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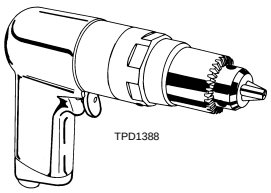


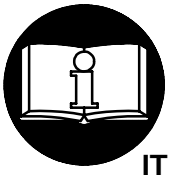
OPERATION AND MAINTENANCE MANUAL FOR SERIES 7A DRILLS

Skinsulate™ Comfort Coating

NOTICE

Series 7A 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 5/16" (8 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.**
- **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.**
- **Always use a Dead Handle with Models 7ANST8 and 7AQST8.**
- **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.

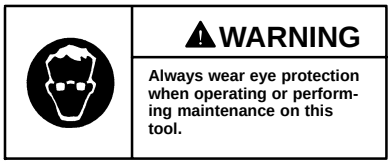
Printed in U.S.A.

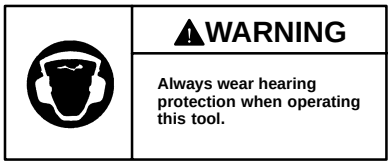
Ingersoll-Rand®

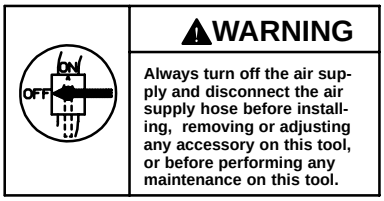
WARNING LABEL IDENTIFICATION

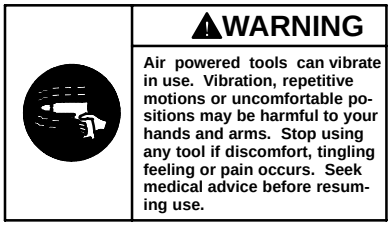
⚠ WARNING

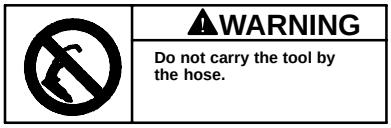
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

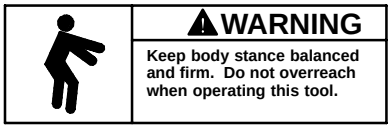


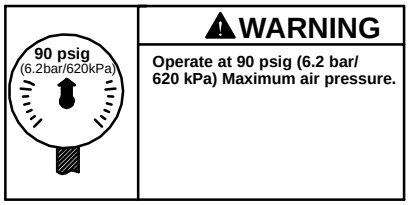












PLACING TOOL IN SERVICE

LUBRICATION

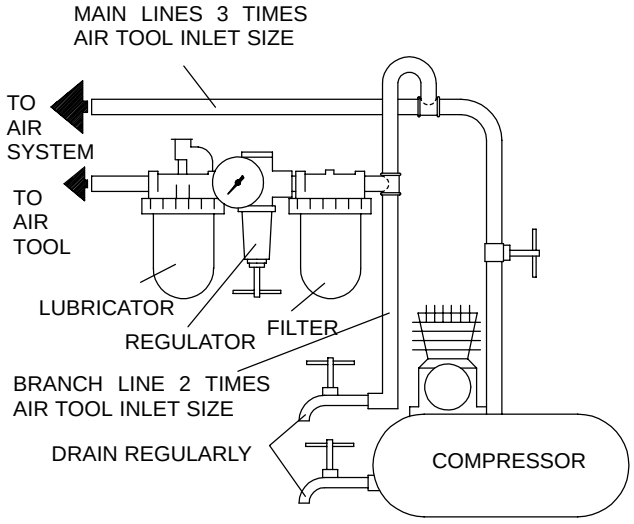
Ingersoll–Rand No. 10 **Ingersoll–Rand No. 28**

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

For USA – No. C28–04–FKG0–28

For models with D, H, J, JJ, K or L gearing, inject approximately 6 cc of Ingersoll–Rand No. 28 Grease into the Grease Fitting in the Gear Case after each 50 000 cycles or 160 hours of operation, whichever occurs first.

For models with M, N or Q gearing, inject approximately 9 cc of Ingersoll–Rand No. 28 Grease into the Grease Fitting in the Gear Case after each 50 000 cycles or 160 hours of operation, whichever occurs first.



(Dwg. TPD905–1)

DRILL WITH PISTOL GRIP HANDLE			
	Free Speed	Chuck Capacity	
Model	rpm	in	Nm
7ADST4	20 000	1/4	6
7AHST4	6 000	1/4	6
7AJST4	4 800	1/4	6
7AJJST4	4 000	1/4	6
7AKST6	3 200	3/8	10
7ALST6	2 400	3/8	10
7AMST6	1 400	3/8	10
7ANST8	900	1/2	13
7AQST8	600	1/2	13

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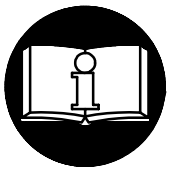
MANUEL D'EXPLOITATION ET D'ENTRETIEN
PERCEUSES DE LA SÉRIE 7A

Skinsulate™ Comfort Coating

Les perceuses de la Série 7A sont destinées aux opérations de perçage dans les industries de l'aérospatiale, de l'automobiles, 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 SECURITÉ SONT JOINTES.
LIRE CE MANUEL AVANT D'UTILISER L'OUTIL.
L'EMPLOYEUR EST TENU À COMMUNIQUER LES INFORMATIONS DE CE MANUEL AUX EMPLOYÉS UTILISANT CET OUTIL.
LE NON RESPECT DES AVERTISSEMENTS SUIVANTS PEUT CAUSER DES BLESSURES

MISE EN SERVICE DE L'OUTIL

- **Toujours exploiter, inspecter et entretenir cet outil conformément au Code de sécurité des outils pneumatiques portatifs de l'American National Standards Institute (ANSI B186.1).**
- **Pour la sécurité, les performances optimales et la durabilité maximale des pièces, cet outil doit être connecté à une alimentation d'air comprimé de 6,2 bar (620 kPa) maximum à l'entrée, avec un flexible de 8 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 corrosiveset/ou une humidité excessive peuvent endommager le moteur d'un outil pneumatique.**
- **Ne jamais lubrifier les outils avec des liquides inflammables ou volatiles tels que le kérosène, le gasol ou le carburant d'aviation.**
- **Ne retirer aucune étiquette. Remplacer toute étiquette endommagée.**

UTILISATION DE L'OUTIL

- **Porter toujours des lunettes de protection pendant l'utilisation et l'entretien de cet outil.**
- **Porter toujours une protection acoustique pendant l'utilisation de cet outil.**
- **Tenir les mains, les vêtements flous et les cheveux longs, éloignés de l'extrémité rotative de l'outil.**
- **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.**
- **Utiliser toujours une poignée auxiliaire sur les Modèles 7ANST–8 et 7AQST8.**
- **Cet outil n'est pas conçu pour fonctionner dans des atmosphères explosives.**
- **Cet outil n'est pas isolé contre les chocs électriques.**

NOTE

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

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

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

Imprimé aux É.U.

Ingersoll-Rand®

SIGNIFICATION DES ETIQUETTES D'AVERTISSEMENT

⚠ ATTENTION

LE NON RESPECT DES AVERTISSEMENTS SUIVANTS PEUT CAUSER DES BLESSURES

⚠ ATTENTION

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

⚠ ATTENTION

Les outils pneumatiques peuvent vibrer pendant l'exploitation. Les vibrations, les mouvements répétitifs et les positions inconfortables peuvent causer des douleurs dans les mains et les bras. N'utiliser plus d'outils en cas d'inconfort, de picotements ou de douleurs. Consulter un médecin avant de recommencer à utiliser l'outil.

⚠ ATTENTION

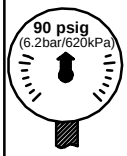
Garder une position équilibrée et ferme. Ne pas se pencher trop en avant pendant l'utilisation de cet outil.

⚠ ATTENTION

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

⚠ ATTENTION

Ne pas transporter l'outil par son flexible.



⚠ ATTENTION

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

⚠ ATTENTION

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

⚠ ATTENTION

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

MISE EN SERVICE DE L'OUTIL

LUBRIFICATION

Ingersoll–Rand No. 10

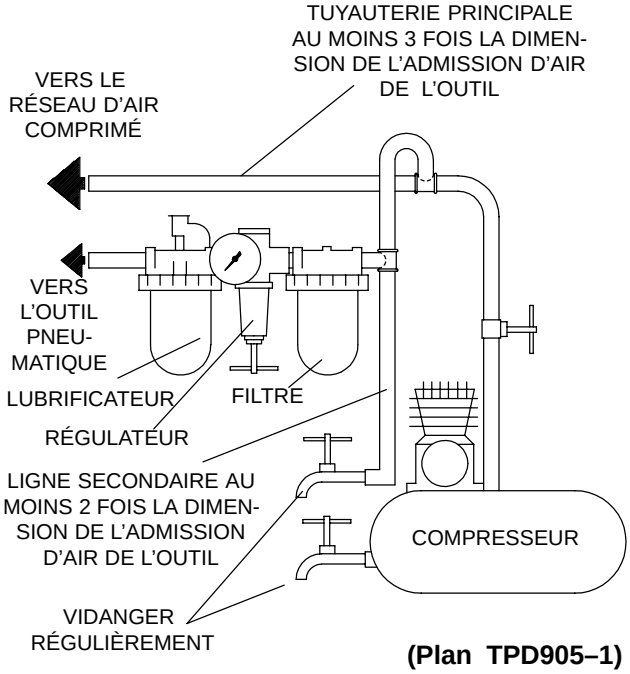
Ingersoll–Rand No. 28

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

É.U. – No. C28–04–FKG0–28

Pour les modèles équipés de la pignonnerie D, H, J, JJ, K ou L, injecter environ 6 cm^3 de graisse Ingersoll–Rand No. 28 dans le raccord de graissage du boîtier d'engrenages tous les 50 000 cycles ou au minimum toutes les 160 heures de fonctionnement.

Pour les modèles équipés de la pignonnerie M, N, ou Q, injecter environ 9 cm^3 de graisse Ingersoll–Rand No. 28 dans le raccord de graissage du boîtier d'engrenages tous les 50 000 cycles ou au minimum toutes les 160 heures de fonctionnement.



(Plan TPD905–1)

SPÉCIFICATIONS

Modèle	Poignée à levier	Vitesse libre	Capacité du mandrin
		tr/mn	pouces (Nm)
7ADST4	pistolet	20 000	1/4 (6)
7AHST4	pistolet	6 000	1/4 (6)
7AJST4	pistolet	4 800	1/4 (6)
7AJJST4	pistolet	4 000	1/4 (6)
7AKST6	pistolet	3 200	3/8 (10)
7ALST6	pistolet	2 400	3/8 (10)
7AMST6	pistolet	1 400	3/8 (10)
7ANST8	pistolet	900	1/2 (13)
7AQST8	pistolet	600	1/2 (13)

Skinsulate™ Comfort Coating

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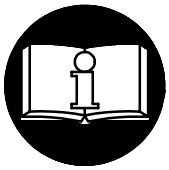
MANUAL DE FUNCIONAMIENTO Y MANTENIMIENTO PARATALADROS MODELOS 7A

NOTA

Los Taladros Modelo 7A están diseñados para las operaciones de taladro en la industria aeroespacial, del automóvil, 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 USAR 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 seguridad, máximo rendimiento y vida de servicio de las piezas, use esta herramienta a una presión de aire máxima de 90 psig (6,2 bar/620 kPa) en la manguera de suministro de aire con diámetro interno de 8 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 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 presión máxima 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 LA HERRAMIENTA

- **Use siempre protección ocular cuando maneje, o realice operaciones de mantenimiento en 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.**
- **Anticipe y esté alerta sobre 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 a menos de, la recomendada presión de aire.**
- **El eje de la herramienta podría seguir girando brevemente después de haber soltado la palanca de estrangulación.**
- **Las herramientas neumáticas pueden vibrar durante el uso. La vibración, repetición o posiciones incómodas 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.**
- **Use siempre un mango de sujeción con los Modelos 7ANST8 y 7AQST8.**
- **Esta herramienta no ha sido diseñada para trabajar en ambientes explosivos.**
- **Esta herramienta no está aislada contra descargas eléctricas.**

NOTA

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

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

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

Impreso en EE. UU.

Ingersoll-Rand®

ETIQUETAS DE AVISO

⚠ AVISO

EL HACER CASO OMISO DE LOS AVISOS SIGUIENTES 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

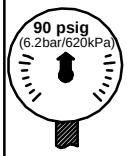
Mantener una postura del cuerpo equilibrada y firme. No estirar demasiado los brazos al manejar la herramienta.

⚠ ADVERTENCIA

Usar siempre protección para los oídos al manejar esta herramienta.

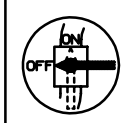
⚠ ADVERTENCIA

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

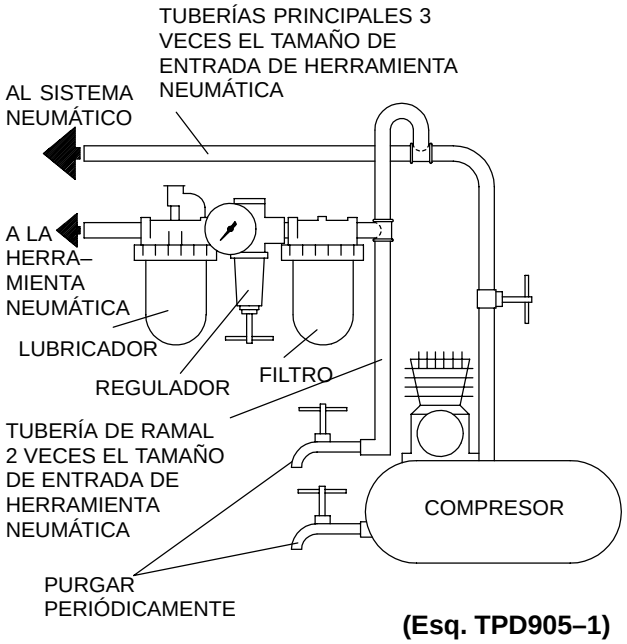
Ingersoll–Rand Nº 28

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

EE. UU. – Nº C28–04–FKG0–28

Para modelos de engranaje D, H, J, JJ, K o L, después de cada 50 000 ciclos o 160 horas de funcionamiento (lo que ocurra primero), inyecte unos 6 cc de Grasa Ingersoll–Rand Nº 28 en el engrasador de la caja de engranaje.

Para modelos de engranaje M, N o Q, después de cada 50 000 ciclos o 160 horas de funcionamiento (lo que ocurra primero), inyecte unos 9 cc de Grasa Ingersoll–Rand Nº 28 en el engrasador de la caja de engranaje.



(Esq. TPD905–1)

PARA PONER LA HERRAMIENTA EN SERVICIO

ESPECIFICACIONES

Modelo	Tipo de Mango	Velocidad Libre	Capacidad de Portapuntas
		rpm	**pulg. (Nm)**
7ADST4	pistola	20 000	1/4 (6)
7AHST4	pistola	6 000	1/4 (6)
7AJST4	pistola	4 800	1/4 (6)
7AJJST4	pistola	4 000	1/4 (6)
7AKST6	pistola	3 200	3/8 (10)
7ALST6	pistola	2 400	3/8 (10)
7AMST6	pistola	1 400	3/8 (10)
7ANST8	pistola	900	1/2 (13)
7AQST8	pistola	600	1/2 (13)

Skinsulate™ Comfort Coating

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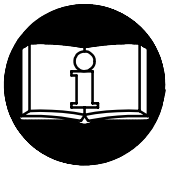
MANUAL DE FUNCIONAMENTO E MANUTENÇÃO
BERBEQUINS SÉRIE 7A

AVISO

Os Berbequins7A 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

- **Sempre opere, inspeccione e mantenha esta ferramenta de acordo com o Código de Segurança do Instituto Americano de Padrões Nacionais para Ferramentas Pneumáticas Portáteis (ANSI B186.1).**
- **Para segurança, máximo desempenho e máxima durabilidade das peças, opere esta ferramenta com uma pressão de ar máxima de 6,2 bar/620 kPa (90 psig) na entrada da mangueira de alimentação de ar com diâmetro interno de 8mm (5/16”).**
- **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.**
- **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.**
- **Use sempre uma Protecção de Punho com os Modelos 7ANST8 e 7AQST8.**
- **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®

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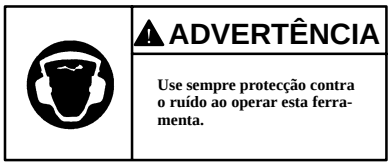
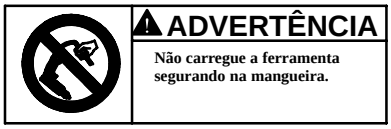
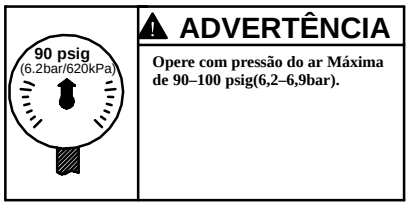






COLOCANDO A FERRAMENTA EM FUNCIONAMENTO

LUBRIFICAÇÃO

Ingersoll–Rand No. 10

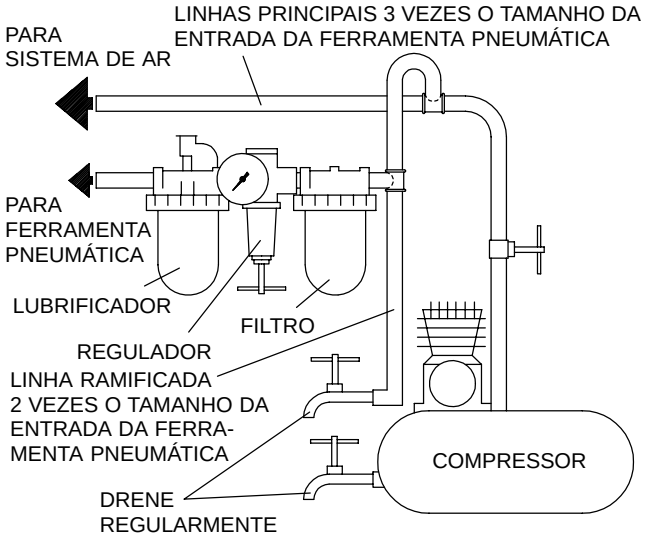
Ingersoll–Rand No. 67

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

E.U.A. – No. C28–04–FKG0–28

Para modelos com engrenagem D, H, J, JJ, K ou L, injecte 6 cc de Massa Lubrificadora Ingersoll–Rand No 28 na Caixa de Engrenagens depois de cada 50 000 ciclos ou 160 horas de operação, qualquer que ocorra primeiro.

Para modelos com engrenagem M, N ou, injecte 9 cc de Massa Lubrificadora Ingersoll–Rand No 28 na Caixa de Engrenagens depois de 50 000 ciclos ou 160 horas de operação, qualquer que ocorra primeiro.

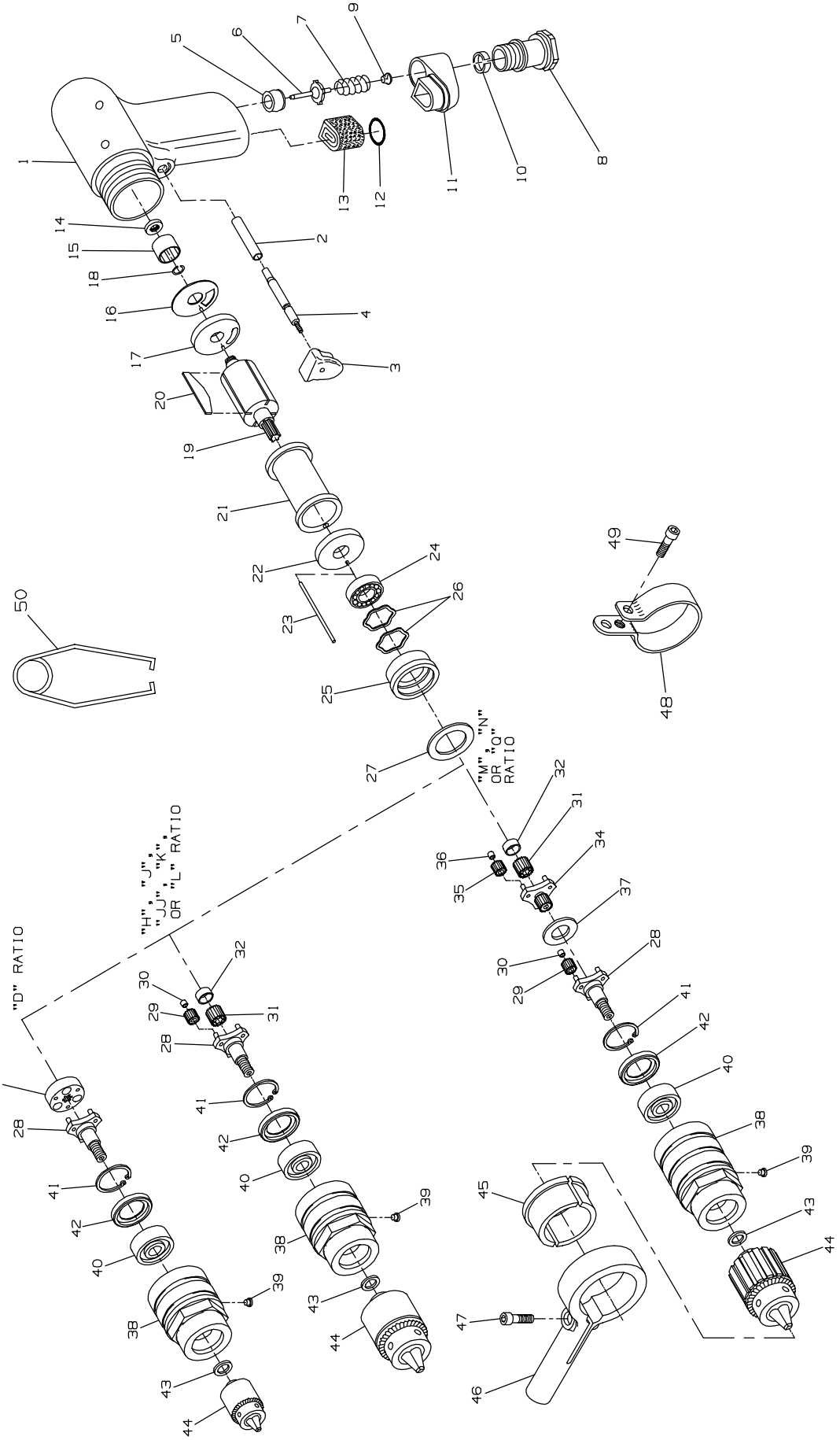


(Desenho TPD905–1)

COLOCANDO A FERRAMENTA EM FUNCIONAMENTO

ESPECIFICAÇÕES

Modelo	Tipo de Punho	Velocidade Livre	Capacidade da Bucha
		rpm	**mm (pol.)**
7ADST4	pistola	20 000	6 (1/4)
7AHST4	pistola	6 000	6 (1/4)
7AJST4	pistola	4 800	6 (1/4)
7AJJST4	pistola	4 000	6 (1/4)
7AKST6	pistola	3 200	10 (3/8)
7ALST6	pistola	2 400	10 (3/8)
7AMST6	pistola	1 400	10 (3/8)
7ANST8	pistola	900	13 (1/2)
7AQST8	pistola	600	13 (1/2)



(Dwg. TPA1365–1)

PART NUMBER FOR ORDERING

		Motor Housing Assembly	
		for models ending in EU	7AH–EU–AST40A
		for all other models	7AH–AST40A
	1	Motor Housing	
		for models ending in EU	7AH–EU–BST40A
		for all other models	7AH–BST40A
	*	Warning Label	
		for models ending in EU	EU–99
		for all other models	WARNING–7–99
	2	Trigger Bushing	4RA–91
		Trigger Assembly	7AH–A93
	3	Trigger	5RA–93
	4	Trigger Pin	7AH–94
♦	5	Throttle Valve Seat	7AH–303
♦	6	Throttle Valve	7AH–302
♦	7	Throttle Valve Spring	7AH–51
	8	Inlet Bushing Assembly	7AH–A565
♦ •	9	Air Strainer Screen	R0A2–61
	10	Inlet Bushing Spacer	7AH–65
	11	Muffler Assembly	3RA–A123
♦	12	Muffler O–ring	85H–167
♦	13	Muffler Element	7RA–311
•	14	Rear Rotor Bearing Nut	7AH–105A
♦	15	Rear Rotor Bearing	7AH–24
♦ •	16	Rear End Plate Gasket	7AH–739
	17	Rear End Plate	7AH–12
♦ •	18	Rear End plate Retainer	7AH–118
	19	Rotor	
		for D, H, J, L, M or N ratio (7 teeth)	7AH–53
		for JJ ratio (6 teeth)	7AJJ–53
		for K or Q ratio (10 teeth)	7AK–53

PART NUMBER FOR ORDERING

♦	20	Vane Packet (set of 4 Vanes)	7AH–42A–4
	21	Cylinder	7AH–3A
	22	Front End Plate	7AH–11
	23	Cylinder Dowel	7AH–98
♦	24	Front Rotor Bearing	R1–22
	25	Front Rotor Bearing Housing	7AH–13
	26	Bearing Spring Washer (2)	7AH–278
	27	Bearing Housing Spacer	7AH–81
	28	Spindle	
		for D or J ratio	7AJ–8A
		for H ratio	7AH–8
		for JJ or Q ratio	7AQ–8A
		for K or N ratio	7AK–8
		for L ratio	7AL–8
		for M ratio	7AM–8A
	29	Spindle Planet Gear Assembly (3)	
		for H ratio (15 teeth)	7AH–A10
		for J or M ratio (18 teeth)	7AJ–A10
		for JJ or Q ratio (19 teeth)	7AQ–A10
		for K or N ratio (21 teeth)	7AK–A10
		for L ratio (22 teeth)	7AL–A10
	30	Spindle Planet Gear Bearing (1 for each Gear)	
		for H ratio	7AH–500
		for J, JJ, M or Q ratio	7AJ–500
		for K, L or N ratio	7AK–500

* 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
31	Rotor Pinion	
	for H, M or N ratio (22 teeth)	7AH–17
	for J ratio (16 teeth)	7AJ–17
	for JJ ratio (13 teeth)	7AJJ–17
32	Rotor Pinion Spacer	
	for H, J, M or N ratio	7AH–18
	for JJ ratio	7AJJ–18
33	Drive Plate (for D ratio)	7AD–171
34	Gear Head	
	for M ratio (16 teeth)	7AM–216
	for N ratio (10 teeth)	7AN–216
	for Q ratio (13 teeth)	7AQ–216
35	Gear Head Planet Gear Assembly (3)	
	for M or N ratio (15 teeth)	7AH–A10
	for Q ratio (21 teeth)	7AP–A10
36	Gear Head Planet Gear Bearing	
	(1 for each Gear) (for M, N or Q ratio)	7AH–500
37	Gear Head Spacer (for M, N or Q ratio)	7AN–80
	Gear Case Assembly	
	for D, H, J, JJ, K or L ratio	
	models ending in ST4 or ST6	7AH–A37A
	for D, H, J, JJ, K or L ratio	
	models ending in EU	7AH–EU–A37A
	for M, N or Q ratio models	
	ending in ST6 or ST8	7AN–A37A
	for M, N or Q ratio models	
	ending in EU	7AN–EU–A37A
38	Gear Case	
	for D, H, J, JJ, K or L ratio models	
	ending in ST4 or ST6	7AH–B37A
	for D, H, J, JJ, K or L ratio	
	models ending in EU	7AH–EU–B37A
	for M, N or Q ratio models ending	
	in ST6 or ST8	7AN–B37A
	for M, N or Q ratio models	
	ending in EU	7AN–EU–B37A

		PART NUMBER FOR ORDERING
39	Grease Fitting	D0F9–879
40	Spindle Bearing	5A–510
41	Spindle Bearing Retainer	7AH–28
42	Grease Shield	7AH–701
43	Drill Chuck Spacer	5A–90
44	Drill Chuck	
	for D, H, J or JJ ratio	
	(0 to 1/4” [0 to 6 mm]	
	capacity)	R00A–99
	for K, L or M ratio (0 to 3/8”	
	[0 to 10 mm] capacity)	6A–99
	for N or Q ratio (5/64” to 1/2”	
	[2 to 13 mm] capacity)	R0K–99
*	Chuck Key	
	for R00A–99 chuck	R00A–J253
	for 6A–99 chuck	R0J–J253
	for R0K–99 chuck	R1T–J253
*	Dead Handle Label (for 7ANST8 and	
	7AQST8)	7AQ–245
45	Dead Handle Adapter (2)	7A–49
46	Dead Handle Assembly	R1A–A48
47	Pinch Bolt	510–638
	Horizontal Hanger Assembly	7RA–A366
48	Horizontal Hanger	7RA–366
49	Hanger Screw	AL–638
50	Vertical Hanger	7L–365
*	Chuck Shield Kit (for D, H, J,	
	JJ or K ratio)	7AH–K309
*	Warning Label(for N or Q ratio)	7A0–245
*	Tune–up Kit (includes illustrated items 5,	
	6, 7, 9, 12, 13, 15, 16, 18, 20 and 24)	7A–DRILLS–TK1

* Not illustrated.

MAINTENANCE SECTION

⚠ WARNING

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

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

LUBRICATION

Each time a Series 7A Drill is disassembled for 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 the recommended grease into the Rear Rotor Bearing (15), Front Rotor Bearing (24) and the Spindle Bearing (40).
3. Work approximately 6 cc to 8 cc of the recommended grease into the D, H, J, JJ, K or L ratio gear train and 10 cc to 12 cc of grease into the M, N or Q ratio gear train. Grease the Planet Gear Bearings (30 and 36), the gear teeth inside the Gear Case (38) and the planet gear shafts on the Spindle (28) and Gear Head (34).

DISASSEMBLY

General Instructions

1. Do not disassemble the tool any further than necessary to replace or repair damaged parts.
2. Whenever grasping a 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 Gearing

1. **For N or Q ratio,** loosen the Pinch Bolt (47) and remove the Dead Handle Assembly (46) and Handle Adapter (45).
2. Remove the Drill Chuck (44) by inserting the short leg of a 1/4” hex key into the Chuck and tightening the Chuck. Rap the long leg of the key sharply with a hammer to remove the Chuck.
3. Being careful not to distort the Motor Housing (1), grasp the flats on the Housing in leather–covered or copper–covered vise jaws with the Gear Case (38) facing upward.
4. Using a wrench on the flats of the Gear Case, loosen, but do not remove the Gear Case.

NOTICE

In the following step, be sure to hold the tool over a workbench so that you will not drop or lose parts.

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.
6. **For D ratio**, hold the Gear Case horizontally and lightly tap the chuck end of the Spindle (28) with a plastic hammer to remove the Spindle and Drive Plate (33).
   For H, J, JJ, K or L ratio, hold the Gear Case horizontally and lightly tap the chuck end of the Spindle (28) with a plastic hammer to remove the Spindle and Spindle Planet Gear Assemblies (29). **H, J and JJ ratios** have a Rotor Pinion (31) and Rotor Pinion Spacer (32) that may come out with the Spindle, or they may have remained with the Rotor (19) when the Gear Case was withdrawn.
   For M, N or Q ratio, hold the Gear Case horizontally and lightly tap the chuck end of the Spindle (28) with a plastic hammer to remove the Gear Head (34), Gear Head Planet Gear Assemblies (35), Gear head Spacer (37), Spindle and Spindle Planet Gear Assemblies (29). **M and N ratios** have a Rotor Pinion (31) and Rotor Pinion Spacer (32) that may come out with the Spindle, or they may have remained with the Rotor (19) when the Gear Case was withdrawn.
7. Withdraw the Spindle Planet Gear Assemblies and/or Gear Head Planet Gear Assemblies from the Spindle and/or Gear Head.
8. If it is necessary to remove the Spindle Bearing (40) from the front of the Gear Case, use a pair of internal snap ring pliers to remove the Spindle Bearing Retainer (41). Remove the Bearing Seal (42).
9. **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, stand the Gear Case on the table of an arbor press, chuck end upward. Using a brass rod that will enter the front of the Gear Case, press the Spindle Bearing from the Gear Case.
10. **For H, J, JJ, M or N ratios**, if the Rotor Pinion remained on the Rotor when the Gear Case was separated from the Housing, Withdraw the Rotor Pinion along with the Rotor Pinion Spacer.

Disassembly of the Motor

1. Remove the Bearing Housing Spacer (27), Front Rotor Bearing Housing (25) and the two Bearing Spring Washers (26) from the Motor Housing (1).
2. Grasp the splined end of the Rotor (19) and pull the assembled motor from the Motor Housing.
3. Remove the Rear End Plate Gasket (16) from the Motor Housing.

⚠ WARNING

In the following step, make certain the Rear End Plate Retainer (18) doesn't spring away when it is slipped off the hub of the Rotor.

4. Using a pair of external snap ring pliers and 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. Withdraw the Rear End Plate (17), Cylinder (21) and Vanes (20).
6. Check the Front Rotor Bearing (24) for damage or roughness. If replacement is necessary, support the Front End Plate (22) between two blocks of wood on the table of an arbor press and press the Rotor from the Bearing.
7. Check the Rear Rotor Bearing (15) for damage or roughness. Do not remove the Rear Rotor Bearing 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, thread a No. 10–24 x 2" long cap screw, having at least 1/2" of thread, through the Rear Rotor Bearing Nut (14) located behind the Bearing. Keep tightening the screw to jack the Bearing out of the Housing.

Disassembly of the Pistol Grip Motor Housing

1. Carefully grasp the Motor Housing (1) in leather–covered or copper–covered vise jaws so that the handle is upward.
2. Unscrew and remove the Inlet Bushing Assembly (8).
3. Remove the Muffler Assembly (11) and Muffler O–ring (12) from the Muffler Assembly.
4. Withdraw the Air Strainer Screen (9), Throttle Valve Spring (7) and Throttle Valve (6) from the housing handle.
5. Withdraw the Trigger Assembly (3).
6. Remove the Muffler Element (13).

NOTICE

In the following step, only remove the Throttle Valve Seat (5) when replacing it or when the Trigger Bushing (2) must be replaced.

7. To remove the Throttle Valve Seat, insert a wire hook through the central hole of the Seat and hooking the underside of the Seat, pull the Seat out of the Motor Housing.
8. Before removing the Trigger Bushing, all Seals and components must be removed from the Motor Housing.
   a. Reposition the Motor Housing in leather–covered or copper–covered vise jaws with the Trigger Bushing upward.

CAUTION

In the following step, apply enough heat to warm the Housing, but do not exceed 200 degrees Fahrenheit. Do not apply heat directly to the Skinsulate covering. Take all precautions necessary to avoid being burned during the following procedure.

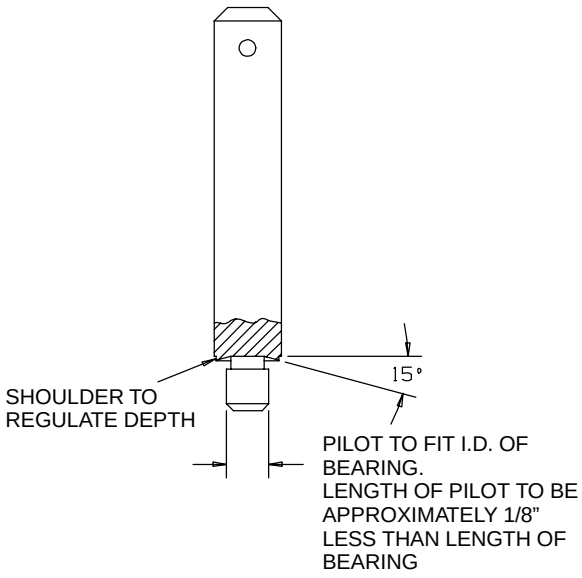
   b. Using a torch, apply heat to the Motor Housing around the Bushing.
   c. Thread a 10–32 tap into the Bushing and pull the Bushing out of the Housing with the tap.

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 installing the bearing in 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. Except for bearings, always clean every part and wipe every part with a thin film of oil before installation.
5. 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 bearings should never be cleaned.** Work grease thoroughly into every open bearing before installation.
6. Apply a film of O–ring lubricant to every O–ring before installation.
7. Unless otherwise noted, always press on the stamped end of a needle bearing when installing a needle bearing into a bearing recess. Use a bearing inserting tool similar to the one shown in Dwg. TPD786.

Needle Bearing Inserting Tool



(Dwg. TPD786)

Assembly of the Pistol Grip Motor Housing

1. If the Trigger Bushing (2) was removed, proceed as follows:
   a. Put a few drops of sealant on the end of a thin stick and insert the stick into the trigger bushing hole of the Motor Housing (1). Work the stick so that the Sealant flows against the shoulder inside the Housing.
   b. Insert the Trigger Bushing into the Motor Housing to a depth approximately one–half he length of the Bushing.
   c. Put a few drops of sealant in the counterbore surrounding the outside diameter of the Bushing.
   d. Rotate the Bushing approximately 180 degrees to make certain the Sealant makes complete contact around the outside of the Bushing.
   e. Push the Bushing into the Housing until it bottoms against the shoulder inside the Housing.
   f. Allow the Sealant to cure for eight hours at room temperature.
2. Carefully grasp the Motor Housing in leather–covered or copper–covered vise jaws, inlet end facing upward.
3. If the Throttle Valve Seat (5) 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. Press the Trigger (3) onto the grooved end of the Trigger Pin so that it is at right angles to the hole in the opposite end of the Pin.
5. Insert the Trigger Assembly into the Trigger Bushing so that the hole in the Trigger Pin aligns dead center with the hole in the Throttle Valve Seat.
6. Fold or roll the Muffler Element (13) and work it into the exhaust cavity in the handle of the Motor Housing.
7. Using needle nose pliers to hold the short stem end of the Throttle Valve (6), install the Valve inserting the long stem end through the hole in the Throttle Valve and Trigger Pin.
8. Place the Air Strainer Screen (9), closed end first, inside the large end coil of the Throttle Valve Spring (7).
9. Insert the Throttle Valve Spring and Screen, small coil end first, so that the Spring encircles the end of the Throttle Valve.
10. Apply a thin coat of O–ring lubricant to the Muffler O–ring (12) and install the O–ring on the hub of the Muffler (11).
11. Install the Inlet Bushing Spacer (10) in the large hole in the Muffler Assembly (11).
12. Place the Muffler Assembly on the face of the handle so that the hub with the Muffler O–ring extends into the handle.
13. Thread the Air Inlet Bushing (8) into the large hole in the Muffler Assembly. Tighten the Bushing to a minimum of 25 ft–lb (34 Nm) torque.

Assembly of the Motor

1. If the Rear Rotor Bearing (15) was removed, install a new one as follows:
   a. Place the Rear Rotor Bearing Nut (14) in the bore at the bottom of the bearing recess in the Motor Housing (1).
   b. Using a needle bearing inserting tool that has a pilot extending into the Bearing, and a shoulder that contacts the the outer radius on the bearing shell, press the Rear Rotor Bearing, unstamped end first, into the bearing recess until it is about 0.010" (0.25 mm) below flush.
   c. Inject a little grease into the Bearing.
2. Slide the Front End Plate (22), flat side first, over the splined end of the Rotor (19).
3. Using a sleeve that contacts only the inner ring of the Front Rotor Bearing (24), press the Front Rotor Bearing onto the splined hub of the Rotor until it seats against the Front End Plate.
4. The clearance between the Front End Plate and Rotor is critical. While holding the Front End Plate, gently tap the front end of the Rotor until you can insert a 0.001" feeler gauge or shim between the face of the Rotor and End Plate.

5. Grasp the splined end of the Rotor in leather–covered or copper–covered vise jaws with the short hub of the Rotor upward.
6. Wipe each Vane (20) with a film of light oil and place a Vane in each slot in the Rotor.
7. Place the Cylinder (21), air port end trailing, down over the Rotor and against the Front End Plate.
8. Place the Rear End Plate (17), flat side first, over the short hub of the Rotor.

⚠ WARNING

When performing the next step, make certain the Rear End Plate Retainer (18) does not spring away as you slip it onto the hub of the Rotor.

9. Install the Rear End Plate Retainer in the groove on the rotor hub.
10. Smear a film of light grease on the Rear End Plate Gasket (16) and place the Gasket on the End Plate so that the port in the Gasket is aligned with the port in the End Plate.
11. 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 of the housing bore, and slide the motor into the Motor Housing until it seats.
12. Withdraw the assembly dowel and insert the Cylinder Dowel (23) until the Cylinder Dowel is slightly below the surface of the Front End Plate.
13. Place the two Bearing Spring Washers (26) inside the Front Rotor Bearing Housing (25).
14. Slide the Front Rotor Bearing Housing over the Front Rotor Bearing.

Assembly of the Gearing

1. Using a sleeve that contacts only the outer ring of the Bearing, press the Spindle Bearing (40) into the Gear Case (38) until it seats.
2. Place the Grease Shield (42) against the Spindle Bearing so that the outer rim of the Grease Shield slides over the outer ring of the Bearing.
3. Using snap ring pliers, install the Spindle Bearing Retainer (41) in the groove behind the Bearing and Grease Shield.
4. If the Spindle Planet Gear Bearings (30) or Gear Head Planet Gear Bearings ((36) were removed, press a new Bearing into each Spindle Planet Gear (29) or Gear Head Planet Gear (35) using a bearing inserting tool that has a pilot and that contacts the outer radius of the Bearing. Press against the stamped end of the Bearing.
5. Work a small amount of the recommended grease into the gear teeth in the Gear Case.
6. Insert the Spindle, threaded end first, into the Gear Case and through the bore of the Spindle Bearing.
7. **For D ratio,** align the three holes in the Drive Plate (33) with the spindle gear shafts and install the Drive Plate on the shafts.
   For all other ratios, grease the bearings and gears of the Spindle Planet Gear Assemblies (29) and install them on the pins of the Spindle.
8. **For M, N or Q ratio,** install the Gear Head Spacer (37) in the Gear Case against the Spindle Planet Gears.
9. **For M, N or Q ratio,** grease the splined hub of the Gear Head (34) 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.
10. **For M, N or Q ratio,** grease the bearings and gears of the Gear Head Planet Gear Assemblies (35) and install them on the pins of the Gear Head.
11. **For H, J or JJ ratio,** grease the Rotor Pinion (31) and nstall it in the center of the Spindle Planet Gears. Make certain the teeth of the Pinion and Planet Gears mesh.
    For M or N ratio, grease the Rotor Pinion (31) and install it in the center of the Gear Head Planet Gears. Make certain the teeth of the Pinion and Planet Gears mesh.
12. **For H, J, JJ, M or N ratio**, slide the Rotor Pinion Spacer (32) onto the splined shaft of the Rotor.
13. Install the Bearing Housing Spacer (27) against the gearing or Drive Plate in the Gear Case.
14. 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.

NOTICE

After hand tightening the Gear Case, 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.

15. Tighten the Gear Case between 40 and 50 ft–lb (54 and 68 Nm) torque.
16. Install the Drill Chuck Spacer (43) onto the drill spindle.
17. Thread the Drill Chuck (47) onto the drill spindle and tighten.
18. **For M or Q ratio**, install the Dead Handle Adapter (45) and Dead Handle Assembly (46) onto the front end of the Gear Case. Tighten the Pinch Bolt (47) between 10 and 20 in. lb (1.4 and 2.3 Nm) torque.

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Loss of Power	Low air pressure	Check air supply at the Inlet. 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 a **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 them as instructed.
Leaky Throttle Valve	Worn Throttle Valve and/or Throttle Valve Seat	Install a new Throttle Valve and/or Throttle Valve Seat.
	Dirt accumulation on Throttle Valve and/or Throttle Valve Seat	Pour about 3 cc of a clean, suitable, cleaning solution into the air inlet and operate the tool for about 30 seconds. **Immediately**, pour 3 cc of the recommended oil into 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 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.