Wrap Spring Product Selection

Step 1—Determine function and series

Function: Overrunning
Series: SC-"OR"

An overrunning/one way wrap spring clutch generates torque in one direction. The output hub freewheels or overruns after the input hub stops.

Function: Start/Coast
Series: SC-"SS"

The start/coast wrap spring clutch is used to engage and disengage torque on a random basis. Once disengaged, the output coasts to a stop.

Function: Single revolution and start/stop
Series: SC-"SR", DCB, or DCB Super

Single revolution and start/stop wrap spring clutches give precise nonaccumulating error single revolution cycling. Multiple stops can also be achieved through special design. The output hub does not override.

Step 2—Calculate system WK^2

Reflect WK^2 to the Clutch or Clutch/Brake

Step 3—Select model by torque capacity

Choose from "Operating Parameters Chart." Torque capacity must exceed calculated requirements and RPM.

Torque Formulas

Wrap Spring Products engage almost instantly; Clutches .003 seconds and Brakes .0015 seconds. The greater the load, the tighter the spring grips the hubs. Unlike friction products, wrap spring units are not forgiving. System Inertia must be calculated for proper selection.

Clutches and Clutch-Brakes use different formulas to calculate required torque because of response times and torque capabilities. Use the formula that applies to your application.

Overrunning, One Way, and Start/Coast

Series SC-"OR" and SC-"SS"

System drag torque must be added to the calculated torque for unit selection. Drag torque is the force required to initiate motion that is measured with a torque wrench.

$$\text{Where: Torque (in lbs)} = \frac{WK^2 \ N}{11.1} + T_d$$

WK^2 = System inertia reflected to clutch (lb.in.)
N = Speed of shaft where clutch is located (RPM)
T_d = System drag torque (in-lbs)

Example

A small conveyor requires a random positioning clutch and has a reflected system WK^2 of 36 Lb-In^2 at 95 RPM. The measured drag torque is 5 in-lbs. The conveyor is on an incline. A backstop device is necessary.

Torque = [(36 x 95) ÷ 11.1] + 5 = 313 in-lbs

The SC-6 "SS" clutch is chosen from the "Operating Parameters Chart." It exceeds the torque requirements (500 vs. 313) and is operating within its speed range. Start-Coast (SS) is where the output is allowed to coast to a stop.

Single Revolution and Start/Stop

Series DCB, DCB Super and SC-"SR"

System drag torque must be subtracted from the calculated torque for unit selection. Drag torque is the force required to initiate motion that is measured with a torque wrench. It is important that the DCB and DCB Super operate within their speed range. They require a minimum amount of rotational force to ensure that the clutch and brake springs unwind and or wind on their hubs.

$$\text{Where: Torque (in lbs)} = \frac{WK^2 \ N}{S_f} - T_d$$

WK^2 = System inertia reflected to clutch or clutch/brake (lb.in.)
N = Speed of shaft where clutch is located (RPM)
S_f = Stopping factor (listed below)
5.55 for DCB and DCB Super
1.11 for SC-"SR"
T_d = System drag torque (in-lbs)

Example

A machine requires a single position clutch-brake for placing one shipping label on a box as it passes by. The labeling head has a reflected system WK^2 of 80.5 Lb-In^2 at 140 RPM. The measured drag torque is 3 in-lbs.

Torque = [(80.5 x 140) ÷ 5.55] - 3 = 2028 in-lbs

The DCB-8 Clutch-Brake is chosen from the "Operating Parameters Chart." It exceeds the torque requirements (2500 vs. 2028) and is operating within its speed range.

Mounting

Dynacorp® wrap spring clutches and brakes are factory assembled and tested before you receive them. All wrap spring products are to be mounted where they are fully supported by a shaft going completely through the unit, normally parallel shaft applications. They are secured to the shaft by pinning or by the use of keys. The shaft must be properly supported (Figures A & B).

When assembling sprockets, gears, or pulleys to the unit's hub, the radial bearing load capabilities must not be exceeded. Counterboring or bearing mounting of the sprocket, gear, or pulley may be required (figures A & B).

The side plate on the DCB and DCB Super series are not to be rigidly bolted to anything. It must be restrained from movement by a torque pin or arm through one of the mounting holes. This precaution will eliminate internal bearing damage.

Figure A

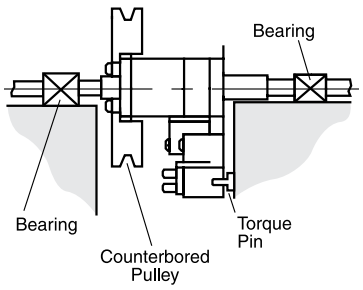
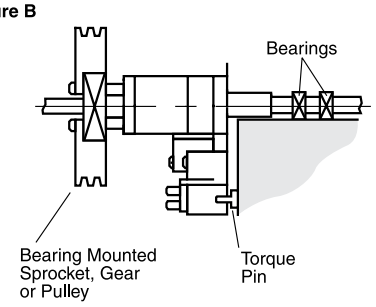


Figure B



Operating Parameters Chart

Model	Static Torque In.-Lbs.	Maximum Input Speed	Minimum* Input Speed	Anti-Back Torque In.-Lbs.	Anti-Overrun Torque In.-Lbs.	Input Hub Maximum Bearing Load Lbs.
DCB-2	25	1800	300	10	10	7.5
DCB-4	125	1200	200	80	25	14
DCB-5	250	750	150	160	45	32
DCB-5 SUPER	250	750	150	125	125	40
DCB-6	500	500	100	300	300	63
DCB-6 SUPER	500	500	100	300	300	65
DCB-8	2500	300	50	600	600	300
DCB-8 SUPER	2500	300	50	600	600	300
SC-2	25	1800	None	—	—	8
SC-4	125	1200	None	—	—	14
SC-5	250	750	None	—	—	32
SC-6	500	500	None	—	—	63
SC-8	2500	300	None	—	—	300

* When operating below minimum speeds, system inertias may have to be increased for proper performance. Consult factory for application assistance.

Inertia Conversion Chart

In order to determine the inertia of a rotating member (shaft, disc, etc.) of a material other than steel, multiply the inertia of the appropriate steel diameter from the chart at right by:

Material	Multiplier
Bronze	1.05
Steel	1.00
Iron	0.92
Powdered Metal Bronze	0.79
Powdered Metal Iron	0.88
Aluminum	0.35
Nylon	0.17

Inertia of Steel Shafting (per inch of length or thickness)

Dia. (Inches)	WK^2 (Lb.-In.^{2})	Dia. (Inches)	WK^2 (Lb.-In.^{2})	Dia. (Inches)	WK^2 (Lb.-In.^{2})
1/4	0.00011	7	66.816	13	803.52
3/8	0.00055	7-1/4	77.04	13-1/4	858.24
1/2	0.00173	7-1/2	87.984	13-1/2	924.48
3/4	0.00864	7-3/4	100.656	13-3/4	995.04
1	0.0288	8	113.904	14	1068.48
1-1/4	0.072	8-1/4	128.88	14-1/4	1147.68
1-1/2	0.144	8-1/2	144	14-1/2	1229.75
1-3/4	0.288	8-3/4	162.72	14-3/4	1317.6
2	0.432	9	182.88	15	1404
2-1/4	0.72	9-1/4	203.04	16	1815.84
2-1/2	1.152	9-1/2	223.2	17	2314.08
2-3/4	1.584	9-3/4	252	18	2910.24
3	2.304	10	277.92	19	3611.52
3-1/2	4.176	10-1/4	306.72	20	4433.76
3-3/4	5.472	10-1/2	338.4	21	5389.92
4	7.056	10-3/4	371.52	22	6492.96
4-1/4	9.072	11	407.52	23	7757.28
4-1/2	11.376	11-1/4	444.96	24	9195.84
5	17.28	11-1/2	486.72	25	10827.36
5-1/2	25.488	11-3/4	529.92	26	12666.24
6	36	12	576	27	14731.2
6-1/4	42.624	12-1/4	626.4	28	17036.64
6-1/2	49.68	12-1/2	679.68	29	19604.16
6-3/4	57.888	12-3/4	735.84	30	22452.48