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IN-LINE SLIP-EASE CLUTCHES

MULTIPLATE DESIGN
ADJUSTABLE TORQUE
FOR SMALL DESIGN ENVELOPES

› MATERIAL:
Housing - Aluminum
Plates - Brass
Friction Pads - Proprietary (Non asbestos)

› FEATURES:
2° Backlash.
Long life.
Fully adjustable within rating limits.
Low stick/slip ratio.
Continuous slip within dissipation limit.

› SPECIFICATIONS:
Fig. 2 has a bronze bearing in the hub end so that a gear, pulley, etc. can be mounted on hub D.

Other bores and keyways available on special order.

Catalog Number

<table>
<thead>
<tr>
<th>Shaft to Shaft Fig. 1</th>
<th>Thru Shaft Fig. 2</th>
<th>A Dia.</th>
<th>B Bore</th>
<th>Max. Bore</th>
<th>C</th>
<th>D Dia.</th>
<th>E</th>
<th>Torque Range ozf in @ 50 rpm</th>
<th>Dissip. Power Watts</th>
<th>Friction Surfaces</th>
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<tr>
<td>S98CA7-SES075125</td>
<td>S98CA7-SET075125</td>
<td>.75</td>
<td>.125</td>
<td>.250</td>
<td>1.25</td>
<td>.562</td>
<td>.188</td>
<td>24-136</td>
<td>4.5</td>
<td>10</td>
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<tr>
<td>S98CA7-SES075187</td>
<td>S98CA7-SET075187</td>
<td>.87</td>
<td>.187</td>
<td>.250</td>
<td>1.25</td>
<td>.562</td>
<td>.188</td>
<td>24-136</td>
<td>4.5</td>
<td>10</td>
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<td>.500</td>
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<td>.750</td>
<td>.250</td>
<td>48-256</td>
<td>9</td>
<td>12</td>
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<tr>
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<td>S98CA7-SET100250</td>
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<td>.500</td>
<td>1.50</td>
<td>.750</td>
<td>.250</td>
<td>48-256</td>
<td>9</td>
<td>12</td>
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<tr>
<td>S98CA7-SES137250</td>
<td>S98CA7-SET137250</td>
<td>1.375</td>
<td>.500</td>
<td>2.50</td>
<td>1.00</td>
<td>.375</td>
<td>.375</td>
<td>80-400</td>
<td>15</td>
<td>12</td>
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<tr>
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<td>S98CA7-SET137375</td>
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<td>1.00</td>
<td>.375</td>
<td>.375</td>
<td>80-400</td>
<td>15</td>
<td>12</td>
</tr>
</tbody>
</table>

* See Technical Applications page 13-3.

Δ Housing is black anodized.
MULTIPLATE IN-LINE SLIP CLUTCHES

FUNCTION:
Multiplate slip clutches control torque for intermittent, continuous, or overload slip. It will drive in both directions, slip when the torque setting is reached, and resume driving as the load is reduced. These clutches are excellent as continuous or intermittent drag brakes, protection against overloads, for “soft starts,” slip at the end of a stroke, as friction hinges, for screwing on container caps, etc.

CONSTRUCTION:
The clutch consists of two assemblies: a cartridge and a housing (see cutaway above). The cartridge is set-screwed or keyed to the input shaft. The housing is either set-screwed or keyed to the output shaft or, as shown, is attached to the output gear or pulley with a bronze bearing to allow relative motion between the input shaft and the output gear/pulley. Torque is transmitted from the flats on the hub to the mating flats on the inner plates, through the friction pads to the outer plates, through the torque pins to the housing and the output gear/pulley. The torque level is controlled by compressing the springs with the adjusting nut. For a fixed torque clutch, a collar is attached to the hub in a fixed position instead of the adjusting nut. In operation, either the input shaft or the housing can be the input member, with the other member being driven.

CAPACITY:
The clutch capacity as noted in the catalog is based on continuous operation at 50 rpm for over 25 million cycles. Torque, rpm, duty cycle and life are interdependent. A reduction of any of these will allow an increase in any other. Running at 25 rpm will allow twice the torque, or running for only 10% of the cycle will allow higher rpm, etc. The limit is based on heat buildup measured in watts:

**English Unit Watts =** Torque (lbf) x rpm x 0.0118 x % Duty Cycle

**Metric Unit Watts =** Torque (Nm) x rpm x 0.104 x % Duty Cycle

For typical applications, see examples on page 13-5.
IN-LINE SLIP CLUTCHES

MULTIPLE DESIGN
ADJUSTABLE TORQUE

➤ MATERIAL:

Fig. 1 - Housing - Zinc Plated Steel
Plates - Brass
Friction Materials - Proprietary (Non asbestos)

Fig. 2 - Housing - Aluminum
Plates - Brass
Friction Materials - Proprietary (Non asbestos)

➤ FEATURES:

Fully adjustable within rating limits.
Low stick / slip ratio.
Continuous slip within dissipation limit.
Available with bronze bearing in hub end so that gear, pulley, etc. can be mounted on hub “D”.

Available with other bores as special order.

<table>
<thead>
<tr>
<th>INCH COMPONENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalog Number</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Fig. 1</td>
</tr>
<tr>
<td>S98CA6-MEC160417</td>
</tr>
<tr>
<td>S98CA6-MEC160421</td>
</tr>
</tbody>
</table>

| Fig. 2          |                  |              |                |               |                |               |                     |            |                      |                   |                |
| S98CA6-MOC200424 | 1.250           | .250         | .375           | 1.50          | .76            | .25           | .50                 | 1.00        | 1.062                | 0.94             | 1.6 to 192       | 6.0               | 8               |
| S98CA6-MOC240640 | 1.500           | .250         | .375           | 1.25          | .76            | .25           | .75                 | 1.75        | 1.312                | 1.25             | 8 to 400         | 14.5              | 12              |
| S98CA6-MOC320846 | 2.000           | .375         | .500           | 2.50          | .76            | .25           | 1.01                | 37          | 2.88                 | 188              | 12.8 to 800      | 29.0              | 12              |
| S98CA6-MOC440846 | 2.750           | .500         | .625           | 2.67          | 1.38           | 1.63          | 1.60                | 1.00        | 1.672                | 2.375             | 16.2 to 1200     | 43.0              | 12              |

* See Technical Applications page 13-3.
UNLIMITED APPLICATIONS:*

- Intermittent motion
- Torque limiting
- Indexing
- Hinging
- Phase adjustment
- Many more
- Feeding

*The ingenuity of engineering has led to applications with labelers, indexing, film transport, instrumentation, business machines, computer peripherals, packaging, mailing, plotters, paper feeds and many more. We supply stock clutches or we work with you to develop units for your specific applications.

TYPICAL MULTIPLATE SLIP CLUTCH APPLICATIONS:

1. **TIMING BELT ON HOUSING**
   - Timing belt drives housing.
   - Torque transmitted through adjustable pressure plates to shaft. Also operates as shaft input to timing belt.

2. **SHAFT-TO-SHAFT CONTROL**
   - Either shaft as input.
   - Fixed torque transmitted through pressure plates.
   - Shafts must be journalized. Also can be adjustable torque.

3. **SLIP CARTRIDGE WITH GEAR**
   - Pressure pads transmit torque directly to gear for space saving package.

4. **CLUTCH WITH A MODIFIED GEAR**
   - Torque transmitted directly from gear through pins to adjustable pressure plates.

5. **KNOB WITH TORQUE PROTECTION**
   - Knob connected directly to housing.
   - Fixed torque transmitted to shaft. Will slip above preset torque.

6. **BRAKE TO FRAME OF MACHINE**
   - Outer pressure plates held to machine frame. Adjustable braking pressure transmitted to shaft.

7. **“SINGLE” REVOLUTION CLUTCH**
   - Input shaft turns continuously.
   - Output shaft turns when latch is disengaged.
   - Single revolution, partial revolution, or multi-revolutions can be designed.

8. **CONSTANT TORQUE – SUPPLY OR REWIND SPOOL**
   - Slip clutch mounted directly to spool will give constant torque. Mounted directly to constant diameter cylinder will give constant tension. Many variations available to control wire supply system.
SPRING-WRAPPED SLIP CLUTCHES

> FEATURES:
- Long life under continuous slip conditions.
- Unidirectional or bidirectional operation.
- Same or different clockwise and counterclockwise torques.
- Precise and stable limit torque calibration (range: 1.0 to 480 ozf in.).
- Same torque at breakaway as at high slip velocities.
- Mounting provisions for gear, sprocket or pulley.
- Corrosion-resistant materials.

> APPLICATIONS:
- Tension control of film or tape drives
- Transmission overload protection

> SPECIAL DESIGNS:
The standard line of slip elements provides a wide selection of limit torques, sizes and coupling arrangements.
In addition, our engineers will modify designs to meet your specific requirements in such areas as:
- Configuration
- Driving arrangement
- Limit torques from a fraction of an ozf in. to several lbf ft.
- Calibration of torque to a tolerance of ± 5%
- Different limit torques for the two directions of rotation
- Spring windup and limit torque combination. The spring action of the slip element is useful for tensioning of tape and prevention of slack loops.

* Stock units are calibrated with equal clockwise and counterclockwise slip torques corresponding to the tabulated Upper Limit Torques. Other torques are readily available from full, down to 1/8 of the Upper Limit Torque for each model. Torque values are independent of each other for clockwise and counterclockwise rotation, and may be specified the same or different for the two directions.

** All clutches in this series have a pilot diameter "K" and three tapped holes "N" for mounting a gear, sprocket or pulley on the input hub. Screw penetration into the clutch housing must not exceed the depth specified in column "N". Concentricity of pilot diameter "K" to bore "C" is .001 T.I.R. max.

All slip clutches are designed for long life under continuous slip conditions. The useful life of these elements is a function of the transmitted torque and slip speed.

The life of the slip couplings & clutches is defined as the number of hours of continuous slip required to cause a deviation of 10% from the initial calibrated torque value. Extensive life tests have been performed on a number of standard units. The "Life Expectancy Curves" are designed for approximating the life span of standard slip clutches and couplings.

Continued on the next page
EXAMPLE:

If a slip clutch is to provide a torque limit of 50 ozf in. at a continuous slip speed of 100 rpm for 500 hours, the smallest item which can be calibrated is from the S9940Y–SWC15A.. series.

The upper limit torque for this unit is 80 ozf in.

Limit Torque Ratio = \( \frac{\text{Required Torque}}{\text{Upper Limit Torque}} = \frac{50}{80} = 0.63 \)

From “Life Expectancy Curves” 100 rpm & 0.63 ratio:

\[
\text{Life} = \frac{2,800,000 \text{ Rev}}{100 \text{ Rev / Min. x 60 Min. / Hour}} = 466.7 \text{ Hrs.}
\]

The 466.7 hours life value is less than desired 500 hours.

The next larger slip clutch belongs to the S9940Y–SWC18A series.

The upper limit torque for this unit is 120 ozf in.

Limit Torque Ratio = \( \frac{50}{120} = 0.42 \)

From “Life Expectancy Curves” for 100 rpm & 0.42 ratio:

\[
\text{Life} = \frac{4,800,000 \text{ Rev}}{100 \text{ Rev / Min. x 60 Min. / Hour}} = 800 \text{ Hrs.}
\]

A S9940Y–SWC18A.. series clutch will provide the desired life.

<table>
<thead>
<tr>
<th>rpm</th>
<th>Torque</th>
<th>Hours of Continuous Slip in Each Direction</th>
<th>Hours of Operation Duty Cycle: 1 Sec. Slip, 1 Sec. Rest</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>1/2 Upper Limit Upper Limit</td>
<td>3,070, 1,420</td>
<td>6,500, 3,040</td>
</tr>
<tr>
<td></td>
<td>Upper Limit</td>
<td>1,420</td>
<td>3,040</td>
</tr>
<tr>
<td>50</td>
<td>1/2 Upper Limit Upper Limit</td>
<td>1,420, 620</td>
<td>3,040, 1,420</td>
</tr>
<tr>
<td></td>
<td>Upper Limit</td>
<td>620</td>
<td>1,420</td>
</tr>
<tr>
<td>100</td>
<td>1/2 Upper Limit Upper Limit</td>
<td>620, 250</td>
<td>1,420, 620</td>
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<td></td>
<td>Upper Limit</td>
<td>250</td>
<td>620</td>
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<tr>
<td>200</td>
<td>1/2 Upper Limit Upper Limit</td>
<td>250, 100</td>
<td>620, 250</td>
</tr>
<tr>
<td></td>
<td>Upper Limit</td>
<td>100</td>
<td>250</td>
</tr>
</tbody>
</table>

The table entitled “Typical Element Life” provides life in hours of operation for some typical slip speeds and torques of standard slip elements. The torque is presented in terms of 1/2 and full upper limit torque rating of a given slip element.

AVERAGE POWER DISSIPATION (P)

Continuous Slip  \( P = 0.00074 \ T N \)

Cycle Slip  \( P = 0.00074 \ T N C \)

where:

T = Slip Torque [ozf in.]
N = Average Slip Speed [rpm]
C = Duration of Slip / Cycle
Duration of Cycle
SPRING-WRAPPED SLIP CLUTCHES

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SPRING-WRAPPED SLIP CLUTCHES

Fig. 1

Fig. 2

INCH COMPONENT

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>S9940Y-SWC06A02</td>
<td>1</td>
<td>.1248</td>
<td>1.05</td>
<td>.18</td>
<td>.72</td>
<td>.080</td>
<td>.03</td>
<td>#2-56</td>
<td>.51</td>
<td>.45</td>
<td>.374</td>
<td>.63</td>
<td>.500</td>
<td>#0-80 .08 DP.</td>
<td>9 ± 1 1.0</td>
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<tr>
<td>S9940Y-SWC06A03</td>
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<td>1.173</td>
<td>1.24</td>
<td>.21</td>
<td>.85</td>
<td>.095</td>
<td>.04</td>
<td>#4-40</td>
<td>.88</td>
<td>.68</td>
<td>.499</td>
<td>1.00</td>
<td>.650</td>
<td>#1-72 10 DP.</td>
<td>20 ± 2 2.4</td>
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<tr>
<td>S9940Y-SWC10A03</td>
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<td>1.248</td>
<td>.3213</td>
<td>1.39</td>
<td>.23</td>
<td>.94</td>
<td>.100</td>
<td>.04</td>
<td>#6-32</td>
<td>1.01</td>
<td>.68</td>
<td>.499</td>
<td>1.25</td>
<td>.925</td>
<td>#2-56 11 DP.</td>
<td>48 ± 5 5.7</td>
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<td>.23</td>
<td>.94</td>
<td>.100</td>
<td>.04</td>
<td>#6-32</td>
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<td>.499</td>
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<td>.925</td>
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<td>.23</td>
<td>.94</td>
<td>.100</td>
<td>.04</td>
<td>#8-32</td>
<td>1.51</td>
<td>.74</td>
<td>.749</td>
<td>1.87</td>
<td>1.170</td>
<td>#4-40 17 DP.</td>
<td>120 ± 12 14</td>
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<td>.3213</td>
<td>1.39</td>
<td>.23</td>
<td>.94</td>
<td>.100</td>
<td>.04</td>
<td>#8-32</td>
<td>2.01</td>
<td>.74</td>
<td>.749</td>
<td>2.25</td>
<td>1.170</td>
<td>#4-40 17 DP.</td>
<td>150 ± 15 18</td>
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<td>1.248</td>
<td>.3213</td>
<td>1.39</td>
<td>.23</td>
<td>.94</td>
<td>.100</td>
<td>.04</td>
<td>#8-32</td>
<td>2.01</td>
<td>.74</td>
<td>.749</td>
<td>2.25</td>
<td>1.170</td>
<td>#4-40 17 DP.</td>
<td>240 ± 24 28</td>
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<tr>
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<td>1.248</td>
<td>.3213</td>
<td>1.39</td>
<td>.23</td>
<td>.94</td>
<td>.100</td>
<td>.04</td>
<td>#8-32</td>
<td>2.01</td>
<td>.74</td>
<td>.749</td>
<td>2.25</td>
<td>1.170</td>
<td>#4-40 17 DP.</td>
<td>360 ± 36 43</td>
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<td>1.39</td>
<td>.23</td>
<td>.94</td>
<td>.100</td>
<td>.04</td>
<td>#8-32</td>
<td>2.01</td>
<td>.74</td>
<td>.749</td>
<td>2.25</td>
<td>1.170</td>
<td>#4-40 17 DP.</td>
<td>480 ± 50 57</td>
</tr>
</tbody>
</table>

* or ** See page 13-6

**See page 13-6**
SPRING-WRAPPED SLIP COUPLINGS

FEATURES:
- Long life under continuous slip conditions.
- Unidirectional or bidirectional operation.
- Same or different clockwise and counterclockwise torques.
- Precise and stable limit torque calibration (range: 1/2 to 88 ozf in.).
- Same torque at breakaway as at high slip velocities.
- Corrosion-resistant materials.

APPLICATIONS:
- Tension control of film or tape
- Transmission overload protection
- Friction loads for testing components

RECOMMENDED MOUNTING PROCEDURE:
- Coupling is slipped over one shaft and applicable screws tightened.
- Second shaft is inserted into other end of coupling.
- Pull loose end of coupling back about .02 in. and tighten applicable screws.

The slip coupling serves as a torque limiter as well as a coupling for two collinear shafts. This coupling is equipped with hubs at both ends for pinning to the two shafts. When the load exceeds the limit torque of a slip coupling, the two shafts rotate relative to each other at the full limit torque. The standard coupling is designed to operate with 3° angular or linear misalignments of up to .010 in. between the two shafts. The mounting hole diameters of the slip couplings can differ for the two ends, so that different diameters of “in-line” shafts can be coupled together.

* Stock units are calibrated with equal clockwise and counterclockwise slip torques corresponding to the tabulated Upper Limit Torques. Other torques are readily available from full, down to 1/8 of the Upper Limit Torque for each model. Torque values are independent of each other for clockwise and counterclockwise rotation, and may be specified the same or different for the directions.

This series of slip couplings is designed for long life under continuous slip conditions. The useful life of these elements is a function of the transmitted torque and slip speed.
## INCH COMPONENT

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>B Bore +.0010 -.0000</th>
<th>C Bore +.0010 -.0000</th>
<th>A Dia. ±.02</th>
<th>D ±.03</th>
<th>E Max.</th>
<th>F</th>
<th>G ±.02</th>
<th>J Sub Drill</th>
<th>Upper* Limit Torque ozf in.</th>
<th>Max. Dissip. Power watts</th>
<th>Unit Weight oz.</th>
</tr>
</thead>
<tbody>
<tr>
<td>S9941Y-SWC13A44</td>
<td>.2500 .2500</td>
<td>.3750</td>
<td>1.25</td>
<td>1.43</td>
<td>1.01</td>
<td>.62</td>
<td>.25</td>
<td>.055</td>
<td>48 ± 5.0</td>
<td>5.7</td>
<td>3.8</td>
</tr>
<tr>
<td>S9941Y-SWC15A56</td>
<td>.3125 .3125</td>
<td>.3750</td>
<td>1.50</td>
<td>1.56</td>
<td>1.26</td>
<td>.73</td>
<td>.050</td>
<td>.075</td>
<td>88 ± 9.0</td>
<td>10.5</td>
<td>6.5</td>
</tr>
<tr>
<td>S9941Y-SWC15A58</td>
<td>.3750 .3750</td>
<td>.5000</td>
<td>1.50</td>
<td>1.56</td>
<td>1.26</td>
<td>.73</td>
<td>.050</td>
<td>.075</td>
<td>88 ± 9.0</td>
<td>10.5</td>
<td>6.5</td>
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<tr>
<td>S9941Y-SWC15A66</td>
<td>.3750 .3750</td>
<td>.5000</td>
<td>1.50</td>
<td>1.56</td>
<td>1.26</td>
<td>.73</td>
<td>.050</td>
<td>.075</td>
<td>88 ± 9.0</td>
<td>10.5</td>
<td>6.5</td>
</tr>
</tbody>
</table>

* See preceding page.
UNWIND TENSION CONTROL
Brake mounted on shaft of unwind spool or bobbin.

Information required: (Example)
- Full diameter = 6 in.
- Empty core diameter = 3 in.
- Average tension = 1 lbf
- Velocity = 150 ft./min.

How to size:
- Avg. radius = (Full roll dia. + Empty dia.) / 4
  = (6 + 3) / 4 = 2.25 in.
- Avg. torque (lbf in.) = avg. tension (lbf) x avg. radius (in.) = 1 x 2.25 = 2.25 lbf in.

1. Select Catalog Number S90MCC-MTL37505 based on 2.25 lbf in.
2. Check Operating Curve
   - The Max. rpm occurs at the min. radius
   - Max. rpm = (Velocity / Empty dia. x \( \pi \))
   = (150 ft./min.) / [(0.25 feet) x \( \pi \)]
   = 191 rpm
   2.25 lbf in. at 191 rpm is okay.

Film Unwind - Tension provided by hysteresis units.

NIP ROLL OR PULLEY TENSION CONTROL

Information required: (Example)
- Pulley diameter or nip roll = 3 in.
- Tension = 2.5 lbf
- Velocity = 300 ft./min.

How to size:
- Torque (lbf in.) = Tension x Radius
  = 2.5 lbf x [3 in.] / 2 = 3.75 lbf in.

1. Select Catalog Number S90MCC-MTL37505 based on 3.75 lbf in.
2. Check Operating Curve
   - Max. rpm = (300 ft./min.) / (0.25 ft. x \( \pi \)) = 382 rpm
   382 rpm is too high for continuous duty on the S90MCC-MTL37505 unit.
3. Select Catalog Number S90MCC-MTL62510

Coil Winding - Constant tension provided by hysteresis unit.

Film Tensioning - Constant tensioning supplied by hysteresis unit.
Cycling

Bottle Capping - Constant torque provided by a hysteresis clutch.

Information required: (Example)
- **Slip rpm**: 350 rpm
- **Torque**: 8 lbf in.
- **Duty cycle** (% slip time of total cycle time) = 25%

How to size:
1. Select Catalog Number **S90MCC-MTL62510** based on 8 lbf in.
2. Check Operating Curve
   - 350 rpm is high, but as the duty cycle is only 25%, the Catalog Number **S90MCC-MTL62510** is okay.

Overload Protection Torque Limiting Soft Start (Motor Horsepower Method)

Torque Limiting - Hysteresis clutch provides overload protection.

Information required: (Example)
- **Motor hp**: 1/10 hp
- **Motor rpm**: 900 rpm

How to size:
1. **Torque (lbf in.)** = (Motor hp x 63000) / Motor rpm
   - 7 lbf in. is at the upper limit of safe continuous operation, but is okay.

Material Handling - Hysteresis clutch can provide overload protection and soft start.

1. Select Catalog Number **S90MCC-MTL62525** based on 7 lbf in.
2. Check Operating Curve
   - 7 lbf in. is at the upper limit of safe continuous operation, but is okay.
MAGNETIC CLUTCHES & COUPLINGS

**ADVANTAGES:**
- No electricity
- No breakaway torque
- Constant torque independent of shaft (rotor) speed
- No contacting or wearing parts
- No friction elements – same smooth torque year after year
- No magnetic particles to leak or contaminate end product
- Operable in some of the most difficult environments
- Brake (with shaft) and clutch (with hollow shaft) available
- Custom designs available

**APPLICATIONS:**
- **Fig. 1 As a Coupling**
  This is for load protection or torque limiting. The coupling style unit is directly connected to a motor and turns at the same speed as the motor until the torque is reached. At this point it will slip and still generate the maximum torque.

- **Fig. 2 As a Clutch**
  The unit is connected to a motor by a timing belt or gear. The housing is driven and the shaft is the output end.

- **Fig. 3 As a Payout Brake**
  Brake is stationary and the reel or material is fitted to the output shaft. The tension on the material will vary with the diameter.

**HOW THEY OPERATE:**

**For Maximum Torque**
All important internal clearances are ground to tolerances of less than .001 in. (0.025 mm). Magnet assemblies surround hysteresis assembly. When like poles face each other, they produce maximum magnetic saturation of the hysteresis disc, forcing lines of flux to travel circumferentially through the hysteresis disc.

**For Minimum Torque**
When opposite poles face each other they produce minimum saturation of the hysteresis disc. The lines of flux travel through the hysteresis disc.

Combinations of adjustment angles between the two extremes give infinite adjustability. Because there are no contacting surfaces, the setting can be maintained indefinitely.
HOW TO USE THE CURVES:

Find the slip rpm on the X-axis and the torque on the Y-axis. Notice the areas that represent safe, continuous duty; intermittent duty, such as five minutes on, five minutes off; and the area which is not recommended. Operating above that line for any period of time will cause overheating and possible damage to the unit.
MAGNETIC CLUTCHES & COUPLINGS

PHONE: 516.328.3300 • FAX: 516.326.8827 • WWW.SDP-SI.COM

Inch Component

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Shaft Dia.</th>
<th>Shaft Length</th>
<th>Torque Range</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>S90MCC-5130151</td>
<td>+.003 – .018</td>
<td>.51</td>
<td>.003 – .018</td>
<td>.16</td>
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<tr>
<td>S90MCC-5130651</td>
<td>+.010 – .060</td>
<td>.16</td>
<td>.010 – .130</td>
<td>.16</td>
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<tr>
<td>S90MCC-5131351</td>
<td>+.010 – .130</td>
<td>.16</td>
<td>.010 – .130</td>
<td>.16</td>
</tr>
</tbody>
</table>

MATERIAL:
Housing and Shaft - Stainless Steel
### MAGNETIC CLUTCHES & COUPLINGS

25 lbf in. TORQUE
NONELECTRIC
NO WEARING PARTS
NO FRICION
HOLLOW BORE

> MATERIAL:
- **Housing** - Aluminum, Black Anodized Finish
- **Dial** - Steel, Black Oxide Finish

---

#### INCH COMPONENT

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>B Bore +001 -000</th>
<th>L Length</th>
<th>L1</th>
<th>D Dia.</th>
<th>d Dia.</th>
<th>A Dia.</th>
<th>Torque Range lbf in.</th>
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<tbody>
<tr>
<td>S90MCC-MTL25001</td>
<td>.250</td>
<td>1.65</td>
<td>1.42</td>
<td>1.87</td>
<td>1.95</td>
<td>.866</td>
<td>.06 – 1.25</td>
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<td>S90MCC-MTL37505</td>
<td>.375</td>
<td>2.44</td>
<td>2.12</td>
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<td>2.76</td>
<td>1.378</td>
<td>.18 – 5.00</td>
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<tr>
<td>S90MCC-MTL37510</td>
<td>.375</td>
<td>2.52</td>
<td>2.20</td>
<td>3.23</td>
<td>3.31</td>
<td>1.850</td>
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<td>S90MCC-MTL37525</td>
<td>.375</td>
<td>3.11</td>
<td>2.67</td>
<td>4.57</td>
<td>4.68</td>
<td>2.441</td>
<td>1.00 – 25.00</td>
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<td>.500</td>
<td>2.52</td>
<td>2.20</td>
<td>3.23</td>
<td>3.31</td>
<td>1.850</td>
<td>.50 – 10.60</td>
</tr>
<tr>
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<td>3.11</td>
<td>2.67</td>
<td>4.57</td>
<td>4.68</td>
<td>2.441</td>
<td>1.00 – 25.00</td>
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<td>2.52</td>
<td>2.20</td>
<td>3.23</td>
<td>3.31</td>
<td>1.850</td>
<td>.50 – 10.60</td>
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<td>3.11</td>
<td>2.67</td>
<td>4.57</td>
<td>4.68</td>
<td>2.441</td>
<td>1.00 – 25.00</td>
</tr>
</tbody>
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#### Catalog Number (Ref.)

<table>
<thead>
<tr>
<th>F Hub Dia.</th>
<th>Set Screw</th>
<th>E Thread</th>
<th>E Depth</th>
<th>Bolt Circle</th>
<th>Keyway</th>
<th>Approx. Weight lb.</th>
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<tbody>
<tr>
<td>S90MCC-MTL25001</td>
<td>.75</td>
<td>M4</td>
<td>.31</td>
<td>1.260</td>
<td>—</td>
<td>.73</td>
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<tr>
<td>S90MCC-MTL37505</td>
<td>1.06</td>
<td>M4</td>
<td>.39</td>
<td>1.890</td>
<td>—</td>
<td>2.28</td>
</tr>
<tr>
<td>S90MCC-MTL37510</td>
<td>.99</td>
<td>M5</td>
<td>.39</td>
<td>2.375</td>
<td>—</td>
<td>3.57</td>
</tr>
<tr>
<td>S90MCC-MTL37525</td>
<td>1.38</td>
<td>M5</td>
<td>.47</td>
<td>3.000</td>
<td>1/8</td>
<td>8.95</td>
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<tr>
<td>S90MCC-MTL50010</td>
<td>.99</td>
<td>M5</td>
<td>.39</td>
<td>2.375</td>
<td>3/16</td>
<td>8.95</td>
</tr>
<tr>
<td>S90MCC-MTL50025</td>
<td>1.38</td>
<td>M5</td>
<td>.47</td>
<td>3.000</td>
<td>3/16</td>
<td>8.95</td>
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<tr>
<td>S90MCC-MTL62510</td>
<td>1.46</td>
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<td>.39</td>
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<td>M5</td>
<td>.47</td>
<td>3.000</td>
<td>3/16</td>
<td>8.95</td>
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</table>
ROLLER CLUTCHES

FOR 1/8 TO 3/4 HARDENED SHAFTS
UNIDIRECTIONAL DRIVE

MASS MATERIAL:
- Roller Cup - Case-Hardened Steel
- Needle Bearing - 52100 Hardened Chrome Steel
- Springs - Stainless Steel
- Cage - Nylon 66 (or Equivalent)

OPERATING TEMPERATURE:
Grease +50°F to +160°F

FEATURES:
Ideal for indexing, backstopping or overrunning operations.
Free rolling one way, drives in opposite direction.
 Lightweight, low profile.
High indexing frequency, up to 4 CPS.
Minimum backlash.

SHAFT REQUIREMENTS:
Shaft surface hardness must be Rc 58 min.

WHAT IT DOES:
Transmits torque load in one direction.
OVERRUNS freely in opposite direction.
Either shaft or housing can be driving member.

HOW IT WORKS:
Rollers wedge between shaft and outer race. Positive wedging forces prevent slipping. Springs position rollers for instantaneous lockup.

INCH COMPONENT

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Bore</th>
<th>D. O.D.</th>
<th>W Clutch Width</th>
<th>Max. Torque lb ft</th>
<th>d Recom. Shaft Dia.</th>
<th>d Recom. Shaft Dia.</th>
<th>Housing Bore</th>
<th>Max. Rotating Overrun Speed rpm</th>
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</thead>
<tbody>
<tr>
<td>S99NH3-URC0204</td>
<td>1/8</td>
<td>.9/32</td>
<td>.250</td>
<td>2.86</td>
<td>.1250</td>
<td>.2812</td>
<td>50000</td>
<td>30000</td>
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<tr>
<td>S99NH3-URC0408</td>
<td>1/4</td>
<td>7/16</td>
<td>.500</td>
<td>18.60</td>
<td>.2500</td>
<td>.4370</td>
<td>21000</td>
<td>12000</td>
</tr>
<tr>
<td>S99NH3-URC0608</td>
<td>3/8</td>
<td>5/8</td>
<td>.500</td>
<td>50.40</td>
<td>.3750</td>
<td>.6245</td>
<td>14000</td>
<td>12000</td>
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<td>S99NH3-URC0808</td>
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<td>3/4</td>
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<td>.5000</td>
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<td>9000</td>
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<tr>
<td>S99NH3-URC1010</td>
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<td>7/8</td>
<td>.625</td>
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<td>5000</td>
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<td>.625</td>
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<td>.7500</td>
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<td>12000</td>
<td>7000</td>
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</table>

* Plastic Springs
ROLLER CLUTCHES • WITH BEARING SUPPORT

FOR 3/8 TO 5/8 HARDENED SHAFTS
UNIDIRECTIONAL DRIVE

➤ MATERIAL:
Roller Cup - Case-Hardened Steel
Needle Bearing - 52100 Hardened Chrome Steel
Springs - Stainless Steel
Cage - Plastic
Bearing Support - Sintered Bronze Bearings

➤ SHAFT REQUIREMENTS:
Shaft surface hardness must be Rc 58 min.

INCH COMPONENT

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>d Dia.</th>
<th>ØD O.D.</th>
<th>W Width</th>
<th>Max. Torque lbf in.</th>
<th>Max. Rotating Overrun Speed rpm</th>
<th>Load Ratings lbf</th>
<th>Recommended Housing Bore Tolerance</th>
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</thead>
<tbody>
<tr>
<td>S99NH4-URC1228</td>
<td>.375</td>
<td>.625</td>
<td>.875</td>
<td>50.4</td>
<td>14000</td>
<td>12000</td>
<td>± .0005 / - .0009</td>
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<tr>
<td>S99NH4-URC2032</td>
<td>.625</td>
<td>.875</td>
<td>1.000</td>
<td>175.2</td>
<td>8500</td>
<td>5000</td>
<td>± .0005 / - .0009</td>
</tr>
</tbody>
</table>
Determine clutch or brake torque value
With the inertia value calculated, determine the torque requirement for the function.

A) For Overrunning and Start-Stop (random start-stop)

\[
T = \frac{WR^2 \times rpm}{3700} + \text{friction torque}\]

Where:
- \( T \) = Torque required from wrap spring, lbf in.
- \( WR^2 \) = load inertia, lbf in.\(^2\)
- \( rpm \) = shaft speed at clutch location
- \( t \) = time to engagement (.003 for clutch), sec.

Frictional (drag) torque is the torque necessary to overcome static friction. It may be measured by a spring-scale or by dead-weights, applied to a known moment arm so gradually as to make inertia negligible. It is that torque found just sufficient to induce motion.

**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 by:

<table>
<thead>
<tr>
<th>Material</th>
<th>Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronze</td>
<td>1.05</td>
</tr>
<tr>
<td>Steel</td>
<td>1.00</td>
</tr>
<tr>
<td>Iron</td>
<td>.92</td>
</tr>
<tr>
<td>Powdered Metal Bronze</td>
<td>.79</td>
</tr>
<tr>
<td>Powdered Metal Iron</td>
<td>.88</td>
</tr>
<tr>
<td>Aluminum</td>
<td>.35</td>
</tr>
<tr>
<td>Nylon</td>
<td>.17</td>
</tr>
</tbody>
</table>

**Inertia of Steel Shafting**

(Per Inch of Length or Thickness)

<table>
<thead>
<tr>
<th>Dia. in.</th>
<th>WR(^2) lbf in.(^2)</th>
<th>Dia. in.</th>
<th>WR(^2) lbf in.(^2)</th>
<th>Dia. in.</th>
<th>WR(^2) lbf in.(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4</td>
<td>.00011</td>
<td>7</td>
<td>66.816</td>
<td>13</td>
<td>803.52</td>
</tr>
<tr>
<td>3/8</td>
<td>.00055</td>
<td>7-1/4</td>
<td>77.04</td>
<td>13-1/4</td>
<td>858.24</td>
</tr>
<tr>
<td>1/2</td>
<td>.00173</td>
<td>7-1/2</td>
<td>87.984</td>
<td>13-1/2</td>
<td>924.48</td>
</tr>
<tr>
<td>3/4</td>
<td>.00864</td>
<td>7-3/4</td>
<td>100.656</td>
<td>13-3/4</td>
<td>995.04</td>
</tr>
<tr>
<td>1</td>
<td>.0288</td>
<td>8</td>
<td>113.904</td>
<td>14</td>
<td>1068.48</td>
</tr>
<tr>
<td>1-1/4</td>
<td>.072</td>
<td>8-1/4</td>
<td>128.88</td>
<td>14-1/4</td>
<td>1147.68</td>
</tr>
<tr>
<td>1-1/2</td>
<td>.144</td>
<td>8-3/4</td>
<td>144.00</td>
<td>14-3/4</td>
<td>1229.75</td>
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<tr>
<td>1-3/4</td>
<td>.288</td>
<td>8-1/4</td>
<td>162.72</td>
<td>14-1/2</td>
<td>1317.60</td>
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<tr>
<td>2</td>
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<td>4-1/4</td>
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<td>4-1/2</td>
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<td>5</td>
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<td>17036.64</td>
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<td>12-1/2</td>
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<td>57.888</td>
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<td>735.84</td>
<td>30</td>
<td>22452.48</td>
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</table>
Power-Off Brake – S90SB9- series

Used to stop or hold a load in the absence of power. The case assembly is mounted or fastened to a bulkhead. The armature assembly is attached to the rotating load.

- High-temperature insulated leadwires
- Long-life brake lining (non asbestos)
- Low-inertia rotating components, allowing higher acceleration rates
- UL Class H insulation system, epoxy sealed for efficient operation in extreme environments
- Spline-drive construction withstands high impact stresses imparted by servo systems
- Through holes for internal/external/reversible mounting flexibility

Option 1: Single Output Shaft
Option 2: Double Output Shaft
POWER-OFF SERVO BRAKES

SIMPLE INSTALLATION
ECONOMICAL COST
ENERGY EFFICIENT
SPLINED HUB

> COIL DATA:
Voltage: 24V DC

Other voltages available on special order.

**Keyway Dimensions**

<table>
<thead>
<tr>
<th>R Bore</th>
<th>.250</th>
<th>.312</th>
<th>.375</th>
<th>.500</th>
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</thead>
<tbody>
<tr>
<td>W Width</td>
<td>.602</td>
<td>.694</td>
<td>.700</td>
<td>.700</td>
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<td>H Height</td>
<td>.286</td>
<td>.364</td>
<td>.425</td>
<td>.564</td>
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</table>

**INCH COMPONENT**

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Static Torque lbf in.</th>
<th>Max. watts</th>
<th>R Hub Bore</th>
<th>G Case Inside Dia.</th>
<th>A Dia.</th>
<th>C Dia.</th>
<th>D Dia.</th>
<th>K1 OAL Short Hub</th>
<th>K2 OAL Long Hub</th>
</tr>
</thead>
<tbody>
<tr>
<td>S90SB9-15A04S</td>
<td>5</td>
<td>7</td>
<td>.250</td>
<td>.375</td>
<td>.53</td>
<td>1.50</td>
<td>1.31</td>
<td>.125</td>
<td>—</td>
</tr>
<tr>
<td>S90SB9-15A05S</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>S90SB9-15A06S</td>
<td>10</td>
<td>10</td>
<td>.250</td>
<td>.375</td>
<td>.53</td>
<td>1.79</td>
<td>1.64</td>
<td>.093</td>
<td>1.19</td>
</tr>
<tr>
<td>S90SB9-17A04S</td>
<td>18</td>
<td>12</td>
<td>.250</td>
<td>.375</td>
<td>.43</td>
<td>2.00</td>
<td>1.77</td>
<td>.146</td>
<td>1.19</td>
</tr>
</tbody>
</table>

**Nom. Resistance ohms**

<table>
<thead>
<tr>
<th>Thread</th>
<th>Res. ohms</th>
<th>Nomination</th>
<th>Armature Disengagement mSec</th>
<th>Rotor Energy Dissipation lbf ft./min.</th>
<th>Weight lb.</th>
</tr>
</thead>
<tbody>
<tr>
<td>S90SB9-15A...</td>
<td>#2-56</td>
<td>96</td>
<td>20</td>
<td>10</td>
<td>4.38 x 10^4</td>
</tr>
<tr>
<td>S90SB9-17A...</td>
<td>#6-32</td>
<td>64</td>
<td>20</td>
<td>20</td>
<td>1.87 x 10^3</td>
</tr>
<tr>
<td>S90SB9-19A...</td>
<td>#6-32</td>
<td>54</td>
<td>35</td>
<td>10</td>
<td>2.36 x 10^3</td>
</tr>
</tbody>
</table>

* Typical torque after burnishing; units shipped burnished.

Continued on the next page
### INCH COMPONENT

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Static Torque lbf in.</th>
<th>Max. watts</th>
<th>R Hub Bore</th>
<th>G Case Inside Dia.</th>
<th>A Dia.</th>
<th>C Dia.</th>
<th>D Dia.</th>
<th>K₁ OAL Short Hub</th>
<th>K₂ OAL Long Hub</th>
</tr>
</thead>
<tbody>
<tr>
<td>S90SB9-28A06S</td>
<td>80</td>
<td>20</td>
<td>.375</td>
<td>1.18</td>
<td>3.03</td>
<td>2.76</td>
<td>.177</td>
<td>1.22</td>
<td>—</td>
</tr>
<tr>
<td>S90SB9-28A06L</td>
<td></td>
<td></td>
<td>.500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.22</td>
<td>1.45</td>
</tr>
<tr>
<td>S90SB9-28A08S</td>
<td></td>
<td></td>
<td>.625</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.22</td>
<td>1.45</td>
</tr>
<tr>
<td>S90SB9-28A08L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>—</td>
<td>1.45</td>
</tr>
<tr>
<td>S90SB9-28A10S</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.22</td>
<td>—</td>
</tr>
<tr>
<td>S90SB9-28A10L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>—</td>
<td>1.45</td>
</tr>
</tbody>
</table>

### Keyway Dimensions

<table>
<thead>
<tr>
<th>R Bore</th>
<th>W Width</th>
<th>H Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>.375</td>
<td>.094</td>
<td>.425</td>
</tr>
<tr>
<td>.500</td>
<td>.125</td>
<td>.564</td>
</tr>
<tr>
<td>.625</td>
<td>.168</td>
<td>.709</td>
</tr>
</tbody>
</table>

### Thread Data

- **Thread:** 
- **Nom. Resistance ohms:** 36
- **Armature Engagement msec:** 50
- **Disengagement msec:** 40
- **Rotor Inertia lbf in. sec²:** $1.06 \times 10^{-4}$
- **Energy Dissipation lbf ft./min.:** 1800
- **Weight lb.:** 1.8

*Typical torque after burnishing; units shipped burnished. Continued from the previous page*
POWER-ON FLANGE-MOUNTED BRAKES

ZERO DRAG WHEN DE-ENERGIZED
ANTI-BACKLASH WHEN ENERGIZED

> COIL DATA:
Voltage: 24V DC

Other voltages available on special order.

** Keyway Dimensions **

<table>
<thead>
<tr>
<th>Bore</th>
<th>.250</th>
<th>.375</th>
<th>.500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>.062</td>
<td>.094</td>
<td>.125</td>
</tr>
<tr>
<td>Height</td>
<td>.286</td>
<td>.425</td>
<td>.564</td>
</tr>
</tbody>
</table>

INCH COMPONENT

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Static Torque lbf in.</th>
<th>Nom. Resist. ohms</th>
<th>Max. wattage</th>
<th>Armature Inertia lbf in. sec²</th>
<th>Energy Dissipation lbf ft./min.</th>
<th>Armature Engagement msec</th>
<th>Disengagement msec</th>
<th>P Bore</th>
</tr>
</thead>
<tbody>
<tr>
<td>S90BF9-11A04</td>
<td>5</td>
<td>128</td>
<td>5</td>
<td>3.4 x 10⁻³</td>
<td>175</td>
<td>5</td>
<td>18</td>
<td>.250</td>
</tr>
<tr>
<td>S90BF9-17A04</td>
<td>15</td>
<td>108</td>
<td>6</td>
<td>8.1 x 10⁻³</td>
<td>420</td>
<td>10</td>
<td>27</td>
<td>.250</td>
</tr>
<tr>
<td>S90BF9-22A06</td>
<td>40</td>
<td>75</td>
<td>8.5</td>
<td>33.1 x 10⁻³</td>
<td>1400</td>
<td>12</td>
<td>32</td>
<td>.375</td>
</tr>
<tr>
<td>S90BF9-26A06</td>
<td>80</td>
<td>66</td>
<td>9.5</td>
<td>81.0 x 10⁻³</td>
<td>2600</td>
<td>15</td>
<td>35</td>
<td>.375</td>
</tr>
</tbody>
</table>

* Typical torque after burnishing; units shipped burnished.
** For Catalog Number:
- -11A04, initial working air gap at installation shall be .004/.009.
- -17A04, -22A06, -26A06, -26A08 initial working air gap at installation shall be .006/.013.
CLUTCH APPLICATIONS

Shaft-Mounted Clutches
S90CS9 Series

Prime Mover
Field
Armature
Gear or Pulley
Hub
Belt or Chain
Rotor
Antirotation Tab
Load

Flange-Mounted Clutches
S90CF9 Series

Prime Mover
Field
Armature
Gear or Pulley
Hub
Belt or Chain
Rotor
Load

Shaft-Mounted Clutch Couplings
S90CSC Series

Prime Mover
Field
Armature
Hub
Rotor
Antirotation Tab
Load

Flange-Mounted Clutch Couplings
S90CFC Series

Prime Mover
Field
Armature
Hub
Rotor
Load
**SHAFT-MOUNTED CLUTCH COUPLINGS**

ZERO-BACKLASH ARMATURE FOR IN-LINE LOADS

> **COIL DATA:**
  
  Voltage: 24V DC

Other voltages and dissimilar bore combinations are available on special order.

---

**INCH COMPONENT**

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Static Torque lbf in.</th>
<th>Nom. Resist. ohms</th>
<th>Max. wattage</th>
<th>Armature Inertia lbf in. sec²</th>
<th>Rotor Inertia lbf in. sec²</th>
<th>Energy Dissipation lbf ft./min.</th>
<th>Armature Engagement msec</th>
<th>Disengagement msec</th>
</tr>
</thead>
<tbody>
<tr>
<td>S90CSC-11A0404</td>
<td>5</td>
<td>128</td>
<td>5</td>
<td>3.4 x 10⁵</td>
<td>2.6 x 10⁵</td>
<td>175</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>S90CSC-17A0404</td>
<td>15</td>
<td>108</td>
<td>6</td>
<td>8.1 x 10⁵</td>
<td>11.4 x 10⁵</td>
<td>420</td>
<td>10</td>
<td>27</td>
</tr>
<tr>
<td>S90CSC-22A0606</td>
<td>40</td>
<td>75</td>
<td>8.5</td>
<td>33.1 x 10⁵</td>
<td>32.3 x 10⁵</td>
<td>1400</td>
<td>12</td>
<td>32</td>
</tr>
<tr>
<td>S90CSC-26A0606</td>
<td>80</td>
<td>65</td>
<td>9.5</td>
<td>81.0 x 10⁵</td>
<td>62.0 x 10⁵</td>
<td>2800</td>
<td>15</td>
<td>35</td>
</tr>
</tbody>
</table>

---

**Keyway Dimensions**

<table>
<thead>
<tr>
<th>Bore</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>.25</td>
<td>.062</td>
<td>.286</td>
</tr>
<tr>
<td>.375</td>
<td>.094</td>
<td>.425</td>
</tr>
<tr>
<td>.500</td>
<td>.125</td>
<td>.564</td>
</tr>
</tbody>
</table>

---

**Catalog Number (Ref.)**

<table>
<thead>
<tr>
<th>R Bore</th>
<th>A Dia.</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G Dia.</th>
<th>H</th>
<th>K**</th>
<th>Weight lb.</th>
</tr>
</thead>
<tbody>
<tr>
<td>S90CSC-11A0404</td>
<td>250</td>
<td>1.25</td>
<td>.87</td>
<td>.56</td>
<td>.13</td>
<td>.38</td>
<td>.03</td>
<td>.487</td>
<td>22</td>
<td>1.28</td>
</tr>
<tr>
<td>S90CSC-17A0404</td>
<td>250</td>
<td>1.78</td>
<td>1.32</td>
<td>.91</td>
<td>.19</td>
<td>.50</td>
<td>.06</td>
<td>.620</td>
<td>30</td>
<td>1.55</td>
</tr>
<tr>
<td>S90CSC-22A0606</td>
<td>375</td>
<td>2.26</td>
<td>1.52</td>
<td>1.16</td>
<td>.19</td>
<td>.44</td>
<td>.06</td>
<td>.750</td>
<td>36</td>
<td>2.06</td>
</tr>
<tr>
<td>S90CSC-26A0606</td>
<td>375</td>
<td>2.63</td>
<td>1.75</td>
<td>1.34</td>
<td>.19</td>
<td>.50</td>
<td>.06</td>
<td>.875</td>
<td>34</td>
<td>2.11</td>
</tr>
<tr>
<td>S90CSC-26A0808</td>
<td>500</td>
<td>2.63</td>
<td>1.75</td>
<td>1.34</td>
<td>.19</td>
<td>.50</td>
<td>.06</td>
<td>.875</td>
<td>34</td>
<td>2.11</td>
</tr>
</tbody>
</table>

* Typical torque after burnishing; units shipped burnished.

** For Catalog Number:
  - 11A0404, 17A0404, initial working air gap at installation shall be .004/.009.
  - 22A0606, 26A0606, 26A0808, initial working air gap at installation shall be .006/.013.

Δ Keyway not available in rotor.
PRECISION SLIP CLUTCH ASSEMBLIES

PIN TYPE

> MATERIAL:
  Housing - 303 Stainless Steel
  Brake - Oil-Impregnated Steel

> TORQUE:
  5-50 ozf in.

Other bores available on special order.

INCH COMPONENT

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Bore +.0005 -.0000</th>
<th>Hub Diameter</th>
<th>Set Screw</th>
<th>Sub Drill</th>
</tr>
</thead>
<tbody>
<tr>
<td>S9906A-G150S-1</td>
<td>.1200</td>
<td>.312</td>
<td>#2-56</td>
<td>.029</td>
</tr>
<tr>
<td>S9906A-G150S-2</td>
<td>.1248</td>
<td>.375</td>
<td>#4-40</td>
<td>.040</td>
</tr>
<tr>
<td>S9906A-G150S-3</td>
<td>.1873</td>
<td>.500</td>
<td>#6-32</td>
<td>.070</td>
</tr>
<tr>
<td>S9906A-G150S-4</td>
<td>.2498</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Use with Hubless Gears of .125 F.W. and .3750 bore.

CLAMP TYPE

> MATERIAL:
  Housing - 303 Stainless Steel
  Brake - Oil-Impregnated Steel

> TORQUE:
  5-50 ozf in.

Other bores available on special order.

INCH COMPONENT

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Bore +.0005 -.0000</th>
<th>Set Screw</th>
<th>Sub Drill</th>
</tr>
</thead>
<tbody>
<tr>
<td>S9906A-G150-1</td>
<td>.1200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S9906A-G150-2</td>
<td>.1248</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S9906A-G150-3</td>
<td>.1873</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S9906A-G150-4</td>
<td>.2498</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Use with Hubless Gears of .125 F.W. and .3750 bore.
STANDARD SLIP CLUTCH ASSEMBLIES

PIN TYPE

› MATERIAL:
  Housing - 303 Stainless Steel
  Brake - Cork

› TORQUE:
  5-50 ozf in.

INCH COMPONENT

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Bore +.0005 - .0000</th>
<th>Hub Diameter</th>
<th>Set Screw</th>
<th>Sub Drill</th>
</tr>
</thead>
<tbody>
<tr>
<td>S9906A-MM2-02</td>
<td>.1248</td>
<td>.312</td>
<td>#2-56</td>
<td>.029</td>
</tr>
<tr>
<td>S9906A-MM2-03</td>
<td>.1873</td>
<td>.375</td>
<td>#4-40</td>
<td>.040</td>
</tr>
<tr>
<td>S9906A-MM2-04</td>
<td>.2498</td>
<td>.500</td>
<td>#6-32</td>
<td>.070</td>
</tr>
</tbody>
</table>

NOTE: Use with Hubless Gears of .125 F.W. and .3750 bore.
MAGNETIC PARTICLE CLUTCHES & BRAKES

**FEATURES:**
- Magnetic engagement without movement of mechanical parts.
- Smooth and silent.
- No backlash.
- Nearly linear torque vs. current.
- No friction surface to wear out.
- Ultrastable response.
- Low output inertia.
- High torque-to-size ratio.
- Infinitely adjustable torque.

**APPLICATIONS:**
- Tensioning
- Stepping and Indexing
- Overload Protection
- Motor Testing
- Controlled Start / Stop

**HOW THE UNITS WORK:**
The output disk/shaft assembly does not touch the housing. The gap in between is filled with a fine, dry stainless steel powder. The powder is free flowing, until a magnetic field is applied from the stationary coil. The powder particles form chains along the magnetic field lines, linking the disk to the housing. The torque is proportional to the magnetic field and, therefore, to the applied D.C. input current. Output torque is controlled by varying the D.C. input current. The torque vs. current curve is essentially linear, with a slight "S" shape.

While the input torque is less than the output torque, the brake or clutch won’t slip. For brakes, the output shaft won’t rotate. For clutches, the input shaft will be coupled to the output shaft, with no slip.

When the input torque is increased, the brake or clutch will slip smoothly at the torque level set by the coil input current. Output torque is independent of slip rpm.
MAGNETIC PARTICLE CLUTCHES

ULTRAFAST RESPONSES
SOFT OR FAST START

> COIL DATA:
Voltage: 24V DC
Voltages other than 24 Volts DC available on special order.

> APPLICATIONS:
Tensioning
Overload Protection
Torque Limiting Drives
Controlled Starts (and stops with a separate brake)

The shaft becomes coupled to the output shaft with electrical excitation.

All shafts have flat at the end.

INCH COMPONENT

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>B Shaft Dia. ± .0002</th>
<th>D Dia. ± .015</th>
<th>E Nom.</th>
<th>F ± .03</th>
<th>G ± .02</th>
<th>H ± .02</th>
<th>C Dia. ± .000</th>
<th>J ± .01</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>S90MPA-C14D19A</td>
<td>.1872 1.437 .1434</td>
<td>2.88 1.66 59</td>
<td>.63</td>
<td>* .750</td>
<td>* .60</td>
<td>3 #3-48 1.140 B.C.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S90MPA-C23D31</td>
<td>.3122 2.250 4.40</td>
<td>2.50 1.07 83</td>
<td>1.125</td>
<td>.08</td>
<td>2x3 #6-32 2.031 B.C.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S90MPA-C28D37</td>
<td>.3745 2.850 5.07</td>
<td>2.80 1.27 1.00</td>
<td>1.125</td>
<td>.09</td>
<td>2x3 #8-32 2.000 B.C.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S90MPA-C34D50</td>
<td>.4995 3.380 5.53</td>
<td>3.38 1.08 1.08</td>
<td>1.375</td>
<td>.08</td>
<td>2x4 #10-32 3.000 B.C.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For input side see View A, threaded mount holes “K” are at output end only. This assembly is supplied with housing solder terminals with leads attached and with 3 mounting clamps for #4-40 screws on Ø1.72 B.C.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>S90MPA-C14D19A</td>
<td>.06 – 2</td>
<td>3</td>
<td>26 x 10^-7</td>
<td>2000</td>
<td>6</td>
<td>4</td>
<td>9</td>
<td>.7</td>
</tr>
<tr>
<td>S90MPA-C23D31</td>
<td>.12 – 5</td>
<td>5</td>
<td>13 x 10^-6</td>
<td>2000</td>
<td>10</td>
<td>20</td>
<td>18</td>
<td>3.0</td>
</tr>
<tr>
<td>S90MPA-C28D37</td>
<td>.4 – 15</td>
<td>6</td>
<td>33 x 10^-6</td>
<td>1400</td>
<td>20</td>
<td>35</td>
<td>25</td>
<td>5.0</td>
</tr>
<tr>
<td>S90MPA-C34D50</td>
<td>.6 – 35</td>
<td>10</td>
<td>15 x 10^-5</td>
<td>1000</td>
<td>30</td>
<td>50</td>
<td>70</td>
<td>9.0</td>
</tr>
</tbody>
</table>
MAGNETIC PARTICLE BRAKES

ZERO BACKLASH
LOW INERTIA
NO FRICTION SURFACE

> COIL DATA:
Voltage: 24V DC

Voltages other than 24 Volts DC available on special order.

> APPLICATIONS:
Tensioning
Controlled Stops
Positioning
Locking
Motor Testing

The shaft becomes coupled to the housing with electrical excitation. The torque is proportional to the DC input current.

All models are available with the shaft on one end, on special order.

INCH COMPONENT

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>A Dia. ±.001 - .008</th>
<th>B Dia. ±.0002</th>
<th>C Dia. ±.000 - .001</th>
<th>D Dia. ±.015</th>
<th>E ± .01</th>
<th>F ±.03</th>
<th>G ± .02</th>
<th>H ± .02</th>
<th>J ± .01</th>
<th>K</th>
</tr>
</thead>
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** 3/16 keyway & flat, 90° oriented in respect to the keyway on the end of the shaft.

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