

Instruction Manual

IB 016

DIELECTRIC

MODEL 50000

MOTORIZED

COAXIAL SWITCHES

1 $\frac{5}{8}$ & 3 $\frac{1}{8}$

DIELECTRIC COMMUNICATIONS

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Model 50000
Motorized Coaxial Switch

1. GENERAL DESCRIPTION.

The Model 50000 Coaxial Switch provides reliable and fast switching of coaxial transmission line systems. It is a motor driven, rotary type, and can be controlled locally and/or remotely.

The switch is equipped with a manual over-ride, a mechanical position indicator, and is fully protected with auxiliary read-out and inter-lock circuits.

Operable in any position and having a minimum of moving parts, 100,000 cycles are normal without failure.

EIA male flanges are standard with adapters available to mate with unflanged or semiflex transmission lines.

2. SPECIFICATIONS.

Size	1 5/8	3 1/8
Frequency Range	DC - 900 MHz	DC - 900 MHz
Characteristic Impedance	50 ohm	50 ohm
VSWR Maximum	1:05.1	1.05:1
Insertion Loss	0.1 db	0.1 db
Power Rating Peak Average @ 30 MHz @ 300 MHz @ 900 MHz	150 kw 25 kw 6 kw 4 kw	500 kw 90 kw 30 kw 15 kw
Switching Time, nominal	2 seconds	2 seconds
Isolation	60 db	60 db
R.F. Connectors	EIA Male	EIA Male
Drive Motor Current 1ø - 50/60 Hz @ 115V AC @ 230V AC	3.5 Amp., start; 0.5 Amp., run 1.5 Amp., start; 0.3 Amp., run	
Control Relay Power D.C. Coils A.C. Coils	1.2 Watts 2.7 Volt Amps.	
Auxiliary Switch Ratings @ 125V DC @ 250V AC	0.3 Amp. 10.0 Amps	
Net Weight	42 lb. - 19 kg.	54 lb. - 24.5 kg.
Gross Packed Weight	48 lb. - 21.7 kg.	65 lb. - 29.5 kg.
Gross Packed Cube	3.58 ft. ³ - .10 m ³	3.58 ft. ³ - .10 m ³

3. THEORY OF OPERATION.

The Model 50000 Coaxial Switch is a rotary type switch having an aluminum R.F. cavity common to all ports. The rotor assembly contains two inner conductor blades and a common isolating ground plane which oscillates 90° to accomplish the switching function and provide isolation between transmission line paths.

The rotor is driven by a gear motor and slip clutch mechanism. When the motor is activated by connection through the control relay, it will rotate 90° until the mechanism reaches a positive stop. Simultaneously an auxiliary switch is activated to interrupt the motor circuit. Any inertia of the drive is absorbed by slippage of the clutch mechanism.

Auxiliary switches are positioned at each end of travel and are adjusted so that in the closing mode they do not activate until the R.F. contacts are ready to accept power. Conversely, in the opening mode, the auxiliary contacts open prior to the R.F. contact to prevent the breaking of the switch under R.F. power.

4. INSTALLATION.

The switch may be mounted in any convenient position using the four (4) mounting holes shown in Figure 2. Orient the R.F. ports to meet the required transmission line layout.

The manual operate handle should be in an accessible location for emergency switching in the event of control power failure.

Provide twelve (12) inches clearance above the top of the motor drive cover to allow for removal for maintenance.

After the switch is properly mounted in position, remove hardware and protective covers from the R.F. connectors. Attach adapters or EIA female flanged lines to the switch ports and re-install hardware. CAUTION -- Tighten bolts evenly and do not exceed torque ratings of eleven (11) foot pounds on the 1-5/8 and twenty (20) foot pounds on the 3-1/8.

NOTE: The R.F. contacts of the switch flanges protrude above the flange surface, and when properly connected there will be a space between the flanges at the bolt circle. Tightening beyond rated torque will destroy both the switch flange and the mating transmission line flange.

Activate the R.F. switch manually to both positions to be sure rotor moves freely and reaches the positive stops.

Attach electrical supply wiring and control wiring to the removable MS3108B jack supplied with each switch. Refer to Figure 3 for proper connections.

Attach jack to plug and check readout and interlock circuits with continuity tester or ohm meter for proper operation.

Apply correct supply voltage.

Place R.F. switch rotor mechanism in approximately mid-position using manual operate knob.

Momentarily apply correct voltage to pins C and N (observe polarity) and check that position indicator starts to move toward position one. If rotation is incorrect check wiring; if correct, apply control voltage continuously to pins C and N.

Model 50000
 Motorized Coaxial Switch

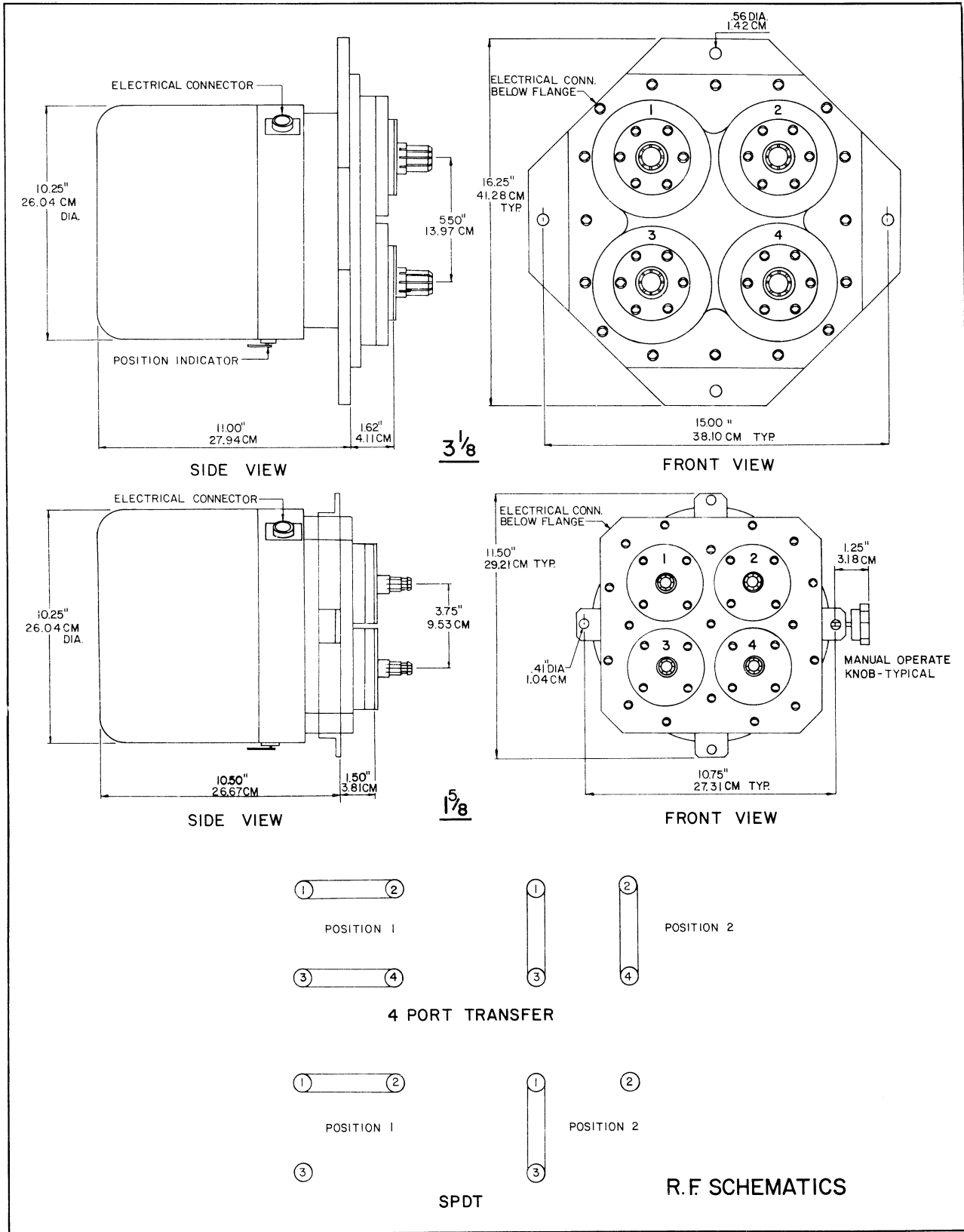
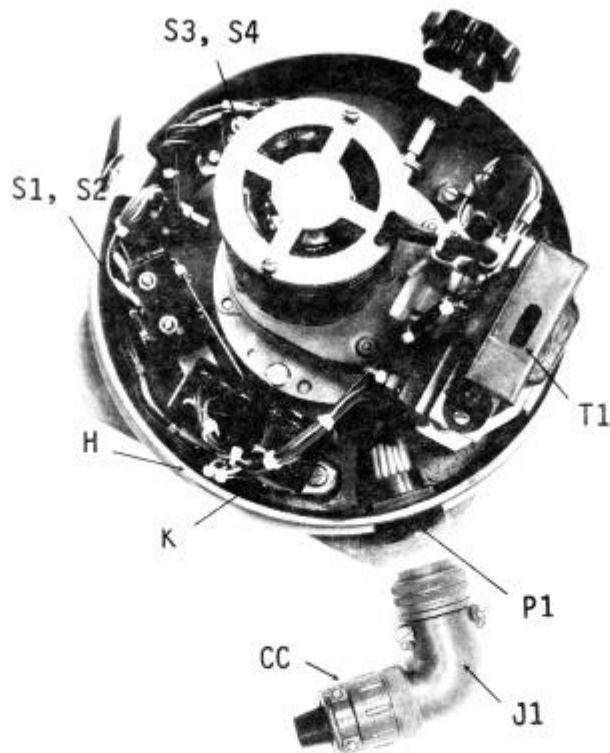


Figure 2. Outline Drawing Model 50000 1-5/8 and 3-1/8 Coaxial Switch

Model 50000
 Motorized Coaxial Switch



7. REPLACEMENT PARTS.

T1	Transformer, 220V-110V	A19636-1
S1, S2, S3, S4	Auxiliary Switch	A44876-1
K	Relay Assembly - 240V AC	B44624-501
	120V AC	B44624-502
	110V DC	B44624-503
	24V DC	B44624-504
	12V DC	B44624-505
P1	Plug	A44867-1
J1	Jack	A23561-1
CC	Cable Clamp	A19720-1
H	Harness Assembly (includes S1, S2, S3, S4, P1 and Relay sockets)	A44586-501

8. ANCILLARY EQUIPMENT.*

Adapter	3-1/8 EIA-F to 3-1/8 No Flange, 6" long	B44900-502
Adapter	3-1/8 EIA-F to 3-1/8 EIA-F, 6" long	C7999-501
Transition	3-1/8 EIA-F to 1-5/8 EIA-F, 6" long	B25623-501
Transition	3-1/8 EIA-M to Type N-F	C14397-503
Adapter	1-5/8 EIA-F to 1-5/8 No Flange, 6" long	B44920-502
Adapter	1-5/8 EIA-F to 1-5/8 EIA-F, 6" long	D30997-1
Transition	1-5/8 EIA-M to Type N-F	C21109-503

* All components listed are copper; similar items having aluminum outer conductors are available. Contact Dielectric Communications for a complete line of coaxial and waveguide transmission lines and components.

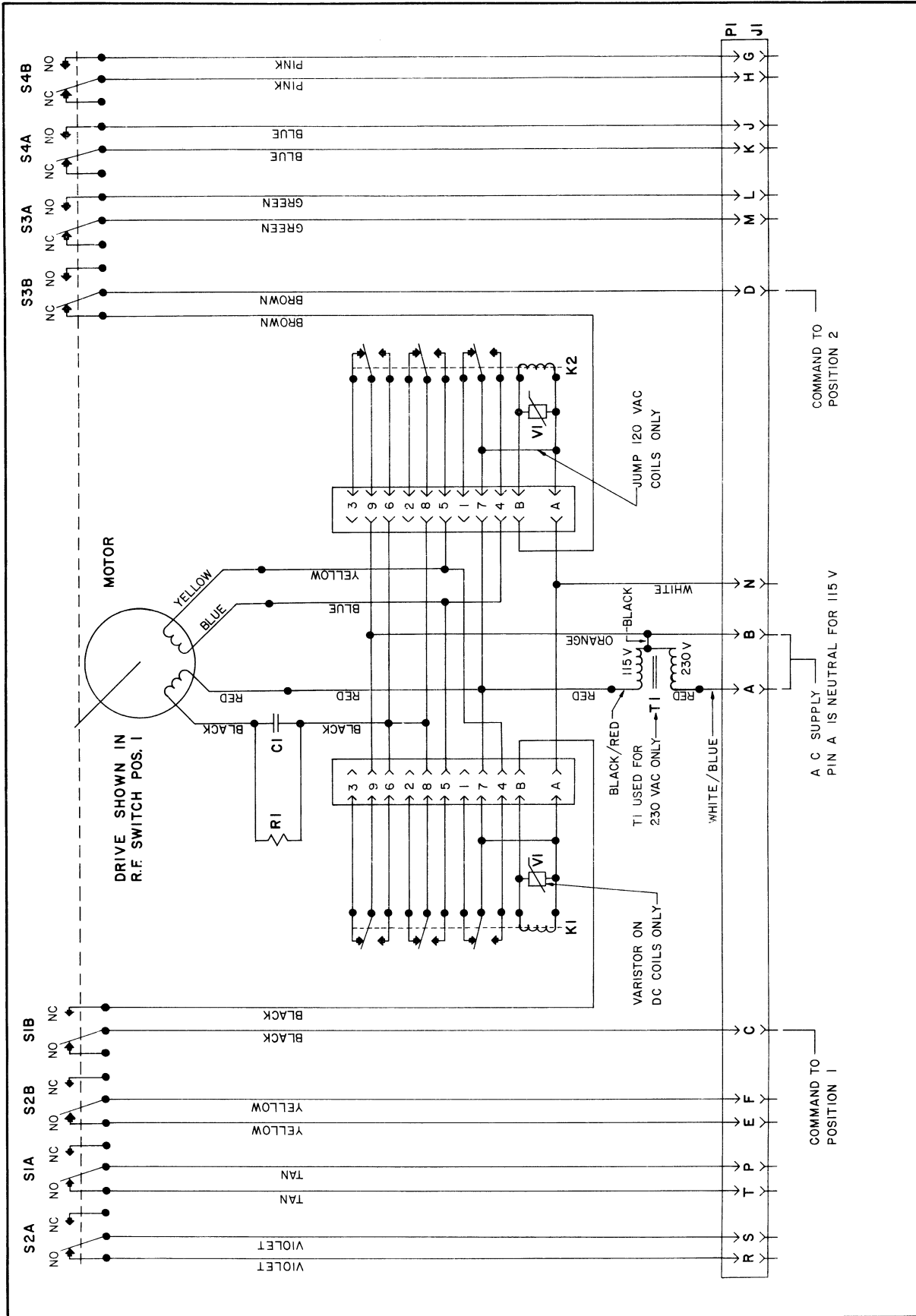


Figure 3. Schematic Diagram Model 50000 Coaxial Switch



IB-426-Rev D
P/N 85171

Model 60000
Motorized Coaxial Switches
1 5/8", 3 1/8", 4 1/16" and 6 1/8"

Instruction Manual

2/10/03

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Note: All specifications are for reference only. Consult factory for details.

WARNING

All Electrical and RF work must be done in accordance with local and national codes and safety requirements.

1.0 General Description

The Model 60000 Coaxial Switch provides reliable and fast switching of coaxial transmission line systems. It is a motor driven rotary type and can be controlled locally or remotely.

Operable in any position and having a minimum of moving parts, the switch will routinely operate through 1,000,000 cycles without failure.

The switch is equipped with a manual over-ride, mechanical position indicators and with auxiliary read-out circuits.

EIA male flanges are standard with adaptors available to mate with unflanged or semiflex transmission lines.

2.0 Specifications

	1 5/8"	3 1/8"	4 1/16"	6 1/8" 50 Ohm	6 1-8" 75 Ohm
Frequency Range	DC-900 MHz	DC-900 MHz	DC-800 MHz	DC-800 MHz	DC-800 MHz
Characteristic Impedance	50 Ohm	50 Ohm	50 Ohm	50 Ohm	75 Ohm
VSWR Max.	1.05:1				
Insertion Loss	0.1 dB max.				
Power Rating	150 kw	500 kw	1000 kw	2000 kw	1500 kw
Peak	25 kw	90 kw	150 kw	300 kw	225 kw
Average at 30 MHz	6 kw	30 kw	50 kw	100 kw	75 kw
Average at 300 MHz	4 kw	15 kw	25 kw	45 kw	38 kw
Average at 900 MHz					
Switching Time (nominal)	3 seconds	3 seconds	3 seconds	4 seconds	4 seconds
Isolation	60 dB				
RF Connectors	EIA Male				
Drive Motor Current 1Ø -50/60 Hz at 115 V AC at 230 V AC	Run Current 115 Nom. .6 AMP 230 Nom. .5 AMP			Start 115 Nom. 1.25 AMP 230 Nom. .9 AMP	
Auxiliary Switch Ratings	120 VAC 3A				
	28 VDC 3A				
Net Weight	36 lbs 16 kg	47 lbs 21.5 kg	60 lbs 27 kg	130 lbs 59 kg	120 lbs 54 kg
Gross Packed Weight	48 lbs 21.7 kg	65 lbs 29.5 kg	85 lbs 38 kg	185 lbs 84 kg	170 lbs 77 kg
Gross Packed Cube	3.58 ft ³ .10 m ³	3.58 ft ³ .10 m ³	9 ft ³ .26 m ³	12.6 ft ³ .35 m ³	12.6 ft ³ .35 m ³

3.0 Theory of Operation

The Model 60000 Coaxial Switch is a rotary type switch having an aluminum RF cavity common to all ports. The rotor assembly contains two inner conductor blades and a common isolating ground plane which oscillates 90° to accomplish the switching function and provide isolation between transmission line paths.

The rotor is driven by a gear motor. When the motor is activated by connection through the control, it will rotate 90°.

Six normally open microswitches are provided for position confirmation. The rotor activates these microswitches; and they must not be used for transmitter interlocking. **One must ensure that RF power is off before a position command is activated. Dielectric cannot be responsible for failure or burnout of switches switched under power.**

3.1 Inside the Drive

The drive used on the 60000 switches is an AC power segregated AC/DC command actuator. The drive is operated by 115 VAC, OR 230 vac and controlled by 12-24 VDC or 115/230 VAC. The different voltages can be selected without removing the cover. See the schematic for pin out for the configuration required. Do not apply AC and DC commands to the drive at the same time.

There is no need to open the switch unless local push button operation is required.

4.0 Installation

1. The switch may be mounted in any convenient position using the four mounting holes shown in Figure 1. Orient the RF ports to meet the required transmission line layout.

2. The manual operate handle stub should be in an accessible location for manual switching in the event of control power failure. Provide a minimum of eight inches of clearance above the top of the motor drive cover to allow for removal.

3. After the switch is properly mounted in position, remove hardware and protective covers from the RF connectors.

4. Attach adaptors or EIA female flanged lines to the switch ports and re-install hardware.

5. Note: The RF contact of the switch flanges protrudes above the flange surface and when properly connected there will be a space between the flanges at the bolt circle. Tightening beyond rated torque will destroy both the switch flange and the mating transmission line flange.

CAUTION

Tighten bolts evenly and do not exceed torque rating of eleven (11) foot pounds on the 1 5/8" switch or twenty (20) foot pounds on the 3 1/8", 4 1/16" and 6 1/8" switches.

5.0 Operation

The 1 5/8", 3 1/8", 4 1/16" AND 6-1/8" Model 60000 switches will change positions in approximately three seconds upon command.

The interlock circuits should be employed to prevent RF power being applied unless a legitimate RF transmission line path has been completed through the switch to an antenna or dummy load. Ensure that RF is off before the switch is commanded for position change.

Warning! User must remove all RF power before switching!

The 60000 series can be operated in four ways.

1. Locally with the cover removed.
2. Locally with the S60 Pendant. This device does not include any provisions for interlocks.
3. Remotely with connection through the Amp connector.
4. Manually with a 3/8" wrench or optional hand wheel.

To operate the switch locally with cover removed:

- A. Remove AC power and remove the cover.
- B. Set the "Man Run" switch to "Man". Plug in AC power
- C. Press either the "CW or CCW" button to desired position and hold until the motor stops.
- D. Reset "Man Run" switch to "Run" and replace cover when done.

To operate with the S60 Pendant:

- A. Connect Amp connector and AC power.
- B. The active side pilot light will illuminate.
- C. Select the desired position. Indicator lights will change status as switch moves.

To operate through Amp connector:

- A. Connect Amp connector and apply AC power.
- B. Connect control end cable and operate through control.

To operate manually:

- A. Assure AC power and Amp connectors are unplugged.
- B. Using wrench or hand wheel press down and turn until pointer on cover lines up with desired position.

6.0 Maintenance and Repairs

The Model 60000 Switch requires no periodic maintenance. However, after the initial installation is complete, the cover should be removed and the switch inspected for loose electrical connections and/or auxiliary switch hardware.

WARNING

Removal of the cover may expose live electrical terminals (240V AC maximum).

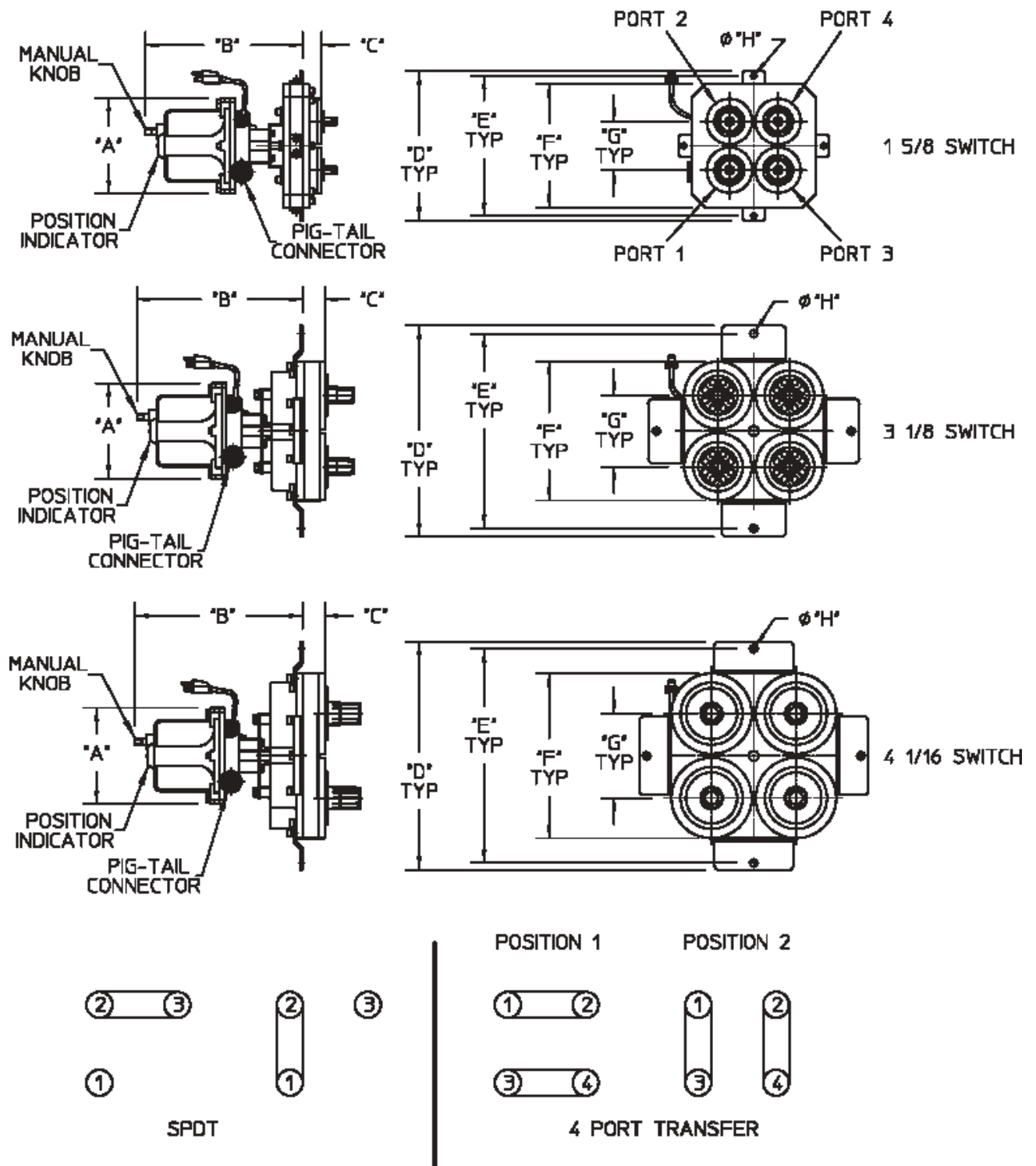
Some sub-assemblies of the units are sealed at the factory after test; breaking these seals voids any warranty and field repair of these assemblies is not recommended.

7.0 Ancillary Equipment*

	Description	Part Number
Adaptors		
1 5/8" EIA-F	to 1 5/8" no flange, 6" large	B-44920-502
	to 1 5/8" EIA-F, 6" large	D-30997-001
3 1/8" EIA-F	to 3 1/8" no flange, 6" large	B-44900-502
	to 3 1/8" EIA-F, 6" large	C-7999-501
4 1/16" EIA-F		
Transitions		
1 5/8" EIA-M	to Type N-F	C-21109-503
3 1/8" EIA-F	to 1 5/8" EIA-F, 6" large	B-25623-501
3 1/8" EIA-M	to Type N-F	C-14397-503
4 1/16" EIA-F		
Cable		
	Dual Switch Controller to 60000 Switch-25'	0101873-025
	Dual Switch Controller to 60000 Switch-50'	0101873-050
	To adapt 60000 switch CPC 24 pin to 16 pin AMP CPC ("Type C")	85156
	To adapt 60000 switch to 50000 amphenol connector	85144
S60 Pendant Control	10' AMP connector cable, AC power cable, and switch box.	85145
Extension Cable	25' Eight conductor cable assembly for longer S60 pendant applications.	85157

*All components are copper; similar items having aluminum outer conductors are available. Contact Dielectric Communications for a complete line of coaxial and waveguide transmission lines and components.

NOTE: PORT LOCATIONS
TYPICAL ALL SWITCHES



SWITCH	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'
1-5/8	7.38	12.13	1.50	11.50	10.75	9.50	3.75	.41
3-1/8	7.38	12.75	1.74	16.25	15.00	10.69	5.50	.56
4-1/16	7.38	12.88	1.72	17.56	16.50	12.69	6.50	.56

Figure 1

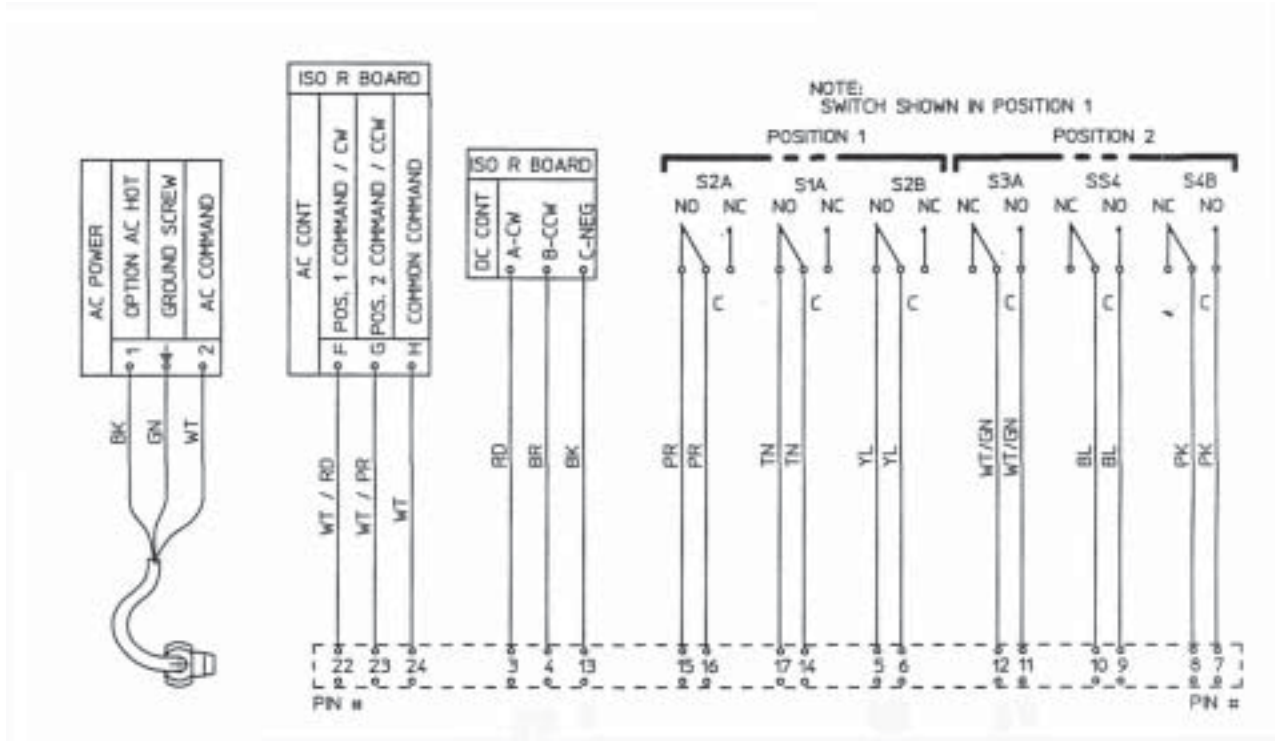


Figure 2

Note:

1. The actuator only requires a 1/2 second command pulse to latch the control in. A maintained command will not harm the unit.
2. Do not apply AC and DC commands at the same time.
3. For AC command between 110 VAC and 230 VAC, hook the common AC conductor to Pin 13 and position 1 and 2 commands to pins 22 and 23.
4. For DC command between 12 and 24 VDC, hook the negative conductor to pin 13 and the position 1 and position 2 to pins 3 and 4.

The actuator has been tested to operate at 10% less than the rated input voltage and is dual rated for 50/60 Hz operation.

WIRING TABLE

50000 PIN #	50000 SWITCH	50000 COLOR	DUAL SWITCH CONTROLLER	WAVEGUIDE SW	UNIVERSAL CONTROL PANEL	60000 PIN #	60000 SWITCH	60000 COLOR
	COMMENT		66982	DC Com AC Mot PIN #	48112-501		COMMENT	
					TB-4 Terminal #			
R	POS # 1 CONTACT S2A NO	VIO	15	J	15	15	POS # 1 CONTACT S2A NO	PR
S	POS # 1 CONTACT S2A COM	VIO	16	S	16	16	POS # 1 CONTACT S2A COM	PR
T	POS # 1 CONTACT S1A NO	TAN	17	F	17	17	POS # 1 CONTACT S1A NO	TN
P	POS # 1 CONTACT S1A COM	TAN	14	G	14	14	POS # 1 CONTACT S1A COM	TN
E	POS # 1 CONTACT S2B NO	YEL	5	Q	5	5	POS # 1 CONTACT S2B NO	YL
F	POS # 1 CONTACT S2B COM	YEL	6	P	6	6	POS # 1 CONTACT S2B COM	YL
C	COMMAND FOR POS #1	W/BLK	3	U	3	3	DC COMMAND FOR POS #1 (+)	RD
A	AC POWER	W/BLK	1	N/A	Used on 50, not on 60	N/A	N/A	N/A
B	AC POWER	WHT	2	N/A	Used on 50, not on 60	N/A	N/A	N/A
N	COMMAND COMMON	ORG	13	R	13	13	DC COMMAND COMMON (-)	BK
D	COMMAND FOR POS # 2	BRN	4	V	4	4	DC COMMAND FOR POS # 2 (+)	BR
M	POS # 2 CONTACT S3A COM	W/GRN	12	B	12	12	POS # 2 CONTACT S3A COM	WT/GRN
L	POS # 2 CONTACT S3A NO	W/GRN	11	A	11	11	POS # 2 CONTACT S3A NO	WT/GRN
K	POS # 2 CONTACT S4A COM	BLU	10	L	10	10	POS # 2 CONTACT S4A COM	BL
J	POS # 2 CONTACT S4A NO	BLU	9	M	9	9	POS # 2 CONTACT S4A NO	BL
H	POS # 2 CONTACT S4B COM	PNK	8	D	8	8	POS # 2 CONTACT S4B COM	PK
G	POS # 2 CONTACT S4B NO	PNK	7	E	7	7	POS # 2 CONTACT S4B NO	PK
						1	RESERVED FOR HEATER	
						2	RESERVED FOR HEATER	
						18	N/A	N/A
						19	N/A	N/A
						20	N/A	N/A
						21	N/A	N/A
						22	AC COMMAND POS # 1	WT/RD
						23	AC COMMAND POS # 2	WT/PR
						24	AC COMMAND COMMON	WT

Wiring Details

