XGT/XGL/XGS Flexible Couplings - High-gain Rubber Type

Specification Change

Zero Backlash | High gain supported | High torque | Vibration absorption

Structure

- Set Screw Type

XGT Standard type ➡ P.xxxx

XGS Short type ➡ P.xxxx

- Single Clamping Type

XGT-CS Standard type ➡ P.xxxx

XGS-CS Short type ➡ P.xxxx

- Double Clamping Type

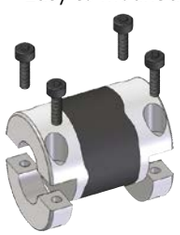
XGT-C Standard type ➡ P.xxxx

XGL-C Long type ➡ P.xxxx

XGS-C Short type ➡ P.xxxx

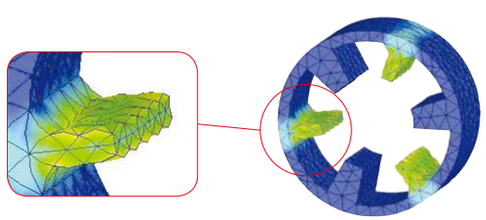
- **XGT-C** **XGL-C** **XGS-C** Split Type

Easy to mount and remove screws.



- Internal Structure

The designed shape of vibration-absorbing rubber achieves high torsional stiffness and high torque according to the finite element method. This product also succeeds in elongating its life by evenly dispersing the stress focusing on around the inner diameter of the jaw throughout the entire jaw.



- Applicable motors

	XGT / XGL / XGS
Servomotor	◎
Stepping Motor	◎
General-purpose Motor	●

◎: Excellent ●: Available

- Property

	XGT / XGL / XGS
Zero Backlash	◎
For Servomotor High Gain	◎
High Torque	◎
High Torsional Stiffness	○
Allowable Misalignment	○
Vibration Absorption Characteristics	◎
Allowable Operating Temperature	−20℃ to 80℃

◎: Excellent ○: Very good

- A completely integrated flexible coupling that connects hubs on both sides with high-gain rubber.
- It is suitable for control motors with high responsiveness, enabling high-accuracy positioning and shortened stabilization time.
- About reduction of stabilization time ➡ P.xxxx

- Application

Actuator / Surface-mount machine / High precision XY stage / Index table

- Material/Finish

RoHS

	XGT / XGL / XGS
Hub	A2017
High-Gain Rubber	HNBR
Hex Socket Head Cap Screw / Hex Socket Set Screw	SCM435 Ferrosoferric Oxide Film (Black)

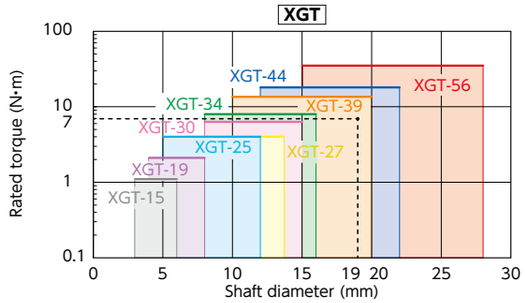
Additional Keyway at Shaft Hole ➡ P.xxxx	Cleanroom Wash & Packaging ➡ P.xxxx	Change to Stainless Steel Screw ➡ P.xxxx
Available / Add'l charge	Please combine with Stainless Steel Screw Alteration Service	Available / Add'l charge

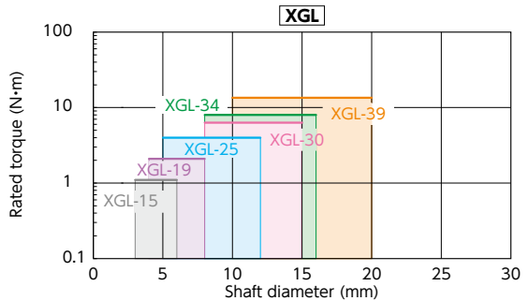
GOOD DESIGN

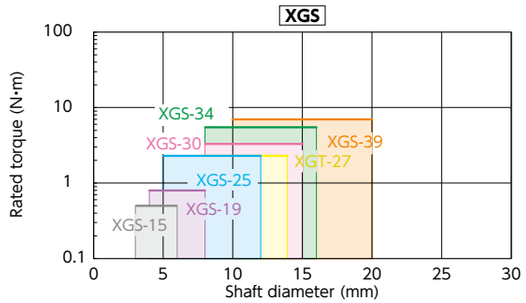
Selection

Selection Based on Shaft Diameter and Rated Torque

The area bounded by the shaft diameter and rated torque indicates the selection size.







- Selection Example

In case of selected parameters of shaft diameter of ϕ 19 and load torque of 7 N•m, the selected size is **XGT-39C**.

Selection Based on the Rated Output of the Servomotor

Rated Output (W)	Servomotor Specifications*1			Selection Size		
	Diameter of Motor Shaft (mm)	Rated Torque (N・m)	Instantaneous Max. Torque (N・m)	XGT	XGL	XGS
10	5 - 6	0.032	0.096	15C	15C	15C
20	5 - 6	0.064	0.19	15C	15C	15C
30	5 - 7	0.096	0.29	19C	19C	19C
50	6 - 8	0.16	0.48	19C	19C	19C
100	8	0.32	0.95	19C	19C	25C
200	9 - 14	0.64	1.9	27C	30C	27C
400	14	1.3	3.8	27C	30C	34C
750	16 - 19	2.4	7.2	39C	39C	–

*1: Motor specifications are based on general values. For details, see the motor manufacturer's catalogs. This is the size for cases where devices such as reduction gears are not used.

Related Products

XGT2 enables further improvement of productivity by adding damping performance to **XGT**.

- Part number specification

XGT - 19C - 6 - 8

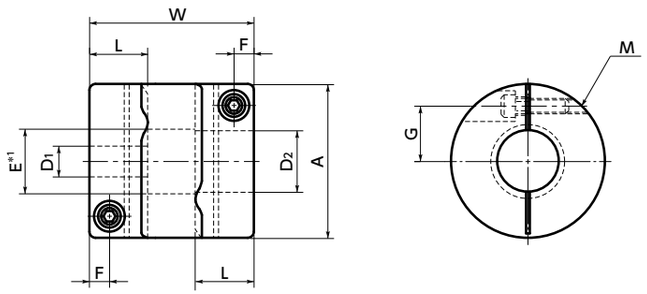
Product Code | Size | Bore Diameter

Please refer to dimensional table for part number specification.

XGS-CS Flexible Couplings - High-gain Rubber Type (short) - Single Clamp Type

Zero Backlash | High gain supported | High torque | Vibration absorption

XGS-CS



*1： $E=D_2+0.5(D_2<5)$
$E=D_2+1(D_2\geq 5)$

Dimensions

Unit : mm

Part Number 1	A	L	W	F	G	M	Screw Tightening Torque (N・m)
XGS-15CS	15	6.5	18	2.15	5	M1.6	0.25
XGS-19CS	19	7.7	20	2.65	6.5	M2	0.5
XGS-25CS	25	9.5	27	3.25	9	M2.5	1
XGS-27CS	27	9.5	27	3.25	10	M2.5	1
XGS-30CS	30	11	30	4	11	M3	1.5
XGS-34CS	34	12	35	4	12.25	M3	1.5
XGS-39CS	39	15.5	40	4.5	14.5	M4	2.5

Part Number	Standard Bore Diameter D_1-D_2 2									
XGS-15CS	3 - 5	3 - 6	4 - 4	4 - 5	4 - 6	4.5 - 5	5 - 5	5 - 6	6 - 6	
XGS-19CS	4 - 5 8 - 8	5 - 5	5 - 6	5 - 7	5 - 8	6 - 6	6 - 6.35	6 - 7	6 - 8	6.35 - 8
XGS-25CS	5 - 6 8 - 10	5 - 8 8 - 11	6 - 6 8 - 12	6 - 8 10 - 10	6 - 10 10 - 12	6 - 11 12 - 12	6 - 12	6.35 - 8	6.35 - 10	8 - 8
XGS-27CS	5 - 6 8 - 10	5 - 8 8 - 11	5 - 14 8 - 12	6 - 6 8 - 14	6 - 8 10 - 10	6 - 10 10 - 12	6 - 11 10 - 14	6 - 12 12 - 12	6 - 14 12 - 14	8 - 8 14 - 14
XGS-30CS	8 - 8 10 - 15	8 - 10 11 - 12	8 - 11 12 - 12	8 - 12 12 - 14	8 - 14 12 - 15	8 - 15 14 - 14	10 - 10 14 - 15	10 - 11 15 - 15	10 - 12	10 - 14
XGS-34CS	8 - 8 10 - 15	8 - 10 11 - 11	8 - 11 11 - 12	8 - 12 12 - 12	8 - 14 12 - 14	8 - 15 12 - 15	10 - 10 14 - 14	10 - 11 14 - 15	10 - 12 15 - 15	10 - 14 16 - 16
XGS-39CS	10 - 10 12 - 20	10 - 12 14 - 14	10 - 14 14 - 15	10 - 15 14 - 16	10 - 16 15 - 15	12 - 12 15 - 16	12 - 14 15 - 19	12 - 15 16 - 16	12 - 16 17 - 17	12 - 19 20 - 20

- All products are provided with hex socket head cap screw.
- Recommended tolerance for shaft diameters is h6 and h7.
- In case of mounting on D-cut shaft, be careful about the position of the D-cut surface of the shaft.
- For the shaft insertion amount to the coupling, see Mounting/maintenance.

Additional Keyway at Shaft Hole ➡ P.xxxx	Cleanroom Wash & Packaging ➡ P.xxxx	Change to Stainless Steel Screw ➡ P.xxxx
Available / Add'l charge	Please combine with Stainless Steel Screw Alteration Service	Available / Add'l charge

Performance

Part Number	Max. Bore Diameter (mm)	Keyway Additional Modification Max. Bore Diameter (mm)	Rated *1 Torque (N・m)	Max. Rotational Frequency (min^{-1})	Moment*2 of Inertia ($kg \cdot m^2$)	Static Torsional Stiffness (N・m/rad)	Max. Lateral Misalignment (mm)	Max. Angular Misalignment (°)	Max. Axial Misalignment (mm)	Mass *2 (g)
XGS-15CS	6	–	0.5	42000	2.0×10^{-7}	25	0.15	1.5	±0.2	7
XGS-19CS	8	6	0.8	33000	5.7×10^{-7}	63	0.15	1.5	±0.2	11
XGS-25CS	12	9	2.3	25000	2.2×10^{-6}	100	0.15	1.5	±0.2	24
XGS-27CS	14	10	2.3	23000	3.0×10^{-6}	120	0.15	1.5	±0.2	27
XGS-30CS	15	11	3.3	21000	5.3×10^{-6}	160	0.2	1.5	±0.3	38
XGS-34CS	16	12	5.5	18000	9.9×10^{-6}	350	0.2	1.5	±0.3	58
XGS-39CS	20	15	7	16000	2.0×10^{-5}	440	0.2	1.5	±0.3	86

*1： Correction of rated torque due to load fluctuation is not required. If ambient temperature exceeds 30℃, be sure to correct the rated torque with temperature correction factor shown in the following table.
The allowable operating temperature of XGS-CS is −20℃ to 80℃.
※ The shaft's slip torque may be smaller than the coupling's rated torque depending on the shaft bore. ➡ P.xxxx

*2： These are values with max. bore diameter.

● Ambient Temperature / Temperature Correction Factor

Ambient Temperature	Temperature Correction Factor
−20℃ to 30℃	1.00
30℃ to 40℃	0.80
40℃ to 60℃	0.70
60℃ to 80℃	0.55

● Part number specification

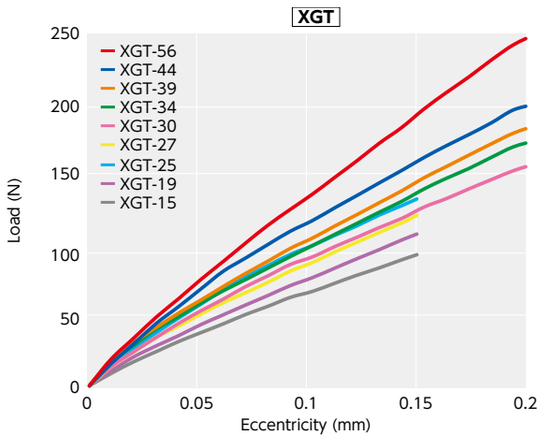
XGS-34CS - 11-12
1 2

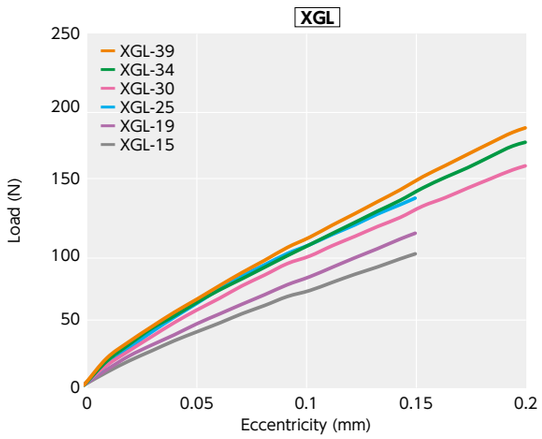
XGT/XGL/XGS Flexible Couplings - High-gain Rubber Type Specification Change

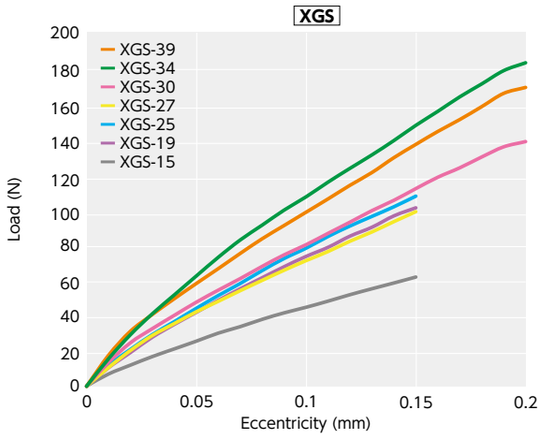
Zero Backlash | High gain supported | High torque | Vibration absorption

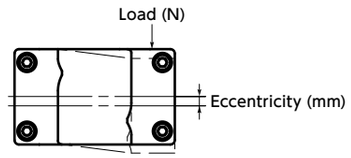
Technical Information

● Eccentric Reaction Force



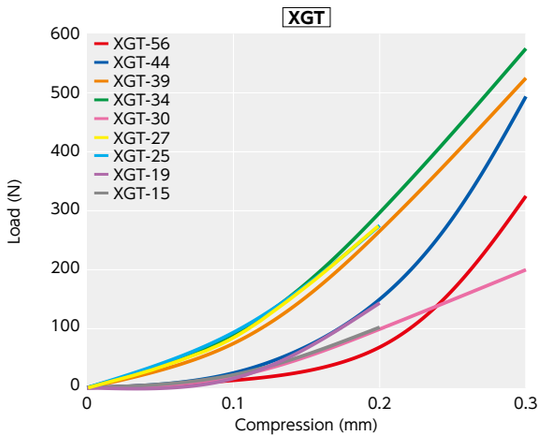


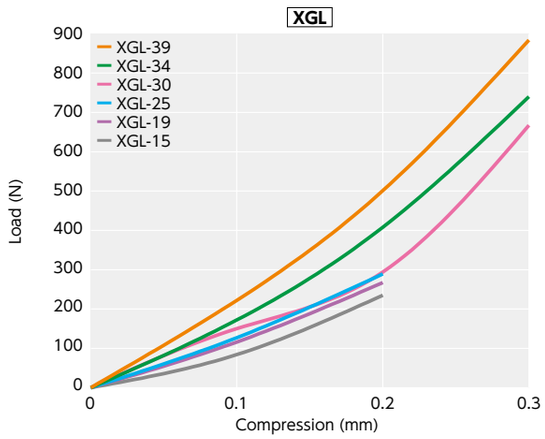


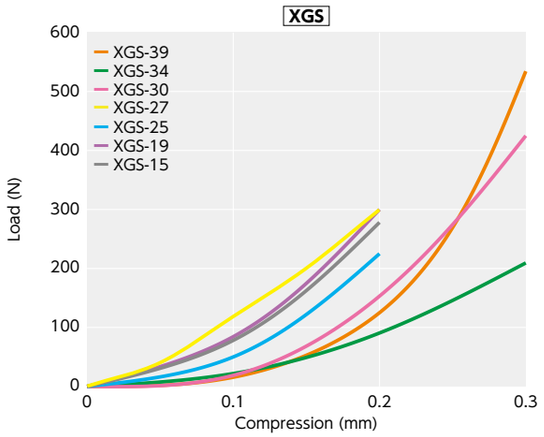


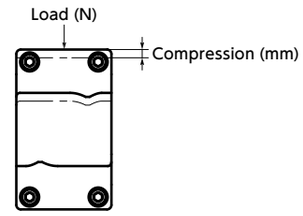
This is the force generated when placing **XGT** **XGL** **XGS** in an eccentric condition. As the eccentric reaction force becomes smaller, the force acting on the shaft bearing also becomes smaller.

● Thrust Reaction Force





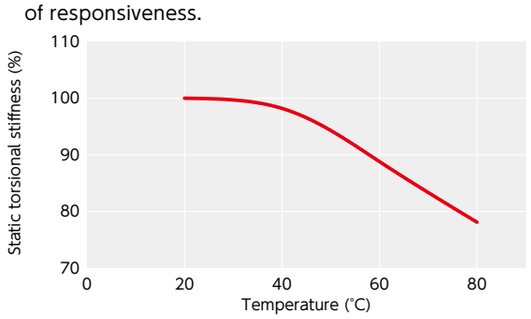




This is the force generated when compressing **XGT** **XGL** **XGS** in the axial direction. As the thrust reaction force becomes smaller, the force acting on the motor also becomes smaller.

● Change in static torsional stiffness due to temperature

This is a value under the condition where the static torsional stiffness at 20℃ is 100%.
Changes in the static torsion spring constant within the operating temperature are shown in the graph.
Before using the unit, be aware of the deterioration of responsiveness.



● Physical property and chemical resistance of high-gain type rubber (HNBR)

	Effect
Aging Resistance	◎
Weather Resistance	◎
Ozone Resistance	◎
Gasoline / Gas Oil	○ - ◎
Benzene / Toluene	△ - ○
Alcohol	◎
Ether	× - △
Ketone (MEK)	×
Ethyl Acetate	× - △
Water	◎
Organic Acid	◎
High Concentration Inorganic Acid	○
Low Concentration Inorganic Acid	◎
Strong Alkali	◎
Weak Alkali	◎

◎: Excellent ○: Available △: Available depending on conditions ×: Not available

● Slip Torque

For set screw type **XGT** **XGS**, see Aluminum Alloy Coupling under "Slip Torque of Coupling - Set Screw Type" for details.
As in the table below, the clamping types **XGT-C**, **XGT-CS**, **XGS-C**, **XGS-CS**, and **XGL-C** have different slip torque according to the bore diameter. Take care during selection.

Unit : N・m

Outside Diameter	Bore Diameter (mm)																	
	3	4	4.5	5	6	6.35	7	8	10	11	12	12.7	14	15	16	17	19	20
15	1	1.3	1.5	1.7	1.9													
19		2.2		2.7	3.1	3.3	3.8											
25				4.3	5	5.5		6.8										
27				3.8	5			6.8										
30								7.5	10	12								
34								8.3	10	10	12		13					
39									13		15	17	17	18	18	23	25	
44											16		19	20	21	23	25	27
56														45			50	61

- These are test values based on the conditions of shaft dimensional allowance: h7, hardness: 34 - 40 HRC, and screw tightening torque of the values described in **XGT-C** **XGT-CS** **XGS-C** **XGS-CS** **XGL-C** dimension tables. They are not guaranteed values.
- Slip torque changes with usage conditions. Carry out tests under conditions similar to actual conditions in advance.

NBK https://www.nbk1560.com

Instruction Manual XG Series Gum-type Flexible Coupling

Couplicon® NBK® The Motion Control Components

Be sure to read the manual before use to ensure correct usage.

1. Introduction

Thank you very much for purchasing Couplicon.

- Once you unpack the product, make sure that it is what you ordered.
- Check for any damage that occurred during transportation. In the unlikely event that the product is incorrect or parts are missing, please contact the dealer where you purchased the item.

2. Safety Precautions

Be sure to read the "Safety Precautions" thoroughly prior to use for the safe use of the product.

⚠ Danger

In the case it is thought that improper handling may cause a person to die or be heavily injured.

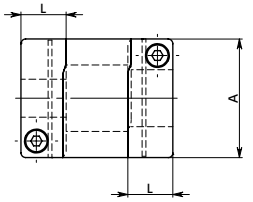
- The devices must be covered with our product protection covers. Otherwise your hands or fingers may contact the device in operation and get injured. However, do not fully cover the device but ventilate the surrounding air.
- A safety mechanism must beinstalled on the equipment for hazard prevention.
- When mounting or removing a product, never turn on the device. Otherwise your hands or fingers may contact the device suddenly driven and get injured.
- The screw (hex socket set screw or hex socket head cap screw) must be properly tightened using a torque driver or torque wrench.
- Do not use this unit with rotational frequency exceeding the max. rotational frequency.
- Never disassemble or modify the products.
- Do not use if there are abnormalities such as cracks, chips, wear, or deformation.

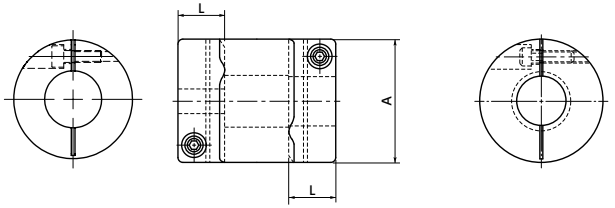
⚠ Precautions

In the case it is thought that improper handling may cause a person to be injured or physical damage to occur.

- Do not store or use the products in an environment that may affect them.
- Be careful about handling the products. Dropping a product may damage them. Also, be careful not to damage your waist or drop a product and damage your feet when transporting products.
- The edges of the product may cause injury during installation or removal. Wear safety gear such as safety glasses and gloves,etc., when working.
- Coupling should be used with misalignment of not more than the allowable value. Use of the unit exceeding the allowable value may damage the product or affect peripheral devices.
- The load torque generated by cont inuous operation must be not more than a rated torque of the coupling. Use of the unit exceeding the allowable value may damage the product or affect peripheral devices.
- In case of a device with large load fluctuation, please apply adhesive agent or upgrade the part number of a coupling to use by one level to prevent screw loosening.
- If any abnormal sound or vibration occurs during operation, immediately stop the operation and check the alignment, interference with peripheral devices, and loosening of screws.
- Screws other than our specified ones (hex socket set screw or hex socket head cap screw) should not be used.
- When discarding the used products, please ask a special dealer to discard them so as to prevent bad influence on environment.
- Never touch the product immediately after stopping the operation. Heat transmission from peripheral devices may cause the product to be highly heated, which may cause the worker to be burned.
- The data in the Technical Information are for reference only. They are not guaranteed values. Carry out tests under conditions similar to actual operating conditions in advance.
- After mounting the coupling, perform a load test for about 10 minutes prior to continuous operation to check the tightness of the screws of each part.

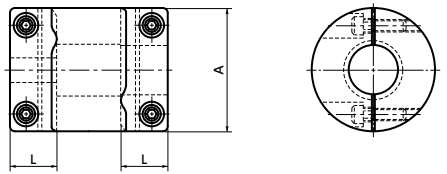
3. Shape Diagram

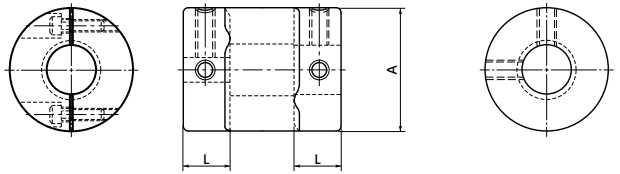




Clamping Type XGT2-C XGS2-C XGL2-C

Clamping Type XGT-CS XGS-CS





Clamping Type XGT-C XGS-C XGL-C

Set Screw Type XGT XGS

4. Mounting the Coupling on Equipment

Be sure to read the "Safety Precautions" and confirm safety before mounting and removal.

- **Cleaning the shaft and bore**
  Wipe away any foreign matter such as dirt, dust, debris, or rust from the surface of the drive shaft and driven shaft to be assembled and the inner periphery of the coupling.

- **Shaft insertion amount**
  The length of the shaft that should be inserted into the coupling is the L dimension in Table 1.
  If the inserted amount is too short, the shaft may slip or the clamping part may break.
  If the inserted amount is too long, there may be shaft interference within the coupling, leading to damage.
  Recommended tolerance for shaft diameters is h6 and h7.

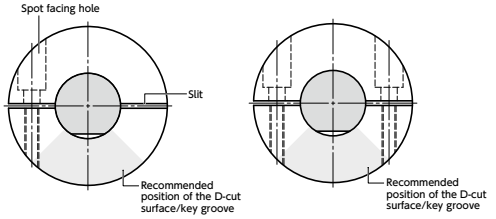
- **Mounting on a D-cut shaft**
  For clamping type
  As a rule, use round shafts with clamping types. When using D-cut shafts or shafts with key grooves, mount the D-cut surface or key groove in a position which avoids slits and bolt spot facing. If the D-cut surface or key groove is not in the recommended position, the clamp part may be damaged if excessive load is applied due to hexagon socket head cap screw tightening.

  For set screw type
  Set the D-cut surface as the set screw fastening position when using set screw types.

Table 1 Hub length L for each coupling size

Part Number	O.D. A (mm)	Hub Length L (mm)
XGT2 - C XGL2 - C XGS2 - C	15	6.5
	19	7.7
	25	9.5
XGT XGT - CS XGT - C	27	9.5
	30	11
XGL - C	34	12
XGS XGS - CS XGS - C	39	15.5
	44	15
	56	19.5
Common for products above	68	24

- For clamping types with 1 hex socket head cap screw
- For clamping types with 2 hex socket head cap screws



- For set screw type

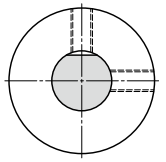


Fig. 1 Positions of D-cut shaft and hub

● Alignment adjustment

① Although flexible coupling permits misalignment and transmits rotation angle and torque, if the misalignment exceeds the allowable value, vibration may occur or the life may be rapidly shortened. Be sure to perform alignment adjustment.

② Shaft center misalignment includes eccentricity (parallel error of both shaft centers), angular (angle error of both shaft centers), and end-play (shaft direction movement of the shaft). Adjust the shaft alignment so that it is not more than an allowable value described in the Dimension/ Performance table in this catalog.

③ The allowable values of misalignment described in the Dimension/Performance table are for the case where any one of eccentricity, angular, and endplay occurs independently. Mixing of two or more misalignment causes each of the allowable values to be reduced to half.

④ Misalignment may occur not only in mounting into the device but also due to vibration, thermal expansion, and shaft bearing abrasion during operation. Therefore, misalignment is recommended to be not more than one third of the allowable value.

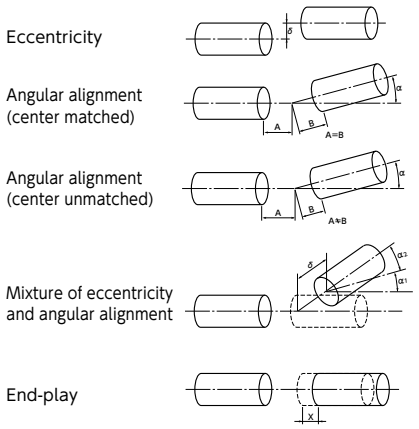


Fig. 2 Types of misalignment

Table 2 Allowable misalignment value for each coupling part number/sleeve

Part Number	A O.D.	Max. Lateral Misalignment (mm)	Max. Angular Misalignment (°)	Max. Axial Misalignment (mm)
XGT2 - C	15	0.15	1.5	±0.2
	19	0.15	1.5	±0.2
XGL2 - C	25	0.15	1.5	±0.2
	27	0.15	1.5	±0.2
XGT XGT - CS XGT - C	30	0.2	1.5	±0.3
	34	0.2	1.5	±0.3
XGL - C	39	0.2	1.5	±0.3
	44	0.2	1.5	±0.3
Common for products above	56	0.2	1.5	±0.3
	68	0.2	1.5	±0.3

Part Number	A O.D.	Max. Lateral Misalignment (mm)	Max. Angular Misalignment (°)	Max. Axial Misalignment (mm)
XGS2 - C	15	0.15	1.5	±0.2
	19	0.15	1.5	±0.2
XGS XGS - CS XGS - C	25	0.15	1.5	±0.2
	27	0.15	1.5	±0.2
	30	0.2	1.5	±0.3
Common for products above	34	0.2	1.5	±0.3
	39	0.2	1.5	±0.3

● Confirmation before screw tightening

When the positions of the drive shaft and driven shaft are determined, make sure that the coupling can be moved smoothly by sliding the coupling in the axial direction while the shaft is loose. Alternatively, slide the coupling in the rotational direction to make sure that it can be rotated smoothly.

● Screw tightening

Be sure to tighten the hex socket set screws or hex socket head cap screws properly, using a torque screwdriver or torque wrench. Refer to Table 3 or 4 for the tightening torque.

● Trial run

After mounting the coupling on the equipment, perform a trial run and confirm that there is no vibration, abnormal noise, or shaft slippage.

Table 3 Screw tightening torque for set screw type

Part Number	O.D. A (mm)	Hex Socket Set Screw Nominal Size	Screw Tightening Torque (N • m)
XGT XGS Common for products above	15	M3	0.7
	19	M3	0.7
	25	M4	1.7
	27	M4	1.7
	30	M4	1.7
	34	M5	4
	39	M5	4
	44	M6	7
	56	M6	7

Table 4 Screw tightening torque for clamping type

Part Number	O.D. A (mm)	Hex Socket Set Screw Nominal Size	Screw Tightening Torque (N • m)
XGT2 - C XGL2 - C XGS2 - C	15	M1.6	0.25
	19	M2	0.5
	25	M2.5	1
XGT - CS XGT - C	27	M2.5	1
	30	M3	1.5
	34	M3	1.5
XGL - C XGS - CS XGS - C	39	M4	2.5
	44	M4	2.5
	56	M5	7
Common for products above	68	M6	12

5. Inquiries

Please contact us as below for inquiries regarding the instruction manual.

NBK America LLC
1-484-685-7500
1-484-685-7600
9:00 to 17:00 on weekdays,Eastern Standard Time

For product specifications and performance, please refer to the Catalog.
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