DIEQUA Corporation



HIGH PERFORMANCE SERVO WORM

INSTALLATION AND SERVICE INSTRUCTIONS

DIEQUA Corporation



DieQua Corporation is a manufacturer and supplier of a wide range of motion control and power transmission drive components. Our focus has always been to provide products that offer superior value, the highest quality, the most unique designs, and the most reliable performance. DieQua continues to develop innovative products to meet the changing technological needs of the industries and customers we serve.



The DieQua Process

DieQua offers an extensive range of motion control and power transmission products. With so many options, identifying the ideal solution or even knowing where to begin can feel overwhelming. That's why our process starts with listening.

Our team is trained to ask the right questions, understand your goals, and guide you to the most effective product or customized solution for your specific application. This consultative approach allows us to consistently exceed customer expectations with the best-fit design.

Your Application. Our Expertise

No two applications are the same. From packaging to robotics to heavy-duty manufacturing, our experienced team understands the performance, precision, and environmental demands of your industry.

We bring decades of hands-on knowledge and real-world problem-solving to every project, ensuring your solution is not only functional but fully optimized.

Customers choose DieQua for more than just high-quality products. They return for our responsiveness, transparency, and long-term commitment to their success.

We don't just deliver parts. We deliver peace of mind. From the first call to field support, we're here to solve your challenges with urgency, clarity, and expertise.

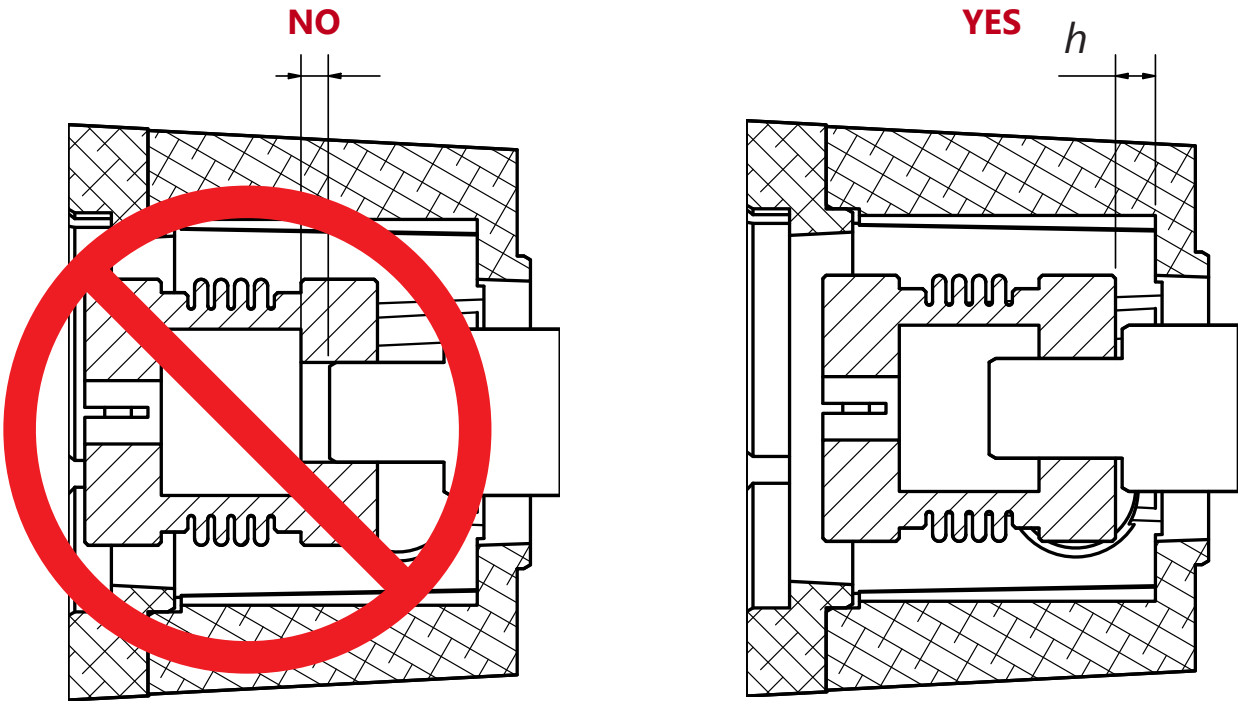


These instructions cover the mounting, commissioning and backlash adjustment of **DieQua Precision Worm (DPW)** right-angle servo gearheads.

Every DPW gearhead is built from fully quality-controlled components and is inspected 100 % before shipment. It will deliver exceptional reliability over tens of thousands of hours of operation, provided the procedures below are followed.

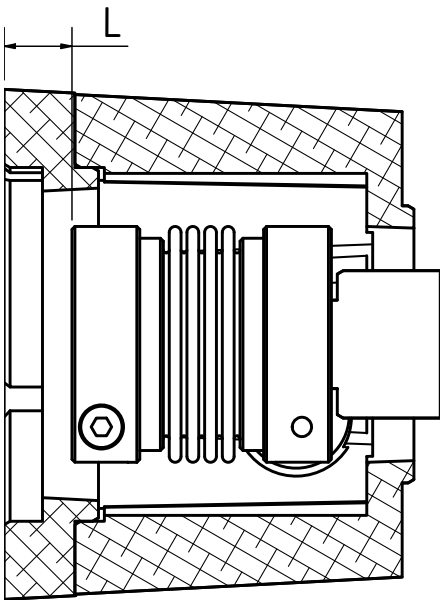
SERVO COUPLING MOUNTING

Slide the coupling onto the gearbox input shaft. Position it so that the full clamping length of the hub is engaged on the shaft, leaving a small gap (h) between the coupling and the face of the gearbox flange, as shown below.

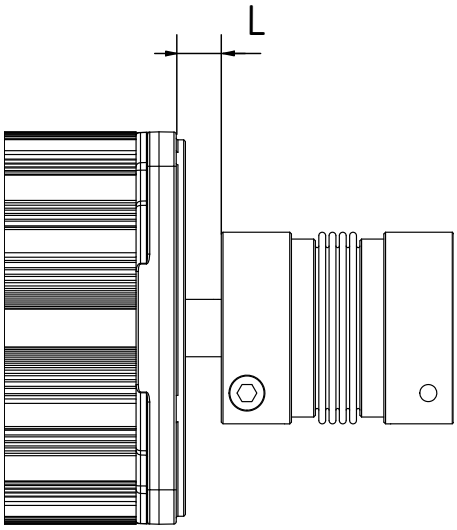


Servo Coupling Mounting

Measure the length (L) from the motor mounting face to the front face of the coupling:



Remove the coupling from the gearbox and fit it onto the motor shaft at the same length (L):



Fit the coupling dry and clean. Do not oil the coupling bore or the shaft: oil causes fretting and changes the clamping torque values.

Tighten the coupling clamping screw on the motor side to the torque given in the table below:

Coupling size	B05	B10	B15	B30	B60	B80
Tightening torque (Nm)	4	4.5	8	15	40	70

Fit the motor and coupling assembly onto the gearbox.

Secure the motor flange to the gearbox flange with the four screws.

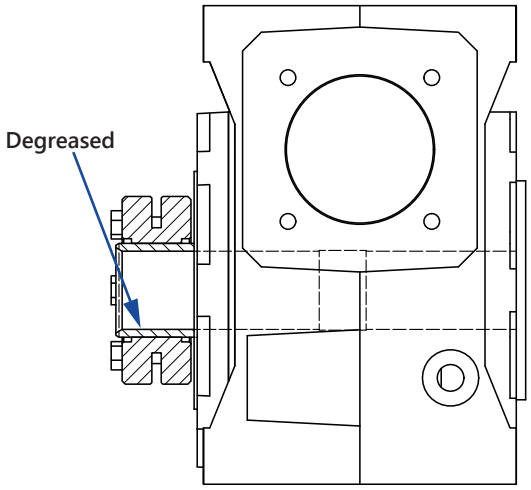
Tighten the coupling clamping screw on the gearbox side, through the radial access hole in the gearbox flange, to the torque given in the table above.

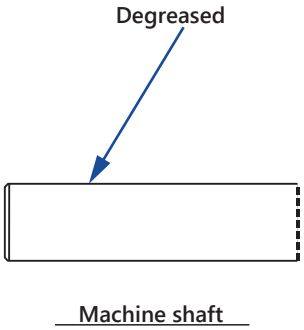
MOUNTING OF SHRINK DISC

DPW smooth hollow shaft version only

The shrink disc is supplied ready for use. Do not disassemble it.

Thoroughly degrease the gearbox output bore and the machine shaft.



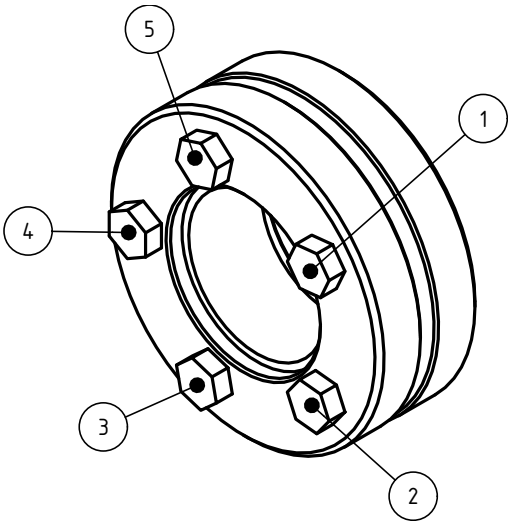


Do not tighten the shrink disc screws until the gearbox has been fitted onto the machine shaft.

Slide the gearbox onto the shaft.

Secure the gearbox to the machine.

Tighten the shrink disc screws gradually, a little at a time, working around the disc in the sequence shown below. Tighten in a circular sequence, not in a criss-cross (star) pattern.



Shrink disc screw ø	Tightening torque *
M5	4 Nm
M6	12 Nm
M8	30 Nm
M10	59 Nm

** Or the torque specified by the shrink disc manufacturer, if different.*

Keep working around the disc until every screw reaches the torque given in the table. **It is normal for each screw to need several passes before it holds the final torque.**

LUBRICATION

Standard, non-grease-filled applications

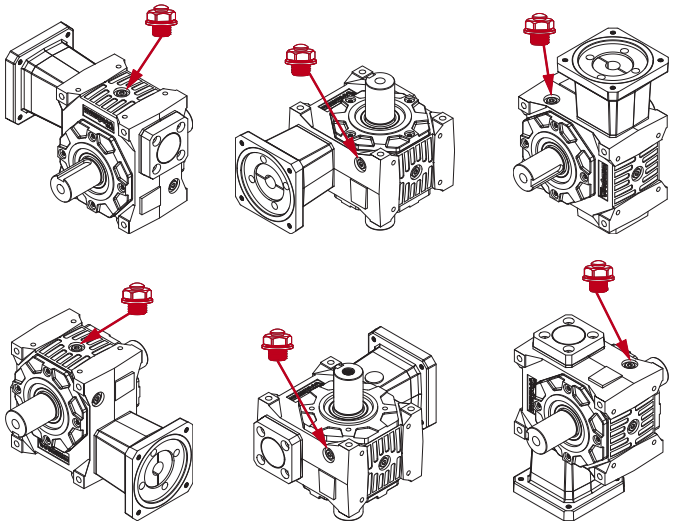
DPW servo gearheads are shipped factory-filled with **PGO-FGL 150**, a synthetic polyglycol (PGO) gear oil, and are lubricated for life. No oil change is required under normal operating conditions.

If oil ever has to be added or replaced, use PGO-FGL 150 or another brand of equivalent polyglycol (PGO) gear oil, ISO VG 150, with an anti-wear (AW) additive. Any brand is acceptable as long as it is a PGO-150 type oil with AW additive.

Do not use any other type of oil, and never mix lubricants. A non-equivalent oil voids the warranty and can damage the gear set: the bronze worm wheel runs in sliding contact with the hardened steel worm and relies on the friction and anti-wear characteristics of the polyglycol oil. Mineral, PAO or EP gear oils can cause overheating, rapid wear or corrosion of the bronze wheel and are not compatible with polyglycol oil.

IMPORTANT: BREATHER PLUG MUST BE FITTED BEFORE START-UP

Before putting the gearhead into service, fit the breather plug (supplied loose with the gearbox) in the uppermost plug position for the mounting orientation, in place of the blanking plug there. Running without the breather builds up pressure inside the gearbox and forces oil out past the seals. Evidence that the breather was not fitted, or was fitted in the wrong position, voids the warranty.



Breather plug position (shown in red) for each mounting orientation.

RUNNING-IN PERIOD

During the first hours of operation (up to 48 hours, depending on the load) the gearbox runs warmer than normal, up to 20 °C above its steady-state temperature, and its efficiency is lower than the value given in the technical catalog. This is normal and requires no action.

Efficiency rises progressively to its rated value as the gears run in. After the running-in cycle, the housing temperature is normally below 70 °C (80 °C in heavily loaded applications).

A small amount of oil may come out of the breather at the highest point of the gearbox when it reaches operating temperature. This is normal as long as it is not continuous.

The running-in period must be completed before a gearhead is returned for warranty evaluation.

SETTING OF TORSIONAL BACKLASH

Backlash class P (≤ 1 arc min) only

The high-strength gear alloys and the very low specific contact pressure (achieved by the largest possible tooth contact area, computer-optimized for every production batch) allow the **DPW** to run for years without any adjustment when it is operated within the catalog ratings.

If the backlash does need to be adjusted, proceed as follows. **Refer to the exploded view on pages 8 and 9.**

- Loosen the coupling clamping screw (item 19) on the gearbox side.
- Loosen the screws (item 2). They do not need to be removed from the housing.
- Remove the adjustment shims (item 8).
- Measure their total thickness.
- Reduce the total thickness (by removing the appropriate number of shims) by the amount needed to obtain the required backlash; see the table below.
- Refit the remaining shims.
- Tighten the screws (item 2).
- Tighten the coupling clamping screw (item 19) on the gearbox side.
- Check that the torque needed to turn the input shaft is constant over a full revolution (by hand, or by monitoring the motor current). A varying torque means the backlash has been set too low. Class P gearheads are delivered with the backlash set to 1 arcminute.

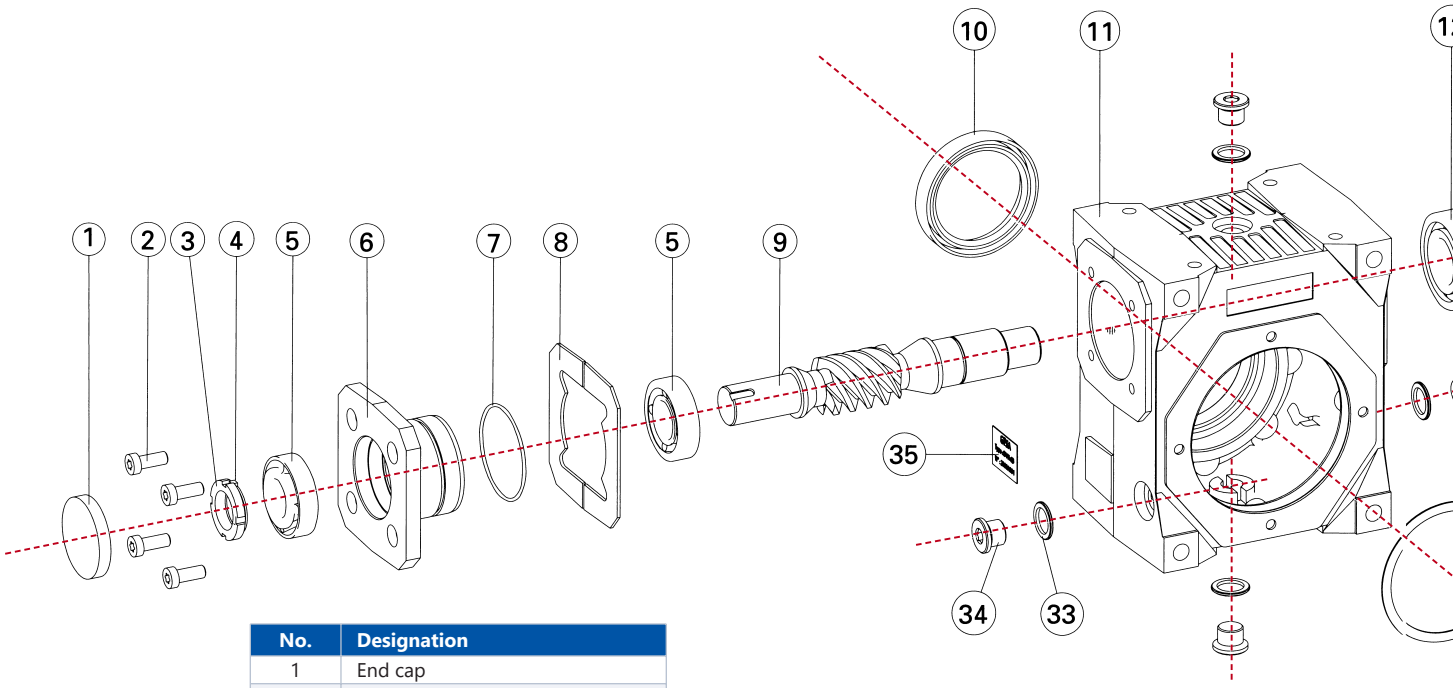
Correct operation with the backlash set significantly below 1 arcminute is not guaranteed and is at the user's own risk.

The table below gives the backlash reduction, in arcminutes, obtained by removing one shim of the thickness shown in the second column, for each gearbox size and nominal ratio (i).

Total shim thickness and backlash are strictly proportional.

Size	Shim thickness (mm)	i = 5	i = 7	i = 10	i = 15	i = 20	i = 30	i = 45	i = 60	i = 90
DPW 35	0.2	0.5	0.5	0.5	0.5	0.5	1	0.9	0.9	0.3
DPW 45	0.3	0.4	0.6	0.6	0.6	0.6	1	0.9	0.9	0.3
DPW 55	0.3	0.4	0.6	0.6	0.6	0.6	0.8	0.9	0.9	0.3
DPW 63	0.3	0.3	0.5	0.5	0.5	0.4	0.7	0.6	0.6	0.2
DPW 75	0.4	0.4	0.6	0.6	0.6	0.5	0.7	0.7	0.7	0.3
DPW 90	0.4	0.3	0.3	0.4	0.4	0.4	0.6	0.7	0.5	0.2
DPW 110	0.6	0.6	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.2

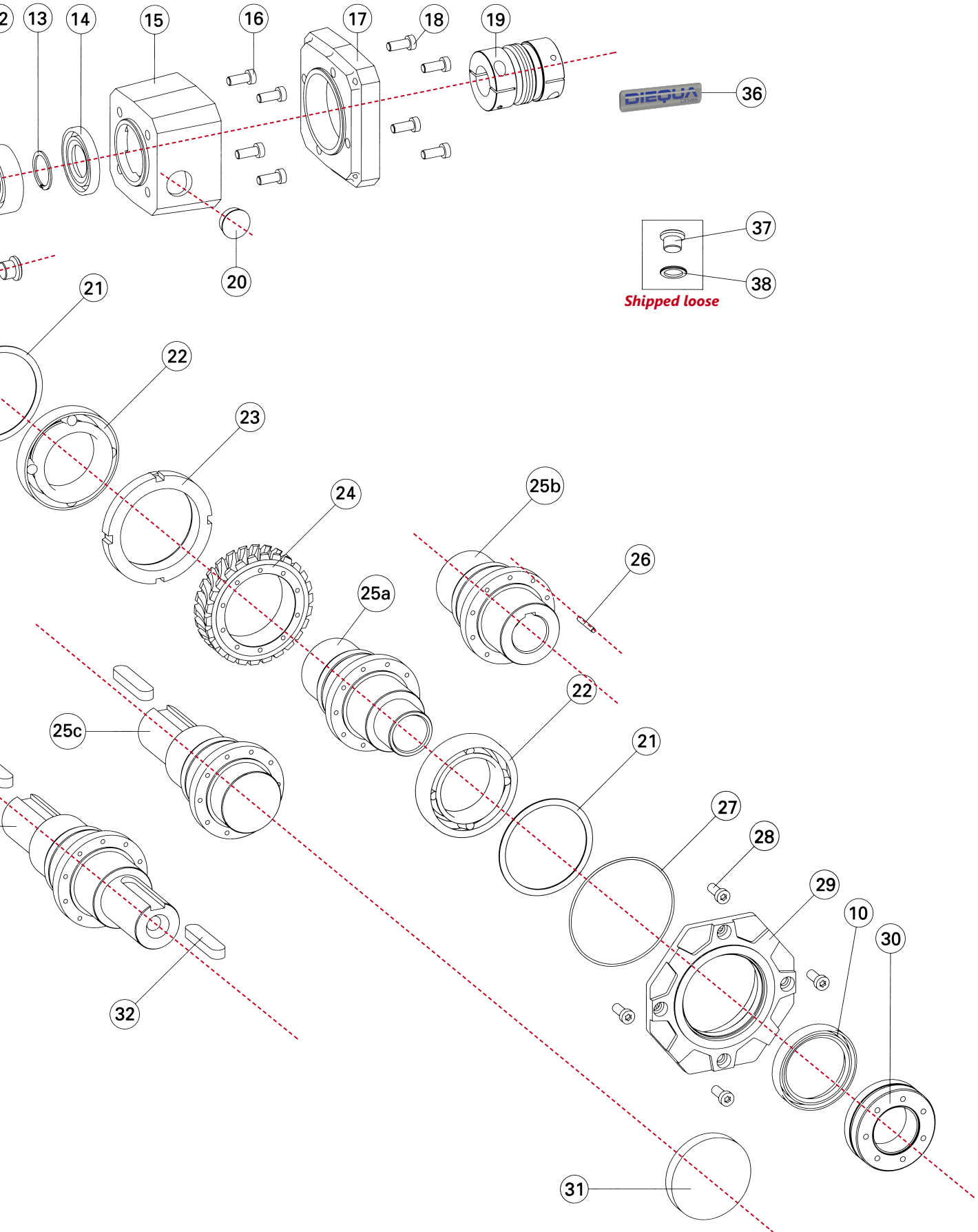
Spare Parts List



No.	Designation
1	End cap
2	Screw
3	Nut
4	Washer
5	Tapered bearing
6	Bearing bush
7	O-ring
8*	Adjustment shims
9	Wormshaft
10	Oil seal
11	Housing
12	Ball bearing
13	Retaining ring
14	Oil seal
15	Motor flange
16	Screw
17	Counterflange
18	Screw
19	Servo coupling
20	End cap
21	Adjustment shims
22	Tapered bearing
23	Nut
24	Wormwheel
25a	Smooth hollow shaft
25b	Keyed hollow shaft
25c	Single male shaft
25d	Dual male shaft
26	Pins
27	O-ring
28	Screw
29	Flange
30	Shrink disc
31	End cap
32	Key
33	Washer
34	Oil plug
35	S/N plate
36	Name plate
37	Breather plug (shipped loose)
38	Washer (shipped loose)

** Backlash class P only*

Spare Parts List (continued)



ABOUT DIEQUA

Founded in 1980 by Dietmar Quaas, and now owned by his sons, DieQua Corporation has expanded from a single product line to become a leading manufacturer and supplier of an extensive line of high-quality power transmission and precision motion control products, including gearboxes, servo gearheads, screw jack systems, speed reducers, cycloidal reducers, and connecting components. The company also offers custom product modifications and complete design solutions for virtually any application. DieQua Corporation serves a wide range of industries, including medical and health care, marine engineering, renewable energy, mining, transportation, steel, forestry and lumber, water and wastewater, automotive, and factory automation, to name a few.

An experienced and knowledgeable technical sales, customer service, and engineering support staff, as well as local distributors, ensure that DieQua customers in North America, Mexico and South America select the optimum components, systems, and best design solutions for their specific requirements.

The DieQua family of products


Spiral Bevel Gearboxes


Servo Gearheads

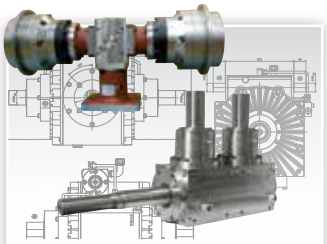

Servo Worm Gearheads


Screw Jack Systems


Helical Speed Reducers


Speed Modulating Gearboxes


Zero Backlash Couplings and Line Shafts


Custom Designs

The DieQua Advantage

Engineering Support

DieQua Corporation has several decades of combined experience specifying power transmission and motion control components. This assures proper selection of components and systems to suit your unique requirements.

Warehousing

We pride ourselves for our extensive in-stock inventory. For fast product turnaround, DieQua Corporation stocks many components of various ratios and sizes, ready to ship fast.

Manufacturing and Assembly

DieQua Corporation now manufactures or assembles most of the products, for on-time delivery of standard orders as well as prototypes. We are ISO 9001 certified and are constantly improving our quality systems to ensure our customers receive the best products.

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