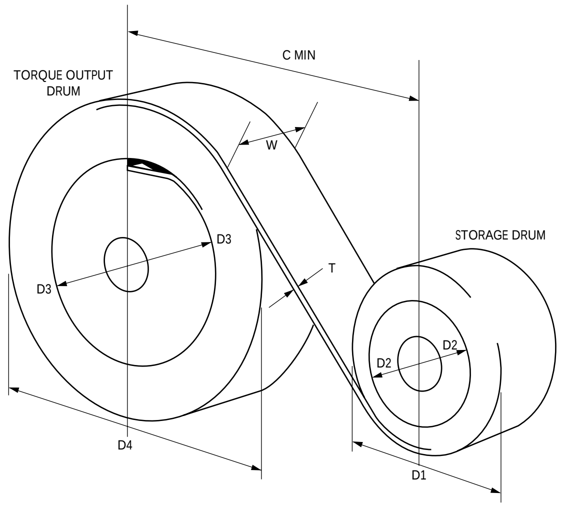
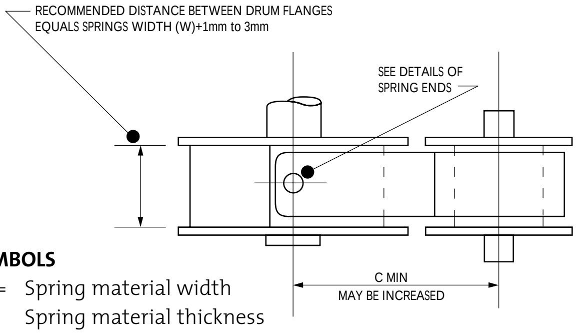




SYMBOLS

W = Spring material width
T = Spring material thickness
L = Spring length (reference only)
C = Distance between drum centres (min)
D2 = Storage drum diameter
D3 = Torque drum diameter
D1 = Outside diameter of spring when fully wound on storage drum
D4 = Outside diameter of spring when fully wound on torque drum

Fatigue Life

The fatigue life has a direct effect on the size of the spring and the maximum torque output available in the least space. A comparison of various chart values illustrates the effect fatigue requirements have on the size of the spring. For any application the required number of cycles or reversals should be estimated for the life of the equipment or a replacement schedule.

The fatigue life of a spring can be defined as either a full or partial extraction and retraction of the spring i.e. the spring can be exercised over its whole length and achieve the average life expectation, however if it is exercised over any one section of the spring repeatedly then that section can be expected to fatigue when the total number of cycles approaches the life predicted for the spring.

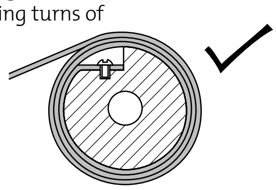
Fatigue Life is not time dependant under normal operating circumstances; it is solely dependent on the number of operations.

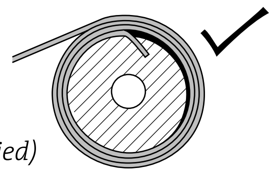
However pollutants even in low concentrations can have the effect of shortening the fatigue life through corrosion or chemical attack, please refer to the statements regarding uses and misuses of Spiroflex springs in our brochure and web site and refer to Spiroflex if in doubt.

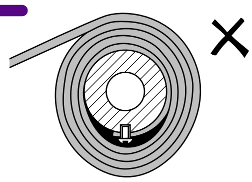
Mounting Details

A spring motor consists of the following, torque output drum, Spiroflex spring and a storage drum. The storage drum is the smaller of the two and is of a specified diameter. The Spiroflex spring will grip the storage drum by its own inherent gripping action.

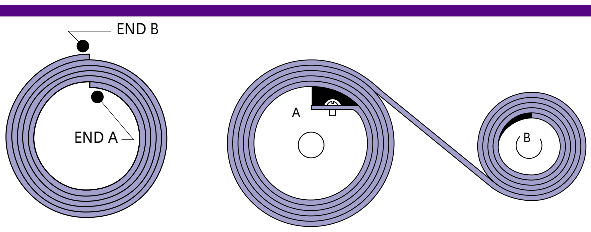
The torque output drum is the larger of the two and is also of a specified diameter. The Spiroflex spring must be attached to the drum in such a way that succeeding turns of the spring will not be raised by any protrusions, (see diagrams). Both drums are usually supplied by the user according to the requirements of his own application.







How the spring is assembled on drum *(not supplied)*



Outer end of spring to be first wrap on storage drum.
The free end is then fastened to the torque output drum so that its curvature will be reversed.

Working Turns

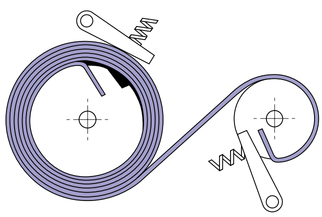
The principal limitation on the total number of rotations of a Spiroflex spring motor is the space requirement of the amount of material involved. Working turns are quoted for the standard range (see spring charts).

Speed and Acceleration

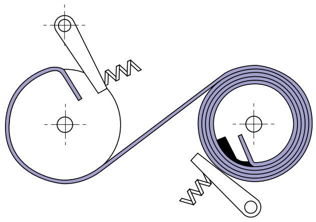
Free release of a charged Spiroflex spring motor, or any condition approaching free release, may permit the torque drum to throw off material faster than the storage drum can coil up. No such limitation exists in the pull-out or charging part of the cycle, except for sudden decelerations. Wherever high-speed operation, sudden stopping or release are predictable service conditions, experimental models should be employed to verify performance.

Stop Mechanisms

If the driven mechanism does not have its own limits, some stops or restraints should be included in the design of the spring motor assembly to prevent over-travel of the spring. In some applications the travel of the motor assembly must be limited itself. The illustration shows a double stop mechanism with the motor in both the wound and unwound positions. More often an automatic stop is required only at the end of the power stroke, in which case the device shown would be used only on the output drum.



Fully Wound Position

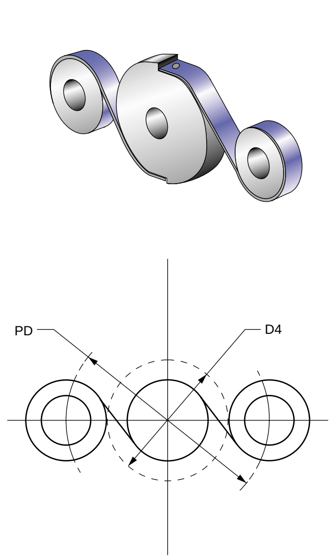


Unwound Position

Multiple Motors

In order to increase the torque output of the Spiroflex spring motor a multiple arrangement may be employed. The torque will be increased directly by the number of Spiroflex springs used in the system. The number of units which can be used depends entirely on the geometry of the layout.

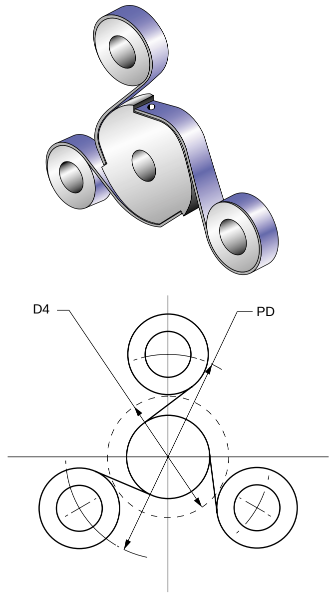
TWIN SPRING MOTOR



Torque equals twice Chart Values

CHART	WORKING TURNS	D4	P.D.	% TORQUE RISE
5	24.50	329T	560T	8%
6	19.25	393T	680T	Zero

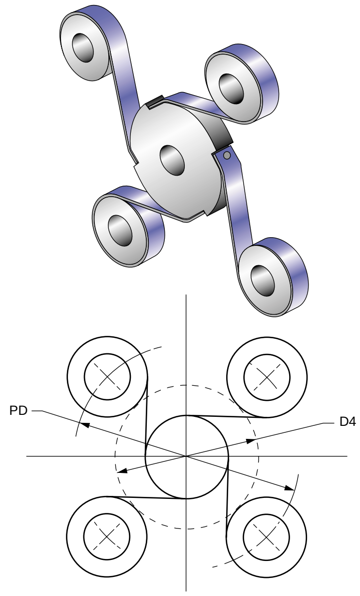
TRIPLE SPRING MOTOR



Torque equals three times Chart Values

CHART	WORKING TURNS	D4	P.D.	% TORQUE RISE
5	22.50	371T	602T	17%
6	17.50	430T	717T	Zero

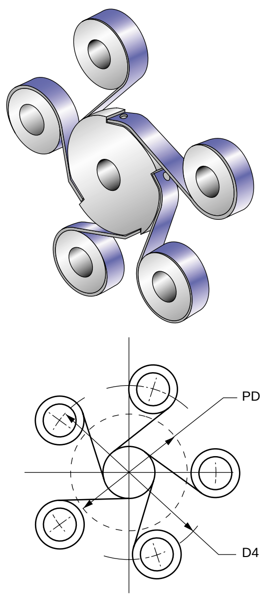
QUADRUPLED SPRING MOTOR



Torque equals four times Chart Values

CHART	WORKING TURNS	D4	P.D.	% TORQUE RISE
5	21.00	413T	644T	24%
6	16.50	461T	748T	7%

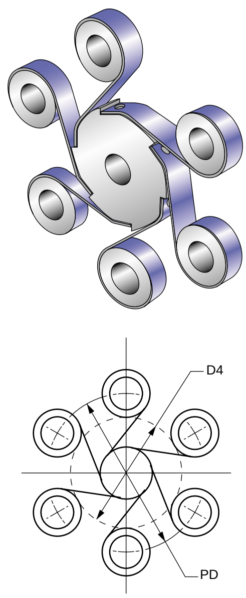
QUINTUPLED SPRING MOTOR



Torque equals five times Chart Values

CHART	WORKING TURNS	D4	P.D.	% TORQUE RISE
5	20.00	446T	677T	30%
6	15.75	492T	780T	10%

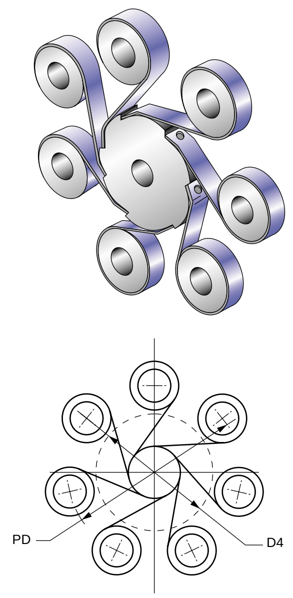
SEXTUPLED SPRING MOTOR



Torque equals six times Chart Values

CHART	WORKING TURNS	D4	P.D.	% TORQUE RISE
5	19.00	479T	710T	35%
6	15.25	516T	803T	13%

SEPTUPLED SPRING MOTOR



Torque equals seven times Chart Values

CHART	WORKING TURNS	D4	P.D.	% TORQUE RISE
5	18.00	508T	739T	39%
6	14.75	542T	829T	16%

Notes on Motor Spring Diagrams

1. Values for Working Turns. D4 and P.D. only apply to the main range charts.
2. Values of D3 and D2 as on charts 5 & 6.
3. % Torque Rise is the increase of torque when the motor is fully wound due to the build-up of D4.

spiroflex