

Tension Brakes/Very High Heat Capacity

AquaMaKKs Water Cooled Clutches and Brakes

AquaMaKKs™ clutches and brakes are pneumatically or hydraulically controlled and water cooled. They consist of a series of alternating friction discs and water jackets. Torque is transmitted by applying axial force from the pneumatic, hydraulic, or spring set actuator. Copper wear plates are used for excellent heat dissipation. AquaMaKKs provides accurate torque control for constant tensioning and are perfectly suited for applications in oil and gas, metal processing and forming, forestry, and marine deck machinery.

Engineered composite water jacket improves performance for marine applications

Wichita engineers have utilized the latest cutting edge technologies and state-of-the-art materials to develop a revolutionary new breakthrough in water cooled clutch and brake design... composite water jackets (patent pending).

Corrosion resistant, saltwater friendly

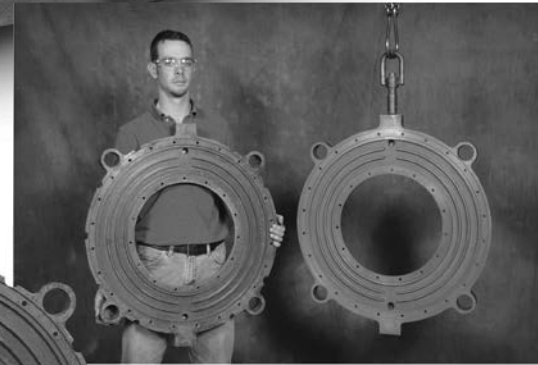
Composite material will not corrode, so salt water and water sources with high PH acidic values can be used for cooling without the need to supply fresh water.

Other composite water jacket benefits include:

- Improved channeled water flow - achieved via groove designed and molded into jacket providing enhanced cooling capability
- Easier maintenance, lightweight – smaller sizes do not require a lifting device. Repair/replace jackets in minutes – AquaMaKKs uses fewer copper mounting bolts than competitors
- Water jacket design and material allows for longer life, requiring fewer replacements
- Reduced overall clutch weight – critical for weight restricted applications (eg: truck mounted)
- Lower cost

AquaMaKKs Design Benefits

- Simplicity of design with fewer parts simplifies installation and maintainability, saving both time and money.
- The standard AquaMaKKs design incorporates premium materials and finishes suitable for marine deck environments. No optional salt water corrosion protection is required.
- Shim design makes it easy to maintain and adjust for wear.
- Unique patent pending water jacket design ensures high heat absorption and torque stability, allowing for greater heat dissipation over similar sized competitive units.
- Unique mounting pattern enables direct replacement to Wichita or competitors' units, requiring no design changes for the customer.
- AquaMaKKs is a perfect solution for field retrofits, rebuilds or new OEM applications.



Composite jacket held on left; cast iron jacket suspended from crane on right.

75% Weight Reduction

A new 36" composite water jacket weighs approx. 95 lbs. A 36" cast iron jacket weighs approx. 375 lbs.

The reduced weight is a significant composite jacket benefit, especially where equipment is mounted on a flat bed trailer.

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Oil and Gas

The AquaMaKKs family is ideally suited for superior water cooled tension control for drawworks applications. It also can be the perfect solution for integration into electronic drilling systems as well as traditional style drawworks control systems.

Features that make AquaMaKKs ideal for oil and gas applications:

- Compatible with major electronic drilling systems
- Airtube design has less hysteresis than piston type actuators, making it ideal for automatic drilling systems
- Engineered packaged solutions including shafts, water kits, covers, and deck mounts
- The unit can be easily removed for service if required and/or quickly swapped out for maximum rig availability and rapid serviceability, reducing expensive downtime



Metal Processing and Forming

AquaMaKKs clutches and brakes can be used to control tension on the coilers in metal processing plants and to control tension in unwind stands and slitters in metal forming facilities.

Features that make AquaMaKKs ideal for metal processing and metal forming applications:

- Compatible with PLC control systems
- Higher thermal capacity than comparable models
- Easy to maintain minimizing downtime
- Open design concept for easy wear inspection
- Safety covers provided for increased operator and plant safety



Marine Deck Machinery

Positioning and Mooring Winches require high heat dissipation and accurate tension control. That's why AquaMaKKs is ideal for these applications.

Features that make AquaMaKKs ideal for marine deck applications:

- The standard AquaMaKKs design incorporates premium materials and finishes suitable for marine deck environments.

No optional salt water corrosion protection is required.

- Compatible with electronic and analog control systems for tension winches
- Long lasting friction material for improved wear life
- Optional designs available for suitability in low temperature environments
- Accessories and packaged engineered solutions available such as deck mounts, manifold kits, water connection kits, covers, and sensor mounting provisions



Forestry

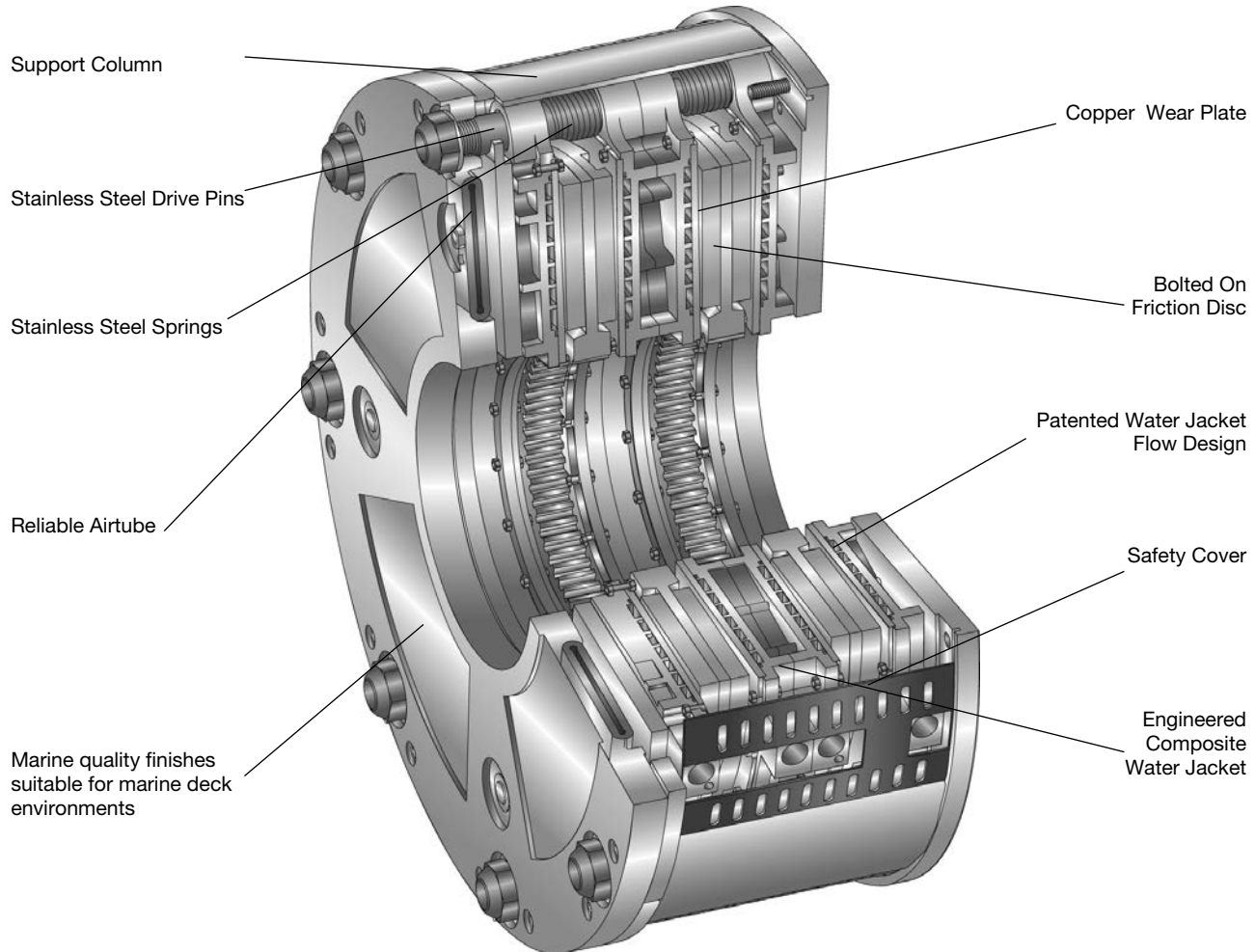
AquaMaKKs water cooled brakes provide precise tension control on winch drives for mobile forestry equipment, such as yarders.

Features that make AquaMaKKs ideal for forestry applications:

- Compatible with tension control systems on yarders
- Open case design enables easy wear inspection and serviceability
- Higher thermal capacity than comparable models
- Lighter weight version available for mobile equipment

Tension Brakes/Very High Heat Capacity

AquaMaKKs Water Cooled Clutches and Brakes



Features

- Durable air tube design with high strength reinforced neoprene air-tubes, offering longer service life.
- Water channels for balanced water flow for the highest thermal capacity.
- Long-lasting friction material with minimal wear on mating copper.
- Copper alloy wear plates enable higher heat transfer than any other metals.
- Hub spline provides perfect alignment of rotating discs.
- External air & water connections.
- Release springs ensure complete disengagement.
- Adjustment for wear is easily accomplished by removing shims without any unit disassembly.
- Unique torque pin column arrangement provides structural integrity of case.
- Open case design with covers for safe, simple, visual inspection and easy maintenance.

Options

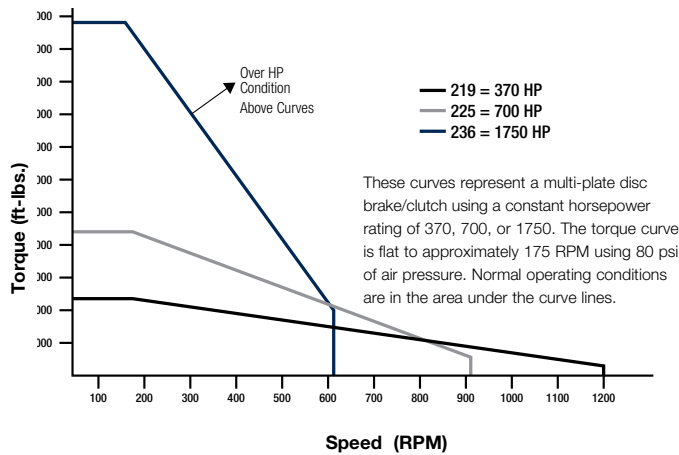
- Standard and HICO friction materials available.
- Optional HICO friction material provides up to 50% higher torque.
- Provisions for electronic wear monitoring.
- Customer specific back-plate mounting configurations.
- Custom engineered solutions available for adding accessories such as deck mount assemblies, water kits, shaft assemblies, etc.
- Materials available for operation in low temperature environments.
- Hydraulic piston actuation available.
- Spring Set version with either air or hydraulic release available.

Tension Brakes/Very High Heat Capacity

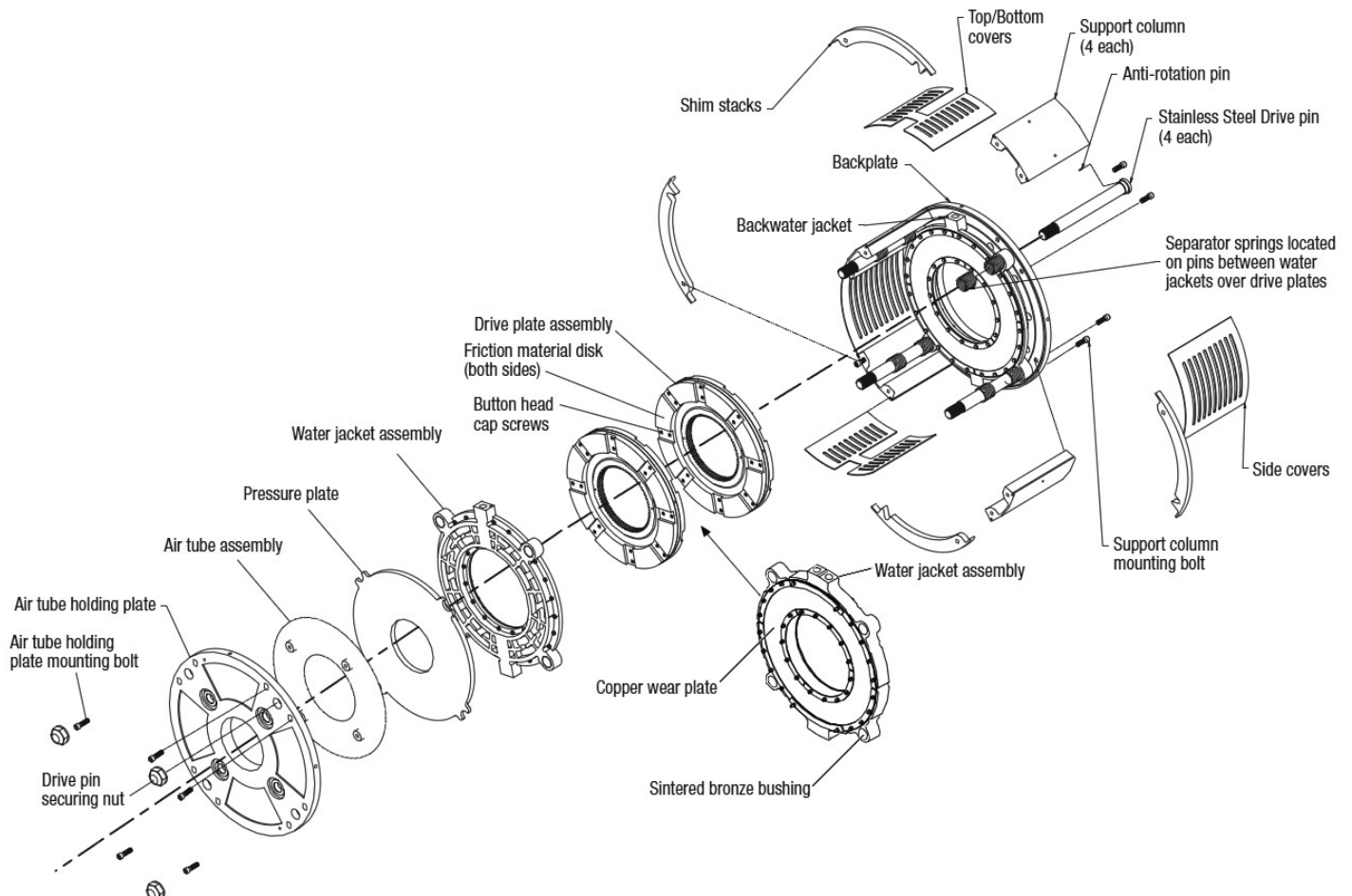
AquaMaKKs Water Cooled Clutches and Brakes

Horsepower Curves for Models 219, 225, and 236 (Standard Linings)

Contact Wichita Clutch for unique HP curve information



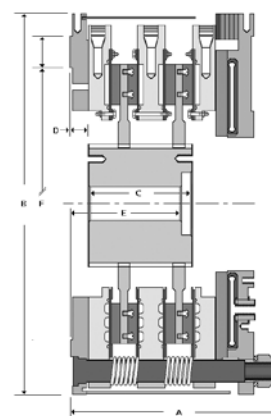
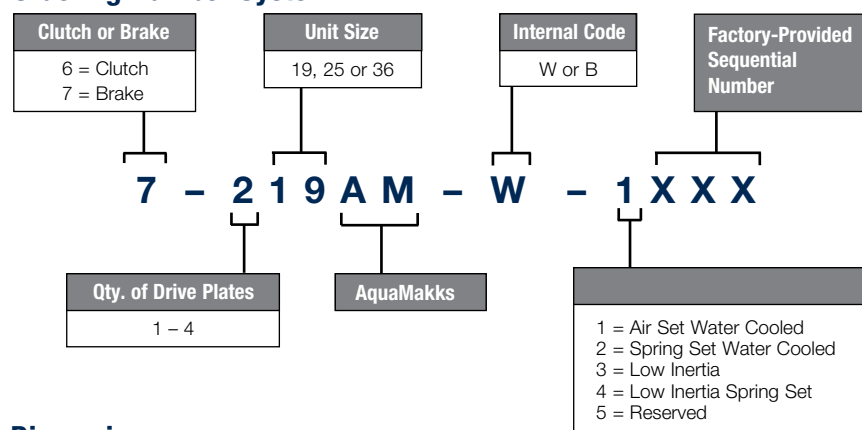
Component Parts



Tension Brakes/Very High Heat Capacity

AquaMaKKs Water Cooled Clutches and Brakes

Ordering Number System



Dimensions

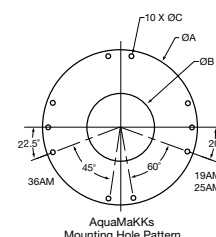
Model Size ATD-	Assembly Number	A Length		B Diameter		C Length		D Length		E Length		F Length			
		in.	(mm.)	in.	(mm.)	in.	(mm.)	in.	(mm.)	in.	(mm.)	OD		ID	
KKB119AM	7-119AM-W-1005	12.35	314	28.3	719	4.13	105	1.25	32	3.75	95	23.25	591	18.25	464
KKB219AM	7-219AM-W-1302	17.09	434	28.3	719	8.97	228	1.25	32	6.88	175	23.25	591	18.25	464
KKB319AM	7-319AM-W-1303	21.58	548	28.3	719	13.39	340	1.25	32	10.88	276	23.25	591	18.25	464
KKB419AM	7-419AM-W-1300	26.07	662	28.3	719	17.88	454	1.25	32	13.75	349	23.25	591	18.25	464
KKB125AM	7-125AM-W-1003	13.75	349	34.12	867	5.49	139	1.38	35	4.88	124	30	762	24.38	619
KKB225AM	7-225AM-W-1300	18.86	479	34.12	867	10.32	262	1.38	35	10.01	254	30	762	24.38	619
KKB325AM	7-325AM-W-1300	23.99	609	34.12	867	16.39	416	1.38	35	14.57	370	30	762	24.38	619
KKB425AM	7-425AM-W-1300	29.42	747	34.12	867	20.66	525	1.38	35	18.32	465	30	762	24.38	619
KKB136AM	7-136AM-W-1000	15	381	45.51	1156	5	127	2.36	60	7.36	187	44.5	1130	18.38	467
KKB236AM	7-236AM-W-1301	21.28	541	45.51	1156	10	254	2.36	60	11.36	289	44.5	1130	18.38	467
KKB336AM	7-336AM-W-1301	26.76	680	45.51	1156	17.05	433	2.36	60	15.36	390	44.5	1130	18.38	467
KKB436AM	7-436AM-W-1301	32.79	833	45.51	1156	23.16	588	2.36	60	20.36	517	44.5	1130	18.38	467

Specifications

Model Size ATD	Assembly Number	"Dynamic Torque Capacity with Standard Linings (optional linings available)"				Heat Capacity Parallel Water Hosing		Max Bore Rect. Key		Max Drive Plate Rotating Speed RPM
		lb.in.		Nm		HP	kW	in	(mm)	
		80 PSI	100 PSI	5.5 BAR	7 BAR					
KKB119AM	7-119AM-W-1005	55,440	83,000	6,259	9,371	185	138	5.56	141	1200
KKB219AM	7-219AM-W-1302	110,880	166,000	12,518	18,741	370	276	5.63	143	1200
KKB319AM	7-319AM-W-1303	166,320	249,000	18,778	28,112	555	414	6.13	156	1200
KKB419AM	7-419AM-W-1300	221,760	332,000	25,037	37,483	740	552	6.13	156	1200
KKB125AM	7-125AM-W-1003	132,000	165,000	14,903	18,629	400	298	7.25	184	935
KKB225AM	7-225AM-W-1300	264,000	330,000	29,806	37,257	800	596	7.38	187	935
KKB325AM	7-325AM-W-1300	396,000	495,000	44,708	55,886	1200	895	7.38	187	935
KKB425AM	7-425AM-W-1300	528,000	660,000	59,611	74,514	1600	1193	9.38	238	935
KKB136AM	7-136AM-W-1000	319,344	399,000	36,054	45,047	850	634	11.25	286	640
KKB236AM	7-236AM-W-1301	638,688	798,000	72,108	90,094	1700	1268	11.75	298	640
KKB336AM	7-336AM-W-1301	958,032	1,197,000	108,162	135,141	2550	1901	11.75	298	640
KKB436AM	7-436AM-W-1301	1,277,376	1,596,000	144,216	180,188	3400	2535	11.75	298	640

Mounting Hole Pattern

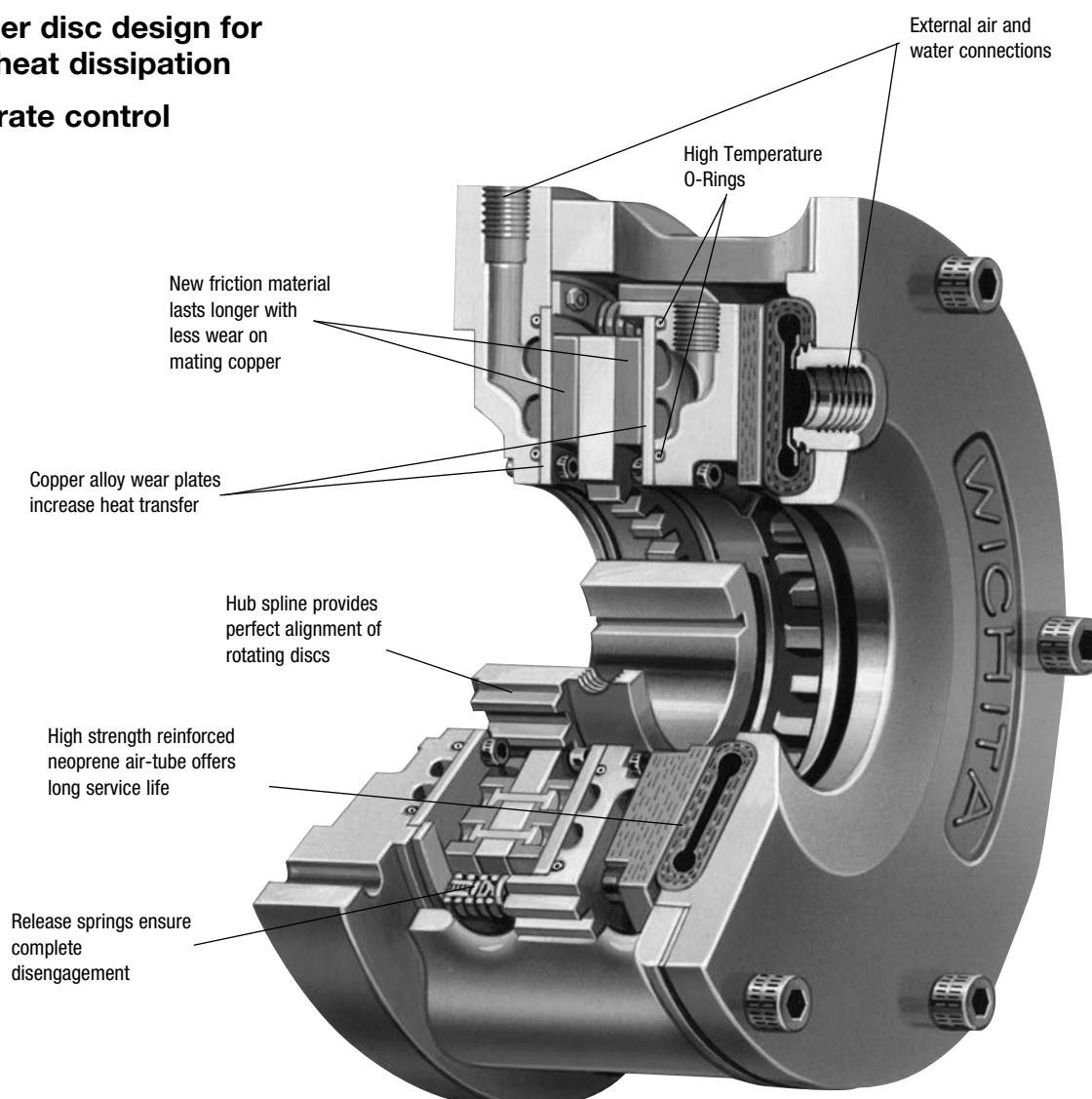
Model	ØA		ØB		ØC		Hole Circle		# Holes	PLT THK	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)		in.	(mm)
KKB 19AM	28.3	719	11	279	0.656	17	22	559	10	1.63	41
KKB 25AM	34.12	867	16.7	424	0.656	17	28.75	730	10	1.63	41
KKB 36AM	45.51	1156	16.5	419	1.06	27	42	1067	10	1.61	41



Tension Brakes/Very High Heat Capacity

Kopper Kool Brakes

- Copper disc design for high heat dissipation
- Accurate control



The Wichita Kopper Kool airtube disc Clutches and Brakes are liquid cooled and consist of a series of alternating discs connecting an inner drive member to an outer drive member.

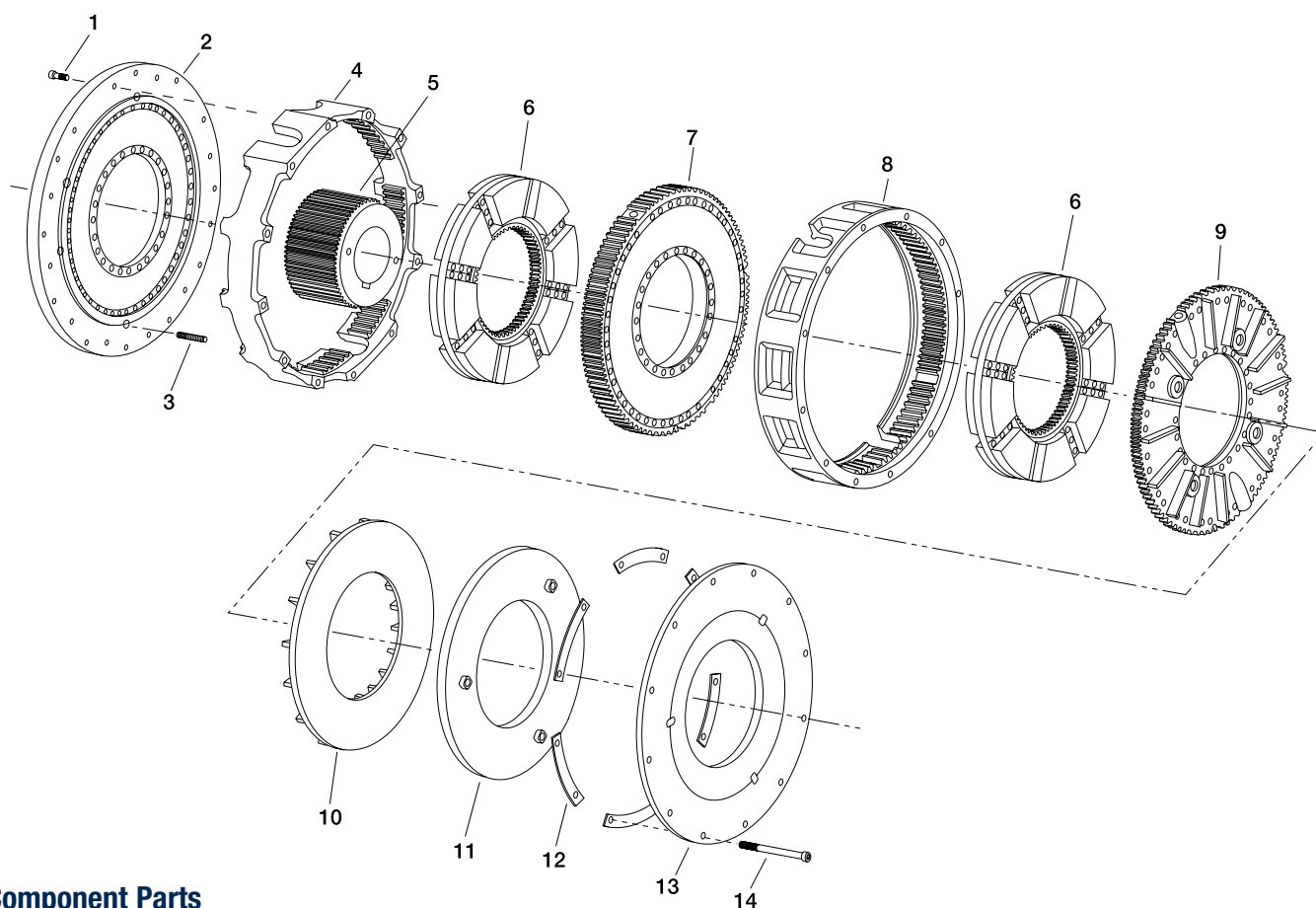
Engagement is achieved by pneumatic expansion of the airtube. This air-operated clutch contains copper discs for excellent heat dissipation and provides an accurately controlled continuous slip action for constant web tensioning. Tension levels are in direct proportion to air pressure applied.

Design Features

- New friction material lasts longer with less wear on mating copper.
- Copper alloy wear plates increase heat transfer.
- Hub spline provides perfect alignment of rotating discs.
- External air & water connections.
- Release springs ensure complete disengagement.
- High strength reinforced neoprene air-tube offers long service life.
- Optional long stroke air tube available on 18" or 24" size units to increase life and standard maintenance intervals.
- High thermal capacity.

Tension Brakes/Very High Heat Capacity

Kopper Kool Brakes

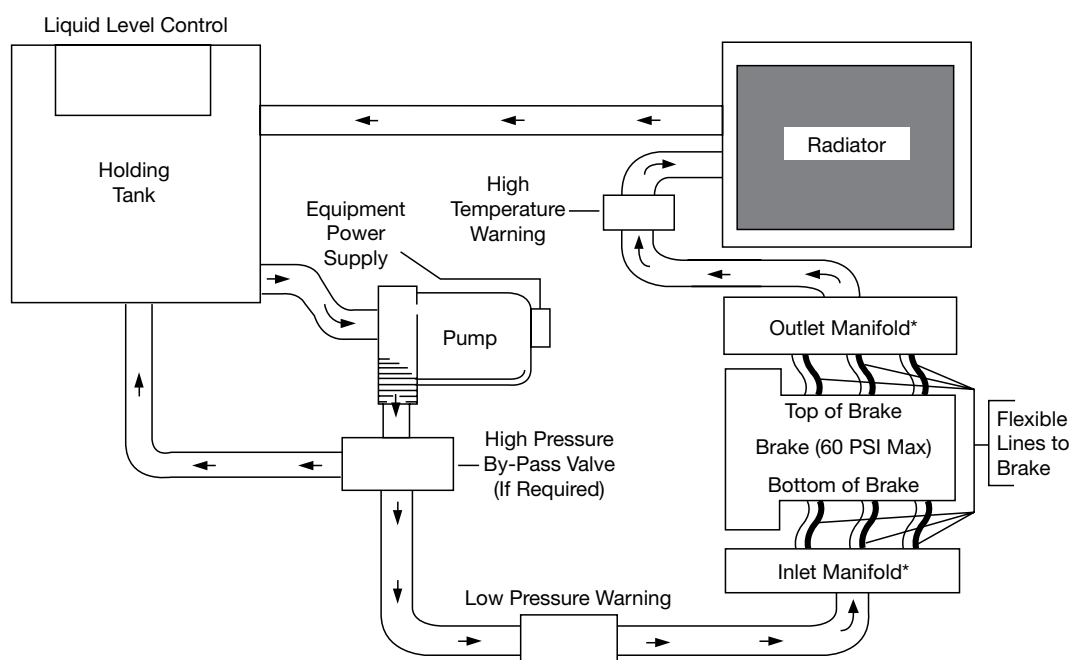


Component Parts

- | | |
|------------------------------------|--|
| 1. Socket Head Capscrews | |
| 2. Backplate Water Jacket Assembly | |
| 3. Release Springs | |
| 4. Ring (Backplate End) | |
| 5. Hub | |
| 6. Drive Plate Assembly | |
| 7. Center Water Jacket Assembly | |
| 8. Ring (Airtube End) | |
| 9. Floating Water Jacket Assembly | |
| 10. Pressure Plate | |
| 11. Airtube | |
| 12. Segmented Shims | |
| 13. Airtube Holding Plate | |
| 14. Socket Head Capscrews | |

Tension Brakes/Very High Heat Capacity

Kopper Kool Brakes



* Must be sufficient size to provide evenly distributed water flow to each water jacket

Principle of Operation

Closed Cooling System

As shown here in the closed loop system, flexible water lines should be brought into each jacket at the 6 o'clock position. When the Kopper Kool Unit is used as a clutch, air vent tubes must be installed internally at the factory to insure proper filling of the water jackets. The Kopper Kooled Clutches also require 5 PSI back pressure on the outlet side of the triple passage roto-coupling to insure complete evacuation of air from these jackets during rotation.

Referring to the closed loop cooling system, the equipment should be protected with low water pressure and high temperature warning devices. For availability information, contact factory.

Tension Brakes/Very High Heat Capacity

Kopper Kool Brakes

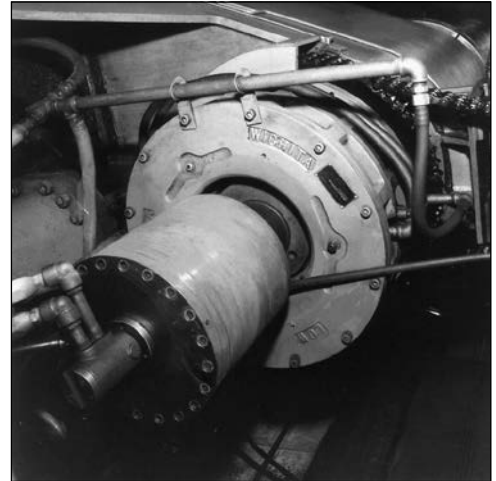
Design advantages

- New friction material is longer lasting with less wear on mating copper. Consistent torque response results directly with air pressure applied. Mechanically retained friction pads can be changed in field.
- Copper has a greater heat transfer capacity than any other metal other than precious metals.
- Generated teeth, in addition to providing perfect alignment of rotating members, offer maximum sensitivity of torque to pressure relationship. All factors affecting torque are fully controlled. Tangential cooling grooves insure effective mixing of cooling water for best heat conductivity. Water volume of the jackets insures high water velocity, which reduces sedimentation and chemical formation. Maximum inlet pressure is 60 PSI.
- Close grain alloy iron jackets for coolant assure maximum resistance to corrosion.
- Releasing springs insure complete disengagement.
- By using a triple roto-coupling, the brake can be used as a constant slipping clutch.
- Flexible fiberglass pressure plate assures even distribution of pressure from actuator to braking surfaces, providing maximum contact area on friction surfaces.
- All coolant and air connections are external and easily accessible. Double outlets in center water jackets for multiple plate units 24" and larger.
- Air passages through brake greatly assist in keeping brake cool.
- Actuating member is a reinforced neoprene airtube which has no resistance to movement, resulting in immediate reaction with small pressure changes. Non-corrosion neoprene is unaffected by actuating medium.

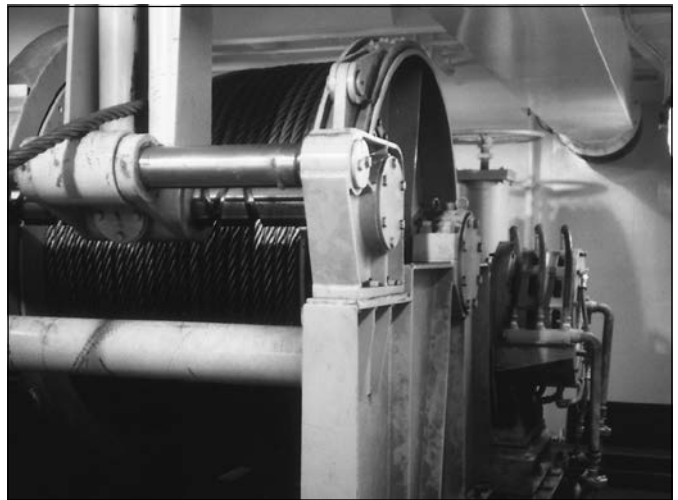
Typical Applications



Wichita Kopper Kool Brakes provide precise tension control on winch drives for mobile equipment.



Kopper Kool Brakes dissipate high heat loads in steel uncoiler applications.



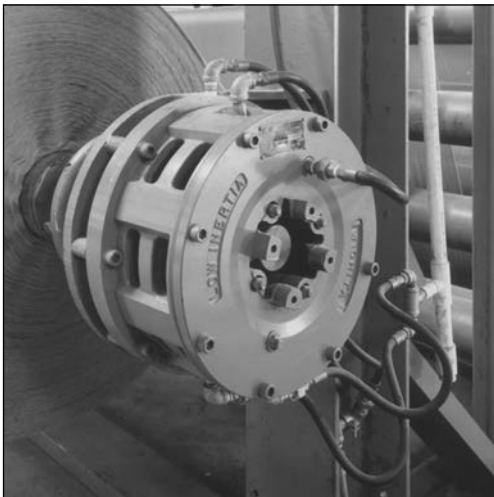
Kopper Kool brakes increase control on marine winches.



Tension Brakes/Very High Heat Capacity

Kopper Kool Brakes

Selecting for an Unwind Application



To properly select a tension brake for an unwind application the following information is needed:

Max. Roll Diameter..... 84 in.
Max. Web Width..... 120 in.
Max. Web Speed..... 1500 FPM
Max. Tension..... 15 PLI
Air Pressure Available..... 100 PSI
Min. Roll Diameter..... 12 in.
Min. Web Width..... 84 in.
Min. Web Speed..... 750 FPM
Min. Tension..... 10 PLI
Shaft Size..... 5.00

Calculations

Using the calculations below, consult Kopper Kool Brake Specifications Chart, page 80.

The brake selected for this application is a 218 Kopper Kool, with 5.5 inch bore.

$$\begin{aligned}\text{Max. Tension} &= \text{Max. PLI} \times \text{Max. Web Width} \\ &= 15 \times 120 = 1,800 \text{ lbs.}\end{aligned}$$

$$\begin{aligned}\text{Max. Torque} &= \frac{\text{Max. Tension} \times \text{Max. Roll Dia.}}{2} \\ &= 1800 \times 84/2 = 75,600 \text{ lb.in.}\end{aligned}$$

$$\begin{aligned}\text{Max. RPM} &= \frac{\text{Max. Web Speed} \times 3.82}{\text{Min. Roll Dia.}} \\ &= 1,500 \times 3.82/12 = 478 \text{ RPM}\end{aligned}$$

$$\begin{aligned}\text{Heat HP} &= \text{Max. Tension} \times \text{Max. Web Speed}/33,000 \\ &= \frac{1,800 \times 1,500}{33,000} = 82 \text{ Heat HP}\end{aligned}$$

$$\begin{aligned}\text{Min. Tension} &= \text{Min. PLI} \times \text{Min. Web Width} \\ &= 10 \times 84 = 840 \text{ lbs.}\end{aligned}$$

$$\begin{aligned}\text{Min. Torque} &= \frac{\text{Min. Tension} \times \text{Min. Roll Dia.}}{2} \\ &= 840 \times 12/2 = 5,040 \text{ lb.in.}\end{aligned}$$

$$\begin{aligned}\text{Min. RPM} &= \frac{\text{Min. Web Speed} \times 3.82}{\text{Max. Roll Dia.}} \\ &= 750 \times 3.82/84 = 34 \text{ RPM}\end{aligned}$$

How to select

1. Select a brake with equal to or greater thermal capacity. The ATD-214 has 150 THP @ 15 GPM. The requirement is 82 THP.
2. Check torque capacity vs. required. The ATD-214 has 42,000 lb.in. @ 100 PSI. The requirement is 75,600 lb.in. Therefore, an ATD-214 Brake will not produce enough torque for this application. An ATD-218 Brake would be the best choice.
3. Check Maximum Bore. The requirement is 5.00 inches. The ATD-218 maximum bore is 5.5 inches.
4. Check Maximum RPM. The requirement is 478 RPM. The maximum RPM for the ATD-218 is 1,300 RPM.

$$\begin{aligned}\text{Max. Air Pressure Required} &= \frac{\text{Max. Torque} \times 100 \text{ PSI}}{\text{Catalog Torque Rating}} \\ &= \frac{75,600 \times 100}{94,000} = 80 \text{ PSI}\end{aligned}$$

$$\begin{aligned}\text{Min. Air Pressure Required} &= \frac{\text{Min. Torque} \times 100 \text{ PSI}}{\text{Catalog Torque Rating}} \\ &= \frac{5,040 \times 100}{94,000} = 5 \text{ PSI}\end{aligned}$$

Tension Brakes/Very High Heat Capacity

Kopper Kool Brakes

Specifications

Model Size ATD-	Assembly Number	Dynamic Torque Capacity*				Heat Capacity		Max Bore Rect. Key	
		lb.in.	Nm			Series Water Hosing HP/kW	Parallel Water Hosing HP/kW		
		80 PSI	100 PSI	5.5 BAR	7 BAR			in.	(mm)
KKB 106	7-306-110-200-0	2,720	3,400	307	384	10 / 7.5	15 / 11	1.75	(44)
KKB 206	7-306-210-200-0	5,440	6,800	614	768	20 / 15	30 / 22		
KKB 108	7-308-110-100-0	4,320	5,400	479	610	21 / 16	32 / 24		
KKB 208	7-308-210-100-0	8,640	10,800	959	1,220	42 / 31	64 / 48	2.25	(57)
KKB 308	7-308-310-101-0	12,960	16,200	1,438	1,830	63 / 47	96 / 72		
KKB 111	7-311-110-106-0	9,600	12,000	1,065	1,356	35 / 26	53 / 40		
KKB 211	7-311-210-107-0	19,200	24,000	2,131	2,712	70 / 52	105 / 78	3.00	(76)
KKB 311	7-311-310-100-0	28,800	36,000	3,196	4,067	105 / 78	158 / 118		
KKB 114	7-314-110-115-0	16,800	21,000	1,864	2,373	50 / 37	75 / 56		
KKB 214	7-314-210-111-0	33,600	42,000	3,728	4,745	100 / 75	150 / 112	4.38	(111)
KKB 314	7-314-310-103-0	50,400	63,000	5,593	7,118	150 / 112	225 / 168		
KKB 116	7-316-110-107-0	25,600	32,000	2,841	3,615	65 / 48	98 / 73		
KKB 216	7-316-210-108-0	51,200	64,000	5,681	7,231	130 / 97	195 / 145	4.75	(121)
KKB 118	7-318-110-100-0	37,600	47,000	4,172	5,310	80 / 60	120 / 89		
KKB 218	7-318-210-100-0	75,200	94,000	8,344	10,620	160 / 119	240 / 179		
KKB 318	7-318-310-101-0	112,800	141,000	12,517	15,930	240 / 179	360 / 268	5.50	(140)
KKB 119	7-319-110-104-0	52,000	65,000	5,770	7,344	—	160 / 119		
KKB 219	7-319-210-111-0	104,000	130,000	11,540	14,688	—	320 / 239		
KKB 121	7-321-110-100-0	49,600	62,000	5,504	7,005	100 / 75	150 / 112	5.50	(140)
KKB 221	7-321-210-102-0	99,200	124,000	11,008	14,010	200 / 149	300 / 224		
KKB 321	7-321-310-100-0	148,800	186,000	16,511	21,015	300 / 224	450 / 336		
KKB 124H	7-325-110-100-0	100,800	126,000	11,185	14,236	190 / 142	285 / 213	6.50	(165)
KKB 224H	7-325-210-101-0	201,600	252,000	22,370	28,471	380 / 283	570 / 425		
KKB 324H	7-325-310-101-0	302,400	378,000	33,556	42,707	570 / 425	855 / 638		
KKB 125	7-326-100-100-0 ¹	122,920	153,650	13,880	17,360	—	350/261	8.13	(207)
KKB 225	7-326-200-100-0 ¹	245,840	307,300	27,760	34,719	—	700 / 522		
KKB 325	7-326-300-101-0 ¹	368,760	460,950	41,640	52,079	—	1050/783		
KKB 127	7-327-110-100-0	120,000	150,000	13,316	16,947	175 / 130	263 / 196	8.00	(203)
KKB 227	7-327-210-100-0	240,000	300,000	26,631	33,894	350 / 261	233 / 174		
KKB 130	7-330-110-300-0	160,000	200,000	17,754	22,596	230 / 172	345 / 257		
KKB 230	7-330-210-301-0	320,000	400,000	35,508	45,193	460 / 343	690 / 515	9.00	(229)
KKB 330	7-330-310-300-0	480,000	600,000	53,263	67,789	690 / 515	1,035 / 772		
KKB 136H	7-337-110-300-0	320,000	400,000	36,154	45,193	500 / 373	750 / 559		
KKB 236H	7-337-210-300-0	640,000	800,000	72,308	90,385	1,000 / 746	1,500 / 1,119	9.00	(229)
KKB 336H	7-337-310-300-0	960,000	1,200,000	108,462	135,578	1,500 / 1,119	2,250 / 1,678		
KKB 436H	7-337-410-102-0 ²	1,250,000	1,600,000	141,227	180,771	2,000 / 1,491	3,000 / 2,237		

* Static torque will vary with temperature. Maximum air pressure is 100 PSI / 7 BAR. Minimum recommended air pressure is 3 PSI.

Note: Maximum water jacket inlet pressure is 60 PSI.

Brakes with as great as 50% higher torque capacity is available upon request.

¹ Current design is with enhanced linings. A unit with regular linings is available upon request.

² Current design is with the Marine Corrosion package. A Non-Marine unit is available upon request.

³ Current design is for intermittent duty applications. Such as, anchor, mooring, take-up and traction type winch applications.

⁴ For information purposes, not for new applications

Tension Brakes/Very High Heat Capacity

Kopper Kool Brakes Specifications

Model Size ATD-	Recom- mended Clearance in.(mm)	Max. Speed RPM	Parallel Water Flow % Ethylene Glycol GPM (LPM)			Total Brake Wt.		Hub & Drive Plate Wt.		WR ² / J=mr ²	
			0%	30%	50%	lb.	(kg)	lb.	(kg)	lb.ft. ²	(kgm ²)
KKB 106	1/16-3/32 (1.5-2)	3,800	1.5 (6)	2.0 (7.4)	2.3 (8.5)	45	(20.4)	5.5	(2.5)	0.14	(0.01)
KKB 206			3 (11)	3.9 (14.8)	4.5 (17)	71	(32.2)	11.7	(5.3)	0.28	(0.01)
KKB 108	1/16-3/32 (1.5-2)	2,860	3.2 (12)	4.1 (1.6)	5 (19)	68	(30.8)	11	(5.0)	0.6	(0.03)
KKB 208	3/32-5/32 (2-4)		6.4 (24)	8.2 (32)	10 (38)	116	(52.6)	25	(11.1)	1.3	(0.05)
KKB 308	1/8-3/16 (3-5)		9.6 (36)	12.3 (48)	15 (57)	164	(74.4)	38	(17.2)	2.0	(0.08)
KKB 111	1/16-3/32 (1.5-2)	2,100	5.3 (20)	6.9 (26)	8 (30)	146	(66.2)	24	(10.9)	2	(0.08)
KKB 211	3/32-5/32 (2-4)		10.5 (40)	13.7 (52)	15.8 (60)	230	(104.3)	54	(24.5)	4	(0.17)
KKB 311	1/8-3/16 (3-5)		15.8 (60)	20.5 (78)	20.5 (78)	314	(142.4)	84	(38.1)	6.0	(0.25)
KKB 114	1/16-3/32 (1.5-2)	1,600	7.5 (28)	9.8 (37)	12 (45)	221	(100.2)	40	(18)	5	(0.21)
KKB 214	3/32-5/32 (2-4)		15 (57)	20 (74)	24 (90)	345	(156.5)	80	(36)	11	(0.44)
KKB 314	1/8-3/16 (3-5)		22.5 (84)	29 (111)	36 (135)	470	(213.2)	120	(54)	16	(0.67)
KKB 116	1/16-3/32 (1.5-2)	1,400	9.8 (37)	12.7 (48)	15 (56)	298	(135)	75	(34)	12	(0.51)
KKB 216	3/32-5/32 (2-4)		19.5 (74)	25.4 (96)	29 (111)	650	(295)	143	(65)	25	(1.07)
KKB 118	1/16-1/8 (1.5-2)	1,300	12 (45)	16 (60)	19 (72)	415	(188)	88	(39.9)	18	(0.76)
KKB 218	3/32-5/32 (2-4)		24 (90)	32 (120)	38 (144)	565	(256)	176	(79.8)	36	(1.52)
KKB 318	1/8-3/16 (3-5)		36 (135)	48 (180)	57 (216)	715	(324)	264	(119.7)	54	(2.28)
KKB 119	3/32-5/32 (2-4)	1,200	16 (61)	21 (79)	24 (91)	337	(153)	84	(38)	12.5	(0.53)
KKB 219	3/32-5/32 (2-4)		32 (121)	42 (158)	48 (182)	464	(210)	144	(65)	21.6	(0.91)
KKB 121	3/32-5/32 (2-4)	1,100	15 (57)	20 (74)	24 (90)	600	(272)	138	(63)	34	(1.43)
KKB 221	1/8-3/16 (3-5)		30 (114)	39 (148)	45 (170)	870	(395)	226	(103)	64	(2.70)
KKB 321	5/32-7/32 (4-6)		45 (170)	59 (221)	68 (255)	1,075	(488)	301	(137)	97	(4.09)
KKB 124H	3/32-5/32 (2-4)	960	29 (106)	38 (144)	45 (170)	935	(424)	240	(109)	110	(4.64)
KKB 224H	1/8-3/16 (3-5)		58 (212)	76 (288)	90 (340)	1,500	(680)	410	(186)	210	(8.85)
KKB 324H	5/32-7/32 (4-6)		87 (318)	114 (432)	135 (510)	2,065	(937)	580	(263)	310	(13.07)
KKB 125	3/32-5/32 (2-4)	935	35 (132)	45 (170)	54 (204)	886	(402)	—	—	—	—
KKB 225	1/8-3/16 (3-5)		70 (264)	90 (340)	108 (408)	1,421	(645)	—	—	—	—
KKB 325	5/32-7/32 (4-6)		105 (396)	135 (510)	162 (611)	1,956	(887)	—	—	—	—
KKB 127	3/32-5/32 (2-4)	850	27 (102)	35 (133)	41 (153)	981	(445)	227	(103)	92	(3.87)
KKB 227	1/8-3/16 (3-5)		54 (204)	70 (266)	81 (307)	1,320	(599)	426	(193)	179	(7.55)
KKB 130	3/32-5/32 (2-4)	760	35 (132)	45 (170)	54 (204)	1,134	(514)	263	(119)	139	(5.86)
KKB 230	1/8-3/16 (3-5)		70 (264)	90 (340)	108 (408)	1,850	(839)	530	(240)	275	(11.59)
KKB 330	5/32-7/32 (4-6)		105 (396)	135 (510)	162 (612)	2,565	(1,163)	795	(361)	410	(17.28)
KKB 136H	3/32-5/32 (2-4)	640	75 (284)	98 (369)	120 (454)	2,550	(1,157)	535	(243)	410	(17.28)
KKB 236H	1/8-3/16 (3-5)		150 (568)	195 (738)	240 (908)	4,111	(1,865)	925	(420)	790	(33.31)
KKB 336H	5/32-7/32 (4-6)		225 (852)	294 (1,107)	360 (1,362)	5,595	(2,538)	1,685	(764)	1,621	(68.3)
KKB 436H	3/16-1/4 (5-7)		300 (1,136)	390 (1,476)	450 (1,703)	6,772	(3,072)	2,198	(997)	2,079	(87.6)

Tension Brakes/Very High Heat Capacity

Kopper Kool Brakes

Specifications

Model Size	Pressure Drop Parallel Flow w/ % Ethylene Glycol PSI / (BAR)			Pressure Drop Series Flow w/ % Ethylene Glycol PSI / (BAR)			Maximum Lining Wear		Water Volume in. ³ / (dm ³)
	0%	30%	50%	0%	30%	50%	in./(cm)	in. ³ /(dm ³)	
ATD-									
KKB 108				4 (0.14)	9 (0.62)	9 (0.62)			8 (0.13)
KKB 208	0.9 (0.06)	1.6 (0.11)	2.3 (0.16)	11(0.76)	25 (1.72)	32 (2.21)	0.4 (1.0)	10 (0.2)	16 (0.26)
KKB 308				15(1.03)	34 (2.34)	41 (2.83)			24 (0.4)
KKB 114				4 (0.14)	8 (0.55)	12 (0.83)			20 (0.33)
KKB 214	1.2 (0.08)	1.6 (0.11)	1.8 (0.12)	24(1.66)	40 (2.76)	52 (3.59)	0.5 (1.3)	60 (1.0)	40 (0.65)
KKB 314				28 (1.93)	48 (3.31)	—			60 (1)
KKB 118				7 (0.48)	13 (0.9)	20 (1.38)			48 (0.8)
KKB 218	1.7 (0.12)	2.4 (0.17)	2.8 (0.19)	52 (3.59)	—	—	0.6 (1.5)	75 (1.2)	96 (1.5)
KKB 318				—	—	—			144 (2.35)
KKB 124H				7 (0.48)	11 (0.76)	14 (0.97)			110 (1.8)
KKB 224H	1.9 (0.13)	2.4 (0.17)	3.1 (0.21)	23 (1.59)	35 (2.41)	48 (3.31)	0.8 (2.0)	200 (3.3)	220 (3.6)
KKB 324H				30 (2.07)	46 (3.17)	—			330 (1.8)
KKB 130				9 (0.62)	14 (0.97)	21 (1.45)			190 (3.1)
KKB 230	2.1 (0.14)	2.4 (0.17)	3.1 (0.21)	31 (2.14)	48 (3.31)	—	0.8 (2.0)	240(3.9)	380 (6.2)
KKB 330				40 (2.76)	—	—			570 (9.3)
KKB 136H				14 (0.97)	24 (1.66)	—			285 (4.7)
KKB 236H	4.0 (0.28)	5.3 (0.37)	7.2 (0.50)	60 (4.14)	—	—	0.8 (2.0)	500 (8.2)	570 (9.3)
KKB 336H				—	—	—			855 (14)

PSI Pressure Curves

The cooling water requirements are listed in the specification table. The pressure drop across the brakes is given for both parallel and series flow. This table also indicates the increased flow requirement when using a mixture of ethylene glycol as an antifreeze or for corrosion protection.

The normal water requirement for Kopper Kool brakes and clutches is one gallon of water for each 10 horsepower or one liter of water for each 2 kilowatts being dissipated. This amount of flow will give a temperature rise through the brake of 50° F (28° C). The outlet water temperature should not exceed 170° F (77° C).

The curves shown in Figures 1 and 3 indicate the pressure through the listed units for both parallel and series flow. Also shown in Figure 2 is the flow through the optional triple passage roto-couplings for Kopper Kool clutches. The data in Figures 1, 2, and 3 will aid in estimating pressure drops for different flow requirements.

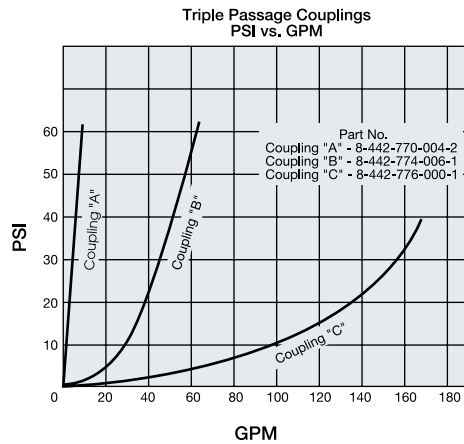


Figure 2

From Figure 2 for 20 GPM PSI drop is 5. The pressure drop would be 6.2 PSI across the inlet and outlet of coupling "B" for this application.

Horsepower ratings as shown are for continuous slip. The ratings can be increased for intermittent service. Please consult the factory for such applications.

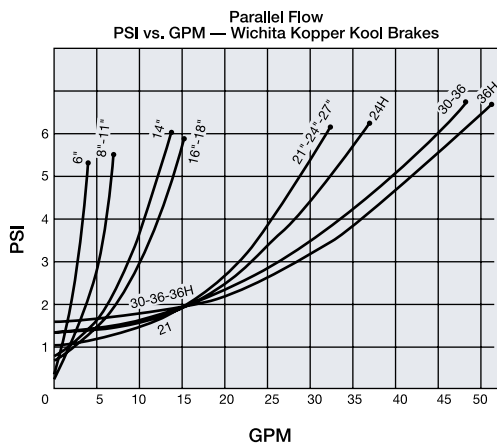


Figure 1

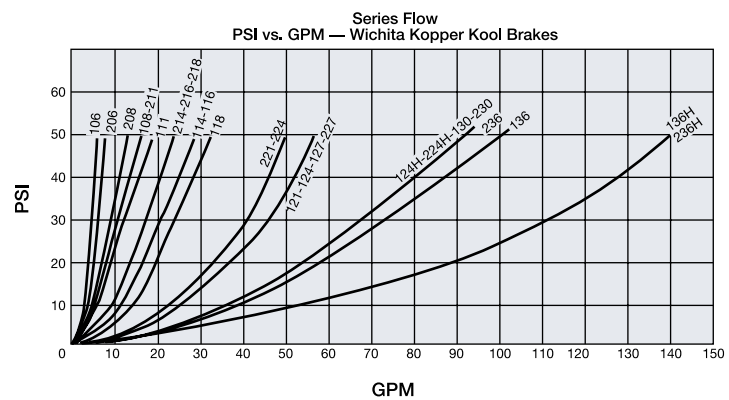


Figure 3

An example of the use of these flow tables is:
An ATD-224H clutch is selected for 200 horsepower @ 190 RPM.

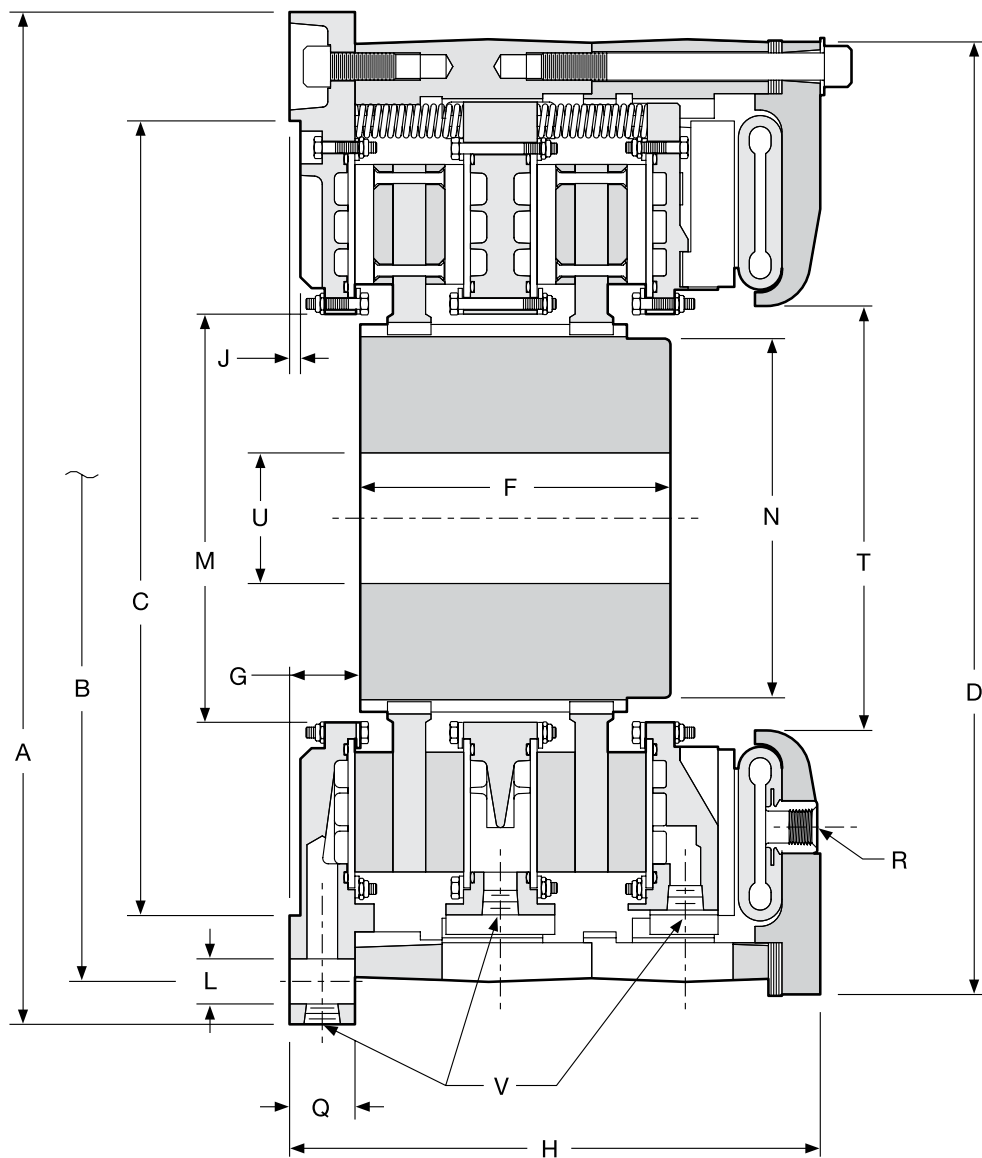
The torque requirement is 66,316 lb.in.

Water flow required = 20 GPM
(4 inlets - 4 outlets @ 5 GPM ea.)

From Figure 1 for 20 GPM
(24H Curve at 5 GPM) PSI drop is 1.2.

Tension Brakes/High Heat Capacity

Kopper Kool Brakes



For mounting hole pattern, see following pages.
For sizes 19 and 25 see page 88.

Tension Brakes/High Heat Capacity

Kopper Kool Brakes

Dimensions: inches (mm)

Model Size ATD-	A Pilot	B Hole Circle	C Pilot	D	F	G	H	J
KKB 106	8.751 / 8.753	8.000	7.377 / 7.379	8.81	2.00 (50.8)	.75(19.1)	5.25 (133.4)	0.13 (3.3)
KKB 206	(222.28 / 222.33)	(203.20)	(187.38 / 187.43)	(223.8)	4.63 (117.6)		7.63 (193.8)	
KKB 108	12.125 / 12.128	11.125	8.375 / 8.378	11.75	2.00 (50.8)		5.68 (144.3)	
KKB 208	(307.98 / 308.05)	(282.58)	(212.73 / 212.80)	(288.5)	4.25 (108)	1.13(28.7)	8.43 (214.1)	0.25 (6.4)
KKB 308					7.00 (177.8)		11.12 (282.4)	
KKB 111	15.997 / 16.000	14.75	11.375 / 11.378	14.75	2.88 (73.2)		6.32 (160.5)	
KKB 211	(406.32 / 406.40)	(374.65)	(288.93 / 289.00)	(374.7)	6.13 (155.7)	.75 (19.1)	9.56 (242.8)	0.25(6.4)
KKB 311					9.12 (231.6)		12.81 (325.4)	
KKB 114	18.747 / 18.750	17.500	14.375 / 14.378	17.50	3.25 (82.6)	1.06(26.9)	7.00 (177.8)	
KKB 214	(476.17 / 476.25)	(444.50)	(365.13 / 365.20)	(444.5)	5.88 (149.4)	1.69 (42.9)	10.57 (268.5)	0.25(6.4)
KKB 314					9.13 (231.9)	1.69 (42.9)	14.13 (358.9)	
KKB 116	21.245 / 21.248	20.000	16.250 / 16.253	20.00	4.00 (101.6)	1.25(31.8)	7.56 (192.0)	0.25(6.4)
KKB 216	(539.62 / 539.70)	(508.00)	(412.75 / 412.83)	(508.0)	7.00 (177.8)		11.50 (292.1)	
KKB 118	23.247 / 23.250	22.000	18.250 / 18.253	21.88	3.63 (92.1.2)	1.06 (26.9)	8.00 (203.2)	
KKB 218	(590.47 / 590.55)	(558.80)	(463.55 / 463.63)	(555.8)	7.13 (181.1)	1.63 (41.4)	12.19 (309.6)	0.25(6.4)
KKB 318					10.75 (273.1)	1.63 (41.4)	16.38 (416.1)	
KKB 121	26.977 / 27.000	25.500	21.375 / 21.378	24.88	5.50 (139.7)	1.25 (31.8)	8.38 (212.9)	
KKB 221	(685.22 / 685.80)	(647.70)	(542.93 / 543.00)	(632.0)	7.94 (201.7)	1.50 (38.1)	15.81 (401.6)	0.25(6.4)
KKB 321					12.44 (316.0)	1.25 (31.8)	17.19 (436.6)	
KKB 124H	29.997 / 30.000	28.750	24.375 / 24.378	31.00	5.00 (127.0)		9.79 (248.7)	
KKB 224H	(761.9 / 762.0)	(730.25)	(619.13 / 619.20)	(787.4)	8.63 (219.2)	1.38 (35.1)	14.68 (372.9)	0.25 (6.4)
KKB 324H					13.63 (346.2)		19.56 (496.8)	

Dimensions: inches (mm)

Model	L					R		U			V ¹ - Inlets	
Size ATD-	No. -	Size	M	N	Q	No. -	Size	T	Min.	Max.	No. -	Size
KKB 106	4 -	0.34 (8.6)	2.94	2.43	0.38	2 -	1/2 NPT	2.00	0.60	1.75	2 -	1/4 NPT
KKB 206			(74.7)	(61.7)	(9.7)			(50.8)	(15.2)	(44.5)	3 -	1/4 NPT
KKB 108											2 -	3/8 NPT
KKB 208	4 -	17/32 (13.5)	4.38	3.50	1.38	2 -	1/2 NPT	3.75	1.00	2.25	3 -	3/8 NPT
KKB 308			(111.3)	(88.9)	(35.1)			(95.3)	(25.4)	(57.2)	4 -	3/8 NPT
KKB 111											2 -	1/2 NPT
KKB 211	4 -	21/32 (16.7)	5.38	4.63	1.13	2 -	1/2 NPT	5.25	1.00	3.00	3 -	1/2 NPT
KKB 311			(136.7)	(117.6)	(28.7)			(133.4)	(25.4)	(76.2)	4 -	1/2 NPT
KKB 114											2 -	1/2 NPT
KKB 214	6 -	21/32 (16.7)	7.38	6.50	1.50	2 -	1/2 NPT	7.00	1.38	4.38	3 -	1/2 NPT
KKB 314			(187.5)	(165.1)	(38.1)			(177.8)	(35.1)	(111.3)	4 -	1/2 NPT
KKB 116											2 -	1/2 NPT
KKB 216	10 -	21/32 (16.7)	8.62	7.50	1.50	2 -	1/2 NPT	8.38	1.38	4.75	3 -	1/2 NPT
KKB 118			(218.9)	(190.5)	(38.1)			(212.9)	(35.1)	(120.7)	2 -	1/2 NPT
KKB 218											3 -	1/2 NPT
KKB 318	10 -	21/32 (16.7)	9.38	8.25	1.50	3 -	1/2 NPT	9.75	2.00	5.50	4 -	1/2 NPT
KKB 121			(238.3)	(209.6)	(38.1)			(247.7)	(50.8)	(139.7)	3 -	3/4 NPT
KKB 221											4 -	3/4 NPT
KKB 321	10 -	21/32 (16.7)	11.38	10.50	1.75	3 -	1/2 NPT	11.38	2.00	6.50	2 -	1 NPT
KKB 124H			(289.1)	(266.7)	(44.5)			(289.1)	(50.8)	(165.1)	3 -	3/4 NPT
KKB 224H											4 -	1 NPT
KKB 324H	10 -	21/32 (16.7)	12.69	11.50	.94	3 -	1/2 NPT	15.12	2.00	7.63	6 -	1 NPT
			(322.3)	(292.1)	(23.9)			(384.0)	(50.8)	(193.8)		

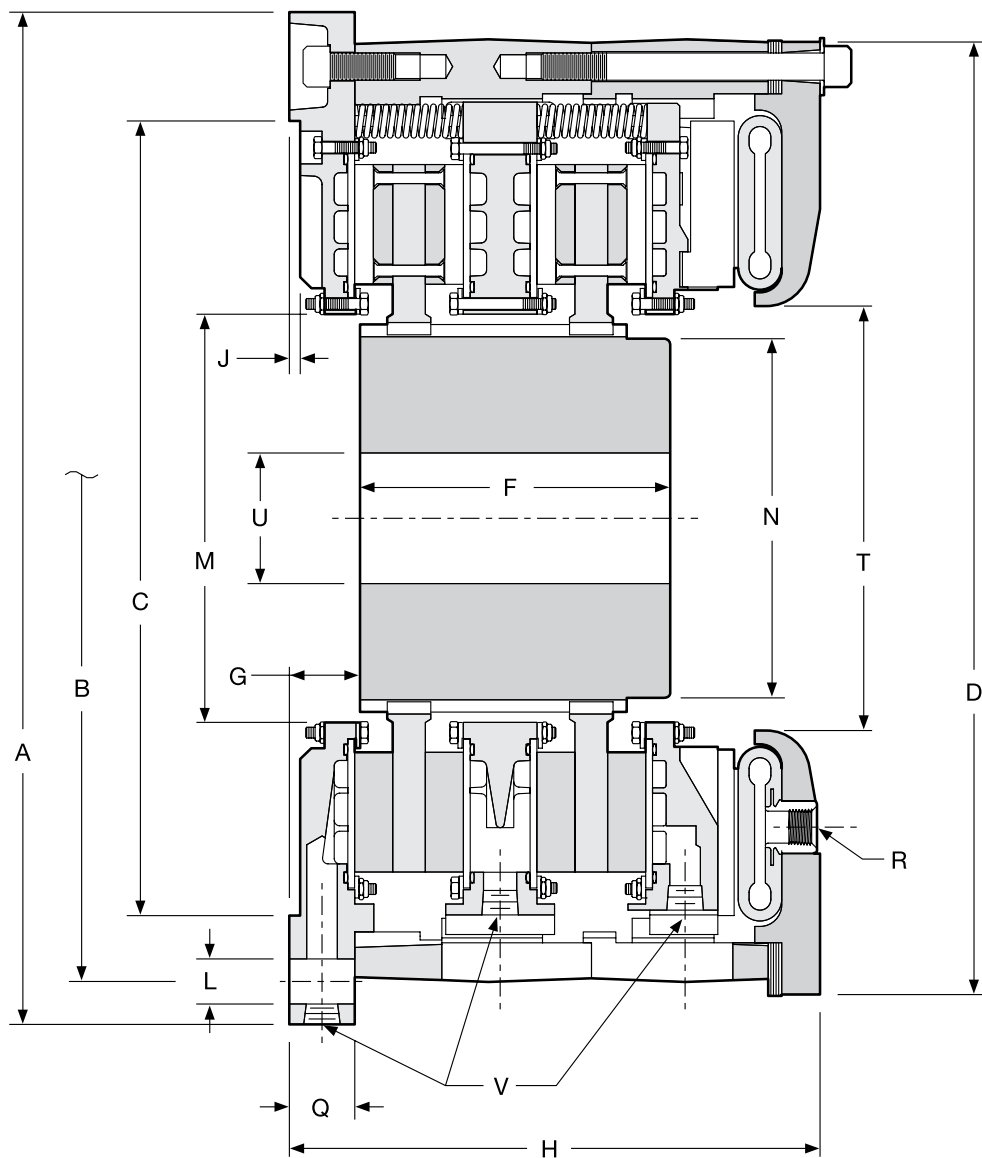
NOTE: For mounting, use socket head capscrews conforming to the ASTM-574-97a.

¹ Number of inlets and outlets are equivalent.

(Consult factory for drawing before final layout.)

Tension Brakes/High Heat Capacity

Kopper Kool Brakes



For mounting hole pattern, see following pages.
For sizes 19 and 25 see page 88.

Tension Brakes/High Heat Capacity

Kopper Kool Brakes

Dimensions: inches (mm)

Model Size ATD-	A Pilot	B Hole Circle	C Pilot	D	F	G	H	J
KKB 127	32.747 / 32.750	31.500	27.375 / 27.378	15.13	5.00 (127)	1.38 (35.1)	9.00 (228.6)	0.25 (6.4)
KKB 227	(831.77 / 831.85)	(800.10)	(695.33 / 695.40)	(384.3)	8.63 (219.2)		13.75 (349.3)	
KKB 130					4.63 (117.6)		9.44 (239.8)	
KKB 230	36.997 / 37.000	35.500	30.375 / 30.378	34.75	9.25 (235)	1.38 (35.1)	14.25 (362)	0.25 (6.4)
KKB 330	(939.72 / 939.80)	(901.70)	(771.53 / 771.60)	(882.7)	13.88 (352.6)		19.00 (482.6)	
KKB 136H					5.63 (143)	1.13 (28.7)	12.63 (320.8)	
KKB 236H	43.497 / 43.500	42.000	36.375 / 36.378	44.50	11.00 (279.4)	1.43 (36.3)	19.26 (489.2)	0.25 (6.4)
KKB 336H	(1,104.82 / 1,104.90)	(1066.80)	(923.93 / 924.00)	(1,130.3)	16.63 (422.4)	1.43 (36.3)	25.76 (654.3)	
KKB 436H	44.50	42.500	36.375 / 36.378	44.50	24.75 (628.7)	1.43 (36.3)	32.26 (819.4)	0.25 (6.4)
	(1,130.3)	(1,079.50)	(923.93 / 924.00)	(1,130.3)				

Dimensions: inches (mm)

Model Size ATD-	L		M	N	Q	R		T	U		V ¹ - Inlets	
	No. -	Size				No. -	Size		Min.	Max.	No. -	Size
KKB 127	14 -	21/32 (16.7)	14.13	12.50	1.75	3 - 1/2 NPT	15.13	2.50	8.00	2 - 3/4 NPT		
KKB 227			(358.9)	(317.5)	(44.5)		(358.9)	(63.5)	(203.2)		3 - 3/4 NPT	
KKB 130	16 -	25/32 (19.8)	15.75	14.25	2.00	4 - 1/2 NPT	17.38	2.50	9.00	2 - 1 NPT		
KKB 230			(400.1)	(362)	(50.8)		(441.5)	(63.5)	(228.6)	4 - 1 NPT		
KKB 330											6 - 1 NPT	
KKB 136H	16 -	13/16 (20.6)	16.50	14.00	1.19	4 - 1/2 NPT	17.38	6.00	9.00	2 - 1.25 NPT		
KKB 236H			(419.1)	(355.6)	(30.2)		(441.5)	(152.4)	(228.6)	4 - 1.25 NPT		
KKB 336H											6 - 1.25 NPT	
KKB 436H	16 -	1.06 (26.9)	16.50	14.00	1.25	4 - 1/2 NPT	17.38	6.00	9.00	8 - 1.25 NPT		
			(419.1)	(355.6)	(31.8)		(441.5)	(152.4)	(228.6)			

NOTE: For mounting, use socket head capscrews conforming to the ASTM-574-97a.

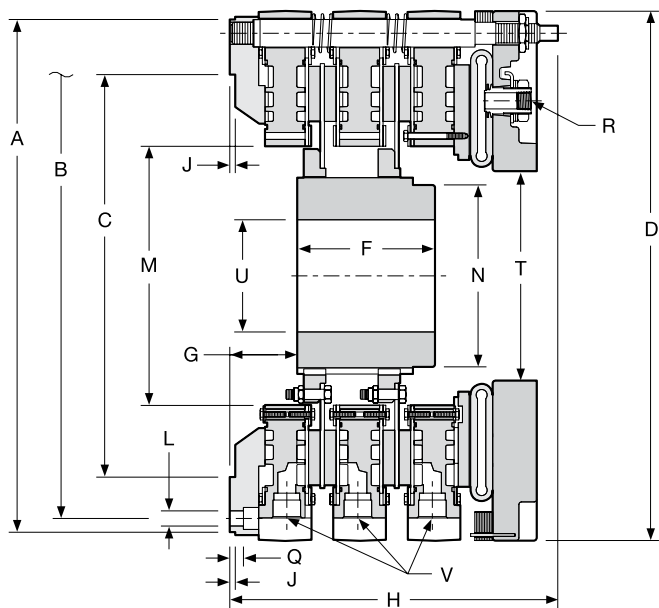
¹ Number of inlets and outlets are equivalent.

(Consult factory for drawing before final layout.)

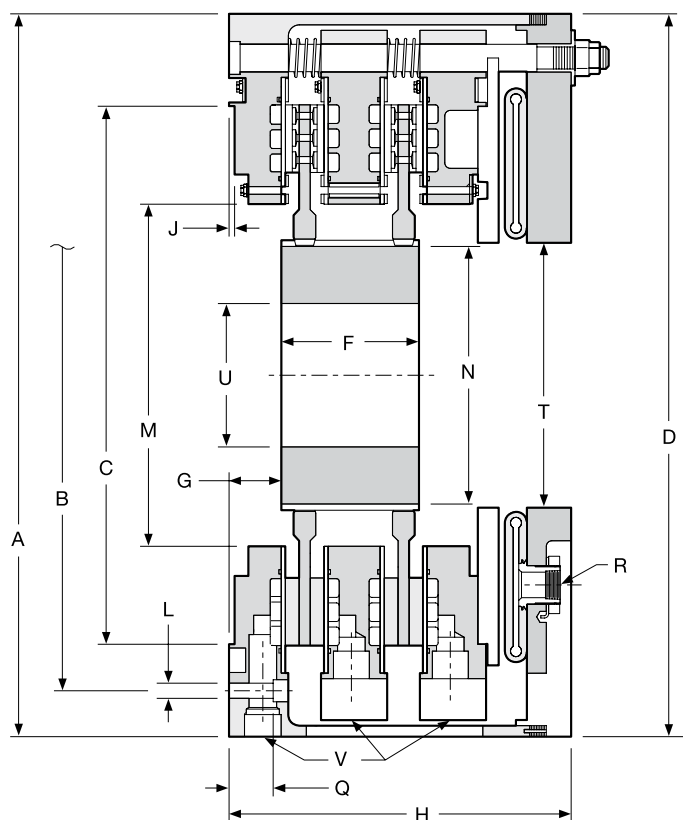
² For information purposes. Not for new applications.

Tension Brakes/High Heat Capacity

Kopper Kool Brakes



Size 19



Size 25

For mounting hole pattern, see following pages.

Tension Brakes/High Heat Capacity

Kopper Kool Brakes

Dimensions: inches (mm)

Model Size ATD-	A Pilot	B Hole Circle	C Pilot	D	F	G	H	J
KKB 119	23.247 / 23.250 (590.47 / 590.55)	22.000 (558.80)	18.253 / 18.256 (463.63 / 463.70)	24.00 (609.6)	3.63 (92.2)	3.00 (76.2)	11.50 (292.1)	0.25 (6.4) KKB
219					6.25 (158.8)	3.06 (77.7)	14.87 (377.7)	
KKB 125					5.00 (127)		11.00 (279)	
KKB 225	32.75 ² (831.9)	28.750 (730.25)	24.375 / 24.378 (619.13 / 619.20)	32.75 (831.9)	6.25 (158.8)	2.36 (59.9)	15.50 (393.7)	0.25 (6.4)
KKB 325					13.62 (346)		19.87 (505)	

Dimensions: inches (mm)

Model Size ATD-	L		M	N	Q	R		T	U		V ¹ - Inlets	
	No. -	Size				No. -	Size		Min.	Max.	No. -	Size
KKB 119	12 -	11/16 (17.5)	11.75 (298.5)	8.25 (209.6)	0.62 (15.7)	4 -	1/2 NPT	9.50 (241.3)	2.75 (70)	5.50 (140)	2 -	1.31-12UN SAE "O" RING
KKB 219											4 -	1.31-12UN SAE "O" RING
KKB 125	12 -	21/32 (16.7)	15.50 (393.7)	11.67 (296.4)	2.00 (50.8)	4 -	1 NPT	12.00 (304.8)	4.00 (102)	8.13 (207)	2 -	1.25 NPT
KKB 225											4 -	1.25 NPT
KKB 325											6 -	1.25 NPT

NOTE: For mounting, use socket head capscrews conforming to the ASTM-574-97a.

¹ Number of inlets and outlets are equivalent.

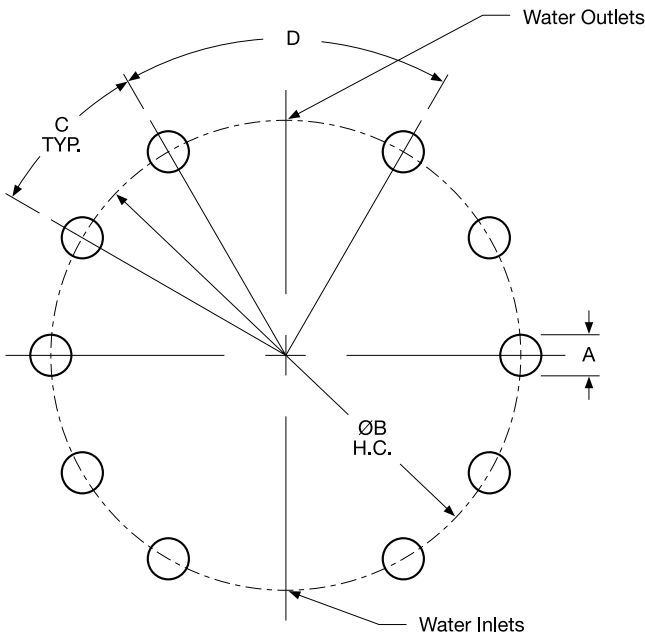
² Not a pilot but a nominal dimension only.

(Consult factory for drawing before final layout.)

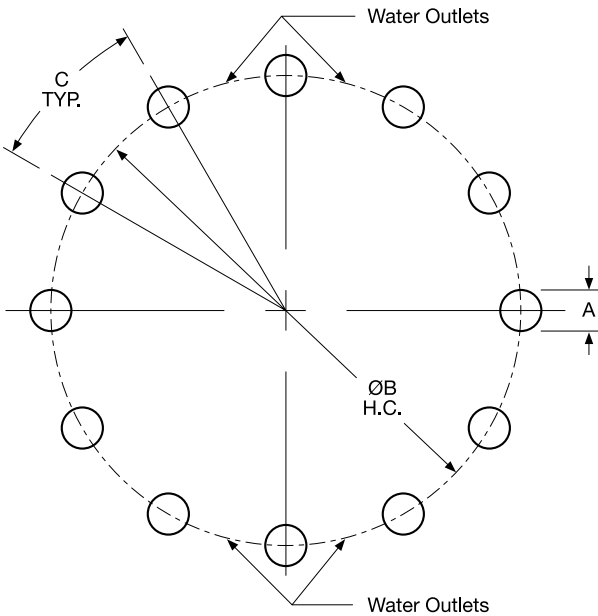
Tension Brakes/High Heat Capacity

Kopper Kool Brakes

Mounting Hole Pattern



KKB Brakes



Sizes 19 & 25

Tension Brakes/High Heat Capacity

Kopper Kool Brakes Mounting Hole Pattern

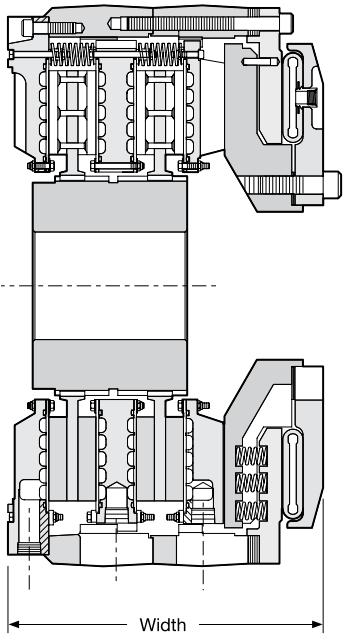
Dimensions: inches (mm)

Model KKB	No. of Mounting Holes	A Size	B Hole Circle	No. of Holes, Hole Pattern is Based	C	D
6	4	0.34 (8.6)	8.000 (203.20)	4	45°	90°
8	4	17/32 (13.5)	11.125 (282.58)	6	60°	120°
11	4	21/32 (16.7)	14.75 (374.65)	6	60°	120°
14	6	21/32 (16.7)	17.500 (444.50)	8	45°	90°
16	10	21/32 (16.7)	20.000 (508.00)	12	30°	60°
18	10	21/32 (16.7)	22.000 (558.80)	12	30°	60°
19	12	11/16 (17.5)	22.000 (558.80)	12	30°	—
21	10	21/32 (16.7)	25.500 (647.70)	12	30°	60°
24H	10	21/32 (16.7)	28.750 (730.25)	12	30°	60°
25	12	21/32 (16.7)	28.750 (730.25)	12	30°	—
27	14	21/32 (16.7)	31.500 (800.10)	16	22.5°	45°
30	16	25/32 (19.8)	35.500 (901.70)	18	20°	40°
36H	16	13/16 (20.6)	42.000 (1,066.80)	18	20°	40°
436H	16	1.06 (26.9)	42.500 (1,079.50)	18	20°	40°
46	22	1.03 (26.2)	56.750 (1,441.45)	24	15°	30°

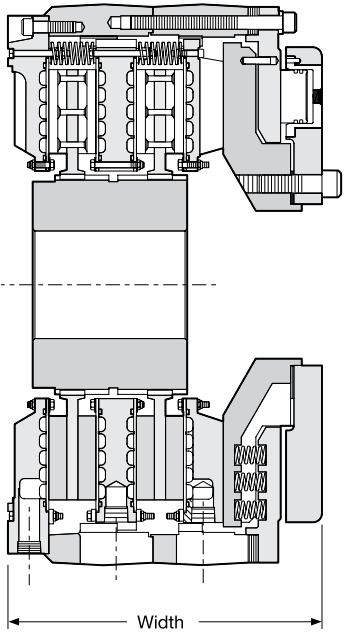
Tension Brakes/High Heat Capacity

Kopper Kool Brakes

Spring-Set Brakes



KKSS Brake



KKSS-HYD Brake

See previous pages for dimensional information.

Tension Brakes/High Heat Capacity

Kopper Kool Brakes Spring-Set Brakes

Dimensions: inches (mm)

Model Size ATD-	Assembly Number	lb.in.	Nm	Dynamic Torque Capacity*		Width	
				Release Pressure		in.	(mm)
				PSI	BAR		
KKSSB 218	7-318-210-113-0	48,000	5,434	90	6.2	15.00	(381)
KKSSB 224H	7-325-210-106-0 ³	104,800	11,840	75	5.2	17.59	(446.8)
KKSSB-HYD 124H	7-325-110-107-0	88,000	9,942	1,280	88.3	12.63	(320.8)
KKSSB-HYD 224H	7-325-210-107-0	160,000	18,077	1280	88.3	17.52	(445)
KKSSB 330H	7-331-310-300-0 ¹	748,900	84,612	100	6.9	22.69	(576.3)
KKSSB 236H ⁴	7-337-210-304-0 ²	649,400	73,370	120	8.3	22.03	(559.6)
KKSSB 336H ⁴	7-337-310-107-0 ^{1,2}	1,177,800	133,070	100	6.9	28.60	(726.4)
KKSSB 336H ⁴	7-337-310-106-0 ²	940,600	106,270	120	8.3	28.60	(726.4)

* Static torque will vary with temperature.

Note: Maximum water jacket inlet pressure is 60 PSI.

Brakes with as great as 50% higher torque capacity is available upon request.

¹ Current design is with enhanced linings. A unit with regular linings is available upon request.

² Current design is with the Marine Corrosion package. A Non-Marine unit is available upon request.

³ Current design is without hub. A unit with hub is available upon request.

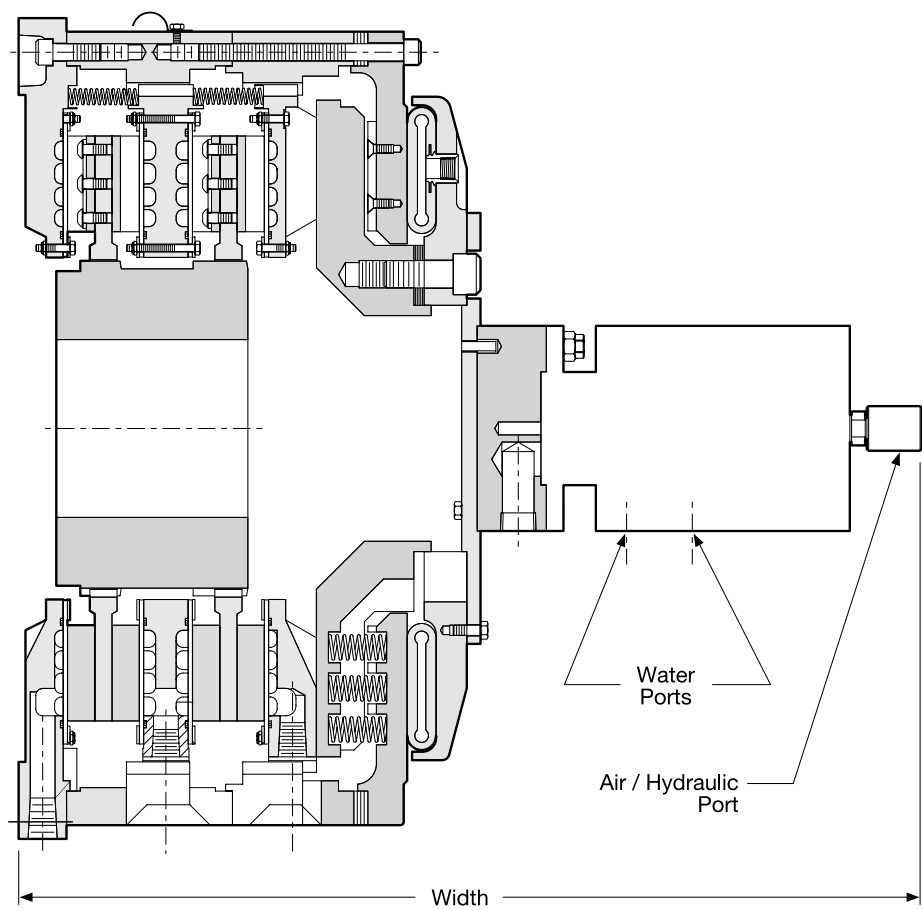
⁴ Mounting same as 436H KK except with 42.500" (1,079.5 mm) hole circle.

Feature Differences: The KKSS brake uses air to release the brake, where as the KKSS-HYD brake uses hydraulic pressure to release the brake.

Tension Brakes/High Heat Capacity

Kopper Kool Custom Units

KKSS Clutch



See previous pages for dimensional information.

Tension Brakes/High Heat Capacity

Kopper Kool Custom Units

KKSS Clutch

Dimensions: inches (mm)

Model Size ATD-	Assembly Number	Dynamic Torque Capacity* with Release Pressure lb.in.(Nm)	PSI (BAR)	Heat Capacity HP(kW)	Roto - Coupling NPT	Max. Speed		Width in.(mm)
						R/C RPM	Unit RPM	
KKSSC 224	6-324-210-102-0 ²	74,250 (8,389)	75 (5.2)	347 ⁵ (260) ⁵	1-1/4"	40	475	33.00 (838.2)
KKSSC 324	6-324-310-102-0 ²	110,700 (12,507)	75 (5.2)	400 ⁶ (300) ⁶	1-1/4"	40	475	37.58 (954.5)
KKSSC 224H	6-325-210-100-0 ^{1,2}	157,225 (17,764)	75 (5.2)	566 ⁷ (425) ⁷	1-1/2"	250	475	38.87 (987.3)
KKSSC 324H	6-325-310-100-0 ^{1,2}	278,700 (31,488)	95 (6.6)	400 ⁷ (300) ⁷	1-1/4"	40	475	39.03 (991.4)
KKSSC 236H	TBD ^{2,3}	542,100 (61,247)	100 (6.9)	1,300 ⁶ (975) ⁶	2"	250	300	32.25 (819.2)
KKSSC-HYD 236H	6-337-210-100-0 ^{2,3}	542,100 (61,247)	1,450 (100.0)	1,300 ⁶ (975) ⁶	2"	250	300	32.25 (819.2)

* Static torque will vary with temperature.

Note: Maximum water jacket inlet pressure is 60 PSI.

Brakes with as great as 50% higher torque capacity is available upon request.

¹ Current design is with enhanced linings. A unit with regular linings is available upon request.

² Current design is with the Marine Corrosion package. A Non-Marine unit is available upon request.

³ Mounting same as 436H KK except with 42.500" (1,079.5 mm) hole circle.

⁵ Series hosing

⁶ Parallel hosing

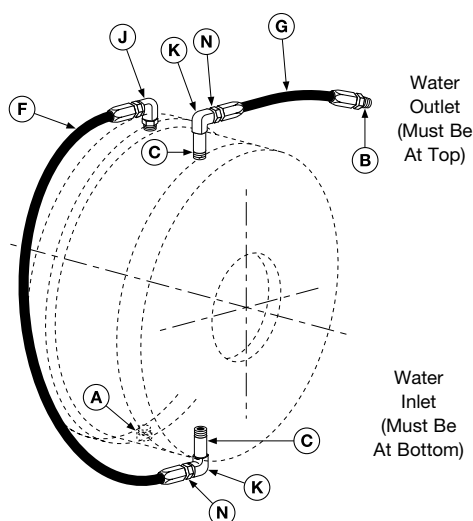
⁷ Partial-parallel hosing

Feature Differences: The KKSS clutch uses air to release the clutch where as; the KKSS-HYD clutch uses hydraulic pressure to release the clutch.

Tension Brakes/High Heat Capacity

Series Water Hose Kits for Kopper Kool Brakes, KKB and Steel Water Cooled Brakes, SWCB

Wichita Water Hose kits contain all necessary fittings, hoses, and connections to completely plumb the brake water system. Customer needs to connect water input at the bottom of the brake and the output water connections at the top of the brake.



Single plate

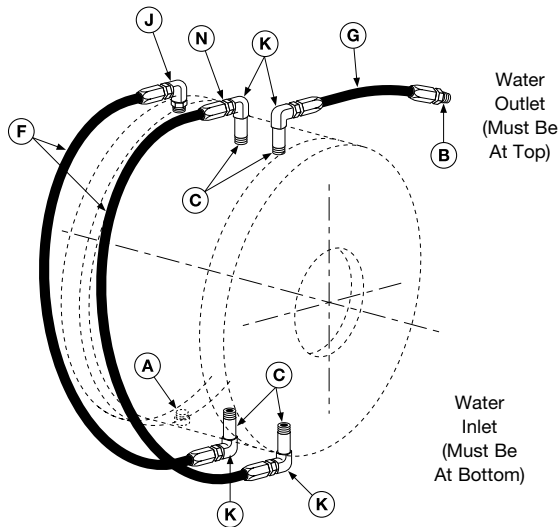
Model Size	ATD- Water Hose Kit Number*	A Inlet Size	B Inlet Size	C Pipe Nipple Part Number	Qty	D Pipe Nipple Part Number	Qty	E Pipe Nipple Part Number	Qty	F Hose Part Number	Qty	G Hose Part Number	Qty
108 KKB	8-908-999-901-5	3/8" NPT	3/8" NPT	2-200-036-122-0	2	—	—	—	—	2-403-240-033-1	1	2-403-110-133-1	1
208 KKB	8-908-999-902-5	3/8" NPT	3/8" NPT	2-200-036-122-0	4	—	—	—	—	2-403-240-033-1	2	2-403-110-133-1	1
308 KKB	8-908-999-903-5	3/8" NPT	3/8" NPT	2-200-036-122-0	6	—	—	—	—	2-403-240-033-1	3	2-403-110-133-1	1
114 KKB	8-914-999-901-6	1/2" NPT	3/4" NPT	2-200-037-122-0	2	—	—	—	—	2-404-320-044-1	1	2-404-110-144-1	1
214 KKB	8-914-999-902-6	1/2" NPT	3/4" NPT	2-200-037-122-0	4	—	—	—	—	2-404-320-044-1	2	2-404-110-144-1	1
314 KKB	8-914-999-903-6	1/2" NPT	3/4" NPT	2-200-037-122-0	6	—	—	—	—	2-404-320-044-1	3	2-404-110-144-1	1
118 KKB	8-918-999-901-6	1/2" NPT	3/4" NPT	2-200-037-122-0	2	—	—	—	—	2-404-380-044-1	1	2-404-110-144-1	1
218 KKB	8-918-999-902-6	1/2" NPT	3/4" NPT	2-200-037-122-0	4	—	—	—	—	2-404-380-044-1	2	2-404-110-144-1	1
318 KKB	8-918-999-903-6	1/2" NPT	3/4" NPT	2-200-037-122-0	6	—	—	—	—	2-404-380-044-1	3	2-404-110-144-1	1
124H SWCB	8-924-999-901-6	1/2" NPT	3/4" NPT	2-200-060-122-0	2	—	—	—	—	2-404-500-044-1	1	2-404-110-144-1	1
224H SWCB	8-924-999-902-6	1/2" NPT	3/4" NPT	2-200-060-122-0	4	—	—	—	—	2-404-500-044-1	2	2-404-110-144-1	1
324H SWCB	8-924-999-903-6	1/2" NPT	3/4" NPT	2-200-060-122-0	6	—	—	—	—	2-404-500-044-1	3	2-404-110-144-1	1
124H KKB	9-925-999-901-7	1" NPT	1" NPT	2-200-051-122-0	2	—	—	—	—	2-405-500-055-1	1	2-405-110-155-1	1
224H KKB	8-925-999-902-7	1" NPT	1" NPT	2-200-051-122-0	4	2-200-082-122-0	2	2-200-017-122-0	1	2-405-500-055-1	2	2-405-110-155-1	1
324H KKB	8-925-999-903-7	1" NPT	1" NPT	2-200-051-122-0	6	2-200-082-122-0	4	2-200-017-122-0	1	2-405-500-055-1	3	2-405-110-155-1	1
130 SWCB	8-930-999-901-7	3/4" NPT	1" NPT	2-200-061-122-0	2	—	—	—	—	2-405-620-055-1	1	2-405-200-155-1	1
230 SWCB	8-930-999-902-7	3/4" NPT	1" NPT	2-200-061-122-0	4	—	—	—	—	2-405-620-055-1	2	2-405-200-155-1	1
330 SWCB	8-930-999-903-7	3/4" NPT	1" NPT	2-200-061-122-0	6	—	—	—	—	2-405-620-055-1	3	2-405-200-155-1	1
130 KKB	8-930-999-901-9	1" NPT	1-1/2" NPT	2-200-062-122-0	2	—	—	—	—	2-407-620-077-1	1	2-407-200-177-1	1
230 KKB	8-930-999-902-9	1" NPT	1-1/2" NPT	2-200-062-122-0	4	2-200-092-122-0	2	2-200-017-122-0	1	2-407-620-077-1	4	2-407-200-177-1	1
330 KKB	8-930-999-903-9	1" NPT	1-1/2" NPT	2-200-062-122-0	6	2-200-092-122-0	4	2-200-017-122-0	1	2-407-620-077-1	3	2-407-200-177-1	1
136 SWCB	8-936-999-901-7	3/4" NPT	1" NPT	2-200-061-122-0	2	—	—	—	—	2-405-680-055-1	1	2-405-200-155-1	1
236 SWCB	8-936-999-902-7	3/4" NPT	1" NPT	2-200-061-122-0	4	—	—	—	—	2-405-680-055-1	2	2-405-200-155-1	1
336 SWCB	8-936-999-903-7	3/4" NPT	1" NPT	2-200-061-122-0	6	—	—	—	—	2-405-680-055-1	3	2-405-200-155-1	1
136H KKB	8-937-999-901-9	1-1/4" NPT	1-1/2" NPT	2-200-063-122-0	2	—	—	—	—	2-407-680-077-1	1	2-407-200-155-1	1
236H KKB	8-937-999-902-9	1-1/4" NPT	1-1/2" NPT	2-200-063-122-0	4	2-200-104-122-0	2	2-200-018-122-0	1	2-407-680-077-1	2	2-407-200-155-1	1
336H KKB	8-937-999-903-9	1-1/4" NPT	1-1/2" NPT	2-200-063-122-0	6	2-200-104-122-0	4	2-200-018-122-0	1	2-407-680-077-1	3	2-407-200-155-1	1

* Denotes complete hose kit

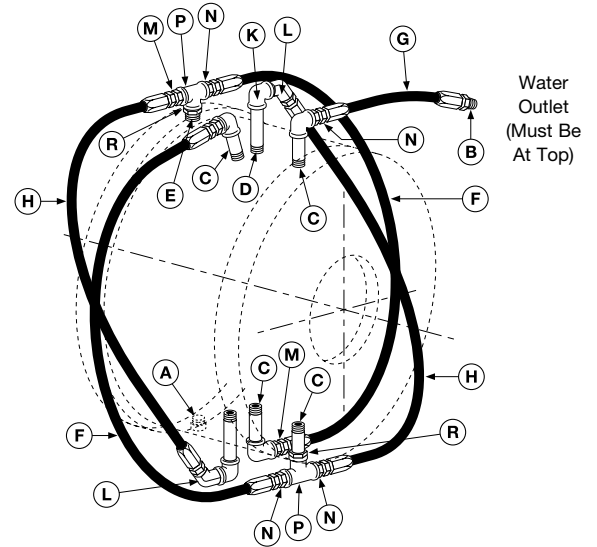


Tension Brakes/High Heat Capacity

Series Water Hose Kits for Kopper Kool Brakes, KKB and Steel Water Cooled Brakes, SWCB



Double Plate
Sizes 208 through 318



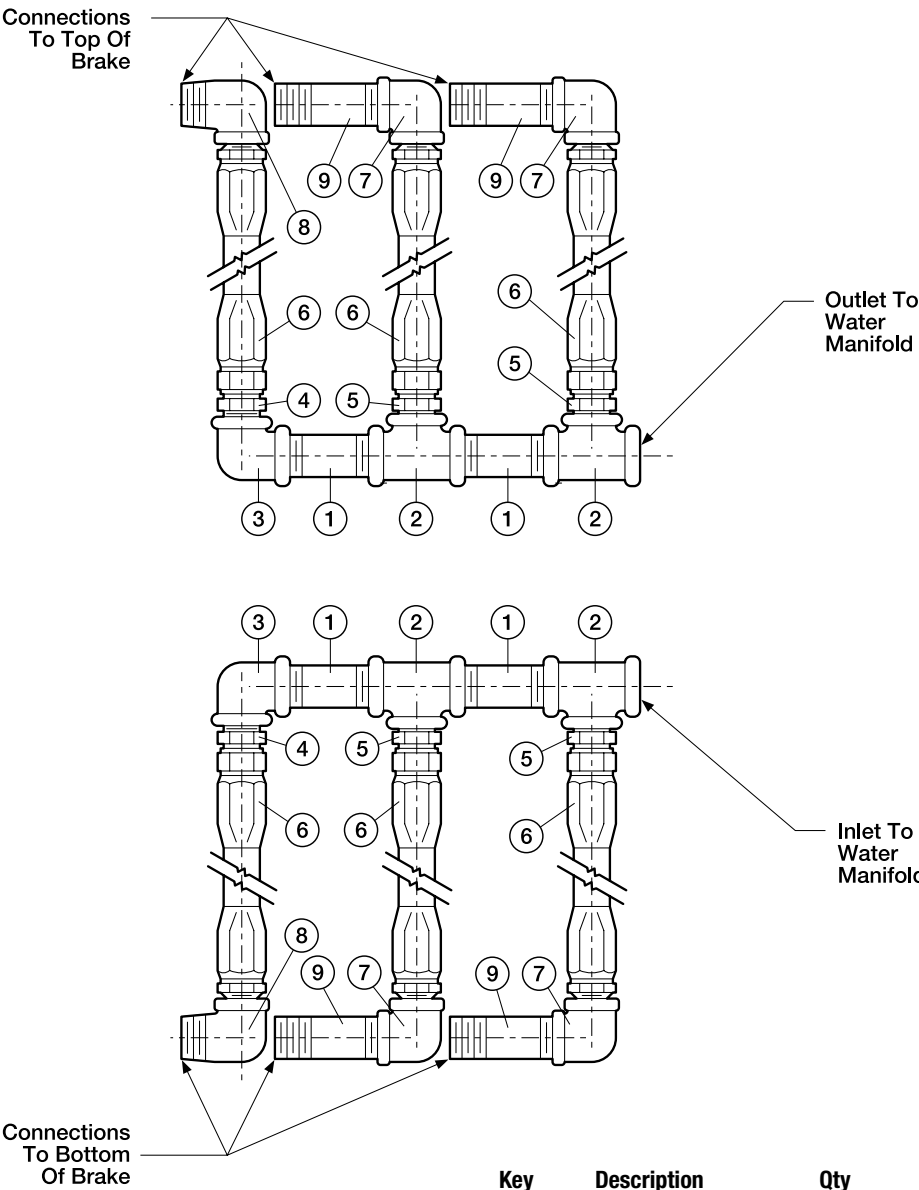
Double Plate
Sizes 224H through 336H

Model Size ATD-	H Hose Part Number	Qty	J Elbow 90 Part Number	Qty	K Elbow 90 Part Number	Qty	L Elbow 45 Part Number	Qty	M Adaptor Part Number	Qty	N Adaptor Part Number	Qty	P Pipe Tee Part Number	Qty
108 KKB	—	—	2-303-027-020-0	1	2-302-027-020-0	2	—	—	—	—	—	—	—	—
208 KKB	—	—	2-303-027-020-0	1	2-302-027-020-0	4	—	—	—	—	—	—	—	—
308 KKB	—	—	2-303-027-020-0	1	2-302-027-020-0	6	—	—	—	—	—	—	—	—
114 KKB	—	—	2-303-039-020-0	1	2-302-039-020-0	2	—	—	—	—	—	—	—	—
214 KKB	—	—	2-303-039-020-0	1	2-302-039-020-0	4	—	—	—	—	—	—	—	—
314 KKB	—	—	2-303-039-020-0	1	2-302-039-020-0	6	—	—	—	—	—	—	—	—
118 KKB	—	—	2-303-039-020-0	1	2-302-039-020-0	4	—	—	—	—	—	—	—	—
218 KKB	—	—	2-303-039-020-0	1	2-302-039-020-0	6	—	—	—	—	—	—	—	—
318 KKB	—	—	2-303-039-020-0	1	2-302-039-020-0	4	—	—	—	—	—	—	—	—
124H SWCB	—	—	2-303-039-020-0	1	2-302-039-020-0	6	—	—	—	—	—	—	—	—
224H SWCB	—	—	2-303-039-020-0	1	2-302-039-020-0	6	—	—	—	—	—	—	—	—
324H SWCB	—	—	2-303-062-001-0	1	2-302-062-001-0	2	—	—	—	—	—	—	—	—
124H KKB	2-405-500-055-1	2	—	—	2-302-062-001-0	5	2-307-062-001-0	2	2-300-062-001-0	2	2-300-062-001-0	5	2-214-041-412-0	2
224H KKB	2-405-500-055-1	3	—	—	2-302-062-001-0	9	2-307-062-001-0	4	2-300-062-001-0	4	2-300-062-001-0	5	2-214-041-412-0	2
324H KKB	—	—	2-303-051-001-0	1	2-210-036-112-0	2	—	—	—	—	—	—	2-300-062-001-0	2
130 SWCB	—	—	2-203-051-001-0	1	2-210-036-112-0	4	—	—	—	—	—	—	2-300-062-001-0	4
230 SWCB	—	—	2-303-064-001-0	1	2-210-041-112-0	6	—	—	—	—	—	—	2-300-062-001-0	6
330 SWCB	—	—	2-303-064-001-0	1	2-210-041-112-0	2	—	—	—	—	—	—	2-300-064-001-0	2
130 KKB	—	—	2-210-041-112-0	5	2-307-064-001-0	2	2-300-064-001-0	2	2-300-064-001-0	5	2-214-041-112-0	2	—	—
230 KKB	—	—	2-407-620-077-1	3	2-210-041-112-0	9	2-307-064-001-0	2	2-300-064-001-0	4	2-300-064-001-0	5	2-214-041-112-0	2
330 KKB	—	—	2-303-051-001-0	1	2-210-036-112-0	2	—	—	—	—	—	—	2-300-062-001-0	2
136 SWCB	—	—	2-303-051-001-0	1	2-210-036-112-0	4	—	—	—	—	—	—	2-300-062-001-0	4
236 SWCB	—	—	2-303-051-001-0	1	2-210-036-112-0	6	—	—	—	—	—	—	2-300-062-001-0	6
336 SWCB	—	—	2-303-075-001-0	1	2-210-046-112-0	2	—	—	—	—	—	—	2-300-075-001-0	2
136H KKB	2-407-660-077-1	2	—	—	2-210-046-112-0	5	2-300-075-001-0	2	2-300-075-001-0	2	2-300-075-001-0	5	2-214-073-112-0	2
236H KKB	2-407-660-077-1	3	—	—	2-210-046-112-0	9	2-300-075-001-0	4	2-300-075-001-0	4	2-300-075-001-0	5	2-214-073-112-0	2
336H KKB	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Tension Brakes/High Heat Capacity

Kopper Kool Brakes

Parallel Water Hose Kits



Key	Description	Qty
1	Nipple	4
2	Pipe Tee	4
3	Elbow	2
4	Straight Adapter	2
5	Straight Adapter	4
6	Hose Rigid to Swivel	6
7	Elbow	2
8	Street Elbow	2
9	Nipple	4

Tension Brakes/High Heat Capacity

Kopper Kool Brakes Parallel Water Hose Kits

Dimensions: inches (mm)

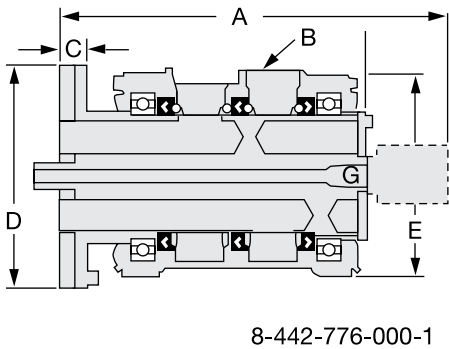
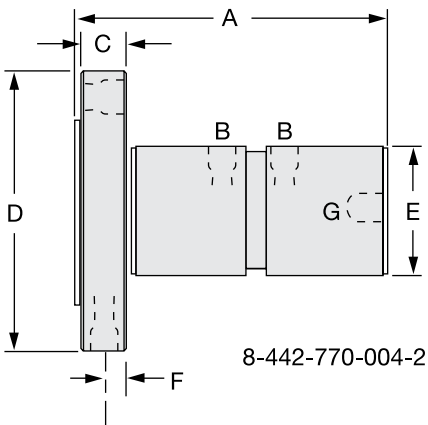
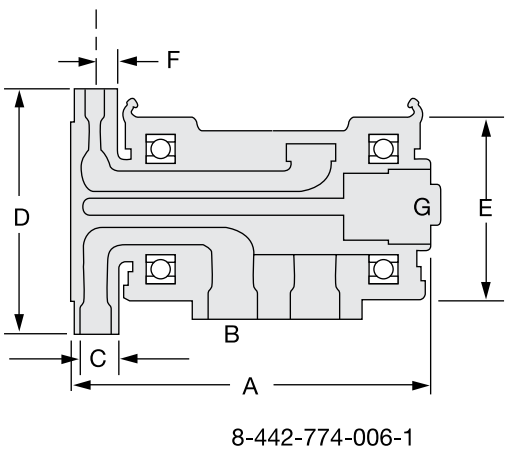
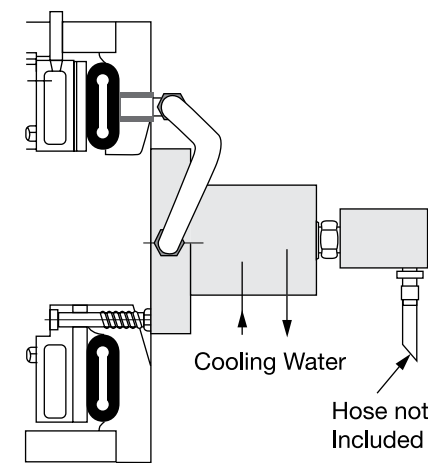
Model Size ATD-	Parallel Water Hose Kit	Manifold Inlet - Outlet Size	Water Jacket Inlet - Outlet Size
KKB 208	8-908-999-904-5	3/4" NPT	3/8" NPT
KKB 308	8-908-999-905-5	3/4" NPT	
KKB 111	8-916-999-905-5	3/4" NPT	1/2" NPT
KKB 211	8-916-999-903-5	3/4" NPT	
KKB 311	8-916-999-904-5	1" NPT	
KKB 114	8-916-999-905-5	3/4" NPT	1/2" NPT
KKB 214	8-916-999-903-5	3/4" NPT	
KKB 314	8-916-999-904-5	1" NPT	
KKB 116	8-916-999-905-5	3/4" NPT	1/2" NPT
KKB 216	8-916-999-903-5	3/4" NPT	
KKB 316	8-916-999-904-5	1" NPT	
KKB 118	8-916-999-905-5	3/4" NPT	1/2" NPT
KKB 218	8-916-999-903-5	3/4" NPT	
KKB 318	8-916-999-904-5	1" NPT	
KKB 119	8-919-999-906-7	1-1/4" NPT	1-5/16" -12 UN SAE "O" – RING
KKB 219	8-919-999-907-7	2" NPT	

C

Tension Brakes/High Heat Capacity

Kopper Kool Brakes

3-Way Roto-Coupling (for water-cooled Clutches)



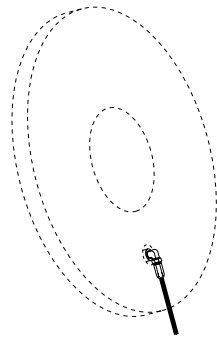
Dimensions: inches (mm)

Wichita Part No.	A	B	C	D	E	F	Thread Size
							G
8-442-770-004-2	7.250	3/8"-18 NPT	1.00	6.50	3.000	.50	5/8"-18
8-442-774-006-1	11.000	1-1/4"-11-1/2 NPT	1.375	7.25	5.375	.687	1/4" NPT
8-442-776-000-1	18.875	2"-11-1/2 NPT	1.250	10.00	9.000	—	1"-14

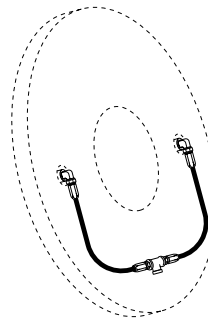


Tension Brakes/High Heat Capacity

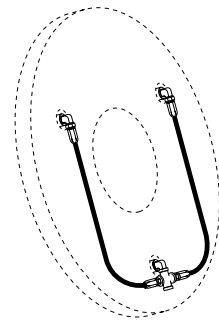
Kopper Kool Brake Air Hose Kits



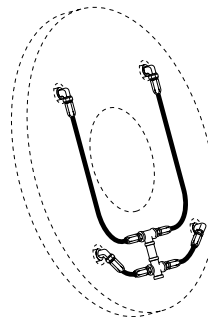
Model	Part Number
8"	8-908-912-100-5 8-908-924-100-5 QRV



Model	Part Number
6"	8-906-912-200-4 8-906-931-201-5 QRV
8"	8-908-913-200-5 8-908-931-200-5 QRV
11"	8-911-913-200-5 8-911-931-200-5 QRV
14"	8-914-913-200-5 8-914-921-200-5 QRV
16"	8-916-913-200-5 8-916-921-200-5 QRV



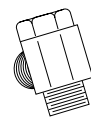
Model	Part Number
18"	8-918-912-200-5 8-918-931-200-5 QRV
21"	8-921-913-200-5 8-921-931-200-5 QRV
24"	8-924-913-200-5 8-924-931-200-5 QRV
27"	8-927-913-200-5 8-927-921-200-5 QRV



Model	Part Number
30"	8-930-913-400-5 8-930-931-400-5 QRV
36"	8-936-913-400-6 8-936-931-400-6 QRV
42"	8-942-913-400-6 8-924-931-400-6 QRV
48"	8-948-912-400-6 8-948-923-400-6 QRV

Air hose kits contain all necessary parts (fittings, hoses and extensions) to completely plumb the brake air system.

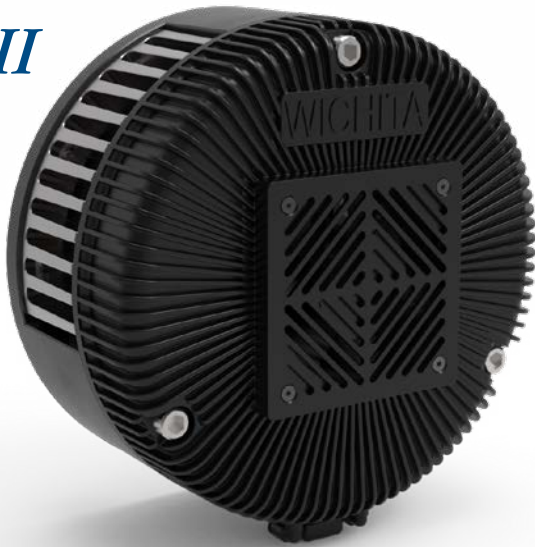
Optional Quick Release Valves can replace elbows on most units (see page 121).



Tension Brakes/Air Cooled

Mistral II Brakes

Mistral II



Wichita Clutch developed the Mistral II series of pneumatic tension brakes to meet the needs of the global paper converting industry. Building on the success of the original Mistral design widely used in corrugating, foil and film processing, and paper converting lines, the new range addresses market demand for an updated brake without compromising the industry-leading performance of the legacy model.

Extensively tested in-house, the Mistral II has been benchmarked against products from competing brands and meets or exceeds all performance criteria. The result is a compact, high-performance and versatile product capable of fulfilling tensioning needs of the latest machine designs.

Safety

Mistral II retains the integral guard of the original, eliminating the costs associated with providing additional guarding.

Design

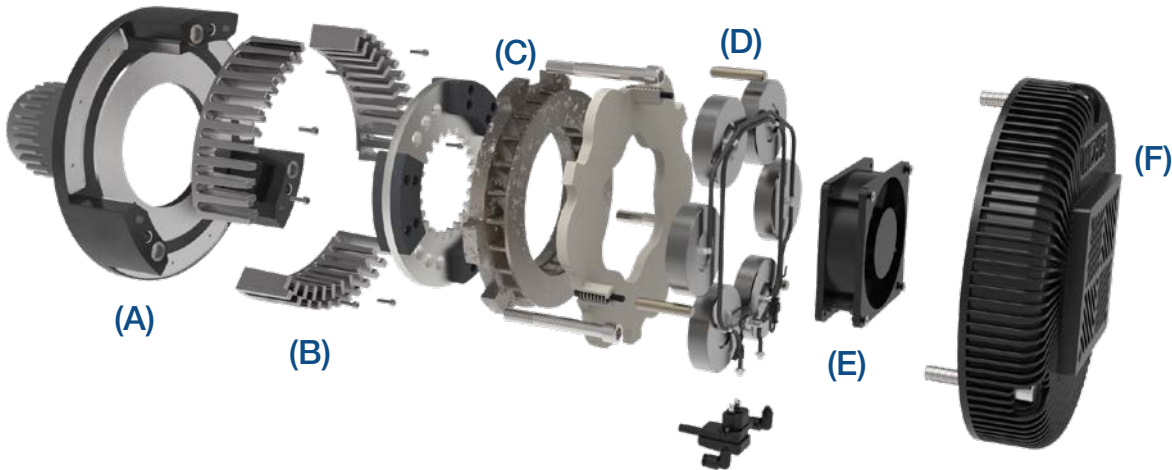
Mistral II is compact at 295 mm diameter, facilitating the pick-up of small or part-reels used in short batch runs. The new, vented housing is semi-gloss black powder coated for durability and aesthetics. Internally, an integrated high-performance, low energy cooling fan enables high heat dissipation to support increased productivity. Removing just three cap screws provides access to the internal parts. Fine tuning of torque capacity is achieved with a variable number of actuators for optimum tension control.

Mounting

Three bolts mount the brake to the arm of the mill roll stand or machine frame and a pilot location simplifies new build and retro-fit installations.

Fine Tuning

The brake may be fitted with a variable number of actuators, allowing precise selection of brake torque capacity for optimum tension control.



Exploded view of the Mistral II, showing major components (A) ring and backplate, (B) heat sinks, (C) floating plate, (D) actuator assembly, (E) Fan and (F) cover

Mistral II

Front Cover Fixing

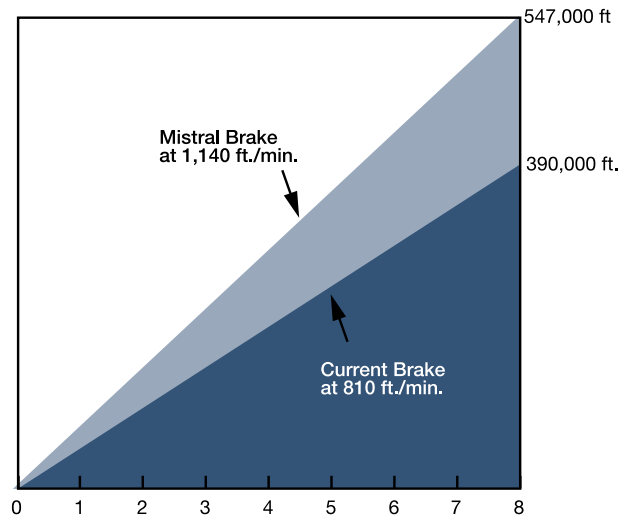
By removing just three cap screws, the front cover can be removed, allowing easy and fast access to the internal parts, which will also automatically disconnect the air and electricity supply.

Integrated Cooling

A high performance, low energy cooling fan is housed within the brake to provide high heat dissipation - a must for higher productivity through controlled tension at high web speeds.



Performance Curve



Performance

Model	Dynamic Slipping Torque Capacity			Heat Transfer Capacity			Max Speed	Inertia of Rotating Parts	Weight	
									Total Brake	Rotating Parts
	Standard Friction Material			No Fan	With Fan					
	0.2 bar	5.5 bar	6 bar		Cont.	30 Min On/Off				
	Nm	Nm	Nm	kW	kW	kW				
200/2	7	198	216	1.1	2.4	2.8	2860	0.01	21.3	3.5
200/4	14	396	432						21.8	
200/6	22	594	648						22.2	

The Mistral II is highly linear in its response: The dynamic braking torque is directly proportional to the incoming air supply pressure and the quantity of actuators employed.

Tension Brakes/Air Cooled

Mistral II Brakes

Selecting a Mistral Brake for a Corrugator Tension – unwind application

To properly select a tension brake for an unwind application the following information is needed.

Application Data

Max. Roll Dia. 48 in.
Max. Web Width. 36 in.
Max. Web Speed 1200 FPM
Max. Tension 2 PLI
Shaft Size 2 in.
Min. Roll Dia. 6 in.
Min. Web Width 36 in.
Min. Web Speed. 1000 FPM
Min. Tension. 1 PLI
Air Pressure Available 80 PSI

Calculations

Using the calculations below, consult Specifications Chart, page 103.

The brake selected for this application is a Mistral 200/2 with 2-1/4 inch bore.

Max. Tension = Max. PLI x Max. Web Width
= 2 x 36 = 72 lbs.

Max. Torque = $\frac{\text{Max. Tension} \times \text{Max. Roll Dia.}}{2}$
= $\frac{72 \times 48}{2} = 1,728 \text{ lb.in.}$

Max. RPM = $\frac{\text{Max. Web Speed} \times 3.82}{\text{Min. Roll Dia.}}$
= $\frac{1,200 \times 3.82}{6} = 764 \text{ RPM}$

Heat HP = $\frac{\text{Max. Tension} \times \text{Max. Web Speed}}{33,000}$
= $\frac{72 \times 1,200}{33,000} = 2.6 \text{ Heat HP}$

Min. Tension = Min. PLI x Min. Web Width
= 1 x 36 = 36 lbs.

Min. Torque = $\frac{\text{Min. Tension} \times \text{Min. Roll Dia.}}{2}$
= $\frac{36 \times 6}{2} = 108 \text{ lb.in.}$

Min. RPM = $\frac{\text{Min. Web Speed} \times 3.82}{\text{Max. Roll Dia.}}$
= $\frac{1,000 \times 3.82}{48} = 79 \text{ RPM}$

How to Select

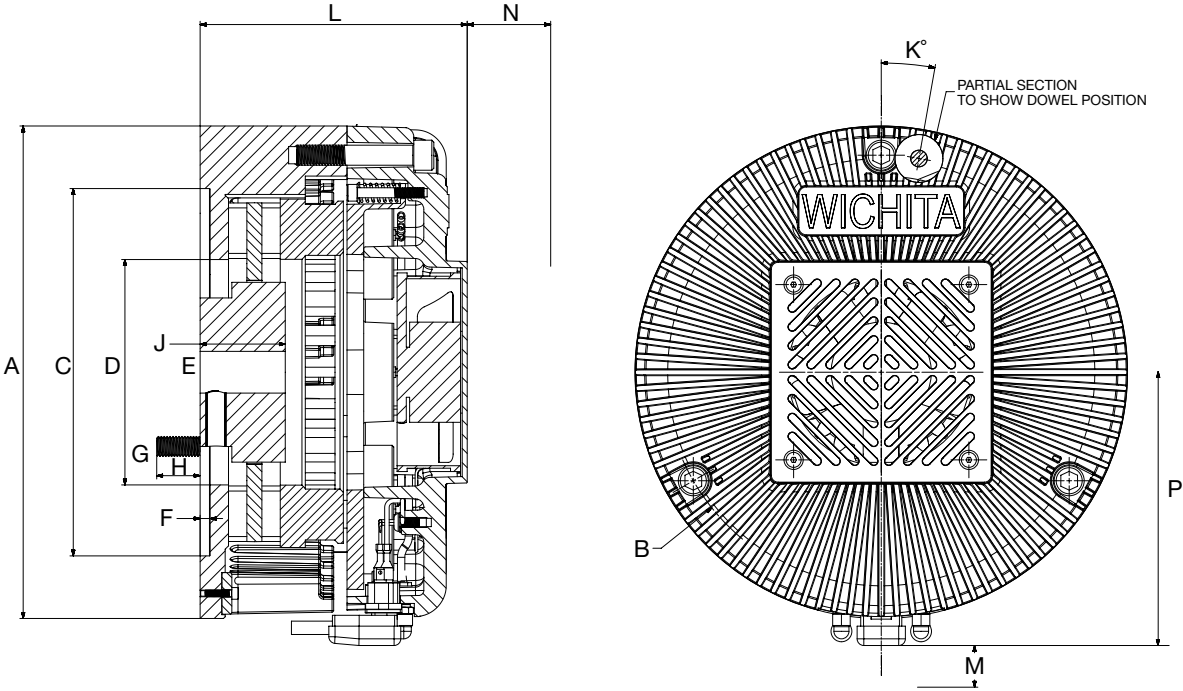
1. Check the required torque versus the available actuators' torque capacities. The Mistral 200/2/LC has a torque capacity of 1,180 lb.in. at 80 PSI. The torque requirement is 1,728 lb.in. and therefore the Mistral 200/2/LC has insufficient torque capacity. However, the 200/2 has sufficient torque capacity.
2. Check thermal requirement. The requirement is 2.6 heat HP. All the Mistral 200's are capable of 3.2 heat HP.
3. Check Maximum Bore. The requirement is 2.00 inches. The Mistral 200's maximum bore is 2.25 inches.
4. Check Maximum RPM. The requirement is 764 RPM. The maximum RPM for the Mistral 200's is 2,860 RPM.

Max. Air Pressure Required = $\frac{\text{Max. Torque} \times 80 \text{ PSI}}{\text{Catalog Torque Rating}}$
= $\frac{1,728 \times 80}{1,770} = 78 \text{ PSI}$

Min. Air Pressure Required = $\frac{\text{Min. Torque} \times 80 \text{ PSI}}{\text{Catalog Torque Rating}}$
= $\frac{108 \times 80}{1,770} = 5 \text{ PSI}$

Mistral II

Dimensions (mm)



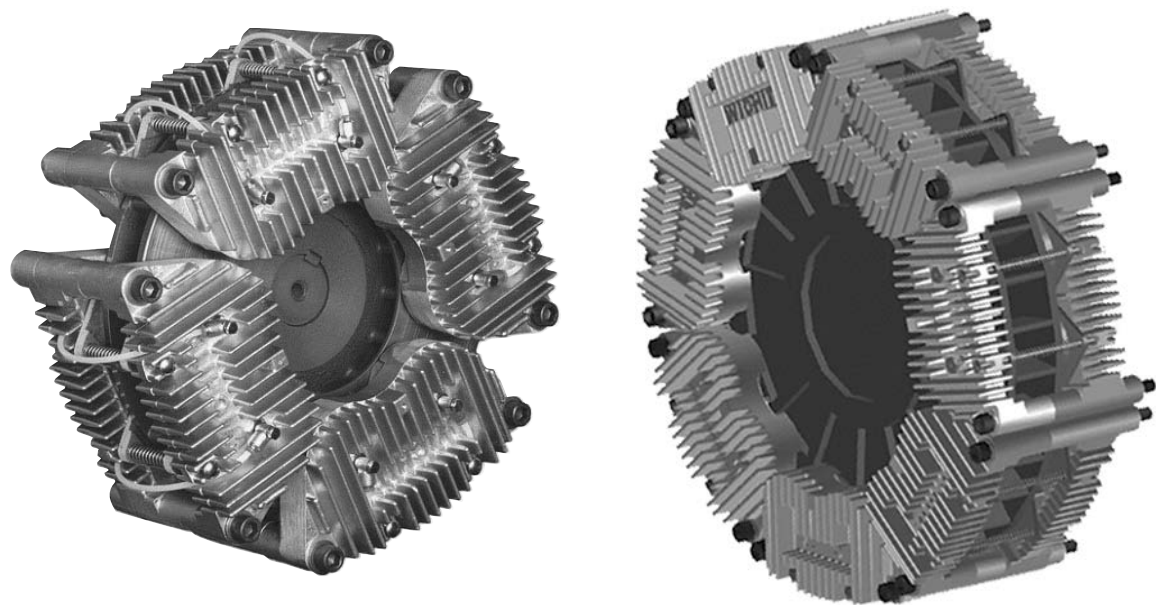
E – maximum permissible shaft dia.
M – space required for plug removal
N – distance required for cover removal

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P
200	295	260	220 H7	N/A	60	6	3xM12	26	51	10	160	25	50	163

Model	Fan Voltages	Fan Power	Electric	Pneumatic	Actuator/Inlet	'AA'	'BB'
200	220 VAC	16 W	Standard IEC Plug	6 mm OD push-fit tube	200/2	2	0
	110 VAC				200/4	2	2
	24 VDC	13.2 W			200/6	2	4

Tension Brakes/Air Cooled

ModEvo Tension Brakes



Brake Discs and Cooling

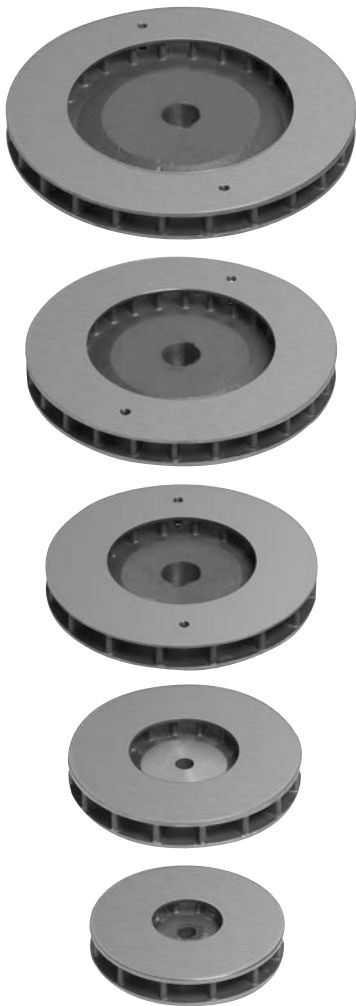
The ModEvo brake disc was developed at the Bedford, UK factory using Finite Element Analysis techniques to ensure maximum strength with minimum weight. The design is optimized to make best use of the cooling air available at slow speeds, and being bidirectional, it achieves high heat dissipation capacity in either rotational direction, unlike some other brakes. An optional electric cooling fan is available where space is limited or more extreme heat handling is required.

Available in five sizes: 250 mm, 300 mm, 350 mm, 400 mm and 450 mm diameters, all discs are the same thickness and use the same brake modules and actuators. Each disc can be specified with a minimum of a single module, up to the maximum number of modules that can be fitted around the disc. This allows torque-

handling capabilities ranging from a maximum of 659 lb.ft. for the 250 mm disc, up to 3181 lb.ft. for the 450 mm disc.

NOTE: If using a high speed ductile iron disc the catalog heat rating should be reduced by 10% as the thermal conductivity of the ductile iron is less than grey cast iron.

Maximum Rotational Speed		
Disc Diameter mm	Standard Speed rev./min.	High Speed rev./min.
250	2,250	3,375
300	1,900	2,850
350	1,650	2,475
400	1,450	2,175
450	1,250	1,875



Actuator Options

Newly developed rolling diaphragm actuators are used in ModEvo, producing more force than previous designs to allow higher torque ratings. However, the sensitivity for which rolling diaphragms are favored is not compromised. Three actuator options are available, offering clamping forces of 100%, 60% or 25%.

The finned, die cast aluminum brake module is common to all brake disc diameters. Each module houses two pairs of actuators, and allows friction pads to be changed quickly without dismantling the module.



100%

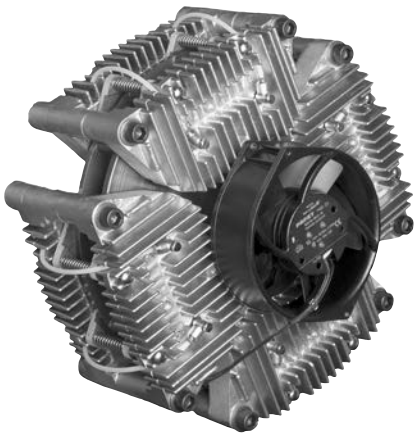


60%



25%

ModEvo 300/8 with Fan



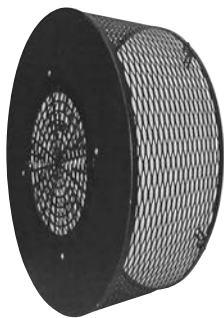
Brake Size (fan Diameter)	24v DC	115v AC	230v AC
250 (150 mm)	Yes	Yes	Yes
300 (150 mm)	Yes	Yes	Yes
350 (150 mm)	Yes	Yes	Yes
400 (150 mm)	Yes	Yes	Yes
(200 mm)	not available	Yes	
Yes			
450 (150 mm)	Yes	Yes	Yes
(200 mm)	not available	Yes	Yes
(250 mm)	not available	Yes	Yes

Optional Guard

The optional guard has a plastic front with 'ModEvo' molded in and a metal ventilated perimeter.

Mounting is by four brackets on customer's machine frame.

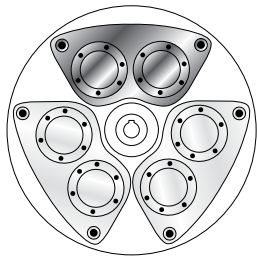
The center of the guard is designed such that it may be cut-out by customer to suit the diameter of the shaft in through-shaft installations.



Tension Brakes/Air Cooled

ModEvo Tension Brakes

ModEvo Model 250



Model	Minimum Torques		
	Minimum (3 PSI) (0.2 Bars) lb.ft.Nm		
	25% Actuators	60% Actuators	100% Actuators
250/1	1 1	2 2	3 4
250/2*	1 2	4 5	6 8
250/4*	3 4	7 10	12 16
250/6*	4 6	11 14	18 24
	Maximum Torques Maximum (87 PSI) (6 Bars) lb.ft.Nm		
250/1	22 30	53 71	88 119
250/2*	44 60	110 143	176 238
250/4*	88 72	211 286	352 477
250/6*	132 179	317 429	528 715

* For single actuator operation torques for 250/1 are applicable.

Model ²	Speed ¹ Max.	Heat Capacity for Effective Cooling Speeds							Inertia Rotating Parts	Weight	
		Continuous Duty** HP(kW)							lb.ft. ² (kgm ²)	lbs.(kg)	
	RPM	50 RPM	100 RPM	200 RPM	300 RPM	400 RPM	500 RPM	600 RPM		Total	Rotating
250/1	2250	Without Fan							1.424 (0.060)	27.337 (12.4)	19.180 (8.7)
250/2	2250	1.34 (1.0)	1.61 (1.2)	2.14 (1.6)	2.68 (2.0)	3.08 (2.3)	3.49 (2.6)	3.62 (2.7)		29.101 (13.2)	
250/4	2250	With Electric Cooling Fan, 150 mm dia.								38.801 (17.6)	
250/6	2250	4.56 (3.4)	4.69 (3.5)	5.09 (3.8)	5.36 (4.0)	5.36 (4.0)	5.36 (4.0)	5.36 (4.0)		48.772 (22.1)	

** For intermittent duty, consult the factory.

¹ Max. speed is with standard brake disc. A high speed brake disc capable of 50% higher speed is also available. Heat Capacity reduced by 10% when high speed disc is used.

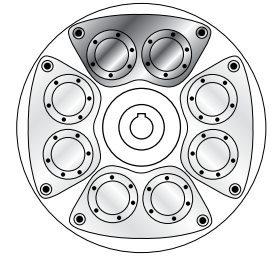
² When selecting number of actuators, use a limit of 3.35 HP per actuator pair (2.5 kW per Actuator pair) for duty w/o fan and 3.75 HP per Actuator pair (2.8 kW per Actuator pair) when fan cooled.

Note: Limit maximum operating temperatures of surfaces (rotor, friction pads, actuators, etc.) to 300°F or less.
Temperatures above 300°F may cause damage and failure of components. Failure to do so will void warranty.

Tension Brakes/Air Cooled

ModEvo Tension Brakes

ModEvo Model 300



Model	Minimum Torques		
	Minimum (3 PSI) (0.2 Bars) lb.ft.Nm		
	25% Actuators	60% Actuators	100% Actuators
300/1	1 1	2 3	4 5
300/2*	2 3	4 6	7 10
300/4*	4 5	9 12	15 20
300/6*	6 8	13 18	22 30
300/8*	7 10	18 24	30 40
	Maximum Torques		
	Minimum (87 PSI) (6 Bars) lb.ft.Nm		
300/1	27 37	66 89	110 149
300/2*	55 75	132 179	220 298
300/4*	110 149	263 357	439 595
300/6*	165 223	395 536	659 893
300/8*	220 298	527 715	879 1191

* For single actuator operation torques for 300/1 are applicable.

Model ²	Speed ¹ Max.	Heat Capacity for Effective Cooling Speeds							Inertia Rotating Parts	Weight	
		Continuous Duty** HP(kW)							lb.ft. ² (kbm ²)	lbs.(kg)	
	RPM	50 RPM	100 RPM	200 RPM	300 RPM	400 RPM	500 RPM	600 RPM		Total	Rotating
300/1	1900	Without Fan							2.966 (0.125)	38.140 (17.3)	29.883 (13.6)
300/2	1900	2.41 (1.8)	2.68 (2.0)	3.35 (2.5)	4.02 (3.0)	4.56 (3.4)	5.09 (3.8)	5.63 (4.2)		39.904 (18.1)	
300/4	1900	With Electric Cooling Fan, 150 mm dia.								49.604 (22.5)	
300/6	1900	6.30 (4.7)	6.70 (5.0)	6.70 (5.0)	6.70 (5.0)	7.37 (5.5)	8.04 (6.0)	8.04 (6.0)		59.525 (27.0)	
300/6	1900									69.446 (31.5)	

** For intermittent duty, consult the factory.

¹ Max. speed is with standard brake disc. A high speed brake disc capable of 50% higher speed is also available. Heat Capacity reduced by 10% when high speed disc is used.

² When selecting number of actuators, use a limit of 3.35 HP per actuator pair (2.5 kW per Actuator pair) for duty w/o fan and 3.75 HP per Actuator pair (2.8 kW per Actuator pair) when fan cooled.

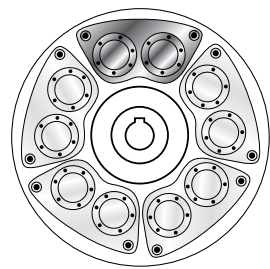
Note: Limit maximum operating temperatures of surfaces (rotor, friction pads, actuators, etc.) to 300°F or less.

Temperatures above 300°F may cause damage and failure of components. Failure to do so will void warranty.

Tension Brakes/Air Cooled

ModEvo Tension Brakes

ModEvo Model 350



Model	Minimum Torques		
	Minimum (3 PSI) (0.2 Bars) lb.ft.Nm		
	25% Actuators	60% Actuators	100% Actuators
350/1	1	3	4
	2	4	6
350/2*	7	18	30
	3	7	12
350/4*	1	3	9
	6	14	24
350/6*	7	16	27
	9	22	36
350/8*	9	21	35
	12	29	48
350/10*	11	27	44
	15	36	60
	Maximum Torques Minimum (87 PSI) (6 Bars) lb.ft.Nm		
350/1	33	80	133
	45	108	181
350/2*	67	160	266
	90	217	361
350/4*	133	320	534
	181	434	723
350/6*	200	480	800
	271	650	1084
350/8*	267	640	1066
	361	867	1445
350/10*	333	800	1334
	452	1084	1807

* For single actuator operation torques for 350/1 are applicable.

Model ²	Speed ¹ Max.	Heat Capacity for Effective Cooling Speeds							Inertia Rotating Parts	Weight	
		Continuous Duty** HP(kW)							lb.ft. ² (k _{bm} ²)	lbs.(kg)	
	RPM	50 RPM	100 RPM	200 RPM	300 RPM	400 RPM	500 RPM	600 RPM		Total	Rotating
350/2	1650	Without Fan							5.458 (0.230)	57.982 (24.8)	46.958 (20.3)
350/4	1650									3.22 (2.4)	
350/6	1650	With Electric Cooling Fan, 150 mm dia.								80.248 (33.7)	
350/8	1650									7.77 (5.8)	
350/10	1650									102.294 (42.7)	

** For intermittent duty, consult the factory.

¹ Max. speed is with standard brake disc. A high speed brake disc capable of 50% higher speed is also available. Heat Capacity reduced by 10% when high speed disc is used.

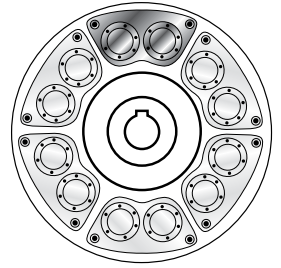
² When selecting number of actuators, use a limit of 3.35 HP per actuator pair (2.5 kW per Actuator pair) for duty w/o fan and 3.75 HP per Actuator pair (2.8 kW per Actuator pair) when fan cooled.

Note: Limit maximum operating temperatures of surfaces (rotor, friction pads, actuators, etc.) to 300°F or less.
Temperatures above 300°F may cause damage and failure of components. Failure to do so will void warranty.

Tension Brakes/Air Cooled

ModEvo Tension Brakes

ModEvo Model 400



Model	Minimum Torques		
	Minimum (3 PSI) (0.2 Bars) lb.ft.Nm		
	25% Actuators	60% Actuators	100% Actuators
400/1	1 2	3 4	5 7
400/2*	3 4	6 8	10 14
400/4*	5 7	12 17	21 28
400/6*	8 11	19 26	32 43
400/8*	11 14	25 34	42 57
400/10*	13 18	31 43	52 71
400/12*	16 21	38 51	63 85
	Maximum Torques Minimum (87 PSI) (6 Bars) lb.ft.Nm		
400/1	39 53	94 128	157 213
400/2	79 107	189 256	314 426
400/4	157 213	377 511	629 852
400/6	236 320	566 767	943 1278
400/8	314 426	755 1022	1258 1704
400/10	393 533	943 1278	1572 2130
400/12	472 639	1132 1534	1886 2556

* For single actuator operation torques for 400/1 are applicable.

Model ²	Speed ¹ Max.	Heat Capacity for Effective Cooling Speeds							Inertia Rotating Parts	Weight	
		Continuous Duty** HP(kW)							lb.ft. ² (kgm ²)	lbs.(kg)	
	RPM	50 RPM	100 RPM	200 RPM	300 RPM	400 RPM	500 RPM	600 RPM		Total	Rotating
400/2	1450	Without Fan 3.62 4.29 6.03 6.70 7.64 8.71 9.38 (2.7) (3.2) (4.5) (5.0) (5.7) (6.5) (7.0)							9.492 (0.400)	69.005 (31.3)	61.509 (26.8)
400/4	1450									78.705 (35.7)	
400/6	1450									88.626 (40.2)	
400/8	1450	With Electric Cooling Fan, 150 mm dia. 8.18 8.98 9.38 10.05 10.72 10.72 10.72 (6.1) (6.7) (7.0) (7.5) (8.0) (8.0) (8.0)								98.547 (44.7)	
400/10	1450									108.467 (49.2)	
400/12	1450									118.168 (53.6)	

**For intermittent duty and thermal ratings using 200 mm fan, consult the factory.

¹ Max. speed is with standard brake disc. A high speed brake disc capable of 50% higher speed is also available. Heat Capacity reduced by 10% when high speed disc is used.

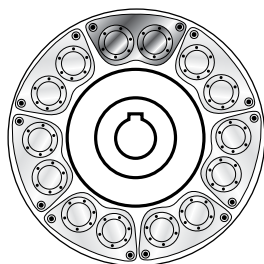
² When selecting number of actuators, use a limit of 3.35 HP per actuator pair (2.5 kW per Actuator pair) for duty w/o fan and 3.75 HP per Actuator pair (2.8 kW per Actuator pair) when fan cooled.

Note: Limit maximum operating temperatures of surfaces (rotor, friction pads, actuators, etc.) to 300°F or less.
Temperatures above 300°F may cause damage and failure of components. Failure to do so will void warranty.

Tension Brakes/Air Cooled

ModEvo Tension Brakes

ModEvo Model 450



Model	Minimum Torques		
	Minimum (3 PSI) (0.2 Bars) lb.ft.Nm		
	25% Actuators	60% Actuators	100% Actuators
450/1	1	4	6
	2	5	8
450/2*	3	7	12
	4	10	16
450/4*	6	15	24
	8	20	33
450/6*	9	22	36
	12	29	49
450/8*	12	29	48
	16	39	65
450/10*	15	36	61
	21	49	82
450/12*	18	43	72
	25	59	98
450/14*	21	51	85
	29	69	115

Maximum Torques Minimum (87 PSI) (6 Bars) lb.ft.Nm			
450/1	45	108	181
	61	147	246
450/2*	91	217	362
	123	295	491
450/4*	181	435	725
	246	589	982
450/6*	272	652	1086
	368	883	1472
450/8*	362	869	1449
	491	1178	1963
450/10*	453	1087	1811
	614	1472	2454
450/12*	543	1304	2173
	736	1767	2945
450/14*	634	1521	2535
	859	2061	3435

* For single actuator operation torques for 450/1 are applicable.

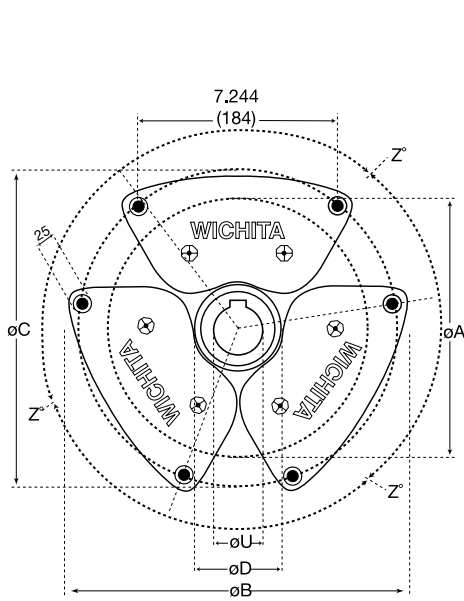
Model ²	Speed ¹ Max.	Heat Capacity for Effective Cooling Speeds							Inertia Rotating Parts	Weight	
		Continuous Duty** HP(kW)							lb.ft. ² (kgm ²)	lbs.(kg)	
	RPM	50 RPM	100 RPM	200 RPM	300 RPM	400 RPM	500 RPM	600 RPM		Total	Rotating
450/2	1250								14.475 (0.610)	82.673 (37.5)	72.752 (33.0)
450/4	1250									Without Fan	
450/6	1250	3.89 (2.9)	4.83 (3.6)	6.84 (5.1)	7.91 (5.9)	8.71 (6.5)	10.32 (7.7)	11.13 (8.3)		102.294 (46.4)	
450/8	1250	With Electric Cooling Fan, 150 mm dia.								112.215 (50.9)	
450/10	1250	8.85 (6.6)	9.12 (6.8)	9.38 (7.0)	9.65 (7.2)	10.72 (8.0)	11.66 (8.7)	12.47 (9.3)		122.136 (55.4)	
450/12	1250									131.836 (59.8)	
450/14	1250									141.757 (64.3)	

**For intermittent duty and thermal ratings using 200 mm or 250 mm fan, consult the factory.

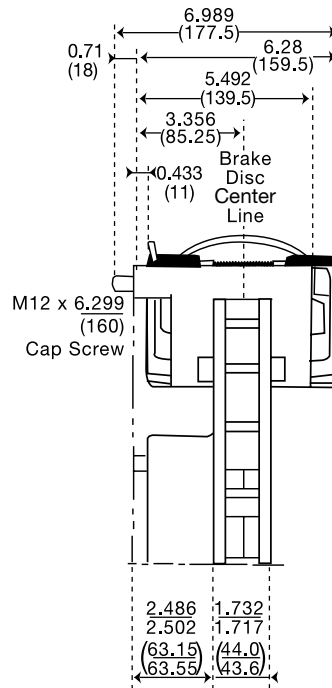
⁴ Max. speed is with standard brake disc. A high speed brake disc capable of 50% higher speed is also available. Heat Capacity reduced by 10% when high speed disc is used.

⁶ When selecting number of actuators, use a limit of 3.35 HP per actuator pair (2.5 kW per Actuator pair) for duty w/o fan and 3.75 HP per Actuator pair (2.8 kW per Actuator pair) when fan cooled.

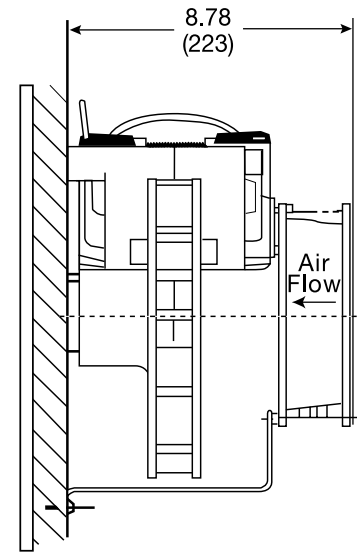
Note: Limit maximum operating temperatures of surfaces (rotor, friction pads, actuators, etc.) to 300°F or less. Temperatures above 300°F may cause damage and failure of components. Failure to do so will void warranty.



Front View



Side View



Side View With Fan

Dimensions: inches (mm)

Size	250	300	350	400	450
ØA - Disc Size	9.843 (250)	11.811 (300)	13.78 (350)	15.748 (400)	17.717 (450)
ØB - Overall	12.756 (324)	14.528 (369)	16.339 (415)	18.149 (461)	20.000 (508)
ØC - Bolt P.C.D	11.752 (298.5)	13.524 (343.5)	15.315 (389)	17.146 (435.5)	18.996 (482.5)
ØD - Clearance Diameter	3.543 (90)	5.512 (140)	7.480 (190)	9.449 (240)	11.417 (290)
U - As Cast Bore	0.984 (25)	0.984 (25)	0.984 (25)	0.984 (25)	0.984 (25)
Maximum Bore	2.165 (55)	3.110 (79)	4.606 (117)	5.354 (136)	6.063 (154)
Z° - Angular Position	120°	90°	72°	60°	51.4°
Maximum Number of Brake Modules	3	4	5	6	7
Wichita Generic Drawing Number	73125-000	73130-000	73141-000	73141-000	73145-000
Hose Length/Module 15667-020 W4 6977	39.37 (1,000)	47.25 (1,200)	55.12 (1,400)	63.00 (1,600)	70.87 (1,800)