

## OPERATION AND MAINTENANCE MANUAL FOR MODELS 20L AND 20SL ANGLE DRILLS

### NOTICE

Models 20L and 20SL Close Quarter Drills are designed for close quarter heavy drilling and reaming in shipbuilding, railroad car shops, fabricated metal and construction applications. Ingersoll-Rand is not responsible for customer modification of tools for applications on which Ingersoll-Rand was not consulted.



### WARNING

**IMPORTANT SAFETY INFORMATION ENCLOSED.  
READ THIS MANUAL BEFORE OPERATING TOOL.**

**IT IS THE RESPONSIBILITY OF THE EMPLOYER TO PLACE THE INFORMATION  
IN THIS MANUAL INTO THE HANDS OF THE OPERATOR.**

**FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.**

#### PLACING TOOL IN SERVICE

- Always operate, inspect and maintain this tool in accordance with American National Standards Institute Safety Code for Portable Air Tools (ANSI B186.1).
- For safety, top performance, and maximum durability of parts, operate this tool at 90 psig (6.2 bar/620 kPa) maximum air pressure at the inlet with 1/2" (13 mm) inside diameter air supply hose assembled with a No. A01-46 Male Hose Nipple (3/8" male pipe to 1/2" 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.
- This tool can exert strong forces on the operator. Use proper support to control these forces.
- Use accessories recommended by Ingersoll-Rand.
- 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.

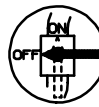
## WARNING LABEL IDENTIFICATION


### ⚠ WARNING


**FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.**

	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>Always wear eye protection when operating or performing maintenance on this tool.</p>
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	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>Always wear hearing protection when operating this tool.</p>
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	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>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.</p>
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	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>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.</p>
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	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>Do not carry the tool by the hose.</p>
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	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>Do not use damaged, frayed or deteriorated air hoses and fittings.</p>
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	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>Keep body stance balanced and firm. Do not overreach when operating this tool.</p>
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	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>Operate at 90 psig (6.2 bar/ 620 kPa) Maximum air pressure.</p>
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**International Warning Label:  
Order Part No. \_\_\_\_\_**

## ADJUSTMENTS

### OILER ADJUSTMENT

To adjust oiler, remove the Backhead and turn the Oiler Adjusting Screws. Turning the Screws in (clockwise) decreases the oil flow. Backing the Screws out (counterclockwise) increases the oil flow.

### NOTICE

**After adjustment, be sure the screw is at least 1/32" (0.8 mm) below the Backhead face; otherwise, it will prevent the proper seating of the Backhead on the Rear End Plate.**

## PLACING TOOL IN SERVICE

### LUBRICATION



**Ingersoll-Rand No. 50**

**Ingersoll-Rand No. 28**

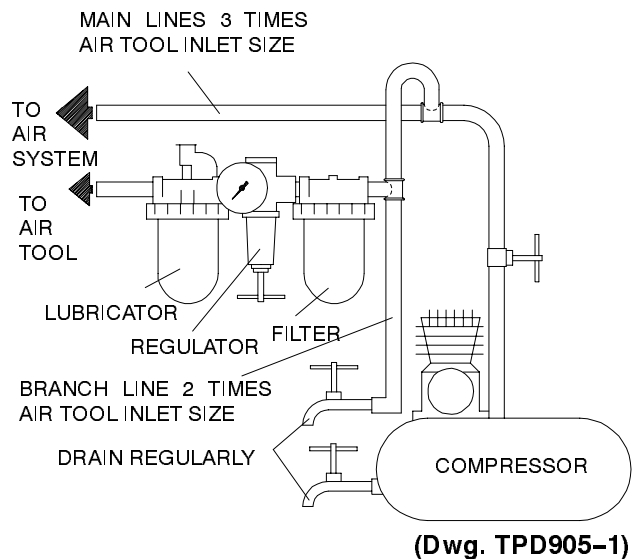
Always use an air line lubricator with this tool. We recommend the following Filter-Lubricator-Regulator Unit:

**For USA - No. C31-06-G00**

**For International - No. FRL30-C6-A29**

**Before starting the tool and after each four hours of operation or after repairs have been made,** unscrew the Oil Chamber Plug and fill the chamber with Ingersoll-Rand No. 50 Oil.

**Weekly, or as experience indicates,** inject 1 or 2 cc Ingersoll-Rand No. 28 Grease into the Grease Fitting. Remove the R2-227 Grease Plug from the Spindle Housing and pump two or three strokes of grease into the Angle Head.



**HOW TO ORDER A LARGE DRILL**

**SELF CLOSING LEVER THROTTLE**

Model	Free Speed, rpm	Capacity in Steel				Morse Taper Socket	Length of Feed	
		Drilling		Reaming			in.	mm
		in.	mm	in.	mm			
20LB	310	7/8	22	5/8	16	No. 2	1-3/4	44
20SLB	310	7/8	22	5/8	16	No. 3	1-3/8	35

# MANUEL D'EXPLOITATION ET D'ENTRETIEN

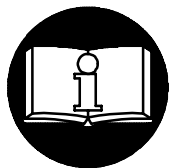
## MODÈLES 20L ET 20SL

### NOTE

Les perceuses d'angles pour espaces restreints Modèles 20L et 20SL sont destinées aux grosses opérations de perçage et d'alésage dans les constructions navales, les ateliers de chemin de fer, la mécanosoudure et les fabrications mécaniques.

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'EMPLOYER 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 13 mm de diamètre intérieur équipé d'un raccord mâle No A01-46 (tuyau mâle 3/8" pour flexible 1/2").
- Couper toujours l'alimentation d'air comprimé et débrancher le flexible d'alimentation avant d'installer, déposer ou ajuster tout accessoire sur cet outil, ou d'entreprendre une opération d'entretien quelconque sur l'outil.
- Ne pas utiliser des flexibles ou des raccords endommagés, effilochés ou détériorés.
- S'assurer que tous les flexibles et les raccords sont correctement dimensionnés et bien serrés. Voir Plan TPD905-1 pour un exemple type d'agencement des tuyauteries.
- Utiliser toujours de l'air sec et propre à une pression maximum de 6,2 bar. La poussière, les fumées corrosives et/ou une humidité excessive peuvent endommager le moteur d'un outil pneumatique.
- Ne jamais lubrifier les outils avec des liquides inflammables ou volatils 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 fous 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.
- Cet outil peut exercer des forces importantes sur l'opérateur. Utiliser un support correct pour contrôler ces forces.
- Utiliser les accessoires recommandés par Ingersoll-Rand.
- 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.

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Imprimé aux É.U.

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# SIGNIFICATION DES ETIQUETTES D'AVERTISSEMENT

## ATTENTION

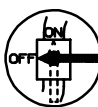
LE NON RESPECT DES AVERTISSEMENTS SUIVANTS PEUT CAUSER DES BLESSURES




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



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




**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**  
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.



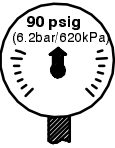
**ATTENTION**  
Ne pas transporter l'outil par son flexible.



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



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



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

Etiquette d'avertissement internationale:  
Commander Pièce No. \_\_\_\_\_



## RÉGLAGES

### RÉGLAGE DE L'HUILEUR

Pour régler l'huileur, déposer la tête arrière et tourner les vis de réglage. Le débit d'huile diminue lorsque les vis sont vissées (sens des aiguilles d'une montre) et il augmente lorsque elles sont dévissées (sens inverse des aiguilles d'une montre). Le dévissage (sens inverse des aiguilles d'une montre) augmente le débit.

### NOTE

Après le réglage, s'assurer que la vis est au moins à 0,8 mm en dessous de la face de la tête arrière, sinon elle empêchera l'assise correcte de la tête arrière sur le flasque arrière.

## MISE EN SERVICE DE L'OUTIL

### LUBRIFICATION



Ingersoll-Rand No. 50

Ingersoll-Rand No. 28

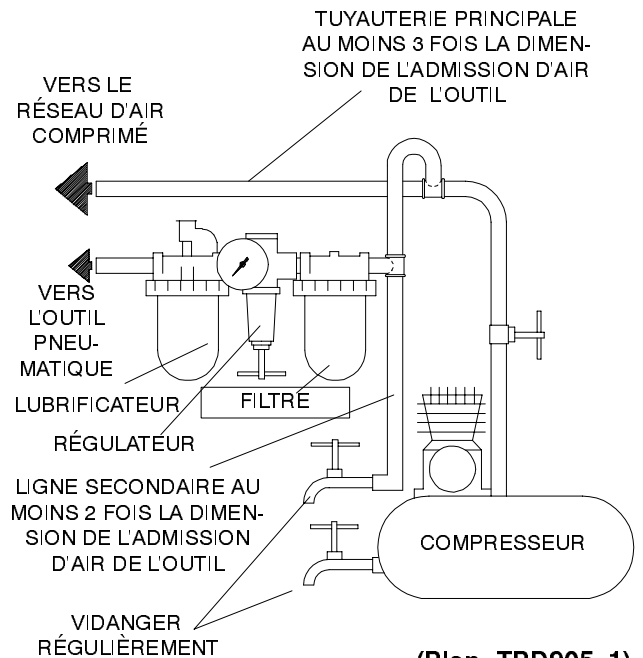
Utiliser toujours un lubrificateur avec cet outil. Nous recommandons l'emploi du filtre-régulateur-lubrificateur suivant :

For USA - No. C31-06-G00

International - No. FRL30-C6-A29

Avant de mettre l'outil en marche et toutes les quatre heures de fonctionnement ou lorsque des réparations ont été effectuées, dévisser le bouchon de la chambre d'huile et remplir cette dernière avec de l'huile Ingersoll-Rand No. 50.

Toutes les semaines, ou en fonction de l'expérience, injecter 1 ou 2 cm<sup>3</sup> de graisse Ingersoll-Rand No. 28 dans le raccord de graissage. Retirer le bouchon de graissage R2-227 du corps de broche et pomper deux ou trois coups de graisse dans le renvoi d'angle.



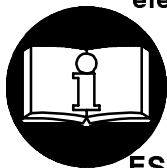
# MANUAL DE FUNCIONAMIENTO Y MANTENIMIENTO

## TALADROS ANGULARES MODELOS 20L Y 20SL

### NOTA

Los Taladros de Distancia Mínima Modelos 20L y 20SL están diseñados para taladrado pesado a mínima distancia y escariado en astilleros, talleres de vagones de ferrocarriles, y aplicaciones de construcción y metales fabricados.

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 útil 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 13 mm montado con un. conector de manguera macho N<sup>o</sup> A01-46 (tubo macho 3/8 pulg. a manguera 1/2 pulg.)
- 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.
- Esta herramienta puede ejercer mucha fuerza sobre el operario. Use un soporte apropiado para controlar esta fuerza.
- Utilice únicamente los accesorios Ingersoll-Rand recomendados.
- 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.

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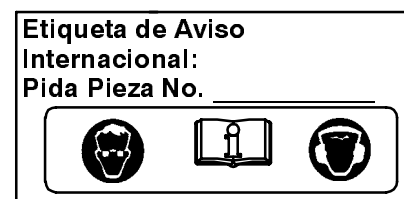
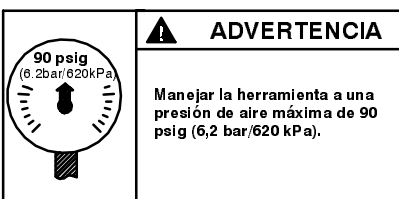
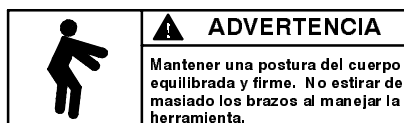
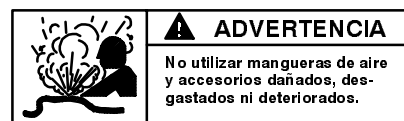
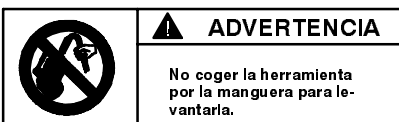
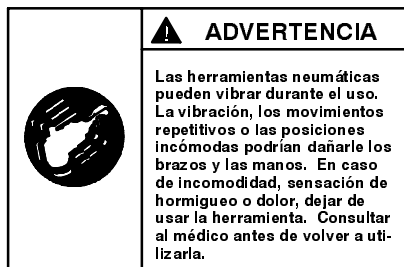
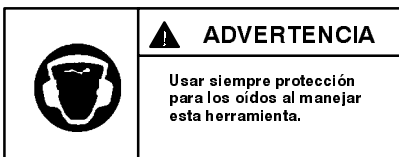
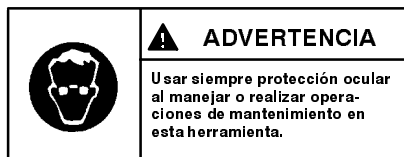
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## ETIQUETAS DE AVISO

### AVISO

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



## AJUSTES

### AJUSTE DE LUBRICADOR

Para ajustar el lubricador, saque la Cabeza Trasera y gire los Tornillos de Ajuste de Lubricador. Si se enroscan los Tornillos (girándolos en el sentido de las agujas del reloj) se reduce el flujo de aceite. Si se desenroscan los Tornillos (en sentido contrario al de las agujas del reloj) se incrementa el flujo de aceite.

### NOTA

Después de realizar el ajuste, asegúrese de que el tornillo esté como mínimo 1/32 pulg. (0,8 mm) por debajo de la de superficie de Cabeza Trasera; si no fuera así, evitará la colocación adecuada de la Cabeza Trasera en la Placa Trasera.

## PARA PONER LA HERRAMIENTA EN SERVICIO

### LUBRICACIÓN



Ingersoll-Rand N° 50



Ingersoll-Rand N° 28

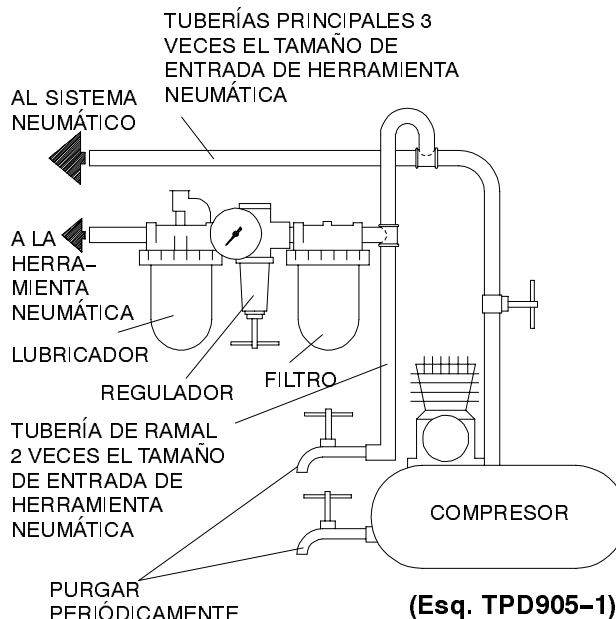
Use siempre un lubricante de aire con esta herramienta. Recomendamos la siguiente unidad de Filtro-Lubricador-Regulador:

For USA - No. C31-06-G00

Internacional - N° FRL30-C6-A29

Antes de comenzar a utilizar la herramienta y después de cada cuatro horas de uso, o después de que se haya llevado a cabo alguna reparación, desatornille el Tapón de Cámara de Aceite y llene dicha cámara de Aceite Ingersoll-Rand N° 50.

Semanalmente, o como indique la experiencia, inyecte 1 ó 2 cc de Grasa Ingersoll-Rand N° 28 en el Engrasador. Saque el Tapón de Grasa RS-227 de la Carcasa de Eje y ponga dos o tres disparos de grasa en la Cabeza Angular.



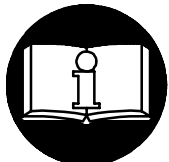
# INSTRUÇÕES PARA BERBEQUINS ANGULARES MODELOS 20L E 20SL

## AVISO

Os Berbequins de Ângulo Modelos 20L e 20SL são concebido para aplicações de perfuração e pesado e mandrilagem em construção de navios, oficinas de vagões ferroviários, fabricação de metais e construção.

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 SEGUINTE ADVERTÊNCIAS PODE  
RESULTAR EM FERIMENTOS.**

### COLOCANDO A FERRAMENTA EM FUNCIONAMENTO

- Sempre opere, inspecione 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) com uma mangueira de alimentação de ar com 13 mm (1/2") de diâmetro interno montada com um Bico de Mangueira Macho No. A01-46 (tubo macho de 3/8" para mangueira de 1/2").
- 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.
- Esta Ferramenta não está isolada contra choques eléctricos.
- Esta Ferramenta não foi concebida para trabalhos em atmosferas explosivas.

## AVISO

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

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

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**INGERSOLL-RAND®**  
**PROFESSIONAL TOOLS**




# IDENTIFICAÇÃO DO RÓTULO DE ADVERTÊNCIA

## ⚠️ ADVERTÊNCIA

O NÃO CUMPRIMENTO DAS SEGUINTE 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 formigamento 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).

**Rótulo de Advertência Internacional No. de Referência para Pedido**



## AJUSTES

### AJUSTE DO RESERVATÓRIO DE ÓLEO

Para ajustar o Reservatório de Óleo, remova o Cabeçote Traseiro e gire os Parafusos de Ajuste do Reservatório de Óleo. Ao girar os Parafusos para dentro (sentido horário) diminui o fluxo de óleo. Girando-os para fora (sentido contrário ao dos ponteiros do relógio) aumenta o fluxo de óleo.

### AVISO

Depois do ajuste, certifique-se de que o parafuso está a pelo menos 0,8 mm (1/32") abaixo da face do Cabeçote Traseiro, caso contrário, ele impedirá que o assentamento apropriado do Cabeçote Traseiro na Placa da Extremidade Traseira.

## COLOCANDO A FERRAMENTA EM FUNCIONAMENTO

### LUBRIFICAÇÃO



**Ingersoll-Rand No. 50      Ingersoll-Rand No. 28**

Use sempre um lubrificador de linha com estas ferramentas. Nós recomendamos a seguinte Unidade Filtradora-Lubrificadora-Reguladora.

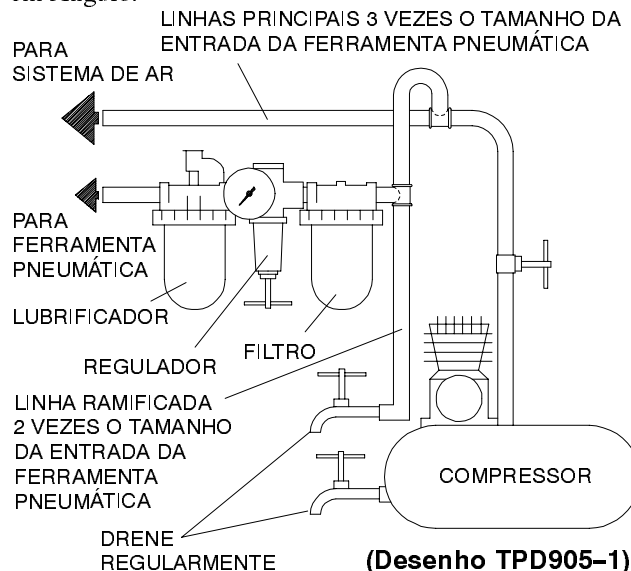
**For USA - No. C31-06-G00**

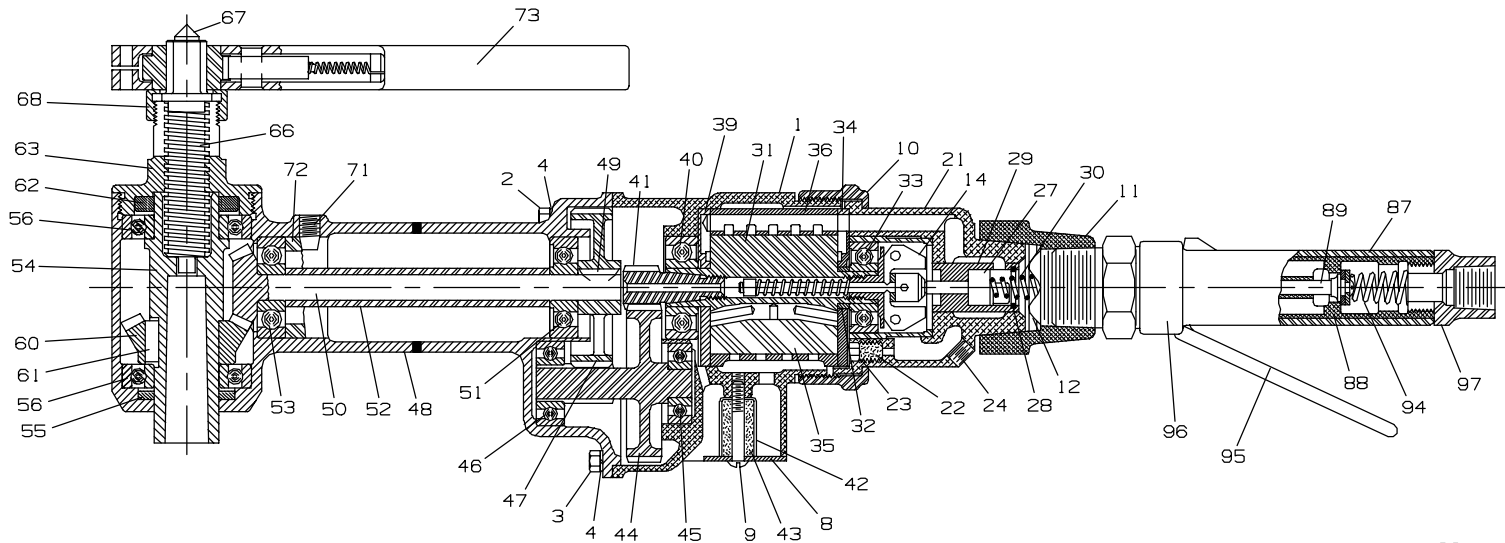
**Para Internacional - No. FRL30-C6-A29**

**Antes de operar a Ferramenta e depois de cada 8 horas de operação**, desparafuse o Bujão da Câmara de Óleo e encha a câmara com Óleo Ingersoll-Rand No. 50.

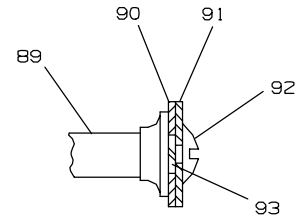
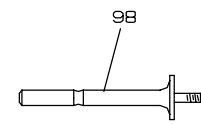
**Semanalmente, ou como a experiência indicar**, injecte 1 ou 2 cc de Massa Lubrificadora Ingersoll-Rand No. 28 no Adaptador de Massa Lubrificadora. Remova o Bujão de Massa Lubrificadora R2-227 do Corpo do Fuso e bombeie

dois ou três medidas de Massa Lubrificadora no Cabeçote em Ângulo.

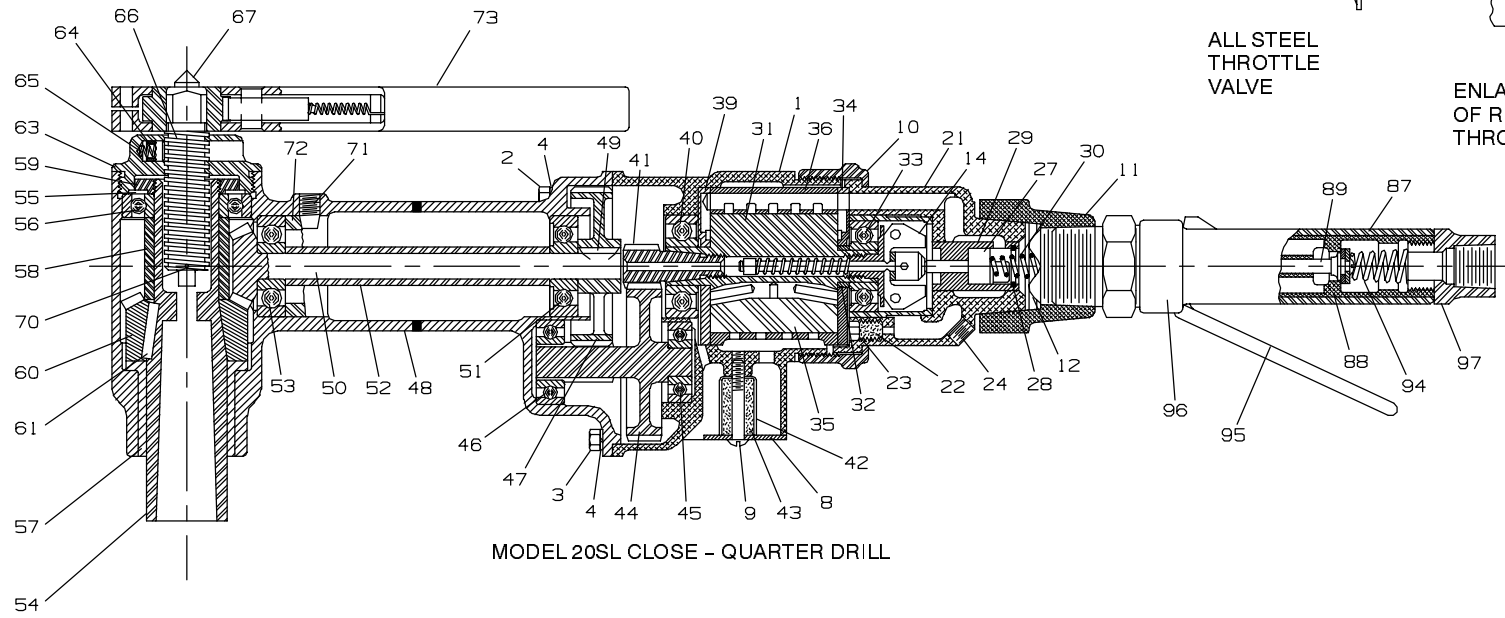




MODEL 20L CLOSE - QUARTER DRILL



10



MODEL 20SL CLOSE - QUARTER DRILL

PART NUMBER FOR ORDERING

PART NUMBER FOR ORDERING

1	Motor Housing		27	Governor Valve .....	R2-425A
	for models ending in -EU .....	R2H-EU-40	• 28	Governor Valve Retaining Spring .....	R2-281A
	for all other models .....	R2H-40	29	Governor Valve Bushing .....	R2-429A
*	Nameplate		30	Governor Valve Spring .....	R2-431A
	for models ending in -EU .....	R2H-EU-99	31	Rotor .....	R22H-53
	for all other models .....	R2H-99	32	Rotor Bearing Spacer .....	R2H-65
2	Cap Screw (long) (4) .....	R22H-68	• 33	Rear Rotor Bearing .....	R2-22
3	Cap Screw (short) (2) .....	R3-7	• 34	Rear End Plate .....	R2H-12
4	Lock Washer (6) .....	8U-58	• 35	Vane Packet (set of 5 Vanes) .....	R2-42B-5
*	Housing Plug .....	R1-369	• 36	Cylinder .....	R2-3B
*	Grease Fitting .....	R1-188	*	Cylinder Dowel .....	P25-98
*	Hexagon Head Pipe Plug .....	R4G-276	*	End Plate Dowel .....	R2H-74A
8	Exhaust Deflector .....	R2H-23	• 39	Front End Plate .....	R2H-11
9	Deflector Screw .....	R2H-312	• 40	Front Rotor Bearing .....	R2-24A
10	Coupling Nut .....	R2-282	41	Rotor Pinion .....	R2L-17A
11	Throttle Connector .....	R20-333	42	Felt Retainer .....	R2H-175
*	Rotation Label .....	R2H-100	43	Muffler Felt .....	R2H-311
• 12	Air Strainer Screen .....	D02-889	44	Intermediate Gear .....	R2L-82A
14	Governor Assembly .....	R2XJ-A424	45	Intermediate Gear Rear Bearing .....	R1L-24
21	Backhead		46	Intermediate Gear Front Bearing .....	T06-33
	for models ending in -EU .....	R2-EU-102C	47	Bevel Pinion Drive Gear .....	R2K-9
	for all other models .....	R2-102C			
*	Warning Label				
	for models ending in -EU .....	EU-99			
	for all other models .....	WARNING-8-99			
22	Oiler Felt (2) .....	R2-75			
23	Oiler Adjusting Screw (2) .....	R2-71			
24	Oil Chamber Plug .....	R2-227			
*	Backhead Stud (2) .....	R2-144			
*	Stud Nut (2) .....	501-639			

MAINTENANCE SECTION

- \* Not illustrated.
- To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a bullet (•) for every four tools in service.

# MAINTENANCE SECTION

## ANGLE HEAD PARTS

PART NUMBER FOR ORDERING



		<b>20L, 20L-EU Angle Drill</b>	<b>20SL, 20SL-EU Angle Drill</b>
48	Spindle Housing .....	R20-194	R20S-194
49	Bevel Pinion Drive Gear Key .....	TC-18	TC-18
• 50	Bevel Pinion .....	R20-205A	R20-205A
• 51	Bevel Pinion Rear Bearing .....	R2H-97	R2H-97
52	Bearing Spacer .....	R20-528	R20-528
• 53	Bevel Pinion Front Bearing .....	T06-24	T06-24
54	Spindle		
	Standard .....	R20-508	R20S-508
	Use-Em-Up .....	R20-294	R20S-294
• 55	Spindle Packing (1 for 20SL and 20SL-EU; 2 for all others)	R20-21	R20S-21
• 56	Spindle Bearing (1 for 20SL and 20SL-EU; 2 for all others)	T13-22	T13-22
• 57	Spindle Bushing .....	---	R20S-559
58	Spindle Bearing Spacer .....	---	R20S-576
59	Spindle Nut .....	---	R20S-578
• 60	Bevel Gear .....	R20-206A	R20S-206A
61	Bevel Gear Key .....	R20-610	R20S-610
• 62	Packing Ring (2) .....	R20-202	---
63	Spindle Housing Cap .....	R20-195	R20S-195
64	Friction Button .....	---	R20S-491
65	Friction Button Spring .....	---	4U-664
66	Feed Screw .....	R20-291	R20S-291
67	Feed Screw Center .....	W9-244	W9-244
68	Feed Screw Adjusting Nut .....	R20-499	---
*	Grease Plug .....	R2-227	R2-227
70	Feed Screw Stop Pin .....	---	5UT-762
71	Retainer Lock Screw (3) .....	R20-561	R20-561
72	Bearing Retainer .....	R20-224	R20-224
73	Ratchet Handle .....	R30-48	R30-48
*	Hose Nipple (1/2" hose to 3/8" male pipe) .....	A01-46	A01-46

\* Not illustrated.

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

# MAINTENANCE SECTION

## THROTTLE PARTS

PART NUMBER FOR ORDERING

		Self-Closing Lever Throttle
	Throttle Assembly .....	R20-AL401
87	Throttle Sleeve .....	R2J-269
■ 88	Throttle Body .....	R20-401
★ 89	Rubber-Faced Throttle Valve .....	R3H-402
• 90	Throttle Valve Face .....	8000-159A
91	Throttle Valve Face Cap .....	8000-157
92	Valve Stem Screw .....	R4-158
93	Valve Stem Screw Lock Washer .....	H54U-352
• 94	Throttle Valve Spring .....	T01-308
95	Throttle Lever .....	R2J-273
96	Throttle Lever Spacer .....	R2J-270
97	Throttle Body Cap .....	R2J-304
98	All-Steel Throttle Valve .....	T01-302

- If ordered as a replacement for a Throttle Body equipped with an All-Steel Throttle Valve also order the Rubber-Faced Throttle Valve (89). The Throttle Body for use with the All-Steel Throttle Valve (98) is discontinued.
- ★ Cannot be used as a replacement for the All-Steel Throttle Valve (98).
- To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a bullet (•) for every four tools in service.

## MAINTENANCE TOOLS

TOOL NAME	OPERATION	TOOL NUMBER FOR ORDERING
Coupling Nut Spanner Wrench	Removing or installing the Coupling Nut (10).	T1SE-59
Grease Gun	Lubrication.	P25-228
Throttle Valve Puller and Lapping Tool	Removing the All-Steel Throttle Valve (98) from-Throttle Body. Also used for lapping the All-Steel Throttle to the seat in the Throttle Body.	T01-371

## MAINTENANCE SECTION

### WARNING

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

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

### LUBRICATION

Each time a Model 20L, 20L-EU, 20SL or 20SL-EU Angle Drill is disassembled for maintenance, repair or replacement of parts, lubricate the tool as follows: Pour approximately 3 cc of Ingersoll-Rand No. 50 Oil into the air inlet. Remove the Oil Chamber Plug (24) and fill the chamber with Ingersoll-Rand No. 50 Oil.

### 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.

#### Air Strainer

Periodically, as experience indicates, remove the Throttle Connector (11) from the Backhead (21) and using a clean, suitable cleaning solution, clean the Air Strainer Screen (21).

#### Disassembly of the Motor

1. Secure the Rotor Pinion (41) in leather-covered or copper-covered vise jaws and unscrew the Governor Assembly (14).

### NOTICE

**This is left-hand thread; turn clockwise to remove.**

2. Insert a 5/16" (7 mm) rod into the hole from which the Governor Assembly was removed. Grasp the motor assembly by the Cylinder (36) in one hand (never clamp the Cylinder in a vise), and strike the end of the rod with a hammer, driving the rear hub of the Rotor (31) from the Rear Rotor Bearing (33).

3. Hold the Rotor Pinion (41) in leather-covered or copper-covered vise jaws, and with two pieces of flat metal inserted in the vane slots, turn the Rotor to unscrew it from the Rotor Pinion.
4. Screw a 3/8"-24 thread bolt into the Rotor, support the Front End Plate (39) as close to the Rotor as possible and drive, or press on the bolt until the rotor hub is free from the Front Rotor Bearing (40).

#### Disassembly of the Gearing and Angle Head

1. Unscrew and remove the three Retainer Lock Screws (71) before attempting to withdraw the Bevel Pinion (50).
2. Screw a 5/16"-18 thd. bolt into the tapped end of the Bevel Pinion and pull the assembled Pinion from the Housing.
3. Press the Bevel Pinion (50) out of the Bevel Pinion Drive Gear (47) and remove the Bevel Pinion Drive Gear Key (49) before attempting to remove the Bevel Pinion Rear Bearing (51) from the Bevel Pinion. **For Model 20SL or 20SL-EU, hand ream a new Spindle Bushing (57) with the Spindle Bushing Reamer after pressing it into the Spindle Housing (48).**

### ASSEMBLY

#### General Instructions

1. Always press on the **inner** ring of a ball-type bearing when installing the bearing on a shaft.
2. Always press on the **outer** ring of a ball-type bearing when pressing the bearing into a bearing recess.
3. Whenever grasping a tool or part in a vise, always use leather-covered or copper-covered vise jaws. Take extra care with threaded parts and housings.
4. Always clean every part and wipe every part with a thin film of 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 suitable cleaning solution and dry with a clean cloth. **Sealed or shielded bearing should never be cleaned.** Work grease thoroughly into every open bearing before installation.

## MAINTENANCE SECTION

### Assembly of the Motor

1. Note that the Rear End Plate (34) is stamped “12-2H” while the Front End Plate (39) is unstamped. Slip the Front End Plate (39), crescent grooved side first, over the front hub on the Rotor (31).

#### NOTICE

**The front rotor hub contains a tapered socket.**

2. Press the Front Rotor Bearing (40), shielded side first, onto the rotor front hub with a sleeve that will contact only the bearing inner ring. Press the Bearing on as far as possible without binding the Front End Plate (39) against the rotor face.

#### NOTICE

**Make sure the tapered surface on the Rotor Pinion (41) and tapered socket in the rotor hub are clean.**

3. Screw the Rotor Pinion into the Rotor (31).
4. Install a Vane (35) in each vane slot in the Rotor (31) and then slip the Cylinder (36) over the Rotor, entering the short End Plate Dowel (No. R2H-74A) into the dowel hole in the Front End Plate (39).
5. Install the Rotor Bearing Spacer (32) with internally beveled end first, on the rotor rear hub.
6. Place the Rear End Plate (34) on the Cylinder (36) so that the long Cylinder Dowel (No. P25-98) protruding from the top face of the Cylinder enters the dowel hole in the Rear End Plate.
7. Press or drive the Rear Rotor Bearing (33), shielded side first, onto the rotor rear hub with a sleeve that will contact only the bearing inner ring.
8. Refer to section on **Governor Adjustment**. Then tightly screw the Governor Assembly into the Rotor (31).

### Assembly of the Gearing and Angle Head

#### NOTICE

**Install the assembled Spindle (54) with Bevel Gear (60) and Bearings (56) before installing the assembled Bevel Pinion.**

Assemble the Bevel Pinion as follows:

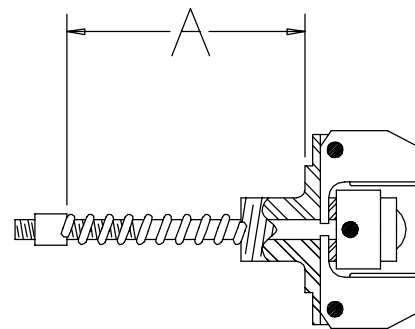
1. Press the unshielded Bevel Pinion Front Bearing (53) onto the Bevel Pinion (50). Slide the Bearing Spacer (52) over the Bevel Pinion. Slip the Bearing Retainer (72), straight side first, over the Bearing Spacer.
2. Install the Bevel Pinion Rear Bearing (51), shielded side first.
3. Install the Bevel Pinion Drive Gear Key (49) in the keyway in the pinion shaft. Press the Bevel Pinion Drive Gear (47), recessed hub side first, onto the pinion shaft.
4. Screw a 5/16”-18 thread bolt into the tapped hole in the pinion shaft and drive, or press the Pinion with assembled parts into the Spindle Housing (48).

### Governor Valve Bushing Replacement

1. Remove the Governor Valve Retaining Spring (28) and withdraw the Governor Valve (27). Support the large face of the Backhead (21) and press out the old Bushing (29) with a 1/2” (12 mm) diameter arbor.
2. Start the new Bushing, deep counterbored end first, into the Backhead, and press it in flush with the bottom of the large bore with a 1” (25 mm) diameter arbor.
3. Clamp the Governor Valve Bushing Reamer upright in a vise.
4. Hold the Backhead (21) squarely above the Reamer and slowly rotate it while applying a light downward pressure to feed the Reamer. Continue until the Reamer bottoms in the Bushing.
5. Screw a 3/8”-24 thread bolt into the Governor Valve (27) and check the fit of the Valve in the Bushing (29). If any binding is noted, lap the Valve to a good fit in the Bushing with fine grain lapping compound.
6. After lapping, remove all trace of the compound by washing the parts in clean kerosene.
7. Apply a few drops of light oil to the Valve, slide it into the Bushing and install the Governor Valve Retaining Spring (28) in the groove in the bushing wall.

### GOVERNOR ADJUSTMENT

When installing a new Governor Assembly (14), screw the adjusting nut onto the governor stem until dimension “A” equals 1-29/32” (48.4 mm). This will usually result in the proper governed free speed. However, this is only an approximate setting. Further adjustment may be necessary. Screw the nut further onto the stem to increase the speed; back it off to decrease the speed. The correct governed free speed of the various sizes at the Spindle is:



**A = 1-29/32” (48 mm)**

(Dwg. TPD497)

Model	RPM at 90 psig (6.2 bar/620 kPa)
20L, 20L-EU, 20SL, 20SL-EU	310

Before starting a reassembled tool, refer to the Lubrication Instructions on page 3.

## MAINTENANCE SECTION

### TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Low power or low free speed	Dirty Inlet Bushing or Air Strainer Screen	Using a suitable cleaning solution in a well-ventilated area, clean the Air Strainer Screen. Allow to air dry.
	Worn or broken Vanes	Replace the <b>complete</b> set of Vanes.
	Worn or broken Cylinder and/or scored End Plates	Examine Cylinder and replace if it is worn or broken or if bore is scored or wavy. Replace End Plates if they are Low power scored.
	Dirty motor parts	Disassemble the tool and clean all parts with a clean, suitable, cleaning solution, in a well-ventilated area. Reassemble the tool as instructed in this manual.
Motor will not run	Incorrect assembly of motor.	Disassemble motor, replace worn or broken parts and reassemble as instructed.
Rough operation	Worn or broken Rear Rotor Bearing or Front Rotor Bearing	Examine each bearing. Replace if worn or damaged.
	Worn or broken Gear teeth	Check for a worn or broken gearing or if a replacement is necessary.
Air leaks	Worn Throttle Valve Face or Throttle Valve Face Cap	Replace worn parts.
	Oil Chamber Plug worn or not tight	Tighten the Plug. If the problem persists, replace the Plug.

#### NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.