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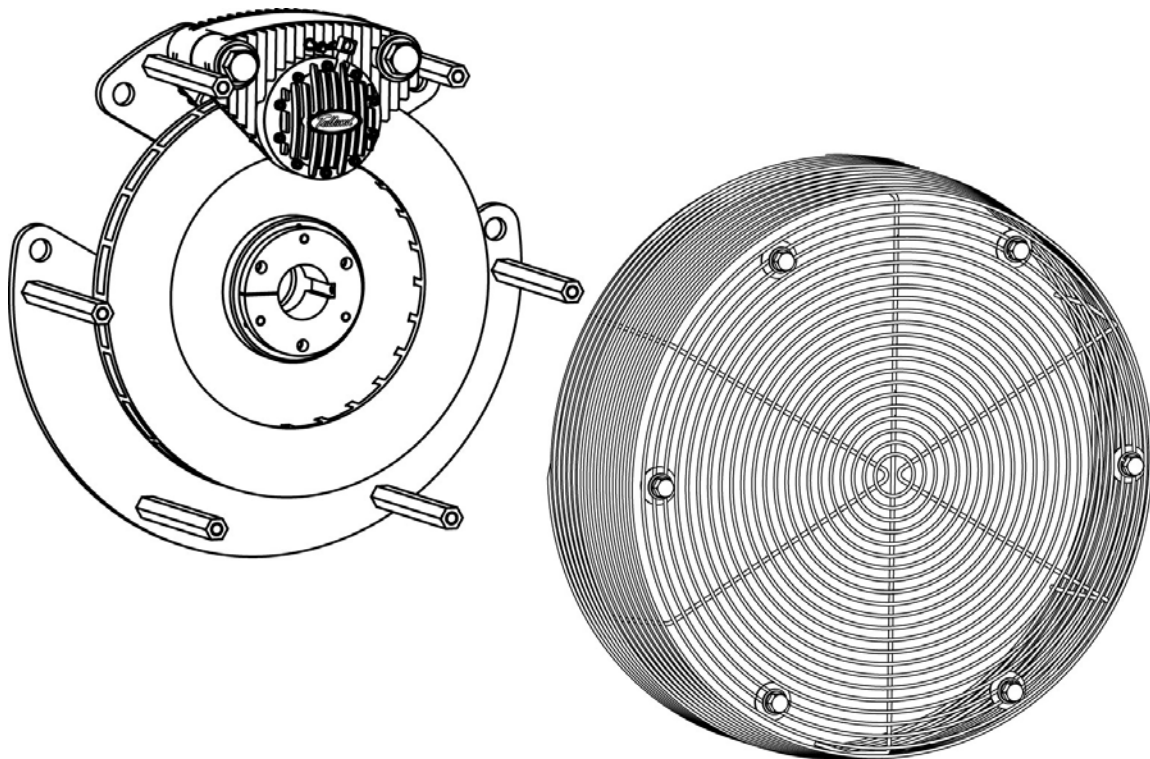
MAGPOWR

PIPE

TIDLAND

Tidland Air Brake

Installation, Operation, and Maintenance



Models 200, 250, 305, 380, 460, 610

TABLE OF CONTENTS

TIDLAND CUSTOMER SERVICE.....	2
RECOMMENDED TOOLS	2
CAUTION.....	2
INSTALLATION	3
Caliper Mounting Plate.....	3
Brake Disc and Q.D. Bushing	4
Torque Specifications	5
To Move the Brake Disc	6
Installing Additional Caliper(s).....	6
Reference Dimension Guideline Chart	7
Installing the Air Lines	8
Installing the Brake Guard.....	9
Removing the Brake Guard	9
OPERATION	10
MAINTENANCE	10
Replacing the Brake Pads.....	10
Replacing the Brake Disc.....	10
Replacing the Brake Diaphragm	11
Assembly Diagram and Parts List.....	12

TIDLAND CUSTOMER SERVICE

- 1-800-426-1000

www.tidland.com

Visit the Tidland Repair and Return Center online to review our return policies
or to submit an electronic Return Material Authorization Request.
www.tidland.com/returns

RECOMMENDED TOOLS

- Torque wrench; socket wrenches; hex key set
- *Loctite*[®] 545 thread sealant (or equivalent)

For more accessories to help with your winding processes, visit www.tidland.com.

CAUTION

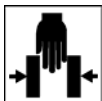
Read and understand warnings and safety symbols.



Wear eye protection when using tools or compressed air.
Brake operation generates dust.



Brake surfaces can be hot.
Wear gloves or allow brake to cool before handling.

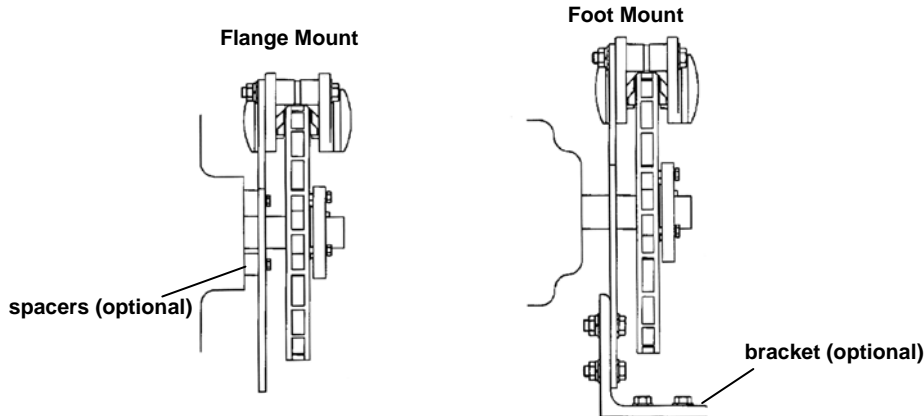


Moving brake parts can pinch or crush.
Keep hands away from brake during operation.
Disconnect power and air before performing maintenance on the brake.

INSTALLATION

Caliper Mounting Plate

1. Determine the caliper mounting plate installation style. The flange mount or the foot mount (examples shown below. Brake guards not shown for clarity).



- a. The flange mounted plate may require spacers to provide clearance for the calipers.
 - b. The foot mounted plate bracket and bracket bolts (and flange mounted plate bolts) must be able to resist maximum brake torque (see individual brake ratings or consult Tidland Customer Service for installation bolt size).
2. Standard caliper mounting plates require drilling holes for installation. Consult Tidland Customer Service for pre-drilled holes in caliper mounting plate.
 3. Install the caliper mounting plate to the machine frame.

Note: The caliper mounting plate must be perpendicular to and centered on the brake shaft.

4. Using a dial indicator, determine the squareness of the caliper mounting plate to the brake shaft. TIR (Total Indicator Runout) of the mounting plate near caliper mounting holes should be within 0.010" (0.25 mm).

Suggestion: Place magnetic V-block base dial indicator on the brake shaft and sweep mounting plate near the caliper mounting holes with dial indicator plunger. Place shims under the mounting plate to attain TIR required.

INSTALLATION

Brake Disc and Q.D. Bushing

The brake disc is secured to the brake shaft with a Q.D. bushing. As the bolts are tightened, note that the Q.D. bushing will remain stationary on the shaft and the brake disc will move toward the Q.D. bushing flange. The brake disc must be located at dimension 'J' (Reference Dimension Chart, page 7) after final adjustments to provide the correct clearance for installation of the new brake pad.

1. Slide the Q.D. bushing onto the shaft with the taper facing toward the caliper mounting plate.

Note: Do not install the key (not supplied) at this time.

2. Position the Q.D. bushing to the reference dimension 'K' (see the Reference Dimension Guideline Chart, page 7) from the caliper mounting plate to the inside of the Q.D. bushing flange.

3. Scribe a mark on the brake shaft next to the outside of the Q.D. bushing flange.

Note: If the Q.D. bushing overhangs the brake shaft, scribe a mark on the inside of the bushing. The overhang must be less than 0.5" (12.7mm).

4. Remove the Q.D. bushing and place the brake disc on the shaft with the larger diameter of the tapered bore away from the caliper mounting plate.

Note: Do not remove the balance clips from brake disc vents. These are weights provided to balance your brake disc. Removal may cause excessive vibration.

Note: Use a residue-free brake cleaner to remove the rust preventive from the brake disc machined surfaces before operation with brake pads.

5. Replace the Q.D. bushing on the shaft with the taper facing toward the brake disc.

6. Align the outside of the Q.D. bushing flange with the scribed mark. Slide the brake disc onto the taper of Q.D. bushing. Make sure to align the holes in Q.D. bushing flange and the brake disc hub.

7. Secure the key at this time.

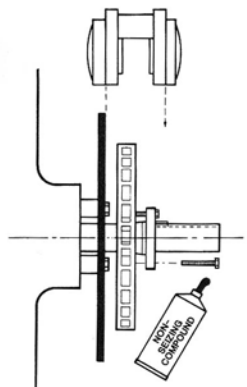
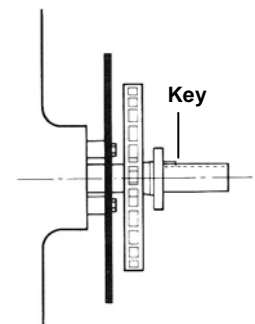
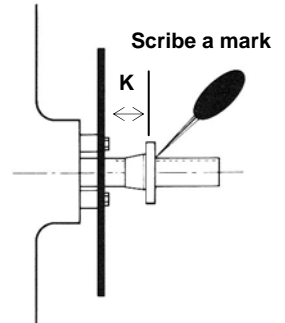
8. Coat the bushing bolt threads with graphite-based nonseizing compound.

9. Insert the bushing bolts, with lock washers, through the Q.D. flange clearance holes and into the brake hub tapped holes. Just tighten the bolts.

10. Separate two halves of one caliper:
 - a. Remove the hitch pin from the pad retaining rod.
 - b. Remove the pad retaining rod.
 - c. Remove the spring and the two brake pads.
 - d. Separate the two halves after removing the nuts, lock washers, and flat washers from the caliper bolts.

11. Tighten the Q.D. bushing bolts until there is enough space between the brake disc and caliper mounting plate to insert the first caliper half (with pads removed). Pull brake disc onto Q.D. bushing taper evenly by alternately tightening the bushing bolts.

Note: The distance between bushing flange and the brake disc hub should be in excess of 1/4" (6.3 mm); except Model 610—distance should exceed 5/16" (7.9 mm).



INSTALLATION

Brake Disc and Q.D. Bushing Installation (continued)

12. Record the additional distance required, and note the location of Q.D. bushing on brake shaft to allow a new brake pad to be assembled loosely between the brake caliper and the brake disc.
 - a. Loosen caliper hex bolts and remove caliper.
 - b. Loosen and remove Q.D. bushing bolts.
 - c. Install Q.D. bushing bolts into tapped holes of the Q.D. bushing flange.
 - d. Alternately tighten the Q.D. bushing bolts against the brake disc hub to loosen the friction fit of the brake disc hub and the Q.D. bushing taper.
 - e. Loosen the brake disc off the Q.D. bushing taper.
 - f. Move Q.D. bushing **away** from the caliper mounting plate the additional distance required to clear the new brake pad.

13. Assemble both the caliper halves to caliper mounting plate. Insert the caliper hex bolts from the caliper side through the caliper mounting plate. Install flat washers, lock washers, and hex nuts to hex bolts.

14. Push the caliper toward the center of the brake disc while tightening the hex bolts to ensure that the "top" of the brake pad will be flush or below the brake disc O.D.

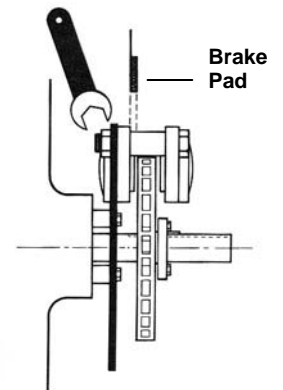
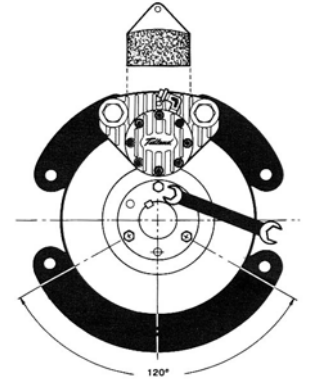
15. Tighten the caliper hex bolts to a torque value listed in Torque Specifications Chart, below.

16. Rotate the brake disc until one Q.D. bushing bolt is directly under the caliper.

17. Tighten the bolt slightly.

18. Rotate the brake disc 120° until the next bolt is directly under the caliper and tighten the bolt slightly.

19. Tighten each of the bolts following the same procedure until a brake pad will just slip between the caliper half next to the caliper mounting plate and brake disc. Do not exceed torque specifications.



TORQUE SPECIFICATIONS				
Model	Q.D. Bushing Bolts		Caliper Hex bolts	
	Wrench Torque	Bolts Supplied	Wrench Torque	Bolts Supplied
200	7-9 ft-lb. (9-12 Nm)	1/4-20 NC x 1-1/4"	52-55 ft-lb. (70-80 Nm)	M12x1.75x120 mm LG
250	12-15 ft-lb. (16-20 Nm)	5/16-18 NC x 2"	52-55 ft-lb. (70-80 Nm)	M12x1.75x120 mm LG
305	12-15 ft-lb. (16-20 Nm)	5/16-18 NC x 2"	148-162 ft-lb. (200-220 Nm)	M18x2.5x160 mm LG
380	27-30 ft-lb. (36-40 Nm)	3/8-16 NC x 2"	148-162 ft-lb. (200-220 Nm)	M18x2.5x160 mm LG
460	55-60 ft-lb. (75-81 Nm)	1/2-13 NC x 2-3/4"	148-162 ft-lb. (200-220 Nm)	M18x2.5x160 mm LG
610	70-75 ft-lb. (95-101 Nm)	9/16-12 NC x 3-1/2"	148-162 ft-lb. (200-220 Nm)	M18x2.5x220 mm LG

INSTALLATION

Brake Disc and Q.D. Bushing Installation (continued)

The brake disc should be the correct distance (dimension 'J': Reference Dimension Chart, page 7) from the caliper mounting plate. If the distance is not correct, then a new brake pad will not fit between the caliper and the brake disc.

To Move the Brake Disc

- a. Adjust the Q.D. bushing location.
- b. Loosen caliper hex bolts and remove caliper.
- c. Loosen and remove Q.D. bushing bolts.
- d. Install Q.D. bushing bolts into tapped holes of the Q.D. bushing flange.
- e. Tighten the Q.D. bushing bolts, alternately, against the brake disc hub to loosen the friction fit of the brake disc hub and the Q.D. bushing taper.
- f. Move the brake disc off the Q.D. bushing taper.
- g. Move Q.D. bushing **away** from the caliper mounting plate the additional distance required to clear the new brake pad.

20. The brake disc should now run within 0.040" (1.02 mm) Total Indicator Runout (TIR).
21. Using a dial indicator, dial in the brake disc to within 0.005" (0.013mm) TIR by tightening each bushing bolt with partial turns as required. Do not exceed maximum torque (Torque Specification Chart, page 5). The distance between the brake disc hub and the bushing flange should be approximately 3/16" (4.8 mm); except for Model 610—distance should be approximately 1/4" (6.2 mm).
22. Install the other brake pad.

Note: Use 0.030" (0.75 mm) thick shim washers placed between the caliper halves if the other brake pad will not fit between the caliper and the brake disc. Make sure to use an equal number of shims on each mounting boss of the caliper.

Installing Additional Caliper(s)

1. With the caliper mounting plate, initial caliper and Q.D. bushing in place, bolt the additional caliper(s) to the caliper mounting plate.

Note: The caliper mounting plate will accommodate three Tidland air brake calipers—four calipers on Model 250 and Model 610.

2. Follow steps 13, 14, 15 above for correct installation, including hex bolt torque.

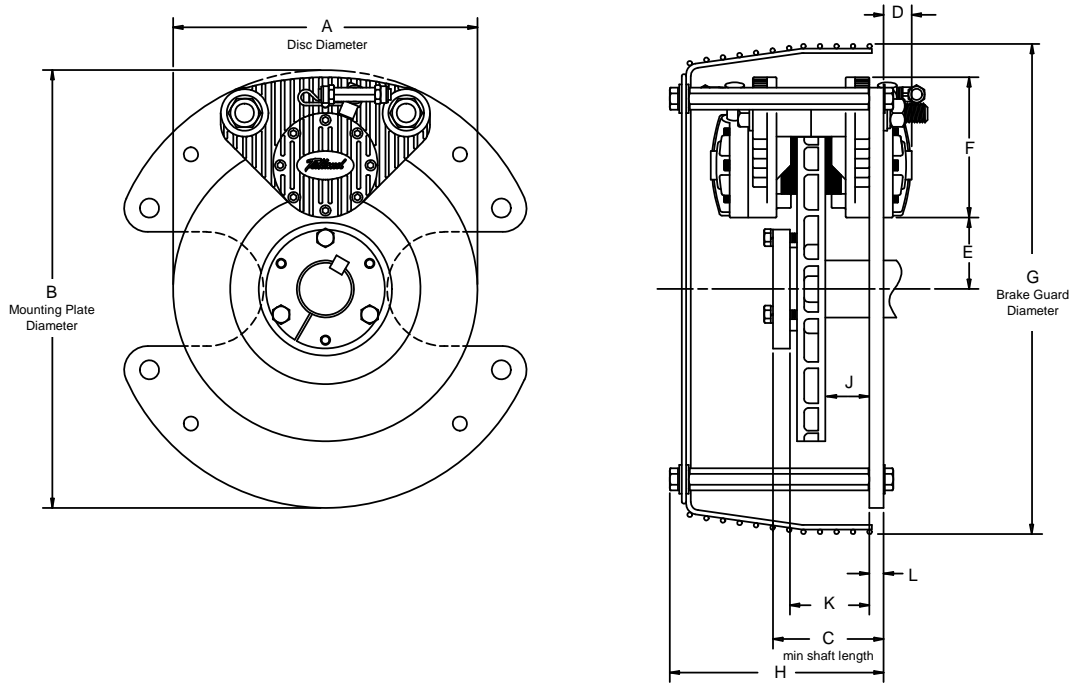
Note: The caliper shim washers may be used to center the caliper on the brake disc without Q.D. bushing adjustment. Equal amounts of washers must be used between the caliper and the caliper mounting plate—or between the caliper halves, should more pad clearance be required. For best results, position all components as shown in the Reference Dimension Guideline Chart, see page 7.

3. For additional brake discs on the same brake shaft, make sure there is a distance of 7.5" (190.5 mm) between brake disc centers. Allow 7.9" (200 mm) on Model 460. Allow 12" (304.8 mm) on Model 610.
4. For more than one brake disc on a brake shaft, ensure the following distances between discs:

Model 200, 250	6.2"
Model 305, 380	7.5"
Model 460	7.9"
Model 610	12.0"

INSTALLATION

Reference Dimension Guideline Chart



Model	A	B	C	D	E	F	G	H	J	K	L	Minimum Spacing
200	200mm	292mm	74mm	19mm	48mm	94mm	327mm	143mm	30mm	53mm	10mm	136mm
	8"	11-1/2"	2-29/32"	3/4"	1-7/8"	3-11/16"	12-7/8"	5-5/8"	1-3/16"	2-3/32"	3/8"	5-3/8"
250	250mm	337mm	77mm	19mm	71mm	94mm	373mm	143mm	30mm	67mm	10mm	136mm
	10"	13-1/4"	3-1/32"	3/4"	2-13/16"	3-11/16"	14-11/16"	5-5/8"	1-3/16"	2-5/8"	3/8"	5-3/8"
305	305mm	435mm	87mm	30mm	71mm	140mm	476mm	180mm	37mm	72mm	10mm	184mm
	12"	17-1/8"	3-13/32"	1-13/64"	2-13/16"	5-17/32"	18-3/4"	7"	1-7/16"	2-27/32"	3/8"	7-1/4"
380	380mm	508mm	98mm	30mm	110mm	140mm	548mm	180mm	37mm	72mm	10mm	184mm
	15"	20"	3-27/32"	1-13/64"	4-5/16"	5-17/32"	21-9/16"	7"	1-7/16"	2-27/32"	3/8"	7-1/4"
460	460mm	578mm	117mm	27mm	148mm	140mm	625mm	196mm	37mm	82mm	13mm	194mm
	18"	22-3/4"	4-19/32"	1-5/64"	5-13/16"	5-17/32"	24-5/8"	7.7"	1-7/16"	3-7/32"	1/2"	7-5/8"
610	610mm	729mm	167mm	47mm	192mm	173mm	800mm	285mm	57mm	125mm	16mm	305mm
	24"	28-11/16"	6-9/16"	1-27/32"	7-35/64"	6-53/64"	31-1/2"	11.2"	2-1/4"	4-15/16"	5/8"	12"

Tips

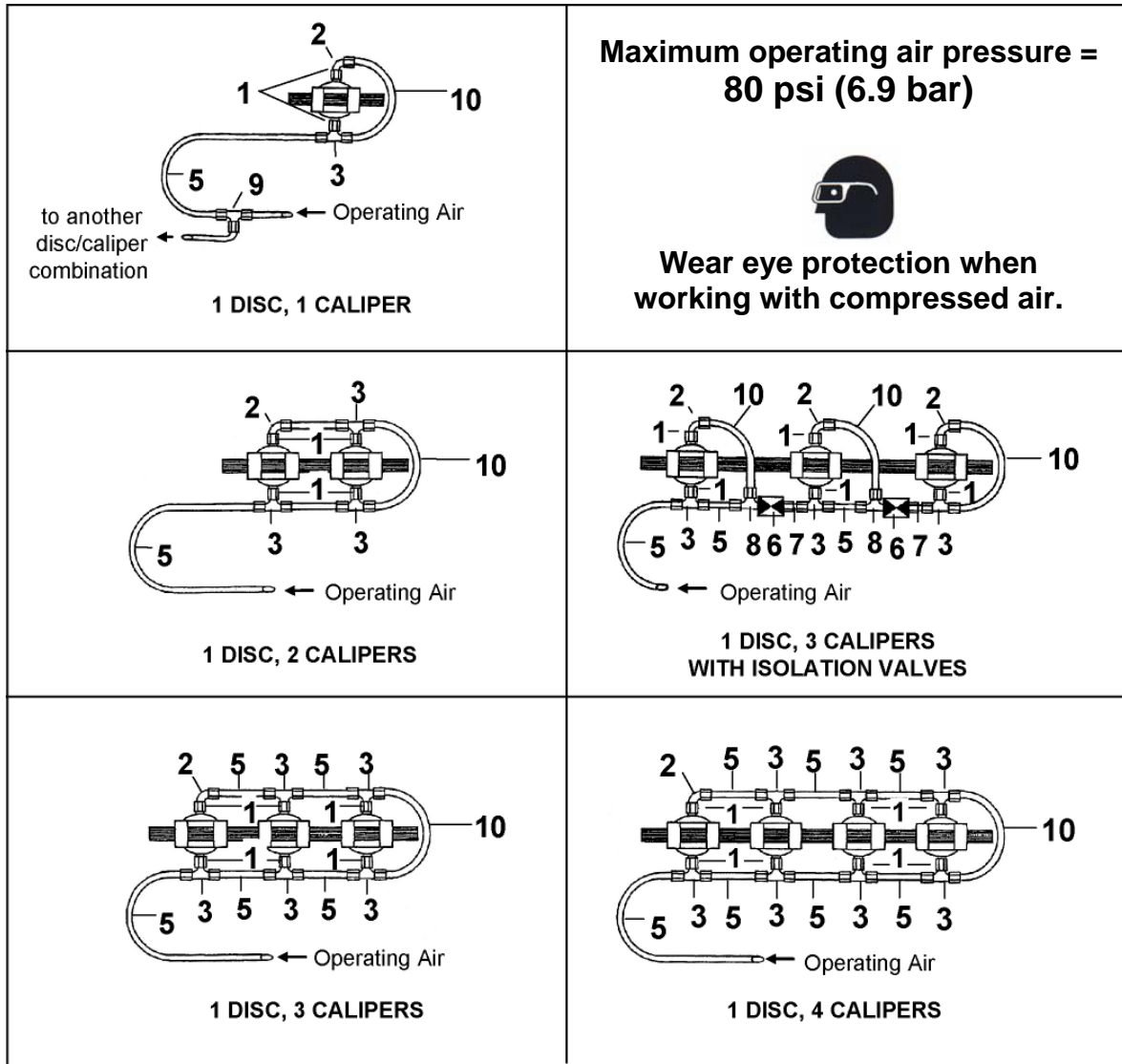
- The brake disc must run true to ensure maximum brake lining life and optimum tension brake performance.
- Ensure that the caliper-to-brake relationship follows the Reference Dimension Guideline Chart.
- If bushing bolts are over-tightened, then the bushing may be released by placing the bushing bolts in the threaded jacking screw holes. Tightening the bolts in these holes will force the brake disc away from the bushing taper.
- Extreme tension requirements may dictate the use of multiple calipers. In extreme heavy-duty applications, multiple brake discs and caliper mounting plates may be required as well. Should this be the case, their assembly should be treated as individual units. These are air-cooled brakes and radiate heat. A generous space between each brake unit will ensure a lower average operating temperature and maximum brake lining life. See minimum spacing requirements in above chart. Special brake guard requirements may apply.

INSTALLATION

Installing the Air Lines

- Air piping is installed by connecting all calipers through a clean air supply and regulator.
- Isolation valves may be installed to provide versatility and to reduce the working number of multiple calipers.
- Optional 3-way valves (Items 4 and 6) may be installed in-line between the tension control and the brake piping assembly. Ports are marked on parts:
 - Port 1 = In
 - Port 2 = Out
 - Port 3 = Exhaust
- Any air hoses that cross over the rotor should be high temperature tubing: see Item 10 in table.

	Description	Part No.
1	EL, 1/8" pipe M x 1/8" pipe F	113825
2	EL, 1/8" pipe M x 1/4" tube	127387
3	TEE, 1/4" tube x 1/4" tube @ 180° x 1/8" pipe M @ 90°	127612
4	3-way valve, 1/4" pipe (optional-not shown)	126449
5	1/4" poly tubing, normal temperature T305: use 16 in.[406 mm] per caliper T460: use 24 in.[610 mm] per caliper	127609
6	3-way isolation valve, 1/8" pipe (optional)	127670
7	Straight Connection, 1/8" pipe M x 1/4" tube	127390
8	TEE, 1/4" tube x 1/8" pipe M @ 180° x 1/4" tube @ 90°	127388
9	TEE, 1/4" tube x 1/4" tube x 1/4" tube	127389
10	1/4" poly tubing, high temperature T305: use 12 in. (305 mm) per crossover T460: use 16 in. (406 mm) per crossover	676508



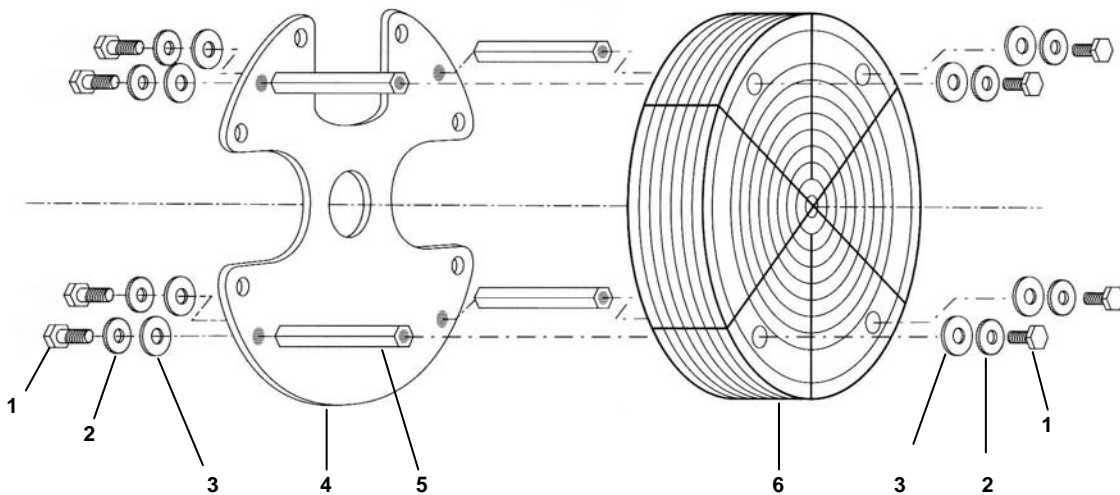
INSTALLATION

Installing the Brake Guard

1. Attach each hex standoff to the front (disc side) of the caliper mounting plate, as shown below, with hex bolt, lock washer, and flat washer.
2. Place the brake guard over the brake assembly and over hex standoffs. Align the brake guard bolt holes with the hex standoff holes.
3. Insert and tighten the hex bolts with washers on outside of brake guard.

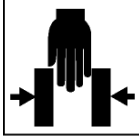
Removing the Brake Guard

1. Remove the hex bolts, flat washers, and lock washers. The hex standoffs should remain attached to the caliper mounting plates.
2. Remove brake guard.



Brake Guard Assembly	
1	Hex Bolts
2	Lock Washers
3	Flat Washers
4	Caliper Mounting Plate
5	Hex Standoffs
6	Brake Guard

OPERATION



- Clean, non-lubricated, dry air is required for optimal performance of the Air Brake.
- To **maintain continuous tension in the web**, ensure that air pressure is supplied from a tension control device.
- To **maintain intermittent braking**, Tidland recommends the use of an air regulator and an air valve for air control.
- Do not exceed the recommended maximum speed at any time during operation of the Air Brake.

Model	Maximum Speed
200	4700 rpm
250	3800 rpm
305	3000 rpm
380	2500 rpm
460	2100 rpm
610	1550 rpm

Note: Use a residue-free brake cleaner to remove the rust preventive from the brake disc machined surfaces before operation with brake pads.

MAINTENANCE

Replacing the Brake Pads

- Periodic visual inspections are recommended to determine when the brake pads should be replaced.
 - When the thickness of the brake pad lining is approximately 1/8" (3mm), the pads should be replaced.
1. Exhaust all air pressure from the air brake.
 2. Remove the brake guard. See *To Remove the Brake Guard* on page 9.
 3. Remove one hitch pin from the retaining pin.
 4. Remove the retaining pin from the calipers.
 5. Remove retracting spring from between the brake pads.
 6. Pull out the used brake pads.
 7. While brake pads are removed, check the condition of the brake disc.
 8. Replace the brake disc, if necessary.
 9. Place the new brake pad into position.
Note: The brake pad lining should face toward the brake disc. The steel backing of the brake pad should face toward the caliper half.
 10. Replace the retracting spring between the brake pads.
 11. Replace the retaining pin through the holes in the calipers, the holes in the brake pad backing plates, and through the open slot of the arched retracting spring.
 12. Replace the hitch pin into the retaining pin.
Note: There should be a hitch pin at each end of the retaining pin.

Replacing the Brake Disc

1. Exhaust all air pressure from the air brake.
2. See "Brake Disc Installation," page 4.
3. With the brake disc removed, check the condition of the brake pads.
Replace the brake pads, if necessary.



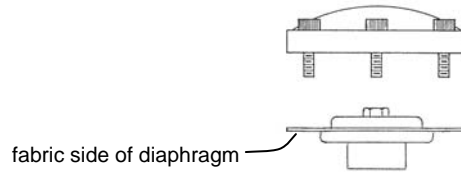
Replacing the Brake Diaphragm

Tidland recommends using the Diaphragm Repair Kit.

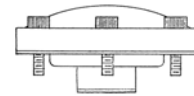
- Caliper Model 50 (Kit P/N 128062)
- Caliper Model 85 (Kit P/N 128063)

1. Exhaust all air pressure from the air brake.
2. Remove the brake guard. See *To Remove the Brake Guard* on page 9.
3. Disconnect the air line at the brake caliper cap fitting.
4. Remove the socket head cap screws.
5. Remove the brake caliper cap.
6. Remove old diaphragm kit (hex head cap screw, diaphragm retainer plate, diaphragm, piston, push rod, push rod cap, piston insert nut).
7. Replace with new Diaphragm Repair Kit.

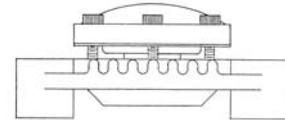
- a. Apply a thread sealant (according to manufacturer's directions) to the threads of the socket head cap screws. Place socket head capscrews in caliper cap.



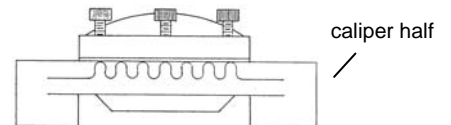
- b. Press the diaphragm onto the socket head capscrews.



- c. Turn socket head capscrews into the caliper cap tapped holes one or two threads.

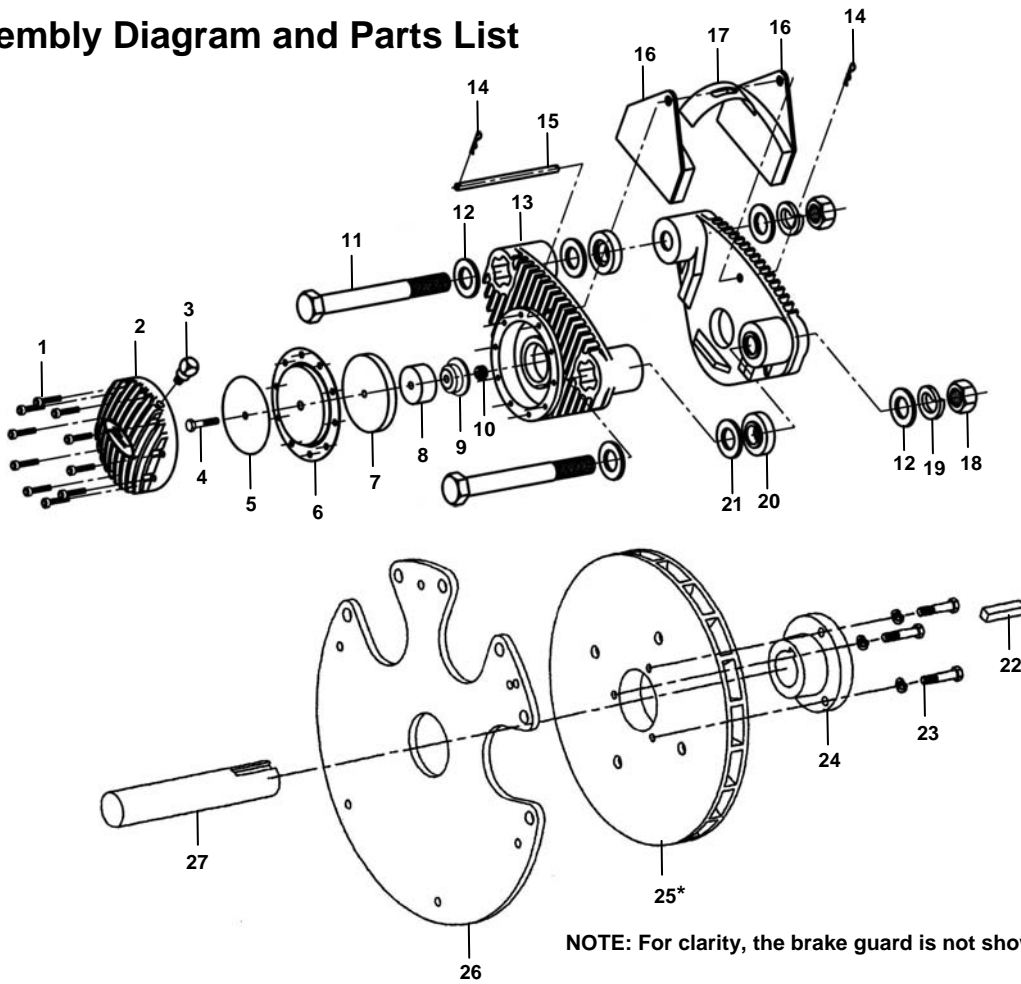


- d. Press the caliper cap and diaphragm down into the caliper half and tighten the socket head capscrews. Make sure that the diaphragm lays flat before tightening the capscrews



MAINTENANCE

Assembly Diagram and Parts List



NOTE: For clarity, the brake guard is not shown.

	Description
1	Socket Head Capscrew
2	Brake Caliper Cap
3	Air Inlet 90 degree Elbow
4	Hex Head Capscrew
5	Diaphragm Retainer Plate
6	Diaphragm
7	Piston
8	Push Rod
9	Push Rod Cap

	Description
10	Piston Insert Nut
11	Hex Bolt
12	Flat Washer
13	Brake Caliper
14	Hitch Pin
16	Brake Pad
17	Retracting Spring
18	Hex Nut
19	Lock Washer

	Description
20	Spacer—Model 460 only
21	Shim Washer
22	Key (customer supplied)
23	Bushing Bolts and Lock Washers
24	Q.D. Bushing
25	Brake Disc *
26	Caliper Mounting Plate
27	Brake Shaft (customer supplied)
–	Diaphragm Repair Kit (items 4-10)

* The brake disc is supplied with a center hub installed. **Do not attempt disassembly.** Contact Tidland Customer Service for assistance with replacement parts.

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