Tie Installation, Gare and Operation of Circuit Breakers and Accessories

TYPE "P" HOVABLE PORTION HC 750A/1000A RUPTAIR MACRISTIC POWER CIRCUIT BREAKER AND AUXILIARY EQUIPMENT

(SOLENOID OFERATOR)

BOOK BUX=6590)

These instructions are not intended to cover all details of variations that may be encountered in connection with the installation, operation, and maintenance, of this equipment. Should additional information be desired tontest the Allis-Chalmers Mfg. Company.

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Contact Lead

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ILLUSTRATIONS FOR MAGNETIC BREAKER AND AUXILIARY EQUIPMENT

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SECTION - S

CAUTIONS TO BE OBSERVED IN THE INSTALLATION, OPERATION, AND MAINTENANCE OF

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AIR MAGNETIC CIRCUIT EREAKERS

- 1. Examine breaker when delivered and report any SHIPPING DAMAGE.
- 2. Breaker shipped TIED in CLOSED POSITION.
- 3. Remove SHIPPING BRACES and FASTENINGS.
- 4. Moist breaker only with SPREADER avoid SHORT HITCHES.
- 5. Barrier stacks are shipped in SEPARATE CONTAINERS.
- 6. Store to keep breaker and barrier stacks CLFAN and DRY.
- 7. Operating power LEADS must be large enough to avoid VOLTAGE DROP.
- 8. Before adjusting or repairing, disconnect breaker from all sources of POWER and see that breaker is OPEN.
- 9. Unbolt MOVING END ARC RUNNER AND ARC CHUTE SUPPORT before tilting arc chutes.
- 10. Barrier stacks require SPECIAL HANDLING to avoid damage.
- 11. Avoid CLEAN ING FLUIDS detrimental to insulation or paint.
- 12. Keep GRAPHITE off insulation under penalty of replacement.
- 13. Do not dress Silver Contact surfaces.
- 14. Install barrier stacks before ENERGIZING breaker.
- 15. Do not close energized breaker with MANUAL CLOSING DEVICE except when equipped with stored-energy closer.
- 16. Reconnect MOVING END ARC RUNNER and ARC CHUTE SUPPORT before ENERGIZING breaker.

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PART 1 - INTRODUCTION

1.1 GENERAL

Allis-Chalmers power circuit breakers are the products of advanced research and design. They are precision electrical equipment, tested to current ASA, EEI, and NEMA Standards, and manufactured in accordance with highest standards.

1,2 PROPER CARE IS ESSENTIAL TO GOOD SERVICE

The successful operation of this circuit breaker depends on proper installation and maintenance as a complement to quality design and fabrication.

The information and instructions included in this book are to aid you in installing and maintaining these units so that you will obtain the highly satisfactory service of which they are capable.

The following numbering system has been adopted for ready reference in this instruction book:

1.2 - Refers to Section #2 of Part 1

4-220 - Refers to item #220 on illustration marked Figure 4

Please pass this information along to your engineers, erection personnel, and servicemen who will then be better able to aid you in realizing the best service from this equipment.

1,3 and enipping

During assembly and when circuit breakers are completed, they are subjected to a series of tests and inspections. Packing is expertly done to assure maximum protection during shipment.

1.4 RECEIPT

Upon receipt of the circuit breaker remove all packing traces and examine the breaker and auxiliary equipment carefully to see that no damage has occurred during transit. If any injury is disclosed, a claim for damages should be filled at once with the transportation company and the Allie-Chalmers Manufacturing Company notified.

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1.5 STORAGE

If the breaker cannot be set up immediately in its permanent location, and it is necessary to store the equipment, it should be kept in a clean dry place and rotected from dust, the action of corrosive gases, from coal combination products, etc., and from mechanical injury.

1.6 REMOVE SHIPPING SUPPORTS

This circuit breaker has been shipped looked in the closed position. Packing braces that were installed to hold moving parts stationary in transit, must be removed. Fastenings installed to hold moving components of auxiliaries in closed position during transit must be removed.

1,7 HANDLING

In moving a circuit breaker after shipping crates or supports have been removed, and in handling the breaker with a crane or hoist, hooks should be attached only to special supports provided for the purpose and a spreader used where necessary to prevent distortion of frame members. Avoid short hitches which could place too much strain on parts of the breaker such as bushings, insulating parts, fittings, etc., which are not designed primarily for structural strength.

1.8 PRE-INSTALLATION SERVICE

Circuit breakers are completely set up, adjusted, and tested at the factory. However, since there are possibilities that adjustments or fastenings may have become loosened during shipment, storage, and installation, they should be checked thoroughly and corrected where necessary as described hereinefter before energization. The breaker should be operated several times manually at first, and then electrically, prior to and after installation in posticion before the breaker is ready for service.

Bushings and other insulating parts should be clean and dry. All contact surfaces should be inspected to see if they are clean and smooth. (Do not dress silver surfaces.)

PART 2 - INSTALLATION

2.1 GENERAL

Although the circuit breaker was completely adjusted, tested and packed for any imum protection in transit, it is necessary that adequate steps be taken to prepare the unit for installation.

2.2 REMOVE SHIPPING BRACES

Breaker is shipped in closed position with closing springs discharged. Barrier stacks (21-25)* are shipped in separate containers. Remove all shipping braces and fastenings used to hold trip latch (4-27) and other moving parts of breaker and auxiliaries.

2.3 PREPARE BREAKER FOR INSPECTION

Prepare breaker for installation inspection and servicing outside of cubicle. Remove phase barriers (see Section 6.3a); remove screws (21-37) and screws (21-39) on all three phases; install are chute lifter and tilt back are chutes to expose interior of breaker (see photos).

2.4 INSPECT AND CHECK BREAKER

Examine for any moisture, dirt and other foreign material, which could impair optimum breaker performance.

Close breaker with maintenance closing handle. Watch operation of operator linkages and contacts carefully. Contacts should mate properly but need not make at same time on all phases. Trip manually (21-43).

Operate breaker several times electrically to check for smooth operation.

2.5 INSTALL BARRIER STACKS

Lower arc chutes; remove arc chute lifter; replace screws (21-37) and screws (21-39) in all phases. Remove tubes (26-18) and defelectors (21-28) and (21-29) (see Section 5.3b). Install barrier stacks taking care that slotted refractory plate slips between arc runner and its guide (see Section 5.3b).

Replace tubes and deflectors. Note center deflector differs from outer ones (see Section 6.3b).

Replace barriers and panel springs.

2.6 INSERTION MECHANISM

The breaker insertion mechanism should be checked and lubricated if necessary for proper operation to prevent jamming during insertion. The breaker should be moved into position so that it can be rolled straight into the cubicle with a minimum of friction on the wheels and guides in the cubicle.

2.7 GROUNDING CONTACTS

Check to see that grounding fingers (21-12) on bottom of breaker will make proper contact with stationary ground bar in cubicle. Check for proper grounding contact when breaker is moved into cubicle.

2.8 MECHANICAL INTERLOCKS

Test mechanical interlock plunger (21-18) and make sure that it operates freely and has no binds nor interference.

2,9 POSITIONS IN CUBICLE

Move the breaker into each of its three positions in the cubicle; disconnected position, test position, and operating position. Test to rule sure that breaker can be closed electrically only in its position and in its operating position. Then a suitchboard has more than one of this type of the same size and rating of circuit breaker, each circuit brocker chould be tried in each of the three positions in several cubicles to assure interchangeability.

2,10 OPERATE IN TEST POSITION

The breaker should be operated several times electrically in its test position to see that all parts work correctly in final preparation for its operating position. Hake sure that secondary contacts of breaker are in clipment with secondary contacts in the cubicle.

Move the breaker slowly to its operating position. Check alignment of all air breaker contacts for proper engagement with the orbital privary stude. The alignment of breaker and subicle primary contacts should be close enough so that the contact fingers on the breaker will mesh with the stude in the subicle without jamming. In the operating position in its subicle, the Allis-Chalmers RUPTAIR'air magnetic circuit breaker is ready for energization and operation within its rating.

PART 3 - BREAKER OPERATION

3.1 GENERAL (Fig. 4)

A sold operator is an integral part of this type of breaker unit: (For breakers equipped with the stored energy closer, see separate instruction book.) It is mounted in the lower section of breaker and is contained within the breaker frame. The operator is furnished with a mechanically trip-free mechanism consisting of a toggle linkage so designed as to provide quick and positive tripping at any position of the closing stroke. The operator mechanism is of low inertia, capable of quick acceleration, and it is equipped with a low energy trip device and opening coil designed to provide high speed release of the trip mechanism upon energization of the trip coil.

3.2 CLOSING (Fig. 13)

Figure 13 shows the mechanism of the operator in the open position. Points "B", "G", and "H" are fixed centers about which crank arms (2) and (3), link (6), trip latch (9), and prop latch (10) rotate respectively. Center "E" is a temporarily fixed center, being restrained by stop (11) and latch (9) as long as latch (9) is in position.

The closing force is applied at the toggle roll (D) by means of armsture (12). The toggle linkage (4) and (5) moves towards the on-center or in-line position, thus rotating crank arms (2) and (3) counterclockwise about center "B". Movement of crank arm (2) closes the breaker and compresses the breaker opening springs (7). When links (4) and (5) reach their final position, prop latch (10) drops behind center "D" to lock the mechanism in the closed position as shown in Fig. 14. After closing the breaker, armsture (12) returns to its normal position. Manual closing is as described except that armsture (12) is actuated manually through the manual closing device.

3.3 OPENING (Fig. 15)

Opening of the breaker is accomplished either manually or electrically. Manually, the breaker is tripped by pushing on the trip button which in turn causes trip pin (13) to move downward, thus rotating trip latch (9) in a clockwise direction. Temporarily fixed center "E" is thereby released, enabling link (6) to rotate clockwise about center "F". Since the restraining force on opening springs (7) is now released, they act to rapidly open the breaker contacts. Reset spring (8) then acts to return the mechanism to the normal open-position shown-in-Fig. 13.— Electrical tripping is as above except that trip pin (13) is actuated by trip coil (14).

The tripping action described above can take place at any time during a closing operation, either manual or electrical, and regardless of whether or not the armature is energized. Thus the mechanism is electrically and mechanically trip-free in any position.

Part 4 - adjustments

4.1 GENERAL

The tracker has been completely set up, adjusted and tested at the factory. However, adjustments or fastenings may be changed or become loosened during shipment, storage or installation and should be checked and corrected, if necessary, before breaker is operated electrically. Manual operation (use maintenance closing device) of breaker should be used for preliminary operation to see that all parts are free and work smoothly. The bushings and other insulating parts should be clean and dry. All contact surfaces should be inspected to see that they are clean and smooth. (Do not dress silver surfaces.) Removal of all phase barriers and removal or raising of arc chute assemblies gives access to breaker for checking adjustments.

CAUTION: NOTE THAT THE MAINTENANCE CLOSING DEVICE IS NOT SUITABLE FOR ACTUATING THE HREAKER ON EMERGIZED CIRCUIT.

The paragraphs immediately following give the proper adjustments and methods of making same on the Allis-Chalmers RUPTAIR Air Magnetic Power Circuit Breaker. Adjustment values are all listed in Appendix B attached. Note reference method - Appendix B-1 indicates item #1 in Appendix B.

4.2 OPENING SPRINGS

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The opening springs (21-31) are fixed in adjustment such that with the breaker in the fully closed position the springs will be compressed to a length which will provide the opening velocity of 10 to 14 ft/sec. in the first three inches of movement measured at the radius of the arcing contact "touch" point. Changes in adjustment are not necessary and no provision is made for changing spring reaction.

4.3 TOGGLE SETTING (Pig. 4)

tith the breaker closed and armsture (4-4) held with maintenance closing device against pole head (4-72), the armsture must push the toggle roll (4-15) to a point which will provide a clearance of $1/32 \pm 1/64$ with the prop latch (4-97), and $1/16 \pm 1/32$ clearance to stop (4-59).

4.4 OPERATOR MECHANISM MAIN LATCH AND PROP LATCH (Fig. 4)

The main operator latch (4-27) is in proper adjustment when the latch roll (4-15-4) engages it at a point $3/16 \neq 0$, -1/16 from the bottom edge of the latch face (4-27). Changes in adjustment are made by positioning stop screw (7-4). The latch roll stop screw (4-75) should be positioned such that the latch roll will have a clearance of $1/32 \pm 1/64$ between the latch roll and the latch face. The prop latch (4-97) is normally adjusted such that it engages the toggle roll (4-15) at a point 1/8 to 3/16 from the bottom edge of the latch. Adjustment is made by using spacers (4-99). Latch adjustmenta, once properly made, are permanent in nature and will not normally require readjustment in service.

4.5 AUXILIARY SWITCH (Fig. 11)

The auxiliary switch, located at the rear of the break as been adjusted at the factory and should not normally require further adjustment. However, before the breaker is placed in service a check should be made to see that the crank arm (11-10) throws approximately equal distances on either side of a vertical center line. The adjustment for throw of crank arm is made by positioning the clevis on the auxiliary switch connecting rod. After correct adjustment is made, make sure all fastenings and locknuts are secure. Each rotor (11-3) can be adjusted individually in steps of 15 degrees merely by pressing the contact to one side against the spring and rotating it within its insulated rotor housing until it snaps into the desired position. Any changes made on this switch should be done carefully.

4.6 LIMIT SWITCH (Fig. 4)

The limit switch is located on the front of the operator frame and contains both the "a-a" and "b-b" stages of limit switch contacts. The switch has been adjusted correctly before leaving the factory. However, a check should be made to see that, with the breaker open and actuating lever (4-41) against the roll pin (4-56), there is 1/16 to 1/8 overtravel of limit switch plunger after "b-b" contact make. Adjustments are made by use of screw (4-51). With the breaker closed the "a-a" contacts will be closed and no adjustment is necessary.

4.7 LATCH CHECK SWITCH (Fig. 12)

The latch check switch (12-175) is mounted on the right side of operator frame together with switch operating arm (12-171). Proper adjustment has been made prior to shipment. However, a check should be made to see that plunger on the latch check switch (12-175) has a clearance of 1/32 to 1/16 with operating arm (12-171). Adjustments are made by use of spacer (12-173).

4.8 INTERLOCK PLUNGER (Fig. 21)

The foot lever (21-20) operates the interlock plunger (21-18) as well as the trip latch. Depressing the lever trips the breaker and raises plunger (21-18) sufficiently to release the breaker allowing it to be moved in the cubicle. The interlock is in proper adjustment when the plunger (21-18) is positioned to $1-3/4 \stackrel{1}{=} 1/16$ above the floor line, and causes tripping of breaker contacts when it is raised to a level not more than 2-1/16 above the floor line. The latch tripping rod associated with the foot lever should be clear of the trip latch (4-27) by 1/32 to 1/16.

4.9 TRIPPING UNIT (Fig. 7)

The shunt trip application as shown in Fig. 7 is factory set and should need no further adjustment. In proper adjustment, trip pin (7-14) should float freely on its spring and not have any binds. The travel of the trip armature should be such that slow manual actuation of the trip pin (7-14) will trip the breaker and have 1/16 to 3/32 aftertravel. Adjustments are made by use of spacer (7-22). Particular attention should be given this adjustment since latch stop screw (7-4) will be affected and require compensation any time that a spacer (7-22) is added or removed. Collar (7-18) should be set to provide 1/16 to 3/32 clearance between latch and end of trip pin.

4.10 DASHPOT (Fig. 10)

The two dashpots in the breaker are carefully adjusted in the factory with the use of a speed analyzer. In proper adjustment the opening curve of a speed analyzer chart should indicate minimum contact bounce with no perceptible flattening along the slope of the curve. Normally no further adjustment of the dashpots should be required. This adjustment is made if necessary by loosening band (10-25), rotating this band around tube (10-3) to vary the dashpot opening. The openings on the two dashpots in a breaker should be approximately of equal size.

4.11 CONTACT ALIGNMENT AND STROKE (Fig. 23)

The contacts are an integral part of the bushing assemblies and are carefully aligned with the upper and lower bushings before shipment and no further adjustment should normally be necessary. Check for proper contact alignment and, at the same time, for moving contact stroke by checking dimension c, View "AA", Fig. 23, between contact finger (23-11) and plate (23-7), on each side of bushing, top and bottom of each phase separately. It is not necessary that contacts touch simultaneously on all three phases.

When this dimension is found to be 1/16 t 1/64 at all four points in a phase, both the alignment of the contacts and the stroke of the moving contact of that phase are correct.

If this dimension is found to be different than 1/16 ± 1/64 but all four in any phase measure within 1/32 of each other, it is necessary to adjust the stroke of the moving contact of that phase (see Section 4.13). If this dimension is not within tolerance, and there is a difference of over 1/32 among the four measurements in a phase, it is necessary to first adjust the contact alignment (see Section 4.11, and then the stroke of the moving contact (see Section 4.13).

4.12 ADJUSTMENT FOR CONTACT ALIGNMENT (FIG. 23)

To adjust contact alignment, close and latch breaker. Loosen two screws (23-5) and two screws (23-6). Move top block (23-4) and bottom block (23-2) sidewise until dimension c, View "AA", Figure 23, is $1/16 \pm 1/64$. Refasten screws (23-5) and (23-6). Both the contact alignment and stroke will be in proper adjustment.

In the event that this exact dimension and tolerance cannot be obtained, move blocks (23-4) and (23-2) so that all four dimensions c in a phase are within 1/32 of each other. Contact alignment in this phase will then be in proper adjustment.

Care must be exercised in adjusting contact alignment to retain blocks (23-4) and (23-2) firmly against stops on stud.

4.13 ADJUSTMENT FOR STROKE (FIGURES 21 & 23)

This adjustment is accomplished by lengthening or shortening link (21-47) between operator mechanism and interrupter moving blade to bring dimension c, View "AA", Figure 23, to 1/16 ± 1/64. Open breaker, remove pin (21-46), low checknut, and adjust the length of link (21-47) by screwing rod end in or out as required to bring this dimension to within tolerance in all four measurements in the phase. Make up checknut, replace pin (21-46), insert and spread cotter pin. The stroke should be adjusted in each phase individually.

4.14 CONTACT LEAD (FIG. 23)

Contact lead is adjusted on breakers in the factory and should normally not require further adjustment. It should, however, be checked on each phase separately and only with contact alignment on the phase in correct adjustment.

In order to prepare breaker for contact lead check and adjusting, be sure that breaker is open and disconnect the movable contact from operator link (21-47) by removing pin (21-46) and two spacers (21-45). Bring movable arcing contact (23-10) so that it just touches the stationary arcing contact (23-9) as shown in Fig. 23, View "AA", (Arcing Contacts Engaging). Measure dimension a, Figure 23, the shortest gap between the two tertiary contacts, and dimension b (View "AA", Figure 23), the shortest gap between the main contacts. Dimension a should be 5/32+0, -1/32 and dimension b should be 5/16+1/16, -1/32.

If the dimensions a and b are not correct, remove one roll pin from each plate (23-7), loosen eight screws (23-1). Insert a spacer 5/32 +0, -1/32 thick between the tertiary contacts, and apply a C-clamp bearing on rear of block (23-4) and front of movable contact (23-10). Tighten C-clamp to obtain dimensions b. With contacts held in this position, move two plates (23-7) back so that pins (23-13) are touching leading end of plate slots. Tighten eight screws (23-1); drill and insert pin to retain adjustment. Remove spacer, remove C-clamp, and reconnect movable contact to link (21-47).

PART 5 - MAINTENANCE

5.1 GENERAL

Safety of the operator and continuity of electric service of loads connected to circuit breakers are dependent upon proper operation of the breakers. In order to keep circuit breakers in proper order, it is recommended that a routine service inspection should be made at six month or 2000 operation intervals, whichever comes first. The actual service interval and the amount of servicing required will usually be determined by the particular conditions at the installation and will be influenced by such things as the number of operations, number of fault interruptions, cleanlings of the equipment and past experience with the equipment.

Servicing is usually intended to cover adjusting, cleaning, lubricating, tightening, inspaction, test, etc. A permanent record is usually desirable and should list for each serial number the date, operation counter reading, general condition of equipment and work done by servicemen.

Be sure that the breaker and its mechanism is disconnected from all electric power and that the breaker is in the open position before any maintenance is attempted.

5,2 CONTACTS

Enspect all contacts frequently, depending on severity of service. Roplaco badly pitted or burned contacts before they are damaged to such an entered to could improper operation of the breaker.

5.3 BARRIER STACKS

The barrier stacks are fragile and should be handled carefully. The barrier stacks should be inspected for erosion of the plates in the areas of the blots. The stacks should be replaced when a milky glaze is observed on the full length of the edges of most of the slots. They should be likewise replaced if plates are broken or cracked. When cleaning the breaker and cubicle, inspect for pieces of barrier stack refractory material which would obviously indicate breakage.

5.4 BREAKER TIMING

Check the contact adjustment and breaker timing, also check adjustments of numiliary equipment and see that it functions properly. A comparison of breaker timing at any period of maintenance with that taken when the breaker was new will immediately indicate a condition of maladjustment or friction should the timing vary more than 1/2 cycles on opening or 2 cycles on clowing with the same coils.

5.5 LUBRICATION

Inbrication is of the utmost importance and a special effort should be made to assure that all moving parts are kept clean and preperly lubricated at all times. The disconnect hinge joint and the solenoid armature are largested with microfine dry graphite. Graphite should be rubbed in well and all excess carefully removed.

CAUTION: GRAPHITE MUST HE KEPT OFF INSULATION UNDER PENALTY OF REPLACEMENT, AS IT CANNOT HE SATISFACTORILY REMOVED.

Bearing Pins and other moving parts should be lightly lubricated with a light film of "Aero Imbriplate" or equal. Needle Bearings will in general not require frequent lubrication, but care should be taken to prevent entrance of dirt and foreign material during maintenance work. Mating surfaces of main and arcing contacts should not be lubricated.

5.6 MAINTENANCE GUIDE

Refer to the attached "Schedule of Checks and Adjustments," Appendix A, for a digest of pertinent instruction book information, a guide to simple and convenient maintenance procedures. Make adjustments to values tabilited in "Circuit Breaker Adjustment Values," Appendix B Ottached.

PART 6 - REPLACEMENT PARTS

6.1 HOW TO ORDER

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When ordering replacement parts, it is very important to give complete information. This information should include:

- (1) Breaker serial number
- (2) Number of pieces required
- (3) Reference number
- (4) Instruction book number
- (5) Description of part (Use instruction book descriptions where possible)
- (6) Rated voltage of all motors, relays and coils ordered
- (7) Rated amperes of all motors, relays and coils ordered
- (8) Rated voltage of breaker
- (9) Rated amperes of breaker

The breaker serial number is necessary to determine the correct identity of a part; without this serial number, Allis-Chalmers Mfg. Co. cannot be sure of the correct identity of the desired parts.

If any doubt exists as to the instruction book reference or the description a dimensional sketch of the desired part will help to properly identify it.

6.2 RECOMMENDED SPARE PARTS LIST (BWX-6590)

It is recommended that sufficient parts be carried in stock to enable operators of circuit breakers to replace without delay any worn, broken, or cameged parts. A list of recommended spare parts follows and is arranged to facilitate choosing the correct parts for the breakers involved. Two collambon this list give the quantities recommended for an installation of one to five breakers and for an installation of five or more breakers.

			Recommend	for Stock
			1-5	5 or more
Ref. No.	<u>Description</u>	Drawing No.	Breakers	Breakers
21-3	Contact Finger Assembly 1200 Amps	71-201-738-501	2	۷.
	2000 Amps	71-201-458-501	2	6
	3000 Amps		2	6
		12 540 445 305	~	Ü
4-8	Coil (Closing)	71-207-740	1	1
•				
7-21	Coil (Trip)	71-200-745	1	1
21 -21	X-Relay	73. 207. 374. 503	-	_
	DC (less coil)	71-307-178-501	1	1
	DC (Coil)	71-207-181		1
	230V AC (with coil)	₩-643-201	1 1	1
07 07	115V AC (with coil)	W-643-208	Τ.	1
21-21	Y-Relay and coil 125V DC	W 513 206	1	1
	250V DC	W-541-306	1	i
	48V DC	₩-541-307 ₩-541-309	1	i
		W-643-211	i	ì
	230V AC 115V AC	W-643-212	1	1
	IIJV AC	M-045-212	1	T
21-25 a	Barrier Stack	71-302-776-501	2	6
<u> </u>	LETTICE BUSICA	11-302-110 301	~	-
23 - \$1	Contact Finger (Stationary)	71-111-458-501	10	30
~ ~	January,	12 170 702		
23-9	Arcing Contact (Stationary)	71-113-148-501	3	. 3
	(/)			•
23-10	Contact (Moving)	71-207-476-504	3	3
				10
23-25	Washer	71-111-446-001	4	12
0/ 5		77 207 100 502	2	2
26-5	Transfer Stack	71-207-489-502	3	3
21-21 •	Silicon Rectifier Assembly	71-111-26/-501	í	1
21-21	(for AC close)	11-111-204-701	-	-
	(TOL WO CTORE)			
21-21	Surge Protector	W-663-301	1	-1
4	(for AC close)		_	_
	(-01 110 0100)			

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6.3 REPLACING PARTS

Before removing any part, observe its function and adjustment. By so doing, it is usually possible to avoid any approximate amount of adjustment work after the installation of the replacement part.

CAUTION: HEFORE HEMOVING ANY PART, MAKE SURE THAT THE HREAKER AND ITS OFERATING MECHANISM IS DISCONNECTED FROM ALL ELECTRIC POWER AND THAT THIS EREAKER IS IN THE OPEN POSITION.

. 6.3a PHASE BARRIERS (FIG. 21)

Disconnect springs (21-41) and lower panel (21-32) to floor. Remove bar (21-26) and then two outer phase barriers (21-5). Next remove two screens (21-13), plate (21-8), bar (21-27) and channel (21-51) in order as listed. Slide out inner phase barrier assembly (21-9). Replace parts in reverse order making cortain that barriers are properly seated in their locating slots.

6.3b BARRIER STACK

To replace a barrier stack it is necessary to first remove the phase barriers. (See Section 6.3a) Next loosen two screws (21-50) and one screw (21-49) permitting tube (26-18) and deflector (21-28) or (21-29) to be removed as a unit. Note that the difference between inner and outer deflectors is the block to which bar (21-26) is fastened. This block extends beyond the rest of the deflector on the two outer phases.

The barrier stacks (26-23) can next be removed. Care must be taken as a slotted refractory plate fits between each guide (26-7) and each arc runner (26-3), and (26-4).

On Enstallation make certain the "Vee" slots of the barrier stack are domeward and that the slotted refractory plate slips between the arc runner and its guide.

On replacing the tube (26-18) avoid any twisting which could damage parts of the barrier stack. Tighten screws (21-49) and (21-50).

Replace phase barriers as described in section 6.3a.

APPENDIX A

SCHEDULE OF CHECKS AND ADJUSTMENTS

This tabulation is intended to serve as a ready reference for servicing of this equipment. Other items may be added as experience dictates. For a thorough understanding of the breaker, it is recommended that the instruction book be studied.

- 1 Breaker should be prepared for servicing outside of its cubicle. Breaker must be in the open position and disconnected from electric power. Remove p ase barriers (Section 6.3a) and raise arc chutes to expose breaker interior. Remove screws (21-37) and (21-39) prior to raising arc chutes.
- 2 Operate breaker with maintenance closing device to check general operation and freedom of movement.
- 3 Visually inspect all parts during all phases of servicing.
- 4- If a travel recording device is available, it will furnish an excellent indication of the mechanical operation of the breaker. Refer to Section 5.4.
- 5 Clean all parts of breaker. An air blower is useful in removing dust from generally inaccessible places.
- 6 Check operating mechanism toggle adjustment per Section 4.3.
- 7 Check trip latch (4-27) adjustment per Section 4.4.
- 8 Check latch roll stop screw (4-75) adjustment per Section 4.4.
- 9 Check prop latch (4-97) adjustment per Section 4.4.
- 10 Check trip pin (7-14) clearance per Section 4.9.
- 11 & Check trip pin (7-14) aftertravel per Section 4.9.
- 12 Check latch check switch (12-175) adjustment per Section 4.7. Check freedom of movement, lubricate arm.
- 13 Check limit switch (Fig. 4) adjustment per Section 4.6. Operate manually and electrically. Inspect to see that contacts are clean and make properly.
- 14 Check auxiliary switch adjustment per Section 4.5.
- 15 Check control relay for proper action.
- 16 Operation counter is actuated by a spring which should be adjusted for minimum force by positioning of the counter arm. Record counter reading.

APPENDIX B

CIRCUIT BREAKER ADJUSTMENT VALUES

Item No	Breaker Component	Reference Section No.	Illustration No.	Adjustment Values
र हिरा	Opening springs	4.2	10-4	10 to 14 ft./sec.
2	Clearance between toggle roll and proplatch	4.3	4-15 4-97	1/32 ± 1/64
3	Clearance between toggle roll and stop	4.3	4 –1.5 4–59	1/16 ± 1/32
4	Point of engagement latch roll and latch face	4.4	4-15-A 4-27	3/16 ÷ 0, -1/16
5	Clearance of latch roll and latch face	4.4	4-15-A 4-27	1/32 ± 1/64
6	Point of engagement prop latch and toggle roll	4.40	4–97 4–1 5	1/8 to 3/16
7	Limit switch overtrave	el 4.6	4-18	1/16 to 1/8
8	Latch check switch plunger	4.7	12-175	1/32 to 1/16
9	Interlock plunger above floor line	re 4.8	21-18	1-3/4 ± 1/16
10 00	Max. clearance plunger above floor line - to trip breaker	- 4.8	21-18	2-1/16
11	Clearance latch trip rod and trip latch	4.8	21-20 4-27	1/32 to 1/16
12	Trip pin aftertravel	4.9	7–14	1/16 to 3/32
13	Clearance - latch to end of trip pin	4.9	7 –14 7 –2 0	1/16 to 3/32
14 *	Dash pot	4.10	10-25 10-3	Many track and a second track to the

MAN COR STANDARD CORE

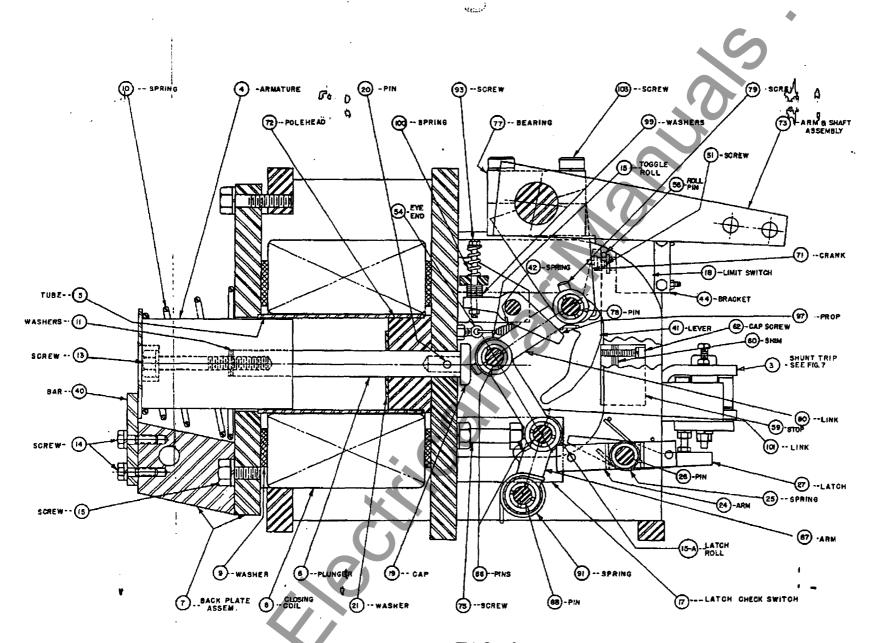


FIG. 4
TYPICAL OPERATOR ASSEMBLY
JUNEII,1958 71-500-163

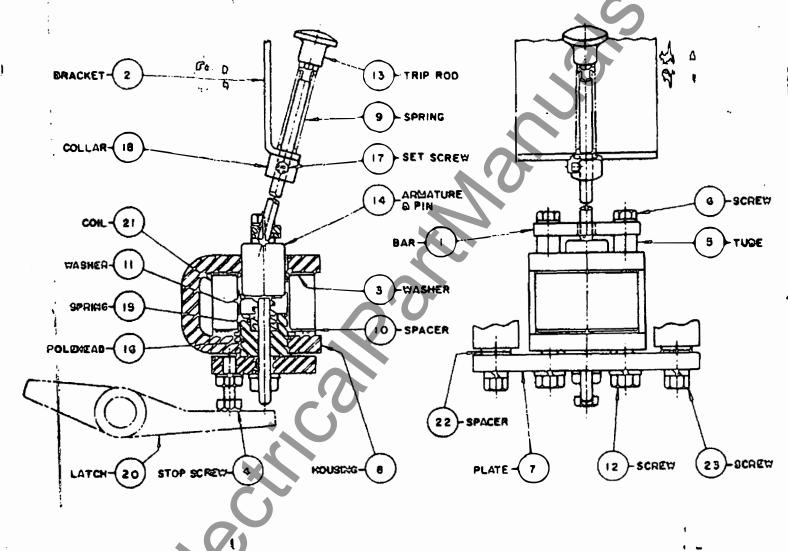


FIG. 7
TYPICAL SHUNT TRIP ASSEMBLY

JUNE 24, 1960

71-302-533

MAN COR STANDARD CORE

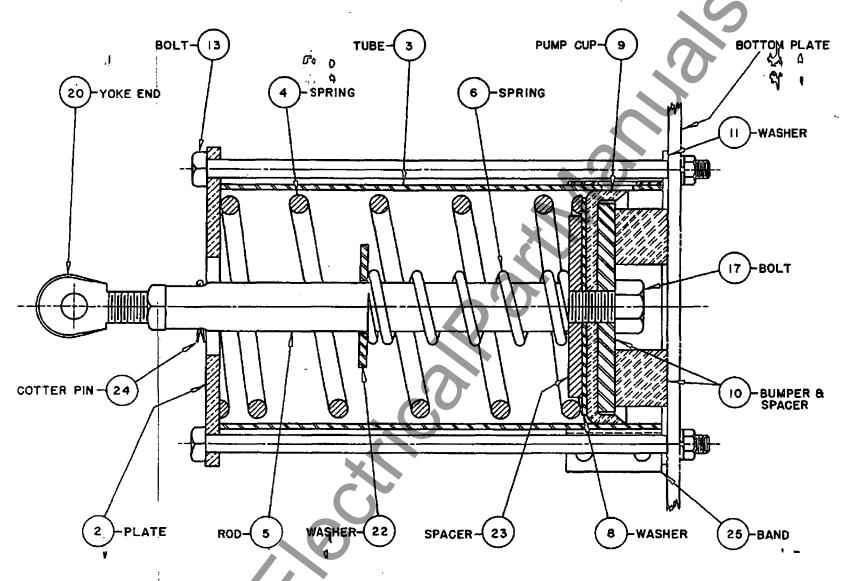


FIG. 10

DASH POT AND OPENING SPRING ASSEMBLY

APRIL 26, 1960

71-302-461

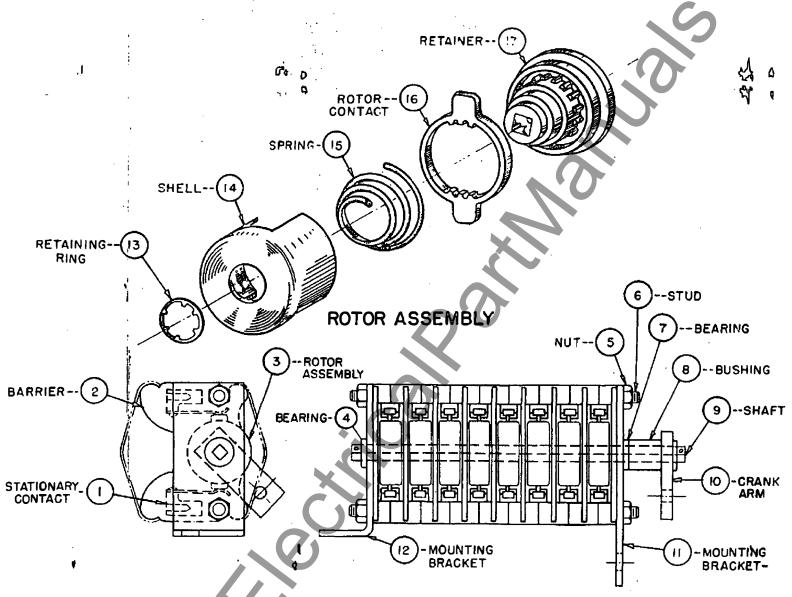
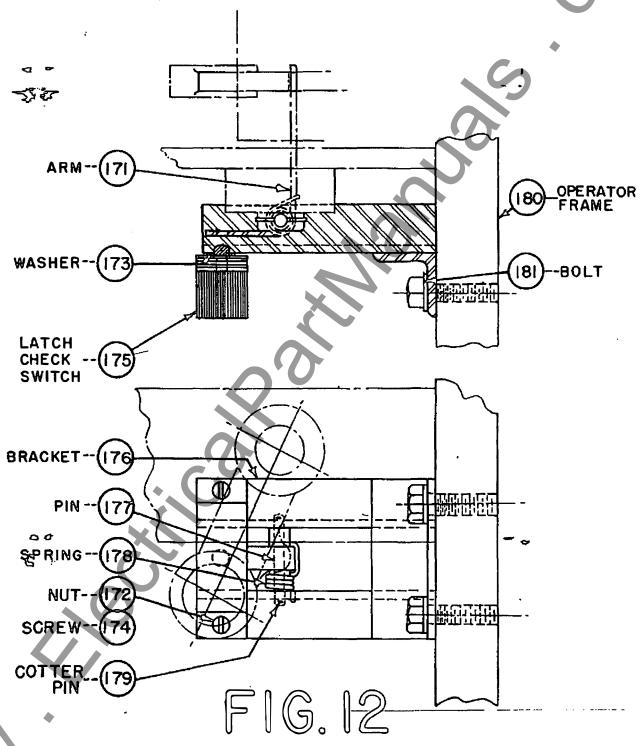


FIG. 11
TYPICAL AUXILIARY SWITCH
JULY 16, 1958 71-301-758

MAN CORE

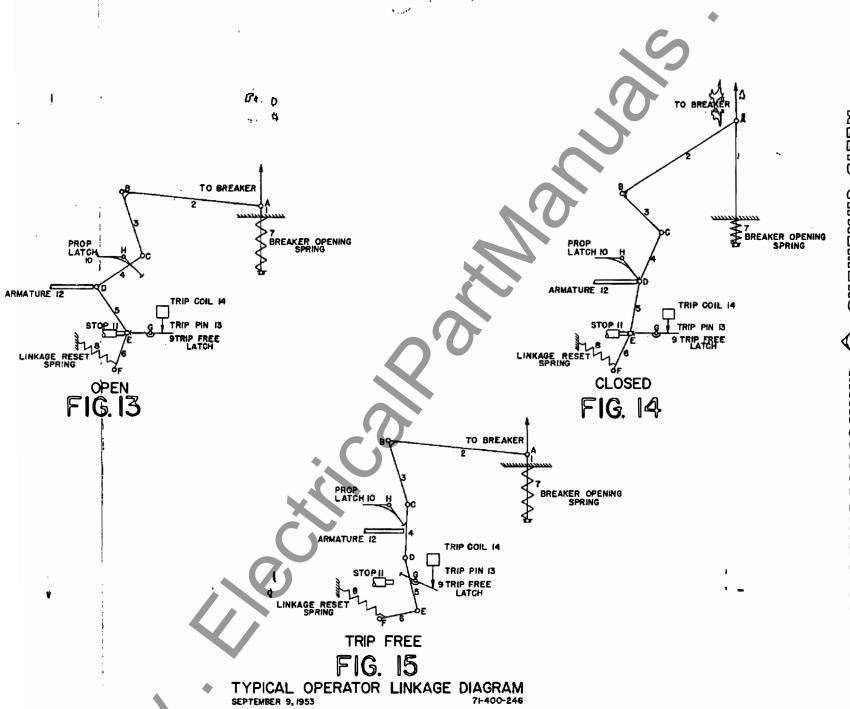
ALLIS-CHALMERS 📤 MANUFACTURING COMPANY

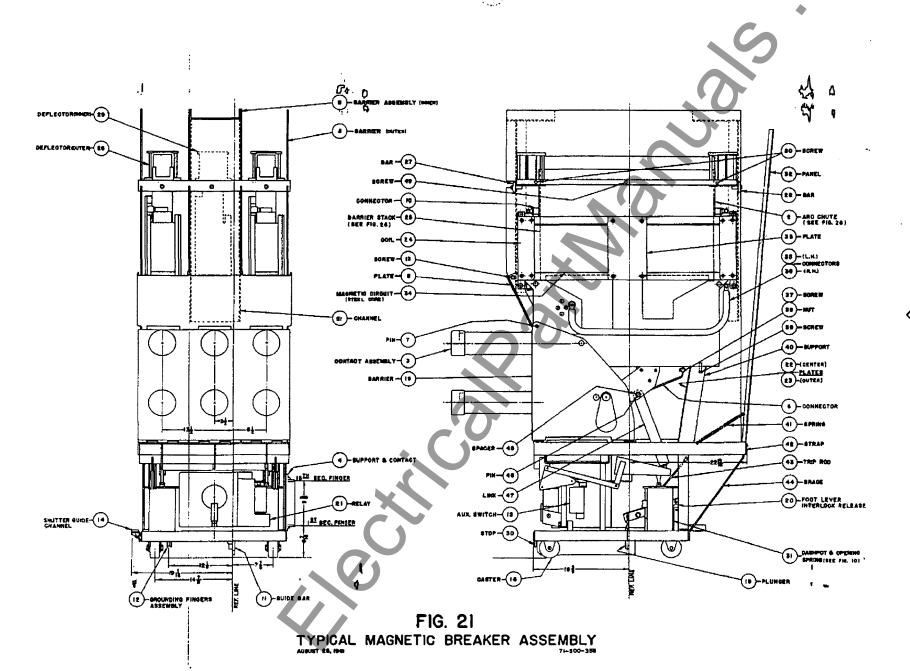


TYPICAL LATCH CHECK SWITCH
TYPE SO-35

JUNE 16, 1953

71-201-023





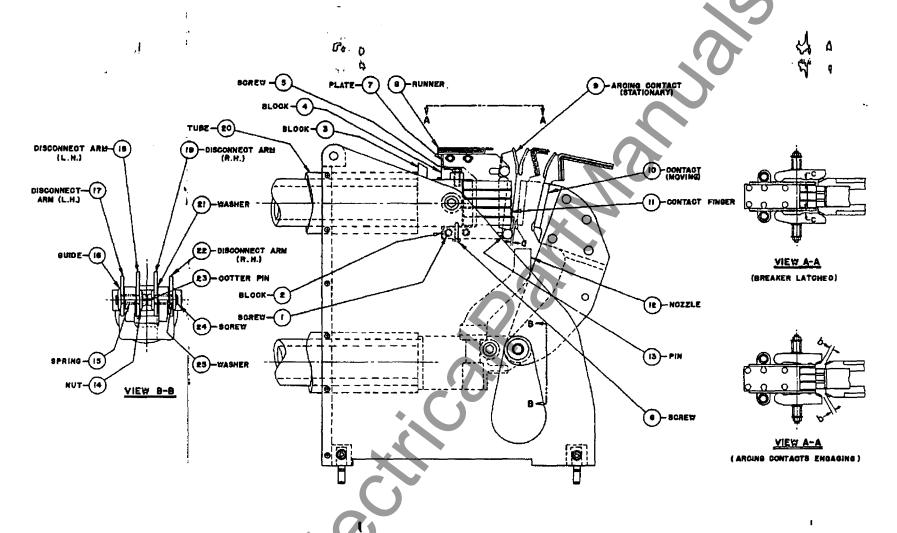


FIG. 23 TYPICAL STUD & SUPPORT ASSEMBLY 71-401-404

ALLIS-CHALMERS 🐵 MANUFACTURING COMPANY

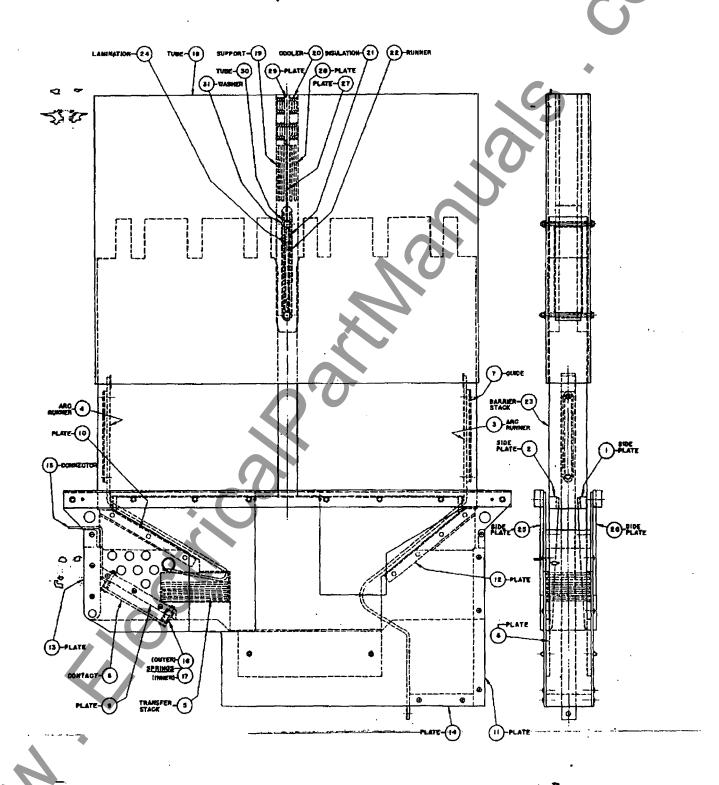


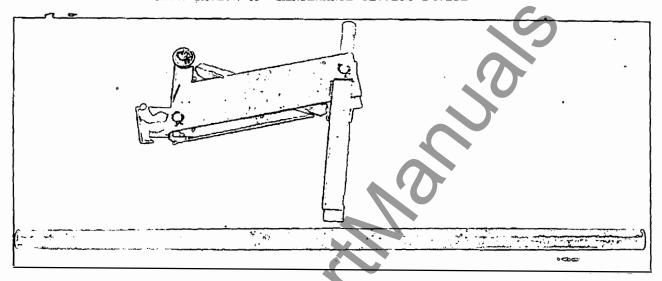
FIG. 26

TYPICAL ARC CHUTE

AUG. 18, 1981 7-114-858

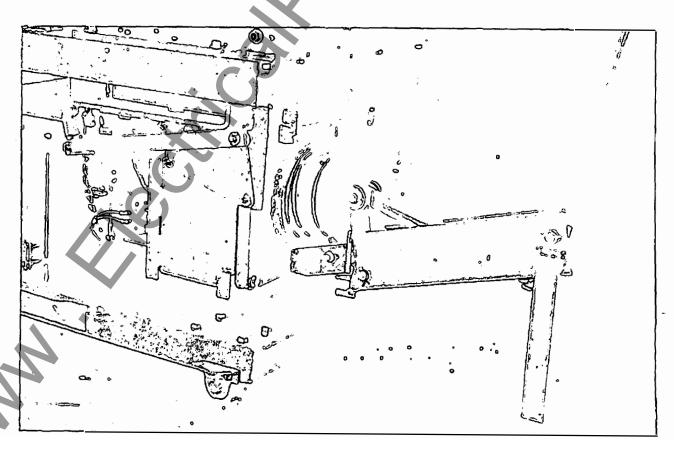
ALLIS-CHALMERS 📤 MANUFACTURING COMPANY

APPLICATION OF MAINTENANCE CLOSING DEVICE



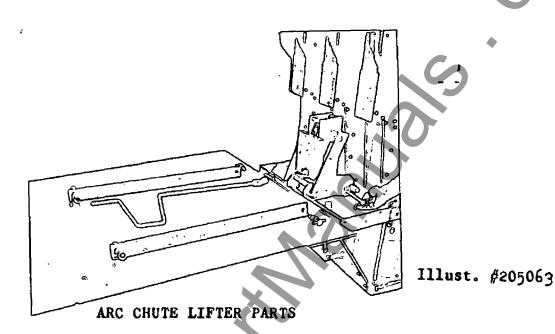
Closing Device Parts

Illust. #205049

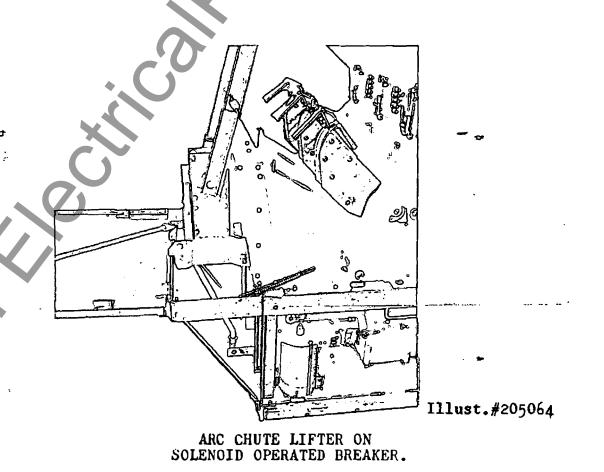


MAN COR STANDARD CORE

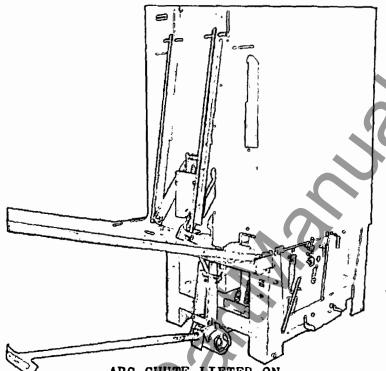
ALLIS-CHALMERS 🐵 MANUFACTURING COMPANY



Unfasten panel springs and remove barriers before mounting chute lifter.

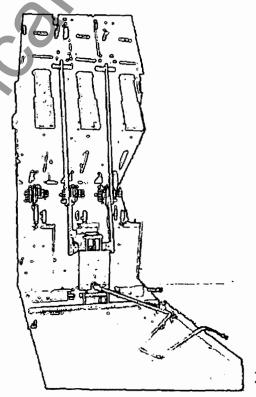


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Illust. #205065

ARC CHUTE LIFTER ON STORED ENERGY OPERATED BREAKER.



Illust. #205066

ARC CHUTE TILTED BACK