

# INSTALLATION MANUAL



## ECHT-FLEX COUPLING® NES series

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 should be considered an essential part of the ECHT-FLEX COUPLING and remain with the coupling when redistributed.


To ensure safety, read all instructions thoroughly before installing or working on the equipment.

### TSUBAKIMOTO CHAIN CO.

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

 <b>WARNING</b>	Death or serious injury may result from misusing the product without following the instructions.
 <b>CAUTION</b>	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.

 <b>WARNING</b>
<p>(General)</p> <ul style="list-style-type: none"><li>• 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.</li><li>• Transporting, installing, operating, maintaining or inspecting must be carried out by skilled and professional engineers to avoid mis-handling and hazardous situations.</li><li>• When coupling is used with vehicles that carry human, use a device to protect the vehicle: otherwise, accidents and damage may occur.</li><li>• 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 damage and accidents resulting in death or injury.</li></ul> <p>(Unpacking upon delivery)</p> <ul style="list-style-type: none"><li>• If delivered in a wooden case, unpack with care. Sharp nails may cause injury.</li></ul> <p>(Additional machining)</p> <ul style="list-style-type: none"><li>• Never modify the coupling; the quality or function of the product may decrease and break or damage the machine or injure the operator.</li></ul> <p>(Transportation)</p> <ul style="list-style-type: none"><li>• Never step under the product when it is being elevated for transportation: otherwise, either the product or load may fall, causing accidents resulting in death or injury.</li></ul> <p>(Installation)</p> <ul style="list-style-type: none"><li>• Wear appropriate clothing and safety gear (safety goggles, gloves, shoes, etc.).</li><li>• Make sure the power is switched off, and the machine is completely stopped before installing. Take caution so that the power does not reconnect accidentally.</li><li>• Make sure to tighten and apply sufficient amount of anti-loosening agent to the hexagonal socket head cap screws.</li></ul> <p>(Operation)</p> <ul style="list-style-type: none"><li>• Avoid contact with any rotating parts ( coupling, shaft, etc. ) during operations. Rotating parts can catch approaching objects and cause serious injuries.</li></ul> <p>(Maintenance and inspection)</p>

- 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 does not reconnect accidentally.  
Make sure the driving and driven equipment 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 equipment and cause injuries.

### (Transportation)

- Pay extra attention so that the equipment will not fall or rollover during transportations.

### (Installation)

- Do not touch the edge and inner diameter of any part with bare hands to avoid possible injury.
- Make sure to align the drive and driven shafts as instructed in the manual when installing the coupling

### (Operation)

- Do not touch the coupling during operation s to avoid injuries.
- Immediately stop the machine upon any sign of abnormal operation.

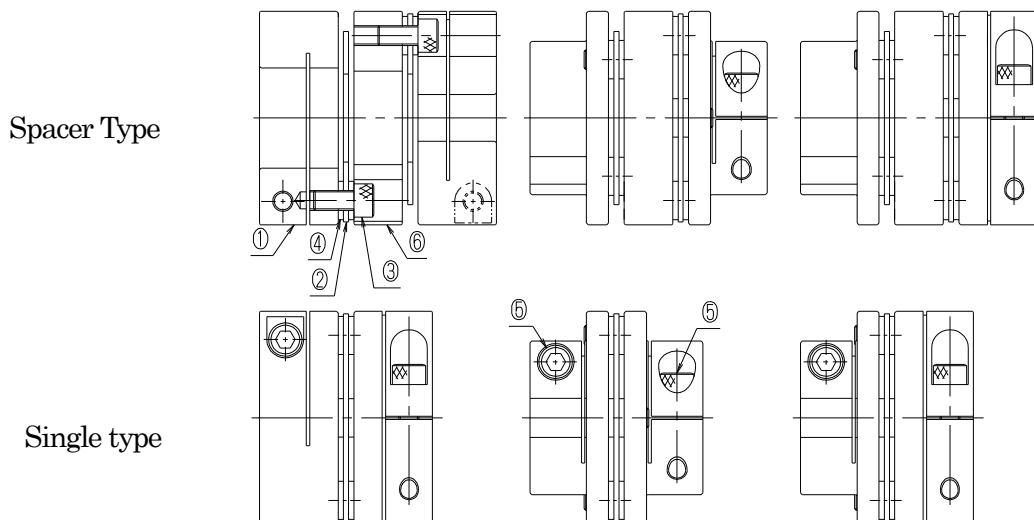
### (Maintenance and inspection)

- Wear appropriate clothing and safety gear (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.
- Conduct periodic inspections to make sure that the drive and driven shafts are aligned as described in the manual, and 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



①Hub ②Disk(s) ③Hexagonal Bolts ④Washer ⑤Clamp Bolts ⑥Spacer

## 2. Condition Requirements

Operate in a well-ventilated room with minimum dust and humidity, at an ambient temperature of  $-30^{\circ}\text{C}\sim 100^{\circ}\text{C}$ . Avoid areas where flammable materials, explosives and corrosive liquid or gas may be present. The units are not suitable for outdoor use for they are not treated with waterproof or anti-corrosive agents.

Do not disassemble the units because both types are assembled to secure their concentricity prior to shipment.

Recommended tolerance for the shafts is **h7**, except for those mounted to  $\phi 35$  bores (which are primarily prepared for servo motor shafts). Tolerance for these shafts must be within **0~+0.010**.

## 3. Installation

3-1. Use a clean rag to wipe off dust and oil from the shafts and mounting surface of the coupling.

3-2. Mount coupling onto shafts after they have been aligned carefully.

The more accurate the initial centering of the coupling, the less stress it will experience during operations. Wear of the shaft bearing, dents in the mounting surface, changes in conditions affected by temperature and vibration can affect the life of the coupling as well as your equipment. Center accurately, especially for high-speed operations.

Angular, parallel, and axial misalignments are interrelated. While you increase one, another will decrease. Center according to the values in Tables 1 or 2 and Graphs 1 or 3.

Table 1. Allowable Misalignment (Spacer Type)

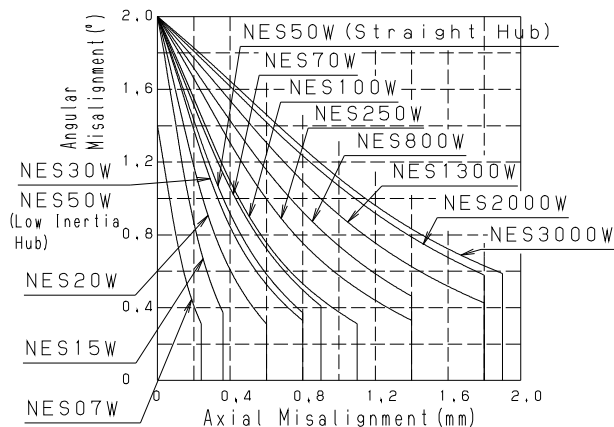
Model No.	Angular $\theta$ (deg)	Parallel $\varepsilon$ (mm)	Axial $\gamma$ (mm)
NES07W	1.4°	0.05	$\pm 0.24$
NES15W	2°	0.12	$\pm 0.36$
NES20W	2°	0.15	$\pm 0.6$
NES30W	2°	0.18	$\pm 0.8$
NES50W	2°	※1 0.24(0.18)	$\pm 0.8$
NES70W	2°	0.24	$\pm 0.9$
NES100W	2°	0.25	$\pm 1.1$
NES250W	2°	0.28	$\pm 1.4$
NES800W	2°	0.34	$\pm 1.4$
NES1300W	2°	0.52	$\pm 1.8$
NES2000W	2°	0.56	$\pm 1.4$
NES3000W	2°	0.55	$\pm 1.8$

Table 2. Allowable Misalignment (Single Type)

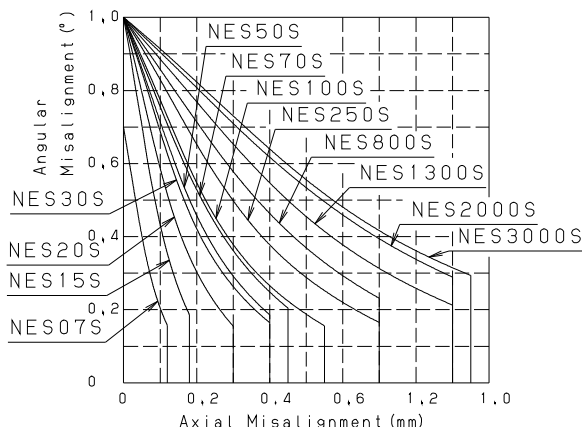
Model No.	Angular $\theta$ (deg)	Parallel $\varepsilon$ (mm)	Axial $\gamma$ (mm)
NES07S	0.7°	0.02	$\pm 0.12$
NES15S	1°	0.02	$\pm 0.18$
NES20S	1°	0.02	$\pm 0.3$
NES30S	1°	0.02	$\pm 0.4$
NES50S	1°	0.02	$\pm 0.4$
NES70S	1°	0.02	$\pm 0.45$
NES100S	1°	0.02	$\pm 0.55$
NES250S	1°	0.02	$\pm 0.7$
NES800S	1°	0.02	$\pm 0.7$
NES1300S	1°	0.02	$\pm 0.9$
NES2000S	1°	0.02	$\pm 0.7$
NES3000S	1°	0.02	$\pm 0.9$

※1 Parallel Allowable Misalignment is 0.18mm for Low inertia Hub.

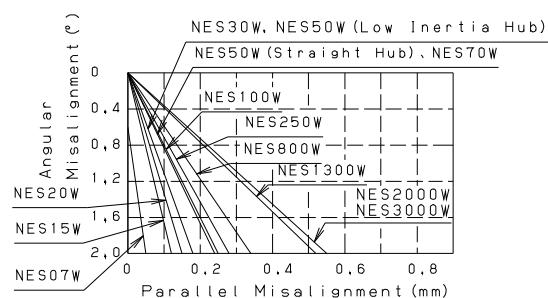
Graph 1. Relationship Between Angular and Axial Misalignments for Spacer Types



Graph 2. Relationship Between Angular and Axial Misalignments for Single Types



Graph 3. Conversion Graph for Angular and Parallel Misalignments



Allowable misalignments in graphs 1 and 2 are as follows.

- Angular misalignment: Parallel misalignment is 0.02 mm and below, while axial misalignment is 0 mm.
- Parallel misalignment: Both angular and axial misalignments are 0 mm.
- Axial misalignment: Angular misalignment is 0, while parallel misalignment is 0.02 mm and below.

To use Graph 1, first convert parallel misalignment to angular value using Graph 3. Then add the obtained value to the original angular misalignment, and align according to Graph 1.

Graph 2 includes parallel misalignments below 0.02mm.

### How to use the graphs:

#### Example 1

Determine the allowable axial misalignment for NES50W with angular misalignment of  $0.4^\circ$  and parallel misalignment of 0.1mm.

- a) Convert parallel to angular misalignment using Graph 3.
  - According to the graph, 0.1mm parallel misalignment is equivalent to  $0.85^\circ$  angular misalignment.
- b) Add the angular value—converted from the parallel misalignment—to the originally given angular misalignment.
  - $0.4^\circ$  angular misalignment +  $0.85^\circ$  parallel misalignment =  $1.25^\circ$
- c) Determine the allowable axial misalignment using Graph 1.

The graph shows that the allowable axial misalignment is 0.26 mm when angular misalignment is  $1.25^\circ$ .

#### Example 2

Determine the allowable parallel misalignment for NES250W with angular misalignment of  $0.4^\circ$  and axial misalignment of 0.2mm.

- a) Determine the angular misalignment using Graph 1.
  - According to the graph, allowable angular misalignment is  $1.7^\circ$  when axial misalignment is 0.2mm.
- b) Next, determine the allowable parallel misalignment using Graph 3.
  - Angular misalignment of  $0.4^\circ$  leaves a remainder of  $(1.7-0.4) = 1.3^\circ$  allowable angle.
  - Finally, convert this value to parallel misalignment using Graph 3 and obtain the final value, 0.18mm.

#### Example 3

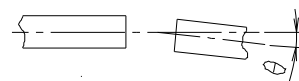
Determine the allowable axial misalignment for NES50S with angular misalignment of  $0.4^\circ$  and parallel misalignment of 0.01mm.

- a) Determine the allowable axial misalignment by using Graph 3.
  - According to the graph, axial misalignment is 0.23mm while angular misalignment is  $0.4^\circ$ .
  - (The parallel misalignment, 0.01mm does not need to be considered in this case because the graph already takes its effects into account.)

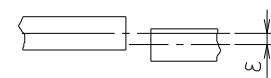
3-3. Verify that the coupling rotates and moves in the axial direction when applied with light force—while clamp bolts are loosely screwed on. Alignment is complete if the coupling rotates and moves smoothly. Do not apply heavy load in the axial direction while fixing your coupling to the shafts. This may deform or displace the disk(s) and lead to unit failure.

Figure 4. Centering

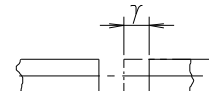
Angular Misalignment



Parallel Misalignment



Axial Misalignment



3-4. Be sure the coupling is smoothly fixed to both shafts. Then, tighten the clamp bolts with the torque specified in Table 4. Finally, insert the shafts all the way into the end of hubs.

Table 4. Clamp Bolt Tightening Torque

Model No.	NES07	NES15	NES20	NES30	NES50	NES70	NES100	NES250	NES800	NES1300	NES2000	NES3000
Bolt Size	M2	M2	M2.5	M2.5	M3	M3	M4	M4	M6	M6	M8	M8
Bolt Tightening Torque N·m	0.5	0.5	1.0	1.0	1.9	1.9	3.8	3.8	12	12	30	30

#### 4. Torque Capacity

Table 5. Torque Capacity

Model No.	NES07	NES15	NES20	NES30	NES50	NES70	NES100	NES250	NES800	NES1300	NES2000	NES3000
Allowable Torque (N·m)	0.7	1.5	2.0	3.0	5.0	7.0	10	25	80	130	200	300
Max. Speed (r/min)	18000	18000	18000	18000	18000	18000	15000	10000	10000	10000	9000	8000

However, note that the clamp portions of hubs, whose bore diameters are listed in Table 6, cannot transfer torque above the specified allowable torque capacities.

Table 6. Transmissible torque at clamp portion (N · m)

Model No. \ Shaft Dia	4	19	20	22	24	25	28	32	35	38	40	42
NES15	1.3	—	—	—	—	—	—	—	—	—	—	—
NES1300 (Straight Hub)	—	—	107	118	—	—	—	—	—	—	—	—
NES1300 (Low inertia Hub)	—	105	105	110	115	120	125	—	—	—	—	—
NES3000 (Low inertia Hub)	—	—	—	—	—	—	—	235	245	255	260	265

## 5. 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 according to the instructions provided in the manual, Seller will repair and replace at no charge once the Goods are returned to the Seller. This warranty does not cover the following:

- 1) Any cost related to removal or re-installation of Goods from the Buyer’s equipment or machines to repair or replace parts.
- 2) Cost 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 into other equipment or machines.
- 4) Structure change of the Goods by any modifications or alterations 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 injustices 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 use condition.
- 12) Losses or damages not liable to the Seller.

### 4. Dispatch Service

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



## TSUBAKIMOTO CHAIN CO.

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