

## Section 9 Positorq® Absorber Brakes

### Tension Control and Dynamometers

The **Positorq Absorber Brakes and Clutches** use the same basic design of a multiple disc stack furnished with a continuous supply of cooling and lubricating fluid as do the other Force Control products. A major difference between the **Positorq** and the **Posistop** brake is that the **Positorq** is designed as a constant slip device and is normally force lubed for smooth torque control and energy absorption.

Tension brakes and dynamometers are essentially energy absorbers. Rotary motion is transformed through the brake to heat. Therefore, a critical function of the brake is to be able to dissipate this heat during slip. In the **Positorq**, fluid is pumped through the

shaft to furnish a continuous supply of fluid to the friction surfaces. The fluid, both lubricates the surfaces at the point of contact and removes the heat. The heated fluid is then circulated through a cooling unit (either oil to water or oil to air) dissipating the heat and returned to the **Positorq**.

Since the effective radius, number of discs and friction factor remains constant, the torque available is directly equivalent to the (air or hydraulic) actuation pressure furnished to the actuating piston.

**Positorq Brakes are rated up to 117,935 Lb. Ft. Slip Torque and 2000 Thermal Horsepower.**

### Advantages of the Positorq Absorber Brakes

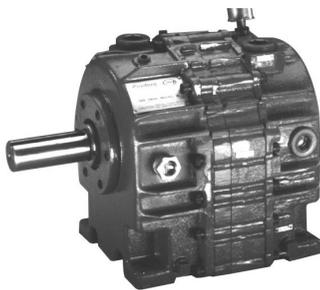
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#### A. Simple Precise Torque Control

1. Torque is proportional to the actuation pressure supplied to the actuation piston. This allows for easy control of the Torque.
2. Lubricated friction surfaces provide smooth stable torque control over the entire speed range, even at low speeds.
3. Teflon Piston Liners produce very smooth controllable piston movement for precise control.

#### B. High Capacity-Compact Size

1. Multiple braking surfaces reduces overall size.
2. A separate forced lube cooling system allows for a small unit size with high thermal capacity.



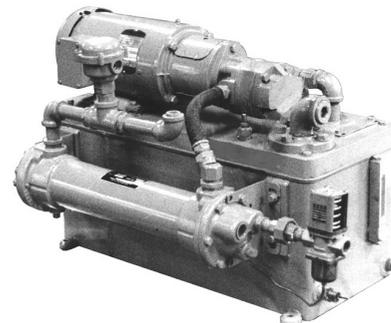
TB-05 Positorq

#### C. Hostile Environments

1. Totally enclosed cast iron housing design prevents contamination by dust, dirt, chips, chemicals, water, etc.
2. Enclosed unit also prevents contamination of the surrounding environment.

#### D. Low Maintenance-Long Life

1. Lubricating and cooling of the friction surfaces reduces disc and plate wear to a minimum.
2. Heavy duty construction, lubricated bearings and high quality seals with wear sleeves reduce downtime.
3. Teflon liners on the piston reduce piston seal wear.
4. Wear Indicator (80 Series only) for easy disc wear check.



Typical Force Lube Cooling Unit

## Positorq Standard Design Configurations

The *Positorq* comes in various design configurations depending on the required use. These Absorber Brakes & Clutches can be used as Tension Brakes in the steel, plastic

and paper industry as well as energy absorbers for Dynamometers for testing automobiles, tractors, gearing, axles and motors. There are many styles and sizes available.

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### A. FOOT MOUNTED BRAKE

(Sizes TB-03 to TB-20)

The smaller series foot mounted *Positorq* comes in 6 housing sizes and can be furnished with single or dual brake stacks. (TB-20 can also have 3 stacks for a higher torque range.) They can also be furnished with a single or double shaft extension. They range in torque from 72 to 2146 Lb. Ft. continuous slip and up to 4292 Lb. Ft. static torque. They can dissipate up to 180 thermal horsepower continuously.



### B. FOOT MOUNTED BRAKE

(Sizes TB-82 to TB-87)

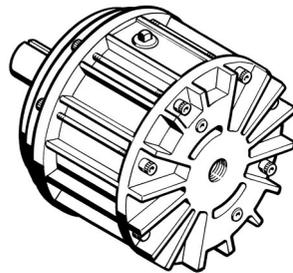
The larger series foot mounted *Positorq* brakes also come in 6 housing sizes with extended or hollow shaft arrangements. They range in torque from 1995 to 118,000 Lb. Ft. continuous slip and up to 235,581 Lb. Ft. static torque. They can dissipate up to 3800 thermal horsepower continuously. These units are suited to large dynamometer applications and primary paper mill and steel unwinding applications.



### C. FLANGE MOUNTED BRAKE

(Size TB-20 & TB-83)

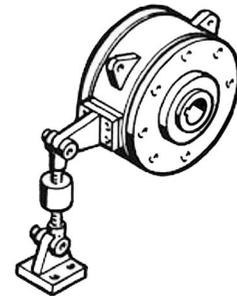
The flange mounted *Positorq* brake comes in an aluminum housing with a flange mounting and either an extended shaft or hollow bore. This is an excellent brake for use on shaftless unwind stands in paper converting applications. Torque is up to 44,000 Lb. Ft. continuous slip and 250 thermal horsepower.



### D. SHAFT MOUNTED BRAKE

(Sizes TB-85-205, TB-85-212 and TB-87)

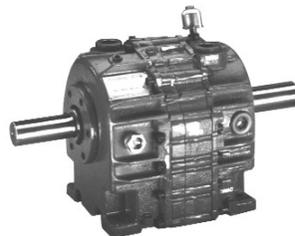
Shaft mounted units are available in 5 torque ranges in the basic TB-85 and TB-87 housing. Torque ranges from 7095 to 118,000 Lb. Ft. with continuous thermal horsepower up to 2000. They can be furnished with either an extended shaft or a hollow shaft design. Flange mounting or torque arm mounting is also available.



### E. FOOT MOUNTED CLUTCHES

(Sizes TC-02 to TC-30)

The Foot Mounted TC-02 to TC-30 *Positorq* Clutches can be used as energy absorbers for Dynamometers. The Force Control oil shear design eliminates stick slip and chatter at low speeds. This makes them particularly effective on low speed, high torque applications such as transmission, hydraulic motor and gear testing. The extremely high static torque capability also allows high torque lock-up testing.



### F. FORCED LUBE COOLING UNIT

The Forced Lube Cooling Units are required for most continuous slip applications. The cooling units are furnished with a pump/motor/coupling arrangement, filter system, pressure switch, temperature switch and heat exchanger mounted on a reservoir. Heat exchangers can be oil to water or oil to air. They are designed for each particular application.



## Positorq Features and Benefits

### Smooth Consistent Control

- ◆ State-of-the Art friction materials and fluids have been developed for very smooth and consistent operation. Jerks, steps, chatter, etc. have virtually been eliminated.
- ◆ Controlled fluid temperature through the brake improves consistency for precision testing.

### Stable Torque Control

- ◆ Smooth, consistent actuation with low piston hysteresis is experienced by using Teflon Liners over the O-Rings to seal the non-rotating piston. This eliminates stick slip often associated with O-Ring seals.
- ◆ Torque is controlled by actuation pressure and is independent of speeds above the residual (minimum) drag torque.

### Low Speed Capability

- ◆ Operational speeds at levels down to 0 RPM are precisely controlled without chatter, stick slip or torque variation.
- ◆ Speed-up drives which can influence test results are eliminated.

### High Torque and Horsepower Capability

- ◆ Various sizes available from 53 Ft. Lbs. up to 27,656 Ft. Lbs. Continuous heat absorption capability up to 1500 thermal horsepower.

### Quiet Operation

- ◆ Extremely quiet operation with noise levels of the brake system below 65 db. This is beneficial for laboratory operation or noise testing.

### Quick Response for Computer Control

- ◆ Quick, precise piston actuation produces excellent response to manually or computer generated signals. Hydraulic actuation can also be furnished for even quicker actuation.
- ◆ Low rotating mass inertia for increased responsiveness to changes in torque requirements.

### No Adjustment Required

- ◆ Adjustment is not required, making it very useful for long continuous life tests of many months duration without shutting down for brake adjustments or repairs.

### Long Service Life

- ◆ Oil shear technology nearly eliminates the frictional wear of the disc stack. Therefore long life and low maintenance costs are experienced. Inexpensive repair kits are available from stock.
- ◆ An external wear indicator indicates the need for impending stack replacement long before actual failure would occur.

### Low Air Pressure Required

- ◆ Maximum required air pressure is below 60 PSI reducing problems associated with low plant air pressure.

### Totally Enclosed Design

- ◆ The totally enclosed design eliminates any contamination to the lab or test area with friction materials or other harmful contaminants.

The **Positorq Brake** is an excellent **Energy Absorber** for **Tension & Dynamometer** applications requiring high torque, low speed and especially for endurance testing. The oil shear system is very smooth eliminating stick slip and chatter common to low speed testing. Also by using the fluid for lubrication and cooling the life under load is extremely long allowing for continuous testing for weeks or months with no change in characteristics.

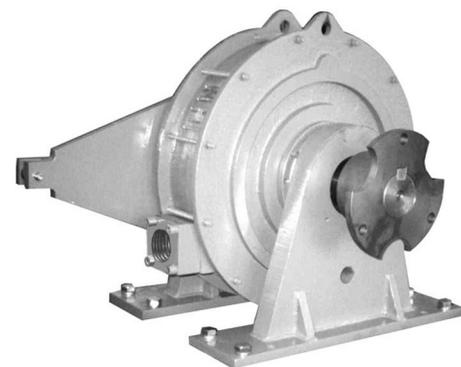
The quick response piston and low inertia is also beneficial in testing under varying load conditions such as computer generated load simulations.

### Tension Application



TB-85HT Positorq Absorber Brake for Tension Application

### Dynamometer Application



TB-82 Positorq Absorber Brake with torque arm for base mounting.

## Positorq Dynamometer Typical Applications

There are many applications where *Positorq* brake dynamometers can be used. A few typical applications are shown below.

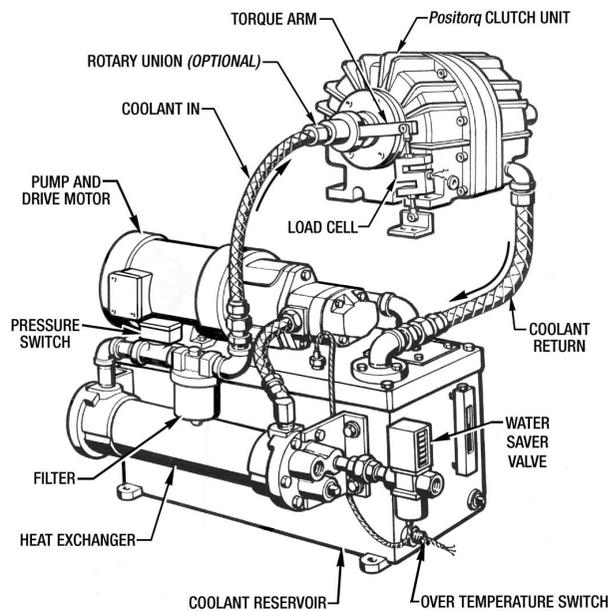
**(A) Hydraulic Motor Testing** is a way to test hydraulic motors after repair or for trouble shooting. Also full load torque and efficiency can be verified.

**(B) Gear Box Testing** is an excellent application because the brake can absorb continuous loads and high lock up torque for destructive testing. This could also be used for noise testing of the gear box under load for environmental conditions.

**(C) Transmission Testing** is a good way to test a transmission from an automobile, truck, tractor or other off-the road equipment. The brake can be controlled by a computer to simulate field conditions for shock loads. Also endurance testing for auto or truck transmissions.

**(D) Axle Testing** requires high torque at low speeds with no stick slip or chatter. The assemblies can also be tested for efficiency and noise with the *Positorq* Brake.

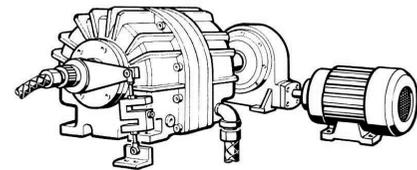
### System Components



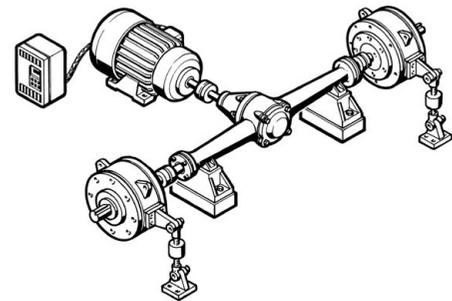
Positorq Foot Mounted Clutch with a Load Cell and Forced Lube Cooling Unit for a dynamometer application.

### Typical Applications

#### A Gear Box or Hydraulic Motor Testing



#### B Axle Testing



## Dynamometer Accessories

There are several accessories that can be furnished with the *Positorq Dynamometer Brakes* to complete the control loop.

■ **Load Cell** - An S-Beam type load cell can be furnished with the *Positorq Brake* when assembled with bearing mounted Positorq and base. These are available in various load ranges depending on the torque requirements.

■ **Servo Valves** - These are used to control the air or hydraulic actuation pressure to the *Positorq Brake* which sets the torque level. These can be ordered to be controlled either manually using a potentiometer, or outputs from a PLC, PID control or computer. Contact the factory for additional information on these items.

■ **Solenoid Valve** - The solenoid valve is simply an On/Off valve to actuate the *Positorq Brake*. It does not control pressure. It only allows the actuation pressure to be applied to the brake stack.

■ **PID Control** - The PID controller is a way of controlling an accurate feedback loop for controlling torque to a set point. The required setting is set at the PID control which will control the actuation pressure to maintain the desired torque.

■ **Speed Pick-Up** - A magnetic speed pick-up can be furnished on the output end of the *Positorq Brake* to measure RPM. A digital readout can also be furnished.

## Positorq Typical Tension Applications

There are various tension applications which are excellent for the *Positorq* brake system. A few of them are shown below.

**(A) Tension Stand** for a paper mill is a common application. The larger *Positorq* brakes are excellent in the Kraft paper applications with the high PLI and high speeds. An optional payout drive can also be furnished for threading. The forced lube cooling unit can be built as a part of the structure eliminating additional components.

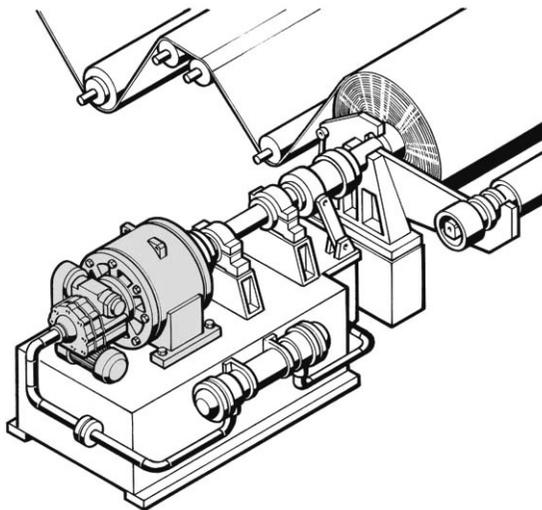
**(B) Shaftless Unwind Stands** for a paper converting mill can effectively use the flange mounted brakes because the light aluminum housing reduces the weight on the moveable arms. These are excellent for tension stands on corrugated, laminated or coating lines. The smooth

tension improves product quality and the long life reduces maintenance requirements.

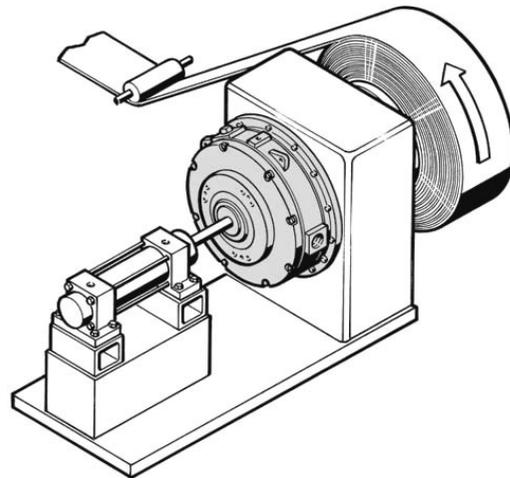
**(C) Unwind Stand** for a steel mill requires very high torque at low speeds, which is perfect for the *Positorq* brake. The smooth operation eliminates chatter which can cause marks in leveling, polishing or coating. The enclosed housing reduces wear and torque changes due to moisture, scale and chips in the friction material.

**(D) Unwind Stands** for plastic film need very consistent tension to eliminate stretching and deformation. The oil shear *Positorq* brake is very smooth and with the reduced inertia of rotating components is extremely responsive to changes in controller outputs.

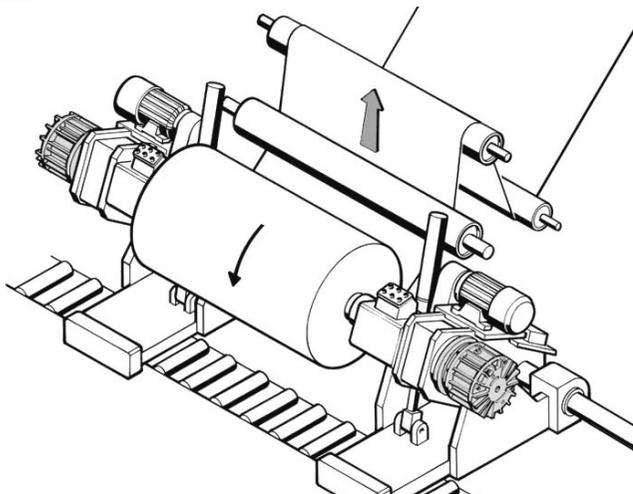
**A** Tension Stand (Paper Mill)



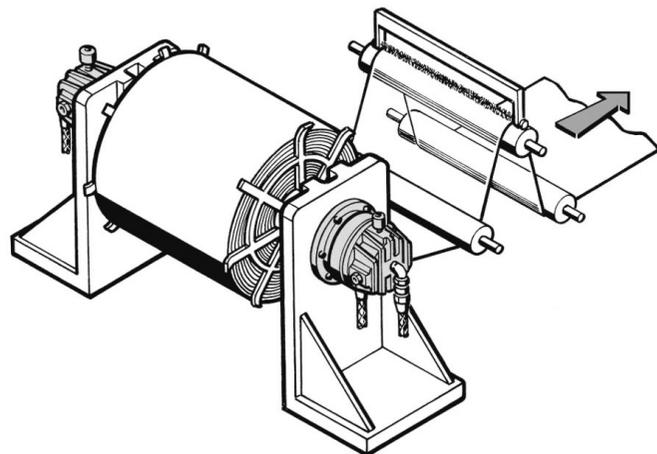
**C** Unwind Stand (Steel Mill)



**B** Shaftless Unwind Stand (Paper Converting Mill)



**D** Unwind Stand (Plastic Film)





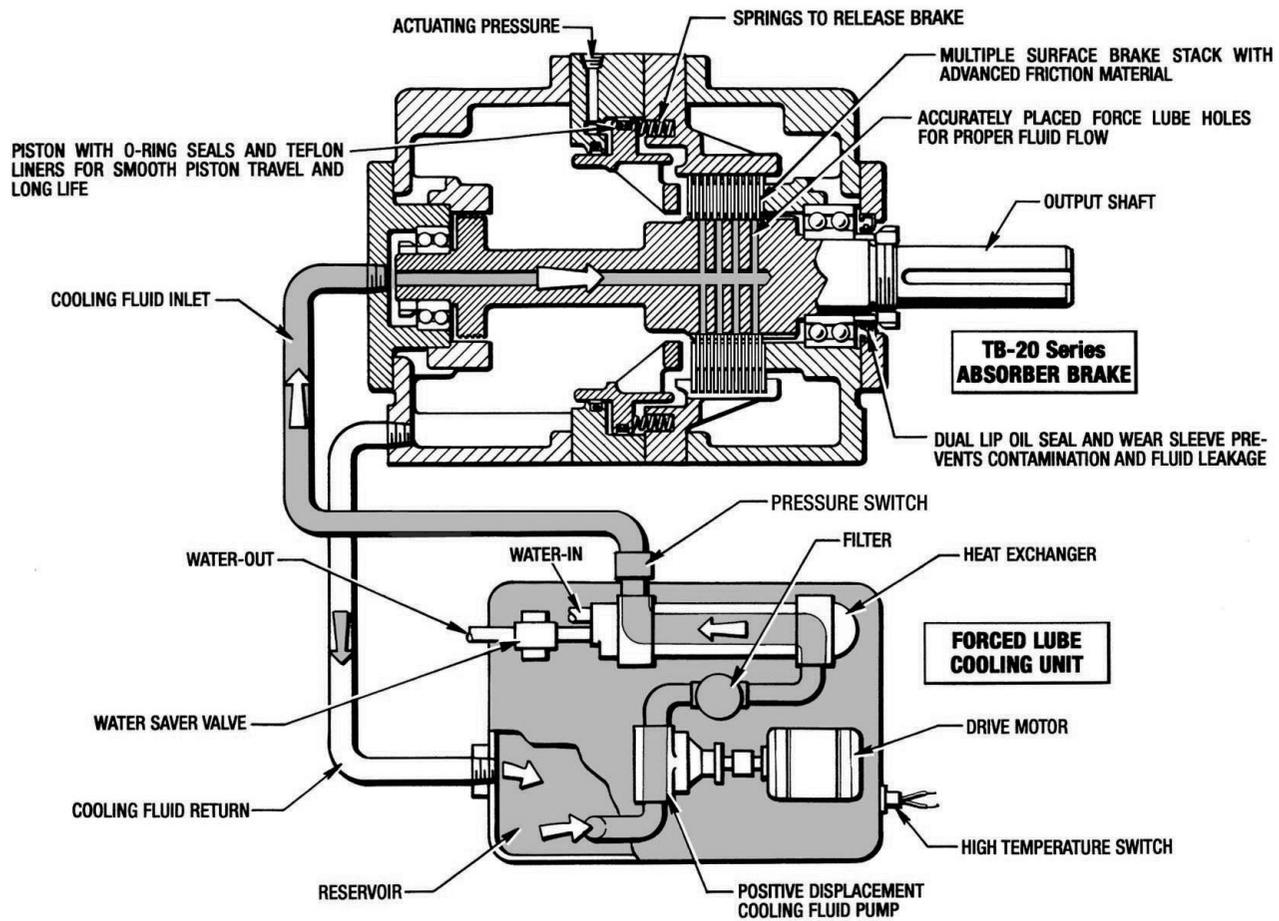
## A. Positorq Foot Mounted Absorber Brakes

(Sizes TB-03 to TB-20)

The smaller **Positorq** Absorber Brakes normally consists of a **Positorq** brake and a forced lube cooling unit. Fluid is pumped through the brake under low pressure (less than 80 PSI), to cool and lubricate the stack. The fluid is pumped through the output shaft, through the stack and back

into the sump. A positive displacement pump is used to reduce the possibility of starvation of the stack and flow switches are provided to shut down the system in case of failure. Efficient heat exchangers are used to remove the heat absorbed from the brake.

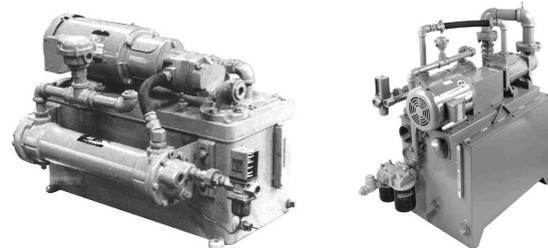
### System Features and Components (Without Kidney Filtration )



FOOT MOUNTED  
ABSORBER BRAKE



TYPICAL FORCED LUBE COOLING UNITS



## Positorq Absorber Brake Specifications

### Sizes TB-03 to TB-20 Foot Mounted

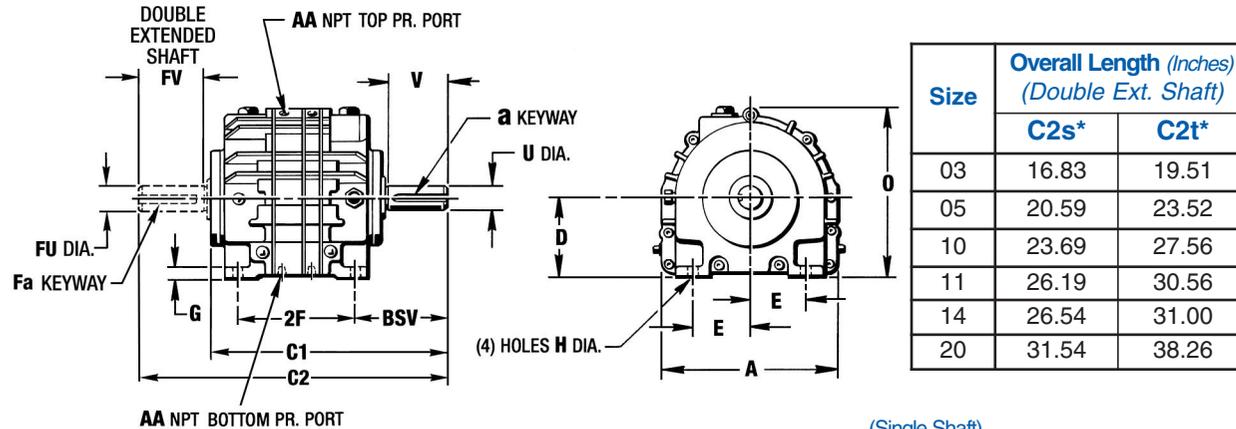
Positorq Size	No. of Discs	Dynamic Brake Torque (Lb. Ft.)		Max. Static Torque @ PSIG	Max. RPM	Thermal		Piston Chamber Volume (Cu. In.)	Inertia Cyclic Parts (Lb. Ft. <sup>2</sup> )
		Maximum Continuous Slip @ PSIG	Maximum * Momentary Slip @ PSIG			Basic	Force Lube		
03	5	72 @ 43	107 @ 55	145 @ 69	3600	0.40	35.0	7.6	.04
	10	144 @ 43	214 @ 55	290 @ 69			70.0	15.2	.10
05	9	130 @ 30	195 @ 43	261 @ 60	3600	1.00	63.0	8.0	.08
	18	260 @ 30	391 @ 43	521 @ 60			125.0	16.0	.16
10	7	277 @ 32	415 @ 44	554 @ 56	3600	1.25	90.0	12.0	.25
	14	554 @ 32	831 @ 44	1,108 @ 56			132.0	24.0	.50
11	7	478 @ 50	717 @ 70	956 @ 90	1800	1.20	60.0	12.0	.38
	14	956 @ 50	1,435 @ 70	1,913 @ 90			120.0	24.0	.54
14	11	751 @ 49	1,127 @ 68	1,503 @ 87	1800	1.20	60.0	12.0	.53
	22	1,503 @ 49	2,254 @ 68	3,006 @ 87			120.0	24.0	.99
20	7	641 @ 33	960 @ 47	1,280 @ 60	1800	1.50	95.0	23.0	1.50
	14	1,282 @ 33	1,920 @ 47	2,560 @ 60			190.0	46.0	3.2
	21	1,922 @ 35	2,880 @ 47	3,844 @ 60			190.0	69.0	4.7

\* - Less than 60 seconds, less than 60% duty.

## Positorq Absorber Brake Dimensions (Inches)

### Sizes TB-03 to TB-20 Foot Mounted

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Size	Foot Mounting Dimensions (Inches)									Overall Length		Shaft Dim. (Inches)			Port (NPT) - AA	
	A	D	E	2Fs**	2Ft**	G	H	O	BSV	C1s**	C1t**	a/Fa	U/FU	V/FV	(Bot.)	(Top)
03	10.25	4.5	3.31	6.50	9.13	.50	.44	10.38	5.19	13.25	15.88	5/16 x 5/32	1-3/8	3.50	1/4	1/4
05	10.25	6.5	3.50	9.09	12.02	.75	.56	12.38	5.75	16.50	19.42	3/8 x 3/16	1-5/8	4.00	1/4	1/4
10	12.50	6.5	3.50	12.69	16.56	1.00	.75	13.63	5.50	19.75	23.62	3/8 x 3/16	1-3/4	3.75	1/4	1/4
11	12.62	6.5	4.75	12.69	16.56	1.00	.75	14.50	6.75	21.00	24.88	5/8 x 5/16	2-3/8	5.00	1/4	1/4
14	12.62	6.5	4.75	13.04	16.32	1.00	.75	14.50	6.75	21.38	25.85	5/8 x 5/16	2-3/8	5.00	1/4	1/4
20	17.50	9.0	5.75	16.78	21.50	1.38	.88	19.00	7.38	26.75	31.50	5/8 x 5/16	4.75	4.75	3/8	1/2

\* - Top porting is standard, bottom porting is optional. The use of bottom porting is recommended to purge contaminants out of the cylinders when they are exhausted. Top porting will not purge the cylinders.

\*\* - In the dimensional table "s" denotes a single brake stack unit and "t" denotes a tandem brake stack unit.

\*\*\*- Keyed shaft not available on Size 20 Tandem stack units

**B. Positorq Absorber Brakes (Sizes TB-82 to TB-87)**



**System Features and Components**  
*(With Kidney Filtration)*

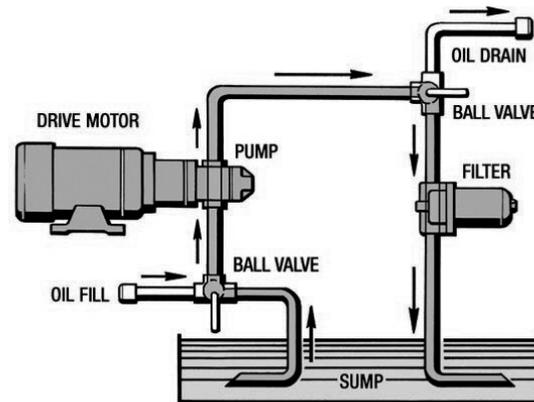
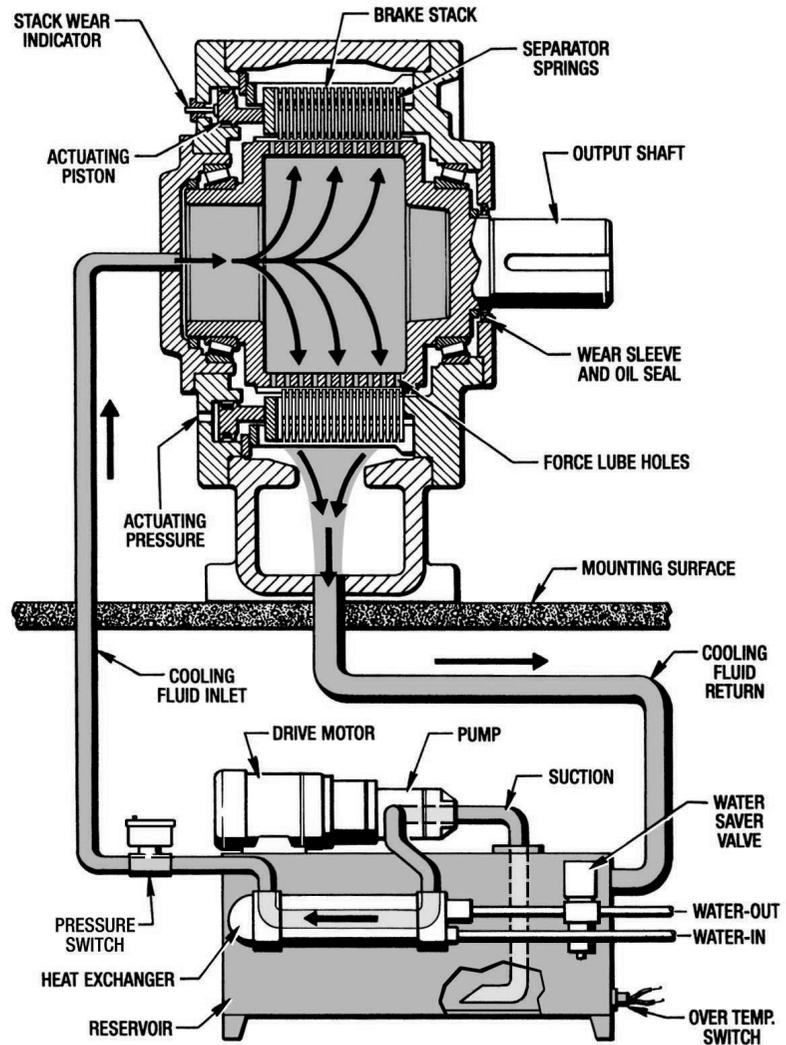
**Positive Forced Oil Lubrication** fights wear and absorbs heat for long-lasting dependability and fewer shutdowns which reduces maintenance costs and increases mill productivity.

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In the **Positorq Brake**, a multiple disc brake stack operates in a positive supply of cooling fluid that's delivered from the center of the shaft.

The circulation of fluid between carefully prepared friction surfaces of the disc stack is the key to the service life of the **Positorq**. The circulating fluid, while providing lubrication, carries heat away from the disc stack. The heat is then dissipated by an auxiliary **Forced Lubrication Cooling Unit** designed for your application's thermal horsepower load.

- Positive fluid supply for dependable operation.
- Totally enclosed, will not contaminate your plant environment.
- Quiet operation.
- Closed loop automatic or manual tension control options.
- Use 3-15 PSI process control signal with 2:1 booster for automatic mode.
- Field proven in steel and paper mills.
- Minimal overhaul costs when infrequent overhauls are needed.
- Highly efficient Kidney Filtration System.



**Positorq Specifications**

**Sizes TB-82 to TB-87**

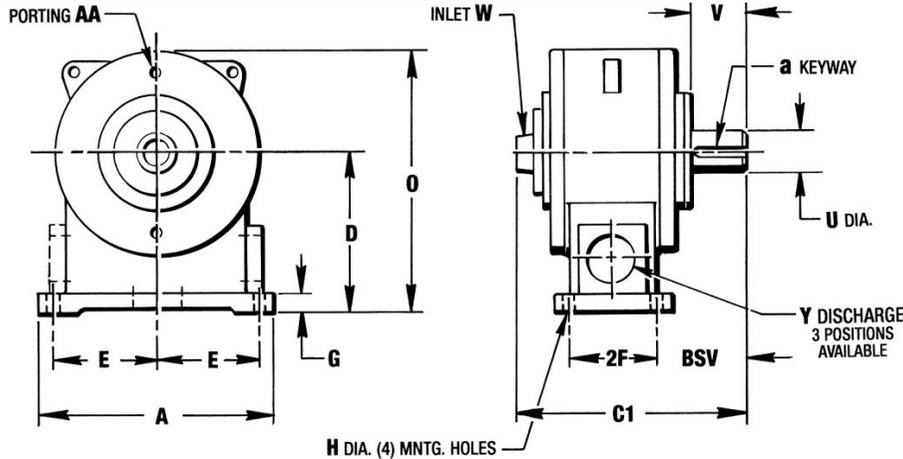
Smaller Units - Page 9.6  
 Selection Procedure - Section 15  
 Engineering Information - Section 16

Positorq Size	Number of Discs	Dynamic Brake Torque (Lb. Ft.)		Static Torque @ PSIG	Max. RPM	Thermal Horsepower		Piston Chamber Volume (Cu. In.)	Inertia Cyclic Parts (Lb. Ft. <sup>2</sup> )
		Continuous Slip @ PSIG	Momentary * Slip @ PSIG			Basic	Force Lube		
82	10	1,995 @ 18	2,992 @ 25	3,989 @ 31	1220	-----	188	26	11
	12	2,400 @ 31	3,600 @ 41	4,800 @ 52		-----	225		
83	12	4,644 @ 36	6,966 @ 51	9,288 @ 66	1275	-----	311	53	33
84	12	8,210 @ 33	12,315 @ 48	16,420 @ 63	1500	-----	522	86	55
	18	12,315 @ 19	18,473 @ 27	24,631 @ 36		-----	783		75
85	18	26,853 @ 52	40,280 @ 77	53,706 @ 102	1000	-----	936	83	140
	24	35,804 @ 52	53,706 @ 77	71,608 @ 102		-----	1248		180
86	36	53,706 @ 52	80,560 @ 77	107,413 @ 102	862	-----	1873	166	266
	48	71,608 @ 52	107,413 @ 77	143,217 @ 102		-----	2496		345
87	28	127,600 @ 43	191,343 @ 65	255,200 @ 86	400	-----	3600	209	3910

\* - Less than 60 seconds, less than 60% duty.

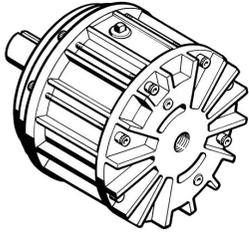
**Positorq Dimensions (Inches)**

**Sizes TB-82 to TB-87 Foot Mounted**



Size	No. of Discs	Foot Mounting Dimensions							Overall Dim.		Shaft Dimensions			AA (NPT)	Pipe Size (NPT)	
		A	D	E	2F	G	H	O	BSV	C1	a	U	V		W	Y
82	10	24.0	12.56	9.50	5.63	1.00	0.75	23.00	8.06	23.00	1 x 1/2	4.25	4.88	1/4	1-1/4	3
	12															
83	12	25.0	15.00	11.50	6.00	1.50	0.93	27.50	10.25	23.18	1-1/4 x 5/8	5.00	7.00	1/4	2	4
84	12	27.5	18.00	12.25	8.75	1.50	1.06	33.00	9.94	27.75	1-1/2 x 3/4	6.00	5.93	1/2	2-1/2	4
	18									30.75					3	8
85	18	34.0	23.00	15.00	12.88	2.50	1.56	38.00	12.68	33.40	1-1/2 x 3/4	6.00	7.88	1/2	3	6
	24									36.21					4	6
86	36	36.0	22.00	16.00	23.00	4.00	2.25	37.00	14.56	47.44	1-3/4 x 7/8	7.00	8.75	1/2	4	10
	48									53.06					5	14
87	27	56.0	37.00	24.00	30.00	5.00	3.00	59.00	24.56	61.00	N/A	10.00	N/A	1	6	16

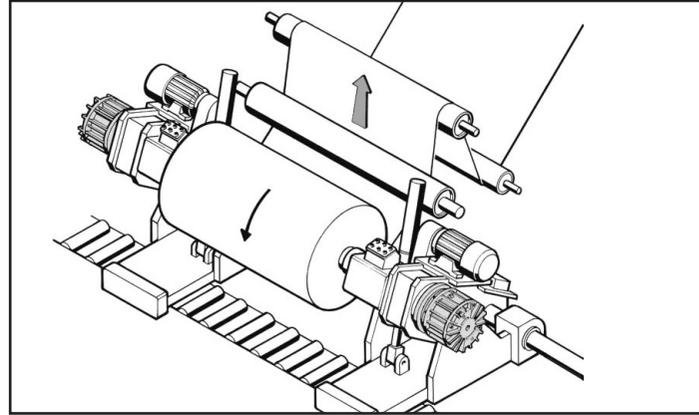
Thru Shaft Options Available - Consult Factory N/A = Non Applicable



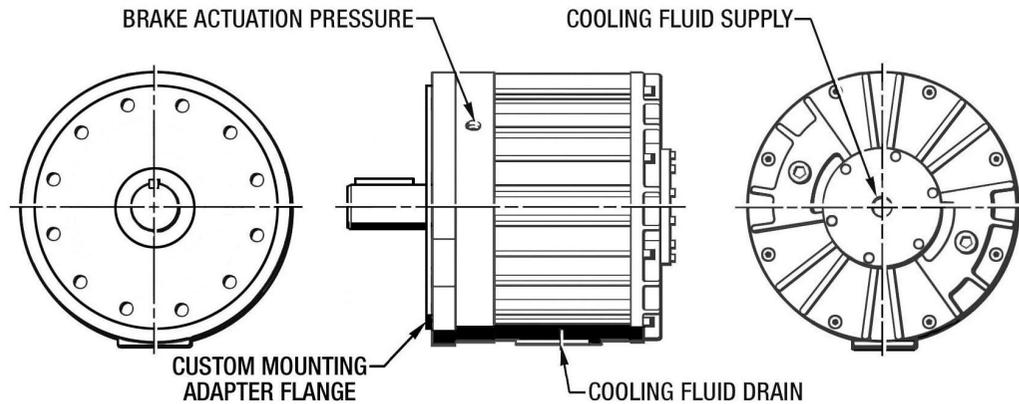
## C. Flange Mounted Positorq Brake

The **Flange Mounted Positorq** is furnished in an aluminum housing. It was designed for the shaftless unwind application. Maximum continuous torque is 44,000 Lb. Ft. and the maximum continuous thermal horsepower is 250. The unit can be furnished with an extended shaft or quill type shaft. **The flange mounting can be modified to fit various applications.**

### TYPICAL APPLICATION (Shaftless Unwind Stand for Paper Converting Process)



### Positorq Brake Views



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These **Flange Mounted Positorq Brakes** normally require special modifications to fit a specific application. Consult our factory for certified installation, dimensional drawings and assistance in ordering.

### Positorq Specifications

Selection Procedure - Section 15  
Engineering Information - Section 16

Positorq Size	Number of Discs	Dynamic Brake Torque (Lb. Ft.)		Static Torque (Lb. Ft. @ PSIG)	*** Max. RPM	**** Thermal HP With Force Lube Cooling	Piston Chamber Volume (Cu. In.)	Inertia Cyclic Parts (Lb. Ft. <sup>2</sup> )
		Continuous Slip @ PSIG	Momentary <sup>3</sup> Slip @ PSIG					
TB-20-804	10	1,027 @ 60	1,540 @ 88	2,055 @ 116	2200	100	20	1.6
TB-20-806	19	1,952 @ 60	2,928 @ 88	3,904 @ 116	2200	190	20	2.7
TB-20-807	19	4,124 @ 412*	6,187 @ 612*	8,250 @ 813*	700	190	7.36*	6
TB-83-211	12	7,252 @ 825*	10,878 @ 1,200*	14,500 @ 1580*	120	560	7.32*	28
TB-83-212	20	12,086 @ 825*	18,120 @ 1,200*	24,170 @ 1580*	120	900	7.32*	39
85-209	32	47,920 @ 800*	71,880 @ 1,150*	95,850 @ 1510*	900**	1500	11.9*	303

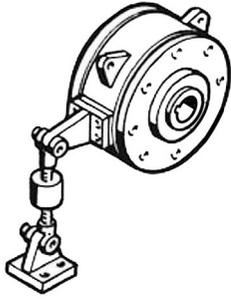
\* - Hydraulic Actuation.

\*\* - With High Speed Shaft Seal.

\*\*\* - Maximum RPM generally related to type of shaft seal used. Consult factory for higher speeds.

\*\*\*\* - Thermal Horsepower ratings based on current design. Consult factory for higher ratings.

<sup>3</sup> - Less than 60 seconds, less than 60% duty.

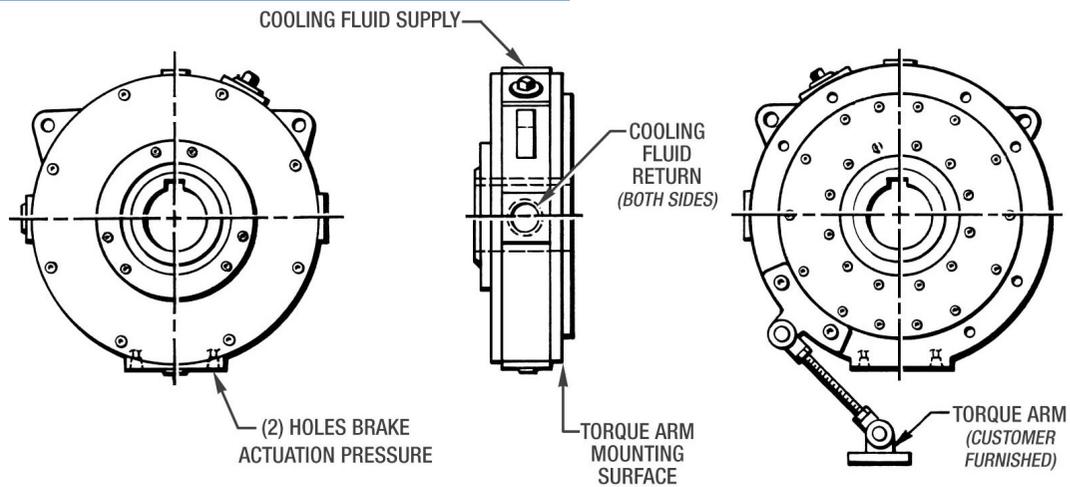


## D. Shaft Mounted Positorq (Size TB-85 & TB-87)

The **Shaft Mounted Positorq** was designed to replace dry friction brakes which were flange mounted. Often these are used in steel applications where a hollow bore is required to accommodate a pull rod mechanism which operates the unwind stand mandrel through the large

shaft. (See Example C on page 9.5) The brake is available with 5 different stack configurations for different torque requirements. The brake can be also be flange mounted to suit and match your unit. A forced lube cooling unit is also normally required.

### Positorq Brake Views



These **Shaft Mounted Positorq Brakes** normally require special modifications to fit a specific application. Consult our factory for certified installation, dimensional drawings and assistance in ordering.

### Positorq Specifications

Selection Procedure - Section 15  
Engineering Information - Section 16

Positorq Size	Number of Discs	Dynamic Brake Torque (Lb. Ft.)		Static Torque (Lb. Ft. @ PSIG)	*** Max. RPM	**** Thermal HP With Force Lube Cooling	Piston Chamber Volume (Cu. In.)	Inertia Cyclic Parts (Lb. Ft. <sup>2</sup> )
		Continuous Slip @ PSIG	Momentary * Slip @ PSIG					
85-205	7	7,095 @ 61	10,643 @ 88	14,190 @ 114	500	184	175	50
	12	12,163 @ 61	18,245 @ 88	24,326 @ 114		374		90
	18	18,244 @ 61	27,366 @ 88	36,489 @ 114		540		160
85-212	37	55,200 @ 790*	82,800 @ 1,145*	110,400 @ 1500*	900	250	12.27*	253
87	27	117,935 @ 43	176,903 @ 65	235,581 @ 86	400	2000	355	3975

\* - Hydraulic Actuation.  
\* - Less than 60 seconds, less than 60% duty.

## How to order your Positorq Absorber Brake

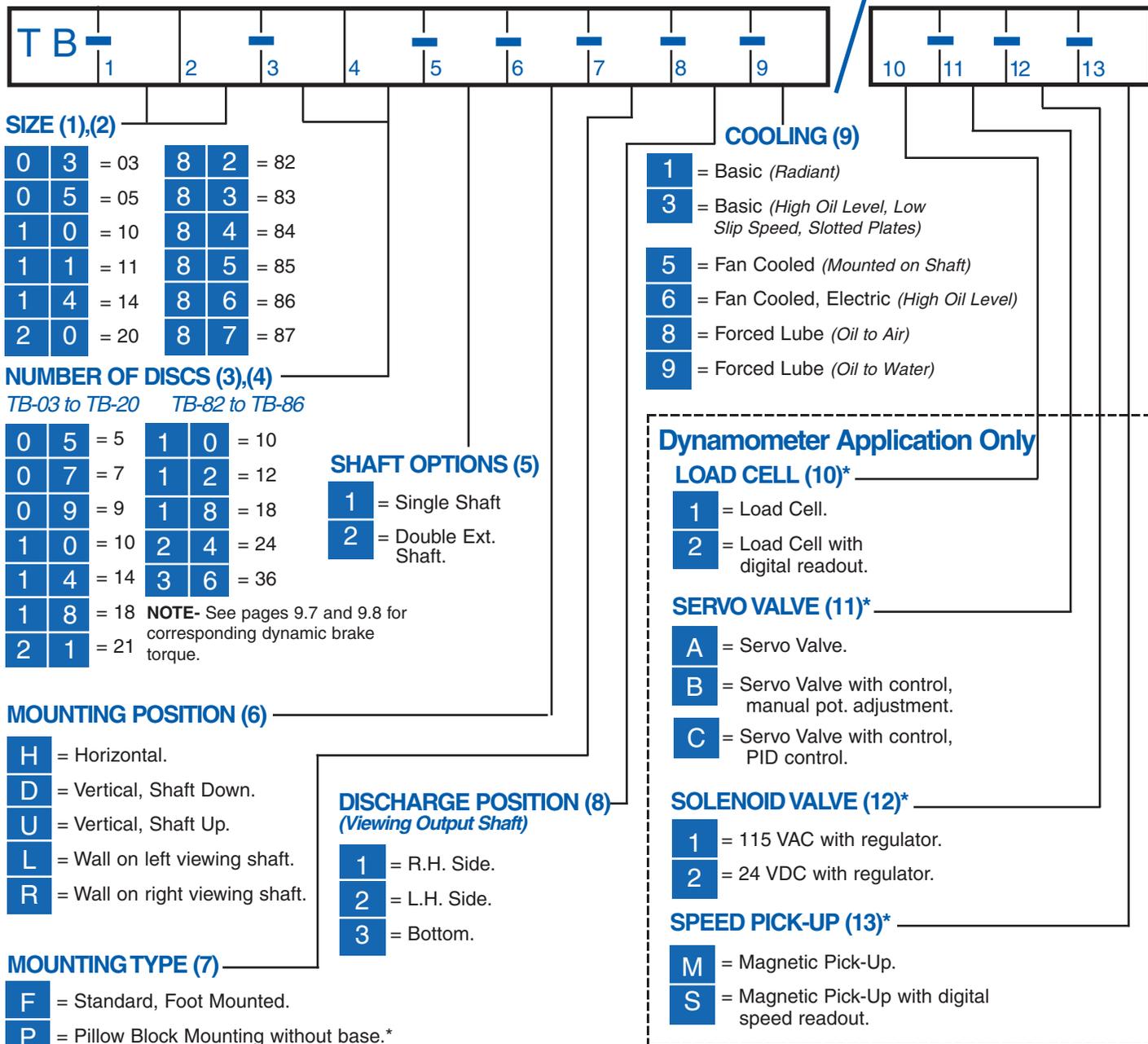
The **Positorq Ordering System** has been developed to simplify the ordering process and to reduce any misunderstanding and costly errors. To correctly order a **Positorq Absorber**

**Brake** for a **Tension Application** use the **Ordering System Chart (Fill in Items 1 thru 8 only)**. For a **Dynamometer Application (Fill in Items 1 thru 12)**.

Example for Tension Application: TB-20-14-1-H-B-1-9

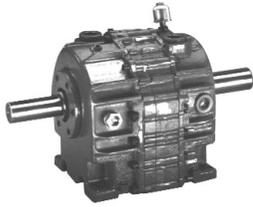
### Ordering System Chart

### Example for Dynamometer Application: TB-20-14-1-H-B-1-9 / 2-C-1-S



\*- **NOTE:** (For Dynamometer Application Only) If Any Options (10) through (13) are not required then place a "N" (which stands for **NONE**) in each appropriate block of the Ordering System Chart for that particular option.

9



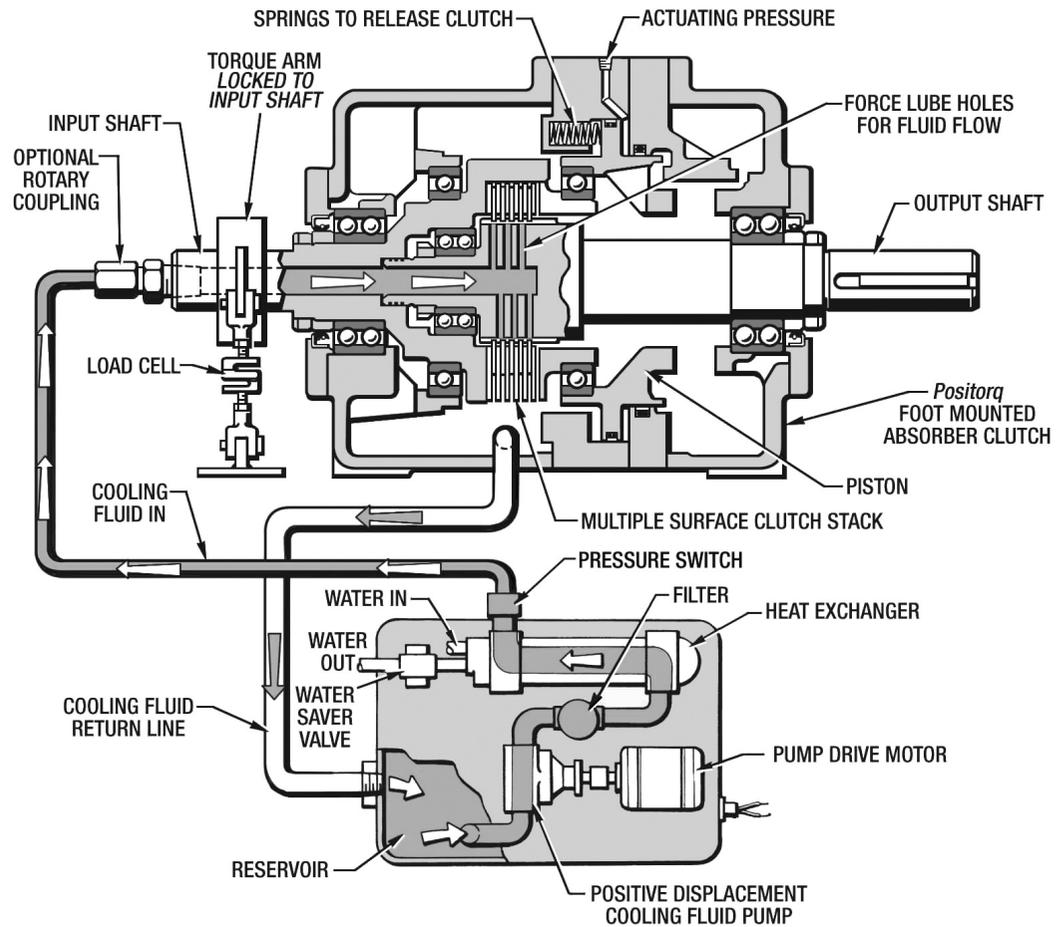
## E. Positorq Foot Mounted Absorber Clutch

(Sizes TC-02 to TC-30)

The **Positorq Absorber Clutch** is designed for applications requiring high torque, low speed endurance testing. Fluid is pumped from the sump, through the clutch input shaft and returned to the sump under low pressure to cool and lubricate the clutch stack. A positive displacement pump is used to reduce the possibility of starving the clutch stack, a

flow switch is provided for shutting down the system in case of a failure, and efficient heat exchangers are used to remove the heat from the cooling fluid that was absorbed from the clutch.

There are nine available sizes with a dynamic continuous slipping torque range of 30 Lb. Ft. to 2792 Lb. Ft.

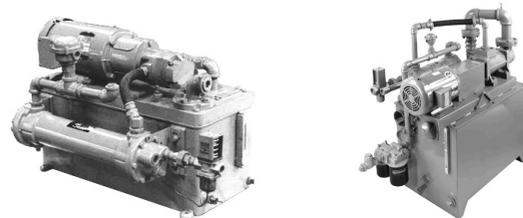


9

FOOT MOUNTED ABSORBER CLUTCH



TYPICAL FORCED LUBE COOLING UNITS



## Positorq Absorber Clutch Specifications

Sizes TC-02 to TC-30 Foot Mounted

Positorq Size	No. of Discs	Dynamic Clutch Torque (Lb. Ft.)		Max. Static Torque @ PSIG	Max. RPM	Thermal Horsepower		Piston Chamber Volume (Cu. In.)	Inertia Cyclic Parts (Lb. Ft. <sup>2</sup> )
		Maximum Continuous Slip @ PSIG	Maximum * Momentary Slip @ PSIG			Basic	Force Lube		
02	4	27 @38	40 @ 58	53 @ 77	3600	CF	11	1	.02
2.5	4	50 @28	75 @ 42	100 @ 57	3600	CF	34	5	.12
03	6	86 @ 25	130 @ 38	173 @ 51	3600	CF	46	7.6	.05
05	10	144 @ 25	216 @ 38	288 @ 51	3600	CF	46	8	.07
10	8	319 @ 24	479 @ 36	638 @ 48	3600	CF	92	12	.29
11	10	680 @ 38	1,021 @ 57	1,361 @ 76	1800	CF	118	12	.56
14	13	885 @ 38	1,327 @ 57	1,770 @ 76	1800	CF	118	12	.62
20	8	822 @ 27	1,232 @ 40	1,643 @ 53	1800	CF	176	23	1.59
30	14	2,792 @ 21	4,188 @ 32	5,583 @42	1800	CF	136	97	12.96

\* - Less than 60 seconds, less than 60% duty.

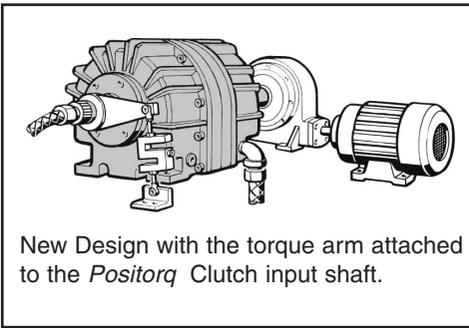
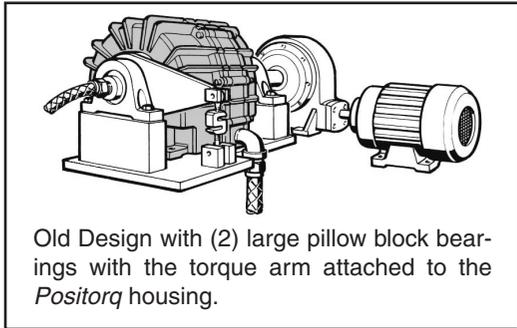
CF - Consult Factory

# 9

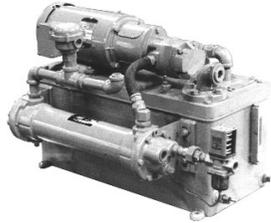
## An Innovative Answer for the Dynamometer Application

Force Control has brought a low cost alternative for your dynamometer applications. We have eliminated the need for large pillow blocks and mounting hardware by attaching the torque arm directly to the *Positorq* Clutch input Shaft. See the illustrations below.

### Gearbox or Hydraulic Motor Testing



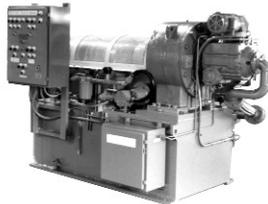
## F. Forced Lube Cooling Unit



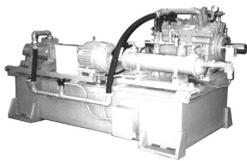
A free-standing Forced Lube Cooling Unit for sizes TB-03 to TB-20 Positorq.



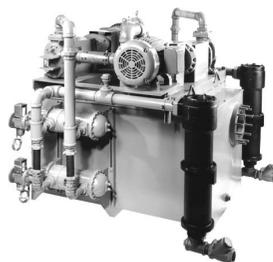
A free-standing Forced Lube Cooling Unit for sizes TB-82 to TB-86 Positorq.



A Positorq Tension Brake mounted on a structural type Forced Lube Cooling Unit.



A size 20 Posidyne Clutch/Brake Centrifuge Drive mounted on a structural type Force Lube Cooling Unit.



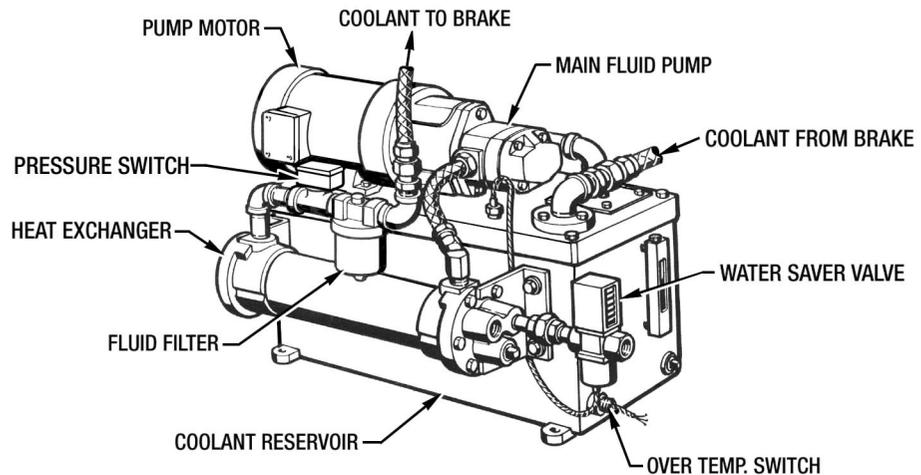
A Dual Pump Forced Lube Cooling System all mounted on a common tank for maximum cooling efficiency and oil delivery.

In most cases the **Positorq Absorber Brakes** require a **Forced Lubrication System**. The **Forced Lube Cooling Unit** is basically a steel reservoir with a pump, motor and heat exchanger to pump cooling fluid from the reservoir through the heat exchanger, to the brake and back. The cooling fluid is specially designed transmission fluid used for cooling and lubrication. This system is different than many hydraulic systems in that it has very high flow capacity (GPM) with low system pressure. (See next page for specific Forced Lube Cooling Systems.)

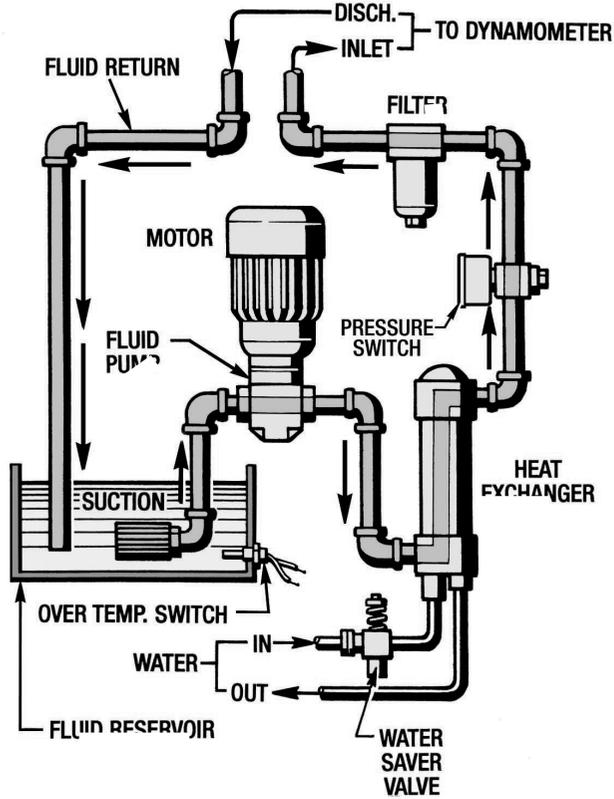
The standard Forced Lube Cooling Unit is designed for years of trouble free service, safety and also includes protection for the cooling unit as well as the **Positorq Brake**. There are many variations, depending on system requirements, all systems will generally include the following:

1. **Main Fluid Pump** - A rotary screw type pump with over 25 GPM. Sometimes a small gear type pump can be used on smaller systems unless gear noise is a problem.
2. **Heat Exchanger** - Oil-to-Water or Oil-to-Air. The oil-to water type of heat exchanger will require a water modulating valve.
3. **Filter** - Installed in Coolant to Brake line. Canister screw type with replaceable filter element. Used on systems with less than 60 GPM flow capacity.
4. **Pressure Switch** - This Pressure Switch is wired into the system to stop the prime mover in case of loss of fluid pressure.
5. **Over Temperature Switch** - This is wired into an alarm system to warn of an over temperature condition.
6. **Kidney Filtration System** - For larger systems, a kidney filtration system is used that includes another small pump and motor to re-circulate the fluid through a filter. A vacuum gauge is included to identify a dirty filter. When using the kidney filtration system a ball valve arrangement is used to allow use of the filter system to pump old fluid out of the reservoir and new fluid in. Fluid coming in is pumped through a filter before going into the reservoir. This Kidney Filter System is shown and described on page 9.16.
7. **Reservoir** - A reservoir is sized to hold all the fluid and contains special baffles to cause sediment to drop out and for any aeration to settle down.

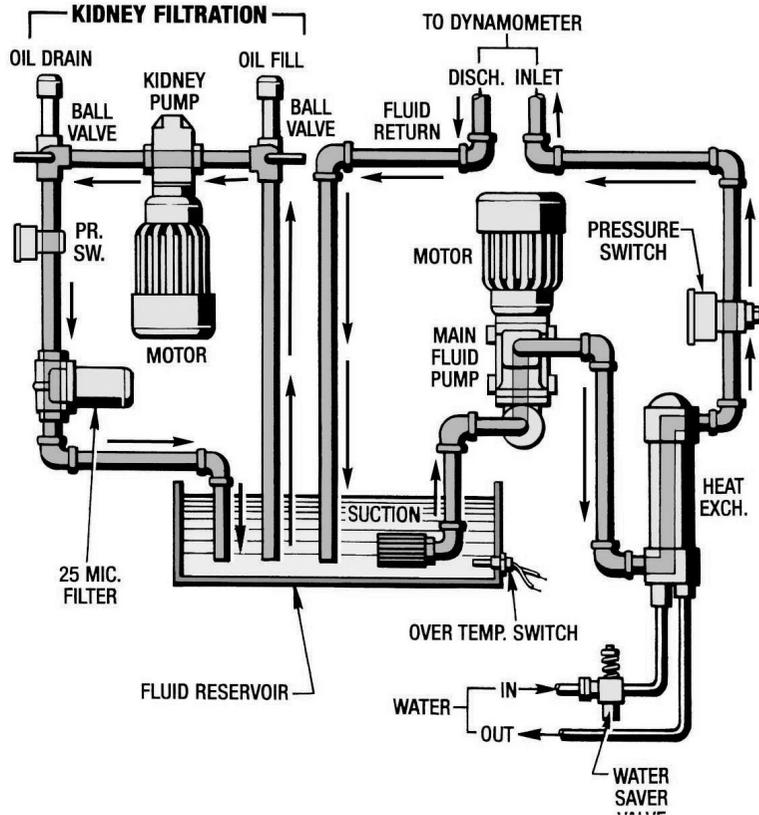
**Sizing and selection of the Forced Lube Cooling Units is based on many factors which cannot all be described in this catalog. The cooling system is designed to work with a particular Positorq brake under certain conditions and therefore has to be sized and selected by Force Control with the brake.**



Forced Lube Cooling System  
(Without Kidney Filtration)

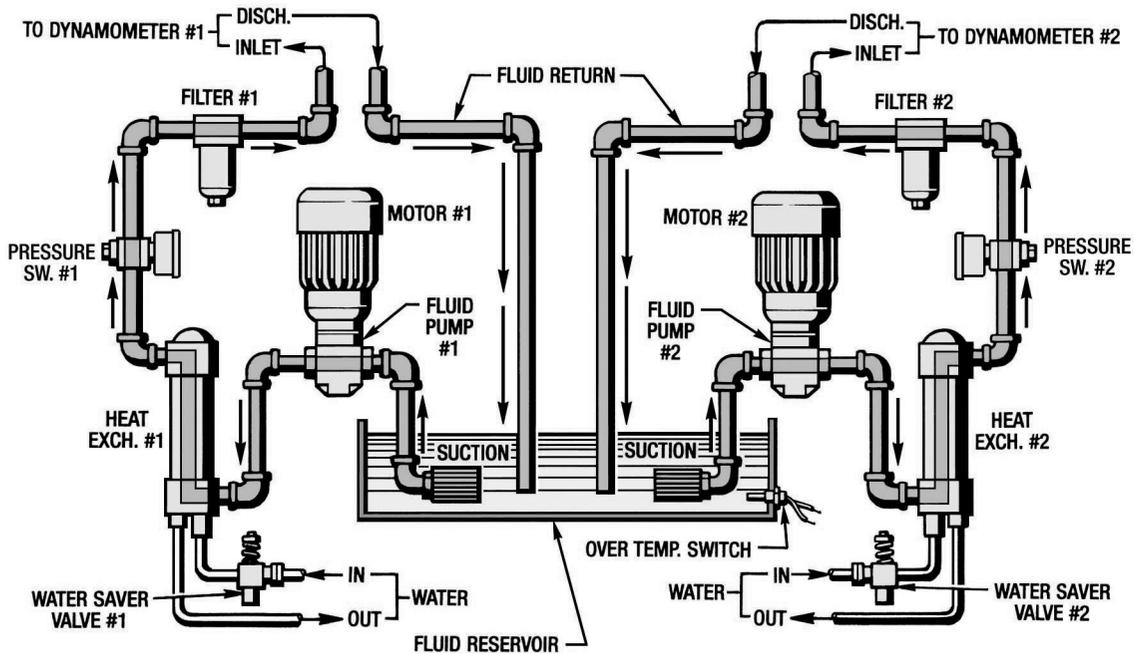


Forced Lube Cooling System  
(With Kidney Filtration)



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Dual-Pump Forced Lube Cooling System  
(Without Kidney Filtration)



NOTE: Kidney Filtration can also be included on this Dual-Pump Forced Lube Cooling System.