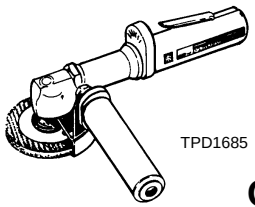


TPD1685

03538071
Form P6953
Edition 8
September, 1999

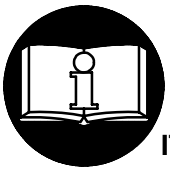
F E P

OPERATION AND MAINTENANCE MANUAL FOR SERIES HA AND HXA ANGLE GRINDERS

NOTICE

Series HA and HXA Angle Grinders are designed for close–quarter work in the metal fabricating industry, shipyards, pipe fabrication and limited space applications. They are particularly good where conduits, pipes, ducts, etc. pass through bulkheads or frames. These small Angle Grinders are very efficient at grinding weld bead and leaving a fine finish.

Ingersoll–Rand is not responsible for customer modification of tools for applications on which Ingersoll–Rand was not consulted.



⚠ WARNING

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

PLACING TOOL IN SERVICE

- **Always operate, inspect and maintain this tool in accordance with American National Standards Institute Safety Code for Portable Air Tools (ANSI B186.1).**
- **For safety, top performance, and maximum durability of parts, operate this tool at 90 psig (6.2 bar/620 kPa) maximum air pressure at the inlet with 3/8" (10 mm) inside diameter air supply hose.**
- **Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.**
- **Do not use damaged, frayed or deteriorated air hoses and fittings.**
- **Be sure all hoses and fittings are the correct size and are tightly secured. See Dwg. TPD905–1 for a typical piping arrangement.**
- **Always use clean, dry air at 90 psig 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.

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

Printed in U.S.A.

INGERSOLL-RAND®
PROFESSIONAL TOOLS

WARNING LABEL IDENTIFICATION

⚠ WARNING

FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

⚠WARNING

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

⚠WARNING

Always wear hearing protection when operating this tool.

⚠WARNING

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.

⚠WARNING

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.

⚠WARNING

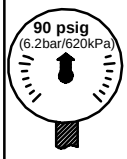
Do not carry the tool by the hose.

⚠WARNING

Do not use damaged, frayed or deteriorated air hoses and fittings.

⚠WARNING

Keep body stance balanced and firm. Do not overreach when operating this tool.



⚠WARNING

Operate at 90 psig (6.2 bar/ 620 kPa) Maximum air pressure.

GRINDER SPECIFIC WARNINGS

⚠ WARNING

FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

- **Do not use this tool if actual free speed exceeds the nameplate rpm.**
- **Before mounting a wheel, after any tool repair or whenever a Grinder is issued for use, check free speed of Grinder with a tachometer to make certain its actual speed at 90 psig (6.2 bar/620 kPa) does not exceed rpm stamped or printed on the nameplate. Grinders in use on the job must be similarly checked at least once each shift.**
- **Always use the recommended Ingersoll–Rand Wheel Guard furnished with the Grinder.**
- **Do not use any grinding wheel, bur or other accessory having a maximum operating speed less than the free speed of the Grinder in which it is being used. Always conform to maximum rpm on grinding wheel blotters.**
- **Inspect all grinding wheels for chips or cracks prior to mounting. Do not use a wheel that is chipped or cracked or otherwise damaged. Do not use a wheel that has been soaked in water or any other liquid.**
- **Make certain grinding wheel properly fits the arbor. Do not use reducing bushings to adapt a wheel to any arbor unless such bushings are supplied by and recommended by the wheel manufacturer.**
- **After mounting a new wheel, hold the Grinder under a steel workbench or inside a casting and run it for at least 60 seconds. Make certain no one is within the operating plane of the grinding wheel. If a wheel is defective, improperly mounted or the wrong size and speed, this is the time it will usually fail.**
- **When starting with a cold wheel, apply it to the work slowly until the wheel gradually warms up. Make smooth contact with the work and avoid any bumping action or excessive pressure.**
- **Always replace a damaged, bent or severely worn wheel guard. Do not use a wheel guard that has been subjected to a wheel failure.**
- **Make certain wheel flanges are at least 1/3 the diameter of grinding wheel, free of nicks, burrs and sharp edges. Always use wheel flanges furnished by the manufacturer; never use a makeshift flange or a plain washer. Tighten Flange Nut securely.**
- **Guard opening must face away from operator. Bottom of wheel must not project beyond guard.**
- **Series HA90 Angle Grinders have a free speed of 9 000 rpm and Series HA120 and HXA120 Angle Grinders have a free speed of 12 000 rpm, when operated at 90 psig (6.2 bar/620 kPa) air pressure. Operation at higher air pressure will result in excessive speed.**

(continued)

GRINDER SPECIFIC WARNINGS

- **Always match collet size with accessory shank size.**
- **Always insert tool shank no less than 10 mm in the collet. Tighten Collet Nut securely to prevent accessory from working out during operation of the Grinder. Check tightness of Collet Nut before operating the Grinder. Pay particular attention to the fact that allowed speed of a mounted point is lowered when the length of the shaft is increased between end of collet and mounted point (overhang).**

WARNING: Incorrect combinations of grinding wheel, wheel guard and tool speed could result in injury. Correct combinations are specified below:

Guard Part Number	Wheel Type	Wheel Diameter in. (mm)	Maximum Wheel Thickness in. (mm)	Maximum Speed rpm
AG121–106–4	27	4 (100)	1/4 (6.4)	15,000
LA3–106–45	27	4.5 (115)	1/4 (6.4)	13,200
LA3–106–5	27	5 (125)	1/4 (6.4)	13,200

PLACING TOOL IN SERVICE

LUBRICATION

Ingersoll–Rand No. 10 **Ingersoll–Rand No. 67**
Ingersoll–Rand No. 50 **Ingersoll–Rand No. 68**
Ingersoll–Rand No. 63 **Ingersoll–Rand No. 77**

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

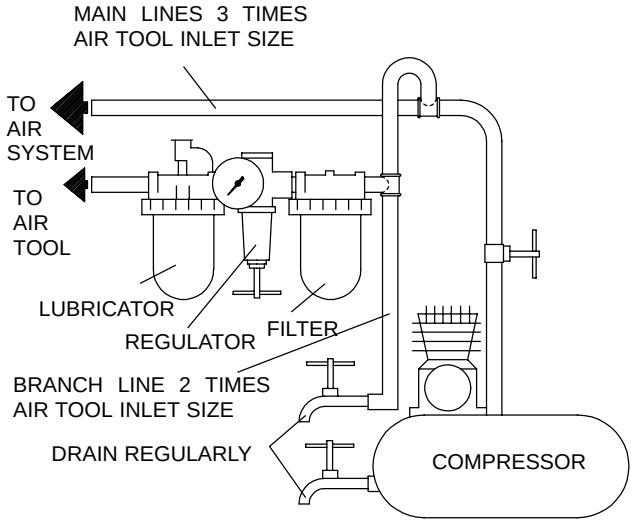
For USA – No. C28–04–FKG0–28

After each two 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.

After each eight hours of operation, inject approximately 3 cc of Ingersoll–Rand No. 67 or Ingersoll–Rand No. 77 Grease into the Angle Grease Fitting. **Excessive lubrication will cause grease to work out around the Arbor.**

CAUTION

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



(Dwg. TPD905–1)

PLACING TOOL IN SERVICE

HOW TO ORDER CYCLONE GRINDERS

ANGLE GRINDERS with 1/4" COLLET	
Model	**Speed/rpm**
HA120RG4 (Rear Exhaust)	12,000
HA90RG4 (Rear Exhaust)	9,000
ANGLE GRINDERS with 3/8"–24 SPINDLE THREAD	
HA120RP64 (Rear Exhaust)	12,000
HA120RP64M (Rear Exhaust)	12,000
HXA120RP64 (Rear Exhaust)	12,000
HA90RP64 (Rear Exhaust)	9,000
ANGLE GRINDERS with 5/8"–11 SPINDLE THREAD	
HA120RP1045 (Rear Exhaust)	12,000
HA120RP105 (Rear Exhaust)	12,000
HXA120RP1045 (Rear Exhaust)	12,000
ANGLE GRINDERS with M14 x 2.0–6g SPINDLE THREAD	
HA120RP945M (Rear Exhaust)	12,000
HA120RP95M (Rear Exhaust)	12,000

The following equipment is available at an extra price and must be ordered separately:

1. Ergo Handle . . . . . Part No. LG2–A48

NOTICE

All the models listed above can be changed to front exhaust tools by reversing the Flow Ring and aligning the 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 above models. Example: HA120RG4 Rear Exhaust Model becomes HA120FG4 Front Exhaust Model.

HOW TO ORDER CUSTOM MODELS

1. To order a tool with a Locking Lever, select the desired model and add an **"L"** to the end of the existing number.

   Example: HA120RG4**L**

   NOTICE

   Anytime a tool is ordered with a Low–Profile Concentric Flange, it will come equipped with a Locking Lever from the factory.

2. To order a tool with a Low–Profile Concentric Flange, select the desired model and add a **"C"** to the end of the existing number.

   Example: HA120RG4**C**

NEW GRINDER TO ACCESSORY COLOR MATCHING GUIDE

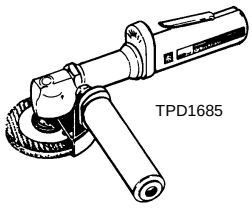
Ingersoll–Rand has pioneered a new color code system designed to:

1. Simplify the identification of rated tool speed via a unique corresponding color match.
2. Easily communicate the appropriate backing pads and accessories for each tool through a matching color code system on the backing pads and/or other corresponding Grinder accessories.
3. The chart below demonstrates the color code system between the Grinder and the accessory.

(READ FROM LEFT TO RIGHT)

SPEED COLOR ON NAMEPLATE	RATED TOOL SPEED	SAFE RANGE ACCESSORY (MAXIMUM OPERATING SPEED)							
		35,000	30,000	25,000	20,000	18,000	15,000	12,000	9,000
RED	35,000	RED							
ORANGE	30,000		ORANGE						
YELLOW	25,000			YELLOW					
GREEN	20,000				GREEN				
BLUE	18,000					BLUE			
GREY	15,000						GREY		
TAN	12,000							TAN	
VIOLET	9,000								VIOLET

(TPD1146–1)



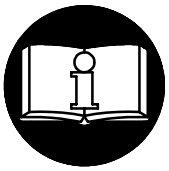
F

MANUEL D'EXPLOITATION ET D'ENTRETIEN DES MEULEUSES D'ANGLE DES SÉRIES HA ET HXA

NOTE

Les meuleuses d'angle des séries HA et HXA sont destinées aux travaux dans des espaces restreints dans l'industrie de fabrication, les chantiers navals, la fabrication de tuyauteries et les applications à espace limités. En particulier, elles sont idéales dans les endroits où les tubes, tuyauteries, gaines, etc. passent à travers des cloisons ou des châssis. Ces petites meuleuses sont très efficaces pour le meulage des cordons de soudure lorsqu'une bonne finition est requise.

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



⚠ ATTENTION

D'IMPORTANTES INFORMATIONS DE SECURITÉ SONT JOINTES.
LIRE CE MANUEL AVANTD'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 6,2 bar. La poussière, les fumées corrosives et/ou une humidité excessive peuvent endommager le moteur d'un outil pneumatique.**
- **Ne jamais lubrifier les outils avec des liquides inflammables ou volatiles tels que le kérosène, le gasol ou le carburant d'aviation.**
- **Ne retirer aucune étiquette. Remplacer toute étiquette endommagée.**

UTILISATION DE L'OUTIL

- **Porter toujours des lunettes de protection pendant l'utilisation et l'entretien de cet outil.**
- **Porter toujours une protection acoustique pendant l'utilisation de cet outil.**
- **Tenir les mains, les vêtements flous et les cheveux longs, éloignés de l'extrémité rotative de l'outil.**
- **Prévoir, et ne pas oublier, que tout outil motorisé est susceptible d'à–coups brusques lors de sa mise en marche et pendant son utilisation.**
- **Garder une position équilibrée et ferme. Ne pas se pencher trop en avant pendant l'utilisation de cet outil. Des couples de réaction élevés peuvent se produire à, ou en dessous, de la pression d'air recommandée.**
- **La rotation des accessoires de l'outil peut continuer pendant un certain temps après le relâchement de la gâchette.**
- **Les outils pneumatiques peuvent vibrer pendant l'exploitation. Les vibrations, les mouvements répétitifs et les positions inconfortables peuvent causer des douleurs dans les mains et les bras. N'utiliser plus d'outils en cas d'inconfort, de picotements ou de douleurs. Consulter un médecin avant de recommencer à utiliser l'outil.**
- **Utiliser les accessoires recommandés par Ingersoll-Rand.**
- **Cet outil n'est pas conçu pour fonctionner dans des atmosphères explosives.**
- **Cet outil n'est pas isolé contre les chocs électriques.**

NOTE

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

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

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

Imprimé aux É.U.

INGERSOLL-RAND®
PROFESSIONAL TOOLS

SIGNIFICATION DES 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

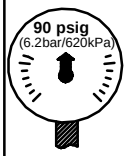
Ne pas transporter l'outil par son flexible.

⚠ ATTENTION

Ne pas utiliser des flexibles ou des raccords endommageés, 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 SPECIFIQUES AUX MEULEUSES

⚠ ATTENTION

LE NON RESPECT DES AVERTISSEMENTS SUIVANTS PEUT CAUSER DES BLESSURES

- **Ne pas utiliser cet outil si la vitesse à vide réelle dépasse celle indiquée sur la plaque signalétique.**
- **Avant de monter une meule, après toute réparation de l'outil ou avant de fournir une meuleuse pour utilisation, vérifier la vitesse à vide de la meuleuse avec un tachymètre pour s'assurer que la vitesse réelle à 6,2 bar (620 kPa) ne dépasse pas celle poinçonnée ou imprimée sur la plaque signalétique. Les meuleuses sorties sur chantier doivent être vérifiées de la même façon au moins une fois par poste.**
- **Utiliser toujours le protège–meule Ingersoll–Rand fourni avec la meuleuse.**
- **Ne jamais utiliser une meule, une fraise ou tout autre accessoire ayant une vitesse de service inférieure à la vitesse à vide de la meuleuse sur laquelle il est monté. Respecter toujours la vitesse maximum inscrite sur les disques en papier de la meule.**
- **Inspecter toutes les meules avant de les monter pour vérifier qu'elles ne présentent pas d'éclats ou de fissures. Ne jamais utiliser une meule écaillée, fissurée ou ayant un endommagement quelconque. Ne jamais utiliser une meule qui a été trempée dans l'eau ou tout autre liquide.**
- **S'assurer que la meule se monte correctement sur l'arbre. Ne pas utiliser de bagues réductrices, à moins que ces bagues soient recommandées et fournies par le fabricant de la meule.**
- **Après avoir monté une nouvelle meule, tenir la meuleuse sous un établi en acier ou dans une pièce coulée et la faire tourner pendant au moins 60 secondes. S'assurer que personne ne se tient dans le plan de rotation de la meule. Toute meule défectueuse, mal montée ou de dimension et vitesse incorrectes se cassera généralement à ce moment là.**
- **Pour commencer le travail avec une meule froide, l'appliquer lentement contre la pièce jusqu'à ce que la meule s'échauffe progressivement. Mettre la meule en contact avec la pièce en douceur en évitant tout choc ou pression excessive.**
- **Remplacer toujours un protège–meule endommagé, tordu ou très usé. Ne pas utiliser un protège–meule qui a été soumis à la rupture d'une meule.**
- **S'assurer que les flasques de meule couvrent au moins 1/3 du diamètre de la meule, et qu'ils sont exempts d'entailles, de bavures et d'arêtes vives. Utiliser toujours les flasques fournis par le fabricant; ne jamais utiliser un flasque de fortune ou une rondelle plate. Serrer fermement l'écrou du flasque.**
- **L'ouverture du protège–meule doit être orientée côté opposé à l'opérateur. Le bas de la meule ne doit pas dépasser le protège–meule.**
- **Les meuleuses d'angle de la Série HA ont une vitesse à vide de 9 000 tr/mn, et les meuleuses d'angle de la Série HXA ont une vitesse à vide de 12 000 tr/mn, lorsqu'exploitées avec une pression d'air de 6,2 bar (620 kPa). L'exploitation à une pression supérieure produira une vitesse excessive.**

AVERTISSEMENTS SPECIFIQUES AUX MEULEUSES

- **Toujours choisir une pince adaptée à la dimension de la queue de l'accessoire.**
- **La queue de l'outil doit toujours être insérée dans la pince sur au moins 10 mm. Serrer fermement l'écrou de pince pour éviter tout desserrage de l'accessoire pendant l'emploi de la meuleuse. Vérifier le serrage de l'écrou de pince avant de mettre la meuleuse en marche. Ne jamais oublier que la vitesse admissible d'une meule sur tige doit être réduite lorsque la longueur de la tige entre le bout de la pince et la meule (porte–à–faux) est augmentée.**

ATTENTION: Une mauvaise combinaison de roue d'affûtage, de protection de roue et de vitesse de l'outil peut provoquer un accident corporel. Les combinaisons correctes sont spécifiées ci–dessous:

Référence de la protection	Type de roue	Diamètre de roue mm (po.)	Epaisseru maximale de roue mm (po.)	Vitesse maximale (t/min)
AG121–106–4	27	4 (100)	1/4 (6,4)	15.000
LA3–106–45	27	4.5 (115)	1/4 (6,4)	13.200
LA3–106–5	27	5 (125)	1/4 (6,4)	13.200

MISE EN SERVICE DE L'OUTIL

LUBRIFICATION


Ingersoll–Rand No. 10 **Ingersoll–Rand No. 67**
Ingersoll–Rand No. 50 **Ingersoll–Rand No. 68**
Ingersoll–Rand No. 63 **Ingersoll–Rand No. 77**

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

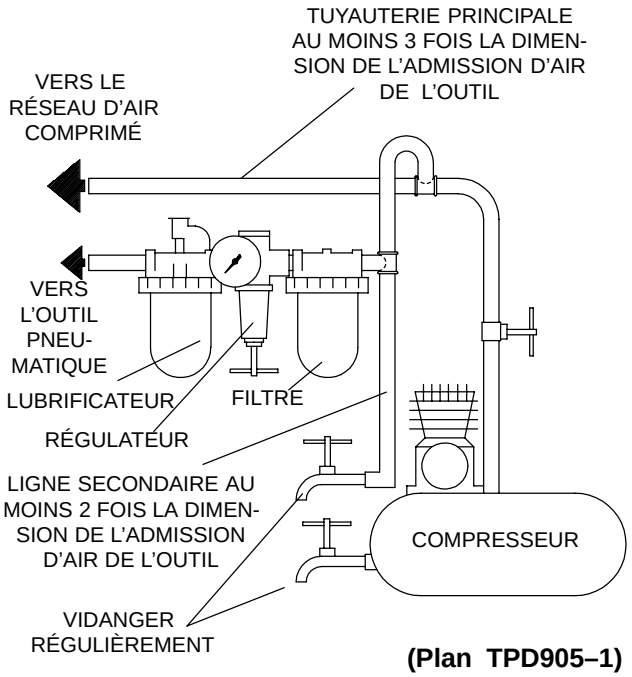
E. U. – No. C28–04–FKG0–28

Toutes les deux heures de fonctionnement, si un lubrificateur de ligne n'est pas utilisé, injecter 1/2 à 1 cm^3 d'huile Ingersoll–Rand No. 10 dans le raccord d'admission.

Toutes les huit heures de fonctionnement, injecter 3 cm^3 de graisse Ingersoll–Rand No. 67 ou No. 77 dans le raccord de graissage du renvoi d'angle. **Tout graissage excessif causera l'extrusion de la 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.



(Plan TPD905–1)

MISE EN SERVICE DE L'OUTIL

NOUVEAU GUIDE DE CORRESPONDANCE MEULEUSE/ACCESSOIRE À CODE COULEUR

Ingersoll–Rand a lancé un nouveau système de code couleur destiné à:

1. Simplifier l'identification des vitesses nominales des outils grâce à un code couleur de correspondance unique.
2. Faire correspondre facilement les plateaux–supports et les accessoires à chaque outil grâce à l'introduction d'un code couleur d'identification sur les plateaux et/ou les accessoires des meuleuses.
3. Le tableau ci–dessous illustre le système d'identification couleur pour les meuleuses et les accessoires.

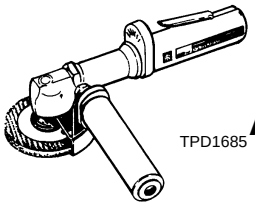
(A LIRE DE GAUCHE A DROITE)

COULEUR DE VITESSE SUR PLAQUE SIGNALETIQUE	VITESSE NOMINALE DE L'OUTIL	GAMME SURE DES ACCESSOIRES (VITESSE MAXIMALE DE FONCTIONNMENT)							
		35 000	30 000	25 000	20 000	18 000	15 000	12 000	9 000
ROUGE	35,000	ROUGE							
ORANGE	30,000		ORANGE						
JAUNE	25,000			JAUNE					
VERT	20,000				VERT				
BLEU	18,000					BLEU			
GRIS	15,000						GRIS		
OCRE	12,000							OCRE	
VIOLET	9,000								VIOLET

(Plan TPD1146–1)

SPÉCIFICATIONS

Modèle	Vitesse d'exploitation maximum
1/4" PINCE	
HA120RG4	12.000
HA90RG4	9.000
3/8"–24 FILETAGE DE BROCHE	
HA120RP64	12.000
HA120RP64M	12.000
HXA120RP64	12.000
HA90RP64	9.000
5/8"–11 FILETAGE DE BROCHE	
HA120RP1045	12.000
HA120RP105	12.000
HXA120RP1045	12.000
M14 x 2.0–6g FILETAGE DE BROCHE	
HA120RP945M	12.000
HA120RP95M	12.000



TPD1685

MANUAL DE USO Y MANTENIMIENTO PARA AMOLADORAS ANGULARES MODELOS HA Y HXA

E

NOTA

Las Amoladoras Angulares Serie HA y HXA están diseñadas para trabajo de cercanía en la industria de fabricación de metales, astilleros, fabricación de tuberías y aplicaciones en espacios reducidos. Estas amoladoras resultan especialmente eficaces para aquellas situaciones en las que los conductos, tuberías, etc. atraviesan tabiques o bastidores. Estas pequeñas Amoladoras Angulares son muy eficaces para amolar cordones de soldadura y obtener un acabado fino.
Ingersoll–Rand no aceptará responsabilidad alguna por la modificación de las herramientas efectuada por el cliente para las aplicaciones que no hayan sido consultadas con Ingersoll–Rand.

⚠ AVISO

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

PARA PONER LA HERRAMIENTA EN SERVICIO

- **Utilice, examine y mantenga siempre esta herramienta conforme al código de seguridad para herramientas neumáticas portátiles de la American National Standards Institute (ANSI B186.1).**
- **Para seguridad, máximo rendimiento y vida de servicio de las piezas, use esta herramienta a una presión de aire máxima de 90 psig (6,2 bar/620 kPa) en la manguera de suministro de aire con diámetro interno de 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 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 utilice esta herramienta o realice operaciones de mantenimiento en la misma.**
- **Use siempre protección para los oídos cuando utilice esta herramienta.**
- **Mantenga las manos, la ropa suelta y el cabello largo alejados del extremo giratorio de la herramienta.**
- **Anticipe y esté alerta sobre los cambios repentinos en el movimiento durante la puesta en marcha y 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.**
- **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.

Impreso en EE. UU.

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ETIQUETAS DE AVISO

⚠ AVISO

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

⚠ ADVERTENCIA

Use siempre protección ocular cuando utilice esta herramienta o realice operaciones de mantenimiento en la misma.

⚠ ADVERTENCIA

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

⚠ ADVERTENCIA

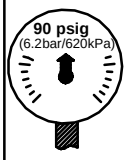
Mantener una postura del cuerpo equilibrada y firme. No estirar demasiado los brazos al manejar la herramienta.

⚠ ADVERTENCIA

Use siempre protección para los oídos cuando utilice esta herramienta.

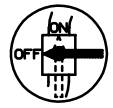
⚠ ADVERTENCIA

No coger la herramienta por la manguera para levantarla.



⚠ ADVERTENCIA

Manejar la herramienta a una presión de aire máxima de 90 psig (6,2 bar/620 kPa).



⚠ ADVERTENCIA

Cortar siempre el suministro de aire y desconectar la manguera de suministro de aire antes de instalar, retirar o ajustar cualquier accesorio de esta herramienta, o antes de realizar cualquier operación de mantenimiento de la misma.

⚠ ADVERTENCIA

No utilizar mangueras de aire y accesorios dañados, desgastados ni deteriorados.

AVISOS ESPECÍFICOS PARA AMOLADORA

⚠ AVISO

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

- **No use esta herramienta si la velocidad libre real excede la indicada en la placa de identificación.**
- **Antes de montar una muela, y después de todas las reparaciones de herramienta y siempre que se proporcione una Amoladora para su uso, compruebe la velocidad libre de dicha Amoladora con un tacómetro para asegurarse que su velocidad real a 90 psig (620 bar/6,2 kPa) no exceda las rpm estampadas o impresas en la placa de identificación. Las Amoladoras usadas en trabajos deberán ser examinadas similarmente como mínimo una vez en cada jornada de trabajo.**
- **Use siempre el Cubremuela Ingersoll–Rand recomendado y suministrado con la Amoladora.**
- **No use nunca una muela, taladro rotatorio dental o cualquier otro accesorio que tenga una velocidad máxima de funcionamiento menor que la velocidad libre de la Amoladora en la que se esté usando. Cumpla siempre las rpm máximas indicadas en los distanciadores de la muela.**
- **Inspeccione todas las muelas antes de su montaje para ver si tienen grietas o roturas. No use una muela que esté rota o agrietada o dañada de cualquier otra forma. No use una muela que haya estado a remojo en agua o en cualquier otro líquido.**
- **Asegúrese de que la muela esté bien puesta en la espiga. No use anillos reductores para adaptar una muela a la espiga a menos que estos hayan sido suministrados y recomendados por el fabricante de muelas.**
- **Después de haber montado una muela nueva, sujete la Amoladora bajo un banco de acero o en un molde y hágala funcionar durante 60 segundos como mínimo. Asegúrese que no haya nadie en el entorno de operación de muela. Si la muela es defectuosa, está mal montada o es del tamaño y velocidad incorrectas, normalmente fallará en este momento.**
- **Cuando ponga en marcha una muela en frío, aplíquela lentamente al trabajo hasta que se caliente gradualmente. Contacte la zona de trabajo suavemente, y evite golpes o exceso de presión.**
- **Cambie siempre un cubremuela dañado, torcido o muy desgastado. No use un cubremuela que haya experimentado un fallo de muela.**
- **Asegúrese que las bridas de muela sean de un diámetro mínimo de 1/3 de la muela y que estén libres de marcas, abrasiones y bordes afilados. Use siempre las bridas de muela suministradas por el fabricante; no use nunca una brida casera o arandela normal. Apriete la Tuerca de Brida de manera segura.**
- **La apertura del cubremuela deberá estar orientada hacia afuera del operario. La parte inferior de la muela no deberá proyectarse fuera del cubremuela.**
- **Las Amoladoras Angulares Modelo HA90 tienen una velocidad libre de 9 000 rpm y las Amoladoras Angulares Modelos HA120 y HXA120 tienen una velocidad libre de 12 000 rpm, cuando se operan a una presión de aire de 90 psig (6,2 bar/620 kPa). Si se utiliza la herramienta a una presión de aire comprimido mayor, se causará exceso de velocidad.**

(continuación)

AVISOS ESPECÍFICOS PARA AMOLADORA

- **Empareje siempre el tamaño de pinza con el tamaño de vástago de accesorio.**
- **Inserte siempre el vástago de herramienta en la pinza un mínimo de 10 mm. Apriete la Tuerca de Pinza de manera segura para evitar que se salga el accesorio durante el funcionamiento de la Amoladora.**

Compruebe el apriete de Tuerca de Pinza antes de usar la Amoladora. Preste especial atención al hecho de que la velocidad permitida de un punto de montaje disminuye cuando se incrementa la longitud de eje entre extremo de pinza y punto de montaje (saliente).

AVISO: Combinaciones incorrectas de rueda de rectificación, protector de rueda y velocidad de herramienta puedan resultar en lesionamientos. Las combinaciones correctas se especifican a continuación:

Número de Pieza del Protector	Tipo de Rueda	Diámetro de Rueda mm (in.)	Grosor Máximo de Rueda mm (in.)	Velocidad Máxima (rpm)
AG121–106–4	27	4 (100)	1/4 (6,4)	15.000
LA3–106–45	27	4.5 (115)	1/4 (6,4)	13.200
LA3–106–5	27	5 (125)	1/4 (6,4)	13.200

PARA PONER LA HERRAMIENTA EN SERVICIO

LUBRICACIÓN

Ingersoll–Rand Nº 10 **Ingersoll–Rand Nº 67**
Ingersoll–Rand Nº 50 **Ingersoll–Rand Nº 68**
Ingersoll–Rand Nº 63 **Ingersoll–Rand Nº 77**

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

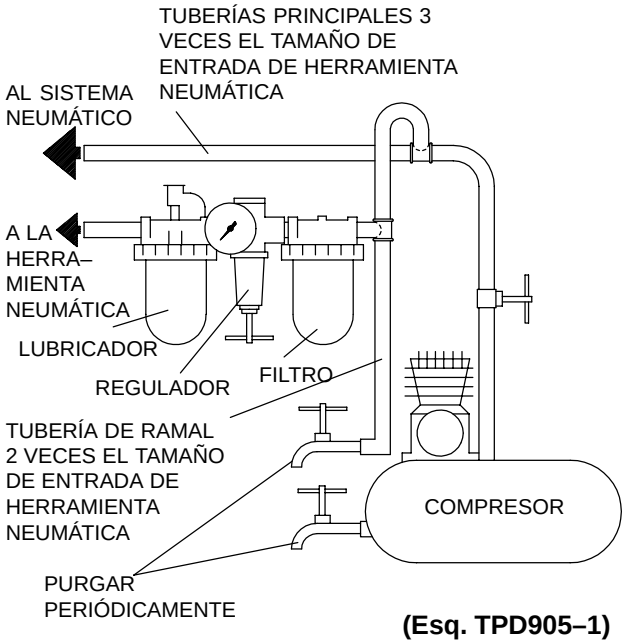
Para EE. UU. – Nº. C28–04–FKG0–28

Después de cada dos horas de uso, si no se usa un lubricante de línea de aire comprimido, inyecte 1/2 – 1 cc de Aceite Ingersoll–Rand Nº 10 en la Admisón de Aire.

Después de cada ocho horas de uso, inyecte unos 3 cc de Grasa Ingersoll–Rand Nº 67 o Grasa Ingersoll–Rand Nº 77 en el Engrasador Angular. **El exceso de lubricación causará que caiga grasa en la espiga.**

PRECAUCIÓN

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



(Esq. TPD905–1)

PARA PONER LA HERRAMIENTA EN SERVICIO

NUEVO SISTEMA DE CÓDIGO DE COLORES

Ingersoll–Rand ha introducido un nuevo sistema de codificación de colores diseñado para:

1. Simplificar la identificación de la velocidad de herramienta regulada por una codificación de colores correspondientes única.
2. Comunicar fácilmente los accesorios y almohadillas de refuerzo correspondientes a cada herramienta gracias a un sistema de codificación de colores en las almohadillas de repuesto o/y otros accesorios de Amoladora correspondientes.
3. La tabla que aparece más abajo muestra el sistema de codificación de colores entre Amoladora y accesorio.

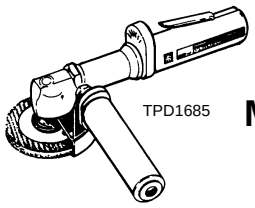
(LEA DE IZQUIERDA A DERECHA)

COLOR DE VELOCIDAD EN PLACA DE IDENTIFICACION	VELOCIDAD DE HERRA–MIENTA	LIMITE DE SEGURIDAD DE ACCESORIO (MAXIMA VELOCIDAD DE OPERACION)							
		35 000	30 000	25 000	20 000	18 000	15 000	12 000	9 000
ROJO	35 000	ROJO							
NARANJA	30 000		NARANJA						
AMARILLO	25 000			AMARILLO					
VERDE	20 000				VERDE				
AZUL	18 000					AZUL			
GRIS	15 000						GRIS		
MARRON	12 000							MARRON	
VIOLETA	9 000								VIOLETA

(Esq. TPD1146–1)

ESPECIFICACIONES

Modelo	Velocidad Libre, rpm
1/4” PINZA	
HA120RG4	12.000
HA90RG4	9.000
3/8”–24 ROSCA ESTRIADA	
HA120RP64	12.000
HA120RP64M	12.000
HXA120RP64	12.000
HA90RP64	9.000
5/8”–11 ROSCA ESTRIADA	
HA120RP1045	12.000
HA120RP105	12.000
HXA120RP1045	12.000
M14 x 2.0–6g ROSCA ESTRIADA	
HA120RP945M	12.000
HA120RP95M	12.000


TPD1685

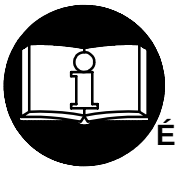
P

MANUAL DE FUNCIONAMENTO E MANUTENÇÃO PARA SÉRIES DE ESMERILADORAS DE ÂNGULO HA E HXA

AVISO

As séries de Esmeriladoras de Ângulo HA E HXA são concebidas para trabalho close–quarter na indústria de metais, estaleiros, fabricação de tubos e aplicações espaciais limitadas. Elas são particularmente ideais onde condutas, tubos, canais, etc. passem através de quadros principais ou estruturas. As Esmeriladoras são muito eficientes para esmerilamento de cordão de solda deixando um acabamento fino.

A Ingersoll–Rand não é responsável por modificações, feitas pelo cliente em ferramentas, nas quais a Ingersoll–Rand não tenha sido consultada.



⚠ ADVERTÊNCIA

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

COLOCANDO A FERRAMENTA EM FUNCIONAMENTO

- **Sempre opere, inspeccione e mantenha esta ferramenta de acordo com o Código de Segurança do Instituto Americano de Padrões Nacionais para Ferramentas Pneumáticas Portáteis (ANSI B186.1).**
- **Para segurança, máximo desempenho e máxima durabilidade das peças, opere esta ferramenta com uma pressão de ar máxima de 6,2 bar/620 kPa (90 psig) na entrada da mangueira de alimentação de ar com diâmetro interno de 10 mm (3/8 pol.).**
- **Desligue sempre a alimentação de ar e desconecte a mangueira de alimentação de ar antes de instalar, remover ou ajustar qualquer acessório nesta ferramenta, ou antes de executar qualquer serviço de manutenção nesta ferramenta.**
- **Não use mangueiras de ar ou adaptadores danificados, gastos ou deteriorados.**
- **Certifique–se de que todas as mangueiras e adaptadores sejam do tamanho correcto e estejam apertados com firmeza. Veja o Desenho TPD905–1 para um arranjo típico de tubagem.**
- **Use sempre ar seco e limpo com pressão máxima de 90 psig. Pó, fumos corrosivos e/ou humidade excessiva podem arruinar o motor de uma ferramenta pneumática.**
- **Não lubrifique as ferramentas com líquidos inflamáveis ou voláteis tais como querosene, diesel ou combustível de jactos.**
- **Não remova nenhum rótulo. Reponha qualquer rótulo danificado.**

USANDO A FERRAMENTA

- **Use sempre óculos de protecção quando estiver operando ou executando serviço de manutenção nesta ferramenta.**
- **Use sempre protecção contra ruído ao operar esta ferramenta.**
- **Mantenha as mãos, partes do vestuário soltas e cabelos compridos afastados da extremidade em rotação..**
- **Antecipe e esteja alerta a mudanças repentinas no movimento quando ligar e operar qualquer ferramenta motorizada.**
- **Mantenha a posição do corpo equilibrada e firme. Não exagere quando operar esta ferramenta. Torques de reacção elevados podem ocorrer na ou abaixo da pressão de ar recomendada.**
- **Os acessórios da ferramenta podem continuar a 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 Escritório da Ingersoll–Rand Mais Próximo.

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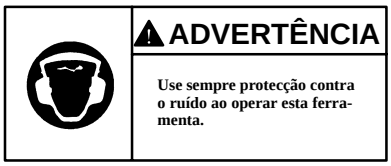
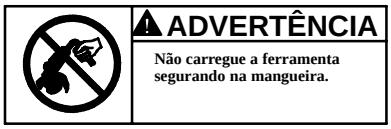
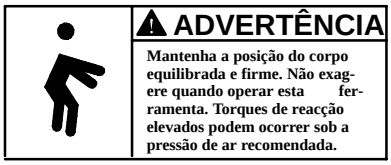
IDENTIFICAÇÃO DO RÓTULO DE ADVERTÊNCIA

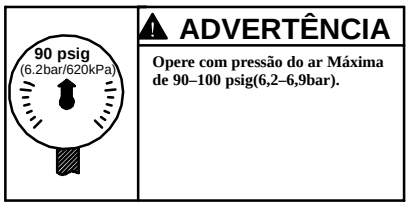
⚠ ADVERTÊNCIA

O NÃO CUMPRIMENTO DAS SEGUINTES ADVERTÊNCIAS PODE RESULTAR EM FERIMENTO.









ADVERTÊNCIAS ESPECÍFICAS SOBRE A ESMERILADORA

⚠ ADVERTÊNCIA

O NÃO CUMPRIMENTO DAS SEGUINTES ADVERTÊNCIAS PODE RESULTAR EM FERIMENTO.

- **Não use esta ferramenta se a velocidade livre total exceder a rpm indicada na placa de identificação.**
- **Antes de montar o disco, depois de qualquer reparação de ferramenta ou quando se pretende que uma Esmeriladora seja colocada em funcionamento, verifique a velocidade livre da Esmeriladora com um tacometro para se certificar de que a sua velocidade real a 6,2 bar/620kPa (90 psig) não exceda a rpm selada ou impressa na placa de identificação. As Esmeriladoras em funcionamento devem ser similarmente verificadas pelo menos uma vez em cada turno**.
- **Use sempre o Protector do Disco da Ingersoll–Rand fornecido com a Esmeriladora**
- **Não use qualquer disco de esmerilamento, broca ou outro acessório que possua uma velocidade máxima de operação menor do que a velocidade livre da Esmeriladora que esteja a ser usada. Respeite sempre a máxima rpm nos adaptadores de disco de esmerilamento.**
- **Verifique todas os discos de esmerilamento para ver se há lascas ou rachaduras antes da montagem. Não use um disco que esteja lascado ou rachado ou de alguma maneira danificado. Não use um disco que tenha sido encharcado com água ou qualquer outro líquido.**
- **Verifique se o disco de esmerilamento se encaixa na árvore de montagem. Não use rolamentos redutores para adaptar um disco na árvore de montagem a não ser que tais rolamentos tenham sido fornecidos ou recomendados pelo fabricante do disco**.
- **Depois de montar um novo disco, segure a Esmeriladora sob uma bancada de aço ou dentro de uma moldagem e coloque–a em funcionamento por 60 segundos. Verifique se não há ninguém dentro do plano de operação. Se o disco estiver com algum defeito, inadequadamente montado ou se for do tamanho errado ou tiver velocidade incorrecta, este é o momento em que ele normalmente falhará.**
- **Quando iniciar um trabalho com um disco frio, ponha–o a trabalhar lentamente até que o discor aqueça gradualmente Faça um contacto suave com o local a ser trabalhado e evite de executar qualquer ação de batimento ou pressão excessiva**.
- **Reponha um protector do disco sempre que estiver danificado, torto ou severamente gasto. Não use um protector do disco que tenha sido sujeito a uma falha do disco.**
- **Certifique–se de que as flanges da roda sejam pelo menos 1/3 do diâmetro do disco de esmerilamento, livre de cortes, arestas e extremidades afiadas. Use sempre flanges do disco fornecidas pelo fabricante. Nunca use uma flange provisória ou uma anilha plana. Aperte bem a Porca da Flange.**
- **A abertura do protector deve estar afastada do operador. O fundo do disco não deve se extender para fora do protector.**
- **As Esmeriladoras de Ângulo Séries HA90 possuem uma velocidade livre de 9000 rpm e as Séries HA120 e HXA120 possuem 12000 rpm, quando operadas sob uma pressão de ar de 6,2 bar/620 kPa (90 psig). Operações sob condições de pressões mais elevadas resultarão em velocidades excessivas.**

(continua)

ADVERTÊNCIAS ESPECÍFICAS DA ESMERILADORA

- **Use sempre uma pinça cuja dimensão seja igual ao encabadouro acessório.**
- **Insira sempre o encabadouro da ferramenta com comprimento que não seja inferior a 10mm no colete. Aperte a Porca do Pinça seguramente para evitar que o acessório se desajuste durante a operação da esmeriladora. Verifique o aperto da Porca do Pinça antes de operar a esmeriladora. Preste particular atenção ao facto de que a velocidade permitida de um ponto montado é diminuída quando o comprimento do eixo é aumentado entre a extremidade da pinça e o ponto montado. (pendurado)**

ADVERTÊNCIA: Combinações incorrectas de disco de esmerilamento, protectordo disco e velocidade da ferramenta pode resultar em ferimento.
As combinações correctas estaõ especificadas abaixo:

Número de Peça do Protector	Tipo do Disco	Diâmetro do Disco mm (pol.)	Espressura Máxima do Disco mm (pol.)	Velocidade Máxima rpm
AG121–106–4	27	100 (4)	6,4 (1/4)	15.000
LA3–106–45	27	115 (4,5)	6,4 (1/4)	13.200
LA3–106–5	27	125 (5)	6,4 (1/4)	13.200

COLOCANDO A FERRAMENTA EM FUNCIONAMENTO

LUBRIFICAÇÃO

Ingersoll–Rand No. 10 **Ingersoll–Rand No. 67**
Ingersoll–Rand No. 50 **Ingersoll–Rand No. 68**
Ingersoll–Rand No. 63 **Ingersoll–Rand No. 77**

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

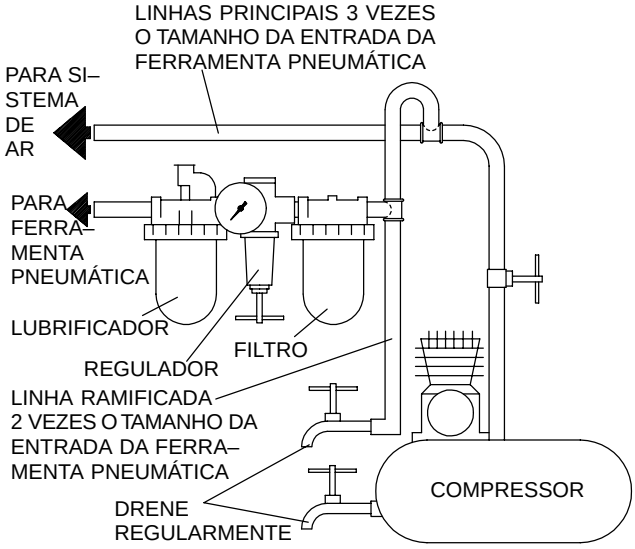
Para E. U. A. – No. C28–04–FKG0–28

Depois de cada duas horas de operação, se estiver usando um lubrificador de ar de linha, injecte 1/2 a 1 cc de Óleo Ingersoll–Rand No. 10 na Entrada de Ar.

Depois de cada oito horas de operação, injecte cerca de 3 cc de Massa Lubrificante Ingersoll–Rand No 67 ou Ingersoll–Rand No 77 no Adaptador de Massa Lubrificante de Ângulo. **Lubrificação excessiva poderá fazer com que a massa lubrificante se espalhe em volta da Árvore de Montagem.**

CUIDADO

Não marque as superfícies não metálicas desta ferramenta com códigos de identificação do cliente. Tais acções podem afectar o desempenho da ferramenta.



(Desenho. TPD905–1)

COLOCANDO A FERRAMENTA EM FUNCIONAMENTO

NOVO GUIA DE COMBINAÇÃO DE CORES ENTRE A ESMERILADORA E O ACESSÓRIO

A Ingersoll–Rand é pioneira no desenho de um novo sistema de código de cores para :

1. Simplificar a identificação da velocidade aferida de uma ferramenta através de uma única combinação de cores correspondentes.
2. Comunicam facilmente os painéis traseiros e acessórios apropriados para cada ferramenta através de um sistema de códigos de combinação de cores nos paineis traseiros e/ou acessórios correspondentes à Esmeriladora.
3. A tabela abaixo demonstra o sistema de códigos de cores correspondentes à Esmeriladora e ao Acessório.

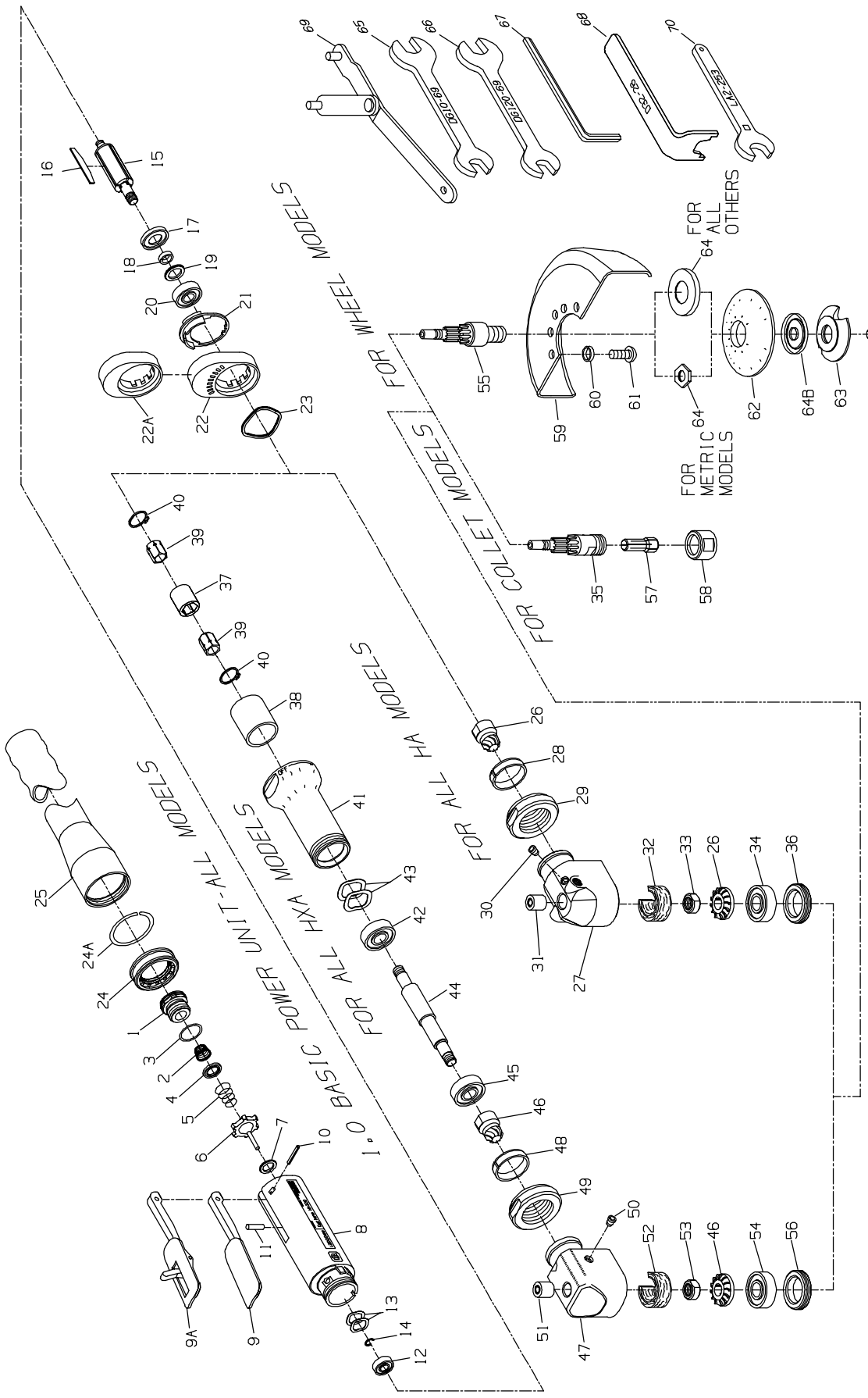
(LEIA DA ESQUERDA PARA A DIREITA)

COR DA VELOCIDADE NA PLACA DE IDENTIFICAÇÃO	VELOCIDADE AFERIDA DA FERRAMENTA	ACESSÓRIO DE INTERVALO SEGURO (MÁXIMA VELOCIDADE DE OPERAÇÃO)							
		35,000	30,000	25,000	20,000	18,000	15,000	12,000	9,000
VERMELHA	35,000	VERMELHA							
LARANJA	30,000		LARANJA						
AMARELA	25,000			AMARELA					
VERDE	20,000				VERDE				
AZUL	18,000					AZUL			
CINZA	15,000						CINZA		
MARRON CLARO	12,000							MARRON CLARO	
VIOLETA	9,000								VIOLETA

(Desenho TPD1146–1)

ESPECIFICAÇÕES

Modelo	Velocidade Livre rpm
1/4” PINÇA	
HA120RG4	12.000
HA90RG4	9.000
3/8”–24 ROSCA DO FUSO	
HA120RP64	12.000
HA120RP64M	12.000
HXA120RP64	12.000
HA90RP64	9.000
5/8”–11 ROSCA DO FUSO	
HA120RP1045	12.000
HA1210RP105	12.000
HXA120RP1045	12.000
M14 x 2.0–6g ROSCA DO FUSO	
HA120RP945M	12.000
HA120RP95M	12.000



(Dwg. TPA1297–6)

PART NUMBER FOR ORDERING

PART NUMBER FOR ORDERING

		Common parts for ALL HA and HXA Grinders			17	Front End Plate	LG2–11
					18	Front End Plate Spacer	LG2–65
	1	Inlet Assembly	LG2–A465	•	19	Front Seal Cup Assembly	61H–A32
	2	Inlet Screen	R1602–61		20	Front Rotor Bearing	LG2–24
•	3	Inlet Seal	R18LF–21		21	Flow Ring	
	4	Throttle Valve Spring Seat	LG3–592			for HA90 (blue)	LG3–103–3
	5	Throttle Valve Spring	7L–51			for HA120 and HXA120 (red)	LG2–103–3
	6	Throttle Valve	LG3–302		22	High Profile Flange	LG2–23
	7	Throttle Valve Seat	LG3–303	#	22A	Concentric Flange	LG3R–23
	8	Motor Housing	LG3–40		23	Flange Clamp	LG2–29
	9	Throttle Lever	LG2–273	⊕	24	Exhaust Hose Adapter	LG2–184
	9A	Locking Throttle Lever Assembly		⊕	24A	Exhaust Hose Retainer	6WT–203
		(for all models ending in L or C)	LG2–A400	⊕	25	Exhaust Hose	3RL–284
	*	Lever Lock	LG1–402		*	Warning Label	
	*	Lock Spring	LG1–405			for collet models ending in –EU	EU–99
	*	Lock Pin	5UT–757			for 4” diameter wheel models ending in –EU	EU–64–99
	10	Throttle Lever Pin	61H–120			for 4–1/2” diameter wheel models ending in –EU	EU–945–99
	11	Throttle Valve Plunger	LG2–191			for 5” diamter wheel models ending in –EU	EU–95–99
	12	Rear Rotor Bearing	R120–127			for all other models	LG2–99
•	13	Rear Rotor Bearing Spacer (2)	400–25–191				
•	14	Rear Rotor Bearing Retainer	LG1–118				
	15	Rotor	LG3–53–4				
•	16	Vane Packet (set of 4 Vanes)	DG31–42–4				

* 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 with all models ending in **M, MC** or **ML** and **ALL** Front Exhaust models: optional equipment on all other models.

⚠ WARNING

 # Always install a Locking Throttle Lever Assembly (9A) on a tool with a Low Profile Concentric Flange (22A). 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 (9).

			PART NUMBER FOR ORDERING
	*	Nameplate	
		for standard length 9 000 rpm models ending in –EU	LA309–EU–301
		for all other standard length 9 000 rpm models	LA309–301
		for all other standard length 12 000 rpmmodels ending in –EU	LA312–EU–301
		for standard length 12 000 rpm models	LA312–301
		for extended length 12 000 rpm models	LXA312–301
		Additional parts for all HA models	
	26	Bevel Pinion and Bevel Gear (sold only as a matched set)	
		for HA90	LA2–A552–1.9
		for HA120	LA2–A552–1.7
+	27	Angle Housing Assembly	LA2–A550S
	28	Clamp Spacer	LA2–46
	29	Clamp Nut	LG2–27
	30	Grease Fitting	D0F9–879
	31	Upper Arbor Bearing	AG210–693
	32	Wick	LA2–560
	33	Bevel Gear Nut	LA2–578
	34	Lower Arbor Bearing	LA2–593
	35	Arbor for models ending in G4, G4C or G4L	AG220–4–G4
	36	Arbor Bearing Cap	AG20–531
		Additional parts for all HXA models	
	37	Arbor Coupling	LE2–304
	38	Clamp Sleeve	LE2–176
	39	Spindle Bearing Nut (2)	LE2–85
	40	Coupling Retaining Ring (2)	RX3–729
	41	Extension Housing	LA3–20
	42	Rear Spindle Bearing	WFS182–22
	43	Rear Spindle Bearing Washer (2)	7AH–278
	44	Spindle	LA3–4
	45	Front Spindle Bearing	LG2–24
	46	Bevel Pinion and Bevel Gear (sold only as a matched set)	LA2–A552–1.7
+	47	Angle Housing Assembly	LA2–A550S
	48	Clamp Spacer	LA2–46
	49	Clamp Nut	LG2–27
	50	Grease Fitting	D0F9–879
	51	Upper Arbor Bearing	AG210–693
	52	Wick	LA2–560

* Not illustrated.

\+ The LA2–A550S Angle Housing Assembly is furnished with three Wicks. Use Wick (LA2–560) **without** the notch on HA90, HA120 and HXA120 models.

		PART NUMBER FOR ORDERING
53	Bevel Gear Nut	LA2–578
54	Lower Arbor Bearing	LA2–593
55	Arbor	
	for models ending in P64, P64C, P64L, P64M, P64MC or P64ML	AG220–4
	for models ending in P1045, P1045C or P1045L	AG230–4–1045
	for models ending in P945M, P945MC, P945ML P95M, P95MC or P95ML	AG230–4–945
56	Arbor Bearing Cap	AG20–531
	Additional parts for all collet models	
57	Collet	
	for models ending in –EU	G160HD–700–6mm
	for all other models	G160HD–700–1/4
58	Collet Nut	DG120–699A
	Additional parts for all wheel models	
59	Wheel Guard	
	for models ending in P64, P64C, P64L, P64M, P64MC or P64ML (4” or 102 mm)	AG121–106–4
	for models ending in P1045, P1045C, P1045L, P945M, P945MC or P945ML (4–1/2” or 115 mm)	LA3–106–45
	for models ending in P105, P105C or P105L (5” or 127 mm)	LA3–106–5
	for models ending in P95M, P95MC or P95ML (5” or 127 mm)	LA3–106–5–EU
60	Guard Lock Washer (3)	R2–320
61	Guard Mounting Screw (3)	AG31–667

			PART NUMBER FOR ORDERING
◊	62	Wheel Flange	
		for models ending in P64, P64C or P64L	R0A2D61–337
		for models ending in P1045, P1045C, P1045L, P105, P105C or P105L	AG230–337–5
		for models ending in P64M, P64MC or P64ML	AG31–337–4
		for models ending in P945M, P945MC, P945ML, P95M, P95MC or P95ML	LG3–337–45M
◊	63	Flange Nut	
		for models ending in P64, P64C or P64L	AG21–337A–3
		for models ending in P1045, P1045C, P1045L, P105, P105C or P105L	AG230–338–5
		for models ending in P64M, P64MC or P64ML	AG31–338–4
		for models ending in P945M, P945MC, P945ML, P95M, P95MC or P95ML	AG230–338–45M
▮	64	Flange Spacer	
		for models ending in P64, P64C, P64L, P64M, P64MC or P64ML	LA2–111
		for models ending in P1045, P1045C, P1045L, P105, P105C or P105L	R3F–286

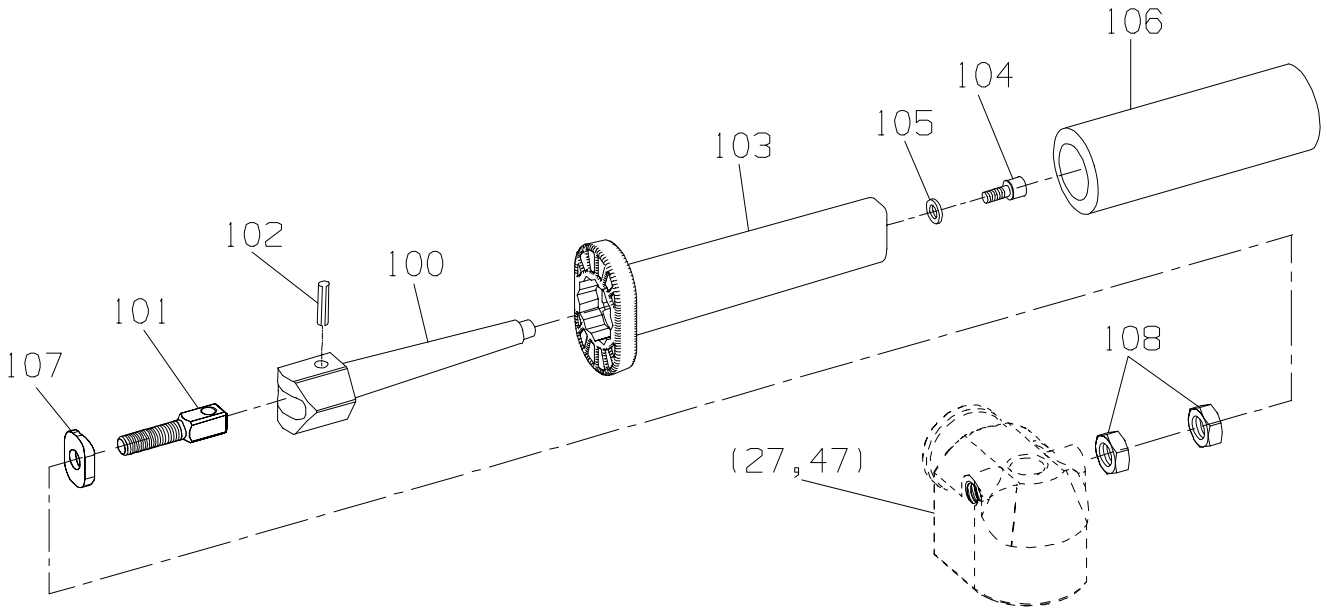
▮ These Flange Spacers must be used on the specified models in addition to the Guard (59), Flange (62) and Nut (63) when mounting a Type 27 Depressed Center Wheel less than 1/4” thick. For mounting Type 27 Depressed Center Wheels less than 1/4” thick on metric models, reverse the Flange Nut (63).

◊ These parts must be used for mounting Type 27 Depressed Center Wheels 4”, 4–1/2” or 5” diameter X 1/4” thick.

		PART NUMBER FOR ORDERING
64A	Wheel Retaining Screw (for models ending in P945M, P945MC, P945ML, P95M, P95MC or P95ML)	LG2–219M
64B	Wheel Retaining Screw Washer (for models ending in P945M, P945MC, P945ML, P95M, P95MC or P95ML)	LG2–218
	Accessories for all models	
65	Collet Body/Arbor Wrench (included with all models ending in G4, G4C or G4L and all models using Type 27 Wheels **except** models ending in P945M, P945MC, P945ML, P95M, P95MC or P95ML) (double–end 1/2” x 9/16”)	DG10–69
66	Collet Nut Wrench (included with all models ending in G4, G4C or G4L) (double–end 5/8”x 3/4”)	DG120–69
67	Arbor Wrench furnished with all models using Type 27 Wheels and ending in P1045, P1045C, P1045L, P105, P105C or P105L (3/16” hex wrench)	AG220–340
	furnished with all models using Type 27 Wheels and ending in P945M, P945MC, P945ML, P95M, P95MC or P95ML (6 mm hex wrench)	AG230–340M
68	Flange Nut Wrench (L–shaped) (included with all models using Type 27 Wheels **except** models ending in P945M, P945MC, P945ML, P95M, P95MC or P95ML)	D32–26
69	Flange Nut Wrench (adjustable spanner) (included with all models using Type 27 Wheels and ending in P945M, P945MC, P945ML, P95M, P95MC or P95ML)	AG230–26M
70	Clamp Nut Wrench (1–1/2”)	LA2–253
*	I–R No. 10 Oil (4 oz. bottle)	10Z4
*	I–R No. 63 Oil (4 oz. bottle)	63Z4
*	I–R No. 67 Grease (1 lb. can)	67–1LB
*	I–R No. 77 Grease (1 lb. can)	77–1LB

* Not illustrated.

LG2–A48 ERGO HANDLE ASSEMBLY



(Dwg. TPD1864)

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.

⚠ 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 Grinders is disassembled for overhaul or replacement of parts, lubricate as follows:

1. Always wipe the Vanes (16) with a light film of oil before inserting them into the vane slots.
2. Lubricate the Front Seal Cup Awwembly (19) with Ingersoll–Rand No. 50 Oil.
3. 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 all Collet Model Angle Heads

1. Grasp the tool in copper–covered or leather–covered vise jaws with the Collet (57) upward. Using the Collet Body Wrench (65) on the flats of the collet Arbor (35) and the Collet Nut Wrench (66) on the Collet Nut (58), unscrew the Collet Nut and remove the Collet.
2. Using a spanner wrench, unscrew and remove the Arbor Bearing Cap (36). This is a **left–hand thread.** Rotate the spanner wrench **clockwise** to remove the Cap.

NOTICE

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

3. Using the Clamp Nut Wrench (70), loosen the Clamp Nut (29) and pull the Angle Housing Assembly (27) away from the Motor Housing (8)). This is a **left–hand thread**. Rotate the Nut Wrench **clockwise** to loosen the Nut.
4. Remove the Flange Clamp (23) from the Angle Housing or Flange (22).
5. Grasp the collet Arbor and pull the assembled Arbor out of the Angle Head. The Wick is staked into position and will be destroyed by removal. Make certain a replacement Wick is available before removing the old Wick.If the Wick (32) needs replacement, pull it out of the Angle Housing.
6. If the Upper Arbor Bearing (31) needs replacement, support the Angle Head on the table of an arbor press, arbor end downward, and press the Bearing out of the Angle Head.
7. Grasp the collet Arbor in copper–covered or leather–covered vise jaws with the collet end downward. Using an adjustable wrench, unscrew and remove the Bevel Gear Nut (33) and lift the Bevel Gear off the Arbor.
8. If the Lower Arbor Bearing (34) 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

When removing the Clamp Nut in the following procedure, take all precautions necessary to prevent the Spacer from being forcefully ejected in a manner or direction that is hazardous.

9. 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 (28) and pry the Spacer off the Housing.

Disassembly of all Wheel Model Angle Heads

1. Grasp the tool in copper–covered or leather–covered vise jaws with the Flange Nut (63) upward.
2. **For models ending in P945M, P945MC, P945ML, P95M, P95MC or P95ML**, use a 4 mm hex wrench to unscrew the Wheel Retaining Screw (64A).

3. Use the Arbor Wrench (65 or 67) to hold the Arbor (35 or 55) and using the Flange Nut Wrench (68 or 69), unscrew and remove the Flange Nut. Remove the Wheel Retaining Screw Washer (64B), the wheel, Wheel Flange (62) and Flange Spacer (64) from the Arbor.
4. Using a 1/8" hex wrench, unscrew and remove the three Guard Mounting Screws (61), Guard Lock Washers (60) and Wheel Guard (59).
5. Using a spanner wrench, unscrew and remove the Arbor Bearing Cap (36 or 56). This is a **left–hand thread.** Rotate the spanner wrench **clockwise** to remove the Cap.

NOTICE

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

6. Using the Clamp Nut Wrench (70), loosen the Clamp Nut (29 or 49) and pull the Angle Housing Assembly (27 or 47) away from the Motor Housing (8) or Extension Housing (41). This is a **left–hand thread**. Rotate the Nut Wrench **clockwise** to loosen the Nut.
7. Remove the Flange Clamp (23) from the Angle Housing or Flange (22).
8. Grasp the Arbor and pull the assembled Arbor out of the Angle Head.TheWick is staked into position and will be destroyed by removal. Make certain a replacement Wick is available before removing the old Wick. If the Wick (32 or 52) needs replacement, pull it out of the Angle Housing.
9. If the Upper Arbor Bearing (31 or 51) needs replacement, support the Angle Head on the table of an arbor press, arbor end downward, and press the Bearing out of the Angle Head.
10. Grasp the Arbor in copper–covered or leather–covered vise jaws with the wheel end downward. Using an adjustable wrench, unscrew and remove the Bevel Gear Nut (33 or 53) and lift the Bevel Gear off the Arbor.
11. If the Lower Arbor Bearing (34 or 54) 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.

Disassembly of Extension Assembly on HXA120 Models

1. Being careful not to distort the Housing, grasp the tool in copper–covered or leather–covered vise jaws with the Spindle (44) upward. Using a 1–1/2" wrench on the flats of the Extension Housing (41), unscrew and remove the assembled Housing. This is a **left–hand thread.** Rotate the Housing **clockwise** to remove it. Remove the Arbor Coupling (37), Clamp Sleeve (38) and Flange Clamp (23).
2. Grasp the Bevel Pinion (46) and pull the assembled Spindle from the Extension Housing. Remove the two Rear Spindle Bearing Washers (43) from the Housing.
3. Using snap ring pliers, remove the Coupling Retaining Ring (40) from the Spindle Bearing Nut (39) 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 (42) off the Spindle.
8. Using a bearing puller or arbor press, pull or press the Front Spindle Bearing (45) off the Spindle.

Disassembly of the Motor

1. Pull the Flange (22) and Flow Ring (21) off the front of the Motor Housing (8).
2. Grasp the Bevel Pinion (26) or Spindle Bearing Nut (39) and pull the assembled motor out of the Motor Housing. Remove the two Rear Rotor Bearing Spacers (13) from the bottom of the Housing.
3. Remove the Vanes (16) from the Rotor (15).
4. Grasp the Rotor in copper–covered or leather–covered vise jaws with the Bevel Pinion or Spindle Bearing Nut upward. Using a 1/2" wrench for the Nut or a 9/16" wrench for the Pinion, unscrew and remove the Pinion or Nut.
5. If the Front Rotor Bearing (20) must be replaced, support the Front End Plate (17) 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 (18) and Front Seal Cup Assembly (19) from the hub of the Rotor.
6. If the Rear Rotor Bearing (12) must be replaced, use snap ring pliers to remove the Rear Rotor Bearing Retainer (14).
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.

3. Remove the Throttle Valve Spring Seat (4), Throttle Valve Spring (5) and Throttle Valve (6) from the Motor Housing (8).
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 (10) from the Housing and remove the Throttle Lever (9). Remove the Throttle Valve Plunger (11).

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. Except for bearings, always clean every part and wipe every part with a thin film of oil before installation.
5. Check every bearing for roughness. If an open bearing must be cleaned, wash it thoroughly in **clean** solution 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.

Assembly of the Throttle and Inlet

1. Insert the Throttle Valve Plunger (11) into the Motor Housing (8).
2. Position the Throttle Lever (9) on the Motor Housing and using an arbor press, press the Throttle Lever Pin (10) 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 and 25 ft–lb (27.1 and 33.9 Nm) torque.

Assembly of the Motor

1. If the Rear Rotor Bearing (12) was removed, stand the Rotor (15) 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 (14) in the groove on the hub of the Rotor.
3. Install the Front End Plate (17), counterbored end trailing, onto the threaded hub of the Rotor. Using finger pressure, press the Front Seal Cup Assembly (19), felt end trailing, onto the end of the Front End Plate Spacer (18) 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.

NOTICE

Before performing the next step, be aware that 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.

4. 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 (20) onto the hub of the Rotor.
5. Grasp the assembled Rotor in copper–covered or leather–covered vise jaws with the threaded rotor hub upward.
6. Thread the Bevel Pinion (26) or Spindle Bearing Nut (39) onto the Rotor and using a torque wrench, tighten the Pinion or Nut between 14 and 19 ft–lb (19.0 and 25.8 Nm) torque.

7. **For HXA models,** using snap ring pliers, install the Coupling Retaining Ring (40) on the Spindle Bearing Nut.
8. 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 (13) into the bottom of the motor housing bore.
9. Wipe each Vane (16) with a light film of oil and insert a Vane into each vane slot in the Rotor.
10. Grasp the Bevel Pinion or Spindle Bearing Nut and insert the assembled Rotor into the Motor Housing (8).
11. Assemble the Flow Ring (21) with the Flange (22) 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:
    a. **For front exhaust tools,** align the notched projection on the edge of the Flow Ring with the letter "**F**" on the Housing.
    b. **For rear exhaust tools,** align the notched projection on the edge of the Flow Ring with the letter "**R**" on the Housing.
12. Carefully install the assembled Flange, Flow Ring leading, onto the front of the Motor Housing. Make certain the Ring properly engages the Housing.

Assembly of the Extension Housing on HXA Models

1. If the Rear Spindle Bearing (42) was replaced, stand the Spindle (44) 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.
2. If the Front Spindle Bearing (45) 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.
3. 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.
4. Using a 9/16" wrench on the flats of the Bevel Pinion (46), 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.
5. Using a 1/2" wrench on one of the Spindle Bearing Nuts (39), thread the Nut with the Coupling Retaining Ring (40), counterbored end leading, onto the Spindle. Tighten the Nut between 14 and 19 ft–lb (19.0 and 25.8 Nm) torque.
6. Install the two Rear Spindle Bearing Washers (43) in the Extension Housing in the rear spindle bearing cavity.
7. 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.
8. Grasp the assembled motor in copper–covered or Leather–covered vise jaws with the Spindle Bearing Nut upward. Coat the inside of the Arbor Coupling (37) with approximately 1 cc of Ingersoll–Rand No. 68 Grease and install the Coupling over the Bearing Nut. Position the Clamp Sleeve (38) over the Coupling in the Motor Housing and the Flange Clamp (23) over the Sleeve against the Flange (22).
9. 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 and 25 ft–lb (27.1 and 33.9 Nm) torque.

Assembly of the Angle Head

1. If the Upper Arbor Bearing (31 or 51) was removed and a new Bearing must be installed, proceed as follows:
    a. Support the machined face of the Angle Head (27 or 47) on the table of an arbor press with the upper arbor bearing bore upward.

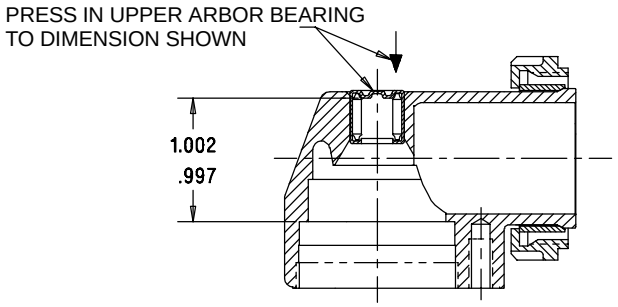
NOTICE

When installing the Bearing in the next step, always press on the stamped or closed end of the Bearing.

NOTICE

Do not press theUpper Arbor Bearing flush with the top of the Angle Housing. Press the Bearing to the dimensions given in the following step.

    b. Press a new Upper Arbor Bearing into the bore.



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2. If the Lower Arbor Bearing (34 or 54) 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 leading**, onto the Arbor.

NOTICE

The Bevel Gear and Bevel Pinion in the next step 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 used with 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 (26 or 46), 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 (33 or 53).
5. Apply a thin coat of thread–locking compound 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 between 8 and 9 ft–lb (10.8 and 12.2 Nm) torque.
6. Form the Wick (32 or 52) 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 one of the Wicks having a notch on one side, make certain the notch 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 or leather–covered vise jaws with the Throttle Lever **downward**.
9. Install the motor Clamp Nut (29 or 49), threaded end trailing, onto the motor end of the Angle Head. Spread the Clamp Spacer (28 or 48) 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 Motor Housing or Extension Housing. Using the Motor Clamp Nut Wrench (70), 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 (36 or 56).
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 a spanner wrench, 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

1. Install the Collet (57) into the end of the Arbor (35).
2. Using the Collet Body Wrench (65) to hold the Arbor, thread the Collet Nut (58) onto the Arbor.

Assembly Instructions for All Wheel Models

1. Position the Wheel Guard (59) against the face of the Angle Housing (27 or 47) and using a 1/8” hex wrench, install the three Guard Mounting Screws (61) and Lock Washers (60). Tighten the Screws between 3.0 and 3.5 ft–lb (4.1 and 4.7 Nm) torque.
2. Install the Flange Spacer (64), Wheel Flange (62), Wheel Retaining Screw Washer (64B), wheel and Flange Nut (63) on the Arbor. Use the Arbor Wrench (65 or 67) to hold Arbor while tightening the Flange Nut with the Flange Nut Wrench (68 or 69).
3. **For models ending in P945M, P945MC, P945ML, P95M, P95MC or P95ML,** install the Wheel Retaining Screw (64A) and tighten it securely.

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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 bare Motor Housing and Flange in a clean, suitable, cleaning solution. If elements cannot be cleaned, replace the Motor Housing and/or the Flange.
	Plugged Inlet Screen	Clean the Inlet Screen in a clean, sutable, cleaning solution or replace the Screen.
	Worn or broken Vanes	Install a **complete** set of new Vanes.
	Loose Clamp Nut or Arbor Housing	Tighten the Nut or Housing between 20 and 25 ft–lb (27 and 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 Assembly dragging against the shield of the Front Rotor Bearing	Reposition the Front Seal Cup Assembly.
Excessive runout	Bent Arbor	Replace the Arbor.
	Loose Collet Nut	Tighten the Collet Nut until snug.
	Worn or damaged Collet or Collet Nut	Replace the damaged component and retest.
	Worn or damaged Upper Arbor Bearing or Lower Arbor Bearing	Replace the worn or damaged Bearing.
Scoring of End Plate	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.
Leaky Throttle Valve	Dirt accumulation on Throttle Valve or Throttle Valve Seat	Disassemble, inspect and clean parts.
	Worn Throttle Valve or Throttle Valve Seat	Replace the Throttle Valve and/or Throttle Valve Seat.
	Excessive dirt build–up beneath the Throttle Lever	Clean out the slot area.
	Bent Throttle Valve Plunger	Replace the Plunger.
Exhausts at wrong direction	Incorrect orientation of the Flow Ring	Reverse the face of the Flow Ring against the Motor Housing.

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Front Rotor Bearing runs hot	Incorrect installation of the Front Seal Cup Assembly	Reposition the Front Seal Cup Assembly 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 installed 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 buildup	Disassemble the tool and clean in a suitable cleaning solution. Assemble the tool and inject 3 cc of the recommended oil into the Inlet and run the Grinder 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 Assembly 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 the Pinion because they are a matched set and must not be used separately.

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.