AMP *"CHAMP*"* 50-POSITIQN INSERTION TOOL OPERATION AND MAINTENANCE

Contents Page

1. GENERAL

1.01 This section is issued to describe the operation and maintenance of the *"CHAMP"* Insertion Tool (No. 229378-1), as well as the *"CHAMP"* male (No. 229940-4) and female (No. 229941-4) connectors used with the Tool.

1.02 The Insertion Tool is acquired on a lease basis from AMP, Inc. The Tool has a *lifetime* warranty. Repairs and update modifications are made by AMP at their cost. (Refer to Part 7 for ordering information.)

Note: AMP retains ownership and maintains location records of the Tools.

1.03 It is designed to permit field installation of 25-pair connectors (male or female) on raw-ended "D" inside wiring cable and connectorization of existing cable already terminated on connecting blocks. It may also be used in rearrangements of cable duct systems, key telephone systems (KTS), cross-connect fields, etc.

1.04 Basically, the two Tool models described in this practice are the same. The difference lies in the method of mounting and adjusting the shear plates in relation to the wire stuffers. Late model Tools have an improved design for the block holder, and the wire holders have adjustable back-up plates. (See Fig. 1.)

1.05 Connectors (manufactured by AMP, Inc.) used with this tool are compatible with the KS-16689, List 3 plug, and the KS-16690, List 1 connector now in use.

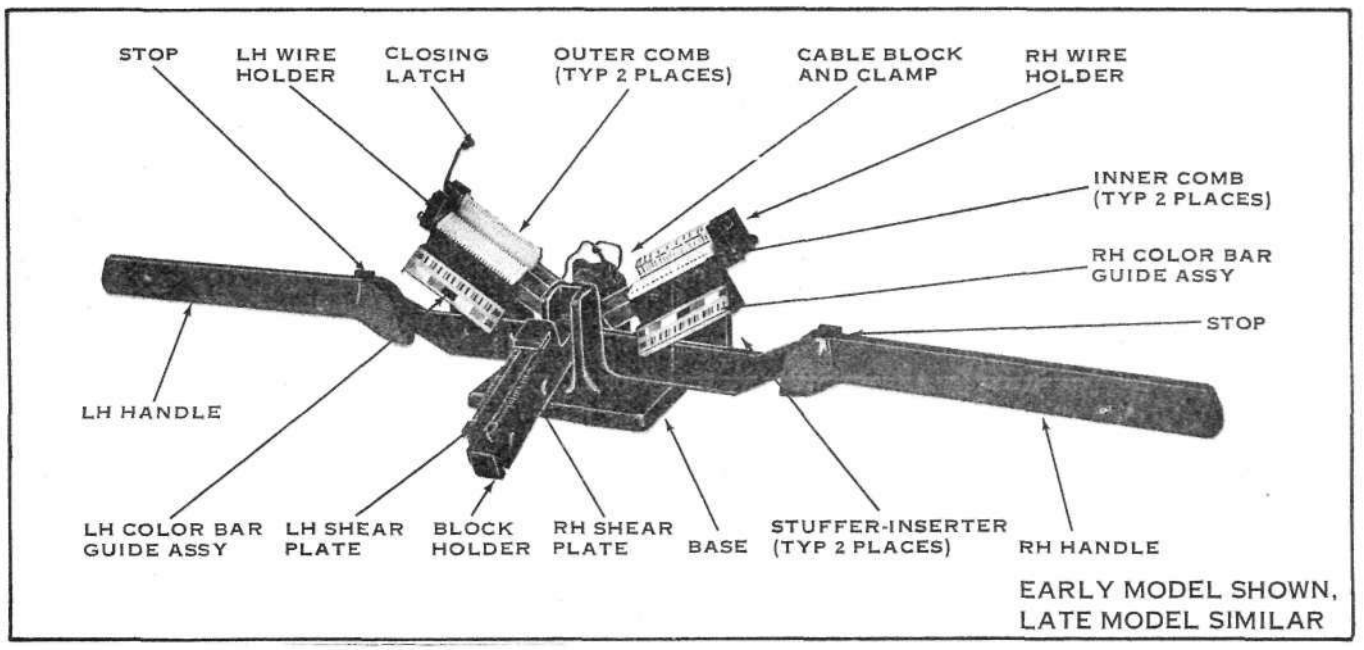


FIGURE 1

*"*CHAMP*" — Registered trademark of AMP Incorporated

Note: Order Connectors from the Supply Service Centers in the usual manner. (Part 7 contains ordering information.)

2. POSITIONING TOOL

2.01 Position Tool on a flat surface, at a convenient height for the operator, so cable enters back.

Note: The work area should be well illuminated and the Tool attached to the work surface.

2.02 To operate the handles safely, the area around the Tool should be kept clear.

3. CABLE PREPARATION

3.01 Being *careful* not to cut insulation of individual wires, remove portion of cable sheath. Cut sheath back 8 inches from end.

3.02 Separate wires into five color groups (white, red, black, yellow, violet), then wrap a piece of wire around each group to keep separated. (See Fig. 2.)

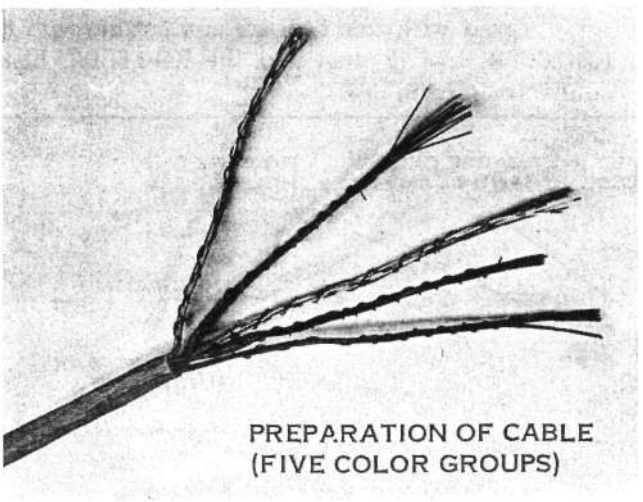


Fig. 2

3.03 Secure cable on cable block at back of Tool with cable clamp. Cable sheath must extend 1/2-inch above cable block with first group of wires laced toward bottom. Refer to Exhibit 1 to determine first group.

3.04 To open Tool swing handles down, unlatch wire holders and pivot out, then pivot block holder front.

3.05 Check that color bar guides correspond with connector, male or female as shown in Exhibit 1. For male connector, numbers 1 and 26 *must be* toward center. For female connector block, numbers 25 and 50 *must be* toward center. If necessary, rotate color bar guide(s) 180° to correspond.

Note: On later Tools and color bar replacements, the correct side of color bar is indicated by "M" and "F".

3.06 Pull first group of wires toward front. Separate so wires with same body color are to the right and same tracer color are to the left. This applies to both male and female connector.

3.07 Starting toward center of Tool, take wires for one side and then the other side. Lace each wire through outer comb (rear) and corresponding position in inner comb (front). Then bend at right angle under inner comb and around inside of guide support, while keeping wires taut. *Make certain* wires are parallel and color code corresponds to color bar. (See Fig. 3.)

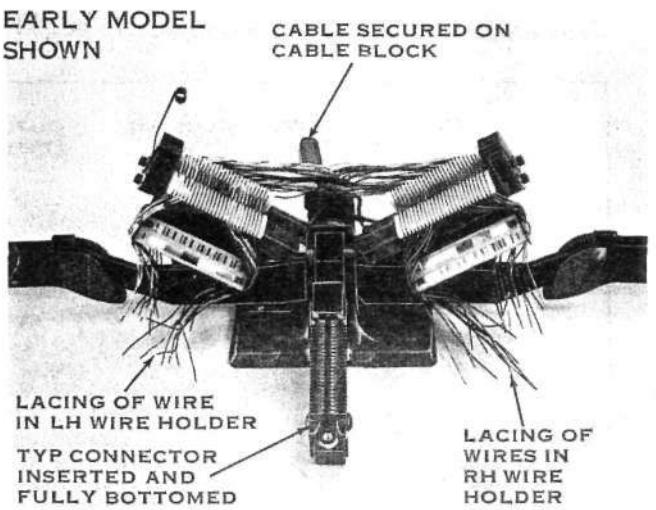


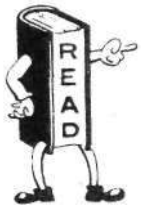
Fig. 3

3.08 With remaining groups of wires, repeat 3.06 and 3.07 in the proper sequence until all groups have been laced. At the approximate midpoint of lacing the groups, bend wires outward at

right angle under inner comb and around outside of guide support, keeping wires taut.

3.09 Insert connector into block holder between shear plates, then push in until fully bottomed. Whether male or female connector is being used, low number wire positions are to the left, and high numbers to the right as shown in Exhibit 1.

4. OPERATION



Caution: Before beginning this procedure, ensure all wires are parallel and in the combs and the connector is bottomed in the block holder. If not, damage will occur to wires and/or connector.

4.01 With connector bottomed in block holder, pivot it up to the vertical position.

4.02 Pivot wire holders to the vertical position, one at a time, to mesh and secure block holder. Ensure wires remain in combs, are not pinched, and the closing latch is securely latched to assure wire placement. (Refer to Fig. 4.)

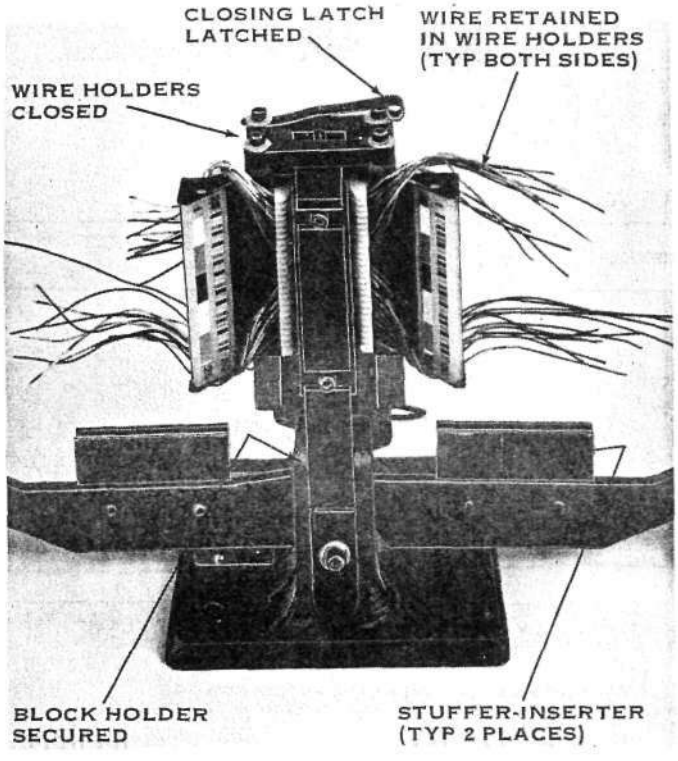


Fig. 4

4.03 Raise handles and bring them together so inserters and stuffers enter wire holders. After inserters and stuffers have contacted wires, squeeze handles together until stops on handles hit. This will assure that all wires are fully inserted in the contacts of the connector and that the ends are sheared. (See Fig. 5.)

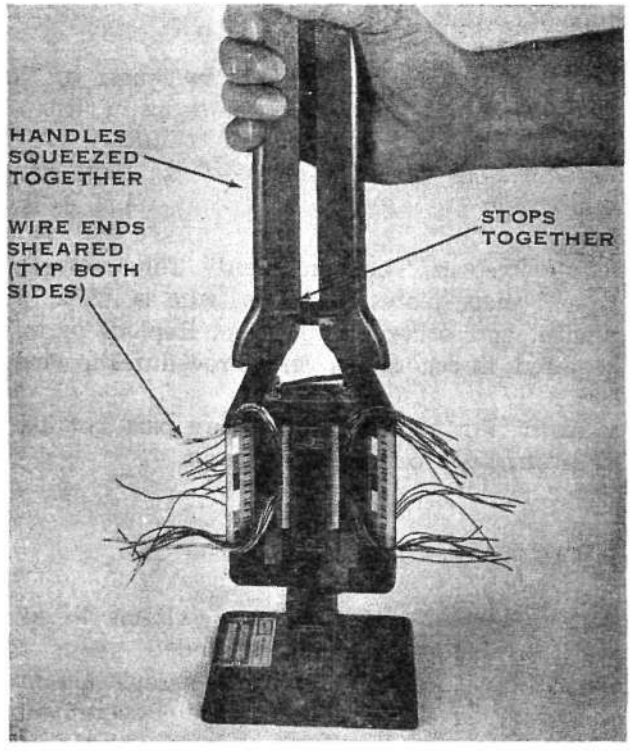


Fig. 5

4.04 Swing handles down, then remove sheared wire ends from wire holders.

4.05 If any wires are not sheared, repeat 4.03 and 4.04.

4.06 Unlatch closing latch and pivot wire holders out.

4.07 Open cable clamp and remove terminated connector. Then lift connector straight up to clear block holder. Pivot block holder down to prepare Tool for next operation.

4.08 Visually inspect connector for proper termination of all wires. Reinsert any wires not retained in their respective contacts. Use AMP T-Handle Insertion Tool (Part No. 229384-1).

5. MAINTENANCE

5.01 When Tool is not in use, insert a connector in block holder, then close Tool in the same manner described in Part 4 but without wires.

5.02 Clean Tool periodically with a soft-bristled brush and/or soft cloth. *DO NOT* use any type of solvent on the Tool.

5.03 Lubricate pivot points in center of Tool periodically with a few drops of light machine oil. Apply a thin coat of *"LUBRIPLATE*"*, or equivalent to sides of inserters. *Avoid excess lubrication.*

5.04 Inspect Tool frequently for damage to shear plates, inserters, wire stuffers, wire combs, and other components. Replace parts, as required, in accordance with procedures in Part 6.

Note: For replacement of any part not listed, return Tool to the manufacturer.

6. PARTS REPLACEMENT

6.01 Recommended Spares — Items listed in Table A are recommended spares that should be stocked for immediate replacement as described in this practice. The Recommended Spares column indicates the quantity of each item required to maintain up to 10 Tools for a period of one year under normal use.

Note: During the replacement of parts, use *"SCREW-LOCK*"* (Item **12)** on ALL screws to retain after tightening.

6.02 Color Bar Guide Assembly Replacement. (See Fig. 6.)

1. Note orientation of color bar guide assembly to be replaced.
2. Spread guide support and remove old guide assembly.
3. Select correct color bar guide assembly (Item 1 or 2).
4. Spread guide support and install new guide assembly as noted in Step 1. If necessary, refer to Exhibit 1.

6.03 Cable Clamp Replacement (Fig. 6) — To replace cable clamp (Item 3), open tool, then drive out pin far enough to remove old clamp. Install new clamp by driving in pin.

6.04 Closing Latch Replacement (Fig. 6) —

Early Model Tools

1. Remove screw, and flat washer, if applicable, securing closing latch to left wire holder.

TABLE A

ITEM NO.	AMP PART NO.	DESCRIPTION	QTY PER TOOL	RECOMMENDED SPARES
1	229459-1	GUIDE ASSY, Color Bar (Left Side)	1	2
2	229460-1	GUIDE ASSY, Color Bar (Right Side)	1	2
3	229408-1	CLAMP, Cable	1	2
4A	229404-1	LATCH, Closing (Early Models)	1	3
4B	27314-1	LATCH, Closing (Late Models)	1	3
5	229399-1	COMB, Inner (Front)	2	4
6	229406-1	COMB, Outer (Rear)	2	4
7*	229397-1	PLATE, Shear (Right Hand)	1	2
8*	229416-1	PLATE, Shear (Left Hand)	1	2
9««	229474-1	STUFFER.Wire (Late Models)	2	4
10	229405-1	PIN, Inserter	4	8
11**.	229475-1	INSERTER, Wire (Late Models)	2	4
12	23419-4	SCREW-LOCK	AR	1

NOTES: * ITEMS 7 AND 8 MUST BE INSTALLED AS MATCHED PAIRS ON EARLY MODELS WHICH HAVE TWO SHEAR PLATE LOCATORS BACKING UP THE SHEAR PLATES. ON LATE MODELS, IT IS NOT NECESSARY TO REPLACE BOTH SHEAR PLATES IF ONLY ONE NEEDS REPLACING.

"ON EARLY MODELS, IF IT IS NECESSARY TO REPLACE ITEM 9 (WIRE STUFFER) AND/OR ITEM 11 (WIRE INSERTER), REPLACE BOTH ITEMS ON BOTH SIDES BECAUSE THE ITEMS LISTED ARE OF A NEW DESIGN AND ARE NOT INTERCHANGEABLE WITH THE EARLY DESIGN.

* *"LUBRIPLATE"* - Registered trademark of Fiske Bros. Refining Company
*"SCREW-LOCK" - Registered trademark of LOCTITE Corporation

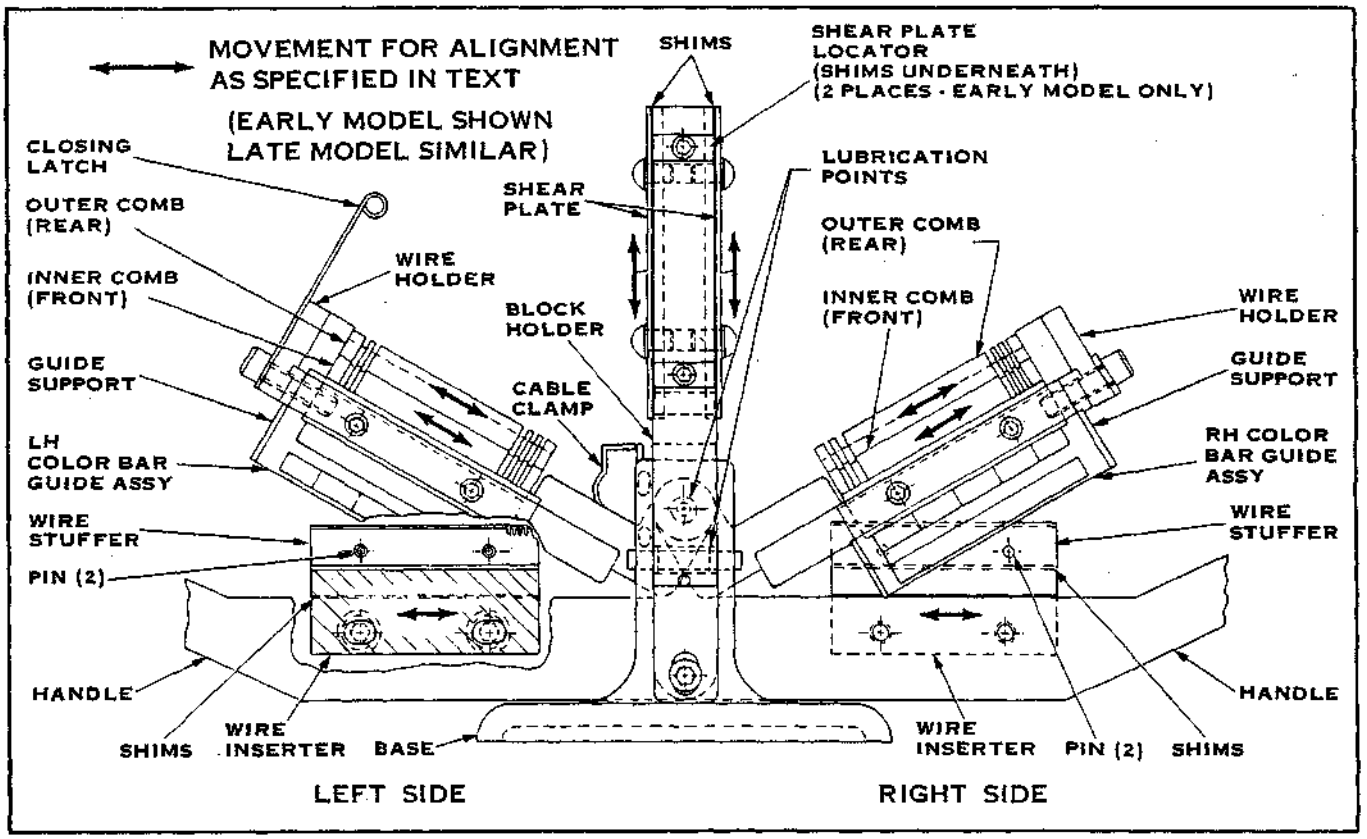


Fig. 6

Caution: DO NOT loosen or remove any other screws in wire holder because of alignment.

2. Install new closing latch (Item 4) with screw, and flat washer if applicable.

3. Close both wire holders to assure closing latch properly engages with right wire holder.

Late Model Tools

1. Remove screws securing closing latch to back of wire holders, using hex wrench.

2. Align new closing latch (Item 4), then secure with screws.

6.05 Comb Replacement (Fig. 6) —

Caution: Because of alignment, DO NOT remove more than one comb at a time.

1. Remove two screws and lock washers securing comb and guide support, or wire comb clamp to wire holder.

2. Install new comb (Item 5 or 6) and guide support, or wire comb clamp, with two lock washers and screws but *DO NOT* tighten screws.

3. Using several pieces of straight wire, insert them in new comb and in same position of opposite comb.

4. Move new comb until wires are 90° to face of comb, then tighten two screws to secure comb in position,

6.06 Replacement of Shear Plates (Fig. 6) — The design improvements in the late model tool require a shear plate replacement procedure that differs from that used for the early models. Both procedures follow.

Caution: NEVER attempt to reface shear plates in ANY tool. This would destroy the flatness required for the shearing of all wires.

Early Model Tools

1. Insert a connector into block holder until it bottoms.

2. Observe fit of connector between shear plates, and alignment of slots in shear plates with contacts in connector. This is important for alignment of new shear plates.

3. Remove connector from block holder.

4. Loosen screw in each of two shear plate locators.

5. Remove two screws securing first shear plate to block holder, then remove shear plate. If shims are behind shear plate, retain for installation of new plate.

6. Install new shear plate (Item 7 or 8) — with shims, if applicable — and two screws, but *DO NOT* tighten screws.

7. Insert a connector until it bottoms, and then align shear plate with connector as observed in Step 2. After alignment, turn screws until they are just snug.

8. Raise block holder, and lock in vertical position with wire holders and closing latch.

9. Slowly raise handles to move wire inserters into wire holders. If inserter on side of shear plate being replaced, binds or is obstructed — *DO NOT FORCE.* In this instance, adjust the shear plate as described in Step 10.

10. Reopen Tool and move shear plate out slightly by loosening screws in shear plate locators, then repeat Steps 7 through 9. After handles are fully closed, alternate between screws in shear plate locators, turning each in a few degrees at a time while moving handle "in" and "out" until a slight drag is observed, drag MUST BE EQUAL at top and bottom.

11. With shear plates adjusted properly, tighten screws securely while ensuring drag is slight and even at top and bottom.

    Note: If screws in shear plate locators become tight before slight drag is observed, remove shims under locators as necessary.

12. After the first side is properly aligned and adjusted, repeat Steps 5 through 11 for second shear plate, as applicable.

13. With **both** shear plates secured to block holder after adjustment, remove each shear plate locator. Determine thickness of shims required under each fill cavity so each screw can be fully tightened. Install shims with locator, lockwasher, and screw at each location, and tighten screws.

14. Perform several test cycles of the Tool to check wire placement and shearing action. It will be necessary to fully fill Tool with wire and insert a connector to make this check. **ALL** wires must be cut clean.

Late Model Tools

1. Remove two screws securing shear plate to be replaced, then remove plate from block holder.

2. Install new shear plate on block holder with two screws, but *DO NOT* tighten.

3. With block holder open, push down and back on shear plate to seat on shoulders of block holder. While holding in this position, tighten two screws.

4. Insert a connector into block holder until it bottoms**,** then check alignment of contact in connector with slots in shear plate. If not aligned, adjust setscrew that acts as a bottom stop until proper alignment is obtained.

5. Remove connector, then raise block holder, and lock in vertical position with wire holders and closing latch.

6. Attempt to close Tool by raising handles. If wire inserter binds or has excessive drag on shear plate being replaced, *DO NOT FORCE.* Reopen handles and adjust backup plate by continuing with the next step.

7. Loosen top and bottom screws securing backup plate to wire holder, as shown in Fig. 7. This will give more clearance between backup plate and shear plate.

8. Fully close Tool. Alternating between top and bottom screws in backup plate, slowly tighten screws while squeezing backup plate against wire inserter, and wire inserter against shear plate. Holding this adjustment,

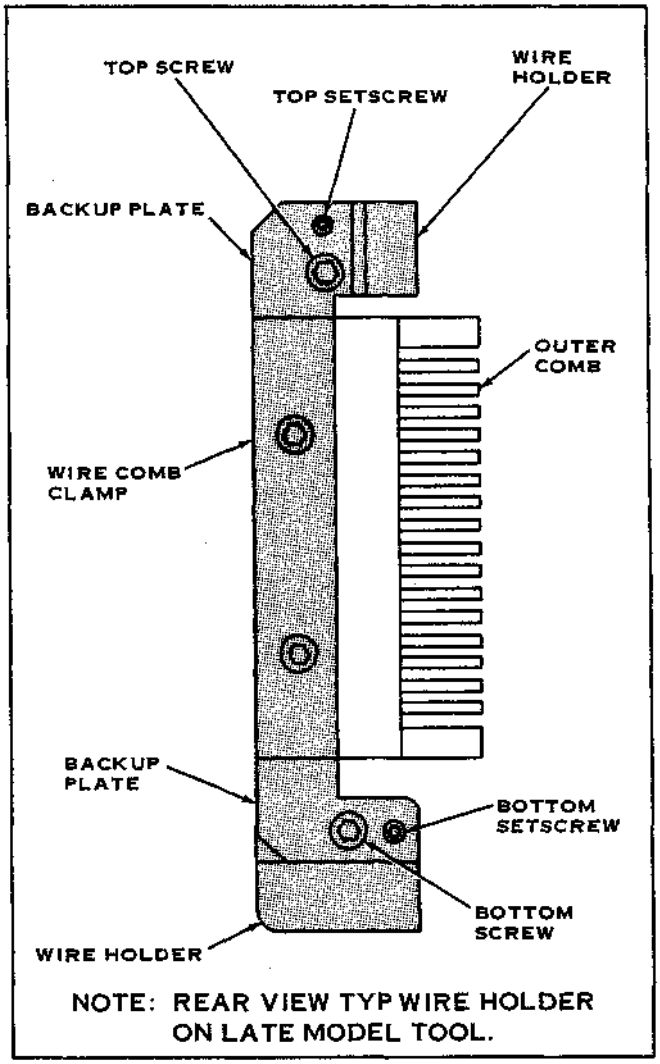


Fig. 7

turn top and bottom setscrews in until they contact wire holder and apply slight pressure outward on backup plate. Then slightly tighten top and bottom screws again.

9. Check for slight drag on wire inserter while moving handle "in" and "out". Drag MUST be even at top and bottom. If not even, alternate between screw and setscrew at top and bottom until proper adjustment is obtained.

10. If opposite shear plate is to be replaced, repeat this procedure.

11. Perform several test cycles of the Tool to check wire placement and shearing action. It will be necessary to fully fill the Tool with wire and insert a connector to make this check. ALL wires must be cut clean and properly inserted.

6.07 Wire Stuffer Replacement (Fig. 6) —

Note: This procedure applies to both right and left side of the Tool. It should *NOT* be necessary to remove inserters.

1. Supporting wire inserter on a solid, flat surface, use a drift punch to drive out the two pins securing stuffer.

2. Remove stuffer from wire inserter.

3. Insert new stuffer (Item 9) in wire inserter and align holes.

4. Again with wire inserter supported on a solid, flat surface, secure stuffer with two new pins (Item 10).

5. With connector inserted in block holder and Tool closed, operate the respective handle several times to assure proper alignment of stuffer with contacts in connector. If alignment is incorrect, adjust wire inserter as described in 6.08.

6.08 Wire Inserter Replacement (Fig. 6) —

Note: This procedure applies to both right and left side of Tool. It may not be necessary to replace both wire inserters but if so, *DO NOT* remove both at the same time.

1. Remove two screws and flat washers securing wire inserter to handle. Retain shims between wire inserter and handle.

2. If wire stuffer in the removed wire inserter is undamaged, remove and install it in new wire inserter (Item 11) with new pins (Item 10). Otherwise, install a new wire stuffer (Item 9).

3. Install wire inserter on handle with' shims, flat washers, and screws removed in Step 1. *DO NOT* tighten screws at this time. Shims *MUST NOT* protrude from under wire inserter.

4. Using a connector as a gage in the block

holder, close and latch the wire holders over the block holder.

5. Raise handle, opposite the one on which the wire inserter is being replaced, until wire inserter bottoms against connector. This will maintain alignment of Tool while aligning new wire inserter.

6. Slowly raise handle containing new wire inserter until it begins to enter wire holder. Screws *MUST BE* loose enough to allow movement of wire inserter.

7. At this point, move wire inserter up and down slightly to align wire stuffer with contacts in connector while moving handles together. *DO NOT FORCE*, otherwise damage could occur.

8. After obtaining correct alignment, apply enough pressure to handles to bottom wire inserter in connector, then HOLD while tightening the two screws.

9. Slowly lower and raise handles several times while observing entry of wire stuffers into connector. If necessary, repeat Steps 6 through 8 for new wire inserter after loosening screws.

10. With screws tight in new wire inserter, raise handles until both wire inserters enter connector, then squeeze handles together until stops on handles touch. Release pressure applied to handles, and measure distance between stops. Distance *MUST BE* .030 to .040 inch.

11. If distance between stops is greater or less than .030 to .040 inch, it will be necessary to add or remove shims under the new wire inserter. Changing the number of shims, however, requires that the adjustment procedure be repeated to assure proper alignment.

12. After adjustment procedure is complete, remove screws in new wire inserter, one at a time, apply *"LOCTITE"* screw lock (Item 12), then reinstall and tighten.

13. Lubricate sides of inserters as described in Part 5.

7. ORDERING INFORMATION

7.01 The AMP *"CHAMP"* Tool (No. 229378-1) and replacement parts shall be ordered directly from the manufacturer on Purchase Order P2 or P2A as specified in SI 70, Section 3.

AMP, Incorporated
Harrisburg, Pennsylvania 17105

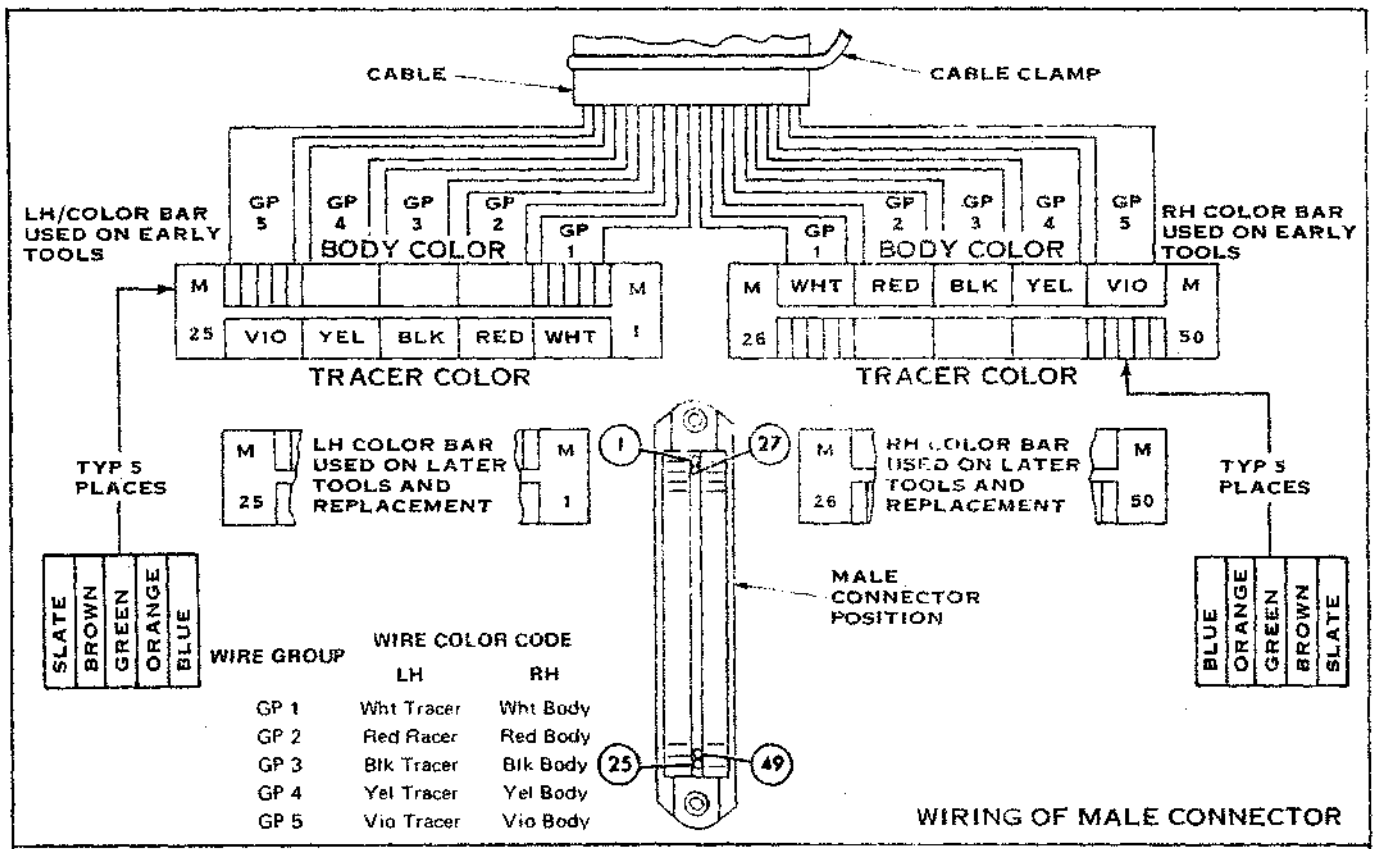
7.02 The pink copy of this form (P2 or P2A) shall be sent to:

Engineering Staff Director
General Trade Products
Room 226
140 New Montgomery Street
San Francisco, California 94105

7.03 Order connectors from the Supply Service Centers in the usual manner.

(Qty) Connector, Male, CHAMP 229940-4

(Qty) Connector, Female, CHAMP 229941-4


CABLE
CABLE CLAMP
LH/COLOR BAR USED ON EARLY TOOLS
GP 5
GP 4
GP 3
GP 2
GP 1
BODY COLOR
RH COLOR BAR USED ON EARLY TOOLS
M
25
VIO
YEL
BLK
RED
WHT
1
TRACER COLOR
WHT
RED
BLK
YEL
VIO
26
50
TYP 5 PLACES
LH COLOR BAR USED ON LATER TOOLS AND REPLACEMENT
RH COLOR BAR USED ON LATER TOOLS AND REPLACEMENT
1
27
MALE CONNECTOR POSITION
SLATE
BROWN
GREEN
ORANGE
BLUE
WIRE GROUP
WIRE COLOR CODE
LH
RH
GP 1 Wht Tracer Wht Body
GP 2 Red Racer Red Body
GP 3 Blk Tracer Blk Body
GP 4 Yel Tracer Yel Body
GP 5 Vio Tracer Vio Body
25
49
WIRING OF MALE CONNECTOR

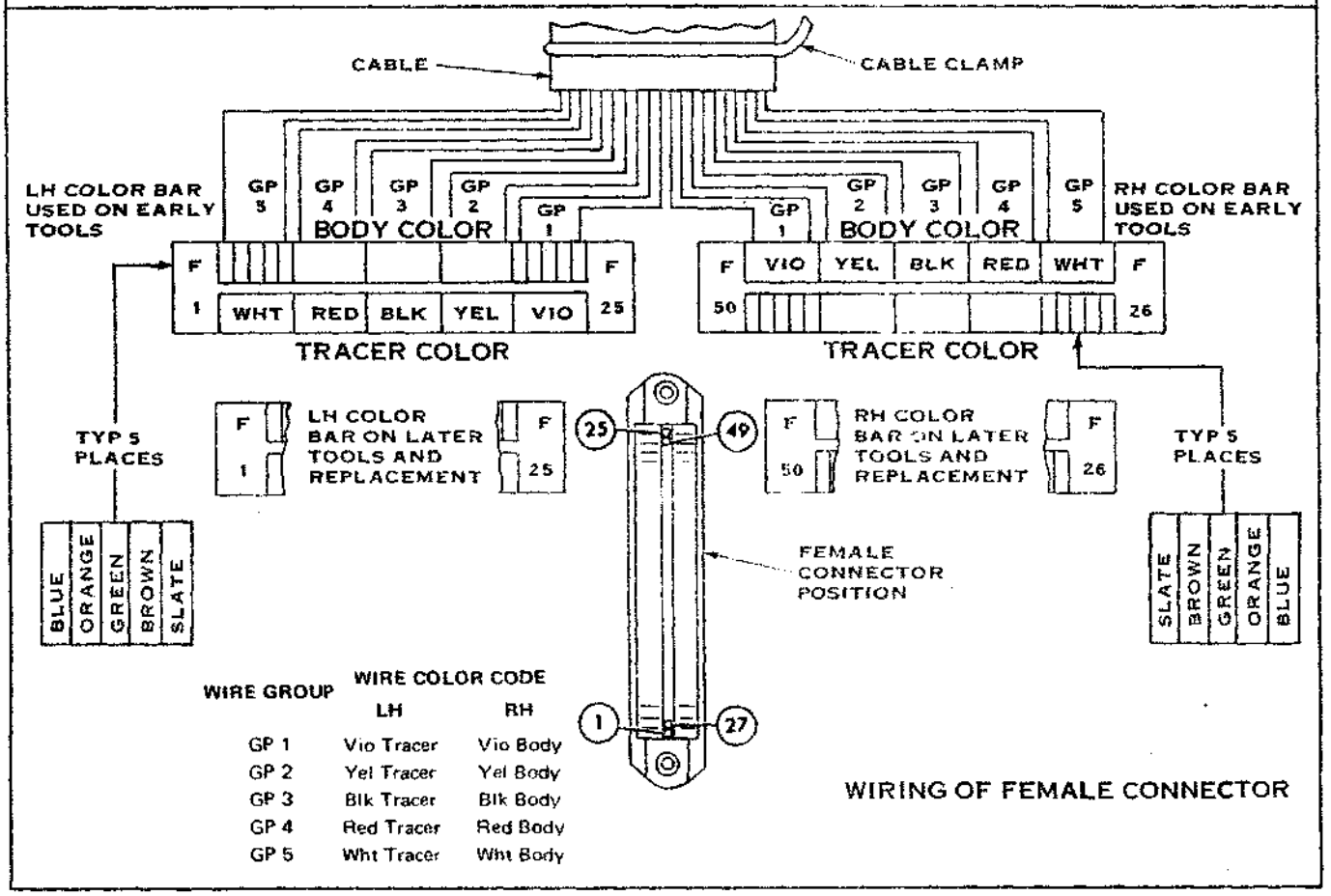

CABLE
CABLE CLAMP
LH COLOR BAR USED ON EARLY TOOLS
GP 5
GP 4
GP 3
GP 2
GP 1
BODY COLOR
RH COLOR BAR USED ON EARLY TOOLS
F
1
WHT
RED
BLK
YEL
VIO
25
TRACER COLOR
50
26
TYP 5 PLACES
LH COLOR BAR ON LATER TOOLS AND REPLACEMENT
RH COLOR BAR ON LATER TOOLS AND REPLACEMENT
25
49
FEMALE CONNECTOR POSITION
BLUE
ORANGE
GREEN
BROWN
SLATE
WIRE GROUP
WIRE COLOR CODE
LH
RH
GP 1 Vio Tracer Vio Body
GP 2 Yel Tracer Yel Body
GP 3 Blk Tracer Blk Body
GP 4 Red Tracer Red Body
GP 5 Wht Tracer Wht Body
1
27
WIRING OF FEMALE CONNECTOR

Exhibit 1