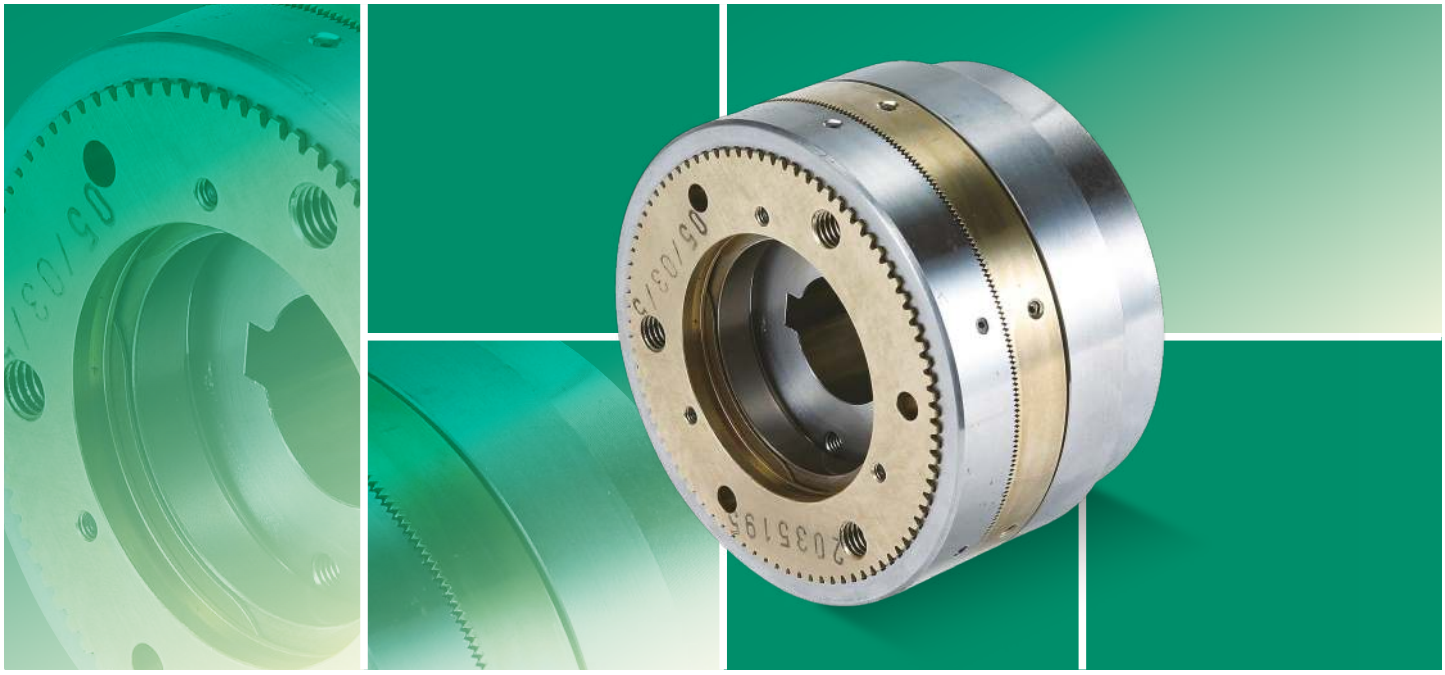
ELECTROMAGNETIC TOOTH CLUTCHES

Application	Printing machinery, wrapping machinery, filling machinery, food machinery, medical machinery

Meshing-type Electromagnetic-actuated Clutch Has High Torque and Reliable Transmission

These electromagnetic tooth clutches are electromagnetic-actuated clutches of the type that transmit torque by engaging tooth. Since torque is transmitted by engaging tooth, these clutches can transmit very high torque with a compact size (five to ten times our dry-type single discs). They may be either full position, which engage everywhere around their circumference, or single position, which engage at a set position, engaging in only one location per revolution. The shape of the tooth tip may be either symmetrical or sawtooth. Symmetrical tips can be used in any rotation direction, while sawtooth tips are faster than symmetrical tips and can engage at higher speeds.



Compact, high torque
Since torque is transmitted by the meshing of the tooth, high torque transmission can be achieved with a compact form factor.

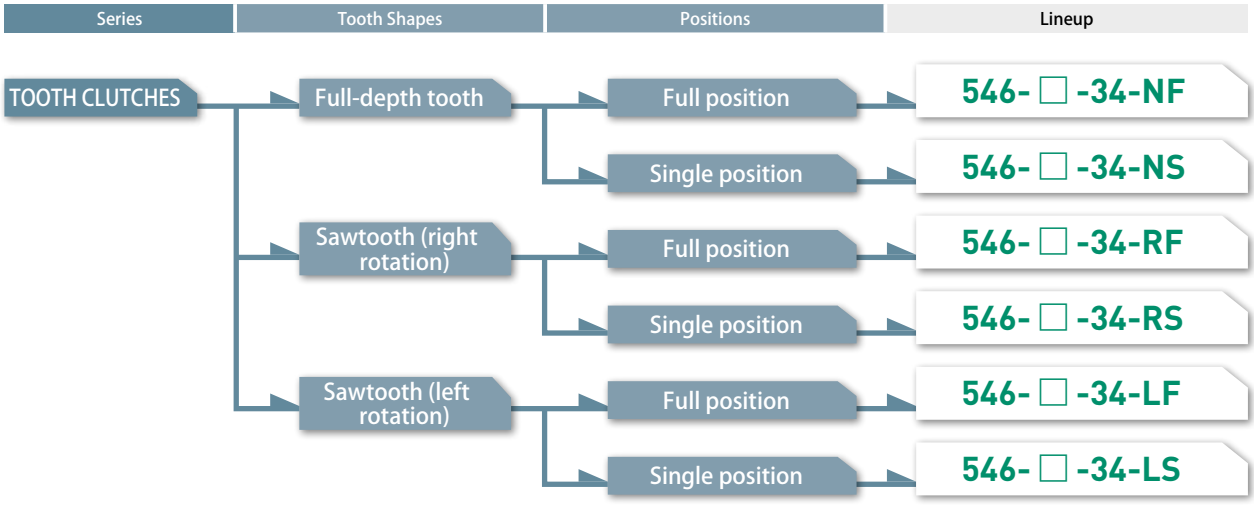
No drag torque
Since the tooth do not form a magnetic circuit, engagement and release can be faster, and there is no drag torque.

Easy mounting
Bearings are built in, so there is no centering of stator and rotor.

Can be used in oily environments
Can be used in oily environments under some usage conditions.

Special position engagement
Special tooth shapes can be made that mesh at multiple locations.

Available Models



Tooth Shape/Construction

Full-depth Tooth

By far the most common tooth shape, it can be used rotating in either direction.

Sawtooth

These have fewer tooth that the full-depth tooth type, and have a smaller angle of mesh insertion. They can thus engage at a relatively higher speed than full-depth tooth.

Full Position

A common tooth shape that can mesh anywhere around the full circumference.

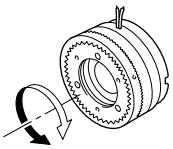
Single Position

This tooth shape is for fixed position engagement, where only one location meshes per revolution.

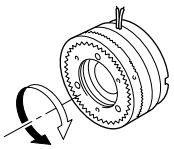
Name of tooth shape	NF	NS	RF	RS	LF	LS
Type of tooth shape	Full-depth tooth	Full-depth tooth	Sawtooth	Sawtooth	Sawtooth	Sawtooth
Position	Full	Single	Full	Single	Full	Single
Rotational direction	Both	Both	Right	Right	Left	Left

• The reference point for rotation direction (rotor) is the direction as seen from the adapter plate. With armature input, the rotation direction is as stated. Note that with shaft input, the direction is the opposite.Example: To get right rotation at shaft input, use a left-rotating sawtooth (L).

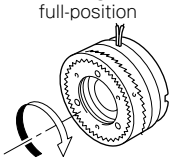
[NF] Full-depth tooth, full-position



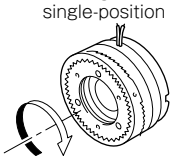
[NS] Full-depth tooth, single-position



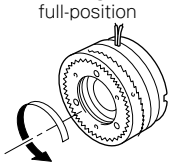
[RF] Right-handed rotating sawtooth, full-position



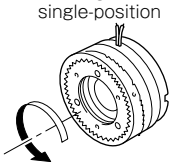
[RS] Right-handed rotating sawtooth, single-position



[LF] Left-handed rotating sawtooth, full-position



[LS] Left-handed rotating sawtooth, single-position



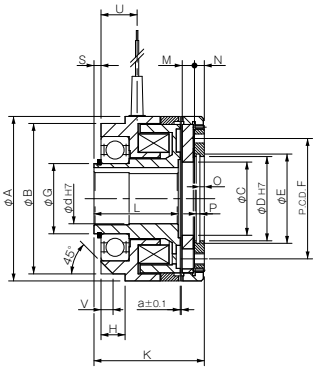
546 Models

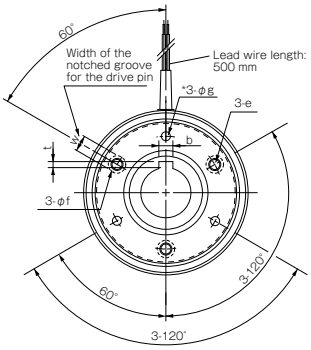
Specifications

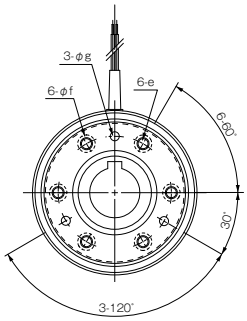
Model	Size	Torque [N·m]	Coil [at 20 ℃]				Heat resistance class	Allowable rotation speed of engagement [min⁻¹]			Max. rotation speed [min⁻¹]	Moment of inertia J [kg·m²]		Number of teeth		Armature pull-in time t_a [s]	Armature release time t_{ar} [s]	Bearing number	Mass [kg]
			Exciting voltage [V]	Wattage [W]	Current [A]	Resistance [Ω]		NF	NS	Sawtooth		Rotor	Armature	Full-depth tooth, Full	Sawtooth, Full				
546-12-34	12	17.5	DC24	13.3	0.55	43.4	F	50	30	100	1500	6.6×10^{-5}	6.0×10^{-5}	200	25	0.035	0.040	6004	0.5
546-13-34	13	25	DC24	18.7	0.78	31.0	F	50	30	100	1500	1.5×10^{-4}	1.2×10^{-4}	220	30	0.040	0.050	6005	0.9
546-15-34	15	50	DC24	21.3	0.89	27.1	F	50	30	100	1500	3.7×10^{-4}	3.7×10^{-4}	260	36	0.060	0.060	6007	1.5
546-21-34	21	100	DC24	27.0	1.13	21.0	F	50	30	100	1500	8.7×10^{-4}	5.2×10^{-4}	290	36	0.080	0.070	6009	2.4
546-23-34	23	250	DC24	36.3	1.51	15.9	F	50	30	100	1500	2.06×10^{-3}	1.85×10^{-3}	280	38	0.090	0.080	6011	3.9
546-25-34	25	500	DC24	56.6	2.36	10.2	F	50	30	100	1500	4.88×10^{-3}	4.51×10^{-3}	250	40	0.100	0.090	6014	6.8
546-31-34	31	1000	DC24	79.7	3.32	7.2	F	50	30	100	1500	1.12×10^{-2}	1.28×10^{-2}	195	40	0.110	1.110	6017	11.1
546-32-34	32	2200	DC24	114.1	4.75	5.1	F	50	30	100	1500	2.87×10^{-2}	2.92×10^{-2}	186	40	0.120	0.130	6020	15.3

• The armature pull-in and release times are reference values under no load in a static state. They are generally longer depending on the size of the load and the operating state when engaged.
• The allowable rotation speeds of engagement NF and NS indicate, respectively, full-depth tooth/full position and full-depth tooth/single position.

Dimensions







Drawing of mounting bore positions for size 31 and size 32

• The relationship between the positions of the keyway and mounting bore will differ from that shown in the drawing while the parts are fitted together.
• The dimension ø g marked with [*] does not apply for size 12.

Unit [mm]

Size	Shaft bore dimensions						
	d H7	Models compliant with JIS standards			Models compliant with the old JIS standards		
		b P9		t +0.5 0	b E9		t +0.5 0
12	10	3	-0.006 -0.031	1.2	4	+0.05 +0.02	1.5
13	15	5	-0.012 -0.042	2	5	+0.05 +0.02	2
15	20	6	-0.012 -0.042	2.5	5	+0.05 +0.02	2
	25	8	-0.015 -0.051	3	7	+0.061 +0.025	3
21	25	8	-0.015 -0.051	3	7	+0.061 +0.025	3
	30	8	-0.015 -0.051	3	7	+0.061 +0.025	3
23	30	8	-0.015 -0.051	3	7	+0.061 +0.025	3
	40	12	-0.018 -0.061	3	10	+0.061 +0.025	3.5
25	40	12	-0.018 -0.061	3	10	+0.061 +0.025	3.5
	50	14	-0.018 -0.061	3.5	12	+0.075 +0.032	3.5
31	50	14	-0.018 -0.061	3.5	12	+0.075 +0.032	3.5
	60	18	-0.018 -0.061	4	15	+0.075 +0.032	5
32	60	18	-0.018 -0.061	4	15	+0.075 +0.032	5
	70	20	-0.022 -0.074	4.5	18	+0.075 +0.032	6

Unit [mm]

Size	Radial direction dimensions										Axial direction dimensions											
	A	B	C	D	E	F	G	e	f	g	H	K	L	M	N	O	P	S	U	V	W	a
546-12-34	57	52	22.5	26	27.2	36	20	M4	8.5	—	10	43	34	4.3	3.1	1.3	1.3	2.0	15	4.5	5	0.2
546-13-34	67	58	31	32	33.7	46	25	M5	8.5	4.5	11	49	39	4.9	3.5	1.4	1.3	2.5	16.5	5	6	0.3
546-15-34	82	75	36.5	42	44.5	60	35	M6	10	4.5	12	55	42	6.1	4.8	2.2	1.9	3.5	18	6	8	0.3
546-21-34	95	88	46	52	55	70	45	M8	12	5.5	14	63	45	8.7	6.0	2.8	2.2	3.0	20	6	10	0.4
546-23-34	114	105	55	62	65	80	55	M8	12	7.8	18	69	50	9.0	6.5	3.3	2.2	3.0	24	6	10	0.4
546-25-34	134	127	68	72	75	95	70	M12	15	9.5	20	83	61	11.0	8.4	4.3	2.7	3.0	26	8	10	0.4
546-31-34	166	152	80	90	93.5	120	85	M12	15	9.5	22	93.5	66	13.1	11.4	5.3	3.2	3.5	31	10	12	0.5
546-32-34	195	175	95	100	103.5	150	100	M12	19	11.5	24	110	80	14.0	11.7	6.3	3.2	4.0	38.5	10	12	0.5

How to Place an Order

546-12-34-NF 24V 10DIN

Size

Tooth shape
NF: Full-depth tooth, full-position
RF: Right-handed rotating sawtooth, full-position
LF: Left-handed rotating sawtooth, full-position
NS: Full-depth tooth, single-position
RS: Right-handed rotating sawtooth, single-position
LS: Left-handed rotating sawtooth, single-position

Rotor bore diameter (dimensional symbol d)

Keyway standards
DIN: Compliant with JIS standards P9
JIS: Compliant with the old JIS standards (class 2) E9