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SQUARE D COMPANY
SMYRNA, TN

ENGINEERING STANDARD

E50001

SUBJECT: FG-2 BREAKER RATINGS

FG-2 METAL CLAD CIRCUIT BREAKER RATINGS (1)

IDENTIFICATION			RATED VALUES								Related Required Capabilities				ANSI RATING		
			Voltage		Insulation		Current					Current Values					
SQUARE D Catalog Number	Nominal Voltage Class KV, RMS	Nominal 3 Phase MVA Class	Maximum Voltage KV, RMS	Voltage Range Factor	Rated Withstand Test Voltage: Low Freq. KV, RMS	Rated Withstand Test Voltage: Impulse 1.2x50 KV, Crest	Continuous @ 60 Hz. A, RMS	Int. Capability @ Max. Voltage (2) KA, RMS	Interrupting Time CY	Permissible Trip Delay SEC	Rated Minimum Voltage (3) KV, RMS	Max. Sym. Int. Cap. (4) KA, RMS	3 Sec. Short Time Current Carrying Capability KA, RMS	Close & Latch Capability KA, RMS		Assy. No. 46001-448-XX (5)	Rated for Reclosing Service (6)
FG-2-05007-12	4.16	75	4.76	1.36	19	60	1200	8.8	5	2	3.5	12	12	19	X	-50	X
FG-2-05015-12							1200									-50	X
FG-2-05015-20		150		1.36			2000	18			3.5	24	24	39		-53	X
FG-2-05015-30							3000									N/A	
FG-2-05025-12							1200								X	-51	X
FG-2-05025-20		250		1.24			2000	29			3.85	36	36	58	X	-54	X
FG-2-05025-30							3000									N/A	
FG-2-05035-12							1200								X	N/A	
FG-2-05035-20		350		1.19			2000	41			4	49	49	78	X	N/A	
FG-2-05035-30							3000								X	N/A	
FG-2-08025-12	7.2	250	8.25	1.79	36	95	1200	17			4.6	30	30	49		-51	X
FG-2-08025-20							2000									-54	X
FG-2-08050-12							1200								X	-52	X
FG-2-08050-20		500		1.25			2000	33			6.6	41	41	66	X	-55	X
FG-2-08050-30							3000									N/A	
FG-2-15050-12*	13.8		15.0				1200								X	-50	X
FG-2-15050-20*		500		1.30			2000	18			11.5	23	23	37	X	-53	X
FG-2-15050-30*							3000									N/A	
FG-2-15075-12							1200								X	-52	X
FG-2-15075-20		750		1.30			2000	28			11.5	36	36	58	X	-55	X
FG-2-15075-30							3000									N/A	
FG-2-15100-12							1200								X	N/A	
FG-2-15100-20		1000		1.30			2000	37			11.5	48	48	77	X	N/A	
FG-2-15100-30							3000								X	N/A	

* Interrupter has been tested and successfully passed Interruptions of 23KA RMS Sym From 11.5kV to 17.0kV. ANSI Standard ratings shown

NOTES:

(1) Refer to ANSI Standard C37.04 for definitions of terms used.

(2) Rated Short Circuit Current at Maximum Rated Voltage

(3) Rated Maximum Voltage divided by K

(4) Rated Short Circuit Current at Minimum Rated Voltage

(5) N/A means Not Presently Available

(6) Refer to Engineering Standard E50005 for Reclosing Duty Cycles

REPLACES STANDARD	DATED	PREPARED BY	DATE	APPROVED BY	DATE	EFFECTIVE
		John Rammel	8/30/85	D Dykes	9/12/85	

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SQUARE D COMPANY
SMYRNA, TN

ENGINEERING STANDARD

E 50002

SUBJECT FG-2 BREAKER VOLTAGE DERATING FACTORS

BREAKER	VOLTAGE CLASS	RATED MVA	OPERATING VOLTAGE (V)	MAX. SYM. INT. CAP. @ OPER. VOLTAGE (KA) ①	DERATED MVA ②
FG-2-05007-XX*	4.16	75	2400	12	50
FG-2-05015-XX	4.16	150	2400	24	100
FG-2-05025-XX	4.16	250	2400	36	150
FG-2-08050-XX	7.2	500	2400	41	170
FG-2-05007-XX	4.16	75	4160	10.07	75
FG-2-05025-XX	4.16	250	4160	33.18	250
FG-2-08050-XX	7.2	500	4160	41	295
FG-2-15050-XX	13.8	500	4160	23	166
FG-2-08025-XX	7.2	250	4800	29.22	250
FG-2-08050-XX	7.2	500	4800	41	341
FG-2-15050-XX	13.8	500	4800	23	191
FG-2-08025-XX	7.2	250	7200	19.48	250
FG-2-08050-XX	7.2	500	7200	37.81	500
FG-2-15050-XX	13.8	500	7200	23	287
FG-2-15050-XX	13.8	500	8320	23	331
FG-2-15075-XX	13.8	750	8320	36	519
FG-2-15050-XX	13.8	500	12000	22.5	500 ③
FG-2-15075-XX	13.8	750	12000	35	750
FG-2-15050-XX	13.8	500	12470	21.65	500 ③
FG-2-15075-XX	13.8	750	12470	33.68	750
FG-2-15050-XX	13.8	500	13200	20.45	500 ③
FG-2-15075-XX	13.8	750	13200	31.82	750
FG-2-15050-XX	13.8	500	13800	19.56	500 ③
FG-2-15075-XX	13.8	750	13800	30.43	750

*-12, -20, or -30 DERATING VALUES ARE VALID FOR ALL, AS LISTED, IF AVAILABLE

REPLACES STANDARD	DATED	PREPARED BY	DATE	APPROVED BY	DATE	EFFECTIVE
		John Rammel	8/30/85	D Dykes	9/15/85	

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SQUARE D COMPANY SMYRNA, TN	ENGINEERING STANDARD	E 50002
SUBJECT FG-2 BREAKER VOLTAGE DERATING FACTORS		PAGE 2 OF 2

NOTES: 1. Maximum Symmetrical Interrupting Capability at Operating Voltage =

$$\frac{\text{Rated Short Circuit Current x Maximum Rated Voltage}}{\text{Operating Voltage}}$$

This value shall not exceed the value shown in Engineering Standard E50001 for maximum symmetrical interrupting capability at rated minimum voltage.

2. Derated MVA = $\sqrt{3}$ x Operating Voltage x Maximum Symmetrical Interrupting Capability at Operating Voltage

3. The FG-2-15050-XX breaker has been tested and is capable of interrupting 23kA symmetrical over the range of 11.5kV through 17.0kV. Consult Engineering Test Report number S-1-831128 for test data. The derating values shown above apply only to the standard ANSI ratings for this breaker.

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SQUARE D COMPANY SMYRNA, TN	ENGINEERING STANDARD	E50051
SUBJECT FG-2 METAL CLAD BREAKER WEIGHTS		PAGE 1 OF 1

BREAKER CATALOG NUMBER	WEIGHT (LBS.)
FG-2-05007-12	520
FG-2-05015-12	
FG-2-15050-12	
FG-2-05025-12	525
FG-2-08025-12	
FG-2-08050-12	530
FG-2-15075-12	
FG-2-05015-20	600
FG-2-15050-20	
FG-2-05025-20	605
FG-2-08025-20	
FG-2-08050-20	610
FG-2-15075-20	

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SQUARE D COMPANY SMYRNA, TN	ENGINEERING STANDARD	E 50052
SUBJECT FG-2 BREAKER LIFTING INSTRUCTIONS		PAGE 1 OF 1

The FG-2 Metal Clad Circuit Breaker is equipped with two (2) plates for lifting the breaker with either a hoist, crane, or forklift truck.

NOTE: The breaker should not be lifted by means of a forklift truck underneath the breaker, as extensive damage could occur to the ground shoe, code plate, guide rail and trip roller assemblies. A packaged breaker may be lifted and moved around with the forks of the forklift truck underneath the breaker skid .

For lifting an uncrated breaker, rotate the lifting plates on the breaker into an upright position and secure. Insert lifting hooks into the eyes on the plates. When lifting and moving is complete, rotate the plates down to the storage position and tighten securely. See Figure 1.

For breaker weights, refer to Engineering Standard E50051.

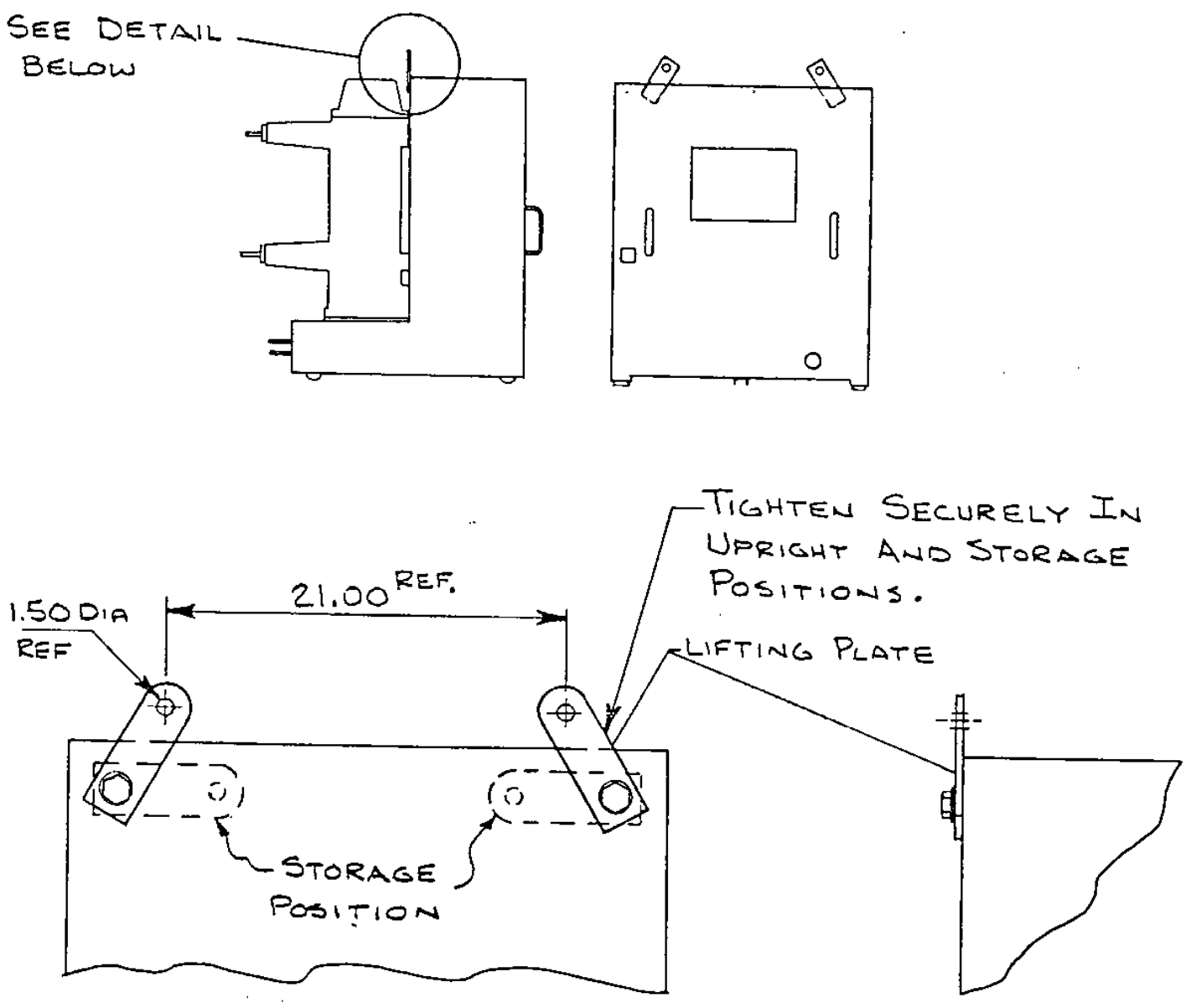

FIGURE 1

REPLACES STANDARD	DATED	PREPARED BY	DATE	APPROVED BY	DATE	EFFECTIVE
		John Rammel	8/30/85	DLD	9/12/85	

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SQUARE D COMPANY SMYRNA, TN	ENGINEERING STANDARD	E 50053
SUBJECT FG-2 BREAKER MECHANICAL OPERATION		PAGE 1 OF 3

The following sequence describes the mechanical operation of the FG-2 circuit breaker. The sequence begins with the open breaker out of the cell and the springs discharged. The racking arms are in position for insertion of the breaker into the cell. Refer to Figure 1.

Position the breaker in front of the cell so that the guide rail on the breaker is in alignment with the guide rail channel on the cell floor. Roll the breaker into the cell until the racking arms come in contact with the racking cams located at both sides of the breaker cell. The breaker is now in the disconnected position, and the arrow on the guide rail (at the front of the breaker) will be in alignment with the test/disconnected position label on the cell floor. To place the breaker in a test mode, the control power plug must be engaged.

The control power plug is connected by pulling the black knob at the lower right hand corner of the breaker out to the full extent of its' travel. Rotate the knob clockwise 45°to lock it into position, and then lift and push the knob into the breaker until the control power plug firmly engages the mating receptacle at the rear of the breaker cell. (The breaker may now be tested electrically if so desired and if control power is available.)

To rack the breaker into the connected position, open the crank port door by pushing the slide down, and insert the racking handle. Rotate the handle clockwise and the breaker will begin to move toward the connected position. When the breaker reaches the connected position, a clutch mechanism will disengage the racking mechanism, and the racking handle will spin freely. An audible clicking sound will be heard if the handle continues to be rotated. In the connected position, the arrow on the guide rail (at the front of the breaker) will be in a lignment with the connected position label on the cell floor. The control power plug rod may now be placed in the stored position by rotating the black knob 45°counter-clockwise, and sliding it into the breaker.

To manually charge the closing springs, insert the spring charging handle into the manual charging slot. Pump the handle up and down. Near the end of the charging cycle, there will be a noticeably lighter force required. Continuing the pumping will produce a loud snap. The spring charged indicator on the breaker will move indicating that the springs are charged. The breaker is ready for closing.

NOTE: The breaker can not be closed unless the springs are fully charged.

To manually close the breaker, push the button marked "Close" on the front of the breaker. This will cause the breaker to close, and the closing spring charged indicator will move back to the "uncharged" position. During the closing operation, the opening springs were automatically charged by the closing spring energy which was released. Additionally, the contact status indicator will change to show that the main contacts are closed.

REPLACES STANDARD	DATED	PREPARED BY	DATE	APPROVED BY	DATE	EFFECTIVE
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To manually open the breaker, push the button marked "OPEN" on the front of the breaker. This will cause the breaker to open, and the contact status indicator will change to show that the main contacts are open. Additionally, the operations counter will advance by one (1) on the opening stroke.

To rack the breaker out of the cell, push the crank port door slide down, and insert the breaker racking handle.

NOTE: If the breaker contacts are closed, the breaker must be opened before the crank port door can be opened. If, after pushing the open pushbutton, the crank port door will still not open, this indicates that the breaker main contacts are stuck closed. In this case, the breaker should not be removed from the cell until primary power is disconnected.

After inserting the handle, rotate it counter-clockwise. The breaker will begin to move to the test/disconnected position. Continue cranking until the racking mechanism comes to a firm stop. Do not overtorque! The control power plug is automatically disengaged during the racking out procedure.

To remove the breaker from the cell, lift the safety latch at the lower left corner of the breaker and pull the breaker out of the cell.

CAUTION: If the breaker is located in the top cell of the Two-High Switchgear, be sure that a Square D lift truck is locked into position before removing the breaker from the cell.

NOTE: If the closing springs are charged with the breaker in the test/disconnected position, when pulling the breaker out of the cell, the trip rollers under the breaker will cause the breaker to close and then open, thereby discharging both the opening and closing springs.

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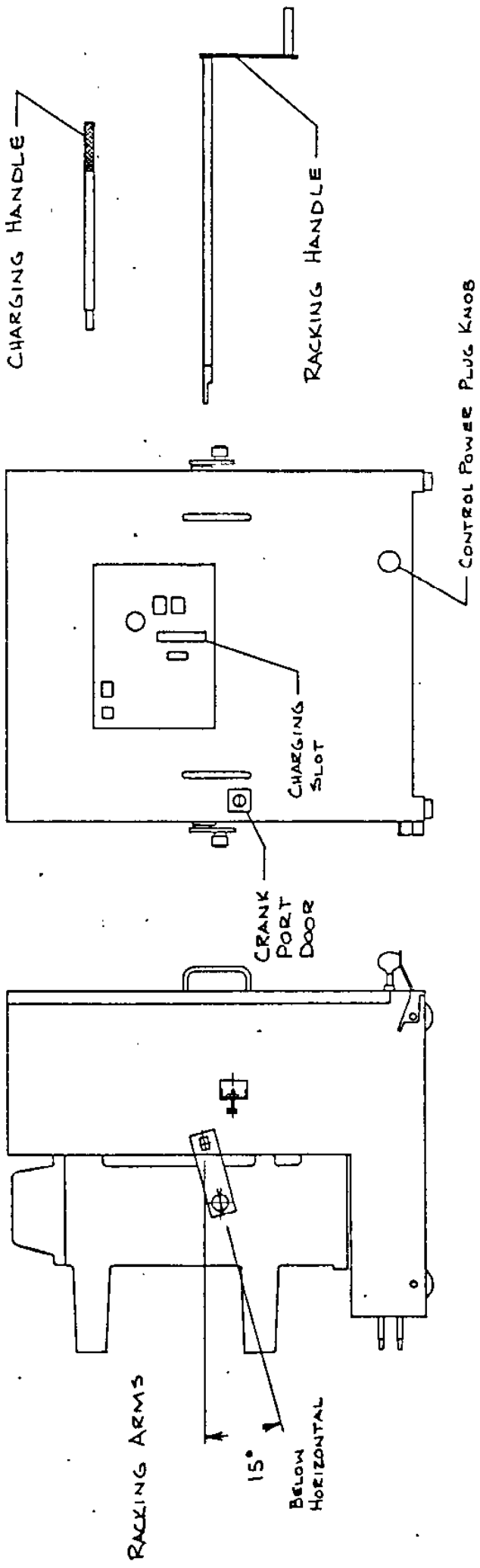
SQUARE D COMPANY SMYRNA, TN	ENGINEERING STANDARD	E 50053
SUBJECT FG-2 BREAKER MECHANICAL OPERATION		PAGE 3 OF 3



NOTE: RACKING ARMS SHOWN IN POSITION FOR MOVING THE BREAKER INTO THE TEST POSITION IN THE CELL FROM OUTSIDE OF CELL.

FIGURE 1

REPLACES STANDARD	DATED	PREPARED BY	DATE	APPROVED BY	DATE	EFFECTIVE
		John Rammel	8/30/85			

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SQUARE D COMPANY SMYRNA, TN	ENGINEERING STANDARD	E 50076
SUBJECT FG-2 BREAKER MOC SWITCH ASSEMBLY		PAGE 1 OF 1

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This optional assembly is required on FG-2 breakers which are used in breaker cells which have MOC Switch Assemblies. The assembly consists of a roller connected to the breaker operating mechanism through a series of mechanisms and linkages. Assembly number 46001-011-50 should be specified on the FG-2 breaker specification sheet, if required.

The roller protrudes from the right side of the breaker, about one third the way up from the floor. See Figure 1.

The operation of the cell mounted MOC contacts is the same as for the standard breaker mounted auxiliary switches. When the breaker is closed in the test or connected position, the roller, mechanically linked to the breaker operating mechanism, moves up a distance of 2". This action changes the mode of the cell mounted contacts. When the breaker is opened, the roller moves back down to its original position and the contacts return to their original mode. See Engineering Standard E50507 for MOC operating details for the cell mounted portion.

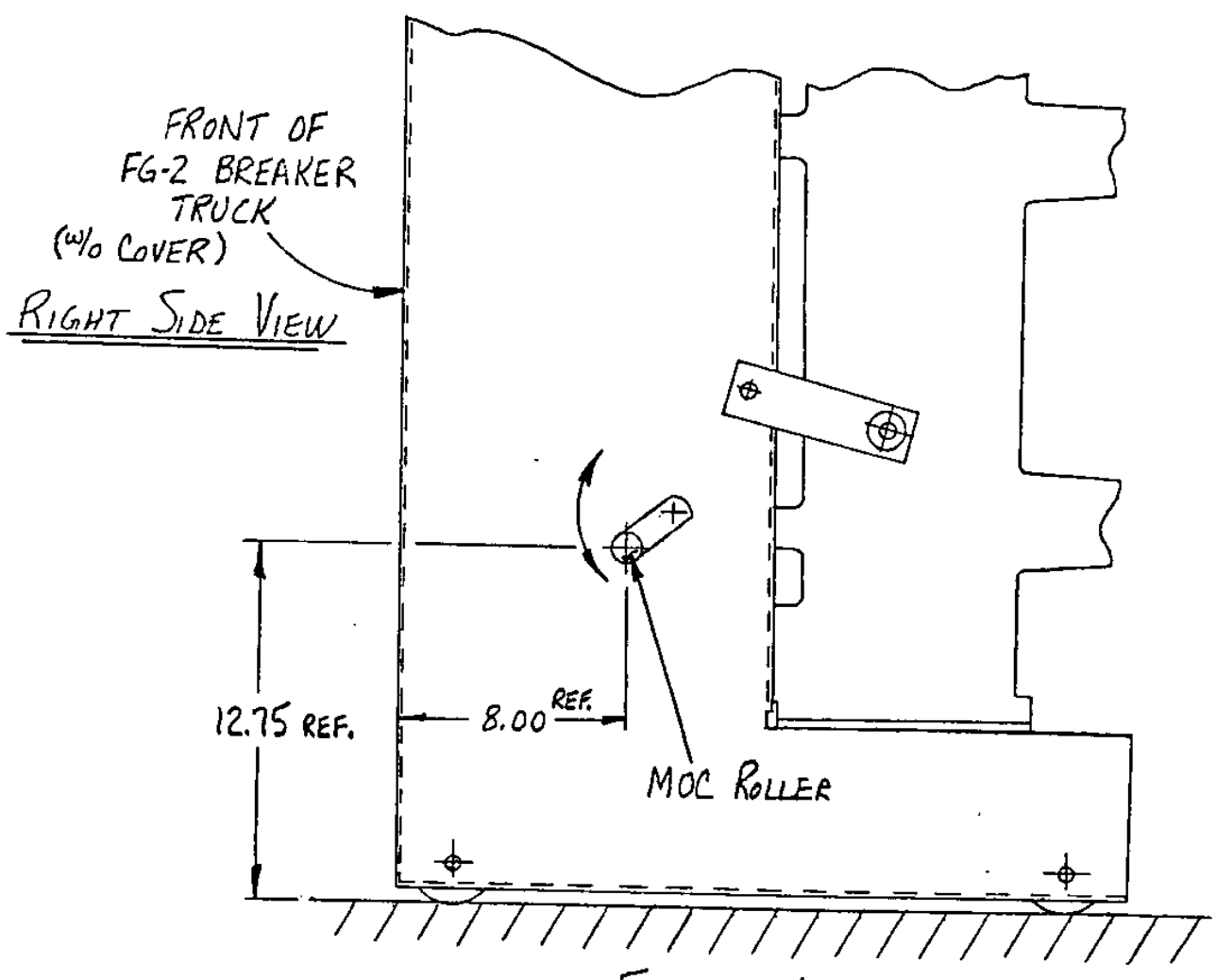

FIGURE 1

REPLACES STANDARD	DATED	PREPARED BY	DATE	APPROVED BY	DATE	EFFECTIVE
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SQUARE D COMPANY SMYRNA, TN	ENGINEERING STANDARD	E 50078
SUBJECT FG-2 BREAKER KEY INTERLOCK ASSEMBLY		PAGE 1 OF 1

Type FG-2 breakers can be provided with an optional key interlock assembly. The purpose of the key interlock is to hold a trip on the breaker and prevent the closing of the breaker. The key interlock is mounted on the breaker and does not provide a means of locking the breaker in or out of the cell.

CAUTION: It is possible to remove a key interlocked breaker from a cell and place another breaker of the same rating into the cell and operate it. It is recommended that the cell key interlock assembly be used if the intended function is to lock the breaker out of the cell and prevent energization of the load side primary connections.

The Square D type SF lock is to be used for this purpose.* Equivalent lock designs are also acceptable. The lock should be ordered such that the bolt is extended when the key is removed. Additionally, mounting bolt kit type B4 should be ordered for each lock to be installed. See Catalog Section 9890 for ordering information.

To lock the breaker open, push the open pushbutton in, rotate the key, and remove the key. To unlock, insert the key and rotate. The pushbutton will spring back to its normal position.

The key interlock should be installed on the breaker per reference drawing 46001-797. Two (2) 3/8 flatwashers (23601-00242) are required with the B4 mounting kit to space the lock the required distance from the mechanism cover. Two (2) 3/8 lockwashers (23701-00240) are also required behind the mechanism cover. After bolting the lock to the breaker, install the sealing wire provided in the B4 kit.

*ORDER TYPE SF-0-E

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SQUARE D COMPANY SMYRNA, TN	ENGINEERING STANDARD	E 50126
SUBJECT FG-2 CIRCUIT BRKR SCHEMATIC/ELECTRICAL OPERATION		PAGE 1 OF 2

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Type FG-2 circuit breakers are normally operated electrically. They are wired such that when the closing springs are discharged upon closing the breaker, the springs are automatically recharged (if control power is available). The following description of operation assumes the initial conditions that the breaker is open, the closing springs are discharged, the breaker is in test or connected position, and control power has just been applied. It also assumes AC tripping power is used. Refer to Figure 1 for schematic details and terminal locations. For motor and coil data for specific control voltages, refer to Engineering Standard E50127.

Since the closing springs are discharged, limit switch 52LS/bb is closed. The charging motor charges the closing springs, which requires approximately six (6) seconds. When charging is complete, contact 52LS/bb opens, de-energizing the motor, and contact 52LS/aa closes to permit energization of the closing circuit. The closing springs are now charged and waiting for a "CLOSE" command. The "CLOSE" command is given by closing an external closing control switch. This energizes closing coil 52X through contacts 52/b(1,2), 52LS/aa, and 52Y/b. This causes the breaker to close. When the breaker closes, contact 52/b(9,10) opens, turning off the green "Breaker Open" pilot light. At the same time, contact 52/a(7,8) closes, turning on the red "Breaker Closed" pilot light. Additionally, upon closing the breaker, the closing springs are discharged, causing limit switch 52LS/bb to close. This again energizes the motor circuit, recharging the closing springs.

Anti-pump relay 52Y (and resistor RES on 250 VDC only) is included to limit the circuit breaker to one closing operation per "CLOSE" command. Should the "CLOSE" command remain applied and the breaker be tripped open, an automatic reclosure of the breaker following the recharging of the closing springs is prevented. The anti-pump circuit serves as a lockout to prevent breaker "pumping" until an operator can reclose the breaker under a no-trip condition. The circuit functions as follows: When the breaker closes, contact 52/a(3,4) closes, energizing anti-pump relay 52Y. Relay contact 52Y/b opens and prevents additional closing signals from being applied to the closing coil 52X. Relay contact 52Y/a closes and seals in the anti-pump relay 52Y until the external "CLOSE" command is removed. At that time, anti-pump relay 52Y is de-energized.

A "TRIP" command is given by closing an external tripping control switch. This energizes trip coil 52/TC through contact 52/a(5,6), which was closed due to an earlier closing of the breaker. This opens the breaker. Contact 52/a(5,6) opens, clearing trip coil 52/TC. When the breaker opens, contact 52/a(7,8) opens, turning off the red "Breaker Closed" pilot light, and contact 52/b(9,10) closes, turning on the green "Breaker Open" pilot light. The circuit breaker is now ready for its next "CLOSE" command as the closing springs were recharged following the previous closing operation.

For mechanical operation of the breaker, refer to Engineering Standard E50053.

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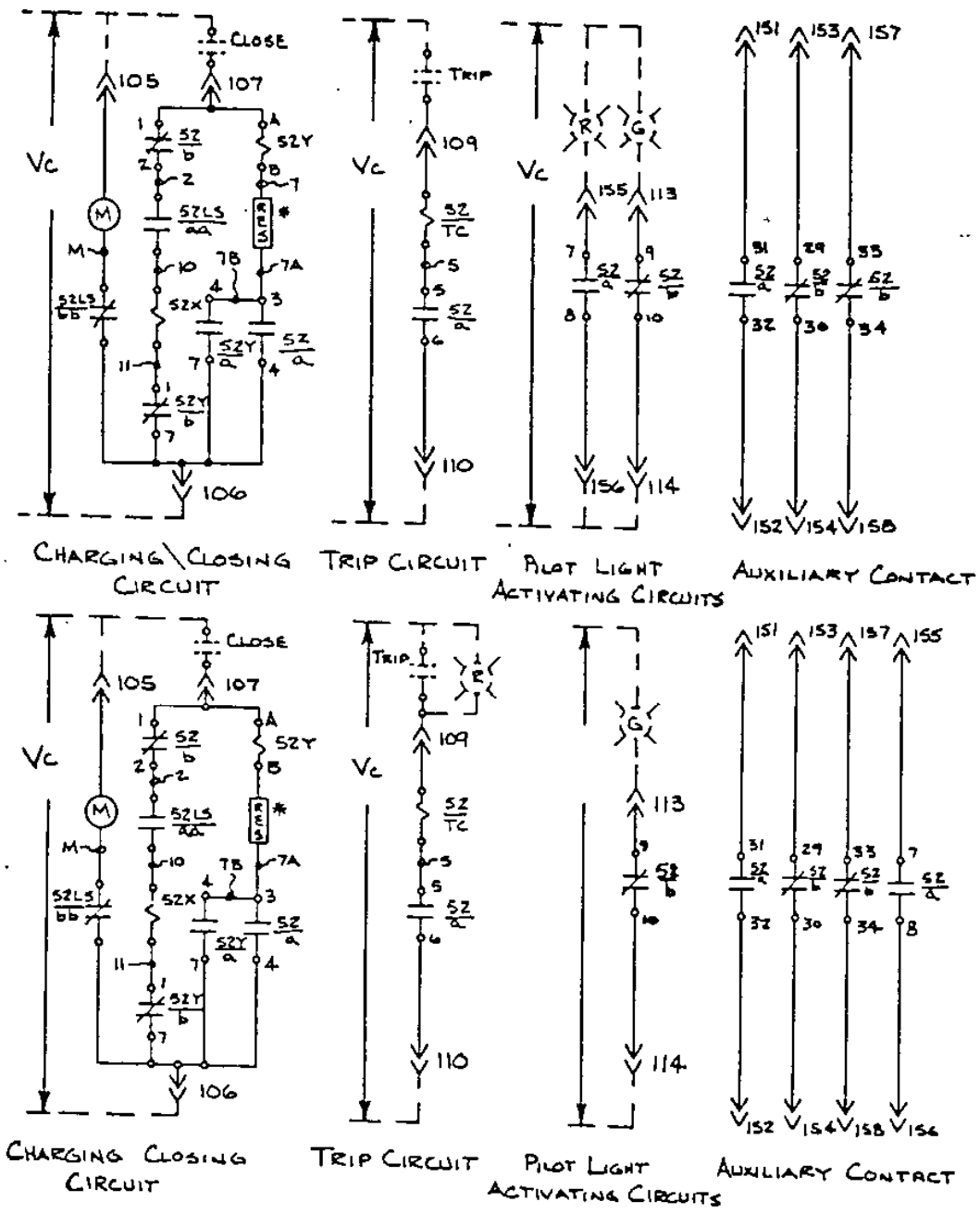
SUBJECT FG-2 CIRCUIT BRKR SCHEMATIC/ELECTRICAL OPERATION		PAGE 2 OF 2

AC OR DC CLOSE

AC TRIP



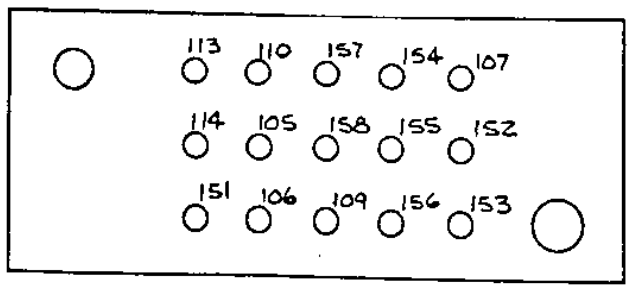
AC OR DC CLOSE

DC TRIP

* 250 VDC ONLY. FOR ALL OTHERS RESISTOR IS REMOVED, WIRE 7A IS REMOVED, AND WIRE 7 IS CONNECTED FROM 52Y TERMINAL B TO 52/a TERMINAL 3.

LEGEND:

52/TC	Breaker Trip Solenoid
52X	Breaker Closing Solenoid
52Y	Anti-Pump Relay
52Y/a	Anti-Pump Relay Contact - Norm Open
52Y/b	Anti-Pump Relay Contact - Norm Closed
52LS/aa	Closing Springs Charged Limit Switch- Open when springs are not charged. Closed when springs are charged.
52LS/bb	Closing Springs Charged Limit Switch- Closed when springs are not charged. Open when springs are charged.
52/a	Auxiliary Switch Contacts - Open when breaker is in the tripped (open) position. Closed when breaker is in the closed position.
52/b	Auxiliary Switch Contacts - Closed when breaker is in the tripped (open) position. Open when breaker is in the closed position.
M	Charging Motor



REAR VIEW OF CONTROL PLUG CONNECTOR (SCREW TERMINAL SIDE) CONTROL TERMINAL LOCATIONS

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SQUARE D COMPANY
SMYRNA, TN

ENGINEERING STANDARD

E 50127

SUBJECT FG-2 BREAKER OPERATING CONTROLS AND DATA

PAGE 1 OF 1

CONTROL DESCRIPTION	SQUARE D PART #	M-G PART #	RATED VOLTAGE	REQ'D * OPERATING RANGE (ANSI)	CURRENT AT RATED VOLTAGE (A)	BURDEN (VA)	DC RESISTANCE (OMHS)
CHARGING MOTOR	①N/A	①N/A	24 VDC	--	--	--	--
	44065-357-02	886658	48 VDC	38-56 VDC	6.0	288	--
	886672	886672	125 VDC	100-140 VDC	3.2	400	--
	44065-357-04	886662	250 VDC	200-280 VDC	1.6	400	--
	886672	886672	120 VAC	104-127 VAC	3.0	360	--
	44065-357-04	886662	240 VAC	208-254 VAC	1.6	384	--
ANTI-PUMP RELAY	①N/A		24 VDC	--	--	--	--
	KUP11D55 - 48VDC		48 VDC	38-56 VDC	0.027	1.3	1800
	8501KFD12 125V		125 VDC	100-140 VDC	0.019	2.4	6450
	8501KFD12 125V②		250 VDC	200-280 VDC	0.020	5	12450③
	8501KF12 120/60		120 VAC	104-127 VAC	0.017	2	2250
	44050-266-01		240 VAC	208-254 VAC	0.012	3	7200
CLOSING SOLENOID	①N/A	①N/A	24 VDC	--	--	--	--
	44065-389-02	887191 AH	48 VDC	38-56 VDC	0.675	32.5	68
	44065-389-03	887191 AD	125 VDC	100-140 VDC	0.26	33	480
	44065-389-04	887191 AA	250 VDC	200-280 VDC	0.15	37	1700
	887191 AK	887191 AK	120 VAC	104-127 VAC	0.7	84	26
	887191 AG	887191 AG	240 VAC	208-254 VAC	0.4	96	115
TRIP SOLENOID	44080-590-25	887191 BN	24 VDC	14-28 VDC	2.0	48	6.75
	44080-590-21	887191 BJ	48 VDC	28-56 VDC	1.08	48	44.5
	44080-590-24	887191 BF	125 VDC	70-140 VDC	0.7	87.5	184
	44080-590-22	887191 BB	250 VDC	140-280 VDC	0.23	57	1100
	44080-590-21	887191 BJ	120 VAC	104-127 VAC	0.6	72	44.5
	44080-590-24	887191 BF	240 VAC	208-254 VAC	0.33	79	184

* Per Table 10, ANSI C37.06-1979
① 24 VDC Closing is not recommended by ANSI
② Also Requires (1) 6000 OHM Resistor, P/N 26160-21660
③ 6450 OHMS - Anti-Pump Relay, 6000 OHMS - Resistor

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FG-2 Metal Clad circuit breakers are supplied with two (2) auxiliary switch blocks. The upper switch block has five (5) contacts and the lower switch block has nine (9) contacts. Refer to Figure 1. The upper switch block contacts are used in the breaker control circuits, while the lower switch block contacts are used for auxiliary circuits. Due to the terminal limitations of the circuit breaker control power plug, only three (3) of the auxiliary contacts may be wired out of the breaker. If more are needed, MOC switch assemblies will have to be added for this purpose. Refer to Engineering Standards E50076 and E50507 for further information.

Both switch blocks are mounted to the left of the main operating mechanism. The upper switch block has two (2) "b" contacts (closed when breaker is open) and three (3) "a" contacts (open when breaker is open), both types using standard cams. The lower switch block has five (5) "b" contacts and four (4) "a" contacts. Starting at the left end of the lower switch block, the first contact has long cams providing late break-early make operation, while the sixth contact has long cams which provide early make-late break operation. All other contacts have standard cams. Standard breakers have two (2) "b" and one (1) "a" contact wired to the control power plug, with all three of these having standard cams. For details on the wiring of the breaker contacts, refer to Engineering Standard E50126.

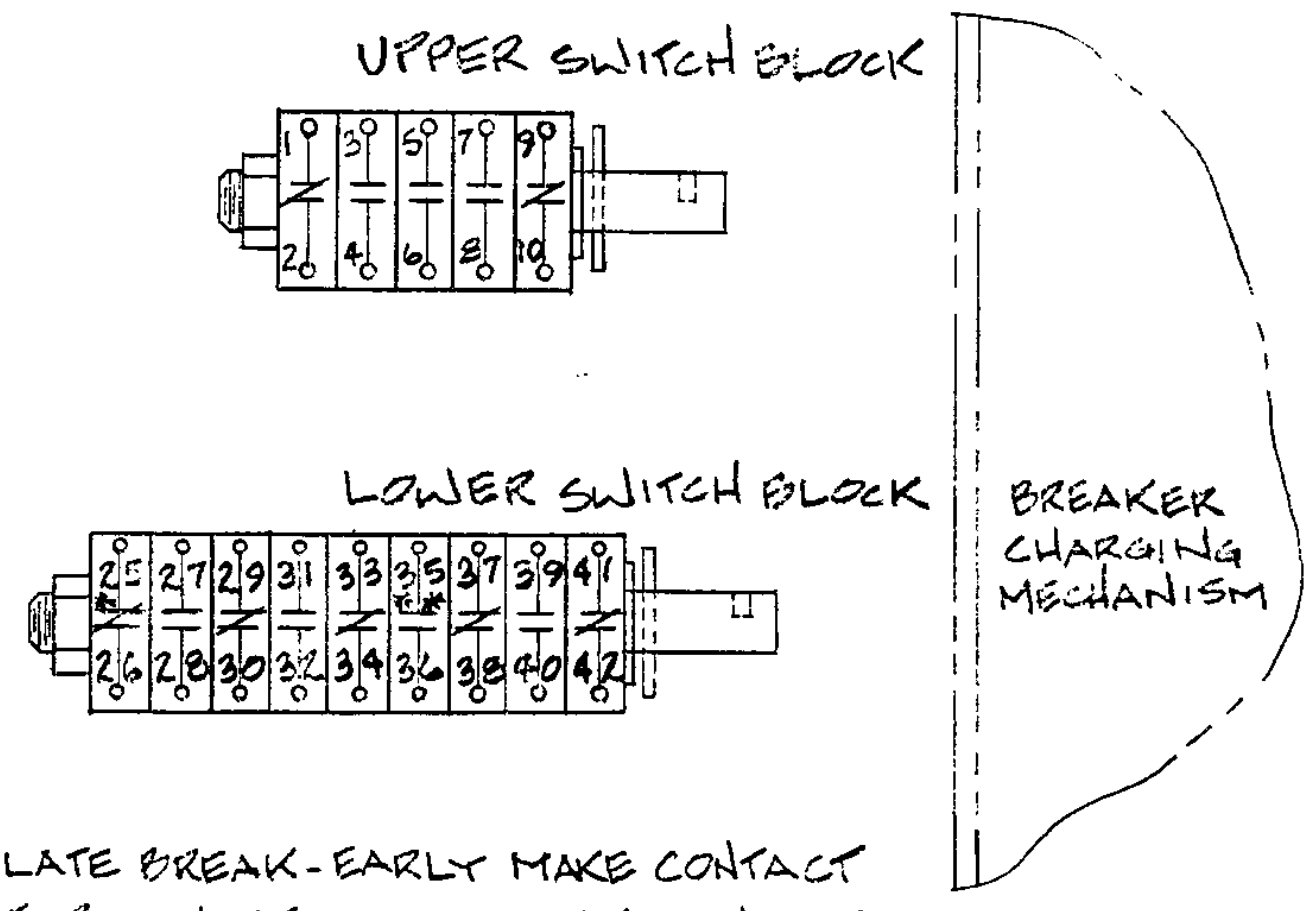

FIGURE-1

REPLACES STANDARD	DATED	PREPARED BY	DATE	APPROVED BY	DATE	EFFECTIVE
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The contacts for these switch blocks as well as the switch blocks used for MOC applications and TOC applications (44065-038-50 and 44065-038-52) are rated as shown in Table 1 below.

Voltage	Current		
	Continuous	Make	Break
Up to 240 VAC 60HZ	10A.	10A*	10A*
Up to 250 VDC	10A.	3A.**	3A.**

* For Power Factor = 0.30

** For $L/R \leq 0.01$

Table 1

The individual contacts on each switch block are independent of the others. It is possible to convert any of the contacts from an "a" to a "b" (or N.O. to N.C. in the case of TOC switches) and vice versa. The procedure for doing this is as follows:

1. Note the position of the cam on the switch contact to be converted.

2. Open or close the breaker to position the cam to be converted in the open position.

3. Hold the square end of the switch block shaft using an eight (8) millimeter open end wrench. Using a thirteen (13) millimeter wrench, loosen the lock nut on the opposite end of the shaft about two (2) turns.

4. Insert a thin bladed screwdriver between the metal cam and the notched ring of the contact to be changed to separate and release the indentation in the metal cam from the notched ring. The cam is now free to turn.

5. Rotate the cam to the new position.

6. Insert the screwdriver between the nut and washer at the end of the block to reclose the gap between the metal cam and the notched ring. The cam may need to be moved slightly to align the indentation and the notch.

7. Retighten the lock nut, taking care that all of the other cams are in their original position and all of the cam indentations are properly seated in their respective notches.

8. Operate the breaker (or MOC/TOC assembly) to assure that the adjustment accomplished the purpose intended, and that all other cams operate as before.

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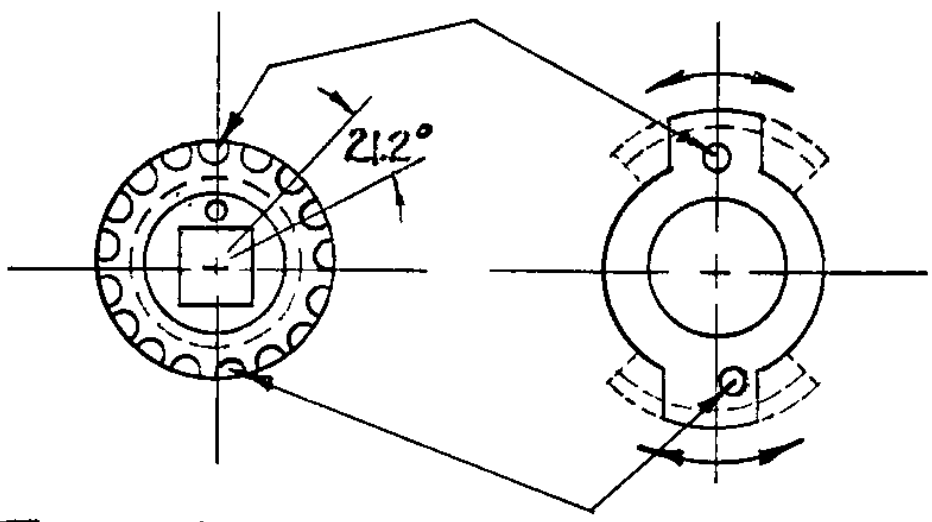
In addition to conversion of contacts from "a" to "b" and vice versa, they may also have timing characteristics changed. To do this, follow the same procedure used for conversion, but move the cam indentation only enough to achieve the desired timing characteristics. See Figure 2.

Standard Location shown. To adjust timing, rotate cam to proper notched ring indentation for timing desired.



CONTACT CAM TIMING ADJUSTMENT
FIGURE 2

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		John Rammel	8/30/85			

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