ALLIS-CHALMERS

INSTRUCTIONS

For Installation
Operation
Maintenance

SPACE MAKER
Type 456
CONTACTOR

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INTRODUCTION

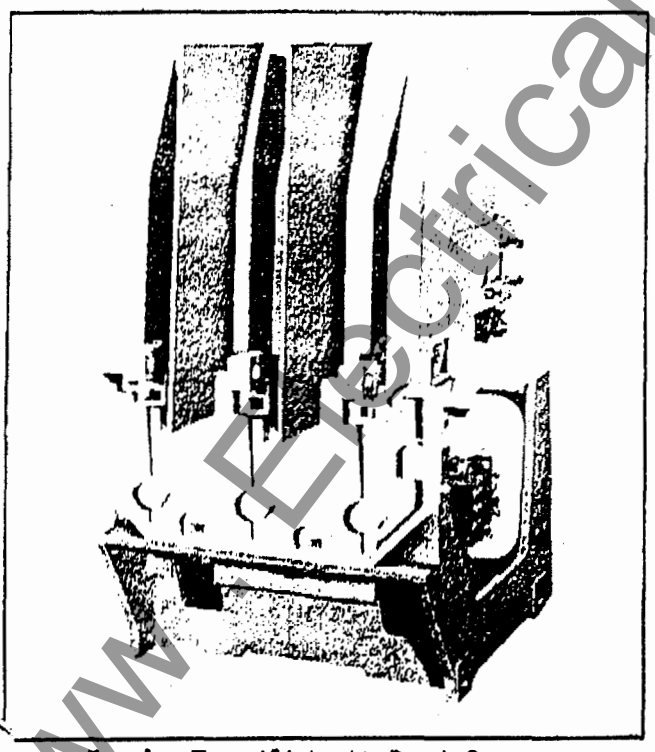

Fig. 1 – Type 456 Ac Air Break Contactor

DESCRIPTION

The 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.

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 also 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.

The accessibility of the contactor allows fast and convenient inspection and testing resulting in better maintenance. 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.

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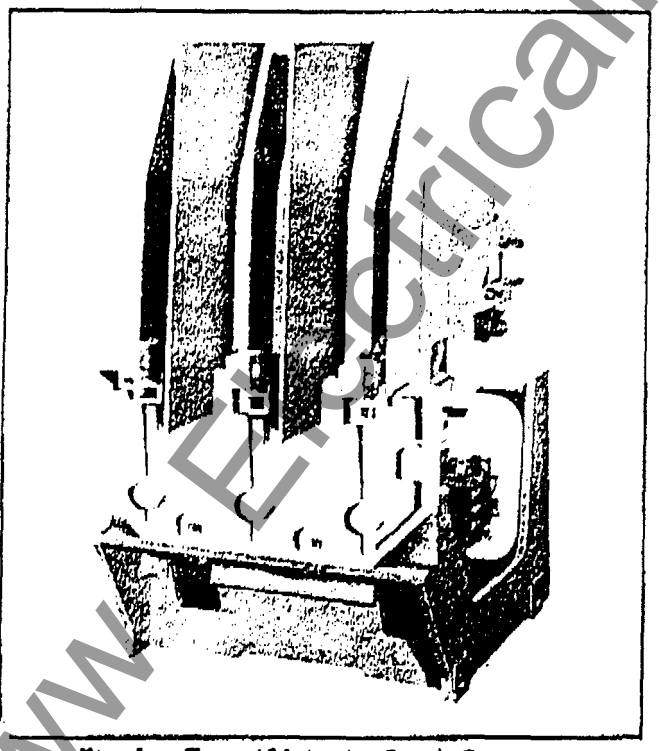

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The supporting base is of cast aluminum. The push-rods, contact support blocks and other parts are con-

structed of molded glass polyester. All insulation in contact with high voltage current carrying parts is flame retardent 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 are mounted on a non-conductive glass polyester support block along with the blowout coil assemblies. One terminal of each blowout is connected to the stationary contact assembly.

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.

If signs of damage are apparent, a claim for damage should be made immediately with the transportatic company.

STORING. If the contactor can be set up immediatel in its permanent location, it is advisable to do so, eve though it may not be placed in operation for some time If it cannot be installed immediately, it should be kep 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 occured.
7. Any other pertinent information.

INSTALLATION

Mounting

The contactor should be installed in a clean dry 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 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 & 5)

When contacts require replacement, replace contacts (20) and (59) and springs (69) 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 (80) allowing cap screws (73) to slip out of pushrod (60). Movable contact (59) is now accessible for replacement.

Stationary Contact Assembly (Fig. 4)

First remove movable contact assembly. Remove hex head nut with lockwasher (30) (33). 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 (94).

Slide magnet assembly from the base of the yoke (35). Machine screw (94) along with magnet core (83) can then be lifted from coil along with washer (86).

Replace coil and reassemble following the reverse procedure.

Maintenance Adjustments (Fig. 5)

Tighten auxiliary drive link (98) to coupling angle so that coupling angle is vertical and all auxiliaries operate simultaneously.

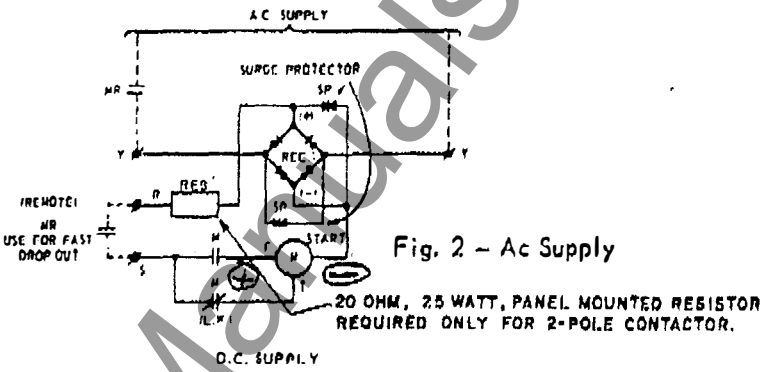


Fig. 2 – Ac Supply

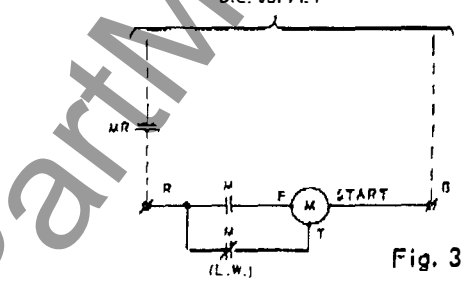


Fig. 3 – Dc Supply

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. 2)	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
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	5.0 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.

* Not Available

TROUBLE SHOOTING CHART

Trouble	Cause	Remedy
CONTACTS	Overload.	Reduce load.
Overheating of contacts.	Insufficient contact pressure.	Clean and adjust contacts. Replace contact springs if weak and/or replace contacts if wear allowance of 1/32" 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" 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 (37 and 38); also check leaf spring drive (89) 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.
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.

(Chart is continued on next page)

(Continued from page 5)

Trouble	Cause	Remedy
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 (89) and pole assembly (38) for mechanical damage.
	Overvoltage and/or high ambient.	Check circuit and application.
	High steady state or transient voltages.	Check circuit and application. Install item 39 (Fig. 5) if not included in original assembly.

Parts List for Type 456 Air Break Contactor (14-514-449)

Item	Description	Qty. Req'd	Part No.
1	Type 456 Air Break Contactor Frame	1	14-422-858-001
2	Stationary Contact	6	14-141-684-001
3	Stationary Contact Support Black	1	14-227-877-501
	Stationary Contact Support	1	14-317-577-501
4A	Support Bar	3	25-120-957-002
	Blowout Pole and Coil Ass'y Includes Items 5 through 15:	3	14-422-046-501
5	Blowout Coil Ass'y	3	14-145-386-501
6	Blowout Ass'y	3	14-230-679-501
7	Blowout Pole Ass'y R.H.	3	14-142-286-501
8	Blowout Pole Ass'y L.H.	3	14-142-286-502
9	Arc Chute Support	3	14-231-654-001
10	Blowout Coil Washer	6	14-133-782-001
11	¼"-20 – 3¾" Hex Hd. Cap Screw	6	15-171-230-001
12	¼"-20 Hex Elastic StopNut	6	00-633-067-00-104
13	¼"-20 Hex Hd Nut	12	00-631-059-00-104
14	¼" Lockwasher	12	00-655-017-00-026
15	¼" Flatwasher	12	00-651-007-00-146
16	Arc Chute Ass'y	3	14-422-044-501
17	Stop	1	14-170-322-001
18	Nameplate	1	14-147-040-001
19	No. 6 x 1¼" Rd. Hd. Self-Tap Screw	2	00-615-581-00-120
20	Stationary Contact Insert Ass'y	6	14-147-051-501
21	Inside Phase Barrier	2	14-133-795-001
22	⅜" – 16 x 1½" Hex Hd. Cap Screw	2	00-611-289-00-470
23	⅜" – 16 x 1¾" Hex Hd. Cap Screw	4	00-611-289-00-472
24	¼" – 16 x 1¼" Hex Hd. Cap Screw	7	00-611-289-00-468
25	½" – 13 x 2½" Hex Hd. Cap Screw	3	00-611-289-00-556
26	½" – 13 x 1¾" Hex Hd. Cap Screw	3	00-611-289-00-550
27	½" – 13 x 2¼" Hex Hd. Cap Screw	5	00-611-289-00-554
28	¼" – 16 Hex Nut	6	00-631-059-00-104
29	½" – 13 Hex Nut	6	00-631-003-00-108
30	⅜" – 16 Hex Nut	6	00-631-059-00-106
31	¼" Lockwasher	14	00-655-017-00-032
32	½" Lockwasher	13	00-655-017-00-036
33	⅜" Lockwasher	6	00-655-017-00-030
34	¾" Flatwasher	6	00-651-007-00-230
	Magnet Yoke and Auxiliary Contact Ass'y Includes Items 35 through 58	1	14-322-014-501
35	Magnet Yoke	1	14-319-712-001
	Auxiliary Contact Panel Ass'y Includes Items 36 thru 48	1	14-230-682-501
36	Auxiliary Contact Panel	1	14-230-680-001
37	Pole Ass'y (N.O. – N.C.)	3	14-226-593-009
38	Pole Ass'y (N.C.)	1	14-226-593-002
39	Surge Protector	2	26-204-874-002
40	Encapsulated Rectifier (order as per original units)	1	14-174-031-001
41	Terminal Block	1	00-857-035-00-041
42	No. 8 – 32 x ⅝" Rd. Hd. Mach. Screw	4	00-615-471-00-176
43	No. 8 Lockwasher	4	00-655-017-00-020
44	No. 10 x ¾" Rd. Hd. Self-Tapping Screw	4	00-615-581-00-222
45	No. 8 Washer	4	00-651-027-00-072
46	No. 10 Washer	6	00-651-027-00-093
47	No. 10 – 1½" Lg. Rd. Hd. Self-Tap Screw	2	00-615-581-00-227
48	Coupling	1	14-145-432-001
	Bearing Housing Ass'y Includes Items 53 and 54	1	14-231-652-501
49	Bearing Housing	1	14-231-653-001
50	Oilite Bearing	2	00-815-081-00-126
51	Stationary Pivot Seat	1	14-145-322-001
52	Shim (1/64")	2	14-133-780-002
53	½" – 13 x 1¼" Hex Hd. Cap Screw	2	00-611-289-00-546

Item	Description	Qty. Req'd	Part No.
54	¼" – 20 x ⅞" Hex Hd. Cap Screw	2	00-611-289-00-377
55	No. 10 – 32 x ½" Hex Hd Machine Screw Slotted	3	00-611-445-00-218
56	No. 10 Flat Washer	3	00-651-007-00-087
57	½" Lockwasher	2	00-655-017-00-036
58	¼" Lockwasher	2	00-655-017-00-026
	Movable Contact Carrier Ass'y Includes items 59 thru 81	1	14-422-045-501
59	Movable Contact Ass'y	3	14-227-873-501
60	Contact Push Rod	3	14-227-879-002
61	Movable Contact Carrier	1	14-321-927-002
62	Contact Arm	1	14-321-928-002
63	Spherical Bearing	2	14-123-887-004
64	Movable Pivot Seat	1	14-145-321-001
65	Movable Contact Spring Saddle	3	14-142-157-001
66	Movable Contact Guide	3	14-141-685-001
67	Bearing Pin	1	14-145-379-001
68	Barrel Nut	1	14-145-379-002
69	Spring	3	14-145-668-001
70	5/16" – 18 x 1¾" Hex Hd. Cap Screw	3	00-611-289-00-428
71	¼" – 16 x 1¼" Flat Hex Socket Hd. Machine Screw	1	00-615-087-00-468
72	No. 10 – 32 x ½" Hex Hd. Machine Screw w/Lockwasher	2	00-611-445-00-218
73	¼" – 20 x 2¼" Hex Hd. Cap Screw	6	00-611-289-00-388
74	5/16" Lockwasher	3	00-655-017-00-030
75	Bearing Pin Ass'y	1	14-170-557-501
76	¾" Washer	2	00-651-027-00-400
77	¼" Lockwasher, Ctsk.	1	00-655-077-00-200
78	⅜" Lockwasher	2	00-655-017-00-032
79	¼" – 16 x 1¼" Hex Socket Cap Screw	2	00-615-114-00-468
80	¼" – 20 Hex Locknut	6	00-633-225-00-104
81	⅜" – 16 Hex Nut	3	00-631-059-00-106
82	Armature	1	14-145-381-001
83	Magnet Core Ass'y	1	14-142-161-001
84	Magnet Coil	1	See Chart
85	Pivot Bar	1	14-230-539-001
86	Washer	1	14-171-157-013
87	Spring	2	14-145-712-001
88	Link	1	14-147-033-001
89	Leaf Spring Drive	1	14-145-440-001
90	No. 8 x ½" Rd. Hd. Mach. Screw	1	00-615-471-00-178
91	No. 8 – 32 Elastic Stop Nut	1	00-633-125-00-108
92	½" – 13 x 1½" Hex Hd. Cap Screw	2	00-611-289-00-548
93	No. 8 Washer	1	00-651-027-00-072
94	⅜" – 16 x 5½" Hex Hd. Cap Screw	1	00-611-289-00-492
95	No. 10 – 24 Elastic Stop Nut	1	00-633-057-00-110
96	No. 10 Lockwasher	4	00-655-017-00-022
97	¼" x ⅜" Hex Socket Hd. Shoulder Screw 10-24 x 3/8"	1	00-617-349-00-248
98	Auxiliary Drive	1	14-170-324-001
99	⅜" Washer	2	00-651-007-00-087
100	Armature Shaft	1	14-231-651-001
101	Washer	1	14-179-558-001
102	No. 10 – 32 x ½" Rd. Hd. Mach. Screw	3	00-615-521-00-218
103	No. 10 – 32 Hex Nut	3	00-631-123-00-210
104	No. 10 Washer	6	00-651-027-00-087
105	No. 6 x ¼" Rd. Hd. Drive Screw	2	00-615-623-00-120
106	⅛" Lockwasher	1	00-655-017-00-032
107	½" Lockwasher	2	00-655-017-00-036
118	Washer Plastic	1	14-426-664-001
119	Washer Neoprene	1	14-129-241-023
120	Stop	1	14-170-322-001
	MAIN CONTACT REPLACEMENT KIT (3-pole)	1	14-172-548-801

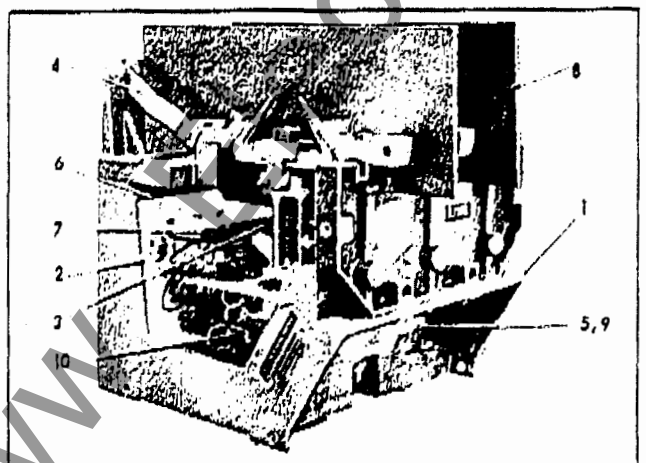
Type 456 Contactor Coil Chart

230 Volts A.C. Supply	14-183-122-501
125 Volts D.C. Supply	14-183-181-501
250 Volts D.C. Supply	14-183-182-501

Two Pole contactor is made similarly to the three pole version pictured and described below.

TYPE 456 DYNAMIC BRAKING CONTACTOR

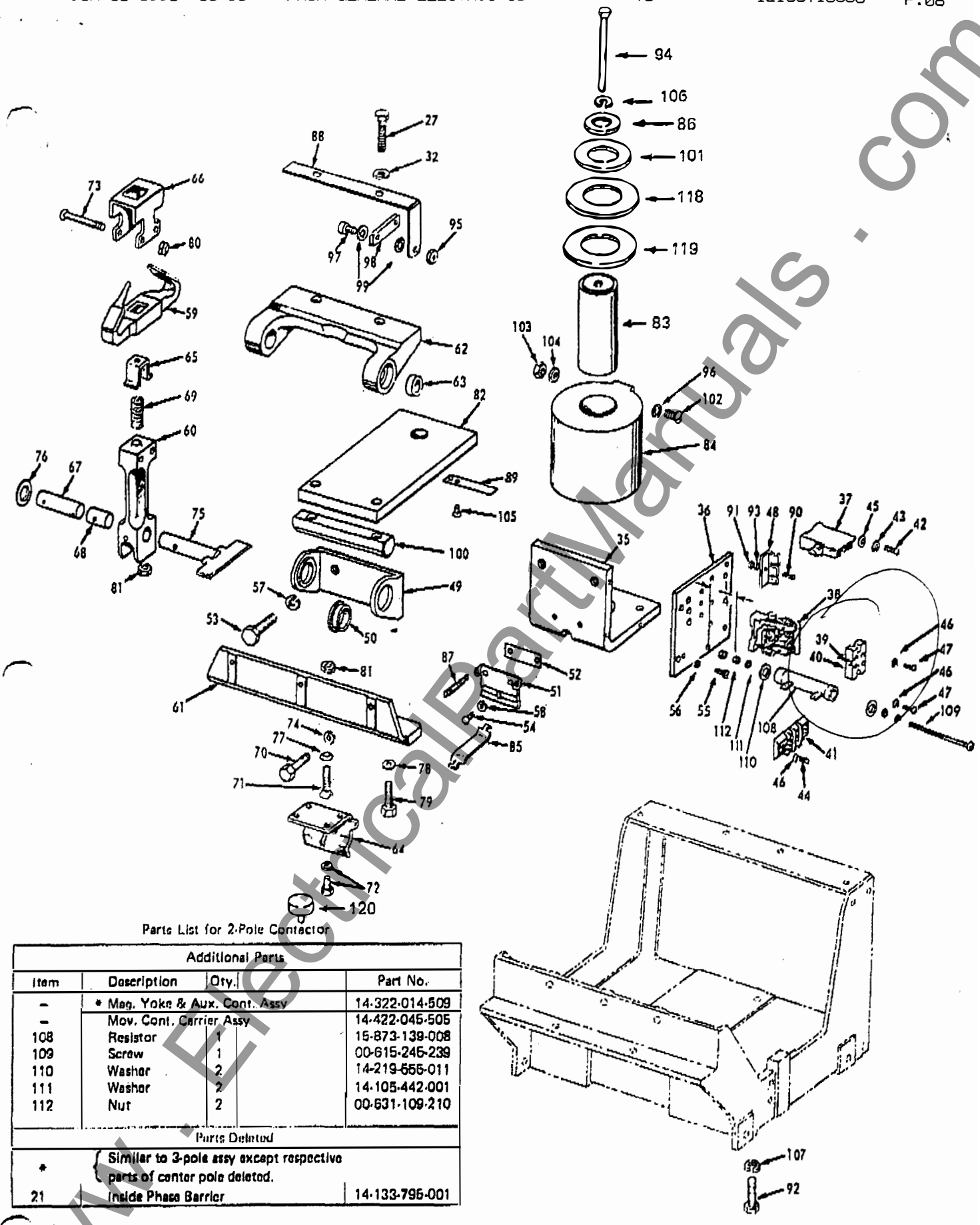
14-519-296-501



Type 456-D Dynamic Braking Contactor 223864

PARTS LIST FOR 456-D CONTACTOR

Item	Description	Qty. Req'd	Part No.
1	Frame	1	14-423-749-001
2	Magnet Yoke and Aux. Contact Assembly	1	14-322-014-504
3	Movable Contact Carrier 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	Inside Phase Barrier	2	14-145-665-001
9	Spring Guide	2	14-173-987-001
10	Rectifier	1	14-174-031-001



Parts List for 2-Pole Contactor

Additional Parts			
Item	Description	Qty.	Part No.
–	* Mag. Yoke & Aux. Cont. Assy		14-322-014-509
–	Mov. Cont. Carrier Assy		14-422-045-505
108	Resistor	1	15-873-139-008
109	Screw	1	00-615-245-239
110	Washer	2	14-219-655-011
111	Washer	2	14-105-442-001
112	Nut	2	00-631-109-210
Parts Deleted			
*	Similar to 3-pole assy except respective parts of center pole deleted.		
21	Inside Phase Barrier		14-133-795-001

See Parts List

Fig. 5 – Magnet Yoke and Auxiliary Contact Assembly.

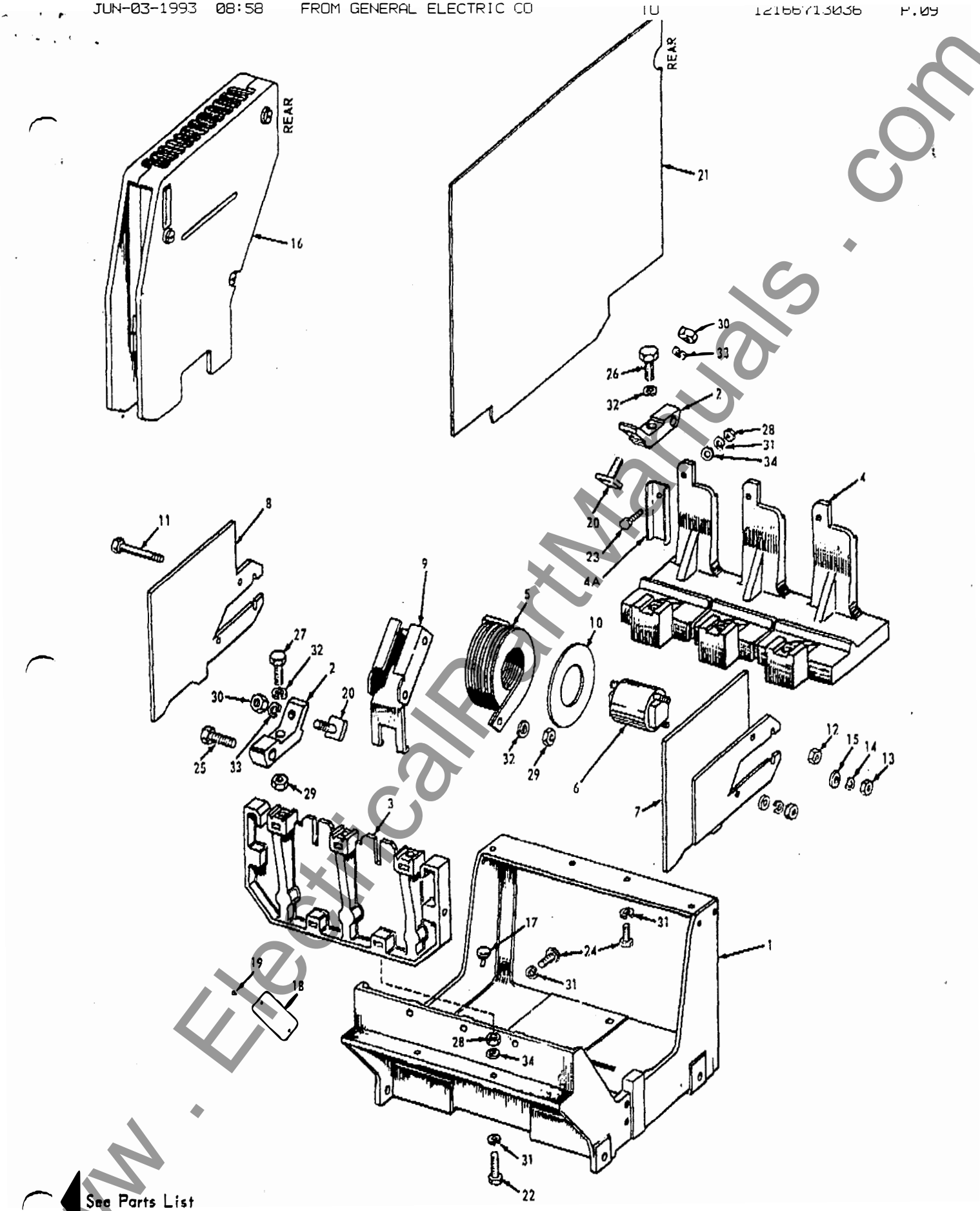


Fig. 4 – Frame Assembly, Stationary Contact, Blow Out Pole and Coil Assembly.