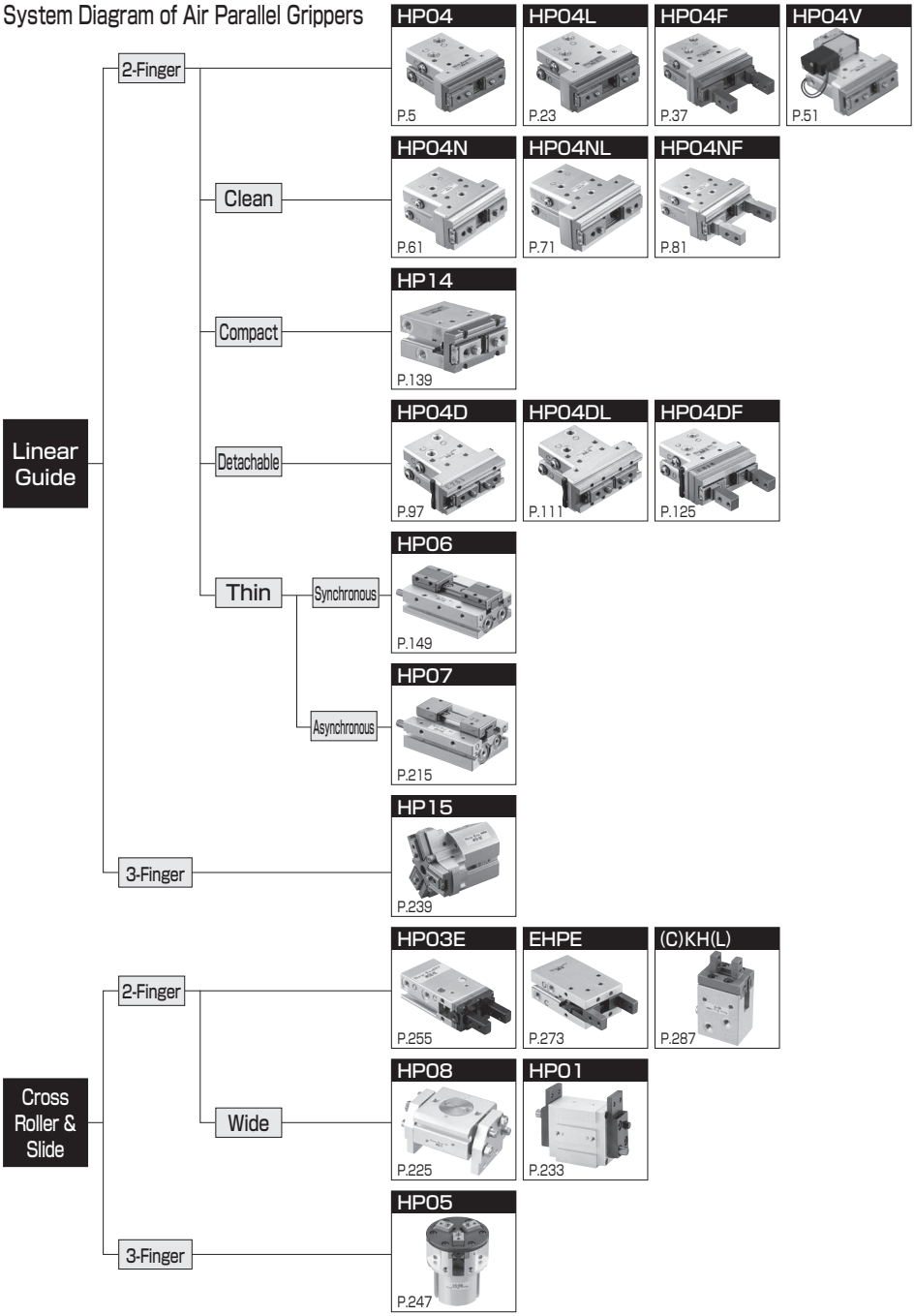
System Diagram of Grippers and Rotors

System Diagram of Air Parallel Grippers



System Diagram of Air Rotary Grippers

Guide & Slide
- 2-Finger
  - 180° opening/closing
    - HV02G P.301
    - HV02E P.311
  - EHVE P.321
  - EHVJ P.333

SH P.341

VH P.347

MH P.359

System Diagram of Mechanical Grippers

Linear Guide
- 2-Finger
  - HP09 P.365
  - HP09L P.375
  - HP09F P.385
- Detachable
  - HP09D P.413
  - HP09DL P.421
  - HP09DF P.429
- 3-Finger
  - HP15M P.405

Slide
- 2-Finger
  - HP10 P.395

System Diagram of Rotors

Rack & Pinion
- Table Type
  - RS01 P.467
  - (R)SR P.487
  - RT02 P.441
  - RT01 P.457
- Integrated with Gripper
  - RH01 P.501

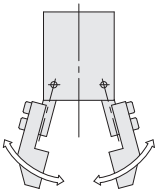
Technical Data — Gripper Selection —

Gripper Selection

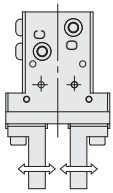
Select the gripper type and the guide method and check if the grip force, grip point, load, and moment are within the allowable range.

1. Gripper Types

There are two gripper types: "Rotary Gripper" whose levers rotate centering around the fulcrum point and "Parallel Gripper" whose levers move in parallel along with the guide. Select your gripper according to the workpiece size, shape and grip method.



Angular Gripper



Parallel Gripper

Type \ Item	Workpiece Size	Gripping Force	Gripping Accuracy	Price
Parallel Gripper	This gripper can grip different sizes of workpieces with in the stroke range.	Almost constant although it differs depending on the gripping point.	Good (It differs depending on the guide type)	High
Angular Gripper	This gripper can grip only workpieces in a certain size.	Inverse proportion to the gripping point	Not good	Low

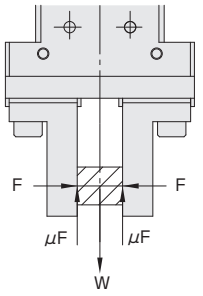
2. Guide Method (Parallel)

The levers move along with the guide. Since the performance differs depending on the guide method, select the guide method according to the use conditions.

Type	Thrust Guide	Cross Roller Guide	Linear Guide
Series	(C)KH(L) Series EHPE Series HP01 Series HP08 Series HP10 Series	HP03E Series HP05 Series	HP04 Series HP06 Series HP07 Series HP09 Series HP14 Series HP15 Series
Performance	A system that uses a metal bush or a slide plate to slide levers and receive load. This system has minor backlash, but it is a low price compared to other guide systems.	A guide system that has cylindrical rollers arranged in series in the V groove rail. This type has advantages such as less vertical backlash and high rigidity.	A guide system that has balls arranged in series in the rail. This type has advantages such as good gripping efficiency due to light movement and small sliding resistance, and high accuracy and rigidity.

3. Gripping Force

You need to select an appropriate gripping force to gripping workpieces for transportation and assembly. As shown in the figure below, a workpiece of W in mass is gripped when "Gripping Force(F) x Friction Coefficient(μ) x Number of Levers(n) x Safety Ratio(s)" is greater than Mass(W).
When the gripper operates while gripping a workpiece, "inertia force" must be added to the items of the calculation formula above. It is difficult to calculate accurate grip force F using this calculation formula because this formula is largely influenced by variations and uncertain elements. Therefore, the selection method is specified below.



F : Gripping Force (N)
μ : Coefficient friction between lever and workpiece
W: Workpiece mass (kg)
n : Number of levers
s : Safety ratio
g : Gravity acceleration 9.8(m/s^2)

$$F \cdot \mu \cdot n \cdot s > W \cdot g$$

$$F > \frac{W \cdot g}{\mu \cdot n \cdot s}$$

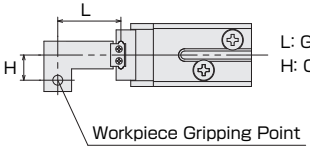
◆Selection Guide

When the gripper only grips a workpiece: F>10W·g ~20W·g
When the gripper operates normally while gripping a workpiece: F>20W·g~30W·g
When the gripper operates with rapid acceleration/deceleration while gripping a workpiece: F>30W·g ~50W·g
(The cases above apply when μ is between 0.1 and 0.2.)

Note) When the gripper grips a heavier workpiece, the attachment must be made of a material with a larger friction coefficient μ.

4. Gripping Point

The larger the gripping point or the overhang gets, the larger the moment to the lever gets. This may result in breakage. Observe the gripping point limitation range of each model.
For the rotary grippers, use them within the gripping point range (range within the solid line) in List of Effective Gripping Force.



L: Gripping Point
H: Overhang

5. Allowable Load, Allowable Moment

For grippers with a linear guide, external force can be applied to the levers.
(Pressing a workpiece against the levers, increasing the attachment size, etc.)
When an external force is added, use an appropriate external force and moment within the range with reference to the page of "Allowable Load and Allowable Moment" of each model.

6. Others

In addition to the items selected so far, you need to check the working temperature, frequency, stroke, etc. Use them within the allowable range with reference to the "Specifications" page of each model.
Consult us if you have any question.