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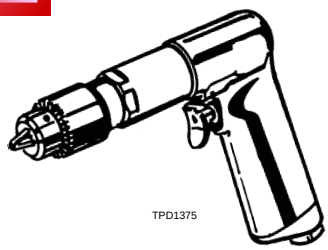
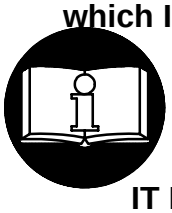


OPERATION AND MAINTENANCE MANUAL FOR SERIES 3 AIR DRILLS

Skinsulate® Comfort Coating

NOTICE

Series 3 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 1/4" (6 mm) inside diameter air supply hose.**
- **Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.**
- **Do not use damaged, frayed or deteriorated air hoses and fittings.**
- **Be sure all hoses and fittings are the correct size and are tightly secured. See Dwg. TPD905–1 for a typical piping arrangement.**
- **Always use clean, dry air at 90 psig (6.2 bar/620 kPa) maximum air pressure. Dust, corrosive fumes and/or excessive moisture can ruin the motor of an air tool.**
- **Do not lubricate tools with flammable or volatile liquids such as kerosene, diesel or jet fuel.**
- **Do not remove any labels. Replace any damaged label.**

USING THE TOOL

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

NOTICE

The use of other than genuine Ingersoll–Rand replacement parts may result in safety hazards, decreased tool performance, and increased maintenance, and may invalidate all warranties.
Repairs should be made only by authorized trained personnel. Consult your nearest Ingersoll–Rand Authorized Servicenter.

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

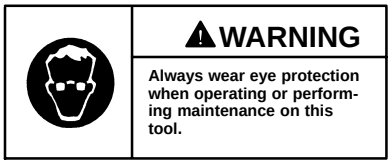
Printed in U.S.A.

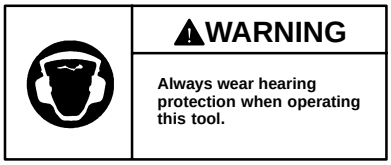
INGERSOLL-RAND®
PROFESSIONAL TOOLS

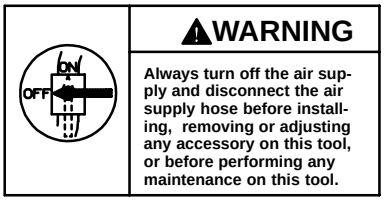
WARNING LABEL IDENTIFICATION

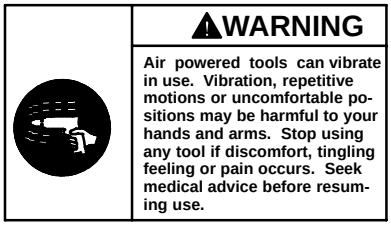
⚠ WARNING

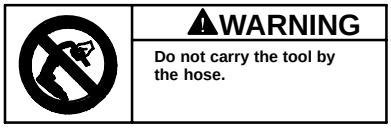
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

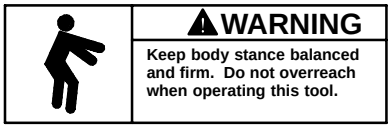


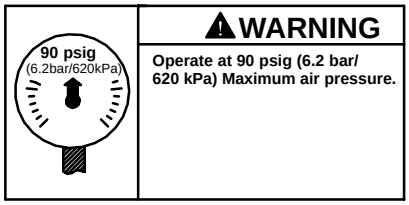












PLACING TOOL IN SERVICE

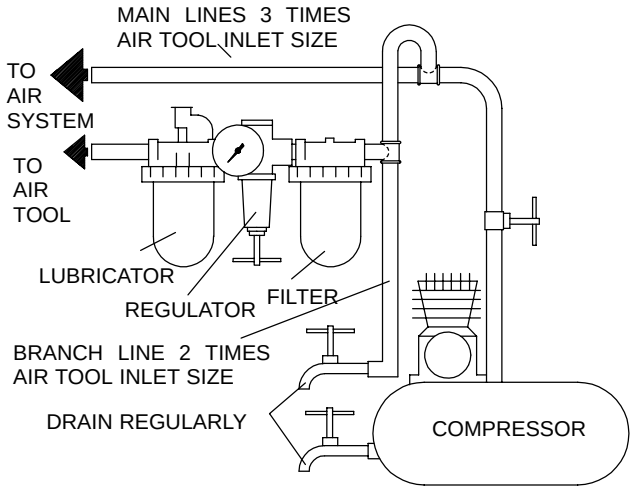
LUBRICATION

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. C08–02–FKG0–28

After each 40,000 cycles or each month, whichever occurs first, lubricate the gear train with Ingersoll–Rand No. 28 Grease.

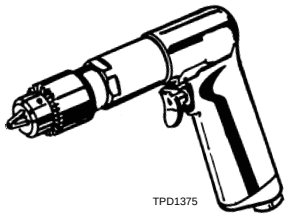


(Dwg. TPD905–1)

PLACING TOOL IN SERVICE

HOW TO ORDER A DRILL

PISTOL GRIP HANDLE			
	Free Speed	**Chuck Capacity**	
Model	**rpm**	**in**	**mm**
3P76ST4	6,600	1/4	6.35
3P44ST4	4,000	1/4	6.35
3P38ST4	3,800	1/4	6.35
3P21ST4	2,100	1/4	6.35
3P13ST4	1,300	14	6.35
3P09ST4	900	1/4	6.35
3P06ST4	600	1/4	6.35
IN–LINE HANDLE WITH LEVER THROTTLE			
3S60MF4	6,000	1/4	6.35
3S39MF4	3,900	1/4	6.35
3S30MF4	300	1/4	6.35



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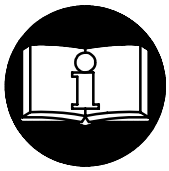
MODE D'EMPLOI DES PERCEUSES PNEUMATIQUES DE LA SÉRIE 3

Skinsulate® Comfort Coating

NOTE

Les perceuses de la Série 3 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).**
- **Pour la sécurité, les performances optimales et la durabilité maximale des pièces, cet outil doit être connecté à une alimentation d'air comprimé de 6,2 bar (620 kPa) maximum à l'entrée, avec un flexible de 6 mm de diamètre intérieur.**
- **Couper toujours l'alimentation d'air comprimé et débrancher le flexible d'alimentation avant d'installer, déposer ou ajuster tout accessoire sur cet outil, ou d'entreprendre une opération d'entretien quelconque sur l'outil.**
- **Ne pas utiliser des flexibles ou des raccords endommagés, effilochés ou détériorés.**
- **S'assurer que tous les flexibles et les raccords sont correctement dimensionnés et bien serrés. Voir Plan TPD905–1 pour un exemple type d'agencement des tuyauteries.**
- **Utiliser toujours de l'air sec et propre à une pression maximum de 6,2 bar (620 kPa). La poussière, les fumées corrosives et/ou une humidité excessive peuvent endommager le moteur d'un outil pneumatique.**
- **Ne jamais lubrifier les outils avec des liquides inflammables ou volatiles tels que le kérosène, le 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®
PROFESSIONAL TOOLS

SIGNIFICATION DES ÉTIQUETTES D'AVERTISSEMENT

⚠ ATTENTION

LE NON RESPECT DES AVERTISSEMENTS SUIVANTS PEUT CAUSER DES BLESSURES.

⚠ ATTENTION

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

⚠ ATTENTION

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

⚠ ATTENTION

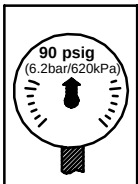
Garder une position équilibrée et ferme. Ne pas se pencher trop en avant pendant l'utilisation de cet outil.

⚠ ATTENTION

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

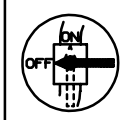
⚠ ATTENTION

Ne pas transporter l'outil par son flexible.



⚠ ATTENTION

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



⚠ ATTENTION

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

⚠ ATTENTION

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

MISE EN SERVICE DE L'OUTIL

LUBRIFICATION

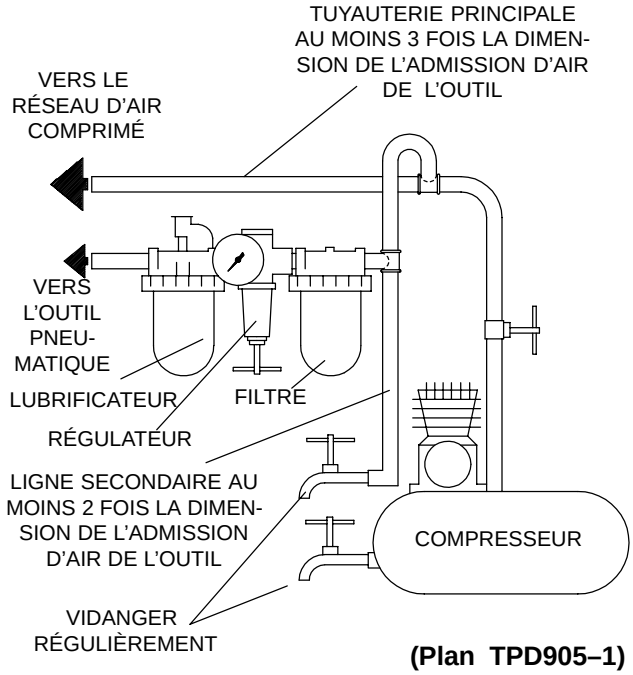
Ingersoll–Rand No. 10

Ingersoll–Rand No. 28

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

É.U. – No. C08–02–FKG0–28

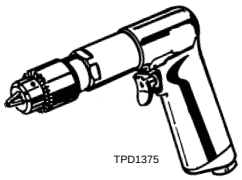
Tous les 40.000 cycles ou au moins tous les mois, lubrifier le train d'engrenages avec de la graisse Ingersoll–Rand No. 28.



(Plan TPD905–1)

SPÉCIFICATIONS

Modèle	Type de poignée	Capacité du mandrin		Vitesse à vide
		pouces	mm	tr/mn
3P76ST4	pistolet	1/4	6,35	6.600
3P44ST4	pistolet	1/4	6,35	4.400
3P38ST4	pistolet	1/4	6,35	3.800
3P21ST4	pistolet	1/4	6,35	2.100
3P13ST4	pistolet	1/4	6,35	1.300
3P09ST4	pistolet	1/4	6,35	900
3P06ST4	pistolet	1/4	6,35	600
3S60MF4	en ligne	1/4	6,35	6.000
3S39MF4	en ligne	1/4	6,35	3.900
3S30MF4	en ligne	1/4	6,35	300



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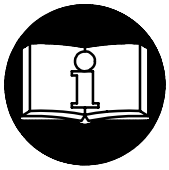
MANUAL DE FUNCIONAMIENTO Y MANETNIMIENTO TALADROS NEUMÁTICOS DE LA SERIE 3

Skinsulate® Comfort Coating

NOTA

Los taladros de la serie 3 están diseñados para las operaciones de taladrado en las industrias aeroespacial, del automóvil, de 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 de 90 psig (6,2 bar/620 kPa) con una manguera de suministro de aire con diámetro interno de 6 mm.**
- **Corte siempre el suministro de aire y desconecte la manguera de suministro de aire antes de instalar, desmontar o ajustar cualquier accesorio de esta herramienta, o antes de realizar cualquier operación de mantenimiento de la misma.**
- **No utilice mangueras de aire y 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 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 atento a 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 elevados pares de reacción a la presión de aire recomendada, e incluso a presiones inferiores.**
- **Los accesorios de la herramienta podrían 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 con el médico antes de volver a utilizarla.**
- **Utilice únicamente los accesorios Ingersoll–Rand recomendados.**
- **El muelle de la válvula reguladora ejerce presión contra la tapa de dicha válvula. Tenga cuidado al sacar la 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®
PROFESSIONAL TOOLS

ETIQUETAS DE AVISO

⚠ AVISO

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

⚠ ADVERTENCIA

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

⚠ ADVERTENCIA

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

⚠ ADVERTENCIA

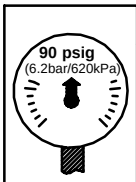
Mantener una postura del cuerpo equilibrada y firme. No estirar demasiado los brazos al manejar la herramienta.

⚠ ADVERTENCIA

Usar siempre protección para los oídos al manejar esta herramienta.

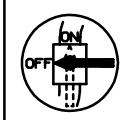
⚠ ADVERTENCIA

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

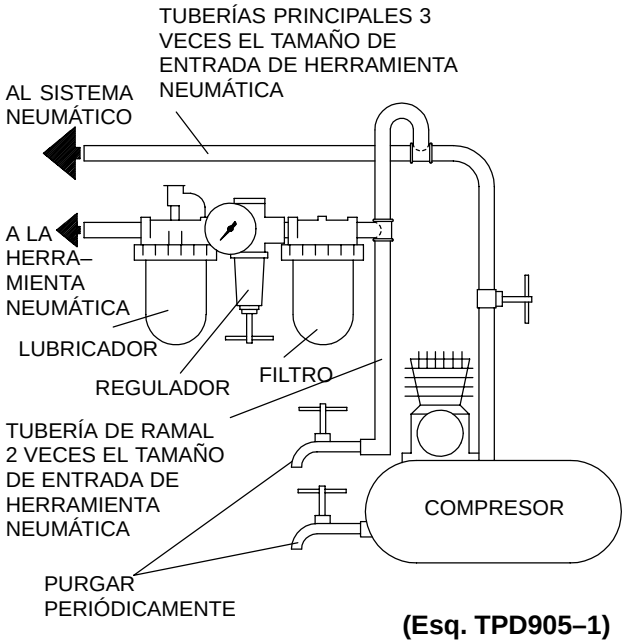
Ingersoll–Rand Nº 10

Ingersoll–Rand Nº 28

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

Para EE.UU. – No. C08–02–FKG0–28

Después de cada 40.000 ciclos o mensualmente (lo que ocurra primero), lubrique el tren de engranajes con grasa Ingersoll–Rand Nº 28.



(Esq. TPD905–1)

PARA PONER LA HERRAMIENTA EN SERVICIO

ESPECIFICACIONES

Modelo	Tipo de empuñadura	Capacidad del portabrocas		Velocidad en vacío
		pulg.	mm	rpm
3P76ST4	pistola	1/4	6,35	6.600
3P44ST4	pistola	1/4	6,35	4.400
3P38ST4	pistola	1/4	6,35	3.800
3P21ST4	pistola	1/4	6,35	2.100
3P13ST4	pistola	1/4	6,35	1.300
3P09ST4	pistola	1/4	6,35	900
3P06ST4	pistola	1/4	6,35	600
3S60MF4	recta	1/4	6,35	6.000
3S39MF4	recta	1/4	6,35	3.900
3S30MF4	recta	1/4	6,35	300

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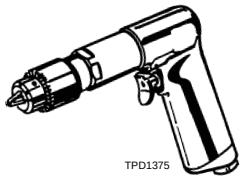


MANUAL DE FUNCIONAMENTO E MANUTENÇÃOPARA OS BERBEQUINS PNEUMÁTICOS SÉRIES 3

Skinsulate® Comfort Coating

AVISO

Os Berbequins Séries 3 são concebidos para aplicações de perfuração em indústrias aeroespacial, de automóveis, de equipamentos, electrónica, de maquinaria aeroespaciais e de mobiliário.
A Ingersoll–Rand não é responsável por modificações, feitas pelo cliente em ferramentas, nas quais a Ingersoll–Rand não tenha sido consultada.

⚠ ADVERTÊNCIA

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

COLOCANDO A FERRAMENTA EM FUNCIONAMENTO

- **Sempre opere, inspeccione e mantenha esta ferramenta de acordo com o Código de Segurança do Instituto Americano de Padrões Nacionais para Ferramentas Pneumáticas Portáteis (ANSI B186.1).**
- **Para segurança, máximo desempenho e máxima durabilidade das peças, opere esta ferramenta com uma pressão de ar máxima de 6,2 bar/620 kPa (90 psig) na entrada da mangueira de alimentação de ar com diâmetro interno de com 6 mm (1/4”).**
- **Desligue sempre a alimentação de ar e desconecte a mangueira de alimentação de ar antes de instalar, remover ou ajustar qualquer acessório nesta ferramenta, ou antes de executar qualquer serviço de manutenção nesta ferramenta.**
- **Não use mangueiras de ar ou adaptadores danificados, gastos ou deteriorados.**
- **Certifique–se de que todas as mangueiras e adaptadores sejam do tamanho correcto e estejam apertados com firmeza. Veja o Desenho TPD905–1 para um arranjo típico de tubagem.**
- **Use sempre ar seco e limpo com pressão máxima de 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.**
- **Os acessórios da ferramenta podem continuar a emitir impactos brevemente após a pressão ter sido aliviada.**
- **Ferramentas accionadas pneumáticamente podem vibrar em uso. Vibração, movimentos repetitivos ou posições desconfortáveis podem ser prejudiciais às mãos e aos braços. Pare de usar a ferramenta caso ocorra algum desconforto, sensação de formigueiro ou dor. Procure assistência médica antes de retornar ao trabalho.**
- **Use acessórios recomendados pela Ingersoll–Rand.**
- **O Tampo de Válvula Reguladora de Pressão está sob pressão da Mola da Válvula. Tenha cuidado ao removê–lo. (*Em ferramentas onde aplicável*).**
- **Esta Ferramenta não foi concebida para trabalhos em atmosferas explosivas.**
- **Esta Ferramenta não está isolada contra choques eléctricos.**

AVISO

O uso de peças de substituição que não sejam genuinamente da Ingersoll–Rand podem resultar em riscos de segurança, diminuição do desempenho da ferramenta, aumento da necessidade de manutenção e pode invalidar todas as garantias. As reparações devem ser feitas somente por pessoal treinado autorizado. Consulte o Centro de Serviços da Ingersoll–Rand mais próximo.

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

Impresso nos E.U.A.

INGERSOLL-RAND®
PROFESSIONAL TOOLS

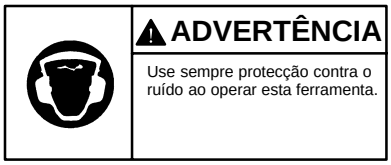
IDENTIFICAÇÃO DO RÓTULO DE ADVERTÊNCIA

⚠ ADVERTÊNCIA

O NÃO CUMPRIMENTO DAS SEGUINTES ADVERTÊNCIAS PODE RESULTAR EM FERIMENTOS.

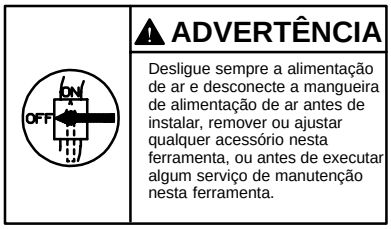
⚠ ADVERTÊNCIA

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.

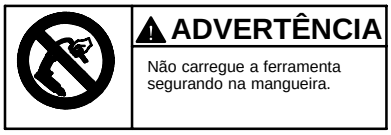


⚠ ADVERTÊNCIA

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.

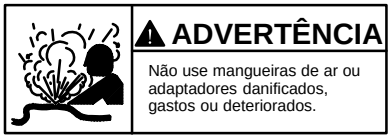
⚠ ADVERTÊNCIA

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.

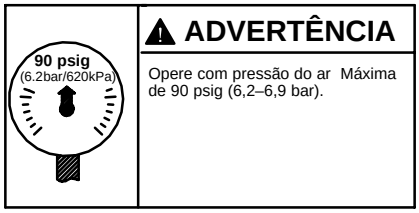


⚠ ADVERTÊNCIA

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 psig (6,2–6,9 bar).

COLOCANDO A FERRAMENTA EM FUNCIONAMENTO

LUBRIFICAÇÃO

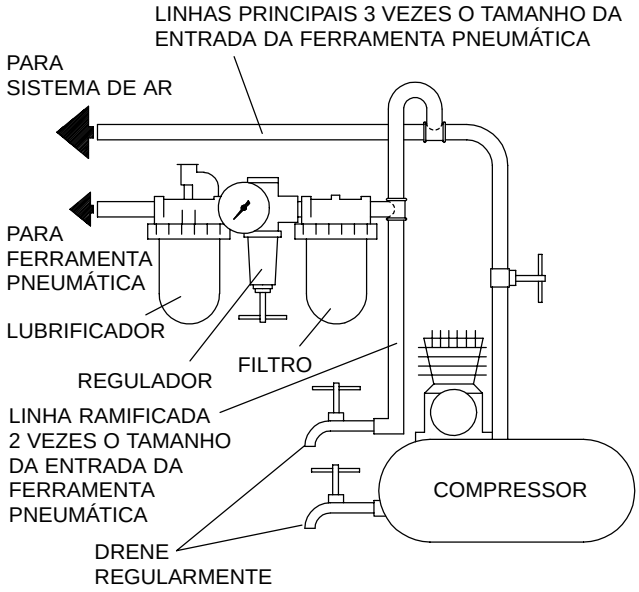
Ingersoll–Rand No. 10

Ingersoll–Rand No. 28

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

Para EUA – No. C08–02–FKG0–28

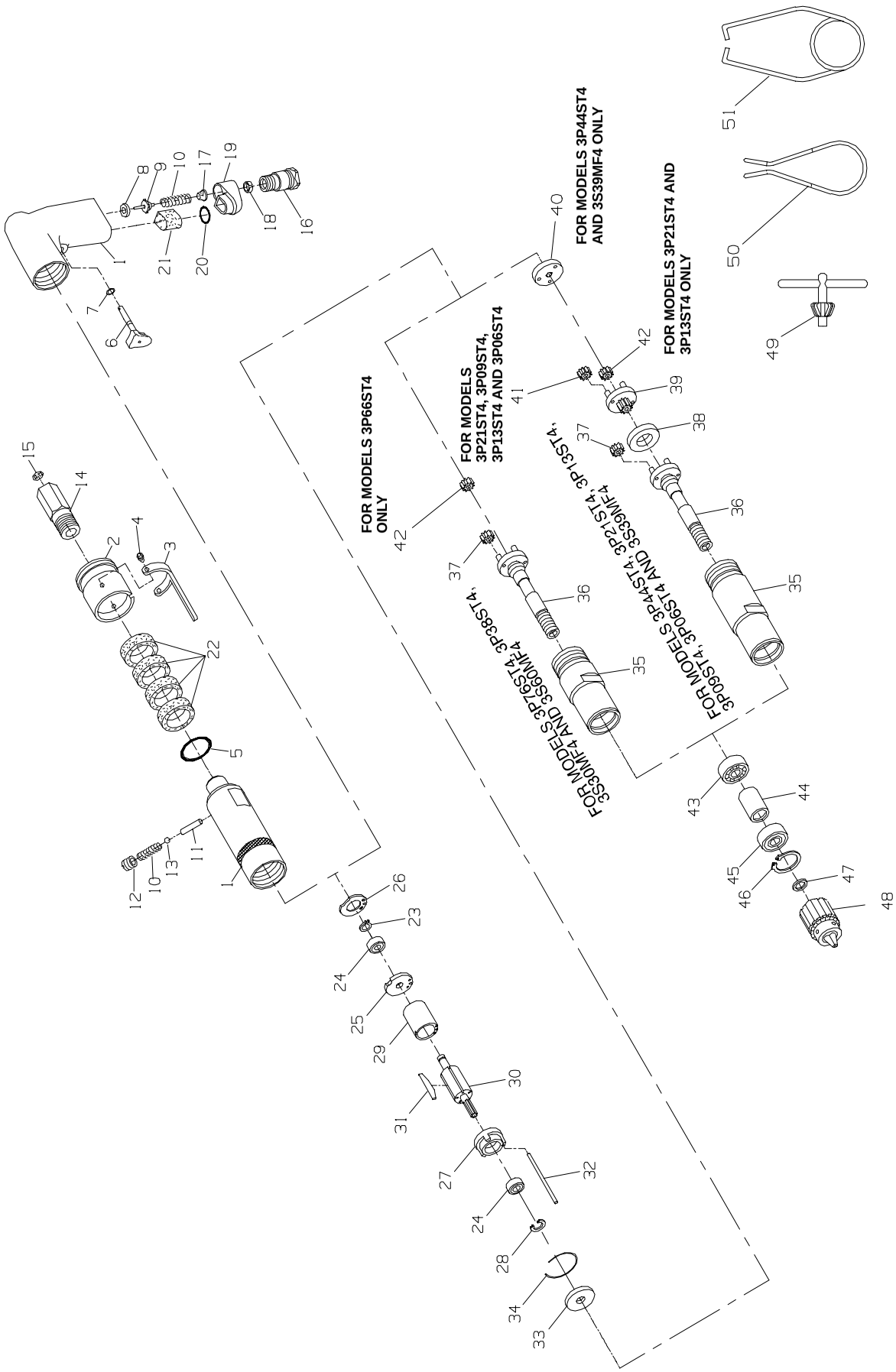
Depois de 40.000 ciclos ou cada mês, o que ocorrer primeiro, lubrifique o trem de engrenagem com Massa Ingersoll–Rand No. 28.



(Desenho TPD905–1)

ESPECIFICAÇÕES

Modelo	Tipo de Punho	Capacidade do Encabadouro		Velocidade Livre
		mm	pol.	rpm
3P76ST4	pistola	6,35	1/4	6.600
3P44ST4	pistola	6,35	1/4	4.400
3P38ST4	pistola	6,35	1/4	3.800
3P21ST4	pistola	6,35	1/4	2.100
3P13ST4	pistola	6,35	1/4	1.300
3P09ST4	pistola	6,35	1/4	900
3P06ST4	pistola	6,35	1/4	600
3S60MF4	em linha	6,35	1/4	6.000
3S39MF4	em linha	6,35	1/4	3.900
3S30MF4	em linha	6,35	1/4	300



(Dwg. TPA1361–1)

		PART NUMBER FOR ORDERING
	1	Motor Housing Assembly
		for 3P models ending in –EU .. 3A–EU–AST40
		for all other 3P models 3A–AST40
		for 3S models ending in –EU .. 3L–EU–A40
		for all other 3S models 3L–A40
	*	Warning Label
		for models ending in –EU EU–99
		for all other models WARNING–7–99
		Exhaust Deflector Assembly
		(for Model 3S) 3RL–A23
	2	Exhaust Deflector
		(for Model 3S) 3RL–23
	3	Throttle Lever
		(for Model 3S) 3RL–273
•	4	Throttle Lever Pin (2)
		(for Model 3S) 3RL–120
	5	Exhaust Deflector Seal
		(for Models 3S) 3RL–210
	6	Trigger Assembly
		(for Model 3P) 3RA–A93
♦ •	7	Trigger Pin Seal
		(for Model 3P) 8SL–259
♦ •	8	Throttle Valve Seat
		(for Model 3P) 7AH–303
♦ •	9	Throttle Valve
		(for Model 3P) 7AH–302
♦ •	10	Throttle Valve Spring
		for Model 3P 3RA–51
		for Model 3S 3RL–51
	11	Throttle Valve Plunger
		(for Model 3S) 3RL–302
	12	Throttle Valve Cap
		(for Model 3S) 3RL–266
	13	Throttle Valve Ball
		(for Model 3S) 4U–722
	14	Inlet Bushing Assembly (1/4")
		(for Model 3S) 3RL–565
•	15	Inlet Screen
		(for Model 3S) 3RL–61
	16	Inlet Bushing (1/4")
		(for Model 3P) 7AH–565
♦ •	17	Inlet Screen (for Model 3P) R0A2–61
	18	Inlet Bushing Spacer
		(for Model 3P) 7AH–65
	19	Muffler Assembly
		(for Model 3P) 3RA–A123
♦ •	20	Muffler O–ring
		(for Model 3P) 85H–167
♦ •	21	Muffler Element
		(for Model 3P) 3RA–310
	22	• Muffler Element (4)
		(for Models 3S) 3RL–311
♦ •	23	Rear Rotor Bearing Retainer 8SL–305
♦	24	Rotor Bearing (2) DG10–22
	25	Rear End Plate 3RL–12
♦ •	26	Rear End Plate Gasket 3RL–739
	27	Front End Plate 3RL–11
♦ •	28	Front Rotor Bearing Retainer 3RL–13
	29	Cylinder 3RL–3HP
	30	Rotor 3RL–53HP
♦ •	31	Vane Packet (set of 6 Vanes) 3RL–42–6

* 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
32	Cylinder Dowel	3RL–98
33	Motor Clamp Washer	3RL–207
34	Clamp Washer Retaining Ring	3RL–208
35	Gear Case	
	for Models 3P38ST4, 3P76ST4, 3S30MF4 and 3S60MF4	3AL–37
	for Models 3P38ST4–EU, 3P76ST4–EU, 3S30MF4–EU and 3S60MF4–EU	3AL–EU–37
	for Models 3P44ST4, 3P21ST4, 3P13ST4, 3P09ST4, 3P06ST4 and 3S39MF4	3AM–37
	for Models 3P44ST4–EU, 3P21ST4–EU, 3P13ST4–EU, 3P09ST4–EU, 3P06ST4–EU and 3S39MF4–EU	3AM–EU–37
36	Spindle	
	for Models 3P76ST4, 3S60MF4 and 3P66ST4	3AH–8
	for Models 3P38ST4 and 3S30MF4	3AL–8
	for Model 3P09ST4 and 3P21ST4	3AM–8
	for Models 3P44ST4, 3P13ST4, 3P06ST4 and 3S39MF4	3AN–8
37	Spindle Planet Gear (3)	
	for Models 3P38ST4 and 3S30MF4	3RLL–10
	for Models 3P76ST4, 3P09ST4, 33P21ST4 and 3S60MF4	3RLM–10
	for Models 3P44ST4, 3P13ST4, 3P06ST4 and 3S39MF4	3RLN–10
38	Gear Head Spacer (for Models 3P44ST4, 3P21ST4, 3P13ST4, 3P09ST4, 3P06ST4 and 3S39MF4)	3RL–80
39	Gear Head	
	for Model 3P21ST4	3RLM–216
	for Models 3P44ST4, 3P13ST4 and 3S39MF4	3RLN–216
	for Model 3P09ST4	M002–216–028
	for Model 3P06ST4	M002–216–044
40	Drive Plate (for Models 3P44ST4 and 3S39MF4)	M002–171
41	Gear Head Planet Gear (3)	
	for Models 3P21ST4 and 3P13ST4	3RLM–10
	for Models 3P09ST4 and 3P06ST4	3RLL–10
42	Rotor Pinion (for Models 3P21ST4, 3P13ST4 and 3P76ST4)	3RLM–17
43	Rear Spindle Bearing	R00H–97
44	Spindle Bearing Spacer	3A–111A
45	Front Spindle Bearing	R00A–510
46	Spindle Bearing Retainer	3RANT2–28
47	Drill Chuck Spacer	5A–90
48	Drill Chuck	R0H–99
49	Chuck Key	R1H–J253
50	Horizontal Hanger	3RA–365
51	Vertical Hanger	7AH–565
*	Tune–up Kit (includes illustrated parts 7, 8, 9, 10, 17, 20, 21, 23, 24 [2], 26, 28, and 31)	3A–TK2HP

* 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 3 Drill is disassembled for maintenance and repair or replacement of parts, lubricate the tool as follows:

1. **Gearing:**
   For H or L ratios, coat gears with 2 to 4 cc of Ingersoll–Rand No. 28 Grease.
   For J, M, N, P or Q ratios, coat gears with 4 to 6 cc of Ingersoll–Rand No. 28 Grease.
2. Use Ingersoll–Rand No. 10 Oil for for lubricating the motor. Inject approximately 1 to 2 cc of oil into the air inlet before attaching the air hose.

DISASSEMBLY

General Instructions

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

Disassembly of the Tool

1. Each Series 3 Drill is comprised of three modules or units which include a motor housing and motor unit, a gear unit and a drill chuck spindle unit. The tool can be disassembled for repairs to each individual unit without disturbing the other units.
2. To remove Drill Chuck (48), lightly grasp the tool in a leather–covered or copper–covered vise using the flats on the Gear Case (35). Insert the Chuck Key into one of the holes in the Chuck and tap lightly with a hammer. Remove the Drill Chuck Spacer (47).
3. Using two wrenches, unscrew and remove the Gear Case from the Motor Housing (1).

Disassembly of Gearing

1. Using a thin blade screwdriver, work the Motor Clamp Washer Retaining Ring (34) from the groove in the Gear Case and withdraw the Motor Clamp Washer (33).
2. **For Models 3P44ST4, 3P21ST4, 3P13ST4, 3P09ST4 and 3P06ST4,** tap the motor end of the Gear Case against the top of the workbench to remove the Gear Head (39), Gear Head Spacer (38), Drive Plate (40) or Gear Head Planet Gears (41).
   For 3P76ST4, remove the Rotor Pinion (42).
3. To remove the Spindle (36) and Spindle Planet Gears (37), firmly hold the Gear Case and tap the threaded end of the Spindle with a soft–faced hammer, driving the Spindle from the Gear Case.
4. Use snap ring pliers to remove the Spindle Bearing Retainer (46) from the groove in the front of the Gear Case.
5. Using a sleeve that contacts the outer ring of the bearing, press the Rear Spindle Bearing (43) from the front of the Gear Case.

Disassembly of the Motor

1. Grasp the splined end of the Rotor (30) and pull the motor from the Motor Housing.
2. Withdraw the Rear End Plate Gasket (26) from the bottom of the housing bore.
3. While grasping the Cylinder (29) in one hand, lightly tap on the splined end of the Rotor to drive the Rotor from the bore of the Front Rotor Bearing (24), thus freeing the Front End Plate (30) and Bearing.
4. Using snap ring pliers, remove the Front Rotor Bearing Retainer (28) and pull the Front Rotor Bearing from the Front End Plate.
5. Slide the Cylinder off the Rotor, and withdraw the Vanes (31) from the vane slots.
6. Remove the Rear Rotor Bearing Retainer (23) from the groove in the hub of the Rotor.
7. Support the Rear End Plate (25) as close to the rotor body as possible, and press the Rotor from the Rear Rotor Bearing.

Disassembly of the Motor Housing

For Pistol Grip (Model 3P)

1. Lightly grasp the pistol grip handle in leather–covered or copper–covered vise jaws so that the Air Inlet Bushing (16) is upward.
2. Unscrew the Air Inlet Bushing and remove the Inlet Bushing Spacer (18), Muffler Assembly (19), Muffler O–ring (20), Air Strainer Screen (17), Throttle Valve Spring (10) and Throttle Valve (9).
3. Withdraw the Trigger (6) and Trigger Pin Seal (7).

4. Using a stiff wire hook, pull the Throttle Valve Seat (8) from the handle.
5. Using a pair of needle–nose pliers, pull the Muffler Element (21) from the handle.

For In–Line (Model 3S)

1. Remove the Throttle Valve Cap (12), Throttle Valve Spring (10), Throttle Valve Ball (13) and Throttle Valve Plunger (11) from the Motor Housing (1).
2. Using an adjustable wrench, remove the Inlet Bushing Assembly (14).
3. If the Inlet Screen (15) requires replacement, use the eraser end of a wooden pencil to push the Inlet Screen from the Inlet Bushing Assembly.
4. Remove the Exhaust Deflector Assembly (2) from the Motor Housing.
5. Remove the Exhaust Deflector Seal (5) from the Housing.
6. The Throttle Lever (3) is attached to the Exhaust Deflector Assembly with two Throttle Lever Pins (4) which are two–piece rivets. Lightly grasping the Deflector in leather–covered or copper–covered vise jaws, drive the pin in the center of the rivet inward with a pin punch until it is free of the rivet. Repeat the procedure on the other rivet. Squeeze the ends of the rivets together and pry them from the Deflector with a screwdriver or pull them with pliers.
7. Work the Muffler Elements out of the Exhaust Deflector.

ASSEMBLY

General Instructions

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

Assembly of the Motor Housing

For Pistol Grip (Model 3P)

1. Grasp the handle in a vise so that the handle is vertical
and the entrance to the handle bore is upward.
2. Note that the Throttle Valve Seat (8) is symmetrical and can be installed in the handle either side first in order to get full use of each side. Push the Throttle Valve Seat into the tapped bore of the handle with a 1/2” (13 mm) diameter dowel. Push it in until it seats.
3. Install the Trigger Pin Seal (7) onto the trigger pin andinsert Trigger (6) in the Housing.
4. Installation of the Throttle Valve is sometimes a bit difficult due to the smallness of the Valve and the depth of the bore n which it is located. The difficult part is in holding the Valve while inserting the long end of the valve stem through the hole in the trigger pin. Although the Valve can be held with a push–button mechanical pencil or a wooden dowel, one of the easiest ways to hold it is by using a common wooden pencil with rubber eraser. Insert the short end of the valve stem into the rubber eraser full depth, then backing it out far enough so that the Valve is just nicely supported. Insert the Valve into the bore of the handle so that the long end of the stem enters the hole in the trigger stem. Pull outward on the Trigger to hold the Valve while removing the pencil.
5. Place the Air Strainer Screen (17), closed end first, inside the large end coil of the Throttle Valve Spring (10).
6. Insert the Throttle Valve Spring and Screen, small coil first, into the handle so that the Spring encircles the end of the Throttle Valve.
7. If the Muffler Element (21) was removed from the handle, wash it in clean, suitable, cleaning solution and then fold it and pinch it dry. While keeping it folded, insert it into the exhaust cavity in the handle.
8. Place the Muffler O–ring (20) over the perforated baffle of the Muffler (21).
9. Place the Muffler on the face of the handle so that the perforated baffle extends into the handle.
10. Slide the Inlet Bushing Spacer (18) over the threaded end of the Inlet Bushing (16), and install the Inlet Bushing in the handle. Tighten it to 26 ft–lb (35 Nm) of torque.

Assembly of the Motor Housing

For In–Line (Model 3S)

1. Work new Muffler Elements (22) into the Exhaust Deflector (2) to a point beyond the two throttle lever pin holes.
2. Position the Throttle Lever (3) on the Exhaust Deflector with the Lever covering the timing notch at the front end of the Deflector. Insert the two Throttle Lever Pins (4) through the Lever and into the Exhaust Deflector. Using pliers, press the pins in the center of the Throttle Lever Pins flush with the head.

NOTICE

Do not distort the Exhaust Deflector by applying too much force.

3. Center a new Inlet Screen (15) over the air line end of the Inlet Bushing Assembly (14) and, using the eraser end of a wooden pencil, push the Screen into the Bushing until it bottoms on the internal shoulder.
4. Place the Exhaust Deflector Seal (5) on the smaller shoulder of the Motor Housing. To hold the Seal in position, lightly coat the Seal and shoulder with Ingersoll–Rand No. 28 Grease. Place the Exhaust Deflector on the rear of the Housing, aligning the notch in the Deflector with the alignment pin in the Housing. Secure the Deflector to the Housing with the Inlet Bushing Assembly. Use a torque wrench and tighten the Inlet Bushing Assembly to 15 to 18 ft–lb (20 to 24 Nm) torque.
5. Before installing throttle components, make sure that the Motor Housing is positioned correctly.
   For Model 3S, the Throttle Lever should be facing downward. Insert the Throttle Valve Plunger (11), Throttle Valve Ball (13) and Throttle Valve Spring (10) Into the Motor Housing. Position the Throttle Valve Cap (12) on the Throttle Valve Spring. Screw the Valve Cap into the Motor Housing until the cap is within approximately two threads of being flush with the Housing. Apply a light, uniform coat of thread locking compound to the remaining two threads. Tighten the Valve Cap securely and place the Housing on a workbench with the Valve Cap facing downward. Allow the compound to cure completely.

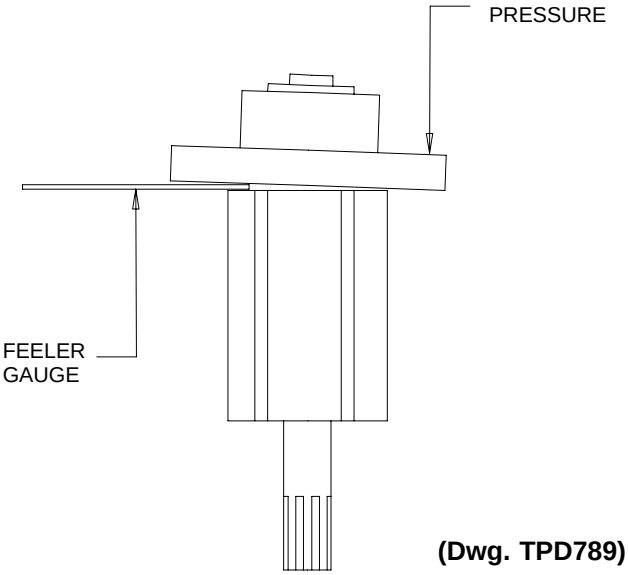
Assembly of the Motor

1. Place the Rear End Plate (25) on the short, unsplined shaft of the Rotor (30) with the counter bore away from the body of the Rotor.
2. Using a sleeve that contacts the inner ring of the Rear Rotor Bearing (24), press the Bearing onto the shaft until the Rear End Plate just contacts the rotor body.
3. The clearance between the Rear End Plate and Rotor is critical. While pressing down with your finger on the outer edge of the End Plate on the Bearing side, insert a .002” (.05 mm) feeler gauge between the face of the Rotor and End Plate directly opposite the point where pressure is applied. Refer to Dwg. TPD789. Supporting the End Plate, lightly tap the shaft with a plastic hammer to increase the space. Press the Bearing farther onto the shaft if the space is too wide. When the proper clearance is obtained, install the Rear Rotor Bearing Retainer (23) on the shaft.

NOTICE

This measurement must be made at the outside diameter of the rotor body.

Measurement of Rear End Plate Clearance



(Dwg. TPD789)

4. Place the Rotor, with the splined end up, in a block which has clearance for the Rotor Bearing and supports the Rear End Plate.
5. Wipe each Vane (31) with a light film of Ingersoll–Rand No. 10 oil and place a Vane in each slot in the Rotor.
6. Note that the Cylinder (29) has a notch in one end. Place the Cylinder, notched end up, down over the Rotor and against the Rear End Plate, aligning the dowel hole in the Cylinder with the U–shaped notch in the rim of the Rear End Plate.

7. Install the Front Rotor Bearing (24) in the Front End Plate (27) and retain it with the Front Rotor Bearing Retainer (28).
8. Using a sleeve that contacts the inner ring of the bearing, press the assembled Front End Plate, flat side first, on the splined end of the Rotor until the End Plate just contacts the Cylinder.
9. Install the Rear End Plate Gasket (26) in the Motor Housing, aligning the small notch in the Gasket with the dowel pin hole in the Housing.
10. Insert a thin, rigid wire into the dowel pin hole at the bottom of the motor recess in the Motor Housing. Grasping the assembled motor by the spline on the Rotor and with the dowel pin holes of the Front End Plate and Cylinder aligned with the U–shaped notch in the Rear End Plate, install the assembled motor in the Motor Housing. Maintain alignment between the motor and Motor Housing by passing the aligned dowel holes in the assembled motor over the wire positioned in the Motor Housing. Withdraw the wire and install the Cylinder Dowel (32), making certain the Cylinder Dowel is flush with or below the Front End Plate.

Assembly of the Gearing

1. Set the Gear Case (35) on the table of an arbor press with the threaded end down.
2. Using a sleeve that will contact the outer ring of the bearing, press the Rear Spindle Bearing (43), open side first, into the bearing recess until it seats.
3. Work some grease into the teeth of the Spindle Planet Gears (37) and onto the planet gear shafts on the Spindle (36).
4. Slide the Spindle into the Gear Case so that the spindle shaft passes through the bore of the Rear Spindle Bearing.
5. Install the Spindle Bearing Spacer (44) and Front Spindle Bearing (45), shielded side out, on the shaft of the Spindle.
6. Install the Spindle Bearing Retainer (46) in the groove in the Gear Case.
7. Slide the Spindle Planet Gears onto the planet gear shafts, making certain the teeth on the Gears mesh with the teeth of the Gear Case.
8. **For Models 3P13ST4, 3P21ST4 and 3P76ST4,** work some grease into the teeth of the Rotor Pinion (42). Place the Rotor Pinion in the Spindle so that it meshes with the Spindle Planet Gear.
9. **For Models 3P44ST4, 3P21ST4, 3P13ST4, 3P09ST4, 3P06ST4 and 3S39MF4**, coat the Gear Head Spacer (38) with grease and place it In the Gear Case against the Spindle Planet Gears.
10. **For Models 3P44ST4, 3P21ST4, 3P13ST4, 3P09ST4, 3P06ST4 and 3S39MF4**, work some grease onto the planet gear shafts on the Gear Head (39).
    For Model 3P06ST4, work some grease into the teeth of the Gear Head Planet Gears (41).
11. **For Models 3P44ST4, 3P21ST4, 3P13ST4, 3P09ST4, 3P06ST4 and 3S39MF4,** slide the Gear Head into the Gear Case so that the teeth on the gear head shaft mesh with the Spindle Planet Gears.
12. **For Models 3P21ST4, 3P13ST4, 3P09ST4 and 3P06ST4**, slide the Gear Head Planet Gears onto the planet gear shafts, making certain the teeth on the Planet Gears mesh with the teeth in the Gear Case.
13. **For Models 3P44ST4 and 3S39MF4**, side the Drive Plate (40) on the planet gear shafts of the Gear Head.
14. **For Models 3P21ST4, 3P13ST4 and 3P09ST4** work some grease into the teeth of the Rotor Pinion (42) and place the Rotor Pinion in the Gear Head so that it meshes with the Gear Head Planet Gears.
15. Place the Motor Clamp Washer (33) into the Gear Case and install the Clamp Washer Retaining Ring (34).

Assembly of the Tool

NOTICE

The Gear Case has a left–hand thread.

1. Apply some grease to the spline of the Rotor Shaft and screw the Gear Case and components into the Motor Housing. Tighten to 15 to 18 ft–lb (20 to 25 Nm) torque.
2. Slide the Drill Chuck Spacer (47) over the threaded end of the Drill Chuck Spindle and install the Drill Chuck (48).

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 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 light 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.