

TWO POLE AC CONTACTOR

8247364, 8272487, 8302169, 8330937, 8332661

DESCRIPTION

These heavy duty contactors, Fig. 1, are used to make and break alternating current circuits to —

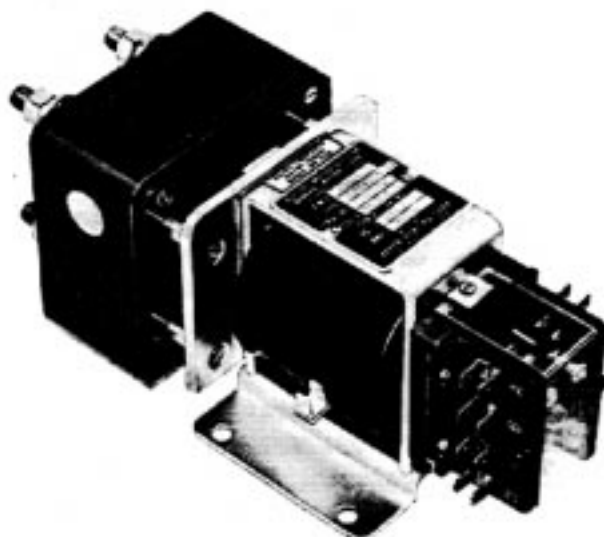
1. Locomotive radiator cooling fans.
2. Magnetic amplifiers on locomotives and drilling rig power units equipped with static control of generator excitation.

The contactors are usually equipped with auxiliary contacts that operate in low voltage (74V) direct current control circuits.

The contactor contains two sets of normally open bridge-type main contacts that are thermally isolated from the contactor coil and operating mechanism. The contact assembly is completely enclosed by a snap-on cover to prevent entry of dust and dirt and possible accumulation on contact tips. An arc barrier is located between the poles nearest to the front (No. 1 and 4) main contact tips.

The main contact tips are of silver cadmium oxide fused to base metal. These contact surfaces make their own contour irregularities after a short period of operation. It is during this initial period that the highest rate of contact wear and discoloration occurs. Irregularity of surface and contact discoloration are, however, normal conditions that do not adversely affect contactor operation. The contact tips should not be dressed or filed regardless of appearance, as this will merely shorten their service life.

Flat-faced silver alloy tips on the bridge type movable contact plate mate with radius-faced stationary contact posts when the contactor coil is energized by DC con-



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Fig. 1 — Two Pole AC Contactor

rol current. A square hole centered in the movable contact plate locates the plate on the square shaft of the contact carrier. This hole and shaft locate the plate to mate with stationary contacts and prevent twisting of the plate. The edges of the square shaft are chamfered to preclude binding if the plate warps from excess heat.

Movable contact plate springs insure positive contact pressure while allowing armature overtravel with resulting contact wipe and allowance for wear. An armature return spring acting in coordination with the movable plate springs and gravity action insure that the contacts will open quickly when the coil is de-energized.

Rectangular metal plates are installed on each stationary contact post to dissipate heat generated at the contacts.

The movable contact carrier is attached to a brass plate that is brazed to a cylindrical stem. The stem rides in a tubular

*This bulletin is revised and supersedes previous issues of this number.

guide utilizing a nylon bearing insert. This tubular guide forms the core of the magnet coil, in which the armature plunger rides. A core stop within the tubular guide limits plunger travel, while the location of the plunger on the threaded carrier stem determines contact overtravel.

If the contactor is equipped with auxiliary contacts, the plunger is provided with a nylon bearing that rides in the tubular guide. If the contactor is not equipped with auxiliary contacts, the plunger rides freely within the guide and a lower nylon bearing is spring-held in a cap that is screwed to the underside of the magnet frame. The lower unthreaded portion of the movable contact carrier stem rides in the bearing.

On contactors equipped with auxiliary contacts, the actuating stem is threaded down to the end to provide a means of actuating the auxiliary contacts. The movable auxiliary contact carrier is fastened to another actuating stem that is screwed to the main actuating stem and locked against the armature plunger. Hex nuts and lock washers fastened the auxiliary contact carrier to the actuating stem.

MAINTENANCE

The contactor should be inspected at intervals prescribed for such equipment in the applicable Scheduled Maintenance Program. The inspection should include a check for the following:

1. Loose or missing parts.
2. Free movement of parts.
3. Adequate clearance of electrical parts.
4. Security of mounting of all parts.
5. Continuity of all electrical connections.
6. Burned, worn, or badly pitted contacts.
7. Burned or cracked arc barriers and protective cover.
8. Magnet coil resistance.

MISSING PARTS

The only parts that are normally susceptible to loss or misplacement are the snap-on protective covers and, on early model contactors, the plugs (Part No. 8305730) in the resinox stationary contact base. If these devices are not applied to the contactor, dust and dirt can settle on the contact tips. Such a condition is most serious when the contactors are applied to operate cooling fans.

During cold weather a fan contactor may remain inactive for an extended period and dirt can accumulate on the contact tips. If the accumulation is sufficient to prevent proper contact at one of the poles. The cooling fan motor may be started in a single phase condition and motor failure may result.

If an inspection reveals the lack of a contactor protective cover or base plugs (older models only), the contactor should be thoroughly cleaned. The contact tips should be wire brushed to remove imbedded dirt, and a protective cover and base plugs provided as applicable.

BURNED CONTACTS

Serious burning can occur in contactors used to operate cooling fans. If inspection reveals contact tips that are burned and pitted across their entire surface and contactor base posts, bases, and arc barriers that are scorched, the temperature switches that operate the contactor should be thoroughly checked for intermittent or floating action. Such action can cause the contactor to open on high starting current drawn by the fan motor.

If contact tips are seriously burned they should be replaced and the movable contact plate springs closely checked for loss of tension due to overheating. If doubt concerning the springs exists, they should be replaced. These springs have a free length of 0.475" to 0.425". If they have taken a set from excess heat, their free length will be less than specified.

When an inspection reveals burning that is not sufficient to warrant contact tip

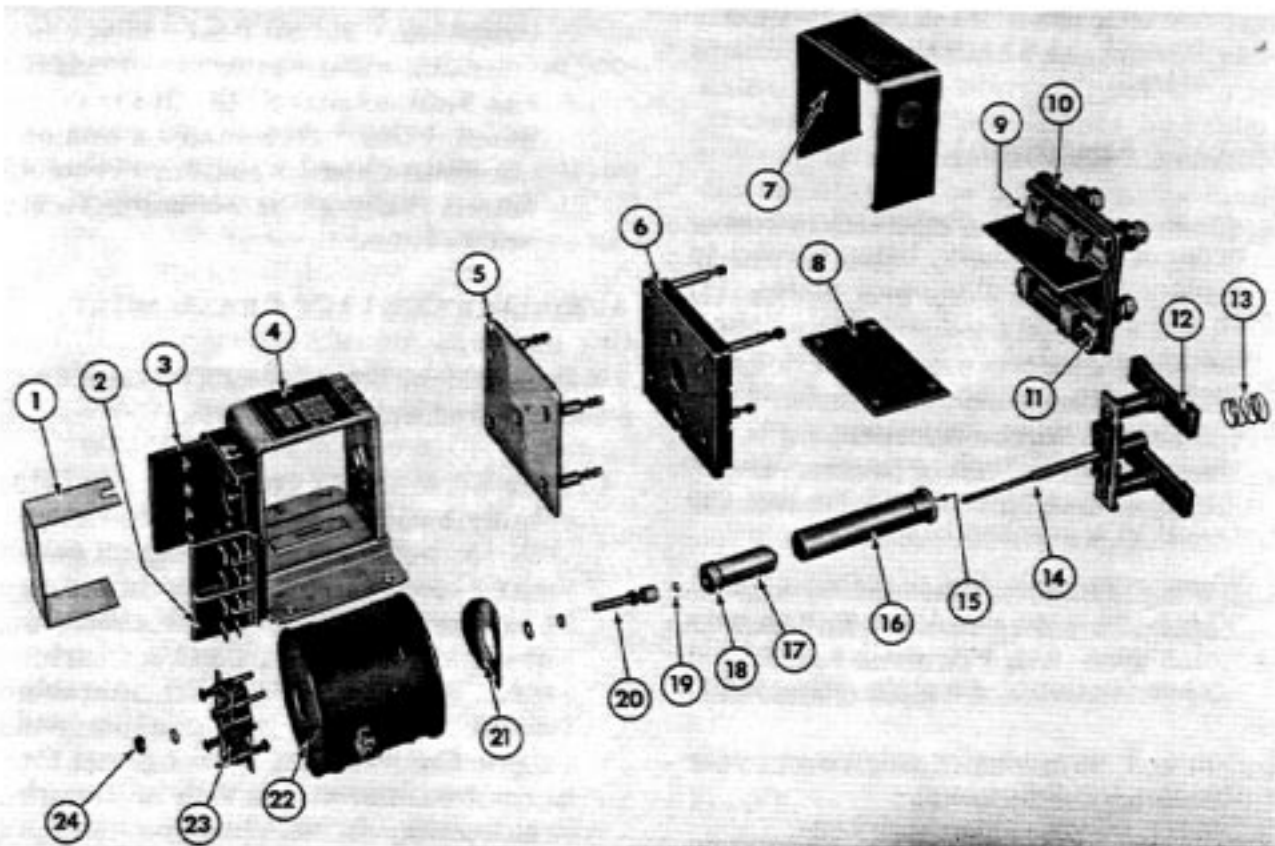
replacement, dismount the movable contact plate from its shaft and dress down any burrs or flash beads at the mounting hole. Verify that an overheat condition has not distorted the mounting hole and that the plate moves freely on the mounting shaft. Clearance between the shaft and the sides of the mounting hole should be at least 0.010" at all four sides.

CONTACT DISASSEMBLY (See Fig. 2)

1. To remove the stationary contacts, pry off the protective cover (7), then remove the four screws holding the back cover plate (8) and remove the cover

plate. Remove the three screws holding the upper base assembly (10), and remove the assembly. Remove the hardware holding the stationary contact and remove the contacts from the base. Retain the rectangular brass heat dissipators.

2. To remove the movable contacts, remove hug-lock nuts and flat washers, then remove the contact plate assemblies (12) and the contact springs.
3. If the contactor is equipped with auxiliary contacts, partial disassembly of the contact assembly at this time will



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|------------------------------------|-----------------------------------|
| 1. Auxiliary Contact Cover | 13. Movable Contact Return Spring |
| 2. Stationary Contact Block | 14. Contact Carrier Stem |
| 3. Auxiliary Contact Assembly | 15. Nylon Bearing Insert |
| 4. Magnet Coil Frame | 16. Core Guide Tube |
| 5. Contact Assembly Mounting Plate | 17. Armature Plunger |
| 6. Lower Contact Base Assembly | 18. Plunger Bearing |
| 7. Contact Base Cover | 19. Split Washer |
| 8. Back Cover Plate | 20. Aux. Contact Carrier Stem |
| 9. Stationary Contact Post | 21. Spring Washer |
| 10. Upper Contact Base Assembly | 22. Magnet Coil |
| 11. Heat Dissipator Plate | 23. Aux. Contact Carrier |
| 12. Movable Contact Plate | 24. Hex Nut |

Fig. 2 — Disassembled Contactor

simplify adjustments at reassembly. To remove the interlock assembly, perform the following:

- a. Remove the plastic cover plate (1) by loosening the screw at the front and lifting up the catch spring at the back of the assembly.
- b. Remove the stationary contact block (2) at one side of the assembly. Then unscrew the lower hex nut (24) on the actuating stem (20). It is necessary to break the glyptol seal.
- c. Lift the movable auxiliary contact carrier (23) free of the stationary contact assembly and actuating stem.

CONTACT REASSEMBLY

1. Reassemble main contacts in reverse order of disassembly, being careful to replace the heat dissipator plates (11) on the stationary contact posts before inserting the posts into the upper base. Tighten the copper contact retaining nuts to a torque approaching but not exceeding 180 inch pounds. Greater torque may start a fracture that can result in a cracked base.

When replacing the movable contact plates, be sure that the hug-lock nuts and washer are bottomed against the square portion of the plate guide shaft.

2. Adjust main contact overtravel by performing the following:
 - a. At the bottom of the armature plunger assembly (17) loosen the stop nut or, on contactors equipped with interlocks, the hex portion of the auxiliary contact carrier stem (20).
 - b. Manually raise the contact carrier until the contact with the least gap just touches the stationary contact. Then with a 0.025" feeler, check each of the remaining three contacts. If the gauge fits between any of the three contacts, the relay should be rejected.

- c. After Step b has been completed, raise the contact carrier stem (14) until the armature plunger (17) bottoms on the stop core that is part of the magnet core guide tube (16). Measure the contact carrier overtravel with a suitable measuring device. The overtravel should be a minimum of 5/64". If necessary, adjust by placing a screwdriver into the slots at the bottom of the armature plunger and threading the plunger up or down the contact carrier stem. When the adjustment is made, lock the plunger in position on the stem by tightening the lock nut or interlock actuating stem against the plunger and split washer (19). (If the contactor being reassembled contains normally closed auxiliary contacts do not tighten the actuating stem at this time.)

AUXILIARY CONTACT REASSEMBLY

To reassemble the auxiliary contact assembly perform the following:

1. Slide the auxiliary contact carrier (23) onto the auxiliary contact carrier stem (20). On contactors that contain normally closed auxiliary contacts it may be necessary to unscrew the actuating stem from the main contact carrier stem, then manipulate the movable contact carrier into position and tighten the actuating stem against the armature plunger, but do not disturb the setting of the plunger. Hold a screwdriver at the plunger slots while tightening the actuating stem.
2. Replace the lower split washer and hex nut (24) onto the actuating stem and tighten the hex nut to compress the split washers.
3. Measure auxiliary contact gap and overtravel. Gap should measure 7/64" minimum. Overtravel should measure 1/32" minimum.

4. If necessary, again remove the movable auxiliary contact carrier and adjust the hex nuts on the actuating stem to obtain proper gap and overtravel.
5. When adjustments are complete, seal the hex nuts with glyptol or Duco household cement.

COIL REPLACEMENT

Disassembly

To remove the coil it is first necessary to remove the main contact assembly as described in Steps 1, 2, and 3 under the heading Contact Disassembly. Then proceed as follows:

1. Remove the four mounting screws holding the lower base assembly (6) and remove the base. Remove the return spring (13).
2. If the contactor is not equipped with auxiliary contacts, perform Step a below; if it is equipped with auxiliary contacts perform Step b.
 - a. Remove the bearing cap from the bottom of the coil housing. This cap contains a nylon bearing and a spring. Then remove the nut which locks the plunger to the stem, and unscrew the stem. The actuating stem may then be removed from the coil core.
 - b. Unscrew the interlock actuating stem from the plunger, being careful not to drop the small split lock-washer. Then unscrew the plunger from the armature stem. The stem may then be removed from the coil core.
3. Remove the hardware holding the mounting plate and remove the plate and magnet coil core. The coil and large spring washer may then be removed by sliding the coil to one side, taking care to disengage the coil holding tab from the slot in the back of the coil frame.

Reassembly

Reassembly may be done in reverse order of disassembly, and contact gap and overtravel must be set as described in the preceding articles. When replacing the coil, insert the coil into the frame so that the contact tabs are at the lower third of the coil.

CORE GUIDE AND PLUNGER INSPECTION

Inspect the guide tube and plunger whenever the coil is removed or if faulty operation is suspected. Inspect the nylon bearings (15 and 18) for damage or excessive wear. No wear limits have been established for these bearings, but it is recommended that the bearings be replaced if wear is evident when the contactor is disassembled. The manufacturing dimensions of the bearings are presented as a guide.

1. Bearing at top of guide tube. Inside diameter, new — 0.254" to 0.256".
2. Plunger bearing — Contactors equipped with auxiliary contacts. This bearing is staked to the armature plunger. Outside diameter, new — 0.644" to 0.642".
3. Lower bearing — Contactors with no auxiliary contacts. Inside diameter of bearing surface, new — 0.098" (+0.001/-0).

PUTTING REPAIRED CONTACTOR INTO SERVICE

A remote possibility exists that new contact tips on contactors used to operate cooling fans may "weld-in" while they are forming oxide during the first few makes and breaks. To preclude this possibility, the contacts should be "burned in" as follows:

1. With locomotive engine running, place reverser lever in neutral position and advance throttle lever to Run 8 position.
2. Energize the fan contactor for 10 seconds then drop it out.
3. Repeat Step 2 three times.

MAINTENANCE DATA

ALL CONTACTORS

Main Contacts

Arrangement 2 Normally Open
 Rating 100 Amperes, 230 V. AC
 Coil 358 Ohms \pm 10 @20° C.

Operation @20° C.

Working 74 V. DC
 Pickup 48 V. DC Maximum
 Dropout 5 to 28 V. DC

Hi-Pot

Coil to Ground 600 V. RMS 60 Cycles
 Coil to Contacts 600 V. RMS 60 Cycles
 Contacts to Ground 600 V. RMS 60 Cycles
 Contacts to Contacts 600 V. RMS 60 Cycles

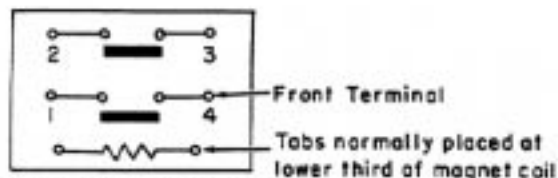
AUXILIARY CONTACTS

Contact Arrangement See Fig. 3

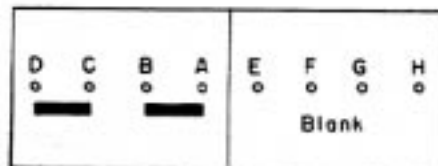
Contact Rating 10 Amperes 74 V. DC

Hi-Pot

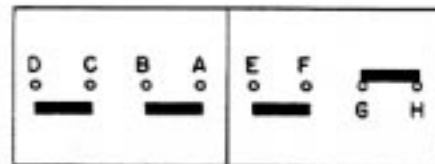
Auxiliary Contacts to Auxiliary Contacts 2400 V. RMS 60 Cycles



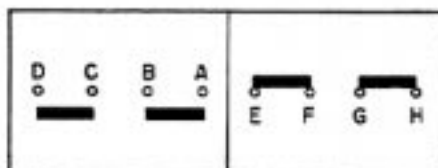
MAIN CONTACTS AND COIL



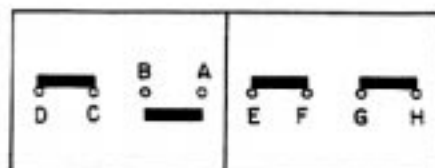
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AUXILIARY CONTACT ARRANGEMENTS

Part number 8247364 is equipped with no auxiliary contacts

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Fig. 3 — Contact Arrangement

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