SIEMENS

3AF BREAKER

ADJUSTMENTS

3AF VACUUM CIRCUIT BREAKER

1.0 TRIP LATCH ADJUSTMENT, PRELIMINARY

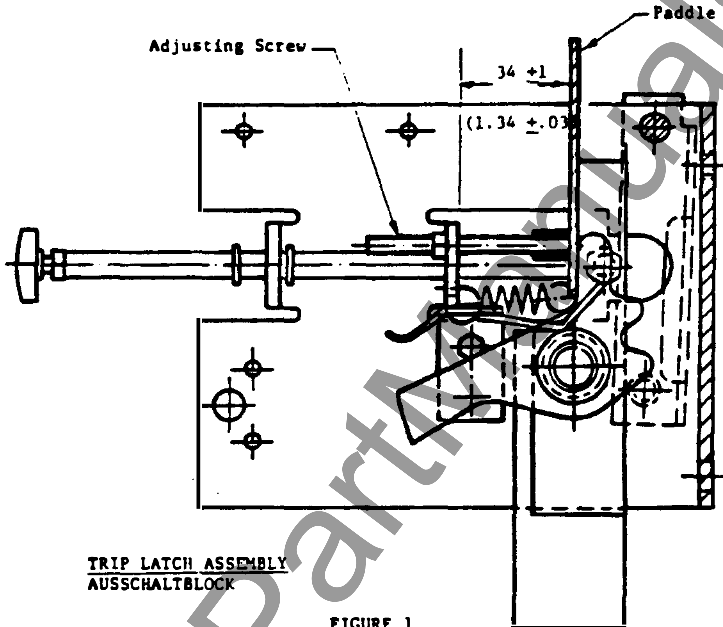

FIGURE 1

409-00590

This adjustment sets trip latch in position to ensure it ability to support the breaker bell crank under torque loads imposed by the tripping springs. This adjustment is usually required during the mechanisms initial assembly. Set adjusting screw to establish indicated dimension between latch paddle and trip latch support frame. Secure adjustment by fastening jam nut.

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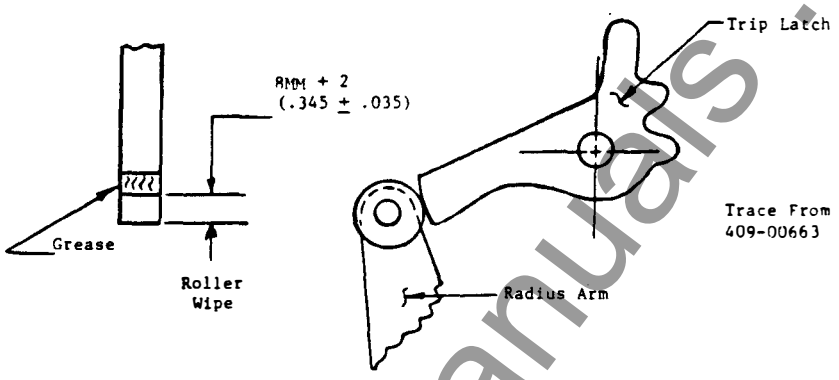
3AF VACUUM BRKR ADJ

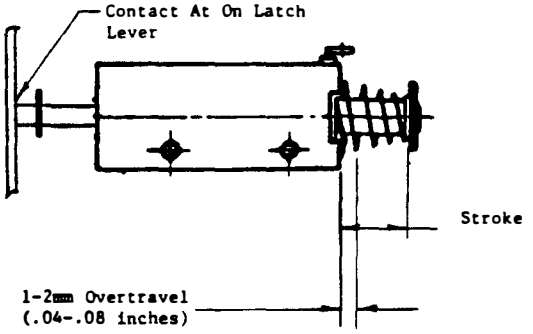
2.0 TRIP LATCH FINAL ADJUSTMENT



Final trip latch adjustment is made after breaker assembly is complete and prior to electrical testing.

Using the adjusting screw as shown in Figure 1, increase latch roller wipe (counter-clockwise screw rotation) or decrease roller wipe (clockwise rotation) to achieve the roller wipe indicated above.

When properly adjusted, solenoid stroke will be approximately 15mm (0.39 to 0.59 inches), and the breaker will have tripped prior to reaching the limit of solenoid travel. Approximately 1 to 2mm of plunger overtravel must occur after the breaker trips.



18-740-886-402 ISSUE X

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INDUST. ENG. DIST.

UNLESS OTHERWISE SPECIFIED:
1-PLACE DEC ±
2-PLACE DEC ±
3-PLACE DEC ±
ANGULAR ±
MACHINED SURFACE TEXTURE ✓
FOR TOLERANCES NOT SPECIFIED SEE 000-SERIES SHOP PRACTICE STANDARDS

SIMILAR TO

DR WDK
CH JTC
BULLETIN 9/87

MATL

CURRENT DATE D-C	PART NUMBER D-10	ISS. NO.
C 01-21-84	18-740-886-402	03

TYPE	REF.	PART NAME D-20	N.M. 00-00	00-00	SIZE REQUIRED	SHEET NO.
		BAF VACUUM BRKR ADJ				2 of 14

01 ON 1/31/84 JTC

SEE SH. 1

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3.0 RADIUS ARM AND SHOCK ABSORBER ADJUSTMENT

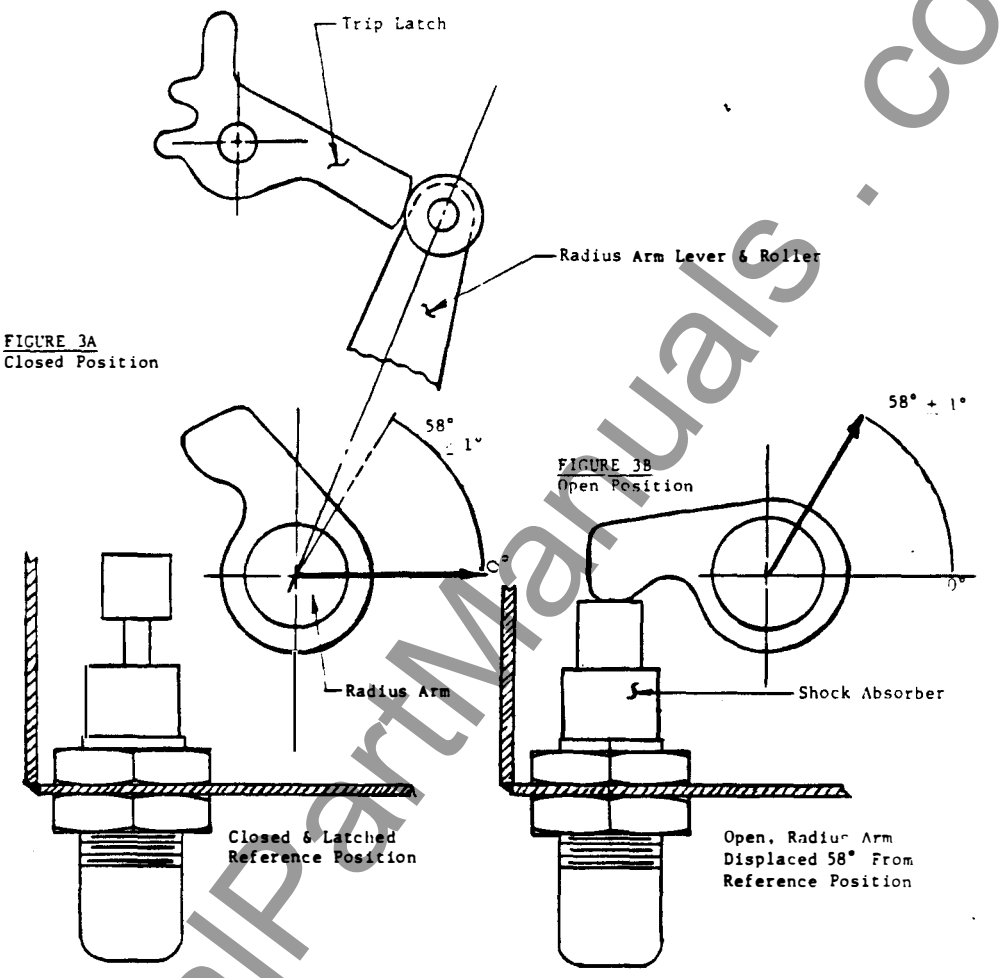

FIGURE 3A
Closed Position

FIGURE 3B
Open Position

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1-PLACE DEC ± ANGULAR
2-PLACE DEC ±
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MACHINED SURFACE TEXTURE

INDUST. ENG. DIST.
DISPLACE TO
DR. WDA
CH. JPC
BULLETIN 9187

SEE SHT. 1
01 04-16-84 JPC

MATL
N 01-21-84 18-740-886-402 03

TYPE 22 SEQ. 23 PART NAME 30-65 BAF VACUM BRKR ADJ.
N.M. 66-68 69-93
DATE REQUIRED
SHEET NO 3 of 14

3.0 RADIUS ARM AND SHOCK ABSORBER ADJUSTMENT CONT.

The breaker shaft displacement, between open and closed positions, is controlled by the shock absorber which arrests motion and maintains the open breaker shaft position against the torsional force of the tripping springs. The reference position from which angular displacements are to be measured is the closed position as shown above in Figure 3A.

A prerequisite to this adjustment is the preliminary trip latch setting as described in Item 1.0. The breaker shaft, trip latch support and tripping springs must be installed. The coupling rod's lower connection pin must be in place to permit "maintenance closing".

The enclosure wall adjacent to either end of radius arm must be calibrated to 58° of arc with the breaker shaft axis as center. A magnetically secured gage or protractor is most suitable for this purpose. An ajustable pointer must be fitted to the breaker shaft.

The breaker shaft may be manipulated by use of the maintenance closing lever. The arm should be rotated to the closed position against the torsional load of the opening springs. The close position is attained when the trip latch falls behind the radius arm lever and roller.

In the closed position, adjust pointer to align with zero position on the gage (protractor). With pressure on the maintenance closing handle lift roller of trip latch and carefully release latch. Ease breaker shaft in the direction the opening springs want to take it. Allow 58° of displacement to occur, and then hold the radius arm steady until the shock absorber is brought into contact and its piston compressed to support the radius arm. Relax pressure on maintenance closing lever.

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Breaker shaft displacement may now be adjusted to the required angle by manipulating the heavy upper nut on the shock absorber. After achieving a satisfactory adjustment, lock shock absorber setting by holding the upper nut and running the lower nut upward to compress and secure the assembly. Tighten to 80 to 100 ft. lbs.

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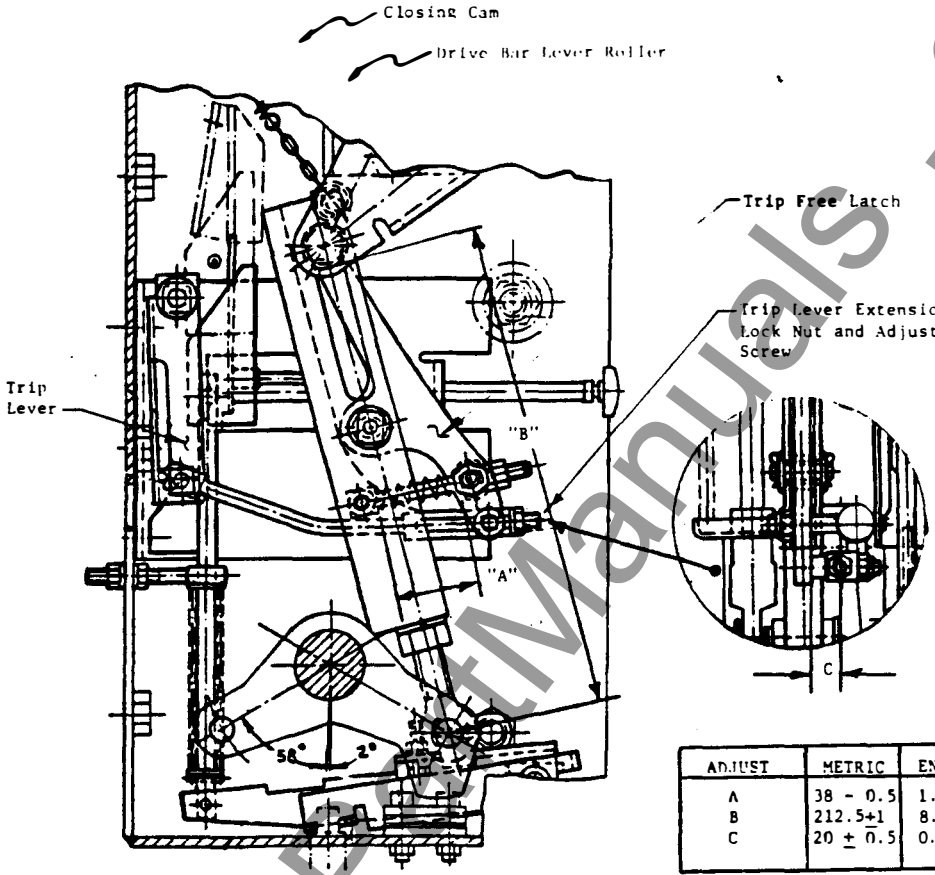
1-PLACE DEC ± | ANGULAR ±
2-PLACE DEC ±
3-PLACE DEC ±
FOR TOLERANCES NOT SPECIFIED SEE 300-SERIES SHOP PRACTICE STANDARDS
MACHINED SURFACE TEXTURE ✓

BULLETIN 9/87

MATL	ORC	CURRENT DATE	PART NUMBER	SHEET NO
	C	01-21-84	18-740-886-402	03

TYPE	REQ.	PART NAME	N.M.	DATE REQUIRED	SHEET NO
22	23	BAF VACUUM BRKR ADJ	44-66 / 66-99		4 of 4

4.0 TRIP FREE MECHANISM ADJUSTMENTS



ADJUST	METRIC	ENGLISH
A	38 - 0.5	1.486 ± .01
B	212.5±1	8.366 ± .03
C	20 ± 0.5	0.787 ± .02

*Note: These are preliminary adjustments to be completed during breaker assembly.

Trip free coupling rod required adjustments "A", "B" and "C" be completed prior to this sub assemblies insertion in the mechanism, see table.

Final adjustment of the trip free coupling rod requires that the trip latch final adjustment, Item 2, be completed as prerequisite.

With closing springs charged, a clearance should be noted between the surface of the closing cam and the roller of the coupling rod lever. This clearance can be achieved by adjusting rod end at the terminus of the coupling rod. One turn of the rod end will alter this clearance by 0.035 inches. The clearance should be the minimum necessary to permit free rotation of the roller.

"The trip lever extension lock nut and adjusting screw" may be adjusted only after completing the trip latch final adjustment described on sheet 2. With the breaker in the "open" position, the "trip lever adjusting screw" is set to allow minimum play between the adjusting screw and pin extending from the "trip free latch", less than 1mm.

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SEE SHT. 1

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1-PLACE DEC ± ANGULAR
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FOR TOLERANCES NOT SPECIFIED SEE 000-SERIES SHOP PRACTICE STANDARDS
MACHINED SURFACE TEXTURE

DR WDM CH JTE BULLETIN 9/87

MOD C	CURRENT DATE	PART NUMBER	
C	01.21.84	18-740-886-402	03

MAT'L

TYPE | REF. | PART NAME | M.M | DATE REQUIRED | SHEET NO.
22 | 23 | BAF VACUUM BRKR ADJ | 60-40 60-93 | | 5 of 6

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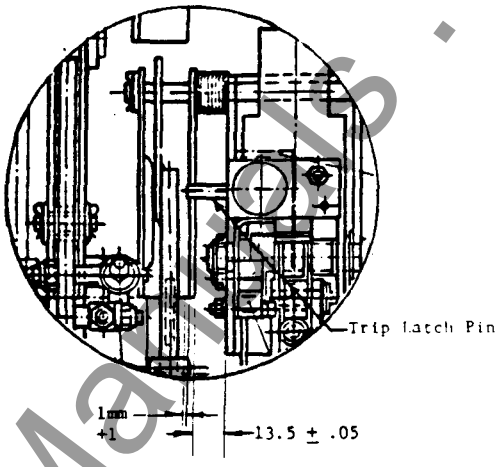
4.0 TRIP FREE MECHANISM ADJUSTMENTS CONT.

Free lock nut and adjust screw to remove free play from the "trip lever extension". When properly adjusted the trip lever will be drawn forward until it just touches the laterally extended trip latch pin, see inset. Any motion of the trip latch should cause immediate displacement of the coupling rods trip free latch.



Visually check to be certain the trip latch pin over hangs the trip lever by 1 to 2mm as shown above.

18-740-866-402 ISSUE X

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1-PLACE DEC ±
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3-PLACE DEC ±
ANGULAR ±
FOR TOLERANCES NOT SPECIFIED SEE 300 SERIES SHOP PRACTICE STANDARDS
MACHINED SURFACE TEXTURE ✓

DRWN WVA
CHK JTC
BULLETIN 9/87

01 04-10-84 JTC SEE SHT 1

MATL

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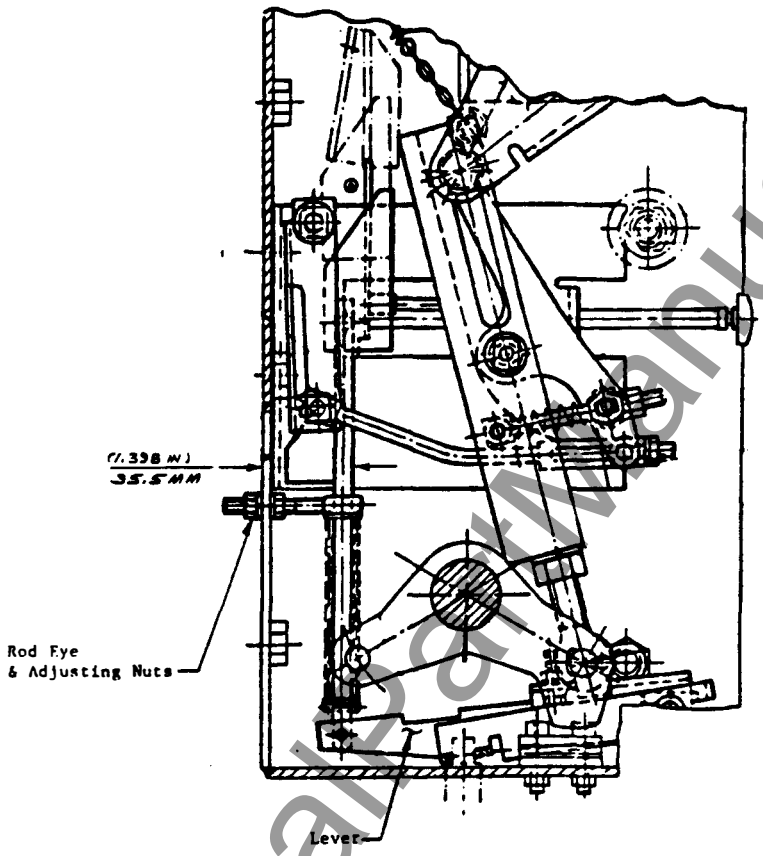
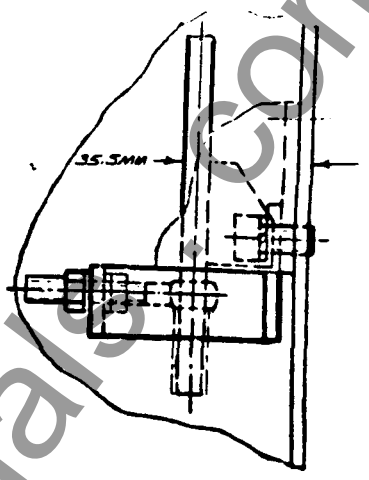
SHEET NO 4

5.0 CIRCUIT BREAKER RACKING INTERLOCK





Revised bracket to support eye bolt and facilitate 6.5mm adjustment from front of mechanism.

18-740-886-402 X

The racking interlock requires that the actuating pushrod be adjusted such that the lever flag can be displaced as shown from the rear inside surface of the enclosure. This adjustment is achieved through the rod eye and adjusting nut which support the actuating pushrod. After installation and adjustment the racking interlock lever and pushrod must move freely.

The 35.5mm dimension may be adjusted to cause more or less sensitive spring release and trip free operation. Small changes in this dimension are effective. Limit variation to ±1mm.

SEE SH. 1

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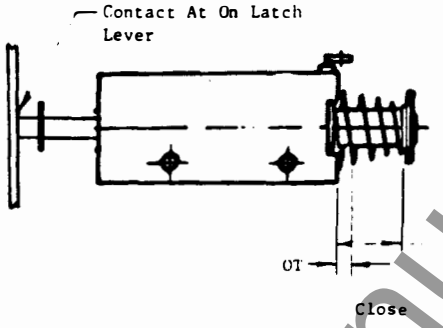
UNLESS OTHERWISE SPECIFIED		SIMILAR TO	
1-PLACE DEC ± / 2-PLACE DEC ± / 3-PLACE DEC ±	ANGULAR ±	MACHINED SURFACE TEXTURE ✓	DR WDK / CH JTC
FOR TOLERANCES NOT SPECIFIED SEE 000 SERIES SHOP PRACTICE STANDARDS			BULLETIN 9/87

MATL	DOC	CURRENT DATE D-D	PART NUMBER D-10	
	C	01-21-84	18-740-886-402	03

TYPE	DES.	PART NAME 30-63	M.M. 64-00	65-93	MOVE REQUIRED	SHEET NO
22	21	ROD-RACKING INTLK ADJ				1 of 1

6.0 CLOSING SOLENOID REQUIRES no adjustment.

Stroke should be 10 to 15mm (0.39 to 0.59 inches) when properly adjusted. Closing spring release should occur 1 to 2mm before the solenoid reaches the end of its stroke. (See sheet 2 for opening solenoid and trip latch setting).

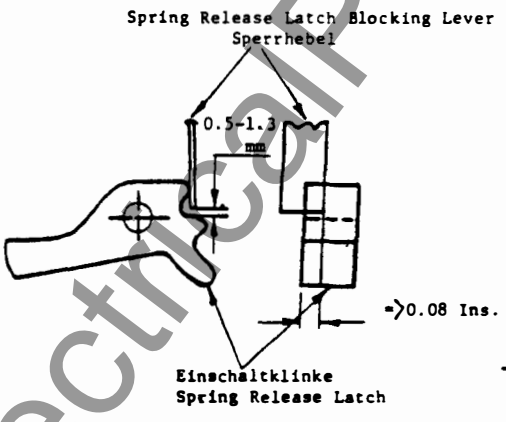


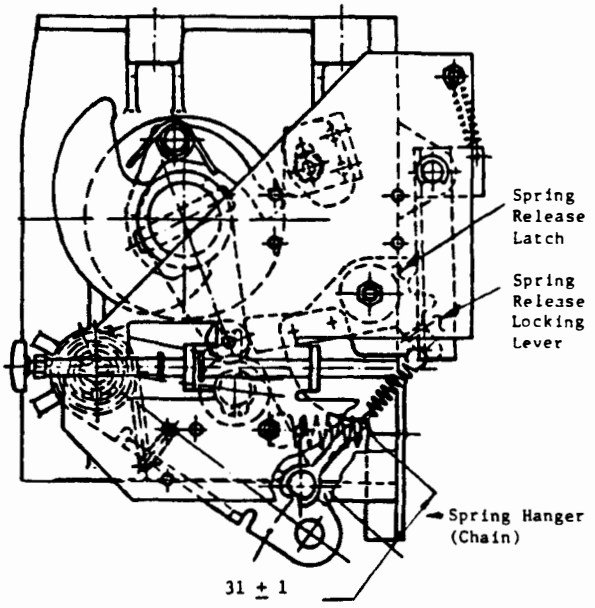
7.0 MECHANICAL SPRING RELEASE BLOCKING DEVICE

The 3AF breaker employs a closing spring release blocking device to prohibit spring release in a closed breaker.

The blocking lever is normally spring returned to an inactive position. Whenever the breaker is closed, a spring coupling the drive lever to the spring blocking lever draws the blocking lever into an active position over the tail of the closing spring releases latch to block latch rotation.

The dimensional relationship between blocking device should be checked to the values shown below.





18-740-886-402 X ISSUE

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UNLESS OTHERWISE SPECIFIED:
1-PLACE DEC ± ANGULAR
2-PLACE DEC ±
3-PLACE DEC ±
FOR TOLERANCES NOT SPECIFIED SEE 300-SERIES SHOP PRACTICE STANDARDS
MACHINED SURFACE TEXTURE

DR WDH CH JTC BULLETIN 9/87

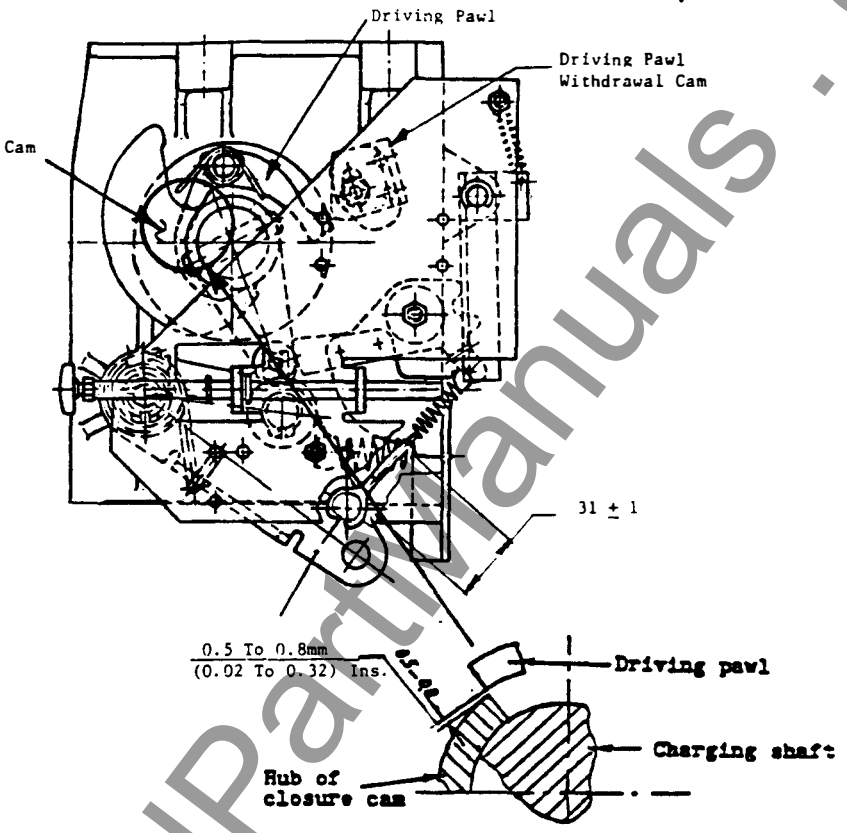
SEE SHT 1 18-740-886-402 01

MATL

C	01 21 84	18 740 886 402	03

TYPE	REQ.	PART NAME	N.M.	SIZE REQUIRED	SHEET NO
		3AF VACUM BRKR ADJ.			8 of 14F

8.0 CHARGING MECHANISM FOR CLOSING SPRINGS



The action of driving pawl, closing cam, and withdrawal cam is as follows. Assuming the closing spring is discharged, approximately 25 revolutions of manual crank handle will bring the driving pawl into contact with the spring charging crank and closing cam. The pawl "dogs" into the closing cam hub and forces it and the spring crank into rotation causing the closing springs to acquire progressively more tension.

This process continues until the spring crank reaches top dead center. Continued crank rotation brings the crank beyond top dead center and the closing spring rapidly advances the closing cam beyond the driving pawl. After a short interval of angular displacement, motion of the closing cam is quickly arrested by a cam appendage and roller which contact the closing spring release latch.

Continued rotation of the driving pawl brings the "tail" of the driving pawl against the withdrawal cam. The withdrawal cam rotates the engaged end of the driving pawl free of the closing cams hub. The withdrawal cam must be set so that the following conditions are met.

- Driving pawl withdrawal must not begin until the closing spring cam has passed over top dead center.
- Withdrawal must be completed before the leading edge of the driving pawl over takes the bearing surface in the hub of the closing cam.
- Clearance while passing the bearing surface of the closing cam hub must be set to the clearances indicated, 0.5 to 0.8mm (0.02 to 0.032 inches)

Check that motor cutoff switches; LS21, LS22, LS3, LS9, LS41, have successfully changed state.

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SEE SHT 1

SIEMENS-ALLIS

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3-PLACE DEC ±
ANGULAR ±
FOR TOLERANCES NOT SPECIFIED SEE 800-SERIES SHOP PRACTICE STANDARDS
MACHINED SURFACE TEXTURE

SIMILAR TO

DR WDW CH JTC BULLETIN 9/87

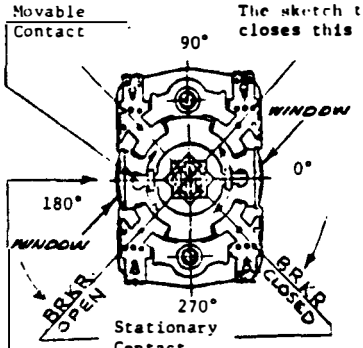
MATL	FORC	CURRENT DATE	PART NUMBER	INT
	C	01-21-84	18-740-886-402	03

TYPE	REQ.	PART NAME	N.M.	DATE REQUIRED	SHEET NO
22	89	BAF VACUM BRKR ADJ..			9 OF 11

9.0 AUXILIARY SWITCH ADJUSTMENT AND MOTOR CUTOFF SWITCH ADJUSTMENT

Auxiliary switch function is achieved by presetting the operator pushrod to a predetermined dimension. The required dimension is shown to the left in the accompanying sketch. Proper adjustment of the auxiliary switch may be confirmed by observing action of the movable contact thru a transparent inspection window. The sketch to the left shows this contact in a neutral position. As the breaker closes this contact and its diametrically opposed mate rotate clockwise to be fully straddled by the stationary contacts located at the -45 and 135 degree positions. In the open position, the movable contact is rotated counterclockwise to straddle completely the stationary contacts located at 45° and 225°. Correct adjustment of the connecting rod places the movable contacts in a fully straddled position with the breaker opened and closed.

A pre-formed connecting rod has been introduced on more recent models of this circuit breaker. Connecting rod adjustments are not provided nor are they required. However, proper function should be visually confirmed by observing contact function through the inspection windows.



AUXILIARY SWITCH SECTIONAL END VIEW

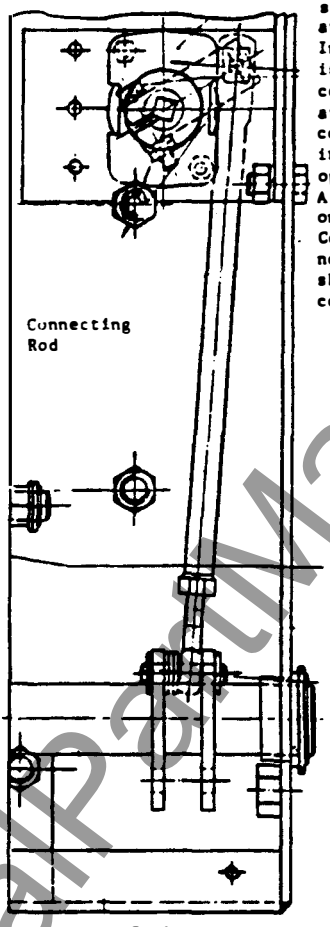


FIG. 1

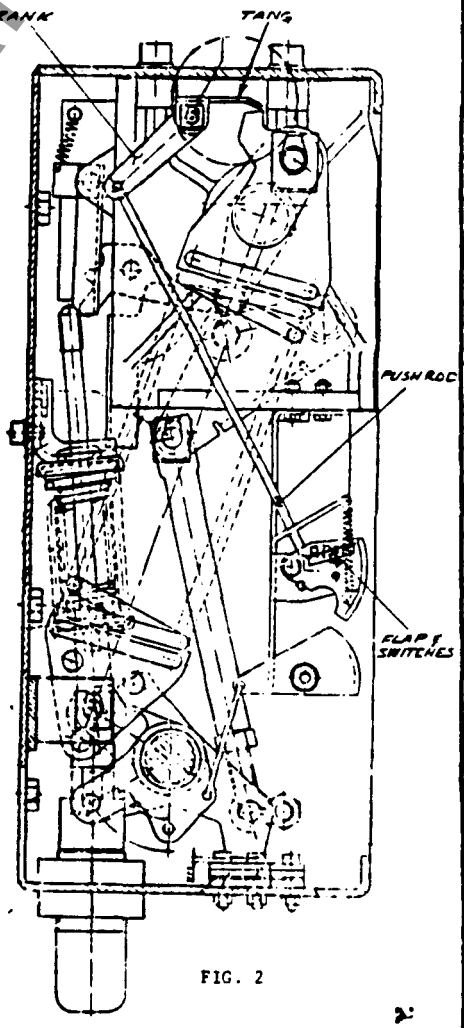


FIG. 2

MOTOR CUTOFF SWITCH ADJUSTMENT

The motor cutoff switch functions to remove power from the spring charging motor at the instant the springs achieve a full charge. The system consists of a crank with tang and cam or striker forged into the crank which stretches the closing spring. As full spring extention occurs, the spring crank passes over "top dead center" and advances rapidly until arrested by the spring release latch. During this period of rapid motion the striker displaces the tang and crank counter clockwise depressing the pushrod and hinged "flap". The hinged "flap" forces the operating buttons of several ganged switches downward causing all the switch contacts to change state. Proper adjustment ensures all switch operating buttons are sufficiently depressed to cause switch operation without excessive motion which may pack or jam switches. Adjustment is achieved by slight bending of the tang encircled above.

18-740-886-402 ISSUE X

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UNLESS OTHERWISE SPECIFIED

1-PLACE DEC ± ANGULAR ±
2-PLACE DEC ±
3-PLACE DEC ±

FOR TOLERANCES NOT SPECIFIED SEE 300-SERIES SHOP PRACTICE STANDARDS

MACHINED SURFACE TEXTURE ✓

BULLETIN 9187

C 01-21-84 | 18-740-886-402 | 03

PART NAME 20-35: 3AF VACUM BRKR ADJ.

SHEET NO 10 OF 11

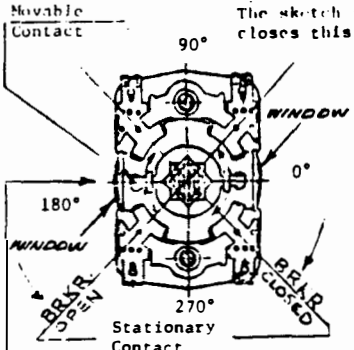
SEE SHT 1 01 01-21-84

9.0 AUXILIARY SWITCH ADJUSTMENT AND MOTOR CUTOFF SWITCH ADJUSTMENT

Auxiliary switch function is achieved by presetting the operater pushrod to a predetermined dimension. The required dimension is shown to the left in the accompanying sketch. Proper adjustment of the auxiliary switch may be confirmed by observing action of the movable contact thru a transparent inspection window. The sketch to the left shows this contact in a neutral position. As the breaker closes this contact and its diametrically opposed mate rotate clockwise to be fully straddled by the stationary contacts located at the -45 and 135 degree positions.

In the open position, the movable contact is rotated counterclockwise to straddle completely the stationary contacts located at 45° and 225°. Correct adjustment of the connecting rod places the movable contacts in a fully straddled position with the breaker opened and closed.

A pre-formed connecting rod has been introduced on more recent models of this circuit breaker. Connecting rod adjustments are not provided nor are they required. However, proper function should be visually confirmed by observing contact function through the inspection windows.



AUXILIARY SWITCH SECTIONAL END VIEW

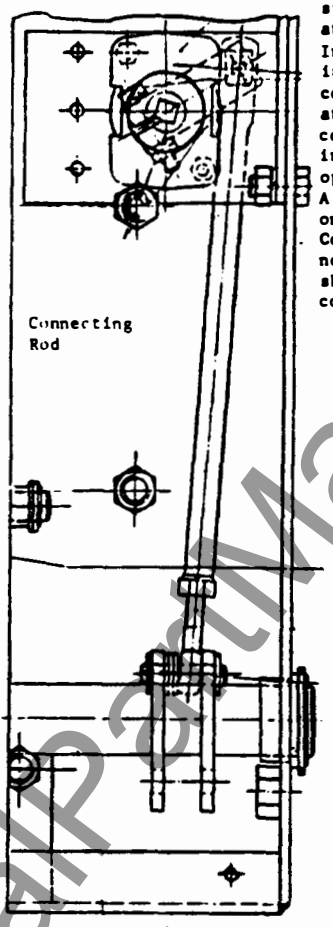


FIG. 1

MOTOR CUTOFF SWITCH ADJUSTMENT

The motor cutoff switch functions to remove power from the spring charging motor at the instant the springs achieve a full charge. The system consists of a crank with tang and cam or striker forged into the crank which atretches the closing spring. As full spring extention occurs, the spring crank passes over "top dead center" and advances rapidly until arrested by the spring release latch. During this period of rapid motion the striker displaces the tang and crank counter clockwise depressing the pushrod and hinged "flap". The hinged "flap" forces the operating buttons of several ganged switches downward causing all the switch contacts to change state. Proper adjustment ensures all switch operating buttons are sufficiently depressed to cause switch operation without excessive motion which may pack or jam switches. Adjustment is achieved by slight bending of the tang encircled above.

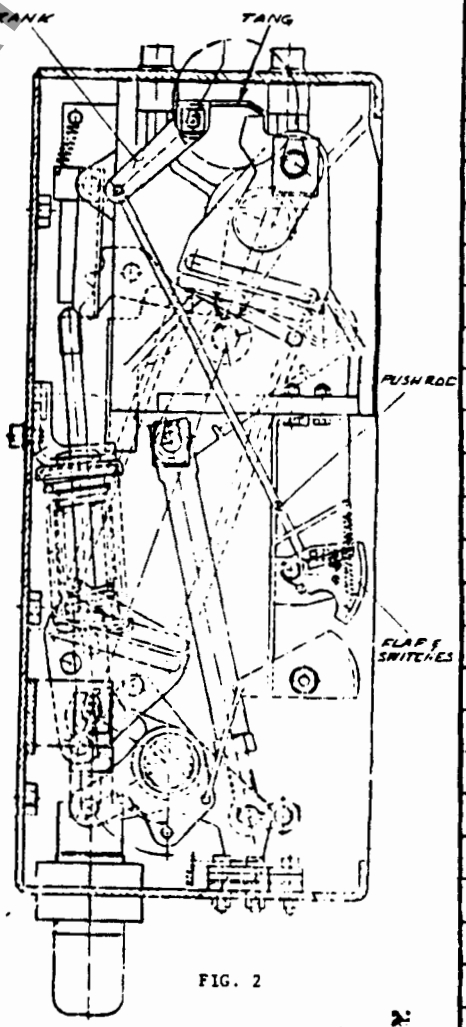


FIG. 2

18-740-886-402 ISSUE X

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UNLESS OTHERWISE SPECIFIED

1-PLACE DEC ± ANGULAR ±
2-PLACE DEC ±
3-PLACE DEC ±

FOR TOLERANCES NOT SPECIFIED SEE 500-SERIES SHOP PRACTICE STANDARDS

MACHINED SURFACE TEXTURE

INDUST. ENG. DIST

SIMILAR TO

DR WDK CH JLC BULLETIN 9/87

MATL

C 01-21-84 | 18-740-886-402 | 03

PART NAME 40-63: 3AF VACUM BRKR ADJ.

N.M. 40-46 | 49-53

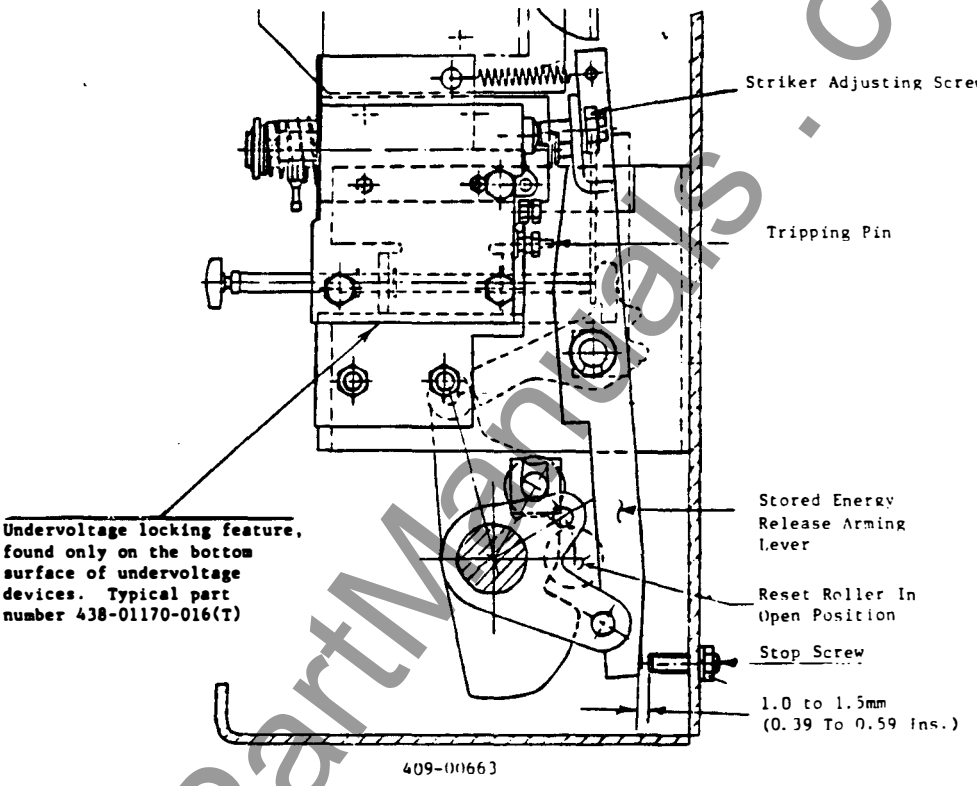
DATE REQUIRED

SHEET NO 10 OF 14

SEE SHT 1

01 JLC 9-4-87

10.0 SECONDARY RELEASE AND UNDERVOLTAGE DEVICE MECHANISM



Prior to performing the adjustments which follow, observe the following preliminaries:

- Undervoltage Releases -- The locking feature must be released (placed in position "B") and rated voltage applied. Do this before proceeding. When adjustments are completed the locking release should be returned to the locked position, "A."
- Secondary releases are <u>not</u> to be energized during their adjustment.

Adjustment proceeds with the breaker in the open position. Release striker by pressing the "tripping pin." Striker will become extended and bear against the "striker adjusting screw."

Turn the "striker adjusting screw" clockwise (access hole in rear of the enclosure) until the striker latches. Continue screw rotation an additional 1½ turns and secure striker screw by means of the lock nut.

Set "stop screw" as shown with indicated clearance over arming lever.

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SIMILAR TO

UNLESS OTHERWISE SPECIFIED:
1-PLACE DEC ±
2-PLACE DEC ±
3-PLACE DEC ±
ANGULAR ±
FOR TOLERANCES NOT SPECIFIED SEE 300-SERIES SHOP PRACTICE STANDARDS
MACHINED SURFACE TEXTURE ✓

DR WDK CH JC BULLETIN 9/8/7

MATL

10 SEE SHT 1 01-16-84

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3AF VACUM BRKR ADJ.

SHEET NO 11 of 11

18-740-886-102 ISSUE X

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11.0 CONTACT STROKE AND FORCE ADJUSTMENTS

INTERRUPTER TYPE		STROKE MM (Ins.)	PART NUMBER
VS20004	A1	16±1 (0.63 - 0.04)	454959
VS20006	A2	16±1 (0.63 - 0.04)	461392
VS10006	B1	11±1 (0.43 - 0.04)	461368
VS12015	B14	6±1 (0.20 - 0.28)	461350
VS10028	C1	11±1 (0.43 - 0.04)	461384
VS30029	D21	21±1 (0.79 - 0.83)	474601
VS30028	D21	20±1 (0.75 - 0.83)	462127
VS30030	D21	21±1 (0.79 - 0.83)	474601 (w/Ag Plating)

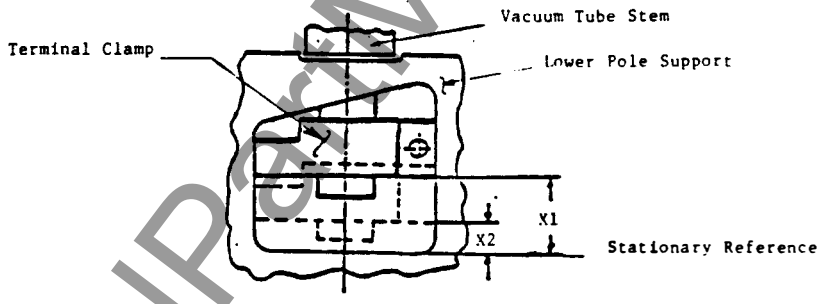
Interrupter stroke is to be set at values as shown in the table above. The control of vacuum tube stroke is achieved by adjusting the "rod end" (eye) which terminates the insulated coupling rod at the end nearest the vacuum tube.

With the breaker open, remove pin joining the eye of the insulated coupling rod to the lever at the base of each pole assembly. The interrupter will close immediately under the influence of atmospheric pressure.

Check now for the presence of a small white erosion mark located in the center of the keyway just where the movable stem enters the body of the vacuum tube. This white mark must be viewed from the "stud" (primary connection) side of the vacuum breaker. With the tubes contacts closed this mark must always be visible.

Contact stroke displacements must be measured or gaged between a fixed point on the movable contact structure and some fixed reference on the lower pole support.

In the procedure shown below, the bottom surface of the terminal clamp and lower surface of an access window in the lower pole support have been chosen as points of measurements.



With atmospheric pressure holding the vacuum tube closed, measure this distance from the bottom surface of the terminal clamp, record this value as X_1. Move the lever backward to align the appropriate hole with the "eye" on the insulated coupler. Insert pin and measure the distance from the bottom surface of the terminal clamp to the stationary reference, record this value as X_2.

The difference between X_1 and X_2 ($X_1 - X_2$), represents vacuum tube stroke, and the value recorded must agree with information shown in the table of "Contact Force and Travel Data". Iterative adjustment of the isolated coupler "eye" may be required to achieve the required ($X_1 - X_2$) dimension.

Contact force measurement is crucial to breaker performance at rated close, latch and momentary currents. It is best measured by means of specialize fixtures and load cells as noted below.

Formed Pole Support Type 4FT 212-264-014
Cast Pole Support Types 4FT 210-854-014
4FT 210-854-022

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MATL
WORK CURRENT DATE 3-8 C 01-21-88 PART NUMBER 8-18 18-740-886-402 03
TYPE 22 REV. 23 PART NAME 24-65 BAF VACUM BRKR AD). M.M. 66-68 69-93 DATE REQUIRED SHEET NO 12 of 14

11.0 CONTACT STROKE AND FORCE ADJUSTMENTS CONT.

An alternate means of measuring contact force consists of measuring contact pressure spring deflection beyond installed lengths.

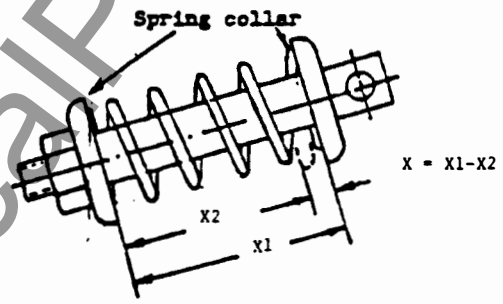
Required performance data may be found in the table of "Contact Force and Travel Data".

Measurements will proceed with the breaker closed, and for safety must be blocked in this position as the work proceeds. Use blocking device 2FT 211-165-014.

LOAD CELL METHOD

- Attach load cell device and install continuity tester to the upper and lower breaker terminal.
- Tighten adjusting nut on load cell until continuity is lost.
- Read force at the point of continuity loss and record the value. Check table for appropriate value.
- Force measurement must be repeated on each pole.
- Remove blocking device after completing measurements on each pole.

CONTACT PRESSURE SPRING DEFLECTION PROCEDURE (Excess Stroke)



- Check table for correct contact pressure spring color code.
- With breaker open measure dimension X_1 in each of three phase positions. Distance inside opposing spring collars.
- Close breaker and install blocking device 2FT 211-165-014.
- Measure X_2 and record for each respective phase position.
- The difference between X_1 and X_2 must meet the appropriate values listed in the table and be recorded.
- Remove blocking device and open breaker.

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SUB C	CURRENT DATE	PART NUMBER	
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TYPE	REF.	PART NAME	N.M.		REVS REQUIRED	SHEET NO.
		3AF VACUM BRKR ADJ.				13 of 14

CONTACT FORCE AND TRAVEL DATA 00-857-024-004

ITEM	SAI TYPE	2HI TYPE	CONT. AMPS	SIEMENS TYPE NO.	TUBE TYPE	CLOSING SPRING HANGER		STROKE	Over-Travel Spring Color *	Over Travel Spring Compression (Ins.) (X1 - X2)	Contact Force Newtons
						K	C				
1	5-MSV 250	5-3AF 250	1200	3AF10523	VS12015		X	$6\pm^{1}$	Orange	10-12	4000 ± 200
2	5-MSV 250	5-3AF 250	2000	3AF10543	"		X	$6\pm^{1}$	"	10-12	4000 ± 200
3	5-FSV 350	5-3AF 350	1200	3AF24723	VS10028	(1)		$8\pm^{1}_{0.5}$	Brown	8-10	7000 ± 300
4	5-FSV 350	5-3AF 350	2000	3AF24763	"	(1)			"	8-10	7000 ± 300
5	5-FSV 350	5-3AF 350	3000	3AF24773	"	(1)			"	8-10	7000 ± 300
6	7-FSV 500	7-3AF 500	1200	3AF2362	"	X		$11\pm^{1}$	Blue	8-10	5400 ± 540
7	7-FSV 500	7-3AF 500	2000	64	"	X			"	8-10	5400 ± 540
8	7-FSV 500	7-3AF 500	3000	67	"	X			"	8-10	5400 ± 540
9	15-FSV 500	15-3AF 500	1200	3AF2342	VS10006	X			Orange	8-12	2600 ± 260
10	15-FSV 500	15-3AF 500	2000	44	"	X			"	4-8	2600 ± 260
11	15-FSV 750	15-3AF 750	1200	3AF2362	VS10028	X			Blue	8-10	5400 ± 540
12	15-FSV 750	15-3AF 750	2000	3AF2364	"	X			"	8-10	5400 ± 540
13	15-FSV 750	15-3AF 750	3000	67	"	X			"	8-10	5400 ± 540
14	15-FSV1000	15-3AF1000	1200	3AF24723	"	(1)		$8\pm^{1}_{0.5}$	Brown	8-10	7000 ± 300
15	15-FSV1000	15-3AF1000	2000	3AF24763	"	(1)			"	8-10	7000 ± 300
16	15-FSV1000	15-3AF1000	3000	3AF24773	"	(1)			"	8-10	7000 ± 300
17	SD-15-12.5	———	1200	3AF27424	VS20006		X	$16\pm^{1}$	Orange	10-12	2400 ± 240
18	SD-15-12.5	———	2000	3AF27444	"		X		"	8-10	2400 ± 240
19	SD-15-16	———	1200	3AF27424	"		X		"	10-12	2400 ± 240
20	SD-15-16	———	2000	3AF27444	"		X		"	8-10	2400 ± 240
21	SDV-15-20	———	1200	3AF27424	"		X		"	10-12	2400 ± 240
22	SDV-15-20	———	2000	3AF27444	"		X		"	8-10	2400 ± 240
23	SDV-15-25	———	1200	3AF27424	"		X		"	10-12	2400 ± 240
24	SDV-15-25	———	2000	3AF27444	"		X		"	8-10	2400 ± 240
25	SDV-38-25	———	1200	3AF37462	VS30028	X		20 ± 1.0	Red		3350 ± 250
26	SDV-38-25	———	2000	3AF37464	VS30028	X		20 ± 1.0	"		3350 ± 250

* 8.25KV

(1) LOWER SPRING HANGER--ONE HOLE

OVERTRAVEL SPRING CODE		
Blue	409-00171-001	18-658-104-054
Orange	409-00068-001	18-658-104-050
Yellow	409-00128	
Gray	409-00067	
Green	409-00568	
Red	409-00754	
Brown	409-01081-001	18-658-104-049

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C01 2184 18-740-886-402 C2

BULLETIN 9/87

01 04-16-84

3AF VACUUM BRKR ADJ.

5kV INTERIM VEHICLE ADJUSTMENTS

The following settings and adjustments apply to the 5kV Interim Vehicle, and must be performed in addition to those described in drawing series #18-740-886-402 for the vacuum breaker.

Many adjustments must be performed in the assembly fixture, 75-533-949- , final settings, in general, require pinning after achieving fixture settings.

ASSEMBLY DRAWING REFERENCE 18-742-988-503(T)
18-658-486-535

M1 I. GUIDE BAR SETTING

The assembled breaker must be inserted into fixture and centered before guide bar settings are established. The breaker's vertical risers shall be spaced 0.987±0.03 on each side from the inclined panel checking guide-bars. The fixture guide bars are spaced at a 22.687 calibrated dimension. It is suggested that spacers be developed to assist the centering operation. This procedure is critical, as the MSV breaker passes the cubicle entrance with minimum design clearances.

Once centered, the guide bar (with loosened fasteners) should be clamped to the inboard surface of the fixture's guide bar slot. Care in performing this operation will facilitate primary alignment.

Securely torque guide bar fasteners to 150 ± 20 foot pounds, and proceed to primary stud alignment.

After completing primary stud alignment, use holes in base plate and drill two 0.190 ± .003 diameter holes thru guide bar and then pin bar in two places with roll pins, Item #48.

M2 II. PRIMARY STUD ALIGNMENT

Align primary studs to drawing dimensions to tolerance of ± 0.060.

- Top stud elevation: 38.00 inches
- Lower Stud Elevation: 26.00 inches
- Center Stud Lateral Displacement of Guide Bar Reference: 3.50 inches
- Phase Spacing: 7.00 inches

M3 III. CAM SHUTTER SETTING

Fixture cam shutter to fixture dimensions.

- Lateral Displacement from Guide Bar Reference to Outer Surface of Guide: 14.34 ± 0.06 inches
- Shutter cam profile makes a transition from an inclined surface to a horizontal surface 0.94 ± 0.06 inches toward the panel end of the breaker ahead of the plunger reference.
- Drill two 0.190 holes using guide holes in cam and its supporting angle. Drive two roll pins through supporting angle into base, and two pins thru cam into supporting angle; use roll pins, Item #10.

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		5KV VEHICLE ADJUST		M13	SHEET NO 1 OF 75

M4 IV. SECONDARY DISCONNECT SETTING

Align and set to fixture dimensions:

- Bottom secondary contact elevation to contact centerline:
  6.437 ± .060 inches

- Lateral displacement from guide bar reference to crest of secondary contacts:
  7.25 ± .060 inches

- Fore and aft alignment, crest of contacts must lie toward panel end of breaker ahead of plunger reference:
  0.69 ± .060 inches

After completing final adjustment drill (2) 0.190 ± .003 holes using guide holes in secondary mounting plate. Drive two roll pins through this plate into vertical breaker channels, use Item #48.

M5 V. GROUNDING FINGER SETTING

Align and set to fixture dimensions:

- Rearward extension of grounding fingers from plunger reference:
  17.00 ± 0.125 inches

- Lateral displacement from guide bar reference to center of fingers:
  8.88 ± .06 inches

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M6 VI. CONTINUOUS CURRENT INTERLOCK

Install interlock bar by mounting with specified fasteners through prepared holes in base. Elevation: 2.75 ± .06 inches.

1200 Amp Breaker Extension, vertical portion nearest guide bar.

2000 Amp Breaker, Extension Outboard, vertical portion set at greatest distance from the guide bar.

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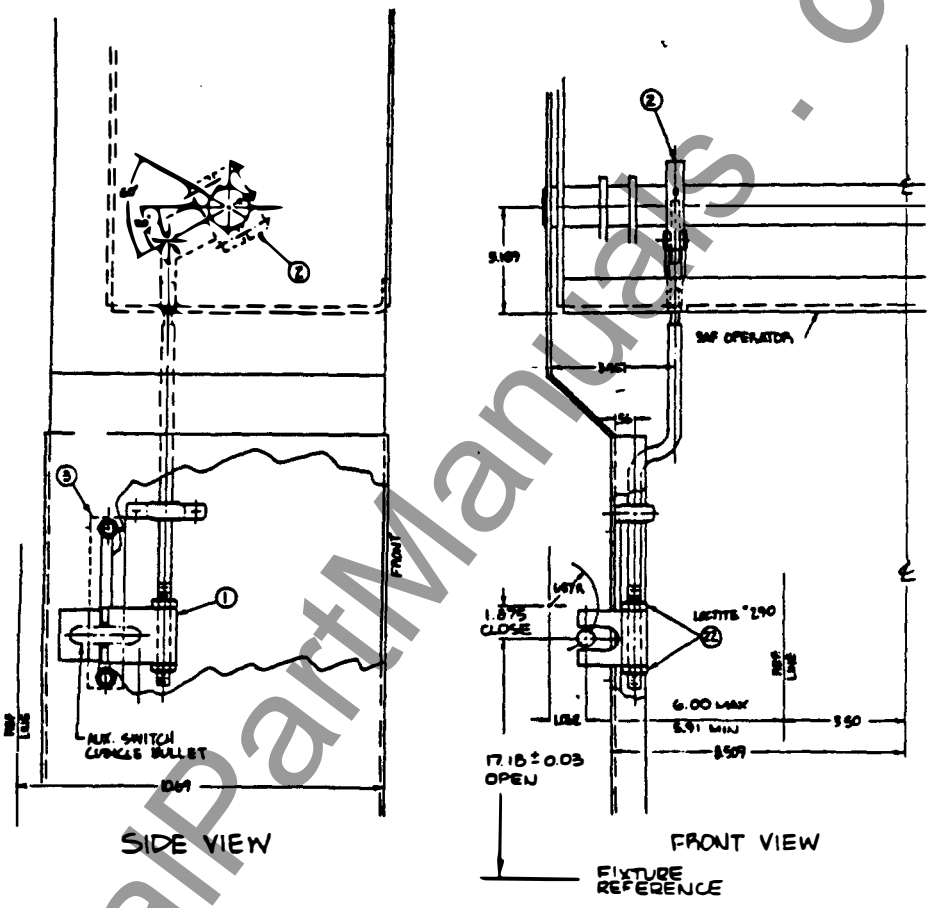
		5 KV VEHICLE ADJUST		M13	SHEET NO 2 OF 7

VII. REMOTE AUXILIARY SWITCH OPERATING YOKE ADJUSTMENT



FIXTURE REFERENCE

The yoke (1) which operates the cubicle mounted auxiliary switch is set in the fixture to an elevation of 17.18 ± 0.03 inches. A prerequisite to this adjustment requires that the operating arm (2) be set to a 30° angle, as shown, with the breaker opened. This arm must be fastened securely, the shaft drilled 0.190 ± .003 inches to an 0.250 depth and the arm pinned using an 0.188 X 0.75 long spring pin.

The yoke is set to the 17.18 ± 0.03 elevation by manipulating nuts (22). After achieving the correct setting, these nuts should be securely tightened after applying Locktite thread adhesive.

During this adjustment, check that the yoke moves freely between nylon guide strips (3). Washers are used to space the nylon strips, their number may have to be adjusted in order to ensure free movement.

Check the lateral extension of the yoke ends at 5.91-6.00 inches of the reference line.

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5KV VEHICLE ADJUST

SHEET NO 3 OF 7

M8 VIII. RACKING INTERLOCK ADJUSTMENT

Initial adjustment begins by setting the rail plunger linkage. Plunger (1) free height is not adjustable, being established by design at 1.75 ± .06 inches.

The bridging link (2) must be set in an essentially horizontal position. Using the adjusting eye (3) directly above the plunger, set the bridging link at 3.00 ± .03 inches above the base surface. Securely lock with jam nut.

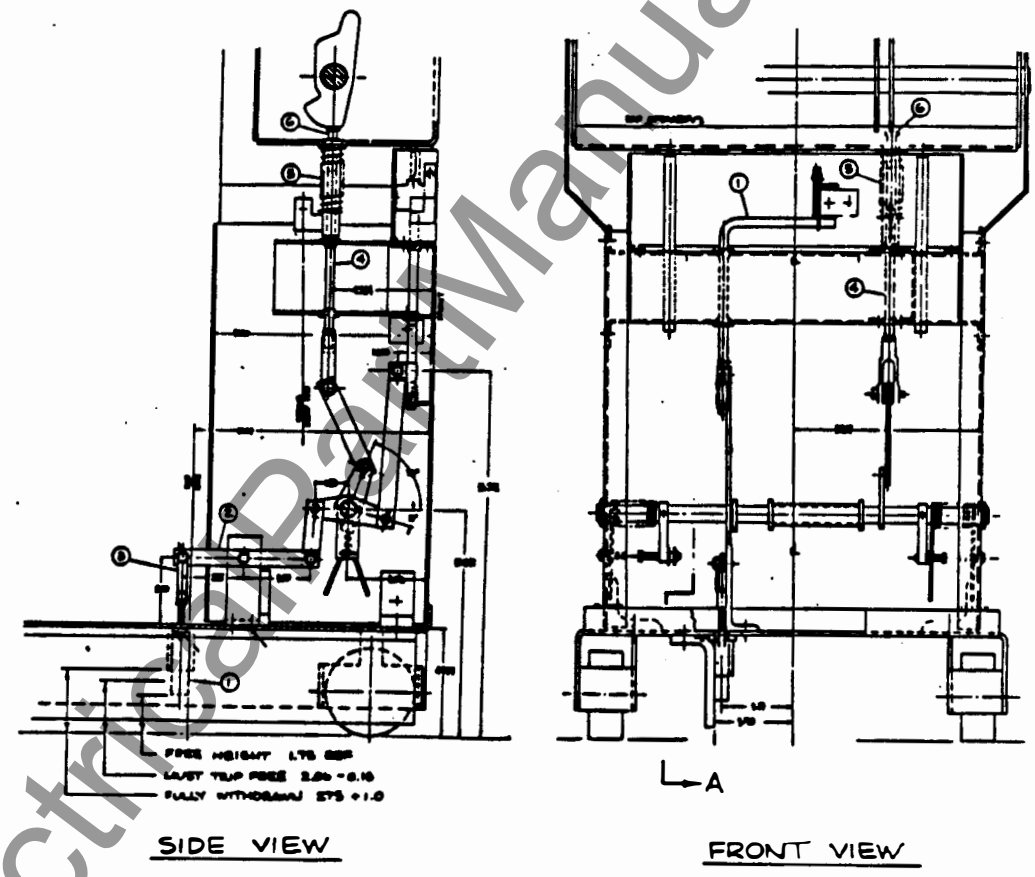

FIGURE #1 LINKAGE DETAIL

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5 KV VEHICLE ADJUST.				4 OF 7

M9 VIII. RACKING INTERLOCK ADJUSTMENT (continued)

During these adjustments, the closing spring discharge tube (5) should be blocked or clamped so that its upper end is flush with the guide bushing on the inside of the mechanism enclosure.

Adjust pushrod (4) until the washer and retaining ring associated with the "floating tip" (6) of the push rod lies flush with guide bushing and end of the spring discharge tube. When properly adjusted, the floating tip should be immediately displaced upward as the "racking release handle" (7) is raised.

The pushrod and floating tip must demonstrate free movement, responding to the "Racking Release Handle," and returning freely to its initial state upon release of the handle.

Close the breaker and observe that the floating tip clears breaker shaft cam by 1-2mm (.04 to 0.08 inches). With the breaker closed, this cam must block racking release. A closed breaker must not open when the racking release handle is lifted.

The mechanism internal to the breaker enclosure may now be adjusted. This adjustment is to be accomplished through the racking "interlock adjusting screw" (see Figure 2). Block the lever which engages the floating tip of the pushrod, Figure #1, by inserting a 2mm (.080-inch) shim between the lever and flat washer attached to the floating tip. This action simulates the effect of lifting the "racking release lever" on a closed breaker. Be sure the breaker is open while performing this adjustment.

18·740·886·403 01

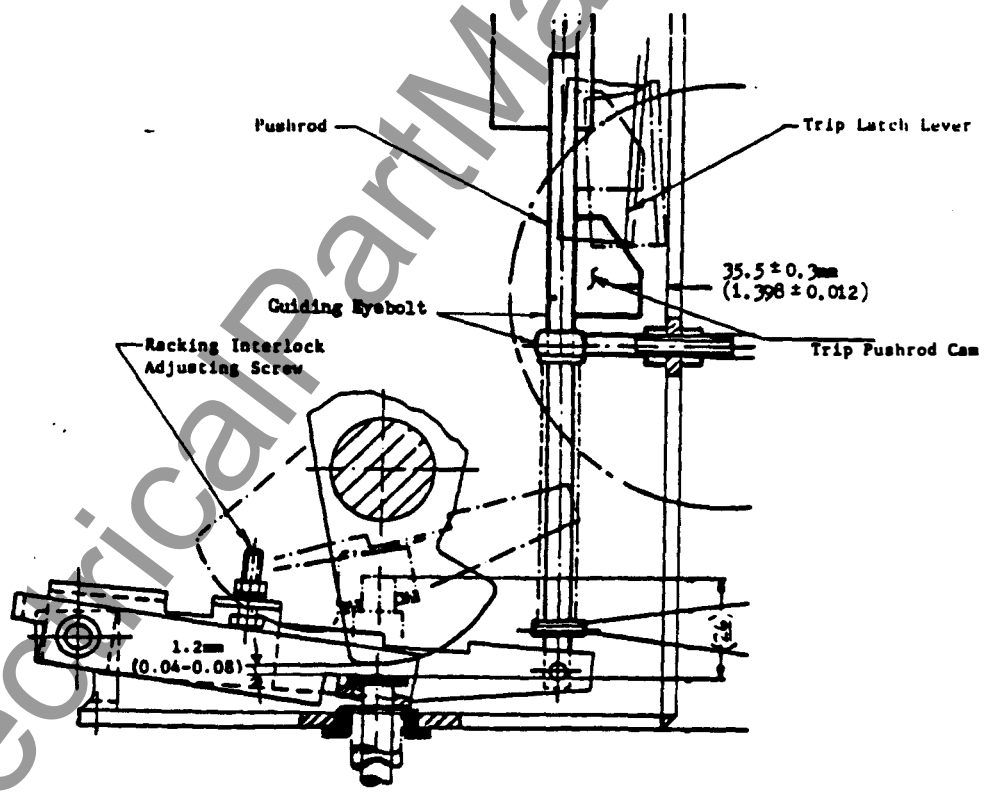

FIGURE 2 RACKING INTERLOCK

COMPONENTS INTERNAL TO BREAKER'S OPERATING MECHANISM

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		5 KV VEHICLE ADJUST.			M3 SHEET NO 5 OF 7

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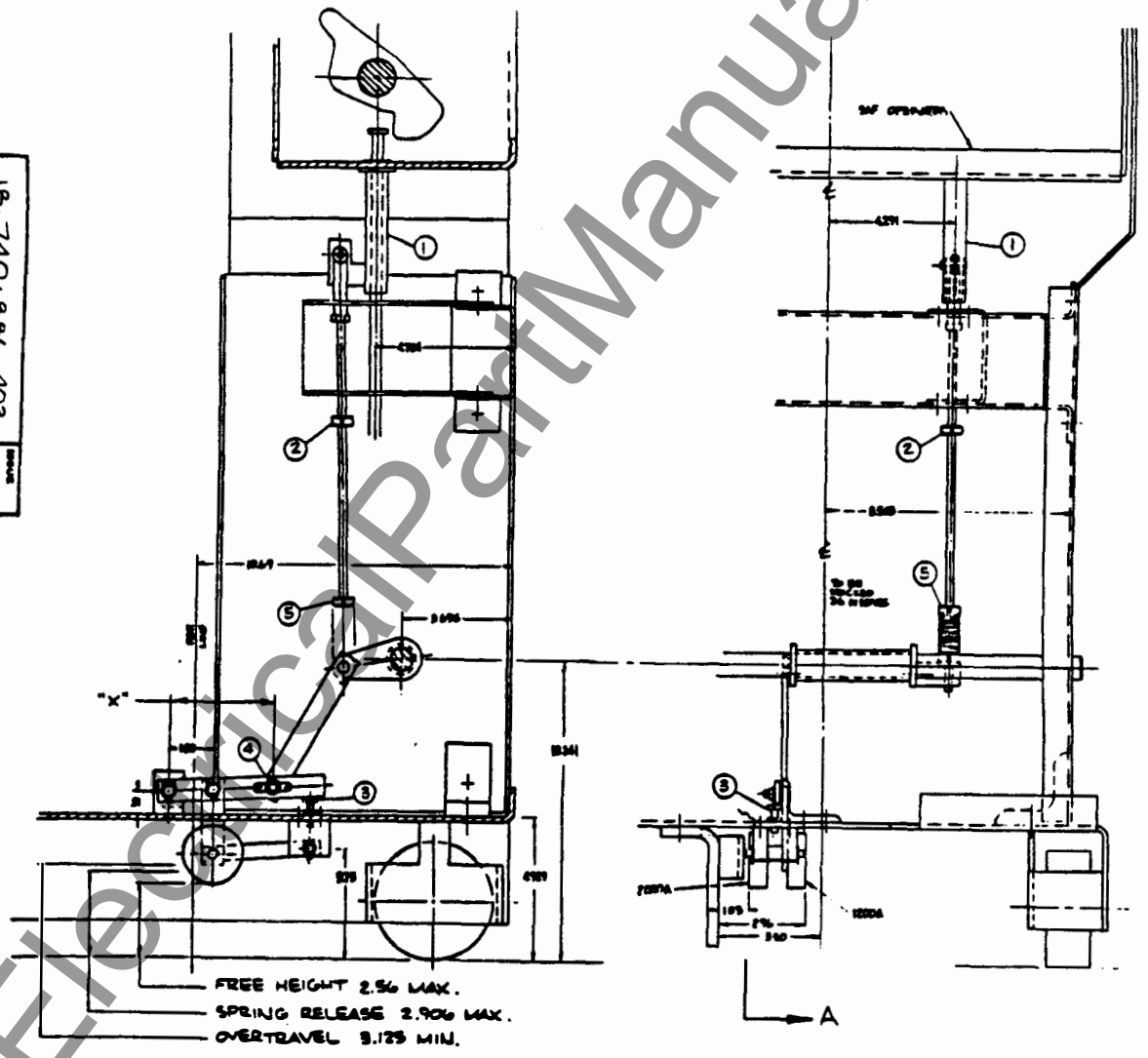
M10 VIII. RACKING INTERLOCK ADJUSTMENT (concluded)

Advance "racking interlock adjusting screw" to raise trip pushrod and cam. Continue this action until the pushrod cam contacts and bears against the trip latch lever, see Figure 2. Lock adjustment with jam nut. Remove blocking, charge and close breaker. Attempt to raise racking release lever and check that pushrod is blocked by the breaker shaft cam. Open breaker and recharge closing springs. Raise rail plunger to an elevation of 2.06 inches by lifting the "breaker racking release handle." Hold the handle in this position and close the breaker. The breaker must operate "trip free" and not close.

M11 IX. SPRING DUMP ADJUSTMENT

Refer to Figure 3. With breaker in the "open" position, displace spring dump tube (1) upward approximately 0.88 inches until free movement is lost. The pushrod shown in Figure 2 will begin to bind in its guiding eye bolt. Clamp the spring dump tube in this position.



SECTION A·A FRONT VIEW

FIGURE 3 SPRING DUMP MECHANISM

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5 KV VEHICLE ADJUST			M13	6 OF 7

M12 IX. SPRING DUMP ADJUSTMENT (continued)

Run the "2nd fixed collar" (2) up to the horizontal brace, and set firmly with two set screws.

Establish roller free height by setting the free height adjusting screws, (3). Bottom surface of the roller must be set at a maximum of 2.56 inches from floor or reference plain.

Check to make certain that the cylindrical pivot (4) is loose and that the "1st fixed collar (5) and group of bellville washers are free to adjust. (Suggest temporarily moving these items up the pushrod and lightly setting them in place.)

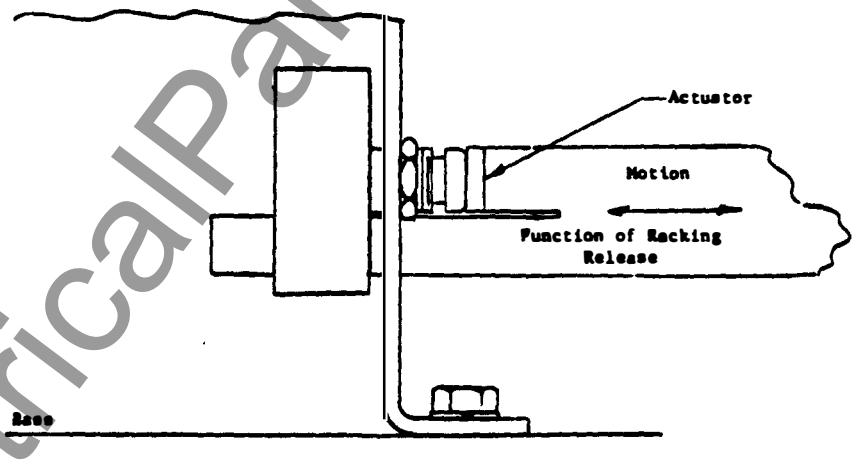
Free clamp on spring dump tube and allow the tube to move downward until the spring dump tube is flush to the guide bushing on the inside of the mechanism enclosure. Clamp spring dump tube in this position. Adjust the cylindrical pivot to dimension "X" as shown in Figure 3 and tighten firmly in place. Note: be sure to rotate cylinder pivot toward rear of breaker to ensure slot is positioned to enable full angular motion. A good initial estimate for dimension "X" is 4.0 inches.

Free collars and bellville washers allowing this group of parts to bear on the cylindrical pivot. Press downward on the collar (5) compressing the bellville washers and securely set the collar in place with two set screws. The bottom collar nearest the cylinder is to remain free.

Charge the breakers closing springs, and raise roller to a height of 2.9 inches. The charging springs should be released automatically.

If spring release does not occur, dimension "X" must be iteratively increased in small increments followed by resetting the first fixed collar until automatic spring discharge is consistently achieved.

M13 X. ELECTRICAL INTERLOCK - RACKING RELEASE SYSTEM



After completing all "racking release adjustment," the interlock shown above must be set.

With "racking release handle" in its fully depressed position, free switch and rotate bushing through the wall of the wiring enclosure. The switch operator will bear against the actuator pad. Continue rotating until switch operates, distinctly heard click, and then beyond this point by at least one full turn. Orient body of switch as shown, and secure with jam nut.

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		5 KV VEHICLE ADJUST		M13	SHEET NO 7 OF 7

15KV INTERIM VEHICLE ADJUSTMENTS

The following settings and adjustments apply to the 15KV Interim Vehicle, and must be performed in addition to those described in drawing series 18-740-886-402 for the vacuum breakes.

Many adjustments must be performed in the assembly fixture, 75-535-760-05, final settings in general require pinning after achieving fixture settings.

M1 I. GUIDE BAR SETTING

The assembled breaker must be inserted into fixture and centered before guide bar settings are established. The breakers vertical channels shall be spaced 1.188 - 0.030 from fixture guide bars which run the depth of the fixture at an elevation of approximately 26 inches. It is suggested that spacers be developed to assist the centering operation.

Once centered the guide bar (with loosened fasteners should be clamped to the inboard surface of the fixtures guide bar slot. Care in performing this operation will facilitate primary alignment.

Securely torque guide bar fasteners to 150 ± 20 foot pounds, and proceed to primary stud alignment.

After completing primary stud alignment, use holes in base plate and drill two 0.190 ± .003 diameter holes thru guide bar and then pin bar in two places with roll pins item # 10.

M2 II. PRIMARY STUD ALIGNMENT

Align primary studs to drawing dimensions to tolerance of ± 0.060.

- Top stud elevation: 43.00 inches
- Lower Stud Elevation: 31.00 inches
- Center Stud Lateral Displacement of Guide Bar Reference: 3.50 inches
- Phase Spacing: 10.00 inches

M3 III. CAM SHUTTER SETTING

Fixture cam shutter to fixture dimensions

- Lateral Displacement from Guide Bar Reference to Outer Surface of Guide: 19.125 ± .125 inches
- Fore and Aft Displacement of Apex in Slot Detail rearward From Front Surface of Reference Plunger: 4.250 ± .03 inches
- Drill four 0.190 holes using guide holes in cam and its supporting angle. Drive two roll pins through supporting angle into base, and two pins thru cam into supporting angle, use roll pins, item # 10.

18-740-886-401

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MATL: TOP LEVEL "18-471-243-434

ORG | CURRENT DATE | PART NUMBER | ISS
N | 01.18.84 | 18.740.886.401 | C

PART NAME: 15KV VEHICLE ADJUST.

SIZE | SHEET 1 OF 7

15KV INTERIM VEHICLE ADJUSTMENTS

The following settings and adjustments apply to the 15KV Interim Vehicle, and must be performed in addition to those described in drawing series "18-740-886-402 for the vacuum breaker.

Many adjustments must be performed in the assembly fixture, 75-535-760-05, final settings in general require pinning after achieving fixture settings.

M1 I. GUIDE BAR SETTING

The assembled breaker must be inserted into fixture and centered before guide bar settings are established. The breakers vertical channels shall be spaced 1.188 - 0.030 from fixture guide bars which run the depth of the fixture at an elevation of approximately 26 inches. It is suggested that spacers be developed to assist the centering operation.

Once centered the guide bar (with loosened fasteners should be clamped to the inboard surface of the fixtures guide bar slot. Care in performing this operation will facilitate primary alignment.

Securely torque guide bar fasteners to 150 ± 20 foot pounds, and proceed to primary stud alignment.

After completing primary stud alignment, use holes in base plate and drill two 0.190 ± .003 diameter holes thru guide bar and then pin bar in two places with roll pins item # 10.

M2 II. PRIMARY STUD ALIGNMENT

Align primary studs to drawing dimensions to tolerance of ± 0.060.

- Top stud elevation: 43.00 inches
- Lower Stud Elevation: 31.00 inches
- Center Stud Lateral Displacement of Guide Bar Reference: 3.50 inches
- Phase Spacing: 10.00 inches

M9 III. CAM SHUTTER SETTING

Fixture cam shutter to fixture dimensions

- Lateral Displacement from Guide Bar Reference to Outer Surface of Guide: 19.125 ± .125 inches
- Fore and Aft Displacement of Apex in Slot Detail rearward From Front Surface of Reference Plunger: 4.250 ± .03 inches
- Drill four 0.190 holes using guide holes in cam and its supporting angle. Drive two roll pins through supporting angle into base, and two pins thru cam into supporting angle, use roll pins, item # 10.

P1

IV. SECONDARY DISCONNECT SETTING

M4

Align and Set to Fixture Dimensions

- Bottom aecondary contact elevation to contact centerline: 6.437 ± .060 inches
- Lateral displacement from guide bar reference to crest of secondary contacts: 12.25 ± .060 inches
- Fore and aft alignment, crest of contacts must lie toward panel end of breaker ahead of plunger reference: 0.812 ± .060 inches

After completing final adjuatment drill (2) 0.190 ± .003 holes using guide holes in secondary mounting plate. Drive two roll pins through this plate into vertical breaker channels, use item # 10 .

M5

V. GROUNDING FINGER SETTING

Align and set to Fixture Dimensions

- Rearward extension of grounding fingers from plunger reference: 17.625 ± .125 inches
- Lateral displacement from guide bar reference to center of fingers: 12.25 ± .06 inches

M6

VI. CONTINUOUS CURRENT INTERLOCK

Install interlock bar by mounting with specified fasteners through prepared holes in base. Side nesrast center of breaker should be 8.5 inches (Ref) laterally displaced from guide bar. Elevation 2.50 ± .06 inches.

1200 Amp Breaker Extention Nearest Guide Rail

2000 Amp Breaker, Extention Outboard.

18-740-886-401

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CH JT

TOP LEVEL *18-471-243-434

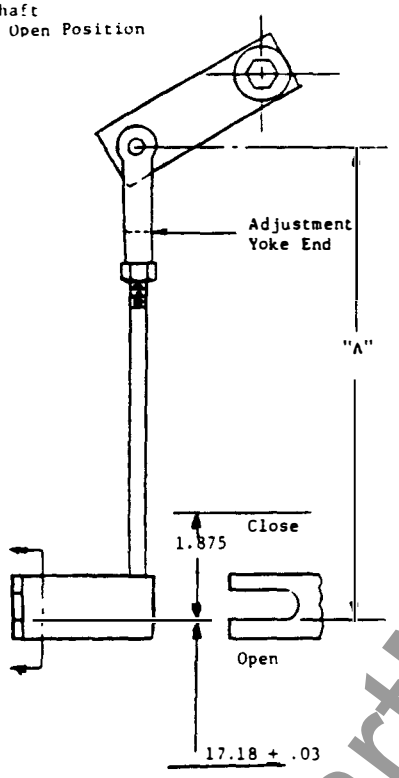
ORD N | CURRENT DATE 01-18-84 | PART NUMBER 18-740-886-401 | REV 01

PART NAME 15KV VEHICLE ADJUST.

SHEET NO 2 OF 9

VII. REMOTE AUXILIARY SWITCH OPERATING YOKE ADJUSTMENT

Breaker Shaft
Extension Open Position



The "yoke" which operates cubicle mounted auxiliary switches is set in the fixture to appropriate elevation. The required elevation dimension is 17.18 ± .01 inches with breaker open.

Adjustment is made by dismounting and rotating the adjustment yoke as shown to the left.

The dimension "A" provides an initial setting and will ensure rapid convergence to the desired setting thru a minimum of iterative yoke adjustments.

One complete turn of the yoke alters the elevation dimension 0.035 inches.

DIMENSION	A
15KV, 500MVA, 2KA	14.27
15KV; 500MVA, 1.2KA	13.49
15KV, 750 MVA	13.00

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TOP LEVEL 18-471-243-434 | N | 01-18-84 | 18-740-886-401 | 0

15KV VEHICLE ADJUST.

SHEET 3 OF 5

VIII. RACKING INTERLOCK ADJUSTMENT

Initial adjustment begins by setting the rail plunger linkage. Plunger free height is not adjustable, being established by design at 1.75 ± .06 inches.

The bridging link must be set in an essentially horizontal position. Using the adjusting eye directly above the plunger, set the bridging link at 3.00 ± .03 inches above the base surface. Securely lock with jam nut.

The required length of the push rod must now be established. This length is dependent on the type of breaker being manufactured, and to facilitate adjustment, set during assembly at the values shown below.

DIMENSION "A" FIGURE #1	
BREAKER TYPE	"A" INS.
15KV 500MVA 2000A	12.93
15KV 500MVA 1200A	12.14
8.25KV/15KV 500 6 750MVA	11.67

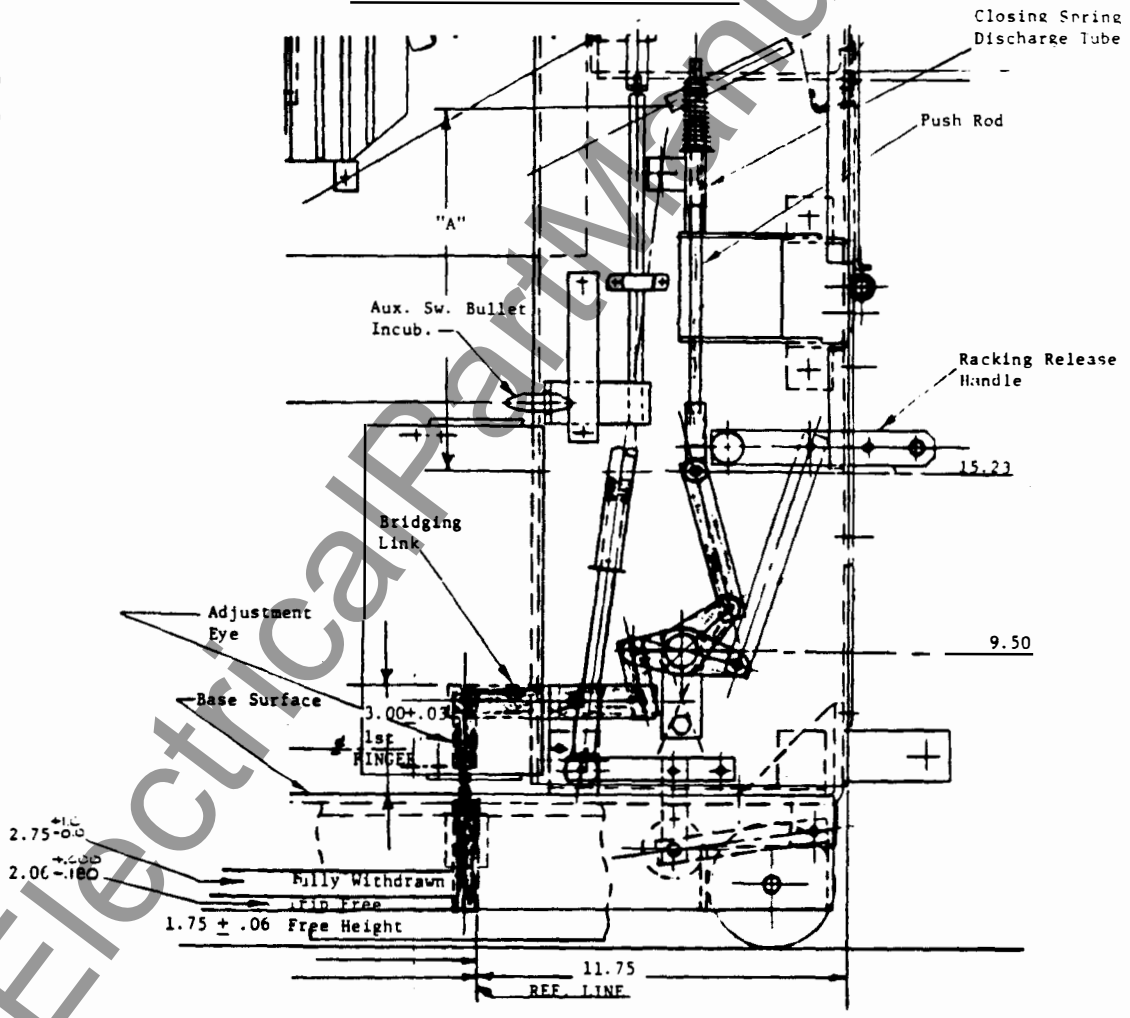

FIGURE #1 LINKAGE DETAIL

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15KV VEHICLE ADJUST.

SHEET NO 4 OF 91

VIII. RACKING INTERLOCK ADJUSTMENT (CONT.)

During these adjustments, the closing spring discharge tube should be blocked or clamped so that its upper end is flush with the guide bushing on the inside of the mechanism enclosure.

Adjust pushrod until the washer and retaining ring associated with the "floating tip" of the push rod lies flush with guide bushing and end of the spring dump tube. When properly adjusted, the floating tip should be immediately displaced upward as the "racking release handle" is raised.

The pushrod and floating tip must demonstrate free movement, responding to the "Racking Release Handle", and returning freely to its initial state upon release of the handle.

Close the breaker and observe that the floating tip clears breaker shaft cam by 1-2mm (.04 to 0.08 ins.). With the breaker closed this cam must block racking release. A closed breaker must not open when the racking release handle if lifted.

The mechanism internal to the breaker enclosure may now be adjusted. This adjustment is to be accomplished through the racking "interlock adjusting screw" see Figure 2. Block the lever which engages the floating tip of the pushrod, Figure #1, by inserting a 2mm (.080 inch) shim between the lever and flat washer attached to the floating tip. This action simulates the affect of lifting the "racking release lever" on a closed breaker. Be sure the breaker is open while performing this adjustment.

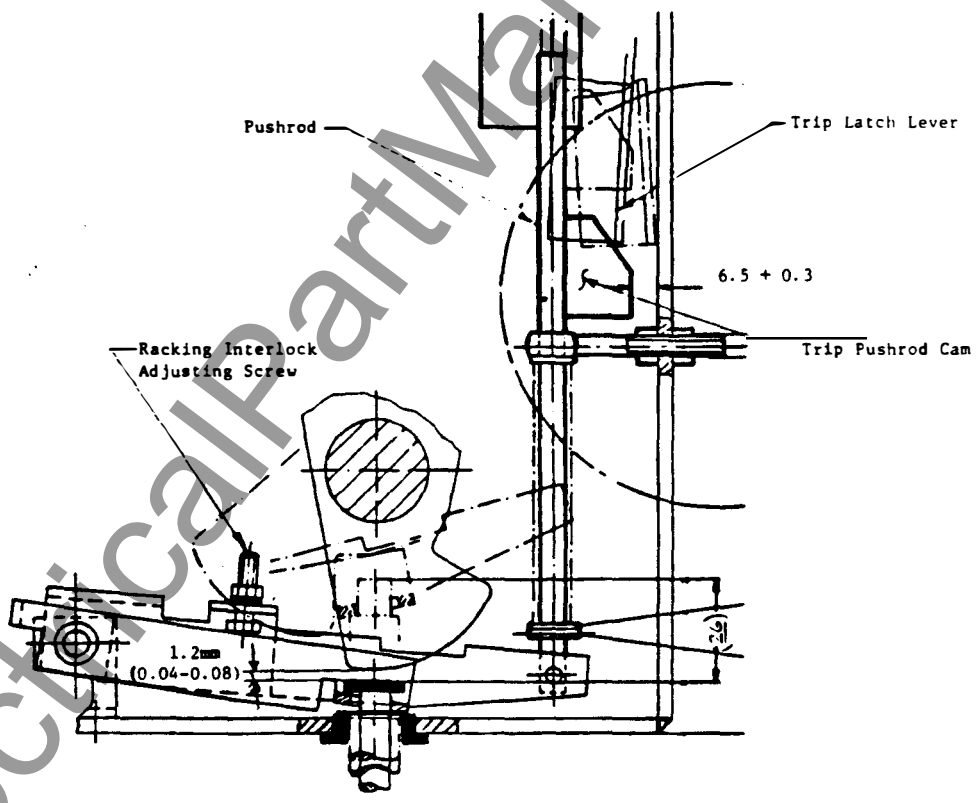

FIGURE 2 RACKING INTERLOCK

COMPONENTS INTERNAL TO BREAKERS OPERATING MECHANISM

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15KV VEHICLE ADJUST.

SHEET NO 5 of 9

VIII. RACKING INTERLOCK ADJUSTMENT (CONT.)

Advance "racking interlock adjusting screw" to raise trip pushrod and cam. Continue this action until the pushrod cam contacts and bears against the trip latch lever, see Figure 2. Lock adjustment with jam nut. Remove blocking, charge and close breaker. Attempt to raise racking release lever and check that pushrod is blocked by the breaker shaft cam. Open breaker and recharge closing springs. Raise rail plunger to an elevation of 2.06 inches by lifting the "breaker racking release handle". Hold the handle in this position and close the breaker. The breaker must operate "trip free" and not close.

IX. SPRING DUMP ADJUSTMENT

Refer to Figure 3, displace spring dump tube upwards approximately 0.875 inches until free movement is lost. The pushrod shown in Figure 2 will bind in its guiding eye bolt. Clamp the spring dump tube in this position.

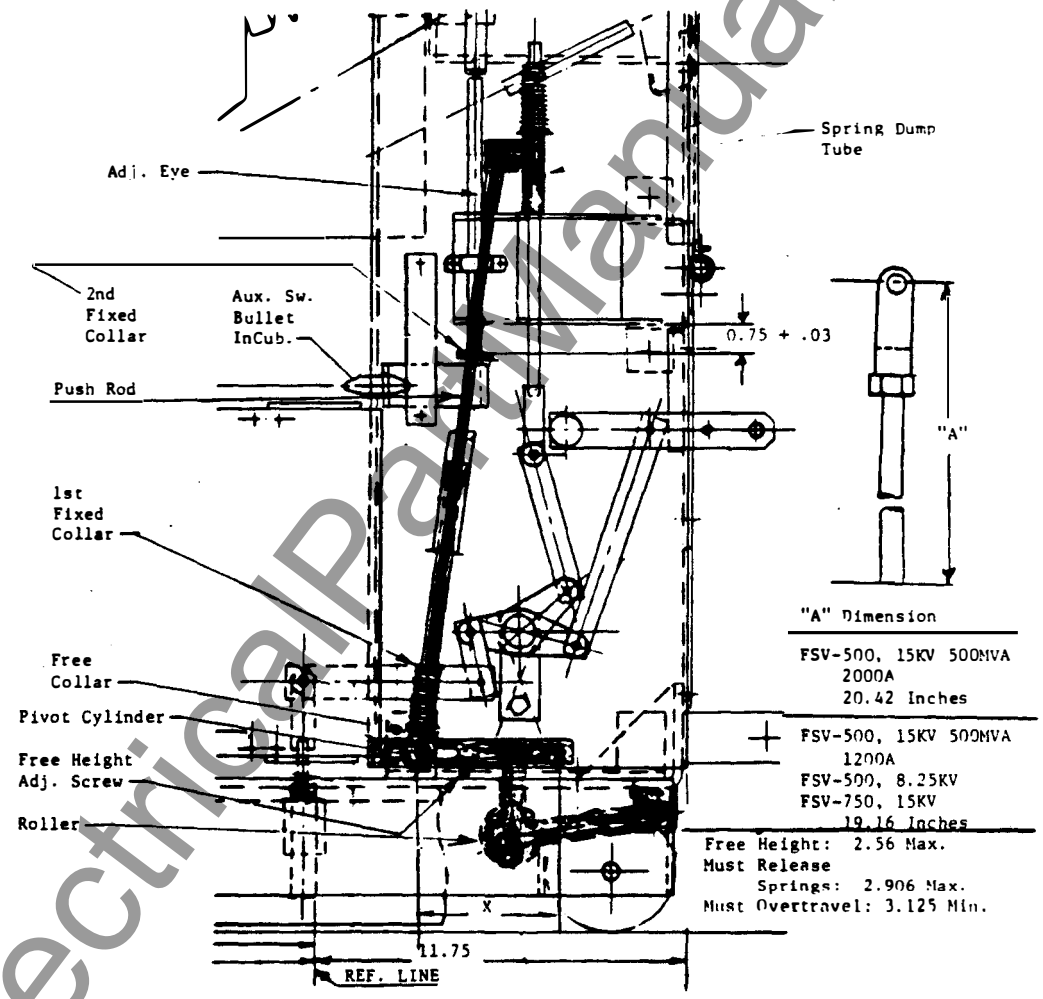

FIGURE 3 SPRING DUMP MECHANISM

(M12) IX. SPRING DUMP ADJUSTMENT (CONT.)

Run the "2nd fixed collar" up to the horizontal brace, and set firmly with two set screws.

Establish roller free height by setting the free height adjusting screws. Bottom surface of the roller must be set at a maximum of 2.56 inches from floor or reference plain.

Check to make certain that the cylinder pivot is loose and that the "1st fixed collar" and group of bellville washers are free to adjust. (Suggest temporarily moving these items up the pushrod and lightly setting them in place).

Free clamp on spring dump tube and allow the tube to move downward until the spring dump tube is flush to the guide bushing on the inside of the mechanism enclosure. Clamp spring dump tube in this position. Adjust the cylinder pivot to dimension "X" as shown in Figure 2 and tighten firmly in place. Note: be sure to rotate cylinder pivot toward rear of breaker to ensure slot is positioned to enable full angular motion.

Free collars and bellville washers allowing this group of parts to bear on the "cylinder pivot". Press downward on the upper collar, 1st fixed collar of Figure 3, and securely set it in place with two set screws. The bottom collar nearest the cylinder is to remain free.

Charge the breakers closing springs, and raise roller to a height of 2.9 inches. The charging springs should automatically be released.

If spring release does not occur dimension "X" must be iteratively increased in small increments followed by resetting the first fixed collar until automatic spring discharge is consistently achieved.

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(M13) X. FRONT BARRIER

Install and set to fixture dimensions.

After completing adjustment drill two 0.190 ± .003 holes through each hinge and crossbrace. Drive two roll pins through each hinge and crossbrace.

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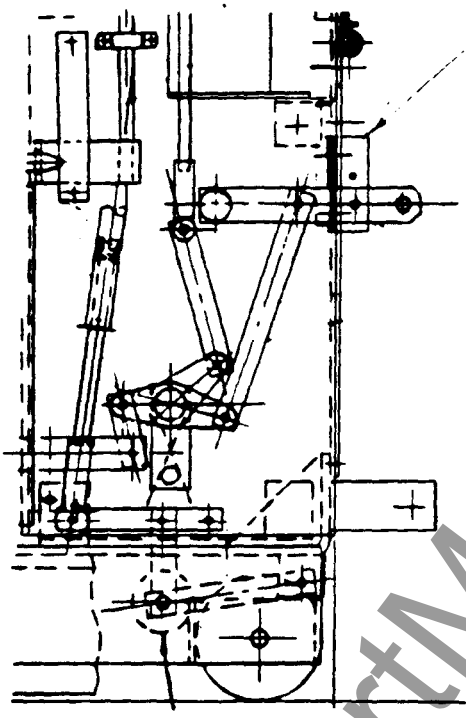
SIZE REQUIRED (M15) SHEET NO

XI. PADLOCK PROVISION ADJUSTMENT



Having completed racking interlock and spring release adjustments, install lower front cover.

Mount padlocking angle with fasteners just set to a snug condition. Lift breaker release handle to point where breaker is trip free and the plunger is not more than 2.25 inches from floor.

Tap padlocking angle into the position where its hole aligns with the hole in the racking release lever.

Mark this position release handle and tighten securely the padlocking angle hardware.

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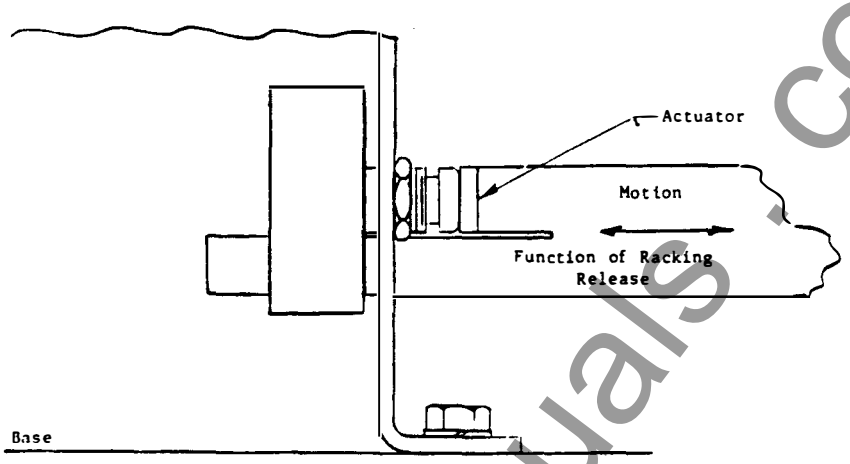
TOP LEVEL *18-471-243-434	N	01.1884	18.740.886.401	01

15KV VEHICLE ADJUST.

SHEET NO 8 OF 9F

XII. ELECTRICAL INTERLOCK - RACKING RELEASE SYSTEM



After completing all "racking release adjustment", the interlock shown above must be set.

With "racking release handle" in its fully depressed position, free switch and rotate bushing through the wall of the wiring enclosure. The switch operator will bear against the actuator pad. Continue rotating until switch operates, distinctly heard click, and then beyond this point by at least one full turn. Orient body of switch as shown, and secure with jam nut.

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15KV VEHICLE ADJUST.

SHEET NO 9 OF 9

H-2 VACUUM CIRCUIT BREAKER VEHICLE ADJUSTMENTS

The following settings and adjustments apply to the H-2 Circuit Breaker, and must be performed in addition to those described in drawing series #18-740-886-402 for the vacuum breaker.

Generally, adjustments must be performed in the assembly fixtures 34-325-088-601 and 34-325-089-601. Final settings in selected areas require pinning after achieving fixtured settings.

M1 I. RACKING BLOCK SETTING

The racking block, Item 2 of 18-477-760-521, is set in the assembly fixture, 34-325-088-601. A dimension of 7.937 ± 0.01 is set from the panel end surface of the block to the pole support plate mounting surface. The racking blocks on each side of the vehicle must be set to this dimension and securely fastened.

After fixturing, two holes, 0.187/0.192 dia., are to be drilled through the side frame and racking block. Two 0.187 spring pins are to be driven into these holes to ensure racking block security.

M2 II. LATERAL ALIGNMENT WHEEL

Four (4) lateral alignment wheels are to be set in the assembly fixture 34-325-089-601. Two (2) wheels on the right-hand side of the vehicle, as observed from the panel end, are to be set at 0.375 inches from the vehicle's side frame. A line tangent to the periphery of these wheels must be perpendicular to the circuit breaker's pole support mounting surface with 0.010 inches.

Two (2) remaining alignment wheels on the opposite side of the vehicle shall be set on a line of peripheral tangency parallel to that of the right-hand wheels and displaced 29.75-0.03 inches, parallelism to the opposite wheels is required within 0.010 inches. After completing each setting, secure two mounting bolts at each wheel support bracket.

After fixturing each set of wheels, the wheel mounting brackets and supporting angle shall each be thru drilled, 0.187/0.192 diameter, in two places, and 0.187 spring pins driven in place to ensure wheel alignment secureness.

M3 III. PRIMARY STUD ALIGNMENT

- Lateral displacement from right-hand lateral alignment wheels external periphery 4.065 ± 0.030
- Lateral phase spacing 10.812 ± 0.030
- Vertical phase spacing 12.500 ± 0.030
- Vertical phase alignment relative to track roller bearing surface.
  - -- Lower Primary Vertical Center Line 0.312 ± 0.030
  - -- Upper Primary Vertical Center Line 12.188 ± 0.030

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GENERAL TOP LEVEL DRAWINGS
FINAL TRUCK ASSY 18-477-760-621 D
FINAL BRKR ASSY 18-477-760-590-645 & 650 D
N 4-17-86 18-743-755-401 01
H-2 VEHICLE ADJUSTMENT
SHEET NO. 1 of 6
DRIVE REQUIRED M11
PRINTED IN U.S.A. FORM NO. 8972-168A

M-4 IV. SECONDARY DISCONNECT SETTING

Align and Set to Fixture Dimensions

- Outboard secondary bayonet elevation to track roller bearing surface: 10.688 ± 0.030.
- Lateral displacement from right-hand alignment wheels external periphery: 4.500 ± 0.030
- Fore and aft alignment, active side of molded connector housing is displaced 9.750 ± 0.030 from racking block surface.

Secure bracket mounting hardware. Check that screws mounting connector housings have been freed one turn to allow the contact housings to "float" into final alignment upon meeting their mating contacts.

M-5 V. GROUNDING FINGER SETTING

Align and set to Fixture Dimensions

- Rearward extension of grounding bar from racking block reference: 11.938 ± 0.030
- Lateral displacement from alignment wheel periphery to near side of ground bar: 2.062 ± 0.03

M-6 IV. CONTINUOUS CURRENT INTERLOCK

Install interlock bar(s) by mounting with specified fasteners through prepared holes in base.
See 18-740-568-529(T) for mounting appropriate to the circuit breaker's rating.
Interference block locations are established vertically from the track roller bearing surface and laterally from the right-hand alignment wheel's outboard periphery.

- Vertical Extension
  -- Long Blocks, 18-658-017-079, -12.00 ± 0.06 inches
  -- Short Blocks, 18-658-017-080 -11.25 ± 0.06 inches
- Lateral positions to near surface of each block:
  -- 1st Pos. 14.813 ± 0.058
  -- 2nd 15.563
  -- 3rd 16.313
  -- 4th 17.063
  -- 5th 17.813
  -- 6th 18.563
  -- 7th 19.313
  -- 8th 20.063

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	H-2 VEHICLE ADJUSTMENT			SHEET NO. 20F6

M-7 VII. RACKING INTERLOCK AND SPRING DISCHARGE SYSTEM ADJUSTMENT

Racking interlock adjustment is performed by carefully presetting the trip free components, and then proving the required performance by functional tests. Adjustments prerequisite to the functional trails include the following:

The actuator should be installed as shown in Figure #1. The actuator's smaller diameter should be passed through the foot of the shorter lever and cotter pinned in place.

Free the "racking interlock adjusting screw," and raise the long lever to elevate the "pushrod." The pushrod should be raised until the "trip pushrod cam" just contacts without displacing the "trip latch lever." Capture the long lever in this position by advancing the "racking interlock adjusting screw" until it bears on the short lever. Secure jam nut.

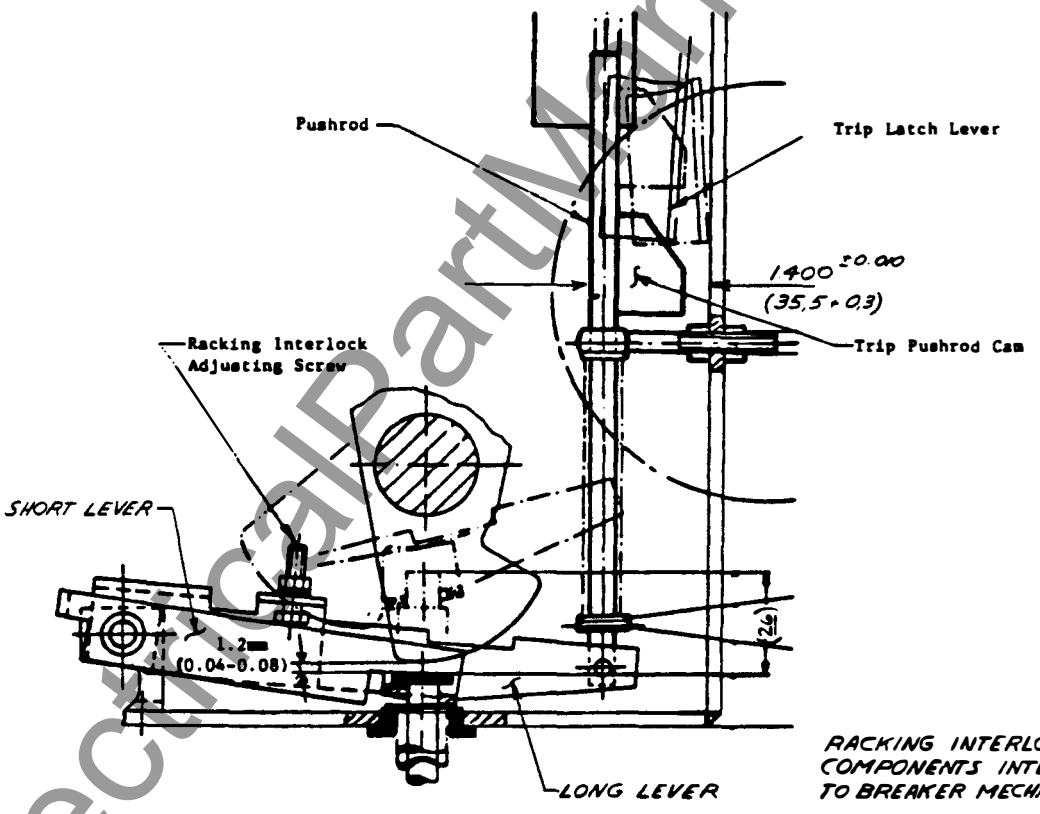

FIGURE 1

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H-2 VEHICLE ADJUSTMENT				3 of 6

The actuator may now be preset. The trip free roller shall be gaged at 1.534 from the vehicle's side frame, Dimension "A."

The actuator, shown in Figure 3, may now be set by freeing the "actuator adjustment nut." Once freed, the actuator is screw up or down until the edge of its large diameter is flush with the inside surface of the mechanism enclosure. After completing this setting, the "actuator adjustment nut" should be secured.

Having completed these adjustments, proceed to perform functional tests.

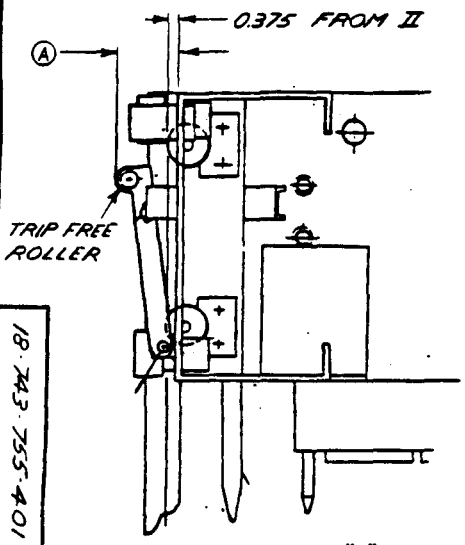

FIGURE 2
TRIP FREE ROLLER ASSY.

CLOSE FUNCTION: "A" dimension set at 1.534. Charge breaker and close, breaker must consistently complete each close operation.

TRIP FREE FUNCTION: "A" dimension set at 1.279. Charge breaker and initiate close operation. The breaker must be "trip free." That is, the closing springs must discharge with no displacement of the breaker shaft.

SPRING DISCHARGE: Charge closing springs and move the roller to an "A" dimension of 0.909. The closing springs must discharge before this dimension is reached.

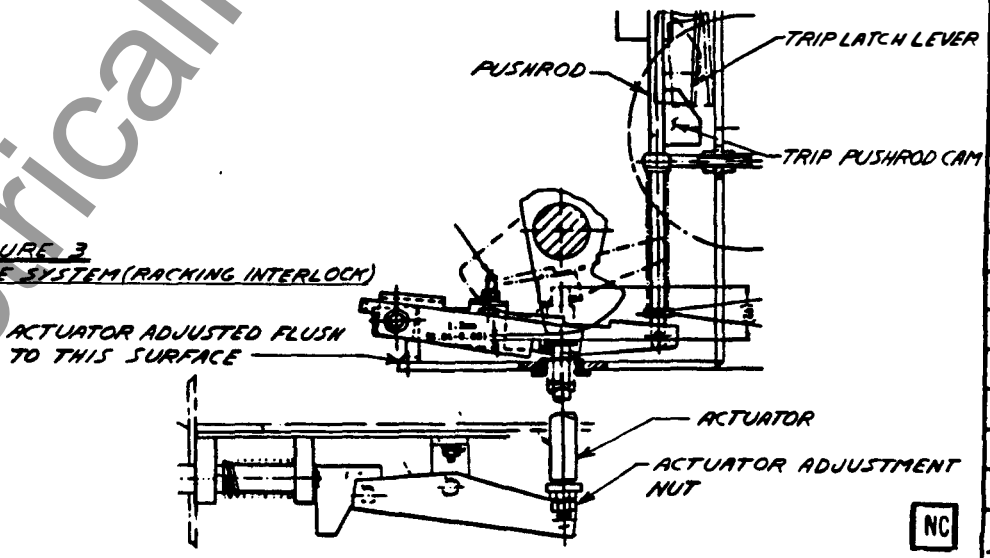

FIGURE 3
TRIP FREE SYSTEM (RACKING INTERLOCK)

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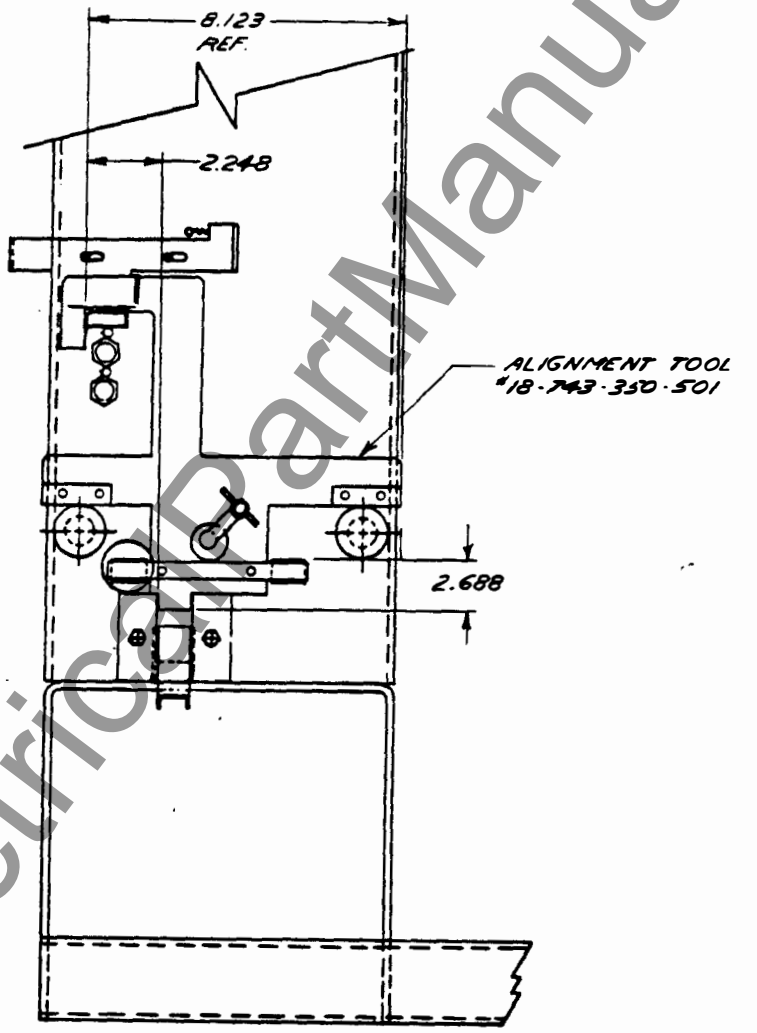
VIII. CLOSE SIGNAL LEVER LATERAL ALIGNMENT

The close signal lever's lateral alignment is established by the fixture guided installation of a "U"-shaped bracket, 18-658-111-170.

An alignment tool, 18-743-350-501, is applied as shown in the figure below. The "U" bracket is positioned in depth and height by the alignment tool.

Once in position, an 0.219 diameter hole is prepared using a hole in the "U" bracket as a guide. An 0.25-20 self-threading fastener is then applied to secure the bracket in one place. After confirming position and freedom of lever motion, a second 0.219 diameter hole is prepared and the second fastener secures the bracket in final position. See 18-840-231-802 if further detail is required.



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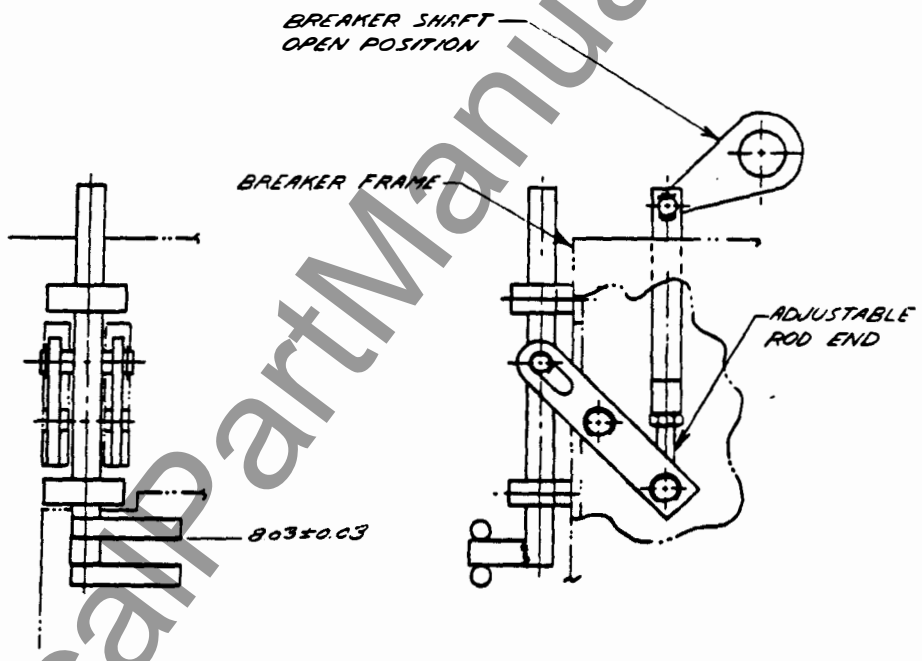
H-2 VEHICLE ADJUSTMENT				SHEET NO 5 of 6

M10 VIX. REMOTE AUXILIARY (MOC) SWITCH ADJUSTMENT (OPTIONAL FEATURE)

The mechanism which operates cubicle-mounted auxiliary ("MOC") switches is set in the fixture to appropriate elevation. The required elevation dimension is 8.03 ± 0.03 inches with breaker open relative to the track roller bearing surface.

Adjustment is made by dismounting and rotating the adjustable rod end as shown to the left.



M11 X. CELL (TOC) SWITCH STRIKER ADJUSTMENT (OPTIONAL ITEM)

The cell switch striker is defined as Item 8 of truck assembly Drawing 18-477-760-521. The striker consists of an annular bracket which is set to the dimensions given below in the referenced fixtures:

- Vertical position is set by the truck frame weldment.
- Depth is to be taken at 6.50 ± 0.03 off racking block reference surfaces.
- Lateral position is taken at 12.94 ± 0.03 inches from the outboard periphery of the right-hand alignment wheels. The adjustments of Article II are prerequisit to this setting.

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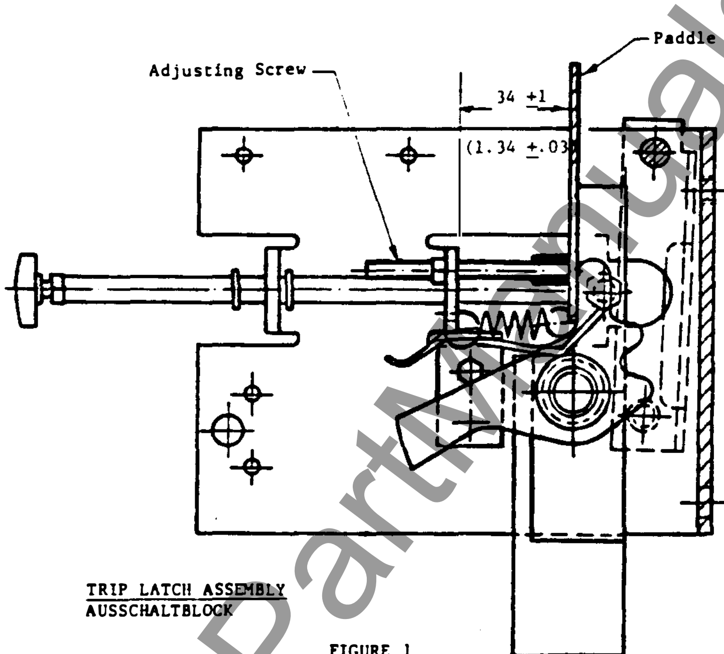
		M-2 VEHICLE ADJUSTMENT				SHEET NO 6 of 6

3AF VACUUM CIRCUIT BREAKER

1.0 TRIP LATCH ADJUSTMENT, PRELIMINARY



TRIP LATCH ASSEMBLY
AUSSCHALTBLOCK

FIGURE 1

409-00590

This adjustment sets trip latch in position to ensure it ability to support the breaker bell crank under torque loads imposed by the tripping springs. This adjustment is usually required during the mechanisms initial assembly. Set adjusting screw to establish indicated dimension between latch paddle and trip latch support frame. Secure adjustment by fastening jam nut.

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