RELCOMM TECHNOLOGIES
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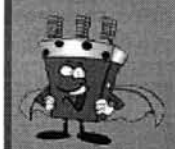


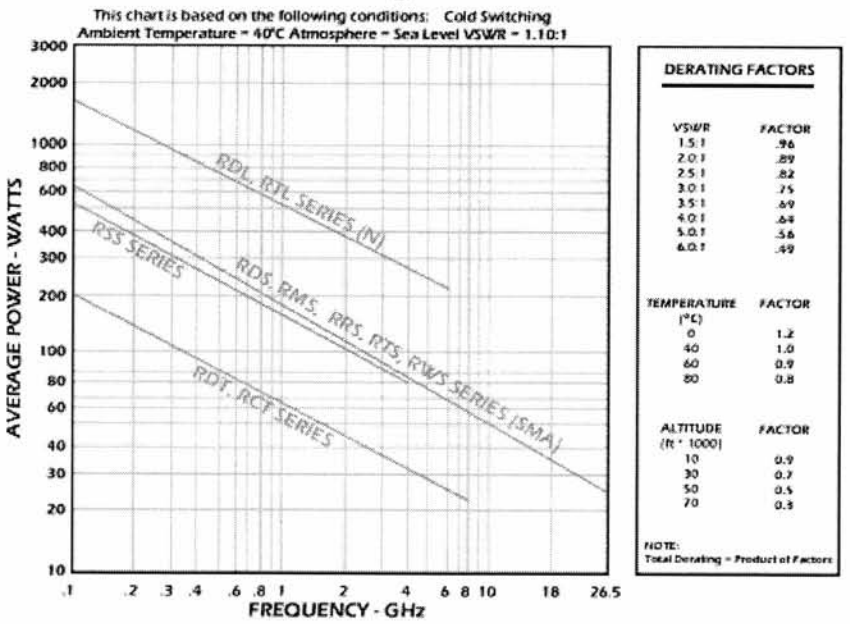
TYPICAL CHARACTERISTICS

Nominal Impedance (Ohm)	50						
Frequency Range (GHz)	DC - 1	1 - 2	2 - 4	4 - 8	8 - 12	12 - 18	18 - 26.5
VSWR (maximum)	1.1:1	1.15:1	1.2:1	1.3:1	1.4:1	1.5:1	1.6:1
Insertion Loss (dB max)	0.1	0.15	0.20	0.3	0.4	0.5	0.6
Isolation (dB minimum)	80	75	70	70	60	60	50

Operating Temp. Range	-30 to +85°C
Storage Temp. Range	-55 to +100°C
Nominal Operating Coil Voltages	5, 12, 15, 24, 28 VDC

Materials/Finish:	
Housing	Aluminum/Nickel
Cover	Aluminum/Black Anodized
Pin Outs	Brass/Gold
Insulation	Teflon
Contacts	Beryllium Copper/Gold

RF Power Rating Chart



Click here for a printable power chart.

[Home] [Products]

EXCELLENCE BY DESIGN

RELAIS COAXIAUX ET GUIDE D'ONDE

SMA - SMA 2.9 SPDT jusqu'à 40 GHz

RELAIS COAXIAUX MINIATURES :

R565 . . . . . .

CONNECTEUR HF
- 4 : SMA *18 GHz*
- 5 : SMA 2.9 - *26,5 GHz*
- 7 : SMA 2.9 - *40 GHz*
- x : Autres (1)

OPTIONS
- 000 : Sans option
- 129 : Avec commande TTL
- xxx : Autres (1)

TYPE
- 1 : Monostable
- 2 : Monostable avec circuit de recopie
- 3 : Bistable
- 4 : Bistable avec circuit de recopie
- 5 : Bistable avec auto-coupure
- 6 : Bistable avec circuit de recopie et auto-coupure
- x : Autres (1)

ALIMENTATION
- 2 : 12 Vdc
- 3 : 28 Vdc
- x : Autres (1)

(1) *x ou xxx : numéros réservés à des demandes spécifiques.*

CARACTERISTIQUES GENERALES :

CARACTERISTIQUES HYPERFREQUENCES

Bande de fréquence *(GHz)*	CC - 18 / CC - 26.5				CC - 40	
	CC - 6	6 - 12	12 - 18	18 - 26,5	CC - 18	18 - 40
R.O.S.	≤ 1,25	≤ 1,40	≤ 1,50	≤ 1,60	≤ 1,50	≤ 1,90
Pertes d'insertion *(dB)*	≤ 0,20	≤ 0,40	≤ 0,50	≤ 0,70	≤ 0,50	≤ 1,0
Isolation *(dB)*	≥ 70	≥ 60	≥ 60	≥ 50	≥ 60	≥ 50
Impédance *(Ω)*	50					
Séquence de commutation	Break Before Make					

AUTRES CARACTERISTIQUES

Type d'utilisation	Monostable ou Bistable	
Alimentation nominale *(Vdc)*	12	28
Résistance bobine (± 10%) *(Ω)*	90	520
Consommation à 23°C *(mA)*	133	55
Puissance moyenne	Voir courbe de puissance page 9	
Puissance crête *(kW)*	5 (1 µs, 1‰)	
Temps de commutation *(ms)*	20	
Pouvoir de coupure du circuit de recopie	1 W - 30 V - 100 mA	
Endurance	10^6 manœuvres	
Connecteurs	**SMA - SMA 2.9**	
Bornes de sortie d'alimentation et recopie	Sortie à souder	
Poids *(g)*	Sans option : 35	Avec toutes options : 45

Des produits de ce catalogue sont couverts par des brevets et/ou des demandes de brevets Français et étrangers

RADIALL®
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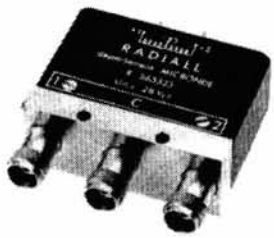
SERIE

R 565 - - -

18 GHz

RELAIS INVERSEUR DE PUISSANCE TNC -

Ce relais coaxial inverseur bistable a été conçu spécialement pour des applications de puissance. Le matériau à haute conductibilité thermique utilisé pour la réalisation des embases TNC-P a permis d'obtenir un compromis puissance, fréquence, volume très intéressant.
Sa bande d'utilisation s'étend du continu à 18 GHz avec une puissance transportable de 100 W CW aux fréquences supérieures dans les conditions d'environnement les plus sévères.



CARACTÉRISTIQUES HYPERFRÉQUENCES

RELAIS INVERSEUR DE PUISSANCE BISTABLE

Fréquence GHz ⩽	6	12	18
Pertes dB ⩽	0,2	0,4	0,6
R.O.S. ⩽	1,25	1,40	1,5
Isolation dB ⩾	70	60	60

CARACTÉRISTIQUES ÉLECTRIQUES

- Impédance caractéristique : 50 Ω
- Fréquence : 0 - 18 GHz
- Connecteurs : TNC P
- Alimentation U : 24 - 30 V par bornes soudables
- Moteur : bistable
- Consommation sous 28 V à 23°C : 190 mA max.

CARACTÉRISTIQUES MÉCANIQUES

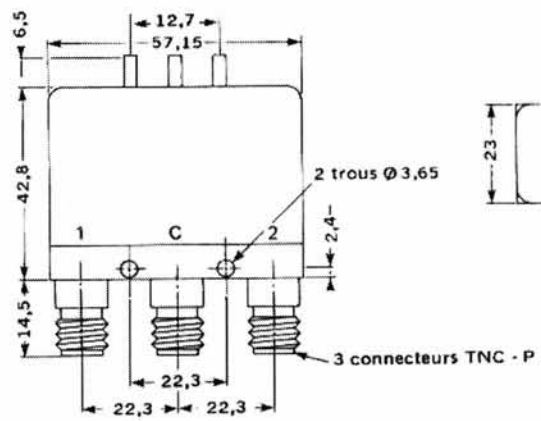
- Construction : étanche
- Temps de commutation : ⩽ 20 ms
- Endurance : 10^6 manœuvres
- Masse : 150 g max.
- Tolérances générales : ± 0,5 mm

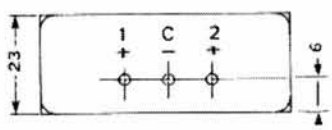
CARACTÉRISTIQUES D'ENVIR

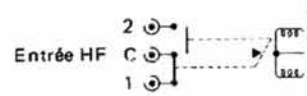
- Température d'utilisation : -
- Vibrations : 20 g (1
- Brouillard salin :

Norme NFC 20 600

DIMENSIONS MÉCANIQUES ET SCHÉMA ÉLECTRIQUE DU RELAIS INVERSEUR DE PUISSANCE BISTABLE







Référence : R 565 333 121

RADIALL département MICRONDE

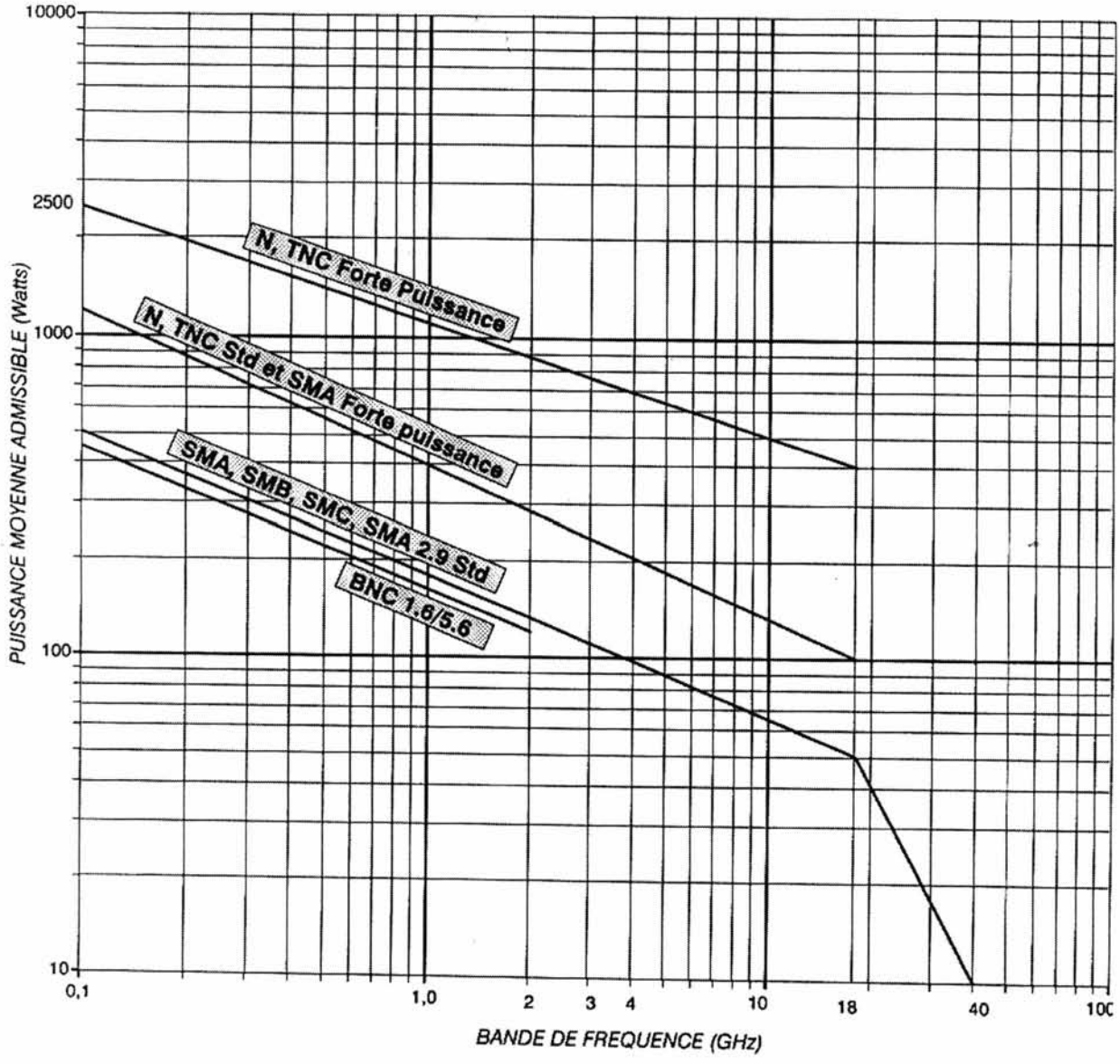
101. Rue Philibert Hoffmann - Z.I. Ouest - 93116 ROSNY-SOUS-BOIS Cedex
Téléphone : (1) 854.80.40 - Télex : RADIA A 220 673 F

INFORMATIONS TECHNIQUES

IV COURBES DE PUISSANCE :

Ces courbes sont données pour une température ambiante de 25°C, au niveau de la mer, et en puissance transportable.

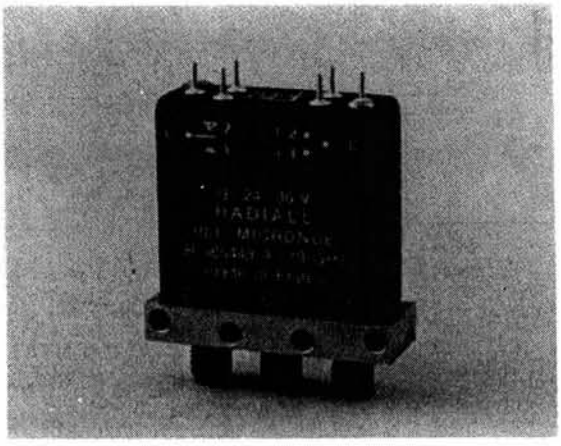
COURBE de REDUCTION de la PUISSANCE EN FONCTION de la FREQUENCE



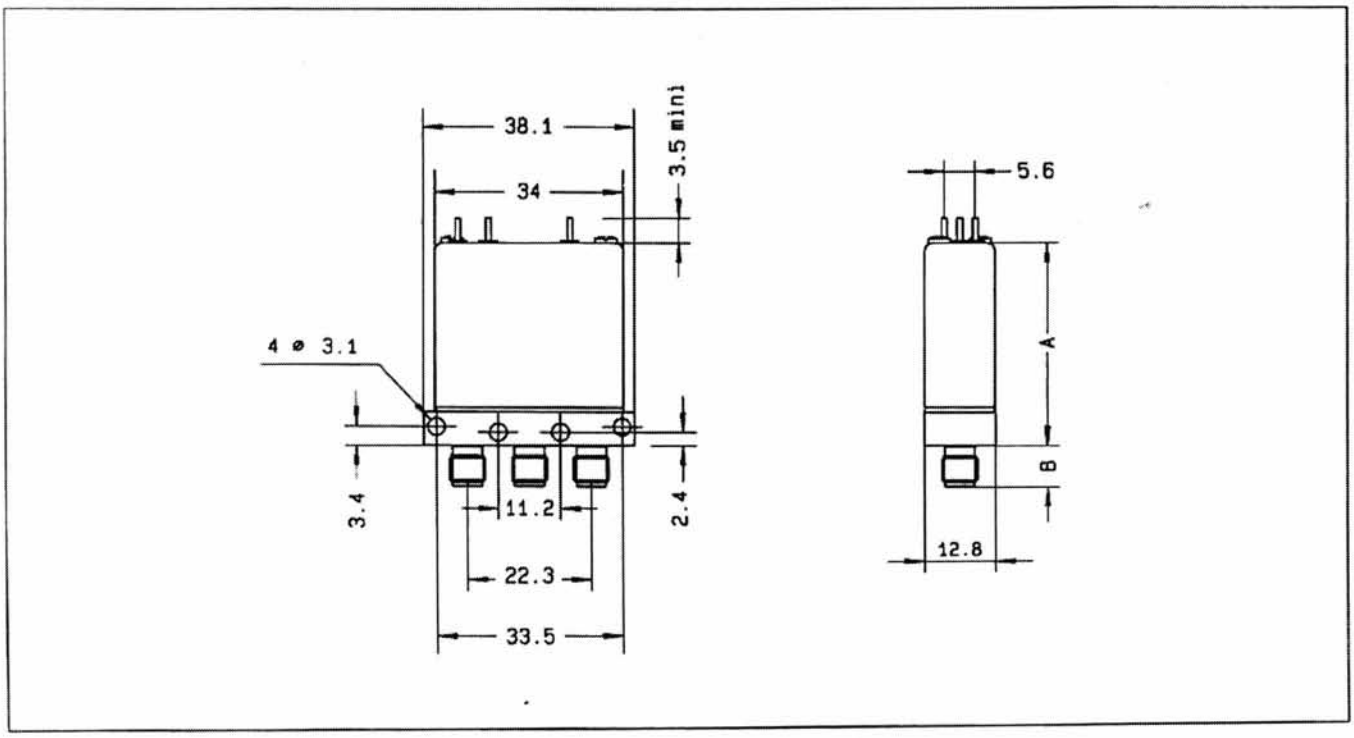
RELAIS COAXIAUX ET GUIDE D'ONDE

SMA - SMA 2.9 SPDT jusqu'à 40 GHz

RELAIS COAXIAUX MINIATURES :



DIMENSIONS MECANIQUES



	A max (mm)
Sans option	28,5
Avec toutes options	38

	B max (mm)
SMA	7,7
SMA 2.9	6,4

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(F6CIS) Doc Relais “Hyper/power”

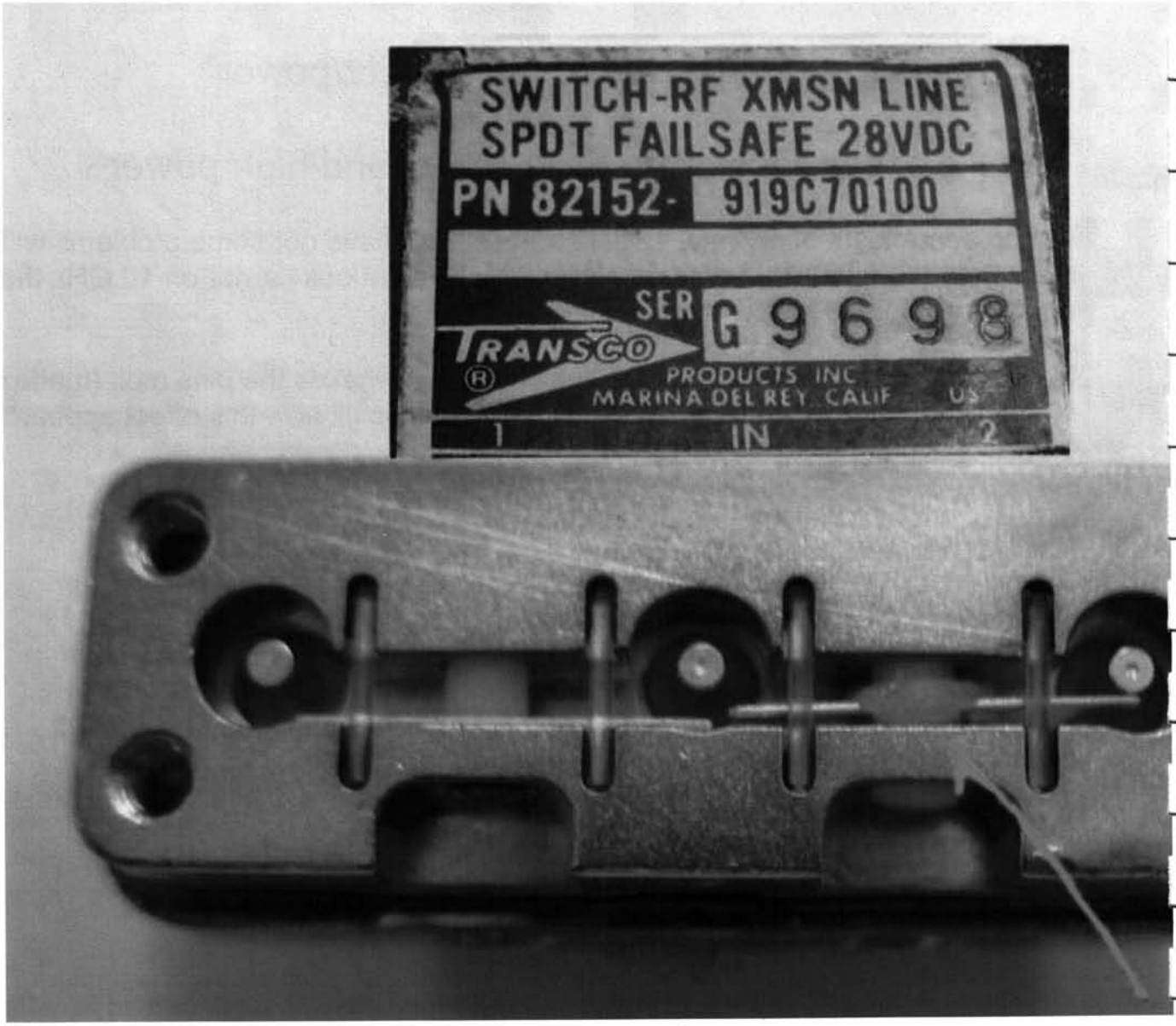
experiences with SMA relays and high power

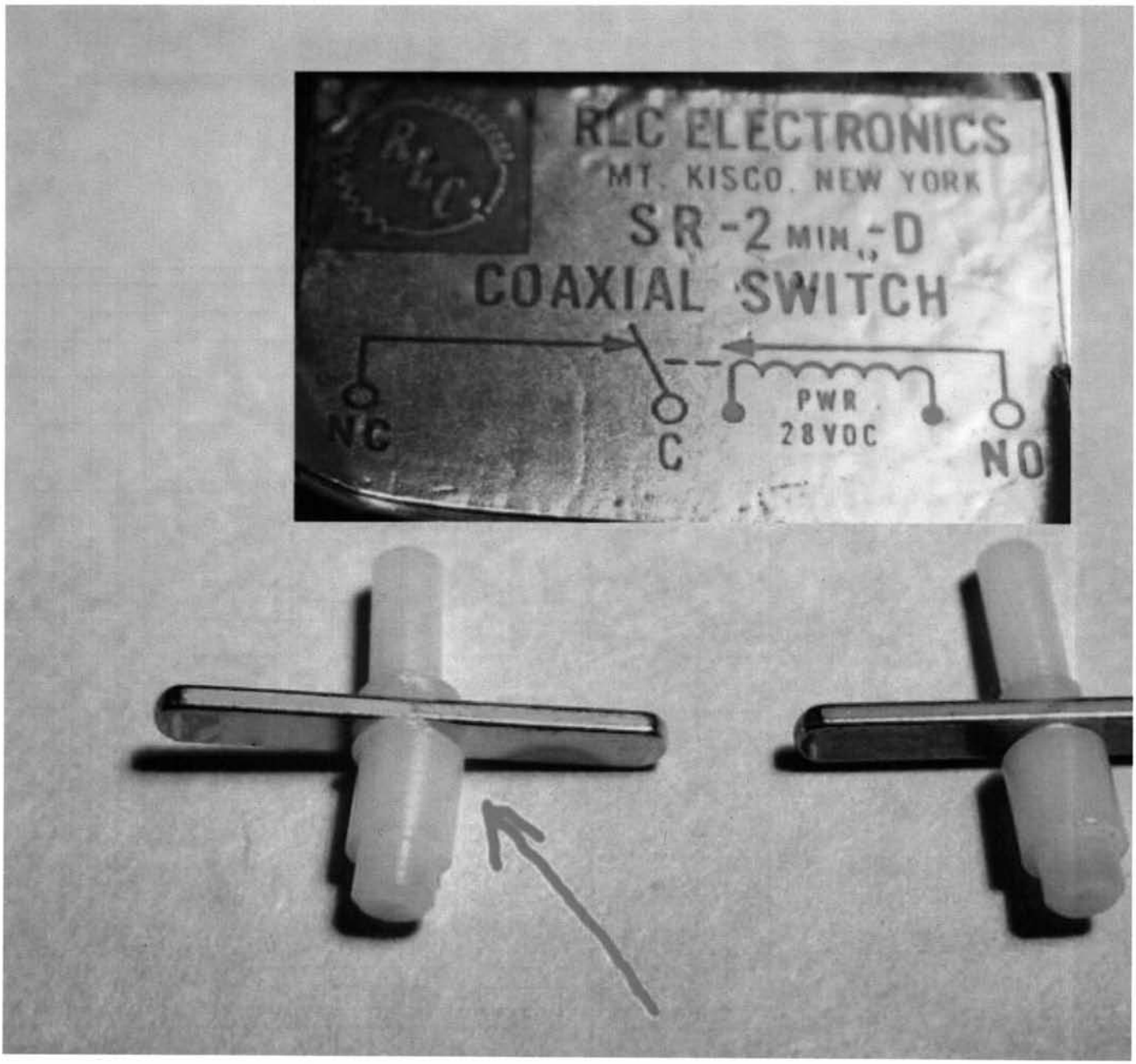
During some tests of my new 10GHz transverter I have got some problems with the antenna relay. After some time with 22 W continuous carrier on 10 GHz the actuator pins have melted (see pictures).

Maybe it's a small transition resistance which then makes the pins melt (made of synthetic material) at the high power on 10 GHz. Up till now this effect appeared only at "second-hand" SMA relays.

Note for new and used coaxial relays

Clean the relay-contacts after a longer storage.
Switch the relay for some hours with a generator or other suitable circuit.
You should connect the contacts with current (2mA - 100mA) or RF (50 - 250mW).The value of the chosen current or the RF depends on the contact material (e.g. AgNi+Au of approximately 2 mA -100 mA).

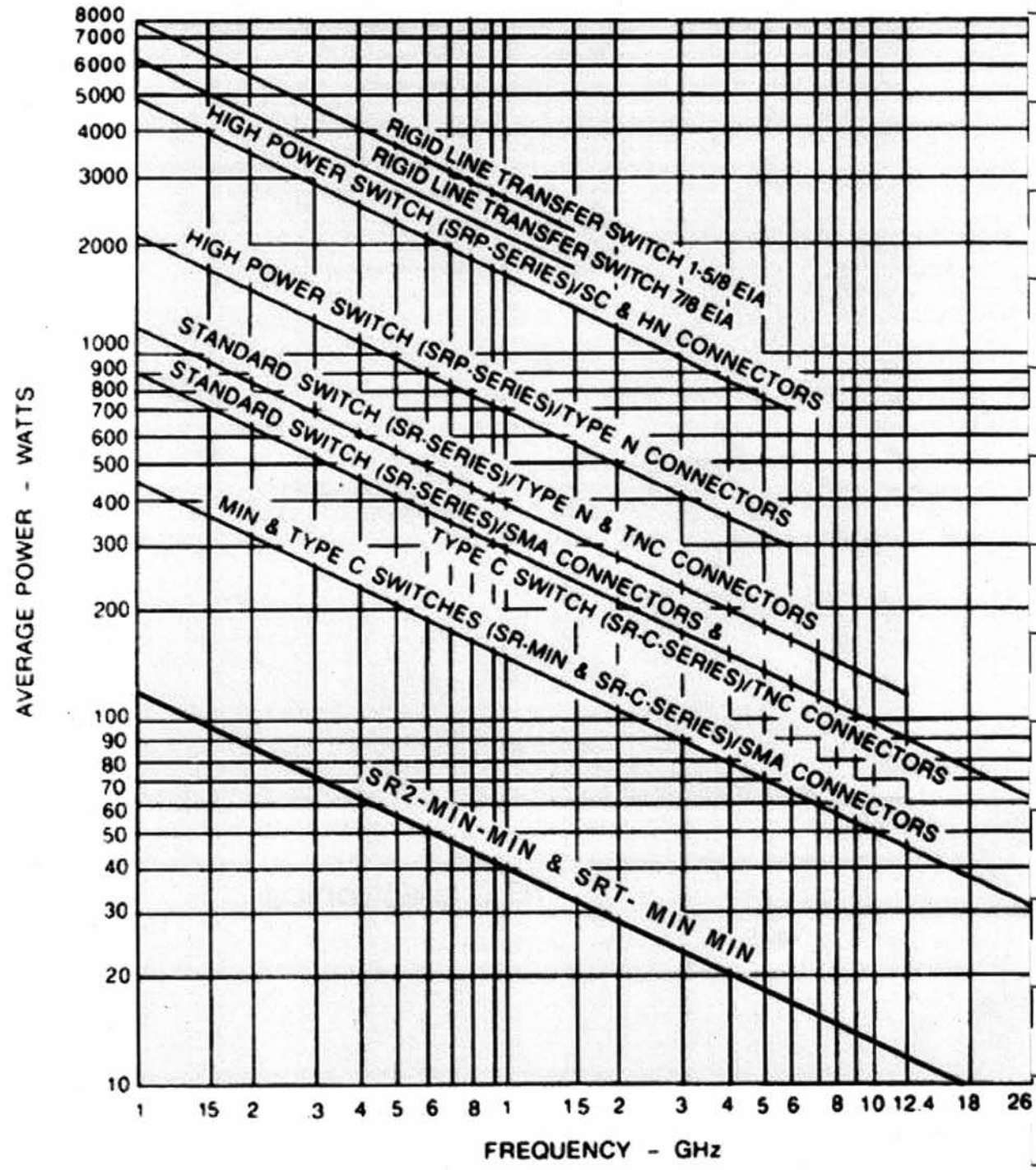

SWITCH-RF XMSN LINE
SPDT FAILSAFE 28VDC
PN 82152- 919C70100
SER G 9698
TRANSCO
PRODUCTS INC
MARINA DEL REY CALIF US
1
IN
2



RLC electronics

Power Rating vs Frequency

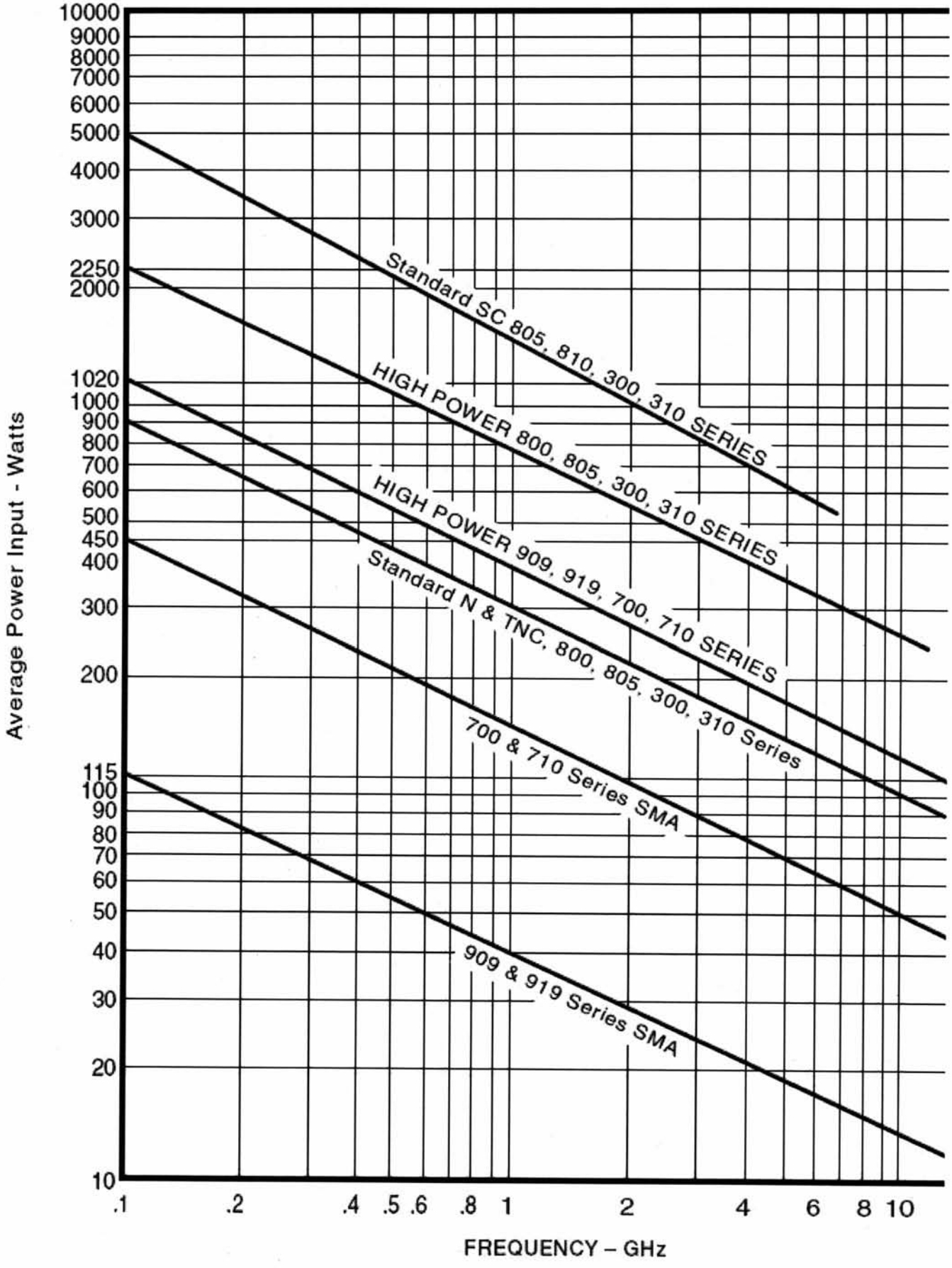
Rating stated for 25°C ambient temperature, matched 50 ohm system sea level and cold switching.



Power level ratings are given for switches equipped with temperature construction (which must be specified when

maximum power handling capacity is required switches should be derated to 75% of indicat

TRANSCO/ DOW-KEY



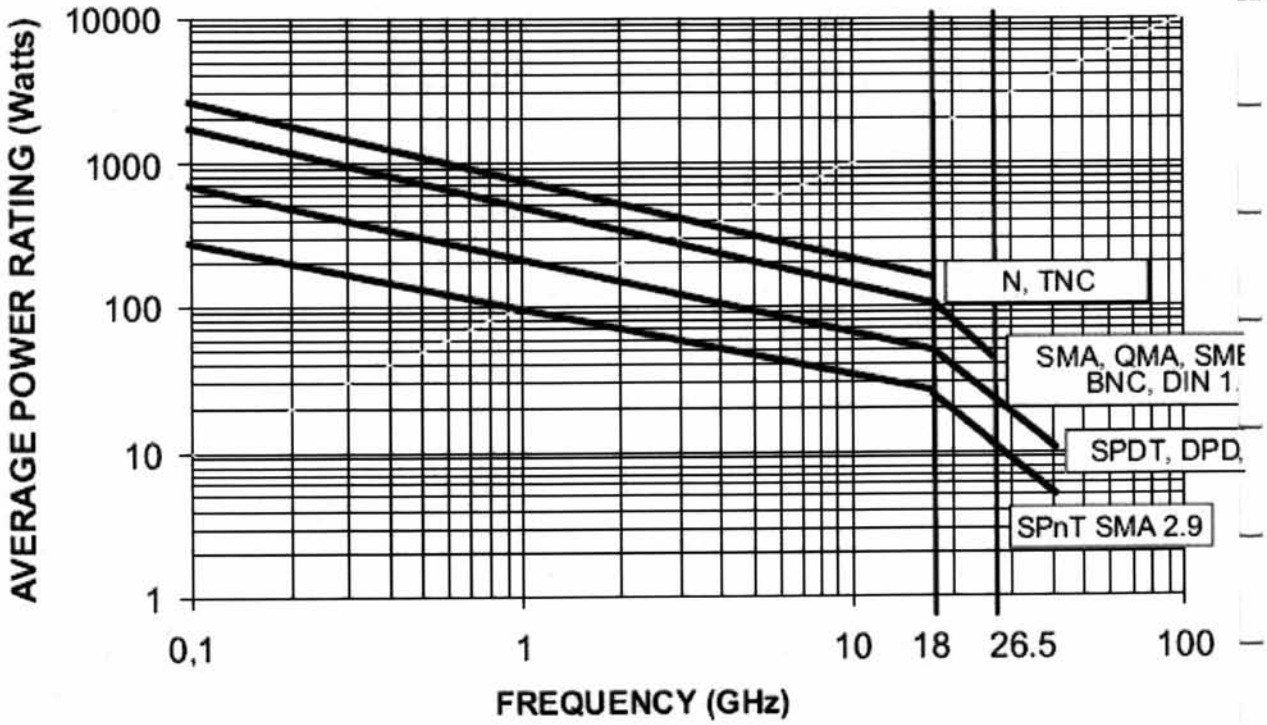
GLOSSARY (continued)

RF POWER RATING

The RF power rating is the capability of handling RF power (CW power) through closed contacts. The RF power s removed during switching. Power ratings assume unity V.S.W.R. (matched load) at room temperature (25°C), pressure (14.7 p.s.i.) and cold switching. See below the CW power capability Vs. Frequency Chart. Changes specifications require power derating (see derating factor versus V.S.W.R.).

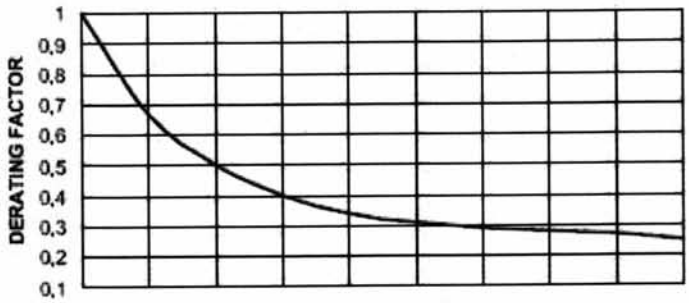
This graph is based on the following conditions :

- Ambient temperature : +25°C
- Sea level
- V.S.W.R : 1:1 and cold switching



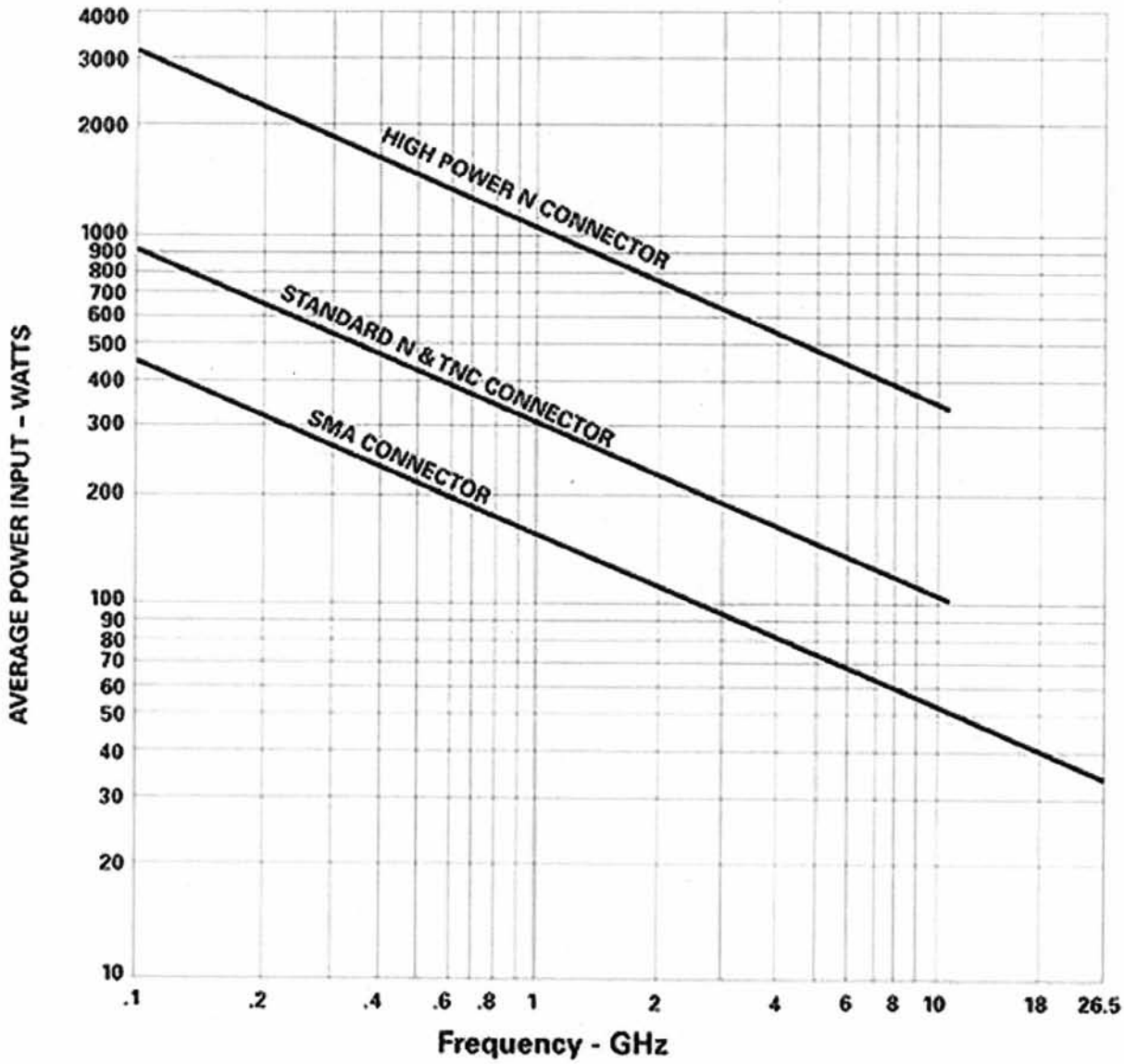
DERATING FACTOR VERSUS VSWR

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



CW POWER CAPACITY VS. FREQUENCY

Note: This graph is intended to provide an estimate of the CW power handlir capacity of DBP Microwave's switches. In the absence of actual test data, D Microwave recommends leaving a 3dB margin between the CW power obtaine the graph and the actual CW power. Please consult the factory before speci products in applications with less than the recommended 3dB margin.



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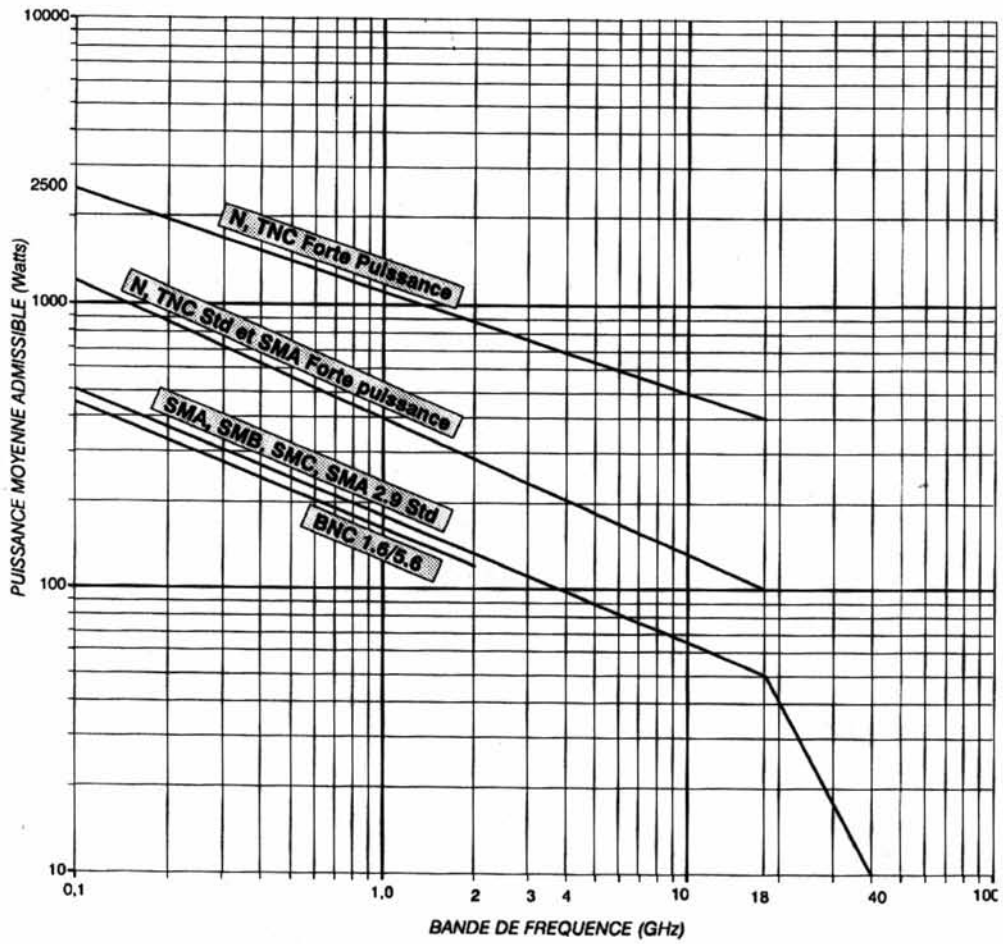

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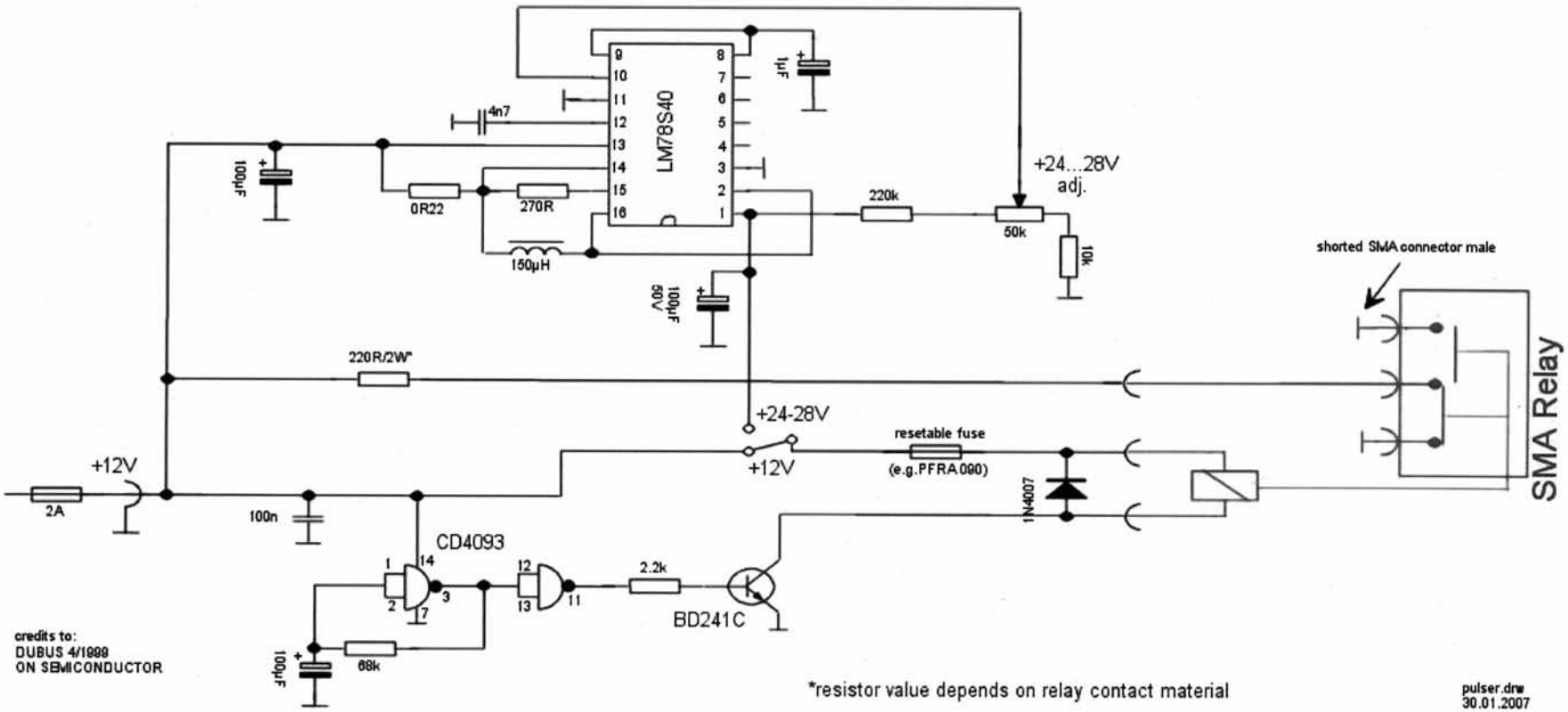
relay-contact-cleaner circuit diagram (click to enlarge)

coaxial relay contact-cleaner

Some types of coaxial-relays have an transition resistance on the contacts after long storage time.
High power warms the contacts, what has the consequence that the actuator pins melt (made of synthetic material).
The circuit is designed for SPDT (Single Pole Double Through) failsafe relay versions.
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.
Unselected inputs are directed to an open load (NON-TERMINATED.)
Actuating voltage 12V or 24-28V.
Note: For relays with LATCHING (self cut-off/ pulse latching) or LOGIC driver you must insert a suitable interface.



DowKey® Microwave CORPORATION

C	M	A	S
Commercial	Military	Avionics	Space

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
0-1	1.10	85	0.10
1-4	1.15	80	0.15
4-8	1.20	70	0.20
8-12	1.30	65	0.30
12-18	1.35	60	0.35
*18-26.5	1.50	55	0.50

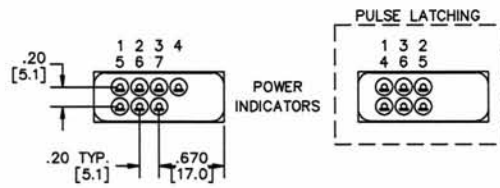
** "K" option only. Ex: 401K-3208*
Note: Typical performance dependent on selected options

401 Series SPDT Latching,SMA

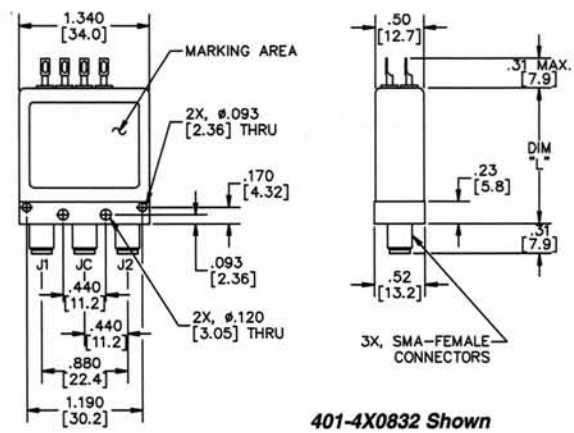
Specifications

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)
Coil Current (max @ nom.Vdc & 20°C):
12 Vdc 230 mA
28 Vdc 120 mA
Switching Time:
15 mS maximum
Operating Temperature:
-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)
Mechanical Life, Cycles:
1,000,000 minimum
Vibration, Operating:
10G RMS, 20-2000 Hz
Mechanical Shock, Non-Operating:
50G, 1/2 Sine, 11mS
Nominal Weight:
2.5 oz., (71g.)

Mechanical



DIM "L" (MAX)		MODEL	ELEC. SCHEM.
1.40	35.6	401-3X08	3
1.40	35.6	401-3X0832	3
1.80	45.7	401-4X08	4
1.80	45.7	401-4X0832	4
1.80	45.7	401-4X0802A	5
1.80	45.7	401-4X0832A	5



401-4X0832 Shown

For Electrical Schematic see page # 1-5

Part Number Selection

401 [J] - [4] [2] [08] [02] [A]

Special Options
A = High Power
I = Immersion Seal
J = 'D' Connector
K = 26.5 GHz
M = 5mS
R = (+) Com
S = Epoxy Seal
T = -55°C to + 85°C

Actuator
3 = Pulse Latching
4 = Latching Self Cutoff
7 = Pulse Latching with Suppression Diodes

Coil Voltage
2 = 12Vdc
3 = 28Vdc
7 = 20Vdc
8 = 24Vdc
9 = 15Vdc

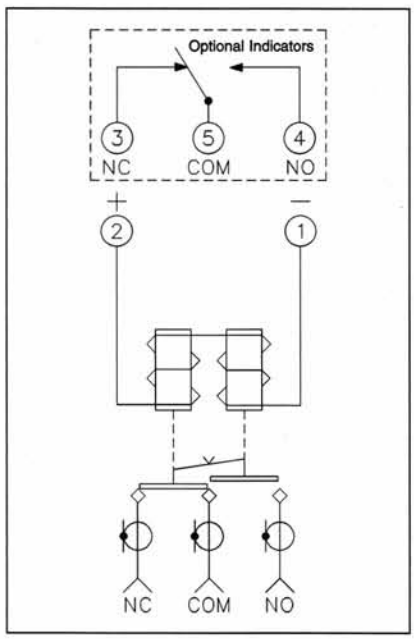
Connectors
08 = SMA Female
19 = Pins, PC Board Mount

Indicators
02 = No Indicators
32 = Indicators

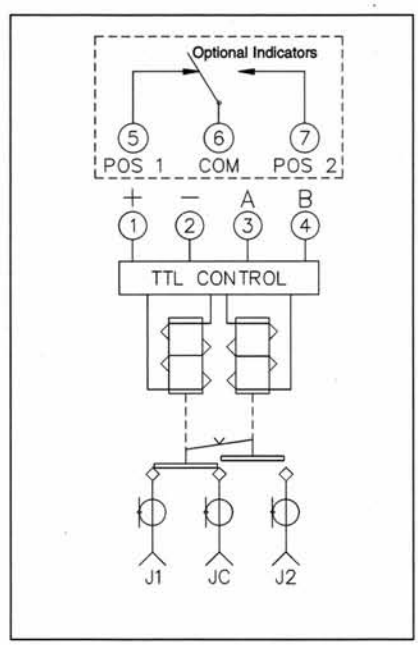
Circuit Options
A = TTL High
L = TTL Low

DowKey® Microwave CORPORATION

1 401/403 Failsafe



2 401/403 Failsafe TTL



LOGIC TRUTH TABLE

FAILSAFE TTL - SCH #2

LOGIC TRUTH TABLE		
RF PATH	INDICATOR PATH	LOGIC INPUT "A"
NC–COM	NC–COM	0
NO–COM	NO–COM	1

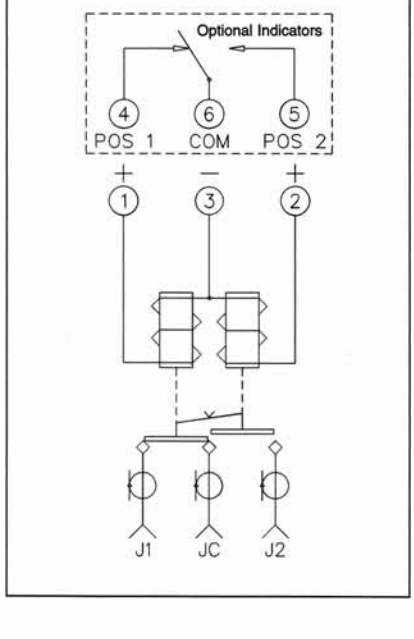
"0" = 0.0V–0.8V
"1" = 2.4V–5.5V

SELF CUTOFF TTL - SCH #5

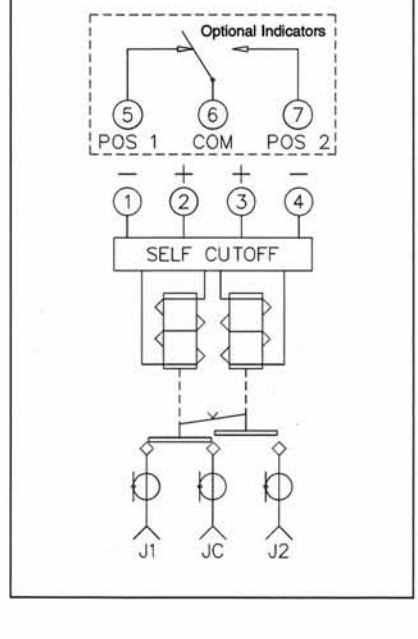
LOGIC TRUTH TABLE			
RF PATH	INDICATOR PATH	LOGIC INPUT "A"	LOGIC INPUT "B"
JC–J1	COM–1	1	0
JC–J2	COM–2	0	1

"0" = 0.0V–0.8V
"1" = 2.4V–5.5V

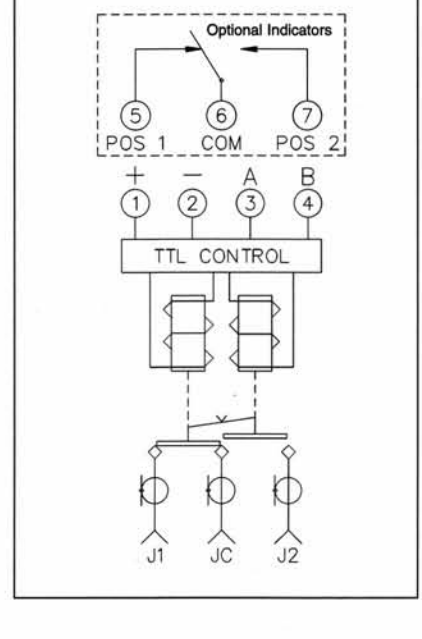
3 401 Pulse Latch



4 401 Self Cutoff



5 401 Self Cutoff TTL



TELEDYNE MICROWAVE

Ordering Information

All Teledyne Microwave products can be ordered by contacting an authorized factory representative or directly from Teledyne Microwave (415) 968-2211. Inventory stock is normally delivered within two weeks.

Custom Engineering

Microwave components and subsystems can be built to specification. Contact Teledyne Microwave Marketing with your requirements.

Terms

Net 30 days from date of invoice.

Shipping

All orders are FOB, Mountain View, CA and shipped via UPS surface unless otherwise specified.

Customer Service

1-800-832-6869 (Outside CA)
1-415-960-8613 (Inside CA)

Our dedicated Customer Service Department can be contacted for:

- Delivery status
- Order expediting
- Returns and repairs

Please contact Customer Service prior to returning any material.

Coaxial Switch Part Numbers

CS - 33 S 1 C - T (Example)

Switch (2 or 3 characters)

CR	Coaxial Switch - Reduced Height
CS	Coaxial Switch - Standard Height
CT	Internally Terminated Coaxial Switch
SA	Switch Attenuator
SM	Switch Matrix

Series Type (2 characters)

33	Miniature SPDT DC – 22.0 GHz Designate inboard mount (21 GHz Max) with the letter I (Example: CRI-33)
32	Standard SPDT DC – 12.4 GHz
53	Miniature SPDT DC – 26.5 GHz
35	Miniature DPDT DC – 18.0 GHz
37	Miniature Transfer DC – 18.0 GHz
47	Standard Transfer DC – 12.4 GHz
38	Miniature Multi-Throw DC – 18.0 GHz
18	Standard Multi-Throw DC – 12.4 GHz
58	Miniature Multi-Throw DC – 26.5 GHz
39	Latching Multi-Throw DC – 18.0 GHz

Connector Type

S	SMA Female	**B**	BNC Female	**6**	Mixed Connectors
N	N Female	**T**	TNC Female	**X**	SC Connectors

Actuator Voltage (1 character)

1	28 VDC Failsafe
2	115 VAC Failsafe
5	Special Voltage – Failsafe
6	28 VDC Latching
7	115 VAC Latching
9	Special Voltage – Latching

Actuator Type (1 or 2 characters)

O	No cutoff or indicators
C	Indicator contacts only
D	Self cutoff only
E	Self cutoff and indicators
3-8	Indicates no. of positions on Multi-throw Switches

Dash Number (1 or more characters)

	Number denotes special and additional customer requirements
T	TTL Driver
D	Decoders and TTL Driver

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TTL Switch Driver Option

As a special option, on both failsafe and latching type switches, drivers can be provided which are compatible with industry standard low power Schottky TTL circuits.

VCC Input

The V_{cc} may or may not have to be connected to 5 volts as follows:

1. For a low current interface, connect V_{cc} to 5 volts. All units are provided with a 5 volt (V_{cc}) connection and internal pull up resistor (R1). With a 5 volt connection made, the logic input current drain is compatible with two low power Schottky TTL loads. (40 μA, high current)

2. For a high current interface, the V_{cc} connection is optional. If a high level logic input current drive (450 μA @ 2.4 volts) is available, the 5 volt (V_{cc}) connection need not be made.

Multi-Throw

Teledyne Microwave has two options available for TTL compatible drivers on multi-throw switches:

T-Option

This option uses a circuit similar to the SPDT and Transfer circuit. There is one control input for each position.

D-Option

This option includes a decoder. The control input is a 3-bit parallel word that is decoded to internally select the appropriate position.

Performance Parameters vs Frequency

Generally speaking, the performance of coaxial switches degrades with increasing frequency i.e., the VSWR and insertion loss increase and the isolation decreases. All Teledyne Microwave data sheets specify these three parameters as "worst case" at the highest operating frequency, either 12.4 GHz or 18 GHz depending on the type of switch used. If the switch is used only over a band whose upper limit is limited, much better specifications can be achieved. Special applications such as this, should be called out so that better performance can be offered.

Actuator Current vs Temperature

Due to the fact that actuator coil resistance will vary as a function of temperature, there is a resultant inverse relationship between switch operating temperature and actuator drive current. For switches operating at 28 volts D.C., the approximate actuator drive current at temperature, T, can be calculated from the equation:

$$I_T = \frac{28}{\frac{28}{I_A}\,[1 + .00385\,(T - 20)]}$$

Where:

I_T = Actuator current at temperature T

I_A = Room temperature actuator current—see catalog specification page

T = Temperature of interest in degrees celsius

Truth Tables

SPDT Failsafe

Logic Input	RF Path	
1	IN to 1	IN to 2
	Normally Closed	Normally Open
0	On	Off
1	Off	On

SPDT Latching

Logic Input		RF Path	
1	2	IN to 1	IN to 2
0	0	No Change	
1	0	On	Off
0	1	Off	On
1	1	Forbidden	

Transfer Failsafe
CS-37S10-T or CS-47N10-T

Logic Input	RF Path			
1	1-2	3-4	1-3	2-4
0	On	On	Off	Off
1	Off	Off	On	On

Transfer Latching
CS-37S60-T or CS-47N60-T

Logic Input		RF Path			
1	2	1-2	3-4	1-3	2-4
0	0	No Change			
1	0	Off	Off	On	On
0	1	On	On	Off	Off
1	1	Forbidden			

Multithrow
CS-38S16-D

Logic Input			RF Position					
1	2	3	1	2	3	4	5	6
0	0	0	On	Off	Off	Off	Off	Off
1	0	0	Off	On	Off	Off	Off	Off
0	1	0	Off	Off	On	Off	Off	Off
1	1	0	Off	Off	Off	On	Off	Off
0	0	1	Off	Off	Off	Off	On	Off
1	0	1	Off	Off	Off	Off	Off	On

Pin C — Common
Pin J — Vsw +28 Vdc
Pin 4 & 5 — Spares

Multithrow
CS-38S16-T

Logic Input						RF Position					
1	2	3	4	5	6	1	2	3	4	5	6
1	0	0	0	0	0	On	Off	Off	Off	Off	Off
0	1	0	0	0	0	Off	On	Off	Off	Off	Off
0	0	1	0	0	0	Off	Off	On	Off	Off	Off
0	0	0	1	0	0	Off	Off	Off	On	Off	Off
0	0	0	0	1	0	Off	Off	Off	Off	On	Off
0	0	0	0	0	1	Off	Off	Off	Off	Off	On

Pin C — Common
Pin J — Vsw +28 Vdc
Pin B — Vcc +5 Vdb
Pin 7,8,D,E,F — Spares

Applications

The transfer switch, whether it is adapted to coaxial or waveguide transmission lines is basically a modified double-pole-double-throw (DPDT) device. A true DPDT switch is a six port device that contains two completely independent transmission paths. In a transfer switch the two transmission paths are provided but are not totally independent as shown in Fig. 1.

Figure 1

The transfer switch has several interesting applications as follows:

Two Transmitters to Either of Two Antennas

Two microwave transmitters can be connected to either of two alternate antennas as shown in Fig. 2.

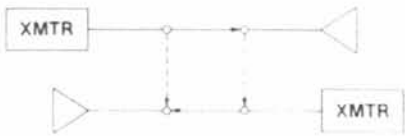


Figure 2

Circuit Insertion

A complete microwave circuit or circuit element can be inserted into a transmission line by using a transfer switch as shown in Fig. 3.

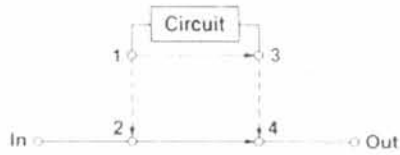
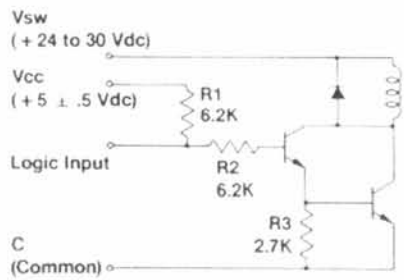


Figure 3

In the event that the 1-3 shorting of the microwave circuit is undesirable, this leg can be left out.

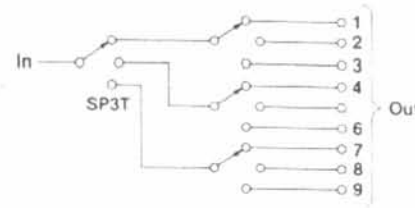
Basic Driver Schematic
SPDT and Transfer Switches



Failsafe uses 1 circuit
Latching uses 2 circuits
(Vsw, Vcc, & C are common to both circuits)

Series Application of Multi-Throw Switches

Many times requirements for greater than six position switches are encountered. Since it is difficult to design a high performance unit that has more than eight throws or positions, one solution is as shown.

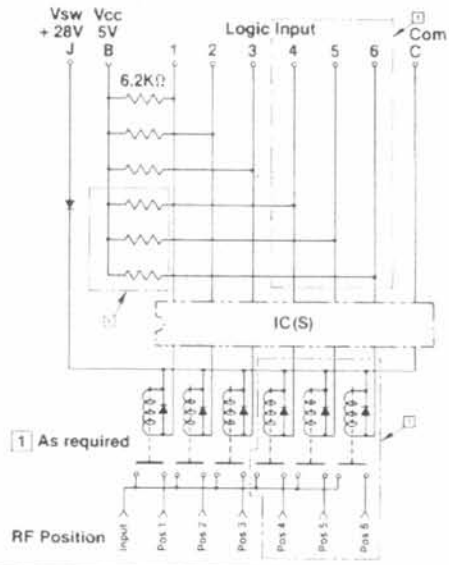


The example shows a single-pole-9-throw unit made up of 4 three-throw switches. The number of throws possible using this technique is essentially unlimited and is equal to the total number of throws available in the output stage. If a 2 stage unit were set up using 6 position switches, the resultant would be a total of 36 outputs or a SP36T switch bank.

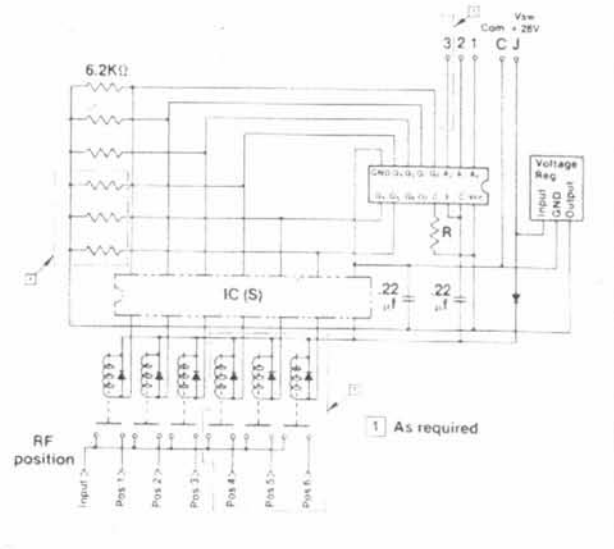
Magnetic Sensitivity

The switch can be sensitive to ferrous materials or external magnetic fields. Neighboring ferrous materials should be no closer than 0.5 inches and external magnetic field should have a flux density less than 5 gauss.

Basic T Schematic



Basic D Schematic



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Glossary of Switching Terms

Failsafe

A switch with an actuator that contains a spring return mechanism that provides RF connection to one selected position when no voltage is applied to the power terminals. This type of switch requires continuous voltage to maintain RF connection to any other position. For multi-position switches, the no voltage condition is all RF connections open.

Latching

A switch with an actuator that contains a mechanism, either mechanical or magnetic, that will maintain a chosen RF contact path whether or not voltage is maintained after switching is accomplished.

Self-Deenergizing/Self-Cutoff

Applies to latching switches only. A switch that has the ability to disconnect the actuator drive circuit so that D.C. current will not be consumed after switching has been accomplished. Self-cutoff can be accomplished either by using mechanical contacts or IC drive circuits.

Indicator Contacts

A set of internally mounted D.C. contacts that are mechanically connected to the actuator and transfer in one-to-one correspondence with the RF contacts. These contacts are usually wired to indicator lights to remotely show switch position, but in many cases, can also be used as interlock contacts. Indicator contact rating (max.) is 30 VDC, 50 mA, or 1.5 watts resistive load.

Switching Time

The total amount of time between application of voltage to the actuator terminals and completion of switching including all contact bounce, if any. Total switching time is made up of three parts, namely (1) inductive delay in the actuator coil, (2) transfer time of the RF contacts, and (3) bounce time of the RF contacts.

Actuator

The electromechanical mechanism that transfers the RF contacts from one position to another. Most Teledyne Microwave actuators use either linear or rotary solenoids acting on mechanical linkage to the RF contacts.

SPDT Switch

Single-Pole-Double-Throw. A switch with one input and two output ports.

Multi-Throw Switch

A switch with one input and more than two outputs. Standard Teledyne Microwave switches (CS-38, CS-58, CS-18 and CS-39) provide up to 8 outputs operating from a single input.

Transfer Switch

A four-port switch that provides two independent pairs of RF paths through it. These pairs are actuated simultaneously, such actuation being similar to that of a double-pole-double-throw switch. See application notes as to typical usage.

Isolation

The measure of the power level at the output connector of an unconnected RF channel as referenced to the power at the input connector. Specified in dB below input power level.

Internal Termination

Applies to SPDT and Multi-Throw switches. An unselected input or output port will be connected to an internal 50 ohm termination. Switches without internal termination will open circuit the unselected ports and the VSWR will be infinite.

Attenuator Switch

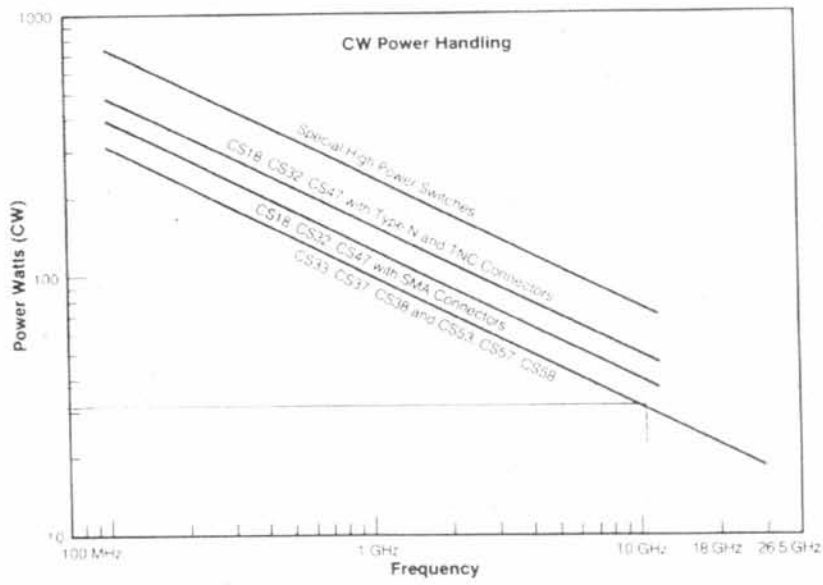
A two state switch that has a low loss and a high loss state. The low loss state insertion loss is typically 0.5 dB or less. The high loss state is precision level of attenuation such as 10, 20, 30 dB.

Arc Suppression Diode

A diode connected in parallel with the coil. The diode will clip the back emf spike to 0.7 volts when the coil is de-energized. The diode cathode is connected to the positive side of the coil and the diode anode is connected to the negative side.

Date Code

Either serial numbers or date codes are marked on the switches. The date code is in accordance with MIL-STD-1285A and consists of four digits. The first two digits are the year, and the last two digits are the week of that year (YYWW). Thus, 8604 will be switches which went through final inspection during the fourth week of 1986.



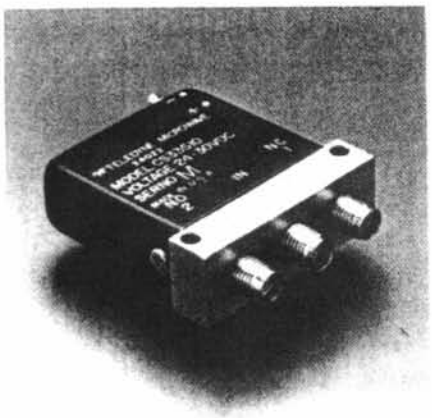
Power Handling Capability (watts cw)

There are several factors which determine the power handling capability of a given switch design. The following graph, however, may be used as a baseline for selecting an appropriate switch model.

Notes:

1. This graph is based on the following reference conditions:
   - A/ Ambient temperature 40°C
   - B/ Sea Level operating
   - C/ 1.2 VSWR load
   - D/ Non Switching
2. For applications calling for low pressure, high altitude or severe temperature requirements, the above power ratings would be derated. Please contact factory for specific information.

Failsafe DC-22 GHz Miniature SPDT Switches



CS-33S10

CS-33 Series
DC-22 GHz*
SMA Connectors

Description

The Type CS-33 Failsafe Switch is a broadband SPDT electro-mechanical switch designed to switch microwave signals from a common input to either of two outputs. Designed for 50 ohm transmission lines, the unit is set up for minimum size compatible with SMA connector spacing. Two different mounting hole configurations are offered: standard and optional inboard mounting.

The failsafe switches on this page are provided with a spring operated actuator which is particularly desirable in applications where the switch is connected to one position (normally closed) most of the time and only periodically is switched to the alternate position. In this type of application, holding power is required only when operating in the alternate position. Also, switching circuitry is simplified, since only one d-c circuit is required.

Specifications

RF Contacts:
Break before make

Actuator Voltage:
24-30 VDC; 12, 15, 20 VDC, and 115 VAC on special order

Actuator Current:
80 mA @ 28 VDC and 20°C

Switching Time:
20 msec

Weight:
1.65 oz. max.

Temperature Range:
– 54°C to + 85°C

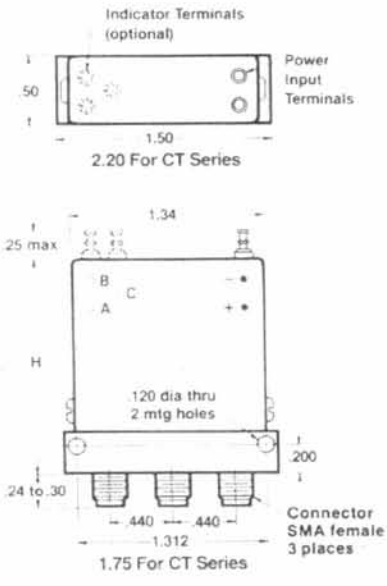
Life:
1 million cycles

RF Power Handling:
See graph in front of brochure

Optional Features

- Indicator Circuits
- Special Actuator Voltages
- TTL Compatible Drivers
- Arc Suppression Diodes
- Power Connectors
- Inboard Mounting

Outboard Mounting



H = 1.20 max CR Model
options may add
height. Consult factory
H = 1.55 max STD Model
H = 2.10 max TTL Model

RF Performance

Frequency	DC–6 GHz	6–12 GHz	12–18 GHz	18–22 GHz*
VSWR (maximum)	1.25:1	1.40:1	1.50:1	1.70:1
Insertion Loss (maximum)	0.2 dB	0.4 dB	0.5 dB	0.8 dB
Isolation (minimum)	70 dB	60 dB	60 dB	50 dB

* Outboard Mounts To 22 GHz
Inboard Mounts To 21 GHz

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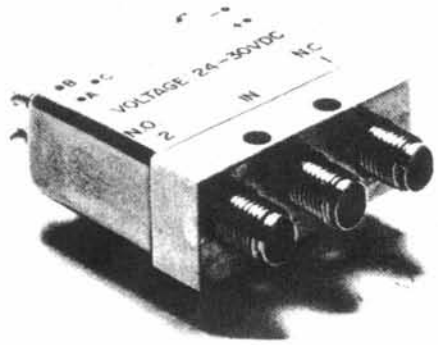
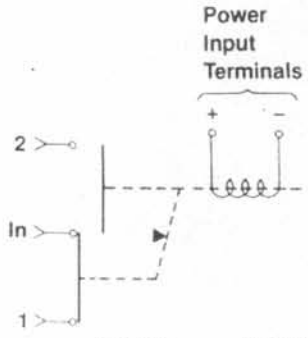


CR33S1C-99

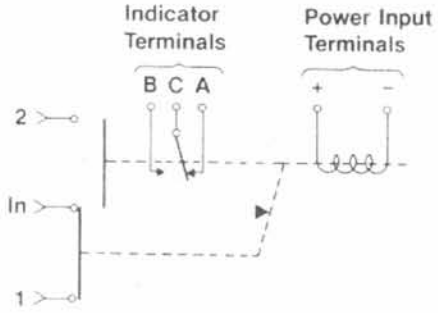
CS-33S10



Position
De-energized
Energized

RF Continuity
IN & 1
IN & 2

CS-33S1C

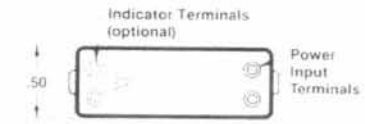


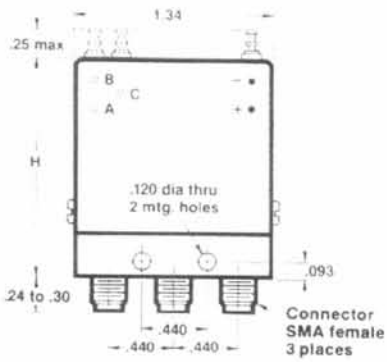
Position
De-energized
Energized

RF Continuity
IN & 1
IN & 2

Indicator
A-C
B-C

Inboard Mounting





H = 1.20 max CR Model
options may add
height. Consult factory
H = 1.55 max STD Model
H = 2.10 max TTL Model

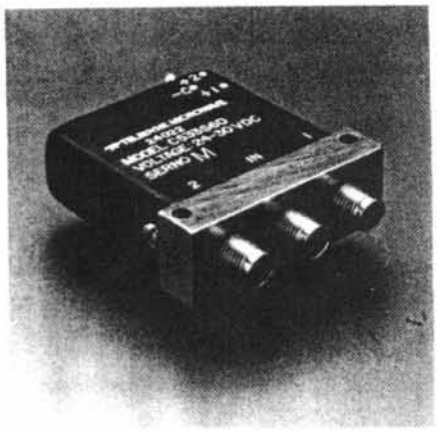
Part Number Table

All units have SMA-Female connectors

For TTL Drivers add -T to Part No.

Actuator Type	Without Indicators	With Indicators
Failsafe	CS-33S10	CS-33S1C

Latching DC-22 GHz Miniature SPDT Switches



CS-33S60

CS-33 Series

DC-22 GHz*

SMA Connectors

Description

The Type CS-33 Latching Switch is a broadband SPDT electro-mechanical switch designed to switch microwave signals from a common input to either of two outputs. Designed for 50 ohm transmission lines, the unit is set up for minimum size compatible with SMA connector spacing.

The switches on this page are provided with a magnetic latching actuator which is particularly desirable in applications where actuator power consumption must be kept to an absolute minimum. The latching type actuator requires less switching current than the failsafe type. In the self-cutoff version, power is applied only for the very short duration (approximately 50 msec. max.) of the actuator transfer from one position to the other. This makes this type of actuator especially suitable for space vehicles or portable battery operated systems.

Specifications

RF Contacts:
Break before make

Actuator Voltage:
24–30 VDC, 12, 15, 20 VDC, and 115 VAC on special order

Actuator Current:
60 mA @ 28 VDC and 20°C

Switching Time:
10 msec.

Weight:
1.65 oz.

Temperature Range:
– 54°C to + 85°C

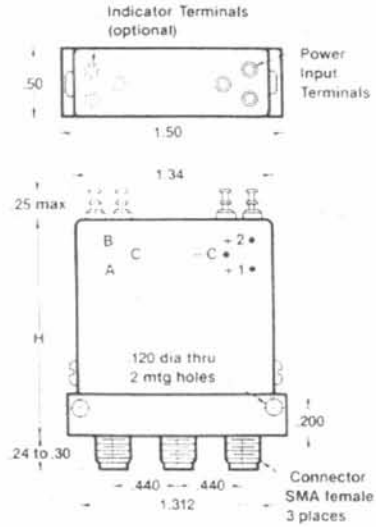
Life:
1 million cycles

RF Power Handling:
See graph in front of brochure

Optional Features

- Indicator Circuits
- Special Actuator Voltages
- TTL Compatible Drivers
- Arc Suppression Diodes
- Power Connectors
- Inboard Mounting

Outboard Mounting



H = 1.20 max CR Model
options may add height. Consult factory
H = 1.55 max STD Model
H = 2.10 max TTL Model

RF Performance

Frequency	DC-6 GHz	6-12 GHz	12-18 GHz	18-22 GHz*
VSWR (maximum)	1.25:1	1.40:1	1.50:1	1.70:1
Insertion Loss (maximum)	0.2 dB	0.4 dB	0.5 dB	0.8 dB
Isolation (minimum)	70 dB	60 dB	60 dB	50 dB

* Outboard Mounts To 22 GHz
Inboard Mounts To 21 GHz

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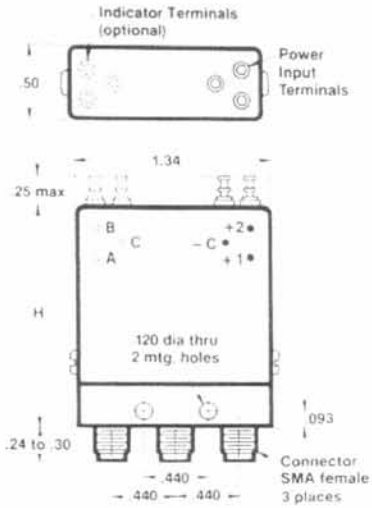
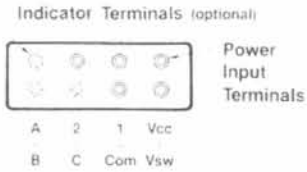
Inboard Mounting



H = 1.20 max CR Model
options may add
height. Consult factory
H = 1.55 max STD Model
H = 2.10 max TTL Model

TTL Option



Part Number Table

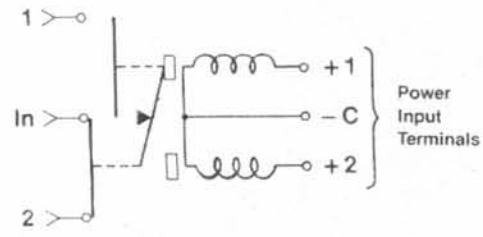
All units have SMA-Female connectors

For TTL Drivers add -T to Part No.

Actuator Type	Without Indicators	With Indicators
Latching without Self-Cutoff	CS-33S60	CS-33S6C
Latching with Self-Cutoff	CS-33S6D	CS-33S6E

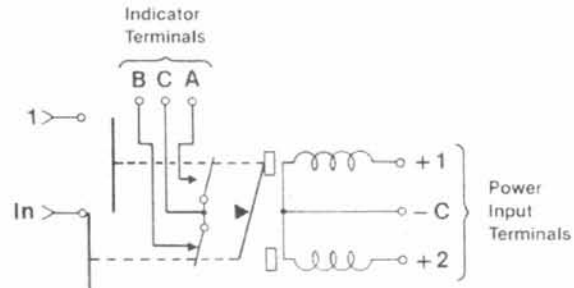
For Models CS-33S60 and CS-33S6C power is applied in a pulse form of sufficient duration (20 msec. min.) to cause switching. For Models CS-33S6D and CS-33S6 steady voltage may be applied continuously, but switch only draws current during the actual switching cycle.

CS-33S60



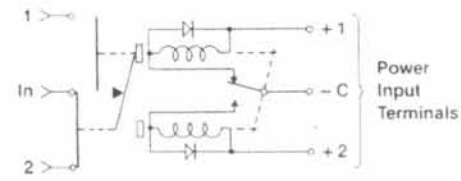
Position	Voltage	RF continuity
1	+1 & −C	IN & 1
2	+2 & −C	IN & 2

CS-33S6C



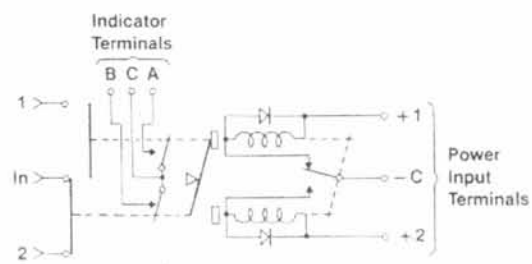
Position	Voltage	RF continuity	Indicator
1	+1 & −C	IN & 1	A & C
2	+2 & −C	IN & 2	B & C

CS-33S6D

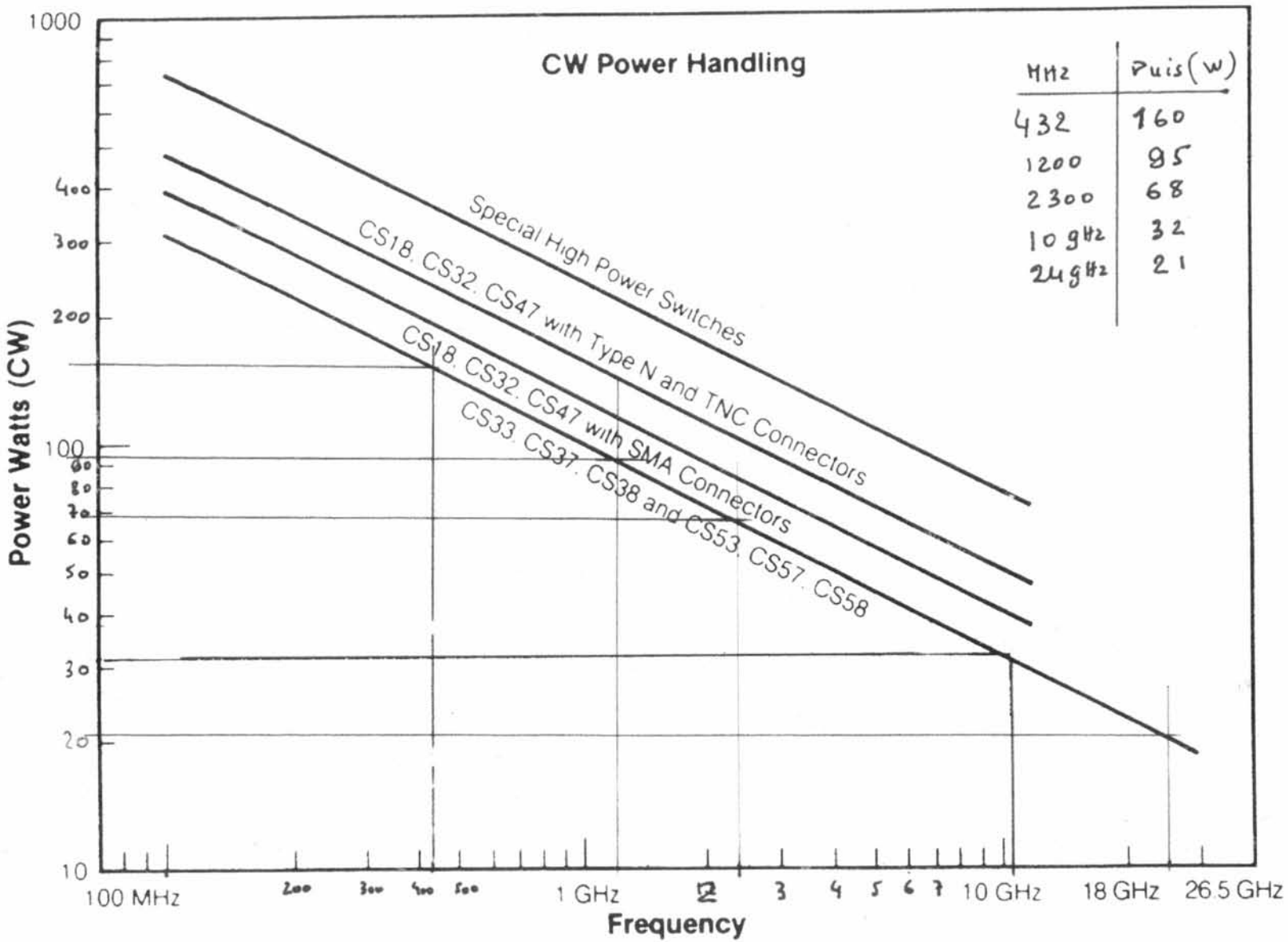


Position	Voltage	RF continuity
1	+1 & −C	IN & 1
2	+2 & −C	IN & 2

CS-33S6E



Position	Voltage	RF continuity	Indicator
1	+1 & −C	IN & 1	A & C
2	+2 & −C	IN & 2	B & C



Notes:

1. This graph is based on the following reference conditions:
   A/ Ambient temperature 40°C
   B(Sea Level operating

2. For applications calling for low pressure, high altitude or severe temperature requirements, the above power ratings would be derated. Please contact facto(for specific

Transco 909C70100 Latching SPDT DC-18 GHz Switch
This type DO Latching SPDT Switch has RF geometry optimized for SMA connectors and operates over a 0-18 GHz frequency band. It is magnetically latched; no holding power is required to maintain a position.

Operates on 20 to 30 VDC.
Coil Resistance 310 Ohms min.
Current: 95 mA max @ 28 VDC and 20 deg. C
Switching time 20 milliseconds
RF Contacts are break-before-make
Impedance is 50 Ohms nominal

Dynatech/U-Z D3-413M30LL Specifications:

* Frequency Range: DC to 18.0 GHz
* VSWR, DC-3 GHz: 1.15:1
* VSWR, 3-8 GHz: 1.3:1
* VSWR, 8-12.4 GHz: 1.4:1
* VSWR, 12.4-18 GHz: 1.5:1
* Insertion Loss (Max), DC-3 GHz: 0.2 dB
* Insertion Loss (Max), 3-8 GHz: 0.3 dB
* Insertion Loss (Max), 8-12.4 GHz: 0.4 dB
* Insertion Loss (Max), 12.4-18 GHz: 0.5 dB
* Isolation (Min), DC-3 GHz: 80 dB
* Isolation (Min), 3-8 GHz: 70 dB
* Isolation (Min), 8-12.4 GHz: 60 dB
* Isolation (Min), 12.4-18 GHz: 60 dB

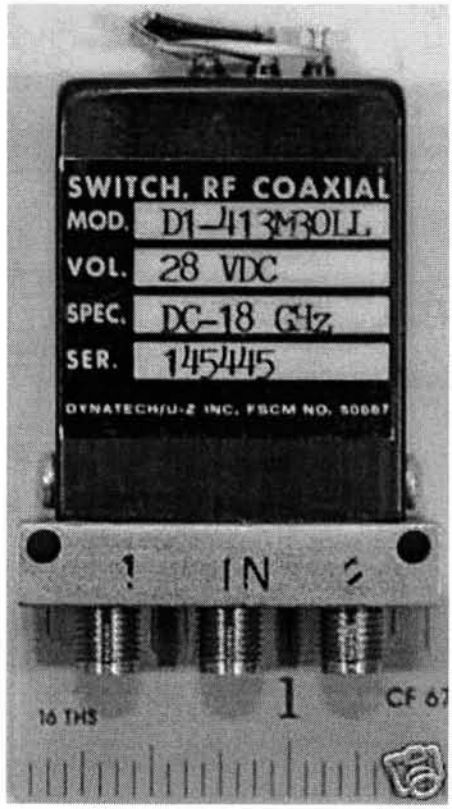
* Switching Time: 15 mS Maximum

* Actuating Voltage: 24-30 Vdc (28 Vdc nominal)

* Actuating Current: 140 mA Maximum at 72°

* Operating Mode: Failsafe with suppression diodes

- Special Option: Low Logic



Please wait
Image not available

SPDT Switch Picture | Transfer Switch Picture | SP6T Switch

We can now offer a wide array of electromechanical RF switches, from DC to 40 GHz. The table below shows some of our standard products. Custom products are also available. We can quote in accordance with other manufacturers' part numbers as well. If you don't see it on this page, please call or e-mail us for a rapid quotation.

Standard Electromechanical RF Switches

Model Number/ Configuration	Frequency Range (GHz)	Insertion Loss (dB max)	Isolation (dB min)	VSWR (max)	Current (mA max @ 28VDC)
S2-6 SPDT	.01-12.4	0.40	70	1.4	75
S2-8 SPDT	.01-18.0	0.50	60	1.5	75
S2-9 SPDT	.01-26.5	0.60	50	1.6	75
S22-6 Transfer	.01-12.4	0.40	70	1.4	125
S22-8 Transfer	.01-18.0	0.50	60	1.5	125
S22-9 Transfer	.01-26.5	0.60	50	1.6	125
S4-6 SP4T	.01-12.4	0.40	70	1.4	125
S4-8 SP4T	.01-18.0	0.50	60	1.5	125
S4-9 SP4T	.01-26.5	0.60	50	1.6	125
S6-6 SP6T	.01-12.4	0.40	70	1.4	125
S6-8 SP6T	.01-18.0	0.50	60	1.5	125
S6-9 SP6T	.01-26.5	0.60	50	1.6	125

We have a number of options available for our switches, including coil voltage, failsafe, latching, indicator, suppression diodes, etc. Please call or e-mail us with your exact requirement. We can also quote to a particular outline requirement.

Techlock Distributing

270 Regency Ridge, Ste 206
Dayton, OH 45459
Phone 513-434-5078
Fax 513-434-5079
VISA/Mastercard Accepted

Miniature Coaxial Switches

This RLC Electronics' Miniature Coaxial Switch is a single pole, two position type. The switch provides extremely high reliability, long life and excellent electrical performance characteristics over the frequency range of DC-65 GHz.

The miniature package utilizes high density packaging techniques, hence the overall volume of the switch is less than 3/4 cubic inch.

Specifications

S¹-2 MIN[2-3-4-5-6-7-8]

Switch Type	SINGLE POLE TWO POSITION										
Frequency Range	DC-18.0 GHz			26.5 GHz Opt	40.0GHz Option					50.0GHz Opt.	65.0GHz Opt.
Frequency (GHz)	DC-4.0	4.0-12.4	12.4-18.0	18-26.5	DC-6	6-12	12-18	18-26.5	26.5-40	40-50	50-65
Insertion Loss (Max dB)	0.1	0.2	0.3	0.5	0.2	0.4	0.5	0.7	0.9	1.1	1.1
VSWR (Max)	1.2:1	1.3:1	1.5:1	1.5:1	1.3:1	1.4:1	1.5:1	1.7:1	1.9:1	1.9	1.9
Isolation (Min)	80	70	60	60	70	60	60	55	50	50	50

Power Rating, RF Cold Switching: See page 5.
Impedance: 50 Ohms
Operating Power 25°C:
(Failsafe): 12Vdc at 250 ma nom.
28Vdc at 140 ma nom. 115 Vac at 50 ma nom.
(Latching): 12 Vdc at 120 ma nom. 28 Vdc at 60 ma nom. 115 Vac at 43 ma nom. Current applied 10 ms min. cutthroat circuitry(standard), recovery time 100 ms nom.

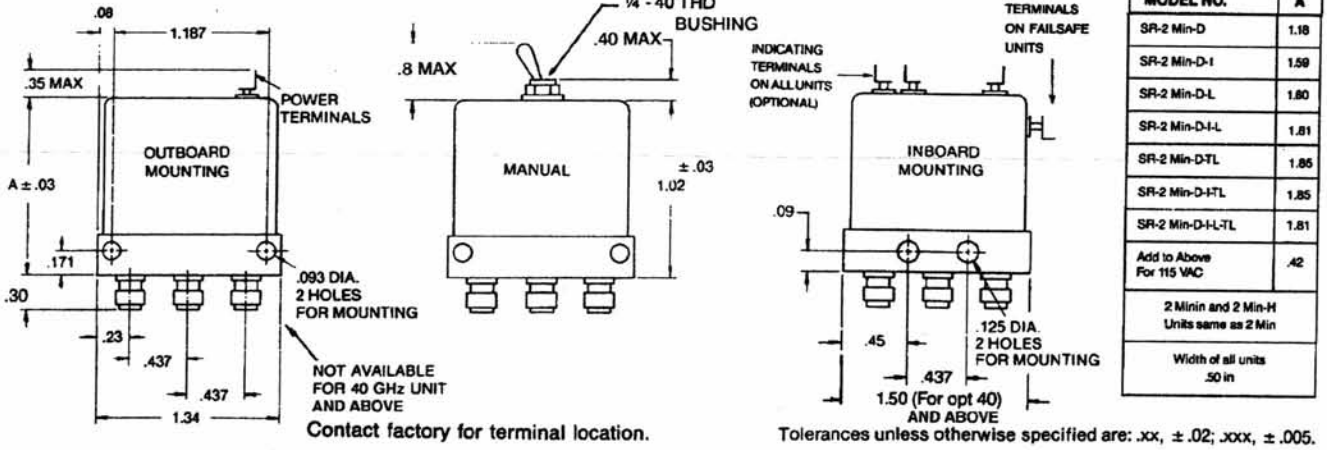
Connectors, RF: SMA Female (40 GHz - 2.92 mm) (50 GHz - 2.4 mm) (65 GHz - 1.85 mm)
Connectors, Power: Feed through solder lugs.
Life: 1,000,000 operations.
Switching Time: 15 mS Max.
Weight: 2 oz.
Environmental Conditions: MIL-S-3928
Operating Mode: Manual, failsafe or latching.
Switching Sequence: Break before make.

To designate the switch desired use:

(1) "M" for Manual, "R" for Remote.
(2) "Min" for outboard mountings or "Minin" for inboard mountings.40 GHz is inboard only.
(3) "A" for 115 Vac, "D" for 28 Vdc or "H" for 12 Vdc.
(4) "I" for indicators if desired.
(5) "L" for latching cutthroat if desired.
(6) "TL" for TTL Driver if desired
(7) "26" for 26.5 GHz option., "40" for 40 GHz option, "50" for 50 GHz option, "65" for 65 GHz option
(8) "Arc" for Arc Suppression diodes (N/A with TTL and Latching)

Example: SR-2 MIN-D is a remote, outboard mounting, 28 Vdc; Failsafe switch, for DC to 18 GHz use.

Outline Drawing



MODEL NO.	A
SR-2 Min-D	1.18
SR-2 Min-D-I	1.59
SR-2 Min-D-L	1.80
SR-2 Min-D-I-L	1.81
SR-2 Min-D-TL	1.86
SR-2 Min-D-I-TL	1.85
SR-2 Min-D-I-L-TL	1.81
Add to Above For 115 VAC	.42
2 Minin and 2 Min-H Units same as 2 Min	
Width of all units .50 in	

Contact factory for terminal location.

Tolerances unless otherwise specified are: .xx, ± .02; .xxx, ± .005.

RLC ELECTRONICS, INC.
83 Radio Circle, Mount Kisco, New York 10549 • Telephone: 914-241-1334 • Fax: 914-241-1753
e-mail: sales@rlcelectronics.com • www.rlcelectronics.com

TELEDYNE MICROWAVE

Ordering Information

All Teledyne Microwave products can be ordered by contacting an authorized factory representative or directly from Teledyne Microwave (415) 968-2211. Inventory stock is normally delivered within two weeks.

Custom Engineering

Microwave components and subsystems can be built to specification. Contact Teledyne Microwave Marketing with your requirements.

Terms

Net 30 days from date of invoice.

Shipping

All orders are FOB, Mountain View, CA and shipped via UPS surface unless otherwise specified.

Customer Service

1-800-832-6869 (Outside CA)
1-415-960-8613 (Inside CA)

Our dedicated Customer Service Department can be contacted for:

- Delivery status
- Order expediting
- Returns and repairs

Please contact Customer Service prior to returning any material.

Coaxial Switch Part Numbers

CS - 33 S 1 C - T (Example)

Switch (2 or 3 characters)

CR	Coaxial Switch – Reduced Height
CS	Coaxial Switch – Standard Height
CT	Internally Terminated Coaxial Switch
SA	Switch Attenuator
SM	Switch Matrix

Series Type (2 characters)

33	Miniature SPDT DC – 22.0 GHz Designate inboard mount (21 GHz Max) with the letter I (Example: CRI-33)
32	Standard SPDT DC – 12.4 GHz
53	Miniature SPDT DC – 26.5 GHz
35	Miniature DPDT DC – 18.0 GHz
37	Miniature Transfer DC – 18.0 GHz
47	Standard Transfer DC – 12.4 GHz
38	Miniature Multi-Throw DC – 18.0 GHz
18	Standard Multi-Throw DC – 12.4 GHz
58	Miniature Multi-Throw DC – 26.5 GHz
39	Latching Multi-Throw DC – 18.0 GHz

Connector Type

S	SMA Female	**B**	BNC Female	**6**	Mixed Connectors
N	N Female	**T**	TNC Female	**X**	SC Connectors

Actuator Voltage (1 character)

1	28 VDC Failsafe
2	115 VAC Failsafe
5	Special Voltage – Failsafe
6	28 VDC Latching
7	115 VAC Latching
9	Special Voltage – Latching

Actuator Type (1 or 2 characters)

O	No cutoff or indicators
C	Indicator contacts only
D	Self cutoff only
E	Self cutoff and indicators
3-8	Indicates no. of positions on Multi-throw Switches

Dash Number (1 or more characters)

	Number denotes special and additional customer requirements
T	TTL Driver
D	Decoders and TTL Driver

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TTL Switch Driver Option

As a special option, on both failsafe and latching type switches, drivers can be provided which are compatible with industry standard low power Schottky TTL circuits.

VCC Input

The V_{cc} may or may not have to be connected to 5 volts as follows:

1. For a low current interface, connect V_{cc} to 5 volts. All units are provided with a 5 volt (V_{cc}) connection and internal pull up resistor (R1). With a 5 volt connection made, the logic input current drain is compatible with two low power Schottky TTL loads (40 μA, high current).

2. For a high current interface, the V_{cc} connection is optional. If a high level logic input current drive (450 μA @ 2.4 volts) is available, the 5 volt (V_{cc}) connection need not be made.

Multi-Throw

Teledyne Microwave has two options available for TTL compatible drivers on multi-throw switches:

T-Option

This option uses a circuit similar to the SPDT and Transfer circuit. There is one control input for each position.

D-Option

This option includes a decoder. The control input is a 3-bit parallel word that is decoded to internally select the appropriate position.

Performance Parameters vs Frequency

Generally speaking, the performance of coaxial switches degrades with increasing frequency i.e., the VSWR and insertion loss increase and the isolation decreases. All Teledyne Microwave data sheets specify these three parameters as "worst case" at the highest operating frequency, either 12.4 GHz or 18 GHz depending on the type of switch used. If the switch is used only over a band whose upper limit is limited, much better specifications can be achieved. Special applications such as this, should be called out so that better performance can be offered.

Actuator Current vs Temperature

Due to the fact that actuator coil resistance will vary as a function of temperature, there is a resultant inverse relationship between switch operating temperature and actuator drive current. For switches operating at 28 volts D.C., the approximate actuator drive current at temperature, T, can be calculated from the equation:

$$I_T = \frac{28}{\frac{28}{I_A}\,[1 + .00385\,(T - 20)]}$$

Where:

I_T = Actuator current at temperature T

I_A = Room temperature actuator current—see catalog specification page

T = Temperature of interest in degrees celsius

Truth Tables

SPDT Failsafe

Logic Input	RF Path	
1	IN to 1	IN to 2
	Normally Closed	Normally Open
0	On	Off
1	Off	On

SPDT Latching

Logic Input		RF Path	
1	2	IN to 1	IN to 2
0	0	No Change	
1	0	On	Off
0	1	Off	On
1	1	Forbidden	

Transfer Failsafe
CS-37S10-T or CS-47N10-T

Logic Input	RF Path			
1	1-2	3-4	1-3	2-4
0	On	On	Off	Off
1	Off	Off	On	On

Transfer Latching
CS-37S60-T or CS-47N60-T

Logic Input		RF Path			
1	2	1-2	3-4	1-3	2-4
0	0	No Change			
1	0	Off	Off	On	On
0	1	On	On	Off	Off
1	1	Forbidden			

Multithrow
CS-38S16-D

Logic Input			RF Position					
1	2	3	1	2	3	4	5	6
0	0	0	On	Off	Off	Off	Off	Off
1	0	0	Off	On	Off	Off	Off	Off
0	1	0	Off	Off	On	Off	Off	Off
1	1	0	Off	Off	Off	On	Off	Off
0	0	1	Off	Off	Off	Off	On	Off
1	0	1	Off	Off	Off	Off	Off	On

Pin C — Common
Pin J — Vsw +28 Vdc
Pin 4 & 5 — Spares

Multithrow
CS-38S16-T

Logic Input						RF Position					
1	2	3	4	5	6	1	2	3	4	5	6
1	0	0	0	0	0	On	Off	Off	Off	Off	Off
0	1	0	0	0	0	Off	On	Off	Off	Off	Off
0	0	1	0	0	0	Off	Off	On	Off	Off	Off
0	0	0	1	0	0	Off	Off	Off	On	Off	Off
0	0	0	0	1	0	Off	Off	Off	Off	On	Off
0	0	0	0	0	1	Off	Off	Off	Off	Off	On

Pin C — Common
Pin J — Vsw +28 Vdc
Pin B — Vcc +5 Vdb
Pin 7,8,D,E,F — Spares

Applications

The transfer switch, whether it is adapted to coaxial or waveguide transmission lines is basically a modified double-pole-double-throw (DPDT) device. A true DPDT switch is a six port device that contains two completely independent transmission paths. In a transfer switch the two transmission paths are provided but are not totally independent as shown in Fig. 1.

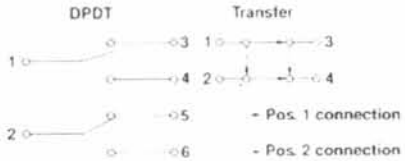


Figure 1

The transfer switch has several interesting applications as follows:

Two Transmitters to Either of Two Antennas

Two microwave transmitters can be connected to either of two alternate antennas as shown in Fig. 2.

Figure 2

Circuit Insertion

A complete microwave circuit or circuit element can be inserted into a transmission line by using a transfer switch as shown in Fig. 3.

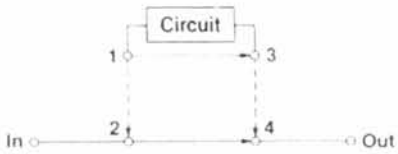
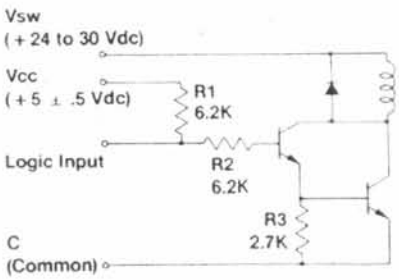


Figure 3

In the event that the 1-3 shorting of the microwave circuit is undesirable, this leg can be left out.

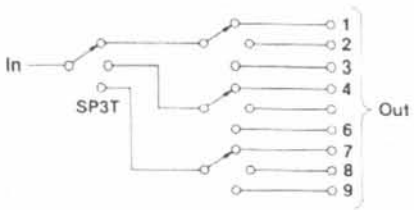
Basic Driver Schematic
SPDT and Transfer Switches



Failsafe uses 1 circuit
Latching uses 2 circuits
(Vsw, Vcc, & C are common to both circuits)

Series Application of Multi-Throw Switches

Many times requirements for greater than six position switches are encountered. Since it is difficult to design a high performance unit that has more than eight throws or positions, one solution is as shown:

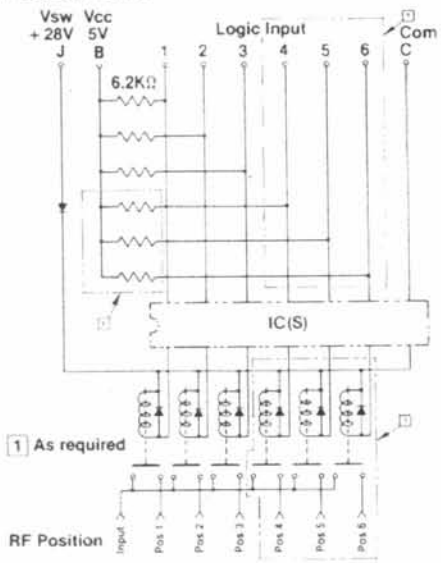


The example shows a single-pole-9-throw unit made up of 4 three-throw switches. The number of throws possible using this technique is essentially unlimited and is equal to the total number of throws available in the output stage. If a 2 stage unit were set up using 6 position switches, the resultant would be a total of 36 outputs or a SP36T switch bank.

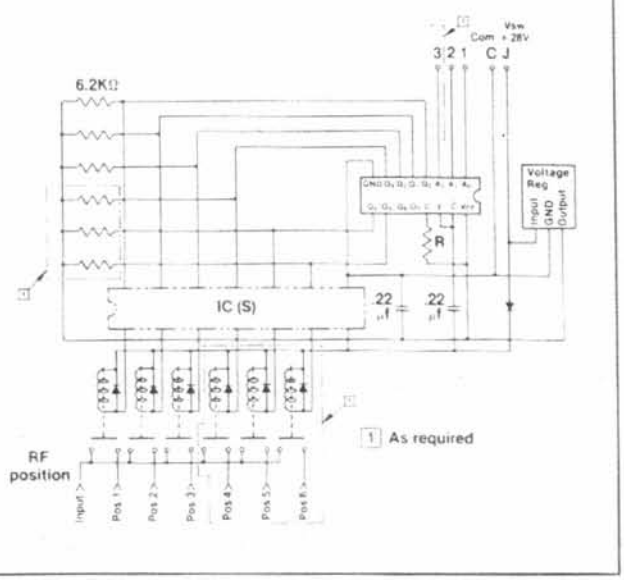
Magnetic Sensitivity

The switch can be sensitive to ferrous materials or external magnetic fields. Neighboring ferrous materials should be no closer than 0.5 inches and external magnetic field should have a flux density less than 5 gauss.

Basic T Schematic



Basic D Schematic



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Glossary of Switching Terms

Failsafe

A switch with an actuator that contains a spring return mechanism that provides RF connection to one selected position when no voltage is applied to the power terminals. This type of switch requires continuous voltage to maintain RF connection to any other position. For multi-position switches, the no voltage condition is all RF connections open.

Latching

A switch with an actuator that contains a mechanism, either mechanical or magnetic, that will maintain a chosen RF contact path whether or not voltage is maintained after switching is accomplished.

Self-Deenergizing/Self-Cutoff

Applies to latching switches only. A switch that has the ability to disconnect the actuator drive circuit so that D.C. current will not be consumed after switching has been accomplished. Self-cutoff can be accomplished either by using mechanical contacts or IC drive circuits.

Indicator Contacts

A set of internally mounted D.C. contacts that are mechanically connected to the actuator and transfer in one-to-one correspondence with the RF contacts. These contacts are usually wired to indicator lights to remotely show switch position, but in many cases, can also be used as interlock contacts. Indicator contact rating (max.) is 30 VDC, 50 mA, or 1.5 watts resistive load.

Switching Time

The total amount of time between application of voltage to the actuator terminals and completion of switching including all contact bounce, if any. Total switching time is made up of three parts, namely (1) inductive delay in the actuator coil, (2) transfer time of the RF contacts, and (3) bounce time of the RF contacts.

Actuator

The electromechanical mechanism that transfers the RF contacts from one position to another. Most Teledyne Microwave actuators use either linear or rotary solenoids acting on mechanical linkage to the RF contacts.

SPDT Switch

Single-Pole-Double-Throw. A switch with one input and two output ports.

Multi-Throw Switch

A switch with one input and more than two outputs. Standard Teledyne Microwave switches (CS-38, CS-58, CS-18 and CS-39) provide up to 8 outputs operating from a single input.

Transfer Switch

A four-port switch that provides two independent pairs of RF paths through it. These pairs are actuated simultaneously, such actuation being similar to that of a double-pole-double-throw switch. See application notes as to typical usage.

Isolation

The measure of the power level at the output connector of an unconnected RF channel as referenced to the power at the input connector. Specified in dB below input power level.

Internal Termination

Applies to SPDT and Multi-Throw switches. An unselected input or output port will be connected to an internal 50 ohm termination. Switches without internal termination will open circuit the unselected ports and the VSWR will be infinite.

Attenuator Switch

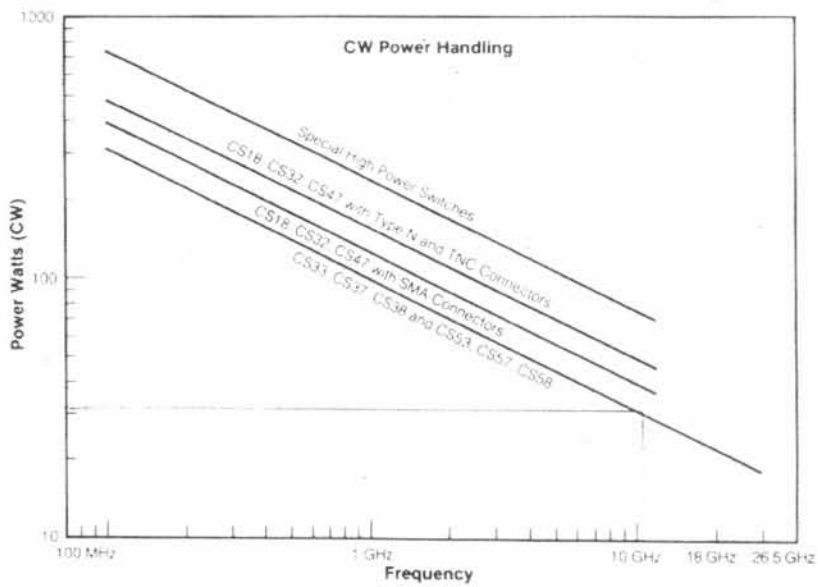
A two state switch that has a low loss and a high loss state. The low loss state insertion loss is typically 0.5 dB or less. The high loss state is precision level of attenuation such as 10, 20, 30 dB.

Arc Suppression Diode

A diode connected in parallel with the coil. The diode will clip the back emf spike to 0.7 volts when the coil is de-energized. The diode cathode is connected to the positive side of the coil and the diode anode is connected to the negative side.

Date Code

Either serial numbers or date codes are marked on the switches. The date code is in accordance with MIL-STD-1285A and consists of four digits. The first two digits are the year, and the last two digits are the week of that year (YYWW). Thus, 8604 will be switches which went through final inspection during the fourth week of 1986.



Power Handling Capability (watts cw)

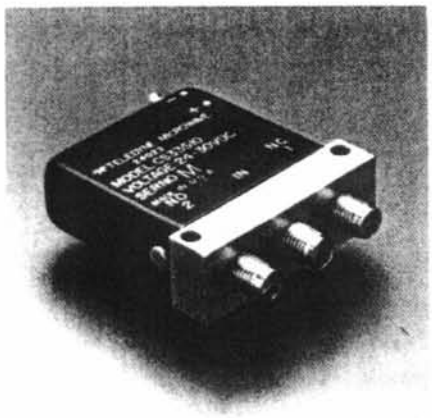
There are several factors which determine the power handling capability of a given switch design. The following graph, however, may be used as a baseline for selecting an appropriate switch model.

Notes:

1. This graph is based on the following reference conditions.
   - A/ Ambient temperature 40°C
   - B/ Sea Level operating
   - C/ 1.2 VSWR load
   - D/ Non Switching

2. For applications calling for low pressure, high altitude or severe temperature requirements, the above power ratings would be derated. Please contact factory for specific information.

Failsafe DC-22 GHz Miniature SPDT Switches



CS-33S10

CS-33 Series
DC-22 GHz*
SMA Connectors

Description

The Type CS-33 Failsafe Switch is a broadband SPDT electro-mechanical switch designed to switch microwave signals from a common input to either of two outputs. Designed for 50 ohm transmission lines, the unit is set up for minimum size compatible with SMA connector spacing. Two different mounting hole configurations are offered: standard and optional inboard mounting.

The failsafe switches on this page are provided with a spring operated actuator which is particularly desirable in applications where the switch is connected to one position (normally closed) most of the time and only periodically is switched to the alternate position. In this type of application, holding power is required only when operating in the alternate position. Also, switching circuitry is simplified, since only one d-c circuit is required.

Specifications

RF Contacts:
Break before make

Actuator Voltage:
24–30 VDC, 12, 15, 20 VDC, and 115 VAC on special order

Actuator Current:
80 mA @ 28 VDC and 20°C

Switching Time:
20 msec

Weight:
1.65 oz. max.

Temperature Range:
– 54°C to + 85°C

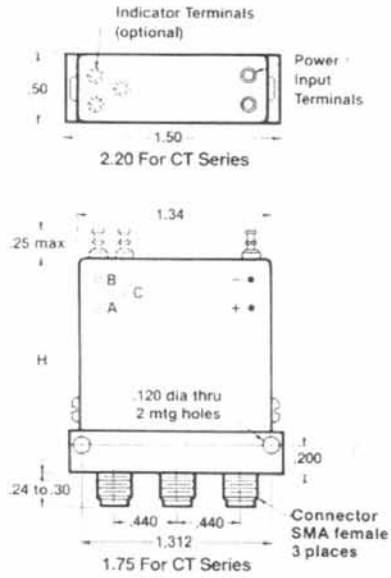
Life:
1 million cycles

RF Power Handling:
See graph in front of brochure

Optional Features

- Indicator Circuits
- Special Actuator Voltages
- TTL Compatible Drivers
- Arc Suppression Diodes
- Power Connectors
- Inboard Mounting

Outboard Mounting



H = 1.20 max CR Model
options may add
height. Consult factory
H = 1.55 max STD Model
H = 2.10 max TTL Model

RF Performance

Frequency	DC-6 GHz	6-12 GHz	12-18 GHz	18-22 GHz*
VSWR (maximum)	1.25:1	1.40:1	1.50:1	1.70:1
Insertion Loss (maximum)	0.2 dB	0.4 dB	0.5 dB	0.8 dB
Isolation (minimum)	70 dB	60 dB	60 dB	50 dB

* Outboard Mounts To 22 GHz
Inboard Mounts To 21 GHz

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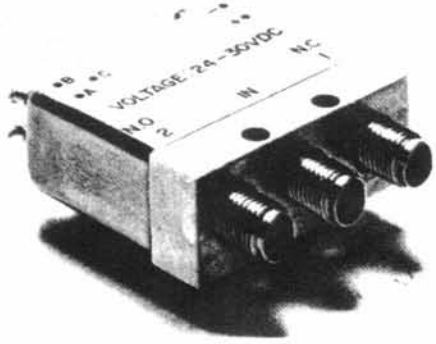
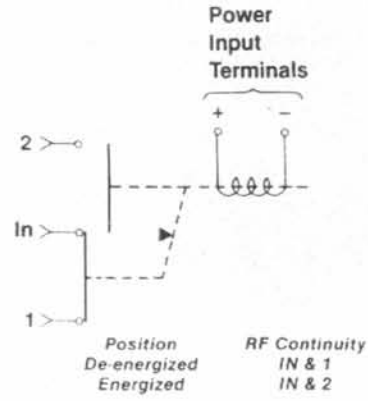
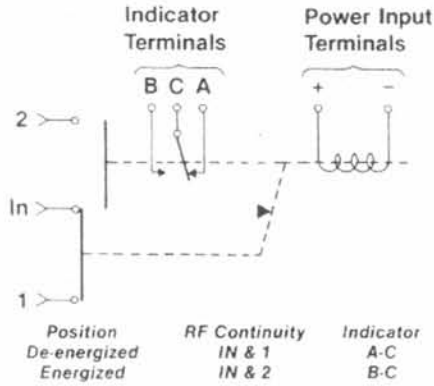


CR33S1C-99

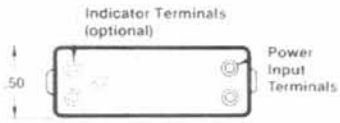
CS-33S10

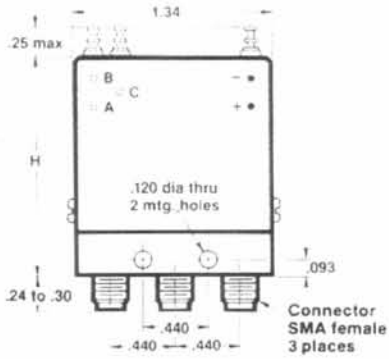


CS-33S1C



Inboard Mounting





H = 1.20 max CR Model
options may add
height. Consult factory
H = 1.55 max STD Model
H = 2.10 max TTL Model

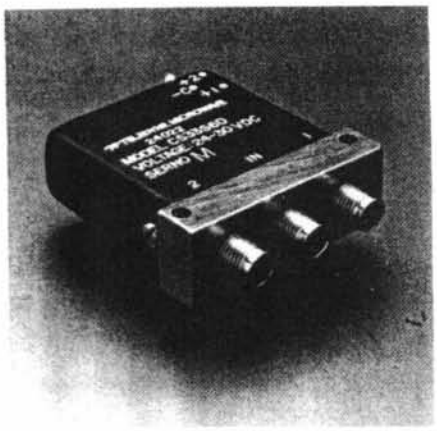
Part Number Table

All units have SMA-Female connectors

For TTL Drivers add -T to Part No.

Actuator Type	Without Indicators	With Indicators
Failsafe	CS-33S10	CS-33S1C

Latching DC-22 GHz Miniature SPDT Switches



CS-33S60

CS-33 Series
DC-22 GHz*
SMA Connectors

Description

The Type CS-33 Latching Switch is a broadband SPDT electro-mechanical switch designed to switch microwave signals from a common input to either of two outputs. Designed for 50 ohm transmission lines, the unit is set up for minimum size compatible with SMA connector spacing.

The switches on this page are provided with a magnetic latching actuator which is particularly desirable in applications where actuator power consumption must be kept to an absolute minimum. The latching type actuator requires less switching current than the failsafe type. In the self-cutoff version, power is applied only for the very short duration (approximately 50 msec. max.) of the actuator transfer from one position to the other. This makes this type of actuator especially suitable for space vehicles or portable battery operated systems.

Specifications

RF Contacts:
Break before make

Actuator Voltage:
24–30 VDC, 12, 15, 20 VDC, and 115 VAC on special order

Actuator Current:
60 mA @ 28 VDC and 20°C

Switching Time:
10 msec.

Weight:
1.65 oz.

Temperature Range:
– 54°C to + 85°C

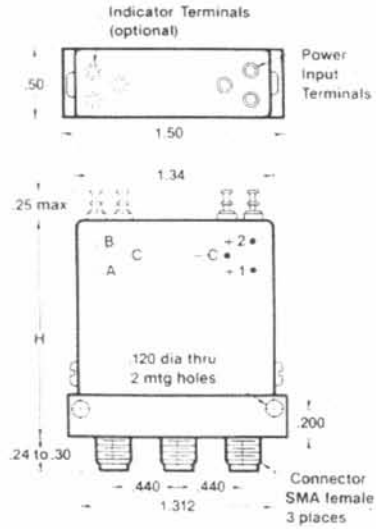
Life:
1 million cycles

RF Power Handling:
See graph in front of brochure

Optional Features

- Indicator Circuits
- Special Actuator Voltages
- TTL Compatible Drivers
- Arc Suppression Diodes
- Power Connectors
- Inboard Mounting

Outboard Mounting



H = 1.20 max CR Model
options may add
height. Consult factory
H = 1.55 max STD Model
H = 2.10 max TTL Model

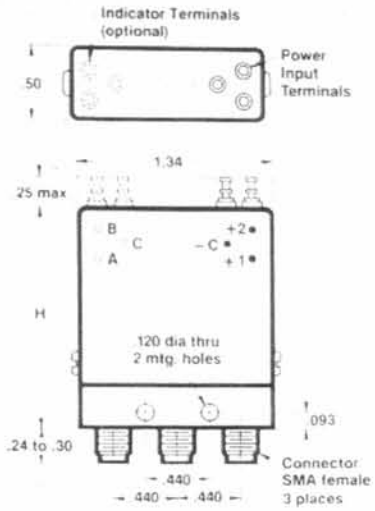
RF Performance

Frequency	DC-6 GHz	6-12 GHz	12-18 GHz	18-22 GHz*
VSWR (maximum)	1.25:1	1.40:1	1.50:1	1.70:1
Insertion Loss (maximum)	0.2 dB	0.4 dB	0.5 dB	0.8 dB
Isolation (minimum)	70 dB	60 dB	60 dB	50 dB

* Outboard Mounts To 22 GHz
Inboard Mounts To 21 GHz

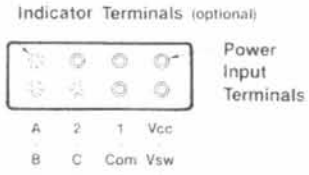
TELEDYNE MICROWAVE • 1290 Terra Bella Ave. • Mountain View, CA 94043 • 415-968-2211 • FAX 415-966 1521

Inboard Mounting



H = 1.20 max CR Model
options may add height. Consult factory
H = 1.55 max STD Model
H = 2.10 max TTL Model

TTL Option



Part Number Table

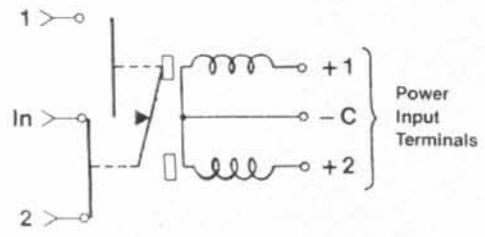
All units have SMA-Female connectors.

For TTL Drivers add -T to Part No.

Actuator Type	Without Indicators	With Indicators
Latching without Self-Cutoff	CS-33S60	CS-33S6C
Latching with Self-Cutoff	CS-33S6D	CS-33S6E

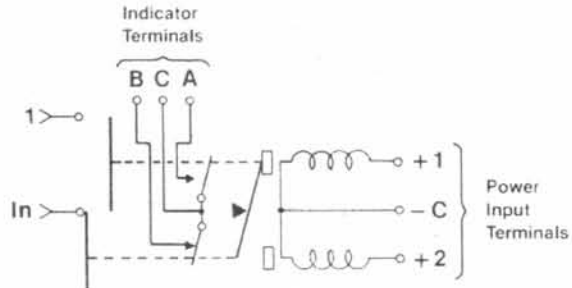
For Models CS-33S60 and CS-33S6C power is applied in a pulse form of sufficient duration (20 msec. min.) to cause switching. For Models CS-33S6D and CS-33S6 steady voltage may be applied continuously, but switch only draws current during the actual switching cycle.

CS-33S60



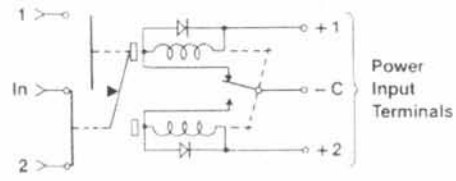
Position	Voltage	RF continuity
1	+1 & -C	IN & 1
2	+2 & -C	IN & 2

CS-33S6C



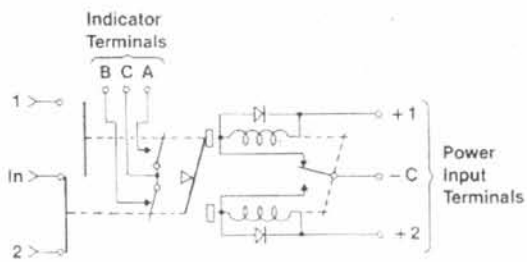
Position	Voltage	RF continuity	Indicator
1	+1 & -C	IN & 1	A & C
2	+2 & -C	IN & 2	B & C

CS-33S6D

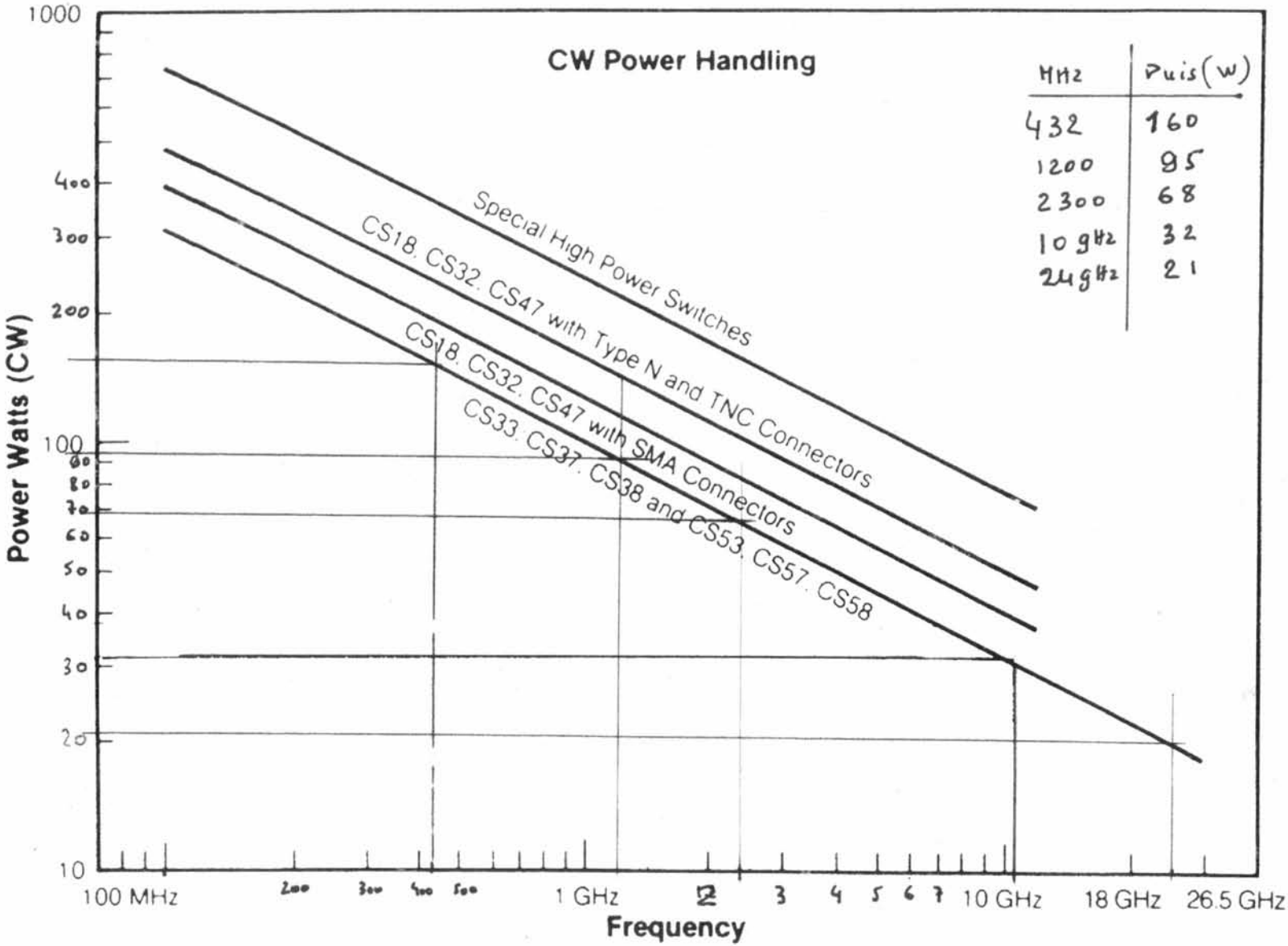


Position	Voltage	RF continuity
1	+1 & -C	IN & 1
2	+2 & -C	IN & 2

CS-33S6E



Position	Voltage	RF continuity	Indicator
1	+1 & -C	IN & 1	A & C
2	+2 & -C	IN & 2	B & C



Notes:

1. This graph is based on the following reference conditions:
   A/ Ambient temperature 40°C
   B/ Sea Level operating

2. For applications calling for low pressure, high altitude or severe temperature requirements, the above power ratings would be derated. Please contact factory for specific

2-weg-Relais (SPDT)

Modell	SR-2MIN-D	SR-2MIN-H	STR-2-D	SR-2-N-D	SR-2-N-H
Konfiguration	2-weg	2-weg	2-weg m. Termin.	2-weg	2-weg
Schalterart	failsafe	failsafe	failsafe	failsafe	failsafe
Frequenzbereich	DC–18 GHz	DC–18 GHz	DC–18 GHz	DC–12,4 GHz	DC–12,4 GHz
Isolation	60 dB / 18 GHz	60 dB / 18 GHz	60 dB / 18 GHz	60 dB / 12,4 GHz	60 dB / 12,4 GHz
Einfügungsdämp.	0,3 dB / 18 GHz	0,3 dB / 18 GHz	0,3 dB / 18 GHz	0,6 dB / 12,4 GHz	0,6 dB / 12,4 GHz
VSWR	1,5:1 / 18 GHz	1,5:1 / 18 GHz	1,5:1 / 18 GHz	1,6:1 / 12,4 GHz	1,6:1 / 12,4 GHz
Impedanz	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω
HF-Belastbarkeit*	150 W CW	150 W CW	2 W CW	350 W CW	350 W CW
HF-Anschlüsse	SMA weibl.	SMA weibl.	SMA weibl.	N weibl.	N weibl.
Steuerspannung	28 V DC	12 V DC	28 V DC	28 V DC	12 V DC
Artikel-Nr.	27/10	27/11	27/3	27/281	27/191
Stückpreis (D) **	US$ 112,00	US$ 112,00	DM 675,00	DM 319,00	DM 319,00
Stückpreis (CH) ***	US$ 129,00	US$ 129,00	CHF 641,50	CHF 303,50	CHF 303,50

Mehrwege- und Transferrelais

Modell	SR-6C-D	SR-6C-H	SR-T-N-D	SR-T-N-H
Konfiguration	6-weg (SP6T)	6-weg (SP6T)	Transfer (DPDT)	Transfer (DPDT)
Schalterart	failsafe	failsafe	failsafe	failsafe
Frequenzbereich	DC–18 GHz	DC–18 GHz	DC–12,4 GHz	DC–12,4 GHz
Isolation	60 dB / 18 GHz	60 dB / 18 GHz	55 dB / 12,4 GHz	55 dB / 12,4 GHz
Einfügungsdämp.	0,5 dB / 18 GHz	0,5 dB / 18 GHz	0,6 dB / 12,4 GHz	0,6 dB / 12,4 GHz
VSWR	1,5:1 / 18 GHz	1,5:1 / 18 GHz	1,6:1 / 12,4 GHz	1,6 / 12,4 GHz
Impedanz	50 Ω	50 Ω	50 Ω	50 Ω
HF-Belastbarkeit*	150 W CW	150 W CW	350 W CW	350 W CW
HF-Anschlüsse	SMA weiblich	SMA weiblich	N weiblich	N weiblich
Steuerspannung	28 V DC	12 V DC	28 V DC	12 V DC
Artikel-Nr.	27/6	27/18	27/289	27/421
Stückpreis (D) **	US$ 364,00	US$ 364,00	US$ 539,00	DM 655,00
Stückpreis (CH) ***	US$ 419,00	US$ 419,00	US$ 620,00	CHF 622,50

* Bei 1 GHz, leistungslos geschaltet (+25 °C, bei Seehöhe, an 50 Ω)
** Ab Donauwörth, Preise solange Vorrat reicht, zzgl. gesetzl. MWSt., bei 1–9 Stück, unverpackt
*** Ab Ellighausen, Preise solange Vorrat reicht, zzgl. gesetzl. MWSt., bei 1–9 Stück, verpackt

= neue Modelle

Hotline 09 06/7 06 93-55 Kennziffer 1308

www.telemeter.de/go/RLC

50-W-Leistungsverstärker 1800-2200 MHz

Das Verstärkermodell RF18002200-50 liefert über einen Frequenzbereich von 1800–2200 MHz eine HF-Ausgangsleistung von 50 W und ist damit besonders für Anwendungen im Bereich des Mobilfunks geeignet. Typische Anwendungen sind z. B. Prüffeld oder Qualitätssicherung.
Der Verstärker ist mit einem 230-V-Netzteil ausgerüstet und in einem 19"-Einschub untergebracht. Das Gehäuse beinhaltet neben der notwendigen Kühleinrichtung auch diverse Schutzschaltungen, die einen sicheren und störungsfreien Betrieb gewährleisten.
Neben den ansprechenden Eigenschaften überrascht auch der äußerst günstige Preis dieser Leistungsverstärker.

Frequenzbereich	1800–2200 MHz
HF-Ausgangsleistung	50 W CW
Impedanz	50 Ω
Verstärkung	43 dB min.
Klasse	A
HF-Anschlüsse	N weibl.
Max. Last-VSWR	5 : 1
Kühlung	Lüfter
Versorgung	230 V AC, 50 Hz
Abmessungen	19" x 4 HE x 460 mm
CE-Zeichen	ja
Artikel-Nr.	111/319

Weitere Informationen erhalten Sie unter entsprechender Hotline oder Kennziffer.

Hotline 09 06/7 06 93-55 Kennziffer 1309

Systeme zur Geschwindigkeitsmessung

Zur Geschwindigkeitsmessung im Bereich von 2 bis 350 km/h fertigt die Firma Avitronics kundenspezifische Dopplerbaugruppen mit Antenne im ISM-Frequenzbereich bei 24,125 sowie im Frequenzbereich bei 18 GHz.
Die Sensoren können beispielsweise für einen variablen Abstand der Boden-Messeinrichtung bis 50 cm gefertigt werden und einen Messfehler von < 2% aufweisen. Literatur hierüber ist leider nicht verfügbar, da ausnahmslos Systeme nach Kundenvorgaben realisiert werden. (Bitte Spezifikationen zusenden).
Übrigens – Ausführungen nach Kundenwunsch sind unsere Spezialität!

Hotline 09 06/7 06 93-55 Kennziffer 1310

VSWR-Messung leicht gemacht

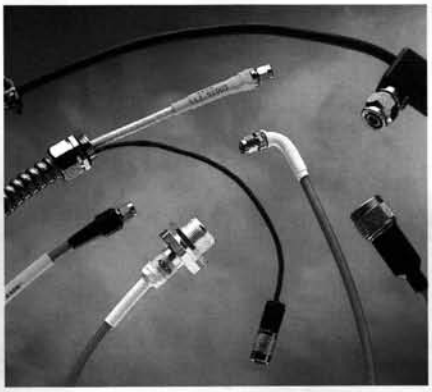
- Frequenzbereich 20–2700 MHz
- Selektive VSWR-Messung
- Problemlose Bandbreitenermittlung bei Antennen
- Eingebauter, durchstimmbarer HF-Generator
- Einfache Handhabung
- Netzunabhängig
- Ideal für Installation und Wartung beliebiger Funkanlagen
- Schnelle Messung von Antennen „aus der Hand"

Immer häufiger besteht bei Wartung und Installation von Funkantennen der Bedarf, das Stehwellenverhältnis zu überprüfen und zu vermessen. Diesem Wunsch trägt das neue VSWR-Messgerät Rechnung.

Modell SWR ONE	Artikel-Nr. 617/1

Hotline 09 06/7 06 93-55 Kennziffer 1313

Neue dämpfungsarme Mikrowellenkabel bis 40 GHz



Um Ihnen die Auswahl des Kabels zu erleichtern, haben wir die Eigenschaften der verschiedenen konfektionierten Mikrowellenkoaxialkabel zusammengefasst.

Hotline 09 06/7 06 93-55 Kennziffer 1311

AXOWAVE®	3S	4H	5C
Elektrische Eigenschaften			
Charakteristischer Widerstand (Ω)	50 ±1	50 ±1	50 ±1
Nutzfrequenz (GHz)	0–18	0–40	0–26,5
Grenzfrequenz (GHz)	42	42	29
Nennkapazität (pF/m)	87	85	87
Signalfortpflanzungsgeschwindigkeit (%)	76	76	76
Dämpfungsverluste (dB) (1 m langes konfekt. Kabel – bei max. Frequenz)	2,10	2,95	2,10
Max. Stehwellenverhältnis (VSWR) (in der Frequenzbreite) (Für Kabellängen >10 m, bitte anfragen.)	1,25 gerade SMA-Stecker	1,35 K-kompatible Stecker	1,25 vo 1,35 vo gerade
Schirmdämpfung (dB) bei 1 GHz	<-100	<-100	<-110
Physikalische und mechanische Eigenschaften			
Kabelaußendurchmesser (mm)	3,7	4,1	5,3
Min. Biegeradius, Festverlegung (mm)	20	20	25
Min. Biegeradius, dynamischer Einsatz (mm)	40	50	50
Außenmantelmaterial	FEP	FEP	FEP

* Richtwert

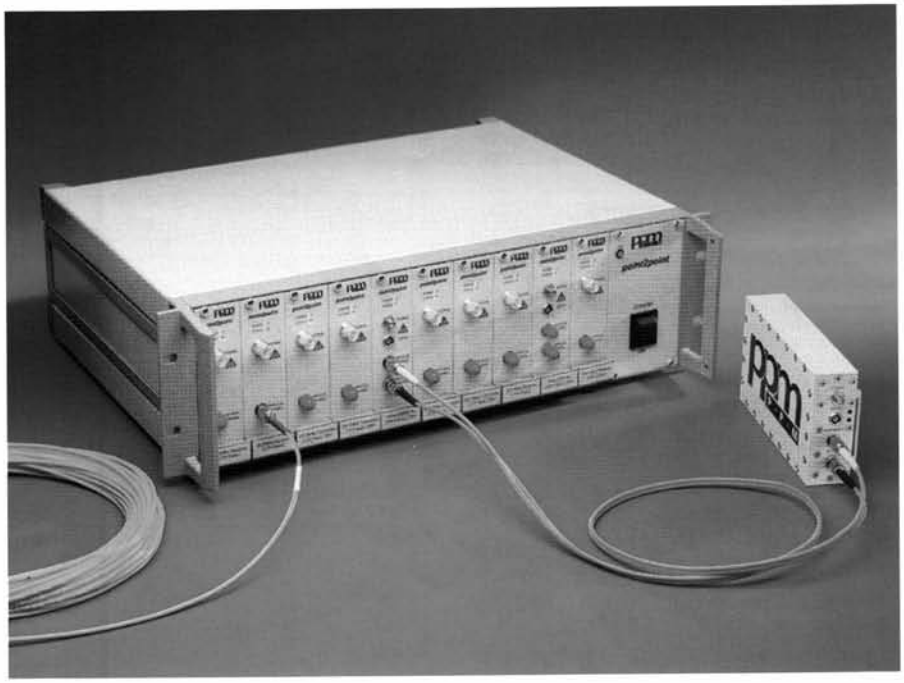
Erweiterte Point2point-Fibre-Optik-Link-Systeme

Dieses neue point2point-Fibre-Optik-Link-System ist ein modular aufgebautes optisches Übertragungssystem für Analog- und Datensignale auf LWL-Basis.
Ein typisches point2point-System besteht aus einem Sender, der über ein Glasfaserkabel mit einem Empfänger verbunden ist. Der Sender wandelt das am Eingang anliegende elektrische Signal in ein optisches, welches über ein Lichtwellenleiter-Kabel an den Empfänger übertragen wird. Im Empfänger wird das optische Signal wieder in ein elektrisches Signal umgewandelt.
Sender und Empfänger werden als einzelne Module, als abgeschirmte Module oder als Kassetten-Module für den Einbau in einen 19"-Überrahmen angeboten.
Viele Übertragungssysteme können mit einer RS232-Schnittstelle bestellt werden. Diese Option ermöglicht dem Anwender über die optische LWL-Strecke RS232-Daten zu senden, um damit auch andere Mess- und Testeinrichtungen zu steuern und/oder zu überwachen.

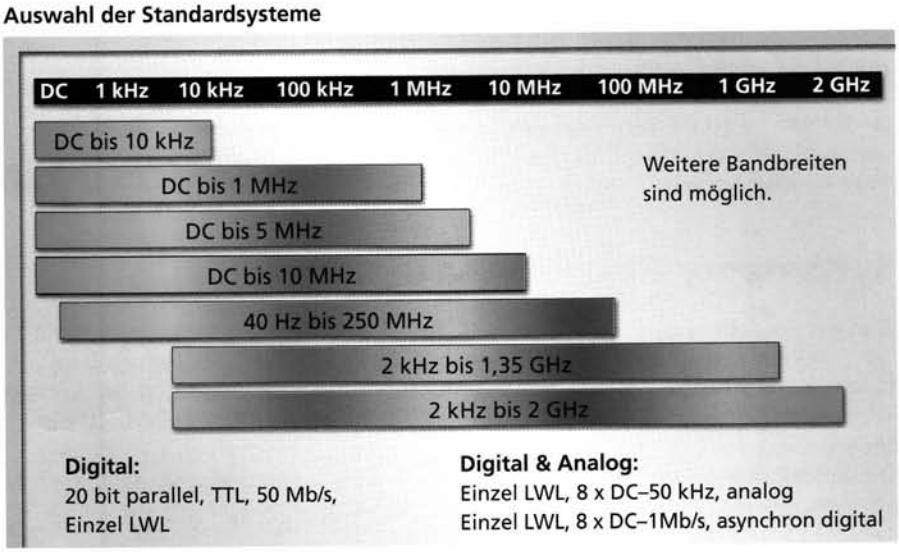
Anwendungen:

- Fernbedienung von Antennen und Positionierern
- Messung hoher Impulsleistungen in der HF- und Mikrowellentechnik
- Signalübertragung aus Räumen oder in Räume mit starken elektromagnetischen Störfeldern (EMV-Messtechnik).
- Übertragung breitbandiger Videosignale aus Räumen mit hohen elektromagnetischen Feldern (EMV-Messtechnik).
- Gefahrlose Signalübertragung aus Räumen oder in Räume mit hohen elektrischen Spannungen.
- Serielle oder parallele Übertragung digitaler Daten mit hoher Geschwindigkeit.

Hotline 09 06/7 06 93-55 Kennziffer 1312



Auswahl der Standardsysteme



Tel. (09 06) 7 06 93-0, Fax (09 06) 7 06 93-50 Tel. (0 71) 6 99 20 20, Fax (0 71) 6 99 20 24

Type C Multi-Position Coaxial Switches (3 to 6 Position)

This RLC Electronics' Basic Mid-Size Multi-Position Coaxial Switch line provides up to 6 positions with extremely high reliability, long life and outstanding electrical performance. It features extremely low insertion loss and VSWR over the entire frequency range, while maintaining high isolation.

Specifications

$S^{1-2}\ C^{3-4-5-6-7}$

RF Positions	3-6	3-6	3 to 6 for OPTION 40	
Switch Type:	SP-3T...6T	SP-3T...6T	SP-3T-40	SP-6T-40
Frequency Range:(GHz)	DC-18	DC-26.5	DC-40	
Insertion Loss (Max dB)			Ins. Loss: (dB Max)	
DC-4.0 GHz	0.20	0.20	DC-6.0	0.25
4.0-12.4 GHz	0.30	0.30	6.0-12	0.40
12.4-18 GHz	0.50	0.50	12-18.5	0.50
18-26.5 GHz (option 26)	–	0.75	18.5-26.5	0.75
			26.5-40	0.90
VSWR (Max)			VSWR: (Max)	
DC-4 GHz	1.25	1.25	DC-6.0	1.30
4.0-12.4 GHz	1.40	1.40	6.0-12	1.40
12.4-18 GHz	1.50	1.50	12-18.5	1.50
18-26.5 GHz (option 26)	–	1.80	18.5-26.5	1.70
			26.5-40	2.00
Isolation (dB Min)			Insolation: (dB Min)	
			DC-18.5	60
DC-18 GHz	60	60	18.5-26.5	55
18-26.5 GHz (option 26)	–	40	26.5-40	45

Power Rating, RF Cold Switching: See page 5.
Impedance: 50 Ohms
Operating Power 25°C:
(Failsafe): 12Vdc at 400 ma nom.
28Vdc at 150 ma nom. 115 Vac at 50 ma nom.
(Latching): 12 Vdc at 462 ma nom.
28 Vdc at 400 ma nom. 115 Vac at 225 ma nom.
Cutthroat circuitry (standard), recovery time 100ms nom.

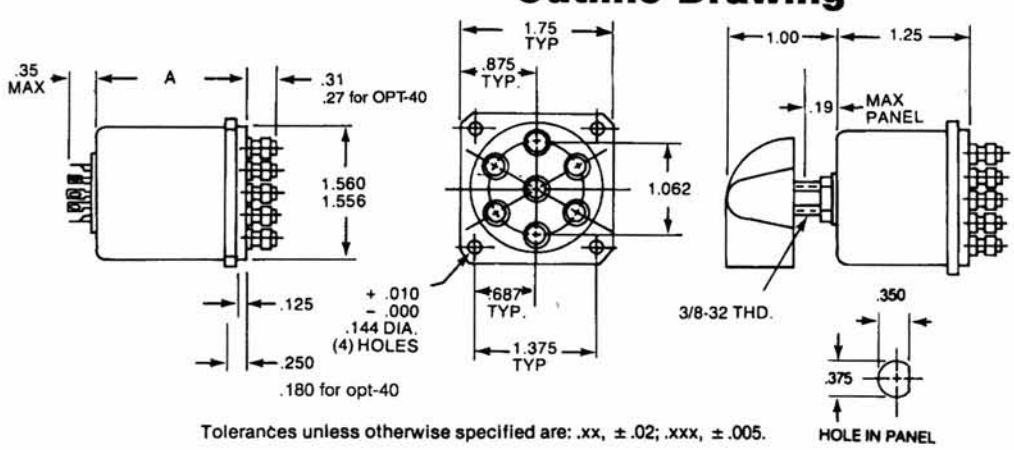
Connectors, RF: SMA Female (40 GHz 2.92 mm)
Connectors, Power: Feed through solderlugs.
Life: 1,000,000 operations.
Switching Time: 15 mS Max. Failsafe 125mS latching
Weight: 10oz.
Environmental Conditions: MIL-S-3928
Operating Mode: Manual, failsafe or latching.
Switching Sequence: Break before make.

To designate the switch desired use:

(1) "M" for Manual, "R" for Remote.
(2) "3C", "4C", "5C" or "6C" throw operation
(3) "A" for 115 Vac, "D" for 28 Vdc or "H" for 12 Vdc.
(4) "I" for indicators if desired.
(5) "L" for latching cutthroat if desired
(6) "TL" for TTL Driver if desired
(7) "26" for the 26.5GHz option "40" for the 40GHz option

Example: SR-6C-D-I-L is a remote, 6 position, 28 Vdc; with indicators, latching cutthroat switch.

Outline Drawing



Tolerances unless otherwise specified are: .xx, ± .02; .xxx, ± .005.

MODEL NO.	A
SR-•C-D	1.58
SR-•C-D-I	2.25
SR-•C-D-L	3.73
SR-•C-D-I-L	4.00
SR-•C-D-TL	2.25
SR-•C-D-I-TL	2.25
SR-•C-D-L-TL	4.40
SR-•C-D-I-L-TL	4.40
SR-•C-H same as SR-•C-D	

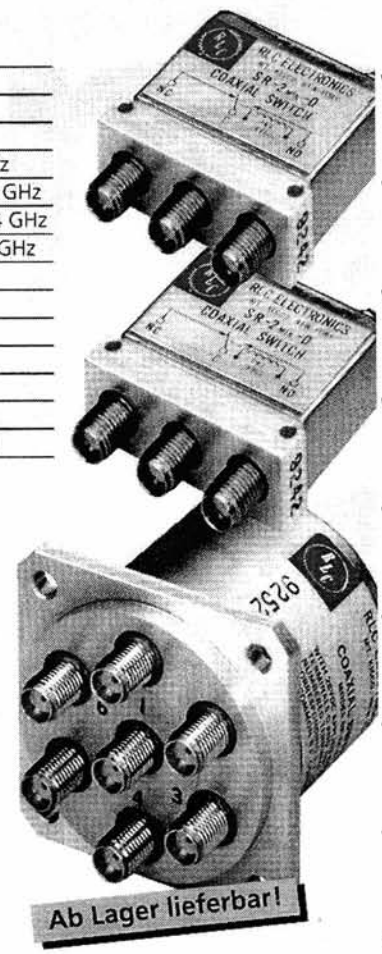
RLC ELECTRONICS, INC.
83 Radio Circle, Mount Kisco, New York 10549 • Telephone: 914-241-1334 • Fax: 914-241-1753
e-mail: sales@rlcelectronics.com • www.rlcelectronics.com

2-weg-Relais (SPDT)

Modell	SR-2MIN-D	SR-2MIN-H	STR-2-D	SR-2-N-D	SR-2-N-H
Konfiguration	2-weg	2-weg	2-weg m. Termin.	2-weg	2-weg
Schalterart	failsafe	failsafe	failsafe	failsafe	failsafe
Frequenzbereich	DC–18 GHz	DC–18 GHz	DC–18 GHz	DC–12,4 GHz	DC–12,4 GHz
Isolation	60 dB / 18 GHz	60 dB / 18 GHz	60 dB / 18 GHz	60 dB / 12,4 GHz	60 dB / 12,4 GHz
Einfügungsdämp.	0,3 dB / 18 GHz	0,3 dB / 18 GHz	0,3 dB / 18 GHz	0,6 dB / 12,4 GHz	0,6 dB / 12,4 GHz
VSWR	1,5:1 / 18 GHz	1,5:1 / 18 GHz	1,5:1 / 18 GHz	1,6:1 / 12,4 GHz	1,6:1 / 12,4 GHz
Impedanz	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω
HF-Belastbarkeit*	150 W CW	150 W CW	2 W CW	350 W CW	350 W CW
HF-Anschlüsse	SMA weibl.	SMA weibl.	SMA weibl.	N weibl.	N weibl.
Steuerspannung	28 V DC	12 V DC	28 V DC	28 V DC	12 V DC
Artikel-Nr.	27/10	27/11	27/3	27/281	27/191
Stückpreis (D) **	US$ 112,00	US$ 112,00	DM 675,00	DM 319,00	DM 319,00
Stückpreis (CH) ***	US$ 129,00	US$ 129,00	CHF 641,50	CHF 303,50	CHF 303,50

Mehrwege- und Transferrelais

Modell	SR-6C-D	SR-6C-H	SR-T-N-D	SR-T-N-H
Konfiguration	6-weg (SP6T)	6-weg (SP6T)	Transfer (DPDT)	Transfer (DPDT)
Schalterart	failsafe	failsafe	failsafe	failsafe
Frequenzbereich	DC–18 GHz	DC–18 GHz	DC–12,4 GHz	DC–12,4 GHz
Isolation	60 dB / 18 GHz	60 dB / 18 GHz	55 dB / 12,4 GHz	55 dB / 12,4 GHz
Einfügungsdämp.	0,5 dB / 18 GHz	0,5 dB / 18 GHz	0,6 dB / 12,4 GHz	0,6 dB / 12,4 GHz
VSWR	1,5:1 / 18 GHz	1,5:1 / 18 GHz	1,6:1 / 12,4 GHz	1,6 / 12,4 GHz
Impedanz	50 Ω	50 Ω	50 Ω	50 Ω
HF-Belastbarkeit*	150 W CW	150 W CW	350 W CW	350 W CW
HF-Anschlüsse	SMA weiblich	SMA weiblich	N weiblich	N weiblich
Steuerspannung	28 V DC	12 V DC	28 V DC	12 V DC
Artikel-Nr.	27/6	27/18	27/289	27/421
Stückpreis (D) **	US$ 364,00	US$ 364,00	US$ 539,00	DM 655,00
Stückpreis (CH) ***	US$ 419,00	US$ 419,00	US$ 620,00	CHF 622,50



* Bei 1 GHz, leistungslos geschaltet (+25 °C, bei Seehöhe, an 50 Ω)
** Ab Donauwörth, Preise solange Vorrat reicht, zzgl. gesetzl. MWSt., bei 1–9 Stück, unverpackt
*** Ab Ellighausen, Preise solange Vorrat reicht, zzgl. gesetzl. MWSt., bei 1–9 Stück, verpackt

= neue Modelle

www.telemeter.de/go/RLC

Hotline 09 06/7 06 93-55 Kennziffer 1308

TYPE D3: SPDT up to 22 GHz

Standard Connectors:

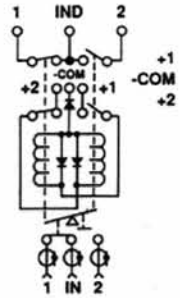
SMA

Specifications:

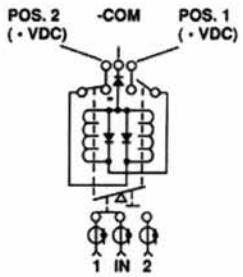
Operating Frequency	DC-3GHz	3-8GHz	8-12.4GHz	12.4-18GHz	18-22GHz
V.S.W.R. (maximum)	1.15:1	1.3:1	1.4:1	1.5:1	1.6:1
Insertion loss (max.)	0.2 dB	0.3 dB	0.4 dB	0.5dB	0.6 dB
Isolation (minimum)	80 dB	70 dB	60 dB	60 dB	60 dB
Actuating voltage	24-30 Vdc (28 Vdc nominal)				
Actuating current	140 milliamps maximum at 28 Vdc and 72°				
Impedance	50 ohms				
Switching Time	15 milliseconds maximum				
R.F. Power	See Power Chart Page 12				
Operating Mode	Failsafe				
Operating Temp.	-35°C to +85°C				
Operating Life	1,000,000 cycles minimum				
Environmental	Designed to meet MIL-E-5400 and MIL-S-3928				
Finish	Switch	Aluminum, electroless nickel plated per MIL-C-26074			
	Connector Contact	Beryllium copper, gold plated per MIL-G-45204			
	Cover	Aluminum, Black			

SCHEMATICS

Latching

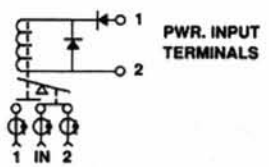


Latching with indicator circuitry, self de-energizing circuitry and suppression diodes.

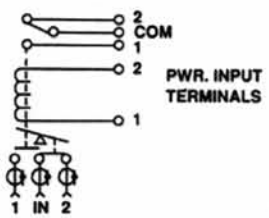


Latching with self de-energizing circuitry and suppression diodes.

Failsafe



Failsafe with suppression diodes



Failsafe, SPDT indicating circuitry

26655 W. AGOURA RD. • CALABASAS, CA 91302-1921 • Tel. 818-880-6100 • FAX 818-880-5941

DYNATECH MICROWAVE TECHNOLOGY, INC.

ORDERING INFORMATION

HOW TO ORDER:

Dynatech Microwave Technology's standard options allow customers to specify switches to their own hardware requirements. For example, D1-413C38T is a SPDT switch with SMA connectors, solder terminals, 28 Vdc, latching, DC to 18 GHz, polarity: common plus and external terminations in each positon.

D1-413C38T

SERIES:

R.F. CONNECTORS

- **1** N
- **2** BNC
- **3** TNC
- **4** SMA
- **5** SC
- **6** APC 3.5
- **7** Other (Specify)
- **8** Quick Disconnect
- **9** K

POWER TERMINALS

- **0** None
- **1** Solder
- **2** Pygmy, Bendix Type or Equivalent
- **3** Other (Specify)

VOLTAGE

- **1** 6 Vdc + 10%
- **2** 12 Vdc + 10%
- **3** 24 to 30 Vdc
- **4** 48 Vdc + 10%
- **5** 110 Vac + 10%
- **6** 12-15 Vdc
- **7** 18-20 Vdc
- **8** 20-24 Vdc
- **9** Other (Specify)

SPECIAL OPTIONS

- **1** Bracket
- **F** Flange
- **LL** Low Logic
- **L** Logic Driver (High)
- **M** Manual Override
- **P** High Power Handling
- **R** Reset (Latching Only
- **T** Termination, (50Ω)

POLARITY

- **0** Not Applicable
- **8** Common Plus (+)
- **9** Common Minus (-)

FREQUENCY RANGE

- **1** DC TO 3 GHz
- **2** DC to 12.4 GHz
- **3** DC to 18 GHz
- **4** Other (Specify)
- **5** DC to 22 GHz
- **6** DC to 26.5 GHz
- **7** DC to 40 GHz

CIRCUIT OPTIONS

- **A** Failsafe
- **B** Failsafe, SPDT indicating circuitry
- ***C** Latching
- ***D** Latching with self de-energizing circuitry, and suppression diodes
- ***E** Latching with SPDT indicator circuitry, self de-energizing circuitry, and suppression diodes
- ***F** Latching with SPDT indicating circuitry
- ***G** Normally open with indicator circuitry and suppression diodes
- **H** Normally open with indicator circuitry
- ***J** Normally open with suppression diodes
- **K** Normally open
- **M** Failsafe with suppression diodes
- **N** Normally open with failsafe to Pos. 1
- **P** Manual
- **Q** Failsafe, SPDT indicating circuitry and suppression diodes
- ***R** Normally open with failsafe to Pos. 1 and suppression diodes
- ***S** Normally open with failsafe to Pos. 1, suppression diodes and indicator circuitry
- **X** Other (specify)

***must specify polarity, i.e., common (-) or (+)**

NOTE: Polarity not applicable on switches with logic.

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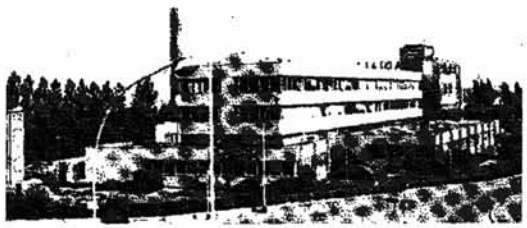
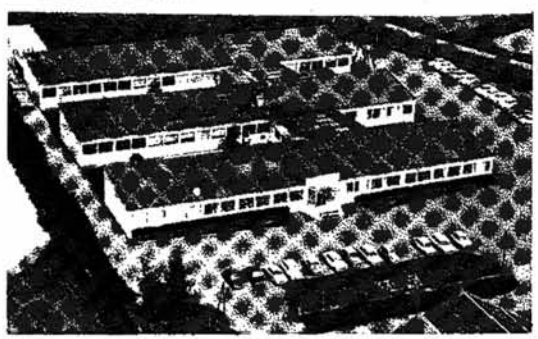


VOIRON

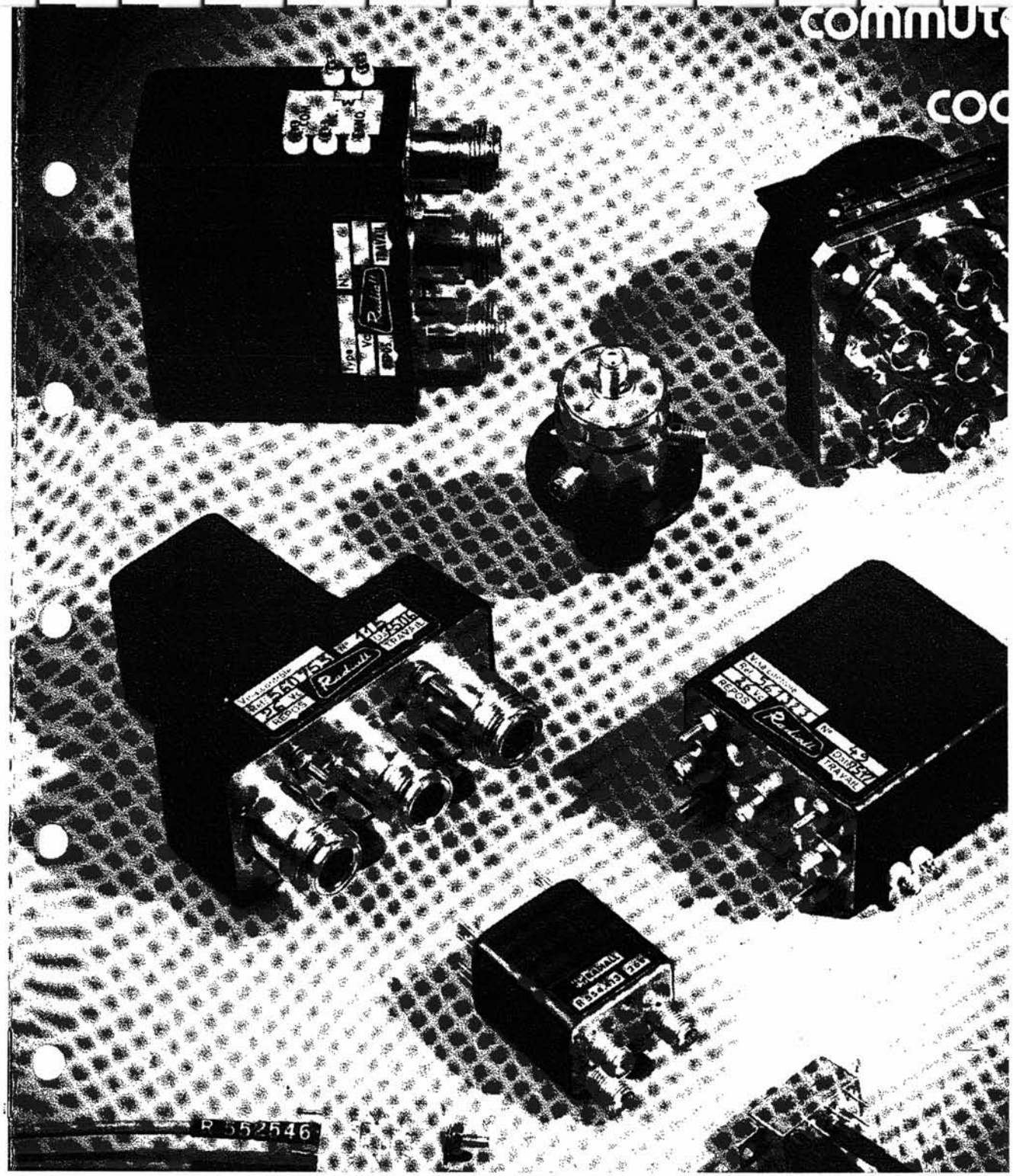
CHATEAU-RENAULT



ADIALL G.m.b.H.
1 - Postfach 2206
DEUTSCHLAND
l. : 06103/ * 1027
: 417955 RADIA

OMPONENTS Ltd
seway - STAINES
esex - ENGLAND
: STAINES 59991
Tlx : 934 853

RADIALL
ibert Hoffmann



TYPE	COMMANDE	TAILLE	CONNECTEURS
SPDT	ELECTRIQUE	Quartz	
		1/2 Quartz	
		Miniature	RIM (SMA)
			SUBVIS (SMC)
			SUBCLIC (SMB)
			RIM (SMA)
		Standard	N - C - HN - BNC - TNC
			mQ - RIM (SMA)
			SUBVIS (SMC)
			SUBCLIC (SMB)
			N 75 Ω - BNC 75 Ω
			N BNC SUBCLIC (SMB)
			N 75 Ω - BNC 75 Ω
	MANUEL	Standard	N - C - BNC - TNC - mQ
			SUBVIS (SMC)
			SUBCLIC (SMB)
			RIM (SMA)
			N 75 Ω - BNC 75 Ω
DPDT	ELECTRIQUE	Standard	N - BNC
SP 3 T - SP 4 T SP 6 T - SP 12 T	MANUEL	Standard	N - BNC TNC - mQ
SP 3 T - SP 6 T	MANUEL	Miniature	RIM (SMA)
SP 3 T - SP 4 T SP 6 T - SP 12 T	ELECTRIQUE	Standard	N - BNC TNC - mQ

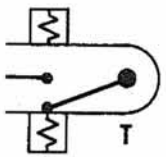
présentés dans ce
milles de fonctions

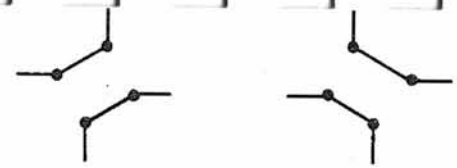
: ou SPDT (une

utation d'une ligne
hoisie parmi deux.

l'est pas commuté,

nmuté peut être,
, en circuit ouvert





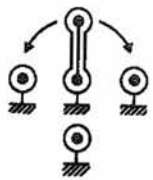
Ces relais assurent la permutation de connexion de quatre lignes coaxiales deux à deux.

Ils permettent par exemple l'insertion de quadripoles dans une ligne coaxiale, ou la permutation de deux émetteurs sur deux antennes.

Dans ce type de relais, seul le conducteur central est commuté. Le conducteur extérieur est commun aux quatre lignes et sa conception permet d'assurer la conservation des impédances caractéristiques.

- COMMUTATEURS 3, 4, 6 ou 12 POSITIONS

Ils assurent la connexion d'une ligne coaxiale avec l'une des 3, 4, 6 ou 12 autres lignes. (Le conducteur de masse n'est pas commuté, seul le conducteur intérieur l'est). Les lignes non connectées restent en circuit ouvert.



MODES DE COMMANDE

Les accessoires de commutation précédents peuvent être commandés manuellement ou électriquement. Seul le dernier mode appelle queiques précisions :

- ALIMENTATION

Les valeurs indiquées sont les valeurs nominales.

nominale.

- RELAIS ELECTROMAGNETIQUES :

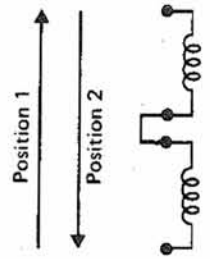
Selon les types, les relais sont présentés en deux versions : monostables ou bistables.

Moteurs monostables :

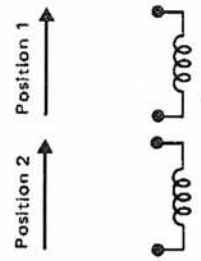
La position travail n'est maintenue que pendant l'impulsion de commande. En l'absence de tension de commande, le relais reprend toujours sa position initiale appelée position repos.

Moteurs bistables :

Les deux positions sont stables, en l'absence de tension de commande. Le changement de position peut être obtenu de deux façons différentes :



Inversion de tension sur une même bobine



Alimentation des deux bobines différentes

L'avantage essentiel de ce type de moteur réside dans le fait qu'il peut rester indifféremment alimenté ou non, sans que la position des contacts coaxiaux en soit modifiée. Il permet d'intéressantes réductions de consommation d'énergie.

- COMMUTATEURS ELECTRIQUES :

Ils sont commandés par un système pas à pas. Un positionnement très précis est assuré par un indexage mécanique. Les recommandations de branchement sont indiquées dans les pages correspondantes. Après que le sélecteur ait atteint la position choisie, l'ali-

CONDITIONS D'

Sauf indications co
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conditions les plus s

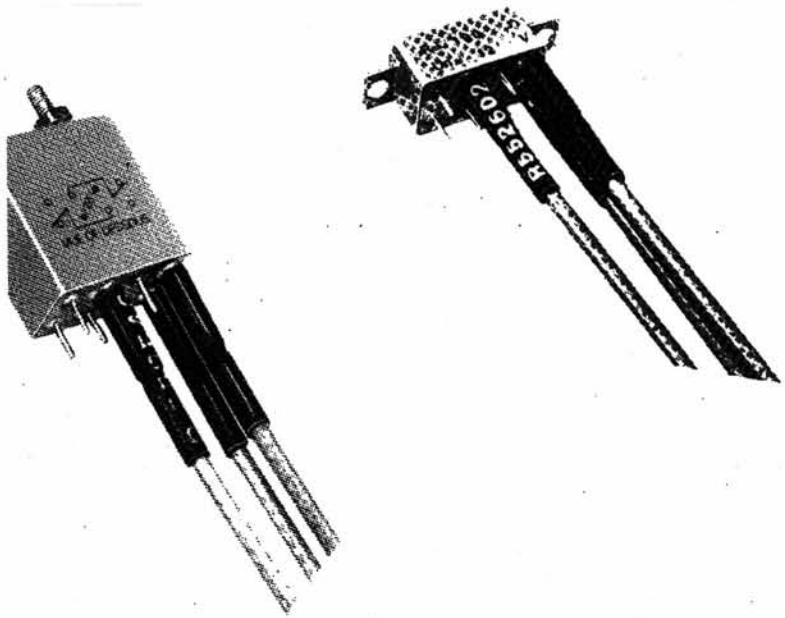
MATERIAUX et

Sauf indications cc
coaxial :

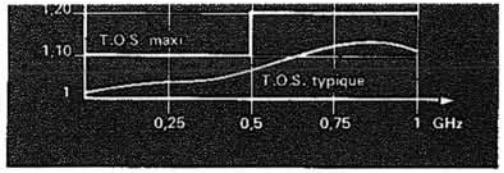
- Pièces élastiques
- Contacts électriqu
- Autres pièces mé
- Isolant

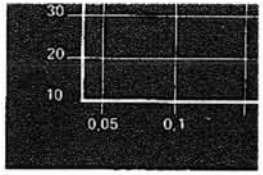
Protection :

- Modèles BNC - T
  RiM
- mΩ



ance caractéristique	:	50 Ω
ence d'utilisation	:	0 à 1 000 MHz
nce HF admissible	:	60 W à 10 MHz - 20 W à 1 GHz
d'insertion (câble compris)	:	⩽ 0,3 dB de 0 à 500 MHz ⩽ 0,5 dB de 500 à 1000 MHz
n d'alimentation	:	12 - 26 V continu
mmation	:	taille Quartz : 170 mW taille 1/2 Quartz : 0,8 mW
ance de contact	:	75 mΩ sans câble
n de tenue au sol	:	500 V. eff. - 50 Hz
ance d'isolement sous 500 Vcc		⩾ 100 MΩ
ir de coupure	:	2 A continu sur circuit résistif
de réponse établissement	:	6 ms (travail et repos)
ions : suivant NF - C - 20 616 sévérité 2000 Hz - 10 g : câbles coaxiaux bridés à n maxi. de la platine		
	:	suivant NF - C 20 608 sévérité 50 g câbles coaxiaux bridés à 30 mm maxi de la platine
ance de fonctionnement	:	100 000 manoeuvres mini.
érature d'utilisation	:	− 55 +100° C
coaxiaux 50 Ω	:	KX 22A ou RG 316/U (autres câbles par exemple 75 Ω : nous consulter)



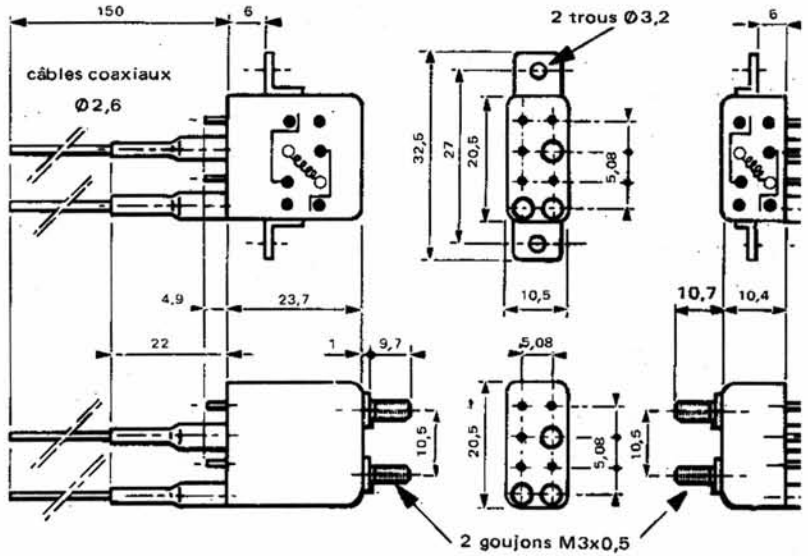


TAILLE QUARTZ

TAI

FIXATION par EQUERRES

FIXATION par GOUJONS



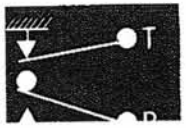
Taille	QUARTZ		1/2 QUAR	
Fixation	équerres	goujons	équerres	
12 V	R. 552 502	R. 552 522	R. 552 602	R
26 V	R. 552 503	R. 552 523	R. 552 603	R

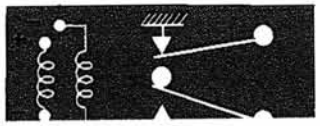
ont une fonction d'inverseurs simples. Ils sont équipés de 3 connecteurs miniat et présentent un encombrement très réduit. Ils existent en version monostable ions de contacts auxiliaires sont en développement.

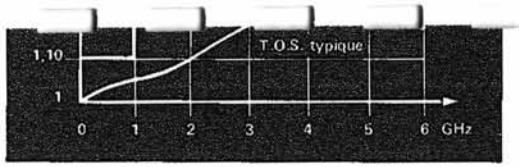
tion	:	inverseur simple
ecteurs coaxiaux	:	RiM femelle (MIL - C - 39 012 - SMA)
dance caractéristique	:	50 Ω
uence d'utilisation	:	0 - 6 GHz
s	:	⩽ 0,2 dB à 2 GHz
		⩽ 0,3 dB à 6 GHz
tance de contact	:	< 50 mΩ
ion d'alimentation	:	6 - 12 - 26 - 48 V continu
ommation	:	environ 2 W pour monostable et 4 W pour bistable
de moteur	:	Monostable ou Bistable
entation par bornes soudables		
tance d'isolement sous 500 Vcc		
bobine et masse	:	> 1 000 MΩ
voie HF et masse	:	> 1 000 MΩ
ion de tenue au sol		
bobine et masse	:	500 V. eff. - 50 Hz
voie HF et masse	:	750 V. eff. - 50 Hz
rance de fonctionnement	:	200 000 manoeuvres
s de réponse	:	< 20 ms
itions	:	conformes à NFC20616 Sévérité : 2000 Hz - 10 g
s	:	conformes à NFC20608 Sévérité : 30 g
pérature d'utilisation	:	− 40° C +85° C
truction	:	Etanche

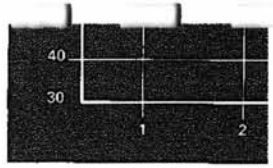
nes d'alimentation. Ce schéma lorsque le relais est sur la voie nuter sur la voie travail (T), ivant la polarité indiquée. La e est mise à la masse.

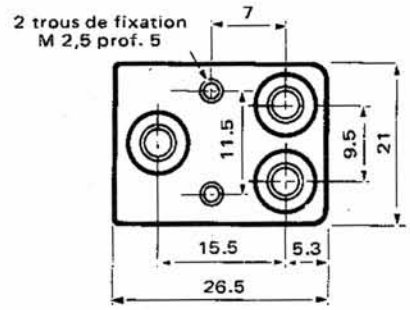
Vue extérieure côté bornes d'alimentation. Ce schéma représente la position des contacts lorsqu'une bobine est alimentée suivant la polarité indiquée. Pour commuter, inverser la polarité sur l'une des bobines. La voie coax non commutée est mise à la masse. Le relais pourra rester alimenté en permanence à condition que les 2 bobines soient montées en série, sinon le relais devra être utilisé avec un facteur de fonctionnement de 0,5.

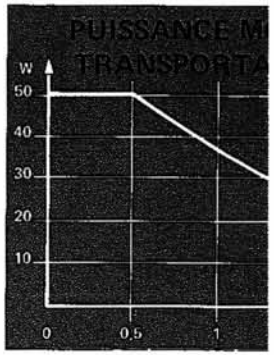




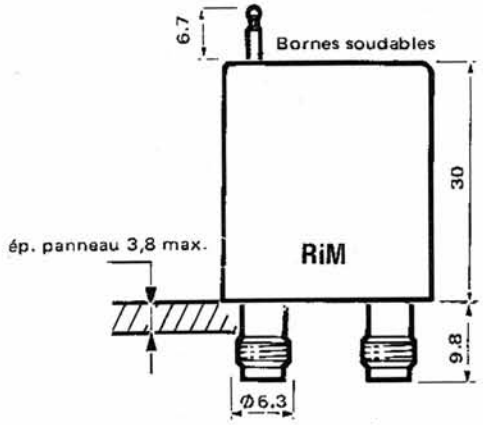


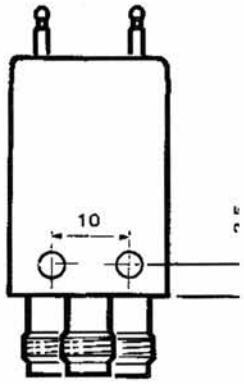






MONOSTABLE

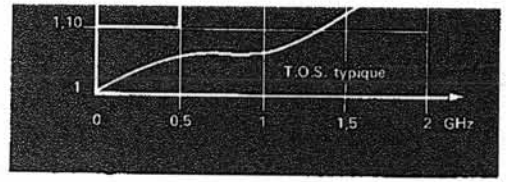


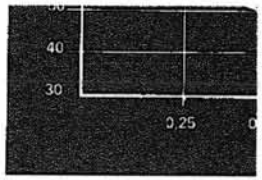


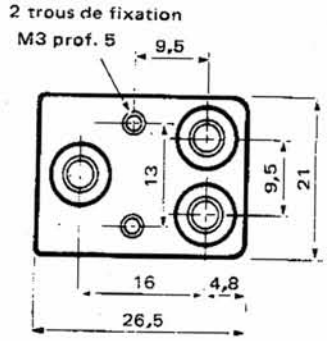
MONOSTABLE		BISTABLE	
Tension	Code	Tension	Code
6 V	R 554 411	6 V	R 554 4
12 V	R 554 412	12 V	R 554 4
26 V	R 554 413	26 V	R 554 4
48 V	R 554 414	48 V	R 554 4

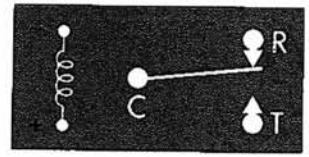
ont une fonction d'inverseurs simples. Ils sont équipés de 3 connecteurs minia-
un encombrement très réduit. Ils sont équipés d'un moteur monostable. Cette
ble avec l'ancienne série mH.

ance caractéristique	:	50 Ω
ence d'utilisation	:	0 - 2 GHz
d'insertion	:	< 0,2 dB
nce HF moyenne trans-	:	40 W à 500 MHz
le à 25° C		25 W à 1 GHz
		15 W à 2 GHz
rature d'utilisation	:	– 20 +70° C
ance de fonctionnement	:	100 000 manoeuvres
tation	:	par bornes soudables
n d'alimentation	:	6 - 12 - 26 - 48 V continu









Vue ext
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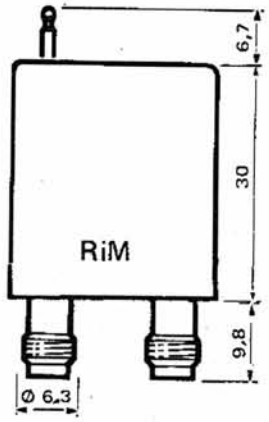
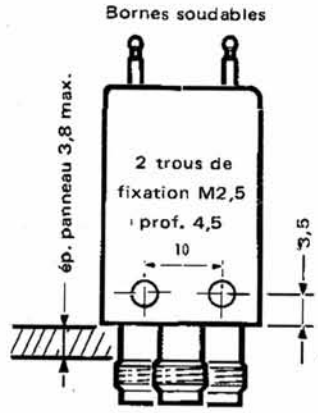
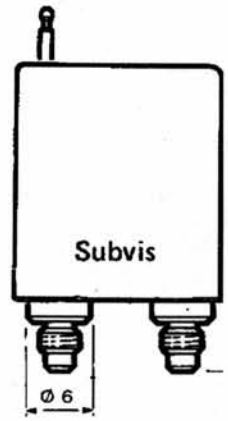
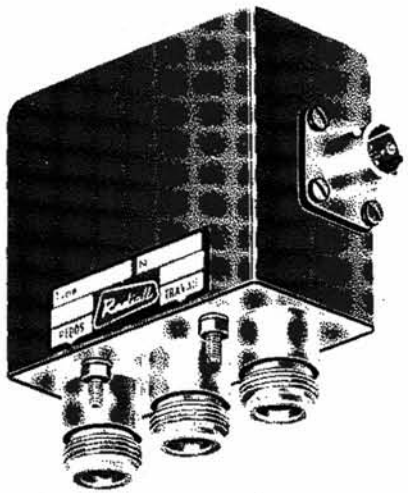
Pour co
alimente
indiquée







Tension	SUBVIS (SMC)	SUBCLIC (SMB)	RI
6 V	R 553 051	R 553 251	R 5
12 V	R 553 052	R 553 252	R 5
26 V	R 553 053	R 553 253	R 5
48 V	R 553 054	R 553 254	R 5



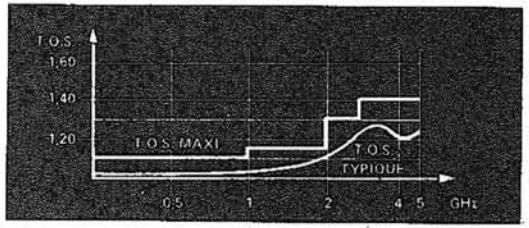
onction d'inverseurs coaxiaux. Ils sont équipés de 3 connecteurs qui s'accou-
e leur série correspondante.
ditions climatiques et mécaniques les plus sévères et peuvent être utilisés sur
portés. (Norme AIR Catégorie III C).

rature d'utilisation	:	− 40 +85° C
r humide	:	95 % HR à 55° C
ression	:	85 mb = 64 mm Hg = 17 000 m
ions dans les 3 axes	:	10 - 55 Hz - 1,5 mm d'amplitude 55 - 500 Hz - 10 g
	:	30 g - 11 ms
ance de fonctionnement	:	500 000 manoeuvres

TATION : par bornes soudables ou par embase multibroche (NF - C 93 422 E 301 B - brochage 8 - 3A - P) *

n d'alimentation	:	6 - 12 - 26 - 48 - 120 V continu
nmation	:	2 W
n de tenue au sol entre bobine e	:	1 500 V eff. - 50 Hz
nce d'isolement entre bobine e sous 500 Vcc	:	> 100 MΩ
de réponse sous tension nominale	:	établissement travail ⩽ 20 ms établissement repos ⩽ 12 ms

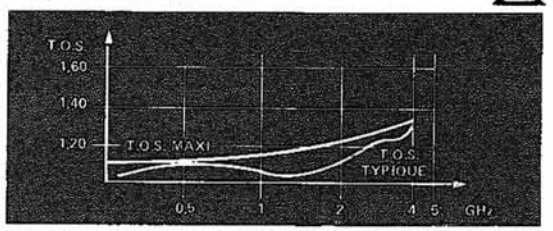
Puissance HF transportable à 200 MHz	500 W	500 W	500 W	80 W
Tension de tenue au sol - 50 Hz entre sortie HF utilisée et masse	1500 V eff.	1500 V eff.	1500 V eff.	1000 V eff.
Résistance d'isolement mini entre voies HF et masse sous 500 V. CC	100 MΩ	100 MΩ	100 MΩ	100 MΩ

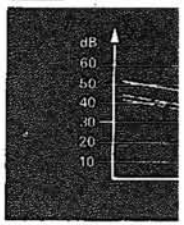


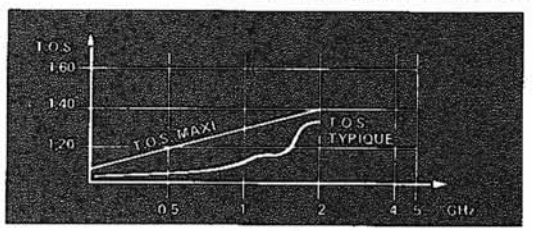
▷ T.O.S. N

T.O.S. C △

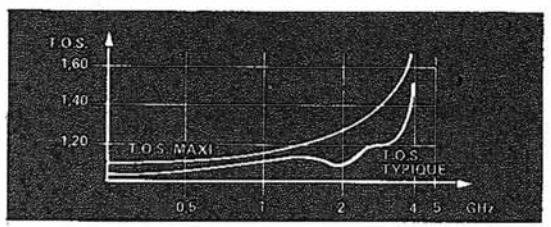
AFFAIBLIS
N - C - HN

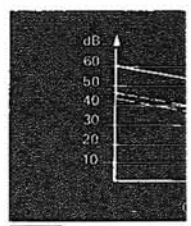






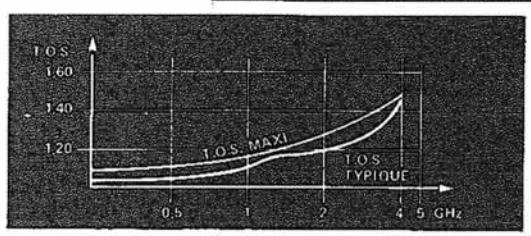
▷ T.O.S. HN



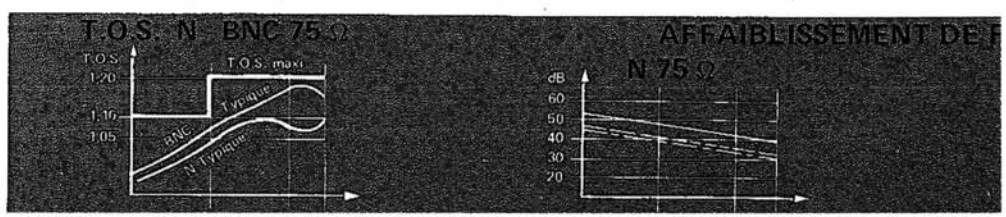


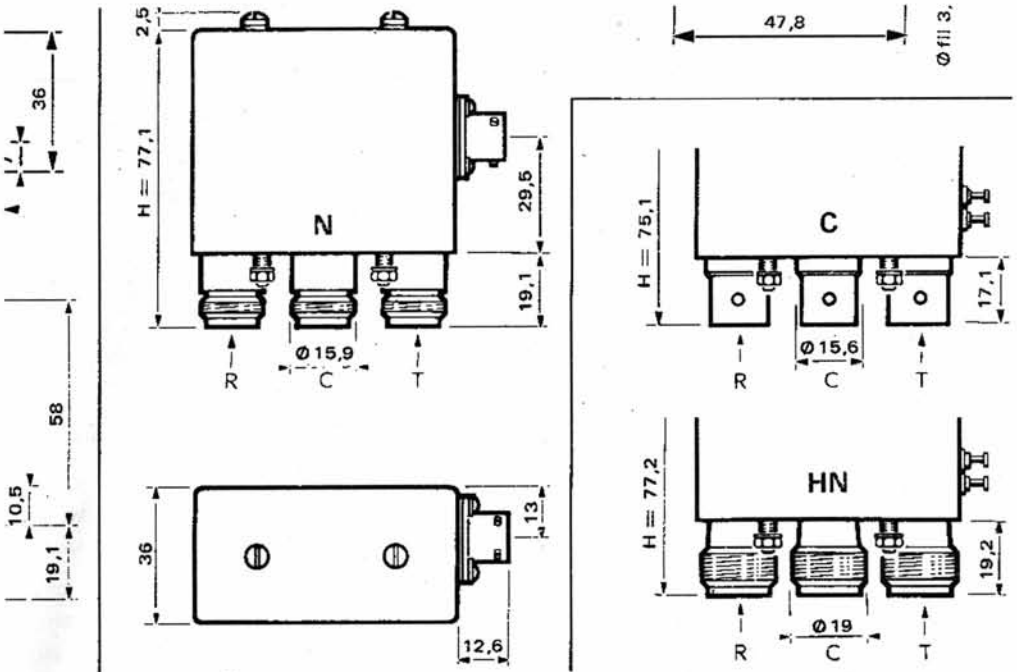
▽ T.O.S. BNC-TNC-mQ

▽ AFFAIBLIS
BNC-TNC-m



▷ T.O.S. RiM-Subvis-Subclic





Le dernier chiffre du N° de Code est caractéristique de la tension d'alimentation de
léter ce N° de Code en remplaçant ● par le chiffre 1, 2, 3, 4 ou 5 suivant tableau :

nsion	6 V	12 V	26 V	48 V	120 V
●	1	2	3	4	5

Poids g	CODE sans contact de masse Fig. 1	CODE avec contact de masse Fig. 2	CODE avec charge 1/4 W Fig. 3
290	R 562 70 ●	R 562 71 ●	R 562 72 ●
275	R 562 80 ●	R 562 81 ●	R 562 82 ●
290	R 562 90 ●	R 562 91 ●	
280	R 562 60 ●	R 562 61 ●	R 562 62 ●
300	R 562 73 ●	R 562 74 ●	R 562 75 ●
285	R 562 83 ●	R 562 84 ●	R 562 85 ●
290	R 562 93 ●	R 562 94 ●	

FIGURE 1

REPOS 1 - 2 TRAVAIL 3 - 2

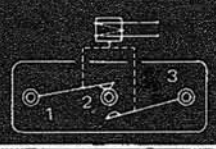


FIGURE 2

REPOS 1 - 2 (3-masse) TRAVAIL 3 - 2 (1-masse)

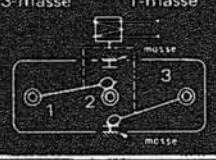
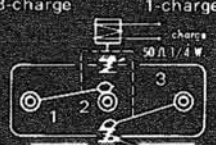


FIGURE 3

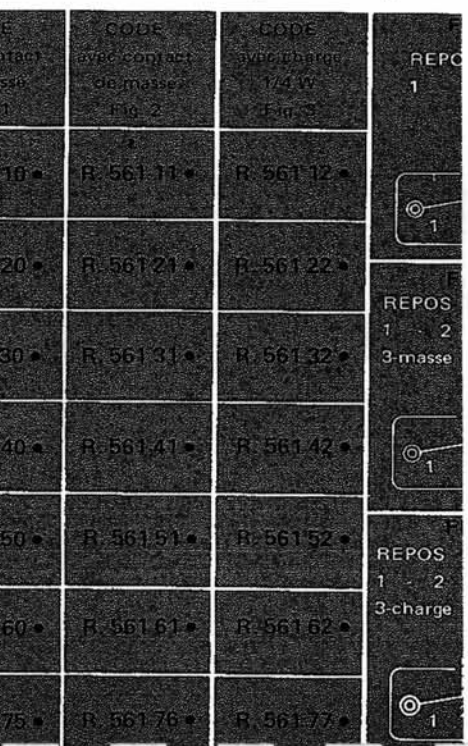
REPOS 1 - 2 (3-charge) TRAVAIL 3 - 2 (1-charge)

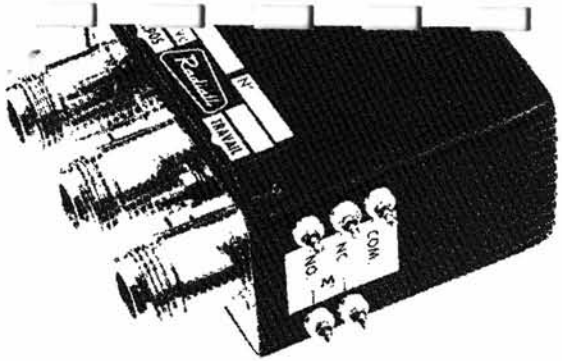


ATTENTION : Le dernier chiffre du N° de Code est caractéristique de la tensio
la bobine, compléter ce N° de Code en remplaçant ● par le chiffre 1, 2, 3, 4 ou

Tension	6 V	12 V	26 V	48 V
●	1	2	3	4

Connecteurs coaxiaux	Poids g	CODE sans contact de masse Fig. 1	CODE avec contact de masse Fig. 2	CODE avec charge 1/4 W Fig. 3
SUHR	180	R 561 10 ●	R 561 11 ●	R 561 12 ●
SUHR LC	180	R 561 20 ●	R 561 21 ●	R 561 22 ●
BNC	180	R 561 30 ●	R 561 31 ●	R 561 32 ●
BNC	185	R 561 40 ●	R 561 41 ●	R 561 42 ●
TNC	185	R 561 50 ●	R 561 51 ●	R 561 52 ●
mΩ	190	R 561 60 ●	R 561 61 ●	R 561 62 ●
BNC 75 Ω	185	R 561 75 ●	R 561 76 ●	R 561 77 ●





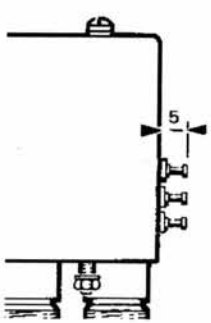
de la série CM alimentés par bornes soudables sont équipables de contacts verseur (SPDT). Les contacts auxiliaires sont assurés par un interrupteur à lame magnétique (ampoule reed).

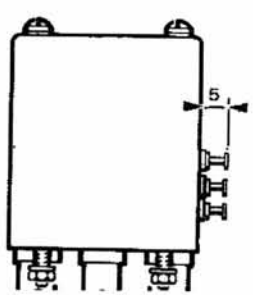
nce de coupure en c.c. sur

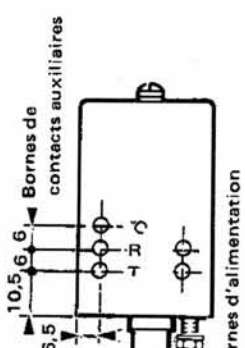
: résistant	:	3 W
ɜ intensité	:	0,25 A
ɜ tension	:	48 V
ance de contact initial	:	200 mΩ
ance d'isolement	:	1 000 MΩ
ɔn de claquage en c.c.	:	250 V

ntation et sortis par bornes soudables

:er le suffixe 120 au numéro de code du modèle standard
ɔle : **R. 562 703 120**
Relais CM/N 50Ω/26 V/ contacts auxiliaires







ornes d'alimentation

Ces relais ont une fonction d'inverseurs coaxiaux. Ils sont équipés de 3 connecteurs coaxia leur série correspondante. Ils peuvent être utilisés sur du matériel terrestre fixe, semi-fi

- Température d'utilisation : − 25 + 70°C
- Endurance de fonctionnement : 250.000 manœuvres

L'alimentation se fait par cosses à souder

- Tension d'alimentation : 6 - 12 - 26 - 48 - 120 V cor
- Consommation : 2 W
- Rigidité diélectrique entre bobine et masse : 1 500 V. eff. 50 Hz
- Isolement entre bobine et masse sous 500 V. CC : > 100 MΩ
- Temps de réponse sous tension nominale établissement travail ≤ 2
  établissement repos ≤

	N			BNC SUBCLI		
Impédance caractéristique Fréquence d'utilisation T.O.S. de 0 à 0,5 GHz 0,5 à 1,5 GHz 1,5 à F (max)	50 Ω 0 - 5 GHz < 1,15 < 1,25 < 1,40			50 Ω 0 - 4 GHz < 1,15 < 1,25 < 1,60		
	sans contact de masse	avec contact de masse	sans flasque (50 Ω)	sans contact de masse	avec contact de masse	sans
Affaiblissement à 0,5 GHz de réjection à 1,5 GHz à 4,0 GHz	36 26 18	43 33 25	34 24 16	37 27 19	50 40 32	
Puissance HF transportable à 0,2 GHz Résistance d'isolement entre voies HF et masse sous 500 V CC Tension de tenue au sol entre voies HF	400 W 1 500 V. eff.			60 W 1 000 V. eff.		

	≤ 1,40			≤ 1,50					
	sans contact de masse	avec contact de masse	avec charge 50 Ω	sans contact de masse	avec contact de masse	avec charge 50 Ω	sans contact de masse	avec contact de masse	avec charge 75 Ω
	36 26 18	43 33 25	34 24 16	37 27 19	50 40 32	33 23 15	37 27	48 38	35 25
	400 W 1 500 V. eff. > 100 MΩ			60 W 1 000 V. eff. > 100 MΩ			N 75 Ω 400 W 1 500 V. eff. > 100 MΩ		BNC 75 Ω 60 W 1 000 V. eff. > 100 MΩ

CODE sans contact de masse Fig. 1	CODE avec contact de masse Fig. 2	CODE avec charge 1/4 W Fig. 3
R. 558 700	R. 558 710	R. 558 720
R. 558 800	R. 558 810	R. 558 820
R. 557 400	R. 557 410	R. 557 420
R. 557 500	R. 557 510	R. 557 520
R. 557 600	R. 557 610	R. 557 620
R. 557 200	R. 557 210	R. 557 220
R. 557 100	R. 557 110	R. 557 120
R. 557 300	R. 557 310	R. 557 320
R. 558 730 R. 557 401	R. 558 740 R. 557 411	R. 558 750 R. 557 421

FIGURE 1

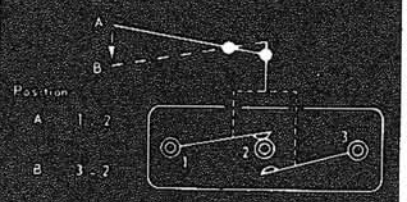


FIGURE 2

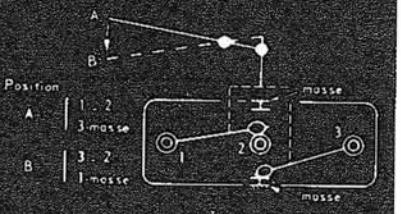
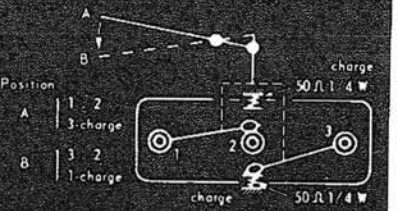
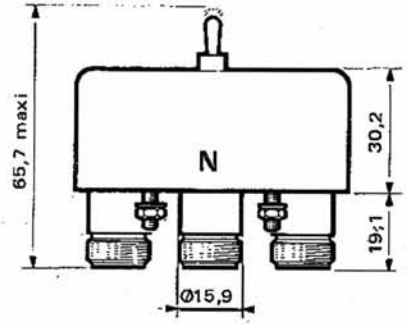
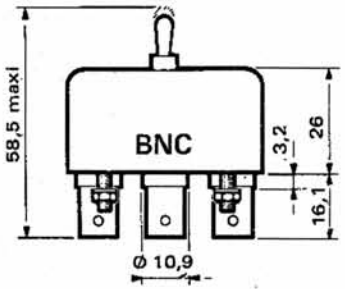
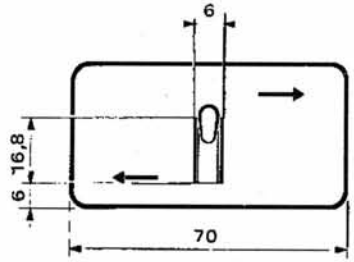


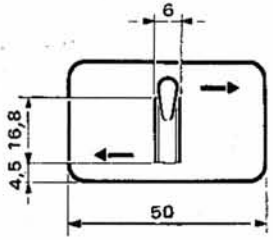
FIGURE 3

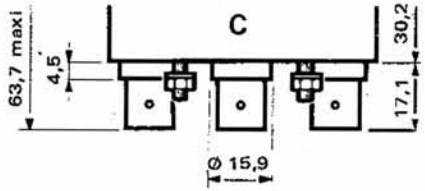


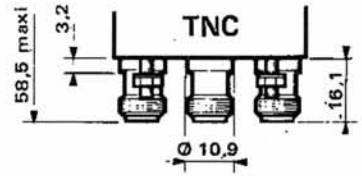


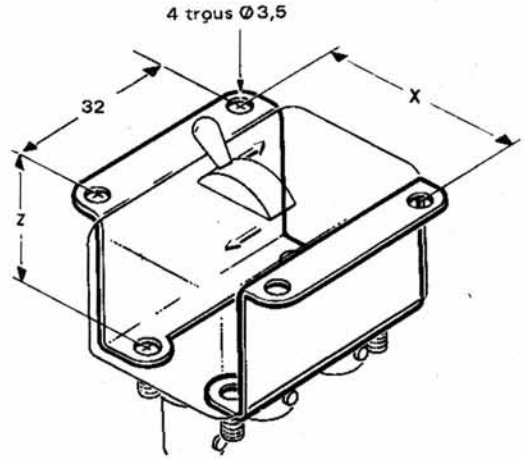


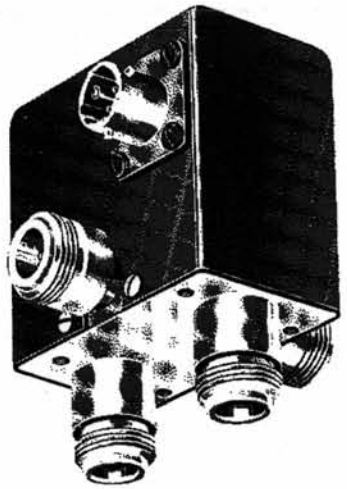










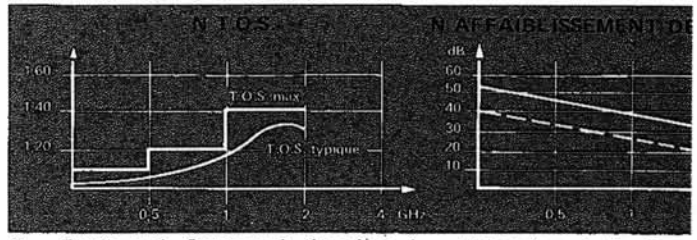


2 entrées et 2 sorties qui s'inversent lorsqu'on alimente la bobine. Ils résistent aux
es et mécaniques les plus sévères et peuvent être utilisée sur du matériel aéro-
Catégorie III C).

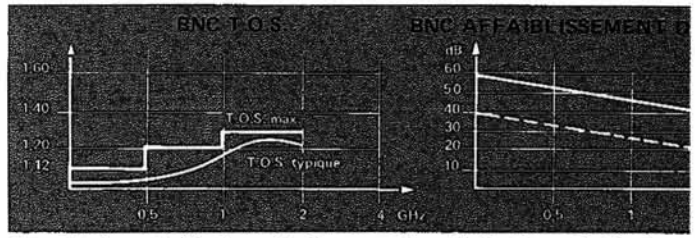
érature d'utilisation	:	− 40 +85° C
ur humide	:	95 % HR à 55° C
pression	:	85 mb = 64 mm Hg = 17 000 m
ions dans les 3 axes	:	10 - 55g 1,5 mm d'amplitude
		55 - 500 Hz 10 g
	:	30 g - 11 ms
ance au fonctionnement	:	100 000 manoeuvres
ntation : modèle BNC	:	par bornes soudables
modèle N	:	par embase multibroche(NF - C 93 422 modèle HE 301 B - brochage 8 - 3A - P) *
n d'alimentation	:	6 - 12 - 26 - 48 - 120 V continu
mmation	:	3 W
n de tenue au sol entre		
et masse	:	1 500 V eff. - 50 Hz
ance d'isolement entre		
et masse sous 500 V cc	:	> 100 MΩ

de réponse décollage repos < 10 ms décollage travail < 2 ms

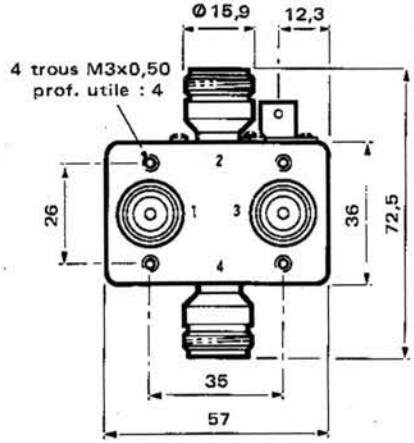
Puissance HF transportable à 200 MHz		500 W
Tension de tenue au sol - 50 Hz	entre voies HF	1 300 V eff.
	entre voies HF et masse	
Résistance d'isolement sous 500 Vcc	entre voies HF	> 100 MΩ
	entre voies HF et masse	

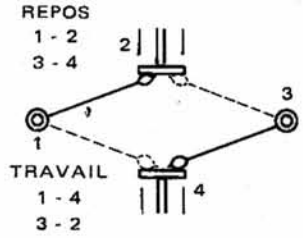


2 Entrée en 1 - Sortie en 2 - Charge en 4 1 Entrée en 1 - Sortie en



2 Entrée en 1 - Sortie en 2 - Charge en 4 1 Entrée en 1 - Sortie en



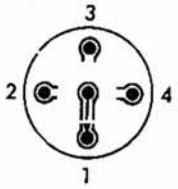


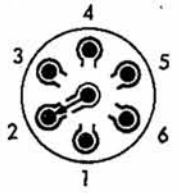
N		BNC	
CODE	Alimentation	CODE	Alimentation
R. 563 701	6 V	R. 563 401	6 V
R. 563 702	12 V	R. 563 402	12 V
R. 563 703	26 V	R. 563 403	26 V
R. 563 704	48 V	R. 563 404	48 V
R. 563 705	120 V	R. 563 405	120 V
Poids	275 g	Poids	165 g

n seul circuit coaxial possèdent toutes les prises disposées axialement sur une
ıodèles 12 positions qui ont 6 sorties axiales et 6 sorties radiales.

ıture d'utilisation : − 40 + 85°C
ıce : 100 000 positions minimum
le 100 000 positions, nous conseillons de nous retourner le commutateur
évision d'entretien.

POSITIONS **6 POSITIONS** **12 POSITIONS**



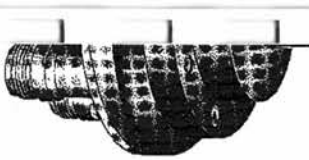


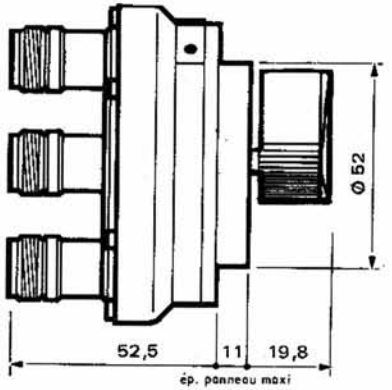
N femelle

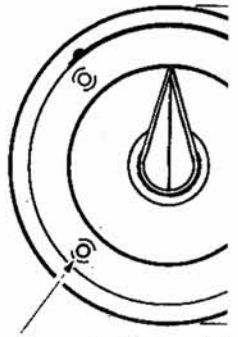
	50 Ω		
	de 0 à 1 GHz	de 1 à 3,5 GHz	de 3,5 à 6,5 GHz
	< 1,10 > 70 dB < 0,1 dB	< 1,25 > 60 dB < 0,2 dB	< 1,50 > 50 dB < 0,3 dB
	1 kW à 200 MHz 5 kW maxi	conditions atmosphériques normales	

BNC - TNC - mQ femelle

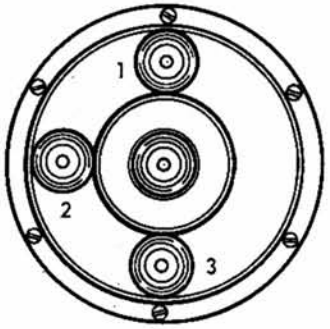
	50 Ω		
	de 0 à 1 GHz	de 1 à 4 GHz	de 4 à 8 GHz
	< 1,10 > 70 dB < 0,1 dB	< 1,25 > 60 dB < 0,2 dB	< 1,60 > 50 dB < 0,3dB
	500 W à 200 MHz	conditions atmosphériques normales	





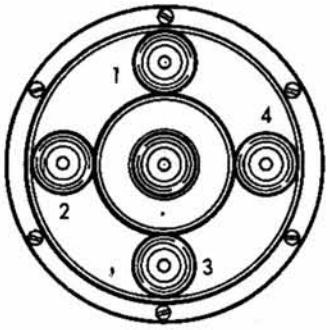


3 positions

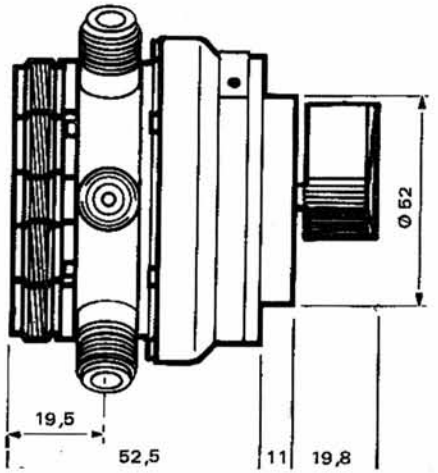


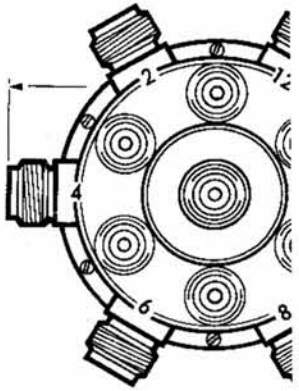
R. 582 703

4 positions



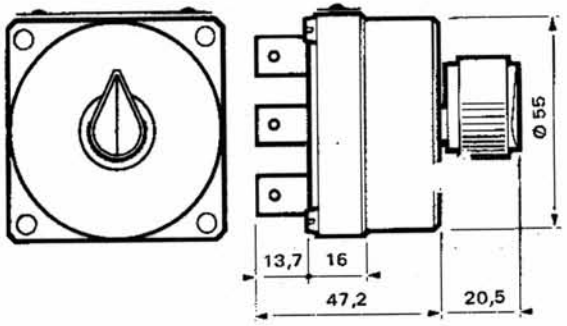
R. 582 704

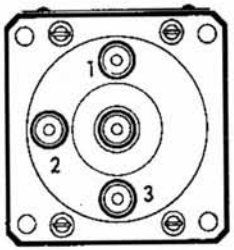




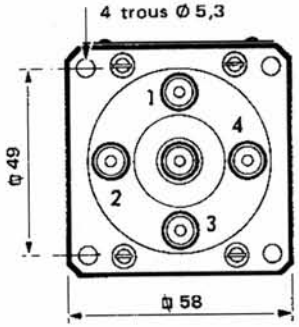
12 positions

BNC

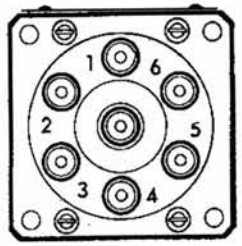




3 positions

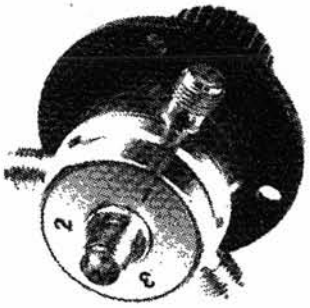


4 positions



6 positions

Connecteurs	3 Positions CODE	4 Positions CODE	6 Positions CODE	12 Positions CODE
N	R. 582 703	R. 582 704	R. 582 706	R. 582 708
BNC	R. 581 403	R. 581 404	R. 581 406	
TNC	R. 581 503	R. 581 504	R. 581 506	
mQ	R. 581 603	R. 581 604	R. 581 606	



Ces commutateurs fonctionnent jusqu'à 12,4 GHz.

Ils se composent d'un seul circuit coaxial comprenant une entrée et

- Connecteurs coaxiaux : RiM femelle (MIL
- Endurance de fonctionnement : 100 000 position
- Température de fonctionnement : − 40 + 85°C
- Impédance caractéristique : 50 Ω
- Fréquence d'utilisation : 0 - 12,4 GHz

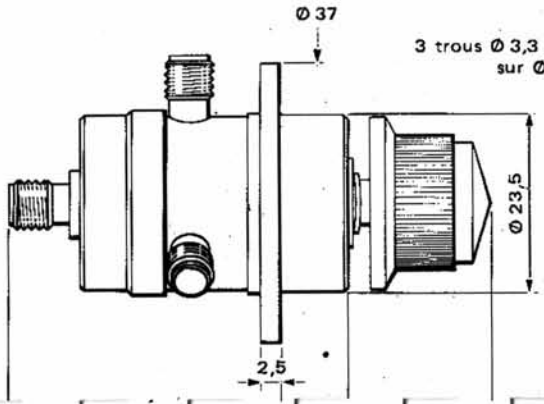
	de 0 à 1 GHz	de 1 à 4 GHz	de 4 à 12,4 GHz
T.O.S.	< 1,10	< 1,20	< 1,40
Affaiblissement de réjection	> 60 dB	> 60 dB	> 50 dB
Perte d'insertion	< 0,1 dB	< 0,2 dB	< 0,4 dB
Puissance HF transportable	50 W	25 W	15 W
Puissance crête	2 kW		

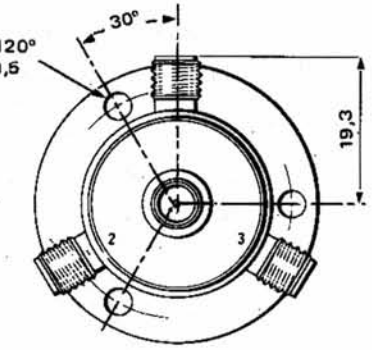
SCH

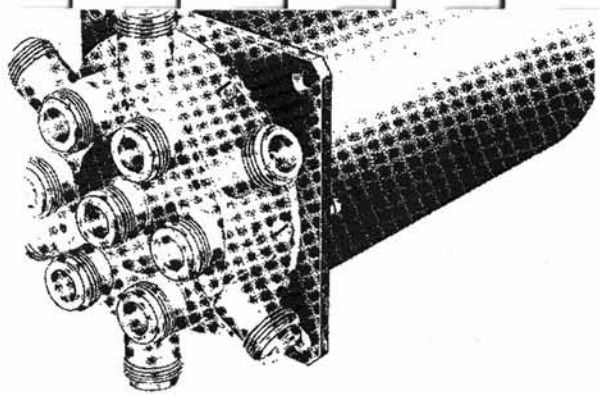
3 POS

3 positions

R. 576 303



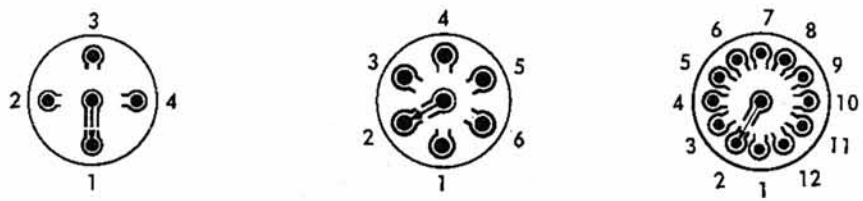


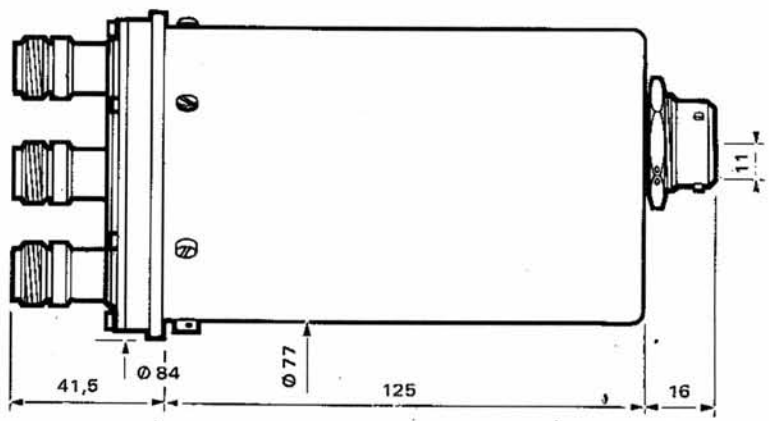


un seul circuit coaxial possèdent toutes les prises disposées axialement sur une
odèles 12 positions, qui ont 6 sorties axiales et 6 sorties radiales.

rature d'utilisation : − 40 + 85°C
ince : 100 000 positions minimum
positions, nous conseillons de nous retourner le commutateur pour une révision

'OSITIONS 6 POSITIONS 12 POSITIONS





N femelle

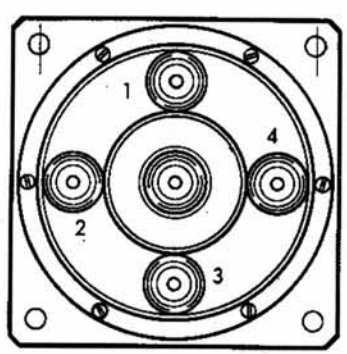
	50 Ω		
	de 0 à 1 GHz	de 1 à 3,5 GHz	de 3,5 à 6,5 GHz
	< 1,10 > 70 dB < 0,1 dB	< 1,20 > 60 dB < 0,2 dB	< 1,50 > 50 dB < 0,3 dB
	1 kW à 200 MHz 5 kW max	conditions atmosphériques normales	

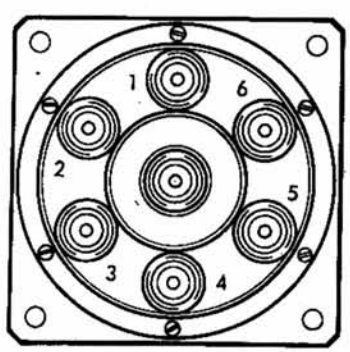
4 positions
R. 582 754

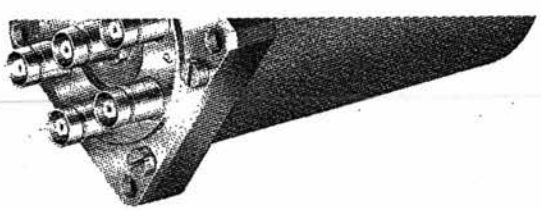
6 positions
R. 582 756

BNC-TNC-mΩ femelle

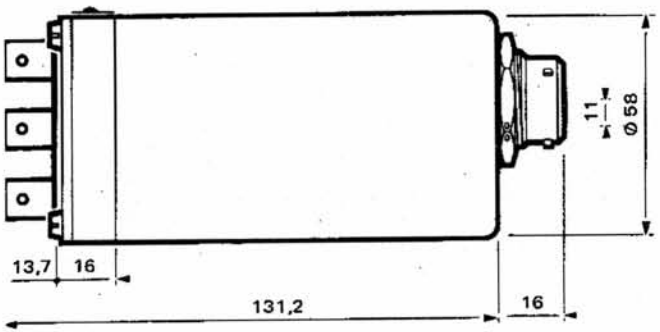
	50 Ω		
	de 0 à 1 GHz	de 1 à 4 GHz	de 4 à 8 GHz
	< 1,10 > 70 dB < 0,1 dB	< 1,25 > 60 dB < 0,2 dB	< 1,50 > 50 dB < 0,3 dB
	500 W à 200 MHz 1 kW max	conditions atmosphériques normales	



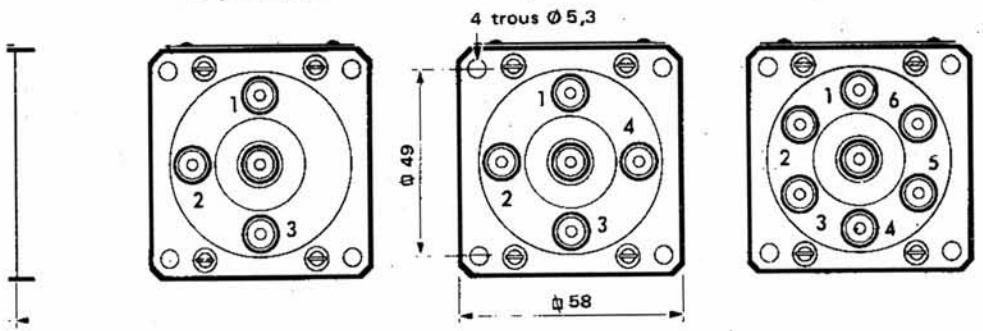


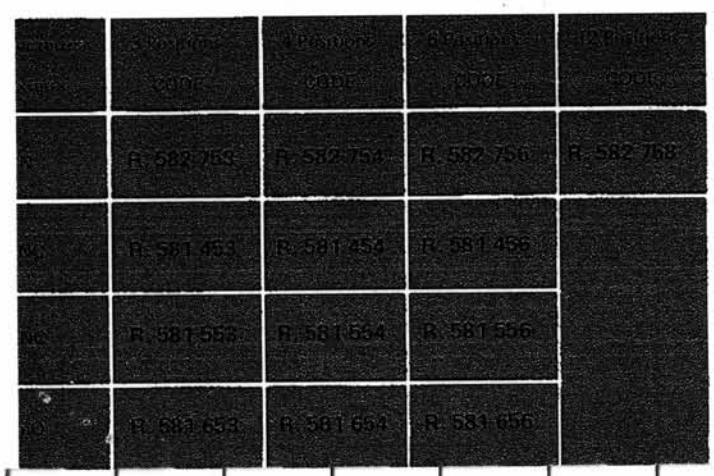


BNC



3 positions **4 positions** **6 positions**





- Consommation : 3 A sous 24 V pendant le temps de commutation.
- Temps de commutation maxi :

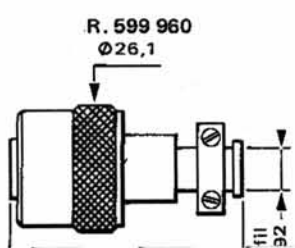
3 positions	:	180 millisecondes/position
4 positions	:	180 millisecondes/position
6 positions	:	120 millisecondes/position
12 positions	:	60 millisecondes/position

- Le moteur tourne toujours dans le sens des numéros de sorties croissants.
- Cadence de fonctionnement maximum :
  - 0,5 position/seconde pour le 3 et 4 position
  - 1 position/seconde pour le 6 position
  - 2 position/seconde pour le 12 position
- Pouvoir de coupure du cricuit de contrôle : 1 A/150 V sur circuit résistif.

BRANCHEMENT

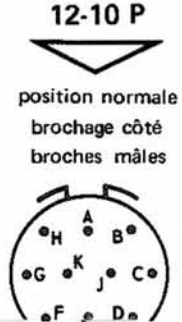
L'alimentation se fait par une embase multibroche située à l'arrière du commutateur. Cette embase est conforme :
- à la norme française - NF - C - 93 422 modèle HE 301 B (ancienne norme AIR - Pr. L. 54 125) ou norme US - MIL - C 26 482.

3 POSITIONS



12-10 P

position normale
brochage côté
broches mâles



3	Position
4 - 6	Position
12	Position

Brochage de l'embas
12 - 10 P pou
14 - 19 P pou
18 - 32 P pou

Le branchement do
au type de commuta
La commande réali
procédés. L'intensit
sera d'au moins 3 a

1er procédé :

par contacteur à to
fois *fil est indispen*

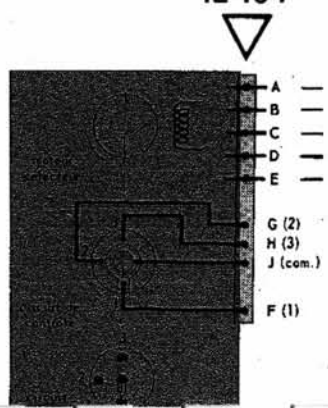
2ème procédé :

par bouton poussoi
circuit fermé au r
(440 ms maxi). U
poussoir branché su
où le moteur est arrê

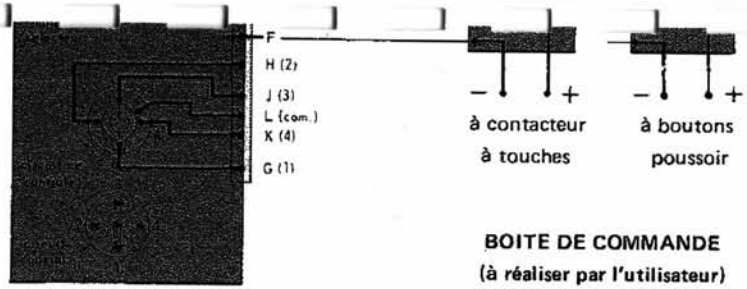
Nous co

Alimentation : cour
sous 24 V.

12-10 P



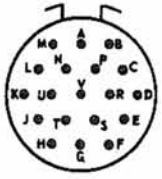
brochage côté
broches mâles

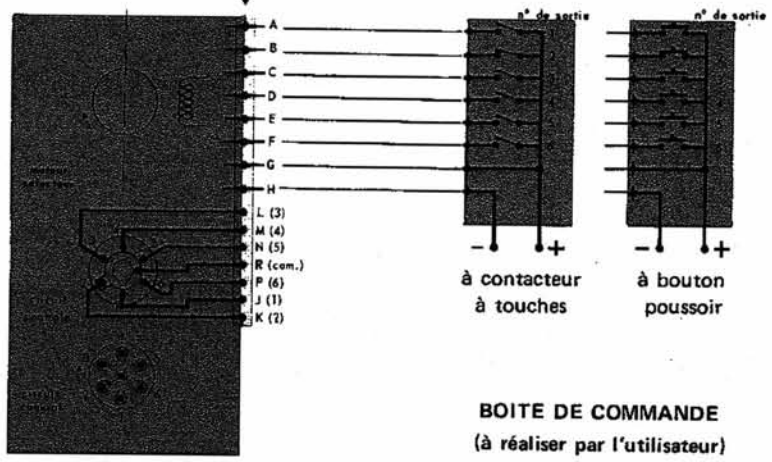


BOITE DE COMMANDE
(à réaliser par l'utilisateur)

14-19 P

position normale
brochage côté
broches mâles

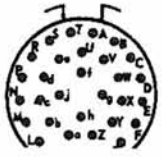


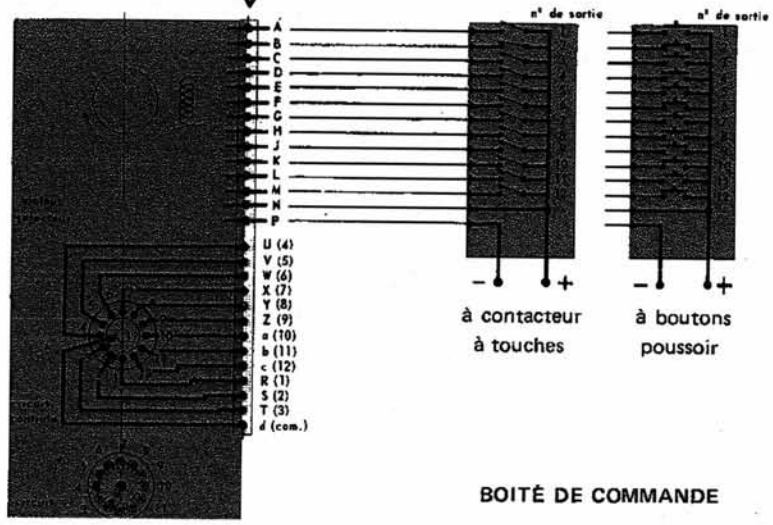


BOITE DE COMMANDE
(à réaliser par l'utilisateur)

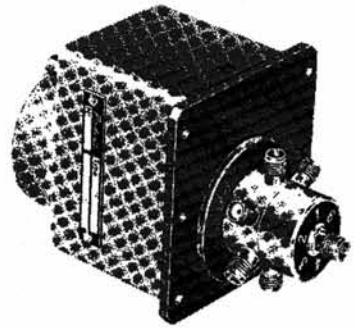
18-32 P

position normale
brochage côté
broches mâles





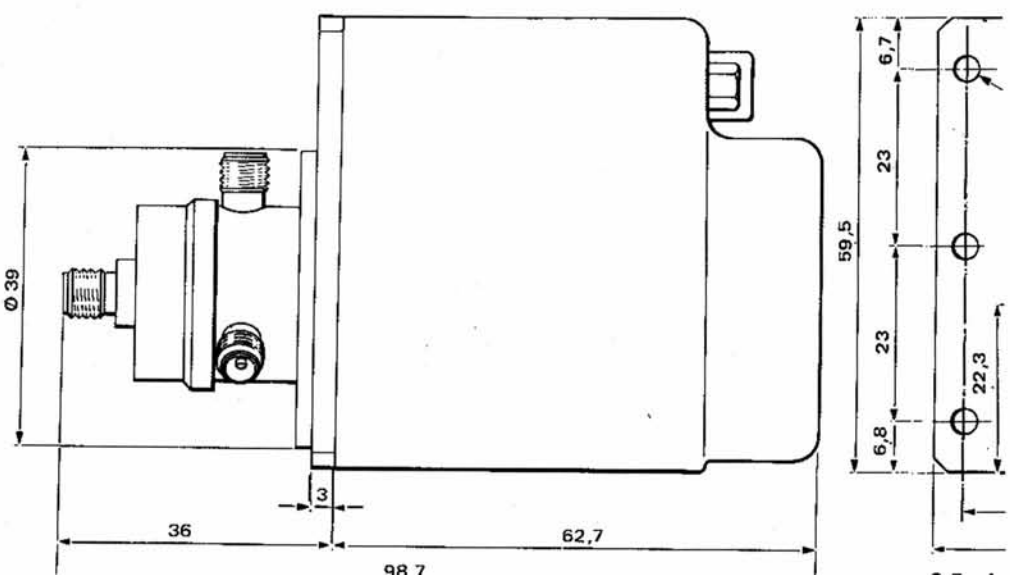
BOITE DE COMMANDE



Ces commutateurs coaxiaux fonctionnant jusqu'à 12,4 GHz, sont actuellem
existants. Ils se composent d'un seul circuit comprenant une entrée et 3 ou 6 s

- Connecteurs coaxiaux : RiM femelle (MIL - C - :
- Endurance de fonctionnement : 100 000 positions minir
- Température de fonctionnement : – 40 +85° C
- Impédance caractéristique : 50 Ω
- Fréquence d'utilisation : 0 - 12,4 GHz

	de 0 à 1 GHz	de 1 à 4 GHz	d
T.O.S.	≤ 1,10	≤ 1,20	
Affaiblissement de réjection	> 60 dB	> 60 dB	
Pertes d'insertion	< 0,1 dB	< 0,2 dB	
Puissance HF transportable	50 W	25 W	
Puissance crête	2 kW		



limentation de voyants,

à 30 V continu
sous 24 V pendant le
de commutation

position
position
sorties pour passer d'une

ns des numéros de sorties

:
sition
sition
'A
ax. (circuit purement ré-

eur Subminiature rectan-
teur. Ce connecteur est
cteurs « Subminiature »
uipée de contacts mâles).

ntacts femelles est livrée
câble sortie droite et ver-
ge correspondant, soit :

le schéma correspondant

r peut se faire par deux
boite de commande sera
temps de commutation.

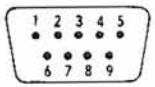
ure d'un seul circuit à la
u'un seul circuit fermé).

est nécessaire de laisser le
temps de commutation
ncorporé au bouton pous-
indique le moment où le

e 1er procédé.

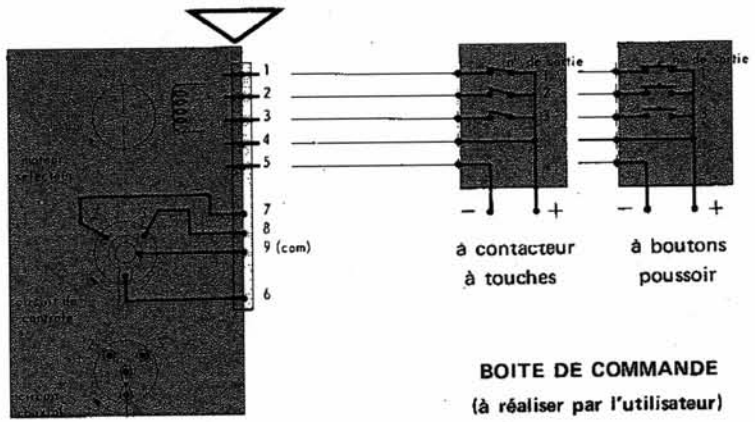
ommation 75 W environ

position normale



brochage vu côté broches mâles

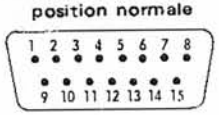
DE-9P



BOITE DE COMMANDE
(à réaliser par l'utilisateur)

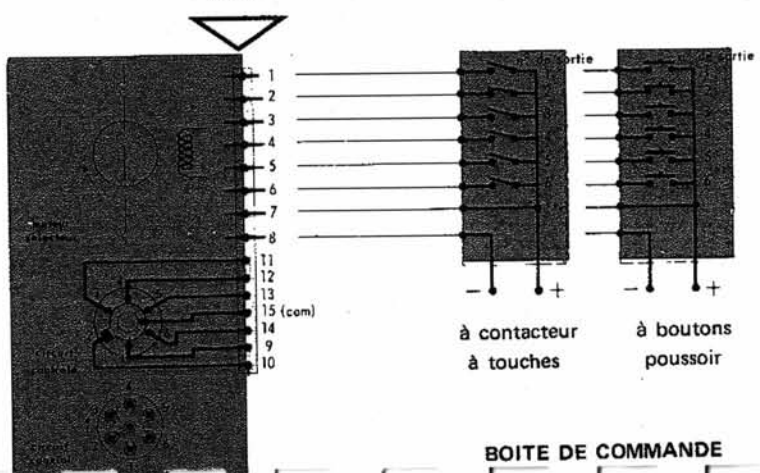
6 POSITIONS
CODE **R. 576 356**

position normale



brochage vu côté broches mâles

DA-15P



BOITE DE COMMANDE

BNC - TNC **mQ** **SubVIS - SubCLIC**	44	11,5	50	30	52

Ces inverseurs peuvent se fixer côté connecteurs coaxiaux de la même façon que les relais CP ou CM.

RELAIS COAXIAUX SERIES CP - CM

Modèles	Øa	X	Z	L	H
N - C	16,2	20	48	70	36
HN	19,5	26	48	70	36
BNC - TNC **mQ** **SubVIS - SubCLIC**	11,2	20	35	50	30

RELAIS MINIATURES

Modèles	A	B	C	Øa
RM	9,5	16	13	3,5
RD	7	15,5	11,5	3

RELAIS SUBMINIATURES SmH

Modèles	A	B	C	Ø D
Taille QUARTZ **Taille 1/2 QUARTZ**	27	21	11	3,2

RELAIS COAXIAUX SERIE D V

Modèles	Øa	X	Y	L	H
N	16,2	26	35	57	36
BNC	11,2	20	32	50	30

Table of Contents

DowKey Microwave Corporation 1667 Walter Street, Ventura, California 93003 (805) 650-0260 • FAX (805) 650-1734

Table of Contents

Established in 1945, DowKey became the largest producer of electro-mechanical switches when the company was acquired in 1996 by K&L Microwave/Transco under the umbrella of Dover Technologies, division of Dover Corporation with annual revenues in excess of 4 billion dollars.

The company offers switches in the three major markets - Commercial, Military, and Hi-Rel space. DowKey Microwave products are currently used in airborne, sea ground-based, military, missiles, and EW systems as well as commercial communication and instrumentation systems, medical equipment, cellular telephone, two-way paging systems, PCS, PCN, test equipment, commercial airlines and satellite applications.

Although the product specifications listed in the catalog are for commercial switches, Military specification and special environment products are available upon request. All of the switches are specifically designed to take the maximum advantage of standardized parts to minimize cost and delivery.

In the last decade, DowKey's market share has grown at a rapid pace. To meet the demands of a growing company, DowKey has assembled the most experienced management and engineering team in the industry - a team that offers innovative approaches to designs - a team that improves and brings new life to the product line.

These include:

- Broad selection of catalog RF and Microwave switches operating from DC to 18.5 GHz.
- Custom switches operating up to 26.5 GHz.
- Hi-Rel space qualified switches for military and commercial satellites.
- Complex devices using innovations that include other components to form switch matrixes, switch attenuators, IEEE 488 compatible components, and other unique design solutions to our customer's requirements are available.

A. DowKey Radial multithrow switches in SP3T - SP10T configurations controlled by TTL, or binary logic.
B. DowKey INTELLIGENT RELAY IN-LINE series of multithrow switches with binary logic inputs.

DowKey, located in Ventura, California - one hour north of the Los Angeles airport, is in the process of expanding its facility to 36,000 square feet. The current facility houses a certified clean room, environmental testing lab with both thermal and thermal shock capability, two 18 inch and one 24 inch diameter thermal vacuum chambers, and a computer controlled shock and vibration system (capable of up to 100g's).

DowKey has made a substantial commitment to quality by providing formal training in team work and quality awareness to every employee of the company.

The DowKey inspection system fully complies with MIL-I-45208. Qualification testing is performed to customer specific requirements including MIL-PRF-3928E. Solderers and soldering inspectors are certified to MIL-STD-2000A. The document change control system insures that product design, methods, and processes remain consistent with customer requirements. DowKey is currently pursuing ISO 9001 certification.

This catalog is intended to be used as a guide in selecting the proper type of switch or switching function for a given application and to identify product families we have delivered to make the system designer's life a little easier. It is important to note that DowKey Microwave does not limit itself to catalog products and will gladly entertain variations to the published specifications. We welcome requests regarding custom integrated components and switch function assemblies. Drawing on DowKey Microwave's technical expertise we can offer a cost effective approach for our customers.

DowKey Part Numbering System

X A B C - D E FG H I J

(X) RELAY FAMILY

- 2 Low Frequency
- 4/5 50 Ohm System
- 7 75 Ohm System

(A) CONFIGURATION

0	SPDT	A	SP10T
1	Transfer	B	SP11T
2	SPST	C	SP12T
3	SP3T	D	6P7T
4	SP4T		
5	SP5T		
6	SP6T		
7	SP7T		
8	SP8T		
9	SP9T		

(B) SIZE

- 1 Std. Case, normally SMA connectors (Radial)
- 2 Std. Case, normally N Connectors
- 3 Small Case, normally SMA (Multithrow)
- 4 Intermediate Cavity, SMA/TNC
- 5 Miniature Radial
- 6 Std. Case, normally N connectors (Radial)
- 9 Microminiature Switch

(C) SPECIAL OPTIONS

A	High Power	K	26.5 GHz
B	Bypass (2-4)	L	Flange Mount Cavity
C	Special Mounting Bracket	M	Fast Switching
D	Bypass (1-2)	N	Remove STD Mounting Bracket
E	Bypass (3-4)	P	Power Connector
F	Bypass (1-3)	R	Reverse Polarity
G	Make Before Break		
H	HI-REL	S	Seal Epoxy, Sand & Dust
I	Seal, Immersion	T	-55°C to +85°C
J	"D" Type Connector		

(D) ACTUATOR COIL TYPE

- 1 Manual
- 2 Failsafe, Position 1
- 3 Pulse Latching
- 4 Latching, Self Cutoff
- 5 Normally Open
- 6 Failsafe, Suppression Diodes
- 7 Pulse Latching, Suppression Diodes
- 9 Normally Open, Suppression Diodes

(J) SPECIAL OPTIONS

- A TTL HI, Commercial (2.4 - 5.5 Vdc)
- B TTL HI, Military (2.4 - 5.5 Vdc)
- C MOSFET Driver, Pulse Latch
- E CMOS BCD Decoding Logic & MOSFET Driver, Commercial
- L TTL Logic Low, Commercial (0.0 - 0.8 Vdc)
- G Other Special Circuit

(I) TERMINATIONS

1	Short	5	50Ω, 5W
2	Open	6	50Ω, 10W
3	50 Ω	7	50Ω, Term, Port 1
4	75 Ω	8	50Ω, 2W External

(H) AUXILIARY/INDICATOR CONTACTS

- 0 None
- 2 Mechanical SPST
- 3 Mechanical SPDT
- 4 Mechanical DPDT

(FG) CONNECTORS

- 01 N
- 02 BNC
- 03 TNC
- 04 UHF
- 05 C
- 07 BMA (OSP)
- 08 SMA
- 09 3.5mm (SMA Interface)
- 14 TPS
- 19 Pins (PC Board Drop-in)
- 25 N, High Isolation (NC Port Only)
- 26 BNC, High Isolation (NC Port Only)
- 28 UHF, High Isolation (NC Port Only)
- 32 F (75 Ω)
- 44 BNC (75Ω)
- 51 HN
- 53 SC
- 72 F (75Ω) High Isolation (NC & NO Ports Only)

(E) ACTUATOR COIL VOLTAGE

0	Manual	5	110 Vdc
1	6 Vdc	6	110 Vac
2	12 Vdc	7	20 Vdc
3	28 Vdc	8	24 Vdc
4	48 Vdc	9	15 Vdc

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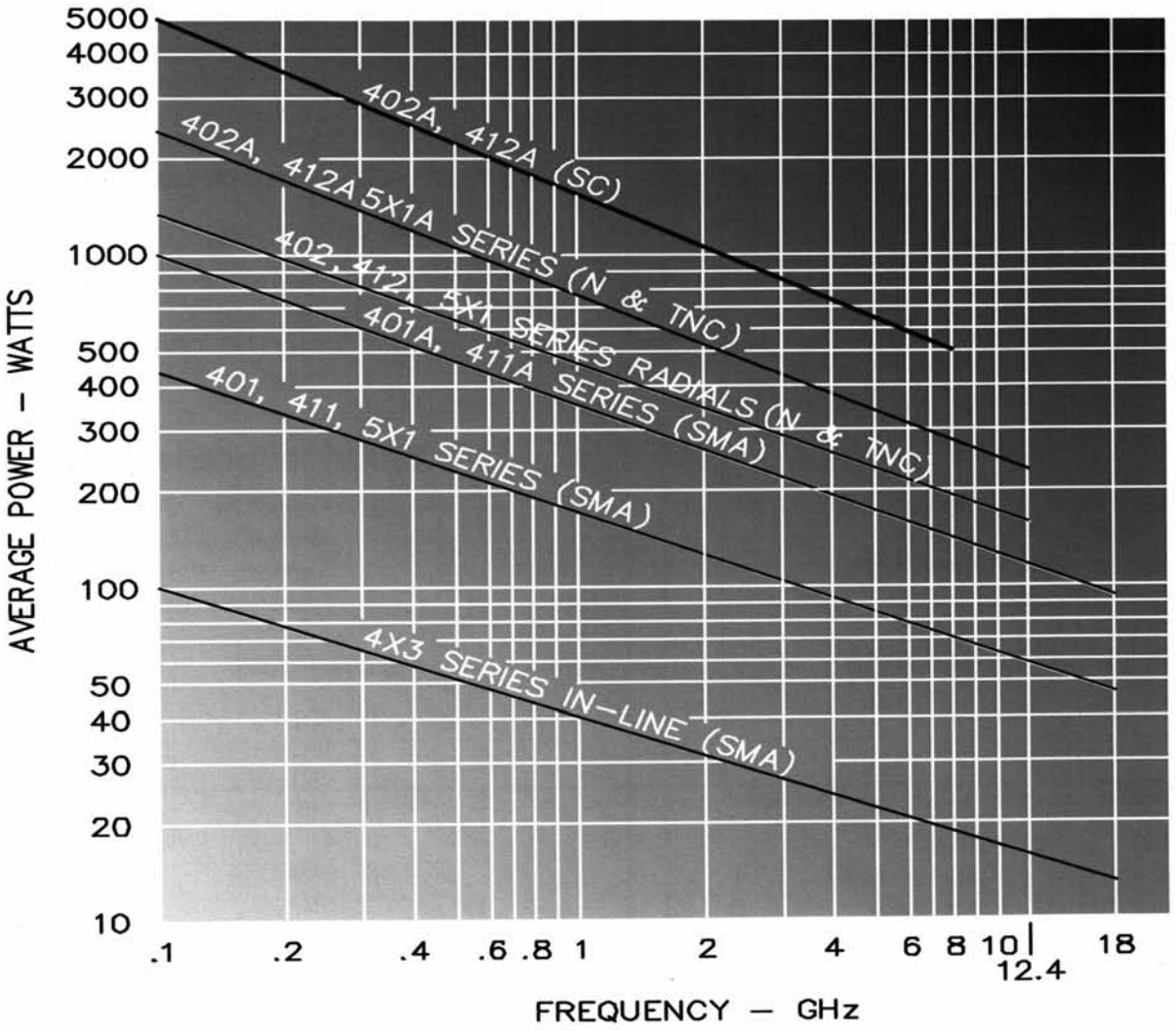
This chart is based on the following conditions:
Ambient Temperature= 40° C; Altitude= Sea Level; VSWR= 1.0:1; Non-switching
UHF connectors are not recommended for applications above 300MHz.
Please consult factory for additional information.



VSWR	Derating Factor	VSWR	Derating Factor
1.5:1	.96	3.5:1	.07
2.0:1	.88	4.0:1	.64
2.5:1	.84	4.5:1	.06
3.0:1	.75	5.0:1	.56

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Ordering Information

PACKAGING

All products shipped from the DowKey facility are packaged in accordance with best commercial practices unless otherwise specified in the contract or purchase order.

SHIPPING

Shipment by commercial air freight is recommended to ensure safe handling and prompt deliver. Orders within the continuous U.S. will be shipped Via United Parcel Service unless other directions are received.

TERMS

Standard terms are net, 30 days, F.O.B. Ventura California. There is a $250 minimum order for shipments to domestic (USA) destinations.

DELIVERY

Most standard products are available from stock or within typical manufacturing lead time of 6-8 weeks after receipt of an order.

PRICES AND SPECIFICATIONS

Quotations for standard catalog items, in any quantity, are available from the factory or the nearest factory authorized representative. Quotations are normally valid for a period of sixty days. Special item pricing is available after definition of customer requirements and consultation with DowKey Microwave Corporation engineering, manufacturing and sales.

APPLICATIONS/TECHNICAL ASSISTANCE

Approximately one-half of DowKey Microwave Corporation's products are items built to customer specifications. These items have been designed and manufactured to satisfy unique requirements. DowKey provides a knowledgeable and experienced engineering staff to work closely with customers in systems design and applications development. This service is available for either the complete design of specialized switching components or switching function subsystems, or in minor modification to existing standard products to meet a customer's specific requirements. DowKey applications engineers will work co-operatively with customer engineering staff to fulfill special requirements.

WARRANTY

DowKey Microwave Corporation warrants all switch products to be free of defects in material or workmanship for a period of one year after the date of initial shipment. The limit of liability under this warranty is to repair or replace any product or part thereof which is returned by the purchaser, and proves defective after examination by DowKey. This warranty does not extend to any products mishandled, misused, or subjected to abuse or neglect in storage, transportation , or use. Please call DowKey's RMA department to receive a return authorization number prior to returning any item under this warranty. Items being returned from locations outside of the U.S. should be sent Via Air Parcel Post unless other means are specifically agreed upon by DowKey Microwave Corporation. Repairs or alterations made without consent or knowledge of DowKey Microwave Corporation will invalidate this warranty. This warranty supercedes all others, either expressed or implied.

DowKey MICROWAVE CORPORATION continually improves products as new technologies and components become available. We, therefore, reserve the right to alter, amend, discontinue or replace any product and or specifications at our sole discretion in this catalog without prior notice.

DowKey®

Microwave Switches

DowKey Microwave Corporation
1667 Walter Street, Ventura, California 93003
(805) 650-0260 • FAX (805) 650-1734

DowKey® Microwave CORPORATION

The DowKey Microwave 401 Series SPDT switches perform broadband high performance switching functions extending to 26.5 GHz on selected units.

The 401 Series switching mechanism has a break-before-make configuration, with a balanced actuator which provides excellent tolerance to shock and vibration.

The 401 Series switch utilizes DowKey designed connectors featuring a mechanically captivated center contact which eliminates epoxy staking, and reduces RF leakage. Due to the small size of these switches, only SMA connectors are available.

Typical applications for the 401 Series include:

- Test Equipment Band Selection
- Switch Matrixes
- EW and Missile Systems
- Microwave Radio

DowKey® 401 Series Failsafe

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 185 mA
28 Vdc 90 mA

Switching Time:
15 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Vibration, Operating:
10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:
50G, 1/2 Sine, 11mS

Nominal Weight:
2.5 oz., (71g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-1	1.10	85	0.10	100
1-4	1.20	80	0.20	50
4-8	1.30	70	0.30	35
8-12	1.40	65	0.40	25
12-18	1.50	60	0.50	10
*18-26.5	1.50	60	0.60	10

* "K" option only. Ex: 401K-2208

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Standard	with Mechanical Indicators
12 Vdc	SMA	401-2208	401-220832
28 Vdc	SMA	401-2308	401-230832
TTL Compatible Logic			
12 Vdc	SMA	401-220802A	401-220832A
28 Vdc	SMA	401-230802A	401-230832A

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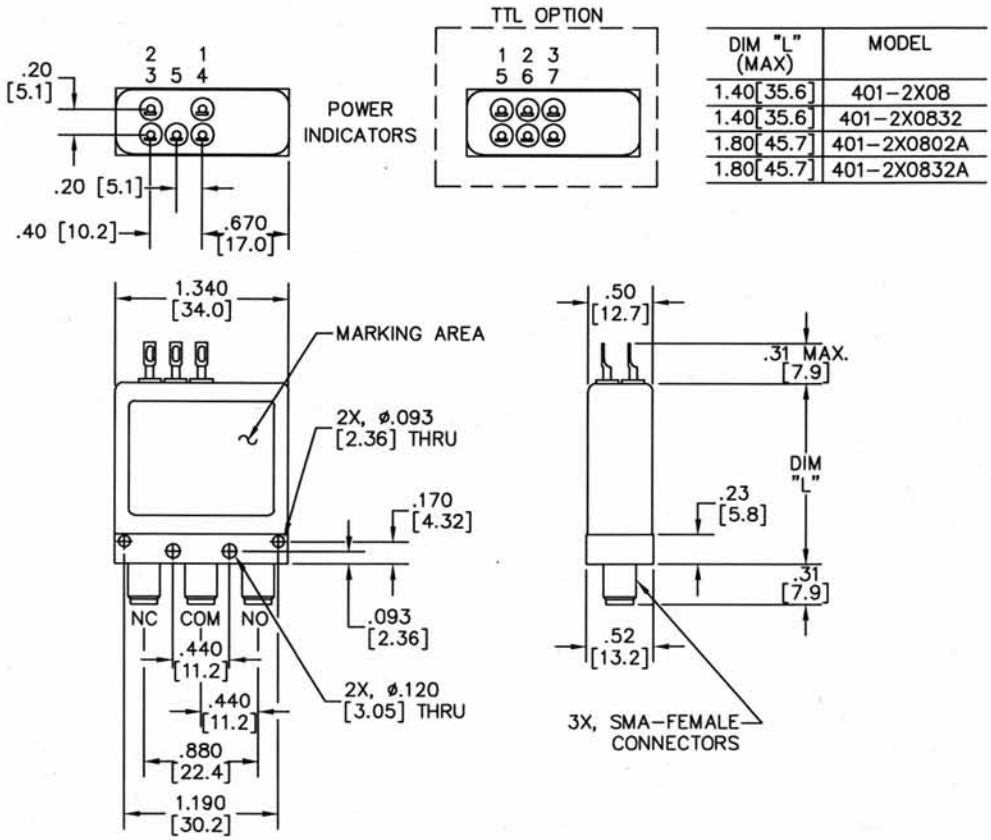
Mechanical



DIM "L" (MAX)	MODEL
1.40[35.6]	401-2X08
1.40[35.6]	401-2X0832
1.80[45.7]	401-2X0802A
1.80[45.7]	401-2X0832A

Available Options

Immersion Seal

9 PIN "D" Plug

5ms Switching Time

Increased Power Handling

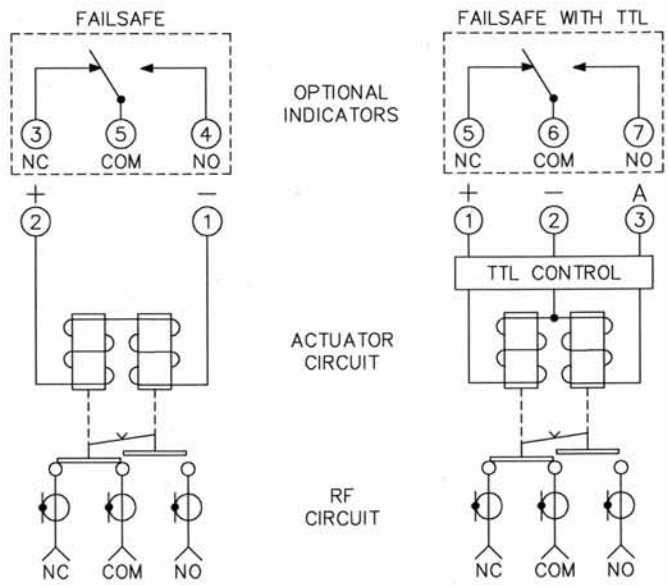
Operating Voltages:
15, 20, 24 Vdc

Jan TX TTL Drive Components

-55°C to +85°C Operation

DC - 26.5 GHz Operation

Electrical



LOGIC TRUTH TABLE		
RF PATH	INDICATOR PATH	LOGIC INPUT "A"
NC-COM	NC-COM	0
NO-COM	NO-COM	1

"0" = 0.0V-0.8V
"1" = 2.4V-5.5V

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DowKey® Microwave CORPORATION

The DowKey Microwave 401 Series SPDT switches perform broadband high performance switching functions extending to 26.5 GHz.
The 401 Series switching mechanism has a break-before-make configuration, with a balanced actuator which provides excellent tolerance to shock and vibration.

Due to the small size of these switches, only the SMA connectors are available. These DowKey designed connectors feature a mechanically captivated center contact which eliminates epoxy staking, and reduces RF leakage. All self cutoff models include coil suppression diodes.

DowKey® 401 Series Latching

Typical applications for the 401 Series include:

- Test Equipment Band Selection
- Switch Matrixes
- EW and Missile Systems
- Microwave Radio

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)
Coil Current (Nominal):
12 Vdc 218 mA
28 Vdc 108 mA
Switching Time:
15 mS maximum
Operating Temperature:
-25°C to +65°C
Mechanical Life, Cycles:
1 x 10^6 minimum
Vibration, Operating:
10G RMS, 20-2000 Hz
Mechanical Shock, Non-Operating:
50G, 1/2 Sine, 11mS
Nominal Weight:
2.5 oz., (71g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-1	1.10	85	0.10	100
1-4	1.20	80	0.20	50
4-8	1.30	70	0.30	35
8-12	1.40	65	0.40	25
12-18	1.50	60	0.60	10
*18-26.5	1.50	60	0.60	10

* "K" option only. Ex: 401K-3208

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Standard SPDT	with Mechanical Indicators
Pulse Latch			
12 Vdc	SMA	401-3208	401-320832
28 Vdc	SMA	401-3308	401-330832
Latching with Self Cut-off			
12 Vdc	SMA	401-4208	401-420832
28 Vdc	SMA	401-4308	401-430832
Latching with Self Cut-Off, TTL Compatible			
12 Vdc	SMA	401-420802A	401-420832A
28 Vdc	SMA	401-430802A	401-430832A

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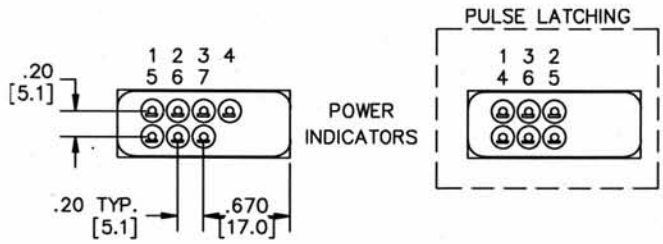
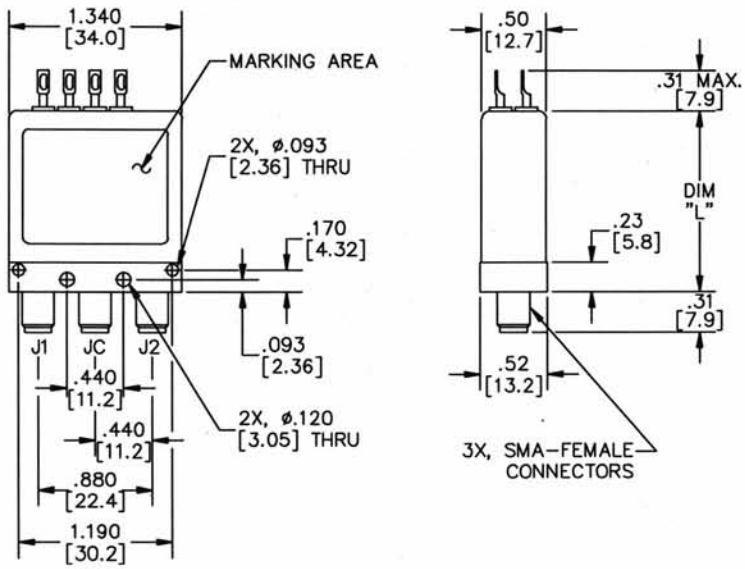
Mechanical



DIM "L" (MAX)	MODEL
1.40[35.6]	401-3X08
1.40[35.6]	401-3X0832
1.80[45.7]	401-4X08
1.80[45.7]	401-4X0832
1.80[45.7]	401-4X0802A
1.80[45.7]	401-4X0832A



Available Options

Immersion Seal

9 PIN "D" Plug

5ms Switching Time

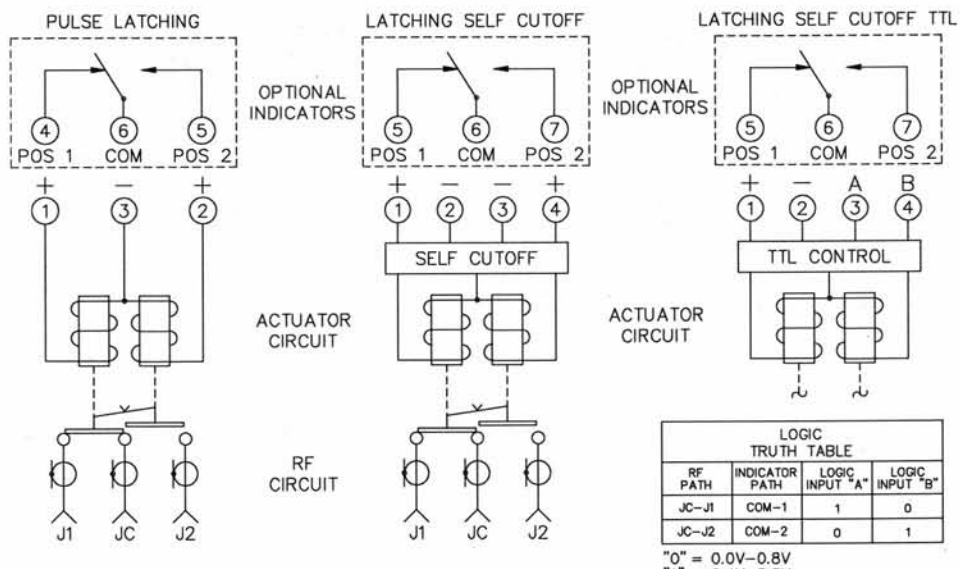
Increased Power Handling

Operating Voltages:
15, 20, 24 Vdc

-55°C to +85°C Operation

DC - 26.5 GHz Operation

Electrical



LOGIC TRUTH TABLE			
RF PATH	INDICATOR PATH	LOGIC INPUT "A"	LOGIC INPUT "B"
JC-J1	COM-1	1	0
JC-J2	COM-2	0	1

"0" = 0.0V-0.8V
"1" = 2.4V-5.5V

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DowKey® Microwave CORPORATION

The DowKey Microwave 402 Series switches are designed for high performance in microwave systems to 12.4 GHz. They are commonly used for any application where high isolation and low VSWR are required. The DowKey designed type "N" connector features a mechanically captivated center conductor which eliminates epoxy staking, and consequently, RF leakage. The balanced actuator is designed for uniform contact pressure in either switch position, which provides low and stable contact resistance over the life of the switch.

Typical applications for the 402 Series include:

- Main/Standby Switching of Transponders, Transmitters, Antennas
- Band Selection
- Polarization Switching

DowKey® 402 Series Failsafe

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)
Coil Current (Nominal):
12 Vdc 261 mA
28 Vdc 108 mA
Switching Time:
20 mS maximum
Operating Temperature:
-25°C to +65°C
Mechanical Life, Cycles:
1 x 10^6 minimum
Vibration, Operating:
10G RMS, 20-2000 Hz
Mechanical Shock, Non-Operating:
50G, 1/2 Sine, 11mS
Nominal Weight:
9.0 oz., (260g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-1	1.15	85	0.15	350
1-2	1.20	80	0.20	250
2-4	1.25	70	0.25	150
4-8	1.35	65	0.35	120
8-12.4	1.50	60	0.50	100

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Standard	with Mechanical Indicators
12 Vdc	N	402-2201	402-220132
28 Vdc	N	402-2301	402-230132
TTL Compatible Logic			
12 Vdc	N	402-220102A	402-220132A
28 Vdc	N	402-230102A	402-230132A

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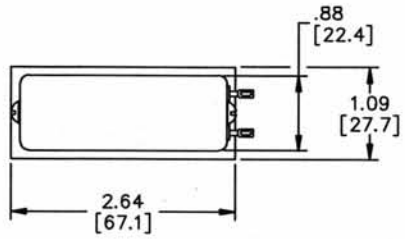
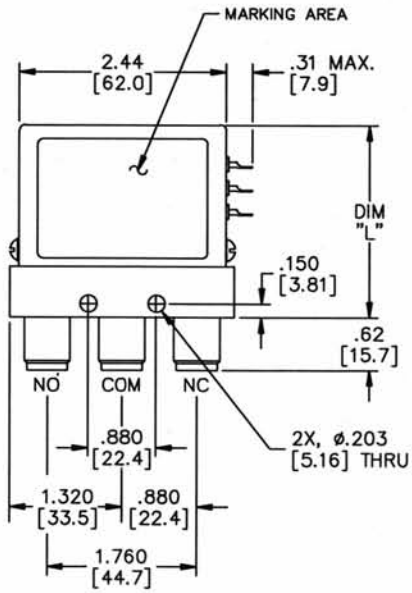
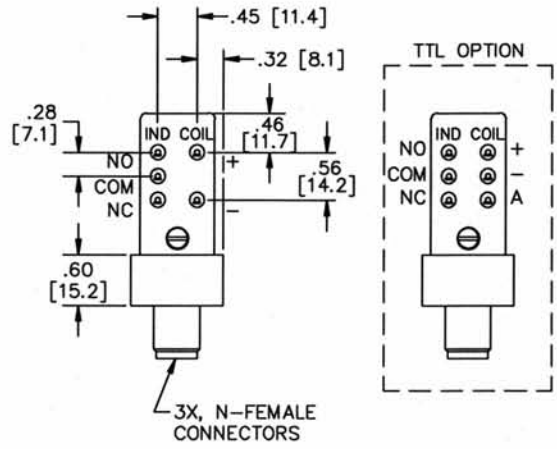
Mechanical



DIM "L" (MAX)	MODEL
2.30[58.4]	402-2X01
2.30[58.4]	402-2X0132
2.30[58.4]	402-2X0102A
2.30[58.4]	402-2X0132A





Available Options

Immersion Seal

9 PIN "D" Plug

Increased Power Handling

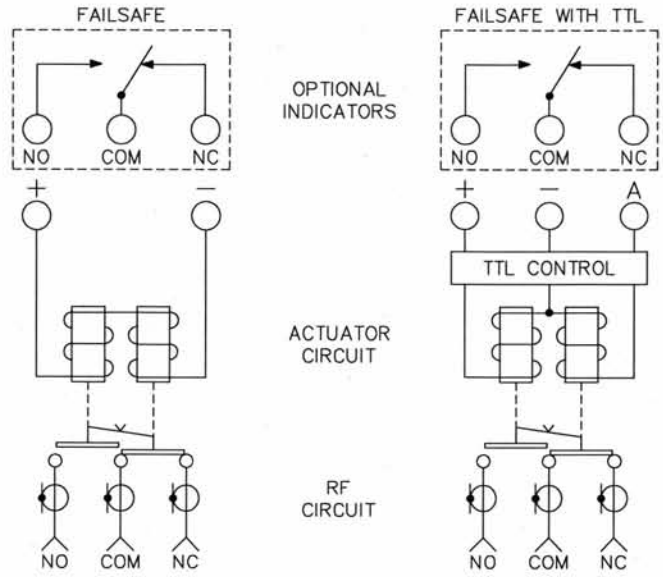
Operating Voltages:
15, 20, 24 Vdc

Jan TX TTL Drive Components

-55°C to +85°C

BNC, TNC Connectors
(Consult factory for
RF characteristics)

Electrical



LOGIC TRUTH TABLE		
RF PATH	INDICATOR PATH	LOGIC INPUT "A"
NC-COM	NC-COM	0
NO-COM	NO-COM	1

"0" = 0.0V-0.8V
"1" = 2.4V-5.5V

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DowKey® Microwave CORPORATION

The DowKey Microwave 402 Series switches are designed for high performance in microwave systems to 12.4 GHz. They are commonly used for any application where high isolation and low VSWR are required. The DowKey designed type "N" connector features a mechanically captivated center conductor which eliminates epoxy staking, and consequently, RF leakage. The balanced actuator is designed for uniform contact pressure in either switch position, which provides low and stable contact resistance over the life of the switch. A set of auxiliary contacts is optionally available.

DowKey® 402 Series Latching

Typical applications for the 402 Series include:

- Main/Standby Switching of Transponders, Transmitters, Antennas
- Band Selection
- Polarization Switching

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 300 mA
28 Vdc 127 mA

Switching Time:
20 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Vibration, Operating:
10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:
50 G, 1/2 Sine, 11 mS

Nominal Weight:
9.0 oz. (260g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-1	1.15	85	0.15	350
1-2	1.20	80	0.20	250
2-4	1.25	70	0.25	150
4-8	1.35	65	0.35	120
8-12.4	1.50	60	0.50	100

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Standard	with Mechanical Indicators
Pulse Latch			
12 Vdc	N	402-3201	402-320132
28 Vdc	N	402-3301	402-330132
Latching with Self Cut-Off			
12 Vdc	N	402-4201	402-420132
28 Vdc	N	402-4301	402-430132
Latching with Self Cut-Off, TTL Compatible			
12 Vdc	N	402-420102A	402-420132A
28 Vdc	N	402-430102A	402-430132A

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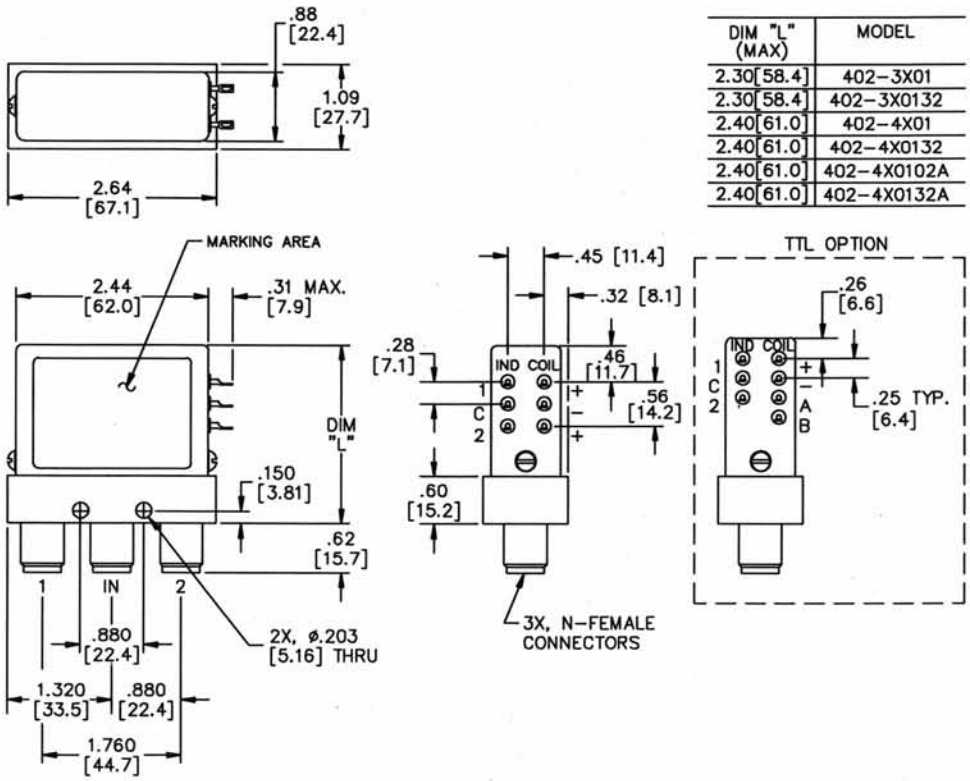
Mechanical



DIM "L" (MAX)	MODEL
2.30 [58.4]	402-3X01
2.30 [58.4]	402-3X0132
2.40 [61.0]	402-4X01
2.40 [61.0]	402-4X0132
2.40 [61.0]	402-4X0102A
2.40 [61.0]	402-4X0132A

Available Options

Immersion Seal

9 PIN "D" Plug

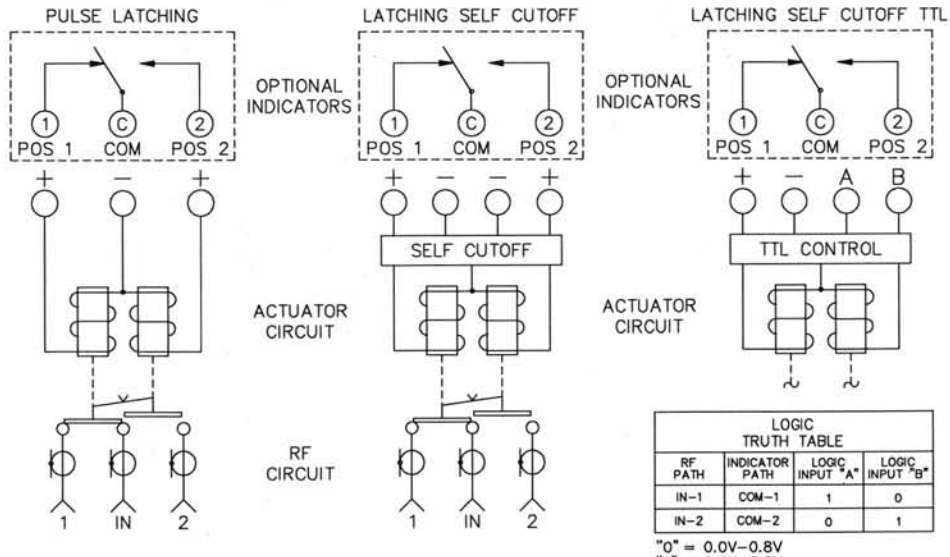
Increased Power Handling

Operating Voltages:
15, 20, 24 Vdc

-55°C to +85°C

BNC, TNC Connectors
(Consult factory for RF characteristics)

Electrical



LOGIC TRUTH TABLE			
RF PATH	INDICATOR PATH	LOGIC INPUT "A"	LOGIC INPUT "B"
IN-1	COM-1	1	0
IN-2	COM-2	0	1

"0" = 0.0V-0.8V
"1" = 2.4V-5.5V

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DowKey® Microwave CORPORATION

The DowKey Microwave 403 Series SPDT switches perform broadband and high frequency, switching with extended performance to 26.5 GHz. The 403 Series switching mechanism uses the same break-before-make balanced actuator as the 401 Series failsafe switches. This actuator provides excellent tolerance to shock and vibration.

Due to the small size of these switches, only SMA connectors are available. These DowKey designed connectors feature a mechanically captivated center contact which eliminates epoxy staking, and reduces RF leakage.

DowKey® 403 Series Failsafe

Typical applications for the 403 Series include:

- Test Equipment Band Selection
- Switch Matrixes
- EW and Missile Systems
- Microwave Radio

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)
Coil Current (Nominal):
12 Vdc 185 mA
28 Vdc 90 mA
Switching Time:
15 mS maximum
Operating Temperature:
-25°C to +65°C
Mechanical Life, Cycles:
1 x 10^6 minimum
Vibration, Operating:
10 G RMS, 20-2000 Hz
Mechanical Shock, Non-Operating:
50 G, 1/2 Sine, 11 mS
Nominal Weight:
1.5 oz., (42g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-1	1.10	85	0.10	100
1-4	1.20	80	0.20	50
4-8	1.30	70	0.30	35
8-12	1.40	65	0.40	25
12-18	1.50	60	0.50	10
*18-26.5	1.50	60	0.50	10

* "K" option only. Ex: 403K-2208

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Standard
12 Vdc	SMA	403-2208
28 Vdc	SMA	403-2308
TTL Compatible Logic		
12 Vdc	SMA	403-220802A
28 Vdc	SMA	403-230802A

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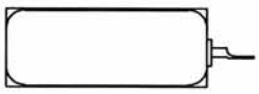
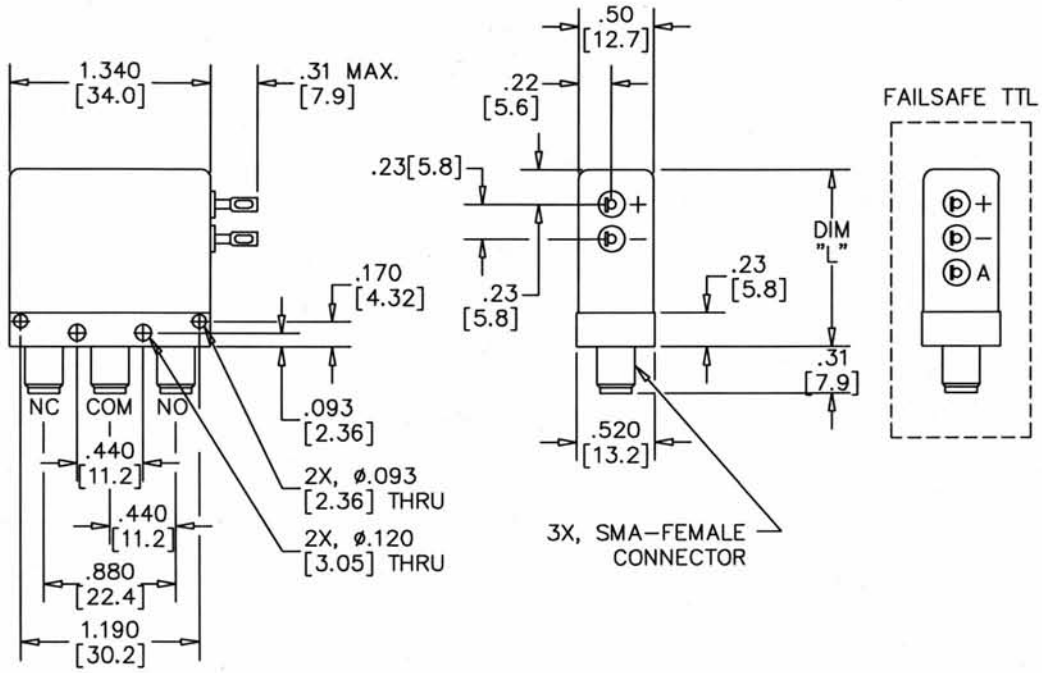
Mechanical



DIM "L" (MAX)	MODEL
1.18[30.0]	403-2X08
1.40[35.6]	403-2X0802A



Available Options

Immersion Seal

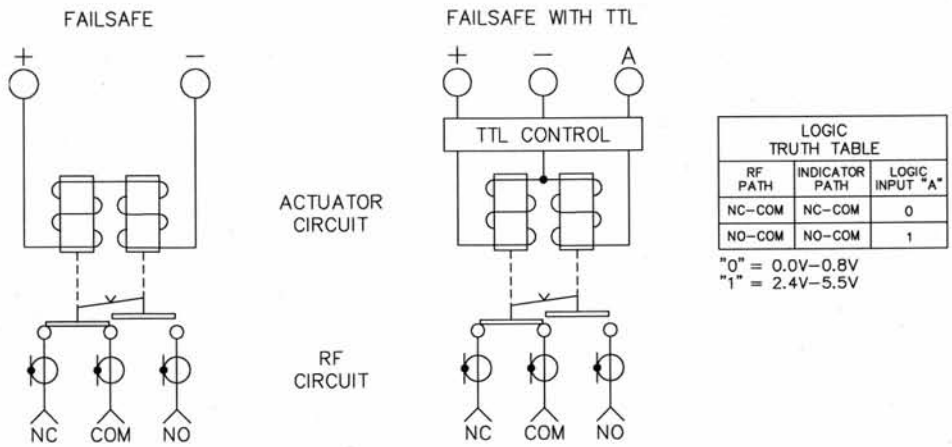
Increased Power Handling

Operating Voltages:
15, 20, 24 Vdc

-55°C to +85°C Operation

DC - 26.5 GHz Operation

Electrical



LOGIC TRUTH TABLE		
RF PATH	INDICATOR PATH	LOGIC INPUT "A"
NC-COM	NC-COM	0
NO-COM	NO-COM	1

"0" = 0.0V-0.8V
"1" = 2.4V-5.5V

DowKey Microwave Corporation
1667 Walter Street, Ventura, California 93003
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DowKey® Microwave CORPORATION

The DowKey Microwave 411 Series is a failsafe transfer switch for use in applications where high isolation, low VSWR, and low insertion loss are critical. The DowKey designed connector features a mechanically captivated center conductor which eliminates epoxy staking, and consequently, RF leakage. The 411 Series features the same reliable balanced actuator designs as are found in the 401 Series.

Typical applications for the 411 Series include:

- Switch Matrixes
- Standby Transmitters with Dummy Load
- Alternate Antenna Select

DowKey® 411C Series Failsafe

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 364 mA
28 Vdc 138 mA

Switching Time:
20 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Vibration, Operating:
10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:
50 G, 1/2 Sine, 11 mS

Nominal Weight:
4.0 oz., (115g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-1	1.10	85	0.10	200
1-4	1.20	80	0.20	100
4-8	1.30	70	0.30	50
8-12	1.40	65	0.40	35
12-18	1.50	60	0.50	25

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Standard	with Mechanical Indicators
12 Vdc	SMA	411C-2208	411C-220832
28 Vdc	SMA	411C-2308	411C-230832
TTL Compatible Logic			
12 Vdc	SMA	411C-220802A	411C-220832A
28 Vdc	SMA	411C-230802A	411C-230832A

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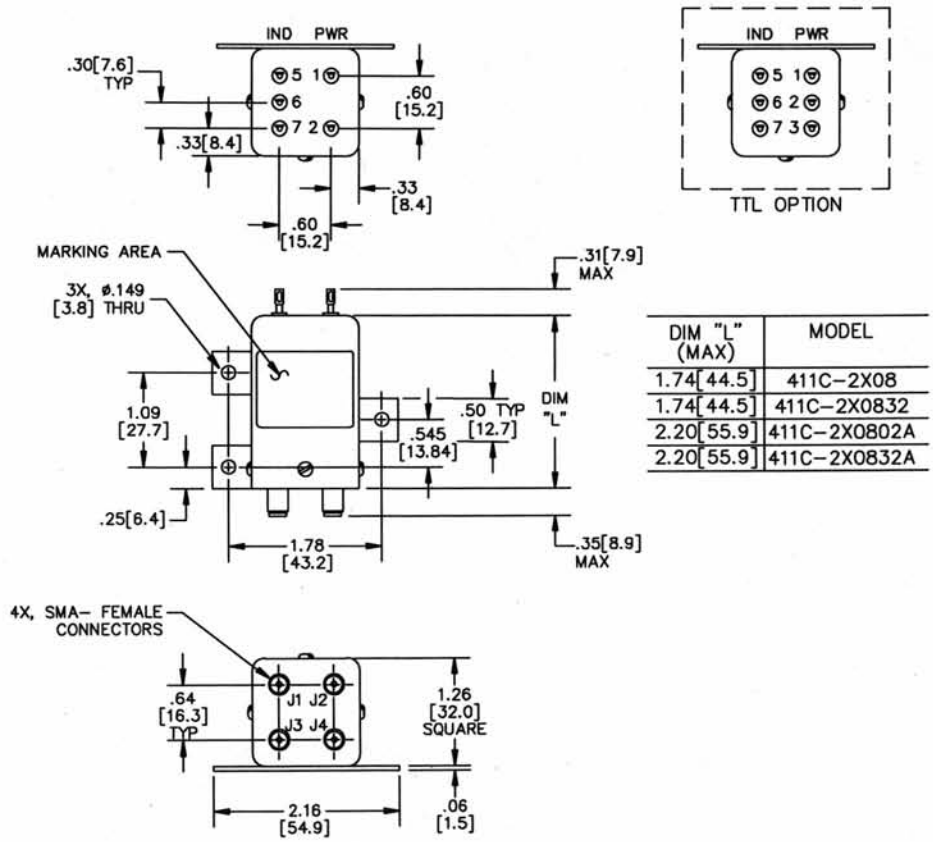
Mechanical



DIM "L" (MAX)	MODEL
1.74[44.5]	411C–2X08
1.74[44.5]	411C–2X0832
2.20[55.9]	411C–2X0802A
2.20[55.9]	411C–2X0832A

Available Options

BYPASS (2-4)

BYPASS (1-3)

BYPASS (1-2)

BYPASS (3-4)

9 PIN "D" Plug

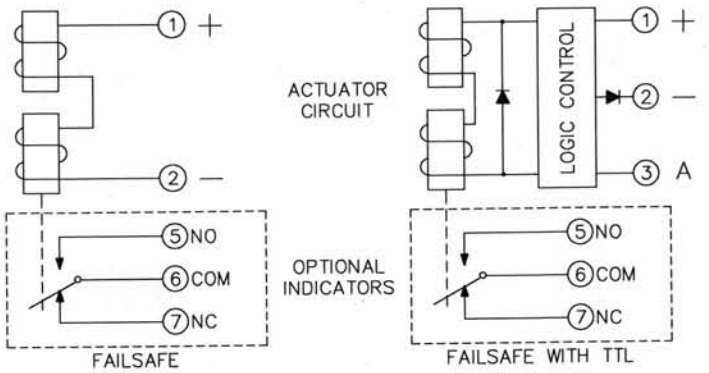
Operating Voltages:
15, 20, 24 Vdc

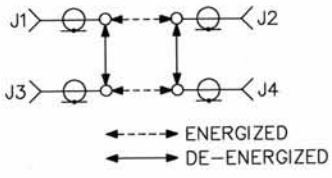
Jan TX TTL Drive Components

-55°C to +85°C

DowKey Bracket

Electrical





LOGIC TRUTH TABLE		
RF PATH	INDICATOR PATH	LOGIC INPUT "A"
J1–J3/J2–J4	NC–COM	0
J1–J2/J3–J4	NO–COM	1

"0" = 0.0V–0.8V
"1" = 2.4V–5.5V

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DowKey® Microwave CORPORATION

The DowKey Microwave 411 Series is a latching transfer switch for use in applications where high isolation, low VSWR, and low insertion loss are critical. The DowKey designed connector features a mechanically captivated center conductor which eliminates epoxy staking, and consequently, RF leakage. The 411 Series is available with pulse latching, and latching with self-cutoff actuators. Standard 411 Series latching switches are provided with four DC control terminals which allow the user to wire either a positive (+) or negative (-) common control line. On request, DowKey can provide a three terminal configuration with the common control line internally wired. All logic controlled models include an electronic self-cutoff circuit with suppression diodes.

DowKey® 411C Series Latching

Typical applications for the 411 Series include:

- Switch Matrixes
- Standby Transmitters with Dummy Load
- Alternate Antenna Select

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 300 mA
28 Vdc 127 mA

Switching Time:
20 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Vibration, Operating:
10 G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:
50 G, 1/2 Sine, 11 mS

Nominal Weight:
4.0 oz., (115g.)

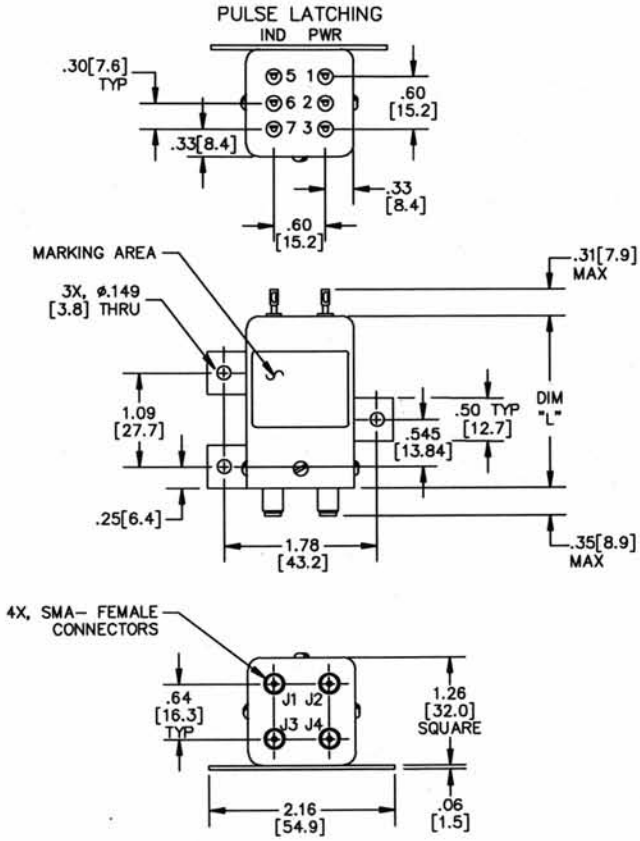
RF Characteristics

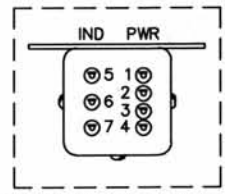
Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-1	1.10	85	0.10	200
1-4	1.20	80	0.20	100
4-8	1.30	70	0.30	50
8-12	1.40	65	0.40	35
12-18	1.50	60	0.50	25

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Standard	with Mechanical Indicators
Pulse Latching			
12 Vdc	SMA	411C-3208	411C-320832
28 Vdc	SMA	411C-3308	411C-330832
Latching with Self Cut-Off			
12 Vdc	SMA	411C-4208	411C-420832
28 Vdc	SMA	411C-4308	411C-430832
Latching with Self Cut-Off, TTL Compatible			
12 Vdc	SMA	411C-420802A	411C-420832A
28 Vdc	SMA	411C-430802A	411C-430832A

Mechanical





LATCHING SELF CUTOFF
LATCHING SELF CUTOFF TTL

DIM "L" (MAX)	MODEL
1.74[44.5]	411C–3X08
1.74[44.5]	411C–3X0832
2.20[55.9]	411C–4X08
2.20[55.9]	411C–4X0832
2.20[55.9]	411C–4X0802A
2.20[55.9]	411C–4X0832A

Available Options

BYPASS (2-4)

BYPASS (1-3)

BYPASS (1-2)

BYPASS (3-4)

Reverse Polarity

9 PIN "D" Plug

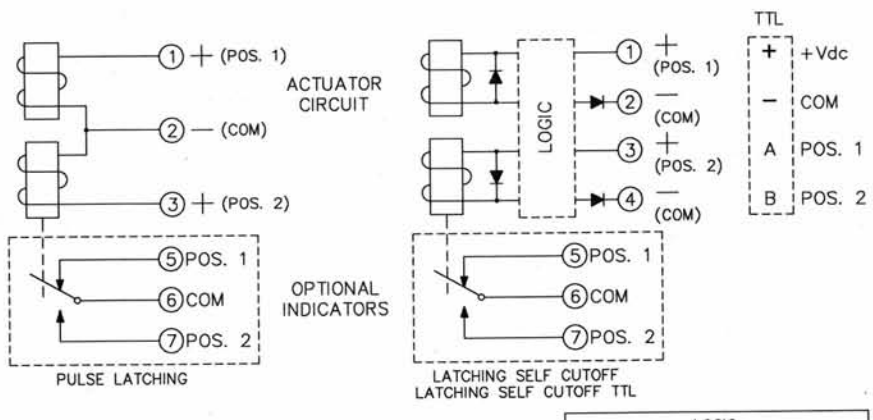
Operating Voltages: 15, 20, 24 Vdc

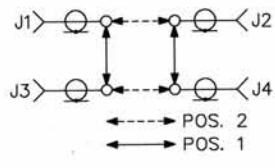
Jan TX TTL Drive Components

-55°C to +85°C

DowKey Bracket

Electrical





LOGIC TRUTH TABLE			
RF PATH	INDICATOR PATH	LOGIC INPUT "A"	LOGIC INPUT "B"
J1–J3/J2–J4	COM–1	1	0
J1–J2/J3–J4	COM–2	0	1

"0" = 0.0V–0.8V
"1" = 2.4V–5.5V

DowKey Microwave Corporation
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DowKey® Microwave CORPORATION

The DowKey Microwave 412 Series switches are designed for high performance, high power applications in microwave systems to 12.4 GHz. The RF path is optimized for Type "N" connectors. The DowKey designed connector features a mechanically captivated center conductor. This eliminates epoxy staking, and consequently, RF leakage. All logic controlled models include an electronic self-cutoff circuit.

DowKey® 412 Series Failsafe

Typical applications for the 412 Series include:

- Switch Matrixes
- Standby Transmitters with Dummy Load
- Alternate Antenna Select

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 300 mA
28 Vdc 175 mA

Switching Time:
20 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Vibration, Operating:
10 G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:
30 G, 1/2 Sine, 11 mS

Nominal Weight:
14 oz., (397g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-1	1.15	85	0.15	1000
1-2	1.20	80	0.20	350
2-4	1.25	70	0.25	250
4-8	1.35	65	0.35	150
8-12.4	1.50	60	0.50	120

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Standard	with Mechanical Indicators
12 Vdc	N	412-2201	412-220132
28 Vdc	N	412-2301	412-230132
TTL Compatible Logic			
12 Vdc	N	412-220102A	412-220132A
28 Vdc	N	412-230102A	412-230132A

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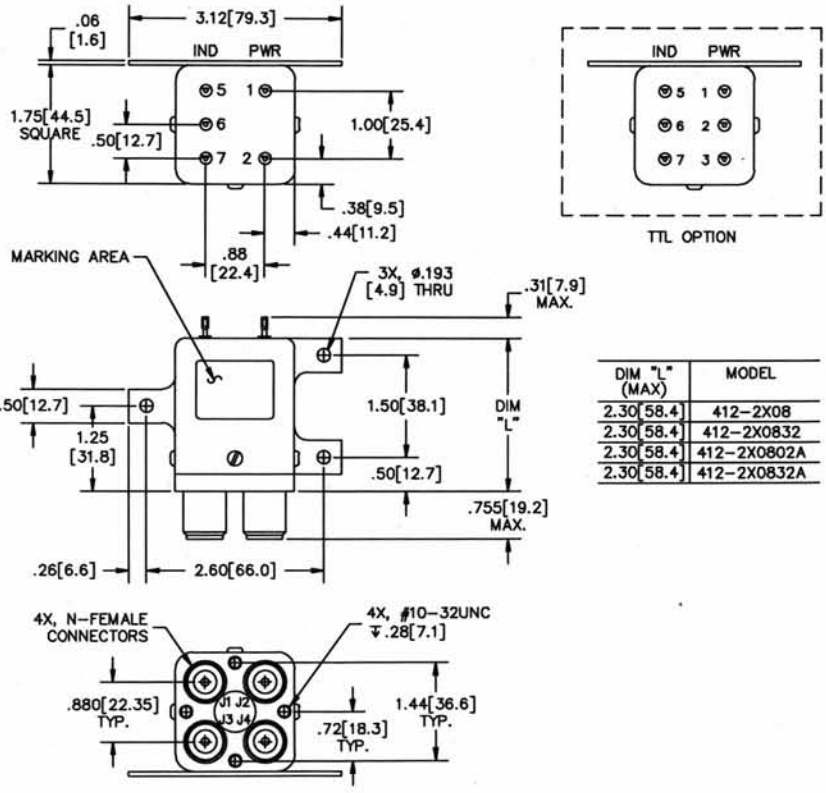
Mechanical



DIM "L" (MAX)	MODEL
2.30[58.4]	412-2X08
2.30[58.4]	412-2X0832
2.30[58.4]	412-2X0802A
2.30[58.4]	412-2X0832A

Available Options

Immersion Seal

Operating Voltages:
15, 20, 24 Vdc

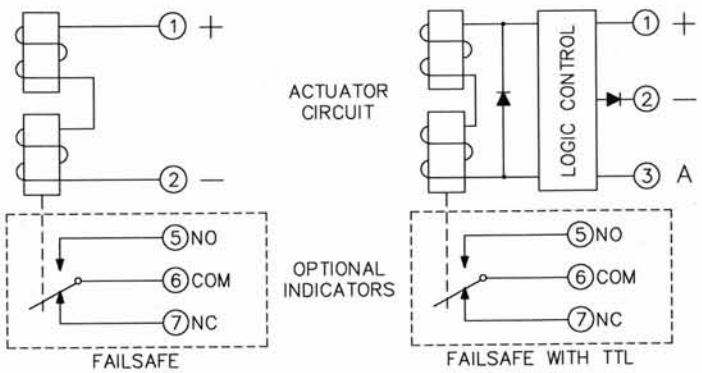
Jan TX TTL Drive Components

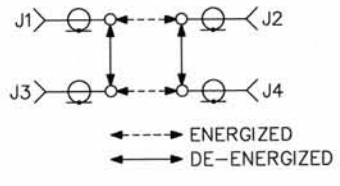
-55°C to +85°C Operation

BNC, TNC Connectors
(Consult factory for
RF characteristics)

DowKey Bracket

Electrical





LOGIC TRUTH TABLE		
RF PATH	INDICATOR PATH	LOGIC INPUT "A"
J1-J3/J2-J4	NC-COM	0
J1-J2/J3-J4	NO-COM	1

"0" = 0.0V-0.8V
"1" = 2.4V-5.5V

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DowKey® Microwave CORPORATION

The DowKey Microwave 412 Series switches are designed for high performance, high power applications in microwave systems to 12.4 GHz. The RF path is optimized for Type "N" connectors. The DowKey designed connector features a mechanically captivated center conductor. This eliminates epoxy staking, and consequently, RF leakage. The switch is available with or without a mounting bracket.

DowKey® 412 Series Latching

Typical applications for the 412 Series include:

- Switch Matrixes
- Standby Transmitters with Dummy Load
- Alternate Antenna Select

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 300 mA
28 Vdc 175 mA

Switching Time:
20 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Vibration, Operating:
10 G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:
30 G, 1/2 Sine, 11 mS

Nominal Weight:
14 oz., (397g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-1	1.15	85	0.15	1000
1-2	1.20	80	0.20	350
2-4	1.25	70	0.25	250
4-8	1.35	65	0.35	150
8-12.4	1.50	60	0.50	120

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Standard	with Mechanical Indicators
Pulse Latch			
12 Vdc	N	412-3201	412-320132
28 Vdc	N	412-3301	412-330132
Latching with Self Cut-Off			
12 Vdc	N	412-4201	412-420132
28 Vdc	N	412-4301	412-430132
Latching with Self Cut-Off, TTL Compatible			
12 Vdc	N	412-420102A	412-420132A
28 Vdc	N	412-430102A	412-430132A

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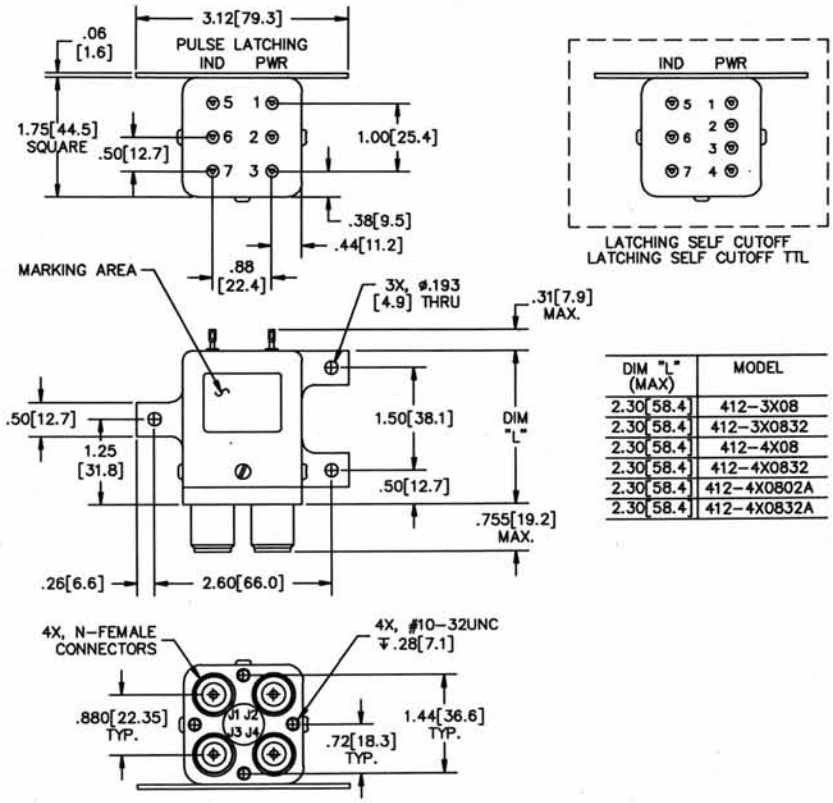
Mechanical



DIM "L" (MAX)	MODEL
2.30[58.4]	412-3X08
2.30[58.4]	412-3X0832
2.30[58.4]	412-4X08
2.30[58.4]	412-4X0832
2.30[58.4]	412-4X0802A
2.30[58.4]	412-4X0832A

Available Options

Immersion Seal

Operating Voltages:
15, 20, 24 Vdc

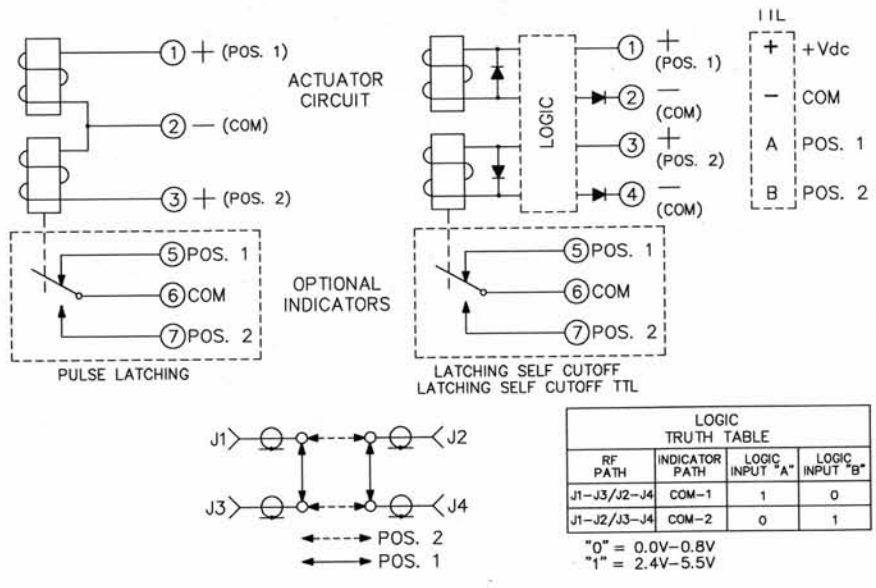
Jan TX TTL Drive Components

-55°C to +85°C Operation

BNC, TNC Connectors
(Consult factory for
RF characteristics)

DowKey Bracket

Electrical



LOGIC TRUTH TABLE			
RF PATH	INDICATOR PATH	LOGIC INPUT "A"	LOGIC INPUT "B"
J1-J3/J2-J4	COM-1	1	0
J1-J2/J3-J4	COM-2	0	1

"0" = 0.0V-0.8V
"1" = 2.4V-5.5V

DowKey Microwave Corporation
1667 Walter Street, Ventura, California 93003
(805) 650-0260 • FAX (805) 650-1734

DowKey® Microwave CORPORATION

The DowKey Microwave 509 Series SP2T Failsafe switch is a micro-miniature, PC board mount SPDT coaxial switch. The switch was designed specifically for applications where small size, reduced weight, and less power consumption are required. Overall size is only 0.75"x0.75"x0.25" and the weight is 0.5 ounce. The actuator consumes less than one watt which is 30% less power than similar designs.

The RF characteristics are excellent over the DC-12.4 GHz frequency range. Because the 509 is hermetically laser sealed after being vacuum baked and backfilled with an inert gas, it is able to satisfy hot switching requirements. The 509 has been subjected to 50 Watts (CW) hot switching at 1GHZ and had minimal RF degradation after one million cycles.

DowKey® 509 Series Failsafe

Typical applications for the 509 Series include:

- Microwave Radio
- EW and Missile Systems
- Repeater Stations

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 83 mA
28 Vdc 37 mA

Switching Time:
15 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Vibration:
10 G RMS, 20-2000 Hz

Mechanical Shock:
30 G, 1/2 Sine, 11 mS

Nominal Weight:
0.5 oz., (14.2g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
DC-1	1.25	60	0.35	50
1-8	1.30	50	0.40	30
8-12.4	1.45	50	0.45	10

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Standard
12 Vdc	PIN	509-2219
28 Vdc	PIN	509-2319

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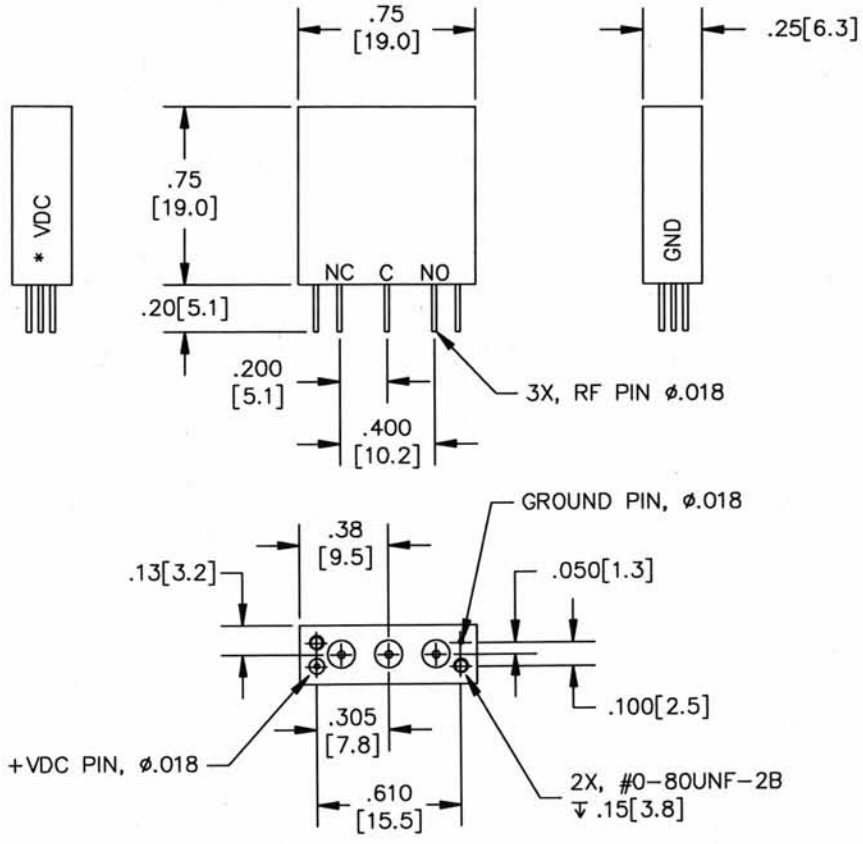
Mechanical

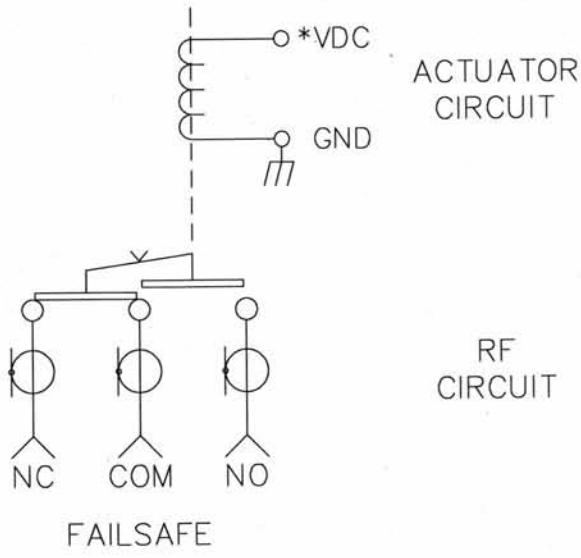


Available Options

Operating Voltages:
15, 20, 24 Vdc

-55°C to +85°C Operation

Electrical



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DowKey® Microwave CORPORATION

The DowKey Microwave 521 Series 2P3T switches offer exceptional isolation and low insertion loss. These characteristics offer unique advantages for switch matrix and critical test applications. The 521 features dual balanced actuators to achieve five port signal transfer, or create an SPDT switch in which the unused RF input is internally connected to a 2 Watt 50 Ohm termination.

Due to the small size of these switches, only the SMA connectors are available.

DowKey® 521 Series Failsafe

Typical applications for the 521 Series include:

- Automatic Test Equipment
- Compact Switch Matrixes
- VXI Switch Cards

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 680 mA
28 Vdc 294 mA

Switching Time:
20 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Vibration, Operating:
10 G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:
50 G, 1/2 Sine, 11 mS

Nominal Weight:
3.0 oz., (85g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-4	1.20	70	0.20	100
4-8	1.30	65	0.30	70
8-12	1.40	60	0.40	60
12-18	1.50	60	0.50	45

Power handling capability is for through path only. Optional internal termination is limited to 500 milliwatts dissipation.

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Standard	with Mechanical Indicators
12 Vdc	SMA	521-220803	521-220833
28 Vdc	SMA	521-230803	521-230833
TTL Compatible Logic			
12 Vdc	SMA	521-220803A	521-220833A
28 Vdc	SMA	521-230803A	521-230833A

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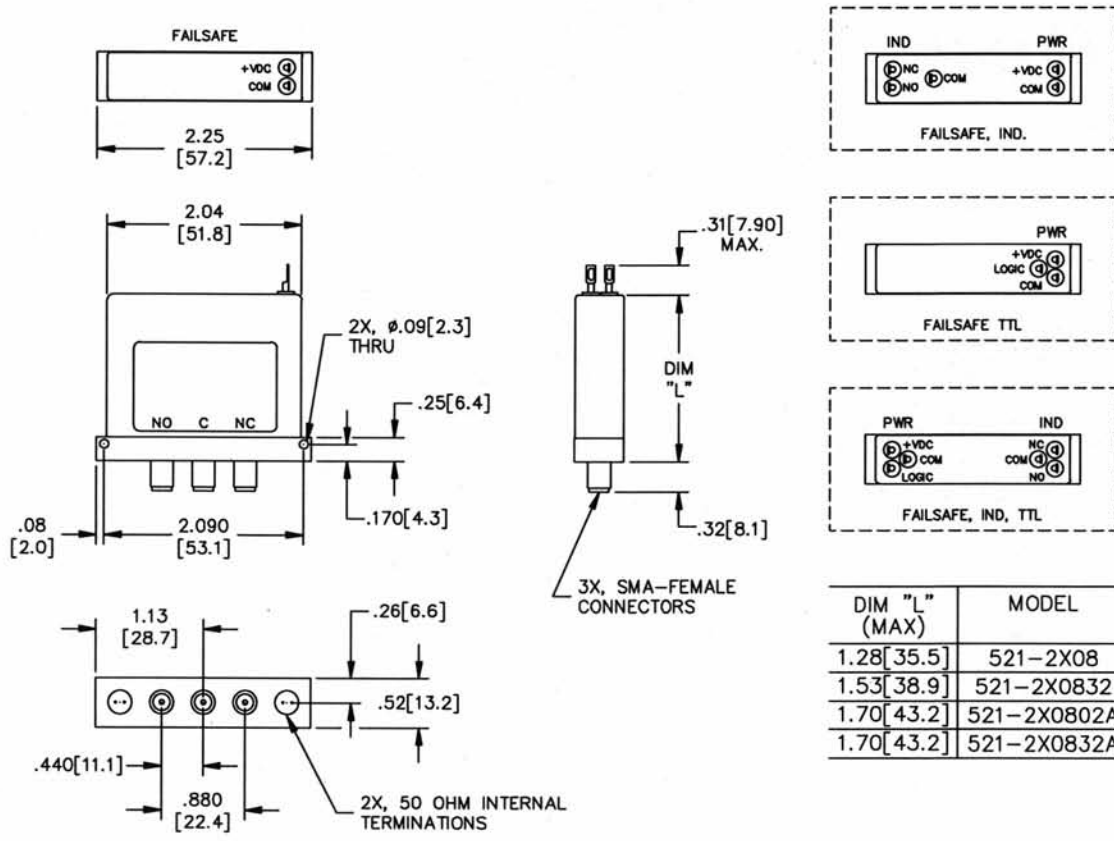
Mechanical



DIM "L" (MAX)	MODEL
1.28[35.5]	521-2X08
1.53[38.9]	521-2X0832
1.70[43.2]	521-2X0802A
1.70[43.2]	521-2X0832A

Available Options

Immersion Seal

9 PIN "D" Plug

Operating Voltages:
15, 20, 24 Vdc

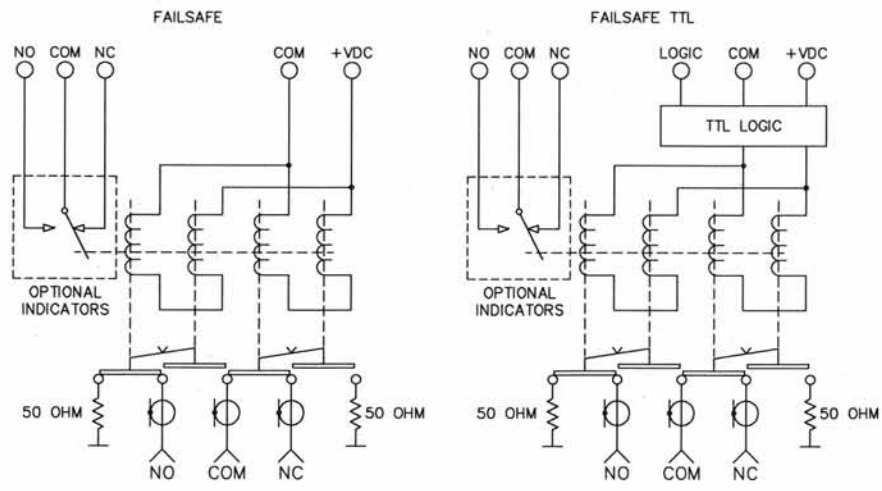
-55°C to +85°C Operation

5W, 10W Internal Terminations

2W External Terminations

Unterminated (5 port)

Electrical



Commercial CCR-53

Miniature DC-26.5GHz SPDT Switch

Failsafe

The CCR-53 Switch is a broadband, SPDT, electromechanical, coaxial switch designed to switch a microwave signal from a common input to either of two outputs. The characteristic impedance is 50 Ohms. The switches are small with connector spacing compatible with SMA connectors.

The CCR-53 series switch is offered with either a failsafe or latching actuator. This design is compatible with the two most common mounting hole patterns. The CCR-53 series switch is interchangeable with a variety of switches.

Specifications

RF Contacts: Break before make

Actuator

Voltage (VDC) 20°C	12	15	28
Current (mA)	200	160	90

Switching Time: 20 msec max

Connectors: SMA (f)

Weight: 1.65 oz. max

Temperature Range: -25°C to +65°C (Operating)

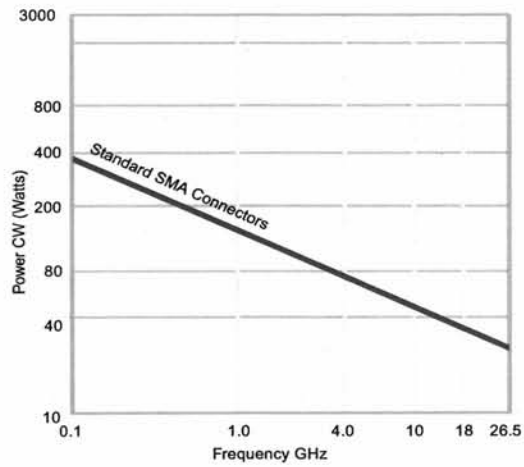
Shock: MIL-STD-202 Method 213, Condition D (500G Non Operating)

Vibration: MIL-STD-202 Method 214, Condition D (10G RMS Non Operating)

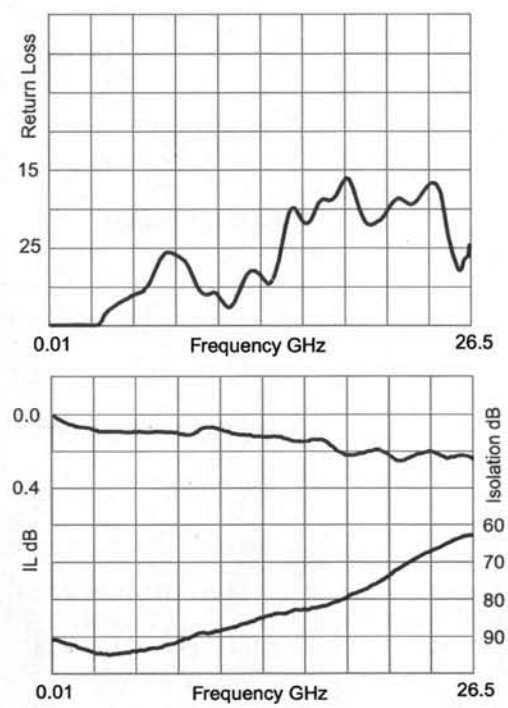
Humidity: Moisture Seal Available

MTBF: 7.3 Million Hours (MIL-HDBK-217F Fixed, 25°C, <1 Cycle per hour)

RF Power Handling



Typical Performance

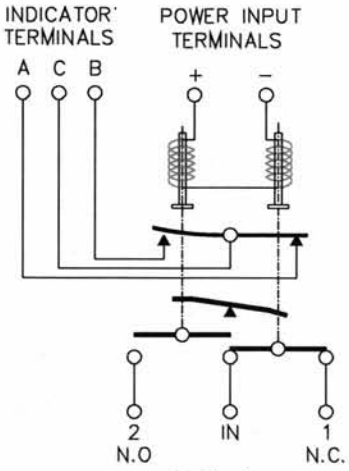


Specifications	DC-6 GHz	6-12 GHz	12-18 GHz	18-26.5GHz
VSWR (max)	1.25:1	1.40:1	1.50:1	1.80:1
Insertion Loss (min)	0.20 dB	0.40 dB	0.50 dB	0.70 dB
Isolation (max)	70.0 dB	60.0 dB	60.0 dB	50.0 dB

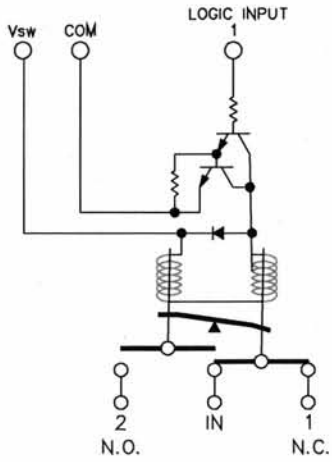
Commercial CCR-53

Miniature DC-26.5GHz SPDT Switch

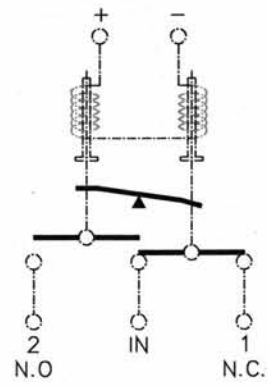
Failsafe



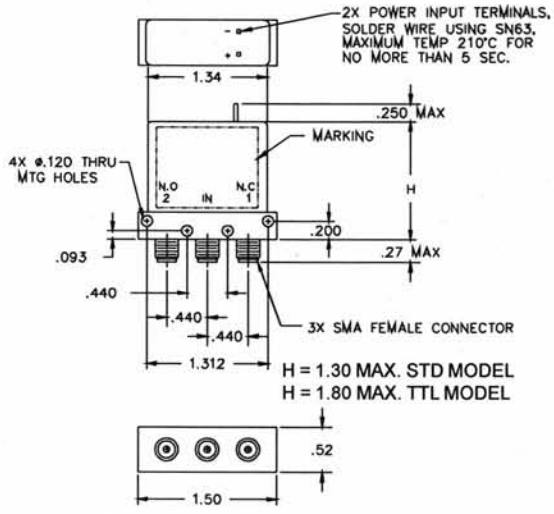
Indicators



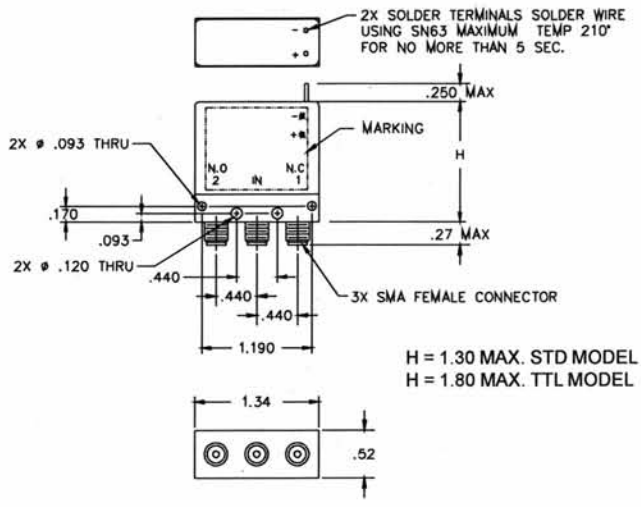
TTL



Analog



Standard Width Body



Optional Narrow Width Body

Part Numbering System for CCR-53 (Failsafe)

CCR-53 S 1 O - N

- Series
- Connectors
- Actuator Voltage
- Actuator Type
- Options

Connector
S: SMA Female #

Actuator Voltage
1: 28Vdc Failsafe #
2: 15Vdc Failsafe #
3: 12Vdc Failsafe #

Actuator Type
O: No Indicator Contacts #
C: Indicator Contacts #

Options
T: TTL Drivers with Diodes
N: Narrow Body #
R: Positive + Common

For other options contact Factory

#: Stock item subject to prior sale

Elite CR-33

Miniature DC-22GHz SPDT Switch

Failsafe

The CR-33 Switch is a broadband, SPDT, electromechanical, coaxial switch designed to switch a microwave signal from a common input to either of two outputs. The CR-33 Series has a higher operting Frequency and temperature range than the commercial CCR-33 series. The characteristic impedance is 50 Ohms. The switches are small with connector spacing compatible with SMA connectors.

The CR-33 series switch is offered with either a failsafe or latching actuator. This design is compatible with the two most common mounting hole patterns. The CR-33 series switch is interchangeable with a variety of switches.

If your requirements are more demanding then perhaps the CM-33 Range of 10 Million cycle switches would be of interest.

Specifications

RF Contacts: Break before make

Actuator

Voltage (VDC) 20°C	12	15	28
Current (mA)	200	160	90

Switching Time: 20 msec max

Connectors: SMA (f)

Weight: 1.65 oz. max

Temperature Range: -54°C to +85°C (Operating)

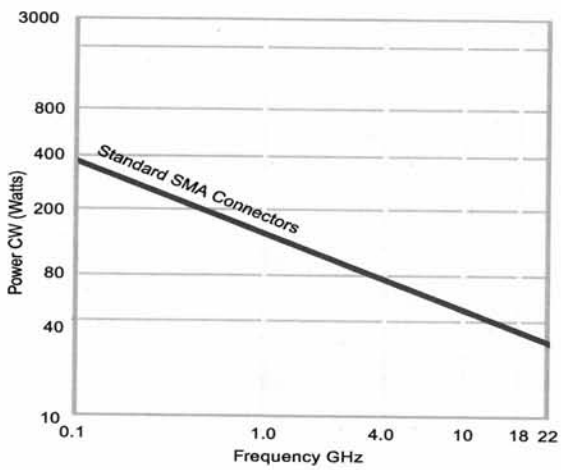
Shock: MIL-STD-202 Method 213, Condition D (500G Non Operating)

Vibration: MIL-STD-202 Method 214, Condition D (10G RMS Non Operating)

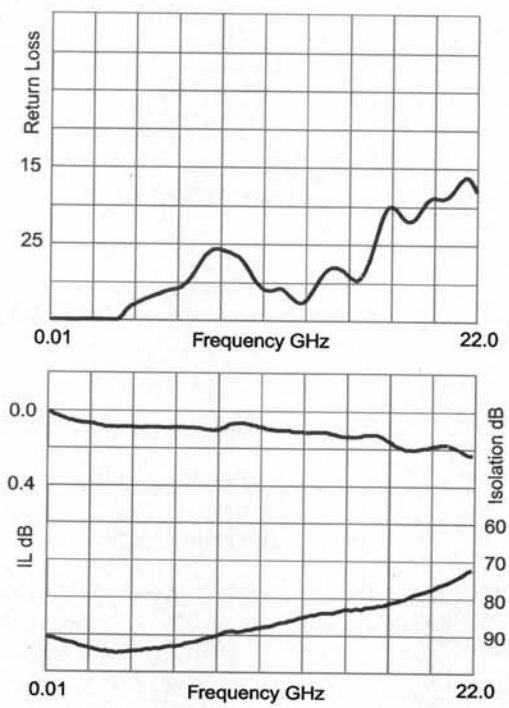
Humidity: Moisture Seal Available

MTBF: 7.3 Million Hours (MIL-HDBK-217F Fixed, 25°C, <1 Cycle per hour)

RF Power Handling



Typical Performance

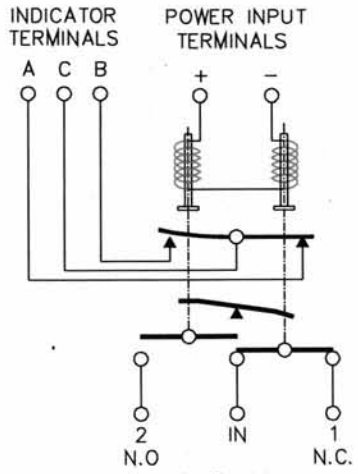


Specifications	DC-6 GHz	6-12 GHz	12-18 GHz	18-22 GHz
VSWR (max)	1.25:1	1.40:1	1.50:1	1.60:1
Insertion Loss (min)	0.20 dB	0.40 dB	0.50 dB	0.60 dB
Isolation (max)	70.0 dB	60.0 dB	60.0 dB	50.0 dB

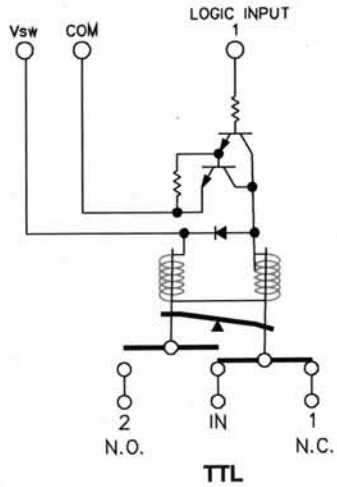
Elite CR-33

Miniature DC-22GHz SPDT Switch

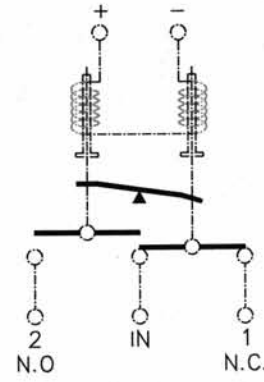
Failsafe



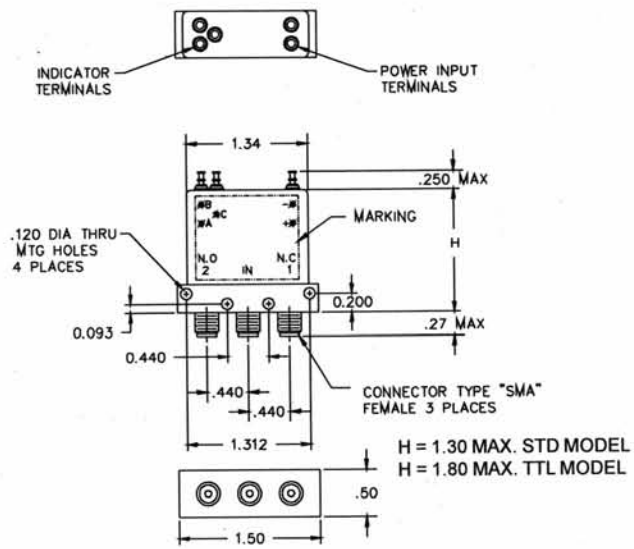
Indicators



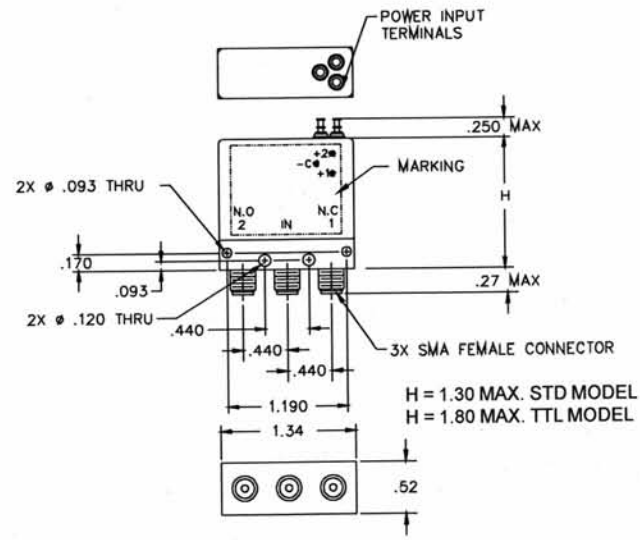
TTL



Analog



Standard Width Body



Optional Narrow Width Body

Part Numbering System for CR-33 (Failsafe)

CR-33 S 1 O - N

- Series
- Connectors
- Actuator Voltage
- Actuator Type
- Options

Connector
S: SMA Female

Actuator Voltage
1: 28Vdc Failsafe
2: 15Vdc Failsafe
3: 12Vdc Failsafe

Actuator Type
O: No Indicator Contacts
C: Indicator Contacts

Options
T: TTL Drivers with Diodes
N: Narrow Body
R: Positive + Common

For other options contact Factory

Elite CR-53

Miniature DC-26.5 GHz SPDT Switch

Failsafe

The CR-53 Switch is a broadband, SPDT, electromechanical, coaxial switch designed to switch a microwave signal from a common input to either of two outputs. The CR-53 Series has a higher operting Temperature range than the commercial CCR-53 and higher frequency range than the Elite CR-33 series. The characteristic impedance is 50 Ohms. The switches are small with connector spacing compatible with SMA connectors.

The CR-53 series switch is offered with either a failsafe or latching actuator. This design is compatible with the two most common mounting hole patterns. The CR-53 series switch is interchangeable with a variety of switches.

If your requirements are more demanding then please contact the factory.

Specifications

RF Contacts: Break before make

Actuator

Voltage (VDC) 20°C	12	15	28
Current (mA)	200	160	90

Switching Time: 20 msec max

Connectors: SMA (f)

Weight: 1.65 oz. max

Temperature Range: -54°C to +85°C (Operating)

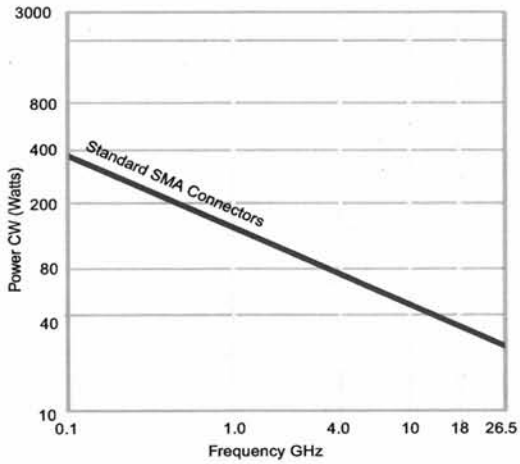
Shock: MIL-STD-202 Method 213, Condition D (500G Non Operating)

Vibration: MIL-STD-202 Method 214, Condition D (10G RMS Non Operating)

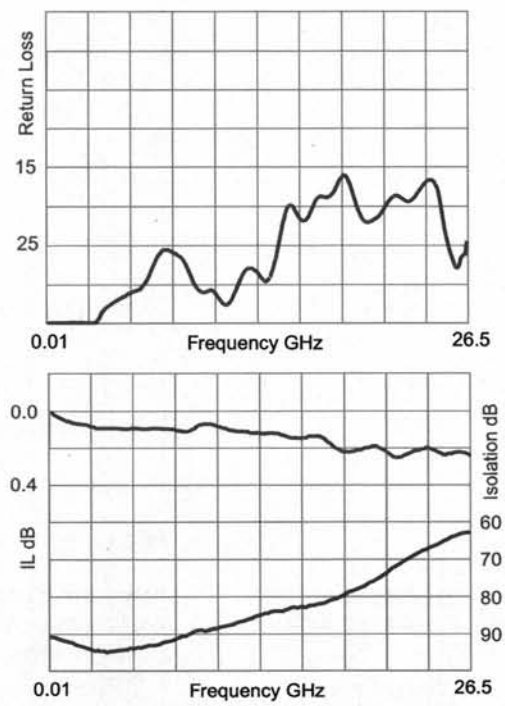
Humidity: Moisture Seal Available

MTBF: 7.3 Million Hours (MIL-HDBK-217F Fixed, 25°C, <1 Cycle per hour)

RF Power Handling



Typical Performance

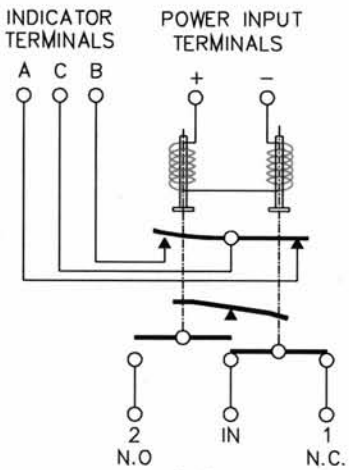


Specifications	DC-6 GHz	6-12 GHz	12-18 GHz	18-26.5GHz
VSWR (max)	1.25:1	1.40:1	1.50:1	1.80:1
Insertion Loss (min)	0.20 dB	0.40 dB	0.50 dB	0.70 dB
Isolation (max)	70.0 dB	60.0 dB	60.0 dB	50.0 dB

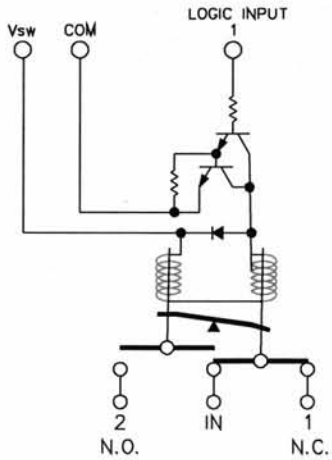
Elite CR-53

Miniature DC-26.5 GHz SPDT Switch

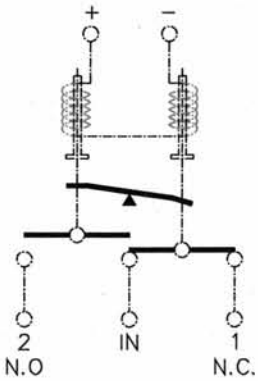
Failsafe



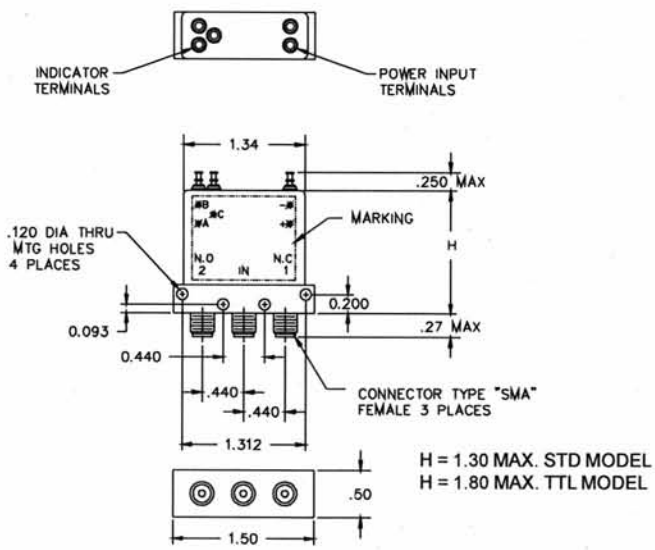
Indicators



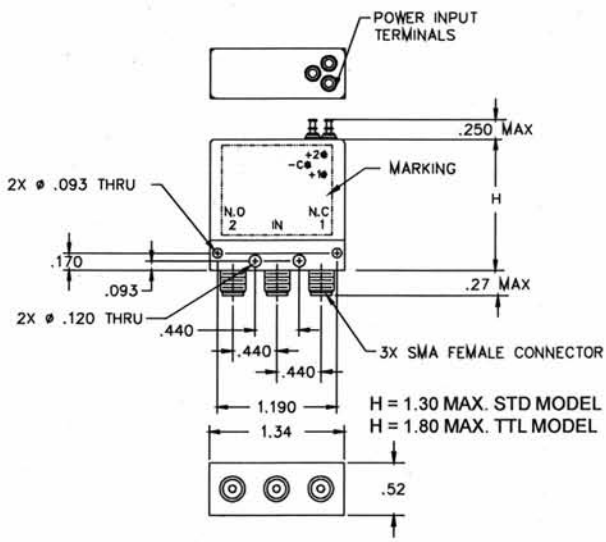
TTL



Analog



Standard Width Body



Optional Narrow Width Body

Part Numbering System for CR-53 (Failsafe)

CR-53 S 1 O - N

- Series
- Connectors
- Actuator Voltage
- Actuator Type
- Options

Connector
S: SMA Female

Actuator Voltage
1: 28Vdc Failsafe
2: 15Vdc Failsafe
3: 12Vdc Failsafe

Actuator Type
O: No Indicator Contacts
C: Indicator Contacts

Options
T: TTL Drivers with Diodes
N: Narrow Body
R: Positive + Common

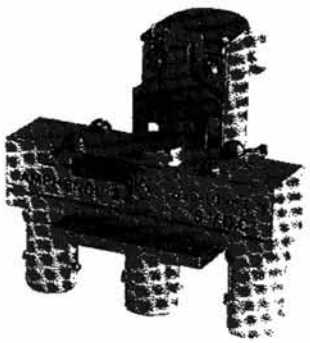
For other options contact Factory

DowKey Delivers in Eight Weeks or Less.

Amphenol Coaxial Switch Replacements.

Call Today for Catalog Cross Reference List and Data Sheets.
(805) 684-0427

Amphenol 316 Series



RF/Video Switches

DowKey 56 Series

Amphenol 315 Series

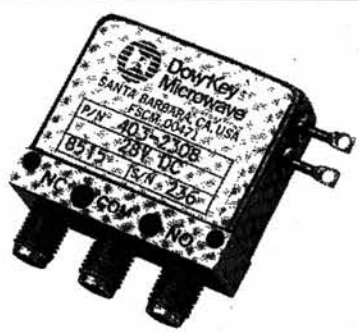
RF/Video Switches

DowKey 163-164 Series

Amphenol 303-10179/Mil-S-3928

Microwave Switches

DowKey 403-2308 /Mil-S-3928



Sales offices open 7 AM to 5 PM, PST.
(805) 684-0427, TWX 910-380-4327, EID 586052
1110 Mark Avenue, Carpinteria, CA 93013-2918

DowKey® Microwave CORPORATION

DowKey/Amphenol Part Number Cross-Reference

Direct drop-in replacements or equivalents in design and function to a broad cross-section of the Amphenol RF and Microwave switch line are available from DowKey. Typical lead time is 6-8 weeks ARO.

DowKey P/N	Amphenol P/N	Coils	Connectors	Terminations	Actuation
46-21XXXX	316-XXXXX-1	6 Vdc	•	••	Failsafe
-22XXXX	-2	12 Vdc	•	••	Failsafe
-23XXXX	-3	26.5 Vdc	•	••	Failsafe
-24XXXX	-4	48 Vdc	•	••	Failsafe
-25XXXX	-5 or 6	110 Vdc	•	••	Failsafe
-26XXXX	-8	115 Vac	•	••	Failsafe
54-21XXXX	318-XXXXX-1	6 Vdc	*	**	Failsafe
-22XXXX	-2	12 Vdc	*	**	Failsafe
-23XXXX	-3	26.5 Vdc	*	**	Failsafe
-24XXXX	-4	48 Vdc	*	**	Failsafe
-25XXXX	-5 or 6	110 Vdc	*	**	Failsafe
-26XXXX	-8	115 Vac	*	**	Failsafe
55-21XXXX	314-XXXXX-1	6 Vdc	*	**	Failsafe
-22XXXX	-2	12 Vdc	*	**	Failsafe
-23XXXX	-3	26.5 Vdc	*	**	Failsafe
-24XXXX	-4	48 Vdc	*	**	Failsafe
-25XXXX	-5 or 6	110 Vdc	*	**	Failsafe
-26XXXX	-8	115 Vac	*	**	Failsafe
56-21XXXX	316-XXXXX-1	6 Vdc	*	**	Failsafe
-22XXXX	-2	12 Vdc	*	**	Failsafe
-23XXXX	-3	26.5 Vdc	*	**	Failsafe
-24XXXX	-4	48 Vdc	*	**	Failsafe
-25XXXX	-5 or 6	110 Vdc	*	**	Failsafe
-26XXXX	-6	115 Vac	*	**	Failsafe
62-21XXXX	317-XXXXX-1	6 Vdc	*	**	Failsafe
-22XXXX	-2	12 Vdc	*	**	Failsafe
-23XXXX	-3	26.5 Vdc	*	**	Failsafe
-24XXXX	-4	48 Vdc	*	**	Failsafe
-25XXXX	-5 or 6	110 Vdc	*	**	Failsafe
-26XXXX	-8	115 Vac	*	**	Failsafe
78-XXXX	322-XXXXX	N/A	•	••	N/A
-XXXX	-XXXXX	N/A	•	••	N/A
-XXXX	-XXXXX	N/A	•	••	N/A
-XXXX	-XXXXX	N/A	•	••	N/A
116-22XXXX	323-XXXXX-2	12 Vdc	•*	*•*	Failsafe
-23XXXX	-XXXXX-3	26.5 Vdc	•*	*•*	Failsafe
164-21XXXX	315-XXXXX-1	6 Vdc	•	••	Failsafe
-22XXXX	-2	12 Vdc	•	••	Failsafe
-23XXXX	-3	26.5 Vdc	•	••	Failsafe
-24XXXX	-4	48 Vdc	•	••	Failsafe
-25XXXX	-5 or 6	110 Vdc	•	••	Failsafe
-26XXXX	-8	115 Vac	•	••	Failsafe
401-220832	303-10179-52	12 Vdc	SMA	••	Failsafe w/ Indicators
-230832	-53	26.5 Vdc	SMA	••	Failsafe w/ Indicators
403-2208	303-10179-2	12 Vdc	SMA	••	Failsafe
-2308	-3	26.5 Vdc	SMA	••	Failsafe
402-2201	303-10167-2	12 Vdc	N	••	Failsafe
-2301	-3	26.5 Vdc	N	••	Failsafe
-220132	-52	12 Vdc	N	••	Failsafe w/ Indicators
-230132	-53	26.5 Vdc	N	••	Failsafe w/ Indicators
411-2208	303-11022-2	12 Vdc	SMA	••	Failsafe
-2308	-3	26.5 Vdc	SMA	••	Failsafe
-220832	-52	12 Vdc	SMA	••	Failsafe w/ Indicators
-230832	-53	26.5 Vdc	SMA	••	Failsafe w/ Indicators
412-2201	303-11017-2	12 Vdc	N	••	Failsafe
-2301	-3	26.5 Vdc	N	••	Failsafe
-220832	-52	12 Vdc	N	••	Failsafe w/ Indicators
-230832	-53	26.5 Vdc	N	••	Failsafe w/ Indicators

(XXX)-(XX) (XX) (XX)

Series No. | Coil | Connector | Indicator Contacts | Termination

Example: 62-220203
Series 62 with 12 Vdc coil, BNC connectors, no indicators, 50Ω termination.

Connectors:
(01) N
(02) BNC
(03) TNC
(04) UHF
(05) C
(06) MB
(08) SMA
(19) PIN (P.C.B. Mount)
(25) N - High Isolation NC Port
(26) BNC-High Isolation NC Port
(28) UHF-High Isolation NC Port
(32) F - (75 Ω)
(51) HN
(53) SC

Indicator Contacts:
(0) None
(3) SPDT
(4) DPDT

Termination:
(1) Grounded
(2) Open
(3) 50Ω
(4) 75Ω

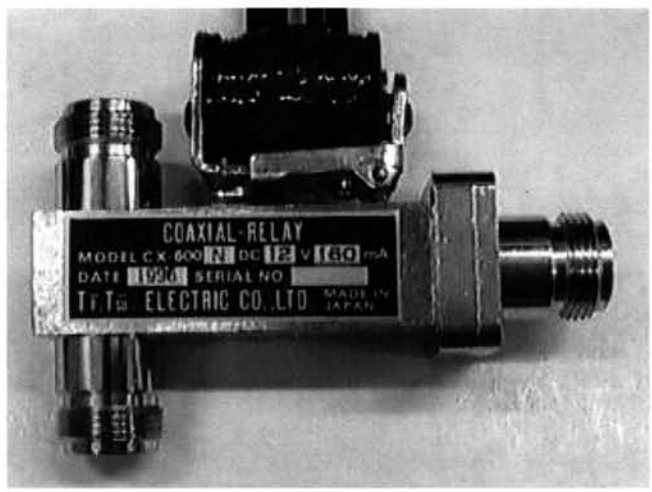
* Connectors: BNC, TNC, C, MB, N, UHF only
** Terminations: open, grounded, 50Ω, 75Ω

• Connectors: BNC, TNC, MB only
•• Terminations: open only

•* Connectors: BNC, TNC only
• Terminations: open, grounded, 50Ω only

TOHTSU Coaxial RF Relays

CX600N



Type: SPDT Coax Relay
Connectors: CX600N all N type
Connectors: CX600M all UHF type
Connectors: CX600NC N & 2 coax
CX600N/NC Max freq: 1500 mhz
CX600M Max freq: 500 mhz
Max pwr: 2000 watts at 30 MHz
Max pwr: 1300 watts at 150 mhz
Max pwr: 800 at 500 mhz
Max pwr: 500 watts at 1000 mhz
Max pwr: 100 watts at 2000 mhz
Insertion loss: .2db at 500 mhz
Impedance: 50 ohms
SWR: 1.2:1 nominal at 500 mhz
Isolation: 52 DB at 30 mhz
38 db at 150 mhz
27 db at 500 mhz
24 db at 1000 mhz
Coil voltage: 11-15 VDC
Coil current: 160 Ma at 12 VDC
Switch time: 20 ms nominal
Dimensions: 3.1"L, 1.0"W, 2.4"H
Weight: 8 oz

CX120P

Type: SPDT Coax Relay

Connectors: Circuit board mount
Max freq: 1500 mhz
Max pwr: 300 watts at 30 mhz
Max pwr: 250 watts at 50 mhz
Max pwr: 200 watts at 150 mhz
Max pwr: 150 watts at 1000 mhz
Insertion loss: .2db at 500 mhz
Impedance: 50 ohms
SWR: 1.2:1 nominal at 500 mhz
Isolation: 60 DB at 30 mhz
46 db at 150 mhz
34 db at 500 mhz
27 db at 1000 mhz
Coil voltage: 11-15 VDC
Coil current: 80 Ma at 12 VDC
Switch time: 20 ms nominal
Dimensions: 1.4"L, 1.4"W, 0.7"H
Weight: 2.5 oz

DowKey® Microwave CORPORATION

The DowKey Microwave 521 Series 2P3T switches have exceptional isolation and low insertion loss. These characteristics offer unique advantages for switch matrix and critical test applications. The 521 features dual balanced actuators to achieve five port signal transfer, or create an SPDT switch in which the unused RF input is internally connected to a 2 Watt 50 Ohm termination.

Due to the small size of these switches, only the SMA connectors are available. Latching switches with logic include an electronic self-cutoff circuit and coil suppression diodes.

DowKey® 521 Series Latching

Typical applications for the 521 Series include:

- Automatic Test Equipment
- Compact Switch Matrixes
- VXI Switch Cards

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 440 mA
28 Vdc 190 mA

Switching Time:
20 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Vibration, Operating:
10 G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:
50 G, 1/2 Sine11 mS

Nominal Weight:
5.0 oz., (142g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-4	1.20	70	0.20	100
4-8	1.30	65	0.30	70
8-12	1.40	60	0.40	60
12-18	1.50	60	0.50	45

Power handling capability is for through path only. Optional internal termination is limited to 500 milliwatts dissipation.

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Standard	with Mechanical Indicators
12 Vdc	SMA	521-420803	521-420833
28 Vdc	SMA	521-430803	521-430833
Latching Self Cutoff, TTL compatible logic			
12 Vdc	SMA	521-420803A	521-420833A
28 Vdc	SMA	521-430803A	521-430833A

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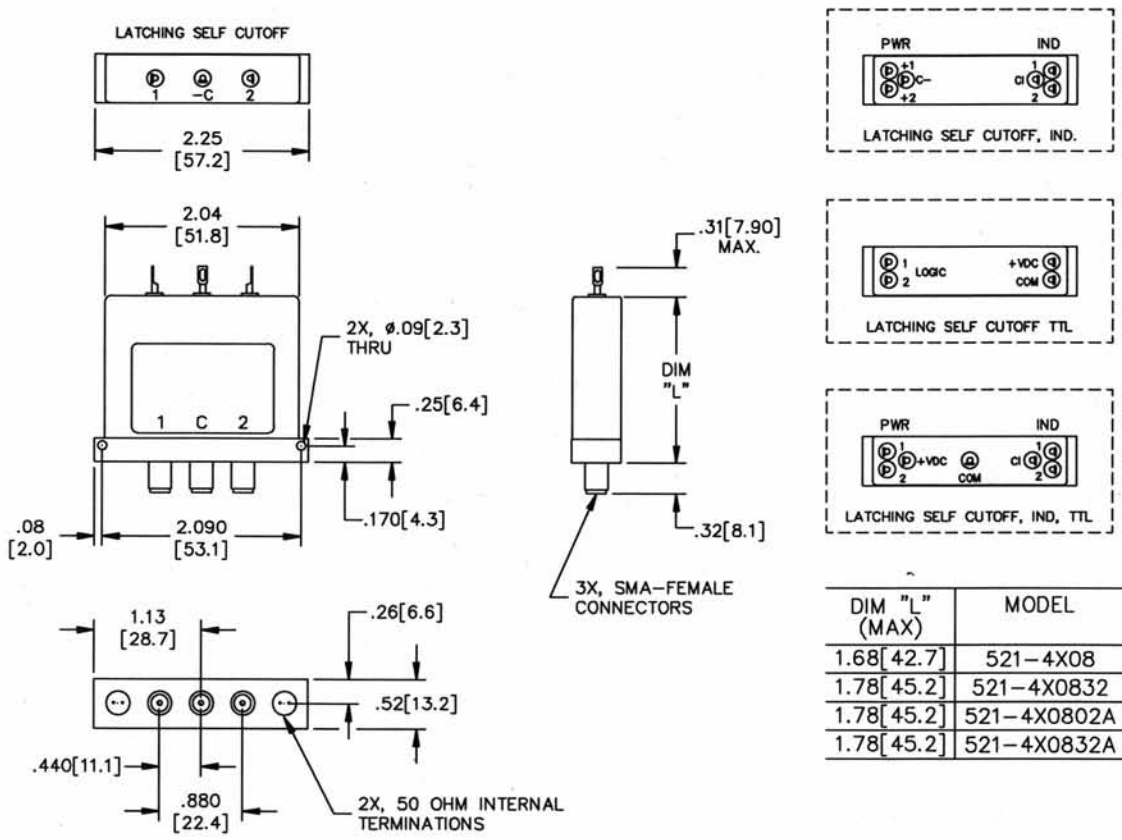
Mechanical



DIM "L" (MAX)	MODEL
1.68[42.7]	521-4X08
1.78[45.2]	521-4X0832
1.78[45.2]	521-4X0802A
1.78[45.2]	521-4X0832A

Available Options

Immersion Seal

9 PIN "D" Plug

Operating Voltages: 15, 20, 24 Vdc

-55°C to +85°C Operation

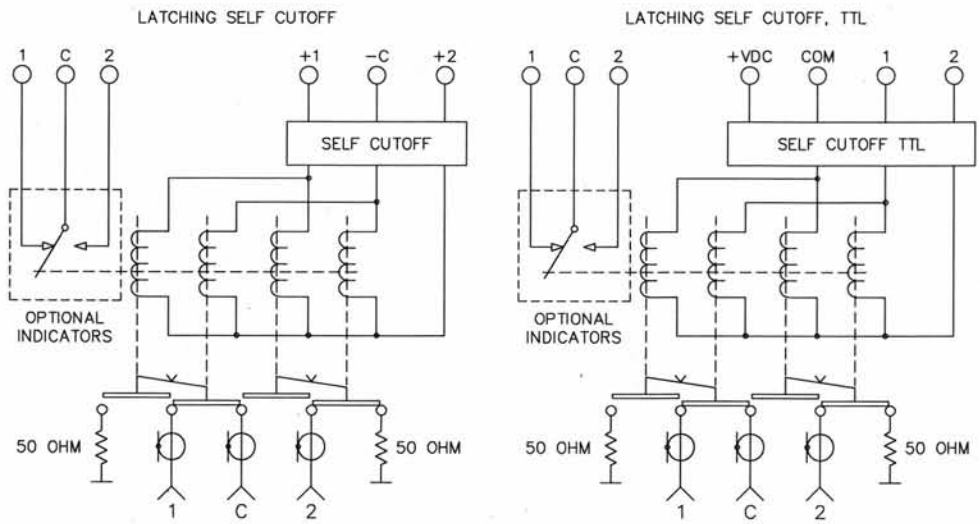
5W, 10W Internal Terminations

2W External Terminations

Unterminated (5 port)

Reverse Polarity

Electrical



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DowKey® Microwave CORPORATION

The DowKey Microwave 3 to 6 Position Normally Open switch is a multi-position electro-mechanical coaxial switch with SMA connectors. The RF characteristics are excellent over the DC-18 GHz frequency range.

Options include extended frequency range up to 26.5 GHz, a "D" type control connector, moisture seal, indicator contacts, suppressions diodes, special operating voltages, and TTL or BCD compatibility. Also available are BMA (Blind Mate) connectors which provide quick installation into modular plug-in systems operating to 18 GHz. The BMA connectors mate with OSP* female connectors.

*OSP is a registered trademark of M/A COM Omni-Spectra, Inc.

DowKey® 531-561 Series Normally Open Terminated, SMA

Typical applications for the 531-561 Series include:

- Automatic Test Equipment
- Switch Matrixes
- Multi-Band or Alternate Source Selection

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 324 mA
28 Vdc 140 mA

Switching Time:
15 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
11.0 oz., (312g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
DC-4	1.25	70	0.20	100
4-8	1.35	65	0.30	70
8-12	1.40	60	0.40	60
12-16	1.50	60	0.50	50
16-18	1.60	60	0.50	45

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Switch Configuration SP3T	SP4T	SP6T
12 Vdc	SMA	531-520803	541-520803	561-520803
28 Vdc	SMA	531-530803	541-530803	561-530803
Normally open with indicators				
12 Vdc	SMA	531-520823	541-520823	561-520823
28 Vdc	SMA	531-530823	541-530823	561-530823
Normally open with TTL Compatible Logic				
12 Vdc	SMA	531-520803A	541-520803A	561-520803A
28 Vdc	SMA	531-530803A	541-530803A	561-530803A
Normally open with Indicators, TTL Compatible Logic				
12 Vdc	SMA	531-520823A	541-520823A	561-520823A
28 Vdc	SMA	531-530823A	541-530823A	561-530823A

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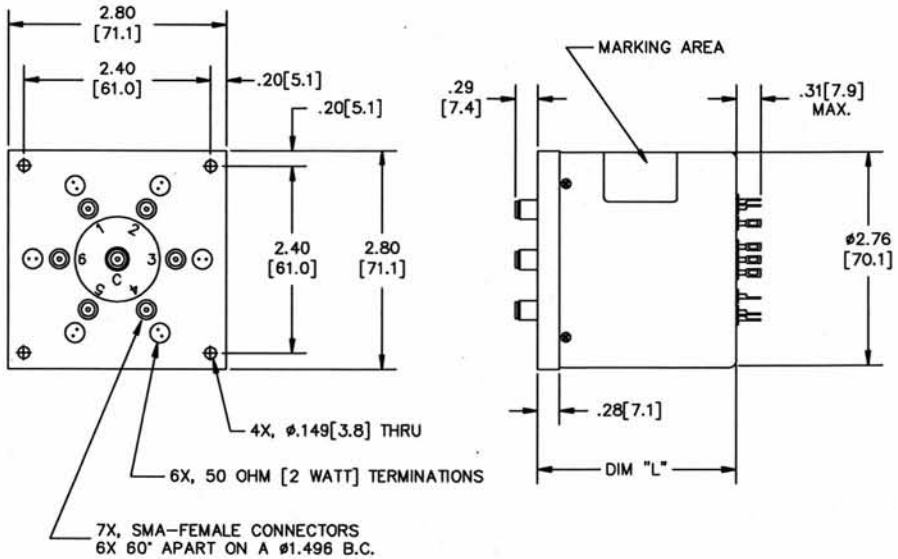
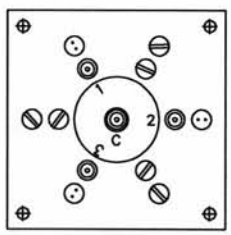
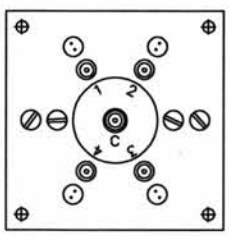
Mechanical





3 POSITION



4 POSITION

DIM "L" (MAX)	MODEL
1.95[49.5]	5X1-5X0803
2.29[58.2]	5X1-5X0823
2.29[58.2]	5X1-5X0803A
2.58[65.5]	5X1-5X0823A

Available Options

Moisture Seal

9 or 15 PIN "D" Plug

BCD Decoding Circuit

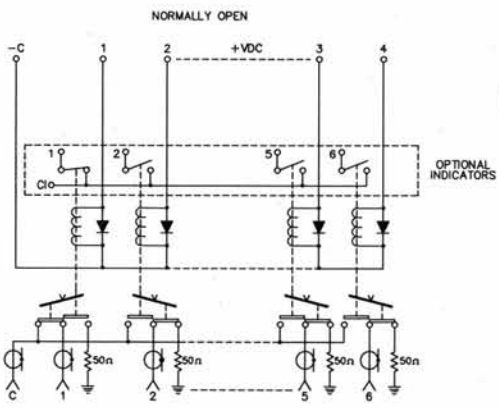
Operating Voltages:
15, 20, 24 Vdc

-55°C to +85°C Operation

Normally Closed, Position 1

BMA Connectors

Electrical



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DowKey® Microwave CORPORATION

DowKey's Microwave 3 to 6 Position Latching switch is a multi-position electro-mechanical latching coaxial switch with suppression diodes and a solid state self cut-off circuit. Utilizing SMA connectors, the RF characteristics are excellent over the DC-18 GHz frequency range.

Options include extended frequency range up to 26.5 GHz, a "D" type control connector, moisture seal, indicator contacts, operating voltages, and TTL or BCD compatibility. Also available are BMA (Blind Mate) connectors which provide quick installation into modular plug-in systems operating to 18 GHz. The BMA connectors mate with OSP* female connectors.

*OSP is a registered trademark of M/A COM Omni-Spectra, Inc.

DowKey® 531-561 Series Latching, SMA

Typical applications for the 531-561 Series include:

- Automatic Test Equipment
- Switch Matrixes
- Multi-Band or Alternate Source Selection

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 414 mA
28 Vdc 177 mA

Switching Time:
15 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
9.5 oz., (269 g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
DC-4	1.25	70	0.20	100
4-8	1.35	65	0.30	70
8-12	1.40	60	0.40	60
12-16	1.50	60	0.50	50
16-18	1.60	60	0.50	45

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Switch Configuration SP3T	SP4T	SP6T
Latching with Self Cut-Off				
12 Vdc	SMA	531-4208	541-4208	561-4208
28 Vdc	SMA	531-4308	541-4308	561-4308
Latching with Self Cut-Off, Indicators				
12 Vdc	SMA	531-420822	541-420822	561-420822
28 Vdc	SMA	531-430822	541-430822	561-430822
Latching with Self Cut-Off, TTL Compatible Logic				
12 Vdc	SMA	531-420802A	541-420802A	561-420802A
28 Vdc	SMA	531-430802A	541-430802A	561-430802A
Latching with Self Cut-Off, Indicators, TTL Compatible Logic				
12 Vdc	SMA	531-420822A	541-420822A	561-420822A
28 Vdc	SMA	531-430822A	541-430822A	561-430822A

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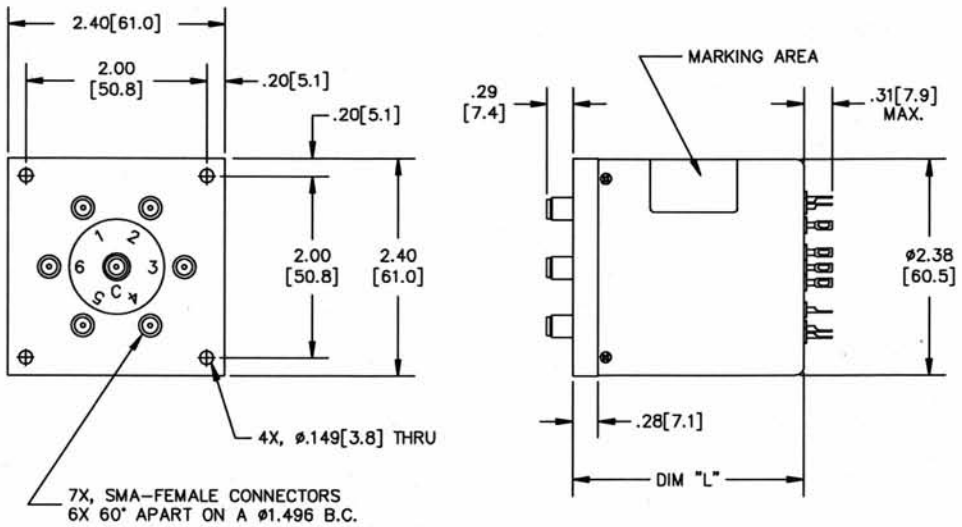
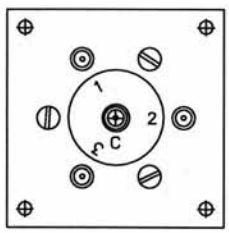
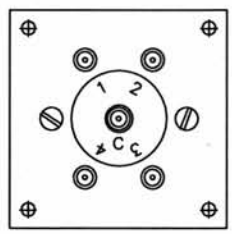
Mechanical





3 POSITION



4 POSITION

DIM "L" (MAX)	MODEL
2.40[61.0]	5X1-4X08
2.70[68.6]	5X1-4X0822
2.70[68.6]	5X1-4X0802A
3.00[76.2]	5X1-4X0822A

Available Options

Moisture Seal

9 or 15 PIN "D" Plug

BCD Decoding Circuit

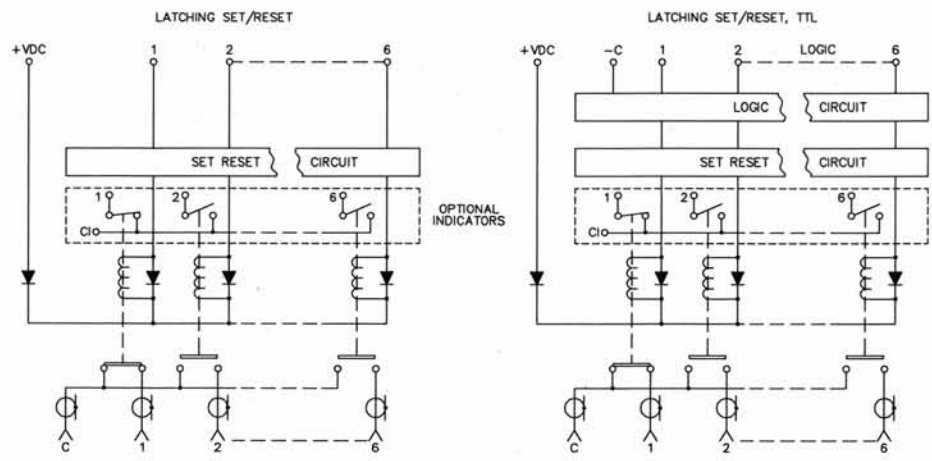
Operating Voltages:
15, 20, 24 Vdc

-55°C to +85°C Operation

Common Negative

BMA Connectors

Electrical



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DowKey® Microwave CORPORATION

The DowKey Microwave 3 to 6 Position Latching Terminated switch is a multi-position electro-mechanical latching coaxial switch with suppression diodes, a solid state self cut-off circuit, and 2 Watt, 50 Ohm internal terminations.. Utilizing SMA connectors, the RF characteristics are excellent over the DC-18 GHz frequency range.

Options include 5 Watt terminations, a "D" type control connector, moisture seal, indicator contacts, special operating voltages, and TTL or BCD compatibility. Also available are BMA (Blind Mate) connectors which provide quick installation into modular plug-in systems operating to 18 GHz. The BMA connectors mate with OSP* female connectors.

*OSP is a registered trademark of M/A COM Omni-Spectra, Inc.

DowKey® 531-561 Series Latching Terminated, SMA

Typical applications for the 531-561 Series include:

- Automatic Test Equipment
- Switch Matrixes
- Multi-Band or Alternate Source Selection

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 414 mA
28 Vdc 177 mA

Switching Time:
15 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
10.0 oz, (283 g)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
DC-4	1.25	70	0.20	100
4-8	1.35	65	0.30	70
8-12	1.40	60	0.40	60
12-16	1.50	60	0.50	50
16-18	1.60	60	0.50	45

Power handling capability is for through path only. Internal termination is limited to 500 milliwatts dissipation.

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Switch Configuration SP3T	SP4T	SP6T
12 Vdc	SMA	531-420803	541-420803	561-420803
28 Vdc	SMA	531-430803	541-430803	561-430803
Latching with Self Cut-Off, Indicators				
12 Vdc	SMA	531-420823	541-420823	561-420823
28 Vdc	SMA	531-430823	541-430823	561-430823
Latching with Self Cut-Off, TTL Compatible Logic				
12 Vdc	SMA	531-420803A	541-420803A	561-420803A
28 Vdc	SMA	531-430803A	541-430803A	561-430803A
Latching with Self Cut-Off, Indicators, TTL Compatible Logic				
12 Vdc	SMA	531-420823A	541-420823A	561-420823A
28 Vdc	SMA	531-430823A	541-430823A	561-430823A

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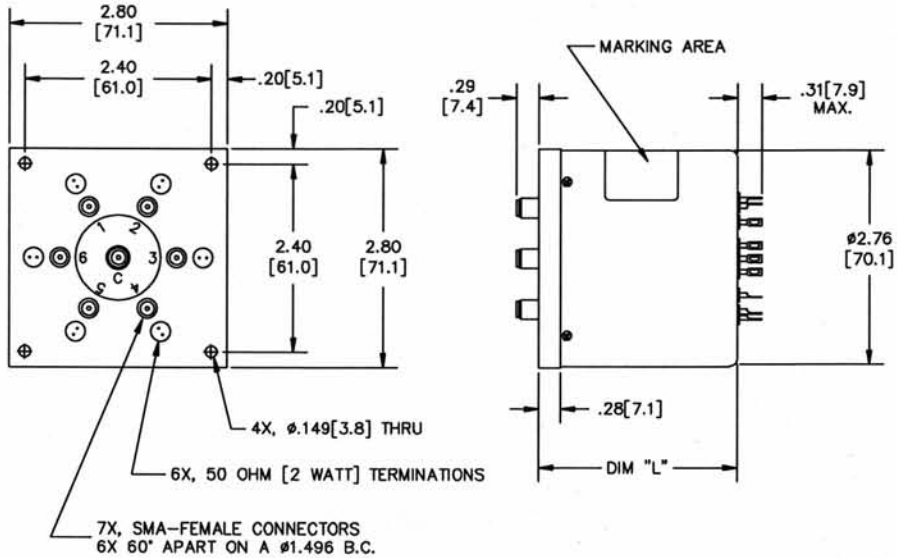
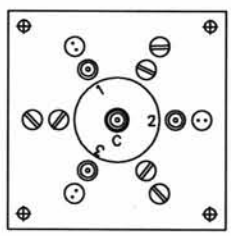
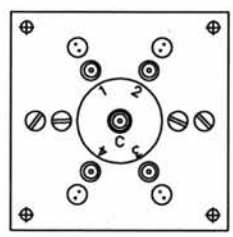
Mechanical





3 POSITION



4 POSITION

DIM "L" (MAX)	MODEL
2.40[61.0]	5X1-4X0803
2.70[68.6]	5X1-4X0823
2.70[68.6]	5X1-4X0803A
3.00[76.2]	5X1-4X0823A

Available Options

Moisture Seal

9 or 15 PIN "D" Plug

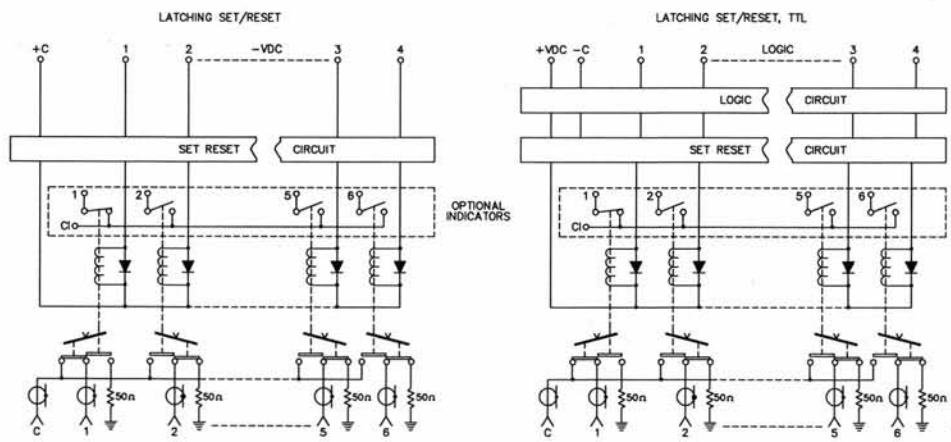
BCD Decoding Circuit

Operating Voltages:
15, 20, 24 Vdc

-55°C to +85°C Operation

BMA Connectors

Electrical



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DowKey® Microwave CORPORATION

The DowKey Microwave 3 to 6 Position Normally Open switch is a multi-position electro-mechanical coaxial switch. The RF characteristics are excellent over the DC-12.4 GHz frequency range. Available connectors include "N" and "TNC". "BNC" connectors are also available but are not recommended for use above 1 GHz.

Options include "D" type control connector, moisture seal, indicator contacts, suppression diodes, special operating voltages, and TTL or BCD compatibility.

Typical applications for the 531-561 Series include:

- Automatic Test Equipment
- Switch Matrixes
- Multi-Band or Alternate Source Selection

DowKey® 531-561 Series Normally Open, N

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 100 mA
28 Vdc 56 mA

Switching Time:
20 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
17.0 oz., (482g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
DC-4	1.25	70	0.30	175
4-8	1.35	60	0.40	125
8-12.4	1.50	60	0.40	100

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Switch Configuration SP3T	SP4T	SP6T
12 Vdc	N	531-5201	541-5201	561-5201
28 Vdc	N	531-5301	541-5301	561-5301
Normally open with Indicators				
12 Vdc	N	531-520122	541-520122	561-520122
28 Vdc	N	531-530122	541-530122	561-530122
Normally open with TTL Compatible Logic				
12 Vdc	N	531-520102A	541-520102A	561-520102A
28 Vdc	N	531-530102A	541-530102A	561-530102A
Normally open with Indicators, TTL Compatible Logic				
12 Vdc	N	531-520122A	541-520122A	561-520122A
28 Vdc	N	531-530122A	541-530122A	561-530122A

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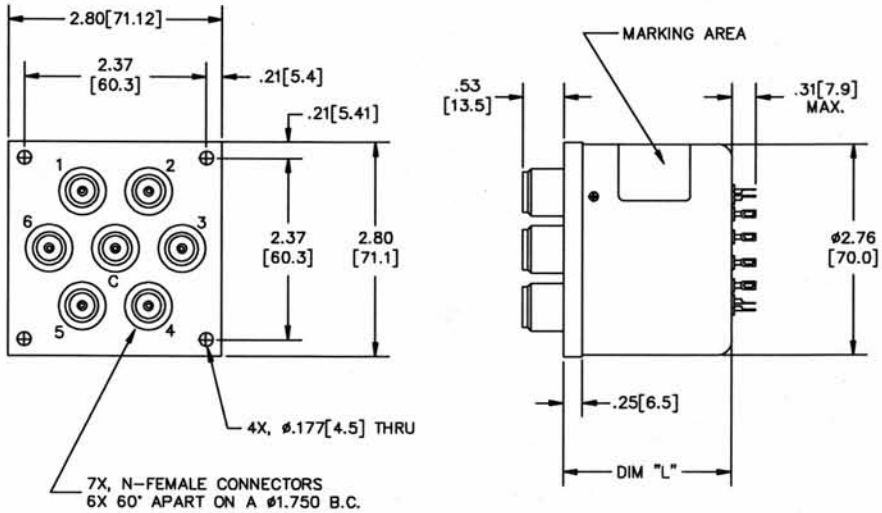
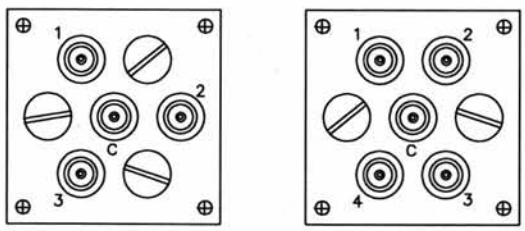
Mechanical





DIM "L" (MAX)	MODEL
2.20[55.9]	5X1-5X01
2.62[66.5]	5X1-5X0122
2.57[65.3]	5X1-5X0102A
2.90[73.7]	5X1-5X0122A

Available Options

Moisture Seal

9 or 15 PIN "D" Plug

Operating Voltages:
15, 20, 24 Vdc

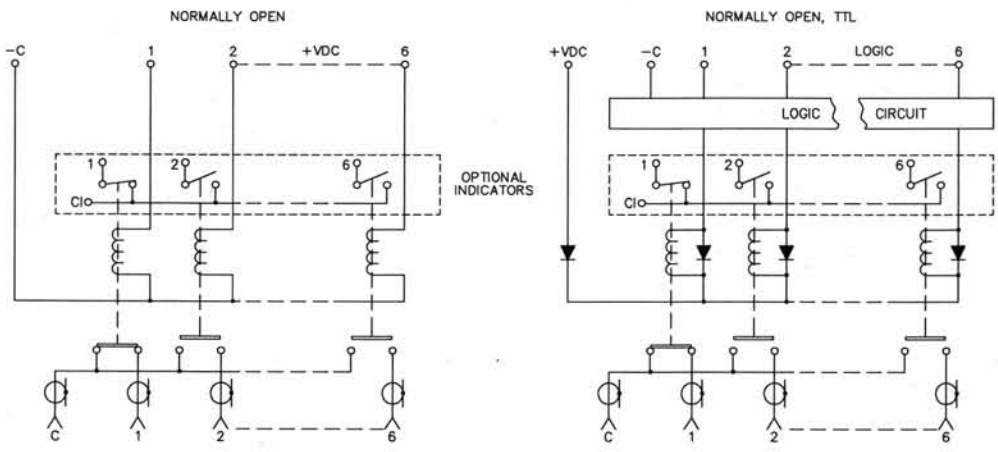
-55°C to +85°C Operation

BCD Decoding Circuit

BNC, TNC Connectors
(Consult factory for RF characteristics)

High Power
(Consult factory for RF power rating)

Electrical



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DowKey® Microwave CORPORATION

DowKey's Microwave 3 to 6 Position Latching switch is a multi-position electro-mechanical coaxial switch with suppression diodes and a solid state self cut-off circuit. Utilizing "N" and "TNC" connectors, the RF characteristics are excellent over the DC-12.4 GHz frequency range. "BNC" connectors are also available but are not recommended for use above 1 GHz.

Options include "D" type control connector, moisture seal, indicator contacts, special operating voltages, and TTL or BCD compatibility.

DowKey® 531-561 Series Latching, N

Typical applications for the 531-561 Series include:

- Automatic Test Equipment
- Switch Matrixes
- Multi-Band or Alternate Source Selection

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 521 mA
28 Vdc 224 mA

Switching Time:
20 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
22.0 oz., (624g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
DC-4	1.25	70	0.30	175
4-8	1.35	60	0.40	125
8-12.4	1.50	60	0.50	100

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Switch Configuration SP3T	SP4T	SP6T
12 Vdc	N	531-4201	541-4201	561-4201
28 Vdc	N	531-4301	541-4301	561-4301
Latching with Self Cut-Off, Indicators				
12 Vdc	N	531-420122	541-420122	561-420122
28 Vdc	N	531-430122	541-430122	561-430122
Latching with Self Cut-Off, TTL Compatible Logic				
12 Vdc	N	531-420102A	541-420102A	561-420102A
28 Vdc	N	531-430102A	541-430102A	561-430102A
Latching with Self Cut-Off, Indicators, TTL Compatible Logic				
12 Vdc	N	531-420122A	541-420122A	561-420122A
28 Vdc	N	531-430122A	541-430122A	561-430122A

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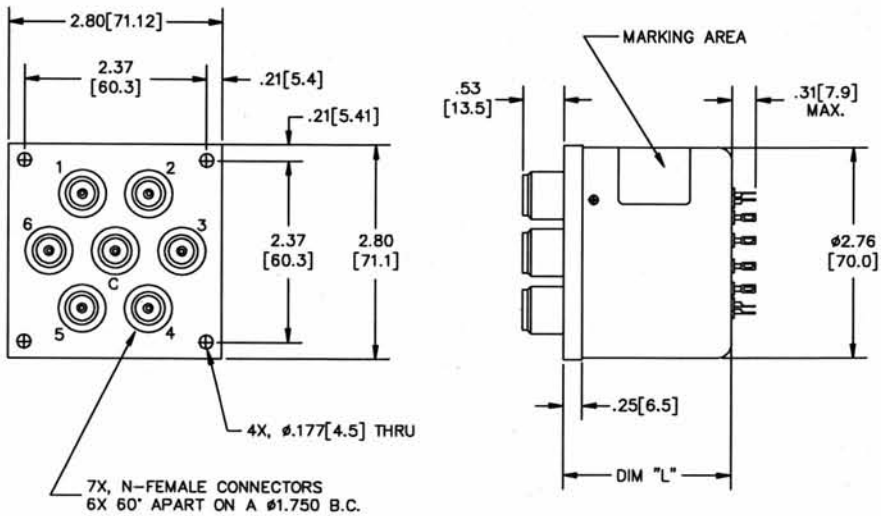
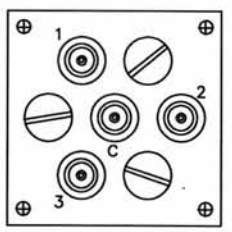
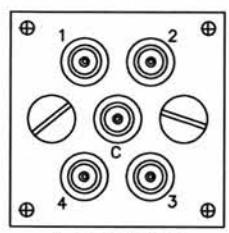
Mechanical







DIM "L" (MAX)	MODEL
2.20[55.9]	5X1-4X01
2.60[66.0]	5X1-4X0122
2.72[69.1]	5X1-4X0102A
2.91[73.9]	5X1-4X0122A

Available Options

Moisture Seal

9 or 15 PIN "D" Plug

Operating Voltages:
15, 20, 24 Vdc

-55°C to +85°C Operation

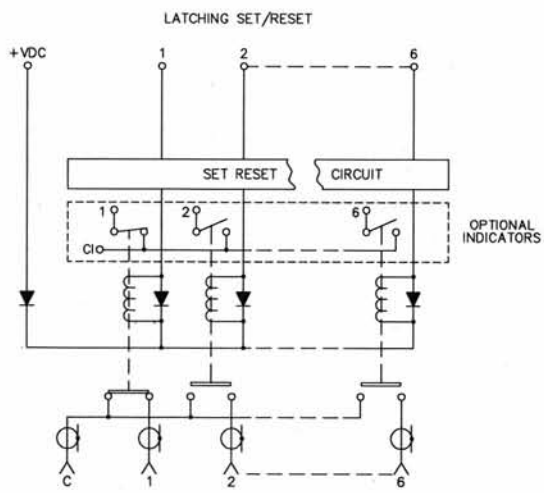
BCD Decoding Circuit

Common Negative

BNC, TNC Connectors
(Consult factory for RF characteristics)

High Power
(Consult factory for RF power rating)

Electrical



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DowKey® Microwave CORPORATION

The DowKey Microwave 535-565 Series Multi-position switches are designed for superior performance in restricted area applications such as portable military test sets. The switches are the smallest multi-position switches available that conform to the mechanical dimensions of a MIL-PRF-3928/18 switch. All models have SMA connectors with mechanically captivated center conductors for minimal RF leakage and low signal loss. Three-, four-, and six-position models are standard.

Typical applications for the 535-565 Series include:

- Automatic Test Equipment
- Compact Switch Matrixes
- Multi-Band or Alternate Source Selection

DowKey® 535-565 Series Normally Open, SMA

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 333 mA
28 Vdc 161 mA

Switching Time:
20 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
4.0 oz., (115g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
DC-4	1.25	70	0.20	100
4-8	1.35	65	0.30	70
8-12	1.40	60	0.40	60
12-18	1.50	60	0.50	45

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Switch Configuration SP3T	SP4T	SP6T
12 Vdc	SMA	535-5208	545-5208	565-5208
28 Vdc	SMA	535-5308	545-5308	565-5308
Normally open with indicators				
12 Vdc	SMA	535-520822	545-520822	565-520822
28 Vdc	SMA	535-530822	545-530822	565-530822
Normally open with TTL Compatible Logic				
12 Vdc	SMA	535-520802A	545-520802A	565-520802A
28 Vdc	SMA	535-530802A	545-530802A	565-530802A
Normally open with indicators, TTL Compatible Logic				
12 Vdc	SMA	535-520822A	545-520822A	565-520822A
28 Vdc	SMA	535-530822A	545-530822A	565-530822A

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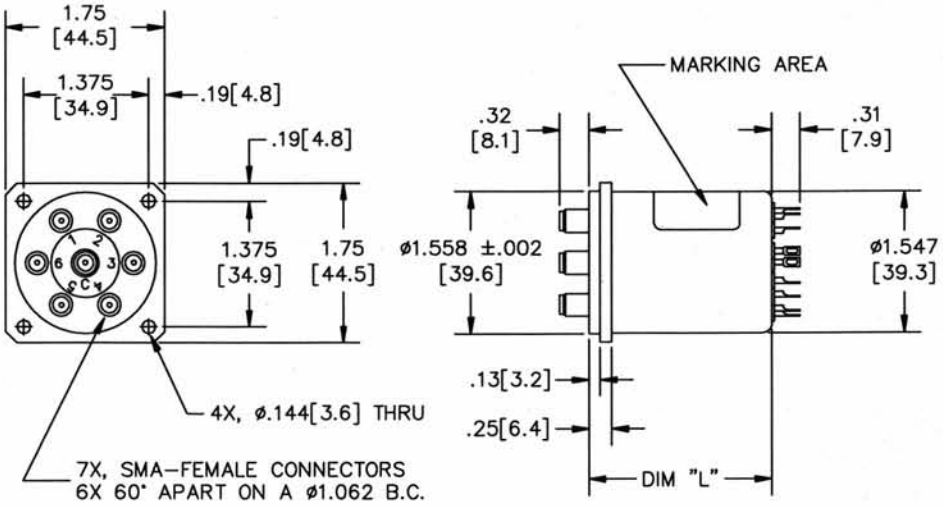
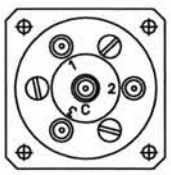
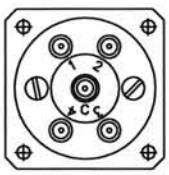
Mechanical





3 POSITION



4 POSITION

DIM "L" (MAX)	MODEL
1.41[35.8]	5X5–5X08
1.90[48.3]	5X5–5X0822
1.70[43.2]	5X5–5X0802A
2.08[52.8]	5X5–5X0822A

Available Options

Moisture Seal

9 PIN "D" Plug*

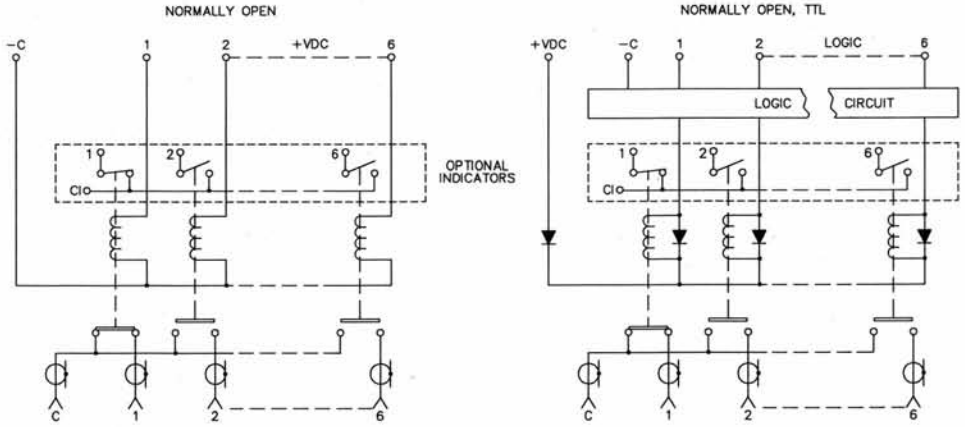
BCD Decoding Circuit

Operating Voltages:
15, 20, 24 Vdc

-55°C to +85°C Operation

***"D" Plug not available with indicators**

Electrical



DowKey Microwave Corporation
1667 Walter Street, Ventura, California 93003
(805) 650-0260 • FAX (805) 650-1734

DowKey® Microwave CORPORATION

The DowKey Microwave 7 to 8 Position Normally Open switch is a multi-position electro-mechanical coaxial switch with SMA connectors. The RF characteristics are excellent over the DC-18 GHz frequency range.

Options include "D" type control connector, moisture seal, indicator contacts, special operating voltages, suppression diodes, and TTL or BCD compatibility. Also available are BMA (Blind Mate) connectors which provide quick installation into modular plug-in systems. The BMA connectors mate with OSP* female connectors.

*OSP is a registered trademark of M/A COM Omni-Spectra, Inc.

DowKey® 571-581 Series Normally Open, SMA

Typical applications for the 571-581 Series include:

- Automatic Test Equipment
- Switch Matrixes
- Multi-Band or Alternate Source Selection

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 286 mA
28 Vdc 122 mA

Switching Time:
15 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
5.0 oz., (142g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
DC-4	1.25	70	0.20	100
4-8	1.35	65	0.30	70
8-12	1.40	60	0.40	60
12-16	1.50	60	0.50	50
16-18	1.80	55	0.80	45

Power handling capability is for through path only. Internal termination is limited to 500 milliwatts dissipation.

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Switch Configuration SP7T	SP8T
12 Vdc	SMA	571-5208	581-5208
28 Vdc	SMA	571-5308	581-5308
Normally Open with Indicators			
12 Vdc	SMA	571-520822	581-520822
28 Vdc	SMA	571-530822	581-530822
Normally Open with TTL Compatible Logic			
12 Vdc	SMA	571-520802A	581-520802A
28 Vdc	SMA	571-530802A	581-530802A
Normally Open with Indicators, TTL Compatible Logic			
12 Vdc	SMA	571-520822A	581-520822A
28 Vdc	SMA	571-530822A	581-530822A

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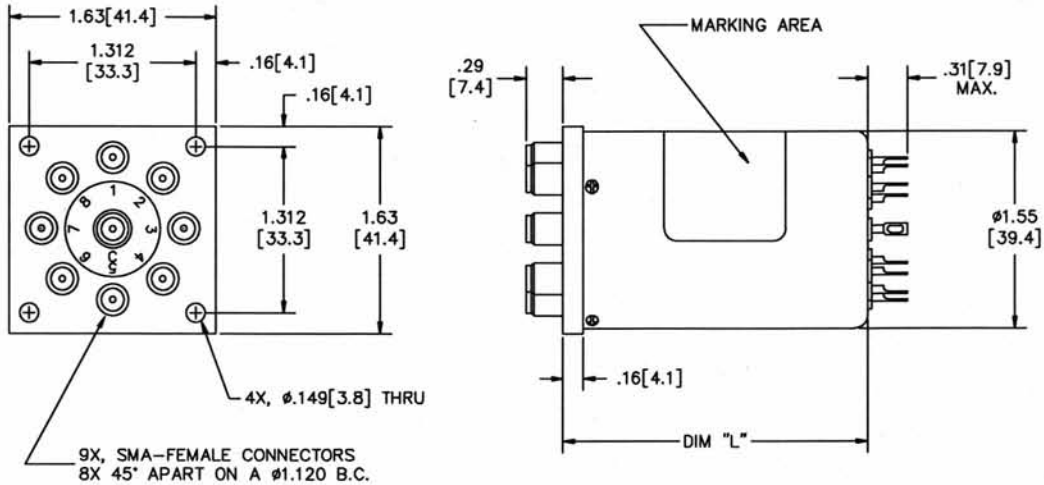
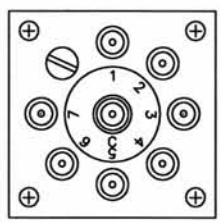
Mechanical





7 POSITION

DIM "L" (MAX)	MODEL
1.95[49.5]	5X1-5X08
2.29[58.2]	5X1-5X0822
2.29[58.2]	5X1-5X0802A
2.58[65.5]	5X1-5X0822A

Available Options

Moisture Seal

9, 15 or 25 PIN "D" Plug

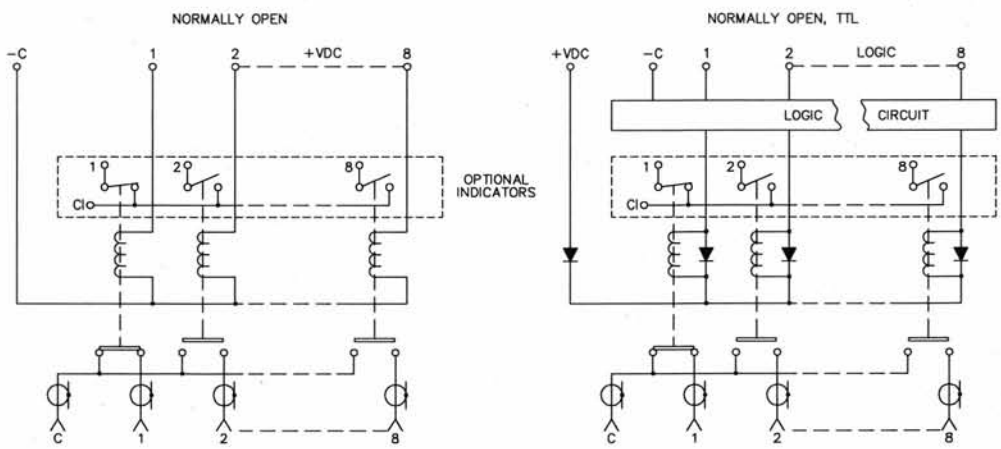
Operating Voltages:
15, 20, 24 Vdc

-55°C to +85°C Operation

BCD Decoding Circuit

BMA Connectors

Electrical



DowKey Microwave Corporation
1667 Walter Street, Ventura, California 93003
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DowKey® Microwave CORPORATION

The DowKey Microwave 7 to 8 Position Normally Open Terminated switch is a multi-position electro-mechanical coaxial switch with SMA connectors and 2 Watt, 50 Ohm internal terminations. The RF characteristics are excellent over the DC-18 GHz frequency range.

Options include 5 Watt terminations, a "D" type control connector, moisture seal, indicator contacts, special operating voltages, and TTL or BCD compatibility. Also available are BMA (Blind Mate) connectors which provide quick installation into Modular plug-in systems. The BMA connectors mate with OSP* female connectors.

*OSP is a registered trademark of M/A COM Omni-Spectra, Inc.

DowKey® 571-581 Series Normally Open Terminated, SMA

Typical applications for the 571-581 series include:

- Automatic Test Equipment
- Switch Matrixes
- Multi-Band or Alternate Source Selection

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 324 mA
28 Vdc 140 mA

Switching Time:
15 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
16.5 oz., (468 g)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
DC-4-1	1.25	70	0.20	100
4-8	1.35	65	0.30	70
8-12	1.40	60	0.40	60
12-16	1.50	60	0.50	50
16-18	1.80	55	0.80	45

Power handling capability is for through path only. Internal termination is limited to 500 milliwatts dissipation.

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Switch Configuration SP7T	SP8T
12 Vdc	SMA	571-520803	581-520803
28 Vdc	SMA	571-530803	581-530803
Normally Open with Indicators			
12 Vdc	SMA	571-520823	581-520823
28 Vdc	SMA	571-530823	581-530823
Normally Open with TTL Compatible Logic			
12 Vdc	SMA	571-520803A	581-520803A
28 Vdc	SMA	571-530803A	581-530803A
Normally Open with Indicators, TTL Compatible Logic			
12 Vdc	SMA	571-520823A	581-520823A
28 Vdc	SMA	571-530823A	581-530823A

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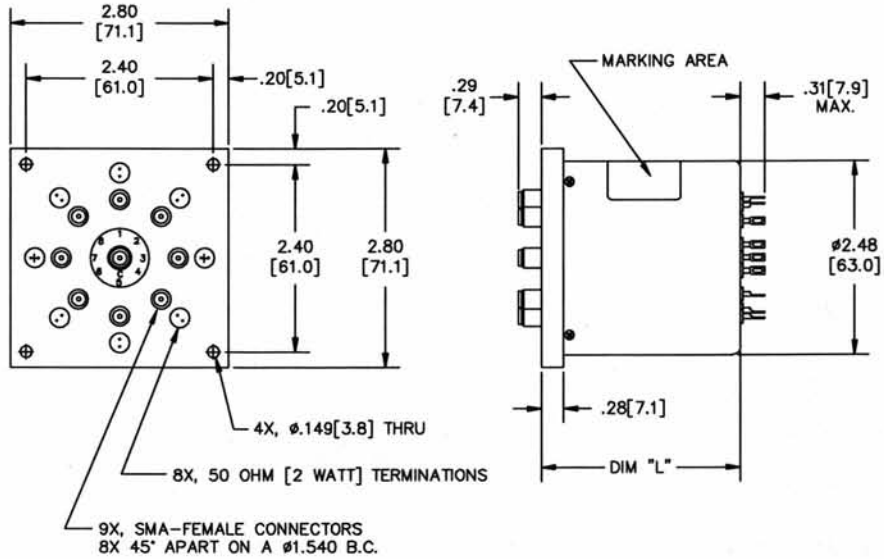
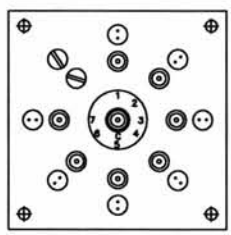
Mechanical





7 POSITION

DIM "L" (MAX)	MODEL
1.93[49.0]	5X1-5X0803
2.25[57.2]	5X1-5X0823
2.25[57.2]	5X1-5X0803A
2.60[66.0]	5X1-5X0823A

Available Options

Moisture Seal

15 or 25 PIN "D" Plug

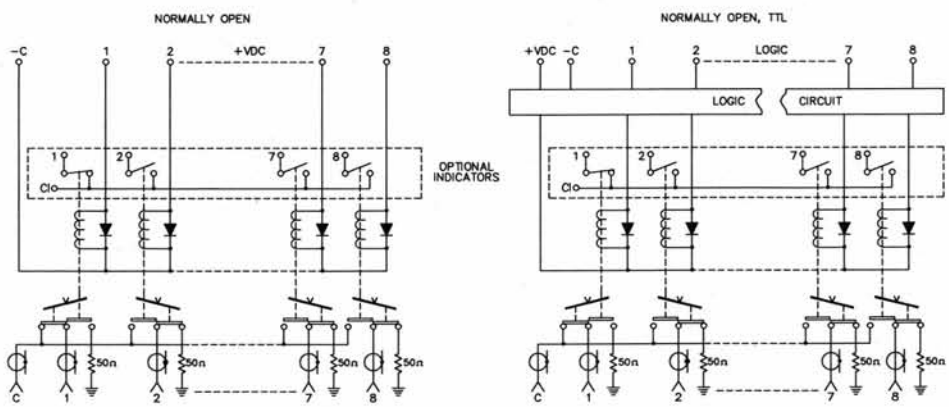
Operating Voltages:
15, 20, 24 Vdc

-55°C to +85°C Operation

BCD Decoding Circuit

BMA Connectors

Electrical



DowKey Microwave Corporation
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DowKey® Microwave CORPORATION

The DowKey Microwave 7 to 8 Position Latching switch is a multi-position electro-mechanical coaxial switch with suppression diodes and a solid state self cut-off circuit. Utilizing SMA connectors, the RF characteristics are excellent over the DC-18 GHz frequency range.

Options include a "D" type control connector, moisture seal, indicator contacts, special operating voltages, and TTL or BCD compatibility. Also available are BMA (Blind Mate) connectors which provide quick installation into Modular plug-in systems. The BMA connectors mate with OSP* female connectors.

*OSP is a registered trademark of M/A COM Omni-Spectra, Inc.

DowKey® 571-581 Series Latching, SMA

Typical applications for the 571-581 series include:

- Automatic Test Equipment
- Switch Matrixes
- Multi-Band or Alternate Source Selection
- VXI Test Sets

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 414 mA
28 Vdc 158 mA

Switching Time:
15 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
11.2 oz., (317g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
DC-4	1.25	70	0.20	100
4-8	1.35	65	0.30	70
8-12	1.40	60	0.40	60
12-16	1.50	60	0.50	50
16-18	1.80	55	0.80	45

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Switch Configuration SP7T	SP8T
12 Vdc	SMA	571-4208	581-4208
28 Vdc	SMA	571-4308	581-4308
Latching with Self Cut-Off, Indicators			
12 Vdc	SMA	571-420822	581-420822
28 Vdc	SMA	571-430822	581-430822
Latching with Self Cut-Off, TTL Compatible Logic			
12 Vdc	SMA	571-420802A	581-420802A
28 Vdc	SMA	571-430802A	581-430802A
Latching with Self Cut-Off, Indicators, TTL Compatible Logic			
12 Vdc	SMA	571-420822A	581-420822A
28 Vdc	SMA	571-430822A	581-430822A

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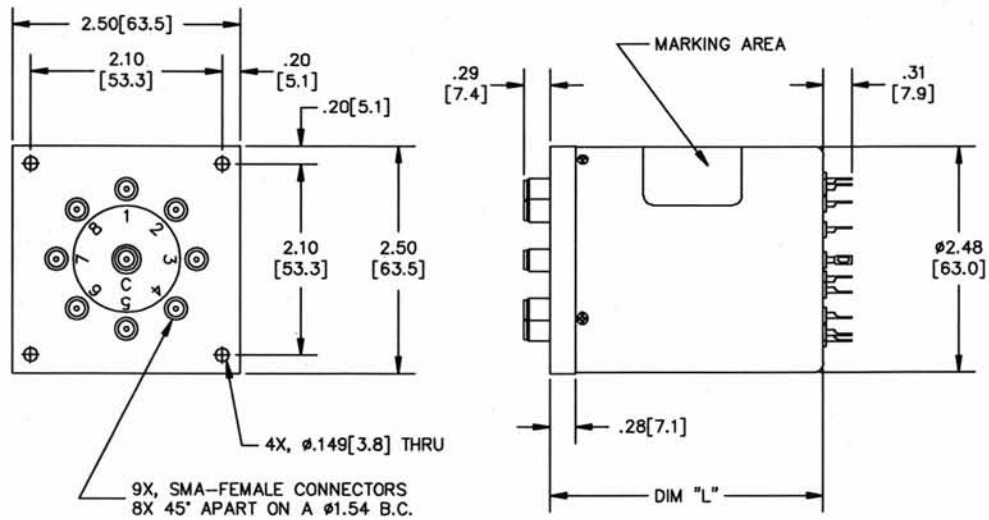
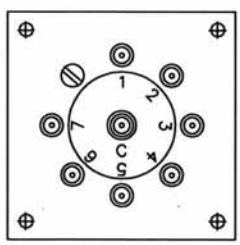
Mechanical





7 POSITION

DIM "L" (MAX)	MODEL
2.40[61.0]	5X1-4X08
2.70[68.6]	5X1-4X0822
2.70[68.6]	5X1-4X0802A
3.00[76.2]	5X1-4X0822A

Available Options

Moisture Seal

9, 15 or 25 PIN "D" Plug

Operating Voltages: 15, 20, 24 Vdc

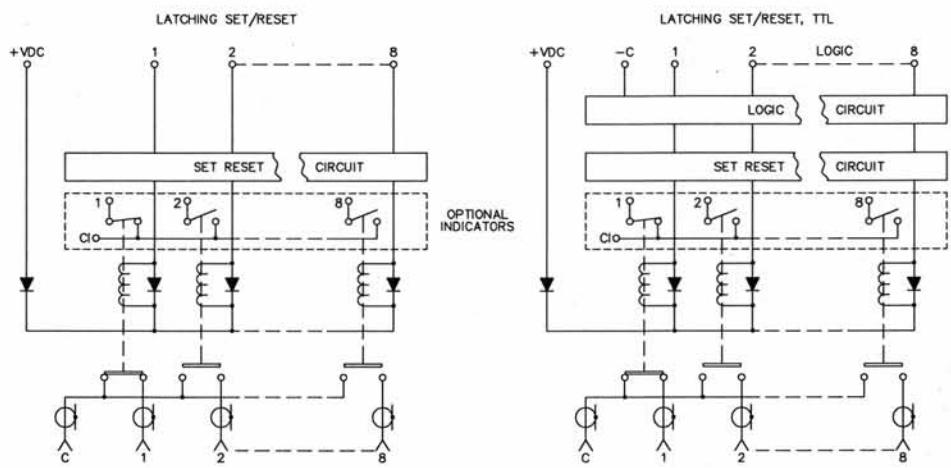
-55°C to +85°C Operation

BCD Decoding Circuit

Negative Common

BMA Connectors

Electrical



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DowKey® Microwave CORPORATION

The DowKey Microwave 7 to 8 Position Latching Terminated switch is a multi-position electro-mechanical coaxial switch with suppression diodes and a solid state self cut-off circuit, and 2 Watt, 50 Ohm internal terminations. Utilizing SMA connectors, the RF characteristics are excellent over the DC-18 GHz frequency range.

Options include 5 Watt terminations, a "D" type control connector, moisture seal, indicator contacts, special operating voltages, and TTL or BCD compatibility. Also available are BMA (Blind Mate) connectors which provide quick installation into Modular plug-in systems. The BMA connectors mate with OSP* female connectors.

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DowKey® 571-581 Series Latching Terminated, SMA

Typical applications for the 571-581 series include:

- Automatic Test Equipment
- Switch Matrixes
- Multi-Band or Alternate Source Selection

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 414 mA
28 Vdc 177 mA

Switching Time:
15 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
14.5 oz., (411g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
DC-4	1.25	70	0.20	100
4-8	1.35	65	0.30	70
8-12	1.40	60	0.40	60
12-16	1.50	60	0.50	50
16-18	1.80	55	0.80	45

Power handling capability is for through path only. Internal termination is limited to 500 milliwatts dissipation.

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Switch Configuration SP7T	SP8T
12 Vdc	SMA	571-420803	581-420803
28 Vdc	SMA	571-430803	581-430803
Latching with Self Cut-Off, Indicators			
12 Vdc	SMA	571-420823	581-420823
28 Vdc	SMA	571-430823	581-430823
Latching with Self Cut-Off, TTL Compatible Logic			
12 Vdc	SMA	571-420803A	581-420803A
28 Vdc	SMA	571-430803A	581-430803A
Latching with Self Cut-Off, Indicators, TTL Compatible Logic			
12 Vdc	SMA	571-420823A	581-420823A
28 Vdc	SMA	571-430823A	581-430823A

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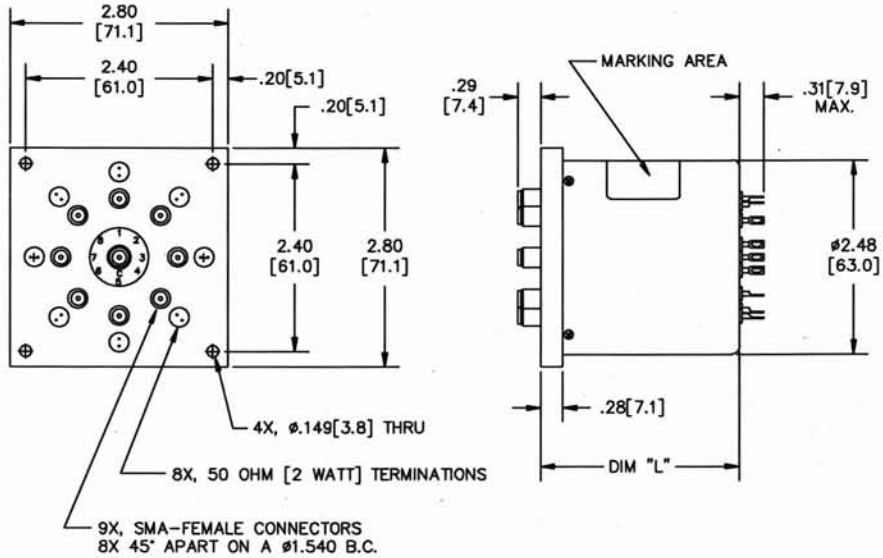
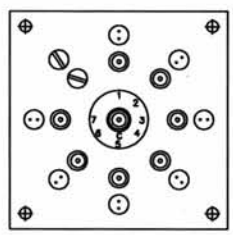
Mechanical





7 POSITION

DIM "L" (MAX)	MODEL
2.40[61.0]	5X1-4X0803
2.70[68.6]	5X1-4X0823
2.70[68.6]	5X1-4X0803A
3.00[76.2]	5X1-4X0823A

Available Options

Moisture Seal

15 or 25 PIN "D" Plug*

Operating Voltages:
15, 20, 24 Vdc

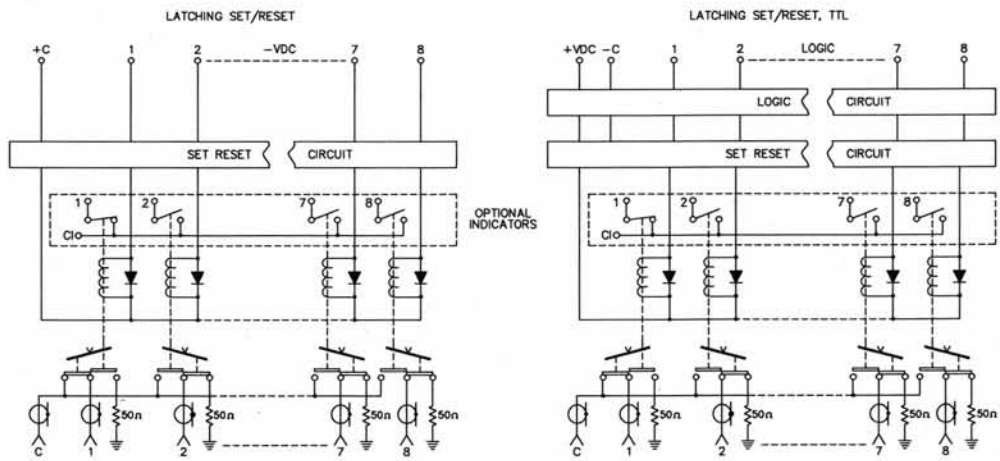
-55°C to +85°C Operation

BCD Decoding Circuit

Negative Common

BMA Connectors

Electrical



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DowKey® Microwave CORPORATION

The DowKey 9 to 10 Position Normally Open switch is a multi-position electro-mechanical coaxial switch with SMA connectors. The RF characteristics are excellent over the DC-18 GHz frequency range.

Options include a "D" type control connectors, moisture seal, indicator contacts, suppression diodes, special operating voltages, and TTL or BCD compatibility. Also available are BMA (Blind Mate) connectors which provide quick installation into Modular plug-in systems. The BMA connectors mate with OSP* female connectors.

*OSP is a registered trademark of M/A COM Omni-Spectra, Inc.

DowKey® 591-5A1 Series Normally Open, SMA

Typical applications for the 591-5A1 series include:

- Automatic Test Equipment
- Switch Matrixes
- Multi-Band or Alternate Source Selection

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 286 mA
28 Vdc 122 mA

Switching Time:
15 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
5.5 oz., (156g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
DC-4	1.25	70	0.20	100
4-8	1.35	65	0.30	70
8-12	1.40	60	0.40	60
12-16	1.50	60	0.6	50
16-18	1.80	55	0.80	45

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Switch Configuration SP9T	SP10T
12 Vdc	SMA	591-5208	5A1-5208
28 Vdc	SMA	591-5308	5A1-5308
Normally Open with Indicators			
12 Vdc	SMA	591-520822	5A1-520822
28 Vdc	SMA	591-530822	5A1-530822
Normally Open with TTL Compatible Logic			
12 Vdc	SMA	591-520802A	5A1-520802A
28 Vdc	SMA	591-530802A	5A1-530802A
Normally Open with Indicators, TTL Compatible Logic			
12 Vdc	SMA	591-520822A	5A1-520822A
28 Vdc	SMA	591-530822A	5A1-530822A

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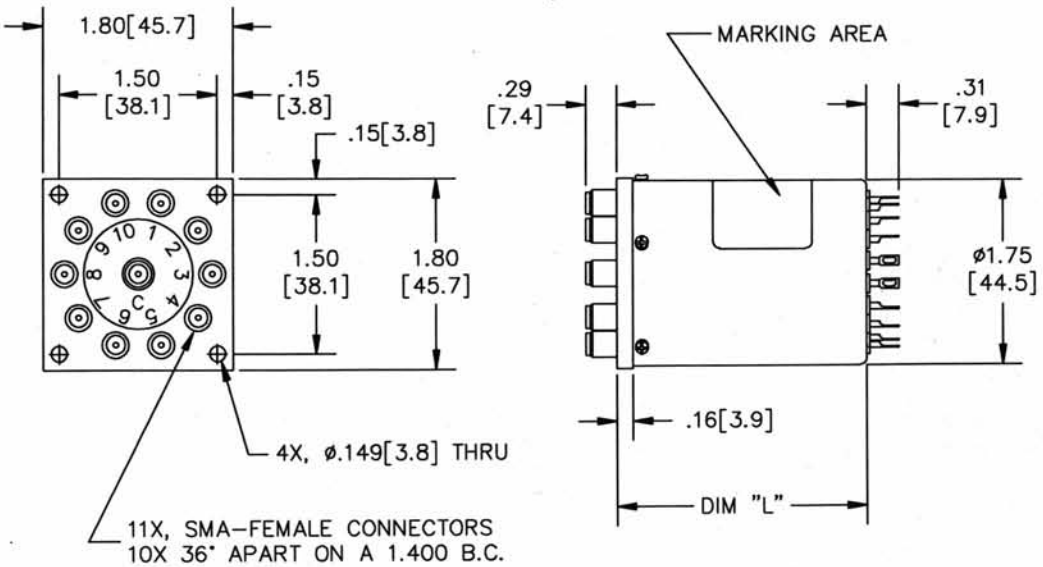
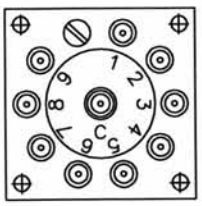
Mechanical





9 POSITION

DIM "L" (MAX)	MODEL
1.63[41.4]	5X1–5X08
2.13[54.1]	5X1–5X0822
2.23[56.6]	5X1–5X0802A
2.71[68.8]	5X1–5X0822A

Available Options

Moisture Seal

9, 15 or 25 PIN "D" Plug

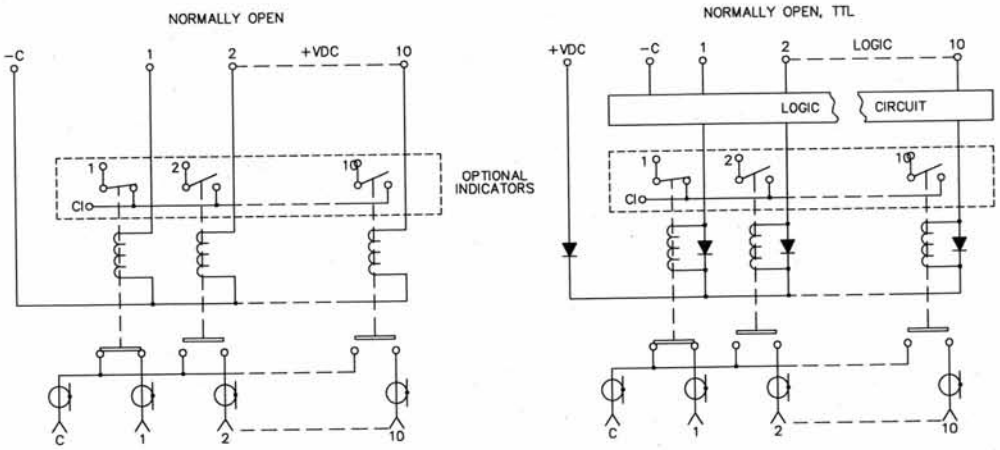
Operating Voltages: 15, 20, 24 Vdc

-55°C to +85°C Operation

BCD Decoding Circuit

BMA Connectors

Electrical



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DowKey® Microwave CORPORATION

DowKey's 9 to 10 Position Normally Open switch is a multi-position electro-mechanical coaxial switch with SMA connectors. The RF characteristics are excellent over the DC-18 GHz frequency range.

Options include a "D" type control connectors, moisture seal, indicator contacts, suppression diodes, special operating voltages, and TTL or BCD compatibility. Also available are BMA (Blind Mate) connectors which provide quick installation into Modular plug-in systems. The BMA connectors mate with OSP* female connectors.

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DowKey® 591-5A1 Series Normally Open Terminated, SMA

Typical applications for the 591-5A1 Series include:

- Automatic Test Equipment
- Switch Matrixes
- Multi-Band or Alternate Source Selection

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 324 mA
28 Vdc 140 mA

Switching Time:
15 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
17.5 oz., (496g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
DC-4	1.25	70	0.20	100
4-8	1.35	65	0.30	70
8-12	1.40	60	0.40	60
12-16	1.50	60	0.60	50
16-18	1.80	55	0.80	45

Power handling capability is for through path only. Internal termination is limited to 500 milliwatts dissipation.

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Switch Configuration SP9T	SP10T
12 Vdc	SMA	591-520803	5A1-520803
28 Vdc	SMA	591-530803	5A1-530803
Normally Open with Indicators			
12 Vdc	SMA	591-520823	5A1-520823
28 Vdc	SMA	591-530823	5A1-530823
Normally Open with TTL Compatible Logic			
12 Vdc	SMA	591-520803A	5A1-520803A
28 Vdc	SMA	591-530803A	5A1-530803A
Normally Open with Indicators, TTL Compatible Logic			
12 Vdc	SMA	591-520823A	5A1-520823A
28 Vdc	SMA	591-530823A	5A1-530823A

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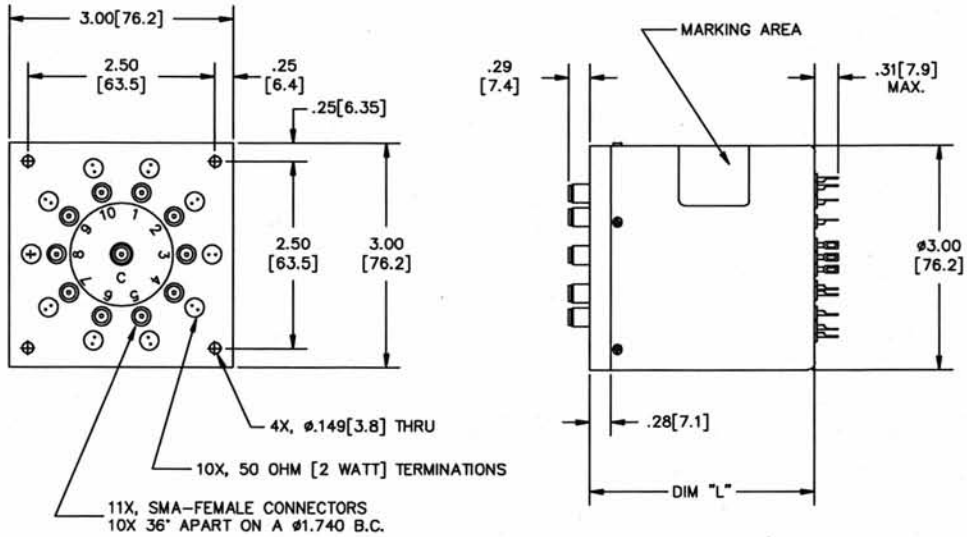
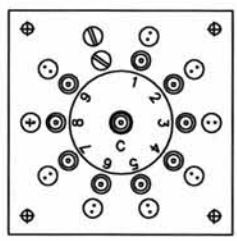
Mechanical





DIM "L" (MAX)	MODEL
1.93[49.0]	5X1-5X0803
2.27[57.6]	5X1-5X0823
2.27[57.6]	5X1-5X0803A
2.56[65.0]	5X1-5X0823A

Available Options

Moisture Seal

15 or 25 PIN "D" Plug

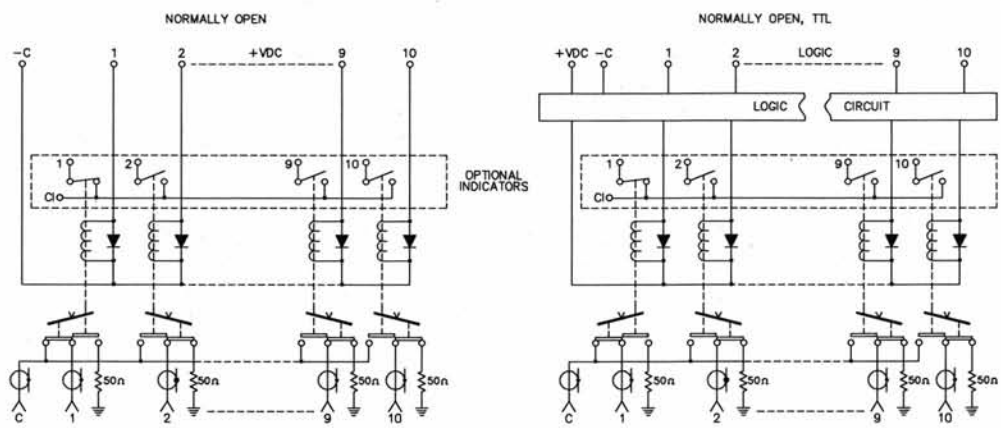
Operating Voltages: 15, 20, 24 Vdc

-55°C to +85°C Operation

BCD Decoding Circuit

BMA Connectors

Electrical



DowKey Microwave Corporation
1667 Walter Street, Ventura, California 93003
(805) 650-0260 • FAX (805) 650-1734

DowKey® Microwave CORPORATION

The DowKey 9 to 10 Position Latching switch is a multi-position electro-mechanical coaxial switch with SMA connectors. The RF characteristics are excellent over the DC-18 GHz frequency range.

Options include a "D" type control connector, moisture seal, indicator contacts, special operating voltages, and TTL or BCD compatibility. Also available are BMA (Blind Mate) connectors which provide quick installation into Modular plug-in systems. The BMA connectors mate with OSP* female connectors.

*OSP is a registered trademark of M/A COM Omni-Spectra, Inc.

DowKey® 591-5A1 Series Latching, SMA

Typical applications for the 591-5A1 Series include:

- Automatic Test Equipment
- Switch Matrixes
- Multi-Band or Alternate Source Selection
- VXI Test Sets

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 414 mA
28 Vdc 177 mA

Switching Time:
15 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
14.9 oz., (422g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
DC-4	1.25	70	0.20	100
4-8	1.35	65	0.30	70
8-12	1.40	60	0.40	60
12-16	1.50	60	0.50	50
16-18	1.80	55	0.80	45

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Switch Configuration SP9T	SP10T
12 Vdc	SMA	591-4208	5A1-4208
28 Vdc	SMA	591-4308	5A1-4308
Latching with Self Cut-Off, Indicators			
12 Vdc	SMA	591-420822	5A1-420822
28 Vdc	SMA	591-430822	5A1-430822
Latching with Self Cut-Off, TTL Compatible Logic			
12 Vdc	SMA	591-420802A	5A1-420802A
28 Vdc	SMA	591-430802A	5A1-430802A
Latching with Self Cut-Off, Indicators, TTL Compatible Logic			
12 Vdc	SMA	591-420822A	5A1-420822A
28 Vdc	SMA	591-430822A	5A1-430822A

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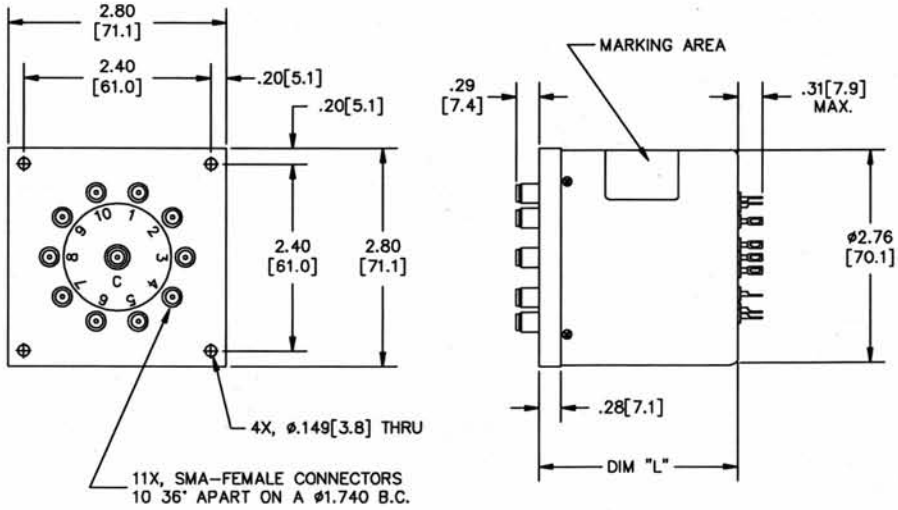
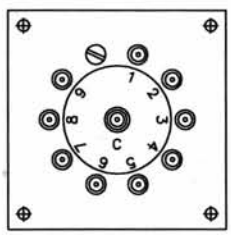
Mechanical





DIM "L" (MAX)	MODEL
2.40[61.0]	5X1-4X08
2.70[68.6]	5X1-4X0822
2.70[68.6]	5X1-4X0802A
3.00[76.2]	5X1-4X0822A

Available Options

Moisture Seal

15 or 25 PIN "D" Plug

Operating Voltages: 15, 20, 24 Vdc

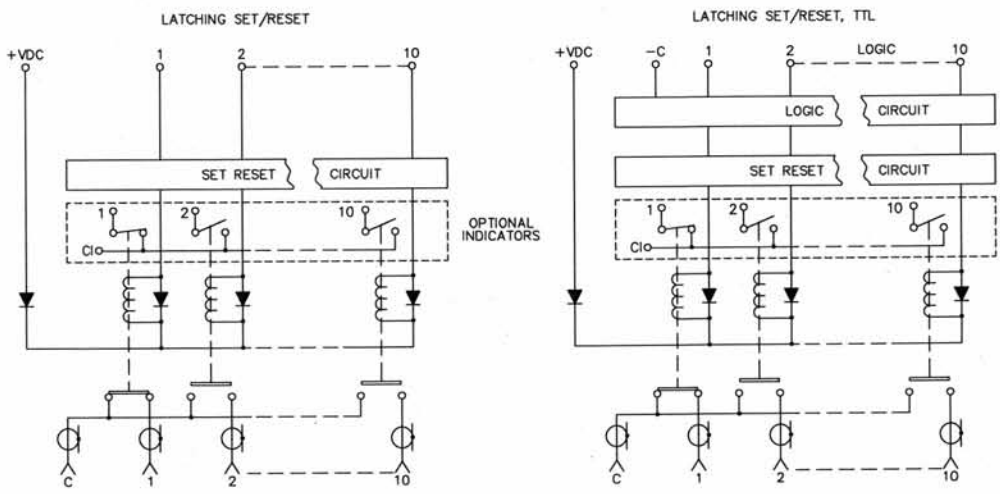
-55°C to +85°C Operation

BCD Decoding Circuit

Negative Common

BMA Connectors

Electrical



DowKey Microwave Corporation
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DowKey® Microwave CORPORATION

The DowKey 9 to 10 Position Latching Terminated switch is a multi-position electro-mechanical coaxial switch with suppression diodes and a solid state self cut-off circuit. Utilizing SMA connectors, the RF characteristics are excellent over the DC-18 GHz frequency range.

Options include a "D" type control connector, moisture seal, indicator contacts, special operating voltages, and TTL or BCD compatibility. Also available are BMA (Blind Mate) connectors which provide quick installation into Modular plug-in systems. The BMA connectors mate with OSP* female connectors.

*OSP is a registered trademark of M/A COM Omni-Spectra, Inc.

DowKey® 591-5A1 Series Latching Terminated, SMA

Typical applications for the 591-5A1 Series include:

- Automatic Test Equipment
- Switch Matrixes
- Multi-Band or Alternate Source Selection

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 414 mA
28 Vdc 177 mA

Switching Time:
15 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
15.3 oz., (434g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
DC-4	1.25	70	0.20	100
4-8	1.35	65	0.30	70
8-12	1.40	60	0.40	60
12-16	1.50	60	0.60	50
16-18	1.80	55	0.80	45

Power handling capability is for through path only. Internal termination is limited to 500 milliwatts dissipation.

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Switch Configuration SP9T	SP10T
12 Vdc	SMA	591-420803	5A1-420803
28 Vdc	SMA	591-430803	5A1-430803
Latching with Self Cut-Off, Indicators			
12 Vdc	SMA	591-420823	5A1-420823
28 Vdc	SMA	591-430823	5A1-430823
Latching with Self Cut-Off, TTL Compatible Logic			
12 Vdc	SMA	591-420803A	5A1-420803A
28 Vdc	SMA	591-430803A	5A1-430803A
Latching with Self Cut-Off, Indicators, TTL Compatible Logic			
12 Vdc	SMA	591-420823A	5A1-420823A
28 Vdc	SMA	591-430823A	5A1-430823A

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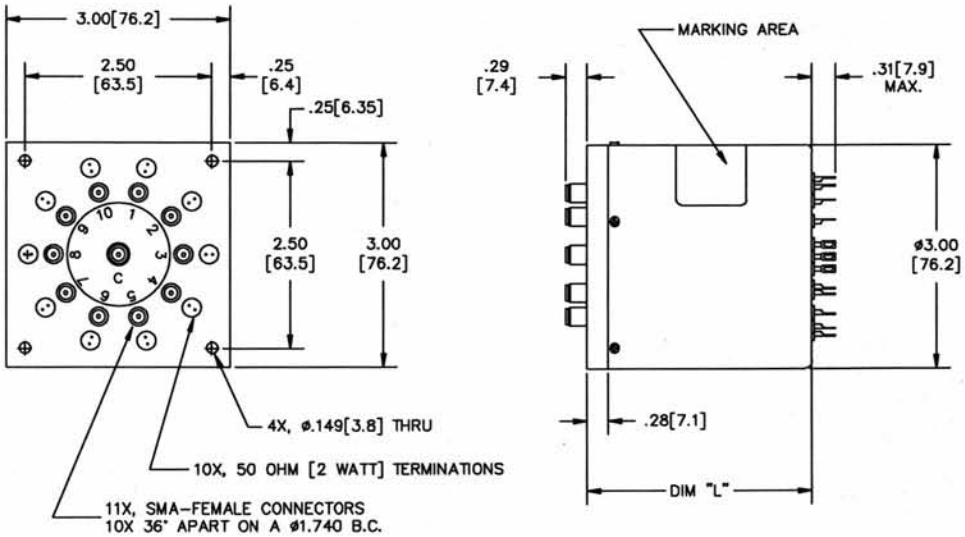
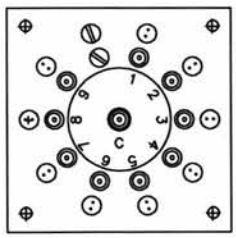
Mechanical





DIM "L" (MAX)	MODEL
2.40[61.0]	5X1-4X0803
2.70[68.6]	5X1-4X0823
2.70[68.6]	5X1-4X0803A
3.00[76.2]	5X1-4X0823A

Available Options

Moisture Seal

15 or 25 PIN "D" Plug

Operating Voltages: 15, 20, 24 Vdc

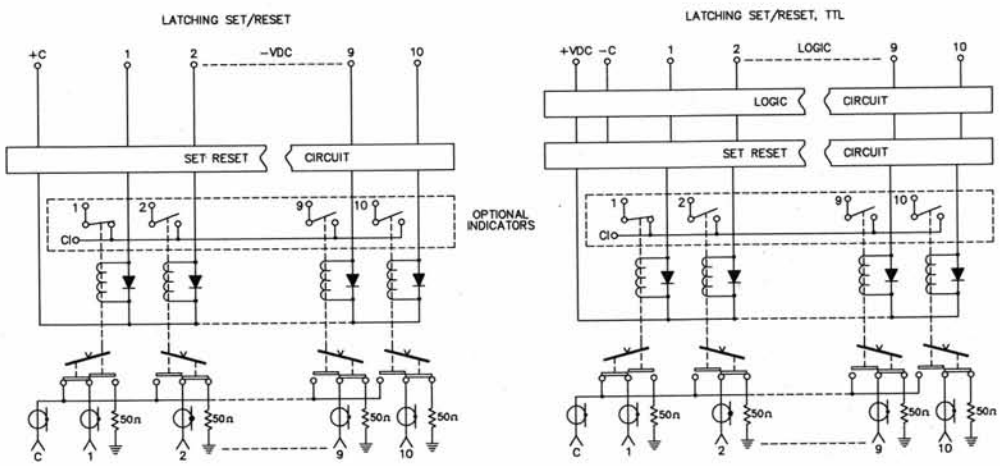
-55°C to +85°C Operation

BCD Decoding Circuit

Negative Common

BMA Connectors

Electrical



DowKey Microwave Corporation
1667 Walter Street, Ventura, California 93003
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DowKey® Microwave CORPORATION

Available with two types of internal drive electronics (Binary Decoding or MOSFET Pulse Latching), these SP3T and SP4T IN-LINE Series Multithrow Switches are ideal for test equipment and simple switch matrix applications. Featuring excellent insertion loss and isolation performance through 18 GHz, along with the DowKey INTELLIGENT RELAY internal electronics, the 433 and 443 Series are suitable for many systems applications.

Typical applications for the 433-443 Series include:

- Test Equipment Band Selection
- Switch Matrixes

DowKey® 433 & 443 Series INTELLIGENT RELAY SP3T & SP4T IN-LINE

Specifications :

Operating Voltage:
(across temperature range)
15 Vdc (14-17 Vdc)
28 Vdc (24-32 Vdc)
Coil Current (Nominal):
15 Vdc 187 mA
28 Vdc 177 mA
Switching Time:
15 mS maximum
Operating Temperature:
0°C to +65°C
Mechanical Life, Cycles:
1 x 10^6 minimum
RF Connectors:
SMA-Female Only

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-1	1.50	80	0.20	100
1-4	1.50	70	0.30	50
4-8	1.50	65	0.40	25
8-12	1.60	60	0.50	15
12-18	2.00	60	1.00	10

Power handling capability is for through path only. Optional internal termination is limited to 500 milliwatts dissipation

Connectors and Part Numbers

Terminations None	Terminations 50Ω	Descriptions
SP3T Switches		
433-320802C	433-320803C	12 Vdc Coil, MOSFET Drivers, Pulse Latching
433-330802C	433-330803C	28 Vdc Coil, MOSFET Drivers, Pulse Latching
433-420802E	433-420803E	12 Vdc Coil, Binary Decoding, with ENABLE, Latching, Self-Cutoff
433-420802E	433-420803E	28 Vdc Coil, Binary Decoding, with ENABLE, Latching, Self-Cutoff
SP4T Switches		
443-320802C	443-320803C	12 Vdc Coil, MOSFET Drivers, Pulse Latching
443-330802C	443-330803C	28 Vdc Coil, MOSFET Drivers, Pulse Latching
443-420802E	443-420803E	12 Vdc Coil, Binary Decoding, with ENABLE, Latching, Self-Cutoff
443-420802E	443-430803E	28 Vdc Coil, Binary Decoding, with ENABLE, Latching, Self-Cutoff

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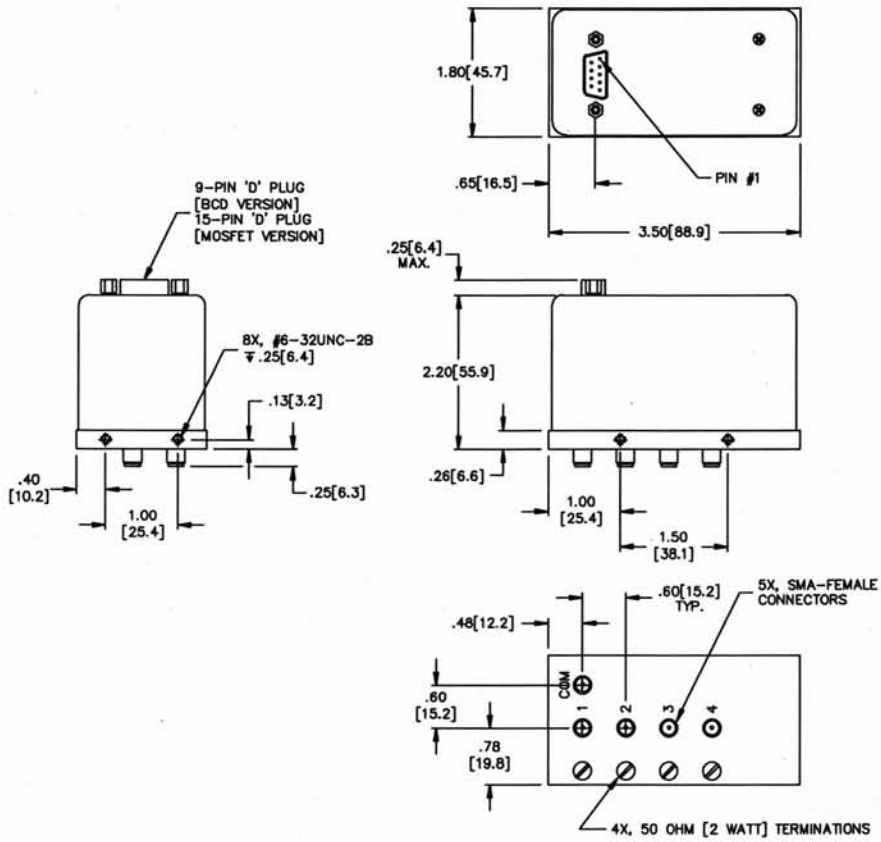
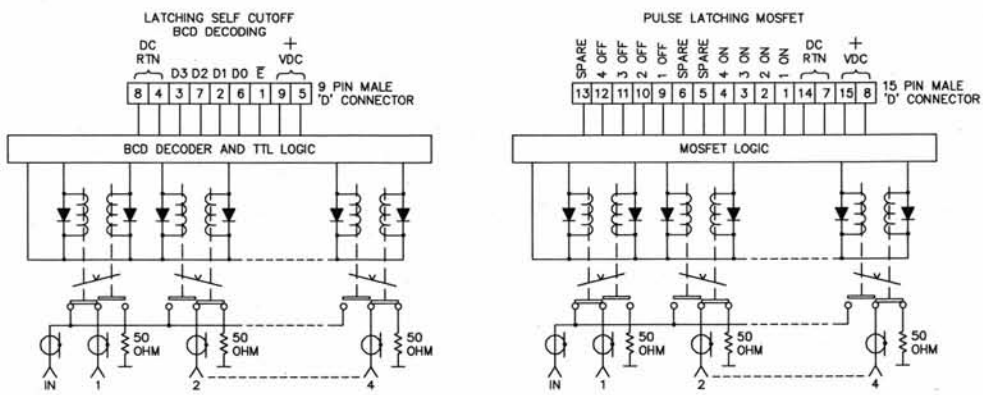
Mechanical



Electrical



DowKey Microwave Corporation
1667 Walter Street, Ventura, California 93003
(805) 650-0260 • FAX (805) 650-1734

DowKey® Microwave CORPORATION

Available with either CMOS Binary logic decoding circuits or MOSFET pulse latching electronics, these DowKey INTELLIGENT RELAY Multithrow Switches were designed to simplify the physical construction and reduce the amount of supporting (logic and switch driver) electronics required to implement complex switch assemblies. These SP7T and SP10T DowKey INTELLIGENT RELAY IN-LINE Multithrow Switches are ideal for complex switch matrix or test equipment applications.

Typical applications for the 473-4A3 Series include:

- Test Equipment Band Selection
- Switch Matrixes

DowKey® 473 to 4A3 Series INTELLIGENT RELAY SP7T & SP10T IN-LINE

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)			RF Power Watts (CW)
			1-3	4-6	7-10	
0-2	1.50	80	0.20	0.30	0.40	50
2-8	1.50	70	0.40	0.50	0.80	25
8-12	1.50	65	0.50	0.70	1.00	15
12-18	2.00	60	1.00	1.50	2.00	10

Power handling capability is for through path only. Optional internal termination is limited to 500 milliwatts dissipation

Specifications :

Operating Voltage:
(across temperature range)
15 Vdc (14-17 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
15 Vdc 187 mA
28 Vdc 177 mA

Switching Time:
15 mS maximum

Operating Temperature:
0°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

RF Connectors:
SMA-Female Only

Connectors and Part Numbers

Terminations None	Terminations 50Ω	Descriptions
SP7T Switches		
473-320802C	473-320803C	12 Vdc Coil, MOSFET Drivers, Pulse Latching
473-330802C	473-330803C	28 Vdc Coil, MOSFET Drivers, Pulse Latching
473-420802E	473-420803E	12 Vdc Coil, Binary Decoding, with ENABLE, Latching, Self-Cutoff
473-420802E	473-430803E	28 Vdc Coil, Binary Decoding, with ENABLE, Latching, Self-Cutoff
SP8T Switches		
483-320802C	483-320803C	12 Vdc Coil, MOSFET Drivers, Pulse Latching
483-330802C	483-330803C	28 Vdc Coil, MOSFET Drivers, Pulse Latching
483-420802E	483-420803E	12 Vdc Coil, Binary Decoding, with ENABLE, Latching, Self-Cutoff
483-430802E	483-430803E	28 Vdc Coil, Binary Decoding, with ENABLE, Latching, Self-Cutoff
SP9T Switches		
493-320802C	493-320803C	12 Vdc Coil, MOSFET Drivers, Pulse Latching
493-330802C	493-330803C	28 Vdc Coil, MOSFET Drivers, Pulse Latching
493-420802E	493-420803E	12 Vdc Coil, Binary Decoding, with ENABLE, Latching, Self-Cutoff
493-430802E	493-430803E	28 Vdc Coil, Binary Decoding, with ENABLE, Latching, Self-Cutoff
SP4T Switches		
4A3-320802C	4A3-320803C	12 Vdc Coil, MOSFET Drivers, Pulse Latching
4A3-330802C	4A3-330803C	28 Vdc Coil, MOSFET Drivers, Pulse Latching
4A3-420802E	4A3-420803E	12 Vdc Coil, Binary Decoding, with ENABLE, Latching, Self-Cutoff
4A3-430802E	4A3-430803E	28 Vdc Coil, Binary Decoding, with ENABLE, Latching, Self-Cutoff

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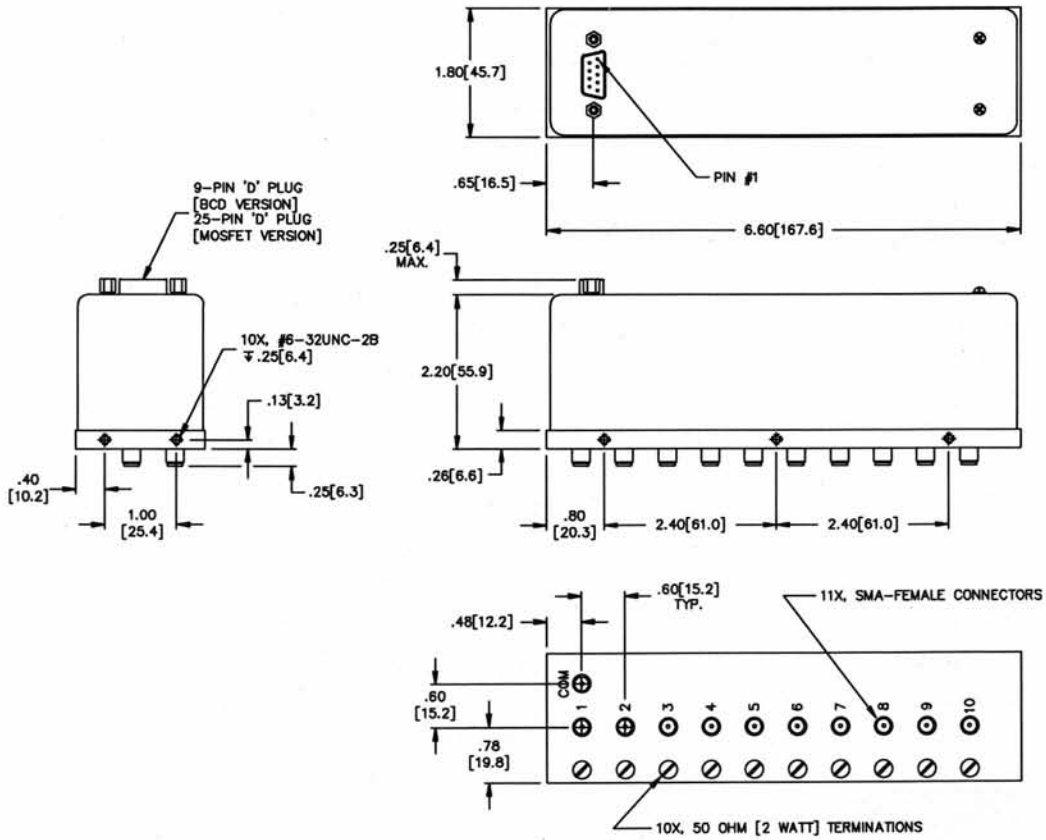
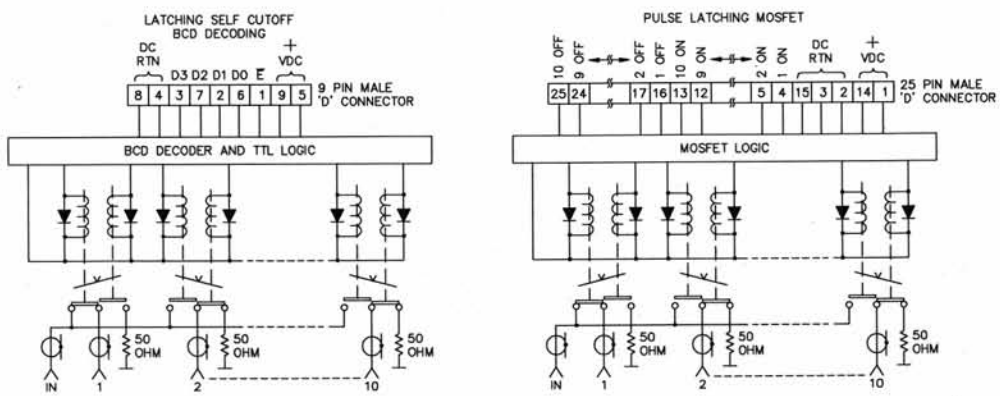
Mechanical



Electrical



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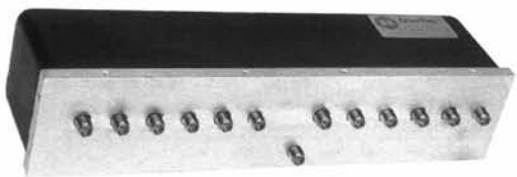
DowKey® Microwave CORPORATION

Available with either 15 Vdc or 28 Vdc actuator coils, these DowKey INTELLIGENT RELAY IN-LINE Series SP12T Multithrow Switches are available with internal binary decoding CMOS logic circuits with latching self cut-off drivers. The IN-LINE construction has the common port in the center of the RF cavity to provide excellent electrical performance through 18 GHz. The 4C3 Series switches are ideal for large switch matrix or complicated automatic test equipment switching applications.

Typical applications for the 4C3 Series include:

- Test Equipment Band Selection
- Switch Matrixes



DowKey® 4C3 Series INTELLIGENT RELAY SP12T IN-LINE

Specifications :

Operating Voltage:
(across temperature range)
15 Vdc (14-17 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
15 Vdc 187 mA
28 Vdc 177 mA

Switching Time:
15 mS maximum

Operating Temperature:
0°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

RF Connectors:
SMA-Female Only

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)			RF Power Watts (CW)
			1-4	5-8	9-12	
0-2	1.50	80	0.20	0.30	0.40	50
2-8	1.50	70	0.40	0.50	0.60	25
8-12	1.60	60	0.50	0.60	0.80	15
12-18	2.00	60	1.00	1.50	2.00	10

Power handling capability is for through path only. Optional internal termination is limited to 500 milliwatts dissipation

Connectors and Part Numbers

Terminations		Descriptions
None	50Ω	
SP7T Switches		
4C3-420802E	4C3-420803E	12 Vdc Coil, Binary Decoding, with ENABLE, Latching, Self-Cutoff
4C3-430802E	4C3-430803E	28 Vdc Coil, Binary Decoding, with ENABLE, Latching, Self-Cutoff

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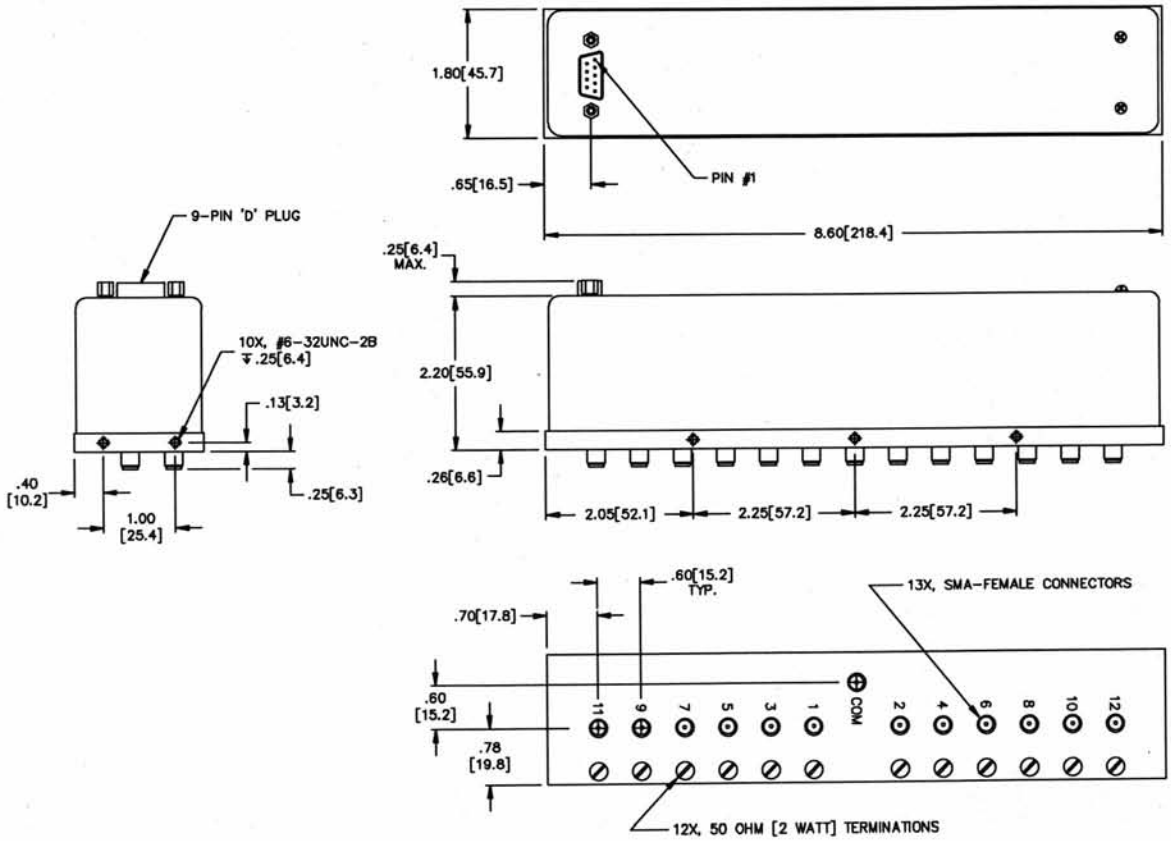
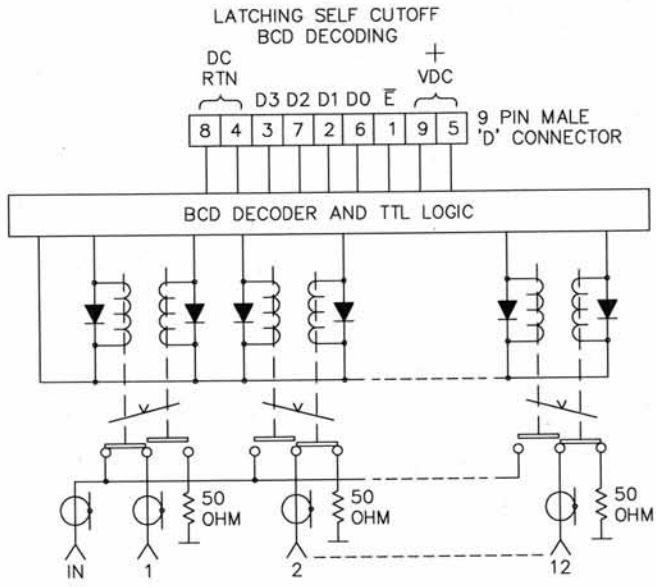
Mechanical



Electrical



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DowKey® Microwave CORPORATION

This DPDT switch is two SPDT relays (similar to the DowKey 164 Series) mounted together on a common plate with a single actuating coil. The connectors are all opposite the mounting surface, allowing easy access and flush-mount capability. With excellent RF performance, this low cost dual relay is suitable for most general purpose switching applications.

Typical applications for the 46 Series include:

- RF and Microwave Communications
- Dual-Monitor Video Switching
- Magnetic Resonance Imaging Systems
- RF and Video Switching

DowKey® 46 Series DPDT Switch

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 250 mA
28 Vdc 114 mA

Operate Time:
20 mS maximum

Operating Temperature:
0°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
9.5 oz., (270g.)

RF Characteristics

Frequency MHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-50	1.03	60	0.03	150
50-100	1.05	52	0.04	150-125
100-200	1.07	45	0.05	125-100
200-400	1.12	40	0.10	100-75
400-1,000	1.20	30	0.15	75-50

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Standard
12 Vdc	BNC	46-2202
28 Vdc	BNC	46-2302
115 Vac	BNC	46-2602
12 Vdc	TNC	46-2203
28 Vdc	TNC	46-2303
115 Vac	TNC	46-2603

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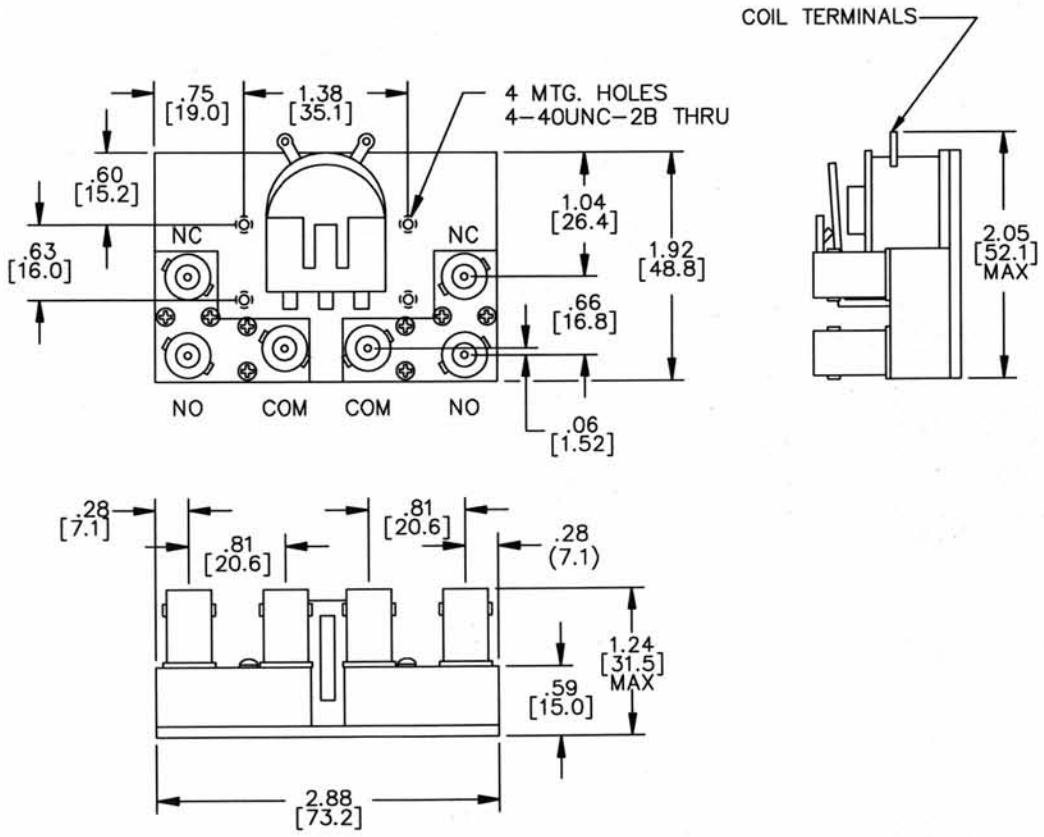
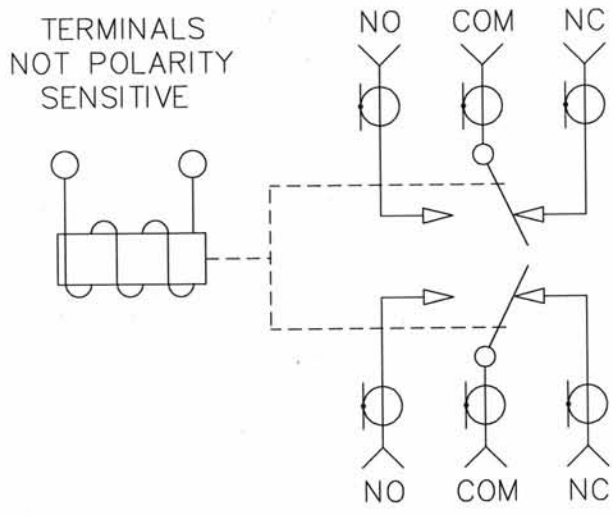
Mechanical



Electrical



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DowKey® Microwave CORPORATION

With a maximum power rating of 150 Watts CW, these medium size switches can be used in a variety of switching functions. The DowKey 54 Series switches have all connectors mounted on the same plane as the power coil, and this switch may be flush mounted on any available surface. The 54 Series switches are manufactured with gold-plated silver contacts and a two-blade construction which achieves a minimum of 50 dB isolation at 50 MHz and 35 dB isolation at 3 GHz. Also available are different connector locations as the 55, 56 and 62 Series. All configurations have the same RF performance as the 54 Series.

DowKey® 54 Series SPDT Switch

Typical applications for the 54 Series include:

- Low Frequency Signal Switching
- Test Equipment
- Television Broadcast Equipment
- Medium Power Amplifier Switching, up to 500 Watts at UHF

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 171 mA
28 Vdc 96 mA

Operate Time:
20 mS maximum

Operating Temperature:
0°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
4.5 oz., (125g.)

RF Characteristics

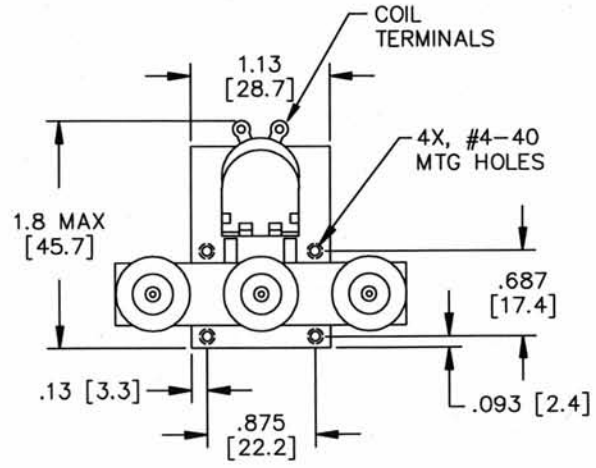
Frequency MHz	VSWR Grounded (max)	VWSR Non-Grounded (max)	Isolation Grounded dB (min)	Isolation Non-Grounded dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
50	1.05	1.05	75	55	0.10	150
100	1.06	1.06	70	50	0.10	125
200	1.07	1.07	64	42	0.10	100
400	1.10	1.15	60	38	0.10	100
1,000	1.15	1.20	55	32	0.20	75
2,000	1.20	1.25	48	29	0.30	50
3,000	1.30	1.40	35	--	0.40	25

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Grounded	Non-Grounded	50Ω Termination	75Ω Termination
12 Vdc	N	54-220101	54-220102	54-220103	54-220104
28 Vdc	N	54-230101	54-230102	54-230103	54-230104
115 Vac	N	54-260101	54-260102	54-260103	54-260104
12 Vdc	BNC	54-220201	54-220202	54-220203	54-220204
28 Vdc	BNC	54-230201	54-230202	54-230203	54-230204
115 Vac	BNC	54-260201	54-260202	54-260203	54-260204
12 Vdc	TNC	54-220301	54-220302	54-220303	54-220304
28 Vdc	TNC	54-230301	54-230302	54-230303	54-230304
115 Vac	TNC	54-260301	54-260302	54-260303	54-260304

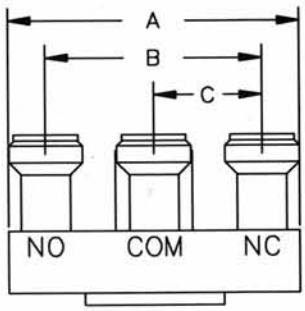
DowKey Microwave Corporation 1667 Walter Street, Ventura, California 93003 (805) 650-0260 • FAX (805) 650-1734

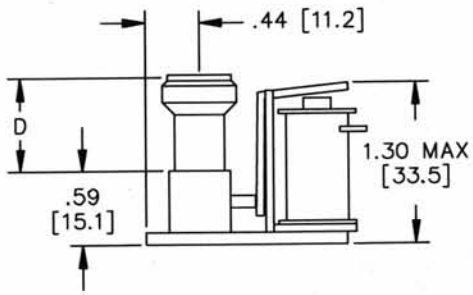
Mechanical



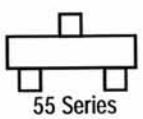
TYPICAL CONNECTOR LENGTHS

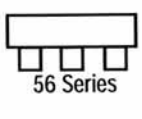
CONN. DIM.	N 01 (Shown)	BNC 02	TNC 03
A	2.350 [59.7]	2.000 [50.8]	2.000 [50.8]
B	1.750 [44.5]	1.560 [39.6]	1.560 [39.6]
C	.875 [22.2]	.780 [19.8]	.780 [19.8]
D	.760 [19.3]	.635 [16.1]	.635 [16.1]

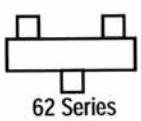




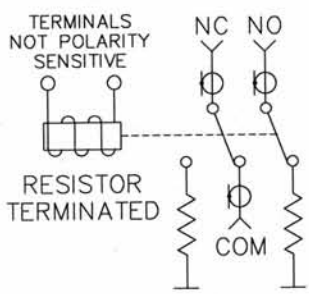
Available Options

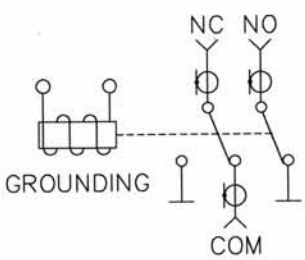

55 Series

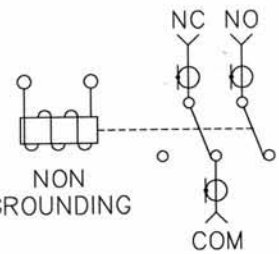

56 Series


62 Series

Electrical







DowKey Microwave Corporation
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(805) 650-0260 • FAX (805) 650-1734

DowKey® Microwave CORPORATION

The DowKey 60 Series coaxial relays are ruggedly constructed and designed for operation to a maximum power level of 1 kilowatt. They have been the standard for air traffic control and two way radio systems for over forty years.

Also available in the 60 Series is a patented, high isolation option ("G" option) for transmit-receive applications. This option leaves the unused input open, and increases the isolation on the N/C connector to 85 dB at frequencies up to 500 MHz. This option reduces the maximum power rating of the N/C connector to 20 Watts, and will increase the VSWR of this terminal above approximately 400 MHz. They are available with or without two form "C" auxiliary contacts.

DowKey® 60 Series SPDT Switch

Typical applications for the 60 Series include:

- Transmit-Receive Switching
- Communication Antenna Switching
- Video Switching
- Hot Standby Transmitters or Receivers

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 250 mA
28 Vdc 108 mA

Operate Time:
20 mS maximum

Operating Temperature:
0°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
12.0 oz., (340g.)

RF Characteristics

Frequency MHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
50	1.10	40	0.10	1,000
100	1.15	35	0.15	1,000
400	1.30	25	0.20	500
1,000	1.60	20	0.25	350

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	SPDT	SPDT w/DPDT Aux. Contacts	"G" Option	"G" Option w/DPDT Aux. Con.
12 Vdc	N	60-2201	60-220142	60-2225	60-222542
28 Vdc	N	60-2301	60-230142	60-2325	60-232542
115 Vac	N	60-2601	60-260142	60-2625	60-262542
12 Vdc	BNC	60-2202	60-220242	60-2226	60-222642
28 Vdc	BNC	60-2302	60-230242	60-2326	60-232642
115 Vac	BNC	60-2602	60-260242	60-2626	60-262642
12 Vdc	UHF*	60-2204	60-220442	60-2228	60-222842
28 Vdc	UHF*	60-2304	60-230442	60-2328	60-232842
115 Vac	UHF*	60-2604	60-260442	60-2628	60-262842

*Not recommended for applications above 300 MHz.

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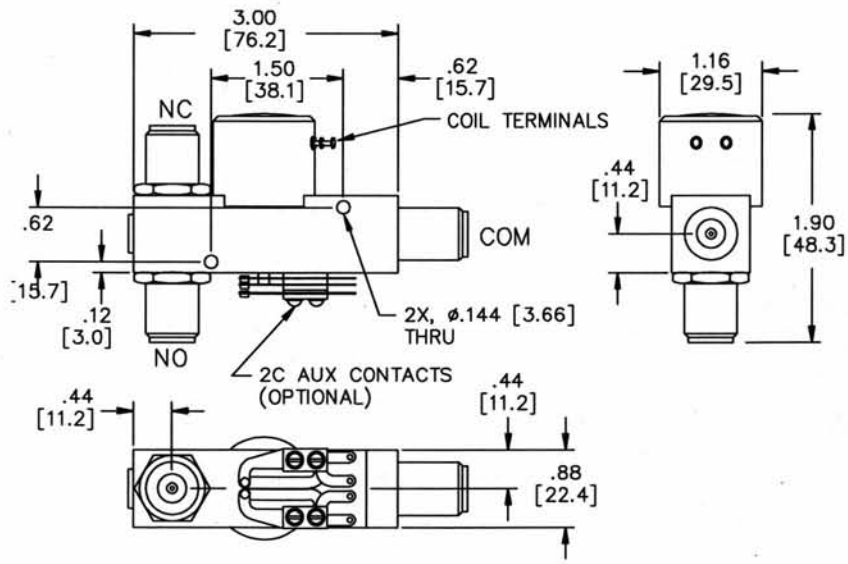
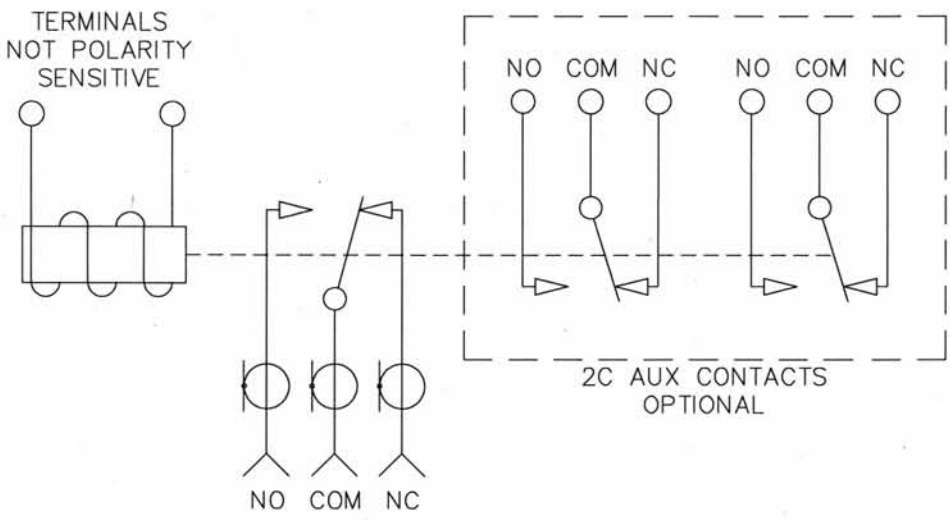
Mechanical



TYPICAL CONNECTOR LENGTHS

CONN. DIM.	N 01 (Shown)	BNC 02	UHF 04	C 05	N"G" 25	BNC"G" 26	UHF"G" 28
NC	0.70 [17.8]	0.60 [15.2]	0.70 [17.8]	0.70 [17.8]	1.20 [30.5]	1.20 [30.5]	1.00 [25.4]
NO	0.70 [17.8]	0.60 [15.2]	0.70 [17.8]	0.70 [17.8]	0.70 [17.8]	0.60 [15.2]	0.70 [17.8]
COMMON	0.50 [12.7]	0.70 [17.8]	0.50 [12.7]	0.50 [12.7]	0.50 [12.7]	0.70 [17.8]	0.50 [12.7]

Electrical



DowKey Microwave Corporation
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DowKey® Microwave CORPORATION

The DowKey 63 Series SPDT Failsafe Relay provides an enclosed actuator for use in environments where dust or moisture may be encountered.

Typical applications for the 63 Series include:

- ILS Air Traffic Control Equipment
- UHF/UHF Standby Transmitters and Receivers

DowKey® 63 Series SPDT Failsafe Switches

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 255 mA
28 Vdc 112 mA

Operate Time:
20 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
6.0 oz., (170g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-.5	1.10	70	0.10	150-100
.5-2	1.30	50	0.20	100-75
2-3	1.40	45	0.30	75-50

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Failsafe Standard SPDT
12 Vdc	N	63-2201
28 Vdc	N	63-2301

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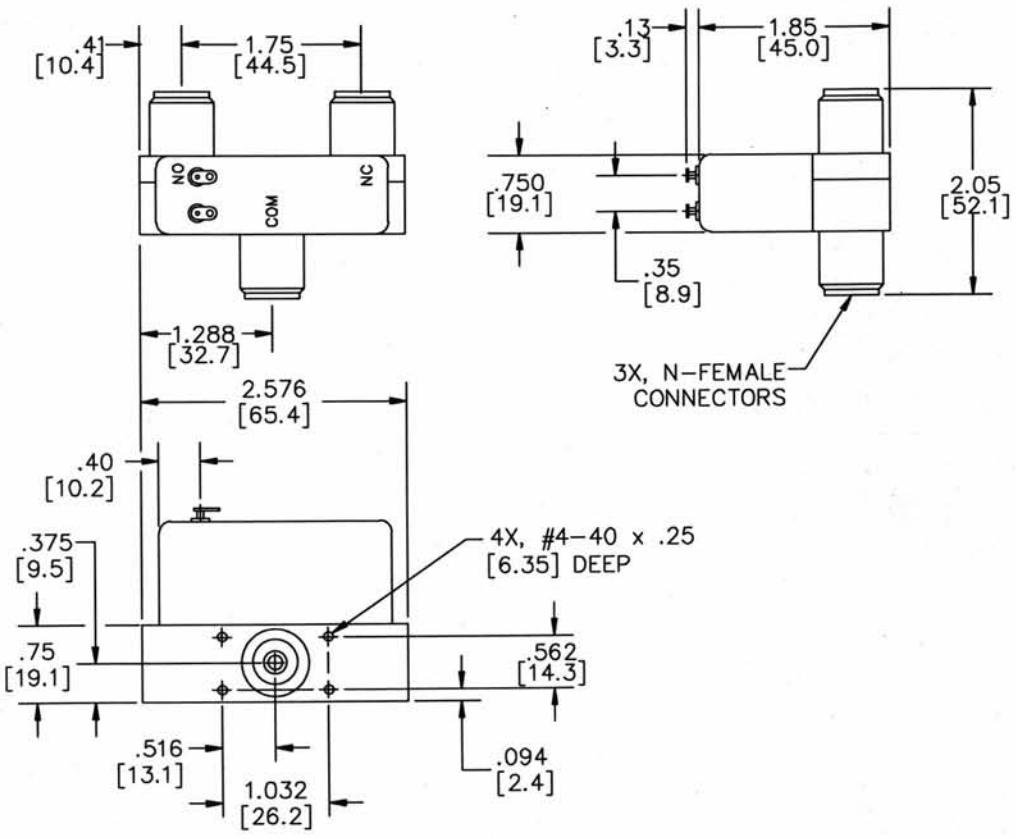
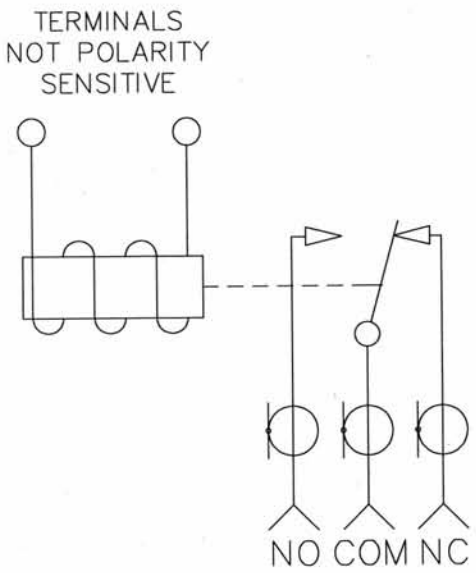
Mechanical



Electrical



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DowKey® Microwave CORPORATION

The DowKey 64 Series SPDT Transfer Failsafe Relay provides an enclosed actuator for use in environments where dust or moisture may be encountered.

Typical applications for the 64 Series include:

- ILS Air Traffic Control Equipment
- UHF/UHF Standby Transmitters and Receivers

DowKey® 64 Series Transfer Relay

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 255 mA
28 Vdc 112 mA

Operate Time:
20 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
7.0 oz., (198g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-0.5	1.10	30	0.10	150-100
0.5-1.5	1.20	25	0.20	100-50
1.5-3.0	1.40	20	0.40	50-25

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Failsafe Standard Transfer
12 Vdc	N	64-2201
28 Vdc	N	64-2301

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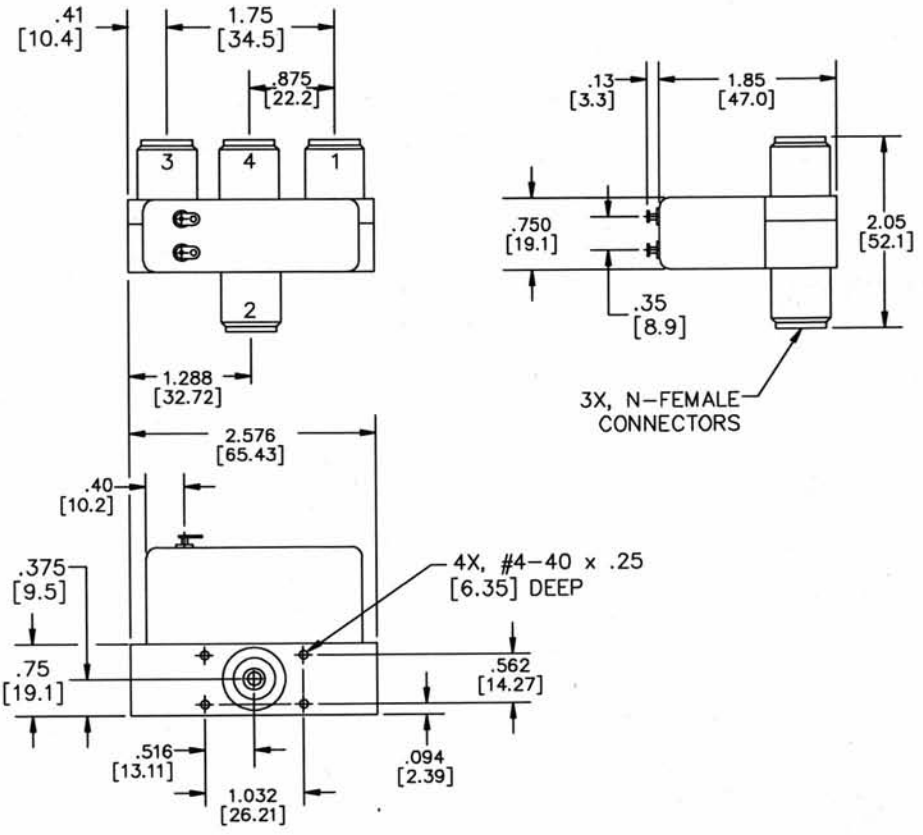
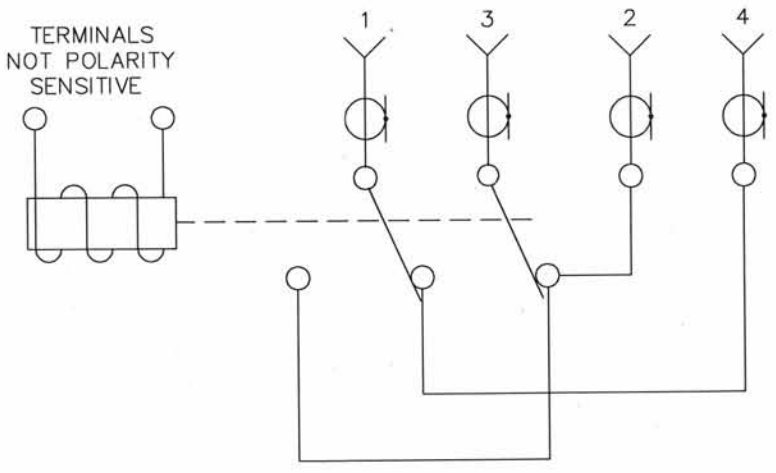
Mechanical



Electrical



SHOWN IN DE-ENERGIZED POSITION

DowKey Microwave Corporation
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(805) 650-0260 • FAX (805) 650-1734

DowKey® Microwave CORPORATION

The DowKey 66 Series switch was developed to meet high isolation switching requirements of the cable television industry. Isolation of greater than 90 dB is achieved up to 500 MHz through the unique 75 Ohm connectors, which have a double break design to completely isolate the unused input from the RF cavity, leaving the input lead open (not grounded). The relay is designed for baseband video source switching, using the auxiliary contacts for audio signals. The 66 Series can be used for a variety of studio switching applications, eliminating the need to stock more than one type of relay.

DowKey® 66 Series SPDT Switch

Typical applications for the 66 Series include:

- IF Switching
- UHF/VHF Channel Switching
- Studio or Cable Head-End
- Video Source Selection

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
26.5 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 265 mA
26.5 Vdc 150 mA

Operate Time:
25 mS maximum

Operating Temperature:
0°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
10.0 oz., (283g.)

RF Characteristics

Frequency MHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
50	1.05	100	0.04	100
100	1.10	100	0.06	100
300	1.30	95	0.10	40
500	1.65	90	0.20	20

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Standard SPDT	SPDT with 2 "C" Contacts
12 Vdc	F*	66-2272	66-227242
26.5 Vdc	F*	66-2372	66-237242

*** Not recommended for use with RG-6 cable.**

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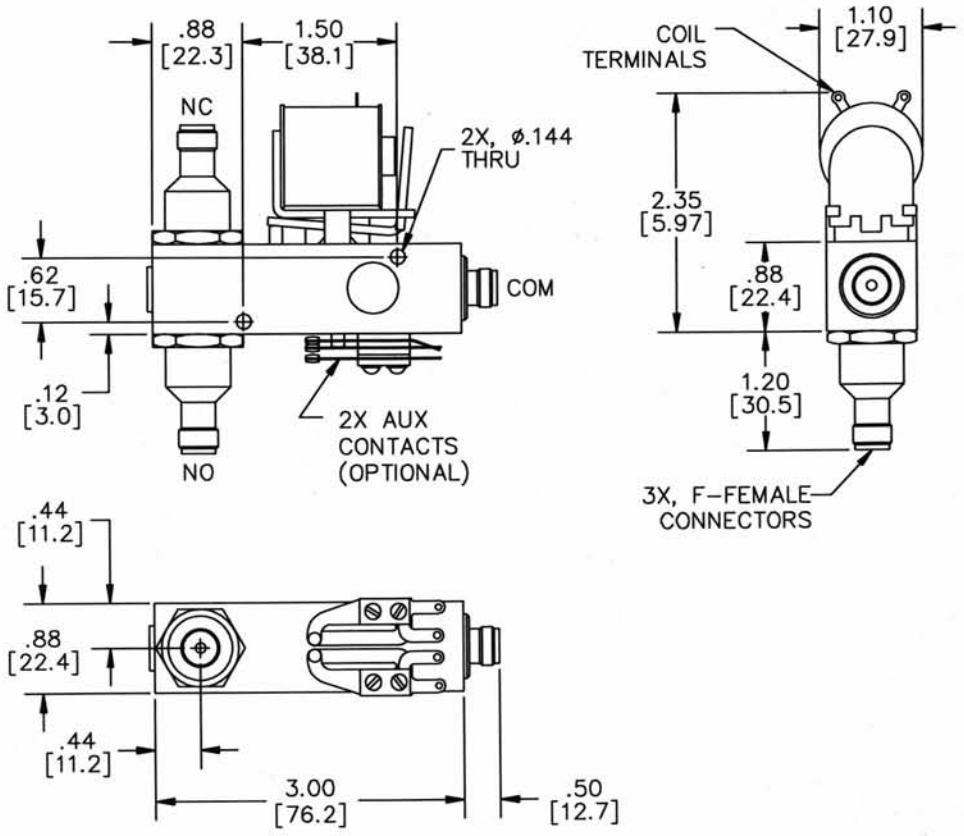
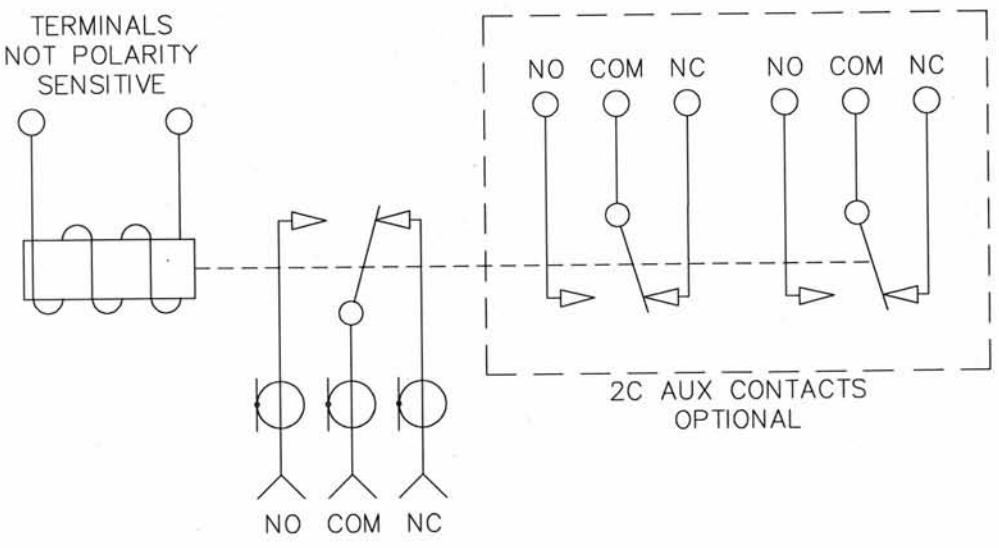
Mechanical



Electrical



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DowKey® Microwave CORPORATION

These medium size, light-weight relays are designed and manufactured with gold plated RF contacts and silver plated outer conductors which give good RF performance to 1 GHz (Isolation is greater than 30 dB, Insertion loss is less than 0.15 dB). Available with either 50 Ohm BNC connectors or 75 Ohm type "F" connectors, the "T" shaped configuration has the common connector at one end of the RF cavity block and the N/O and N/C connectors 180° apart on the opposite end. Other options include type TNC connectors.

DowKey® 77 Series SPDT Switch

Typical applications for the 77 Series include:

- Military Communications
- Commercial and Industrial Communications
- CATV/MATV/CCTV Switching

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
26.5 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 171 mA
28 Vdc 96 mA

Operate Time:
35 mS maximum

Operating Temperature:
0°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
3.5 oz., (99g.)

RF Characteristics

Frequency MHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
50	1.05	50	0.03	150
100	1.10	45	0.04	100
400	1.20	40	0.10	75
1,000	1.50	30	0.15	50

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Standard SPDT	SPDT wit 1 "C" Aux. Contact
12 Vdc	BNC	77-2202	77-220232
26.5 Vdc	BNC	77-2302	77-230232
115 Vac	BNC	77-2602	77-260232
12 Vdc	F*	77-2232	77-227242
26.5 Vdc	F*	77-2332	77-237242
115 Vac	F*	77-2632	77-263242

*** Not recommended for use with RG-6 cable.**

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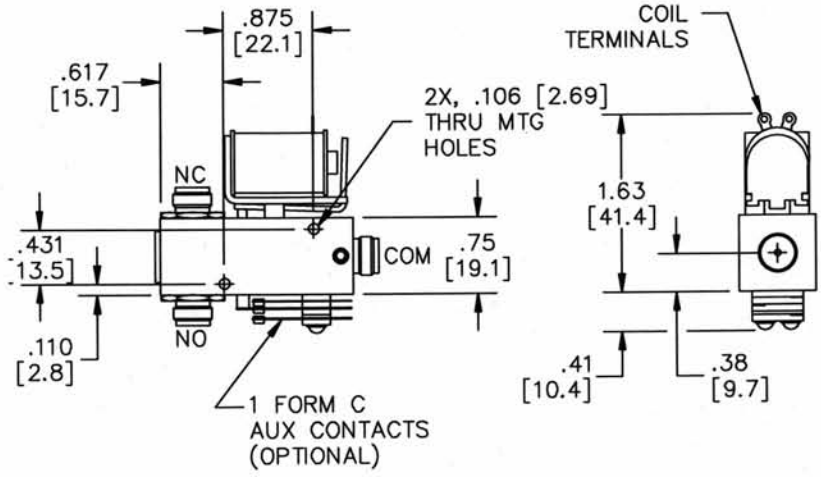
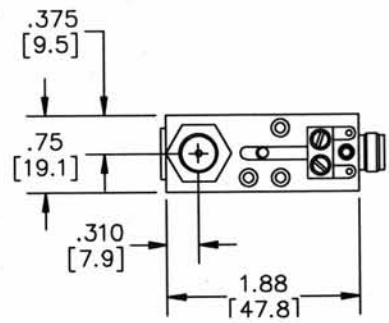
Mechanical

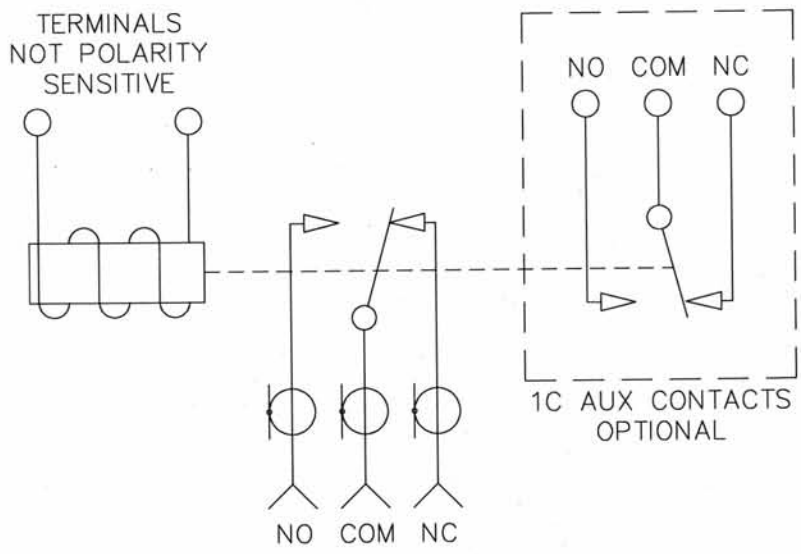




TYPICAL CONNECTOR LENGTHS

CONN.	BNC 02	TNC 03	F 32 (SHOWN)
NC	.50 [12.7]	.50 [12.7]	.30 [7.62]
NO	.50 [12.7]	.50 [12.7]	.30 [7.62]
COM	.50 [12.7]	.50 [12.7]	.20 [5.08]

Electrical



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78 Series Manual Multithrow Switch

DowKey® Microwave CORPORATION

These DowKey manually operated switches are constructed with coaxial switching members rather than wafer switches. They are offered in SPDT, DPDT, SP3T, SP4T, and SP6T configurations, with the unused ports open (non-grounding). With RF power handling capabilities of 1 KW at 50 MHz and 60 dB isolation, the relay is ideal for use in low frequency, high power situations where signal integrity is a critical parameter and switching time of less importance.

DowKey® 78 Series Manual Multithrow Switch

Typical applications for the 78 Series include:

- Military/Commercial RF Communications
- Laboratory Test Equipment
- Video Viewing "Carrell" or Audition Room Source Selection
- Patch Panels

Specifications :

Operating Temperature:
0°C to +65°C

Normal Weight:
10.0 oz., (283g.)

RF Characteristics

Frequency MHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
50	1.10	60	0.03	1,000
100	1.15	55	0.05	1,000
225	1.25	45	0.10	600
450	1.45	40	0.15	450

Connectors and Part Numbers

Connector Type	SPDT	DPDT	SP3T	SP4T	SP6T
N	78-0201	78-0701	78-0301	78-0401	78-0601
BNC	78-0202	78-0702	78-0302	78-0402	78-0602
UHF	78-0204	78-0704	78-0304	78-0404	78-0604

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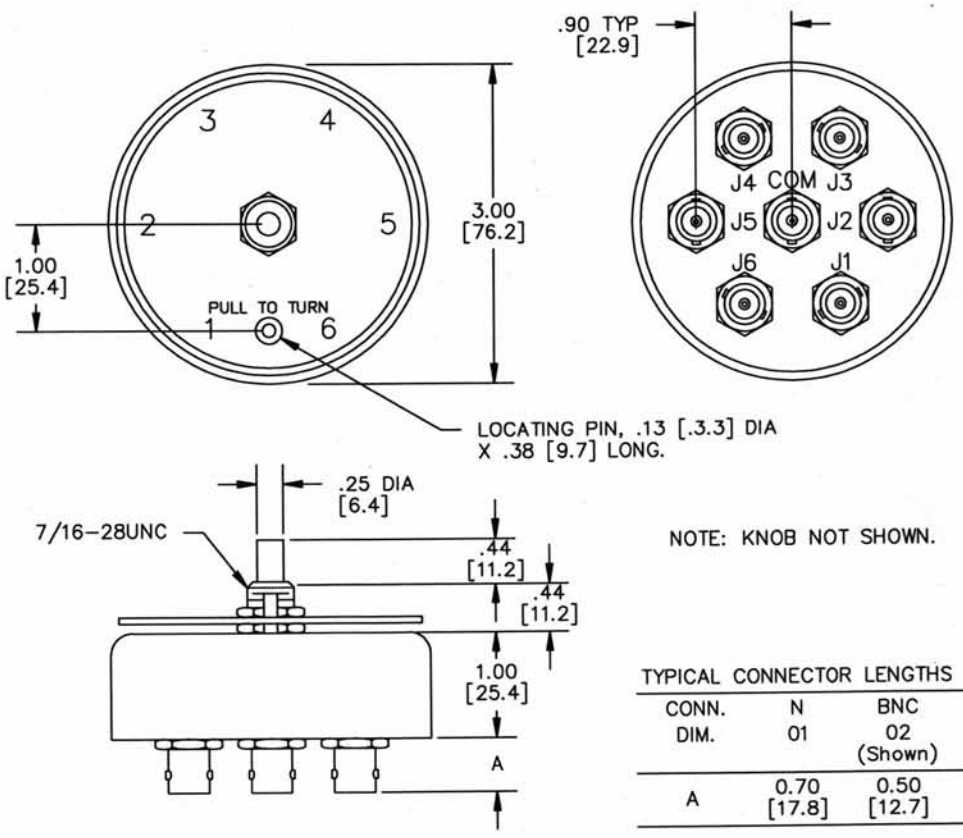
Mechanical



NOTE: KNOB NOT SHOWN.

TYPICAL CONNECTOR LENGTHS

CONN. DIM.	N 01	BNC 02 (Shown)	UHF 04
A	0.70 [17.8]	0.50 [12.7]	0.70 [17.8]

Electrical

CONNECTOR LOCATIONS

SWITCH TYPE	CONNECTORS USED	ROTATIONAL STOPS
SPDT	J3, J4, C	YES
SP3T	J1. J3, J5, C	NO
SP4T	J1, J2, J3, J4, C	YES
SP6T	J1, J2, J3, J4, J5, J6, C	NO
DPDT	J1, J2, J3, J4, J5, J6	YES

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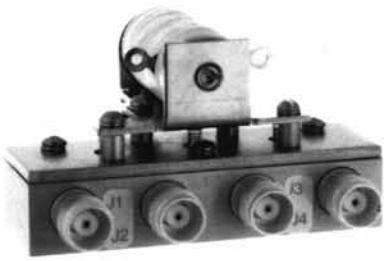
DowKey® Microwave CORPORATION

The DowKey Microwave 79 Series bypass relays offer superior RF performance and an economical alternative to microwave transfer switches in applications to 3 GHz.

Typical applications for the 79 Series include:

- Amplifier Bypass
- Power Monitor Circuit
- Switch/Filter



DowKey® 79 Series Bypass Switches

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 300 mA
28 Vdc 258 mA

Operate Time:
35 mS maximum

Operating Temperature:
0°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
7.0 oz., (200g.)

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-1	1.10	80	0.05	500-200
1-2	1.15	70	0.10	200-100
2-3	1.25	60	0.20	100-50

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Failsafe Standard
12 Vdc	TNC	79-2203
28 Vdc	TNC	79-2303

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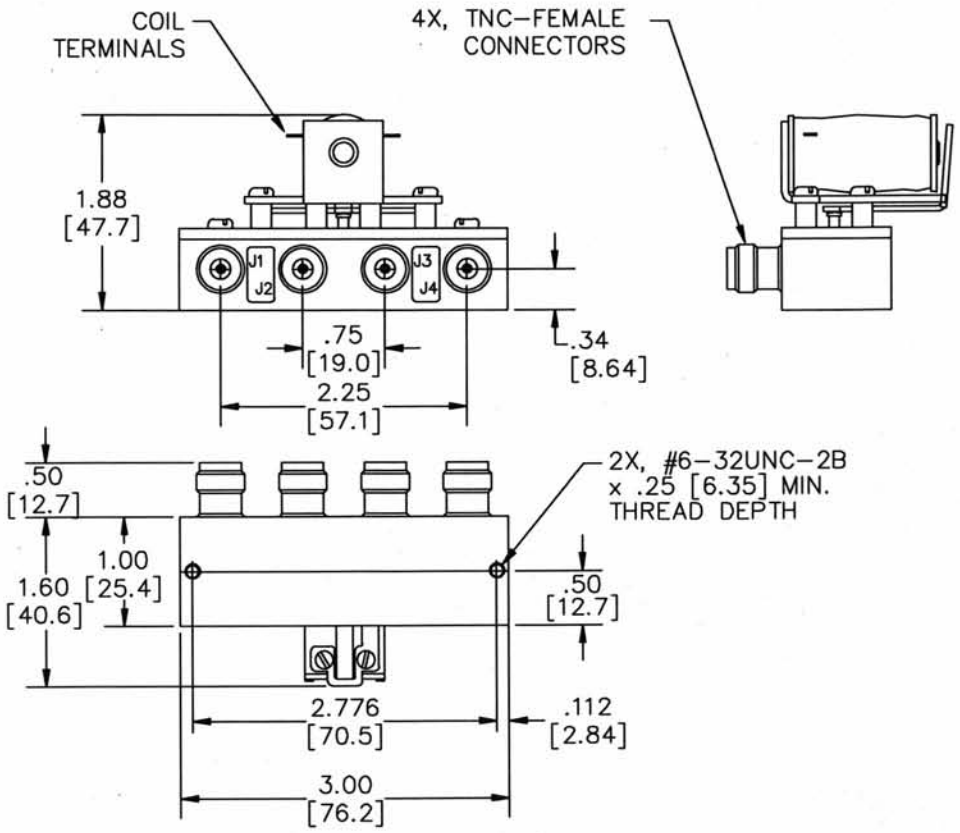
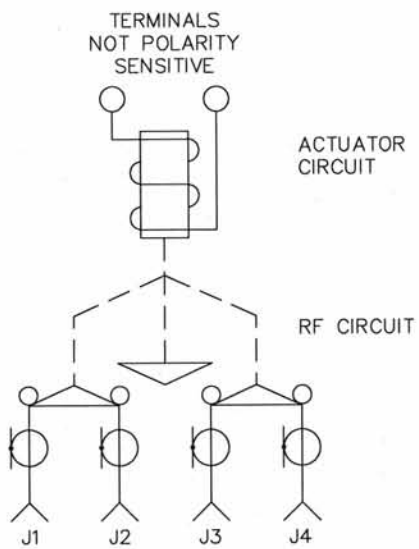
Mechanical



Electrical



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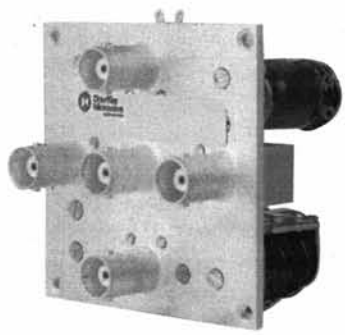
DowKey® Microwave CORPORATION

The DowKey 116 Series are small multiple-position switches designed for applications where one or more inputs or outputs are required to be connected simultaneously. Each position has its own actuating solenoid, and each port may be grounded or non-grounded in the de-energized state. RF performance is excellent and remains stable to approximately 3 GHz. Grounding the unused positions increases isolation.

Typical applications for the 116 Series include:

- Military Communications Equipment
- Multiple Video Monitor Switching
- Multiple Test Monitor Switching



DowKey® 116 Series SP4T Switch

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 380 mA
28 Vdc 96 mA

Operate Time:
25 mS maximum

Operating Temperature:
0°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
12..0 oz., (340g.)

RF Characteristics

Frequency MHz	VSWR (max)	Isolation Grounding dB (min)	Isolation Non-Grounding dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
50	1.02	60	45	0.02	200
100	1.02	55	40	0.03	200
400	1.05	50	35	0.05	100
1,000	1.10	35	25	0.10	65
2,000	1.20	30	20	0.15	45

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	SP4T Grounding	SP4T Non-Grounding
12 Vdc	N	116-220101	116-220102
28 Vdc	N	116-230101	116-230102
12 Vdc	BNC	116-220201	116-220202
28 Vdc	BNC	116-230201	116-230202
12 Vdc	TNC	116-220301	116-220302
28 Vdc	TNC	116-230301	116-230302

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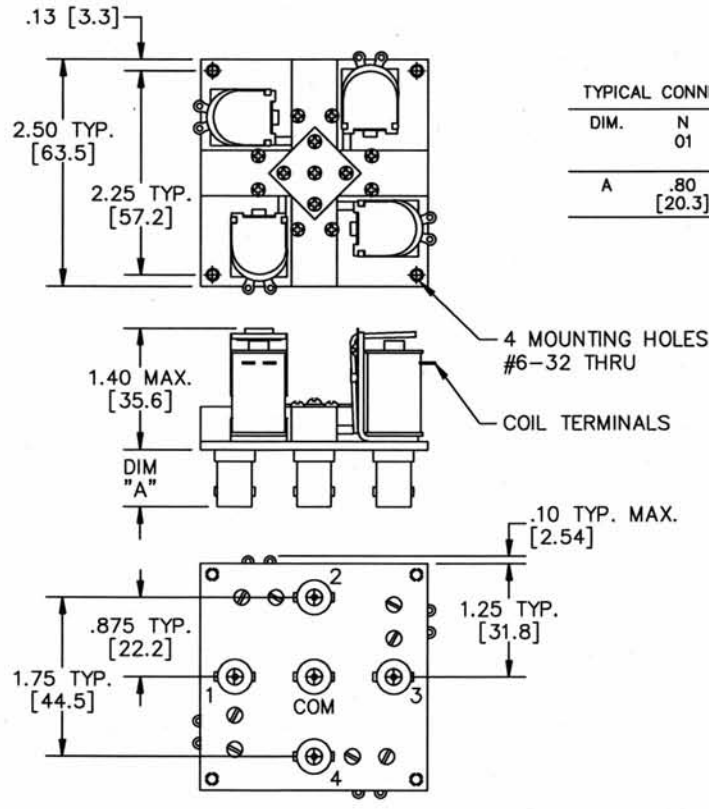
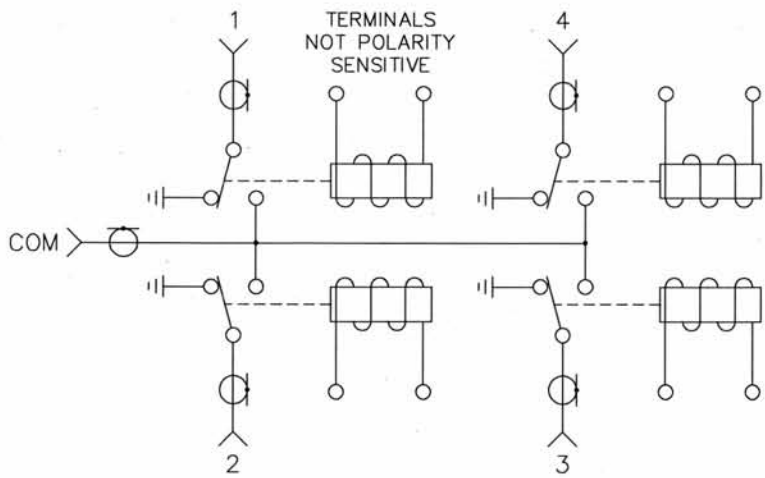
Mechanical



TYPICAL CONNECTOR LENGTHS

DIM.	N 01	BNC 02 (SHOWN)	TNC 03
A	.80 [20.3]	.60 [15.2]	.60 [15.2]

Electrical



GROUNDING TYPE. SHOWN IN DE-ENERGIZED POSITION

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DowKey® Microwave CORPORATION

The DowKey 164 Series has all connectors and the actuator assembly mounted on the same plane so that the switch can be flush-mounted on a panel or cabinet wall. With good performance to 1 GHz, these switches have numerous general purpose uses.

Typical applications for the 164 Series include:

- Military Communications
- Test Equipment
- Magnetic Resonance Imaging Equipment
- Video and RF Switching

DowKey® 164 Series SPDT Switch

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 172 mA
28 Vdc 96 mA

Operate Time:
20 mS maximum

Operating Temperature:
0°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
4.5 oz., (127g.)

RF Characteristics

Frequency MHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
0-50	1.03	50	0.03	150
50-100	1.05	50	0.04	150-125
100-200	1.07	45	0.05	125-100
200-400	1.12	40	0.10	100-75
400-1,000	1.20	30	0.15	75-50

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	164 Series
12 Vdc	BNC	164-2202
28 Vdc	BNC	164-2302
115 Vac	BNC	164-2602
12 Vdc	TNC	164-2203
28 Vdc	TNC	164-2303
115 Vac	TNC	164-2603

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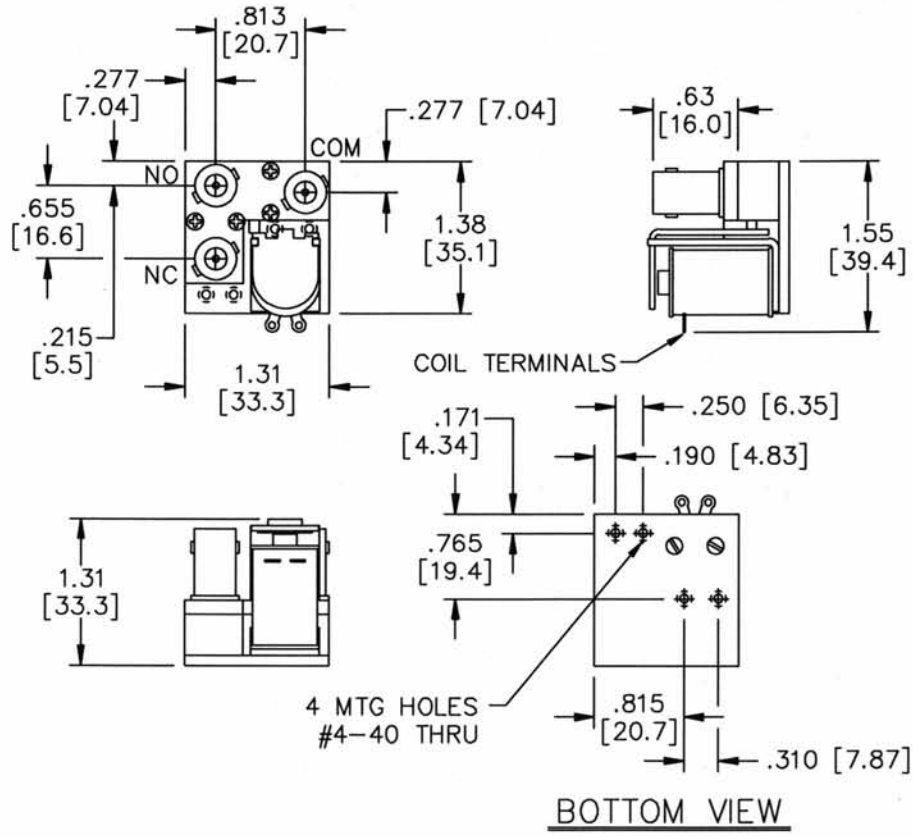
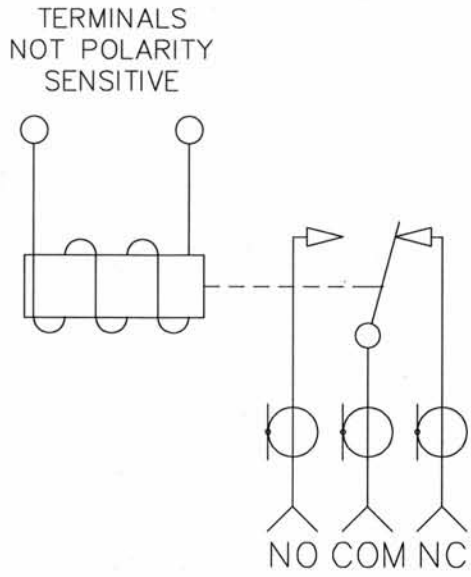
Mechanical



Electrical



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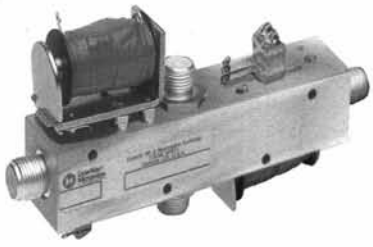
DowKey® Microwave CORPORATION

The DowKey 167 Series transfer relay is designed for high power operation, and is capable of handling up to 2 kilowatts at 30 MHZ. The switch has two coils which can be operated in parallel for break before make transfer. When the coils are operated separately, make before break switching can be accomplished to either 2 or 4. All models have a DPDT set of auxiliary contacts.

Typical applications for the 167 Series include:

- Switching Two Transmitters Between an Antenna and Dummy Load
- Reversing the Feed Phase for Directional Antennas
- High Power Amplifier Transfer and By-Pass Switching



DowKey® 167 Series Transfer Switches

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 171 mA
28 Vdc 96 mA

Operate Time:
25 mS maximum

Operating Temperature:
0°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
12.0 oz., (340g.)

RF Characteristics

Frequency MHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (max)*
0-25	1.05	45	0.04	2,000
25-50	1.05	45	0.05	2,000-1,500
50-100	1.08	40	0.06	1,500-1,000
100-300	1.12	30	0.08	1,000-600
300-500	1.15	25	0.10	600-450
500-1,000	1.50	20	0.50	400-300

*Power ratings shown are for cold switching. RF power must be removed prior to the switching cycle.

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Part Number
12 Vdc	N	167-220142
28 Vdc	N	167-230142
115 Vac	N	167-260142
12 Vdc	UHF**	167-220442
28 Vdc	UHF**	167-230442
115 Vac	UHF**	167-260442

** Not recommended for applications above 300 MHz.

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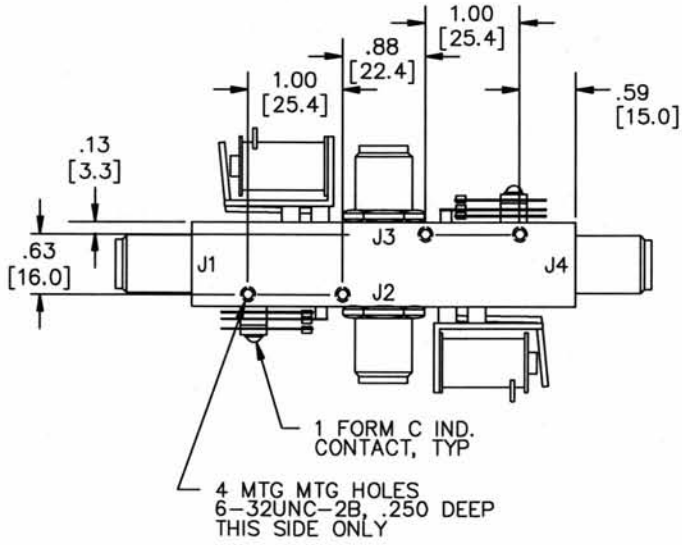
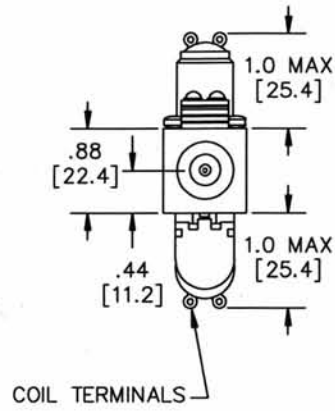
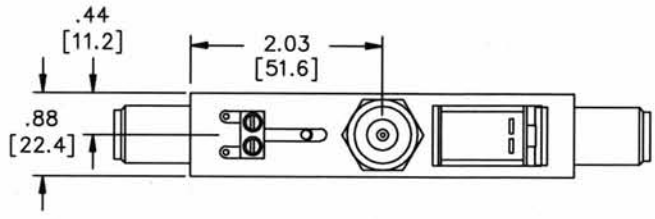
Mechanical



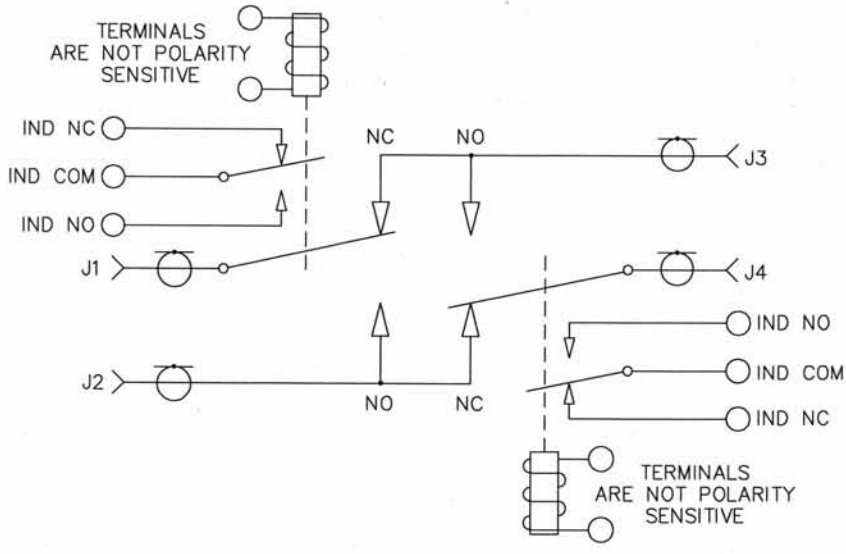




TYPICAL CONNECTOR LENGTHS

CONN. DIM.	N 01 (Shown)	UHF 04
J1,J4	0.60 [16.0]	0.60 [16.0]
J2,J3	0.70 [17.8]	0.70 [17.8]

Electrical



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DowKey® Microwave CORPORATION

The DowKey 169 Series SPDT switch is the smallest of the DowKey coaxial RF relays. The switch is manufactured with gold plated contacts to provide reliable RF performance to 1 GHz.

Typical applications for the 169 Series include:

- Military Communications
- Commercial Radio
- Transmit/Receive Switching
- Antenna Switching
- Conditions where size and weight are critical parameters

DowKey® 169 Series SPDT Switch

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 171 mA
28 Vdc 96 mA

Operate Time:
20 mS maximum

Operating Temperature:
0°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
4.5 oz., (125g.)

RF Characteristics

Frequency MHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (max)
50	1.03	50	0.03	150
100	1.06	50	0.05	100
400	1.12	45	0.10	75
1,000	1.25	35	0.15	50
2,000	1.50	30	0.30	25

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Part Number
12 Vdc	BNC	169-2203
28 Vdc	BNC	169-2302

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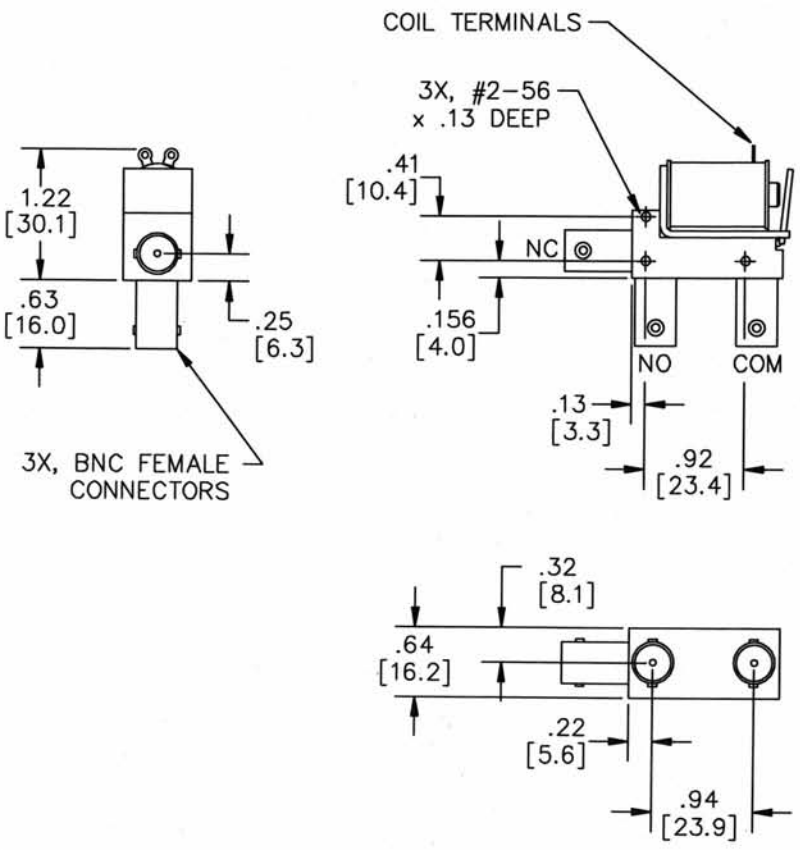
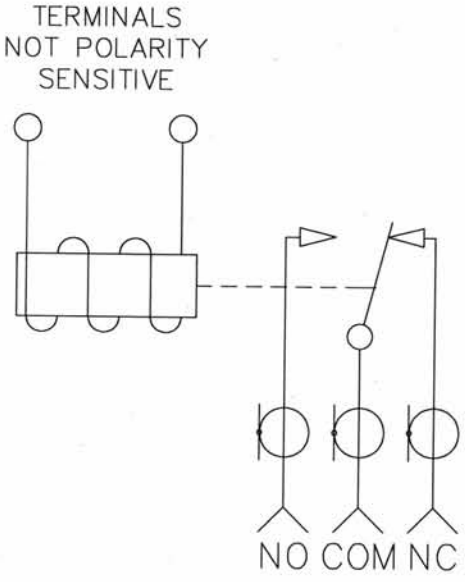
Mechanical



Electrical



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DowKey® Microwave CORPORATION

The DowKey 260 Series is a standard DPDT switch with six connectors, allowing two of four straight-through paths from two inputs. The 260B is identical in construction, except that there is an internal connection between the N/C contacts, leaving only four connectors. The 260B Series is widely used to insert or by-pass a circuit element (such as an amplifier or filter) in a transmission path between two normally connected elements. Both are available with a choice of actuator coils, connector options, and a pair of form "C" auxiliary contacts.

Typical applications for the 260 & 260B Series include:

- Inserting a Linear Amplifier Between an Exciter and an Antenna
- Filter, Attenuator, or Amplifier By-Pass Switching
- Insert Filters or Attenuators in a Transmission Path
- Dual Simultaneous Transmit/Receive or Antenna Switching

DowKey® 260 Series DPDT & 260B Series By-Pass Switch

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
26.5 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 250 mA
26.5 Vdc 110 mA

Operate Time:
25 mS maximum

Operating Temperature:
0°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
12..0 oz., (340g.)

RF Characteristics

Frequency MHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (max)
0-50	1.05	40	0.04	1,000
50-100	1.08	35	0.05	1,000
100-400	1.15	25	0.10	1,000-500
400-1,000	1.20	18	0.15	500-350

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	DPDT	with 2 "C" Ind. Contacts	By-Pass	with 2 "C" Ind. Contacts
12 Vdc	N	260-2201	260-220142	260B-2201	260B-220142
26.5 Vdc	N	260-2301	260-230142	260B-2301	260B-230142
115 Vac	N	260-2601	260-260142	260B-2601	260B-260142
12 Vdc	BNC	260-2202	260-220242	260B-2202	260B-220242
26.5 Vdc	BNC	260-2302	260-220242	260B-2202	260B-220242
115 Vac	BNC	260-2602	260-220242	260B-2202	260B-220242
12 Vdc	UHF*	260-2204	260-220442	260B-2204	260B-220442
26.5 Vdc	UHF*	260-2304	260-230442	260B-2304	260B-230442
115 Vac	UHF*	260-2604	260-260442	260B-2604	260B-260442

*Not recommended for applications above 300 MHz.

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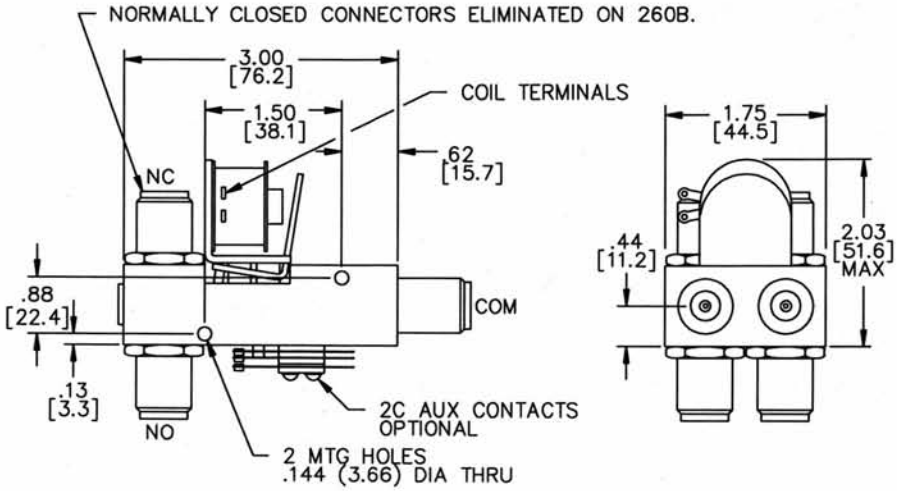
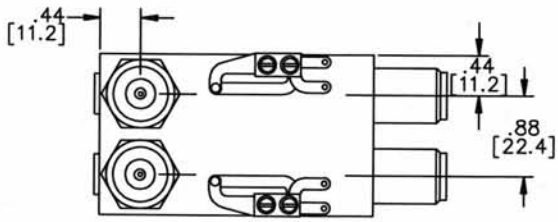
Mechanical

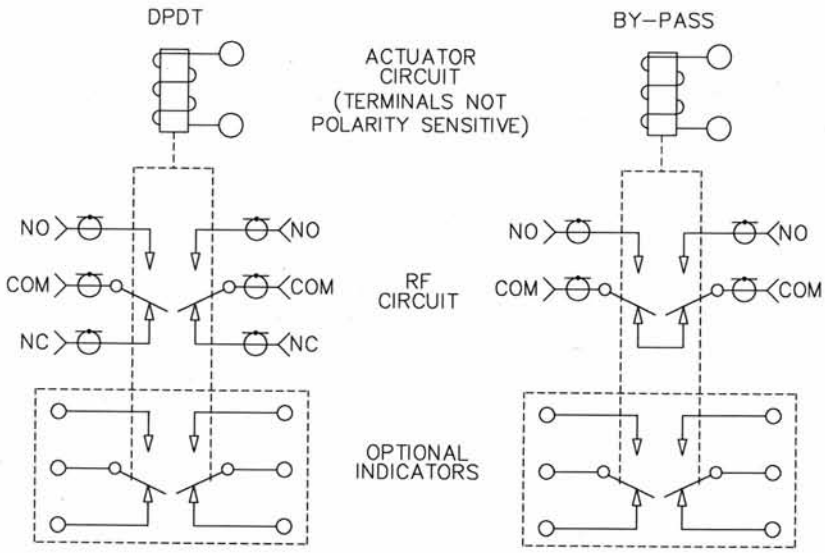




TYPICAL CONNECTOR LENGTHS

CONN. DIM.	N 01 (Shown)	UHF 04	BNC 02
COM.	0.50 [12.7]	0.50 [12.7]	0.70 [17.8]
NC,NO	0.70 [17.8]	0.70 [17.8]	0.60 [15.2]

Electrical



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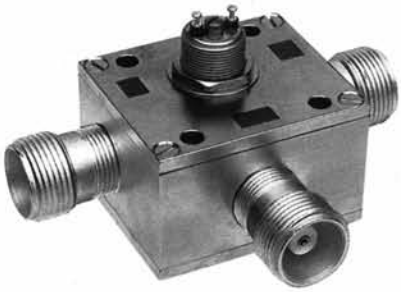
310 Series SPDT High Power Vacuum Coaxial Switch

DowKey® Microwave CORPORATION

The DowKey 310 Series SPDT relays have high power handling capability in a small package. The ability to handle up to 3 KW at low frequencies (up to 30 MHz) is achieved with vacuum-enclosed contacts, minimizing noise and losses. This rugged switch is capable of "hot" switching 1 KW at 30 MHz with the optional special Tungsten-Molybdenum contacts to avoid pitting when switched with RF power applied. (It should be noted that even with heavy-duty construction, hot-switching will reduce the typical operational life of 1,000,000 cycles significantly - to approximately 10,000 cycles)



DowKey® 310 Series SPDT Switch

Typical applications for the 310 Series include:

- High Power Transmitter Switching
- Radar Pulse Forming Networks
- Phased Array Antenna Systems
- UHF/VHF Communications Systems
- Magnetic Resonance Imaging Systems

Specifications :

Operating Voltage:
(across temperature range)
12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (Nominal):
12 Vdc 150 mA
28 Vdc 84 mA

Switching Time:
8 mS maximum

Operating Temperature:
-25°C to +65°C

Mechanical Life, Cycles:
1 x 10^6 minimum

Nominal Weight:
9.0 oz., (260g.)

RF Characteristics

Frequency MHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
30	1.05	35	0.07	3,000
50	1.06	30	0.08	2,300
100	1.08	25	0.09	2,000
400	1.10	17	0.10	850

Connectors and Part Numbers

Nominal Coil Voltage	Connector Type	Part Number
12 Vdc	N	310-2201
28 Vdc	N	310-2301
115 Vac	N	310-2601
12 Vdc	HN	310-2251
28 Vdc	HN	310-2351
115 Vac	HN	310-2651
12 Vdc	SC	310-2253
28 Vdc	SC	310-2353
115 Vac	SC	310-2653

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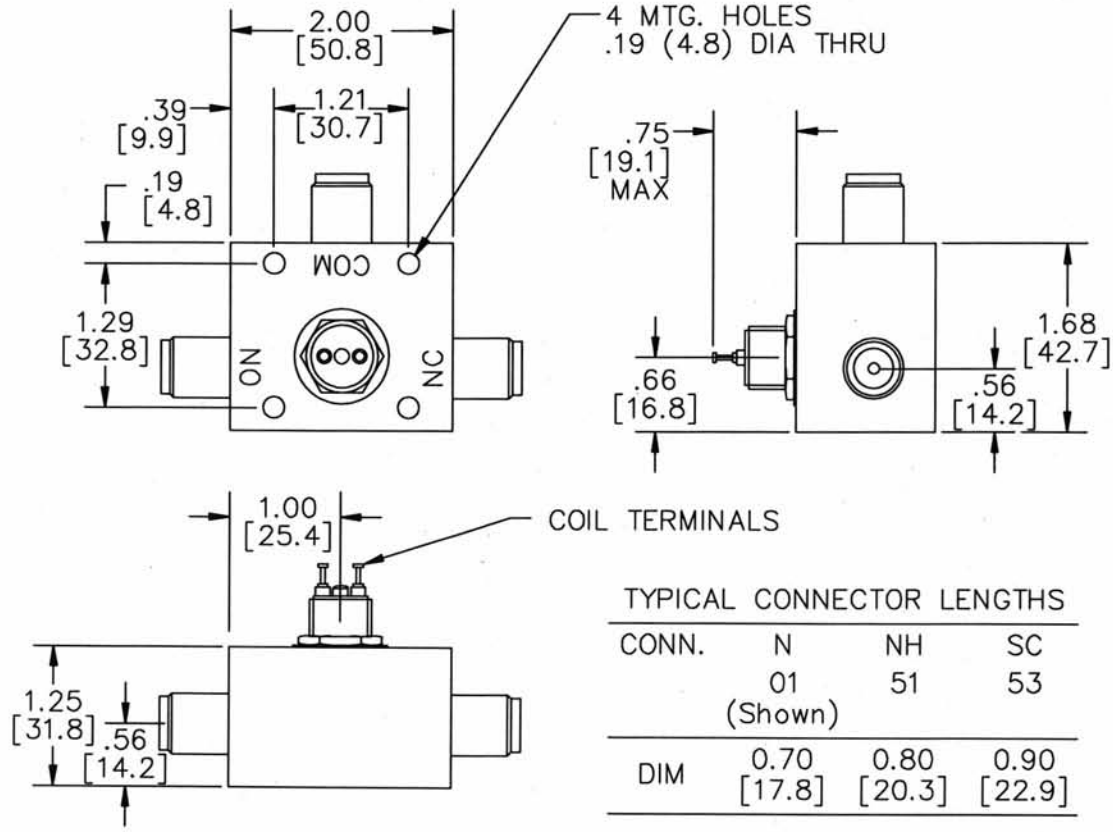
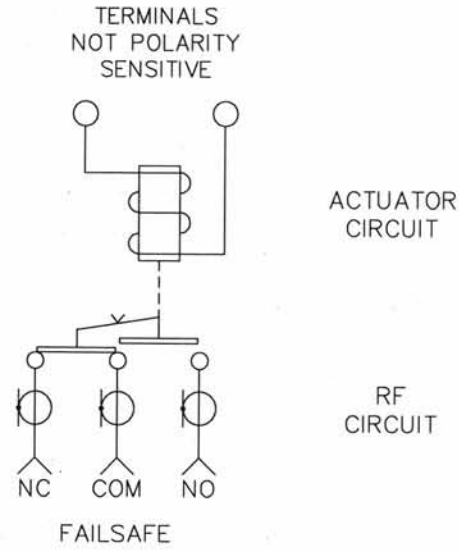
Mechanical



TYPICAL CONNECTOR LENGTHS

CONN.	N	NH	SC
	01 (Shown)	51	53
DIM	0.70 [17.8]	0.80 [20.3]	0.90 [22.9]

Electrical



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DowKey/TRANSCO

Standard RF, Microwave and Waveguide Switches

DowKey Microwave Corporation
1667 Walter Street, Ventura, California 93003
(805) 650-0260 • FAX (805) 650-1734

TRANSCO PART NUMBERS AND FEDERAL STOCK NUMBERS PER MIL S 3928

Slash No.	Option No.	TPI Part No.	FSN 5985-
MIL-S-3928/7-	-01	C6N2A1	-
	-02	C0N2AB	552-9040
	-03	C4N2AB	548-3715
	-04	C6N3A1	-
	-05	C4N3AB	539-6133
	-06	C0N6AB	754-9860
	-07	C4N6AB	989-5364
	-08	C6N6A1	-
	-09	11600	-
	-10	13300	783-5769
	-12	C0N3AB	-
	-17	11300	504-8506
	-18	11100	557-5208
	-19	11400	-
	-20	11200	557-5721
	-21	11800	586-7023
	-22	C0N4AB	448-0300
	-24	14100	501-1886
	-25	300C00100	-
	-26	300C00200	241-3503
MIL-S-3928/9-	-01	1460-820	518-0832
	-04	M1460-H22	401-2883
	-05	M1460-H20	439-5691
	-06	1460-20-95	512-5297
	-07	1460-3-96	296-5334
	-08	1460-6-96	813-0833
	-09	1460-830-95	-
	-10	1460-22-95	-
	-11	1460-822	296-6729
	-12	1460-6	504-6639
	-13	M1460-H30	01-097-3720
	-14	M1460-HA3	01-118-8463
	-15	M1460-HA6	763-3823

Slash	No.Option	No.TPI Part	No.FSN 5985
MIL-S-3928/10-	-04	810C00100	272-7325
			123-8438*
	-05	810C00200	433-6758
			01-017-5236*
	-06	810C05200	-
	-07	315C05200	-
	-08	310C00200	246-9414
	-09	810C00300	009-3691-0
	-09	810C00300	617-2436
	-10	300C00200	241-3503
MIL-S-3928/15-	-01	919C70100	477-0060*
			433-8301
	-06	900C70100	155-0122
	-07	909C7010	150-8559
	-08	909C70200	022-9059
	-09	919C72700	-
	-10	919C70200	621-6997
	-01	919C70100-8	01-043-0781
	-07	909C70100-8	01-092-9506
	-08	909C70200-8	022-9059
	-10	919C70200-8	00-150-8559
MIL-S-3928/17-	-02	144C70100	01-106-0807*
			01-042-0669
		144C70600	275-7009
MIL-S-3928/18-	-01	146C70100	172-8187
			01-086-0592*
	-02	146C70600	005-2503
	-01	146C70100-8	
	-02	146C70600-8	
MIL-S-3928/19-	-01	700C70900	009-6619
	-02	710C70100	125-9895
	-05	710C71400	-
	-02	710C70100-8	01-106-3305
	-05	710C71400-8	625-9681
MIL-S-3928/20-	-01	820C31700	-
	-03	810C30900	417-0532
	-04	910C90700	006-4308
	-06	900C31500	619-7145
	-07	810C30100	248-2974
			01-116-4495*
	-08	800C30200	325-6104
		with diodes	01-021-4686
MIL-S-3928/21-	-01	700C30200	139-1745
			01-100-8860*
	-02	310C30800	630-6674
	-03	300C30200	-

*Multiple federal stock numbers

Coaxial Switch

Type DO

Description

The Type DO Latching SPDT Switch has RF geometry optimized for SMA connectors and operates over a 0-18GHz frequency band. It is magnetically latched and available with or without actuator cut-off circuitry. It is also available with or without indicating switches. DowKey's design mechanically links indicating switches to the rotating armature for positive indication.

Actuator features:
1. Balanced rotating armature
2. Reliable actuation with low current
3. Positive latching with permanent magnets

A single voltage pulse of 20 milliseconds is all that is required to change positions; no holding power is required to maintain a position.

Magnetic latching offers distinct advantages over other mechanisms since it uses no springs or mechanical detents which are prone to fatigue and wear. Transco considers magnetic latching to be the optimum design for applications which require high vibration levels, environmental extremes, long life and reliability.

This switch is part of the Type D family of switches featuring different RF connectors and frequencies.

Type	Conn.	Freq.
D	N &TC	12 GHz
DO	SMA	18 GHz
DX	SC	6 GHz
DO	3 5 mm	26.5GHz

Standard Products

P/N	Schematic
909C70 1 00*	1
909C70200**	2
909C71100	3
909C71200	4

* Meets MIL-S-3928/15-07
** Meets MIL-S-3928/15-08

Special Configuration

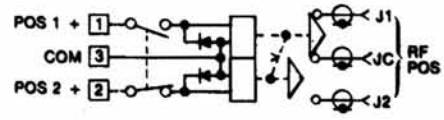
Actuating Voltage
Transient Circuit
TTL Logic Circuit
Mounting Configuration
Terminal Location

(For dimensions and circuit diagrams see pages 106 and 107)

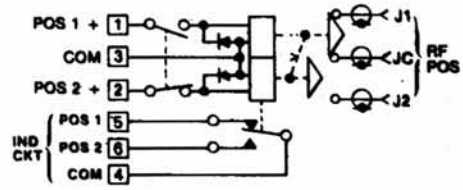
RF Circuit: SPDT
Actuator: Latching
Connector: SMA
Frequency: 0-18GHz

Schematic

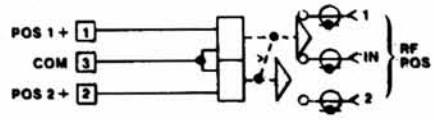
#1. Latching



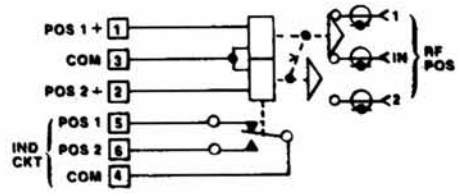
2. Latching with Indicator



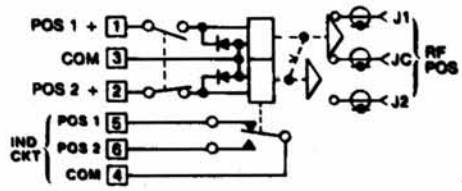
3. Pulse Latching



4. Pulse Latching w/ Indicator

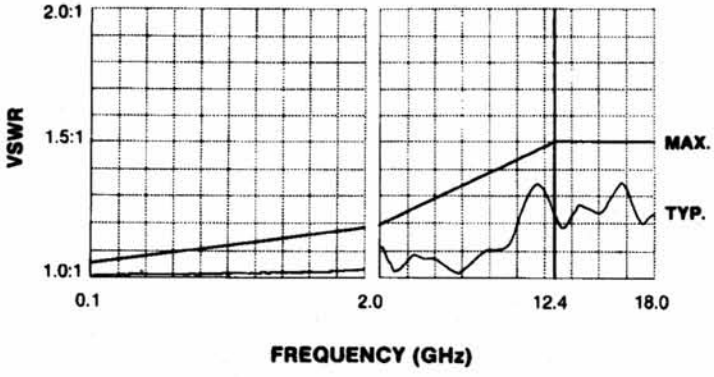


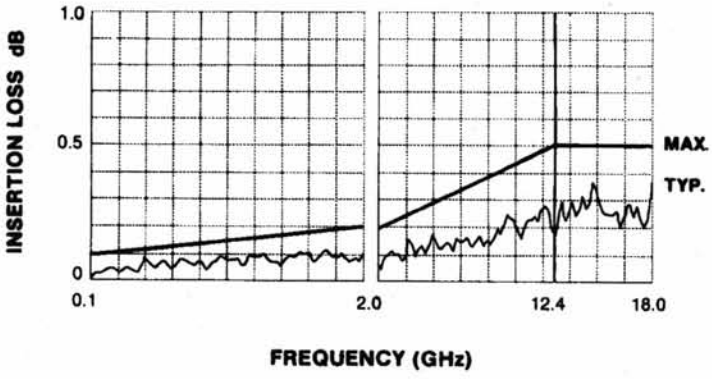
5. Latching w/ Indicator

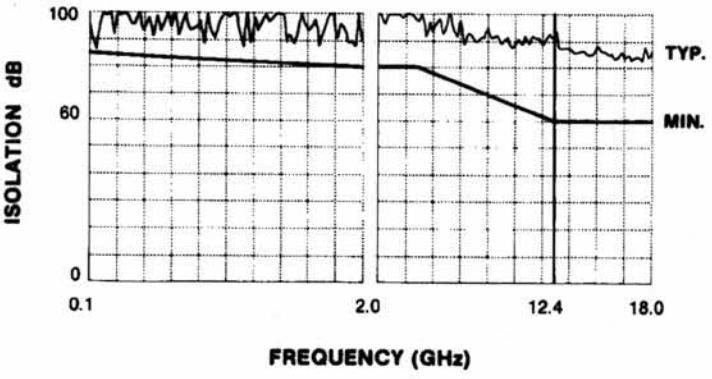


Specifications

Typical RF data of a production switch; computer printouts below:

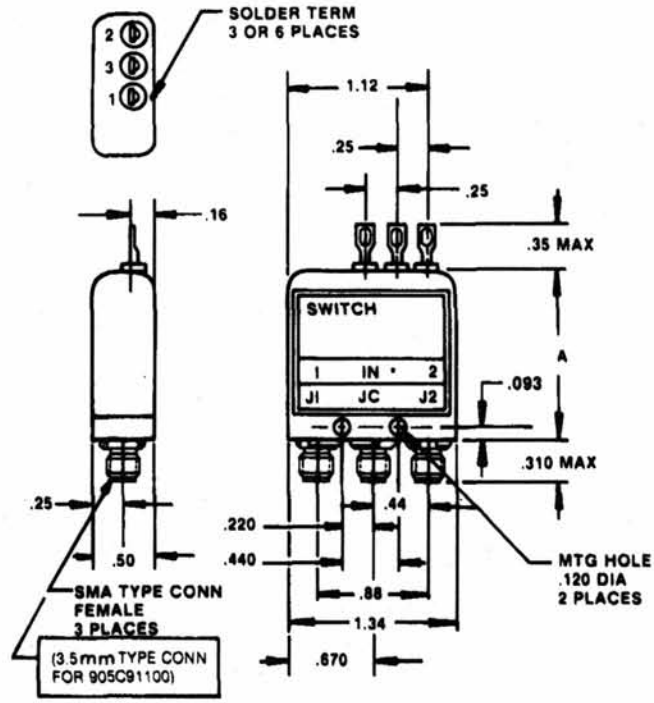






Voltage:	20 to 30Vdc
Coil Resistance:	310 ± 10 Ohms @ 20°C
Current:	95mA max @ 28Vdc and 20°C
Switching Time:	20 milliseconds
RF Contacts:	break-before-make
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	20g's sine/random
Life:	1,000,000 cycles min
Weight:	909C70100, 909C71100 } 1.5 oz.
	909C70200, 909C71200 } 2.0 oz.

Dimensions



Lower Frequency

At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

P/N	A
909C70100 909C71100 905C91100	1.30
909C70200 909C71200	1.50

Coaxial Switch

Type DO

Description

The type DO coaxial switch has RF geometry optimized for SMA connectors and operates over a 0-18GHz frequency band. It is also available with or without indicators. DowKey's design mechanically links indicating switches to the rotating armature for positive indication.

Actuator features:
1. Balanced rotating armature
2. Low current required to develop the actuating torque

This design features a dual magnetic field for high efficiency and long life reliability...also excellent shock/vibration characteristics.

This switch is part of the Type D family of switches featuring different RF connectors and frequencies.

Type	Conn.	Freq.
D	N	12 GHz
DO	SMA	18 GHz
DX	SC	6 GHz

Standard Products

P/N	Schematic
919C70100*	1
919C70200**	2

* Meets MIL-S-3928/15-01
** Meets MIL-S-3928/15-10

Special Configuration

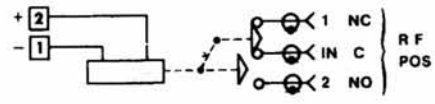
Actuating Voltage
Transient Circuit
TTL Logic Circuit
Mounting Configuration
Terminal Location

(For dimensions and circuit diagrams see pages 106 and 107)

RF Circuit: SPDT
Actuator: Failsafe
Connector: SMA
Frequency: 0-18GHz

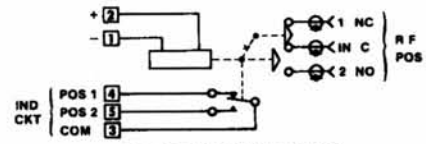
Schematic

 # 1. Failsafe



ENERGIZE TO CONNECT IN TO 2 (POS 2)
SHOWN IN FAILSAFE POSITION (POS 1)

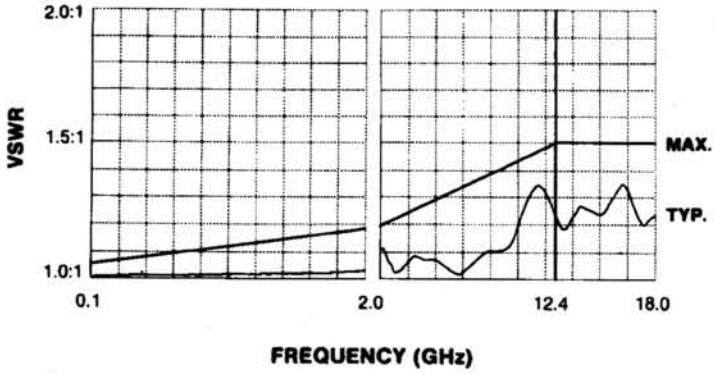
 # 2. Failsafe w/ Indicator

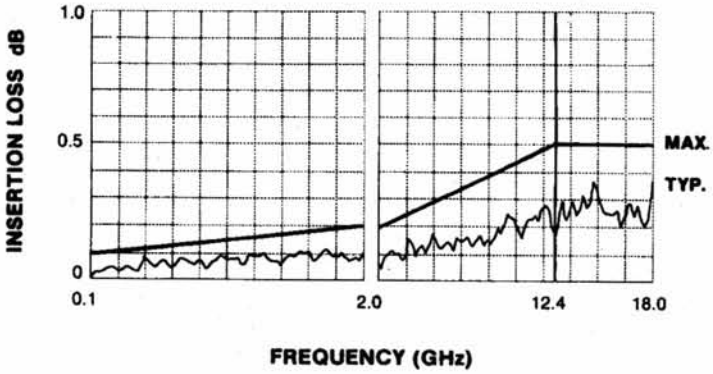


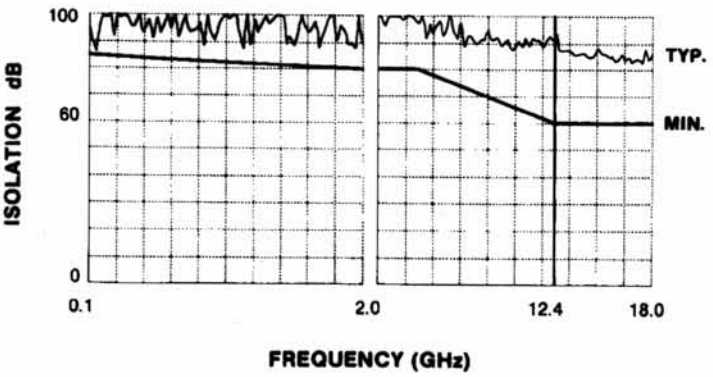
ENERGIZE TO CONNECT IN TO 2 (POS 2)
SHOWN IN FAILSAFE POSITION (POS 1)

Specifications

Typical RF data of a production switch; computer printouts below:

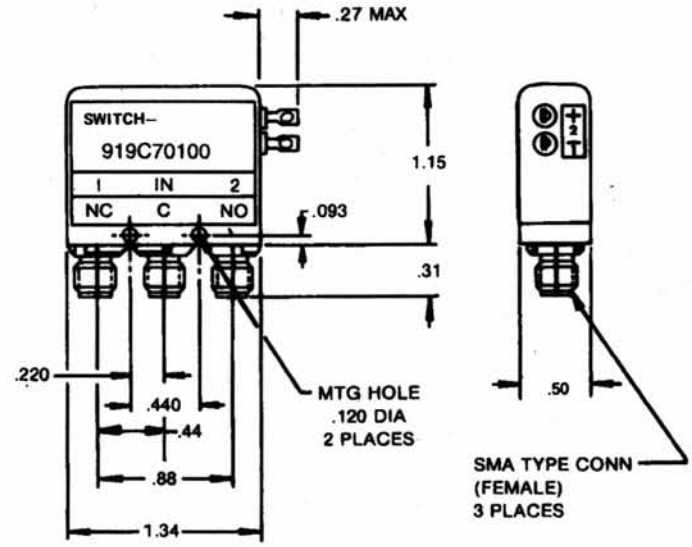


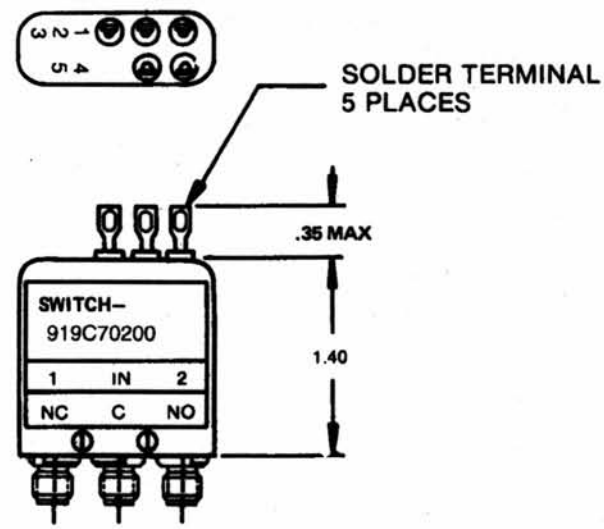




Voltage:	20 to 30Vdc
Coil Resistance:	290 Ohms min.
Current:	100mA max @ 28Vdc and 20°C
Switching Time:	20 milliseconds
RF Contacts:	break-before-make
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	20g's sine/random
Life:	1,000,000 cycles min
Weight:	919C70100 1.25 oz. max.
	919C70200 1.35 oz. max.

Dimensions





Lower Frequency

At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Coaxial Switch

Type DO

Description

The type DO latching and failsafe switches have RF geometry optimized for 3.5mm connectors and operate over a 0-26.5GHz frequency band. The latching model is magnetically latched and available with or without actuator cutoff circuitry. Both latching and failsafe models are available with or without indicators. DowKey's design mechanically links indicating switches to the rotating armature for positive indication.

Standard Products

P/N	Schematic	Type
905C90100	1	Latching
905C90100	2	Latching w/I.C.
905C91100	3	Pulse Latching
905C91200	4	Pulse Latching w/I.C.
915C90100	5	failsafe
915C90200	6	failsafe w/I.C.

* **Meets MIL-S-3928**

Special Configuration

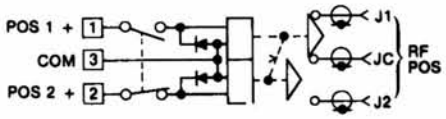
Actuating Voltage
Transient Circuit
TTL Logic Circuit
Mounting Configuration
Terminal Location

(For dimensions and circuit diagrams see pages 106 and 107)

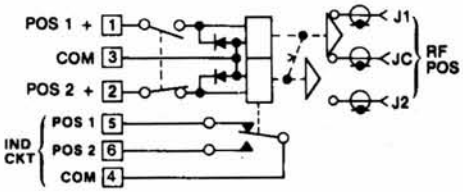
RF Circuit: SPDT
Actuator: Latching and Failsafe
Connector: *3.5mm
Frequency: 0-26.5GHz

Schematic

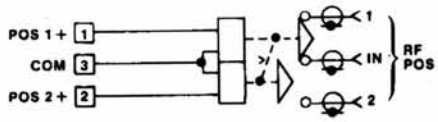
#1. Latching



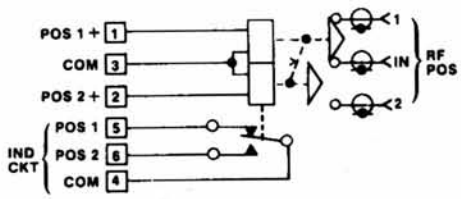
2. Latching with Indicator



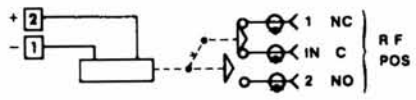
3. Pulse Latching



4. Pulse Latching w/ Indicator

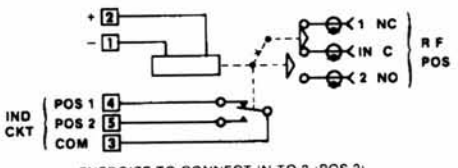


5. Failsafe



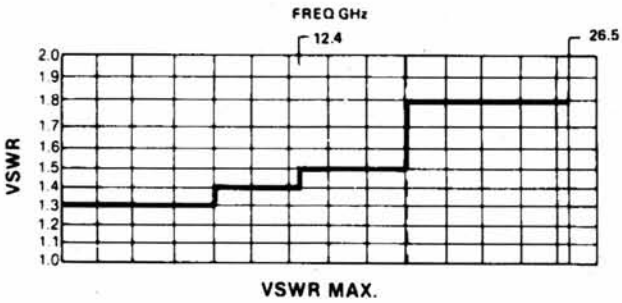
ENERGIZE TO CONNECT IN TO 2 (POS 2)
SHOWN IN FAILSAFE POSITION (POS 1)

6. Failsafe w/Indicator

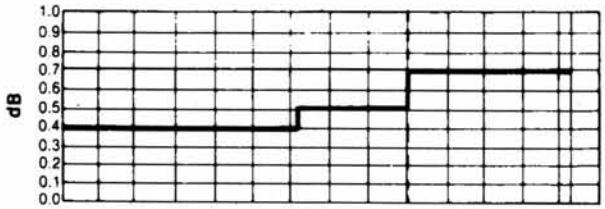


ENERGIZE TO CONNECT IN TO 2 (POS 2)
SHOWN IN FAILSAFE POSITION (POS 1)

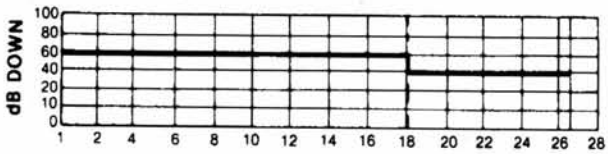
RF Characteristics



VSWR MAX.



INSERTION LOSS MAX.



ISOLATION MIN.

Lower Frequency

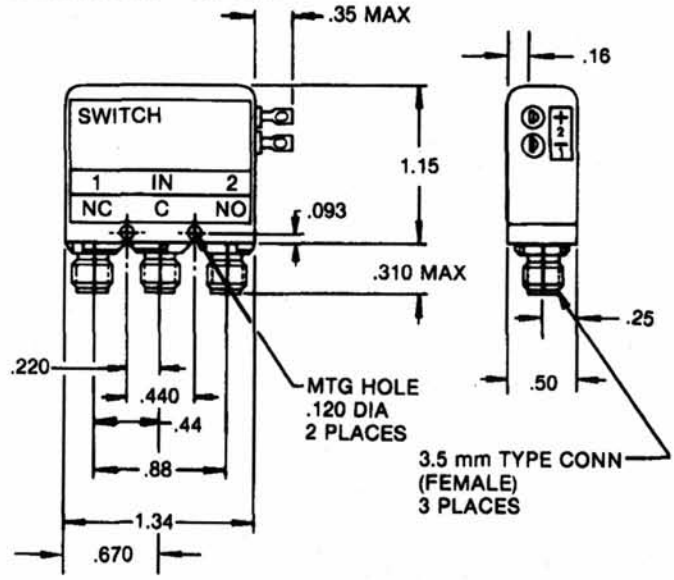
At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Voltage:	20 to 30Vdc	
Coil Resistance:	310 ± 15 Ohms @ 20°C	
Current:	95mA max @ 28Vdc and 20°C	
Switching Time:	20 milliseconds	
RF Contacts:	break-before-make	
Impedance:	50 Ohms nominal	
Temperature:	-55°C to 85°C	
Vibration:	20g's sine/random	
Life:	1,000,000 cycles min	
Weight:	905C90100 Latching	1.5 oz.
	905C90200 Latching w/I.C.	2.0 oz.
	905C91100 Pulse Latching	1.5 oz.
	905C91200 Pulse Latching w/I.C.	2.0 oz.
	915C90100 failsafe	1.25 oz.
	915C90200 failsafe w/I.C.	1.35 oz.

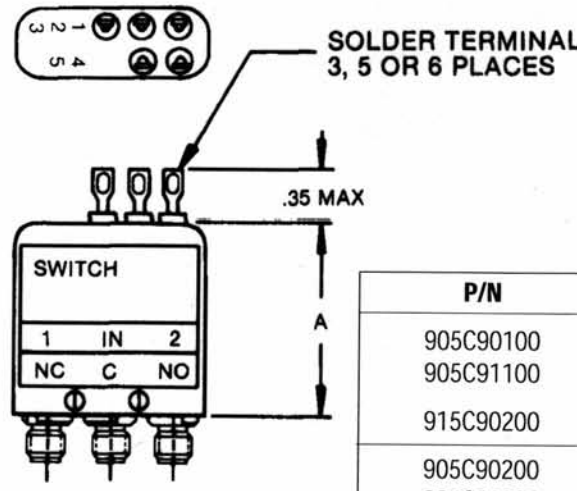
Characteristics of failsafe Models

Coil Resistance	290 Ohms min.
Current	120mA max @ 28Vdc and 20°C

Dimensions - failsafe



Latching and failsafe with indicator

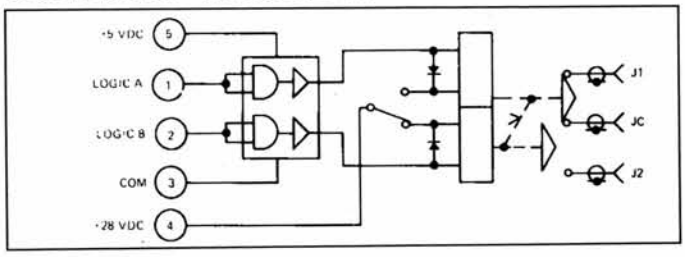


P/N	A
905C90100 905C91100	1.30
915C90200	1.40
905C90200 905C91200	1.50 1.50

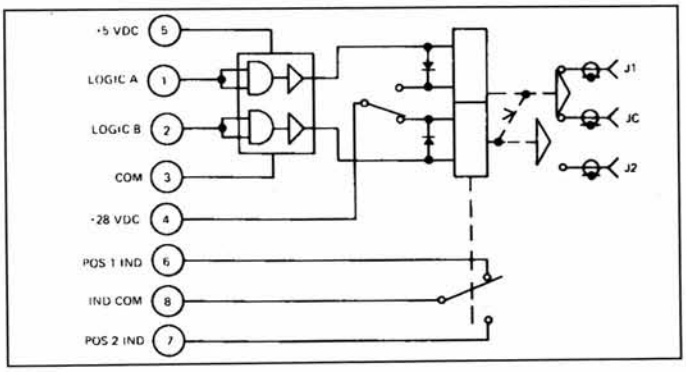
Specifications subject to change without notice

Schematic

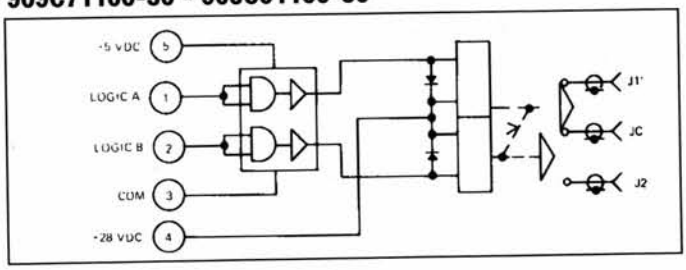
909C70100-30 - 905C90100-30



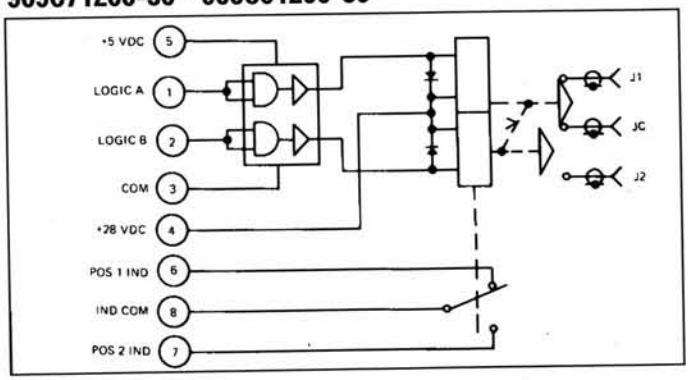
909C70200-30 - 905C90200-30



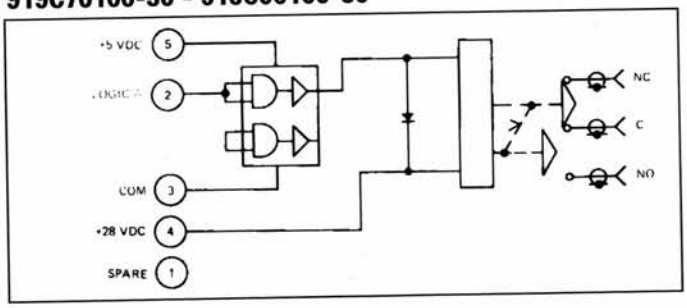
909C71100-30 - 905C91100-30



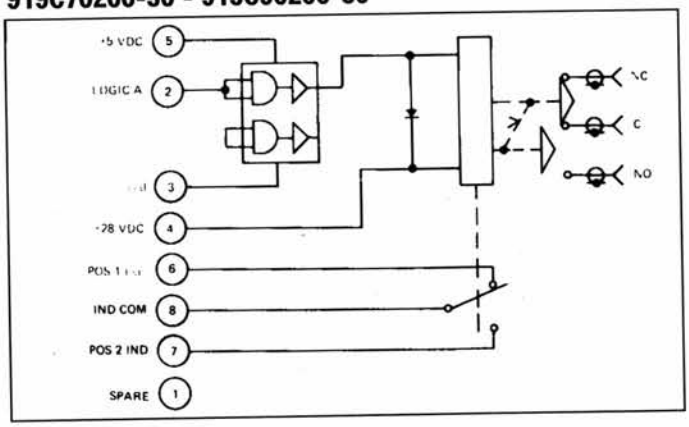
909C71200-30 - 905C91200-30



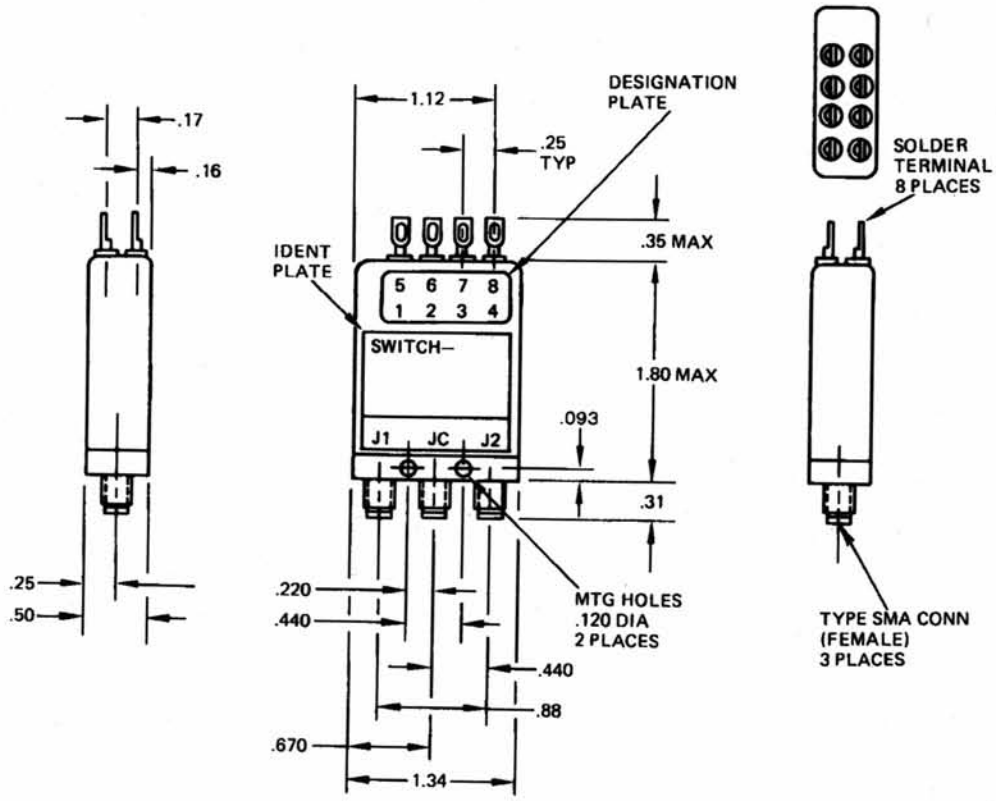
919C70100-30 - 915C90100-30



919C70200-30 - 915C90200-30



Dimensions



Logic Truth Table

Voltage

28Vdc	20 to 30Vdc
5Vdc	4.5 to 5.5Vdc
Logic 0	0 to 4Vdc
Logic 1	2.4 to 5.5Vdc pulse width 20ms at 20Vdc

Coil Current: 120mA max at 28Vdc, 20°C
Switching Time, Max: 20ms at 20Vdc

909C70200-30
909C70100-30
909C71100-30
909C71200-30
905C90100-30
905C90200-30
905C91100-30
905C91200-30

Logic Truth Table		
RF Path	Logic Signal	
	A	B
In 1	1	0
In 2	0	1

919C70100-30
919C70200-30
915C90100-30
915C90200-30

Logic Truth Table		
RF Path	Logic Signal	
	A	
In 1	0	
In 2	1	

Coaxial Switch

Type D

Description

The Type D Latching SPDT Switch has RF geometry optimized for N and TNC connectors and operates over a 0-12.4GHz frequency band. It is magnetically latched and available with or without an actuator cut-off circuit. It is also available with or without indicating switches. DowKey's design mechanically links indicating switches to the rotating armature for positive indication.

Actuator features:
1. Balanced rotating armature
2. Reliable actuation with low current
3. Positive latching with permanent magnets

A single voltage pulse of 50 milliseconds is all that is required to change positions; no holding power is required to maintain a position.

Magnetic latching offers distinct advantages over other mechanisms since it uses no springs or mechanical detents which are prone to fatigue and wear. DowKey considers magnetic latching to be the optimum design for applications which require high vibration levels, environmental extremes, long life and reliability.

This switch is part of the DowKey family of switches. Other types in this family are referenced below.

Type	Conn.	Freq.
DO	SMA	18 GHz
DX	SC	6.5 GHz

Meets MIL-S-3928

Standard Products

P/N	Conn.	Schematic
805C00100	N	1
805C00200	N	2
805C01100	N	3
805C01200	N	4
805C30100	TNC	1
805C30200*	TNC	2
805C31100	TNC	3
805C31200	TNC	4

Meets MIL-S-3928/20-08

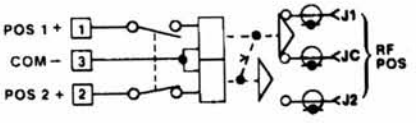
Special Configuration

DC-Power Plug
Transient Circuit
TTL Logic
Terminal Location

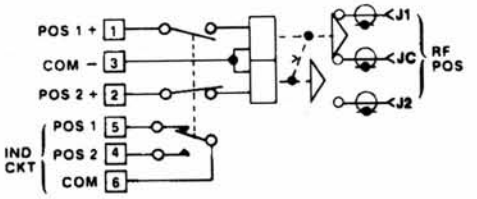
RF Circuit: SPDT
Actuator: Latching
Connector: TNC & N
Frequency: 0-12.4GHz

Schematic

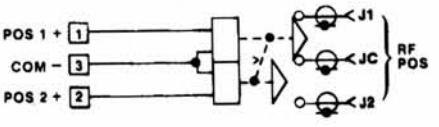
#1. Latching



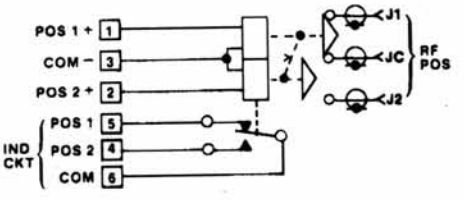
2. Latching with Indicator



3. Pulse Latching



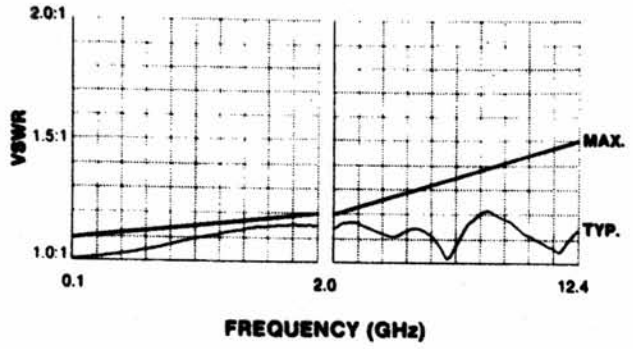
4. Pulse Latching w/ Indicator

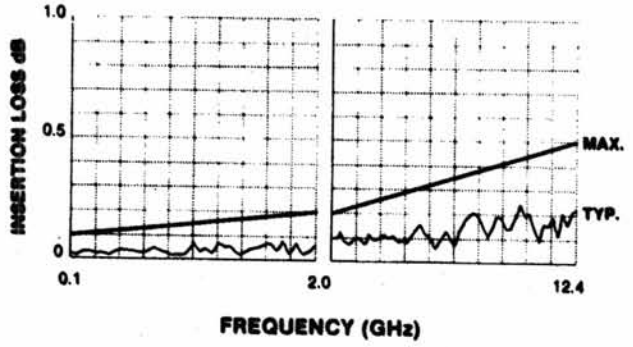


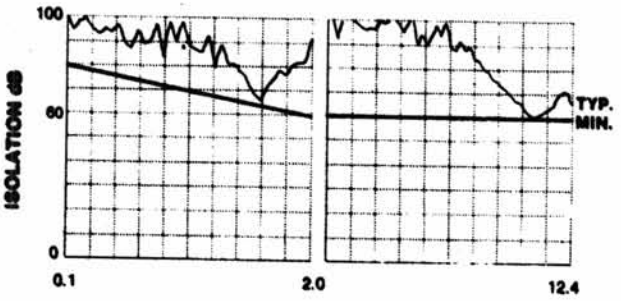
Specifications

Typical RF data of a production switch; computer printouts below:

Type N Shown

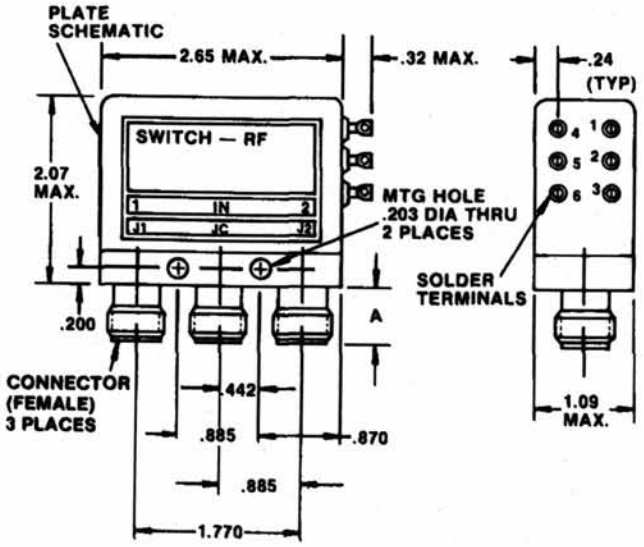






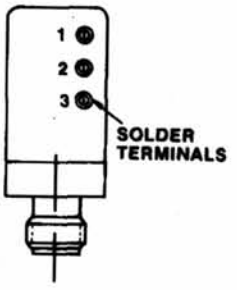
Actuator Voltage:	20 to 30Vdc
Coil Resistance:	95 ± 5 Ohms @ 20°C
Current:	0.31 amps max. @ 28Vdc
Switching Time:	20 milliseconds
RF Contacts:	break-before-make
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	20g's sine/random
Life:	100,000 cycles min
Weight:	8.2 oz. max.

Dimensions



805C00200 SHOWN

CONN	A
N	.60
TNC	.56



805C00100 SHOWN

Lower Frequency

At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Coaxial Switch

Type D

Description

The Type D Coaxial SPDT Switch has RF geometry optimized for TNC and N connectors and operates over a 0-12.4GHz frequency band. It is also available with or without indicators. DowKey's design mechanically links indicating switches to the rotating armature for positive indication.

Actuator features:

1. Balanced rotating armature
2. Lower current required to develop the actuating torque.
3. Dual holding power - permanent magnet plus electromagnet

This design features a dual magnetic field for high efficiency and long life reliability...and excellent shock/vibration characteristics.

This switch is part of the DowKey family of switches. Other types in this family are referenced below.

Type	Conn.	Freq.
DO	SMA	18 GHz
DX	SC	6.5 GHz

Standard Products

P/N	Conn.	Schematic
810C00100	N	1
810C00200	N	2
810C30100	TNC	1
810C30200	TNC	2

Meets MIL-S-3928/10-04 (810C00100)
MIL-S-3928/10-05 (810C00200)

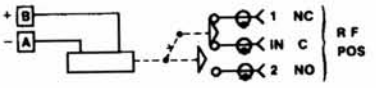
Special Configuration

Actuating Voltage — TTL Logic Circuit
Transient Circuit — Terminal Location
Mounting Configuration

RF Circuit: SPDT
Actuator: Failsafe
Connector: TNC & N
Frequency: 0-12.4GHz

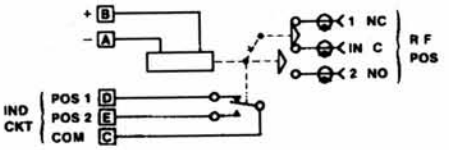
Schematic

#1. Failsafe



SHOWN IN FAIL-SAFE POSITION (NC)
ENERGIZE TO CONNECT POSITION 2 (NO)

2. Failsafe with Indicator Circuit

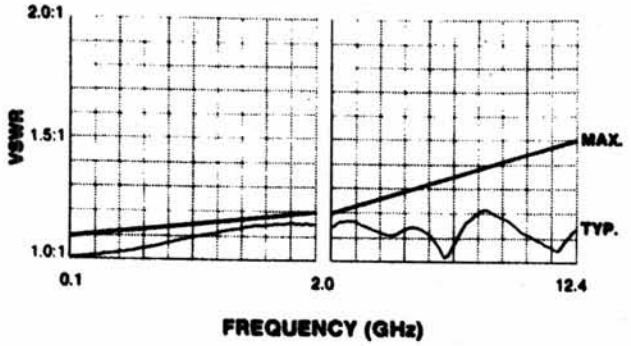


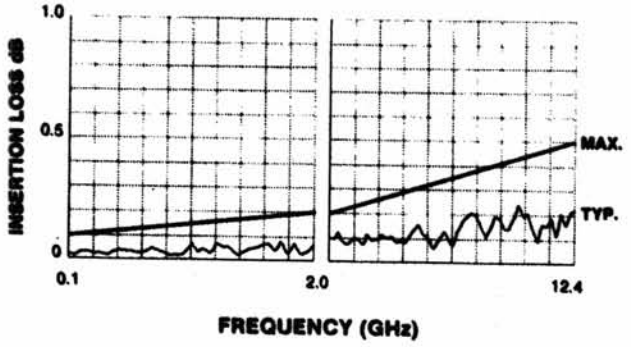
SHOWN IN FAIL-SAFE POSITION (NC)
ENERGIZE TO CONNECT POSITION 2 (NO)

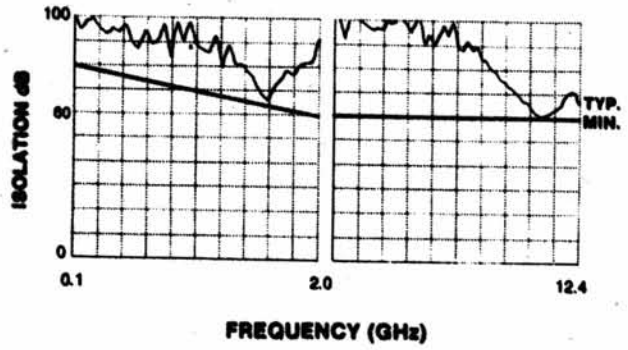
Specifications

Typical RF data of a production switch; computer printouts below:

Type N Shown

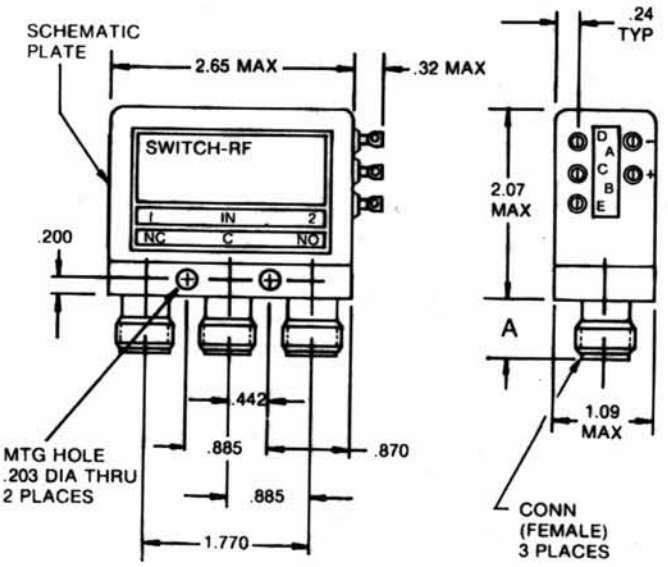






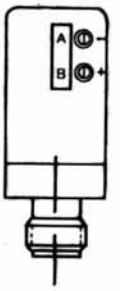
Actuator Voltage:	20 to 30Vdc
Coil Resistance:	190 ± 10 Ohms @ 20°C
Current:	160 amps max. @ 28Vdc and 20°C
Switching Time:	20 milliseconds max. RF to RF
RF Contacts:	break-before-make
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	20g's sine/random
Life:	1,000,000 cycles min
Weight:	8.2 oz. max.

Dimensions



810C00200 SHOWN

CONN	A
N	.60
TNC	.56



810C00100 SHOWN

Lower Frequency

At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Coaxial Switch

Type DT

Description

The Type DT Coaxial Switch has RF geometry optimized for TNC connectors and operates over a 0-12.4GHz frequency band. This type switch is in a smaller package than Type D and is available in Latching or failsafe models, with or without indicators.

Latching models use a magnetic latching actuator with cut-off circuitry. This switch draws current for approximately 30 milliseconds to change position; no holding power is required to maintain a position.

The failsafe models feature dual holding power...a permanent magnet plus electromagnet for low current with high efficiency.

This switch is part of the DowKey family of switches. Other types in this family are referenced below.

Type	Conn.	Freq.
D	N &TC	1 2.4 GHz
DO	SMA	1 8 GHz
DX	SC	6.5 GHz

RF Circuit: SPDT
Actuator: Latching and failsafe
Connector: TNC
Frequency: 0-12.4GHz

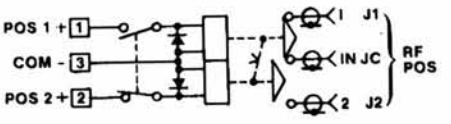
Standard Products

P/N	Schematic
900C30100	1
900C30200	2
910C30100	3
910C30200	4

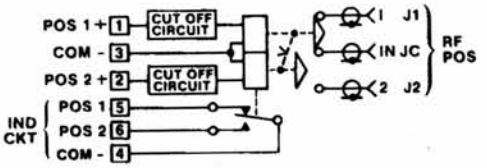
* Meets MIL-S-3928/15

Schematic

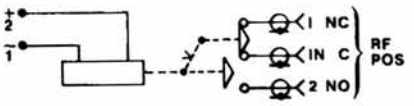
#1. Latching



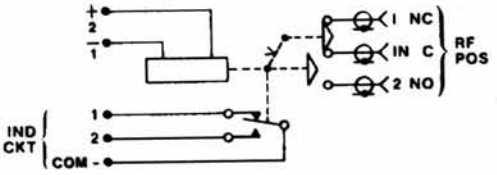
2. Latching with Indicator



3. Failsafe



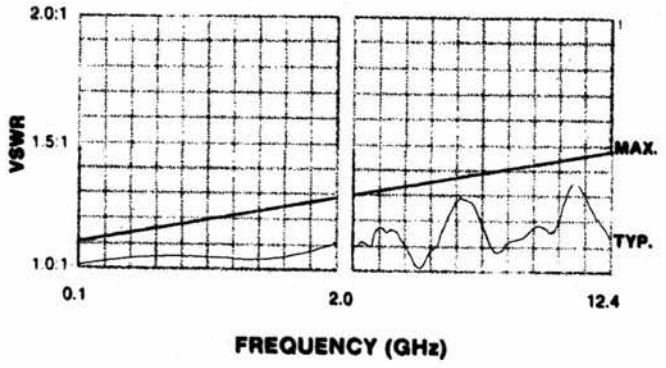
4. Failsafe w/ Indicator

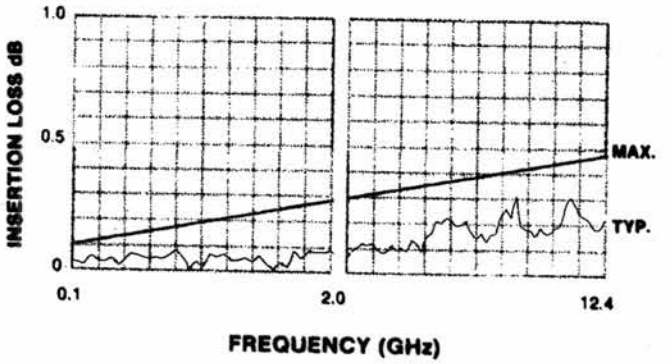


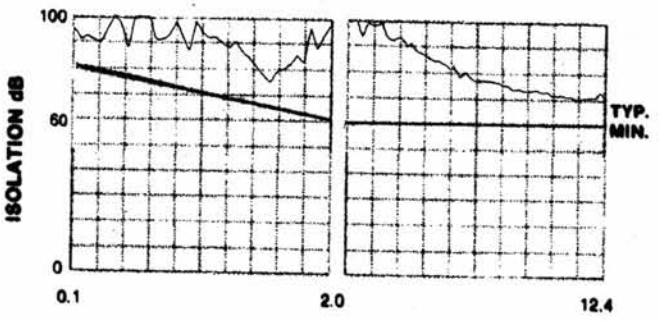
Specifications

Typical RF data of a production switch; computer printouts below:

Type TNC Shown







Lower Frequency

At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Voltage:	20 to 30Vdc
Switching Time:	20 milliseconds max @ 28Vdc
RF Contacts:	break-before-make
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	20g's sine/random
Life:	100,000 cycles min
Weight:	4 oz. max.

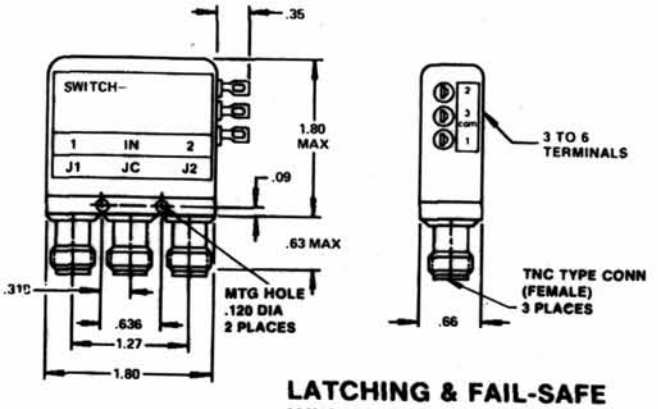
Latching Models
900C30100 and 900C30200

Coil Resistance:	55 ± 5 Ohms @ 20°C
Current:	510mA max @ 28Vdc and 20°C

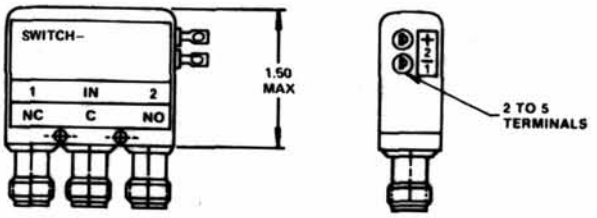
failsafe Models
910C30100 and 910C30200

Coil Resistance:	115 ± 5 Ohms @ 20°C
Current:	280mA max @ 28Vdc and 20°C

Dimensions



LATCHING & FAIL-SAFE With Indicating Switches



FAIL-SAFE Without Indicating Switches
DIM. NOT SHOWN ARE SAME AS ABOVE

Mating connector to be 5/8" diameter

Coaxial Switch

Type DX

Description

The Type DX Coaxial Switches are designed for high average power applications over a 0-6.5GHz frequency band. They use SC connectors with one inch center-to-center spacing.

These switches utilize HCI (heat conducting dielectric) to increase the average power handling capabilities. Test results on a large number of components employing HCI have consistently indicated a CW power rating 2.5 times greater than obtainable with conventional low-loss dielectric materials.

These switches are available in latching or failsafe models, with or without indicating switches.

The latching models use DowKey's Type D switch magnetic latching actuator featuring a balanced rotating armature.

The failsafe models use DowKey's Type D switch failsafe actuator featuring dual holding power...a permanent magnet and electromagnet.

This switch is part of a DowKey family of switches. Other types in this family are referenced below.

Type	Conn.	Freq.
D	N &TNC	1 2.4 GHz
DO	SMA	1 8 GHz

Standard Products

P/N	Schematic
800C51100	1
800C51200	2
810C51100	3
810C51200	4
800C50100	
800C50200	①
* Meets MIL-S-3928	②

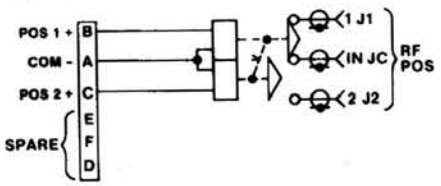
① Same as schematic 1 with the addition of current cutoff circuit.

② Same as schematic 2 with the addition of current cutoff circuit.

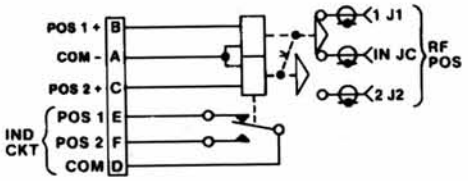
RF Circuit: SPDT High Power
Actuator: Latching and Failsafe
Connector: SC
Frequency: 0-6.5GHz

Schematic

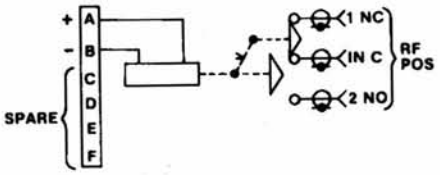
#1. Pulse Latching



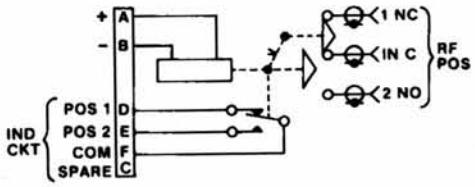
2. Pulse Latching with Indicator



3. Failsafe

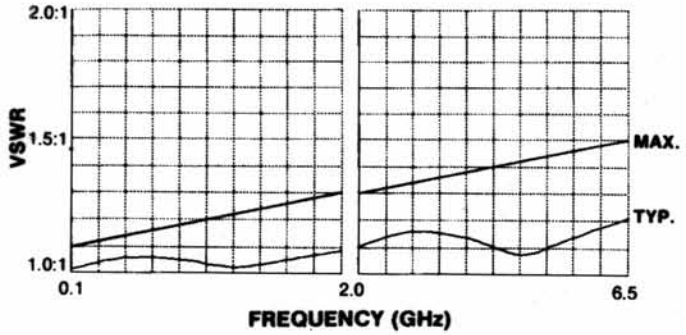


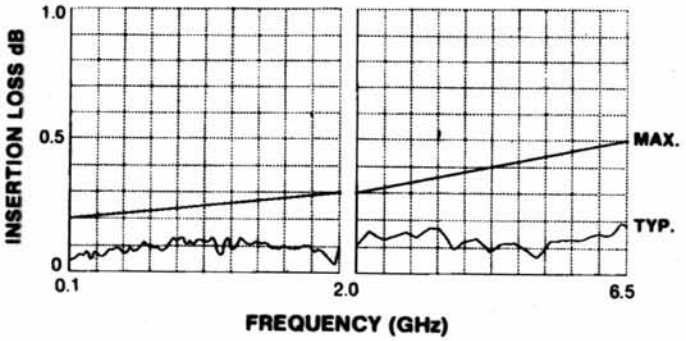
4. Failsafe w/ Indicator

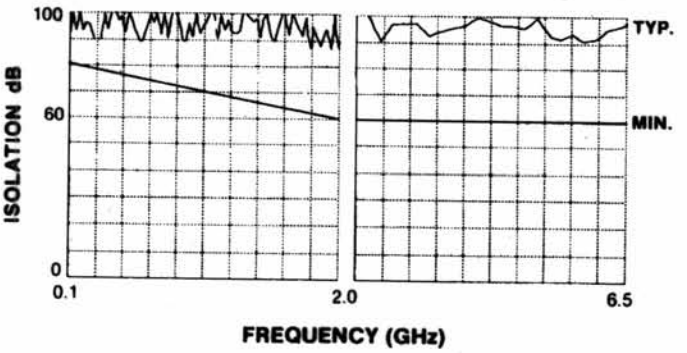


Specifications

Typical RF data of a production switch; computer printouts below:







Voltage:	20 to 30Vdc
RF Contacts:	break-before-make
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	10g's sine/random
Life:	100,000 cycles min
Weight:	8.5 oz. max.

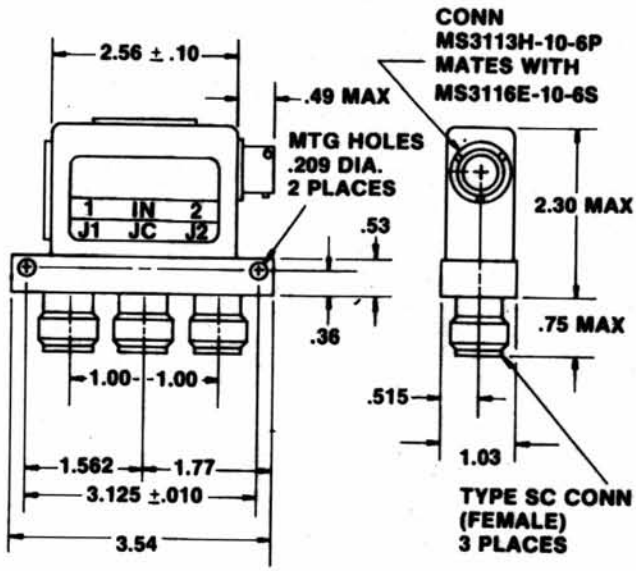
Latching Models
800C51100 and 800C51200
800C50100 and 800C50200

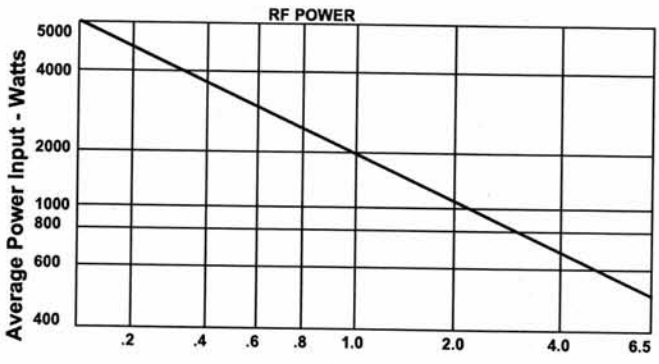
Coil Resistance:	95 ± 5 Ohms @ 20°C
Current:	320mA max @ 28Vdc and 20°C
Switching Time:	20mS max @ 28Vdc and 20°C

failsafe Models
810C51100 and 810C51200

Coil Resistance:	310 ± 5 Ohms @ 20°C
Current:	280mA max @ 28Vdc and 20°C
Switching Time:	30mS max @ 28Vdc and 20°C

Dimensions





At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Coaxial Switch

Type PD

Description

The Type PD Switch has the RF contact operation of make-before-break for switching under RF power. The Type PD Switch is available in latching or failsafe models with or without indicating switches.

MBB: Contacts arranged so the closing contacts make before interrupting the closed circuit. This type always has both circuits closed for an instant.

The MBB option offers an advantage in some high power switching applications because the maximum VSWR is limited to a value slightly in excess of 2:1. The BBM type presents a momentary infinite VSWR during switching.

The failsafe model features the same actuator design as the failsafe Type D Switch.

This switch has been tested 63,000 cycles under the following conditions with no measurable effect on the performance specifications.

Power	Frequency	Cycles
25 W CW	3350MHz	3,000
150 W CW	250MHz	20,000
	1087MHz	40,000

4KW pk., 5 W average.

These are not maximum ratings. Please contact DowKey/Transco regarding a switch to test in your system.

Standard Products

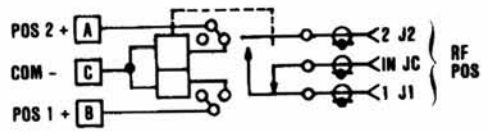
P/N	Conn	Schematic
808C00100	N	1 } Latching
808C00200	N	2 }
818C00100	N	3 } failsafe
818C00200	N	4 }
808C30100	TNC	1 } Latching
808C30200	TNC	2 }
818C30100	TNC	3 } failsafe
818C30200	TNC	4 }

* Meets MIL-S-3928

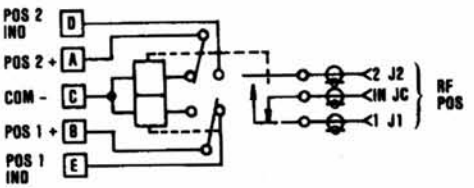
RF Circuit: SPDT (MBB)
Actuator: Latching and Failsafe
Connector: TNC & N
Frequency: 0-12.4GHz

Schematic

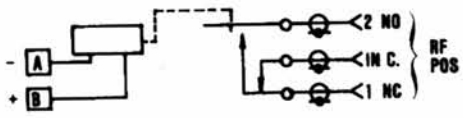
#1. Latching



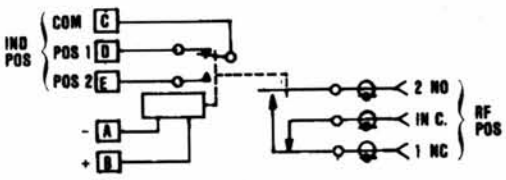
 # 2. Latching with Indicator



 # 3. Failsafe



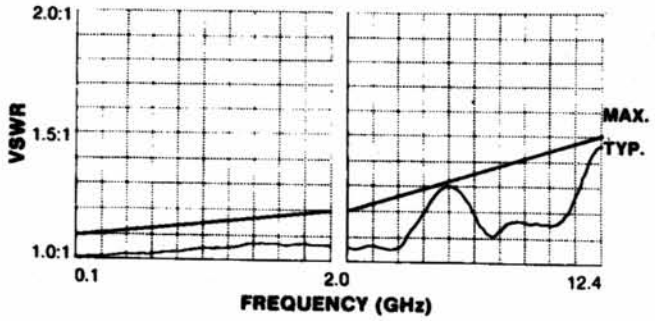
 # 4. Failsafe w/ Indicator

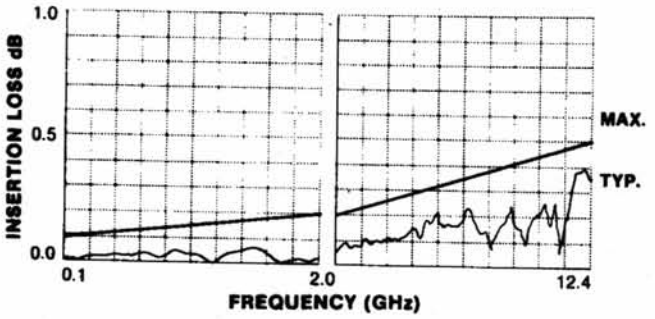


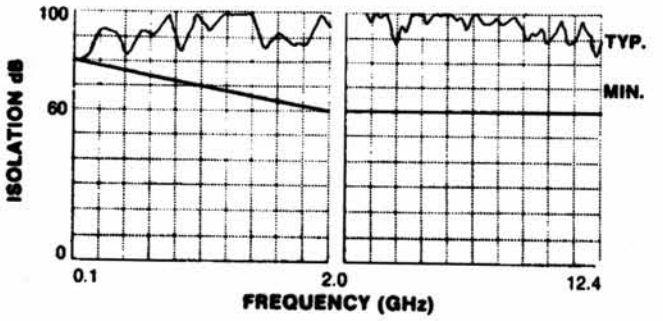
Specifications

Typical RF data of a production switch; computer printouts below:

Type N shown







Lower Frequency

At 10MHz, typical values are:
Isolation: 80dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Voltage:	20 to 30Vdc
Switching Time:	30 milliseconds max @ 28Vdc
RF Contacts:	break-before-make
Time in MBB Pos	2mS approx.
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	20g's sine/random
Life:	100,000 cycles min
Weight:	8 oz. max.

Latching Models
808C00100 and 808C00200
808C30100 and808C30200

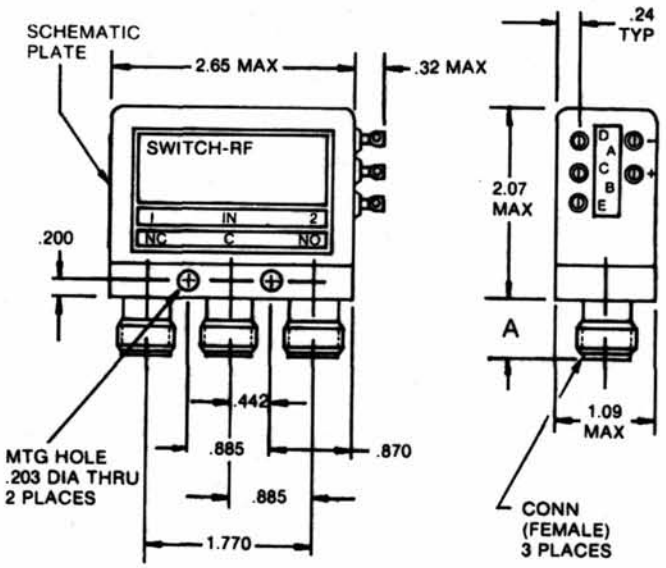
Coil Resistance:	55 ± 5 Ohms @ 20°C
Current:	.51 amp @ 28Vdc and 20°C

failsafe Models
818C00100 and 818C00200
818C30100 and 818C30200

Coil Resistance:	100 ± 5 Ohms @ 20°C
Current:	.28 amp @ 28Vdc and 20°C

Dimensions

FAIL-SAFE SHOWN



Coaxial Switch

Type HO

Description

The Type HO Coaxial Switch has RF geometry optimized for SMA connectors and operates over a 0-18GHz frequency band. It is magnetically latched and available with or without an actuator cut-off circuit. It is also available with or without indicators. DowKey's design mechanically links indicating switches to the rotating armature for positive indication.

Actuator features:

1. Balanced rotating armature
2. Reliable actuation with low current
3. Positive latching with permanent magnets
4. Basic design concept qualified for space applications.

A single voltage pulse of 20 milliseconds is all that is required to change positions; no holding power is required to maintain a position.

Magnetic latching offers distinct advantages over other mechanisms since it uses no springs or mechanical detents which are prone to fatigue and wear. DowKey considers magnetic latching to be the optimum design for applications which require high vibration levels, environmental extremes, long life and reliability.

This switch is part of a DowKey family of switches. Other types in this family are referenced below.

Type	Conn.	Freq.
H	N	12.4GHz
HT	TNC	12.4GHz
HX	SC	6.5GHz

Standard Products

P/N	Schematic
700C70100	1
700C70200	2
700C71100	3
700C71200	4

Meets MIL-S-3928

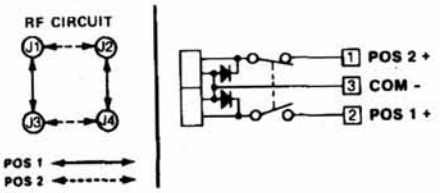
Special Configuration

Actuating Voltage	TTL Logic Circuit
Transient Circuit	Terminal Location
Power Plug	Mounting Configuration

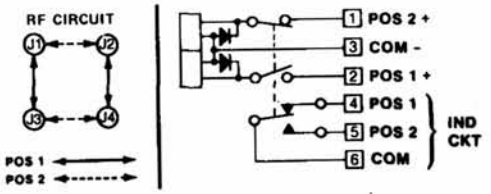
RF Circuit: Transfer
Actuator: Latching
Connector: SMA
Frequency: 0-18GHz

Schematic

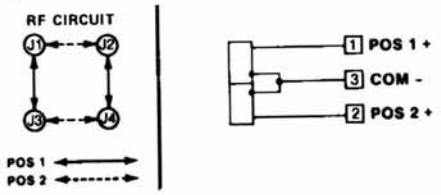
#1. Latching



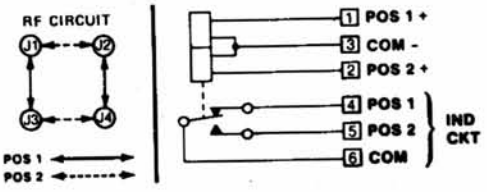
2. Latching with Indicator Circuit



3. Pulse Latching

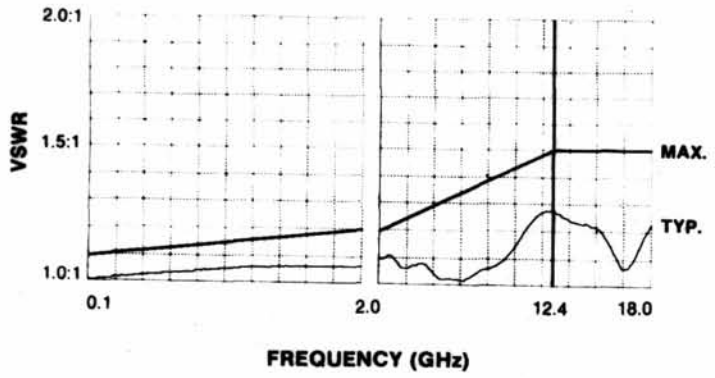


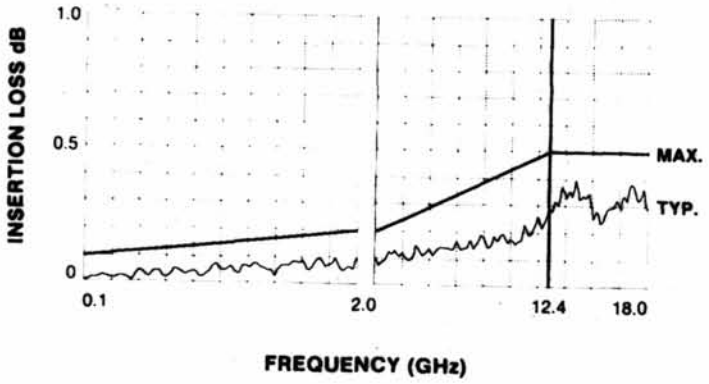
4. Pulse Latching w/ Indicator Circuit

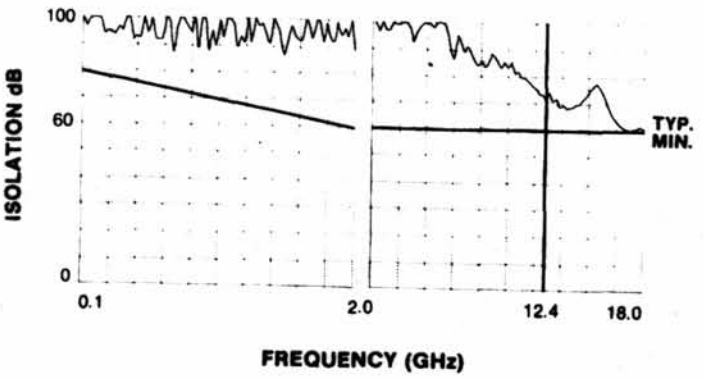


Specifications

Typical RF data of a production switch; computer printouts below:

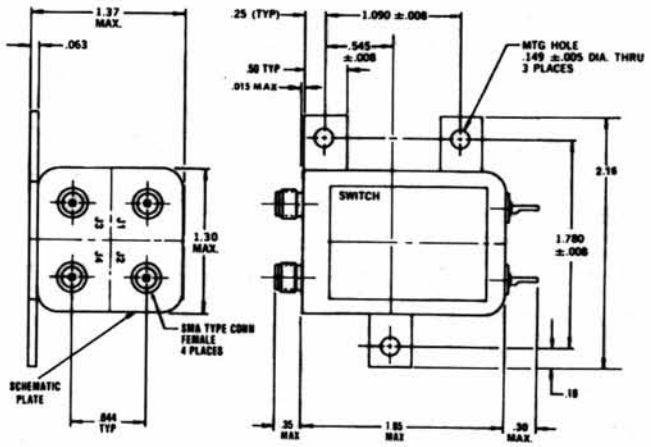


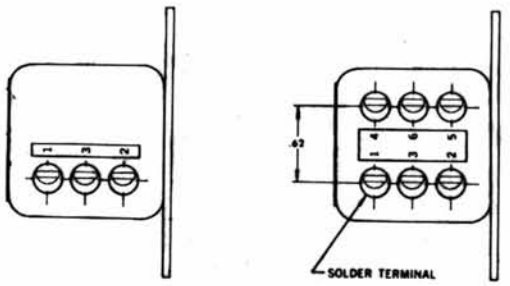




Actuator Voltage:	20 to 30Vdc
Coil Resistance:	500 ± 50 Ohms @ 20°C
Current:	65 mA max. @ 28Vdc and 20°C
Switching Time:	20 milliseconds @ 28Vdc and 20°C
RF Contacts:	break-before-make
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	20g's sine/random
Life:	100,000 cycles min
Weight:	3.5 oz. max.

Dimensions





WITHOUT INDICATOR **WITH INDICATOR**

Lower Frequency

At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Coaxial Switch

Types HO & HOF

Description

The Type HO Transfer Switch has RF geometry optimized for SMA connectors and operates over a 0-18GHz frequency band. It is also available with or without indicators. DowKey's design mechanically links indicating switches to the rotating armature for positive indications.

Actuator features:

1. Balanced rotating armature
2. Low current required to develop the actuating torque
3. Dual holding power - permanent magnet plus electromagnet.

The design features a dual magnetic field for high efficiency and long life reliability - also excellent shock/vibration characteristics.

This switch is part of a DowKey family of switches. Other types in this family are referenced below.

Type	Conn.	Freq.
H	N	12.4GHz
HT	TNC	12.4GHz
HX	SC	6.5GHz

Standard Products

P/N	Schematic
710C70100*	1
710C70200	2
715C70100*	3
710C71400**	4 (with arc suppression diode)

***Meets MIL-S-3928/19-02**
***Meets MIL-S-3928/19-05**

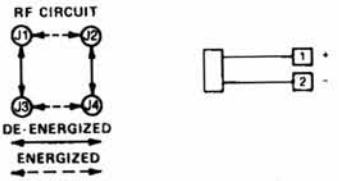
Special Configuration

Actuating Voltage	TTL Logic Circuit
Transient Circuit	Terminal Location
Power Plug	Mounting Configuration

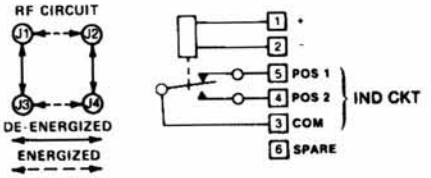
RF Circuit: Transfer
Actuator: Failsafe
Connector: SMA
Frequency: 0-18GHz

Schematic

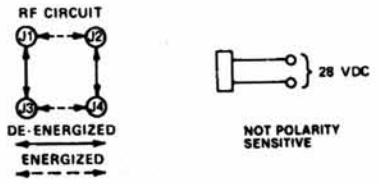
#1. Failsafe



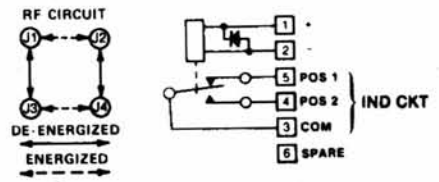
2. Failsafe with Indicator Circuit



3. Failsafe



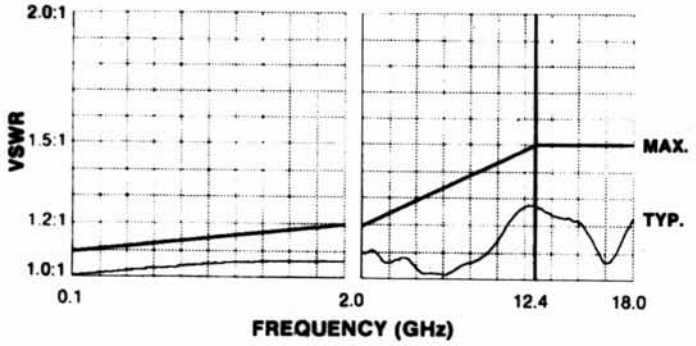
4. Failsafe w/ Indicator Circuit

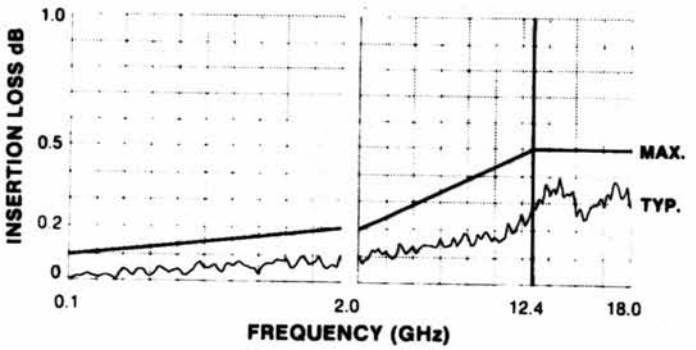


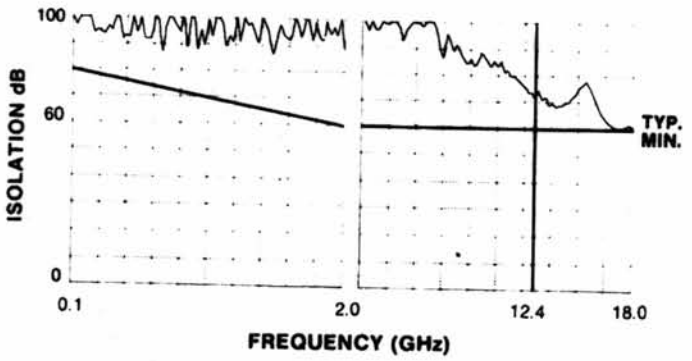
Specifications

Typical RF data of a production switch; computer printouts below:

Type N Shown

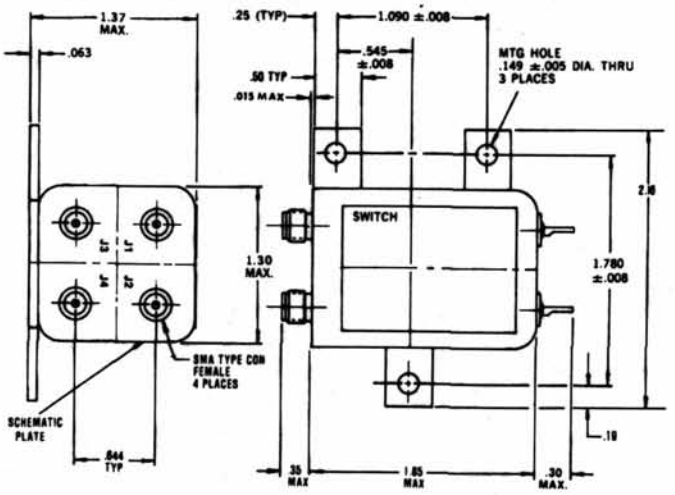




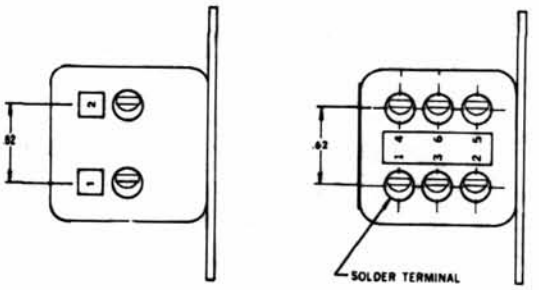


Actuator Voltage:	20 to 30Vdc
Coil Resistance:	250 ± 25 Ohms @ 20°C
Current:	120 mA max. @ 28Vdc and 20°C
Switching Time:	20 milliseconds @ 28Vdc and 20°C
RF Contacts:	break-before-make
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	20g's sine/random
Life:	100,000 cycles min
Weight:	3.5 oz. max.

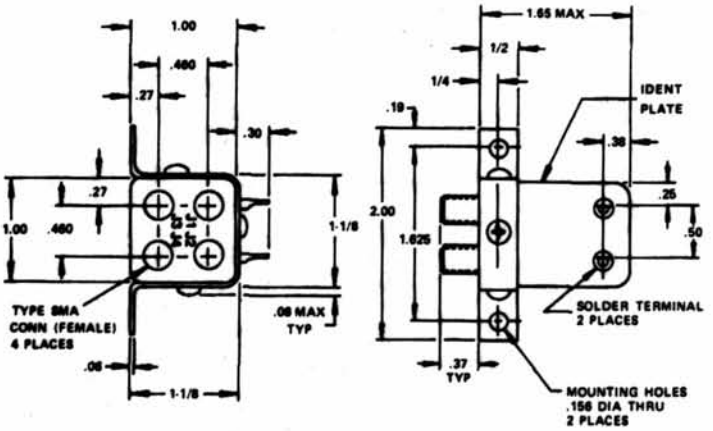
Dimensions



HO 710C70100 & 710C70200



WITHOUT INDICATOR **WITH INDICATOR**



HOF 715C70100

Lower Frequency

At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Coaxial Switch

Type HO

Description

The Type HO Coaxial Transfer Switches have RF geometry optimized for 3.5mm connectors and operate over a 0-26.5GHz frequency band. The latching model is magnetically latched and is available with or without actuator cutoff circuit. Both latching and failsafe models are available with or without indicators.

A single voltage pulse of 20 milliseconds is all that is required to change positions. No holding power is required to maintain a position.

DowKey's failsafe model design features a dual magnetic field for high efficiency and long life reliability - also excellent shock/vibration characteristics.

Standard Products

P/N	Schematic	Type
705C90100	1	Latching
705C90200	2	Latching w/I.C.
705C91100	3	Pulse Latching
705C91200	4	Pulse Latching w/I.C.
745C90100	5	failsafe
745C90200	6	failsafe w/I.C.

Meets MIL-S-3928

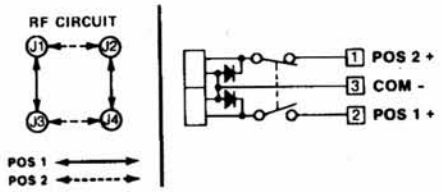
Special Configuration

Actuating Voltage	Mounting Configuration
Transient Circuit	Terminal Location
TTL Logic Circuit	Power Plug

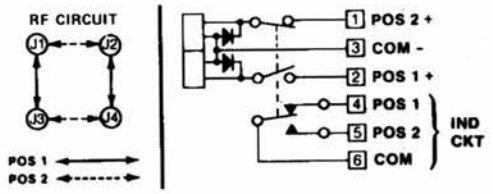
RF Circuit: Transfer
Actuator: Latching and Failsafe
Connector: 3.5mm
Frequency: 0-26.5GHz

Schematic

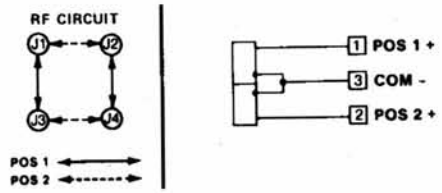
#1. Latching



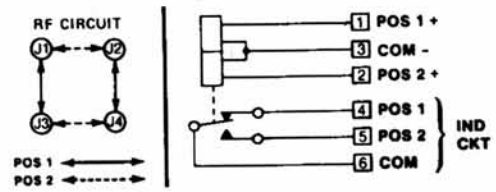
2. Latching with Indicator Circuit



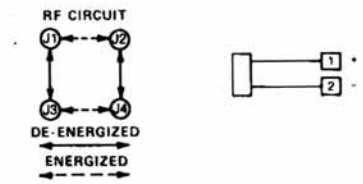
3. Pulse Latching



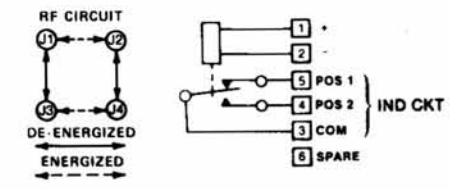
4. Pulse Latching w/ Indicator Circuit



5. Failsafe



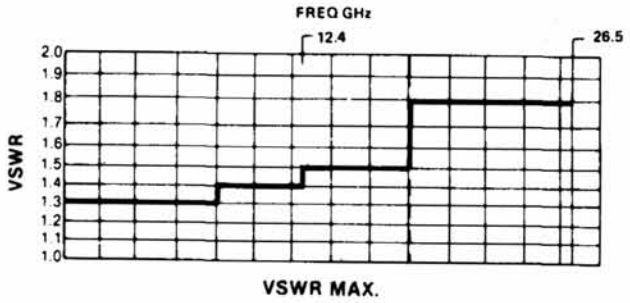
6. failsafe w/Indicator Circuit



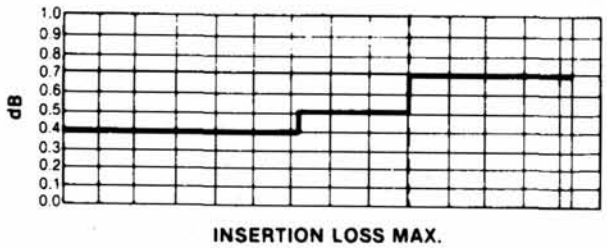
Specifications

Maximum RF performance of a production switch

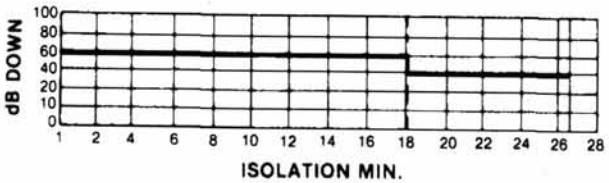
RF Characteristics



VSWR MAX.



INSERTION LOSS MAX.



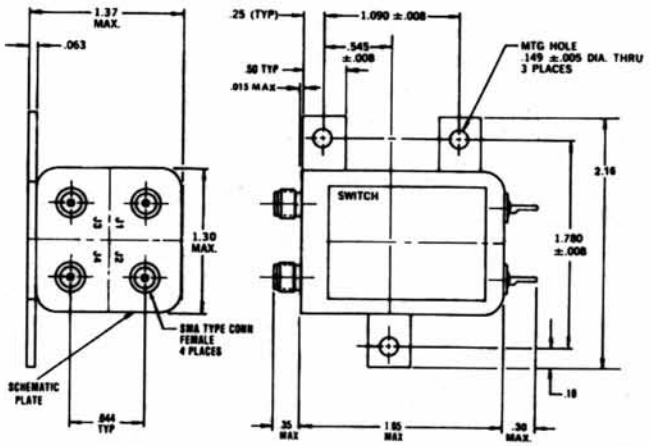
ISOLATION MIN.

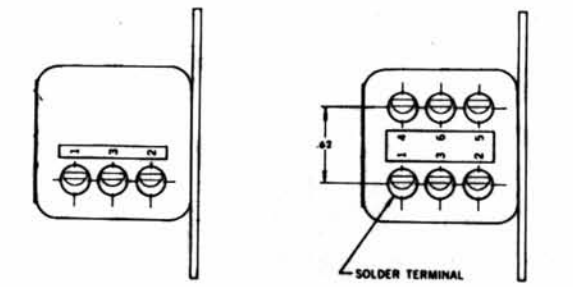
Voltage:	20 to 30Vdc
Coil Resistance:	500 ± 50 Ohms @ 20°C
Current:	65mA max @ 28Vdc and 20°C
Switching Time:	20 milliseconds @ 28Vdc and 20°C
RF Contacts:	break-before-make
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	20g's sine/random
Life:	100,000 cycles min
Weight:	3.5 oz.

Characteristics of failsafe Models

Coil Resistance	250 ± 25 Ohms @ 20°C
Current	120mA max @ 28Vdc and 20°C

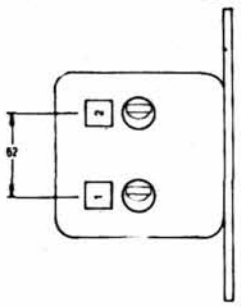
Dimensions





LATCHING WITHOUT INDICATOR

LATCHING WITH INDICATOR



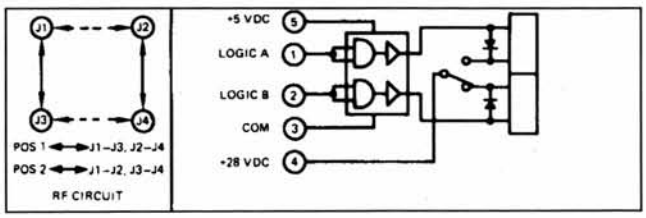
FAIL-SAFE WITHOUT INDICATOR

Lower Frequency

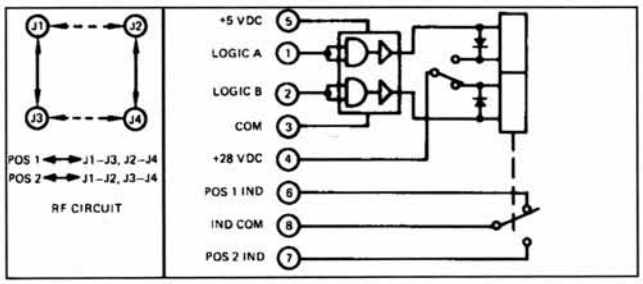
At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Schematic

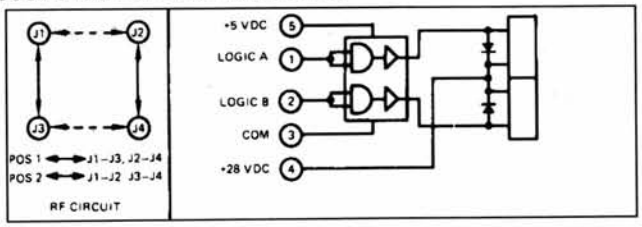
700C70100-30 - 705C90100-30



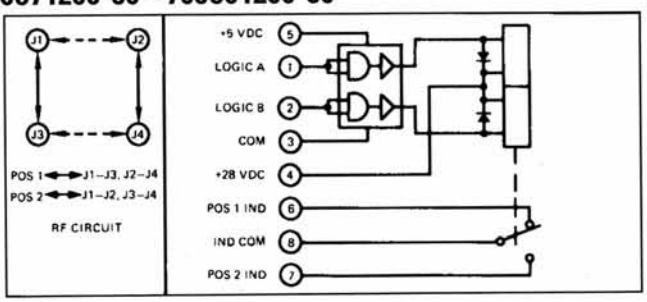
700C70200-30 - 705C90200-30



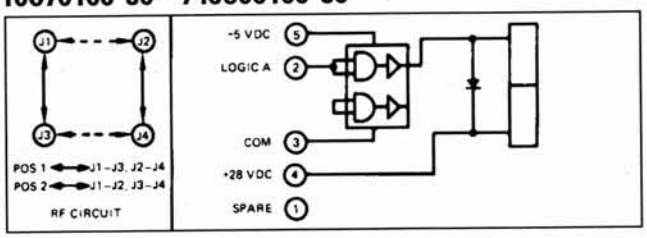
700C71100-30 - 705C91100-30



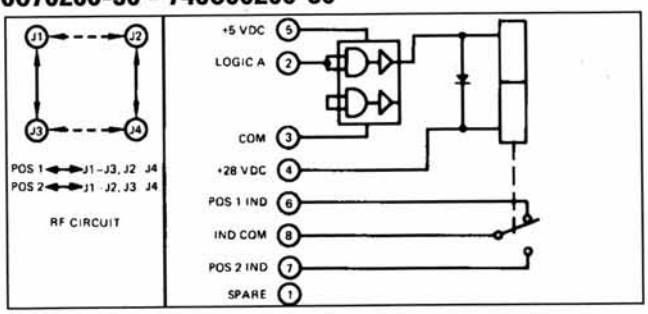
700C71200-30 - 705C91200-30



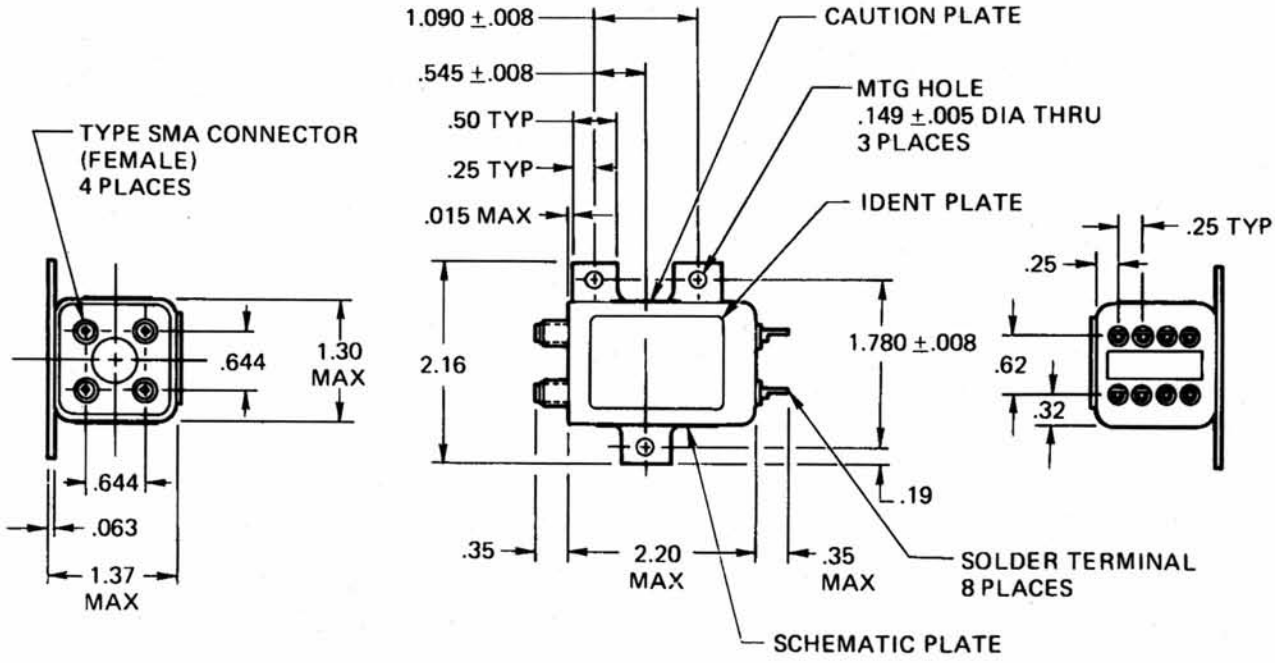
710C70100-30 - 745C90100-30



710C70200-30 - 745C90200-30



Dimensions



Logic Truth Table

Voltage

28Vdc	20 to 30Vdc
5Vdc	4.5 to 5.5Vdc
Logic 0	0 to .4Vdc
Logic 1	2.4 to 5.5Vdc pulse width 20ms at 20Vdc MIN

Switching Time, Max: 20ms at 20Vdc

700C70100-30
700C70200-30
700C71100-30
700C71200-30
705C90100-30
705C90200-30
705C91100-30
705C91200-30

Logic Truth Table		
RF Position	Logic Signal	
	A	B
Pos 1	1	0
Pos 2	0	1

710C70100-30
710C70200-30
745C90100-30
745C90200-30

Logic Truth Table		
RF Position	Logic Signal	
	A	
Pos 1	0	
Pos 2	1	

Coaxial Switch

Type H

Description

The Type H Latching Transfer Switch has RF geometry optimized for TNC and N connectors and operates over a 0-12.4GHz frequency band. The actuator is a magnetic latching type utilizing a current cut-off circuit. It is also available with or without indicating switches. DowKey's design mechanically links indicating switches to the rotating armature for positive indication.

Actuator features:
1. Symmetrical armature
2. Positive latching with permanent magnets.

Magnetic latching offers distinct advantages over other mechanisms since it uses no springs or mechanical detents which are prone to fatigue and wear. DowKey considers magnetic latching to be the optimum design for applications which require high vibration levels, environmental extremes, long life and reliability.

Type	Conn.	Freq.
HO	SMA	18GHz
HT	TNC	12.4GHz
HX	SC	6.5GHz

Standard Products

Pin	Conn	Schematic
300C00100	N	1
300C00200*	N	2
300C30100	TNC	1
300C30200**	TNC	2

* Meets MIL-S-3928/10-10
** Meets MIL-S-3928/21-03

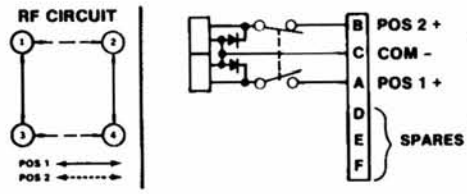
Special Configuration

Actuating Voltage
TTL Logic Circuit
Mounting Configuration
Terminal Location

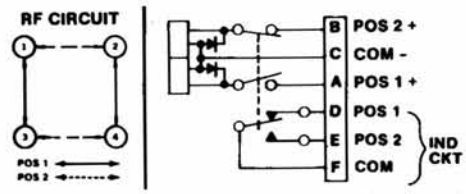
RF Circuit: Transfer
Actuator: Latching
Connector: N & TNC
Frequency: 0-12.4GHz

Schematic

1. Latching

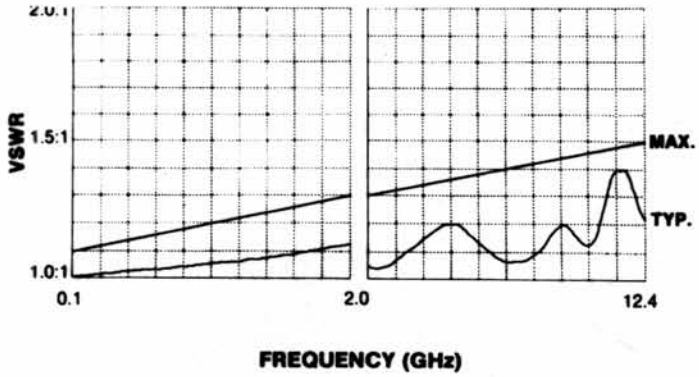


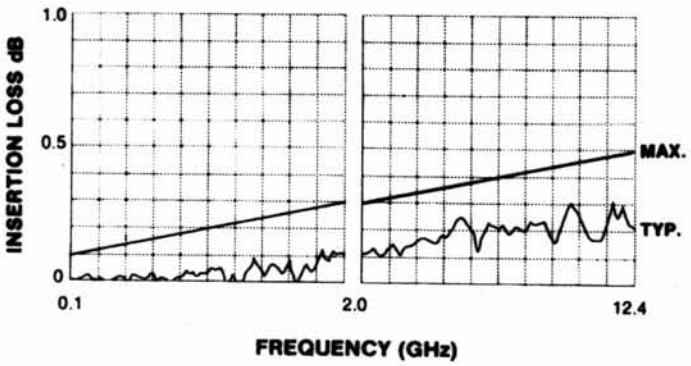
2. Latching w/ Indicator Circuit

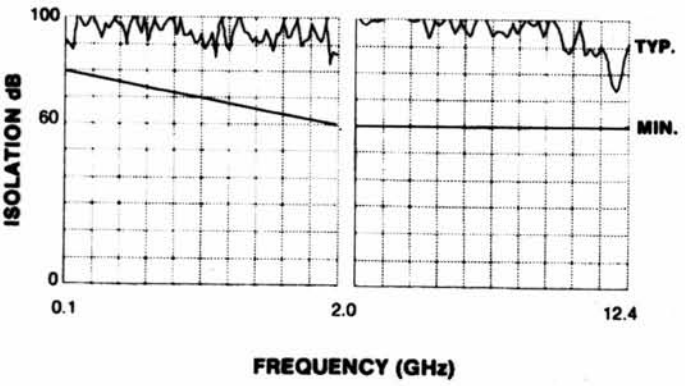


Specifications

Typical RF data of a production switch; computer printouts below:

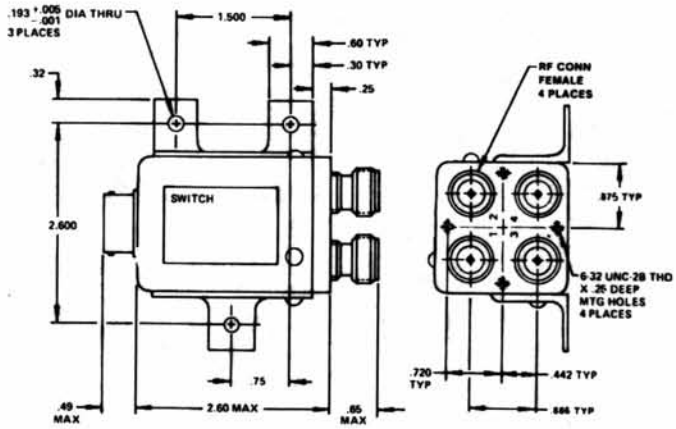


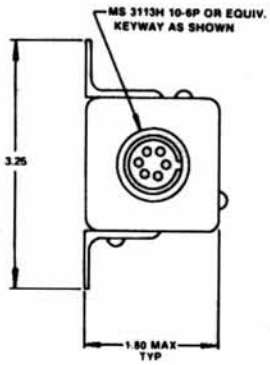




Voltage:	20 to 30Vdc
Coil Resistance:	45 ± 5 Ohms @ 20°C
Current:	.65 amp max @ 28Vdc and 20°C
Switching Time:	20 milliseconds max RF to RF
RF Contacts:	break-before-make
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	20g's sine/random
Life:	100,000 cycles min
Weight:	12 oz.

Dimensions





Lower Frequency

At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Coaxial Switch

Type H

Description

The Type H failsafe Transfer switch has RF geometry optimized for Type N and TNC connectors and operates over a 0-12.4GHz frequency band. It is available with or without indicating switches. DowKey's design mechanically links indicating switches to the rotating armature for positive indication.

A proven failsafe actuator is utilized to provide reliable performance in applications where the simplicity of failsafe operation is desired.

This switch is part of a DowKey family of switches. Other types in this family are referenced below.

Type	Conn.	Freq.
HO	SMA	18GHz
HT	TNC	12.4GHz
HX	SC	6.5GHz

Standard Products

P/N	Conn	Schematic
310C00100	N	1
310C00200*	N	2
310C30100	TNC	1
310C30200	TNC	2

Other Products

P/N	Schematic
310C30800**	3
with solder terminals	

*Meets MIL-S-3928/10-08
** Meets Mil-S-3928/21-02

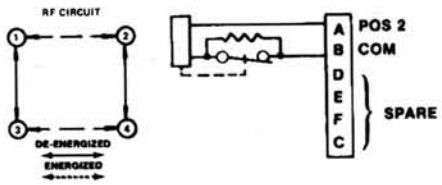
Special Configuration

Actuating Voltage
Transient Current
Mounting Configuration
TTL Logic Circuit
Terminal Location

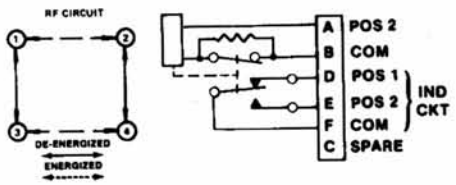
RF Circuit: Transfer
Actuator: Failsafe
Connector: N & TNC
Frequency: 0-12.4GHz

Schematic

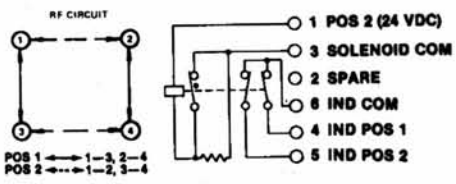
#1. Failsafe



2. Failsafe with Indicator Circuit

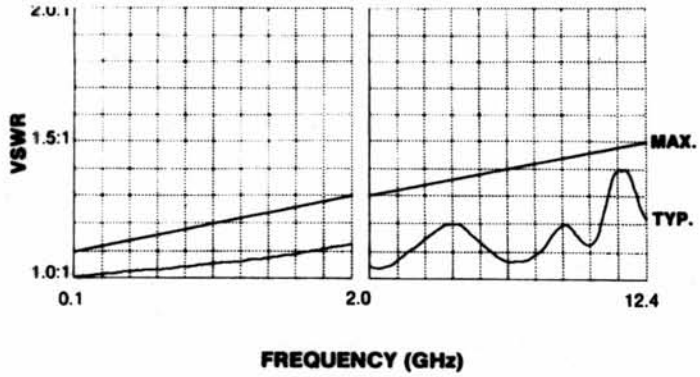


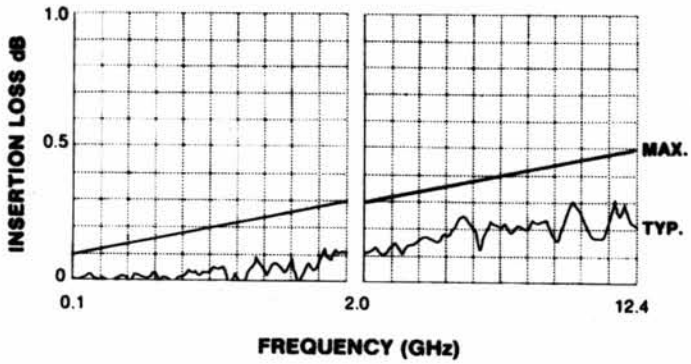
3. Failsafe with Indicator and Solder Terminal

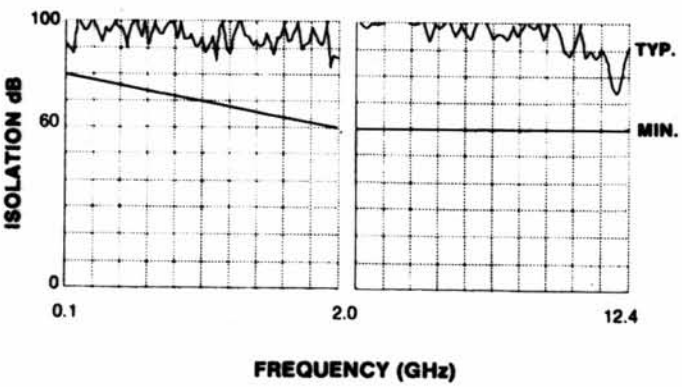


Specifications

Typical RF data of a production switch; computer printouts below:

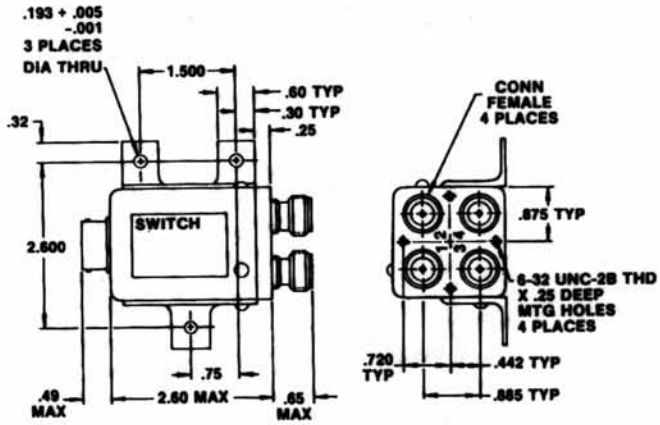


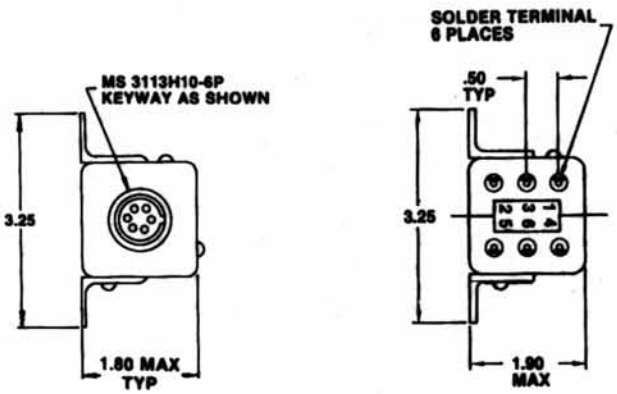




Actuator Voltage:	20 to 30Vdc
Current:	1.0 amp max. @ 28Vdc and 20°C
Switching Time:	20 milliseconds max RF to RF
RF Contacts:	break-before-make
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	20g's sine/random
Life:	100,000 cycles min
Weight:	12 oz. max.

Dimensions





Lower Frequency

At 10MHz, typical values are:
Isolation: 90dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Coaxial Switch

Type HT

Description

The Type HT Coaxial Switch has RF geometry optimized for TNC connectors and operates over a 0-12.4GHz frequency band. The model HT is available in latching or failsafe models. It offers TNC connectors in the smallest possible package. Both models are available with or without indicators. DowKey's design mechanically links indicating switches to the rotating armature for positive indications.

The latching models use a magnetic latching actuator featuring a balanced rotating armature and a current cut-off circuit. Current is required for only 30 milliseconds to change position; no holding power is required.

The failsafe models feature dual holding power...a permanent magnet plus electromagnet for low current with high efficiency.

This switch is part of the DowKey family of switches. Other types in this family are referenced below.

Type	Conn.	Freq.
H	N	12.4 GHz
HO	SMA	18 GHz
HX	SC	6.5 GHz

Standard Products

P/N	Schematic
700C30100	1
700C30200*	2
710C30100	3
710C30200	4

* **Meets MIL-S-3928/21-01**

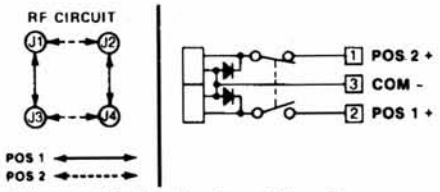
Special Configuration

Actuating Voltage TTL Logic Circuit
Terminal Location Mounting Configuration

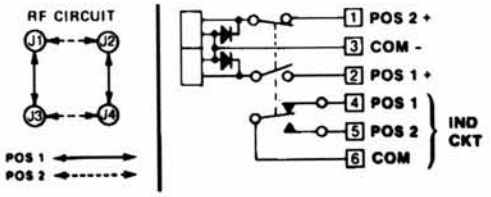
RF Circuit: Transfer
Actuator: Latching and Failsafe
Connector: TNC
Frequency: 0-12.4GHz

Schematic

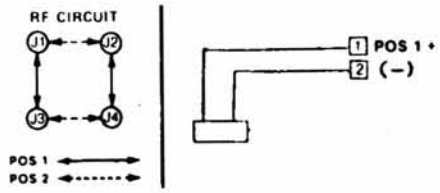
#1. Latching



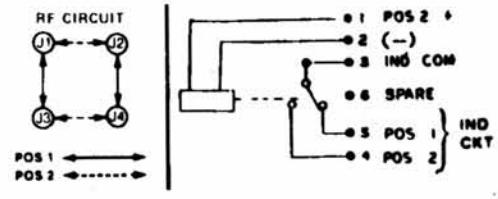
2. Latching with Indicator Circuit



3. Failsafe

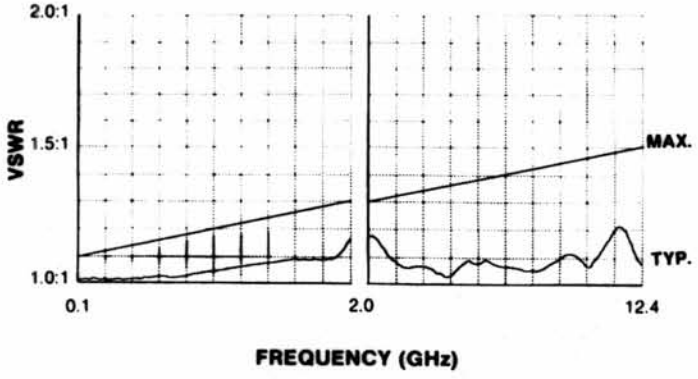


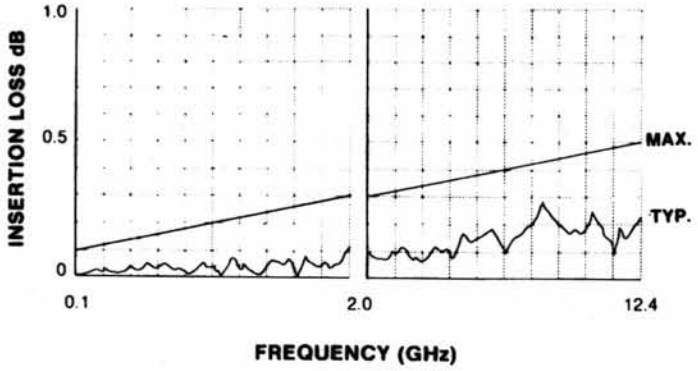
4. Failsafe w/ Indicator Circuit

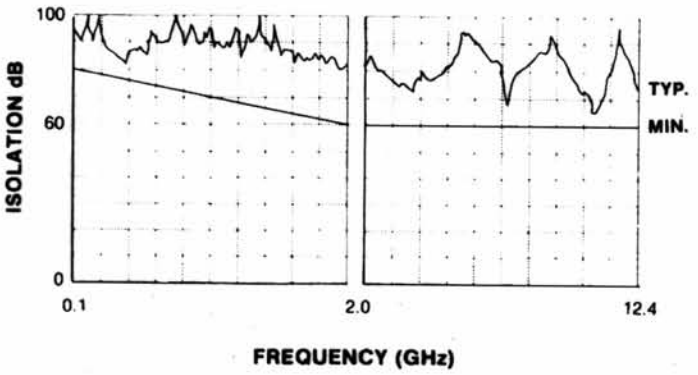


Specifications

Typical RF data of a production switch; computer printouts below:







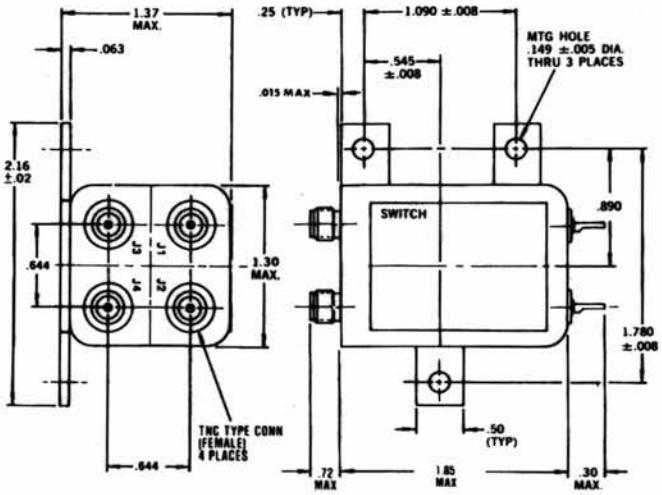
Failsafe Models

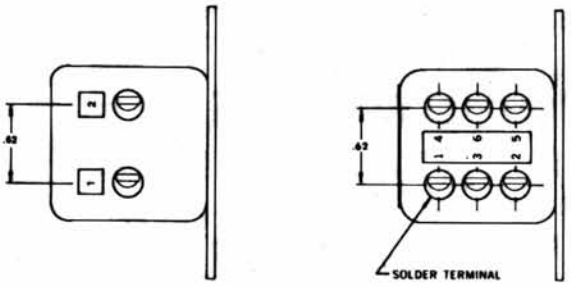
Coil Resistance:	250 ± 25 Ohms @ 20°C
Current:	120mA @ 28Vdc and 20°C

Latching Models

Coil Resistance:	500 ± 50 Ohms @ 20°C
Current:	65mA @ 28Vdc and 20°C
Voltage:	20 to 30Vdc
Switching Time:	20 milliseconds max RF to RF
RF Contacts:	break-before-make
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	20g's sine/random
Life:	100,000 cycles min
Weight:	3.5 oz. max.

Dimensions





Lower Frequency

At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Mating connector to be 5/8" diameter

Coaxial Switch

Type HX

Description

The Type HX Coaxial Switches are designed for high average power applications over a 0-6.5GHz frequency band. They use SC connectors and are available in latching or failsafe models, with or without indicators.

These switches utilize HCI (heat conducting dielectric*) to increase the average power handling capabilities. Test results on a large number of components employing HCI have consistently indicated a CW power rating 2.5 times greater than obtainable with conventional low-loss dielectric materials.

Latching models use a magnetic latching actuator featuring a balance rotating armature. Current is required for only 40 milliseconds to change position; no holding power is required.

failsafe models feature dual holding power provided by a permanent magnet plus an electromagnet for low current with high efficiency.

This switch is part of a DowKey family of switches. Other types in this family are referenced below.

Type	Conn.	Freq.
H	N	12.4 GHz
HO	SMA	1 8 GHz
HT	TNC	12.4GHz

Standard Products

P/N	Schematic
300C51100	1
300C51200	2
310C51100	3
310C51200	4

Meets MIL-S-3928

*** Transco developed proprietary material**

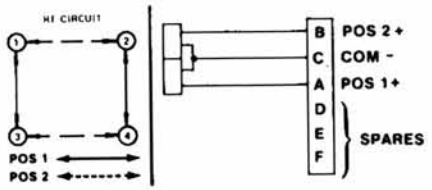
Special Configuration

Actuating Voltage
Mounting Configuration
Actuator Cut-off Circuit

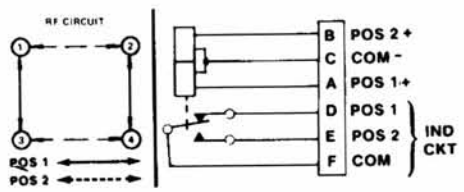
RF Circuit: Transfer High Power
Actuator: Latching and Failsafe
Connector: SC
Frequency: 0-6.5GHz

Schematic

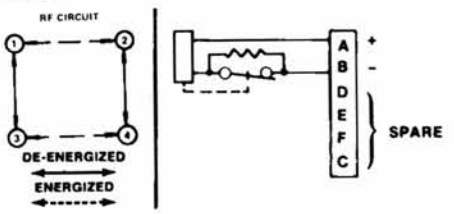
#1. Pulse Latching



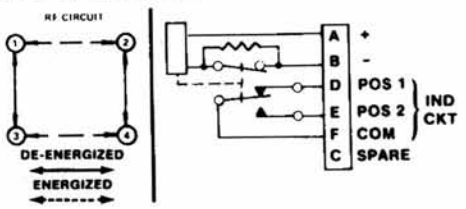
 # 2. Pulse Latching with Indicator



 # 3. Failsafe

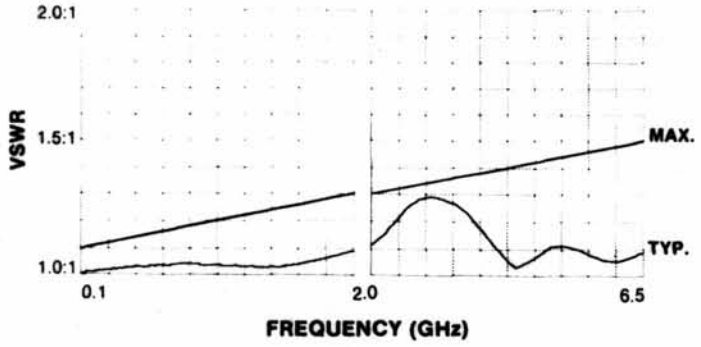


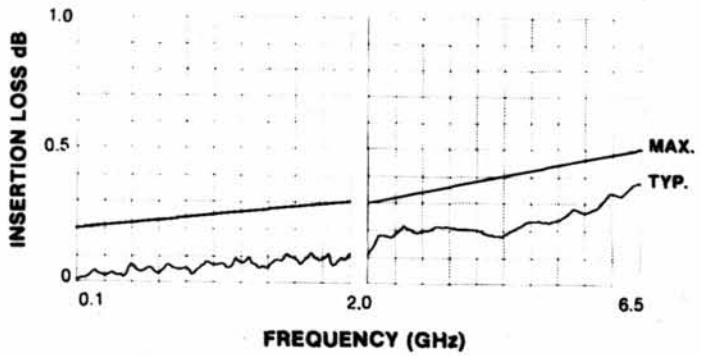
 # 4. Failsafe w/ Indicator

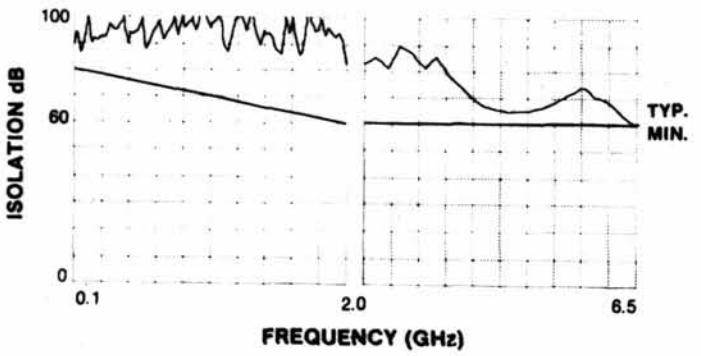


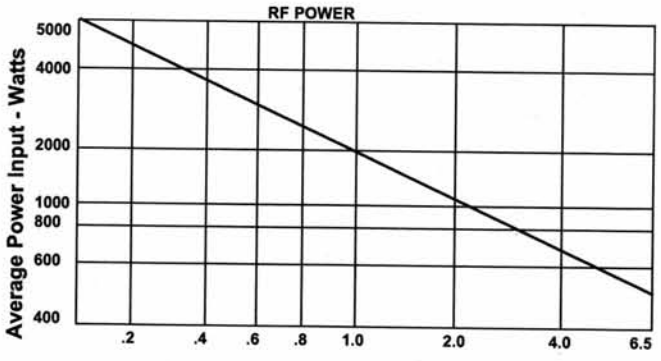
Specifications

Typical RF data of a production switch; computer printouts below:









Voltage:	22 to 30Vdc
Switching Time:	20 milliseconds max @ 28Vdc
RF Contacts:	break-before-make
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	10g's sine/random
Life:	100,000 cycles min
Weight:	12.5 oz. max.

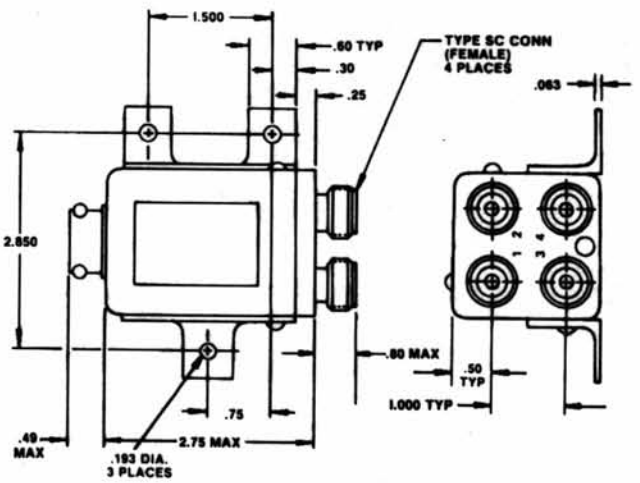
Latching Models
300C51100 and 300C51200

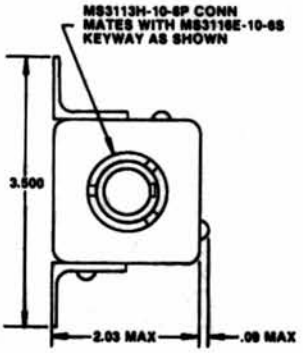
Current: .65 amp @ 28Vdc and 20°C

failsafe Models
310C51100 and 310C51200

Current Pull-in: 1.1 amp max @ 28Vdc and 20°C
Current Holding: 270 mA max @ 28Vdc and 20°C

Dimensions





Lower Frequency

At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Coaxial Switch Type MO

Description

The Type MO SP3T to SP6T switch utilizes selective linear actuators for each position. RF geometry is optimized for SMA connectors and operates over a 0-18GHz frequency band. Individual solenoids mean faster switching time...no waiting for the switch to sequence through a number of positions before stopping at the selected position. Separate "selective" solenoids provide positive action and a low actuator current requirement.

This switch is part of a DowKey family of switches. Other types in this family are referenced below:

Type	Conn.	Freq.
M	N &TNC	12.4 GHz
MX	SC	6.5 GHz
ML	N &TNC	12.4GHz

Standard Products

P/N	Schematic	
143C70600	1	
144C70600	2	
145C70600	3	
146C70600*	4	
146C70600-30	5	TTL Logic

* Meets MIL-S-3928/18-02

Special Configuration

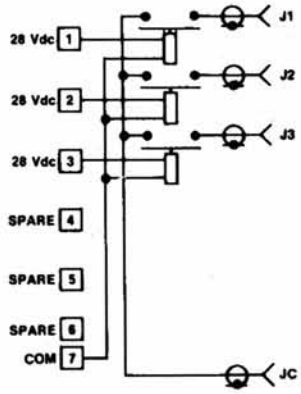
Actuating Voltage
Transient Circuit
TTL Logic Circuit
Mounting Configuration
Terminal Location

(For dimensions and circuit diagrams see page 144)

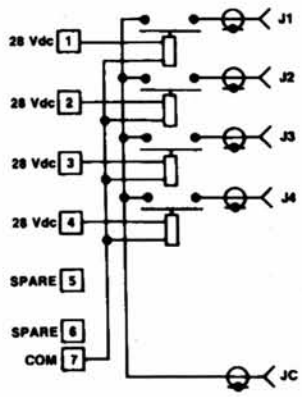
RF Circuit: SP3T to SP6T
Actuator: *Selective with Solder Terminals
Connector: SMA
Frequency: 0-18GHz

Schematic

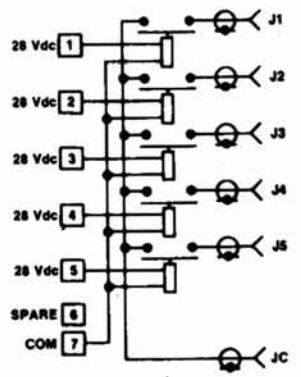
#1. 3 POS



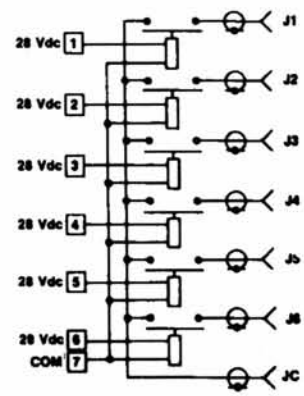
 # 2. 4 POS



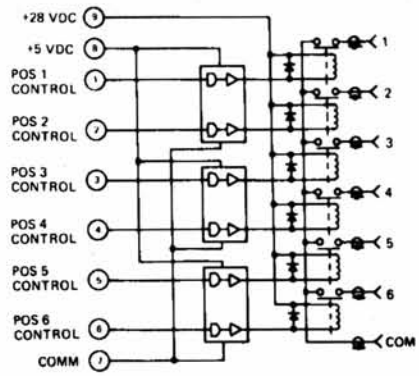
 # 3. 5 POS



 # 4. 6 POS

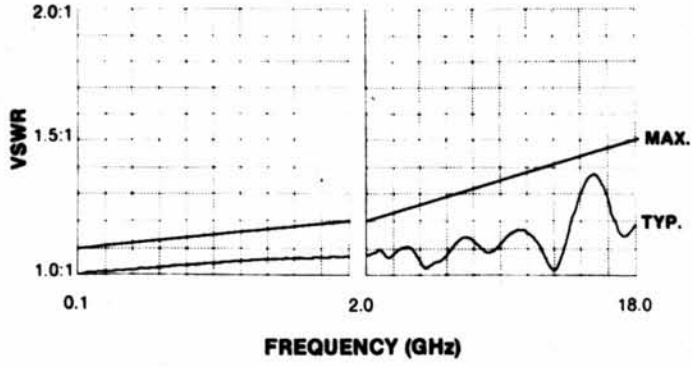


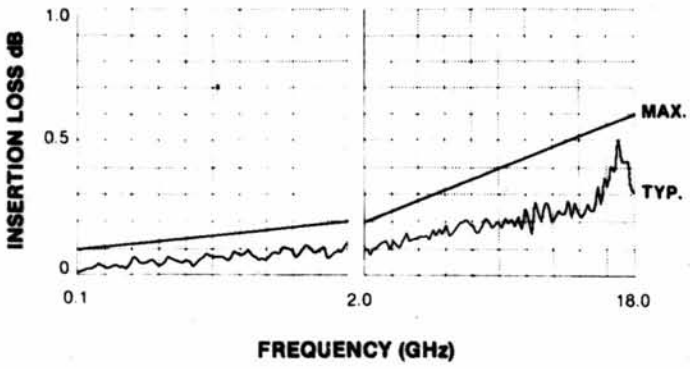
 # 5. 146C70600-30

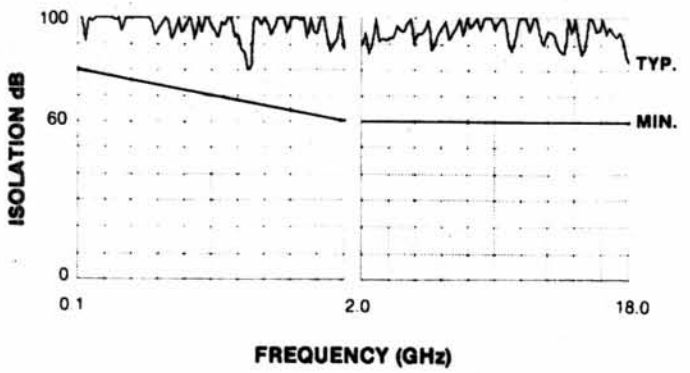


Specifications

Typical RF data of a production switch; computer printouts below:



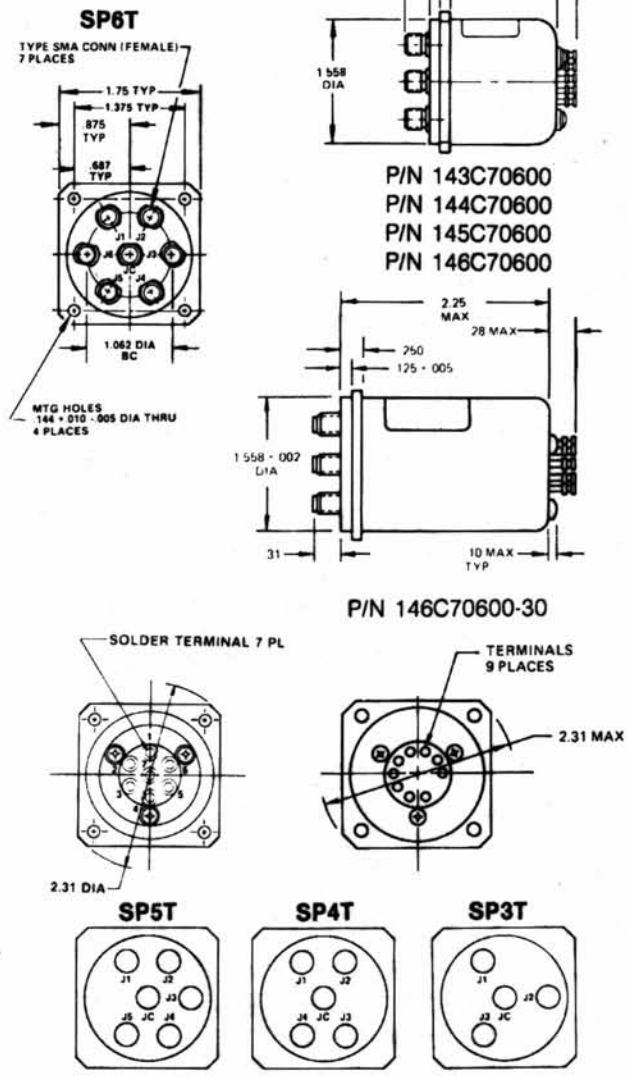




Control Input Logic Table					RF Conn	
1	2	3	4	5	6	RF Com To
0	0	0	0	0	0	Open
1	0	0	0	0	0	RF 1
0	1	0	0	0	0	RF 2
0	0	1	0	0	0	RF 3
0	0	0	1	0	0	RF 4
0	0	0	0	1	0	RF 5
0	0	0	0	0	1	RF 6

Voltage:	20 to 30Vdc
Coil Resistance:	205 ± 15 Ohms @ 20°C
Current:	170mA max @ 28Vdc and 20°C
Switching Time:	20 milliseconds max @ 28Vdc and 20°C
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	10g's sine/random
Life:	1,000,000 cycles min
Weight:	5.5 oz. max for the SP6T

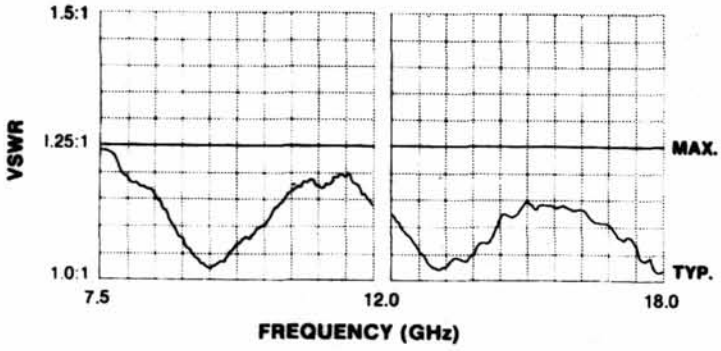
Dimensions

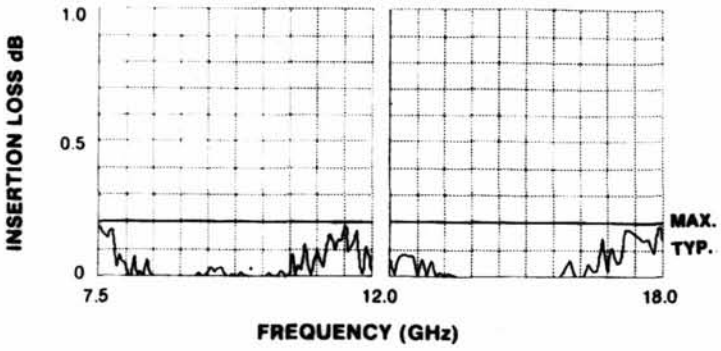


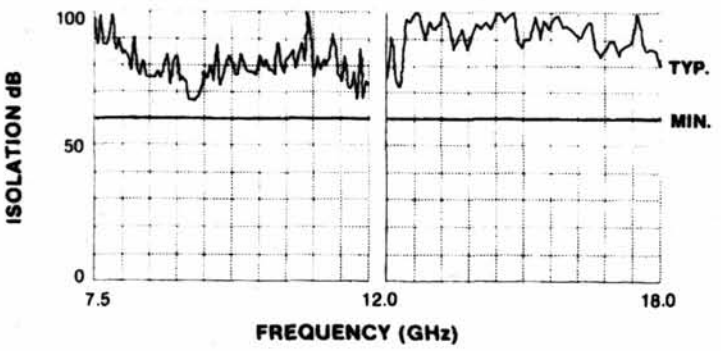
Lower Frequency

At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Specifications

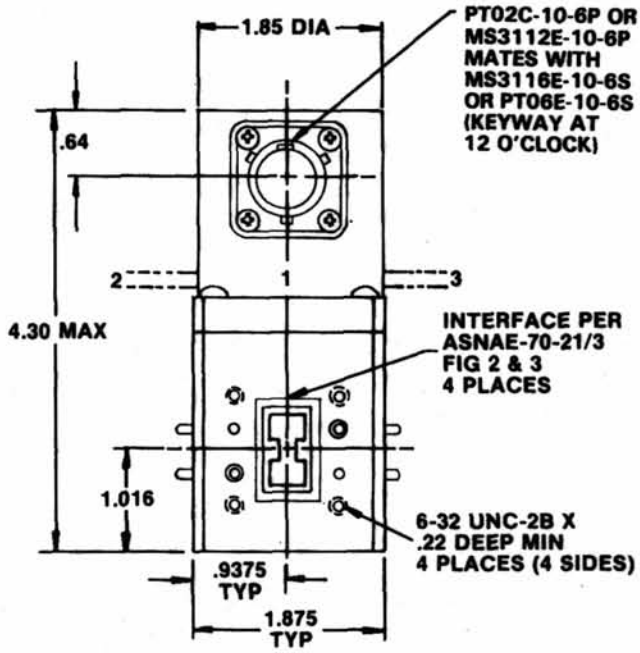


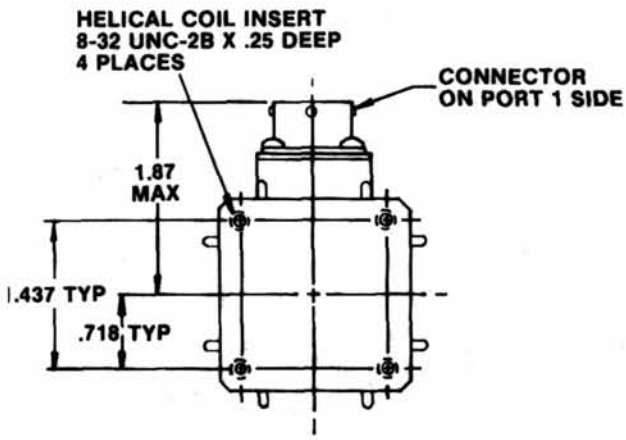




Actuator:	
Voltage:	24 to 30Vdc
Current:	.80 amps max. @ 28Vdc, 20°C
Switching Time:	100 milliseconds max
Duty:	continuous operation
Pressurized:	20 psig
Temperature:	-54°C to +84°C
Life:	200,000 actuations min
Finish:	dull black
Weight:	1.3 lb. max

Dimensions





Waveguide Switch

Type GF

Description

This is a broad band double ridge waveguide switch similar to DowKey/Transco's standard type GR waveguide switches. It features the same simple proven design of RF assembly and actuator assembly called "transactor".

Transactor Actuator

This is a low current bi-directional actuator developed by DowKey/Transco. Designed specifically for DowKey/Transco's waveguide switches, this actuator uses torque motor principles conforming to MIL-M-8609 (DC motors) and MIL-M-7960 (AC motors).

Transactor does not require any mechanical coupling devices normally associated with conventional solenoid type actuators. This assures long life and high reliability.

Standard Products

P/N	Schematic	Type
30C01200	1	A
30C01300	1	B

Special Configuration

Actuating Voltage
Transient Circuit

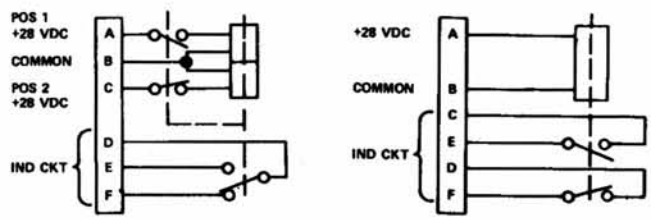
Other Products

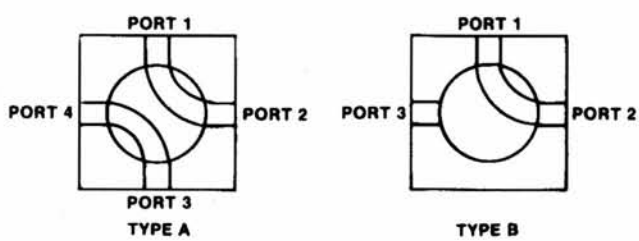
P/N	Schematic	Type
30C02000	2	A
30C02100	2	B

RF Circuit: **Transfer**
Actuator: **Latching and Failsafe**
Connector: **WRD750D24**
Frequency: **7.5-18GHz**

Schematic

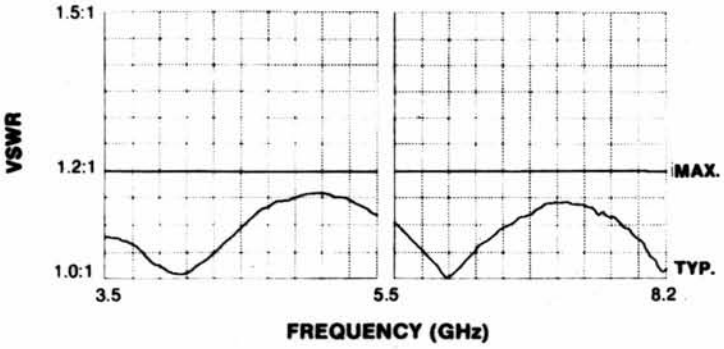
#1. Latching **# 2. Failsafe**

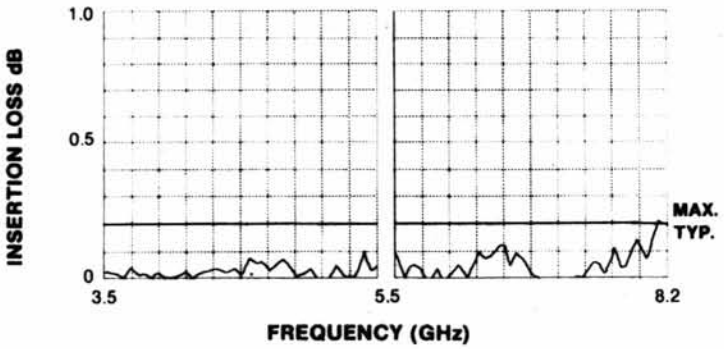


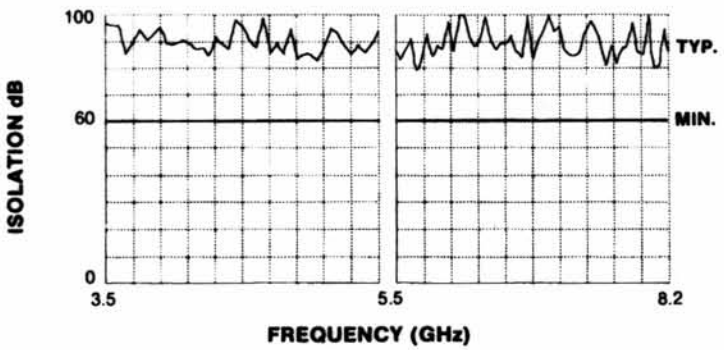


TOP VIEW
CONNECTOR ON PORT 1 SIDE

Specifications

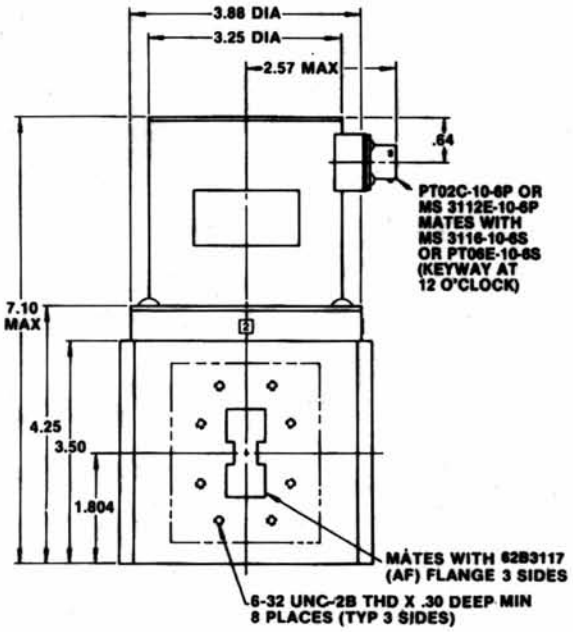


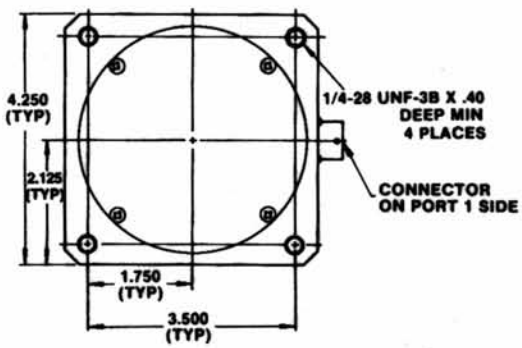




Actuator:	
Voltage:	24 to 30Vdc
Current:	.85 amps max. @ 28Vdc, 20°C
Switching Time:	150 milliseconds max
Duty:	continuos operation
Pressurized:	20 psig
Temperature:	-54°C to +84°C
Life:	200,000 actuations min
Finish:	dull black
Weight:	9 lb. max

Dimensions





Waveguide Switch

Type GF

Description

This is a broad band double ridge waveguide switch similar to DowKey's standard type GR waveguide switches. This simple proven design combines the actuator rotor and switch RF rotor in a single integrated assembly.

Transactor Actuator

This is a low current bi-directional actuator developed by DowKey/Transco. Designed specifically for DowKey/Transco's waveguide switches, this actuator uses torque motor principles conforming to MIL-M-8609 (DC motors) and MIL-M-7960 (AC motors).

Transactor does not require any mechanical coupling devices normally associated with conventional solenoid type actuators. This assures long life and high reliability.

Standard Products

P/N	Schematic	Type
30D01900	A	1
30D01400	B	1

Special Configuration

Actuating Voltage
Transient Circuit

Other Products

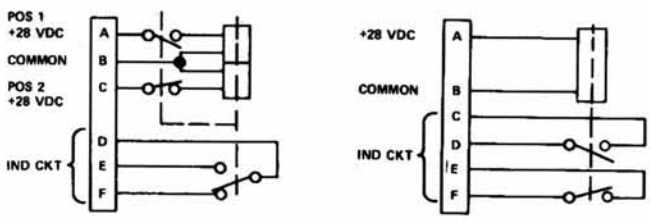
P/N	Schematic	Type
30D00500	B	2

Designed to meet MIL-S-55041

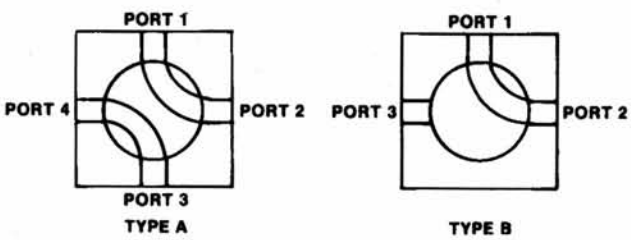
RF Circuit: SPDT & Transfer
Actuator: Latching and Failsafe
Connector: WRD350D24
Frequency: 3.5-8.2GHz

Schematic

#1. Latching **# 2. Failsafe**



SHOWN IN POSITION 1

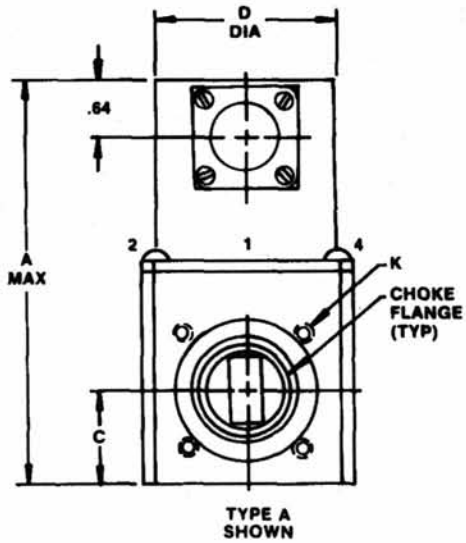


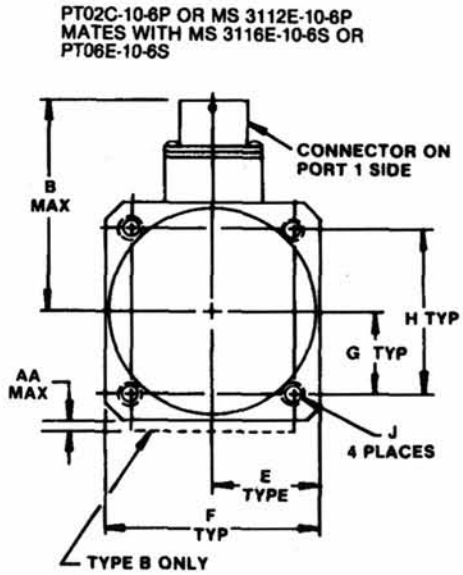
TYPE A **TYPE B**

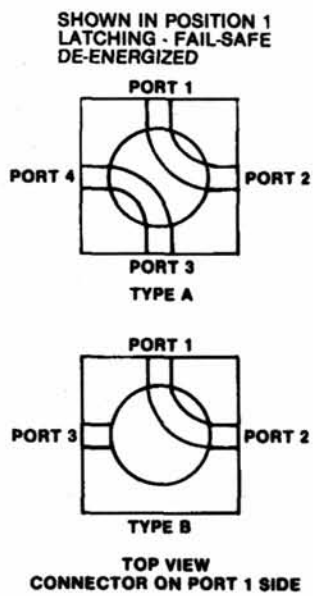
TOP VIEW
CONNECTOR ON PORT 1 SIDE

Positions:	3 or 4 port
RF Power:	equivalent to 90° E-Plane WG bend
Actuator:	"transactor"
Voltage:	24 to 30Vdc
Current:	see chart
Switching Time:	see chart
Indicator:	for switching position
Pressurized:	20 psig
Temperature:	-54°C to 95°C
Life:	200,000 cycles min
Finish:	dull black

Dimensions and Part Numbers







PART NO.	WAVE-GUIDE SIZE	SWITCH TYPE	FREQUENCY RANGE GHz	SWITCHING TIME, MAX	CURRENT AMP MAX (28Vdc, 20°C)	AA	A	B	C	D	E	F	G	H	J	K	WEIGHT LBS. MAX.
33D00100	WR 62	A FAILSAFE	12.4 - 18.00	100MS	.5	-	3.80	1.87	.877	1.850	.9375	1.875	.718	1.437	8-32 x .25 DEEP	6-32 x .22 DEEP	1.3
33D00200	WR 62	A LATCHING	↕	↕	1	-	4.00	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
33D00300	WR 62	B FAILSAFE	↕	↕	.5	.10	3.80	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
33D00400	WR62	B LATCHING	12.4-18.00	↕	1	.10	4.00	↕	.877	↕	↕	↕	↕	↕	↕	↕	1.3
33D09100	WR 75	A FAILSAFE	10.0 - 15.00	↕	.5	-	3.95	↕	.941	↕	↕	↕	↕	↕	↕	↕	1.4
33D09200	WR 75	A LATCHING	↕	↕	1	-	4.15	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
33D09300	WR 75	B FAILSAFE	↕	↕	.5	.10	3.95	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
33D09400	WR 45	B LATCHING	10.0-15.00	↕	1	.10	4.15	↕	.941	↕	↕	↕	↕	↕	↕	6-32 x .22 DEEP	↕
33D01100	WR 90	A FAILSAFE	8.20-12.40	↕	.5	-	4.05	↕	1.016	↕	↕	↕	↕	↕	↕	8-32 x .22 DEEP	↕
33D01200	WR 90	A LATCHING	↕	↕	1	-	4.30	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
33D01300	WR 90	B FAILSAFE	↕	↕	.5	.13	4.05	↕	↕	↕	↕	↕	↕	↕	↕	↕	↕
33D01400	WR 90	B LATCHING	8.20-12.40	↕	1	.13	4.30	1.87	1.016	1.850	.9375	1.875	.718	1.437	8-32 x .25 DEEP	8-32 x .22 DEEP	1.4
33D03200	WR 112	A LATCHING	7.05 - 10.00	↕	1	-	5.10	2.07	1.245	2.25	1.187	2.375	1.000	2.000	10-32 x .31 DEEP	8-32 x .28 DEEP	2.3
33D03400	WR112	B LATCHING	7.05-10.00	100MS	1	.13	5.10	2.07	1.245	2.25	1.187	2.375	1.000	2.000	10-32 x .31 DEEP	8-32 x .28 DEEP	2.3
33D04200	WR 137	A LATCHING	5.85-8.20	150MS	1	-	7.00	2.57	1.750	3.25	2.125	4.250	1.750	3.500	1/4-20 X .40 DEEP	10-32 x .30 DEEP	8.3
33D04400	WR 137	B LATCHING	5.85-8.20	↕	1	.13	7.00	↕	1.750	↕	↕	↕	↕	↕	↕	↕	8.3
33D06200	WR 187	A LATCHING	3.95-5.85	↕	1	-	7.50	↕	2.000	↕	↕	↕	↕	↕	↕	↕	9.0
33D06400	WR 187	B LATCHING	3.95-5.85	150 MS	1	.13	7.50	↕	2.00	↕	2.125	4.250	1.750	3.500	1/4-20 X .40 DEEP	10-32 x .30 DEEP	9.0
33D08200	WR 284	A LATCHING	2.60-3.95	500 MS	1.5	-	9.00	↕	2.750	↕	2.937	5.875	2.375	4.750	1/4-20 X .50 DEEP	1/4-20 X .40 DEEP	17.0
33D08400	WR 284	B LATCHING	2.60-3.95	500 MS	1.5	.15	9.00	2.57	2.750	3.25	2.937	5.875	2.375	4.750	1/4-20 X .50 DEEP	1/4-20 X .40 DEEP	17.0

Waveguide Switch — Type GR

Description

The state-of-the-art Type GR Waveguide switch series with ten different waveguide sizes utilizes the unique transactor actuator. This direct coupled actuator is small in size and more reliable than older designs using motors/gears, rotary or linear solenoids. The complete line is available failsafe or latching.

Standard Products

The following are standard for this switch series: failsafe or latching, choke flanges, pressurized, indicator circuits, 28Vdc, power connector.

Special Configuration

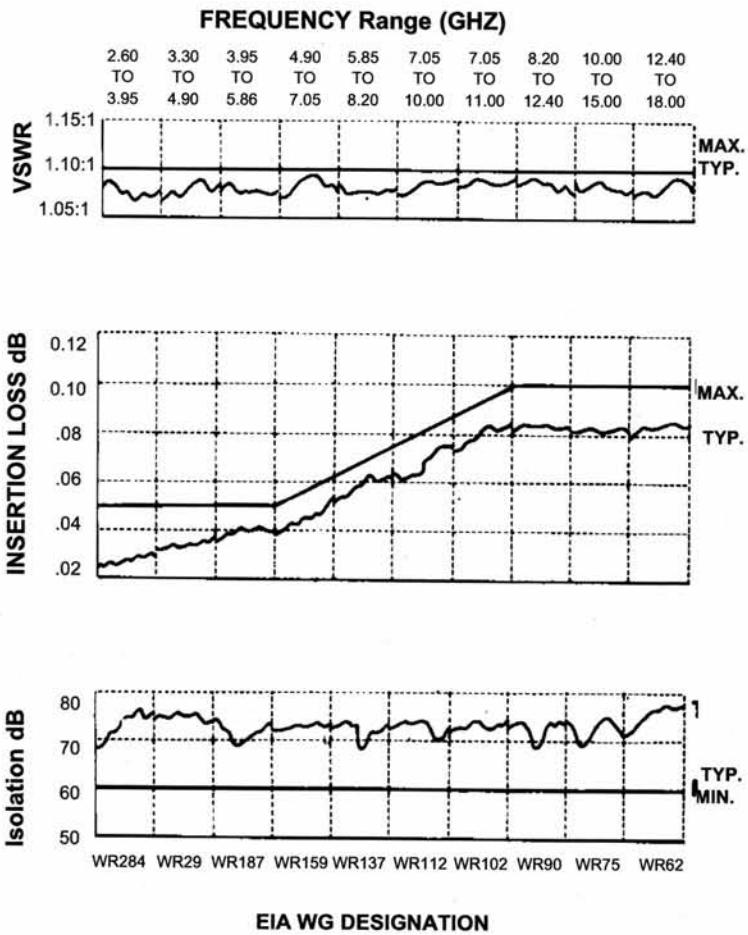
Actuating Voltage
Transient Circuit

Transactor Actuator

Transco has used modern motor technology and combined the actuator rotor and switch RF rotor in a single integrated assembly. This exclusive design feature greatly extends the switch life.

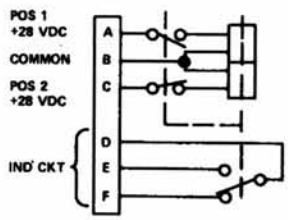
RF Circuit: 3 or 4 Port
Actuator: Latching and Failsafe
Connector: WR284 - WR62
Frequency: 2.6-18GHz

RF Performance

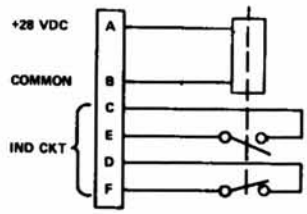


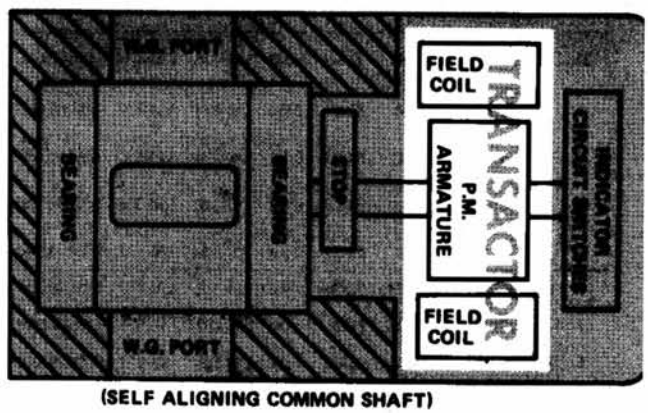
Schematic

#1. Latching



 # 2. Failsafe





(SELF ALIGNING COMMON SHAFT)

Reference Table of Rigid Rectangular Wavetable Data and Fittings

EIA WG DESIGNATION WR ( )	RECOMMENDED OPERATE RANGE FOR TE_{10} MODE		CUT-OFF FOR FOR TE_{10} MODE		RANGE IN $\frac{2\lambda}{\lambda c}$	RANGE IN $\frac{\lambda g}{\lambda}$	THEORETICAL PEAK POWER RATING LOWEST TO HIGHEST FREQUENCY MEGAWATTS	THEORETICAL ATTENUATION LOWEST TO HIGHEST FREQUENCY	JAN FLANGE DESIG.		CHOKE UG ( )/U	DIMENSIONS (inches)						WALL THICKNESS NOMINAL
	FREQUENCY GHz	WAVELENGTH (cm)	FREQUENCY GHz	WAVELENGTH (cm)					MATERIAL ALLOY	JAN WG DESIGNATION RG( )/U		COVER UG ( )/U	EIA WG DESIGNATION WR ( )	INSIDE	TOL.	OUTSIDE	TOL.	
2300	0.32-0.49	93.68-61.18	0.256	116.84	1.60-1.05	1.68-1.17	153.0-212.0	.051-.031	Alum				2300	23.000-11.500	+ .020	23.250-11.750	+ .020	0.125
2100	0.35-0.53	85.65-56.56	0.281	106.68	1.62-1.06	1.68-1.18	120.0-173.0	.054-.034	Alum.				2100	21.000-10.500	+ .020	21.250-10.750	+ .020	0.125
1800	0.41-0.625	73.11-47.96	0.328	91.44	1.60-1.05	1.67-1.18	93.4-131.9	.056-.038	Alum.	201			1800	18.000-9.000	+ .020	18.250-9.250	+ .020	0.125
1500	0.49-0.75	61.18-39.97	0.393	76.20	1.61-1.05	1.62-1.17	67.6-93.3	.069-.050	Alum.	202			1500	15.000-7.500	+ .015	15.250-7.750	+ .015	0.125
1150	0.64-0.96	46.84-31.23	0.513	58.42	1.60-1.07	1.82-1.18	35.0-53.8	.128-.075	Alum.	203			1150	11.500-5.750	+ .015	11.750-6.000	+ .015	0.125
975	0.75-1.12	39.95-26.76	0.605	49.53	1.61-1.08	1.70-1.19	27.0-38.5	.137-.095	Alum.	204			975	9.750-4.875	+ .010	10.000-5.125	+ .010	0.125
770	0.96-1.45	31.23-20.67	0.766	39.12	1.60-1.06	1.66-1.18	17.2-24.1	.201-.136	Alum.	205			770	7.700-3.850	+ .005	7.950-4.100	+ .005	0.125
650	1.12-1.70	26.76-17.63	0.908	33.02	1.62-1.07	1.70-1.18	11.9-17.2	.317-.212	Brass	69	417A		650	6.500-3.250	+ .005	6.660-3.410	+ .005	0.080
								.269-.178	Alum.	103	418A							
510	1.45-2.20	20.67-13.62	1.157	25.91	1.60-1.05	1.67-1.18	7.5-10.7						510	5.100-2.550	+ .005	5.260-2.710	+ .005	0.080
430	1.70-2.60	17.63-11.53	1.372	21.84	1.61-1.06	1.70-1.18	5.2-7.5	.588-.385	Brass	104	435A		430	4.300-2.150	+ .005	4.460-2.150	+ .005	0.080
								.501-.330	Alum.	105	437A							
340	2.20-3.20	13.63-9.08	1.736	17.27	1.58-1.05	1.78-1.22	3.1-4.5	.877-.572	Brass	112	553		340	3.400-1.700	+ .005	3.560-1.860	+ .005	0.080
								.751-.492	Alum.	113	554							
284	2.60-3.95	11.53-7.59	2.078	14.43	1.50-1.05	1.67-1.17	2.2-3.2	1.102-.752	Brass	48	54	53	284	2.840-1.340	+ .005	3.000-1.500	+ .005	0.080
								.940-.641	Alum.	75	585	584						
229	3.30-4.90	9.08-6.12	2.577	11.63	1.56-1.05	1.6-2.2							229	2.290-1.145	+ .005	2.418-1.273	+ .005	0.064
187	3.95-5.85	7.59-5.12	3.152	9.510	1.60-1.08	1.67-1.19	1.4-2.0	2.08-1.44	Brass	49	148B	149A	187	1.872-0.872	+ .005	2.000-1.000	+ .005	0.064
								1.77-1.12	Alum.	95	406A	407						
159	4.90-7.05	6.12-4.25	3.711	8.078	1.51-1.05	1.52-1.19	0.79-1.0						159	1.590-0.795	+ .004	1.718-0.923	+ .004	0.064
137	5.85-8.20	5.12-3.66	4.301	6.970	1.47-1.05	1.48-1.17	0.56-0.71	2.87-2.30	Brass	50	343A	344	137	1.372-0.622	+ .004	1.500-0.750	+ .004	0.064
								2.45-1.94	Alum.	106	440A	441						
112	7.05-10.00	4.25-2.99	5.259	5.700	1.49-1.05	1.51-1.17	0.35-0.46	4.12-3.21	Brass	51	52A	51	112	1.122-0.497	+ .004	1.250-0.625	+ .004	0.064
								3.50-2.74	Alum.	68	137A	138						
90	8.20-12.40	3.66-2.42	6.557	4.572	1.60-1.06	1.68-1.18	0.20-0.29	6.45-4.48	Brass	52	40A	39	90	0.900-0.400	+ .003	1.000-0.500	+ .003	0.050
								5.49-3.83	Alum.	67	136A	135						
75	10.00-15.00	2.99-2.00	7.868	3.810	1.57-1.05	1.64-1.117	0.17-0.23						75	0.750-0.375	+ .003	0.850-0.475	+ .003	0.050
62	12.4-18.00	2.42-1.66	9.486	3.160	1.53-1.05	1.55-1.18	0.12-0.16	9.51-8.31	Brass	91	541	419	62	0.622-0.311	+ .0025	0.702-0.391	+ .003	0.040
								— —	Alum	— —	— —	— —						
								6.14-5.36	Silver	107	— —	— —						
51	15.00-22.00	2.00-1.36	11.574	2.590	1.54-1.05	1.58-1.18	0.080-0.107						51	0.510-0.255	+ .0025	0.590-0.335	+ .003	0.040
42	18.00-26.50	1.66-1.13	14.047	2.134	1.56-1.06	1.62-1.18	0.034-0.048	20.7-14.8	Brass	53	596	595	42	0.420-0.170	+ .0020	0.500-0.250	+ .003	0.040
								17.6-12.6	Alum.	121	598	597						
								13.3-9.5	Silver	66	— —	— —						
34	22.00-33.00	1.36-0.91	17.328	1.730	1.57-1.05	1.62-1.18	0.034-0.048						34	0.340-0.170	+ .0020	0.420-0.250	+ .003	0.040
								— —	Brass	—	600	599						
								— —	Alum.	—	—	—						
28	26.50-40.00	1.13-0.75	21.081	1.422	1.59-1.05	1.65-1.17	0.022-0.031	21.9-15.0	Silver	96	—	—	28	0.280-0.140	+ .0015	0.360-0.220	+ .002	0.040
22	33.00-50.00	0.91-0.60	26.342	1.138	1.60-1.05	1.67-1.17	0.014-0.020	— —	Brass	—	385	383	22	0.224-0.112	+ .0010	0.304-0.192	+ .002	0.040
								31.0-20.9	Silver	97								
19	40.00-60.00	0.75-0.50	31.357	0.956	1.57-1.05	1.63-1.16	0.011-0.015						19	0.188-0.094	+ .0010	0.268-0.174	+ .002	0.040
15	50.000-75.000	60-0.40	39.863	0.752	1.60-1.06	1.67-1.17	0.0063-0.0090	— —	Brass	—	385		15	0.148-0.074	+ .0005	0.0202-0.141	+ .002	0.040
								52.9-39.1	Silver	98		—						
12	60.00-90.00	0.50-0.33	48.350	0.620	1.61-1.06	1.68-1.18	0.0042-0.0060	— —	Brass	—	387		12	0.122-0.061	+ .0005	0.202-0.141	+ .002	0.040
								93.3-52.2	Silver	99		—						
10	75.00-110.00	0.40-0.27	59.010	0.508	1.57-1.06	1.61-1.18	0.0030-0.0041						10	0.100-0.050	+ .0005	0.180-0.130	+ .002	0.040
8	90.00-140.00	0.333-0.214	73.840	.406	1.64-1.05	1.75-1.17	0.0018-0.0026	152-99	Silver	138	—	—	8	0.080-0.040	+ .00003	0.156DIA	+ .001	—
7	110.00-170.00	0.272-0.176	90.840	.330	1.64-1.06	1.77-1.18	0.0012-0.0017	163-137	Silver	136	—	—	7	0.065-0.325	+ .000025	0.156DIA	+ .001	—
5	140.00-220.00	0.214-0.136	115.750	.259	1.65-1.05	1.77-1.18	0.0012-0.00107	308-193	Silver	135	—	—	5	0.051-0.0255	+ .000025	0.156DIA	+ .001	—
4	170.00-260.00	0.176-0.115	137.520	.218	1.61-1.05	1.69-1.17	0.00052-0.00075		384-254	Silver	137	—	—	4 0.043-0.0215	+ .000020	0.156DIA	+ .001	—
3	220.00-325.00	0.136-0.092	173.280	.173	1.57-1.06	1.62-1.18	0.00035-0.00047		512-348	Silver	139	—	—	3 0.034-0.0170	+ .000020	0.156DIA	+ .001	—

Transco Products, Inc. Switches listed in MIL-S-55041C

SP2T Failsafe

Specification Sheet	Option No.	TPI Part No.	FSN 5985
MIL-S-55041/3A	/3-001	35D02800	_
	/3-002	32C01200	-
	/3-005	33D01300	-
	/3-006	33D00300	01-039-8434

Transfer Latching

Specification Sheet	Option No.	TPI Part No.	FSN 5985
MIL-S-55041/4A	/4-001	33C00500	-
	/4-002	33D00200	00-009-4530

1P2T Failsafe

Specification Sheet	Option No.	TPI Part No.	FSN 5985
MIL-S-55041/6A	/6-001	33C12500	-

2P2T Failsafe

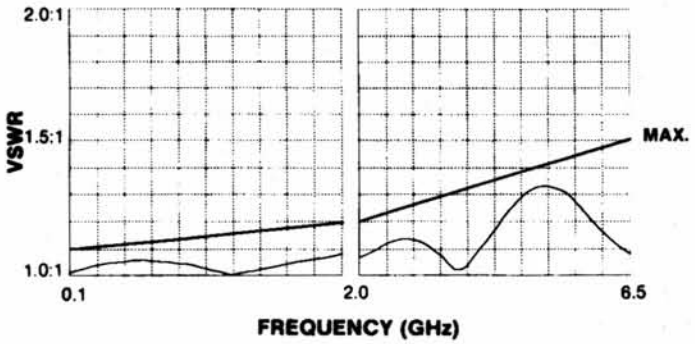
Specification Sheet	Option No.	TPI Part No.	FSN 5985
MIL-S-55041/7A	/7-001	33D00100-10	-
	/7-002	33D01100	-

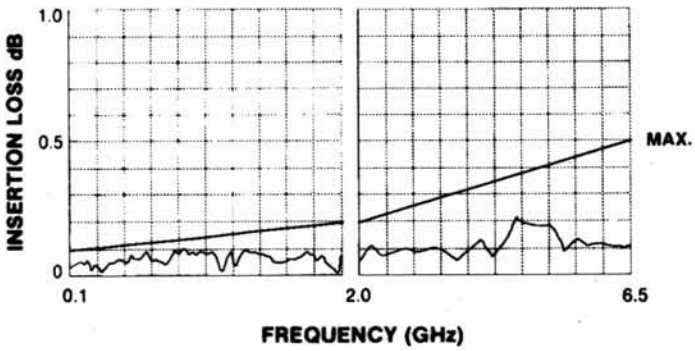
1P2T Latching

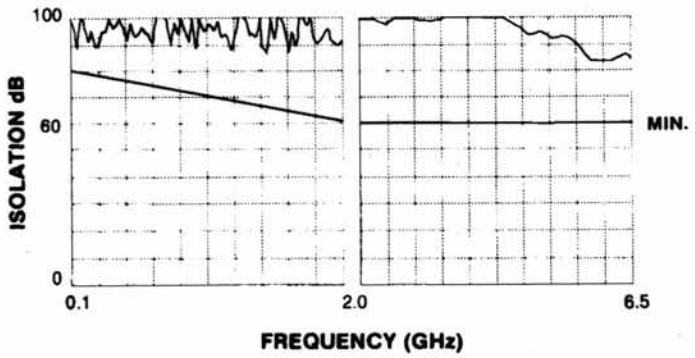
Specification Sheet	Option No.	TPI Part No.	FSN 5985
MIL-S-55041/11	/11-001	33D08400	01-073-1529
	/11-002	33D06400	-
	/11-003	33D04400	-
	/11-004	33D03400	01-099-6613 00-009-3159
	/11-005	33D00400	-

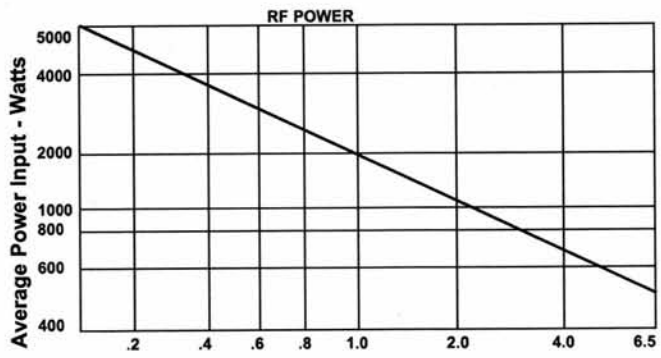
Specifications

Typical RF data of a production switch; computer printout below:



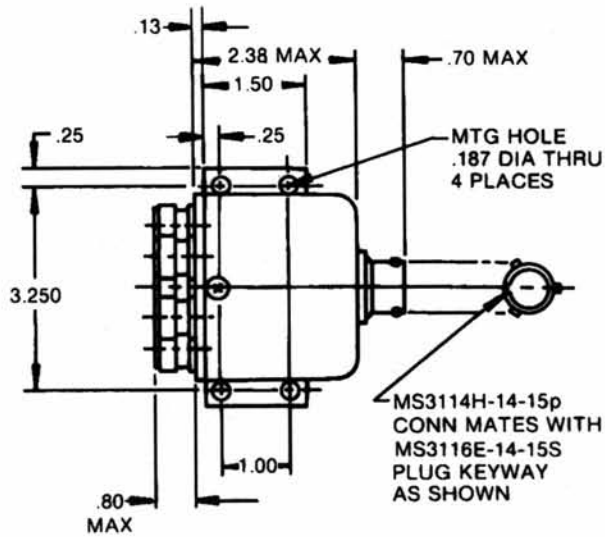


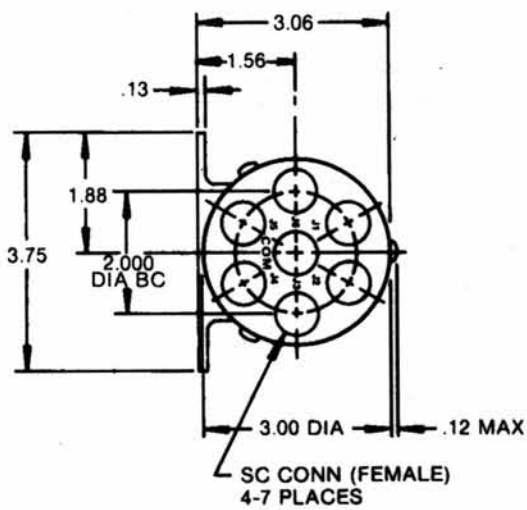




Voltage:	22 to 30Vdc
Coil Resistance:	210 ± 15 Ohms @ 20°C
Current:	170mA max @ 28Vdc and 20°C
Switching Time:	20 milliseconds @ 28Vdc and 20°C
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	10g's sine/random
Life:	100,000 operations min - each pos
Weight:	18.5 oz (136C51100)

Dimensions





Lower Frequency

At 10MHz, typical values are:
Isolation: 80dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Coaxial Switch

Type MX

Description

The Type MX coaxial switches are designed for high average power applications over a frequency band 0-6.5GHz. They use SC connectors, one-inch center-to-center spacing.

These switches utilize HCI (heat conducting dielectric) to increase the average power handling capabilities. Test results on a large number of components employing HCI have consistently indicated a CW power rating 2.5 times greater than obtainable with conventional low-loss dielectric materials.

The Type MX SP3T to SP6T switch utilizes selected linear actuators for each position. Individual solenoids mean faster switching time...no waiting for the switch to sequence through a number of positions before stopping at the selected position. These switches are available with or without mechanically activated indicating switches, giving positive position indication.

This switch is part of a DowKey family of switches. Other types in this family are referenced below.

Type	Conn.	Freq.
M	N & TNC	12.4GHz
ML	N &TNC	12.4GHz
MO	SMA	18GHz

Designed to meet MIL-S-3928

*** Transco developed proprietary material**

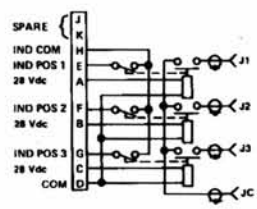
Standard Products

P/N	Pos	Schematic	Ind Ckt
133C51100	3	1	NO
133C51200	3	1	YES
134C51100	4	2	NO
134C51200	4	2	YES
135C51100	5	3	NO
135C51200	5	3	YES
136C51100	6	4	NO
136C51200	6	4	YES

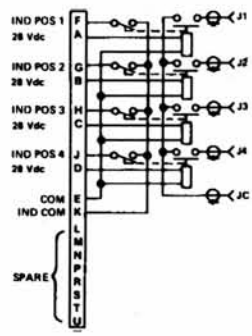
RF Circuit: SP3T to SP6T
Actuator: Selective
Connector: SC
Frequency: 0-6.5GHz

Schematic

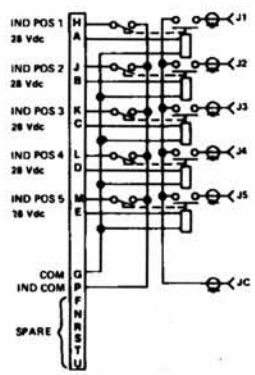
#1. SP3T w/Indicator



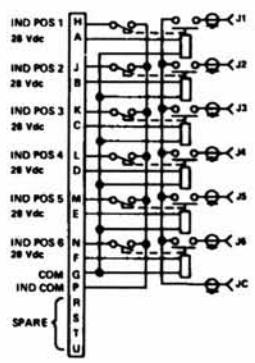
 # 2. SP4T w/Indicator



 # 3. SP5T w/Indicator



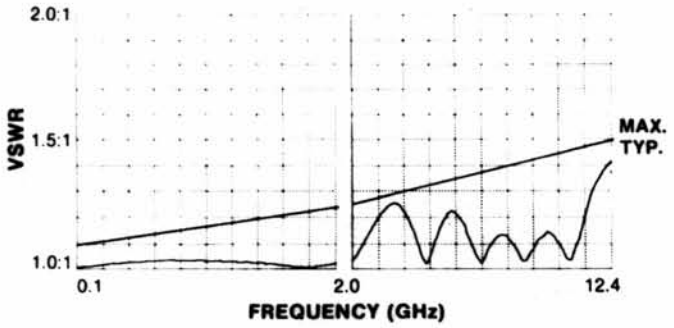
 # 4. SP6T w/Indicator

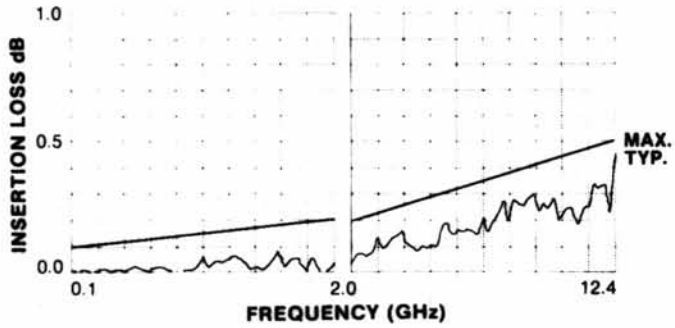


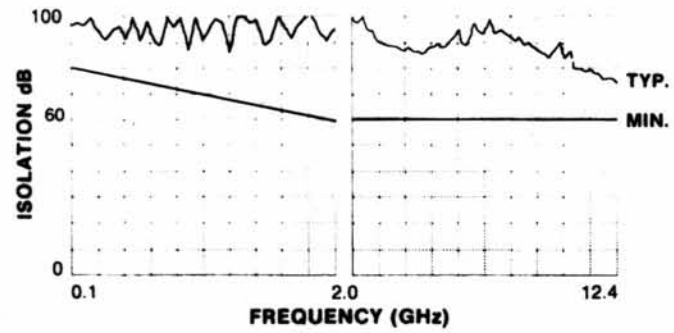
Specifications

Typical RF data of a production switch; computer printout below:

TNC data shown

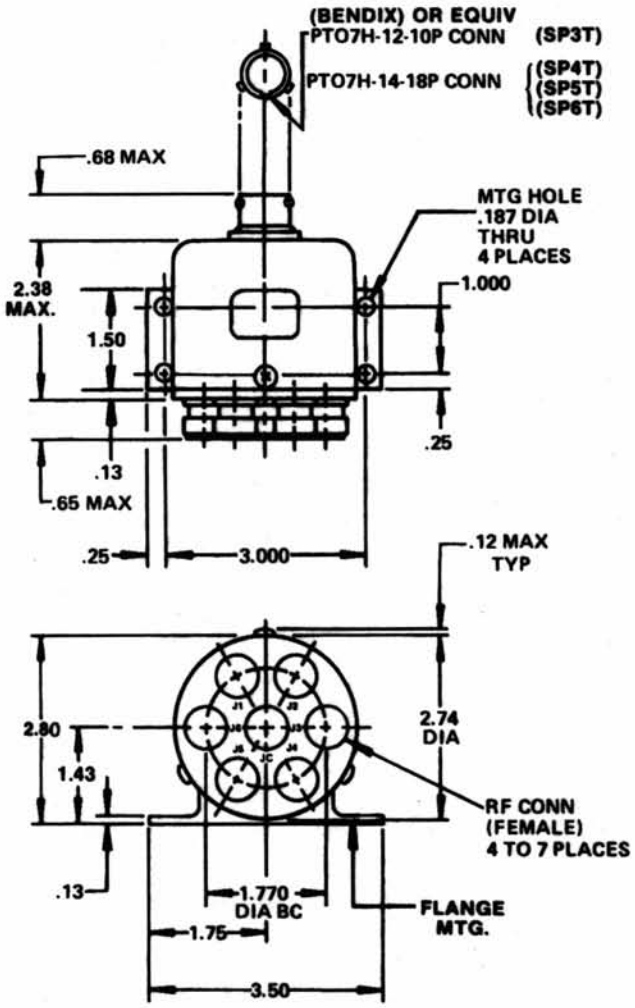






Voltage:	20 to 30Vdc
Coil Resistance:	205 ± 15 Ohms @ 20°C
Current:	170mA max @ 28Vdc and 20°C
Switching Time:	20 milliseconds @ 28Vdc and 20°C
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	10g's sine/random
Life:	100,000 cycles min
Weight:	16 oz max for the SP6T and ind ckt

Dimensions



Lower Frequency

At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Coaxial Switch

Type M

Description

The Type M SP3T to SP6T switch utilizes selected linear actuators for each position. RF geometry is optimized for N and TNC connectors and operates over a 0-12.4GHz frequency band. Individual solenoids mean faster switching time...no waiting for the switch to sequence through a number of positions before stopping at the selected position. Separate "selective" solenoids provide positive action and a low actuator current requirement.

This switch is part of the DowKey family of switches. Other types in this family are referenced below.

Type	Conn.	Freq.
MX	SC	6.5 GHz
ML	N &TNC	12.4GHz
MO	SMA	18GHz

Designed to meet MIL-S-3928

RF Circuit: SP3T to SP6T
Actuator: *Selective
Connector: N and TNC
Frequency: 0-12.4GHz

Standard Products

P/N	Schematic	Conn	Ind Ckt
133C00100	1	N	NO*
133C00200	1	N	YES
133C30100	1	TNC	NO*
133C30200	1	TNC	YES
134C00100	2	N	NO*
134C00200	2	N	YES
134C30100	2	TNC	NO*
134C30200	2	TNC	YES
135C00100	3	N	NO*
135C00200	3	N	YES
135C30100	3	TNC	NO*
135C30200	3	TNC	YES
136C00100	4	N	NO*
136C00200	4	N	YES
136C30100	4	TNC	NO*
136C30200	4	TNC	YES

*** Indicator circuit pins are spare on units without indicator circuits**

Special Configuration

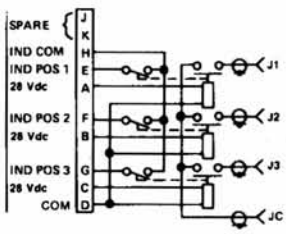
115 Vac
Solder Terminals

Other Products

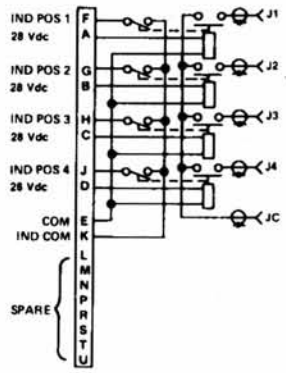
Face mount and face mount with indicator switches

Schematic

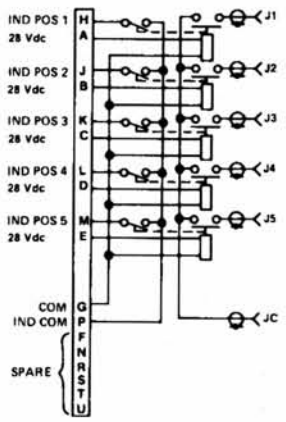
#1. SP3T w/Indicator



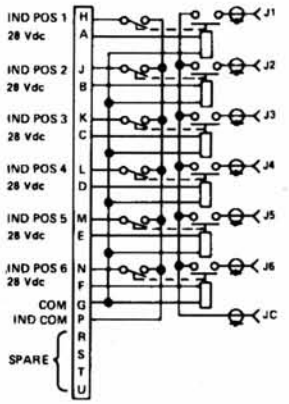
2. SP4T w/Indicator



3. SP5T w/Indicator



4. SP6T w/Indicator

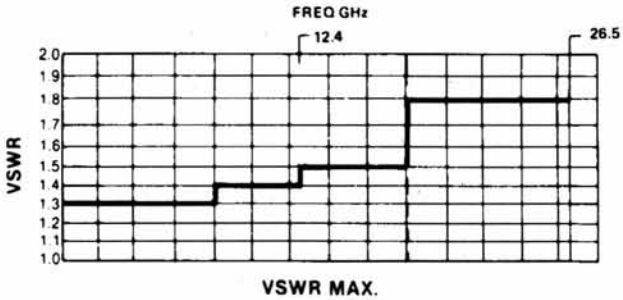


Specifications

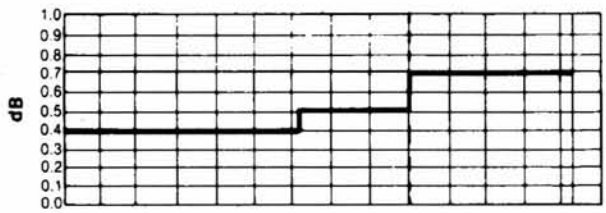
* Solenoid for each RF position
** Mates with SMA

Voltage:	20 to 30Vdc
Coil Resistance:	205 ± 15 Ohms @ 20°C
Current:	170mA max @ 28Vdc and 20°C
Switching Time:	20 milliseconds @ 28Vdc and 20°C
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	10g's sine/random
Life:	1,000,000 cycles min
Weight:	5.5 oz. max for the SP6T

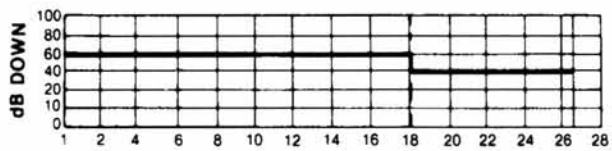
RF Characteristics



VSWR MAX.

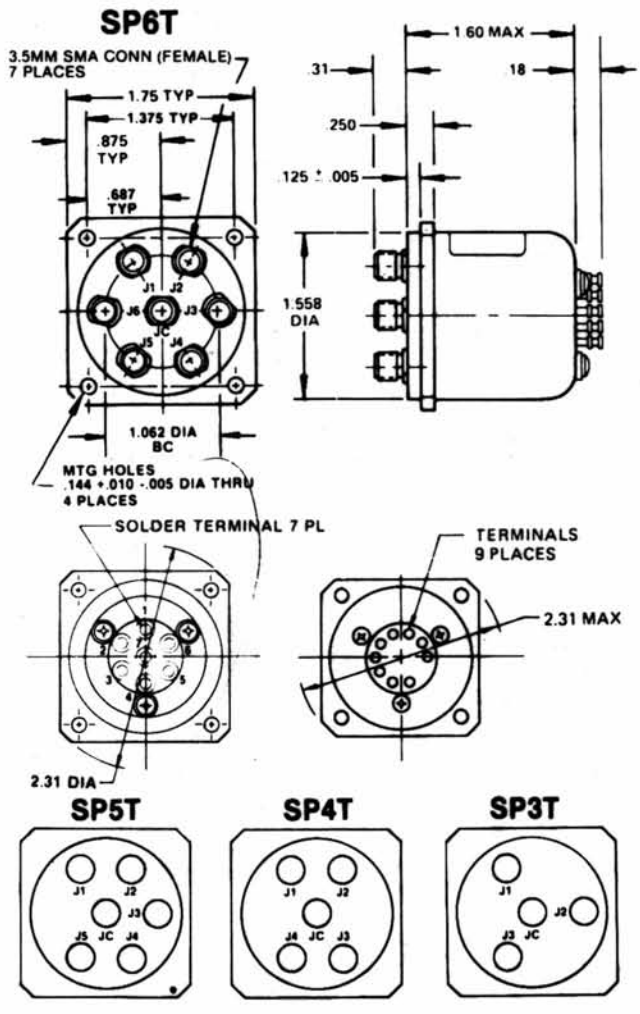


INSERTION LOSS MAX.



ISOLATION MIN.

Dimensions



Lower Frequency

At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

Coaxial Switch

Type MO

Description

The Type MO SP3T to SP6T switch utilizes selected linear actuators for each position. RF geometry is optimized for 3.5mm connectors and operates over a 0-26.5GHz frequency band. Individual solenoids mean faster switching time...no waiting for the switch to sequence through a number of positions before stopping at the selected position. Separate "selective" solenoids provide positive action and a low actuator current requirement.

Standard Products

P/N	Schematic	Type
153C90600	1	Selective 3 pos.
154C90600	2	Selective 4 pos.
155C90600	3	Selective 5 pos.
156C90600	4	Selective 6 pos.

Meets MIL-S-3928

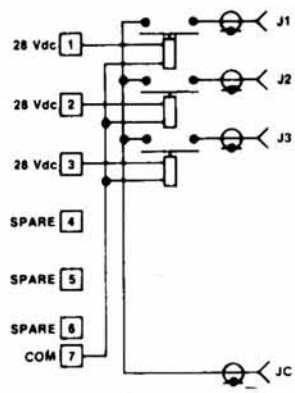
Special Configuration

Actuating Voltage
Transient Circuit
TTL Logic Circuit

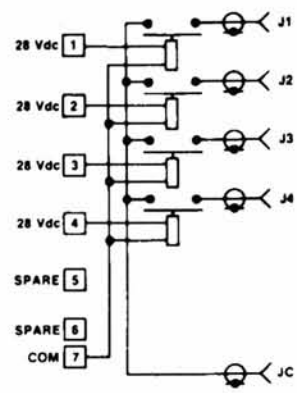
RF Circuit: **SP3T to SP6T**
Actuator: **Selective with Solder Terminals***
Connector: **3.5mm****
Frequency: **0-26.5GHz**

Schematic

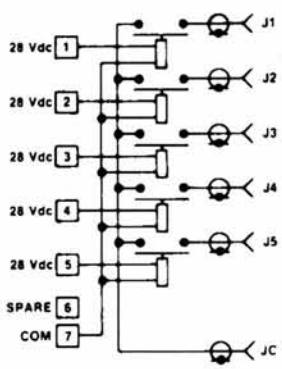
#1. 3 POS



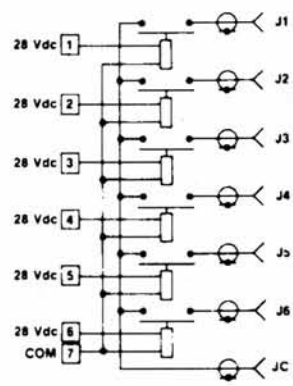
 # 2. 4 POS



 # 3. 5 POS

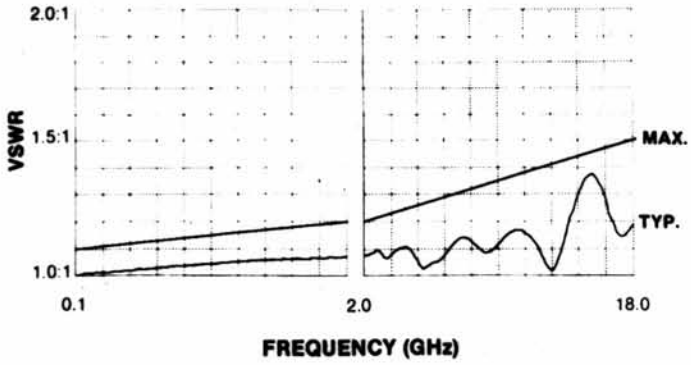


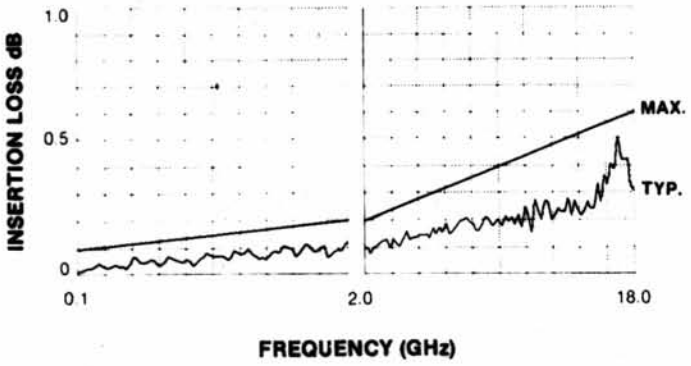
 # 4. 6 POS

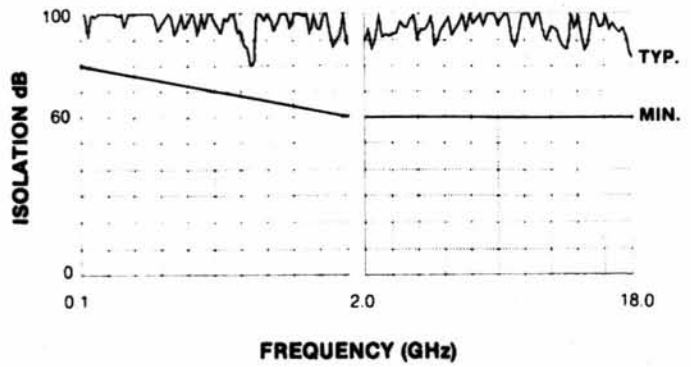


Specifications

Typical RF data of a production switch; computer printouts below:





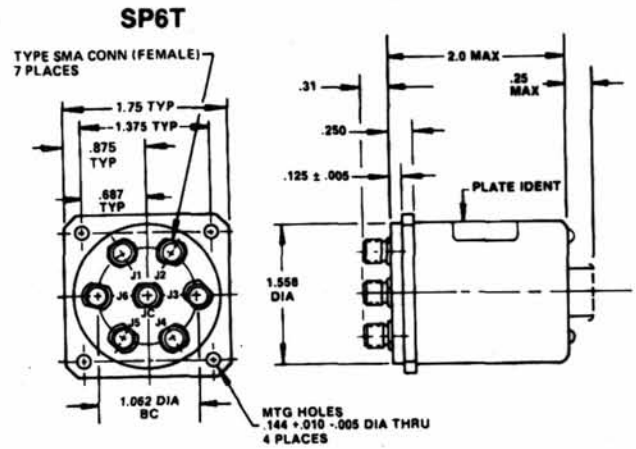


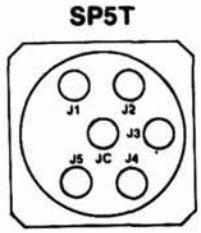
Lower Frequency

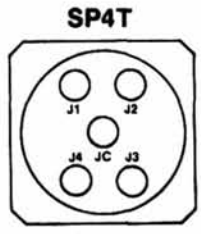
At 10MHz, typical values are:
Isolation: 100dB
VSWR: 1.05:1
Insertion Loss: 0.05dB
Because of the inherently good RF performance at lower frequencies, this product line is not tested below 2GHz except upon request.

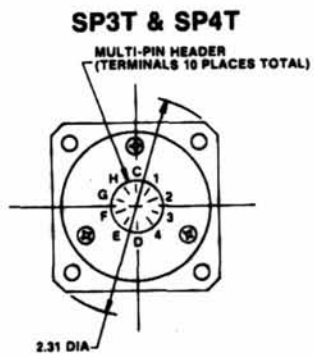
Voltage:	24 to 30Vdc
Coil Resistance:	205 ± 15 Ohms @ 20°C
Current:	170mA max @ 28Vdc and 20°C
Switching Time:	20 milliseconds @ 28Vdc and 20°C
Impedance:	50 Ohms nominal
Temperature:	-55°C to 85°C
Vibration:	20g's sine/random
Life:	1,000,000 cycles min
Weight:	5.5 oz. max for the SP6T

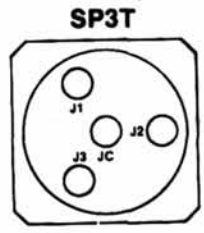
Dimensions











Coaxial Switch

Type MOI

Description

The Type MOI SP3T to SP6T switch utilizes selected linear actuators for each position. RF geometry is optimized for SMA connectors and operates over a 0-18GHz frequency band. Individual solenoids mean faster switching time...no waiting for the switch to sequence through a number of positions before stopping at the selected position. Separate "selective" solenoids provide positive action and a low actuator current requirement. These switches are supplied with indicating switches that are mechanically linked to each solenoid for positive position indication.

This switch is part of a DowKey family of switches. Other types in this family are referenced below

Type	Conn.	Freq.
M	N &TNC	12.4 GHz
MX	SC	6.5 GHz
ML	N &TNC	12.4GHz
MO	SMA	18GHz

Standard Products

P/N	Schematic
143C71300	1
144C71300	2
145C71300	3
146C71300	4

Meets MIL-S-3928

Special Configuration

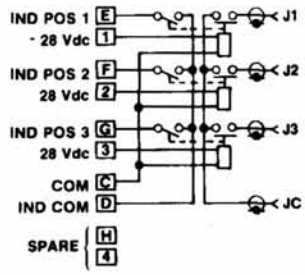
Actuating Voltage TTL Logic Circuit
Transient Circuit Power Connector

RF Circuit: SP3T to SP6T (w/ Indicator)
Actuator: *Selective
Connector: SMA
Frequency: 0-18GHz

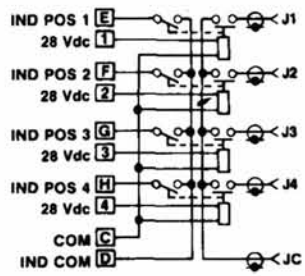
*** Solenoid for each RF position**

Schematic

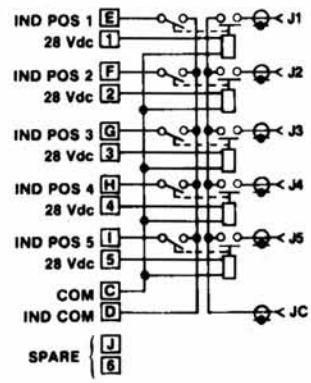
#1. 3 POS



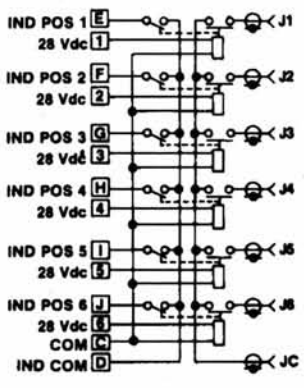
 # 2. 4 POS



 # 3. 5 POS



 # 4. 6 POS



Relais coaxial Radiall 582753

Fréquences GHz ≤	1	3,5	6
pertes dB ≤	0,2	0,3	0,4
ROS ≤	1,15	1,3	1,5
Isolation ≥	70	60	50

Fréquence max 6,5 GHz
alimentation U = 26 V
moteur : système LEDEX
consommation à 26 V 23°C = 3A
pouvoir de coupure signalisation : 150 VA ; 1A max
Puissance HF transportable CW à 0,2GHz 1KW