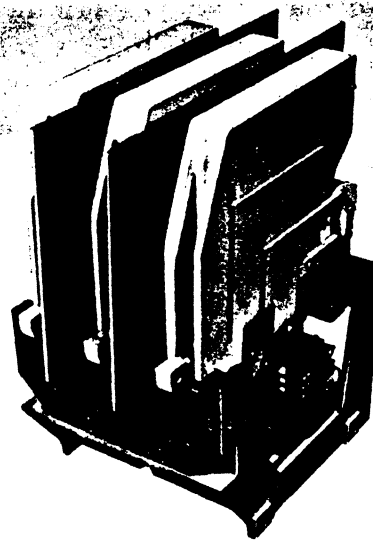


SPACE MAKER

Installation
Operation
Maintenance



CONTACTOR

 **ALLIS-CHALMERS**

20X9759E

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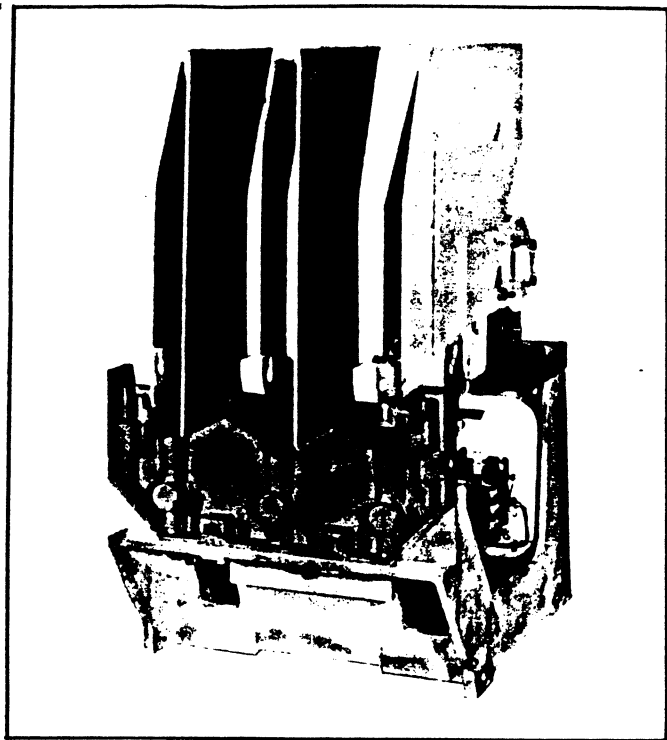


Fig. 1 – Type 456 Ac Air Break Contactor.

DESCRIPTION

The 456 high voltage, 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.

The basic contactor itself 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 provides a wedging action for higher effective contact pressures. Straight line vertical action ends the principle source of maintenance – flexible leads. Dust and dirt slide off. See Fig. 5. Item (64).

The accessibility of the contactor allows fast and convenient inspection and testing resulting in better maintenance. The type 456 contactor features front 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 push-rods, contact support blocks and other parts are constructed of molded glass polyester. All insulation in contact with high voltage current carrying parts is flame retardant and track resistant.

An auxiliary contact panel assembly consists of a silicon rectifier, three NO – NC auxiliary switches and one NC long wipe switch which are mounted on an aluminum plate for magnet operation. The auxiliary switches are operated by an auxiliary drive link from the magnet armature. See Fig. 5.

The stationary contact assemblies (2, 20, 29, and 32) are mounted on a non-conductive glass polyester support block along with the blowout coil assemblies (5). One terminal of each blowout is connected to the stationary contact assembly by means of a hex head machine screw (24).

GENERAL INFORMATION

Warranty

We warrant each new air break contactor to be free of defects in material and workmanship for a period of one year after date of shipment to the original purchaser. This warranty is limited to the furnishing of any part or parts which to our satisfaction have been proven defective.

Receiving

UNLOADING AND UNPACKING. Air break contactors are shipped completely assembled. Remove the shipping crate carefully, using nail pullers.

Inspect for damage in shipment. Upon receipt of the air contactors, remove all packing and carefully examine them to see that they have not been damaged in shipment. If signs of damage are apparent, a claim for damages should be made immediately with the transportation company.

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. If it cannot be installed immediately, it should be kept in a clean, dry place, where it will not be exposed to dirt, the action of corrosive gasses, or to other mechanical injury.

When Writing to the Factory

If it is necessary to write to Allis-Chalmers 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. Service factor; that is, length of time in service and total number of operations.
5. Voltage, current and frequency.
6. Description of how failure occurred.
7. Any other pertinent information.

INSTALLATION

Mounting

The contactor should be installed in a clean, dry place where good ventilation can be secured. It should be readily accessible for cleaning and inspection and should be carefully set up and leveled on its supporting foundation, and bolted 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, bright and smooth, and that current-carrying members are in good condition mechanically.

Installing Arc Chutes and Phase Barriers (Fig. 1 and 4)

ARC CHUTES AND PHASE BARRIERS MUST BE INSTALLED BEFORE ENERGIZING CONTACTOR.

To install arc chutes (16) slide in rear of chute first, then push down on front, then rear of chutes, making sure the arc runners are properly seated over the stationary contacts. Arc chutes are in place when groove on side of arc chute is even with the top of blowout plates (7 and 8).

Phase barriers (21) are to be installed with notch to rear. See Fig. 4.

Electrical Connections

Inspect all insulated wiring to see that no damage has resulted in installing the contactor. Test the wiring for possible grounds or short circuits. Make sure that all current-carrying parts outside the contactor have adequate current-carrying capacity and are correctly insulated in accordance with standard practice. All electrical connections should be made carefully per furnished wiring diagram. **IMPORTANT:** To obtain correct magnetic action from blowouts, connect the load wires (motor, furnace, etc.) to the terminals on the blowout coils.

MAINTENANCE

Replacing Main Contacts (Fig. 4)

When contacts require replacement, replace contacts (20) (64) and springs (74) on all three phases at the same time. To gain access to all contacts, remove two

phase barriers and all three arc chutes (16). Then swing back hinged blowout coil assemblies. All main contacts are now accessible for replacement.

Removal of Arc Chutes (Fig. 4)

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

Movable Contact Assembly (Fig. 5)

Remove hex huglock nuts (85) allowing cap screws (78) to slip out of pushrod (65). Movable contact (64) is now accessible for replacement.

Stationary Contact Assembly (Fig. 4)

First remove movable contact assembly. Remove hex head nut with lockwasher (29) (32). Stationary contact (20) may now be removed for replacement.

To Replace Magnet Coil (Fig. 5)

Remove wire connections from coil.

Loosen hex head machine screw (99).

Slide magnet assembly from the base of the yoke (34).

Machine screw (99) along with magnet core (88) can then be lifted from coil along with washer (91).

Replace coil and reassemble following the reverse procedure.

Maintenance Adjustments (Fig. 5)

Tighten auxiliary drive link (103) to coupling angle so that coupling angle is vertical and all auxiliaries operate simultaneously.

RATING TABLE

No. of Poles	Continuous Ampere Rating 8 Hr. Basis	KVA Interrupting Capacity at		Maximum Horsepower							
				2000-2500 volts				4000-5000 volts			
				Synchronous		Induction	Impulse Level (BIL)	Synchronous		Induction	Impulse Level (BIL)
		2500 v	5000 v	1.0 pf	.8 pf			1.0 pf	.8 pf		
3	400	50,000	50,000	1750	1500	1500	60 kv	3000	2500	2500	60 kv

OPERATING DATA FOR 456 CONTACTOR

	230 Volt Ac Supply (See Fig. 2)	115 Volt Ac Supply (See Fig. 2a)	250 Volt Dc Supply (See Fig. 3)	125 Volt Dc Supply (See Fig. 3)
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
Drop-out time (to contact break)	4-5 cycles	4-5 cycles	4-5 cycles	4-5 cycles
Normal inrush current	5.0 a.	10.0 a.	3.5 a.	7.0 a.
Maximum inrush current	6.5 a.	13.0 a.	4.5 a.	9.0 a.
Normal sealing current	0.2 a.	0.4 a.	0.136 a.	0.26 a.
Maximum sealing current	0.25 a.	0.5 a.	0.15 a.	0.30 a.

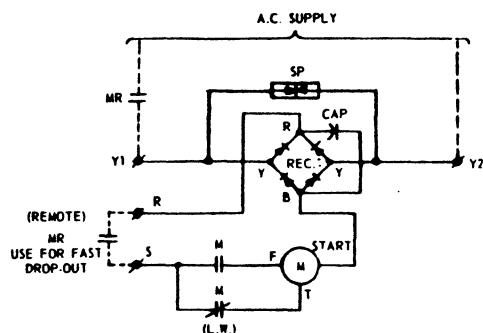


Fig. 2 - Ac Supply
Clip-in Rectifier
(Obsolete)

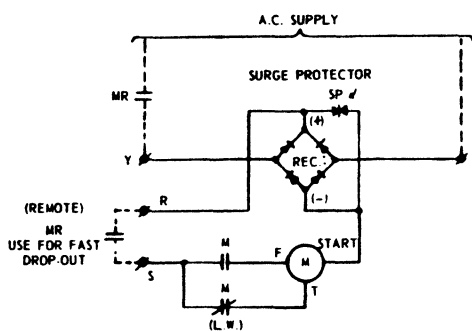


Fig. 2a - Ac Supply
New Moulded Rectifier

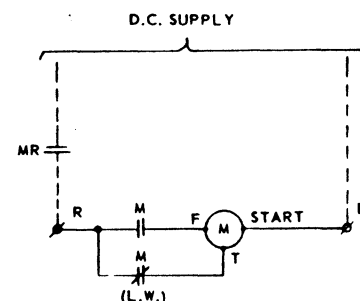


Fig. 3 - Dc Supply

TROUBLE SHOOTING CHART

Trouble	Cause	Remedy
CONTACTS Overheating of contacts.	Overload.	Reduce load.
	Insufficient contact pressure.	Clean and adjust contacts. Replace contact springs if weak and/or replace contacts if wear allowance of $\frac{3}{32}$ " per contact is used up.
	Loose connection.	Tighten.
Contact chatter or pumping.	Poor contact in control circuit.	Check all connections in control circuit.
	Improper setting of long wipe contact (between T & S in contactor coil circuit).	The N.O. contact of "M" (between F & S) 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 (36 and 37); also check leaf spring drive (94) for mechanical damage.
	Fluttering control relay such as pressure or temperature switch.	Increase wear allowance on the pilot device contacts or replace faulty contact.
	Abnormally low control voltage.	Raise voltage. Voltage must be 85% of nominal.
	Open coil.	Replace.
Short contact life.	Bounce on opening or closing.	Check operating voltage. Should not exceed nominal voltage by more than 10%.
	Improper seating of arc runners.	See instructions on installing arc chutes.
	Low voltage; magnet not sealing.	Correct voltage. Voltage must be 85% of nominal.
	Fluttering control relay such as pressure or temperature switch.	Properly adjust switch or replace.
	Excessive jogging.	Check application.
	Foreign materials in operating or contact mechanisms.	Remove.

(Chart is continued on next page)

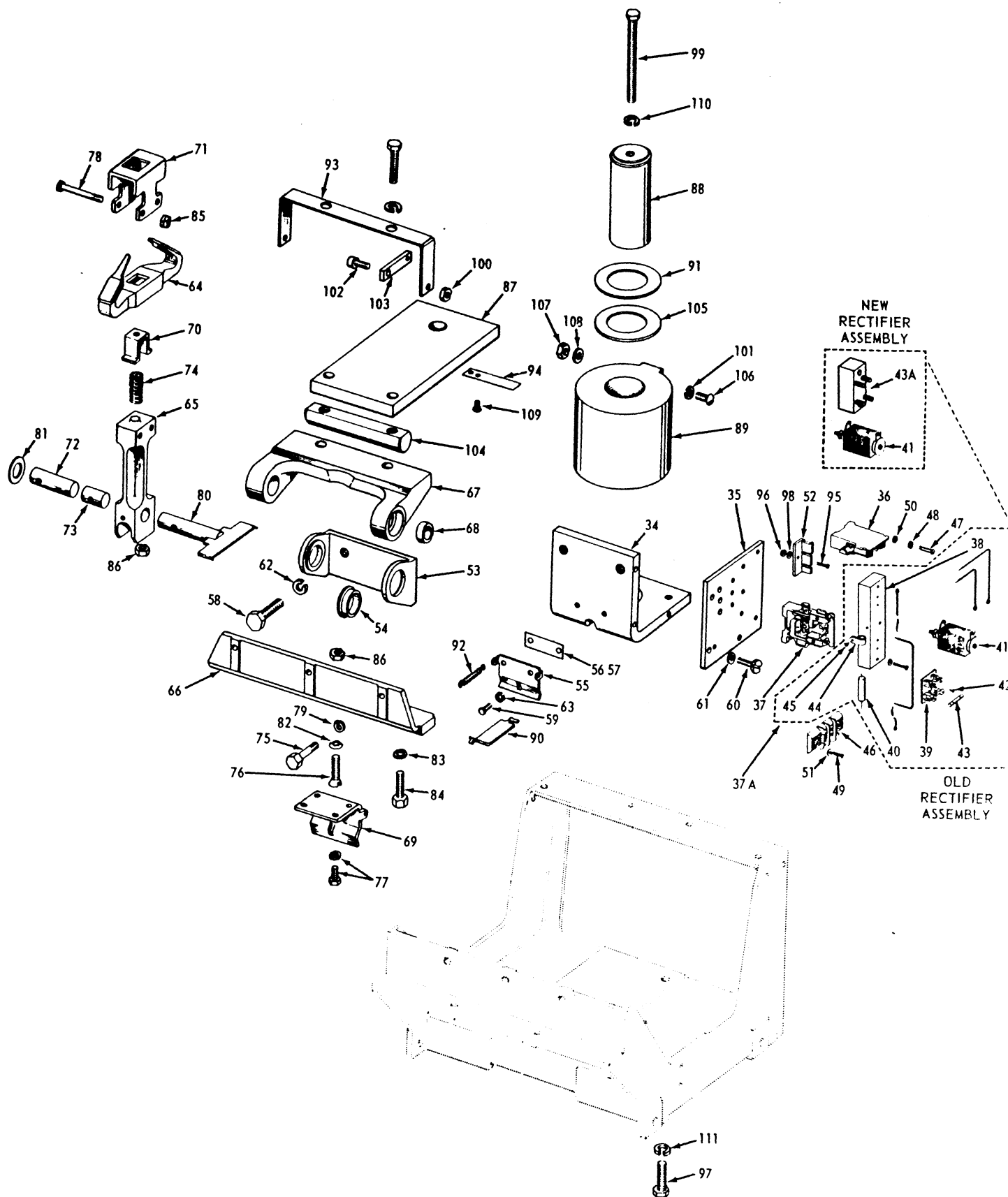
Trouble	Cause	Remedy
Weak contact pressure.	Low contact pressure.	Replace contacts and/or springs.
	Worn tips or weak contact spring.	Replace. (See 'Maintenance Adjustments'.)
Welding of contacts.	Inadequate spring pressure.	Replace springs.
	Fluttering control relay such as pressure or temperature switch	Properly adjust switch or replace.
	Low control voltage, contact may drop out part way, open on slow dips of voltage.	Improve voltage.
	Mechanical interference.	Check for mechanical binding and adjust.
	Misadjustment of mechanical interlock.	Adjust.
COIL Coil failure and/or rectifier.	Failure of magnetic circuit to close.	Check for mechanical binding of contactor.
	Mechanical injury.	Replace damaged parts.
	Excessive jogging.	Check application.
	Fluttering control relay such as pressure or temperature switch.	Properly adjust switch or replace.
	Mechanical interlock interference.	Adjust.
	Failure to long wipe contact to open.	Check leaf spring drive (94) and pole assembly (37) for mechanical damage.
	Overvoltage and/or high ambient.	Check circuit and application.
	High steady state or transient voltages.	Check circuit and application. Install item 41 (Fig. 5) if not included in original assembly.

Parts List for Frame Assembly, Stationary Contact, Blowout Pole and Coil Assembly (Fig. 4)
Type 456 Air Break Contactor (14-514-449)

Item	Description	Qty. Req'd	Part No.	Item	Description	Qty. Req'd	Part No.
1	Type 456 Air Break Contactor Frame	1	14-422-858-00-001	18	Nameplate	1	14-147-040-001
2	Stationary Contact	6	14-141-684-001	19	No. 6 x 1 1/4" Rd. Hd. Self-Top Screw	2	00-615-581-00-120
3	Stationary Contact Support Block	1	14-227-877-501	20	Stationary Contact Insert Ass'y	6	14-147-051-001
4	Stationary Contact Support Blowout Pole and Coil Ass'y	1	14-317-577-501	21	Inside Phase Barrier	2	14-133-795-001
	Includes items 5 through 15:	3	14-422-046-00-501	22	3/8" - 16 x 1 1/2" Hex Hd. Cap Screw	2	00-611-289-00-470
5	Blowout Coil Ass'y	3	14-145-386-501	23	3/4" - 16 x 1 1/2" Hex Hd. Cap Screw	7	00-611-289-00-468
6	Blowout Ass'y	3	14-230-679-501	24	1/2" - 13 x 2 1/2" Hex Hd. Cap Screw	3	00-611-289-00-556
7	Blowout Pole Ass'y R.H.	3	14-142-286-501	25	1/2" - 13 x 1 3/4" Hex Hd. Cap Screw	3	00-611-289-00-550
8	Blowout Pole Ass'y L.H.	3	14-142-286-502	26	1/2" - 13 x 2 1/4" Hex Hd. Cap Screw	5	00-611-289-00-554
9	Arc Chute Support	3	14-231-654-001	27	3/8" - 16 Hex Nut	6	00-631-059-00-106
10	Blowout Coil Washer	6	14-133-782-001	28	1/2" - 13 Hex Nut	6	00-631-003-00-108
11	3/4"-20 - 3 3/4" Hex Hd. Cap Screw	6	00-611-345-00-397	29	3/16" - 18 Hex Nut	6	00-631-059-00-105
12	1/4"-20 Hex Elastic Stop Nut	6	00-633-067-00-104	30	3/8" Lockwasher	13	00-655-017-00-032
13	1/4"-20 Hex Hd. Nut	12	00-631-059-00-104	31	1/2" Lockwasher	13	00-655-017-00-036
14	1/4" Lockwasher	12	00-655-017-00-026	32	3/16" Lockwasher	6	00-655-017-00-030
15	1/4" Flatwasher	12	00-651-007-00-146	33	3/8" Flatwasher	6	00-651-007-00-230
16	Arc Chute Ass'y	3	14-422-044-501				
17	Stop	1	14-170-322-001				

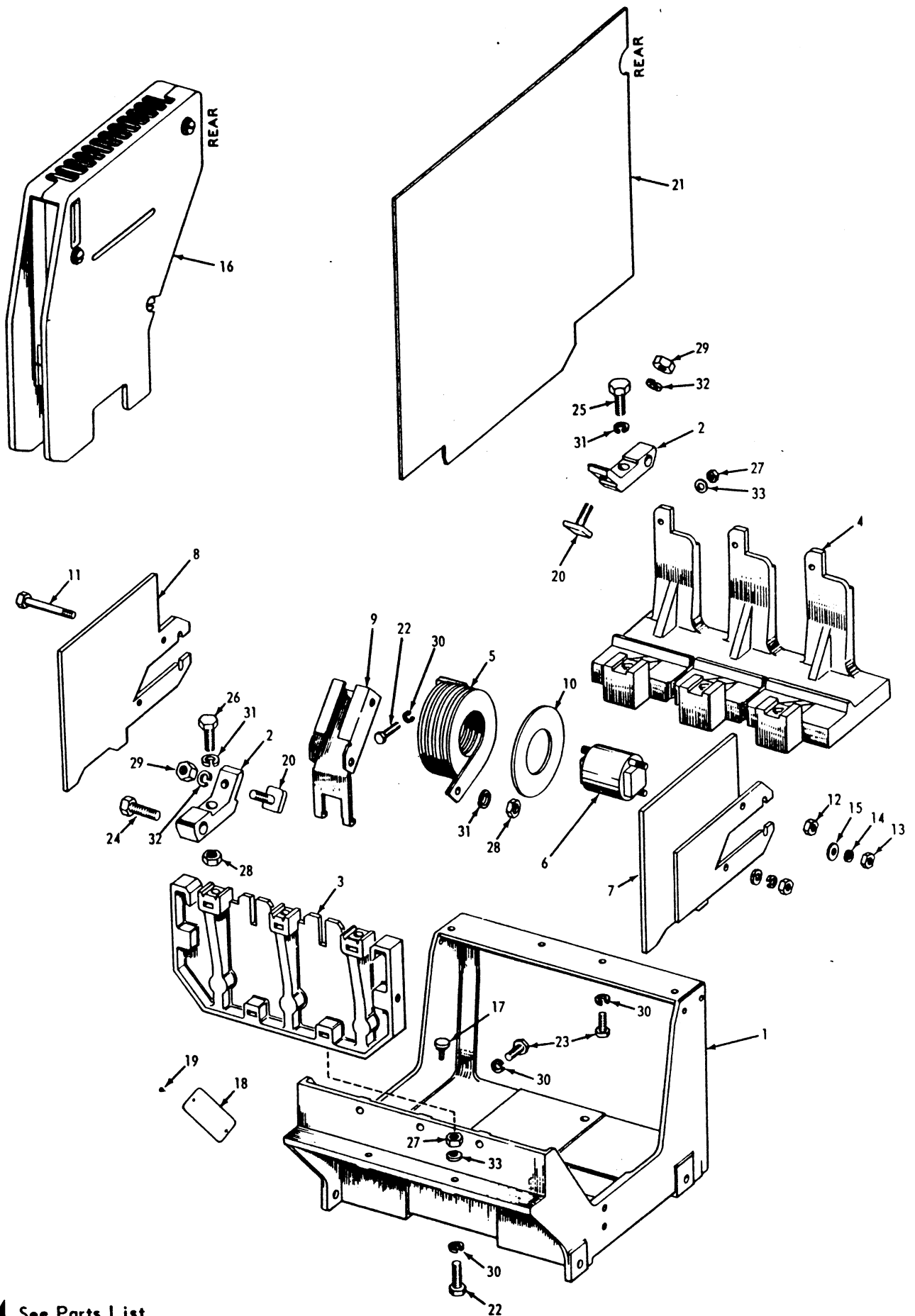
Parts List for Magnet Yoke and Auxiliary Contact Assembly (Fig. 5)
Type 456 Air-Break Contactor (14-514-449)

Item	Description	Qty. Req'd	Part No.	Item	Description	Qty. Req'd	Part No.
	Magnet Yoke and Auxiliary Contact Ass'y Includes items 34 through 63	1	14-322-014-00-501	70	Movable Contact Spring Saddle	3	14-142-157-001
34	Magnet Yoke	1	14-319-712-001	71	Movable Contact Guide	3	14-141-685-001
	Auxiliary Contact Panel Ass'y Includes items 35 thru 52	1	14-230-682-501	72	Bearing Pin	1	14-145-379-001
35	Auxiliary Contact Panel	1	14-230-680-001	73	Barrel Nut	1	14-145-379-002
36	Pole Ass'y (N.O. - N.C.)	3	14-226-593-009	74	Spring	3	14-145-668-001
37	Pole Ass'y (N.C.)	1	14-226-593-002	75	$\frac{5}{16}$ " - 18 x $1\frac{1}{4}$ " Hex Hd. Cap Screw	3	00-611-289-00-428
37A	Rectifier Panel Ass'y Includes items 38 through 45 (see item 43A)	1	14-233-666-501	76	$\frac{3}{4}$ " - 16 x $1\frac{1}{4}$ " Flat Hex Socket Hd. Machine Screw	1	00-615-087-00-468
38	Panel	1	14-172-448-001	77	No. 10 - 32 x $\frac{1}{2}$ " Hex Hd. Machine Screw w/Lockwasher	2	00-611-445-00-218
39	Rectifier Mtg. Clip	2	14-233-633-011	78	$\frac{1}{4}$ " - 20 x $2\frac{1}{4}$ " Hex Hd. Cap Screw	6	00-611-289-00-388
40	Capacitor	1	14-227-701-021	79	$\frac{5}{16}$ " Lockwasher	3	00-655-017-00-030
41	Surge Protector	1	14-237-225-00-003	80	Bearing Pin Ass'y	1	14-170-557-501
42	No. 4 x $\frac{3}{8}$ " Rd. Hd. Self-Tapping Screw	4	00-615-577-00-072	81	$\frac{3}{4}$ " Washer	2	00-651-027-00-400
43	Rectifier for Open Panel Encapsulated Rectifier (used in place of item 37A in later models, order as per original units)	4	14-233-633-010	82	$\frac{3}{4}$ " Lockwasher, Ctsk.	1	00-655-077-00-200
43A		1	14-174-031-001	83	$\frac{3}{8}$ " Lockwasher	2	00-655-017-00-032
44	Cable Clamp	1	00-857-275-00-008	84	$\frac{3}{8}$ " - 16 x $1\frac{1}{4}$ " Hex Socket Cap Screw	2	00-615-114-00-468
45	No. 10 x $\frac{3}{8}$ " Rd. Hd. Self-Tapping Screw	1	00-615-581-00-216	85	$\frac{1}{4}$ " - 20 Hex Locknut	6	00-633-225-00-104
46	Terminal Block	1	14-318-587-004	86	$\frac{3}{8}$ " - 16 Hex Nut	3	00-631-059-00-106
47	No. 8 - 32 x $\frac{5}{16}$ " Rd. Hd. Mach. Screw	4	00-615-471-00-176	87	Armature	1	14-145-381-001
48	No. 8 Lockwasher	4	00-655-017-00-020	88	Magnet Core Ass'y	1	14-142-393-501
49	No. 10 x $\frac{1}{4}$ " Rd. Hd. Self-Tapping Screw	4	00-615-581-00-222	89	Magnet Coil	1	See Chart
50	No. 8 Washer	4	00-651-027-00-072	90	Pivot Bar	1	14-230-539-001
51	No. 10 Washer	4	00-651-027-00-093	91	Washer	1	14-145-664-001
52	Coupling	1	14-145-432-001	92	Spring	2	14-145-712-001
	Bearing Housing Ass'y Includes items 53 and 54	1	14-231-652-501	93	Link	1	14-147-033-001
53	Bearing Housing	1	14-231-653-001	94	Leaf Spring Drive	1	14-145-440-001
54	Oilite Bearing	2	14-229-525-002	95	No. 8 x $\frac{3}{4}$ " Rd. Hd. Mach. Screw	1	00-615-471-00-178
55	Stationary Pivot Seat	1	14-145-322-001	96	No. 8 - 32 Elastic Stop Nut	1	00-633-125-00-108
56	Shim ($\frac{1}{16}$ ")	1	14-133-780-001	97	$\frac{1}{2}$ " - 13 x $1\frac{1}{2}$ " Hex Hd. Cap Screw	3	00-611-289-00-550
57	Shim ($\frac{1}{64}$ ")	2	14-133-780-002	98	No. 8 Washer	1	00-651-027-00-072
58	$\frac{1}{2}$ " - 13 x $1\frac{1}{4}$ " Hex Hd. Cap Screw	2	00-611-289-00-546	99	$\frac{3}{8}$ " - 16 x $5\frac{1}{2}$ " Hex Hd. Cap Screw	1	00-611-289-00-492
59	$\frac{1}{4}$ " - 20 x $\frac{7}{8}$ " Hex Hd. Cap Screw	2	00-611-289-00-377	100	No. 10 - 24 Elastic Stop Nut	1	00-633-057-00-110
60	No. 10 - 32 x $\frac{1}{2}$ " Hex Hd. Machine Screw Slotted	3	00-611-445-00-218	101	No. 10 Lockwasher	4	00-655-017-00-022
61	No. 10 Flat Washer	3	00-651-007-00-087	102	$2\frac{1}{2}$ " x $\frac{3}{8}$ " Hex Socket Hd. Cap Screw	1	00-617-349-00-248
62	$\frac{1}{2}$ " Lockwasher	2	00-655-017-00-036	103	Auxiliary Drive	1	14-170-324-001
63	$\frac{1}{4}$ " Lockwasher	2	00-655-017-00-026	104	Armature Shaft	1	14-231-651-00-001
	Movable Contact Carrier Ass'y Includes items 64 through 87	1	14-422-045-501	105	Washer	1	14-129-241-023
64	Movable Contact Ass'y	3	14-227-873-501	106	No. 10 - 32 x $\frac{1}{2}$ " Rd. Hd. Mach. Screw	3	00-615-521-00-218
65	Contact Push Rod	3	14-227-879-501	107	No. 10 - 32 Hex Nut	3	00-631-123-00-210
66	Movable Contact Carrier	1	14-321-927-002	108	No. 10 Washer	6	00-651-027-00-087
67	Contact Arm	1	14-321-928-002	109	No. 6 x $\frac{1}{4}$ " Rd. Hd. Drive Screw	2	00-615-623-00-120
68	Spherical Bearing	2	14-123-887-004	110	$\frac{3}{8}$ " Lockwasher	1	00-655-017-00-032
69	Movable Pivot Seat	1	14-145-321-001	111	$\frac{1}{2}$ " Lockwasher	1	00-655-017-00-036
				PARTS KIT			
				Type 456 Contactor Coil Chart			
				220 Volts A.C. Supply		14-183-122	
				110 Volts A.C. Supply		14-183-180	
				125 Volts D.C. Supply		14-183-181	
				250 Volts D.C. Supply		14-183-182	



See Parts List
Page 7

Fig. 5 - Magnet Yoke and Auxiliary Contact Assembly.



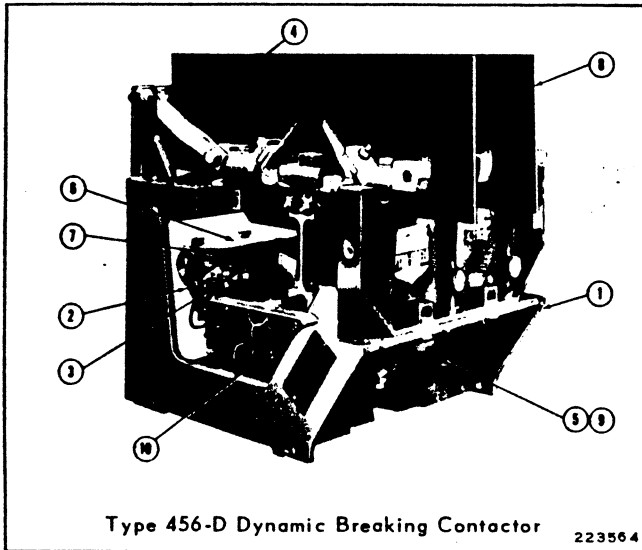
See Parts List
Page 6

Fig. 4 - Frame Assembly, Stationary Contact, Blow Out Pole and Coil Assembly.

TYPE 456 DYNAMIC BREAKING CONTACTOR

14-519-296

PARTS LIST FOR 456-D CONTACTOR



Item	Description	Qty. Req'd	Part No.
1	Frame	1	14-423-749-00-001
2	Magnet Yoke and Aux. Contact Assembly	1	14-322-014-00-504
3	Movable Contact Carrier Assembly	1	14-422-045-00-502
4	Terminal Support	3	14-234-917-00-501
5	Spring	2	14-145-439-00-001
6	Armature	1	14-234-916-00-001
7	Link	1	14-173-978-00-001
8	Inside Phase Barrier	2	14-145-665-00-001
9	Spring Guide	2	14-173-987-00-001
10	Rectifier	1	14-184-116-00-001

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