

# General Characteristics

Synchronous timing belts provide an economical means of power transmission. Timing belts are basically like flat belts with a series of evenly spaced teeth on the inside circumference. These drives utilize the positive engagement of the toothed belt with another set of matching teeth on the pulley.

- The positive nature of these drives results in high efficiencies and the capability of carrying heavy loads, with large accelerations at very high speeds.
- They do not slip, therefore there is no relative motion between the meshing elements. Due to this feature, different parts of the drive will maintain a constant speed ratio or even a permanent relative position. This is important in applications where motion sequence or indexing is involved.
- They allow for great flexibility in design. The designer can place components in more advantageous positions without excess cost. Speeds can be stepped up or down without an expensive gear train.
- Timing belts combine the best of two worlds. Since they are basically flat belts with a tooth profile they offer the same advantages while also combining them with the positive grip benefits of chain sprockets.
- Unlike flat belts there is no slippage therefore required belt tension is low resulting in small bearing loads and improved life.
- Absence of metal-to-metal contact eliminates the need for lubricating systems, oil- retaining devices - and their nuisance, cost, weight, and product contamination.
- Constant angular velocity means speed is transmitted uniformly. There is no chordal rise and fall of the pitch line as with roller chain, no belt creep or slippage and thus no chatter or vibration.
- Compact design means smaller pulleys, shorter centers and narrow belts. All these features combine to reduce space requirements.
- They have a high horsepower to weight ratio. Often an important consideration where weight is critical as on portable equipment.
- Synchronous drives are generally the most economical when compared to other systems. The cost of the drive itself is the only expense. They do not require motor bases, lubrication systems or tensioning devices and maintenance costs are minimal.

There are two distinctive styles of synchronous drives. The main difference between the two is in the shape of the teeth that mesh between belt and pulley. The tooth profile most common among synchronous belts is trapezoidal in shape. It is available in both English and metric pitches. This design was derived from the spur gear and was eventually superseded by a curvilinear tooth profile which exhibited some desirable and superior qualities. Both tooth profiles are pictured below.

### **Curvilinear Features**

- Carry 2-3 more horsepower
- Reduced drive size
- Speed ratios to 20:1
- Smaller drives yields cost savings

### **Trapezoidal Features**

- Precise positioning
- Quiet operation
- Belts in neoprene and urethane
- Many styles to choose

### **Some of the many applications of B&B synchronous drives are:**

- |                              |                                  |
|------------------------------|----------------------------------|
| • Data storage equipment     | • Money handling equipment       |
| • Centrifuges                | • Robotics equipment             |
| • Ticket dispensers          | • DC stepper/servo               |
| • Machine tools              | • Medical equipment              |
| • Printers                   | • Vending equipment applications |
| • Plotters                   | • Sewing machines                |
| • Hand power tools           | • Vacuum cleaners                |
| • Floor care equipment       | • Food processors                |
| • Copiers                    | • ATM's                          |
| • Postage handling equipment | • Office equipment               |