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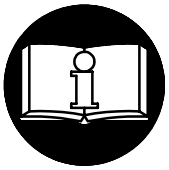
OPERATION AND MAINTENANCE MANUAL FOR SERIES 6 DRILLS

NOTICE

Series 6 Drills are designed for drilling operations in the aerospace, automotive, appliance, electronic, machining and furniture industries.
Ingersoll–Rand is not responsible for customer modification of tools for applications on which Ingersoll–Rand was not consulted.



⚠ WARNING

IMPORTANT SAFETY INFORMATION ENCLOSED.
READ THIS MANUAL BEFORE OPERATING TOOL.
IT IS THE RESPONSIBILITY OF THE EMPLOYER TO PLACE THE INFORMATION IN THIS MANUAL INTO THE HANDS OF THE OPERATOR.
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

PLACING TOOL IN SERVICE

- **Always operate, inspect and maintain this tool in accordance with American national Standards Institute Safety Code for Portable Air Tools (ANSI B186.1).**
- **For safety, top performance, and maximum durability of parts, operate this tool at 90 psig (6.2 bar/620 kPa) maximum air pressure at the inlet with 3/8" (10 mm) inside diameter air supply hose.**
- **Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.**
- **Do not use damaged, frayed or deteriorated air hoses and fittings.**
- **Be sure all hoses and fittings are the correct size and are tightly secured. See Dwg. TPD905–1 for a typical piping arrangement.**
- **Always use clean, dry air at 90 psig (6.2 bar/620 kPa)maximum air pressure. Dust, corrosive fumes and/or excessive moisture can ruin the motor of an air tool.**
- **Do not lubricate tools with flammable or volatile liquids such as kerosene, diesel or jet fuel.**
- **Do not remove any labels. Replace any damaged label.**

USING THE TOOL

- **Always wear eye protection when operating or performing maintenance on this tool.**
- **Always wear hearing protection when operating this tool.**
- **Keep hands, loose clothing and long hair away from rotating end of tool.**
- **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 shaft may continue to rotate briefly after throttle is released.**
- **Air powered tools can vibrate in use. Vibration, repetitive motions or uncomfortable positions may be harmful to your hands and arms. Stop using any tool if discomfort, tingling feeling or pain occurs. Seek medical advice before resuming use.**
- **Use accessories recommended by Ingersoll–Rand.**
- **The Throttle Valve Cap is under pressure from the Throttle Valve Spring. Use care when removing the Throttle Valve Cap. *(On tools where applicable.)***
- **This tool is not designed for working in explosive atmospheres.**
- **This tool is not insulated against electric shock.**

NOTICE

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

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

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

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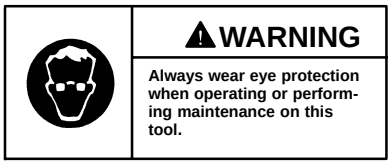
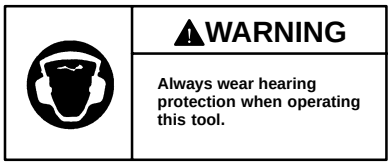
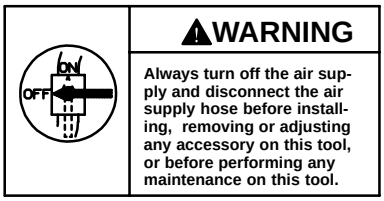
WARNING LABEL IDENTIFICATION

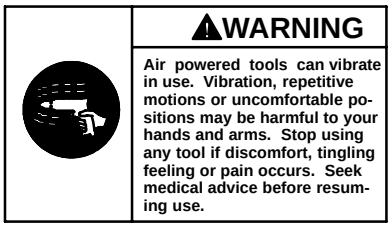
⚠ WARNING

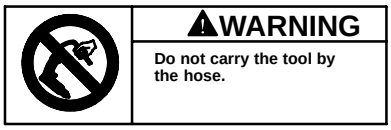
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

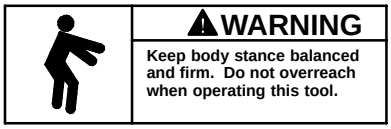


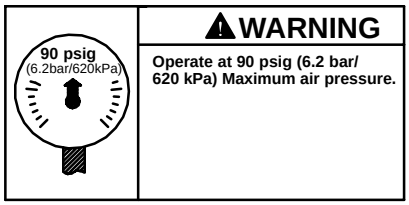












PLACING TOOL IN SERVICE

LUBRICATION

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

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

USA – No. C18–03–FKG0–28

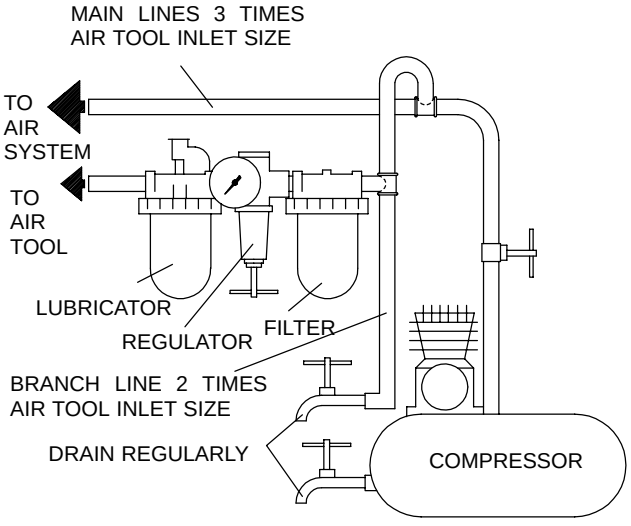
Motor

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

Gearing

For models with H, J, JJ, K, or L gearing, after each 50,000 cycles or 160 hours of operation, whichever comes first, inject 2 – 3 cc of Ingersoll–Rand No. 67 Grease into the Grease Fitting.

For models with R gearing, after each 50,000 cycles or 160 hours of operation, whichever comes first, inject 3 – 4 cc of Ingersoll–Rand No. 67 Grease into the Grease Fitting.



(Dwg. TPD905–1)

HOW TO ORDER A DRILL

LEVER THROTTLE

Model	Free Speed rpm	Chuck Capacity in	Chuck Capacity mm
6LH1	6 000	1/4	6
6LJ1	5 100	1/4	6
6LJJ1	3 950	1/4	6
6LK1	3 100	1/4	6
6LL1	2 150	1/4	6
6LR3	500	3/8	10

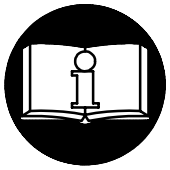
F

MANUEL D'EXPLOITATION ET D'ENTRETIEN DES PERCEUSES DE LA SÉRIE 6

NOTE

Les perceuses de la Série 6 sont destinées aux opérations de perçage dans les industries de l'aérospatiale, de l'automobile, des appareils ménagers, de l'électronique, de l'usinage et des meubles.

Ingersoll–Rand ne peut être tenu responsable de la modification des outils par le client pour les adapter à des applications qui n'ont pas été approuvées par Ingersoll–Rand.



⚠ ATTENTION

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

MISE EN SERVICE DE L'OUTIL

- **Toujours exploiter, inspecter et entretenir cet outil conformément au Code de sécurité des outils pneumatiques portatifs de l'American National Standards Institute (ANSI B186.1).**
- **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.**
- **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.**
- **Le chapeau de la soupape de commande est soumis à la pression du ressort de soupape. Prendre les soins nécessaires lors de la dépose du chapeau de soupape de commande. *(Sur les outils concernés).***
- **Cet outil n'est pas conçu pour fonctionner dans des atmosphères explosives.**
- **Cet outil n'est pas isolé contre les chocs électriques.**

NOTE

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

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

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

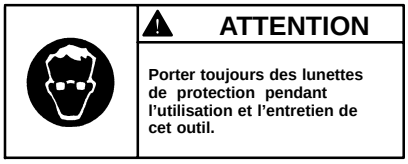
Imprimé aux É.U.

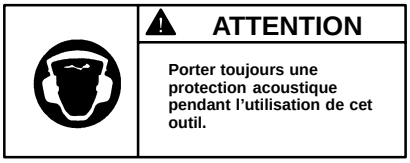
Ingersoll-Rand®

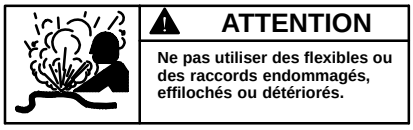
SIGNIFICATION DES ETIQUETTES D'AVERTISSEMENT

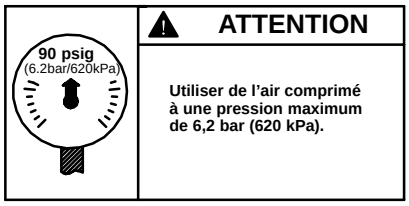
⚠ ATTENTION

LE NON RESPECT DES AVERTISSEMENTS SUIVANTS PEUT CAUSER DES BLESSURES









MISE EN SERVICE DE L'OUTIL

LUBRIFICATION

Ingersoll–Rand No. 10

Ingersoll–Rand No. 67

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

É.U. – No. C18–03–FKG0–28

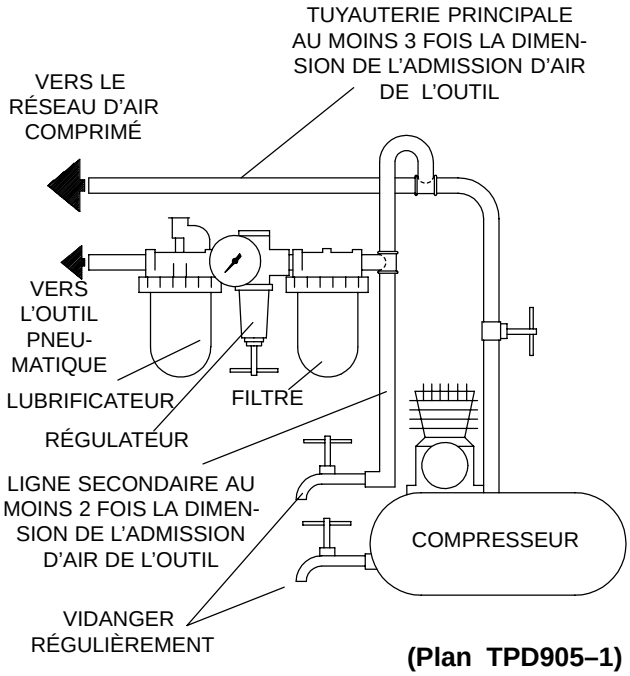
Moteur

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

Pignonnerie

Pour les modèles équipés de la pignonnerie H, J, JJ, K ou L, tous les 50 000 cycles ou 160 heures de fonctionnement, selon le cas, injecter 2 – 3 cm^3 de graisse Ingersoll–Rand No. 67 dans le raccord de graissage

Pour les modèles équipés de la pignonnerie R, tous les 50 000 cycles ou 160 heures de fonctionnement, selon le cas, injecter 3 à 4cm^3 de graisse Ingersoll–Rand No. 67 dans le raccord de graissage



(Plan TPD905–1)

SPÉCIFICATIONS

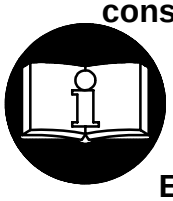
Modèle	Type de poignée	Vitesse libre tr/mn	Capacité du mandrin pouces (mm)
6LH1	levier	6 000	1/4 (6)
6LJ1	levier	5 100	1/4 (6)
6LJJ1	levier	3 950	1/4 (6)
6LK1	levier	3 100	1/4 (6)
6LL1	levier	2 150	1/4 (6)
6LR3	levier	500	3/8 (10)

E

MANUAL DE FUNCIONAMIENTO Y MANTENIMIENTO
TALADROS DE LA SERIE 6

NOTA

Los taladros de la serie 6 están diseñados para las operaciones de taladrado de las industrias aeroespacial, del automóvil, electrodomésticos, electrónica, mecánica y del mueble.
Ingersoll–Rand no aceptará responsabilidad alguna por la modificación de las herramientas efectuada por el cliente para las aplicaciones que no hayan sido consultadas con Ingersoll–Rand.



⚠ AVISO

SE ADJUNTA INFORMACIÓN IMPORTANTE DE SEGURIDAD.
LEA ESTE MANUAL ANTES DE UTILIZAR LA HERRAMIENTA.
ES RESPONSABILIDAD DE LA EMPRESA ASEGURARSE DE QUE EL OPERARIO ESTÉ AL TANTO DE LA INFORMACIÓN QUE CONTIENE ESTE MANUAL.
EL HACER CASO OMISO DE LOS AVISOS SIGUIENTES PODRÍA OCASIONAR LESIONES.

PARA PONER LA HERRAMIENTA EN SERVICIO

- **Utilice, examine y mantenga siempre esta herramienta conforme al código de seguridad para herramientas neumáticas portátiles de la American National Standards Institute (ANSI B186.1).**
- **Para mayor seguridad, rendimiento óptimo y larga vida útil de las piezas, utilice esta herramienta a una presión de aire máxima en la entrada de 90 psig (6,2 bar/620 kPa) con una manguera de suministro de aire con diámetro interno de 10 mm.**
- **Corte siempre el suministro de aire y desconecte la manguera de suministro de aire antes de instalar, desmontar o ajustar cualquier accesorio de esta herramienta, o antes de realizar cualquier operación de mantenimiento de la misma.**
- **No utilice mangueras de aire y racores dañados, desgastados o deteriorados.**
- **Asegúrese de que todos los racores y mangueras sean del tamaño correcto y estén bien apretados. El Esq. TPD905–1 muestra una disposición característica de las tuberías.**
- **Use siempre aire limpio y seco a una presión máxima de 90 psig (6,2 bar/620 kPa). El polvo, los gases corrosivos y/o el exceso de humedad pueden estropear el motor de una herramienta neumática.**
- **No lubrique las herramientas con líquidos inflamables o volátiles tales como queroseno, gasoil o combustible para motores a reacción.**
- **No saque ninguna etiqueta. Sustituya toda etiqueta dañada.**

UTILIZACIÓN DE LA HERRAMIENTA

- **Lleve siempre protección ocular cuando utilice esta herramienta o realice operaciones de mantenimiento en la misma.**
- **Lleve siempre protección para los oídos cuando utilice esta herramienta.**
- **Mantenga las manos, la ropa suelta y el cabello largo alejados del extremo giratorio de la herramienta.**
- **Anticipe y esté alerta sobre los cambios repentinos en el movimiento durante la puesta en marcha y utilización de toda herramienta motorizada.**
- **Mantenga una postura del cuerpo equilibrada y firme. No estire demasiado los brazos al manejar la herramienta. Pueden darse pares de reacción elevados a la presión de aire recomendada, e incluso a presiones inferiores.**
- **El eje de la herramienta puede seguir girando brevemente después de haberse soltado la palanca de mando.**
- **Las herramientas neumáticas pueden vibrar durante el uso. La vibración, los movimientos repetitivos o las posiciones incómodas pueden dañarle los brazos y manos. En caso de incomodidad, sensación de hormigueo o dolor, deje de usar la herramienta. Consulte al médico antes de volver a utilizarla.**
- **Utilice únicamente los accesorios recomendados por Ingersoll–Rand.**
- **El muelle de la válvula reguladora hace fuerza contra la tapa de la válvula. Tenga cuidado al sacar dicha tapa.** ***(Si procede, según la herramienta.)***
- **Esta herramienta no ha sido diseñada para trabajar en ambientes explosivos.**
- **Esta herramienta no está aislada contra descargas eléctricas.**

NOTA

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

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

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

Impreso en EE. UU.

Ingersoll-Rand®

ETIQUETAS DE AVISO

⚠ AVISO

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

⚠ ADVERTENCIA

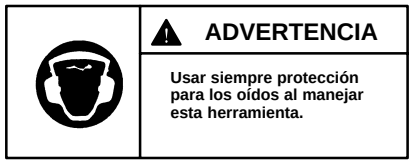
Usar siempre protección ocular al manejar o realizar operaciones de mantenimiento en esta herramienta.

⚠ 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.

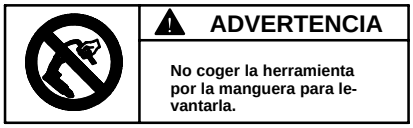
⚠ ADVERTENCIA

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



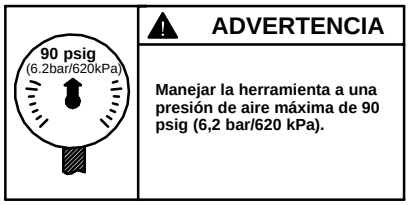
⚠ ADVERTENCIA

Usar siempre protección para los oídos al manejar esta herramienta.



⚠ ADVERTENCIA

No coger la herramienta por la manguera para levantarla.



⚠ ADVERTENCIA

Manejar la herramienta a una presión de aire máxima de 90 psig (6,2 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.

PARA PONER LA HERRAMIENTA EN SERVICIO

LUBRICACIÓN

Ingersoll–Rand Nº. 10

Ingersoll–Rand Nº. 67

Utilice siempre un lubricador de aire comprimido con estas herramientas. Recomendamos utilizar el siguiente conjunto de filtro–lubricador–regulador:

EE. UU. – Nº. C18–03–FKG0–28

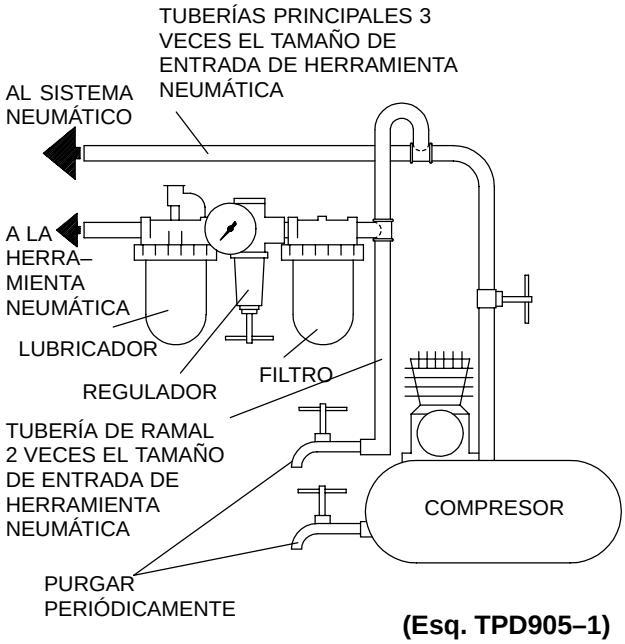
Motor

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

Engranaje

Para modelos de engranaje H, J, JJ, K o L, después de cada 50.000 ciclos o 160 horas de funcionamiento, lo que ocurra primero, inyecte 2 –3 cc de Grasa Ingersoll–Rand Nº. 67 en el Engrasador.

Para modelos de engranaje R, después de cada 50.000 ciclos o 160 horas de funcionamiento (lo que ocurra primero), inyecte 3–4 cc de Grasa Ingersoll–Rand Nº 67 en el engrasador.



(Esq. TPD905–1)

ESPECIFICACIONES

Modelo	Tipo de Empuñadura	Velocidad en vacio	Capacidad de portabrocas
		rpm	pulg. (mm)
6LH1	palanca	6 000	1/4 (6)
6LJ1	palanca	5 100	1/4 (6)
6LJJ1	palanca	3 950	1/4 (6)
6LK1	palanca	3 100	1/4 (6)
6LL1	palanca	2 150	1/4 (6)
6LR3	palanca	500	3/8 (10)

P

MANUAL DE FUNCIONAMENTO E MANUTENÇÃO
BERBEQUINS SÉRIE 6

AVISO

Os Berbequins 6 são concebidos para aplicações de perfuração em linhas de montagem, indústrias de equipamentos, eletronicas, aeroespaciais e de mobílias.
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

- **Opere, inspeccione e mantenha sempre esta ferramenta de acordo com todas regulamentações (local, estadual, federal e do país), que possam ser aplicadas às ferramentas pneumáticas operadas manualmente ou seguras com as mãos.**
- **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 6,2 bar/620 kPa (90 psig). Pó, fumos corrosivos e/ou humidade excessiva podem arruinar o motor de uma ferramenta pneumática.**
- **Não lubrifique as ferramentas com líquidos inflamáveis ou voláteis tais como querosene, diesel ou combustível de jactos.**
- **Não remova nenhum rótulo. Reponha qualquer rótulo danificado.**

USANDO A FERRAMENTA

- **Use sempre óculos de protecção quando estiver operando ou executando serviço de manutenção nesta ferramenta.**
- **Use sempre protecção contra ruído ao operar esta ferramenta.**
- **Mantenha as mãos, partes do vestuário soltas e cabelos compridos afastados da extremidade em rotação.**
- **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.**
- **O eixo da ferramenta pode continuar a girar brevemente após a pressão tenha sido aliviada.**
- **Ferramentas accionadas pneumáticamente podem vibrar em uso. Vibração, movimentos repetitivos ou posições desconfortáveis podem ser prejudiciais às mãos e aos braços. Pare de usar a ferramenta caso ocorra algum desconforto, sensação de formigueiro ou dor. Procure assistência médica antes de retornar ao trabalho.**
- **Use acessórios recomendados pela Ingersoll–Rand.**
- **O Tampo da Válvula Reguladora de Pressão está sob pressão da Mola da Válvula. Tenha cuidado ao removê–lo. (*Apenas em algumas ferramentas.)***
- **Esta Ferramenta não foi concebida para trabalhos em atmosferas explosivas.**
- **Esta Ferramenta não está isolada contra choques eléctricos.**

AVISO

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

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

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

Impresso nos E.U.A.

Ingersoll-Rand®

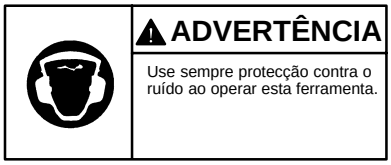
IDENTIFICAÇÃO DO RÓTULO DE ADVERTÊNCIA

⚠ ADVERTÊNCIA

O NÃO CUMPRIMENTO DAS SEGUINTES ADVERTÊNCIAS PODE RESULTAR EM FERIMENTO.

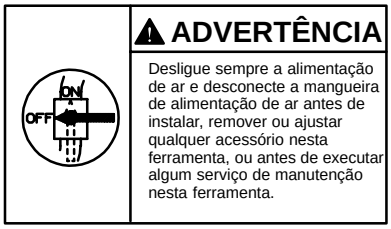
⚠ ADVERTÊNCIA

Use sempre óculos de protecção quando estiver operando ou executando algum serviço de manutenção nesta ferramenta.



⚠ ADVERTÊNCIA

Use sempre protecção contra o ruído ao operar esta ferramenta.

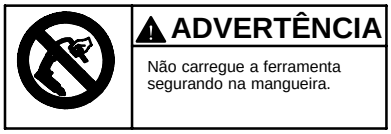


⚠ ADVERTÊNCIA

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 algum serviço de manutenção nesta ferramenta.

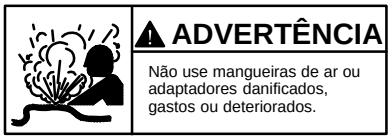
⚠ ADVERTÊNCIA

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.



⚠ ADVERTÊNCIA

Não carregue a ferramenta segurando na mangueira.

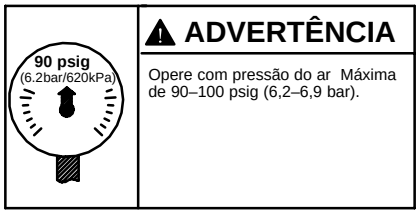


⚠ ADVERTÊNCIA

Não use mangueiras de ar ou adaptadores danificados, gastos ou deteriorados.

⚠ ADVERTÊNCIA

Mantenha a posição do corpo equilibrada e firme. Não exagere quando operar esta ferramenta. Torques de reacção elevados podem ocorrer sob a pressão de ar recomendada.



⚠ ADVERTÊNCIA

Opere com pressão do ar Máxima de 90–100 psig (6,2–6,9 bar).

COLOCANDO A FERRAMENTA EM FUNCIONAMENTO

LUBRIFICAÇÃO

Ingersoll–Rand No. 10

Ingersoll–Rand No. 67

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

E.U.A. – C18–03–FKG0–28

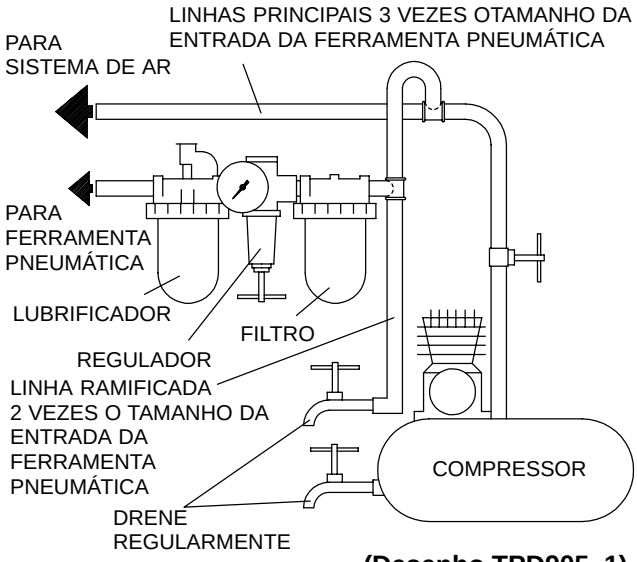
Motor

Ante de operar a Ferramenta e em cada 8 horas de operação, a menos que esteja usando um lubrificador de ar de linha, remova mangueira de ar e injecte algumas gotas de Óleo Ingersoll–Rand No. 10 na entrada de ar.

Engrenagem

Para modelos com engrenagem H, J, JJ, K ou L, depois de 50 000 ciclos ou 160 horas de operação, o que ocorrer primeiro, injecte 3–4 cc de Massa Lubrificadora Ingersoll–Rand No 67 no Adaptador de Massa Lubrificadora.

Para modelos com engrenagem R, depois de 50 000 ciclos ou 160 horas de operação, o que ocorrer primeiro, injecte 2–3 cc de Massa Lubrificadora Ingersoll–Rand No 67 no Adaptador de Massa Lubrificadora.

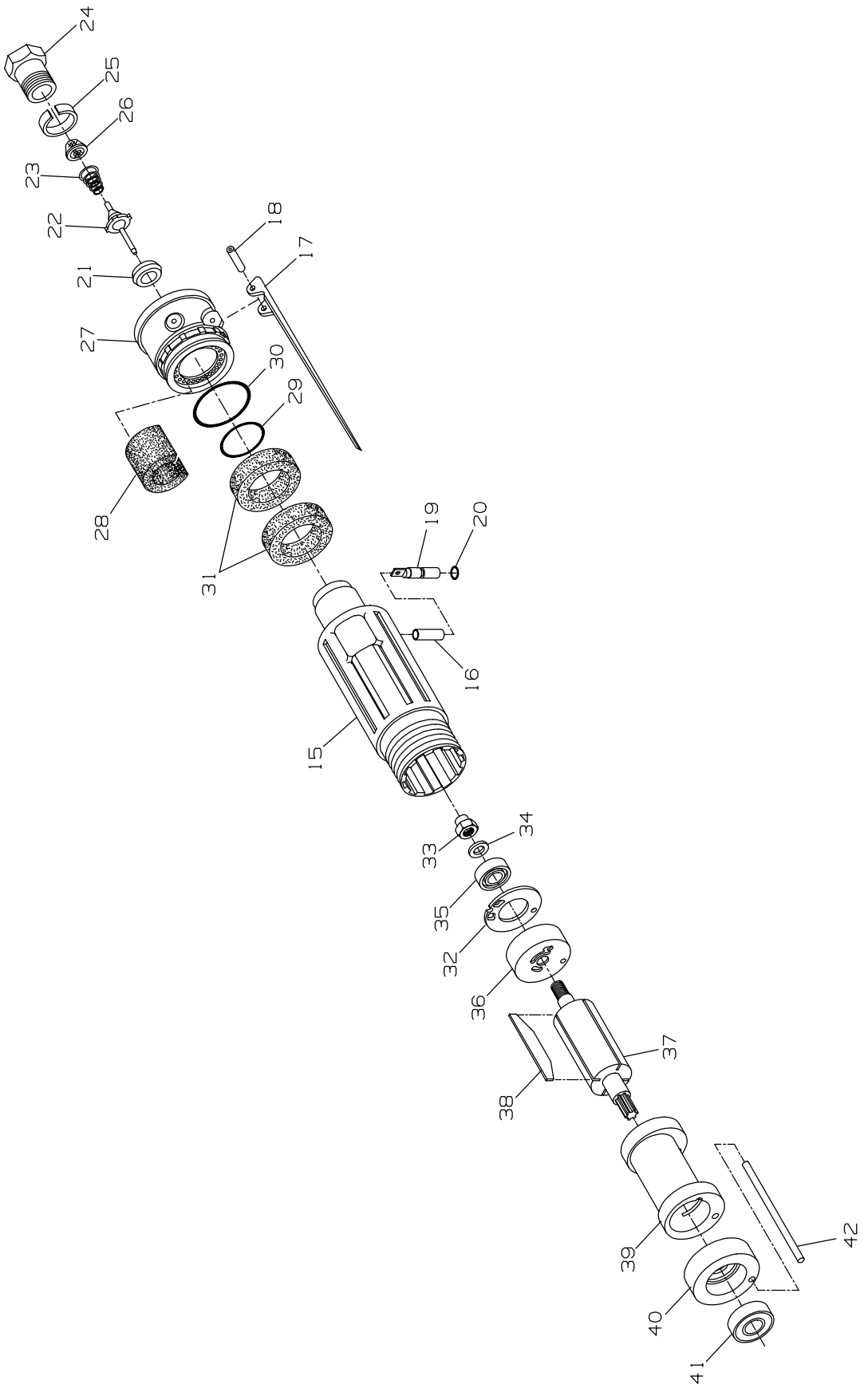


(Desenho TPD905–1)

ESPECIFICAÇÕES

Modelo	Tipo de Punho	Velocidade Livre rpm	Capacidade do Bucha mm (pol.)
6LH1	alavanca	6 000	6 (1/4)
6LJ1	alavanca	5 100	6 (1/4)
6LJJ1	alavanca	3 950	6 (1/4)
6LK1	alavanca	3 100	6 (1/4)
6LL1	alavanca	2 150	6 (1/4)
6LR3	alavanca	500	10 (3/8)

SERIES 6 DRILL POWER UNIT



(Dwg. TPA1139–2)

			PART NUMBER FOR ORDERING
		Motor Housing Assembly	
		for 6L Models	6LH–A40
		for 6L–EU	6LH–EU–A40
	15	Motor Housing	
		for 6L Models	6WS–B40
		for 6L–EU Models	6WS–EU–B40
	16	Throttle Plunger Bushing	7L–91
	*	Warning Label	
		for models ending in –EU	EU–99
		for all other models	WARNING–7–99
	17	Throttle Lever	7L–273
	18	Throttle Lever Pin	7L–120
	19	Throttle Plunger Assembly	5LK2C–A94
♦ •	20	Throttle Plunger Seal	6LL–259
♦	21	Throttle Valve Seat	7AH–303

			PART NUMBER FOR ORDERING
♦	22	Throttle Valve	7AH–302
♦	23	Throttle Valve Spring	7L–51
	24	Inlet Bushing	7L–565
	25	Inlet Bushing Spacer	7AH–65
♦ •	26	Air Strainer Screen	R0A2–61
	27	Rear Muffler Assembly	6WS–A23
♦ •	28	Muffler Element	3RA–310
♦	29	Silencer Seal Ring	WWV100A1–43
♦ •	30	Exhaust Deflector Seal	6AH–103
♦⊗	31	Exhaust Silencer (2)	4RL–311
♦ •	32	Rear End Plate Gasket	6WRT–739
♦ •	33	Rear Rotor Bearing Retaining Nut	6WT–118
♦ •	34	Bearing Thrust Washer	6WT–117
♦	35	Rear Rotor Bearing	DG20–22

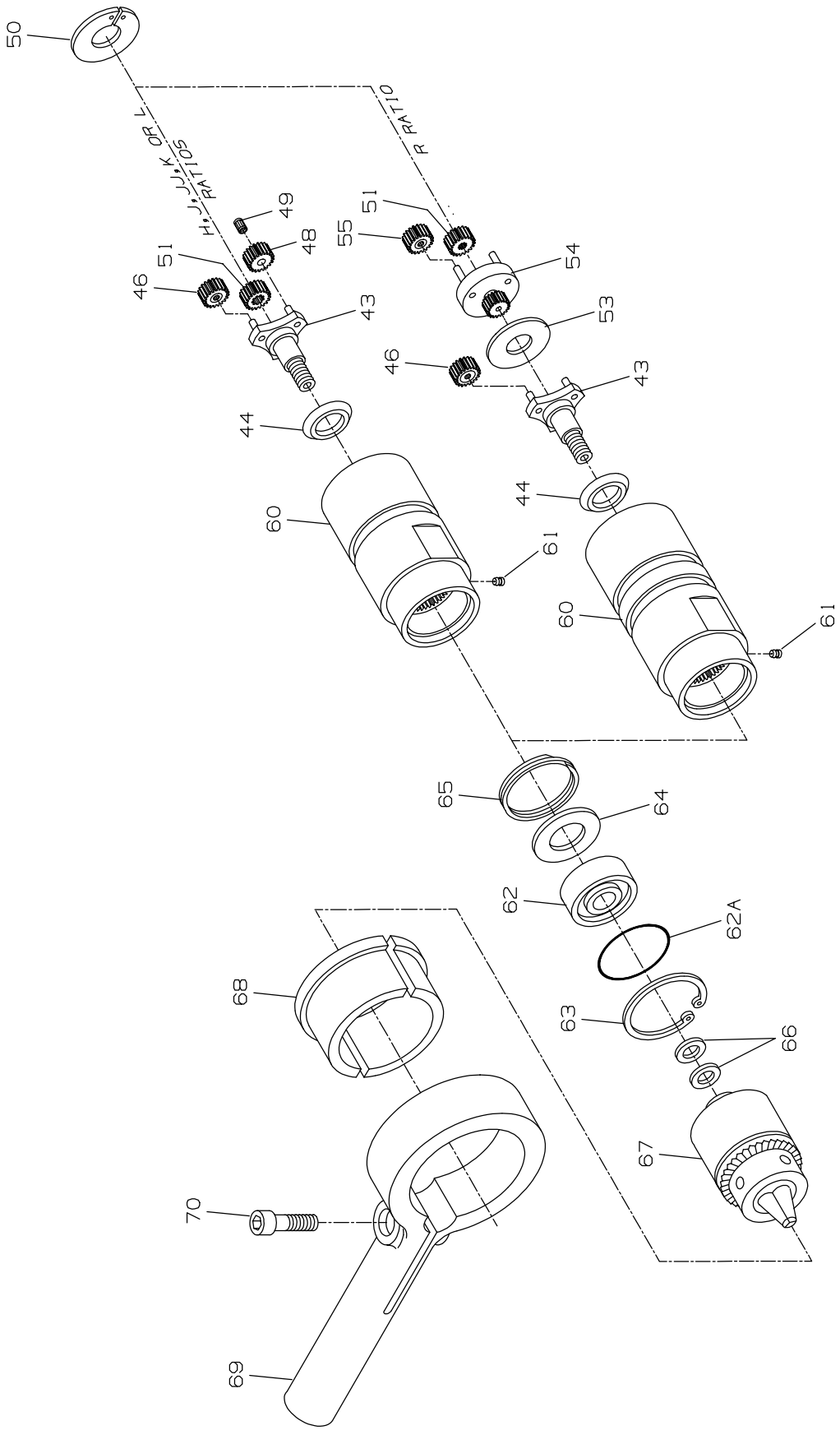
* Not illustrated.

♦ 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.

⊗ Model 6L Lever Throttle Drills are furnished with either one or two Exhaust Silencers (Part No. 4RL–311). Exhaust sound levels can be lowered and free speed reduced by adding a Silencer to models having only one Silencer. Exhaust sound levels can be raised and free speed increased by removing a Silencer from models furnished with two Silencers. **Do not use less than one Silencer.**

SERIES 6 DRILL GEAR UNITS



(Dwg. TPA1140–2)

			PART NUMBER FOR ORDERING				PART NUMBER FOR ORDERING
	36	Rear End Plate	6AH–12		48	Spindle Planet Gear (for H ratio) (14 teeth) (3)	6WTM–10
	37	Rotor			49	Spindle Planet Gear Bearing (for H ratio) (3)	6WTM–500
		for H or J ratios (9 teeth)	6AH–53		50	Gear Retainer	6LL–81
		for JJ ratio (12 teeth)	6AJ–53		51	Rotor Pinion	
		for K or R ratios (9 teeth)	6AK–53			for H ratio (21 teeth)	6WTM–17
		for L ratio (6 teeth)	6AL–53			for J ratio (17 teeth)	6WTN–17
♦	38	Vane Packet (set of 4 Vanes)	6WT–42–4		53	Gear Head Spacer (for R ratio)	6LM–80
	39	Cylinder	6AH–3		54	Gear Head	
	40	Front End Plate	6WT–11			for R ratio (marked R)	6LR–216A
♦	41	Front Rotor Bearing	R00H–97		55	Gear Head Planet Gear Assembly (3)	
	42	Cylinder Dowel	6WT–98	+		for R ratio (20 teeth)	6WTK–A10
	43	Spindle Assembly				Gear Case Assembly	
		for H ratio	6AH–A8			for H, JJ, J, K and L ratios	6AH–A37
		for JJ ratio	6AJJ–A8			for R ratio	6AM–A37
		for R ratio	6AP–A8		60	Gear Case	
		for K ratio	6AK–A8			for H, JJ, J, K and L ratio models ending in –EU	6AH–EU–B37
		for L ratio	6AL–A8			for all H, JJ, J, K and L ratio models	6AH–B37
		for J ratio	6AM–A8			for R ratio model ending in –EU	6AM–EU–B37
	44	Seal Support	5A–28			for all other R ratio models	6AM–B37
	46	Spindle Planet Gear Assembly (3)			61	Grease Fitting	D0F9–879
		for JJ or R ratios (18 teeth)	6WTP–A10		62	Spindle Bearing	5A–510
		for J ratio (16 teeth)	6WTN–A10	♦	62A	Spindle Bearing Seal	6AH–103
		for K ratio (20 teeth)	6WTK–A10				
		for L ratio (20 teeth)	6WTL–A10				

♦ Indicates Tune–up Kit part.

\+ The gears used in both the No. 6WTL–A10 and No. 6WTK–AI0 Planet Gear Assemblies have 20 teeth. The Gear (Part No. 6WTK–A10) can be distinguished by the annular groove through the middle of the tooth.

		PART NUMBER FOR ORDERING			PART NUMBER FOR ORDERING
63	Spindle Bearing Retainer	7L–28	69	Dead Handle Assembly	R1A–A48
64	Grease Shield	5R–701	70	Pinch Bolt	510–638
65	Shield Retainer	6LL–343	*	Chuck Shield Kit (for 1/4” and	
66	Drill Chuck Spacer (2 for R or S ratios;			5/16” chuck capacity models)	7AH–K309
	1 for all other ratios)	5A–90	*	Grease Gun	R00A2–228
67	Drill Chuck		*	Piped–Away Exhaust Kit	7L–K284
	for H, JJ, J, K or L ratio		*	Horizontal Hanger Assembly	7RA–A366
	(0 to 1/4”(0 to 6.0 mm) capacity) . . .	R00A–99		Horizontal Hanger	7RA–366
	for R ratio			Hanger Screw	AL–638
	(0 to 3/8” (0 to 10 mm) capacity) . . .	6A–99	*	Vertical Hanger	7L–365
*	Chuck Key		*	Tune–up Kit (includes illustrated items	
	for R00A–99 chuck	R00A–J253		20, 21, 22, 23, 26, 28, 29, 30, 31 [2], 32, 33, 34,	
	for 6A–99 chuck	R0J–J253		35, 38, 41 and 62A)	6–DRILLS–TK1
68	Dead Handle Adapter (2)	6A–49			

* Not illustrated.

MAINTENANCE SECTION

⚠ WARNING

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

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

LUBRICATION

Each time the Series 6 Drills are disassembled for maintenance, repair or replacement of parts, lubricate the tool as follows:

1. Moisten all O–rings with O–ring lubricant.
2. Work approximately 1.5 cc of Ingersoll–Rand No. 67 Grease into the Rear Rotor Bearing (35), Front Rotor Bearing (41) and the Spindle Bearing (62).
3. Work approximately 6 cc to 8 cc of Ingersoll–Rand No. 67 Grease into the D, H, J, JJ, K or L ratio gear train and 10 cc to 12 cc of the grease into the R ratio gear train. Grease the Planet Gear Bearings (46, 49, and 55), the gear teeth inside the Gear Case (60) and the planet gear shafts on the Spindle (43) and Gear Head (54).

DISASSEMBLY

General Instructions

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

Disassembly of the Gearing

1. **For L or R ratio,** loosen the Pinch Bolt (70) and remove the Dead Handle Assembly (69) and Handle Adapter (68).
2. Remove the Drill Chuck (67) by inserting the Chuck Key in one of the holes in the Chuck and tapping the Key sharply with a hammer.
3. Being careful not to distort the Motor Housing (1 or 15), grasp the flats on the Housing in leather–covered or copper covered vise jaws with the Gear Case (60) facing upward.
4. Using a wrench on the flats of the Gear Case, loosen, but do not remove the Gear Case.
5. Remove the tool from the vise and, while holding the tool horizontally, carefully unscrew the Gear Case and pull it away from the Motor Housing.

NOTICE

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

6. Using snap ring pliers, remove the Gear Retainer (50).
7. **For H or J ratio,** the Rotor Pinion (51) may come out with the Gear Case, or it may have remained with the Rotor (37) when the Gear Case was removed. Remove the Rotor Pinion.
8. **For R ratio,** remove the Gear Head Planet Gear Assembly (55), Gear Head (54) and Gear Head Spacer (53).
9. Remove the Spindle Planet Gear Assembly (46) or Spindle Planet Gear (48).
10. Push the Spindle from the Gear Case.
11. If it is necessary to remove the Spindle Bearing (62) from the front of the Gear Case, use a pair of internal snap ring pliers to remove the Spindle Bearing Retainer (63). Remove the Bearing Seal (62A).
12. Do not remove the Spindle Bearing from the Gear Case unless it is absolutely necessary and you have a new bearing for replacement. If you must remove the bearing from the Gear Case, position the Gear Case vertically in an arbor press, internally threaded end facing upward. Using a 3/4” (19 mm) diameter brass rod against the bearing, press the Spindle Bearing from the Gear Case.
13. Tap the front end of the Gear Case on a workbench to remove the Grease Shield (64).
14. Remove the Seal Support (44) from the Spindle.
15. If the Grease Shield Retainer (65) must be removed, insert a thin blade screwdriver under the tab, and rotary motion, spiral the Retainer out of the groove in the Gear Case.

Disassembly of the Motor

1. Grasp the splined end of the Rotor (37) in leather–covered or copper–covered vise jaws and pull the assembled motor from the Motor Housing (1 or 15).
2. Remove the Rear End Plate Gasket (32) from the Motor Housing.
3. Using a wrench, unscrew and remove the Rear Rotor Bearing Retaining Nut (33).

4. Remove the Rotor from the vise and remove the Bearing Thrust Washer (34), Rear End Plate (36), Cylinder (39) and Vanes (38).
5. Check the Front Rotor Bearing (41) for damage or roughness. If replacement is necessary, support the Front End Plate (40) between two blocks of wood on the table of an arbor press. Using a flat face punch on the inner ring, tap the Bearing out of the End Plate.
6. Check the Rear Rotor Bearing (35) for damage or roughness. If replacement is necessary, use a flat face punch on the inner ring and tap the Bearing out of the End Plate.

Disassembly of the Lever Throttle Motor Housing

1. Using a pin punch and hammer, drive the Throttle Lever Pin (18) out of the Rear Muffler (27) to release the Throttle Lever (17).
2. Being careful not to distort the Housing (15), grasp the flats on the Motor Housing in leather–covered or copper–covered vise jaws with the inlet upward.
3. Using a wrench on the flats, unscrew and remove the Inlet Bushing (24) and the Air Strainer Screen (26).
4. Remove the Throttle Valve Spring (23).
5. Remove the Rear Muffler (27), Inlet Bushing Spacer (25), two Exhaust Silencers (31), Muffler Element (28), Exhaust Deflector Seal (30) and the Silencer Seal Ring (29).
6. Lift out the Throttle Valve (22) and Throttle Plunger Assembly (19).
7. Remove the Throttle Plunger Seal (20) from the Throttle Plunger.
8. To remove the Throttle Valve Seat (21), insert a wire hook through the central hole of the Seat and hooking the underside of the Throttle Valve Seat pull the Seat out of the Motor Housing.

NOTICE

Only remove the Throttle Valve Seat when replacing it or when the Throttle Plunger Bushing (16) must be replaced.

9. Before removing the Throttle Plunger Bushing all seals and components must be removed from the Motor Housing. To remove the Throttle Plunger Bushing, proceed as follows:
   a. Grasp the rear hub of the Motor Housing in leather–covered or copper–covered vise jaws with the Throttle Plunger Bushing upward.
   b. Using a torch, apply heat to the Motor Housing around the Bushing.

CAUTION

Apply enough heat to warm the Housing, but not enough heat to distort it.

   c. Thread a 10–32 tap into the Bushing and pull the Bushing out of the Housing with the tap.

ASSEMBLY

General Instructions

1. Always press on the **inner** ring of a ball–type bearing when installing the bearing on a shaft.
2. Always press on the **outer** ring of a ball–type bearing when pressing the bearing into a bearing recess.
3. Unless otherwise noted, always press on the stamped end of a needle bearing when installing the needle bearing in a recess.
4. Whenever grasping a tool or part in a vise, always use leather–covered or copper–covered vise jaws. Take extra care with threaded parts and housings.
5. Always clean every part and wipe every part with a thin film of oil before installation.
6. Apply a film of O–ring lubricant to all O–rings before final assembly.
7. Check every bearing for roughness. If an open bearing must be cleaned, wash it thoroughly in a suitable cleaning solution and dry with a clean cloth. **Sealed or shielded bearing should never be cleaned.** Work grease thoroughtly into every open bearing before installation.

Assembly of the Lever Throttle Motor Housing

1. If the Throttle Plunger Bushing (2) was removed, proceed as follows:
   a. Insert the Throttle Plunger Bushing into the Motor Housing (15) to a depth approximately one–half the length of the Bushing.
   b. Put a few drops of a quality liquid sealant in the counterbore surrounding the outside diameter of the Bushing.
   c. Rotate the Bushing approximately 180 degrees to make certain the sealant makes complete contact around the outside of the Bushing.
   d. Push the Bushing into the Housing until it bottoms against the shoulder inside the Housing.
   e. Allow the sealant to cure for the required length of time or about eight hours at room temperature.
2. Carefully grasp the flats on the Motor Housing in leather–covered or copper–covered vise jaws, inlet end facing upward.
3. If the Throttle Valve Seat (21) was removed, use a flat–faced rod 1/2” (13 mm) in diameter by 3” (76 mm) long to push the Seat into the Motor Housing until it seats.
4. Install the Throttle Plunger Seal (20) in the groove of the Throttle Plunger (19).

5. Insert the Throttle Plunger into the Plunger Bushing and rotate the Plunger until the hole in the Plunger aligns dead center with the hole in the Throttle Valve Seat.
6. Using needle nose pliers to hold the short–stem end of the Throttle Valve (22), install the Valve inserting the long–stem end through the hole in the Throttle Valve Seat and Throttle Plunger.
7. After folding the Muffler Element (28) lengthwise, and with the fold trailing, install the Element by wrapping it horseshoe fashion around the inside of the Rear Muffler (27) covering all exhaust holes.
8. Install the Exhaust Deflector Seal (30) into the groove on the front end of the Rear Muffler.
9. Install the two Exhaust Silencers (31) over the hub at the rear of the Motor Housing and work the Silencers into the Housing.
10. Install the Silencer Seal Ring (29) over the hub of the Motor Housing approximately halfway down the hub.
11. Install the Rear Muffler over the hub of the Motor Housing, aligning the wide tab on the Rear Muffler with the throttle plunger hole in the Motor Housing.

NOTICE

Tabs on the Rear Muffler match notches on the Motor Housing. Do not force the Muffler into place.

12. Insert the Air Strainer Screen (26), closed end first, inside the external threaded end of the Inlet Bushing (24).
13. Insert the Throttle Valve Spring (23), large coil end first, into the Inlet Bushing making sure it contacts the Air Strainer Screen.
14. Install the Inlet Bushing Spacer (25) in the large hole in the Rear Muffler.
15. 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 26 ft–lbs (35 Nm) torque.** The Inlet Bushing must securely clamp the Rear Muffler.
16. Note that the throttle lever pinhole in the Rear Muffler is larger at one end than the other. Install the Throttle Lever (17) pressing the Throttle Lever Pin (18) into the large end of the pinhole.

Assembly of the Motor

1. Using a sleeve that contacts the outer ring of the Rear Rotor Bearing (35), press the Rear Rotor Bearing into the Rear End Plate (36) if the Bearing was removed.
2. Place the Rear End Plate, Bearing end trailing, on the threaded hub of the Rotor (37). Insert a 0.001” feeler gauge or shim between the face of the Rotor and End Plate. Place the Bearing Thrust Washer (34) on the threaded hub of the Rotor. Thread the Rear Rotor Bearing Retaining Nut (33) onto the hub of the Rotor and tighten it until the feeler gauge has a slight drag during removal. Remove the feeler gauge.

NOTICE

The Rotor must spin freely while holding the End Plate.

3. Lightly grasp the threaded hub of the Rotor in leather–covered or copper–covered vise jaws with the splined hub upward.
4. Wipe each Vane (38) with a film of light oil and place a Vane in each slot in the Rotor.
5. Looking down the axis of the Rotor and Cylinder (39), position the Cylinder over the Rotor with the cylinder dowel hole at twelve o’clock, the notch in cylinder face at ten o’clock and the two slots in the side of the Cylinder at two o’clock. Place the Cylinder down over the Rotor and Vanes and against the Rear End Plate.
6. Push the Front Rotor Bearing (41) into the recess in the Front End Plate (40).
7. Remove the assembled Rotor from the vise and using a sleeve that contacts the inner ring of the Front Rotor Bearing, press the Bearing, flat side of the Front End Plate first, onto the rotor shaft.

NOTICE

Align the cylinder dowel hole in the Rear End Plate, Cylinder and Front End Plate before pressing the Bearing onto the shaft. After pressing the Bearing onto the shaft, lightly rap the end of the splined hub with a plastic hammer to relax the load on the Bearing. The Rotor must rotate in the Bearing without drag.

8. Position the Rear End Plate Gasket (32) in the bottom of the motor housing bore so that the dowel hole and air inlet port in the Gasket align with the dowel hole and air inlet in the housing bore face.
9. Using an assembly dowel 3/32” in diameter by 10” long (2.3 mm x 254 mm), align the dowel holes in the Front End Plate, Cylinder and Rear End Plate. Insert the assembly rod through the aligned holes so that about 3” (76 mm) of the rod extends beyond the Rear End Plate Insert the extension into the dowel hole at the bottom ofthe housing bore, and slide the motor into the Motor Housing until it seats.
10. Withdraw the assembly dowel and insert the Cylinder Dowel (42) until the Cylinder Dowel is slightly below the surface of the Front End Plate.

Assembly of the Gearing

1. Stand the Gear Case (60), end with the flats upward, on a workbench.
2. If the Shield Retainer (65) was removed, install it in the second groove below the front face of the Gear Case.
3. Place the Grease Shield (64) in the Gear Case so that it butts against the Shield Retainer.
4. Using a sleeve that contacts the outer ring of the Bearing, press the Spindle Bearing (62) into the Gear Case until it butts against the Grease Shield. Install the Spindle Bearing Seal (62A).
5. Using snap ring pliers, install the Spindle Bearing Retainer (63) against the Bearing Seal and into the groove in front of the Spindle Bearing.
6. Turn the Gear Case over so that the internal threaded end faces upward.
7. Install the Seal Support (44), large end first, over the hub of the Spindle (43).
8. Slide the Spindle into the Gear Case, threaded end first, until the Seal Support contacts the inner ring of the Spindle Bearing.

NOTICE

For K, L or R ratio, make certain the Spindle Seal does not get pinched between the Seal Support and the Spindle Bearing.

9. **For H Ratio,** push the Spindle Planet GearBearings (49) into the Spindle Planet Gears (48). Grease the assembled Spindle Planet Gears and Bearings and install them on the pins of the Spindle.
10. **For J, JJ, K, L or R ratio,** grease the bearings and gears of the Spindle Planet Gear Assemblies (46) and install them on the pins of the Spindle.
11. **For R ratio,** install the Gear Head Spacer (53) in the Gear Case against the Spindle Planet Gears.
12. **For R ratio,** grease the splined hub of the Gear Head (54) and insert it into the Gear Case. The splined hub must pass through the Gear Head Spacer and mesh with the teeth of the Spindle Planet Gears.
13. **For R ratio,** grease the bearings and gears of the Gear Head Planet Gear Assemblies (55) and install them on the pins of the Gear Head.
14. **For H or J ratio,** grease the Rotor Pinion (51) and install it in the center of the Spindle Planet Gears. Make certain the teeth of the Pinion and Planet Gears mesh.
15. Using snap ring pliers, install the Gear Retainer (50) in the shallow internal groove in the Gear Case behind the Drive Plate, Spindle Planet Gears or Gear Head Planet Gears.
16. Thread the assembled Gear Case onto the assembled Motor Housing until it is hand tight. Make certain the gear teeth on the Spindle mesh with the gear teeth of the Rotor Pinion, Gear Head Planet Gears or Spindle Planet Gears.
17. Tighten the Gear Case between 30 to 35 ft–lb (41 to 47 Nm) torque.

NOTICE

Run the motor at free speed on low air pressure while final tightening the Gear Case. Listen while tightening to make certain the gears mesh properly.

18. **For H, J, JJ, K or L ratio,** install one Drill Chuck Spacer (66) onto the drill spindle.
    For R ratio, install two Drill Chuck Spacers (66) onto the drill spindle.
19. Thread the Drill Chuck (67) onto the drill spindle and tighten.
20. **For L or R ratio,** install the Dead Handle Adapter (68) and Dead Handle Assembly (69) onto the front end of the Gear Case. Tighten the Pinch Bolt (70) to 10 to 20 in.lb (1.4 to 2.3 Nm) torque.

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Loss of Power	Low air pressure	Check air supply. For top performance, the air pressure must be 90 psig (6.2 bar/620 kPa) at the inlet.
	Plugged Air Strainer Screen or Inlet Screen	Clean the Air Strainer or screen in a clean, suitable, cleaning solution. If the Screen cannot be cleaned, replace it.
	Clogged Muffler or Exhaust Silencer	Clean the Muffler Element in a clean, suitable cleaning solution. If it cannot be cleaned, replace it.
	Worn or broken Vanes	Replace the **complete** set of Vanes.
	Damaged Rear End Plate Gasket	Install a new Rear End Plate Gasket.
	Worn or broken Cylinder	Replace the Cylinder if it is cracked or if the bore appears wavy or scored.
	Improper lubrication or dirt build–up	Clean the Motor Unit parts and lubricate as instructed.
Leaky Throttle Valve	Worn Throttle Valve and/or Throttle Valve Seat	Install a new Throttle Valve and/or a Throttle Valve Seat.
	Dirt accumulation on Throttle Valve and/or Throttle Valve Seat	Pour about 3 cc of a clean, suitable cleaning solution in the air inlet and operate the tool for about 30 seconds. **Immediately** pour 3 cc of the recommended oil in the air inlet and operate the tool for 30 seconds to lubricate all the cleaned parts.
Gear Case gets hot	Excessive grease	Clean and inspect the Gear Case and gearing parts and lubricate as instructed.
	Worn or damaged parts	Clean and inspect the Gear Case and gearing. Replace worn or broken components.

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.