SIEMENS

INSTRUCTIONS

Installation

Operation

Maintenance

Type 456 5KV

AC Air-Break

Contactor

CC 6030-03
20X9759-11
February, 19

TABLE OF CONTENTS

The information contained within is intended to assist operating personnel by providing information on the general characteristics of equipment of this type. It does not relieve the user of responsibility to use sound Practices and Safety Procedures in the installation, application, operation and maintenance of the particular equipment purchased. This instruction book is not a training manual for unskilled persons.

If drawings or other supplementary instructions for specific applications are forwarded with this manual or separately, they take precedence over any conflicting or incomplete information in this manual.

GENERAL INFORMATION

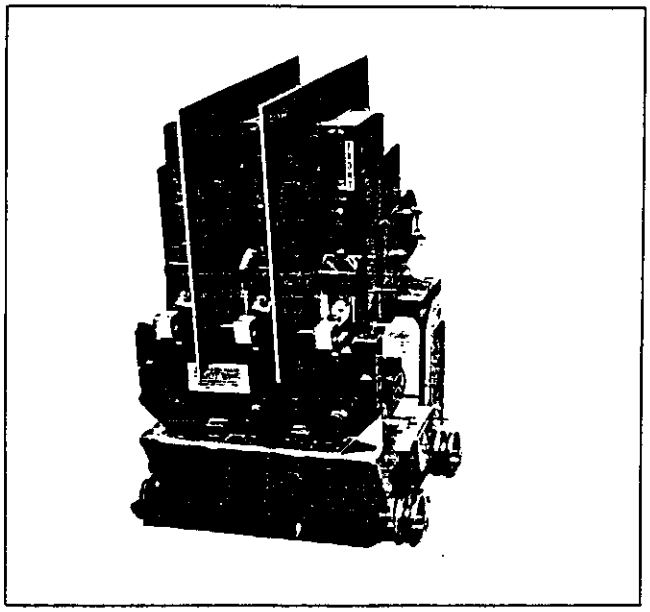


Fig. 1 - Type 456 AC Air-Break Contactor

INTRODUCTION

The Type 456 5KV AC air-break contactor is designed primarily for general alternating current motor starting applications. It is particularly suited for applications requiring frequent starting, reversing, plugging or dynamic braking.

GENERAL DESCRIPTION

The basic contactor is of compact design, 24 in. deep, 16 in. wide, and 28 in. high. The contacts are double break and have a contact angle of 45 degrees which facilitates natural arc movement into the arc chute. This angle also provides a wedging action for higher effective contact pressure. Dust and dirt slide off.

The accessibility of the contactor allows fast and convenient inspection and testing. The Type 456 contactor features lift out arc chutes. Hinged blow-out pole pieces swing back to expose all contacts for quick inspection and replacement.

The supporting base is of cast aluminum. The pushrods, contact support blocks and other insulating parts are constructed of glass polyester. All insulation in contact with high voltage current carrying parts is flame retardant and track resistant.

An auxiliary contact panel assembly for magnet operation consists of a silicon rectifier, three NO - NC auxiliary switches and one NC long wipe switch which are mounted on an aluminum plate. The auxiliary switches are operated by an auxiliary drive link from the magnet armature.

The stationary contact assemblies are mounted on a glass polyester support block along with the blowout coil assemblies. One terminal of each blowout is connected to the stationary contact assembly.

CONTACTOR RATINGS

No. of Poles	Enclosed Continuous Ampere Rating 8 Hr. Basis	KVA Interrupting Capacity at		Maximum Horsepower							
				2200-2500 Volts				4000-5000 Volts			
				Synchronous		Induction	Impulse Level (BIL)	Synchronous		Induction	Impulse Level (BIL)
		2200-2500V	4000-5000V	1.0pf	.8pf			1.0pf	.8pf		
3	360	50,000	50,000	1750	1500	1500	60KV	3000	2500	2500	60KV

Auxiliary Contacts: Each contactor is equipped with 2 N.O. and 3 N.C. extra auxiliary contacts rated 600V, 10A (NEMA Class A600). A third (3rd) N.O. is used to energize the contactor's magnet. See Circuit Diagrams page 4.

RECEIVING, UNLOADING AND UNPACKING

Air break contactors are shipped completely assembled. To unpack, remove the cardboard shipping carton, then remove the screws holding the contactor to the wooden platform and lift the contactor from the platform. Refer to Figure 2 for recommended lifting method.

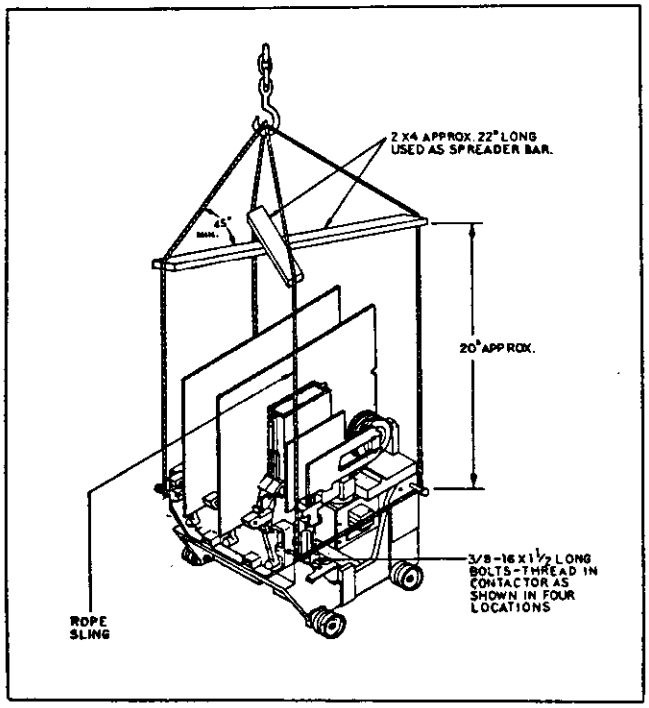


Fig. 2 - Recommended Lifting Method

NOTE: If any signs of damage are apparent, file a claim immediately with the transportation company and notify your Siemens-Allis Sales Office. As much identification as possible should accompany the claim with a description of the damage.

STORING

If the contactor can be set up immediately in its permanent location, it is advisable to do so, even though it may not be placed in operation for some time. Contactor should be stored indoors in a clean dry dust-free heated area where condensation cannot occur.

INSTALLATION

GENERAL

Installation shall be in accordance with the National Electrical Code, ANSI, and NFPA 70 Standards.

MOUNTING

The contactor should be installed in a clean dry heated place with good ventilation. It should be readily accessible for cleaning and inspection and should be carefully set up and leveled on its supporting foundation and secured in place.

All adjustments have been made at the factory before shipping and generally no change is required. See that all contact surfaces are clean and smooth, and that current-carrying parts are not damaged.

ELECTRICAL CONNECTIONS

Inspect all insulated wiring to see that no damage has resulted from installing the contactor. Test the high voltage wiring for possible grounds or short circuits.

WARNING: Dielectric testing is hazardous, and should be conducted only by trained personnel. Refer to test device instructions for safety precautions.

A high potential test at 2¼ times the nominal system voltage plus 2000 volts applied for one minute between phases and from all phases to ground is the preferred method. Be sure to disconnect any devices (control power transformer, etc.) from the circuit which could be damaged by the test voltage. If a hi-pot tester is unavailable, then a Megger test at 1000 volts is a suitable second choice.

Make sure that all current-carrying parts outside the contactor have adequate current-carrying capacity and are correctly insulated in accordance with the requirements of the National Electrical Code (NEC). All electrical connections should be made carefully per furnished wiring diagram. Tighten all lugs to recommended torque values. If crimp lugs are supplied, use recommended tools only. IMPORTANT: To obtain correct magnetic action from blowouts, connect the load wires (motor, furnace, etc.) to the terminals on the rear of the blow-out coils. (Refer to Figure 3.).

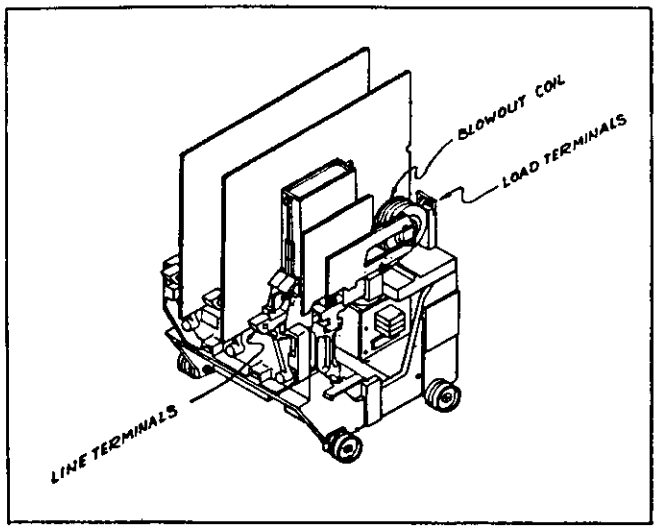


Fig. 3 - Location of Line and Load Terminals

OPERATION

PRE-ENERGIZATION CHECK

WARNING: Perform the following checks **before** energizing the high voltage circuit:

1. Be sure all arc chutes are correctly installed and both phase barriers are in place.
2. Operate the contactor by hand to be sure that all parts move freely. If the contactor has been stored for some time, clean any excessive amounts of dust and dirt that may have accumulated.
3. Connect **only** control power and operate the contactor electrically several times. At 85 to 110% of rated control voltage (see operating data), the contactor should pick-up and seal cleanly with no pumping or chattering.

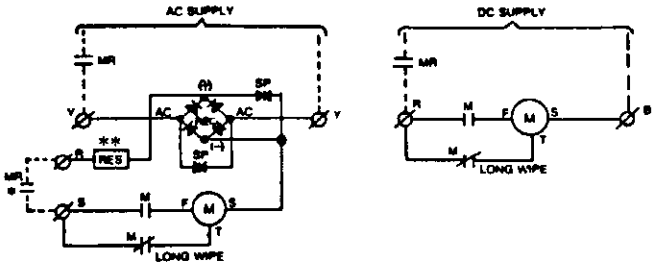
The contactor may now be placed in service by connecting main incoming cables. The contactor must be appropriately guarded or isolated before energizing the high voltage circuit. Operating characteristics of contactors which are installed in SpaceMaker-II carriages are described in separate instruction book ICD 6031.

OPERATING DATA

	230 Volt AC Supply	115 Volt AC Supply	250 Volt DC Supply	125 Volt DC Supply
Rated control voltage	230 volts	115 volts	250 volts	125 volts
Pick-up voltage	150 volts	80 volts	160 volts	85 volts
Drop-out voltage	90 volts	50 volts	80 volts	50 volts
Pick-up time (to contact touch)	12-13 cycles	13 cycles	14 cycles	13-14 cycles
*Fast drop-out time (to contact break)	4-5 cycles	4-5 cycles	4-5 cycles	4-5 cycles
*Normal drop-out time (to contact break)	25-35 cycles	25-35 cycles	—	—
Normal inrush current	5.0a.	10.0a.	3.5a.	7.0a.
Maximum inrush current	6.5a.	13.0a.	4.5a.	9.0a.
Normal sealing current	0.2a.	0.4a.	0.13a	0.26a.
Maximum sealing current	0.25a.	0.5a.	0.15a.	0.30a.

*Drop-out times shown in above table are not total clearing times. Contactor clearing time is equal to drop-out time plus arcing time. Arcing times vary depending on voltage and current being interrupted.

CONTROL CIRCUIT DIAGRAMS



115 OR 230 VOLT AC SUPPLY | **125 OR 250 VOLT DC SUPPLY**

MR - Master Control Relay Contact (remote from contactor), contact rating designation to be NEMA A600.

* MR Contact between terminals R and S on AC operated contactor is used to achieve fast drop-out time shown in above table. For normal drop-out time, connect a jumper wire between R and S.

** Panel mounted resistor required only on two-pole contactors.

MAINTENANCE

The customer should establish a periodic maintenance program. The frequency of inspection, periodic cleaning and preventive maintenance schedule will depend upon the operating conditions, NFPA Publication 70B "Electrical Equipment Maintenance" may be used as a guide to establish such a program. The following items should be included on any comprehensive maintenance check list:

WARNING

CONTACTOR MUST BE DISCONNECTED FROM ALL POWER SOURCES BEFORE PERFORMING ANY INSPECTION, MAINTENANCE OR REPAIR. ONLY QUALIFIED PERSONNEL FAMILIAR WITH ELECTRICAL EQUIPMENT AND THE HAZARDS INVOLVED SHOULD BE PERMITTED TO SERVICE THIS EQUIPMENT.

ARC CHUTE AND PHASE BARRIER REMOVAL AND RE-INSTALLATION

Refer to Figure 4

To remove an arc chute, lift the back end of the chute until it releases, then lift the entire chute upward, slide forward and out.

To re-install an arc chute, slide in rear of arc chute first, then push front arc runner clip down over front stationary contact until notches in front of chute fit into mating grooves in contactor insulator block. Now push rear of arc chute down so that rear arc runner clip engages over rear stationary contact. When properly seated, horizontal grooves on sides of arc chute should line up with top of blow-out plates.

The two phase barriers may be removed by lifting straight up, then sliding forward and out. To re-install, reverse this procedure making sure that notches in barriers face to the rear (load) side of the contactor.

WARNING: DO NOT ENERGIZE CONTACTOR UNLESS ARC CHUTES AND PHASE BARRIERS ARE INSTALLED.

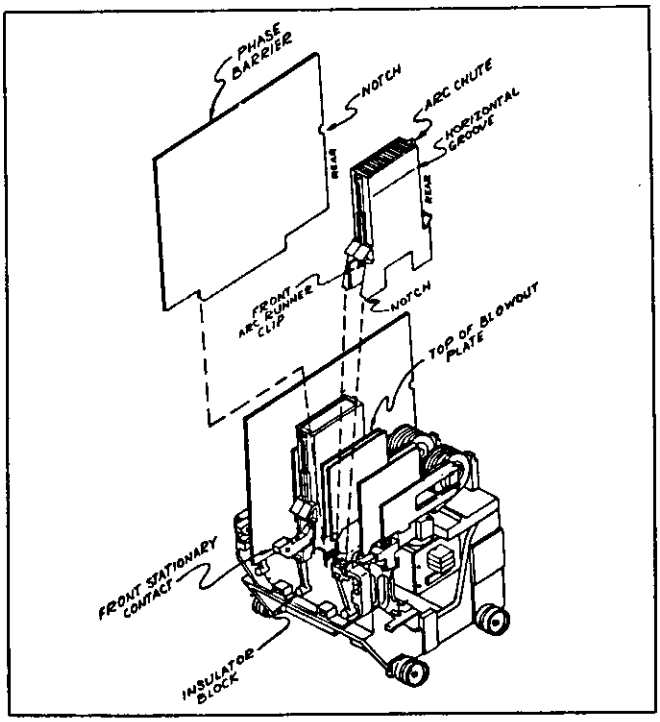


Fig. 4 - Arc Chute and Phase Barrier Installation

MAIN CONTACT INSPECTION AND REPLACEMENT

All main contacts are made from a material specially suited for making and breaking high electrical currents while resisting welding and erosion due to arcing. The contacts are brazed to a copper alloy base material which serves to support them, carry electrical current and conduct heat away. This base material is subject to erosion and welding if exposed to arcing; therefore contacts must be replaced when the contact material is worn nearly to the point of exposing the base material. As a guide, the contacts should be replaced when approximately 3/32 inch of contact material has been eroded away.

CAUTION: Contacts must be replaced before any part of one contact makes contact with the base material of its mating contact.

The interval between inspections will vary with the nature of the load being switched. It is recommended that the contacts be inspected after the first 1,000 operations. If only minor pitting is observed, then the inspection interval can be increased. Evidence of heavy pitting and erosion of contact material means the contacts should be checked more frequently to determine if the wear allowance of 3/32 inch is being approached.

Refer to Figure 9

When contacts require replacement, replace contacts (3) and (35) and springs (32) on all three phases at the same time. To gain access to all contacts, remove two phase barriers and all three arc chutes (14). Then swing back hinged blowout coil assemblies. All main contacts are now accessible for replacement.

Remove hex lock nuts (80) allowing cap screws (74) to slip out of pushrod (28) Movable contact (35) is now accessible for replacement.

First remove movable contact assembly. Remove hex head nut with lockwasher (85) (84). Stationary contact (3) may now be removed for replacement.

MAGNET COIL REPLACEMENT

Refer to Figure 9

Remove wire connections from coil. Loosen hex head machine screw (89). Slide magnet assembly from the base of the yoke (16). Machine screw (89) along with magnet core (17) can then be lifted from coil along with washers (18) (19) (20) (21) (94). Replace coil and reassemble following the reverse procedure.

AUXILIARY CONTACT ADJUSTMENT

Refer to Figure 9

Tighten auxiliary drive link (39) to coupling angle (46) just enough to remove excessive free play. Do not overtighten.

ARC CHUTE INSPECTION AND MAINTENANCE

The arc chutes should be inspected as part of routine maintenance each time the contacts are inspected. In service, the arc chute ceramic will become discolored slightly due to normal arcing as the contactor operates. Dust and dirt will also tend to accumulate after a period of time. The following procedure should be used to clean the arc chutes after they have been removed from the contactor:

1. Blow out dust and dirt by directing dry compressed air from the bottom of the arc chute up through the spaces between the ceramic arc splitters. The air should also be directed over the surfaces of the ceramic flash plates located in the lower portion of the chute (refer to Figure 5).
2. Using a cloth or by light sanding, remove any additional loose residue (carbon, etc.) from the flash plates. Pay particular attention to the areas which have vertical grooves on the ceramic surface. Do not use abrasives which might embed conducting particles in the ceramic (emery cloth, wire brush, etc.).

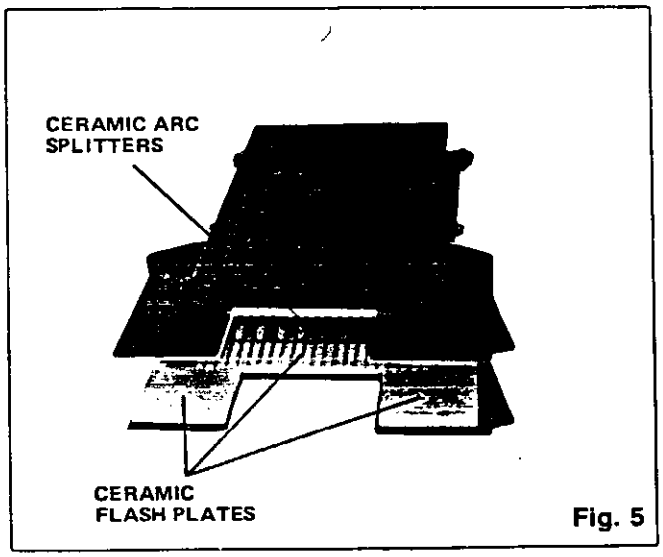


Fig. 5

In addition to periodic cleaning, the arc chutes should be inspected for any obvious physical damage such as cracked or missing ceramic pieces. Small chips or slight cracks in the ceramic should not cause concern as long as no large pieces are missing or are in danger of falling out of the assembly. If any components require replacement, the complete arc chute assembly must be replaced.

CAUTION: When replacing arc chutes, refer to important ordering information at the end of this manual.

After prolonged periods of operation at medium-to-heavy currents or after the contactor has been required to interrupt at or near its full 50MVA rating, heavy electrically conductive deposits may accumulate on the flash plates which would interfere with proper contactor operation. In the event of this, it is recommended that a dielectric or Megger test be performed as follows to verify dielectric strength of the flash plate sufaces. If a Megger is used, the recommended test voltage is 1000 volts.

WARNING: Dielectric test voltages are hazardous. Refer to test device instructions for safety precautions.

1. Clip Megger or dielectric tester leads onto the flash plates at the points shown in Figure 6 using alligator clips or the equivalent.
2. The area between the clips should withstand 9KV AC(13KV DC) for one minute or should indicate a resistance of at least 100 Megohms. Be sure to test both left and right sides of the arc chute. If either side fails to meet the dielectric requirement, then disassembly and cleaning is necessary before placing the arc chute back into service. If one arc chute fails the test, then disassembly and cleaning of all three arc chutes is recommended.

PERIODIC CLEANING

Accumulation of dust and foreign material such as coal dust, cement dust or lamp black must be blown off the contactor, all surfaces must be wiped clean at regular intervals. Dust can collect moisture, causing voltage breakdown.

RECOMMENDED TORQUE VALUES

When making bolted assemblies, the following consideration should be generally followed. The tightening torques are determined by the size of hardware used.

1. Metal-to-Metal — Apply standard tightening torque as listed:

Thread Size	Torque (In.-Lb.)
8-32	14- 20
10-32	20- 30
1/4-20	40- 60
5/16-18	168-228
3/8-16	240-360
1/2-13	480-600

2. Metal-to-Insert Molded in Compound Part — Apply approximately 2/3 of standard tightening torque.
3. Compound-to-Insert Molded in Compound Part — Apply approximately 1/2 of standard tightening torque.
4. Compound-to-Compound — Apply approximately 1/2 of standard tightening torque.

DISASSEMBLY AND CLEANING OF ARC CHUTES

CAUTION: Arc chute disassembly should be performed only if the dielectric test described in these instructions was not passed.

Disassembly Procedure (Refer to Figure 7)

1. Lay the arc chute on its side.
2. Remove the hardware which attaches the two arc chute halves at four locations marked (1) in the figure.
3. Loosen, but do not remove, the four arc runner attachment screws marked (2).
4. Carefully lift off one of the arc chute halves to expose the ceramic barrier stack and the arc runner and clip assemblies. Refer to Figure 8.
5. Remove the barrier stack and the arc runners.
6. Clean the ceramic flash plates on the bottom of the arc chute halves by dry nonconductive sandblasting. After sandblasting, all of the dark colored deposits should be removed and the ceramic surfaces should appear white.
7. Wipe off the arc chute halves with a dry cloth and reassemble the arc chute by reversing the disassembly procedure. The ceramic barrier stack can be installed either way but the "V" notches in the splitter plates must be toward the bottom.
8. Repeat the dielectric test to ensure that dielectric strength has been restored to the flash plate surfaces, in which case the arc chutes can now be returned to service.

It is recommended that disassembly and sandblasting of the arc chute be done no more than three (3) times during the service life of any arc chute. After this point, other parts of the arc chute may have become contaminated to the extent that performance is degraded and the entire arc chute should be replaced.

CAUTION: Refer to "IMPORTANT INFORMATION WHEN REPLACING ARC CHUTES" at the end of this manual.

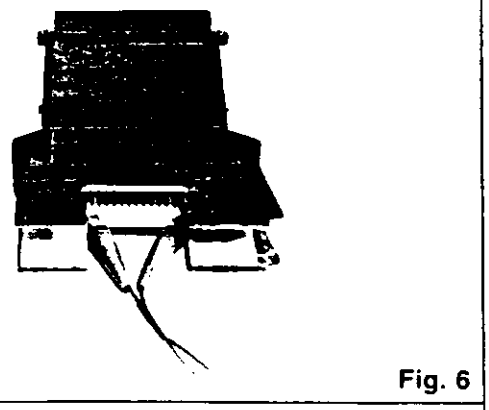


Fig. 6

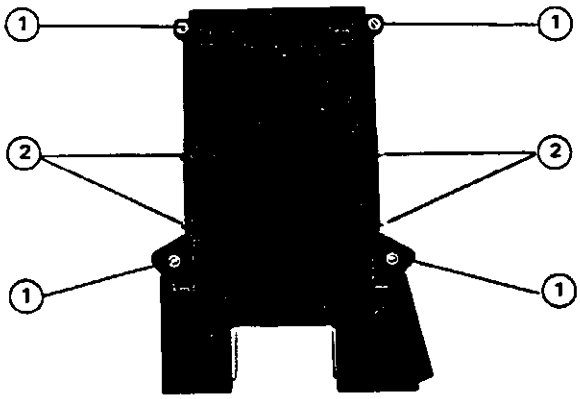


Fig. 7

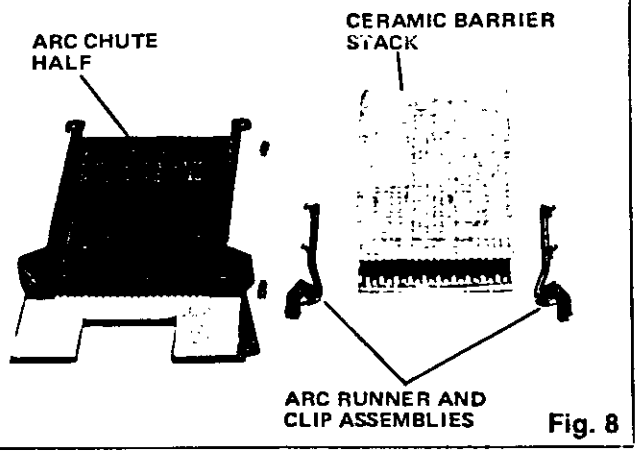


Fig. 8

TROUBLE SHOOTING

In the unlikely event that operating problems are encountered, use the following trouble-shooting chart to isolate the cause of the malfunction and find the remedy. If the corrective action given in the chart fails to correct the difficulty, consult your field sales representative.

If it is necessary to write to Siemens-Allis relative to the equipment, the following information should be given:

1. Manufacturer's order number, if available.
2. Nameplate data on contactor.
3. Duty cycle and any details of operation.
4. Length of time in service and approximate total number of operations.
5. Voltage, current and frequency.
6. Description of problem.
7. Any other pertinent information.

TROUBLE SHOOTING CHART

WARNING
REMOVE ALL POWER TO CONTACTOR PRIOR TO MAKING THESE CHECKS EXCEPT WHERE CONTROL POWER IS REQUIRED AND EXERCISE CAUTION AT ALL TIMES.

TROUBLE	CAUSE	REMEDY
CONTACTS Overheating of contacts.	Overload.	Reduce current load.
	Insufficient contact pressure.	Clean contact surfaces. Replace contact springs if weak and/or replace contacts if wear allowance of 3/32" per contact is used up.
	Loose connection.	Check and tighten power connections.
Contact chatter or pumping.	Poor contact in control circuit.	Check all connections in control circuit for tightness.
	Improper functioning of long wipe contact (between T & S in contactor coil circuit).	The N.O. contact of "M" in parallel with the N.C. L.W. contact must close before L.W. contact opens. If this sequence is not followed check for worn contacts and physical damage of pole assembly (47 and 48); also check leaf spring drive (41) for mechanical damage.
	Fluttering control relay such as pressure or temperature switch.	Properly adjust switch or replace.
	Abnormally low control voltage.	Measure control voltage. Voltage must be at least 85% of rated value shown in OPERATING DATA.
	Open coil	Check continuity of coil and replace if defective.
Short contact life.	Bounce on closing.	Check operating voltage. Should not exceed rated voltage by more than 10%.
	Improper seating of arc runners.	Refer to Arc Chute installation instructions.
	Low voltage; magnet not sealing.	Measure control voltage. Voltage must be at least 85% of rated value shown in OPERATING DATA.
	Fluttering control relay such as pressure or temperature switch.	Properly adjust switch or replace.
	Excessive jogging	Check application.

TROUBLE SHOOTING CHART (CONT'D)

WARNING
REMOVE ALL POWER TO CONTACTOR PRIOR TO MAKING THESE CHECKS EXCEPT WHERE CONTROL POWER IS REQUIRED AND EXERCISE CAUTION AT ALL TIMES.

TROUBLE	CAUSE	REMEDY
Short Contact Life	Foreign materials in operating or contact mechanisms.	Remove
Welding of contacts.	Inadequate contact pressure.	Replace contacts if wear allowance is exceeded. Replace contact pressure springs.
	Fluttering control relay such as pressure or temperature switch.	Properly adjust switch or replace.
	Low control voltage, contactor dropping partially open.	Measure voltage to determine if abnormally low dips in voltage occur, particularly during motor start-up.
	Mechanical interference.	Check for mechanical binding and adjust.
	Misadjustment of mechanical interlock for contactors installed in SpaceMaker controller.	Adjust mechanical interlock. Refer to SpaceMaker-II instruction book ICD 6031.
COIL/RECTIFIER Burned-Out coil or rectifier	Failure of magnet armature to close.	Check for mechanical binding of contactor.
	Fluttering control relay such as pressure or temperature switch.	Properly adjust switch or replace.
	Mechanical interlock interference.	Adjust. Refer to SpaceMaker-II instructions ICD 6031.
	Failure of long wipe contact to open.	Check leaf spring drive (41) and pole assembly (48) for mechanical damage.
	Control voltage too high.	Measure voltage. Voltage should not exceed rated voltage by more than 10%
	High ambient temperature.	Ambient temperature outside contactor enclosure should not exceed 40°C.

PARTS LIST

TYPE 456 AIR-BREAK CONTACTOR

Control Voltage	Number of Poles	Part Number Basic Contactor with Wheels
115 VAC	3	25-125-248-503
115 VAC	2	25-125-248-504
230 VAC	3	14-514-449-501
230 VAC	2	14-514-449-506
230 VAC	3	14-519-296-501 †

† Spring closed Dynamic Braking Contactor, furnished less wheels.

REFER TO FIGURE 9

PARTS LIST - BASIC TYPE 456 CONTACTOR - 2 OR 3 POLES

ITEM	DESCRIPTION	QTY 3 - POLE	QTY 2 - POLE	PART NUMBER
1	Frame	1	1	14-422-858-001
2	Stationary Contact	6	4	14-141-684-001
3	Stationary Contact Insert	6	4	14-147-051-501
4	Stationary Contact Support-Front	1	1	14-227-877-501
5	Stationary Contact Support-Rear	1	1	14-317-577-501
6	Support Bar	3	2	25-120-957-002
7	Blowout Coil	3	2	25-205-568-801
8	Blowout Core	3	2	14-230-679-501
8A	Fishpaper Insulator	6	4	14-422-046-007
9	Blowout Plate - R.H.	3	2	14-142-286-501
10	Blowout Plate - L.H.	3	2	14-142-286-502
11	Blowout Coil Washer	6	4	14-133-782-001
12	Arc Chute Support	3	2	14-231-654-001
13	Phase Barrier	2	—	14-133-795-001
14	Arc Chute Assembly*	3	2	25-131-017-502
15	Stop	1	1	14-170-322-001
16	Magnet Yoke Assembly	1	1	14-319-712-501
17	Magnet Core	1	1	14-142-161-001
18	Neoprene Washer	1	1	14-129-241-023
19	Plastic Washer	1	1	14-145-664-001
20	Steel Washer	1	1	14-179-558-001
21	Stainless Steel Washer	1	1	14-171-157-013
22	Shim .015 thick	2	2	14-133-780-002
23	Stationary Pivot Seat	1	1	14-145-322-001
24	Spring	2	2	14-145-712-001
25	Pivot Bar	1	1	14-230-539-001
26	Movable Pivot Seat	1	1	14-145-321-001
27	Movable Contact Carrier	1	1	14-321-927-002
28	Contact Push Rod	3	2	14-227-879-002
29	Bearing Pin Assembly	1	1	14-170-557-501
30	Barrel Nut	1	—	14-145-379-002
31	Bearing Pin	1	1	14-145-379-001
32	Contact Pressure Spring	3	2	14-145-668-001
33	Spring Saddle	3	2	14-142-157-001
34	Movable Contact Guide	3	2	14-141-685-001
35	Movable Contact Assembly	3	2	14-227-873-501
36	Contact Arm	1	1	14-321-928-002
37	Bearing	2	2	14-123-887-004
38	Auxiliary Contact Actuator Arm	1	1	14-147-033-001
39	Auxiliary Contact Drive Link	1	1	14-170-324-001

* - Refer to "IMPORTANT INFORMATION WHEN REPLACING ARC CHUTES", Page 12.

ITEM	DESCRIPTION	QTY 3-POLE	QTY 2-POLE	PART NUMBER
40	Armature	1	1	14-145-381-001
41	Leaf Spring Drive	1	1	14-145-440-001
42	Armature Shaft	1	1	14-231-651-001
43	Bearing Housing	1	1	14-231-653-001
44	Oilite Bearing	2	2	25-131-385-001
45	Auxiliary Contact Panel	1	1	14-230-680-001
46	Auxiliary Contact Coupling	1	1	14-145-432-001
47	Auxiliary N.O.-N.C. Contact Assembly	3	3	14-226-593-009
48	N.C. Contact Assembly	1	1	14-226-593-002
49	Terminal Block	1	1	00-857-035-041
50	Wheel Assembly	4	4	14-147-042-501
51	Wheel Shaft	4	4	14-147-041-001
52	#6-32 x .37 Lg. Rd. Hd. Mach. Scr.	—	2	00-615-471-122
53	#6-32 Hex Nut	—	2	00-631-109-106
54	#6 Flatwasher	—	2	00-651-027-050
55	#6 Lockwasher	—	2	00-651-017-018
56	#6 x .25 Rd. Hd. Drive Scr.	2	2	00-615-623-120
57	#8-32 x .62 Lg. Rd. Hd. Mach. Scr.	4	4	00-615-471-176
58	#8-32 x .75 Lg. Rd. Hd. Mach. Scr.	1	1	00-615-471-178
59	#8 Flatwasher	6	6	00-651-027-072
60	#8 Lockwasher	4	4	00-651-017-020
61	#8-32 Elastic Stop Nut	1	1	00-633-125-108
62	#10-32 x .50 Lg. Hex. Hd. Mach. Scr. with Lockwasher	2	2	00-611-445-218
63	#10-32 x .75 Lg. Hex. Hd. Mach. Scr.	3	3	00-611-445-222
64	#10-32 x .50 Lg. Rd. Hd. Mach. Scr.	3	3	00-615-521-218
65	#10 x .75 Lg. Rd. Hd. S/T Scr.	2	2	00-615-581-222
66	#10 x 1.0 Lg. Rd. Hd. S/T Scr.	2	2	00-615-581-225
67	#10-32 x 2.75 Lg. Fil. Hd. Scr.	—	1	00-615-245-239
68	#10 Flatwasher	3	3	00-651-027-087
69	#10 Flatwasher	5	5	00-615-027-093
70	#10 Lockwasher	3	4	00-655-017-022
71	#10-32 Hex Nut	3	5	00-631-123-210
72	#10-24 Elastic Stop Nut	1	1	00-633-057-110
73	.25 - 20 x .87 Lg. Hex. Hd. Cap Scr.	2	2	00-611-289-377
74	.25-20 x 2.25 Lg. Hex. Hd. Cap Scr.	6	4	00-611-289-388
75	.25-20 x 3.75 Lg. Hex. Hd. Cap Scr.	6	4	15-171-236-001
76	.25 Flatwasher	12	8	00-651-007-146
77	.25 Lockwasher	14	10	00-655-017-026
78	.25-20 Hex Nut	12	8	00-631-059-104
79	.25-20 Hex Elastic Stop Nut	6	4	00-633-067-104
80	.25-20 Hex Lock Nut	6	4	00-633-221-904
81	.25 x .37 Shoulder Hex Socket Hd. Screw #10-24 x .37 Lg.	1	1	00-617-349-248
82	.25 ID x .562 OD x .047 Thick Flatwasher	2	2	00-651-007-123
83	.312-18 x 1.75 Lg. Hex. Hd. Cap Scr.	3	2	00-611-289-428
84	.312 Lockwasher	9	6	00-655-017-030
85	.312-18 Hex Nut	6	4	00-631-059-105
86	.375-16 x 1.25 Lg. Hex. Hd. Cap Scr.	7	7	00-611-315-468
87	.375-16 x 1.5 Lg. Hex. Hd. Cap Scr.	2	2	00-611-315-470
88	.375-16 x 1.75 Lg. Hex Hd. Cap Scr.	3	2	00-611-315-472
89	.375-16 x 5.5 Lg. Hex. Hd. Cap Scr.	1	1	00-611-315-492
90	.375-16 x 1.0 Lg. Flat Hex Socket Hd. Mach. Screw	1	—	00-615-087-468
91	.375-16 x 1.25 Lg. Hex Socket Hd. Mach. Screw	2	2	00-615-114-468
92	.375-16 Hex Nut	8	6	00-631-059-106
93	.375 Flatwasher	6	4	00-651-007-230
94	.375 Lockwasher	14	13	00-655-017-032
95	.375 Lockwasher CTSK tooth	1	—	00-655-077-200
96	.50-13 x 1.25 Lg. Hex. Hd. Cap Scr.	2	2	00-611-315-546
97	.50-13 x 1.50 Lg. Hex. Hd. Cap Scr.	2	2	00-611-315-548

ITEM	DESCRIPTION	QTY 3-POLE	QTY 2-POLE	PART NUMBER
98	.50-13 x 1.75 Lg. Hex. Hd. Cap Scr.	3	2	00-611-315-550
99	.50-13 x 2.25 Lg. Hex. Hd. Cap Scr.	5	4	00-611-315-554
100	.50-13 x 2.50 Lg. Hex. Hd. Cap Scr.	3	2	00-611-315-556
101	.50 Flatwasher	6	4	00-651-007-285
102	.50 Lockwasher	19	17	00-655-017-036
103	.50-13 Hex Nut	6	4	00-631-003-108
104	.50-13 Hex Nut	4	4	00-631-059-108
105	.625 Flatwasher	4	4	00-651-027-357
106	.75 Brass Washer .062 Thick	2	2	00-651-027-400
107	'U' Washer	4	4	00-659-056-062
108	Mica Washer	—	2	14-219-555-011
109	Centering Washer	—	2	14-105-442-001

ADDITIONAL COMPONENTS - 115 VAC CONTACTORS

ITEM	DESCRIPTION	QTY 3-POLE	QTY 2-POLE	PART NUMBER
110	Magnet Coil	1	1	14-183-180-501
111	Rectifier with Internal Surge Suppression	1	1	25-127-039-001
112	Leaf Return Spring	1	1	25-131-184-001
113	Resistor 4 ohm 25 Watt	—	1	25-125-247-005

ADDITIONAL COMPONENTS — 230 VAC CONTACTORS

114	Magnet Coil	1	1	14-183-122-501
115	Rectifier with Internal Surge Suppression	1	1	25-127-144-001
116	Resistor 20 ohm 25 Watt	—	1	15-873-139-008

SUBASSEMBLIES

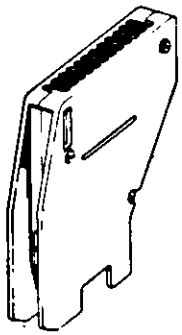
The following Factory-assembled groups of components are available as sub-assemblies:

ITEM	DESCRIPTION	QTY 3-POLE	QTY 2-POLE	PART NUMBER
117	Blowout Pole Sub-Assembly Consisting of Items 7-12, 75-79.	3	2	14-422-046-501
118	Stationary Contact Sub-Assembly Consisting of Items 2, 3, 84, 85.	6	4	25-127-634-502
119A	Movable Contact Sub-Assembly (3-Pole) Consisting of Items 26-37, 62, 74, 80, 83, 84, 86, 90, 92, 92, 94, 95, 106.	1	—	14-422-045-501
119B	Movable Contact Sub-Assembly (2-pole) Consisting of Items 26-29, 31-37, 62, 74, 80, 83, 84, 86, 92, 94, 106.	—	1	14-422-045-505
120A	Pre-Wired Auxiliary Contact Panel Sub-Assembly for 115 VAC Contactor. Consisting of Items 45-49, 57, 59, 60, 65, 66, 69, 111, 112.	1	—	25-125-247-510
120 B	Pre-Wired Auxiliary Contact Panel Sub-Assembly For 115 VAC Contactor. Consisting of Items 120, 52-55, 67, 70, 71, 108, 109, 113.	—	1	25-125-247-511
120 C	Pre-Wired Auxiliary Contact Panel Sub-Assembly for 230 VAC Contactor. Consisting of Items 45-49, 57, 59, 60, 65, 66, 69, 115.	1	—	14-230-682-501

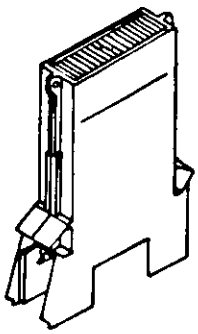
ITEM	DESCRIPTION	QTY 3-POLE	QTY 2-POLE	PART NUMBER
120D	Pre-Wired Auxiliary Contact Panel Sub-Assembly for 230 VAC Contactor. Consisting of Items 120C, 52-55, 67, 70, 71, 108, 109, 116.	—	1	25-302-616-501
121A	Magnet Yoke and Auxiliary Contact Panel Sub-Assembly for 115 VAC Contactor, Consisting of Items 120A, 16-23, 38-44, 56, 58, 59, 61, 63, 64, 68, 70-73, 77, 81, 82, 89, 94, 96, 99, 102, 110.	1	—	25-125-247-508
121B	Magnet Yoke and Auxiliary Contact Panel Sub-Assembly For 115 VAC Contactor, Consisting of Items 120B, 16-23, 38-44, 56, 58, 59, 61, 63, 64, 68, 70-73, 77, 81, 82, 89, 94, 96, 99, 102, 110.	—	1	25-125-247-509
121C	Magnet Yoke and Auxiliary Contact Panel Sub-Assembly for 230 VAC Contactor, Consisting of Items 120C, 16-23, 38-44, 56, 58, 59, 61, 63, 64, 68, 70-73, 77, 81, 82, 89, 94, 96, 99, 102, 110.	1	—	25-127-634-503
121D	Magnet Yoke and Auxiliary Contact Panel Sub-Assembly for 230 VAC Contactor, Consisting of Items 120D, 16-23, 38-44, 56, 58, 59, 61, 63, 64, 68, 70-73, 77, 81, 82, 89, 94, 96, 99, 102, 110.	—	1	25-127-634-506

MAIN CONTACT REPLACEMENT KIT - Kit includes complete set of main stationary and movable contacts plus contact pres springs for a three-pole contactor. Order part number 14-172-548-801.

IMPORTANT INFORMATION WHEN REPLACING ARC CHUTES



OBSOLETE ARC CHUTE (14-422-044-501)



REPLACEMENT ARC CHUTE (14)

The arc chute for type 456 contactors manufactured prior to January, 1980 and pictured at upper left is obsolete and no longer available as a replacement part.

This arc chute has been superseded with a new design which is smaller and lighter. The older design arc chute was comprised of two molded light gray halves with interleaved arc splitter fins. The newer design, shown at lower left, is made of two dark gray plastic halves which house an integral ceramic arc splitter assembly.

The two arc chute designs are interchangeable, with one very important exception - **THEY MUST NOT BE MIXED IN THE SAME CONTACTOR.** If arc chutes of different types are mixed, then interrupting duty between individual poles will be unequal causing substantial reduction in the interrupting capacity of the contactor. When contactors employing the obsolete arc chute design require replacement of one or more arc chutes, a complete set of three of the newer ceramic-type arc chutes must be ordered and installed. Similar instructions apply for two-pole contactors, except only two arc chutes are required.

TYPE 456-D DYNAMIC BRAKING CONTACTOR

The Type 456-D Dynamic Braking contactor is similar in construction to the normally-open Type 456 air-break design. The main difference is in the magnetic actuator used to open and close the main contacts, and in the fact that the entire arc interrupter assembly is omitted. Two pressure springs located below the movable contact carrier are used to hold the main contacts in the normally-closed position. Energizing the magnet coil opens the contacts against spring pressure, and the contacts will remain open until control power is removed.

Dynamic braking contactors are used to connect braking resistors across the stator winding of synchronous motors to facilitate emergency stopping. Since this contactor is supplied without arc chutes or magnetic blowouts, it must never be applied in a circuit requiring power interruption.

—WARNING—

DO NOT USE DYNAMIC BRAKE CONTACTOR IN CIRCUITS WHERE POWER INTERRUPTION IS REQUIRED.

The parts list given below for the Type 456-D contactor includes only components which are unique to the spring-closed design. To find parts not listed below, refer to the 3-pole air break contactor parts list and exploded view.

REFER TO FIGURE 10

TYPE 456-D CONTACTOR PARTS LIST - 230VAC OPERATION

ITEM	DESCRIPTION	QTY	PART NUMBER
1	Frame	1	14-423-749-001
2	Magnet Yoke and Auxiliary Contact Sub-Assembly	1	14-322-014-504
3	Movable Contact Carrier Sub-Assembly	1	14-422-045-502
4	Terminal Support	3	14-234-917-501
5	Spring	2	14-145-439-001
6	Armature	1	14-234-916-001
7	Link	1	14-173-978-001
8	Phase Barrier	2	14-145-665-001
9	Spring Guide	2	14-173-987-001
10	Rectfier (Included in Sub-Assembly Item 2)	1	25-127-144-001
11	Magnet Coil (Included in Sub-Assembly Item 2)	1	14-183-181-501

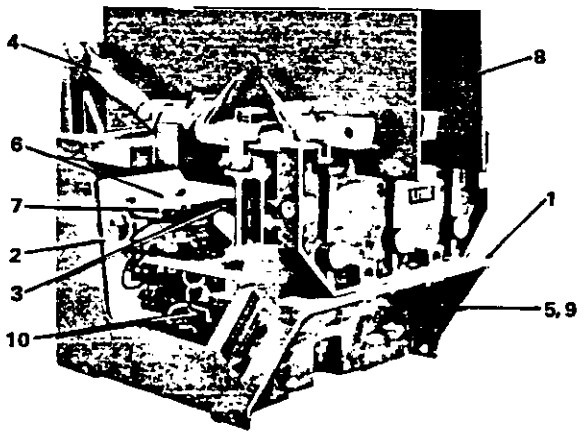
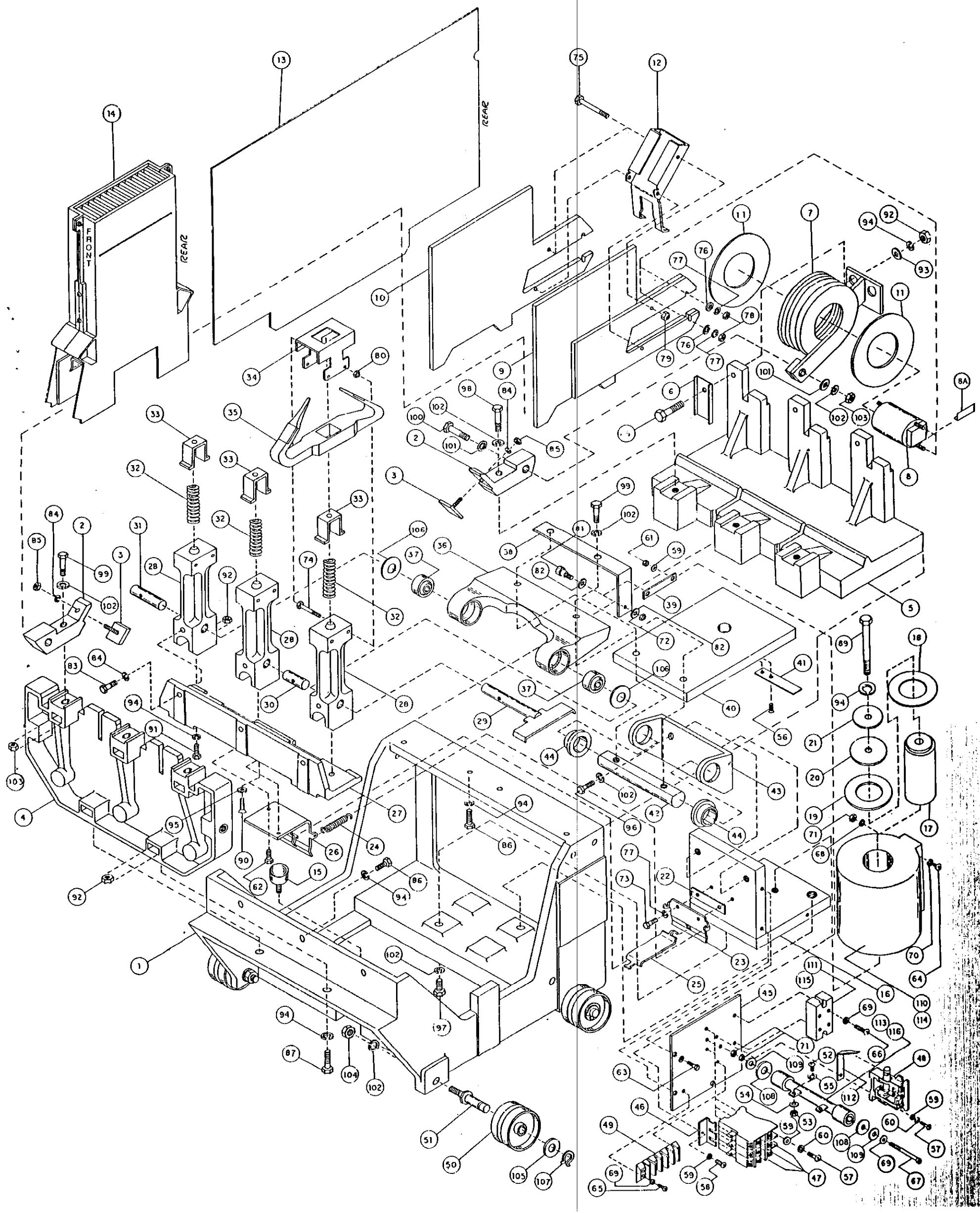
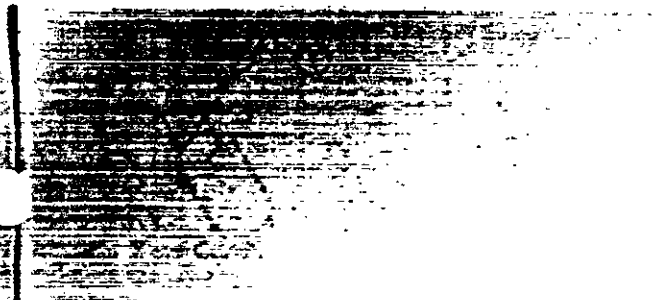


Fig. 10 - Type 456-D Dynamic Braking Contactor

FIGURE 9 - TYPE 456 CONTACTOR EXPLODED VIEW





SIEMENS

Custom Control Divis
Siemens-Allis, Inc.
Box 89
Wichita Falls, Texas