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2 COUPLING 2014

Coupling

GMT GMT GLOBAL INC.

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◎On the basis of the execution of the best service and product innovation, GMT hereby would have this declaration of retaining the right for engineering change. If any drawings or articles revised and added in the catalogs, there would be no extra further notice. To get most up-to-day information, please contact our agent or sales while necessary.

Model no. Introduction

F	A	C	E		Ø40R	10*10	
F	A	C	H	- S	Ø32	6*8	- LK

F	A	C	E		Ø40R	10*10	Custom made
F	A	C	H	S	Ø32	6*8	LK
Type	Material	Axis fixing	Coupling model	Length	O.D. / (Jaw type option)	Ød1*Ød2	Key way
F: Flexible R: Rigid	A: Aluminum S: Stainless Steel C: Carbon steel	M: Set screw fixing C: Clamping fixing B: 2 Pieces S: Zero backlash type	S: Spiral beam type(for servo motor) M: Spiral beam type (for stepping motor) C: Metal disk with high rigid design H: Metal disk in straight type T: Metal disk in steps type B: Bellows design G: Oldham type - phosphor bronze spacer P: Oldham type - carbon resin spacer J: Oldham type - Black POM spacer N: Oldham type - POM spacer E: Jaw type U: Aluminum spacer	L: Long design S: Short design	◆Refer to dimension table to decide the O.D. ◆Jaw Spider options: B: Blue (80 ShoreA) W: White (92 ShoreA) R: Red (98 ShoreA)	◆Bore diameter of two sides of the coupling	◆LK: left side Ød1 ◆RK: right side Ød2 ◆WK: Both sides (Ød1 & Ød2)

Note：
- ◆ Material AL, surface in anodized finished.
- ◆ Accessories are clamping screws and set screws.
- ◆ Shaft dia. Ød1, Ød2 accepted by custom sizes.(Within specified Max. bore dimensions)
- ◆ GMT coupling series are all processed in cryogenic treatment.(Refer to P.73)

Coupling introduction

- ◆ Coupling is a mechanism device, connecting transmission between two shafts and transmitting safety torque.
- ◆ Coupling divided into "Flexible type" and "Rigidity type".
- ◆ To apply flexible couplings timing in case of power transmission, two shafts are not easy to set in alignment, or to simplify two shafts installation. It contains shock buffer to absorb parallelism, deflection, axial displacement, deviation improvement, and improvement of traditional transmission power, so few deviation would not cause any unusual situation on bearing. It's widly applied to current markets.
- ◆ Rigidity coupling is an unit causing non-eccentric, non-deflection, and make two connected shafts fixed in one unit. Users must do the best to have motor running and axis of load in alignment due to high requirement of concentricity, also means of axis has to be calibrated strictly; otherwise, the rotating shaft would be broken caused by mechanism fatigue, also the bearing would be thermal abrasion due to eccentric load, those were brought by continuous vibration of the axis during long term running of the motor. The advantage of rigidity coupling is to transmit transmission torque precisely.

(1) Coupling is a mechanism unit used in transmitting torque and rotating angle. Each model is purposed. Please select as your requirement from the table below.
(2) Take spec and hole size on the list for reference to select product you need.
(3) Confirm rated torque、Max. speed and dimension of selected coupling matched with the equipment you are going to use.
(4) Max. torque is double of allowable torque in coupling, and torque produced in continuous rotation shall not exceed to allowable torque.

	Spiral Beam type									
Flexible coupling	FAMS	FACS	FAMML	FAMMS	FSMML	FSMMS	FACML	FACMS	FSCML	FSCMS
page	P.12	P.13	P.14	P.15	P.16	P.17	P.18	P.19	P.20	P.21
Advantages comparison: Zero backlash	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
High torque rigidity	Excellent	Excellent	Good	Good	Good	Good	Good	Good	Good	Good
High torque	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good
Allowable axis deviation			Good		Good		Good		Good	
Character: Flexibility			●		●		●		●	
Complete miniature	●	●		●		●		●		●
Stainless steel					●	●			●	●
Constant velocity										
Screw fixing type	●		●	●	●	●				
Clamp fixing type		●					●	●	●	●
Allowable angular deflection	●	●	●	●	●	●	●	●	●	●
Allowable parallel offset	●	●	●	●	●	●	●	●	●	●
Low inertial torque	●	●	●	●	●	●	●	●	●	●
Torque range(N·m)	0.5~3	0.5~3	0.1~4	0.1~8	0.1~8	0.1~4	0.4~8	0.4~4	0.4~8	0.4~4
Product character	◆Coupling slitted in aluminum or stainless steel material is as structure as spiral beam type allowable offset. ◆Difference of material and beam types cause variation in transmitting torque and allowable offset. ◆Due to zero backlash required in high rotation accuracy, meanwhile, position accuracy meets the same requirement.									

	Oldham type				Jaw type (Large shaft diameter use)					Zero Backlash type(Spindle use)	
Flexible coupling	FACPL	FACPS	FAMN	FACU	FAME	FAMK	FACE	FACK	FACE	FASE	FCSE
page	P.38	P.39	P.40	P.41	P.45	P.46	P.47	P.48	P.49	P.50	P.50
Advantages comparison: Zero backlash				Good	Good	Good	Good	Good	Good	1. Zero rotation backlash 2. Hight torsion 3. High torque 4. Low Inertia 5. High rigidity 6. Variation resistance 7. High fricition 8. Intergrated clamping nut for bolt assembly easily	1. Zero rotation backlash 2. Hight torsion 3. High torque 4. Low Inertia 5. High rigidity 6. Variation resistance 7. High fricition 8. Intergrated clamping nut for bolt assembly easily
High torque rigidity	Good	Good	Good	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent		
High torque	Excellent	Good	Good	Good	Excellent	Excellent	Excellent	Excellent	Excellent		
Allowable axis deviation	Excellent	Excellent	Excellent	Good	Good	Good	Good	Good	Good		
Vibration absorbability	Good	Good	Good		Good	Good	Good	Good	Good		
Isolation	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent		
Character: Flexibility					●	●	●	●	●		
Complete miniature	●	●	●								
Screw fixing type			●		●	●					
Clamp fixing type	●	●		●			●	●	●		
Key way type						●		●	●		
Allowable angular deflection	●	●	●	●	●	●	●	●	●		
Allowable parallel offset	●	●	●	●	●	●	●	●	●		
Low inertial torque	●	●	●	●	●	●	●	●	●		
Torque range(N·m)	0.7~9	0.2~2.8	0.7~9	0.3~6	0.7~17	4~17	0.7~17	4~17	60~190	◆Usage temperature: -20°C ~ 90°C ◆Offset of angular and axial deviation are individual allowed values. Thus, the coupling unit allowable value will be reduced in case couple reasons of axial offset appearing at the same time. ◆No rotation backlash, high accuracy clamping prestress design. ◆Light aluminum shaft bushing offers small inertia. ◆Tight clamping force to bring high friction moment. ◆Stable rotation to perform a high linear speed 40m/s.	◆Usage temperature: -20°C ~ 90°C ◆Offset of angular and axial deviation are individual allowed values. Thus, the coupling unit allowable value will be reduced in case couple reasons of axial offset appearing at the same time. ◆No rotation backlash, high accuracy clamping prestress design. ◆Tight clamping force to bring high friction moment. ◆Stable rotation to perform a high linear speed 40m/s.
Product character	◆Oldham type ◆Few friction resistance, apply to braking system (Ex: braking mechanism, relay shfat). Light torque corresponds to larger parallel offset and angular deviation. ◆Jaw type ◆Press-in type of the PU insert; select hardness through Polyurethane to make difference of vibration absorbability technically. ◆Press-in type applied in low torque makes zero backlash, and equipped with good adjustment of vibration absorbability as well.								◆Usage temperature: -20°C ~ 90°C ◆Offset of angular and axial deviation are individual allowed values. Thus, the coupling unit allowable value will be reduced in case couple reasons of axial offset appearing at the same time. ◆Available to make key ways on request. Refer to P. 2 for Key way marking options.		

	Metal Disk type						Bellows type				Oldham type					
	FACCL	FACCS	FACHL	FACHS	FACTL	FACTS	FAMB	FSMB	FACB	FSCB	FSMG	FSCG	FSMP	FSCP	FAMJ	FACJ
page	P.22	P.23	P.24	P.25	P.26	P.27	P.28	P.29	P.30	P.31	P.32	P.33	P.34	P.35	P.36	P.37
Advantages comparison: Zero backlash	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent						
High torque rigidity	Excellent	Good	Excellent	Excellent	Good	Good	Good	Good	Good	Good	Excellent	Excellent	Good	Good	Good	Good
High torque	Good	Good	Good	Excellent	Good	Good	Good	Good	Good	Good	Excellent	Excellent	Good	Good	Good	Good
Allowable axis deviation	Good		Good		Good		Good	Good	Good	Good	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
Character: Flexibility	●		●		●											
Complete miniature		●		●		●										
Stainless steel								●		●						
Constant velocity							●	●	●	●	●		●		●	
Screw fixing type							●		●			●		●		●
Clamp fixing type	●	●	●	●	●	●		●		●	●	●	●	●	●	
Allowable angular deflection	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Allowable parallel offset	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Low inertial torque	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Torque range(N·m)	1.2~25	1.2~25	0.7~9	0.7~9	2~10	2~10	0.3~2	0.5~3	0.3~2	0.5~3	3~50	3~50	0.3~28	1.6~18	30~80	26~72
Product character	◆Composed of body and disc, which is bended, to creat its allowable offset structure. ◆Difference of body or strength & material of disc cause variation in transmitting torque and allowable offset. ◆Due to zero backlash required in rotation accuracy, meanwhile, position accuracy meets the same requirement. ◆Widely ranges from standard to high torque change due to variable matches of dimesnions and materials for disc.							◆Uniform turning with allowable offset suits for constant velocity like encoder application.			◆Oldham type ◆Few friction resistance, apply to braking system (Ex: braking mechanism, relay shfat). Light torque corresponds to larger parallel offset and angular deviation. ◆Jaw type ◆Press-in type of the PU insert; select hardness through Polyurethane to make difference of vibration absorbability technically. ◆Press-in type applied in low torque makes zero backlash, and equipped with good adjustment of vibration absorbability as well.					

Rigidity coupling	RAM	RSM	RACS	RSCS	RAB	RSB	RACL	RSCL
page	P.53	P.54	P.55	P.56	P.57	P.58	P.59	P.60
Zero backlash	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
High rigidity torque	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
High torque	Good	Good	Good	Good	Good	Good	Good	Good
Stainless steel		●		●		●		●
Screw fixing type	●	●						
Clamp fixing type			●	●	●		●	●
2-piece type					●	●		
Low inertial torque	●	●	●	●	●	●	●	●
Torque range(N·m)	0.3~4	0.3~2	0.3~4	0.3~2	0.3~2	0.3~2	0.3~2	0.3~2
Product character	◆Coupling having frequently powerful shaft-combination. ◆Having no allowable offset applys to condition in axial side absorbing angular deviation. ◆To install lock screw on coupling secures the shaft well.							

(1) There are five ways to fix coupling onto shaft as below. Please select coupling as your demand.

(2) Set screw or clamping screw (hexagonal countersink screw) shall be secured by screw driver or torque wrench. Securing torque refer to product specifications.

Set screw fixing

This fixing in low cost is the most traditional.
Front of screw contacting with shaft directly may cause damage or difficult disassembly.

Clamping fixing

Use sink screw securing to narrow the slit for clamping shaft tightly.
Clamped fix and easy disassembly won't cause damage of shaft.

Separation fixing

Use separated bushings to fix and disassemble without moving your equipment.

Key way fixing

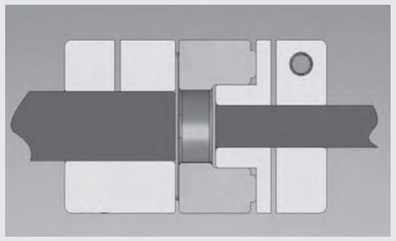
This type is also traditonal, like set screw fixing, suits for transmission in higher torque. Prevent from parallel movement, it's usually used with set screw fixing and clamp fixing together.

Zero Backlash type

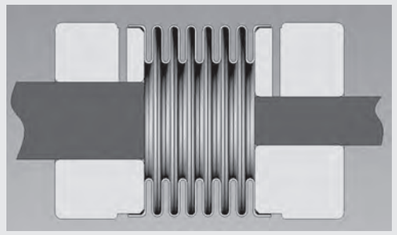
Zero backlash type coupling is designed to be equipped high precision clamping nut as one unit, performs high friction moment and reliable movement which is suitable for spindle transmission of the machine.

To maintain installation completeness of all kinds of couplings, it's recommended to install as follow charts to avoid direct contact of two shafts and to have a regular run.

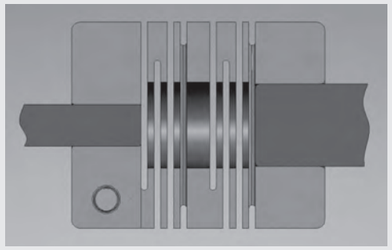
Oldham type



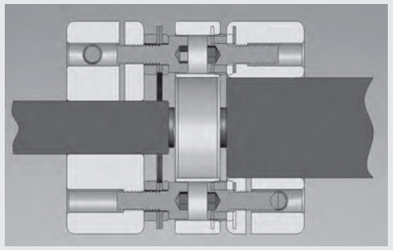
Bellows type



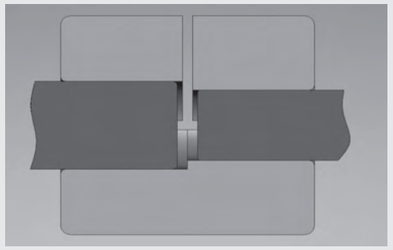
Spiral beam type



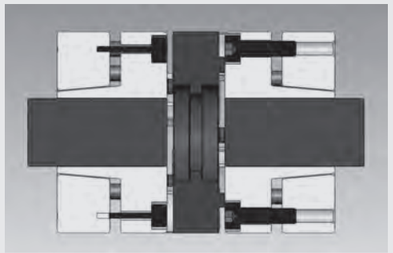
Metal Disk type



Rigidity coupling



Zero Backlash type



Coupling - Deviation adjustment

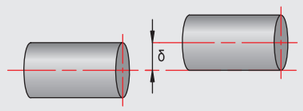
(1) Flexible coupling transmits torque and rotation angle, and absorb deviation from shaft installation. It may cause vibration or shortening life hours of coupling, while deviation is over allowed range. Thus, make sure and take perfect adjustment for deviaiton.

(2) There are three deviation for shaft, as parallel deviation, angular deviation and axial deviation. Please adjust deviation lower than allowed range listed in the product spec offered by our catalog.

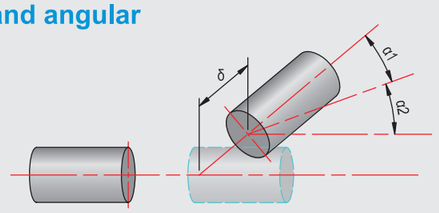
(3) The max. allowable deviation listed in our catalog is in case of only one deviation existing. While two or more deviation existing at same time, allowable range shall be lower than 1/2 x max. deviation listed in the spec of catalog.

(4) Deviaiton happened not only on equipment installation, but caused by vibration in running progress, heated expansion, bearing abrasion. Thus, it's recommended to adjust axial deviation lower than 1/3 x Max. range.

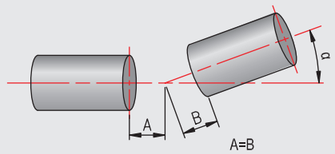
Parallel deviation



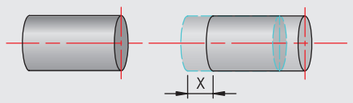
Complex deviation in parallel and angular



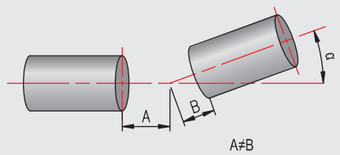
Symmetry angular deviation



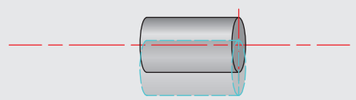
Axial deviation



Asymmetry angular deviation



Run out



Torque

In physics, torque is defined as "force in vertical" x "distance to rotating center", metric unit (N·m), divided by acceleration of gravity 9.8m/ sec^2, unit could be converted to famillar (kg-m). Imperial uint lb-ft, in case of conversion to metric unit, just take lb-ft divided by 7.22. Torque we called is not force unit, but a kind of the moment of force, which means capacity of energy transforming, We could see the connection from normal unit used in calculating torque (Kgm), and generally judging from words: Kgm stands for the capacity of rising an object weighed 1 kg in 1 meter movement. This is a kind of the moment of force, so inappropriate to call it force. Motor producing force per time unit is decided by RPM and torque of motor, and REC out shown in motor, (W) shown in Japan, (HP) power output shown in USA and Europe.
(1HP=746w=0.746kw)

Coupling - Allowed torque

Transmitted torque occurs in allowed speed range rotating continuously.

Max. torque in driven side

Max. torque in driven side being hitted in the moment, ex: torque produced while breaking.

Allowable angular (deflection)

The deflection between two shafts while connecting two shafts.

Allowable axial deviaiton displacement

Displacement caused in axial while connecting two shafts.

Inertial torque

It's not easy to change running status of object with big mass (whether from static to running or running to static); equally, rotating inertial or inertial torque is to show keeping object in running status, bigger inertia torque makes tough rotation.

Static torsional stiffness

Required (N·m) to rotate 1 radian.

Motor

Induction motor

(1) More than triple torque occurs in case of running momently.
(2) Shaft axis center of the motor has ±1.5mm movement back and forth while running, and it's not recommended to use spiral beam type.
(3) DC motor could be used in working environment with dust.

Stepping motor

(1) Without triple torque in case of running momently, but max. rated torque of motor occurs.
(2) Larger torque in low speed than servo motor in same level.
(3) Higher RPM, smaller torque in motor.
(4) Motor have temperature rise in case of running continuously. (to improve by using disk type coupling)
※Force output in stepping motor is smaller than servo motor.

Servo motor

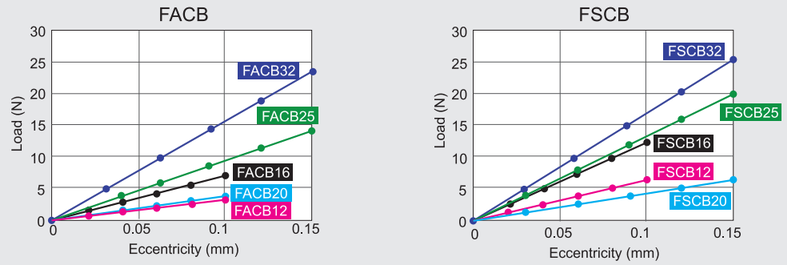
(1) More than triple torque occurs in case of running momently.
(2) Under rated RPM range, cause rated torque.
(3) Same torque produce in low speed and high speed
(4) Temperature rise is small in case of running continuously.

Encoder

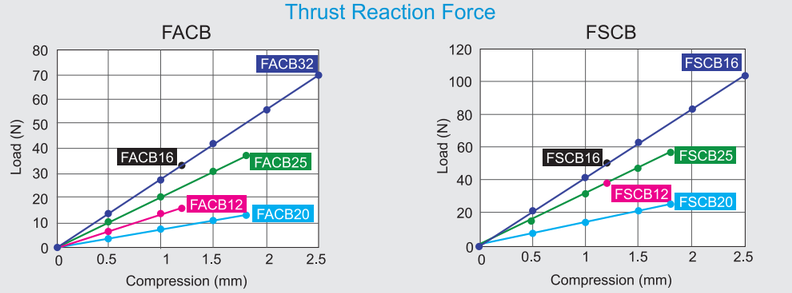
(1) Built-in in servo motor, has tiny driven torque.
(2) Or connected to stepping motor. (optional)

Bellows type - Rigidity standard

Eccentric Reaction Force



Thrust Reaction Force



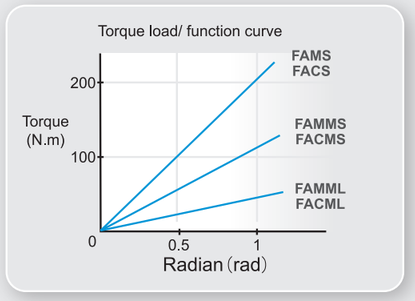
Spiral beam type - Rigidity standard

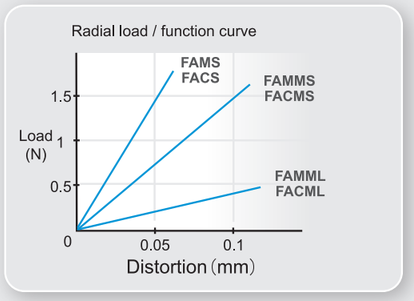
FAMML FAMMS FACML FACMS FAMS FACS

Torque rigidity and flexibility -
Balance acquired among incompatible functions.
These flexible couplings apply to stepping motor.

High torque rigidity, light and complete miniature.
These flexible couplings apply to servo motor.

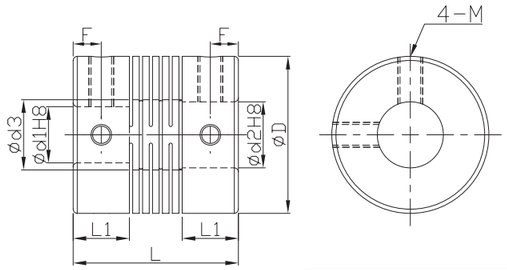
Character comparison





FAMS

- Zero backlash.
- The flexure allowed by the beam portion of the couping is capable of accommodating angular, parallel, and axial misalignment.
- Rotation character of clockwise or anti-clockwise are exactly the same.
- Free maintenance, oil-resist and anti-corrosiveness.
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.



*Ød3=Ød2+0.5

Material	Surface finish	Accessories
Aluminum Alloy	Anodized	Set screw

Dimensions		Ød1	Ød2												L	L1	F	M
Model no.	ØD		5	6	6.35	7	8	9.525	10	11	12	14	15	16				
FAMS	16	5	●	●											17.4	6	3	3
		6		●														
	19	5	●	●		●	●								20	6.8	3.4	3
		6		●	●	●	●											
		6.35			●		●											
		8					●		●									
		10							●									
	24	6		●			●		●						25	8.5	4.25	4
		6.35			●		●		●									
		7					●											
		8					●	●	●									
		9.525							●									
		10							●	●	●							
		11									●							
		12									●							
	29	8					●		●	●	●				30	10.2	5.1	4
		10							●	●	●	●						
		11									●	●						
		12									●	●						
	34	10										●			35	12	6	5
		11										●						
		12									●	●		●				
		14										●	●	●				
		15											●	●				
		16												●				

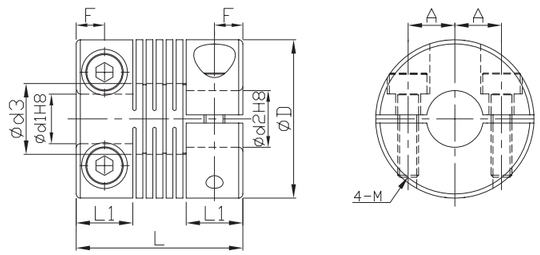
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)					
FAMS	16	0.5	0.5	0.05	±0.1	200	24000	$2.8*10^{-7}$	0.7	7
	19	1				270	20000	$6.2*10^{-7}$		10
	24	1.5				790	16000	$2.0*10^{-6}$	1.7	22
	29	2				1400	13000	$5.2*10^{-6}$		40
	34	3				2200	11000	$1.1*10^{-5}$	4	64

Ordering Example: FAMS24 (Model no.) - 8 (Ød1) * 12 (Ød2) - 100 PCS (Q'ty)

FACS

- Zero backlash.
- The flexure allowed by the beam portion of the coupling is capable of accommodating angular, parallel, and axial misalignment.
- Rotation character of clockwise or anti-clockwise are exactly the same.
- Free maintenance, oil-resist and anti-corrosiveness.
- Offset, deflection, shaft deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.



*Ød3=Ød2+0.5

Material	Surface finish	Accessories
Aluminum Alloy	Anodized	Clamping screw

Dimensions		Ød1	Ød2												L	L1	F	M	A
Model no.	ØD		5	6	6.35	7	8	9.525	10	11	12	14	15	16					
FACS	16	5	●	●											17.4	6	3	2	4.74
		6		●															
	19	5	●	●		●	●								20	6.8	3.4	2.5	5.6
		6		●	●	●	●												
		6.35			●		●												
		8					●												
	24	6		●			●		●						25	8.5	4.25	3	8
		6.35			●		●		●										
		7					●												
		8					●	●	●										
		9.525							●										
		10							●										
	29	8					●		●	●	●				30	10.2	5.1	3	9
		10							●	●	●								
		11									●								
		12									●								
	34	10										●			35	12	6	3	11
		11										●							
		12									●	●		●					
		14										●	●	●					
		15											●	●					
		16												●					

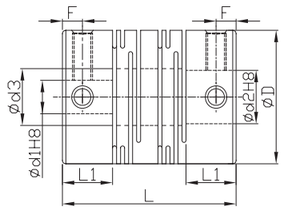
★Moment of inertial torque and weight calculated by maximum diameter.

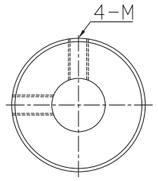
Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)					
FACS	16	0.5	0.5	0.05	±0.1	200	9500	$2.5*10^{-7}$	0.5	7
	19	1				270	8000	$5.8*10^{-7}$		12
	24	1.5				790	6300	$1.8*10^{-6}$	1	23
	29	2				1400	5200	$4.7*10^{-6}$		41
	34	3				2200	4400	$1.1*10^{-5}$	1.5	62

Ordering Example: FACS24 (Model no.) - 8 (Ød1) * 12 (Ød2) - 100 PCS (Q'ty)

FAMML

- Zero backlash.
- The flexure allowed by the beam portion of the couping is capable of accommodating parallel, angular, and axial misalignment.
- High wrench torque rigidity and sensitivity.
- Rotation character of clockwise or anti-clockwise are exactly the same.
- Free maintenance, oil-resist and anti-corrosiveness.
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.





*Ød3=Ød2+0.5

*When Ød1＜4 and Ød2＞5, there would be 3 set screws.
When Ød1 and Ød2 both smaller than 4, there would be 2 set screws.

Material	Surface finish	Accessories
Aluminum Alloy	Anodized	Set screw

Dimensions		Ød1	Ød2																L	L1	M Rough thread	F
Model no.	ØD		2	3	4	5	6	6.35	7	8	9.525	10	11	12	14	15	16	18				
FAMML	8	2	●	●															14	3.5	2	1.7
		3		●																		
	12	3		●	●														18.5	5	2.5	2.5
		4			●	●																
		5				●	●															
	16	4			●	●	●												23	6.5	3	3
		5				●	●		●	●												
		6					●	●	●	●												
		6.35								●												
	20	5				●	●		●	●									26	7.5		
		6					●	●	●	●		●										
		6.35								●												
		8								●	●	●										
		9.525										●										
		10										●										
	25	5					●												31	8.5	4	4
		6					●	●		●		●										
		6.35								●		●										
		8								●	●	●		●								
		9.525										●										
		10										●	●	●								
		12												●								
	32	6								●									41	12		6
		6.35								●												
		8								●	●	●		●								
		9.525										●		●								
		10										●	●	●	●							
		12												●	●							
		14													●		●					
	40	8									●								56	17	5	8.5
		9.525										●		●								
		10										●										
		12												●								
		14													●		●	●				
		15														●						
		16															●	●				
		18																●				

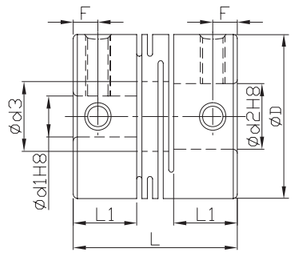
★Moment of inertial torque and weight calculated by maximum diameter.

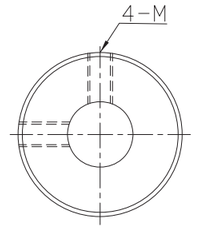
Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)					
FAMML	8	0.1	2	0.10	±0.2	25	48000	$1.2*10^{-8}$	0.3	1.4
	12	0.4			±0.3	45	32000	$8.3*10^{-8}$	0.5	3.7
	16	0.5			±0.4	80	24000	$3.3*10^{-7}$	0.7	8.1
	20	1				170	19000	$9.0*10^{-7}$		14
	25	2		0.15	±0.5	380	15000	$2.6*10^{-6}$	1.7	27
	32	4				500	12000	$9.6*10^{-6}$		60
	40	8		0.20		600	9600	$3.2*10^{-5}$	4	130

Ordering Example: FAMML25 (Model no.) - 10 (Ød1) * 12 (Ød2) - 100 PCS (Q'ty)

FAMMS

- Zero backlash.
- The flexure allowed by the beam portion of the couping is capable of accommodating angular, and axial misalignment.
- No accommodating to parallel misalignment.
- High wrench torque rigidity and sensitivity.
- Rotation character of clockwise or anti-clockwise are exactly the same.
- Free maintenance, oil-resist and anti-corrosiveness.
- FAMMS can't allow axial deviation caused by offset
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.





*Ød3=Ød2+0.5

*When Ød1＜4 and Ød2＞5, there would be 3 set screws.
When Ød1 and Ød2 both smaller than 4, there would be 2 set screws.

Material	Surface finish	Accessories
Aluminum Alloy	Anodized	Set screw

Dimensions		Ød1	Ød2										L	L1	M Rough thread	F
Model no.	ØD		2	3	4	5	6	7	8	10	12	14				
FAMMS	8	2	●										10	3.4	2	1.7
		3		●												
	12	4			●	●							14	5.2	2.5	2.5
		5				●										
	16	5				●	●						18	6.8	3	3
		6					●									
	20	5					●	●	●				20	7.65		
		6					●	●	●							
		8							●							
	25	5					●						25	9.6	4	4
		6					●		●	●						
		6.35							●	●						
		8							●	●						
		10								●						
	32	8							●	●			32	12.6		6
		10								●	●					
		12									●	●				

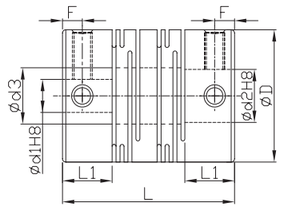
★Moment of inertial torque and weight calculated by maximum diameter.

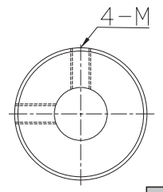
Specification		Allowable wrench torque (N·m)	Allowable misalignment		Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD		Angular (°)	Axial (mm)					
FAMMS	8	0.1	1	±0.1	24	48000	$1.0*10^{-8}$	0.3	1
	12	0.4			80	32000	$7.0*10^{-8}$	0.5	3.1
	16	0.5		±0.2	180	24000	$2.8*10^{-7}$	0.7	7.4
	20	1			200	19000	$7.5*10^{-7}$		12
	25	2			780	15000	$2.3*10^{-6}$	1.7	24
	32	4			1100	12000	$8.0*10^{-6}$		50

Ordering Example: FAMMS25 (Model no.) - 8 (Ød1) * 10 (Ød2) - 100 PCS (Q'ty)

FSMML

- Zero backlash.
- The flexure allowed by the beam portion of the couping is capable of accommodating parallel, angular, and axial misalignment.
- High wrench torque rigidity and sensitivity.
- Rotation character of clockwise or anti-clockwise are exactly the same.
- Free maintenance, oil-resist and anti-corrosiveness.
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.





*Ød3=Ød2+0.5

*When Ød1＜4 and Ød2＞5, there would be 3 set screws.
When Ød1 and Ød2 both smaller than 4, there would be 2 set screws.

Material	Accessories
SUS303	Set screw

Dimensions		Ød1	Ød2																L	L1	M Rough thread	F
Model no.	ØD		2	3	4	5	6	6.35	7	8	9.525	10	11	12	14	15	16	18				
FSMML	8	2	●	●															14	3.5	2	1.7
		3		●																		
	12	3		●	●														18.5	5	2.5	2.5
		4			●	●																
		5				●	●															
	16	4			●	●	●												23	6.5	3	3
		5				●	●		●	●												
		6					●	●	●	●												
		6.35								●												
	20	5				●	●		●	●									26	7.5		
		6					●	●	●	●		●										
		6.35								●												
		8								●	●	●										
		9.525										●										
		10										●										
	25	5					●												31	8.5	4	4
		6					●	●		●		●										
		6.35								●		●										
		8								●	●	●		●								
		9.525										●										
		10										●	●	●								
		12												●								
	32	6								●									41	12		6
		6.35								●												
		8								●	●	●		●								
		9.525										●		●								
		10										●	●	●	●							
		12												●	●							
		14													●		●					
	40	8									●								56	17	5	8.5
		9.525										●		●								
		10										●										
		12												●								
		14													●		●	●				
		15														●						
		16															●	●				
		18																●				

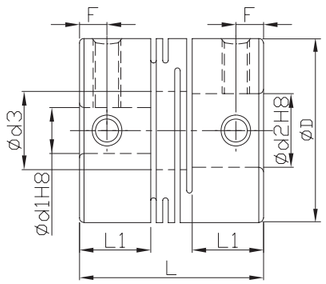
★Moment of inertial torque and weight calculated by maximum diameter.

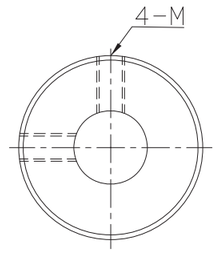
Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)					
FSMML	8	0.2	2	0.10	±0.2	50	48000	$3.1*10^{-8}$	0.3	3
	12	0.3			±0.3	64	32000	$2.1*10^{-7}$	0.5	9.3
	16	0.5				85	24000	$8.4*10^{-7}$	0.7	21
	20	1				250	19000	$2.4*10^{-6}$		38
	25	2		0.15	±0.4	330	15000	$6.8*10^{-6}$	1.7	71
	32	3.5			±0.5	850	12000	$2.6*10^{-5}$		160
	40	8		0.20		1000	9600	$9.7*10^{-5}$	4	350

Ordering Example: FSMML25 (Model no.) - 8 (Ød1) * 10 (Ød2) - 100 PCS (Q'ty)

FSMMS

- Zero backlash.
- The flexure allowed by the beam portion of the couping is capable of accommodating angular, and axial misalignment.
- No accommodating to parallel misalignment.
- High wrench torque rigidity and sensitivity.
- Rotation character of clockwise or anti-clockwise are exactly the same.
- Free maintenance, oil-resist and anti-corrosiveness.
- FSMMS can't allow axial deviation caused by offset
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.





*Ød3=Ød2+0.5

*When Ød1＜4 and Ød2＞5, there would be 3 set screws.
When Ød1 and Ød2 both smaller than 4, there would be 2 set screws.

Material	Accessories
SUS303	Set screw

Dimensions		Ød1	Ød2										L	L1	M Rough thread	F
Model no.	ØD		2	3	4	5	6	7	8	10	12	14				
FSMMS	8	2	●										10	3.4	2	1.7
		3		●												
	12	4			●	●							14	5.2	2.5	2.5
		5				●										
	16	5				●	●						18	6.8	3	3
		6					●									
	20	5					●	●	●				20	7.65		
		6					●	●	●							
		8							●							
	25	5					●						25	9.6	4	4
		6					●		●	●						
		6.35							●	●						
		8							●	●						
		10								●						
	32	8							●	●			32	12.6		6
		10								●	●					
		12									●	●				

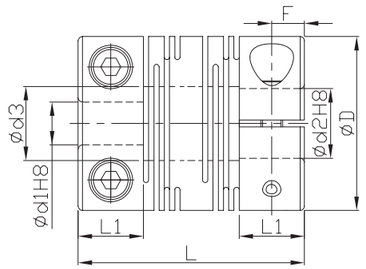
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Allowable misalignment		Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD		Angular (°)	Axial (mm)					
FSMMS	8	0.2	1	±0.1	49	48000	$2.4*10^{-8}$	0.3	2.7
	12	0.3			140	32000	$1.8*10^{-7}$	0.5	7.8
	16	0.5			240	24000	$7.2*10^{-7}$	0.7	18
	20	1			330	19000	$2.0*10^{-6}$		32
	25	2		±0.2	720	15000	$6.1*10^{-6}$	1.7	63
	32	3.5			1300	12000	$2.1*10^{-5}$		130

Ordering Example: FSMMS25 (Model no.) - 8 (Ød1) * 10 (Ød2) - 100 PCS (Q'ty)

FACML

- The flexure allowed by the beam portion of the couping is capable of accommodating angular, parallel, and axial misalignment.
- Rotation character of clockwise or anti-clockwise are exactly the same.
- Free maintenance, oil-resist and anti-corrosiveness.
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.



*Ød3=Ød2+0.5

Material	Surface finish	Accessories
Aluminum Alloy	Anodized	Clamping screw

Dimensions		Ød1	Ød2													L	L1	M Rough thread	A	F
Model no.	ØD		4	5	6	6.35	7	8	9.525	10	11	12	14	15	16					
FACML	12	4	●	●												18.5	5	2	4	2.5
		5		●																
	16	5		●	●											23	6.5	2.5	5	3.25
		6			●															
	20	5			●	●	●	●								26	7.5		6.5	3.75
		6			●	●	●	●												
		6.35						●												
		8						●												
	25	5			●											31	8.5	3	9	4.25
		6			●	●		●		●										
		6.35						●		●										
		8						●	●	●										
		9.525								●										
		10								●										
	32	8						●	●	●		●				41	12	4	11	6
		9.525								●		●								
		10								●	●	●	●							
		12										●	●							
	40	8						●		●						56	17	5	14	8.5
		10								●										
		12										●	●							
		14											●		●					
		15												●						
		16													●					

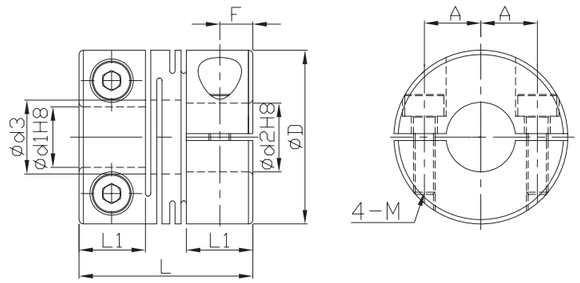
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)					
FACML	12	0.4	2	0.10	±0.3	45	12000	$7.8*10^{-8}$	0.5	3.6
	16	0.5			±0.4	80	9500	$3.4*10^{-7}$	1	9.2
	20	1				170	7600	$9.1*10^{-7}$		16
	25	2		0.15	±0.5	380	6100	$2.6*10^{-6}$	1.5	28
	32	4				500	4800	$9.7*10^{-6}$	2.5	64
	40	8		0.20		600	3800	$3.3*10^{-5}$	4	140

Ordering Example: FACML32 (Model no.) - 10 (Ød1) * 12 (Ød2) - 100 PCS (Q'ty)

FACMS

- Zero backlash.
- The flexure allowed by the beam portion of the couping is capable of accommodating angular, and axial misalignment.
- No accommodating to parallel misalignment.
- High wrench torque rigidity and sensitivity.
- Rotation character of clockwise or anti-clockwise are exactly the same.
- Free maintenance, oil-resist and anti-corrosiveness.
- FACMS can't allow axial deviation caused by offset
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.



*Ød3=Ød2+0.5

Material	Surface finish	Accessories
Aluminum Alloy	Anodized	Clamping screw

Dimensions		Ød1	Ød2							L	L1	M Rough thread	A	F
Model no.	ØD		4	5	6	7	8	10	12	14					
FACMS	12	4	●	●							14	5.2	2	4	2.6
		5		●											
	16	5		●	●						18	6.8	2.5	5	3.4
		6			●										
	20	5			●	●	●				20	7.65		6.5	3.8
		6			●	●	●								
		8					●								
	25	5			●						25	9.6	3	9	4.8
		6			●		●	●							
		8					●	●							
		10						●							
	32	8					●	●			32	12.6	4	11	6.3
		10						●	●	●					
		12							●	●					

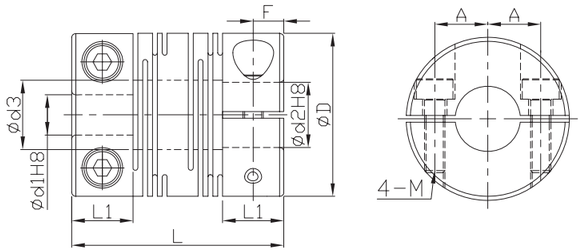
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Allowable misalignment		Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD		Angular (°)	Axial (mm)					
FACMS	12	0.4	1	±0.1	80	12000	$6.4*10^{-8}$	0.5	3
	16	0.5		±0.2	180	9500	$2.9*10^{-7}$	1	8
	20	1			200	7600	$7.5*10^{-7}$		13
	25	2			780	6100	$2.3*10^{-6}$	1.5	25
	32	4			1100	4800	$8.1*10^{-6}$	2.5	53

Ordering Example: FAMS25 (Model no.) - 8 (Ød1) * 10 (Ød2) - 100 PCS (Q'ty)

FSCML

- The flexure allowed by the beam portion of the couping is capable of accommodating angular, parallel, and axial misalignment.
- Rotation character of clockwise or anti-clockwise are exactly the same.
- Free maintenance, oil-resist and anti-corrosiveness.
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.



*Ød3=Ød2+0.5
*1pc clamping screw in ØD12~DØ32 of stainless steel type.

Material	Accessories
SUS303	Clamping screw

Dimensions		Ød1	Ød2													L	L1	M Rough thread	A	F
Model no.	ØD		4	5	6	6.35	7	8	9.525	10	11	12	14	15	16					
FSCML	12	4	●	●												18.5	5	2	4	2.5
		5		●																
	16	5		●	●											23	6.5	2.5	5	3.25
		6			●															
	20	5			●	●	●	●								26	7.5		6.5	3.75
		6			●	●	●	●												
		6.35						●												
		8						●												
	25	5			●											31	8.5	3	9	4.25
		6			●	●		●		●										
		6.35						●		●										
		8						●	●	●										
		9.525								●										
		10								●										
	32	8						●	●	●		●				41	12	4	11	6
		9.525								●		●								
		10								●	●	●	●							
		12										●	●							
	40	8						●		●						56	17	5	14	8.5
		10								●										
		12										●	●							
		14											●		●					
		15												●						
		16													●					

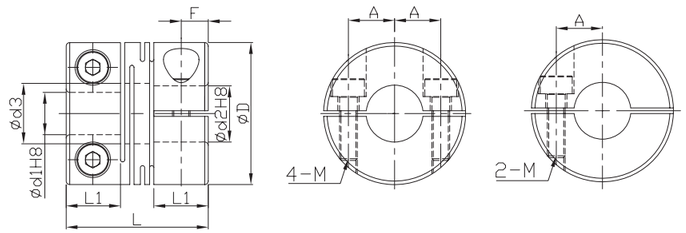
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)					
FSCML	12	0.3	2	0.10	±0.2	64	12000	$2.2*10^{-7}$	0.5	10
	16	0.5			±0.3	85	9500	$9.0*10^{-7}$	1	25
	20	1				250	7600	$2.5*10^{-6}$		43
	25	2		0.15	±0.4	330	6100	$7.1*10^{-6}$	1.5	78
	32	3.5			±0.5	850	4800	$2.7*10^{-5}$	2.5	170
	40	8		0.20		1000	3800	$9.0*10^{-5}$	4	370

Ordering Example: FSCML32 (Model no.) - 12 (Ød1) * 14 (Ød2) - 100 PCS (Q'ty)

FSCMS

- Zero backlash.
- The flexure allowed by the beam portion of the couping is capable of accommodating angular, and axial misalignment.
- No accommodating to parallel misalignment.
- High wrench torque rigidity and sensitivity.
- Rotation character of clockwise or anti-clockwise are exactly the same.
- Free maintenance, oil-resist and anti-corrosiveness.
- FSCMS can't allow axial deviation caused by offset
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.



*Ød3=Ød2+0.5
*1pc clamping screw in ØD12~DØ32 of stainless steel type.

Material	Accessories
SUS303	Clamping screw

Dimensions		Ød1	Ød2								L	L1	M Rough thread	A	F
Model no.	ØD		4	5	6	7	8	10	12	14					
FSCMS	12	4	●	●							14	5.2	2	4	2.6
		5		●											
	16	5		●	●						18	6.8	2.5	5	3.4
		6			●										
	20	5			●	●	●				20	7.65		6.5	3.8
		6			●	●	●								
		8					●								
	25	5			●						25	9.6	3	9	4.8
		6			●		●	●							
		8					●	●							
		10						●							
	32	8					●	●			32	12.6	4	11	6.3
		10						●	●	●					
		12							●	●					

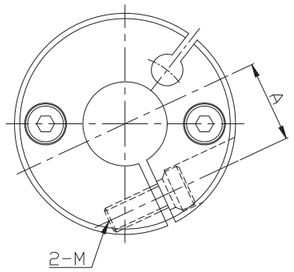
★Moment of inertial torque and weight calculated by maximum diameter.

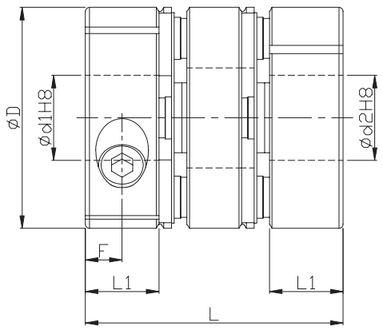
Specification		Allowable wrench torque (N·m)	Allowable misalignment		Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD		Angular (°)	Axial (mm)					
FSCMS	12	0.3	1	±0.1	140	12000	$1.8*10^{-7}$	0.5	8.5
	16	0.5			240	9500	$7.8*10^{-7}$	1	21
	20	1		±0.2	330	7600	$2.1*10^{-6}$		36
	25	2			720	6100	$6.3*10^{-6}$	1.5	69
	32	3.5			1300	4800	$2.2*10^{-5}$	2.5	150

Ordering Example: FSCMS25 (Model no.) - 6 (Ød1) * 8 (Ød2) - 100 PCS (Q'ty)

FACCL

- High wrench torque load, high wrench torque rigidity capacity and excellent sensibility.
- Zero backlash.
- The flexure allowed by the stainless steel disk portion of the couping is capable of accommodating angular, parallel, and axial misalignment.
- Clockwise character is exactly the same as anti-clockwise one.
- Free maintenance, oil-resist and anti-corrosiveness.
- Teethless screw to lock disks.
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.





Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Clamping screw
Disk	SUS303	—	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2																L	L1	A	F	Clamping screw	
Model no.	ØD	4	5	6	8	9	10	11	12	14	15	17	19	20	22	24	25					M	Lock torque (N·m)
FACCL	21	●	●	●	●	●												24.5	7	7	3.5	M2.5	1.2
	28		●	●	●	●	●											32	9	9.5	4	M3	1.5
	34			●	●	●	●	●	●	●								35	9.8	12	5	M3	1.5
	46				●	●	●	●	●	●	●	●	●					44	12.6	16.5	6	M4	3.5
	55								●	●	●	●	●	●	●	●	●	55	16	20.5	7	M5	6

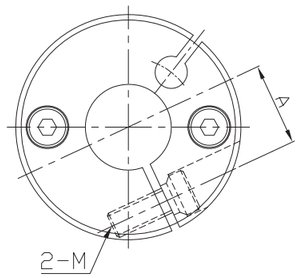
★Moment of inertial torque and weight calculated by maximum diameter.

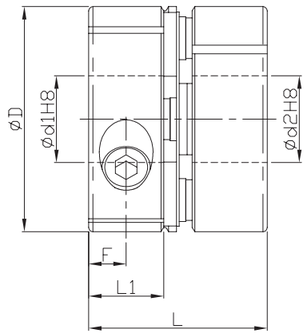
Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)				
FACCL	21	1.2	1.0	0.10	±0.20	1000	10000	$1.11*10^{-6}$	17
	28	1.6	1.2	0.15		1300		$4.68*10^{-6}$	42
	34	4	1.5	0.20		2800		$1.10*10^{-5}$	65
	46	10		0.25	±0.30	6200		$4.70*10^{-5}$	151
	55	25				12000		$1.19*10^{-4}$	260

Ordering Example: FACCL46 (Model no.) - 10 (Ød1) * 12 (Ød2) - 100 PCS (Q'ty)

FACCS

- High wrench torque load, high wrench torque rigidity capacity and excellent sensibility.
- Zero backlash.
- The flexure allowed by the stainless steel disk portion of the couping is capable of accommodating angular, and axial misalignment.
- No accommodating to parallel misalignment.
- Clockwise character is exactly the same as anti-clockwise one.
- Free maintenance, oil-resist and anti-corrosiveness.
- Teethless screw to lock disks.
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.





Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Clamping screw
Disk	SUS303	—	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2																L	L1	A	F	Clamping screw	
Model no.	ØD	4	5	6	8	9	10	11	12	14	15	17	19	20	22	24	25					M	Lock torque (N·m)
FACCS	21	●	●	●	●	●												16.7	7	7	3.5	M2.5	1.2
	28		●	●	●	●	●											21	9	9.5	4	M3	1.5
	34			●	●	●	●	●	●	●								23.3	9.8	12	5	M3	1.5
	46				●	●	●	●	●	●	●	●	●					29.8	12.6	16.5	6	M4	3.5
	55								●	●	●	●	●	●	●	●	●	37.2	16	20.5	7	M5	6

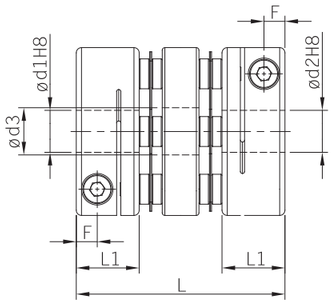
★Moment of inertial torque and weight calculated by maximum diameter.

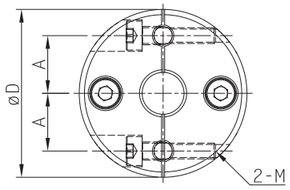
Specification		Allowable wrench torque (N·m)	Allowable misalignment		Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	★ Weight (g)
Model no.	ØD		Angular (°)	Axial (mm)				
FACCS	21	1.2	1.0	±0.10	1500	10000	$7.90*10^{-7}$	12
	28	1.6	1.2		1800		$3.24*10^{-6}$	30
	34	4	1.5		3600		$7.60*10^{-6}$	45
	46	10		±0.15	10000		$3.23*10^{-5}$	105
	55	25			20000		$8.19*10^{-5}$	180

Ordering Example: FACCS34 (Model no.) - 10 (Ød1) * 14 (Ød2) - 100 PCS (Q'ty)

FACHL

- High wrench torque load, high wrench torque rigidity capacity and excellent sensibility.
- Zero backlash.
- The flexure allowed by the stainless steel disks portion of the couping is capable of accommodating angular, parallel, and axial misalignment.
- Clockwise character is exactly the same as anti-clockwise one.
- Free maintenance, oil-resist and anti-corrosiveness.
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.





Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Clamping screw
Disk	SUS301	—	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2																						L	L1	d3	A	F	Clamping screw	
Model no.	ØD	4	4.5	5	6	6.35	7	8	9.525	10	11	12	14	15	16	17	18	19	20	22	24	25							M	Lock torque (N·m)
FACHL	19	●	●	●	●	●	●	●																27	8	8.5	6.5	2.5	2	0.5
	25				●	●	●	●	●	●	●	●												31	10	12.5	9	3.5	2.5	1
	32							●	●	●	●	●	●	●										40	12	16	11	4	3	1.5
	40							●	●	●	●	●	●	●	●	●	●	●	●					44	14	21	15	5	4	2.5
	50												●	●	●	●	●	●	●	●	●	●		57	18	26	18	6	5	7

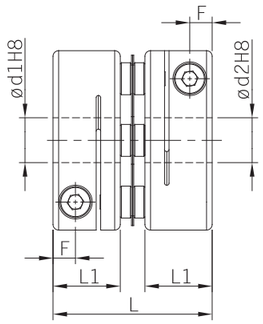
★Moment of inertial torque and weight calculated by maximum diameter.

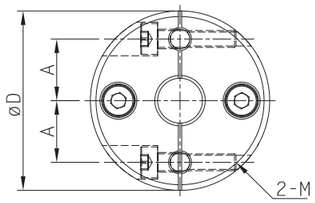
Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia ($kg \cdot m^2$)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)				
FACHL	19	0.7	1.5	0.12	±0.5	200	10000	$8.7*10^{-7}$	18
	25	1				450	8000	$2.7*10^{-6}$	25
	32	2.5		0.15		1100	6000	$9.6*10^{-6}$	60
	40	3.5				1400	5000	$1.9*10^{-5}$	100
	50	9				2200	4000	$8.1*10^{-5}$	210

Ordering Example: FACHL40 (Model no.) - 10 (Ød1) * 12 (Ød2) - 100 PCS (Q'ty)

FACHS

- Hard torque load、high torque rigidity and excellent sensibility.
- Zero backlash.
- Miniature coupling has short length.
- Dual stainless steel disk to correct angular and axial deviation.
- No correction for radial deviation.
- Clockwise character is exactly the same as anti-clockwise one.
- Free maintenance, oil-resist and anti-corrosiveness.
- FACH-S can't allow axial deviation caused by offset.
- Offset, deflection, shaft deviation are individual allowed value.





Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Clamping screw
Disk	SUS301	—	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2																						L	L1	F	A	Clamping screw	
Model no.	ØD	4	4.5	5	6	6.35	7	8	9.525	10	11	12	14	15	16	17	18	19	20	22	24	25							M	Lock torque (N·m)
FACHS	19	●	●	●	●	●	●	●																20	8	2.5	6.5	2	0.5
	25				●	●	●	●	●	●	●	●												24	10	3.5	9	2.5	1
	32							●	●	●	●	●	●	●										29	12	4	11	3	1.5
	40							●	●	●	●	●	●	●	●	●	●	●	●					33	14	5	15	4	2.5
	50												●	●	●	●	●	●	●	●	●	●		42	18	6	18	5	7

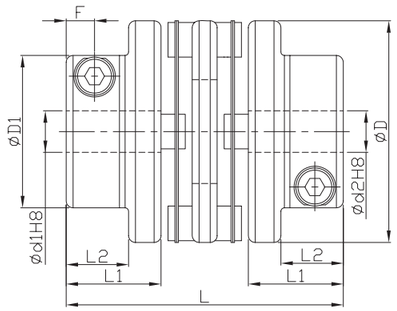
★Moment of inertial torque and weight calculated by maximum diameter.

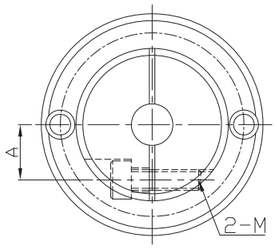
Specification		Allowable wrench torque (N·m)	Allowable misalignment		Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia ($kg \cdot m^2$)	★ Weight (g)
Model no.	ØD		Angular (°)	Axial (mm)				
FACHS	19	0.7	0.7	±0.2	280	10000	$6.3*10^{-7}$	9
	25	1			630	8000	$2.1*10^{-6}$	19
	32	2.5			1600	6000	$7.2*10^{-6}$	41
	40	3.5			2600	5000	$1.3*10^{-5}$	68
	50	9			3100	4000	$6.1*10^{-5}$	140

Ordering Example: FACHS40 (Model no.) - 10 (Ød1) * 12 (Ød2) - 100 PCS (Q'ty)

FACTL

- High wrench torque load, high wrench torque rigidity capacity and excellent sensibility.
- Zero backlash.
- Dual stainless steel rings to correct radial、angular and axial deviation.
- Clockwise character is exactly the same as anti-clockwise one.
- Free maintenance, oil-resist and anti-corrosiveness.
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.





Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Clamping screw
Disk	SUS301	—	

Dimensions		ØD1	Ød1&Ød2 selection *Ød1 ≦ Ød2													L	L1	L2	A	F	Clamping screw	
Model no.	ØD		6	7	8	10	11	12	14	15	16	18	19	20	25						M	Lock torque (N·m)
FACTL	32	22	●	●	●	●										40	13.7	9	8	4	3	1.5
	40	28		●	●	●	●	●	●							46	16.5	12	10.5	6	4	2.5
	50	39						●	●	●	●	●	●	●		52	19.4	15	14.8	7	5	7
	63	45								●	●	●	●	●	●	58	22.3	18	17	8	6	12

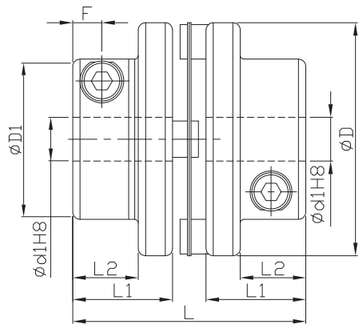
★Moment of inertial torque and weight calculated by maximum diameter.

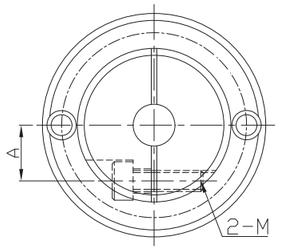
Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia ($kg \cdot m^2$)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)				
FACTL	32	2	2	0.15	±0.4	1000	4800	$6.2*10^{-6}$	48
	40	4		0.2	±0.5	1500	3800	$1.6*10^{-5}$	81
	50	7.5			±0.6	2000	3100	$4.6*10^{-5}$	150
	63	10		0.3	±0.8	2500	2400	$1.1*10^{-4}$	230

Ordering Example: FACTL40 (Model no.) - 12 (Ød1) * 14 (Ød2) - 100 PCS (Q'ty)

FACTS

- Hard torque load、high torque rigidity and excellent sensibility.
- Zero backlash.
- Miniature coupling has short length.
- Dual stainless steel disk to correct angular and axial deviation.
- No correction for radial deviation.
- Clockwise character is exactly the same as anti-clockwise one.
- Free maintenance, oil-resist and anti-corrosiveness.
- FACH-S can't allow axial deviation caused by offset.
- Offset, deflection, shaft deviation are individual allowed value.





Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Clamping screw
Disk	SUS301	—	

Dimensions		ØD1	Ød1&Ød2 selection *Ød1 ≦ Ød2													L	L1	L2	A	F	Clamping screw	
Model no.	ØD		6	7	8	10	11	12	14	15	16	18	19	20	25						M	Lock torque (N·m)
FACTS	32	22	●	●	●	●										32	13.7	9	8	4	3	1.5
	40	28		●	●	●	●	●	●							38	16.5	12	10.5	6	4	2.5
	50	39						●	●	●	●	●	●	●		44	19.4	15	14.8	7	5	7
	63	45								●	●	●	●	●	●	50	22.3	18	17	8	6	12

★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Allowable misalignment		Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia ($kg \cdot m^2$)	★ Weight (g)
Model no.	ØD		Angular (°)	Axial (mm)				
FACTS	32	2	1	±0.2	1300	4800	$4.5*10^{-6}$	38
	40	4			2800	3800	$1.2*10^{-5}$	66
	50	7.5			3700	3100	$3.7*10^{-5}$	120
	63	10			5000	2400	$8.4*10^{-5}$	190

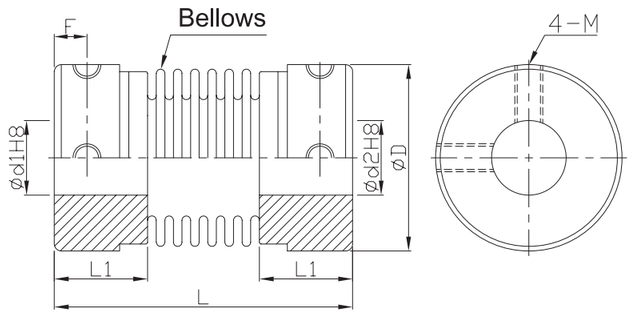
Ordering Example: FACTS32 (Model no.) - 10 (Ød1) * 12 (Ød2) - 100 PCS (Q'ty)

Aluminum with Phosphor bronze bellows coupling ▶ Set screw

Flexiable | Bellows coupling

FAMB

- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.



*When Ød1<4 and Ød2>5, there would be 3 set screws.
*When Ød1 and Ød2 both smaller than 4, there would be 2 set screws.

Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Set screw
Bellows	C5191	—	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2										L	L1	F	Set screw	
Model no.	ØD	3	4	5	6	6.35	8	9.525	10	12	14				M	Lock torque (N·m)
FAMB	12	●	●	●	●	●						23.5	7.5	2.5	2.5	0.5
	16		●	●	●	●	●					26.5	9	3	3	0.7
	20			●	●	●	●	●	●			32	10	3.5		
	25				●	●	●	●	●	●		36.5	12	4.5	4	1.7
	32				●	●	●	●	●	●	●	42	13.5	5.5		

★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia ($kg \cdot m^2$)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)				
FAMB	12	0.3	1.5	0.10	+0.4 -1.2	82	32000	$9.0*10^{-8}$	4
	16	0.5				110	24000	$3.5*10^{-7}$	9
	20	0.8	2	0.15	+0.6 -1.8	180	19000	$9.9*10^{-7}$	16
	25	1.3				240	15000	$3.1*10^{-6}$	32
	32	2		0.20	+0.8 -2.5	330	12000	$9.2*10^{-6}$	57

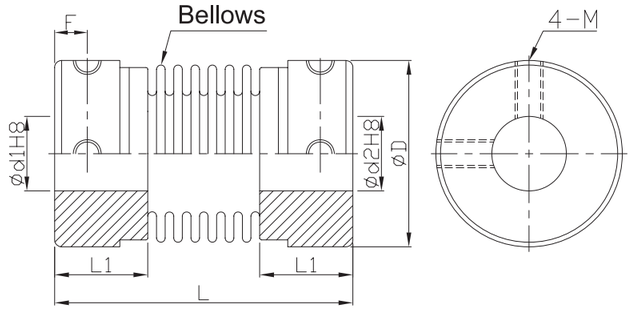
Ordering Example: FAMB20 (Model no.) - 6 (Ød1) * 8 (Ød2) - 100 PCS (Q'ty)

Full stainless steel bellows coupling ▶ Set screw

Flexiable | Bellows coupling

FSMB

- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.



*When Ød1<4 and Ød2>5, there would be 3 set screws.
*When Ød1 and Ød2 both smaller than 4, there would be 2 set screws.

Component	Material	Accessories
Main frame	SUS303	Set screw
Bellows	SUS316	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2										L	L1	F	Set screw	
Model no.	ØD	3	4	5	6	6.35	8	9.525	10	12	14				M	Lock torque (N·m)
FSMB	12	●	●	●	●	●						23.5	7.5	2.5	2.5	0.5
	16		●	●	●	●	●					26.5	9	3	3	0.7
	20			●	●	●	●	●	●			32	10	3.5		
	25				●	●	●	●	●	●		36.5	12	4.5	4	1.7
	32				●	●	●	●	●	●	●	42	13.5	5.5		

★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia ($kg \cdot m^2$)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)				
FSMB	12	0.5	1.5	0.10	+0.4 -1.2	100	32000	$2.1*10^{-7}$	9
	16	1				150	24000	$8.0*10^{-7}$	20
	20	1.5	2	0.15	+0.6 -1.8	220	19000	$2.3*10^{-6}$	37
	25	2				330	15000	$7.0*10^{-6}$	73
	32	3		0.20	+0.8 -2.5	490	12000	$2.1*10^{-5}$	130

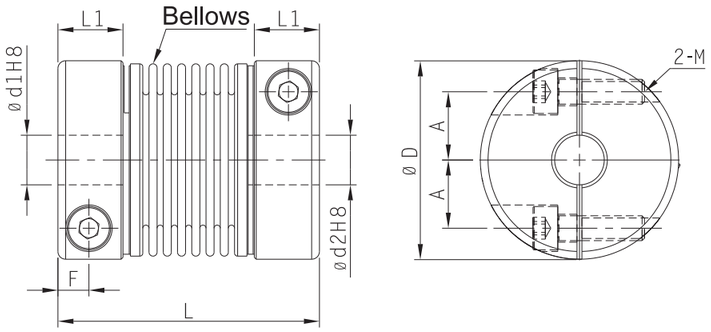
Ordering Example: FAMB25 (Model no.) - 8 (Ød1) * 10 (Ød2) - 100 PCS (Q'ty)

Aluminum with Phosphor bronze bellows coupling ▶ Clamping screw

Flexiable | Bellows coupling

FACB

- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.



Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Clamping screw
Bellows	C5191	—	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2									L	L1	F	A	Clamping screw	
Model no.	ØD	4	5	6	6.35	8	9.525	10	12	14					M	Lock torque (N·m)
FACB	12	●	●								23.5	7.5	2.3	4	2	0.5
	16	●	●	●	●						26.5	9	3	5	2.5	1
	20		●	●	●	●					32	10	3.5	6.5		
	25			●	●	●	●	●			36.5	12	4.5	9	3	1.5
	32					●	●	●	●	●	42	13.5	5	11	4	2.5

★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)				
FACB	12	0.3	1.5	0.10	+0.4 -1.2	82	13000	$9.7*10^{-8}$	4
	16	0.5				110	9500	$3.7*10^{-7}$	10
	20	0.8	2	0.15	+0.6 -1.8	180	7700	$1.0*10^{-6}$	16
	25	1.3				240	6100	$3.1*10^{-6}$	32
	32	2		0.20	+0.8 -2.5	330	4800	$9.6*10^{-6}$	58

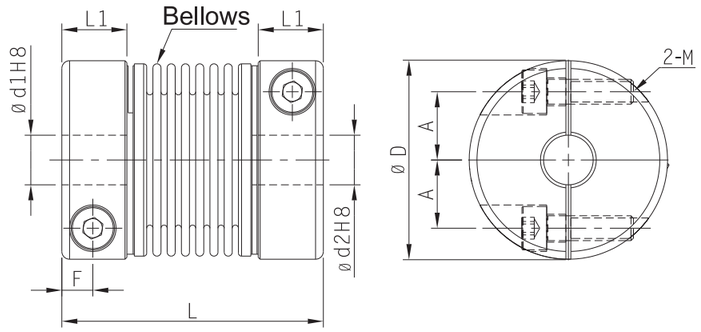
Ordering Example: FACB25 (Model no.) - 6 (Ød1) * 8 (Ød2) - 100 PCS (Q'ty)

Full stainless steel bellows coupling ▶ Clamping Screw

Flexiable | Bellows coupling

FSCB

- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.



Component	Material	Accessories
Main frame	SUS303	Clamping screw
Bellows	SUS316	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2									L	L1	F	A	Clamping screw	
Model no.	ØD	4	5	6	6.35	8	9.525	10	12	14					M	Lock torque (N·m)
FSCB	12	●	●								23.5	7.5	2.3	4	2	0.5
	16	●	●	●	●						26.5	9	3	5	2.5	1
	20		●	●	●	●					32	10	3.5	6.5		
	25			●	●	●	●	●			36.5	12	4.5	9	3	1.5
	32					●	●	●	●	●	42	13.5	5	11	4	2.5

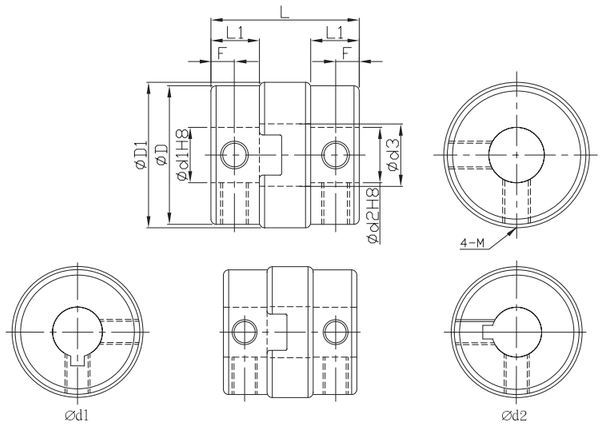
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)				
FSCB	12	0.5	1.5	0.10	+0.4 -1.2	100	13000	$2.1*10^{-7}$	9
	16	1				150	9500	$8.1*10^{-7}$	22
	20	1.5	2	0.15	+0.6 -1.8	220	7700	$2.3*10^{-6}$	38
	25	2				330	6100	$6.9*10^{-6}$	74
	32	3		0.20	+0.8 -2.5	490	4800	$2.1*10^{-5}$	130

Ordering Example: FSCB20 (Model no.) - 6 (Ød1) * 8 (Ød2) - 100 PCS (Q'ty)

FSMG

- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.
- Suit for high wrench torque, high rotation.
- In case of parallel deviation over 0.1, abrasion of the insert is direct ration to load torque, offset, and rotation numbers.
- Available options for key way per inner diameter is bigger than 6mm. (Refer to page 38)



FSMGLK (key way Ød1 side)
FSMGRK (key way Ød2 side)
FSMGWK (key way Ød1 and Ød2 side)

Component	Material	Accessories
Main frame	SUS304 Alloy	Set screw
Spacer	Aluminum bronze(filled with Solid lubricant)	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2															ØD	ØD1	Ød3	L	L1	F	Set screw	
Model no.	ØD	4	5	6	6.35	7	8	9.525	10	11	12	14	15	16	18	20							M	Lock torque (N·m)
FSMG	15	●	●	●	●	●	●										14.5	15	7.2	16	5.4	2.6	3	0.7
	17		●	●	●	●	●										16.8	17.5	8.2	19.8	6.7	3.2	4	1.7
	20			●	●	●	●	●	●	●	●						20	21	9	21.6	7	3.4		
	26			●	●	●	●	●	●	●	●	●					26	27	12	25.6	9	4		
	30						●		●		●	●					30	31	14	33	12	6		
	34								●	●	●	●	●	●			34	35	14	34	13	5.5	5	4.0
	38								●		●	●	●	●	●	●	38	41	17	39.5	15	7		

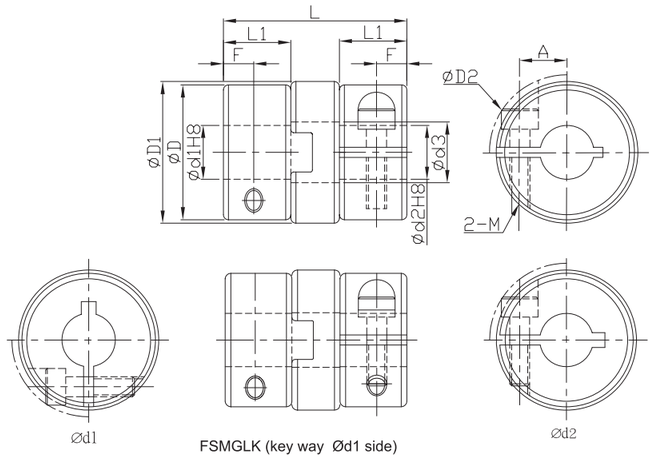
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)				
FSMG	15	3	1.5	0.5	±0.1	800	8000	$4*10^{-8}$	15
	17	5		0.5	±0.1	1000	7000	$1*10^{-7}$	25
	20	7		0.5	±0.1	2200	6000	$2*10^{-6}$	37
	26	10		0.8	±0.2	4000	5000	$6*10^{-6}$	79
	30	30		1	±0.3	5500	5000	$2.5*10^{-5}$	120
	34	32		1	±0.2	8000	4000	$4*10^{-5}$	180
	38	50		1	±0.3	11000	4000	$1*10^{-4}$	256

Ordering Example: FSMG26 (Model no.) - 8 (Ød1) * 12 (Ød2) - 100 PCS (Q'ty)

FSCG

- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.
- Suit for high wrench torque, high rotation.
- In case of parallel deviation over 0.1, abrasion of the insert is direct ration to load torque, offset, and rotation numbers.
- Available options for key way per inner diameter is bigger than 6mm. (Refer to page 38)



FSMGLK (key way Ød1 side)
FSMGRK (key way Ød2 side)
FSMGWK (key way Ød1 and Ød2 side)

Component	Material	Accessories
Main frame	SUS304 Alloy	Clamping screw
Spacer	Aluminum bronze(filled with Solid lubricant)	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2															ØD	ØD1	ØD2	Ød3	L	L1	A	F	Clamping screw	
Model no.	ØD	4	5	6	6.35	7	8	9.525	10	11	12	14	15	16	18	20									M	Lock torque (N·m)
FSCG	15	●	●	●													14.5	15	16	7.2	18.4	6.6	4.5	3.2	2.5	1.0
	17		●	●	●												16.8	17.5	19	8.2	24.4	9	5	4	3	1.8
	20			●	●	●	●	●	●								20	21	23	9	27.2	10	7	4.5		
	26			●	●	●	●	●	●	●	●						26	27	29	12	30.4	11.5	8.4	5	4	3.0
	30						●		●		●	●					30	31	32	14	33	12	9	6	4	4.5
	34								●	●	●	●	●	●			34	35	37	17	34	13	11		5	8.0
	38								●		●	●	●	●	●	●	38	41	41	17	39.5	15	13.7	7		

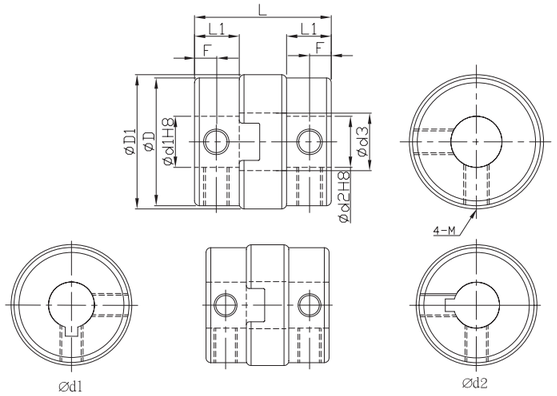
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)				
FSCG	15	3	1.5	0.5	±0.1	800	8000	$6*10^{-7}$	17
	17	5		0.5	±0.1	1000	7000	$1.2*10^{-6}$	30
	20	7		0.5	±0.1	2200	6000	$3*10^{-6}$	48
	26	10		0.8	±0.2	4000	5000	$1*10^{-5}$	90
	30	30		1	±0.3	5500	5000	$2.5*10^{-5}$	120
	34	32		1	±0.2	8000	4000	$4*10^{-5}$	172
	38	50		1	±0.3	11000	4000	$1*10^{-4}$	246

Ordering Example: FSCG26 (Model no.) - 10 (Ød1) * 12 (Ød2) - 100 PCS (Q'ty)

FSMP

- Operating temperature : -40°C~90°C
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.
- Available options for key way per inner diameter is bigger than 6mm. (Refer to page 38)



*When Ød1<4 and Ød2>5, there would be 3 set screws.
*When Ød1 and Ød2 both smaller than 4, there would be 2 set screws.

FSMGLK (key way Ød1 side)
FSMGRK (key way Ød2 side)
FSMGWK (key way Ød1 and Ød2 side)

Component	Material	Accessories
Main frame	SUS304 Alloy	Set screw
Spacer	Carbon resin	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2																		ØD	ØD1	Ød3	L	L1	F	Set screw	
Model no.	ØD	1	1.5	2	3	4	5	6	6.35	7	8	9.525	10	11	12	14	15	16	18	20							M	Lock torque (N·m)
FSMP	6	●	●	●																	6	6.2	2.4	8.4	3	1.5	1.6	0.15
	8	●		●	●																8	8.2	3.4	9.6	3.5	1.7		
	10			●	●	●															10	10.2	4.4	10.2	3.7	1.8	2	0.3
	12				●	●	●														12	12.5	4.0	14.2	5.2	2.5	3	0.7
	15					●	●	●	●	●	●										14.5	15	5.0	16	5.4	2.6		
	17						●	●	●	●	●										16.8	17.5	7.2	19.8	6.7	3.2	4	1.7
	20							●	●	●	●	●	●	●	●						20	21	8.2	21.4	7	3.4		
	26							●	●	●	●	●	●	●	●	●					26	27	12.0	25.6	9	4		
	30										●		●		●	●					30	31	13.0	33	12	6		
	34												●	●	●	●	●	●			34	35	13.0	34.2	13	5.5	5	4.0
	38												●		●	●	●	●	●	●	38	41	17.0	40	15	7		

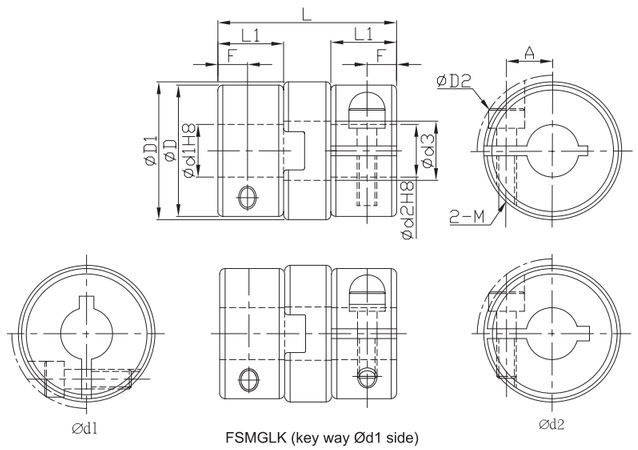
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)				
FSMP	6	0.3	3	0.3	±0.25	9	12000	$1.5*10^{-8}$	1.5
	8	0.5		0.4	±0.3	13		$2.2*10^{-8}$	2.5
	10	0.8		0.4	±0.32	21		$3.6*10^{-8}$	4
	12	1		0.5	±0.35	44		$1.6*10^{-7}$	8
	15	1.6		0.8	±0.45	90	10000	$3.5*10^{-7}$	11
	17	2.2		1	±0.55	250		$7.8*10^{-7}$	18
	20	3.2		1.5	±0.6	340	8000	$1.7*10^{-6}$	29
	26	6		2		420	6500	$6.2*10^{-6}$	65
	30	15				1200	6200	$2*10^{-5}$	100
	34	16		2.5		2400	6000	$2.5*10^{-5}$	155
	38	28				3500	5800	$8*10^{-5}$	240

Ordering Example: FSMP26 (Model no.) - 8 (Ød1) * 10 (Ød2) - 100 PCS (Q'ty)

FSCP

- Operating temperature : -40°C~90°C
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.
- FSCP lock torque of clamping screw is 5.4 (N · m) based on shaft dia (Ød1, Ød2) over Ø16.
- Available options for key way per inner diameter is bigger than 6mm. (Refer to page 38)



FSMGLK (key way Ød1 side)
FSMGRK (key way Ød2 side)
FSMGWK (key way Ød1 and Ød2 side)

Component	Material	Accessories
Main frame	SUS304 Alloy	Clamping screw
Spacer	Carbon resin	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2															ØD	ØD1	ØD2	Ød3	L	L1	A	F	Clamping screw	
Model no.	ØD	4	5	6	6.35	7	8	9.525	10	11	12	14	15	16	18	20									M	Lock torque (N·m)
FSCP	15	●	●	●													14.5	15	16	5.0	18.4	6.6	4.5	3.2	2.5	1.0
	17		●	●	●												16.8	17.5	19	7.2	24.4	9	5	4	3	1.8
	20			●	●	●	●	●	●								20	21	23	8.2	27.2	10	7	4.5		
	26			●	●	●	●	●	●	●	●						26	27	29	12	30.4	11.5	8.4	5	4	3.0
	30						●		●		●	●					30	31	32	13	33	12	9	6	4	4.5
	34								●	●	●	●	●	●			34	35	37	13	34	13	11		5	8.0
	38								●		●	●	●	●	●	●	38	41	41	17	40	15	13.7	7		

★Moment of inertial torque and weight calculated by maximum diameter.

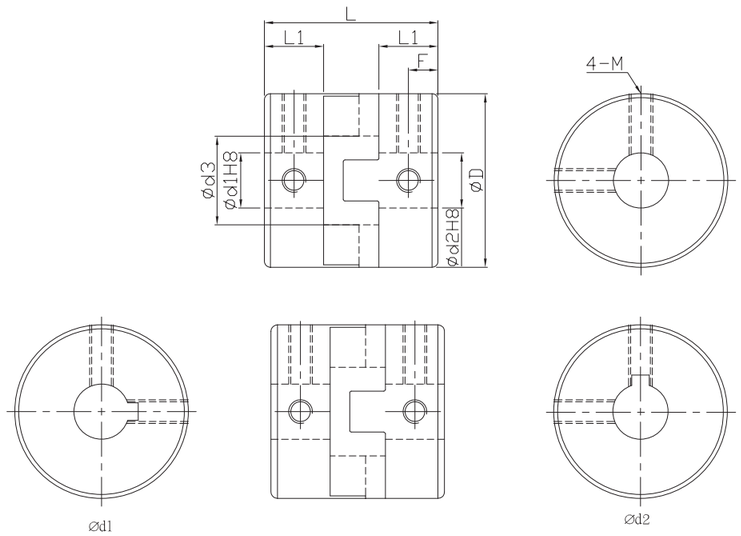
Specification		Allowable wrench torque (N·m)	Allowable misalignment			Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)	Axial (mm)				
FSCP	15	1.6	3	0.8	±0.45	90	10000	$5.0*10^{-7}$	15
	17	2.2		1	±0.55	250		$1.0*10^{-6}$	28
	20	3.2		1.5	±0.6	340	8000	$2.4*10^{-6}$	40
	26	6		2		420	6500	$8.0*10^{-6}$	85
	30	15				1200	6200	$2.0*10^{-5}$	100
	34	16		2.5		2400	6000	$2.5*10^{-5}$	155
	38	18				3500	5800	$8.0*10^{-5}$	240

◎FSMP&FSCP spacer selection, please refer to P.42

Ordering Example: FSCP26 (Model no.) - 10 (Ød1) * 12 (Ød2) - 100 PCS (Q'ty)

FAMJ

- Operating temperature : -20°C~80°C
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.
- Available options for key way per inner diameter is bigger than 6mm. (Refer to page 39)



FAMJLK(key way Ød1 side)
FAMJRK (key way Ød2 side)
FAMJWK (key way Ød1 and Ød2 side)

Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Set screw
Spacer	Black (POM)	—	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2												Ød3	L	L1	F	Set screw	
Model no.	ØD	14	15	16	18	20	22	25	26	28	30	35	38					M	Lock torque (N·m)
FAMJ	44	●	●	●	●	●	●							22.5	46	15	7.5	6	7.0
	55				●	●	●	●	●					28	57	19	9.5	8	15.0
	70						●	●		●	●	●	●	39	77	25	12.5	10	30.0

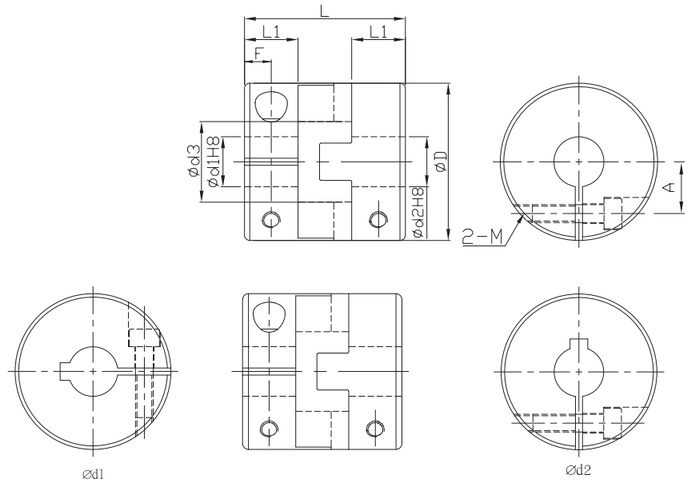
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Allowable misalignment		Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)				
FAMJ	44	30	2	1	1500	12000	$4*10^{-5}$	140
	55	45		1.5	2800	10000	$11*10^{-5}$	260
	70	80		2	4800	8000	$40*10^{-5}$	450

Ordering Example: FAMJ44 (Model no.) - 18 (Ød1) * 22 (Ød2) - 100 PCS (Q'ty)

FACJ

- Operating temperature : -20°C~80°C
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.
- Select bigger lock torque of clamping screw than listed values on catalogs when shaft diameter is too small.
- List torque tightness values are only for general standard.
- Available options for key way per inner diameter is bigger than 6mm. (Refer to page 39)



FACJLK (key way Ød1 side)
FACJRK (key way Ød2 side)
FACJWK(key way Ød1 and Ød2 side)

Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Clamping screw
Spacer	Black (POM)	—	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2										Ød3	L	L1	F	A	Clamping screw	
Model no.	ØD	14	15	16	18	20	22	25	28	30	35						M	Lock torque (N·m)
FACJ	44	●	●	●	●	●						22.5	46	15	7.5	14.5	5	*8.4
	55				●	●	●	●				28	57	19	9.5	17	6	*14.4
	70						●	●	●	●	●	39	77	25	12.5	24	8	*30.0

★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Allowable misalignment		Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)				
FACJ	44	26	2	1	1500	12000	$4*10^{-5}$	140
	55	40		1.5	2800	10000	$11*10^{-5}$	260
	70	72		2	4800	8000	$40*10^{-5}$	450

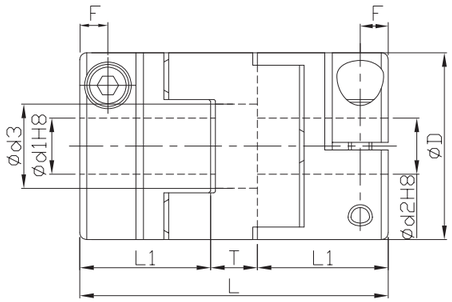
◎FAMJ&FACJ spacer selection, please refer to P.43

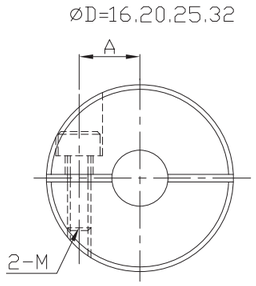
Ordering Example: FACJ44 (Model no.) - 16 (Ød1) * 18 (Ød2) - 100 PCS (Q'ty)

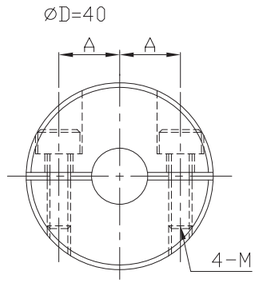
Oldham coupling with black polyacetel(POM) Spacer ▶ Clamping Screw ▶ Long type

FACPL

- Operating temperature : -20°C~80°C
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.







Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Clamping screw
Spacer	(POM)	—	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2													Ød3	L	L1	T	F	A	Clamping screw	
Model no.	ØD	4	5	6	6.35	7	8	9.525	10	11	12	14	15	16							M	Lock torque (N·m)
FACPL	16	●	●	●											7	29	13	3	3	5	2.5	1
	20		●	●	●	●	●								9	33	14	5		6.5		
	25			●	●	●	●	●	●						11	39	17	5	3.8	9	3	1.5
	32						●	●	●	●	●	●			14.5	45	19	7	4.5	11	4	2.5
	40										●	●	●	●	17	50	23	4	7	13	5	4

★Moment of inertial torque and weight calculated by maximum diameter.

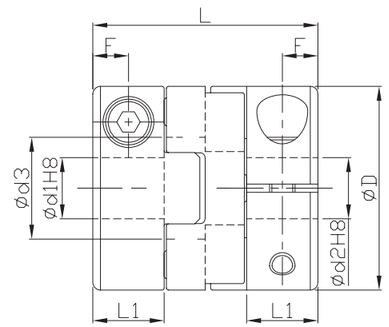
Specification		Allowable wrench torque (N·m)	Allowable misalignment		Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)				
FACPL	16	0.7	3	1.0	31	9500	$5.8*10^{-7}$	12
	20	1.2		1.5	60	7600	$1.5*10^{-6}$	19
	25	2		2.0	140	6100	$4.4*10^{-6}$	36
	32	4.5		2.5	280	4800	$1.4*10^{-5}$	69
	40	9		3.0	540	3800	$4.1*10^{-5}$	130

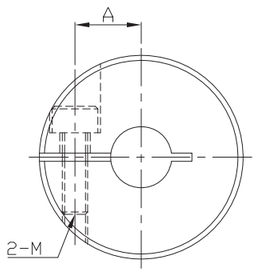
Ordering Example: FACPL16 (Model no.) - 8 (Ød1) * 10 (Ød2) - 100 PCS (Q'ty)

Oldham coupling with polyacetel(POM) Spacer ▶ Clamping Screw ▶ Short type

FACPS

- Operating temperature : -20°C~80°C
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.





Component	Material	Surface finish	Accessories
Main frame	AL 7075	Anodized	Clamping screw
Spacer	(POM)	—	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2												Ød3	L	L1	F	A	Clamping screw	
Model no.	ØD	3	4	5	6	6.35	7	8	9.525	10	11	12	14						M	Lock torque (N·m)
FACPS	12	●	●	●										6	14.9	5	2.5	4	2	0.5
	16	●	●	●	●									8	21	7	3.5	5	2.5	1
	20			●	●	●	●	●						10	22			6.5		
	25					●	●	●	●	●				14	27.2	8	4	9	3	1.5
	32						●	●	●	●	●	●	●	18	33.3	10	5	11	4	2.5

★Moment of inertial torque and weight calculated by maximum diameter.

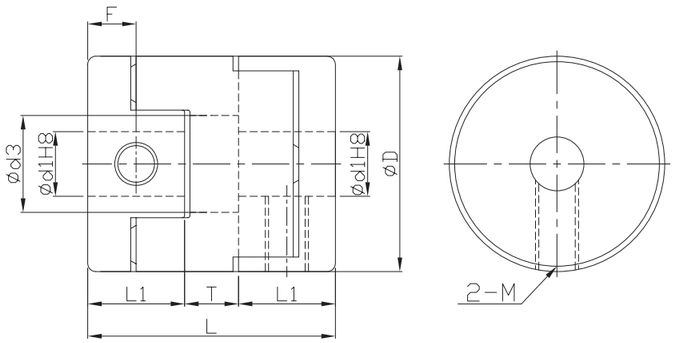
Specification		Allowable wrench torque (N·m)	Allowable misalignment		Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)				
FACPS	12	0.2	2	0.6	9	13000	$7.1*10^{-8}$	3
	16	0.4		1.0	30	9500	$3*10^{-7}$	8
	20	0.7		1.3	47	7600	$7.4*10^{-7}$	13
	25	1.2		1.5	85	6100	$2.2*10^{-6}$	24
	32	2.8		2.0	190	4800	$7.3*10^{-6}$	48

◎ FACPL&FACPS spacer selection, please refer to P.44

Ordering Example: FACPS25 (Model no.) - 8 (Ød1) * 10 (Ød2) - 100 PCS (Q'ty)

FAMN

- Operating temperature : -20°C~80°C
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.



Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Set screw
Spacer	(POM)	—	

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2														Ød3	L	L1	T	F	Set screw	
Model no.	ØD	3	4	5	6	6.35	7	8	9.525	10	11	12	14	15	16						M	Lock torque (N·m)
FAMN	16	●	●	●	●	●										7	18	7	4	3.5	3	0.7
	20		●	●	●	●	●	●								9	23	9	5	4.5	4	1.7
	25			●	●	●	●	●	●	●						11	28	11	6	5.5	5	4
	32							●	●	●	●	●	●			14.5	33	13	7	6.5	6	7
	40							●	●	●	●	●	●	●	●	17	32	14	4	7		

★Moment of inertial torque and weight calculated by maximum diameter.

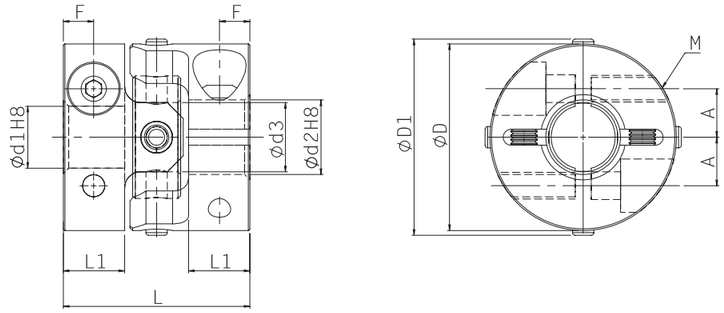
Specification		Allowable wrench torque (N·m)	Allowable misalignment		Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	★ Weight (g)
Model no.	ØD		Angular (°)	Parallel (mm)				
FAMN	16	0.7	3	1.0	31	9500	$3.2*10^{-7}$	7
	20	1.2		1.5	60	7600	$1.0*10^{-6}$	14
	25	2		2.0	140	6100	$3.0*10^{-6}$	27
	32	4.5		2.5	280	4800	$9.5*10^{-6}$	50
	40	9		3.0	540	3800	$2.3*10^{-5}$	80

☞FAMN spacer selection, please refer to P.44

Ordering Example: FAMN25 (Model no.) - 6 (Ød1) * 8 (Ød2) - 100 PCS (Q'ty)

FACU

- Offset of angular, parallel, or axial deviation are individual value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.
- Suitable applied for high torque rigidity and low vibration needs.



Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Clamping screw
Spacer	Aluminum Alloy	Anodized	
Pin	SUJ-2	—	
Bearing	Aluminum + Teflon	—	

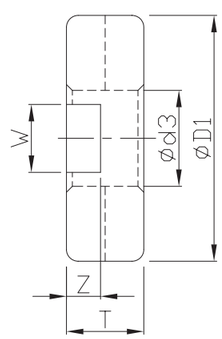
Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2														ØD	ØD1	Ød3	L	L1	A	F	Clamping screw	
Model no.	ØD	3	4	5	6	8	10	11	12	14	15	16	18	19	20								M	Lock torque (N·m)
FACU	15	●	●	●	●											15	16	4	18	6	5.2	2.5	M2	0.5
	20		●	●	●	●										20	22	7	20	7	6.5	2.7	M2	0.5
	25			●	●	●	●	●	●							25	27	10	27	9	9	3.5	M2.5	1
	30				●	●	●	●	●	●						30	32	10	30	9.5	10.5	4	M3	1.5
	35					●	●	●	●	●	●	●				35	37	13	35	11.5	12.5	5	M4	2.5
	40					●	●	●	●	●	●	●	●	●	●	40	42	15	40	12.5	15	5.5	M4	2.5

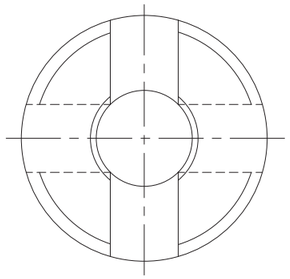
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque		Allowable misalignment		Static torsional stiffness (N·m/rad)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	★ Weight (g)
Model no.	ØD	Rated torqe (N·m)	Max. torqe (N·m)	Angular (°)	Parallel (mm)				
FACU	15	0.3	0.6	1	0.2	200	42000	$2.3*10^{-7}$	8
	20	0.6	1.2			400	31000	$8.1*10^{-6}$	16
	25	1.2	2.4			900	25000	$2.7*10^{-6}$	33
	30	2.4	4.8			1300	21000	$6.2*10^{-5}$	53
	35	4	8			2200	18000	$1.3*10^{-5}$	81
	40	6	12			2300	4000	$2.6*10^{-5}$	120

Ordering Example: FACU25 (Model no.) - 10 (Ød1) * 12 (Ød2) - 100 PCS (Q'ty)

FS-PC





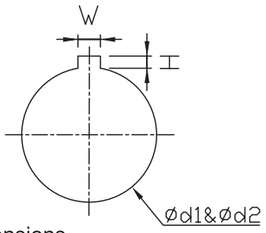
◆ Spacer

Material：carbon resin

Dimensions		ØD1	T	Ød3	W	Z	Coupling
Model no.	ØD						
FS-PC	6	6.2	2.2	2.4	1.3	1.3	FSMP6
	8	8.2	2.4	3.4	1.6	1.5	FSMP8
	10	10.2	2.6	4.4	1.6	1.6	FSMP10
	12	12.5	3.8	4.0	3	1.8	FSMP12
	15	15	4.8	5.0	3.4	2.3	FSMP15 FSCP15
	17	17.5	6	7.2	4.6	2.9	FSMP17 FSCP17
	20	21	6.6	8.2	5.8	3.2	FSMP20 FSCP20
	26	27	7	12.0	7	4	FSMP26 FSCP26
	30	31	8.5	13.0	7	4	FSMP30 FSCP30
	34	35	7	13.0	7	4	FSMP34 FSCP34
	38	41	9.5	16.0	7	4	FSMP38 FSCP38

◆ W dimension is made in strict standard, and inter-inlaid adjustment.

Ordering Example:	FS-PC	26
	Model no.	ØD

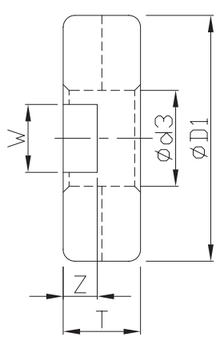


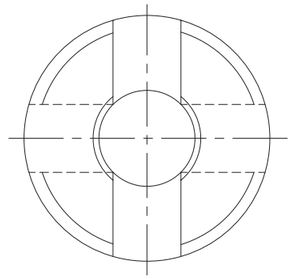
◆ Key way dimensions

(Reference for FSMG, FSCG, FSMP, FSCP)

Shaft dia. Ød1□Ød2	w		H		Key dimensions W*H
	Datum dimension	Allowable tolerance	Datum dimension	Allowable tolerance	
6~7.9	2	±0.0125	1.0	+0.1 0	2*2
8~10	3		1.4		3*3
10.1~12	4	±0.0150	1.8		4*4
12.1~17	5		2.3		5*5
17.1~20	6		2.8		6*6

FS-PP



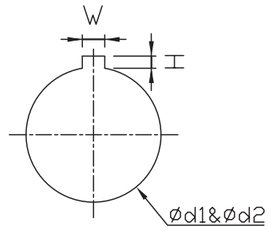


◆ Spacer

Material : Polyacetel (POM)

Dimensions		ØD1	T	Ød3	W	Z	Coupling
Model no.	ØD						
FS-PP	44	44.3	14	22.5	10.4	9	FAMJ44 FACJ44
	55	55	17	28	13	11	FAMJ55 FACJ55
	70	69	25	39	15	16.5	FAMJ70 FACJ70

Ordering Example:	FS-PP	44
	Model no.	ØD

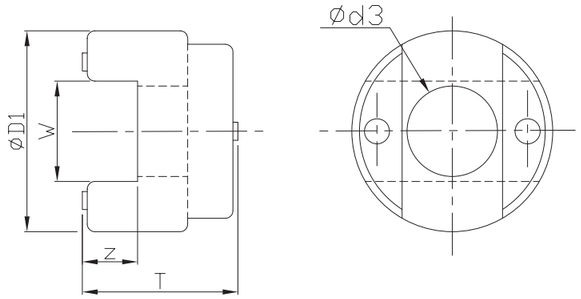


◆ Key way dimensions

(Reference for FAMJ, FACJ)

Shaft dia. Ød1□Ød2	w		H		Key dimensions W*H
	Datum dimension	Allowable tolerance	Datum dimension	Allowable tolerance	
14~17	5	±0.0150	2.3	+0.1 0	5*5
17.1~22	6		2.8		6*6
22.1~30	8	±0.0180	3.3	+0.2 0	8*7
30.1~38	10				10*8

FA-PB



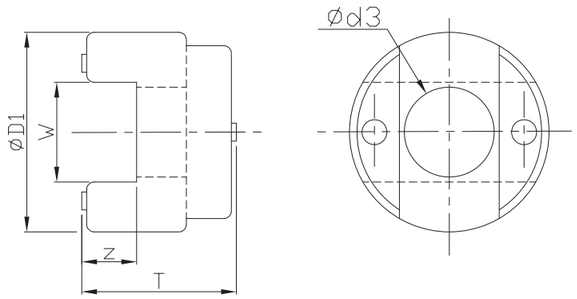
◆ Spacer

Material : Polyacetel (POM)

Dimensions		ØD1	T	Ød3	W	Z	Coupling
Model no.	ØD						
FA-PB	16	16	12	7	8	4.5	FAMN16 FACPL16
	20	20	15	9	10	5.5	FAMN20 FACPL20
	25	25	18	11	12	6.5	FAMN25 FACPL25
	32	32	21	14.5	15	7.5	FAMN32 FACPL32
	40	40	18	17	19	7.5	FAMN40 FACPL40

Ordering Example: FA-PB (Model no.) 32 (ØD)

FA-PG



◆ Spacer

Material : Polyacetel (POM)

Dimensions		ØD1	T	Ød3	W	Z	Coupling
Model no.	ØD						
FA-PG	12	12	4.9	6	4	2.5	FACPS12
	16	16	7	8	5	3.5	FACPS16
	20	20	8	10	7	4	FACPS20
	25	25	11.2	14	9	5.5	FACPS25
	32	32	13.3	18	10	6.5	FACPS32

Ordering Example: FA-PG (Model no.) 32 (ØD)

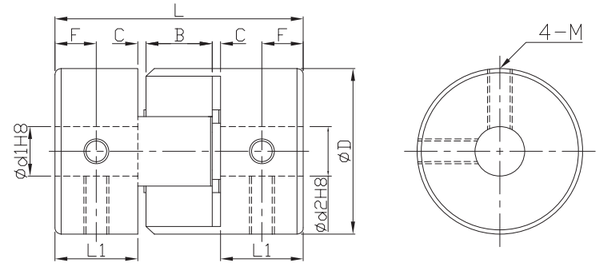
FAME

(B)

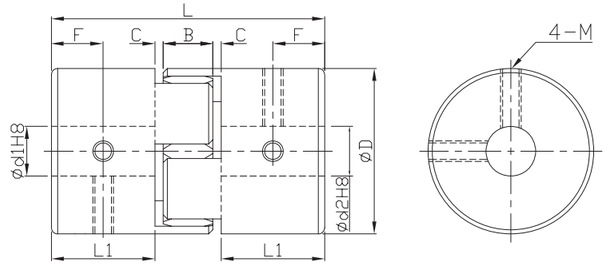
(W)

(R)

- Operating temperature : -20°C~60°C
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.



FAME ØD=14.20.30



FAME ØD=40

Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Set screw
Spider	Urethane(PU)	—	

★ Dimension "C", must be previously reserved while assemly by users, otherwise it would affect allowed deflection, accelerating shaft and coupling damage.

Dimensions		Spider (color selection)	Ød1&Ød2 selection *Ød1 ≦ Ød2														L	L1	B	C	F	Set screw	
Model no.	ØD		3	4	5	6	6.35	7	8	9.525	10	11	12	14	15	16						M	Lock torque (N·m)
FAME	14	B (Blue)	●	●	●	●											22	7	6	1	3.5	3	0.7
	20	W (White)			●	●	●	●	●	●							30	10	8		5		
	30							●	●	●	●	●	●	●			35	11	10	1.5	5.5	4	1.7
	40	R (Red)									●	●	●	●	●	●	66	25	12	2	12.5	5	4

★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)			Allowable misalignment					Static torsional stiffness (N·m/rad)			Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	★ Weight (g)
					Angular (°)	Parallel (mm)			Axial (mm)						
Model no.	ØD	B	W	R		B	W	R		B	W	R			
FAME	14	0.7	1.2	2	1.0	0.15	0.10	0.10	+0.6 0	8	14	22	27000	$2.1*10^{-7}$	7.3
	20	1.8	3	5		0.20	0.15		+0.8 0	16	29	55	19000	$1.0*10^{-6}$	18
	30	4	7.5	12.5		0.20	0.15		+1.0 0	46	73	130	13000	$5.9*10^{-6}$	46
	40	4.9	10	17		0.15	0.10		+1.2 0	380	570	1200	9600	$4.0*10^{-5}$	150

Ordering Example: FAME30 (Model no.) - 10 (Ød1) - 12 (Ød2) - 100 PCS (Q'ty)

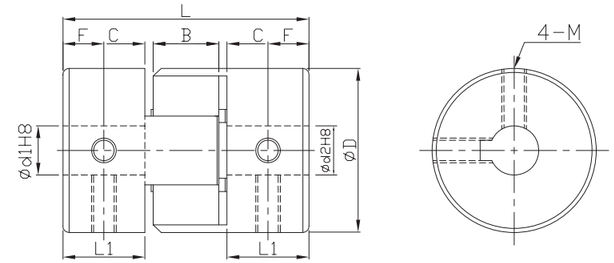
FAMK

(B)

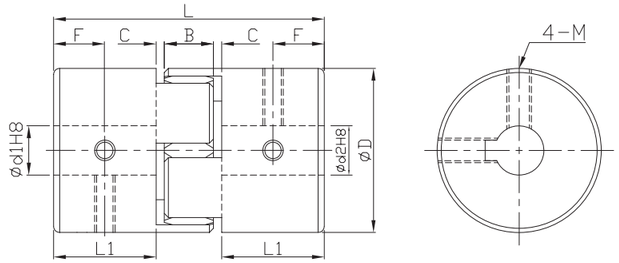
(W)

(R)

- Operating temperature : -20°C~60°C
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.



FAMK ØD=30



FAMK ØD=40

Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Set screw
Spider	Urethane(PU)	—	

★ Dimension "C", must be previously reserved while assemly by users, otherwise it would affect allowed deflection, accelerating shaft and coupling damage.

Dimensions		Spider (color selection)	Ød1&Ød2 selection *Ød1 ≦ Ød2						L	L1	B	C	F	Set screw	
Model no.	ØD		10	11	12	14	15	16						M	Lock torque (N·m)
FAMK	30	B（Blue） W（White） R（Red）	●	●	●	●			35	11	10	1.5	5.5	4	1.7
	40		●	●	●	●	●	●	66	25	12	2	12.5	5	4

★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)			Allowable misalignment					Static torsional stiffness (N·m/rad)			Max. RPM (r/min^{-1})	★ Moment of inertia ($kg \cdot m^2$)	★ Weight (g)
					Angular (°)	Parallel (mm)			Axial (mm)						
Model no.	ØD	B	W	R		B	W	R		B	W	R			
FAMK	30	4	7.5	12.5	1.0	0.20	0.15	0.10	+1.00 0	46	73	130	5100	$5.8*10^{-6}$	45
	40	4.9	10	17		0.15	0.10		+1.20 0	380	570	1200	3800	$3.8*10^{-5}$	150

◎FAME&FAMK spider selection and installation remark please refer to P.51

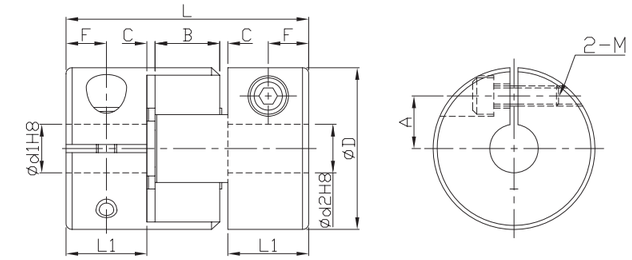
Ordering Example: FAMK30 (Model no.) - 12 (Ød1) * 14 (Ød2) - 100 PCS (Q'ty)

FACE

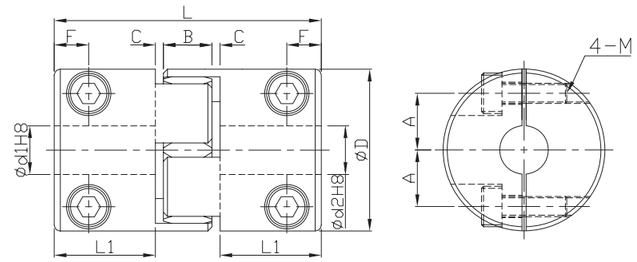
(B)

(W)

(R)



FACE ØD=14.20.30



FACE ØD=40

- Operating temperature : -20°C~60°C
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.

Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Clamping screw
Spider	Urethane(PU)	—	

★ Dimension "C", must be previously reserved while assemly by users, otherwise it would affect allowed deflection, accelerating shaft and coupling damage.

Dimensions		Spider (color selection)	Ød1&Ød2 selection *Ød1 ≦ Ød2														L	L1	B	C	F	A	Clamping screw	
Model no.	ØD		3	4	5	6	6.35	7	8	9.525	10	11	12	14	15	16							M	Lock torque (N·m)
FACE	14	B（Blue） W（White） R（Red）	●	●	●												22	7	6	1	3.5	4	2	0.5
	20				●	●	●	●	●								30	10	8		5	6.5	2.5	1
	30							●	●	●	●	●	●				35	11	10	1.5	5.5	10	4	2.5
	40										●	●	●	●	●	●	66	25	12	2	8.5	14	5	4

★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)			Allowable misalignment					Static torsional stiffness (N·m/rad)			Max. RPM (r/min^{-1})	★ Moment of inertia ($kg \cdot m^2$)	★ Weight (g)
					Angular (°)	Parallel (mm)			Axial (mm)						
Model no.	ØD	B	W	R		B	W	R		B	W	R			
FACE	14	0.7	1.2	2	1.0	0.15	0.10	0.10	+0.6 0	8	14	22	11000	$1.6*10^{-7}$	6
	20	1.8	3	5		0.20	0.15		+0.8 0	16	29	55	7600	$1.1*10^{-6}$	19
	30	4	7.5	12.5		0.20	0.15		+1.0 0	46	73	130	5100	$6.2*10^{-6}$	50
	40	4.9	10	17		0.15	0.10		+1.2 0	380	570	1200	3800	$3.9*10^{-5}$	160

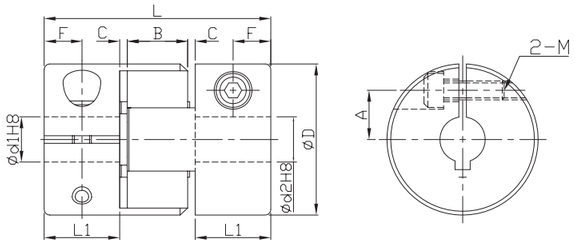
Ordering Example: FACE14 (Model no.) - 10 (Ød1) * 12 (Ød2) - 100 PCS (Q'ty)

FACK

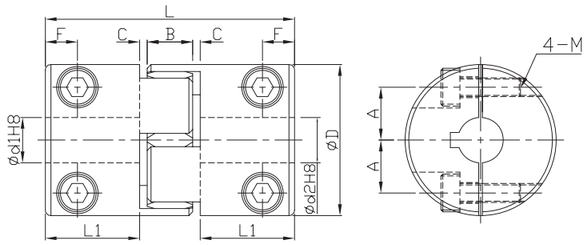
(B)

(W)

(R)



FACK ØD=14.20.30



FACK ØD=40

- Operating temperature : -20°C~60°C
- Offset, deflection, shaft deviation are individual allowed values, so axial offsets in all reasons appearing at same time would reduce values.

Component	Material	Surface finish	Accessories
Main frame	Aluminum Alloy	Anodized	Clamping screw
Spider	Urethane(PU)	—	

★ Dimension "C", must be previously reserved while assemly by users, otherwise it would affect allowed deflection, accelerating shaft and coupling damage.

Dimensions		Spider (color selection)	Ød1&Ød2 selection *Ød1 ≦ Ød2						L	L1	B	C	F	A	Clamping screw	
Model no.	ØD		10	11	12	14	15	16							M	Lock torque (N·m)
FACK	30	B (Blue) W (White) R (Red)	●	●	●				35	11	10	1.5	5.5	10	4	2.5
	40		●	●	●	●	●	●	66	25	12	2	8.5	14	5	4

★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)			Allowable misalignment					Static torsional stiffness (N·m/rad)			Max. RPM (r/min^{-1})	★ Moment of inertia ($kg \cdot m^2$)	★ Weight (g)
					Angular (°)	Parallel (mm)			Axial (mm)						
Model no.	ØD	B	W	R		B	W	R		B	W	R			
FACK	30	4	7.5	12.5	1.0	0.20	0.15	0.10	+1.0 0	46	73	130	5100	$4.2*10^{-6}$	50
	40	4.9	10	17		0.15	0.10		+1.2 0	380	570	1200	3800	$3.7*10^{-5}$	160

◎FACE&FACK spider selection and installation remark please refer to P.51

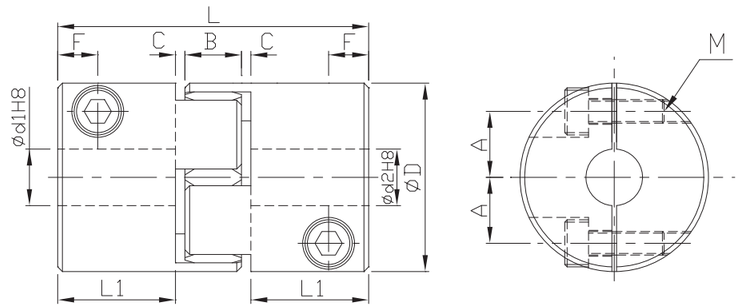
Ordering Example: FACK30 (Model no.) - 10 (Ød1) * 12 (Ød2) - 100 PCS (Q'ty)

FACE

(W)

(R)

- Operating temperature : -20°C~90°C
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.
- Key way available on request per indicated as LK(Ød1 bore), RK(Ød2 bore), WK(Ød1.Ød2 bore)



FACE D=55.65.80

Component	Material	Surface finished	Accessories
Main frame	AL6061T651	Anodized	Clamping
Spider	Urethane(PU)	—	

Key way Ød1 . Ød2	W		H		Key way dimension W□
	Dimension	Alloable tolerance	Dimension	Alloable tolerance	
6~7	2	±0.015	1.0	±0.1	2*2
8~10	3		1.4		3*3
11~12	4	±0.02	1.8		4*4
13~16	5		2.3		5*5
18~22	6		2.8		6*6
24~30	8	±0.025			8*8
32~42	10		3.3		10*10

Size		Spider Elestic strength (Color)	Ød1&Ød2 options * Ød1≦Ød2							L	L1	B	C	F	A	Clamping screw	
Model	ØD		16	20	24	32	35	40	42							M	Lock Torque (N·m)
FACE	55	92sh A(W) 98sh A(R)	●	●	●					78	30	14	2	10.5	20	M6	10.5
	65		●	●	●	●	●			90	35	15	2.5	11.5	25	M8	25
	80		●	●	●	●	●	●	●	114	45	18	3	15.5	25	M8	30

★Moment of inertial torque and weight calculated by maximum diameter.

Specifications		Allowable Torque (N.m)		Allowable Angle Mis-alignment	Allowable Parallel Mis-alignment (mm)		Allowable Axile Mis-alignment (mm)	Static torsional stiffness (N·m/rad)		Max. RPM (r/min^{-1})	Moment of inertia (kg·m)	Weight (g)
Model	ØD	R	W		R	W		R	W			
FACE	55	60	35	0.9°	0.1	0.1	1.2	2600	1600	8650	$1.6*10^{-4}$	330
	65	160	95				1.2	4900	3000	7350	$3.8*10^{-4}$	560
	80	325	190				1.2	6500	5300	5950	$1.0*10^{-3}$	560

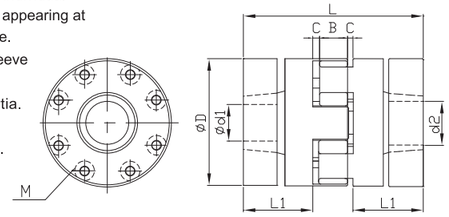
Ordering Example: FACE65 (Model no.) - 24 (Ød1) * 55 (Ød2) - 100 PCS (Q'ty)

FASE

(W)

(R)

- Operating temperature：-20˚C~90˚C
- Offset of angular, parallel, or axial deviation are individual allowed value, so couple reasons of axial offset appearing at same time would reduce the unit allowable value.
- Zero blacklash and high precision expansion sleeve design.
- Aluminum sleeve, light and low rotatary inertia.
- Tighted axle to have high friction torque.
- Stable rotation in maximum speed to 40m/s.



Component	Material	Surface finished	Accessories
Main frame	Aluminum	Anodized	Clamping
Spider	Urethane(PU)	—	

Size		Spider Elestic strength (Color)	Ød1&Ød2 Options * Ød1 ≦ Ød2									L	L1	B	C	Cinch Bolt	
Model	ØD		16	20	24	26	28	29	32	36	38					M	Lock Torque (N·m)
FASE FCSE	55	92sh A(W) 98sh A(R)	●	●	●							78	30	14	2	M5	6
	65					●	●	●	●	●	●	90	35	15	2.5	M5	7
	80					●	●	●	●	●	●	114	45	18	3	M6	12
	95						●	●	●	●	●	126	50	20	3	M8	30

★Moment of inertial torque and weight calculated by maximum diameter.

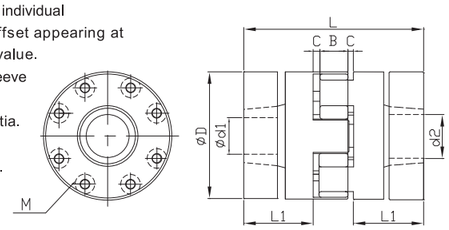
Specifications		Allowable Torque (N·m)		Allowable Angle Misalignment	Allowable Parallel Misalignment (mm)		Allowable Axile Misalignment (mm)	Static torsional stiffness (N·m/rad)		Max. RPM (r/min^{-1})	Moment of inertia (kg·m)	Weight (g)
Model	ØD	R	W		R	W		R	W			
FASE	55	60	35	0.9°	0.1	0.1	1.2	2600	1600	8650	$0.78*10^{-4}$	162
	65	160	95				1.2	2600	1600	7350	$1.70*10^{-4}$	240
	80	325	190				1.2	4900	3000	5950	$5.17*10^{-4}$	490
	95	450	265				1.2	2600	1600	5000	$11.7*10^{-4}$	772

FCSE

(W)

(R)

- Operating temperature：-20°C~90°C
- Offset of angular, parallel, or axial deviation are individual allowed value , so couple reasons of axial offset appearing at same time would reduce the unit allowable value.
- Zero blacklash and high precision expansion sleeve design.
- Aluminum sleeve, light and low rotatary inertia.
- Tighted axle to have high friction torque.
- Stable rotation in maximum speed to 40m/s.

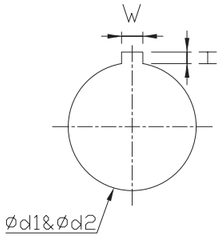


Component	Material	Surface finished	Accessories
Main frame	Mid-carbon steel	Black dyed	Clamping screw
Spider	Urethane(PU)	—	

Specifications		Allowable Torque (N·m)		Allowable Angle Misalignment	Allowable Parallel Misalignment (mm)		Allowable Axile Misalignment (mm)	Static torsional stiffness (N·m/rad)		Max. RPM (r/min^{-1})	Moment of inertia (kg·m)	Weight (g)
Model	ØD	R	W		R	W		R	W			
FCSE	55	60	35	0.9°	0.1	0.1	1.2	2600	1600	6950	$1.91*10^{-4}$	399
	65	160	95				1.2	2600	1600	5850	$4.18*10^{-4}$	592
	80	325	190				1.2	4900	3000	4758	$12.9*10^{-4}$	1225
	95	450	265				1.2	2600	1600	4000	$31.7*10^{-4}$	2300

Ordering Example: FCSE80 (Model no.) - 28 (Ød1) * 36 (Ød2) - 100 PCS (Q'ty)

Key way dimensions



Shaft dia. Ød1□Ød2	w		H		Key dimensions W*H
	Datum dimension	Allowable tolerance	Datum dimension	Allowable tolerance	
10 · 11 · 12	4	±0.0150	1.8	+0.1	4*4
14 · 15 · 16	5		2.3	0	5*5

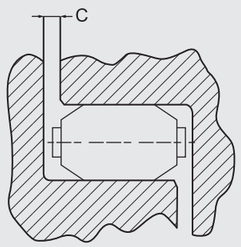
Jaw Spider

Model no.	ØD	Coupling		Shape diagram	Colour	Hardness JIS A (Shore A standard)
FS-B FS-W FS-R	14	FAME14	FACE14		B= Blue W= White R= Red	B=80 W=92 R=98
	20	FAME20	FACE20			
	30	FAME30 FACE30	FAMK30 FACK30			
	40	FAME40 FACE40	FAMK40 FACK40			

Model no.	ØD	Coupling	Shape diagram	Colour	Hardness JIS A (Shore A standard)	Remark
FS-W FS-R	55	FACE		W=White R =Red	92 shA 98 shA	Spider colour might be green base on same hardness
	65					
	80					
	55	FASE				
	65					
	80					
	95					
	55	FCSE				
	65					
	80					
	95					

Ordering Example: FS-W (Model no.) 30 (ØD)

- Spiders are available used for set screw type and clamping type.
- Larger hardness has better sensibility in angular transmission. Smaller hardness has better vibration absorbability.
- Additional remark of installation of Flexible couplings integrated with Jaw Spiders :
  Flexible couplings (integrated with Jaw Spiders), model number FAME, FAMK, FACE, FACK series need to reserve "C" dimension while assembling. This would ensure coupling the function and usage life of Jaw Spiders, as well as keeping isoltion feature of the coupling.



Polyacetal plastic(POM)

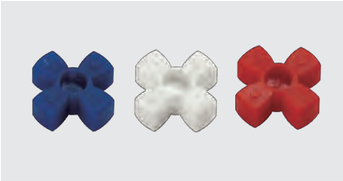
Polyacetal(Abbr. POM), also called Plastic steel.

POM character：Polyoxymethylene is a kind of thermal plasticity polymer, having good physical, mechanical and chemical functions. It has high hardness, rigidity in very wide range of temperature. Secondarily, resisted strength, fatigue resistance, creep resistance are excellent as well, especially outstanding dimen-sion stability and durability; besides, polyoxymethylene has advantages of small friction factor, good durability, dispens-able lubricant, good organci solvent-resistance, low absorbent ability etc…. Long-term using in the range of -40~104 ℃. In addition, polyoxymethylene has better corro-sion resistance.

Urethane(PU)

PU glue is also called polyurethane

Polyurethane application is kind of flexible polymer, used as elastic resilience and damping in shock absorber. Generally, polyurethane suits for terrains with collision from small to medium level most, and adjustable polyurethane makes perfect effect. Urethane glue is water-resistant, abrasion-resist, high mechanism strength, and product hardness adjusted by purposes, high elasticity, good shock absorbability, no hurting machine tools, a excelent anti-collision material.



Highly wear-resisting copper alloy

Highly wear-resisting copper alloy(aluminum bronze(C6161))

High tensile-resist strength, wear-resistance, and offer various extruded materials, forged materials, centrifugal rolls, and applied to gear, bearing, bushing, slide panel, plastic mould, electrode heads….etc.

Character chart for plastic material

Material	Specific gravity	Thermal distortion temperature	Flammability	Feature		Purpose
				Advantage	Defect	
POM	1.14 ~ 1.43	Homopolymer	Flammable	1. Tough、flexible	1. Low anti-ultraviolet	1. Parts in industry load
				2. CLIP character、excelent fatigue resistance	2. Heat dissolution and formald-ehyde gas produced	2. Automobile、electric parts
				3. Self-lubricity, low abrasion-resistance	3. Low anti-acid	3. toy parts
				4. Drug tolerance		4. Substitute for metal
				5. Good heat-resistance		
PU	1.11 ~ 1.24	Softening point	Flammable	1. Good abrasion-resistance	1. Softness in low level，easily stuck while demolding and shrink.	1. Shoes and sports utilities
				2. Climate-resistant and low temperature-resistant (-35℃~50℃)	2. Long dried time for materials	2. Shock absorb, noise elimination, bushing
				3. anti-oxygen, ozone aging characters		3. Grip and grasp with soft-touch feeling
				4. Good tensile rate of bending strength		
				5. Adjustable toughness		

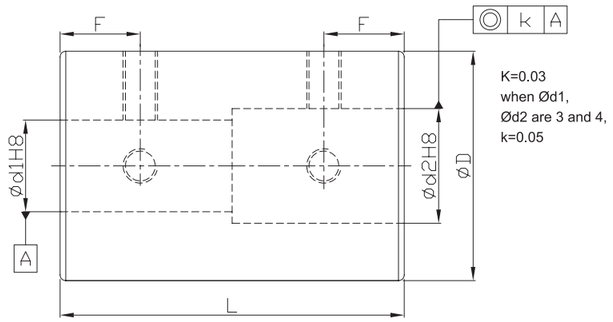
Remark of plastic spacer corrosponding to environment temperature.

Plastic spacer series include rubber or plastic parts. These model no, must be used in operating temperature range indicated on our catalogs. If temperature over 30℃, max. torque and allowable torque shall be corrected by factors as listed below.

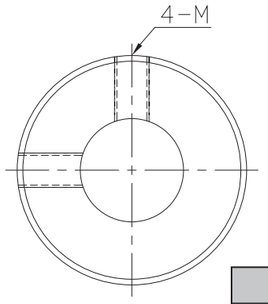
Environment temperature	Corrective factor
-20℃ ~ 30℃	1.00
30℃ ~ 40℃	0.80
40℃ ~ 60℃	0.70
60℃ ~ 100℃	0.55

RAM

- Light, very low inertial and high sensibility.
- Maintenance free, super anti-oil and corrosion-resistance.



*When Ød1<4 and Ød2>5, there would be 3 set screws.
*When Ød1 and Ød2 both smaller than 4, there would be 2 set screws.



Material	Surface finish	Accessories
Aluminum Alloy	Anodized	Set screw

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2													L	F	M Rough thread
Model no.	ØD	3	4	5	6	8	10	11	12	14	15	16	18	20			
RAM	16	●	●	●	●										24	6	3
	20			●	●	●	●								30	7	
	25					●	●	●	●						36	9	4
	32								●	●	●	●			41	10	
	40										●	●	●	●	44	10.5	5

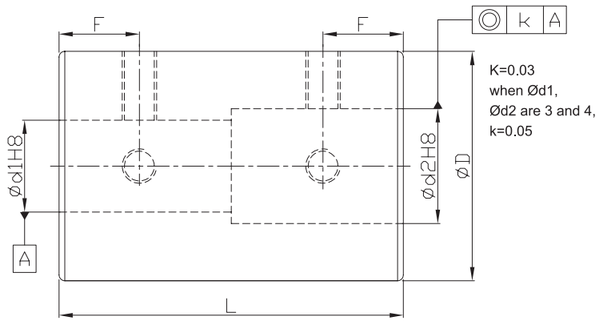
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Max. RPM (r/min^{-1})	★ Moment of inertia ($kg \cdot m^2$)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD					
RAM	16	0.3	24000	$4.4*10^{-7}$	0.7	11
	20	0.5	19000	$1.3*10^{-6}$		20
	25	1	15000	$3.9*10^{-6}$	1.7	39
	32	2	12000	$1.2*10^{-5}$		71
	40	4	4000	$1.5*10^{-5}$	4	120

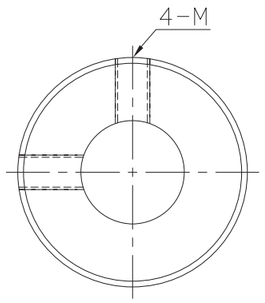
Ordering Example: RAM20 (Model no.) - 6 (Ød1) * 8 (Ød2) - 100 PCS (Q'ty)

RSM

- Light, very low inertial and high sensibility.
- Maintenance free, super anti-oil and corrosion-resistance.



*When Ød1<4 and Ød2>5, there would be 3 set screws.
*When Ød1 and Ød2 both smaller than 4, there would be 2 set screws.



Material	Accessories
SUS303	Set screw

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2											L	F	M Rough thread
Model no.	ØD	3	4	5	6	8	10	11	12	14	15	16			
RSM	16	●	●	●	●								24	6	3
	20			●	●	●	●						30	7	
	25					●	●	●	●				36	9	4
	32								●	●	●	●	41	10	

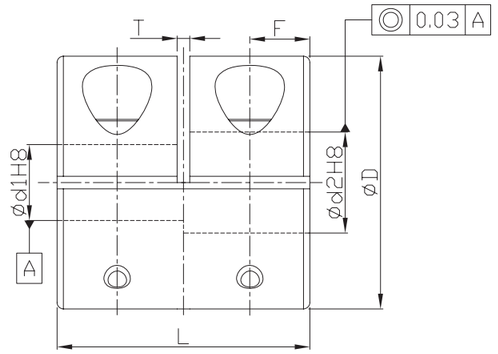
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Max. RPM (r/min^{-1})	★ Moment of inertia ($kg \cdot m^2$)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD					
RSM	16	0.3	24000	$1.2*10^{-6}$	0.7	28
	20	0.5	19000	$3.5*10^{-6}$		54
	25	1	15000	$1.0*10^{-5}$	1.7	100
	32	2	12000	$3.1*10^{-5}$		190

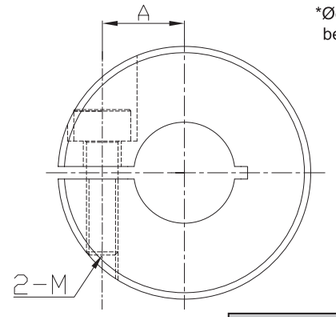
Ordering Example: RSM20 (Model no.) - 6 (Ød1) * 8 (Ød2) - 100 PCS (Q'ty)

RACS

- Light, very low inertial and high sensibility.
- Maintenance free, super anti-oil and corrosion-resistance.
- Beam type with no allowable offset almost, please show the axis entirely in operating.



*Ød1&Ød2 tolerance are defined before machining.



Material	Surface finish	Accessories
Aluminum alloy	Anodized	Clamping screw

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2									L	A	T	F	M Rough thread
Model no.	ØD	5	6	8	10	12	14	15	16	18					
RACS	16	●	●								16	5	1	3.75	2.5
	20		●	●							20	6.5		4.75	
	25			●	●						25	9		6	3
	32				●	●	●				32	11		7.75	4
	40						●	●	●	●	44	13	1.5	10.5	5

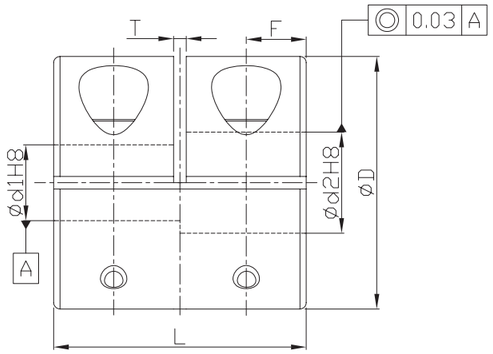
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Max. RPM (r/min^{-1})	★ Moment of inertia ($kg \cdot m^2$)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD					
RACS	16	0.3	9500	$3.0*10^{-7}$	1	9
	20	0.5	7600	$8.7*10^{-7}$		15
	25	1	6100	$2.7*10^{-6}$	1.5	29
	32	2	4800	$7.1*10^{-6}$	2.5	61
	40	4	4000	$1.5*10^{-5}$	7	120

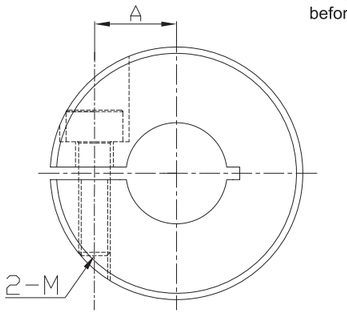
Ordering Example: RACS32 (Model no.) - 10 (Ød1) * 12 (Ød2) - 100 PCS (Q'ty)

RSCS

- Light, very low inertial and high sensibility.
- Maintenance free, super anti-oil and corrosion-resistance.
- Beam type with no allowable offset almost, please show the axis entirely in operating.



*Ød1&Ød2 tolerance are defined before machining.



Material	Accessories
SUS303	Clamping screw

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2						L	A	T	F	M Rough thread
Model no.	ØD	5	6	8	10	12	14					
RSCS	16	●	●					16	5	1	3.75	2.5
	20		●	●				20	6.5		4.75	
	25			●	●			25	9		6	3
	32				●	●	●	32	11		7.75	4

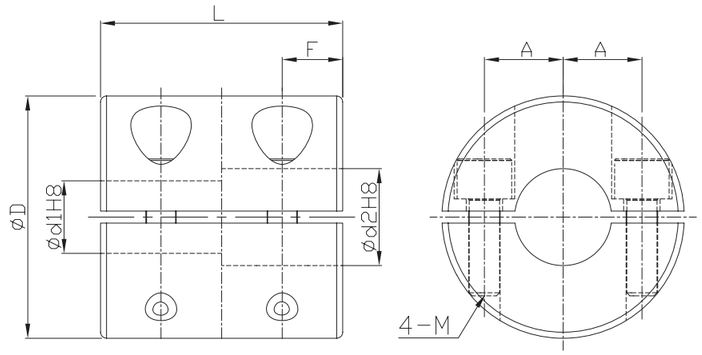
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD					
RSCS	16	0.3	9500	$8.0*10^{-7}$	1	22
	20	0.5	7600	$2.4*10^{-6}$		41
	25	1	6100	$7.3*10^{-6}$	1.5	80
	32	2	4800	$2.5*10^{-5}$	2.5	160

Ordering Example: RSCS20 (Model no.) - 6 (Ød1) * 8 (Ød2) - 100 PCS (Q'ty)

RAB

- Light, very low inertial and high sensibility.
- Maintenance free, super anti-oil and corrosion-resistance.
- Beam type with no allowable offset almost, please show the axis entirely in operating.



*Ød1&Ød2 tolerance are defined before machining.

Material	Surface finish	Accessories
Aluminum Alloy	Anodized	Clamping screw

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2						L	A	F	M
Model no.	ØD	5	6	8	10	12	14				
RAB	16	●	●					16	5	4	2.5
	20		●	●				20	6.5	5	
	25			●	●			25	9	6	3
	32				●	●	●	32	11	8	4

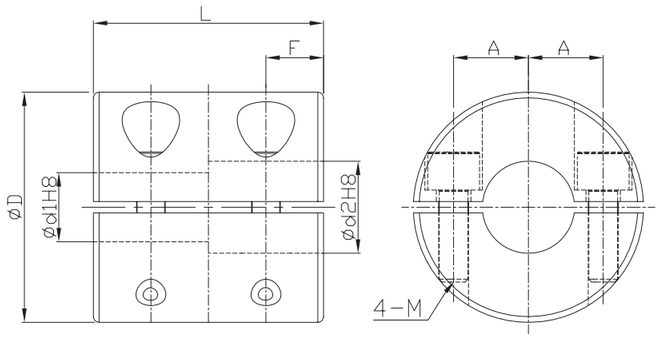
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD					
RAB	16	0.3	9500	$3.2*10^{-7}$	1	8.8
	20	0.5	7600	$8.7*10^{-7}$		15
	25	1	6100	$2.7*10^{-6}$	1.5	29
	32	2	4800	$9.3*10^{-6}$	2.5	61

Ordering Example: RAB25 (Model no.) - 8 (Ød1) * 10 (Ød2) - 100 PCS (Q'ty)

RSB

- Light, very low inertial and high sensibility.
- Maintenance free, super anti-oil and corrosion-resistance.
- Beam type with no allowable offset almost, please show the axis entirely in operating.



*Ød1&Ød2 tolerance are defined before machining.

Material	Accessories
SUS303	Clamping screw

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2						L	A	F	M
Model no.	ØD	5	6	8	10	12	14				
RSB	16	●	●					16	5	4	2.5
	20		●	●				20	6.5	5	
	25			●	●			25	9	6	3
	32				●	●	●	32	11	8	4

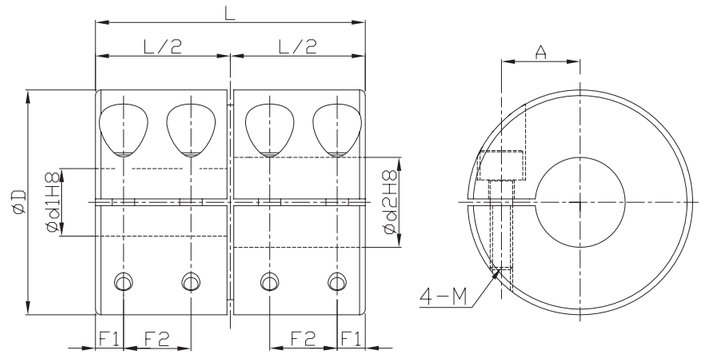
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Max. RPM (r/min^{-1})	★ Moment of inertia ($kg \cdot m^2$)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD					
RSB	16	0.3	9500	$8.2*10^{-7}$	1	22
	20	0.5	7600	$2.4*10^{-6}$		41
	25	1	6100	$7.3*10^{-6}$	1.5	80
	32	2	4800	$2.5*10^{-5}$	2.5	160

Ordering Example: RSB20 (Model no.) - 6 (Ød1) * 8 (Ød2) - 100 PCS (Q'ty)

RACL

- Light, very low inertial and high sensibility.
- Maintenance free, super anti-oil and corrosion-resistance.
- Beam type with no allowable offset almost, please show the axis entirely in operating.



*Ød1&Ød2 tolerance are defined before machining.

Material	Surface finish	Accessories
Aluminum Alloy	Anodized	Clamping screw

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2						L	A	F1	F2	M
Model no.	ØD	5	6	8	10	12	14					
RACL	16	●	●					22	5	2.5	5.5	2
	20		●	●				24	7		6	
	25			●	●			36	9	4.5	9	2.5
	32				●	●	●	40	11	4	10	3

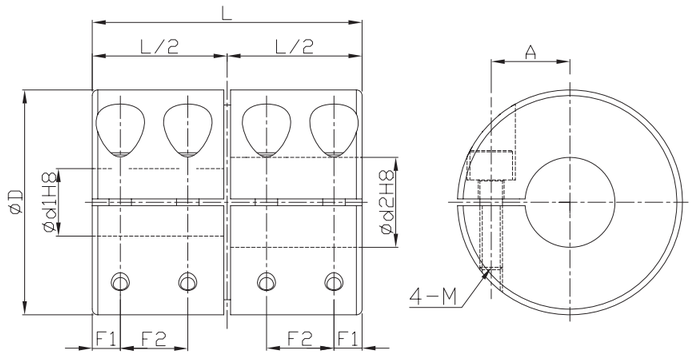
★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Max. RPM (r/min^{-1})	★ Moment of inertia ($kg \cdot m^2$)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD					
RACL	16	0.3	9000	$3.4*10^{-7}$	0.5	10
	20	0.5	7000	$9.2*10^{-7}$		18
	25	1	6000	$3.4*10^{-6}$	1	38
	32	2	4500	$1.0*10^{-5}$	1.5	70

Ordering Example: RACL25 (Model no.) - 8 (Ød1) * 10 (Ød2) - 100 PCS (Q'ty)

RSCL

- Light, very low inertial and high sensibility.
- Maintenance free, super anti-oil and corrosion-resistance.
- Beam type with no allowable offset almost, please show the axis entirely in operating.



*Ød1&Ød2 tolerance are defined before machining.

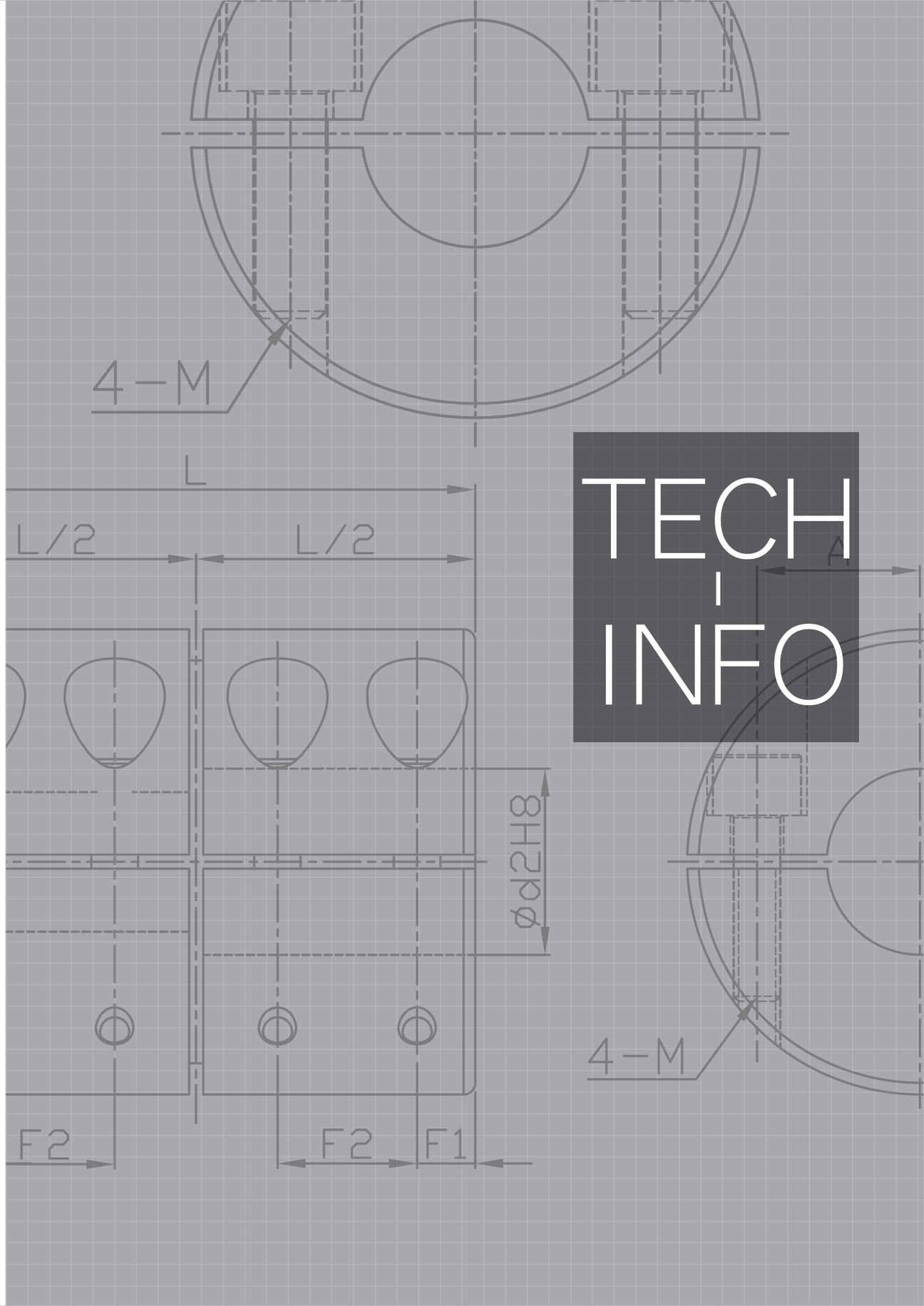
Material	Accessories
SUS303	Clamping screw

Dimensions		Ød1&Ød2 selection *Ød1 ≦ Ød2						L	A	F1	F2	M
Model no.	ØD	5	6	8	10	12	14					
RSCL	16	●	●					22	5	2.5	5.5	2
	20		●	●				24	7		6	
	25			●	●			36	9	4.5	9	2.5
	32				●	●	●	40	11	4	10	3

★Moment of inertial torque and weight calculated by maximum diameter.

Specification		Allowable wrench torque (N·m)	Max. RPM (r/min^{-1})	★ Moment of inertia (kg·m^2)	Screw fixing torque (N·m)	★ Weight (g)
Model no.	ØD					
RSCL	16	0.3	9000	$8.9*10^{-7}$	0.5	25
	20	0.5	7000	$2.5*10^{-6}$		45
	25	1	6000	$9.2*10^{-6}$	1	100
	32	2	4500	$2.7*10^{-5}$	1.5	180

Ordering Example: RSCL25 (Model no.) - 8 (Ød1) * 10 (Ød2) - 100 PCS (Q'ty)



Installation notice :

(1) To avoid mistakenly operating driver, please be sure to cut off main power and start installation after security confirmation.

(2) Please clear out miscellaneous, dust and oil...etc attached on the shafts and inner of coupling. Especially for the grease with molybdenum disulfide and extreme pressure additive which affect friction factor substantially, please proceed defatting treatment entirely.

(3) In order to perform coupling functions completely, please proceed installing as range of max. allowable offset in the spec list. Installation error in the list is top value occuring individually, so please take below half of allowed values in multiple cases into account.

(4) Please take the ruler against to outer body while centering, with around 90° to proceed checking two departed points. Centering accuracy has huge affection to life hours of unit.

(5) Please set safety cover after installating this product. Otherwise, it might get hurt by touching products in operating.

(6) To lock screw, please be sure to use corrected torque wrench and refer to the torque value of clamping lock screw in the spec list to secure.

(7) Installing by using wrong connecting ways would cause too much vibration, abnormal running or inaccurate center, overloaded defelction to damage motor, coupling...etc mechanism units. It's recommended to notice accuracy balance correction to extend unit life while assembling mechanically.

Operation notice :

(1) Considering safety, please set protective jacket on the turning parts of device surrounding couplings.

(2) If allowable offset is set over limited range or too much torque, it might cause distortion of coupling possible to shorten life.

(3) If any noise (metal sound) in running, please stop operating, and check any interference to centering and shafts, and screw loosened or not.

(4) If load variation of device is too much, please put adhensive or adjust one level higher of coupling model to avoid screw loose.

Safety notice :

In order to work safetly, please read description as below, and keep the instruction to recheck the points if necessary.

Danger

Following acts might cause danger or harmful damage if using mistakenly.

- For safety work, coupling and related rotating parts must be protected by covers. You might be hurt if touching these parts in operating.
- To avoid danger, protection device must be installed.
- Power off is necessary while assembling and disassembling.
- Lock screw and counter bore screw must be secured by using screwdriver, wrench or torque wrench fitly.
- Operating speed of product never over top speed.
- No disassembling or recombinating products.

Warning

Following acts might cause body hurt or wealth loss if using mistakenly.

- Please operate in allowable deviation range. It might cause damage of coupling if deviation is out of allowed range and probably affect coupling system badly.
- Torque produced by continuously operating can't exceed rated torque. Otherwise, coupling might be damaged, or affect coupling system badly.
- While securing, please use screws（lock screw and counter bore screw）appointed by GMT, not any ones else.
- No operating in the environment affecting products badly.
- Please stop operation of rotating machine if hearing abnormal noise. Check deviation of machine, any interference between shafts, screws loosened or not...etc.
- If the rotating machine you use operates in bigger load variation, please use anti-loosen glue on screws to avoid coming off, or use one-size larger coupling.
- Please ask experts to deal with these products to avoid damage to environment while product abandon.
- Never touch coupling after completing operation. You might be burned by high temperature caused by coupling system.

Reference Table of Basic Shaft Fitting

Unit：μ=0.001mm

Basic Shaft	Bore Tolerance Classes																
	Clearance fit							Transition fit			Interference fit						
h5							H6	JS6	K6	M6	N6*	P6					
h6					F6	G6	H6	JS6	K6	M6	N6*	P6*					
					F7	G7	H7	JS7	K7	M7	N7	P7*	R7	S7	T7	U7	X7
h7				E7	F7		H7										
					F8		H8										
h8			D8	E8	F8		H8										
			D9	E9			H9										
h9			D8	E8			H8										
		C9	D9	E9			H9										
	B10	C10	D10														

★ There may be exceptions in these fits depending on dimension classes.

Reference Table for Basic Bore Fitting

Unit：μ=0.001mm

Basic Bore	Shaft Tolerance Classes																
	Clearance fit							Transition fit			Interference fit						
H6						g5	h5	js5	k5	m5							
						g6	h6	js6	k6	m6	n6*	p6*					
H7					f6	g6	h6	js6	k6	m6	n6	p6*	r6*	s6	t6	u6	x6
					f6		h7	js7									
H8				e7	f7		h7										
					f7		h8										
				e8	f8												
H9			d9	e9			h8										
			d8	e8			h9										
H9		c9	d9	e9													
	b9	c9	d9														
H10	b9	c9	d9														

★ There may be exceptions in these fits depending on dimension classes.

Reference Table of Shaft Tolerance

Unit：μ=0.001mm

Basic Dimensions (mm)		Tolerance Zone Class for Shaft																
		b9	c9	d8	d9	e7	e8	e9	f6	f7	f8	g5	g6	h5	h6	h7	h8	h9
—	≤3	-140 -165	-60 -85	-20 -34	-20 -45	-14 -24	-14 -28	-14 -39	-6 -12	-6 -16	-6 -20	-2 -6	-2 -8	0 -4	0 -6	0 -10	0 -14	0 -25
>3	≤6	-140 -170	- 70 -100	-30 -48	-30 -60	-20 -32	-20 -38	-20 -50	-10 -18	-10 -22	-10 -28	-4 -9	-4 -12	0 -5	0 -8	0 -12	0 -18	0 -30
>6	≤10	-150 -186	- 80 -116	-40 -62	-40 -76	-25 -40	-25 -47	-25 -61	-13 -22	-13 -28	-13 -35	-5 -11	-5 -14	0 -6	0 -9	0 -15	0 -22	0 -36
>10	≤14	-150 -193	- 95 -138	-50 -77	-50 -93	-32 -50	-32 -59	-32 -75	-16 -27	-16 -34	-16 -43	-6 -14	-6 -17	0 -8	0 -11	0 -18	0 -27	0 -43
>14	≤18																	
>18	≤24	-160 -212	-110 -162	-65 -98	-65 -117	-40 -61	-40 -73	-40 -92	-20 -33	-20 -41	-20 -53	-7 -16	-7 -20	0 -9	0 -13	0 -21	0 -33	0 -52
>24	≤30																	
>30	≤40	-170 -232	-120 -182	-80 -119	-80 -142	-50 -75	-50 -89	-50 -112	-25 -41	-25 -50	-25 -64	-9 -20	-9 -25	0 -11	0 -16	0 -25	0 -39	0 -62
>40	≤50	-180 -242	-130 -192															
>50	≤65	-190 -264	-140 -214	-100 -146	-100 -174	-60 -90	-60 -106	-60 -134	-30 -49	-30 -60	-30 -76	-10 -23	-10 -29	0 -13	0 -19	0 -30	0 -46	0 -74
>65	≤80	-200 -274	-150 -224															
>80	≤100	-220 -307	-170 -257	-120 -174	-120 -207	-72 -107	-72 -126	-72 -159	-36 -58	-36 -71	-36 -90	-12 -27	-12 -34	0 -15	0 -22	0 -35	0 -54	0 -87
>100	≤120	-240 -327	-180 -267															
>120	≤140	-260 -360	-200 -300	-145 -208	-145 -245	-85 -125	-85 -148	-85 -185	-43 -68	-43 -83	-43 -106	-14 -32	-14 -39	0 -18	0 -25	0 -40	0 -63	0 -100
>140	≤160	-280 -380	-210 -310															
>160	≤180	-310 -410	-230 -330															
>180	≤200	-340 -455	-240 -355	-170 -242	-170 -285	-100 -146	-100 -172	-100 -215	-50 -79	-50 -96	-50 -122	-15 -35	-15 -44	0 -20	0 -29	0 -46	0 -72	0 -115
>200	≤225	-380 -495	-260 -375															
>225	≤250	-420 -535	-280 -395															
>250	≤280	-480 -610	-300 -430	-190 -271	-190 -320	-110 -162	-110 -191	-110 -240	-56 -88	-56 -108	-56 -137	-17 -40	-17 -49	0 -23	0 -32	0 -52	0 -81	0 -130
>280	≤315	-540 -670	-330 -460															
>315	≤355	-600 -740	-360 -500	-210 -299	-210 -350	-125 -182	-125 -214	-125 -265	-62 -98	-62 -119	-62 -151	-18 -43	-18 -54	0 -25	0 -36	0 -57	0 -89	0 -140
>355	≤400	-680 -820	-400 -540															
>400	≤450	-760 -915	-440 -595	-230 -327	-230 -385	-135 -198	-135 -232	-135 -290	-68 -108	-68 -131	-68 -165	-20 -47	-20 -60	0 -27	0 -40	0 -63	0 -97	0 -155
>450	≤500	-840 -995	-480 -635															

★ In each column,the upper value is the upper dimensional tolerance, and the lower figure is the lower dimensional tolerance.

Reference Table of Bore Tolerance

Unit：μ=0.001mm

Basic Dimensions (mm)		Tolerance Zone Class for Bore																		
		B10	C9	C10	D8	D9	D10	E7	E8	E9	F6	F7	F8	G6	G7	H6	H7	H8	H9	H10
—	3	+180 +140	+85 +60	+100 +60	+34 +20	+45 +20	+60 +20	+24 +14	+28 +14	+39 +14	+12 +6	+16 +6	+20 +6	+8 +2	+12 +2	+6 0	+10 0	+14 0	+25 0	+40 0
>3	≤6	+188 +140	+100 +70	+118 +70	+48 +30	+60 +30	+78 +30	+32 +20	+38 +20	+50 +20	+18 +10	+22 +10	+28 +10	+12 +4	+16 +4	+8 0	+12 0	+18 0	+30 0	+48 0
>6	≤10	+208 +150	+116 +80	+138 +80	+62 +40	+76 +40	+98 +40	+40 +25	+47 +25	+61 +25	+22 +13	+28 +13	+35 +13	+14 +5	+20 +5	+9 0	+15 0	+22 0	+36 0	+58 0
>10	≤14	+220 +150	+138 +95	+165 +95	+77 +50	+93 +50	+120 +50	+50 +32	+59 +32	+75 +32	+27 +16	+34 +16	+43 +16	+17 +6	+24 +6	+11 0	+18 0	+27 0	+43 0	+70 0
>14	≤18																			
>18	≤24	+244 +160	+162 +110	+194 +110	+98 +65	+117 +65	+149 +65	+61 +40	+73 +40	+90 +40	+33 +20	+41 +20	+53 +20	+20 +7	+28 +7	+13 0	+21 0	+33 0	+52 0	+84 0
>24	≤30																			
>30	≤40	+270 +170	+182 +120	+220 +120	+119 +80	+142 +80	+180 +80	+75 +50	+89 +50	+112 +50	+41 +25	+50 +25	+64 +25	+25 +9	+34 +9	+16 0	+25 0	+39 0	+62 0	+100 0
>40	≤50	+280 +180	+192 +130	+230 +130																
>50	≤65	+310 +190	+214 +140	+260 +140	+146 +100	+174 +100	+220 +100	+90 +60	+106 +60	+134 +60	+49 +30	+60 +30	+76 +30	+29 +10	+40 +10	+19 0	+30 0	+46 0	+74 0	+120 0
>65	≤80	+320 +200	+224 +150	+270 +150																
>80	≤100	+360 +220	+257 +170	+310 +170	+174 +120	+207 +120	+260 +120	+107 +72	+126 +72	+159 +72	+58 +36	+71 +36	+90 +36	+34 +12	+47 +12	+22 0	+35 0	+54 0	+87 0	+140 0
>100	≤120	+380 +240	+267 +180	+320 +180																
>120	≤140	+420 +260	+300 +200	+360 +200	+208 +145	+245 +145	+305 +145	+125 +85	+148 +85	+185 +85	+68 +43	+83 +43	+106 +43	+39 +14	+54 +14	+25 0	+40 0	+63 0	+100 0	+160 0
>140	≤160	+440 +280	+310 +210	+370 +210																
>160	≤180	+470 +310	+330 +230	+390 +230																
>180	≤200	+525 +340	+255 +240	+425 +240	+242 +170	+285 +170	+355 +170	+146 +100	+172 +100	+215 +100	+79 +50	+96 +50	+122 +50	+44 +15	+61 +15	+29 0	+46 0	+72 0	+115 0	+185 0
>200	≤225	+565 +380	+375 +260	+445 +260																
>225	≤250	+605 +420	+395 +280	+465 +280																
>250	≤280	+690 +480	+430 +300	+510 +300	+271 +190	+320 +190	+400 +190	+162 +110	+191 +110	+240 +110	+88 +56	+108 +56	+137 +56	+49 +17	+69 +17	+32 0	+52 0	+81 0	+130 0	+210 0
>280	≤315	+750 +540	+460 +330	+540 +330																
>315	≤355	+830 +600	+500 +360	+590 +360	+299 +210	+350 +210	+440 +210	+182 +125	+214 +125	+265 +125	+98 +62	+119 +62	+151 +62	+54 +18	+75 +18	+36 0	+57 0	+89 0	+140 0	+230 0
>355	≤400	+910 +680	+540 +400	+630 +400																
>400	≤450	+1010 +760	+595 +440	+690 +440	+327 +230	+385 +230	+480 +230	+198 +135	+232 +135	+290 +135	+108 +68	+131 +68	+165 +68	+60 +20	+83 +20	+40 0	+63 0	+97 0	+155 0	+250 0
>450	≤500	+1090 +840	+635 +480	+730 +480																

★ In each column,the upper value is the upper dimensional tolerance, and the lower figure is the lower dimensional tolerance.

Hardness Reference Table

(HRC) Rockwell C scale hardness	(HV) Vickers hardness	Brinell hardness 10mm dia. ball bearing 3000kgf load		Rockwell hardness			Rockwell superficial hardness Diamond conic indenter			(HS) Shore hardness	Tensile strength (Approx. value) MPa kgf/mm²	(HRC) Rockwell C scale hardness
		Standard ball bearing	Tungster carbide ball bearing	(HRA) A scale 60kgf load Diamond conic indenter	(HRB) B scale 100kgf load 1.6mm (1/16in) dia.tube	(HRD) D scale 100kgf load Diamond conic indenter	15-N scale 15kgf load	30-N scale 15kgf load	45-N scale 15kgf load			
68	940	—	—	85.6	—	76.9	93.2	84.4	75.4	97	—	68
67	900	—	—	85	—	76.1	92.9	83.6	74.2	95	—	67
66	865	—	—	84.5	—	75.4	92.5	82.8	73.3	92	—	66
65	832	—	-739	83.9	—	74.5	92.2	81.9	72	91	—	65
64	800	—	-722	83.4	—	73.8	91.8	81.1	71	88	—	64
63	772	—	-705	82.8	—	73	91.4	80.1	69.9	87	—	63
62	746	—	-688	82.3	—	72.2	91.1	79.3	68.8	85	—	62
61	720	—	-670	81.8	—	71.5	90.7	78.4	67.7	83	—	61
60	697	—	-654	81.2	—	70.7	90.2	77.5	66.6	81	—	60
59	674	—	-634	80.7	—	69.9	89.8	76.6	65.5	80	—	59
58	653	—	615	80.1	—	69.2	89.3	75.7	64.3	78	—	58
57	633	—	595	79.6	—	68.5	88.9	74.8	63.2	76	—	57
56	613	—	577	79	—	67.7	88.3	73.9	62	75	—	56
55	595	—	560	78.5	—	66.9	87.9	73	60.9	74	2075	55
54	577	—	543	78	—	66.1	87.4	71.2	59.8	72	2015	54
53	560	—	525	77.4	—	65.4	86.9	70.2	58.6	71	1950	53
52	544	-500	512	76.8	—	64.6	86.4	69.4	57.4	69	1880	52
51	528	-487	496	76.3	—	63.8	85.9	68.5	56.1	68	1820	51
50	513	-475	481	75.9	—	63.1	85.5	67.6	55	67	1760	50
49	598	-464	469	75.2	—	62.1	85	66.7	53.8	66	1695	49
48	584	451	455	74.7	—	61.4	84.5	65.8	52.5	64	1635	48
47	471	442	443	74.1	—	60.8	83.9	64.8	51.4	63	1580	47
46	458	432	432	73.6	—	60	83.5	64	50.3	62	1530	46
45	446	421	421	73.1	—	59.2	83	63.1	49	60	1480	45
44	434	409	409	72.5	—	58.5	82.5	62.2	47.8	58	1435	44
43	423	400	400	72	—	57.7	82	61.3	46.7	57	1385	43
42	412	390	390	71.5	—	56.9	81.5	60.4	45.5	56	1340	42
41	402	381	381	70.9	—	56.2	80.9	59.5	44.3	55	1295	41
40	392	371	371	70.4	—	55.4	79.9	58.6	43.1	54	1250	40
39	382	362	362	69.9	—	54.6	79.4	57.7	41.9	52	1215	39
38	372	353	353	69.4	—	53.8	78.8	56.8	40.8	51	1180	38
37	363	344	344	68.9	—	53.1	78.3	55.9	39.6	50	1160	37
36	354	336	336	68.4	-109	52.3	77.7	54.2	38.4	49	1115	36
35	345	327	327	67.9	-108.5	51.5	77.2	53.3	37.2	48	1080	35
34	336	319	319	67.4	-108	50.8	76.6	52.1	36.1	47	1055	34
33	327	311	311	66.8	-107.5	50.0	76.1	51.3	34.9	46	1025	33
32	318	301	301	66.3	-107	49.2	75.6	50.4	33.7	44	1000	32
31	310	294	294	65.8	-106	48.4	75	49.5	32.5	43	980	31
30	302	286	286	65.3	-105.5	47.7	74.5	48.6	31.3	42	950	30
29	294	279	279	64.7	-104.5	47	73.9	47.7	30.1	41	930	29
28	286	271	271	64.3	-104	46.1	73.3	46.8	28.9	41	910	28
27	279	264	264	63.8	-103	45.2	72.8	45.9	27.8	40	880	27
26	272	258	258	62.8	-102.5	44.6	72.2	45	26.7	38	860	26
25	266	253	253	62.4	-101.5	43.8	71.6	44	25.5	38	840	25
24	260	247	247	62	-101	43.1	71	43.2	24.3	37	825	24
23	254	243	243	61.5	100	42.1	70.5	42.3	23.1	36	805	23
22	248	237	237	61	99	41.6	69.9	41.5	22	35	785	22
21	243	231	231	60.5	98.5	40.9	69.4	—	20.7	35	770	21
20	238	226	226	—	97.8	40.1	—	—	19.6	34	760	20
18	230	219	219	—	96.7	—	—	—	—	33	730	18
16	222	212	212	—	95.5	—	—	—	—	32	705	16
14	213	203	203	—	93.9	—	—	—	—	31	675	14
12	204	194	194	—	92.3	—	—	—	—	29	650	12
10	196	187	187	—	90.7	—	—	—	—	28	620	10
8	188	179	179	—	89.5	—	—	—	—	27	600	8
6	180	171	171	—	87.1	—	—	—	—	26	580	6
4	173	165	165	—	85.5	—	—	—	—	25	550	4
2	166	158	158	—	83.5	—	—	—	—	24	530	2
0	160	152	152	—	81.7	—	—	—	—	24	515	0

Material Reference:Stainless Steel Series

About Stainless Steel

1.Stainless steel is a common name for metal alloys that consist of 10.5% or more Chromium(Cr) and more than 50% Iron(Fe). Generally, an increase of chromium content improves the corrosion resistance of stainless steels. The addition of Ni, Mo, Cu, Al, Si, etc. improves corrosion resistance, mechanical properties, workability, and other properties.

2.Stainless steel is divided into Cr and Cr-Ni series by main elements. The three major classes of stainless steel are martensite, ferrite, and austenitic series. Two additional classes worth mentioning include Duplex(with austenitic and ferritic structures), and precipitation hardening stainless steel, used in certain extreme conditions.

Categories of Stainless Steel

Category	Cr Series		Cr-Ni Series
Metal Structure	Martensite Series	Ferrite Series	Austenitic Series
Hardening	Quench Hardening	Anti-Quench Hardening	Work Hardening

Effect of Each Element which Influences Properties

Element		Improved Properties
C	Low Carbon	Corrosion Resistance (Intergranular Corrosion Resistance)
	High Carbon	Strength, Hardness
Mo		Corrosion Resistance (Pitting Corrosion Resistance)
Cu		Acidity Resistance
Ti/Nb		Corrosion Resistance (Intergranular Corrosion Resistance)
Si/Al		Oxidation Resistance
S/Se		Cutting Performance

Grades and Characteristics of Stainless Steel

Grade	Characteristics
SUS302	Standard grade of 18Cr-8Ni. SUS303 and SUS304 are improvements over SUS302. They exhibit better corrosion resistance and mechanical properties due to the addition of Ni.
SUS303	Cutting performance is improved by adding S and P to SUS302. There is less corrosion resistance, but this improved by adding Mo.
SUS304 SUS304L	Improved grade of SUS302. Has a lower amount of carbon, better corrosion resistance and improved weldability. The most commonly specified in austenitic stainless steels. SUS304L contains lower carbon amounts that SUS304 and has improved intergranular corrosion resistance and weldability.
SUS316 SUS316L	Better corrosion resistance (pitting corrosion resistance) and acidity resistance due to the addition of Mo. Has great strength and heat resistance.SUS316L contains lower carbon amounts that SUS316 and has improved intergranular corrosion resistance and weldability.
SUSXM7	Work Hardening by cold working is restrained due to the addition of Cu to SUS304.
SUS430	Standard grade of 18Cr steel with better cold working and corrosion resistance. Most widely used ferrite stainless steel due to its low price.
SUS434	Improved corrosion resistance through adding Mo to SUS430.
SUS410	The most widely used martensite stainless steel. Better mechanical properties and corrosion resistance after heat treatment.
SUS403	Smaller percentage of Si and Cr with improved corrosion resistance and toughness after heat treatment. Used for valves, pump shafts, cutlery, bolts, nuts, steam turbine wings, jet engine parts, etc.
SUS416	Improved cutting performance of 13Cr steel due to the addition of S and P. Corrosion resistance is slightly inferior to the standard type.
SUS431	Improved toughness due to the addition of Ni and improved corrosion resistance due to the addition of Cr. Best corrosion resistance in martensite steels in which heat treatment is available. Used for paper making machines, shafts for shipping, airplane parts, etc.
SUS440C	The hardest of stainless steels with superior wear resistance. Used for dice, ball bearings, etc.

Components and Mechanical Properties of Stainless Steel

About Stainless Steel

	Components (%)									Mechanical Properties		
Grade	C	Si	Mn	P	S	Ni	Cr	Mo	others	Tensile Strength (N/mm²)	Elongation (%)	Brinell Hardness (HB)
SUS302	Below 0.15	Below 1.00	Below 2.00	Below 0.045	Below 0.03	8.00~10.00	17.00~19.00	—	—	Above 520	Above 40	Below 187
SUS303	Below 0.15	Below 1.00	Below 2.00	Below 0.20	Above 0.15	8.00~10.00	17.00~19.00	Below 0.60	—	Above 520	Above 40	Above 187
SUS304	Below 0.08	Below 1.00	Below 2.00	Below 0.045	Below 0.03	8.00~10.50	18.00~20.00	—	—	Above 520	Above 40	Below 187
SUS304L	Below 0.03	Below 1.00	Below 2.00	Below 0.045	Below 0.03	9.00~13.00	18.00~20.00	—	—	Above 480	Above 40	Below 187
SUS316	Below 0.08	Below 1.00	Below 2.00	Below 0.045	Below 0.03	10.00~14.00	16.00~18.00	2.00~3.00	—	Above 520	Above 40	Below 187
SUS316L	Below 0.03	Below 1.00	Below 2.00	Below 0.045	Below 0.03	12.00~15.00	16.00~18.00	2.00~3.00	—	Above 480	Above 40	Below 187
SUSXM7	Below 0.08	Below 1.00	Below 2.00	Below 0.045	Below 0.03	8.50~10.50	17.00~19.00	—	Cu:3.00-4.00	Above 480	Above 40	Below 187

Ferrite Series

	Components (%)									Mechanical Properties		
Grade	C	Si	Mn	P	S	Ni	Cr	Mo	others	Tensile Strength (N/mm²)	Elongation (%)	Brinell Hardness (HB)
SUS430	Below 0.12	Below 0.75	Below 1.00	Below 0.04	Below 0.03	Below 0.60	16.00~18.00	—	—	Above 450	Above 40	Below 187
SUS434	Below 0.12	Below 1.00	Below 1.00	Below 0.04	Below 0.03	Below 0.60	16.00~18.00	0.75~1.25	—	Above 450	Above 40	Below 187

Martensite Series

	Components (%)									Mechanical Properties		
Grade	C	Si	Mn	P	S	Ni	Cr	Mo	others	Tensile Strength (N/mm²)	Elongation (%)	Brinell Hardness (HB)
SUS410	Below 0.15	Below 1.00	Below 1.00	Below 0.04	Below 0.03	Below 0.60	11.50~13.50	—	—	Above 540	Above 25	Below 159
SUS416	Below 0.15	Below 1.00	Below 1.25	Below 0.06	Above 0.15	Below 0.60	12.00~14.00	Below 0.60	—	Above 540	Above 17	Below 159
SUS440C	0.95~1.20	Below 1.00	Below 1.00	Below 0.04	Below 0.03	Below 0.60	16.00~18.00	Below 0.75	—	Above 780	Below 15	Above 56HRC

★ The numerical values listed above are for reference only; they are not guaranteed under performance conditions.

Material Reference:Aluminum Alloy-Series

Alloy Type	Symbol	Descriptions
Al-Cu series	A2011 A2014 A2017 A2024	2017 and 2024, known as duralumin and super duralumin, are typical of this type, which is almost as strong as steel. This type has superior machinability. 2011, which contains Pb and Bi, is widely used as free-cutting alloy for machine parts. 2014 has a wide range for high-strength forging applications. It is not corrosion resistant because it contains a considerable amount of copper and therefore requires sufficient corrosion prevention processing when exposed to a corrosive environment.
Al-Mn series	A3003 A3004	This type, which is alloyed with Mn, maintains the workability and corrosion-resistance of pure aluminum, but has slightly higher strength. It has a wide range of applications including various wares, building materials and containers. 3003 is the most typical alloy of this type. 3004 adds 1% of Mg to the alloy components of 3003, yielding higher strength. 3004 is widely used for aluminum cans, roof boards and door panel materials.
Al-Si series	A4032	4032 is alloyed with Si and has less thermal expansion and better abrasion resistance. In addition, 1% of respective Cu, Ni and Mn are added to improve heat resistance. Better heat resistance and little thermal expansion make this type suitable for forging piston materials.
Al-Mg system	A5005 A5052 A5083	5005 is a typical type that contains a small amount of Mg. It is used for interior ceiling boards for vehicles, building materials and various ware materials. 5052 is a typical alloy of this type that contains a medium amount of Mg. It is the most common alloy and exhibits medium strength. 5083 contains a large amount of Mg, and has the best strength among non-thermal treatment alloys and superior weldability. It is used as a structural material for marine vessels, vehicles and chemical plants.
Al-Mg-Si series	A6061 A6063	Alloys of this type have superior strength, corrosion resistance and are used as structural materials. 6061 is alloyed with a small amount of Cu for better strength with slightly weaker corrosion-resistance, but has superior forgeability and is used for rivet materials and small parts of vehicles. It has the benefit of providing the allowable stress equivalent to that of SS400 steel if proof stress is 254N/mm² or more and deflection does not cause any design problem. 6063 has lower strength but superior extrusion performance. It is used for structural materials that do not require the strength equivalent to that of 6061.
Al-Zn series	A7075 A7N01	Alloys of this type are divided into two categories: Al-Zn-Mg-Cu and Al-Zn-Mg. The Al-Zn-Mg-Cu alloys have the highest strength among aluminum alloys. Al-Zn-Mg alloys contain no Cu and are used for welding construction. A typical type of Al-Zn-Mg-Cu series is 7075, which is used for airplanes, sport gears, etc. Al-Zn-Mg alloys have comparatively high strength. The post-welding heat-affected areas recover strength by natural aging that is close to the strength of the original material, thereby providing superior joint efficiency. 7N01 is typical of this type and is used as a structural material for railroad vehicles etc.

• Chemical Components of Aluminum Alloy

Symbol	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Al	Others
A2011	0.4 or less	0.7 or less	5.0~6.0	—	—	—	0.30 or less	—	Remaining	Pb:0.20~0.6
A2014	0.50~1.2	0.7 or less	3.9~5.0	0.40~1.2	0.2~0.8	0.1 or less	0.25 or less	—	Remaining	Zr+Ti:0.2 or less
A2017	0.20~0.8	0.7 or less	3.5~4.5	0.40~1.0	0.4~0.8	0.1 or less	0.25 or less	—	Remaining	Zr+Ti:0.2 or less
A2024	0.5 or less	0.5 or less	3.8~4.9	0.30~0.9	1.2~1.8	0.1 or less	0.25 or less	—	Remaining	Zr+Ti:0.2 or less
A3003	0.6 or less	0.7 or less	0.05~0.20	1.0~1.5	—	—	0.10 or less	—	Remaining	—
A3004	0.3 or less	0.7 or less	0.25 or less	1.0~1.5	0.8~1.3	—	0.25 or less	—	Remaining	—
A4032	11.0~13.5	1.0 or less	0.50~1.3	—	0.8~1.3	0.1 or less	0.25 or less	—	Remaining	Ni:0.50~1.3
A5005	0.3 or less	0.7 or less	0.2 or less	0.2 or less	0.50~1.1	0.1 or less	0.25 or less	—	Remaining	—
A5052	0.25 or less	0.4 or less	0.1 or less	0.1 or less	2.2~2.8	0.15~0.35	0.10 or less	—	Remaining	—
A5083	0.4 or less	0.4 or less	0.1 or less	0.40~1.0	4.0~4.9	0.05~0.25	0.25 or less	0.15 or less	Remaining	—
A6061	0.40~0.8	0.7 or less	0.15~0.40	0.15 or less	0.8~1.2	0.04~0.35	0.25 or less	0.15 or less	Remaining	—
A6063	0.20~0.6	0.35 or less	0.1 or less	0.1 or less	0.45~0.9	0.1 or less	0.10 or less	0.10 or less	Remaining	—
A7075	0.4 or less	0.5 or less	1.2~2.0	0.3 or less	2.1~2.9	0.18~0.28	5.1~6.1	0.10 or less	Remaining	Zr+Ti:0.25

Temper Designation of Aluminum Alloys

Symbol	Definition	Meaning
F	As fabricated	Products obtained from the manufacturing process with no special adjustment by work hardening or thermal treatment
O	Annealed	Wrought alloys are annealed to achieve the softest state. Cast alloys are annealed for better extension and size stabilization.
H	Work hardened	Work hardened for higher strength, regardless of whether additional thermal treatment to obtain proper softness is carried out.
T	Products with stable temper other than F, O and H, obtained by thermal treatment	Thermal treatment is carried out to obtain stable temper, regardless of whether additional thermal treatment is carried out.

Subdesignation Symbol	Meaning
H1	Work hardened only: Products are only work hardened with no additional thermal treatment in order to obtain prescribed mechanical properties.
H2	Thermally softened in proper manner after work hardened: Products are work hardened to obtain values higher than prescribed and then thermally treated in a proper manner to reduce strength to a prescribed level. The alloys of this temper, which are aged and softened at room temperature, have strength almost equivalent to that of the temper H3. Other alloys of this temper have strength almost equivalent to that of H1 temper, but slightly higher extension.
H3	Stabilization treated after work hardened: Products are work hardened and then stabilized using low temperature heating. This results in slightly reduced strength but better extension. This stabilization treatment is applied only to alloys that contain magnesium, which are gradually aged and softened at room temperature.
T1	Cooled and naturally aged after high temperature processing: Products, such as extruded alloys, are processed at a high temperature, cooled and then naturally aged to a sufficiently stable state. No positive cold working is carried out so correction using cold working has only a small effect on alloys of this type.
T2	Cooled, cold worked, and then naturally aged after high temperature processing: Products, such as extruded alloys, are processed at a high temperature, cooled, positively cold worked and then naturally aged to a sufficiently stable state.
T3	Solution treated, cold worked and then naturally aged: Products are solution treated, cold worked to increase their strength, and then naturally aged to a sufficiently stable state.
T4	Solution treated and then naturally aged: Products are solution treated and naturally aged to a sufficiently stable state. No positive cold working is carried out so correction using cold working has only a small effect on alloys of this type.
T5	Cooled, artificially aged and work hardened after high temperature processing: Products, such as cast alloys or extruded alloys, are processed at a high temperature, cooled, and then artificially aged and work hardened. No positive cold working is carried out so correction using cold working has only a small effect on alloys of this type.
T6	Solution treated, then artificially aged and work hardened: Products are solution treated and artificially aged only. No positive cold working is carried out so correction using cold working has only a small effect on alloys of this type.
T7	Solution treated and then stabilization treated: Products are solution treated, artificially aged and work hardened excessively to obtain strength higher than the maximum specified by the artificial aging conditions and to obtain special mechanical properties.
T8	Solution treated, cooled, and then artificially aged and work hardened: Products are solution treated, cold worked to increase the strength, and then artificially aged and work hardened.
T9	Solution treated, artificially aged and work hardened, and then cold worked: Products are solution treated, artificially aged, strongly work hardened, and then cool worked to increase the strength.

• Mechanical Properties of Aluminum Alloy

Class (JIS Name)	Temper	Tensile Strength (N/mm²)	Proof Stress (N/mm²)	Extension (%)	Brinell Hardness (HBS 10/500)	Fatigue Strength (N/mm²)
A2014	T6	485	415	13	135	125
A2017	O	180	70	22	45	90
A2024	T4	470	325	20	120	140
A3003	O	110	40	30	28	50
A4032	T6	380	315	9	120	110
A5052	H38	290	255	7	77	140
A5083	H116	315	230	16	—	160
A6061	T6	310	275	12	95	95
A6063	T6	240	215	12	73	70
A7075	T6	570	505	11	150	160
A7N01	T5	345	295	15	100	125

★ The values shown in the table above are just for reference, but they are not guaranteed values.

Coupling Testing Facility

◆Exclusive use for coupling test

(1) For use durability test.
(2) For mass production inspection in development process.

Coupling Test Report Test Item : General Test	GMT	Tester	Q013
Model Number : FACE Type of space ring : R	Test Day	2012/02/13	16:43:47
Outer diameter : 40 Inner diameter d1 : 10 Inner diameter d2 : 10	(N.m) 20.00 18.00 16.00 14.00 12.00 10.00 8.00 6.00 4.00 2.00 0.00		
Test Parameger	0.0 48.0 96.0 144.0 192.0 240.0 288.0 336.0 384.0 432.0 480.0 (min)		
Deflection : -1.08° Eccentricity : -0.10 mm			
Planned testing time : 480 min 0 sec			
Forward rotation : 0 min 10 sec			
Pause : 2 sec			
Inverse rotation : 0 min 10 sec			
Present torgue : 16.50 (N.m)	Remark:		
Zeroed torgue : 0.00 (N.m)			
Machine operating time : 480 min 0 sec	Serial NO.	20120213-FACE40R-8	
Revolution Test : 200 rpm / min	Back to main page / Back to last page / Print / PAUSE / STOP		

Advantage of Cryogenic Treatment

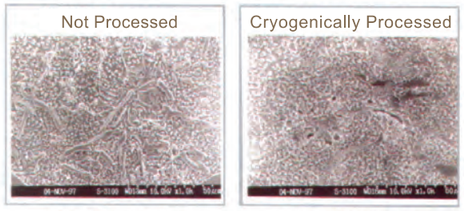
All **GMT** Coupling is well been cryogenic processing.

Cryogenic process is to place the part in the medium with temperature under 196℃, followed step by step progress of new technic to improve material character. Found by relevant search, cryogenic process is not only obviously increase on strength and life of black (colour)metal, plastic and china…etc, but also improve the structure evenly. Increase of dimension stability brings huge economic benefit and promising application in aviation, aerospace, optics, creatures, chemistry, machinery, electronic and light industry.

◆Purpose of cryogenic process

Improving physical character (mechanical character) of metal or other material by progress of subzero processing, to raise usage life, efficiency and quality of parts or workpiece.

Ex: Comparison of metallographic analysis



Metallographic analysis before cryogenic process Metallographic analysis after cryogenic process

◆Benefic analysis of aluminum alloy after cryogenic process:

Improvement during process or in the end of process:

(1) Deformation of microstructure stress caused by designed material shape.
(2) Effectively controlling aging deformation.
(3) After mechanical testing, mechanism strength has been obviously improved, and perfectly perform the desinged mechanism.

Practical application：After dissolving aluminum alloy(Duralumin),have it with cryogenic process and unfrozen immediately. It could not only speed up aging, but reduce most of residual stress at same time to improve mechanical character. Found by another info, aluminum alloy casting with cryogenic process has improvement of processed ability.

Material	Parts	Hardness	Durability	Processing life	Dimension stability	Others
SKH	Drill, Cutting, Tools	+	+	+	+	1 time temper
SKD11	Blanking Die, Punch, Cutting Blade, Roller	+	+	+	+	Avoid broken by grinding
SKD61	Aluminum extrusion die	+	+			
SUJ	Rail, Roll Guide	+	+		+	
Inner parts	Bearing, Gear, Bushing, Cam	+	+		+	Avoid broken by grinding
SUS	Austenite(300)	+	+		+	Improvement of corrosion resistance
	Martensitic(420J2, 440)	+	+		+	
	Separated(630, 631)	+	+	+	+	
18Ni 280Grade	18%Ni type	+	+		+	Speed up sging
	25%Ni type	+	+		+	Speed up sging
Sintering alloy	Cutting tools, Roller, Automobile parts		+	+	+	Reduce residual stress
Cu alloy	Electrode, Fire gate					
AL alloy	Automatic machinery, precision processing, die manufacture, electponic and precision instrument, SMT, PC board soldering device		+		+	Improvement of processed ability

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