

LINE-ARC® Single-Pole DC Contactor

NEMA Size 3, 100 A, Normally Open

Class 7004 Type MEO-1/MEMO-1, Series A

Contacteur de \equiv (cd) de un polo LINE-ARC®

Tamaño NEMA 3, de 100 A normalmente abierto

Clase 7004 tipo MEO-1/MEMO-1, serie A

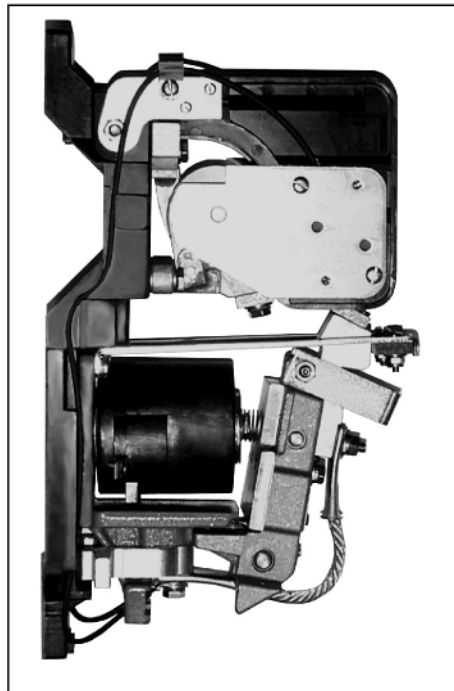
Contacteur cc unipolaire LINE-ARC®

NEMA taille 3, 100 A normalement ouvert

Classe 7004 type MEO-1/MEMO-1, série A



Retain for future use. / Conservar para uso futuro. / À conserver pour usage ultérieur.



INTRODUCTION

⚠ DANGER
HAZARDOUS VOLTAGE
Disconnect all power before working on equipment.
Failure to follow this instruction will result in death or serious injury.

These single-pole contactors are mill type clapper devices, designed to meet NEMA standards. To identify contactor parts (denoted by parentheses), refer to the parts list on page 10 and to the assembly drawing on page 11.

Contactor Ratings

Table 1: Maximum Contactor Ratings @ 600 Vdc, +40 °C Ambient

Size	Ratings	DC Motor Horsepower @ 230 Vdc	DC Amperes
Size 3, 100 A	Open 8 hour	25	100
	Enclosed	23	90
	Crane	35	133

Operating Coils

The operating coils are designed in accordance with NEMA standards to withstand 110% of rated voltage continuously and to operate the contactor successfully at 80% of rated voltage. Standard coil voltages are 115/120 Vdc and 230/240 Vdc. Table 2 lists the ratings for standard coils. For other coil voltages, refer to the crane control catalog.

Table 2: Operating Coil Ratings

Coil Part No.	DC Voltage Rating	Nominal Resistance (Ω) @ +20 °C
51017-056-50	230/240	1619
51017-056-51	115/120	407

Electrical Interlocks

Electrical interlocks consist of stationary contacts mounted on the magnet fram/ movable arm support (41) and moving contacts attached to the bottom of the contact arm (22). A set of electrical interlocks contains one N.O. (normally open) and one N.C. (normally closed) double-break contact. Make and break ratings apply to double-throw contacts only when both the N.O. and N.C. contacts are connected to the same polarity. The electrical interlock ratings (Table 3) comply with NEMA standard ICS-5, Part 1 Table 1-4-1 (AC) and Table 1-4-2 (DC).

Table 3: Electrical Interlock Ratings

Rating	Volts	Maximum Current (A)		Max. Continuous Current (A)
		Make	Break	
AC (A600)	120	60	6.0	10
	240	30	3.0	
	480	15	1.5	
	600	12	1.2	
DC (N600)	125	2.2	2.2	10
	250	1.1	1.1	
	600	0.4	0.4	

Contact Tips

The movable and stationary power contact tips are identical. Copper power contact tips are standard. Optional silver-faced power contact tips are recommended for applications where the contactor remains closed for long periods of time. Silver-faced contact tips are standard on crane manual magnetic disconnect switches and are optional on DC starters.

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INSTALLATION

⚠ DANGER

HAZARDOUS VOLTAGE

Disconnect power to the contactor before installation, adjustment, maintenance or troubleshooting. Metal parts of the contactor may be at line voltage.

Failure to follow this instruction will result in death or serious injury.

⚠ CAUTION

IMPROPER CONNECTION HAZARD

Failure to connect the operating coil to the proper voltage may cause improper contactor operation or damage to the coil.

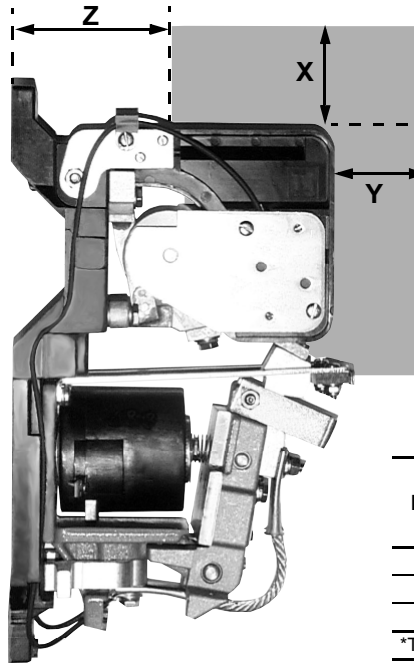
ARC CHUTE POSITION HAZARD

Do not operate the contactor with the arc chute up.

Failure to follow these instructions can result in injury or equipment damage.

ENGLISH

1. Unpack the contactor carefully. Remove the shipping tape, if used.
2. Inspect the nameplate data for correct equipment. Visually verify that the contactor operating coil (39) is the correct voltage. The operating coil circuit voltage may differ from the power circuit voltage.
3. Visually verify that all parts are undamaged and secure.
4. Mount the contactor vertically on a rigid support and fasten it down tightly using a plain washer against the contactor base. Provide the clearances shown in Figure 1 above the top of the contactor and in front of the arc chute.



NOTE: Shaded area indicates arcing clearances.

Dimension	Clearance*			
	600 Vdc		240 Vdc	
	in.	mm	in.	mm
X	2.0	50.8	2.0	50.8
Y	6.0	152	2.5	63.5
Z	4.0	101	4.0	101

*To grounded, uninsulated panel

Figure 1: Electrical Clearances

5. With all power disconnected, mount auxiliary devices (such as mechanical or electrical interlocks) on the contactor. Install and adjust these auxiliary devices according to the instructions provided with the devices.
6. With all power disconnected, pivot the arc chute upward and operate the contactor by hand. The contact tips (10) must meet squarely. If they do not, align them according to "Contact Tip Alignment" on page 5.
7. Pivot the arc chute downward to its proper position.
8. Wire the contactor according to the control panel wiring diagram, ensuring that all connections are secure. The operating coil circuit voltage may differ from the power circuit voltage.

ADJUSTMENTS

Contactors may require contact alignment or adjustment of the electrical or mechanical interlocks.

⚠ DANGER

HAZARDOUS VOLTAGE

- Contactors operated under load expel an arc. Stay away from a contactor operating under load.
- Disconnect power to the contactor before aligning contact tips or adjusting the electrical interlock. Metal parts of the contactor may be at line voltage.

Failure to follow these instructions will result in death or serious injury.

Contact Tip Alignment

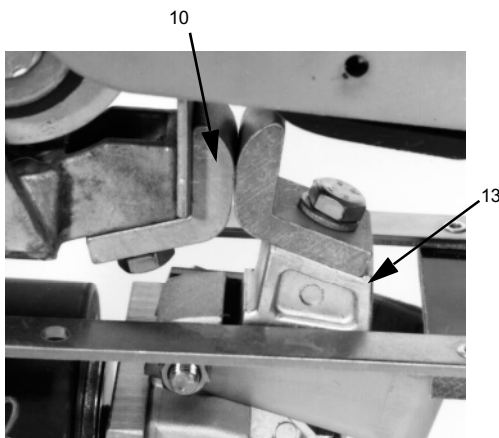


Figure 2: Contact Arm Assembly

Refer to Figure 2 when aligning the contact tips.

1. Disconnect all power.
2. Pivot the arc chute upward.
3. Visually verify that:
 - The movable contact tip is positioned against the ridge located on the auxiliary arm (13), as shown.
 - The stationary contact tip (10) is positioned against the stationary contact support.
 - The contact tip surfaces are vertically and horizontally aligned.
4. Pivot the arc chute downward to its proper position.

CAUTION

ARC CHUTE POSITION HAZARD

Do not operate the contactor with the arc chute up.

Failure to follow this instruction can result in product damage and shortened product life.

Electrical Interlock Adjustment

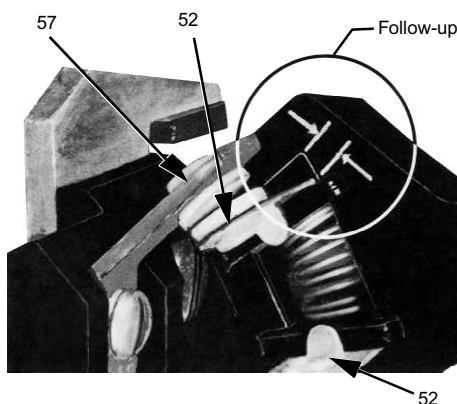


Figure 3: Electrical Interlock Contact Follow-Up

Refer to Figure 3 adjusting the electrical interlock.

1. Disconnect all power.
2. Visually verify that:
 - The electrical interlock assembly (49) has proper follow-up (amount of spring compression). With new electrical interlock contacts, the moving contacts (52) must provide at least $\frac{1}{16}$ in. (1.6 mm) follow-up on each stationary contact when the contact arm reaches its limit of travel (either completely closed or completely open).
 - The N.C. electrical interlock contacts open before the power contact tips close.
3. To adjust the electrical interlock follow-up, bend the stationary contacts (56, not shown, and 57).

Mechanical Interlock Adjustment

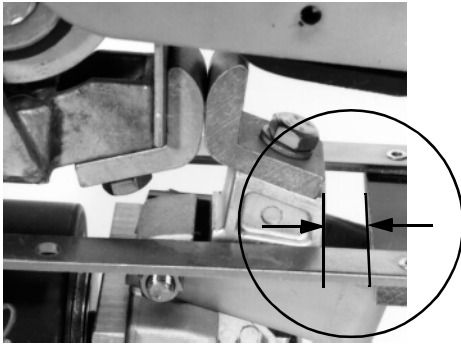


Figure 4: Contact Tip Gap

The mechanical interlock is a tie bar which, when attached to two adjacent contactors, ensures that only one of the two contactors can close at any one time. Refer to Figure 4 when adjusting the mechanical interlocks.

1. Disconnect all power.
2. Visually verify that the mechanical interlock allows the contact arm (22) of either contactor to reach its limit of travel (either completely closed or completely open) without binding.
3. Hold the contact arm of the left contactor fully closed and push the contact arm of the right contactor closed until it is stopped by the mechanical interlock. With new contact tips, verify that there is a gap of at least $\frac{1}{32}$ in. (0.8 mm) but not more than $\frac{1}{16}$ in. (1.6 mm) between the inside edge of the stop bracket (44) and the back surface of the auxiliary arm (13), as shown in Figure 4. If the gap is not within the limits, adjust the mechanical interlock as follows:
 - Loosen the two hex head screws holding the mechanical interlock to the stop bracket.
 - Move the mechanical interlock until the desired gap is achieved.
4. Repeat step 3 above while holding the right contactor in the fully-closed position.
5. Push one contactor to the kiss position (when contact tips first touch) and verify that the other contactor does not come to the kiss position at the same time.
6. If both contactors come to the kiss position at the same time, repeat steps 3–5, increasing the gap to no more than $\frac{1}{32}$ in. (0.8 mm).
7. Visually verify that the mechanical interlock allows the contact arm of either contactor to reach its limit of travel (either completely closed or completely open) without binding.

MAINTENANCE

This section describes maintenance procedures that may be required. These contactors require no lubrication because they have permanently lubricated, oil-impregnated bearings.

⚠ DANGER

HAZARDOUS VOLTAGE

Disconnect power to the contactor before installation, adjustment, maintenance, or troubleshooting. Metal parts of the contactor may be at line voltage.

Failure to follow this instruction will result in death or serious injury.

Contact Tip Inspection and Replacement

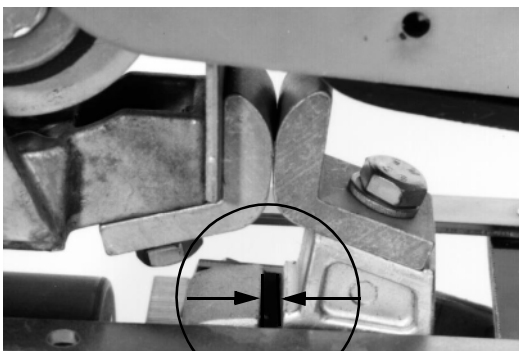


Figure 5: Contact Follow-Up

Replace the contact tips when the contact follow-up (Figure 5) is less than $\frac{1}{16}$ in. (1.6 mm). To replace the contact tips:

1. Disconnect all power.
2. Pivot the arc chute upward.
3. Remove the silicon bronze hex-head cap screw (11), lock washer (12), and the movable contact tip located on the auxiliary arm (13).
4. Remove the silicon bronze hex-head cap screw, lock washer, and the stationary contact tip located on the blowout coil assembly (2).
5. Install the new stationary contact tip using the silicon bronze hex-head cap screw, flat washer, and lock washer.
6. Install the new movable contact tip using the silicon bronze hex-head cap screw, brass flat washer, and lock washer.

NOTE: Failure to position the new movable contact tip against the ridge on the auxiliary arm can result in improper contactor operation.

7. Manually operate the contactor and check the contact tips for alignment (see "Contact Tip Alignment" on page 5).
8. Check the adjustment of the mechanical interlock, if used.
9. Pivot the arc chute downward to its proper position.

CAUTION

ARC CHUTE POSITION HAZARD

Do not operate the contactor with the arc chute up.

Failure to follow this instruction can result in product damage and shortened product life.

Coil Replacement

To replace the coil:

1. Disconnect all power.
2. Disconnect the coil leads.
3. Remove the hex-head nut, lock washer, and plain washer, and disconnect the top end of the shunt connector (21).
4. Slide out the contact arm pin (24) after removing the hex-head nut, lock washer, and set screw (26).
5. Remove the contact arm assembly (22).
6. Unscrew the silicon bronze hex-head cap screw (35) from the front of the magnet core and remove the lock washer (36), core cap spacer (37), core cap (38), and coil (39).
7. Install the new coil using the core cap, core cap spacer, and lock washer. Tighten the silicon bronze hex-head screw. *Note that the core cap, which is thicker than the spacer, must be positioned against the coil (see Figure 7 on page 11).* Ensure that the spring washer (40) is positioned so that the outside edge (concave side) is against the coil and not against the magnet frame (41).
8. Replace the contact arm. Make sure that the opening spring (29) is seated properly over the hex-head cap screw (35).
9. Replace the contact arm pin. Tighten the set screw and hex-head nut.
10. Ensure that the auxiliary-arm pin (27) is centered and the set screw (18) is tight.
11. Connect the top end of the shunt connector by replacing the plain washer, lock washer, and hex-head nut.
12. Reconnect the coil leads.
13. Check the contact tip alignment and the adjustment of the mechanical interlock, if used.

Arc Chute Replacement

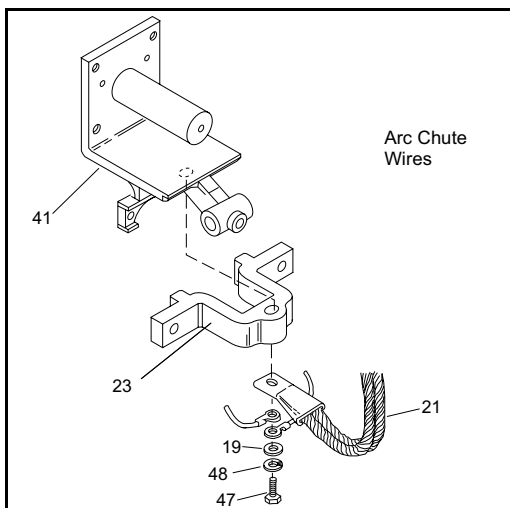


Figure 6: Assembling the Arc Chute Wire and Shunt Connector

To replace the arc chute:

1. Disconnect all power.
2. Pivot the arc chute upward.
3. Remove the hex-head cap screw (47), plain washer (19), and lock washer (48). Then disconnect the arc chute wires and the shunt connector (21).
4. Remove the arc chute wires from the contactor base.
5. Remove the hex-head nut (17), lock washer (8), hex-head cap screw (45), and then the arc chute.
6. Install the new arc chute, securing it with the hex-head cap screw, lock washer, and hex-head nut.
7. Reposition the arc chute wires along the contactor base.
8. Reconnect the arc chute wires and shunt connector (see Figure 6) using the washer, lock washer, and hex-head cap screw.

9. Pivot the arc chute downward to its proper position.

CAUTION

ARC CHUTE POSITION HAZARD

Do not operate the contactor with the arc chute up.

Failure to follow this instruction can result in product damage and shortened product life.

Shunt Connector Replacement

Replace the shunt connector when the flexible braided wires are broken or burned, or if wires are loose in the terminal connectors on either end of the shunt connector.

1. Disconnect all power.
2. Disconnect the bottom end of the shunt connector (21) by removing the hex-head cap screw, lock washer, washer, and arc chute wires.
3. Disconnect the top end of the shunt connector by removing the hex-head nut, lock washer, and washer.
4. Ensure that the auxiliary arm pin (27) is centered and the set screw (18) is tight.
5. Install the new shunt connector. Secure the top end of the shunt connector with the washer, lock washer, and hex-head nut.
6. Secure the bottom end of the shunt connector and the arc chute wires with the washer, lock washer, and hex-head cap screw (see Figure 6 on page 7).

Electrical Interlock Replacement

Replace the electrical interlock contact tips when inspection shows that they are burned or badly pitted. Replace the entire electrical interlock assembly when replacing the contact tips.

Electrical Interlock Assembly Replacement

To replace the electrical interlock assembly:

1. Disconnect all power.
2. Loosen the terminal clamps and screws (57), and remove the terminal leads from the stationary contact assembly. Note the position of the leads to ensure proper replacement.
3. Remove the pan head screw (50), lock washer (51), washer (59), and the movable contact assembly.
4. Remove the captive screw assembly (58) and the stationary contact assembly.
5. Install the new stationary contact assembly and secure it with the captive screw assembly. Be sure to position the stationary contact assembly as shown in Figure 7 on page 11.
6. Install the new movable contact assembly and secure it with the washers, lock washers, and pan head screws. Be sure to position the movable contact assembly as shown in Figure 7.
7. Manually operate the contactor and check the movable contacts for follow-up and sequencing (see "Electrical Interlock Adjustment" on page 5).
8. Replace the terminal leads.

Electrical Interlock Contact Tip Replacement

After the electrical interlock assembly has been removed from the contactor, the contact tips can be replaced. To replace the electrical interlock contact tips:

1. Remove the electrical interlock assembly from the contactor.
2. Remove both sets of movable contact tips (52) from the movable contact assembly by compressing the spring (54) and retainers (53), then sliding out the movable contact tips.

3. Install both sets of new movable contact tips by compressing the spring and retainers, then sliding in the movable contact tips.
4. Remove both top stationary contact tips (57) from the stationary contact assembly along with the screws and washers that hold them in place.
5. Remove the terminal clamps and screws from the top stationary contact tips (57).
6. Install both new top stationary contact tips, replacing the contact tip screws, the terminal clamps, and their screws.
7. Remove the screws and terminal clamps that hold both bottom stationary contact tips (56) on the stationary contact assembly.
8. Install both new bottom stationary contact tips, replacing the screws, the terminal clamps, and their screws.
9. Manually operate the contactor and check the movable contacts for follow-up according to "Electrical Interlock Adjustment" on page 5.
10. Replace the terminal leads.

Opening Spring Replacement

To replace the opening spring:

1. Disconnect all power.
2. Pivot the arc chute upward.
3. Disconnect the top end of the shunt connector (21) by removing the hex head nut (20), lock washer (48), and washer. (19)
4. Slide out the contact arm pin (24) after removing the hex-head nut, lock washer, and set screws (26).
5. Remove the contact arm (22).
6. Remove the hex-head cap screws (31), lock washer, washers, armature plate (30), and the opening spring (29).
7. Install the new opening spring by inserting the narrow end of the spring through the hole in the armature plate, so that the wide end of the spring is located between the armature plate and the contact arm.
8. Secure the armature plate to the contact arm using the washers, lock washers, and hex-head cap screws. To ensure that the opening spring is positioned properly, verify that there is no gap between the armature plate and the contact arm.
9. Replace the contact arm assembly. Make sure that the opening spring is seated properly over the hex-head cap screw (35).
10. Replace the contact arm pin, set screw, lock washer, and hex-head nut. Tighten the set screw and hex-head nut.
11. Connect the top end of the shunt connector by replacing the washer, lock washer, and hex-head nut.
12. Check the contact tip alignment and the adjustment of the mechanical interlock, if used.
13. Pivot the arc chute downward to its proper position.

CAUTION

ARC CHUTE POSITION HAZARD

Do not operate the contactor with the arc chute up.

Failure to follow this instruction can result in product damage and shortened product life.

ORDERING INSTRUCTIONS

Specify the quantity, part number, and description of the part, giving the complete nameplate data of the contactor. To identify parts, see Figure 7 on page 11.

Table 4: Parts List

Item	Description	Part Number	Qty	Item	Description	Part Number	Qty
1	Arc chute	51017-217-50	1	33	Nameplate	‡	1
2	Blowout coil assembly	51017-205-50	1	34	#6 - 32 x 1/4" pan head screw	■	2
3	Blowout coil guard	51017-237-01	1	35	1/4"- 20 x 5/8" silicon bronze hex-head cap screw	■	1
4	1/4"- 20 x 1/2" pan head screw with captive lock washer	■	5	36	1/4" silicon bronze lock washer	■	1
5	1/4"- 20 x 7/8" slotted, hex-head cap screw	■	1	37	Core cap spacer	50502-006-06	1
6	1/4" lock washer	■	11	38	Core cap	50502-006-05	1
7	1/4"- 20 x 3/4" slotted, hex-head cap screw	■	2	†39	Operating coil, 230/240Vdc, or	51017-056-50	1
8	1/4" lock washer	■	10		Operating coil, 115/120Vdc	51017-056-51	
9	1/4"- 20 x 3/8" brass, flat-head screw	21203-20120	1	40	Spring washer	51017-041-01	
†10	Contact tip kit consisting of two sets of tips and hardware:	Class 9998		41	Magnet frame/ movable arm support	51017-289-01	1
	Copper tips, or	Type ME-1	1	42	Contactor base	51017-238-50	1
	Silver tips	Type ME-2	1	43	1/4"- 20 x 3/8" pan head machine screw	■	2
11	1/4"- 20 x 5/8" silicon bronze hex-head cap screw	21407-20200	2	44	Stop bracket	51017-243-50	1
12	1/4" silicon bronze lock washer	23711-22000	2	45	1/4"- 20 x 2" hex-head cap screw	■	1
13	Auxiliary arm	51017-242-50	1	46	1/4"- 20 x 5/8" slotted, hex-head cap screw	■	2
14	Auxiliary arm spring (for Type MEO-1), or Auxiliary arm spring (for Type MEMO-1)	50502-602-42	1	47	1/4"- 20 x 3/4" hex-head cap screw	21401-20240	1
		50502-602-47	1	48	1/4" lock washer	23701-00200	
15	Auxiliary arm spring retainer	51017-239-01	1	†49	Electrical interlock kit, or	Class 9999 Type MX11	1
16	1/4"- 20 x 1-1/2" hex-head cap screw	■	1		Bulk pack of five sets of replacement electrical interlock contacts, consisting of: 10 movable contact tips (item 52) 10 bottom stationary contact tips (item 56) 10 top stationary contact tips (item 57) 4 spring retainers (item 53) 2 springs (item 54)	51075-038-54	1
17	1/4"- 20 hex-head nut	■	2				
18	1/4"- 20 x 1-1/2" headless, slotted, half dog point set screw	21802-20480	1				
19	1/4" plain washer	■	2				
20	1/4"- 20 hex-head nut	■	2				
21	Shunt connector	51018-204-51	1				
22	Contact arm	51017-214-50	1	50	#10 - 24 x 1" pan head screw	■	2
23	Lower terminal	51017-290-01	1	51	#10 lock washer	■	3
24	Contact arm pin	51019-251-05	1	52	Movable contact tip	51075-023-50	2
25	Bearing	29005-40260	2	53	Spring retainer	51075-046-01	2
26	1/4"- 20 x 3/4" headless, slotted, half dog point set screw	21802-20240	1	54	Spring	50502-602-38	1
27	Auxiliary arm pin	51019-251-03	1	55	#10 - 24 x 1/2" pan head screw with captive lock washer	■	1
28	Bearing	29005-20160	2	56	Bottom stationary contact tip	51075-017-50	2
29	Opening spring	50502-602-03	1	57	Top stationary contact tip	51075-016-50	2
30	Armature plate	51017-234-01	1	58	#10 - 24 x 1/2" captive screw assembly with long shank and captive lock washer	■	1
31	1/4"- 20 x 1-1/4" hex-head cap screw	■	2	59	#10 plain washer	■	3
32	1/4" plain washer	■	2	60	1/2" brass flat washer	■	2

■ Obtain standard hardware, listed without Square D part number, from a local hardware supplier.

† Parts recommended for general maintenance.

‡ Part not available.

NOTE: The following user modification kits are also available for this contactor:

Class 9999, Type ML1 power lug kit consisting of four clam shell lugs

Class 9999, Type MK2 pneumatic timer kit

Class 9999, Type MM2 mechanical interlock kit for two single-pole, normally open contactors or two double-pole, normally open contactors

Class 9999, Type MT2 tie bar kit for two single-pole, normally open contactors

**EXPLODED ASSEMBLY
DRAWING**

Figure 7 identifies items in the parts list and in the maintenance and adjustment procedures.

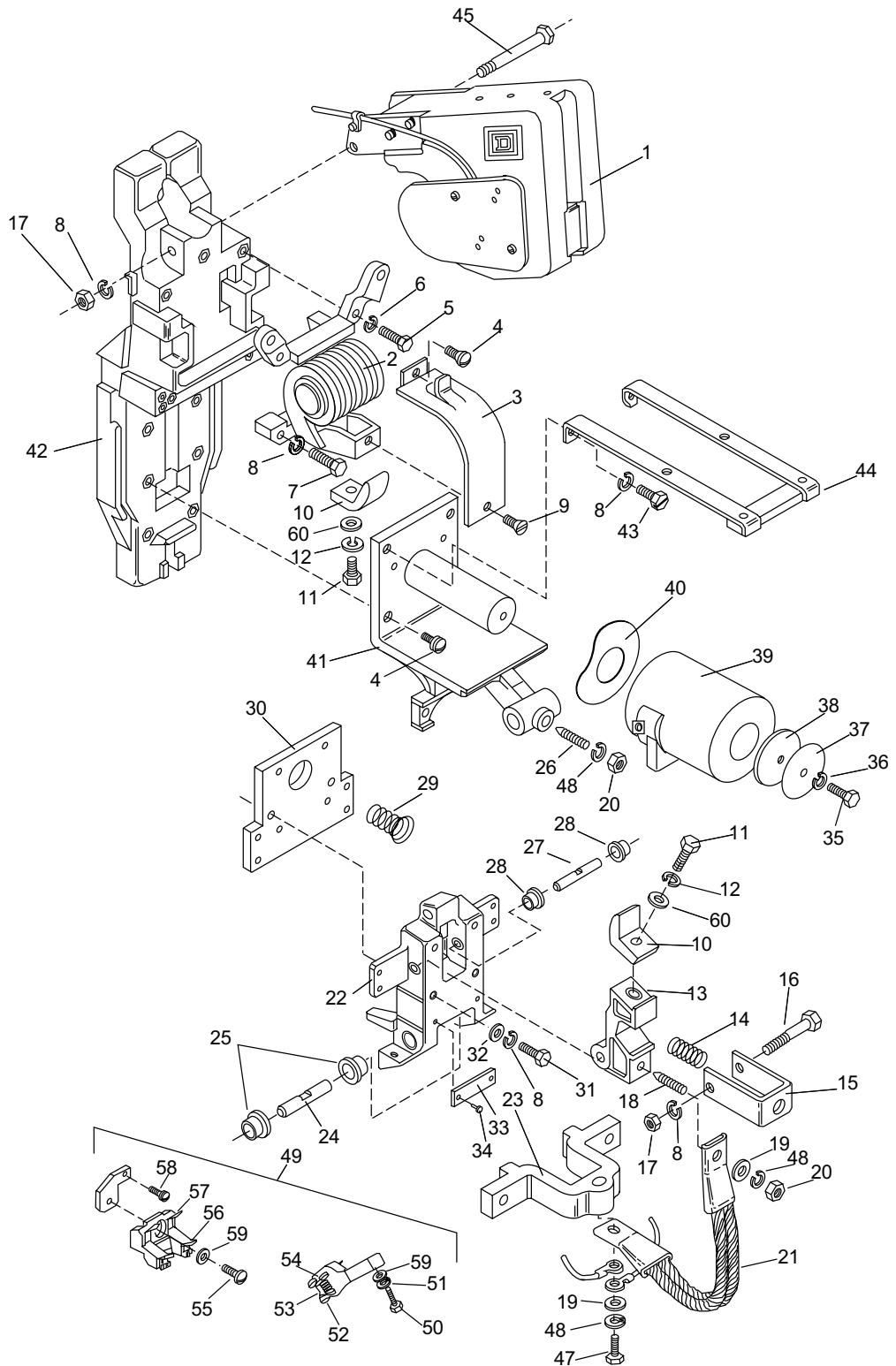


Figure 7: Contactor Assembly Drawing

ENGLISH

TROUBLESHOOTING

When troubleshooting, refer to page 3 for contactor ratings (Table 1) and coil ratings (Table 2).

⚠ DANGER

HAZARDOUS VOLTAGE

- Troubleshooting procedures marked with an asterisk (*) require the application of power. Do not touch the contactor with power applied.
- Disconnect power to the contactor before performing any other troubleshooting corrective action.

Failure to follow these instructions will result in death or serious injury.

Table 5: Troubleshooting Procedure

Problem	Possible Causes	Corrective Action
The contacts do not close or operation is sluggish.	Improper or inoperative operating coil	Visually verify the coil part number. Measure the resistance to determine if the coil is inoperative.
	Low control circuit voltage	* Measure the control circuit voltage. It must be at least 80% of the rated coil voltage. If it is 0, the problem is elsewhere in the circuit.
	Loose connection in the control circuit	Inspect the connections. Tighten if loose.
	Mechanical interference or binding	Inspect for interference or binding: <ul style="list-style-type: none"> — Disconnect the mechanical interlock from the contactor that is binding (see “Mechanical Interlock Adjustment” on page 6). — Ensure that the tie bar is not causing the binding. — Manually close the contact arm and verify that the cap screw head (35) on the core of the magnet frame assembly clears the hole in the armature plate. — manually close the contact arm and verify that the auxiliary arm bearings are not binding.
The contact tips overheat, short tip life.	Loose connections	Inspect the contact tips and shunt connections. Tighten if loose.
	The movable or stationary contact tip is not properly aligned.	Align the contact tips. See page 5.
	There is foreign matter on the contact surfaces.	Remove all foreign matter.
	The contact tips are worn beyond the recommended limits.	Replace the contact tips. See page 6.
	The contact surfaces are severely scored or burned.	Ensure that the arc chute wires are connected to the magnet frame/ movable arm support and are not broken.
	The arc chute is improperly installed.	Visually verify that the arc chute is pivoted to the full downward position.
	The opening spring is inoperative.	Replace the spring.
	Normal load currents are below 5% of rated contactor current.	Use a smaller size contactor.
The operating coil overheats.	Improper or inoperative coil	Visually verify the coil part number. Measure the resistance to determine if the coil is inoperative.
	High voltage condition on the coil	* Measure the control circuit voltage. It must not exceed 110% of the rated coil voltage.
	Loose connection at the coil terminals	Check the connections. Tighten if loose.

* See the danger statement above.