INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

LOAD BREAK AIR SWITCH

Type LCB for Power Centers

THE WESTINGHOUSE TYPE LCB SWITCH for power center transformers is a three pole, group operated, air insulated, single throw link type switch. Selector service may be obtained by the tandem use of two switches tied to a common transformer bus. When used with air cooled or liquid filled transformers the switch is mounted in a separate free standing compartment which is bolted to the power center transformer either directly or through a transition compartment. Switches of suitable voltage ratings are rated to interrupt 60 cycle load currents of 600 amperes at 5 KV and below, 200 amperes 7.5 KV, and 100 amperes at 15 KV.

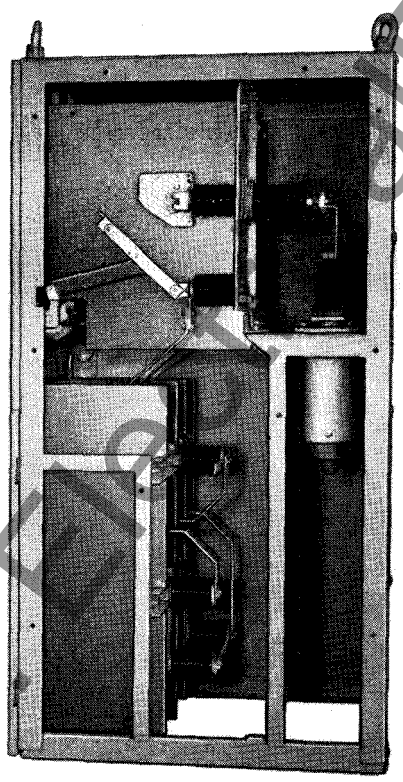

FIG. 1. Switch in Open Position

®Trade-Mark

The switch blades are of the divided jaw type with silver to silver contact surfaces. The face of the switch blades are serrated at the jaw end to produce a series of "knife-edge" or high pressure line contacts. Action of the switch keeps these contact lines clean and reduces maintenance. Contact pressure is maintained by beryllium copper spring washers which are factory adjusted and then locked by castellated nuts.

The switch blades are mounted on separate post type insulators with a Micarta ® operating link connecting each of the switch blades to a common steel operating shaft for gang operation.

Quick-break blades are mounted on the main blades and held in position by means of coil springs. A "De-ion" arc chamber with auxiliary contact is mounted on the switch tongue bushing.

The switch operating mechanism includes a detachable handle mounted inside the operating door on the front of the switch case. The door latch has a lock on it to prevent unauthorized operation of the switch.

In special cases these switches may be equipped with electrical or mechanical key type interlocks arranged in conjunction with circuit breakers on the secondary side of the power center to prevent opening the switch when a load is on the transformer.

INSTALLATION

When making the installation it is advisable to check the switch by operating it a few times to be sure that all parts move freely. Check particularly the operation of the quick-break blades as to the parallel operation of all three blades.

If an electrical interlock is supplied, any necessary connections to the low voltage breaker and source of supply should be made and the operation of the interlock should be checked. If a key type interlock is supplied, check to be sure that switch and breaker interlocks are keyed alike. The extra key should be removed from the power center and retained by a responsible person for use only in cases of emergency.

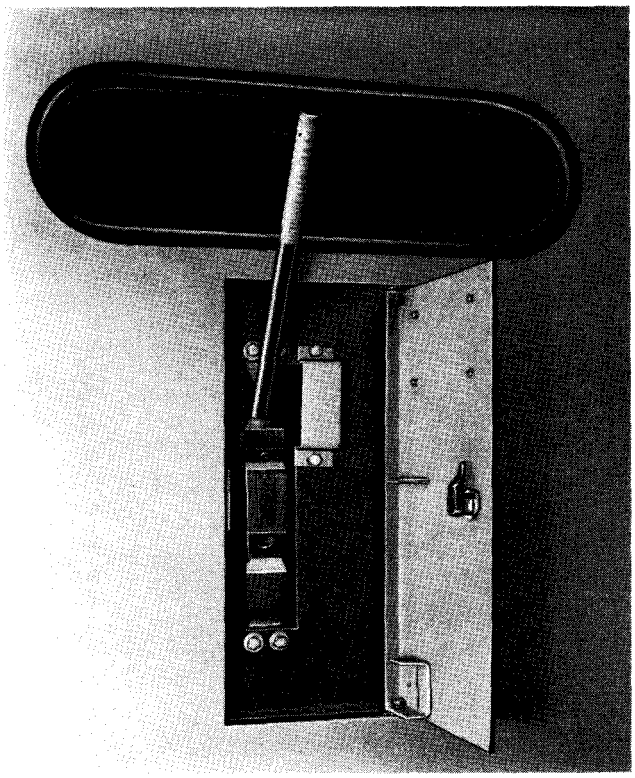

FIG. 2. Switch Operating Mechanism

OPERATION

The door to the switch operating mechanism must be unlocked and the handle withdrawn from the clip on the back of the door. Insert the handle into the socket on the operating rod and move the switch to the desired position. The switch should be operated in a snappy, positive manner.

Caution: This switch should be operated in a snappy positive manner so as to completely close or open the switch with one motion.

In a closed position most of the current flows through the main blade. A very small proportion of the current flows through the quick-break blade in the arc chute. On opening the switch, as the contacts on the main blade separate, all current is transferred momentarily to the quick-break blade which is maintained in the circuit by means of high pressure fingers within the arc chute. As the main blade continues to open, the angle of the quick-break arm continues to widen until a stop prevents further movement. At this point, the quick-break blade is pulled from the pressure contacts within the arc chute and, aided by a torsional spring at the pivot point, snaps open at high speed regardless of the speed at which the switch handle is operated.

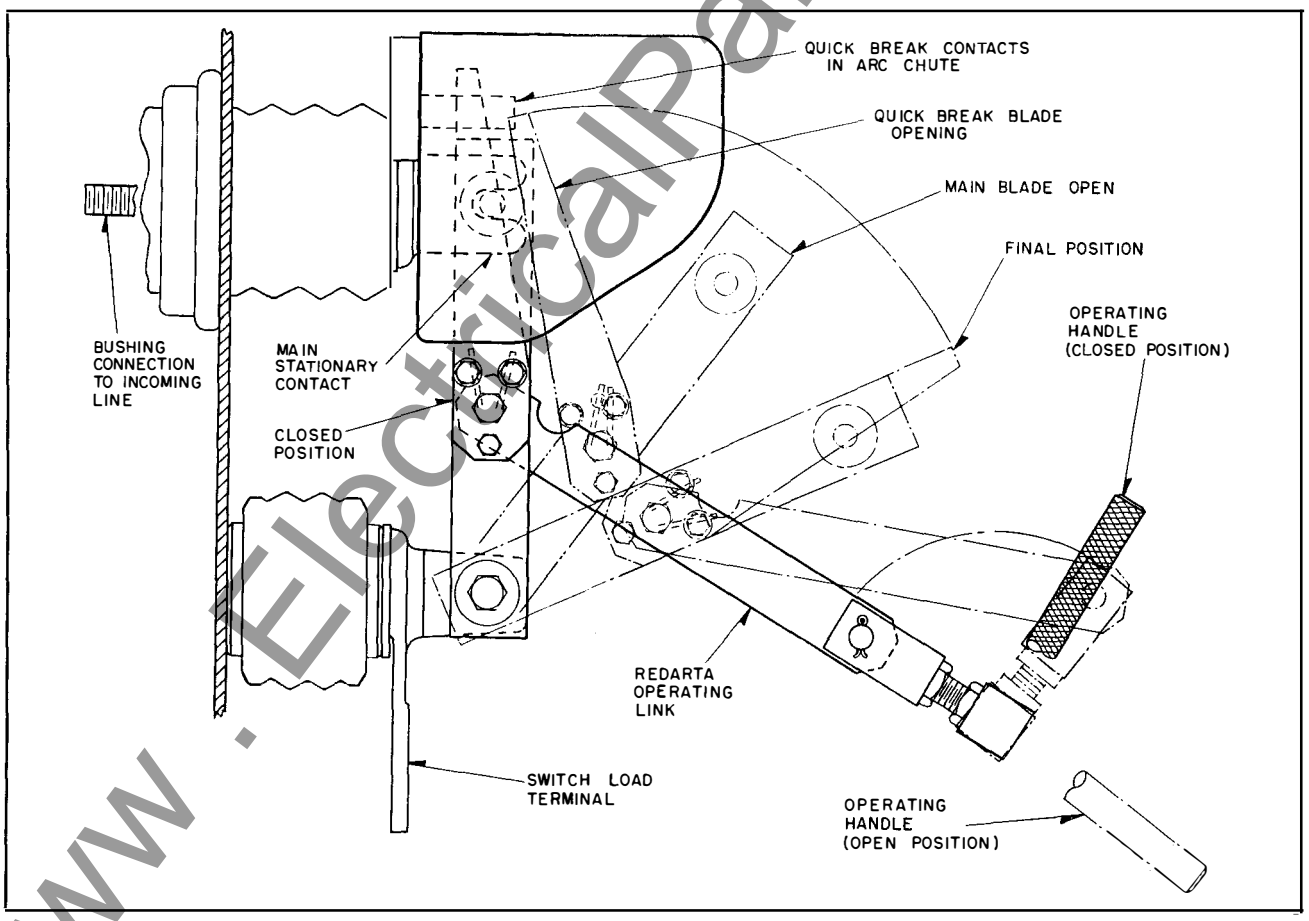

FIG. 3. Quick-Break Mechanism Operation

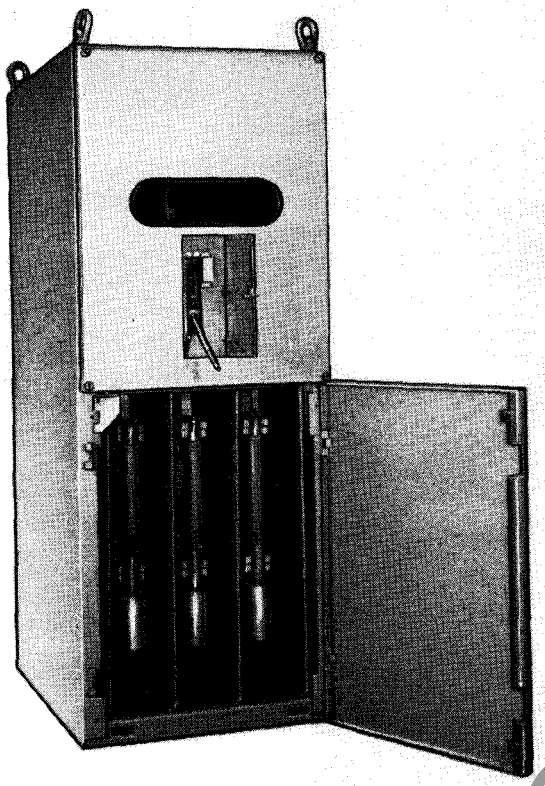

FIG. 4. Front View of an LCB Switch

The heat of the arc, meanwhile, releases a blast of non-ionized gases from the lining of the arc chamber. This combination of quick-break and "De-ion" action quickly snuffs out the arc and the circuit is safely disconnected.

If the switch has fuses, it will be mechanically interlocked to prevent opening the fuse access door, until the switch has been placed in the open position. The switch, as long as the fuse access door is open, will also prevent closing the mechanical interlock.

MAINTENANCE

Periodic examination should be made at least once a year to keep the switch in first class operating condition and to assure trouble-free operation. Any badly eroded arc chutes or defective contact parts should be replaced.

Under normal conditions of operation approximately 500 operations of the switch may be expected when breaking load current of 100 amperes at 15 KV, 200 amperes at 7.5 KV, or 600 amperes at 5 KV and below, before replacement of current interrupting parts is required.

RENEWAL PARTS

If renewal parts are required, order from the nearest Westinghouse Sales Office, giving description of parts wanted, with transformer serial number and rating as stamped on transformer instruction plate.

WESTINGHOUSE ELECTRIC CORPORATION
SHARON PLANT • TRANSFORMER DIVISION • SHARON, PA.
(Rep. 4-59) Printed in U.S.A.

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When making the installation it is advisable to check the switch by operating it a few times to be sure that all parts move freely. Check particularly the operation of the quick-break blades as to the parallel operation of all three blades.

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INSTRUCTIONS

FIELD CHECK

Of Type "TR", "BR", "FR" and "LR" Circuit Breakers In "CSP" and "CSPB" Distribution Transformers

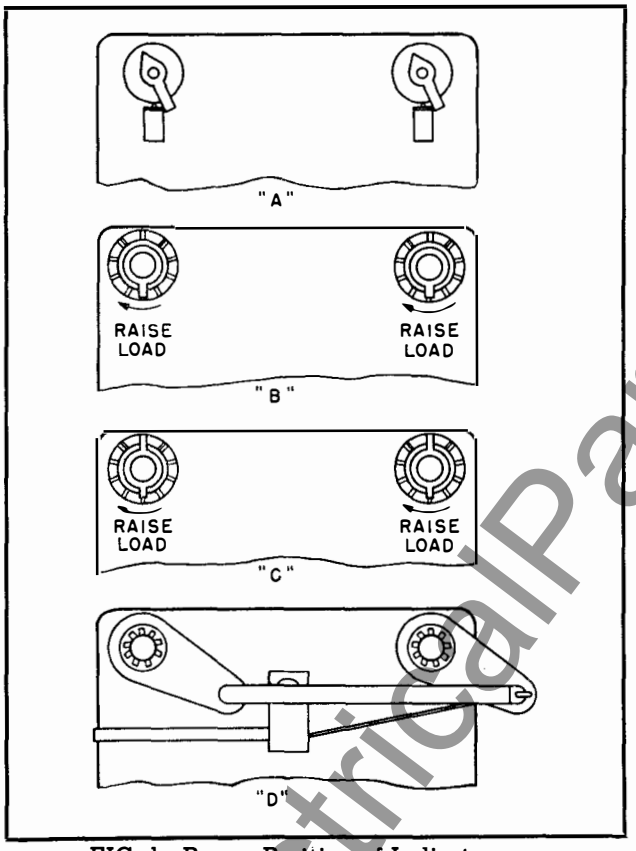

FIG. 1. Proper Position of Indicators on Adjusting Knobs During Calibration Check of "TR" Breakers.

Calibration checks, made on hundreds of units which were in service from one to ten years, indicate that these breakers very rarely are outside the original calibrating limits. It may, however, be desirable on occasion to make a shop test which will indicate that the breaker operates properly and that its calibration is reasonably close to the original setting.

At the factory, calibration is performed under ideal conditions, including closely controlled and accurately measured oil temperature, very accurately regulated current, and fully automatic timing equipment. It is not ordinarily practical to use, elsewhere, the extreme care and specialized equipment employed at the factory. The following procedure requires a minimum of time and equipment, but should suffice to insure satisfactory performance in the field.

TYPES OF TESTS

A preliminary test may be made, if desired, before the breaker is mounted in the transformer. To make such a test, the breaker may be mounted in any suitable container of transformer oil, on a rigid support which will hold it in the normal operating position, and connected directly to any suitable a.c. or d.c. power supply.

Whether or not this preliminary test is made, a final test is required after the breaker has been assembled in the transformer, to insure that the proper breaker has been installed, that the linkage connecting it to the external handle is adjusted correctly, and that the signal circuit has been connected properly. The most practical method of making the test is to short-circuit the high-voltage terminals of the transformer and apply sufficient voltage to the proper low-voltage terminals to circulate the desired current through the breaker. If more convenient, however, the voltage may be applied to the high-voltage terminals, and the proper low-voltage terminals short-circuited.

PROCEDURE

During the test, the pointers or control arms on the adjusting knobs must be in the same position as when the breaker originally was calibrated. Several different pointer arrangements have been used in each type of breaker, as shown in Figs. 1, 2, 3, and 4. The original calibration position was as illustrated. Those shown in Figs. 1C and 3B were used in "CSPB" and "CPB" transformers only. After the test, adjusting knobs on TR breakers in 1½ and 3 Kva transformers, with serial numbers below 2,500,000, should be rotated approximately ½ turn counterclockwise, so that the projecting end of the pointer, instead of being against the stop, as in Fig. 1A, is opposite the stop. For all other breakers, the pointers should be left in the positions illustrated when the test is completed.

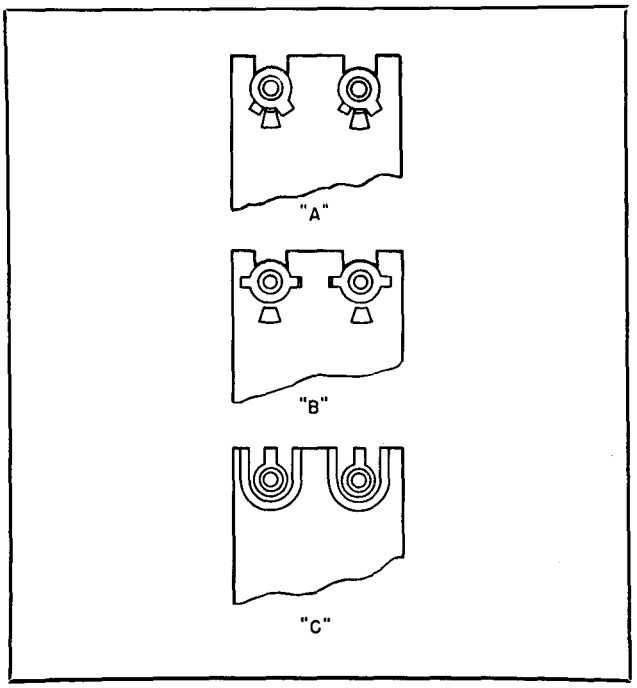

FIG. 2. Proper Position of Indicators on Adjusting Knobs During Calibration Check of "FR" Breakers.

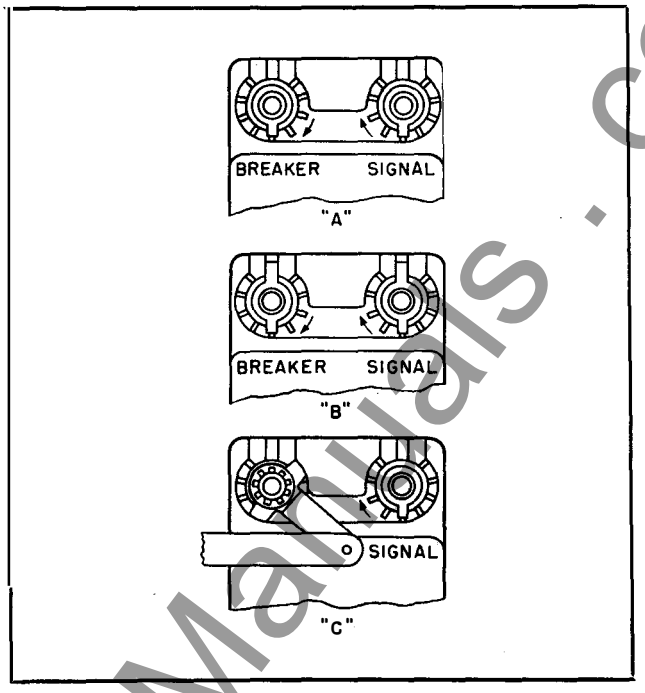

FIG. 3. Proper Position of Indicators on Adjusting Knobs During Calibration Check of "BR" Breakers.

The oil level should be at least one inch above the top of the breaker, and the oil temperature should be close enough to that of the room air so that it will not change appreciably in a five-minute interval.

The current indicated in Table 1 or Table 2, for the breaker being tested, should be passed through each pole of the breaker, separately, and should be held as nearly constant as is practical until the breaker trips. If the oil temperature is between 20 and 30°C. (68 to 86°F.) tripping should occur between 10 and 40 seconds after the start of the test, or between 10 and 30 sec. in the case of the "LR" breaker. Higher temperatures will cause earlier tripping, and lower temperatures, later tripping. Some of the older breakers were calibrated on the flatter part of the current-time curve, and a considerable variation in trip time corresponds to a small variation in trip temperature. Consequently, if the breaker does not trip within the specified time limits, the test may be repeated, using a current 5% higher, if the trip time was too long, or 5% lower, if too short. If tripping then occurs within the time limits, the breaker may be assumed to be reasonably close to normal calibration, and no adjustment need be made. If it does not then trip within the limits, it may be recalibrated as described below. (Before this is done, however, a check should be made to make sure that the proper current has been used). When repeated tests are made on the same pole of a breaker, a cooling time of at least 15 minutes should be allowed between tests.

CONNECTIONS

Preliminary Test. The top terminal of the pole being tested should be connected to one side of the power supply, and the bottom terminal to the other. Note that in some "TR", "BR" and "LR" Breakers, a lead or terminal is brought out through the front of the breaker (the side facing the low-voltage bushings). *This should not be used in making the test.* The leads which connect the breaker to the power supply should be large enough to prevent excessive heating, as such heat may affect the breaker performance.

Single-Phase "CSP" or "CP" Transformers With One Breaker. To test one pole, connect test leads to X1 and X2. To test the other pole, connect to X2 and X3. (See Nameplate).

Single-Phase "CSP" or "CP" Transformers With Two Breakers. In these transformers, the breakers are interconnected, as shown in Fig. 5, so that one pole of each is in parallel with the corresponding pole of the other. The two breakers may be tested simultaneously, following the same procedure as in the case of a single breaker, except to use twice the test current specified in Table 1. To test them separately, one breaker may be opened manually and the other tested exactly as if it were the only breaker in the transformer.

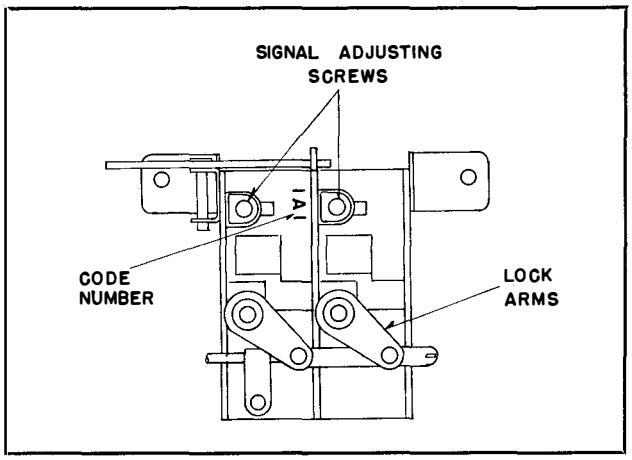

FIG. 4. Proper Position of Lock-Arms During Calibration Check of "LR" Breakers.

Loose connections or impedance unbalance in the windings may cause a circulating current to flow in the parallel circuits containing the breakers. This current will cause the breakers to trip sooner, when tested in parallel, than when tested individually. If the breakers trip below the specified time limit, when tested in parallel, but each is within the limits when tested individually, they may be recalibrated, as described below, so that they will trip within the limits when tested in parallel. The performance of the transformer will be reasonably satisfactory if this recalibration does not require more than ½ turn of the adjusting knobs.

Single-Phase "CSPB" or "CPB" Transformers. Two low-voltage connections have been used in these transformers, as shown in Fig. 6, the connection used in a particular transformer being indicated on the nameplate. In either case, the "Circuit #1" terminals should be used to test the left-hand breaker, and the "Circuit #2" terminals to test the right-hand breaker. In transformers connected per Fig. 6A, the two breakers are not calibrated alike and different test currents must be used. Also, since the current used in testing the left-hand breaker passes through the right-hand breaker, the right-hand breaker should be tested first. In transformers connected per Fig. 6B, the two breakers are calibrated alike, and either breaker may be tested first.

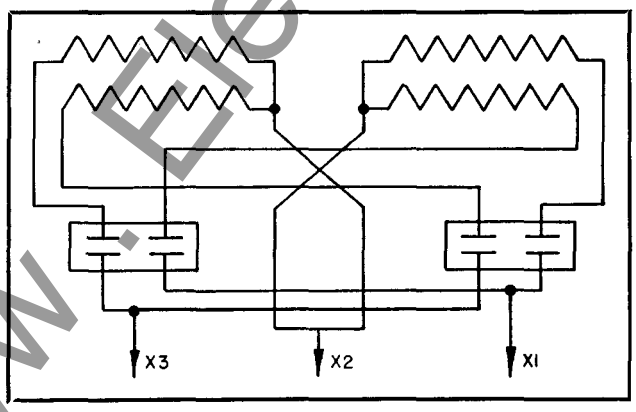

FIG. 5. Low-Voltage Connections of "CSP" Transformer With Two Breakers.

Three-Phase "CSP" or "CP" Transformers. When the low-voltage windings are Wye-connected, the breaker is installed as shown in Fig. 7. In the larger ratings, as shown on the nameplate, only half the current in each phase passes through the bimetal. In these ratings, the test current should be twice the value shown in Table 1, and loose connections may cause premature tripping. as described above. If the neutral is brought out to a bushing, test connections should be made from X0 to X1, X2 and X3, in turn, to check the corresponding breaker poles. When the neutral is not accessible, X2 and X3 should be connected together and to one test lead, the other test lead being connected to X1. Then the test current will divide between the poles in series with X2 and X3, while the pole in series with X1 will carry the entire current and will be the one which will trip the breaker. Similar connections may then be used to test the other two poles.

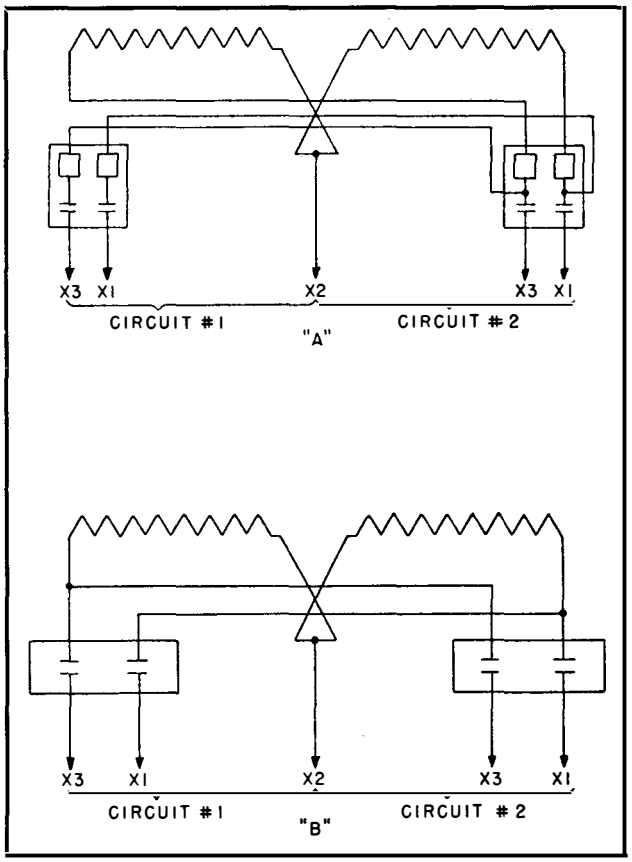

FIG. 6. Low-Voltage Connections of "CSPB" Transformer.

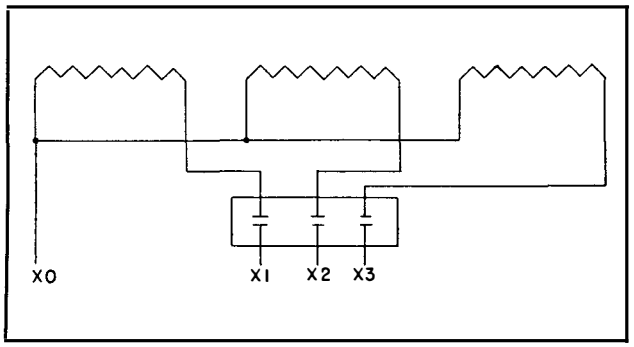

FIG. 7. Three-Phase "CSP" Transformer With Wye-Connected Low-Voltage Windings.

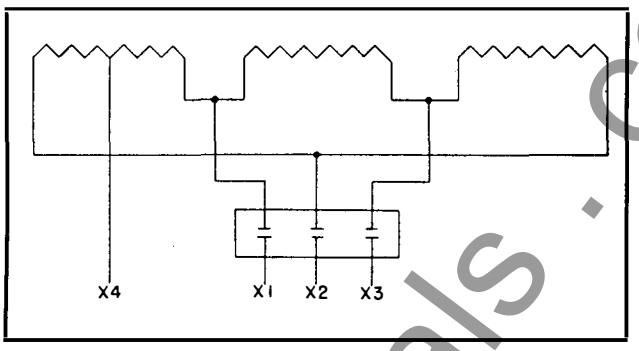

FIG. 8. Three-Phase "CSP" Transformer With Delta-Connected Low-Voltage Windings.

In transformers with Delta-connected low-voltage windings, the breaker is connected as shown in Fig. 8. Where a series-parallel connection is provided, the diagram in Fig. 8 applies to the series connection only, and the breaker test should be made with that connection, following the procedure described above for Wye-connected transformers without accessible neutral.

RECALIBRATION

In the event that recalibration of any pole is necessary, the pointer or control arm on the adjusting knob should be removed and the knob rotated slightly. Clockwise rotation increases the trip time, counterclockwise rotation decreases it. If more than a half turn of the knob is needed to bring the breaker trip within the given time limits, it is possible that the breaker has been damaged mechanically, and a new breaker may be required. After calibration, the pointer or control arm should be replaced on the knob as shown in Fig. 1, 2, 3, or 4. In 1½ and 3 Kva transformers with serial numbers below 2,500,000, the knobs should then be rotated counterclockwise as described above under "Procedure".

In late model "FR" breakers, and in "TR", "BR" or "LR" breakers with the emergency control arms, the calibration is sealed with a "spring-grip" washer. This washer must be cut or broken to remove it from the adjusting knob, and should not be used again. New washers (S# 1629 637 for "FR", or S# 1575 426 for "TR", "BR" or "LR" breakers) may be obtained from the factory at nominal cost. In replacing control arms, care must be taken to position them so that the shoulder on the arm is against the stop on the breaker so as to prevent counterclockwise rotation. A minimum clearance of .040 inch should be allowed between the arm and the washer which retains the arm on the adjusting knob.

CHECK ON SIGNAL OPERATION

The test methods described above do not usually provide sufficient voltage to light the signal lamp. To check the operation of the signal, a suitable plug may be inserted in the lamp socket and connected to a battery and bell, or other device which will indicate when the circuit is closed. The signal circuit should close in roughly ⅓ to ¾ of the time required for the breaker to trip. If the signal circuit does not close until the breaker trips, or if it closes normally but reopens when the breaker trips, the operating mechanism should be checked as described below. If it does not close at all, the socket and wiring should be tested for open circuits.

In the "TR" Breaker, the difference between the signal and trip operations is fixed, and if the breaker trip time is correct, it may be assumed that the signal operating time is also correct. In the "BR" breaker, the signal and breaker trip have separate adjustments, and it may be assumed that, if an adjustment of the breaker trip knob is required, a similar adjustment should be made on the signal knob.

In the "LR" Breaker, the time difference between the signal and breaker trip operations is set at factory calibration by adjusting the signal adjusting screw. This adjustment is then locked with a "spring-grip" washer S# 1629 637 (see Fig. 4). If the breaker trip time is correct, it may be assumed that the signal trip time is also correct; however, the time difference between the signal and the breaker trip operations can be increased by moving the signal adjusting screw counterclockwise, and can be decreased by moving the screw clockwise.

ADJUSTMENT OF OPERATING MECHANISM

Proper adjustment of the operating mechanism is important, since incorrect adjustment may cause faulty signal light operation or difficulty in resetting, or permit mechanical damage to the breaker. A preliminary adjustment may be made as follows:

FIELD CHECK OF BREAKERS

"FR" Breakers. (See Fig. 9). With the vertical rod disconnected from the operating arm, set the breaker and the external handle in the fully-closed position. Rotate the rod until the upper end slips freely into the hole in the operating arm. Shorten the rod by rotating it two full turns clockwise, reinsert it in the operating arm, and secure it in place with a cotter pin.

"TR" Breakers. (See Fig. 10). With the vertical rod disconnected from the operating arm, set the breaker and the external handle in the fully-closed position. If the rod is provided with a turnbuckle, loosen the upper lock-nut. Adjust the length of the rod so that the upper end slips freely into the proper hole in the operating arm. If the lever projecting from the side of the breaker contains two holes, the rod should be inserted in the outer hole in both the lever and the operating arm. If the lever contains only one hole, the rod should be inserted in the inner hole in the operating arm. In either case, the rod should then be shortened by rotating the upper end two full turns, reinserted in the operating arm, and secured in place with a cotter pin.

"BR" Breakers. (See Fig. 11). In transformers built before February, 1948, the shaft protruding from the side of the breaker pointed toward the low-voltage bushings and upward when the breaker was closed, as shown in Fig. 11A. Since then, the shaft points toward the high-voltage bushings and downward, when the breaker is closed, as in Fig. 11B. To adjust the rod, proceed as follows:

1. For Breakers Built Before February, 1948. Set the breaker operating shaft and the external operating handle in their extreme closed position. Screw the threaded end of the rod into the swivel nut or clevis until the top end of the rod fits into the proper hole in the operating arm. Shorten the rod by two full turns. Reinsert the rod in the operating arm and secure it with the cotter key.

Note: Two operating arms, of different length, have been used with these breakers, each having two holes to receive the end of the rod. In either one, the rod should be inserted in the small hole which is 1⅛ inches from the center of the large hole.

2. For Breakers Built Since February, 1948. Set the breaker operating shaft and the external operating handle in their extreme closed position. Screw the threaded end of the rod into the swivel nut until the top end of the rod fits into the outer hole in the operating arm. Lengthen the rod by two full turns, reinsert it in the operating arm, and secure it with the cotter key.

"LR" Breakers. (See Fig. 12.) With the vertical operating rod disconnected from the operating arm, set the breaker in the fully closed position, and hold the external handle against the quadrant stop in the closed position. Lengthen the operating rod by rotating it several turns counterclockwise. Shorten the operating rod by clockwise rotation until the upper end will just slip freely into the hole in the operating arm. Rotate the rod three additional turns clockwise, reinsert the upper end in the hole in the operating arm, and secure the rod in place with a cotter pin.

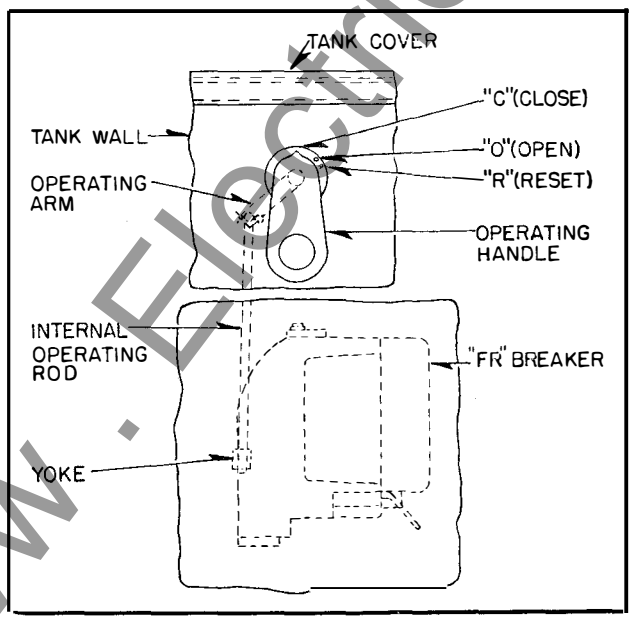

FIG. 9. "FR" Breaker Operating Mechanism.

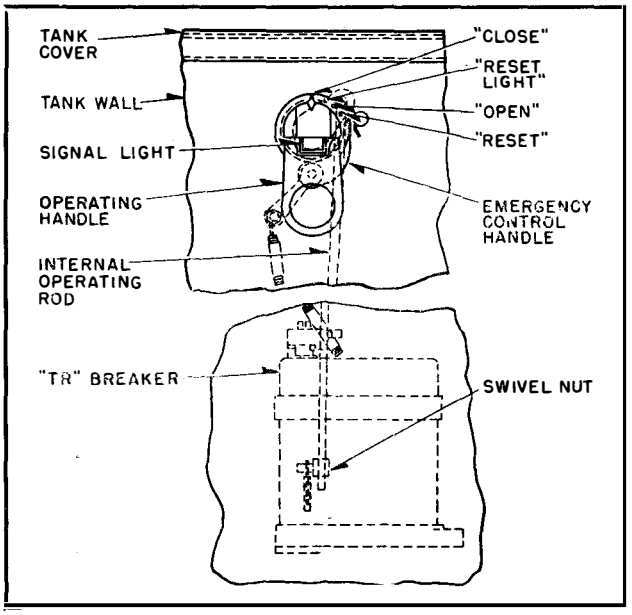

FIG. 10. "TR" Breaker Operating Mechanism.

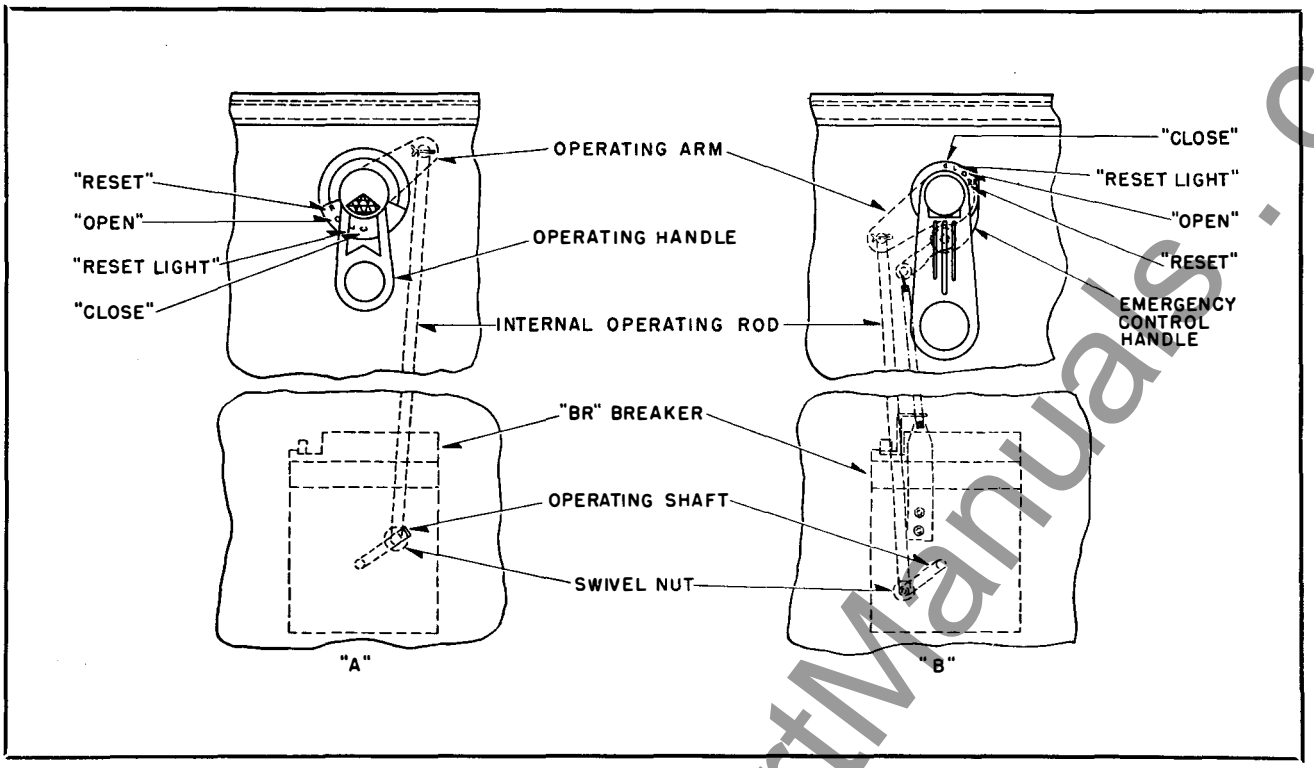

FIG. 11. "BR" Breaker, Operating Handle, Linkage and Signal Light.

EMERGENCY CONTROL MECHANISM

The length of the control wire should be adjusted so that, when the external handle is in the "normal" or upward position, the control arms will also be in the "normal" position; that is, rotated counterclockwise against the stops. If the meter seal has been removed from the handle, it should be replaced so that the handle is held in the "normal" position.

CHECK ON ADJUSTMENT OF OPERATING MECHANISM

The procedure outlined above ordinarily will result in correct operation of the mechanism and, for "FR" breakers, it may be assumed that such is the case. For "TR" and "BR" breakers, the correctness of the adjustment may be verified while testing the breaker, as follows:

"TR" Breakers.

1. If resetting is difficult, the operating rod should be lengthened.

2. If the signal circuit closes during the test, but reopens when the breaker trips, the packing gland nut on the handle assembly should be tightened to prevent spring-back when tripping occurs.

"BR" Breakers.

1. If resetting is difficult in the early design, which is assembled as shown in Fig. 11A, the operating rod should be lengthened. In the later design, assembled per Fig. 11B, it should be shortened.

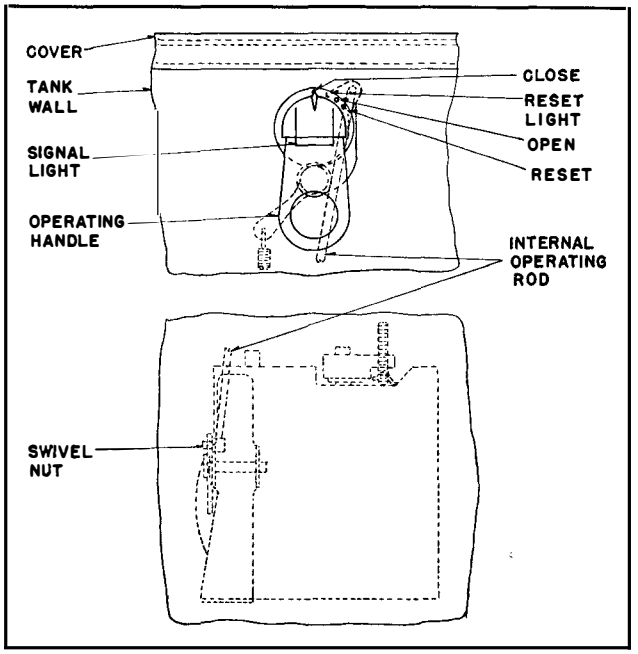

FIG. 12.

2. If the signal circuit does not close until the breaker trips, the rod should be shortened, in early designs, and lengthened in the later design.

"LR" Breakers.

1. The mechanical operation of the "LR" Breaker can easily be checked in the following manner:

a. Open and close the breaker, using the external operating handle.

b. Mechanically trip the breaker by lifting gently on one of the calibration lock-arms (See Fig. 4).

c. Reset and close the breaker, using the external operating handle.

2. If in operation 1-a above, the breaker will not close, lengthen the operating rod by counterclockwise rotation.

3. If in operation 1-c above the breaker will not reset and close, shorten the operating rod by clockwise rotation.

Table No. 1

CURRENTS TO BE USED IN CHECKING CIRCUIT BREAKERS

Breaker Should Trip Between 10 and 40 Seconds If Oil Temperature Is Between 20° and 30°C.

FOR "TR" BREAKERS USED IN "CSP" AND "CP" TRANSFORMERS

Breaker Style Number	Sub of Style	Current in Amperes	Breaker Style Number	Sub of Style	Current in Amperes	Breaker Style Number	Sub of Style	Current in Amperes
910 735	All	385	910 831	All	415	910 926	All	395
910 801	All	55	910 910	*, A	370	910 927	All	395
910 802	All	115	910 910	B, C, D, E, F	385	910 928	*	430
910 803	All	170	910 911	*, A	370	910 928	A	460
910 804	All	200	910 911	B, C, D, E, F	385	910 929	*	430
910 805	All	205	910 912	*	395	910 929	A	460
910 806	*, A	370	910 912	A, B	440	912 231	All	55
910 806	B, C, D, E	385	910 912	C, D	470	912 232	All	85
910 807	*	415	910 913	*	395	912 233	All	120
910 807	A, B	440	910 913	A, B	440	912 234	All	160
910 807	C, D	470	910 913	C, D	470	912 235	All	200
910 808	All	50	910 914	*, A	360	912 247	All	205
910 809	All	115	910 914	B, C, D	370	912 253	All	55
910 810	All	170	910 915	*, A	360	912 255	All	125
910 811	All	190	910 915	B, C, D	370	912 258	All	215
910 812	All	220	910 916	*	395	912 275	All	90
910 813	All	370	910 916	A, B	440	986 908	All	175
910 814	All	415	910 917	*	395	1026 107	All	105
910 815	All	55	910 917	A, B	440	1026 137	All	45
910 816	All	120	910 918	*, A	395	1028 961	All	385
910 817	All	175	910 918	B, C, D, E	405	1028 962	All	385
910 818	All	210	910 919	*, A	395	1104 078	All	215
910 819	All	225	910 919	B, C, D, E	405	1104 079	All	390
910 820	*, A	380	910 920	*	430	1118 557	*	430
910 820	B, C, D, E	390	910 920	A, B	460	1118 557	A, B	460
910 821	All	420	910 920	C, D	490	1356 218	All	390
910 822	All	85	910 921	*	430	1356 219	All	390
910 823	All	170	910 921	A, B	460	1483 117	All	470
910 824	All	210	910 921	C, D	490	1575 478	All	55
910 825	All	380	910 922	All	395	1575 479	All	115
910 826	All	415	910 923	All	395	1575 480	All	170
910 827	All	85	910 924	*	430	1575 481	All	200
910 828	All	180	910 924	A	460	1575 482	All	205
910 829	All	210	910 925	*	430	1575 483	All	385
910 830	All	380	910 925	A	460	1575 484	All	470

* Indicates Style Number without Sub Letter.
NOTE: Test currents for breakers not listed, and for those marked with S.O. number, may be obtained from Sharon.

Table No. 1—Continued

FOR "TR" BREAKERS USED IN "CSP" AND "CP" TRANSFORMERS—Continued

Breaker Style Number	Sub of Style	Current in Amperes	Breaker Style Number	Sub of Style	Current in Amperes	Breaker Style Number	Sub of Style	Current in Amperes
1575 485	All	50	1575 500	All	85	1629 021	All	385
1575 486	All	190	1575 501	All	160	1629 022	All	470
1575 487	All	220	1575 502	All	205	1629 023	All	405
1575 488	All	120	1575 503	All	215			
1575 489	All	175	1575 504	All	105			
1575 490	All	225	1575 505	All	45			
1575 491	All	390	1575 506	All	460			
1575 492	All	85	1575 507	All	215			
1575 493	All	180	1575 508	All	390			
1575 494	All	385	1575 509	All	175			
1575 495	All	470	1575 510	All	90			
1575 496	All	370	1575 511	All	125			
1575 497	All	405	1583 257	All	125			
1575 498	All	490	1608 853	All	200			
1575 499	All	55	1609 244	All	230			

"TR" BREAKERS USED WITH "CSPB" AND "CPB" TRANSFORMERS ONLY

(All Subs of Breaker Style Numbers)

Breaker Style Number	Current in Amperes		Breaker Style Number	Current in Amperes		Breaker Style Number	Current in Amperes for Each Breaker
	Left Hand	Right Hand		Left Hand	Right Hand		
1356 355	155	175	1435 233	165	205	1484 707	120
1356 356	190	210	1435 234	175	220	1484 708	165
1356 357	210	235	1435 235	220	390	1484 709	200
1356 358	355	395	1435 861	215	385	1484 710	220
1435 232	115	175				1511 929	230
						1590 994	120
						1590 995	165
						1590 996	200
						1590 997	230

"FR" BREAKERS

Breaker Style Number	Sub of Style	Current in Amperes	Breaker Style Number	Sub of Style	Current in Amperes	Breaker Style Number	Sub of Style	Current in Amperes
1029 106	All	49	1118 951	All	113	1408 532	All	97
1029 109	All	104	1185 094	All	113	1408 841	All	105
1029 111	All	113	1356 980	All	37	1484 106	All	163
1065 943	All	95	1366 133	All	56	1571 301	All	46
1104 037	All	56	1366 134	All	113			

* Indicates Style Number without Sub Letter.
NOTE: Test currents for breakers not listed, and for those marked with S.O. number, may be obtained from Sharon.

Table No. 1—Continued

"BR" BREAKERS								
Breaker Style Number	Sub of Style	Current in Amperes	Breaker Style Number	Sub of Style	Current in Amperes	Breaker Style Number	Sub of Style	Current In Amperes
1483 434	All	1090	1511 741	All	275	1590 295	All	490
1483 435	*	945	1511 932	All	505	1590 296	All	455
1483 435	A	845	1512 947	All	250	1590 297	All	240
1483 436	All	520	1512 991	All	235	1590 298	All	155
1483 437	All	275	1512 993	All	280	1590 299	All	125
1483 743	All	1090	1512 994	All	1205	1590 300	All	275
1483 744	*	945	1571 025	All	1205	1590 301	All	505
1483 744	A	845	1571 026	All	1205	1590 302	All	250
1484 028	All	455	1571 726	All	415	1590 303	All	235
1484 029	All	455	1571 768	All	125	1590 304	All	280
1484 498	All	1145	1575 687	All	585	1590 305	All	1205
1484 499	All	1145	1576 252	All	860	1590 306	All	1205
1484 500	All	860	1583 235	All	250	1590 307	All	1205
1484 501	All	860	1583 376	All	1175	1590 308	All	415
1484 502	All	455	1583 781	All	75	1590 309	All	125
1484 503	All	455	1590 280	All	1145	1590 310	All	585
1484 504	All	1175	1590 281	All	1145	1590 311	All	860
1484 505	All	1175	1590 282	All	860	1590 312	All	250
1484 506	All	885	1590 283	All	860	1590 313	All	1175
1484 507	All	885	1590 284	All	455	1590 314	All	75
1484 508	All	260	1590 285	All	455	1590 442	All	260
1484 509	All	260	1590 286	All	1175	1590 443	All	260
1484 663	All	600	1590 287	All	1175	1590 517	All	260
1484 664	All	585	1590 288	All	885	1590 518	All	260
1484 665	All	445	1590 289	All	885	1590 901	All	915
1484 666	All	490	1590 290	All	260	1608 262	All	585
1511 611	All	455	1590 291	All	260	1608 263	All	585
1511 738	All	240	1590 292	All	600	1608 427	All	915
1511 739	All	155	1590 293	All	585	1609 243	All	885
1511 740	All	125	1590 294	All	445			

* Indicates Style Number without Sub Letter.
NOTE: Test currents for breakers not listed, and for those marked with S.O. number, may be obtained from Sharon.

Table No. 2

CURRENTS TO BE USED IN CHECKING CIRCUIT BREAKERS

Breaker Should Trip Between 10 and 30 Seconds If Oil Temperature Is Between 20° and 30°C.

Note: The "LR" Breaker "Code Number", which has been conspicuously marked on the top of each breaker, completely identifies the electrical characteristics of the breaker for the calibration check.

Breaker Code Number	Current in Amperes	Breaker Code Number	Current in Amperes	Breaker Code Number	Current in Amperes
1-A-1	73	3-A-1	106	5-A-1	174
1-B-1	64	3-A-2	119	5-A-2	168
		3-A-3	112	5-A-3	196

NOTE: Test currents for breakers not listed, and for those marked with S.O. number, may be obtained from Sharon.

Table No. 2—Continued

Breaker Code Numbers	Current in Amperes	Breaker Code Numbers	Current in Amperes	Breaker Code Number	Current in Amperes
7-A-1	196	15-A-1	342	25-B-1	614
7-A-2	184	15-A-2	332		
7-A-3	202	15-A-3	322		
10-A-1	237	15-B-1	309		
10-A-2	244				
10-A-3	222	15-C-1	376		
10-B-1	292	25-A-1	444		
		25-A-2	432		
10-C-1	240	25-A-3	456		

NOTE: Test currents for breakers not listed, and for those marked with S.O. number, may be obtained from Sharon.

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