SMALL GEAR MOTORS 6W-90W

The PTC-Group has an extensive lineup of small gear motors of 90 watts or less.

The most common gear motor is the parallel type ASTERO™ gear motor. The motor and gear head are sold separately, so customers can freely create their own combinations. Customers can choose a combination that suits their needs from a wide variation of motors.

The HYPONIC® gear motor is a high-efficiency, high-torque gear motor that uses a hypoid gear. It has a compact, high output design with no torque limitations up to a reduction ratio of 1/200. Another important aspect is that hypoid gears are very quiet.

ALTAX® gear motors are very strong motors that utilize the Cyclo® gear mechanism. They are ideal for operating in conditions requiring durability.

<table>
<thead>
<tr>
<th>PARALLEL</th>
<th>IN-LINE</th>
<th>RIGHT ANGLE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASTERO™ GEARMOTOR</strong></td>
<td><strong>ALTAX® GEARMOTOR</strong></td>
<td><strong>HYPONIC® DRIVE</strong></td>
</tr>
<tr>
<td>Power</td>
<td>6W-90W</td>
<td>40W-90W</td>
</tr>
<tr>
<td>Ratio</td>
<td>1/3-1/200</td>
<td>1/6-1/51</td>
</tr>
<tr>
<td>Motor Type</td>
<td>Induction (Single Phase, Three Phase) Reversible Brake Speed Control CE UL Inter Decimal Gearhead (1/10)</td>
<td>Induction (Single Phase, Three Phase) Reversible Brake Speed Control (Inverter)</td>
</tr>
</tbody>
</table>
GEAR MOTORS 0.1-2.2kW

The PTC-Group 0.1kW to 2.2kW class small gear motors of in-line and right-angle type are leaders in the industry.

The in-line ALTAX® α gear motor is created for compact size and uses the Cyclo® gear mechanism. Its casing has both strength and compact size due to the use of three-dimensional CAD stress analysis. The Cyclo® gear mechanism offers toughness and long life in gear motors.

The right-angle HYPONIC DRIVE® NEO series gear motor is a high-efficiency, low noise gear motor that uses a hypoid gear. It achieves operating efficiency that is several tens of percent higher than the general worm reduction mechanism. Compared with conventional HYPONIC motors, this series offers optimum design and much more compact size.

The PREST® C gear motor is designed for use in mechanical multi-story parking facilities. With operation in residential areas in mind, this gear motor is designed for extremely low operating and braking noise. The radial load has been increased and the casing width decreased. This was done in order for easier design of multilevel parking facilities.

Casing Designed for ALTAX® α
This combines the three-dimensional CAD finite element analysis system with Sumitomo technology. It achieves both strength and compact size.

Hypoid Gear
The hypoid gear is midway between a worm gear and a bevel gear. It is more efficient than a worm gear and much quieter than a bevel gear. It is the optimum gear for use in small right-angle gear motors.
Ever since it first went on sale in 1939, the Cyclo® Drive has been highly evaluated by customers for its strength and reliability.
The secret to this product is its unique gear teeth and mechanism.
As a cycloidal tooth profile in the inner gear and an epitrochoidal parallel curve in the outer gear has been adopted, the gear engagement ratio is very high, to eliminate the risk of tooth breakage and greatly raising the reliability of the reducer.
Further more, high carbon and chromium bearing steel noted for their heat and fatigue resisting properties have been used.
The Sumitomo-unique mechanism offers high reduction ratios of 1/6 to 1/119 for the single stage type and 1/121 to 1/7569 for the double stage type, making the drives much more compact than when normal involute gears are used.
The very high reduction ratio of 1/9251 to 1/658503 for the three-stage type, impossible with normal involute gears, can be achieved easily with this mechanism.

In addition to the characteristics of the Cyclo® Drive mechanism, the greater load capacity of the 6000 series offers up to 40 percent more size reduction.
Elasticity analysis and development of a new tooth profile has helped to further reduce noise.

The BEVEL BUDDY BOX®, with right-angle shaft, and HELICAL BUDDY BOX®, with parallel shaft, are designed to take advantage of the superior characteristics of this Cyclo® gear mechanism by using bevel gears and helical gears for the output stage.
These two product lineups make Cyclo® drives even easier to use.
These are Cyclo® Drives used for precision control. They combine the high strength and impact resistance of Cyclo® Drive with very low backlash design. Because they are the component type, they are easy to install in customer machines. High precision alignment is made possible when combined with servo motors. This line is ideal for applications that require higher rigidity and precision stopping. They are used in machine tools, industrial robots and factory automation equipment. The FC-A, F1C-A and F2C-T series are available to suit different types of applications.

The LB series Cyclo Drive can be directly connected to general-purpose servo motors. There are standard backlash models and low 0.1° backlash models.

The IB series low backlash reduction gears use a Sumitomo-unique planetary gear mechanism. When combined with servo motors, they can be used in all types of precision alignment applications, such as robots for injection molding machines, machine tools and packaging machines.
Sumitomo Heavy Industries also provides an extensive line of medium and large-sized speed reducers.

Two types of speed reducers are provided for the Paramax® series.
One is a parallel gearbox with helical gears and the other combines helical gears and bevel gears in a right-angle gearbox.
Systematic combinations of individual components has led to standardization of almost all gears, shafts and cases.
This makes both higher quality and shorter delivery times possible for speed reducers.
Compared with the ordinary pressure angle of 20˚, a 25˚ pressure angle offers tooth form with thicker dedendum.
This provides the higher tooth strength rating that is essential for shock load applications.

FEM analysis is used to maximize housing strength and rigidity,
thereby ensuring correct gear alignment and noise reduction.
The new 9000 series right-angle models allow direct motor mounting.
This eliminates the need for coupling and simplifies motor installation, enabling more compact design.

The HEDCON® worm gear speed reducer is based on the unique dual contact theory,
which creates a high-efficiency, high-strength worm reduction mechanism.
A high-precision series featuring low backlash is also available.

The COMPOWER® model's planetary gear utilizes a unique isosteric mechanism combined with high-precision carburized ground gears. The result is a compact and powerful planetary gear speed reducer.
This series includes the very large 75,000kgf-m class model.
Sumitomo Heavy Industries offers two types of speed control drives. One is a mechanical series and the other an electrical series.

The electrical series includes the AC inverter that is now widely used, an AF motor specifically designed for that AC inverter and an IV-DRIVE, which combines the AC inverter and motor. Sumitomo Heavy Industries has optimized the inverter and Cyclo gear motor combination by designing the inverter to store motor characteristics when the two are used together. Torque performance, including starting torque, has been improved to create greater operating power.

The Beier® Variator, with a 50 year history and sales of 700,000 units, is provided as a stepless variable speed reducer. The Beier Cyclo® Variator, which combines Cyclo Drive, is provided as a variable speed reducer. The key characteristics of this series are a choice of constant horsepower or a combination of constant horsepower and torque, which offers especially high torque in the low-speed range.
Asia+Oceania

China
- Sumitomo (SHI) Cyclo Drive China, Ltd. (SCT)
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International Operations [3]
### International Operation [4]

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- **Sumitomo Heavy Industries, Ltd.**
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  - Web Site: http://www.shi.co.jp/ptc/

  **Sales Office**
  - Sapporo
  - Sendai
  - Sakai
  - Tokyo
  - Yokohama
  - Shizuoka
  - Nagoya
  - Kansai
  - Osaka
  - Kobe
  - Takamatsu
  - Nihama
  - Okayama
  - Hiroshima
  - Kitakyushu
  - Fukuoka

- **Nagoya Plant**
  - Address: 1, Asahi-machi 6-chome, Ohbu-shi, Aichi 474-8501, Japan
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  - Time Difference GMT+9
  - Products: CYCLO DRIVE, BEIER VARIATOR, RHYTXAX, BUDDYBOX, Motors, Inverters

- **Okayama Gearbox Plant**
  - Address: 8230, Tama-cho, Ohbu-cho, Okayama, 713-8501, Japan
  - TEL: (81)-86-525-6315 FAX: (81)-86-525-6316
  - Time Difference GMT+9
  - Products: PARAMAX, COMPPOWER, HEDCON

- **Okayama Gearmotor Plant**
  - Address: 8230, Tama-cho, Ohbu-cho, Okayama, 713-8501, Japan
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  - Time Difference GMT+9
  - Products: ALTAX, HYPERSONIC

- **Astero Business center**
  - Address: 1, Asahi-machi 6-chome, Ohbu-shi, Aichi 474-8501, Japan
  - TEL: (81)-562-48-5139 FAX: (81)-562-48-5236
  - Time Difference GMT+9
  - Products: Astero

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### Subsidiaries of Power Transmission & Controls Group

**U.S.A.**
- **Sumitomo Machinery Corporation of America (SMA)**
  - Capital: US$7,723 thousand
  - Foundation: June 1966
  - Web Site: http://www.smcyclo.com/

**Germany**
- **Sumitomo (SHI) Cyclo Drive Germany, GmbH**
  - Capital: DM12 million
  - Foundation: June 1974
  - Web Site: http://www.smcyceuro.com/

**China**
- **Sumitomo (SHI) Cyclo Drive China, Ltd.**
  - Capital: RMB87,000 thousand
  - Foundation: December 1994
  - Web Site: http://www.cyclodrive.com/china/

**Singapore**
- **Sumitomo (SHI) Cyclo Drive Asia Pacific Pte., Ltd.**
  - Capital: S$3000 thousand
  - Foundation: September 1995

**Canada**
- **SM-Cyclo of Canada, Ltd.**
  - Capital: CA$10 thousand
  - Foundation: September 1993

**Taiwan**
- **Taichung SM-Cyclo Co., Ltd.**
  - Capital: NT$75 million
  - Foundation: April 1996

**United Kingdom**
- **Sumitomo (SHI) Cyclo Drive Europe, Ltd.**
  - Capital: £6400 thousand
  - Foundation: December 1996
  - Web Site: http://www.smcyceuro.com/

**Korea**
- **SM-Cyclo of Korea Co., Ltd.**
  - Capital: Won1,000 million
  - Foundation: April 1997
  - Web Site: http://www.smcyceuro.com/

**Japan**
- **Osaka Chain & Machinery, Ltd.**
  - Capital: ¥841 million
  - Foundation: 1916.9
  - Web Site: http://www.seisa.co.jp

- **Sumitomo Heavy Industries PTC Sales Co., Ltd.**
  - Capital: ¥200 million
  - Foundation: May 1953