PTM

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JT8D GEARBOX HOUSING
SHOULDERED STUDS

P/Ns	PT010032	SERIES
	PT010033	"
	PT010034	"
	PT010035	"
	PT010036	"
	PT010037	"
	PT010038	"
	PT010039	"
	PT010045	"

COMPONENT INSTALLATION PROCEDURE

72-61-02

TITLE PAGE

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PTM International
COMPONENT INSTALLATION PROCEDURE

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Introduction

This Component Installation Procedure manual describes the procedure for the installation of PTMI-manufactured shouldered studs as replacements for OEM studs installed in the JT8D engine gearbox housing split-line flange and in the oil filter housing exterior face. This procedure is applicable to housings assembled with OEM locknuts and split-line gaskets as well as the improved alternate gasket P/N PT010031 and Vespel®-lined locknuts P/Ns PT010040D01 and PT010040D02 produced by PTMI. The technical staff at PTM International will be pleased to offer advice on any questions regarding this procedure.

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Abbreviations

The following abbreviations are used in this publication

Abbreviation	Definition
PTMI	PTM International
FAA	Federal Aviation Administration
PMA	Parts Manufacturing Approval
OEM	Original Equipment Manufacturer
INST	Installation
UNJC	Unified National class "J" Coarse
in.	Inches
P/N	Part Number

ELIGIBILITY

The part numbers for the shouldered studs are listed in Table 1. All of the part numbers are covered by FAA PMAs and are eligible for use on the gearbox housings listed in Table 2 for installation on the JT8D engine models JT8D-1 through -17AR and JT8D-209 through -219 under Supplemental Type Certificate SE00429AT. The STC certifies the use of PTMI drawing PT010050 Rev. A or later FAA-approved drawing. This master "top" drawing lists the shouldered stud P/Ns of Table 1 and provides installation procedures consistent with (but not as detailed as) those contained in this manual.

GEARBOX HOUSING AND OIL FILTER STUDS

DESCRIPTION

1. Description

A. JT8D engine (all models, including the -200 Series) gearboxes frequently experience oil leaks at the front housing (cover)-to-rear housing split-line due to the loss of the torque provided by the nut/stud combinations that secure the two sections. During assembly or during on-wing repairs, the nuts are frequently over-torqued, resulting in a partial failure of the magnesium housing threads that mate with the stud threads. This thread damage results in what is normally known as the "stud pulling" effect. The more the nut is tightened, the more the stud is pulled; thus the greater the loss of torque and the greater the oil leak path.

B. In addition, rapid oil losses, which often result in in-flight shutdowns, are caused by the "pulling" of the rear housing oil filter cover studs during required oil filter changes, normally accomplished at 250 flight-hour intervals. The pulled stud condition goes unnoticed and the aircraft is returned to service. Subsequent oil loss can lead to in-flight shutdowns which can be eliminated by preventing the "pulling" effect. This is accomplished by incorporating a shoulder as an integral part of the stud design.

C. The stud shoulder fits into a counterbored recess precision-machined in the front and rear housings at each of the stud locations. When the nut is torqued on the stud, any tendency of the stud to "pull" will be inhibited by contact of the shoulder against the mating part (cover or housing, depending on the location of the stud), in effect preventing the stud from moving in the direction of the "pulling" force.

D. A tight tolerance has been specified for the depth of the counterbore and the shoulder thickness. This ensures that very little axial movement of the studs in the flange threads is required for the shoulder to absorb the pulling stress caused by the torquing of the nuts. It also ensures that the shoulder does not protrude above the flange surface and thereby prevent proper mating of the flanges.

INSTALLATION PROCEDURE

1. Preliminary Preparations

   A. Fully protect the inside of the gearbox housing and cover, including the oil tube transfer holes, from the magnesium chips that will result from the stud thread hole counterboring operations below.

2. Installation Location

   A. Figure 1 shows the specific location of each stud P/N. The installation procedure applies to a total of up to 47 studs in the housing split-line flanges and 4 studs in the oil filter cavity interior face.

3. Installation Procedure

   NOTE: All thread size references pertain to the threaded position of the stud installed in the subject flanges.

   NOTE: Stud threads are available in sizes up to .012 in. over the standard pitch diameter. (Standard +.003, +.006, +.009, and +.012). Refer to Table 1.

   A. Replacement of OEM 1/4-20 studs in front and rear housing split-line flanges.

      (1) Remove existing OEM stud(s) from applicable locations in the front and/or rear housing split-line flanges.

      (2) Note size code, if any, marked on end of stud with 1/4-20 threads.

      (3) Clean up threaded holes from which studs were removed.

      (4) Check for existence of helicoil in threaded hole. Relocate any helicoils, as necessary, to place the helicoil upper end at a minimum of .070 in. below the flange surface.

(5) Machine counterbores in the split-line flange at the locations for 1/4-20 stud installation per section A-A of Figure 1. Use PTMI tool No. 91PT330-04 and instructions provided with tooling instruction drawing 91PT330-04INST shown in Figure 3.

(6) Remove tool, break sharp edges, chamfer lead thread to major diameter and clean up counterbored holes.

(7) Install applicable shoulder studs of appropriate oversize to maintain snug fit in accordance with the instructions of JT8D Engine Manual Chapter 72-61-01/ 72-61-02 Repair 01. Use size code noted in step 3.A.(2) for guidance in oversize selection.

NOTE: Stud shoulder must be flush with flange surface.

B. Replacement of OEM 5/16-18 studs in front and rear housing split-line flanges.

(1) Remove existing OEM stud(s) from applicable locations in the front and/or rear housing split-line flanges.

(2) Note size code, if any, marked on end of stud with 5/16-18 threads.

(3) Clean up threaded holes from which studs were removed.

(4) Machine counterbores in the split-line flange at the locations for 5/16-18 stud installation per section C-C of Figure 1. Use PTMI tool No. 91PT330-04 and instructions provided with tooling instruction drawing 91PT330-04INST shown in Figure 3.

(5) Remove tool, break sharp edges, chamfer lead thread to major diameter and clean up counterbored holes.

(6) Install shoulder stud PT010038 of appropriate oversize to maintain snug fit in accordance with the instructions of JT8D Engine Manual Chapter 72-61-01/ 72-61-02 Repair 01. Use size code noted in step 3.B.(2) for guidance in oversize selection.

NOTE: Stud shoulder must be flush with flange surface.

C: Replacement of OEM 3/8-16 studs in oil filter cavity exterior face not subject to 72-61-01 Repair 43 for re-tapping of threads to 7/16-14.

(1) Remove existing OEM stud(s) from oil filter cavity exterior face.

(2) Note size code, if any, marked on end of stud with 3/8-16 threads.

(3) Clean threaded holes from which studs were removed.

(4) Machine counterbores in the face, at the locations for 3/8-16 stud installation per section B-B of Figure 1. Use PTMI tool No. 91PT330-03 and instructions provided with tooling instruction drawing 91PT330-03INST shown in Figure 2.

(5) Remove tool, break sharp edges, chamfer lead thread to major diameter and clean up counterbored holes.

(6) Install shoulder studs PT010037 of appropriate oversize to maintain snug fit in accordance with the instructions of JT8D Engine Manual Chapter 72-61-01/ 72-61-02 Repair 01. Use size code noted in step 3.C.(2) for guidance in oversize selection.

NOTE: Stud shoulder must be flush with flange surface.

D : Installation of 7/16-14 studs in oil filter cavity exterior face threaded holes requiring enlargement to 7/16-14

(1) Remove existing OEM stud(s) from oil filter cavity exterior face.

(2) Drill and tap oil filter housing threads to accept 7/16-14UNJC stud threads. Thread depth to be no greater than .850 in.

(3) Break sharp edges of lead thread.

(4) Install shoulder studs PT010039 of appropriate oversize to maintain snug fit in accordance with the instructions of JT8D Engine Manual Chapter 72-61-01 Repair 01 until shoulder formed by thread run-out is flush with housing flange.

E: Installation of 7/16-14 studs in oil filter cavity exterior mating face threaded holes that have been repaired by 72-61-01 Repair 43

(1) Confirm 72-61-01 Repair 43 has been accomplished.

(2) Remove existing OEM stud(s).

(3) Note size code, if any, marked on end of stud with 7/16-14 threads.

(4) Clean up threaded holes from which studs were removed.

(5) Install shoulder studs PT010045 of appropriate oversize to maintain snug fit in accordance with the instructions of JT8D Engine Manual Chapter 72-61-01 Repair 01. Use size code noted in step 3.E.(2) for guidance in oversize selection.

NOTE: Stud shoulder must be flush with 72-61-01 Repair 43 bushing surface.

2. Final Cleanup and Check

A. Remove all tooling from the housing, and clean counterbored holes and housing threads.

B. Check all installed shoulder studs to assure shoulder surface is flush to .002 in. below the housing flange surface.

PTMI P/N	IN LIEU OF OEM P/N	PITCH DIA. SIZE	INSTALLATION PROCEDURE
PT010032D01	547344	Standard	Procedure 3.A.
PT010032D02	547344+3	+.003	"
PT010032D03	547344+6	+.006	"
PT010032D04	547344+9	+.009	"
PT010032D05	547344+12	+.012	"
PT010033D01	578057	Standard	"
PT010033D02	578057P3	+.003	"
PT010033D03	578057P6	+.006	"
PT010033D04	578057P9	+.009	"
PT010033D05	578057P12	+.012	"
PT010034D01	547403	Standard	"
PT010034D02	547403+3	+.003	"
PT010034D03	547403+6	+.006	"
PT010034D04	547403+9	+.009	"
PT010034D05	547403+12	+.012	"
PT010035D01	547343	Standard	"
PT010035D02	547343+3	+.003	"
PT010035D03	547343+6	+.006	"
PT010035D04	547343+9	+.009	"
PT010035D05	547343+12	+.012	"
PT010036D01	547342	Standard	"
PT010036D02	547342+3	+.003	"
PT010036D03	547342+6	+.006	"
PT010036D04	547342+9	+.009	"
PT010036D05	547342+12	+.012	"
PT010037D01	544855	Standard	Procedure 3.C.
PT010037D02	544855P3	+.003	"
PT010037D03	544855P6	+.006	"
PT010037D04	544855P9	+.009	"
PT010037D05	544855P12	+.012	"

APPROVED ALTERNATE STUD P/Ns

Table 1

PTMI P/N	IN LIEU OF OEM P/N	PITCH DIA. SIZE	INSTALLATION PROCEDURE
PT010038D01	547341	Standard	Procedure 3.B.
PT010038D02	547341+3	+.003	"
PT010038D03	547341+6	+.006	"
PT010038D04	547341+9	+.009	"
PT010038D05	547341+12	+.012	"
PT010039D01	545122	Standard	Procedure 3.D.
PT010039D02	545122P3	+.003	"
PT010039D03	545122P6	+.006	"
PT010039D04	545122P9	+.009	"
PT010039D05	545122P12	+.012	"
PT010045D01	545122	Standard	Procedure 3.E.
PT010045D02	545122P3	+.003	"
PT010045D03	545122P6	+.006	"
PT010045D04	545122P9	+.009	"
PT010045D05	545122P12	+.012	"

APPROVED ALTERNATE STUD P/Ns

Table 1

FRONT HOUSING P/N

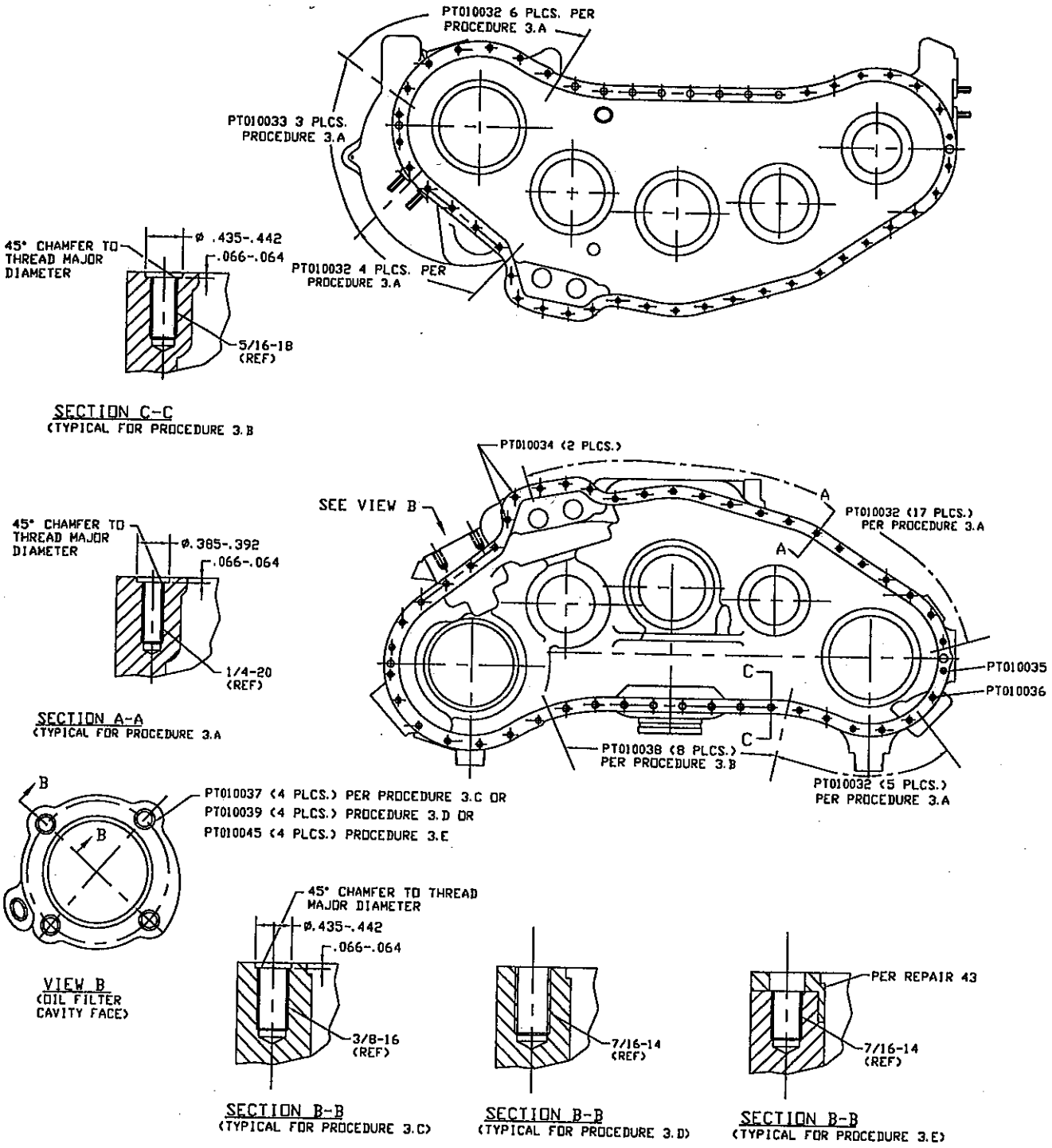
478757	500441	502306	506381	511743	528198	537627	537629
538638	538639	538640	555111	555112	555113	555115	555117
555119	555623	555624	555625	555627	555628	555629	555630
555631	556591	556592	578059	593561	593563	593564	593565
594510	615615	615616	615617	616031	616032	616033	616035
616036	616037	616038	616039	616041	616042	616043	616045
616046	616047	616048	616049	642776	642823	642824	648962
697667	726448	766231	776151	778857	778969	811086	811087

REAR HOUSING P/N

493188	499806	504889	515366	531643	531648	538604	538636
544836	544838	544839	544849	544850	555637	555638	559523
564908	564909	591573	593074	593159	593161	593162	615140
615141	615142	615396	615398	615636	615640	615641	615647
615648	616002	616003	616009	616010	616011	642398	642399
642774	642822	664643	664644	666742	666743	667487	667488
697666	807350	538604-001	538636-001	559523-001	564908-001	564909-001	591573-001
593074-001	615396-001	615398-001	642398-001	642399-001	642774-001	642822-001	664643-001
664644-001	666742-001	666743-001	667487-001	667488-001	697666-001	807350-001	785841

GEARBOX HOUSING PART NUMBERS ELIGIBLE FOR ALTERNATE STUDS

Table 2



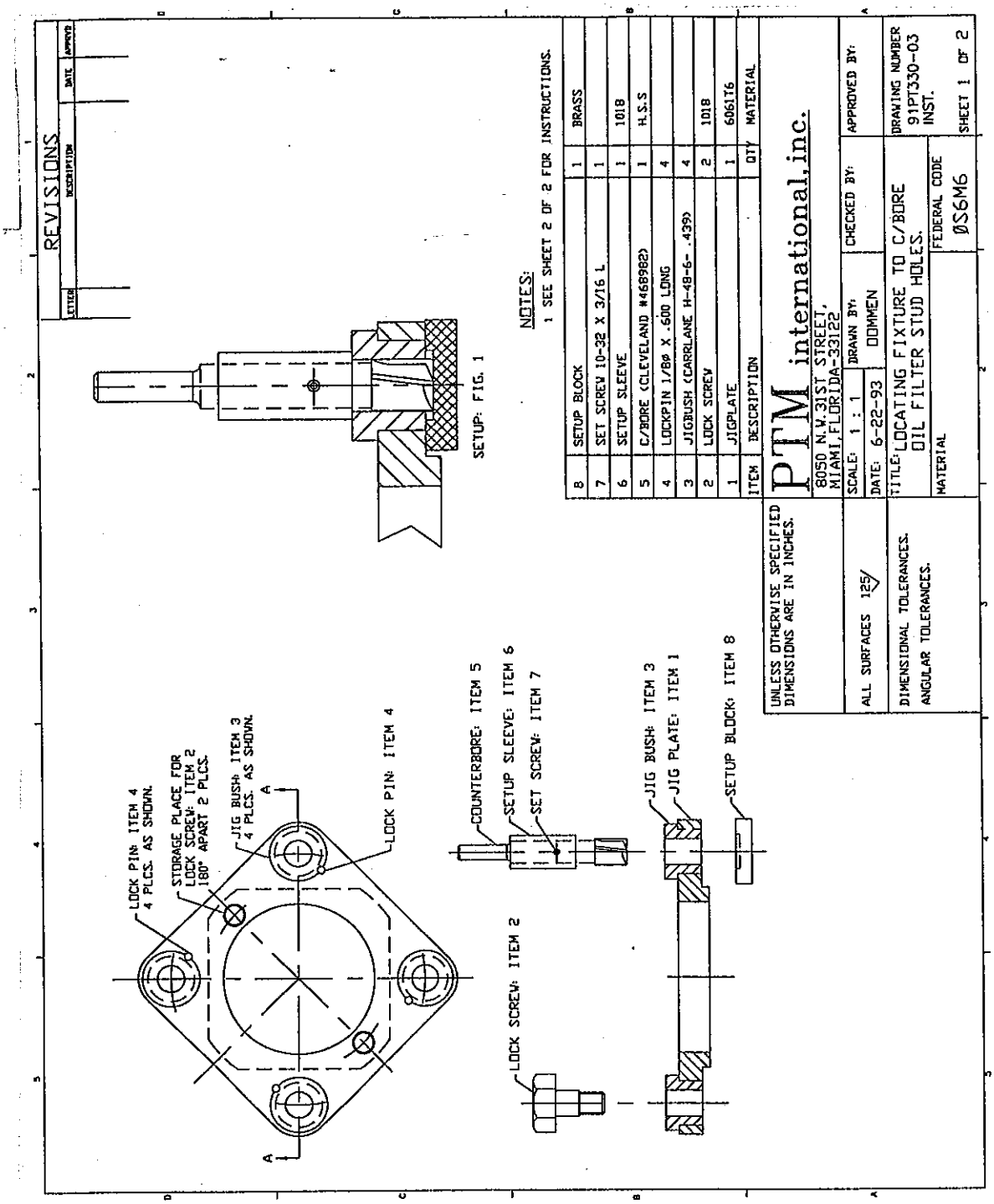
GEARBOX HOUSING STUD LOCATION PRE-MACHINING.
FIG. 1

SPECIAL TOOLS, FIXTURES AND EQUIPMENT

1. The following table lists the special tools and equipment required for the installation of the shouldered studs.

   NOTE: Equivalent substitutes may be used for listed items.

Tool Item No.	Tool Part No.	Description	Remarks
1.	91PT330-03	Counterbore fixture for oil filter cavity	See Figure 2
2.	91PT330-04	Counterbore fixture for split-line flanges	See Figure 3



TOOLING INSTRUCTION DRAWING
91PT330-03INST

Figure 2

From the instructions provided in:

DRAWING NUMBER
91PT330-03
INST.

SHEET 2 OF 2

A. COUNTERBORE DEPTH SETUP:

(1) Loosen up set screw (Item 7) on counterbore setup sleeve.

(2) Insert counterbore (Item 5) with loose setup sleeve (Item 6) in the jig bush/jig plate (Items 3 and 1).

(3) See Figure 1. Place jig plate (Item 1) over the setup block (Item 8), extend counterbore (Item 5) all the way into the setup block (Item 8) recess and lock set screw (Item 7) on the setup sleeve (Item 6) in position.

B. JIG PLATE INSTALLATION:

(1) If installed, remove all the studs to be replaced and insure the housing threads are not damaged. Clean threads as required.

(2) If helicoils are installed on the housing, reposition helicoil, until it is approximately .080 in. - .100 in. below the flange surface.

(3) Install jig plate (Item 1) over the filter housing flange face.

(4) To align the jig plate (Item 1) in place, install lockscrew (Item 2) on the hole to be counterbored.

(5) Lock jig plate (Item 1) in place using two additional lockscrews (Item 2). Then, remove lockscrew (Item 2) previously installed on the hole to be counterbored.

TOOLING INSTRUCTIONS
Figure 2

From the instructions provided in:

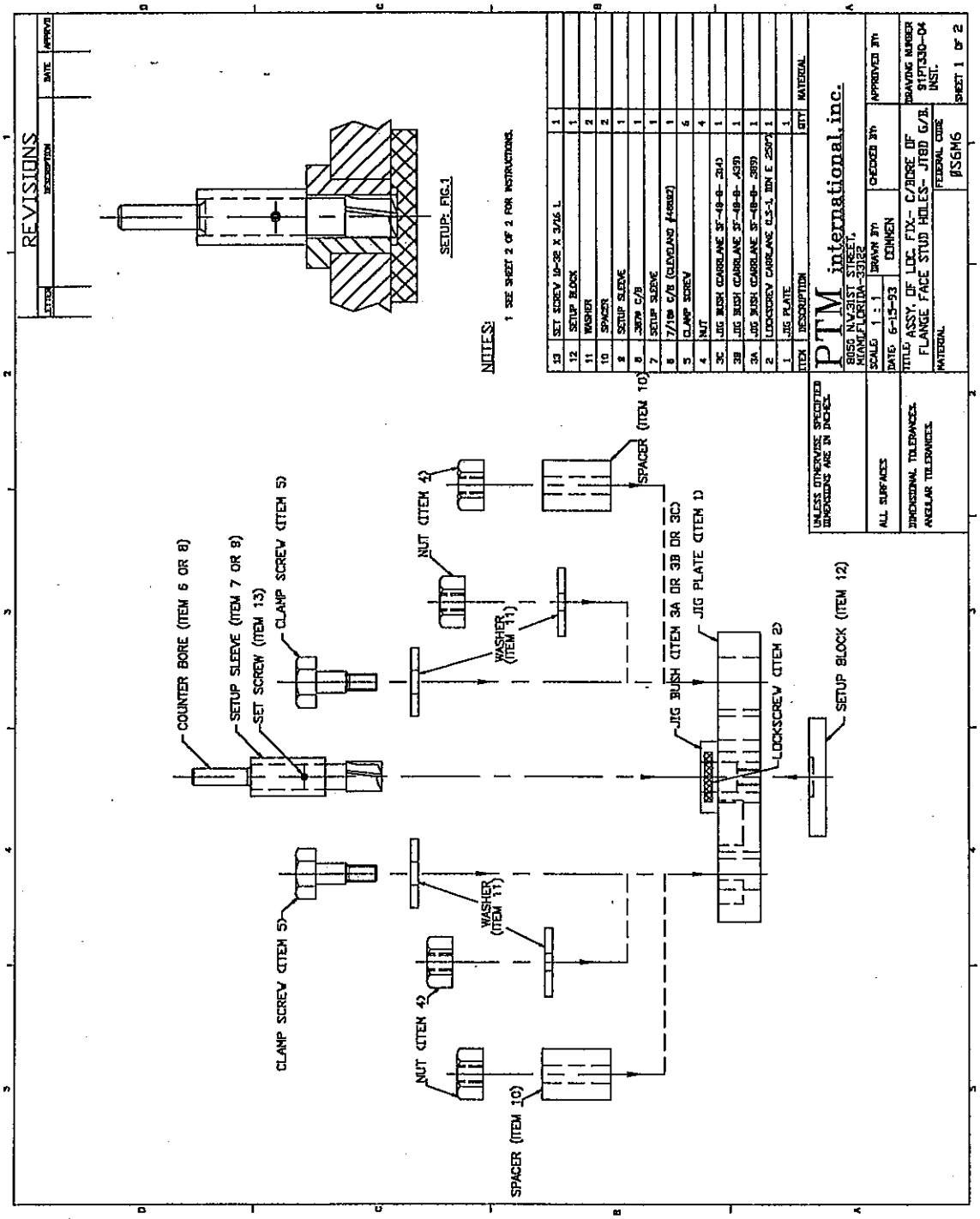
DRAWING NUMBER
91PT330-03
INST.

SHEET 2 OF 2

C. FLANGE COUNTERBORE:

(1) Install the previously set counterbore (Item 5) inside the jig bush (Item 3).

(2) Counterbore the housing flange until counterbore set up sleeve (Item 6) to bottoms on jig bush (Item 3) face.



TOOLING INSTRUCTION DRAWING
91PT330-04INST

Figure 3

From the instructions provided in:

DRAWING NUMBER
91PT330-04
INST.

SHEET 2 OF 2

A. COUNTERBORE DEPTH SETUP:

(1) Install required jig bush (.389 in. for 1/4 in. studs or .439 in. for 5/16 in. studs) (Item 3A or 3B) in the jig plate (Item 1) and lock with lock screw (Item 2).

(2) Loosen up set screw (Item 13) on counterbore setup sleeve (Item 7 or 9).

(3) Insert counterbore (Item 6 or 8) with loose setup sleeve (Item 7 or 9) in the jig bush/jig plate (Items 3A or 3B and 1).

(4) See Figure 3. Place the jig plate (Item 1) over the setup block (Item 12), extend counterbore (Item 6 or 8) all the way into the setup block (Item 12) recess and lock set screw (Item 13) on the set up sleeve (Item 7 or 9) in position.

B. JIG PLATE INSTALLATION:

(1) If installed remove existing stud to be replaced and insure the housing threads are not damaged. Clean threads as required.

(2) If a helicoil is installed, reposition helicoil until it is approximately .080 in. - .100 in. below the flange surface.

(3) Remove jig bush (Item 3A or 3B) from jig plate (Item 1).

(4) Install jig plate (Item 1) over existing studs on the flange.

TOOLING INSTRUCTIONS
Figure 3

From the instructions provided in:

DRAWING NUMBER
91PT330-04
INST.

SHEET 2 OF 2

NOTE: Jig plate (Item 1) may need to be rotated and/or placed upside down until the right assembly combination will position it over the stud to be counterbored.

(5) Install .314 in. diameter jig bush (Item 3C) on jig plate (Item 1) and lock with lockscrew (Item 2).

(6) Insert appropriate size clamp screw (Item 5) and washer (Item 11) on jig bush (Item 3C), align hole to be counterbored and lock clamp screw (Item 5) in place.

(7) Lock the jig plate (Item 1) to the housing using spacers (Item 10), if needed, washers (Item 11) and nuts (Item 4) (if the studs are installed) or the appropriate size clamp screws (Item 5) and washers (Item 11) (if the studs are removed).

(8) Remove the clamp screw (Item 5) from the jig bush (Item 3C) and remove .314 in. diameter jig bush (Item 3C) from the jig plate (Item 1).

C. FLANGE COUNTERBORE:

(1) Install the appropriate diameter (.389 in. or .439 in.) jig bush (Item 3A or 3B) in the jig plate (Item 1) and lock in place with lockscrew (Item 2).

(2) Install the previously set, appropriate size, counterbore (Item 6 or 8) inside the jig bush (Item 3A or 3B).

(3) Counterbore the housing flange until counterbore set up sleeve (Item 7 or 9) bottoms on jig bush (Item 3A or 3B).