**UNWIND TENSION CONTROL**

Brake mounted on shaft of unwind spool or bobbin.

Information required: (Example)
- Full diameter = 150 mm
- Empty core diameter = 75 mm
- Average tension = 5 N
- Velocity (meters per min.) = 50 m/min.

How to size:
- Avg. radius = \( \frac{[\text{Full roll dia.} + \text{Empty dia.}]}{4} \)
  \( = \frac{(150 + 75)}{4} = 56.25 \text{ mm} = 0.056 \text{ m} \)
- Avg. torque (N \( \cdot \) m) = avg. tension (N) \( \times \) avg. radius (m)
  \( = 5 \times 0.056 = 0.28 \text{ N} \cdot \text{m} \)

1. Select Catalog Number S90MCCCMMTL0806 based on 0.28 N \( \cdot \) m
2. Check Operating Curve
   - The Max. rpm occurs at the min. radius
   - Max. rpm = Velocity / (Empty dia. \( \times \pi \))
     \( = \frac{(50 \text{ m/min.})}{(0.075 \text{ m}) \times \pi} \)
     \( = 212 \text{ rpm} \)
   - 0.28 N \( \cdot \) m at 212 rpm is okay.

**NIP ROLL OR PULLEY TENSION CONTROL**

Coil Winding - Constant tension provided by hysteresis unit.

Information required: (Example)
- Pulley diameter or nip roll = 76 mm
- Tension = 10 N
- Velocity = 100 m/min.

How to size:
- Torque (N \( \cdot \) m) = Tension \( \times \) Radius
  \( = 10 \text{ N} \times \left(\frac{(0.076 \text{ m})}{2}\right) = 0.38 \text{ N} \cdot \text{m} \)

1. Select Catalog Number S90MCCCMMTL0806 based on 0.38 N \( \cdot \) m
2. Check Operating Curve
   - The Max. rpm occurs at the min. radius
   - Max. rpm = Velocity / (Empty dia. \( \times \pi \))
     \( = \frac{(100 \text{ m/min.})}{(0.076 \text{ m}) \times \pi} \)
     \( = 419 \text{ rpm} \)
   - 419 rpm is too high for continuous duty on the S90MCCCMMTL0806 unit.
3. Select Catalog Number S90MCCCMMTL1612

Film Tensioning - Constant tensioning supplied by hysteresis unit.
MAGNETIC CLUTCHES & COUPLINGS

APPLICATIONS – EXAMPLES

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

01 Metric

CYCLING

Bottle Capping - Constant torque provided by a hysteresis clutch.

Information required: (Example)
- Slip rpm = 350 rpm
- Torque = 1 N • m
- Duty cycle (% slip time of total cycle time) = 25%

How to size:
1. Select Catalog Number S90MCCMMTL1612 based on 1 N • m
2. Check Operating Curve
   350 rpm is high, but as the duty cycle is only 25%, the Catalog Number S90MCCMMTL1612 is okay.

OVERLOAD PROTECTION TORQUE LIMITING SOFT START (Motor Horsepower Method)

Torque Limiting - Hysteresis clutch provides overload protection.

Information required: (Example)
- Motor HP = 0.07 kw (1/10 HP)
- Motor rpm = 900 rpm

How to size:
- Torque (N • m) = (Motor HP x 9550) / Motor rpm
  = (0.07 kw x 9550) / 900 = 0.74 N • m

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

1. Select Catalog Number S90MCCMMTL1628 based on 0.74 N • m
2. Check Operating Curve
   0.75 N • m 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
  - 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 max. 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**

0.0003...0.014 N • m TORQUE RANGE
NONELECTRIC
NO WEARING PARTS
NO FRICTION

> MATERIAL:
**Housing and Shaft** - Stainless Steel

The projections shown are per ISO convention.

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>B Shaft Length</th>
<th>A Shaft Length</th>
<th>Torque Range N • m</th>
<th>Weight kg</th>
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</table>
MAGNETIC CLUTCHES & COUPLINGS

0.007...2.83 N•m TORQUE RANGE
NONELECTRIC
NO WEARING PARTS
NO FRICTION
HOLLOW BORE

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

The projections shown are per ISO convention.

## METRIC COMPONENT

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Bore</th>
<th>L</th>
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<th>d</th>
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<th>Keyway</th>
<th>Weight kg</th>
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**MAGNETIC CLUTCHES & COUPLINGS**

0.33...7.9 N • m TORQUE RANGE
NONELECTRIC
NO WEARING PARTS
NO FRICTION
HOLLOW BORE

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

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The projections shown are per ISO convention.

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**METRIC COMPONENT**

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<th>Catalog Number</th>
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**Keyway Dimensions**

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<tr>
<td>h</td>
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