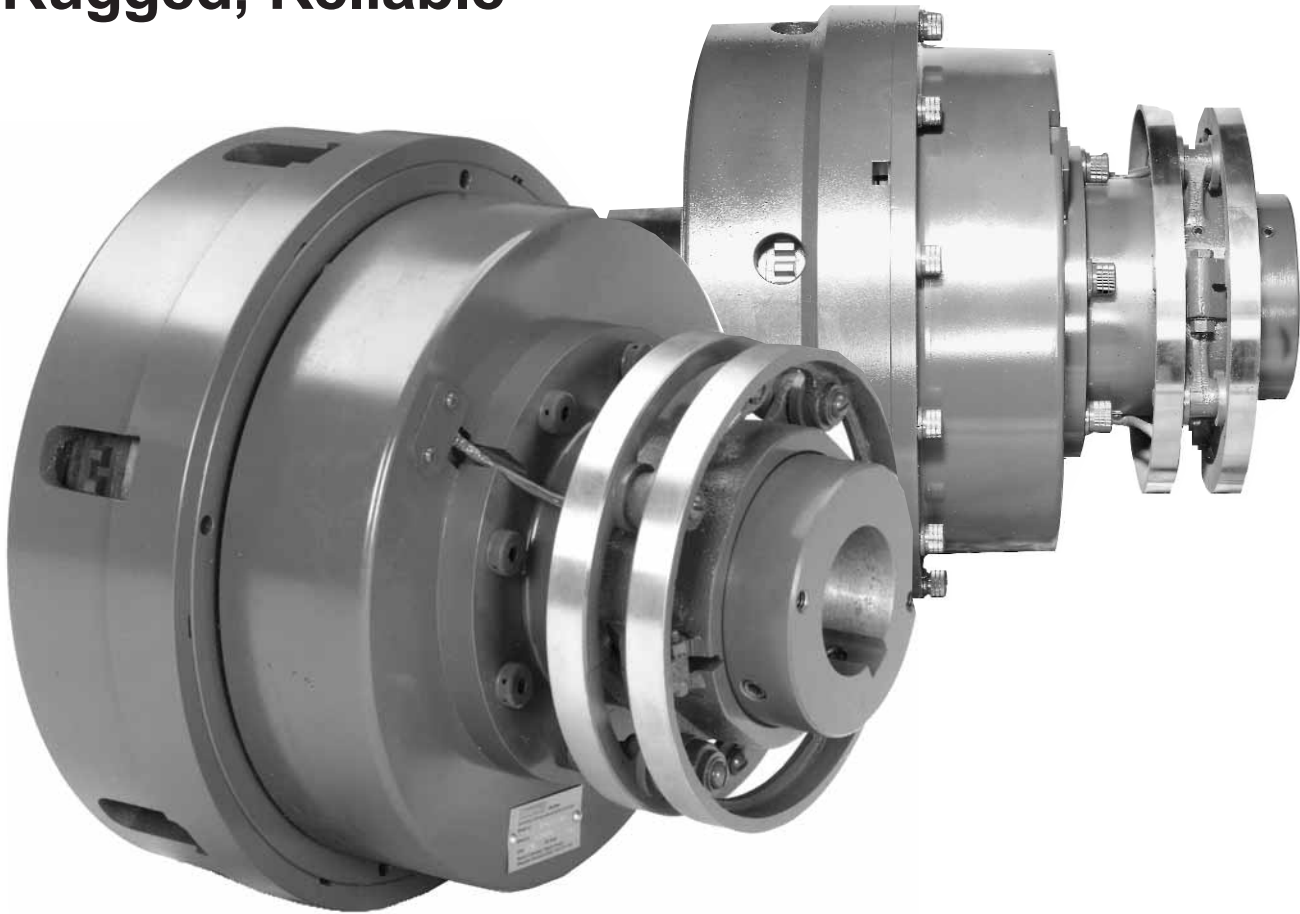


Stearns® Heavy Duty Clutches & Brakes...

Rugged, Reliable



Stearns heavy duty clutches and brakes represent over 75 years of design, engineering and on-the-job experience. Stearns products are backed by a reputation for quality and integrity.

Stearns will customize heavy duty clutches and brakes to most customer requirements.

For your heavy duty power transmission control needs, there's a Stearns clutch or brake for the job.

Stearns heavy duty clutches are large, rotating field/magnetic devices with torque ranges from 7 lb-ft through 120,000 lb-ft. These clutches are available as electrically engaged and as spring engaged - electrically released clutches.

Stearns heavy duty brakes are foot mounted, stationary field, spring engaged - electrically released devices. These brakes provide a stopping and holding function on a drive or motor shaft.

Stearns heavy duty rectifiers and combination forcing circuit/rectifiers are available to provide the necessary direct current power to operate spring-engaged clutches or brakes.

Typical applications of these heavy duty products:

- Steel Mills, Screw-Downs
- Standby Engine/Motor Generator Sets
- Kiln Drive Systems and Backup Drives
- Rubber Mills
- Oil Field Equipment
- Dock and Pier Handling Equipment

- Emergency Drive for Large Fans, Blowers and Pumps
- Metal Forming Machinery
- Dynamometers
- Pulp Processing Equipment
- Large Textile Machines
- Cranes and Hoists, as a Coupling between Motors

The heavy duty clutches and brakes are made-to-order. This catalog information is provided to assist selection and basic fit for Stearns heavy duty products. The dimensions are for estimating only and are subject to change based on the application requirements.

An approval drawing process with new applications provides Stearns manufacturing with customer selection and dimensional requirements. For replacement units and repair parts, the serial number from the nameplate is extremely important.

With the part number and serial number, our customer service personnel can assist you in securing the correct parts or replacement clutch. The serial number on the nameplate is also stamped into the magnet body. It is critical information. The heavy duty products are made-to-order, and can differ from other units of the same style and size.

Selection

For the heavy duty products, we suggest the following equation be used.

$$T = \frac{5252 \times P}{N} \times SF$$

Where,

T = Torque, lb-ft

P = Horsepower, hp

N = Shaft Speed Differential at Clutch or Brake, RPM

SF = Service Factor

5252 = Constant

The service factors for the preceding equation can be selected from the following table:

The torque value calculated from the above equation can be compared to the ratings given for the individual products, as shown in the performance data tables.

Application Considerations

Lubricants: Dry friction clutches and brakes should not be used where the friction surfaces will be subjected to oil, cutting fluid or other lubricants and contaminants as these will reduce the torque output.

High Speed: Recommended balance rpm and maximum rpm are listed by size in the catalog section.

High Temperature Environments: Environments where the ambient temperature exceeds 40°C (104°F) could cause early coil failure. Class H coil insulation is available.

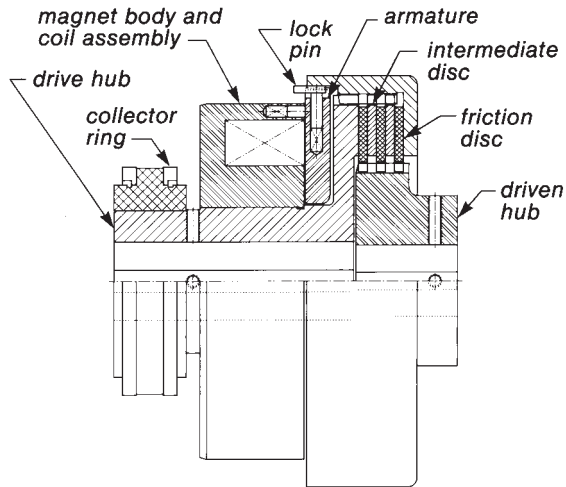
Vertical Application: The heavy duty products are not intended for vertical applications.

Application	SF
Brake (Non-Overhauling Load)	1.5
NEMA Design A, B and C AC Motors	2.8
NEMA Design D AC Motors	3.5
Shunt Wound DC Motors	4.5
Compound Wound DC Motors	5.0
Series Wound DC Motors	8.0
Internal Combustion Engines	5.0

Outline of Heavy Duty Products

Think of the Stearns *Heavy Duty Clutches and Brakes* for any application requiring rugged, high torque, low inertia clutches and brakes

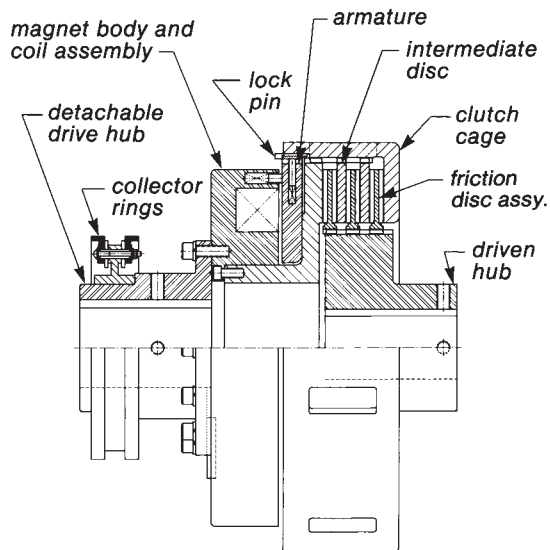
Style E Electrically Set Clutch



Torque 7 to 9000 lb-ft
 Basic Unit (as shown) Form 1
 Clutch Coupling
 Collector Rings on One-Piece
 Drive Hub
 Straight Bores
 115 or 230 Volts DC Operation
 Class B Insulation Standard

OPTIONS: Metric Bores ■ Collector Ring on Magnet Body (shorter overall length)
 ■ Three-Piece Housing ■ Through Shaft (bronze bushed or ball bearing, driven hub
 for mounting sprockets, gears, etc.) ■ Other Voltages ■ Dynamic Balancing (as
 required) ■ Pilot Bearing in Driven Hub (for long unsupported shafts)

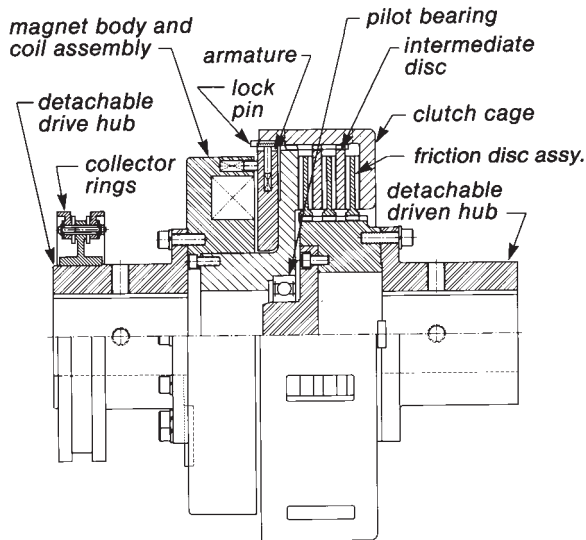
Style E, Class S Electrically Set Clutch



Torque 600 to 9000 lb-ft
 Basic Unit (as shown) Form 1
 Clutch Coupling
 Two-Piece Split Collector Rings
 on Drive Hub
 Detachable Drive Hub (vertical
 removal of clutch without
 disturbing shafts)
 Straight Bores
 115 or 230 Volts DC Operation
 Class B Insulation Standard
 Carrier Ring Type Friction Disc

OPTIONS: Taper Bores ■ Metric Bores ■ Three-Piece Housings ■ Other Voltages
 ■ Dynamic Balancing (as required) ■ Spindle Shafts ■ Floating Shaft Arrangements
 ■ Detachable Driven Hub

Style E, Class M Electrically Set Clutch



Torque 3,000 to 120,000 lb-ft
Basic Unit (as shown) Form 6
(pilot bearing) for Long
Unsupported Shafts

Two-Piece Split Collector
Rings on Drive Hub

Straight Bores

Detachable Drive and Driven
Hubs (vertical removal of
clutch without disturbing
shafts)

115 or 230 Volts DC
Operation

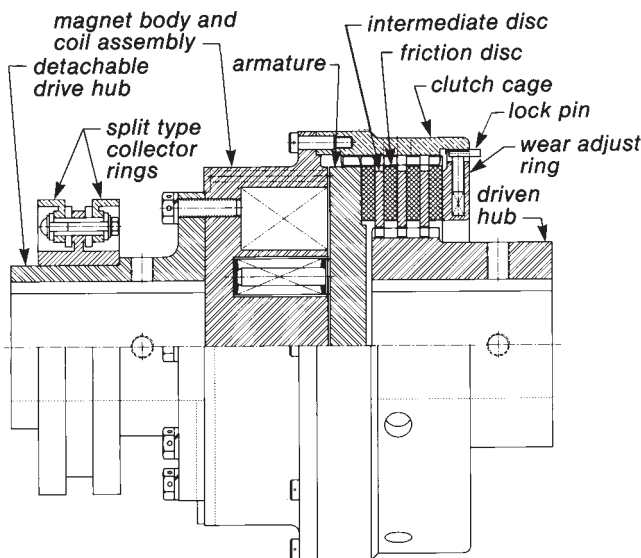
Class B Insulation Standard

Carrier Ring Type Friction
Disc

OPTIONS:

- Dynamic Balancing (as required)
- Collector Ring Cover
- Housing for Most Smaller Sizes
- Spindle Shafts
- Floating Shaft Arrangements

Style SCE, Class S3 Spring-Set Clutch



Torque 450 to 12,000 lb-ft

Basic Unit (as shown) Form 1
Clutch Coupling

Two-Piece Split Collector
Rings on Drive Hub

Detachable Drive Hub
(vertical removal of clutch
without disturbing shafts)

Straight Bores

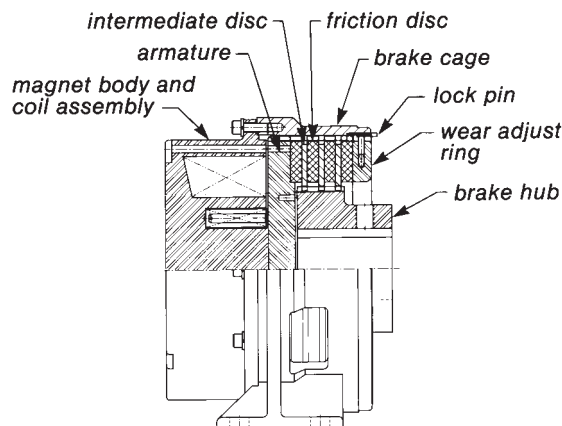
115 or 230 Volts DC
Operation for Forcing

Class B Insulation Standard

OPTIONS:

- Taper Bores
- Metric Bores
- Three-Piece Housings
- Through Shaft (some sizes)
- Pilot Bearing in Driven Hub (for wider spaced shafts)
- Detachable Driven Hub
- Dynamic Balancing (as required)
- Combination Forcing Circuit Voltage and Holding Voltage Circuits Required (forcing-rectifier control available from Stearns Division)

Style SCEB, Class S3 Spring-Set Brake



Torque 450 to 12,000 lb-ft

Foot Mounted

Straight Bore

115 or 230 Volts DC
Operation for Forcing

Class B Insulation Standard

OPTIONS:

- Taper Bores
- Metric Bores
- Detachable Hub
- Combination Forcing Circuit Voltage and Holding Voltage Circuits Required (forcing-rectifier control available from Stearns Division)
- Limited Through-Shaft Capability



Style SCE, Class S3

Spring Engaged Clutch with Straight Bores

Stearns Style SCE, Class S3 Clutch is a high torque, low inertia, electromagnetic clutch for steel mill screw-downs, and similar equipment. The basic design of this clutch has been time-tested and proven by over 50 years of successful application.

Stearns S3 Clutch is designed to provide extremely high capacity in a relatively small package.

The Style SCE, Class S3 Clutch is spring engaged, electromagnetically released. A spring loaded lock pin simplifies adjustment of air gap. When adjustment is required, lock pin is depressed and wear adjustment ring rotated until lock pin snaps into next slot in cage.

Friction linings can be quickly replaced without disturbing related equipment on either side of the clutch.

This clutch operates on direct current and requires forcing circuit (see Page 49 or Wiring Diagram). If your plant does not have direct current, a suitable combination forcing circuit/rectifier can be supplied.

Class B coil insulation is standard.

Performance Data

MECHANICAL

Clutch Size	Nominal Static Torque (lb-ft)	Wk ² (lb-ft ²)		RPM at which Dynamic Balancing is Required	Approx. Shipping (wt-lbs)	Max. RPM
		Drive End	Driven End			
802	450	6.90	.60	1200	115	3600
804	900	7.20	.80	1200	130	3600
1004	1400	17.25	1.45	1200	200	3300
1006	2100	18.20	1.90	1200	210	3300
1204	3500	46.75	3.50	1000	330	2000
1206	5000	49.20	4.65	1000	350	2000
1406	7800	100.70	11.40	1000	550	1800
1606	12000	187.30	20.80	800	700	1600

ELECTRICAL

Clutch Size	Source Line Voltage	Series Resistor		Coil Resistance ohms	DC Watts Circuit	
		ohms	watt		Inrush	Holding
800	230	275	125	130	407W-1.77A	130W-.567A
1000	230	155	200	82	643W-2.8A	223W-.97A
1200	230	125	250	58.4	910W-3.95A	288W-1.25A
1400	230	135	250	60.8	870W-3.78A	269W-1.17A
1600	230	135	200	59.4	890W-3.87A	272W-1.18A

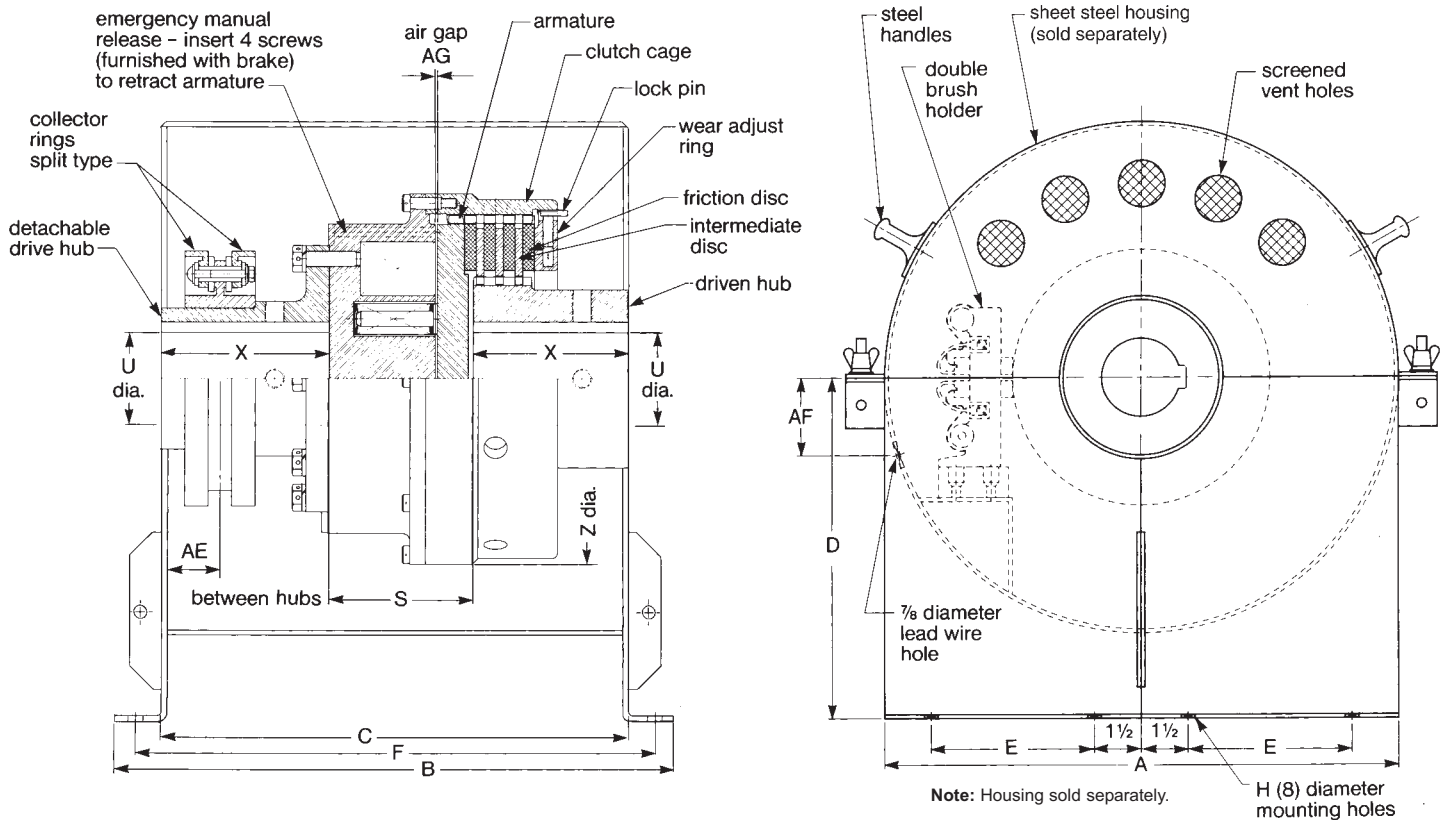
Dimensional Data (In Inches)

Size	A	B	C	D ^①	E	F	H	S	Z	AE	AF	AG	Drive Hub			Driven Hub		
													U ^②	X	Keyway	U ^②	X	Keyway
802	15 1/2	14 1/2	11 1/2	8 1/4	4 3/4	13 1/4	7/16	4 1/8	10 1/8	1 3/4	2 1/2	.050	2 1/2	4 1/4	5/8 x 5/16	2 3/4	3 1/8	5/8 ξ 5/16
804		12	13 3/4			3 5/8												
1004	16 1/2	17 3/8	14 3/8	8 3/4	5 1/4	16 1/8	7/16	4 5/8	12	1 7/8	2 1/2	.060	3	5 3/8	3/4 x 3/8	3 1/4	4 3/8	3/4 ξ 3/8
1006		15	16 3/4			5												
1204	19	19 9/16	16 1/16	10	6 1/2	18 5/16	9/16	5 7/16	14 1/2	2 1/16	2 1/2	.060	4	5 7/8	1 x 1/2	3 3/4	4 3/4	7/8 ξ 7/16
1206		20 3/16	16 11/16			18 15/16											5 3/8	
1406	20	23 7/8	20 3/8	10 1/2	7	22 5/8	9/16	7 1/4	16 3/4	2 1/16	2 1/2	.060	4	6 1/8	1 x 1/2	4 3/4	7	1 1/4 ξ 5/8
1606	22	24 3/8	20 7/8	11 1/2	8	23 1/8	9/16	6 3/4	19	2 1/16	2 1/2	.060	4 3/4	7 1/8	1 1/4 x 5/8	5 1/2	7 3/4	1 1/4 ξ 5/8

① "D" is minimum - larger size to suit customer.

② If bore is to be larger than "U", consult factory.

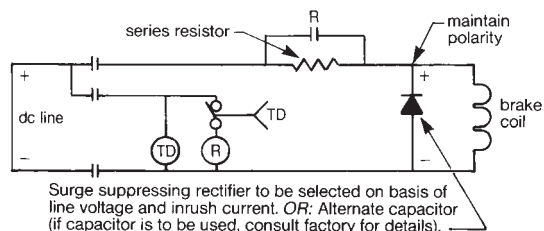
Note: Wk² on drive and driven end are calculated for maximum "U" bore (as shown in Table).



Dimensions are for estimating only and subject to change without notice. For installation purposes, request certified prints.

Note: Consult factory for modifications and approval drawings.

Wiring Diagram



Surge suppressing rectifier to be selected on basis of line voltage and inrush current. OR: Alternate capacitor (if capacitor is to be used, consult factory for details).

(R) is a normally open, single pole, DC contactor.

(TD) is a normally closed time delay relay.

To release the clutch, the three pole contactor is closed. This closes (R) contacts and applies full line voltage to clutch coil. After a few seconds interval, time delay relay opens contactor (R) and places resistor in series with the clutch coil, reducing voltage imposed on coil from line voltage to lower holding voltage.

To engage the clutch, the contactor is opened. The back (EMF) generated in the clutch coil is dissipated through the surge suppressing rectifier, protecting the coil and lead wire insulation and minimizing arcing at the contacts.



Style SCE, Class S3

Spring Engaged Clutch with Tapered Bores

Stearns Style SCE, Class S3 Clutch is a high torque, low inertia, electromagnetic clutch for steel mill screw-downs, and similar equipment. The basic design of this clutch has been time-tested and proven by over 50 years of successful application.

Stearns S3 Clutch is designed to provide extremely high capacity in a relatively small package.

The Style SCE, Class S3 Clutch is spring engaged, magnetically released. A spring loaded lock pin simplifies adjustment of air gap. When adjustment is required, lock pin is depressed and wear adjustment ring rotated until lock pin snaps into next slot in cage.

Friction linings can be quickly replaced without disturbing related equipment on either side of the clutch.

This clutch operates on direct current and requires forcing circuit (see Page 49 or Wiring Diagram). If your plant does not have direct current, a suitable combination forcing circuit/rectifier can be supplied.

Class B coil insulation is standard.

Performance Data

MECHANICAL

Clutch Size	Nominal Static Torque (lb-ft)	Wk ² (lb-ft ²)		RPM at which Dynamic Balancing is Required	Approx. Shipping (wt-lbs)	Max. RPM
		Drive End	Driven End			
802	450	6.90	.65	1200	115	3600
804	900	7.20	.85	1200	130	3600
1004	1400	17.25	1.80	1200	200	3300
1006	2100	18.20	2.20	1200	210	3300
1204	3500	46.75	3.70	1000	330	2000
1206	5000	49.20	4.60	1000	350	2000
1406	7800	100.70	9.75	1000	550	1800
1606	12000	187.30	18.20	800	700	1600

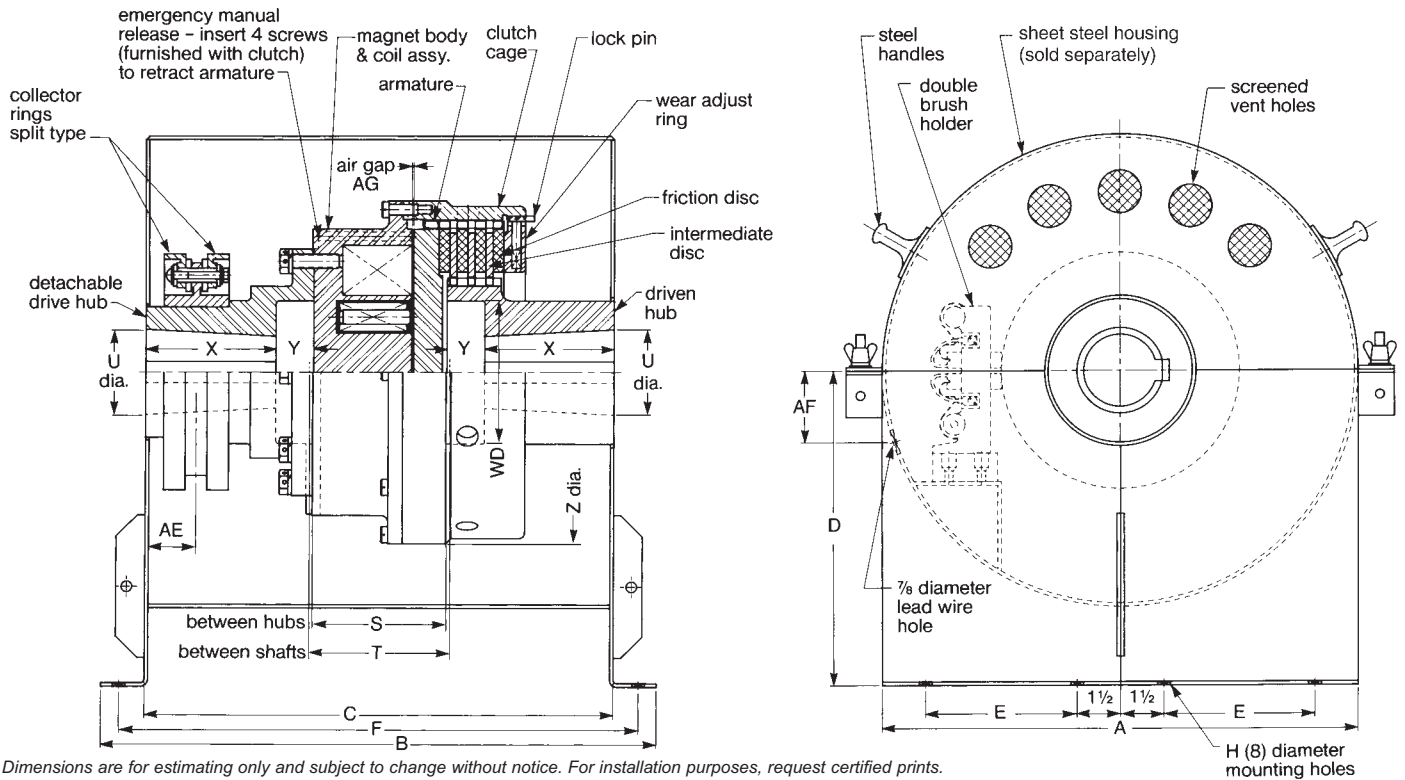
ELECTRICAL

Clutch Size	Source Line Voltage	Series Resistor		Coil Resistance ohms	DC Watts Circuit	
		ohms	watt		Inrush	Holding
800	230	275	125	130	407W-1.77A	130W-.567A
1000	230	155	200	82	643W-2.8A	223W-.97A
1200	230	125	250	58.4	910W-3.95A	288W-1.25A
1400	230	135	250	60.8	870W-3.78A	269W-1.17A
1600	230	135	200	59.4	890W-3.87A	272W-1.18A

Dimensional Data (In Inches)

Size	Mill Motor Frame Size ^①	A	B	C	D	E	F	H	S	T ^②	Z	AE	AF	AG	U ^③	X	Y	WD	Keyway							
802	602 802	15 1/2	15 3/8	12 3/8	7 3/8	4 3/4	14 1/8	7/16	4 1/8	4 1/2	10 1/8	1 3/4	2 1/2	.050	1 3/4	3	④	3 1/4	1/2 ξ 1/4							
	603 803		16 1/4	13 1/4	8 1/4		15			4 1/4					2	3 1/2	1 1/16	3 1/2								
	604 804				8 3/4																					
804	602 802		15 3/8	12 3/8	7 3/8	14 1/8	4 1/2			1 3/4					1 3/4	3 1/4										
	603 803		16 1/4	13 1/4	8 1/4	15	4 1/4			2					3 1/2	1 1/16	3 1/2									
	604 804				8 3/4																					
1004	606 806	16 1/2	18	15	9 3/4	5 1/4	16 3/4	7/16	4 5/8	4 3/4	12	1 3/4	2 1/2	.060	2 1/2	4	1 3/16	4	1/2 ξ 1/4							
	608 808		19 1/4	16 1/4	11		18								3 3/4 ξ 1/4											
1006	606 806		18	15	9 3/4		16 3/4								4	4	1 1/2 ξ 1/4									
	608 808		19 1/4	16 1/4	11	18	5								5	3/4 ξ 1/4										
1204	610 810		19	20 13/16	17 5/16	12	6 1/2								19 9/16	9/16	5 7/16	5 9/16	14 1/2	2	.060	3 1/4	4 1/2	1 7/16	5 1/4	3/4 ξ 1/4
	612 812			22 1/16	18 9/16	13 1/8									20 13/16							5 5/8	5 5/8	5 5/8		
1206	610 810	20 13/16		17 5/16	12	19 9/16		5 7/16	5 9/16	5 1/4																
	612 812	22 1/16		18 9/16	13 1/8	20 13/16	5 7/16	5 9/16	5 5/8																	
1406	614 814	20		24 1/8	20 5/8	14 1/2	7	22 7/8	9/16	7 1/4	7 3/8	16 3/4	2 1/8	.060	4 1/4							5	1 11/16	6 1/2	1 ξ 3/8	
1606	616 816	22		24 7/8	21 3/8	15 3/4	8	23 5/8	9/16	6 3/4	6 7/8	19	2 1/8	.060	4 5/8							5 1/2	1 13/16	7	1 1/4 ξ 3/8	
	618 818		25	21 1/2	17 1/2	23 3/4		6 3/4							6 7/8	19	2 1/8	5	6	1 3/8	7 1/2	1 1/4 ξ 1/2				

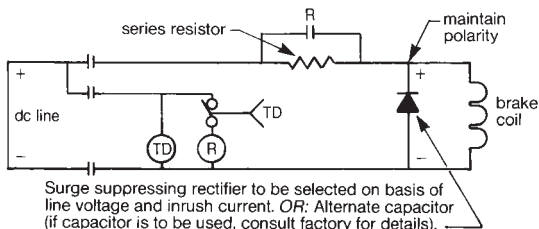
- ① Indicates motor shaft size which clutch will accommodate. Clutch selection should be based on application requirements, not motor frame size.
- ② Dimension "T" is minimum - if to be greater, add to driven hub.
- ③ Note - if bore is to be larger than "U", consult factory.
- ④ Dimension "Y" drive end (1 1/4"), dimension "Y" driven end (1").



Dimensions are for estimating only and subject to change without notice. For installation purposes, request certified prints.

Note: Consult factory for modifications and approval drawings.

Wiring Diagram



(R) is a normally open, single pole, DC contactor.
(TD) is a normally closed time delay relay.

To release the clutch, the three pole contactor is closed. This closes (R) contacts and applies full line voltage to clutch coil. After a few seconds interval, time delay relay opens contactor (R) and places resistor in series with the clutch coil, reducing voltage imposed on coil from line voltage to lower holding voltage.

To engage the clutch, the contactor is opened. The back (EMF) generated in the clutch coil is dissipated through the surge suppressing rectifier, protecting the coil and lead wire insulation and minimizing arcing at the contacts.

For Convenience, Safety and Energy Savings, Look to Stearns® Rectifier Controls.

Perfectly matched to Stearns DC actuated clutches, brakes or combination units, Stearns rectifier controls offer solid-state reliability that also takes into account important human use factors, making them easy to utilize and maintain.

Stearns rectifier controls are available in fixed or adjustable output models with compact housings to simplify installation.

For ultimate convenience, all wiring connections are readily

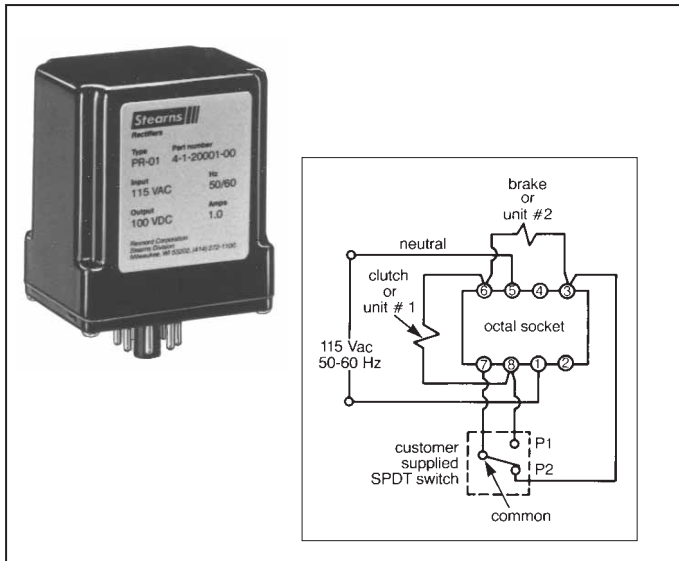
accessible. The PR Series even goes one step further, offering the ease of modular plug-in designs connecting directly to octal sockets.

For safety, all models offered are fused to provide protection against overload and feature an arc suppression circuit, minimizing arcing and extending contact life. In the PR Series, the internal fuse can be changed only by removing the rectifier from its socket - eliminating a potential shock hazard.

For energy savings, efficiency is built into Stearns rectifiers. The adjustable voltage output on the PR-33, for example, uses thyristor control for a low 4-watt power loss-87% less than some competitive units.

When you need reliable performance and more, look to Stearns rectifier controls.



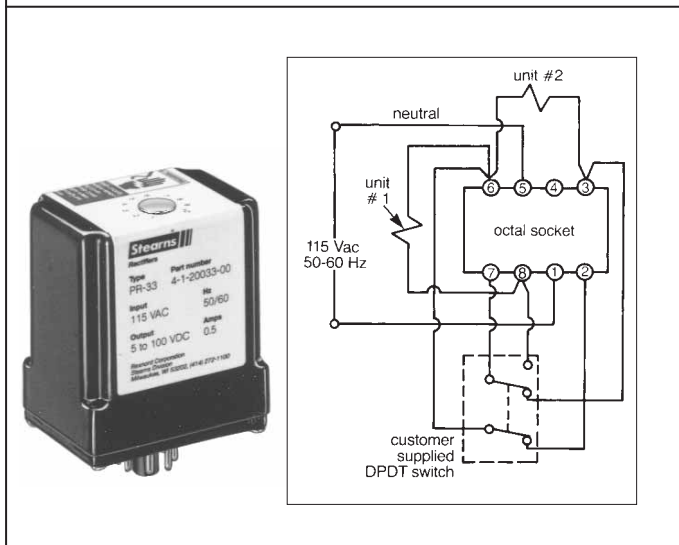


Rectifier Controls

Model PR-01

Two fixed 100 volt outputs.

- Modular plug-in design uses octal socket for easy mounting and wiring connection.
- Internally fused for overload protection.
- Operates one clutch or one brake, or both, one on at a time.



Model PR-33

One fixed 100 volt output and one adjustable 15-100 volt output to allow reduced torque starts or stops for "soft" cushioned engagement.

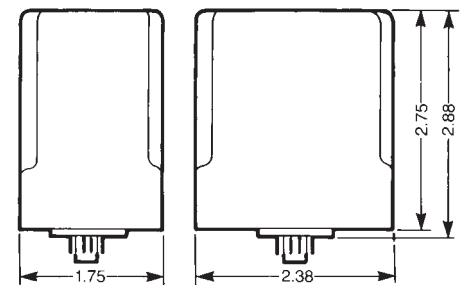
- Adjustable control on top of housing for easy accessibility.
- Modular plug-in design uses octal socket for each mounting and wiring connection.
- Internally fused for overload protection.
- Operates one clutch or one brake, or both, one on at a time.

Enclosure dimensions apply to both PR-01 and PR-33.

Performance/List Price Data

Rectifier Part Number	AC Input Voltage	Nominal DC Output			Control Circuits		Switching Relay	List Price ②	Discount Symbol
		Volts	Max. Amp [Ⓛ]	Max. Watts	#1	#2			
PR-01 4-1-20001-00	115 50-60 Hz	100	1.0	100	Fixed	Fixed	No	\$266.00	X-1
PR-33 4-1-20033-00	115 50-60 Hz	15-100	0.5	50	Fixed	Variable	No	642.00	X-1

① Based on ambient temperature of 104°F.
② List prices subject to change without notice.

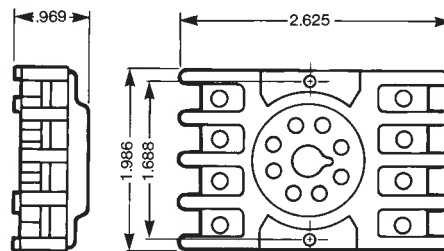


Octal Socket(s)

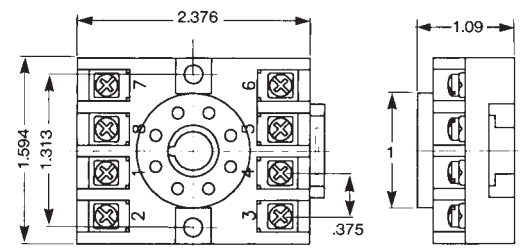
Supplied with terminal screws and clips



Part Number: 9-61-0153-00
Dimensions



Part Number: 9-61-0153-01
Dimensions



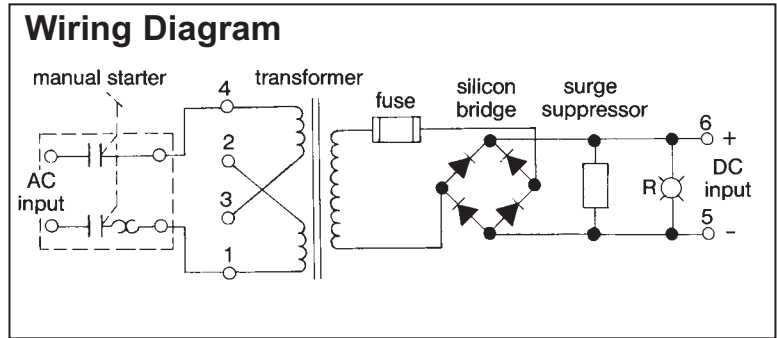
List Price Data

Octal Socket Part Number	List Price	Discount Symbol
9-61-0153-00	\$128.00	X-1
9-61-0153-01	48.00	X-1

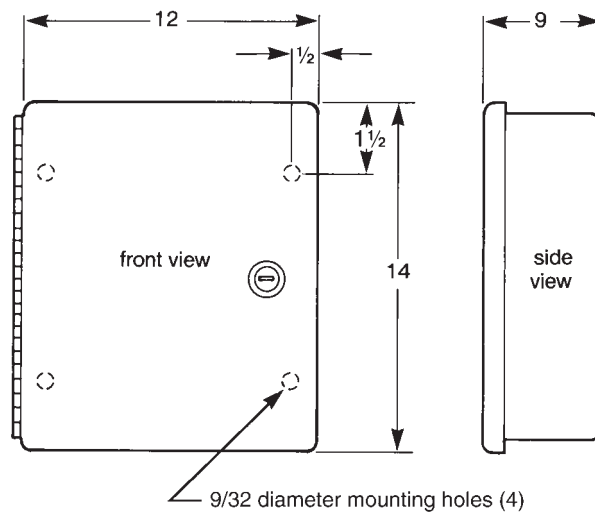
Rectifier Controls

Series 12000 Silicon Rectifiers

Heavy duty single-phase rectifier for use with Stearns heavy duty clutches and brakes. Incorporates a solid-state silicon bridge circuit for high efficiency and excellent voltage regulation. Available with outputs of 115 or 230 Vdc; power ratings of up to 1150 watts. A transformer provides isolation and dual AC input capability... 115/230 or 230/460 Vac. Each rectifier is housed in a NEMA 1 steel cabinet and includes a separately housed manual starter with overload heaters.



Dimensional Data



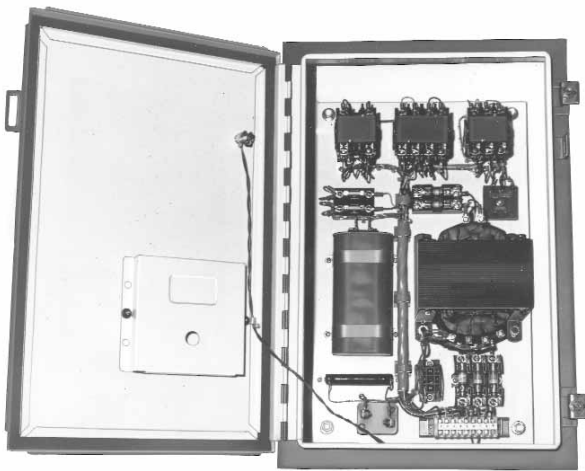
Performance Data

Stock Number	AC Input (50/60 Hz Single-Phase)		DC Output		
	Volts	Amps	Volts	Amps ^①	Watts
4-1-12102-00	115/230	2.5/1.3	115	2.0	230
4-1-12104-00	115/230	6.4/3.2	115	5.0	575
4-1-12202-00	230/460	1.3/0.7	115	2.0	230
4-1-12205-00	230/460	3.2/1.6	115	5.0	575
4-1-12302-00	115/230	5.2/2.6	230	2.0	460
4-1-12305-00	115/230	13.0/6.5	230	5.0	1150
4-1-12402-00	230/460	2.6/1.3	230	2.0	460
4-1-12405-00	230/460	6.4/3.2	230	5.0	1150

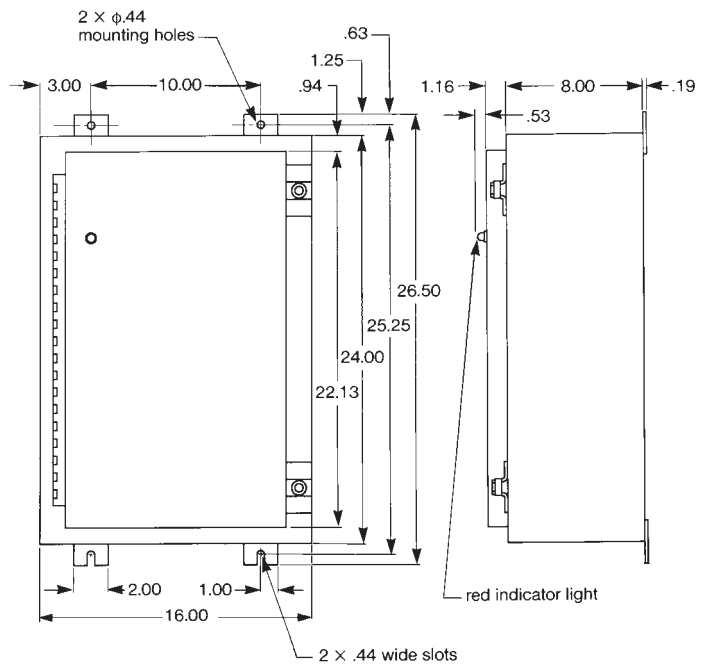
① Based on ambient temperature of 104°F.

Forcing Circuits

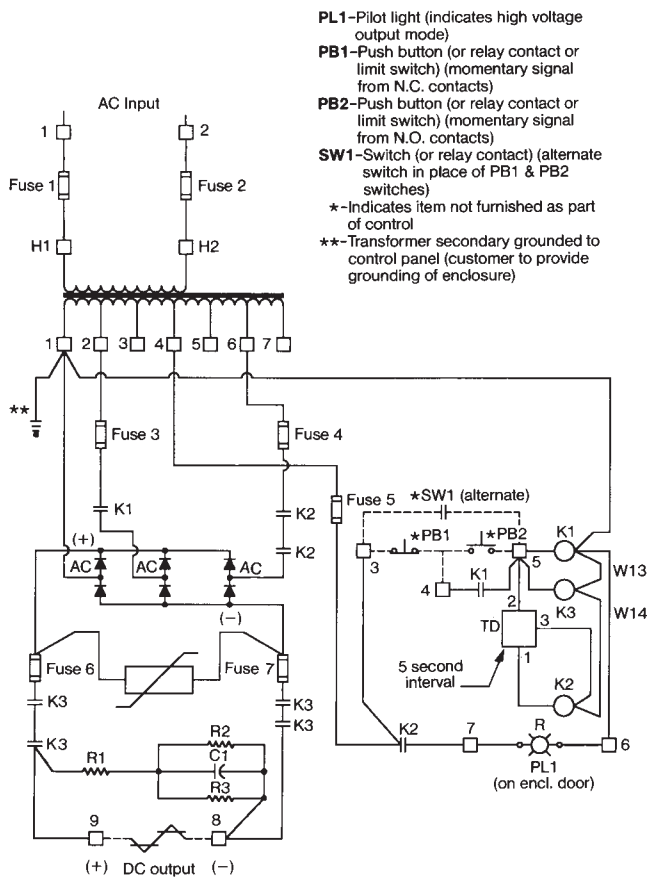
Combination forcing circuit and rectifier for use with Stearns SCE spring-set clutches and SCEB spring-set brakes. Suitable for use with all sizes from 800 through 1600. Provides the momentary forcing voltage necessary to release a clutch or brake. Units are available for 115, 208, 230, 460 and 575 Vac, 50/60 Hz input. The output of each unit is a forcing voltage of 230 Vdc which, after a 5 second delay, drops to a holding voltage of 70 Vdc. Circuitry includes surge suppression network to protect coil and minimize contact arcing. Complete circuit is housed in a NEMA 12 enclosure.



Dimensional Data



Wiring Diagram



Performance Data

Stock Number	AC Input Voltage 50/60 Hz	DC Input			Approx. Shipping Wt. (lbs.)
		Forcing Volts	Holding Volts	Watts	
4-3-00115-12	115 Vac	230	70	1000	60
4-3-00208-12	208 Vac	230	70	1000	60
4-3-00230-12	230 Vac	230	70	1000	60
4-3-00460-12	460 Vac	230	70	1000	60
4-3-00575-12	575 Vac	230	70	1000	60

Application Engineering Data

Basic Torque Formula:

$$T = \frac{hp \times 5,252}{N_{cb}} \times SF$$

Where:

T = Average dynamic torque, lb-ft

hp = Motor horsepower

SF = Service factor

N_{cb} = rpm of the clutch/brake shaft

5,252 = Constant

Inertia:

$$I = W \times K^2$$

Where:

W = Weight of the object

K^2 = The square of the radius of gyration

Velocity, Linear:

$$V = \pi DN$$

Where:

$\pi = 3.142$

D = Diameter of drive head pulley

N = rpm

Reflected Inertia - Linear:

$$Wk_L^2 = W \left(\frac{V}{2\pi N_{cb}} \right)^2$$

Where

W = The weight of the component, lb

V = The velocity of the component in feet per minute

N_{cb} = The rpm of the clutch/brake shaft

Reflected Inertia - Rotational:

$$Wk_r^2 = Wk_C^2 \times \left(\frac{N}{N_{cb}} \right)^2$$

Where:

Wk_r^2 = Inertia reflected to the clutch or brake

Wk_C^2 = Inertia of the component

N = rpm of the component

N_{cb} = rpm of the clutch or brake shaft

Dynamic Torque:

$$T_d = \frac{Wk^2 \times N}{308 \times t}$$

Where:

T_d = Dynamic torque, lb-ft

Wk^2 = Total inertia seen by the clutch/brake (including the clutch/brake inertia and motor inertia if applicable), lb-ft²

N = rpm of the clutch/brake

t = Stopping time in seconds (or starting time)

308 = Constant

Thermal Capacity:

$$E = 1.7 \times WR^2 \left(\frac{N}{100} \right)^2 \times F$$

Where:

E = Energy (heat) which needs to be dissipated, (ft-lb/min) for the application requirement

WR^2 = Total reflected inertia at clutch/brake shaft location. This should include clutch/brake inertia. (lb-ft²)

N = Speed differential in revolutions per minute (rpm) at the clutch/brake shaft.

F = Number of cycles per minute (cycle rate).

Ohms Law:

Ohms = Volts/Amperes

$$\left(R = \frac{E}{I} \right)$$

Amperes = Volts/Ohms

$$\left(I = \frac{E}{R} \right)$$

Volts = Amperes × Ohms
(E = IR)

Power - DC Circuits:

Watts = Volts × Amperes
(W = EI)

$$\text{Amperes} = \frac{\text{Watts}}{\text{Volts}} \left(I = \frac{W}{E} \right)$$

Inertia Table

Wk² of Steel Shafting or Disc per Inch of Length

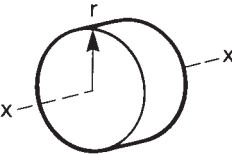
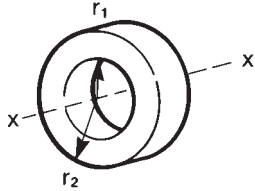
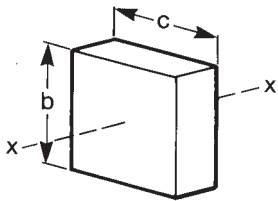
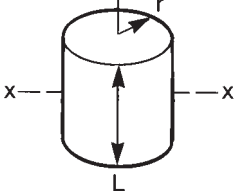
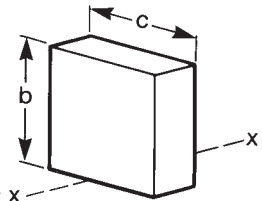
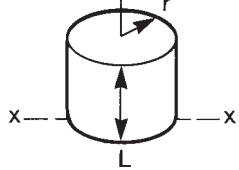
Dia. (inch)	Wk ² (lb-ft ²)	Dia. (inch)	Wk ² (lb-ft ²)	Dia. (inch)	Wk ² (lb-ft ²)	Dia. (inch)	Wk ² (lb-ft ²)	Dia. (inch)	Wk ² (lb-ft ²)
1/8	4.53 × 10 ⁻⁸	4	.0491	9 3/4	1.735	25	75.00	48	1019.2
1/4	7.47 × 10 ⁻⁷	4 1/4	.0626	10	1.920	26	87.74	49	1106.8
3/8	3.83 × 10 ⁻⁶	4 1/2	.0787	10 1/2	2.334	27	102.0	50	1200.0
1/2	1.21 × 10 ⁻⁵	4 3/4	.0977	11	2.811	28	118.0	51	1298.9
5/8	2.93 × 10 ⁻⁵	5	.1200	11 1/2	3.358	29	135.8	52	1403.8
3/4	6.07 × 10 ⁻⁵	5 1/4	.1458	12	3.981	30	155.5	53	1514.9
7/8	.0001	5 1/2	.1757	12 1/2	4.687	31	177.3	54	1632.5
1	.0002	5 3/4	.2099	13	5.484	32	201.3	55	1756.9
1 1/8	.0003	6	.2488	13 1/2	6.377	33	227.7	56	1888.2
1 1/4	.0005	6 1/4	.2930	14	7.376	34	256.6	57	2026.7
1 3/8	.0007	6 1/2	.3427	14 1/2	8.487	35	288.1	58	2172.7
1 1/2	.0010	6 3/4	.3986	15	9.720	36	322.5	59	2326.5
1 5/8	.0013	7	.4610	15 1/2	11.08	37	359.8	60	2488.3
1 3/4	.0018	7 1/4	.5304	16	12.58	38	400.3	66	3643.1
1 7/8	.0024	7 1/2	.6075	16 1/2	14.23	39	444.2	72	5159.6
2	.0031	7 3/4	.6926	17	16.04	40	491.5	78	7166.7
2 1/4	.005	8	.7864	18	20.15	41	542.5	84	9558.9
2 1/2	.0075	8 1/4	.8894	19	25.02	42	597.4	90	12597
2 3/4	.0110	8 1/2	1.002	20	30.72	43	656.4	96	16307
3	.0156	8 3/4	1.125	21	37.34	44	719.6	102	20782
3 1/4	.0214	9	1.260	22	44.98	45	787.3		
3 1/2	.0288	9 1/4	1.405	23	53.73	46	859.6		
3 3/4	.0380	9 1/2	1.564	24	63.70	47	936.9		

To determine Wk² of a given shaft length or disc shape thickness, multiply the table value given above by the length, or thickness, in inches.

Material Factors

Multiply the inertia of the steel diameter by the selected material.	
Bronze 1.1	Nylon .18
Aluminum .35	Cast iron .92

Radius of Gyration, Squared

	Cylinder about Its Own Axis x-x		
	Solid $K^2 = 1/2 r^2$	Hollow $K^2 = 1/2 (r_1^2 + r_2^2)$	
	Axis through Center x-x		
	Prism $K^2 = 1/12 (b^2 + c^2)$	Cylinder $K^2 = \frac{L^2 + 3r^2}{12}$	
	Axis at One End x-x		
	Prism $K^2 = 1/12 (4b^2 + c^2)$	Cylinder $K^2 = \frac{4L^2 + 3r^2}{12}$	

English-Metric Conversion Factors

Multiply the base unit by the factor shown to obtain the desired conversion

Measurement	Base Unit	Factor	Conversion
Length	inch, in <i>millimeter, mm</i>	25.4 .03937	<i>millimeter, mm</i> inch, in
Torque	pound-inch, lb-in <i>newton-meter, Nm</i> pound-feet, lb-ft <i>newton-meter, Nm</i> ounce-inch, oz-in <i>newton-meter, Nm</i>	.112985 8.8507 1.355818 .73756 .007062 141.612	<i>newton-meter, Nm</i> pound-inch, lb-in <i>newton-meter, Nm</i> pound-feet, lb-ft <i>newton-meter, Nm</i> ounce-inch, oz-in
Moment of Inertia	pound-feet squared, lb-ft ² <i>kilogram-meter squared, kgm²</i>	.042 23.81	<i>kilogram-meter squared, kgm²</i> pound-feet squared, lb-ft ²
Kinetic energy	foot-pound, ft-lb <i>joule, J</i>	1.355818 .73756	<i>joule, J</i> foot-pound, ft-lb
Weight	pound, lb <i>kilogram, kg</i>	.453592 2.20462	<i>kilogram, kg</i> pound, lb
Horsepower (English)	horsepower, hp <i>kilowatt, Kw</i>	.7457 1.341	<i>kilowatt, kW</i> horsepower, hp
Thermal capacity	horsepower-seconds per minute, hp-sec/min	12.42833	<i>watts, W</i>
	<i>watts, W</i>	.08046	horsepower-seconds per minute hp-sec/min
Temperature	degrees Fahrenheit, °F <i>degrees Celcius, °C</i>	(°F - 32) × 5/9 (°C × 9/5) + 32	<i>degrees Celcius, °C</i> degrees Fahrenheit, °F

Conversion Factors for Thermal Capacity

Base Unit	Multiply by	To Obtain
horsepower	33,000	ft-lb/min
hp-sec/min	550	ft-lb/min
BTU/min	777.385	ft-lb/min
watts	44.254	ft-lb/min

Metric Bore and Keyways

Bore (millimeter) + .25 mm - .000 mm	Keyway (millimeter) Nominal
6	2 ξ 2
8	2 ξ 2
10	3 ξ 3
12	4 ξ 4
14	5 ξ 5
15	5 ξ 5
16	5 ξ 5
18	6 ξ 6
19	6 ξ 6
20	6 ξ 6
22	6 ξ 6
24	8 ξ 7
25	8 ξ 7
26	8 ξ 7
28	8 ξ 7
30	8 ξ 7

Contact factory for specific application information