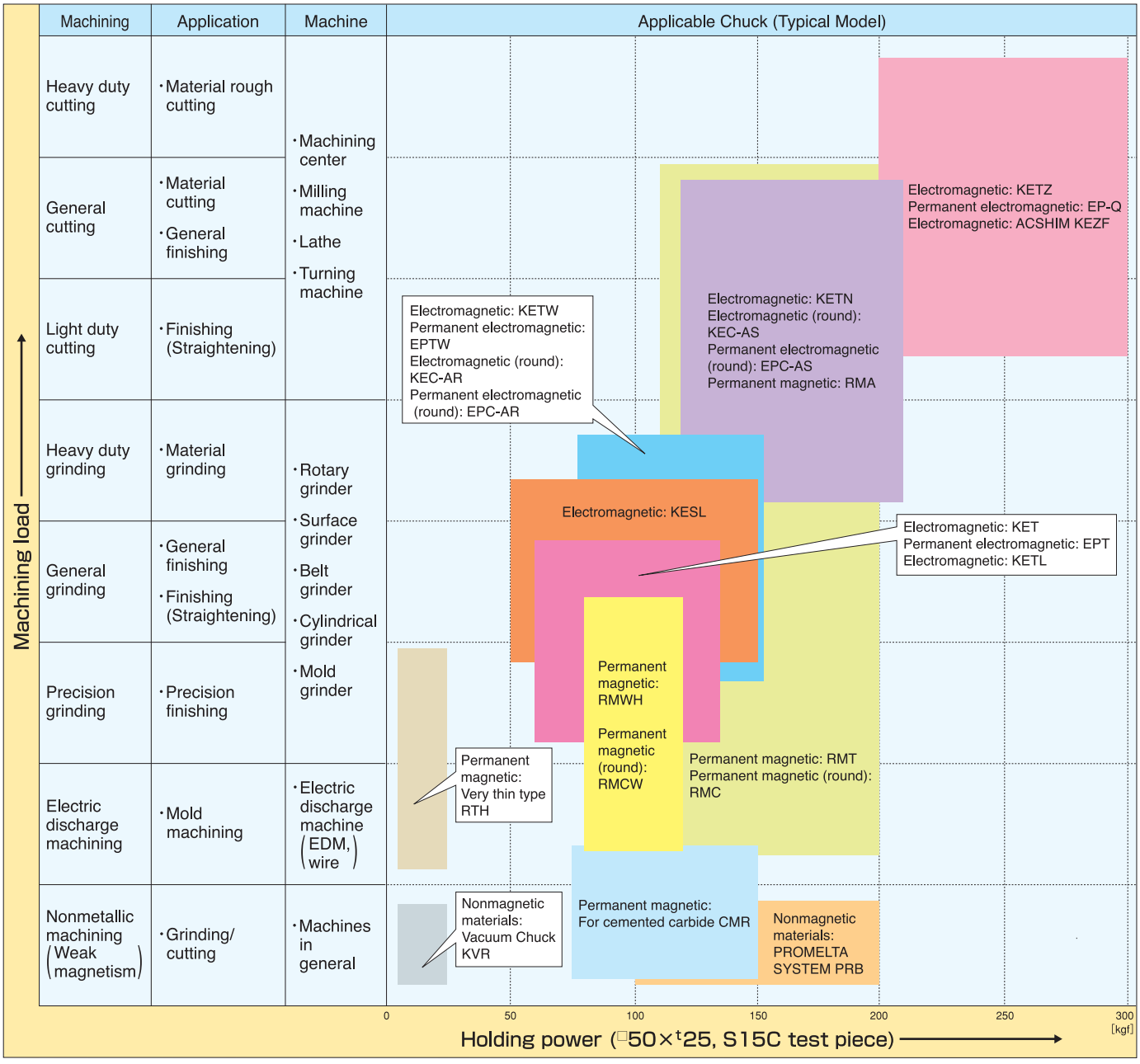
Magnetic Chucks

Magnetic chucks include several types such as electromagnetic chucks, permanent magnetic chucks and permanent electromagnetic chucks, each having particular functional features.

In the machining industry, it has been known since the beginning of the 20th century to apply magnets to holding workpieces. In particular, recent technological development has expanded applications of magnetic chucks from grinding machines only to heavy duty cutting processes by machining centers, lathes, milling machines, etc. Today the applications have further been expanded to include metallic mold machining and electric discharge machining. Thus, the magnetic chucks that meet these high precision machining requirements play a very important role in many machining fields.

In addition to magnetic chucks, KANETEC offers chucks designed for nonmagnetic materials to respond to requirements in grinding of various materials. We believe you will find products in this brochure that meet your diversified needs.

Types of Chucks by Applications

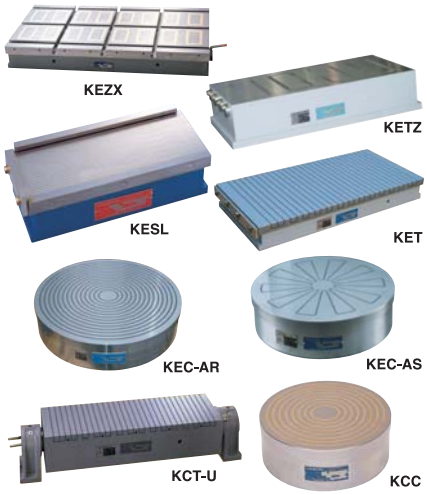


Overview and Features of Chucks

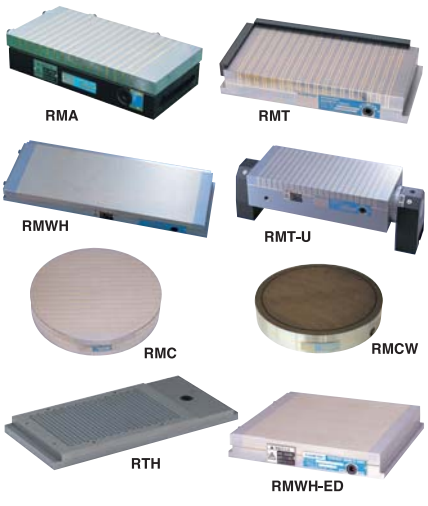
Electromagnetic Chuck	●Very efficient since workpieces can be loaded/unloaded just by switching operation. ●Automatization in machining process is realizable by interlocking the chuck with the machine tool. ●Attraction is electrically controllable. ●Easy to make larger type of chuck.
Water-Cooling Type Electromagnetic Chuck	●Constructed to reduce heat generated during power on by water cooling. ●Used for high precision operations and exhibits features of electromagnetic chucks effectively. ●Most suitable for dry grinding. (Heat from workpieces is absorbed also.)
Permanent Electromagneic Chuck	●Very efficient since workpieces can be loaded/unloaded just by switching operation. ●Energy-saving, since electric power is used only momentarily for loading/unloading workpieces. ●High accuracy due to no change with time passage. ●Never any trouble due to suspension of power supply.

Permanent Magnetic Chuck	●Energy-saving type, requiring no power source. No fear of power failure and can hold workpieces for a long time. ●No heat generated and thus no thermal distortion due to temperature rise. ●Uniform magnetic force irrespective of chuck sizes.
Sine Bar Chuck	●Magnetic chuck equipped with sine bar for high precision grinding and inspection. ●Precisely finished to overall accuracy of 0.005 mm or better. ●Various types are available from electromagnetic, water-cooling electromagnetic, permanent magnetic and permanent electromagnetic chucks.
Vacuum Chuck	●Holds workpieces by action of atmospheric pressure. ●Vacuum chucks nonmagnetic materials.
Promelta System	●Secures workpieces to a special chuck using workpiece fixing material. ●Secures nonmagnetic materials.

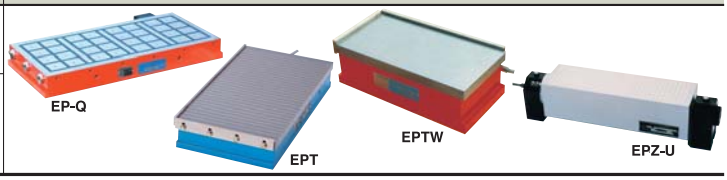
Types of Electromagnetic Chucks

Type	Model	Application	Applicable Machine	Remarks
With T-groove	KEZX	Heavy duty cutting High speed cutting	Milling machine Planomiller Shaper Planer	
Super powerful type	KETZ			
	KEZL			
Powerful waveform type	KETN	Cutting		
Rectangular type	KESL	Grinding, light duty cutting	Milling and grinding machine / mass-production saw blade grinder	
Airup type	KETB	Grinding	Grinder	
Standard rectangular type	KET	Grinding, light duty cutting		
Micropitch type	KETW	Grinding		
Rotary type	KET-U	Mold grinding		
Connecting and rotary type	KET-UT	Large workpieces, angular-grinding of knives		
Circular type	KEC-AR	Ring pole: Grinding	Grinder, lathe, rotary grinder Turning machine	
	KEC-AS	Star pole: Cutting		
Water-cooling type	KCT/KCT-U	Grinding	Grinder	
	KCC	Grinding, rotary grinding	Grinder, rotary grinder	

Types of Permanent Magnetic Chucks

Type	Model	Application	Applicable Machine	Remarks
Powerful type	RMA RMT	Light duty grinding and cutting of thin to thick workpieces.	Milling machine, grinder, electric discharge machine	
Rectangular type Micropitch	RMWH	Fine pitch grinding of small and thin workpieces and holding them in fluid.	Grinder, electric discharge machine	
Rotary type	RMT-U	Mold grinding	Grinder	
Circular type	RMC	Cutting, grinding	Grinder, lathe	
Circular type Micropitch	RMCW	Universal grinding from thin to thick workpieces	Grinder	
Very thin type	RTH	Light duty grinding and high speed grinding		
Cemented carbide type	CMR	Grinding of weak magnetic materials such as cemented carbide.		
Rectangular type with jet holes	RMT-ED	Improved water tightness. Securing workpieces during electric discharge machining.	Electric discharge machine	
Round type with jet holes	RMC-ED			
Rectangular type micropitch	RMWH-ED			

Types of Permanent Electromagnetic Chucks

Type	Model	Application	Applicable Machine	Remarks
Powerful type	EP-Q	Heavy duty cutting, general cutting	Milling machine, machining center	
Rectangular type	EPT	Grinding	Grinder	
Micropitch	EPTW	Grinding thin workpieces		
Rotary type	EPZ-U	Mold grinding		

ATTRACTION OF MAGNETIC CHUCK

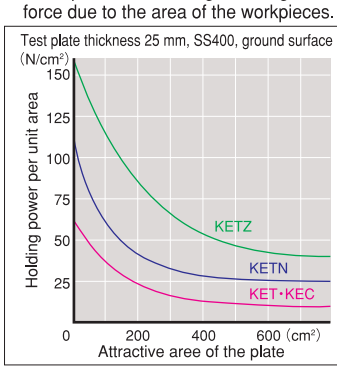
Attraction varies depending on the type of magnetic chuck, the material quality, thickness, area, configuration of workpieces, and their surface roughness. The following graphs show typical examples; you can reference them for the typical trend, however, each specific chuck is a bit different. Always position the workpieces over both N/S poles.

ATTRACTION AND PITCH BETWEEN POLES

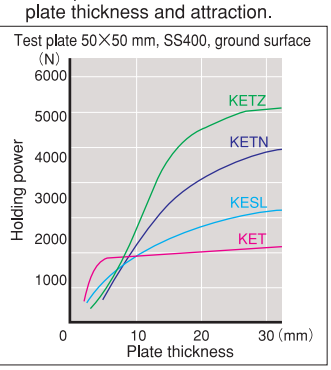
A general reference for optimum attracting condition is that the thickness of the workpieces should be 2 to 4 times the pitch.
To attract the workpieces firmly, it should be placed over the N pole and S pole, and accordingly, the workpieces must be over 3 times the pitch or longer.

Applicable Examples of Attraction (for Electromagnetic Chuck) (1N≒0.1kgf)

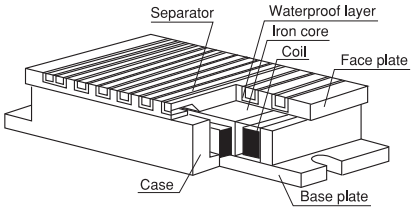
●Example for the change of magnetic force due to the area of the workpieces.



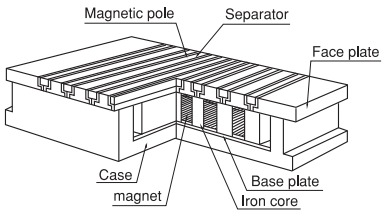
●Example for the correlation between plate thickness and attraction.



Construction for Rectanguler Type Electromagnetic Chuck

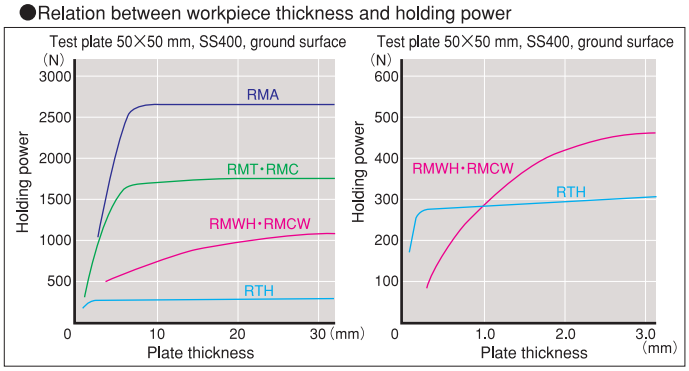


Construction of Rectangular Type Permanent Magnetic Chuck



Applicable Examples of Attraction (for permanent magnetic chuck) (1N≒0.1kgf)

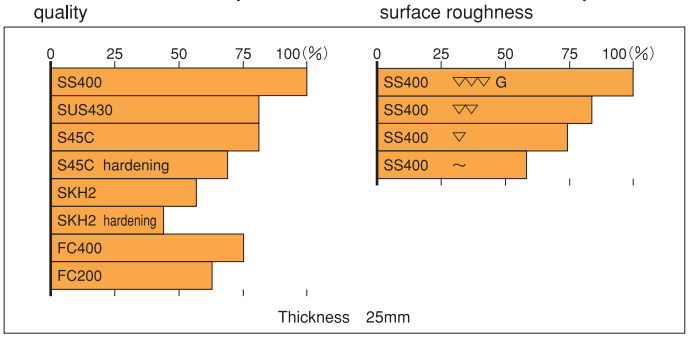
●Relation between workpiece thickness and holding power



Relation between Materials and Attraction (for chucks in general)

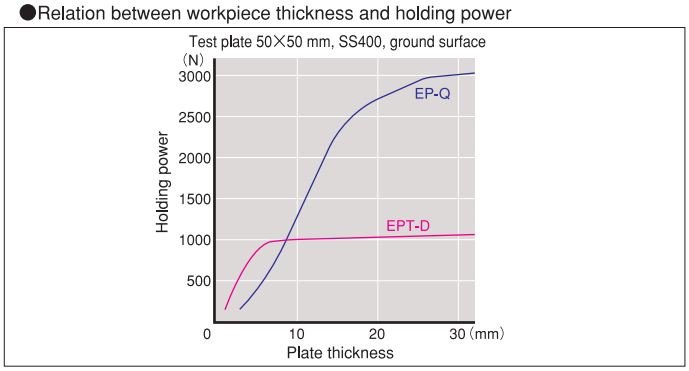
●Difference in attraction by material quality

●Difference in attraction by attractive surface roughness



Data of Holding Power (permanent electromagnetic chuck) (1N≒0.1kgf)

●Relation between workpiece thickness and holding power



Selection of grinding fluid

The separator part of chuck work faces is made of brass, resin, etc. Select grinding fluid that does not corrode these materials. For details, please consult with grinding fluid suppliers.

Standards

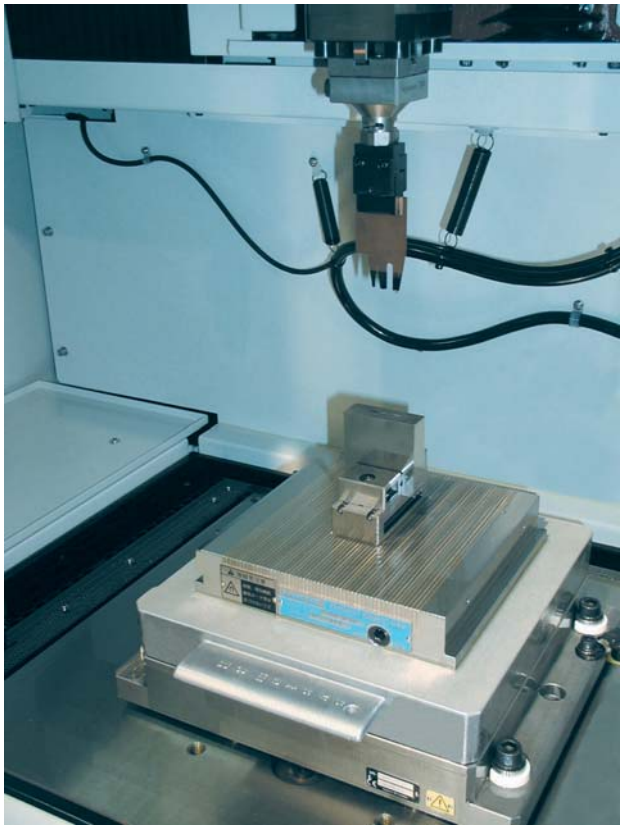
The quality standards of electro-magnetic chucks, including testing methods, have been established as described in the right-side table for dimensional accuracy (flatness/parallelism), holding power (attraction), electrical performance (withstand voltage/insulation resistance/temperature rise limit) and water resistance.

Standards of electromagnetic chucks

(mm)

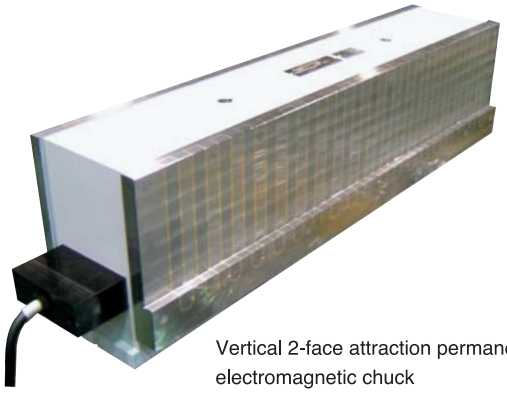
Length or diameter of face plate	Up to 300	Above 300, up to 600	Above 600, up to 900	Above 900	Surface roughness: 6.3S Mounting face: Not convex.
Flatness	0.01	0.015	0.02	0.025	
Parallelism	0.02	0.03	0.04	0.05	
Holding power	The holding power on the chuck face plate must be 98.1 N (10 kgf) or over in average and 49 N (5 kgf) or over in the weakest area.				
Withstand voltage	Dielectric breakdown between the charged part and the body is not allowed. (1500 VAC, 1 min.)				
Insulation resistance	The insulation resistance must be 5 ΩM or over. (Measured with 500 V insulation resistance meter)				
Temperature rise	The temperature rise on the chuck work face must be below 15℃. (Powered on for 3 hours)				
Water resistance	When a chuck is immersed in water, it must not allow water to enter the inside or its insulation performance must not drop.				

Note: The standards of the holding power and temperature rise vary according to models.



Permanent magnetic chuck for electric discharge machine

Acshim (An example of large-size fabrication)



Vertical 2-face attraction permanent electromagnetic chuck

Permanent electromagnetic chuck for grinding (An example of large-size fabrication)

Chucks of special specifications not listed in this catalog are also available.