



HEB250 High Efficiency Brake

Installation, Operation and Maintenance



EN

MI 850A346 1 B

HEB250 User/Installation Manual

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These brake devices must not be installed or used in a machine or system which does not comply with the machinery directive 2006/42/EC.

These brake devices were designed and manufactured to be installed as Partly Completed Machinery into a machine or partly completed machine.

The instructions must be read and used by all persons who have the responsibility of installing and maintaining these brake devices.

These instructions must be retained and incorporated in the technical documentation for the machine or partly completed machinery into which the brake device is installed.

CE Marking:

Only the 2006/42/EC Machinery directive applies to these devices and they are not marked with the CE sign.

Theory of Operation:

Supplied pneumatic pressure acts on a pneumatic seal-piston assembly, which in turn pushes the brake pad against the rotor to cause frictional torque on the rotor. Torque supplied to the rotor is transmitted to a roll of material and acts to create tension in the web being unwound on the roll.

Introduction:

HEB pneumatic brake has a 250 mm [10 in] diameter rotor. Caliper configurations range from 1 to 6 calipers. Brake pads come in 3 different coefficients of friction; L (low), M (medium), and H (high). Rotor design dissipates heat equally in either direction of rotation (i.e. clockwise or counterclockwise) simplifying sizing and installation requirements. The brake also features an anti-squeal design using grooved pads, holes in the rotor face, and a damper situated between the piston and brake pad. Brake pads feature a snap-in design for easy pad replacement. An optional cooling fan is available. For measuring roll RPM a proximity sensor measuring 1 pulse per revolution is also available. The brake uses a precision machined bore and keyway for mounting to the shaft of a machine. Special bore diameters are available as an option.

Model Number Key

The model number and serial numbers are shown on the top of brakes without fan shrouds, and on the side of the shroud for brakes with a fan shroud.

The model number consists of the base model "HEB250" followed by 6 digits specifying the options and an additional 2 digits for specials when applicable.

Format: HEB250-A-B-C-D-EE-FF

A	# of Calipers	B	Friction Coefficient	C	Fan	D	Proximity Sensor (1)	EE	Rotor Bores (2)
1	1 Caliper	L	Low = 0.12	0	No Fan	0	No Proximity Sensor	00	10mm (pilot hole)
2	2 Calipers	M	Med = 0.41	F	Fan	P	Proximity Sensor	10	28 mm
3	3 Calipers	H	High = 0.51					17	35 mm
4	4 Calipers							32	50 mm
5	5 Calipers							42	60 mm
6	6 Calipers							47	1.000 in
								53	1.375 in (1-3/8 in)

FF	Specials (3)
XX	Other bore diameters, etc.

- (1) If a proximity sensor is selected, then a fan must be selected, and the maximum number of calipers is 5.
- (2) Listed rotor bores are standard. See Table 1 for complete list of rotors bore diameters.
- (3) Blank if standard.

Example model number:

HEB250-4-M-F-P-10 is an HEB250 with (4) ea calipers, “medium” coefficient of friction brake pads, with a fan, with a proximity sensor, and a rotor with a 28mm bore diameter.

Table 1. Part number codes for bore diameter and rotor set screw tightening torques (Highlighted Bores are Standard)						
Part Code	Bore Diameter	Bore Units	Keyway	Keyway Units	Set Screws	Set Screw Torque Nm [lb-in]
00	10	mm	Pilot Hole		N/A	N/A
01	19	mm	6 x 6	mm	M6 x 1.0	8 [71]
02	20	mm	6 x 6	mm		
03	21	mm	6 x 6	mm		
04	22	mm	6 x 6	mm		
05	23	mm	8 x 7	mm	M8 x 1.25	18 [159]
06	24	mm	8 x 7	mm		
07	25	mm	8 x 7	mm		
08	26	mm	8 x 7	mm		
09	27	mm	8 x 7	mm		
10	28	mm	8 x 7	mm		
11	29	mm	8 x 7	mm		
12	30	mm	8 x 7	mm		
13	31	mm	10 x 8	mm	M10 x 1.5	35 [310]
14	32	mm	10 x 8	mm		
15	33	mm	10 x 8	mm		
16	34	mm	10 x 8	mm		
17	35	mm	10 x 8	mm		
18	36	mm	10 x 8	mm		
19	37	mm	10 x 8	mm		
20	38	mm	10 x 8	mm		
21	39	mm	12 x 8	mm	M12 x 1.75	64 [566]
22	40	mm	12 x 8	mm		
23	41	mm	12 x 8	mm		
24	42	mm	12 x 8	mm		
25	43	mm	12 x 8	mm		
26	44	mm	12 x 8	mm		
27	45	mm	14 x 9	mm		
28	46	mm	14 x 9	mm		
29	47	mm	14 x 9	mm		
30	48	mm	14 x 9	mm		
31	49	mm	14 x 9	mm		
32	50	mm	14 x 9	mm		
33	51	mm	16 x 10	mm		
34	52	mm	16 x 10	mm		
35	53	mm	16 x 10	mm		
36	54	mm	16 x 10	mm		
37	55	mm	16 x 10	mm		
38	56	mm	16 x 10	mm		
39	57	mm	16 x 10	mm		
40	58	mm	16 x 10	mm		
41	59	mm	18 x 11	mm		
42	60	mm	18 x 11	mm		

Table 1. Part number codes for bore diameter and rotor set screw tightening torques (Highlighted Bores are Standard)							
Part Code	Bore Diameter		Bore Units	Keyway	Keyway Units	Set Screws	Set Screw Torque Nm [lb-in]
43	3/4	0.7500	inch	3/16 x 3/16	inch	1/4-20 UNC	10 [90]
44	13/16	0.8125	inch	3/16 x 3/16	inch		
45	7/8	0.8750	inch	3/16 x 3/16	inch		
46	15/16	0.9375	inch	1/4 x 1/4	inch	5/16-18 UNC	19 [170]
47	1	1.0000	inch	1/4 x 1/4	inch		
48	1-1/16	1.0625	inch	1/4 x 1/4	inch		
49	1-1/8	1.1250	inch	1/4 x 1/4	inch		
50	1-3/16	1.1875	inch	1/4 x 1/4	inch		
51	1-1/4	1.2500	inch	1/4 x 1/4	inch		
52	1-5/16	1.3125	inch	5/16 x 5/16	inch	3/8-16 UNC	34 [300]
53	1-3/8	1.3750	inch	5/16 x 5/16	inch		
54	1-7/16	1.4375	inch	3/8 x 3/8	inch		
55	1-1/2	1.5000	inch	3/8 x 3/8	inch		
56	1-9/16	1.5625	inch	3/8 x 3/8	inch		
57	1-5/8	1.6250	inch	3/8 x 3/8	inch		
58	1-1/16	1.6875	inch	3/8 x 3/8	inch		
59	1-3/4	1.7500	inch	3/8 x 3/8	inch	3/8-16 UNC	34 [300]
60	1-13/16	1.8125	inch	1/2 x 1/2	inch	1/2-13 UNC	70 [625]
61	1-7/8	1.8750	inch	1/2 x 1/2	inch		
62	1-15/16	1.9375	inch	1/2 x 1/2	inch		
63	2	2.0000	inch	1/2 x 1/2	inch		
64	2-1/16	2.0625	inch	1/2 x 1/2	inch		
65	2-1/8	2.1250	inch	1/2 x 1/2	inch		
66	2-3/16	2.1875	inch	1/2 x 1/2	inch		
67	2-1/4	2.2500	inch	1/2 x 1/2	inch		
68	2-5/16	2.3125	inch	5/8 x 5/8	inch		

Serial Number Key:

Serial number consists of a date code followed by a sequence number. Date is formatted as 2 digits for month, then 2 digits for day, then 2 digits for year followed by a 3-digit number sequence starting at 001 each day.

Example serial number:

021312002 - This brake was produced on Feb. 13, 2012 and it was the second brake made that day.

Available Models:

All combinations of options are available except a proximity sensor without a fan.

A fan shroud is used to mount the fan and the connections for the proximity sensor. Models without a fan or proximity sensor do not have a fan shroud.

For models with a proximity sensor one of the calipers is used to mount the sensor, so the maximum number of calipers with pads is 5.

Caliper Positioning

Illustrations below represent the positioning of “active” calipers in all possible configurations. All unused “active” caliper positions are filled with “dummy” calipers. Views are top views looking at the front calipers.

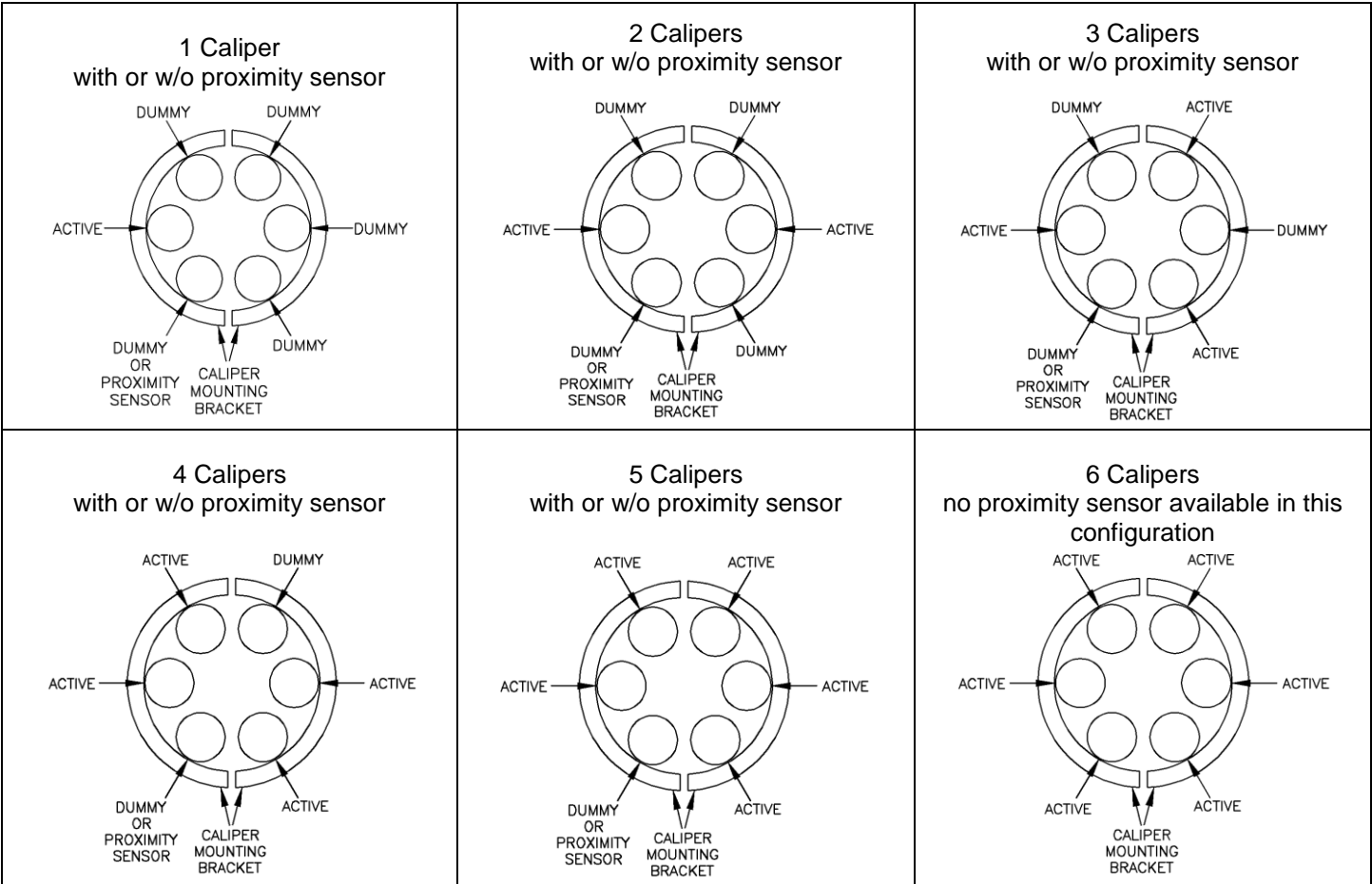


Figure 1. Caliper Positioning

Dimensions:

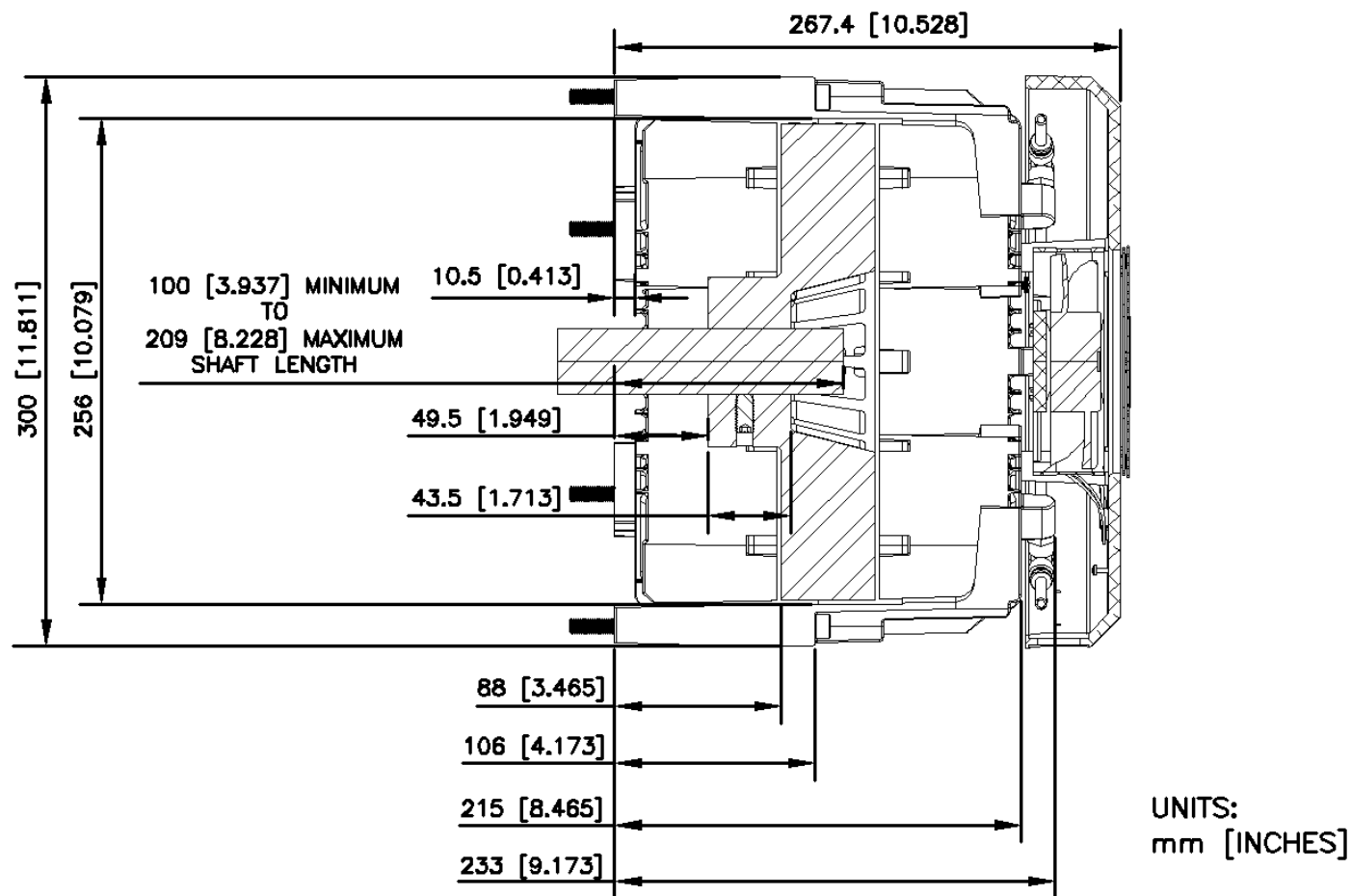


Figure 2. HEB250 Dimensions

Safety Information:

To ensure safe and problem free installation of the pneumatic brake device, the brake must be properly transported and stored, professionally installed and placed in operation. Proper operation and maintenance will ensure a long service life of the device. Only persons who are acquainted with the installation, commissioning, operation and maintenance of the system and who possess the necessary qualifications for their activities may work on the pneumatic brake. Note: The safety information may not be comprehensive.



- The content of these instructions must be read and followed.
- All national, state, and local requirements for installation, accident prevention and environmental protection must be followed.

The safety instructions and symbols described in this section are used to avoid possible dangers for users and to prevent material damage.



SIGNAL WORD

Source of danger and its results.
Avoiding dangers.

The signal word WARNING refers to the danger of moderate to severe bodily injuries or death.

The signal word CAUTION refers to the danger of slight to moderate bodily injuries or material damage.



WARNING/CAUTION – General danger or important note

Reference to general hazards that may result in bodily injuries or damage to device or material.



WARNING/CAUTION – danger due to crushing

Reference to danger of injury caused by crushing.



WARNING/CAUTION – danger due to cutting

Reference to danger of injury caused by cutting.



WARNING/CAUTION – danger due to voltage, electric shock

Reference to danger of injury caused by electric shock due to voltage.



WARNING/CAUTION – danger due to hot surfaces

Reference to risk of injury caused by burning.



WARNING/CAUTION – danger due to flying objects

Reference to risk of injury caused by burning.

Basic Safety Information:

Proper Use:

The HEB brake is intended to produce braking torque proportional to input pneumatic pressure to create web tension in an unwind roll of material.

Intended for indoor operation only.

Improper Use:

Operation outside the technical specifications.

Operation in an Ex-area or intrinsically safe area.

Any other use than the proper use shall be deemed inappropriate.

Installation and commissioning:

- Any brake which is damaged must not be installed or put into operation.
- Only perform installation, maintenance or repair tasks on the brake when the machine has been stopped and is secured from being turned on.
- Only perform installation, maintenance or repair tasks on the brake when there is no electrical power in the system.
- The brake must be securely mounted before being placed in operation.
- Only replacement parts obtained from Fife may be used.
- No modifications may be made to the brake.
- Do not place electrical cables under mechanical strain.
- Do not bring this brake into contact with water or other fluids. Grease or oil on the internal brake parts will cause a loss of torque.

Decommissioning:

- The brake must be disposed of in accordance with all the applicable national, state and local regulations.

Operation:



CAUTION – Burns can result from touching the brake surface during operation.

The brake device converts mechanical motion into heat and the surface of the brake will become hot during operation. Appropriate guards must be installed by the user according to his use of the product.

Maintenance and repair:

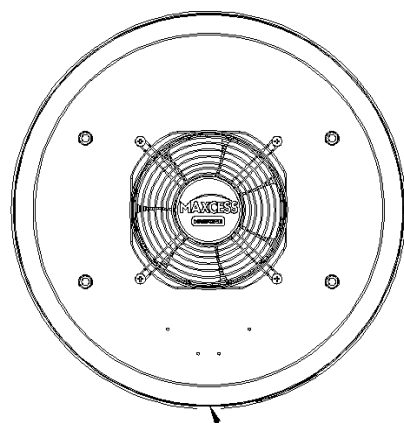


WARNING – Danger of injury from crushing.

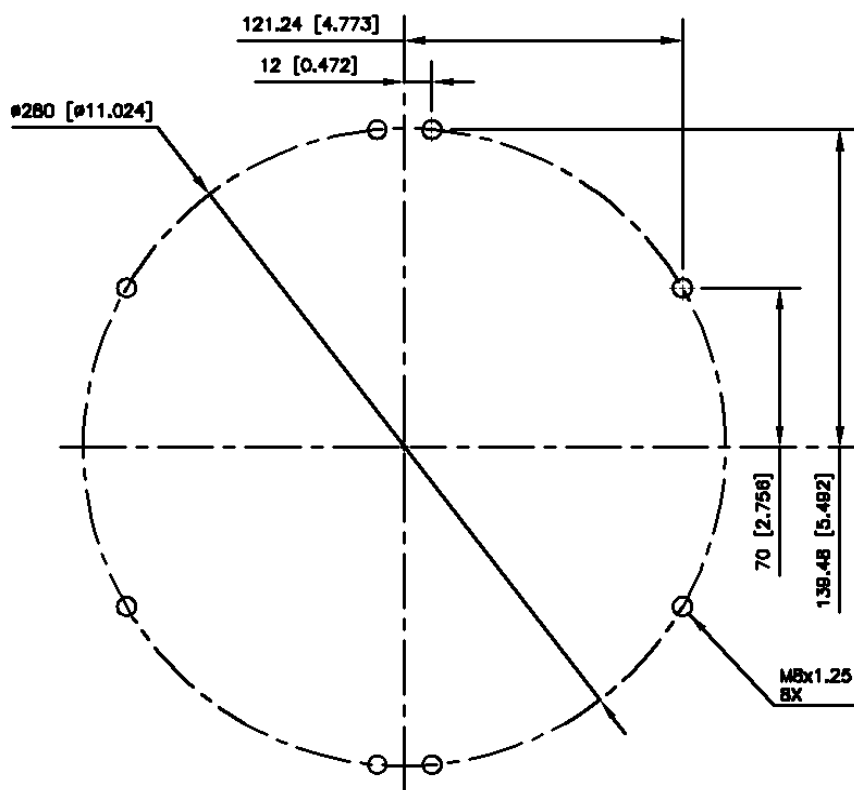
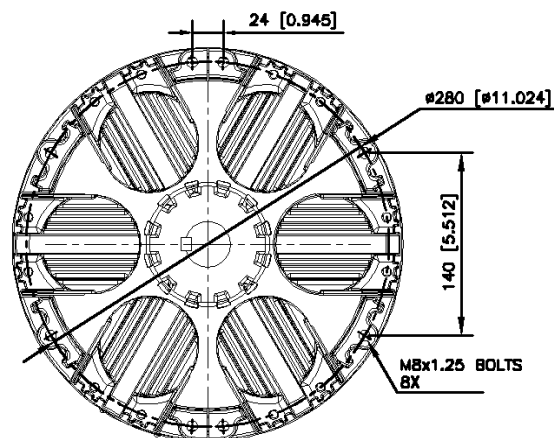
Maintenance and repair tasks on the brake must be performed only when the machine has been stopped and has been secured from being turned on again.

Installation of the brake must be performed only when the machine has been stopped and has been secured from being turned on again.

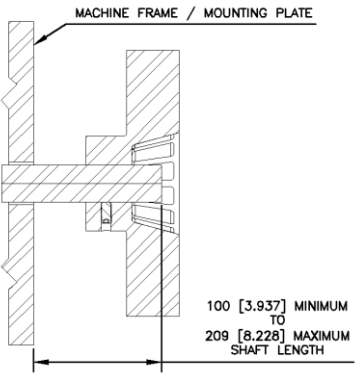
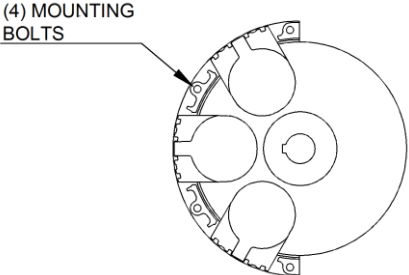
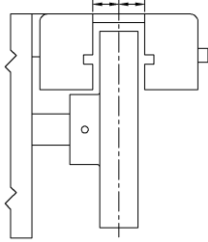
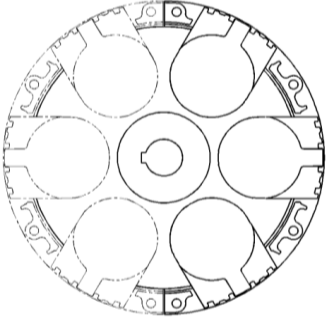
Units: mm [inches]



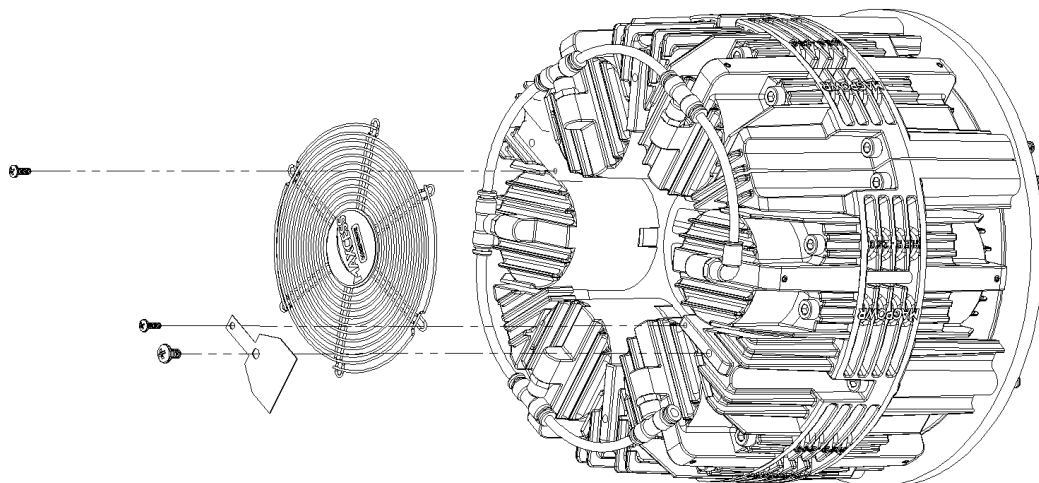
A technical architectural drawing of a building facade. It features a grid of windows with vertical mullions. A central vertical element, possibly a column or a narrow window, runs through the middle. The drawing is a line drawing with no shading.



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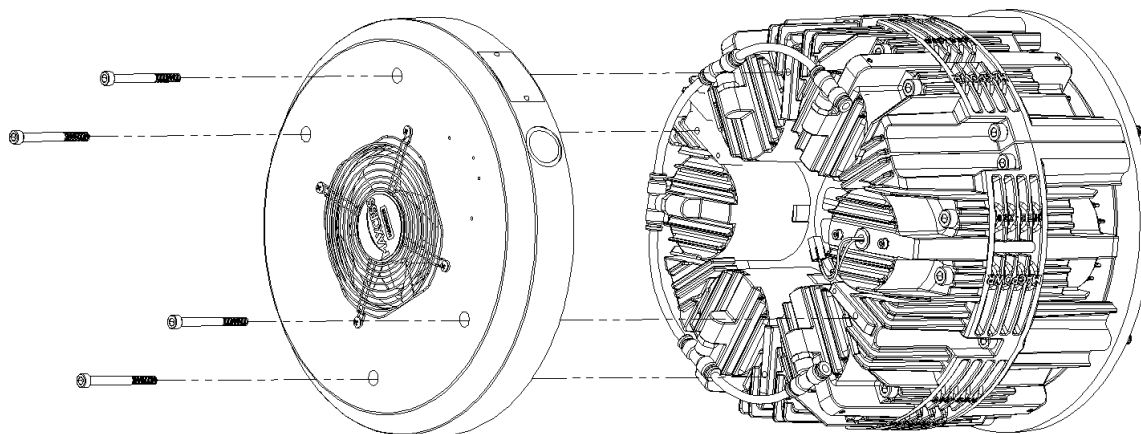
B	Mount the rotor on the shaft without tightening the set screws.	
C	Mount one of the caliper mounting halves (halves are symmetrical, so it does not matter which half) to the machine frame using (4) ea M8x1.25 bolts. Tighten bolts to a torque of 40 Nm [29.5 lb-ft].	
D	Center the rotor between the two brake pads. Use feeler gauges or equivalent to ensure equal distance between the brake pad and rotor on each side. Manually rotate the rotor to verify the rotor does not touch any brake pads during a full rotation.	
E	Secure the rotor by tightening the two set screws to the torque listed in the Table 1. Install rotor set screws using LOCTITE 266 high temperature, high strength threadlocker or equivalent.	
F	Mount the other caliper mounting half to the machine frame using (4) ea M8x1.25 bolts. Tighten bolts to a torque of 40 Nm [29.5 lb-ft].	
G	Install the airlines using 6 mm [0.237 in] outside diameter tubing. Air supply should be clean and dry, and the pressure must not exceed 621 kPa [90 PSI].	

H



For brakes WITHOUT a fan shroud remove the existing (2) ea M4, (1) ea M6 screws, and nameplate on the caliper mounting halves. Install the fan finger guard and the nameplate using the previously removed (2) ea M4, and (1) ea M6 screws as shown in the illustration above.

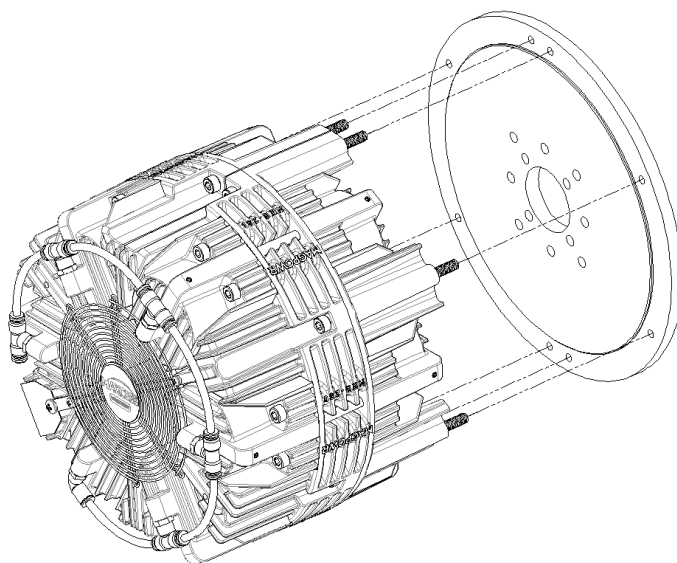
I



For brakes WITH a fan and/or proximity sensor install a 12mm [1/2 inch] conduit fitting in the fan shroud. Route power wires through conduit connector and fan shroud to terminal block on the inside of the fan shroud (see electrical installation section for details). Connect the wires for the proximity sensor to the terminal strip if used (see electrical installation section for details). Position the fan shroud over the center of the HEB250 and connect the proximity sensor connector to the mating connector coming from one of the caliper mounting bracket halves. Mount the fan shroud to the HEB250 by installing (4) ea M6 bolts and tightening to a torque of 8 Nm [6 lb-ft].

How to mount the brake using adapter plate (HEB250BKPLT):

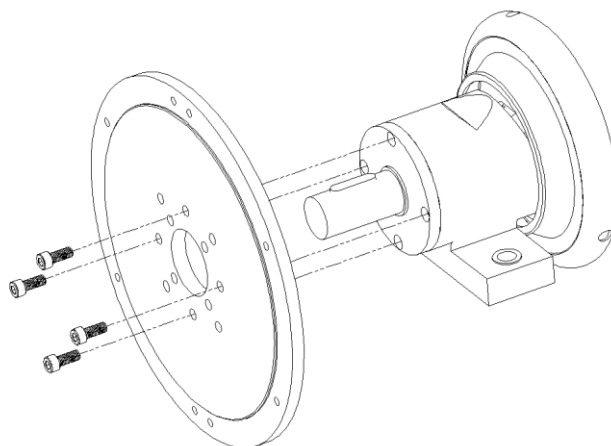
A



Mount adapter plate to existing safety chucks, chucks, bearing block, or machine frame surface using existing bolt hole patterns in adapter plate or attached to customer supplied bracketry or custom weldments. Proceed to step B in the previous section.

How to mount brake using adapter plate to Tidland safety chuck:

A



The HEB250BKPLT adapter plate is designed to fit the lagerdeckel (bearing end plate) for Tidland safety chuck sizes 22-30, 30-40, and 40-50. Stock chucks use M6 bolts to secure the lagerdeckel to the chuck housing. These holes must be re-drilled and tapped to M8 or the M8 version of the aforementioned chucks must be ordered. Remove the existing (4) ea M6 or M8 countersunk bolts from the lagerdeckel and replace with (4) ea M8 socket cap head screws. These screws are used to attach the adapter plate and the bearing end plate to the safety chuck. Tighten to a torque of 40 Nm [29.5 lb-ft]. Proceed to step B in the previous section.

Electrical Installation



WARNING – Death or injury can result from electric shocks.

Installation of the fan shroud must be performed when there is no electrical power in the system.

Never place electrical cables under mechanical strain. Always route wiring in either flexible or rigid conduit.

All wiring must comply with the essential requirements of the appropriate standard(s) and is the responsibility of the installer.

Wiring to the fan shroud must be insulated copper wire with a temperature rating of at least 105°C [221°F]. Wire size should be 0.52 or 0.82 mm² (20 or 18 AWG). Tightening torque for the terminals is 0.4 Nm [3.5 lb-in].

1. Install a 12mm [.500 in] conduit fitting in the fan shroud.
2. Connect the building or machine earth ground to the terminal with the green/yellow wire.
3. Connect a 24 VDC power supply by connecting the positive voltage to the terminal with the red wire and connect the negative voltage to the terminal with the black wire.
4. Connect the wires for the proximity sensor to the terminal strip if used. The terminal strip connector with the white wire is the positive signal from the proximity sensor and the connector with the black wire is the negative for the proximity sensor.
5. Install a pull-up resistor from the proximity sensor signal wire to the +24-volt supply. The resistor should be no more than 10K ohms and no less than 120 ohms. If the RPM monitor or PLC which the proximity sensor signal is connected to already contains an internal pull-up, the external pull-up is not necessary. See proximity sensor specifications.
6. Position the fan shroud over the center of the HEB250 and connect the proximity sensor connector to the mating connector coming from one of the caliper mounting bracket halves.
7. Mount the fan shroud to the HEB250 by installing (4) ea M6 bolts and tightening to a torque of 8 Nm [6 lb-ft].

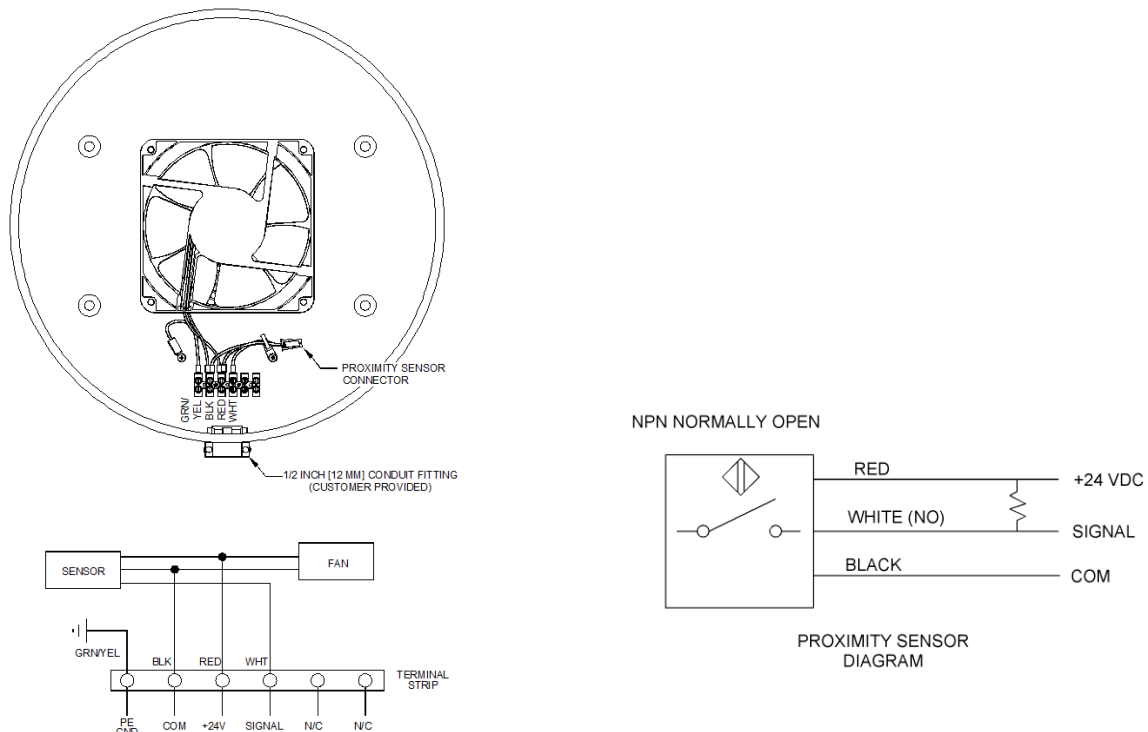


Figure 3. Electrical Wiring

Maintenance:



WARNING – Danger of injury from crushing.

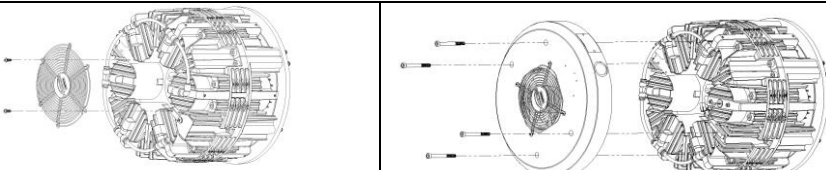
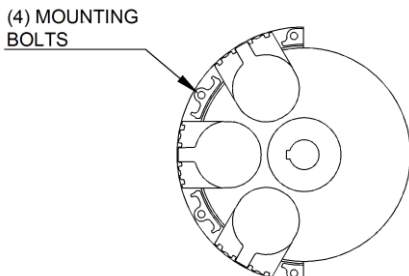
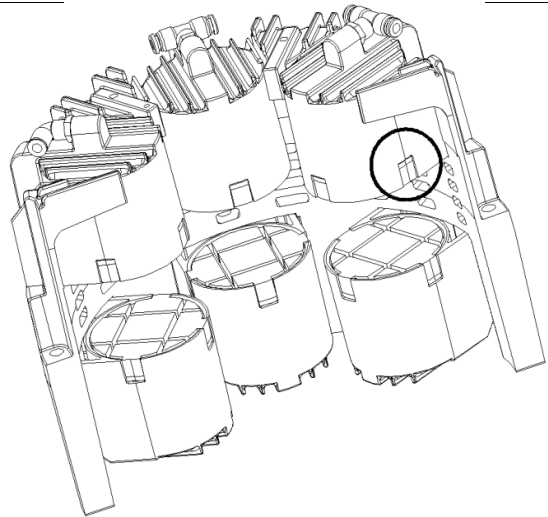
Maintenance and repair tasks on the brake must be performed only when the machine has been stopped and has been secured from being turned on again.

- Daily – Keep the brake assembly free of dust and debris buildup during shift operation.
- As Needed – Keep the rotor free of excessive dust and debris buildup. Use a residue-free brake cleaner such as turpentine, acetone, or *BioBrake™* to wipe down the rotor.
- Fan Replacement – Replace fan every three years or 30,000 hours of brake operation.
- Brake Pads – Calipers assemblies are designed to prevent brake pads from extending so far that the backing plate rubs the rotor. New brake pads measure 15mm [0.591 in] in thickness. Since brake pads will stop extending with 6mm [0.236 in] of overall thickness left (half of this is a metal backing plate) it is recommended to replace brake pads prior to wearing the brake pads down to the 6mm [0.236 in] thickness. Note: brake pads do not contain asbestos.



WARNING – danger to eyes.

Wear eye protection when working with compressed air.

How to replace the brake pads:		
A	For brakes WITHOUT a fan shroud remove the fan finger guard. For brakes WITH a fan shroud remove the fan shroud.	
B	Remove (4) bolts to dismount each caliper mounting half.	
C	Brake pads are clipped onto the piston and are easily removed. Dismount brake pads by prying the brake pad away from the piston until it has become unclipped. To replace with a new brake pad simply line up the tabs of the brake pad with the tabs of the caliper and press until the pad has clipped in place.	
D	Remount caliper mounting halves using (4) each previously removed bolts.	

Replacement Part Kits:

Pad replacement kits. Each kit contains (2) ea pads to fill (1) ea caliper.

Model Number	Description
HEBPKL	HEB pad kit for low friction pads (0.21)
HEBPKM	HEB pad kit for medium friction pads (0.41)
HEBPKH	HEB pad kit for high friction pads (0.51)

Replacement Calipers. Each kit contains a front and back caliper half. (Note: brake pad(s) are NOT included.)
Model Number: HEBCALREPL

Caliper Rebuild kit. Each kit contains seals, bearing strips, and o-rings which will rebuild both the front and back caliper half.

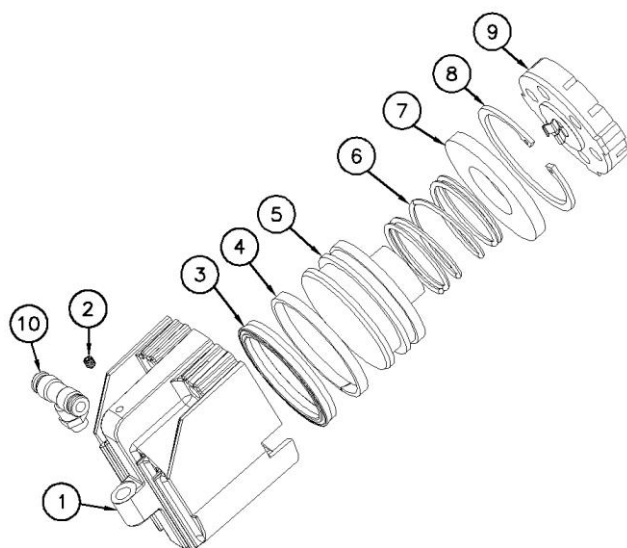
Model Number: RKHEBCAL

Replacement Rotor kit. Add the appropriate 2 digit bore core from table 1 to the end of the model number.

Model Number: HEB250RTR – xx

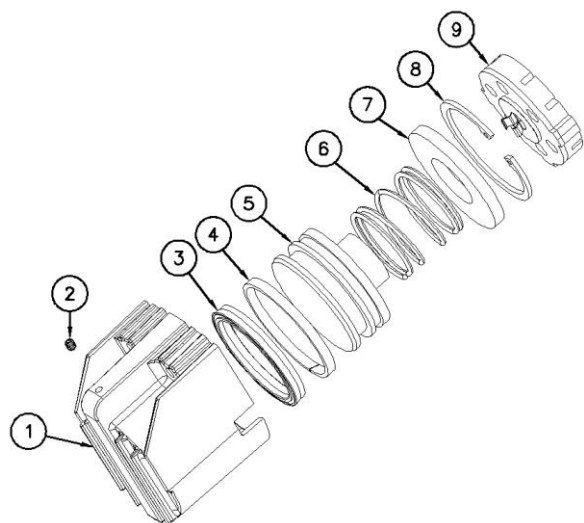
Adapter Plate. HEB250BKPLT

Exploded views of the caliper assemblies:



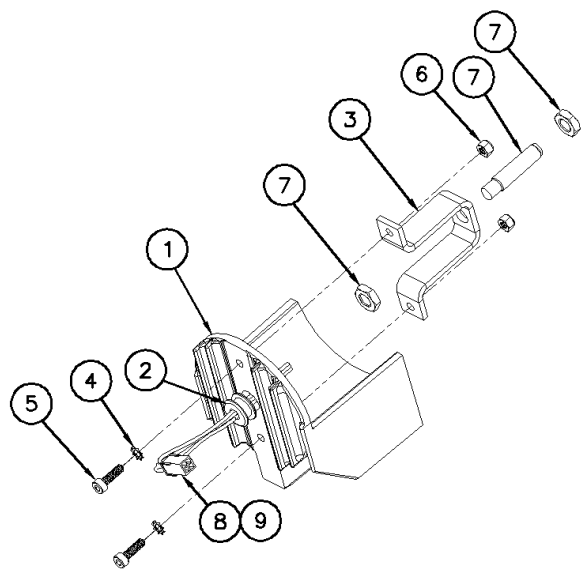
Item	Qty	Description	Part Number
1	1	Front Caliper	712C125-1
2	1	Set Screw	78610-002
3	1	Piston Seal	25A65-1
4	1	Piston Bearing Strip	712C134-1
5	1	Piston	712C127-1
6	1	Compression Spring	5A349-1
7	1	Piston Retaining Plate	712C128-1
8	1	Internal Retaining Ring	28098-059
9	1	Brake Pad Assembly	145C24-X
10	1	Pneumatic Fitting (Tee)	5C344-2
10	1	Pneumatic Fitting (90 Deg)	5C347-2

Figure 4. Front Caliper Assembly Exploded View



Item	Qty	Description	Part Number
1	1	Back Caliper	712C123-1
2	1	Set Screw	78610-002
3	1	Piston Seal	25A65-1
4	1	Piston Bearing Strip	712C134-1
5	1	Piston	712C127-1
6	1	Compression Spring	5A349-1
7	1	Piston Retaining Plate	712C128-1
8	1	Internal Retaining Ring	28098-059
9	1	Brake Pad Assembly	145C24-X

Figure 5. Back Caliper Assembly Exploded View



Item	Qty	Description	Part Number
1	1	Proximity Sensor Caliper	712C130-1
2	1	Grommet	93006-064
3	1	Mounting Bracket	706C43-1
4	2	Lock Washer, M4	27547-004
5	2	Socket Head Cap Screw, M4	27319-005
6	2	Locknut, M4	27608-002
7	1	Proximity Sensor (with Hex Nuts)	32C11-1
8	1	Plug	12C223-4
9	3	Male Crimp Terminal	12B215-1

Figure 6. Proximity Sensor Assembly Exploded View

Troubleshooting:

PROBLEM	POSSIBLE CAUSE	ACTION
No torque or low torque	Airline leaking	Replace air line
	Air fitting leaking	Replace air fitting
	Caliper seal leaking	Order caliper repair kit. RKHEBCAL
	One or more pads worn	Order pad replacement kits. HEBPKL, HEBPKM, or HEBPKH
Fan not running	No power to fan	Check power supply Check wiring for opens
	Fan bearing failed	Replace fan, part number 20C23-1
Proximity Sensor not pulsing	No power to sensor	Check power supply Check wiring for opens
	NPN output needs a pull-up load to +24 volts	Verify connections

Table 1. Troubleshooting

Product Specifications:



WARNING – Do not use the devices outside of their rated specifications.

Temperature Range:

Operating 0°C to +50°C [32°F to 122°F]
Storage -30°C to +80°C [-22°F to 176°F]

Relative Humidity: 5% to 85%

Altitude: 0 to 2000 meters [0 to 6562 feet]

Maximum RPM: 1800 RPM

Maximum Pressure: 621 kPa [90 PSI]

Actuation Pressure: 21 kPa [3 PSI]

Fan:

Voltage: 24 VDC

Current: 1.5 ADC

Proximity Sensor:

Supply Voltage: 24 VDC

Signal Output: NPN Normally Open

Max. Signal Current: 200 mADC

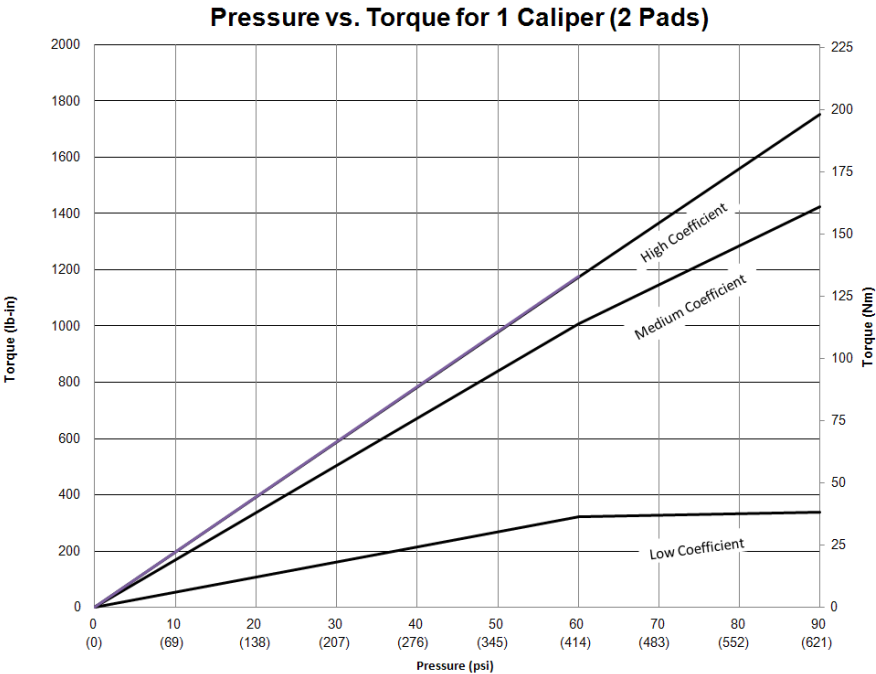
Max. Frequency: 2 kHz

Brake Pads:

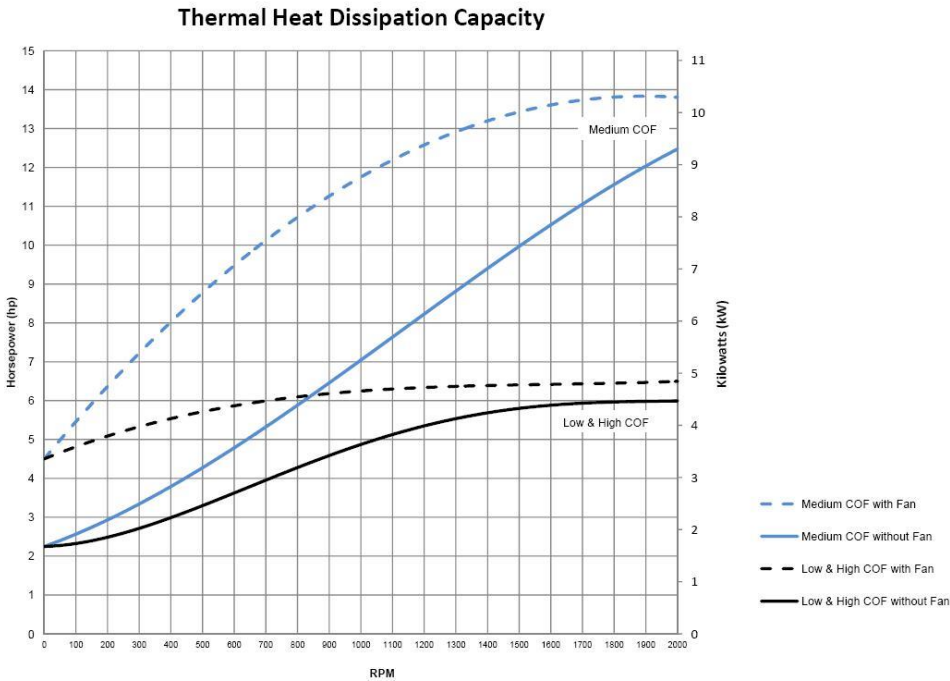
Material: Does not contain asbestos

Pressure vs. Torque:

Number of Calipers	Number of Pads	Torque at 60 psi (414 kPa) lb-in (Nm)			Torque at 90 psi (621 kPa) lb-in (Nm)		
		Coefficient of friction of pad			Coefficient of friction of pad		
		Low (0.12)	Med. (0.41)	High (0.51)	Low (0.12)	Med (0.41)	High (0.51)
1	2	321 (36)	1007 (114)	1174 (133)	338 (38)	1423 (161)	1753 (198)
2	4	641 (72)	2014 (228)	2347 (265)	676 (76)	2847 (322)	3506 (396)
3	6	962 (109)	3021 (341)	3521 (398)	1014 (115)	4270 (482)	5259 (594)
4	8	1282 (145)	4027 (455)	4695 (530)	1352 (153)	5693 (643)	7012 (792)
5	10	1603 (181)	5034 (569)	5868 (663)	1690 (191)	7117 (804)	8765 (990)
6	12	1923 (217)	6041 (683)	7042 (796)	2028 (229)	8540 (965)	10,518 (1,188)



Thermal Heat Dissipation Capacity



Service requests and replacement parts:

To request service or to get replacement parts, contact one of the following addresses:

When ordering replacement parts, please indicate, where possible, part number, drawing number and model description.

Fife Corporation
222 West Memorial Rd.
Oklahoma City, OK, 73114, USA
Phone: 1-405-755-1600
Fax: 1-405-755-8425
Web: www.maxcessintl.com

Fife-Tidland GmbH
Max-Planck-Strasse 8
65779 Kelkheim
Deutschland
Telefon: +49-6195-7002-0
Fax: +49-6195-7002-933
Web: www.maxcess.eu

OR Siemensstrasse 13-15
48683 Ahaus
Deutschland



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