

Instruction Manual ECHT-FLEX COUPLING

Taper-Lock Type

NEF04(10,18,25) □-H□□XH□□

Thank you for purchasing an ECHT-FLEX COUPLING. Make sure the unit delivered matches your order and no shortages exist in the parts provided. Any such shortages or other delivery errors must immediately be reported to your distributor. This manual is an essential part of the ECHT-FLEX COUPLING, and it should remain with the product at all times including when re-distributed. To ensure safety, read all instructions thoroughly before installing or working on the equipment.

Safety precautions in this manual are classified into two categories: "WARNING" and "CAUTION". These are defined as follows:

⚠	WARNING	Death or serious injury may result from misusing the product without following the instructions.
⚠	CAUTION	Minor or moderate injury, as well as damage to the product may result from misusing the product without following the instructions.

Notice that although categorized under "CAUTION", subjects discussed may lead to serious results depending on the situation.

⚠ WARNING

- (General)
- Install a safety cover and prevent access to any rotating parts. Otherwise injury may occur. Set a safety mechanism to stop the rotating parts when the cover is lifted.
 - Transporting, installing, operating, maintaining or inspecting must be carried out by skilled and professional engineers to avoid mis-handling and hazardous situations.
 - When the coupling is used with vehicles for transporting humans, install a suitable protection device on the vehicle. Otherwise, it could fall and result in accidents and damage the equipments.
 - When the coupling is used for an elevator, install a safety device on the elevator in order to prevent it from falling, which can cause accidents resulting in death, injury or damage to the equipments.
- (Unpacking upon delivery)
- If delivered in a wooden case, unpack with care. Sharp nails may cause injury.
- (Additional machining)
- Never modify the coupling. The quality or function of the product may decrease and may break or damage the machine or injure the operator.
- (Transportation)
- Never step under the product when it is elevated for transportation, otherwise either the product or load may fall, causing accidents resulting in death or injury.
- (Installation)
- Wear protective clothing and gears (safety goggles, gloves, shoes, etc.).
 - Make sure the power is switched off, and the machine is completely stopped before installing. Take caution so that the power is not switched back on accidentally.
 - Make sure to tighten and apply anti-loosening agent sufficiently.
- (Operation)
- Avoid contact with any rotating parts (coupling, shaft, etc.) during operations. Rotating parts can catch approaching objects and cause serious injuries.
- (Maintenance and inspection)
- Avoid contact with any rotating parts (coupling, shaft, etc.) during maintenance and inspection. Rotating parts can catch approaching objects and cause serious injuries.
 - Make sure the power is switched off, and the machine is completely stopped before carrying out maintenance and inspection.
 - Take caution so that the power is not turned back on accidentally.
 - Make sure the drive and driven equipments are also completely stopped.

⚠ CAUTION

- (General)
- Do not use coupling beyond its capacity as specified in the drawing. Exceeding its capacity can break the machine and cause injuries.
 - Do not use damaged couplings. They can break your equipments and cause injuries.
- (Transportation)
- Pay extra attention so that the equipment will not fall or rollover during transportations.
- (Installation)
- Do not touch the inner diameter and edge of each part with bare hands, and avoid possible injury.
 - Align the drive and driven shafts to install the coupling as instructed in the manual.
- (Operation)
- Do not touch the coupling during operation s to avoid injuries.
 - Immediately stop the machine upon any sign of abnormal operation.
- (Maintenance and inspection)
- Wear protective clothing and gears (safety goggles, gloves, shoes, etc.).
 - Clean the surrounding area and maintain a clutter-free space to avoid secondary accidents.
 - Comply with Ordinance on Labor Safety and Hygiene 2-1-1 general standards.
 - Periodically check that the drive and driven shafts are aligned as described in the manual. In addition, also check that the rubber and plastic parts are not worn or deformed.
- (Environment)
- Coupling scraps should be disposed as general waste by skilled professionals.
 - This coupling meets RoHS (Restriction of certain Hazardous Substances) standards and contains no hazardous chemicals.

1. Structure and Parts

Figure 1: Single type NEF04S - NEF25S

- ① Hub
- ② Reamer bolts
- ③ Washer A
- ④ Washer B
- ⑤ Disk
- ⑥ U-nut
- ⑦ Pressure ring
- ⑧ Locking bolt

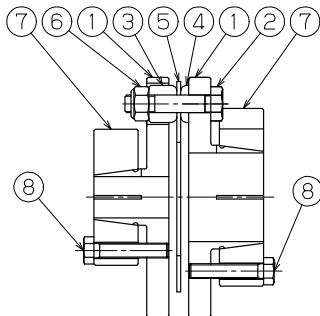


Figure 2: Spacer type NEF04W - NEF25W

- ① Hub
- ② Reamer bolts
- ③ Washer A
- ④ Washer B
- ⑤ Disk
- ⑥ U-nut
- ⑦ Pressure ring
- ⑧ Locking bolt
- ⑨ Spacer

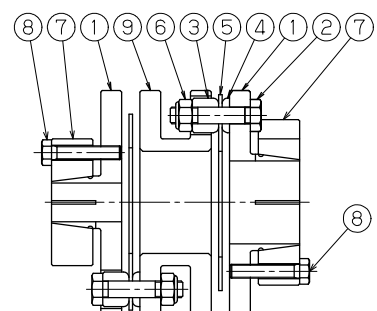
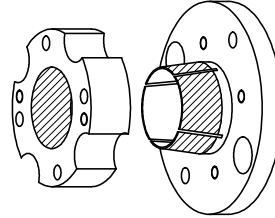


Table 1: Component list (parts and quantities that make for one coupling set)

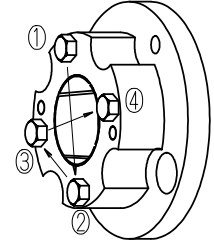
	Hub	Disk set	Reamer bolt	Washer A	Washer B	U-nut	Pressure ring	Locking bolt	Spacer
Single type NEF04S - NEF25S	2	1	4	4	4	4	2	8	–
Spacer type NEF04W - NEF25W	2	2	8	8	8	8	2	8	1

2. Mounting the hubs to the shafts

- Compare the supplied coupling components to those listed in Table 1.
 - The disks in an NEF set are held together by tape for the purpose of maintaining the positional relations between the disks. Use the disk set as is.
 - Check for burrs, scratches, dirt and rust on the drive and driven shafts and the inner diameter of the hub. Wipe off any dirt or grease found.
 - Pull out the pressure rings' locking bolts. Wipe the tapered surface (contact surface) of the hub and pressure ring, and apply a thin layer of oil or grease.
- (Do not use oil or grease that contains silicon-based or molybdc friction-reducing agent.)
- Fit the pressure ring and locking bolt onto each hub and mount them onto the respective shafts. When assembling the locking bolts, make sure that they turn smoothly.
 - Tighten the locking bolts by turning them with your fingers until the pressure rings can be moved no further in the axial direction.
 - At this point, adjust the hub mounting position and phase.
 - Applying half of the tightening torque specified in Table 2, tighten the bolts using a diagonal pattern. A pilot hole is provided in the outer circumference of the pressure ring for turn prevention. Using a turn-proof bar can increase the ease of installation.
 - Finally, use a torque wrench to tighten the bolts with the tightening torque specified in Table 2.
 - Place each device in its respective position. Following the instructions provided in Section 4, center the space between hubs.



Apply oil or grease to the shaded areas



Order of tightening the bolts

Table 2: Tightening torque and allowable torque for locking bolt

Unit: N·m {kg·f·m}

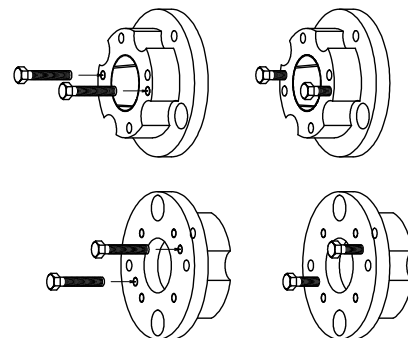
Size	NEF04	NEF10	NEF18	NEF25	
Locking bolt size	M4	M5	M6	M6	
Locking bolt tightening torque	3.0 { 0.3 }	4.9 { 0.5 }	9.8 { 1.0 }	9.8 { 1.0 }	
Shaft hole diameter (mm)	10	39.2 { 4.0 }			
	11	39.2 { 4.0 }			
	12	39.2 { 4.0 }			
	14	39.2 { 4.0 }	98.0 { 10 }		
	15	39.2 { 4.0 }	98.0 { 10 }	176 { 18 }	
	16	39.2 { 4.0 }	98.0 { 10 }	176 { 18 }	
	17	39.2 { 4.0 }	98.0 { 10 }	176 { 18 }	
	18	39.2 { 4.0 }	98.0 { 10 }	176 { 18 }	
	19	39.2 { 4.0 }	98.0 { 10 }	176 { 18 }	
	20	39.2 { 4.0 }	98.0 { 10 }	176 { 18 }	
	22	39.2 { 4.0 }	98.0 { 10 }	176 { 18 }	
	24		98.0 { 10 }	176 { 18 }	245 { 25 }
	25		98.0 { 10 }	176 { 18 }	245 { 25 }
	28		98.0 { 10 }	176 { 18 }	245 { 25 }
	30		98.0 { 10 }	176 { 18 }	245 { 25 }
	32		98.0 { 10 }	176 { 18 }	245 { 25 }
	35		98.0 { 10 }	176 { 18 }	245 { 25 }
38			176 { 18 }	245 { 25 }	
40				245 { 25 }	
42				245 { 25 }	
45				245 { 25 }	
48				245 { 25 }	
50				245 { 25 }	

Recommended shaft diameter tolerance = h7

* However, recommended shaft diameter tolerance for $\phi 35$ is -0.020 to $+0.010$.

3. Removing the hubs from the shafts

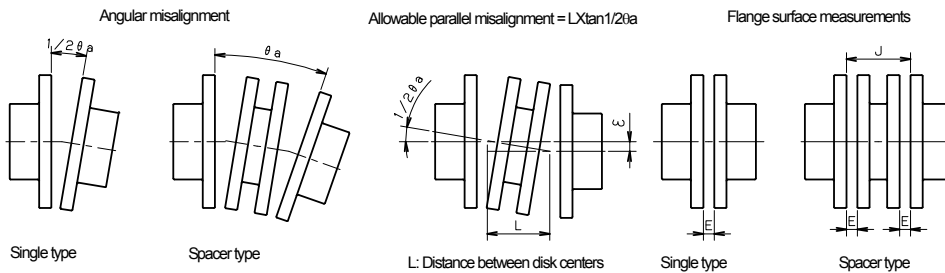
- Make sure that no torque or thrust load is applied to the hubs.
- After checking (1), loosen each locking bolt. The locking bolts can be loosened in random order, but each locking bolt should be loosened gradually, in several steps, before being removed.
- If a hub is still locked and does not move even after loosening all the bolts, insert a bolt into the tapped hole for removal and tighten it until the lock is disengaged.



4. Centering

The greater the accuracy of the initial centering of the coupling, the less eccentric rotational stress will occur during use.

Bearing wear, depressions on the mounting surface, changes in conditions caused by temperature fluctuations, and shock may all result in a shorter service life for the coupling as well as your equipment. Perform adjustment on a periodic basis by following the procedure below.



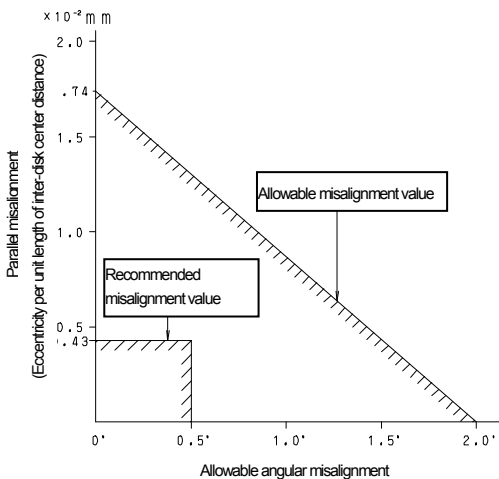
Allowable parallel misalignment = $L \tan 1/2\theta_a$ L: Distance between disk centers = J - E
Note that single types are not capable of handling parallel misalignment of the shaft center.

The coupling's allowable angular misalignment, parallel misalignment, and axial misalignment are all correlated. Therefore, they must be considered collectively, because when one increases, the other will decrease.

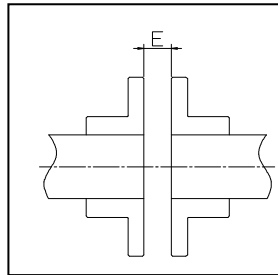
Perform the initial centering within the recommended values provided below.

Relationship between parallel misalignment and angular misalignment for spacer types

(NEF04W – NEF25W)

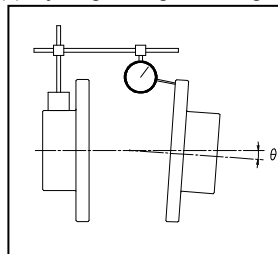


(1) Adjusting the flange surface measurements E (mm)



After measuring E at four points (90° intervals), adjust the position of the hub so that the average of E measurements falls within $E \pm 0.25$ mm. If the drive or driven shaft has steps, the adjustable range may be limited; in such a case, plan the possible E adjustments prior to performing the actual adjustment.

(2) Adjusting the angular misalignment θ (deg)



- Fix the dial gauge onto one of the hubs as shown in the figure. Turn the hub to find the minimum reading on the dial gauge and set to zero.
- Turn the hub on the dial gauge side 360° and read the angular misalignment value.
- Use a shim or another spacer to adjust the equipment so that the dial gauge reading falls within the range of recommended angular misalignment values listed in Table 2.

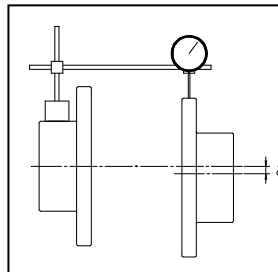
Table 2: Recommended misalignment values

Type No.	Angular Misalignment		Parallel Misalignment	Axial Misalignment	
	θ (deg)	T.I.R (mm)	ϵ (mm)	E (mm)	
Single type	NEF04S	0.25	0.29	Note	6.1 ± 0.25
	NEF10S	0.25	0.35		6.6 ± 0.25
	NEF18S	0.25	0.40		8.3 ± 0.25
	NEF25S	0.25	0.45		11.2 ± 0.25
Spacer type	NEF04W	0.5	0.58	0.13	6.1 ± 0.25
	NEF10W	0.5	0.71	0.14	6.6 ± 0.25
	NEF18W	0.5	0.81	0.17	8.3 ± 0.25
	NEF25W	0.5	0.91	0.18	11.2 ± 0.25

Note: Single types cannot accommodate parallel misalignment due to the nature of their structure.

When centering, adjust to within a misalignment of 0.02 mm.

(3) Adjusting the parallel misalignment ϵ (mm)



- Mount the dial gauge onto the hub flange as shown in the figure. Turn the hub to find the minimum reading on the dial gauge and set to zero.
 - Turn the hub that is fixed with the dial gauge 360° and read the parallel misalignment value.
 - At the hub's pilot hole, the outer circumferential run-out may be excessive. This is due to the flange expanding radially outward when machining the pilot hole. Avoid measuring in these areas.
 - Use a shim or another spacer to adjust the equipment so that the dial gauge reading falls within twice the recommended parallel misalignment values (ϵ) provided in Table 2.
 - If the equipment has been moved for the adjustment of parallel misalignment, re-adjust the angular misalignment.
- (4) Repeat the above adjustments until all required settings are complete.

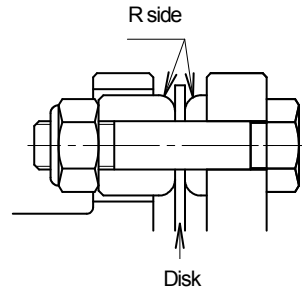
5. Tightening the reamer bolts

Echt-Flex couplings transmit torque via the friction force between the reamer bolt and the U-nut. Tighten the reamer bolts and U-nuts securely with the specified torque.

- (1) Set the disk set, washer, bolt, and the U-nut to their allocated positions by referring to Figures 1 and 2. The "R" side of the washer should be facing the disk.
- (2) The bolts and disk bores are accurately machined using reamer technique. For tightening, turn the U-nuts instead of the bolts in order to avoid damage. Make sure to tighten the U-nuts according to the "Tightening torque for U-nut" provided in Table 3. The U-nut is made of metal, and can be mounted and dismantled up to 20 times. Replace with a new U-nut after the number of remounts has been exhausted.

Table 3: Tightening torque for U-nut

Type No.	U-nut tightening torque N·m {kg f·m}	U-nut size	Spanner size Face-to-face measurement (mm)
NEF04	8.82 { 0.9 }	M6	10
NEF10	8.82 { 0.9 }	M6	10
NEF18	21.6 { 2.2 }	M8	13
NEF25	21.6 { 2.2 }	M8	13



6. Inspection

After operating the equipment for one to two hours, check the angular misalignment and parallel misalignment again.

At this time, tighten the U-nuts again using the specified torque provided in Table 3.

At half-year to year intervals, check for loose U-nuts and other anomalies in parts. It is recommended that the reamer bolts and U-nuts are marked after checking and tightening them.

Warranty

TSUBAKIMOTO CHAIN CO.: hereinafter referred to as "Seller"
Customer: hereinafter referred to as "Buyer"
Goods sold or supplied by Seller to Buyer: hereinafter referred to as "Goods"

1. Warranty period without charge

18 months effective the date of shipment or 12 months effective the first use of Goods, including installation of Goods to Buyer's equipment or machines - whichever comes first.

2. Warranty coverage

Should any damage or problem with the Goods arise within the warranty period, given that the Goods were operated and maintained under instructions provided in the manual, Seller would repair and replace at no charge once the Goods are returned to Seller. The following are excluded from the warranty.

- 1) Any costs related to removing Goods from the Buyer's equipment or machines to repair or replace parts.
- 2) Costs to transport Buyer's equipment or machines to the Buyer's repair shop.
- 3) Costs to reimburse any profit loss due to any repair or damage and consequential losses caused by the Buyer.

3. Warranty with charge

Seller will charge any investigation and repair of Goods caused by:

- 1) Improper installation by failing to follow the instruction manual.
- 2) Insufficient maintenance or improper operation by the Buyer.
- 3) Incorrect installation of Goods to other equipment or machines.

- 4) Any modifications or alterations of Goods by the Buyer.
- 5) Any repair by engineers other than the Seller or those designated by the Seller.
- 6) Operation in an inappropriate environment not specified in the manual.
- 7) Force Majeure or forces beyond the Seller's control such as natural disasters and injustice done by a third party.
- 8) Secondary damage or problem incurred by the Buyer's equipment or machines.
- 9) Defected parts supplied, or specified by the Buyer.
- 10) Incorrect wiring or parameter setting by the Buyer.
- 11) The end of life cycle of the Goods under normal usage.
- 12) Loss or damage not liable to the Seller.

4. Dispatch Service

Service to dispatch a Seller's engineer to investigate, adjust or trial test Seller's Goods is at the Buyer's expense.

5. Disclaimer

- 1) In our constant efforts to improve, TSUBAKIMOTO CHAIN may change the contents of this document without notice.
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