



IB-426

P/N 85171

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

Instruction Manual

Note:

Review the contents of this manual
prior to Removal from the crate and Installation.

Improper handling
can **Void Product Warranty.**

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Note: All specifications are for reference use 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 that can be controlled locally or remotely.

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

Operable in any position and having a minimum of moving parts, the switch will routinely operate through 500,000 cycles without failure.

EIA male flanges are standard with adaptors available to mate with un-flanged or semi-flex 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 Peak Average at 30 MHz Average at 300 MHz Average at 900 MHz	150 kw 25 kw 6 kw 4 kw	500 kw 90 kw 30 kw 15 kw	1000 kw 150 kw 50 kw 25 kw	2000 kw 300 kw 100 kw 45 kw	1500 kw 225 kw 75 kw 38 kw
Switching Time (nominal)	3 seconds	3 seconds	3 seconds	4 seconds	4 seconds
Isolation	60 dB				
RF Connectors	EIA Male				
Drive Motor Current 10 50/60 Hz at 115 V AC at 230 V AC	Run Current Start 115 Nom. .6 AMP 115 Nom. 1.25 AMP 230 Nom. .5 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 the 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.**

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.

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. Locate 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 a control power failure. Provide a minimum of eight (8) inches of clearance above the top of the motor drive cover to allow for removal.

Caution

Switch will return to last electrically commanded position if AC power is removed and re-applied. When switch position is manually changed ensure RF power is removed prior to the application of AC power to the switch or controller.

3. After the switch is properly mounted in position, remove hardware and protective covers from the RF connectors.
4. Attach adapters or EIA female flanged lines to the switch ports and re-install hardware.
5. Ensure Cut-Back to mating piece is correct as well as Myat and/or Dielectric connectors are appropriate. Ensure excessive pressure is not applied to the switch inner assemblies.
6. 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 levels will destroy the switch flange and the mating transmission line flange.

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 (3) 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 switch can be operated in four ways.

1. Locally with the cover removed.
2. Locally with the Remote Pendant (p/n 400024205). This device does not include provisions for interlocks.
3. Remotely with connection through the Amp connector.
4. Manually with a 3/8" wrench.

To operate locally with cover removed:

- A. Remove AC power and remove the cover.
- B. Set the "Man Run" switch to "Man". Plug in the 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.

Caution

Remove RF power prior to the application of AC power to the switch or controller. Switch may rotate to last electrically commanded position.

To operate with the Remote Pendant (p/n 400024205):

- A. Connect Amp connector and AC power.
- B. Press the Left Button for POS 1.
- C. Press the Right Button for POS 2.

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 press down and turn until pointer on cover lines up with desired position.

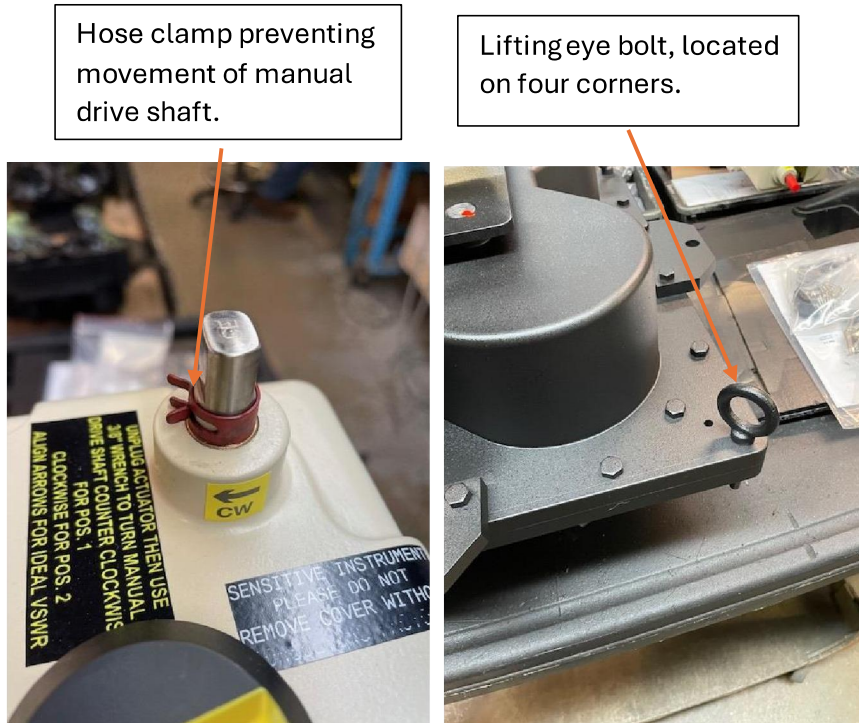
6.0 Maintenance and Repairs

The Model 60000 Switch requires no periodic maintenance.

Warning: Removal of the cover may expose live electrical terminals (240V AC max.). 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 Troubleshooting and Helpful Hints

- When removing the switch from the transport crate, use the eyelets mounted on the top of the unit (6" switches only) to attach straps for lifting the switch whenever possible as this is an electronic device and can be damaged from rough handling.
- It is recommended that a "Two-Person" lift utilized for the removal of all other switches from the crate.
- Avoid using the Actuator as a lifting point.



- The manual actuator shaft comes from the factory with a hose clamp to minimize the risk of inadvertent disengagement during handling (Pressed Down).
- If the switch does not engage after following proper installation steps provided in this document, the manual actuator shaft may be out of position. To rectify, using a pair of pliers, grab the top of the shaft and pull straight up – if the shaft was out of position it will move to its' highest position. Note: The entire distance the shaft can move from bottom (Fully Engaged) to top (Dis-engaged) is approximately 1/4".
- We recommend rotating the switch with:
 - Dielectric Dual Switch Controller – P/N 400013927 or
 - Remote Pendant Hand Held Controller – P/N 400024205
- If you need to manually rotate the switch:
 - Power must be disconnected.
 - If there is resistance moving the shaft with a wrench, STOP.
 - Excessive force can break the shaft and cause damage to internal components.
 - Contact Dielectric for Technical Assistance.
- Issues not addressed in this document should be communicated to a Dielectric Customer Service Representative for support.

8.0 Ancillary Equipment

Available Accessories

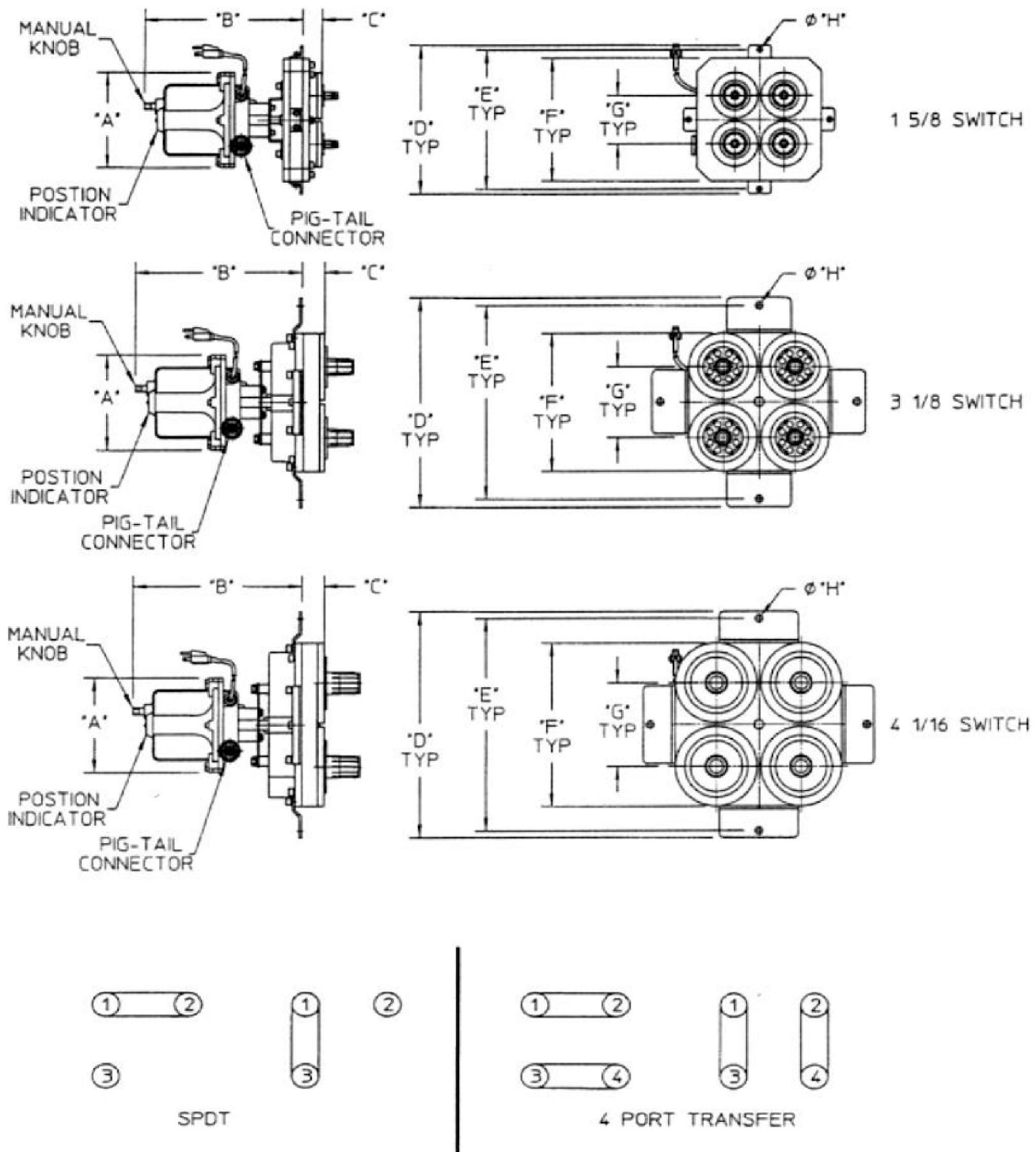
Components	Description	Part Number
Adaptors		
1 5/8" EIA-F	to 1 5/8" no flange, 6" large	B-44920-502
	to 1 5/8" EIA-F, 6" large	D-30997-001
3 1/8" EIA-F	to 3 1/8" no flange, 6" large	B-44900-502
	to 3 1/8" EIA-F, 6" large	C-7999-501
4 1/16" EIA-F		
Transitions		
1 5/8" EIA-M	to Type N-F	C-21109-503
3 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 Various Lengths		See Chart Below
To adapt 60000 switch CPC 24 pin to 16 pin AMP CPC ("Type C")		85156
To adapt 60000 switch to 50000 Amphenol connector		85144

Dual Switch Controller to 60000 Switch

PART NUMBER	LENGTH
11000000372	6 FEET
11000000373	35 FEET
11000007099	100 FEET
R0101873025	25 FEET
R0101873050	50 FEET
R0101873075	75 FEET
400005554	150 FEET

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

Switch Head Configurations/Measurements (Except 6")



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

Wiring Diagram for Actuator

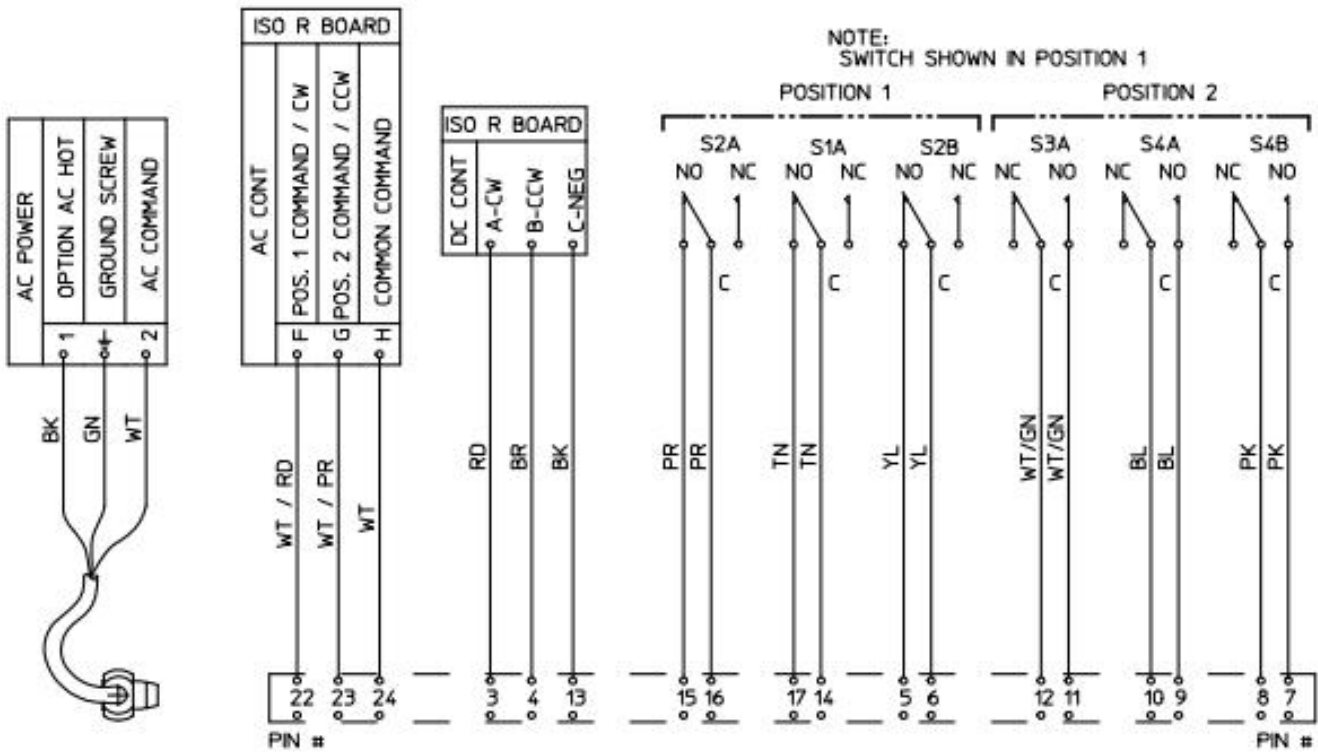


Figure 2

Note:

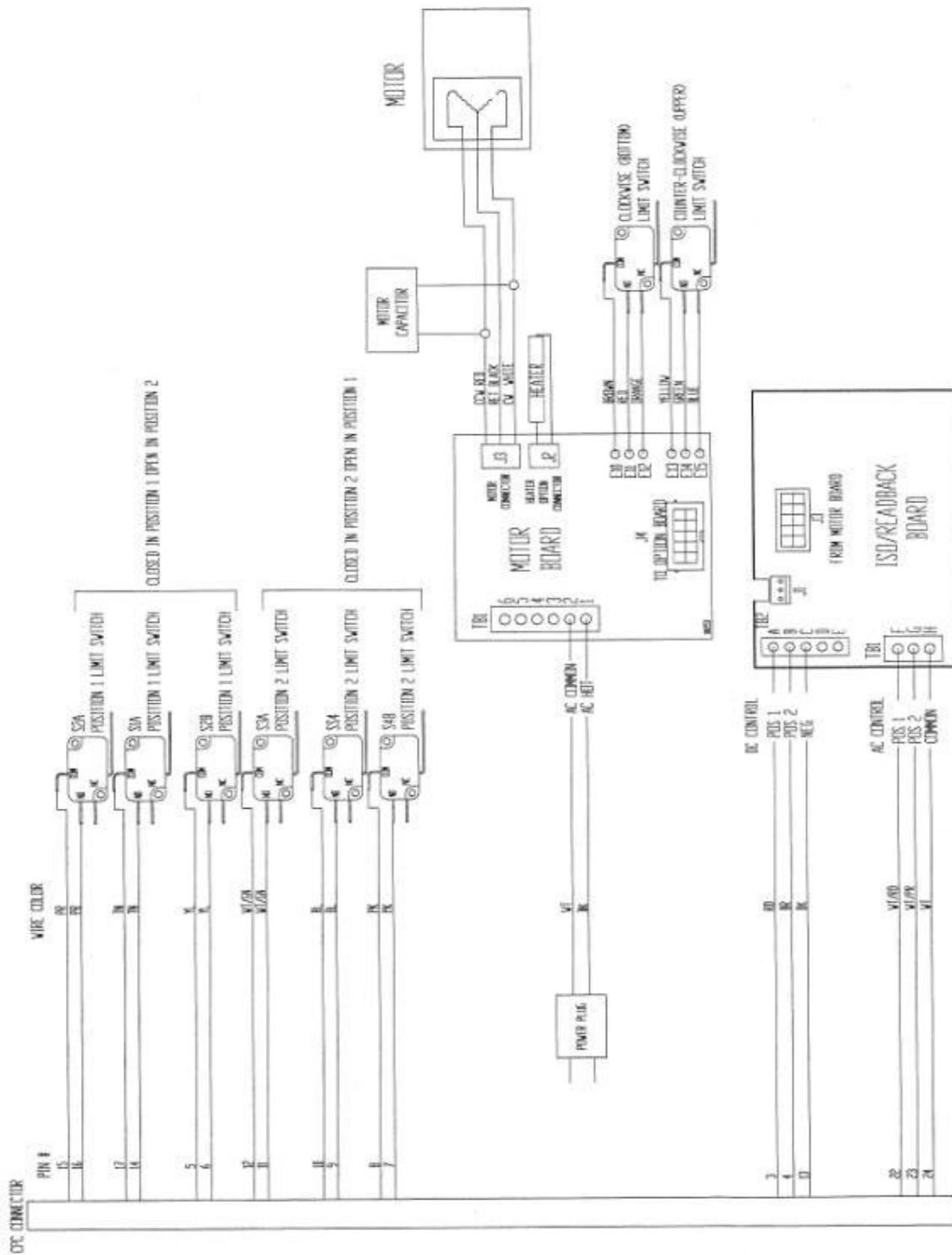
1. The actuator only requires a 1/2 second command pulse to latch the control in. A maintained command will not harm the unit.
2. Do not apply AC and DC commands at the same time.
3. For AC command between 110 VAC and 230 VAC, hook the common AC conductor to pin 24 and position 1 and 2 commands to pins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

Internal Wiring Table for Switches

Internal Wiring Table for Switches									
	50000 SWITCH		DUAL SWITCH CONTROLLER	WAVEGUIDE SW	UNIVERSAL CONTROL PANEL		60000 SWITCH		
50000 PIN #	COMMENT	50000 COLOR	66982	DC Com AC Mot PIN #	48 112-501	60000 PN #	COMMENT	60000 COLOR	
					TB-4 Terminal #				
R	POS # 1 CONTACT S2A NO	VD	15	J	15	16	POS # 1 CONTACT S2A NO	PR	
S	POS # 1 CONTACT S2A COM	VD	16	S	16	15	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	WTGN	
L	POS # 2 CONTACT S3A NO	W/GRN	11	A	11	11	POS # 2 CONTACT S3A NO	WTGN	
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	7	POS # 2 CONTACT S4B COM	PK	
G	POS # 2 CONTACT S4B NO	PNK	7	E	7	8	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	WTRD	
						23	AC COMMAND POS # 2	WT/PR	
						24	AC COMMAND COMMON	WT	

Wiring Schematic



Control Cable Wiring Table

CONTROL CABLE WIRING TABLE							
COMMENT	DUAL SWITCH CONTROLLER		WG SWITCH		50000 SWITCH		60000 SWITCH
	PIN #		PIN #	WIRE COLOR	PIN #	WIRE COLOR	PIN #
POS # 1 CONTACT S2A NO	15		9	White/Red	R	White/Red	16
POS # 1 CONTACT S2A COM	16		17	White/Green	S	White/Green	15
POS # 1 CONTACT S1A NO	17		6	White/Yellow	T	White/Yellow	17
POS # 1 CONTACT S1A COM	14		7	White/Black	P	White/Black	14
POS # 1 CONTACT S2B NO	5		15	Brown	E	Brown	5
POS # 1 CONTACT S2B COM	6		14	Yellow	F	Yellow	6
COMMAND FOR POS # 1	3		19	Orange	C	Orange	3
AC POWER*	1		N/A	N/A	A	Black	N/A
AC POWER*	2		N/A	N/A	B	Red	N/A
COMMAND COMMON	13		16	Red/Black	N	Red/Black	13
COMMAND FOR POS # 2	4		20	Blue	D	Blue	4
POS # 2 CONTACT S3A COM	12		2	Red/Yellow	M	Red/Yellow	12
POS # 2 CONTACT S3A NO	11		1	Red/Green	L	Red/Green	11
POS # 2 CONTACT S4A COM	10		11	Tan	K	Tan	10
POS # 2 CONTACT S4A NO	9		12	Pink	J	Pink	9
POS # 2 CONTACT S4B COM	8		4	Gray	H	Gray	7
POS # 2 CONTACT S4B NO	7		5	Violet	G	Violet	8

* AC Power is not available via pins 1 and 2 on DSC P/N 11000005508. Please see Dual Switch Controller IB-467, section 3 for more detail.