APEX DYNAMICS

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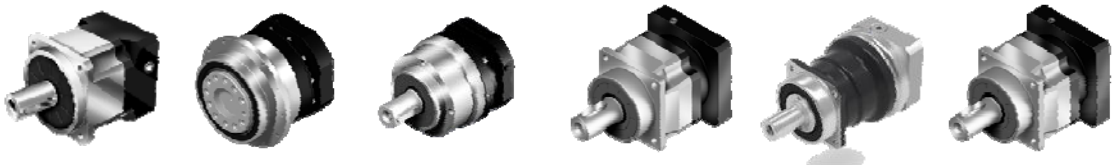
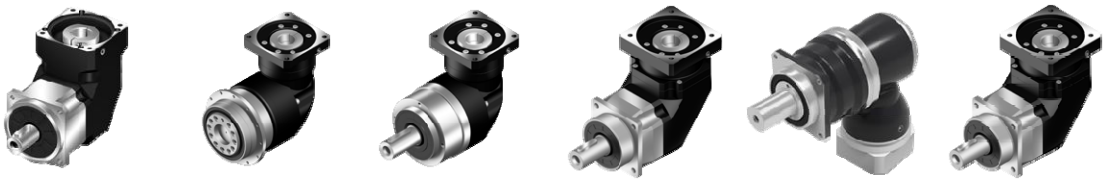
User manual

Planetary Gearboxes



AB **AD** **AE** **AF** **AFH** **AFX**



ABR **ADR** **AER** **AFR** **AFHK** **AFXR**

Content

1. Explanation of this document

This user manual describes how to deal with assembly and mounting of the Apex Dynamics planetary gearboxes.

This manual covers the following series:
AB, ABR, AD, ADR, AE, AER, AF, AFR, AFH, AFHK, AFX and AFXR.

This manual contains important information regarding the use and maintenance of the gearboxes.

1.1 Symbols

The following warning symbols are used in this manual:

	Information	this symbol indicates important information that must be observed for the correct and safe installation of the gearboxes.
	Warning	Hazards and warnings are indicated with this symbol.
	Operation	this sign indicates when something needs to be done.

1.2 Warnings

Warnings must always be followed. Not following a warning instructions can be dangerous or may cause malfunction of the gearbox.

Warnings are indicated as follows:

Type or source of the danger

 Action to avoid the danger

2. Safety

This chapter describes the safety regulations that must be observed for the safe and undangerous use of planetary gearboxes.
Possible sources of danger and necessary safety regulations are also indicated.

2.1 Intend use

Planetary gearboxes are intended for use in industrial applications

➡ The specifications as described in the factory documentation may not be exceeded

➡ The planetary gearboxes may only be used if the machine in which the gearboxes are installed complies with all guidelines and regulations that apply to this machine.

2.2 Qualified employees

All work with the planetary gearboxes may only be carried out by qualified personnel and with due observance of the current safety regulations.

➡ Always ensure that the personnel have read and understood the user manual!

2.3 General safety instructions

Improper use, incorrect installation or operation and overdue maintenance can cause serious damage to property and / or cause personal injury.

➡ Observe the following safety instructions for using the planetary gearboxes:

- Never make any changes or modifications to the gearboxes.
- Never carry out work on the gearboxes other than described in this manual.
- Always ensure that the gearbox type is visible and known.
- Never remove the type description and the serial number from the gearbox.
- Before start using, ensure that all shafts are correctly mounted.
- Always ensure that potential sources of danger are covered and / or secured (for example rotating parts).
- Always comply with the manufacturer's condition before start using.
- Never use damaged parts in combination with the gearboxes.
- Always ensure adequate convection (heat dissipation) when using the gearbox.

2.3 General safety instructions (continue)

- Gearboxes can heat up strongly during use.
- When working on the gearbox, always let it cool down first. Always pay attention to hot lubricants.
- Work on the gear unit only when it is stationary, the driving motor is switched off and secured against being switched on again
- Have repairs within the warranty period carried out by Apex Dynamics only

2.4 Standards and Guidelines

2.4.1 Machinery Directive 2006/42/EG

A gearbox is considered a "machine component" and therefore not subject to the EC Machinery Directive 2006/42/EC.

Using and startup the gearbox is prohibited within the scope of the EC Machinery Directive until it has been determined that the machine in which the gearbox is installed meets the regulations of the EC Machine Directive.

2.4.2 RoHs

All Apex Dynamics planetary gearboxes comply with the European RoHs directive as mentioned in RoHs (2011/96 / EC). All our products are purely mechanical and contain no electronic or electrical components.

2.4.3 REACH

According to the definitions of the European directive (EC 1907/2006 / EU) regarding REACH, the planetary gear units that Apex Dynamics imports and / or manufacters in the EU are not subject to registration.

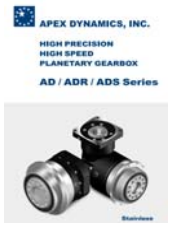
2.4.4 ATEX

Apex Dynamics Inc., declares that the design, manufacture and inspection of the products described in this manual are in accordance with the provisions of Annex II (EHSR) of the ATEX Directive 94/9 / EC.

3. Product description

AB / ABR Series

- Basic housing in stainless, adapter plate in Aluminium, output shaft with/without key or DIN5480
- Helical gears, Nominal torque from 14 up to 2000 Nm.
- 7 sizes, from 42 mm up to 220 mm, 25 ratio's, lifetime lubricated
- Backlash 1, 3, 5, 7 / 2, 4, 6, 7, 9 arcminutes
- Protection class IP65, Operating temperature –10°C ~ +90°C



AD / ADR Series

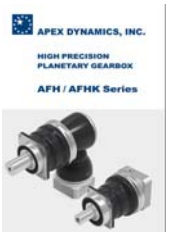
- Basic housing in stainless, adapter plate in Aluminium, output flange ISO 9409
- Helical gears, Nominal torque from 14 up to 2000 Nm.
- 7 sizes, from 47 mm up to 255 mm, 16 ratio's, lifetime lubricated
- Backlash 1, 3, 5, 7 / 2, 4, 6, 7, 9 arcminutes
- Protection class IP65, Operating temperature –10°C ~ +90°C

AE / AER Series

- Basic housing in stainless, adapter plate in Aluminium, output shaft with/without key
- Helical gears, Nominal torque from 14 up to 2000 Nm.
- 7 sizes, from 50 mm up to 235 mm, 21 ratio's, lifetime lubricated
- Backlash 8, 12 / 10, 14 arcminutes
- Protection class IP65, Operating temperature –10°C ~ +90°C

AF / AFR Series

- Basic housing in stainless, adapter plate in Aluminium, output shaft with/without key or DIN5480
- Helical gears, Nominal torque from 14 up to 2000 Nm.
- 7 sizes, from 42 mm up to 220 mm, 25 ratio's, lifetime lubricated
- Backlash 1, 3, 5, 7 / 2, 4, 6, 7, 9 arcminutes
- Protection class IP65, Operating temperature –10°C ~ +90°C



AFH / AFHK Series

- Basic housing in painted steel, adapter plate in Aluminium, output shaft with/without key, DIN5480 or hollow shaft
- Helical gears, Nominal torque from 24 up to 3805 Nm.
- 7 sizes, from 60 mm up to 240 mm, several ratio's, lifetime lubricated
- Backlash 1, 2, 3 / 2, 3 arcminutes
- Protection class IP65, Operating temperature –10°C ~ +90°C

AFX / AFXR Series

- Basic housing in stainless, adapter plate in Aluminium, output shaft with/without key or DIN5480
- Helical gears, Nominal torque from 14 up to 1200 Nm.
- 7 sizes, from 42 mm up to 220 mm, 21 ratio's, lifetime lubricated
- Backlash 1, 3, 5, 7 / 2, 4, 6, 7, 9 arcminutes
- Protection class IP65, Operating temperature –10°C ~ +90°C

For detailed specifications, we refer to the product documentation and / or website of Apex Dynamics.

3.1 Identification plate (laser engraved)

Each gearbox is executed with a laser-engraved type code.

Example:

APEX DYNAMICS, INC.
Model NO: AF140-S1-P2
S/N: 1711106246
Ratio : 010:1
Backlash: ≤ 5 ARCMIN

3.2 Ordering code

The order code for an Apex Dynamics gearbox is structured as follows:

AF140(1)-010-S1-P2-(2) /SERVOMOTOR

Series
Size
Input shaft option(1)
- Empty = standard input diameter
- M1/M2 = larger input diameter

Ratio
Output shaft*
- S1 = smooth shaft, without keyway
- S2 = with key and keyway
- S3 = spline shaft DIN5480
- S4 = hollow shaft

Backlash**
- P0 (see product documentation)
- P1 (see product documentation)
- P2 (see product documentation)

Lubrication(2)
- Empty : Standard lubrication (Gel)
- FG : Food Grade (NSF-H1 approved)
- MT : Grease
- LT : Low Temperature Grease

/SERVOMOTOR
- Brand and type of the servomotor to be mounted

* AE/AER series is always with keyway
** AE/AER series have a fixed backlash class

4. Storage, packaging, transport and disposal

4.1 Storage

The gearboxes must be stored dry and in original packaging.
Storage temperature, -30 ° C ~ + 60 ° C. Try to keep the storage time as short as possible.

4.2 Packaging and transport

The gearboxes are packed in polystyrene or polyurethane foam filling, which means that they are fully protected against transport damage during normal use.

- Never drop a gearbox!
- Transport a gearbox only in the original packaging!
- Protect the packaging and its contents against moisture!

4.3 Disposal

Always follow the applicable regulations when removing gearboxes!
Consult the local authority or local regulations for this.

- Housing parts, gears, shafts and bearings of the gearboxes must be disposed of as steel scrap. This also applies to the aluminum parts, insofar as there is no separate collection.

- Collect used lubricant and dispose it accordance within the applicable regulations.

5. Assembly and commissioning

5.1 Assembly in general

For correct operation and optimum service life, the following instructions must be carefully observed:

- Ensure that the gearbox has sufficient convection.
- Take care that the gearbox can dissipate sufficient heat through the output flange.
- A motor or other external heat sources can heat up the gearbox. Therefore always inquire with the manufacturer / supplier about the occurring motor temperatures.
- Always observe the applicable restrictions regarding the protection class (see Chapter 3.).

5.2 Mounting the gearbox to the motor

The input side of the gearboxes is protected against corrosion, always ensure that this protective layer is removed before assembly (degrease).

Always use the correct tools when mounting the motor on the gearbox.

Mount the motor according to the correct installation manual.

- An English-language mounting manual is supplied with every gearbox.
- Mounting instructions in other languages can be downloaded on: www.apexdyna.nl or www.apexdyna.com.
- Below a table is shown with the recommended tightening torques for mounting bolts. Apex Dynamics uses quality class 12.9.

Bolt size	Wrench width	quality class 8.8 Tightening torque (Max.)		quality class 10.9 Tightening torque (Max.)		quality class 12.9 Tightening torque (Max.)	
	[mm]	[Nm]	[In-lbs]	[Nm]	[In-lbs]	[Nm]	[In-lbs]
M3 x 0.5P	2.5	1.3	12	1.8	16	2.1	19
M4 x 0.7P	3	3	27	4.1	37	4.9	44
M5 x 0.8P	4	6.1	55	8.2	73	9.8	87
M6 x 1P	5	11	98	14	124	17	151
M8 x 1.25P	6	25	222	34	302	41	364
M10 x 1.5P	8	49	434	67	594	80	709
M12 x 1.75P	10	85	753	116	1028	139	1232
M14 x 2P	12	137	1214	186	1648	223	1976
M16 x 2P	14	210	1860	286	2534	343	3038

5.3 Mounting the gearbox in an application

The gearboxes from Apex Dynamics can be installed in any position.

The following must be taken into account when mounting the gearbox:

- Always use the right tools and aids.
- Check if the gearbox is undamaged (no damage due to transport or storage). In particular the output shaft, seals and mounting surfaces.
- Ambient temperature within the specification of the gear unit.
- Output shafts and flange surfaces must be thoroughly cleaned with anti-corrosion agents. Ensure that solvents do not come into contact with seals.
- Tighten fixing materials in accordance with the applicable regulations (see also table with tightening torques in section 5.2).
- Ensure proper alignment of the output shaft.
- Applied transmission elements (like a coupling) must be balanced and may not cause inadmissible radial and / or axial forces.
- For timing belt pulley applications follow the specifications of the timing belt supplier. Be aware of excessive radial forces, always check timing belt tension with appropriate measuring equipment

5.4 Operation (commissioning)

Always allow the gearbox to run in first (trial run). Increase the load and circulation speed in two to three steps up to the maximum.

Pay attention to the following at a in run or trial run:

- Always check the maximum permissible input speed and torque when starting up.
- Is the gearbox running smoothly?
- Are vibrations or unusual running noises occurring?
- Is there any leakage at the in- and output side of the gearbox?
- Check whether the housing temperature remains within the specified specification.

6. Maintenance

6.1 General

All gearboxes from Apex Dynamics are lubricated for life, replacement / additional lubricant is therefore not necessary within the specified lifespan. The gearboxes are maintenance-free, to guarantee the service life it is important to regularly check the gearboxes.

➡ Check the seals for leakage at least after every 2,500 operating hours or every six months.

➡ Regularly check whether the housing temperature remains within the specified specification.

7. Malfunctions

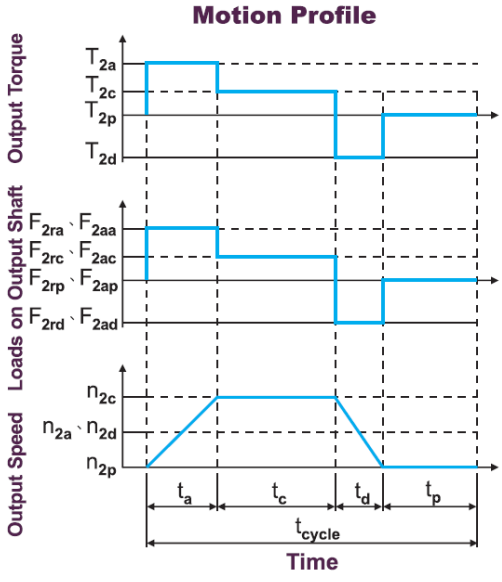
7.1 General

Contact Apex Dynamics BV in the following situations:

- Irregular or extreme noise
- Temperature increase
- Leakage

We always need the following information for a malfuntion message:

- Full type number, with serial number and mounted motor.
- Clear description of the malfunction.
- Environmental conditions during and before the malfunction report.
- Application data:
  - Kind of application
  - Motion profile
  - Torques (nominal and maximum)
  - Radial and axial load
  - Continuous (S1) or cyclic (S5) operation



8. Service

8.1 General

Gearboxes from Apex Dynamics are generally not overhauled.
A gear unit is made up of various components that have been run into each other, so replacing or overhauling individual components is not an option.

8.1 Contact data

For questions and / or problems you can contact Apex Dynamics BV.

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