

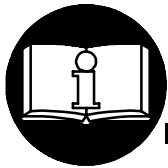
# OPERATION AND MAINTENANCE MANUAL FOR MODELS ES60P, ES60T, ES70P, ES70T, ES80P, ES90P, ES90T, ES100P AND ES100T ELECTRIC SCREWDRIVERS (DELVO)

## NOTICE

Models ES60P, ES60T, ES70P, ES70T, ES80P, ES90P, ES90T, ES100P and ES100T Electric Screwdrivers are designed for installing threaded fasteners in light industrial and appliance manufacturing applications.

Ingersoll-Rand is not responsible for customer modification of tools for applications on which Ingersoll-Rand was not consulted.

## ⚠ WARNING



### IMPORTANT SAFETY INFORMATION ENCLOSED.

**READ ALL THESE INSTRUCTIONS BEFORE PLACING TOOL IN SERVICE OR OPERATING THIS TOOL AND SAVE THESE INSTRUCTIONS.**

**IT IS THE RESPONSIBILITY OF THE EMPLOYER TO PLACE THE INFORMATION IN THIS MANUAL INTO THE HANDS OF THE OPERATOR.**

**FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.**

**WHEN USING ELECTRIC TOOLS, BASIC SAFETY PRECAUTIONS SHOULD ALWAYS BE FOLLOWED TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK AND PERSONAL INJURY, INCLUDING THE FOLLOWING.**

#### PLACING TOOL IN SERVICE

- Always operate, inspect and maintain this tool in accordance with all regulations (local, state, federal and country), that may apply to hand held/hand operated pneumatic tools.
- Inspect tool cords periodically and if damaged, have them repaired by an authorized service facility. Inspect extension cords periodically and replace if damaged.
- Do not remove any labels. Replace any damaged label.

#### USING THE TOOL

- Always wear eye protection when operating or performing maintenance on this tool.
- Power tools can vibrate in use. Vibration, repetitive motions, or uncomfortable positions may be harmful to your hands and arms. Stop using any tool if discomfort, tingling feeling or pain occurs. Seek medical advice before resuming use.
- **Guard Against Electric Shock.** Prevent body contact with earthed or grounded surfaces. For example; pipes, radiators, ranges, refrigerator enclosures.
- **Don't abuse Cord.** Never carry tool by cord or yank it to disconnect from receptacle. Keep cord from heat, oil, and sharp edges.

- **Keep work area clean.** Cluttered areas and benches invite injuries.
- **Consider work area environment.** Don't expose power tools and chargers to water. Keep work area well lighted. Do not use tool in explosive or flammable atmospheres.
- **Keep bystanders and children away.** Do not permit unauthorized personnel to operate this tool, or touch tool or cord.
- **Store idle tools.** When not in use, tools should be stored in a dry, high or locked up place, out of reach of children.
- **Don't force tool.** It will do the job better and more safely at the rate for which it was intended.
- **Use the right tool.** Do not force a small tool or attachment to do the job of a heavy-duty tool.
- **Do not use a tool for a purpose for which it is not intended.** Example: Do not use a screwdriver as a drill.
- **Dress properly.** Do not wear loose clothing or jewelry. They can be caught in moving parts. Rubber gloves and non-skid footwear are recommended when working outdoors. Wear protective hair covering to contain long hair.

## NOTICE

The use of other than genuine Ingersoll-Rand replacement parts may result in personal injury, decreased tool performance and increased maintenance, and may invalidate all warranties.

Have your tool repaired by a qualified person. This electric tool is in accordance with the relevant safety requirements. Repairs should only be carried out by qualified persons using original spare parts; otherwise this may result in considerable danger to the user.

Repairs should be made only by authorized, trained personnel. Consult your nearest Ingersoll-Rand Authorized Servicer.

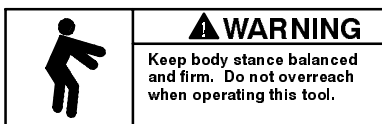
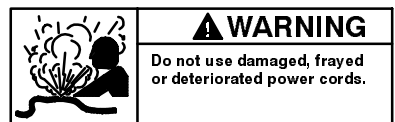
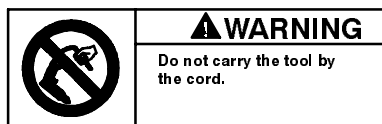
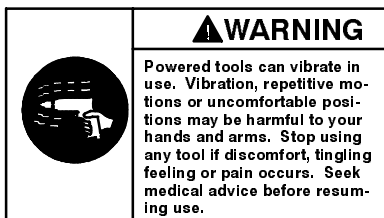
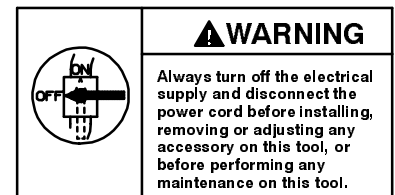
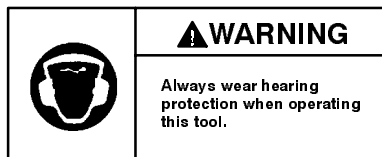
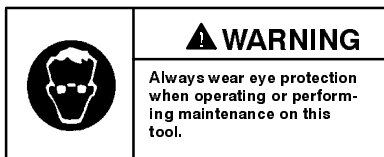
**⚠ WARNING**

**FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.**

**USING THE TOOL (Continued)**

- **Secure work.** Use clamps or a vise to hold work. Operators often need both hands to perform job functions.
- **Don't overreach.** Keep proper footing, balance, and a firm grip on the tool at all times.
- **Maintain tools with care.** Keep tools clean for better and safer performance. Follow instructions for lubricating and changing accessories. Inspect tool cords periodically and if damaged, have them repaired by an authorized service facility. Inspect extension cords periodically and replace if damaged. Keep handles dry, clean, and free from oil and grease.
- **Remove adjusting keys and wrenches.** Form habit of checking to see that keys and adjusting wrenches are removed from tool before turning it on.
- **Avoid unintentional starting.** Don't carry tool with finger on switch.
- **Do not drop or abuse the tool.**
- **Whenever a tool is not being used, position the Power Switch to the "OFF" position and unplug the power cord.**
- **Stay alert.** Watch what you are doing. Use common sense. Do not operate tool when you are tired.
- **Check damaged parts.** Before further use of the tool, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced by an authorized service center unless otherwise indicated elsewhere in this operation manual.
- **Have defective switches replaced by an authorized service center.**
- **Do not use the tool if the switch does not turn it on and off.**
- **Do not drop or abuse the screwdriver.**
- **Whenever changing a bit, make certain the Forward/Reverse Switch is in the "OFF" position and the tool is unplugged.**
- **Do not allow chemicals such as acetone, benzene, thinner, ketone, trichloroethylene or other similar chemicals to come in contact with the screwdriver housing as damage will result.**
- **Do not adjust the torque setting higher than 9 on the Torque Scale.**
- **There should be a tool rest interval when cycles are three seconds or longer.**
- **Do not tighten more than 900 tapping screws (size: 2 mm, length: 4 mm) per hour.**
- **Do not use this screwdriver for tightening wood screws.**
- **Do not operate the Forward/Reverse Switch when the motor is running.**
- **Whenever a tool is not being used, move the Forward/Reverse Switch to the "OFF" position and unplug the screwdriver.**
- **The use of any accessory or attachment other than recommended in this manual can present a risk of personal injury.**

**WARNING LABEL IDENTIFICATION**



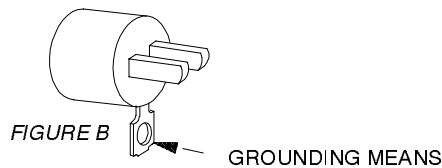
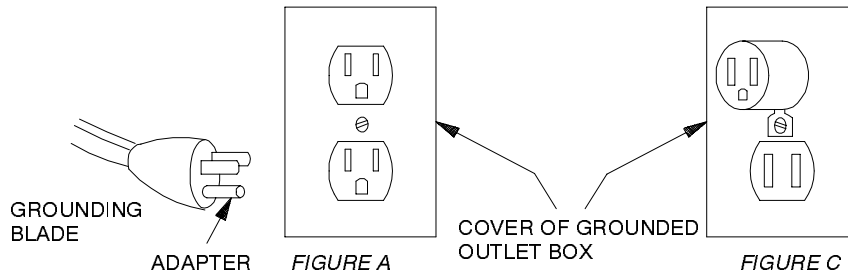
## PLACING TOOL IN SERVICE

### GROUNDING INSTRUCTIONS

The tool should be grounded while in use to protect the operator from electric shock. The tool is equipped with a three-conductor cord and three-prong grounding-type plug to fit the proper grounding-type receptacle. The green (or green and yellow) conductor in the cord is the grounding wire. Never connect the green (or green and yellow) wire to a live terminal.

If your unit is for use on less than 150V, it has a plug that looks like that shown in Figure A.

An adapter (see Figure B) is available for connecting Figure A-type plugs to 2-prong receptacles. The green colored rigid grounding strap must be connected to a permanent ground such as to a properly grounded outlet box as shown in figure C.



(Dwg. TPD446-1)

### WARNING

For safe use of adapters, the outlet box must be grounded. If there is any doubt, have a qualified electrician check connections.

Use only 3-wire extension cords that have 3-prong grounding type plugs and 3 pole receptacles that accept the controllers plug. Replace or repair damaged cords.

## ADJUSTMENTS

### TORQUE ADJUSTMENT

To adjust the torque on these screwdrivers, proceed as follows:

1. Determine the torque output of the tool by checking a tightened fastener with a torque wrench.
2. Increase or decrease the torque output by rotating the Spring Adjusting Ring (37 or 39). Rotating the Ring clockwise to a higher number on the Torque Scale increases torque output while rotating the Ring counterclockwise to a lower number decreases the torque output.

### NOTICE

The numbers from zero to seven on the Torque Scale are reference numbers only and are not an indication of actual torque output.

3. Check the adjustment with a torque wrench. A number of factors will affect torque output from one job to another. Final torque adjustment should be made at the job through a series of gradual increases. Always start below the desired torque and work upward.

### NOTICE

### DO NOT ATTEMPT TO REPAIR THIS TOOL.

All repairs and maintenance of this tool and its cord must be performed by an authorized service center. Contact Sales Office listed on last page of this form.

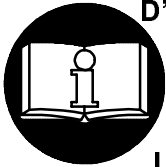
SAVE THESE INSTRUCTIONS.  
DO NOT DESTROY.

# MANUEL D'EXPLOITATION ET D'ENTRETIEN DES VISSEUSES ÉLECTRIQUES MODÈLES ES60P, ES60T, ES70P, ES70T, ES80P, ES90P, ES90T, ES100P ET ES100T (DELVO)

## NOTE

Les visseuses électriques des modèles ES60P, ES60T, ES70P, ES70T, ES80P, ES90P, ES90T, ES100P et ES100T (DELVO) sont destinées au montage des fixations filetées dans les applications de production industrielle légère et d'appareillage. Ingersoll-Rand ne peut être tenu responsable de la modification des outils par le client pour les adapter à des applications qui n'ont pas été approuvées par Ingersoll-Rand.

## ATTENTION



**D'IMPORTANTES INFORMATIONS DE SÉCURITÉ SONT JOINTES. VEUILLEZ LIRE TOUTES CES INSTRUCTIONS AVANT DE METTRE CET OUTIL EN SERVICE OU AVANT D'EXPLOITER CET OUTIL, ET CONSERVEZ CES INSTRUCTIONS.**

**L'EMPLOYEUR EST TENU DE COMMUNIQUER LES INFORMATIONS DE CE MANUEL AUX EMPLOYÉS UTILISANT CET OUTIL.**

**LE NON RESPECT DES AVERTISSEMENTS SUIVANTS PEUT CAUSER DES BLESSURES. PENDANT L'UTILISATION D'OUTILS ÉLECTRIQUES, PRENEZ TOUJOURS LES PRÉCAUTIONS DE SÉCURITÉ NÉCESSAIRES, Y COMPRIS CELLES DÉCRITES CI-DESSOUS, POUR RÉDUIRE LES RISQUES D'INCENDIE, DE CHOC ÉLECTRIQUE ET DE BLESSURE PERSONNELLE.**

### MISE EN SERVICE DE L'OUTIL

- Cet outil doit toujours être exploité, inspecté et entretenu conformément à toutes les réglementations (locales, départementales, fédérales et nationales), applicables aux outils pneumatiques tenus/commandés à la main.
- Inspecter périodiquement les cordons d'alimentation, et, en cas d'endommagement, les faire réparer par un centre d'entretien autorisé. Inspecter périodiquement les rallonges et les remplacer en cas d'endommagement.
- Ne retirer aucune étiquette. Remplacer toute étiquette endommagée.

### UTILISATION DE L'OUTIL

- Porter toujours des lunettes de protection pendant l'utilisation et l'entretien de cet outil.
- Les outils électriques peuvent vibrer pendant l'usage. Les vibrations, les mouvements répétitifs et les positions inconfortables peuvent causer des douleurs dans les mains et les bras. N'utiliser plus d'outils en cas d'inconfort, de picotements ou de douleurs. Consulter un médecin avant de recommencer à utiliser l'outil.
- Faire attention aux chocs électriques. Éviter tout contact du corps avec des surfaces mises à la masse. Par exemple : tuyauteries, radiateurs, fours, enceintes de réfrigérateurs.
- Ne pas maltraiter le cordon d'alimentation. Ne jamais transporter l'outil par son cordon, et ne jamais tirer sur le

cordon pour le débrancher de sa prise. Tenir le cordon éloigné des sources de chaleur, de l'huile et des arêtes vives.

- **Maintenir le lieu de travail propre.** Les zones et les établis encombrés peuvent être cause de blessures.
- **Considérer l'environnement du lieu de travail.** Ne jamais exposer les outils électriques ou les chargeurs à l'eau. Assurer un éclairage adéquat de la zone de travail. Ne jamais utiliser l'outil dans des atmosphères explosives ou inflammables.
- **Tenir les personnes et les enfants éloignés.** Ne jamais laisser du personnel non autorisé se servir ou toucher l'outil ou le cordon.
- **Ranger les outils non utilisés.** Lorsqu'ils ne sont pas utilisés, les outils doivent être rangés dans un endroit sec et fermé hors de portée des enfants.
- **Ne pas forcer l'outil.** Il effectuera sa tâche plus efficacement et en toute sécurité s'il est utilisé à sa vitesse normale.
- **Utiliser l'outil correct.** Ne jamais forcer un petit outil ou accessoire à effectuer la tâche d'un outil à usage intensif.
- **Ne pas utiliser un outil pour une tâche autre que celle pour laquelle il a été conçu.** Par exemple, ne pas utiliser une visseuse comme une perceuse.
- **Porter les vêtements appropriés.** Ne pas porter de vêtements flous ou des bijoux. Ils peuvent être attrapés par les pièces en mouvement. Des gants en caoutchouc et des chaussures antidérapantes sont recommandés pour les travaux à l'extérieur. Porter un filet protecteur pour retenir les cheveux longs.

## NOTE

L'utilisation de rechanges autres que les pièces d'origine Ingersoll-Rand peut causer des blessures personnelles, réduire les performances de l'outil et augmenter l'entretien, et peut annuler toutes les garanties.

Faites réparer votre outil par un personne compétente. Cet outil électrique est conforme aux exigences de sécurité applicables. Les réparations ne doivent être effectuées que par des personnes compétentes utilisant les rechanges d'origine, sous peine de danger considérable pour l'opérateur.

Les réparations ne doivent être effectuées que par des réparateurs qualifiés autorisés. Consultez votre Centre de Service Ingersoll-Rand le plus proche.

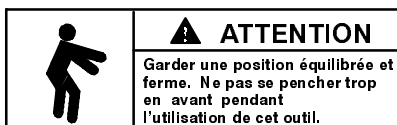
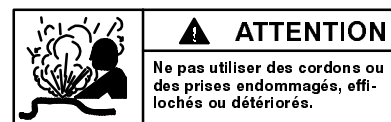
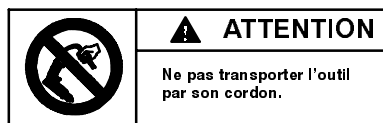
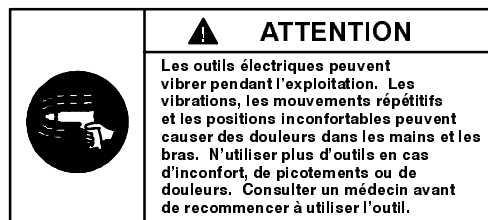
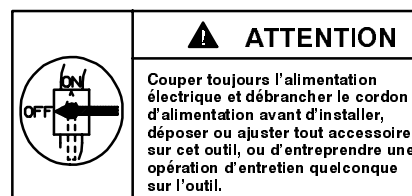
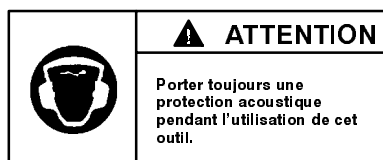
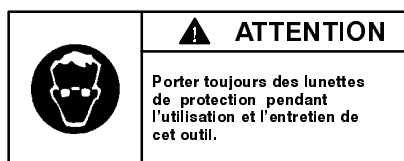
## ⚠ ATTENTION

### LE NON RESPECT DES AVERTISSEMENTS SUIVANTS PEUT CAUSER DES BLESSURES.

#### UTILISATION DE L'OUTIL *(suite)*

- **Fixer les pièces.** Utiliser des brides ou un étau pour fixer les pièces. Les opérateurs ont souvent besoin de leurs deux mains pour effectuer leur travail.
- **Ne pas se pencher en avant.** Conserver une position stable et équilibrée, et tenir fermement l'outil à tout moment.
- **Entretien des outils avec soin.** Pour obtenir des performances optimales et sûres, tenir les outils propres. Observer les instructions de lubrification et de changement d'accessoires. Inspecter périodiquement les cordons d'alimentation, et, en cas d'endommagement, les faire réparer par un centre d'entretien autorisé. Inspecter périodiquement les rallonges et les remplacer en cas d'endommagement. Tenir les poignées sèches, propres et exemptes d'huile et de graisse.
- **Retirer les clés de réglage.** Prendre l'habitude de vérifier que toutes les clés de réglage et de serrage sont enlevées de l'outil avant de le mettre en marche.
- **Éviter toute mise en marche accidentelle.** Ne pas transporter l'outil avec un doigt sur l'interrupteur.
- **Ne pas laisser tomber ou maltraiter l'outil.**
- **A chaque fois qu'un outil n'est pas utilisé, placer l'interrupteur d'alimentation à la position "ARRÊT" et débrancher le cordon d'alimentation.**
- **Rester alerte.** Être attentif pendant le travail. Ne pas prendre de risque. Ne pas utiliser l'outil en cas de fatigue.
- **Vérifier les pièces endommagées.** Avant tout autre usage de l'outil, un carter de protection ou tout autre composant endommagé doit être vérifié pour s'assurer qu'il remplira correctement son rôle. Vérifier l'alignement des pièces mobiles, le grippage des pièces en mouvement, la cassure des pièces, leurs fixations et toute autre condition qui pourrait affecter le fonctionnement de l'outil. Sauf indication contraire dans ce manuel, tout carter ou autre composant endommagé doit être réparé ou remplacé par un centre d'entretien autorisé.
- **Faire remplacer les interrupteurs défectueux par un centre d'entretien autorisé.**
- **Ne pas utiliser l'outil si l'interrupteur n'assure pas correctement la mise en marche ou l'arrêt.**
- **Ne pas laisser tomber ou maltraiter la visseuse.**
- **A chaque fois qu'un embout est changé, vérifier que le commutateur de marche avant/marche arrière est à la position "ARRÊT" et que l'outil est débranché.**
- **Ne jamais laisser des produits chimiques tels que l'acétone, le benzène, les diluants, la cétone, le trichloréthylène ou d'autres produits similaires, entrer en contact avec le corps de la visseuse sous peine d'endommagement.**
- **Ne pas ajuster le réglage du couple au-delà de la valeur 9 sur l'échelle de couple.**
- **Prévoir un intervalle de repos de l'outil lorsque les cycles ont une durée de trois secondes ou plus.**
- **Ne pas visser plus de 900 vis auto-taraudeuses (Ø 2 mm, longueur 4 mm) par heure.**
- **Ne pas utiliser cette visseuse pour le serrage des vis à bois.**
- **Ne pas actionner l'interrupteur marche avant/marche arrière lorsque le moteur est en marche.**
- **Lorsqu'un outil n'est pas utilisé, placer l'interrupteur marche avant/marche arrière à la position "ARRÊT" et débrancher la visseuse.**
- **L'utilisation d'accessoires ou d'équipements autres que ceux recommandés dans ce manuel peut présenter des risques de blessure personnelle.**

### SIGNIFICATION DES ÉTIQUETTES D'AVERTISSEMENT

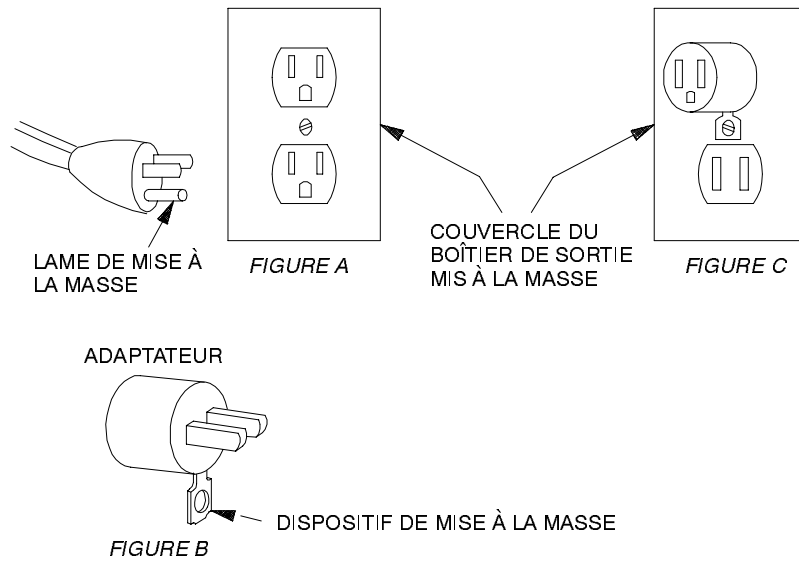


## MISE EN SERVICE DE L'OUTIL

L'outil doit être branché sur prise de terre pour protéger l'opérateur contre tout choc électrique. Le contrôleur est équipé d'un cordon d'alimentation à 3 conducteurs et d'une prise à 3 broches avec mise à la masse qui se connecte dans une prise femelle avec broche de mise à la masse.

Le conducteur vert (ou vert et jaune) du cordon est le conducteur de mise à la masse. Ne jamais connecter le conducteur vert (ou vert et jaune) à une borne sous tension.

Si votre unité est destinée à une alimentation inférieure à 150 volts, elle aura une prise comme celle illustrée à la Figure A. Un adaptateur (voir Figure B) est disponible pour connecter les prises du type de la Figure A à des prises femelles à deux broches. La bande rigide de couleur verte de mise à la masse sortant de l'adaptateur doit être connectée à une masse permanente, comme par exemple un boîtier de sortie correctement mis à la masse.



### ⚠ ATTENTION

Pour une utilisation sûre des adaptateurs, le boîtier de sortie doit être connecté à la masse. En cas de doute, demander à un électricien qualifié de vérifier les connexions.

### Rallonges:

Utiliser seulement des rallonges à 3 conducteurs équipées de prises à 3 broches avec mise à la masse et de prises femelles à 3 broches acceptant la prise mâle du contrôleur. Remplacer ou réparer toute rallonge endommagée.

## RÉGLAGES

### ———— RÉGLAGE DU COUPLE ————

Pour régler le couple de ces visseuses, procéder comme suit :

1. Déterminer le couple produit par l'outil en vérifiant une fixation serrée à l'aide d'une clé dynamométrique.
2. Augmenter ou réduire le couple produit en tournant la bague de réglage du couple (37 ou 39). La rotation de la bague **dans le sens des aiguilles d'une montre** à un chiffre supérieur de l'échelle de couple augmente le couple de serrage, tandis que la rotation de la bague **dans le sens inverse des aiguilles d'une montre** à un chiffre inférieur réduit le couple.

### NOTE

Les chiffres de 0 à 7 sur l'échelle de couple ne sont donnés qu'à titre indicatif et ne sont pas une indication de la valeur réelle du couple de serrage.

3. Vérifier le réglage à l'aide d'une clé dynamométrique. Un certain nombre de facteurs affectera le couple d'un travail à un autre. Le réglage final du couple doit être effectué sur le travail par petites étapes successives. Commencer toujours en dessous du couple désiré et augmenter le couple progressivement.

### NOTE

### NE PAS ESSAYER DE RÉPARER CET OUTIL

Toutes les réparations et l'entretien de cet outil doivent être confiés à un centre d'entretien autorisé. Veuillez contacter le bureau de vente listé à la dernière page de cette publication.

**CONSERVEZ SOIGNEUSEMENT CES INSTRUCTIONS. NE PAS LES DÉTRUIRE.**

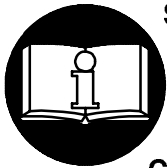
# MANUAL DE USO Y MANTENIMIENTO PARA ATORNILLADORES ELÉCTRICOS MODELOS ES60P, ES60T, ES70P, ES70T, ES80P, ES90P, ES90T, ES100P Y ES100T (DELVO)

## NOTA

Los atornilladores eléctricos de las modelos ES60P, ES60T, ES70P, ES70T, ES80P, ES90P, ES90T, ES100P y ES100T están diseñados para atornillar en aplicaciones industriales ligeras y aparatos electrodomésticos.

Ingersoll-Rand no aceptará responsabilidad alguna por la modificación de las herramientas efectuada por el cliente para las aplicaciones que no hayan sido consultadas con Ingersoll-Rand.

## AVISO



SE ADJUNTA INFORMACIÓN IMPORTANTE DE SEGURIDAD. LEA Y CONSERVE TODAS ESTAS INSTRUCCIONES ANTES DE PONER EN SERVICIO O USAR ESTA HERRAMIENTA. ES RESPONSABILIDAD DE LA EMPRESA ASEGURARSE DE QUE EL OPERARIO ESTÉ AL TANTO DE LA INFORMACIÓN QUE CONTIENE ESTE MANUAL.

EL HACER CASO OMISO DE LOS AVISOS SIGUIENTES PODRÍA OCASIONAR LESIONES. CUANDO SE USAN HERRAMIENTAS ELÉCTRICAS ES PRECISO ADOPTAR SIEMPRE ENTRE OTRAS LAS SIGUIENTES PRECAUCIONES BÁSICAS PARA REDUCIR EL RIESGO DE INCENDIO, DESCARGAS ELÉCTRICAS Y LESIONES.

### PARA PONER LA HERRAMIENTA EN SERVICIO

- Use, inspeccione y mantenga esta herramienta siempre de acuerdo con todas las normativas (locales, estatales, federales, nacionales), que apliquen a las herramientas neumáticas de operación y agarre manual.
- Examine periódicamente los cables de las herramientas y, si están estropeados, encargue su reparación a un centro de servicio autorizado. Examine periódicamente los cables de prolongación y cámbielos si están estropeados.
- No saque ninguna etiqueta. Sustituya toda etiqueta dañada.

### UTILIZACIÓN DE LA HERRAMIENTA

- Lleve siempre protección ocular cuando utilice esta herramienta o realice operaciones de mantenimiento en la misma.
- Las herramientas eléctricas pueden vibrar durante el uso. La vibración, los movimientos repetitivos o las posiciones incómodas pueden dañarle los brazos y manos. En caso de incomodidad, sensación de hormigueo o dolor, deje de usar la herramienta. Consulte con el médico antes de volver a utilizarla.
- Protéjase contra las descargas eléctricas. Evite el contacto del cuerpo con superficies puestas a tierra. Por ejemplo: tuberías, radiadores, cocinas o cámaras frigoríficas.
- No abuse del cable. No conviene llevar la herramienta cogida por el cable ni desenchufar el cable dándole un tirón. Proteja el cable del calor, aceite y cantos vivos.

- Conserve limpio el lugar de trabajo. Los espacios y bancos de trabajo llenos de estorbos acaban dando lugar a lesiones.
- Examine el entorno de trabajo. No exponga las herramientas eléctricas y aparatos cargadores al contacto con agua. Mantenga el lugar de trabajo bien iluminado. No use la herramienta en ambientes explosivos o inflamables.
- Mantenga apartados a curiosos y niños. No permita que personal no autorizado utilice ni toque esta herramienta ni el cable.
- Guarde las herramientas que no se usen. Cuando no se estén usando conviene guardar las herramientas en un lugar seco, alto o cerrado bajo llave, fuera del alcance de los niños.
- No fuerce la herramienta. Hará mejor el trabajo y de manera más segura utilizándola al régimen para el que ha sido proyectada.
- Use la herramienta conveniente. No fuerce una herramienta o accesorio pequeño a hacer el trabajo de una herramienta pesada.
- No conviene usar una herramienta para un fin distinto del previsto. Ejemplo: No debe usarse un destornillador como taladro.
- Use ropa adecuada. No use ropa suelta ni joyería, pues pueden ser atrapadas por piezas en movimiento. Se recomienda usar guantes de goma y calzado antideslizante cuando se trabaje al exterior. Si se lleva el pelo largo conviene contenerlo cubriéndose la cabeza.

## NOTA

El uso de piezas de recambio que no sean auténticas de Ingersoll-Rand puede dar lugar a que se sufran lesiones, se reduzca el rendimiento de la herramienta y aumenten los cuidados de mantenimiento necesarios, así como la anulación de toda garantía.

Encargue las reparaciones a una persona capacitada. Esta herramienta eléctrica está construida de conformidad con los requisitos pertinentes en materia de seguridad. Las reparaciones sólo deben ser efectuadas por personal capacitado empleando repuestos de origen, pues de lo contrario el usuario queda expuesto a riesgos considerables.

Las reparaciones sólo se deben encomendar a personal debidamente cualificado y autorizado. Consulte con el centro de servicio autorizado Ingersoll-Rand más próximo.

**EL HACER CASO OMISO DE LOS AVISOS SIGUIENTES PODRÍA OCASIONAR LESIONES.**

**USO DE HERRAMIENTA (Continuación)**


- **Sujete las piezas.** Use mordazas o un tornillo de banco para sostener la pieza. Los operarios a menudo necesitan las dos manos para ejecutar ciertos trabajos.
- **No se estire demasiado.** Mantenga una postura del cuerpo equilibrada y firme, y tenga bien agarrada la herramienta en todo momento.
- **Cuide de las herramientas con atención.** Conserve limpias las herramientas para mejorar su rendimiento y seguridad. Observe las instrucciones para lubricar y cambiar accesorios. Examine periódicamente los cables de las herramientas y, si están estropeados, encargue su reparación a un centro de servicio autorizado. Examine periódicamente los cables de prolongación y cámbielos si están estropeados. Mantenga las empuñaduras secas, limpias y exentas de aceite y grasa.
- **Quite siempre las llaves de ajuste.** Acostúmbrase a constatar que se han quitado de la herramienta las llaves manuales de ajuste antes de conectar la corriente.
- **Evite la puesta en marcha intempestiva.** No lleve la herramienta con el dedo en el interruptor.
- **No deje caer la herramienta ni abuse de ella.**
- **Siempre que no vaya a usar la herramienta, desconecte el interruptor de alimentación poniéndolo en “OFF” y desenchufe el cable.**
- **Manténgase alerta.** Vigile lo que está haciendo. Use el sentido común. No utilice la herramienta cuando esté cansado.
- **Compruebe si hay piezas estropeadas.** Antes de seguir usando la herramienta, una guarda u otra pieza que esté estropeada conviene comprobar con atención que funcionará debidamente y realizará su función prevista. Comprobar la alineación de las piezas móviles y constatar si hay agarrotamiento de elementos móviles, rotura de piezas, su montaje, y cualesquiera otras

condiciones que puedan afectar a su funcionamiento. Una guarda u otra pieza cualquiera que esté estropeada debe repararse debidamente o ser sustituida por un centro de servicio autorizado a no ser que se indique otra cosa en alguna parte de este manual.


- **Encarge a un centro de servicio autorizado que sustituya interruptores que estén defectuosos.**
- **No use la herramienta si el interruptor no conecta ni desconecta.**
- **No deje caer el atornillador ni abuse de él.**
- **Siempre que cambie un útil, asegúrese de que el conmutador de cambio del sentido de rotación está puesto en “OFF” y que la herramienta está desenchufada.**
- **No deje que entren en contacto con la carcasa del atornillador sustancias químicas como acetona, benceno, diluyentes, cetona, tricloroetileno ni otros productos químicos similares, pues se producirán daños.**
- **No ajuste el par a un valor más alto que el 9 de la escala.**
- **Debe hacerse una pausa en el uso de la herramienta cuando los ciclos sean de tres segundos o más de duración.**
- **No apriete más de 900 tornillos autoroscantes (tamaño: 2 mm, longitud: 4 mm) por hora.**
- **No utilice este atornillador para apretar tornillos para madera.**
- **No cambie el sentido de rotación mientras el motor esta funcionando.**
- **Siempre que no vaya a usar una herramienta, ponga en “OFF” el mando de inversión del sentido de rotación y desenchufe el atornillador.**
- **El uso de cualquier accesorio o aditamento distinto de los recomendados en este manual conlleva el riesgo de sufrir lesiones.**


**ETIQUETAS DE AVISO**


	<p><b>ADVERTENCIA</b></p> <p>Usar siempre protección ocular al manejar o realizar operaciones de mantenimiento en esta herramienta.</p>
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	<p><b>ADVERTENCIA</b></p> <p>Usar siempre protección para los oídos al manejar esta herramienta.</p>
-------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------

	<p><b>ADVERTENCIA</b></p> <p>Cortar siempre la corriente y desenchufar el cable de la red antes de montar, desmontar o ajustar cualquier accesorio en esta herramienta, o antes de efectuar algún trabajo de mantenimiento en ella.</p>
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	<p><b>ADVERTENCIA</b></p> <p>Las herramientas eléctricas pueden vibrar durante el uso. La vibración, los movimientos repetitivos o las posiciones incómodas podrían dañarle los brazos y las manos. En caso de incomodidad, sensación de hormigueo o dolor, dejar de usar la herramienta. Consultar al médico antes de volver a utilizarla.</p>
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	<p><b>ADVERTENCIA</b></p> <p>No llevar la herramienta cogida por el cable.</p>
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	<p><b>ADVERTENCIA</b></p> <p>No usar cables que estén estropeados, rozados o deteriorados.</p>
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	<p><b>ADVERTENCIA</b></p> <p>Mantener una postura del cuerpo equilibrada y firme. No estirar demasiado los brazos al manejar la herramienta.</p>
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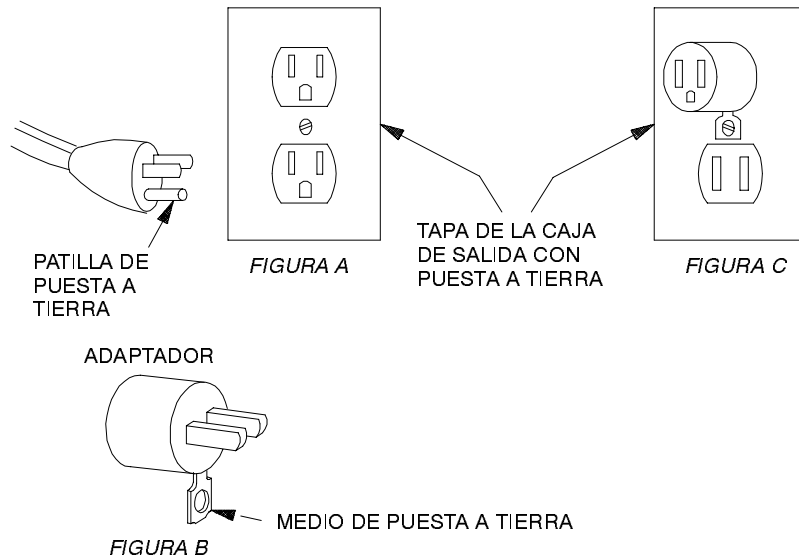


## PARA PONER LA HERRAMIENTA EN SERVICIO

La herramienta debe estar conectada a tierra mientras esté en uso para evitar descargas eléctricas al operario. El controlador tiene un cable trifilar y enchufe de tres contactos, del tipo con contacto a tierra, que se acopla en el correspondiente enchufe hembra puesto a tierra.

El conductor verde (o verde y amarillo) del cable es el de tierra. No conecte nunca el conductor verde (o verde y amarillo) a un borne con tensión. Si el aparato es para uso

con red de menos de 150V y tiene un enchufe parecido al ilustrado en la Fig. A. Existe un adaptador (Fig. B) para conectar enchufes del tipo de la Fig. A a enchufes hembra de 2 contactos. La tira rígida de color verde que sobresale del adaptador tiene que conectarse a una toma de tierra permanente, tal como una caja de enchufes debidamente puesta a tierra.



(Esq. TPD446-1)

### ⚠ AVISO

Para usar adaptadores de manera segura es preciso que el enchufe esté puesto a tierra. En caso de duda conviene que un electricista verifique las conexiones.

### Cables de prolongación

Utilice únicamente cables de prolongación trifilares que tengan enchufes de 3 contactos y empleando enchufes hembra tripolares que admitan el enchufe del controlador. Cambie o repare los cables estropeados.

## AJUSTES

### ———— AJUSTE DE PAR ————

Para ajustar el par en estos atornilladores, proceder como sigue:

1. Constatar el par que desarrolla la herramienta comprobando un tornillo apretado con una llave dinamométrica.
2. Aumentar o reducir el par girando el anillo de ajuste del muelle (37 o 39). Girando el anillo **en sentido horario** a un número más alto de la escala aumenta el par, y girándolo **en sentido antihorario** a un número más bajo se reduce el par.

### NOTA

Los números del nulo al siete de la escala de pares son sólo números de referencia y no una indicación del par realmente desarrollado.

3. Comprobar el ajuste con una llave diamométrica. Hay una variedad de factores que pueden afectar al par al cambiar de un trabajo a otro. El ajuste definitivo debe hacerse sobre la marcha mediante una serie de incrementos graduales. Conviene empezar siempre con un par inferior al deseado y aumentarlo progresivamente.

### NOTA

### ABSTENERSE DE INTENTAR REPARAR ESTA HERRAMIENTA

Todos los trabajos de reparación y mantenimiento de esta herramienta y su cable tienen que ser efectuados por un centro de servicio autorizado. Al final de esta publicación figura la lista de centros de venta.

**GUARDE ESTAS INSTRUCCIONES.  
NO LAS DESTRUYA.**

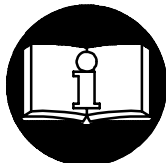
# MANUAL DE FUNCIONAMENTO E MANUTENÇÃO PARA AS APARAFUSADORAS ELÉCTRICAS (DELVO) MODELOS ES60P, ES60T, ES70P, ES70T, ES80P, ES90P, ES90T, ES100P E ES100T

## AVISO

As Aparafusadoras Eléctricas Modelos ES60P, ES60T, ES70P, ES70T, ES80P, ES90P, ES90T, ES100P e ES100T são concebidas para instalar fixadores roscados em aplicações industriais ligeiras e de fabrico de aparelhos.

A Ingersoll-Rand não pode ser responsabilizada pela modificação de ferramentas para aplicações para as quais não tenha sido consultada.

## ⚠ ADVERTÊNCIA



**IMPORTANTES INFORMAÇÕES DE SEGURANÇA EM ANEXO.  
LEIA TODAS ESTAS INSTRUÇÕES ANTES DE PÔR A FERRAMENTA EM SERVIÇO  
OU DE OPERAR ESTA FERRAMENTA E GUARDE ESTAS INSTRUÇÕES.  
É RESPONSABILIDADE DA ENTIDADE PATRONAL PÔR AS INFORMAÇÕES  
CONTIDAS NESTE MANUAL À DISPOSIÇÃO DOS UTILIZADORES.**

**A NÃO OBEDEIÊNCIA ÀS ADVERTÊNCIAS SEGUINTESS PODERÁ RESULTAR EM LESÕES PESSOAIS.  
AO UTILIZAR FERRAMENTAS ELÉCTRICAS, DEVE-SE SEMPRE SEGUIR AS PRECAUÇÕES  
BÁSICAS DE SEGURANÇA PARA REDUZIR O RISCO DE INCÊNDIO, CHOQUE ELÉCTRICO E  
LESÕES PESSOAIS, INCLUINDO O SEGUINTE.**

### COLOCAÇÃO DA FERRAMENTA EM SERVIÇO

- Opere, inspeccione e faça manutenção nesta ferramenta sempre de acordo com todos os regulamentos (locais, estatais, federais e nacionais), que possam ser aplicáveis a ferramentas pneumáticas de funcionamento manual.
- Inspeccione os cabos da ferramenta periodicamente e, se estiverem danificados, mande-os reparar num centro de atendimento autorizado. Inspeccione periodicamente os cabos de extensão e substitua-os se estiverem danificados.
- Não retire nenhum rótulo. Substitua os rótulos danificados.

### UTILIZAÇÃO DA FERRAMENTA

- Use sempre protecção para os olhos ao operar ou fazer manutenção nesta ferramenta.
- As ferramentas eléctricas podem vibrar durante a utilização. Vibração, movimentos repetitivos ou posições desconfortáveis podem ser nocivos às suas mãos e braços. Pare de utilizar qualquer ferramenta se ocorrer desconforto, sensação de formigueiro ou dor. Procure assistência médica antes de reiniciar a utilização.
- **Protecção Contra Choque Eléctrico.** Impeça contacto do corpo com superfícies ligadas à terra. Por exemplo: tubos, radiadores, fogões metálicos, frigoríficos.
- **Não Force o Cabo.** Nunca transporte a ferramenta pelo cabo ou puxe-o para desligar da tomada. Mantenha o cabo afastado do calor, óleo e arestas afiadas.

- **Mantenha a área de trabalho limpa.** Áreas e bancadas atravancadas constituem um convite a lesões.
- **Considere o ambiente da área de trabalho.** Não exponha ferramentas eléctricas e carregadores à água. Mantenha a área de trabalho bem iluminada. Não utilize a ferramenta em atmosferas explosivas ou inflamáveis.
- **Mantenha afastados os espectadores e as crianças.** Não permita que pessoal não autorizado opere esta ferramenta ou toque na ferramenta ou no cabo.
- **Guarde ferramentas inactivas.** Quando não estiverem em uso, as ferramentas devem ser guardadas num local seco, alto ou trancado, longe do alcance das crianças.
- **Não force a ferramenta.** Esta realizará o trabalho melhor e com mais segurança na potência para a qual foi concebida.
- **Utilize a ferramenta correcta.** Não force uma ferramenta ou acessório pequenos para realizar o trabalho de uma ferramenta para trabalho pesado.
- **Não utilize a ferramenta para uma finalidade para a qual não foi concebida.** Exemplo: Não use uma aparafusadora como um berbequim.
- **Vista-se adequadamente.** Não use roupas soltas ou jóias. Estas podem agarrar em peças móveis. Recomenda-se usar luvas de borracha e calçado antideslizamento ao trabalhar ao ar livre. Use um chapéu ou outra protecção para prender cabelos longos.

## AVISO

A utilização de qualquer peça sobresselente que não seja Ingersoll-Rand genuína pode resultar em lesões pessoais, em desempenho reduzido da ferramenta e mais necessidade de manutenção, e pode invalidar todas as garantias.

Esta ferramenta deve ser consertada por uma pessoa qualificada. Esta ferramenta eléctrica está de acordo com os requisitos de segurança relevantes. As reparações só devem ser realizadas por pessoas qualificadas, utilizando peças sobresselentes genuínas, caso contrário, poderá resultar em perigo considerável para o utilizador.

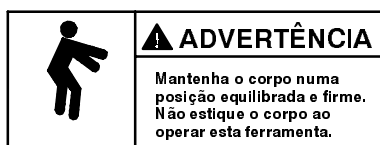
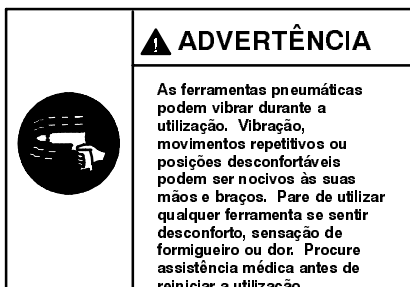
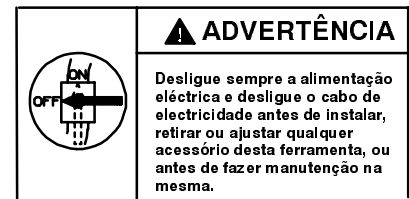
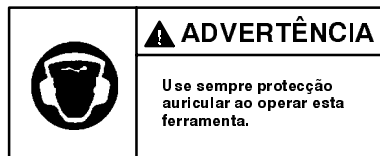
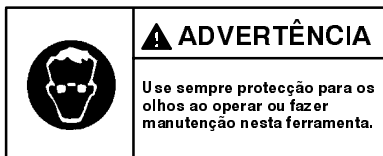
As reparações só devem ser feitas por pessoal autorizado e com formação adequada. Consulte o Representante Autorizado Ingersoll-Rand mais próximo.

## ⚠️ ADVERTÊNCIA

### A NÃO OBEDIÊNCIA ÀS ADVERTÊNCIAS SEGUINTESS PODERÁ RESULTAR EM LESÕES PESSOAIS. UTILIZAÇÃO DA FERRAMENTA (Continua)

- **Fixe o trabalho.** Use braçadeiras ou um torno de bancada para segurar o trabalho. Frequentemente, os operadores precisam de ambas as mãos para executar as funções do trabalho.
- **Não estique o corpo.** Mantenha os pés numa posição equilibrada e firme e segure firmemente a ferramenta o tempo todo.
- **Mantenha cuidadosamente as ferramentas.** Mantenha as ferramentas limpas para desempenho melhor e mais seguro. Siga as instruções para lubrificação e troca de acessórios. Inspeccione os cabos da ferramenta periodicamente e, se estiverem danificados, mande-os reparar num centro de atendimento autorizado. Inspeccione periodicamente os cabos de extensão e substitua-os se estiverem danificados. Mantenha as pegas secas, limpas e isentas de óleo e gordura.
- **Retire as chaves de mandril e chaves inglesas de ajuste.** Habitue-se a verificar que as chaves de mandril e chaves inglesas de ajuste são retiradas da ferramenta antes de a ligar.
- **Evite arranques involuntários.** Não transporte a ferramenta com o dedo no interruptor.
- **Não deixe cair ou faça mau uso da ferramenta.**
- **Sempre que uma ferramenta não estiver em uso, ponha o Interruptor de Electricidade na posição “OFF” e desligue o cabo de electricidade.**
- **Fique alerta.** Preste atenção ao que está a fazer. Empregue o bom senso. Não opere a ferramenta quando estiver cansado.
- **Examine peças danificadas.** Antes de utilizar a ferramenta novamente, um resguardo ou outra peça que esteja danificada deve ser examinada cuidadosamente para confirmar que ela funcionará adequadamente e que executará a sua função pretendida. Verifique o alinhamento de peças móveis, adesão de peças móveis, quebra de peças, montagem e quaisquer outras condições que possam afectar o funcionamento da ferramenta. Um resguardo ou outra peça que esteja danificada deve ser reparada adequadamente ou substituída num centro de atendimento autorizado, a menos que esteja indicado de forma diferente neste manual de funcionamento.
- **Mande substituir interruptores defeituosos num centro autorizado de atendimento.**
- **Não utilize a ferramenta se o interruptor não a ligar e desligar.**
- **Não deixe cair ou faça mau uso da aparafusadora.**
- **Sempre que for trocar uma ponta, certifique-se de que o Interruptor de Avanço/Reversão está na posição “OFF” e de que a ferramenta está desligada na tomada.**
- **Não permita que produtos químicos como acetona, benzina, solvente, cetona, tricloroetileno ou outros produtos semelhantes entrem em contacto com a carcaça da aparafusadora, pois poderá provocar avaria.**
- **Não ajuste o valor de binário acima de 9 na Escala de Binário.**
- **Deve ser feito um intervalo de descanso da ferramenta quando os ciclos durarem três segundos ou mais.**
- **Não aperte mais de 900 parafusos de abrir rosca (tamanho: 2mm, comprimento: 4mm) por hora.**
- **Não empregue esta aparafusadora para apertar parafusos para madeira.**
- **Não opere o Interruptor de Avanço/Reversão quando o motor estiver a funcionar.**
- **Sempre que uma ferramenta não estiver em uso, ponha o Interruptor de Avanço/Reversão na posição “OFF” e desligue a aparafusadora.**
- **A utilização de qualquer acessório que não esteja recomendado neste manual pode apresentar risco de lesões pessoais.**

### IDENTIFICAÇÃO DAS ETIQUETAS DE ADVERTÊNCIA

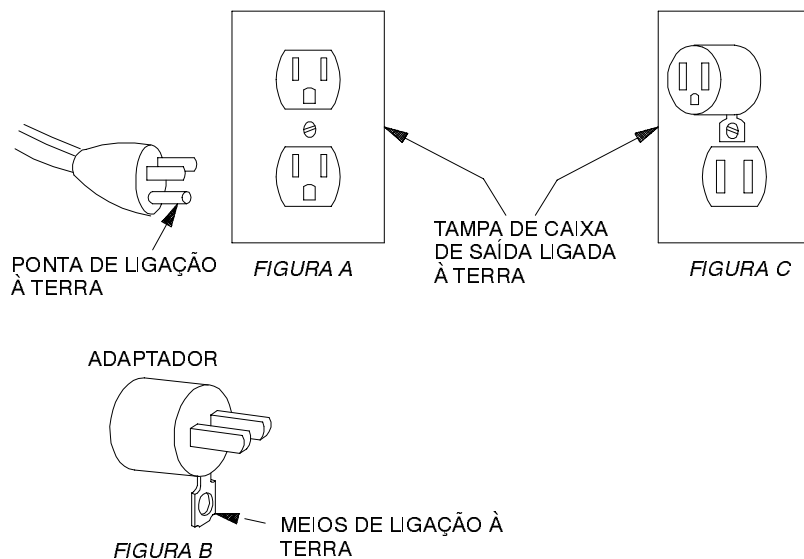


## COLOCAÇÃO DA FERRAMENTA EM SERVIÇO

A ferramenta deve estar ligada à terra enquanto estiver em uso para proteger o operador contra choque eléctrico. O controlador está equipado com um cabo de três fios e uma ficha de ligação à terra com três pontas para encaixar numa tomada de ligação à terra adequada.

O condutor verde (ou verde e amarelo) do cabo é o fio de ligação à terra. Nunca ligue o fio verde (ou verde e amarelo) a um terminal com tensão. Se a sua unidade for

para utilização em menos de 150 V, ela tem uma ficha parecida com a mostrada na Figura A. Há um adaptador (ver Figura B) disponível para ligar fichas do tipo da Figura A a tomadas para 2 pontas. A tira rígida, de cor verde, de ligação à terra que se estende do adaptador tem que ser ligada a um ponto de ligação permanente à terra, como uma caixa de saída adequadamente ligada à terra.



(Des. TPD446-1)

### ⚠ ADVERTÊNCIA

Para utilização segura de adaptadores, a caixa de saída tem que estar ligada à terra. Se tiver alguma dúvida, peça a um electricista qualificado para verificar as ligações.

#### Cabos de Extensão:

Utilize apenas cabos de extensão de 3 fios que tenham fichas de ligação à terra com três pontas e tomadas de 3 pólos que aceitem a ficha do controlador. Substitua ou repare os cabos danificados.

## AJUSTES

### REGULAÇÃO DE BINÁRIO

Para ajustar a potência de binário destas aparafusadoras, proceda como segue:

1. Determine a potência de binário da ferramenta verificando um fixador apertado com uma chave dinamométrica.
2. Aumente ou diminua a potência de binário rodando o Anel de Ajuste de Mola (37 ou 39). Rodar o Anel para **a direita**, para um número mais alto na Escala de Binário, aumenta a potência de binário; enquanto rodar o Anel para **a esquerda**, para um número mais baixo, diminui a potência de binário.

### AVISO

Os números de 0 a 7 na Escala de Binário são apenas números de referência e não uma indicação da potência de binário real.

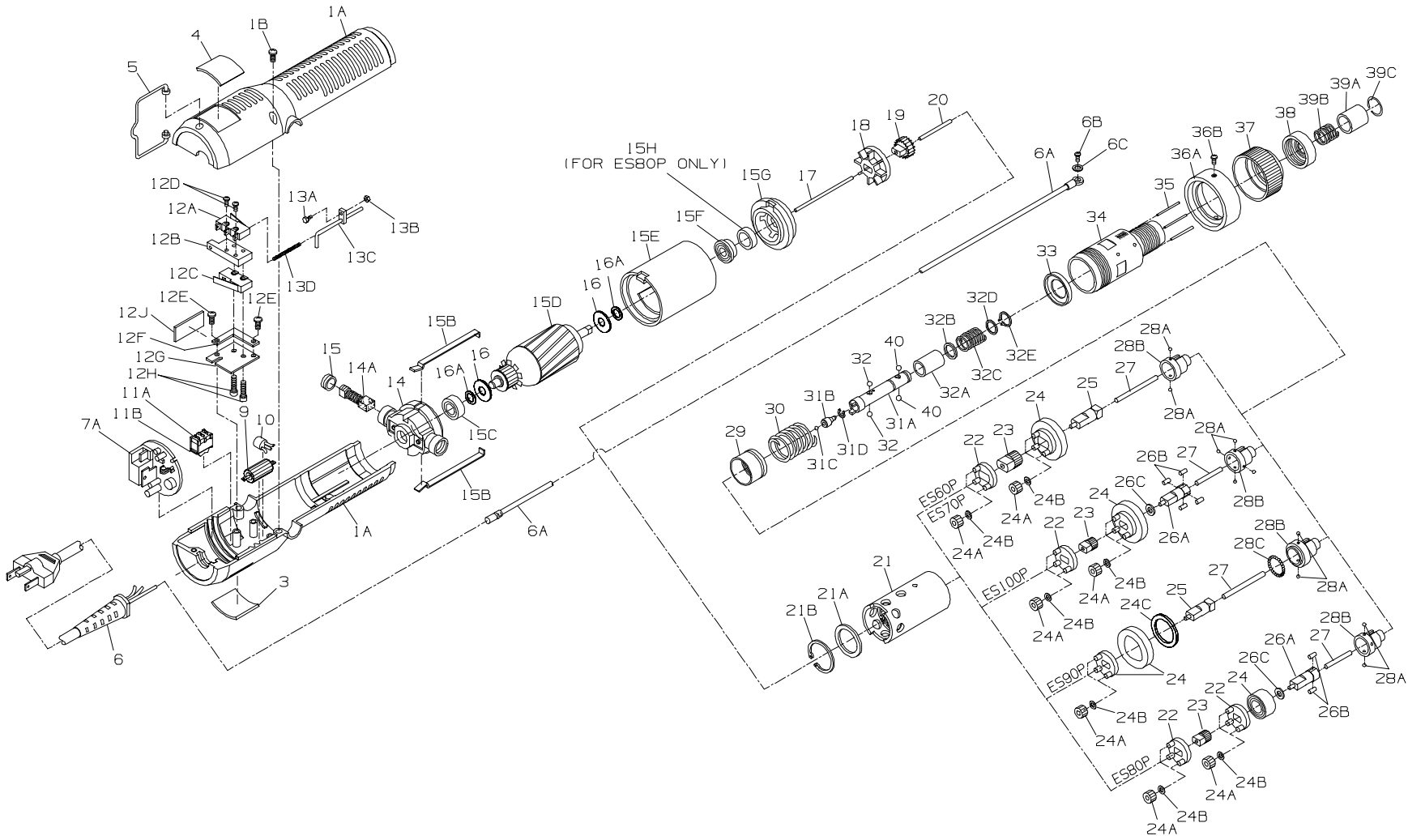
3. Verifique o ajuste com uma chave dinamométrica. Vários factores afectarão a potência de binário de uma tarefa para a outra. O ajuste final da potência de binário deve ser feito na tarefa através de uma série de aumentos graduais. Comece sempre abaixo da potência desejada e aumente gradualmente.

### AVISO

### NÃO TENTE REPARAR ESTA FERRAMENTA.

Todas as reparações e manutenção desta ferramenta e do seu cabo têm que ser efectuadas por um centro de atendimento autorizado. Contacte o escritório de vendas listado na última página deste manual.

**CONSERVE ESTAS INSTRUÇÕES.  
NÃO AS DESTRUA.**



## Models ES60P, ES70P, ES80P, ES90P and ES100P Electric Screwdrivers

PART NUMBER FOR ORDERING

PART NUMBER FOR ORDERING

	Housing Package . . . . .	ES60P-ULA40		12G	Switch Base . . . . .	----
1A	Housing (includes right and left side) . . . .	----		12H	Base Screw (2) . . . . .	ES60P-707
+ 1B	Housing Screw (3) . . . . .	----		12J	Switch Base Insulating Plate . . . . .	----
3	Warning Label				Adjusting Rod Package . . . . .	ES60T-A617
	for models ES80P and ES90P . . . .	ES80P-UL99		13A	Adjusting Screw . . . . .	----
	for all other models . . . . .	ES60T-UL99		13B	Adjusting Screw Nut . . . . .	----
*	Warning Label . . . . .	WARNING-13-99		13C	Pilot Rod "D" . . . . .	----
4	Nameplate			13D	Pilot Rod Spring . . . . .	----
	for model ES60P . . . . .	ES60P-UL301			Motor Assembly	
	for model ES70P . . . . .	ES70P-UL301			for models ES60P, ES70P	
	for model ES80P . . . . .	ES80P-UL301			and ES100P . . . . .	ES60T-ULB53
	for model ES90P . . . . .	ES90P-UL301			for model ES80P . . . . .	ES80P-ULB53
	for model ES100P . . . . .	ES100P-UL301			for model ES90P . . . . .	ES90T-ULB53
5	Suspension Bail . . . . .	ES60T-365		14	Rear End Plate . . . . .	ES60T-620
6	Cord Assembly . . . . .	ES60T-UL239	+ 14A	14A	Brush Assembly (2) . . . . .	----
	Ground Wire Package . . . . .	ES80P-ULA154		15	Brush Cap (2) . . . . .	ES60T-618
6A	Ground Wire . . . . .	----		15B	Motor Assembly Spring (2) . . . . .	ES60T-108
6B	Ground Screw . . . . .	----		15C	Rear Armature Bearing . . . . .	ES60T-22
6C	Ground Washer . . . . .	----		15D	Armature Assembly	
7A	Control Base Package . . . . .	ES60T-ULB616			for model ES80P . . . . .	ES80P-091
9	Resistor (R10) . . . . .	E560T-615			for model ES90P . . . . .	ES90T-009
10	Coil (L2) . . . . .	ES60T-614			for all other models . . . . .	ES60T-004
11A	Reverse Switch Assembly . . . . .	ES60T-ULA666	15E	15E	Yoke Assembly	
	Reverse Switch . . . . .	ES60T-UL666			for models ES80P and ES90P . . . .	ES90T-008
11B	Reverse Switch Rocker . . . . .	----			for all other models . . . . .	ES60T-002
	Switch Package . . . . .	ES60P-A613		15F	Front Armature Bearing	
12A	Microswitch . . . . .	----			for model ES80P . . . . .	ES80P-122
12B	Switch Plate . . . . .	----			for all other models . . . . .	ES60T-24
12C	Microswitch . . . . .	----		15G	Front End Plate . . . . .	ES60T-103
12D	Pilot Screw (2) . . . . .	ES60P-708				
12E	Switch Base Screw (2) . . . . .	ES60P-729				
12F	Insulating Plate . . . . .	----				
15H	Bearing Washer (for ES80P only) . . . . .	ES80P-141				

MAINTENANCE SECTION

14

\* Not illustrated.

+ Can be purchased in quantities of ten. Refer to the non-illustrated listing of parts section for an ordering part number.

**Models ES60P, ES70P, ES80P, ES90P and ES100P Electric Screwdrivers (Continued)**

**PART NUMBER FOR ORDERING** 

**PART NUMBER FOR ORDERING** 

15H	Bearing Washer (for ES80P only) . . . . .	ES80P-141	23	Gear Head Sun Gear	
16	Insulator (2)			for model ES60P (16 teeth) . . . . .	ES60T-622
	for ES80P . . . . .	ES80P-680		for model ES70P (13 teeth) . . . . .	ES70T-622
	for all other models . . . . .	ES80P-681		for model ES80P (23 teeth) . . . . .	ES80P-622
16A	Washer (2)			for model ES100P (11 teeth) . . . . .	ES100P-622
	for ES80P . . . . .	ES80P-682	24	Spindle Assembly	
	for all other models . . . . .	ES80P-683		for models ES60P, ES70P	
*	Front End Plate Washer . . . . .	ES60T-612		and ES100P . . . . .	ES60T-A8
*	Base Insulation Film Pack . . . . .	ES60T-650		for model ES90P . . . . .	ES90T-A8
17	Pilot Rod "F" (2.465" [62.7 mm] long) . . . . .	ES60T-611	24	Spindle Bearing Assembly (for model	
18	Armature Fan			ES80P only) . . . . .	ES80P-A8
	for model ES80P . . . . .	ES80P-62		Spindle Gear Package	
	for all other models . . . . .	ES60T-62		for model ES60P (14 teeth) . . . . .	ES60T-A10
19	Fan Sun Gear			for model ES70P (17 teeth) . . . . .	ES70T-A10
	for model ES60P (16 teeth) . . . . .	ES60T-610		for model ES80P (13 teeth) . . . . .	ES80P-A10
	for model ES70P (13 teeth) . . . . .	ES70T-610		for model ES90P (19 teeth) . . . . .	ES90T-A10
	for model ES80P (23 teeth) . . . . .	ES80P-610		for model ES100P (19 teeth) . . . . .	ES100P-A10
	for model ES90P (11 teeth) . . . . .	ES90T-610	24A	Spindle Gear	
	for model ES100P (11 teeth) . . . . .	ES100P-610		for model ES60P (6) . . . . .	ES60T-116
20	Pilot Rod "G" (.385" [10 mm] long) . . . . .	ES60T-609		for model ES70P (6) . . . . .	ES70T-202
21	Gear Case Assembly			for model ES80P (6) . . . . .	ES80P-508
	for model ES60P (44 teeth) . . . . .	ES60T-37		for model ES90P (3) and for model	
	for model ES70P (47 teeth) . . . . .	ES70P-37		ES100P (6) . . . . .	ES90T-002
	for model ES90P (49 teeth) . . . . .	ES90T-37	24B	Gear Washer (6 for models ES60P,	
	for models ES80P and ES100P			ES70P, ES80P and ES100P;	
	(49 teeth) . . . . .	ES100P-37		3 for model ES90P) . . . . .	ES60T-733
21A	Gear Head Seat . . . . .	----			
21B	Gear Head Seat Retainer . . . . .	----			
22	Gear Head Assembly				
	for models ES60P, ES70P6				
	and ES100P . . . . .	ES60T-A21			
	for model ES80P (2) . . . . .	ES80T-A216			

**MAINTENANCE SECTION**

\* Not illustrated.

**Models ES60P, ES70P, ES80P, ES90P and ES100P Electric Screwdrivers (Continued)**

**PART NUMBER FOR ORDERING** 

**PART NUMBER FOR ORDERING** 

24C	Spindle Washer (for model ES90P) . . . . .	ES90T-680	30	Clutch Spring	
25	Cam			for model ES60P and ES90P	
	for models ES60P and ES70P . . . . .	ES60T-589		(standard) . . . . .	ES60T-583
	for model ES90P . . . . .	ES90T-589		for model ES60P and ES90P	
	Cam Package			(optional) . . . . .	VDS-511
	for model ES80P . . . . .	ES80P-A589		for model ES70P . . . . .	ES70T-583
	for model ES100P . . . . .	ES100P-A589		for model ES80P . . . . .	ES80P-583
26A	Cam (for models ES80P			for model ES100P . . . . .	ES100P-583
	and ES100P) . . . . .	----		Bit Holder Assembly . . . . .	ES60P-A586
26B	Cam Pin (2 for model ES80P;		31A	Bit Holder . . . . .	----
	4 for model ES100P . . . . .	----	31B	Pilot . . . . .	ES60T-133
26C	Cam Washer (for models ES80P		31C	Pilot Ball (.062" [1.6 mm] dia.) . . . . .	ES60T-705
	and ES100P) . . . . .	----	31D	Pilot Retaining Ring . . . . .	ES60T-706
27	Pilot Rod "H" (2.36" [60 mm] long) . . . . .	ES60T-606	32	Pilot Cam Ball (.156" [4 mm] dia.)(2) . . . . .	2U-696
	Cam Guide Package		32A	Slide Ring . . . . .	ES60T-129
	for models ES60P and ES70P . . . . .	ES60T-A605	32B	Slide Ring Washer (.032" [0.8 mm]	
	for model ES80P . . . . .	ES80P-A605		thick) . . . . .	ES60T-130
	for model ES90P . . . . .	ES90T-A605	32C	Slide Ring Spring . . . . .	ES60P-213
	for model ES100P . . . . .	ES100P-P605	32D	Washer (.013" [0.3mm] thick) . . . . .	ES60T-667
28A	Cam Guide Ball (.156" [4 mm] dia.)		32E	Stop Ring . . . . .	ES60T-668
	(4 for model ES100P;		*	Pin . . . . .	ES50TC-755
	2 for all others) . . . . .	2U-696	33	Spring Plate . . . . .	ES60T-623
28B	Cam Guide . . . . .	----	34	Clutch Housing Assembly	
28C	Cam Guide Ball (for model ES90P			for models ES60P, ES70P,	
	only (.0787" [2 mm]) (23) . . . . .	----		ES80P and ES90P . . . . .	ES60T-ULA580
29	Taper Ring Assembly			for model ES100P . . . . .	ES100P-ULA580
	for models ES60P, ES70P				
	and ES90P . . . . .	ES60T-A604			
	for models ES80P and ES100P . . . . .	ES100P-A604			

\* Not illustrated.



**Models ES60P, ES70P, ES80P, ES90P and ES100P Electric Screwdrivers (Continued)**

**PART NUMBER FOR ORDERING** 

**PART NUMBER FOR ORDERING** 

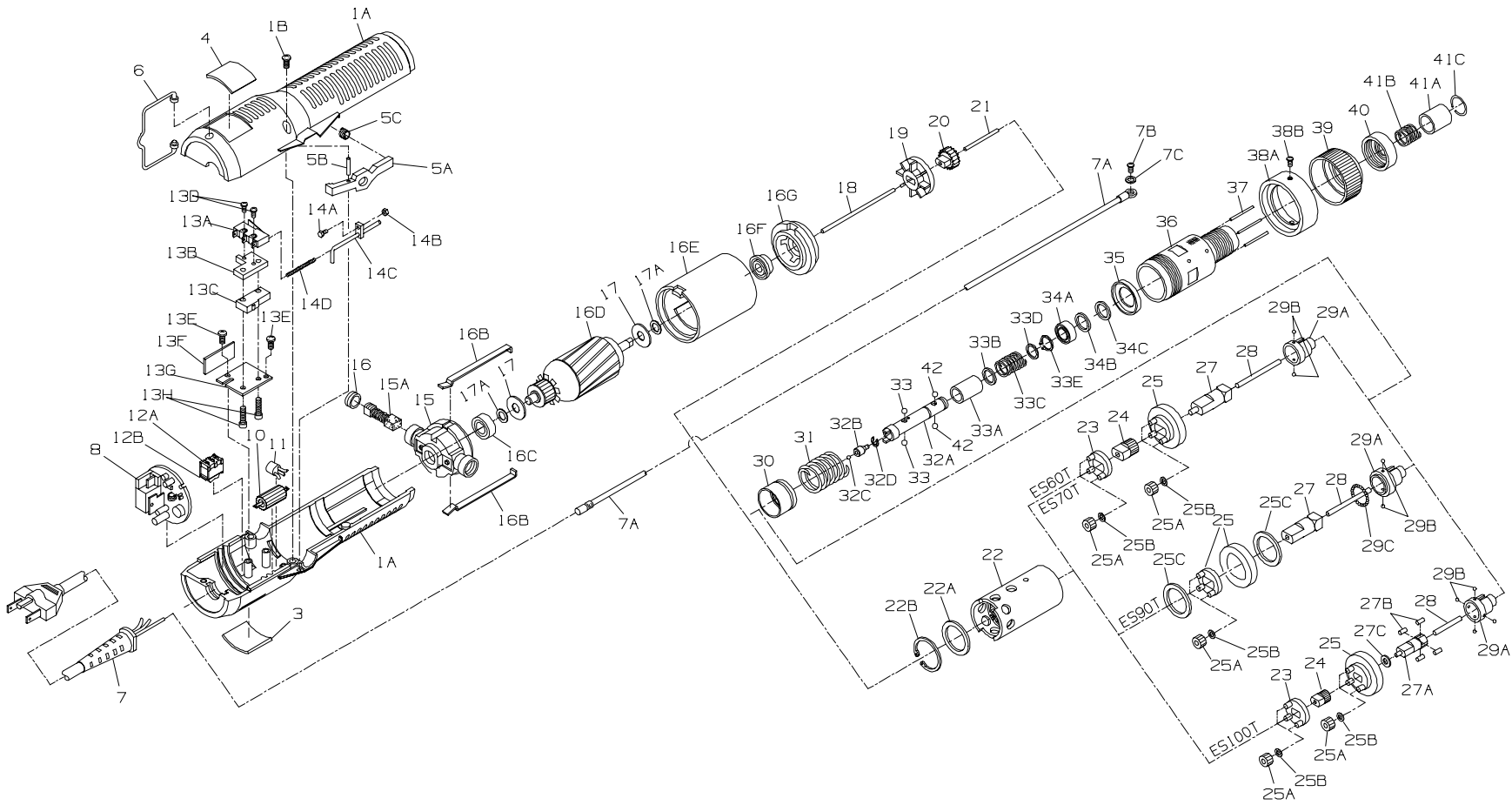
35	Clutch Adjusting Pin Package (includes [3] clutch adjusting pins) . . . . .	ES60T-601-3	*	Pistol Grip Handle . . . . .	DLW2100TP
	Coupling Package . . . . .	ES60T-UL600	*	Screw and Nut Package . . . . .	DLW2100-SNP
36A	Coupling . . . . .	----	*	Grid Plate (for size M2.0 screws) . . . . .	DLW3400
+ 36B	Coupling Screw (2) . . . . .	ES60T-711	*	Shaker Plate	
37	Spring Adjusting Ring . . . . .	ES60T-582		for size M3.0 screws . . . . .	DLW3600
38	Cover . . . . .	ES60T-405		for size M4.0 screws (short) . . . . .	DLW3800
	Bit Sleeve Package . . . . .	ES60P-A602	*	for size M4.0 screws (long) . . . . .	DLW4000
39A	Bit Sleeve . . . . .	----		Balancer	
39B	Bit Spring . . . . .	----		for 7/8 to 2-1/4 lb (.4 to 1.0 kg)	
39C	Retaining Ring . . . . .	----		loads . . . . .	BLD1
40	Bit Retaining Ball (.094" [2.4 mm] dia.) (2) . . . . .	R000B-263	*	for 2 to 4 lb(1 to 2 kg) loads . . . . .	BLD2
*	Housing Screw Package (includes [10] Housing Screws illustration number 1B) . . . . .	ES60T-670-10	*	for 4 to 6lb (2 to 3kg) loads . . . . .	BLD3
*	Brush Package (includes [10] Brush Assemblies illustration number 14A) . . . . .	ES60T-619-10	*	Torque Adjustment Cover . . . . .	ES60T-675
*	Coupling Screw Package (includes [10] Coupling Screws illustration number 36B) . . . . .	ES60T-671-10	*	Torque Adjustment Cover Screw . . . . .	99V60-274
			*	Microswitch Adjustment Wrench Set . . . . .	ES60T-MSW
			*	Torque Adjusting Cover . . . . .	ES60T-TAC

\* Not illustrated.

+ Can be purchased in quantities of ten. Refer to the non-illustrated listing of parts for an ordering part number.

# Models ES60T, ES70T, ES90T and ES100T Electric Screwdrivers

18



MAINTENANCE SECTION

(Dwg. TPA1170-8)

## Models ES60T, ES70T, ES90T and ES100T Electric Screwdrivers

PART NUMBER FOR ORDERING

PART NUMBER FOR ORDERING

	Housing Package . . . . .	ES60T-ULA40		Control Base Package . . . . .	ES60T-ULB616
1A	Housing (includes right and left side) . . . . .	----	8	Resistor (R10) . . . . .	ES60T-615
+ 1B	Housing Screw (3) . . . . .	----	10	Coil (L2) . . . . .	ES60T-614
3	Warning Label		11	Reverse Switch Assembly . . . . .	ES60T-ULA666
	for models ES60T, ES70T		12A	Reverse Switch . . . . .	ES60T-UL666
	and ES100T . . . . .	ES60T-UL99	12B	Reverse Switch Rocker . . . . .	----
	for model ES90T . . . . .	ES80P-UL99		Switch Package . . . . .	ES60T-A613
*	Warning Label . . . . .	WARNING-13-99	13A	Microswitch . . . . .	----
4	Nameplate		13B	Switch Plate . . . . .	----
	for model ES60T . . . . .	ES60T-UL301	13C	Microswitch . . . . .	----
	for model ES70T . . . . .	ES70T-UL301	13D	Pilot Screw (2) . . . . .	ES60P-708
	for model ES90T . . . . .	ES90T-UL301	13E	Switch Base Screw (2) . . . . .	ES60P-729
	for model ES100T . . . . .	ES100T-UL301	13F	Insulating Plate . . . . .	----
	Trigger Assembly . . . . .	ES60T-A93	13G	Switch Base . . . . .	----
5A	Trigger . . . . .	----	13H	Base Screw (2) . . . . .	ES60P-707
5B	Trigger Pin . . . . .	----		Adjusting Rod Package . . . . .	ES60T-A617
5C	Trigger Spring . . . . .	----	14A	Adjusting Screw . . . . .	----
6	Suspension Bail . . . . .	ES60T-365	14B	Adjusting Screw Nut . . . . .	----
7	Cord Assembly . . . . .	ES60T-UL239	14C	Pilot Rod "D" . . . . .	----
	Ground Wire Package . . . . .	ES80P-ULA154	14D	Pilot Rod Spring . . . . .	----
7A	Ground Wire . . . . .	----			
7B	Ground Screw . . . . .	----			
7C	Ground Washer . . . . .	----			

\* Not illustrated.

+ Can be purchased in quantities of ten. Refer to the non-illustrated listing of parts for an ordering part number.

**Models ES60T, ES70T, ES90T and ES100T Electric Screwdrivers (Continued)**

**PART NUMBER FOR ORDERING** 

**PART NUMBER FOR ORDERING** 

	Motor Assembly for models ES60T, ES70T and ES100T . . . . .	ES60T-ULB53	22	Gear Case Assembly for models ES60T and ES70T (47 teeth) . . . . .	ES70P-37
	for model ES90T . . . . .	ES90T-ULB53		for model ES90T (49 teeth) . . . . .	ES90T-37
15	Rear End Plate . . . . .	ES60T-620		for model ES100T (49 teeth) . . . . .	ES100P-37
+ 15A	Brush Assembly (2) . . . . .	----	22A	Gear Head Seat . . . . .	----
16	Brush Cap (2) . . . . .	ES60T-618	22B	Gear Head Seat Retainer . . . . .	----
16B	Motor Assembly Spring (2) . . . . .	ES60T-108	23	Gear Head Assembly (for models ES60T, ES70T and ES100T) . . . . .	ES60T-A216
16C	Rear Armature Bearing . . . . .	ES60T-22	24	Gear Head Sun Gear for model ES60T (16 teeth) . . . . .	ES60T-622
16D	Armature Assembly for models ES60T, ES70T and ES100T . . . . .	ES60T-004		for model ES70T (13 teeth) . . . . .	ES70T-622
	for model ES90T . . . . .	ES90T-009		for model ES100T (11 teeth) . . . . .	ES100P-622
16E	Yoke Assembly for models ES60T, ES70T and ES100T . . . . .	ES60T-002	25	Spindle Assembly for models ES60T, ES70T and ES100T . . . . .	ES60T-A8
	for model ES90T . . . . .	ES90T-008		for model ES90T . . . . .	ES90T-A8
16F	Front Armature Bearing . . . . .	ES60T-24		Spindle Gear Package for model ES60T (14 teeth) . . . . .	ES60T-A10
16G	Front End Plate . . . . .	ES60T-103		for model ES70T (17 teeth) . . . . .	ES70T-A10
17	Insulator (2) . . . . .	ES80P-681		for model ES90T (19 teeth) . . . . .	ES90T-A10
17A	Washer (2) . . . . .	ES80P-683		for model ES100T (19 teeth) . . . . .	ES100P-A10
*	Front End Plate Washer . . . . .	ES60T-612	25A	Spindle Gear for model ES60T (6) . . . . .	ES60T-116
18	Pilot Rod "F" (2.465" [62.6 mm] long) . . . . .	ES60T-611		for model ES70T (6) . . . . .	ES70T-202
*	Base Insulation Film Pack . . . . .	ES60T-650		for model ES90T (3) and for model ES100T (6) . . . . .	ES90T-002
19	Armature Fan . . . . .	ES60T-62	25B	Gear Washer (6 for models ES60T, ES70T and ES100T; 3 for model ES90T) . . . . .	ES60T-733
20	Fan Sun Gear for model ES60T (16 teeth) . . . . .	ES60T-610			
	for model ES70T (13 teeth) . . . . .	ES70T-610			
	for model ES90T (11 teeth) . . . . .	ES90T-610			
	for model ES100T (11 teeth) . . . . .	ES100P-610			
21	Pilot Rod "G" (.385" [9.8 mm] long) . . . . .	ES60T-609			

\* Not illustrated.

+ Can be purchased in quantities of ten. Refer to the non-illustrated part number.

## Models ES60T, ES70T, ES90T and ES100T Electric Screwdrivers

PART NUMBER FOR ORDERING

PART NUMBER FOR ORDERING

25C	Spindle Washer (for model ES90T) (2) . . . . .	ES90T-680		Bit Holder Assembly . . . . .	ES60T-A586
27	Cam		32A	Bit Holder . . . . .	----
	for models ES60T and ES70T . . . . .	ES60T-589	32B	Pilot . . . . .	ES60T-133
	for model ES90T . . . . .	ES90T-589	32C	Pilot Ball (.062" [1.6 mm] dia.) . . . . .	ES60T-705
	Cam Package (for model ES100T) . . . . .	ES100P-A589	32D	Pilot Retaining Ring . . . . .	ES60T-706
27A	Cam . . . . .	----	33	Pilot Cam Ball (.156" [4 mm] dia.) (2) . . . . .	2U-696
27B	Cam Pin (4) . . . . .	----	33A	Slide Ring . . . . .	ES60T-129
27C	Cam Washer . . . . .	----	33B	Slide Ring Washer (.032" [0.8 mm thick) . . . . .	ES60T-130
28	Pilot Rod "H" (2.36" [60 mm] long) . . . . .	ES60T-606	33C	Slide Ring Spring . . . . .	ES60T-305
	Cam Guide Package		33D	Washer (.013" [0.3 mm] thick) . . . . .	ES60T-667
	for models ES60T and ES70T . . . . .	ES60T-A605	33E	Stop Ring . . . . .	ES60T-668
	for model ES90T . . . . .	ES90T-A605	*	Pin . . . . .	ES50TC-755
	for model ES100T . . . . .	ES100P-P605		Holder Bearing Assembly . . . . .	ES60T-A603
29A	Cam Guide . . . . .	----	34A	Holder Bearing . . . . .	----
29B	Cam Guide Ball (.156" [4 mm] dia.) (4 for model ES100T; 2 for all others) . . . . .	2U-696	34B	Holder Washer (.012" [0.3 mm] thick) (2) . . . . .	----
29C	Cam Guide Ball (for model ES90T) (23) . . . . .	----	35	Spring Plate . . . . .	ES60T-623
30	Taper Ring Assembly		36	Clutch Housing Assembly	
	for model ES100T . . . . .	ES100P-A604		for model ES100T . . . . .	ES100P-ULA580
	for all other models . . . . .	ES60T-A604		for all other models . . . . .	ES60T-ULA580
31	Clutch Spring		37	Clutch Adjusting Pin Package (includes [3] clutch adjusting pins) . . . . .	ES60T-601-3
	for model ES60T and ES90T (standard) . . . . .	ES60T-583		Coupling Package . . . . .	ES60T-UL600
	for model ES60T and ES90T (optional) . . . . .	VDS-511	38A	Coupling . . . . .	----
	for model ES70T . . . . .	ES70T-583	+ 38B	Coupling Screw (2) . . . . .	ES60T-711
	for model ES100T . . . . .	ES100P-583	39	Spring Adjusting Ring . . . . .	ES60T-582

\* Not illustrated.

+ Can be purchased in quantities of ten. Refer to the non-illustrated listing of parts for an ordering part number.

**Models ES60T, ES70T, ES90T and ES100T Electric Screwdrivers (Continued)**

**PART NUMBER FOR ORDERING** 

**PART NUMBER FOR ORDERING** 

40	Cover .....	ES60T-405	*	Balancer	
	Bit Sleeve Package .....	ES60T-A602		for 7/8 to 2-1/4 lb.	
41A	Bit Sleeve .....	----		(.4 to 1 kg) loads .....	BLD1
41B	Bit Spring .....	----		for 2 to 4 lb. (1 to 2 kg) loads ....	BLD2
41C	Retaining Ring .....	----		for 4 to 6 lb. (2 to 3 kg) loads ....	BLD3
42	Bit Retaining Ball (2) .....	R000B-263	*	Torque Adjustment Cover .....	ES60T-675
*	Housing Screw Package (includes [10]		*	Torque Adjustment Cover Screw .....	99V60-274
	Housing Screws illustration number 1B) .....	ES60T-670-10	*	Pistol Grip Handle .....	DLW2100TP
*	Brush Package (includes [10] Brush		*	Screw and Nut Package .....	DLW2100-SNP
	Assemblies illustration number 15A) .....	ES60T-619-10	*	Microswitch Adjustment Wrench Set .....	ES60T-MSW
*	Coupling Screw Package (includes [10]		*	Torque Adjusting Cover .....	ES60T-TAC
	Coupling Screws illustration number 38B) ...	ES60T-671-10			
*	Grid Plate (for size M2.0 screws) .....	DLW3400			
*	Shaker Plate				
	for size M3.0 screws .....	DLW3600			
	for size M4.0 screws (short) .....	DLW3800			
	for size M4.0 screws (long) .....	DLW4000			

\* Not illustrated.

## MAINTENANCE SECTION

### WARNING

Always wear eye protection when operating or performing maintenance on this tool.

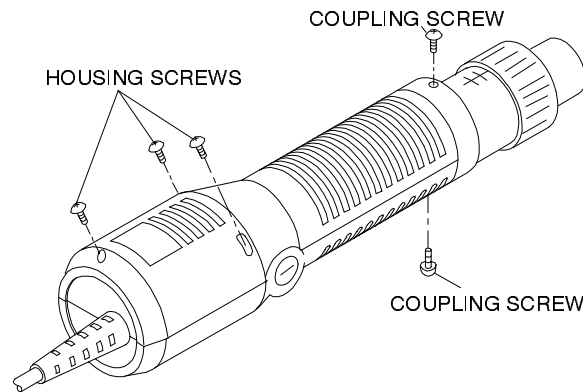
Always turn off electrical supply and disconnect electrical cord before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.

### DISASSEMBLY

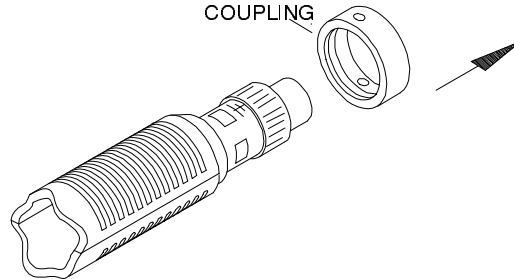
1. Using a No. 2 tip Phillips head screwdriver on the Housing Screws (1B) and a No. 1 Phillips head screwdriver on the Coupling Screws (36B or 38B), remove the two Coupling Screws and the three Housing Screws.

### NOTICE

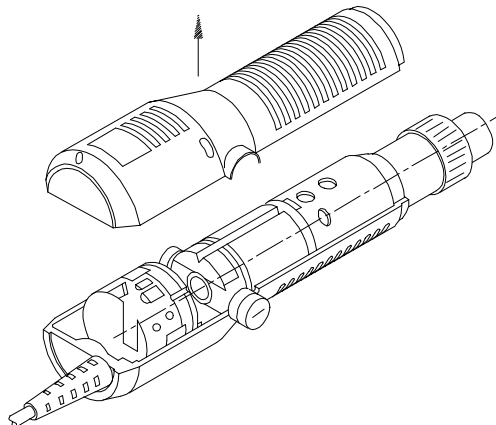
The screw threads are coated with Threadlocker 222®\*. It may be necessary to rapidly tap the end of the screwdriver handle with a hammer while backing the Screws out of the Housing.



2. Remove the Coupling (36A or 38A) by pulling it off the front end of the Electric Screwdriver.



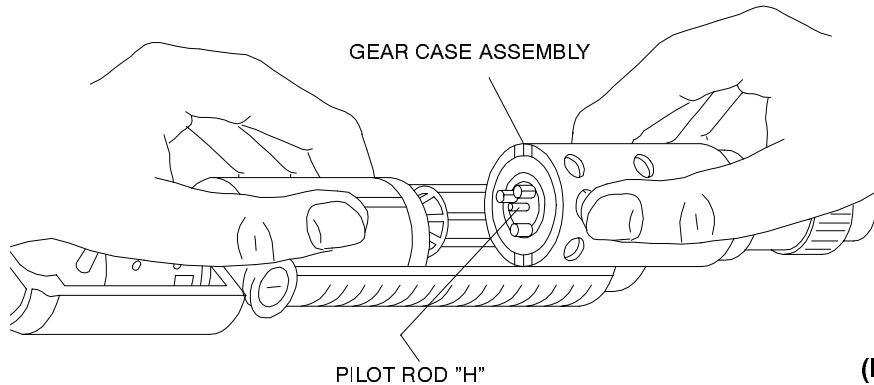
3. Carefully separate the two halves of the Housing (1A) by using a thin blade screwdriver to pry them apart.



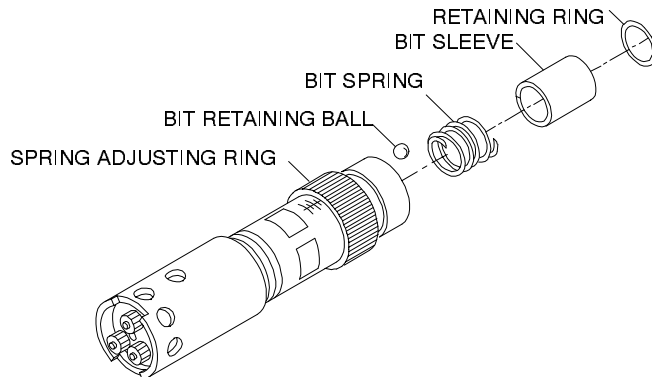
\* Registered trademark of Loctite Corporation.

## MAINTENANCE SECTION

4. With the assembled motor elevated slightly from the Housing, pull the Gear Case Assembly (21 or 22) away from the assembled motor.



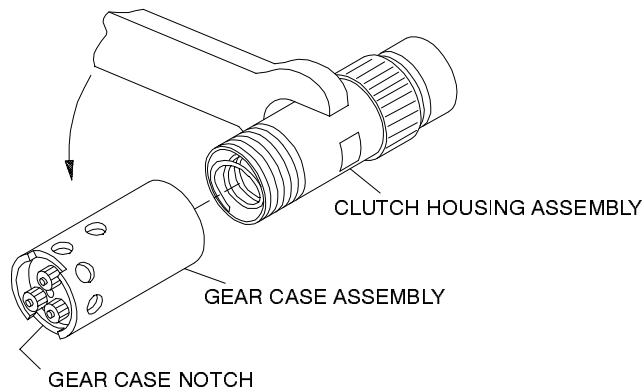
5. Remove the Pilot Rod "H" (27 or 28) from the Gear Case Assembly.
6. Using a thin blade screwdriver, spiral the Retaining Ring (39C or 41C) out of the front of the Clutch Housing Assembly (34 or 36). Remove the Bit Sleeve (39A or 41A), Bit Spring (39B or 41B) and the Bit Retaining Balls (40 or 42). Loosen the Spring Adjusting Ring (37 or 39) until it is just finger tight.



7. Fit the two notches at the rear of the Gear Case Assembly (21 or 22) into an assembly fixture and using an open end wrench on the flats on the Clutch Housing Assembly (34 or 36), unscrew and remove the Clutch Housing Assembly.

### NOTICE

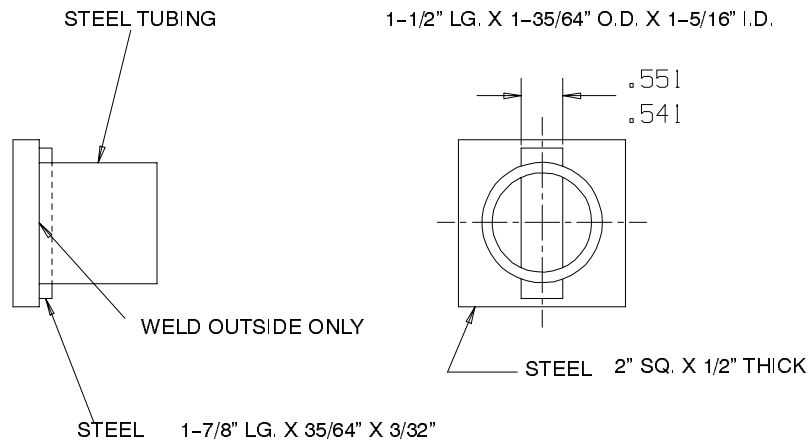
This is a left-hand thread.



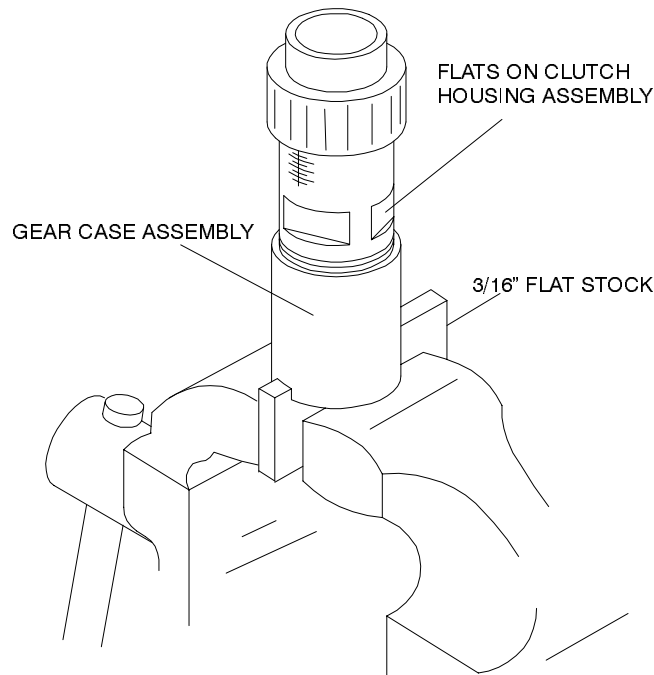


## MAINTENANCE SECTION

### ES60T Clutch Housing Fixture



### Removing the Clutch Housing from the Gear Case



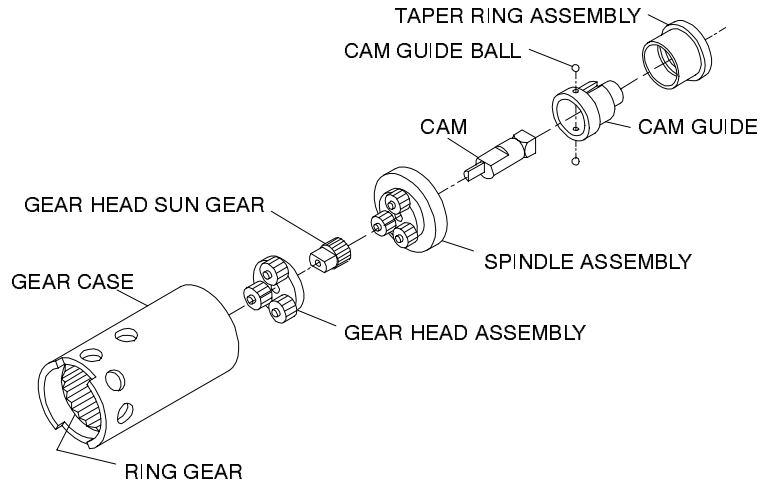
8. Remove the Taper Ring Assembly (29 or 30), Cam Guide (28B or 29A) and Cam Guide Balls (28C or 29B) from the Gear Case Assembly.

**For Model ES80P, ES100P or ES100T,** remove the Cam (26A or 27A), Cam Pins (26B or 27B) (2 for model ES80P and 4 for model ES100P or ES100T) and the Cam Washer (26C or 27C).

**For Model ES90P or ES90T,** remove the Cam (25 or 27). Remove the Spindle Assembly (24 or 25) and the two Spindle Washers (24C or 25C) from the Gear Case Assembly.

## MAINTENANCE SECTION

**For all other models**, remove the Cam (25 or 27). Remove the Spindle Assembly (24 or 25), Gear Head Sun Gear (23 or 24) and Gear Head Assembly (22 or 23) from the Gear Case Assembly. Do not attempt removal of the ring gear inside the Gear Case. It is a press fit into the Gear Case.

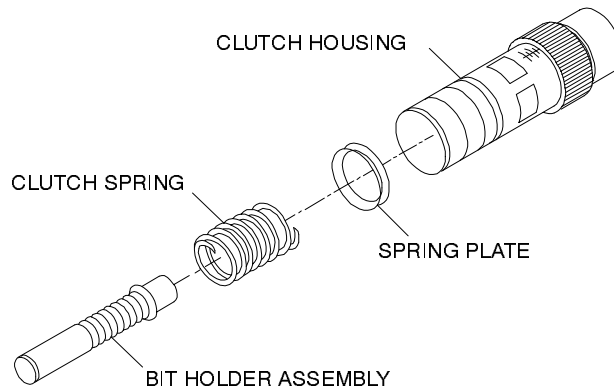


(Dwg. TPD1035)

- Slide the Bit Holder Assembly, Clutch Spring (30 or 31) and Spring Plate (33 or 35) out of the Clutch Housing.

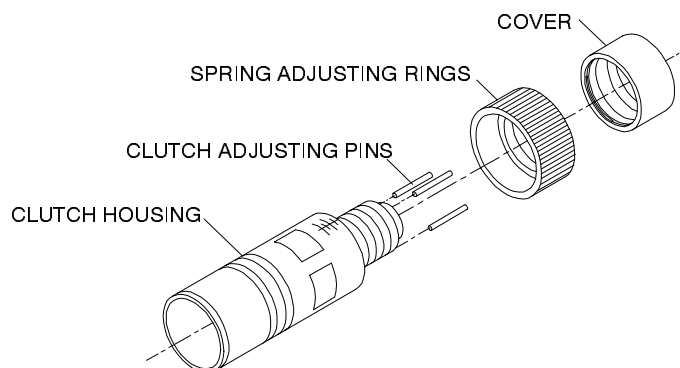
### NOTICE

**Trigger models have a Holder Bearing Assembly. Remove the Assembly from the Clutch Housing.**



(Dwg. TPD1036)

- Unscrew and remove the Cover (38 or 40). Unscrew and remove the Spring Adjusting Ring (37 or 39) and pull the three Clutch Adjusting Pins (35 or 37) out of the Clutch Housing.



(Dwg. TPD1037)

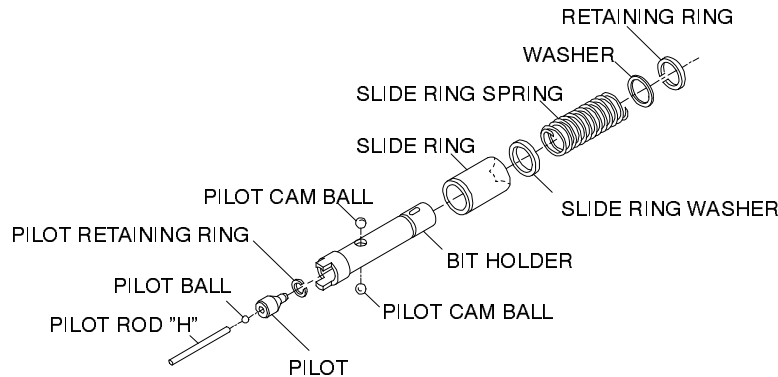
## MAINTENANCE SECTION

11. Pull the Pilot Rod "H" (27 or 28) out of the Bit Holder and using miniature, internal snap ring pliers, remove the Stop Ring (32E or 33E) from the Bit Holder (31A or 32A).

### NOTICE

**Spread the Ring only enough to remove it from the Bit Holder. Excessive expansion may damage the Ring.**

12. Remove the Washer (32D or 33D), Slide Ring Spring (32C or 33C), Slide Ring Washer (32B or 33B) and Slide Ring (32A or 33A) from the Bit Holder.



(Dwg. TPD1038)

13. When the Slide Ring is removed, the two Pilot Cam Balls (32 or 33) will come out of the Bit Holder. Removing the Balls allows the Pilot (31B or 32B), Pilot Ball (31C or 32C) and Pilot Retaining Ring (31D or 32D) to be removed from the end of the Bit Holder.

### NOTICE

**The Pilot Ball must be clean to be removed from the Pilot. However, only remove the Pilot Ball and Pilot Retaining Ring if it is necessary.**

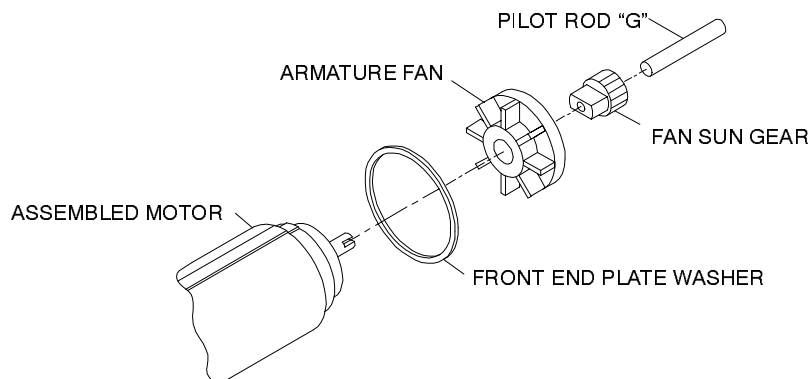
14. Remove the Front End Plate Washer (if the tool has one), the Fan Sun Gear (19 or 20) and the Armature Fan (18 or 19) from the front of the motor.

### NOTICE

**The Front End Plate Washer consists of one or more thin, semi-transparent plastic pieces. Pull the Pilot Rod "G" (20 or 21) out of the Fan Sun Gear.**

### ⚠ WARNING

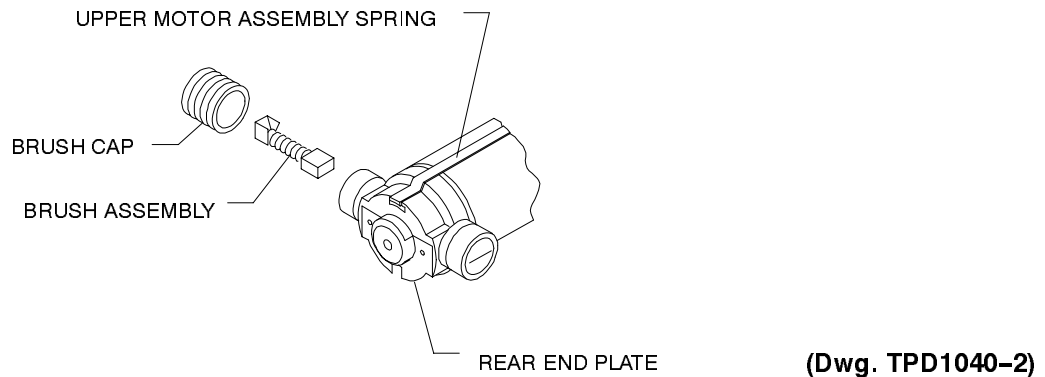
**Do not lose, substitute or damage Pilot Rod "G". It is a critical component of the tool's electrical insulation system and any substitution, omission or damage could cause a shock.**



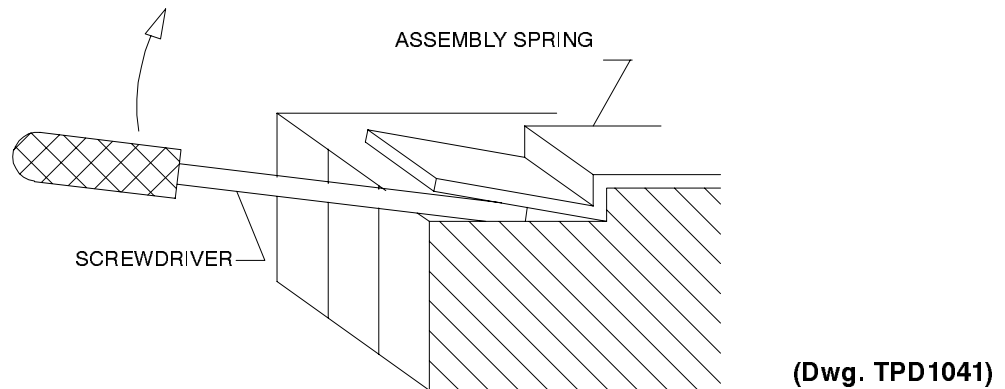
(Dwg. TPD1039)

## MAINTENANCE SECTION

15. If additional disassembly is required, unsolder the Capacitors (15A or 16A) and (16 or 17) from the Control Base (7A or 8) and from the end of the Upper Motor Assembly Spring (15B or 16B).



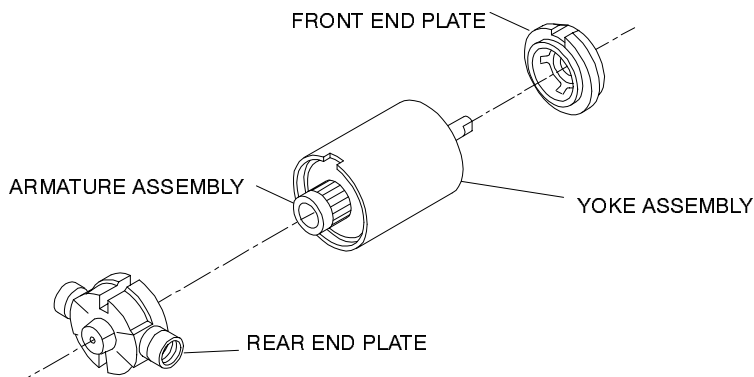
16. Unscrew and remove the two Brush Caps (15 or 16) and pull the two Brush Assemblies (14A or 15A) out of the Rear End Plate (14 or 15). Mark the Brushes so they can be reinstalled exactly as they were removed unless they are replaced.
17. Using a thin blade screwdriver, remove the Motor Assembly Springs (15B or 16B) by inserting the screwdriver between the Spring and Rear End Plate and prying upward.



18. Remove the Rear End Plate (14 or 15) and the Front End Plate (15G or 16G) from the Yoke Assembly (15E or 16E) and Armature Assembly (15D or 16D). If Insulators (16 or 17) and Washers (16A or 17A) are removed, replace them with new ones.

### CAUTION

**Do not separate the Armature Assembly from the Yoke Assembly. The magnet in the Yoke will become slightly demagnetized and adversely affect motor performance.**



# MAINTENANCE SECTION

## ASSEMBLY

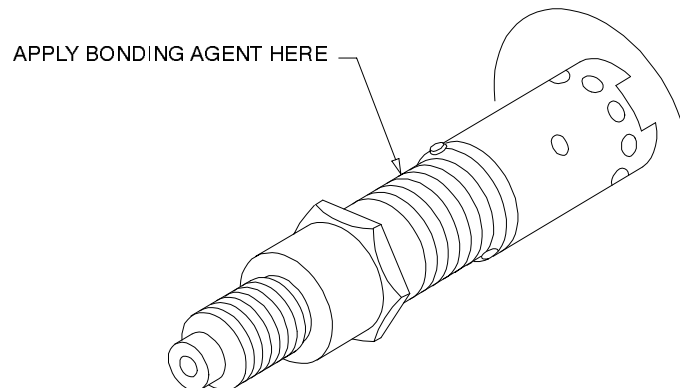
To assemble these tools, reverse the disassembly procedure. There are certain assembly and lubrication instructions which are important for optimum performance and they are as follows:

1. Keep the commutator surface of the armature free from all contaminants.
2. Use good quality, properly sized snap ring pliers when installing the Stop Ring (32E or 33E) on the Bit Holder (31A or 32A) and do not expand the Stop Ring more than required to install it on the Holder. Excessive expansion may cause the Ring to deform and fail.
3. To assemble the Clutch Housing Assembly to the Gear Case Assembly, proceed as follows:
  - a. Apply 0.3 cc of Ingersoll-Rand No. 67 Grease to the Spindle Assembly (24 or 25).
  - b. Insert the Cam (25, 26A or 27), small end first, into the Gear Case (21 or 22).
  - c. Inject a small amount of grease into the holes for the Cam Guide Balls (28C or 29B) and insert a Cam Guide Ball into each hole.  
**For model ES80P**, insert a Cam Pin (26B or 27B) between each of the two Cam Guide Balls and hold each in position with a small amount of grease.  
**For Model ES100P or ES100T**, insert a Cam Pin between each of the four Cam Guide Balls and hold each in position with a small amount of grease.
  - d. Being careful not to dislodge the Cam Guide Balls or Cam Guide Pins, thread the Gear Case onto the Clutch Housing about two threads.

### NOTICE

**This is a left-hand thread.**

- e. At the middle of the Clutch Housing thread, apply Loctite Threadlocker 242, or equivalent, to approximately three threads.



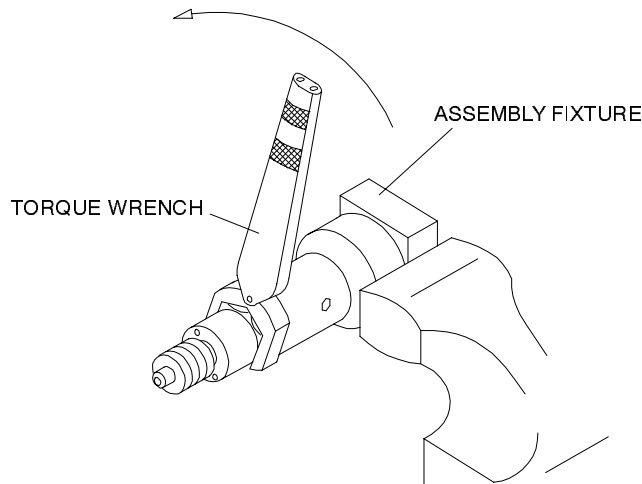
(Dwg. TPD1044)

- f. Carefully thread the Clutch Housing into the Gear Case until contact is made with the Cam. When contact is made, unscrew the Clutch Housing two full thread revolutions.
- g. Insert a 1/4" tee wrench or hex wrench into the end of the Bit Holder (31A or 32A). While pushing the Bit Holder inward with the wrench, rotate the Gear Case until the jaws of the Cam Guide (28B or 29A) engage the Cam. The wrench will move inward noticeably when engagement occurs.
- h. While maintaining engagement with the wrench, hand tighten the Gear Case as much as possible.
- i. With the assembly fixture held in vise jaws, position the notches in the Gear Case onto the fixture and, using a torque wrench, tighten the Clutch Housing to 21 ft-lb (28.5 Nm) torque. Refer to Drawing TPD1053 on Page 16.

### NOTICE

**Recalibrate the torque wrench every six months.**

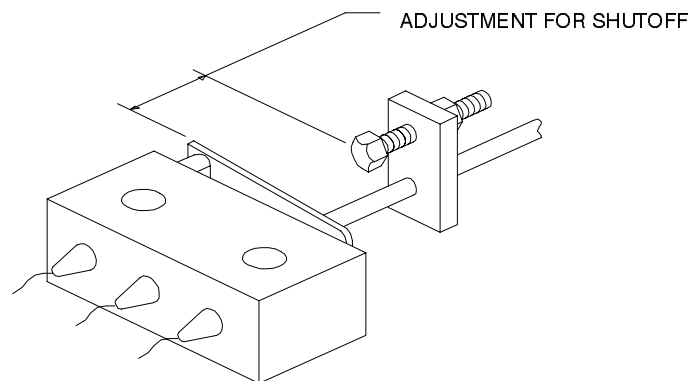
## MAINTENANCE SECTION



(Dwg. TPD1045)

4. The brake switch must be timed to actuate when the clutch cams over. To adjust the timing, loosen the Adjusting Screw Nut (13B or 14B) and turn the Adjusting Screw (13A or 14A) in or out until the microswitch (12A or 13A) is actuated at the same time the clutch cams over or slightly before it cams over. If the motor lugs before the brake switch actuates, shorten the Adjusting Screw.

### CLUTCH SHUTOFF/BRAKE SWITCH



(Dwg. TPD1046)

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## LUBRICATION

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Whenever an Electric Screwdriver is disassembled for maintenance or repair, lubricate the following components in the recommended manner with Ingersoll-Rand No. 67 Grease.

1. Inject a tiny amount of grease into the hole in the Pilot (31B or 32B) for the Pilot Ball (31C or 32C).
2. Wipe a film of grease on the tapered inner surface of the Slide Ring (32A or 33A) and the Taper Ring Assembly (29 or 30).
3. Apply a moderate amount of grease to the outer surfaces of the Cam (25, 26A or 27), the Cam Guide (28B or 29A) and the Cam Guide Balls (28C or 29B).
4. Wipe a thin coat of grease on each of the Spindle Gears (24A or 25A).

### CAUTION

**Do not pack the gearing with grease. Excess grease may be pulled into the motor by the Armature Fan (18 or 19).**

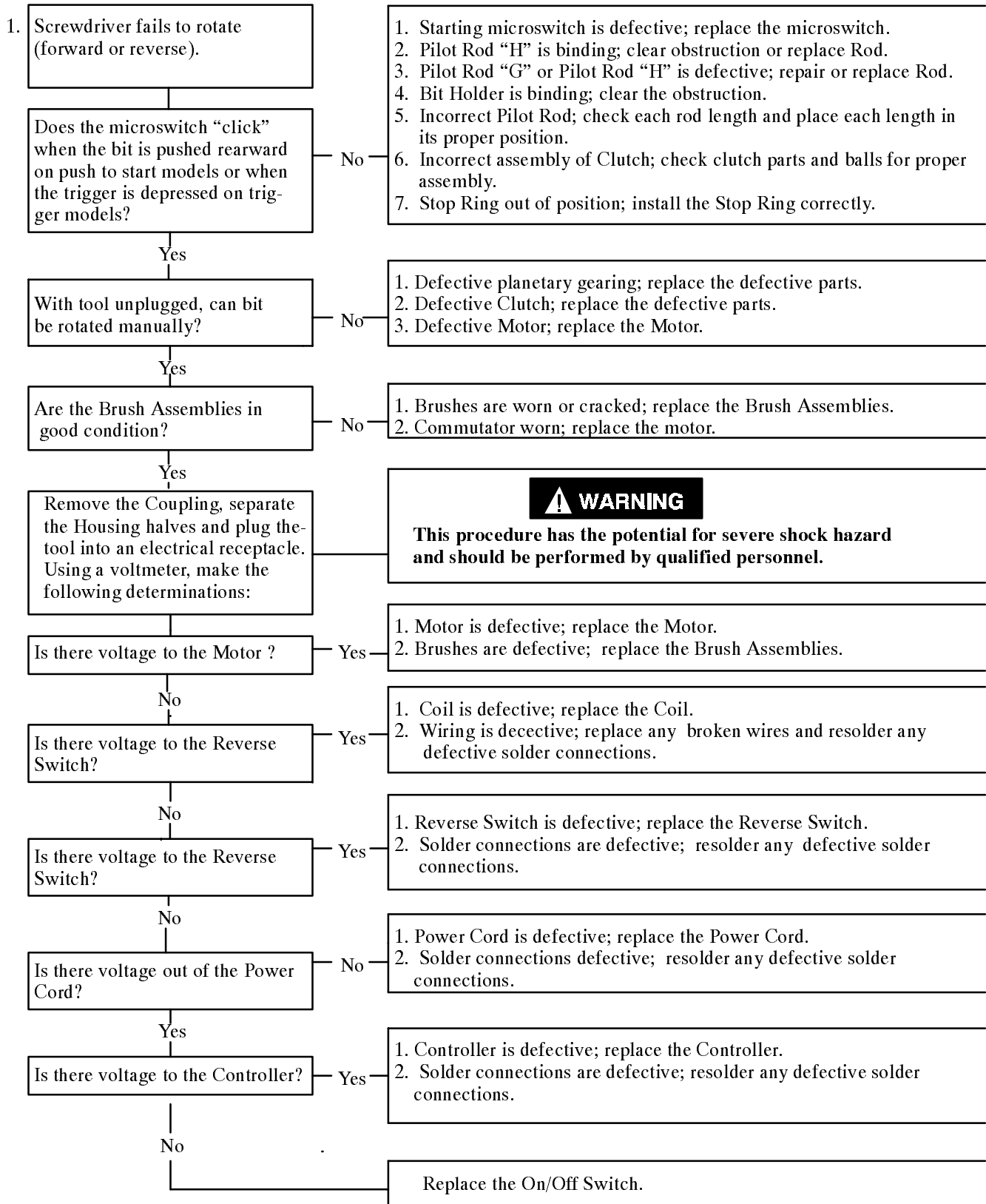
5. Wipe a very thin coating of grease onto Pilot Rod "H" (27 or 28).

### WARNING

**Pilot Rod "G" (20 or 21) must be totally free of grease. Grease on this Rod could cause electric shock.**

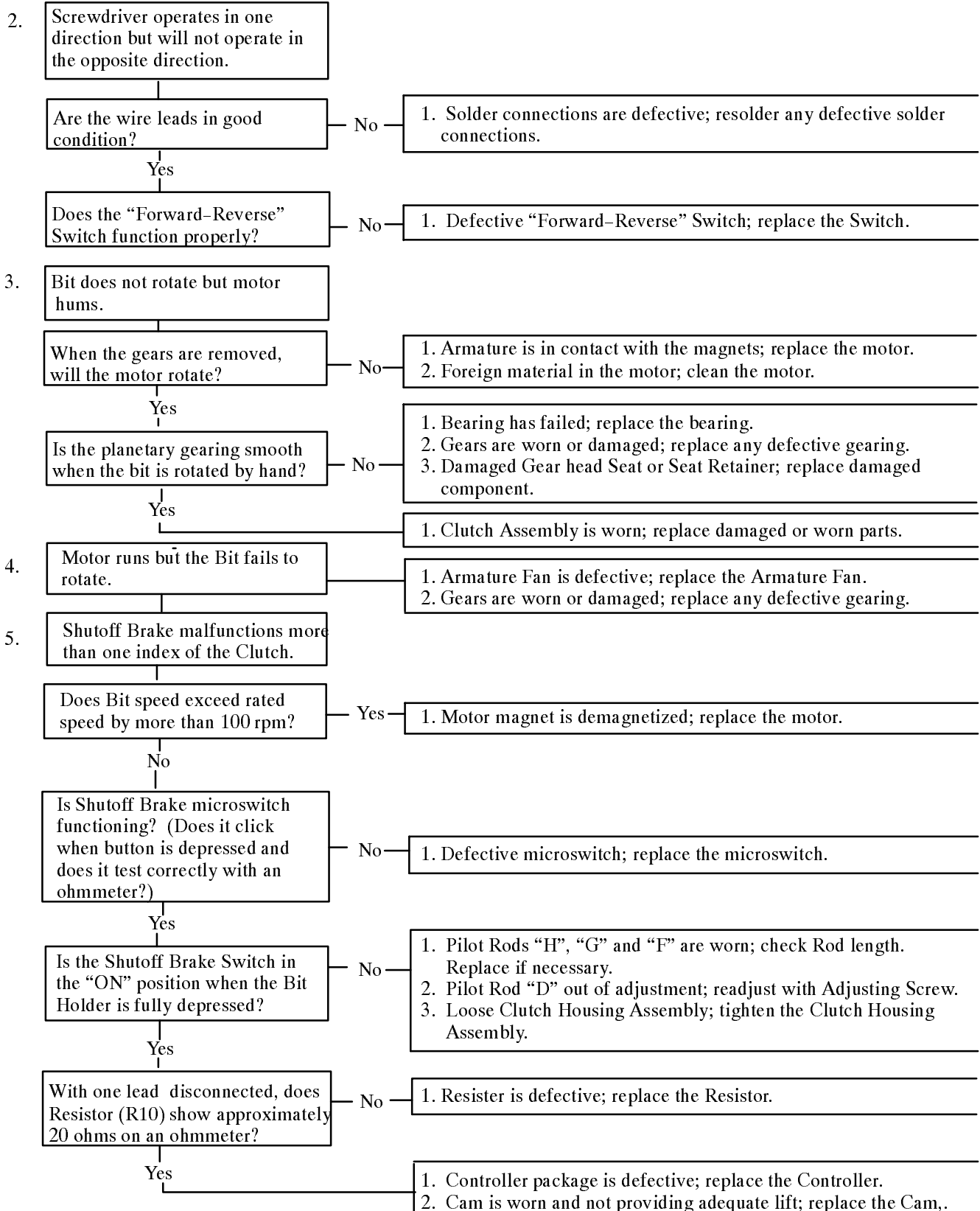
# MAINTENANCE SECTION

## TROUBLESHOOTING GUIDE



# MAINTENANCE SECTION

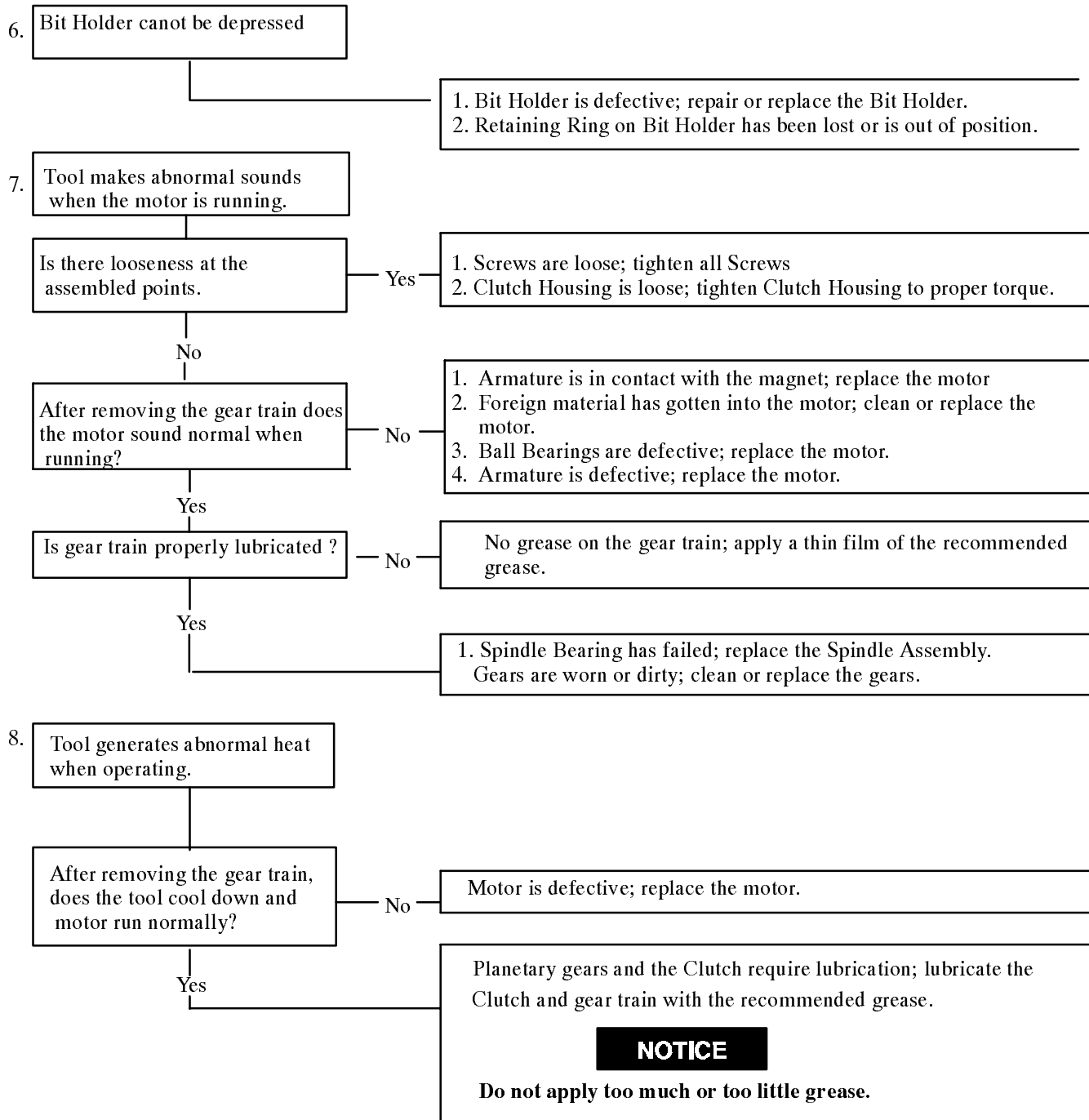
## TROUBLESHOOTING (Continued)





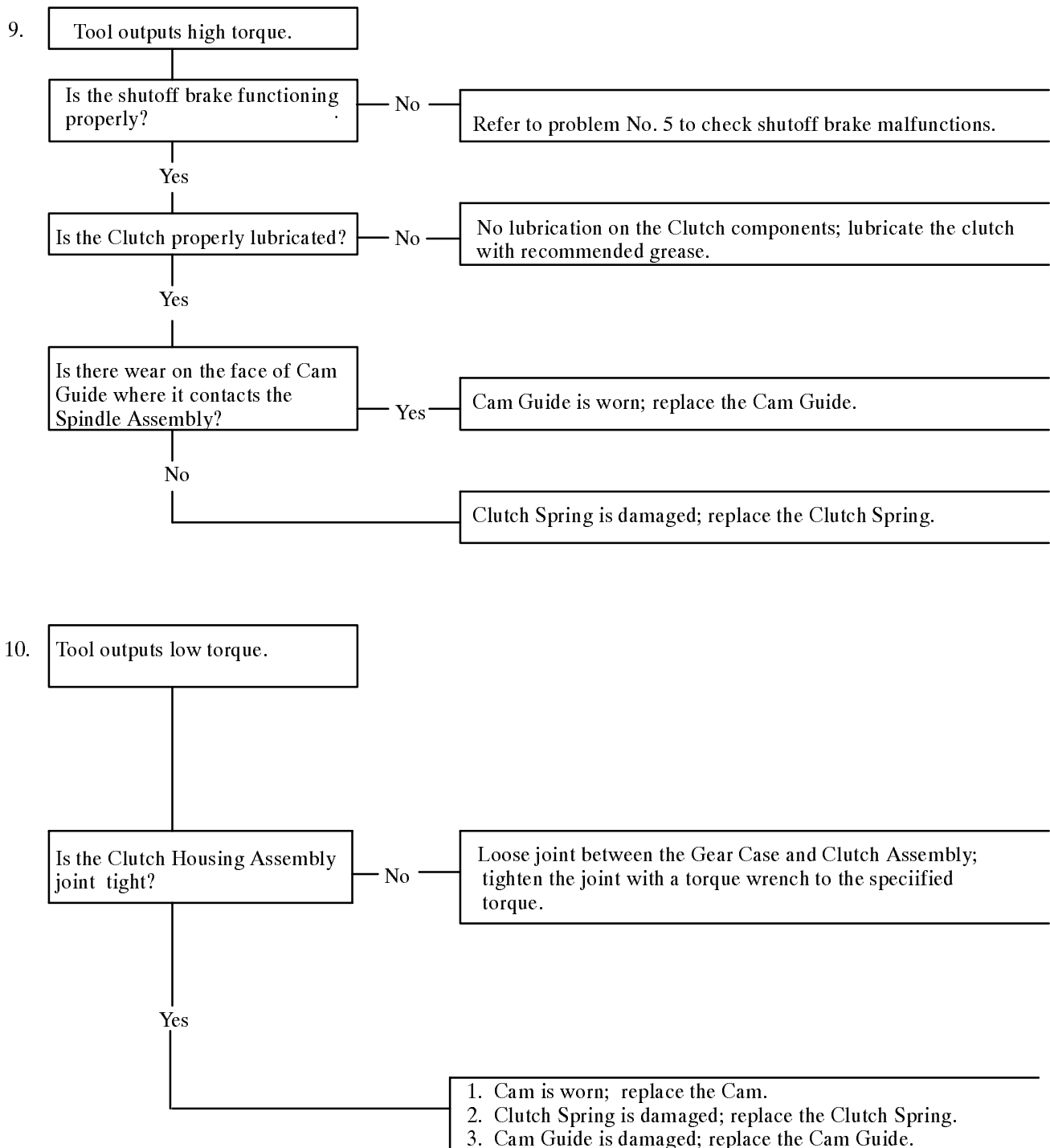
# MAINTENANCE SECTION

## TROUBLESHOOTING GUIDE (Continued)



# MAINTENANCE SECTION

## TROUBLESHOOTING GUIDE (Continued)



# MAINTENANCE SECTION

