September 1964

OPERATING INSTRUCTIONS FOR THE TIE ROD PIN ASSEMBLY TOOL, NT 600827

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Information Category

UNCLASSIFIED

9/10/64
Authorized Classifier Date

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ABSTRACT

This document contains the description and illustrations of operations necessary to assemble and disassemble the TIE ROD PIN of the FUEL CLUSTER with the aid of the TIE ROD PIN ASSEMBLY TOOL, NT 600827. The document was prepared to serve as an operating manual for the TIE ROD PIN ASSEMBLY TOOL, NT 600827 to be used by the personnel of the Reactor Assembly Laboratory during FUEL CLUSTER assembly and repairs.

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I. INTRODUCTION

The TIE ROD PIN ASSEMBLY TOOL, NT 600827 was designed to provide a controlled, convenient means of assembling and disassembling the TIE ROD PIN during the assembly and repairs of the FUEL CLUSTERS.

The physical shape of the parts involved during the assembly and repairs of the FUEL CLUSTER is such, that on several occasions in the past a CLUSTER TIE ROD and in more numerous instances a TIE ROD PIN was damaged. To alleviate the difficulties and to eliminate hardware damage during assembly and disassembly of the TIE ROD PIN, the TIE ROD PIN ASSEMBLY TOOL, NT 600827 was designed, produced and successfully tried. In general, the operating principle of this ASSEMBLY TOOL alleviates the difficulties encountered during assembly and disassembly of the TIE ROD PIN. Specifically, the operating principles of the tool are as follows:

1. The tool aligns the components to be assembled or disassembled, i.e., the TIE ROD, the TIE ROD NUT and the TIE ROD PIN with respect to each other, so that no obstructions are present to hinder the TIE ROD PIN while it is being inserted or withdrawn.
2. The tool guides the TIE ROD PIN through the slot in the TIE ROD NUT and through the hole in the TIE ROD during installation and removal.
3. The TIE ROD PIN is enclosed and supported by the tool so that it cannot be bent out of shape during the installation or removal.

4. The construction of the tool is such, that the installing or the removing component of the tool is guided to exert an axial force concentrically with the length axis of the TIE ROD PIN thus preventing the pin from being bent.

II OPERATION INSTRUCTIONS FOR TIE ROD PIN ASSEMBLY

PREPARATION:

In order to perform the TIE ROD PIN ASSEMBLY through the use of the TIE ROD PIN ASSEMBLY TOOL, NT 600827, position the hole in the TIE ROD vertically and align the SLOT in the TIE ROD NUT so that it straddles the hole in the TIE ROD.

Prepare the TIE ROD PIN ASSEMBLY TOOL for the installation of the TIE ROD PIN as follows:

For location of TOOL parts refer to Figure 1 and the drawing NT 600827.

1. Remove the SCREW from the SPINDLE.
2. Remove the QUILL from the SPINDLE.
3. Withdraw the SPINDLE until it clears the MOVABLE JAW and it protrudes from the FRAME approximately 1/8 inch.
4. Equip the QUILL with the INSTALLATION PUNCH (Item No. 123 of Drawing No. NT 600827).

ASSEMBLY:

The design of the FUEL CLUSTER specifies that the TIE ROD PIN is to be installed into the hole in the TIE ROD and the slot in the TIE ROD NUT as shown in Figure 2.

To assemble the TIE ROD PIN into the TIE ROD proceed as follows:

For details of the following assembly steps, refer to Figure 3.

5. Place the MOVABLE JAW of the ASSEMBLY TOOL around the TIE ROD NUT and at the same time engage the PIN GUIDE into the SLOT in the TIE ROD NUT.
6. Insert the INSTALLATION KEY into the STATIONARY JAW of the FRAME and simultaneously depress the MOVABLE JAW SLIDE so that the PIN and the SLOT GUIDE of the INSTALLATION KEY engage the hole in the TIE ROD and the slot in the TIE ROD NUT, respectively. At the same time the PIN of the INSTALLATION KEY must enter into the PIN GUIDE of the MOVABLE JAW.

NOTE

HOLD THE MOVABLE JAW AND THE INSTALLATION KEY
IN THE ENGAGED POSITION.

The completion of the preceeding assembly step has aligned the hole in the TIE ROD the slot in the TIE ROD NUT with the ASSEMBLY TOOL.

For details of the following assembly steps refer to Figure 4.

7. While maintaining the position of the MOVABLE JAW SLIDE and the position of the INSTALLATION KEY as described in preceeding steps 5 and 6 install using TWEEZERS the TIE ROD PIN into the hole in the MOVABLE JAW.

NOTE

MAKE CERTAIN THE TIE ROD PIN DOES NOT PROTRUDE FROM THE BOTTOM OF THE COUNTERSINK IN THE MOVABLE JAW.

For details of the following assembly steps refer to Figure 5.

8. Without releasing the hold on the MOVABLE JAW SLIDE and the INSTALLATION KEY, thread the SPINDLE into the FRAME until it bears against the MOVABLE JAW.
9. Next, install the QUILL equipped with the INSTALLATION PUNCH into the SPINDLE.

For details for the following assembly steps refer to Figure 6.

10. Thread the SCREW into the SPINDLE and at the same time release the hold on the INSTALLATION KEY.

CAUTION

MAINTAIN THE HOLD ON THE FRAME.

11. Continue threading the SCREW into the SPINDLE until a marked resistance against threading is felt.

CAUTION

DO NOT RELEASE THE HOLD ON THE FRAME WHILE THREADING THE SCREW INTO THE SPINDLE. THE THREADING OF THE SCREW MUST BE ACCOMPLISHED WITHOUT ENCOUNTERING RESISTANCE, EXCEPT AT THE END OF THE SCREW TRAVEL. IF ANY RESISTANCE IS FELT, STOP THE OPERATION AND WITHDRAW THE ASSEMBLY TOOL AS DESCRIBED IN STEPS 12 AND 13. REMOVE THE TIE ROD PIN AND EXAMINE IT, ALSO EXAMINE THE TIE ROD AND THE TIE ROD NUT IN THE VICINITY OF THE TIE ROD PIN HOLE FOR BURRS OR OTHER OBSTRUCTIONS. EXAMINE THE MOVALBE JAW AND THE PIN GUIDE FOR OBSTRUCTIONS. IF NO OBSTRUCTIONS ARE FOUND, ATTEMPT TO INSTALL THE TIE ROD PIN BY CAREFULLY REPEATING PROCEDURES DESCRIBED IN STEPS 1 THROUGH 11 OF THESE INSTRUCTIONS.

NOTE

AS THE TIE ROD PIN ENTERS THE TIE ROD IT WILL DISPLACE AND EVENTUALLY DISLODGE THE INSTALLATION KEY FROM THE STATIONARY JAW OF THE FRAME, THEREFORE DO NOT ATTEMPT TO HOLD THE KEY DURING THE PROCEDURES DESCRIBED IN STEPS 10 AND 11 OF THESE INSTRUCTIONS.

With the completion of the procedures described in step 11 the TIE ROD PIN is installed in the TIE ROD. All that remains is the removal of the TIE ROD PIN ASSEMBLY TOOL.

To disengage the TIE ROD PIN ASSEMBLY TOOL from the assembled FUEL CLUSTER proceed as follows:

12. While maintaining the hold on the FRAME of the ASSEMBLY TOOL withdraw the SPINDLE from the MOVABLE JAW until the INSTALLATION PUNCH clears the MOVABLE JAW.
13. Maintain the hold on the FRAME and release the MOVABLE JAW SLIDE. Then, disengage the PIN GUIDE from the slot in the TIE ROD NUT and the TIE ROD PIN.

Figure 1 Tie Rod Pin Assembly Tool, NT 600827 Equipped for Tie Rod Pin Assembly

Figure 2 Tie Rod, Tie Rod Nut and Tie Rod Pin Assembled

Figure 3 Tie Rod Pin Assembly Steps 5 and 6

Figure 4 Tie Rod Pin Assembly Step 7

Figure 5 Tie Rod Pin Assembly Steps 8 and 9

Figure 6 Tie Rod Pin Assembly Steps 10 and 11

III. OPERATION INSTRUCTIONS FOR TIE ROD PIN REMOVAL

In addition to the function of installing the TIE ROD PIN, the TIE ROD PIN ASSEMBLY TOOL, NT 600827 is also designed for the removal of the TIE ROD PIN.

PREPARATION:

In order to perform the TIE ROD PIN removal through the use of the TIE ROD PIN ASSEMBLY TOOL, NT 600827 position the assembled TIE ROD PIN vertically.

Prepare the TIE ROD PIN ASSEMBLY TOOL for the removal of the TIE ROD PIN as follows:

For location of tool parts refer to Figure 7 and the drawing NT 600827.

1. Remove the SCREW from the SPINDLE.
2. Remove the QUILL from the SPINDLE.
3. Withdraw the SPINDLE until it clears the MOVALBE JAW and it protrudes from the FRAME approximately 1/8 inch.
4. Equip the QUILL with the REMOVAL PUNCH (Item No. 122 of Drawing No. NT 600827).

REMOVAL:

To remove the TIE ROD PIN from the TIE ROD proceed as follows:

For details of the following assembly steps, refer to Figure 8.

5. Place the MOVABLE JAW of the assembly tool around the TIE ROD NUT and at the same time engage the PIN GUIDE into the SLOT and around the TIE ROD PIN in the TIE ROD NUT.
6. Insert the REMOVAL KEY into the STATIONARY JAW of the FRAME and simultaneously depress the MOVABLE JAW SLIDE so that the SLOT GUIDE of the REMOVAL KEY engages the slot in the TIE ROD NUT and the TIE ROD PIN.

NOTE

HOLD THE MOVABLE JAW AND THE REMOVAL KEY
IN THE ENGAGED POSITION.

The completion of the preceeding assembly step has aligned the TIE ROD PIN with the ASSEMBLY TOOL.

For details of the following assembly steps refer to Figure 9.

7. Without releasing the hold on the MOVABLE JAW SLIDE and the REMOVAL KEY, thread the SPINDLE into the FRAME until it bears against the MOVABLE JAW.
8. Next, install the QUILL equipped with the REMOVAL PUNCH into the SPINDLE.

For details of the following assembly steps refer to Figure 10.

9. Thread the SCREW into the SPINDLE.

CAUTION

MAINTAIN THE HOLD ON THE MOVABLE JAW SLIDE
AND THE REMOVAL KEY.

10. Continue threading the SCREW into the SPINDLE until a marked resistance against threading is felt.

With the completion of the procedures described in step 10 the TIE ROD PIN is partially removed from the TIE ROD. Next, the TIE ROD PIN ASSEMBLY TOOL must be removed from the TIE ROD.

To disengage the TIE ROD PIN ASSEMBLY TOOL from the TIE ROD proceed as follows:

11. While maintaining the hold on the FRAME of the ASSEMBLY TOOL withdraw the SPINDLE from the MOVABLE JAW until the INSTALLATION PUNCH clears the MOVABLE JAW.
12. Maintain the hold on the FRAME and release the MOVABLE JAW SLIDE. Then, disengage the PIN GUIDE and the SLOT GUIDE of the REMOVAL KEY from the slot in the TIE ROD NUT and the TIE ROD PIN.
13. Carefully rotate the TIE ROD until the displaced end of the TIE ROD PIN points upward as shown in Figure 11.

14. With the aid of pliers grip the displaced end of the TIE ROD PIN and with an oscillatory motion remove the TIE ROD PIN from the TIE ROD.

CAUTION

SUPPORT THE TIE ROD AGAINST THE APPLIED FORCE TO
PREVENT THE TIE ROD FROM BEDNING.

Figure 7 Tie Rod Pin Assembly Tool, NT 600827 Equipped for Tie Rod Pin Removal

Figure 8 Tie Rod Pin Removal Steps 5 and 6

Figure 9 Tie Rod Pin Removal Steps 7 and 8

Figure 10 Tie Rod Pin Removal Steps 9 and 10

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Figure 11 Tie Rod, Tie Rod Nut and Tie Rod Pin partially removed

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