D-C CONTACTORS

IC2800-1178, 1180, Y107, Y108, Y127, AND Y128

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.

DESCRIPTION

The devices described in this instruction are primarily NEMA Sizes 8 and 9, d-c mill type contactors having a d-c operating magnet. They are single pole, normally open, shunt contactors and have two operating coils that can be series or parallel connected.

All contactors have one set of arcing tips with a series blowout coil. The IC2800-1178, Y107 and Y127 contactors have one set of main current-carrying tips and the IC2800-1180, Y108 and Y128 contactors have two parallel sets of main current-carrying tips. The arcing tips and the blowout coil are shorted out when the main tips are fully sealed in.

The IC2800-1178 and 1180 are unmounted, back-connected devices that are assembled and adjusted by the user in accordance with these instructions. All forms must be mounted on an insulated panel.

The IC2800Y107 and Y108 are unit mounted, front-connected contactors. They are assembled on an insulated base of the dead-back type which can be mounted on either steel or insulated panel. All forms are completely assembled, adjusted and tested at the factory.

The IC2800Y127 and Y128 are unit mounted forms of the IC2800-1178 and 1180. Special forms are available where the lower connection terminal is front-connected. All forms are completely assembled, adjusted and tested at the factory. They are assembled on an insulated base which can be mounted on either a steel or insulated panel having a cutout that allows the back connection terminals to protrude through the panel.

Special forms of these contactors are available for use in a-c applications. These forms can be identified by the laminated pole pieces in the blowout coil assembly.

Forms of the IC2800-1178 and 1180 contactors are available that can be mechanically tied together for use in applications where two pole and three pole contactors are required. Refer to the General Electric Company for details.

A maximum of eight electrical interlock circuits can be supplied on any form of contactor.

Contactors can be mechanically interlocked when necessary.

Direct current must be supplied to the coils for both a-c and d-c applications. A rectifier can be used with a-c control power if d-c is not available. Refer to Section labeled "Coil Connections."

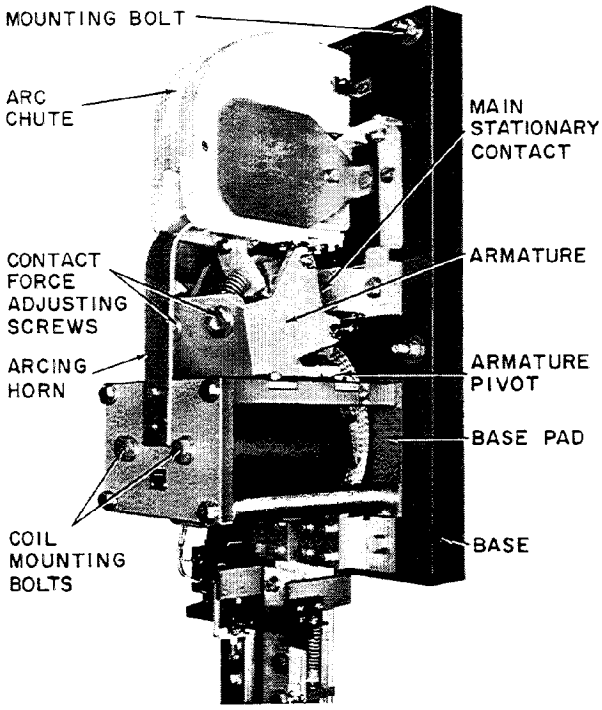


Fig. 1. IC2800-Y108 d-c contactor with IC2820-E401 relay.

INSTALLATION

When mounting these contactors, the proper NEMA standard for electrical clearance and creepage to conducting parts and to ground must be maintained. Note that the complete magnet structure is at the same potential as the power tips.

To obtain the maximum interruption rating of the interlocks mounted away from the magnet-frame, an air gap of 3/4-inch must be maintained between the open face of the interlocks and any conducting part or ground.

Maintain the following minimum arcing clearances for interruption at maximum current and voltage:

a. Above contactor arc chutes to other devices – 8 inches.

b. Above contactor arc chutes to enclosure not lined with insulation – 8 inches.

c. In front of contactor arc chutes to enclosure not lined with insulation – 8 inches.

d. Above contactor arc chutes to enclosure lined with insulation – 4 inches.

e. In front of contactor arc chutes to enclosure lined with insulation – 4 inches.

CAUTION: *NEVER OPERATE THE CONTACTOR WITH POWER ON THE CONTACTS UNLESS THE ARC CHUTES ARE IN PLACE.*

MOUNTED CONTACTORS

Mount the IC2800Y107 and IC2800Y108 in a vertical position – See Fig. 1. Attach them to the main base or panel with mounting bolts in accordance with the outline and drilling plan supplied with the contactor.

For estimating purposes, Fig. 2 gives typical outline and drilling plans showing the upper bus connections to the right and horizontal to the base. When mounting the contactor on a non-insulating base, make sure that the sheet of insulation supplied with the contactor is in place between the contactor base and the main base or panel.

Mount the IC2800Y127 and IC2800Y128 as described above. When mounting the contactor on a non-insulating base or panel, the cutout that allows the back-connection terminals to protrude through the panel must be of such size that the proper NEMA standard for electrical clearance and creepage between the panel and all live parts on the back of the contactor base is maintained.

UNMOUNTED CONTACTORS

Contactors IC2800-1178 and IC2800-1180 are for assembly directly on the purchaser's insulation base or panel of 1-1/2 to 2-inch thickness. Drill the base in accordance with the outline and drilling plan supplied with the contactor. For estimating purposes, Fig. 3 gives typical outline and drilling plans which include mounting electrical interlocks. Then, referring to Figs. 4 and 5, assemble and adjust the contactor as follows:

1. Mount the arcing stationary tip and blowout assembly (See Fig. 4). The stationary contact tip must be assembled as shown in Fig. 4A. The tip must be flush with surface "J" and line "K".

2. Mount the main tip assembly, spacer and shims per Fig. 4B. Initially, the spacer contained a tapped hole into which a stud was inserted. Now, the stud is brazed to the spacer to make the stud and spacer a single unit.

3. Connect the blowout coil and the main stationary-tip assembly with the connection strap. The spacer with the tapped hole must be under the main stationary-tip assembly where this connection is made. The connection strap does not rest against the panel. The bracket for the connection strap must be as shown in Fig. 5.

4. Mount the frame and armature assembly as a unit (Fig. 4) although they are two separate pieces. Make sure that the armature fits into its pivot (Fig. 5), the base pads are in place on both sides of the panel, and the grounding strap is in place on the back of the panel.

5. Operate the armature and measure the wipe of the main contacts. (See Fig. 6 – measurement C). The term "wipe" as used here may be more familiar as "allowance for erosion of tip material." Accurate measurements cannot be made by operating the armature manually. The coils should be energized to check adjustments.

Install shims, as needed, between the spacer assembly and the panel, as shown in Fig. 4B, to obtain a wipe of 19/64-inch $\pm$ 1/32-inch. Loosen hardware at the back of the panel to allow adding of the shims.

Manually operate the armature until the arcing tips just touch, then a gap of at least 3/16-inch must exist between the main tips. (See Fig. 6 – measurement F). Vary wipe C within its limits to maintain this dimension.

With these dimensions held, a minimum allowable main tip gap of 3/4-inch must be maintained. (See Fig. 6 – measurement D).

Check arcing tip gap and wipe as listed in Table 2. The arcing tip gap and wipe are set at the factory.

6. Mount the electrical-interlock assemblies at the sides of the contactor, if used. Adjust the operating arms to obtain the tip wipe and tip gap specified under "Electrical Interlocks." The exception is an interlock controlling a holding resistor. If it is used, it must be adjusted for a 1/16 inch gap, plus or minus 1/64 inch, to assure complete pickup before the holding resistor is placed in the circuit.

7. Add the arc chute to the contactor, seating it completely on the stationary arcing horn. Operate the movable contacts by hand to check clearance with the arc chute. Re-adjust the assembly, if necessary, to obtain clearance.

8. Connect the contactor into its control circuit. Apply voltage to the coil circuit. Contactors should pick up and fully wipe with cold coil at the following percentages of coil rated voltage.

a. Rectified a-c control with holding resistors	75 Percent
b. Rectified a-c control without holding resistors	70 Percent
c. D-c control	63 Percent
d. D-c control with holding resistor	75 Percent

If the contactor fails to pick-up and wipe-in, or if it fails to drop-out against its stop, adjust the shunts to obtain proper operation. Slotted holes are provided at the connection to the lower bus bar assembly. Remove any slack in the shunts to improve pick-up.

9. With the contactor picked-up, check to insure that the armature seats against both cores. This check can be made by inserting a strip of thin paper between armature and core, before coils are energized.

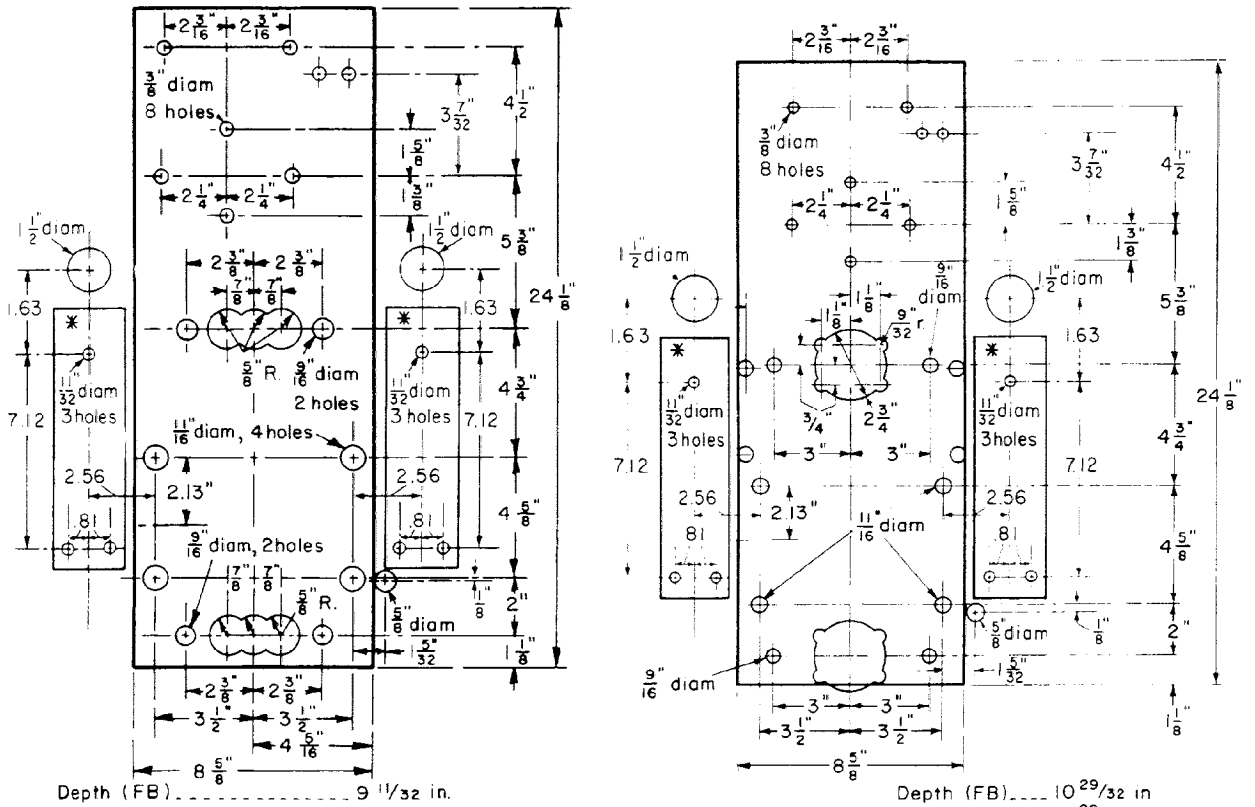


Fig. 3. Typical outline and drilling plans.

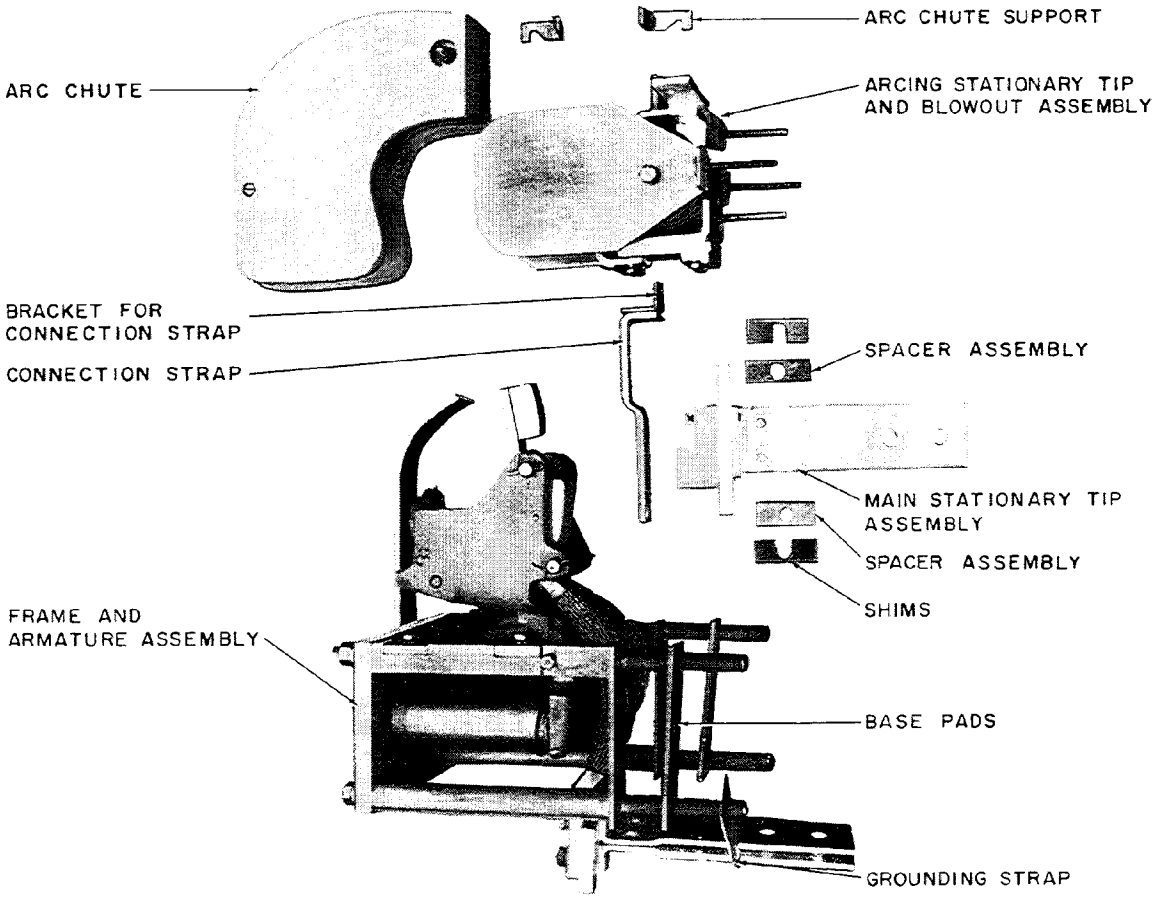


Fig. 4. IC2800-1178 contactor (unmounted).

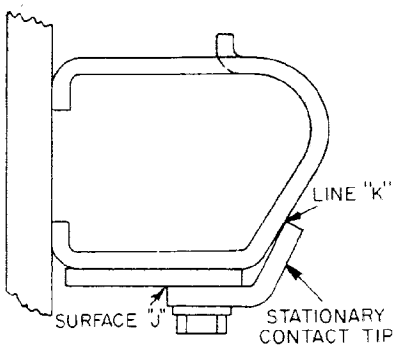


Fig. 4A. Stationary arcing contact bracket.

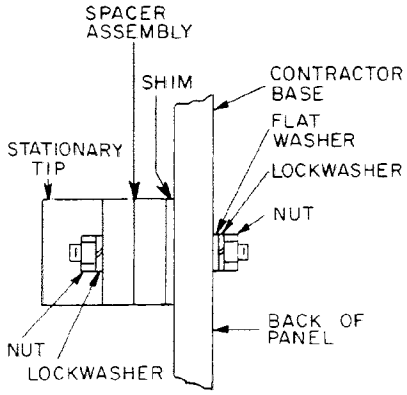


Fig. 4B. Stationary main-tip assembly.

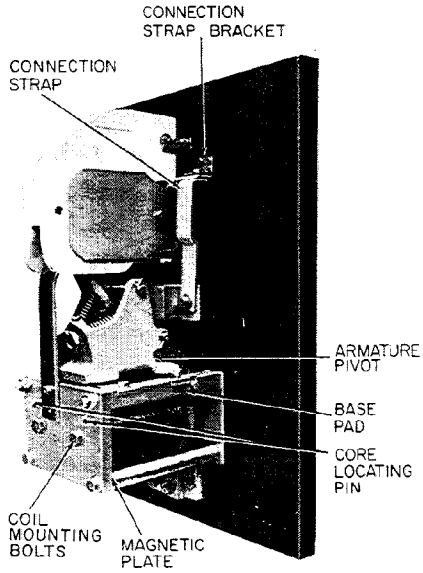


Fig. 5. IC2800-1178 contactor (mounted).

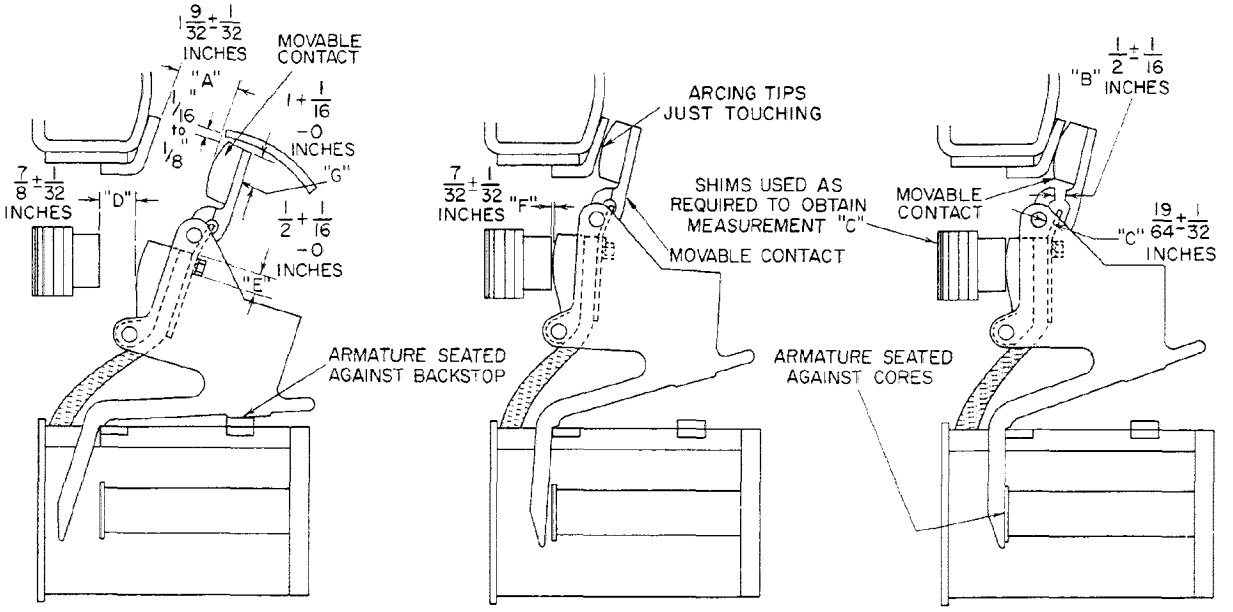


Fig. 6. Contact adjustments.

COIL CONNECTIONS

The IC2800-1180, Y108 and Y128, whether operated on straight d-c or rectified a-c control, requires the use of a holding resistor in series with the coils when the contactor is closed.

Original design coils of the IC2800-1178, Y107 and Y127 when operated on straight d-c did not require a holding resistor, but present design of these coils now require the holding resistor on both d-c and rectified a-c control.

Contactors with d-c magnets may be operated directly from a d-c supply or through rectifiers from an a-c supply. (See Fig. 7a, b, c.) Whenever rectifiers are employed, both the a-c and d-c sides of the rectifier must be opened simultaneously by use of an auxiliary contactor MX, so that the main contactor M will not experience a time-delay drop-out because of coil discharge through the rectifier. Coils used with rectifiers are designed to allow for a drop in voltage due to rectification, and are different from coils of the same nominal voltage for d-c supplies. All contactors have two coils (see Fig. 7a, b, c) which may be connected in series or parallel in accordance with the wiring diagram. (See Fig. 8).

To obtain proper flux, coils must be connected as shown in wiring diagram, Fig. 8. The magnet is designed to allow for flux return through the second core; not through the frame and armature.

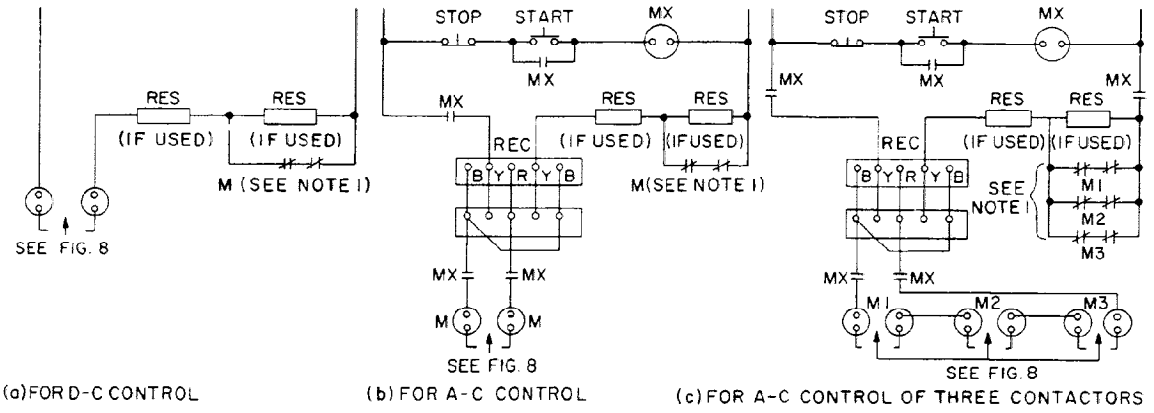
For three-phase a-c control applications when control power is also a-c, connect the three contactors as shown in Fig. 7c. Note that a-c control power must be broken on both sides of the rectifier and that the d-c circuit must be broken at the same time. The latter is required to give a satisfactory dropout. If used, an interlock-holding resistor is connected with all three contactors to prevent insertion of resistance before all contactors have picked-up.

COIL REPLACEMENT

To remove the coils, first disconnect the coil leads. Then, remove the assembly containing the magnet plate, cores, and coils by removing hardware located at "A," see Fig. 4. After assembly has been removed from the contactor, remove the coil mounting bolts.

When replacing coils be sure to reinstall the coil-spring washer. The coil should then be placed on the core so that the coil flange seats properly on the milled step of the core. Align the core so that the core locating pin on magnet plate, if present, will enter the hole provided in the core. When tightening the coil mounting bolts, care should be taken to insure that the core locating pins are not flattened and that the coil flange is not broken.

After the assembly has been reinstalled on the contactor, check to see that electrical clearance exists between the coil terminals and the magnet frame posts. Also check to insure that the armature seats against both cores.



NOTE 1: SPECIALLY ADJUSTED INTERLOCKS SET FOR 1/16±1/64 INCH GAP

Fig. 7. Typical connections.

MAINTENANCE

CONTACT WIPE AND GAP

When they are new, the arcing and main contacts will have wipes and gaps as shown in Table 2. Renew the arcing contacts when their wipe is reduced to 1/4 inch or when the gap of the main contacts is reduced to 1/16 inch with the arcing contacts just touching.

Renew the main contacts when their wipe has been reduced to 1/4 inch, or before the silver face has been worn through.

Except for replacement when worn to indicated limits, contacts will not normally require attention while in service. The silver main contacts will eventually become slightly pitted and discolored but they should not be filed.

TABLE 2 CONTACT WIPE AND GAP

	Inches	Measured at
WIPE		
Arcing contacts	1/2 + 1/16 - 1/32	B, Fig. 6
Main contacts	19/64 ± 1/32	C, Fig. 6
GAP		
Arcing contacts	1 1/8 min.	A, Fig. 6
Main contacts	3/4 min.	D, Fig. 6
Main contacts with arcing contacts just touching	3/16 min.	F, Fig. 6

CONTACT REPLACEMENT

Remove the arc chute and arcing horn to reach the movable arcing contact. The movable arcing contact and then the stationary arcing contact can be removed by taking out their mounting bolts (Fig. 9).

Before removing the main movable contacts, measure the height of the spring-adjusting screws (Fig. 9) above the armature-assembly casting and note the measurements for use in re-assembly.

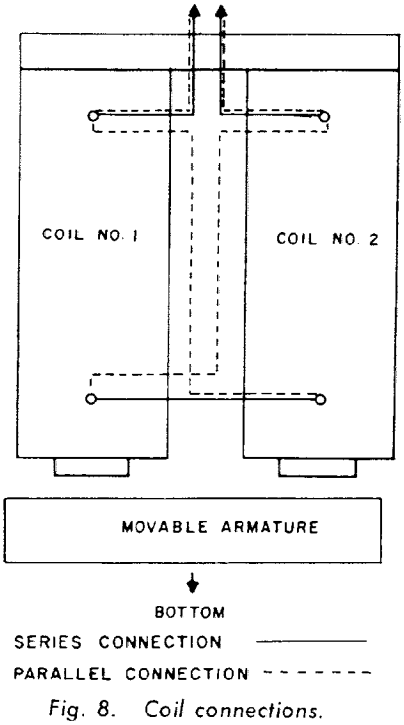


Fig. 8. Coil connections.

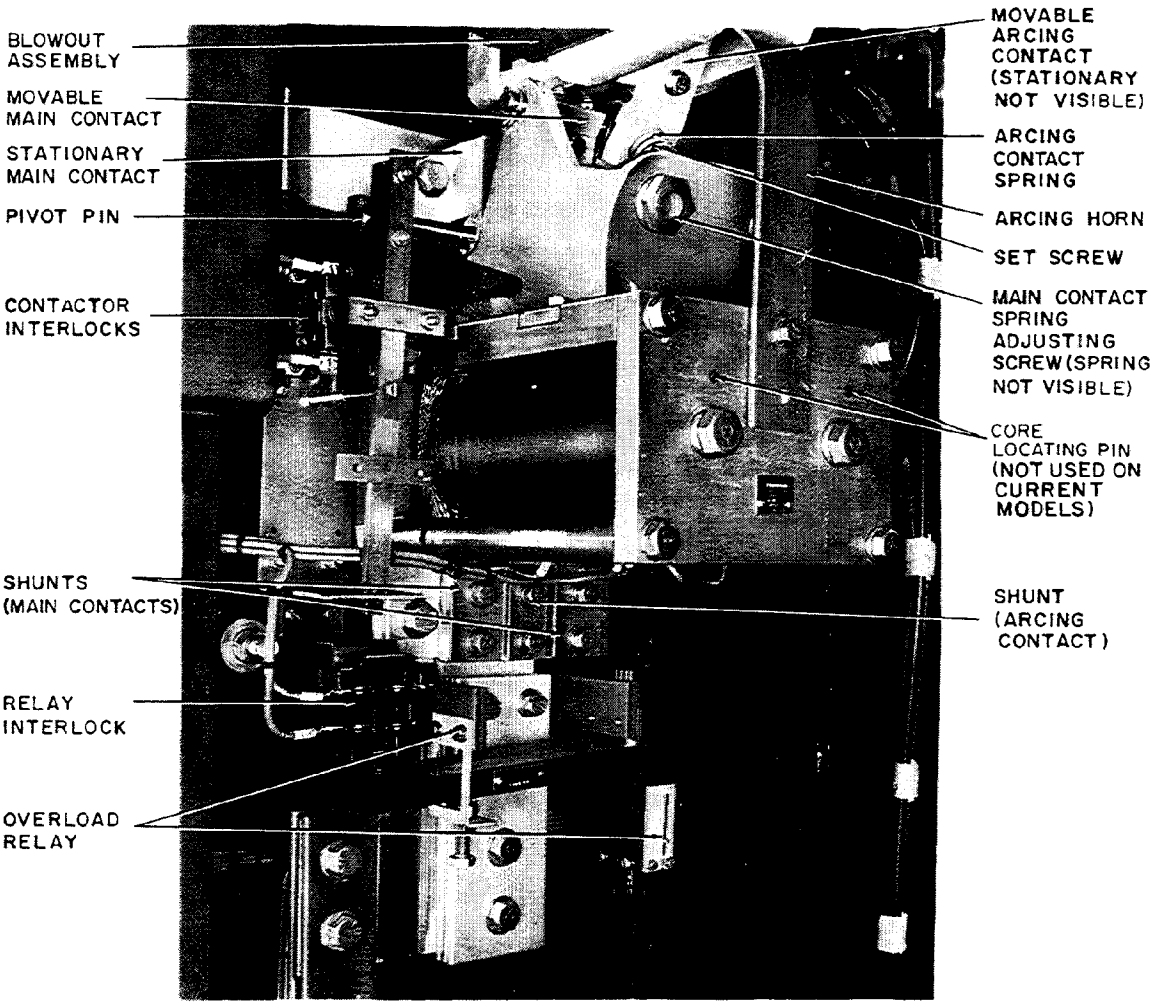


Fig. 9. IC2800-Y108 contactor with IC2820-E401 relay.

Then, remove the spring-adjusting screws (after loosening the setscrews), and springs, to expose the movable contacts. Remove both the movable and stationary contacts by taking out their mounting bolts.

Install new contacts and reassemble the springs, adjusting screws, and arcing horn. Place the adjusting screws at their original height setting and tighten the setscrews. Check that the wipe and gap dimensions are in accordance with Table II and see that the stationary-contact tips meet the requirements shown in Fig. 6. When the contactor is de-energized, the arcing horn for the arcing tip must be adjusted so that the gap between the movable tip and the horn is 1/16 to 1/8 inch as shown in Fig. 6. Put the arc chute in place. *

*Contactors which have a voltage rating of greater than 600 volts must have their arc horns and moving contacts centered within the arc chutes within 1/32 inch.

Never operate the contactor with power on the contacts without first making sure that the arc chute is completely down on the stationary arcing horn. The contactor must operate freely through full stroke and the contacts must not touch the arc chutes at any position.

CONTACT FORCE

It is important that the compression of the springs for the contacts be kept correct. If the force is too low, the contacts will overheat. If it is too high, the contactor may be prevented from completely closing. Check the compression of the springs occasionally and correct where necessary.

To check the pressure on the arcing contacts, insert a strip of thin paper between the stop portion of the movable arcing contact and the contact support at B (Fig. 6). Attach the hook of a spring

scale to the center of the arcing contact at G (Fig. 6) and pull on the scale at right angles to the plane of contact. The pounds pull at the instant the paper can be moved is the initial contact force. If this force is outside the limits shown in Table 3, the arcing-contact spring should be replaced.

Check the initial force of the main contacts in a similar way by placing a strip of paper between the movable contact and the stop pin at C (Fig. 6) and pull at bolts E (Fig. 6). Reset the spring-adjusting screw, if necessary, to bring the initial contact force within the limits shown in Table 3.

TABLE 3 INITIAL CONTACT PRESSURE

Arcing Contacts	Main Contacts
14 - 18 pounds	33 - 41 pounds

Contactors may be mechanically or electrically tied together, (to make two- and three-pole contactors), having all coils wired in series.

If these contactors require a holding resistor, holding interlocks from each contactor are required and must be wired in parallel across the holding resistor as shown in Fig. 10.

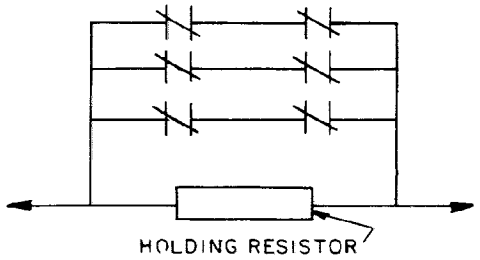


Fig. 10.

This will insure that all contactors will pick up and seal properly because the holding resistor will not be inserted until the slowest moving contactor has operated its holding interlock.

With the contactor picked up, check to see that the armature seals in on both cores. This may be checked by inserting a thin strip of paper between the corehead and armature and then energizing the contactor. If paper can be removed, the armature has not sealed in properly.

ADJUSTMENTS

For Contactors Mechanically Tied Together

1. It is not necessary for all movable arcing tips to make with their respective stationary tip at the same time. These tips should make within 1/8-inch as sighted by eye.

2. With all contactors de-energized, all armatures must rest on their respective fibre armature stops within 1/32-inch. The armature stop should be shimmed to obtain this adjustment.

3. With all contactors picked up, all armatures must make physical contact at some point on their respective fulcrum plates.

4. Armatures tied together must have a minimum of 0.010-inch end play in all positions of operation.

5. All armatures in the picked-up position must touch each core at some point.

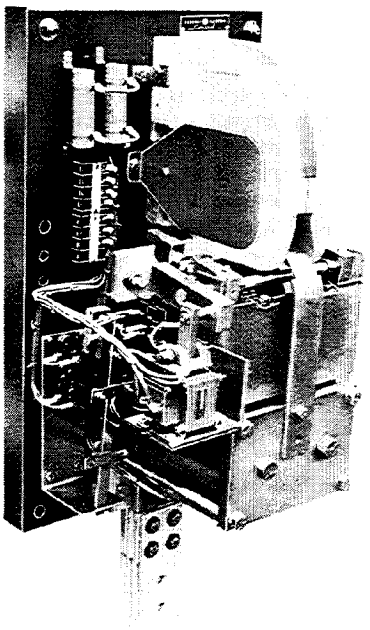


Fig. 11. Contactors with mechanical latch and electrical unlatch.

LATCH ASSEMBLY ADJUSTMENTS

1. The needle bearings must not be jammed against the armature and must be free at all times.

2. The latch blocks, which engage on the bearings, must be approximately centered on the bearings. Washers may be used for centering the bearings and also for obtaining alignment.

TIP GAP AND WIPE DATA

TABLE 4 LATCH ASSEMBLY ADJUSTMENTS

Contactor	Gap			Wipe †		
	Arc Tip "A" (Inches)	Main Tip (Inches)	Main Tip Arc Tip Touching (Inches)	Arc Tip "B" (Inches)	Electrical Main Tip "C" (Inches)	Mechanical Main Tip "D" (Inches)
Less Blowout Assembly		3/4 Minimum			19/64 ± 1/32	17/64 ± 1/64
With Blowout Assembly	1-1/8 Minimum	3/4 Minimum	3/16 Minimum	1/2 -1/16 -1/32	19/64 ± 1/32	17/64 Minimum

† Electrical wipe is measured with the contactor coils energized, and the armature not held-in with the latches. Mechanical wipe is measured with control voltage removed from the contactor coils, and the armature held-in with the latches.

NOTE: It is recommended that the electrical wipe be set at approximately 21/64 inch (upper limit of "C" tolerance); then, release control voltage so that the contactor is held-in by the latches. Adjust latches for a mechanical wipe of 17/64-inch minimum. This allows for 1/16-inch clearance between the needle bearings and the latches, which is a sufficient clearance for the latches to drop into position when the contactor is operated manually or electrically. See Fig. 12a.

a) When two contactors are mechanically joined together, it is imperative that the dimensions listed in this section be as close to equal as possible for each of the contactors. If the adjustments are not equal for each contactor, mechanical binding will result.

b) To equalize the mechanical wipe, adjust the latch block and tighten jam nuts. All latches must be supporting the armature(s) in the latched position. To check this, carefully do the following:
(1) In the latched position, raise each latch block slightly and observe the needle bearing.
(2) If the needle bearing moves, then the latch is holding.
(3) Repeat for each latching block.
(4) Adjust if necessary.

c) When the handle for manual operation is used, the motion of the handle must be free and very fluid. If a jerky motion is experienced, re-adjust per Figs. 4a and 4b.

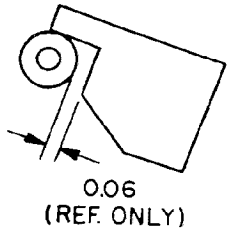


Fig. 12A

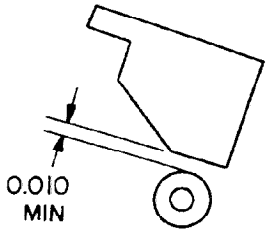


Fig. 12B.

The solenoid mounted on each latched contactor should be set for a gap of approximately 1/4 to 3/8 inch. Adjust by moving the solenoid bracket up or down as required.

1. When two contactors are joined together, the solenoid coils will be connected in series. Again, the gap of the plunger must be the same for each solenoid.

2. With the contactor(s) de-energized and the solenoid in the energized position, the gap between the needle bearing and the latch block should be 0.010-inch minimum. See Fig. 12b.

After ALL adjustments have been made, it is desirable to drill and pin the operating arms to the shaft to prevent their changing relationships.

ELECTRICAL INTERLOCKS

CONTACT TIP GAP AND WIPE

Contacts		Maximum	Minimum
Not Operated	Tip Gap	7/64 in.	5/64 in.
	Tip Wipe	5/64 in.	3/64 in.

Contact Rating (Amperes)

Number of Interlocks	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	-	-	-	-

* Non-inductive 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.

These interlocks use a contact 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. 13, 14, or 15.

Spring ends must not protrude into holes (A), slots (B), or keys (C), which serve as guides for operating arm (see Fig. 15).

Contact blocks with circuits as shown in Fig. 15 require a spring spacer (D) to assure that the center spring is properly in place. Because of the circuit rearrangement feature, a spring spacer is supplied with all other two circuit contact blocks, as shown in Figs. 13 and 14.

When circuits are rearranged to obtain one normally open and one normally closed circuit, reassemble parts as shown in Fig. 14 to assure proper electrical creepage between the two circuits.

The interlock should be positioned on its bracket so that with the contactor in its energized position, the interlock plunger, Fig. 14, 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. 14.

Tip gaps and wipes, when new, should be as shown in the following table. Replace contact tips when wipe reaches one half of minimum specified.

OVERCURRENT PROTECTION

GENERAL

If a-c overcurrent protection is required for a-c applications of the IC2800-1178, -1180, -Y107, or -Y108 contactors, an instantaneous overload relay, mounted separately, may be used.

If d-c overcurrent protection is required, an IC2820-E400 or IC2820-E401 instantaneous overload relay may be used. These d-c overload relays are designed specifically for use on the IC2820-1178, -1180, -Y107, and -Y108 contactors. Ordinarily, these relays are mounted on the contactors and shipped as part of the contactor. This method is recommended because it eliminates the possibility of relay adjustments being changed in mounting.

IC2820-1091 relays which were used in the past for d-c overcurrent protection are obsolete with renewal parts only available. They have different electrical interlocks from those of the IC2820-E400

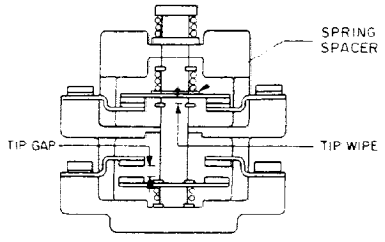


Fig. 13. Interlock block with one set of normally open contacts and one set of normally closed contacts in de-energized position of contactor

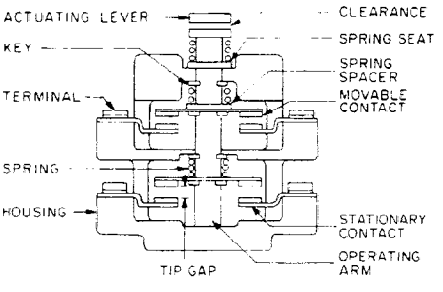


Fig. 14. Interlock block with normally closed contacts in energized position of contactor

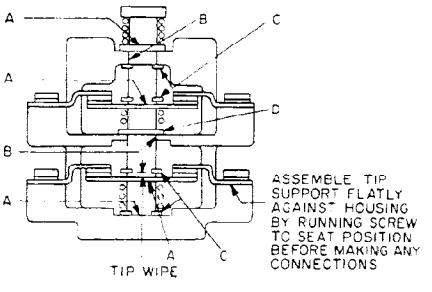


Fig. 15. Interlock block with normally open contacts in energized position of contactor

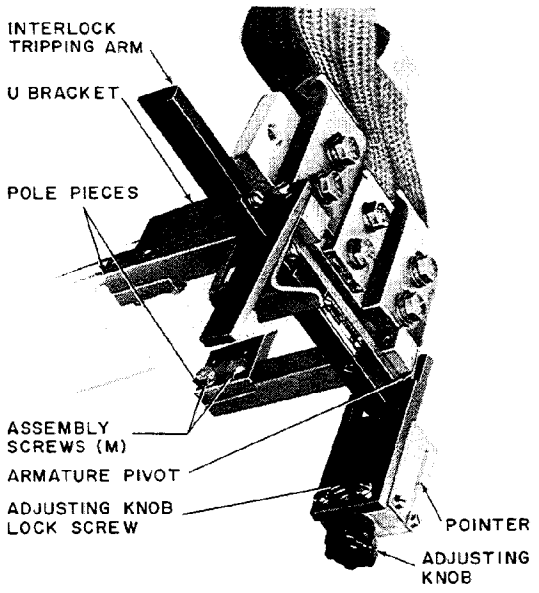


Fig. 16. IC2820-E400 overload relay (electrical interlock not shown).

and -E401 relays. However, minimum tip gap and tip replacement instructions of the latter will apply. The IC2820-1091 relays have a slightly different operating mechanism with different air gaps. (Gaps A and B, Fig. 19.) As on the IC2820-E400 and -E401 relays, the air gaps should not be changed from the original factory setting. Operating mechanism adjustments on the IC2820-1091 relay, when allowed by parts, are the same as for other d-c overcurrent relays.

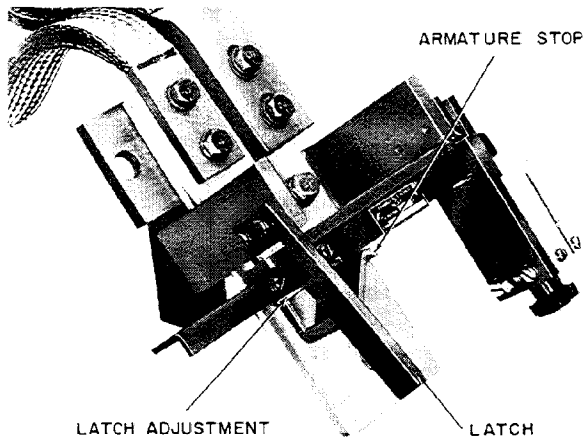


Fig. 17. IC2820-E401 overload relay (electrical interlock not shown).

MOUNTING (SEE FIGS. 16 AND 17)

These instructions apply only to d-c overcurrent relays shipped as separate items for mounting on contactors in the field. These d-c overcurrent relays are completely adjusted and calibrated before shipment. Each relay will require some disassembly and reassembly in the field, which can change the calibration. However, if care is taken in mounting, the adjustments and calibration should not change. Under no circumstances should the relay air gaps (Gaps A and B, Fig. 19) be changed from the original factory setting. Before mounting the relay, first measure and record the air gap dimensions, which should not differ widely from those given in Table 5. Then measure the gaps again after mounting, to make sure they are exactly the same as originally measured.

The IC2820-E400 mounts with a U-bracket around the lower connection-bus assembly of the IC2800-1178 or -1180 contactor. It attaches to the bus assembly on the back of the base, but the relay proper is on the front of the base and all adjustments are made from the front.

The IC2820-E400 requires additional drilling (see panel layout, Fig. 18). Before attempting to mount this relay, first completely mount and adjust the IC2800-1178 or IC2800-1180 contactor. Remove

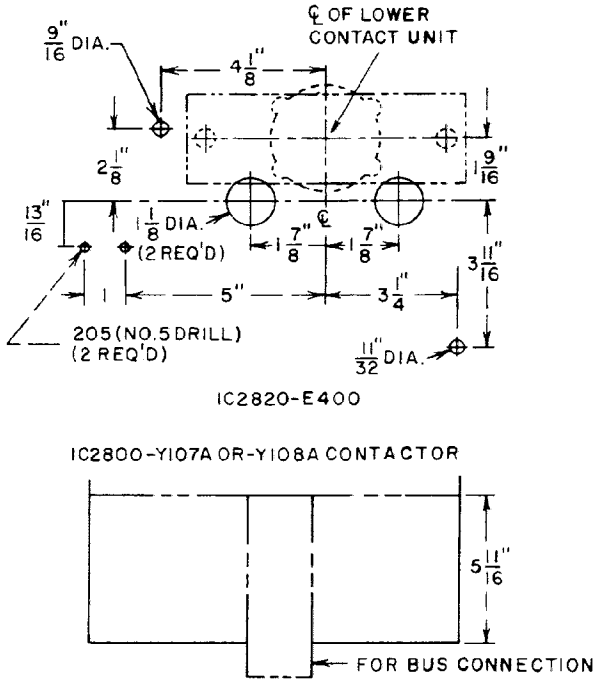


Fig. 18. Panel layout (front view).

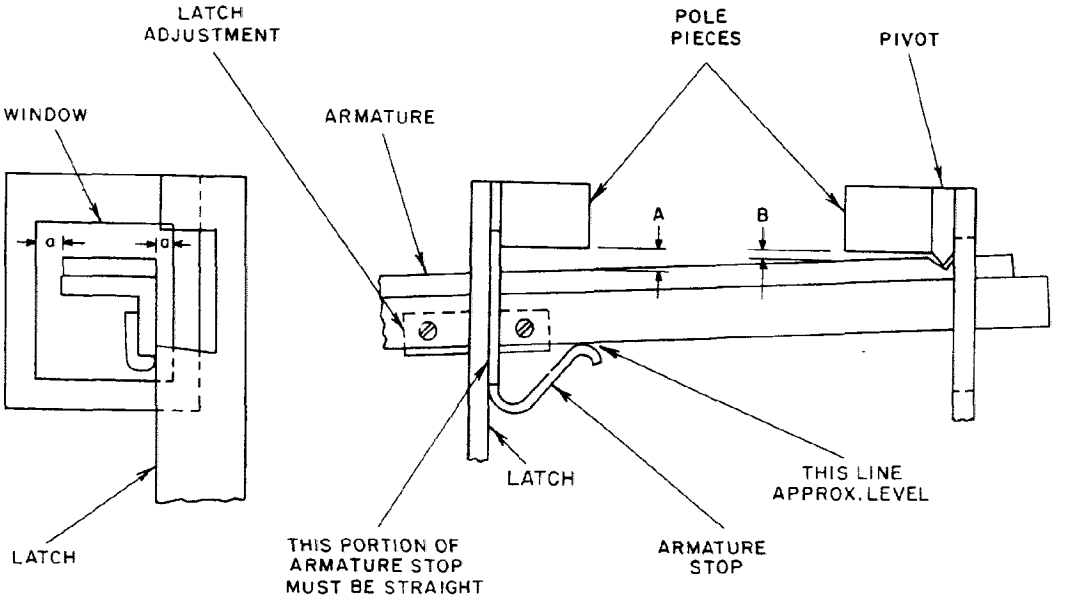


Fig. 19. Relay adjustments.

the assembly screws (M) which fasten the U-bracket to the pole pieces. Mount the U-bracket to the bus assembly on the back of the base. Pick up the remainder of the relay as a unit and, from the front of the panel, insert the pole pieces through the two 1-1/8 inch diameter holes located just below the lower shunt connection.

Take care not to apply too much force, or to twist the pole pieces, because this will upset the relay adjustments and calibration. Replace the assembly screws (M) and mount the electrical interlock with its bracket in the 0.205-inch diameter holes. The electrical-interlock bracket has slotted mounting holes to permit adjustment. If care has been taken in mounting this relay, the only necessary adjustments are to the electrical interlock. However, check the other adjustments as given in the following section.

The IC2820-E401 is completely front connected and is mounted by sliding it over the lower connection-bus assembly of the IC2800-Y107 or IC2800-Y108 contactors. No additional drilling is required. Mount the electrical interlock in the holes already provided in the contactor sub-base. Adjust the electrical interlock and check the other adjustments as given in the sections on Adjustments and Testing in this instruction.

ADJUSTMENTS (SEE FIG. 19)

1. The air gaps (Gap A and Gap B of Fig. 19. between the armature and the pole pieces, with the armature dropped out against the armature stop, are given in Table 5. These air gaps are given as reference information only as air gaps must be identically maintained as originally shipped. (See mounting instructions above.) These gaps are obtained by bending the armature stop and adjusting the pivot within the limits of its screw clearance holes. Take care when bending the armature stop that the portion alongside which the latch moves is not deformed. Make sure that the latch operates freely after the armature gaps are set. Also, take care that the armature stop remains approximately level where the armature hits it.

2. The armature fits through two windows which position it and also act as guides for it. Both windows are in parts having slotted-screw clearance holes to permit any adjustment necessary in aligning the windows with respect to the armature.

The support nearest the pivot should be approximately centered. Then, center the armature stop about the armature. The result should leave an equal amount of clearance on either side of the armature to the sides of the windows. Points "a" of Fig. 19).

Check that the amount of side-to-side movement of the armature, which is permitted by the window nearest the pivot, is not enough to allow the armature to rest against, or rub, either side of the window in the armature stop. Rubbing of armature against armature stop window will cause erratic trips.

3. The latch and latch adjustment (see Fig. 19) must be set to meet the following requirements:

a. The latch must drop into place easily when the armature is operated slowly by hand.

b. With the armature dropped back against the latch, Gap A (see Fig. 19) should be 1/16 inch or less.

4. The electrical interlock must be adjusted to meet the following requirements:

a. With the armature resting against the armature stop, there should be a minimum clearance of 3/32 inch between the interlock tripping arm and the interlock plunger (see Fig. 13).

b. With the armature dropped back against the latch, the gap on the normally closed contacts should be approximately 1/16 inch (see Fig. 15).

TESTING

Using the adjusting knob, set the pointer at the value of current desired. If possible, raise the current slowly until the relay trips. It may be necessary to readjust the spring pressure by means of the adjusting knob if the relay did not trip at the desired current.

After setting the tripping point at the desired current, lock the adjusting knob with the lock-screw provided for that purpose.

Also, the armature should not step pick-up. That is, it must not pick up where it hits the interlock plunger and then hesitates before it operates the interlock. If this happens, readjust the electrical interlock and the latch adjustment to permit the armature to travel further before engaging the interlock plunger.

RENEWAL PARTS

Order replacement coils by the catalog number stamped on the existing coil. Request the renewal parts bulletin for identification of other parts or identify by description and complete contactor IC number.

TABLE 5 IC2820-E400, -E401 OVERLOAD RELAYS

NEMA Size	For Use On Contactor IC2800-	Type of Reset	Calibration Range in Amperes	IC2820 Form	Air Gap in Inches*	
					Gap A	Gap B
8	1178	Automatic	800–2500	E400E3	13/64	3/64
			1500–6000	E400E2	9/32	1/16
		Hand	800–2500	E400F3	13/64	3/64
			1500–6000	E400F2	9/32	1/16
	Y107	Automatic	800–2500	E401A3	5/16	3/64
			1500–6000	E401A2	7/16	1/16
		Hand	800–2500	E401B3	5/16	3/64
			1500–6000	E401B2	7/16	1/16
9	1180	Automatic	800–2500	E400C3	13/64	3/64
			1500–6000	E400C2	9/32	1/16
		Hand	800–2500	E400D3	13/64	3/64
			1500–6000	E400D2	9/32	1/16
	Y108	Automatic	800–2500	E401C3	5/16	3/64
			1500–6000	E401C2	7/16	1/16
		Hand	800–2500	E401D3	5/16	3/64
			1500–6000	E401D2	7/16	1/16

* These dimensions are given for reference only. Do not change the relay air gaps as the nameplate calibration is with the gaps set and any change will affect the calibration.

GENERAL ELECTRIC COMPANY • DRIVE SYSTEMS DEPARTMENT
SALEM, VA. 24153

GENERAL ELECTRIC

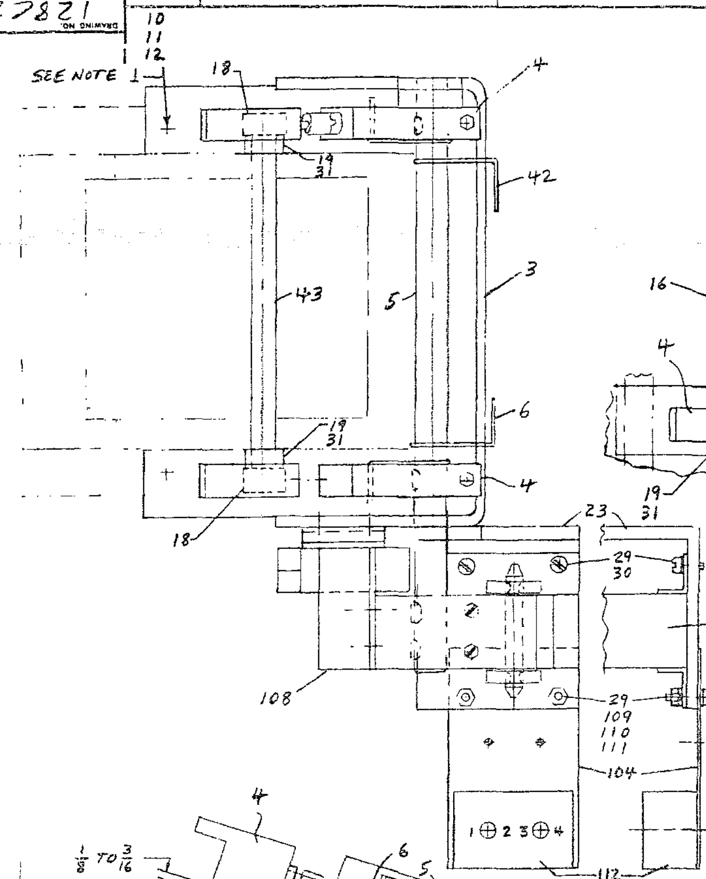
GENERAL ELECTRIC 128C2296 CONT ON SHEET FL SH NO 4

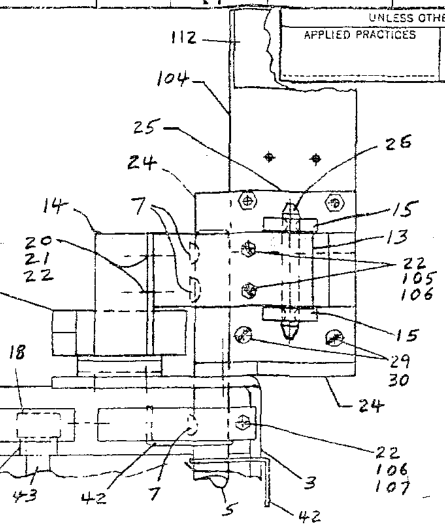
TITLE: **LATCH ASM**

FIRST MADE FOR IC2800-1180-1178 (FAST DROP OUT SOLENOID)

DSPD 245 A4828 P2 (6-8-72)

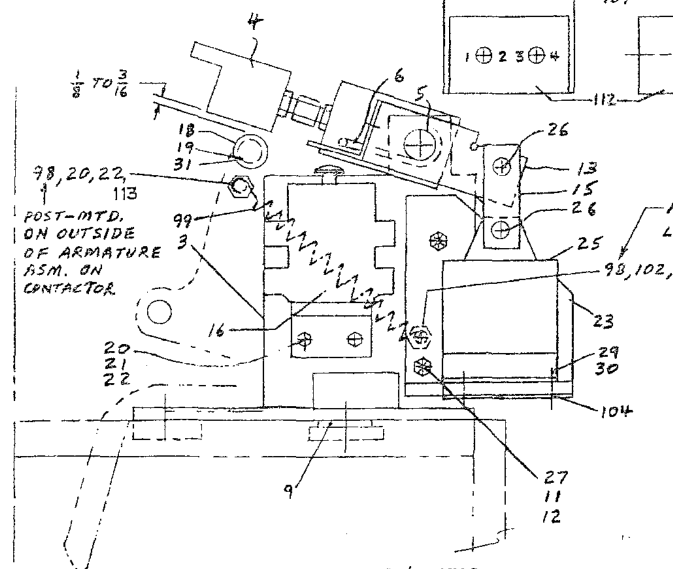
UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING:— APPLIED PRACTICES | SURFACES ✓ | TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS ± DECIMALS ± ANGLES ±





SOLENOID & INTERL. ON RIGHT SIDE OTHERWISE SAME AS PT. 1

(2)



SOLENOID & INTERL. ON LEFT SIDE

(1)

NOTES

1. FOUR HOLES IN BRACKET PT. 104 ARE USED TO SECURE LEADS FOR INTERLOCK PT. 16 AND SOLENOID PT. 25. SECURE EACH LEAD TO AT LEAST TWO HOLES WITH CORD TIES.
2. ADJUST SOLENOID BRACKET PT. 23 AND 24 TO OBTAIN A LATCH ROLLER CLEARANCE OF 1/8 TO 3/16 INCH AS SHOWN.
3. WITH THE LATCH ENGAGED, ADJUST THE INTERLOCK PT. 16 TO OBTAIN A N.O. CONTACT WIPE OF .047 TO .078 INCH AND A N.C. CONTACT GAP OF .078 TO .109 INCH.
4. TORQUE AS FOLLOWS:
   #10 SOLENOID SCREWS: 32 IN-LBS
   1/4 BOLTS: 9 FT-LBS
   3/8 BOLTS: 31 FT-LBS
   1/2 LATCH ADJUST: 75 FT-LBS

GROUP: 23 | 24 | 25 | 26

PART NO.	CATALOG NUMBER	NOMENCLATURE	23 (1180-LEFT HAND)	24 (1180-RIGHT HAND)	25 (1178-LEFT HAND)	26 (1178-RIGHT HAND)
001	ASM128C2296SH4P1	ASM	0X		0X	
003	171B3467G3	LATCHSUP	01	01	01	01
004	205A7123G2	LATCHASM	02	02	02	02
005	323A4354P1	SHAFT	01	01	01	01
006	174A4420P1	SPRING	01	01	01	01
007	N3400P304	KEY	04	04	04	04
009	N402AP43B6	WASHER	02	02	02	02
010	N22P25016B6	BOLT	04	04	04	04
011	N402AP13B6	WASHER	06	06	06	06
012	N405P43B43	LKWASHER	06	06	06	06
013	323A4356P1	LEVER	01	01	01	01
014	323A4357P1	LEVEREXT		01		01
015	964S239P1	LINK	02	02	02	02
016	SEE DL	INTERLOK	0X	0X	0X	0X
018	PDMH1000TRAKROL	TRAKROLL	02	02	02	02
019	323A4359P1	SPACER	02	02		
020	N25P21008B6	BOLT	06	06	06	06
021	N402AP11B6	WASHER	06	06	06	06
022	N405P41B43	LKWASHER	09	09	09	09
024	323A4358P1	BRACKET		01		01
025	SEE DL	SOLENOID	0X	0X	0X	0X
026	279A596P6	PIN	02	02	02	02
027	N22P25012B6	BOLT	02	02	02	02
029	N402AP9B6	WASHER	04	04	04	04
030	N144P16006B43	SCREW	02	02	02	02
031	323A4359P2	SPACER			02	02
042	174A4420AAP1	SPRING	01	01	01	01
043	323A4360P1	SHAFT	01	01	01	01
023	323A4358P2	BRACKET	01		01	
098	259A5985P1	POST	04	04		
099	241338ZP1	SPRING	02	02	02	02
102	GRADE AA	LOCTITE	0X	0X	0X	0X
103	N646P21012B6	CAPSCREW	02	02	02	02
104	683J121553E30000AAY	TBSUPPORT	01	01	01	01
105	286A113P16	BOLT	02	02	02	02
106	N203P21B6	NUT	04	04	04	04
107	N22P21032B6	BOLT	02	02	02	02
108	323A4357P2	LEVEREXT	01		01	
109	N144P16012B43	SCREW	02	02	02	02
110	N405P9B43	LKWASHER	02	02	02	02
111	N210P16B6	NUT	02	02	02	02
002	ASM128C2296SH4P2	ASM		0X		0X
112	106B7000G1	TERMBORD	01	01	01	01
113	259A5985P3	POST			04	04

REVISIONS

1	G25 AND 26 DELETED PT. 99, ADDED PT. 113 J. ROBERTSON 4-13-93

1180 - LEFT HAND
1180 - RIGHT HAND
1178 - LEFT HAND
1178 - RIGHT HAND

PRINTS TO

MADE BY G. F. Ralston 11-9-92 | APPROVALS JWM | DRIVE SYSTEMS
ISSUED JAN. 27, 1993 | SALEM, VA.

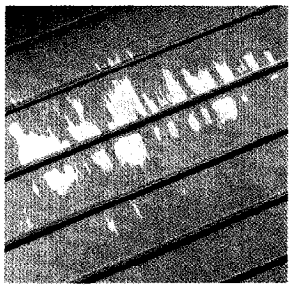
128C2296 CONT ON SHEET FL SH NO 4

DRAWING NO. 128C2296 CONT ON SHEET FL SH NO 4

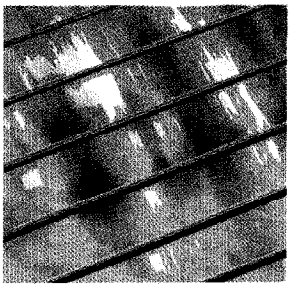
GE Motors
Commutator Check Chart

For Comparing Commutator Surface Markings

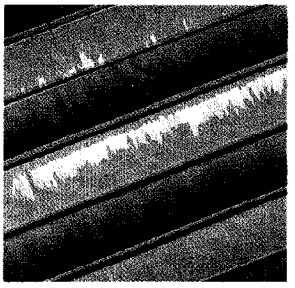
SATISFACTORY COMMUTATOR SURFACES



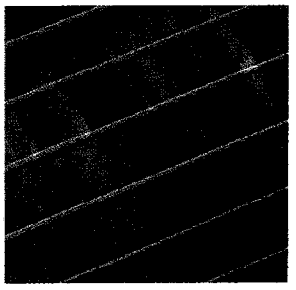
LIGHT TAN FILM over entire commutator surface is one of many normal conditions often seen on a well-functioning machine.



MOTTLED SURFACE with random film pattern is probably the most frequently observed condition of commutators in industry.

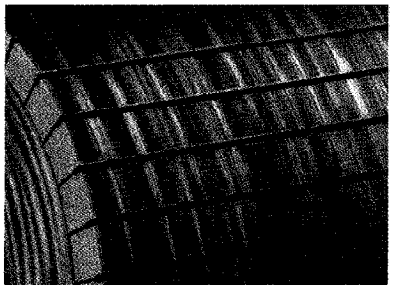


SLOT BAR-MARKING, a slightly darker film, appears on bars in a definite pattern related to number of conductors per slot.

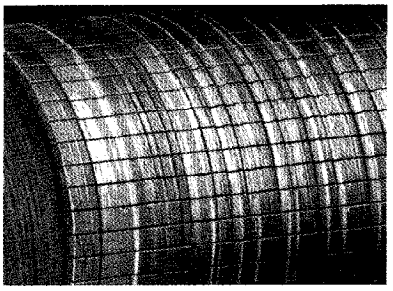


HEAVY FILM can appear over entire area of efficient and normal commutator and, if uniform, is quite acceptable.

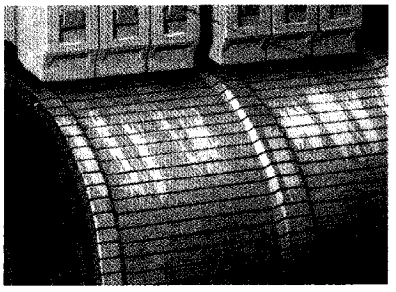
WATCH FOR THESE DANGER SIGNS



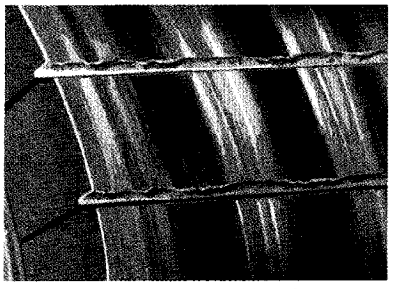
STREAKING on the commutator surface signals the beginning of serious metal transfer to the carbon brush. Check the chart below for possible causes.



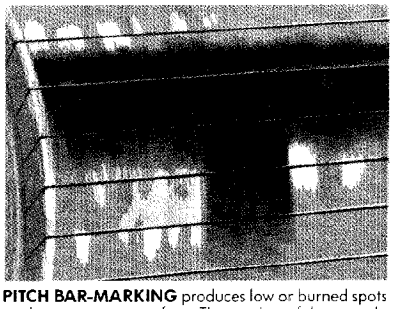
THREADING of commutator with fine lines results when excessive metal transfer occurs. It usually leads to resurfacing of commutator and rapid brush wear.



GROOVING is a mechanical condition caused by abrasive material in the brush or atmosphere. If grooves form, start corrective action.



COPPER DRAG, an abnormal build-up of commutator material, forms most often at trailing edge of bar. Condition is rare, but can cause flashover if not checked.



PITCH BAR-MARKING produces low or burned spots on the commutator surface. The number of these markings equals half or all the number of poles on the motor.

HEAVY SLOT BAR-MARKING can involve etching of trailing edge of commutator bar. Pattern is related to number of conductors per slot.

CAUSES OF POOR COMMUTATOR CONDITION

Frequent visual inspection of commutator surfaces can warn you when any of the above conditions are developing so that you can take early corrective action. The chart below may indicate some possible causes of these conditions, suggesting the proper productive maintenance.

	Electrical Adjustment	Electrical Overload	Light Electrical Load	Armature Connection	Unbalanced Shunt Field	Brush Presure (light)	Vibration	Type of Brush In Use		Contamination	
								Abrasive Brush	Porous Brush	Gas	Abrasive Dust
Streaking			X			X		X	X	X	X
Threading			X			X			X	X	
Grooving								X			X
Copper Drag						X	X	X		X	
Pitch Bar-Marking				X	X	X	X	X			
Slot Bar-Marking	X	X								X	

GE Motors
3001 East Lake Road
Erie, PA 16531
Phone: 814-875-3129
FAX: 814-875-3421

HOW TO GET THE MOST VALUE FROM THIS CHART

The purpose of the Commutator Check Chart is to help you spot undesirable commutator conditions as they develop so you can take corrective action before the condition becomes serious. This chart will also serve as an aid in recognizing satisfactory surfaces.

The box chart above indicates the importance of selecting the correct brush and having the right operating conditions for optimum brush life and commutator wear.

For additional information or help with carbon brush application or commutation problems, contact your nearest GE Sales Office or Distributor.

GEA-7053A

M/GCO Printed In U.S.A.