INSTRUCTIONS

IC2800-A501
D-C ACCELERATING CONTACTOR
100 AMPERES—600 VOLTS

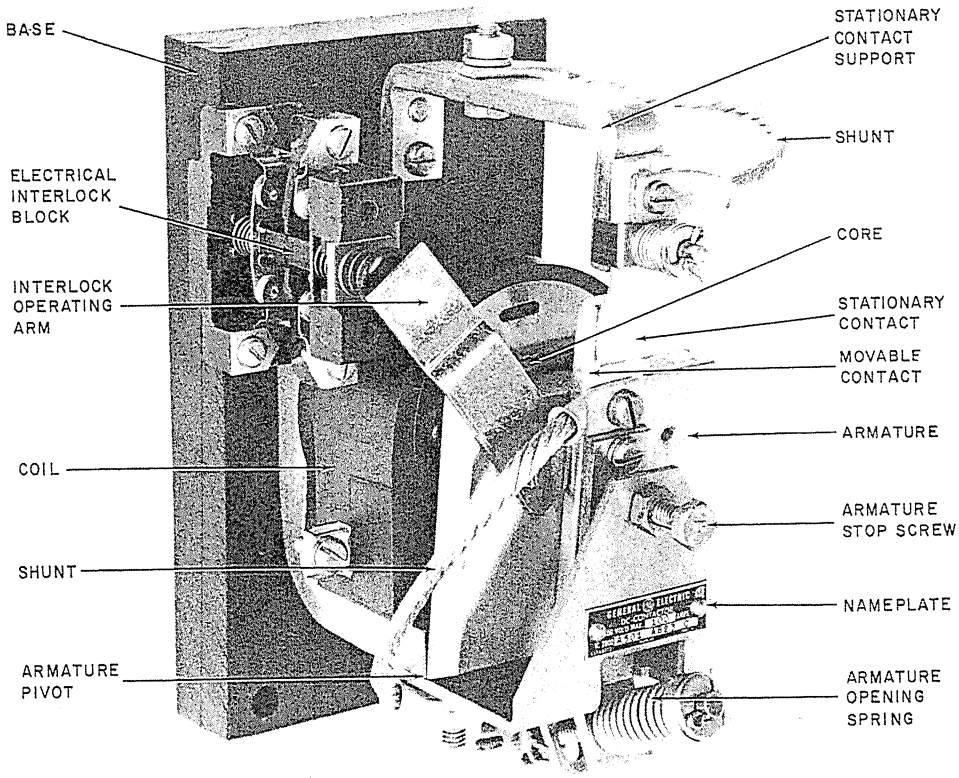


Fig. 1. IC2800-A501 contactor with two-circuit auxiliary interlock block

Before any adjustments, servicing, parts replacement or any other act is performed requiring physical contact with the electrical working components or wiring of this equipment, the POWER SUPPLY MUST BE DISCONNECTED.

GENERAL

The IC2800-A501 d-c contactor has one normally closed main pole and has a 100-ampere, 600-volt maximum rating. It is unit-mounted, front-connected and primarily used as an accelerating contactor for short-circuiting starting resistance of d-c motors.

The power contacts have no blowout coil; therefore, the contactor should not be used to interrupt current.

This contactor will pick up instantaneously but will have a magnetic time delay action on dropout which restrains the power tips from closing for an interval of time after the coil has been de-energized.

Two auxiliary electrical interlock circuits, which are contained in a single molded housing, are available as a combination of two normally open, two normally closed, or one normally open and one normally closed.

The operating coils are normally intermittent rated but may be made continuous rated by use of a holding resistor.

INSTALLATION

The IC2800-A501 contactor is a unit-mounted device on a compound base and can be mounted on either steel or insulated panels. When mounting the

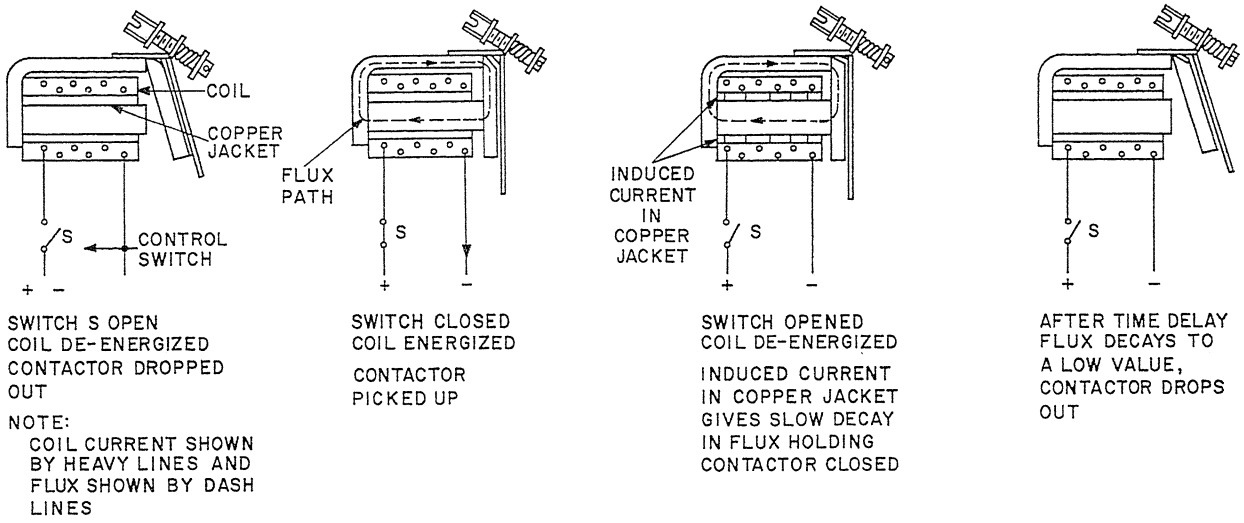


Fig. 2. Time-delay dropout of contactor with copper jacket

contactor on a steel panel, make sure that the sheet of insulation supplied with the contactor is in place between the contactor base and the main base or panel.

All contacts, armature and core, and pivot points must be free from dirt or foreign matter.

The contactor should be mounted with the armature pivot down as shown in Fig. 1.

OPERATION

The construction is such that when voltage is applied to the coil terminals, magnetic action attracts the armature to the core which opens the normally closed power contacts.

When voltage has been removed from the coil, the contactor will have a magnetic-time-delay action which prevents the power contacts from closing immediately. This time delay is obtained by use of a cylindrical copper jacket between the core and coil. When the coil is de-energized, the current in the coil and the flux in the magnetic circuit decays slowly, producing the time-delay dropout of the contactor armature as shown in Fig. 2.

ADJUSTMENTS

The three principal adjustments of the contactor are the shim, power contacts and the armature opening spring.

Shims

The shim is a coarse adjustment affecting only the dropout time as given in Table I. For the frequent operation encountered in steel-mill service, the use of shims thinner than 0.010 inch is not recommended.

The 0.010-inch thick shim is ordinarily supplied with the contactor unless a shim of different thickness is required to secure a longer or shorter time for certain applications.

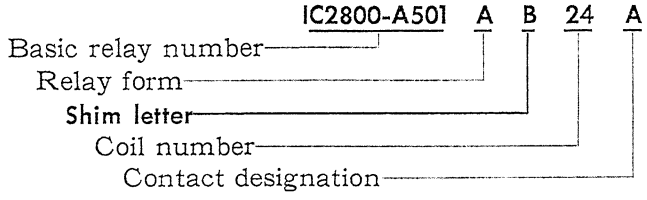
If bimetal shims are used, make sure that the bronze side of the shim is next to the armature and that brass screws (not steel) are used to fasten the shim to the armature. The effective air gap in the magnetic circuit when bimetal shims are used is so small that such factors as accumulation of dirt particles or mechanical wear will tend to affect the timing to a greater extent than when thicker shims are used.

A shim must always be used. While it may appear possible in some cases to secure a relatively long time delay by omitting the shim, the time is likely to be erratic. It is also probable that after a few operations, the residual flux will prevent the armature from opening at all.

The dropout value will always be a relatively low percentage of the pickup value for a given setting, about ten percent or less.

Shim Letter Identification

To identify the shim furnished on a given relay, refer to the shim suffix letter in the relay catalog number. The shim suffix letter appears in the position illustrated in the following example:



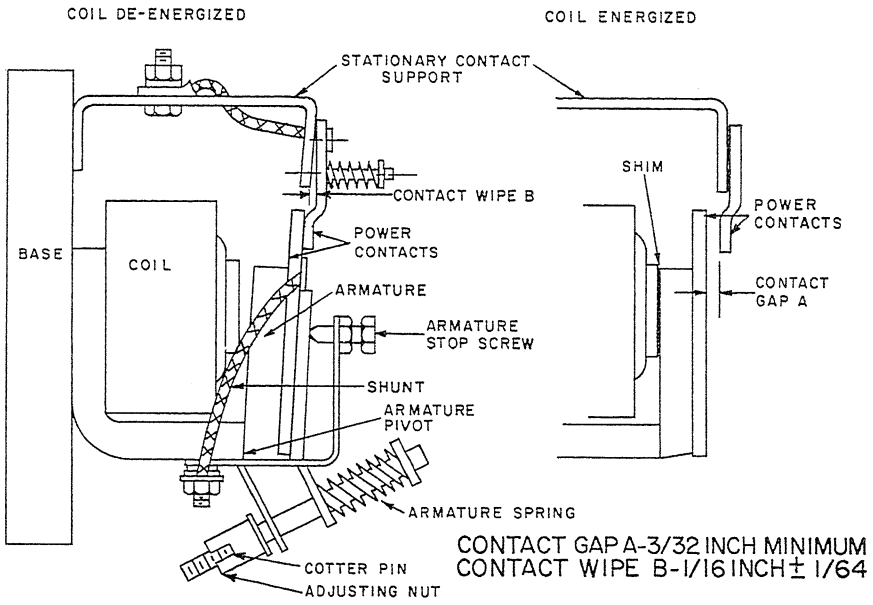


Fig. 3. Tip gap and wipe

TABLE I
Shim Data for IC2800-A501

Qty.	Shim Cat. No.	Effective Thickness in Inches	Identification			Approximate Time Range—Seconds	
			Shim Letter	Shape	Material	Intermittent Coils†	Continuous Coils‡
1	5351666	.001	D		bimetal	6.5–8.5	3.25–4.25
1	5353251	.0015	E		bimetal	5.8–7.6	2.9–3.8
1	125A4003 Plus	.0035	C*		bronze	2.6–4.8	1.3–2.4
1	5353251				bimetal		
1	2475160	.005	F		bronze	1.86–3.24	.93–1.62
1	5386520	.010	B		bronze	1.05–2.14	.53–1.07
1	2489801	.015	R		bronze	.63–1.3	.31–.65
2	5386520	.020	X		bronze	.48–.88	.24–.44
2	2489801	.030	Y		bronze	.34–.59	.17–.29

* Assemble with shim 125A4003 between armature and V-5353251 shim.

† These dropout ranges are obtained by energization of intermittent-rated coils for 2 seconds or more at full voltage. For applications where the IC2800-A501 coil is only energized long enough to pick up a second contactor, such as an IC2800-1607, the lower limit of these ranges should be decreased by approximately 35 percent.

‡ These dropout ranges are obtained by energization of continuous-rated coils for 2 seconds or more at full voltage with holding resistor inserted by normally closed interlock.

Contactors can be adjusted to drop out within any listed time range, but not necessarily to specific points within the time range.

NOTE: The time ranges given are from the time the circuit of a copper-jacketed coil is broken until the armature drops out. The times given are for operating at rated voltage for a relay which will pick up at 63 percent or less of rated voltage with a cold coil.

Shims thicker than 0.020 in. cannot be used with gradually increasing voltage as pickup will not be clean.

Power Contacts

The contactor is completely adjusted at the factory and no other adjustments should be necessary. However, the following adjustments should be checked after changing of any part.

Referring to Fig. 3, the armature stop screw should be adjusted to obtain the contact gap (A) and wipe (B). It may be necessary to slightly bend the stationary contact support to aid in obtaining these adjustments.

The vertical edges of the stationary and movable contacts should line up within 1/32 inch.

A minimum clearance of 1/16 inch should exist between the end of the stationary contact and the terminal of the shunt attached to the movable contact.

Armature Opening Spring

The armature opening spring permits fine adjustment of the time-delay dropout and is also the main adjustment of pickup current and voltage. In the time-delay dropout application the spring affects the time as indicated in Fig. 4.

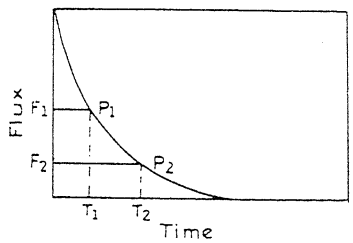


Fig. 4. Flux—time curve

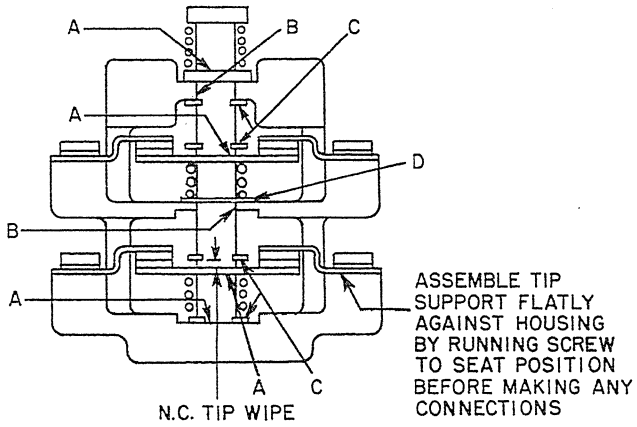


Fig. 5. Interlock block with normally closed contacts in unoperated position

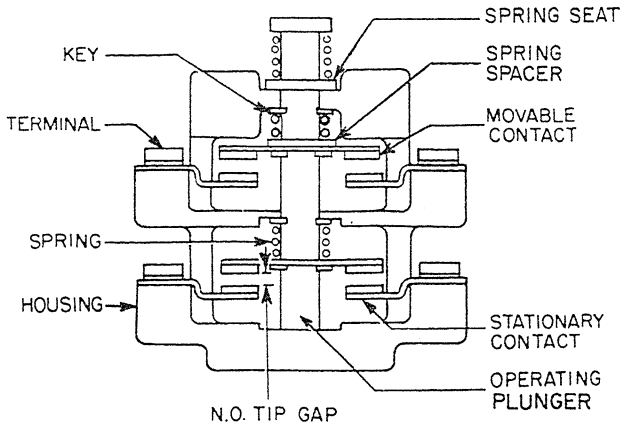


Fig. 6. Interlock block with normally open contacts in unoperated position

For the armature spring force (P1), the armature will release at time (T1), while if the spring force is decreased to (P2), a further decrease in flux is necessary before the armature releases, and the time delay is increased to (T2). Since the flux density in the magnetic circuit is above the point of saturation when the armature is closed, the time adjustment is substantially independent of the usual variation in line voltage. To adjust the spring force, remove cotter pin, Fig. 3, to free the adjusting nut. Replace after adjustment.

The armature spring force must be strong enough to hold the armature positively against the back stop screw, but must not be increased to a value where the armature will fail to close if the coil is energized when at its maximum operating temperature.

ELECTRICAL INTERLOCKS

Interlock ratings are listed in Table II.

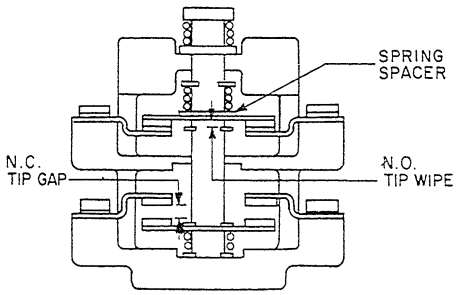


Fig. 7. Interlock block with one set of normally open contacts and one set of normally closed contacts in operated position

These contactors use an interlock block having internal parts which can be rearranged to give different contact arrangements. Should this be necessary the parts should be reassembled in accordance with Figs. 5, 6, or 7.

TABLE II
Interlock Ratings (In Amperes)

Number of Contacts	Carry	Make	Interrupt						
			*D-c Inductive			†A-c			
			125v	250v	600v	110v	220v	440v	600v
One Set	10	60	1.8	0.5	0.2	6	3	1.5	1.2
Two Sets in Series	10	60	4.0	1.2	0.35				

*Noninductive d-c interrupting rating is 1.5 times inductive.

†Capable of interrupting inrush current of 60 amperes at 110 volts, 30 amperes at 220 volts, 15 amperes at 440 volts, and 12 amperes at 600 volts a limited number of times.

Spring ends must not protrude into holes (A), slots (B), or keys (C), which serve as guides for the operating plunger. See Figs. 5 and 6.

Interlock blocks with two normally closed circuits require a spring spacer (D) as shown in Fig. 5 to assure that the center spring is properly in place. Because of the circuit rearrangement feature, a spring spacer is also supplied with other two-circuit interlock blocks, as shown in Figs. 6 and 7.

When circuits are rearranged to obtain one normally open and one normally closed circuit, the normally closed circuit must be located at the bottom as shown in Fig. 7.

The interlock block should be positioned on its bracket so that with the contactor in its energized position, the interlock plunger (Fig. 6) should not bottom, and with the contactor in its de-energized position, there should be some clearance (C) between the interlock plunger and the interlock operating arm (Fig. 8).

Tip gaps and wipes (see Figs. 5, 6, and 7), when new, should be as shown in Table III.

TABLE III
Contact Tip Gap and Wipe

Contacts		Maximum	Minimum
Not Operated	(N.O.) Tip Gap (N.C.) Tip Wipe	1/8" 3/32"	5/64" 3/64"
Operated	(N.O.) Tip Wipe (N.C.) Tip Gap	5/64" 7/64"	3/64" 5/64"

An interlock block (Fig. 7) having one set of normally open contacts and one set of normally closed contacts must be adjusted so that with one set of contacts just touching, there is at least 1/64 inch of gap between the other set of contacts.

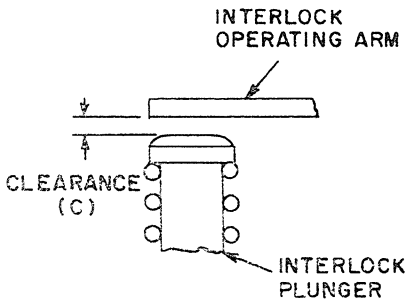


Fig. 8. Contactor in its de-energized position

MAINTENANCE
(Refer to Fig. 9)

COILS

To replace the contactor coil, remove the hardware that mounts the lower shunt and the armature assembly to the frame. The complete armature assembly may then be removed without disturbing the calibration. Then carefully remove the bronze coil retainer to assure that no damage is inflected on the core head. Damage such as burrs to the edge of the core will increase the effective air gap such that the timing is appreciably reduced. Replace the coil. Replace the bronze coil retainer being sure that it fits into the groove in the core. Replace the armature assembly being careful to correctly attach the shunt to frame assembly. Support (K) must fit into the V groove of bracket (L). Check contact gap and wipe as given in Fig. 3.

POWER CONTACTS

The power contacts are silver faced and should require little attention during their normal life. Check them occasionally for wear and replace before the silver is worn away.

To replace the stationary contact, remove screw (1) that secures the upper shunt to the contact. Remove cotter pin (2) to release the spring seat and spring. After replacing the contact make sure the surface between the shunt and contact is clean. This will assure good contact and reduce heating at this point.

To replace the movable contact, remove screw (3) that secures the lower shunt to the contact. Remove cotter pin (5) to release the spring seat and spring. Then remove screw (4) that secures the contact to the armature. As with the stationary contact, make sure the surface between the shunt and contact is clean.

SHIMS

To replace the shim, remove the armature assembly in the same manner as when replacing the coil. Remove 2 brass screws that secure the shim to the under side of the armature. To assure that proper timing is maintained, the new shim must have the same shape as the shim being replaced (see Table I).

ELECTRICAL INTERLOCKS

Replace contact tips when the wipe (Figs. 5 and 7) as specified in Table III decreases to one-half of the minimum specified.

To replace removable contacts on interlock blocks illustrated in Figs. 5, 6, and 7, lift the spring seat with the thumb and forefinger and remove the operating plunger which supports the movable contacts. Snap off the U-shaped keys and the movable contacts can be removed and replaced. Care should be taken not to lose any parts or pieces during this operation.

To replace a stationary contact, remove the terminal screw and lift the contact assembly off the housing. Replace by pressing the new contact assembly into the molded insert and run the terminal screw to its seal position. Care should be taken to avoid changing the shape of this contact assembly in handling. Also, the shape should not change during operation.

The complete electrical interlock block can be replaced with a new one by removing it and its bracket from the contactor base. Remove the interlock block from the bracket, then assemble the new interlock block on the bracket, maintaining the same position on the bracket. Assemble the interlock bracket to the contactor base and check the tip gaps and wipes as given in Table III.

RENEWAL PARTS

When ordering renewal parts, address the nearest General Electric sales office, specify the quantity required, and give the catalog numbers or describe the required parts in detail. Also be sure to give the complete nameplate rating of the equipment.

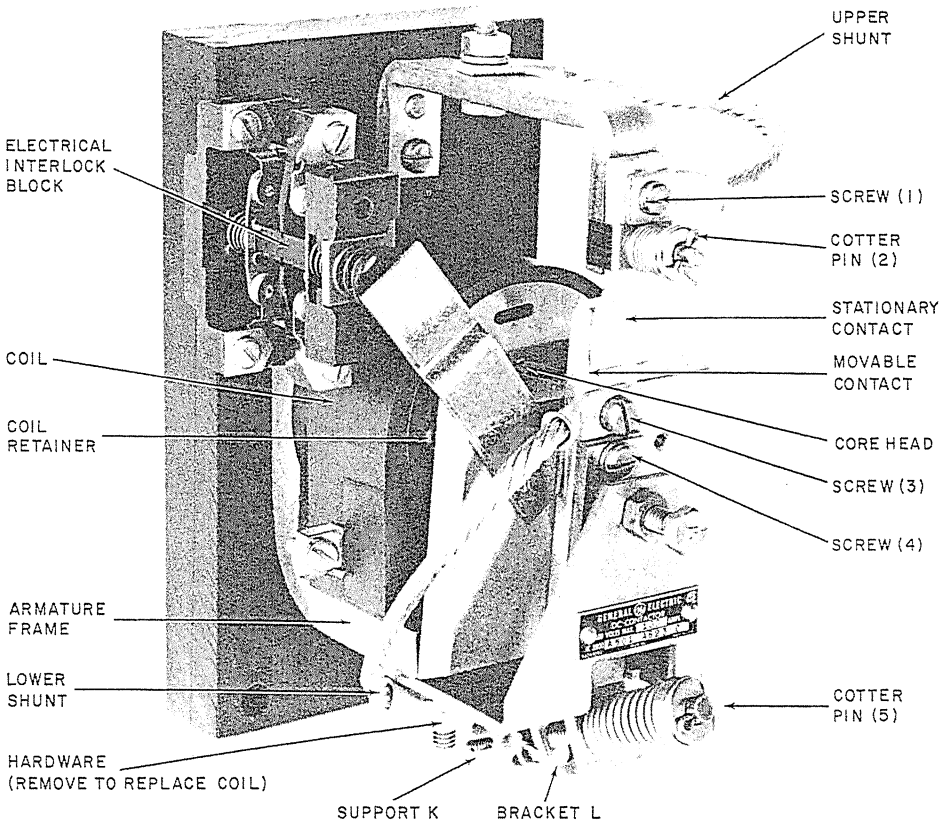


Fig. 9. IC2800-A501 contactor maintenance references

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