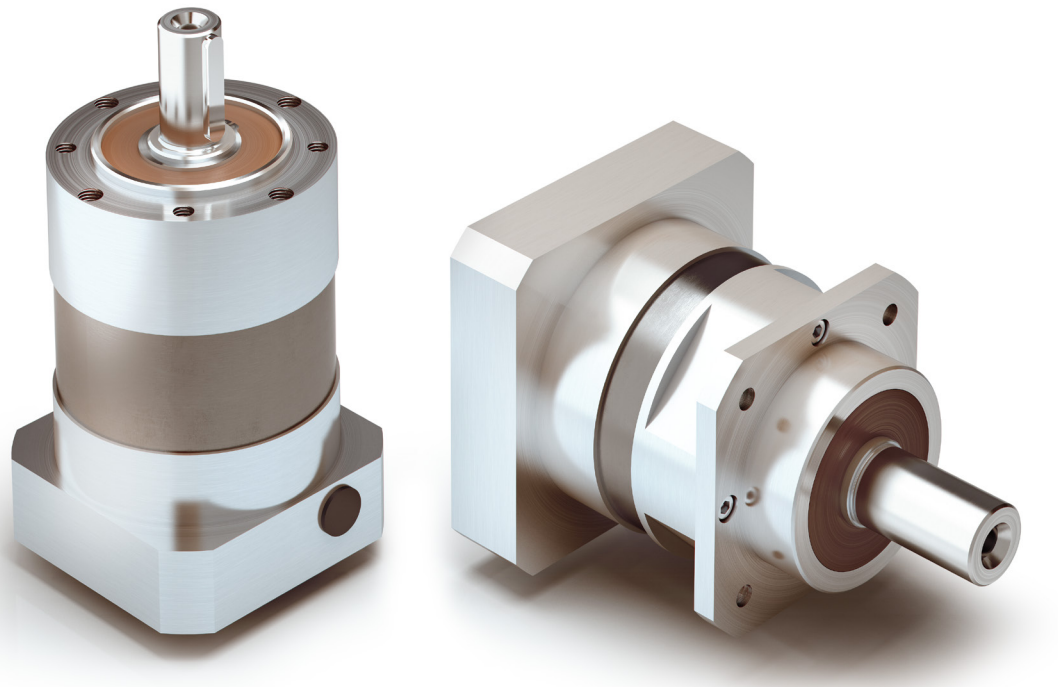


Antriebssysteme

Betriebs- und Wartungsanleitung
Servo-Planetengetriebe
Serie: APG / APGS

Operating and maintenance instructions
servo planetary gearbox
Type: APG / APGS
(Translation from the German original)

Inhalt

Important basic information

1. Use of the documentation

We ask that you read these operation instructions
carefully before commissioning the device and observe all directions.
These operating instructions thoroughly explain
how to carry out the operation, and provide you with important directions for use, maintenance, and care. These instructions may also include information which is not relevant to the configuration of your gearbox. Any claims for defects for damage arising from operating errors or improper use shall not be recognised. Ensure that this documentation is available in a legible condition. Make sure that those responsible for the installation and operation, as well as persons who are working with the product independently, have fully read and understood the documentation. Should you require any clarification or additional information, please contact Atlanta KG.

1.1 Change Index

Index	Date	short sign	change

1.2 Description, designation

The Atlanta planetary gearbox type APG and APGS shall henceforth simply be referred to as gearbox.

1.3 Structure of the safety notes

1.4 Symbols and signal words

The following table shows the grading and significance of the signal words of the warnings

symbol / signal word	meaning
⚠	Point out the handling and impact of safety information.
⚠ **DANGER**	Draws attention to an imminent threat that will result in a fatal injury or death if not avoided.
⚠ **WARNING**	Draws attention to a dangerous situation that can result in a fatal injury or death if not avoided.
⚠ **CAUTION**	Draws attention to a dangerous situation that can cause a mild to moderate injury if not avoided
NOTICE	Draws your attention to possible damage to property and other important information.

1.5 Structure of safety instructions

	**symbol / signal word**
	type of hazard • the possible hazard if you disregarded the safety instructions ▪ all protective measures you need to take so you will not be harmed

1.6 Hazard symbols used

Hazard symbol	Meaning
	General hazard
	Warning of hot surfaces
	Warning of risk of crushing
	Warning of risk of hand crushing
	Warning of dangerous electrical voltage
	Warning of rotating parts
	Warning of environment pollution
	Warning of explosive atmospheres

1.7 EC Machinery Directive

In accordance with the EC Machinery Directive 2006/42/EC, the gearbox are not machines but rather components to be integrated in machines. Within the scope of application of the EC Machinery Directive, commissioning is prohibited until it has been determined that the machine in which the gearbox will be installed complies with the provisions of the EC Machinery Directive.

1.8 Risk analysis

We strongly recommend that you carry out an analysis of all risks associated with the entire machine or installation after the project development and at the latest after the installation of the gearbox.

1.9 Changes, modifications

Changes or modifications to the gearbox must only be carried out with explicit, written permission from ATLANTA KG.

1.9.1 Technical changes

ATLANTA KG reserves the right to make technical changes in order to improve the product

1.9.2 Disclaimer

Observe the information contained in this document. Incorrect handling or other handling which does not conform to this documentation will adversely affect the properties of the product. The manufacturer is not liable for damage or injuries arising from incorrect use of the gearbox.
Non-compliance with this documentation shall lead to the forfeiture of any material guarantees made by ATLANTA KG.

2. Safety

2.1 Intended use

NOTICE	The gearbox must only be used for speed and torque conversion in mechanical and plant engineering under atmospheric conditions. Point 2.3 Areas of application defines the operating conditions and limits under which the gearbox can be operated.

2.2 Improper use

NOTICE	Uses which fall outside of limits specified in Point 2.3 Areas of application are considered improper and are prohibited. Operating the gearbox is prohibited when: ● It has not been installed correctly (e.g. mounting of the motor) ● It has not been fastened correctly (e.g. fixing screws) ● The gearbox is heavily soiled ● It is operated without lubricant

2.3 Area of application

- The gearbox must not be operated outside or under water.
- Depending on the size, the gearbox is designed for a max. input speed of 6000rpm on the input shaft. Driving via the output shaft is not permitted without written permission from ATLANTA KG
- The gearbox is designed for intermittent operation (S3 according to DIN EN 60034-1)
- Continuous operation (S1 according to DIN EN 60034-1) is not permitted without written permission from ATLANTA KG. The continuous operation is defined by the duty cycle. If it is higher than 30% or longer than 20 minutes on a unit, this constitutes as continuous operation
- For input speeds of 6000rpm and continuous operation, the gearbox must not exceed a housing temperature of 60°
- The permissible input speed and the output torque, as well as the permissible additional forces must not be exceeded. The design principles specified in the Atlanta catalogue must be observed. The maximum permissible data can be found in our catalogue or on our website: http://www.atlantagmbh.de
- The gearbox must not be exposed to the following environmental conditions:

- Explosive atmospheres,
- Oils
- Acids
- Gases,
- Vapours
- Radiation

- The ambient temperature must be between -10 °C and +40 °C, in accordance with the lubricants used. For ambient temperatures outside of the permissible range, please contact ATLANTA KG
- The gearboxs must only be operated if sufficient heat dissipation is available to prevent a build up of heat
- In pressure ranges outside of 0.9-1.1 bar ambient pressure
- Use in the Ex area is prohibited unless expressly intended for this purpose

2.4 Reasonably foreseeable misuse

Any operations which exceed the permissible input speed, output torque, or additional forces are not permitted.

2.5 Staff requirements

General hazards

The gearboxs could result in residual risks to persons or equipment. For this reason, all assembly, installation, commissioning, and maintenance work must be carried out by trained and qualified personnel only, who know the possible risks.
All work must be carried out by persons who, due to their expert knowledge as a result of professional training, experience and recent work, have a reliable understanding of safety-related matters. The qualified persons must possess state-of-the-art knowledge with regard to the task being carried out and the hazards to be considered, and they must adhere to these.
They must possess the required qualification for the job and be familiar with the assembly, installation, commissioning, and operation of the product. The operation instruction and particularly the safety notices must be read thoroughly, understood, and observed for this purpose.

Risk of electric shock

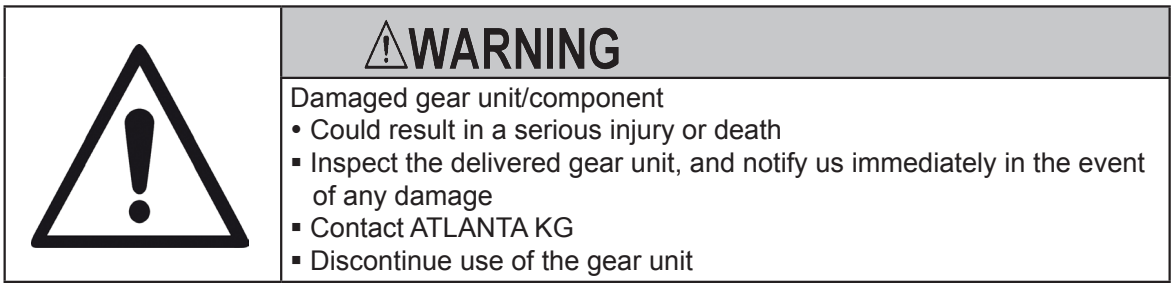
Work on the electrical equipment must only be carried out by a qualified person, and this person must possesses state-of-the-art knowledge with respect to the task being carried out as well as the possible hazards, and they must adhere to this.

	mechanic(2)	electrican (2)	carriers (2)	trainees (3)	hird-parties (3)
Transport			X		
assembly	X	X			
Installation	X	X			
storage	X	X	X		
Disposal	X	X	X		

1) possibly unskilled, possibly inexperienced
2) qualified or instructed person
3) no education, no experience, lack of risk awareness

2.6 Transport

No special drill holes or threads are provided to transport the gearbox. If required, we recommend the use of transport straps.
Place the transport straps as tight and flat as possible around the gearbox. Secure the straps so that the gearbox cannot slip out of them.
Use adequately dimensioned transport and loading mediums.
Observe the safety specifications during transport and lifting.



2.7 Observation of installation instructions

Read these Operating and maintenance instruction carefully and thoroughly before assembling or operating the gearbox. It contains everything you need to know to avoid personal injury and property damage, so that assembly can run smoothly and damage to the environment can be avoided.
Pay careful attention to all safety instructions and other indications, requirements, and information in these assembly instructions.

2.8 Residual risks and protective measures

An overview of all residual risks and protective measures that apply to these installation instructions.

⚠WARNING

Crushing / impact
- Could lead to a serious injury or death
- Secure the gear unit against falling
- Secure the gear unit against unintentional start-up

⚠WARNING

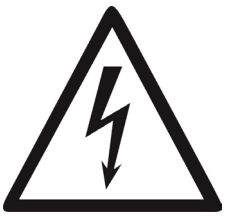
Entanglement / entrapment
- Could lead to a serious injury or death
- Make sure there is sufficent room between you and the moving gear
- Secure the gear against unintentional start-up
- Only carry out work on the machinery when it is fully stooped
- rotating parts must be covered using suitable protection casings

⚠DANGER

Flying debris
- Could lead to a serious injury or death
- Secure the gear unit against unintentional start-up
- Only carry out work on the machinery when it is fully stopped
- Rotating parts must be covered using suitable protective casings
- Secure the parallel keys against being flung out

⚠CAUTION

Hot surface
- Could lead to a mild or moderate injury
- Do not touch the gear units if they have high operating temperatures, or use suitable protective equipment, e.g. gloves
- Allow the gear unit to cool before carrying out any assembly or maintenance work
- The surface temperature during operation must not exceed the temperature specified under Area of application
- Avoid misalignments, as these could lead to increased operating temperatures
- Before mounting, - Maintenance work on the gearbox must be allowed to cool down



⚠DANGER

Electric voltage
- Could lead to a serious injury or death
- Work must only be carried out by qualified personnel
- Observe the general safety regulations for electrical engineering

NOTICE

Warning regarding environmental contamination
- Lubricants (oils and grease) are hazardous materials which could contaminate soil and water
- Prevent the lubricants from entering drains, sewage systems and open bodies of water
- Collect discharged lubricant in suitable containers and dispose of it according to the currently valid national regulations and specifications

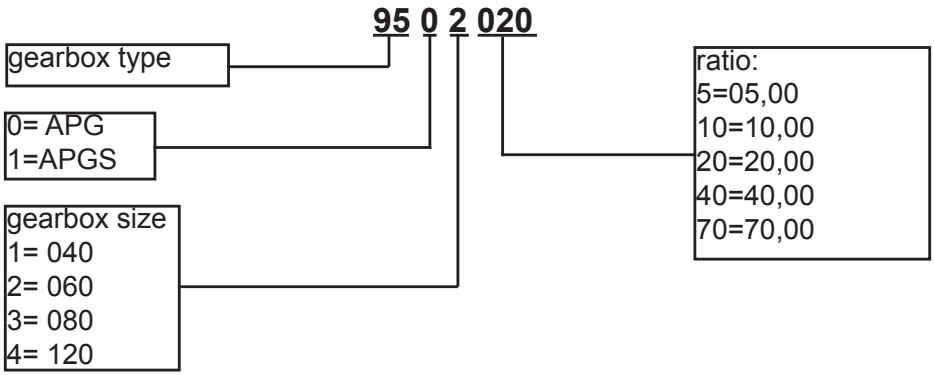
3. Technical data

3.1 Short description

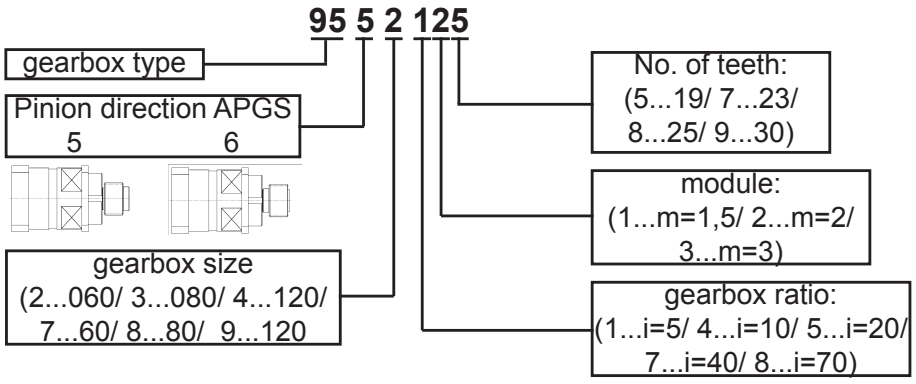
The low-backlash gearbox is suitable for use in tool machines as well as robot, handling, and automation equipment. It is characterised by low-backlash toothing in conjunction with the steel ring gear.
The light metal housing enables an optimal heat dissipation. The slip ring sealed bearings of the gearbox are designed for a maximum input speed of up to 6000min-1 (short term).
The lubrication of the gearbox is adjusted so that they can be operated in any installation position.

3.1 Article number

APG / APGS WITHOUT pinion
The article number is made up as follows:
Example APG servo planetary gearbox, size = 80 mm, with gear reduction 20

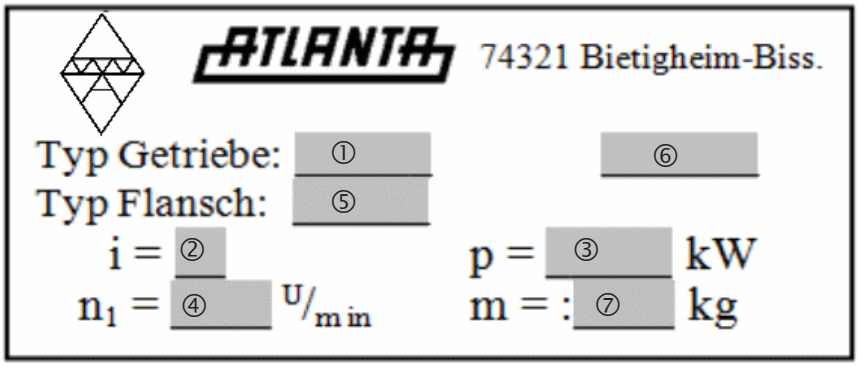


APGS with Pinion
The article number is made up as follows:
Example APG servo planetary gearbox, size = 80 mm, with gear reduction 20, with pinion teeth = 19 module =2



3.3 Label

The gearbox is labelled with a type sign (see below) which specifies the gearbox type, the ratio, the max. output for S3 operation, the max. revolutions per minute for S3 operation, the mounting date and the serial number of the gearbox.



① Gearbox
② ratio
③ max.output for S3 operation
④ max.speed for S3 operation
⑤ Motor flange type
⑥ Serial number
⑦ Total weight

3.4 Noise emission

Despite endeavouring to construct low-noise gearbox, the gearbox can reach running noises of around 70 dBA at the top speed and under a full load

3.5 Protection class (IP code)

The gearbox have the protection class IP 54 in conformity with DIN 40050 (protection against corrosion must be considered separately).

4. Delivery, internal transport, unpacking

⚠WARNING

Waring supended loads
- Could lead to a serious injury or death
- Observe the safety instructions for transport with lifting devices
- Wear personal protective equipment
- Use suitable lifting devices

4.1 Delivery, internal transport

The gearbox are packaged for transport in cardboard boxes.
It is advisable to not remove the outer packaging of the gearbox until at the operation site.
No special drill holes or threads are provided to transport the gearbox. If required, we recommend the use of transport straps
Place the transport straps as tight and flat as possible around the gearbox. Secure the straps so that the gearbox cannot slip out of them
Use adequately dimensioned transport and loading mediums
Observe the safety specifications during transport and lifting
Make sure that the load is handled slowly and carefully and set down

4.2 Weight including packaging

gearbox	weight in kg (without motorflange)
APG 040	0,5
APG 060	1,3
APG 080	3,1
APG 120	5,8
APGS 060	1,45
APGS 080	3,2
APGS 120	7,9

4.3 Unpacking

⚠CAUTION

Cutting injuries
- Could lead to a mild or moderate injury
- Take suitable protective measures
- Wear suitable gloves

Remove the delivery content from the transport and unpack the outer packaging.
Remove the transport packaging and outer packaging carefully.
Use a suitable tool to open the packaging.
- Check the delivery for completeness.
- Check the delivery for damage.

If the delivery is incomplete or damaged:
Document any damage/missing parts and notify the transport company.
Notify Atlanta KG in writing about any damage/missing parts
For the disposal of the packaging, observe the current national regulations!
If applicable, dispose of individual parts separately depending on their composition and existing country-specific provisions.

4.4 Storage

If the gearbox is not installed immediately after delivery, the following measures must be taken:
- To store the gearbox, keep it in the packaging and observe the following specifications
- Store the gearbox with a horizontal hollow output shaft, so that there is no contact with other objects.
- Store connecting parts such as the coupling or pinion shaft separately.
- Protect steel components against corrosion.
- Protect the gearbox from environmental influences (ozone, UV light, electrofusion, dust, dirt, humidity, temperature fluctuations [0°C to +30°C], vibrations, etc.).
- We recommend the ‚first in, first out' principle for storage logistics.
- Occasionally turning the input shaft of the gearbox benefits the commissioning
- The maximum storage time under these conditions is two years.

5. Assembly and installation

5.1 Assembly preparation

⚠CAUTION

Danger of injury due to incorrect assembly
- Could lead to a mild or moderate injury
- Only carry out work on the gear unit when it is fully stopped
- Do not install damaged or soiled gear units

- Check the gearbox for external damage or soiling.
- Damaged or soiled gearboxs must not be installed or operated.
- Check the specifications on the nameplate against the order.
- Please check whether the gearbox is suitable for your application. Please note the section Areas of application.
- For assembly in the industries related to food, chemicals, and pharmaceuticals, the corresponding national and international regulations must be considered.
- In order to compensate for any linear shaft expansions, sufficient axial clearance must be provided for the shaft ends in the coupling.
- All parts to be mounted on the shaft ends must not be raised in a manner that will subject them to shock and impact, but rather, they must be properly raised using thread centring in the shaft ends and any relevant attachments.
- If the gearbox is operated without an output element, then the parallel keys must be secured against being ejected.
- To avoid accidents, the corresponding shaft and coupling covers in accordance with accident prevention regulations must be supplied.
- Before assembly, all shaft and contact surfaces of the adjacent components must be free of corrosion inhibitors and soiling
- The gearbox, especially the area of the seals, must not be used with sharp-edged objects and cleaning fluid to be cleaned.

5.2 Tightening torques

Only use the screws supplied. The use of incorrect screws could result in damage to machinery or human injuries. All screw connections that tightening torques are given for must be tightened and verified using a calibrated torque wrench.
When using the torques according to the company‘s own standard, which provides for utilisation of 90% of the yield strength of the screw, a suitable washer/bushing must be used
The tightening torques can be found in relevant, well-known tables. Should DIN EN ISO 4762 screws be used, then you can use the following table:

for the countersunk holes:

Hexag. socket-head screws DIN EN ISO 4762 Strength class 8.8 /aluminium housing	M4	M5	M6	M8	M10	M12	M16
Tightening torque in Nm *)	2,8	5,6	9	21	42	49	125
Tightening torque in lbf in *)	25	50	81	186	371	433	1105

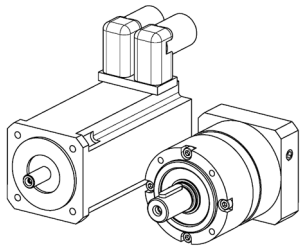
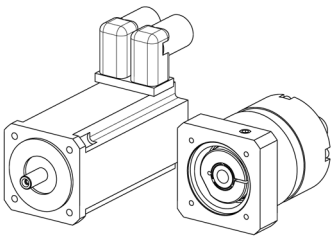
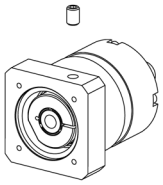
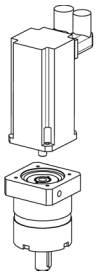
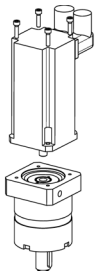
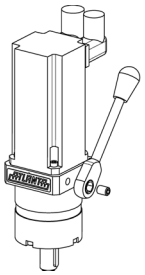
for the threaded holes:
(Effective length of thread min. 1.5 x dnenn / contact surface with at least 500N/mm² limiting sur-face pressure)

Hexag. socket-head screws DIN EN ISO 4762 Strength class 8.8	M4	M5	M6	M8	M10	M12	M16
Tightening torque in Nm *)	3	5,9	10	25	48	84	205
Tightening torque in lbf in *)	26,5	52	88	221	424	743	1813

*) Use only calibrated torque wrenches! If the tightening torque is too low, the required torque will not be transmitted. If the tightening torque is too high, the screws will be overstrained and become unusable.

5.3 Mounting the motor

Motors with longer shafts than those permitted for the respective gearbox lead to tensions during assembly which will damage the motor and the gearbox. Check the interfering edges by measuring or by dimensional inspection based on our catalogue information and the specification of the motor manufacturer.

<table>
<tr>
<td> 
DIN 42955-N
Correct motor (without feather key), correct gear unit</td>
<td> 
Clean and oil/grease all contact surfaces.
Remove any damage.</td>
</tr>
<tr>
<td> 
Position the clamping screw, open the clamping screw</td>
<td> 
Preferred assembly in a vertical position
Insert the motor in the gear unit</td>
</tr>
<tr>
<td> 
The motor flange must fit on the gear unit flange. Tighten the screws according to the general table using a cross-head</td>
<td> 
Tighten the clamping bolt in the clamping hub with top torque
Close the sealing plugs</td>
</tr>
</table>

Gear un	screws DIN EN ISO 4762	Tightening torque for clamping screw in Nm *)	Tightening torque for clamping screw in lbf in *)
APG 040	M4x12-10.9	3,5	31
APG 060	M5x14-12.9	6	53
APG 080	M6x20-10.9	9	81
APG 120	M8x20-10.9	11 (shaft diam. Ø14) 20 (shaft diam. Ø19)	97,5 177
APGS 060	M6x20-10.9	9	81
APGS 080	M6x20-10.9	9	81
APGS 120	M8x20-10.9	11 (shaft diam. Ø14) 20 (shaft diam. Ø19)	97,5 177

*) Use only calibrated torque wrenches! If the tightening torque is too low, the required torque will not be transmitted. If the tightening torque is too high, the screws will be overstrained and become unusable.

5.4 Maximum permissible motor weight

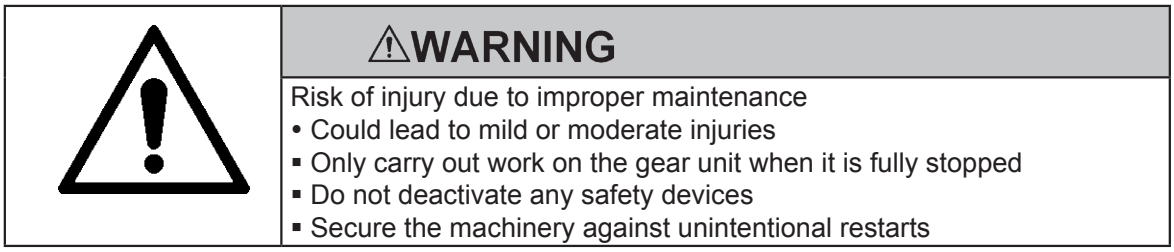
for horizontal and stationary installation position

Gearbox	max. motor weight in kg
APG 040	2
APG 060	3,5
APG 080	9
APG 120	16,5
APGS 060	3,5
APGS 080	9
APGS 120	16,5

6. Commissioning

- Before operating, ensure that the following requirements are met.
- Observe the safety instructions in the individual chapters.
- Check that the gearbox and components are correctly attached.
- Check that the gearbox and components are correctly oriented.
- Check that the lubrication level is correct before commissioning! The lubricant fill levels can be found in the Maintenance chapter.
- Before commissioning, make sure that the monitoring and protective equipment has not been decommissioned; this also applies to test operation.

7. Maintenance



⚠WARNING

Risk of injury due to improper maintenance
- Could lead to mild or moderate injuries
- Only carry out work on the gear unit when it is fully stopped
- Do not deactivate any safety devices
- Secure the machinery against unintentional restarts

7.1 Maintenance intervals

If operated correctly and in accordance with the catalogue, the gear box are designed for 20,000 hours of operation. Exceptions to this are the wear parts such as the bearings and the shaft seals.
The following maintenance tasks must be carried out.

After 5,000 machine hours or at the latest after 6 months:

- Check operating noise for possible bearing damage.
- Visual inspection of the seals for leaks. Should any leaks be found, then please contact ATLANTA. KG.

After 10,000 machine hours or at the latest after 24 months:

- Under normal operating conditions, grease serves as permanent lubrication. If operation is continuous, then we recommend changing the grease every 10,000 machine hours

7.2 Lubrication

NOTICE	NOTICE
	Lubricants • Could lead to mild or moderate injuries or cause property damage ▪ Long, intense contact with synthetic lubricants could lead to skin irritation ▪ Synthetic lubricants must not be mixed with mineral lubricants ▪ Mixing different lubricants may impair its their effectiveness. This could result in damage to the gear unit ▪ Mineral lubricants reduce the transferable power and must not be used without consulting ATLANTA KG

For general applications:

Manufactur	Lubrication	Internet adress
Castrol	Castrol Longtime PD 0 Konsistenz „0“ nach DIN 51818	www.castrol.com

7.3 Replacing the lubricant

In order to replace the lubricant, a repair and inspection is required at the factory.

7.4 Shaft seals

Shaft seals provide a seal for the gap between the housing and the rotating shafts. They are wear parts whose replacement is required after reaching the wear limit. The service life of the shaft seals is influenced by numerous parameters, which include:

- Peripheral speed at the sealing lip
- Temperature
- Internal pressure of the gearbox
- Lubricant viscosity
- Chemical composition and additives in the lubricants
- Installation condition (supply of lubricant for the sealing lip)
- Particle or metal abrasion in the lubricant
- Shaft seal material
- External contaminants
- Damage during replacement

These numerous influencing parameters make it practical impossible to provide an exact service life estimate without carrying out specific tests on an individual basis. As the service life of the shaft seals is subject to the aforementioned deviations, regular monitoring is absolutely necessary. This is the only way to prevent an unnoticed loss. When renewing the shaft seal, the condition of the sealing lip contact surface on the shaft must also be checked. If there are run-in marks, the shaft must be repaired or replaced. Alternatively, the shaft seal can easily be mounted axially displaced, so that the sealing lip runs in a new condition

8. Cleaning

	NOTICE
NOTICE	Cleaning • Could lead to property damage ▪ Cleaning with high-pressure cleaners is not permissible as this would destroy the sealing rings, enabling water to enter the gear unit, which would lead to premature failure of the gear unit ▪ Cleaning with solvents or cleaning agents is only permissible following confirmation from ATLANTA ▪ After cleaning the gear unit, it must be equipped with corrosion protection again

9. Repair

Should any faults arise during the warranty period which require repairs on the gearbox, then these repairs may only be carried out by ATLANTA KG. We recommend that you

10. corrective maintenance

Please inform us if you are sending us the gearbox for repair
To info@atlantagmbh.de or 07142-7001-0 to discuss the next steps with
You
We will require the following information in advance:

- Nameplate data (complete)
- Type of fault
- Presumed cause
- If possible, digital pictures

Delivery address for the repair
Atlanta Antriebssysteme
E.Seidenspinner Gmbh&Co.KG
Adolf- Heim-Straße 16/18
D-74321 Bietigheim-Bissingen

11. Fault list (troubleshooting)

⚠WARNING

Troubleshooting
- Could lead to a serious injury or death
- Observe the general primary residual risks
- Only carry out work on the machinery when it is fully stopped
- Do not deactivate any safety devices
- Secure the gear unit against unintentional restarts

fault	Possible cause	Measure
Increased noise during operation	Tension noises	Flange connection does not conform to DIN 42955-R
	Metallic grinding noise	Bearing damage Contact us
		Damage to gear-tooth system Contact us
	Gear unit attachment is loose	Tighten screws/nuts with the prescribed torque. Replace damaged screws/nuts
Loss of lubricant	Leaking	Defective seal Contact us
	Apparent leak	Humidity in the seal gap Temporary leakage due to high grease levels between the sealing and protective lip. The excess grease can seep out as an apparent leak.
Increased temperature during operation	Motor heats up the gear unit	Check the technical data. Avoid heat transfer
	Surrounding temperature too high	Provide sufficient cooling
	Weak dimensioning Speed/torque too high	Check the technical data

12. Disposal

Please observe the current national regulations!
If applicable, dispose of individual parts separately depending on their composition and existing country-specific provisions, e.g. as:

Steel scrap

- Gear wheels/toothed racks
- Shafts (hollow shafts)
- Roller bearings
- Castings
- Couplings

Aluminium scrap

- Housing parts
- Adaptor parts

Bronze scrap

- Worm wheel (separate from hollow shaft)

Old oil (dispose of it properly)

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