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OPERATION AND MAINTENANCE MANUAL FOR SERIES 7RL REVERSIBLE ANGLE WRENCHES

NOTICE

Series 7RL Reversible Angle Wrenches are designed for running small threaded fasteners in close-quarter applications.

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

⚠ WARNING

IMPORTANT SAFETY INFORMATION ENCLOSED.
READ 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 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 accessories 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.
- Use only impact sockets and accessories. Do not use hand (chrome) sockets or accessories.
- The Throttle Valve Cap is under pressure from the Throttle Valve Spring. Use care when removing the Throttle Valve Cap. (On tools where applicable.)
- Whenever the Angle Head is installed or repositioned, the Throttle Lever must be positioned so that reaction torque will not tend to retain the throttle in the "ON" position.
- 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.

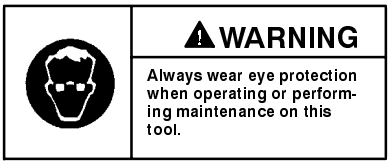
Printed in U.S.A.

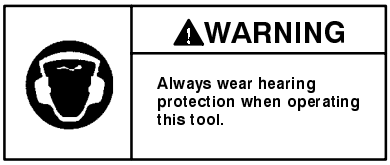
INGERSOLL-RAND®
PROFESSIONAL TOOLS

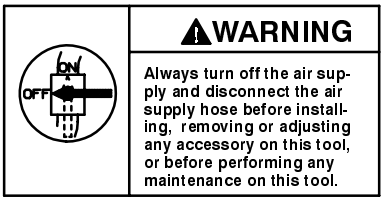
WARNING LABEL IDENTIFICATION

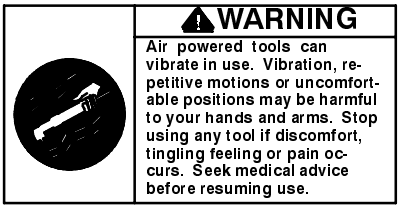
⚠ WARNING

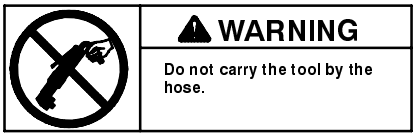
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

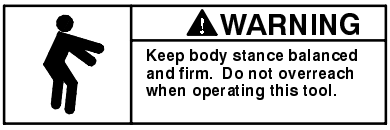


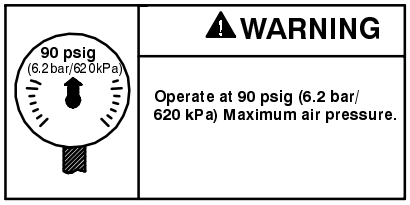












ADJUSTMENTS

Cushion Clutch

Adequate lubrication is very important for satisfactory clutch life. Use Ingersoll–Rand No. 67 Grease.

5LN2C–AH580 Adjustable Cushion Clutch

After each 50,000 cycles or every 100 hours of operation, whichever occurs first, lubricate the Cushion Clutch as follows:

1. Rotate the Adjusting Hole Cover to expose the adjusting hole.
2. Insert the Clutch Sprag Key into the adjusting hole and into one of the holes in the Clutch Adjusting Nut to keep the Nut from turning.
3. Using a wrench on the output end of the Angle Head, turn the wrench counterclockwise until the Clutch Adjusting Nut is loose or until the clicking sound stops.
4. Graps the flats of the Gear Case and using a wrench, unscrew the Coupling Nut.
5. Remove the Clutch Housing and Angle Housing from the Gear Case.
6. Grasp the Clutch Shaft Support and pull the entire Clutch Assembly from the Housing.
7. Remove the Clutch Driver and Clutch Shaft Support from the Clutch. Work a small amount of the recommended grease between the Clutch Ball Spacer and Front Clutch Jaw and three strokes of grease (1.0 cc) around the Clutch Balls of the Jaw. Work a small amount of the recommended grease between the two front clutch spring seats and around the Spring Seat Bearing. This should be done every 50,000 cycles or 100 hours whichever occurs first.

7L3C–A580 Adjustable Cushion Clutch

After each 50,000 cycles or every 100 hours of operation, whichever comes first, lubricate the Cushion Clutch as follows:

⚠ WARNING

Disconnect the air supply hose at the tool before performing any maintenance.

1. Rotate the Adjusting Hole Cover to expose the adjusting hole.
2. Insert a 1/4” Allen Wrench into the Bit Holder or using a wrench on the output end of the Angle Head , rotate the Bit Holder until the hole in the Clutch Adjusting Nut is aligned with the slot in the Clutch Housing.
3. 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.
4. Grasp the flats on the Clutch Housing in a vise, making certain not to distort the Housing.

NOTICE

The Clutch Housing has a left-hand thread.

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

⚠ WARNING

Do not get your fingers between the clutch components.

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

Angle Head

After each eight hours of operation, inject 0.5 cc to 1.0 cc of Ingersoll-Rand No. 67 Grease into the Grease Fitting in the Angle Housing.

CLUTCH ADJUSTMENT

For Models 7RLL2C6, 7RLL3C6 and 7RLM3C6, 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, two Clutch Springs are offered.
The Heavy Clutch Spring (color-coded green) is suitable for the majority of applications since it will give precise adjustment from approximately 45 to 90 in-lb (5.0 to 10.2 Nm).
The Light Clutch Spring (color-coded black) is for applications ranging from approximately 15 to 65 in-lb (1.7 to 7.6 Nm).

⚠ WARNING

Disconnect the air supply 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 or grasp the square drive of the Socket Adapter Spindle Assembly with an adjustable wrench. Rotate the wrench 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.

⚠ WARNING

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 ratchets. Do not adjust the Clutch beyond the torque capacity of the tool.

3. Grasp the tool firmly in one hand and rotate the output end of the Angle Head. 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.

CHANGING THE CLUTCH SPRING

5LN2C-AH580 Clutch

1. Carefully grasp the flats of the Coupling Nut in leather-covered or copper-covered vise jaws. Angle Attachment facing downward.

NOTICE

This is a left-hand thread.

2. Using a wrench on the flats of the Gear Case, loosen the Gear Case from the Coupling Nut. Remove the tool from the vise.
3. Unscrew the Coupling Nut and remove the Clutch Housing from the Gear Case.
4. Grasp the Clutch Shaft Assembly and pull the Assembly out of the Clutch Housing.
5. Grasp the spline of the Clutch Shaft Support in leather-covered or copper-covered vise jaws with the Clutch Adjusting Nut upward and the Clutch Driver against the top of the vise jaws.

NOTICE

This is a left-hand thread.

6. Using a wrench on the flats of the Clutch Adjusting Nut, loosen and remove the Nut.

CAUTION

There are twenty-four Clutch Balls located between the Clutch Driver and the Clutch Spring Seat nearest the Clutch Driver. Failure to remove the remaining components carefully may result in the Balls falling out of position and becoming lost.

7. With the assembly in the vise and while applying slight downward pressure to the Clutch Spring Seat nearest the Clutch Driver, remove the Adjusting Nut Lock, first Clutch Spring Seat, Spring Seat Bearing, second Clutch Spring Seat and the Clutch Spring from the Clutch Shaft.
8. Thoroughly grease the Bearing and Adjusting Nut Lock and, in the order named, slide the following over the Clutch Shaft: the new Clutch Spring, a Clutch Spring Seat, the Spring Seat Bearing, another Clutch Spring Seat and the Adjusting Nut Lock, indented side trailing.

NOTICE

This is a left-hand thread.

9. Start the Clutch Adjusting Nut, detent side first, onto the Clutch Shaft 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 Shaft Assembly into the Clutch Housing with the splined end of the Clutch Shaft Support trailing.
12. Install the Clutch Housing Assembly into the Gear Case Assembly matching the spline of the Clutch Housing with that of the Gear Case.
13. Thread the Coupling Nut onto the Gear Case, hand tight. Grasp the flats of the Gear Case in copper-covered vise jaws and using a wrench on the flats of the Coupling Nut, tighten it to 25 ft-lb (34 Nm) torque.
14. Adjust the Clutch as directed in the section **Clutch Adjustment.**

7L3C-A580 Clutch

1. Carefully grasp the flats of the Clutch Housing in copper-covered or leather-covered vise jaws, Angle Head facing downward.

NOTICE

This is a left-hand thread.

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.
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.

NOTICE

This is a left-hand thread.

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.

NOTICE

This is a left-hand thread.

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

This is a left-hand thread.

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 Adjustment.**

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:

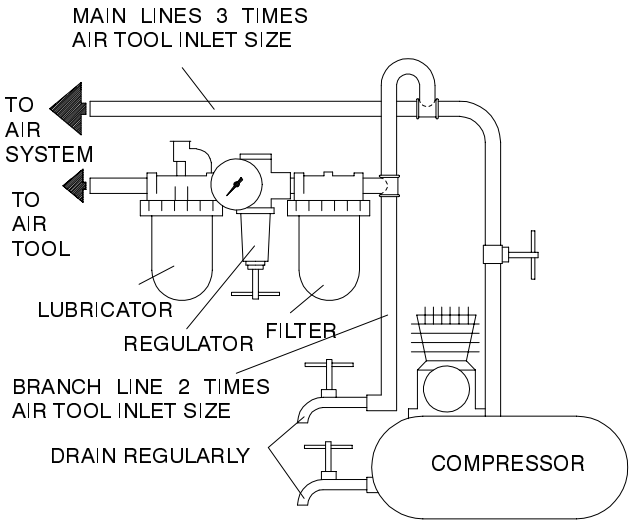
For USA – No. C05–02–G00

Motor

After every 8 hours of operation, unless an air line lubricator is used, inject 1–1/2 cc of Ingersoll–Rand No. 10 Oil into the Air Inlet.

Gearing

After each 50,000 cycles or 100 hours, whichever occurs first, use Ingersoll–Rand No. 28 Grease and the R000A2–228 Grease Gun to lubricate the Gearing through the Grease Fitting . For **L ratio,** inject 5 or 6 strokes (2.0 cc) and for **M and N ratios,** inject 10 or 12 strokes (4.0 cc).



(Dwg. TPD905–1)

HOW TO ORDER A REVERSIBLE ANGLE WRENCH

Model	Torque Range (Soft Draw) in–lb	Torque Range (Soft Draw) Nm	Free Speed rpm	Square Drive in	Clutch Spring
REVERSIBLE ADJUSTABLE CUSHION CLUTCH					
7RLL2C6	15–100	1.7–11.3	1 400	3/8	H
7RLL3C6	25–110	2.8–12.5	1 400	3/8	M
7RLM3C6	25–130	2.8–14.8	800	3/8	M
REVERSIBLE STALL					
7RLL3D6	100	11.3	1 400	3/8	---
7RLM3D6	175	19.8	800	3/8	---
7RLN3D6	265	29.9	500	3/8	---

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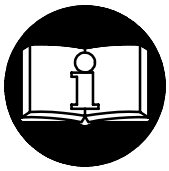
MANUEL D'EXPLOITATION ET D'ENTRETIEN DES CLÉS D'ANGLE RÉVERSIBLES DE LA SÉRIE 7RL

NOTE

Les Clés d'Angle Réversibles de la Série 7RL sont destinées au serrage de la petite boulonnerie dans des espaces restreints.
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, inspecter et entretenir cet outil conformément au Code de sécurité des outils pneumatiques portatifs de l'American National Standards Institute (ANSI B186.1).**
- **Pour la sécurité, les performances optimales et la durabilité maximale des pièces, cet outil doit être connecté à une alimentation d'air comprimé de 6,2 bar (620 kPa) maximum à l'entrée, avec un flexible de 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. 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 rotation 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.**
- **N'utiliser que les douilles et les accessoires pour clés à chocs. Ne pas utiliser les douilles et accessoires (chromés) de clés manuelles.**
- **Le chapeau de 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).**
- **A chaque fois que le renvoi d'angle est monté ou repositionné, le levier de commande doit être positionné de manière à ce que le couple de réaction n'ait pas tendance à retenir la commande en position "MARCHE" .**
- **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.

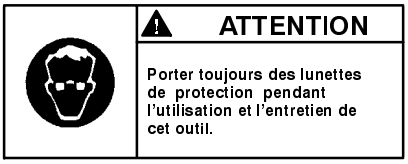
Imprimé aux É.U.

INGERSOLL-RAND®
PROFESSIONAL TOOLS

SIGNIFICATION DES ETIQUETTES D'AVERTISSEMENT

⚠ ATTENTION

LE NON RESPECT DES AVERTISSEMENTS SUIVANTS PEUT CAUSER DES BLESSURES.



⚠ ATTENTION

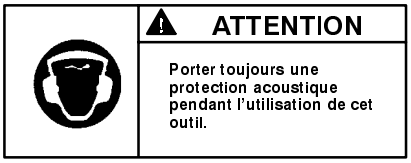
Porter toujours des lunettes de protection pendant l'utilisation et l'entretien de cet outil.

⚠ 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.



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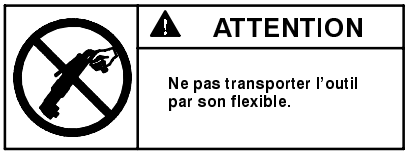
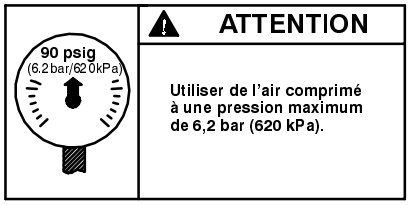


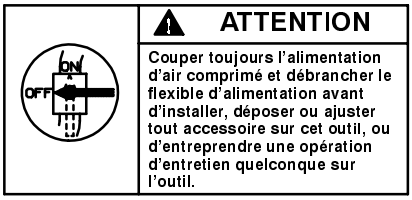
⚠ ATTENTION

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 endommageés, effilochés ou détériorés.

RÉGLAGES

Lubrification

Une lubrification correcte est essentielle pour une durée de vie satisfaisante du limiteur. Utiliser de la graisse Ingersoll–Rand Nº. 67.

Limiteur amortisseur réglable 5LN2C–AH580.

Tous les 50 000 cycles ou toutes les 100 heures de fonctionnement, selon ce qui se produit en premier, lubrifier le limiteur comme suit :

1. Tourner le capot du trou de réglage pour découvrir le trou de réglage.
2. Insérer la clé d'arrêt du limiteur dans le trou de réglage et dans un des trous de l'écrou de réglage de limiteur pour empêcher la rotation de l'écrou.
3. A l'aide d'une clé placée sur la sortie de la tête de renvoi, tourner la clé dans le sens inverse des aiguilles d'une montre jusqu'à ce que l'écrou de réglage soit desserré ou que le déclic s'arrête.
4. Serrer les méplats du boîtier d'engrenages et dévisser l'écrou d'accouplement à l'aide d'une clé.
5. Déposer le corps de limiteur et le corps de renvoi du boîtier d'engrenages.
6. Serrer le support d'arbre de limiteur et retirer le limiteur entier du corps.
7. Déposer l'entraîneur du limiteur et le support d'arbre de limiteur du limiteur. Insérer une petite quantité de graisse entre la cage des billes du limiteur et le crabot avant et trois coups de pistolet de graissage (1 cm^3) autour des billes. Insérer une petite quantité de la graisse recommandée entre les deux sièges de ressort avant et autour du roulement de siège de ressort. Ce graissage doit être effectué toutes les 100 heures de fonctionnement ou tous les 50 000 cycles.

Limiteur amortisseur réglable 7L3C–A580

Tous les 50 000 cycles ou toutes les 100 heures de fonctionnement, selon ce qui se produit en premier, lubrifier le limiteur amortisseur comme suit :

⚠ ATTENTION

Débrancher le flexible d'alimentation d'air comprimé de l'outil avant d'effectuer n'importe quel opération d'entretien.

1. Tourner le capot du trou de réglage pour découvrir le trou de réglage.
2. Insérer une clé pour six pans creux de 1/4" dans le porte-embout ou à l'aide d'une clé sur la sortie du renvoi d'angle, tourner le porte-embout jusqu'à ce que le trou de l'écrou de réglage du limiteur soit aligné sur la rainure du corps de limiteur.
3. 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.
4. Serrer les méplats du corps de limiteur dans un étau, en prenant soin de ne pas déformer le corps.

NOTE

Le corps de limiteur est fileté à gauche.

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

⚠ ATTENTION

Prendre soin de ne pas placer les doigts entre les composants du limiteur.

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

Tête de renvoi

Toutes les huit heures de fonctionnement, injecter 0,5 cm^3 à 1,0 cm^3 de graisse Ingersoll–Rand No. 67 dans le raccord de graissage du renvoi d'angle.

REGLAGE DU LIMITEUR

Les modèles 7RLL2C6, 7RLL3C6 et 7RLM3C6 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 deux ressorts de limiteur.

Le ressort de limiteur type fort (code couleur : vert) convient à la majorité des cas puisqu'il donnera un ajustement précis d'environ 5,0 à 10,2 Nm.

Le ressort de limiteur type léger (code couleur : noir) est destiné aux applications allant de 1,7 à 7,6 Nm.

⚠ ATTENTION

Débrancher le flexible d'alimentation d'air comprimé 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 pour six pans creux de 1/4" dans le porte-embout ou, placer une clé à molette sur le carré d'entraînement de la broche d'adaptateur de douille. Tourner la clé jusqu'à ce que les trous radiaux de l'écrou de réglage du limiteur soient visibles dans la rainure du corps de limiteur. 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.

⚠ ATTENTION

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 se calera avant le déclenchement du crabot du limiteur. Ne jamais régler le limiteur au–delà du couple maximum de l'outil.

3. Saisir fermement l'outil d'une main et tourner la sortie du renvoi d'angle. 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 façon d'effectuer le réglage est d'utiliser l'outil sur l'application réelle et d'augmenter ou de diminuer le couple fourni jusqu'à ce que la valeur recherchée soit obtenue. Dans tous les cas, il est recommandé d'arriver progressivement au réglage final.

CHANGEMENT DU RESSORT DE LIMITEUR

Limiteur 5LN2C–AH580

1. Serrer soigneusement les méplats de l'écrou d'accouplement dans un étau équipé de mordaches en cuir ou en cuivre, renvoi d'angle vers le bas.

NOTE

Ce filetage a un pas à gauche.

2. A l'aide d'une clé placé sur les méplats du boîtier d'engrenages, desserrer ce dernier de l'écrou d'accouplement. Retirer l'outil de l'étau.
3. Dévisser l'écrou d'accouplement et séparer le corps de limiteur du boîtier d'engrenages.
4. Saisir l'ensemble d'arbre de limiteur et extraire l'ensemble du corps de limiteur.
5. Serrer les cannelures du support d'arbre de limiteur dans un étau équipé de mordaches en cuir ou en cuivre, l'écrou de réglage du limiteur étant dirigé vers le haut et l'entraîneur du limiteur contre le dessus des mors de l'étau.

NOTE

Ce filetage a un pas à gauche.

6. A l'aide d'une clé placé sur les méplats de l'écrou de réglage du limiteur, dévisser et déposer ce dernier.

AVERTISSEMENT

Il y a vingt–quatre billes entre l'entraîneur de limiteur et le siège du ressort de limiteur le plus proche de l'entraîneur. Déposer les composants soigneusement afin de ne pas laisser tomber et perdre les billes.

7. L'ensemble étant dans l'étau, et tout en appliquant une légère pression sur le siège de ressort de limiteur le plus proche de l'entraîneur, déposer la rondelle frein, le premier siège de ressort, le roulement de siège de ressort, le deuxième siège de ressort et le ressort de limiteur de l'arbre 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'arbre de limiteur: le nouveau ressort de limiteur, un siège de ressort, le roulement de siège de ressort, un autre siège de ressort, la rondelle frein de l'écrou de réglage, côté bosselé en arrière.

NOTE

Ce filetage a un pas à gauche.

9. Visser l'écrou de réglage de limiteur, côté cranté en premier, sur l'arbre 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'arbre de limiteur assemblé dans le corps de limiteur, extrémité cannelée du support d'arbre en arrière.
12. Monter le corps de limiteur assemblé dans le boîtier d'engrenages en engageant les cannelures du corps de limiteur dans celles du boîtier.
13. Visser à la main l'écrou d'accouplement sur le boîtier d'engrenages. Serrer les méplats du boîtier d'engrenages dans un étau équipé de mordaches en cuir ou en cuivre et, à l'aide d'une clé, serrer l'écrou d'accouplement à un couple de 34 Nm.
14. Ajuster le limiteur comme indiqué à la section **Réglage du limiteur**.

Limiteur 7L3C-A580

1. Serrer soigneusement les méplats du corps de limiteur dans un étau équipé de mordaches en cuir ou en cuivre, renvoi d'angle dirigé vers le bas.

NOTE

Ce filetage a un pas à gauche.

2. A l'aide d'une clé placé sur les méplats du boîtier d'engrenages, desserrer ce dernier du corps de limiteur. Retirer l'outil de l'étau.
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.

NOTE

Ce filetage a un pas à gauche.

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.

NOTE

Ce filetage a un pas à gauche.

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

Ce filetage a un pas 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 :

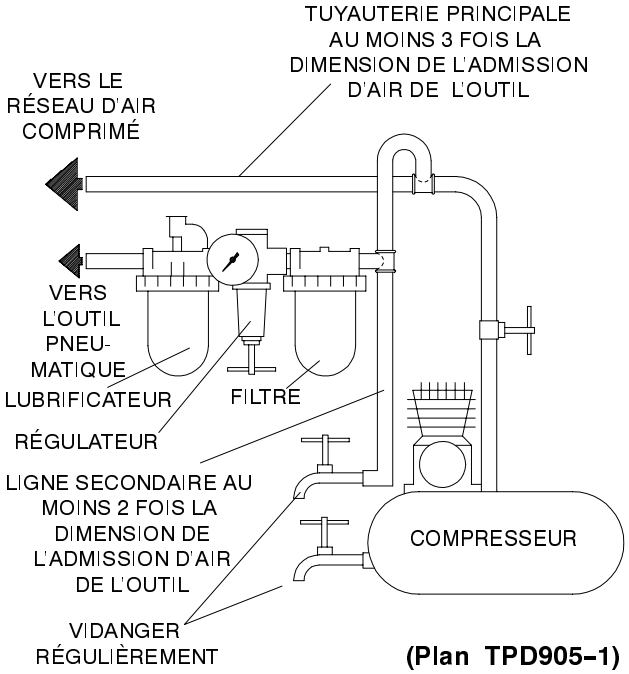
For USA – No. C05–02–G00

Moteur

Toutes les huit heures de fonctionnement, si un lubrificateur de ligne n'est pas utilisé, injecter 1–1/2 cm^3 d'huile Ingersoll–Rand Nº. 10 dans le raccord d'admission de l'outil.

Pignonnerie

Toutes les 100 heures ou tous les 50 000 cycles, utiliser de la graisse Ingersoll–Rand Nº. 28 et le pistolet de graissage R000A2–228 pour lubrifier la pignonnerie par l'intermédiaire du raccord de graissage.
Pour le rapport **L**, actionner le pistolet 5 à 6 fois (2,0 cm^3); pour les rapports **M et N**, actionner le pistolet 10 à 12 fois (4,0 cm^3).



(Plan TPD905–1)

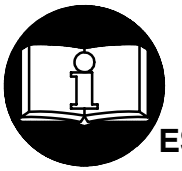
SPÉCIFICATIONS

Modèle	Limiteur	Plage de couple (Serrage élastique)	Vitesse à vide	entr. carré	Ressort du Limiteur
		pouces–lb (Nm)	tr/mn	in.	
7RLL2C6	Limiteur amortisseur	15–100 (1,7–11,3)	1 400	3/8	H
7RLL3C6	Limiteur amortisseur	25–110 (2,8–12,5)	1 400	3/8	M
7RLM3C6	Limiteur amortisseur	25–130 (2,8–14,8)	800	3/8	M
7RLL3D6	calage	100 (11,3)	1 400	3/8	– – –
7RLM3D6	calage	175 (19,8)	800	3/8	– – –
7RLN3D6	calage	265 (29,9)	500	3/8	– – –
7RLM2D6	calage	175 (19,8)	800	3/8	– – –

MANUAL DE FUNCIONAMIENTO Y MANTENIMIENTO PARA LLAVES ANGULARES REVERSIBLES MODELO 7RL (E)

NOTA

Las Llaves Angulares Reversibles Modelo 7RL están diseñadas para el atornillado de pequeñas uniones roscadas en aplicaciones de acceso reducido.
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 USAR LA HERRAMIENTA.
ES RESPONSABILIDAD DE LA EMPRESA ASEGURARSE DE QUE EL OPERARIO ESTE 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 neumáticas portátiles de la American National Standards Institute (ANSI B186.1).
- Para seguridad, máximo rendimiento y durabilidad de piezas, use esta herramienta a una máxima presión de aire de 90 psig (6,2 bar/620kPa) en la admisión de manguera de suministro de aire de diámetro interno de 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 accesorios dañados, desgastados ni deteriorados.
- Asegúrese de que todas las mangueras y los accesorios sean del tamaño correcto y estén bien apretados. Vea Esq. TPD905–1 para un típico arreglo de tuberías.
- Use siempre aire limpio y seco a una máxima presión de 90 psig. El polvo, los gases corrosivos y/o el exceso de humedad podrían estropear el motor de una herramienta neumática.
- No lubrique las herramientas con líquidos inflamables o volátiles tales como queroseno, gasoil o combustible para motores a reacción.
- No saque ninguna etiqueta. Sustituya toda etiqueta dañada.

USO DE HERRAMIENTA

- Use siempre protección ocular cuando maneje, o realice operaciones de mantenimiento a, esta herramienta.
- Use siempre protección para los oídos cuando maneje esta herramienta.
- Mantenga las manos, la ropa suelta y el cabello largo alejados del extremo giratorio de la herramienta.
- Note la posición de la palanca de inversión antes de funcionar la herramienta para estar consciente de su dirección giratoria cuando funcione el estrangulador.
- Anticipe y esté alerta a los cambios repentinos en el movimiento durante la puesta en marcha y el manejo de toda herramienta motorizada.
- Mantenga una postura de cuerpo equilibrada y firme. No estire demasiado los brazos al manejar la herramienta. Pueden ocurrir reacciones de alto par a, o menos de, la recomendada presión de aire.
- Los accesorios de la herramienta podrían seguir girando brevemente después de haber soltado la palanca de estrangulación.
- Las herramientas neumáticas pueden vibrar durante el uso. La vibración, repetición o posiciones incomodas pueden dañarle los brazos y manos. En caso de incomodidad, sensación de hormigueo o dolor, deje de usar la herramienta. Consulte a un médico antes de volver a usarla otra vez.
- Utilice únicamente los accesorios Ingersoll–Rand recomendados.
- Utilice únicamente bocas y accesorios para llaves de impacto. No utilice bocas o accessorios manuales (cromados).
- La Tapa de Válvula de Estrangulación está presionada por el Muelle de Válvula de Estrangulación. Tenga cuidado al sacar la Tapa de Válvula de Estrangulación. (En las herramientas que la aplican).
- Cuando se instale o reposicione la Cabeza Angular, la Palanca de Estrangulación deberá posicionarse de forma que la reacción de par no tienda a retener el mando en la posición de “ON” (ACCIONAMIENTO).
- Esta herramienta no ha sido diseñada para trabajar en ambientes explosivos.
- Esta herramienta no está aislada contra descargas eléctricas.

NOTA

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

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

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

Impreso en EE. UU.

INGERSOLL-RAND®
PROFESSIONAL TOOLS

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

Las herramientas neumáticas pueden vibrar durante el uso. La vibración, los movimientos repetitivos o las posiciones incómodas podrían dañarle los brazos y las manos. En caso de incomodidad, sensación de hormigueo o dolor, dejar de usar la herramienta. Consultar al médico antes de volver a utilizarla.

⚠ ADVERTENCIA

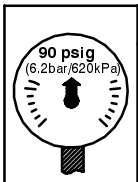
Mantener una postura del cuerpo equilibrada y firme. No estirar demasiado los brazos al manejar la herramienta.

⚠ ADVERTENCIA

Usar siempre protección para los oídos al manejar esta herriamenta.

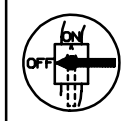
⚠ ADVERTENCIA

No coger la herramienta por la manguera para levantarla.



⚠ ADVERTENCIA

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



⚠ ADVERTENCIA

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

⚠ ADVERTENCIA

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

AJUSTES

Embrague Ajustable

La buena lubricación es muy importante para una satisfactoria vida útil de embrague. Use Grasa Ingersoll–Rand Nº 67.

Embrague Ajustable 5LN2C–AH580

Después de cada 50.000 ciclos o cada 100 horas de funcionamiento, lo que ocurra primero, lubrique el Embrague Ajustable de la forma siguiente:

1. Mueva la Tapa de Orificio de Ajuste para ver el orificio de ajuste.
2. Inserte la Llave de Engalgado de Embrague en el orificio de ajuste y en uno de los orificios de la Tuerca de Ajuste de Embrague para evitar que se mueva la Tuerca.
3. Con una llave en el extremo de trabajo de la Cabeza Angular, mueva la llave a la izquierda hasta que la Tuerca de Ajuste de Embrague esté floja o hasta que pare el clic.
4. Sujete los lados planos de la Carcasa de Engranajes y con una llave de tuercas, desenrosque la Tuerca de Acoplamiento.
5. Quite la Carcasa de Embrague y la Carcasa Angular de la Caja de Engranajes.
6. Sujete el Soporte de Eje de Embrague y saque el completo Conjunto de Embrague de la Carcasa.
7. Saque el Accionamiento de Embrague y el Soporte de Eje de Embrague del Embrague. Ponga una pequeña cantidad de la grasa recomendada entre el Distanciador de Bola de Embrague y Mordaza Delantera de Embrague y póngale tres toques de grasa (1,0 cc) alrededor de las Bolas de Embrague de las Mordazas. Ponga una pequeña cantidad de la grasa recomendada entre los dos asientos de muelle de embrague y alrededor del Rodamiento de Asiento de Muelle. Esto deberá hacerse cada 50.000 ciclos o cada 100 horas, lo que ocurra primero.

Embrague Ajustable 7L3C–A580

Después de cada 50.000 ciclos o cada 100 horas de uso, lo que ocurra primero, lubrique el Embrague Ajustable de la forma siguiente:

⚠ AVISO

Desconecte la manguera de suministro de aire comprimido de la herramienta antes de hacerle cualquier trabajo de mantenimiento.

1. Mueva la Tapa de Orificio de Ajuste para ver el orificio de ajuste.
2. Inserte una Llave Allen de 1/4” en el Portapuntas o utilice una llave en el extremo de trabajo de la Cabeza Angular, y mueva el Portapuntas hasta que el orificio en la Tuerca de Ajuste de Embrague esté alineado con la ranura en la Carcasa de Embrague.
3. Inserte la Llave de Ajuste de Embrague en el orificio en la Tuerca de Ajuste de Embrague y mientras sujeta la Tuerca para que no de vueltas, mueva el Portapuntas a la izquierda hasta que no haya compresión en el Muelle de Embrague.
4. Sujete los lados planos de la Carcasa de Embrague en un tornillo de banco, asegurarse de no estropear la Carcasa.

NOTA

La Carcasa de Embrague lleva rosca a izquierda.

5. Con una llave ajustabble, sujete los lados planos de la Carcasa de Engranajes y desenrosque la completa unidad de potencia completa de la Carcasa de embrague.

⚠ AVISO

No atrape sus dedos entre los componentes de embrague.

6. Saque el embrague montado fuera de la Carcasa de Embrague y ponga un poco de Grasa Ingersoll-Rand Nº 67 alrededor de las Bolas de Rodamiento de Mordaza de Embrague, Bolas de Liberación de Embrague, Rodamiento de Asiento de Muelle y entre el Cierre de Tuerca de Ajuste y el de Tuerca de Ajuste de Embrague. Para engrasar las Bolas de Liberación de Embrague, gradúe las Mordazas de Embrague hasta que se eleve el Asiento de Muelle.

Cabeza Angular

Después de cada ocho horas de uso, inyecte de 0,5 cc a 1,0 cc de Grasa Ingersoll-Rand Nº 67 en el Engrasador en la Carcasa Angular.

AJUSTE DE EMBRAGUE

Los Modelos 7RLL2C6, 7RLL3C6 y 7RLM3C6 incorporan un embrague ajustable con ajuste externo dentro de ciertos topes que actúa cuando se haya logrado un predeterminado par. Para incrementar los límites de par ajustables, hay disponibles dos Muelles de Embrague. **El Muelle Fuerte de Embrague (codificado en verde)** vale para la mayoría de aplicaciones porque ofrece ajuste preciso desde aproximadamente 45 a 90 in-lb (5,0 a 10,2 Nm).
El Muelle Ligero de Embrague (codificado en negro) es para aplicaciones de aproximadamente 15 a 65 in-lb (1,7 a 7,6 Nm).

⚠ AVISO

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

Para ajustar el Embrague, proceda como sigue:

1. Mueva la Tapa de Orificio de Ajuste en la Caja de Embrague para ver el orificio de ajuste.
2. Introduzca una Llave Allen de 1/4" en el receso del Portapuntas o sujete el cuadradillo del Conjunto de Espiga Adaptadora de Bocas con una llave ajustable. Mueva la llave hasta que uno de los orificios radiales en la Tuerca de Ajuste de Embrague esté visible a través de la ranura en la Carcasa de Embrague. Inserte la Llave de Engalgar Embrague en la ranura de la Carcasa de Embrague y en el orificio en la Tuerca de Ajuste para calzar la Tuerca contra rotaciones.

⚠ AVISO

Cuando el embrague esté equipado con el Muelle Fuerte, éste podrá colocarse a más 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.

3. Sujete la herramienta firmemente en un mano y gire el eje de salida de la Cabeza Angular. Si mueve el extremo de trabajo a la derecha cuando está de cara a la parte delantera, esto incrementa la compresión de Muelle de Embrague e incrementa el par de actuación de Embrague.

NOTA

Obtendrá el ajuste más satisfactorio normalmente usando la herramienta en la aplicación actual de trabajo e incrementando o disminuyendo el par obtenido hasta lograr la posición deseada. En cualquier caso, se recomienda que se haga el ajuste final por medio de una progresión gradual.

CAMBIO DE MUELLE DE EMBRAGUE

Embrague 5LN2C-AH580

1. Sujete con cuidado los lados planos de la Tuerca de Acoplamiento en un tornillo de banco con mordazas cubiertas de cobre o cuero. Acoplamiento Angular hacia abajo.

NOTA

Esta es una rosca a izquierda.

2. Con una llave en los lados planos de la Carcasa de Engranajes, afloje la Carcasa de Engranajes de la Tuerca de Acoplamiento. Saque la herramienta del tornillo de banco.
3. Desenrosque la Tuerca de Acoplamiento y saque la Carcasa de Embrague fuera de la Carcasa de Engranajes.
4. Sujete el Conjunto de Eje de Embrague y saque el Conjunto fuera de la Carcasa de Embrague.
5. Sujete el estrio del Soporte de Eje de Embrague en un tornillo de banco con mordazas cubiertas de cuero o cobre con la Tuerca de Ajuste de Embrague hacia arriba y el Accionamiento de Embrague contra la parte superior de las mordazas de tornillo de banco.

NOTA

Esta es una rosca a izquierda.

6. Con una llave en los lados planos de la Tuerca de Ajuste de Embrague, afloje y saque la Tuerca.

PRECAUCIÓN

Lleva veinticuatro Bolas de Embrague entre el Accionador de Embrague y el Asiento de Muelle de Embrague más próximo al Accionador de Embrague. Si los componentes restantes no se extraen con cuidado, pueden caer y perderse las bolas.

7. Con el conjunto en tornillo de banco y mientras se le aplica una ligera presión hacia abajo al Asiento de Muelle de Embrague más cercano al Accionador de Embrague, saque el Cierre de Tuerca de Ajuste, primer Asiento de Muelle de Embrague, Rodamiento de Asiento de Muelle, segundo Asiento de Muelle de Embrague y Muelle de Embrague fuera del Eje de Embrague.
8. Engrase bien el Rodamiento y Cierre de Tuerca de Ajuste y, en el orden nombrado, ponga lo siguiente sobre el Eje de Embrague: el nuevo Muelle de Embrague, un Asiento de Muelle de Embrague, el Rodamiento de Asiento de Muelle, otro Asiento de Muelle de Embrague y el Cierre de Tuerca de Ajuste, extremo indentado atrás.

NOTA

Esta es una rosca a izquierda.

9. Enrosque la Tuerca de Ajuste de Embrague, lado de tope primero, en el Eje de Embrague y apriétela a mano contra la compresión de 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 Eje de Embrague en la Caracasa de Embrague con el extremo estriado de Soporte de Eje de Embrague atrás.
12. Instale el Conjunto de Carcasa de Embrague en el Conjunto de Carcasa de Engranajes casando el extremo dentado de la Carcasa de Embrague con el de la Carcasa de Engranajes.
13. Enrosque la Tuerca de Acoplamiento en la Carcasa de Engranajes, apriete a mano. Sujete los planos de la Carcasa de Engranajes en un tornillo de banco con mordazas cubiertas de cobre y con una llave en los lados planos de la Tuerca de Acoplamiento, apriétela a 25 ft–lb (34 Nm) de par.
14. Ajuste el Embrague como se indica en la sección de **Ajuste de Embrague.**

Embrague 7L3C–A580

1. Sujete cuidadosamente los lados planos de la Carcasa de Embrague en un tornillo de banco con mordazas cubiertas de cobre o cuero, Cabeza Angular hacia abajo.

NOTA

Esta es una rosca a izquierda.

2. Con una llave en los planos de la Carcasa de Engranajes afloje la Carcasa de Engranajes de la Carcasa de Embrague. Saque la herramienta del tornillo de banco.
3. Desenrosque y saque la Carcasa de Embrague de la Carcasa de Engranajes.
4. Sujete el Accionamiento 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.

NOTA

Esta es una rosca a izquierda.

6. Con una llave en los lados planos de la Tuerca de Ajuste de Embrague, afloje y saque la Tuerca.
7. Con el conjunto en un tornillo de banco y mientras le aplica una ligera presión abajo al Asiento de Bola de Embrague, saque el Cierre de Tuerca de Ajuste, Rodamiento de Asiento de Muelle, Asiento de Muelle de Embrague y Muelle de Embrague fuera del Accionador de Embrague.
8. Engrase bien el Rodamiento y Cierre de Tuerca de Ajuste y, en el orden nombrado, ponga lo siguiente sobre el Accionador de Embrague: el nuevo Muelle de Embrague, el Asiento de Muelle de Embrague, el Rodamiento de Asiento de Muelle y el Cierre de Tuerca de Ajuste, extremo indentado atrás.

NOTA

Esta es una rosca a izquierda.

9. Enrosque la Tuerca de Ajuste de Embrague, lado de detención primero, en el Accionamiento de Embrague y apriétela a mano contra la compresión de 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 dentado de Accionador de Embrague atrás.

NOTA

Esta es una rosca de izquierda.

12. Enrosque el embrague completo en la Carcasa de Engranajes. Apriete la Carcasa de Embrague entre 2 a 5 ft–lb (2,7 a 6,8 Nm) de par.
13. Ajuste el Embrague como se indica en la sección **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 llaves de impacto. Recomendamos la siguiente unidad de Filtro–Lubricador–Regulador:

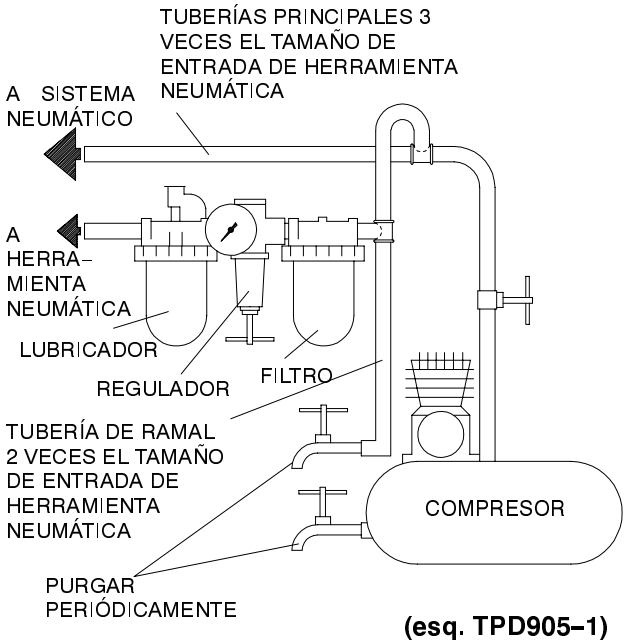
For USA – No. C05–02–G00

Motor

Después de cada 8 horas de uso, a menos que se use un lubricante de línea de aire comprimido, inyecte 1–1/2 cc de Aceite Ingersoll–Rand Nº 10 en la Admisón de Aire.

Engranajes

Después de cada 50.000 ciclos ó 100 horas, lo que ocurra primero, use Grasa Ingersoll–Rand Nº 28 y la Pistola Engrasadora R000A2–228 para lubricar los Engranajes por el Engrasador. Para **radio L,** inyecte 5 ó 6 toques (2,0 cc) y para **radios M y N,** inyecte 10 ó 12 toques (4,0 cc).



(esq. TPD905–1)

ESPECIFICACIONES

Modelo	Dispositivo de Par	Par de apriete (Junta blanda)	Velocidad Libre	Cuadradillo	Muelle de Embrague
		in–lbs (Nm)	rpm	pulg.	
7RLL2C6	Embrague Ajustable	15–100 (1,7–11,3)	1 400	3/8	H
7RLL3C6	Embrague Ajustable	25–110 (2,8–12,5)	1 400	3/8	M
7RLM3C6	Embrague Ajustable	25–130 (2,8–14,8)	800	3/8	M
7RLL3D6	Calado	100 (11,3)	1 400	3/8	– – –
7RLM3D6	Calado	175 (19,8)	800	3/8	– – –
7RLN3D6	Calado	265 (29,9)	500	3/8	– – –
7RLM2D6	Calado	175 (19,8)	800	3/8	– – –

MANUAL DE FUNCIONAMENTO E MANUTENÇÃO
FERRAMENTAS PNEUMÁTICAS ANGULARES REVERSÍVEIS SÉRIES 7RL

P

AVISO

As Ferramentas Pneumáticas Angulares Reversíveis Séries 7RL são concebidas para operar apertadores de roscas pequenos em aplicações com espaço reduzido.
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).
- Opere, inspeccione e mantenha esta ferramenta de acordo com todos os regulamentos (local, estadual, federal e do pais) que possam se aplicar a ferramentas pneumáticas portáteis e manuais.
- 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 10mm (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 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.
- Use somente soquetes e acessórios de impacto. Não use soquetes ou acessórios de mão (cromo).
- O Tampo da Válvula Reguladora de Pressão está sob pressão da Mola da Válvula. Tenha cuidado ao removê–lo. (*Aplicável a algumas ferramentas.)*
- Sempre que a Cabeça Angular seja instalada ou substituída, a Alavanca Reguladora de Pressão deve ser posicionada de tal modo que o torque de reacção não tenha tendência de reter a posição "LIGADO" na alavanca reguladora de pressão.
- 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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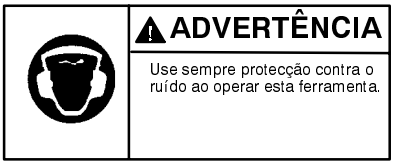
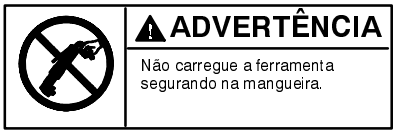
PROFESSIONAL TOOLS

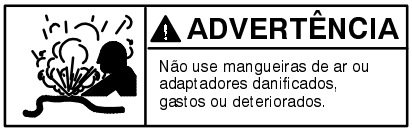
IDENTIFICAÇÃO DO RÓTULO DE ADVERTÊNCIA

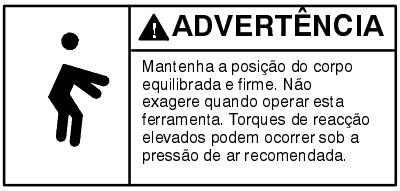
⚠ ADVERTÊNCIA

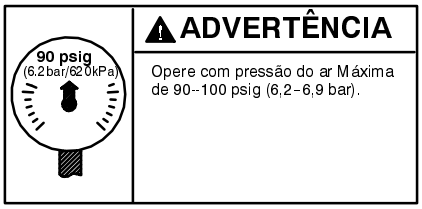
O NÃO CUMPRIMENTO DAS SEGUINTES ADVERTÊNCIAS PODE RESULTAR EM FERIMENTOS.











AJUSTES

Embraiagem de Coxim

A lubrificação adequada é muito importante para que a vida útil da embraiagem seja satisfatória. Use Massa Ingersoll–Rand No. 67

Embraiagem de Coxim Ajustável 5LN2C–AH580

Depois de cada 50 000 ciclos ou 100 horas de operação, o que ocorrer primeiro, lubrifique a Embraiagem de Coxim da seguinte maneira:

1. Gire a Capa do Furo de Ajuste para expor o furo de ajuste.
2. Insira a Chave da Embraiagem no furo de ajuste e em um dos furos na Porca de Ajuste da Embraiagem para evitar que a Porca gire.
3. Usando uma chave dinamométrica na extremidade de saída do Cabeçote em Ângulo, gire a chave no sentido anti–horário até que a Porca de Ajuste da Embraiagem esteja solta ou até que o som de clique pare.
4. Segure as pás da Caixa de Engrenagens e use uma chave dinamométrica para desapertar a Porca de Acoplamento.
5. Remova o Corpo da Embraiagem e o Corpo em Ângulo da Caixa de Engrenagens.
6. Segure o Suporte do Eixo da Embraiagem e puxe do Corpo o Arranjo da Embraiagem por inteiro.
7. Remova o Comando da Embraiagem e o Suporte do Eixo da Embraiagem Aplique uma pequena quantidade de Massa Lubrificadora entre o Espaçador das Esferas da Embraiagem e Garra da Embraiagem Frontal e 1 cc (3 medidas) de Massa Lubrificadora em volta das Esferas da Emabraiagem da Garra. Aplique uma pequena quantidade de Massa Lubrificadora recomendada entre os dois assentos de mola da embraiagem frontais e em volta do Rolamento do Assento da Mola. Isto deve ser feito a cada 50 000 ciclos ou 100 horas de operação, o que ocorrer primeiro.

Embraiagem de Coxim Ajustável 7L3C–A580

Depois de cada 50 000 ciclos ou 100 horas de operação, o que ocorrer primeiro, lubrifique a Embraiagem de Coxim da seguinte maneira:

⚠ ADVERTÊNCIA

Desligue a alimentação de ar da Ferramenta antes de executar qualquer serviço de manutenção.

1. Gire a Capa do Furo de Ajuste para expor o furo de ajuste.
2. Insira uma chave Allen de 1/4” no Suporte do Bite ou usando uma chave dinamométrica na extremidade de saída do Cabeçote em Ângulo, gire o Suporte do Bite até que o furo na Porca de Ajuste da Embraiagem esteja alinhada com o orifício no Corpo da Embraiagem.
3. Insira a Chave de Ajuste da Embraiagem no furo na Porca de Ajuste da Embraiagem e enquanto estiver segurando a Porca para que ela não gire, gire o Suporte do Bite no **sentido contrário ao dos ponteiros do relógio** até que não haja compressão na Mola da Embraiagem.
4. Segure as pás no Corpo da Embraiagem num torno, certificando–se de não entortar o corpo.

AVISO

O Corpo da Embraiagem possui uma rosca à esquerda.

5. Utilizando uma chave dinamométrica ajustável, agarre as pás na Caixa de Engrenagens e desaparafuse por inteiro a unidade de potência para fora do Corpo da Embraiagem.

⚠ ADVERTÊNCIA

Não coloque seus dedos entre os componentes da embraiagem.

6. Retire a embraiagem montada do Corpo da Embraiagem e aplique uma certa quantidade de Massa Lubrificadora Ingersoll-Rand No. 67 ao redor das Esferas dos Rolamentos da Garra da Embraiagem, das Esferas de Alívio da Embraiagem, do Rolamento do Assento da Mola e entre a Trava da Porca de Ajuste e Porca de Ajuste da Embraiagem. Para enMassa Lubrificadorar as Esferas de Alívio da Embraiagem, ajuste a Garra da Embraiagem até que o Assento da Mola levante.

Cabeçote em Ângulo

Depois de cada oito horas de operação, injecte de 0,5 a 1,0 cc de Massa Lubrificadora Ingersoll-Rand No. 67 no Adaptador de Massa Lubrificadora no Corpo em Ângulo.

AJUSTE DA EMBRAIAGEM

Para Modelos 7RLL2C6, 7RLL3C6 e 7RLM3C6, incorpore uma embraiagem ajustável que possa ser externamente ajustada dentro de um certo intervalo na parte dentada quando um torque pré-determinado for aplicado. Para aumentar o intervalo de torque, duas Molas de Embraiagem são oferecidas.

A Mola de Embraiagem Pesada (código de cores verde) que é adequada para a maioria das aplicações já que ela dará um ajuste preciso de cerca de 5,0 a 10,2 Nm (45 a 90 pol-lb).

A Mola de Embraiagem Leve (código de cores preta) que é para as aplicações variando de aproximadamente 1,7 a 7,6 Nm (15 a 65 pol-lb).

⚠ ADVERTÊNCIA

Desligue a alimentação de ar da ferramenta antes de prosseguir.

Para ajsutar a Embraiagem, proceda da seguinte maneira:

1. Gire a Capa do Furo de Ajuste para expor o furo de ajuste.
2. Insira uma Chave Allen de 1/4" no recesso no Suporte do Bite ou agarre o comando quadrado do Arranjo do Fuso do Adaptador do Soquete com uma chave dinamométrica ajustável. Gire a chave até que um dos furos radiais na Porca de Ajuste da Embraiagem esteja visível através do orifício no Corpo da Embraiagem. Insira uma Chave de Embraiagem no orifício alongado no Corpo da Embraiagem e no furo na Porca de Ajuste para evitar que a Porca gire.

⚠ ADVERTÊNCIA

A embraiagem, quando equipada com uma Mola Pesada, pode ser ajustada além da capacidade de torque da ferramenta e nesse caso a ferramenta irá engripar antes que a Embraiagem dentada. Não ajuste a Embraiagem além capacidade de torque da ferramenta.

3. Segure a ferramenta firmemente em uma mão e gire a extremidade de saída do Cabeçote em Ângulo. Girando a extremidade de saída no sentido horário quando estiver de frente para a parte frontal vai aumentar a compressão na Mola da Embraiagem e elevar o torque no qual a embraiagem irá continuar a funcionar.

AVISO

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

TROCANDO A MOLA DA EMBRAIAGEM

Embraiagem 5LN2C-AH580

1. Segure cuidadosamente as pás da Porca de Acoplamento nos mordentes de uma morsa revestidos de couro ou de cobre. O Acoplamento em Ângulo voltado para baixo.

AVISO

Esta é uma rosca à esquerda.

2. Usando uma chave nas pás da Caixa de Engrenagens, solte a Caixa de Engrenagens da Porca de Acoplamento. Remova a ferramenta da morsa.
3. Desaparafuse a Porca de Acoplamento e remova o Corpo da Embraiagem da Caixa de Engrenagem.
4. Segure o Arranjo do Eixo da Embraiagem e puxe o Arranjo para fora do Corpo da Embraiagem.
5. Segure a estria do Suporte do Eixo da Embraiagem nos mordentes de morsa revestidos de couro ou de cobre com a Porca de Ajuste da Embraiagem com a face para cima e o Comando da Embraiagem contra o topo dos mordentes da morsa.

AVISO

Esta é uma rosca à esquerda.

6. Usando uma chave nas pás da Porca de Ajuste da Embraiagem, solte e remova a Porca.

CUIDADO

Há vinte e quatro Esferas de Embraiagem localizadas entre o Comando da Embraiagem e o Assento da Mola da Embraiagem mais próximo do Comando da Embraiagem. Se os componentes remanescentes não foram cuidadosamente removidos pode fazer com que as esferas saiam da posição e se percam.

7. Com o arranjo na morsa e enquanto aplica uma leve pressão para baixo sobre o Assento da Mola de Embraaigem mais próxima do Comando da Embraiagem, remova a Trava da Porca de Ajuste, o primeiro Assento da Mola da Embraiagem, o Rolamento do Assento da Mola, o segundo Assento da Mola da Embraiagem e a Mola da Embraiagem do Eixo da Embraiagem.
8. Aplique Massa Lubrificadora por inteiro na Trava da Porca de Ajuste e no Rolamento, na ordem dada, deslize os seguintes itens sobre o Eixo da Embraiagem: a nova Mola da Embraiagem, um Assento da Mola da Embraiagem, o Rolamento do Assento da Mola, outro Assento da Mola de Embraiagem e a Trava da Porca de Ajuste, com o lado dentado.

AVISO

Esta é uma rosca à esquerda.

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 Embraiagem montada do torno.
11. Instale o Arranjo do Eixo da Embraiagem no Corpo da Embraiagem com a extremidade estriada do Suporte do Eixo da Embraiagem.
12. Instale o Arranjo do Corpo da Embraiagem no Arranjo da Caixa de Engrenagem combinando a estria do Corpo da Embraiagem com a estria da Caixa de Engrenagem.
13. Rosqueie a Porca de Acoplamento na Caixa de Engrenagem com a mão. Agarre as pás da Caixa de Engrenagem nas garras do torno revestidas de cobre e usando uma chave na pás da Porca de Acoplamento, aperte-a com um torque de 34 Nm (25 pés-lb).
14. Ajuste a Embraiagem como orientado na secção **Ajuste da Embraiagem.**

Embraiagem 7L3C-A580

1. Segure cuidadosamente as pás do Corpo da Embraiagem nas garras vise revestidas de couro ou de cobre. O Cabeçote em Ângulo voltado para baixo.

AVISO

Esta é uma rosca à esquerda.

2. Usando uma chave nas pás da Caixa de Engrenagens, solte a Caixa de Engrenagens do Corpo da Embraiagem. Remova a ferramenta da morsa.
3. Desaparafuse e remova o Corpo da Embraiagem da Caixa de Engrenagem.
4. Agarre o Comando da Embraiagem e puxe o arranjo para fora do Corpo da Embraiagem.
5. Agarre cuidadosamente a Garra da Embraiagem Frontal nos mordentes de uma morsa revestidos de couro ou de cobre com a face da Porca de Ajuste da Embraiagem para cima.

AVISO

Esta é uma rosca à esquerda.

6. Usando uma chave nas pás da Porca de Ajuste da Embraiagem, solte e remova a Porca.
7. Com o arranjo na morsa e enquanto aplica uma leve pressão para baixo sobre o Assento da Mola de Esferas da Embraiagem, remova a Trava da Porca de Ajuste, o Rolamento 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 Rolamento, e, na ordem dada, deslize o seguintes itens sobre o Comando da Embraiagem: a nova Mola da Embraiagem, o Assento da Mola da Embraiagem, o Rolamento do Assento da Mola e a Trava da Porca de Ajuste, com o lado dentado do trilho.

AVISO

Esta é uma rosca à esquerda.

9. Comece aplicando a Porca de Ajuste da Embraiagem, o lado dentado primeiro, sobre o Comando da Embraiagem e aperte-a com os dedos contra a Mola. Com uma chave aperte a Porca com uma ou duas voltas adicionais.
10. Remova a Embraigem montada da morsa.
11. Instale o Arranjo do Comando da Embraiagem no Corpo da Embraiagem com a extremidade estriada do Suporte do Comando da Embraiagem do trilho.

AVISO

Esta é uma rosca à esquerda.

12. Rosqueie a embraiagem 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:

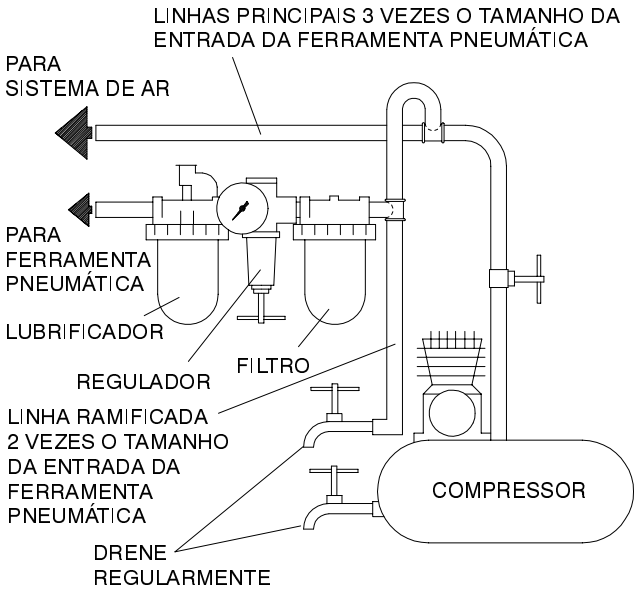
For USA – No. C05–02–G00

Motor

Depois de cada 8 horas de operação, a menos que esteja usando um lubrificador de ar de linha, injecte 1–1/2 cc de Óleo Ingersoll–Rand No. 10 na entrada de ar.

Engrenagem

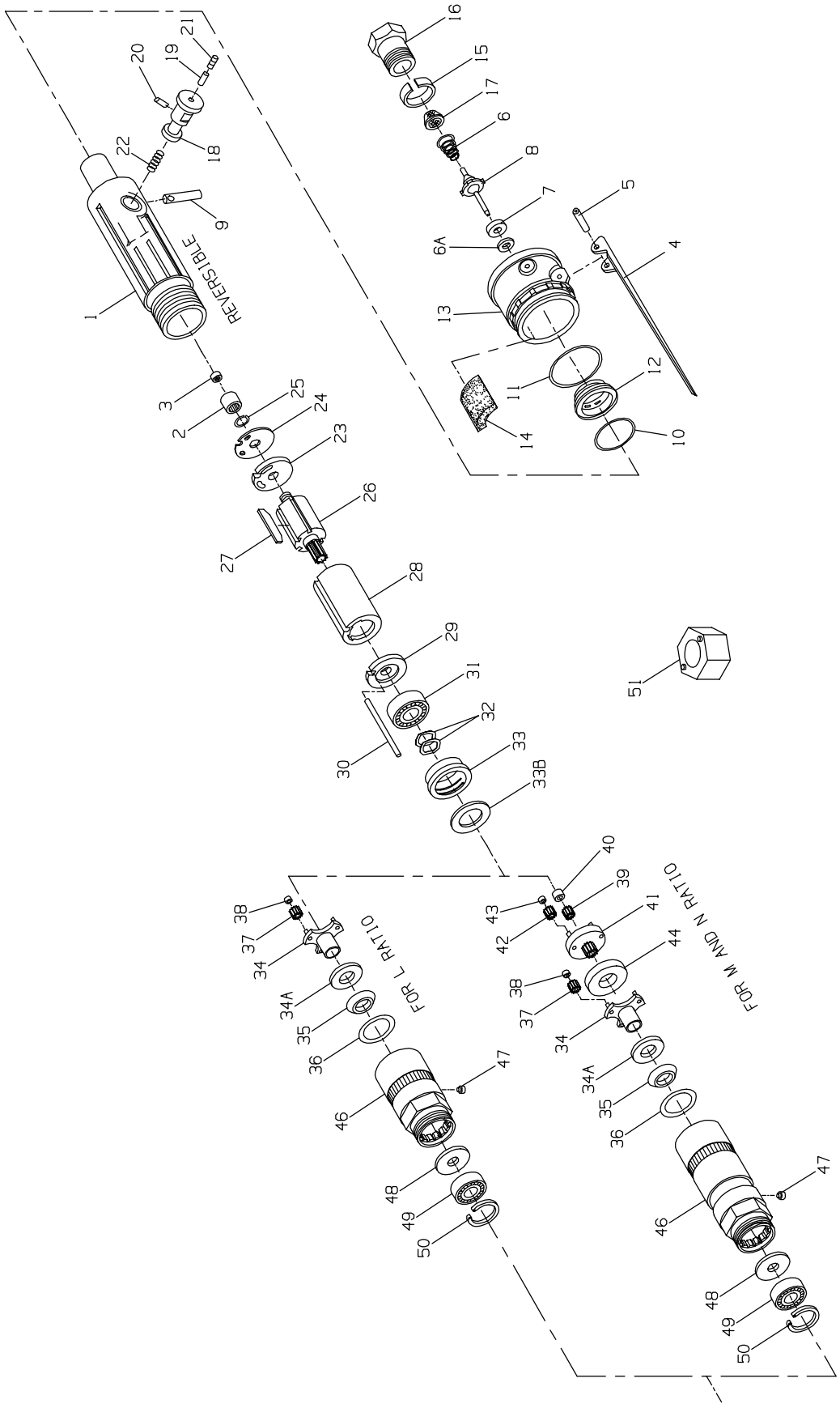
Depois de cada 50 000 ciclos ou 100 horas, o que ocorrer primeiro, use Massa Lubrificadora Ingersoll–Rand No. 28 e o Canhão de Massa Lubrificadora R0002A2–228 para lubrificar a engrenagem através do adaptador de Massa Lubrificadora. Para a **razão L** injecte 2,0 cc (5 ou 6 medidas) de para as **razões M e N,** injecte 4,0 cc (10 ou 12 medidas).



(Desenho TPD905–1)

ESPECIFICAÇÕES

Modelo	Equipamento de Torque	Intervalo de Torque (Apertos Ligeiros)	Velocidade Livre	Comando Quadrado	Mola da Embraiagem
		Nm (pés–lb)	rpm	pol.	
7RLL2C6	embraiagem em coxim	1,7–11,3 (15–100)	1 400	3/8	H
7RLL3C6	embraiagem em coxim	2,8–12,5 (25–110)	1 400	3/8	M
7RLM3C6	embraiagem em coxim	2,8–14,8 (25–130)	800	3/8	M
7RLL3D6	desligamento	11,3 (100)	1 400	3/8	– – –
7RLM3D6	desligamento	19,8 (175)	800	3/8	– – –
7RLN3D6	desligamento	29,9 (265)	500	3/8	– – –
7RLM2D6	desligamento	19,8 (175)	800	3/8	– – –



(Dwg. TPA893–4)

		PART NUMBER FOR ORDERING	
		Motor Housing Assembly	
		for 7RL models ending in -EU (with standard length lever)	7RL-EU-A40
		for 7RL models not ending in -EU (with standard length lever)	7RL-A40
		for 7RL models ending in -EU (with long length lever)	7RL-EU-AL40
		for 7RL models not ending in -EU (with long length lever)	7RL-AL40
	1	Motor Housing	
		for models ending in -EU	7RL-EU-B40
		for all other housings	7RL-B40
	*	Warning Label	
		for models ending in -EU	EU-99
		for all other models	WARNING-7-99
♦	2	Rear Rotor Bearing	7AH-24
	*	Throttle Valve Plunger Bushing	5RLK2C-91
	3	Rotor Bearing Nut	7AH-105A
	4	Throttle Lever	
		standard length	7L-273
		long length	7L-L273
	5	Throttle Lever Pin	7L-120
♦	6	Throttle Valve Spring	7L-51

		PART NUMBER FOR ORDERING	
	6A	Throttle Valve Seat Support	7RAK-304
♦	7	Throttle Valve Seat	7RAK-303
♦	8	Throttle Valve	7RAK-302
	9	Throttle Valve Plunger	7RL-94
♦	10	Silencer Seal Ring	WWV100A1-43
♦•	11	Exhaust Deflector Seal	7A-379
	12	Exhaust Silencer	7L-310
	13	Exhaust Deflector	7L-23
♦	14	Muffler Element	7L-311
	15	Inlet Bushing Spacer	7AH-65
	16	Inlet Bushing	7L-565
♦	17	Air Strainer Screen	R0A2-61
	18	Reverse Valve	7RL-329
	19	Lock Pin Retainer	7RL-56
	20	Reverse Valve Lock Pin	7RL-347
	21	Retainer Setscrew	7RL-669
	22	Reverse Valve Spring	55RP-515
	23	Rear End Plate	7RL-12
♦•	24	Reat End Plate Gasket	7RL-739
♦	25	Rear End Plate Retainer	7AH-118
	26	Rotor (7 teeth)	7RLL-53
♦	27	Vane Packet (set of 4 Vanes) (.062" [1.57 mm] thick)	7RL-42-4

* Not illustrated.

♦ Indicates Tune-up Kit part.

• 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
28	Cylinder	7RL–3
29	Front End Plate	7AH–11
30	Cylinder Dowel	7AH–98
♦• 31	Front Rotor Bearing	R1–22
32	Rotor Bearing Spring Washer (2)	7AH–278
33	Rotor Bearing Housing	7AH–13
33B	Bearing Housing Spacer	7AH–81
	Spindle Assembly	
	for 7RLN	7LK–A8
	for 7RLL	7LL–A8
	for 7RLM	7LM–A8
34	Spindle	
	for 7RLN	7LK–8
	for 7RLL	7LL–8
	for 7RLM	7LJ–8
34A	Seal Retaining Washer	7L–303
35	Seal Support	5RAK–5
♦• 36	Seal	182A53–610
37	Spindle Planet Gear Assembly (3)	
	for 7RLN (21 teeth)	7AK–A10
	for 7RLL (22 teeth)	7AL–A10
	for 7RLM (18 teeth)	7AJ–A10
38	Planet Gear Bearing (1 for each Gear)	
	for 7RLL and 7RLN	7AK–500
	for 7RLM	7AJ–500
• 39	Rotor Pinion for 7RLM and 7RLN (22 teeth)	7AH–17
• 40	Rotor Pinion Spacer for 7RLM and 7RLN	7AH–18
41	Gear Head	
	for 7RLM (16 teeth)	7AM–216
	for 7RLN (10 teeth)	7AN–216
• 42	Gear Head Planet Gear Assembly (3) (for 7RLM and 7RLN) (15 teeth)	7AH–A10
43	Gear Head Planet Gear Bearing (1 for each Gear)	7AH–500
44	Gear Head Spacer (for M and N ratios only)	7AN–80
	Gear Case Assembly	
	for 7RLL	7LH–A37A
	for 7RLM and 7RLN	7LM–A37A
46	Gear Case	
	for 7RLL	7LH–B37A
	for 7RLM and 7RLN	7LML–B37A
47	Grease Fitting	D0F9–879
48	Grease Shield	5R–710
49	Spindle Bearing	R1L–24
50	Spindle Bearing Retainer	7L–28
51	Housing Cap Wrench	141A12–26
*	Grease Gun	R000A2–228
*	Vertical Hanger	7L–365
*	Horizontal Hanger	6WS–366
*	Tune–up Kit (includes illustrated parts 2, 6, 7, 8, 10, 11, 14, 17, 24, 25, 27, 31 and 36)	
	for reversible models	7RL–S/D–A/ T–TK1
	for nonreversible models	7L–S/D–A/ T–TK1
*	Piped–Away Exhaust Kit	7L–K284
*	Gear Case/Housing Sleeve	7L–747

* Not illustrated.

♦ Indicates Tune–up Kit part.

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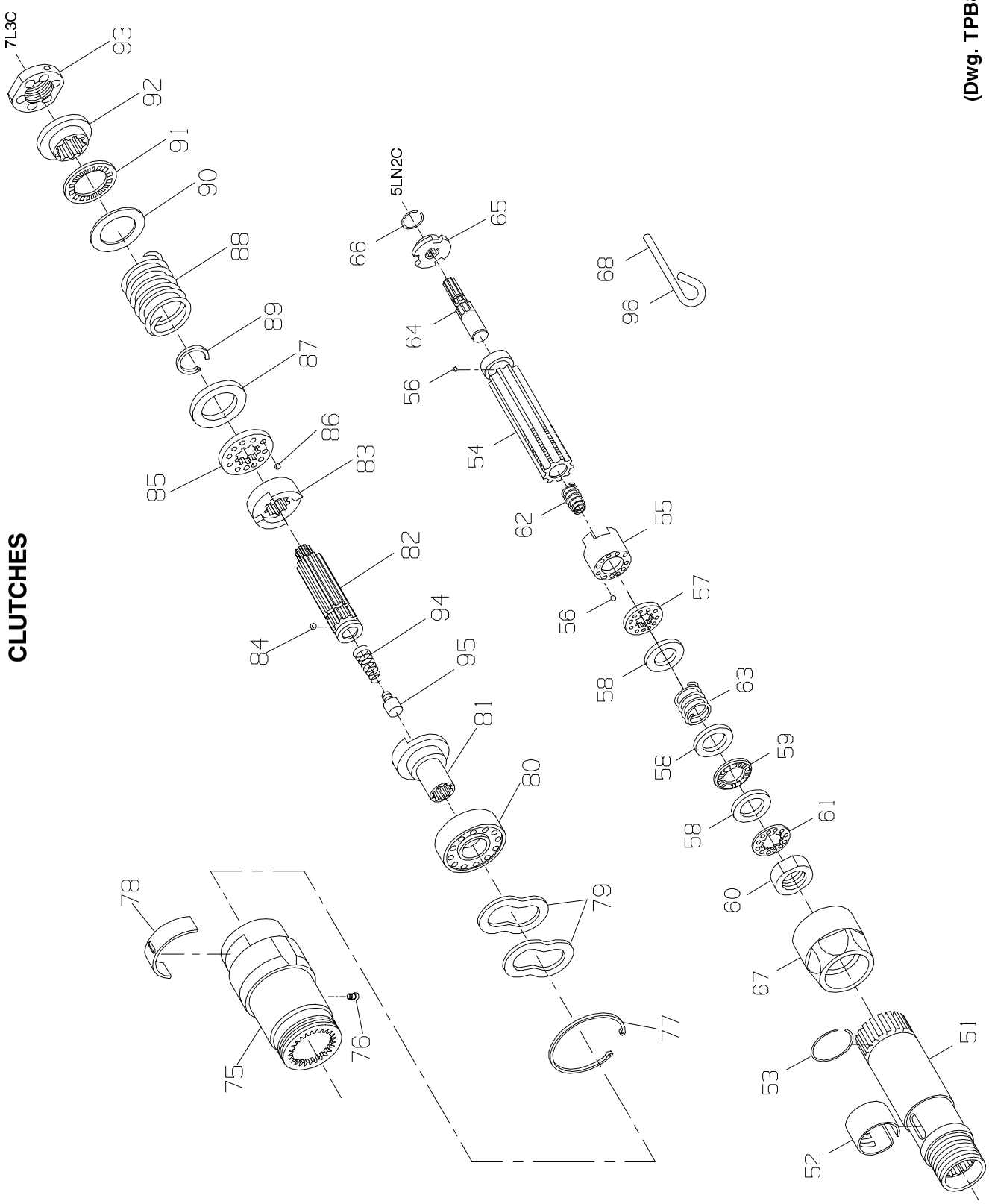
CLUTCHES



(Dwg. TPB802–2)

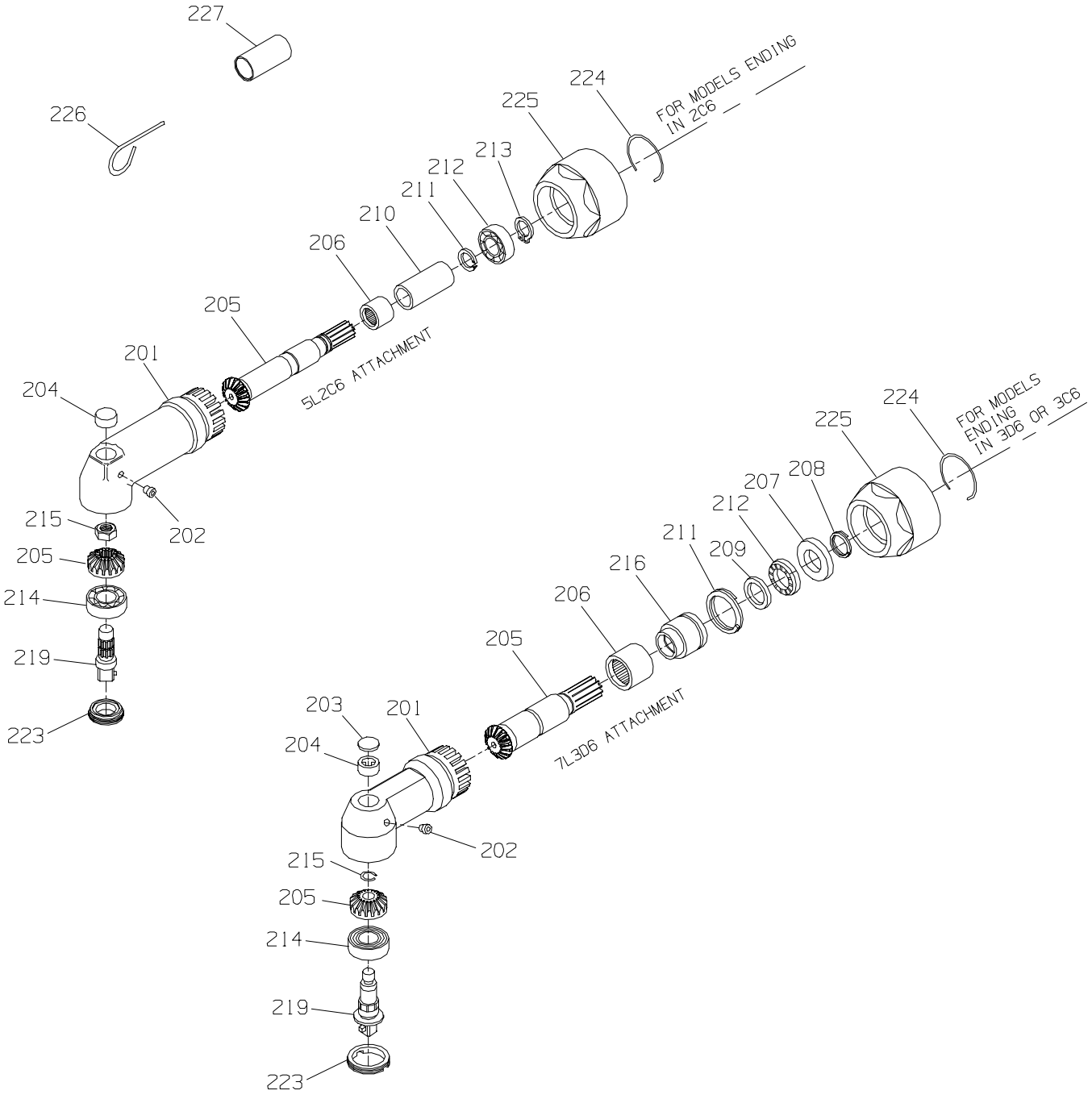
		PART NUMBER FOR ORDERING
	Cushion Clutch Attachment (with Heavy Clutch Spring) (for models ending in 2C3)	5LN2C–AH580
51	Clutch Housing Assembly	5LK2C–B580
52	Adjusting Hole Cover	5C1–415
53	Coupling Nut Retainer	5C1–29
	Clutch Shaft Assembly	5LN2C–AH586
54	Clutch Shaft	5LK2C–586
• 55	Front Clutch Jaw	5C1–589A
• 56	Clutch Ball (24)	RX1–629
• 57	Clutch Ball Spacer	5C1–401A
• 58	Clutch Spring Seat (3)	5C1–627
• 59	Spring Seat Bearing	5C1–105
60	Clutch Adjusting Nut	5C1–582A
61	Adjusting Nut Lock	5C1–588
62	Clutch Engaging Spring	5LK2C–626
63	Clutch Spring (Heavy) (Green)	5C1–H583
	Clutch Driver Assembly	5LK2C–A581
64	Clutch Shaft Support	5LK2C–584
65	Clutch Criver	5LK2C–581
66	Clutch Driver Retainer	7AH–118
67	Coupling Nut	7L–27
68	Clutch Sprag Key	5C1–416
*	Clutch Spring (Light) (Black)	5C1–L583
	Cushion Clutch Attachment (with Medium Clutch Spring) (for models ending in 3C6)	7L3C–A580
75	Clutch Housing Assembly	7L3C–B580
76	Grease Fitting	D0F9–879
77	Retaining Ring	7L–28
78	Adjusting Hole Cover	7C–415A
79	Driver Bearing Washer	R43F–278
80	Clutch Driver Bearing	R1L–24
81	Driver Jaw	7L3C–585
	Clutch Driver Assembly	7C1–M581A
• 82	Clutch Driver	7C–581A
• 83	Front Clutch Jaw	7C–589A
• 84	Jaw Bearing Ball (12)	2U–696
• 85	Clutch Ball Spacer	7C–401A
• 86	Clutch Release Ball (9)	4U–31
• 87	Clutch Ball Seat	7C–627
88	Clutch Spring (Medium) (Yellow)	7C–583A
89	Spring Seat Stop	7C–704B
90	Clutch Spring Seat	7C–623
91	Spring Seat Bearing	R02W–696
92	Adjusting Nut Lock	7C–588A
93	Clutch Adjusting Nut	7C–582A
• 94	Disengaging Plunger Spring	4C–626
• 95	Disengaging Plunger	7P1–584
96	Clutch Adjusting Key	5C1–416
*	Clutch Spring (Light) (Black)	7C–L583A
*	Clutch Spring (Heavy) (Green)	7C–H583A

* 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

ANGLE ATTACHMENT FOR 7RL WRENCHES



(Dwg. TPA953–4)

PART NUMBER FOR ORDERING

		Angle Attachments	
		5L2C6	7L3D6
	Angle Attachment	5L2C6	7L3D6
201	Angle Housing Assembly	5L2C–A550	7L3A–B550
202	Grease Fitting	D0F9–879	D0F9–879
203	Angle Housing Cap	---	8SA32–110
• 204	Upper Spindle Bearing	120A4–603	8SA32–603
• 205	Matched Bevel Gear Set	141A12–A552	7L3A–A552
• 206	Bevel Pinion Bearing	H54U–511B	182A53–606
207	Rear Thrust Bearing Seat	---	7L2A–682
• 208	Bearing Seat Retainer	---	1415A12–6
209	Front Thrust Bearing Seat	---	141A12–683
210	Pinion Bearing Spacer	AGS141–165	---
• 211	Bearing Spacer Retainer	RXA21–343	182A53–685
212	Bevel Pinion Thrust Bearing	120A4–97	161A32–105
• 213	Bearing Retainer	120A4–588	---
• 214	Lower Spindle Bearing	120A4–593	8SA32–593
• 215	Bevel Gear Retainer	120A4–578	8SA32–578
216	Bevel Pinion Bearing Spacer	---	182A53–165
219	Socket Adapter Spindle Assembly (3/8” square drive)	141A12–A607	8SA32–P507–3/8
*	Socket Retaining Spring	401–718	401–718
*	Socket Retaining Pin	5020–716	5020–716
223	Spindle Bearing Cap	120A4–531	8SA32–531
224	Coupling Nut Retainer	141A12–29	5C1–29
225	Coupling Nut	141A12–27	7L–27
226	Bevel Pinion Sprag Key	5C1–416	---
227	Bearing Inserting Tool	---	7L3A–950

* 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

	Spindle Assembly	
	1/4" hex recess (for standard bits) (for 5L2C6 Angle Attachment)	5L2C3–B586
	1/4" hex recess (for insert bits) (for 5L2C6 Angle Attachment)	5L2C4–B386
	1/4" square drive Spindle Assembly (for 5L2C6 Angle Attachment)	141A9–A607–1/4
	3/8" square drive (for 5L2C6 Angle Attachment)	141A12–A607
	3/8" square drive (flush spindle) (for 7L3D6 Angle Attachment)	8SA32–P507–3/8
	3/8" square drive (recessed spindle) (for 7L3D6 Angle Attachment)	8SA32–P607–3/8
*	Bit Retainer (for No. 5L2C4–B386 Spindle Assembly)	5L2C4–425
*	Socket Retaining Spring (for No. 141A12–A607, No. 8SA32–P507–3/8 or No. 8SA32–P607–3/8 Spindle Assembly)	401–718
*	Socket Retaining Pin (for No. 141A12–A607 or No. 8SA32–P507–3/8 Spindle Assembly	5020–716

* Not illustrated.

⚠ WARNING

Always wear eye protection when operating or performing maintenance on this tool.
Always 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 a Series 7RL Angle Wrench is disassembled for maintenance, repair or replacement of parts, lubricate the tool as follows:

1. Inject a few drops of Ingersoll–Rand No. 10 Oil into each vane slot in the Rotor bore before inserting the Vanes.
2. Moisten all O–rings with O–ring lubricant.
3. Work approximately 1.5 cc of Ingersoll–Rand No. 28 Grease into the Rear Rotor Bearing (2), Front Rotor Bearing (31) and Spindle Bearing (49).
4. Work approximately 3 cc to 6 cc of Ingersoll–Rand No. 28 Grease into the gear train. Grease the Planet Gear Bearings (38) or (43), the teeth on the Planet Gears (37) or (42), the gear teeth inside the Gear Case (46) and the planet gear shafts on the Spindle (34) and Gear Head (41).
5. Work approximately 0.5 cc of Ingersoll–Rand No. 67 Grease into the Lower Spindle Bearing (214) of the Angle head.
6. Work approximately 0.5 cc to 1 cc of Ingersoll–Rand No. 67 Grease into the Upper Spindle Bearing (204), Bevel Pinion Bearing (206) and Bevel Pinion Thrust Bearing (212).
7. Apply a light coat of Ingersoll–Rand No. 67 Grease to the Bevel Gear (205), Bevel Pinion (205) and bevel pinion spline.

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.
5. Do not press any needle bearing from a part unless you have a new needle bearing on hand for installation. Needle bearings are always damaged during the removal process.

Disassembly of the Angle Attachment

1. Carefully grasp the flats of the Coupling Nut (225) in leather–covered or copper–covered vise jaws so that the Angle Attachment (201) is facing downward.

NOTICE

This is a left–hand thread.

2. Using a wrench on the flats of the Gear Case (46), loosen the Gear Case from the Coupling Nut. Remove the tool from the vise. Unscrew and remove the Coupling Nut from the Gear Case.

3. Carefully grasp the Angle Attachment in leather-covered or copper-covered vise jaws so that the Spindle (219 or 220) is facing upward.

NOTICE

This is a left-hand thread.

4. Using the Housing Cap Wrench (51), unscrew and remove the Spindle Bearing Cap (223). Withdraw the Spindle from the Angle Attachment.
5. Inspect the Lower Spindle Bearing (214) for looseness or roughness. If either of these conditions exists, replace the bearing as follows:
   a. Grasp the output end of the Spindle in copper-covered vise jaws.
   b. Unscrew or unstrap the Bevel Gear Retainer (215) and lift off the Bevel Gear (205).
   c. Press the Spindle from the Lower Spindle Bearing.

NOTICE

Do not remove the Upper Spindle Bearing unless you have a new Bearing ready to install. This type of bearing is always damaged during the removal process.

6. If the Upper Spindle Bearing (203) appears rough or loose, press it from the Angle Housing (201).
7. **For 5L2C6 Angle Attachment,** remove the Bearing Retainer (213) and slide off the Bevel Pinion Thrust Bearing (212).
   For 7L3D6 Angle Attachment, remove the Bearing Seat Retainer (208). Slide off the Rear Thrust Bearing Seat (207), Bevel Pinion Thrust Bearing (212) and Front Thrust Bearing Seat (209).
8. **For 5L2C6 Angle Attachments,** use snap ring pliers to remove the Bearing Spacer Retainer (211). Remove the Pinion Bearing Spacer (210).
   For 7L3D6 Angle Attachment, use a screwdriver to remove Bearing Spacer Retainer (211) and remove Bevel Pinion Bearing Spacer (216).

NOTICE

Do not remove the pinion shaft and Bevel Pinion Bearing (206) unless you have a new bearing on hand.

9. Grasp the spline of the pinion shaft in leather-covered or copper-covered vise jaws and while gently tapping the rear face of the Angle Attachment with a soft hammer, pull the Bevel Pinion and Bearing (206) from the Angle Attachment.
   After the Angle Attachment is disassembled, check all parts for damage or wear.

NOTICE

If the gear teeth on either the Bevel Gear (205) or Bevel Pinion (205) are worn or chipped, replace both parts. These are a matched set and must be replaced with a matched set.

Disassembly of the Clutch

1. Carefully grasp the flats of the Coupling Nut (67) in leather-covered or coppper-covered vise jaws, Clutch Housing (51) facing downward.

NOTICE

This is a left-hand thread.

2. Using a wrench on the flats of the Gear Case (46), loosen the Gear Case from the Coupling Nut. Remove the tool from the vise.
3. Unscrew the Coupling Nut and remove the Clutch Housing from the Gear Case.
4. Grasp the Clutch Shaft Assembly and pull the Assembly out of the Clutch Housing.

CAUTION

When the Clutch Adjusting Nut (60) is loosened enough to relieve the spring pressure, hold the assembly over a container to catch the twenty-four Clutch Balls (56) that will be free to drop out and might otherwise be lost.

NOTICE

This is a left-hand thread.

5. Working over a workbench, unscrew and remove the Clutch Adjusting Nut.
6. Remove the Adjusting Nut Lock (61), Clutch Spring Seat (58), Spring Seat Bearing (59) and another Clutch Spring Seat (58).
7. Slide the Clutch Spring (63), the third Clutch Spring Seat (58) and Clutch Ball Spacer (57) off the Clutch Shaft (54).
8. Remove the Front Clutch Jaw (55).
9. Remove the Clutch Driver Retainer (66) and slide the Clutch Driver (65) from the Clutch Shaft Support (64).

NOTICE

This is a slip fit.

10. Using needle nose pliers or a wire hook, remove the Clutch Engaging Spring (62).

Disassembly of the Gearing

1. Using a pin punch and hammer, drive out the Throttle Lever Pin (5) to release the Throttle Lever (4).
2. Grasp the flats of the Motor Housing in leather–covered or copper–covered vise jaws, Gear Case facing upward, being careful not to distort the Motor Housing.

NOTICE

This is a right–hand thread.

3. Using a wrench on, the flats of the Gear Case, loosen, but do not remove the Gear Case.

CAUTION

Be certain to hold the tool over a workbench so that you will not lose any parts.

4. Remove the tool from the vise and, while holding the tool horizontally, carefully unscrew the Gear Case by hand and pull it away from the Motor Housing.
5. **For M or N ratio,** the Rotor Pinion (39) and Rotor Pinion Spacer (40) may come out with the Spindle, or they may have remained with the Rotor (26) when the Gear Case was removed. Remove the Rotor Pinion and Rotor Pinion Spacer.
6. **For K or L ratio,** remove the Spindle Planet Gears (37). Position the Gear Case vertically in an arbor press, planet gear end down. Using a 7/16" (11 mm) diameter brass rod against the outer rim of the Spindle, press the Spindle from the Gear Case.
   For M or N ratio, remove the Gear Head Planet Gears (42), Gear Head (41), Gear Head Spacer (44) and Spindle Planet Gears (37). Position the Gear Case vertically in an arbor press, planet gear end down. Using a 7/16" (11 mm) diameter brass rod against the outer rim of the Spindle, press the Spindle from the Gear Case.
7. Using snap ring pliers, remove the Spindle Bearing Retainer (50).
8. Tap the externally threaded end of the Gear Case on a workbench to remove the Grease Shield (48) and Spindle Bearing (49).
9. Remove the Seal (36), Seal Support (35) and Seal Retaining Washer (34A) from the Spindle.

Disassembly of the Motor and Throttle

1. Remove the Rotor Bearing Housing (33) from the Motor Housing (1).
2. Grasp the splined end of the Rotor (26) and pull the assembled motor from the Motor Housing.
3. Remove the Rear End Plate Gasket (24) from the Motor Housing.

CAUTION

Make certain the Rear End Plate Retainer (25) does not fly when it is slipped off the hub of the Rotor.

4. Using a pair of external snap ring pliers with just the tips of the pliers inserted between the ends of the Rear End Plate Retainer, spread the Retainer enough to remove it from the groove in the hub of the Rotor.
5. Remove the Rear End Plate (23), Cylinder (28) and Vanes (27).
6. Check the Front Rotor Bearing (31) for damage or roughness. If replacement is necessary, support the Front End Plate (29) between two blocks of wood on the table of an arbor press. Press the Rotor from the Front Rotor Bearing.
7. Do not remove the Rear Rotor Bearing (2) unless you have a new bearing on hand for replacement. The old bearing will be damaged during the removal process. To remove the Rear Rotor Bearing, refer to step 14 below.
8. Grasp the flats of the Motor Housing in leather–covered or copper–covered vise jaws, inlet facing upward.
9. Using a wrench on the flats, unscrew and remove the Inlet Bushing (16).
10. Remove the Throttle Valve Spring (6) and Air Strainer Screen (17).
11. Remove the Exhaust Deflector (13), Inlet Bushing Spacer (15), Exhaust Silencer (12), Muffler Element (14), Exhaust Deflector Seal (11) and Silencer Seal Ring (10).
12. Lift out the Throttle Valve (8) and the Throttle Valve Plunger (9).
13. If removal of the Throttle Valve Seat (7) is necessary, use a wire hook to pull the Throttle Valve Seat from the Motor Housing.
14. If removal of the Rear Rotor Bearing is necessary, thread a No. 10–24 thread cap screw through the Bearing and into the Rear Rotor Bearing Nut (3) to jack the Bearing form the bearing recess.

Disassembly of the Reverse Valve

1. Using a 3/32" Allen Wrench, remove the Retainer Setscrew (21).
2. Remove the Lock Pin Retainer (19).

NOTICE

Be careful not to lose the Reverse Valve Spring (22) when removing the Reverse Valve (18).

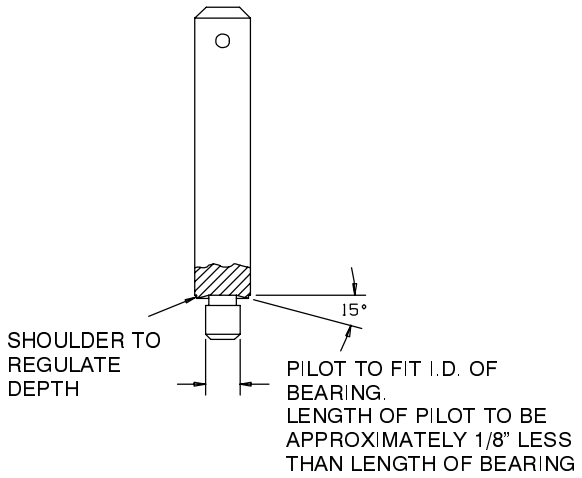
3. While holding the Motor Housing horizontally with the throttle plunger hole downward, tap the top side of the Housing with a plastic hammer to dislodge the Reverse Valve Lock Pin (20) allowing the Reverse Valve to be withdrawn from the Housing.

ASSEMBLY

General Instructions

1. Always press on the **inner** ring of a ball-type bearing when installing the bearing on a shaft.
2. Always press on the **outer** ring of a ball-type bearing when pressing the bearing into a bearing recess.
3. Whenever grasping a tool or part in a vise, always use leather-covered or copper-covered vise jaws. Take extra care with threaded parts and housings.
4. Always clean every part and wipe every part with a thin film of the recommended oil before installation.
5. Check every bearing for roughness. If an open bearing must be cleaned, wash it thoroughly in a clean, suitable, cleaning solution and dry with a clean cloth. **Sealed or shielded bearings should not be cleaned.** Work grease into every open bearing before installation.
6. Apply a film of O-ring lubricant to all O-rings before installation.
7. Unless otherwise noted, always press on the stamped end of a needle bearing when installing the needle bearing in a recess. Using the bearing inserting tool similar to the one shown in Dwg. TPD786.

Needle Bearing Inserting Tool



(Dwg. TPD786)

Assembly of the Motor and Throttle

1. If the Rear Rotor Bearing (2) was removed, install a new one as follows:
   a. Install the Rotor Bearing Ejecting Nut (3) in the hexagon recess in the bore of the Motor Housing.
   b. Using a bearing inserting tool that has a pilot extending into the Bearing and a shoulder that contacts the outer radius of the bearing shell, press a new Rear Rotor Bearing (2) into the Motor Housing until it is about .010" to .020" (0.25 mm to 0.50 mm) below flush. Inject 0.5 cc of grease into the Bearing.
2. Carefully grasp the flats of the Motor Housing in copper-covered vise jaws, inlet end facing upward.
3. If the Throttle Valve Seat (7) was removed, use a flat-faced rod 1/2" (11 mm) in diameter by 3" (75 mm) long to push the Throttle Valve Seat into the Motor Housing until it seats.
4. Install the Throttle Valve Plunger (9) until the hole in the Plunger aligns dead center with the hole in the Throttle Valve Seat.
5. Using needle nose pliers to hold the short-stem end of the Throttle Valve (8), install the Valve, long-stem end through the hole in the Throttle Valve Seat and the Throttle Plunger.
6. Install the Muffler Element (14) by wrapping it horseshoe fashion around the inside of the Exhaust Deflector (13) covering all exhaust holes.
7. Snap the Exhaust Silencer (12) into the large open end of the Exhaust Deflector.
8. Install the Exhaust Deflector Seal (11) into the groove on the front end of the Exhaust Deflector.
9. Install the Silencer Seal Ring (10) over the hub of the Motor Housing and flush with the base of the hub.
10. Install the Exhaust Deflector over the hub of the Motor Housing, aligning the wide tab on the Exhaust Deflector with the throttle plunger hole in the Motor Housing.

NOTICE

Tabs on the Exhaust Deflector match notches in the Motor Housing. Do not force the Exhaust Deflector in place.

11. Insert the Air Strainer Screen (17) closed end first, inside the external threaded end of the Inlet Bushing (16).
12. Insert the Throttle Valve Spring (6) large coil end first, into the Inlet Bushing, making sure it contacts the Air Strainer Screen.
13. Install the Inlet Bushing Spacer (15) in the large hole in the Exhaust Deflector.
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 Inlet Bushing to a minimum of 25 ft-lb (33.9 Nm) torque.
15. Note that the throttle lever pin hole in the Exhaust Deflector is larger at one end than the other. Install the Throttle Lever (4), pressing the Throttle Lever Pin (5) into the large end of the pin hole.
16. Slide the Front End Plate (29), flat side first, over the splined end of the Rotor (26).

17. Using a sleeve that contacts only the inner ring of the Front Rotor Bearing (31), press the Front Rotor Bearing onto the splined hub of the Rotor until it seats against the Front End Plate. Inject 0.5 cc of grease into the bearing.
18. The clearance between the Front End Plate and the Rotor is critical. While holding the Front End Plate, gently tap the splined end of the Rotor until you can insert a 0.001" feeler gauge or shim between the face of the Rotor and End Plate.
19. Grasp the splined end of the Rotor in copper-covered vise jaws so that the short hub of the Rotor is upward.
20. Wipe each Vane (27) with a film of Ingersoll-Rand No. 10 Oil and place a Vane in each slot in the Rotor.
21. Place the Cylinder (28) down over the Rotor and against the Front End Plate so that the tapered section on the rim faces the Front End Plate.
22. Place the Rear End Plate (23), flat side first, over the short hub of the Rotor.

CAUTION

Make certain the End Plate Retainer (25) does not fly as you slip it on the hub of the Rotor.

23. Install the End Plate Retainer in the groove on the rotor hub.
24. Position the Rear End Plate Gasket (24) into the bottom of the motor housing bore so the dowel hole and air inlet port in the Gasket align with the dowel hole and air inlet in the hosing bore face.
25. 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, Cylinder and Rear End Plate. 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 at the bottom of the housing bore, and slide the motor into the Motor Housing until it seats.
26. Withdraw the assembly dowel and insert the Cylinder Dowel (30) until the Cylinder Dowel is slightly below the surface of the Front End Plate.
27. Place the two Bearing Spring Washers (32) inside the Rotor Bearing Housing (33).
28. Slide the Rotor Bearing Housing into the Motor Housing and over the Front Rotor Bearing until it seats.

Assembly of the Reverse Valve

1. Install the Reverse Valve Lock Pin (20) into the hole in the side of the Reverse Valve (18).
2. Slip the Reverse Valve Spring (22) into the end of the Reverse Valve opposite the reverse valve knob.
3. Hold the Motor Housing (1) horizontally with the Throttle Lever on top. Insert the Reverse Valve and Spring in the reverse valve bushing, so that the Reverse Valve Lock Pin is on top. Rotate the Reverse Valve one-half turn (180°) to allow the Lock Pin to drop into the slot in the wall of the Bushing. Release the Reverse Valve and install the Lock Pin Retainer (19) and Retainer Setscrew (21). Tighten Retainer Setscrew to 20 in-lb (27 Nm).

NOTICE

The Setscrew must not protrude from the Reverse Valve.

4. Operate the Reverse Valve to make sure it functions smoothly.

Assembly of the Gearing

1. Install the Grease Shield (48) into the front end of the Gear Case (46) until it seats in the recess.
2. Slip the Spindle Bearing (49) into the Gear Case until it seats and is flush against the Grease Shield.
3. Using snap ring pliers, install the Spindle Bearing Retainer (50) in the groove in front of the Spindle Bearing.
4. If the Spindle Planet Gear Bearings (38) were removed, press in new Spindle Planet Gear Bearings using a bearing inserting tool similar to the one in Dwg. TPD786 that has a pilot and that contacts the outer radius of the Bearing. Press against the stamped end of the Bearing.

   For M ratio, press the new Spindle Planet Gear Bearings into the Spindle Planet Gear to a depth of .02" to .03" (.50 mm to 75 mm) from the face of the Spindle Planet Gear.
5. **For L ratio,** proceed as follows:
   a. While supporting the inner race of the Spindle Bearing in an arbor press, external threads of the Gear Case facing downward, press the spindle into the Spindle Bearing until the shoulder of the Spindle is seated against the Bearing.
   b. Place a Spindle Planet Gear (37) on each gear shaft of the Spindle.
   c. Work 3 cc to 6 cc of the recommended grease into the gear train.

   For M or N ratio, proceed as follows:
   a. While supporting the inner race of the Spindle Bearing in an arbor press, external threads of the Gear Case facing downward, press the Spindle into the Spindle Bearing until the shoulder of the Spindle is seated against the bearing.
   b. Place a Spindle Planet Gear on each gear shaft of the Spindle.
   c. Work 3 cc to 6 cc of the recommended grease into the gear train.

d. If the Gear Head Planet Gear Bearings (43) were removed, press in new Gear Head Planet Gear Bearings using a bearing inserting tool similar to that one in Dwg. TPD786 that has a pilot and that contacts the outer radius of the Bearing. Press against the stamped end of the Bearing.
e. Install the Gear Head Spacer (44) into the Gear Case flush against the face of the Spindle Planet Gears.
f. Install the assembled Gear Head (41) into the Gear Case, entering the spline of the Gear Head into mesh with the Spindle Planet Gears.

6. Insert the Bearing Housing Spacer (33B) into the Gear Case.
7. **For M or N ratio,** place the Rotor Pinion Spacer (40) and Rotor Pinion (39) over the splined end of the Rotor.

NOTICE

This is a right-hand thread.

8. Thread the assembled Gear Case into the Motor Housing and tighten to 40 ft-lb (54 Nm) torque.

NOTICE

Run the motor at free speed on low air pressure while tightening the Gear Case. Listen while tightening to make sure there is no scoring.

Assembly of the Cushion Clutch

1. Install the Clutch Driver (65), flat side first, onto the spline end of the Clutch Shaft Support (64) and retain with the Clutch Driver Retainer (66). Set the Clutch Driver Assembly aside.
2. Slide the Front Clutch Jaw (55), jaw end first, over the end of the Clutch Shaft (54) and along the splines to the groove at the opposite end.
3. Coat the grooved end with the recommended grease and insert 13 Clutch Balls (56) (9/64" diameter) between the Jaw and into the groove of the Clutch Shaft. Pull the Clutch Jaw down to lock the Bearings into the groove of the Shaft.
4. While holding the Clutch Jaw firmly on the Clutch Balls, insert the Clutch Driver Assembly, spline end trailing, into the bore of the Clutch Shaft.

NOTICE

Make certain the jaws of the Clutch Driver engage the Front Clutch Jaw.

5. Carefully grasp the spline of the Clutch Shaft Support in leather-covered or copper-covered vise jaws so that the spline end of the Clutch Shaft faces upward.
6. Lightly coat the face of the Front Clutch Jaw with the recommended grease.
7. Slide the Clutch Ball Spacer (57) over the splined end of the Clutch Shaft, aligning the holes in the Spacer with the holes in the Clutch Jaw. Put some grease in the holes in the Spacer.
8. Insert a Clutch Ball (56) (9/64" diameter) into each of the eleven holes in the Spacer, and, **in the order named,** slide the following over the Clutch Shaft: one Clutch Spring Seat (58), the Spring Seat Bearing (59), the third Clutch Spring Seat (58) and the Adjusting Nut Lock (61), indented side trailing. Thoroughly grease the Clutch Balls, Bearing and Adjusting Nut Lock.
9. Start the Clutch Adjusting Nut (60), detent side first, onto the Clutch Shaft and run it finger tight against the compression of the Spring.

NOTICE

This is a left-hand thread.

10. Remove the assembled Clutch from the vise.
11. Install the Clutch Shaft Assembly into the Clutch Housing (51) with the splined end of the Clutch Shaft Support trailing.
12. Install the Clutch Housing Assembly into the Gear Case Assembly matching the spline of the Clutch Housing with that of the Gear Case (46).
13. Thread the Coupling Nut (67) onto the Gear Case, hand tight. Grasp the flats of the Gear Case in leather-covered or copper -covered vise jaws and using a wrench on the flats of the Coupling Nut, tighten it to 25 ft-lb (34 Nm) torque.

Assembly of the Angle Attachment

1. Lubricate the Bevel Pinion (205) with 0.5 cc of the recommended grease and insert it, gear end first, into the long bore of the Angle Attachment (201).
2. Lubricate the Bevel Pinion (206) with a light coat of the recommended grease and insert it, unstamped end first, into the bore of the Angle Attachment and onto the bevel pinion shaft.
3. **For 5L2C6 Angle Attachment,** press the Bevel Pinion Bearing, stamped face outward, using the Pinion Bearing Spacer (210).

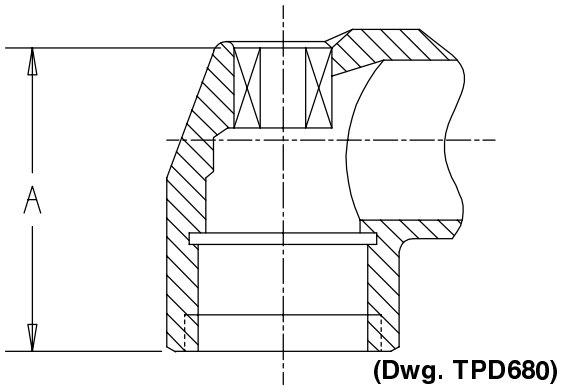
NOTICE

The outward face of the Spacer must be flush with the internal groove in the Angle Housing.
Using snap ring pliers, install the Bearing Spacer Retainer (211).

For the 7L3D6 Angle Attachment, use the Bearing Inserting Tool (227) and press the Bevel Pinion Bearing so the stamped face is a maximum of 1.35" (34.40 mm) but not less that 1.34" (34.14 mm) below the end of the face of the Angle Head. Install the Bevel Pinion Bearing Spacer (216) and install the Bearing Spacer Retainer (211).

4. **For 5L2C6 Angle Attachment,** lubricate the Bevel Pinion Thrust Bearing (212) with 0.5 cc to 1 cc of the recommended grease. Install the Bearing over the splined end of the Bevel Pinion and retain it with the Bearing Retainer (213).
   For 7L3D6 Angle Attachment, lubricate the Bevel Pinion Thrust Bearing (212) with 0.5 cc of the recommended grease. Install in order named the Front Thrust Bearing Seat (209). Bevel Pinion Thrust Bearing, and Rear Thrust Bearing Seat (207) over the splined end of the Bevel Pinion and retain with the Bearing Seat Retainer (208).
5. If the Lower Spindle Bearing (214) has been removed, work 0.5 cc to 1 cc of the recommended grease into the bearing. Use a sleeve that will contact ony the inner ring of the Bearing and press the Lower Spindle Bearing, sealed side first, onto the Spindle (219 or 220).
6. Lubricate the Bevel Pinion Gear (205) with 0.5 cc to 1 cc of the recommended grease and slide the Bevel Gear onto the Spindle
7. Apply a thin coat of thread locking compound to the threads of the Bevel Gear Retainer and tighten it on the Spindle to 10 ft–lb (13.5 Nm) torque.

   For 7L3D6 Angle Attachment, snap Bevel Gear Retainer in place on Spindle to retain Bevel Gear on Spindle.
8. Lubricate a new Upper Spindle Bearing (204) with 0.5 cc to 1 cc of the recommended grease. Press the closed end of the Upper Spindle Bearing entering the Bearing into the small bore opposite the threaded end of the Angle Housing (201) to the dimension shown in Drawing TPD680.
   For 7L3D6 Angle Attachment, press Angle Housing Cap (203) flat and flush with surface of Angle Housing.
9. Lubrciate the Spindle Upper Bearing, Bevel Gear and Lower Spindle Bearing with 0.5 cc to 1 cc of the recommended grease and install the Spindle into the Angle Attachment.



(Dwg. TPD680)

Minimum Dimension "A"		
Angle Attachment	**in**	**mm**
5L2C6	1.21	30.75
7L3D6	.72	18.25
Maximum Dimension "A"		
5L2C6	1.37	31.25
7L3D6	.73	18.50

10. Clean the threads on the Angle Attachment and The Spindle Bearing Cap (223), and apply a thin coat of thread locking compound to the threads.
11. Install the Spindle Bearing Cap.
    For 5L2C6, tighten to 15 ft–lb (20.0 Nm) torque.
    For 7L3D6, tighten to 25 ft–lb (34.0 Nm) torque.
12. Slide the Coupling Nut (225), threaded end trailing, over the splined end of the Angle Attachment.
13. Apply the Coupling Nut Retainer (224) to the external groove on the splined end of the Angle Attachment.
14. **For 5L2C6 Angle Attachment,** engage the spline on the Bevel Pinion with the matching spline in the Clutch Shaft (54) and thread the Coupling Nut onto the Clutch Attachment. Tighten the Coupling Nut to a minimum of 25 ft–lb (34 Nm) torque. Make certain the output end of the Spindle is on the same side of the tool as the Throttle Lever (4).
15. **For 7L3D6 Angle Attachment,** engage the spline on the Bevel Pinion with the matching spline in the Spindle (34) and thread the Coupling Nut onto the Gear Case (46). Tighten the Coupling Nut to a minimum of 25 ft–lb (34 Nm) torque. Make certain the output end of the Spindle is on the same side of the tool as the Throttle Lever.

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Low power or low free speed	Low air pressure	Check the air line pressure at the inlet. The pressure must not exceed 90 psig (6.2 bar/620 kPa) at the inlet.
	Plugged Inlet Bushing Screen or Air Strainer Screen	Clean the Screen in a clean, suitable, cleaning solution. If it cannot be cleaned, replace it.
	Worn or broken Vanes	Replace the **complete** set of Vanes.
	Loose Rotor Bearing Retaining Nut	Tighten the Nut.
	Worn or broken Cylinder	Replace the Cylinder if it is worn or broken or if the bore is scored or wavy.
	Scoring of End Plates	Replace End Plates if they are scored.
	Improper lubrication or dirt build–up in the motor.	Lubricate the Wrench as instructed in **LUBRICATION.** If lubrication does not result in satisfactory operation, disassemble the motor inspect and clean all parts.
	Clogged Muffler	Clean the Muffler Element in a clean, suitable, cleaning solution. If it cannot be cleaned, replace it.
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 for about 30 seconds. **Immediately,** pour 3 cc of oil in the air inlet and operate the tool for 30 seconds to lubricate all cleaned parts.
Scoring	Improper assembly	Make certain that all motor or Cylinder parts are properly aligned prior to clamping the motor assembly.
Gear Case gets hot	Excessive grease	Clean and inspect the Gear Case gearing parts and lubricate as instructed in **LUBRICATION**.
	Worn or damaged parts	Clean and inspect the Gear Case and gearing. Replace worn or broken components.
Angle Attachment gets hot	Excessive grease	Clean and inspect the Angle attachment and gearing parts. Lubricate as instructed in Lubrication.
	Inadequate grease	Inject 0.5 to 1.5 cc of grease into the Grease Fitting.
	Worn or damaged parts	Clean and inspect the Angle Attachment and gearing. If the Bevel Gear and/or Bevel Pinion is worn or broken, replace both parts as they are a matched set.
Inconsistent disengagement of Clutch Attachment	Improper lubrication	Lubricate the Attachment in accordance with the instructions in Lubrication.
	Worn or damaged part	Replace the worn or damaged parts.
	Worn Clutch Spring (using a Heavy Spring on a light torque application)	Install a light Clutch Spring in place of the Heavy Spring.

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Motor stalls	Improper adjustment of Attachment or incorrect gearing ratio for the application	Check the adjustment of the Attachment and review the Tool performance compared to torque requirements.
Motor shuts off before peak torque is reached	Improper adjustment of Attachment or incorrect gearing ratio for the application	Check the adjustment of the Attachment and review the Tool performance compared to torque requirements.

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.