**Selection of Power Transmission Efficiency**

The table of transmission performance in this catalog (P. 3506) is based on the following conditions.

1) The chain drive mechanism is run in an atmosphere with a temperature of -10°C ~ +60°C and with no abrasive particles.
2) There is no adverse impact on the mechanisms, such as corrosive gas or high humidity.
3) The two shafts between which power is transmitted are parallel with each other and correctly installed.
4) The recommended lubrication method and oil are used.
5) The power transmission is subjected to minimum load variation.

<table>
<thead>
<tr>
<th>Value of Corrected kW</th>
<th>3) The two shafts between which power is transmitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 lines</td>
<td>X1.7</td>
</tr>
<tr>
<td>3 lines</td>
<td>X2.5</td>
</tr>
<tr>
<td>4 lines</td>
<td>X3.3</td>
</tr>
<tr>
<td>5 lines</td>
<td>X3.9</td>
</tr>
<tr>
<td>6 lines</td>
<td>X4.1</td>
</tr>
</tbody>
</table>

### Table 2. Power Transmission Coefficient for Multiple Chains

The table of transmission performance in this catalog (P. 3506) is based on the following conditions.

1) The chain drive mechanism is run in an atmosphere with a transmission efficiency of a single chain by the multiple chain power transmission coefficient.
2) Transmission efficiency of multiple roller chains should be obtained by multiplying the power the power transmission efficiency of a single chain by the number of chain rows. The power transmission efficiency of multiple roller chains cannot be obtained by simply multiplying the power transmission efficiency of a single chain by the number of chain rows. The chain drive mechanism is run in an atmosphere with a transmission efficiency of a single chain by the multiple chain power transmission coefficient.
3) Corrected Power Transmission<sub>(KW)</sub> Correct the power transmission<sub>(KW)</sub> by using the application coefficient. Multiple chains…Select the appropriate coefficient from the transmission multiple-chain power transmission coefficients(Table 2).
4) Chain and Number of Sprocket Teeth Various design conditions usually demand the chain length to be an odd number, an offset link being used. However, it should be avoided and an even number should be used as much as possible by adjusting the number of sprocket teeth or the inter-shaft distance.
5) Number of Large Sprocket Teeth Generally, the inter-shaft distance should preferably be 30~50 mm, the chain length to be an odd number, and the number of teeth to be selected according to the mechanical load of the machine to be used.
6) Shaft Diameter The chain length for multiple chains is equal to this value plus the width of the sprocket preparing the chain length.
7) Inter-shaft Distance between Sprockets The distance between the shafts can be reduced as long as the sprockets do not interfere with each other and the wrap angle between the small sprocket and the chain is 120° or more. Generally, the inter-shaft distance should preferably be 30 ~ 50 times the pitch of the chain used. Under the preceding load conditions, determine the distance to be 20 times the pitch of the chain less.

### Selection Guide Table

<table>
<thead>
<tr>
<th>Number of Chain Rows</th>
<th>Multiple Row Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 lines</td>
<td>X1.7</td>
</tr>
<tr>
<td>3 lines</td>
<td>X2.5</td>
</tr>
<tr>
<td>4 lines</td>
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<td>X3.9</td>
</tr>
<tr>
<td>6 lines</td>
<td>X4.1</td>
</tr>
</tbody>
</table>

### Example of Selection for Operation under Normal Conditions

The following is an example of selection when a 3.7 kW 1,000 r/min electric (motor) is used to drive a compressor.

1. Operating Conditions
   1) Machine to be used: Compressor; 10 hours operation
   2) Impact Type: Smooth Transmission
   3) Prime Motor Type: Electric Motor
   4) Power Transmission: 3.7 kW
   5) Rotary Speed: 1,000 r/min

2. Application Coefficient
   From Table 1, an application coefficient of 1.2 is selected.

3. Corrected Power Transmission<sub>(KW)</sub>
   Calculate the corrected power transmission<sub>(KW)</sub> by the application coefficient.

4. Chain and Number of Sprocket Teeth
   Using the selection guide table(Table 3) for the transmission efficiency table, select the chain and the number of small sprocket teeth that satisfy the rotary speed of the high-speed shaft and the corrected power transmission<sub>(KW)</sub>. The chain pitch should be as small as possible, as long as the required power transmission efficiency is achieved.

5. Number of Large Sprocket Teeth
   Generally, the inter-shaft distance should preferably be 30~50 mm, the chain length to be an odd number, and the number of teeth to be selected according to the mechanical load of the machine to be used.

6. Shaft Diameter
   The chain length of the chain diagram to be used is less than or equal to the even number of teeth of the machine to be used.

7. Inter-shaft Distance between Sprockets
   The distance between the shafts can be reduced as long as the sprockets do not interfere with each other and the wrap angle between the small sprocket and the chain is 120° or more.

8. Chain Length and Distance between Shaft Centers
   Calculate the chain length and the distance between the shaft centers. The result should be an even number. If the chain length obtained is an odd number, an odd number of teeth should be used as much as possible by adjusting the number of sprocket teeth or the inter-shaft distance.

### Application Coefficient Table

<table>
<thead>
<tr>
<th>Impact Type</th>
<th>1. Machine to be used</th>
<th>5. Diameter and Rotary Speed of High-Speed Shaft</th>
<th>7. Inter-Shaft Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbo/Unit</td>
<td>1. Machine to be used</td>
<td>5. Diameter and Rotary Speed of High-Speed Shaft</td>
<td>7. Inter-Shaft Distance</td>
</tr>
</tbody>
</table>

## Technical Data

**Designing of Chain Drive Mechanism 1**

- [Technical Data for Chain Drive Mechanism 1](#)
- [Application Coefficient Table](#)
- [Selection Guide Table](#)
- [Example of Selection for Operation under Normal Conditions](#)