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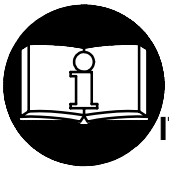
OPERATION AND MAINTENANCE MANUAL FOR SERIES 7 SCREWDRIVERS

NOTICE

Series 7 Screwdrivers are designed for fastening applications in automotive and appliance assembly, the electronic and aerospace industries and for woodworking and furniture construction.
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 3/8" (10 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.
- The Throttle Valve Cap is under pressure from the Throttle Valve Spring. Use care when removing the Throttle Valve Cap. *(On tools where applicable.)*
- This tool is not designed for working in explosive atmospheres.
- This tool is not insulated against electric shock.

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.

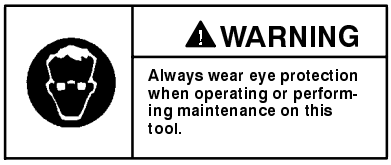
Printed in U.S.A.

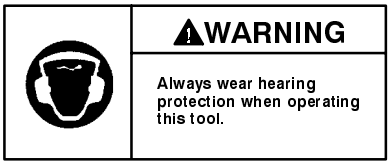
INGERSOLL-RAND®
PROFESSIONAL TOOLS

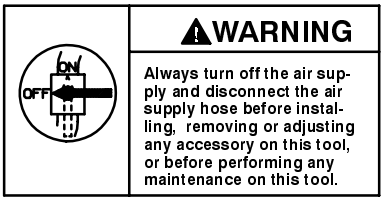
WARNING LABEL IDENTIFICATION

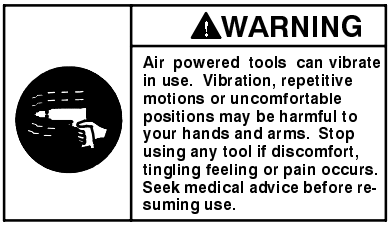
⚠ WARNING

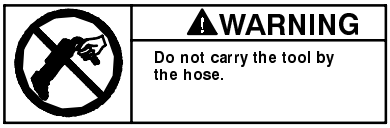
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

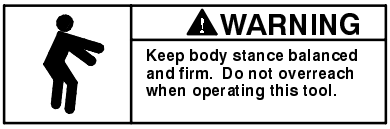


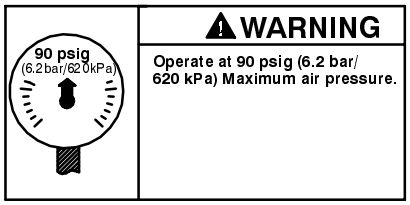












ADJUSTMENTS

CLUTCH ADJUSTMENT

Models ending in C1 incorporate an adjustable clutch that can be externally adjusted within a certain range to ratchet when a predetermined torque has been delivered.

To increase the adjustable torque range, three Clutch Springs are offered.

⚠ WARNING

Turn off the air supply and disconnect the air supply hose from the Tool before proceeding.

To adjust the Clutch, proceed as follows:

1. Rotate the Adjusting Hole Cover on the Clutch Housing to expose the adjusting hole.
2. Insert a 1/4" Allen Wrench into the recess in the Bit Holder and, while pushing against the Bit Holder to engage the Clutch Jaws, rotate the Bit Holder until one of the radial holes in the Clutch Adjusting Nut is visible through the slot in the Clutch Housing. Insert the Clutch Sprag Key into the elongated slot in the Clutch Housing and into the hole in the Adjusting Nut to sprag the Nut against rotation.
3. Grasp the tool firmly in one hand and rotate the output end of the tool. Rotating the output end clockwise when facing the front increases the compression on the Clutch Spring and raises the torque at which the clutch will ratchet.

NOTICE

The most satisfactory adjustment is usually obtained by use of 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.

NOTICE

The clutch, when equipped with the Heavy Spring, can be set beyond the torque capacity of the tool, in which case the tool will stall before the Clutch ratches. Do not adjust the Clutch beyond the torque capacity of the tool.

4. Insert the Clutch Adjusting Key into the hole in the Clutch Adjusting Nut and, while holding the Nut against rotation, rotate the Bit Holder counterclockwise until there is no compression on the Clutch Spring.

CHANGING THE CLUTCH SPRING

1. Carefully grasp the flats of the Clutch Housing in leather–covered or copper–covered vise jaws, Bit Holder facing downward.
2. Using a wrench on the flats of the Gear Case loosen the Gear Case from the Clutch Housing. Remove the tool from the vise.

ADJUSTMENTS

NOTICE

The Gear Case has left-hand threads.

3. Unscrew and remove the Clutch Housing from the Gear Case.
4. Grasp the Clutch Driver and pull the assembly out of the Clutch Housing.
5. Carefully grasp the Front Clutch Jaw in leather-covered or copper-covered vise jaws with the Clutch Adjusting Nut upward.
6. Using a wrench on the flats of the Clutch Adjusting Nut, loosen and remove the Nut.
7. With the assembly in the vise and while applying slight downward pressure to the Clutch Ball Seat, remove the Adjusting Nut Lock, Spring Seat Bearing, Clutch Spring Seat and the Clutch Spring from the Clutch Driver.
8. Thoroughly grease the Bearing and Adjusting Nut Lock and in the order named, slide the following over the Clutch Driver: the new Clutch Spring, the Clutch Spring Seat, the Spring Seat Bearing and the Adjusting Nut Lock, indented side trailing.
9. Start the Clutch Adjusting Nut, detent side first, onto the Clutch Driver and run it finger tight against the compression of the Spring. With a wrench, tighten the Nut an additional one or two turns.
10. Remove the assembled Clutch from the vise.
11. Install the Clutch Driver Assembly into the Clutch Housing with the splined end of the Clutch Driver trailing.

NOTICE

The Gear Case has left-hand threads.

12. Thread the assembled clutch onto the Gear Case. Tighten the Clutch Housing between 2 to 5 ft-lb (2.7 to 6.8 Nm) torque.
13. Adjust the Clutch as directed in the section **Clutch Adjustmen**t.

PLACING TOOL IN SERVICE

LUBRICATION

Ingersoll-Rand No. 10 **Ingersoll-Rand No. 28**
Ingersoll-Rand No. 67

Always use an air line lubricator with these tools.

We recommend the following Filter-Lubricator-Regulator Unit:

For USA - No. C11-03-G00

Motor

Before starting the Tool and after each eight hours of operation, unless the air line lubricator is used, detach the air hose and inject a few drops of Ingersoll-Rand No. 10 Oil into the air inlet.

Gearing

For models with L gearing after each 50,000 cycles or 100 hours of operation, whichever comes first, inject approximately 2 cc of Ingersoll-Rand No. 28 Grease into the Grease Fitting.

For models with M or N gearing after each 50,000 cycles or 100 hours of operation, whichever comes first, inject approximately 4 cc of Ingersoll-Rand No. 28 Grease into the Grease Fitting.

Clutch

For 7C1 or 7C3 Adjustable Clutch, after each 50,000 cycles or 100 hours of operation, whichever comes first, lubricate with Ingersoll-Rand No. 67 Grease as follows:

WARNING

Turn off the air supply and disconnect the air supply hose from the Tool before proceeding.

1. Rotate the Adjusting Hole Cover to expose the slot in the Gear Case.
2. Insert a 1/4" Allen Wrench into the Bit Holder and while pushing against the Bit Holder to engage the clutch jaws, rotate the Bit Holder until the hole in the Clutch Adjusting Nut is aligned with the slot in the Gear Case.
3. Grasp the flats on the Clutch Housing in leather-covered or copper-covered vise jaws, making certain not to distort the Housing.

NOTICE

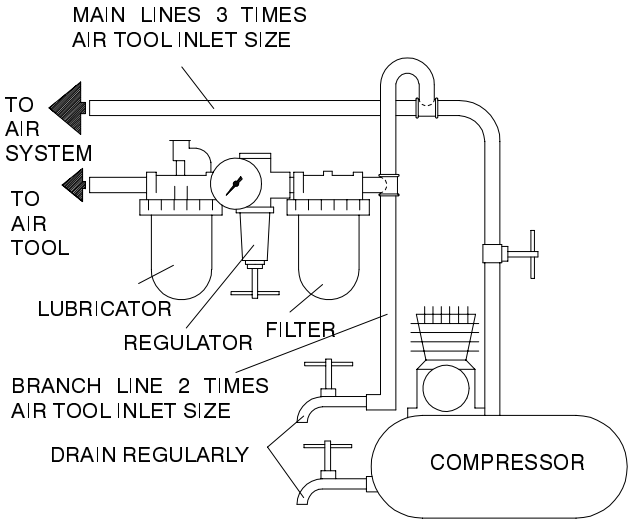
Housing has a left-hand thread.

4. Using an adjustable wrench, grasp the flats on the Gear Case, and unscrew the entire power unit from the Clutch Housing.

5. Withdraw the assembled clutch from the Clutch Housing, and work some Ingersoll-Rand No. 67 Grease around the Clutch Jaw Bearing Balls, Clutch Release Balls, Spring Seat Bearing and between the Adjusting Nut Lock and Clutch Adjusting Nut.

NOTICE

To grease the Clutch Release Balls, index the Clutch Jaw until the Spring Seat lifts.



(Dwg. TPD905-1)

HOW TO ORDER A SCREWDRIVER

REVERSIBLE PISTOL HANDLE with ADJUSTABLE CUSHION CLUTCH		
	Torque Range (Soft Draw)	
Model	in-lb	Nm
7RALC1	15-75	1.7-8.5
7RALC3	15-75	1.7-8.5
7RAMC1	20-110	2.3-12.5
7RAMC3	20-110	2.3-12.5
REVERSIBLE LEVER THROTTLE with ADJUSTABLE CUSHION CLUTCH		
7RLLC1	15-75	1.7-7.4
7RLMC1	20-110	2.3-12.5

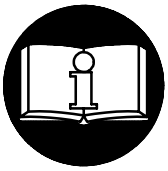
REVERSIBLE PISTOL HANDLE with POSITIVE JAW CLUTCH				
	Torque Range (Soft Draw) 50 psi		Torque Range (Soft Draw) 90 psi	
Model	in-lb	Nm	in-lb	Nm
7RAMP1	63	7.2	115	13.1
7RANP1	91	10.3	165	18.8
REVERSIBLE PISTOL HANDLE with DIRECT DRIVE				
7RALD1	39	4.4	70	8.0

F

MANUEL D'EXPLOITATION ET D'ENTRETIEN DES TOURNEVIS DE LA SÉRIE 7

NOTE

Les tournevis de la Série 7 sont destinés au serrage des fixations d'assemblage automobile et d'équipements ménagers, des industries électroniques et aérospatiales et pour le travail du bois et la construction des meubles.
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.
LIRE CE MANUEL AVANT D'UTILISER L'OUTIL.

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.

MISE EN SERVICE DE L'OUTIL

- **Toujours exploiter, enspecter et entretenir cet outil conformément au Code de sécurité des outils pnmatiques 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 10 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 gasoil 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.**
- **Le chapeau de la soupape de commande est soumis à la pression du ressort de soupape. Prendre les soins nécessaires lors de la dépose du chapeau de soupape de commande.** ***(Sur les outils concernés).***
- **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®
PROFESSIONAL TOOLS

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

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

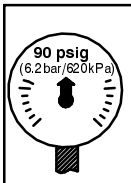
Garder une position équilibrée et ferme. Ne pas se pencher trop en avant pendant l'utilisation de cet outil.

⚠ ATTENTION

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

⚠ ATTENTION

Ne pas transporter l'outil par son flexible.



⚠ ATTENTION

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

⚠ 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

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

RÉGLAGES

REGLAGE DU LIMITEUR

Les modèles dont le numéro de série se termine par C1, comportent un limiteur réglable qui peut être réglé extérieurement dans une certaine gamme de manière à débrayer lorsqu'un couple prédéterminé est atteint.

La gamme de réglage du couple est couverte par trois ressorts de limiteur.

⚠ ATTENTION

Couper l'alimentation d'air comprimé et débrancher le flexible de l'outil avant de continuer.

Pour régler le limiteur, procéder comme suit :

1. Tourner le capot du trou de réglage du corps de limiteur pour découvrir le trou de réglage.
2. Insérer une clé Allen de 1/4" dans l'encastrement du porte–embout et, tout en poussant contre le porte–embout pour engager les clabots du limiteur, tourner le porte–embout jusqu'à ce qu'un des trous radiaux de l'écrou de réglage du limiteur soit visible dans la rainure du corps de limiteur et dans le trou de l'écrou de réglage pour empêcher ce dernier de tourner. Introduire la clé d'arrêt de limiteur dans la rainure du corps de limiteur et dans le trou de l'écrou de réglage pour bloquer la rotation de ce dernier.
3. Saisir fermement l'outil d'une main et tourner la sortie de l'outil. Une rotation de la sortie dans le sens des aiguilles d'une montre, lorsque vu de l'avant, augmente la compression du ressort de limiteur et par conséquent le couple de débrayage du crabot.

NOTE

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

NOTE

Le limiteur, lorsqu'équipé du ressort type fort, peut être réglé au–delà de la capacité de couple de l'outil. Dans ce cas, l'outil calera avant le déclenchement du crabot du limiteur. Ne jamais régler le limiteur au–delà du couple maximum de l'outil.

4. Insérer la clé de réglage du limiteur dans le trou de l'écrou de réglage pour empêcher ce dernier de tourner, et tourner le porte–embout dans le sens inverse des aiguilles d'une montre jusqu'à ce que le ressort de limiteur soit complètement détendu.

CHANGEMENT DU RESSORT DE LIMITEUR

1. Serrer soigneusement les plats du corps de limiteur dans un étau équipé de mordaches en cuir ou en cuivre, porte–embout dirigé vers le bas.
2. A l'aide d'une clé placée sur les méplats du boîtier d'engrenages, desserrer ce dernier du corps de limiteur. Retirer l'outil de l'étau.

RÉGLAGES

NOTE

Le boîtier d'engrenages est fileté à gauche.

3. Dévisser et séparer le corps de limiteur du boîtier d'engrenages.
4. Saisir l'entraîneur de limiteur et extraire l'ensemble du corps de limiteur.
5. Serrer soigneusement le crabot avant du limiteur dans un étau équipé de mordaches en cuir ou en cuivre, l'écrou de réglage du limiteur étant dirigé vers le haut.
6. A l'aide d'une clé placé sur les méplats de l'écrou de réglage du limiteur, dévisser et déposer ce dernier.
7. L'ensemble étant dans l'étau, et tout en appliquant une légère pression sur le siège de ressort de limiteur, déposer l'arrêtoir d'écrou de réglage, le roulement de siège de ressort, le siège de ressort et le ressort de limiteur de l'entraîneur de limiteur.
8. Graisser copieusement le roulement et la rondelle frein de l'écrou de réglage et, dans l'ordre indiqué, monter les pièces suivantes sur l'entraîneur de limiteur : le nouveau ressort de limiteur, le siège de ressort, le roulement de siège de ressort et l'arrêtoir de l'écrou de réglage, côté bosselé en arrière.
9. Visser l'écrou de réglage de limiteur, côté cranté en premier, sur l'entraîneur de limiteur, et le serrer à la main contre la compression du ressort. Utiliser une clé pour serrer l'écrou d'un ou deux tours supplémentaires.
10. Retirer le limiteur assemblé de l'étau.
11. Monter l'entraîneur de limiteur assemblé dans le corps de limiteur, extrémité cannelée de l'entraîneur en arrière.

NOTE

Le boîtier d'engrenages est fileté à gauche.

12. Monter le corps de limiteur assemblé dans le boîtier d'engrenages. Serrer le boîtier d'engrenages à un couple de 2,7 à 6,8 Nm.
13. Ajuster le limiteur comme indiqué à la section **Réglage du limiteur.**

MISE EN SERVICE DE L'OUTIL

LUBRIFICATION

Ingersoll-Rand No. 10 **Ingersoll-Rand No. 28**
Ingersoll-Rand No. 67

Utiliser toujours un lubrificateur avec ces outils.

Nous recommandons l'emploi du filtre-régulateur-lubrificateur suivant :

For USA - No. C11-03-G00

Moteur

Avant de mettre l'outil en marche et toutes les huit heures de fonctionnement, si un lubrificateur de ligne n'est pas utilisé, débrancher le flexible d'alimentation et injecter plusieurs gouttes d'huile Ingersoll-Rand No. 10 dans le raccord d'admission.

Pignonnerie

Pour les modèles équipés de la pignonnerie L, tous les 50 000 cycles ou 100 heures de fonctionnement, selon le cas, injecter environ 2 cm^3 de graisse Ingersoll-Rand No. 28 dans le raccord de graissage.

Pour les modèles équipés de la pignonnerie M ou N, tous les 50 000 cycles ou 100 heures de fonctionnement, selon le cas, injecter environ 4 cm^3 de graisse Ingersoll-Rand No. 28 dans le raccord de graissage.

Limiteur

Pour le limiteur réglable 7C1 ou 7C3, tous les 50 000 cycles ou au-moins toutes les 100 heures de fonctionnement, lubrifier avec de la graisse Ingersoll-Rand No. 67 comme suit :

⚠ ATTENTION

Couper l'alimentation d'air commprimé et débrancher le flexible de l'outil avant de continuer.

1. Tourner le couvercle du trou de réglage pour exposer la rainure dans le boîtier d'engrenages.
2. Insérer une clé une clé Allen de 1/4" dans le porte-embout, et, tout en poussant contre le porte-embout pour engager les clabots du limiteur, tourner le porte-embout jusqu'à ce que le trou de l'écrou de réglage du limiteur soit visible dans la rainure du boîtier d'engrenages.
3. Serrer les plats du corps de limiteur dans un étau équipé de mordaches en cuir ou en cuivre, en prenant soin de ne pas déformer le corps.

NOTE

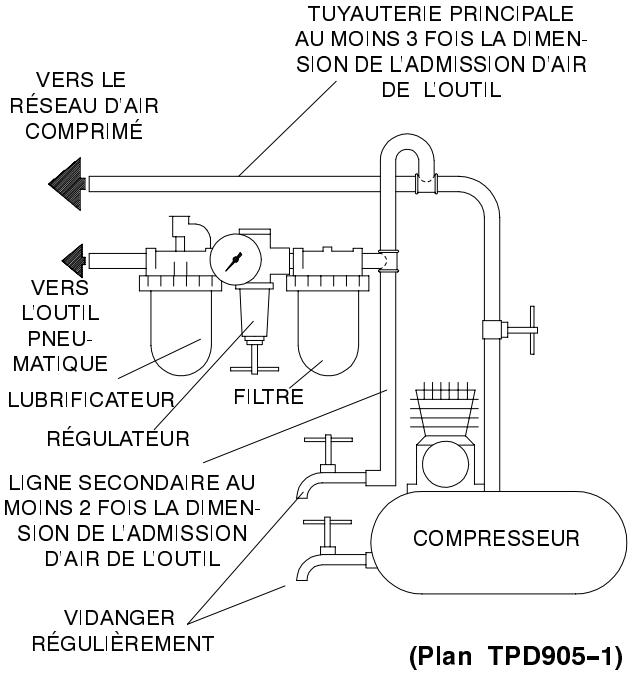
Le corps de limiteur est fileté à gauche.

4. A l'aide d'une clé à molette sur les méplats du boîtier d'engrenages, dévisser l'ensemble d'entraînement du corps de limiteur.

5. Retirer le limiteur assemblé de son corps et appliquer une petite quantité de graisse Ingersoll–Rand No. 67 autour des billes du crabot du limiteur, les billes de débrayage, le roulement de siège de ressort et entre le verrou d'écrou de réglage et l'écrou de réglage du limiteur.

NOTE

Pour graisser les billes de débrayage, indexer le crabot de limiteur jusqu'à ce que le siège de ressort se soulève.



(Plan TPD905–1)

SPÉCIFICATIONS

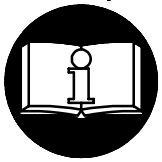
Modèle	Poignée	Limiteur/ Entraîneur	Gamme de couples recommandée (serrage élastique)
		pouces	in-lbs (Nm)
7RALC1	pistolet réversible	amortisseur réglable	15–75 (1,7–8,5)
7RALC3	pistolet réversible	amortisseur réglable	15–75 (1,7–8,5)
7RAMC1	pistolet réversible	amortisseur réglable	20–110 (2,3–12,5)
7RAMC3	pistolet réversible	amortisseur réglable	20–110 (2,3–12,5)
7RLLC1	commande à levier réversible	amortisseur réglable	15–75 (1,7–7,4)
7RLMC1	commande à levier réversible	amortisseur réglable	20–110 (2,3–12,5)
Modèle	**Poignée**	**Limiteur**	**Gamme de couples recommandée (serrage élastique)**
		pouces	in-lbs (Nm)
7RAMP1	pistolet réversible	clabot	50 psi/63 (7,2) 90 psi/115 (13,1)
7RANP1	pistolet réversible	clabot	50 psi/91 (10,3) 90 psi/165 (18,8)
7RALD1	pistolet réversible	entraînement direct	50 psi/39 (4,4) 90 psi/70 (8,0)

E

MANUAL DE FUNCIONAMIENTO Y MANTENIMIENTO PARA ATORNILLADORES DE LA SERIE 7

NOTA

Los atornilladores de la serie 7 están diseñados para aplicaciones de atornillado en la industria del automóvil y electrodomésticos, industrias electrónica y aeroespacial y para carpintería e industria del mueble.
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 ESTE MANUAL ANTES DE UTILIZAR LA 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.

PARA PONER LA HERRAMIENTA EN SERVICIO

- **Utilice, examine y mantenga siempre esta herramienta conforme al código de seguridad para herramientas neumaticas portatiles de la American National Standards institute (ANSI B186.1).**
- **Para mayor seguridad, rendimiento óptimo y larga vida útil de las piezas, utilice esta herramienta a una presión de aire máxima en la entrada de 90 psig (6,2 bar/620 kPa) con una manguera de suministro de aire con diámetro interno de 10 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 racores dañados, desgastados ni deteriorados.**
- **Asegúrese de que todos los racores y mangueras sean del tamaño correcto y estén bien apretados. El Esq. TPD905–1 muestra una disposición característica de las tuberías.**
- **Use siempre aire limpio y seco a una presión máxima de 90 psig (6,2 bar/620 kPa). El polvo, los gases corrosivos y/o el exceso de humedad pueden 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.**

UTILIZACIÓN DE LA HERRAMIENTA

- **Lleve siempre protección ocular cuando utilice esta herramienta o realice operaciones de mantenimiento de la misma.**
- **Lleve 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 hacer funcionar la herramienta para ser consciente de su dirección giratoria cuando funcione el estrangulador.**
- **Anticipe y esté alerta sobre los cambios repentinos en el movimiento durante la puesta en marcha y utilización de toda herramienta motorizada.**
- **Mantenga una postura del cuerpo equilibrada y firme. No estire demasiado los brazos al manejar la herramienta. Pueden darse pares de reacción elevados a la presión de aire recomendada, e incluso a presiones inferiores.**
- **El accesorio de herramienta podría seguir girando brevemente después de haber soltado la palanca de mando.**
- **Las herramientas neumáticas pueden vibrar durante el uso. La vibración, los movimientos repetitivos o las posiciones incómodas pueden fatigar e incluso lesionarle los brazos y manos. En caso de incomodidad, sensación de hormigueo o dolor, deje de usar la herramienta. Consulte al médico antes de volver a utilizarla.**
- **Utilice únicamente los accesorios Ingersoll–Rand recomendados.**
- **La tapa de válvula de estrangulación está presionada por el muelle de válvula de estrangulación. Tenga cuidado al sacar dicha tapa. *(Si procede, según la herramienta).***
- **Questo attrezzo non è stato progettato per operare in atmosfere esplosive.**
- **Questo attrezzo non è isolato contro le scosse elettriche.**
- **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 puede 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 se deben encomendar a personal debidamente cualificado y autorizado. Consulte con el centro de servicio autorizado Ingersoll–Rand más próximo.
Toda comunicación se deberá dirigir a la oficina o al distribuidor Ingersoll–Rand más próximo.

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ETIQUETAS DE AVISO

⚠ AVISO

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

⚠ ADVERTENCIA

Usar siempre protección ocular al manejar o realizar operaciones de mantenimiento en esta herramienta.

⚠ ADVERTENCIA

Usar siempre protección para los oídos al manejar esta herramienta.

⚠ 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

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

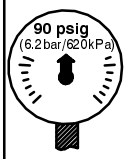
No coger la herramienta por la manguera para levantarla.

⚠ ADVERTENCIA

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

⚠ ADVERTENCIA

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



⚠ ADVERTENCIA

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

AJUSTES

AJUSTE DEL EMBRAGUE

Los modelos que terminan en C1 incorporan un embrague ajustable que puede ser ajustado externamente dentro de cierta gama, que actúa cuando se consiga el par predeterminado.

Para aumentar la gama de par ajustable, hay disponibles tres muelles de embrague.

⚠ AVISO

Desconecte el suministro de aire y la manguera de suministro de aire de la herramienta antes de proceder al ajuste.

Para ajustar el embrague, proceda como sigue:

1. Gire la tapa de orificio de ajuste situada en la carcasa de embrague hasta que se vea dicho orificio.
2. Introduzca una llave Allen de 1/4 pulg. en el receso del portapuntas y, mientras empuja contra dicho portapuntas para calzar las mordazas de embrague, gire el portapuntas hasta que uno de los orificios radiales situados en la tuerca de ajuste de embrague sea visible a través de la ranura que hay en la carcasa de embrague. Introduzca la llave de calzado de embrague en la ranura alargada situada en la carcasa de embrague y en el orificio en la tuerca de ajuste para evitar que dicha tuerca se mueva.
3. Sujete la herramienta firmemente con un mano y gire el extremo de salida de la herramienta. Si mueve el extremo de salida hacia la derecha cuando está de cara a la parte delantera, se incrementa la compresión del muelle de embrague y el par al que actuará dicho embrague.

NOTA

Normalmente se obtendrá el ajuste más satisfactorio utilizando la herramienta en la aplicación real de trabajo, e incrementando o disminuyendo el par hasta lograr la posición deseada. En cualquier caso, se recomienda hacer el ajuste final por progresión gradual.

NOTA

Cuando el embrague esté equipado con el muelle pesado, éste podrá colocarse más allá de la capacidad de par de herramienta; en tal caso la herramienta se calará antes de que actúe el embrague. No ajuste el embrague a más de la capacidad de par de la herramienta.

4. Introduzca la llave de ajuste de embrague en el orificio que hay en la tuerca de ajuste de embrague y, mientras sujeta la tuerca para que no dé vueltas, gire el portapuntas hacia la izquierda hasta que no haya compresión en el muelle de embrague.

— CAMBIO DEL MUELLE DE EMBRAGUE –

1. Sujete con cuidado los lados planos de la carcasa de embrague en un tornillo de banco con mordazas cubiertas de cobre o cuero, con el portapuntas hacia abajo.
2. Utilizando una llave en los lados planos de la carcasa de engranaje afloje dicha carcasa de la carcasa de embrague. Saque la herramienta del tornillo de banco.

AJUSTES

NOTA

La carcasa de engranaje es de rosca a la izquierda.

3. Desenrosque y saque la carcasa de embrague de la carcasa de engranajes.
4. Sujete el accionador de embrague y saque el conjunto fuera de la carcasa de embrague.
5. Sujete con cuidado la mordaza de embrague delantera en un tornillo de banco con mordazas cubiertas de cobre o cuero con la tuerca de ajuste de embrague hacia arriba.
6. Utilizando una llave en los lados planos de la tuerca de ajuste de embrague, afloje y saque dicha tuerca.
7. Con el conjunto en un tornillo de banco, y mientras aplica una ligera presión hacia abajo sobre el asiento de bola de embrague, saque el seguro de tuerca de ajuste, cojinete de asiento de muelle, asiento de muelle de embrague y muelle de embrague fuera del accionador de embrague.
8. Engrase bien el seguro de la tuerca de ajuste y el cojinete y deslice los siguientes elementos sobre el accionador de embrague en el orden que se indica a continuación: muelle de embrague nuevo, asiento de muelle de embrague, cojinete de asiento de muelle y seguro de tuerca de ajuste, con el extremo indentado atrás.
9. Coloque la tuerca de ajuste de embrague, con el lado de retención por delante, en el accionador de embrague y apriétela a mano contra la compresión del muelle. Con una llave, apriete la tuerca una o dos vueltas más.
10. Saque el embrague completo del tornillo de banco.
11. Instale el conjunto de accionamiento de embrague en la carcasa de embrague con el extremo estriado del accionador de embrague atrás.

NOTA

La carcasa de engranaje es de rosca a la izquierda.

12. Enrosque el embrague completo en la carcasa de engranaje. Apriete la carcasa de embrague entre 2 y 5 ft–lb (2,7 a 6,8 Nm) de par.
13. Ajuste el embrague como se indica en la sección sobre **Ajuste de embrague.**

PARA PONER LA HERRAMIENTA EN SERVICIO

LUBRICACIÓN

Ingersoll–Rand Nº. 10 **Ingersoll–Rand Nº. 28**
Ingersoll–Rand Nº. 67

Utilice siempre un lubricador de aire comprimido con estas herramientas.

Recomendamos utilizar el siguiente conjunto de filtro–lubricador–regulador:

For USA – No. C11–03–G00

Motor

Antes de poner la herramienta en marcha, y después de cada ocho horas de uso,a menos que se haya puesto un lubricante de línea de aire, desconecte la manguera de aire e inyecte unas gotas de aceite Ingersoll–Rand Nº. 10 en la admisión de aire**.**

Engranaje

Para modelos de engranaje L, después de cada 50,000 ciclos o 100 horas de funcionamiento lo que ocurra primero, inyecte aproximadamente 2cc de Grasa Ingersoll–Rand Nº 28 en el Engrasador.

Para modelos de engranaje M o N, después de cada 50,000 ciclos o 100 horas de funcionamiento lo que ocurra primero, inyecte aproximadamente 4 cc de Grasa Ingersoll–Rand Nº. 28 en el Engrasador.

Embrague

Para embrague ajustable 7C1 ó 7C3, después de cada 50,000 ciclos o 100 horas de funcionamiento lo que ocurra primero, lubrique con Grasa Ingersoll–Rand Nº 67 como sigue:

⚠ AVISO

Desconecte el suministro de aire y la manguera de suministro de aire de la herramienta antes de proceder.

1. Gire la tapa del orificio de ajuste hasta que se vea la ranura de la carcasa de engranaje.
2. Introduzca una llave Allen de 1/4 pulg. en el portapuntas, y mientras empuja contra el portapuntas para calzar las mordazas de embrague, gire dicho portapuntas hasta que el orificio que hay en la tuerca de ajuste de embrague esté alineado con la ranura de la carcasa de engranaje.
3. Sujete cuidadosamente los lados planos de la carcasa de embrague en un tornillo de banco con mordazas cubiertas de cobre o cuero, asegurándose de no alterar la carcasa.

NOTA

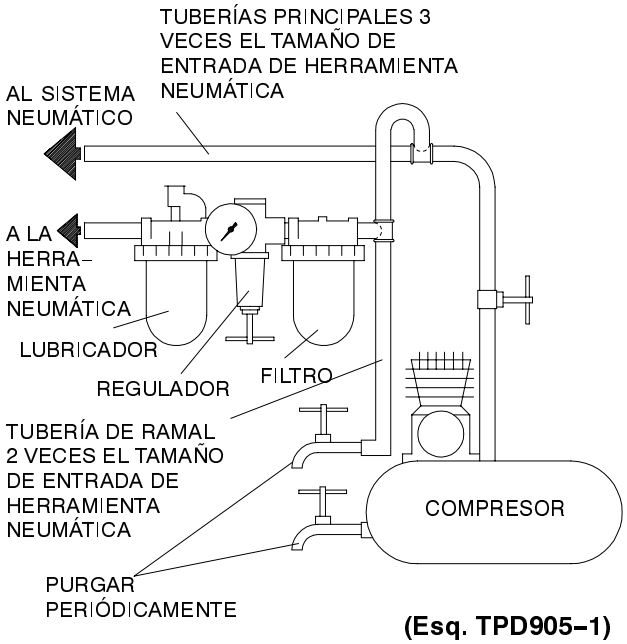
La carcasa es de rosca hacia la izquierda.

4. Utilizando una llave ajustabble, sujete los lados planos de la carcasa de engranaje y desenrosque toda la unidad de potencia de la carcasa de embrague.

5. Saque el embrague montado fuera de la carcasa de embrague y ponga algo de Grasa Ingersoll–Rand Nº 67 alrededor de las bolas del cojinete de mordaza de embrague, bolas de escape de embrague, cojinete de asiento de muelle y entre el seguro de tuerca de ajuste y la tuerca de ajuste de embrague.

NOTA

Para engrasar las bolas de escape de embrague, gradúe la mordaza de embrague hasta que se eleve el asiento de muelle.



(Esq. TPD905–1)

ESPECIFICACIONES

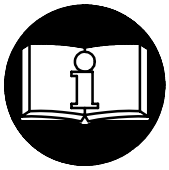
Modelo	Empuñadura	Embrague/ Accionamiento	Gama de par recomendada (junta blanda)
		pulg.	**pulg.–lbs (Nm)**
7RALC1	pistola reversible	amortiguación ajustable	15–75 (1,7–8,5)
7RALC3	pistola reversible	amortiguación ajustable	15–75 (1,7–8,5)
7RAMC1	pistola reversible	amortiguación ajustable	20–110 (2,3–12,5)
7RAMC3	pistola reversible	amortiguación ajustable	20–110 (2,3–12,5)
7RLLC1	mando por pa-lanca reversible	amortiguación ajustable	15–75 (1.7–7.4)
7RLMC1	mando por pa-lanca reversible	amortiguación ajustable	20–110 (2,3–12,5)
Modelo	**Empuñadura**	**Embrague**	**Gama de par recomendada (junta blanda)**
		pulg.	**pulg.–lbs (Nm)**
7RAMP1	pistola reversible	mordaza positiva	50 psi/63 (7,2) 90 psi/115 (13,1)
7RANP1	pistola reversible	mordaza positiva	50 psi/91 (10,3) 90 psi/165 (18,8)
7RALD1	pistola reversible	accionamiento directo	50 psi/39 (4,4) 90 psi/70 (8,0)

P

MANUAL DE FUNCIONAMENTO E MANUTENÇÃO PARA APARAFUSADORAS SÉRIE 7

AVISO

As Aparafusadoras Pneumáticas Série 7 são concebidas para aplicações de aperto em indústrias automotivas, de equipamentos, electrónicas, aeroespaciais e de mobiliário. 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 10 mm (3/8").
- 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.
- O Tampo da Válvula Reguladora está montado sob pressão da Mola da Válvula. Tenha cuidado ao removê–lo. (*Em ferramentas onde aplicável.)*
- 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.

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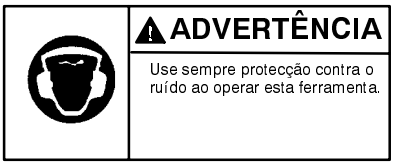
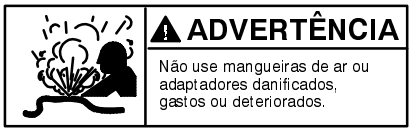
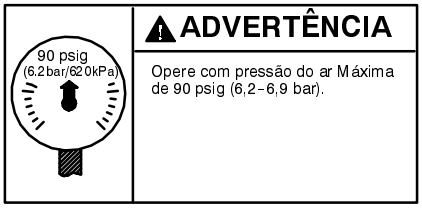
⚠ ADVERTÊNCIA

O NÃO CUMPRIMENTO DAS SEGUINTES ADVERTÊNCIAS PODE RESULTAR EM FERIMENTOS.







AJUSTES

AJUSTE DA EMBRAIAGEM

Os Modelos que terminam em C1 incorporam uma embraiagem ajustável que pode ser externamente ajsutada dentro de um certo intervalo para ratchet quando um torque pré-determinado tiver sido enviado.

Para aumentar o intervalo de torque ajustável, três Molas de Embraiagem são oferecidas:

⚠ ADVERTÊNCIA

Desligue a alimentação de ar da Ferramenta antes de prosseguir.

1. Gire a Capa de Ajuste do Orifício no Corpo da Embraiagem.
2. Insira uma Chave Allen de 1/4” no recesso no Suporte do Bite e, enquanto estiver empurrando contra o Suporte do Bite para acoplar as Garras da Embraiagem, gire o Suporte do Bite até que um dos orifícios radiais na Porca de Ajuste da Embraiagem seja visível através da ranhura no Corpo da Embraiagem. Insira a Chave Sprag da Embraiagem na ranhura alongada no Corpo da Embraiagem e no orifício na Porca de Ajuste para evitar que a Porca gire.
3. Segure a Ferramenta com firmeza em uma mão e gire a extremidade de saída da ferramenta. Ao girar a extremidade de saída no sentido horário ao estar de frente a parte frontal aumentará a Compreesão na Mola da Embraiagem e elevará o torque com o qual a embraiagem.

AVISO

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

AVISO

A embraiagem, quando equipada com uma Mola Pesada, pode ser ajustada além da capacidade de torque da ferramenta em cada caso a ferramenta irá stall antes que a Embraiagem. Não ajuste a Embraiagem além capacidade de torque da ferramenta.

TROCANDO A MOLA DA EMBRAIAGEM –

1. Segure cuidadosamente as pás do Corpo da Embraiagem nas garras vise revestidas de couro ou de cobre. O Suporte do Bite com a face para baixo.
2. Usando uma chave nas pás da Caixa de Engrenagens, solte a Caixa de Engrenagens do Corpo da Embraiagem. Remova a ferramenta do torno.

AJUSTES

AVISO

Isto possui uma rôsca à esquerda.

3. Desaparafuse e remova o Corpo da Embraiagem da Caixa de Engrenagem.
4. Segure o Eixo da Embraiagem e puxe o Arranjo para fora do Corpo da Embraiagem.
5. Segure com cuidado a Garra da Embraiagem Frontal nas garras do torno revestidas de couro ou de cobre com a Porca de Ajuste da Embraiagem com a face para cima.
6. Usando uma chave nas pás da Porca de Ajuste da Embraiagem, solte e remova a Porca.
7. Com o arranjo no torno e enquanto aplicando uma leve pressão para baixo sobre o Assento da Esfera da Embraiagem, remova a Trava da Porca de Ajuste, o Casquilho do Assento da Mola, o Assento da Mola da Embraiagem e a Mola da Embraiagem do Comando da Embraiagem.
8. Aplique Massa Lubrificadora por inteiro na Trava da Porca de Ajuste e no Casquilho, na ordem dada, deslize o seguintes itens sobre o Eixo da Embraiagem: a nova Mola da Embraiagem, o Assento da Mola da Embraiagem, o Casquilho do Assento da Mola, outro Assento da Mola de Embraiagem e a Trava da Porca de Ajuste, com o lado dentado.
9. Comece aplicando a Porca de Ajuste da Embraiagem, o lado dentado primeiro, sobre o Eixo da Embraiagem e deslize os dedos de modo a apertá-la contra a Mola. Com uma chave aperte a Porca com uma ou duas voltas adicionais.
10. Remova a Embraigem montada do vise.
11. Instale o Arranjo do Eixo da Embraiagem no Corpo da Embraiagem com a extremidade estriada do Suporte do Eixo da Embraiagem.

AVISO

A Caixa de Engrenagem possui uma rôsca à esquerda.

12. Rosqueie a embraiagem montada na Caixa de Engrenagem. Aperte o Corpo da Embraiagem com um torque entre 2,7 e 6,8 Nm (2 a 5 pés-lb).
13. Ajuste a Embraiagem como orientado na secção **Ajuste da Embraiagem.**

COLOCANDO A FERRAMENTA EM FUNCIONAMENTO

LUBRIFICAÇÃO

Ingersoll-Rand No. 10 **Ingersoll-Rand No. 28**
Ingersoll-Rand No. 67

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

For USA - No. C11-03-G00

Motor

Antes de por a Ferramenta em funcionamento ou depois de cada 8 horas de operação, ao menos que esteja usando um lubrificador de ar de linha, injecte algumas gotas de Óleo Ingersoll-Rand No. 10 na entrada de ar.

Engrenagem

Para modelos com engrenagem L depois de cada 50 000 ciclos ou 100 horas, o que ocorrer primeiro, injecte aproximadamente 2 cc de Massa Lubrificadora Ingersoll-Rand No. 28 no Adaptador de Massa Lubrificadora.

Para modelos com engrenagem M e N depois de cada 50 000 ciclos ou 100 horas, o que ocorrer primeiro, injecte aproximadamente 4 cc de Massa Lubrificadora Ingersoll-Rand No. 28 no Adaptador de Massa Lubrificadora.

Embraiagem

Para a Embraiagem Ajustável 7C1 ou 7C3, depois de cada 50 000 ciclos ou 100 horas de operação, o que ocorrer primeiro, lubrifique com Massa Lubrificadora Ingersoll-Rand No. 67 da seguinte maneira:

⚠ ADVERTÊNCIA

Desconecte a alimentação de ar da ferramenta antes de prosseguir.

1. Gire a Capa de Ajuste do Orifício no Corpo da Embraiagem.
2. Insira uma Chave Allen de 1/4" no recesso no Suporte do Bite e, enquanto estiver empurrando contra o Suporte do Bite para acoplar as garras da embraiagem, gire o Suporte do Bite até que o orifício na Porca de Ajuste da Embraiagem esteja alinhado com a ranhura na caixa de engrenagem.
3. Segure as pás no Corpo da Embraiagem nas garras do torno revestidas de couro ou cobre, certificando-se para não entortar o Corpo.

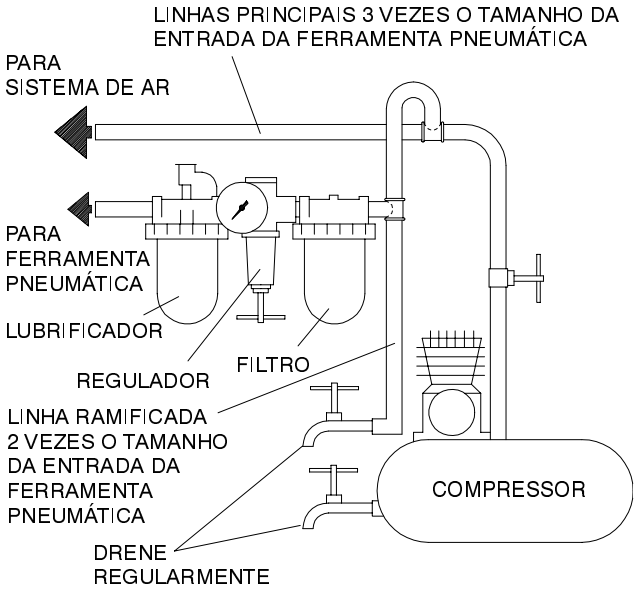
AVISO

Esta é uma rosca à esquerda.

4. Usando uma chave ajustável, agarre as pás na Caixa de Engrenagem e desaparfuse a unidade de potência inteira do Corpo da Embraiagem.
5. Retire a embraiagem montada do Corpo da Embraiagem e aplique um pouco de Massa Lubrificadora Ingersoll-Rand No. 67 ao redor das Esferas do Casquilho da Garra da Embraiagem, das Esferas de Liberação da Embraiagem, do Casquilho do Assento da Mola e entre a Trava da Porca de Ajuste e Porca de Ajuste da Embraiagem.

AVISO

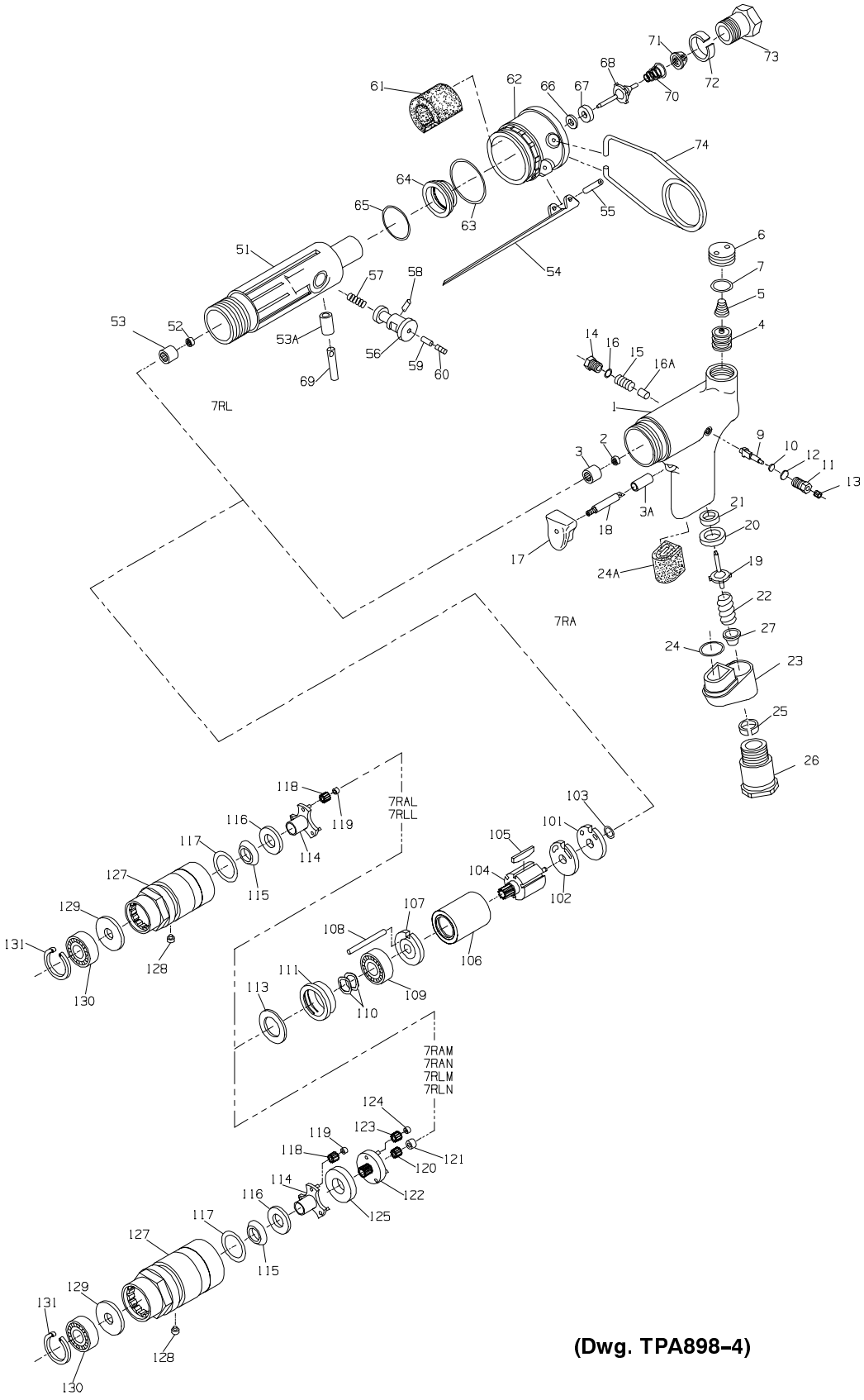
Para lubrificar as Esferas de Liberação da Embraiagem, ajuste a Garra da Embraiagem até que o Assento da Mola se erga.



(Desenho TPD905–1)

ESPECIFICAÇÕES

Modelo	Punho	Embraiagem/Comando	Intervalo de Torque Recomendado (aperto ligeiro)
		pol.	Nm (pés-lbs.)
7RALC1	pistola reversível	embraiagem mola ajustável	1,7–8,5 (15–75)
7RALC3	pistola reversível	embraiagem mola ajustável	1,7–8,5 (15–75)
7RAMC1	pistola reversível	embraiagem mola ajustável	2,3–12,5 (20–110)
7RAMC3	pistola reversível	embraiagem mola ajustável	2,3–12,5 (20–110)
7RLLC1	alavanca de regulagem de pressão reversível	embraiagem mola ajustável	1,7–7,4 (15–75)
7RLMC1	alavanca de regulagem de pressão reversível	embraiagem mola ajustável	2,3–12,5 (20–110)
Modelo	**Punho**	**Embraiagem/Comando**	**Intervalo de Torque Recomendado (aperto ligeiro)**
		pol.	**Nm (pés-lbs.)**
7RAMP1	pistola reversível	garra positiva	50 psi/7,2 (63) 90 psi/13,1 (115)
7RANP1	pistola reversível	garra positiva	50 psi/10,3 (91) 90 psi/18,8 (165)
7RALD1	pistola reversível	comando directo	50 psi/4,4 (39) 90 psi/8,0 (70)



(Dwg. TPA898–4)

		Motor Housing Assembly	
		for models ending in –EU	7RA–EU–A40
		for all other models	7RA–A40
	1	Motor Housing	
		for models ending in –EU	7RA–EU–B40
		for all other models	7RA–B40
	*	Warning Label	
		for models ending in –EU	EU–99
		for all other models	WARNING–7–99
	2	Bearing Ejecting Nut	7AH–105A
♦•	3	Rear Rotor Bearing	7AH–24
	3A	Trigger Bushing	4RA–91
	4	Reverse Valve	7RA–329
	5	Reverse Valve Spring	7RA–515
	6	Reverse Valve Cap	7RA–269
♦•	7	Reverse Valve Cap Seal	7RA–358
		Actuating Valve Assembly	7RA–A516
	9	Actuating Valve	7RA–B516
♦•	10	Actuating Valve Face	R2F–167
	11	Actuating Valve Bushing Assembly	7RA–A518
	12	Valve Bushing Seal	R0BRIC–283
	13	Actuating Valve Button	7RA–520
	14	Actuating Valve Cap Assembly	7RA–A517
	15	Actuating Valve Spring	7RA–519
♦•	16	Actuating Valve Cap Seal	R0BRIC–283
	16A	Actuating Valve Bumper	7RA–664
	17	Trigger Assembly	7AH–A93
	18	Trigger Pin	7AH–94
♦	19	Throttle Valve	7RAK–302
♦	20	Throttle Valve Seat	7RAK–303
	21	Throttle Valve Seat Support	7RAK–304
♦	22	Throttle Valve Spring	7AH–51
	23	Muffler Assembly	3RA–A123
♦•	24	Muffler O–ring	85H–167
♦	24A	Muffler Element	7RA–311
	25	Inlet Bushing Spacer	7AH–65
	26	Inlet Bushing Assembly	7AH–A565
♦	27	Air Strainer Screen	R0A2–61
	*	Dead Handle (for 7RANP1)	R1A–48
	*	Pinch Bolt (for 7RANP1)	510–638
	*	Dead Handle Adapter (2) (for 7RANP1)	7A–49
	*	Nameplate	
		for models ending in –EU	4RA–EU–301
		for all other models	4RA–301
	*	Nameplate Screws (2)	BN403–302
	*	Horizontal Hanger	7RA–366

* Not illustrated.

• To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a bullet (•) for every four tools in service.

♦ Indicates Tune–up Kit part.

	Motor Housing Assembly	
	for models ending in –EU	7RL–EU–AL40
	for all other medels	7RL–AL40
51	Motor Housing	
	for models ending in –EU	7RL–EU–B40
	for all other models	7RL–B40
*	Warning Label	
	for models ending in –EU	EU–99
	for all other models	WARNING–7–99
52	Bearing Ejecting Nut	7AH–105A
♦• 53	Rear Rotor Bearing	7AH–24
53A	Plunger Bushing	5RLK2C–91
54	Throttle Lever	7L–L273
55	Throttle Lever Pin	7L–120
56	Reverse Valve	7RL–329
57	Reverse Valve Spring	55RP–515
58	Reverse Valve Lock Pin	7RL–347
59	Lock Pin Retainer	74L–56
60	Retainer Set Screw	7RL–669
♦ 61	Muffler Element	7L–311
62	Exhaust Deflector	7L–23
♦• 63	Exhaust Deflector Seal	7A–379
64	Exhaust Silencer	7L–310
♦• 65	Silencer Seal Ring	WWV100A1–43
66	Throttle Valve Seat Support	7RAK–304
♦• 67	Throttle Valve Seat	7RAK–303
♦ 68	Throttle Valve	7RAK–302
69	Throttle Valve Plunger	7RL–94
♦ 70	Throttle Valve Spring	7L–51
♦• 70	Air Strainer Screen	R0A2–61
72	Inlet Bushing Spacer	7AH–65
73	Inlet Bushing	7L–565
74	Suspension Ball	7L–365
*	Dead Handle (for 7RLMC1)	R1A–48
*	Pinch Bolt (for 7RLMC1)	510–638
*	Dead Handle Adapter (2) (for 7RLMC1)	7A–49

* Not illustrated.

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♦ Indicates Tune–up Kit part.

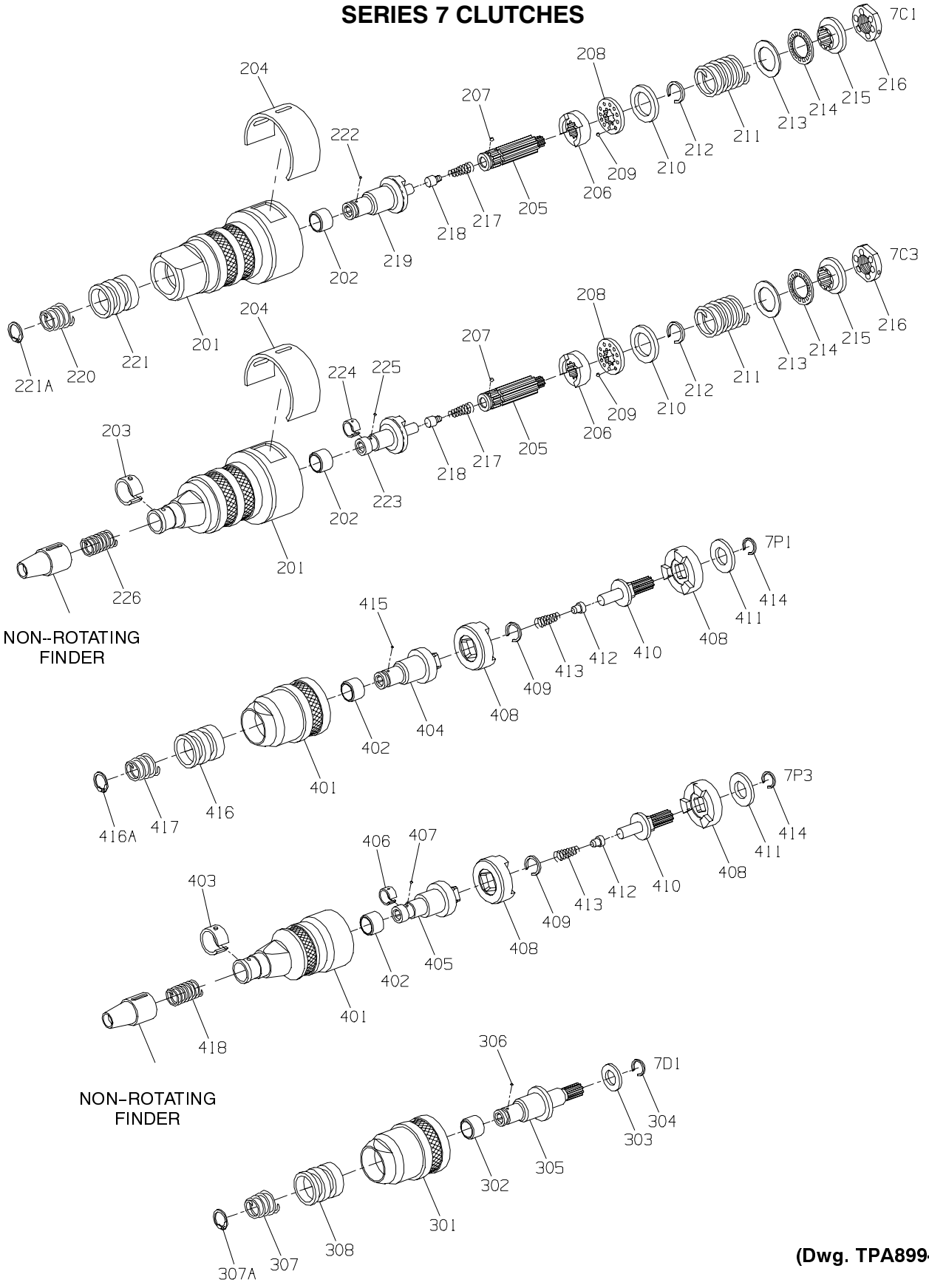
♦•	101	Rear End Plate Gasket	7RL–739
	102	Rear End Plate	7RL–12
♦	103	Rear End Plate Retainer	7AH–118
	104	Rotor	7RLL–53
♦•	105	Vane Packet (set of 4 Vanes)	7RL–42–4
	106	Cylinder	7RL–3
	107	Front End Plate	7AH–11
	108	Cylinder Dowel	7AH–98
♦•	109	Front Rotor Bearing	R1–22
	110	Bearing Spring Washer (2)	7AH–278
	111	Front Rotor Bearing Housing	7AH–13
	113	Bearing Housing Spacer	7AH–81
	114	Spindle Assembly	
		for N ratio	7LK–A8
		for L ratio	7LL–A8
		for M ratio	7LM–A8
	115	Seal Support	5RAK–5
	116	Seal Retaining Washer	7L–303
♦	117	Seal	182A53–610
	118	Spindle Planet Gear Assembly (3)	
		for N ratio (21 teeth)	7AK–A10
		for L ratio (22 teeth)	7AL–A10
		for M ratio (18 teeth)	7AJ–A10
	119	Spindle Planet Gear Bearing (1 for each Gear)	
		for L or N ratio	7AK–500
	120	Rotor Pinion (for M and N ratios)	7AH–17
	121	Rotor Pinion Spacer (for M and H ratios)	7AH–18
	122	Gear Head	
		for M ratio	7AM–216
		for N ratio	7AN–216
	123	Gear Head Planet Gear Assembly (3) (for M and H ratios)	7AH–A10
	124	Planet Gear Bearing (1 for each Gear)	7AH–500
	125	Gear Head Spacer	7AN–80
		Gear Case Assembly	
		for L ratio	7LH–A37A
		for M and N ratios	7LM–A37A
	127	Gear Case	
		for L ratio	7LH–B37A
		for M and N ratios	7LM–B37A
	128	Grease Fitting	D0F9–879
	129	Grease Shield	5R–701
	130	Spindle Bearing	R1L–24
	131	Spindle Bearing Retainer	7L–28
	*	Grease Gun	R000A2–228
	*	Reverse Valve Cap Wrench	141A12–26
	*	Tune–up Kit	
		for Models 7RALC1, 7RALD1, 7RAMC1, 7RALP1, 7RAMC3, 7RAMP1, 7RANP1 and 7RALC3 (includes illustrated parts: 3, 7, 10, 16, 19, 20, 22, 24, 24A, 27, 101, 105, 109 and 117)	7RA–S/D–TK1
		for Models 7RLLC1, 7RLLC3 and 7RLMC1 (includes illustrated parts: 53, 61, 63, 65, 67, 68, 70, 101, 103, 105, 109 and 117)	7RL–S/D–A/T–TK1

* Not illustrated.

• To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a bullet (•) for every four tools in service.

♦ Indicates Tune–up Kit part.

SERIES 7 CLUTCHES



(Dwg. TPA899–1)

PART NUMBER FOR ORDERING

		7C1	7C3
	Cushion Clutch Attachment		
	(assembled with Medium Clutch Spring)	7C1	7C3
201	Clutch Housing Assembly	7C1-A580A	7C3-A580A
202	Housing Bushing	7P1-781	7C3-781
203	Finder Retaining Spring	---	102A60-628
204	Adjusting Hole Cover	7C-415A	7C-415A
	Clutch Driver Assembly		
	(assembled with Medium Clutch Spring)	7C-A581A	7C-A581A
• 205	Clutch Driver	7C-581A	7C-581A
• 206	Front Clutch Jaw	7C-589A	7C-589A
• 207	Jaw Bearing Ball (12)	2U-696	2U-696
• 208	Clutch Ball Spacer	7C-401A	7C-401A
• 209	Clutch Release Ball (9)	4U-31	4U-31
• 210	Clutch Ball Seat	7C-627	7C-627
211	Clutch Spring		
	Light (black)	7C-L583A	7C-L583A
	Medium (yellow)	7C-583A	7C-583A
	Heavy (green)	7C-H583A	7C-H583A
212	Spring Seat Stop	7C-704B	7C-704B
213	Clutch Spring Seat	7C-623	7C-623
214	Spring Seat Bearing	R02W-696	R02W-696
215	Adjusting Nut Lock	7C-588A	7C-588A
216	Clutch Adjusting Nut	7C-582A	7C-582A
• 217	Plunger Spring	4C-626	4C-626
• 218	Disengaging Plunger	7P1-584	7P1-584
219	Bit Holder	7C1-586A	---
• 220	Retaining Sleeve Spring	5C1-931-4	---
• 221	Bit Retaining Sleeve	5C1-930-4	---
221A	Sleeve Spring Retainer (Blue)	5C1-853	---
222	Bit Retaining Ball	RX1-629	---
223	Bit Holder Assembly	---	7C3-A586
224	Bit Retaining Spring	---	102A60-241
225	Bit Retaining Ball	---	AV1-255
226	Finder Spring	---	102A60-242
*	Bit Holder Guide	---	102A60-630
*	Clutch Adjusting Key	5C1-416	5C1-416

* Not illustrated.

• To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a bullet (•) for every four tools in service.

PART NUMBER FOR ORDERING

		7D1
	Direct Drive Attachment	7D1
301	Housing Assembly	7P1–A580
302	Housing Bushing	7P1–781
303	Spacer	7D1–211
304	Spacer Retainer	7AH–118
• 305	Bit Holder	7D1–586
• 306	Bit Retaining Ball	RX1–629
• 307	Retaining Sleeve Spring	5C1–931–4
• 307A	Sleeve Spring Retainer (Blue)	5C1–853
308	Bit Retaining Sleeve	5C1–930–4

• To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a bullet (•) for every four tools in service.

PART NUMBER FOR ORDERING

		7P1	7P3
	Positive Drive Attachment	7P1	7P3
401	Clutch Housing Assembly	7P1–A580A	7P3–A580A
402	Housing Bushing	7P1–781	7C3–781
403	Finder Retaining Spring	---	102A60–628
404	Bit Holder	7P1–586	---
405	Bit Holder Assembly	---	7P3–A586
406	Bit Retaining Spring	---	102A60–241
407	Bit Retaining Ball	---	AV1–255
• 408	Clutch Jaw (2)	PX3–587	PX3–587
409	Clutch Jaw Retaining Ring	R2–285	R2–285
• 410	Clutch Driver	7P–581	7P–581
411	Clutch Driver Spacer	7P1–211	7P1–211
412	Disengaging Plunger	7P1–584	7P1–584
413	Plunger Spring	RX2–626	RX2–626
• 414	Clutch Driver Spacer Retainer	7AH–118	7AH–118
• 415	Bit Retaining Ball	RX1–629	---
• 416	Bit Retaining Sleeve	5C1–930–4	---
• 416A	Sleeve Spring Retainer (Blue)	5C1–853	---
• 417	Retaining Sleeve Spring	5C1–931–4	---
418	Finder Spring	---	102A60–242
*	Bit Holder Guide	---	102A60–630

* Not illustrated.

• To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a bullet (•) for every four tools in service.

MAINTENANCE SECTION

⚠ WARNING

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

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

LUBRICATION

Each time the Series 7 Screwdriver is disassembled for maintenance, repair or replacement of parts, lubricate the tool as follows:

1. **Motor**
   Use lngersoll-Rand No. 10 Oil for lubricating the motor. Inject a few drops of oil into the air inlet before attaching the air hose.
2. **Gearing**
   For L gearing, coat the gears with 2 cc of Ingersoll-Rand No. 28 Grease.
   For M or N gearing, coat the gears with 4 cc of Ingersoll-Rand No. 28 Grease.
3. **Clutch**
   Lightly lubricate the Adjustable Cushion Clutch with Ingersoll-Rand No. 67 Grease.

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 vise 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 new gaskets and O-rings for replacement.

Disassembly of the Tool

1. Grasp the flats on the nose of the Clutch Housing (201, 301 or 401) in a leather-covered or copper-covered vise jaws, making certain not to distort the Clutch Housing.
2. Using an adjustable wrench, grasp the flats on the Gear Case (127) and unscrew the entire power unit from the Clutch Housing.
3. If you are disassembling a pistol grip model, lightly grasp the handle of the Motor Housing (1) in leather-covered or copper-covered vise jaws, so that the Gear Case is upward. If you are disassembling a lever throttle model, lightly grasp the flats on the Motor Housing (51) in leather-covered or copper-covered vise jaws so that the Gear Case is upward.
4. Using an adjustable wrench, grasp the flats on the Gear Case and unscrew the Gear Case from the Motor Housing. Lift the Gear Case along with the gearing from the Motor Housing.
5. Remove the Motor Housing from the vise and grasp the pinion end of the Rotor (104) in the vise. Make certain to use leather-covered or copper-covered vise jaws for this operation. Withdraw the motor from the Motor Housing.

Disassembly of the Gearing

1. If the Bearing Housing Spacer (113) remained with the Gear Case (127) when the tool was disassembled. slide it from the bore of the Gear Case.
2. **For 7RAM and 7RAN models,** hold the Gear Case vertically, external threaded end upward, and tap it gently against the surface of a workbench to jar the Gear Head (122), Gear Head Planet Gears (123) and Gear Head Spacer (125) from the Gear Case. If the Rotor Pinion (120) remained in the Gear Case when the tool was disassembled, it will come out with the Gear Head and associated parts.
3. **For all models,** position the Gear Case, external threaded end up, on the table of an arbor press. Using a small drift against the end of the Spindle (114), press the Spindle along with the Spindle Planet Gear (118) from the bore of the Spindle Bearing (130).
4. Lift the Seal (117), Seal Support (115) and Seal Retaining Washer (116) from the Spindle.
5. If the Spindle Planet Gear Bearings (119) and Gear Head Planet Gear Bearings (124) are to be replaced, press them from the Planet Gears.
6. Using snap ring pliers, remove the Spindle Bearing Retainer (131) from the Gear Case.
7. Gently tap the external threaded end of the Gear Case against the workbench to dislodge the Spindle Bearing (130) and Grease Shield (129).

Disassembly of the Motor

1. Slide the Front Rotor Bearing Housing (111) along with the two Bearing Spring Washers (110) from the Front Rotor Bearing (109).

2. **For 7RAM and 7RAN models**, if the Rotor Pinion (120) and Rotor Pinion Spacer (121) remained with the motor when the tool was disassembled, slide them from the Rotor (104). Grasp the pinion end of the Rotor in leather–covered or copper–covered vise jaws so that the Rear End Plate (102) is upward.

⚠ CAUTION

Make certain the Retainer does not fly off when it is slipped off the hub of the Rotor.

3. Using a pair of external snap ring pliers with just the tips of the pliers inserted between tie ends of the End Plate Retainer (103), spread the Retainer enough to remove it from the groove in the hub of the Rotor.
4. Lift off the Rear End Plate (102), Cylinder (106) and Vanes (105).
5. Check the Front Rotor Bearing for damage or roughness. If replacement is necessary, support the Front End Plate (107) between two blocks of wood on the table of an arbor press and press the Rotor from the Front Rotor Bearing.

Disassembly of the Lever Throttle Motor Housing

1. Unscrew the Retainer Set Screw (60) from the Reverse Valve (56). Turn the Motor Housing (51) to allow the Lock Pin Retainer (59) to slide from the hole in the Reverse Valve.
2. Hold the Motor Housing horizontally with the Throttle Lever (54) at the bottom, and withdraw the Reverse Valve and Reverse Valve Spring (57), making certain not to drop or lose the Reverse Valve Lock Pin (58).
3. Lightly grasp the flats on the Motor Housing in leather–covered or copper–covered vise jaws so that the Inlet Bushing (73) is upward.
4. Using a small punch or drift, tap the Throttle Lever Pin (55) from the Exhaust Deflector (62).
5. Unscrew the Inlet Bushing and remove the Exhaust Deflector, Inlet Bushing Spacer (72), Air Strainer Screen (71), Throttle Valve Spring (70) and Throttle Valve (68). Withdraw the Throttle Valve Plunger (69). If the Plunger Bushing (53A) is to be replaced, withdraw it from the Housing with a stiff wire hook. Slide the Exhaust Silencer (64) and Silencer Seal Ring (65) from the Motor Housing.
6. If the Rear Rotor Bearing (53) is to be replaced, remove the old Bearing by threading a No. 10–24 thread cap screw into the Bearing Ejecting Nut (52) and jacking the Bearing from the Housing (51).
7. If the Throttle Valve Seat (67) and Throttle Valve Seat Support (66) are to be replaced, withdraw them from the Motor Housing with a stiff wire hook.

Disassembly of the Pistol Grip Motor Housing

1. Grasp the handle of the Motor Housing (1) in leather–covered or copper–covered vise jaws.
2. If the Rear Rotor Bearing (3) is to be replaced, remove the old Bearing by threading a No. 10–24 thread cap screw into the Bearing Ejecting Nut (2) and jacking the Bearing from the Housing.
3. Unscrew the Reverse Valve Cap (6) and remove the Reverse Valve Spring (5) and Reverse Valve Cap Seal (7).
4. Thread a No. 8–32 thread cap screw into the top of the Reverse Valve (4) and pull the Reverse Valve from the Motor Housing.

NOTICE

A 10 mm hexagon socket fits the Actuating Valve Bushing.

5. Unscrew the Actuating Valve Bushing (11) from the Motor Housing, and remove the entire Actuating Valve Assembly, Actuating Valve Spring (15) and Actuating Valve Bumper (16A).

NOTICE

A 10 mm hexagon socket fits the Actuating Valve Cap.

6. Unscrew the Actuating Valve Cap (14).
7. Unscrew the Inlet Bushing (26) and remove the Inlet Bushing Spacer (25), Air Strainer Screen (27), Muffler Assembly (23), Muffler (24), Throttle Valve Spring (22) and Throttle Valve (19).
8. Withdraw the Trigger Assembly (17). If the Trigger Bushing (3A) is to be replaced, withdraw it from the Housing with a stiff wire hook.
9. If the Throttle Valve Seat (20) and Throttle Valve Seat Support (21) are to be replaced, withdraw them from the handle with a stiff wire hook.

Disassembly of the 7C1 or 7C3 Cushion Clutch

1. Grasp the splined end of the Clutch Driver (205) and pull the entire Clutch Driver Assembly from the Clutch Housing (201).
2. Lightly clamp the splined end of the Clutch Driver in leather–covered or copper–covered vise jaws. Grasp the flats on the Clutch Adjusting Nut (216) with an adjustable wrench and unscrew the Nut until the compression of the Clutch Spring (211) is relieved.
3. Remove the unit from the vise and while holding it over a small box or container, unscrew the Clutch Adjusting Nut from the Clutch Driver. Remove the Adjusting Nut Lock (215), Spring Seat Bearing (214), Clutch Spring Seat (213), Clutch Spring Clutch Ball Seat (210) and Clutch Release Balls (209).

4. If it is necessary to replace the Clutch Ball Seat (210), Front Clutch Jaw (206) or Jaw Bearing Balls (207), remove the Spring Seat Stop (212) from the Groove in the Clutch Driver.
5. Remove the Disengaging Plunger (218) and Disengaging Plunger Spring (217) from the bore of the Clutch Driver.
6. **For 7C1 Cushion Clutch,** remove the Spring Seat Retainer (221A). Use a fine blade screwdriver and work the first coil of the Retaining Sleeve Spring (220) over the end of the Bit Holder. Thread the remainder of the Spring over the end of the Bit Holder. Be careful not to distort the Spring. Once the Spring is removed, slide off the Bit Retaining Sleeve (221) and dump the Bit Retaining Ball (222) from the Bit Holder. Tap the large open end of the Clutch Housing against the top of the workbench to remove the Bit Holder.
7. **For 7C3 Cushion Clutch,** tap the large open end of the Clutch Housing (201) against the top of the workbench to remove the Bit Holder (223).

Disassembly of the 7D1 Direct Drive Attachment

1. Remove the Spring Sleeve Retainer (307A).
2. Using a fine blade screwdriver, work the first coil of the Retaining Sleeve Spring (307) over the end of the Bit Holder (305). Thread the remainder of the Spring over the end of the Bit Holder being certain not to distort the Spring. Once the Spring is removed, slide off the Bit Retaining Sleeve (308) and dump the Bit Retaining Ball (306) from the Bit Holder. Grasp the splined end of the Bit Holder and pull it from the Housing (301).

Disassembly of the 7P1 or 7P3 Positive Jaw Clutch

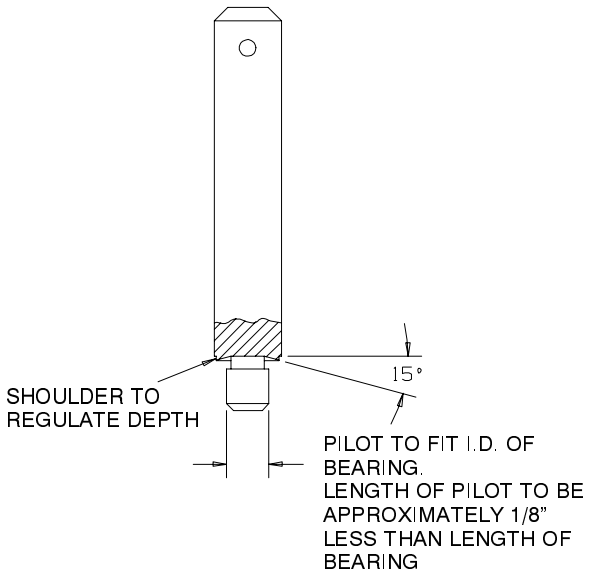
1. Remove the Clutch Driver Spacer Retainer (414) from the Clutch Driver (410) and withdraw the Clutch Driver Spacer (411) and rear Clutch Jaw (408).
2. Remove the Disengaging Plunger (412) and Plunger Spring (413) from the bore of the Bit Holder (404 or 405).
3. **For 7P1 Positive Jaw Clutch**, remove the Sleeve Spring Retainer (416A). Use a fine blade screwdriver and work the first coil of the Retaining Sleeve Spring (417) over the end of the Bit Holder. Thread the remainder of the Spring over the end of the Bit Holder, being careful not to distort the Spring. Once the Spring is removed, slide off the Bit Retaining Sleeve (416) and dump the Bit Retaining Ball (415) from the Bit Holder. Tap the large end of the Clutch Housing (401) against the top of the workbench to remove the Bit Holder.
4. **For 7P3 Positive Jaw Clutch,** if the Bit Holder did not come free from the Clutch Housing in Step 2, lightly tap the large open end of the Clutch Housing on the top of the workbench to dislodge the Bit Holder.
5. Remove the Clutch Jaw Retaining Ring (409) and front Clutch Jaw.

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. Unless otherwise noted, always press on the stamped end of a needle bearing when installing the needle bearing in a recess.
4. Whenever grasping a tool or part in a vise, always use leather-covered or copper covered vise jaws. Take extra care with threaded parts and housings.
5. Always clean every part and wipe every part with a thin film of oil before installation.
6. Apply a film of O-ring lubricant to all O-rings before final assembly.
7. 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 bearing should never be cleaned.** Work grease thoroughly into every open bearing before installation.

Needle Bearing Inserting Tool



(Dwg. TPD786)

Assembly of the 7P1 or 7P3 Positive Jaw Clutch

1. Slide a Clutch Jaw (408), jaw side first, over the splined end of the Clutch Driver (410) until it seats.
2. Slide the Clutch Driver Spacer (411), large diameter first, over the splined end of the Clutch Driver and against the Clutch Jaw.
3. Install the Clutch Driver Spacer Retainer (414) on the splined end of the Clutch Driver against the Clutch Driver Spacer.
4. Slide the second Clutch Jaw (408), plain side first, on the short hub end of the Bit Holder (404 or 405). Retain it with the Clutch Jaw Retaining Ring (409).
5. Insert the small end of the Disengaging Plunger (412) into the Disengaging Plunger Spring (413).
6. Insert the Disengaging Plunger and Spring, spring end first, into the bore of the Bit Holder. Smear this bore of the Bit Holder with a thin film of grease.
7. If the Housing Bushing (402) was removed, press a new Housing Bushing into the Clutch Housing (401) until it is flush with the face of the shoulder at the bottom of the clutch chamber. Smear the inside of the Housing Bushing with grease.
8. **For 7P1 Positive Jaw Clutch**
   a. Insert the Bit Holder (404), hexagon recess first, into the Clutch Housing.
   b. Insert the Bit Retaining Ball (9/64" diameter) (415) in the hole in the side of the Bit Holder.
   c. Slide the Bit Retaining Sleeve (416), small inside diameter first, onto the end of the Bit Holder.
   d. Thread the Retaining Sleeve Spring (417), large coil end first over the end of the Bit Holder until the small–coil end snaps into place behind the shoulder on the lip of the Bit Holder.
   e. Install the Sleeve Spring Retainer (416A).
9. **For 7P3 Positive Jaw Clutch**
   a. Insert the Bit Retaining Ball (l/8" diameter) (407) in the hole in the side of the Bit Holder (405).
   b. Snap the Bit Retaining Spring (406) in the groove around the Bit Holder to retain the Ball in place.
   c. Invert the Bit Holder, hexagon recess first, into the Clutch Housing.
10. Insert the assembled Clutch Driver, jaw end first, into the Clutch Housing so that the pilot on the Clutch Driver enters the bore of the Bit Holder.

Assembly of 7D1 Direct Drive Attachment

1. If the Housing Bushing (302) was removed, press a new Housing Bushing into the Clutch Housing (301) until it is flush with the face of the shoulder at the bottom of the clutch chamber. Smear the inside of the Housing Bushing with grease.
2. Slide the Spacer (303) over the splined end of the Bit Holder (305) and install the Spacer Retainer (304) to hold it in position.
3. Insert the Bit Holder, hexagon recess first, into the Clutch Housing.
4. Insert the Bit Retaining Ball (9/64" diameter) (306) into the hole in the side of the Bit Holder.
5. Slide the Bit Retaining Sleeve (308), small inside diameter first, onto the end of the Bit Holder.
6. Thread the Retaining Sleeve Spring (307), large–oil end first, over the end of the Bit Holder until the small–coil end snaps into place behind the shoulder on the lip of the Bit Holder.
7. Install the Spring Sleeve Retainer (307A).

Assembly of the 7C1 and 7C3 Cushion Clutch

1. Hold the Clutch Driver (205) in a vertical position with the large diameter end upward.
2. Slip the Front Clutch Jaw (206), pocket side first, over the end of the Clutch Driver far enough so that the large groove in the Clutch Driver is fully exposed. Smear a liberal amount of grease in the large groove.
3. Place the twelve Jaw Bearing Balls (5/32" diameter) (207) in the large groove and then slide the Front Clutch Jaw against them to retain them. Invert the Clutch Driver.
4. With the Clutch Driver inverted, set the Clutch Ball Spacer (208), pocket side first, down over the Clutch Driver and against the Front Clutch Jaw. Align the pockets in the Front Clutch Jaw with those in the Clutch Ball Spacer and smear the pockets with a liberal amount of grease.
5. Place a Clutch Release Ball (3/16" dia.) (209) in each pocket.
6. Install the Spring Seat Stop (212) in the small groove on the Clutch Driver.
7. Slip the Clutch Spring Seat (213) down over the Clutch Driver and against the Clutch Release Balls.

NOTICE

Be sure to install the correct Clutch Spring. These are color coded as follows:

Light Spring	**Black**
Medium Spring	**Yellow**
Heavy Spring	**Green**

8. Set the Clutch Spring (211) on top of the Clutch Spring Seat.
9. Smear some grease on the flat surface of the Adjusting Nut Lock (215). Set the Spring Seat Bearing (214) on this surface and smear some grease on the Bearing. Place the Clutch Spring Seat (213) against the Bearing.

10. Grasp the Adjusting Nut Lock, Bearing and Spring Seat as a unit, and slide it Spring Seat first over the Clutch Driver and against the Clutch Spring.
11. Smear a liberal amount of grease on the pocket face of the Adjusting Nut Lock.
12. Thread the Clutch Adjusting Nut (216), detent side first, onto the Clutch Driver and against the Adjusting Nut Lock. The trailing end of the Clutch Adjusting Nut must not extend over the threaded end of the Clutch Driver.
13. If the Housing Bushing (202) was removed, press a new Housing Bushing into the Clutch Housing (201) until it is flush with the face of the shoulder at the bottom of the clutch chamber. Smear the inside of the Housing Bushing with grease.
14. **For 7C1 Cushion Clutch**
    a. Insert the Bit Holder (219), hexagon recess first, into the Clutch Housing.
    b. Insert the Bit Retaining Ball (9/64" diameter) (222) in the hole in the side of the Bit Holder.
    c. Slide the Bit Retaining Sleeve (221), small inside diameter first onto the end of the Bit Holder.
    d. Thread the Retaining Sleeve Spring (220), large coil end first, over the end of the Bit Holder until the small–coil end snaps into place behind the shoulder on the lip of the Bit Holder.
    e. Install the Sleeve Spring Retainer (221A).
15. **For 7C3 Clutch**
    a. Insert the Bit Retaining Ball (1/8" diameter) (225) in the hole in the side of the Bit Holder (223).
    b. Snap the Bit Retaining Spring (224) in the groove around the Bit Holder to retain the ball in place.
    c. Insert the Bit Holder, hexagon recess first, into the Clutch Housing.
16. Work the small coil end of the Plunger Spring (217) over the small diameter end of the Disengaging Plunger (218).
17. Insert the Plunger and Spring, spring end first, into the bore of the assembled Clutch Driver. Smear the bore of the Clutch Driver with a thin film of grease.
18. Insert the assembled Clutch Driver, jaw end first, into the Clutch Housing so that the pilot on the Bit Holder enters the bore of the Clutch Driver.

Assembly of the Lever Throttle Motor Housing

1. If the Rear Rotor Bearing (53) was removed, install a new one as follows:
    a. Place the Bearing Ejecting Nut (52) in the small recess at the bottom of the bore of the Motor Housing (51).
    b. Using a bearing inserting tool that has a pilot that fits the bore of the Bearing and a shoulder that contacts the outer radius on the bearing shell, press the Rear Rotor Bearing, stamped end trailing, into the bearing recess of the Motor Housing until it is about .010" (0.25 mm) below flush.
    c. Inject 0.5 cc of grease into the Bearing.
2. Lightly clamp the flats on the Motor Housing in leather–covered or copper–covered vise jaws so that the inlet end of the Housing is upward.

NOTICE

The Throttle Valve Seat is symmetrical. If one side appears worn, turn the Seat over so that the good side will face the Throttle Valve (68).

3. Install the Throttle Valve Seat Support (66) by pushing it into place with a 1/2" diameter dowel. Follow this with the Throttle Valve Seat (67).
4. Install the Plunger Bushing (53A) and insert the Throttle Valve Plunger (69), hole end first, into the Plunger Bushing until the hole through the Plunger is aligned with the hole in the Throttle Valve Seat.
5. Using needle nose pliers, grasp the short end of the throttle valve stem and install the Throttle Valve (68) so that the long end of the valve stem passes through the Throttle Valve Seat and enters the hole in the Throttle Valve Plunger.
6. Install the Muffler Element (61) by wrapping it horseshoe fashion around the inside of the Exhaust Deflector (62). Make certain that all exhaust holes are covered.
7. Snap the Exhaust Silencer (64) into the large open end of the Exhaust Deflector.
8. Install the Exhaust Deflector Seal (63) into the groove on the front end of the Exhaust Deflector.
9. Install the Silencer Seal Ring (65) over the hub of the Motor Housing and against the shoulder near the base of the hub.
10. Install the Exhaust Deflector over the hub of the Motor Housing, aligning the tabs on the Deflector with the notches in the Housing. Make certain the Deflector is oriented so that the Throttle Lever (54) will be over the Throttle Valve Plunger.
11. Slide the Inlet Bushing Spacer (72) over the threaded end of the Inlet Bushing (73).
12. Insert the Air Strainer Screen (71), closed end first, into the external threaded end of the Inlet Bushing.
13. Insert the Throttle Valve Spring (70), large coil end first, into the Inlet Bushing making certain it contacts the Air Strainer Screen.
14. Thread the Inlet Bushing into the Motor Housing, making certain the Throttle Valve Spring encircles the short–stem end of the Throttle Valve. Tighten the Bushing to a minimum of 25 ft–lb (34 Nm) of torque.

15. Note that one end of the throttle lever pin hole in the Exhaust Deflector is larger than the other end. Install the Throttle Lever (54) and Throttle Lever Pin (55), making certain to start the Pin in the large end of the hole through the Exhaust Deflector.
16. Remove the Motor Housing from the vise.
17. Insert the Reverse Valve Spring (57) into the plain end of the Reverse Valve (56).
18. Insert the Reverse Valve Lock Pin (58) into the small hole in the side of the Reverse Valve.
19. While holding the Motor Housing horizontally with the Throttle Lever on top, and, while holding the Reverse Valve with the Lock Pin facing upward, insert the Reverse Valve into the reverse valve bushing. Push it in against the compression of the Reverse Valve Spring and rotate it one-half turn (180°) to allow the Lock Pin to drop into a slot in the wall of the bushing. After the lock pin has engaged the slot in the bushing, you can release the Reverse Valve and it will stay in position.
20. Insert the Lock Pin Retainer (59) in the tapped end of the Reverse Valve and install the Retainer Set Screw (60). Tighten the Retainer Set Screw to 5 to 20 in-lbs (.57 to 2.26 Nm) torque.

Assembly of the Pistol Grip Motor Housing

1. If the Rear Rotor Bearing (3) was removed, install a new bearing as follows:
   a. Place the Bearing Ejecting Nut (2) in the small recess at the bottom of the bore in the Motor Housing (1).
   b. Using a bearing inserting tool that has a pilot to fit the inside of the Bearing, and a shoulder that contacts the outer radius on the bearing shell, press the Rear Rotor Bearing, stamped end trailing, into the bearing recess of the Motor Housing until it is about .010" (0.25 mm) below flush. Inject 0.5 cc of grease into the Bearing.
2. Grasp the handle in leather-covered or copper-covered vise jaws so that the bore of the Motor Housing is horizontal.
3. Slide the Reverse Valve (4), tapped end trailing, into the reverse valve bushing.
4. Place the Reverse Valve Spring (5) on top of the Reverse valve.
5. Install the Reverse Valve Cap Seal (7) around the rim of the reverse valve bushing.
6. Install the Reverse Valve Cap (6). Tighten it to 7 to 9 ft-lb (9.5 to 12 Nm) of torque.
7. The Actuating Valve (9) can be assembled in either side of the Motor Housing (1), depending upon operator preference.

NOTICE

A 10 mm hexagon socket will fit the Actuating Valve Cap.

8. Install the Actuating Valve Bumper (16A) in the Housing. Install the Actuating Valve Cap Seal (16) on the Actuating Valve Cap (15) and thread the Cap into the side of the Motor Housing. Tighten it to 4 to 6 ft-lb (5.4 to 8 Nm) of torque.
9. Install the Valve Bushing Seal (12) on the Actuating Valve Bushing (11).
10. Install the Actuating Valve Face (10) in the groove on the Actuating Valve (9) and insert the small end of the Actuating Valve into the threaded end of the Bushing until it protrudes from the opposite end.
11. Press the Actuating Valve Button (13) on the small diameter of the Actuating Valve (9).
12. Place the Actuating Valve Spring (14) in the cross bore of the Motor Housing so that it enters the recess in the Actuating Valve Cap.

NOTICE

A 10mm hexagon socket will fit the Actuating Valve Bushing.

13. Take the assembled Actuating Valve and Bushing and thread the Bushing into the cross-bore so that the end of the Actuating Valve enters the bore of the Spring. Work the Actuating Valve a few times to see that it functions smoothly. Tighten the Actuating Valve Bushing to 4 to 6 ft-lb (5.4 to 8 Nm) of torque.
14. Change the position of the Motor Housing in the vise so that the handle is vertical and the entrance to the handle bore is upward.

NOTICE

The Throttle Valve Seat is symmetrical. If one side appears worn, turn the Seat over so that the good side will face the Throttle Valve (19).

15. Insert the Throttle Valve Seat Support (21) into the tapped bore of the handle and push it into place with a 1/2" (13 mm) dowel. Follow the Throttle Valve Seat Support with the Throttle Valve Seat (20).
16. If the Trigger (17) was removed from the Trigger Pin (18), press a new Trigger onto the grooved end of the Pin so that it is at right angles to the hole in the opposite end of the Pin.
17. Install the Trigger Bushing (3A). Install the assembled Trigger and Trigger Pin in the Trigger Bushing.

18. Installation of the Throttle Valve can sometimes be difficult due to the smallness of the Valve and the depth of the bore in which it is located. The difficult part is in holding the Valve while inserting the long end of the valve stem through the hole in the trigger stem. Although the Valve can be held with a push-button mechanical drafting pencil or a wooden dowel, one of the easiest ways to hold it is by using a common wooden pencil with rubber eraser. Insert the short end of the valve stem into the rubber eraser full depth. Then back it out far enough so that the Valve is easily supported. Insert the Valve into the bore of the handle so that the long end of the stem enters the hole in the Trigger Stem. Pull outward on the Trigger to hold the Valve while removing the pencil.
19. Place the Air Strainer Screen (27), closed end first. inside the large end coil of the Throttle Valve Spring (22).
20. Insert the Throttle Valve Spring and Screen, small coil first, into the handle so that the Spring encircles the end of the Throttle Valve.
21. Place the Muffler O-ring (24) over the perforated baffle of the Muffler Assembly (23).
22. Insert the Muffler Element (24A) and place the Muffler on the face of the handle so that the perforated baffle extends into the handle.
23. Slide the Inlet Bushing Spacer (25) over the threaded end of the Inlet Bushing (26), and install the Inlet Bushing in the handle. Tighten it to 25 ft-lb (34 Nm) of torque.

Assembly of the Motor

1. Slide the Front End Plate (107), flat side first, over the splined end of the Rotor (104).
2. Using a sleeve that contacts only the inner ring of the Front Rotor Bearing (109), press the Front Rotor Bearing onto the splined hub of the Rotor until it seats against the Front End Plate.
3. The clearance between the Front End Plate and Rotor is critical. While holding the Front End Plate, gently tap the splined end of the Rotor with a plastic hammer until you can insert a 0.001" feeler gauge or shim between the face of the Rotor and End Plate.
4. Grasp the splined end of the Rotor in leather-covered or copper-covered vise jaws so that the short hub of the Rotor is upward.
5. Place the Cylinder (106) down over the Rotor and against the Front End Plate. The four exhaust holes perpendicular to the cylinder axis **MUST** be at the 5 o'clock position when looking down through the Cylinder at the Front End Plate.
6. Wipe each Vane (105) with a light film of oil and place a Vane in each slot in the Rotor. Make certain the vane slots are clean.
7. Place the Rear End Plate (102), flat side first, over the short hub of the Rotor.

⚠ CAUTION

Make certain the Retainer does not spring loose as you slip it on the hub of the Rotor.

8. Install the Rear End Plate Retainer (103) in the groove on the hub of the Rotor.

Assembly of the Gearing

1. Stand the Gear Case (127), external threaded end upward, on the workbench.
2. Place the Grease Shield (129) in the bottom of the bearing recess in the Gear Case.
3. Slip the Spindle Bearing (130) into the Gear Case until it seats against the Grease Shield.
4. Using snap ring pliers, install the Spindle Bearing Retainer (131) in the groove in front of the Spindle Bearing.
5. If the Spindle Planet Gear Bearings (119) or the Gear Head Planet Gear Bearings (124) were removed, press in new Planet Gear Bearings using a bearing inserting tool that has a pilot that fits the bore of the bearing and a shoulder that contacts the outer radius of the Bearing. Press against the stamped end of the Bearing. Press all Bearings flush or slightly below flush with the face of the Spindle Planet Gear (118) or Gear Head Planet Gear (123).
6. **For 7RAL model,** proceed as follows:
   a. Turn the Gear Case over so that the external threaded end is downward. Place it on the table of an arbor press so that it is supported on the inner ring of the Spindle Bearing.
   b. Place the Seal Retaining Washer (116) followed by the Seal Support (115) and Seal (117) over the hub of the Spindle (114).
   c. Press the Spindle into the Spindle Bearing until the Seal Support contacts the inner ring of the bearing.

⚠ CAUTION

Make certain the Seal does not get pinched between the Seal Support and Spindle Bearing.

   d. Place a Spindle Planet Gear (118) on each planet gear shaft.
   e. Work 3 to 6 cc of the recommended grease into the gear train.

7. **For 7RAM and 7RAN models,** proceed as follows:
   a. Turn the Gear Case over so that the external threaded end is downward. Place it on the table of an arbor press so that it is supported on the inner ring of the Bearing.
   b. Place the Seal Retaining Washer (116) followed by the Seal Support and Seal (117) over the hub of the Spindle (114).
   c. Press the Spindle into the Spindle Bearing until the Seal Support contacts the inner ring of the Bearing.

⚠ CAUTION

Make certain the Seal does not get pinched between the Seal Support and Spindle Bearing.

   d. Place a Spindle Planet Gear (118) on each Planet Gear Shaft.
   e. Work 3 to 6 cc of the recommended grease into the spindle gear train.
   f. Place the Gear Head Spacer (125) against the face of the Spindle Planet Gears.
   g. Insert the splined hub of the Gear Head (122) through the Gear Head Spacer so that it meshes with the Spindle Planet Gears.
   h. Place a Gear Head Planet Gear on each planet gear shaft.
8. Insert the Bearing Housing Spacer (113) in the Gear Case so that it seats against the internal gear teeth.

Assembly of the Tool

1. Position the Rear End Plate Gasket (101) in the bottom of the bore of the Motor Housing (1 or 51) so that the dowel hole and air inlet ports in the Gasket align with those in the Motor Housing.
2. Using an assembly dowel 3/32” in diameter by 10” long (2.3 mm x 254 mm), align the dowel groove in the Front End Plate (107), Cylinder (106) and Rear End Plate (102). Place the assembly rod in the aligned grooves so that about 3” (75 mm) of the rod extends beyond the Rear End Plate. Insert the extension into the dowel hole in the Motor Housing and slide the motor into the Motor Housing until it seats.
3. Withdraw the assembly dowel and insert the Cylinder Dowel (108). When properly positioned, the Cylinder Dowel should be slightly below the surface of the Front End Plate.
4. Place the two Bearing Spring Washers (110) inside the Front Rotor Bearing Housing (111) and against the Front Rotor Bearing Retainer (112).
5. Slide the Front Rotor Bearing Housing over the Front Rotor Bearing.
6. **For 7RAM, 7RAN and 7RLM models,** slide the Rotor Pinion Spacer (121) followed by the Rotor Pinion (120) onto the splined end of the Rotor (104).
7. Thread the assembled Gear Case (127) onto the Motor Housing, and tighten it to 40 ft-lb (54 Nm) of torque.

NOTICE

Run the motor at reduced air pressure while tightening the Gear Case. Listen for any rubbing, grating or scraping noises which can indicate a condition that causes scoring.

NOTICE

The Gear Case has left-hand threads.

8. Thread the assembled clutch onto the Gear Case. Draw the clutch up snugly, but do not tighten it excessively.
9. **For 7C1 and 7C3 Cushion Clutches,** adjust the clutch as described in the section **Clutch Adjustment** on page 2.

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 Air Strainer Screen Inlet Screen	Clean the Air Strainer or screen in a clean, suitable, cleaning solution. If the Screen cannot be cleaned, replace it.
	Clogged Muffler or Exhaust Silencer	Clean the Muffler Element in a clean, suitable cleaning solution. If it cannot be cleaned, replace it.
	Worn or broken Vanes	Replace the **complete** set of Vanes.
	Improper lubrication or dirt build-up	Clean the Motor Unit parts and lubricate as instructed.
Leaky Throttle Valve	Worn Throttle Valve and/or Throttle Valve Seat	Install a new Throttle Valve and/or a Throttle Valve Seat.
	Dirt accumulation on Throttle Valve and/or Throttle Valve Seat	Pour about 3 cc of a clean, suitable, cleaning solution in the air inlet and operate the tool Valve for about 30 seconds. **Immediately** pour 3 cc of the recommended oil in the air inlet and operate the tool for 30 seconds to lubricate all cleaned parts.
Gear Case gets hot	Excessive grease	Clean and inspect the 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 Adjustable Clutch	Improper lubrication	Remove Adjustable Clutch mechanism and check. Lubricate as instructed on page 3.
	Worn or damaged parts	Remove Adjustable Clutch mechanism and examine parts.
	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 air pressure at the inlet	Check the air supply. For top performance, the air pressure must be 90 psig (6.2 bar/620 kPa) at the inlet.
	Insufficient grease	Lubricate the Clutch as instructed on page 3.

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.

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