# NSF SERIES : Sealless & Valveless Self-Priming Pump

## Assembling Instructions

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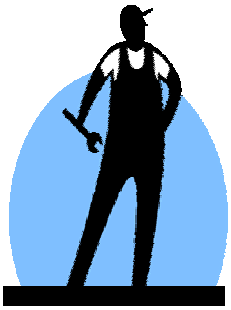
WORLD CHEMICAL USA, INC.
www.worldchemicalusa.com

20610 Manhattan Place Suite 116 Torrance, CA 90501 Phone: 310-328-9114 Fax: 310-328-9441

## 1. NEMA Joint Shaft and Motor Shaft

(1) Place a motor on the workbench. A soft cloth or cardboard surface will help protect against paint damage to the fan cover. The motor shaft should be upward and a terminal box should be on the opposite side of you.

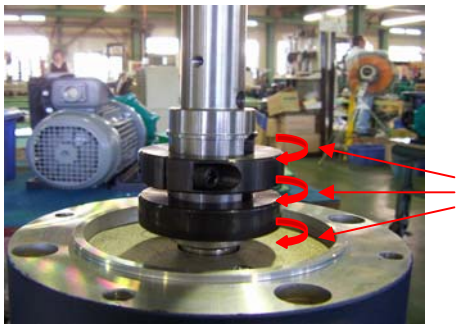



(2) Attach a NEMA joint shaft to the motor shaft and tap the top of the NEMA joint shaft lightly until it goes all the way down to the bottom.

(3) Loosely clamp the jointed shaft with two slit collars. A locking screw of each shaft slit collar has to face perpendicular to the opening of the NEMA joint shaft, with each locking screw facing diagonally opposite.


(4) Align the shaft with dial gauge --- 50μm TIR.

(5) Tighten the shaft slit collars evenly spaced apart each other after aligning the shaft, and re-check that the shaft is aligned within 50μm TIR.

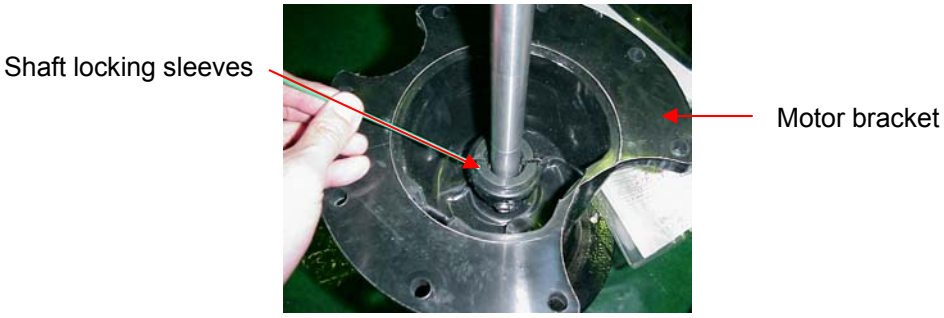



| Model | Size of Shaft Slit Collars |
|---|---|
| 25NSF | SCS-30 |
| 40NSF, 50NSF | SCS-35 |

## 2. Motor Bracket

(1) Place the motor bracket on the motor, with a nameplate on the motor bracket being on the opposite side of you. (The nameplate and motor terminal box face in the same direction.)

(2) Tighten the motor bracket and the motor with inch-threaded bolts.




## 3. Shaft Locking Sleeves

Encircle the NEMA joint shaft with two shaft locking sleeves, and tighten them with M5 x 16 screws and washers.

## 4. O-rings

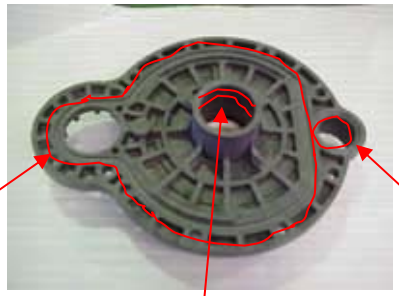
| Model | O-ring for Upper Flange | O-rings for Upper Flange Pipe | O-ring for Priming Water Plug |
|---|---|---|---|
| | Qty 1 | Qty 2 | Qty 1 |
| 25NSF | 25-1 | 25-3 | P-42 |
| 40NSF | 40-1 | 40-3 | |
| 50NSF | 50-1 | | |

(1) Place an o-ring in the groove of the upper flange.

(2) Place two o-ring inside the upper flange pipe, with the edge of the o-rings being vertical to the groove of the upper flange pipe. Soap water makes it easy to place them.

(3) Stretch a priming plug o-ring a little, then place it in the groove.

Pump upper flange



O-ring for the upper flange

O-rings for the upper flange pipe

O-ring for the priming plug

## 5. Upper Flange and Pump Body

(1) Place the pump body on the upper flange, with the pump body's suction flange and water priming plug o-ring being on the same side.


(2) Turn over the pump body and upper flange together.

## 6. Discharge Elbow

(1) Make sure there is no dust in the groove of the discharge elbow, and place an o-ring in the groove.

| Model | Size | Qty |
|---|---|---|
| 25NSF | 25-2 | 1 |
| 40NSF | 40-2 | 1 |
| 50NSF | 50-2 | 1 |

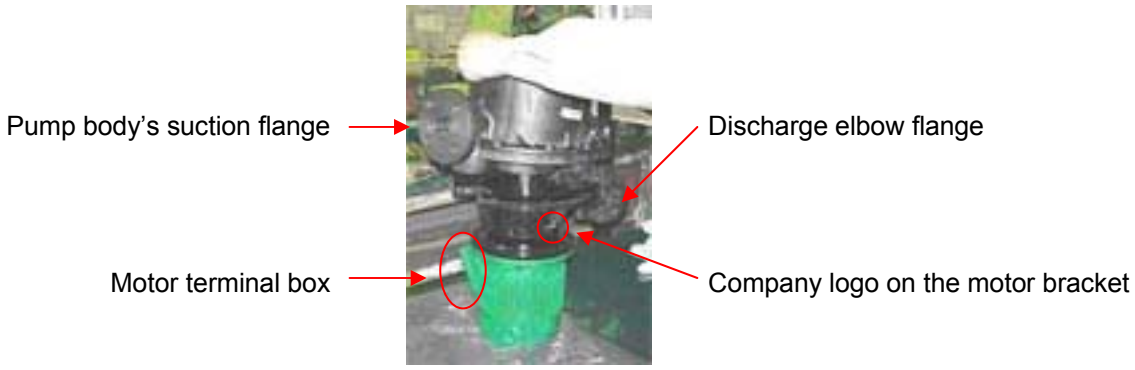
(2) Place the discharge elbow on the pump body, with a discharge elbow flange facing in the opposite direction of pump body's suction flange.

(3) Tighten the discharge elbow with bolts.

| Model | Size | Qty |
|---|---|---|
| 25NSF | M10: B + W + SW | 4 sets |
| | M10: N + W + SW | 1 set |
| 40NSF | M10: B + W + SW | 4 sets |
| | M10: N + W + SW | 1 set |
| 50NSF | M10: B + W + SW | 4 sets |
| | M10: N + W + SW | 3 sets |
| B: Bolt, N: Nut, W: Washer, SW: Spring Washer | | |

## 7. Motor Bracket

(1) Turn over the pump body again, and place it on the motor bracket. A logo on the motor bracket faces in the opposite direction of the motor terminal box.




(2) Temporarily fasten the pump body and the motor bracket at two points that diametrically opposite each other with two bolts. Insert a bolt with washer into a bolt hole from the motor bracket side, and fasten it with a washer, spring washer and nut from the pump body side.

| **Model** | **Bolt Set (Metric)** | **Qty** |
|---|---|---|
| 25NSF | M8 x 55: B + N + W + SW | 8 |
| 40NSF | M10 x 65: B + N + W + SW | 8 |
| 50NSF | M10 x 70: B + N + W + SW | 8 |
| B: Bolt, N: Nut, W: Washer, SW: Spring Washer | | |

(3) Attach a shaft jig to the motor shaft, and turn it by hand to see if the motor shaft turns smoothly.

(4) After verifying a smooth rotation of the shaft, fasten the motor bracket and pump body with bolts and nuts.

*Shaft jig

(*A shaft jig does not come with the pump.).

## 8. Front Gap

- Tool : Depth gauge
- What to be measured :

  A : The height of the front impeller vane from the shoulder of the bolt hole of the upper flange

  B : The depth of the casing

  C : Front gap

- **Formula : B – A = C (“C” must be within the allowable error.)**

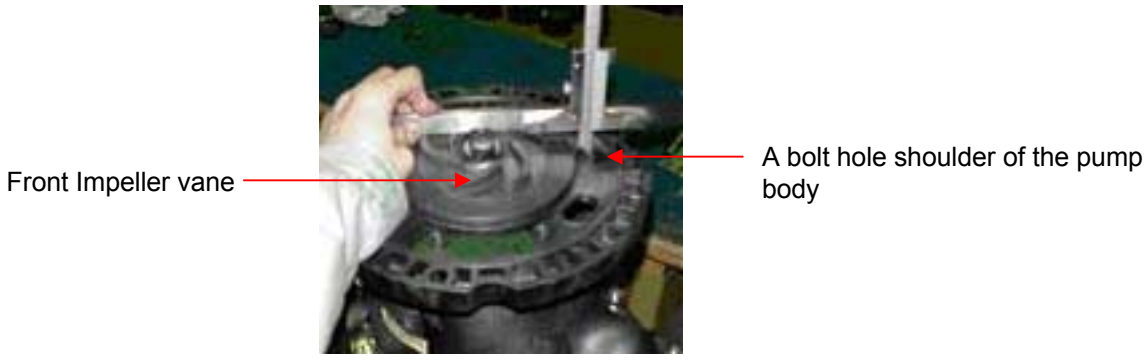
| Model | Allowable Error |
|---|---|
| 25NSF | 1.0 to 1.2 mm |
| 40NSF | 0.7 to 1.0 mm |
| 50NSF | 0.8 to 1.0 mm |

**A : The height of the front impeller vane from the shoulder of the bolt hole of the pump body.**

(1) Place the impeller in the pump to measure “A”.

(2) Measure five different “A”s with depth gauge, and record the maximum and minimum measured values.

- **Let maximum “A” be Amax**
- **Let minimum “A” be Amin**



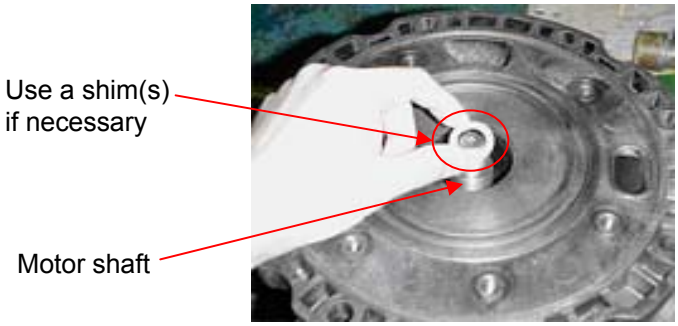

**B : The depth of the casing**

(1) Measure “B” with depth gauge.

(2) If necessary, adjust the front gap with shims. (Each of 0.2mm-, 0.3mm and 0.5mm-shims is provided.)

- **Maximum C = B - Amin**
- **Minimum C = B - Amax**
- **Maximum and minimum Cs have to be within the allowable error.**

Casing




Casing

## 9. Rear Gap

- Tool : Depth gauge
- What to be measured :

  A1 : The depth of the shaft shoulder from the seal ring of the pump body. If a shim(s) is used, do not remove it when you measure “A1.”

  A2 : The depth of the lowest surface of the pump body from its seal ring.

  B1 : The length of the shaft sleeve from the tip of the shaft sleeve to the top edge of metal threading inside the impeller.

  B2 : The length of the shaft sleeve from the tip of the shaft sleeve to the top of one of the radial ribs.

  C : Rear gap

- **Formula :**

  **A3 = A1 – A2**

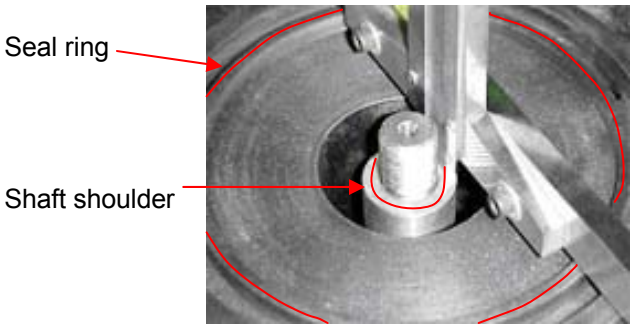
  **B3 = B1 – B2**

  **C = A3 – B3**

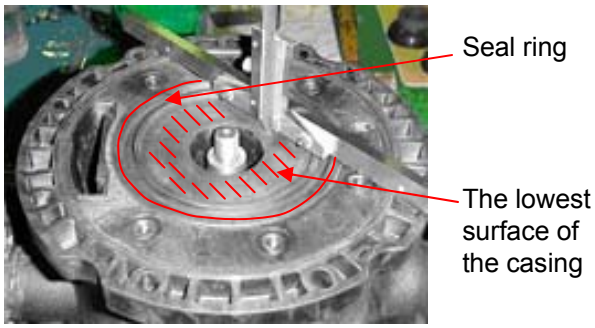
**“C” must be within the allowable error.**

| Model | Allowable Error |
|---|---|
| All NSF | 2.2 mm to 3.0 mm |

### A1 and A2 (A3 = A1 – A3)




**A1** : The depth of the shaft shoulder from the seal ring of the pump body.




**A2** : The depth of the lowest surface of the casing from the seal ring.

### B1 and B2 (B3 = B1 – B2)

**B1** : The length of the shaft sleeve from the tip of the shaft sleeve to the top edge of metal threading inside the impeller.

**B2** : The length of the shaft sleeve from the tip of the shaft sleeve to the top of one of the radial ribs.

## 10. Dry Seal

(1) Place a dry seal on the groove of the impeller sleeve as shown in the picture below.

(2) Make sure that the dry seal is level.

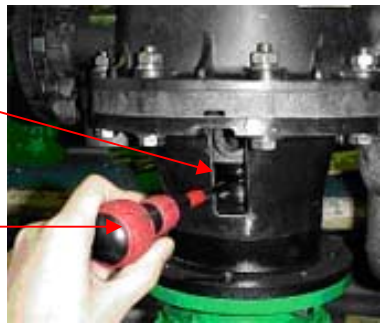
## 11. Impeller with Sleeve

(1) Place the impeller with sleeve in the pump.

(2) Insert a holding tool into a shaft hole that you can see from the opening of the motor bracket.

(3) Tighten the impeller with open-end spanner.


(4) Tighten the shaft sleeves with impeller locking sleeves from the opening of the bracket.



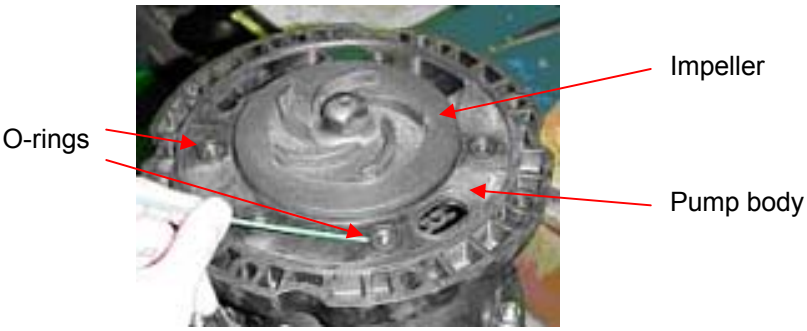
## 12. Casing and O-rings

(1) Make sure there is no dust nor crack on where a casing o-ring is placed, and place it in the groove of the casing.

| Model | Size | Qty |
|---|---|---|
| 25NSF | ISO-264 | 1 |
| 40NSF, 50NSF | ISO-268 | 1 |

(2) Place five o-rings on the bolt holes of the pump body.

| Model | Size | Qty |
|---|---|---|
| 25NSF | P-12 | 5 |
| 40NSF, 50NSF | P-15 | 5 |




(3) Place the casing on the pump body.

(4) Tighten the casing and pump body with bolts.

| Model | Size | Qty |
|---|---|---|
| 25NSF | M8 x 40: B + W + SW | 5 |
| 40NSF, 50NSF | M10 x 45: B + W + SW | 5 |
| B : Bolt, W : Washer, SW : Spring Washer | | |

(5) Attach a drain plug with gasket to the casing.

Drain plug　　Casing

## 13. Pump Base

(1) Place the pump base on the casing as shown below.

(2) Tighten the pump base with bolts.

| Model | Size | Qty |
|---|---|---|
| 25NSF | M8 x 65 : B + N + W + SW | 8 |
| 40NSF, 50NSF | M10 x 70 : B + N + W + SW | 8 |

(3) Re-tighten other bolts.

## 14. Cleaning Plug and Priming Water Plug

(1) Attach an o-ring (P-18) and cleaning plug to the pump body.

(2) Turn over the pump, and attach an o-ring (P-42) and priming water plug to the pump.

Cleaning plug

Water priming plug