

# COUPLINGS

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Coupling Models

SERIES	SERVOFLEX		
MODELS	SFC SA2	SFS S	SFF SS
		 >> P.046	 
		SFS W	
	SFC DA2	 >> P.048	SFF DS
	 >> P.036	SFS G	 
		 >> P.050	  >> P.064

SERIES	HELI-CAL		
MODELS	1441 / HELI-CAL MINI	ARM	DSR
	 >> P.096	 >> P.098	 >> P.099
	3000	ACRM	DSCR
	 >> P.097	 >> P.098	 >> P.099

SERIES	STEPFLEX	MIKI PULLEY STARFLEX		SPRFLEX
MODELS	STF	ALS R	ALS B	AL
	 >> P.124	 >> P.132	 >> P.136	 >> P.145
		ALS Y		
		 >> P.134		

## COUPLINGS

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### SERIES

Metal Couplings	Metal Disc Couplings <b>SERVOFLEX</b>
	High-rigidity Couplings <b>SERVORIGID</b>
	Metal Slit Couplings <b>HELI-CAL</b>
	Metal Coil Spring Couplings <b>BAUMANNFLEX</b>
Rubber and Plastic Couplings	Pin Bushing Couplings <b>PARAFLEX</b>
	Link Couplings <b>SCHMIDT</b>
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	Rubber and Plastic Couplings <b>CENTAFLEX</b>

### SERVORIGID

SFM SS



>> P.072

SFH S



>> P.080

SRG



>> P.091

SFM SS



>> P.074

SFH G



>> P.082

### BAUMANNFLEX

ZG



>> P.104

MM



>> P.106

### PARAFLEX

CPE



>> P.111

### SCHMIDT

NSS



>> P.115

LM



>> P.105

MF



>> P.107

CPU



>> P.112

DL



>> P.120

### BELLOWFLEX

CHP



>> P.149

### CENTAFLEX

CF-A



>> P.158

CF-X



>> P.174

CM



>> P.184

CF-H



>> P.170

CF-B



>> P.180

Selection Guide

1 Select a type

Refer to the list of parts (p. 022), Select by Product Characteristics (p. 025), Select by Driver (p. 025), and Applications (p. 026) sections in order to select the best coupling for the application at hand.

2 Select a size

Select a size with a nominal torque (for SERVOFLEX, a rated torque) higher than the load torque. Make sure to also consider load conditions when making a selection.

3 Check the max. bore diameter

When selecting a model, make sure to check that the mounting shaft diameter is smaller than the maximum bore diameter of the coupling.

4 Overview

Once the model has been selected, check the rated torque, maximum rotation speed, dimensions, and other specifications again to confirm that they satisfy the usage conditions.

Quick Search



You can use the website quick search feature to narrow down your search for couplings.



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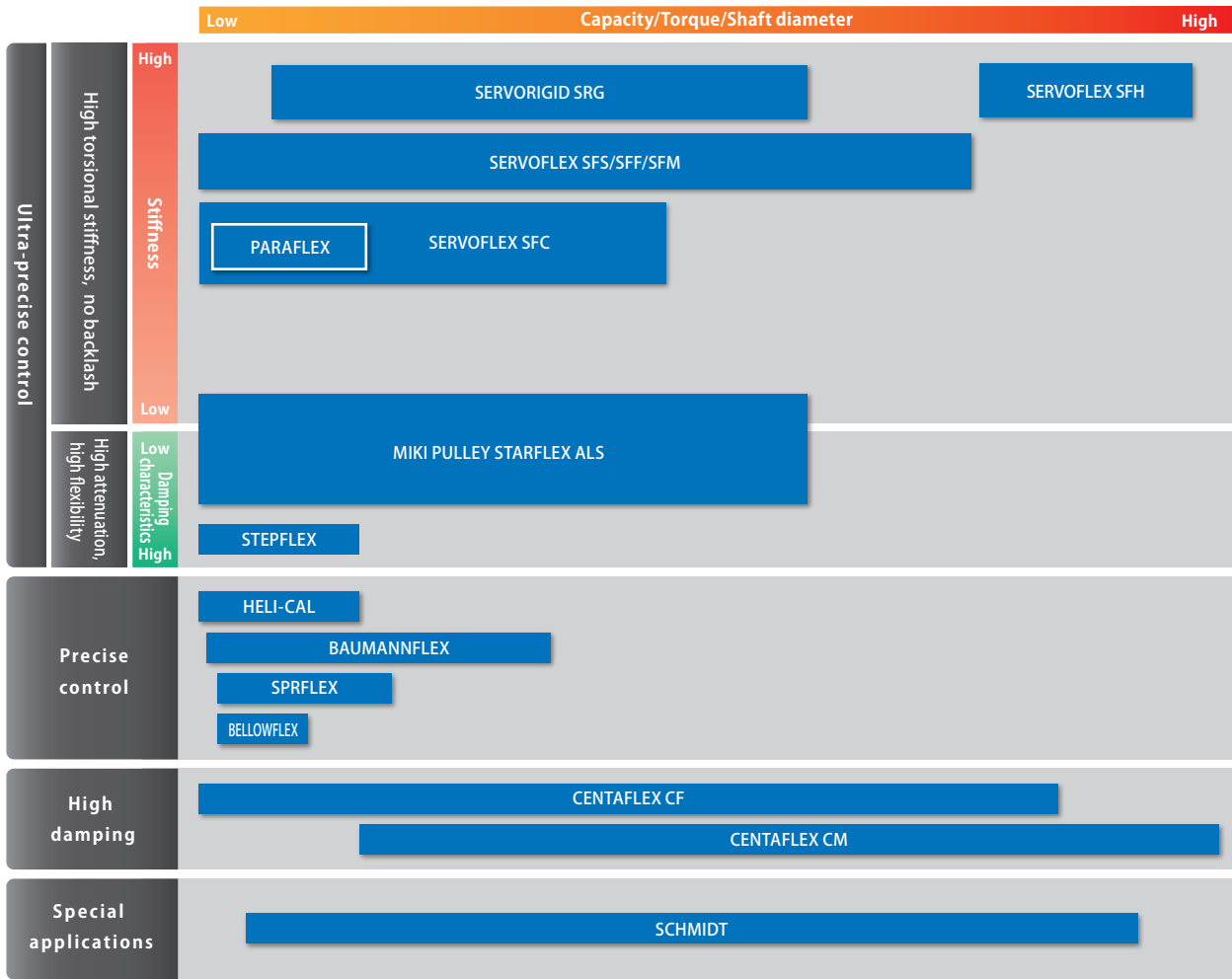
TORQUE LIMITERS

ROSTA

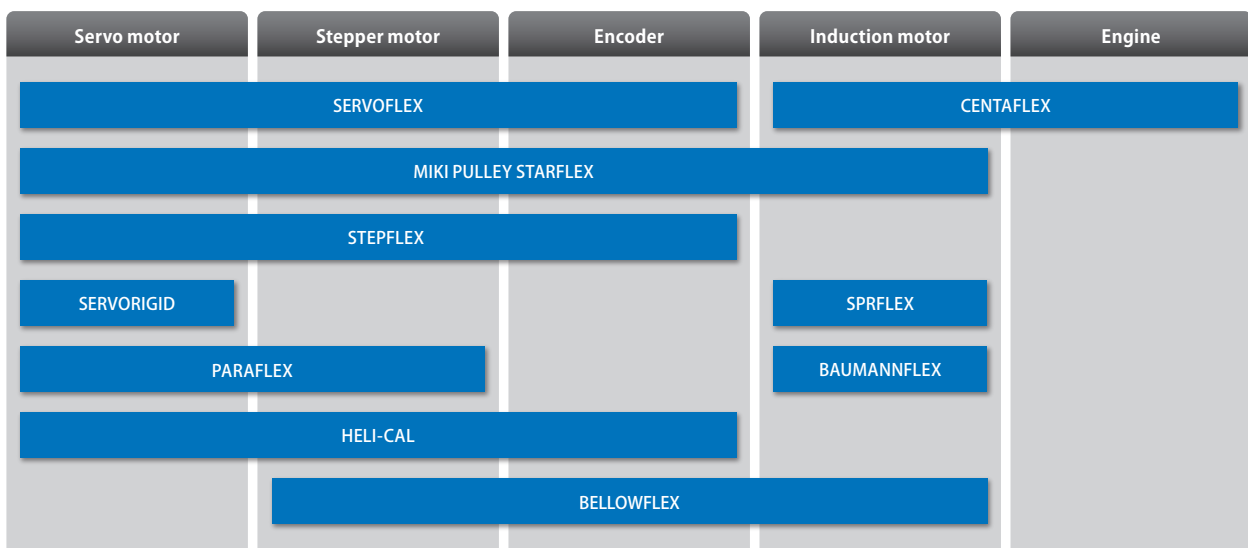
SERIES

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	SERVORIGID
	HELI-CAL
Metal Slit Couplings	BAUMANNFLEX
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	SPRFLEX
Rubber and Plastic Couplings	BELLOWFLEX
	CENTAFLEX

Select by Product Characteristics

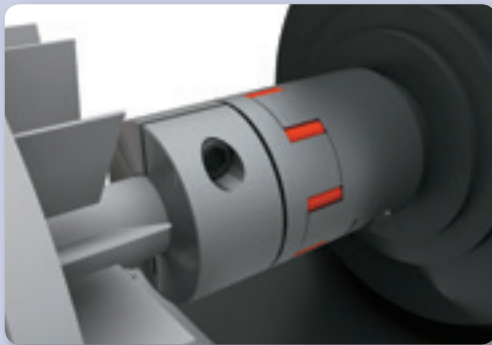
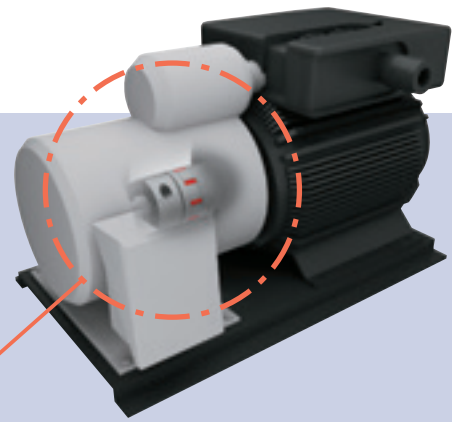


Select by Drive



Applications

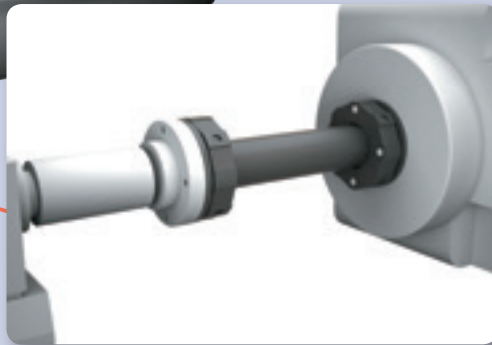
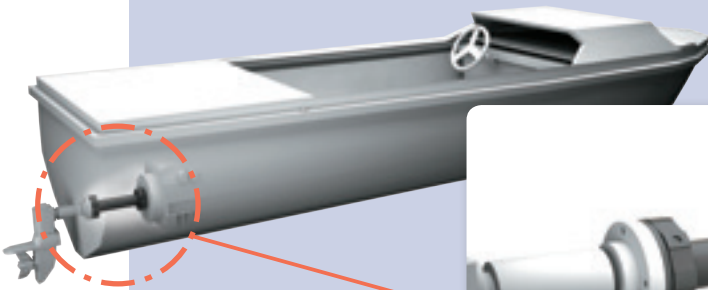
**Product model** ALS R  
**Employed device** Vacuum Pump



MIKI PULLEY STARFLEX coupling for connecting the drive unit.  
 Simple structure and easy maintenance.

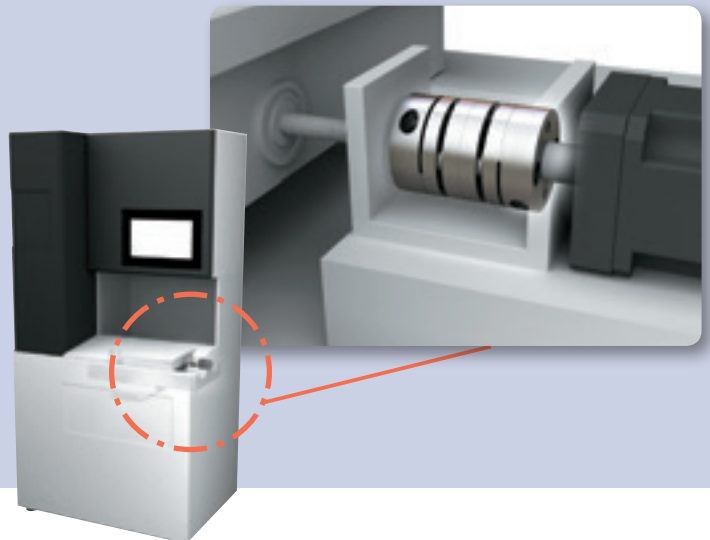
**Product model** CF-A OZ  
**Employed device** Pleasure Boat

CENTAFLEX coupling and floating shaft (for high-speed rotation) are used to connect the engine and the propeller.



**Product model** SFC  
**Employed device** Dicing Saw

SERVOFLEX for connecting the servo motor and ball screw. It is used for ultra-precision machining of semiconductor wafers.



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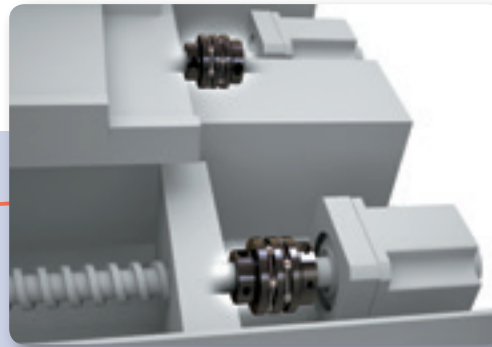
LINEAR SHAFT DRIVES

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SERIES

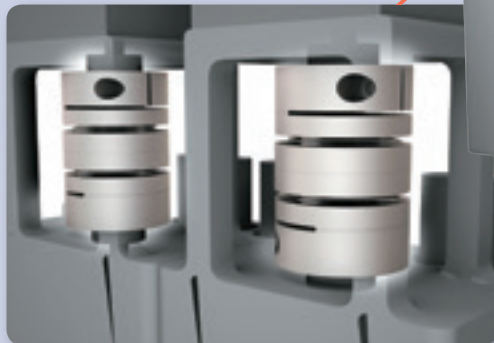
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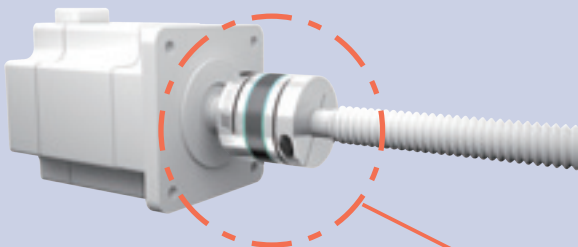
**Product model** SFF  
**Employed device** CNC Lathe

Ultra-high stiffness coupling SFF model for connecting the servo motor and feed shaft. The rated torque is higher than the conventional models, and the coupling size and the moment of inertia can be reduced.

SERVOFLEX coupling for the head of a chip mounter.



**Product model** SFC  
**Employed device** Chip Mounter



**Product model** STF  
**Employed device** General-purpose Feed Shaft

The high damping performance STEPFLEX coupling is used to connect the stepper motor and the ball screw.



# Link Couplings SCHMIDT



High parallel misalignment



For high output

Model	NSS	DL
Max. nominal torque [N·m]	7850	2310
Operating temperature [°C]	-10 ~ 60	-10 ~ 60
Backlash	Extremely small size	Extremely small size
Max. displacement (parallel) [mm]	183 (linear)	4
Driver	Induction motor	
Application	Roll formers, production equipment for sanitary goods	

## Compact Couplings That Transmit Power with Different Shaft Centers



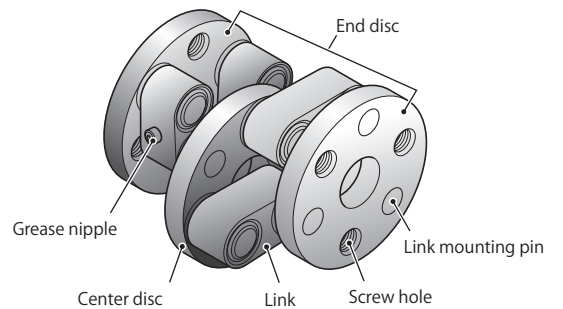
Power transmission with different shaft centers, constructed with spline shafts or the like, efficiently transmit power in a compact form factor. The NSS models not only transmit power with different shaft centers, they can also translate shafts over a wide range while rotating.



### Operating Principles

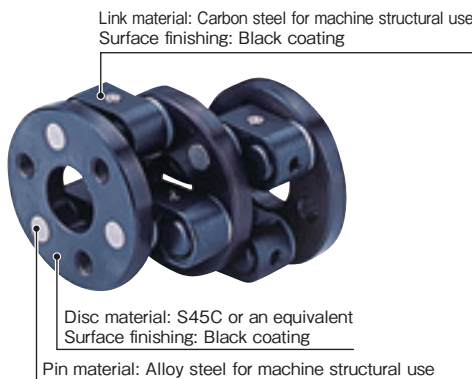
SCHMIDT couplings employ different shaft centers and the crank motion of a link.

Power input at one end disc is transmitted to the other end disc via links and center disc. This eliminates the slight frictional loss of bearings and reliably transmits the drive-side energy to the driven side together with rotation speed and torque.

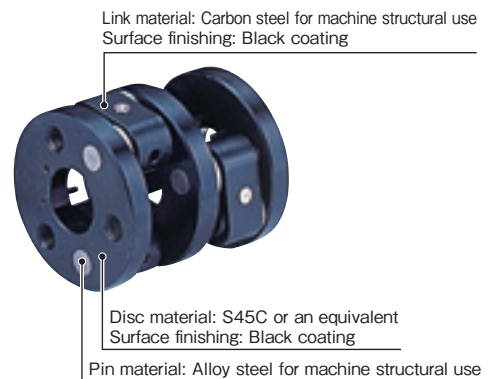


### Structure and Materials

#### ■ NSS



#### ■ DL



# NSS Models

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Rubber and Plastic Couplings  
CENTAFLEX

MODELS

NSS

DL

## Specifications

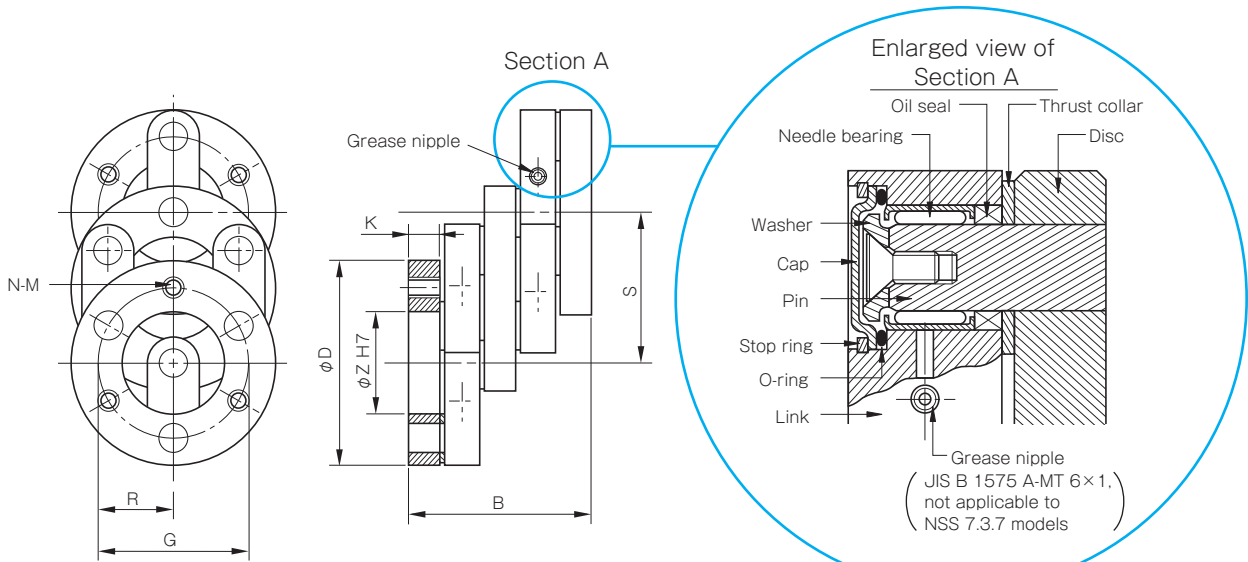
Model	No. of links	Parallel misalignment			Torque		Max. rotation speed [min <sup>-1</sup> ]	Bearing basic load [N] C	Pin pitch = Radius of the circle [m] R	Moment of inertia [kg·m <sup>2</sup> ]	Mass [kg]
		Min. [mm] S × 0.25	Max. [mm] S × 0.95	Linear Max. [mm]	Nominal [N·m]	Max. [N·m]					
NSS 7.3.7	3 × 2	9	34	65	49	137	3000	3870	0.024	9.03 × 10 <sup>-4</sup>	1.3
NSS 7.7.9	3 × 2	18	66	128	68	196	2500	3870	0.035	2.69 × 10 <sup>-3</sup>	1.9
NSS 10.9.12	3 × 2	23	85	165	196	600	2000	8920	0.045	1.15 × 10 <sup>-2</sup>	4.9
NSS 13.9.14	3 × 2	23	85	165	350	1060	1800	14120	0.050	2.80 × 10 <sup>-2</sup>	10.4
NSS 16.10.16	3 × 2	25	95	183	640	1850	1500	21570	0.057	5.80 × 10 <sup>-2</sup>	15.7
NSS 20.9.20	3 × 2	23	85	165	1180	3470	1000	30890	0.075	1.61 × 10 <sup>-1</sup>	27
NSS 20.9.20/4	4 × 2	23	85	165	1370	4170	600	30890	0.075	1.80 × 10 <sup>-1</sup>	30
NSS 20.9.23/5	5 × 2	23	85	165	2060	6280	500	30890	0.090	3.08 × 10 <sup>-1</sup>	35
NSS 20.9.25/6	6 × 2	23	85	165	2750	8340	460	30890	0.100	4.48 × 10 <sup>-1</sup>	43
NSS 20.9.33/8	8 × 2	23	85	165	5200	15700	300	30890	0.140	1.19	59
NSS 20.9.39/10	10 × 2	23	85	165	7850	23500	250	30890	0.170	2.25	79

\* If the number of links is not 3 × 2, the part must be made to order.

\* Max. rotation speed does not take into account dynamic balance.

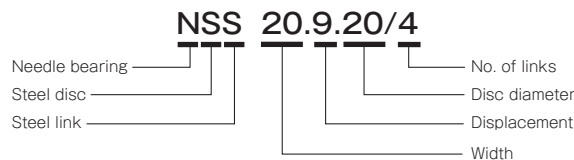
\* Select NSS model SCHMIDT couplings as guided by the design checklist on P.116-119, with due consideration to service life.

## Dimensions



Model	D	B	S	Z	G	N	M	K	Unit [mm]
NSS 7.3.7	70	74	36	25	48	3	M10	10	
NSS 7.7.9	92	74	70	45	70	3	M10	10	
NSS 10.9.12	120	101	90	50	90	3	M12	15	
NSS 13.9.14	140	134	90	55	100	3	M16	22	
NSS 16.10.16	160	155	100	60	115	3	M16	25	
NSS 20.9.20	200	196	90	80	150	3	M20	30	
NSS 20.9.20/4	200	196	90	80	150	4	M20	30	
NSS 20.9.23/5	230	196	90	120	180	5	M20	30	
NSS 20.9.25/6	250	196	90	120	200	6	M20	30	
NSS 20.9.33/8	330	196	90	210	280	8	M20	30	
NSS 20.9.39/10	390	196	90	250	340	10	M20	30	

### How to Place an Order

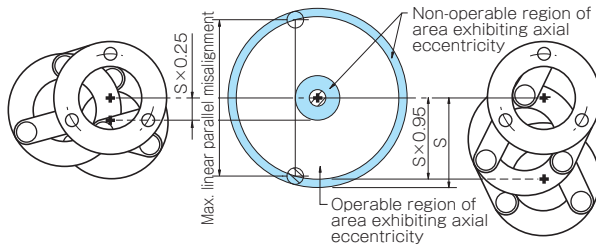


# NSS Models

## Items Checked for Design Purposes

### Precautions for Handling

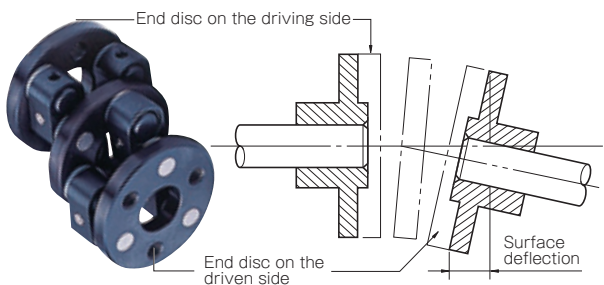
- (1) Couplings are designed for use within an operating temperature range of -10°C to 60°C . NSS model SCHMIDT couplings are not waterproof. Do not use them outdoors.
- (2) The discs are all connected by bearings and can move freely, so be alert to injury during transport and handle so that undue force is not applied to the product.
- (3) Use in a manner that results in the parallel misalignment of both shafts being in the range  $S \times 0.25$  to  $S \times 0.95$ .



### Amount of parallel misalignment of both shafts

Model	Parallel misalignment [mm]		
	$S \times 0.25$	$S \times 0.95$	Max. linear
NSS 7.3.7	9	34	65
NSS 7.7.9	18	66	128
NSS 10.9.12	23	85	165
NSS 13.9.14	23	85	165
NSS 16.10.16	25	95	183
NSS 20.9.20	23	85	165
NSS 20.9.20/4	23	85	165
NSS 20.9.23/5	23	85	165
NSS 20.9.25/6	23	85	165
NSS 20.9.33/8	23	85	165
NSS 20.9.39/10	23	85	165

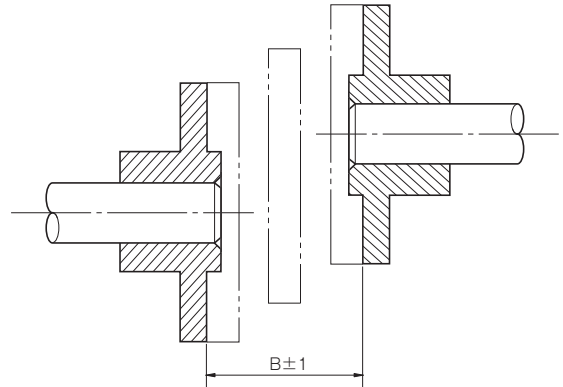
- (4) Make the driving shaft and driven shaft parallel. Adjust the mounting angle misalignment of the two coupling shafts so that the coupling surface deflection is at or below the values of the table below after mounting and during operation. If surface deflection exceeds the allowable value, the product will break down in a very short period of time.



### Allowable surface deflection

Model	Allowable surface deflection [mm]
NSS 7.3.7	0.15
NSS 7.7.9	0.15
NSS 10.9.12	0.2
NSS 13.9.14	0.2
NSS 16.10.16	0.2
NSS 20.9.20	0.2
NSS 20.9.20/4	0.2
NSS 20.9.23/5	0.3
NSS 20.9.25/6	0.4
NSS 20.9.33/8	0.5
NSS 20.9.39/10	0.6

- (5) When mounting a coupling, design and mount it so that the axial length during use is standard dimension  $B \pm 1$  mm.



- (6) Design the device so that no bending or thrust loads act on the coupling. Avoid using these couplings in applications that install them vertically or obliquely.
- (7) The grease for lubricating the bearings should be type 1-1 or 1-2 JIS K2220 cup grease or the equivalent.
- (8) Mount a protective cover on the rotating part. Be careful not to pinch your hand between the discs and links when mounting.
- (9) When mounting heavy items, be sure to use an eye bolt. Eye bolts can be used by securing them to both end discs, but when they are wider than the end disc, the link components and eye bolt can come into contact and suffer damage when hanging, so consider the mounting position when choosing an eye bolt size.

## Selection Procedures

(1) Find the torque,  $T_a$ , applied to the coupling using the output capacity,  $P$ , of the driver and the usage rotation speed,  $n$ .

$$T_a \text{ [N}\cdot\text{m]} = 9550 \times \frac{P \text{ [kW]}}{n \text{ [min}^{-1}\text{]}}$$

(2) When a service factor based on load property,  $K$ , shown on the table below is 1.5, select the model from the quick reference table.

### Service factor based on load property: $K$

When mounted between shafts with virtually no shock	1.0 ~ 1.5
When mounted between shafts with severe shock (including when shaft displacement speed is fast)	1.5 ~ 2.0
When mounted in unbalanced machinery that shakes the entire coupling	2.0 ~ 2.5

If selecting a model using conditions other than those of the quick reference table, calculate the service life using the equation below.

$$p = \frac{4 \times T_a}{N \times R}$$

$$L_h = \frac{16666}{n} \left( \frac{C}{p \cdot K} \right)^{\frac{10}{3}}$$

$P$ : Output capacity of driver [kW]

$p$ : Bearing load [N]

$R$ : Radius of pitch circle of pin [m]

$T_a$ : Transmission torque [N·m]

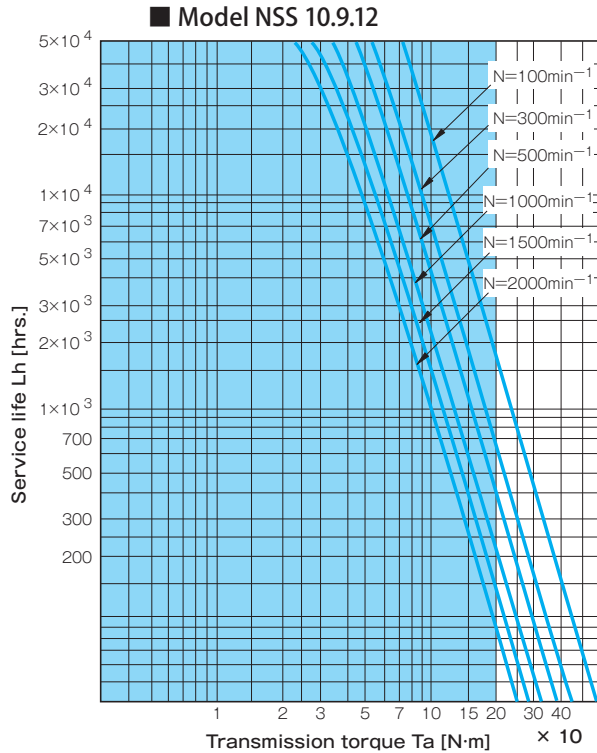
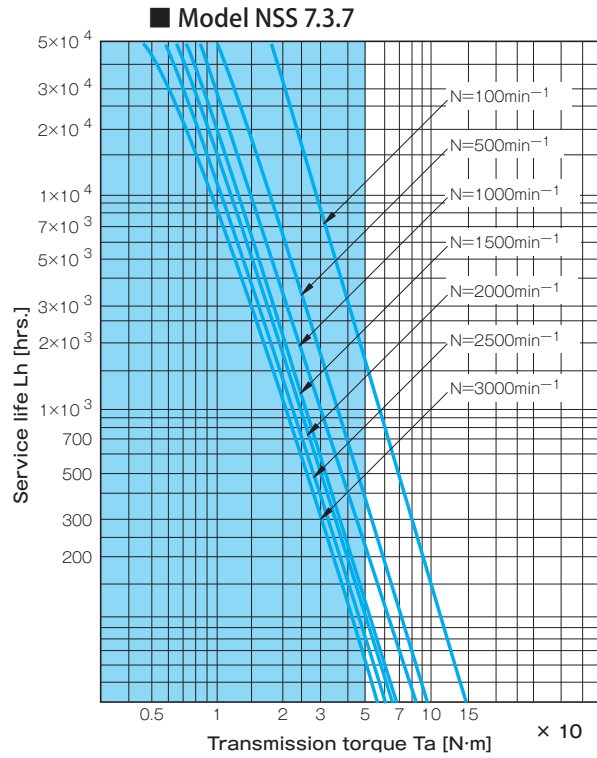
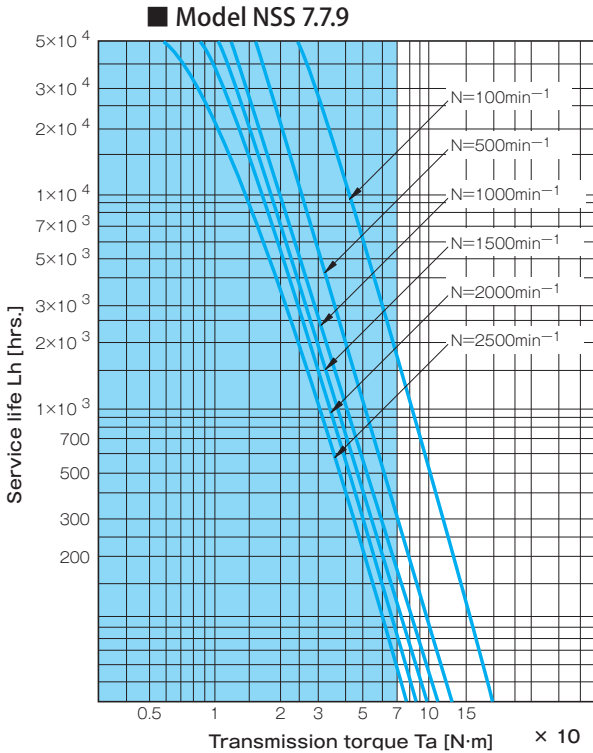
$N$ : Total number of links (on a standard product,  $3 \times 2 = 6$ )

$L_h$ : Service life [h]

$n$ : Usage rotation speed [ $\text{min}^{-1}$ ]

$C$ : Basic load capacity of bearing [N]

$K$ : Load coefficient



\* The table considers safety factors (service factor based on load property:  $K = 1.5$ ). Use in the range of the shaded part in the graph.

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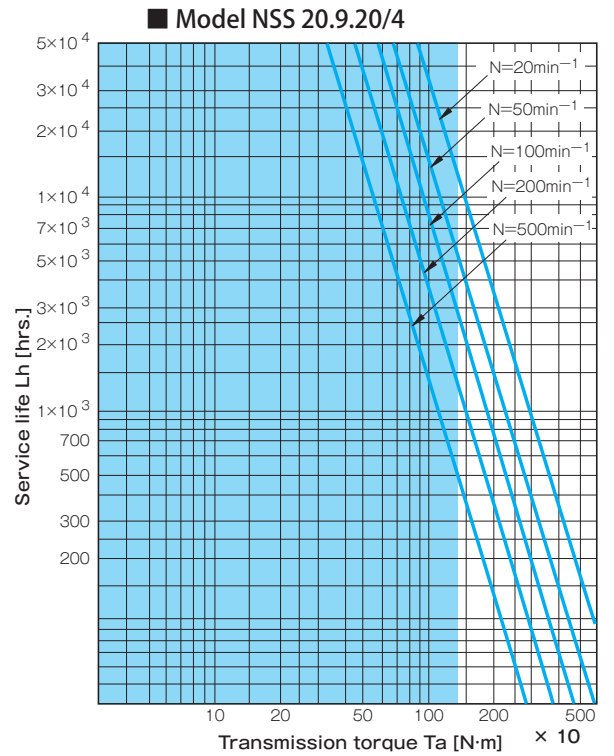
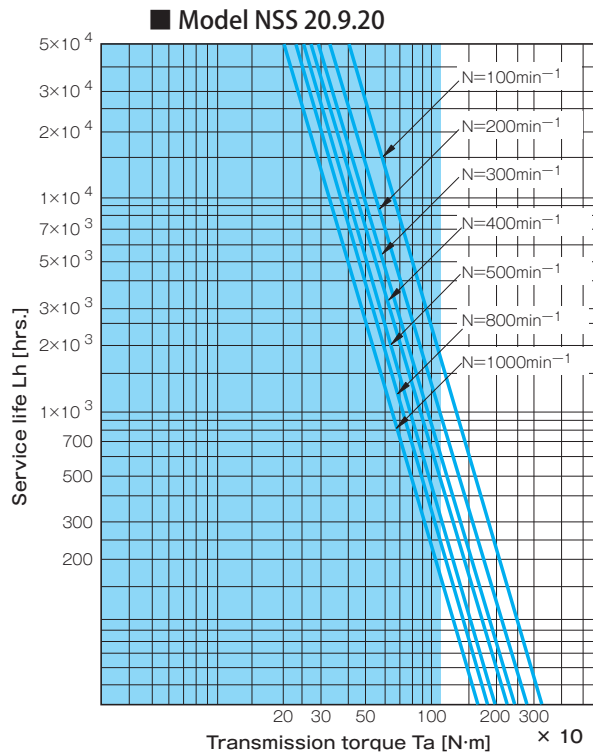
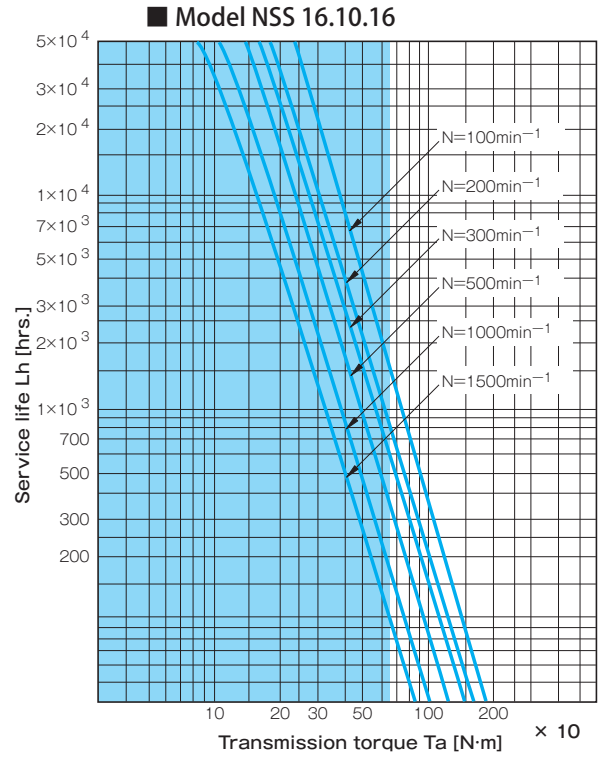
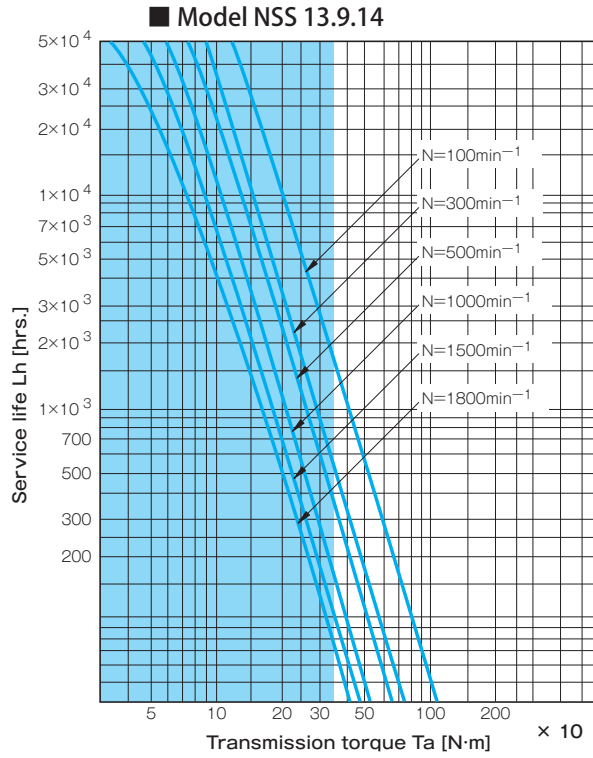
Rubber and Plastic Couplings  
**CENTAFLEX**

## MODELS

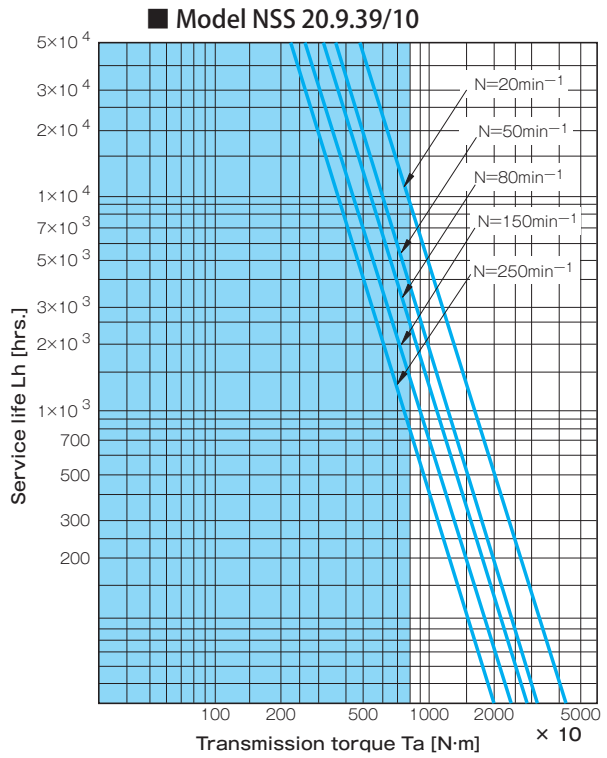
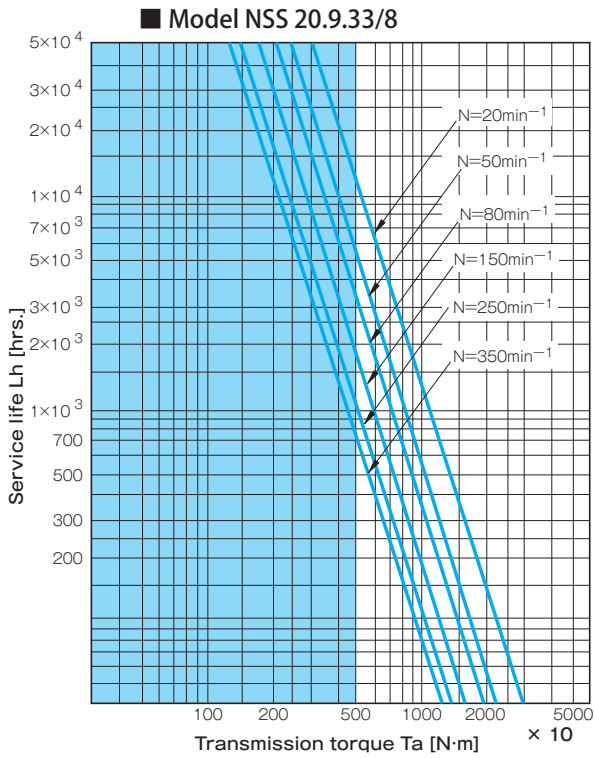
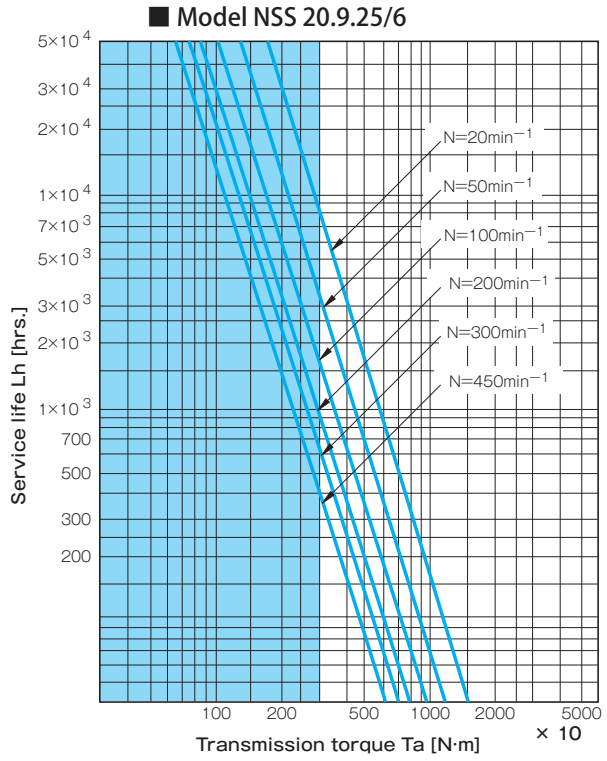
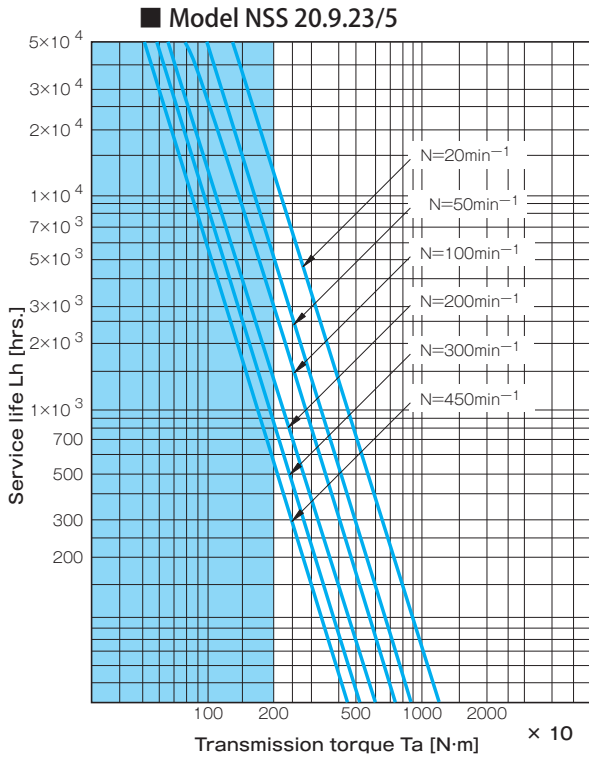
NSS

DL

# NSS Models



\* The table considers safety factors (service factor based on load property:  $K = 1.5$ ). Use in the range of the shaded part in the graph.



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Metal Couplings	Pin Bushing Couplings <b>PARAFLEX</b>
	<b>Link Couplings</b> <b>SCHMIDT</b>
Rubber and Plastic Couplings	Dual Rubber Couplings <b>STEPFLEX</b>
	Jaw Couplings <b>MIKI PULLEY</b> <b>STARFLEX</b>
	Jaw Couplings <b>SPRFLEX</b>
	Plastic Bellows Couplings <b>BELLOWFLEX</b>
	Rubber and Plastic Couplings <b>CENTAFLEX</b>

MODELS

NSS

DL

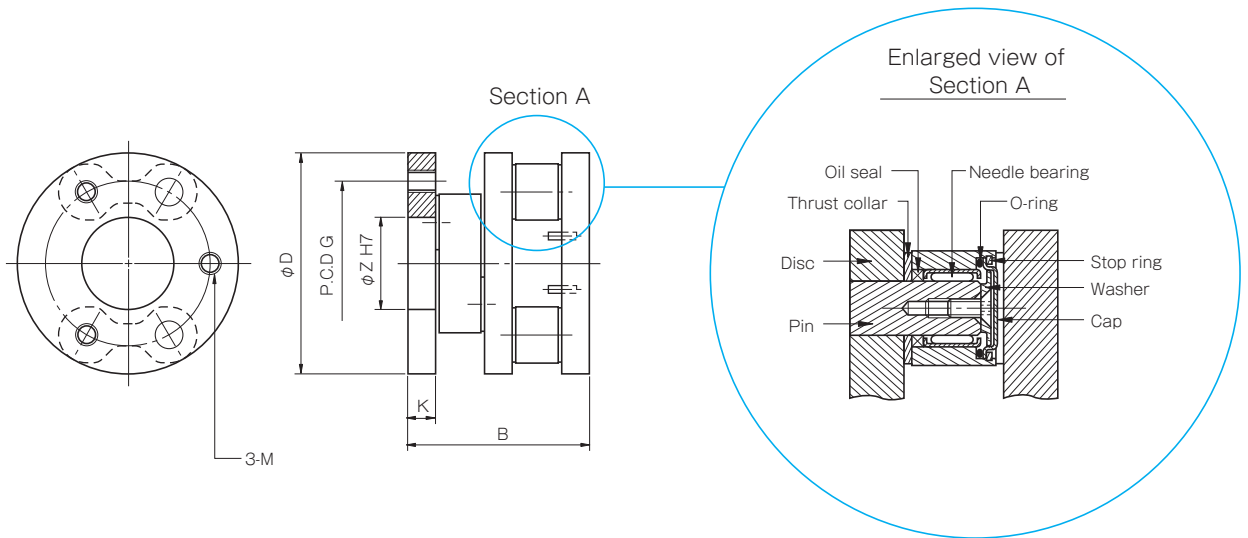
# DL Models

## Specifications

Model	No. of links	Parallel [mm]	Rated torque [N·m]	Max. rotation speed [min <sup>-1</sup> ]	Moment of inertia [kg·m <sup>2</sup> ]	Mass [kg]
DL 7.7-02	2 × 2	2	93	2000	7.75 × 10 <sup>-4</sup>	1.1
DL 7.9-03	2 × 2	3	135	1800	2.30 × 10 <sup>-3</sup>	1.7
DL 10.12-04	2 × 2	4	402	1600	9.98 × 10 <sup>-3</sup>	4.4
DL 13.14-04	2 × 2	4	706	1400	2.60 × 10 <sup>-2</sup>	9.1
DL 16.16-04	2 × 2	4	1230	1200	5.10 × 10 <sup>-2</sup>	13.9
DL 20.20-04	2 × 2	4	2310	1000	1.44 × 10 <sup>-1</sup>	24.1

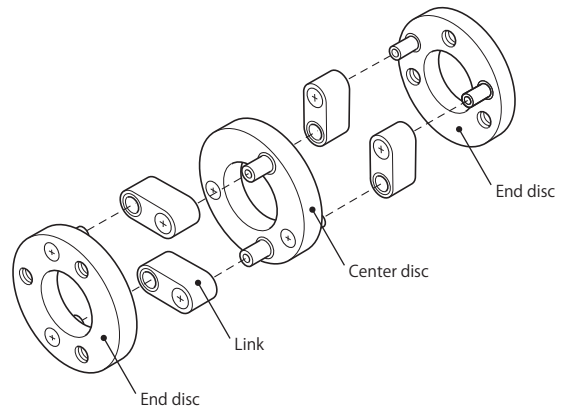
\* Max. rotation speed does not take into account dynamic balance.

## Dimensions

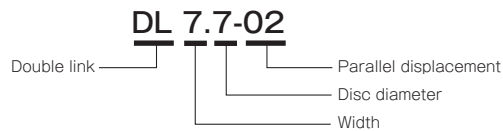


Model	D	B	Z	G	M	K
DL 7.7-02	70	74	25	48	M10	10
DL 7.9-03	92	74	45	70	M10	10
DL 10.12-04	120	101	50	90	M12	15
DL 13.14-04	140	134	55	100	M16	22
DL 16.16-04	160	155	60	115	M16	25
DL 20.20-04	200	196	80	150	M20	30

Unit [mm]



### How to Place an Order



COUPLINGS

ETP BUSHINGS

ELECTROMAGNETIC CLUTCHES & BRAKES

SPEED CHANGERS & REDUCERS

INVERTERS

LINEAR SHAFT DRIVES

TORQUE LIMITERS

ROSTA

SERIES

- Metal Disc Couplings **SERVOFLEX**
- High-rigidity Couplings **SERVORIGID**
- Metal Slit Couplings **HELI-CAL**
- Metal Coil Spring Couplings **BAUMANNFLEX**
- Pin Bushing Couplings **PARAFLEX**
- Link Couplings SCHMIDT**
- Dual Rubber Couplings **STEPFLEX**
- Jaw Couplings **MIKI PULLEY STARFLEX**
- Jaw Couplings **SPRFLEX**
- Plastic Bellows Couplings **BELLOWFLEX**
- Rubber and Plastic Couplings **CENTAFLEX**

MODELS

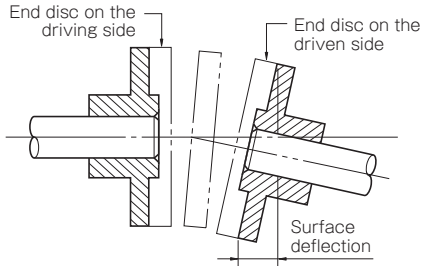
NSS

DL

Items Checked for Design Purposes

Precautions for Handling

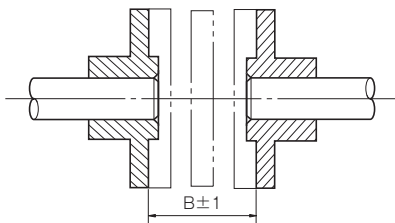
- (1) Couplings are designed for use within an operating temperature range of -10 °C to 60 °C . DL model SCHMIDT couplings are not waterproof. Do not use them outdoors.
- (2) The discs are all connected by bearings and can move freely, so be alert to injury during transport and handle so that undue force is not applied to the product.
- (3) Make the driving shaft and driven shaft parallel. Adjust the mounting angle misalignment of the two coupling shafts so that the coupling surface deflection is at or below the values of the table below after mounting and during operation.



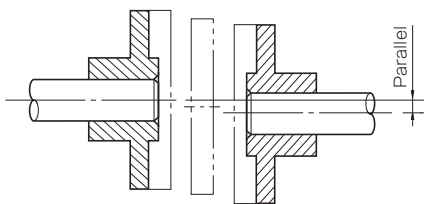
Allowable surface deflection

Model	Allowable surface deflection [mm]
DL 7.7-02	0.15
DL 7.9-03	0.15
DL 10.12-04	0.2
DL 13.14-04	0.2
DL 16.16-04	0.2
DL 20.20-04	0.2

- (4) When mounting a coupling, design and mount it so that the axial length during use is standard dimension B ± 1 mm.



- (5) Adjust so that driving shaft and driven shaft parallel misalignment is within the following allowable values after mounting and during operation.



Allowable parallel misalignment

Model	Allowable parallel misalignment [mm]
DL 7.7-02	± 2
DL 7.9-03	± 3
DL 10.12-04	± 4
DL 13.14-04	± 4
DL 16.16-04	± 4
DL 20.20-04	± 4

- (6) Mount the couplings so they are not subject to axial loads. Avoid using these couplings in applications that install them vertically or obliquely.

Selection Procedures

- (1) Find the torque, Ta, applied to the coupling using the output capacity P of the motor and the usage rotation speed n.

$$T_a [N \cdot m] = 9550 \times \frac{P [kW]}{n [min^{-1}]}$$

- (2) Determine the service factor K from the operating conditions and find the corrected torque, Td, applied to the coupling.

$$T_d = T_a \times K_1 \times K_2 \times K_3$$

Service factor based on load property: K1

Load properties	Constant	Vibrations: Small	Vibrations: Medium	Vibrations: Large
K1	1.0	1.0 ~ 1.5	1.5 ~ 2.0	2.0 ~ 2.5

Service factor based on service life: K2

Required service life [h]	1,000	5,000	10,000	15,000	20,000	25,000	30,000	40,000	50,000
K2	1.0	1.0	1.05	1.1	1.2	1.3	1.4	1.5	1.6

Service factor based on amount of parallel misalignment: K3

Parallel misalignment [mm]	0	0.5	1	1.5	2	2.5	3	3.5	4
K3	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8

- (3) Find Td, and then select the DL model that can be used in the zone under the rated torque diagram shown for each type.

Diagram for rated torque and rotation speed

