



# OPERATING AND MAINTENANCE MANUAL FOR SERIES HAS AND TAS AIR ANGLE SANDERS

## NOTICE

Series HAS and TAS Angle Sanders are designed for smoothing, trimming or removing metal in close-quarter areas in foundries, shipyards, steel mills and in 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 3/8" (10 mm) inside diameter air supply hose.
- Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.
- Do not use damaged, frayed or deteriorated air hoses and fittings.
- Be sure all hoses and fittings are the correct size and are tightly secured. See Dwg. TPD905-1 for a typical piping arrangement.
- Always use clean, dry air at 90 (6.2 bar/620 kPa) 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 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.
- 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.

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**PROFESSIONAL TOOLS**


## WARNING LABEL IDENTIFICATION


### ⚠ WARNING


FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

	<b>⚠ WARNING</b>
	Always wear eye protection when operating or performing maintenance on this tool.


	<b>⚠ WARNING</b>
	Always wear hearing protection when operating this tool.

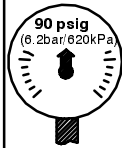
	<b>⚠ WARNING</b>
	Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.

	<b>⚠ WARNING</b>
	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.

	<b>⚠ WARNING</b>
	Do not carry the tool by the hose.

	<b>⚠ WARNING</b>
	Do not use damaged, frayed or deteriorated air hoses and fittings.

	<b>⚠ WARNING</b>
	Keep body stance balanced and firm. Do not overreach when operating this tool.

	<b>⚠ WARNING</b>
	Operate at 90 psig (6.2 bar/620 kPa) Maximum air pressure.

### SANDER SPECIFIC WARNINGS

- These Sanders will operate at the free speed specified on the nameplate if the air supply line furnishes 90 psig (6.2 bar/620 kPa) air pressure at the tool. Operation at higher air pressure will result in excessive speed.
- Use only a sanding pad, buffing wheel or polishing bonnet with these tools. Do not use any grinding

wheel, bur or metal removing accessory other than a sanding pad with these tools. Never use an accessory having a maximum operating speed less than the free speed of the Sander in which it is being used.

# PLACING TOOL IN SERVICE

## LUBRICATION



Ingersoll-Rand No. 10  
Ingersoll-Rand No. 50  
Ingersoll-Rand No. 63



Ingersoll-Rand No. 67  
Ingersoll-Rand No. 68  
Ingersoll-Rand No. 77

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

USA No. - C22-04-G00

**After each 2 hours of operation**, if an air line lubricator is not used, inject 1/2 to 1 cc of Ingersoll-Rand No. 10 Oil into the air inlet.

**For HAS45, HAS60 and TAS60**, after each eight hours of operation, inject approximately 3 cc of Ingersoll-Rand No. 68 Grease into the Grease Fittings.

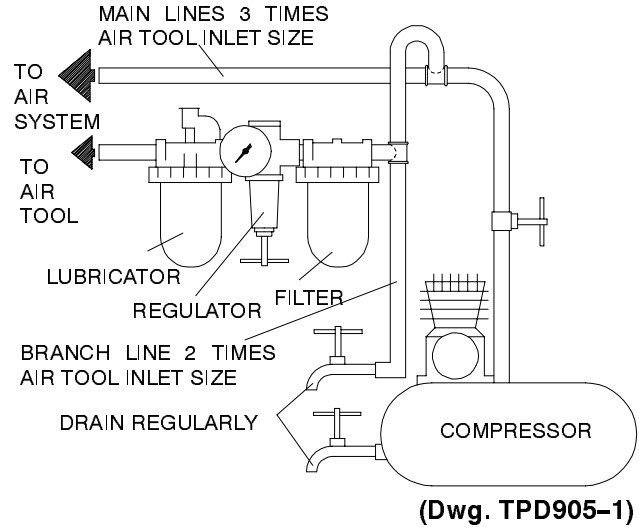
**For all other models**, after each eight hours of operation, inject approximately 3 cc of Ingersoll-Rand No. 68 Grease into the Grease Fittings.

**After each eight hours of operation**, inject approximately 3 cc of Ingersoll-Rand No. 67 or Ingersoll-Rand No. 77 into the Angle Head Grease Fitting.

Excessive lubrication will cause grease to work out around the Arbor.

### CAUTION

Do not mark any nonmetallic surface on this tool with customer identification codes. Such actions could affect tool performance.



## PLACING TOOL IN SERVICE

### HOW TO ORDER A CYCLONE SANDER

#### ANGLE SANDERS with 1/4" COLLET

Model	Speed/rpm
HAS60RG4 (Rear Exhaust)	6 000
TAS90RG4 (Rear Exhaust)	9 000
TAS60RG4 (Rear Exhaust)	6 000

#### ANGLE SANDERS with 5/8"-11 SPINDLE THREAD

HAS90RS10 (Rear Exhaust)	9 000
HAS75RS10 (Rear Exhaust)	7 500
HAS60RS10 (Rear Exhaust)	6 000
HAS45RS10 (Rear Exhaust)	4 500
HAS30RS10 (Rear Exhaust)	3 000
HAS18RS10 (Rear Exhaust)	1 800
TAS90RS10 (Rear Exhaust)	9 000
TAS60RS10 (Rear Exhaust)	6 000
TAS32RS10 (Rear Exhaust)	3 200

#### NOTICE

Any model listed can be changed to a front exhaust tool by reversing the Flow Ring and aligning the indicator marks with the letter "F" on the Housing. To order a front exhaust tool from the factory, substitute the letter "F" for the letter "R" in the model number. Example: TAS90RG4 Rear Exhaust Model becomes TAS90FG4 Front Exhaust Model.

### HOW TO ORDER CUSTOM MODELS

- To order a tool with a Locking Lever, select the desired model and add an "L" to the end of the existing number. Example: TAS90RG4L

Concentric Flange, it will come equipped with a Locking Lever from the factory.

#### NOTICE

Anytime a tool is ordered with a Low-Profile

# MANUEL D'EXPLOITATION ET D'ENTRETIEN D'ANGLE PNEUMATIQUES DES SERIES HAS ET TAS

F

## NOTE

Les meuleuses, ponceuses et polisseuses d'angle de la série HAS et TAS sont destinées au ponçage, à l'ébavurage ou à l'enlèvement du métal dans les fonderies, les chantiers navals, les aciéries et la construction.

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 SECURITE SONT JOINTES.  
LIRE CE MANUEL AVANT D'UTILISER L'OUTIL.**

**L'EMPLOYEUR EST TENU À COMMUNIQUER LES INFORMATIONS DE CE MANUEL AUX  
EMPLOYÉS UTILISANT CET OUTIL.**

**LE NON RESPECT DES AVERTISSEMENTS SUIVANTS PEUT CAUSER DES BLESSURES  
MISE EN SERVICE DE L'OUTIL**

- Toujours exploiter, inspecter et entretenir cet outil conformément au Code de sécurité des outils pneumatiques portatifs de l'American National Standards Institute (ANSI B186.1).
- Pour la sécurité, les performances optimales et la durabilité maximale des pièces, cet outil doit être connecté à une alimentation d'air comprimé de 6,2 bar (620 kPa) maximum à l'entrée, avec un flexible de 10 mm de diamètre intérieur.
- Couper toujours l'alimentation d'air comprimé et débrancher le flexible d'alimentation avant d'installer, déposer ou ajuster tout accessoire sur cet outil, ou d'entreprendre une opération d'entretien quelconque sur l'outil.
- Ne pas utiliser des flexibles ou des raccords endommagés, effilochés ou détériorés.
- S'assurer que tous les flexibles et les raccords sont correctement dimensionnés et bien serrés. Voir Plan TPD905-1 pour un exemple type d'agencement des tuyauteries.
- Utiliser toujours de l'air sec et propre à une pression maximum de 90 (620 kPa) bar. La poussière, les fumées corrosives et/ou une humidité excessive peuvent endommager le moteur d'un outil pneumatique.
- Ne jamais lubrifier les outils avec des liquides inflammables ou volatiles tels que le kérosène, le gasol ou le carburant d'aviation.
- Ne retirer aucune étiquette. Remplacer toute étiquette endommagée.

**UTILISATION DE L'OUTIL**

- Porter toujours des lunettes de protection pendant l'utilisation et l'entretien de cet outil.
- Porter toujours une protection acoustique pendant l'utilisation de cet outil.
- Tenir les mains, les vêtements flous et les cheveux longs, éloignés de l'extrémité rotative de l'outil.
- Prévoir, et ne pas oublier, que tout outil motorisé est susceptible d'à-coups brusques lors de sa mise en marche et pendant son utilisation.
- Garder une position équilibrée et ferme. Ne pas 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.
- 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.

Refer All Communications to the Nearest  
Ingersoll-Rand ou distributeur le plus proche.

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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.



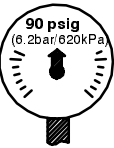
**ATTENTION**  
Ne pas transporter l'outil par son flexible.



**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).

## AVERTISSEMENTS PARTICULIERS A OUX PONCEUSES

- Ces ponceuses fonctionneront à la vitesse à vide spécifiée sur la plaque signalétique lorsque le circuit d'alimentation fournit de l'air à une pression de 6,2 bar (620 kPa) à l'outil. L'exploitation à une pression supérieure produira une vitesse excessive.
- Utiliser seulement un plateau de ponçage, un disque de polissage ou une peau de mouton de polissage

avec ces outils. Ne jamais utiliser de meule ou d'accessoire d'ébavurage ou d'enlèvement de métal autre que le plateau de ponçage sur ces outils. Ne jamais utiliser un accessoire ayant une vitesse de fonctionnement maximum inférieure à la vitesse à vide de la ponceuse ou de sur laquelle il est utilisé.

## MISE EN SERVICE DE L'OUTIL

### LUBRIFICATION



Ingersoll-Rand N°. 10 Ingersoll-Rand N°. 67  
Ingersoll-Rand N°. 50 Ingersoll-Rand N°. 68  
Ingersoll-Rand N°. 63 Ingersoll-Rand N°. 77

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

For USA - No. C22-04-G00

Toutes les deux heures de fonctionnement, sauf si un lubrificateur d'air comprimé est employé, injecter 1/2 à 1 cm<sup>3</sup> d'huile Ingersoll-Rand No. 10 dans le raccord d'admission.

Sur les modèles HAS45, HAS60 et TAS60, toutes les huit heures de fonctionnement, injecter environ 3 cm<sup>3</sup> de graisse Ingersoll-Rand No. 68 dans les raccords de graissage.

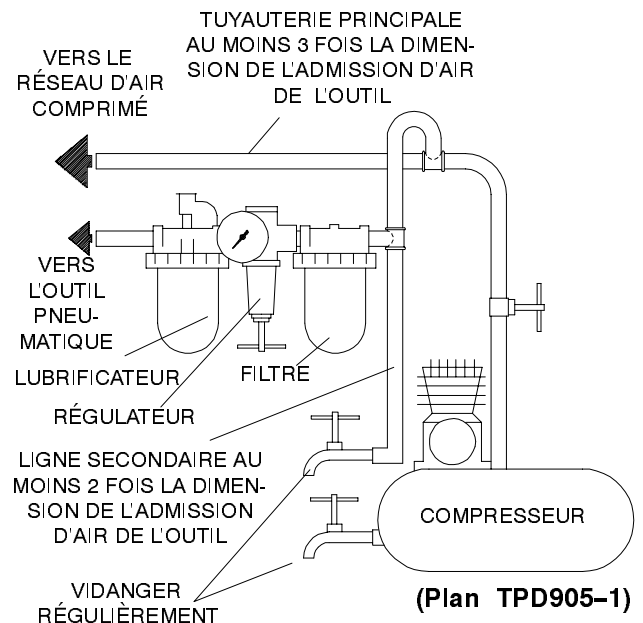
Sur tous les autres modèles, toutes les huit heures de fonctionnement, injecter environ 3 cm<sup>3</sup> de graisse Ingersoll-Rand No. 68 dans les raccords de graissage.

Toutes les huit heures de fonctionnement, injecter environ 3 cm<sup>3</sup> de graisse Ingersoll-Rand No. 67 ou Ingersoll-Rand No. 77 dans le raccord de graissage du renvoi d'angle.

Un graissage excessif conduira à des fuites de graisse autour de l'arbre.

### AVERTISSEMENT

Ne pas marquer les codes d'identification client sur les surfaces non métalliques de cet outil. De telles actions pourraient affecter les performances de l'outil.



## MISE EN SERVICE DE L'OUTIL

### SPÉCIFICATIONS

#### Ponceuses d'angle avec pince 1/4"

Modèle	Vitesse à vide tr/mn
HAS60RG4	6 000
TAS90RG4	9 000
TAS60RG4	6 000

#### Ponceuses d'angle avec broche fileté 5/8" - 11

Modèle	Vitesse à vide tr/mn
HAS90RS10	9 000
HAS75RS10	7 500
HAS60RS10	6 000
HAS45RS10	4 500
HAS30RS10	3 000
HAS18RS10	1 800
TAS90RS10	9 000
TAS60RS10	6 000
TAS32RS10	3 200

# MANUAL DE FUNCIONAMIENTO Y MANTENIMIENTO LIJADORAS ANGULARES NEUMATICAS DE LAS SERIES HAS Y TAS

## NOTA

Las Lijadoras y Angulares Neumáticas Serie HAS, TAS están diseñadas para pulido, recorte o eliminación de metal en fundiciones, astilleros, fábricas de acero y en la industria de construcción.

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 INFORMACION IMPORTANTE DE SEGURIDAD. LEA ESTE MANUAL ANTES DE USAR LA HERRAMIENTA. ES RESPONSABILIDAD DE LA EMPRESA ASEGURARSE DE QUE EL OPERARIO ESTE AL TANTO DE LA INFORMACION QUE CONTIENE ESTE MANUAL. EL HACER CASO OMISO DE LOS AVISOS SIGUIENTES PODRIA OCASIONAR LESIONES.**

### PARA PONER LA HERRAMIENTA EN SERVICIO

- Utilice, examine y mantenga siempre esta herramienta conforme al código de seguridad para herramientas neumáticas portátiles de la American National Standards Institute (ANSI B186.1).
- Para seguridad, máximo rendimiento y durabilidad de piezas, use esta herramienta a una máxima presión de aire de 90 psig (6,2 bar/620kPa) en la admisión de manguera de suministro de aire de diámetro interno de 10 mm.
- Corte siempre el suministro de aire y desconecte la manguera de suministro de aire antes de instalar, desmontar o ajustar cualquier accesorio de esta herramienta, o antes de realizar cualquier operación de mantenimiento de la misma.
- No utilice mangueras de aire y accesorios dañados, desgastados ni deteriorados.
- Asegúrese de que todas las mangueras y los accesorios sean del tamaño correcto y estén bien apretados. Vea Esq. TPD905-1 para un típico arreglo de tuberías.
- Use siempre aire limpio y seco a una máxima presión de 90 (6.2 bar/620 kPa) psig. El polvo, los gases corrosivos y/o el exceso de humedad podrían estropear el motor de una herramienta neumática.
- No lubrique las herramientas con líquidos inflamables o volátiles tales como queroseno, gasoil o combustible para motores a reacción.
- No saque ninguna etiqueta. Sustituya toda etiqueta dañada.

### USO DE HERRAMIENTA

- Use siempre protección ocular cuando maneje, o realice operaciones de mantenimiento a, esta herramienta.
- Use siempre protección para los oídos cuando maneje esta herramienta.
- Mantenga las manos, la ropa suelta y el cabello largo alejados del extremo giratorio de la herramienta.
- Anticipe y esté alerta a los cambios repentinos en el movimiento durante la puesta en marcha y el manejo de toda herramienta motorizada.
- Mantenga una postura de cuerpo equilibrada y firme. No estire demasiado los brazos al manejar la herramienta. Pueden ocurrir reacciones de alto par a, o menos de, la recomendada presión de aire.
- Los accesorios de la herramienta podrían seguir girando brevemente después de haber soltado la palanca de estrangulación.
- Las herramientas neumáticas pueden vibrar durante el uso. La vibración, repetición o posiciones incómodas pueden dañarle los brazos y manos. En caso de incomodidad, sensación de hormigueo o dolor, deje de usar la herramienta. Consulte a un médico antes de volver a usarla otra vez.
- Utilice únicamente los accesorios Ingersoll-Rand recomendados.
- 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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## ETIQUETAS DE AVISO


### ⚠ AVISO


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


	<p><b>⚠ ADVERTENCIA</b></p> <p>Usar siempre protección ocular al manejar o realizar operaciones de mantenimiento en esta herramienta.</p>
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	<p><b>⚠ ADVERTENCIA</b></p> <p>Usar siempre protección para los oídos al manejar esta herramienta.</p>
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	<p><b>⚠ ADVERTENCIA</b></p> <p>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.</p>
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	<p><b>⚠ ADVERTENCIA</b></p> <p>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.</p>
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	<p><b>⚠ ADVERTENCIA</b></p> <p>No coger la herramienta por la manguera para levantarla.</p>
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	<p><b>⚠ ADVERTENCIA</b></p> <p>No utilizar mangueras de aire y accesorios dañados, desgastados ni deteriorados.</p>
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	<p><b>⚠ ADVERTENCIA</b></p> <p>Mantener una postura del cuerpo equilibrada y firme. No estirar demasiado los brazos al manejar la herramienta.</p>
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	<p><b>⚠ ADVERTENCIA</b></p> <p>Manejar la herramienta a una presión de aire máxima de 90 psig (6,2 bar/620 kPa).</p>
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## AVISOS ESPECIFICOS DE LIJADORA

- Estas Lijadoras y Pulidoras funcionarán a la velocidad constante especificada en la placa de identificación si la línea de suministro de aire a la herramienta tiene una presión de 90 psig (6,2bar/6,2 kPa). El funcionamiento a mayores presiones resultará en exceso de velocidad.
- Use sólo lija, placa de pulir o boina de pulir con estas herramientas. No use muela, ni accesorio escariador o fresador, que no sea para lijar con estas herramientas. No use nunca un accesorio que tenga una máxima velocidad de funcionamiento menor a la velocidad de la Lijadora o Pulidora en la que se va a usar.
- Use sólo lija, rueda de pulir o bonete de pulir con estas herramientas. No use muela, ni accesorio escariador o fresador, que no sea para lijar con estas herramientas. No use nunca un accesorio que tenga una máxima velocidad de funcionamiento menor a la velocidad de la Lijadora o Pulidora en la que se va a usar.

## PARA PONER LA HERRAMIENTA EN SERVICIO

### LUBRICACION



Ingersoll-Rand N° 10  
Ingersoll-Rand N° 50  
Ingersoll-Rand N° 63



Ingersoll-Rand N° 67  
Ingersoll-Rand N° 68  
Ingersoll-Rand N° 77

Utilice siempre un lubricador de aire comprimido con estas llaves de impacto. Recomendamos la siguiente unidad de Filtro-Lubricador-Regulador:

For USA - No. C22-04-G00

Después de cada dos horas de trabajo, si no se usa lubricador en línea, inyectar de 1/2 a 1 cc de aceite Ingersoll-Rand N° 10 por la boca de entrada de aire.

En los modelos HAS45, HAS60 y TAS60, después de cada ocho horas de trabajo inyectar aproximadamente 3 cc de grasa Ingersoll-Rand N° 68 por las boquillas de engrase.

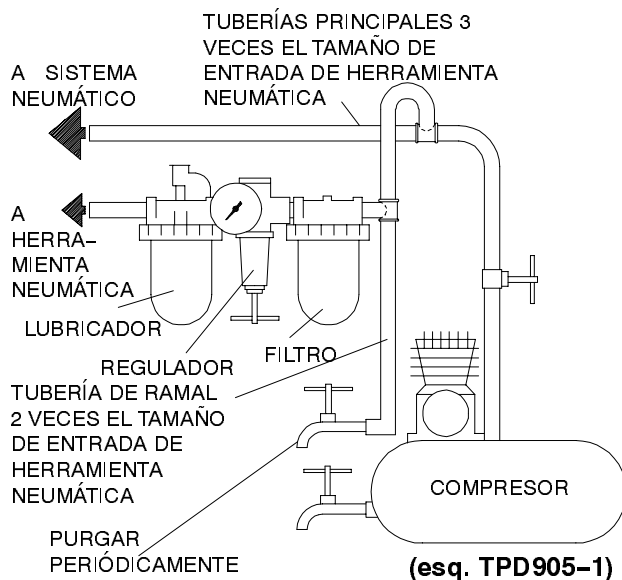
En todos los demás modelos, después de cada ocho horas de trabajo inyectar aproximadamente 3 cc de grasa Ingersoll-Rand N° 68 por las boquillas de engrase.

Después de cada ocho horas de trabajo inyectar aproximadamente 3 cc de grasa Ingersoll-Rand N° 67 o Ingersoll-Rand N° 77 por la boquilla de engrase del cabezal angular.

El exceso de lubricación hará que salga grasa alrededor del eje.

### PRECAUCIÓN

No marque ninguna superficie no metálica de esta herramienta con los códigos de identificación del cliente. Tal acción podría afectar al rendimiento de la herramienta.



### ESPECIFICACIONES

#### Lijadoras angulares con pinza de 1/4"

Modelo	Velocidad Constante rpm
HAS60RG4	6 000
TAS90RG4	9 000
TAS60RG4	6 000

#### Lijadoras angulares con husillo roscado 5/8"- 11

Modelo	Velocidad Constante rpm
HAS90RS10	9 000
HAS75RS10	7 500
HAS60RS10	6 000
HAS45RS10	4 500
HAS30RS10	3 000
HAS18RS10	1 800
TAS90RS10	9 000
TAS60RS10	6 000
TAS32RS10	3 200

# MANUAL DE FUNCIONAMENTO E MANUTENÇÃO SERIE HAS, TAS VINKEL-PUSSEMASKINER

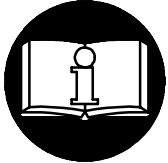
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## AVISO

As Lixadoras e Pneumáticas Séries HAS, TAS são concebidas para alisamento, corte de sebes ou remoção de metais em fundições, estaleiros, siderúrgias e em aplicações de construções metálicas.

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.  
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 10mm (3/8”).
- Desligue sempre a alimentação de ar e desconecte a mangueira de alimentação de ar antes de instalar, remover ou ajustar qualquer acessório nesta ferramenta, ou antes de executar qualquer serviço de manutenção nesta ferramenta.
- Não use mangueiras de ar ou adaptadores danificados, gastos ou deteriorados.
- Certifique-se de que todas as mangueiras e adaptadores sejam do tamanho correcto e estejam apertados com firmeza. Veja o Desenho TPD905-1 para um arranjo típico de tubagem.
- Use sempre ar seco e limpo com pressão máxima de 6,2 BAR/620 KPA (90 psig). Pó, fumos corrosivos e/ou humidade excessiva podem arruinar o motor de uma ferramenta pneumática.
- Não lubrifique as ferramentas com líquidos inflamáveis ou voláteis tais como querosene, diesel ou combustível de jactos.

- Não remova nenhum rótulo. Reponha qualquer rótulo danificado.

## USANDO A FERRAMENTA

- Use sempre óculos de protecção quando estiver operando ou executando serviço de manutenção nesta ferramenta.
- Use sempre protecção contra ruído ao operar esta ferramenta.
- Mantenha as mãos, partes do vestuário soltas e cabelos compridos afastados da extremidade em rotação.
- Antecipe e esteja alerta a mudanças repentinas no movimento quando ligar e operar qualquer ferramenta motorizada.
- Mantenha a posição do corpo equilibrada e firme. Não exagere quando operar esta ferramenta. Torques de reacção elevados podem ocorrer na ou abaixo da pressão de ar recomendada.
- Os acessórios da ferramenta podem continuar a girar brevemente após a pressão ter sido aliviada.
- Ferramentas accionadas pneumáticamente podem vibrar em uso. Vibração, movimentos repetitivos ou posições desconfortáveis podem ser prejudiciais às mãos e aos braços. Pare de usar a ferramenta caso ocorra algum desconforto, sensação de formigueiro ou dor. Procure assistência médica antes de retornar ao trabalho.
- Use acessórios recomendados pela Ingersoll-Rand.
- 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  
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**PROFESSIONAL TOOLS**

# IDENTIFICAÇÃO DO RÓTULO DE ADVERTÊNCIA


## ⚠ ADVERTÊNCIA


O NÃO CUMPRIMENTO DAS SEGUINTE ADVERTÊNCIAS PODE RESULTAR EM FERIMENTO.


	<b>⚠ ADVERTÊNCIA</b> Use sempre óculos de protecção quando estiver operando ou executando algum serviço de manutenção nesta ferramenta.
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	<b>⚠ ADVERTÊNCIA</b> Use sempre protecção contra o ruído ao operar esta ferramenta.
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	<b>⚠ ADVERTÊNCIA</b> 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.
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	<b>⚠ ADVERTÊNCIA</b> 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.
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	<b>⚠ ADVERTÊNCIA</b> Não carregue a ferramenta segurando na mangueira.
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	<b>⚠ ADVERTÊNCIA</b> Não use mangueiras de ar ou adaptadores danificados, gastos ou deteriorados.
-------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------

	<b>⚠ ADVERTÊNCIA</b> 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.
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	<b>⚠ ADVERTÊNCIA</b> Opere com pressão do ar Máxima de 90-100 psig (6,2-6,9 bar).
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## ADVERTÊNCIAS ESPECÍFICAS SOBRE A ESMERILADORA

- Não tente desmontar o Controlador. O Controlador é disponível apenas como uma unidade e é garantido pela vida útil da ferramenta se não for cometido abuso na sua utilização.
- Estas Lixadoras irão operar com velocidade livre especificada na placa de identificação se a linha de alimentação de ar fornecer 6,2 bar/620 kPa (90 psig) de pressão de ar na ferramenta. O funcionamento a pressões de ar mais elevadas irá resultar em velocidade excessiva.
- Use somente almofada de lixa, discos de lixa ou boína de polimento com estas ferramentas. Não use nenhum disco de esmerilamento, ou acessório de fresagem com estas ferramentas. Nunca use um acessório com velocidade máxima de operação que a velocidade livre da esmeriladora ou polidora, na qual o disco está sendo usado.

# COLOCANDO A FERRAMENTA EM FUNCIONAMENTO

## LUBRIFICAÇÃO



Ingersoll-Rand No. 10  
Ingersoll-Rand No. 50  
Ingersoll-Rand No. 60

Ingersoll-Rand No. 67  
Ingersoll-Rand No. 68  
Ingersoll-Rand No. 77

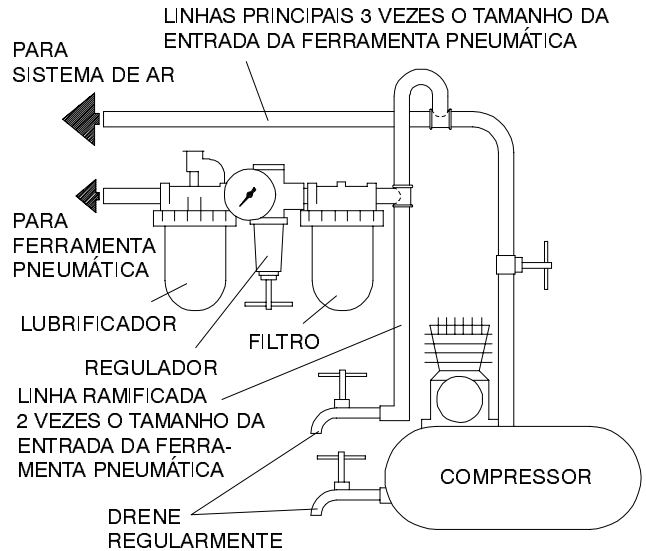
Para USA - No. C22-04-G00

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

Löysää peitelevyn kiinnitysruuvit kuusioavaimella ja poista momentinsäätöruuvin peitelevy.  
Pyöritä akselia, kunnes momentinsäätöruuvi näkyy aukosta.  
Asenna peitelevy ja kiristä kaksi kiinnitysruuvia.

### ⚠ ADVERTÊNCIA

Não marque nenhuma superfície não metálica desta ferramenta com códigos de identificação do cliente. Isto poderia afectar o desempenho da ferramenta.



(Desenho TPD905-1)

## ESPECIFICAÇÕES

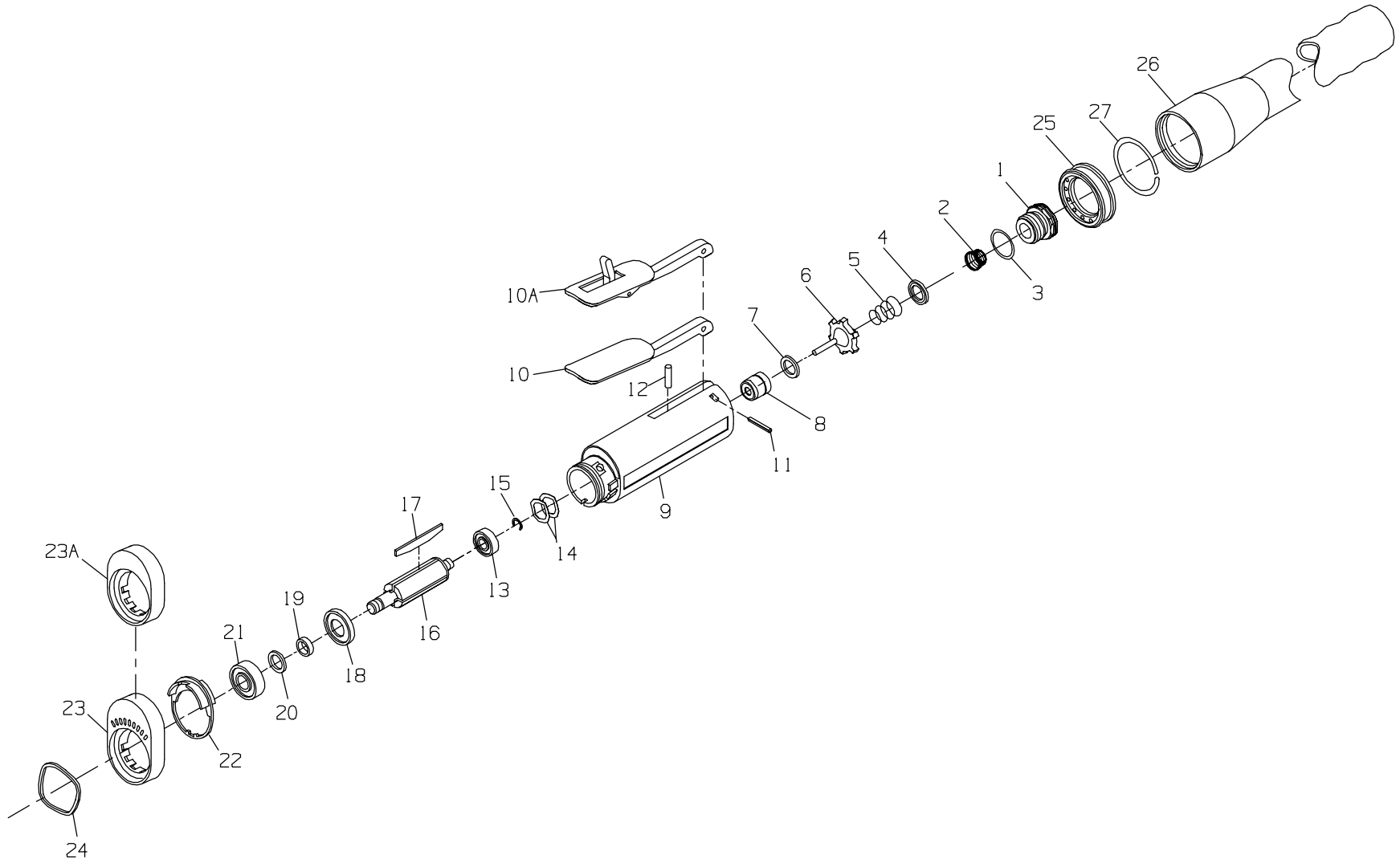
### Lixadeiras em Ângulo com Mandril de 1/4 pol.

Modelo	Velocidade Livre rpm
HAS60RG4	6 000
TAS90RG4	9 000
TAS60RG4	6 000

### Lixadeiras em Ângulo com 5/8 pol.-11 Rosca de Veio

Modelo	Velocidade Livre rpm
HAS90RS10	9 000
HAS75RS10	7 500
HAS60RS10	6 000
HAS45RS10	4 500
HAS30RS10	3 000
HAS18RS10	1 800
TAS90RS10	9 000
TAS60RS10	6 000
TAS32RS10	3 200

# POWER UNIT



MAINTENANCE SECTION

PART NUMBER FOR ORDERING

PART NUMBER FOR ORDERING

1	Inlet Assembly	LG2-A465	21	Front Rotor Bearing	LG2-24
2	Inlet Screen	R1602-61	22	Flow Ring	
• 3	Inlet Seal	R18LF-21		for HAS30 and TAS60 models (khaki)	LG2-103-2
• 4	Throttle Valve Spring Seat	LG3-592		for HAS75 models (red)	LG2-103-3
5	Throttle Valve Spring	7L-51		for all other HAS models (blue)	LG3-103-3
6	Throttle Valve			for all other TAS models (brown)	LG2-103-1
	for HAS models	LG3-302	23	High Profile Flange	LG2-23
	for TAS models	LG2-302	# 23A	Concentric Flange	LG3R-23
7	Throttle Valve Seat		24	Flange Clamp	LG2-29
	for HAS models	LG3-303	∅ 25	Exhaust Hose Adapter	LG2-184
	for TAS models	LG2-303	∅ 26	Exhaust Hose	3RL-284
8	Valve Cartridge Cup (for TAS models only)	LG2-300A	∅ 27	Exhaust Hose Retainer	6WT-203
9	Motor Housing		*	Warning Label	
	for HAS models	LG3-40		for HAS and TAS models	LG2-99
	for TAS models	LG2-40		for EU models	EU-99
10	Throttle Lever	LG2-273	*	Nameplate	
10A	Locking Throttle Lever Assembly (for all models ending in L or C)	LG2-A400		for HAS18	LAS318-301
*	Lever Lock	LG1-402		for HAS18-EU	LAS318-EU-3
*	Lock Spring	LG1-405		for HAS30	LAS303-301
*	Lock Pin	5UT-757		for HAS30-EU	LAS303-EU-301
11	Throttle Lever Pin	61H-120		for HAS45	LAS345-301
12	Throttle Valve Plunger	LG2-191		for HAS45-EU	LAS345-EU-301
13	Rear Rotor Bearing	R120-127		for HAS60	LAS306-301
• 14	Rear Rotor Bearing Spacer (2)	400-25-191		for HAS60-EU	LAS306-EU-301
• 15	Rear Rotor Bearing Retainer	LG1-118		for HAS75	LAS3075-301
16	Rotor			for HAS75-EU	LAS3075-EU-301
	for HAS models	LG3-53-4		for HAS90	LAS309-301
	for TAS models	LG2-53-4		for HAS90-EU	LAS309-EU-301
17	Vane Packet (set of 4 Vanes)			for TAS32	LAS232-301
	for HAS models	DG31-42-4		for TAS32-EU	LAS232-EU-301
	for TAS models	DG21-42-4		for TAS60	LAS206-301
18	Front End Plate	LG2-11		for TAS60-EU	LAS206-EU-301
19	Front End Plate Spacer	LG2-65		for TAS90	LAS209-301
• 20	Front Seal Cup Assembly	61H-A32		for TAS90-EU	LAS209-EU-301

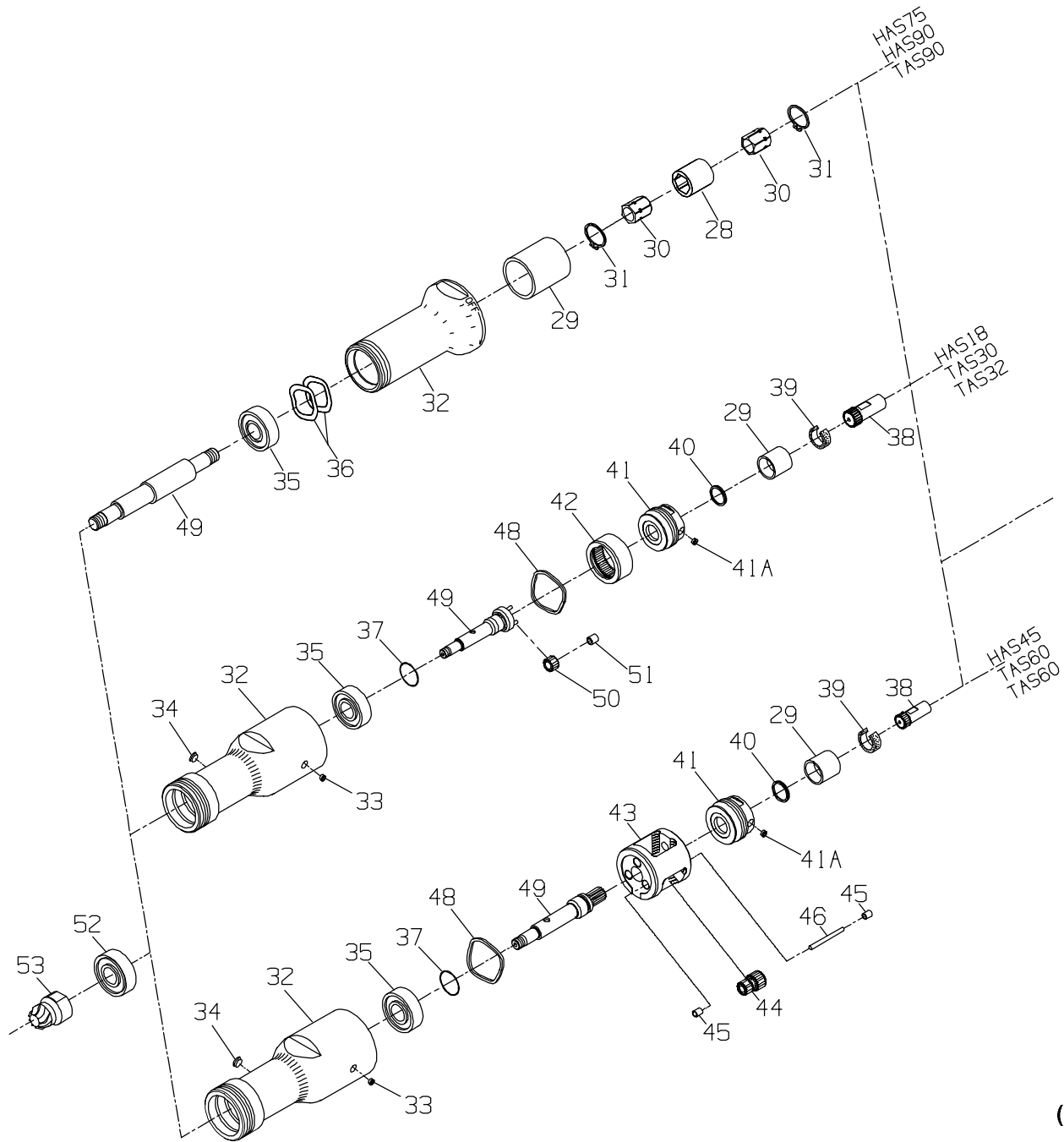
\* Not illustrated.

• 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.

∅ Standard equipment will all models ending in M, MC or ML and ALL Front Exhaust models; optional equipment on all other models.



# Always install a Locking Throttle Lever Assembly (10A) on a tool with a Low Profile Concentric Flange (23A). Installing a Concentric Flange on a tool without a Locking Throttle Lever will allow the tool to continue running if the tool is dropped or set down on the standard non-locking Throttle Lever (10).



**MAINTENANCE SECTION**

**(Dwg. TPB945-3)**



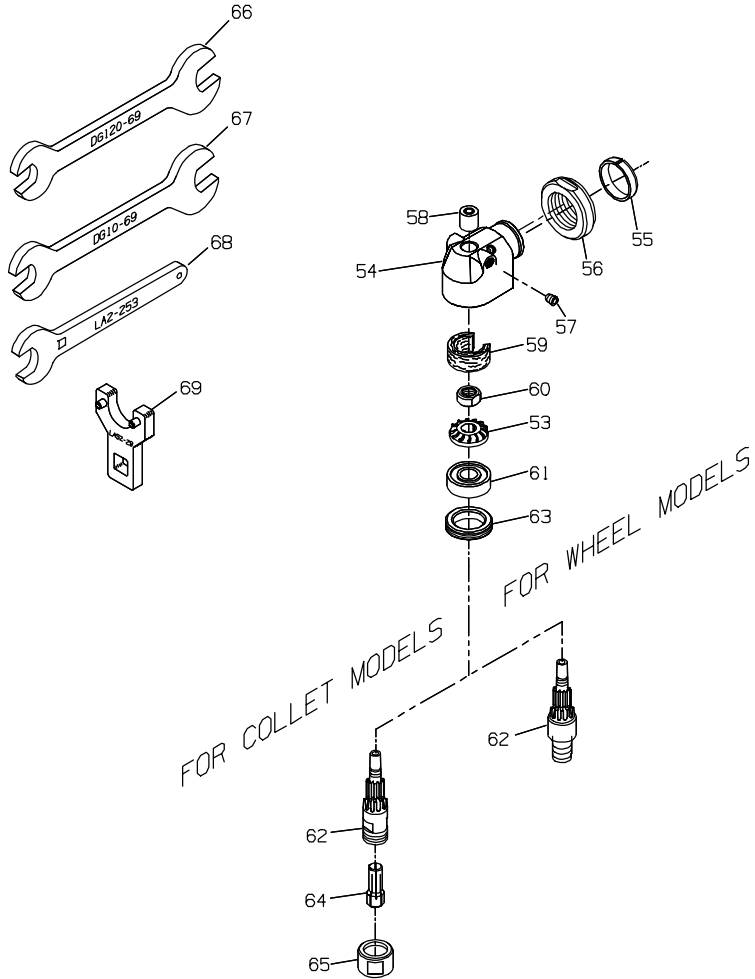
**PART NUMBER FOR ORDERING**

**PART NUMBER FOR ORDERING**

28	Arbor Coupling (for HAS75, HAS90 and TAS90 models) . . . . .	LE2-304	41	Gear Case Adapter Assembly (for HAS18, HAS30, HAS45, HAS60, TAS32 and TAS60 models) . . . . .	LAS2-337
29	Clamp Sleeve for HAS75, HAS90 and TAS90 models . . . . .	LE2-176	41A	Grease Fitting . . . . .	D0F9-879
	for all other models . . . . .	LAS2-176	42	Ring Gear (for HAS18, HAS30 and TAS32 models) . . . . .	LAS2-406
30	Spindle Bearing Nut (for HAS75, HAS90 and TAS90 models) (2) . . . . .	LE2-85	43	Gear Frame (for HAS45, HAS60 and TAS60 models) . . . . .	LES2-8-1.9
31	Coupling Retaining Ring (for HAS75, HAS90 and TAS90 models) (2) . . . . .	RX3-729	44	Spur Gear (for HAS45, HAS60 and TAS60 models) (3) . . . . .	HDS-10-1.9
32	Extension Housing (for HAS75, HAS30 and TAS90 models) . . . . .	LA3-20	45	Spur Gear Bearing (for HAS45, HAS60 and TAS60 models) (2 for each Gear) . . . . .	W22-654
32	Extension Housing Assembly for HAS18, HAS30 and TAS32 models . . . . .	LAS2-A20	46	Spur Gear Pin (for HAS45, HAS60 and TAS60 models) (1 for each Gear) . . . . .	LES2-A191
	for HAS45, HAS60 and TAS60 models . . . . .	LAS2X-A20	48	Gear Clamp (for HAS18, HAS30, HAS45, HAS60, TAS32 and TAS60 models) . . . . .	LG2-29
33	Grease Fitting . . . . .	D0F9-879	49	Spindle for HAS18 models . . . . .	LAS2-8-5.1
34	Extension Housing Plug (for HAS18, HAS30, HAS45, HAS60, TAS32 and TAS60 models) . . . . .	EG220-92		for HAS30 and TAS32 models . . . . .	LAS2-8-3.4
35	Rear Spindle Bearing for HAS18, HAS30, HAS45, HAS60, TAS32 and TAS60 models . . . . .	105352		for HAS45, HAS60 and TAS60 models . . . . .	HAS-8-1.9
	for HAS75, HAS90 and TAS90 models . . . . .	WFS182-22	50	Spindle Planet Gear Assembly (3 required) for HAS18 models (19 teeth) . . . . .	7AQ-A10
36	Rear Spindle Bearing Washer (for HAS75, HAS90 and TAS90 models) (2) . . . . .	7AH-278		for HAS30 and TAS32 models (15 teeth) . . . . .	7AH-A10
37	Rear Spindle Bearing Seal (for HAS18, HAS30, HAS45, HAS60, TAS32 and TAS60 models) . . . . .	AF120-290	51	Planet Gear Bearing (1 for each Gear) for 7AQ-A10 . . . . .	7AJ-500
38	Rotor Pinion for HAS18 models . . . . .	LAS2-17-5.1		for 7AH-A10 . . . . .	7AH-500
	for HAS30 and TAS32 models . . . . .	LAS2-17-3.4	52	Front Spindle Bearing . . . . .	LG2-24
	for HAS45, HAS60 and TAS60 models . . . . .	HDS-17-1.9	53	Bevel Pinion and Bevel Gear (sold only as a matched set) for HAS18, HAS45, HAS90 and TAS90 models . . . . .	LA2-A552-1.9
39	Wick (for HAS18, HAS30, HAS45, HAS60, TAS32 and TAS60 models) . . . . .	LAS2-560		for HAS30, TAS32 and TAS60 models . . . . .	LA2-A552-1.7
40	Wick Retaining Ring (for HAS18, HAS30, HAS45, HAS60, TAS32 and TAS60 models) . . . . .	182A53-685		for HAS60 models . . . . .	LA2-A552-1.3
				for HAS75 models . . . . .	LA2-A552-2.4

**MAINTENANCE SECTION**

**ANGLE ATTACHMENTS**



(Dwg. TPB946-2)

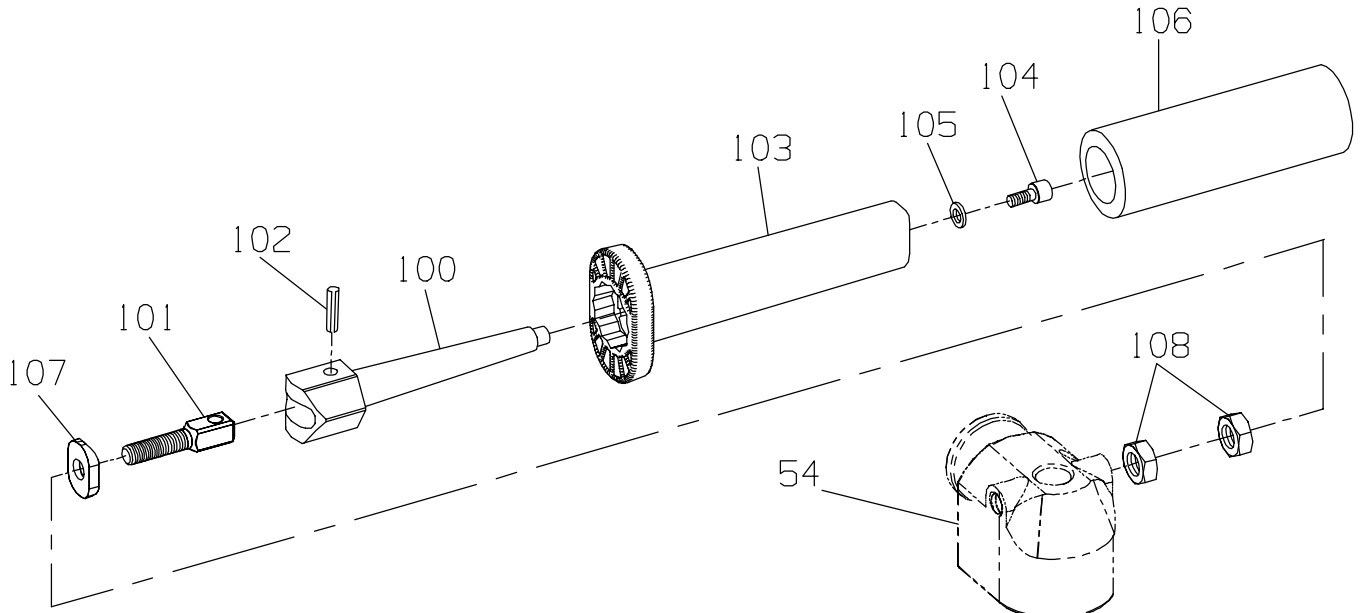
**PART NUMBER FOR ORDERING**



+ 54	Angle Housing Assembly .....	LA2-A550S
55	Clamp Spacer .....	LA2-46
56	Clamp Nut .....	LG2-27
57	Grease Fitting .....	D0F9-879
58	Upper Arbor Bearing .....	AG210-693
59	Wick for HAS60 and TAS60 models ....	LA2-561
	for HAS75 models .....	LA2-562
	for all other models .....	LA2-560
60	Bevel Gear Nut .....	LA2-578
61	Lower Arbor Bearing .....	LA2-593
62	Arbor for models ending in G4, G4C or G4L .....	AG220-4-G4
	for models ending in S10, S10C or S10L .....	LAS2-204-P10
63	Arbor Bearing Cap .....	AG20-531
64	Collet (for models ening in G4, G4C or G4L) .....	G160HD-700-1/4
65	Collet Nut (for models ending in G4, G4C or G4L) .....	DG120-699A
66	Collet Nut Wrench (included with all models ending in G4, G4C or G4L) (double-end 5/8" x 3/4") .....	DG120-69
67	Collet Body Wrench (double-end 1/2" x 9/16")	DG10-69
68	Clamp Nut Wrench (1-1/2") .....	LA2-253
69	Arbor Bearing Cap Wrench .....	LAS2-29

+ The LA2-A550S Angle Housing Assembly is furnished with three Wicks. Use Wick (LA2-561) **with** the single notch on HAS60 and TAS60 models; use Wick (LA2-562) **with** the double notch on HAS75 models; use Wick (LA2-560) **without** the notch on all other models.

# MAINTENANCE SECTION



(Dwg. TPD1975)

## PART NUMBER FOR ORDERING



	Ergo Handle Assembly .....	LG2-A48A
100	Handle Arbor .....	LG2-48Y
101	Position Anchor Bolt .....	LG2-373
102	Anchor Roll Pin .....	R00A2-120
103	Handle .....	LG2-48X
104	Handle Lock Screw .....	AL-638
105	Lock Screw Washer .....	MF-37
106	Handle Grip .....	LG2-48W
107	Anchor Bolt Clamp .....	LG2-58
108	Alignment Nut (2) .....	LG2-428

The Handle can be mounted for right or left hand operation and the angle between the Handle and the tool can be adjusted by loosening the Alignment Nut (108) closest to the Dead Handle and sliding the Handle toward the Housing or away from the Housing. The Handle can be rotated to the most comfortable position by loosening the Alignment Nut (108) next to the Angle Head and turning the Handle to any of the six available positions.

## 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

Whenever one of these Sanders is disassembled for overhaul or replacement of parts, lubricate as follows:

1. Always wipe the Vanes (17) with a light film of oil before inserting them into the vane slots.
2. Inject 0.5 to 1.0 cc of Ingersoll–Rand No. 10 Oil into the air Inlet Assembly (1) after assembly.

### DISASSEMBLY

#### General Instructions

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

#### Disassembly of the Angle Head

1. Grasp the tool in copper–covered vise jaws with the Collet (64) or Arbor (62) upward.
2. Loosen the Alignment Nuts (108) and remove the assembled Ergo Handle (103).
3. **For all collet models**, using the Collet Body Wrench (67) on the flats of the Arbor and the Collet Nut Wrench (66) on the Collet Nut (65), unscrew the Collet Nut and remove the Collet.
4. Using the Arbor Bearing Cap Wrench (69), unscrew and remove the Arbor Bearing Cap (63). This is a **left-hand thread**. Rotate the wrench **clockwise** to remove the Cap.

### NOTICE

In the following step, do not allow the Angle Head to rotate when separating it from the Extension Housing. Components may fall from the Angle Head.

5. Using the Clamp Nut Wrench (68), loosen the Clamp Nut (56) and pull the Angle Housing Assembly (54) away from the Extension Housing (32)). This is a **left-hand thread**. Rotate the Nut Wrench **clockwise** to loosen the Nut.
6. Grasp the Arbor and pull the assembled Arbor out of the Angle Head. If the Wick (59) needs replacement, pull it out of the Angle Housing. The Wick is staked into position and will be destroyed by removal. Make certain a replacement Wick is available before removing the old Wick.
7. If the Upper Arbor Bearing (58) needs replacement, place the Angle Head on the table of an arbor press, arbor end down, and press the Bearing out of the Angle Head.
8. Grasp the Arbor in copper–covered vise jaws with the output end downward. Using an adjustable wrench, unscrew and remove the Bevel Gear Nut (60) and lift the Bevel Gear off the Arbor.
9. If the Lower Arbor Bearing (61) must be replaced, use a piece of tubing to support the Bearing on the table of an arbor press and press the Arbor from the Bearing.

### WARNING

In the following step, take all precautions necessary to prevent the Spacer from being forcefully ejected in a manner or direction that is hazardous.

10. If the Clamp Nut must be removed from the Angle Housing, insert the blades of two screwdrivers, approximately 180 degrees apart, under the Clamp Spacer (55) and pry the Spacer off the Housing.

#### Disassembly of HAS75, HAS90 and TAS90 Extension Assemblies

1. Being careful not to distort the Housing, grasp the tool in copper–covered vise jaws with the Spindle (49) upward. Using a 1–1/2" wrench on the flats of the Extension Housing (32), unscrew and remove the assembled Housing. This is a **left-hand thread**. Rotate the Housing **clockwise** to remove it. Remove the Arbor Coupling (28), Clamp Sleeve (29) and Flange Clamp (24).

## MAINTENANCE SECTION

2. Grasp the Bevel Pinion (53) and pull the assembled Spindle from the Extension Housing. Remove the two Rear Spindle Bearing Washers (36) from the Housing.
3. Using snap ring pliers, remove the Coupling Retaining Ring (31) from the Spindle Bearing Nut (30) on the assembled Spindle.
4. Grasp a 5/32" diameter steel pin vertically in a set of vise jaws and slide the crosshole of the assembled Spindle down onto the pin.
5. Using a 1/2" wrench, unscrew and remove the Spindle Bearing Nut.
6. Using a 9/16" wrench, unscrew and remove the Bevel Pinion.
7. Using a bearing puller, pull the Rear Spindle Bearing (35) off the Spindle.
8. Using a bearing puller or arbor press, pull or press the Front Spindle Bearing (52) off the Spindle.

### Disassembly of the HAS18, HAS30, HAS45, HAS60, TAS32 and TAS60 Extension Assemblies

1. Using a 1-1/2" wrench on the flats of the Extension Housing (32) and a 1-1/2" wrench on the flats of the Gear Case Adapter (41), unscrew the assembled Housing from the Adapter. This is a **left-hand thread**, rotate the Housing **clockwise** to remove it.
2. **For HAS18, HAS30 or TAS32**, remove the three Spindle Planet Gear Assemblies (50) from the Spindle (49) and pull the Ring Gear (42) out of the Housing.  
**For HAS45, HAS60 or TAS60**, pull the assembled Gear Frame (43) off the Spindle (49).
3. **For HAS45, HAS60 or TAS60**, if the Spur Gears (44), Spur Gear Bearings (45) or Spur Gear Pins (46) do not need to be replaced, set the assembled Gear Frame aside. If any of the components must be replaced, proceed as follows:

#### NOTICE

**The Spur Gear Bearings, will be damaged during removal. Make certain a new set of Bearings is available before attempting to disassemble the Gear Frame.**

- a. Stand the assembled Gear Frame on the table of an arbor press and using a pressing plug equal to the size of the Spur Gear Pin, press the Bearing from the Gear Frame.
- b. Push the Pin from the Spur Gear and lift the Spur Gear out of the Gear Frame.
- c. Repeat steps (a) and (b) for the remaining two Spur Gears.
- d. Turn the Gear Frame end for end and press the remaining Bearings from the Gear Frame.

4. Remove the Gear Clamp (48) from the motor end of the Extension Housing.
5. Using a thin blade screwdriver, remove the Extension Housing Plug (34) and rotate the Spindle until the crosshole in the spindle shaft aligns with the plug opening. Insert a 5/32" diameter steel pin through the opening and into the shaft hole to sprag the shaft against rotation. Using a 9/16" wrench or a spanner wrench, unscrew and remove the Bevel Pinion (53).
6. Push on the pinion end of the Spindle to remove it from the Housing. The Rear Spindle Bearing (35) may remain in the Housing or on the Spindle. Pull it out of the Housing or off the Spindle. Remove the Rear Spindle Bearing Seal (37) from the spindle shaft.
7. Pull the Front Spindle Bearing (52) out of the Extension Housing. This Bearing is a slip fit in the Housing.
8. Grasp the assembled motor unit in copper-covered vise jaws with the Gear Case Adapter upward.
9. Using a 1-1/2" wrench on the flats of the Adapter, unscrew and remove the Adapter from the Housing. This is a **left-hand thread**, rotate the Adapter **clockwise** to remove it.
10. Remove the Clamp Sleeve (29) and Wick (39).

### Disassembly of the Motor

1. Pull the Flange (23) and Flow Ring (22) off the front of the Motor Housing (9).
2. Grasp the Spindle Bearing Nut (30) or Rotor Pinion (38) and pull the assembled Motor out of the Motor Housing. Remove the two Rear Rotor Bearing Spacers (14) from the bottom of the Housing.
3. Remove the Vanes (17) from the Rotor (16).
4. Grasp the Rotor in copper-covered vise jaws with the Spindle Bearing Nut or Rotor Pinion upward. Using a 1/2" wrench, unscrew and remove the Nut or Pinion.
5. If the Front Rotor Bearing (21) must be replaced, support the Front End Plate (18) between two blocks on the table of an arbor press. Place the blocks as close to the body of the Rotor as possible and press the Rotor from the Bearing and End Plate. Remove the Front End Plate Spacer (19) and Front Seal Cup Assembly (20) from the hub of the Rotor.
6. If the Rear Rotor Bearing (13) must be replaced, use snap ring pliers to remove the Rear Rotor Bearing Retainer (15).
7. Using a bearing puller, pull the Rear Rotor Bearing off the hub of the Rotor.

### Disassembly of the Inlet and Throttle

1. Using a 15/16" wrench or six point socket, unscrew and remove the Inlet Assembly (1).
2. Remove the Inlet Seal (3) and Inlet Screen (2) from the Inlet.

## MAINTENANCE SECTION

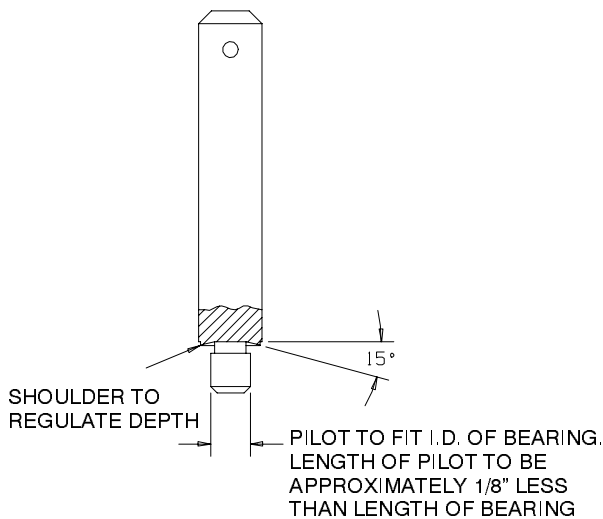
3. Remove the Throttle Valve Spring Seat (4), Throttle Valve Spring (5) and Throttle Valve (6) from the Motor Housing (9).
4. If the Throttle Valve Seat (7) must be replaced, insert a hooked tool through the central opening of the Seat and, catching the underside of the Seat, pull it from the Housing.
5. Press the Throttle Lever Pin (11) from the Housing and remove the Throttle Lever (10). Remove the Throttle Valve Plunger (12).

### 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 not to damage threads or distort housings.
4. Always clean every part and wipe every part with a thin film of oil before installation.
5. Check every bearing for roughness. If an open bearing must be cleaned, wash it thoroughly in **clean** solvent and dry with a clean cloth. **Sealed or shielded bearings should not be cleaned.** Work grease into every open bearing before installation.
6. Apply a film of o-ring lubricant to every O-ring before installation.
7. Unless otherwise noted, always press on the stamped end of a needle bearing when installing a needle bearing into a recess. Use a bearing inserting tool similar to the one shown in Dwg. TPD786.

#### Needle Bearing Inserting Tool



(Dwg. TPD786)

#### Assembly of the Throttle and Inlet

1. Insert the Throttle Valve Plunger (12) into the Motor Housing (9).
2. Position the Throttle Lever (10) on the Motor Housing and using an arbor press, press the Throttle Lever Pin (11) into the Housing and Lever. The Lever will retain the Plunger in the Housing.
3. If the Throttle Valve Seat (7) was removed, use a 5/8" wooden dowel with a flat end to push the Seat into the Motor Housing.
4. Push the small end of the Throttle Valve Spring (5) onto the end of the Throttle Valve (6) with the short stem until the Spring snaps into position around the hub and remains there. Install the dish end of the Throttle Valve Spring Seat (4) onto the large end of the Throttle Valve Spring.
5. Holding the Housing with the Lever downward, make sure the Plunger is out of the way and insert the assembled Throttle Valve, long stem end leading, into the housing recess.
6. Push the Inlet Screen (2), closed end leading, into the bushing of the Inlet Assembly (1). After moistening the Inlet Seal (3) with o-ring lubricant and being careful not to nick the Seal on the threads of the Inlet, install the Seal on the Inlet.
7. Thread the Inlet Assembly into the Housing and tighten it between 20 to 25 ft-lb (27.1 to 33.9 Nm) torque.

#### Assembly of the Motor

1. If the Rear Rotor Bearing (13) was removed, stand the Rotor (16) upright on the table of an arbor press with the threaded end downward. Place the threaded rotor hub into a hole drilled into a flat, smooth block so that the Rotor rests against the large rotor body. Press the Rear Rotor Bearing onto the hub of the Rotor.
2. Install the Rear Rotor Bearing Retainer (15) in the groove on the hub of the Rotor.
3. Install the Front End Plate (18), counterbored end trailing, onto the threaded hub of the Rotor. Using finger pressure, press the Front Seal Cup Assembly (20), felt end trailing, onto the end of the Front End Plate Spacer (19) that is opposite the the large internal bevel. Continue pressing until the felt end is flush with the end of the Spacer. Saturate the felt with Ingersoll-Rand No. 50 Oil. Place the assembled Spacer, Seal Assembly trailing, onto the threaded hub of the Rotor. Make sure the Seal Assembly enters the recess in the Front End Plate.

## MAINTENANCE SECTION

### NOTICE

**In the following step, the Front Rotor Bearing is a flush ground bearing and must be installed in a specific manner. The end of the Bearing with a black stain or hash marks must be away from the Spacer.**

- Stand the small hub of the Rotor on the table of an arbor press with the threaded end upward and press the Front Rotor Bearing (21) onto the hub of the Rotor.
- Grasp the assembled Rotor in copper-covered vise jaws with the threaded rotor hub upward.
- Thread the Spindle Bearing Nut (30) or Rotor Pinion (38) onto the Rotor and using a torque wrench, tighten the Nut or Pinion between 14 and 19 ft-lb (19.0 and 25.8 Nm) torque.
- Using snap ring pliers, install the Coupling Retaining Ring (31) on the Spindle Bearing Nut.
- Inject approximately 1/2 cc of Ingersoll-Rand No. 68 Grease into the small recess at the bottom of the motor housing bore. Drop the two Rear Rotor Bearing Spacers (14) into the bottom of the motor housing bore.
- Wipe each Vane (17) with a light film of oil and insert a Vane into each vane slot in the Rotor.
- Grasp the Spindle Bearing Nut or Rotor Pinion and insert the assembled Rotor into the Motor Housing (9).
- Assemble the Flow Ring (22) with the Flange (23) before installing the Flange on the Housing. Mate the Flow Ring to the end of the Flange without perforations. The positioning of the Flow Ring is dictated by the desired exhaust. To set the tool exhaust, proceed as follows:
  - For front exhaust tools**, align the notched projection on the edge of the Flow Ring with the letter "F" on the Housing.
  - For rear exhaust tools**, align the notched projection on the edge of the Flow Ring with the letter "R" on the Housing.
- Carefully install the assembled Flange, Flow Ring leading, onto the front of the Motor Housing. Make certain the Ring properly engages the Housing.
- If the Front Spindle Bearing (52) was replaced, invert the Spindle on the table of an arbor press and being careful not to damage the threads on the Spindle, press the Bearing, stained or marked end trailing, onto the Spindle until it seats against the shoulder of the shaft.
- Grasp a 5/32" diameter steel pin vertically in a set of vise jaws and slide the crosshole of the Spindle down onto the pin.
- Using a 9/16" wrench on the flats of the Bevel Pinion (53), thread the Pinion onto the Spindle against the Bearing and tighten it between 14 and 19 ft-lb (19.0 and 25.8 Nm) torque.
- Using a 1/2" wrench on one of the Spindle Bearing Nuts (30), thread Nut with the Coupling Retaining Ring (31), counterbored end leading, onto the Spindle. Tighten the Nut between 14 and 19 ft-lb (19.0 and 25.8 Nm) torque.
- Install the two Rear Spindle Bearing Washers (36) in the Extension Housing in the rear spindle bearing cavity.
- Insert the assembled Spindle, Nut end leading, into the small end of the Extension Housing. Push the assembly into the Housing until the Rear Spindle Bearing bottoms against the Rear Spindle Bearing Washers.
- Grasp the assembled motor in copper-covered vise jaws with the Spindle Bearing Nut upward. Coat the inside of the Arbor Coupling (28) with approximately 1 cc of Ingersoll-Rand No. 68 Grease and install the Coupling over the Bearing Nut. Position the Clamp Sleeve (29) over the Coupling in the Motor Housing and the Flange Clamp (24) over the Sleeve against the Flange (23).
- Insert the Spindle Bearing Nut in the assembled Extension Housing into the Arbor Coupling and thread the Extension Housing onto the Motor Housing. This is a **left-hand thread**; rotate the Extension Housing **counterclockwise** to tighten it. Tighten the Housing between 20 to 25 ft-lb (27.1 to 33.9 Nm) torque.

### Assembly of the HAS18, HAS30, HAS45, HAS60 TAS32 and TAS60 Extension Housings

- Form the Wick (39) into a circle and insert it into the Clamp Sleeve (29) against the Wick Retaining Ring (40). Saturate the Wick with approximately 1-1/2 cc of Ingersoll-Rand No. 63 Oil.
- Install the Sleeve, Wick end leading, over the Rotor Pinion (38) inside the Motor Housing (9) and against the Front Rotor Bearing (21).
- Apply a thin coat of o-ring lubricant to the Rear Spindle Bearing Seal (37) and install it in the annular groove on the Spindle (49).

### Assembly of the HAS75, HAS90 and TAS90 Extension Housings

- If the Rear Spindle Bearing (35) was replaced, stand the Spindle (49) on the table of an arbor press and being careful not to damage the threads on the Spindle, press the Bearing onto the Spindle until it seats against the shoulder of the shaft.

## MAINTENANCE SECTION

4. Slide the Rear Spindle Bearing (35) onto the shaft of the Spindle until it covers the Seal. Use care and do not damage the Seal when sliding the Bearing over it.
5. Insert the small end of the Spindle into the large end of the Extension Housing (32) until the small end of the spindle protrudes through the Housing.
6. Slide the Front Spindle Bearing (52) onto the small end of the Spindle and push it into the Extension Housing until the Bearing bottoms in the Housing.
7. Insert a 5/32" steel pin into the hole in the side of the Extension Housing and through the crosshole in the Spindle to sprag the Spindle against rotation. Thread the Bevel Pinion (53) onto the end of the Spindle and tighten it between 14 and 19 ft-lb (19.0 and 25.8 Nm) torque.
8. Drop the Gear Clamp (48) into the large end of the Extension Housing so that it encircles the Rear Spindle Bearing.
9. **For HAS45, HAS60 or TAS60**, if the Gear Frame (43) was disassembled, proceed as follows:
  - a. Stand the Gear Frame on the table of an arbor press with the notched face upward.
  - b. Using a needle bearing inserting tool, press a Spur Gear Bearing (45), marked end trailing, into each of the three holes in the Gear Frame until the trailing end of the Bearing is flush with the counterbored face.
  - c. Position a Spur Gear (44) in the Gear Frame with the small end of the Gear toward the notched face with the Bearings pressed into position.
  - d. Insert the Spur Gear Pin (46) through the hole in the Gear Frame and into the Spur Gear and Spur Gear Bearing.
  - e. Press a Spur Gear Bearing into the gear frame hole around the Pin until the marked end of the Bearing is flush with the counterbored face on the Gear Frame.
  - f. Repeat Steps (c), (d) and (e) with the remaining Spur Gears.
10. **For HAS18, HAS30 or TAS32**, slide the Ring Gear (42), gear teeth trailing, into the Housing against the Rear Spindle Bearing. Make certain the gear teeth mesh with the teeth of the Ring Gear. Install a Spindle Planet Gear Assembly (50) on each of the pins at the motor end of the Spindle. Make certain the gear teeth mesh with the teeth of the Ring Gear.  
**For HAS45, HAS60 or TAS60**, slide the assembled Gear Frame, notched face leading, into the Housing against the Rear Spindle Bearing. The Gear Frame must engage the spline of the Spindle and force the Bearing to bottom in the housing recess.
11. Thread the Gear Case Adapter (41) onto the Extension Housing and tighten it between 20 and 25 ft-lb (27.1 and 33.9 Nm) torque. This is a **left-hand thread**, rotate the Adapter **counterclockwise** to tighten it.
12. Mesh the teeth of the Rotor Pinion with the teeth of the Spur Gears and thread the Gear Case Adapter and Housing Extension onto the Motor Housing. This is a

**left-hand thread**, rotate the Adapter **counterclockwise** to tighten it. Tighten the joint between 20 and 25 ft-lb (27.1 and 33.9 Nm) torque.

13. Install the Extension Housing Plug (34) in the Housing.

### Assembly of the Angle Head

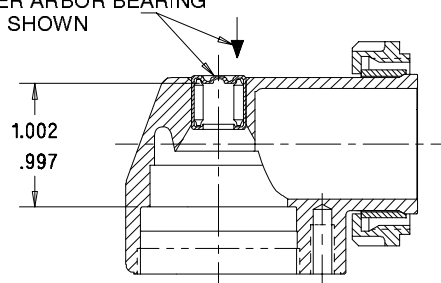
1. If the Upper Arbor Bearing (58) was removed and a new Bearing must be installed, proceed as follows:
  - a. Support the machined face of the Angle Head (54) on the table of an arbor press with the upper arbor bearing bore upward.

#### NOTICE

**Always press on the stamped or closed end of the Bearing.**

- b. Press a new Upper Arbor Bearing into the bore, (Refer to Dwg. TPD1812)

PRESS IN UPPER ARBOR BEARING TO DIMENSION SHOWN



(Dwg. TPD1812)

2. If the Lower Arbor Bearing (61) is being installed, it is necessary to note the identification marks on the Lower Arbor Bearing. One side of the Bearing has black stains or black hash marks across the inner and outer races. Using a sleeve that contacts the inner ring of the Lower Arbor Bearing, press the Bearing, **black stain or hash mark side** away from the Bevel Gear (53) onto the Arbor (62).

#### CAUTION

**The Bevel Gear and Bevel Pinion are specially matched sets. Some sets are color coded for manufacturing purposes only. Only the Gear and Pinion set furnished as a replacement part or the same Gear and Pinion set removed from one tool, is a matched set. A Bevel Gear from one tool and a Bevel Pinion from another tool with the same color code IS NOT A MATCHED SET. Replace these parts only as a matched set. Failure to do so will result in unsatisfactory tool performance and damage to the Bevel Gear and Bevel Pinion.**

3. Slide the Bevel Gear, geared face trailing, onto the small threaded end of the Arbor, aligning the integral keys or spline of the Gear with the slotted keyways or spline in the Arbor.
  4. Thoroughly clean the small threads on the Arbor above the Bevel Gear and the threads in the Bevel Gear Nut (60).



## MAINTENANCE SECTION

5. Apply a thin coat of Loctite 271 w/t Primer\* (M. I. Herson Grade 427) to the threads of the Bevel Gear Nut. Thread the Bevel Gear Nut onto the Arbor to retain the Bevel Gear and tighten the Nut to 8 to 9 ft-lb (10.8 to 12.2 Nm) torque.
6. Form the Wick (59) into a horseshoe shape and fully insert it into the U-shaped cavity in the Angle Head. Make certain the Wick is positioned behind the staking points in the Angle Head. If installing a Wick with one or more notches, mark certain the notched side enters the Housing first. Saturate the Wick with approximately 1.5 cc of Ingersoll-Rand No. 63 Oil. **Do not substitute any other oil.**
7. Inject 3 cc of Ingersoll-Rand No. 67 or Ingersoll-Rand No. 77 Grease into the Upper Arbor Bearing and Wick cavity in the Angle Head. **Do not substitute any other grease.**
8. Carefully grasp the assembled motor in copper-covered vise jaws with the Throttle Lever **downward.**
9. Install the motor Clamp Nut (56), threaded end trailing, onto the motor end of the Angle Head. Spread the Clamp Spacer (55) and install it, beveled end trailing, onto the motor end of the Angle Head against the Clamp Nut.
10. Position the output end of the Angle Head upward and 180 degrees opposite to the Throttle Lever and thread the Clamp Nut onto the Extension Housing. Using the Clamp Nut Wrench (68), tighten the Nut between 20 and 25 ft-lb (27 and 34 Nm) torque. This is a **left-hand thread**, turn **counterclockwise** to tighten.
11. Thoroughly clean the internal threads of the Angle Head and the threads on the Arbor Bearing Cap (63).
12. Insert the assembled Arbor into the Angle Head, bevel gear end first, making sure the teeth on the Bevel Gear and Pinion mesh. Rotate the Arbor manually to determine they are rotating smoothly.
13. Carefully apply a uniform coat of Vibra-Tite VC3 No. 205\*\* to at least the first three threads of the Arbor Bearing Cap and allow the compound to cure for 12 to 15 minutes.
14. Using the Arbor Bearing Cap Wrench (69), install the Arbor Bearing Cap and tighten it between 12 and 15 ft-lb (16.2 and 20.3 Nm) torque. The Bearing Cap has a **left-hand thread**: turn **counterclockwise** to install.

### Assembly Instructions for All Collet Models

Install the Collet (64) into the end of the Arbor and using the Collet Body Wrench (67) to hold the Arbor, thread the Collet Nut (65) onto the Arbor.

### Assembly Instructions for Ergo Handle

Screw assembled Ergo-Handle (103) into the Angle Housing (54) and secure it with the Alignment Nuts (108).

\* Product of Loctite Corporation.

\*\* Product of N.D. Industries.

## MAINTENANCE SECTION

### TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Low power or low free speed	Insufficient air pressure	Check air line pressure at the Inlet of the tool. It must be 90 psig (6.2 bar/620 kPa).
	Clogged muffler elements	Disassemble the tool and agitate the bare Motor Housing and Flange in a clean, suitable cleaning solution. If the elements cannot be cleaned, replace the Motor Housing and/or the Flange.
	Plugged Inlet Screen	Clean the Inlet Screen in a clean, suitable, cleaning solution or replace the Screen.
	Worn or broken Vanes	Install a <b>complete</b> set of new Vanes.
	Loose Clamp Nut	Tighten the Nut to 20 to 25 ft-lb (27 to 34 Nm) torque.
	Worn or broken Motor Housing	Replace the Motor Housing.
	Internal air leakage in the Motor Housing indicated by high air consumption/low speed or air leaking out the front and rear exhaust simultaneously.	Replace the Motor Housing.
	Grit buildup under the Throttle Lever restricting full Throttle Valve Plunger movement.	Remove the Throttle Lever and clean the groove in the Motor Housing.
	Bent stem on Throttle Valve	Replace the Throttle Valve
Front Seal Cup dragging against the shield of the Front Rotor Bearing	Reposition or replace the Front Seal Cup.	
Scoring	Worn Front End Plate Spacer or Front End Plate	Install a new Front End Plate Spacer and Front End Plate.
	Worn Front Rotor Bearing	Install a new Front Rotor Bearing.
Sanding Belt not tracking	Worn Idler parts	Install a new Idler Wheel Assembly
	Misalignment	Adjust the Clevis Mounting Screws
	Sanding on push side of Clevis	Sand on pull side of the Clevis.

## MAINTENANCE SECTION

<b>TROUBLESHOOTING GUIDE</b>		
<b>Trouble</b>	<b>Probable Cause</b>	<b>Solution</b>
Leaky Throttle Valve	Dirt accumulation on Throttle Valve or Valve Seat	Disassemble, inspect and clean parts.
	Worn Throttle Valve or Valve Seat	Replace the Throttle Valve and/or Throttle Valve Seat.
Exhausts at wrong location	Incorrect orientation of the Flow Ring	Reverse the face of the Flow Ring against the Motor Housing.
Front Rotor Bearing runs hot	Incorrect installation of the Front Seal Cup	Reposition the Front Seal Cup flush with the face of the Front End Plate Spacer.
	Front End Plate Spacer rubbing the bore of the Front End Plate	Replace the Front End Plate and Front End Plate Spacer combination.
	Incorrect Front Rotor Bearing installation orientation	If a black stain or black hashmarks are not visible on the face of the Bearing when it is assembled with the End Plate and Rotor, the Bearing is backwards. If possible, remove the Bearing and install it correctly or replace the Bearing.
Slow tool idle	Bent or leaky Throttle Valve	Replace the Throttle Valve.
Air leakage around Flow Ring	Damaged, mutilated or missing Flange Clamp	Replace the Flange Clamp.
	Damaged Flow Ring	Replace the Flow Ring
Rough operation/vibration	Improper lubrication or dirt build-up	Disassemble the tool and clean in a clean, suitable, cleaning solution. Assemble the tool and inject 3 cc of the recommended oil into the Inlet and run the Sander long enough to coat the internal parts with the oil.
	Worn or broken Rear Rotor Bearing or Front Rotor Bearing	Replace the worn or broken Bearings. Examine the Front End Plate, Front End Plate Spacer, Front Seal Cup and Rear Rotor Bearing Spacers and replace any damaged parts. If the rear end plate is damaged, replace the Rotor.
	Worn or broken Upper Arbor Bearing or Lower Arbor Bearing	Replace the worn or broken Bearing.
	Worn or broken Bevel Gear or Bevel Pinion	Examine the Bevel Gear and Bevel Pinion. If either is worn or damaged, replace both the Gear and Pinion because they are a matched set and must not be used separately.

### NOTICE

**SAVE THESE INSTRUCTIONS. DO NOT DESTROY.**

## **NOTES**