Old style
Motor Actuator

ADDENDUM I

TO

TECHNICAL MANUAL
FOR
MODEL SLS-1
STRIP LINE SWITCH
(D93-21C)

SCOPE

This addendum covers the installation, operation and the maintenance of remotely controlled motor actuators for the Model SLS-1M Strip Line Switch.

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CONTENTS

SECTION 8

MOTORIZED OPERATION

8.1 GENERAL

8.1.1 Section 1 through 7 of this technical manual describes the construction and operation of a manually controlled switch. The Model SLS-1 may be equipped with motorized linear actuators for remote control. The motor actuator and its mounting socket mounts directly on the SLS in place of the knob (MP1*), the microswitch mounting plate (IV*) and the microswitches (S1*-S4*). A second harness provides the actuator control wiring and is normally supplied prewired for field installation. A switch matrix equipped with motor actuators is designated a Model SLS-1M.

8.2 CONNECTIONS

8.2.1 Figure 9 shows the connections which are required for the motor actuator. Figure 9A shows the wiring on a manual switch. Notice that S1*, S2*, S3* and S4* on the manual switch corresponds directly with **B1S1** through **B1S4** in the linear actuator. The actuator uses the same interlock and indicator harness wiring as does the manual switch. The six indicator and interlock wires are identified in Figure 9A by letters (A through F). These wires are disconnected from the microswitches and connected to the motor actuator adapter's terminal strips as shown in Figure 9B. Two of the wires (C & F) have pigtails which must be insulated and tucked out of the way. This method of wiring permits convenient manual operation at any time for emergency service or for a change in the operating conditions.

8.2.2 Connections to the motor control harness are made with inline splices on the three pigtails (G, H, J) shown in Figure 9B. The pigtails are colored violet, gray, and white and are connected to the corresponding colored wires on the control harness.

8.2.3 Figure C shows typical actuator wiring and shows a typical control circuit. Control circuits vary in form due to customer requirements and are described in the technical manual for the particular control circuit used. The circuit breaker (**CB1**) is an optional item which is normally provided to supply protection for the SLS-1M assembly and a convenient connecting point for the power input. Transformers **T1** and **T2** are optional items which may be supplied to provide the required 115 Vac ±10% power required by the actuators. Each actuator draws a 0.5 second surge current of approximately 3 amps when operated. For matrices of greater than 5 channels the load is normally split between 2 or 3 phases to limit the surge current to 30 amps per phase.

8.2.4 A typical control unit is the Model MCU-1 Matrix Control Unit which provides remote indication of the switching status and binary remote control (4 wires per channel, 24 volt dc) of the switch matrix operation. The MCU-1 system utilizes binary control modules mounted directly on the Model SLS to de-code the command signals and control the linear actuators. A contactor is provided for energizing all of the actuators simultaneously when switching is to be accomplished.

*NOTE: Refers to SLS-1 parts per Section 7 List of Materials. Actuator parts are shown in bold face type and prefixed with "**B1**" in this Section.

8.3 INSTALLATION

8.3.1 Adapter. When converting from a manual crosspoint, the knob (MP1*) and the microswitch mounting plate (IV*, Figure 6) is removed (See Section 6.1). The actuator adapter (XB1) mounts directly on top of the switch mounting plate (MP2*) with two of the mounting screws (II*, Figure 6). The shaft bearing in the adapter pertrudes downward into the mounting plate and serves to align the adapter. Square up the adapter plate with the mounting plate before tightening the mounting screws. The connections to the adapter plate are described in Section 8.2.

8.3.1 Actuator Installation.

8.3.1.1 Before installing the actuator, remove the hole plugs (B1MP24 and B1MP25, Figure 11) and the cover tube(B1MP17). Insert the manual crank and crank the actuator until the lead screw (B1MP9) projects approximately 1.5" from the front plate (B1MP5).

8.3.1.2 The loose parts required for installing the actuator are shown in Figure 10. Insert a pin into the tool hole in the ram front shaft and install the connecting rod coupling (B1MP11) with a 1/4" external tooth lock washer as shown in Figure 10. Tighten the coupling firmly with a wrench while exercising care to prevent applying torque to the ram. Hook the connecting rod (B1MP10) into the coupling and slide one of the springs (B1MP3) over the connecting rod. Slide the actuator down over the connecting rod (the connecting rod slides through the hole in the lead screw) until the plug (B1P1) engages and the actuator is seated against the adapter plate. Securely tighten the two mounting bolts (B1MP19) with a socket wrench. When properly tightened the actuator will seat squarely against the adapter. Under or over tightening of these bolts will pull the actuator out of square and cause jamming.

8.3.1.3 Rotate the manual crank CCW to the full In position, install the second spring (B1MP3) over the rear of the connecting rod and install a 1/4-20 hex nut. The nut is tightened down securely against the shoulder of the connecting rod compressing the spring, the connecting rod is held with a wrench on the flats provided while tightening the nut. Install the 1/4" split lock washer and the connecting rod cap (B1MP18) on the rear of the connecting rod. The cap is tightened with a wrench on its flats while holding the 1/4-20 nut with a wrench. Installation of the cover tube and hole covers completes the actuators installation. It is recommended that the actuator be manually cranked throughout its range several times to assure smooth operation and freedom from binding before applying power. If binding is present, it is usually a sign of incorrect tightening of the mounting bolts.

8.4 MAINTENANCE

8.4.1 General. The motorized linear actuator has been designed to provide long trouble free service; however, normal care must be exercised to prevent excessive accummulation of dirt or dust in the mechanism.

8.4.2 Lubrication. The low operating duty cycle of the actuator requires lubrication only once per year. Access may be readily gained to the bearings by removing the four mounting screws that hold the front plate (B1MP5) and lifting the front plate out of the way. This may most easily be accomplished when the actuator is in the In position. A drop of regular grade motor oil applied to each bearing will be sufficient.

CAUTION: Oil on the pulleys or the drive belt will cause slippage and must be prevented.

8.4.3 Drive Belt Replacement. Access for drive belt replacement is gained by removing the four screws retaining the front plate (B1MP5) and swinging the front plate out of the way. Any dirt or rubber deposits should be removed and the pulleys cleaned before installing a new drive belt (B1MP2).

8.5 LIST OF MATERIALS - MOTORIZED SWITCH COMPONENTS

Item	Ref. Des.	Description (Item Name)	MFR FMC	Part No. (FSN)	Quan /C.P.	Quan* Used	Spares†		
							%	Min	Quan*
1	B1	LINEAR ACTUATOR	DELTA	D81-33	1		2	1	
2	B1B1	MOTOR, UNIVERSAL 1/15 H.P.	DELTA	D05-22	1		2	1	
3	B1F1	FUSE, 3AG, 1/2A		3AG-1/2A	1		25	5	
4	B1MP1	BEARING, THRUST	DELTA	D04-22	2		2	2	
5	B1MP2	DRIVE BELT	DELTA	D04-24	1		2	2	
6	B1MP3	SPRING, HELICAL, COMPRESSION	DELTA	D04-23	2		1	1	
7	B1MP4	PLATE, RETAINING, ELECTRICAL CONNECTOR	DELTA	D80-105	1		-	-	
8	B1MP5	FRONT PLATE	DELTA	D80-106	1		-	-	
9	B1MP6	BEARING RETAINING PLATE	DELTA	D80-107	1		-	-	
10	B1MP7	SPACER	DELTA	D80-108	2		-	-	
11	B1MP8	CAM	DELTA	D80-109	1		-	-	
12	B1MP9	LEAD SCREW	DELTA	D80-110	1		-	-	

8.5 (CONT'D)

Item	Ref. Des.	Description (Item Name)	MFR FMC	Part No. (FSN)	Quan /C.P.	Quan* Used	Sparest		
							%	Min	Quan*
13	B1MP10	CONNECTING ROD	DELTA	D80-111	1		-	-	1
14	B1MP11	CONNECTING ROD COUPLING	DELTA	D80-112	1		-	-	1
15	B1MP12	MOTOR PULLEY	DELTA	D80-113	1		-	-	
16	B1MP13	DRIVE PULLEY	DELTA	D80-114	1		-	-	
17	B1MP14	CAM GUIDE	DELTA	D80-115	1		-	-	
18	B1MP15	Unassigned							
19	B1MP16	Unassigned							
20	B1MP17	COVER TUBE	DELTA	D80-118	1		-	-	
21	B1MP18	CONNECTING ROD CAP	DELTA	D80-119	1		-	-	1
22	B1MP19	MOUNTING BOLT	DELTA	D80-120	2		-	-	
23	B1MP20	MOTOR MOUNTING PLATE	DELTA	D71-151	1		-	-	
24	B1MP21	SWITCH MOUNTING PLATE	DELTA	D71-152	1		-	-	

8.5 (CONT'D)

Item	Ref. Des.	Description (Item Name)	MFR FMC	Part No. (FSN)	Quan /C.P.	Quan* Used	Spares†		
							%	Min	Quan*
25	B1MP22	SIDE COVER	DELTA	D71-153	2		-	-	
26	B1MP23	NUT STRAP	DELTA	D75-52	4		-	-	
27	B1MP24	SNAP BUTTON	H.H.S.	654	2		-	-	
28	B1MP25	SNAP BUTTON	H.H.S.	655	1		-	-	
29	B1P1	PLUG	ELCO	01-2112-111-104	1		2	1	
30	B1S1	MICROSWITCH (SPST-N.O.)	M.H.	V3L-27-D8	4		3	4	
31	B1S2	Same as B1S1			Ref		-	-	-
32	B1S3	Same as B1S1			Ref		-	-	-
33	B1S4	Same as B1S1			Ref		-	-	-
34	B1S5	MICROSWITCH (SPDT)	M.H.	V3L-3-D8	2		3	2	
35	B1S6	Same as B1S5			Ref		-	-	-
36	B1XF1	FUSEHOLDER	L.F.	342004	1		2	1	-

8.5 (CONT'D)

Item	Ref Des.	Description (Item Name)	MFR FMC	Part No. (FSN)	Quan /C.P.	Quan* Used	Spares†		
							%	Min	Quan*
37	CB1	CIRCUIT BREAKER - 30 A. (Optional)			-	1	-	-	
38		Unassigned							
39		Unassigned							
40	T1	TRANSFORMER 132/120V (Optional)	G.E.	9T51Y112	-		-	-	
41	T2	Same as T1			-	Ref	-	-	
42	XB1	ACTUATOR ADAPTER	DELTA	D34-5	1		-	-	
43	XB1J1	RECEPTACLE	ELCO	01-4112-106 -301-100	1		2	1	
44	XB1TB1	TERMINAL STRIP	KULKA	799-3-KT30	2		2	1	
45	XB1TB2	Same as XB1TB1			-	Ref	-	-	
46	TOOL	MANUAL CRANK	DELTA	D80-103	-	1	-	-	

8.5 (CONT'D)

Item	Ref. Des.	Description (Item Name)	MFR FMC	Part No. (FSN)	Quan /C.P.	Quan* Used	Spares† %	Spares† Min	Spares† Quan*
		FOR EACH CROSSPOINT EQUIPPED WITH LINEAR ACTUATOR DELETE THE FOLLOWING ITEMS FROM THE LIST OF MATERIALS FOR THE MANUALLY OPERATED MODEL (SECTIONS 7.3 & 7.4)							
Section 7.3									
16	MP1	KNOB							
20	S1	MICROSWITCH							
21	S2	Same as S1							
22	S3	Same as S1							
23	S4	Same as S1							
Section 7.4									
1	I	SOCKET HEAD CAP SCREW							
4	IV	MICROSWITCH MOUNTING PLATE							

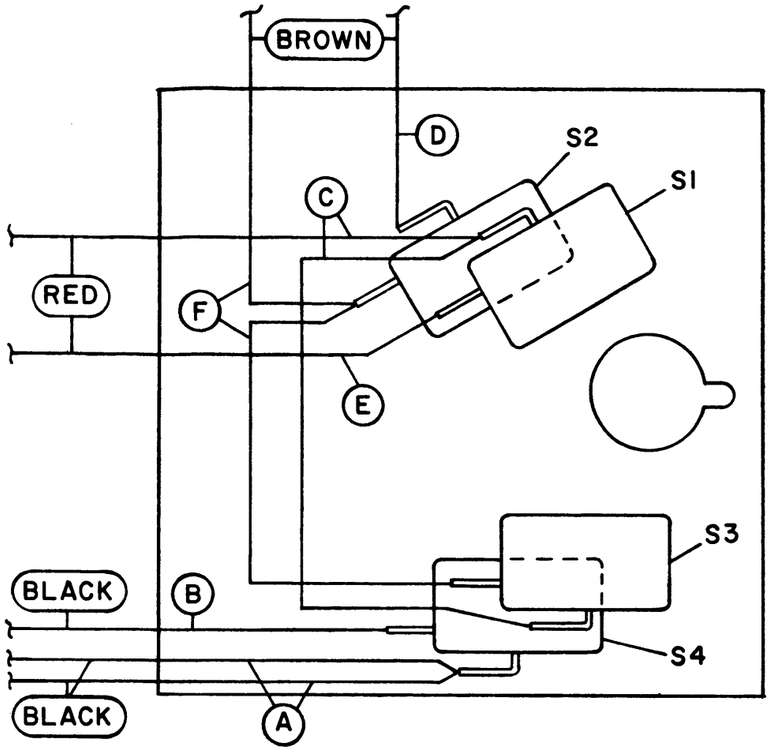


FIGURE 9A
MANUALLY OPERATED
MICROSWITCH CONNECTIONS
NOTE: CIRCLED LETTERS (Ⓐ) REFER TO TEXT, SECTION 8.2.

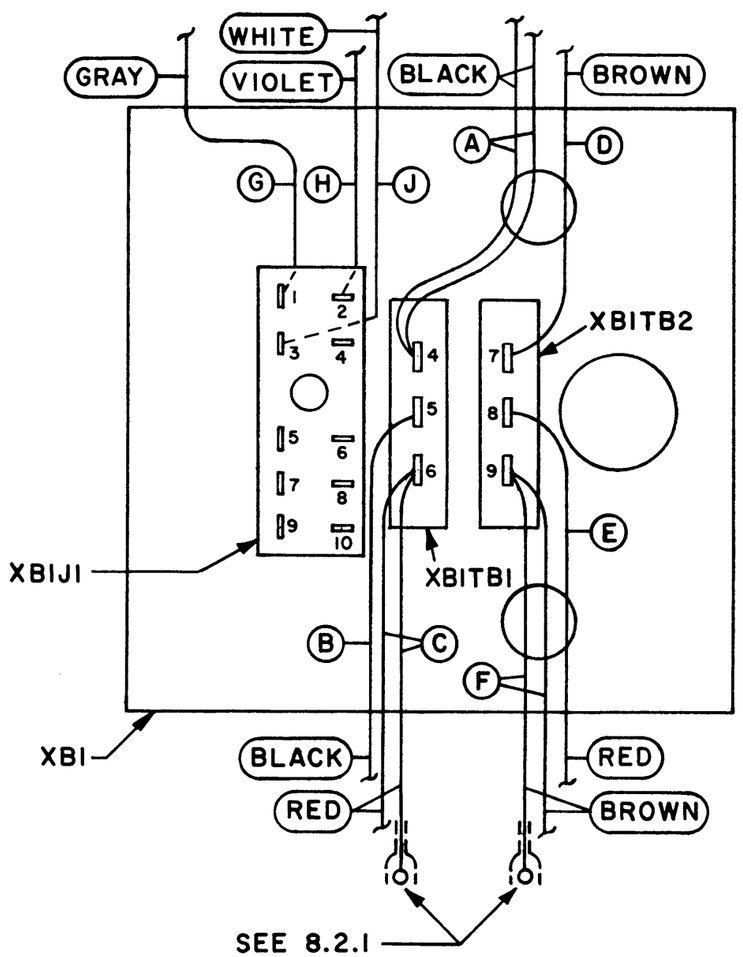


FIGURE 9B
LINEAR ACTUATOR
ADAPTER CONNECTIONS

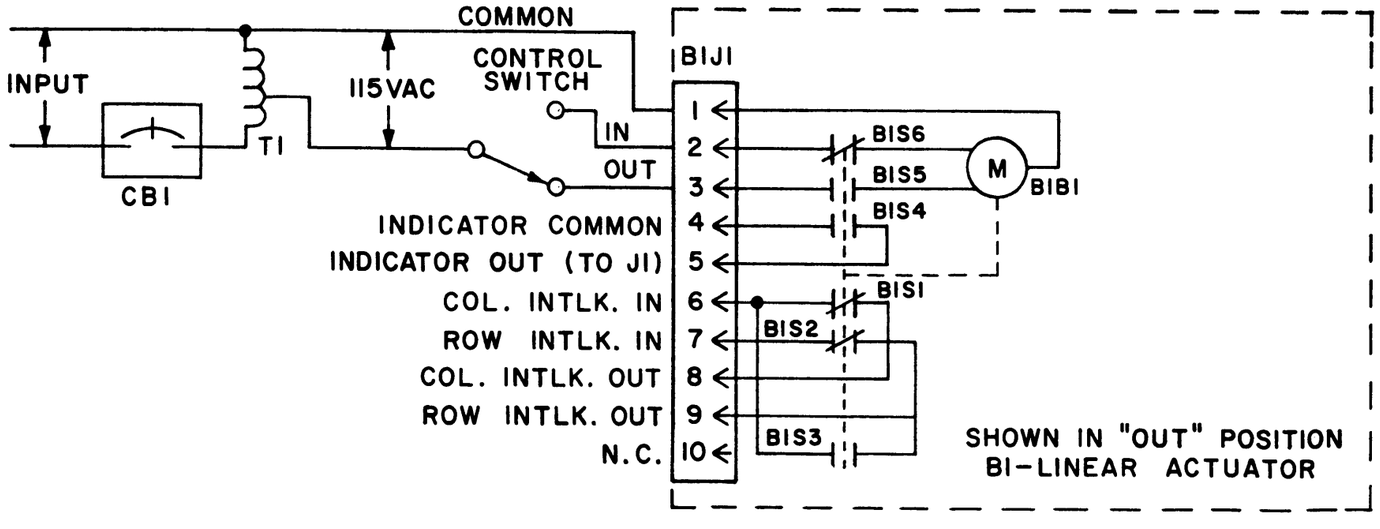
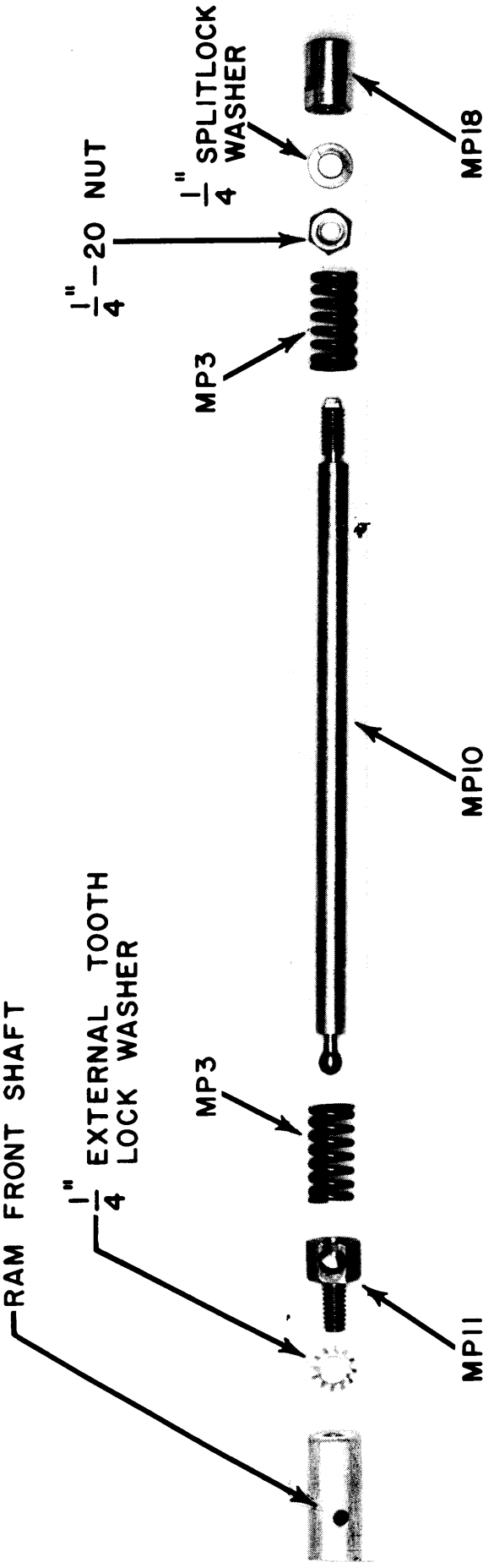


FIGURE 9C
LINEAR ACTUATOR
WIRING DIAGRAM

FIGURE 9
WIRING DIAGRAM
DELTA ELECTRONICS, INC. ALEXANDRIA , VIRGINIA



PARTIAL REFERENCE DESIGNATIONS ARE SHOWN, FOR COMPLETE DESIGNATION PREFIX WITH SUBASSEMBLY DESIGNATION "B1".

FIGURE 10
ACTUATOR INSTALLATION DETAILS
DELTA ELECTRONICS, INC. ALEXANDRIA, VIRGINIA

* NOT SHOWN

PARTIAL REFERENCE DESIGNATIONS ARE SHOWN, FOR COMPLETE DESIGNATION PREFIX WITH SUBASSEMBLY DESIGNATION "B1".

FIGURE 11

ACTUATOR COMPONENTS

DELTA ELECTRONICS, INC.
ALEXANDRIA, VIRGINIA