Connecting to Machinery

⚠ CAUTION

- When connecting the Paramax® reducer to a load, confirm that the alignment is within the specified limits shown in the maintenance manual, drawings, catalog, etc. otherwise, damage to the system may occur due to misalignment.
- Correctly tighten all bolts to the torque specified in the drawing, catalog, etc. to prevent system damage from loose parts.
- When a belt is used to connect the reducer with other equipment, check that the belt tension and the pulley alignment are within the specified limits. When the unit is directly connected to other machinery, check that the alignment is within the specified limits; otherwise, the system may be damaged from misalignment.
- Remove the key temporarily attached to the output shaft of the Paramax® reducer when the shaft is free-rotating (i.e. not loaded); otherwise injury may occur.
- Confirm the direction of rotation before connecting the Paramax® reducer with its driven machine. Incorrect direction of rotation may cause injury or damage to the system.
- Install appropriate guard devices around rotating parts; otherwise, injury may occur.

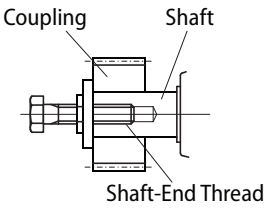

Fig. 7

(1) Coupling

- Follow Manufacturers installation recommendations when installing shaft connections to Sumitomo equipment. The following information is supplied for reference only. Manufacturers installation instructions supersedes any information supplied below.
- The dimensions (A,B and X) illustrated in Fig. 8 must be within the tolerance listed in Table 13.
- When attaching a coupling, do not to apply impact force or excessive thrust to the shaft; otherwise, the bearing may be damaged.
- Shrink fit or shaft-end thread is recommended for mounting (Fig. 8).

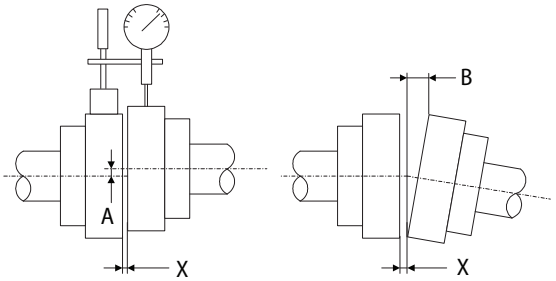

Fig. 8

Table 13. Coupling Alignment Tolerance

Tolerance for A dimension	0.002 in. (0.05mm)
Tolerance for B dimension	0.002 in. (0.05mm)
Tolerance forX dimension	Specified by coupling manufacturer

(2) Chain, Sprocket and Gear

- The chain tension angle must be perpendicular to the shaft of Paramax® reducer.
- The pitch circle of the sprocket and gear must be more than three times of the shaft diameter.
- Position the sprocket and gear as close to Paramax® reducer as possible so the load point will be close to the reducer's vertical centerline (Fig. 9).

(3) V belt

- Excessive V belt tension will damage the output shaft and bearing. The amount must be specified by V belt manufacturer.
- Eccentricity of parallelism between two pulleys must be less than 0.5° (Fig. 10).
- Use a matched set with identical circumferential length when more than one V belt is used.

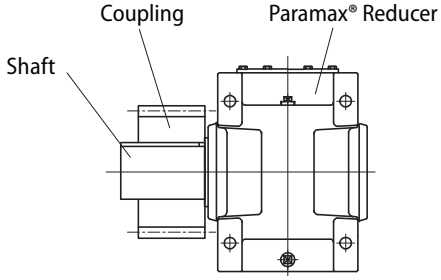

Fig. 9

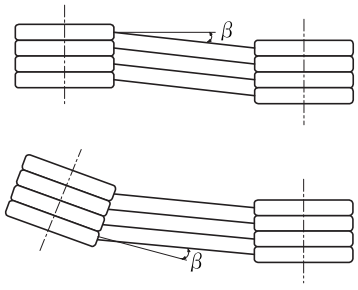

Fig. 10

Connecting to Machinery (cont.)

Hollow Shaft

Shrink Disk Type

The shrink disc has a keyless, shrink fit mechanism that shrinks the hub (HB) mechanically through the tightening locking bolt (ZS),and holds shaft and hub as one fixture (Fig. 11).

Mounting Procedure: (Fig. 12)

(1) Clean and degrease contact surfaces (a) and (c).

(2) Smear surface (c) and (ZS) with "Molykote 321" or its equivalent. However, keep surface (a) as clean as possible (no grease).

(3) Slide O-ring (b) onto the shaft. (only 9090 - 9115)

(4) Mount the reducer on the driven shaft and screw nut (e) until faces (g) and (h) make contact.

(5) Set the shrink disc (k) at dimensions (LV). Tighten locking bolt (ZS) to specified torque (TA) (using a torque wrench). Make sure that both plates are parallel when tightening bolts. After confirming that the shrink disc is set correctly, tighten the bolts with a wrench of appropriate length. Uniformly, tighten bolts clockwise (not diagonally) while keeping both plates parallel. It is recommended to tighten respective bolts by 30 degree each time.

Notes: a. In case of a vertical type unit, mount a thrust washer (B) to prevent the reducer from moving when locking nut (ZS) is loosened (Fig. 11).

b. A high-tension bolt (JIS/ISO/ASTM strength 10.9 or 12.9) is used as a locking bolt (ZS). When replacing it, use one specified by the manufacturer.

Removal Procedure: (Fig. 13)

(1) Loosen locking bolt (ZS) and remove shrink disc (k).

(2) Set thrust washer (f) and hexagon head bolt (n). Remove the reducer from the driven shaft using bolt (m).

Note: Parts (d), (e), (f), (ZY), (m), and (n) are optional. Order these as required.

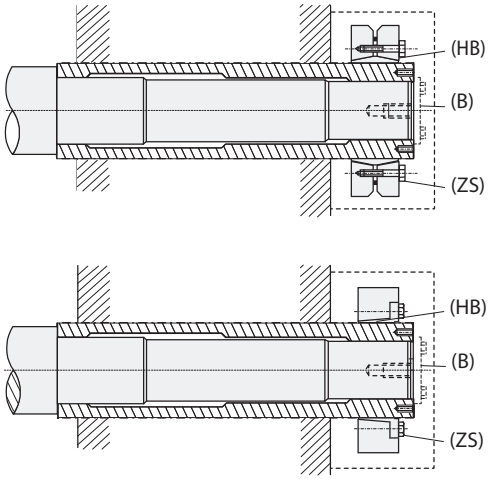

Fig. 11 Full Mounted Position

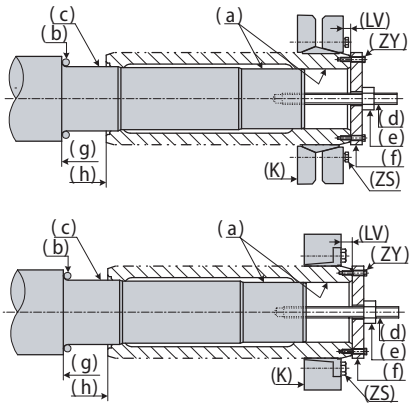

Fig.12 Mounting

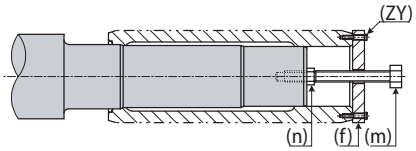

Fig. 13 Removal

Connecting to Machinery (cont.)

Hollow Shaft (cont.)

Keyway Connection

Sizes 9015 - 9055

Mounting Procedure: (Fig. 14)

The hollow shaft bore is provided with retaining ring (d). Ring (d) is the essential component for mounting, securing, and removing the unit.

(1) Smear surface of the shaft (e) with "molykote 321" or its equivalent.

(2) Turn nut (b) and slide the reducer over the driven shaft. Use plain washer (c) if necessary.

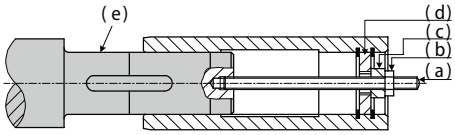

Fig. 14

Securing: (Fig. 15)

(1) After mounting the reducer on the driven shaft, tighten bolt (f). Bolt (f) is not supplied with the unit.

(2) Install cover (g) to protect the bore.

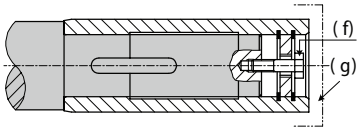

Fig. 15

Removal Procedure: (Fig. 16)

(1) Remove ring (d), mount bolt (n), and reset ring (d).

(2) Attach bolt (J) to ring (d), and turn bolt (J) to disconnect the hollow shaft from the driven shaft.

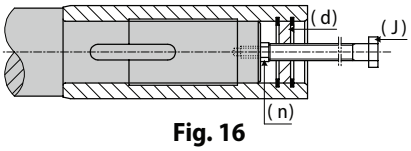

Fig. 16

Special Cases: (Fig. 17)

If the driven shaft has no shoulder when mounting, provide a distance ring (h) for fixing in place. Ring (h) is not supplied with the unit.

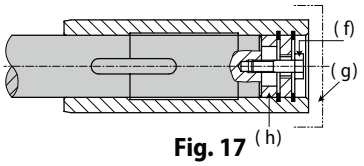

Fig. 17

Sizes 9060 - 9085

Mounting Procedure: (Fig. 18)

The hollow shaft end is provided with thrust washer (d). Thrust washer (d) is the essential component for mounting, securing, and removing the unit.

(1) Smear surface of the shaft (e) with "molykote 321" or its equivalent.

(2) Turn nut (b) and slide the reducer over the driven shaft.

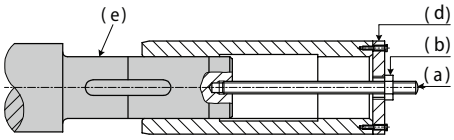

Fig. 18

Securing: (Fig. 19)

(1) After mounting the reducer on the driven shaft, fix bolt (f). Bolt (f) is not supplied with the unit.

(2) Install cover (g) to protect the bore.

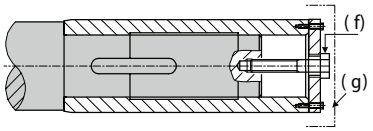

Fig. 19

Removal Procedure: (Fig. 20)

(1) Remove thrust washer (d), mount bolt (n), and reset thrust washer (d).

(2) Attach bolt (J) to thrust washer (d), and turn bolt (J) to disconnect the hollow shaft from the driven shaft.

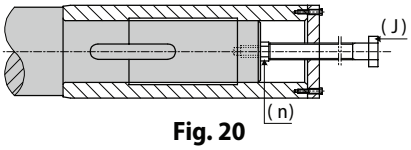

Fig. 20

Special Cases: (Fig. 21)

If the driven shaft has no shoulder when mounting, provide a distance ring (h) for fixing in place. Ring (h)is not supplied with the unit.

Note: Parts (a), (b), (c), (n), and (J) are optional. Order these as required.

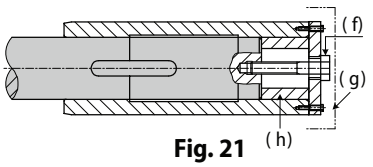

Fig. 21

Connecting to Machinery (cont.), Operation

Hollow Shaft (cont.)

Torque Arm (optional)

The hollow shaft reducer is fixed by the torque arm to prevent the reducer from revolving by an opposite reaction force. Fig. 22 shows the construction of a standard torque arm. Select a torque arm support with proper construction and strength, taking into consideration the reaction force of the reducer and the impact load.

Notes: a. The number of disc springs (s) differs according to the size of the reducer.

b. Use bolt (t) and nut (M) classified as JIS/ISO/ASTM strength class 8.8.

c. Adjust Nut (M1) to remove any clearance in the assembly. Spacer/washer (s) should be able to spin by hand. If not, readjust/loosen M1 nut. Lock in position using locking nut (M2).

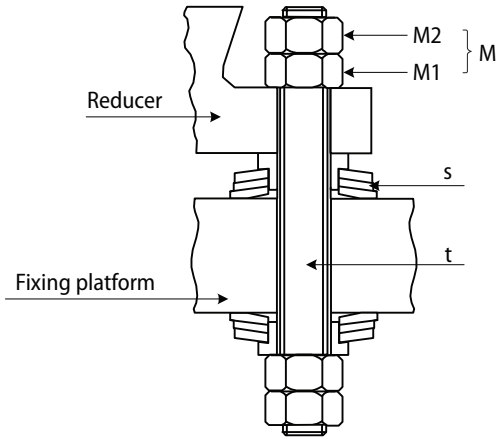

Fig. 22 Standard Torque Arm

Operation

⚠ DANGER

- Do not approach or touch rotating parts (output shaft, etc.) during operation; loose clothing may become caught in these rotating parts and cause serious injury or death.
- When the power supply is interrupted, be sure to turn off the power switch. Unexpected resumption of power may cause electric shock, personal injury or damage to the equipment.
- Do not operate the unit with the terminal box cover removed. Install the terminal box cover after maintenance in order to prevent electric shock.
- Do not open the terminal box cover when power is suppled to an explosion-proof type motor; otherwise explosion, ignition, electric shock, personal injury, fire or damage to the equipment may occur.

⚠ CAUTION

- Do not put fingers or foreign objects into the opening of the reducer; electric shock, personal injury, fire or damage to the equipment may occur.
- The reducer becomes very hot during operation. Touching the unit may result in burns.
- Do not loosen the oil filler plug during operation; otherwise, hot, splashing lubricant may cause burns.
- If a problem occurs during operation, stop operation immediately; otherwise, electric shock, personal injury or fire may occur.
- Do not operate the reducer in excess of the rating; otherwise, personal injury or damage to the equipment may occur.

- **Paramax® reducers are shipped without oil. Units must be filled with the proper amount of recommended oil prior to start-up.**

After the unit is installed, filled with oil and properly wired, before operating check that:

(1) the wiring is correct
(2) the unit is properly coupled with the driven machine
(3) the foundation bolts are tightened securely
(4) the direction of rotation is correct.

After confirming these items, conduct a trial run with a light load. Begin full operation after confirmng that there is no abnormal sound, vibration and/or temperature rise. Check all items listed in Table 14.