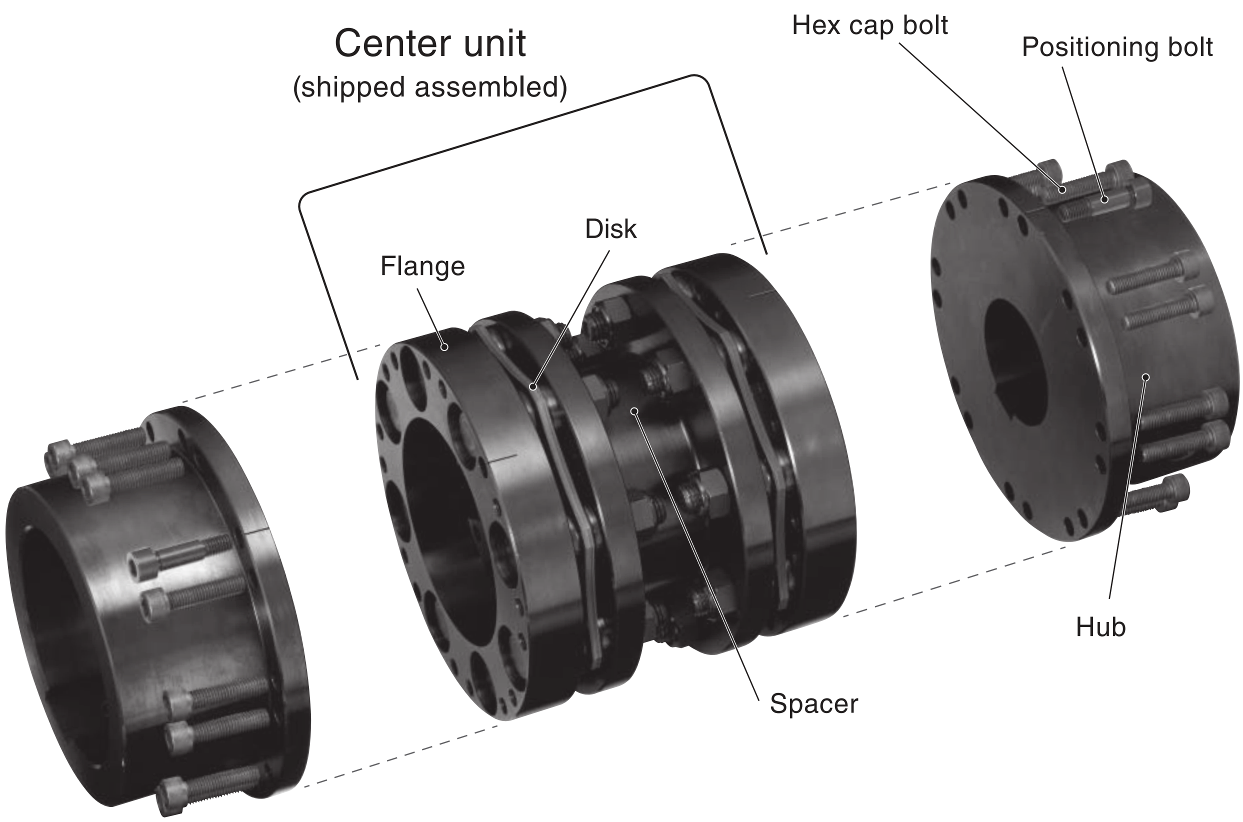
NER Series ECHT-FLEX® Couplings

Designed to provide high capacity, compact size, and easy handling.

New disks and optimized bolts give NER Series ECHT-FLEX Couplings high capacity and smaller size.
The center unit structure greatly reduces mounting time on equipment.

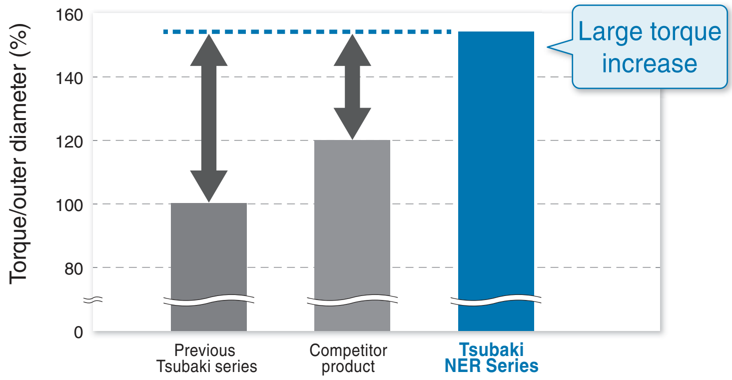
Structure



Features

■ Large transmission capacity

Greatly increased torque relative to previous series enables smaller sizes.



Comparison of torque for same outer diameter
500 kW at 1,450 rpm selected (service factor ≥ 2.0)

■ Easy handling

The disks and spacers have been structured as a single unit (center unit), eliminating on-site disk assemble work after centering.
Can be installed/removed just by the bolts between the center unit and hubs.

■ Large bore diameters

The use of a center unit enables larger maximum bore diameters than other models.

■ Backlash-free, long service life

NER Series models have no backlash and high torsional stiffness, making them ideal for servomotor-based positioning equipment.
No sliding parts, enabling long-term use without lubrication.

■ Wide range of options

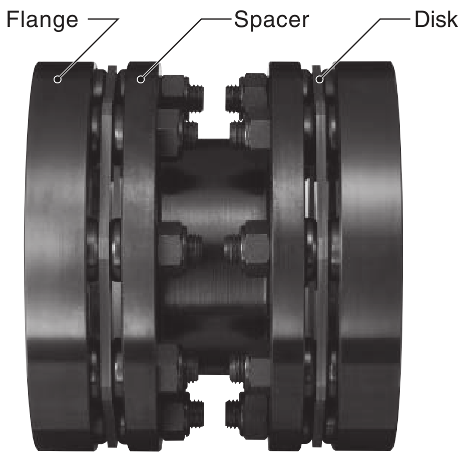
Choose from a wide range of products, including NER with Power-Locks for compact shaft designs, models that meet API610 11th pump standards, and flange-mounting models that can be installed on non-shaft rotating parts.

■ Environmentally friendly

Comply with the regulations on hazardous substances in the RoHS directive.

Features

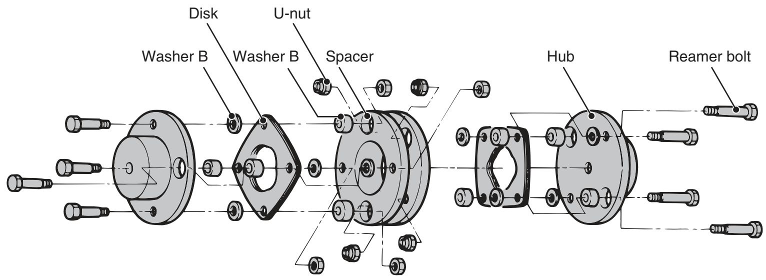
Center unit structure (shipped fully assembled)



NER Series models have a center unit structure with two sets of disks (plate springs) fastened using spacers and flanges on both sides. The structure is shipped from the factory as a assembled unit.

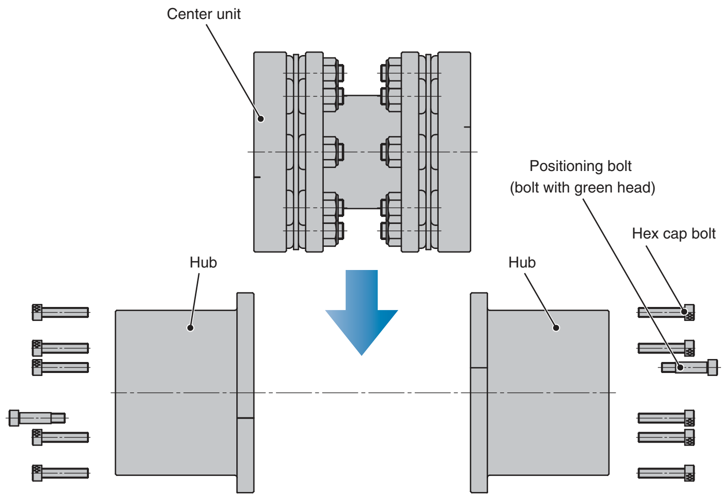
Comparison of mounting work for NER Series

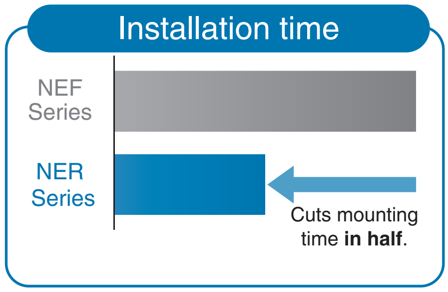
NEF Series



The center unit structure of the NER Series simplifies on-site work.

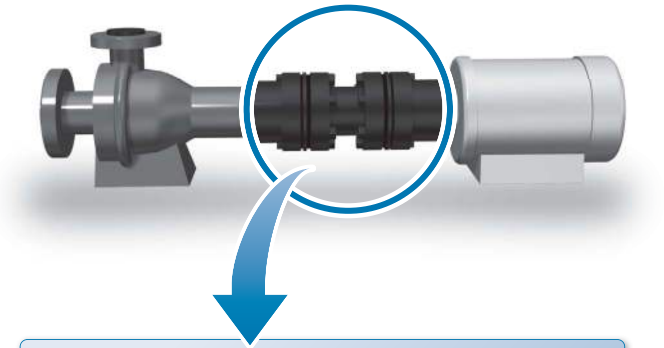
NER Series





Application Examples

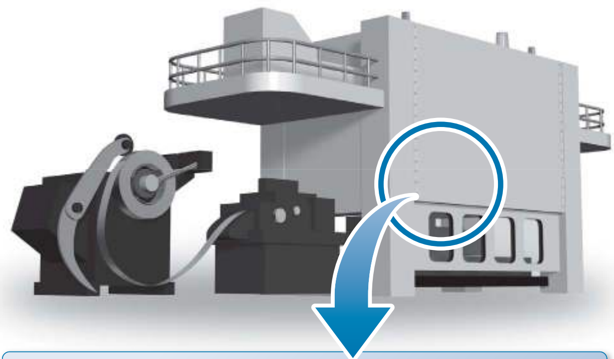
■ Pump



Center unit structure

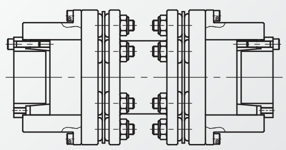
The coupling can be disconnected by removing the center unit without moving the motor or pump, improving pump maintenance.

■ Press



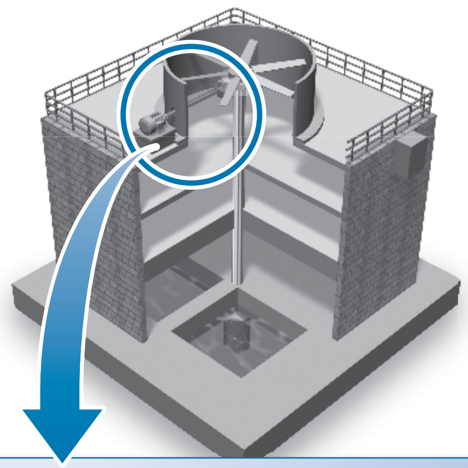
POWER-LOCK coupling type

Servomechanisms are becoming increasingly common in presses, demanding precise positioning. Backlash-free POWER-LOCK are an ideal shaft coupling method for this application.



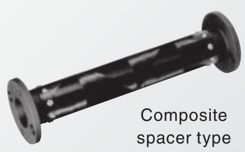
Power-Lock coupling type

■ Cooling tower



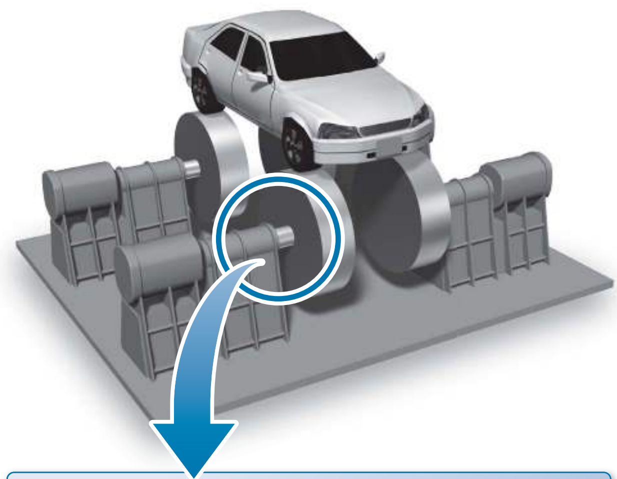
Composite spacer type

In cooling tower application, a long spacer coupling is used between motor and reducer. CFRP spacer is suitable with such corrosive environment. It is much lighter and better handling than stainless steel type.



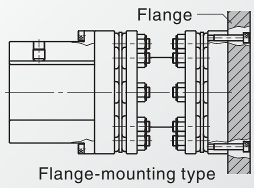
Composite spacer type

■ Vehicle tester



Flange-mounting type

When mounted on a part other than a shaft, the hubs can flange for connecting.



Flange-mounting type

Model Number

Spacer type — **NER230 W - A R X A F 90 P D1**

- NER230: Model No.
- W: Spacer type
- A R (②): Hub type
- A F 90 P D1: Hub type, ① F, ② 90, ③ P, ④ D1

Long spacer type — **NER230 W - A F 70 P D1 X A G 80 J D2 - J1234**

- NER230: Model No.
- W: Spacer type
- A F 70 P D1: Hub type, ① F, ② 70, ③ P, ④ D1
- A G 80 J D2: Hub type, ① G, ② 80, ③ J, ④ D2
- J1234: Distance between flange faces (J : Requested dimension)

①Bore tolerance

F … F7	**J** … JS7	**M** … M7	**K** … K7
G … G7	**P** … P7	**N** … N7	**R** … R7
H … H7			

②Bore diameter

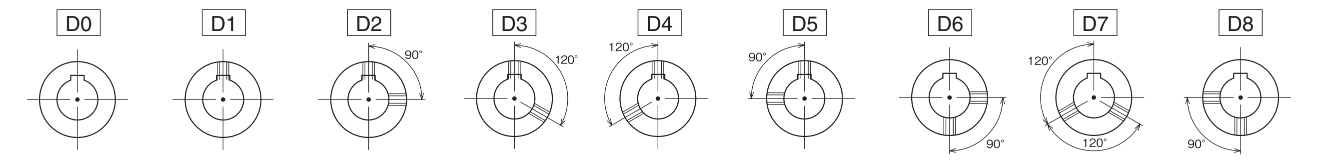
Bore diameters are in integer multiples of 1 mm.
R : Pilot bores

See below.

③Keyway tolerance

J … New JIS Js9	**F** … Old JIS F7
P … New JIS P9	**E** … Old JIS E9

④Set screw position

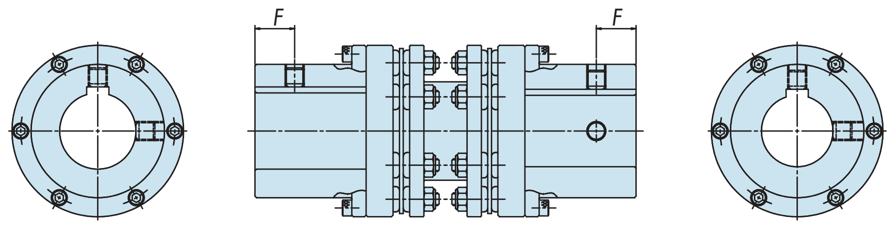


Standard bore range

Model No.	Keyway bore diameter range (1 mm increments) [mm]
NER59W	ϕ25 to ϕ65 (ϕ61)
NER93W	ϕ40 to ϕ85 (ϕ80)
NER230W	ϕ50 to ϕ90 (ϕ84)
NER360W	ϕ60 to ϕ105 (ϕ99)
NER630W	ϕ80 to ϕ125 (ϕ119)
NER850W	ϕ100 to ϕ145 (ϕ139)

* Diameters in parentheses are maximum bore diameters with old JIS machining.

Set screw position and size



Model No.	*F* dimension [mm]	Bore diameter [mm]																			
		25 to 30	31 to 38	39	40 to 44	45 to 49	50 to 51	52	53 to 55	56 to 58	59	60 to 63	64	65	66 to 71	72 to 75	76 to 78	79 to 82	83 to 84	85	86 to 88	89 to 90
NER59	25	M6	M8	M10	M10	M12	M12	M10	M10	M8	M8	M6	M5	M5								
NER93	30				M10	M12	M12	M12	M12	M12	M16	M16	M16	M12	M12	M10	M8	M6	M5	M4		
NER230	35						M12	M12	M12	M12	M16	M16	M16	M16	M16	M16	M12	M12	M10	M10	M10	M8

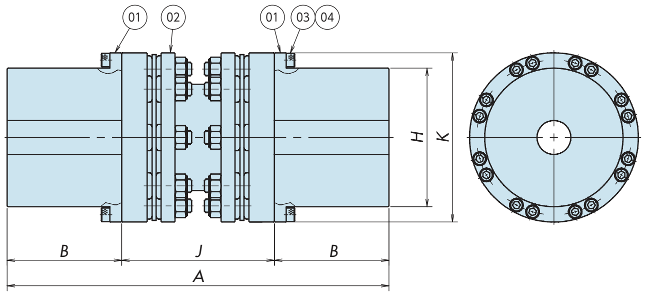
Model No.	*F* dimension [mm]	Bore diameter [mm]												
		60 to 75	76 to 79	80 to 85	86 to 96	97 to 99	100 to 102	103 to 105	106 to 110	111 to 120	121 to 125	126 to 129	130 to 139	140 to 145
NER360	40	M16	M20	M20	M16	M12	M12	M10						
NER630	50			M20	M20	M20	M20	M20	M20	M16	M12			
NER850	60						M20	M20	M20	M20	M20	M20	M16	M12

Transmission Capacity

Model No.	Allowable torque [N·m]	Maximum rotation speed [min^{-1}]	Pilot bore diameter [mm]	Keyway maximum bore diameter [mm]	Shaft-direction spring constant [N/mm]	Allowable misalignment			
						Angular mis-alignment θ [deg]	Parallel misalignment [mm]		End play [mm]
							Spacer type	Long spacer type	
NER59W	590	14900	20	65	350	1.4	0.7	$(J\text{-}44.4)\times\tan\frac{1}{2}\theta$	±1.4
NER93W	930	12500	20	85	380	1.4	0.9	$(J\text{-}50.6)\times\tan\frac{1}{2}\theta$	±1.4
NER230W	2300	11500	25	90	1020	1.0	0.7	$(J\text{-}58.8)\times\tan\frac{1}{2}\theta$	±1.0
NER360W	3600	9700	30	105	585	1.0	0.9	$(J\text{-}70.0)\times\tan\frac{1}{2}\theta$	±1.2
NER630W	6300	8000	35	125	945	1.0	0.9	$(J\text{-}76.4)\times\tan\frac{1}{2}\theta$	±1.6
NER850W	8500	7300	40	145	975	1.0	1.0	$(J\text{-}86.6)\times\tan\frac{1}{2}\theta$	±1.8

Dimensions

Spacer type

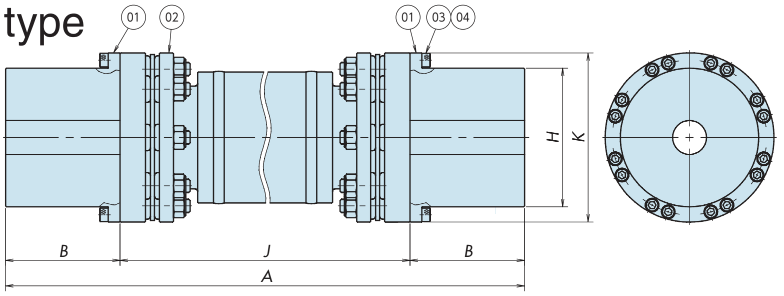


(01) Hubs A
(02) Center unit
(03) Positioning bolt
(04) Hex cap bolt

Unit: [mm]

Model No.	Overall length A	Hub length B	Inter-flange distance J	Boss diameter H	Outer diameter K	Weight [kg]	Moment of inertia [$kg \cdot m^2$]
NER59W	240	70	100	84	108	6.2	0.010
NER93W	297	85	127	105	129	10.6	0.026
NER230W	330	95	140	117	140	15.6	0.045
NER360W	410	115	180	137	166	26.1	0.105
NER630W	450	135	180	163	199	40.2	0.240
NER850W	500	150	200	184	220	53.5	0.400

Long spacer type



(01) Hubs A
(02) Center unit
(03) Positioning bolt
(04) Hex cap bolt

Unit: [mm]

Model No.	Inter-flange distance J		Pilot bore diameter	Keyway maximum bore diameter	Overall length A	Hub length B	Boss diameter H	Outer diameter K	Weight specifications		Moment of inertia specifications	
									W_1	Wk [kg]	G_1 [$kg \cdot m^2$]	Gk
NER59W	J	Up to 6000	20	65	2B+J	70	84	108	6.31	6.15	0.00649	0.0101
	JS	127, 140, 180, 200										
NER93W	J	Up to 6000	20	85		85	105	129	9.25	9.87	0.0131	0.0247
	JS	140, 180, 200										
NER230W	J	Up to 6000	25	90		95	117	140	16.1	31.9	0.0523	0.0407
	JS	180, 200										
NER360W	J	Up to 6000	30	105		115	137	166	18.6	25.8	0.0742	0.0983
	JS	200										
NER630W	J	Up to 6000	35	125		135	163	199	35.5	35.8	0.185	0.208
NER850W	J	Up to 6000	40	145		150	184	220	35.5	46.3	0.185	0.353

The long spacer type approximate weight and moment of inertia are calculated using the following formula (when using the maximum bore diameter):

$$\text{Weight [kg]} = (W_1/1000) \times J + Wk$$

$$\text{Moment of inertia [kg·m}^2\text{]} = (G_1/1000) \times J + Gk$$

J : The constants in the table above are used for J (Inter-flange distance [mm]), W_1, Wk, G_1 and Gk.

Notes 1. Long spacer types are made-to-order products.
2. Specify the J dimension (Inter-flange distance) when ordering.
3. Balance adjustment may be needed for high-speed use or an excessively long J dimension.
A hazard speed check is also needed. See Table 3 on page 19.

Product Selection

1. Correction torque calculation

1-1. When driven by servomotor

Calculate the correction torque by multiplying the servomotor's maximum torque by the service factor (SF) shown in Table 1 for the load type.

Table 1. Service factor (SF) when connected to servomotor

Load type	Uniform load	Moderately variable load	Highly variable load
Service factor (SF)	1.2	1.4	1.5

1-2. When driven by induction motor

Calculate the correction torque by multiplying the load torque calculated using the formula below by the service factor (SF) shown in Table 2 for the load type.

$$T = \frac{60000 \times P}{2\pi \times n} \quad \left\{ T = \frac{974 \times P}{n} \right\}$$

$$T' = T \times SF$$

T =	Load torque	N·m {kgf·m}
P =	Transmitted power	kW
n =	Rotation speed	min^{-1}
T' =	Correction torque	N·m {kgf·m}

Table 2. Service factor (SF) when connected to general-purpose motor

Load type	Motor type				
	General purpose motor, gas turbine		Engine		
	Small moment of inertia	Large moment of inertia	Four cylinders	Six cylinders	Eight cylinders
Uniform load	1.5 to 1.75	1.75 to 2.0	2.5 to 4.0	2.0 to 2.5	1.5 to 2.0
Moderately variable load	2.0 to 2.5	2.5 to 3.0	4.0 to 5.0	2.5 to 3.5	2.0 to 3.0
Highly variable load	3.0 to 4.5	4.5 to 6.0	4.5 to 5.5	3.0 to 4.0	2.5 to 3.5

* If shock loads will be applied, calculate the correction torque by multiplying the motor's maximum output torque by a shock factor of 1 to 2.5.

2. Shaft diameter

Check that the shafts to be mounted are within the coupling's range of mountable shaft diameters.

3. Long spacer type rotation limit

When long spacer types are used at high speeds, the rotation speed needs to be checked to avoid the resonance point.

When selecting long spacer types, check each *J* dimension and whether its rotation speed is within the limit.

If the operating rotation speed exceeds the value shown below, a larger size must be selected.

If the operation speed is not in the ranges shown below, please contact us.

Table 3. Long spacer length (*J* dimension) limits

Unit: [mm]

Model No. \ Operating rotation speed [min^{-1}]	3600	2000	1800	1500	1200	1000	900	750	720	600	500	400	300	200	150
NER59W	1470	1960	2070	2260	2520	2750	2900	3170	3240	3540	3870	4330	4990		
NER93W	1600	2130	2240	2450	2730	2980	3140	3440	3510	3840	4200	4690	5400		
NER230W	1930	2560	2700	2950	3290	3590	3790	4140	4220	4620	5060	5650			
NER360W	2080	2760	2910	3180	3540	3870	4080	4460	4550	4980	5440				
NER630W	2230	2960	3110	3400	3790	4140	4360	4770	4870	5330					
NER850W	2240	2970	3120	3410	3800	4160	4380	4780	4880	5340					

Handling

This section describes the general handling procedures used for NER Series ECHT-FLEX Couplings. For more information, see the instruction manual provided with the product.

1. Installing hubs to the shafts

Cautions

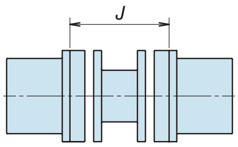
1. Check the coupling components against the list of components in the instruction manual.
2. The center unit has been optimally assembled at the factory. Use it as-is, without disassembling it.
3. Do not subject the center unit to large forces, especially in the shaft direction. It may cause the disks in a bent state, and damage the disks.

Installing procedure

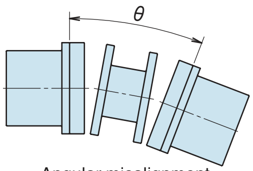
(1) Check that the drive shaft, driven shaft and hub bores are free from burrs, scratches, dirt and rust. Wipe off any dirt or oil.
(2) Mount the hubs to the shafts. If bore is for tight fit, heat the hub uniformly with heated oil (of 150°C or less) to quickly mount it at the proper position on the shaft.
(3) The distance between the hub flange faces is given in Item (1) of Section 2 below.

2. Centering

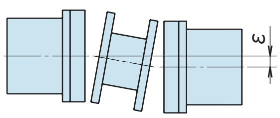
The more accurate the initial centering of the coupling, the less eccentric rotational stress it will experience during operation. Changes during operation caused by factors such as bearing wear, mounting surface subsidence, temperature-induced state changes, and vibrations can reduce the life of the coupling or your equipment. Periodically center the coupling using the procedure below.



Distance between flange faces



Angular misalignment



Parallel misalignment

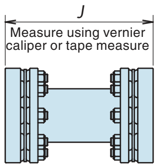
The error in the distance between the coupling's flange faces, the allowable angular misalignment, and the parallel misalignment are all related to each other. Increasing one factor decreases the others, so the factors need to be considered together. Perform the initial centering procedure precisely, to within the recommended centering values below.

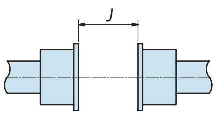
(1) Adjusting the distance between the flange faces (*J*)

Measure the overall length of the center unit, and use this value as the *J* dimension. (The center unit's overall length may be longer or shorter than the reference value depending on the combination of part tolerances. In this case, it may be difficult to attach the center unit even when the hubs are set within *J* ± 0.5 in the drawing reference dimensions.) Measure the *J* dimension at four places every 90 degrees, and adjust the hub positions so that the average of these measurements is within *J* ± 0.5 mm. If the drive shaft or driven shaft is a stepped shaft, the adjustment margin may be restricted, so take steps to enable the *J* dimension to be adjusted beforehand.

(2) Adjusting the angular misalignment (θ)

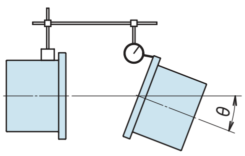
(a) Fasten a dial gauge to one of the hubs as shown in the diagram. Rotate the hub to find the minimum reading on the dial gauge, and zero the gauge at that point.
(b) Rotate the hub on the dial gauge side by 360 degrees, and read the angular misalignment value.
(c) Adjust the equipment by moving it with a shim so that the reading on the dial gauge comes within the recommended angular misalignment range specified in Table 1.





(3) Adjusting the parallel misalignment (ε)

(a) Attach a dial gauge to a hub flange as shown in the diagram. Rotate that hub to find the minimum reading on the dial gauge, and zero the gauge at that point.
(b) Rotate the hub attached to the dial gauge by 360 degrees, and read the parallel misalignment value.
(c) The reading on the dial gauge around the periphery of the hub may fluctuate abnormally at the hub's drilled bore because the flange expanded toward the periphery when the drilled bore was machined. Avoid these locations when reading the dial gauge.
(d) Adjust the equipment by moving it with a shim so that the reading on the dial gauge comes within twice the recommended parallel misalignment range specified in Table 1 or Table 2.
(e) If the equipment was moved to adjust the parallel alignment, readjust the angular alignment.



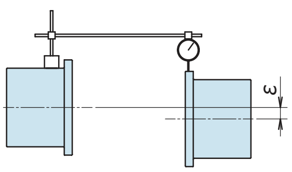


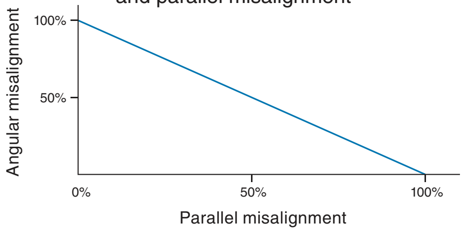
Table 1 Recommended centering values (standard spacers)

Model No.	Recommended centering values			
	Angular misalignment		Parallel misalignment ε [mm]	Distance between flange faces *J* [mm]
	θ [deg]	T.I.R. [mm]		
NER59W	0.35°	0.33	0.18	±0.5
NER93W	0.35°	0.39	0.22	±0.5
NER230W	0.25°	0.31	0.18	±0.5
NER360W	0.25°	0.36	0.22	±0.5
NER630W	0.25°	0.43	0.22	±0.5
NER850W	0.25°	0.48	0.25	±0.5

Table 2 Recommended centering values (long spacers)

Model No.	Recommended centering values			
	Angular misalignment		Parallel misalignment (formula) ε [mm]	Distance between flange faces *J* [mm]
	θ [deg]	T.I.R. [mm]		
NER59W	0.35°	0.33	$(J-27.4)\times0.31\times10^{-2}$	±0.5
NER93W	0.35°	0.39	$(J-30.6)\times0.31\times10^{-2}$	±0.5
NER230W	0.25°	0.31	$(J-35.8)\times0.22\times10^{-2}$	±0.5
NER360W	0.25°	0.36	$(J-43)\times0.22\times10^{-2}$	±0.5
NER630W	0.25°	0.43	$(J-46.4)\times0.22\times10^{-2}$	±0.5
NER850W	0.25°	0.48	$(J-52.6)\times0.22\times10^{-2}$	±0.5

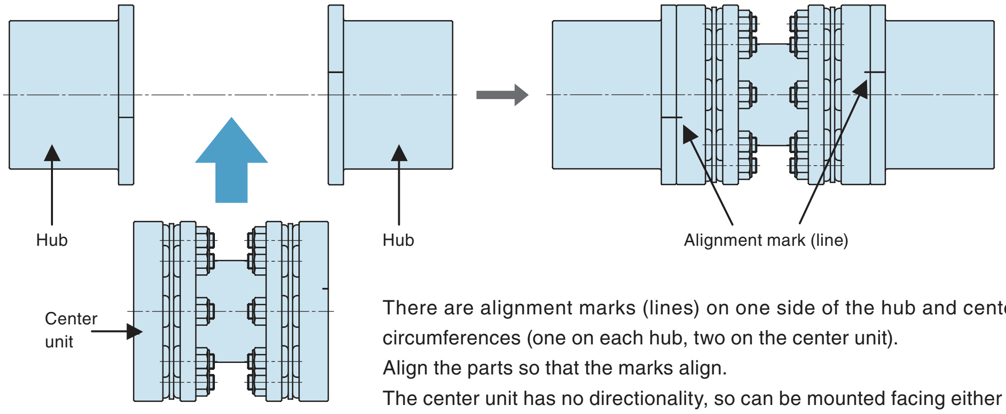
Relationship between angular misalignment and parallel misalignment



Handling

3. Installing center unit

(1) Mount the center unit to the hubs after referring to the component drawing in the instruction manual.

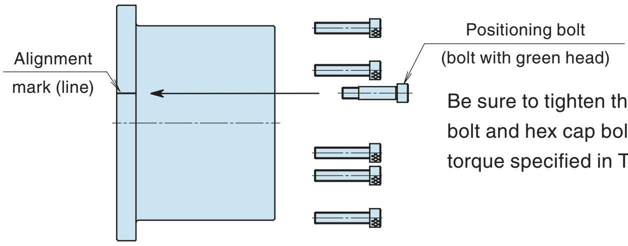


There are alignment marks (lines) on one side of the hub and center unit outer circumferences (one on each hub, two on the center unit).
Align the parts so that the marks align.
The center unit has no directionality, so can be mounted facing either right or left.

Figure 1. Installing center unit

(2) Fasten the hubs and center unit using the positioning bolts and hex socket head bolts.

When fastening the hubs and center unit, insert the positioning bolts (with green heads) into the drilled holes at the alignment marks (lines). The positioning bolts will not fit into other drilled holes. There are two positioning bolts (with green heads) on each side, located 180 degrees apart. (There are a total of four positioning bolts per coupling.)



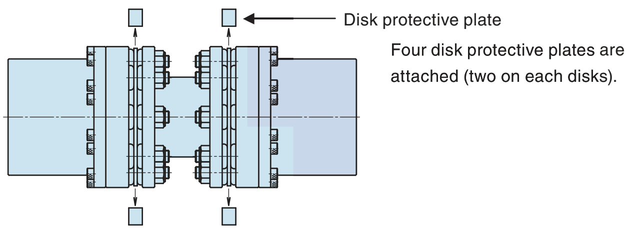
Be sure to tighten the positioning bolt and hex cap bolts to the torque specified in Table 3.

Figure 2. Positioning bolt and hex cap bolt insertion

Table 3. Positioning bolt and hex cap bolt tightening torques

Model No.	Bolt size	Tightening torque [N•m]
NER59W	M6	14
NER93W	M6	14
NER230W	M6	14
NER360W	M8	34
NER630W	M10	67
NER850W	M10	67

(3) When you have assembled the coupling, remove the disk protective plates on the disks.

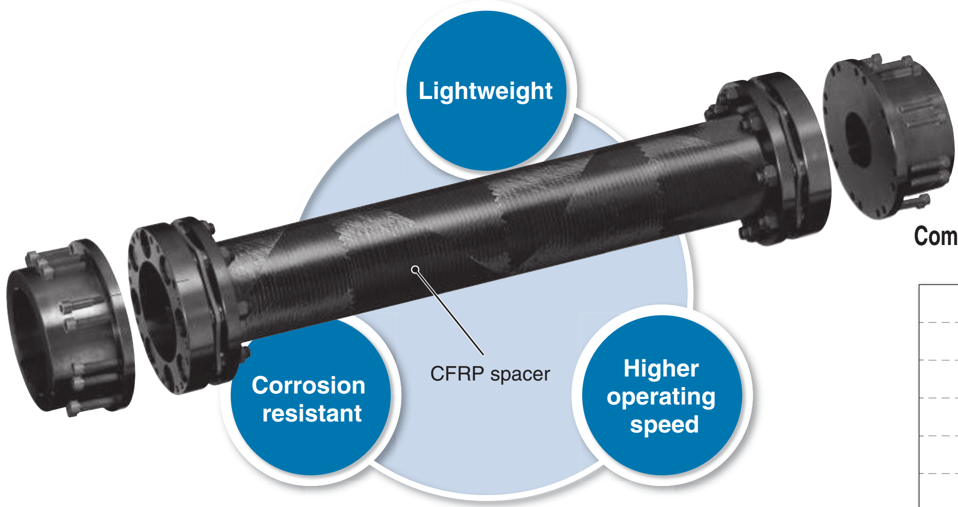


4. Inspection

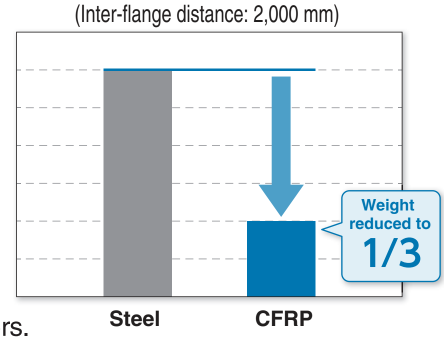
Re-check the angular misalignment and parallel misalignment one or two hours after starting actual operation.
After the check, refasten the positioning bolts and hex socket head bolts to the torque specified in Table 3.
Also check for problem parts or looseness in the positioning bolts and hex sock head bolts every 6 months to one year.
After installing the equipment, marking the positioning bolts, hex socket head bolts and hubs to enable checks for looseness is recommended.
Also check for problems in other parts.

NER Series ECHT-FLEX® Couplings CFRP Spacer Type

By adopting carbon-fiber-reinforced plastic (CFRP) as a spacer material, the NER series CFRP spacer type features outstanding lightness and corrosion resistance in addition to its intrinsic characteristics.



Comparison of NER230W spacer weights
(Inter-flange distance: 2,000 mm)



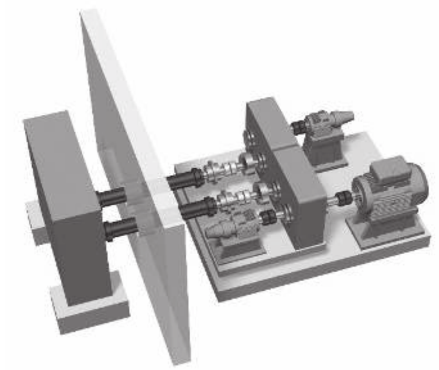
What is carbon-fiber-reinforced plastic (CFRP)?

Carbon-fiber-reinforced plastic is a plastic composite that contains carbon fibers.
This polymer features the same level of strength as steel while being lightweight and highly corrosion-resistant, making it applicable for a wide range of products, including aircraft and automobiles.

Application Examples

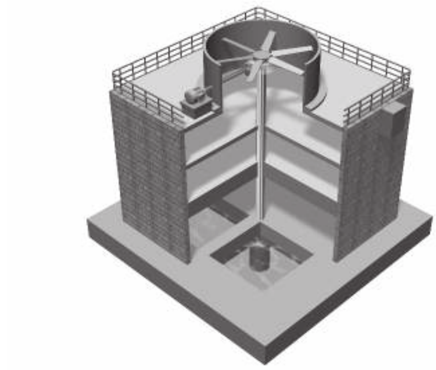
Vehicle testers

Significantly lighter weight
CFRP spacers substantially reduce the weight. The lighter weight improves transportability, installation, and mounting.



Industrial cooling towers

Outstanding corrosion resistance
The NER series CFRP spacer type can be used in environments corrosive.
Under certain conditions, it can provide corrosion resistance that outclasses that of stainless steel.



Model Number

CFRP spacer type

NER230 W - A R X A F 90 P D1 - JC2000

- W: Spacer type
- A: Hub type
- R: Bore diameter (mm) — R ... Pilot bore
- F: Bore tolerance
- P: Keyway tolerance
- D1: Set screw position
- JC2000: Inter-flange distance (mm) — JC ... CFRP spacer

See the model number indication on page 17 for more information.

The CFRP spacer type is made-to-ordered product.
For more information on specifications and availability, please contact us.

Innovation in Motion

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