IB 6.2.10.7-3F

Installation/Maintenance Instructions

Medium-Voltage
Vacuum Power Circuit Breakers

Type 5VKBR-250
1200/2000 Amperes
5000 Volts

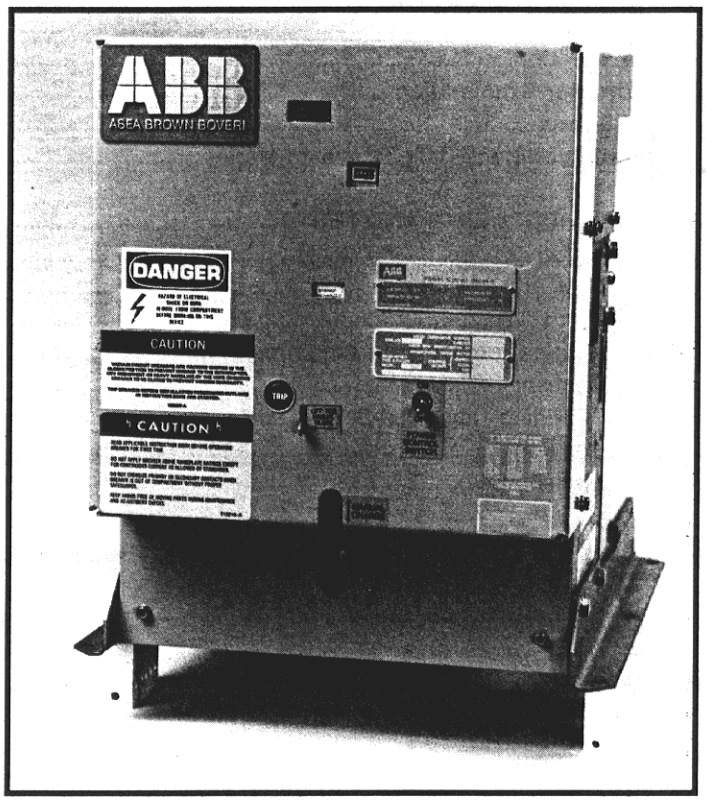

ABB Power T&D Co., Inc.
ABB Power Distribution
Distribution Systems Division

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INTRODUCTION AND RATINGS

Instructions for installation, operation and maintenance of the 5VKB-R are furnished with each shipment of equipment. These instructions are intended as a guide during installation and initial setup and operation. Use of these instructions will facilitate proper maintenance of the equipment and prolong its life and usefulness.

RECEIVING AND STORAGE

Immediately upon receipt of the circuit breaker, examine to determine if any damage or loss was sustained during transit. If abuse or rough handling is evident, file a damage claim at once with the carrier and promptly notify the nearest District Office. The company is not responsible for damage of goods after delivery to the carrier, however, we will lend assistance if notified of claims.

Unpack the circuit breakers as soon as possible after receipt. If unpacking is delayed, difficulty may be experienced in making a claim for damages not evident upon receipt. Use care in unpacking in order to avoid damaging any of the circuit breaker parts. Check the contents of each device against the packing list before discarding any packing material. If any shortage of material is discovered, promptly notify the nearest District Office. Information specifying the purchase order number and part numbers of the damaged or missing parts should accompany the claim.

Circuit breakers should be installed in their permanent location as soon as possible. If the breakers are not to be placed in service for some time, it is advisable to provide adequate means of protection. This may be done by keeping the breaker in its original shipping frame and storing in a warm, dry and uncontaminated atmosphere. If the circuit breaker cannot be stored properly due to circumstances, it must be thoroughly checked before going into service to insure it has not absorbed moisture, rusted or become generally contaminated in any way.

CIRCUIT BREAKER INSTALLATION

General

Prior to initial installation of the circuit breaker into the enclosure, certain preliminary inspections should be made to insure proper operation. The inspection procedures for this are given in this section.

The circuit breaker is shipped with contacts closed, closing springs discharged and opening springs charged.

WARNING WARNING WARNING WARNING

Prior to any disassembly or inspection of the circuit breaker, the closing springs must be discharged, and the breaker should be open.

Installation Inspection

Inspect condition of circuit breaker vacuum interrupters and electrical connections prior to installing the circuit breakers into the switchboard. Even though each circuit breaker is completely adjusted and tested at the factory, shipping and handling conditions could cause defects.

Vacuum Interrupter Examination (Refer to Figure 1)

CAUTION CAUTION CAUTION CAUTION

A grounding stick must be used to discharge the mid-band ring on the vacuum interrupters so equipped, before any work is done on the interrupters.

The insulated vacuum envelope should be examined carefully for cracks in the area of the metal-to-insulation seals on both ends and around the mid-band ring. Since a certain amount of transmitted light is usually required to detect cracks, the inspection should be done in a well lighted area. If the mid-band ring, when so equipped, has been bent by an accidental impact, that area should be specially scrutinized for seal damage. Small external chips will not impair the useful life of the interrupter.

Insulation Structure

All insulated parts should be checked for damage. Any dust or dirt should be removed by air or wiped with a clean lintless cloth saturated with an oil-free solvent.

Manual Operation of Electrically Operated Models

Electrically operated circuit breakers may be charged manually by a removable maintenance handle for bench tests or emergency operation. Position the maintenance handle hooked section on the long slot on the pawl carrier (refer to Figure 6). The small tab on the maintenance handle will fit the small hole of the pawl carrier. Using a pumping motion, rotate the pawl carrier until the ratchet wheel no longer rotates. At this point, the spring charge indicator will indicate SPRINGS CHARGED. The circuit breaker can be closed manually with the manual close lever. NOTE: Occasionally

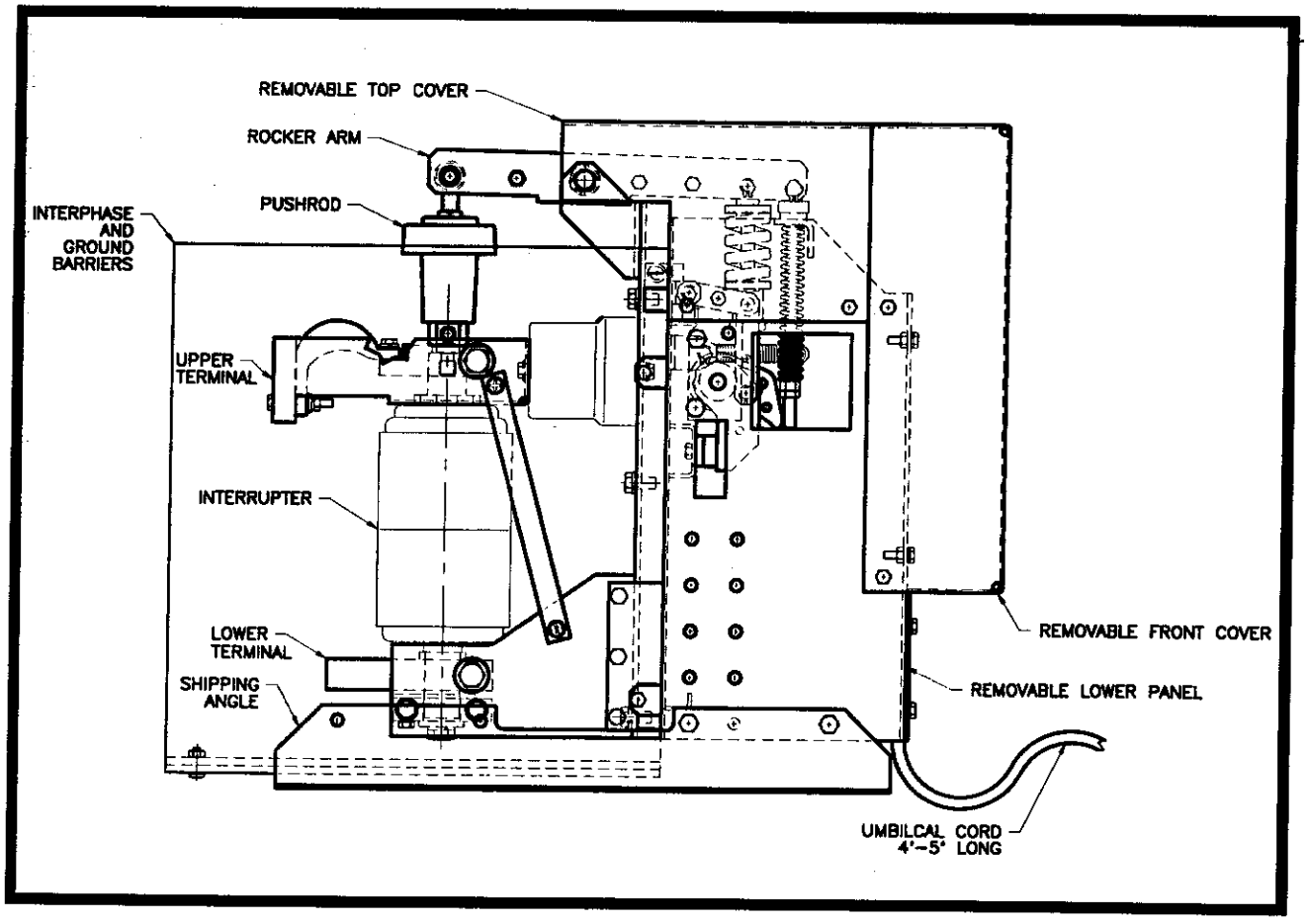

Figure 1 - General Arrangement

the motor crank arm will stop in a position that will not allow manual spring charging. When this happens, the motor crank arm must be rotated manually by using a screw driver to rotate the crank arm sufficiently so that the springs may then be manually charged with the maintenance handle.

MAINTENANCE, ADJUSTMENTS AND TESTS

General Information

The 5VKB-R circuit breaker is designed for minimum maintenance and tested to insure that only minimum maintenance will be required. The few adjustments that are noted are required only when an operational check indicates a problem. Of course, during the maintenance checks, all accessible bolts, units and screws should be routinely checked to insure that they are tight.

It is recommended that the circuit breaker be normally inspected after the first 2000 operations, regardless of its type of duty. These operations can be either no-load mechanical, load current switching, bulk capacitator or reactor switching operations, or for motor starting applications.

Vacuum interrupters, as used on the 5VKB-R circuit breakers, have an inherently long contact life and will provide trouble-free service under varied application conditions, as long as the circuit breaker is applied within its rating. The wear condition of the individual vacuum interrupters will vary, depending on circuit conditions and such variables as single phase versus three-phase interruption,
X/R ratio (asymmetry) and relay delay times. Of course, interrupting high short-circuit current will cause contact erosion to occur faster than load current interruptions. The interruptions for the 5VKB-R circuit breaker have been tested up to 2000% KSI. It is unlikely that a circuit breaker will be subjected to this much duty during the life of the breaker and it is not expected that the interrupters will have to be replaced due to excessive erosion of contacts. There is, however, a check for contact wipe (contact pressure) which is also a measure of contact erosion. This check is covered under "Circuit Breaker Operation and Contacts". When contact wipe is less then the minimum specified and there is not a mechanical problem, then the interrupter should be replaced due to contact erosion.

If, however, after the first inspection period there is no indication of any problems, actual operating experience with specific circuits will indicate the future amount of maintenance needed for the various circuit breakers and the procedure can be modified as required.

Where unusual service conditions exist, as covered by ANSI Standard C37.04, it must be presumed that these conditions were considered at the time of order and that the equipment supplied was designed for the special application and that an appropriate supplemental maintenance program has been developed. These maintenance instructions only cover circuit breakers used under the standard service conditions.

At the selected maintenance period, the following tests and adjustments should be made:

NOTE: The following tabulated tests and adjustments are all that are normally necessary for proper maintenance and operation of the 5VKB-R circuit breaker. The remaining portions of the breaker -- close coil assembly, shunt trip device, control relay, auxiliary switch and motor -- require no maintenance during the standard life of the circuit breaker regardless of the operating duty.

D.C. Millivolt Drop Test

During Maintenance periods, the conditon of the breaker current circuit can easily be determined by performing a millivolt drop test. This test should be performed regardless of whether the circuit breaker had interrupted low or high currents or has minimum operations.

The following table lists the millivolt drop and resistance values for the circuit breakers covered by this instruction book, from terminal to terminal:

Circuit Breaker	Maximum Mv Drop*	Maximum Micro-Ohms
1200/2000 Amperes	8	40
* Millivolt drop with 200 amperes DC flowing		

Insulation Cleaning

Any dirt, dust or grease should be removed from the surfaces of the entire current carrying structure and vacuum interrupter*. Wiping the surface with a clean lint free cloth is normally sufficient for this purpose.

* Remember to discharge mid-band ring on interrupters so equipped.

Circuit Breaker Operation, Contact Adjustment and Timing

Contact Adjustment

1. Full close test: Charge the closing springs and turn off motor switch. Close breaker. Insert manual charge handle into charging lever (see figure 6). During the initial portion of the upward charging motion of the manual charge handle, the closing springs should start charging via the ratchet mechanism. This can be felt by a definite and continual resistance against the manual charging handle and charging lever during the upward stroke, caused by the tension of the closing springs. This indicates that the breaker has fully closed and latched.

If instead, the manual charging handle and charging lever are met with no initial resistance, while at the same time it is observed that the ratchet wheel spins around approximately 180 degrees before the ratchet mechanism starts charging the closing springs, the breaker has not fully closed and latched. This is referred to as a stall, and is caused by excessive loads on the mechanism (i.e. MOC loads) and/or friction. If this condition cannot be relieved, the factory should be consulted.

2. Contact wipe (figure 2) test. The contact gap and contact wipe is set at the factory. These parts should not be repositioned in the field unless a pushrod change is required to correct contact sequence as described elsewhere. Contact wipe is set at the factor at .093 minimum. Contact erosion and wear in mechanical parts will cause a reduction in contact wipe over the life of the breaker and a check should be made to insure that the wipe is not less than .039" (1mm). The measurement is made as follows for the three poles:

a. Open the breaker and discharge the closing springs.

b. In this position there should be no space between the spring base pivot and the adjusting nut.

c. Close the breaker and measure the gap between the spring base pivot and adjusting nut. The dimension should be a minimum of .093 inches on a new breaker.

d. The measurement can decrease to .039" (1mm) on a breaker that has been in service.

e. When contact wipe is less than the .039" (1mm) and it has been determined that the breaker closes fully and there is not a mechanical problem, then the interrupter should be replaced.

3. Contact Gap (See Figure 3). The contact gap is set at the factory at the nominal dimesion of .35". This value will normally increase as the contacts erode. A check of the contact gap tests that the breaker opens fully, and that the gap is sufficient to withstand the applied voltage. The measurement is made as follows for the three poles:

a. Open the breaker and discharge the closing springs.

b. Measure the distance between the bottom of the moving contact clamp and the top of the interrupter metal end-cap. Record this dimension as Y2.

c. Close the breaker and measure the same dimension. Record this as Y1.

d. The contact gap is the difference between the two measurements: Y2 - Y1 = contact gap. The accpetable limits are .281 - .547 inches (7.14 - 13.89 mm), with the upper limit being approached as the contacts wear and the contact wipe (see figure 2) approaches the .039 inch (1mm) minimum. Additionally, to allow for proper contact sequencing (see section 4), there should be no more than .062 inch (1.58mm) difference between the pole with the miminum gap if no timing equipment is available. A larger difference is acceptable if verified.

4. Contact sequence. All three poles should touch within 2 milliseconds at normal closing speeds. An oscilloscope, oscillograph or other timing method should be used to establish the 2 millisecond timing.

Before checking contact sequence, check that the contact wipe and gaps are correct. It is not expected that the contact sequence should exceed the 2 millisecond limit; therefore, before attempting to readjust, check that the test equipment and procedure are correct. Also consider, especially when testing with electronic equipment, that .002 seconds vacuum interrupter contact bounce is permissible during normal closing and this bounce can influence the contact touch measurements.

If it is determined that the contact sequence is not within the 2 milliseconds, then adjustment is required. Usually, readjustment of one pole should be sufficient so that all three poles touch within 2 milliseconds. The gap of the pole to be changed should be decreased if the contacts of that pole are touching after the other two poles, or increased if the contacts are touching before the other two poles. The gap is decreased by turning pushrod clockwise, viewing from the top of the breaker, and increased by turning counterclockwise.

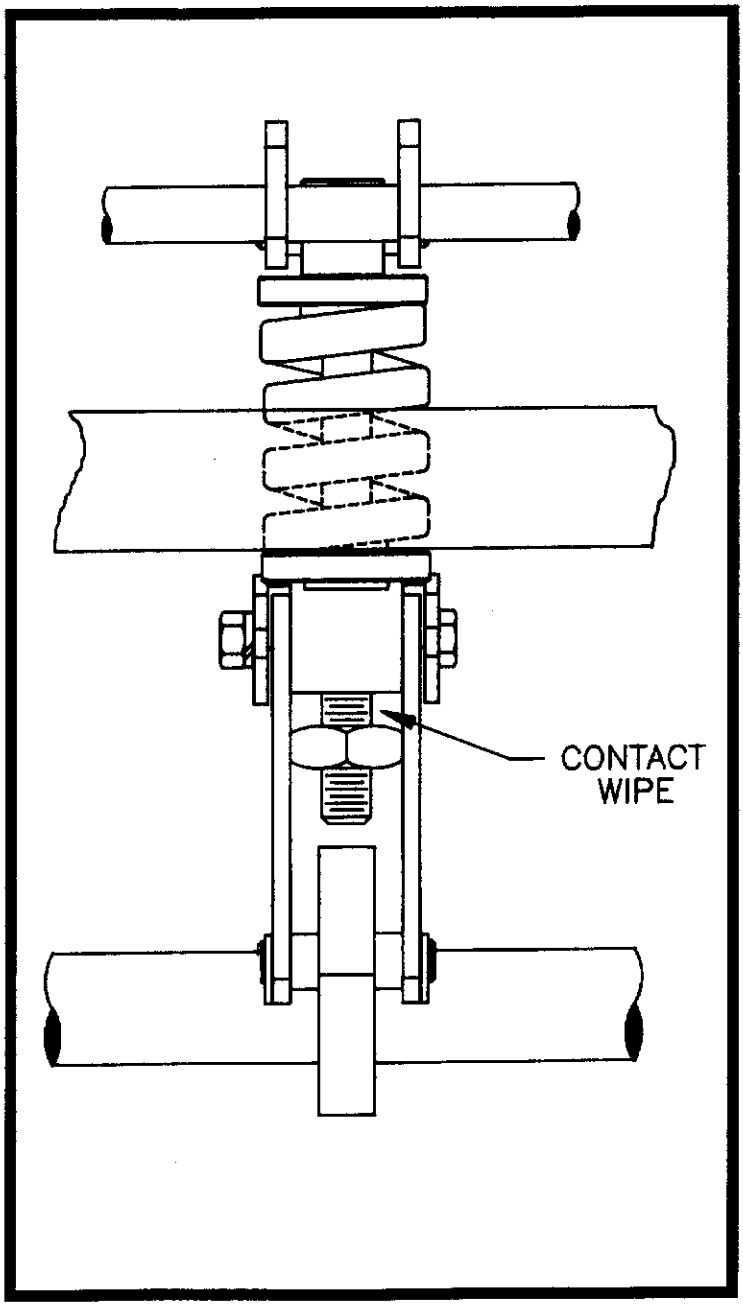

Figure 2 - Contact Wipe

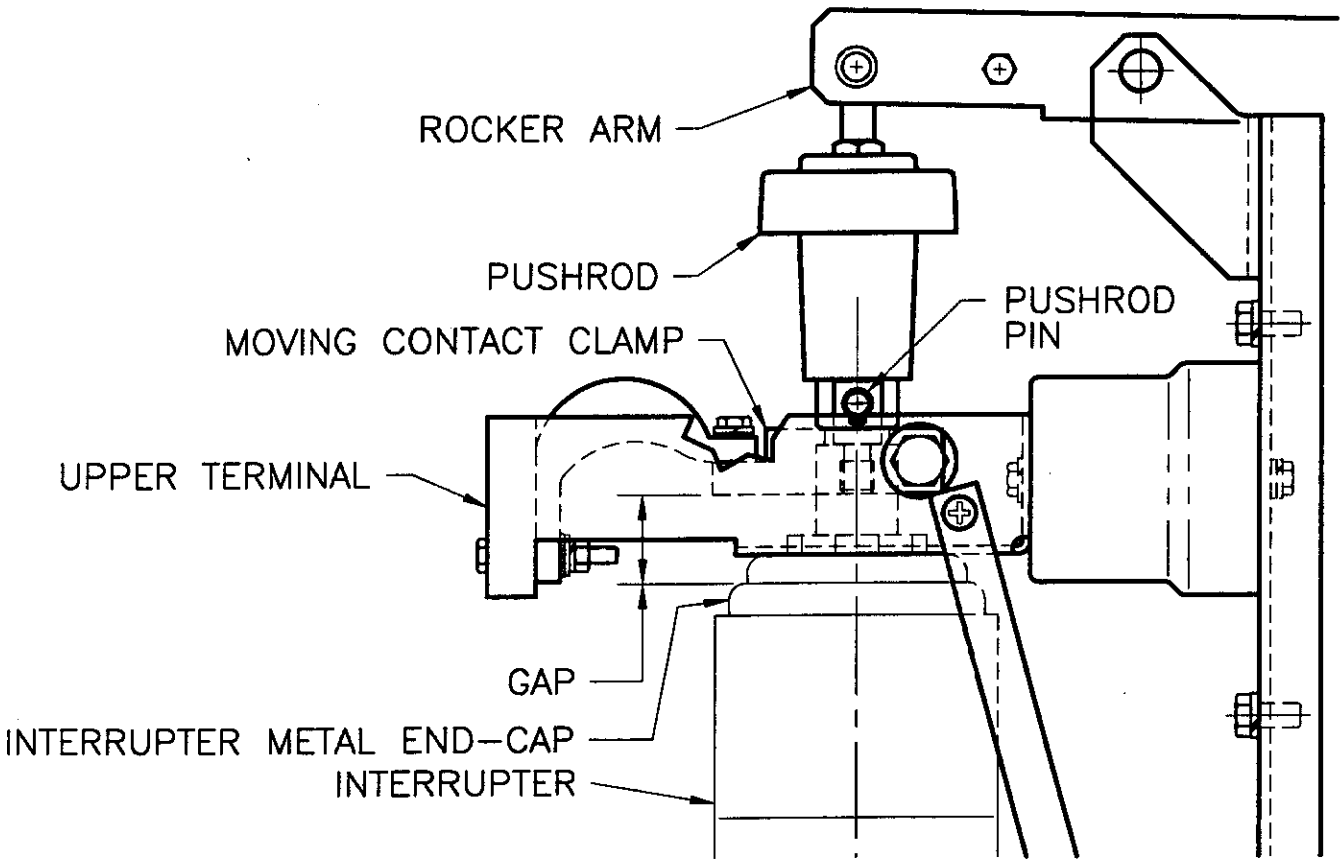

Figure 3 - Contact Gap

Before the pushrod can be turned, the breaker must be open, the closing springs discharged, and the pin removed. With the breaker open, the vacuum in the inetrrupter maintains a constant downward force of approximately 25 lbs. on the moving contact and pushrod. Therefore, before removing the pin, the contact must be held down in the open position by temporary spacers. After removing retaining ring and pin, rotate the pushrod as required.

If the pushrod is of the four hole variety, one quarter (1/4) turn of the pushrod will change the gap by approx. .019". If the pushrod is of the six hole variety, one sixth turn will change the gap by approx. .013". After rotating the pushrod, carefully reposition the moving contact and pushrod vertically to align the pin holes. Replace the pin and retainer and remove the temporary spacer. During the readjustment procedure note that the contact wipe and gap dimensions, specified previously, must be maintained. Also, note that no more than one half (1/2) turn for the four hole pushrod, or two-thirds (2/3) turn for the six hole pushrod total should be required when readjusting for contact sequence.

After completing the contact sequence procedure, recheck the contact wipe and gaps.

Closing and Opening Times and Speeds

After the operation intervals noted previously, it is recommended checking the closing and opening times by use of a cycle counter, travel recorder, oscillograph, etc. to monitor the time from energizing to contacts touch or part.

The circuit breaker closing and opening times should be within the following time ranges for normal operation:

Closing Time Range - MS	Opening Time Range - MS
25 - 45	15 - 25

NOTES: °

1. Below 0 C, the closing times will increase (but with no reduction in closing force); and opening times will be within the limits.

2. Adjustments to correct speeds, if found to be outside limits, are critical and the nearest District Office should be contacted for recommendations.

Operating Mechanism

The various mechanism adjustments described in the following sections apply to all circuit breakers covered by this instruction bulletin.

Latch Engagement (Bite) (Refer to Figure 4)

The latch engagement adjusting screw (3) is located to the right of the right-hand mechanism housing (1). It can be reached easily from the top of the circuit breaker.

To adjust the latch (2) engagement, proceed as follows:

1. Back off adjusting screw (3) to assure excessive latch engagement.
2. Close the circuit breaker.
3. Turn adjusting screw (3) down slowly until the latch just releases, tripping the circuit breaker.
4. Back off the adjusting screw (3) 2 turns.

Control Device (Refer to Figure 5)

The control device is adjusted before leaving the factory. It is recommended that no attempt be made to adjust the internal relays and contacts of this device in the field. If replacement of the control device is required, the close latch release rod (5) overtravel may be adjusted as described below.

Close Latch Release Rod Overtravel

1. Back off on close latch release rod (5) and check that the circuit breaker will not close by attempting to close electrically or manually pushing up on close latch release rod (5) to the full extent of its travel.
2. Charge the closing springs. Push up on close latch release rod (5) to the full extent of its travel. While holding the close latch release rod in this position, turn up on the close its latch release rod (5) until the circuit breaker closes. Turn close release rod (5) up an additional 1 1/2 turns.

Lubrication

The 5VKB-R circuit breakers are lubricated during factory assembly as follows:

1. All mechanism parts, bearings, pins, etc., have been lubricated with Anderol 757 manufactured by Nuodex, Inc. (formerly Tenneco Chemical, Inc.). (ABB No. 712994A, 4oz. tube).

If the grease should become contaminated or unduly oxidized (hardened and darkened) or if parts are replaced, any relubrication should be done with the lubricants noted.

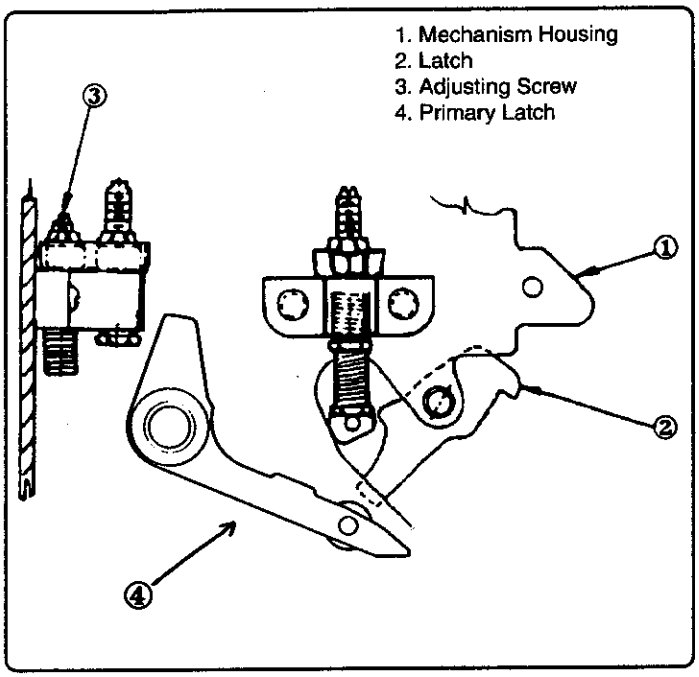

Figure 4 - Trip Latch Engagement Adjustment

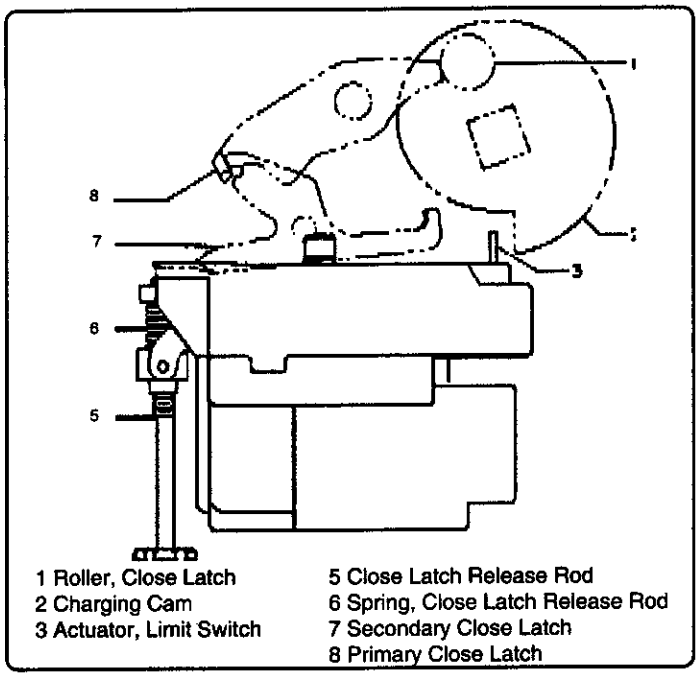

Figure 5 - Control Relay

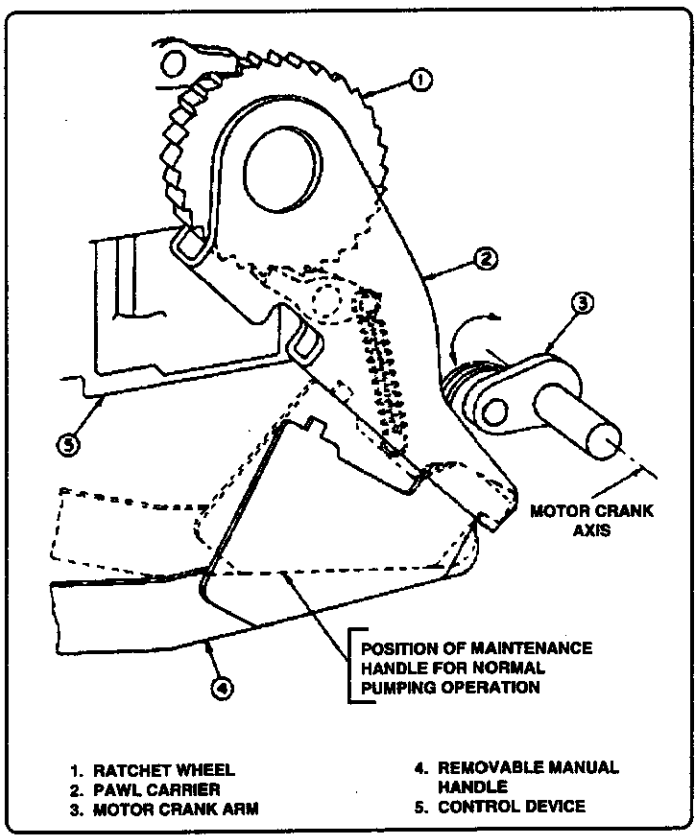

Figure 6 - Manual Charging Of Electrically Operated Circuit Breakers

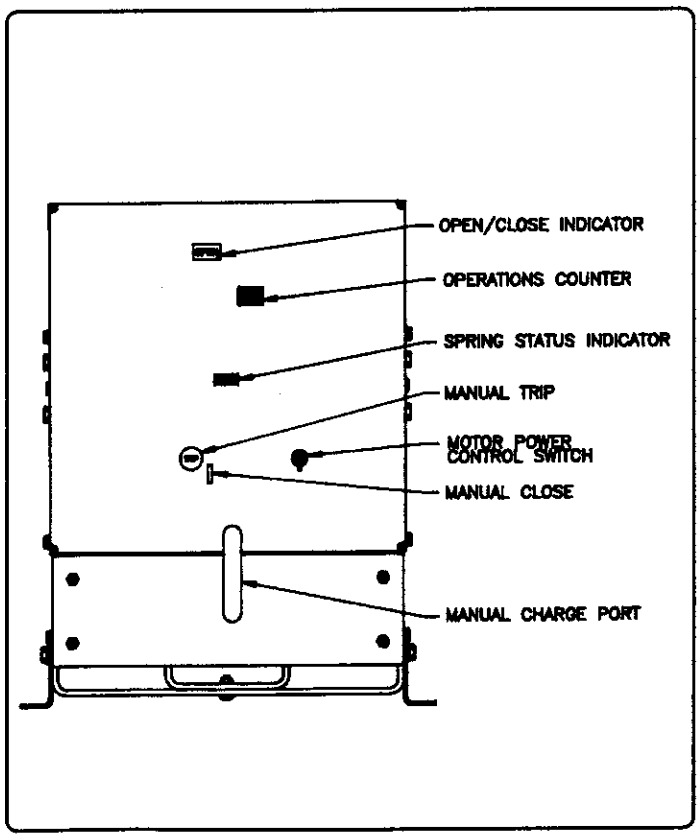

Figure 7 - Control Panel

NOTES:

1. The mechanism should be periodically inspected for lubrication contamination; frequency of inspection is dependent on operating environment.

2. Do not use light oil to lubricate any mechanism parts. In emergency situations, Anderol 732 may be used as a temporary lubricant. In these cases, allow time for the solvents to evaporate prior to any mechanical operations. It is mandatory that the breaker undergo thorough lubrication with Anderol 757 at the next maintenance interval. Use of solvents to free contaminated lubricant is strictly forbidden without immediate relubrication using Anderol 757. Note that bearing surfaces must be repacked and this will require disassembly of the mechanism. Do not operate the circuit breaker without completing this procedure.

3. The charging motor is sealed and no lubrication is required.

DIELECTRIC TESTS

It is recommended that dielectric withstand tests be made prior to use and then at routine maintenance periods to verify the integrity of vacuum interrupters. If, during the dielectric withstand test, the required test voltage cannot be sustained across the open contacts of the vacuum interrupter, the interrupter is faulty and must be replaced. Always insure that the contact air gap is correct before conducting primary circuit dielectric tests.

CAUTION CAUTION CAUTION CAUTION

The procedure for dielectric testing a vacuum breaker is similar to that for any other type breaker; there are two areas which require extra CAUTION in handling.

1. The internal shield of a vacuum interrupter can acquire an electrical charge which is usually retained even after the voltage is removed. On certain types of interrupters, this shield is attached to the exposed mid-band ring and a grounding stick should be used to discharge the ring before working on the device.

2. Dielectric test voltages higher than rated voltage, applied across open contacts, may cause a vacuum interrupter to emit some X-radiation which could be a health hazard on prolonged exposure at close range. Accordingly, even though the emission is low and on for such a short period of time, it is considered appropriate to exercise caution.

Therefore, do not run any primary circuit dielectric withstand tests on isolated interrupters with open contacts, above rated voltage unless test personnel are adequately shielded or they are no less than six feet from the test unit.

It is noted that NO hazardous X-radiation is produced with closed contacts at any test voltage or with open contacts at rated voltage and there should be no cause for concern. Further, if the breaker is tested in its switchgear compartment, the enclosure steel provides sufficient shielding to protect personnel from X-radiation at the test voltages recommended below at the normal distances maintained for electrical safety.

The following test values should be used for dielectric testing the new breaker and are to be applied for a one-minute period:

Description	60 Hz
Primary Circuit	19.0kV
* Secondary Circuit (Control)	1100 V

Once in service the primary circuit should be tested at 75% of this rating.

*If it is desired to make a dielectric test on the secondary control wiring, turn the spring charging motor disconnect switch (1, Fig.7) to the "OFF" position. Apply test voltage (1100V-AC) for one minute to each of the secondary contacts of the circuit breaker.

If it is desired to make a dielectric test on the spring charging motor, turn the motor disconnect switch (1, Fig.7) to the "ON" position. Apply test voltage (540V-AC) for one minute to the motor circuit.

ELECTRICAL CHARACTERISTICS OF CONTROL DEVICES

For operating voltage ranges for various nominal control voltages, refer to Table 1.

For average current values at various nominal control voltages, refer to Table 2. The current values given in this table are average, steady state values and momentary inrush currents for all charging motors and AC coils are approximately six to eight times these values.

ELECTRICAL OPERATING SEQUENCE

Please refer to the specific schematic diagrams and other operational information furnished with your order.

Figures 8 and 9 are provided as typical schematics for general information on electrical information.

DC CLOSING OPERATING SEQUENCE

With the circuit breaker open, the closing springs uncharged, and the control power source energized, and motor disconnect switch closed, operation occurs as follows:

1. Immediately upon the availability of control power across wires 501 & 502, the spring charging motor (motor) is energized, which in turn charges the closing springs. When the closing springs are charged, limit switch contact "LSb" is opened, and limit switch contact "LSa" is closed.

2. Operation of a close control switch, connected at wire 502, energizes the latch release coil (X) through the circuit breaker auxiliary switch "b" contact, the normally closed lockout relay contact "Yb", and the limit switch contact "LSa". The latch release coil (X) releases the closing latch. The springs then discharge to close the circuit breaker.

3. When the springs discharge, limit switch contact "LSb" closes and switch contact "LSa" opens.

4. When limit switch "LSb" in the motor circuit closes, the spring charging motor is energized, which in turn recharges the closing springs.

5. When the circuit breaker closes, all auxiliary switch "b" contacts open and all auxiliary switch "a" contacts close.

6. When the limit switch contact "LSb" closes, the lockout relay coil (Y) is energized and opens lockout relay contact "Yb", which deenergizes the latch release coil (X). Lockout relay contact "Ya" closes, which seals-in the lockout relay coil (Y) as long as the "close" contact is maintained. The purpose of the lockout relay coil (Y) is to prevent pumping of the closing mechanism when closing against a faulted circuit.

7. After the breaker has closed and when the "close" switch is released by the operator, the lockout relay coil (Y) is deenergized. This allows the normally-closed lockout relay contact "Yb" to close, and the normally-open lockout relay contact "Ya" to open.

8. The circuit breaker can be tripped by operation of the trip control switch which energizes the circuit breaker trip coil (TC) through wires 503 and wire 506.

9. The undervoltage device, if furnished, provides a direct acting lock-open and undervoltage tripping feature. This device must be energized to initially close the breaker, and also to maintain the breaker in a closed position.

10. The latch check switch, if furnished, can insure that the tripping mechanism must be reset prior to energizing the closing latch release coil (X), when wired in the close circuit.

Table 1 - Operating Voltage Range

Nominal Control Voltage	Spring Charging Motor	Close Coil	Trip Coil	Undervoltage	
				Pick-Up Maximum	Drop-Out
48 V dc	38 - 56	38 - 56	28 - 56	41	15 - 29
125 V dc	100 - 140	100 -140	70 - 140	105	38 - 75
250 V dc	200 - 280	100 - 280	140 - 280	212	75 - 150
120 V ac	104 -127	104 - 127	104 -127	102	36 - 72
240 V ac	208 - 254	208 - 254	208 - 254	204	74 - 144

Table 2 - Average Current Values

Nominal Control Voltage	Spring Charging Motor	Close Coil	Trip Coil	Lockout Coil	Under Voltage	N.E.C. Fuse
48 V dc	25.0	10.7	3.14	0.15	0.3	25
125 V dc	10.0	5.0	1.3	0.06	0.2	25
250 V dc	5.0	2.2	0.65	0.03	0.1	25
120 V ac	10.0	4.5	6.5	0.40	0.5	25
240 V ac	5.0	2.3	1.15	0.20	0.2	25

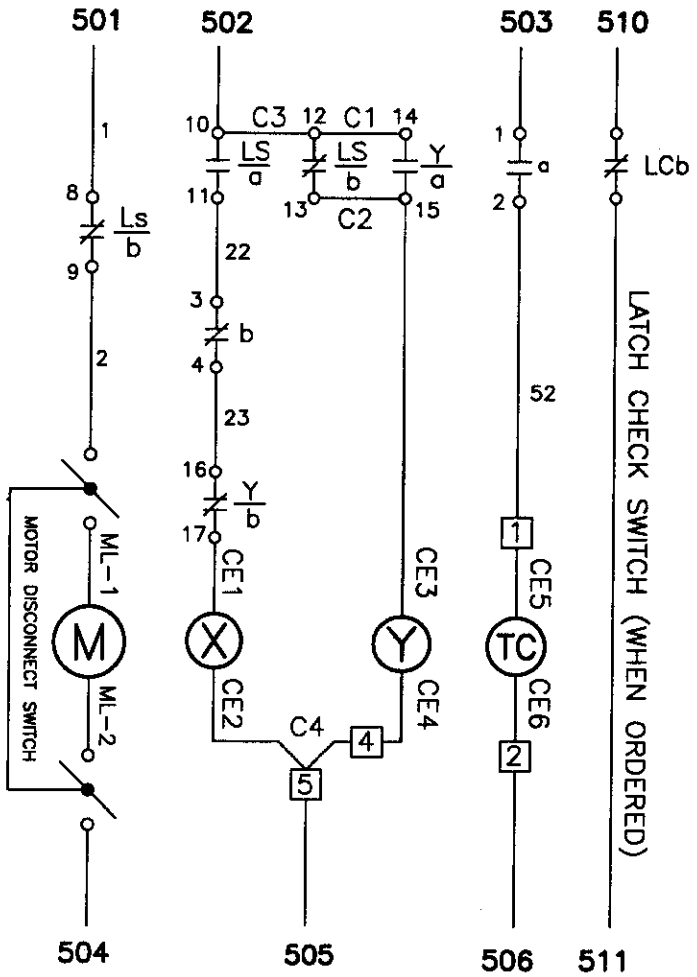

Figure 8 - Typical DC Schematic Diagram Of Control Circuit

LEGEND

a --------- Auxiliary Switch Contact Closed When Breaker Is Closed.
b --------- Auxiliary Switch Contact Open When Breaker Is Closed.
LCb ------ Latch Check Switch Contact Closed When Breaker Operating Mechanism Is Reset. (Option)
LSa ------ Limit Switch Contact Open When Springs Are Discharged. Closed When Springs Are Charged.
LSb ------ Limit Switch Contact Closed When Springs Are Discharged. Open When Springs Are Charged.
TC ------- Shunt Trip Coil.
X --------- Control Relay Release Coil.
Y --------- Control Relay Lockout Coil.
Ya ------- Normally Open Control Relay Contact.
Yb ------- Normally Closed Control Relay Contact.
□ ---------Terminal Block Point.
ML ------- Motor Lead.
CE ------- Coil Lead End.
C1, C2 -- Terminal Jumper (Control Device).
R1, R2 -- Resistor (AC Close)

AC CLOSING OPERATING SEQUENCE

With the circuit breaker open, the closing springs uncharged, and the control power source energized across wires 501 and 504, motor disconnect switch closed, operation occurs as follows:

1. Immediately upon the availability of control power at wires 501 and 504, the spring charging motor (motor) is energized, which in turn charges the closing springs. When the closing springs are charged, limit switch contact "LSa" is closed. Also, upon availability of control power at wire 502 and wire 505 and after the closing springs have been charged, the lockout relay coil (Y) will be energized through the circuit breaker auxiliary switch "b" contact and the parallel resistors R_1 and R_2. The lockout relay will pick up and close contact "Ya".

2. Connecting wire 507 to control via operation of a close control switch energizes the latch release coil (X) through the circuit breaker auxiliary switch "b" contact, the normally open lockout relay contact "Ya", and the limit switch contact "LSa". The latch release coil (X) releases the closing latch. The springs then discharge to close the circuit breaker.

3. When the springs discharge, limit switch contact "LSb" closes and limit switch contact "LSa" opens.

4. When limit switch contact "LSb" in the motor circuit closes, the spring charging motor is energized, which in turn recharges the closing springs.

5. When the circuit breaker closes, all auxiliary switch "b" contacts open and all auxiliary switch "a" contacts close.

6. When the limit switch contact "LSa" opens, both the latch release coil (X) and the lockout relay coil (Y) are deenergized. Contact "Ya" opens the latch release coil (X) circuit. Contact "Yb" closes connecting resistors "R_1" and "R_2" directly to control power as long as the close control switch remains closed. The circuit breaker is prevented from any automatic reclosing in the event "LSa" and auxiliary switch "b" close because "Ya" remains open. The "Yb" contact shorts out the lockout relay coil (Y) through resistors "R_1" and "R_2". The purpose of the lockout relay is to prevent pumping of the circuit breaker's mechanism when closing against a faulted circuit.

7. After the breaker has closed and when the closing control switch is released by the operator, the lockout relay coil (Y) remains deenergized due to the auxiliary switch "b" contact in the closing circuit being open.

8. The circuit breaker can be tripped by operation of the "Remote Trip" switch, which energizes the circuit breaker trip coil (TC) through the auxiliary switch "a" contact.

9. The undervoltage device, if furnished, provides a direct acting lock-open and undervoltage tripping feature. This device must be energized to initially close the breaker, and also to maintain the breaker in a closed position.

10. The latch check switch, if furnished, can insure that the operating mechanism must be reset prior to energizing the closing latch release coil (X), when wired in the close circuit.

11. The remote mounted capacitor trip feature, if furnished, provides an electrical energy storage network, whereby should a loss of control power occur at the instant of a tripping signal, sufficient energy will be furnished to insure an electrical tripping operation.

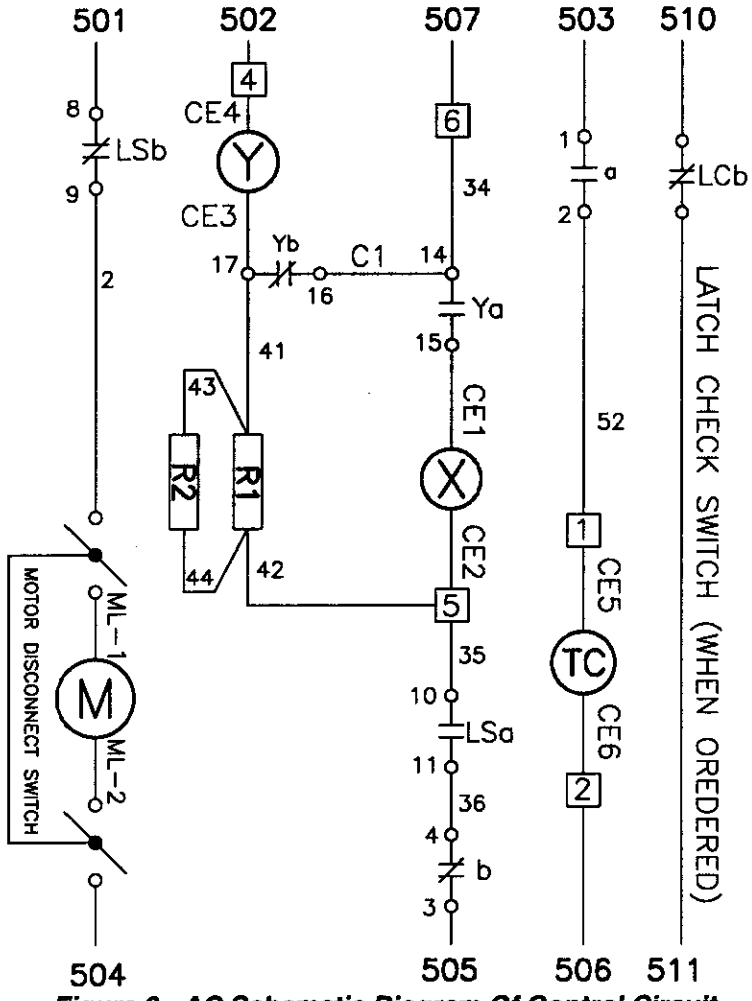

Figure 9 - AC Schematic Diagram Of Control Circuit

RENEWAL PARTS

We recommend only those renewal parts that will be required to insure proper and timely maintenance for normal operation of the 5VKB-R circuit breakers be stocked. Copies of the applicable Renewal Parts Bulletin for specific circuit breakers will be furnished on request to the nearest District Office.

The minimum quantity of assemblies and items recommended in these bulletins are predicated on infrequent replacement of parts based on accumulated tests and operating experience. Total assemblies are recommended for fast replacement, when it is necessary to return the breaker to service as quickly as possible. Replaced assemblies can be returned to the factory for nominal reconditioning. The bulletins contain specific part ordering instructions. If desired, specific instructions regarding replacement of those part assemblies are also available.

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Printed in U.S.A. 15M 0195