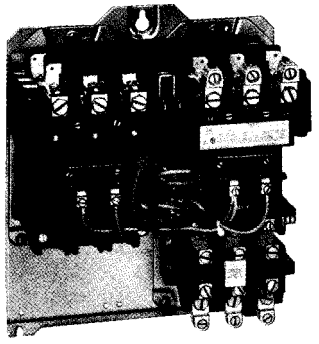
FULL VOLTAGE REVERSING STARTERS
Size 2 I Series A Construction



Size 2

OPERATION — Bulletin 505 starters are most commonly used for full voltage starting and reversing of polyphase squirrel cage motors.

Bulletin 505 starters consist essentially of a "forward" and a "reverse" contactor mounted to a common base. These contactors are electrically and mechanically interlocked to guard against both contactors closing at the same time.

Starters are equipped with Bulletin 592 block type manual reset overload relays.

OPERATING ENVIRONMENT — Starters should always be maintained in a clean and dry condition for dependable operation. Choice of the proper NEMA enclosure type for the application is very important.

REPAIRS-starters can be disassembled as depicted in the "exploded" illustration on Page 4. Additionally the following procedures and techniques are suggested to aid in the sequential disassembly and reassembly of a motor starter.

WARNING — Before part replacements are attempted the POWER SOURCE MUST BE DISCONNECTED.

NOTE — If parts are removed from both contactors, keep them separate and replace them in their original positions, if reused, to avoid mismatched wear patterns.

DISASSEMBLY (Partial) — It is not necessary to remove the starter from its enclosure or to remove the line wiring. The following instructions apply to both the left hand and right hand contactors.

1. Remove all control wires from the operating coil (item 7) and tie point terminal (item 5).
2. Loosen two captive screws and lift off the contact block cover (item 1).
3. Loosen four captive screws from the coil cover (item 4). The tie point terminal is now free to be removed, if it is to be replaced.
4. With the coil cover screws loosened the auxiliary contact block(s) (item 6) can be removed and the coil cover lifted off.
5. Lift out the movable contact support and armature assembly (item 2), the yoke (item 8) and the operating coil (item 7) as a unit. The yoke and the operating coil can now be lifted up and out of the movable contact support assembly.

REPLACING CONTACTS — With steps I-5 under DISASSEMBLY completed inspect the contact surfaces for evidence of wear. When severe contact wear is evidenced it is recommended that all contacts be replaced. Replacing all contacts will guard against uneven and unequal contact closings. Order the required number of single pole contact sets from the part listings on Page 4. Follow steps I-5 under DISASSEMBLY.

MOVABLE CONTACTS — The following instructions describe the replacement of movable contacts.

1. Remove the movable contact (item 9) by depressing the contact spring (item 10) and pushing the contact out to either side. The contact spring will fall free or can be lifted out.
2. Hold the replacement spring and contact in one hand as shown in Figure 1.
3. Seat the contact spring over the "seating projection" on the movable contact support assembly. Slip the movable contact and spring into position in the opening on the movable contact support assembly.
4. Check to determine that the spring is holding the contact centered.

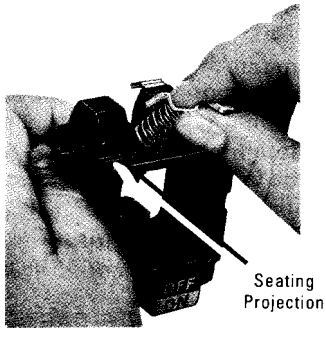


Figure 1

FRONT STATIONARY CONTACTS-The mounting screws that secure the front stationary contacts (item 11) are accessible from the front and are located directly below and to the back of the front terminal assemblies.

1. Loosen and remove the screw and lift out the contact.
2. Install the replacement contact (front and rear stationary contacts are identical) and tighten the contact mounting screw securely (approximately 14-17 inch pounds).

REAR STATIONARY CONTACTS -The mounting screws that secure the rear stationary contacts (item 12) are accessible from the top and are located at an angle in the cavities directly behind the front terminal assemblies.

1. Loosen and remove the mounting screw while holding the contact with a finger from within the contact block assembly.
2. Push the loose contact up and out with the holding finger or allow it to drop down. It may be necessary to push the contact down from the top with a screwdriver.

3. Install the replacement contact from the top catching it from within the contact block assembly with a finger.
4. Insert the mounting screw and tighten securely (approximately 14-17 inch pounds).

REPLACING THE STATIONARY CONTACT BLOCK AND BASE ASSEMBLY-The block and base assembly (item 3) can be removed from a partially disassembled starter if necessary. First follow steps 1-5 under DISASSEMBLY.

1. Remove the line wiring and both front and rear power wiring interconnector assemblies (item 16).
2. The right hand contactor block and base assembly is connected, by bus, to the overload relay. Loosen but do not remove the three terminal screws that connect the block and base assembly to the overload relay. (This is not necessary on the left hand contactor).
3. Each block and base assembly is secured to the mounting plate (item 19) by three #10-32 x .719" Phillips pan head mounting screws with washers (item 15). Remove these screws and the stationary contact block and base assembly (item 3) can be lifted up and out while tilting it slightly to the outside to clear the projection on the mechanical interlock.
4. If new contacts are not being installed, remove stationary contacts **one at a time** from the old block and base assembly and install them in the same positions in the new assembly (see instructions under REPLACING CONTACTS. Follow those instructions also if installing new contact sets).
5. Install the replacement block and base assembly and secure with the three screws with washers and tighten securely (approximately 20-26 inch pounds).
6. Retighten terminal screws to overload relay bus on the right hand contactor securely (approximately 30-40 inch pounds).
7. Reconnect line wiring and front and rear power wiring interconnector assemblies.

REPLACING THE OVERLOAD RELAY -The overload relay (item 13) is connected to both the block and base assembly (item 3) and load lines.

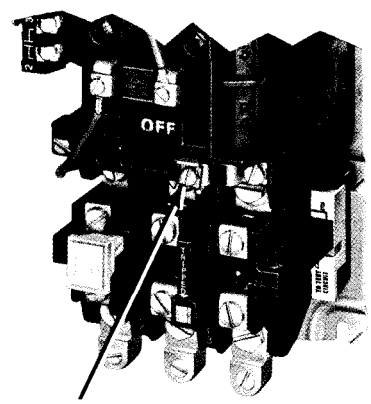
1. Remove the control wire(s) from the overload relay.
2. Remove the load wiring from the overload relay terminals.
3. Loosen but do not remove the three terminal screws that connect the overload relay bus to the block and base assembly, approximately 3 turns.
4. The overload relay is secured to its mounting plate by two #8-32 x 1/2" pan head mounting screws with washers. Remove these screws, lift the overload relay away from the mounting plate, then slide it down and out.
5. The replacement overload relay will be furnished secured to a mounting plate. Remove and discard the mounting plate. install the replacement overload relay being sure the bus connects properly to the terminals on the stationary contact block and base assembly. Secure the overload relay to the mounting plate with the two previously removed screws with washers **(NOTE:** Place the flat washers next to the molded plastic part). Tighten securely (approximately 20 inch pounds).
6. Retighten securely the three terminal screws to overload relay bus (approximately 30-40 inch pounds).
7. Reconnect control and load wiring.

OVERLOAD RELAY TEST MODULE -The overload relay is equipped with a test module (item 14), on the right hand side, that allows opening the normally closed overload contact for test purposes, without tripping the relay.

1. To remove use an appropriate size screwdriver. Hold the blade vertically and insert the screwdriver tip into the slot, provided on the test module, to the point where it "bottoms". Refer to Figure 7 on Page 5.
2. Slide the test module out to the right.
3. Slide the replacement test module into place and press firmly until it locks in place.

REASSEMBLY — The reassembly process is basically the disassembly procedures in the reverse order.

1. Insert the yoke into the operating coil. It is keyed and will fit only one way.
2. Insert the yoke and operating coil into the movable contact support assembly.
3. Insert all three parts as a unit into the stationary contact block and base assembly.
4. Replace the coil cover. Check the tie point terminal for proper position as shown in Figure 2 below. Tighten the coil cover screws securely (approximately 14-17 inch pounds).
5. Replace contact block cover and tighten screws securely (approximately 8-10 inch pounds).
6. Install the auxiliary contact block(s). Refer to detailed instructions on Page 5.



Proper Tie Point Terminal Position

Figure 2

REMOVAL OF MECHANICAL LOAD BALANCER — The movable contact support and armature assembly must be completely open (the word "OFF" totally visible).

1. Loosen the two captive screws and lift off the contact block cover.
2. Remove the load balancer by pivoting the bottom of the balancer housing away from the contactor and lifting up and off.

REPLACING MECHANICAL LOAD BALANCER — The movable contact support and armature assembly must be completely open (the word "OFF" totally visible). The contact block cover must be removed.

1. Hold load balancer at an angle, hooking the three tabs located along the top side edge into the groove provided on the top edge of the stationary contact block. See Figure 3.
2. Push the load balancer toward the contactor mounting plate as far as possible.
3. Exert pivotal force near the bottom of the load balancer "snapping" it in place.

IMPORTANT — Always replace the contact block cover and torque the two captive screws securely (8-10 in. lbs.) The contact block cover secures the load balancer in its final position.

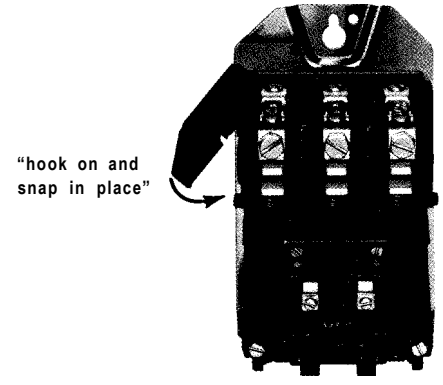


Figure 3

REPLACING MECHANICAL INTERLOCK —

1. Remove all control wiring from left hand contactor.
2. Loosen the front power wiring interconnector assembly screws on the left hand contactor.
3. Remove rear power wiring interconnector assembly completely.
4. The left hand contactor is secured to the starter mounting plate by three #10-32 x 15/64" Tensil-Lock pan head screws. Remove these screws and lift the contactor off of the mounting plate.
5. Loosen the coil cover on the right hand contactor and remove the auxiliary contact block used for electrical interlocking. Retighten coil cover screws securely (approximately 14-17 in. lbs.).
6. The mechanical interlock is secured to the mounting plate by two **#10-32** x 15/64" Tensil-Lock pan head screws. Remove these screws and lift off the mechanical interlock.
7. Install the replacement mechanical interlock.

IMPORTANT — Be sure the "projection" on the right side of the mechanical interlock is inserted into the slot in the stationary contact block of the right hand contactor and the cam rests on top of the movable contact support. (See Figure 4).

Secure the mechanical interlock to the mounting plate with the two previously removed screws and tighten securely (approximately 24 to 29 in. lbs.).

8. Replace the auxiliary contact block used for electrical interlocking on the right hand contactor, position PI. See page 5 for installation instructions.
9. Replace the left hand contactor to the mounting plate.

IMPORTANT — Be sure the "projection" on the left side of the mechanical interlock is inserted into the slot in the stationary contact block of the left hand contactor and the cam rests on top of the movable contact support. (See Figure 4).

Secure the contactor to the mounting plate with the three previously removed screws and tighten securely (approximately 24 to 29 in. lbs.).

10. Replace the rear power wiring interconnector assembly and tighten the front and rear power wiring interconnector assembly screws securely (approximately 14 to 17 in. lbs.).
11. Reconnect all control wiring.

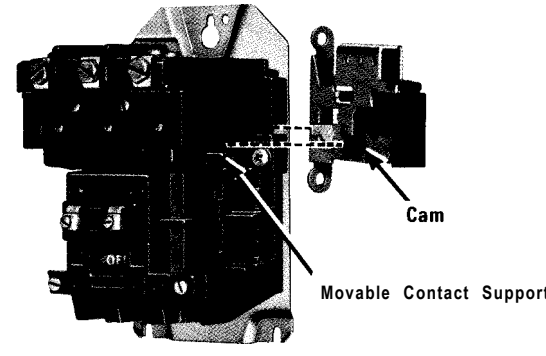


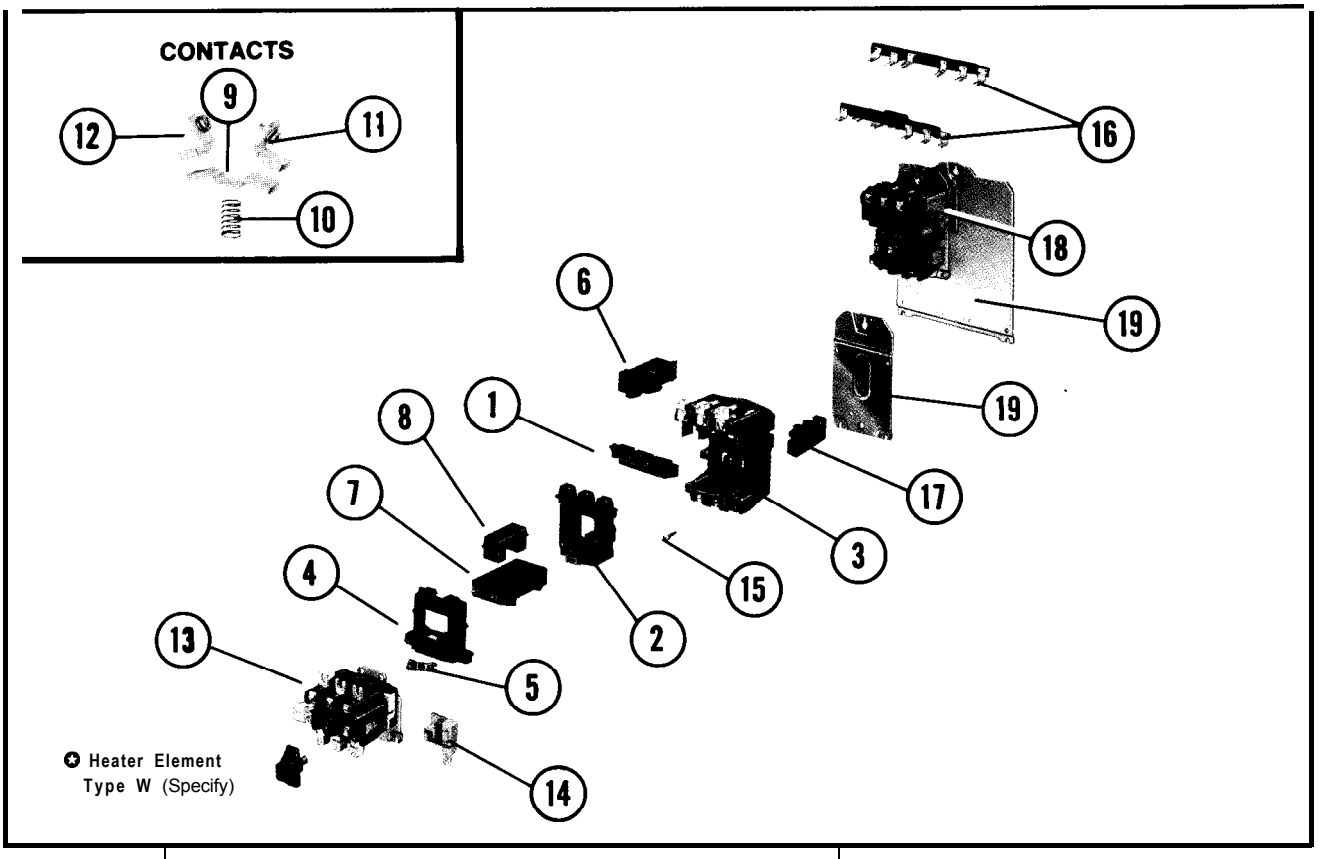
Figure 4

✪ 1 OPERATING COILS

Coil AC Voltage Range	Frequency Hz.	Coil Number
24	60	CC013
115-120	60	CC236
110	50	
110-115	50	cc322
ZOO-208	60	cc249
220-230	50	cc339
230-240	60	CC254
	50	CC342
380	50	cc354
415	50	cc357
440-460	50	CC360
460-480	60	CC273
500	50	CC364
575-600	60	CC278

For coils other than those listed specify coil number and complete rating found'on coil's identification label.

NOTE — Parts indicated with ✪ are recommended spare parts.



Item	Description of Part	Part Number
1	Contact Block Cover	40420-499-01
1 2	Movable Contact Support and Armature Assembly	**40420-498-01**
0 3	Right Hand Stationary Contact Block and Base Assembly	40420-495-02
	Left Hand Stationary Contact Block and Base Assembly	40420-496-02
4	Coil Cover	40420-497-01
5	Tie Point Terminal	599-TP02
6	Auxiliary Contact Block (refer to Page 5)	2 ✪595-AB
7	Operating Coil	See Table Page 3
8	Yoke (50-60 Hz.)	**40410-497-02**
9	Movable Contact	Order Single Pole Contact Set
10	Contact Spring	Order Single Pole Contact Set
11	Front Stationary Contact	Order Single Pole Contact Set
12	Rear Stationary Contact	Order Single Pole Contact Set
9-12	Single Pole Contact Set (includes [1] each items 9-12)	✪**40420-322-51**
13	Overload Relay (includes item 14 test module)	✪**592-C0W16**
14	Test Module (included with item 13 overload relay)	40185-499-01
15	10-32 x .719" Phillips Pan Head Mtg. Screw w/Washer (3 req'd)	28169-101-26
16	Power Wiring Interconnector Assembly (includes [1] front and rear interconnector assembly)	**599-B2R**
17	Mechanical Load Balancer (Refer to Page 2-3)	40420-330-51
18	Mechanical Interlock Assembly (Refer to Page 3)	40410-341-51
19	Mounting Plates	Refer to Factory

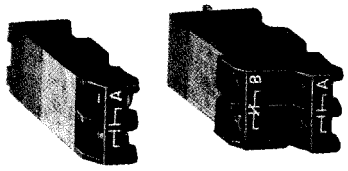
Less contacts, order Single Pole Sets as required.

Starters are furnished with one of the above auxiliary contact blocks on each contactor as standard for electrical interlocking contact.

NOTE — Parts indicated with ✪ are recommended spare parts.

ORDERING INFORMATION -Your order cannot be entered unless the following information is given: Part number, description of part, catalog number and series letter of starter. This renewal parts list applies also to these starters when used on control apparatus listed under other Bulletin numbers.

MODIFICATIONS



Cat. No. 595-A (1 N. 0.) *Cat. No. 595-AB (1 N.O.-1 N.C.)*

AUXILIARY CONTACTS — Bulletin 505 starters are designed to accept one to four auxiliary contact blocks which can provide up to eight auxiliary contacts of the user's choice. Auxiliary contact blocks mount at positions PI and P2 on the coil cover of the left hand contactor, and P3 and P4 on the coil cover of the right hand contactor. Normally, the inboard mounting positions on both contactors are used for or obstructed by factory installed interlock contact blocks. Auxiliary contact blocks can be mounted without the use of tools or additional hardware.

✪ Auxiliary Contact Description	Catalog Number
One Normally Open (1 **N.O.**)	**595-A**
One Normally Closed (1 N.C.)	**595-B**
One Normally Open-One Normally Closed (1 N.O.-1 N C)	**595-AB**
Two Normally Open (2 N.O.)	**595-AA**
Two Normally Closed (2 N.C.)	**595-BB**

NOTE — Parts indicated with ✪ are recommended spare parts.

REMOVAL OF AUXILIARY CONTACT BLOCK -Loosen coil cover and lift out the auxiliary contact block by pivoting its back end away from starter.

INSTALLING OR REPLACING AN AUXILIARY CONTACT BLOCK — The movable contact support and armature assembly must be completely open (the word "OFF" totally visible). The coil cover must be in place and properly secured.

1. Align arrows molded on auxiliary contact block. See Figure 5.
2. Locate molded tabs on side with arrows. See Figure 5.
3. Hook tabs under coil cover at any pocket location (PI, P2, P3, or P4).
4. Exert a pivotal force at the lower end of the block until it snaps into place. Refer to Figure 6.

NOTE — When replacing the "inboard" auxiliary contact blocks (between the contactors) it may be necessary to use a tool, such as a screwdriver. to exert this force because of restricted space

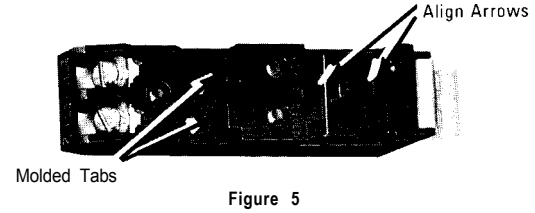


Figure 5

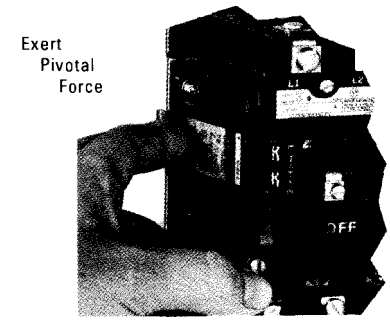
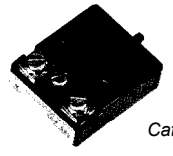


Figure 6



Cat. No. 595-A02

AUXILIARY CONTACT (N.O.) FOR OVERLOAD RELAY-This contact can easily be added to the block type overload relay used on Bulletin 505 Starters. It mounts in place of the standard overload relay test module. A typical application would be for an alarm circuit indicating when the overload relay has tripped.

INSTALLING (N.O.) AUXILIARY CONTACT — First remove the test module as indicated below.

1. Use an appropriate size screwdriver.
2. Hold the blade vertically and insert the screwdriver tip into the slot provided on the test module to the point where it "bottoms". See Figure 7.
3. Slide the test module out to the right.
4. Slide the N.O. auxiliary contact block into the overload relay in place of the test module.
5. Secure the block, using the mounting screw provided, through the hole in the overload relay housing. See Figure 8.

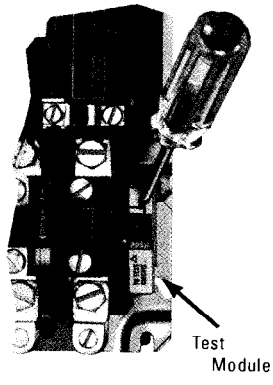


Figure 7

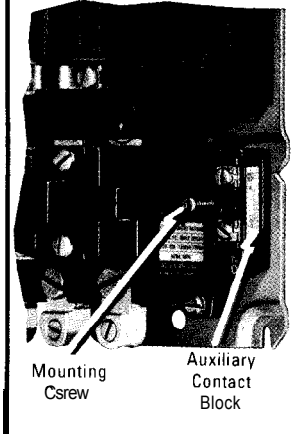


Figure 8