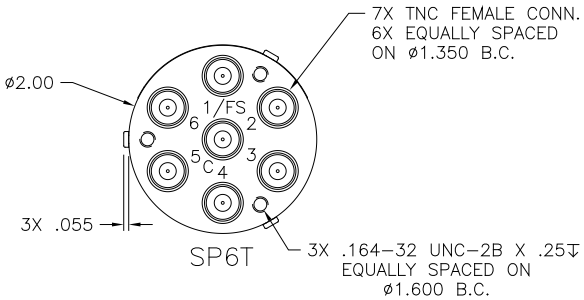
See Page 158 for Legend of Terms and Tolerances

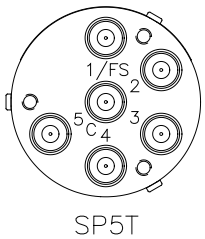
See Page 138 for Logic & BCD Truth Table

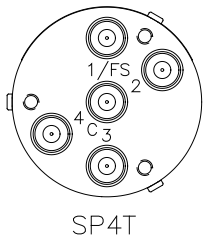
AVAILABLE OPTIONS*	OUTLINE DRAWING DIMENSION "A"
A, L	2.50
B, C, M, N	2.50
D, P	2.75
E, EH, R, RH	2.75
EB, EBH, RB, RBH	2.75
F, FH, S, SH	3.25
FB, FBH, SB, SBH	3.25

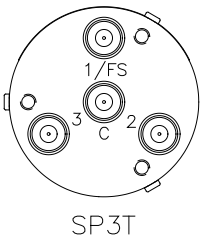
* Consult factory for Dimension "A" when multi-pin connector is desired.

BOTTOM VIEW









L SERIES
1P7T to 1P8T
MULTI POSITION SWITCH
DC-9 GHz ◆ N, BNC, TNC

The ***L Series*** features N, BNC or TNC connectors and a frequency range of DC to 9 GHz.

This series is available with latching self cut-off or normally open functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	35 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-5 GHz	1.35	0.35	70
5-9 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	240mA	240mA	170mA	140mA
Latching	280mA	280mA	270mA	220mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

1 -	N
2 -	BNC
3 -	TNC

OPTION 3 TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub Miniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

Latching Self Cut-Off

D -	Diodes
E -	Diodes, Indicators

Normally Open

G -	Diodes, Indicators
H -	Indicators
J -	Diodes
K -	Standard
N -	Failsafe to Position 1 - Standard Failsafe
R -	to Position 1 - Diodes
S -	Failsafe to Position 1 - Diodes, Indicators

OPTION 6 FREQUENCY

2 -	DC to 9 GHz

OPTION 7 POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
1 -	Bracket
F -	Flange
P -	High Power Handling
R -	Reset (Latching Only)
C -	BCD

L		-					2		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	LATCHING						NORMALLY OPEN				NORMALLY OPEN-FAILSAFE TO POSITION 1				
PIN	D	D w/ TTL	E	E w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL	N	R	N, R w/ TTL	S	S w/ TTL
1	NOTE #1	NOTE #1	NOTE #1	NOTE #1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	COM+/-	+A	COM+/-	+A	COM+/-	COM	+A	COM+/-	COM	+A	COM	COM+/-	+A	COM+/-	+A
3	1-/+	-B	1-/+	-B	1-/+	1	-B	1-/+	1	-B	2	2-/+	-B	2-/+	-B
4	2-/+	1	2-/+	1	2-/+	2	1	2-/+	2	1	3	3-/+	2	3-/+	L2
5	3-/+	2	3-/+	2	3-/+	3	2	3-/+	3	2	4	4-/+	3	4-/+	L3
6	4-/+	3	4-/+	3	4-/+	4	3	4-/+	4	3	5	5-/+	4	5-/+	L4
7	5-/+	4	5-/+	4	5-/+	5	4	5-/+	5	4	6	6-/+	5	6-/+	L5
8	6-/+	5	6-/+	5	6-/+	6	5	6-/+	6	5	7	7-/+	6	7-/+	L6
9	7-/+	6	7-/+	6	7-/+	7	6	7-/+	7	6	8	8-/+	7	8-/+	L7
10	8-/+	7	8-/+	7	8-/+	8	7	8-/+	8	7	N/A	N/A	8	N/A	L8
11	N/A	8	N/A	8	N/A	N/A	8	N/A	N/A	8	N/A	N/A	N/A	N/A	N/A
A	N/A	N/A	COM	COM	N/A	N/A	N/A	COM	COM	COM	N/A	N/A	N/A	COM	COM
B	N/A	N/A	1	1	N/A	N/A	N/A	1	1	1	N/A	N/A	N/A	1	1
C	N/A	N/A	2	2	N/A	N/A	N/A	2	2	2	N/A	N/A	N/A	2	2
D	N/A	N/A	3	3	N/A	N/A	N/A	3	3	3	N/A	N/A	N/A	3	3
E	N/A	N/A	4	4	N/A	N/A	N/A	4	4	4	N/A	N/A	N/A	4	4
F	N/A	N/A	5	5	N/A	N/A	N/A	5	5	5	N/A	N/A	N/A	5	5
G	N/A	N/A	6	6	N/A	N/A	N/A	6	6	6	N/A	N/A	N/A	6	6
H	N/A	N/A	7	7	N/A	N/A	N/A	7	7	7	N/A	N/A	N/A	7	7
I	N/A	N/A	8	8	N/A	N/A	N/A	8	8	8	N/A	N/A	N/A	8	8

NOTE#1: RESET IF (R) OPTION IS SELECTED, OTHERWISE N/A

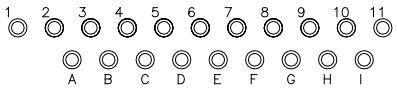
SCHEMATICS

	Pages 139-143														
FIG.	25	26	25	26	29	29	30	29	29	30	33	33	34	33	34

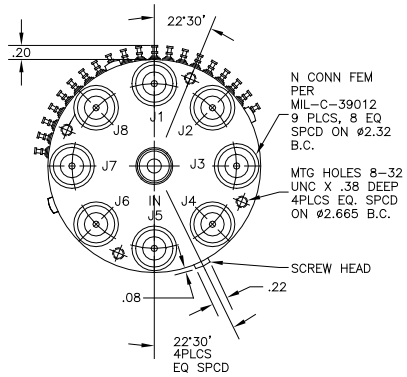
OUTLINE DRAWING DIMENSION "A"

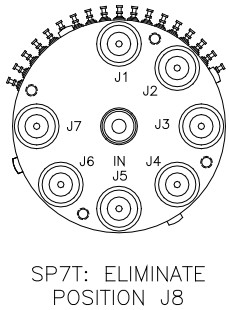
	2.71"	3.08"	2.36"	2.98"	2.15"	2.15"	2.36"	2.15"	2.15"	2.36"	2.15"	2.15"	2.36"	2.15"	2.36"

DC TERMINAL VIEW



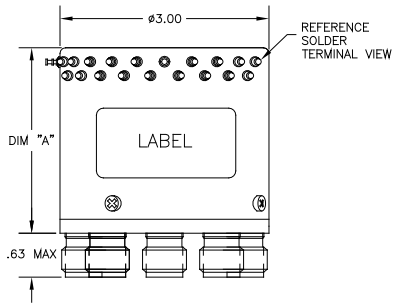
BOTTOM VIEW



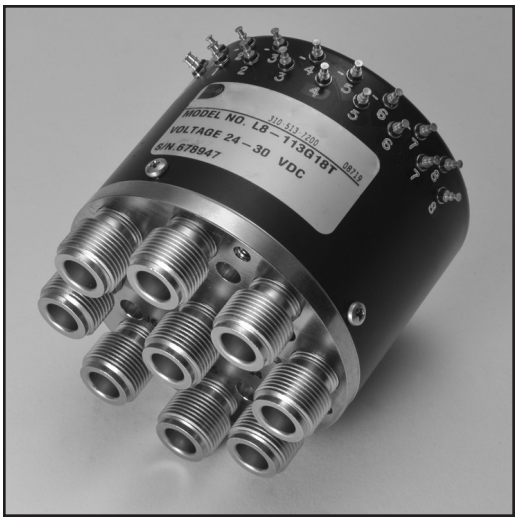


SP7T: ELIMINATE POSITION J8

FRONT VIEW



L SERIES
1P7T to 1P8T MULTI POSITION
50 OHM TERMINATED SWITCH
DC- 9 GHz ◆ N, BNC, TNC



The ***L Series*** features N, BNC or TNC connectors and a frequency range of DC to 9 GHz.

This series is available with latching self cut-off or normally open functions and 50 ohm terminations.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-5 GHz	1.35	0.35	70
5-9 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	240mA	300mA	200mA	140mA
Latching	280mA	353mA	320mA	215mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

1 -	N
2 -	BNC
3 -	TNC

OPTION 3 TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub Miniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

	Latching Self Cut-Off
D -	Diodes
E -	Diodes, Indicators
	Normally Open
G -	Diodes, Indicators
H -	Indicators
	Diodes
J -	Standard
K -	

OPTION 6 FREQUENCY

2 -	DC to 9 GHz

OPTION 7 POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
1 -	Bracket
F -	Flange
P -	High Power Handling
R -	Reset (Latching Only)
C -	BCD
T -	Terminated

L		-					2		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	LATCHING						NORMALLY OPEN			
PIN	D	D w/ TTL	E	E w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL
1	NOTE #1	NOTE #1	NOTE #1	NOTE #1	N/A	N/A	N/A	N/A	N/A	N/A
2	COM+/-	+A	COM+/-	+A	COM+/-	COM	+A	COM+/-	COM	+A
3	1-/+	-B	1-/+	-B	1-/+	1	-B	1-/+	1	-B
4	2-/+	1	2-/+	1	2-/+	2	1	2-/+	2	1
5	3-/+	2	3-/+	2	3-/+	3	2	3-/+	3	2
6	4-/+	3	4-/+	3	4-/+	4	3	4-/+	4	3
7	5-/+	4	5-/+	4	5-/+	5	4	5-/+	5	4
8	6-/+	5	6-/+	5	6-/+	6	5	6-/+	6	5
9	7-/+	6	7-/+	6	7-/+	7	6	7-/+	7	6
10	8-/+	7	8-/+	7	8-/+	8	7	8-/+	8	7
11	N/A	8	N/A	8	N/A	N/A	8	N/A	N/A	8
A	N/A	N/A	COM	COM	N/A	N/A	N/A	COM	COM	COM
B	N/A	N/A	1	1	N/A	N/A	N/A	1	1	1
C	N/A	N/A	2	2	N/A	N/A	N/A	2	2	2
D	N/A	N/A	3	3	N/A	N/A	N/A	3	3	3
E	N/A	N/A	4	4	N/A	N/A	N/A	4	4	4
F	N/A	N/A	5	5	N/A	N/A	N/A	5	5	5
G	N/A	N/A	6	6	N/A	N/A	N/A	6	6	6
H	N/A	N/A	7	7	N/A	N/A	N/A	7	7	7
I	N/A	N/A	8	8	N/A	N/A	N/A	8	8	8

NOTE#1: RESET IF (R) OPTION IS SELECTED, OTHERWISE N/A

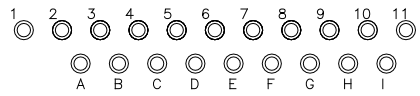
SCHEMATICS

	Pages 139-143									
FIG.	25	26	25	26	29	29	30	29	29	30

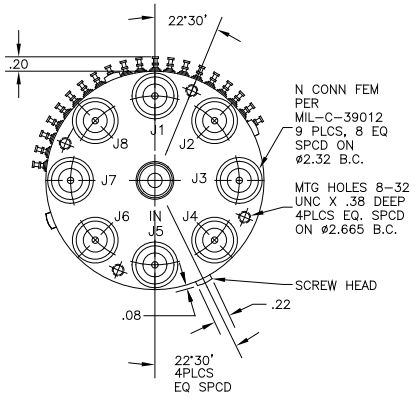
OUTLINE DRAWING DIMENSION "A"

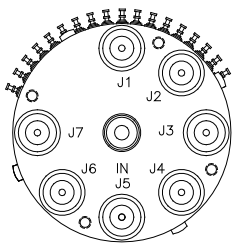
	2.71"	3.08"	2.36"	2.98"	2.15"	2.15"	2.36"	2.15"	2.15"	2.36"

DC TERMINAL VIEW



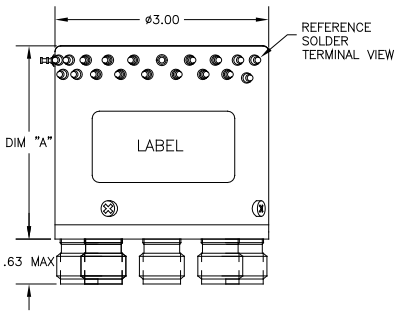
BOTTOM VIEW





SP7T: ELIMINATE POSITION J8

FRONT VIEW



M SERIES
1P3T to 1P6T
MULTI POSITION SWITCH
DC-18 GHz ◆ SMA

The ***M Series*** features SMA connectors and a frequency range of DC to 18 GHz.

This series is available with latching self cut-off or normally open functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.30	0.30	70
8-12.4 GHz	1.40	0.40	60
12.4-18 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	240mA	240mA	170mA	140mA
Latching	500mA	370mA	180mA	180mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

- **4 -** SMA

OPTION 3 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **4 -** Sub Miniature D-Shell Connector

OPTION 4 VOLTAGE

- **1 -** 6 Vdc +/- 10%
- **2 -** 12 Vdc +/- 10%
- **3 -** 24-30 Vdc
- **4 -** 48 Vdc +/- 10%
- **5 -** 110 Vac +/- 10%
- **6 -** 12-15 Vdc
- **7 -** 18-20 Vdc
- **8 -** 20-24 Vdc

OPTION 5 ACTUATOR

Latching Self Cut-Off

- **D -** Diodes
- **E -** Diodes, Indicators

Normally Open

- **G -** Diodes, Indicators
- **H -** Indicators
- **J -** Diodes
- **K -** Standard
- **N -** Failsafe to Position 1 - Standard Failsafe
- **R -** to Position 1 - Diodes
- **S -** Failsafe to Position 1 - Diodes, Indicators

OPTION 6 FREQUENCY

- **3 -** DC to 18 GHz

OPTION 7 POLARITY

- **0 -** Not Applicable
- **8 -** Positive Common
- **9 -** Negative Common

OPTION 8 SPECIAL OPTIONS

- **L -** TTL (High)
- **LL -** TTL (Low)
- **1 -** Bracket
- **F -** Flange
- **P -** High Power Handling
- **R -** Reset (Latching Only)
- **C -** BCD

M		-	4				3		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	LATCHING					NORMALLY OPEN					NORMALLY OPEN - FAILSAFE TO POSITION 1				
PIN	D	D w/ TTL	E	E w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL	N	R	N, R w/ TTL	S	S w/ TTL
1	NOTE #1	NOTE #1	NOTE #1	NOTE #1	N/A	N/A	N/A	C -/+	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	COM+/-	+A	COM+/-	+A	COM+/-	COM	+A	1 -/+	COM	+A	COM	COM+/-	+A	COM+/-	+A
3	1-/+	-B	1-/+	-B	1 -/+	1	-B	2 -/+	1	-B	2	2-/+	-B	2-/+	-B
4	2-/+	1	2-/+	1	2 -/+	2	1	3 -/+	2	1	3	3-/+	2	3-/+	2
5	3-/+	2	3-/+	2	3 -/+	3	2	4 -/+	3	2	4	4-/+	3	4-/+	3
6	4-/+	3	4-/+	3	4 -/+	4	3	5 -/+	4	3	5	5-/+	4	5-/+	4
7	5-/+	4	5-/+	4	5 -/+	5	4	6 -/+	5	4	6	6-/+	5	6-/+	5
8	6-/+	5	6-/+	5	6 -/+	6	5	N/A	6	5	N/A	N/A	6	N/A	6
9	N/A	6	N/A	6	N/A	N/A	6	N/A	N/A	6	N/A	N/A	N/A	N/A	N/A
A	N/A	N/A	COM	COM	N/A	N/A	N/A	COM	COM	COM	N/A	N/A	N/A	COM	COM
B	N/A	N/A	1	1	N/A	N/A	N/A	1	1	1	N/A	N/A	N/A	1	1
C	N/A	N/A	2	2	N/A	N/A	N/A	2	2	2	N/A	N/A	N/A	2	2
D	N/A	N/A	3	3	N/A	N/A	N/A	3	3	3	N/A	N/A	N/A	3	3
E	N/A	N/A	4	4	N/A	N/A	N/A	4	4	4	N/A	N/A	N/A	4	4
F	N/A	N/A	5	5	N/A	N/A	N/A	5	5	5	N/A	N/A	N/A	5	5
G	N/A	N/A	6	6	N/A	N/A	N/A	6	6	6	N/A	N/A	N/A	6	6

NOTE#1: RESET IF (R) OPTION IS SELECTED, OTHERWISE N/A

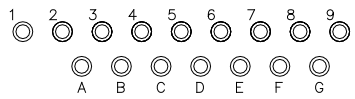
SCHEMATICS

	Pages 139-143														
FIG.	25	26	25	26	29	29	30	29	29	30	33	33	34	33	34

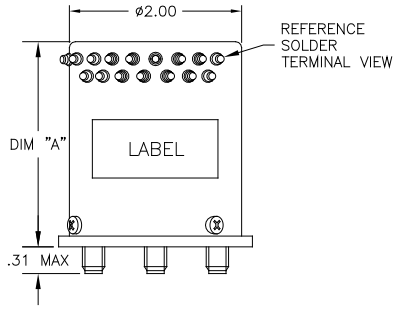
OUTLINE DRAWING DIMENSION "A"

	2.38"	3.13"	2.38"	3.13"	2.13"	2.13"	2.63"	2.13"	2.13"	2.63"	2.13"	2.13"	2.63"	2.13"	2.63"

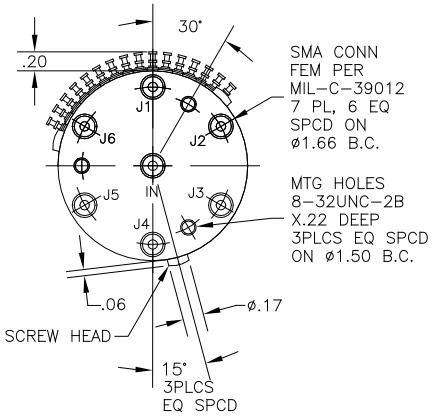
DC TERMINAL VIEW

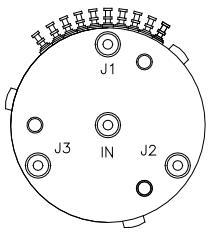


FRONT VIEW

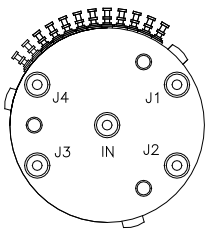


BOTTOM VIEW

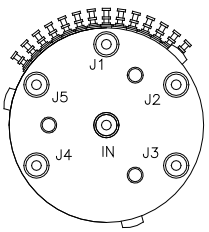




SP3T



SP4T



SP5T

M SERIES
1P3T to 1P6T MULTI POSITION 50 OHM TERMINATED SWITCH
DC-18 GHz ◆ SMA

The ***M Series*** features SMA connectors and a frequency range of DC to 18 GHz.

This series is available with latching self cut-off or normally open functions with 50 ohm terminations.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.30	0.30	70
8-12.4 GHz	1.40	0.40	60
12.4-18 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	240mA	300mA	200mA	140mA
Latching	500mA	462mA	218mA	175mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

- **4 -** SMA

OPTION 3 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **4 -** Sub Miniature D-Shell Connector

OPTION 4 VOLTAGE

- **1 -** 6 Vdc +/- 10%
- **2 -** 12 Vdc +/- 10%
- **3 -** 24-30 Vdc
- **4 -** 48 Vdc +/- 10%
- **5 -** 110Vac +/- 10%
- **6 -** 12-15 Vdc
- **7 -** 18-20 Vdc
- **8 -** 20-24 Vdc

OPTION 5 ACTUATOR

Latching Self Cut-Off

- **D -** Diodes
- **E -** Diodes, Indicators

Normally Open

- **G -** Diodes, Indicators
- **H -** Indicators
- **J -** Diodes
- **K -** Standard

OPTION 6 FREQUENCY

- **3 -** DC to 18 GHz

OPTION 7 POLARITY

- **0 -** Not Applicable
- **8 -** Positive Common
- **9 -** Negative Common

OPTION 8 SPECIAL OPTIONS

- **L -** TTL (High)
- **LL -** TTL (Low)
- **1 -** Bracket
- **F -** Flange
- **P -** High Power Handling
- **R -** Reset (Latching Only)
- **C -** BCD
- **T -** Terminated

M		-	4				3		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

PIN	LATCHING						NORMALLY OPEN			
	D	D w/ TTL	E	E w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL
1	NOTE #1	NOTE #1	NOTE #1	NOTE #1	N/A	N/A	N/A	C -/+	N/A	N/A
2	COM+/-	+A	COM+/-	+A	COM+/-	COM	+A	1 -/+	COM	+A
3	1-/+	-B	1-/+	-B	1 -/+	1	-B	2 -/+	1	-B
4	2-/+	1	2-/+	1	2 -/+	2	1	3 -/+	2	1
5	3-/+	2	3-/+	2	3 -/+	3	2	4 -/+	3	2
6	4-/+	3	4-/+	3	4 -/+	4	3	5 -/+	4	3
7	5-/+	4	5-/+	4	5 -/+	5	4	6 -/+	5	4
8	6-/+	5	6-/+	5	6 -/+	6	5	N/A	6	5
9	N/A	6	N/A	6	N/A	N/A	6	N/A	N/A	6
A	N/A	N/A	COM	COM	N/A	N/A	N/A	COM	COM	COM
B	N/A	N/A	1	1	N/A	N/A	N/A	1	1	1
C	N/A	N/A	2	2	N/A	N/A	N/A	2	2	2
D	N/A	N/A	3	3	N/A	N/A	N/A	3	3	3
E	N/A	N/A	4	4	N/A	N/A	N/A	4	4	4
F	N/A	N/A	5	5	N/A	N/A	N/A	5	5	5
G	N/A	N/A	6	6	N/A	N/A	N/A	6	6	6

NOTE#1: RESET IF (R) OPTION IS SELECTED, OTHERWISE N/A

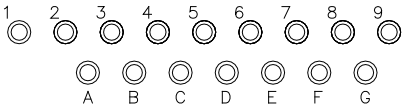
SCHEMATICS

	Pages 139-143									
FIG.	25	26	25	26	29	29	30	29	29	30

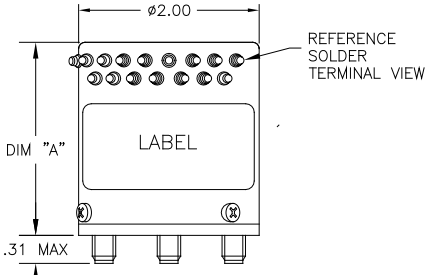
OUTLINE DRAWING DIMENSION "A"

	2.38"	3.13"	2.38"	3.13"	2.13"	2.13"	2.63"	2.13"	2.13"	2.63"

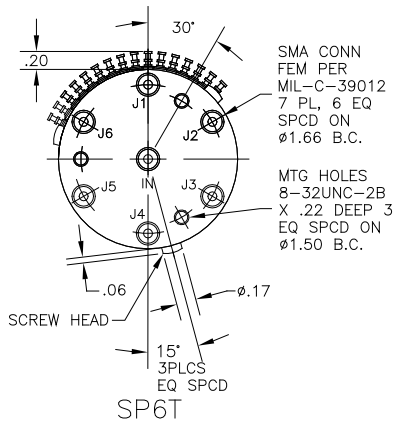
DC TERMINAL VIEW

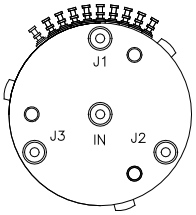


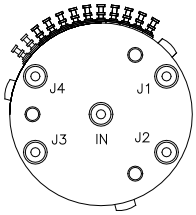
FRONT VIEW

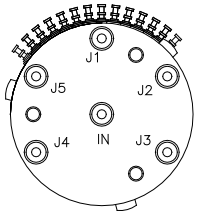


BOTTOM VIEW









MM SERIES
4P3T
MULTI POSITION SWITCH
DC-18 GHz ◆ SMA

The ***MM Series*** contains 4P3T electromechanical switches designed for cell sites with three antennas each receiving or transmitting over 120 degrees or one-third of the coverage area for cellular telephone carrier or wireless applications.

This switch features three inputs and three outputs with one redundant port. The MM4 switch can replace three SPDT and SP3T switches or three transfer switches.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.30	0.30	70
8-12.4 GHz	1.40	0.40	60
12.4-18 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Latching	150mA	150mA	120mA	100mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 – RF CONNECTORS

4 -	SMA

OPTION 3 – TERMINALS

4 -	Sub Miniature D-Shell Connector

OPTION 4 – VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 – ACTUATOR

Pulse Latching

C -	Standard	**F -**	Indicators
Y -	Diodes	**L -**	Diodes, Indicators

OPTION 6 – FREQUENCY

3 -	DC to 18 GHz

OPTION 7 – POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

Please Note: USB option is not available for this series.

MM	4	-	4				3	
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity

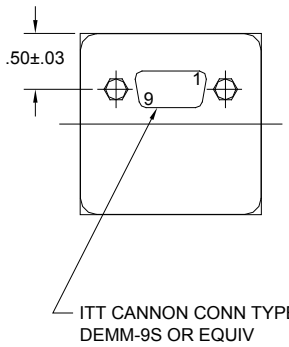
DC TERMINAL FUNCTION

	LATCHING	
PIN	C, Y	F, L
1	P1-J1	P1-J1
2	P1-R	P1-R
3	P2-J2	P2-J2
4	P2-R	P2-R
5	P3-J3	P3-J3
6	P3-R	P3-R
7	N/A	Spare
8	N/A	Spare
9	COM	COM
10	N/A	Spare
11	N/A	Ind P1-R
12	N/A	Ind P2-R
13	N/A	Ind P3-R
14	N/A	Spare
15	N/A	Ind COM

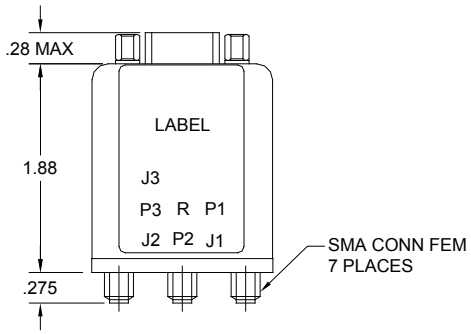
SCHEMATICS

	Pages 139-143	
FIG.	38	38

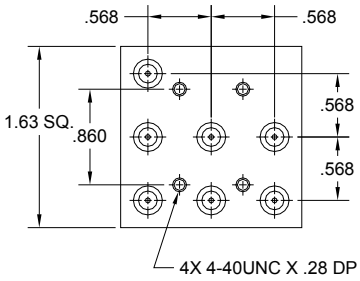
TOP VIEW



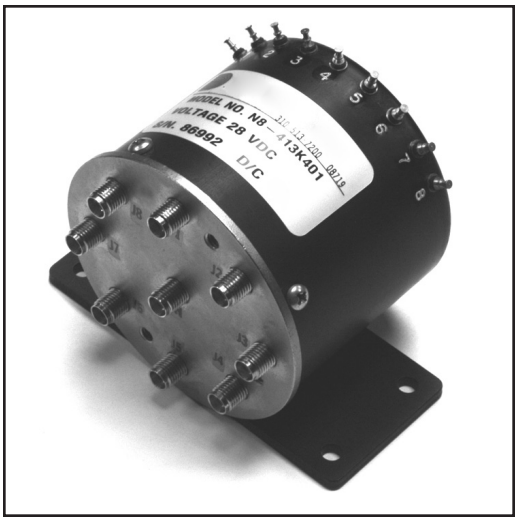
FRONT VIEW



BOTTOM VIEW



N SERIES
1P7T to 1P8T
MULTI POSITION SWITCH
DC-15 GHz ◆ SMA



The ***N Series*** features SMA connectors and a frequency range of DC to 15 GHz.

This series is available with latching self cut-off or normally open functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.30	0.30	70
8-12.4 GHz	1.40	0.40	60
12.4-15 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	240mA	240mA	170mA	140mA
Latching	280mA	280mA	180mA	180mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

4 -	SMA

OPTION 3 TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub Miniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10% (USB Optional)
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

	Latching Self Cut-Off
D -	Diodes
E -	Diodes, Indicators
	Normally Open
G -	Diodes, Indicators
H -	Indicators
J -	Diodes
K -	Standard
N -	Failsafe to Position 1 - Standard Failsafe
R -	to Position 1 - Diodes
S -	Failsafe to Position 1 - Diodes, Indicators

OPTION 6 FREQUENCY

2 -	DC to 15 GHz

OPTION 7 POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
1 -	Bracket
F -	Flange
P -	High Power Handling
R -	Reset (Latching Only)
C -	BCD

N		-	**4**				**2**		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	LATCHING						NORMALLY OPEN				NORMALLY OPEN-FAILAFE TO POSITION 1				
PIN	D	D w/ TTL	E	E w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL	N	R	N, R w/ TTL	S	S w/ TTL
1	NOTE #1	NOTE #1	NOTE #1	NOTE #1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	COM+/-	+A	COM+/-	+A	COM+/-	COM	+A	COM+/-	COM	+A	COM	COM+/-	+A	COM+/-	+A
3	1-/+	-B	1-/+	-B	1-/+	1	-B	1-/+	1	-B	2	2-/+	-B	2-/+	-B
4	2-/+	1	2-/+	1	2-/+	2	1	2-/+	2	1	3	3-/+	2	3-/+	2
5	3-/+	2	3-/+	2	3-/+	3	2	3-/+	3	2	4	4-/+	3	4-/+	3
6	4-/+	3	4-/+	3	4-/+	4	3	4-/+	4	3	5	5-/+	4	5-/+	4
7	5-/+	4	5-/+	4	5-/+	5	4	5-/+	5	4	6	6-/+	5	6-/+	5
8	6-/+	5	6-/+	5	6-/+	6	5	6-/+	6	5	7	7-/+	6	7-/+	6
9	7-/+	1	7-/+	6	7-/+	7	6	7-/+	7	6	8	8-/+	7	8-/+	7
10	8-/+	2	8-/+	7	8-/+	8	7	8-/+	8	7	N/A	N/A	8	N/A	8
11	N/A	3	N/A	8	N/A	N/A	8	N/A	N/A	8	N/A	N/A	N/A	N/A	N/A
A	N/A	5	COM	COM	N/A	N/A	N/A	COM	COM	COM	N/A	N/A	N/A	COM	COM
B	N/A	6	1	1	N/A	N/A	N/A	1	1	1	N/A	N/A	N/A	1	1
C	N/A	7	2	2	N/A	N/A	N/A	2	2	2	N/A	N/A	N/A	2	2
D	N/A	8	3	3	N/A	N/A	N/A	3	3	3	N/A	N/A	N/A	3	3
E	N/A	N/A	4	4	N/A	N/A	N/A	4	4	4	N/A	N/A	N/A	4	4
F	N/A	N/A	5	5	N/A	N/A	N/A	5	5	5	N/A	N/A	N/A	5	5
G	N/A	N/A	6	6	N/A	N/A	N/A	6	6	6	N/A	N/A	N/A	6	6
H	N/A	N/A	7	7	N/A	N/A	N/A	7	7	7	N/A	N/A	N/A	7	7
I	N/A	N/A	8	8	N/A	N/A	N/A	8	8	8	N/A	N/A	N/A	8	8

NOTE#1: RESET IF (R) OPTION IS SELECTED, OTHERWISE N/A

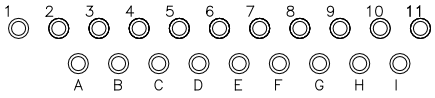
SCHEMATICS

	Pages 139-143														
FIG.	25	26	25	26	29	29	30	29	29	30	33	33	34	33	34

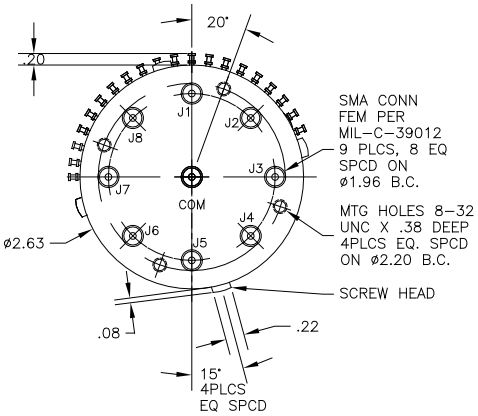
OUTLINE DRAWING DIMENSION "A"

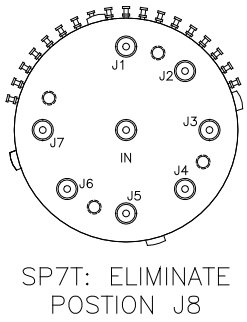
	2.60"	2.98"	2.60"	2.98"	2.10"	2.10"	2.36"	2.10"	2.10"	2.36"	2.10"	2.10"	2.36"	2.10"	2.36"

DC TERMINAL VIEW



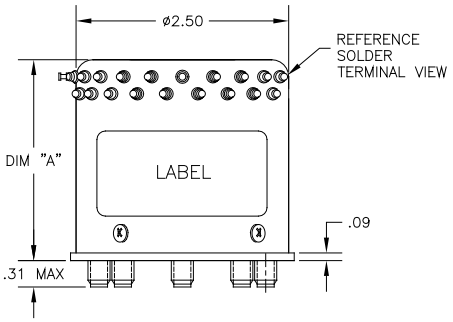
BOTTOM VIEW





SP7T: ELIMINATE
POSTION J8

FRONT VIEW



N SERIES:
1P7T to 1P8T MULTI POSITION 50 OHM TERMINATED SWITCH
DC-15 GHz ◆ SMA

The ***N Series*** features SMA connectors and a frequency range of DC to 15 GHz.

This series is available with latching self cut-off or normally open functions with 50 ohm terminations.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.30	0.30	70
8-12.4 GHz	1.40	0.40	60
12.4-15 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	240mA	300mA	200mA	140mA
Latching	280mA	353mA	218mA	175mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

4 -	SMA

OPTION 3 TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub Miniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

Latching Self Cut-Off

D -	Diodes
E -	Diodes, Indicators

Normally Open

G -	Diodes, Indicators
H -	Indicators
J -	Diodes
K -	Standard

OPTION 6 FREQUENCY

2 -	DC to 15 GHz

OPTION 7 POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
1 -	Bracket
F -	Flange
P -	High Power Handling
R -	Reset (Latching Only)
C -	BCD
T -	Terminated

N		-	4				2		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

PIN	LATCHING					NORMALLY OPEN				
	D	D w/ TTL	E	E w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL
1	NOTE #1	NOTE #1	NOTE #1	NOTE #1	N/A	N/A	N/A	N/A	N/A	N/A
2	COM+/-	+A	COM+/-	+A	COM+/-	COM	+A	COM+/-	COM	+A
3	1-/+	-B	1-/+	-B	1-/+	1	-B	1-/+	1	-B
4	2-/+	1	2-/+	1	2-/+	2	1	2-/+	2	1
5	3-/+	2	3-/+	2	3-/+	3	2	3-/+	3	2
6	4-/+	3	4-/+	3	4-/+	4	3	4-/+	4	3
7	5-/+	4	5-/+	4	5-/+	5	4	5-/+	5	4
8	6-/+	5	6-/+	5	6-/+	6	5	6-/+	6	5
9	7-/+	1	7-/+	6	7-/+	7	6	7-/+	7	6
10	8-/+	2	8-/+	7	8-/+	8	7	8-/+	8	7
11	N/A	3	N/A	8	N/A	N/A	8	N/A	N/A	8
A	N/A	5	COM	COM	N/A	N/A	N/A	COM	COM	COM
B	N/A	6	1	1	N/A	N/A	N/A	1	1	1
C	N/A	7	2	2	N/A	N/A	N/A	2	2	2
D	N/A	8	3	3	N/A	N/A	N/A	3	3	3
E	N/A	N/A	4	4	N/A	N/A	N/A	4	4	4
F	N/A	N/A	5	5	N/A	N/A	N/A	5	5	5
G	N/A	N/A	6	6	N/A	N/A	N/A	6	6	6
H	N/A	N/A	7	7	N/A	N/A	N/A	7	7	7
I	N/A	N/A	8	8	N/A	N/A	N/A	8	8	8

NOTE#1: RESET IF (R) OPTION IS SELECTED, OTHERWISE N/A

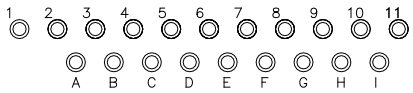
SCHEMATICS

FIG.	Pages 139-143									
	25	26	25	26	29	29	30	29	29	30

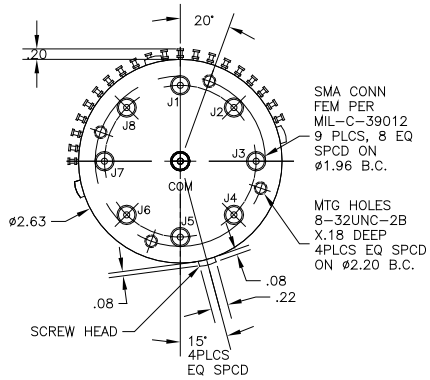
OUTLINE DRAWING DIMENSION "A"

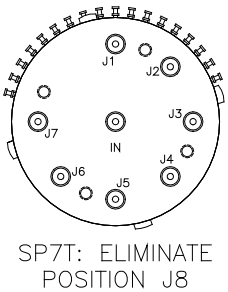
	2.60"	2.98"	2.60"	2.98"	2.10"	2.10"	2.36"	2.10"	2.10"	2.36"

DC TERMINAL VIEW

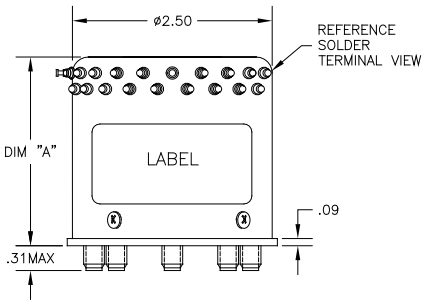


BOTTOM VIEW





FRONT VIEW



N SERIES
1P9T to 1P10T
MULTI POSITION SWITCH
DC-10.5 GHz ◆ SMA

The ***N Series*** features SMA connectors and a frequency range of DC to 10.5 GHz.

This series is available with latching self cut-off or normally open functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.40	0.40	70
8-10.5 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	240mA	240mA	170mA	140mA
Latching	280mA	280mA	180mA	180mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 – RF CONNECTORS

4 -	SMA

OPTION 3 – TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub Miniature D-Shell Connector

OPTION 4 – VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 – ACTUATOR

	Latching Self Cut-Off
D -	Diodes
E -	Diodes, Indicators
	Normally Open
G -	Diodes, Indicators
H -	Indicators
J -	Diodes
K -	Standard
N -	Failsafe to Position 1 - Standard Failsafe
R -	to Position 1 - Diodes
S -	Failsafe to Position 1 - Diodes, Indicators

OPTION 6 – FREQUENCY

2 -	DC to 10.5 GHz

OPTION 7 – POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 – SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
1 -	Bracket
F -	Flange
P -	High Power Handling
R -	Reset (Latching Only)
C -	BCD

N		-	4				2		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	LATCHING					NORMALLY OPEN						NORMALLY OPEN-FAILAFE TO POSITION 1				
PIN	D	D w/ TTL	E	E w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL	N	R	N, R w/ TTL	S	S w/ TTL
1	NOTE #1	NOTE #1	NOTE #1	NOTE #1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	COM+/-	+A	COM+/-	+A	COM+/-	COM	+A	COM+/-	COM	+A	COM	COM+/-	+A	COM+/-	+A
3	1-/+	-B	1-/+	-B	1-/+	1	-B	1-/+	1	-B	2	2-/+	-B	2-/+	-B
4	2-/+	1	2-/+	1	2-/+	2	1	2-/+	2	1	3	3-/+	L2	3-/+	L2
5	3-/+	2	3-/+	2	3-/+	3	2	3-/+	3	2	4	4-/+	L3	4-/+	L3
6	4-/+	3	4-/+	3	4-/+	4	3	4-/+	4	3	5	5-/+	L4	5-/+	L4
7	5-/+	4	5-/+	4	5-/+	5	4	5-/+	5	4	6	6-/+	L5	6-/+	L5
8	6-/+	5	6-/+	5	6-/+	6	5	6-/+	6	5	7	7-/+	L6	7-/+	L6
9	7-/+	6	7-/+	6	7-/+	7	6	7-/+	7	6	8	8-/+	L7	8-/+	L7
10	8-/+	7	8-/+	7	8-/+	8	7	8-/+	8	7	9	9-/+	L8	9-/+	L8
11	9-/+	8	9-/+	8	9-/+	9	8	9-/+	9	8	10	10-/+	L9	10-/+	L9
12	10-/+	9	10-/+	9	10-/+	10	9	10-/+	10	9	N/A	N/A	L10	N/A	L10
13	N/A	10	N/A	10	N/A	N/A	10	N/A	N/A	10	N/A	N/A	N/A	N/A	N/A
A	N/A	N/A	COM	COM	N/A	N/A	N/A	COM	COM	COM	N/A	N/A	N/A	COM	COM
B	N/A	N/A	1	1	N/A	N/A	N/A	1	1	1	N/A	N/A	N/A	1	1
C	N/A	N/A	2	2	N/A	N/A	N/A	2	2	2	N/A	N/A	N/A	2	2
D	N/A	N/A	3	3	N/A	N/A	N/A	3	3	3	N/A	N/A	N/A	3	3
E	N/A	N/A	4	4	N/A	N/A	N/A	4	4	4	N/A	N/A	N/A	4	4
F	N/A	N/A	5	5	N/A	N/A	N/A	5	5	5	N/A	N/A	N/A	5	5
G	N/A	N/A	6	6	N/A	N/A	N/A	6	6	6	N/A	N/A	N/A	6	6
H	N/A	N/A	7	7	N/A	N/A	N/A	7	7	7	N/A	N/A	N/A	7	7
I	N/A	N/A	8	8	N/A	N/A	N/A	8	8	8	N/A	N/A	N/A	8	8
J	N/A	N/A	9	9	N/A	N/A	N/A	9	9	9	N/A	N/A	N/A	9	9
K	N/A	N/A	10	10	N/A	N/A	N/A	10	10	10	N/A	N/A	N/A	10	10

NOTE#1: RESET IF (R) OPTION IS SELECTED, OTHERWISE N/A

SCHEMATICS

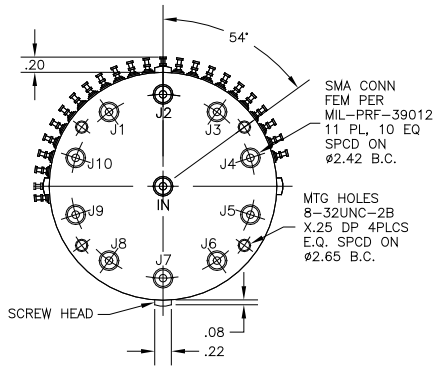
	Pages 139-143														
FIG.	25	26	25	26	29	29	30	29	29	30	33	33	34	33	34

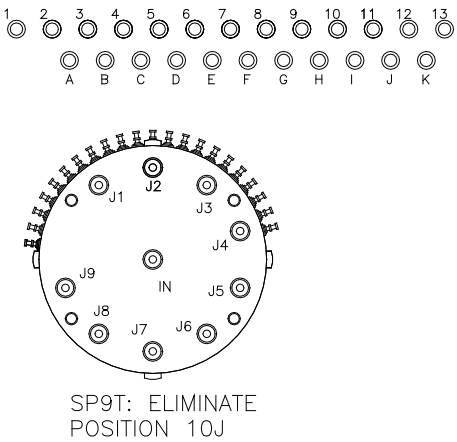
OUTLINE DRAWING DIMENSION "A"

	2.60"	2.98"	2.60"	2.98"	2.10"	2.10"	2.36"	2.10"	2.10"	2.36"	2.10"	2.10"	2.36"	2.10"	2.36"

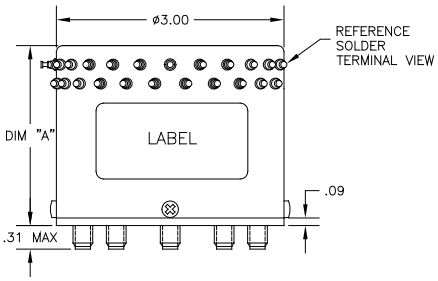
DC TERMINAL VIEW

BOTTOM VIEW

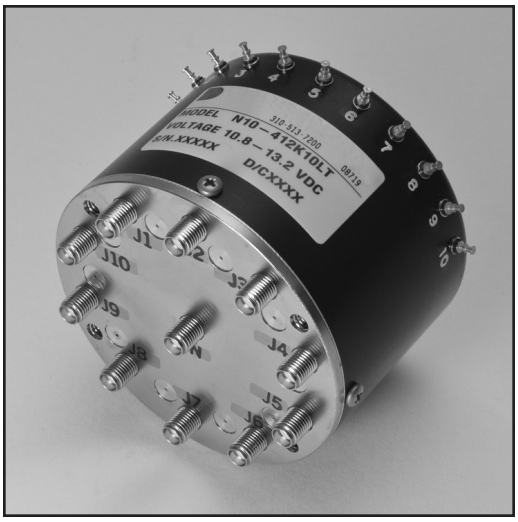




FRONT VIEW



N SERIES
1P9T to 1P10T MULTI POSITION
50 OHM TERMINATED SWITCH
DC-10.5 GHz ◆ SMA



The ***N Series*** features SMA connectors and a frequency range of DC to 10.5 GHz.

This series is available with latching self cut-off or normally open functions with terminations.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.40	0.40	70
8-10.5 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	240mA	300mA	200mA	140mA
Latching	280mA	353mA	218mA	175mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

4 -	SMA

OPTION 3 TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub Miniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

Latching Self Cut-Off	
D -	Diodes
E -	Diodes, Indicators
Normally Open	
G -	Diodes, Indicators
H -	Indicators
J -	Diodes
K -	Standard

OPTION 6 FREQUENCY

2 -	DC to 10.5 GHz

OPTION 7 POLARITY

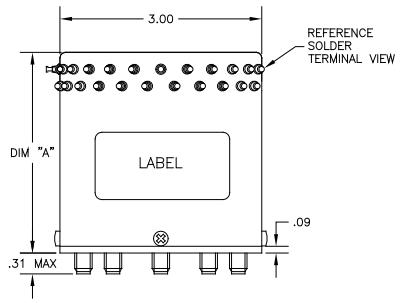
0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

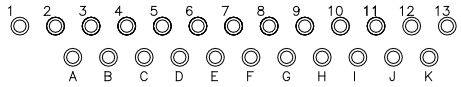
L -	TTL (High)
LL -	TTL (Low)
1 -	Bracket
F -	Flange
P -	High Power Handling
R -	Reset (Latching Only)
C -	BCD
T -	Terminated

N		-	4				2		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

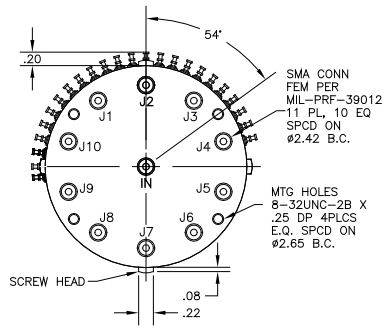
FRONT VIEW

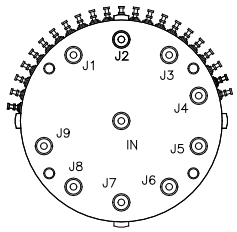


DC TERMINAL VIEW



BOTTOM VIEW





SP9T: ELIMINATE POSITION 10J

DC TERMINAL FUNCTION

PIN	LATCHING				NORMALLY OPEN					
	D	D w/ TTL	E	E w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL
1	NOTE #1	NOTE #1	NOTE #1	NOTE #1	N/A	N/A	N/A	N/A	N/A	N/A
2	COM+/-	+A	COM+/-	+A	COM+/-	COM	+A	COM+/-	COM	+A
3	1-/+	-B	1-/+	-B	1-/+	1	-B	1-/+	1	-B
4	2-/+	1	2-/+	1	2-/+	2	1	2-/+	2	1
5	3-/+	2	3-/+	2	3-/+	3	2	3-/+	3	2
6	4-/+	3	4-/+	3	4-/+	4	3	4-/+	4	3
7	5-/+	4	5-/+	4	5-/+	5	4	5-/+	5	4
8	6-/+	5	6-/+	5	6-/+	6	5	6-/+	6	5
9	7-/+	6	7-/+	6	7-/+	7	6	7-/+	7	6
10	8-/+	7	8-/+	7	8-/+	8	7	8-/+	8	7
11	9-/+	8	9-/+	8	9-/+	9	8	9-/+	9	8
12	10-/+	9	10-/+	9	10-/+	10	9	10-/+	10	9
13	N/A	10	N/A	10	N/A	N/A	10	N/A	N/A	10
A	N/A	N/A	COM	COM	N/A	N/A	N/A	COM	COM	COM
B	N/A	N/A	1	1	N/A	N/A	N/A	1	1	1
C	N/A	N/A	2	2	N/A	N/A	N/A	2	2	2
D	N/A	N/A	3	3	N/A	N/A	N/A	3	3	3
E	N/A	N/A	4	4	N/A	N/A	N/A	4	4	4
F	N/A	N/A	5	5	N/A	N/A	N/A	5	5	5
G	N/A	N/A	6	6	N/A	N/A	N/A	6	6	6
H	N/A	N/A	7	7	N/A	N/A	N/A	7	7	7
I	N/A	N/A	8	8	N/A	N/A	N/A	8	8	8
J	N/A	N/A	9	9	N/A	N/A	N/A	9	9	9
K	N/A	N/A	10	10	N/A	N/A	N/A	10	10	10

NOTE#1: RESET IF (R) OPTION IS SELECTED, OTHERWISE N/A

SCHEMATICS

	Pages 139-143									
FIG.	25	26	25	26	29	29	30	29	29	30

OUTLINE DRAWING DIMENSION "A"

	2.60"	2.98"	2.60"	2.98"	2.10"	2.10"	2.36"	2.10"	2.10"	2.36"

O SERIES
1P3T to 1P6T
MULTI POSITION SWITCH
DC-12.4 GHz ◆ N, BNC, TNC

The ***O Series*** features N, BNC or TNC connectors and a frequency range of DC to 12.4 GHz.

This series is available with latching self cut-off or normally open functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.35	0.35	70
8-12.4 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	240mA	240mA	170mA	140mA
Latching	280mA	280mA	270mA	220mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

1 -	N
2 -	BNC
3 -	TNC

OPTION 3 TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub Miniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

	Latching Self Cut-Off
D -	Diodes
E -	Diodes, Indicators
	Normally Open
G -	Diodes, Indicators
H -	Indicators
J -	Diodes
K -	Standard
N -	Failsafe to Position 1 - Standard Failsafe
R -	to Position 1 - Diodes
S -	Failsafe to Position 1 - Diodes, Indicators

OPTION 6 FREQUENCY

2 -	DC to 12.4 GHz

OPTION 7 POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
1 -	Bracket
F -	Flange
M -	Manual Override
P -	High Power Handling
R -	Reset (Latching Only)
C -	BCD

O		-					**2**		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	LATCHING				NORMALLY OPEN					NORMALLY OPEN - FAILSAFE TO POSITION 1					
PIN	D	D w/ TTL	E	E w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL	N	R	N, R w/ TTL	S	S w/ TTL
1	NOTE #1	NOTE #1	NOTE #1	NOTE #1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	COM+/-	+A	COM+/-	+A	COM+/-	COM	+A	COM+/-	COM	+A	COM	COM+/-	+A	COM+/-	+A
3	1-/+	-B	1-/+	-B	1-/+	1	-B	1-/+	1	-B	2	2-/+	-B	2-/+	-B
4	2-/+	1	2-/+	1	2-/+	2	1	2-/+	2	1	3	3-/+	2	3-/+	2
5	3-/+	2	3-/+	2	3-/+	3	2	3-/+	3	2	4	4-/+	3	4-/+	3
6	4-/+	3	4-/+	3	4-/+	4	3	4-/+	4	3	5	5-/+	4	5-/+	4
7	5-/+	4	5-/+	4	5-/+	5	4	5-/+	5	4	6	6-/+	5	6-/+	5
8	6-/+	5	6-/+	5	6-/+	6	5	6-/+	6	5	N/A	N/A	6	N/A	6
9	N/A	6	N/A	6	N/A	N/A	6	N/A	N/A	6	N/A	N/A	N/A	N/A	N/A
A	N/A	N/A	COM	COM	N/A	N/A	N/A	COM	COM	COM	N/A	N/A	N/A	COM	COM
B	N/A	N/A	1	1	N/A	N/A	N/A	1	1	1	N/A	N/A	N/A	1	1
C	N/A	N/A	2	2	N/A	N/A	N/A	2	2	2	N/A	N/A	N/A	2	2
D	N/A	N/A	3	3	N/A	N/A	N/A	3	3	3	N/A	N/A	N/A	3	3
E	N/A	N/A	4	4	N/A	N/A	N/A	4	4	4	N/A	N/A	N/A	4	4
F	N/A	N/A	5	5	N/A	N/A	N/A	5	5	5	N/A	N/A	N/A	5	5
G	N/A	N/A	6	6	N/A	N/A	N/A	6	6	6	N/A	N/A	N/A	6	6

NOTE#1: RESET IF (R) OPTION IS SELECTED, OTHERWISE N/A

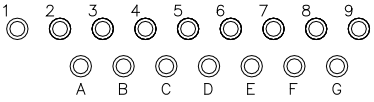
SCHEMATICS

	Pages 139-143														
FIG.	25	26	25	26	29	29	30	29	29	30	33	33	34	33	34

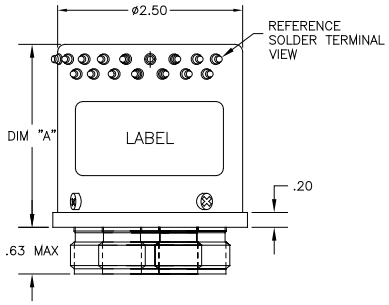
OUTLINE DRAWING DIMENSION "A"

	2.47"	3.20"	2.47"	3.20"	1.97"	1.97"	2.88"	2.47"	2.47"	3.20"	1.97"	1.97"	2.88"	2.47"	3.20"

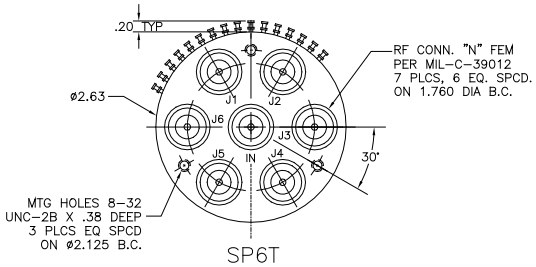
DC TERMINAL VIEW



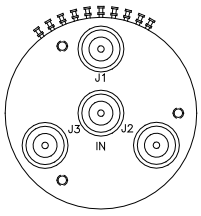
FRONT VIEW



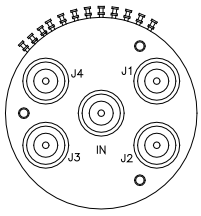
BOTTOM VIEW



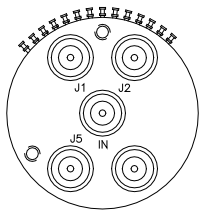
SP6T



SP3T



SP4T



SP5T

O SERIES
1P3T to 1P6T MULTI POSITION 50 OHM TERMINATED SWITCH
DC-12.4 GHz ◆ N, BNC, TNC

The ***O Series*** features N or TNC connectors and a frequency range of DC to 12.4 GHz.

This series is available with latching self cut-off or normally open functions with terminations.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.35	0.35	70
8-12.4 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	240mA	300mA	200mA	140mA
Latching	280mA	353mA	320mA	215mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 – RF CONNECTORS

1 -	N
2 -	BNC
3 -	TNC

OPTION 3 – TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub Miniature D-Shell Connector

OPTION 4 – VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 – ACTUATOR

Latching Self Cut-Off	
D -	Diodes
E -	Diodes, Indicators
Normally Open	
G -	Diodes, Indicators
H -	Indicators
J -	Diodes
K -	Standard
N -	Failsafe to Position 1 - Standard Failsafe
R -	to Position 1 - Diodes
S -	Failsafe to Position 1 - Diodes, Indicators

OPTION 6 – FREQUENCY

2 -	DC to 12.4 GHz

OPTION 7 – POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 – SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
1 -	Bracket
F -	Flange
M -	Manual Override
P -	High Power Handling
R -	Reset (Latching Only)
C -	BCD
T -	Termination

O		-					**2**		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	LATCHING					NORMALLY OPEN					NORMALLY OPEN - FAILSAFE TO POSITION 1				
PIN	D	D w/ TTL	E	E w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL	N	R	N, R w/ TTL	S	S w/ TTL
1	NOTE #1	NOTE #1	NOTE #1	NOTE #1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	COM+/-	+A	COM+/-	+A	COM+/-	COM	+A	COM+/-	COM	+A	COM	COM+/-	+A	COM+/-	+A
3	1-/+	-B	1-/+	-B	1-/+	1	-B	1-/+	1	-B	2	2-/+	-B	2-/+	-B
4	2-/+	1	2-/+	1	2-/+	2	1	2-/+	2	1	3	3-/+	2	3-/+	2
5	3-/+	2	3-/+	2	3-/+	3	2	3-/+	3	2	4	4-/+	3	4-/+	3
6	4-/+	3	4-/+	3	4-/+	4	3	4-/+	4	3	5	5-/+	4	5-/+	4
7	5-/+	4	5-/+	4	5-/+	5	4	5-/+	5	4	6	6-/+	5	6-/+	5
8	6-/+	5	6-/+	5	6-/+	6	5	6-/+	6	5	N/A	N/A	6	N/A	6
9	N/A	6	N/A	6	N/A	N/A	6	N/A	N/A	6	N/A	N/A	N/A	N/A	N/A
A	N/A	N/A	COM	COM	N/A	N/A	N/A	COM	COM	COM	N/A	N/A	N/A	COM	COM
B	N/A	N/A	1	1	N/A	N/A	N/A	1	1	1	N/A	N/A	N/A	1	1
C	N/A	N/A	2	2	N/A	N/A	N/A	2	2	2	N/A	N/A	N/A	2	2
D	N/A	N/A	3	3	N/A	N/A	N/A	3	3	3	N/A	N/A	N/A	3	3
E	N/A	N/A	4	4	N/A	N/A	N/A	4	4	4	N/A	N/A	N/A	4	4
F	N/A	N/A	5	5	N/A	N/A	N/A	5	5	5	N/A	N/A	N/A	5	5
G	N/A	N/A	6	6	N/A	N/A	N/A	6	6	6	N/A	N/A	N/A	6	6

NOTE#1: RESET IF (R) OPTION IS SELECTED, OTHERWISE N/A

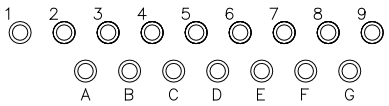
SCHEMATICS

	Pages 139-143														
FIG.	25	26	25	26	29	29	30	29	29	30	33	33	34	33	34

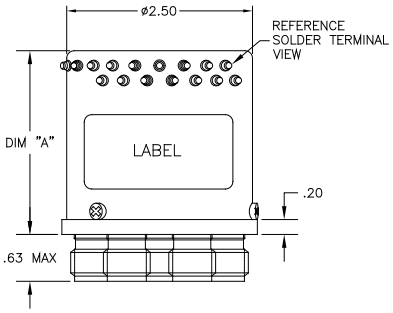
OUTLINE DRAWING DIMENSION "A"

	2.47"	3.20"	2.47"	3.20"	1.97"	1.97"	2.88"	2.47"	2.47"	3.20"	1.97"	1.97"	2.88"	2.47"	3.20"

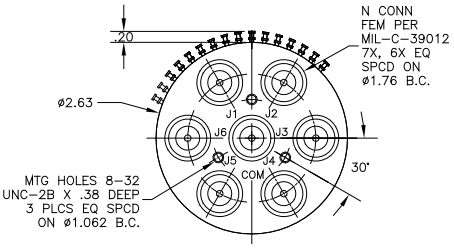
DC TERMINAL VIEW

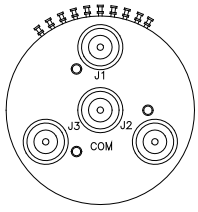


FRONT VIEW

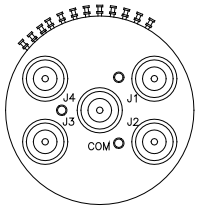


BOTTOM VIEW

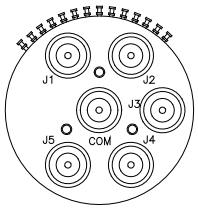




SP3T

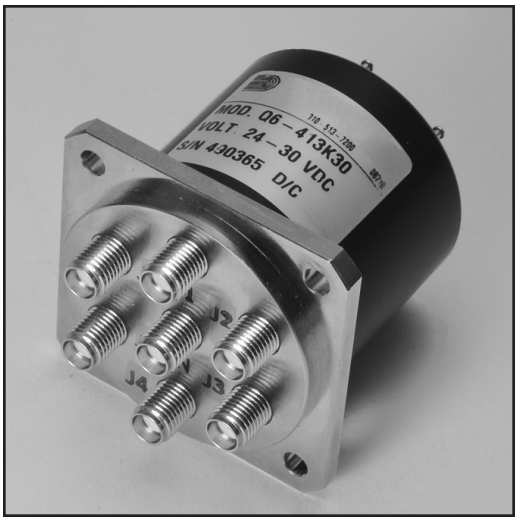


SP4T



SP5T

Q SERIES
1P3T to 1P6T
MULTI POSITION SWITCH
DC-18 GHz ◆ SMA



The ***Q Series*** features SMA connectors and a frequency range of DC to 18 GHz.

This series is available with normally open functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.30	0.30	70
8-12.4 GHz	1.40	0.40	60
12.4-18 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	270mA	270mA	150mA	160mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 – RF CONNECTORS
- **4 -** SMA

OPTION 3 – TERMINALS
- **1 -** Solder Terminals
- **2 -** Circular Connector
- **4 -** Sub Miniature D-Shell Connector

OPTION 4 – VOLTAGE
- **1 -** 6 Vdc +/- 10%
- **2 -** 12 Vdc +/- 10%
- **3 -** 24-30 Vdc
- **4 -** 48 Vdc +/- 10%
- **5 -** 110 Vac +/- 10%
- **6 -** 12-15 Vdc
- **7 -** 18-20 Vdc
- **8 -** 20-24 Vdc

OPTION 5 – ACTUATOR

Normally Open
- **G -** Diodes, Indicators
- **H -** Indicators
- **J -** Diodes
- **K -** Standard

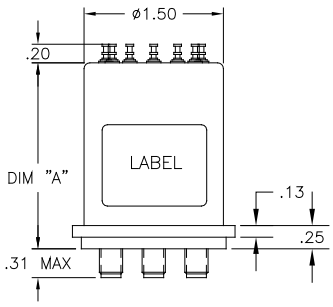
OPTION 6 – FREQUENCY
- **3 -** DC to 18 GHz

OPTION 7 – POLARITY
- **0 -** Not Applicable
- **8 -** Positive Common
- **9 -** Negative Common

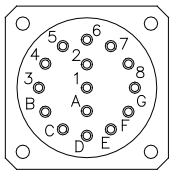
OPTION 8 – SPECIAL OPTIONS
- **L -** TTL (High)
- **LL -** TTL (Low)
- **F -** Flange
- **P -** High Power Handling

Q		-	4				3		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

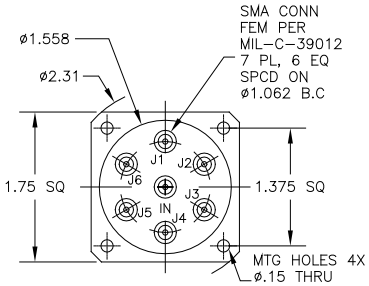
FRONT VIEW



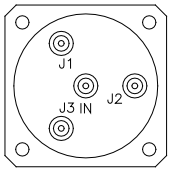
DC TERMINAL VIEW



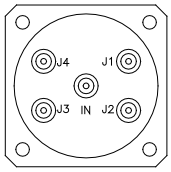
BOTTOM VIEW



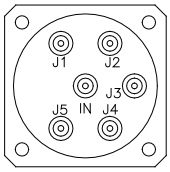
SP6T



SP3T



SP4T



SP5T

DC TERMINAL FUNCTION

PIN	NORMALLY OPEN					
	J	K	J, K w/ TTL	G	H	G, H w/ TTL
1	COM+/-	COM	+A	COM+/-	COM	+A
2	1-/+	1	-B	1-/+	1	-B
3	2-/+	2	1	2-/+	2	1
4	3-/+	3	2	3-/+	3	2
5	4-/+	4	3	4-/+	4	3
6	5-/+	5	4	5-/+	5	4
7	6-/+	6	5	6-/+	6	5
8	N/A	N/A	6	N/A	N/A	6
A	N/A	N/A	N/A	COM	COM	COM
B	N/A	N/A	N/A	1	1	1
C	N/A	N/A	N/A	2	2	2
D	N/A	N/A	N/A	3	3	3
E	N/A	N/A	N/A	4	4	4
F	N/A	N/A	N/A	5	5	5
G	N/A	N/A	N/A	6	6	6

SCHEMATICS

	Pages 139-143					
FIG.	29	29	30	29	29	30

OUTLINE DRAWING DIMENSION "A"

	1.60"	1.60"	2.25"	2.10"	2.10"	2.50"

QK SERIES
1P3T to 1P6T
MULTI POSITION SWITCH
DC-40 GHz ◆ K

The ***QK Series*** features K connectors and a frequency range of DC to 40 GHz.

This series is available with latching self cut-off or normally open functions.

RF Impedance: 50 ohms nominal
Temperature Range: -35°C to +85°C ambient
Operating Life: 1,000,000 cycles min.
Switching Time: 15 mSec max.
Switching Sequence: Break Before Make
Environmental: Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-6 GHz	1.30	0.20	70
6-12 GHz	1.40	0.40	60
12-18 GHz	1.50	0.50	60
18-26.5 GHz	1.70	0.70	55
26.5-40 GHz	2.00	1.00	50

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	180mA	180mA	130mA	140mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 – RF CONNECTORS
- **9 -** K

OPTION 3 – TERMINALS
- **1 -** Solder Terminals
- **2 -** Circular Connector
- **4 -** Sub Miniature D-Shell Connector

OPTION 4 – VOLTAGE
- **1 -** 6 Vdc +/- 10%
- **2 -** 12 Vdc +/- 10%
- **3 -** 24-30 Vdc
- **4 -** 48 Vdc +/- 10%
- **5 -** 110 Vac +/- 10%
- **6 -** 12-15 Vdc
- **7 -** 18-20 Vdc
- **8 -** 20-24 Vdc

OPTION 5 – ACTUATOR

Normally Open
- **G -** Diodes, Indicators
- **H -** Indicators
- **J -** Diodes
- **K -** Standard

OPTION 6 – FREQUENCY
- **7 -** DC to 40 GHz

OPTION 7 – POLARITY
- **0 -** Not Applicable
- **8 -** Positive Common
- **9 -** Negative Common

OPTION 8 – SPECIAL OPTIONS
- **L -** TTL (High)
- **LL -** TTL (Low)
- **1 -** Bracket
- **F -** Flange

QK		-	9					7		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator		**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	NORMALLY OPEN					
PIN	J	K	J, K w/ TTL	G	H	G, H w/ TTL
1	COM+/-	COM	+A	COM+/-	COM	+A
2	1-/+	1	-B	1-/+	1	-B
3	2-/+	2	1	2-/+	2	1
4	3-/+	3	2	3-/+	3	2
5	4-/+	4	3	4-/+	4	3
6	5-/+	5	4	5-/+	5	4
7	6-/+	6	5	6-/+	6	5
8	N/A	N/A	6	N/A	N/A	6
A	N/A	N/A	N/A	COM	COM	COM
B	N/A	N/A	N/A	1	1	1
C	N/A	N/A	N/A	2	2	2
D	N/A	N/A	N/A	3	3	3
E	N/A	N/A	N/A	4	4	4
F	N/A	N/A	N/A	5	5	5
G	N/A	N/A	N/A	6	6	6

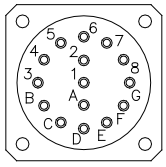
SCHEMATICS

	Pages 139-143					
FIG.	29	29	30	29	29	30

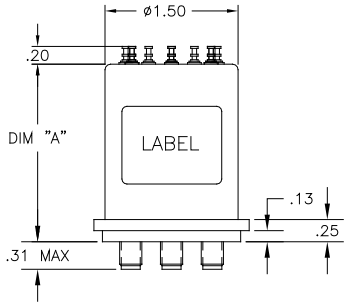
OUTLINE DRAWING DIMENSION "A"

	1.60"	1.60"	2.25"	2.10"	2.10"	2.50"

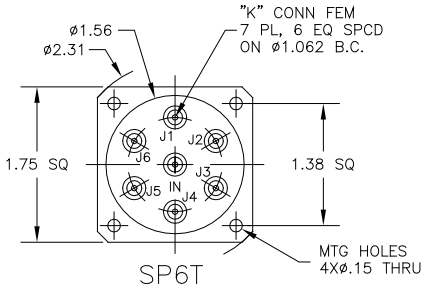
DC TERMINAL VIEW

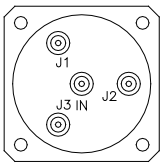


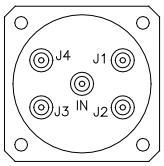
FRONT VIEW

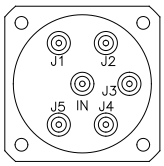


BOTTOM VIEW

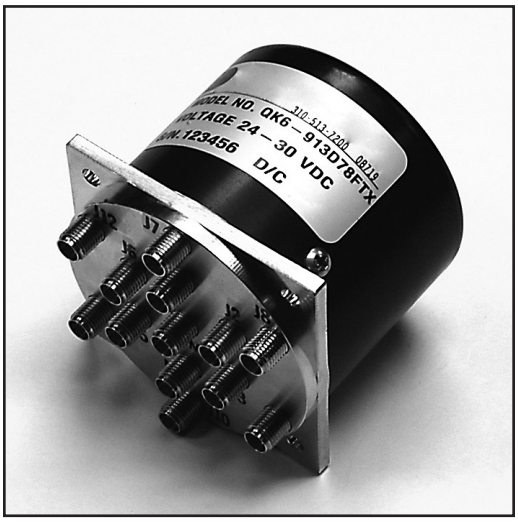








QK SERIES
1P3T to 1P6T MULTI POSITION 50 OHM TERMINATED SWITCH
DC- 40 GHz ◆ K



The ***QK Series*** features K connectors and a frequency range of DC to 40 GHz.

This series is available with latching self cut-off or normally open functions with terminations.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-6 GHz	1.30	0.20	70
6-12 GHz	1.40	0.40	60
12-18 GHz	1.50	0.50	60
18-26.5 GHz	1.70	0.70	55
26.5-40 GHz	2.00	1.00	50

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	282mA	353mA	218mA	175mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

9 -	K

OPTION 3 TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub Miniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

Latching Self Cut-Off

D -	Diodes
E -	Diodes, Indicators

OPTION 6 FREQUENCY

7 -	DC to 40 GHz

OPTION 7 POLARITY

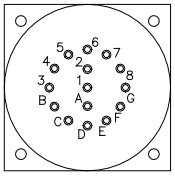
0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

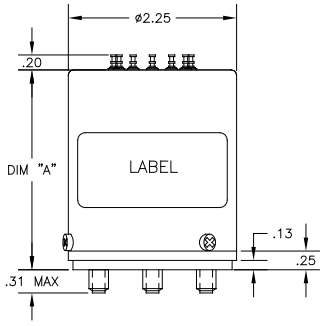
L -	TTL (High)
LL -	TTL (Low)
R -	Reset (Latching Only)
T -	Termination
U -	

QK		-	9				7		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connector	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

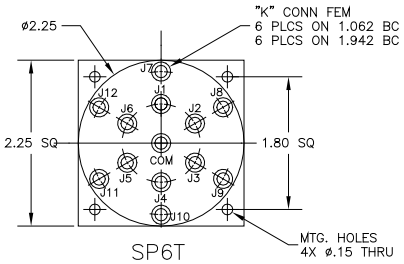
DC TERMINAL VIEW



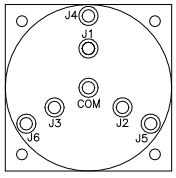
FRONT VIEW



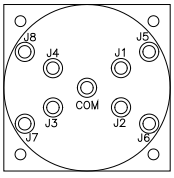
BOTTOM VIEW



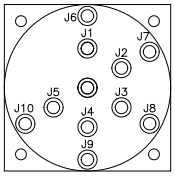
SP6T



SP3T



SP4T



SP5T

DC TERMINAL FUNCTION

PIN	LATCHING			
	D	D w/ TTL	E	E w/ TTL
1	C -/+	+V SW	C -/+	+V SW
2	AV1 -/+	C RTN	AV1 -/+	C RTN
3	AV2 -/+	L1	AV2 -/+	L1
4	AV3 -/+	L2	AV3 -/+	L2
5	AV4 -/+	L3	AV4 -/+	L3
6	AV5 -/+	L4	AV5 -/+	L4
7	AV6 -/+	L5	AV6 -/+	L5
8	N/A	L6	N/A	L6
A	N/A	N/A	Ind COM	Ind COM
B	N/A	N/A	Ind 1	Ind 1
C	N/A	N/A	Ind 2	Ind 2
D	N/A	N/A	Ind 3	Ind 3
E	N/A	N/A	Ind 4	Ind 4
F	N/A	N/A	Ind 5	Ind 5
G	N/A	N/A	Ind 6	Ind 6

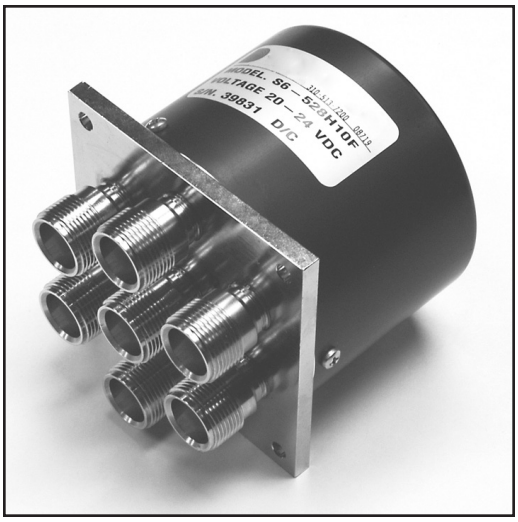
SCHEMATICS

	Pages 139-143			
FIG.	27	28	27	28

OUTLINE DRAWING DIMENSION "A"

	2.38"	2.38"	2.38"	2.38"

S SERIES
1P3T to 1P6T
MULTI POSITION SWITCH
DC- 6.5 GHz ◆ SC



The ***S Series*** features SC connectors and a frequency range of DC to 6.5 GHz and is designed for high power applications.

This series available with latching self cut-off or normally open functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-1 GHz	1.15	0.15	80
1-3 GHz	1.35	0.35	70
3-6.5 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	240mA	240mA	170mA	140mA
Latching	280mA	280mA	270mA	220mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

- **5 -** SC

OPTION 3 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **4 -** Sub Miniature D-Shell Connector

OPTION 4 VOLTAGE

- **1 -** 6 Vdc +/- 10%
- **2 -** 12 Vdc +/- 10%
- **3 -** 24-30 Vdc
- **4 -** 48 Vdc +/- 10%
- **5 -** 110Vac +/- 10%
- **6 -** 12-15 Vdc
- **7 -** 18-20 Vdc
- **8 -** 20-24 Vdc

OPTION 5 ACTUATOR

Latching Self Cut-Off

- **D -** Diodes
- **E -** Diodes, Indicators

Normally Open

- **G -** Diodes, Indicators
- **H -** Indicators
- **J -** Diodes
- **K -** Standard
- **N -** Failsafe to Position 1 - Standard Failsafe
- **R -** to Position 1 - Diodes
- **S -** Failsafe to Position 1 - Diodes, Indicators

OPTION 6 FREQUENCY

- **2 -** DC to 6.5 GHz

OPTION 7 POLARITY

- **0 -** Not Applicable
- **8 -** Positive Common
- **9 -** Negative Common

OPTION 8 SPECIAL OPTIONS

- **L -** TTL (High)
- **LL -** TTL (Low)
- **1 -** Bracket
- **F -** Flange
- **R -** Reset (Latching Only)
- **C -** BCD

S		-	5				2		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	LATCHING					NORMALLY OPEN						NORMALLY OPEN - FAILSAFE TO POSITION 1				
PIN	D	D w/ TTL	E	E w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL	N	R	N, R w/ TTL	S	S w/ TTL
1	NOTE #1	NOTE #1	NOTE #1	NOTE #1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	COM+/-	+A	COM+/-	+A	COM+/-	COM	+A	COM+/-	COM	+A	COM	COM+/-	+A	COM+/-	+A
3	1-/+	-B	1-/+	-B	1-/+	1	-B	1-/+	1	-B	2	2-/+	-B	2-/+	-B
4	2-/+	1	2-/+	1	2-/+	2	1	2-/+	2	1	3	3-/+	2	3-/+	2
5	3-/+	2	3-/+	2	3-/+	3	2	3-/+	3	2	4	4-/+	3	4-/+	3
6	4-/+	3	4-/+	3	4-/+	4	3	4-/+	4	3	5	5-/+	4	5-/+	4
7	5-/+	4	5-/+	4	5-/+	5	4	5-/+	5	4	6	6-/+	5	6-/+	5
8	6-/+	5	6-/+	5	6-/+	6	5	6-/+	6	5	N/A	N/A	6	N/A	6
9	N/A	6	N/A	6	N/A	N/A	6	N/A	N/A	6	N/A	N/A	N/A	N/A	N/A
A	N/A	N/A	COM	COM	N/A	N/A	N/A	COM	COM	COM	N/A	N/A	N/A	COM	COM
B	N/A	N/A	1	1	N/A	N/A	N/A	1	1	1	N/A	N/A	N/A	1	1
C	N/A	N/A	2	2	N/A	N/A	N/A	2	2	2	N/A	N/A	N/A	2	2
D	N/A	N/A	3	3	N/A	N/A	N/A	3	3	3	N/A	N/A	N/A	3	3
E	N/A	N/A	4	4	N/A	N/A	N/A	4	4	4	N/A	N/A	N/A	4	4
F	N/A	N/A	5	5	N/A	N/A	N/A	5	5	5	N/A	N/A	N/A	5	5
G	N/A	N/A	6	6	N/A	N/A	N/A	6	6	6	N/A	N/A	N/A	6	6

NOTE#1: RESET IF (R) OPTION IS SELECTED, OTHERWISE N/A

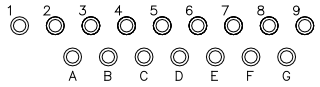
SCHEMATICS

	Pages 139-143														
FIG.	25	26	25	26	29	29	30	29	29	30	33	33	34	33	34

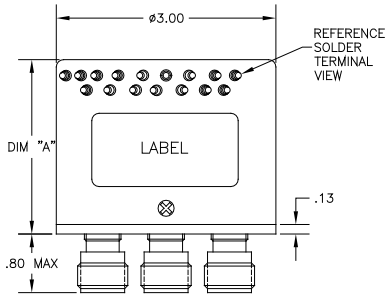
OUTLINE DRAWING DIMENSION "A"

	2.63"	3.00"	2.63"	3.00"	2.38"	2.38"	2.63"	2.38"	2.38"	2.63"	2.38"	2.38"	2.63"	2.38"	2.63"

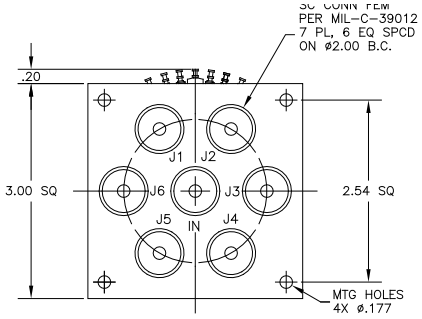
DC TERMINAL VIEW



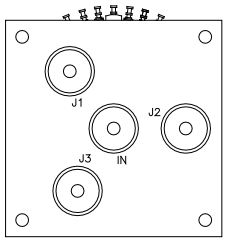
FRONT VIEW



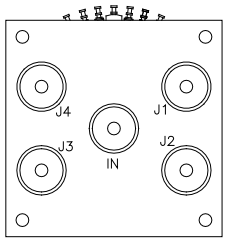
BOTTOM VIEW



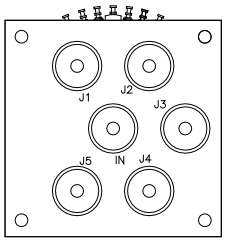
1P6T



1P3T



1P4T



1P5T

S SERIES
1P7T to 1P8T
MULTI POSITION SWITCH
DC- 6.5 GHz ◆ SC

The ***S Series*** features SC connectors and a frequency range of DC to 6.5 GHz and is designed for high power applications.

This series is available with latching self cut-off or normally open functions.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-1 GHz	1.15	0.15	80
1-3 GHz	1.35	0.35	70
3-6.5 GHz	1.50	0.50	60

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	240mA	240mA	170mA	140mA
Latching	280mA	280mA	270mA	220mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 – RF CONNECTORS

5 -	SC

OPTION 3 – TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub Miniature D-Shell Connector

OPTION 4 – VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 – ACTUATOR

	Latching Self Cut-Off
D -	Diodes
E -	Diodes, Indicators
	Normally Open
G -	Diodes, Indicators
H -	Indicators
J -	Diodes
K -	Standard
N -	Failsafe to Position 1 - Standard Failsafe
R -	to Position 1 - Diodes
S -	Failsafe to Position 1 - Diodes, Indicators

OPTION 6 – FREQUENCY

2 -	DC to 6.5 GHz

OPTION 7 – POLARITY

0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 – SPECIAL OPTIONS

L -	TTL (High)
LL -	TTL (Low)
1 -	Bracket
F -	Flange
R -	Reset (Latching Only)
C -	BCD

S		-	5				2		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL FUNCTION

	LATCHING					NORMALLY OPEN					NORMALLY OPEN - FAILSAFE TO POSITION 1				
PIN	D	D w/ TTL	E	E w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL	N	R	N, R w/ TTL	S	S w/ TTL
1	NOTE #1	NOTE #1	NOTE #1	NOTE #1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	COM+/-	+A	COM+/-	+A	COM+/-	COM	+A	COM+/-	COM	+A	COM	COM+/-	+A	COM+/-	+A
3	1-/+	-B	1-/+	-B	1-/+	1	-B	1-/+	1	-B	2	2-/+	-B	2-/+	-B
4	2-/+	1	2-/+	1	2-/+	2	1	2-/+	2	1	3	3-/+	2	3-/+	2
5	3-/+	2	3-/+	2	3-/+	3	2	3-/+	3	2	4	4-/+	3	4-/+	3
6	4-/+	3	4-/+	3	4-/+	4	3	4-/+	4	3	5	5-/+	4	5-/+	4
7	5-/+	4	5-/+	4	5-/+	5	4	5-/+	5	4	6	6-/+	5	6-/+	5
8	6-/+	5	6-/+	5	6-/+	6	5	6-/+	6	5	7	7-/+	6	7-/+	6
9	7-/+	6	7-/+	6	7-/+	7	6	7-/+	7	6	8	8-/+	7	8-/+	7
10	8-/+	7	8-/+	7	8-/+	8	7	8-/+	8	7	N/A	N/A	8	N/A	8
11	N/A	8	N/A	8	N/A	N/A	8	N/A	N/A	8	N/A	N/A	N/A	N/A	N/A
A	N/A	N/A	COM	COM	N/A	N/A	N/A	COM	COM	COM	N/A	N/A	N/A	COM	COM
B	N/A	N/A	1	1	N/A	N/A	N/A	1	1	1	N/A	N/A	N/A	1	1
C	N/A	N/A	2	2	N/A	N/A	N/A	2	2	2	N/A	N/A	N/A	2	2
D	N/A	N/A	3	3	N/A	N/A	N/A	3	3	3	N/A	N/A	N/A	3	3
E	N/A	N/A	4	4	N/A	N/A	N/A	4	4	4	N/A	N/A	N/A	4	4
F	N/A	N/A	5	5	N/A	N/A	N/A	5	5	5	N/A	N/A	N/A	5	5
G	N/A	N/A	6	6	N/A	N/A	N/A	6	6	6	N/A	N/A	N/A	6	6
H	N/A	N/A	7	7	N/A	N/A	N/A	7	7	7	N/A	N/A	N/A	7	7
I	N/A	N/A	8	8	N/A	N/A	N/A	8	8	8	N/A	N/A	N/A	8	8

NOTE#1: RESET IF (R) OPTION IS SELECTED, OTHERWISE N/A

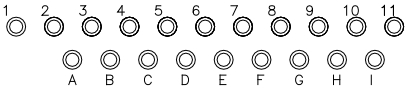
SCHEMATICS

	Pages 139-143														
FIG.	25	26	25	26	29	29	30	29	29	30	33	33	34	33	34

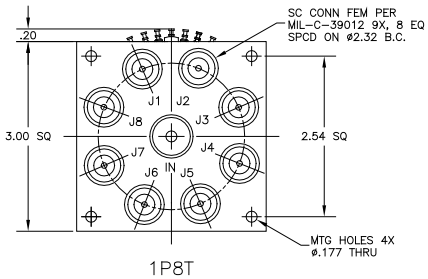
OUTLINE DRAWING DIMENSION "A"

	2.70"	2.70"	2.70"	2.70"	2.30"	2.30"	2.47"	2.30"	2.30"	2.47"	2.30"	2.30"	2.47"	2.30"	2.47"

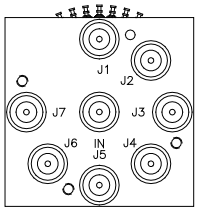
DC TERMINAL VIEW



BOTTOM VIEW

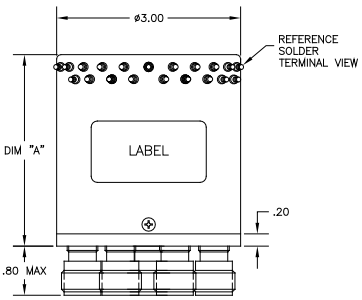


1P8T

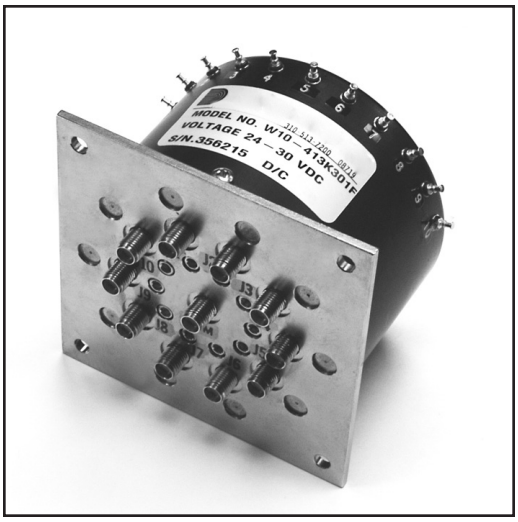


1P7T

FRONT VIEW



W SERIES
1P8T to 1P10T
MULTI POSITION SWITCH
DC-18 GHz ◆ SMA



The ***W Series*** features SMA connectors and a frequency range of DC to 18 GHz.

This series is available with normally open functions only.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.30	0.30	70
8-12.4 GHz	1.40	0.40	60
12.4-15.5 GHz	1.50	0.50	60
15.5-18 GHz	1.80	0.80	55

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	270mA	270mA	150mA	140mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

- **4 -** SMA

OPTION 3 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **4 -** Sub Miniature D-Shell Connector

OPTION 4 VOLTAGE

- **1 -** 6 Vdc +/- 10%
- **2 -** 12 Vdc +/- 10%
- **3 -** 24-30 Vdc
- **4 -** 48 Vdc +/- 10%
- **5 -** 110 Vac +/- 10%
- **6 -** 12-15 Vdc
- **7 -** 18-20 Vdc
- **8 -** 20-24 Vdc

OPTION 5 ACTUATOR

Normally Open

- **G -** Diodes, Indicators
- **H -** Indicators
- **J -** Diodes
- **K -** Standard

OPTION 6 FREQUENCY

- **3 -** DC to 18 GHz

OPTION 7 POLARITY

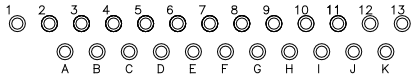
- **0 -** Not Applicable
- **8 -** Positive Common
- **9 -** Negative Common

OPTION 8 SPECIAL OPTIONS

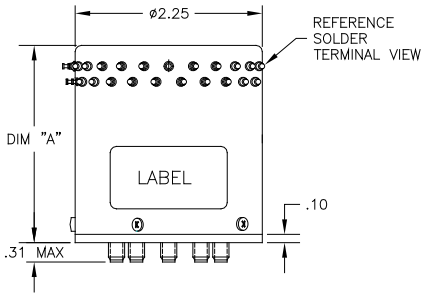
- **L -** TTL (High)
- **LL -** TTL (Low)
- **1 -** Bracket
- **F -** Flange
- **R -** Reset (Latching Only)
- **C -** BCD
- **T -** Terminated

W		-	4				3		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

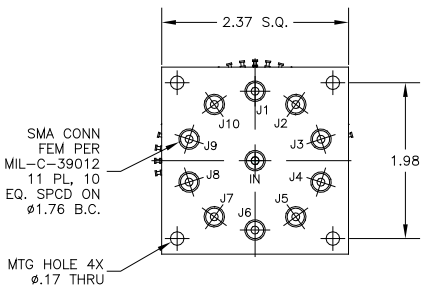
DC TERMINAL VIEW



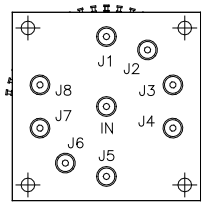
FRONT VIEW



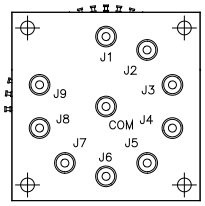
BOTTOM VIEW



SP10T



SP8T



SP9T

DC TERMINAL FUNCTION

PIN	NORMALLY OPEN					
	J	K	J, K w/ TTL	G	H	G, H w/ TTL
1	N/A	N/A	N/A	N/A	N/A	N/A
2	COM+/-	COM	+A	COM+/-	COM	+A
3	1-/+	1	-B	1-/+	1	-B
4	2-/+	2	1	2-/+	2	1
5	3-/+	3	2	3-/+	3	2
6	4-/+	4	3	4-/+	4	3
7	5-/+	5	4	5-/+	5	4
8	6-/+	6	5	6-/+	6	5
9	7-/+	7	6	7-/+	7	6
10	8-/+	8	7	8-/+	8	7
11	9-/+	9	8	9-/+	9	8
12	10-/+	10	9	10-/+	10	9
13	N/A	N/A	10	N/A	N/A	10
A	N/A	N/A	N/A	COM	COM	COM
B	N/A	N/A	N/A	1	1	1
C	N/A	N/A	N/A	2	2	2
D	N/A	N/A	N/A	3	3	3
E	N/A	N/A	N/A	4	4	4
F	N/A	N/A	N/A	5	5	5
G	N/A	N/A	N/A	6	6	6
H	N/A	N/A	N/A	7	7	7
I	N/A	N/A	N/A	8	8	8
J	N/A	N/A	N/A	9	9	9
K	N/A	N/A	N/A	10	10	10

NOTE#1: RESET IF (R) OPTION IS SELECTED, OTHERWISE N/A

SCHEMATICS

FIG.	Pages 139-143					
	29	29	30	29	29	30

OUTLINE DRAWING DIMENSION "A"

	2.10"	2.10"	2.36"	2.10"	2.10"	2.36"

W SERIES
1P8T to 1P10T MULTI POSITION
50 OHM TERMINATED SWITCH
DC-18 GHz ◆ SMA

The ***W Series*** features SMA connectors and a frequency range of DC to 18 GHz.

This series is available with latching self cut-off or normally open functions with terminations.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	1,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.20	0.20	80
3-8 GHz	1.30	0.30	70
8-12.4 GHz	1.40	0.40	60
12.4-15.5 GHz	1.50	0.50	60
15.5-18 GHz	1.80	0.80	55

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	270mA	333mA	185mA	140mA
Latching	280mA	353mA	218mA	175mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

4 -	SMA

OPTION 3 TERMINALS

1 -	Solder Terminals
2 -	Circular Connector
4 -	Sub Miniature D-Shell Connector

OPTION 4 VOLTAGE

1 -	6 Vdc +/- 10%
2 -	12 Vdc +/- 10%
3 -	24-30 Vdc
4 -	48 Vdc +/- 10%
5 -	110 Vac +/- 10%
6 -	12-15 Vdc
7 -	18-20 Vdc
8 -	20-24 Vdc

OPTION 5 ACTUATOR

	Latching Self Cut-Off
D -	Diodes
E -	Diodes, Indicators
	Normally Open
G -	Diodes, Indicators
H -	Indicators
J -	Diodes
K -	Standard

OPTION 6 FREQUENCY

3 -	DC to 18 GHz

OPTION 7 POLARITY

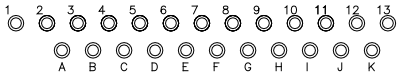
0 -	Not Applicable
8 -	Positive Common
9 -	Negative Common

OPTION 8 SPECIAL OPTIONS

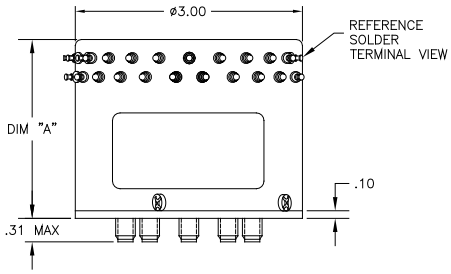
L -	TTL (High)
LL -	TTL (Low)
1 -	Bracket
F -	Flange
R -	Reset (Latching Only)
C -	BCD
T -	Terminated

W		-	4				3		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

DC TERMINAL VIEW



FRONT VIEW



DC TERMINAL FUNCTION

	LATCHING				NORMALLY OPEN					
PIN	D	D w/ TTL	E	E w/ TTL	J	K	J, K w/ TTL	G	H	G, H w/ TTL
1	NOTE #1	NOTE #1	NOTE #1	NOTE #1	N/A	N/A	N/A	N/A	N/A	N/A
2	COM+/-	+A	COM+/-	+A	COM+/-	COM	+A	COM+/-	COM	+A
3	1-/+	-B	1-/+	-B	1-/+	1	-B	1-/+	1	-B
4	2-/+	1	2-/+	1	2-/+	2	1	2-/+	2	1
5	3-/+	2	3-/+	2	3-/+	3	2	3-/+	3	2
6	4-/+	3	4-/+	3	4-/+	4	3	4-/+	4	3
7	5-/+	4	5-/+	4	5-/+	5	4	5-/+	5	4
8	6-/+	5	6-/+	5	6-/+	6	5	6-/+	6	5
9	7-/+	6	7-/+	6	7-/+	7	6	7-/+	7	6
10	8-/+	7	8-/+	7	8-/+	8	7	8-/+	8	7
11	9-/+	8	9-/+	8	9-/+	9	8	9-/+	9	8
12	10-/+	9	10-/+	9	10-/+	10	9	10-/+	10	9
13	N/A	10	N/A	10	N/A	N/A	10	N/A	N/A	10
A	N/A	N/A	COM	COM	N/A	N/A	N/A	COM	COM	COM
B	N/A	N/A	1	1	N/A	N/A	N/A	1	1	1
C	N/A	N/A	2	2	N/A	N/A	N/A	2	2	2
D	N/A	N/A	3	3	N/A	N/A	N/A	3	3	3
E	N/A	N/A	4	4	N/A	N/A	N/A	4	4	4
F	N/A	N/A	5	5	N/A	N/A	N/A	5	5	5
G	N/A	N/A	6	6	N/A	N/A	N/A	6	6	6
H	N/A	N/A	7	7	N/A	N/A	N/A	7	7	7
I	N/A	N/A	8	8	N/A	N/A	N/A	8	8	8
J	N/A	N/A	9	9	N/A	N/A	N/A	9	9	9
K	N/A	N/A	10	10	N/A	N/A	N/A	10	10	10

NOTE#1: RESET IF (R) OPTION IS SELECTED, OTHERWISE N/A

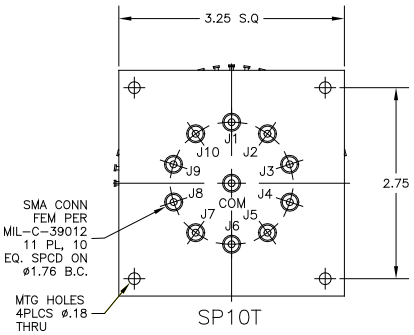
SCHEMATICS

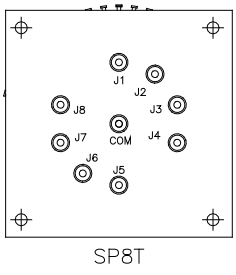
	Pages 139-143									
FIG.	25	26	25	26	29	29	30	29	29	30

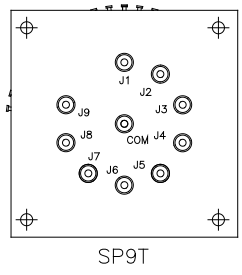
OUTLINE DRAWING DIMENSION "A"

	2.60"	2.98"	2.60"	2.98"	2.10"	2.10"	2.36"	2.10"	2.10"	2.36"

BOTTOM VIEW







DUCOMMUN

HUMAN-MACHINE INTERFACE (HMI) CAPABILITIES

Ducommun leads the way in human-machine interface (HMI) capabilities, from environmentally tested edge-lit panels to fully integrated panel and push-button assemblies, for commercial and military aerospace, rotary and fixed-wing aircraft, military ground vehicles and stand alone communications and navigation radios. Ducommun is investing heavily in new technologies to meet its customers' requirements for short lead times, zero defects, reduced assembly costs, and high reliability.

Whether it's a new platform or the upgrade of an existing one, our engineering team works closely with customers to design their HMI products to meet complex commercial and military requirements. Ducommun was at the design forefront when night vision requirements were released by the military, and was one of the first to incorporate LED technology into application specific designs over 20 years ago.

Discrete Components

Pushbutton Switches & Annunciators

Keyboards & Keypads

Time Delay Relays

Rotary Switches

Illuminated Displays

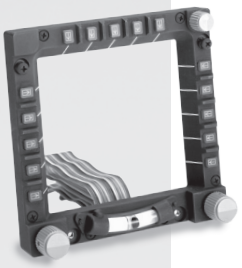
Edge-lit Panels

Lighted Keypads and Controls

LED and Incandescent Lighting

Sunlight Readable/NVIS

Compliant Display Bezels



Integrated Assemblies

Fully Integrated Electronics

Panel Subassemblies

Enclosures

Circuits, Encoders

Harnesses, Connectors, Power Supplies

DUCOMMUN

MICROWAVE & MILLIMETER WAVE COMPONENTS AND SUB-ASSEMBLIES

Ducommun's commitment to excellence in millimeterwave and microwave components is second to none. Through advanced engineering, prototyping and manufacturing strategies, Ducommun has emerged as the preferred solution for industry leading telecommunications and test equipment, military, and government agencies and research institutes.

Products

Amplifiers

Mixers

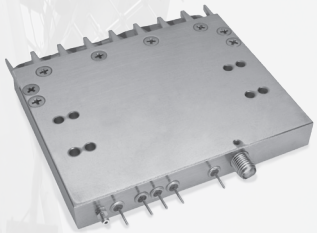
Oscillators

Passive Waveguide Components

Integrated Assemblies

Doppler Sensors

Applications



Law Enforcement Radar

Surveillance Radars

Missile Guidance

Level Sensing Radars

Communication Systems

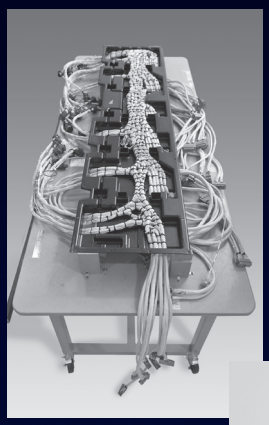
Automated Test Equipment

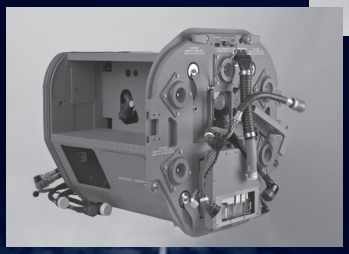
Ducommun provides leading companies worldwide with exceptionally engineered, high quality and cost effective microwave and millimeter wave components and subassemblies with frequency ranges from DC to 140 GHz. In addition to a wide range of standard products, Ducommun engineers work proactively with customers to develop new generations of products for application specific programs.

DUCOMMUN

ELECTROMECHANICAL ASSEMBLIES CAPABILITIES

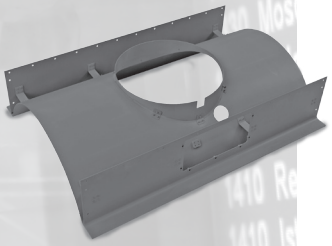
Ducommun offers full service electro-mechanical services including interconnect systems, printed circuit card assemblies, high-level assemblies and system integrations. These world class manufacturing capabilities provide services to the Aerospace and Defense Industry and an array of Commercial Markets.





Our comprehensive manufacturing capabilities are backed by value-added services, including engineering and design support, new model introduction, DFM/DFT, prototyping, test development, component engineering and program management. Our lean enterprise delivers customer focused results through its Program Management structure and Integrated Product Teams.

Capabilities



Printed Circuit Card Assemblies

Interconnect Systems

High-level Assemblies

System Integration

Applications

Mine Automation and Control Systems

Oilfield Service Equipment

Agricultural Applications

Patient Monitoring and Therapy Devices

Surgical Systems

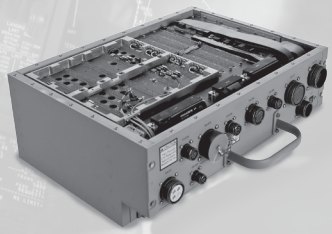
Launch Vehicles

Satellites

Missile and Missile Launchers

Naval Equipment

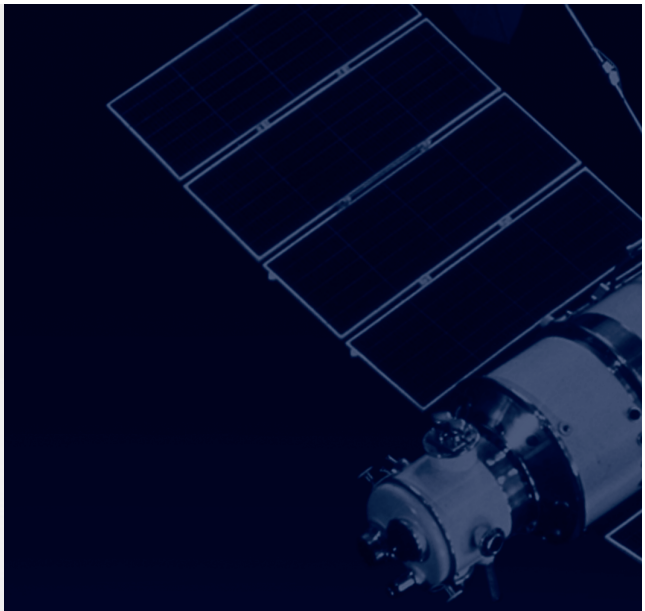
Commercial and Military Aerospace



DUCOMMUN

MOTION CONTROL DEVICES

For over 50 years, Ducommun has been a leader in the design and manufacturing of application specific Motion Control Devices. Our highly reliable motors, resolvers and actuators are designed to withstand the most severe environments including thermal, cryogenic, shock, vibration, and vacuum.



Ducommun provides complete manufacturing, assembly and test capabilities for application specific designs used in extreme environments. Ducommun's electric motors, alternators, resolvers and actuators are found in applications such as satellites, space exploration vehicles, radars, submarines, and oil exploration.

Resolvers & Synchros

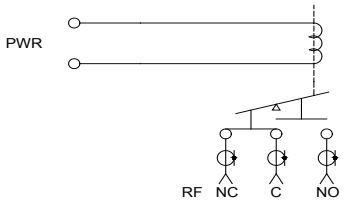
Standard and pancake, single and multi-speed, tandem, redundant, with high accuracy ranges from ODs of .8" up to 13.4".

Electric Motors

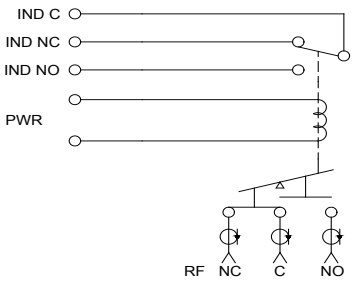
High performance AC and DC motors (Brush and BLDC), variable reluctant, redundant, permanent magnetic stepper motors, alternators

Actuators

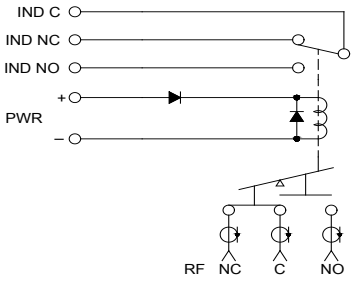
Integrated motion mechanism such as gear head motors, combinations of motors & resolvers and brushless motors and resolvers



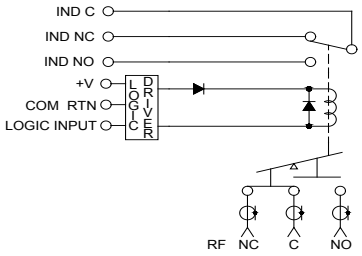
Schematic S1



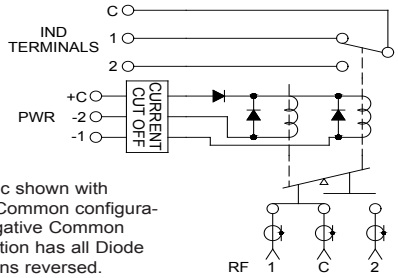
Schematic S2



Schematic S3

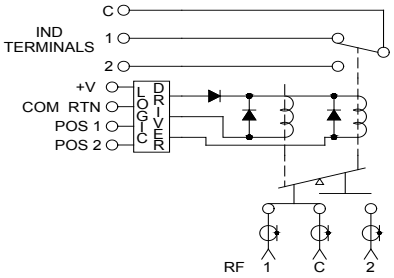


Schematic S4

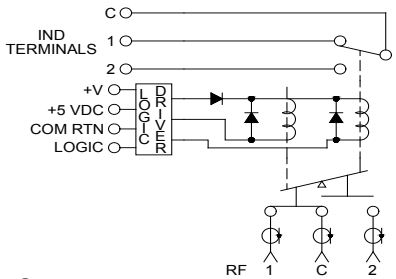


Schematic shown with Positive Common configuration. Negative Common configuration has all Diode orientations reversed.

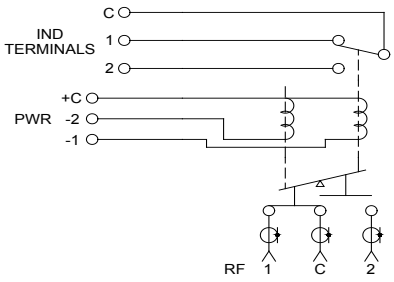
Schematic S5



Schematic S6



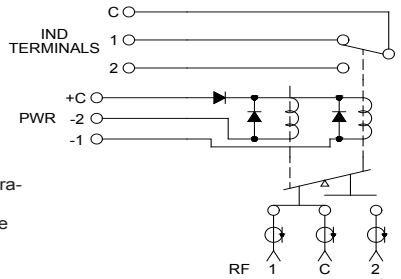
Schematic S7



Schematic shown with Positive Common configuration.

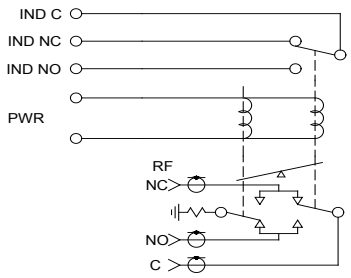
Schematic S8

Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic. This excludes

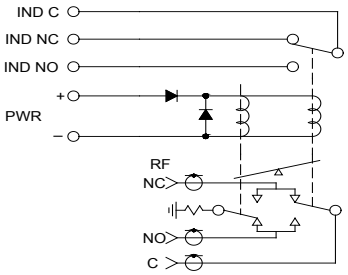


Schematic shown with Positive Common configuration. Negative Common configuration has all Diode orientations reversed.

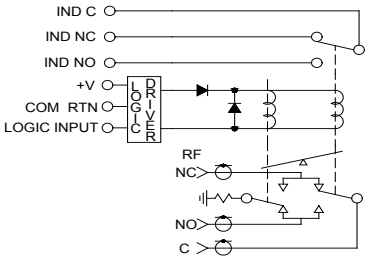
Schematic S9



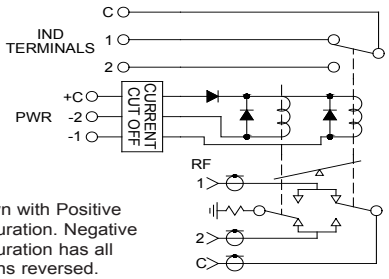
Schematic S10



Schematic S11

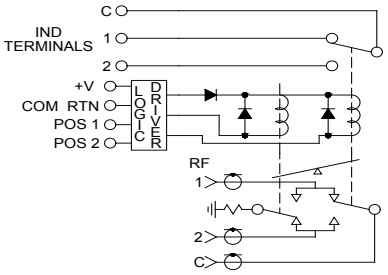


Schematic S12

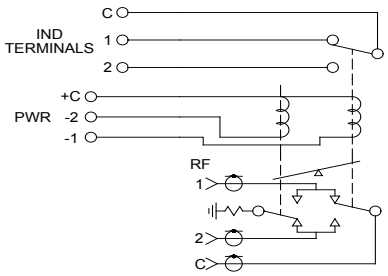


Schematic shown with Positive Common configuration. Negative Common configuration has all Diode orientations reversed.

Schematic S13

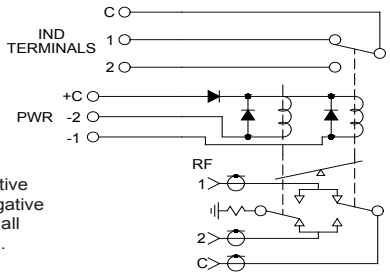


Schematic S14



Schematic shown with Positive Common configuration.

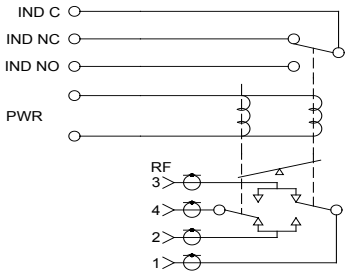
Schematic S15



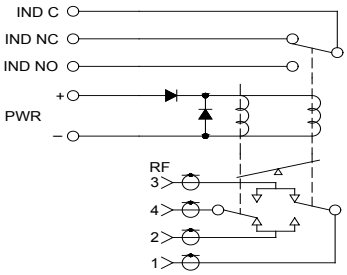
Schematic shown with Positive Common configuration. Negative Common configuration has all Diode orientations reversed.

Schematic S16

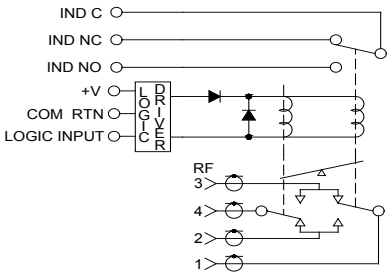
Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.



Schematic S17

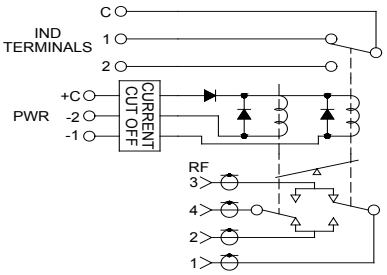


Schematic S18

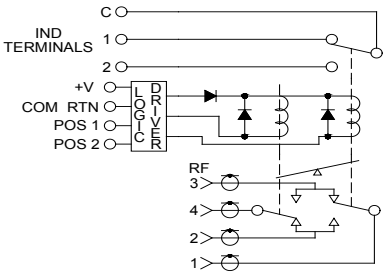


Schematic S19

Schematic shown with Positive Common configuration. Negative Common configuration has all Diode orientations reversed.

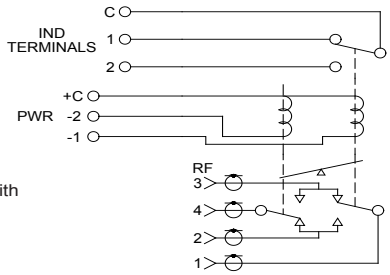


Schematic S20



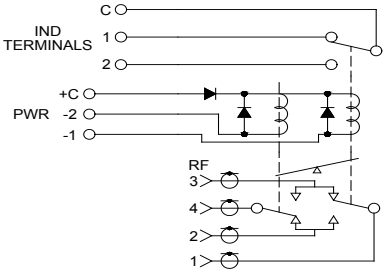
Schematic S21

Schematic shown with Positive Common configuration.

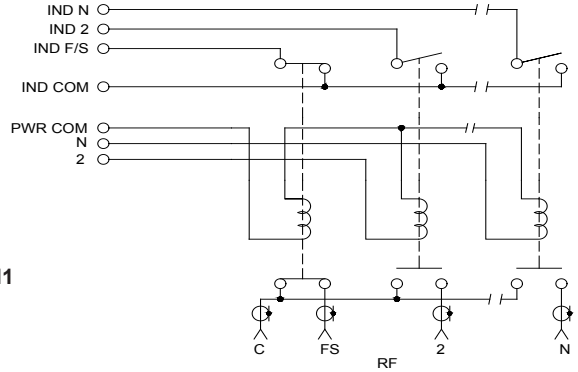


Schematic S22

Schematic shown with Positive Common configuration. Negative Common configuration has all Diode orientations reversed.

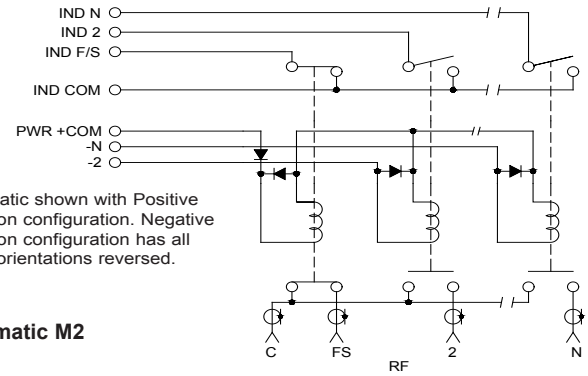


Schematic S23



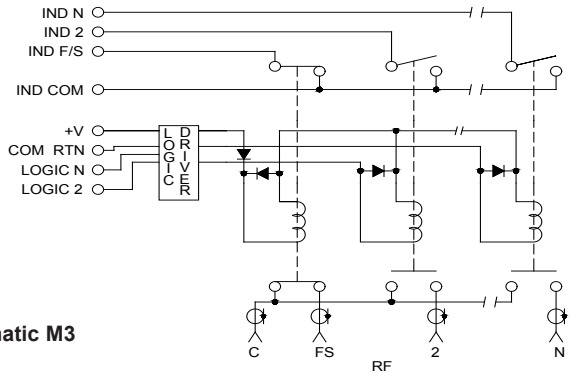
Schematic M1

Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic for all except schematic S1.

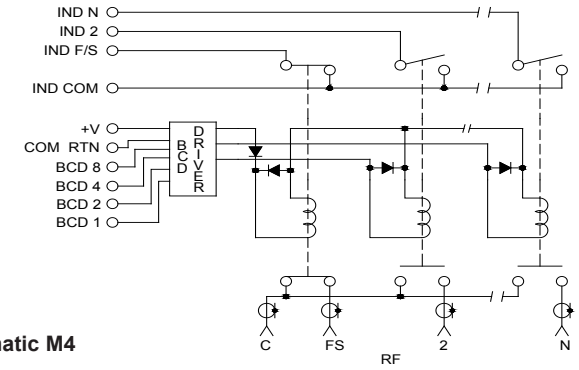


Schematic shown with Positive Common configuration. Negative Common configuration has all Diode orientations reversed.

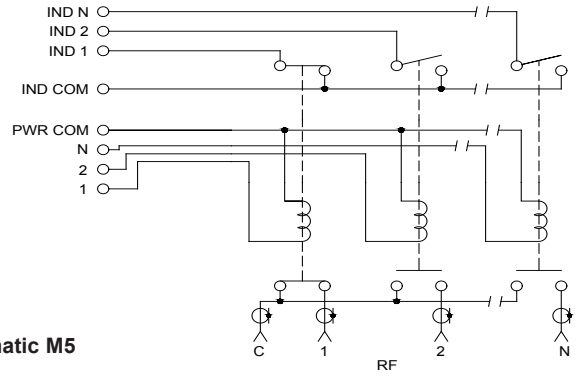
Schematic M2



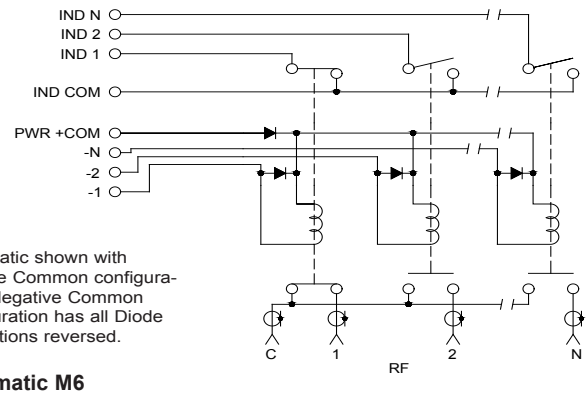
Schematic M3



Schematic M4

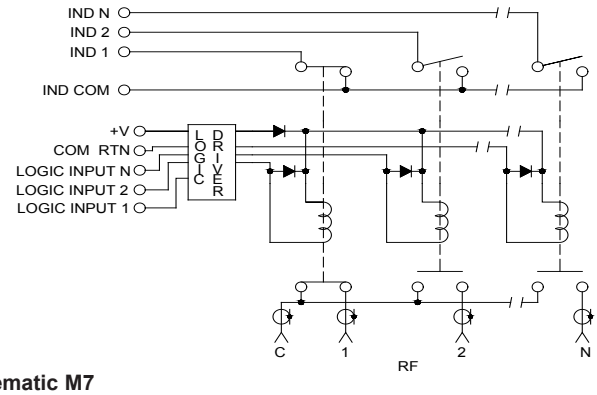


Schematic M5

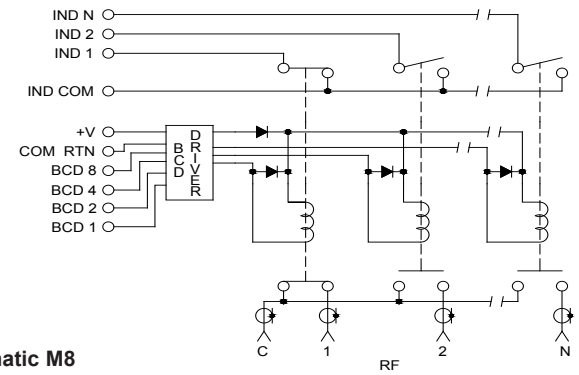


Schematic shown with Positive Common configuration. Negative Common configuration has all Diode orientations reversed.

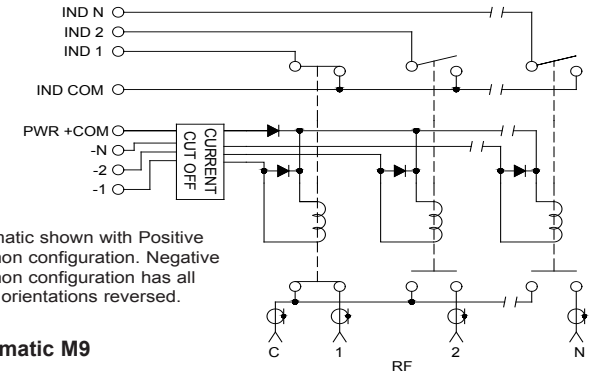
Schematic M6



Schematic M7



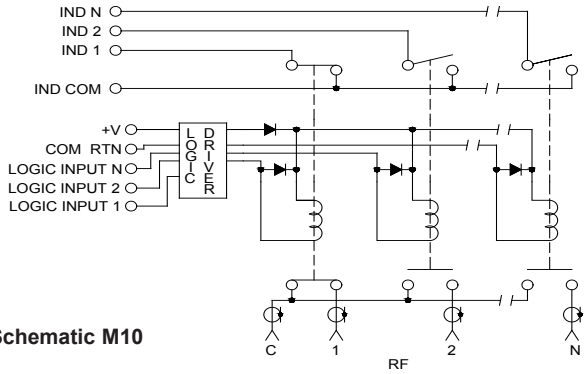
Schematic M8



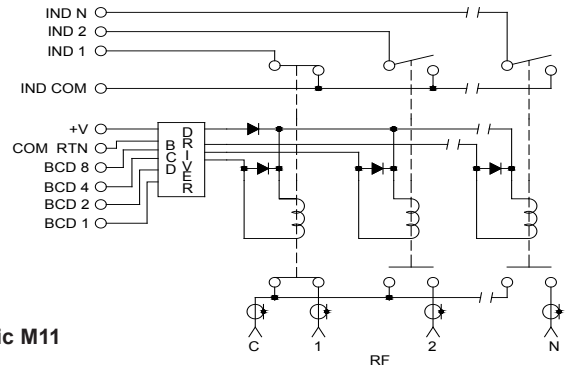
Schematic shown with Positive Common configuration. Negative Common configuration has all Diode orientations reversed.

Schematic M9

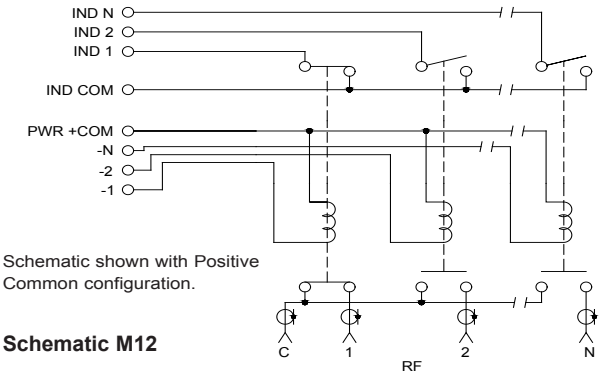
Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.



Schematic M10

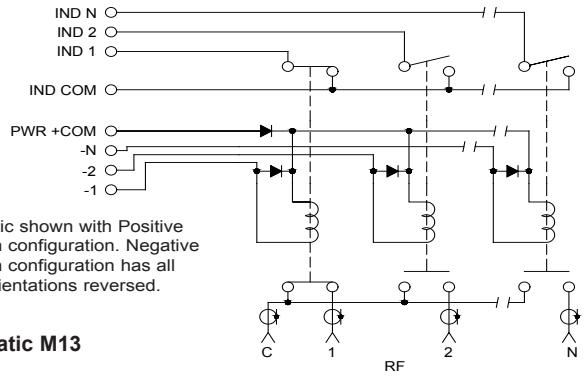


Schematic M11



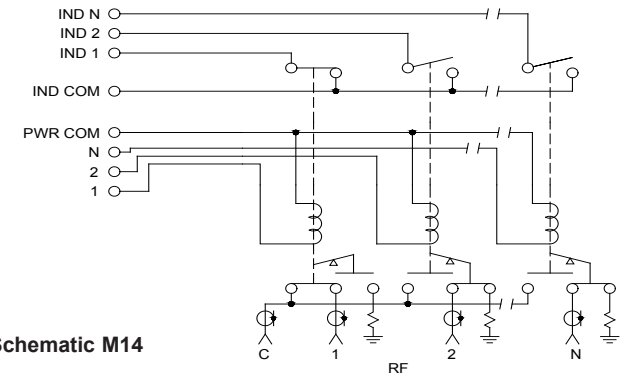
Schematic shown with Positive Common configuration.

Schematic M12

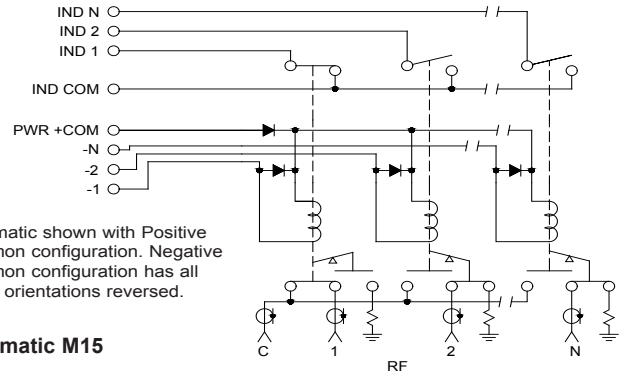


Schematic shown with Positive Common configuration. Negative Common configuration has all Diode orientations reversed.

Schematic M13

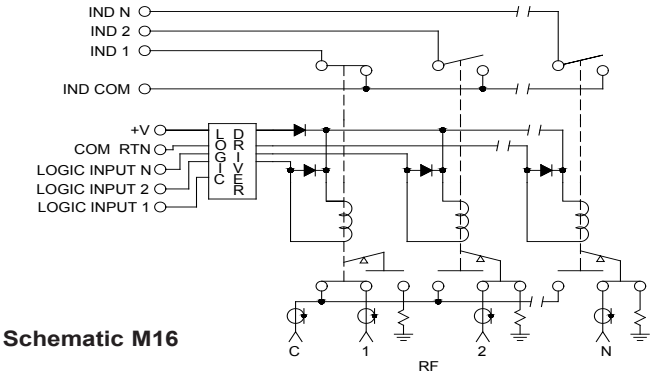


Schematic M14

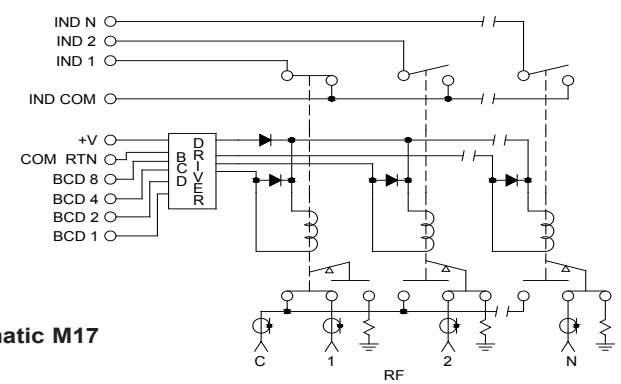


Schematic shown with Positive Common configuration. Negative Common configuration has all Diode orientations reversed.

Schematic M15

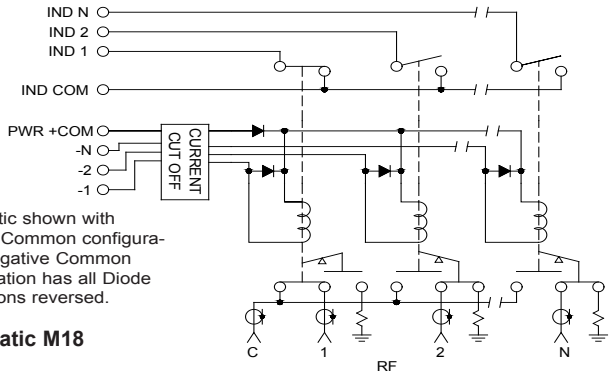


Schematic M16



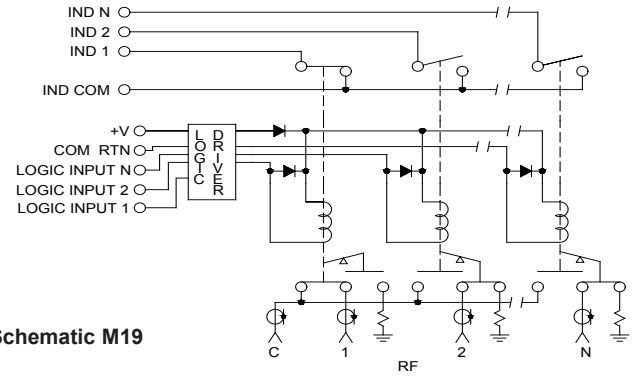
Schematic M17

Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

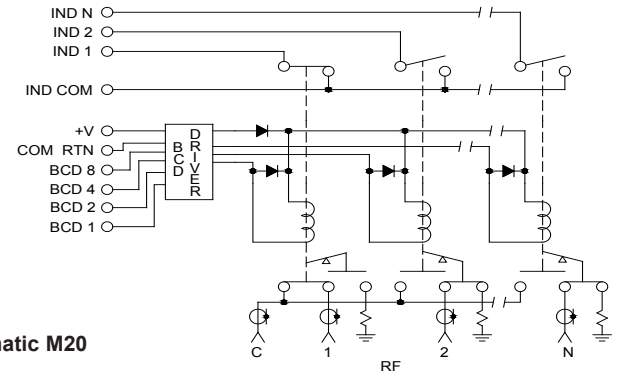


Schematic shown with Positive Common configuration. Negative Common configuration has all Diode orientations reversed.

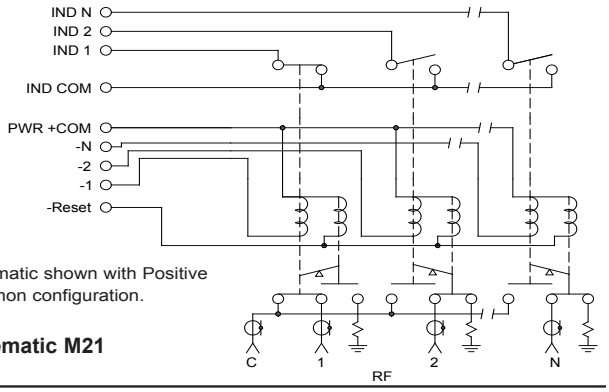
Schematic M18



Schematic M19

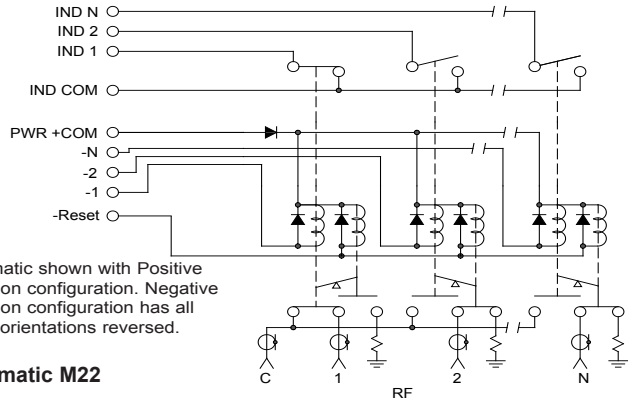


Schematic M20



Schematic shown with Positive Common configuration.

Schematic M21



Schematic shown with Positive Common configuration. Negative Common configuration has all Diode orientations reversed.

Schematic M22

Please Note: Schematics may include optional Indicator Contacts. If your Actuator Option does not include Indicator Contacts, omit them from the schematic.

Single Line Logic Driver Truth Table for 1P2T & Transfer Latching Switches	
Logic	Position Activated
0	2
1	1

NOTE: All BCD inputs shown in the Pin-Out Tables must be controlled. Devices will not function if any BCD inputs are floating.

Low Logic BCD Truth Table for 1P3T to 1P10T Switches				
BCD 8	BCD 4	BCD 2	BCD 1	Position Activated
1	1	1	1	1
1	1	1	0	2
1	1	0	1	3
1	1	0	0	4
1	0	1	1	5
1	0	1	0	6
1	0	0	1	7
1	0	0	0	8
0	1	1	1	9
0	1	1	0	10
0	0	0	0	None or FS
Open	Open	Open	Open	None or FS

High Logic BCD Truth Table for 1P3T to 1P10T Switches				
BCD 8	BCD 4	BCD 2	BCD 1	Position Activated
0	0	0	0	1
0	0	0	1	2
0	0	1	0	3
0	0	1	1	4
0	1	0	0	5
0	1	0	1	6
0	1	1	0	7
0	1	1	1	8
1	0	0	0	9
1	0	0	1	10
1	1	1	1	None or FS
Open	Open	Open	Open	None or FS

Low Logic Driver Truth Table for 1P2T & Transfer Latching Switches		
Logic 2	Logic 1	Position Activated
1	0	1
0	1	2

High Logic Driver Truth Table for 1P2T & Transfer Latching Switches		
Logic 2	Logic 1	Position Activated
0	1	1
1	0	2

Low Logic Driver Truth Table for 1P2T & Transfer Failsafe Switches	
Logic	Position Activated
0	Normally Open
1	Normally Closed

High Logic Driver Truth Table for 1P2T & Transfer Failsafe Switches	
Logic	Position Activated
1	Normally Open
0	Normally Closed

Low Logic Driver Truth Table for 1P3T to 1P10T Switches										
Logic										Position Activated
10	9	8	7	6	5	4	3	2	1	
1	1	1	1	1	1	1	1	1	0	1
1	1	1	1	1	1	1	1	0	1	2
1	1	1	1	1	1	1	0	1	1	3
1	1	1	1	1	1	0	1	1	1	4
1	1	1	1	1	0	1	1	1	1	5
1	1	1	1	0	1	1	1	1	1	6
1	1	1	0	1	1	1	1	1	1	7
1	1	0	1	1	1	1	1	1	1	8
1	0	1	1	1	1	1	1	1	1	9
0	1	1	1	1	1	1	1	1	1	10
1	1	1	1	1	1	1	1	1	1	None or Failsafe
Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	None or Failsafe

High Logic Driver Truth Table for 1P3T to 1P10T Switches										
Logic										Position Activated
10	9	8	7	6	5	4	3	2	1	
0	0	0	0	0	0	0	0	0	1	1
0	0	0	0	0	0	0	0	1	0	2
0	0	0	0	0	0	0	1	0	0	3
0	0	0	0	0	0	1	0	0	0	4
0	0	0	0	0	1	0	0	0	0	5
0	0	0	0	1	0	0	0	0	0	6
0	0	0	1	0	0	0	0	0	0	7
0	0	1	0	0	0	0	0	0	0	8
0	1	0	0	0	0	0	0	0	0	9
1	0	0	0	0	0	0	0	0	0	10
0	0	0	0	0	0	0	0	0	0	None or Failsafe
Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	None or Failsafe

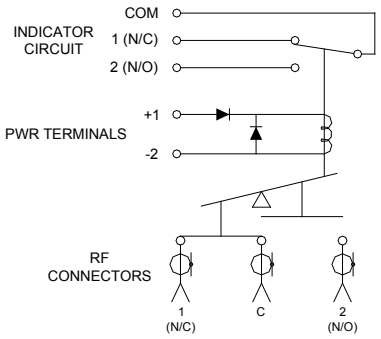


FIG 1 SPDT, FAILSAFE TO POSITION 1

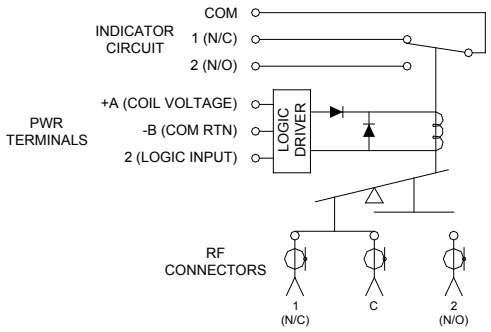


FIG 2 SPDT, FAILSAFE TO POSITION 1, LOGIC CONTROLLED

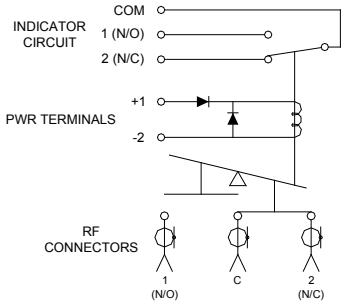


FIG 3 SPDT, FAILSAFE TO POSITION 2

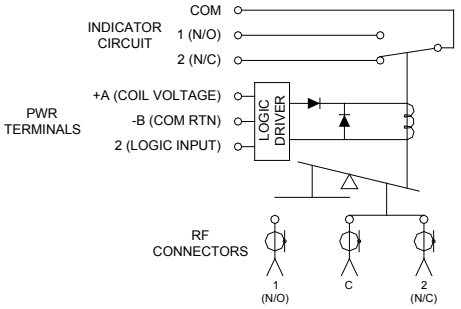


FIG 4 SPDT, FAILSAFE TO POSITION 2, LOGIC CONTROLLED

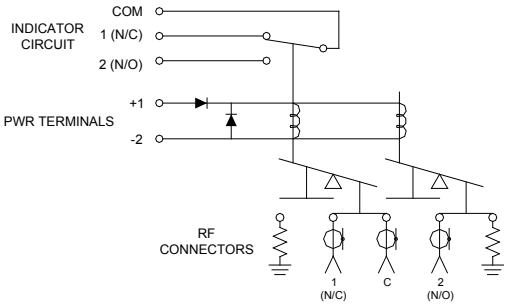


FIG 5 SPDT, FAILSAFE, TERMINATED

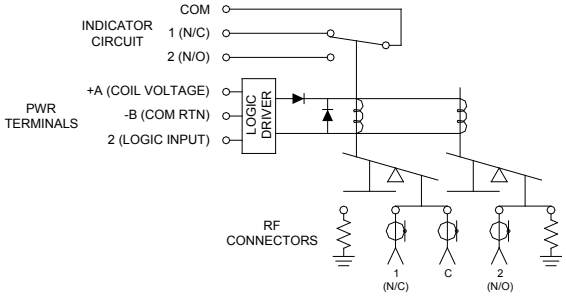


FIG 6 SPDT, FAILSAFE, LOGIC CONTROLLED, TERMINATED

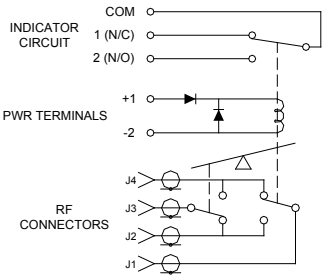


FIG 7 TRANSFER, FAILSAFE

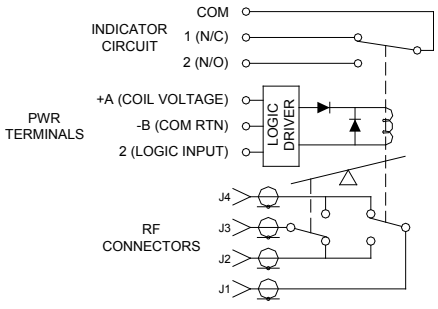


FIG 8 TRANSFER, FAILSAFE, LOGIC CONTROLLED

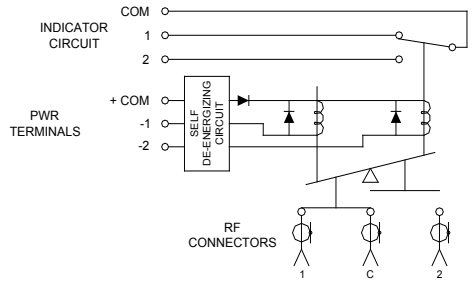


FIG 9 SPDT, LATCHING (SELF DE-ENERGIZING)

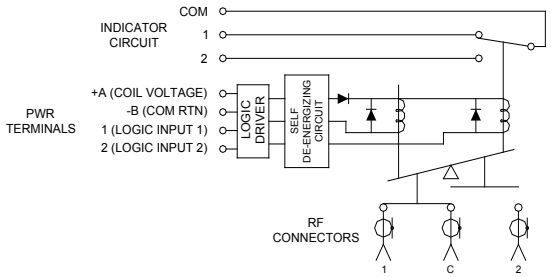


FIG 10 SPDT, LATCHING (SELF DE-ENERGIZING) LOGIC CONTROLLED

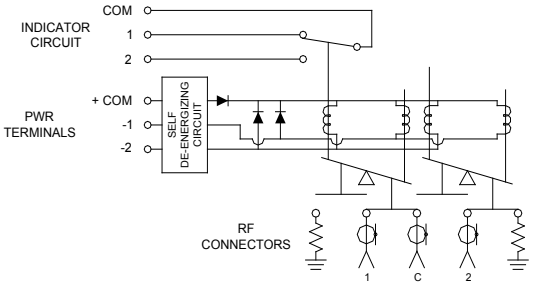


FIG 11 SPDT, LATCHING (SELF DE-ENERGIZING) TERMINATED

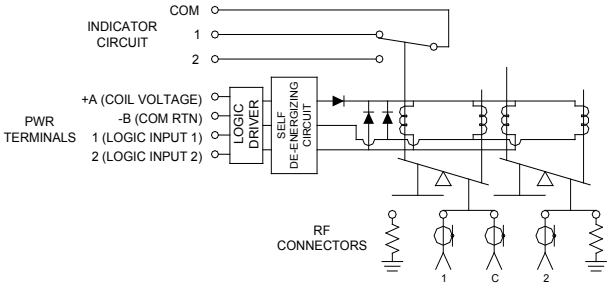


FIG 12 SPDT, LATCHING (SELF DE-ENERGIZING) LOGIC CONTROLLED, TERMINATED

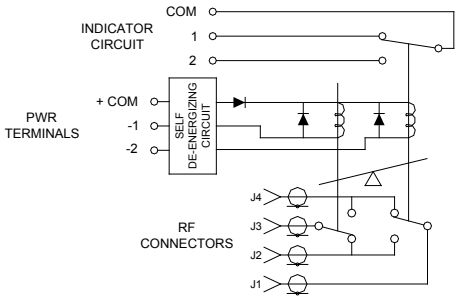


FIG 13 TRANSFER, LATCHING (SELF DE-ENERGIZING)

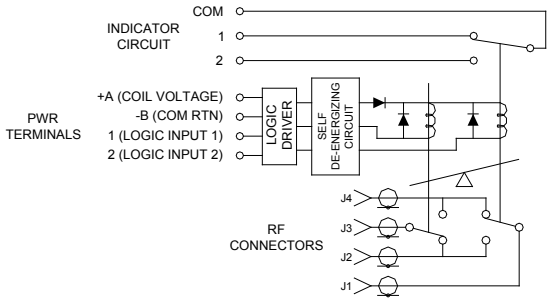


FIG 14 TRANSFER, LATCHING (SELF DE-ENERGIZING) LOGIC CONTROLLED

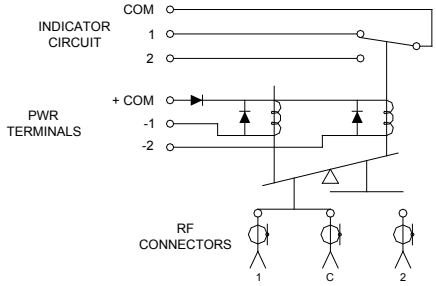


FIG 15 SPDT, PULSE LATCHING

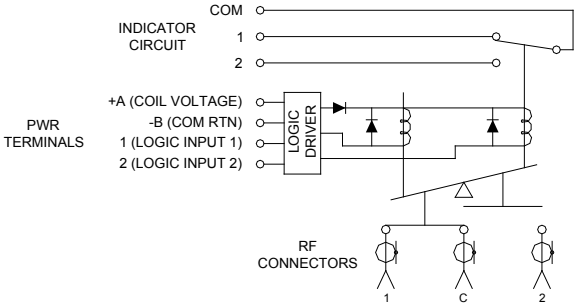


FIG 16 SPDT, PULSE LATCHING, LOGIC CONTROLLED

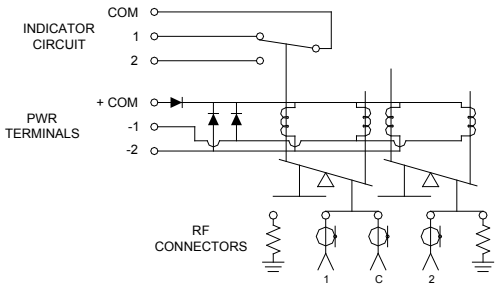


FIG 17 SPDT, PULSE LATCHING, TERMINATED

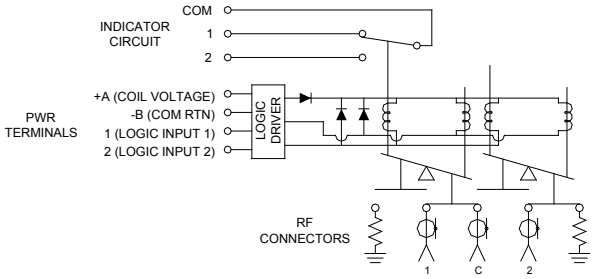


FIG 18 SPDT, PULSE LATCHING
LOGIC CONTROLLED, TERMINATED

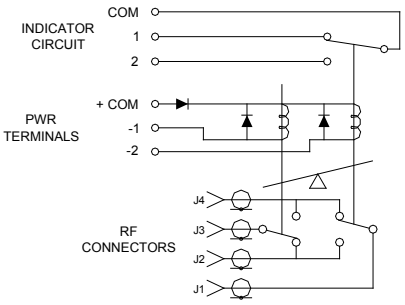


FIG 19 TRANSFER, PULSE LATCHING

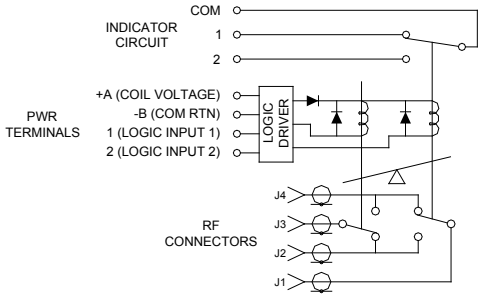


FIG 20 TRANSFER, PULSE LATCHING, LOGIC CONTROLLED

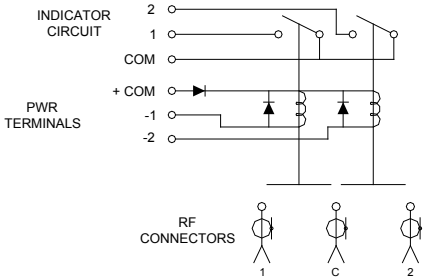


FIG 21 SPDT, NORMALLY OPEN

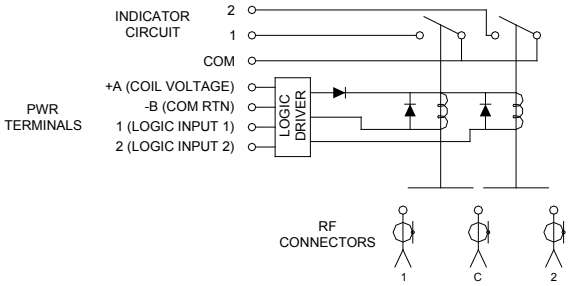


FIG 22 SPDT, NORMALLY OPEN, LOGIC CONTROLLED

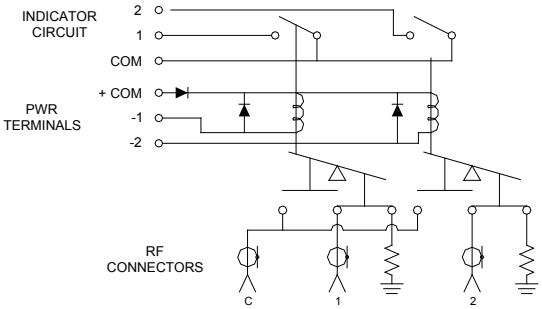


FIG 23 SPDT, NORMALLY OPEN, TERMINATED

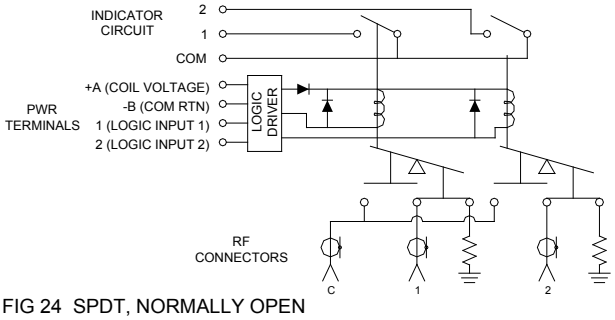


FIG 24 SPDT, NORMALLY OPEN
LOGIC CONTROLLED, TERMINATED

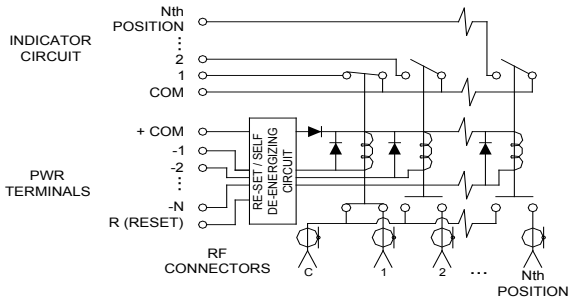


FIG 25 MULTI POSITION, LATCHING (SELF DE-ENERGIZING)

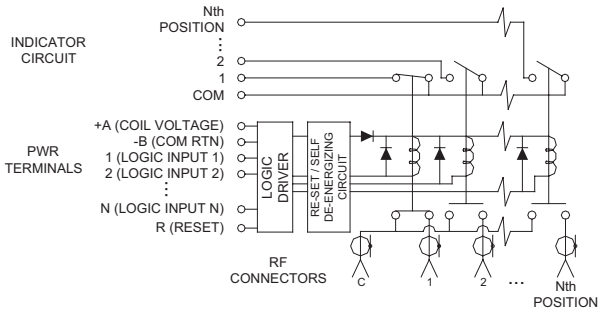


FIG 26 MULTI POSITION, LATCHING (SELF DE-ENERGIZING) LOGIC CONTROLLED

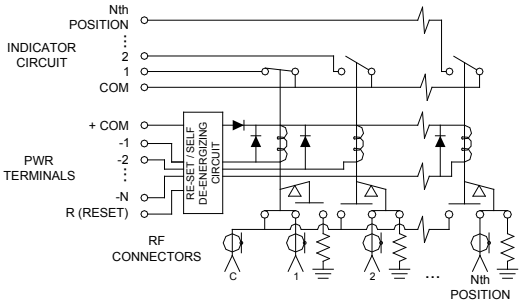


FIG 27 MULTI POSITION, LATCHING (SELF DE-ENERGIZING) TERMINATED

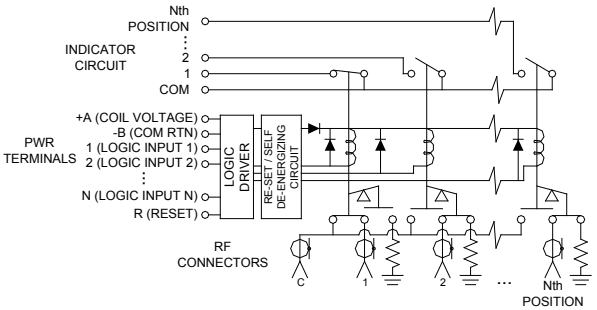


FIG 28 MULTI POSITION, LATCHING (SELF DE-ENERGIZING) LOGIC CONTROLLED, TERMINATED

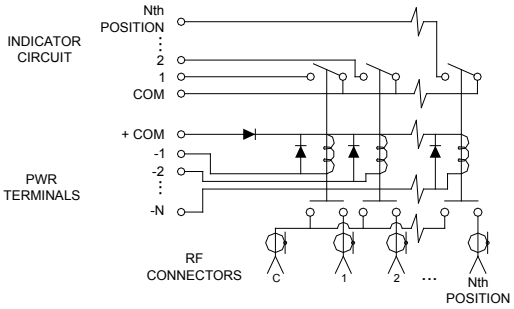


FIG 29 MULTI POSITION, NORMALLY OPEN

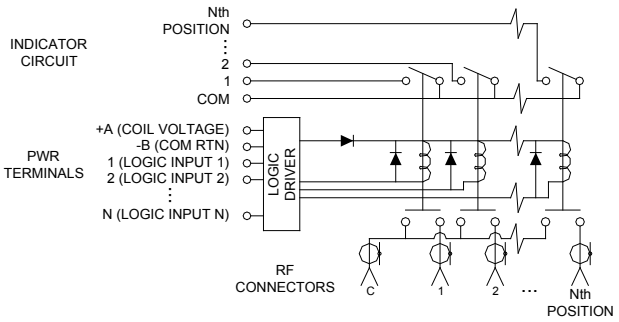


FIG 30 MULTI POSITION, NORMALLY OPEN, LOGIC CONTROLLE

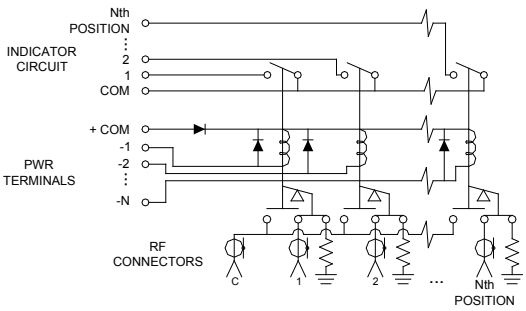


FIG 31 MULTI POSITION, NORMALLY OPEN, TERMINATED

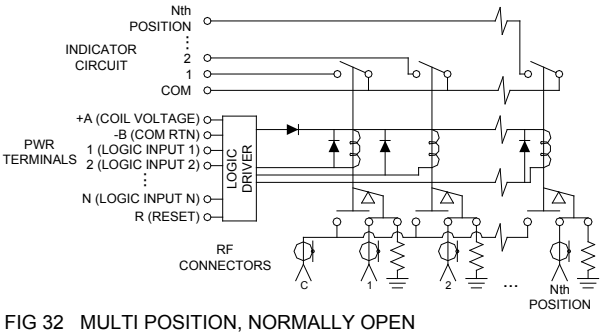


FIG 32 MULTI POSITION, NORMALLY OPEN LOGIC CONTROLLED, TERMINATED

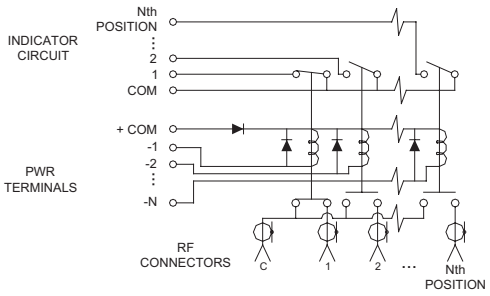


FIG 33 MULTI POSITION, NORMALLY OPEN WITH FAILSAFE TO POSITION 1

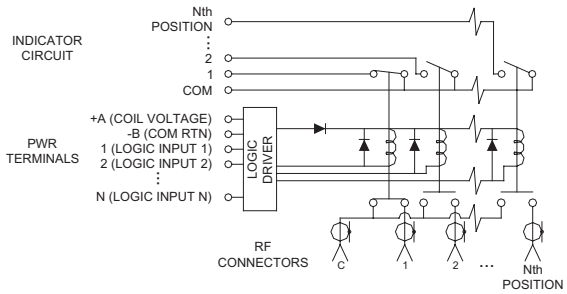


FIG 34 MULTI POSITION, NORMALLY OPEN WITH FAILSAFE TO POSITION 1, LOGIC CONTROLLED

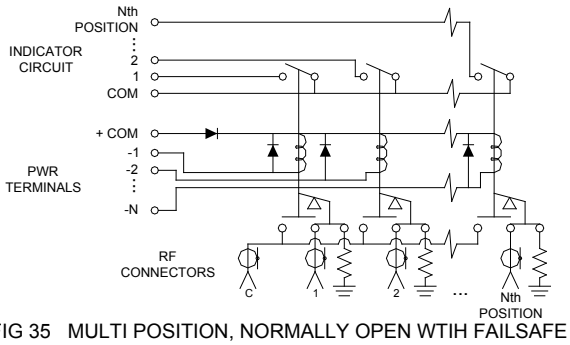


FIG 35 MULTI POSITION, NORMALLY OPEN WTIH FAILSAFE TO POSITION 1, TERMINATED

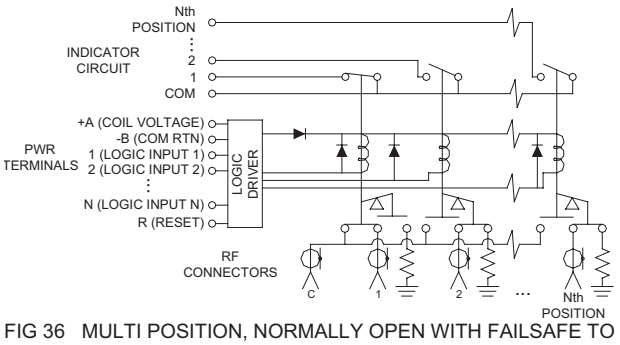


FIG 36 MULTI POSITION, NORMALLY OPEN WITH FAILSAFE TO POSITION 1, LOGIC CONTROLLED, TERMINATED

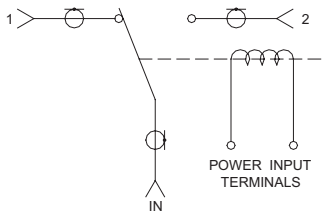


FIG 37 SPDT, FAILSAFE TO POSITION 1, TOH SERIES ONLY

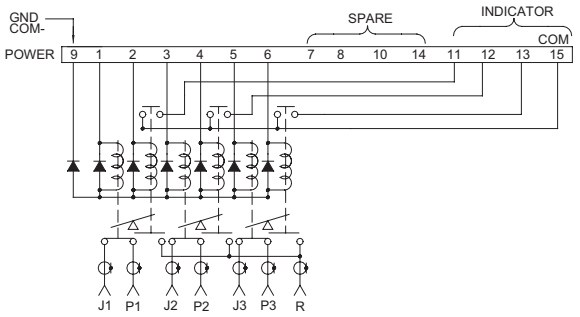
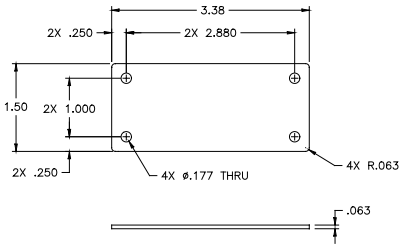
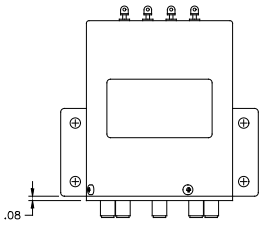
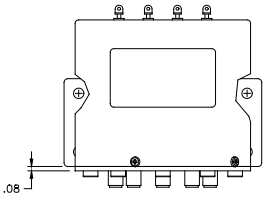


FIG 38 4P3T, LATCHING, MM4 SERIES ONLY

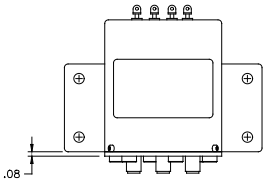




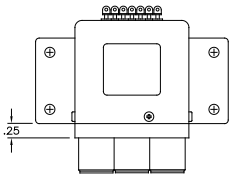
ES SWITCH



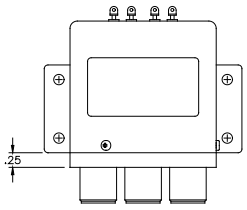
HT SWITCH



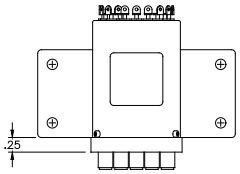
IT/ITE SWITCH



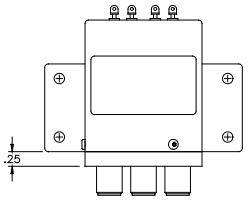
TT, TN/TNH SWITCH



SN/SNH SWITCH

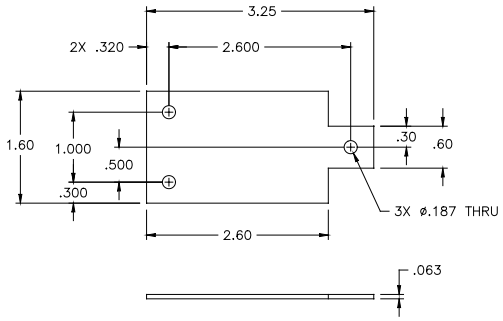


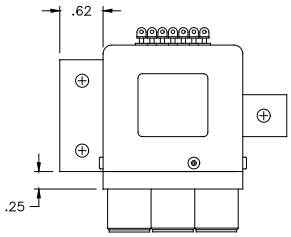
SS/SSE SWITCH
"U" BODY



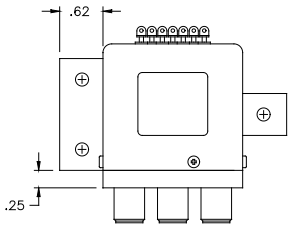
ST SWITCH

"A" BRACKET



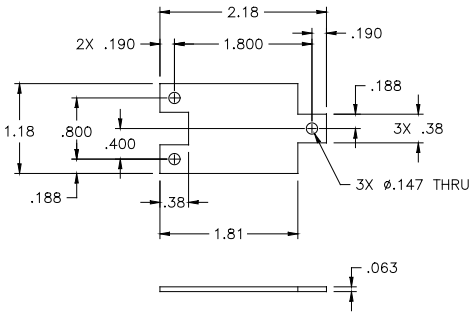


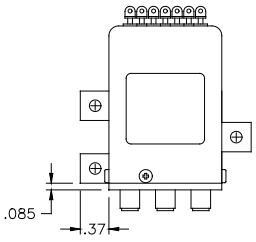
TN/TNH SWITCH



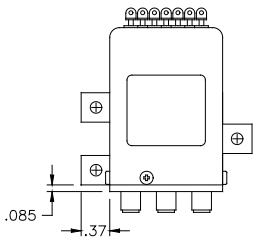
TT SWITCH

"B" BRACKET



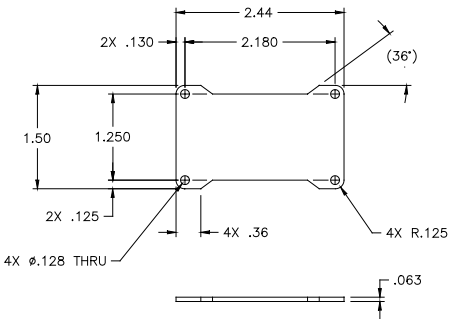


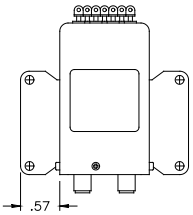
TS/TSE SWITCH



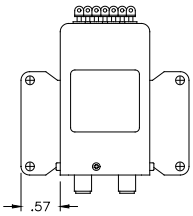
2B/2BE SWITCH

"C" BRACKET



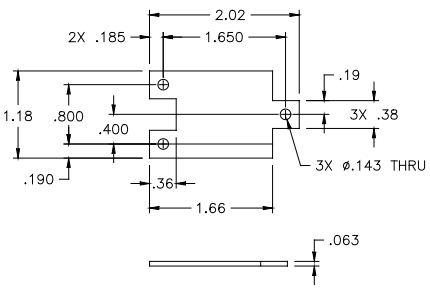


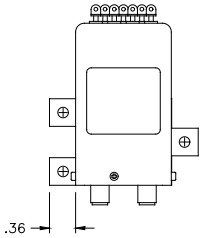
TA/TAE TD/TDE
SWITCH



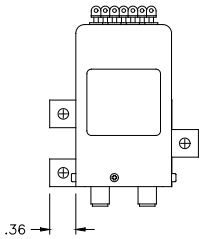
2C/2CE SWITCH

“D” BRACKET



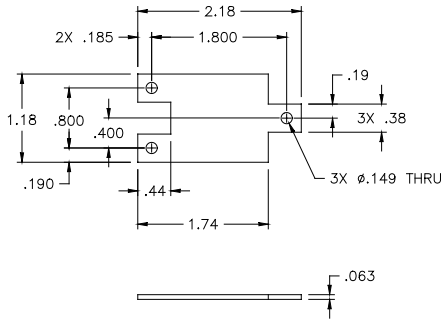


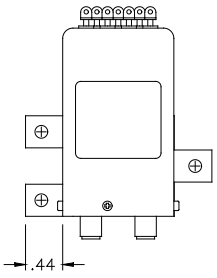
TA/TAE TD/TDE
SWITCH



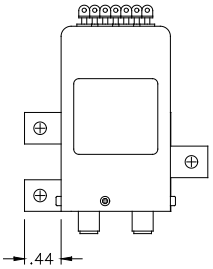
2C/2CE SWITCH

“E” BRACKET



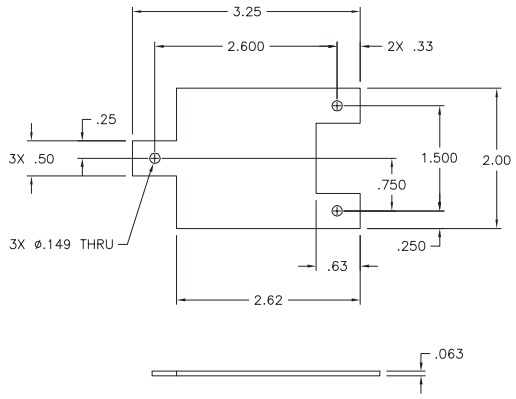


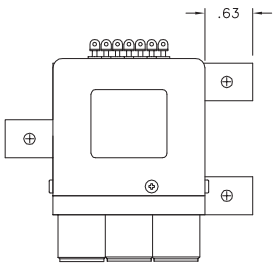
TA/TAE TD/TDE
SWITCH



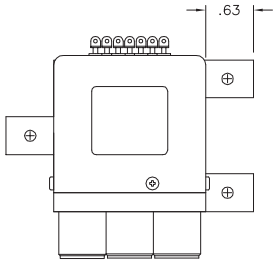
2C/2CE SWITCH

“F” BRACKET



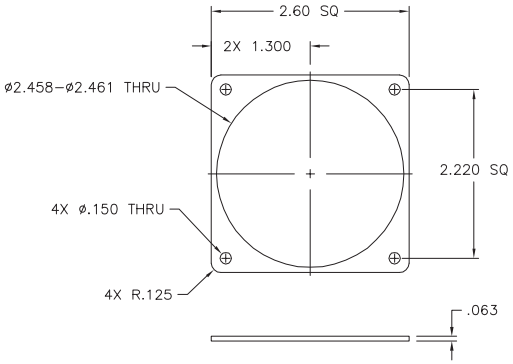


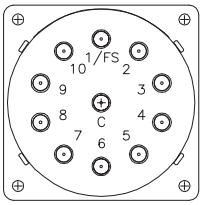
TN/TNH SWITCH



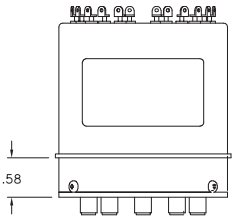
TT SWITCH

“G” BRACKET



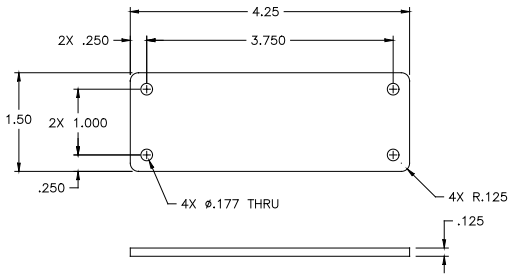


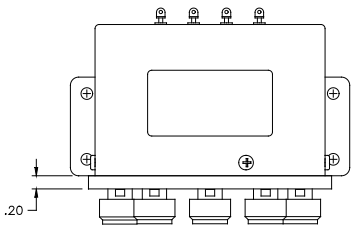
HS SWITCH



HS SWITCH

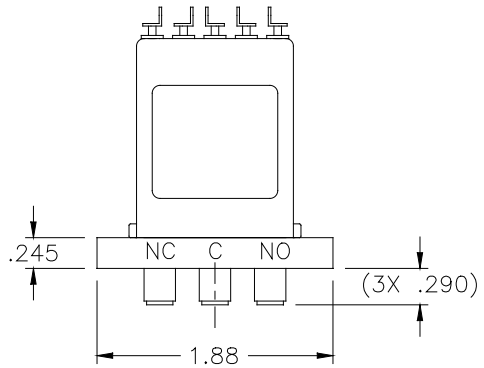
“H” BRACKET

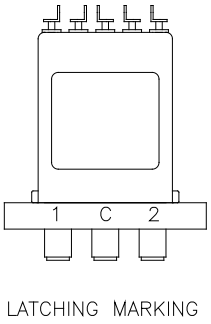


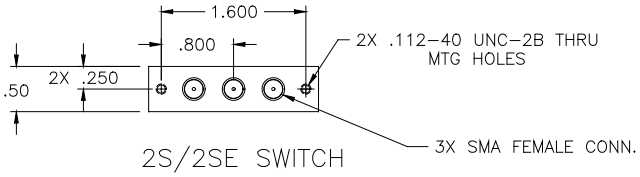


HN SWITCH

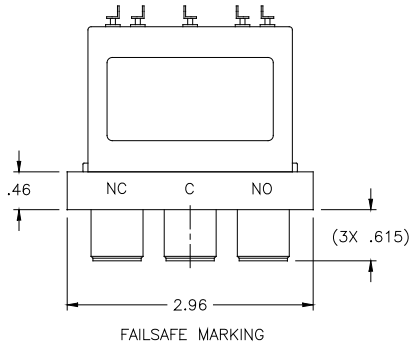
“J” BRACKET

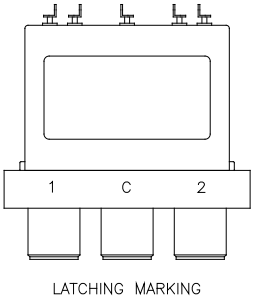


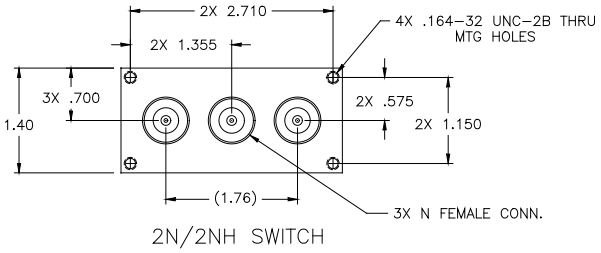




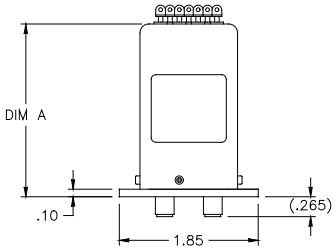
“R” BODY



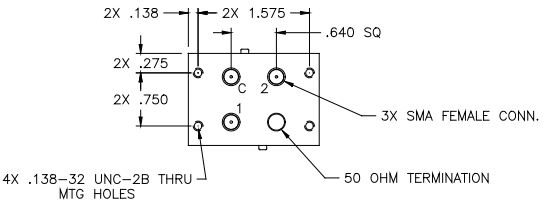


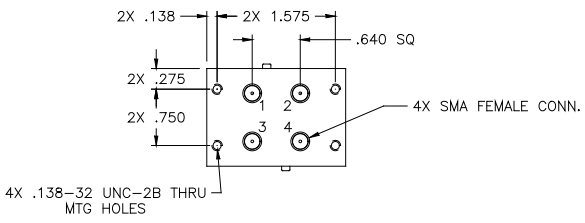


“S” BODY

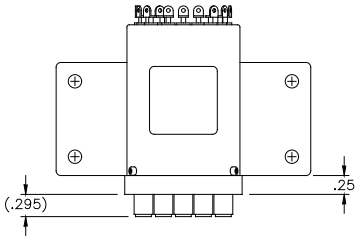


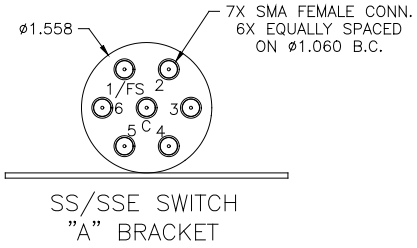
Consult Factory for Dimension “A”



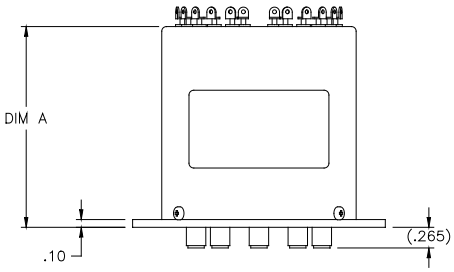


“T” BODY

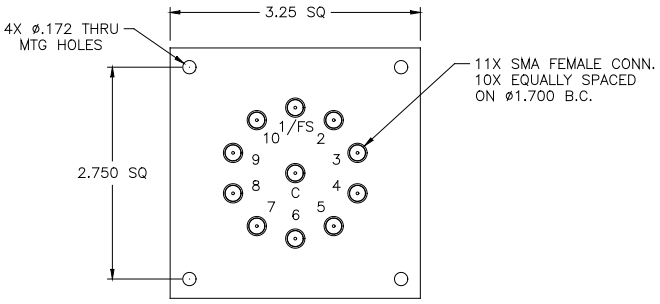




“U” BODY

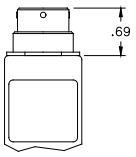


Consult Factory for Dimension “A”



“V” BODY

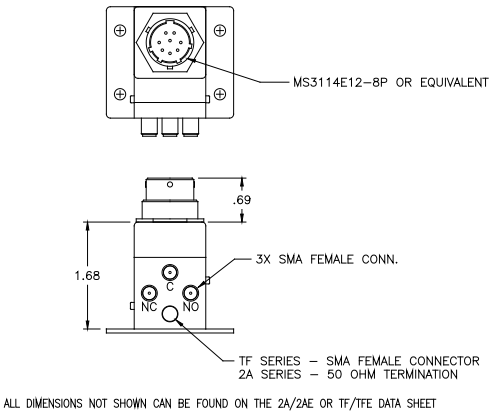
JAM NUT CONNECTOR
MS3114E12–8P OR EQUIV.



PIN	FAILSAFE		LATCHING	
	SPDT TRANSFER	SPDT TRANSFER (Logic Input)	SPDT TRANSFER	SPDT TRANSFER (Logic Input)
1	V SW; +V SW	+V SW	C+/-	+V SW
2	V SW; -V SW	N/A	Position 1 -/+	C RTN
3	COM	C RTN	Position 2 -/+	Logic Input 1
4	Ind NC	Logic Input	Ind COM	Logic Input 2
5	Ind NO	COM	Ind Position 1	Ind COM
6	N/A	Ind NC	Ind Position 2	Ind Position 1
7	N/A	Ind NO	N/A	Ind Position 2
8	N/A	N/A	N/A	N/A

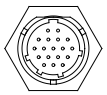
SPDT Series: 2A, 2AE, 2B, 2BE, 2C, 2CE

Transfer Series: TA, TAE, TD, TDE, TF, TFE, TN, TNH, TT

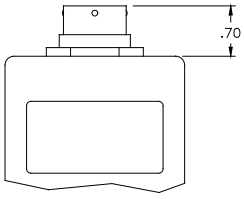


ALL DIMENSIONS NOT SHOWN CAN BE FOUND ON THE 2A/2AE OR TF/TFE DATA SHEET

2A/2AE SWITCH
TF/TFE SWITCH



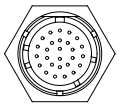
JAM NUT CONNECTOR
MS3114E14–18P OR EQUIV.



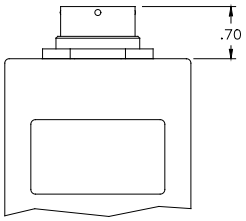
PIN	FAILSAFE		NORMALLY OPEN	
	SP3T - SP6T w/ INDICATORS	SP3T - SP6T w/ INDICATORS (Logic Input)	SP3T - SP6T w/ INDICATORS	SP3T - SP6T w/ INDICATORS (Logic Input)
A	V SW; +V SW; -V SW	+V SW	V SW; +V SW; -V SW	+V SW
B	N/A	N/A	Position 1	N/A
C	Position 2	C RTN	Position 2	C RTN
D	Position 3	N/A or B C D 1	Position 3	Logic or B C D 1
E	Position 4	Logic or B C D 2	Position 4	Logic or B C D 2
F	Position 5	Logic 3 or B C D 4	Position 5	Logic 3 or B C D 4
G	Position 6	Logic 4 or B C D 8	Position 6	Logic 4 or B C D 8
H	Ind COM	Logic Input 5	Ind COM	Logic Input 5
J	Ind FS	Logic Input 6	Ind Position 1	Logic Input 6

PIN	FAILSAFE		NORMALLY OPEN	
	SP3T - SP6T w/ INDICATORS	SP3T - SP6T w/ INDICATORS (Logic Input)	SP3T - SP6T w/ INDICATORS	SP3T - SP6T w/o INDICATORS (Logic Input)
K	Ind Position 2	Ind COM	Ind Position 2	Ind COM
L	Ind Position 3	Ind FS	Ind Position 3	Ind Position 1
M	Ind Position 4	Ind Position 2	Ind Position 4	Ind Position 2
N	Ind Position 5	Ind Position 3	Ind Position 5	Ind Position 3
P	Ind Position 6	Ind Position 4	Ind Position 6	Ind Position 4
R	N/A	Ind Position 5	N/A	Ind Position 5
S	N/A	Ind Position 6	N/A	Ind Position 6
T	N/A	N/A	N/A	N/A
U	N/A	N/A	N/A	N/A

SP3T - SP6T Series: SS, SSE, ST, SN, SNH, IT, ITE



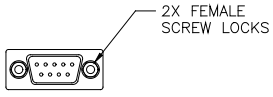
JAM NUT CONNECTOR
MS3114E16-26P OR EQUIV.



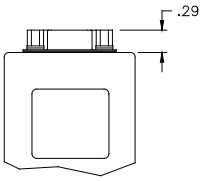
PIN	FAILSAFE		NORMALLY OPEN	
	SP7T - SP10T w/ INDICATORS	SP7T - SP10T w/ INDICATORS (Logic Input)	SP7T - SP10T w/ INDICATORS	SP7T - SP10T w/ INDICATORS (Logic Input)
A	V SW; +V SW; -V SW	+V SW	V SW; +V SW; -V SW	+V SW
B	N/A	N/A	Position 1	N/A
C	Position 2	C RTN	Position 2	C RTN
D	Position 3	N/A or B C D 1	Position 3	Logic or B C D 1
E	Position 4	Logic or B C D 2	Position 4	Logic or B C D 2
F	Position 5	Logic 3 or B C D 4	Position 5	Logic 3 or B C D 4
G	Position 6	Logic 4 or B C D 8	Position 6	Logic 4 or B C D 8
H	Position 7	Logic 5	Position 7	Logic 5
J	Position 8	Logic 6	Position 8	Logic 6
K	Position 9	Logic 7	Position 9	Logic 7
L	Position 10	Logic 8	Position 10	Logic 8
M	Ind COM	Logic 9	Ind COM	Logic 9
N	Ind FS	Logic 10	Ind Position 1	Logic 10

PIN	FAILSAFE		NORMALLY OPEN	
	SP7T - SP10T w/o INDICATORS	SP7T - SP10T w/ INDICATORS (Logic Input)	SP7T - SP10T w/ INDICATORS	SP7T - SP10T w/ INDICATORS (Logic Input)
P	Ind Position 2	Ind COM	Ind Position 2	Ind COM
R	Ind Position 3	Ind FS	Ind Position 3	Ind Position 1
S	Ind Position 4	Ind Position 2	Ind Position 4	Ind Position 2
T	Ind Position 5	Ind Position 3	Ind Position 5	Ind Position 3
U	Ind Position 6	Ind Position 4	Ind Position 6	Ind Position 4
V	Ind Position 7	Ind Position 5	Ind Position 7	Ind Position 5
W	Ind Position 8	Ind Position 6	Ind Position 8	Ind Position 6
X	Ind Position 9	Ind Position 7	Ind Position 9	Ind Position 7
Y	Ind Position 10	Ind Position 8	Ind Position 10	Ind Position 8
Z	N/A	Ind Position 9	N/A	Ind Position 9
a	N/A	Ind Position 10	N/A	Ind Position 10
b	N/A	N/A	N/A	N/A
c	N/A	N/A	N/A	N/A

SP7T - SP10T Series: ES, HS, HN, HT



SUB MINIATURE D-SHELL 9P

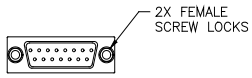


PIN	FAILSAFE				LATCHING			NORMALLY OPEN	
	SPDT TRANSFER	SPDT TRANSFER (Logic Input)	SP3T - SP6T w/o INDICATORS	SP3T - SP6T w/o INDICATORS (Logic Input)	SPDT 2R Series (Logic Input)	SPDT TRANSFER	SPDT TRANSFER (Logic Input)	SP3T - SP6T w/o INDICATORS	SP3T - SP6T w/o INDICATORS (Logic Input)
1	V SW; +V SW	+V SW	V SW; +V SW; -V SW	+V SW	+V SW	C+/-	+V SW	V SW; +V SW; -V SW	+V SW
2	V SW; -V SW	N/A	N/A	C RTN	+5 Vdc	Position 1 -/+	C RTN	Postion 1	C RTN
3	Ind COM	C RTN	Position 2	N/A or B C D 1	CRTN	Position 2 -/+	Logic Input 1	Position 2	Logic or B C D 1
4	Ind NC	Logic Input	Position 3	Logic or B C D 2	Logic	Ind COM	Logic Input 2	Position 3	Logic or B C D 2
5	Ind NO	Ind COM	Position 4	Logic 3 or B C D 4	Ind COM	Ind Position 1	Ind COM	Position 4	Logic 3 or B C D 4
6	N/A	Ind NC	Position 5	Logic 4 or B C D 8	Ind Position 1	Ind Position 2	Ind Position 1	Position 5	Logic 4 or B C D 8
7	N/A	Ind NO	Position 6	Logic 5	Ind Position 2	N/A	Ind Position 2	Position 6	Logic 5
8	N/A	N/A	N/A	Logic 6	N/A	N/A	N/A	N/A	Logic 6
9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

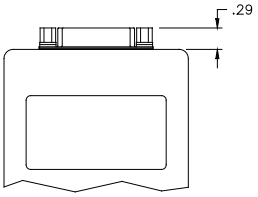
SPDT Series: 2S, 2SE, 2R, 2RE, 2T, 2N, 2NH, 2B, 2BE, 2C, 2CE

Transfer Series: TA, TAE, TD, TDE, TS, TSE, TT, TN, TNH

SP3T - SP6T Series: SS, SSE, ST, SN, SNH, IT, ITE



SUB MINIATURE D–SHELL 15P

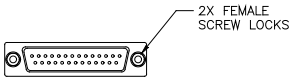


PIN	FAILSAFE		NORMALLY OPEN/LATCHING	
	SP3T - SP6T w/ INDICATORS	SP3T - SP6T w/ INDICATORS (Logic Input)	SP3T - SP6T w/ INDICATORS	SP3T - SP6T w/ INDICATORS (Logic Input)
1	V SW; +V SW; -V SW	+V SW	V SW; +V SW; -V SW	+V SW
2	N/A	C RTN	Position 1	C RTN
3	Position 2	N/A or B C D 1	Position 2	Logic or B C D 1
4	Position 3	Logic or B C D 2	Position 3	Logic or B C D 2
5	Position 4	Logic 3 or B C D 4	Position 4	Logic 3 or B C D 4
6	Position 5	Logic 4 or B C D 8	Position 5	Logic 4 or B C D 8
7	Position 6	Logic 5	Position 6	Logic 5
8	Ind COM	Logic 6	Ind COM	Logic 6
9	Ind FS	Ind COM	Ind Position 1	Ind COM
10	Ind Position 2	Ind FS	Ind Position 2	Ind Position 1
11	Ind Position 3	Ind Position 2	Ind Position 3	Ind Position 2
12	Ind Position 4	Ind Position 3	Ind Position 4	Ind Position 3
13	Ind Position 5	Ind Position 4	Ind Position 5	Ind Position 4
14	Ind Position 6	Ind Position 5	Ind Position 6	Ind Position 5
15	N/A	Ind Position 6	N/A	Ind Position 6

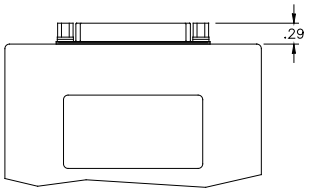
SP3T - SP6T Series: IT, ITE, SN, SNH, ST

PIN	FAILSAFE		NORMALLY OPEN/LATCHING	
	SP7T - SP10T w/o INDICATORS	SP7T - SP10T w/o INDICATORS (Logic Input)	SP7T - SP10T w/o INDICATORS	SP7T - SP10T w/o INDICATORS (Logic Input)
1	V SW; +V SW; -V SW	+V SW	V SW; +V SW; -V SW	+V SW
2	N/A	C RTN	Position 1	C RTN
3	Position 2	N/A or B C D 1	Position 2	Logic or B C D 1
4	Position 3	Logic or B C D 2	Position 3	Logic or B C D 2
5	Position 4	Logic 3 or B C D 4	Position 4	Logic 3 or B C D 4
6	Position 5	Logic 4 or B C D 8	Position 5	Logic 4 or B C D 8
7	Position 6	Logic 5	Position 6	Logic 5
8	Position 7	Logic 6	Position 7	Logic 6
9	Position 8	Logic 7	Position 8	Logic 7
10	Position 9	Logic 8	Position 9	Logic 8
11	Position 10	Logic 9	Position 10	Logic 9
12	N/A	Logic 10	N/A	Logic 10
13	N/A	N/A	N/A	N/A
14	N/A	N/A	N/A	N/A
15	N/A	N/A	N/A	N/A

SP7T - SP10T Series: ES, HS, HN, HT



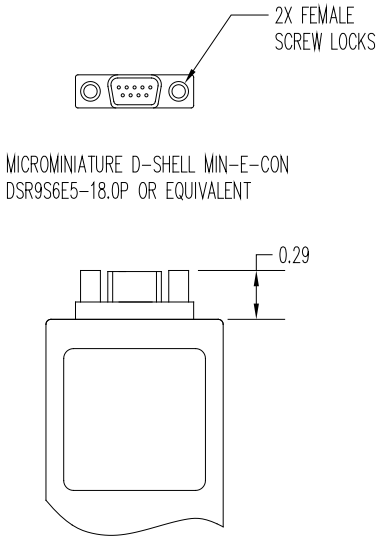
SUB MINIATURE D–SHELL 25P



PIN	FAILSAFE		NORMALLY OPEN	
	SP7T - SP10T w/ INDICATORS	SP7T - SP10T w/ INDICATORS (Logic Input)	SP7T - SP10T w/ INDICATORS	SP7T - SP10T w/ INDICATORS (Logic Input)
1	V SW; +V SW; -V SW	+V SW	V SW; +V SW; -V SW	+V SW
2	N/A	C RTN	Position 1	C RTN
3	Position 2	N/A or B C D 1	Position 2	Logic or B C D 1
4	Position 3	Logic or B C D 2	Position 3	Logic or B C D 2
5	Position 4	Logic 3 or B C D 4	Position 4	Logic 3 or B C D 4
6	Position 5	Logic 4 or B C D 8	Position 5	Logic 4 or B C D 8
7	Position 6	Logic 5	Position 6	Logic 5
8	Position 7	Logic 6	Position 7	Logic 6
9	Position 8	Logic 7	Position 8	Logic 7
10	Position 9	Logic 8	Position 9	Logic 8
11	Position 10	Logic 9	Position 10	Logic 9
12	Ind COM	Logic 10	Ind COM	Logic 10
13	Ind FS	Ind COM	Ind Position 1	Ind COM

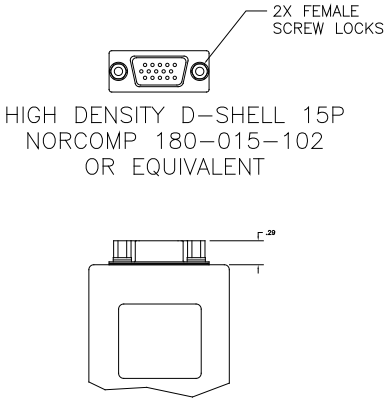
PIN	FAILSAFE		NORMALLY OPEN	
	SP7T - SP10T w/ INDICATORS	SP7T - SP10T w/ INDICATORS (Logic Input)	SP7T - SP10T w/ INDICATORS	SP7T - SP10T w/ INDICATORS (Logic Input)
14	Ind Position 2	Ind Position FS	Ind Position 2	Ind Position 1
15	Ind Position 3	Ind Position 2	Ind Position 3	Ind Position 2
16	Ind Position 4	Ind Position 3	Ind Position 4	Ind Position 3
17	Ind Position 5	Ind Position 4	Ind Position 5	Ind Position 4
18	Ind Position 6	Ind Position 5	Ind Position 6	Ind Position 5
19	Ind Position 7	Ind Position 6	Ind Position 7	Ind Position 6
20	Ind Position 8	Ind Position 7	Ind Position 8	Ind Position 7
21	Ind Position 9	Ind Position 8	Ind Position 9	Ind Position 8
22	Ind Position 10	Ind Position 9	Ind Position 10	Ind Position 9
23	N/A	Ind Position 10	N/A	Ind Position 10
24	N/A	N/A	N/A	N/A
25	N/A	N/A	N/A	N/A

SP7T - SP10T Series: ES, HS, HN, HT



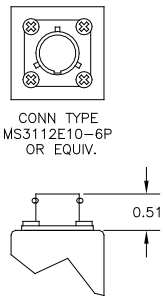
PIN	FAILSAFE NORMALLY OPEN SP3T - SP6T w/o INDICATORS
1	V SW; +V SW; -V SW
2	Position 1
3	Position 2
4	Position 3
5	Position 4
6	Position 5
7	Position 6
8	N/A
9	N/A

SP3T - SP6T Series: SM



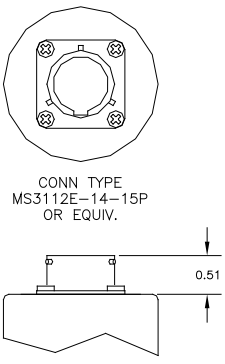
PIN	FAILSAFE		NORMALLY OPEN	
	SP3T - SP6T w/ INDICATORS	SP3T - SP6T w/ INDICATORS (Logic Input)	SP3T - SP6T w/ INDICATORS	SP3T - SP6T w/ INDICATORS (Logic Input)
1	V SW, +V SW, -V SW	V SW	V SW, +V SW, -V SW	V SW
2	N/A	C RTN	Position 1	C RTN
3	Position 2	N/A or BCD 1	Position 2	Logic or BCD 1
4	Position 3	Logic or BCD 2	Position 3	Logic or BCD 2
5	Position 4	Logic or BCD 3	Position 4	Logic or BCD 3
6	Position 5	Logic or BCD 4	Position 5	Logic or BCD 4
7	Position 6	Logic 5	Position 6	Logic 5
8	Ind COM	Logic 6	Ind COM	Logic 6
9	Ind FS	Ind COM	Ind Position 1	Ind COM
10	Ind Position 2	Ind FS	Ind Position 2	Ind Position 1
11	Ind Position 3	Ind Position 2	Ind Position 3	Ind Position 2
12	Ind Position 4	Ind Position 3	Ind Position 4	Ind Position 3
13	Ind Position 5	Ind Position 4	Ind Position 5	Ind Position 4
14	Ind Position 6	Ind Position 5	Ind Position 6	Ind Position 5
15	N/A	Ind Position 6	N/A	Ind Position 6

SP3T - SP6T Series: SS



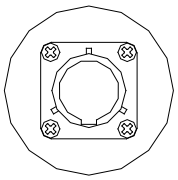
	FAILSAFE		LATCHING	NORMALLY OPEN
PIN	TRANSFER	TRANSFER (Logic Input)	TRANSFER	TRANSFER
A	+1	N.O.	Position 1	+V SW
B	-2	+V	Position 2	C RTN
C	N/A	-B	COM	Logic Input 1
D	Ind Position 1	Ind Position 1	Ind Position 1	Logic Input 2
E	Ind Position 2	Ind Position 2	Ind Position 2	Ind COM
F	Ind COM	Ind COM	Ind COM	Ind Position 1

Series: T3, T4, T5, TK4

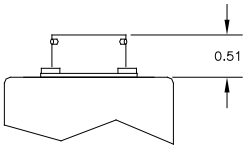


	FAILSAFE		LATCHING		NORMALLY OPEN	
PIN	SP3T - SP6T w/ INDICATORS	SP3T - SP6T w/ INDICATORS (Logic Input)	SP3T - SP6T w/ INDICATORS (No Reset)	SP3T - SP6T w/ INDICATORS (Logic Input-No Reset)	SP3T - SP6T w/ INDICATORS	SP3T - SP6T w/ INDICATORS (Logic Input)
A	N/A	N/A	Position 1	Position1	Position 1	Position 1
B	Position 2	Position 2	Position 2	Position 2	Position 2	Position 2
C	Position 3	Position 3	Position 3	Position 3	Position 3	Position 3
D	Position 4	Position 4	Position 4	Position 4	Position 4	Position 4
E	Position 5	Position 5	Position 5	Position 5	Position 5	Position 5
F	Position 6	Position 6	Position 6	Position 6	Position 6	Position 6
G	C/ +V	C/ +V	C/ +V	C/ +V	C/ +V	C/ +V
H	-B	-B	-B	-B	-B	-B
J	Ind Position 1	Ind Position 0	Ind Position 1	Ind Position 2	Ind Position 3	Ind Position 4
K	Ind Position 2	Ind Position 2	Ind Position 2	Ind Position 2	Ind Position 2	Ind Position 2
L	Ind Position 3	Ind Position 3	Ind Position 3	Ind Position 3	Ind Position 3	Ind Position 3
M	Ind Position 4	Ind Position 4	Ind Position 4	Ind Position 4	Ind Position 4	Ind Position 4
N	Ind Position 5	Ind Position 5	Ind Position 5	Ind Position 5	Ind Position 5	Ind Position 5
P	Ind Position 6	Ind Position 6	Ind Position 6	Ind Position 6	Ind Position 6	Ind Position 6
R	Ind COM	Ind COM	Ind COM	Ind COM	Ind COM	Ind COM

Series: M, O, Q, QK, S

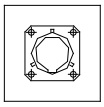


CONN TYPE
MS3112E–14–19P
OR EQUIV.



PIN	FAILSAFE		LATCHING		NORMALLY OPEN	
	SP7T - SP8T w/ INDICATORS	SP7T - SP8T w/ INDICATORS (Logic Input)	SP7T - SP8T w/ INDICATORS (No Reset)	SP7T - SP8T w/ INDICATORS (Logic Input-No Reset)	SP7T - SP8T w/ INDICATORS	SP7T - SP8T w/ INDICATORS (Logic Input)
A	N/A	N/A	Position 1	Position1	Position 1	Position 1
B	Position 2	Position 2	Position 2	Position 2	Position 2	Position 2
C	Position 3	Position 3	Position 3	Position 3	Position 3	Position 3
D	Position 4	Position 4	Position 4	Position 4	Position 4	Position 4
E	Position 5	Position 5	Position 5	Position 5	Position 5	Position 5
F	Position 6	Position 6	Position 6	Position 6	Position 6	Position 6
G	Position 7	Position 7	Position 7	Position 7	Position 7	Position 7
H	Position 8	Position 8	Position 8	Position 8	Position 8	Position 8
J	C/ +V	C/ +V	C/ +V	C/ +V	C/ +V	C/ +V
K	-B	-B	-B	-B	-B	-B
L	Ind Position 1	Ind Position 0	Ind Position 1	Ind Position 2	Ind Position 3	Ind Position 4
M	Ind Position 2	Ind Position 2	Ind Position 2	Ind Position 2	Ind Position 2	Ind Position 2
N	Ind Position 3	Ind Position 3	Ind Position 3	Ind Position 3	Ind Position 3	Ind Position 3
P	Ind Position 4	Ind Position 4	Ind Position 4	Ind Position 4	Ind Position 4	Ind Position 4
R	Ind Position 5	Ind Position 5	Ind Position 5	Ind Position 5	Ind Position 5	Ind Position 5
S	Ind Position 6	Ind Position 6	Ind Position 6	Ind Position 6	Ind Position 6	Ind Position 6
T	Ind Position 7	Ind Position 7	Ind Position 7	Ind Position 7	Ind Position 7	Ind Position 7
U	Ind Position 8	Ind Position 8	Ind Position 8	Ind Position 8	Ind Position 8	Ind Position 8
V	Ind COM	Ind COM	Ind COM	Ind COM	Ind COM	Ind COM

Series: L, N, S



CONN TYPE
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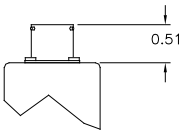
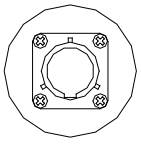
OR EQUIV.



PIN	NORMALLY OPEN	LATCHING
	SPDT TRANSFER (Logic Input)	SPDT TRANSFER (Logic Input)
A	Position 1	Position 1
B	Position 2	Position 2
C	+A	+A
D	-B	-B
E	Ind Position 1	Ind Position 1
F	Ind Position 2	Ind Position 2
G	Ind COM	Ind COM
H	N/A	N/A

Series: D1, D2, D3, D4, D5, D13, DK1, DK3, T3, T4, T5, TK4



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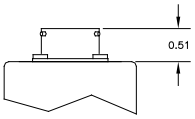
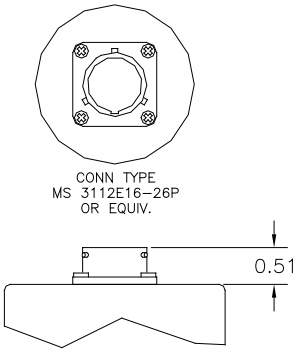


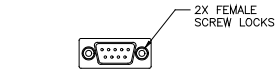
PIN	LATCHING	
	SP3T - SP6T w/ INDICATORS (Reset)	SP3T - SP6T w/ INDICATORS (Logic Input - Reset)
A	Position 1	Position 2
B	Position 2	Position 2
C	Position 3	Position 3
D	Position 4	Position 4
E	Position 5	Position 5
F	Position 6	Position 6
G	C/ +V	C/ +V
H	-B	-B
J	Ind Position 1	Ind Position 1
K	Ind Position 2	Ind Position 2
L	Ind Position 3	Ind Position 3
M	Ind Position 4	Ind Position 4
N	Ind Position 5	Ind Position 5
P	Ind Position 6	Ind Position 6
R	Ind COM	Ind COM
S	RST	RST
T	N/A	N/A
U	N/A	N/A

Series: M, O, Q, QK, S



	FAILSAFE			LATCHING			NORMALLY OPEN	
PIN	SP9T - SP10T w/ INDICATORS	SP9T - SP10T w/ INDICATORS (Logic Input)	SP7T - SP8T w/ INDICATORS (Reset)	SP7T - SP8T w/ INDICATORS (Logic Input-Reset)	SP9T - SP10T w/ INDICATORS (Reset)	SP9T - SP10T w/ INDICATORS (Logic Input-Reset)	SP9T - SP10T w/ INDICATORS	SP9T - SP10T w/ INDICATORS (Logic Input)
A	N/A	N/A	Position 1	Position1	Position 1	Position 1	Position 1	Position 1
B	Position 2	Position 2	Position 2	Position 2	Position 2	Position 2	Position 2	Position 2
C	Position 3	Position 3	Position 3	Position 3	Position 3	Position 3	Position 3	Position 3
D	Position 4	Position 4	Position 4	Position 4	Position 4	Position 4	Position 4	Position 4
E	Position 5	Position 5	Position 5	Position 5	Position 5	Position 5	Position 5	Position 5
F	Position 6	Position 6	Position 6	Position 6	Position 6	Position 6	Position 6	Position 6
G	Position 7	Position 7	Position 7	Position 7	Position 7	Position 7	Position 7	Position 7
H	Position 8	Position 8	Position 8	Position 8	Position 8	Position 8	Position 8	Position 8
J	Position 9	Position 9	C/ +V	C/ +V	Position 9	Position 9	Position 9	Position 9
K	Position 10	Position 10	-B	-B	Position 10	Position 10	Position 10	Position 10
L	C/ +V	C/ +V	Ind Position 1	Ind Position 2	C/ +V	C/ +V	C/ +V	C/ +V
M	-B	-B	Ind Position 2	Ind Position 2	-B	-B	-B	-B
N	Ind Position 3	Ind Position 4	Ind Position 3	Ind Position 3	Ind Position 3	Ind Position 4	Ind Position 3	Ind Position 4
P	Ind Position 2	Ind Position 2	Ind Position 4	Ind Position 4	Ind Position 2	Ind Position 2	Ind Position 2	Ind Position 2
R	Ind Position 3	Ind Position 3	Ind Position 5	Ind Position 5	Ind Position 3	Ind Position 3	Ind Position 3	Ind Position 3
S	Ind Position 4	Ind Position 4	Ind Position 6	Ind Position 6	Ind Position 4	Ind Position 4	Ind Position 4	Ind Position 4
T	Ind Position 5	Ind Position 5	Ind Position 7	Ind Position 7	Ind Position 5	Ind Position 5	Ind Position 5	Ind Position 5
U	Ind Position 6	Ind Position 6	Ind Position 8	Ind Position 8	Ind Position 6	Ind Position 6	Ind Position 6	Ind Position 6
V	Ind Position 7	Ind Position 7	Ind COM	Ind COM	Ind Position 7	Ind Position 7	Ind Position 7	Ind Position 7
W	Ind Position 8	Ind Position 8	RST	RST	Ind Position 8	Ind Position 8	Ind Position 8	Ind Position 8
X	Ind Position 9	Ind Position 9			Ind Position 9	Ind Position 9	Ind Position 9	Ind Position 9
Y	Ind Position 10	Ind Position 10			Ind Position 10	Ind Position 10	Ind Position 10	Ind Position 10
Z	Ind COM	Ind COM			Ind COM	Ind COM	Ind COM	Ind COM
a					RST	RST		
c								

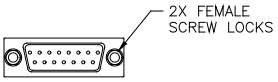
Series: L, N, S, W



SUB MINIATURE D–SHELL 9P

	FAILSAFE			LATCHING			NORMALLY OPEN	
PIN	SPDT TRANSFER	SP3T - SP6T w/o INDICATORS (Reset)	SP3T - SP6T w/o INDICATORS (Logic Input-Reset)	SPDT TRANSFER	SP3T - SP6T w/o INDICATORS (Reset)	SP3T - SP6T w/o INDICATORS (Logic Input-Reset)	SPDT	SP3T - SP6T w/o INDICATORS	SP3T - SP6T w/o INDICATORS (Logic Input)
1	N/A	N/A	N/A	Position 1	Position 1	Position 1	Position 1	Position 1	Position 1
2	Position NO	Position 2	Position 2	Position 2	Position 2	Position 2	Position 2	Position 2	Position 2
3	C/ +A	Position 3	Position 3	C/ +A	Position 3	Position 3	C/ +A	Position 3	Position 3
4	-B	Position 4	Position 4	-B	Position 4	Position 4	-B	Position 4	Position 4
5	Ind Position 1	Position 5	Position 5	Ind Position 1	Position 5	Position 5	Ind Position 1	Position 5	Position 5
6	Ind Position 2	Position 6	Position 6	Ind Position 2	Position 6	Position 6	Ind Position 2	Position 6	Position 6
7	Ind COM	C/ +V	C/ +V	Ind COM	C/ +V	C/ +V	Ind COM	C/ +V	C/ +V
8	N/A	-B	-B	N/A	-B	-B	N/A	-B	-B
9	N/A	N/A	N/A	N/A	RST	RST	N/A	N/A	N/A

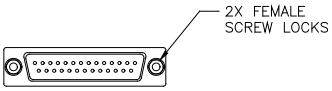
Series: D1, D2, D3, D4, D5, D13, DK1, DK3, T3, T4, T5, TK4, M, O, Q, QK, S



SUB MINIATURE D–SHELL 15P

PIN	FAILSAFE				NORMALLY OPEN/LATCHING			
	SP3T - SP6T w/ INDICATORS	SP3T - SP6T w/ INDICATORS (Logic Input)	SP7T - SP10T w/o INDICATORS	SP7T - SP10T w/o INDICATORS (Logic Input)	SP3T - SP6T w/ INDICATORS	SP3T - SP6T w/ INDICATORS (Logic Input)	SP7T - SP10T w/o INDICATORS	SP7T - SP10T w/o INDICATORS (Logic Input)
1	N/A	N/A	N/A	N/A	Position 1	Position 1	N/A	N/A
2	Position 2	Position 2	Position 2	Position 2	Position 2	Position 2	Position 2	Position 2
3	Position 3	Position 3	Position 3	Position 3	Position 3	Position 3	Position 3	Position 3
4	Position 4	Position 4	Position 4	Position 4	Position 4	Position 4	Position 4	Position 4
5	Position 5	Position 5	Position 5	Position 5	Position 5	Position 5	Position 5	Position 5
6	Position 6	Position 6	Position 6	Position 6	Position 6	Position 6	Position 6	Position 6
7	C/ +A	C/ +A	Position 7	Position 7	C/ +A	C/ +A	Position 7	Position 7
8	-B	-B	Position 8	Position 8	-B	-B	Position 8	Position 8
9	Ind Position 1	Ind Position 1	Position 9	Position 9	Ind Position 1	Ind Position 1	Position 9	Position 9
10	Ind Position 2	Ind Position 2	Position 10	Position 10	Ind Position 2	Ind Position 2	Position 10	Position 10
11	Ind Position 3	Ind Position 3	C/ +V	C/ +V	Ind Position 3	Ind Position 3	C/ +V	C/ +V
12	Ind Position 4	Ind Position 4	-B	-B	Ind Position 4	Ind Position 4	-B	-B
13	Ind Position 5	Ind Position 5	RST	RST	Ind Position 5	Ind Position 5	RST	RST
14	Ind Position 6	Ind Position 6	N/A	N/A	Ind Position 6	Ind Position 6	N/A	N/A
15	Ind COM	Ind COM	N/A	N/A	Ind COM	Ind COM	N/A	N/A

Series: L, M, N, O, Q, QK, S, W



SUB MINIATURE D–SHELL 25P

PIN	FAILSAFE		NORMALLY OPEN/LATCHING			
	SP7T - SP10T w/ INDICATORS	SP7T - SP10T w/ INDICATORS (Logic Input)	SP3T - SP6T w/ INDICATORS (Reset)	SP3T - SP6T w/ INDICATORS (Logic Input-Reset)	SP7T - SP10T w/o INDICATORS (Reset)	SP7T - SP10T w/o INDICATORS (Logic Input-Reset)
1	N/A	N/A	Position 1	Position 1	N/A	N/A
2	Position 2	Position 2	Position 2	Position 2	Position 2	Position 2
3	Position 3	Position 3	Position 3	Position 3	Position 3	Position 3
4	Position 4	Position 4	Position 4	Position 4	Position 4	Position 4
5	Position 5	Position 5	Position 5	Position 5	Position 5	Position 5
6	Position 6	Position 6	Position 6	Position 6	Position 6	Position 6
7	Position 7	Position 7	N/A	N/A	Position 7	Position 7
8	Position 8	Position 8	N/A	N/A	Position 8	Position 8
9	Position 9	Position 9	N/A	N/A	Position 9	Position 9
10	Position 10	Position 10	N/A	N/A	Position 10	Position 10
11	C/ +A	C/ +A	C/ +A	C/ +A	C/ +V	C/ +V
12	-B	-B	-B	-B	-B	-B
13	N/A	N/A	RST	RST	RST	RST
14	Ind Position 1	Ind Position 1	Ind Position 1	Ind Position 1	Ind Position 1	Ind Position 1
15	Ind Position 2	Ind Position 2	Ind Position 2	Ind Position 2	Ind Position 2	Ind Position 2
16	Ind Position 3	Ind Position 3	Ind Position 3	Ind Position 3	Ind Position 3	Ind Position 3
17	Ind Position 4	Ind Position 4	Ind Position 4	Ind Position 4	Ind Position 4	Ind Position 4
18	Ind Position 5	Ind Position 5	Ind Position 5	Ind Position 5	Ind Position 5	Ind Position 5
19	Ind Position 6	Ind Position 6	Ind Position 6	Ind Position 6	Ind Position 6	Ind Position 6
20	Ind Position 7	Ind Position 7	Ind COM	Ind COM	Ind Position 7	Ind Position 7
21	Ind Position 8	Ind Position 8	N/A	N/A	Ind Position 8	Ind Position 8
22	Ind Position 9	Ind Position 9	N/A	N/A	Ind Position 9	Ind Position 9
23	Ind Position 10	Ind Position 10	N/A	N/A	Ind Position 10	Ind Position 10
24	Ind COM	Ind COM	N/A	N/A	Ind COM	Ind COM
25	N/A	N/A	N/A	N/A	N/A	N/A

Series: L, M, N, O, Q, QK, S, W

Switch Definitions and Terms

1. **BCD:** BCD stands for Binary-Coded-Decimal. This is a four-bit system used to represent the ten (10) decimal digits 0-9. As with Logic Drivers, this is a solid state interface that allows the user to control the switch with a low current, high impedance logic signal. This allows a user to conveniently control 10 positions through 4 control lines. Each individual position is selected with a unique BCD code.
2. **BREAK-BEFORE-MAKE:** Disconnecting the RF power from the current RF circuit position before selecting a different position. All **DUCOMMUN** switches are break-before-make designs.
3. **DC ACTUATION:** This type of actuation requires direct current (DC) be applied to each of the switch actuator inputs. It is simple but requires a DC switching device and interface that can handle the current requirements of the switch.
4. **DIODES:** A diode allows current to flow in one direction and prevents it from flowing in the other.

   A switch with diodes has a polarity associated with its operation. This polarity is established by the way the diode is situated within the circuitry. Diodes are also used to protect any equipment that the switch is connected to from voltage spikes. In this case the diodes are referred to as suppression diodes.
5. **FAILSAFE:** The Failsafe position is a Normally Closed contact that does not require actuator power to remain closed. It is only closed when no other switch position is selected. When an alternate position is selected by applying current to the appropriate actuator, the Failsafe contact opens and does not close again until current is removed from the selected position.

   This feature directs signals to a specified path should a failure occur and the system loses power. Another application is one where the user wants one position selected most frequently than other positions. In this scenario the Failsafe position would be assigned to the frequently used position. This is beneficial because the most frequently used state requires no actuator power.
6. **INDICATORS:** Indicators enable an operator or computer to know which RF position is selected.
7. **INSERTION LOSS:** Is a measure of signal loss in the switch RF section. It is a measure of how much power the switch will dissipate internally. The higher the frequency the more Insertion Loss. A device with less Insertion Loss is preferred.
8. **ISOLATION:** Isolation is a measure of RF leakage (crosstalk) between an open position and closed position. A device with higher Isolation is preferred.
9. **LATCHING:** The switch maintains the selected position magnetically without current draw.
   a. **LATCHING SELF CUT-OFF:** Current is required to change positions. Current is required only during the switching phase and an internal current cut-off circuit is used to produce a pulse.
   b. **PULSE LATCHING:** If the user can provide an external source of a current pulse, no cut-off circuit is required. A DC pulse between 20-50 mSecs is required to actuate a position. The user provides current cut-off.

   The main use of latching switches is in systems that do not have the power available to supply constant actuator current. The magnetic latching feature enables these switches to withstand high shock and vibration environments. Latching switches generate less heat than non-latching switches because of the internal current cut-off design and customer provided cut-off in pulse latching switches.

10. **LOGIC DRIVER:** This is a solid state interface that allows the user to control the switch with a low current, high impedance logic signal. For users that employ logic circuits in conjunction with switching requirements, Logic level signals are readily available. In this environment it is often a convenient way to control the relays. Other benefits include easily available control networks and low current interfacing. **DUCOMMUN** offers both high and low level Logic controls as well as BCD controls.
11. **MULTI-POSITION:** Usually reserved for switches with 3 or more throws or positions. **DUCOMMUN** currently manufactures 3 through 10 positions switches.
12. **NORMALLY OPEN:** All switch paths are open until a position is selected. Continuous current is required to maintain the selected path. This configuration represents the simplest and most common type of switch. Most users are able to supply the constant current required by these devices and the design is quite rugged and reliable.
13. **NON-TERMINATED OR REFLECTIVE:** This configuration directs all unselected inputs to an open circuit load. The only source that sees a 50 ohm load is the one associated with the selected position. It is less complicated and less expensive than a terminated switch. If the sources can tolerate an open circuit load, this is the configuration to use.
14. **RETURN LOSS:** Return Loss is a measure of reflected power. A device with a lower Return Loss value is preferred.
15. **SINGLE POLE DOUBLE THROW:** One input directed to either of two outputs or conversely, either of two inputs directed to a single output. SPDT can also be utilized as a terminated SPST switch.
16. **TERMINATED:** This configuration directs all unselected inputs to a 50 ohm load located within the switch body. This is used in systems where the RF sources cannot tolerate an open circuit load condition. When a position is selected the internal 50 ohm load is disconnected from the source and the load becomes the 50 ohm load associated with the instrument connected to the switch Common port. In this type of switch a 50 ohm load is always seen by the RF sources.
17. **TRANSFER:** A four port device with two inputs toggled between two outputs. As an example consider a four port device with connections numbered 1, 2, 3, and 4. In position #1 we have ports 1-3 and 2-4 connected, in position #2 we have ports 1-2 and 3-4 connected. As can be seen, ports 1 and 4 toggled connections with ports 2 and 3.

    This configuration is normally used when you want to toggle 2 sources and 2 loads. An example, would be toggling two antennas A1 and A2 and two transmitters T1 and T2. One state would be A1-T1 and A2-T2; the other would be A1-T2 and A2-T1.
18. **VSWR:** VSWR or Voltage Standing Wave Ratio is another way of measuring the amount of reflected power. A device with lower VSWR is preferred.

GENERAL SPECIFICATIONS

INSULATION RESISTANCE: Resistance greater than 2 Giga-ohms at 50 Vdc is required between the chassis and all switch terminals.

SPECIAL TESTING: Is available upon request. Please contact factory.
FINISH: Electroless Nickel, Contact Factory if different finish is required.

RF CONTACTS: Beryllium Copper, Gold plated over a Nickel undercoating.

STORAGE TEMPERATURE: -55°C to +100°C.

TOLERANCES: Unless otherwise specified. Dimensions are in inches.

XX: +/- 0.03
XXX: +/- 0.005
ANG: +/- 1°

INTERNAL TERMINATION RF POWER: 3WCW @ +85°C

INTERNAL TERMINATION VSWR: 2.00 VSWR max. typical.

REPEATABILITY: 0.1 dB max. between positions.

AUXILIARY CONTACTS: (Indicators) rated at 250mA, 100 Vdc, 5W max. (switching). Must use a series current limiting resistor.

RF CONNECTOR TORQUE: Apply no more than 8 inch pounds of torque to install mating connectors.

SUPPLY VOLTAGE: +/- 10% nominal.

MAGNETIC SENSITIVITY: SPDT switches - electromechanical switches can be sensitive to ferrous materials and external magnetic fields. Allow mounting no closer than 1/8” for neighboring ferrous materials.

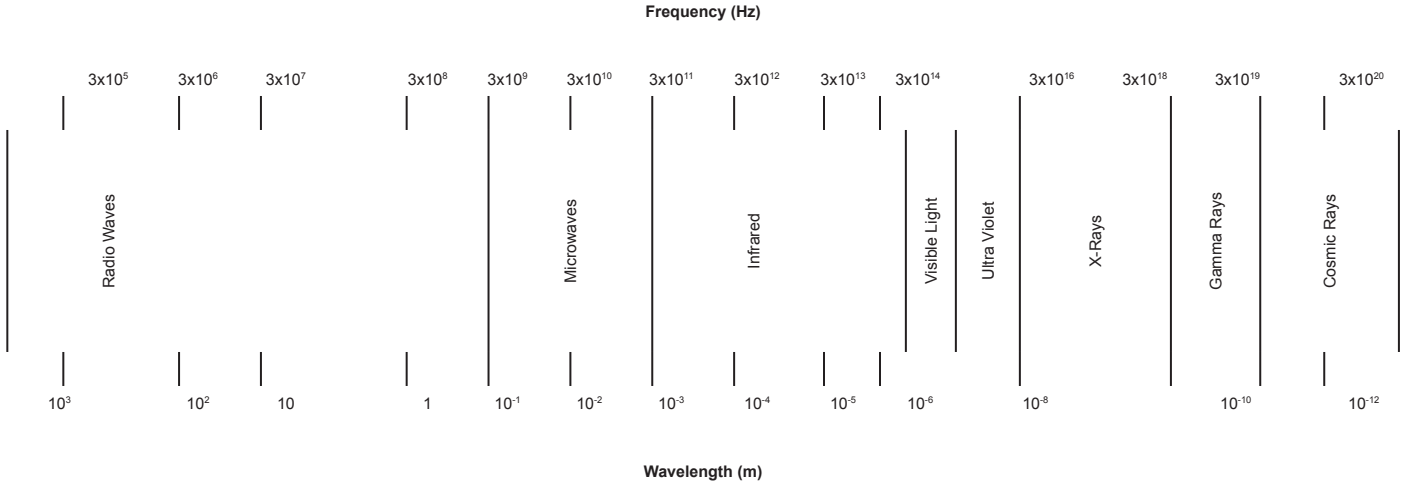
ACTUATION: DTI Microwave switches are RF devices, the impedance match is lost if more than one position is actuated simultaneously. Simultaneous actuation of more than one position is not recommended and under certain circumstances may damage the switch. Please consult factory.

DC TERMINAL FUNCTION LEGEND

N/A	Not Applicable
AV	Actuation Voltage
C	Actuation Voltage Common, Plus (+) or Minus (-)
+V SW	Positive Switch Actuation Voltage
C RTN	Common Return for Actuation & Logic Voltage Supplies
L	Logic Input (1= 3.5 - 5.5 Vdc; 0= 0 - 0.8 Vdc)
PV	Pulse Voltage with specified polarity for latching operation (20 msec min.)
IND COM	Indicator Common
F/S	Failsafe Position (when applicable)
+1, -2	SPDT/Transfer Failsafe version, indicates positive & negative actuation terminals
N/C	Normally Closed Position
N/O	Normally Open Position
+A	TTL Control, Indicates Postive Coil Voltage Terminals
-B	TTL Control, Indicates DC Return

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

ELECTROMAGNETIC SPECTRUM



Frequency vs. Wavelength

$f = c/\lambda$ $\lambda = c/f$

λ= Wavelength (meters)
c= Speed of light ($3x10^8$ meters/sec)

f= Frequency (hertz)

Letter Band Designations	
1-2 GHz	L Band
2-4 GHz	S Band
4-8 GHz	C Band
8-12 GHz	X Band
12-18 GHz	Ku Band
18-27 GHz	K Band
27-40 GHz	Ka Band
40-75 GHz	V Band

Broadcasting Frequencies	
AM	535-1,605 KHz
FM	88-108 MHz
TV CH 2-4	54-72 MHz
TV CH 5-6	76-88 MHz
TV CH 7-13	174-216 MHz
TV CH 14-83	470-890 MHz

ITU Frequency Band Designations		
Band	**Nomenclature**	**Frequency**
ELF	Extremely Low Frequency	3 - 30 Hz
SLF	Super Low Frequency	30 - 300 Hz
ULF	Ultra Low Frequency	300 - 3000 Hz
VLF	Very Low Frequency	3 - 30 kHz
LF	Low Frequency	30 - 300 kHz
MF	Medium Frequency	300 - 3000 kHz
HF	High Frequency	3 - 30 MHz
VHF	Very High Frequency	30 - 300 MHz
UHF	Ultra High Frequency	300 - 3000 MHz
SHF	Super High Frequency	3 - 30 GHz
EHF	Extremely High Frequency	30 - 300 GHz

ITU= INTERNATIONAL TELECOMMUNICATIONS UNION

Typical Metric Prefixes and their Symbols				
Prefix	**Symbol**	**Power of Ten**	**Decimal Value**	**Value**
tera	T	10^{12}	1,000,000,000,000	1 trillion
giga	G	10^9	1,000,000,000	1 billion
mega	M	10^6	1,000,000	1 million
kilo	k	10^3	1,000	1 thousand
milli	m	10^{-3}	0.001	1 thousandth
micro	μ	10^{-6}	0.000	1 millionth
nano	n	10^{-9}	0.000	1 billionth
pico	p	10^{-12}	0.000	1 trillionth

CENTIGRADE - FAHRENHEIT

C	F	C	F	C	F	C	F
-80	-112.0	9	48.2	47	116.6	85	185.0
-70	-94.0	10	50.0	48	118.4	86	186.8
-60	-76.0	11	51.8	49	120.2	87	188.6
-50	-58.0	12	53.6	50	122.0	88	190.4
-45	-49.1	13	55.4	51	123.8	89	192.2
-40	-40.0	14	57.2	52	125.6	90	194.0
-35	-31.0	15	59.0	53	127.4	91	195.8
-30	-22.0	16	60.8	54	129.2	92	197.6
-25	-13.0	17	62.6	55	131.0	93	199.4
-20	-4.0	18	64.4	56	132.8	94	201.2
-19	-2.2	19	66.2	57	134.6	95	203.0
-18	-0.4	20	68.0	58	136.4	96	204.8
-17	1.4	21	69.8	59	138.2	97	206.6
-16	3.2	22	71.6	60	140.0	98	208.4
-15	5.0	23	73.4	61	141.8	99	210.2
-14	6.8	24	75.2	62	143.6	100	212.0
-13	8.6	25	77.0	63	145.4	105	221.0
-12	10.4	26	78.8	64	147.2	110	230.0
-11	12.2	27	80.6	65	149.0	115	239.0
-10	14.0	28	82.4	66	150.8	120	248.0
-9	15.8	29	84.2	67	152.6	130	266.0
-8	17.6	30	86.0	68	154.4	140	284.0
-7	19.4	31	87.8	69	156.2	150	302.0
-6	21.2	32	89.6	70	158.0	160	320.0
-5	23.0	33	91.4	71	159.8	170	338.0
-4	24.8	34	93.2	72	161.6	180	356.0
-3	26.6	35	95.0	73	163.4	190	374.0
-2	28.4	36	96.8	74	165.2	200	392.0
-1	30.2	37	98.6	75	167.0	250	482.0
0	32.0	38	100.4	76	168.8	300	572.0
1	33.8	39	102.2	77	170.6	350	662.0
2	35.6	40	104.0	78	172.4	400	752.0
3	37.4	41	105.8	79	174.2	500	932.0
4	39.2	42	107.6	80	176.0	600	1112.0
5	41.0	43	109.4	81	177.8	700	1292.0
6	42.8	44	111.2	82	179.6	800	1472.0
7	44.6	45	113.0	83	181.4	900	1652.0
8	46.4	46	114.8	84	183.2	1000	1832.0

C= 5/9 (F-32)

F= 9/5*C+32, or 9/5C+32

THE EFFECT OF VSWR ON TRANSMITTED POWER

VSWR	Return Loss (dB)	Reflected Power (%)	Trans. Power (%)	Voltage Refl. Coeff.	Trans. Loss (dB)	VSWR	Return Loss (dB)	Reflected Power (%)	Trans. Power (%)	Voltage Refl. Coeff.	Trans. Loss (dB)
1.00	Infinite	0.000	100.000	0.000	0.0000	1.38	15.9	2.550	97.450	0.160	0.1120
1.01	46.1	0.003	99.997	0.005	0.0002	1.39	15.7	2.670	97.330	0.162	0.1180
1.02	40.1	0.009	99.991	0.010	0.0005	1.40	15.6	2.780	97.220	0.166	0.1220
1.03	36.6	0.022	99.978	0.015	0.0011	1.41	15.4	2.900	97.100	0.169	0.1260
1.04	34.1	0.038	99.962	0.020	0.0018	1.42	15.2	3.030	96.970	0.171	0.1320
1.05	32.3	0.060	99.940	0.024	0.0028	1.43	15.0	3.140	96.860	0.175	0.1370
1.06	30.7	0.082	99.918	0.029	0.0039	1.44	14.9	3.280	96.720	0.180	0.1420
1.07	29.4	0.116	99.884	0.034	0.0051	1.45	14.7	3.380	96.620	0.183	0.1470
1.08	28.3	0.144	99.856	0.038	0.0066	1.46	14.6	3.500	96.500	0.186	0.1520
1.09	27.3	0.184	99.816	0.043	0.0083	1.47	14.5	3.620	96.380	0.190	0.1570
1.10	26.4	0.228	99.772	0.047	0.0100	1.48	14.3	3.740	96.260	0.193	0.1640
1.11	25.6	0.276	99.724	0.052	0.0118	1.49	14.2	3.870	96.130	0.195	0.1720
1.12	24.9	0.324	99.676	0.056	0.0139	1.50	14.0	4.000	96.000	0.199	0.1800
1.13	24.3	0.375	99.625	0.061	0.0160	1.55	13.3	4.700	95.300	0.213	0.2100
1.14	23.7	0.426	99.574	0.065	0.0185	1.60	12.6	5.400	94.600	0.230	0.2400
1.15	23.1	0.488	99.512	0.069	0.0205	1.65	12.2	6.000	94.000	0.245	0.2700
1.16	22.6	0.550	99.450	0.074	0.0235	1.70	11.7	6.800	93.200	0.258	0.3100
1.17	22.1	0.615	99.385	0.078	0.0260	1.75	11.3	7.400	92.600	0.261	0.3400
1.18	21.6	0.682	99.318	0.082	0.0285	1.80	10.9	8.200	91.800	0.285	0.3700
1.19	21.2	0.750	99.250	0.086	0.0318	1.85	10.5	8.900	91.100	0.298	0.4000
1.20	20.8	0.816	99.184	0.091	0.0353	1.90	10.2	9.600	90.400	0.310	0.4400
1.21	20.4	0.900	99.100	0.095	0.0391	1.95	9.8	10.200	89.800	0.320	0.4700
1.22	20.1	0.980	99.020	0.099	0.0426	2.00	9.5	11.000	89.000	0.332	0.5000
1.23	19.7	1.080	98.920	0.103	0.0455	2.10	9.0	12.400	87.600	0.352	0.5700
1.24	19.4	1.150	98.850	0.106	0.0490	2.20	8.6	13.800	86.200	0.372	0.6500
1.25	19.1	1.230	98.770	0.111	0.0530	2.30	8.1	15.300	84.700	0.392	0.7300
1.26	18.8	1.340	98.660	0.115	0.0560	2.40	7.7	16.900	83.100	0.410	0.8000
1.27	18.5	1.430	98.570	0.119	0.0600	2.50	7.3	18.200	81.800	0.429	0.8800
1.28	18.2	1.520	98.480	0.123	0.0640	2.60	7.0	19.500	80.500	0.445	0.9500
1.29	17.9	1.620	98.380	0.126	0.0680	2.70	6.8	21.000	79.000	0.459	1.0300
1.30	17.7	1.710	98.290	0.130	0.0730	2.80	6.5	22.300	77.700	0.473	1.1000
1.31	17.4	1.810	98.190	0.134	0.0780	2.90	6.2	23.700	76.300	0.485	1.1700
1.32	17.2	1.910	98.090	0.137	0.0830	3.00	6.0	25.000	75.000	0.500	1.2500
1.33	17.0	2.020	97.980	0.141	0.0870	3.50	5.1	31.000	69.000	0.555	1.6100
1.34	16.8	2.130	97.870	0.145	0.0920	4.00	4.4	36.000	64.000	0.600	1.9300
1.35	16.5	2.230	97.770	0.149	0.0960	4.50	3.9	40.600	59.400	0.635	2.2700
1.36	16.3	2.330	97.670	0.152	0.1010	5.00	3.5	44.400	55.600	0.665	2.5600
1.37	16.1	2.440	97.560	0.155	0.1060	6.00	2.9	51.000	49.000	0.715	3.0800

dBm to Milliwatts

dBm	Milliwatts	dBm	Milliwatts	dBm	Milliwatts	dBm	Milliwatts	dBm	Milliwatts	dBm	Milliwatts	dBm	Milliwatts
-18.0	0.016	-11.1	0.078	-4.2	0.380	2.7	1.86	9.6	9.12	16.5	44.7	23.4	219
-17.9	0.016	-11.0	0.079	-4.1	0.389	2.8	1.91	9.7	9.33	16.6	45.7	23.5	224
-17.8	0.017	-10.9	0.081	-4.0	0.398	2.9	1.95	9.8	9.55	16.7	46.8	23.6	229
-17.7	0.017	-10.8	0.083	-3.9	0.407	3.0	2.00	9.9	9.77	16.8	47.9	23.7	234
-17.6	0.017	-10.7	0.085	-3.8	0.417	3.1	2.04	10.0	10.0	16.9	49.0	23.8	240
-17.5	0.018	-10.6	0.087	-3.7	0.427	3.2	2.09	10.1	10.2	17.0	50.1	23.9	245
-17.4	0.018	-10.5	0.089	-3.6	0.437	3.3	2.14	10.2	10.5	17.1	51.3	24.0	251
-17.3	0.019	-10.4	0.091	-3.5	4.470	3.4	2.19	10.3	10.7	17.2	52.5	24.1	257
-17.2	0.019	-10.3	0.093	-3.4	0.457	3.5	2.24	10.4	11.0	17.3	53.7	24.2	263
-17.1	0.020	-10.2	0.096	-3.3	0.468	3.6	2.29	10.5	11.2	17.4	55.0	24.3	269
-17.0	0.020	-10.1	0.098	-3.2	0.479	3.7	2.34	10.6	11.5	17.5	56.2	24.4	275
-16.9	0.020	-10.0	0.100	-3.1	0.490	3.8	2.40	10.7	11.7	17.6	57.5	24.5	282
-16.8	0.021	-9.9	0.102	-3.0	0.501	3.9	2.45	10.8	12.0	17.7	58.9	24.6	288
-16.7	0.021	-9.8	0.105	-2.9	0.513	4.0	2.51	10.9	12.3	17.8	60.3	24.7	295
-16.6	0.022	-9.7	0.107	-2.8	0.525	4.1	2.57	11.0	12.6	17.9	61.7	24.8	302
-16.5	0.022	-9.6	0.110	-2.7	0.537	4.2	2.63	11.1	12.9	18.0	63.1	24.9	309
-16.4	0.023	-9.5	0.112	-2.6	0.550	4.3	2.69	11.2	13.2	18.1	64.6	25.0	316
-16.3	0.023	-9.4	0.115	-2.5	0.562	4.4	2.75	11.3	13.5	18.2	66.1	25.1	324
-16.2	0.024	-9.3	0.117	-2.4	0.575	4.5	2.82	11.4	13.8	18.3	67.6	25.2	331
-16.1	0.025	-9.2	0.120	-2.3	0.589	4.6	2.88	11.5	14.1	18.4	69.2	25.3	339
-16.0	0.025	-9.1	0.123	-2.2	0.603	4.7	2.95	11.6	14.5	18.5	70.8	25.4	347
-15.9	0.026	-9.0	0.126	-2.1	0.617	4.8	3.02	11.7	14.8	18.6	72.4	25.5	355
-15.8	0.026	-8.9	0.129	-2.0	0.631	4.9	3.09	11.8	15.1	18.7	74.1	25.6	363
-15.7	0.027	-8.8	0.132	-1.9	0.646	5.0	3.16	11.9	15.5	18.8	75.9	25.7	372
-15.6	0.028	-8.7	0.135	-1.8	0.661	5.1	3.24	12.0	15.8	18.9	77.6	25.8	380
-15.5	0.028	-8.6	0.138	-1.7	0.676	5.2	3.31	12.1	16.2	19.0	79.4	25.9	389
-15.4	0.029	-8.5	0.141	-1.6	0.692	5.3	3.39	12.2	16.6	19.1	81.3	26.0	398
-15.3	0.030	-8.4	0.145	-1.5	0.708	5.4	3.47	12.3	17.0	19.2	83.2	26.1	407
-15.2	0.030	-8.3	0.148	-1.4	0.724	5.5	3.55	12.4	17.4	19.3	85.1	26.2	417
-15.1	0.031	-8.2	0.151	-1.3	0.741	5.6	3.63	12.5	17.8	19.4	87.1	26.3	427
-15.0	0.032	-8.1	0.155	-1.2	0.759	5.7	3.72	12.6	18.2	19.5	89.1	26.4	437
-14.9	0.032	-8.0	0.158	-1.1	0.776	5.8	3.80	12.7	18.6	19.6	91.2	26.5	447
-14.8	0.033	-7.9	0.162	-1.0	0.794	5.9	3.89	12.8	19.1	19.7	93.3	26.6	457
-14.7	0.034	-7.8	0.166	-0.9	0.813	6.0	3.98	12.9	19.5	19.8	95.5	26.7	468
-14.6	0.035	-7.7	0.170	-0.8	0.832	6.1	4.07	13.0	20.0	19.9	97.7	26.8	479
-14.5	0.036	-7.6	0.174	-0.7	0.851	6.2	4.17	13.1	20.4	20.0	100	26.9	490
-14.4	0.036	-7.5	0.178	-0.6	0.871	6.3	4.27	13.2	20.9	20.1	102	27.0	501
-14.3	0.037	-7.4	0.182	-0.5	0.891	6.4	4.37	13.3	21.4	20.2	105	27.1	513
-14.2	0.038	-7.3	0.186	-0.4	0.912	6.5	4.47	13.4	21.9	20.3	107	27.2	525
-14.1	0.039	-7.2	0.191	-0.3	0.933	6.6	4.57	13.5	22.4	20.4	110	27.3	537
-14.0	0.040	-7.1	0.195	-0.2	0.955	6.7	4.68	13.6	22.9	20.5	112	27.4	550
-13.9	0.041	-7.0	0.200	-0.1	0.977	6.8	4.79	13.7	23.4	20.6	115	27.5	562
-13.8	0.042	-6.9	0.204	0.0	1.00	6.9	4.90	13.8	24.0	20.7	117	27.6	575
-13.7	0.043	-6.8	0.209	0.1	1.02	7.0	5.01	13.9	24.5	20.8	120	27.7	589
-13.6	0.044	-6.7	0.214	0.2	1.05	7.1	5.13	14.0	25.1	20.9	123	27.8	603
-13.5	0.045	-6.6	0.219	0.3	1.07	7.2	5.25	14.1	25.7	21.0	126	27.9	617
-13.4	0.046	-6.5	0.224	0.4	1.10	7.3	5.37	14.2	26.3	21.1	129	28.0	631
-13.3	0.047	-6.4	0.229	0.5	1.12	7.4	5.50	14.3	26.9	21.2	132	28.1	646
-13.2	0.048	-6.3	0.234	0.6	1.15	7.5	5.62	14.4	27.5	21.3	135	28.2	661
-13.1	0.049	-6.2	0.240	0.7	1.17	7.6	5.75	14.5	28.2	21.4	138	28.3	676
-13.0	0.050	-6.1	0.245	0.8	1.20	7.7	5.89	14.6	28.8	21.5	141	28.4	692
-12.9	0.051	-6.0	0.251	0.9	1.23	7.8	6.03	14.7	29.5	21.6	145	28.5	708
-12.8	0.053	-5.9	0.257	1.0	1.26	7.9	6.17	14.8	30.2	21.7	148	28.6	724
-12.7	0.054	-5.8	0.263	1.1	1.29	8.0	6.31	14.9	30.9	21.8	151	28.7	741
-12.6	0.055	-5.7	0.269	1.2	1.32	8.1	6.46	15.0	31.6	21.9	155	28.8	759
-12.5	0.056	-5.6	0.275	1.3	1.35	8.2	6.61	15.1	32.4	22.0	158	28.9	776
-12.4	0.058	-5.5	0.282	1.4	1.38	8.3	6.76	15.2	33.1	22.1	162	29.0	794
-12.3	0.059	-5.4	0.288	1.5	1.41	8.4	6.92	15.3	33.9	22.2	166	29.1	813
-12.2	0.060	-5.3	0.295	1.6	1.45	8.5	7.08	15.4	34.7	22.3	170	29.2	832
-12.1	0.062	-5.2	0.302	1.7	1.48	8.6	7.24	15.5	35.5	22.4	174	29.3	852
-12.0	0.063	-5.1	0.309	1.8	1.51	8.7	7.41	15.6	36.3	22.5	178	29.4	871
-11.9	0.065	-5.0	0.316	1.9	1.55	8.8	7.59	15.7	37.2	22.6	182	29.5	891
-11.8	0.066	-4.9	0.324	2.0	1.58	8.9	7.76	15.8	38.0	22.7	186	29.6	912
-11.7	0.068	-4.8	0.331	2.1	1.62	9.0	7.94	15.9	38.9	22.8	191	29.7	933
-11.6	0.069	-4.7	0.339	2.2	1.66	9.1	8.13	16.0	39.8	22.9	195	29.8	955
-11.5	0.071	-4.6	0.347	2.3	1.70	9.2	8.32	16.1	40.7	23.0	200	29.9	977
-11.4	0.072	-4.5	0.355	2.4	1.74	9.3	8.51	16.2	41.7	23.1	204	30.0	1000
-11.3	0.074	-4.4	0.363	2.5	1.78	9.4	8.71	16.3	42.7	23.2	209		
-11.2	0.076	-4.3	0.372	2.6	1.82	9.5	8.91	16.4	43.7	23.3	214		

dBm to Milliwatts

dBm	Milliwatts	dBm	Milliwatts	dBm	Milliwatts	dBm	Milliwatts	dBm	Milliwatts	dBm	Milliwatts
30.1	1.02	36.8	4.79	43.5	22.40	50.2	105.00	56.9	490.00	63.6	2290.00
30.2	1.05	36.9	4.90	43.6	22.90	50.3	107.00	57.0	501.00	63.7	2340.00
30.3	1.07	37.0	5.01	43.7	23.40	50.4	110.00	57.1	513.00	63.8	2400.00
30.4	1.10	37.1	5.13	43.8	24.00	50.5	112.00	57.2	525.00	63.9	2450.00
30.5	1.12	37.2	5.25	43.9	24.50	50.6	115.00	57.3	537.00	64.0	2510.00
30.6	1.15	37.3	5.37	44.0	25.10	50.7	117.00	57.4	550.00	64.1	2570.00
30.7	1.17	37.4	5.50	44.1	25.70	50.8	120.00	57.5	562.00	64.2	2630.00
30.8	1.20	37.5	5.62	44.2	26.30	50.9	123.00	57.6	575.00	64.3	2690.00
30.9	1.23	37.6	5.75	44.3	26.90	51.0	126.00	57.7	589.00	64.4	2750.00
31.0	1.26	37.7	5.89	44.4	27.50	51.1	129.00	57.8	603.00	64.5	2820.00
31.1	1.29	37.8	6.03	44.5	28.20	51.2	132.00	57.9	617.00	64.6	2880.00
31.2	1.32	37.9	6.17	44.6	28.80	51.3	135.00	58.0	631.00	64.7	2950.00
31.3	1.35	38.0	6.31	44.7	29.50	51.4	138.00	58.1	646.00	64.8	3020.00
31.4	1.38	38.1	6.46	44.8	30.20	51.5	141.00	58.2	661.00	64.9	3090.00
31.5	1.41	38.2	6.61	44.9	30.90	51.6	145.00	58.3	676.00	65.0	3160.00
31.6	1.45	38.3	6.76	45.0	31.60	51.7	148.00	58.4	692.00	65.1	3240.00
31.7	1.48	38.4	6.92	45.1	32.40	51.8	151.00	58.5	708.00	65.2	3310.00
31.8	1.51	38.5	7.08	45.2	33.10	51.9	155.00	58.6	724.00	65.3	3390.00
31.9	1.55	38.6	7.24	45.3	33.90	52.0	158.00	58.7	741.00	65.4	3470.00
32.0	1.58	38.7	7.41	45.4	34.70	52.1	162.00	58.8	759.00	65.5	3550.00
32.1	1.62	38.8	7.59	45.5	35.50	52.2	166.00	58.9	776.00	65.6	3630.00
32.2	1.66	38.9	7.76	45.6	36.30	52.3	170.00	59.0	794.00	65.7	3720.00
32.3	1.70	39.0	7.94	45.7	37.20	52.4	174.00	59.1	813.00	65.8	3800.00
32.4	1.74	39.1	8.13	45.8	38.00	52.5	178.00	59.2	832.00	65.9	3890.00
32.5	1.78	39.2	8.32	45.9	38.90	52.6	182.00	59.3	851.00	66.0	3980.00
32.6	1.82	39.3	8.51	46.0	39.80	52.7	186.00	59.4	871.00	66.1	4070.00
32.7	1.86	39.4	8.71	46.1	40.70	52.8	191.00	59.5	891.00	66.2	4170.00
32.8	1.91	39.5	8.91	46.2	41.70	52.9	195.00	59.6	912.00	66.3	4270.00
32.9	1.95	39.6	9.12	46.3	42.70	53.0	200.00	59.7	933.00	66.4	4370.00
33.0	2.00	39.7	9.33	46.4	43.70	53.1	204.00	59.8	955.00	66.5	4470.00
33.1	2.04	39.8	9.55	46.5	44.70	53.2	209.00	59.9	977.00	66.6	4570.00
33.2	2.09	39.9	9.77	46.6	45.70	53.3	214.00	60.0	1000.00	66.7	4680.00
33.3	2.14	40.0	10.00	46.7	46.80	53.4	219.00	60.1	1020.00	66.8	4790.00
33.4	2.19	40.1	10.20	46.8	47.90	53.5	224.00	60.2	1050.00	66.9	4900.00
33.5	2.24	40.2	10.50	46.9	49.00	53.6	229.00	60.3	1070.00	67.0	5010.00
33.6	2.29	40.3	10.70	47.0	51.10	53.7	234.00	60.4	1100.00	67.1	5130.00
33.7	2.34	40.4	11.00	47.1	51.30	53.8	240.00	60.5	1120.00	67.2	5250.00
33.8	2.40	40.5	11.20	47.2	52.50	53.9	245.00	60.6	1150.00	67.3	5370.00
33.9	2.45	40.6	11.50	47.3	53.70	54.0	251.00	60.7	1170.00	67.4	5500.00
34.0	2.51	40.7	11.70	47.4	55.00	54.1	257.00	60.8	1200.00	67.5	5620.00
34.1	2.57	40.8	12.00	47.5	56.20	54.2	263.00	60.9	1230.00	67.6	5750.00
34.2	2.63	40.9	12.30	47.6	57.50	54.3	269.00	61.0	1260.00	67.7	5890.00
34.3	2.69	41.0	12.60	47.7	58.90	54.4	275.00	61.1	1290.00	67.8	6030.00
34.4	2.75	41.1	12.90	47.8	60.30	54.5	282.00	61.2	1320.00	67.9	6170.00
34.5	2.82	41.2	13.20	47.9	61.70	54.6	288.00	61.3	1350.00	68.0	6310.00
34.6	2.88	41.3	13.50	48.0	63.10	54.7	295.00	61.4	1380.00	68.1	6460.00
34.7	2.95	41.4	13.80	48.1	64.60	54.8	302.00	61.5	1410.00	68.2	6610.00
34.8	3.02	41.5	14.10	48.2	66.10	54.9	309.00	61.6	1450.00	68.3	6760.00
34.9	3.09	41.6	14.50	48.3	67.60	55.0	316.00	61.7	1480.00	68.4	6920.00
35.0	3.16	41.7	14.80	48.4	69.20	55.1	324.00	61.8	1510.00	68.5	7080.00
35.1	3.24	41.8	15.10	48.5	70.80	55.2	331.00	61.9	1550.00	68.6	7240.00
35.2	3.31	41.9	15.50	48.6	72.40	55.3	339.00	62.0	1580.00	68.7	7410.00
35.3	3.39	42.0	15.80	48.7	74.10	55.4	347.00	62.1	1620.00	68.8	7590.00
35.4	3.47	42.1	16.20	48.8	75.90	55.5	355.00	62.2	1660.00	68.9	7760.00
35.5	3.55	42.2	16.60	48.9	77.60	55.6	363.00	62.3	1700.00	69.0	7940.00
35.6	3.63	42.3	17.00	49.0	79.40	55.7	372.00	62.4	1740.00	69.1	8130.00
35.7	3.72	42.4	17.40	49.1	81.30	55.8	380.00	62.5	1780.00	69.2	8320.00
35.8	3.80	42.5	17.80	49.2	83.20	55.9	389.00	62.6	1820.00	69.3	8510.00
35.9	3.89	42.6	18.20	49.3	85.10	56.0	398.00	62.7	1860.00	69.4	8710.00
36.0	3.98	42.7	18.60	49.4	87.10	56.1	407.00	62.8	1910.00	69.5	8910.00
36.1	4.07	42.8	19.10	49.5	89.10	56.2	417.00	62.9	1950.00	69.6	9120.00
36.2	4.17	42.9	19.50	49.6	91.20	56.3	427.00	63.0	2000.00	69.7	9330.00
36.3	4.27	43.0	20.00	49.7	93.30	56.4	437.00	63.1	2040.00	69.8	9550.00
36.4	4.37	43.1	20.40	49.8	95.50	56.5	447.00	63.2	2090.00	69.9	9770.00
36.5	4.47	43.2	20.90	49.9	97.70	56.6	457.00	63.3	2140.00	70.0	10000.00
36.6	4.57	43.3	21.40	50.0	100.00	56.7	468.00	63.4	2190.00		
36.7	4.68	43.4	21.90	50.1	102	56.8	479.00	63.5	2240.00		

SWITCH MATRICES
REQUEST FOR QUOTATION

SWITCH MATRICES OVERVIEW

Ducommun RF Products has been actively working with our individual customers to develop unique testing solutions with our Switch Matrices and coaxial switches. Ducommun RF Products has over twenty five years experience with the design and manufacturing of switch matrix systems. Combining together our technical knowledge of both coaxial switches and switching systems, we have been able to assist our customers with a variety of solution that fit their unique requirements.

What mode of switching is preferred?

- ☐ Electro-Mechanical
- ☐ Solid State
- ☐ Either

Matrix Switch Construction

- ☐ Switches on Inputs & Outputs (Blocking)
- ☐ Power Dividers on Inputs & Switches on Outputs (Non-Blocking)
- ☐ Power Dividers on Inputs & Outputs w/1P1T Switches In Between (Super Non-Blocking Type #1)
- ☐ Power Dividers on Inputs & Outputs w/ Prog. Attenuators In Between (Super Non-Blocking Type #2)
- ☐ Other

Number of Inputs

Number of Outputs

Switching Speed

Type of RF Connectors

- ☐ Input Connector Type
- ☐ Output Connector Type

Frequency Range (specify MHz or GHz)

Input Power (specify Watts or dBm)

Remote Control Type (select all applicable)

- ☐ RS-232
- ☐ GPIB
- ☐ Ethernet
- ☐ USB
- ☐ Other (specify)

Front Panel Control

- ☐ Yes
- ☐ No

Package Type

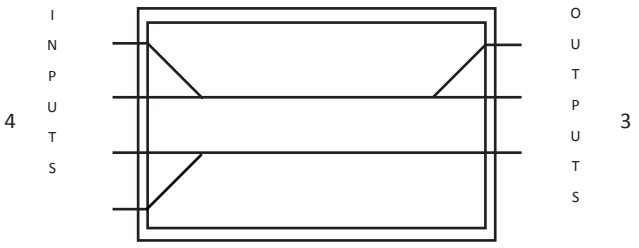
- ☐ 19” Rack
- ☐ Bench Mount
- ☐ Other

Front Panel Controls Required

- ☐ Yes
- ☐ No

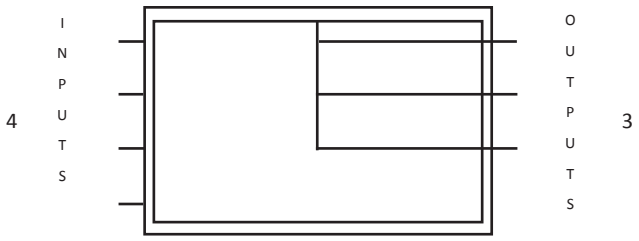
Additional Comments

BLOCKING MATRIX



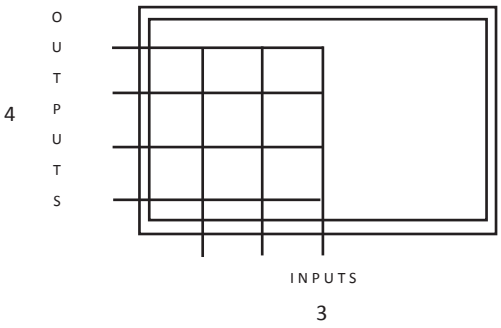
Can connect any input to any output, but due to the limited internal lines (internal lines < Input/Output ports), a limited number of paths can be connected simultaneously. In this example only 2 Inputs at the time can be routed to Outputs.

NON BLOCKING FANOUT MATRIX



Any Input can be connected to one or multiple Outputs simultaneously.

NON BLOCKING CROSS BAR



Any Input can be connected to any Output at the time, but the number of paths can not exceed the lower number of inputs or outputs. (In this example only 3 paths at the time).
(internal paths = lower number of Inputs or Outputs)

CONTACT INFORMATION

Name	
Email Address	
Office Phone	Mobile Phone
What is the best way to contact you?	
Company	
Division (if applicable)	
Address	City
State	Zip Code
Country	
How did you learn that Ducommun's designs and manufactures Switches and Switch Matrices?	

WN SERIES
1P7T to 1P10T
MULTI POSITION SWITCH
DC-22 GHz ◆ SMA

The ***WN Series*** features SMA connectors and a frequency range of DC to 22 GHz.

This series is available with normally open functions only.

RF Impedance:	50 ohms nominal
Temperature Range:	-35°C to +85°C ambient
Operating Life:	2,000,000 cycles min.
Switching Time:	15 mSec max.
Switching Sequence:	Break Before Make
Environmental:	Designed in Accordance to MIL-DTL-3928 (Testing and Operation Modes)

SPECIFICATIONS

Frequency	VSWR (max.)	Insertion Loss (dB max.)	Isolation (dB min.)
DC-3 GHz	1.15	0.15	80
3-8 GHz	1.25	0.25	70
8-12.4 GHz	1.30	0.30	60
12.4-18 GHz	1.40	0.40	60
18-22 GHz	1.60	0.60	55

Actuator Current (typical)	12Vdc	12-15 Vdc	20-24 Vdc	24-30Vdc
Normally Open	160mA	200mA	320mA	400mA

* If reduced coil current is required, please contact Factory.

AVAILABLE OPTIONS

OPTION 2 RF CONNECTORS

- **4 -** SMA

OPTION 3 TERMINALS

- **1 -** Solder Terminals
- **2 -** Circular Connector
- **3 -** Other (Specify) / Molex for USB Option
- **4 -** Sub Miniature D-Shell Connector

OPTION 4 VOLTAGE

- **1 -** 6 Vdc +/- 10%
- **2 -** 12 Vdc +/- 10%
- **3 -** 24-30 Vdc
- **4 -** 48 Vdc +/- 10%
- **5 -** 110 Vac +/- 10%
- **6 -** 12-15 Vdc
- **7 -** 18-20 Vdc
- **8 -** 20-24 Vdc

OPTION 5 ACTUATOR

Latching Self Cut-Off

- **D-** Diodes
- **E-** Diodes, Indicators

Normally Open

- G- Diodes, Indicators
- H- Indicators
- J- Diodes
- K- Standard

OPTION 6 FREQUENCY

- **3 -** DC to 22 GHz

OPTION 7 POLARITY

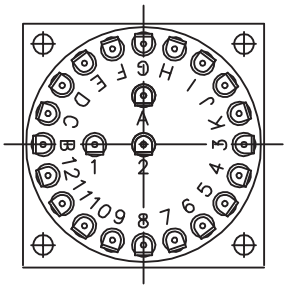
- **0 -** Not Applicable
- **8 -** Positive Common
- **9 -** Negative Common

OPTION 8 SPECIAL OPTIONS

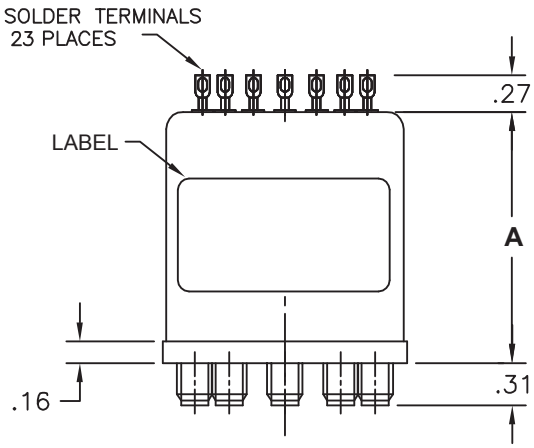
- **L -** TTL (High)
- **LL -** TTL (Low)
- **1 -** Bracket
- **R -** Reset (Latching Only)
- **C -** BCD
- T - Terminated
- U - USB

WN		-	4				3		
Option 1 Series	**Option 1** Number of Positions		**Option 2** RF Connectors	**Option 3** Terminals	**Option 4** Voltage	**Option 5** Actuator	**Option 6** Frequency	**Option 7** Polarity	**Option 8** Special Options

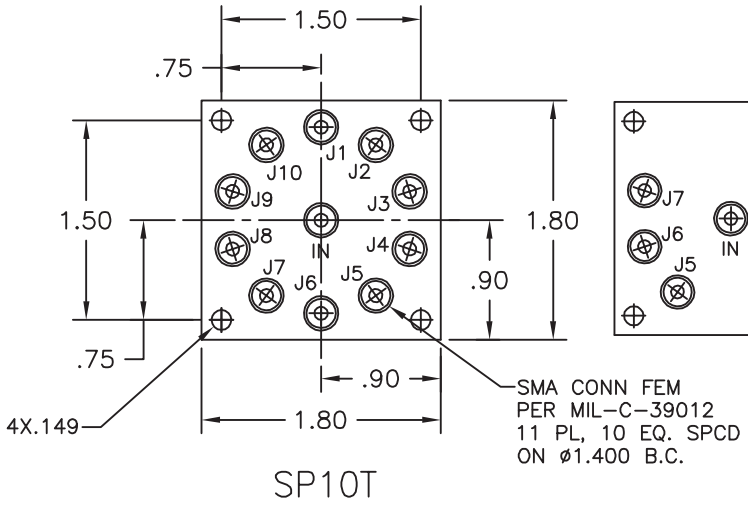
TOP VIEW



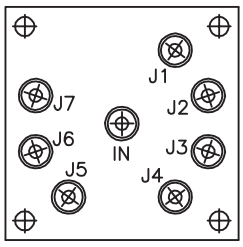
FRONT VIEW



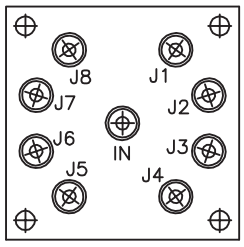
BOTTOM VIEW



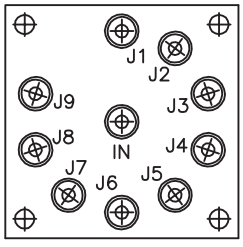
SP10T



SP7T



SP8T



SP9T

DC TERMINAL FUNCTION

PIN	NORMALLY OPEN					
	J	K	J, K w/ TTL	G	H	G, H w/ TTL
1	N/A	N/A	+A	N/A	N/A	+A
2	COM+/-	COM	-B	COM+/-	COM	-B
3	1-/+	1	1	1-/+	1	1
4	2-/+	2	2	2-/+	2	2
5	3-/+	3	3	3-/+	3	3
6	4-/+	4	4	4-/+	4	4
7	5-/+	5	5	5-/+	5	5
8	6-/+	6	6	6-/+	6	6
9	7-/+	7	7	7-/+	7	7
10	8-/+	8	8	8-/+	8	8
11	9-/+	9	9	9-/+	9	9
12	10-/+	10	10	10-/+	10	10
A	N/A	N/A	N/A	COM	COM	COM
B	N/A	N/A	N/A	1	1	1
C	N/A	N/A	N/A	2	2	2
D	N/A	N/A	N/A	3	3	3
E	N/A	N/A	N/A	4	4	4
F	N/A	N/A	N/A	5	5	5
G	N/A	N/A	N/A	6	6	6
H	N/A	N/A	N/A	7	7	7
I	N/A	N/A	N/A	8	8	8
J	N/A	N/A	N/A	9	9	9
K	N/A	N/A	N/A	10	10	10

NOTE#1: RESET IF (R) OPTION IS SELECTED, OTHERWISE N/A

SCHEMATICS

FIG.	Pages 139-143					
	29	29	30	29	29	30

OUTLINE DRAWING DIMENSION "A"

	2.0"	2.0"	3.0"	2.50"	2.50"	3.0"