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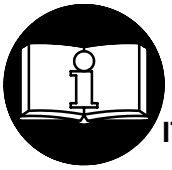
F E P

OPERATION AND MAINTENANCE MANUAL FOR SERIES QP1P, QP1S AND QP1T AIR SCREWDRIVERS

NOTICE

Series QP1P, QP1S and QP1T Air Screwdrivers are designed for fastening applications in automotive and appliance assembly, the electronic and aerospace industries and for woodworking.
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 THIS MANUAL BEFORE OPERATING TOOL.
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.

PLACING TOOL IN SERVICE

- **Always operate, inspect and maintain this tool in accordance with American National Standards Institute Safety Code for Portable Air Tools (ANSI B186.1).**
- **For safety, top performance, and maximum durability of parts, operate this tool at 90 psig (6.2 bar/620 kPa) maximum air pressure at the inlet with 1/4" (6 mm) inside diameter air supply hose.**
- **Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.**
- **Do not use damaged, frayed or deteriorated air hoses and fittings.**
- **Be sure all hoses and fittings are the correct size and are tightly secured. See Dwg. TPD905–1 for a typical piping arrangement.**
- **Always use clean, dry air at 90 psig (6.2 bar/620 kPa) maximum air pressure. Dust, corrosive fumes and/or excessive moisture can ruin the motor of an air tool.**
- **Do not lubricate tools with flammable or volatile liquids such as kerosene, diesel or jet fuel.**
- **Do not remove any labels. Replace any damaged label.**

USING THE TOOL

- **Always wear eye protection when operating or performing maintenance on this tool.**
- **Always wear hearing protection when operating this tool.**
- **Keep hands, loose clothing and long hair away from rotating end of tool.**
- **Note the position of the reversing lever before operating the tool so as to be aware of the direction of rotation when operating the throttle.**
- **Anticipate and be alert for sudden changes in motion during start up and operation of any power tool.**
- **Keep body stance balanced and firm. Do not overreach when operating this tool. High reaction torques can occur at or below the recommended air pressure.**
- **Tool accessory may continue to rotate briefly after throttle is released.**
- **Air powered 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.**
- **Use accessories recommended by Ingersoll–Rand.**
- **This tool is not insulated against electric shock.**
- **This tool is not designed for working in explosive atmospheres.**

NOTICE

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

Repairs should be made only by authorized trained personnel. Consult your nearest Ingersoll–Rand Authorized Servicenter.

Refer All Communications to the Nearest Ingersoll–Rand Office or Distributor.

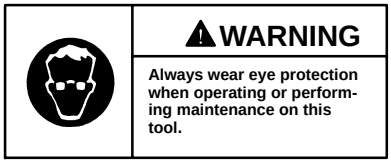
Printed in U.S.A.

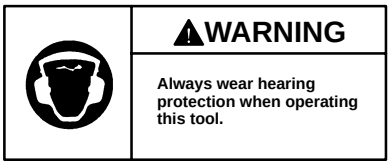
Ingersoll-Rand®

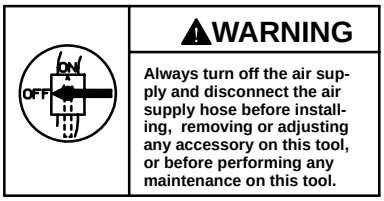
WARNING LABEL IDENTIFICATION

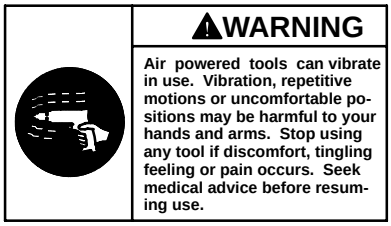
⚠ WARNING

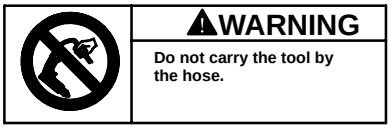
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

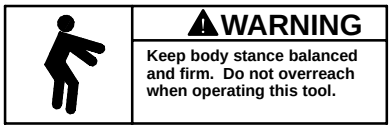


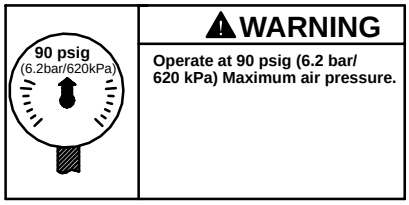












ADJUSTMENTS

CLUTCH ADJUSTMENT

⚠ WARNING

Disconnect the air supply from the Tool before proceeding.

1. Rotate the Clutch Adjusting Hole Cover far enough to expose the clutch adjusting hole in the Clutch Housing.
2. Insert a 1/4” hex wrench into the Bit Holder and rotate the clutch mechanism until the area having an opening between the faces of the Clutch Adjusting Nut Washer and Clutch Adjusting Nut is visible.
3. Using a screwdriver that has a #1 Phillips tip, insert the tip of the screwdriver into the opening and rotate the screwdriver to adjust the Clutch. Rotate the screwdriver clockwise to decrease Clutch Spring tension and torque and counterclockwise to increase the tension and torque.

NOTICE

The most satisfactory adjustment is usually obtained by using the tool on the actual application and increasing or decreasing the delivered torque until the desired setting is reached. In any event, it is recommended that final adjustment be made by gradual progression.

PLACING TOOL IN SERVICE

LUBRICATION

Ingersoll–Rand No. 10

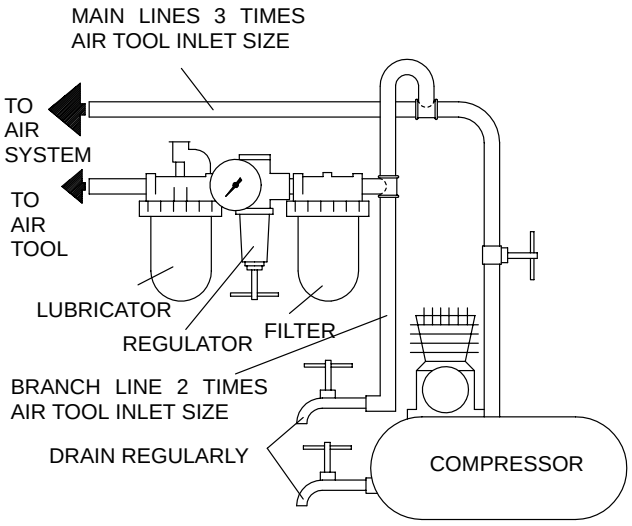
Gearing:
Ingersoll–Rand No. 67
Clutch:
Ingersoll–Rand No. 28

Always use an air line lubricator with this tool.
We recommend the following Filter–Lubricator–Regulator Unit:

For USA – No. C08–02–FKG0–28

Whenever the tool is disassembled for maintenance or repair, lubricate the gear train with Ingersoll–Rand No. 67 Grease.

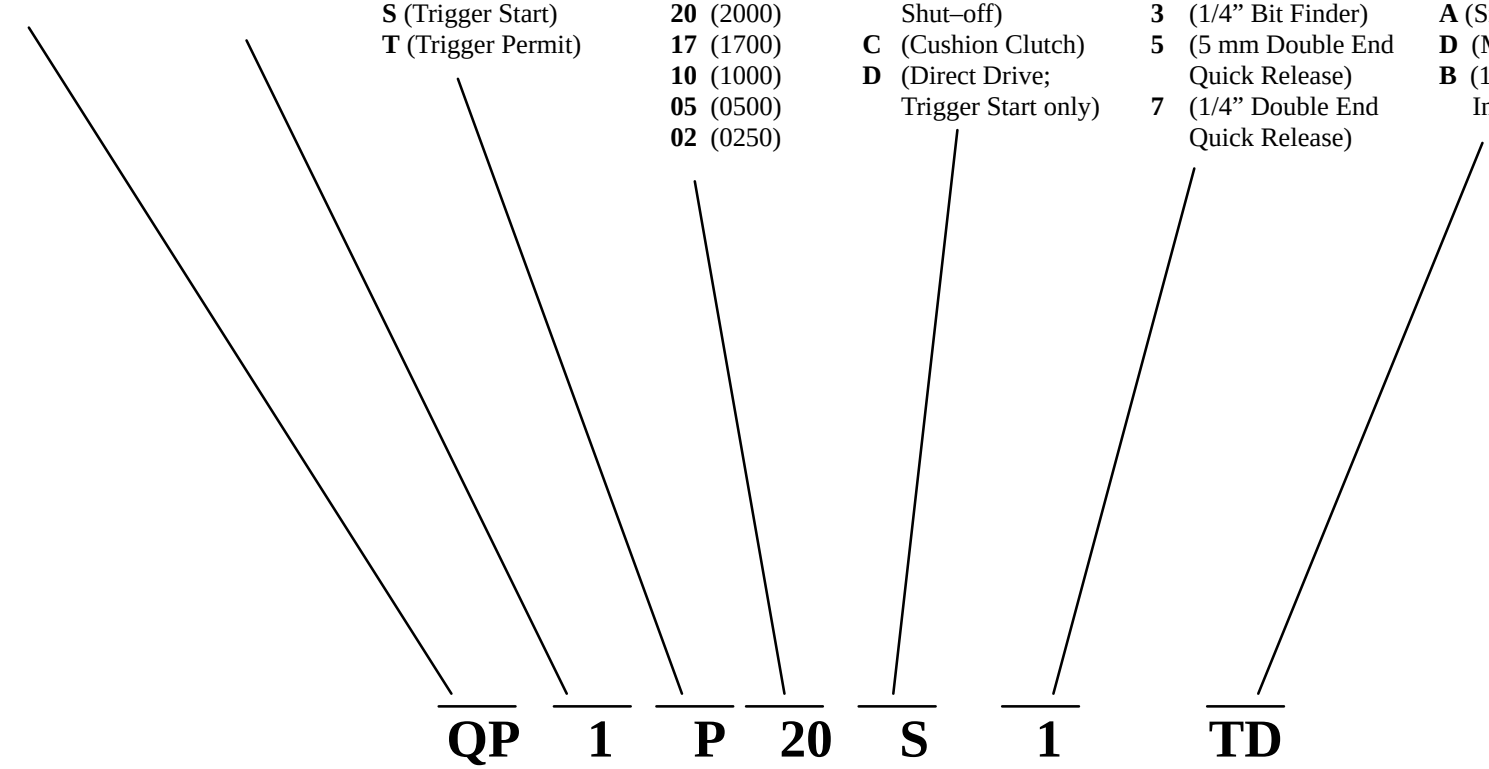
Whenever the tool is disassembled for maintenance or repair, lubricate the clutch assembly with Ingersoll–Rand No. 28 Grease.



(Dwg. TPD905–1)

MODEL IDENTIFICATION

Tool Style	Rotation	Throttle	Free Speed	Clutch	Bit Holder or Driver	Accessories
QP (Pistol)	**1** (Reversible)	**P** (Push–to–Start) **S** (Trigger Start) **T** (Trigger Permit)	**33** (3350) **20** (2000) **17** (1700) **10** (1000) **05** (0500) **02** (0250)	**S** (Automatic Shut–off) **C** (Cushion Clutch) **D** (Direct Drive; Trigger Start only)	**1** (1/4” Quick Release) **3** (1/4” Bit Finder) **5** (5 mm Double End Quick Release) **7** (1/4” Double End Quick Release)	**T** (Top Inlet) **A** (Small Grip) **D** (Memory Chip) **B** (1/4–19 BSPT Inlet)



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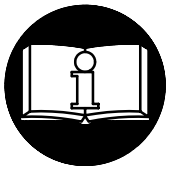
MANUEL D'EXPLOITATION ET D'ENTRETIEN DES VISSEUSES PNEUMATIQUES DES SÉRIES QP1P, QP1S ET QP1T

NOTE

Les visseuses pneumatiques des Séries QP1P, QP1S et QP1T sont destinées au serrage des fixations d'assemblage automobile et d'équipements ménagers, des industries électroniques et aérospatiales et du travail du bois.

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 SECURITÉ SONT JOINTES.
LIRE CE MANUEL AVANT D'UTILISER L'OUTIL.
L'EMPLOYEUR EST TENU À COMMUNIQUER LES INFORMATIONS DE CE MANUEL AUX EMPLOYÉS UTILISANT CET OUTIL.
LE NON RESPECT DES AVERTISSEMENTS SUIVANTS PEUT CAUSER DES BLESSURES**

MISE EN SERVICE DE L'OUTIL

- **Toujours exploiter, inspecter et entretenir cet outil conformément au Code de sécurité des outils pneumatiques portatifs de l'American National Standards Institute (ANSI B186.1).**
- **Pour la sécurité, les performances optimales et la durabilité maximale des pièces, cet outil doit être connecté à une alimentation d'air comprimé de 6,2 bar (620 kPa) maximum à l'entrée, avec un flexible de 6 mm de diamètre intérieur.**
- **Couper toujours l'alimentation d'air comprimé et débrancher le flexible d'alimentation avant d'installer, déposer ou ajuster tout accessoire sur cet outil, ou d'entreprendre une opération d'entretien quelconque sur l'outil.**
- **Ne pas utiliser des flexibles ou des raccords endommagés, effilochés ou détériorés.**
- **S'assurer que tous les flexibles et les raccords sont correctement dimensionnés et bien serrés. Voir Plan TPD905–1 pour un exemple type d'agencement des tuyauteries.**
- **Utiliser toujours de l'air sec et propre à une pression maximum de 6,2 bar (620 kPa). La poussière, les fumées corrosives et/ou une humidité excessive peuvent endommager le moteur d'un outil pneumatique.**
- **Ne jamais lubrifier les outils avec des liquides inflammables ou volatiles tels que le kérosène, le gasol ou le carburant d'aviation.**
- **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.**
- **Porter toujours une protection acoustique pendant l'utilisation de cet outil.**
- **Tenir les mains, les vêtements flous et les cheveux longs, éloignés de l'extrémité rotative de l'outil.**
- **Noter la position du levier d'inversion avant de mettre l'outil en marche de manière à savoir dans quel sens il va tourner lorsque la commande est actionnée.**
- **Prévoir, et ne pas oublier, que tout outil motorisé est susceptible d'à–coups brusques lors de sa mise en marche et pendant son utilisation.**
- **Garder une position équilibrée et ferme. Ne pas se pencher trop en avant pendant l'utilisation de cet outil. Des couples de réaction élevés peuvent se produire à, ou en dessous, de la pression d'air recommandée.**
- **La percussion des accessoires de l'outil peut continuer pendant un certain temps après le relâchement de la gâchette.**
- **Les outils pneumatiques peuvent vibrer pendant l'exploitation. 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.**
- **Utiliser les accessoires recommandés par Ingersoll-Rand.**
- **Cet outil n'est pas conçu pour fonctionner dans des atmosphères explosives.**
- **Cet outil n'est pas isolé contre les chocs électriques.**

NOTE

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

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

Adressez toutes vos communications au Bureau Ingersoll–Rand ou distributeur le plus proche.

Imprimé aux É.U.

Ingersoll-Rand®

SIGNIFICATION DES ETIQUETTES D'AVERTISSEMENT

⚠ ATTENTION

LE NON RESPECT DES AVERTISSEMENTS SUIVANTS PEUT CAUSER DES BLESSURES

⚠ ATTENTION

Porter toujours des lunettes de protection pendant l'utilisation et l'entretien de cet outil.

⚠ ATTENTION

Porter toujours une protection acoustique pendant l'utilisation de cet outil.

⚠ ATTENTION

Couper toujours l'alimentation d'air comprimé et débrancher le flexible d'alimentation avant d'installer, déposer ou ajuster tout accessoire sur cet outil, ou d'entreprendre une opération d'entretien quelconque sur l'outil.

⚠ ATTENTION

Les outils pneumatiques peuvent vibrer pendant l'exploitation. 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.

⚠ ATTENTION

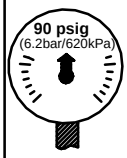
Ne pas transporter l'outil par son flexible.

⚠ ATTENTION

Ne pas utiliser des flexibles ou des raccords endommageés, effilochés ou détériorés.

⚠ ATTENTION

Garder une position équilibrée et ferme. Ne pas se pencher trop en avant pendant l'utilisation de cet outil.



⚠ ATTENTION

Utiliser de l'air comprimé à une pression maximum de 6,2 bar (620 kPa).

RÉGLAGES

REGLAGE DU LIMITEUR

⚠ ATTENTION

Débrancher l'alimentation d'air comprimé de l'outil avant d'entreprendre les opérations suivantes.

1. Tourner suffisamment la bague pour accéder au trou de réglage du limiteur.
2. Insérer une clé hexagonale de 1/4" dans le porte–embout et tourner le mécanisme du limiteur jusqu'à ce que la zone ayant une ouverture entre les faces de la rondelle et de l'écrou de réglage du limiteur soit visible.
3. A l'aide d'un tournevis Phillips No.1, insérer la lame du tournevis dans l'ouverture et tourner le tournevis pour régler le limiteur. Tourner le tournevis dans le sens horaire pour réduire la tension du ressort du limiteur et le couple, et dans le sens antihoraire pour augmenter la tension et le couple.

NOTE

La meilleure méthode de réglage est normalement obtenue en utilisant l'outil sur l'application requise en augmentant ou en diminuant le couple fourni jusqu'à ce que le réglage désiré soit obtenu. De plus, il est toujours recommandé d'obtenir le réglage final au moyen de réglages progressifs.

MISE EN SERVICE DE L'OUTIL

LUBRIFICATION

Ingersoll–Rand No. 10

Pignonnerie:
Ingersoll–Rand No. 67

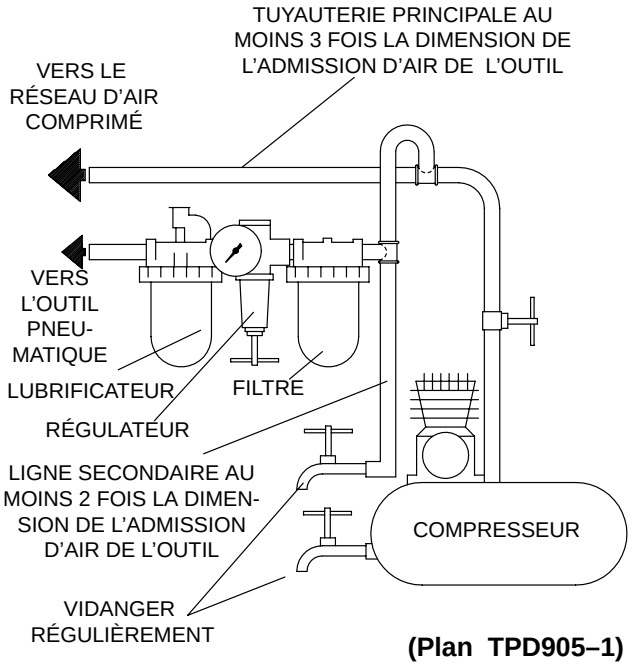
Limiteur:
Ingersoll–Rand No. 28

Utiliser toujours un lubrificateur avec ces outils. Nous recommandons l'emploi du filtre–régulateur–lubrificateur suivant:

É.U. – No. C08–02–FKG0–28

Lubrifier le train d'engrenages avec de la graisse Ingersoll–Rand No. 67 **à chaque fois que l'outil est démonté pour entretien ou réparation**.

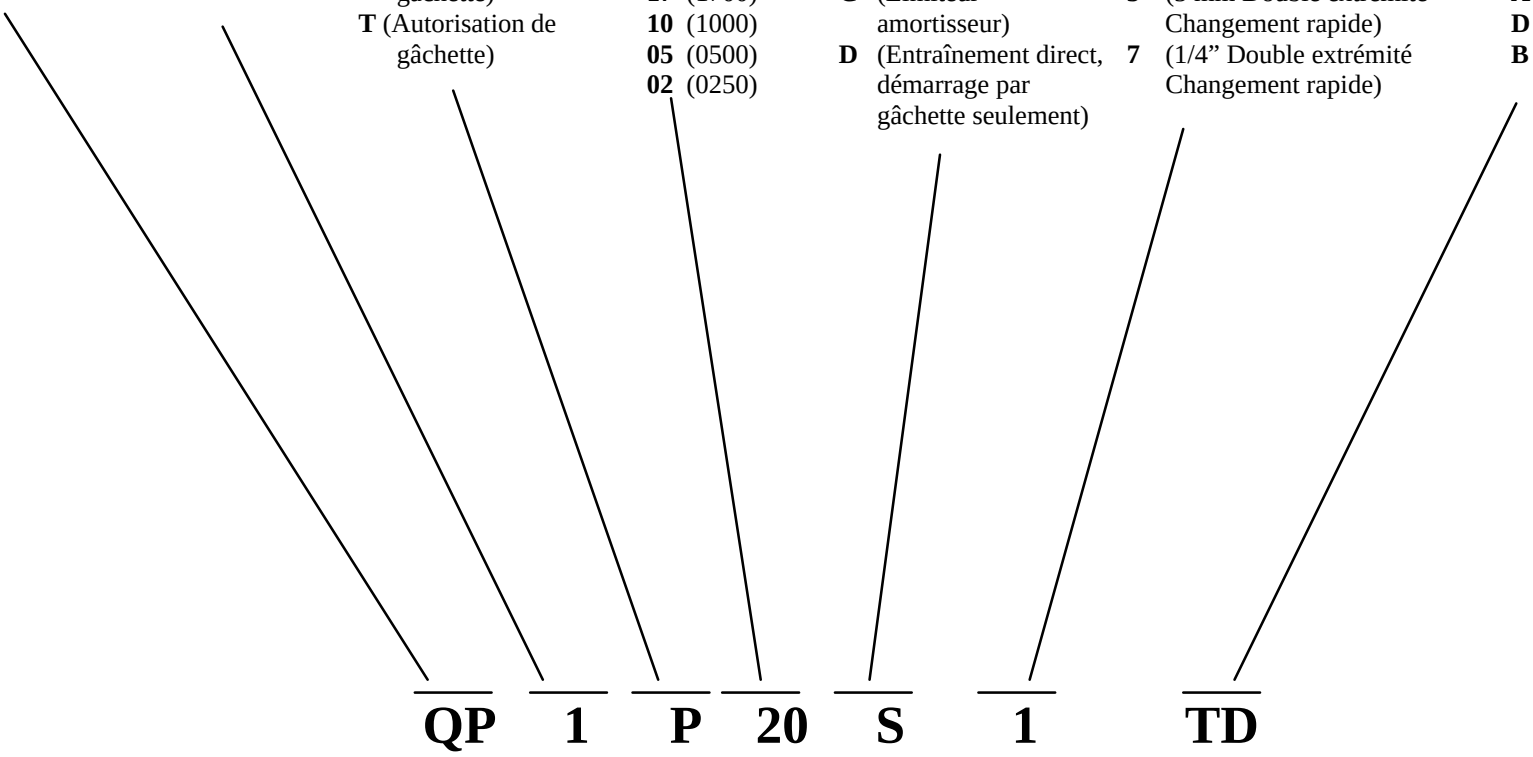
Lubrifier l'ensemble de limiteur avec de la graisse Ingersoll–Rand No. 28 **à chaque fois que l'outil est démonté pour entretien ou réparation**.



(Plan TPD905–1)

IDENTIFICATION DES MODÈLES

Style d'outil	Rotation	Commande	Vitesse à vide	Limiteur	Porte–embout ou entraîneur	Accesoires
QP (Pistolet)	**1** (Réversible)	**P** (Commande par poussée) **S** (Démarrage par gâchette) **T** (Autorisation de gâchette)	**33** (3350) **20** (2000) **17** (1700) **10** (1000) **05** (0500) **02** (0250)	**S** (Arrêt automatique) **C** (Limiteur amortisseur) **D** (Entraînement direct, démarrage par gâchette seulement)	**1** (1/4" Changement rapide) **3** (1/4" Coiffe d'embout) **5** (5 mm Double extrémité Changement rapide) **7** (1/4" Double extrémité Changement rapide)	**T** (Admission par le haut) **A** (Petite poignée) **D** (Puce mémoire) **B** (1/4–19 BSPT Tuyau d'entrée)

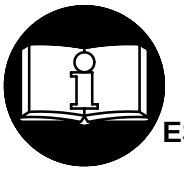


E

MANUAL DE USO Y MANTENIMIENTO PARA ATORNILLADORES NEUMÁTICOS DE LAS SERIES QP1P, QP1S Y QP1T

NOTA

Los atornilladores neumáticos de las series QP1P, QP1S y QP1T están diseñados para aplicaciones de montaje en las industrias de electrodomésticos, del automóvil, electrónica y aeroespacial, así como para carpintería.
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 INFORMACION IMPORTANTE DE SEGURIDAD.
LEA ESTE MANUAL ANTES DE USAR LA HERRAMIENTA.
ES RESPONSABILIDAD DE LA EMPRESA ASEGURARSE DE QUE EL OPERARIO ESTE AL TANTO DE LA INFORMACION QUE CONTIENE ESTE MANUAL.
EL HACER CASO OMISO DE LOS AVISOS SIGUIENTES PODRIA OCASIONAR LESIONES.

PARA PONER LA HERRAMIENTA EN SERVICIO

- **Utilice, examine y mantenga siempre esta herramienta conforme al código de seguridad para herramientas neumáticas portátiles de la American National Standards Institute (ANSI B186.1).**
- **Para seguridad, máximo rendimiento y durabilidad de piezas, use esta herramienta a una máxima presión de aire de 90 psig (6,2 bar/620kPa) en la admisión de manguera de suministro de aire de diámetro interno de 6 mm.**
- **Corte siempre el suministro de aire y desconecte la manguera de suministro de aire antes de instalar, desmontar o ajustar cualquier accesorio de esta herramienta, o antes de realizar cualquier operación de mantenimiento de la misma.**
- **No utilice mangueras de aire y accesorios dañados, desgastados ni deteriorados.**
- **Asegúrese de que todas las mangueras y los accesorios sean del tamaño correcto y estén bien apretados. Vea Esq. TPD905–1 para un típico arreglo de tuberías.**
- **Use siempre aire limpio y seco a una máxima presión de 90 psig (6,2 bar/620kPa). El polvo, los gases corrosivos y/o el exceso de humedad podrían estropear el motor de una herramienta neumática.**
- **No lubrique las herramientas con líquidos inflamables o volátiles tales como queroseno, gasoil o combustible para motores a reacción.**
- **No saque ninguna etiqueta. Sustituya toda etiqueta dañada.**

USO DE HERRAMIENTA

- **Use siempre protección ocular cuando utilice esta herramienta o realice operaciones de mantenimiento en la misma.**
- **Use siempre protección para los oídos cuando utilice esta herramienta.**
- **Mantenga las manos, la ropa suelta y el cabello largo alejados del extremo giratorio de la herramienta.**
- **Note la posición de la palanca de inversión antes de funcionar la herramienta para estar consciente de su dirección giratoria cuando funcione el estrangulador.**
- **Anticipe y esté alerta a los cambios repentinos en el movimiento durante la puesta en marcha y el manejo de toda herramienta motorizada.**
- **Mantenga una postura de cuerpo equilibrada y firme. No estire demasiado los brazos al manejar la herramienta. Pueden ocurrir reacciones de alto par a, o menos de, la recomendada presión de aire.**
- **El accesorio de herramienta podría seguir girando brevemente después de haber soltado la palanca de estrangulación.**
- **Las herramientas neumáticas pueden vibrar durante el uso. La vibración, repetición o posiciones incomodas pueden dañarle los brazos y manos. En caso de incomodidad, sensación de hormigueo o dolor, deje de usar la herramienta. Consulte a un médico antes de volver a usarla otra vez.**
- **Utilice únicamente los accesorios Ingersoll–Rand recomendados.**
- **Esta herramienta no ha sido diseñada para trabajar en ambientes explosivos.**
- **Esta herramienta no está aislada contra descargas eléctricas.**

NOTA

El uso de piezas de recambio que no sean las auténticas piezas Ingersoll–Rand podría poner en peligro la seguridad, reducir el rendimiento de la herramienta y aumentar los cuidados de mantenimiento necesarios, así como invalidar toda garantía.

Las reparaciones sólo serán realizadas por personal cualificado y autorizado. Consulte con el centro de servicio Ingersoll–Rand autorizado más próximo.

Toda comunicación se deberá dirigir a la oficina o al distribuidor Ingersoll–Rand más próximo.

Impreso en EE. UU.

Ingersoll-Rand®

ETIQUETAS DE AVISO

⚠ AVISO

EL HACER CASO OMISO DE LOS AVISOS SIGUIENTES PODRIA OCASIONAR LESIONES.

⚠ ADVERTENCIA

Use siempre protección ocular cuando utilice esta herramienta o realice operaciones de mantenimiento en la misma.

⚠ ADVERTENCIA

Las herramientas neumáticas 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.

⚠ ADVERTENCIA

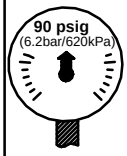
Mantener una postura del cuerpo equilibrada y firme. No estirar demasiado los brazos al manejar la herramienta.

⚠ ADVERTENCIA

Use siempre protección para los oídos cuando utilice esta herramienta.

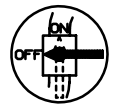
⚠ ADVERTENCIA

No coger la herramienta por la manguera para levantarla.



⚠ ADVERTENCIA

Manejar la herramienta a una presión de aire máxima de 90 psig (6,2 barias/620 kPa).



⚠ ADVERTENCIA

Cortar siempre el suministro de aire y desconectar la manguera de suministro de aire antes de instalar, retirar o ajustar cualquier accesorio de esta herramienta, o antes de realizar cualquier operación de mantenimiento de la misma.

⚠ ADVERTENCIA

No utilizar mangueras de aire y accesorios dañados, desgastados ni deteriorados.

AJUSTES

AJUSTE DE EMBRAGUE

⚠ AVISO

Desconecte el suministro de aire comprimido de la herramienta antes de proceder.

1. Gire la tapa del orificio para ajuste del embrague lo suficiente para que quede expuesto el orificio en la carcasa del embrague.
2. Introduzca una llave exagonal de 1/4” en el portapuntas y gire el mecanismo del embrague hasta que quede visible la zona que tiene una abertura entre las caras de la arandela de la tuerca de ajuste del embrague y de dicha tuerca.
3. Introduzca la punta de un atornillador con punta Phillips nº 1 en la abertura y gire el atornillador para ajustar el embrague. Gire el atornillador hacia la derecha para reducir la tensión y el par del muelle del embrague o hacia la izquierda para aumentarlos.

NOTA

Normalmente se obtendrá el mejor ajuste usando la herramienta en trabajo actual e incrementando o disminuyendo el par hasta lograr el ajuste deseado. En cualquier caso, se recomienda hacer el ajuste final por progresión gradual.

PARA PONER LA HERRAMIENTA EN SERVICIO

LUBRICACION

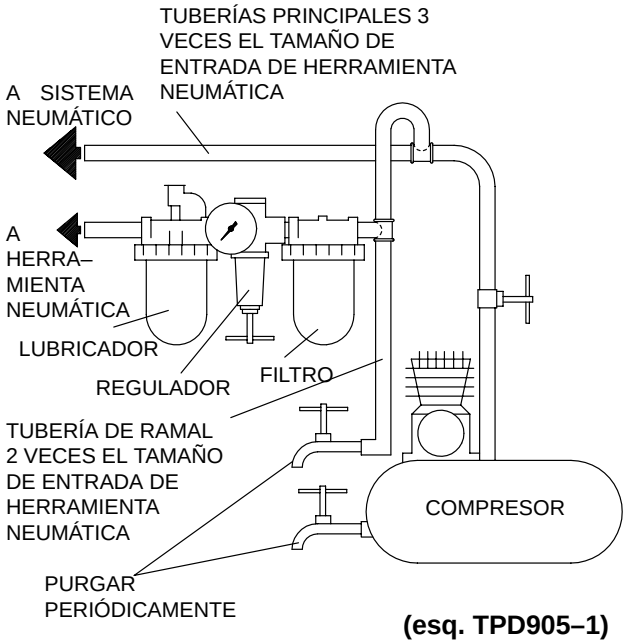
Ingersoll–Rand Nº 10 **Engranajes:**
Ingersoll–Rand Nº 67
Embrague:
Ingersoll–Rand Nº 28

Utilice siempre un lubricador de aire comprimido con estas llaves de impacto. Recomendamos la siguiente unidad de Filtro–Lubricador–Regulador:

EE.UU. – Nº C08–02–FKG0–28

Cada vez que se desarme la herramienta para realizarle trabajos de mantenimiento o reparación, lubrique el tren de engranajes con grasa Ingersoll–Rand Nº 67.

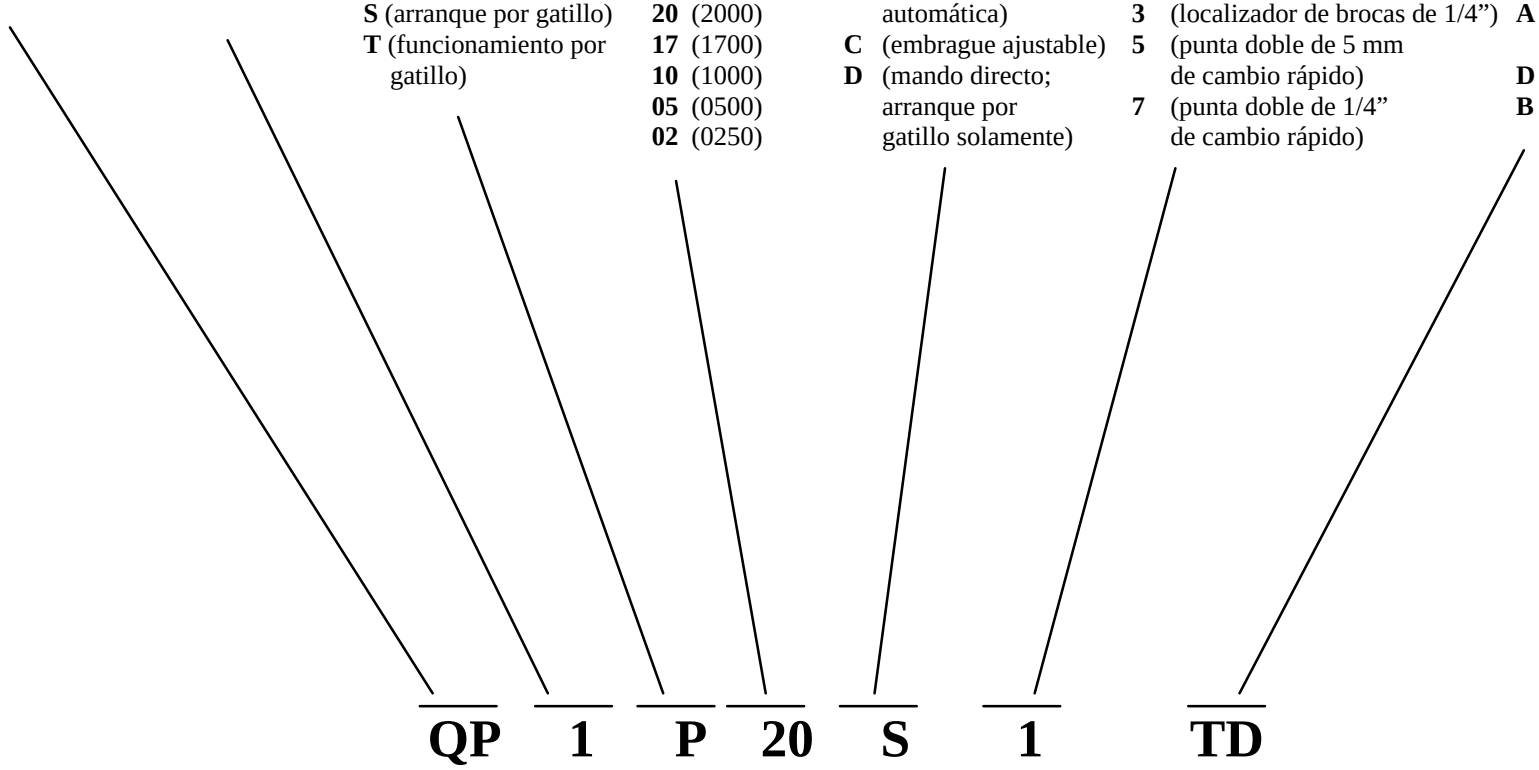
Cada vez que se desarme la herramienta para realizarle trabajos de mantenimiento o reparación, lubrique el conjunto del embrague con grasa Ingersoll–Rand Nº 28.



(esq. TPD905–1)

IDENTIFICACIÓN DE MODELOS

Estilo de herramienta	Rotación	Palanca de mando	Velocidad en vacío	Embrague	Portapuntas o cuadradrillo	Accesorios
QP (Pistola)	**1** (Reversible)	**P** (arranque por empuje) **S** (arranque por gatillo) **T** (funcionamiento por gatillo)	**33** (3350) **20** (2000) **17** (1700) **10** (1000) **05** (0500) **02** (0250)	**S** (parada automática) **C** (embrague ajustable) **D** (mando directo; arranque por gatillo solamente)	**1** (1/4” de cambio rápido) **3** (localizador de brocas de 1/4”) **5** (punta doble de 5 mm de cambio rápido) **7** (punta doble de 1/4” de cambio rápido)	**T** (entrada superior) **A** (empuñadura pequeña) **D** (chip de memoria) **B** (1/4–19 BSPT Boca)

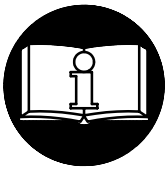


P

MANUAL DE FUNCIONAMENTO E MANUTENÇÃO PARA APARAFUSADORAS PNEUMÁTICAS SÉRIES QP1P, QP1S E QP1T

AVISO

As Aparafusadoras Pneumáticas Séries QP1P, QP1S e QP1T são concebidas para aplicações de fixação na montagem de automóveis e aparelhos, nas indústrias electrónica e aeroespacial e em carpintaria.
A Ingersoll–Rand não é responsável por modificações, feitas pelo cliente em ferramentas, nas quais a Ingersoll–Rand não tenha sido consultada.



⚠ ADVERTÊNCIA

INFORMAÇÃO DE SEGURANÇA IMPORTANTE EM ANEXO
LEIA ESTE MANUAL ANTES DE OPERAR A FERRAMENTA.
É DA RESPONSABILIDADE DO EMPREGADOR COLOCAR A INFORMAÇÃO DESTE MANUAL NAS MÃOS DO OPERADOR.
O NÃO CUMPRIMENTO DAS SEGUINTES ADVERTÊNCIAS PODE RESULTAR EM FERIMENTOS.

COLOCANDO A FERRAMENTA EM FUNCIONAMENTO

- **Sempre opere, inspeccione e mantenha esta ferramenta de acordo com o Código de Segurança do Instituto Americano de Padrões Nacionais para Ferramentas Pneumáticas Portáteis (ANSI B186.1).**
- **Para segurança, máximo desempenho e máxima durabilidade das peças, opere esta ferramenta com uma pressão de ar máxima de 6,2 bar/620 kPa (90 psig) na entrada da mangueira de alimentação de ar com diâmetro interno de 6 mm (1/4”).**
- **Desligue sempre a alimentação de ar e desconecte a mangueira de alimentação de ar antes de instalar, remover ou ajustar qualquer acessório nesta ferramenta, ou antes de executar qualquer serviço de manutenção nesta ferramenta.**
- **Não use mangueiras de ar ou adaptadores danificados, gastos ou deteriorados.**
- **Certifique–se de que todas as mangueiras e adaptadores sejam do tamanho correcto e estejam apertados com firmeza. Veja o Desenho TPD905–1 para um arranjo típico de tubagem.**
- **Use sempre ar seco e limpo com pressão máxima de 6,2 bar/620 kPa (90 psig). Pó, fumos corrosivos e/ou humidade excessiva podem arruinar o motor de uma ferramenta pneumática.**
- **Não lubrifique as ferramentas com líquidos inflamáveis ou voláteis tais como querosene, diesel ou combustível de jactos.**
- **Não remova nenhum rótulo. Reponha qualquer rótulo danificado.**

USANDO A FERRAMENTA

- **Use sempre óculos de protecção quando estiver operando ou executando serviço de manutenção nesta ferramenta.**
- **Use sempre protecção contra ruído ao operar esta ferramenta.**
- **Mantenha as mãos, partes do vestuário soltas e cabelos compridos afastados da extremidade em rotação.**
- **Observe qual é a posição da alavanca que reverte o sentido de rotação antes de operar esta ferramenta de modo a estar atento ao sentido de rotação quando operar o regulador de pressão.**
- **Antecipe e esteja alerta a mudanças repentinas no movimento quando ligar e operar qualquer ferramenta motorizada.**
- **Mantenha a posição do corpo equilibrada e firme. Não exagere quando operar esta ferramenta. Torques de reacção elevados podem ocorrer na ou abaixo da pressão de ar recomendada.**
- **Os acessórios da ferramenta podem continuar a girar brevemente após a pressão ter sido aliviada.**
- **Ferramentas accionadas pneumáticamente podem vibrar em uso. Vibração, movimentos repetitivos ou posições desconfortáveis podem ser prejudiciais às mãos e aos braços. Pare de usar a ferramenta caso ocorra algum desconforto, sensação de formigueiro ou dor. Procure assistência médica antes de retornar ao trabalho.**
- **Use acessórios recomendados pela Ingersoll–Rand.**
- **Esta Ferramenta não foi concebida para trabalhos em atmosferas explosivas.**
- **Esta Ferramenta não está isolada contra choques eléctricos.**

AVISO

O uso de peças de substituição que não sejam genuinamente da Ingersoll–Rand podem resultar em riscos de segurança, diminuição do desempenho da ferramenta, aumento da necessidade de manutenção e pode invalidar todas as garantias.

As reparações devem ser feitas somente por pessoal treinado autorizado. Consulte o Centro de Serviços da Ingersoll–Rand mais próximo.

Envie Todos os Comunicados Para o Distribuidor ou Escritório da Ingersoll–Rand Mais Próximo.

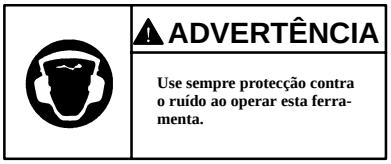
Impresso nos E.U.A.

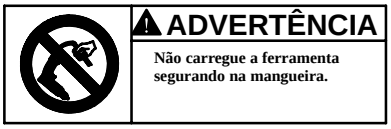
Ingersoll-Rand®

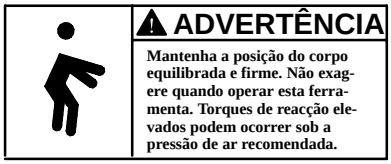
IDENTIFICAÇÃO DO RÓTULO DE ADVERTÊNCIA

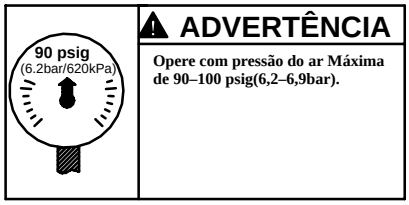
⚠ ADVERTÊNCIA

O NÃO CUMPRIMENTO DAS SEGUINTES ADVERTÊNCIAS PODE RESULTAR EM FERIMENTO.









AJUSTES

AJUSTE DA EMBRAIAGEM

⚠ ADVERTÊNCIA

Desconecte a alimentação de ar da Ferramenta antes de prosseguir.

1. Rode a tampa do orifício de ajuste da embraiagem para expor este orifício na carcaça da embraiagem.
2. Introduza uma chave sextavada de 1/4” no porta–brocas e rode o mecanismo da embraiagem até a área que tem uma abertura entre as faces da anilha da porca de ajuste da embraiagem e da porca de ajuste da embraiagem ficar visível.
3. Introduza a ponta de uma chave de fendas Phillips Nº 1 na abertura e rode a chave de fendas para ajustar a embraiagem. Rode a chave para a direita para reduzir a tensão e o binário da mola da embraiagem e para a esquerda para aumentar a tensão e o binário.

AVISO

O ajuste mais satisfatório é usualmente obtido ao utilizar a ferramenta na aplicação real e aumentando ou diminuindo o torque exercido até que o ajuste desejado seja atingido. Em qualquer caso, é recomendado que o ajuste final seja feito em progressivamente.

COLOCANDO A FERRAMENTA EM FUNCIONAMENTO

LUBRIFICAÇÃO

Ingersoll–Rand No. 10

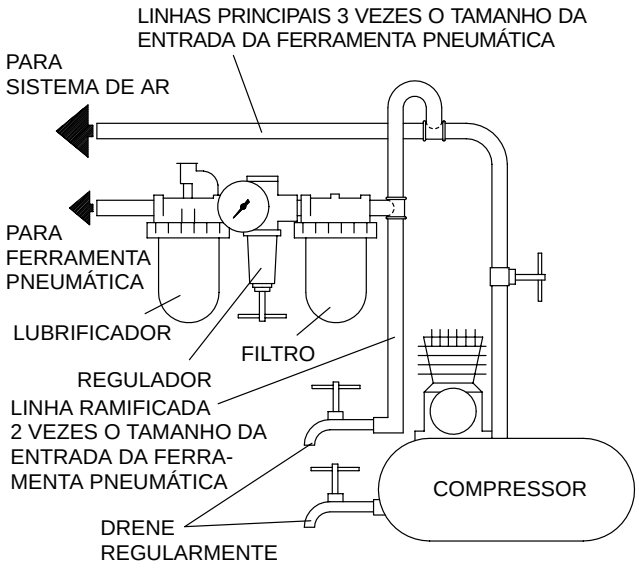
Engrenagem:
Ingersoll–Rand No. 67
Embraiagem:
Ingersoll–Rand No. 28

Use sempre um lubrificador de ar de linha com estas ferramentas. Nós recomendamos a seguinte Unidade Filtro–Lubrificador–Regulador:

Para E.U.A. – No. C08–02–FKG0–28

Sempre que a ferramenta for desmontada para manutenção ou reparação, lubrifique o trem de engrenagens com Massa Ingersoll–Rand Nº 67.

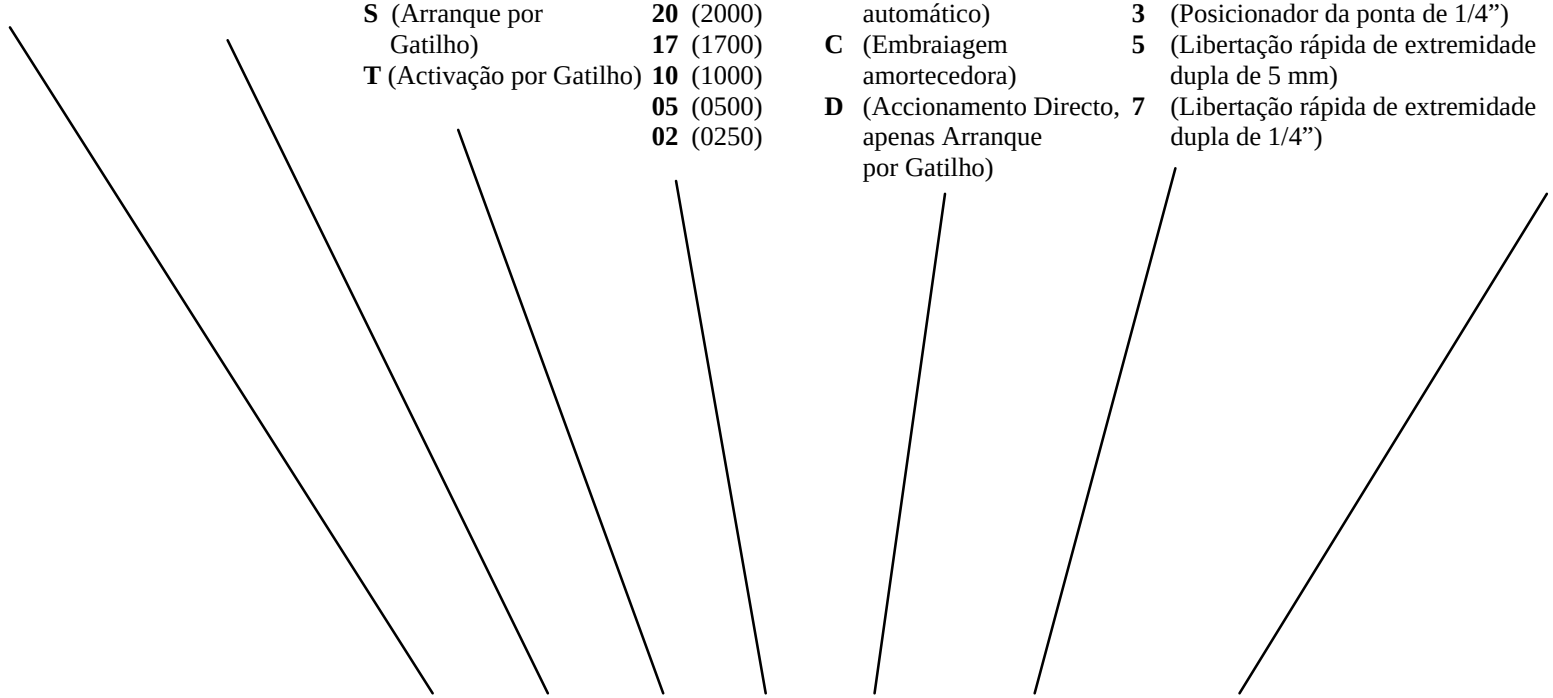
Sempre que a ferramenta for desmontada para manutenção ou reparação, lubrifique o conjunto da embraiagem com Massa Ingersoll–Rand Nº 28.



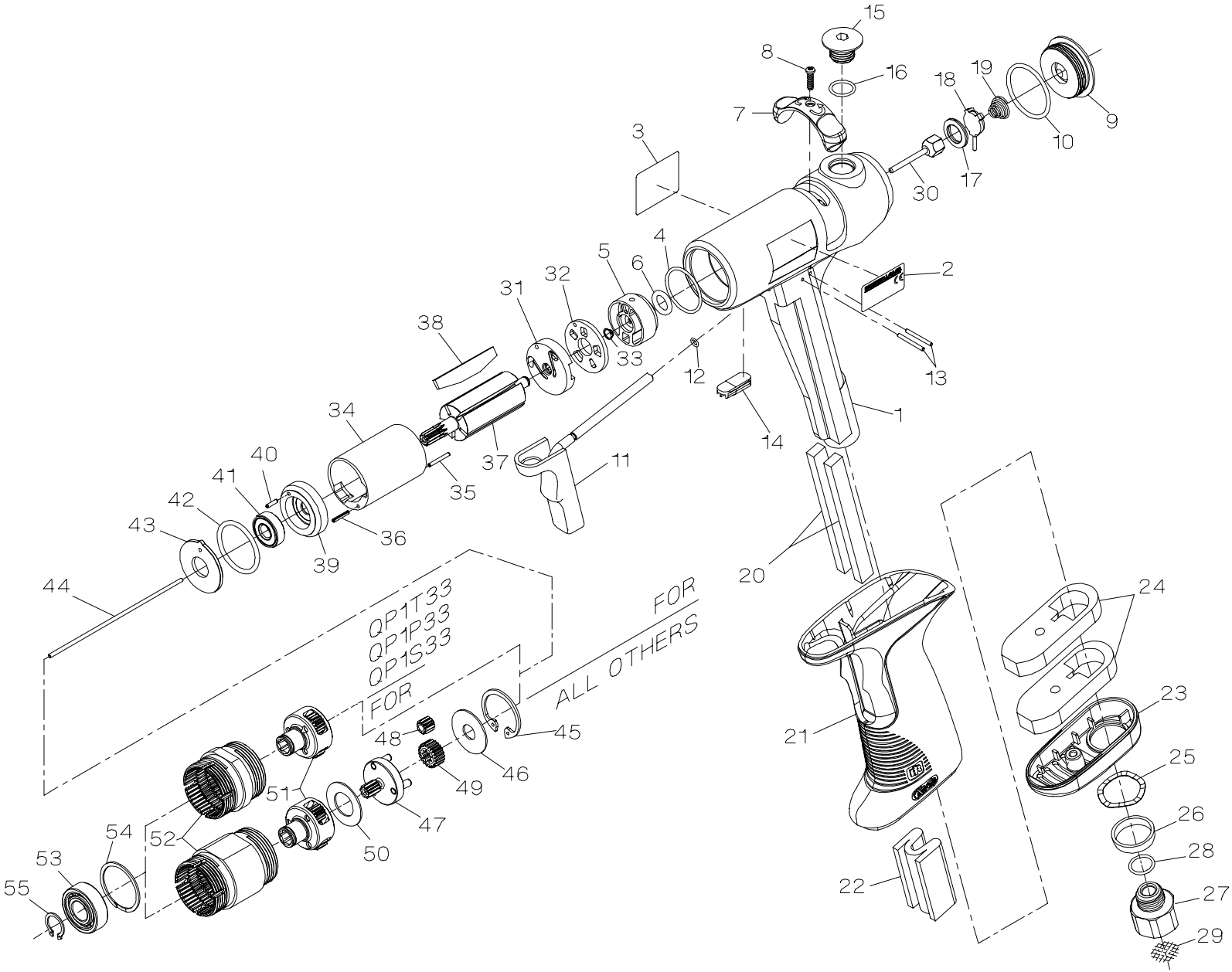
(Desenho TPD905–1)

MODEL IDENTIFICATION

Estilo da ferramenta	Rotação	Estrangulador	Velocidade livre	Embraiagem	Porta–brocas ou accionador	Acessórios
QP (Pistola)	**1** (Reversível)	**P** (Arranque por Pressão) **S** (Arranque por Gatilho) **T** (Activação por Gatilho)	**33** (3350) **20** (2000) **17** (1700) **10** (1000) **05** (0500) **02** (0250)	**S** (Desligamento automático) **C** (Embraiagem amortecedora) **D** (Accionamento Directo, apenas Arranque por Gatilho)	**1** (Libertação rápida de 1/4”) **3** (Posicionador da ponta de 1/4”) **5** (Libertação rápida de extremidade dupla de 5 mm) **7** (Libertação rápida de extremidade dupla de 1/4”)	**T** (Admissão superior) **A** (Punho pequeno) **D** (Chip de memória) **B** (1/4–19 BSPT Entrada)



SERIES QP1P, QP1S AND QP1T MOTOR AND GEARING

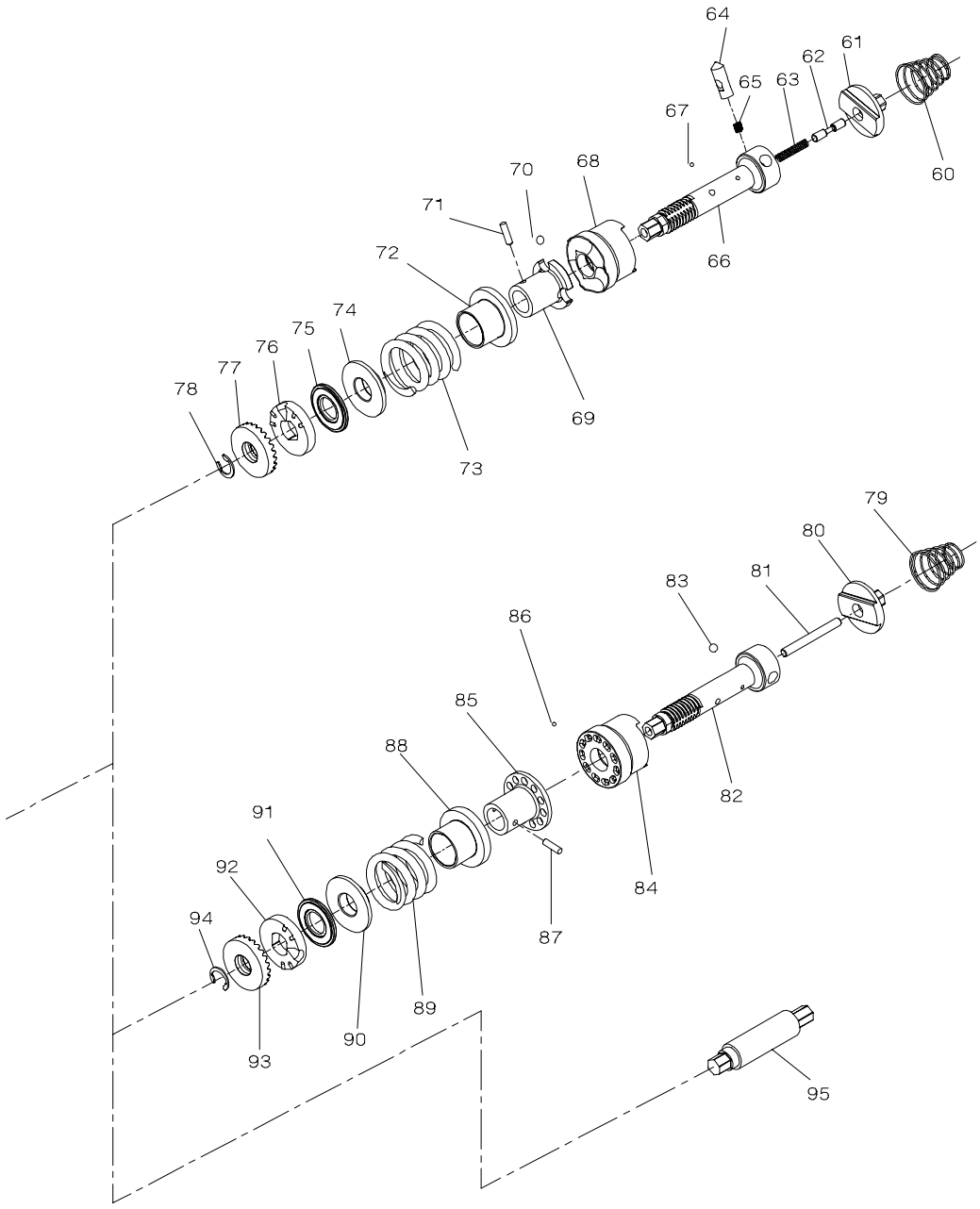


(Dwg. TPA1769)

		PART NUMBER FOR ORDERING			PART NUMBER FOR ORDERING
1	Motor Housing Assembly		14	Memory Chip Holder Assembly (for models with memory chip only; includes memory chip)	TRP–A528
	for Push–to–Start with bottom inlet except 250 rpm models	TRP–A40–P–B	15	Inlet Plug Assembly (for models with top inlet only)	TRP–A565
	for 250 rpm Push–to–Start models with bottom inlet	TRP–A40–2P–B	16	Inlet Plug Seal	TRP–103
	for Push–to–Start with top inlet except 250 rpm Models	TRP–A40–P	17	Throttle Valve Seat	TRP–303
	for 250 rpm Push–to–Start models with top inlet	TRP–A40–2P	18	Throttle Valve	TRP–A302
	for non–Push–to–Start models with bottom inlet except 250 rpm models	TRP–A40–B	19	Throttle Valve Spring	TRP–51
	for 250 rpm non–Push–to–Start models with bottom inlet	TRP–A40–2B	20	Housing Muffler Element (2)	TRP–311–2
	for non–Push–to–Start models with top inlet except 250 rpm models	TRP–A40	21	Housing Grip	
	for 250 rpm non–Push–to–Start models with top inlet	TRP–A40–2		large size (standard)	TRP–40–2
2	Nameplate	TRH–301		small sze	TRP–40–1
3	Warning Label	TRH–99	22	Grip Muffler Element	3RA–310
4	Housing O–ring	TRH–104	23	Grip End Cap	TRP–40–B
5	Reverse Valve Assembly		24	End Cap Muffler Element (2)	TRP–311–1
	for models with an Automatic Shutoff Valve	TRH–A329	25	Wave Washer	TRP–761
	for models without an Automatic Shutoff Valve	TRH–A3291	26	Inlet Bushing Bezel	TRP–123
6	Reverse Valve Seal	R1A–159	27	Inlet Bushing Assembly	TRP–A465
7	Reverse Lever	TRP–273		for 1/4–18 NPT thread	TRP–A465
8	Reverse Lever Screw	TRH–330		for 1/4–19 BSPT thread	TRP–A465–B
9	Rear Housing Cap Assembly	TRP–A202	28	Inlet Bushing Seal	TRP–103
10	Rear Housing Cap Seal	TRP–158	29	Inlet Bushing Screen	TRH–61
11	Trigger Assembly	TRP–A93	30	Automatic Shutoff Valve	
12	Trigger Shaft O–ring	TRP–112		for all trigger permit models and push–to–start models	TRH–A435
13	Trigger Retaining Pin (2 for Push–to–Start models; 1 for all others)	400–25–87–4		for all trigger start models with automatic shutoff clutches	TRP–A435
			31	Rear End Plate Assembly (includes rear rotor bearing)	TRH–A12–1
			32	Rear End Plate Face Plate	TRH–12–2
			33	Rear End Plate Assembly Retainer	8SL–305

		PART NUMBER FOR ORDERING			PART NUMBER FOR ORDERING
34	Cylinder Assembly	TRH–A3	48	Planet Gear (3 for each Gear Head)	
35	Cylinder Rear Alignment Pin	TRH–98		for 250, 500 and 1000 rpm models	TRH–10–16
36	Cylinder Front Alignment Pin	TRH–98–1		for 1700 rpm models	TRH–10–12
37	Rotor			for 2000 rpm models	TRH–10–10
	for models with an Automatic Shutoff Valve	TRH–53	49	Gear Head Pinion	
				for 1700 rpm models	TRH–17–18
	for models without an Automatic Shutoff Valve	TRD–53		for 2000 rpm models	TRH–17–21
38	Vane Packet (set of 5 Vanes)	TRH–42–5	50	Planet Gear Head Spacer (for all models except 3350 rpm models)	TRH–82
39	Front End Plate Assembly	TRH–A11	51	Spindle Assembly (includes all spindle gearing)	
40	End Plate Alignment Pin	TRH–98–2			
41	Front Rotor Bearing	TRH–24		for 250, 500 and 3350 rpm models	TRH–A8–16
42	Motor Seal	TRH–211		for 1700 rpm models	TRH–A8–12
43	Motor Clamp Washer	TRH–207		for 1000 and 2000 rpm models	TRH–A8–10
44	Push Rod (for models with an Automatic Shutoff Valve)	TRH–425	52	Gear Case	
				for 3350 rpm models	TRH–37–S
45	Gear Retainer (for all models except 3350 rpm models)	TRH–28		for all other models	TRH–37
			53	Spindle Bearing	TRH–510
46	Gear Head Spacer (for all models except 3350 rpm models)	TRH–81	54	Spindle Bearing Seat	TRH–208
			55	Spindle Bearing Retainer	4E–6
47	Planet Gear Head Assembly (includes gear shafts)				
	for 250, 500 and 1000 rpm models	TRH–A2169–16			
	for 1700 rpm models	TRH–A2169–12			
	for 2000 rpm models	TRH–A2169–10			

SERIES QP1P, QP1S AND QP1T CLUTCHES

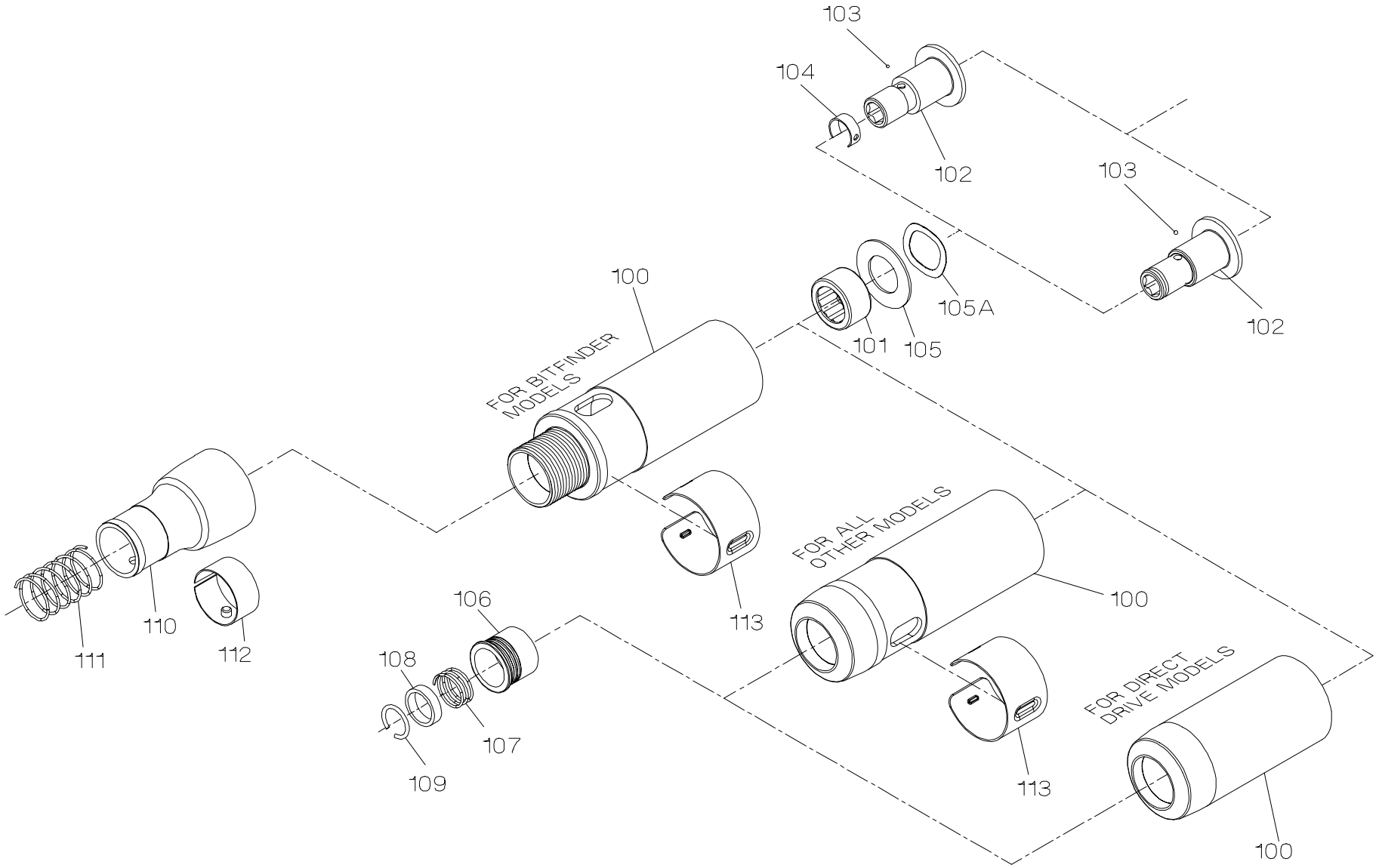


(Dwg. TPA1770)

		PART NUMBER FOR ORDERING
	Automatic Shutoff Clutch Assembly	
	with heavy clutch spring	TRH–AH579
	with medium clutch spring	TRH–AM579
	with light clutch spring	TRH–AL579
60	Clutch Return Spring	TRH–405
61	Clutch Input Driver	TRH–103
62	Automatic Shutoff Plunger	TRH–408
63	Automatic Shutoff Plunger Return Spring	TRH–420
64	Automatic Shutoff Pin	TRH–704
65	Automatic Shutoff Pin Spring	TRH–407
66	Clutch Shaft	TRH–502
67	Clutch Ball (1/8” diameter) (12)	AV1–255
68	Cam Jaw	TRH–721
69	Clutch Cam Ball Driver	TRH–581
70	Clutch Cam Ball (1/4” diameter) (3)	4U–722
71	Clutch Driver Retaining Pin	TRH–188
72	Cam Ball Seat	TRH–627
73	Clutch Spring	
	heavy (green)	TRH–H583
	medium (red)	TRH–M583
	light (yellow)	TRH–L583
74	Spring Seat	TRH–623
75	Thrust Bearing	161A32–105
76	Clutch Adjusting Nut Washer	TRH–582
77	Clutch Adjusting Nut	TRH–588
78	Clutch Adjusting Nut Stop	3S3–701

		PART NUMBER FOR ORDERING
	Cushion Clutch Assembly	
	with heavy clutch spring	TRH–AH579–C
	with medium clutch spring	TRH–AM579–C
	with light clutch spring	TRH–AL579–C
79	Clutch Return Spring	TRH–405
80	Clutch Input Driver	TRH–103
81	Clutch Pushrod	TRH–236–C
82	Clutch Shaft	TRH–502
83	Clutch Ball (1/8” diameter) (12)	AV1–255
84	Cam Jaw	TRH–721–C
85	Clutch Cam Ball Driver	TRH–581–C
86	Clutch Cam Ball (1/8” diameter) (11)	AV1–255
87	Clutch Cam Ball Driver Retaining Pin	TRH–188
88	Cam Ball Seat	TRH–627–C
89	Clutch Spring	
	heavy (green)	TRH–H583
	medium (red)	TRH–M583
	light (yellow)	TRH–L583
90	Spring Seat	TRH–623
91	Thrust Bearing	161A32–105
92	Clutch Adjusting Nut Washer	TRH–582
93	Clutch Adjusting Nut	TRH–588
94	Clutch Adjusting Nut Stop	3S3–701
95	Clutch Shaft (for direct drive models only)	TRH–786–S

SERIES QP1P, QP1S AND QP1T BIT DRIVERS



(Dwg. TPA1777–1)

	PART NUMBER FOR ORDERING			PART NUMBER FOR ORDERING
	Bit Holder Assembly			with 1/4” Double End Quick Release Bit Holder (for Push–to–Start Models and Models with Trigger Permit) TRP–A580–PQ4D
	with 1/4” Quick Release Bit Holder (for Push–to–Start Models and Models withTrigger Permit) . .	TRP–A580–PQ4		with 1/4” Double End Quick Release Bit Holder (for Trigger Start Models with Cushion or Shutoff Clutch) TRP–A580–NQ4D
	with 1/4” Quick Release Bit Holder (for Trigger Start Models with Cushion or Shutoff Clutch) . . .	TRP–A580–NQ4		with 1/4” Double End Quick Release Bit Holder (for Direct Drive Models) TRP–A580–S–NQ4D
	with 1/4” Quick Release Bit Holder (for Direct Drive Models) . .	TRP–A580–S–NQ4	100	Clutch Housing
	with 1/4” Bit Finder Bit Holder (for Push–to–Start Models and Models with Trigger Permit)	TRP–A580–PQ4F		for Models with Bit Finder Bit Holders TRP–580–F
	with 1/4” Bit Finder Bit Holder (for Trigger Start Models with Cushion or Shutoff Clutch)	TRP–A580–NQ4F		for Direct Drive Models without Bit Finder Bit Holders TRP–580–S
	with 5 mm Double End Quick Release Bit Holder (for Push–to–Start Models and Models with Trigger Permit)	TRP–A580–PQ5MD		for all other Models TRP–580
	with 5 mm Double End Quick Release Bit Holder (for Trigger Start Models with Cushion or Shutoff Clutch)	TRP–A580–NQ5MD	101	Clutch Housing Bearing TRH–105
	with 5 mm Double End Quick Release Bit Holder (for Direct Drive Models)	TRP–A580–S–NQ5MD	102	Bit Holder
				for 1/4” Quick Release Bit Holder . TRH–586–H4
				for 1/4” Bit Finder Bit Holder TRH–583–Q4
				for 5 mm Double End Quick Release Bit Holder TRH–586–5MD
				for 1/4” Double End Quick Release Bit Holder TRH–586–Q4D

		PART NUMBER FOR ORDERING			PART NUMBER FOR ORDERING
103	Bit Retaining Ball		108	Spring Seat (for Quick Release Bit Holders) .	TRH–244
	for metric Bit Holders	TRH–629–3M	109	Retaining Ring (for Quick Release Bit	
	for all other Bit Holders	R000B–263		Holders)	TRH–853
104	Bit Retaining Spring (for Bit Finder Bit		110	Non–Rotating Bit Finder (for Bit Finder	
	Holders)	TRH–241		Bit Holders)	TRH–873
105	Shutoff Spacer (for all Models with		111	Spring (for Bit Finder Bit Holders)	102A60–242
	Trigger Start only)	TRH–591	112	Finder Retaining Spring (for Bit Finder	
105A	Wave Washer (for all Models with			Bit Holders)	102A60–628
	Trigger Start only)	TRH–592	113	Clutch Adjusting Hole Cover	TAP–415
106	Bit Retaining Sleeve (for Quick Release		*	Clutch Housing Spanner Wrench	TRH–478
	Bit Holders)	TRH–930	*	Hanger	TRP–A365
107	Retaining Sleeve Spring (for Quick				
	Release Bit Holders)	TRH–931			

* Not illustrated.

CLUTCH SPRING SELECTION CHART

Tool	Free Speed (rpm)	TORQUE RANGE (Soft Draw)		
		Light Clutch Spring (Yellow)	Medium Clutch Spring (Red)	Heavy Clutch Spring (Green)
All Series QP Pistol Grip Screwdrivers	3350	3.0 to 9.7 in–lbs. (0.34 to 1.1 Nm)	———— ————	———— ————
	2000	3.0 to 9.7 in–lbs. (0.34 to 1.1 Nm)	7.9 to 22.1 in–lbs. (0.89 to 2.50 Nm)	———— ————
	1710	3.0 to 9.7 in–lbs. (0.34 to 1.1 Nm)	7.9 to 27.3 in–lbs. (0.89 to 3.08 Nm)	———— ————
	1000	3.0 to 9.7 in–lbs. (0.34 to 1.1 Nm)	7.9 to 27.3 in–lbs. (0.89 to 3.08 Nm)	13.3 to 40.0 in–lbs. (1.50 to 4.52 Nm)
	500	3.0 to 9.7 in–lbs. (0.34 to 1.1 Nm)	7.9 to 28.3 in–lbs. (0.89 to 3.20 Nm)	13.3 to 47.8 in–lbs. (1.50 to 5.40 Nm)
	250	3.0 to 9.7 in–lbs. (0.34 to 1.1 Nm)	7.9 to 28.3 in–lbs. (0.89 to 3.20 Nm)	13.3 to 47.8 in–lbs. (1.50 to 5.40 Nm)

MAINTENANCE SECTION

⚠ WARNING

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

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

LUBRICATION

Each time a Series QP Screwdriver is disassembled for maintenance and repair or replacement of parts, lubricate the tool as follows:

1. Coat all exposed gears with Ingersoll–Rand No. 67 Grease and work some of the Grease into the gearing of the Spindle Assembly (51).
2. Work approximately 6 to 8 cc of Ingersoll–Rand No. 28 Grease into the ball pockets, jaws, adjusting nut lock and shaft threads of the clutch mechanism.
3. Use Ingersoll–Rand No. 10 Oil to lubricate the motor. Inject approximately 1 to 2 cc of oil into the air inlet before attaching the air hose to the tool.

CHANGING INLET LOCATION

Series QP1P, QP1S and QP1T Screwdrivers with the Top Inlet feature are shipped from the factory with the air connection attached to the bottom of the handle. To use the Top Inlet connection on these tools, proceed as follows:

1. Shut off the air supply and disconnect the air supply hose, if the tool is in use.
2. Using a 3/16” hex wrench, unscrew and remove the Inlet Plug Assembly (15) from the top of the Housing (1).
3. Using a 3/4” wrench on the flats of the Inlet Bushing Assembly (27), unscrew and remove the Assembly.
4. Transfer the Wave Washer (25) and Inlet Bushing Bezel (26) from the threads of the Inlet Bushing to the threads of the Inlet Plug. Make certain the Washer is against the Grip End Cap (23) and the smaller end of the Bezel is against the Inlet Plug Seal (16).
5. Thread the assembled Inlet Plug into the bottom of the Handle and tighten it between 15 and 20 ft–fbs. (20 and 27 Nm) torque.
6. Thread the Inlet Bushing with Inlet Bushing Seal (28) into the top of the Handle and tighten it between 15 and 20 ft–lbs. (20 and 27 Nm) torque.
7. Connect the air supply hose to the Inlet Bushing and turn on the air supply.

DISASSEMBLY

General Instructions

1. Do not disassemble the tool any further than necessary to replace or repair damaged parts.
2. Whenever grasping a tool or part in a vise, always use leather–covered or copper–covered vice jaws to protect the surface of the part and help prevent distortion. This is particularly true of threaded members and housings.
3. Do not remove any part which is a press fit in or on a subassembly unless the removal of that part is necessary for repairs or replacement.

4. Do not disassemble the tool unless you have a complete set of gaskets and o–rings for replacement.

Disassembly of the Tool

Each Series QP Screwdriver is made using four modules or units including a motor housing unit, a motor unit, a clutch with bit holder unit and a combined gearing and spindle unit. The tool can be disassembled for repairs to each individual unit without disturbing the other units. To separate the modules, proceed as follows:

NOTICE

The thread in the following step is a left–hand thread. Rotate the Bit Finder clockwise to remove it.

1. **For models with Bit Finder Bit Holders,** unscrew and remove the Non–Rotating Bit Finder (110). **For models with Quick Release Bit Holders,** use a thin blade screwdriver to spiral the Retaining Ring (109) out of the groove in the end of the Bit Holder (102). Being careful not to loose the Bit Retaining Ball (103), slide the Spring Seat (108), Retaining Sleeve Spring (107) and the Bit Retaining Sleeve (106) off the Bit Holder.
2. Lightly grasp the flats of the Gear Case (52) in copper–covered or leather–covered vise jaws with the Clutch Housing (100) upward.

NOTICE

The thread in the following step is a left–hand thread. Rotate the Clutch Housing clockwise to remove it.

3. Using a strap wrench, loosen the Clutch Housing from the Gear Case and remove the assembled tool from the vise jaws. While holding the assembly over a non–damaging container or surface, finish unscrewing the Clutch Housing from the Gear Case. Remove the Clutch Return Spring (60 or 79), the Clutch Input Driver (61 or 80), the Push Rod (44), and the Clutch Assembly or Clutch Shaft (95), from the Housing.
4. Push on the output end of the Bit Holder (102) to remove it from the Clutch Housing.
5. **For Models with Trigger Start,** slide the Shutoff Spacer (105) and Wave Washer (105A) off the Bit Holder.
6. If the Clutch Housing Bearing (101) must be replaced, press it from the Clutch Housing.
7. Lightly grasp the flats of the Gear Case in copper–covered or leather–covered vise jaws with the handle upward and rotate the assembled handle to loosen the assembly from the Gear Case. Remove the assembly from the vise jaws and separate the components.
8. Remove the Motor Clamp Washer (43) and Motor Seal (42) from the Motor Housing (1).
9. Tap the motor end of the Housing on a wooden block to remove the assembled motor from the Housing.

Disassembly of the Adjustable Shutoff Clutch

1. Using a thin blade screwdriver, pry the Clutch Adjusting Nut Stop (78) off the end of the Clutch Shaft (66).
2. Insert the tip of a #1 Phillips Head Screwdriver into the adjustment opening between the Clutch Adjusting Nut (77) and the Clutch Adjusting Nut Washer (76). Rotate the screwdriver clockwise to thread the Adjustment Nut off the Clutch Shaft.

NOTICE

In the following step, the Clutch Cam Balls will be free to fall from the assembly when the Cam Ball Seat is moved. Make certain the Balls fall into a non–damaging container.

3. Holding the assembly over a small pasteboard box, slide the Adjusting Nut Washer, the Thrust Bearing (75), the Spring Seat (74), the Clutch Spring (73) and the Cam Ball Seat (72) off the Clutch Shaft. Allow the three Clutch Cam Balls (70) to fall into the pasteboard box.
4. The Clutch Cam Ball Driver (69) has a cross hole that is larger on one side than the other. Insert a 1/16” drill shank or piece of wire into the smaller hole and gently push the Clutch Driver Retaining Pin (71) out of the larger hole and out of the Driver and the Clutch Shaft.

NOTICE

In the following step, the Clutch Balls will be free to fall from the assembly when the Cam Jaw is moved along the Clutch Shaft. Make certain the Balls fall into a non–damaging container.

5. Holding the assembly over a small pasteboard box, and using care to drop the twelve Clutch Balls (67) into the box, slide the Clutch Cam Ball Driver and Cam Jaw (68) off the Clutch Shaft. If grease held some of the Balls inside the jaw cavity, remove them.
6. With the large end of the Clutch Shaft downward, depress the Automatic Shutoff Pin (64) with varying amounts of finger pressure while tapping the large end edge of the Clutch Shaft on a piece of wood until the Automatic Shutoff Plunger (62) protrudes slightly from the end of the Shaft. Grasp the Plunger and carefully pull it out of the Clutch Shaft.
7. Remove the Automatic Shutoff Pin and Automatic Shutoff Pin Spring (65) from the Clutch Shaft. The Pin Spring should remain in the pin recess when the Pin is removed. To separate the Spring from the Pin, gently rotate the Spring while pulling it from the recess to avoid elongating the Spring.

8. Using a hooked tool, reach into the opening in the end of the Clutch Shaft and carefully pull the Automatic Shutoff Plunger Return Spring (63) out of the Shaft without elongating the Spring.

Disassembly of the Adjustable Cushion Clutch

1. Using a thin blade screwdriver, pry the Clutch Adjusting Nut Stop (94) off the end of the Clutch Shaft (82).
2. Insert the tip of a #1 Phillips Head Screwdriver into the adjustment opening between the Clutch Adjusting Nut (93) and the Clutch Adjusting Nut Washer (92). Rotate the screwdriver clockwise to thread the Adjustment Nut off the Clutch Shaft.

NOTICE

In the following step, the Clutch Cam Balls will be free to fall from the assembly when the Cam Ball Seat is moved. Make certain the Balls fall into a non–damaging container.

3. Holding the assembly over a small pasteboard box, slide the Adjusting Nut Washer, the Thrust Bearing (91), the Spring Seat (90), the Clutch Spring (89) and the Cam Ball Seat (88) off the Clutch Shaft. Allow the eleven Clutch Cam Balls (86) to fall into the pasteboard box.
4. The Clutch Cam Ball Driver (85) has a cross hole that is larger on one side than the other. Insert a 1/16" drill shank or piece of wire into the smaller hole and gently push the Clutch Driver Retaining Pin (87) out of the larger hole and out of the Driver and the Clutch Shaft.

NOTICE

In the following step, the Clutch Balls will be free to fall from the assembly when the Cam Jaw is moved along the Clutch Shaft. Make certain the Balls fall into a non–damaging container.

5. Holding the assembly over a small pasteboard box, and using care to drop the twelve Clutch Balls (83) into the box, slide the Clutch Cam Ball Driver and Cam Jaw (84) off the Clutch Shaft. If grease held some of the Balls inside the jaw cavity, remove them.

Disassembly of the Gearing

1. **For Models having a Clutch,** use snap ring pliers to remove the Gear Retainer (45) from the motor end of the Gear Case (52) and remove the Gear Head Spacer (46) as well.
2. **For 250, 500 and 1000 rpm Models,** lightly rap the motor end of the Gear Case on a wooden workbench top to remove the three Planet Gears (48), the Planet Gear Head Assembly (47) and the Planet Gear Head Spacer (50).

   For 1700 and 2000 rpm Models, lightly rap the motor end of the Gear Case on a wooden workbench top to remove the three Planet Gears (48), the Gear Head Pinion (49), the Planet Gear Head Assembly (47) and the Planet Gear Head Spacer (50).
3. Using snap ring pliers, remove the Spindle Bearing Retaining Ring (55).
4. Stand the Gear Case on the table of an arbor press with the output spindle upward. Using a rod that neatly fits inside the internal hex of the Spindle (51), press the Spindle Assembly out of the Spindle Bearing (53).

CAUTION

Do not remove the Bearing in the following step unless you have a new replacement available for installation. The Bearing will be damaged by the removal process.

5. Invert the Gear Case on the table of an arbor press so that the end face having four notches makes contact with the table. Using a rod against the inner race of the Spindle Bearing, press the Bearing from the Gear Case.
6. If the Spindle Bearing Seat (54) must be replaced, use a small, thin blade screwdriver to spiral it out of the groove in the Gear Case.

Disassembly of the Motor

1. Using snap ring pliers, remove the Rear End Plate Assembly Retainer (33) from the shaft of the Rotor (37).
2. Pull the Rear End Plate Face Plate (32) and Rear End Plate Assembly (31) off the hub of the Rotor.
3. Lift the Cylinder (34) from the Rotor.
4. Remove the Vanes (38) from the Rotor.
5. Support the Front End Plate Assembly (39), as near the rotor body as possible, on the table of an arbor press and press the Rotor from the Front Rotor Bearing (41). Remove the Bearing from the Front End Plate.

Disassembly of the Housing

1. Use a wrench to unscrew and remove the Inlet Bushing Assembly (27) from the Motor Housing Assembly (1). Remove the Inlet Bushing Bezel (26) and the Wave Washer (25).
2. Pull the Housing Grip (21) off the Motor Housing.
3. Pull or carefully pry the Grip End Cap (23) off the inlet end of the Grip and remove the two End Cap Muffler Elements (24).
4. Pull the Grip Muffler Element (22) out of the inlet end of the Grip and the two Housing Muffler Elements (20) out of the trigger end of the Grip.
5. **For Top Inlet Models,** use a 3/16" hex wrench to unscrew and remove the Inlet Plug Assembly (15).

6. Using a 1/4" hex wrench, unscrew and remove the Rear Housing Cap Assembly (9).
7. **For Models with Trigger Start or Trigger Permit,** remove the Throttle Valve Spring (19) and the Throttle Valve (18) from the rear of the Housing.
   For Models with Automatic Shutoff, remove the Automatic Shutoff Valve (30) from the rear of the Housing.
8. **For Models with Trigger Start or Trigger Permit,** if the Throttle Valve Seat (17) must be replaced, insert a hooked tool through the central opening of the Seat and pull it from the Motor Housing.
9. Use a #2 Phillips Head Screwdriver, to unscrew and remove the Reverse Lever Screw (8) and lift the Reverse Lever (7) out of the Motor Housing.
10. Insert a 5/16" wooden dowel between 6 and 8 inches long, into the Rear Housing Cap opening and push the Reverse Valve Assembly (5) out the motor end of the Housing.
11. Use a hooked tool to pull the Housing O–ring (4) out of the Motor Housing.
12. **For Push–to–Start Models**, use a 1/16" pin punch to drift the two Trigger Retaining Pins (13) out of the Motor Housing and pull the Trigger Assembly (11) out of the Housing.
    For all other Models, use a 1/16" pin punch to drift the Trigger Retaining Pin (13) out of the Motor Housing and pull the Trigger Assembly (11) out of the Housing.
13. **For Models having a memory chip,** if the chip must be replaced, pry the Memory Chip Holder Assembly (14) out of the Motor Housing in the area above the trigger location.

ASSEMBLY

General Instructions

1. Always press on the **inner** ring of a ball–type bearing when installing the bearing on a shaft.
2. Always press on the **outer** ring of a ball–type bearing when pressing the bearing into a bearing recess.
3. Whenever grasping a tool or part in a vise, always use leather–covered or copper–covered vise jaws to protect the surface of the part and help prevent distortion. This is particularly true of threaded members and housings.
4. Except for bearings, always clean every part and wipe every part with a thin film of oil before installation.
5. Apply o–ring lubricant to all o–rings before final assembly.
6. Check every bearing for roughness. If an open bearing must be cleaned, wash it thoroughly in a clean, suitable cleaning solution and dry with a clean cloth. **Sealed or shielded bearings should never be cleaned.** Work grease into every open bearing before installation.

Assembly of the Housing

1. **For Models having a memory chip,** if the Memory Chip Holder Assembly (14) is being replaced, insert the memory chip into the Holder with the contact ends leading. Position the Assembly at the slot in the exterior wall of the Motor Housing (1) above the trigger hole with the exposed contacts away from the Housing and pointing toward the spindle end of the tool. Press the Assembly into the slot.
2. Lubricate a new Trigger Shaft O–ring (12) and install it in the groove on the shaft of the Trigger Assembly (11).
3. **For Push–to–Start Models,** insert the shaft of the Trigger Assembly into the hole in the Motor Housing (1) until the flat on the shaft is aligned with the two holes in the Housing for the Trigger Retaining Pins (13). Tap the two pins into the Housing to capture the Trigger Assembly.
   For all other Models, insert the shaft of the Trigger Assembly into the hole in the Motor Housing (1) until the flat on the shaft is aligned with the hole in the Housing for the Trigger Retaining Pin (13). Tap the pin into the Housing to capture the Trigger Assembly.
4. Lubricate the Housing O–ring (4) with o–ring lubricant and install it at the bottom of the cylinder bore in the Motor Housing.
5. Inspect the face on the hub of the Reverse Valve Assembly (5) for nicks or damage. Replace the Assembly if any damage is evident. Examine the Reverse Valve Seal (6) for nicks or cuts and replace the Seal if it is damaged.
6. Lubricate the Reverse Valve Seal with o–ring lubricant and insert the Assembly, Seal end leading, into the cylinder bore of the Motor Housing. Push the Assembly toward the bottom of the cylinder bore until it "snaps" into its proper location.
7. Rotate the Valve inside the Housing until the threaded hole into the side of the Valve for the Reverse Lever Screw (8) is centered radially in the slot in the top of the Housing for the Reverse Lever (7).
8. Install the Reverse Lever in the slot and use a #2 Phillips Head Screwdriver to secure the Lever to the Valve with the Reverse Lever Screw.
9. Install the Throttle Valve Seat (17) in the bottom of the housing cap opening. Use a rod with a flat end and no sharp edges to push the Seat flat at the bottom face of the opening.
10. **For Models with Automatic Shutoff,** install the Automatic Shutoff Valve (30), large end trailing, through the center of the Valve Seat.

11. Install the Throttle Valve (18), flat face leading, in the opening against the Valve Seat. Place the Throttle Valve Spring (19), small end leading, into the Housing against the Valve. Encircle the hub on the Valve with the Spring opening.
12. Examine the Rear Housing Cap Seal (10) for nicks or cuts. If damaged, carefully install a new Seal over the threads of the Rear Housing Cap Assembly (9).
13. Using a 1/4" hex wrench, thread the Assembly into the rear of the Motor Housing. Tighten the Assembly between 15 and 20 ft–lbs. (20 and 27 Nm) torque.
14. **For Top Inlet Models**, examine the Inlet Plug Seal (16) for nicks or cuts. If damaged, carefully install a new Seal over the threads of the Inlet Plug Assembly (15).
15. **For Top Inlet Models,** use a 3/16" hex wrench to thread the Assembly into the top of the Motor Housing. Tighten the Assembly between 15 and 20 ft–lbs. (20 and 27 Nm) torque.
16. Lay a Housing Muffler Element (20) on each side of the handle rib and use a non–pointed probe to fully push the end of each Element into the recess near the body of the Housing.
17. Install the Housing Grip (21) over the Elements and onto the inlet end of the Motor Housing. Make certain the Grip is fully seated against the Housing and the Trigger Assembly works freely.
18. Fold the Grip Muffler Element (22) in half and then fold each half equally again and insert it into the bottom of the Grip.
19. Stack the two End Cap Muffler Elements (24) inside the Grip and push the Grip End Cap (23) onto the inlet end of the Grip.
20. If the Inlet Screen (29) required replacement, use a wooden dowel to carefully push a new one into the Inlet Bushing (27).
21. If the Inlet Bushing Seal (28) is nicked or damaged, carefully install a new one over the threads of the Inlet Bushing.
22. Install the Inlet Bushing Bezel (26), small end leading, followed by the Wave Washer (25) onto the threads of the Inlet Bushing against the Seal.
23. Thread the assembled Inlet Bushing through the Grip End Cap into the handle of the Motor Housing and tighten the Bushing between 15 and 20 ft–lbs. (20 and 27 Nm) torque.

Assembly of the Motor

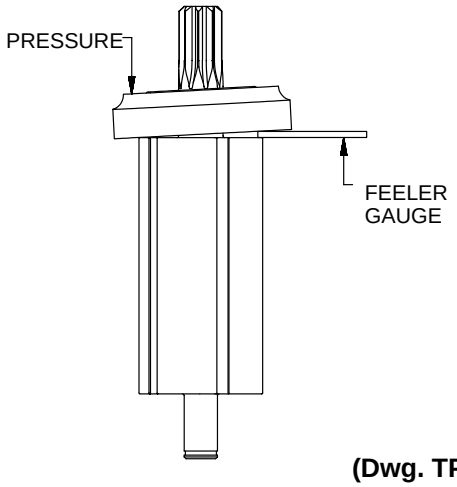
1. Place the Front End Plate (39) on the splined shaft of the Rotor (37) with the bearing recess away from the rotor body.
2. Place the Front Rotor Bearing (41) onto the shaft and using a sleeve or piece of tubing that contacts the inner race of the Bearing, press the Bearing onto the shaft until the Front End Plate nearly contacts the rotor body.

NOTICE

In the following step, the measurement must be made at the end corner of the large rotor body.

3. The clearance between the Front End Plate and Rotor is critical. While pressing down with your finger on the outer edge of the Front End Plate on the bearing side, insert a 0.004" (0.1 mm) feeler gauge between the face of the rotor body and the face of the End Plate at a point that is 180 degrees from where the pressure is applied. Refer to Dwg. TPA1740. To increase the gap, support the End Plate and lightly tap the rotor shaft with a plastic hammer; to decrease the gap, press the Bearing farther onto the rotor shaft.

Measurement of Front End Plate Clearance



(Dwg. TPA1740)

4. Wipe each Vane (38) with a light film of Ingersoll–Rand No.10 Oil and place a Vane in each slot in the Rotor.
5. One end of the Cylinder Assembly (34) has a notch that breaks the outer wall and end face of the Cylinder. With that end trailing, install the Cylinder Assembly over the Rotor and Vanes against the Front End Plate. Make certain the Cylinder Front Alignment Pin (36) enters the hole in the Front End Plate.
6. Install the Rear End Plate Assembly (31), flat face leading, on the rear hub of the Rotor. Make certain the Cylinder Rear Alignment Pin (35) enters the hole in the Rear End Plate.
7. Examine the Rear End Plate Face Plate (32) for scratches. If it is scratched, replace it. If it is not, slide it onto the rear hub of the Rotor and onto the Cylinder Rear Alignment Pin against the Rear End Plate. Some pressure may be required to fit the hole in the Plate onto the Alignment Pin.

8. Using snap ring pliers, install the Rear End Plate Assembly Retainer (33) in the annular groove on the rear rotor hub to secure the assembly in position.
9. Set the assembled motor aside.

Assembly of the Gearing

1. Using a small screwdriver, work the Spindle Bearing Seat (54) into the internal groove nearest the notched end of the Gear Case (52).
2. Stand the Gear Case, notched end upward, on the table of an arbor press. Using a piece of tubing that contacts the outer race of the Spindle Bearing (53), press a new Bearing into the Gear Case against the Seat.
3. Lubricate the gears in the Spindle Assembly (51) with Ingersoll–Rand No. 67 Grease.
4. Invert the Gear Case and using another piece of tubing that supports the inner race of the Bearing and clears the output end of the Spindle Assembly, press the Spindle Assembly into the Bearing from the motor end of the Gear Case.
5. Using snap ring pliers, install the Spindle Bearing Retainer (55) in the external groove near the driver end of the spindle.
6. **For all Clutch Models,** lightly lubricate the Planet Gear Head Spacer (50) with Ingersoll–Rand No. 67 Grease and install it in the Gear Case against the Spindle Assembly.
7. **For all Clutch Models,** lubricate the shafts of the Planet Gear Head Assembly (47) with Ingersoll–Rand No. 67 Grease and install the Gear Head in the Gear Case meshing the spline on the shaft with the gear teeth in the Spindle Assembly.
8. **For 250, 500 and 1000 rpm Models,** lubricate the Planet Gears (48) with Ingersoll–Rand No. 67 Grease and install them on the shafts of the Planet Gear Frame Assembly.
   For 1700 and 2000 rpm Models, lubricate the Planet Gears (48) and Gear Head Pinion (49) with Ingersoll–Rand No. 67 Grease and install the Planet Gears on the shafts of the Planet Gear Frame Assembly. Insert the Gear Head Pinion in the center of the Planet Gears making certain the teeth mesh.
9. **For all Clutch Models,** install the Gear Head Spacer (46) against the Gears and secure the assembly by using snap ring pliers to install the Gear Retainer (45) in the internal groove at the motor end of the Gear Case.

Assembly of the Adjustable Cushion Clutch

1. Insert the small end of the Clutch Shaft (82) into the end of the Cam Jaw (84) having the large opening and slide the Shaft about half way into the Jaw.
2. Drop the twelve Clutch Balls (83) into the Cam Jaw forming a ring around the Clutch Shaft.
3. Lay a bead of Ingersoll–Rand No. 28 Grease, approximately 2 to 3 cc, on top of the Clutch Balls and then bring the Clutch Shaft and Cam Jaw together capturing the Balls between them.
4. While holding the Shaft and Jaw together, slide the Clutch Cam Ball Driver (85), large end leading, onto the Clutch Shaft until it is against the Cam Jaw.
5. Rotate the Driver to align the large hole through one wall of the Driver with the comparable size opening of the cross hole through the Clutch Shaft. Push the Clutch Cam Ball Driver Retaining Pin (87) into the hole to lock the Driver in position on the Clutch Shaft.
6. Apply a coating of Ingersoll–Rand No. 28 Grease to each of the eleven Clutch Cam Balls (86).
7. Holding the assembled Clutch Shaft with the Clutch Cam Ball Driver upward, insert a lubricated Ball into each of the eleven ball pockets in the Driver.
8. Slide the Cam Ball Seat (88), large end leading, onto the Shaft against the Balls. Follow with the Clutch Spring (89), Spring Seat (90), Thrust Bearing (91) and the Clutch Adjusting Nut Washer (92) with the smooth face leading.
9. Thread the Clutch Adjusting Nut (93), smooth face trailing, onto the Clutch Shaft.
10. Insert the tip of a #1 Phillips Head Screwdriver into the adjustment opening between the Clutch Adjusting Nut and the Clutch Adjusting Nut Washer. Rotate the screwdriver counterclockwise and thread the Adjustment Nut onto the Clutch Shaft until the external groove for the Clutch Adjusting Nut Stop (94) is visible.
11. Install the Nut Stop in the groove.

Assembly of the Adjustable Shutoff Clutch

1. Hold the Clutch Shaft (66) in your hand with the large end upward.
2. Insert the Automatic Shutoff Plunger Return Spring (63) into the central opening in the large end of the Clutch Shaft. Use a 1/8” dowel to push the Spring below the cross hole for the Automatic Shutoff Pin (64).
3. Insert the Automatic Shutoff Pin Spring (65) in the end hole of the Automatic Shutoff Pin opposite the pointed end. Rotate the Spring a little to keep it in the hole.
4. Drip one or two drops of Ingersoll–Rand No. 10 Oil into the central hole with the Plunger Return Spring.
5. Position the Shutoff Pin, Spring leading, in the cross hole on the large end of the Clutch Shaft with the hole in the Shutoff Pin aligned with the central hole containing the Return Spring.

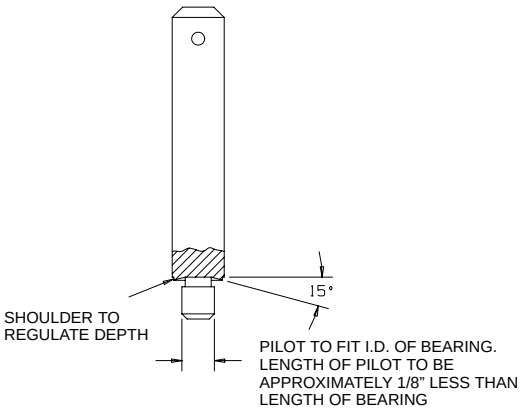
6. Push on the pointed end of the Shutoff Pin to depress the Spring while inserting the Automatic Shutoff Plunger (62) into the central opening with the Return Spring. The smaller center portion of the Shutoff Plunger will allow the Shutoff Pin to spring outward and capture the components within the Clutch Shaft when properly positioned.
7. Insert the small end of the Clutch Shaft into the end of the Cam Jaw (68) having the large opening and slide the Shaft about half way into the Jaw.
8. Drop the twelve Clutch Balls (67) into the Cam Jaw forming a ring around the Clutch Shaft.
9. Lay a bead of Ingersoll–Rand No. 28 Grease, approximately 2 to 3 cc, on top of the Clutch Balls and then bring the Clutch Shaft and Cam Jaw together capturing the Balls between them.
10. While holding the Shaft and Jaw together, slide the Clutch Cam Ball Driver (69), large end leading, onto the Clutch Shaft until it is against the Cam Jaw.
11. Rotate the Driver to align the large hole through one wall of the Driver with the comparable size opening of the cross hole through the Clutch Shaft. Push the Clutch Cam Ball Driver Retaining Pin (71) into the hole to lock the Driver in position on the Clutch Shaft.
12. Apply a coating of Ingersoll–Rand No. 28 Grease to each of the three Clutch Cam Balls (70).
13. Holding the assembled Clutch Shaft with the Clutch Cam Ball Driver upward, insert a lubricated Ball into each of the three ball slots in the Driver.
14. Slide the Cam Ball Seat (72), large end leading, onto the Shaft against the Balls. Follow with the Clutch Spring (73), Spring Seat (74), Thrust Bearing (75) and the Clutch Adjusting Nut Washer (76) with the smooth face leading.
15. Thread the Clutch Adjusting Nut (77), smooth face trailing, onto the Clutch Shaft.
16. Insert the tip of a #1 Phillips Head Screwdriver into the adjustment opening between the Clutch Adjusting Nut and the Clutch Adjusting Nut Washer. Rotate the screwdriver counterclockwise and thread the Adjustment Nut onto the Clutch Shaft until the external groove for the Clutch Adjusting Nut Stop (78) is visible.
17. Install the Nut Stop in the groove.

Assembly of the Tool

1. Grasp the spline of the Rotor (37) in the assembled motor and after aligning the End Plate Alignment Pin (40) with the internal notch in the motor end of the housing bore, insert the assembled motor into the Motor Housing (1). Make certain the motor is far enough into the Housing to have the undercut below the internal housing thread visible.
2. Lubricate the Motor Seal (42) with o–ring lubricant and install it around the Front End Plate (39) and into the undercut in the Housing.
3. Align the tab of the Motor Clamp Washer (43) with the internal notch in the Housing and install it over the rotor hub and End Plate Alignment Pin against the Motor Seal. Make certain the Pin enters the hole in the Washer and the Washer is flat against the Seal.
4. Apply some Ingersoll–Rand No. 67 Grease to the spline on the rotor shaft.
5. Thread the assembled Gear Case (52), output spindle trailing, into the Motor Housing and using a 1–1/16" wrench, tighten the joint between 15 and 20 ft–lbs. (20 and 27 Nm) torque.
6. Grasp the flats on the Gear Case lightly in leather–covered or copper–covered vise jaws with the Spindle Assembly (51) upward.
7. **For Automatic Shutoff Models,** insert the Push Rod (44) into the center of the Spindle Assembly. Only a small portion of the Rod should be visible when it has correctly entered the assembled gearing and motor.
8. **For all Clutch Models,** place the narrow end of the Clutch Return Spring (60 or 79) in the Gear Case against the inner race of the Spindle Bearing (53).
9. **For all Direct Drive Models,** insert the hex end of the Clutch Shaft (95) without the step, into the hex recess of the Spindle Assembly.
   For all Clutch Models, place the hex drive end of the Clutch Input Driver (61 or 80) on the Spring and compress the Spring until the hex on the Driver enters the hex recess in the Spindle Assembly. While holding the Driver in position, engage the raised bar on the face of the Driver with the jaw of the Cam Jaw (68 or 84).
10. If the Clutch Housing Bearing (101) was removed, stand the Clutch Housing (100) on the table of an arbor press with the gear case end upward.

11. Using a Needle Bearing Inserting Tool as shown in Dwg. TPD786 with a 0.030” (0.76 mm) thick washer that clears the inner bore and outer edge of the Bearing inserted between the Bearing and stop surface on the tool, press the Bearing into the Clutch Housing. The trailing end of the Bearing must be between 0.025” and 0.035” (0.63 and 0.89 mm) below the face of the bore into which the Bearing is being pressed.

Needle Bearing Inserting Tool



(Dwg. TPD786)

12. **For Trigger Start Models,** slide the Wave Washer (105A) followed by the Shutoff Spacer (105) onto the hub of the Bit Holder (102) and insert the Bit Holder into the large end of the Clutch Housing and push the output end through the Clutch Housing Bearing. **For Trigger Permit Models,** insert the Bit Holder (102) into the large end of the Clutch Housing and push the output end through the Clutch Housing Bearing.

NOTICE

The following step has threads with a left–hand thread. Rotate the components counterclockwise to tighten them.

13. Install the assembled Clutch Housing over the clutch components and thread it into the Gear Case. Using a strap wrench, tighten the joint between 15 and 20 ft–lbs. (20 and 27 Nm) torque.
14. **For Quick Release Bit Holder Models,** place the Bit Retaining Ball (103) in the hole through the wall of the Bit Holder and slide the Bit Retaining Sleeve (106) large end trailing, onto the Bit Holder. Slide the Retaining Sleeve Spring (107) and Spring Seat (108) onto the Bit Holder and secure the components by installing the Retaining Ring (109) in the external groove at the output end of the Bit Holder.

For Bit Finder Models, place the Bit Retaining Ball (103) in the hole through the wall of the Bit Holder and spread the Bit Retaining Spring (104) enough to slide it onto the Bit Holder and secure the Ball in position.

NOTICE

The following step has threads with a left–hand thread. Rotate the components counterclockwise to tighten them.

15. **For Bit Finder Models,** thread the Non–Rotating Bit Finder (110) onto the Clutch Housing and hand–tighten it between 2 and 6 ft–lbs. (3 and 8 Nm) torque.
16. Remove the tool from the vise jaws.

TESTING THE TOOL

Before placing the tool back in service, test the tool in a run down application to determine if adjustments are necessary to satisfactorily perform the operation. Since four interrelated adjustments can affect tool performance, only experience, along with trial and error, can dictate which adjustment or combination of adjustments will provide the desired results.

The Clutch Spring (73 or 89), the clutch adjustment procedure, the length of the Push Rod (44) and the length of the Shutoff Valve (30) can individually or collectively have an effect on torque and/or speed. Always try to make adjustments before replacing or attempting to modify components.

If adjustments are unable to provide the desired torque, it may be necessary to install a lighter or heavier Clutch Spring.

If the tool ratchets when operated but fails to shutoff, it may be necessary to shorten the Push Rod. Only shorten the Push Rod in small increments. Increments between 0.005” and 0.010” (0.13 and 0.25 mm) are recommended.

If the tool stalls and does not shutoff, runs slower than normal or has low power, the Shutoff Valve may require lengthening. To lengthen the Shutoff Valve, grasp the stem between two pieces of rubber or other non–slip, non–marring material and rotate the molded nut counterclockwise. Rotating the nut one half revolution will lengthen the Valve approximately 0.009” (0.23 mm). **Should the stem of the Valve become bent, marred, nicked or damaged in any way during the adjustment process, replace it.**

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Loss of Power	Low air pressure	Check air supply. For top performance, the air pressure must be 90 psig (6.2 bar/620 kPa) at the inlet.
	Plugged Inlet Bushing Screen	Clean the Inlet Bushing Screen using a clean, suitable cleaning solution. If the Screen cannot be cleaned, replace it.
	Worn or broken Vanes	Replace a **complete** set of Vanes.
	Worn or broken Cylinder	Replace the Cylinder if it is cracked or if the bore appears wavy or scored.
	Shutoff Valve too short	Lengthen the Shutoff Valve. Refer to **TESTING THE TOOL** on page 32.
Motor won't run	Motor Clamp Washer binding	Remove the Gear Case make certain the Washer is flat and the Motor Seal is properly positioned.
	Gears binding	Clean and inspect all gearing. Replace any worn or damaged gearing.
	Push Rod worn	Install a new Push Rod.
Gear Case gets hot	Excessive grease	Clean and inspect Gear Case and gearing parts and lubricate as instructed.
	Worn or damaged parts	Clean and inspect the gear Case and Gearing. Replace worn or broken components.
Inconsistent disengagement of the Adjustable Clutch	Improper lubrication	Remove the Adjustable Clutch mechanism and examine the parts. Lubricate as instructed.
	Wrong Clutch Spring (using Heavy Clutch Spring on light torque application)	Change to Medium or Light Clutch Spring.
Motor stalls before Adjustable Clutch ratchets	Improper Clutch adjustment or improper tool ratio for application	Check Clutch Adjustment and review tool performance vs. requirements.
	Low pressure at the inlet	Check the air supply. For top performance, the air pressure must be 90 psig (6.2bar/620kPa) at the inlet.
	Insufficient grease	Lubricate the Clutch as instructed.
Tool ratchets before shutoff	Push Rod too long	Shorten the push Rod. Refer to **TESTING THE TOOL** on page 32.
Tool stalls without shutting off	Shutoff Valve too short	Lengthen the Shutoff Valve. Refer to **TESTING THE TOOL** on page 32.
Too runs slower than normal	Shutoff Valve too short	Lengthen the Shutoff Valve. Refer to **TESTING THE TOOL** on page 32.

NOTICE

SAVE THESE INSTRUCTIONS. DO NO DESTROY.