

TIMERS  
3-TYPE  
PIECE-PART DATA AND REPLACEMENT PROCEDURES

1. GENERAL

1.01 This section covers the information necessary for ordering parts to be used in the maintenance of 3 type timers. It also covers approved procedures for replacing these parts.

1.02 Part 2 of this section covers the piece part numbers and the corresponding names of the parts which it is practicable to replace in the field. No attempt should be made to replace parts not designated. Part 2 also contains explanatory figures showing the different parts. This information is called "Piece Part Data."

1.03 Part 3 of this section covers the approved procedures for the replacement of the parts covered under part 2. This information is called "Replacement Procedures."

2. PIECE PART DATA

2.01 The figures included in this part show the various piece parts in their proper relation to other parts of the timer. The piece part numbers of the various parts are given together with the names of the parts as listed by the Western Electric Company Merchandise Department. Where these

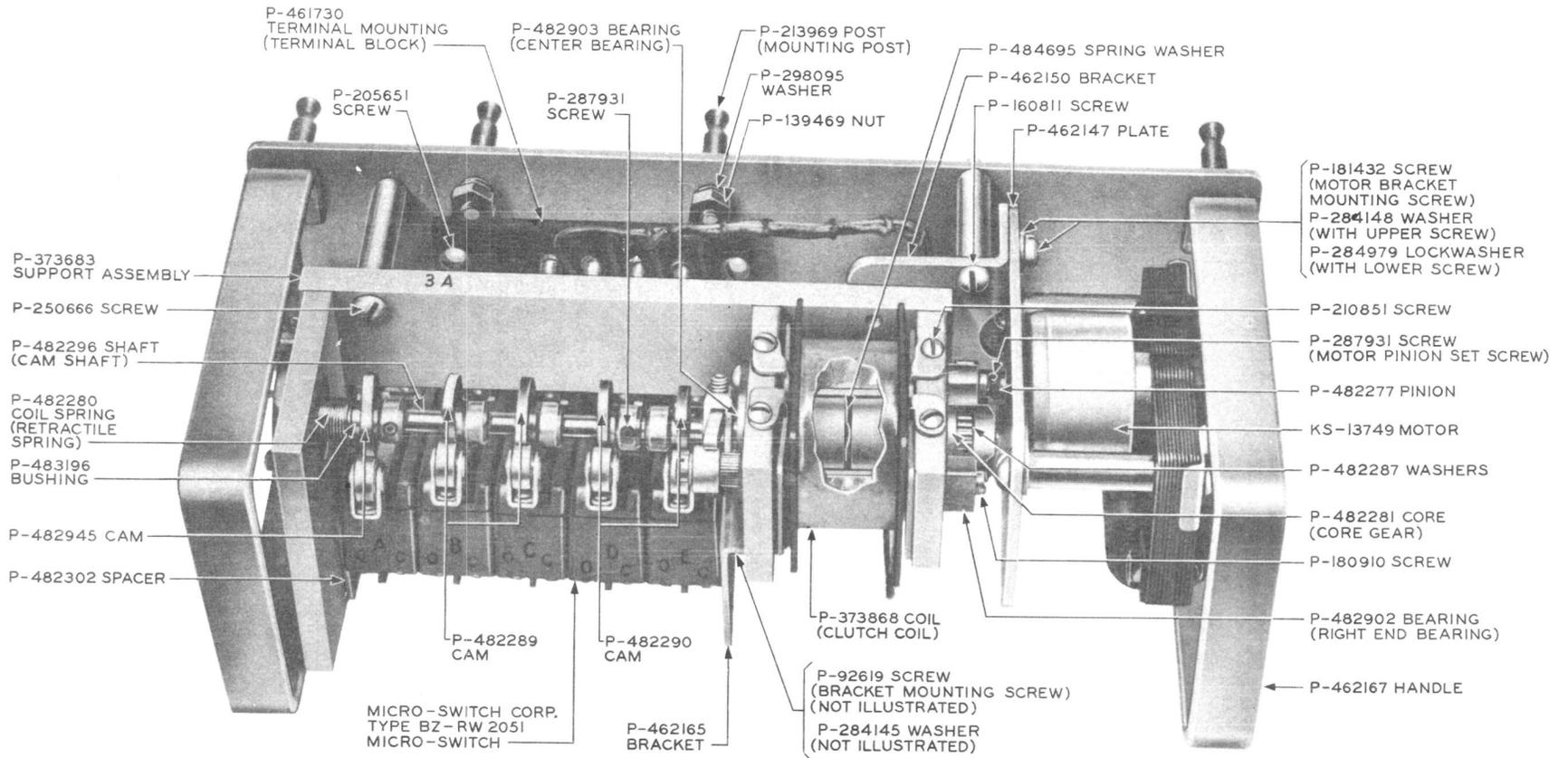
names differ from those in general use in the field the latter names in some cases are shown in parenthesis.

2.02 When ordering parts for replacement purposes, give both the number and name of the piece part. Example: "P-482946 Bearing." Do not refer to the B.S.P. number or any information shown in parenthesis following the piece part number.

2.03 In the replacement of any parts associated with the cam shaft, note whether the timer is equipped with the following:

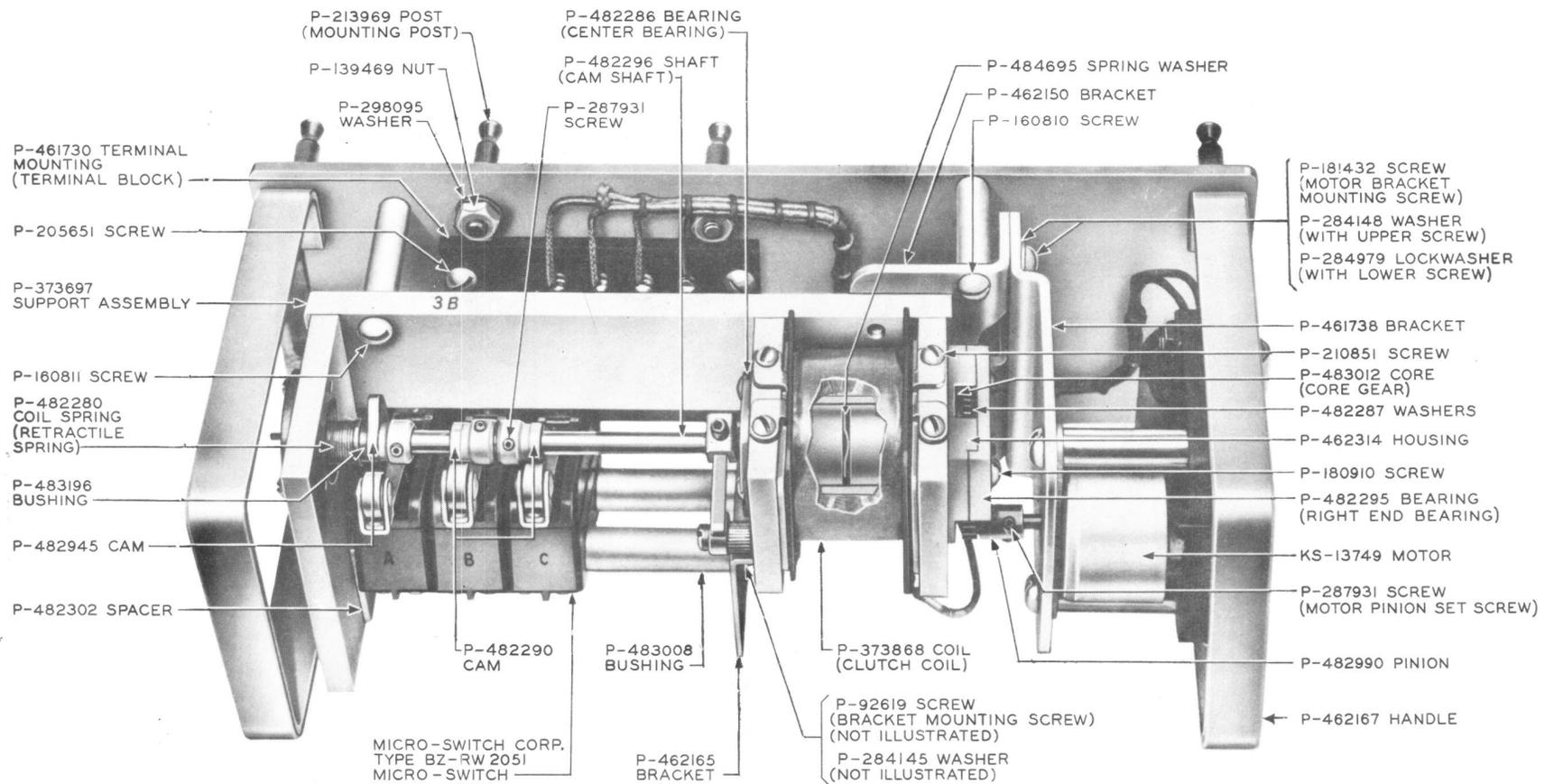
1. Washer on the cam shaft between the center bearing and stop lever clamp.
2. Two piece cams.

If the washer is present it is an indication that the bearings are brass. These should be replaced by phosphor bronze bearings. Two piece cams are to be replaced by cams of one piece construction. In connection with the replacement of either or both of these parts, the cam shaft and core gear should also be replaced and a spring washer should be inserted on the cam shaft between the fixed core of the shaft and the core gear. Ordering information for the phosphor bronze bearings, one piece cams and associated parts noted above are shown on the figures.



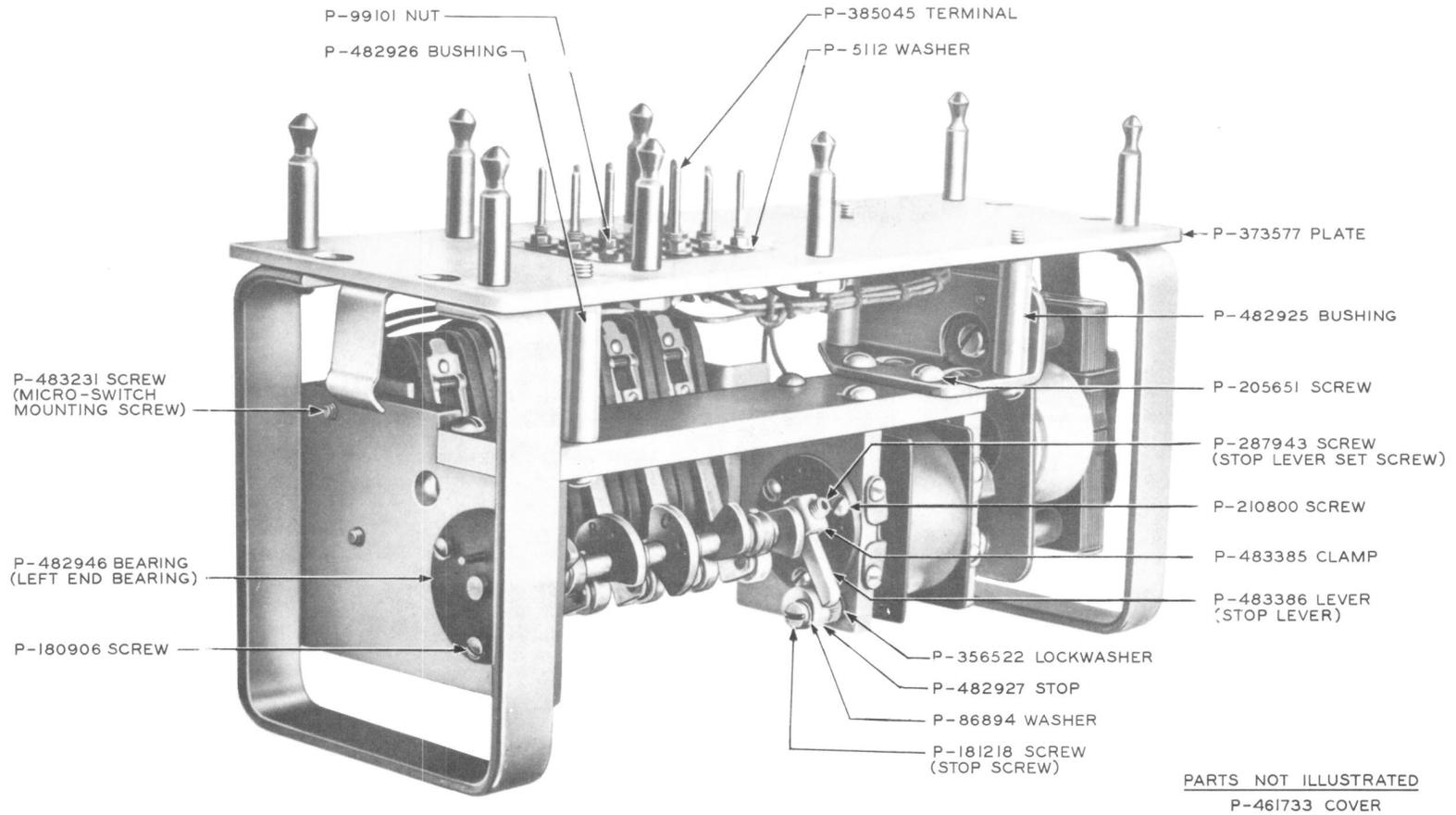
NOTE: IN ORDERING PARTS ASSOCIATED WITH THE CAM SHAFT, SEE PARAGRAPH 2.03.

FIG. 1—NO. 3A TIMER



NOTE: IN ORDERING PARTS ASSOCIATED WITH THE CAM SHAFT, SEE PARAGRAPH 2.03.

FIG. 2 - NO. 3B TIMER



NOTE: IN ORDERING PARTS ASSOCIATED WITH THE CAM SHAFT, SEE PARAGRAPH 2.03.

FIG. 3 - 3 TYPE TIMER

**3. REPLACEMENT PROCEDURES****3.01 List of Tools**

<u>Code or Spec. No.</u>	<u>Description</u>
403A	5/32" and 3/16" Hex. Double End Socket Wrench
417A	1/4" and 3/8" Hex. Open Double End Flat Wrench
KS-2663	File
KS-6854	3-1/2" Screwdriver
R-2958	5/64" Allen Socket Screw Wrench
R-2961	.050" Allen Socket Screw Wrench
-	Combination Pliers
-	P-Long Nose Pliers
-	3" Cabinet Screwdriver
(2 required)	
-	6" Cabinet Screwdriver
-	4" Regular Screwdriver

3.02 Before making any replacement of parts, make the associated circuit busy in the approved manner.

3.03 Replacement of parts will be facilitated by performing the operations with the timer on the bench.

3.04 No replacement procedures are specified for screws or other parts where the procedure consists of a single simple operation.

3.05 After making any replacement of parts of a timer, the part or parts replaced shall meet the readjust requirements involved as specified in Section 030-142-701. Other parts whose adjustments may have been disturbed by the replacing operations shall be checked to the test requirements and an over-all operation check shall be made of the timer before restoring the circuit to service.

3.06 After making any replacement of parts on the timer, relubricate the timer as outlined in Section 030-142-701.

3.07 Left End Bearing, Cam Shaft Retractable Spring and Cam Shaft Retractable Spring Bushing: To replace the left end bearing remove the bearing mounting screws with the 3" cabinet screwdriver and remove the bearing. If necessary replace the retractile spring bushing and the retractile spring placing the short shoulder of the bushing and the end of the spring having the longer straight portion toward

the cams. Before mounting the spring, lubricate as outlined in Section 030-142-701, 2.02(c). Substitute a new bearing and engage the cam shaft retractile spring with the bearing pin and the pin of the A cam by rotating the bearing the necessary amount. Adjust the retractile spring tension and tighten the bearing mounting screws securely.

3.08 Motor and Motor Pinion: Unsolder the wires at the motor terminals. Remove the motor mounting plate or bracket mounting screws and washers using the 4" regular screwdriver and remove the motor from the timer. Loosen the motor pinion set screws with the R-2961 wrench. Remove the motor pinion with the fingers using a pulling and turning motion. Take care not to bend the motor shaft or loosen the shaft in the motor assembly. If difficulty is experienced in removing the pinion, proceed as follows. Clamp the motor in a vise by means of its mounting plate or bracket, taking care not to permit the jaws of the vise to touch the cylindrical motor casing or the motor coil. Hold two 3" cabinet screwdrivers approximately parallel against the mounting plate or bracket under the shoulder of the pinion. Rotate the blades simultaneously to push the pinion off the shaft. Take care in doing this not to loosen the shaft in the motor. Loosen the motor mounting screws with the 4" regular screwdriver and remove the screws and the motor mounting plate or bracket. Remove the mounting screws from the new motor, mount the plate or bracket removed from the replaced motor on the new motor. Insert and securely tighten the screws. If only the motor pinion is to be replaced, file any burrs from the motor shaft with the KS-2663 file and position the new pinion on the motor shaft. Hold the motor assembly in place on the timer and check the gear mesh. Adjust the position of the motor pinion if necessary and tighten the set screws securely. Mount the motor assembly on the timer and partially tighten the motor mounting plate or bracket mounting screws with their associated washers. Adjust for backlash and tighten the screws securely. Solder the wires to the new motor terminals.

3.09 Right End Bearing: To replace the right end bearing remove the motor from its mounting plate as outlined in 3.08 but do not unsolder the motor leads. Remove the right end bearing mounting screws with the 3" cabinet screwdriver and remove the bearing after carefully noting its position on the timer. If the washers between the core gear and the right end bearing adhere to the bearing when it is removed, place them on the cam shaft before mounting the new bearing. Hold the right end bearing in place and check the cam shaft end play. If necessary remove or add washers. There must be at least one washer adjacent to both the center and right end bearings on the core side. Therefore it may be necessary

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to remove the cam shaft as outlined in 3.11 and adjust the number of washers adjacent to the center bearing to obtain the required cam shaft end play. Insert and tighten the bearing mounting screws securely and remount the motor as outlined in 3.08.

**3.10 Core Gear and Spring Washer:** To replace the core gear remove the motor assembly from the timer as outlined in 3.08 but do not unsolder the motor leads. Remove the right end bearing as outlined in 3.09 and the washers adjacent to it. Slide the core gear from the cam shaft. Replace the spring washer if necessary, taking care that the raised side of the prongs of the washer are toward the right when it is positioned on the shaft. Substitute a new gear. This gear may be slightly longer or shorter than the replaced gear, and if so, an adjustment of the number of washers at the right of the core gear will be necessary. Replace the washers and while holding the right end bearing in place, check the cam shaft end play. If the end play requirement is not met, adjust the number of washers adjacent to the right end bearing and, if necessary, the center bearing as outlined in 3.08. Reassemble the parts and tighten all mounting screws securely.

**3.11 Cams, Stop Lever Clamp and Cam Shaft:** Loosen the cam set screws with the R-2961 wrench and the stop lever clamp set screw with the R-2958 wrench. Remove the stop lever. Remove the motor assembly and the right end bearing as covered in 3.08 and 3.09 respectively, but do not unsolder the motor leads. Slide the cam shaft far enough to the right to permit removal of the retractile spring, retractile spring bushing and the parts on the shaft to be replaced. If the cam shaft is to be replaced, remove everything from the part of the shaft to the left of the center bearing. Withdraw the cam shaft from the right end of the timer and remove the washers adjacent to the center bearing from the shaft. Remove also any washers that cling to the center bearing. Substitute the new shaft. Also substitute cams or stop lever if required and reposition them on the cam shaft. Properly position the A cam before adjusting the tension of the retractile spring and the positions of the other cams.

**3.12 Center Bearing:** Remove the cam shaft as covered in 3.11. Remove the center bearing mounting screws with the 6" cabinet screwdriver and remove the center bearing and adjacent bushing if provided. Substitute a new bearing and reassemble the remaining parts in reverse order. Tighten all screws securely.

**3.13 Coil Assembly:** Remove the cam shaft as outlined in 3.11. Remove the coil assembly mounting screws with the 3" cabinet screwdriver and remove the coil assembly. Substitute a new coil assembly and reassemble the parts in reverse order. Tighten all screws securely.

**3.14 Micro-Switches:** To replace a micro-switch remove the terminals to which the wires are soldered, using the KS-6854 screwdriver. Slightly loosen the micro-switch bracket mounting screws with the 4" regular screwdriver and remove the micro-switch mounting screws with the 6" cabinet screwdriver. Remove the micro-switch. Substitute a new micro-switch and insert the mounting screws. Substitute the terminals which were removed from the defective switch for the proper terminals on the new switch. Tighten all screws securely.

**3.15 Terminals and Terminal Block:** To replace a terminal, hold the soldered end of the terminal with the P-long nose pliers and remove the terminal lock nut with the No. 403A wrench. Push the terminal through the terminal block from the rear and with the pliers pull it free from the block. Solder the lead to the new terminal and place the terminal in the terminal block holding the soldered end of the terminal with the P-long nose pliers while tightening the nut. To replace the terminal block, remove the three screws which fasten the timer assembly to the timer base plate with the 4" regular screwdriver and lift the timer assembly off the base plate. Remove all the terminals from the terminal block as outlined above. Tag the wires as to their location on the block so that they can be replaced in the new block properly. Remove the terminal block mounting screws using the 4" regular screwdriver and remove the terminal block. Substitute the new block and insert and securely tighten the mounting screws. Position the terminals in the new terminal block, a row at a time. Remount the washers and nuts tightening the nuts securely while holding the terminals with the P-long nose pliers. Reassemble the parts in reverse order.

**3.16 Mounting Posts:** To replace a mounting post other than the four corner posts, loosen the mounting post nut with the No. 417A wrench and remove the nut, washer and mounting post. Substitute a new post, remount the washer and nut and tighten the nut securely. To replace one of the corner posts, loosen it with the combination pliers applied to the post close to the timer base. Substitute a new post and tighten it securely with the combination pliers.