

Brake Wheels and Couplings

Technical Manual



MAGNETEK
MATERIAL HANDLING

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Preface and Safety

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Product Safety Information

Magnetek, Inc. (Magnetek) offers a broad range of radio remote control products, control products and adjustable frequency drives, industrial braking systems, and power delivery products for material handling applications. This manual has been prepared by Magnetek to provide information and recommendations for the installation, use, operation and service of Magnetek's material handling products and systems (Magnetek Products). Anyone who uses, operates, maintains, services, installs or owns Magnetek Products should know, understand and follow the instructions and safety recommendations in this manual for Magnetek Products.

The recommendations in this manual do not take precedence over any of the following requirements relating to cranes, hoists, lifting devices or other equipment which use or include Magnetek Products:

- Instructions, manuals, and safety warnings of the manufacturers of the equipment where the Magnetek Products are used,
- Plant safety rules and procedures of the employers and the owners of the facilities where the Magnetek Products are being used,
- Regulations issued by the Occupational Health and Safety Administration (OSHA),
- Applicable local, state, provincial, or federal codes, ordinances, standards and requirements, or
- Safety standards and practices for the industries in which Magnetek Products are used.

This manual does not include or address the specific instructions and safety warnings of these manufacturers or any of the other requirements listed above. It is the responsibility of the owners, users and operators of the Magnetek Products to know, understand and follow all of these requirements. It is the responsibility of the employer to make its employees aware of all of the above listed requirements and to make certain that all operators are properly trained.

No one should use Magnetek Products prior to becoming familiar with and being trained in these requirements and the instructions and safety recommendations for this manual.

Product Warranty Information

Magnetek, hereafter referred to as Company, assumes no responsibility for improper programming of a device (such as a drive or radio) by untrained personnel. A device should only be programmed by a trained technician who has read and understands the contents of the relevant manual(s). Improper programming of a device can lead to unexpected, undesirable, or unsafe operation or performance of the device. This may result in damage to equipment or personal injury. Company shall not be liable for economic loss, property damage, or other consequential damages or physical injury sustained by the purchaser or by any third party as a result of such programming. Company neither assumes nor authorizes any other person to assume for Company any other liability in connection with the sale or use of this product.

For information on Magnetek's product warranties by product type, please visit www.magnetek.com.

DANGER, WARNING, CAUTION, and NOTE Statements

Read and understand this manual before installing, operating, or servicing this product. Install the product according to this manual and local codes.

The following conventions indicate safety messages in this manual. Failure to heed these messages could cause fatal injury or damage products and related equipment and systems.



DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.



WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTE: A NOTE statement is used to notify people of installation, operation, programming, or maintenance information that is important, but not hazard-related.

Wheels

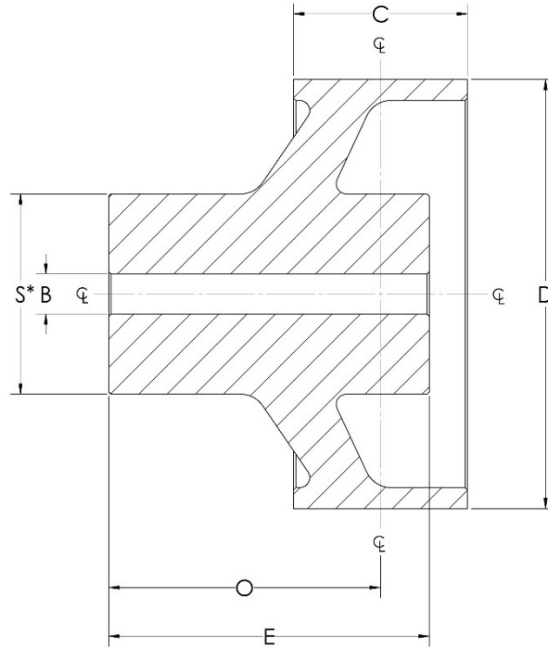
Materials

All Magnetek wheels are manufactured from 65-45-12 ductile iron, with a minimum tensile strength of 65 ksi, a minimum yield strength of 45 ksi, a Brinell hardness of 131-220, and 12% elongation.

Angled Brake Wheel (ABW)

Applications

The ABW is a time-saving AIST-compliant drop-in wheel, best suited for the rugged environment of overhead crane service in the steel industry.



$$*S = B \times (8/5)$$

Figure 1: Angled Brake Wheel (ABW) Dimensions

Table 1: ABW Dimensions

OD (D)	OD WIDTH (C)	BORE (B)		OFFSET (O)		HUB LENGTH (E)		HUB DIAMETER (S)	WEIGHT (LBS)	WK ² (LB-FT ²)	MAX RPM	HEAT DISSIPATION (FT. LB/HOUR)
		MIN	MAX	MIN	MAX	MIN	MAX					
5 (1)	2.75	0.50	1.88	1.88	3.00	2.45	3.57	3.13	16	0.32	12,000	1,000,000
8	3.25	0.75	2.13	2.62	5.09	1.98	6.00	3.75	32	1.34	5,000	1,800,000
10	3.75	0.75	2.88	2.89	4.83	2.05	5.00	4.75	47	3.51	4,000	2,500,000
13	5.75	0.88	4.13	3.24	6.28	1.89	7.50	6.75	115	14.00	3,300	4,200,000
16	6.75	1.00	4.13	4.84	6.54	2.77	7.26	6.75	160	35.00	2,600	6,000,000
19	8.75	1.00	4.38	5.62	7.07	3.19	6.25	7.00	220	74.00	2,300	8,500,000
23	11.25	1.00	5.75	4.47	9.07	2.59	9.28	9.50	333	131.00	1,900	13,000,000
30	14.25	2.00	8.00	9.76	12.98	5.12	13.10	13.50	1,046	755.00	1,600	21,000,000

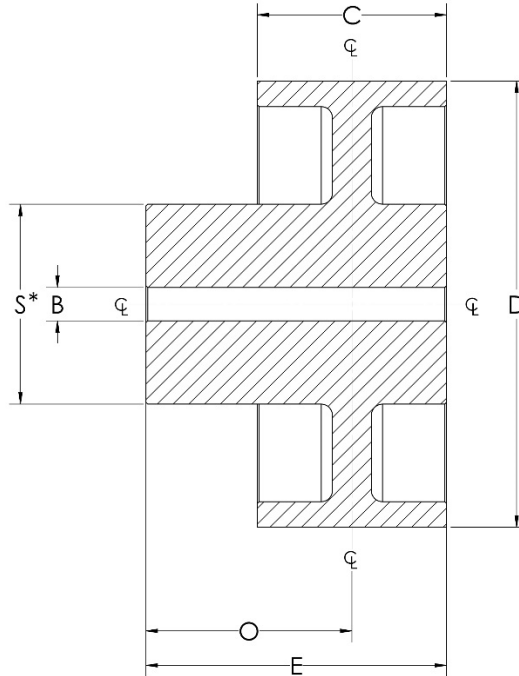
(1) NOT AISE - NEMA DOES NOT DEFINE A 5" BRAKE.

ALL DIMENSIONS ARE IN INCHES

Offset Brake Wheel (OBW)

Applications

The OBW is a general all-purpose wheel, providing even heat distribution for all applications.



$$*S = B \times (8/5)$$

Figure 2: Offset Brake Wheel (OBW) Dimensions

Table 2: OBW Dimensions

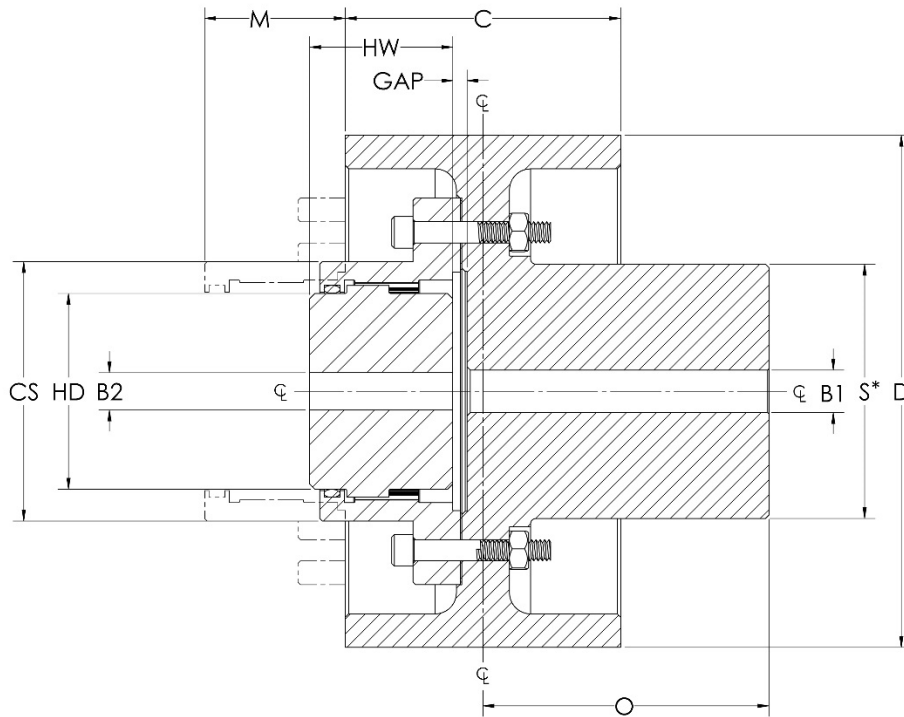
OD(D)	OD WIDTH (C)	BORE (B)		OFFSET(O)		HUB LENGTH (E)		HUB DIAMETER (S)	WEIGHT (LBS)	WK ² (LB-FT ²)	MAX RPM	HEAT DISSIPATION (FT. LB/HOUR)
		MIN	MAX	MIN	MAX	MIN	MAX	MAX				
4	2.25	0.38	1.88	1.38	2.63	3.63	4.88	3.00	10	0.12	10,000	810,000
6	3.25	0.50	1.88	0.62	3.40	1.10	5.03	3.06	16	0.46	9,000	1,400,000
8	4.25	0.75	2.63	0.63	4.44	1.26	6.57	4.25	41	1.95	8,000	2,000,000
10	4.25	0.75	2.63	0.69	4.63	1.38	6.76	4.50	59	4.44	6,000	2,600,000
12	5.25	0.75	3.13	0.89	5.63	1.78	8.63	5.13	84	8.85	5,000	3,600,000
13	5.75	0.75	3.63	0.83	5.50	1.66	8.38	5.85	114	14.00	4,500	4,100,000
15	6.75	1.00	5.00	1.00	6.25	2.00	9.63	8.00	196	30.00	4,000	5,400,000
16	6.75	1.00	5.00	1.13	6.72	2.26	10.10	8.00	219	39.00	3,500	5,800,000
19	8.75	2.00	5.63	1.50	8.38	3.00	13.25	9.00	370	96.00	3,000	8,400,000
23	11.25	2.00	6.25	1.63	10.00	3.26	15.63	10.00	584	223.00	2,500	12,000,000
30	14.25	2.50	8.38	1.63	11.60	3.26	18.73	13.50	1,176	731.00	2,000	21,000,000

ALL DIMENSIONS ARE IN INCHES

Coupling Brake Wheel (CBW)

Applications

The CBW is best suited for environments where space is limited. The CBW also eliminates the need for double shaft extensions on motors and gearboxes.



$$*S = B \times (8/5)$$

Figure 3: Coupling Brake Wheel (CBW) Dimensions

Table 3: CBW Dimensions

OD (D)	OD WIDTH (C)	BORE (B1)		OFFSET(O)		HUB DIAMETER (HD)	HUB WIDTH (HW)	BORE (B2)		COUPLING HUB DIA. (CS)	GAP	MINIMUM CLEARANCE FOR INSTALLATION (M)	HUB DIAMETER (S) MAX	WEIGHT (LBS)	WK ² (LB-FT ²)	MAX RPM
		MIN	MAX	MIN	MAX			MIN	MAX							
6	3.25	0.50	1.88	0.62	3.40	2.31	1.69	0.44	1.625	3.06	0.16	1.66	3.00	19	0.51	9,000
8	4.25	0.75	2.63	0.63	4.44	3.00	1.94	0.69	2.125	3.97	0.16	1.88	4.11	39	1.66	8,000
10	4.25	0.75	2.63	0.69	4.63	3.00	1.94	0.69	2.125	3.97	0.16	1.88	4.11	49	3.43	6,000
12	5.25	0.75	3.13	0.89	5.63	4.00	2.44	0.94	2.75	4.86	0.16	2.38	4.84	86	7.04	5,000
13	5.75	0.75	3.63	0.83	5.50	4.00	2.44	0.94	2.75	4.86	0.16	2.38	4.96	92	12.02	4,500
15	6.75	1.00	5.00	1.00	6.25	4.63	3.03	1.44	3.25	5.84	0.19	2.88	6.10	150	25.96	4,000
16	6.75	1.00	5.00	1.13	6.72	5.63	3.59	1.44	4.00	6.84	0.19	3.31	6.99	194	35.70	3,500
19	8.75	2.00	5.63	1.50	8.38	6.50	4.19	1.81	4.625	7.91	0.22	3.81	8.16	327	86.43	3,000
23	11.25	2.00	6.25	1.63	10.00	7.50	4.75	2.44	5.375	9.25	0.31	4.25	9.66	549	22.97	2,500
30	14.25	2.50	8.38	1.63	11.60	9.50	6.03	3	6.50	11.56	0.34	5.50	11.98	1,028	683.34	2,000

ALL DIMENSIONS ARE IN INCHES

Discs

Materials

All Magnetek discs are manufactured from 1020 AISI steel, with an ultimate tensile strength of 60.9 ksi, a tensile strength yield of 50.8 ksi, a Brinell hardness of 121, and 15% elongation.

Applications

The discs are best suited for hard-wear surfaces, providing longer friction pad life and simple friction pad changes.

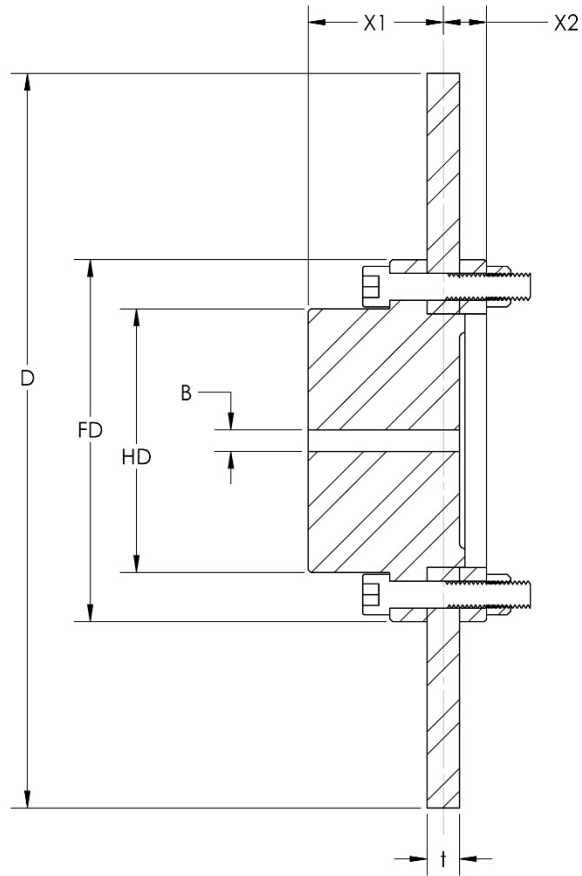


Figure 4: Disc Dimensions

Table 4: Disc Dimensions

BRAKE TYPE	MAX DIAMETER (D)	THICKNESS (t)	HUB DIMAETER (HD)	FLANGE DIAMETER (FD)	BORE (B)		X1	X2
					MIN	MAX		
DT1 (ED23)	16	0.50	3.06	4.56	0.00	2.13	1.73	0.58
DT2 (ED23)	32	0.75	3.97	6.00	0.00	2.81	2.00	0.78
DT2 (ED30)	29	0.75	3.97	6.00	0.00	2.81	2.00	0.78
	32	0.75	4.86	7.00	0.00	3.50	2.47	0.78
DT2 (ED50)	28	0.75	4.86	7.00	0.00	3.50	2.47	0.78
	32	0.75	5.84	8.38	0.00	4.25	3.09	0.91
DT2 (ED80)	32	0.75	5.84	8.38	0.00	4.25	3.09	0.91
DT3 (ED30)	28	1.18	3.97	6.00	0.00	2.81	2.00	0.78
	39	1.18	4.86	7.00	0.00	3.50	2.47	0.78
DT3 (ED50)	28	1.18	4.86	7.00	0.00	3.50	2.47	0.78
	39	1.18	5.84	8.38	0.00	4.25	3.09	0.91
DT3 (ED80)	31	1.18	5.84	8.38	0.00	4.25	3.09	0.91
	39	1.18	6.84	9.44	0.00	4.88	3.62	0.91
DT3 (ED121)	34	1.18	6.84	9.44	0.00	4.88	3.62	0.91
	39	1.18	7.91	11.00	0.00	5.63	4.22	1.16
DT5 (ED121)	33	1.18	6.84	9.44	0.00	4.88	3.62	0.91
	50	1.18	7.91	11.00	0.00	5.63	4.22	1.16
DT5 (ED201)	33	1.18	7.91	11.00	0.00	5.63	4.22	1.16
	48	1.18	9.25	12.50	0.00	6.50	4.78	1.16
	50	1.18	10.38	13.63	0.00	7.63	5.37	1.16
DT5 (ED301)	34	1.18	9.25	12.50	0.00	6.50	4.78	1.16
	47	1.18	10.38	13.63	0.00	7.63	5.37	1.16
	50	1.18	11.56	15.31	4.00	8.75	6.06	1.53

Couplings

Material

All Magnetek couplings are manufactured from 1045 AISI steel, with an ultimate tensile strength of 84.8 ksi, a tensile strength yield of 73.2 ksi, a Brinell hardness of 170, and an elongation at break of 12%.

Installation

Product Inspection (Component Quantities)

CBW

Once the CBW has been received, inspect the wheel to make sure the correct amount of hubs, sleeves, etc. were shipped with the product. Use Table 5 to verify how many parts were received, based on the diameter of the brake wheel.

Table 5: CBW Inspection Chart

WHEEL DIAMETER (in)	HUBS	SLEEVES	O-RINGS	GASKETS	BOLTS / LOCK NUTS
5	1	1	1	1	6
6	1	1	1	1	6
8	1	1	1	1	8
	1	1	1	1	8
10	1	1	1	1	8
	1	1	1	1	8
	1	1	1	1	6
12	1	1	1	1	6
13	1	1	1	1	6
	1	1	1	1	6
15	1	1	1	1	6
16	1	1	1	1	8
	1	1	1	1	8
19	1	1	1	1	8
	1	1	1	1	10
23	1	1	1	1	8
30	1	1	1	1	8

Instructions

ABW and OBW

Taper Bore

For lock nut brake wheel mounting:

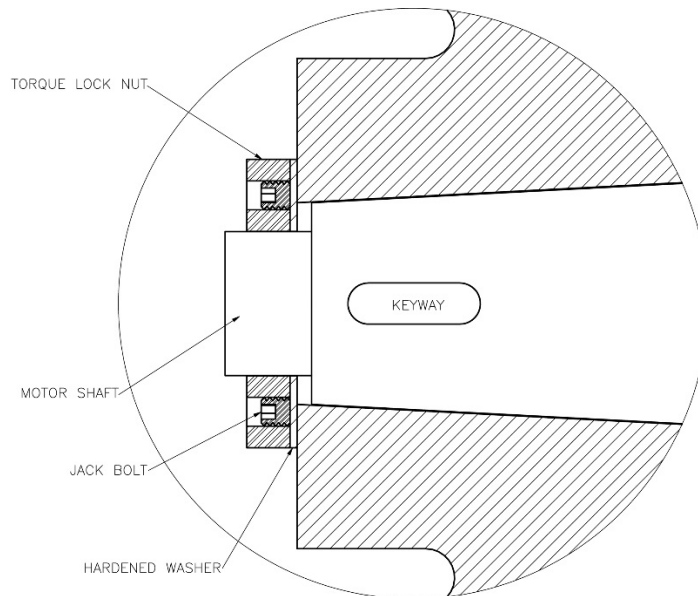


Figure 5: Lock Nut Brake Wheel Mounting

Read the rated torque value to be applied to the jack bolts, which is stamped on the side of the lock nut. Spin the lock nut onto the shaft and hand tighten it only. If the brake is not released, manually release it before proceeding. Tighten all the jack bolts to 25% of their torque value in a crisscross pattern. Once they have all been tightened to 25%, go back and tighten the jack bolts to 100% of their rated torque value in a crisscross pattern.

For **lock washer** brake wheel mounting:

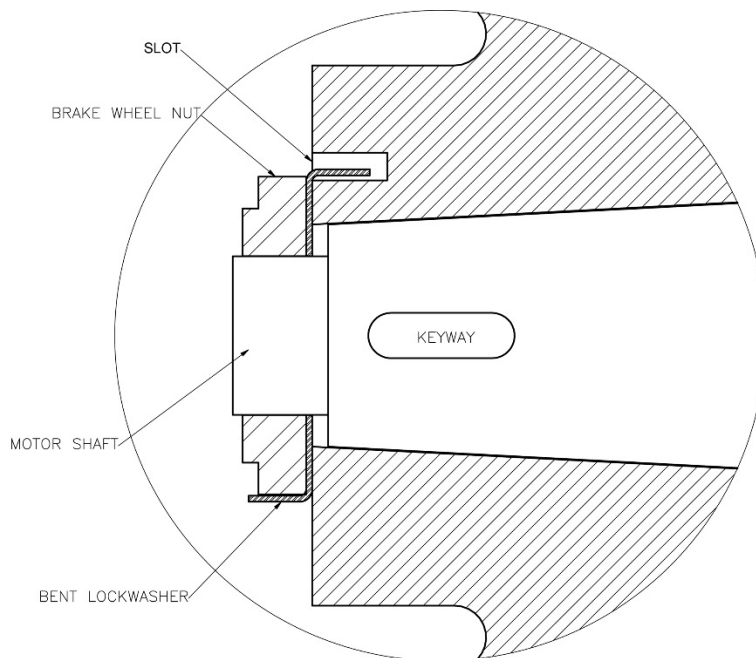


Figure 6: Lock Washer Brake Wheel Mounting

Install the brake wheel onto the motor shaft. Make sure that the brake is fully seated onto the shaft, and that the shaft key is installed.

Next, install the bent lock washer onto the motor shaft, making sure that the tab on the lock washer is inserted into the slot on the brake wheel.

Then, install the brake wheel nut onto the motor shaft, with the shoulder on the nut facing away from the brake wheel. It is required that that shoulder on the brake wheel nut faces away from the brake wheel itself.

Tighten the brake wheel nut against the brake wheel and bent lock washer.

Bend the bent lock washer against the flat on the nut, which is approximately 180° opposite the slot in the brake wheel.

Straight Bore Wheels with Interference Fit

The standard straight bore Magnetek wheels come with a FN2 fit and a Keyway made to ANSI B17.1-1967.

Accurately measure the bore and shaft diameters to ensure a proper fit, and then install the key(s) into the shaft. Heat the hub (via an oven) until the bore is significantly larger than the shaft. A temperature of 350°F (135°C) is usually sufficient; do NOT exceed 400°F (205°C).

Once the hub is sufficiently expanded, quickly install it onto the shaft to the desired axial position.

NOTE: Setting a pre-axial stopping device can help ensure proper placement of the hub.

CBW

Apply a generous amount of coupling grease around the gear teeth on one hub, and the gear teeth inside of the mating sleeve, and then carefully slide the sleeve over the hub. Maintain support for the sleeve to protect the O-Ring seal, and ensure the sleeve does not impact against the hub and cause any damage. The gear teeth in the sleeve should mesh with the gear teeth on the hub. Slide the sleeve over the hub, until the hub protrudes through the O-Ring seal. The teeth and the seal should now support the weight of the sleeve.

Before sliding the wheel and sleeve together, remove the flange gasket from the accessory kit and position the gasket between them. Slide two or more of the bolts from the accessory kit through the top bolt holes to hold the gasket in place.

Slide the wheel and sleeve together once the gasket is situated between them, making sure not to crimp or damage the gasket. Then insert the remainder of the bolts from the accessory kit. The grease fitting holes should be 180° apart. Insert the remainder of the bolts and hand tighten the nuts on each bolt, making sure that the nuts are tightened in a star or crisscrossed pattern. Again, be careful not to crimp or damaged the gasket while tightening the nuts.

Next, use a calibrated torque wrench to finish tightening the nuts and bolts, following a star or crisscrossed pattern, until each bolt has been tightened to the specified torque value.

Insert a grease fitting into one of the grease fitting ports, and leave the second hold unplugged. Rotate the coupling until the grease fittings are horizontal. Inject coupling grease through the fitting until the recommended amount has been loaded into the coupling.

Table 6: Recommended Coupling Grease Volumes (based on size)

Size		F 1	F 1.5	F 2	F 2.5	F 3	F 3.5	F 4	F 4.5	F 5
Lube Capacity	Weight	1 oz	2 oz	3 oz	5 oz	8 oz	10 oz	1.0 lb	1.8 lb	2.3 lb
Size		1010G	1015G	1020G	1025G	1030G	1035G	1040G	1045G	1050G
Lube Capacity	Weight	1.44 oz	2.56 oz	4 oz	8 oz	12.8 oz	1.2 lb	2.0 lb	2.3 lb	3.9 lb

NOTE: Use only coupling grease when filling the grease fitting(s).

Place the grease plugs in both fitting holes prior to moving the coupling into service.

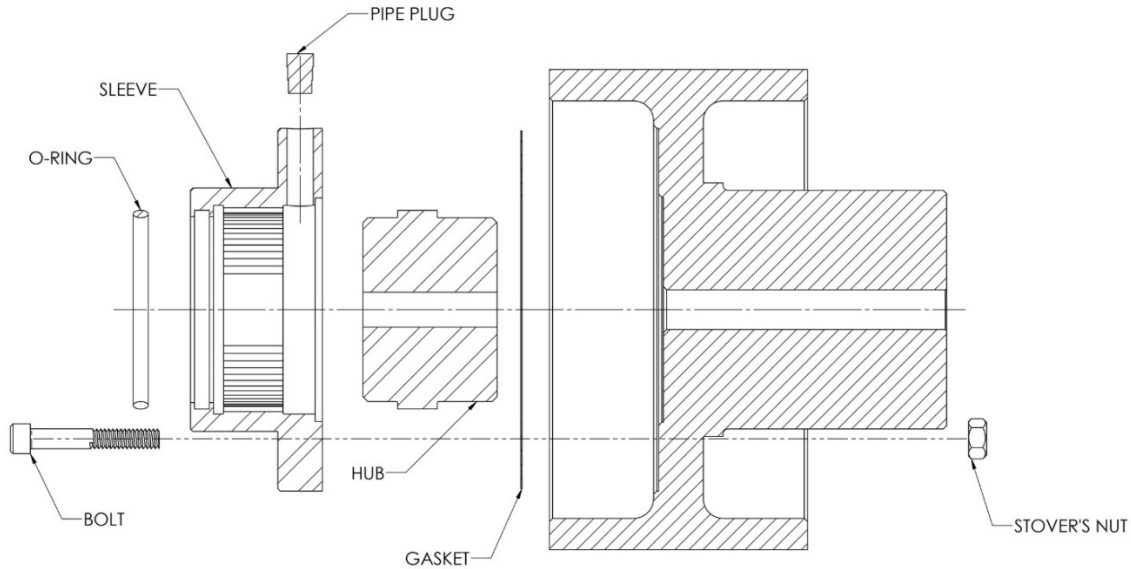


Figure 7: Exploded View of Wheel Coupling

Operational Tests

The wheel run-out must be within in the allowable tolerance (see Table 7). Any unnecessary lining drag will result in excessive heat in the wheel, as well as lining deterioration.

At all speeds, verify that the linings are clear of the wheel. Take steps to correct wheel run-out, imbalance, or the effects of operating near critical speed.

If necessary, check low speed brake wheel run-out as follows:

Using a run-out gauge, verify that the radial run-out does not exceed the run-out allowance per inch of the brake wheel diameter (refer to Table 7 for brake wheel run-out allowance). Lifting the brake wheel with a suitable lever while observing the dial gauge can also check bearing play.

Table 7: Run-Out Allowances (based on diameter)

DIAMETER	RUN-OUT (in)
4	0.004
5	0.005
6	0.006
8	0.008
10	0.010
12	0.012
13	0.013
15	0.015
16	0.016
19	0.019
23	0.023
30	0.030

Maintenance

Inspection

Maintenance and inspection periods depend on operating conditions. High duty cycle applications require more frequent inspections than brakes operating on low duty cycle applications. Magnetek recommends a general inspection every 100 operating hours or every month at minimum.

Check the brake wheel for unusual scoring, signs of over-heating, cracking, or wear. Replace any damaged, cracked, or excessively worn brake wheels by following the procedure under "Replacement Parts."

Check wheel run-out at all speeds (see Operational Tests for details).

Replacement

Magnetek recommends replacement at the first sign of heat spots, cracking, and scaling. Always quote the Magnetek serial number when ordering a replacement wheel.

Storage

The brake wheel(s) can be stored indoors indefinitely, provided it is stored in a dry location. Outdoor storage is possible for a reasonable time if adequately protected from moisture and a corrosive atmosphere.

Always protect the brake wheel(s) from direct exposure from the elements. Covering the wheel(s) with plastic sheeting is unacceptable unless provisions are made to prevent condensation under the plastic.

Rust may form on the surface of the brake wheel during storage, although this is normally not a problem with ductile iron wheels. If rust does form on the surface of the brake wheel, it is not necessary to clean the wheel before placing it into service – the first few brake applications should polish the wheel.

Steel wheels may form scale when corroded, and the braking surface may have to be re-machined to remove the scale (see Table 8 for machining limits). Dynamic balance may be affected.

Table 8: Machining Limits

DIAMETER	MINIMUM WHEEL DIAMETER
4	3.96
5	4.96
6	5.94
8	7.94
10	9.92
12	11.90
13	12.90
15	14.90
16	15.87
19	18.87
23	22.87
30	29.87