# Assembly Instructions and EC Declaration of Incorporation




ATEK
ANTRIEBSTECHNIK
Das Winkelgetriebe

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The assured characteristics of our gearboxes as well as the fulfillment of possible warranty claims require the observance of these instructions. Therefore read through the assembly instructions carefully, before you work on the gearbox or put it into operation.

Current information and changes can be found on our homepage.
Subject to technical modifications. Date: August 2017



## 1 Safety Instructions

The following basic safety instructions serve to avoid personal injury and damage to property. The owner/operator must ensure, that the basic safety instructions are observed and complied with. Verify, that persons responsible for the system and the operation as well as those persons who work on the device on their own responsibility, have read and understood the documentation completely. If anything is unclear or if further information is required, please contact us The work concerning the transport, storage, installation/assembly, commissioning, servicing and maintenance may only be performed by qualified specialist personnel.

To be observed thereby:
- the information contained in these instructions
- the type plate on the gearbox
- the system-specific provisions and requirements
- as well as the national / regional regulations for safety and the prevention of accidents.
- that, during all work, the personal protective equipment (e.g. safety shoes, gloves, safety glasses) is to be worn.

Qualified operating personnel are persons who have an appropriate professional qualification, and are familiar with the execution of the work specified above.

Serious personal injuries and property damage can occur due to

- improper use
- incorrect installation or operation
- prohibited removal of the necessary protective covers.

### 1.1 Safety- and Information Signs



This symbol indicates a general danger.



This symbol indicates a danger due to electric current.



This symbol indicates danger due to rotating parts.



This symbol indicates hot surfaces.



Warning of harmful or irritating substances.

## 2 Use in accordance with specifications

ATEK gearboxes are incomplete machines in the sense of the Machinery Directive 2006/42/EC. They are intended for installation in machines, and with the performance values specified in the ATEK catalogue, are intended exclusively for the redirection and change of the torque / speed respectively.

## 3 Type designation

For the explanation of the type designation, refer to the type-specific manual. The character sequence /0000 stands for the standard version. Deviating numbers identify special versions. The type of the special version is explained in the order text.

## 4 Upon receipt of the delivery

- Comparison with the delivery documents
- Inspect packaging for possible damage
- Report damaged packaging or goods to the transport company and ATEK immediately

## 5 In-house transport

Use approved and adequately dimensioned transport equipment, such as slings, ring bolts etc.

Basically, damaged gearboxes must not be used. A fall from a great height can lead to damage inside the gearbox and consequently to a potential hazard.



**Attention!** When removing the transport protection mechanical hazards can develop, such as crushing, shearing, impact, cutting.



**Attention!** Mechanical hazards such as crushing, shearing, impact can occur if the machine falls down.

## 6 Storage

To be observed during storage:

- Positioning appropriate for the structural shape
- Closed rooms without great fluctuations in temperature, which are free of vibrations, cool, dry, ozone-free and moderately aerated
- No direct sunlight on the gearbox
  0149 Temperatures below –10°C and above +35°C reduce the sealing quality over the long term
- Do not store any solvents, fuels, lubricants, chemicals, acids, disinfectants, rubber solvents in close proximity.
- A prime coat is not sufficient as long-term conservation

## 7 Colouring

If the colouring cannot be carried out by Atek, then the radial shaft seal rings and vent filter are to be protected against the effect of solvents, hardeners and paint. Painted radial shaft seal rings dry out and represent a considerable damage potential. For subsequent lacquering the vent filter resp. the vent valve is definitely to be protected against the penetration of paint without fail.

## 8 Conversions and modifications

The gearboxes must not be modified either constructively or safety-related without our consent. Any unauthorised modification in this regard will exclude any liability.

## 9 General assembly instructions for all gearbox types

### 9.1 Assembly preparations

- Do not clean contamination with sharp-edged objects, wire brushes or emery paper
- Do not clean seals with solvents or aggressive chemicals
- Inspect sealing ring seats of the shafts for damage in the form of scratches, contamination or rust deposits
- Installation positions result from the designation of the gearbox sides, whereby the side situated below is specified as installation position
- Only mount the gearbox in the ordered installation position, free of distortion and stress on a vibration-damping, torsionally rigid foundation

### 9.2 Requirements on the installation space

- Ensure for adequate installation space with sufficient air circulation
- Avoid heavy pollution in the air (insofar as the seals are not coordinated for this)
- Do not undertake any enclosure or panelling of the gearbox without consultation
- The influence of abrasive or chemically aggressive substances on the seals is to be avoided in the interest of the service life

### 9.3 Venting

If a venting of the gearbox is provided, the screw plug must be removed (sealing during transport) and replaced by the supplied vent filter. On vertical gearbox walls the vent filter is screwed into the elbow included in the scope of supply.



**Attention!** Hazards can develop due to substances when removing the screw plug. Lubricants must not be swallowed or get into the eyes.

If a vent filter is provided and the gearbox is operated without it, damage to the seal can occur as a result of the overpressure and cause an impermissible loss of oil. The operator must ensure, that the venting is protected against deposits and that an adequate air exchange is enabled.

### 9.4 Gearbox attachment

When installing the gearbox, an even support on a level, vibration-damped and torsion-free substructure is to be ensured, in order to ensure a stress-free assembly.



**Attention!** Mechanical hazards can develop when positioning the machine, such as crushing and shearing.

### 9.5 Motor connection



**Attention!** Risk of death during the opration of motors or gearbox motors from live bare parts (in the case of open connector / terminal boxes), if applicable also moving or rotating parts as well as hot surfaces.

- Carry out motor connection according to wiring diagram
- Ensure conformity of mains voltage and frequency with the type plate data
- Establish a secure protective conductor connection
- Correct a possible false rotational direction by exchanging 2 phases
- Seal cable entry openings not required and the terminal box itself dust- and watertight
- Prevent overloading and phase failure with circuit breakers

### 9.6 Assembly of the attachments

Attachments on the output shaft such as toothed wheels or toothed belt pulleys are to be mounted without force. They must not be mounted by means of driving or knocking under any circumstances. Use only suitable tools or devices. When using clamping elements the admissible tightening torques of the clamping elements are to be observed. For this refer to the assembly sheet for clamping sets. The starting torque is to be applied step by step and evenly in turn.

With shrink connections, the attachments are also to be secured axially. Align shaft- and flange connections very carefully, thereby, if possible, observe the reduced tolerance range from DIN 42955.

Make sure, that the forces acting on the output shaft (e.g. due to belt tension) do not exceed the permissible forces.

Attachments, flanges or the foundation must not cause any heating of the gearbox above 90°C

### 9.7 Commissioning

“The gearbox must not be put into service until it has been ascertained, if appropriate, that the machine into which the gearbox is to be installed complies with the Directive 2006/42/EC”.

It is to be checked before commissioning, whether:

- Lubricant is present.
- All screws have been firmly tightened and rotating parts have been secured against coming loose.
- The coupling of the drive- and output shafts does not generate any inadmissible lateral forces and torques.
- If a vent filter is provided, then it is to be checked whether it has been fitted.

If possible a no-load test run is to be performed. Thereby the running noises and the temperature development are to be observed.



**Attention!** Mechanical hazards may occur, such as being pulled in, caught and being grabbed by rotating parts.



**Attention!** Mechanical hazards can occur through contact with hot surfaces.

In the event of abnormal noises or vibrations, the commissioning is to be aborted and the service department is to be contacted. The same applies for gearboxes that have not been designed for temperatures above 90°C, but exceed this temperature.

### 9.8 Lubrication

Please observe any possible instructions on the type plate of the gearbox!

Gearboxes with permanent lubrication are provided with the necessary quantity of lubricant at works, and are maintenance-free under normal operating conditions.

An oil change is also necessary, if a substantial amount of lubricant has escaped due to leakage. You can ask our service department about the quantity and grade of oil. You need the serial number of the gearbox for this.

As a rough guide value of the filling quantity the following can be assumed:

- for bevel gearboxes
  the middle of the horizontal shaft,
- for worm gearboxes
  the middle of the gear meshing.



**Attention!** Hazards can develop due to substances when filling the machine. Lubricants must not be swallowed or get into the eyes.

### 9.9 Maintenance

All ATEK drive units require only a minimum of maintenance. On gearboxes with lifetime lubrication, it is restricted to the regular inspection for lubricant losses due to leaks, the visual inspection of the condition of the seals and, if necessary, temperature measurements.

Please note, that any warranty claim will expire if the gearbox is opened. Therefore, during this period the gearboxes should only be opened at ATEK or following approval by ATEK.



**Attention!** All maintenance work must only be carried out after the machine has been switched off.

## 10 Special assembly instructions for LC gearboxes

The motor shaft is to be greased with a suitable assembly paste e.g. NEVER SEEZ®

**Step 1: Remove sealing plug**

Remove the sealing plug in the gearbox-motor flange, which covers the access to the clamping screw of the clamping ring. Loosen the screws of the motor flange crosswise and pull the motor flange down away from the gearbox.

**Step 2: Screw motor together with motor flange**

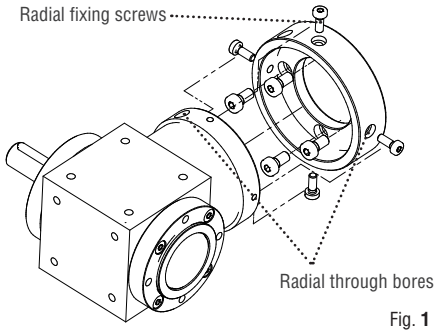



Fig. **1**

Mate the motor flange on the motor, align it and screw together crosswise.Then turn the clamping ring, so that the head of the clamping screw is ligned with the now open bore in the gearbox neck flange.



**Attention!** The screw heads must not protrude from the counterbores

**Step 3: Screwing motor–motor flange onto the gearbox**

Slide motor onto the slotted shaft of the gearbox until the gearbox neck flange and motor flange are in contact, flat and without a gap. The motor shaft must thereby be able to be pushed easily into the drive shaft. Depending on the tolerance field of the motor centring diameter, the centring fit is designed as transition fit.



**Attention!** The radial through bore in the motor flange and the bore in the gearbox must be in alignment. (Fig. 1)

| Gearbox type | Screw size | Starting torque (Nm) |
|---|---|---|
| LC035 | M3 | 2,1 |
| LC045 | M4 | 5,0 |

Table **1**

**Attention!** To avoid stresses due to the dead weight of the motor and/or the gearbox, this mating process should only be carried out in the vertical position.

In order to prevent tensioning of the motor-gearbox combination, the fixing screws of the motor flange are to be tightened crosswise with the correct torque (Table 1)

**Step 4: Clamping motor shaft in gearbox**

The clamping screw of the clamping ring is to be tightened with an Allen key through the radial through bore with the value specified in Table 2

*Clamp coupling (Standard)*

| Ø Motorwelle (mm) | Schraube | Anzugsmoment (Nm) |
|---|---|---|
| <8 | M3 | 2 |
| >8 | M4 | 5 |

Table **2**

**Step 5**

The sealing plug removed at Step 1 is to be re-inserted.

## 11 Special assembly instructions for VC/SC gearboxes

The axial plug-in, zero-backlash shaft coupling with integrated friction-type shaft-hub connection enables simple blind installation and consists of 3 parts:

1. Conical hub, already mounted in the gearbox drive shaft
2. Involute sprocket made from plastic
3. Clamping hub type KN or KNN or tension ring hub (2-piece) type SN

Particular attention is to be given to the controlled tightening of the clamping- or tensioning screws and the condition of the contact surfaces. Fit pairing motor shaft: Hub k6/H7. With other shaft tolerances, the torques specified in the catalogue can change.

**Assembly of clamping hub on the motor shaft**

Clean and degrease hub bore and the motor shaft. Loosen clamping screw slightly – push hub onto shaft – measure dimension A (Fig. 3) on the gearbox – adjust clearance dimension B (from Table 5). Tighten clamping screw with the starting torque specified in Table 3.

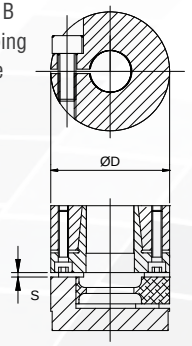



Fig. **2**

| Coupling size | 14 | 19/24 | 24/28 | 28/38 | 38/45 |
|---|---|---|---|---|---|
| Coupling diameter D [mm] | 30 | 40 | 55 | 65 | 80 |
| Clamping screw DIN 912 | M4 | M6 | M6 | M8 | M10 |
| Starting torque TA [Nm] | 2,9 | 10 | 10 | 25 | 49 |

Table **3**

**Assembly of tension ring hub on the motor shaft**

Clean hub bore and shaft and then oil with low viscosity oil (e.g. Castrol 4 in 1).

**Attention!** Oils and greases with molybdenum disulphideor other high-pressure additives as well as sliding grease pastes must not be used.

Loosen the tensioning screws a little and pull the tension ring away from the hub slightly, so that the tension ring sits loosely – push hub onto the motor shaft – measure dimension A (Fig. 3) on the gearbox – adjust clearance dimension B (from Table 5). Tighten the tensioning screws evenly crosswise to the starting torque specified in Table 4. Repeat the procedure until all screws have been tightened to the starting torque.

| Coupling size | 14 | 19/24 | 24/28 | 28/38 | 38/45 |
|---|---|---|---|---|---|
| Coupling diameter D [mm] | 30 | 40 | 55 | 65 | 80 |
| Clamping screw DIN 912 | 4xM3 | 6xM4 | 4xM5 | 8xM5 | 8xM6 |
| Starting torque TA [Nm] | 1,34 | 2,9 | 6 | 6 | 10 |

Table **4**

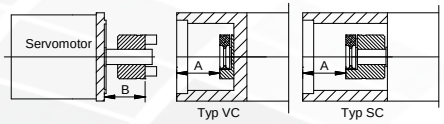



Fig. **3**

| Coupling size | 14 | 19/24 | 24/28 | 28/38 | 38/45 |
|---|---|---|---|---|---|
| Coupling diameter D [mm] | 30 | 40 | 55 | 65 | 80 |
| Clamping screw S | 1,5 | 2 | 2 | 2,5 | 3 |
| Starting torque B=A-S | A - 1,5 | A - 2 | A - 2 | A -2,5 | A - 3 |

Table **5**

## 12 Special assembly instructions for HC gearboxes

**Remove sealing plug**

Remove the sealing plug in the gearbox connection flange, which covers the access to the clamping screw of the bellows coupling. Then turn the bellows coupling, so that the head of the clamping screw is aligned with the now open bore in the gearbox connection flange.

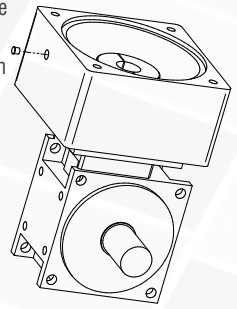


Fig. **4** *Removing the sealing plug*

**Mating motor in gearbox**

Push on motor into gearbox until the gearbox connection flange and motor attachment surface are in contact, flat and without a gap. The motor shaft must thereby be able to be inserted easily into the bellows coupling. Depending on the tolerance field of the motor centring diameter, the centring fit is designed as transition fit. In this case, the motor can be easily mounted on the gearbox with the fixing screws.

It is to be ensured, that the two flange surfaces of motor and gearbox are thereby always parallel to each other.

**Attention:** To avoid stresses due to the dead weight of the motor and/or the gearbox, this mating process should only be carried out in the vertical position.

In individual cases, unwanted installation conflicts can occur with custom-designed servo-motors. If in these cases motor and gearbox are screwed together, then due to tensions this can lead to the destruction of or damage to the motor and/or the gearbox. A detailed dimensional investigation in the area of the coupling and the end of the motor shaft is to be carried out before their assembly.

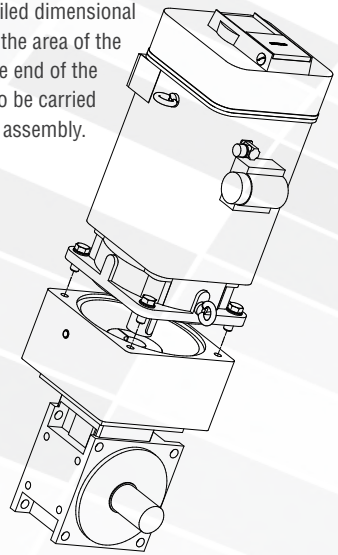


Fig. **5** *Mating and screwing together of motor on gearbox*

**Connecting motor with gearbox**
In order to prevent tensioning of the motor-gearbox connection, the motor fixing screws are to be tightened crosswise with the correct torque (Fig. 5 Mating and screwing together of motor on gearbox).

**Connecting motor shaft with gearbox**
The coupling clamping screw is to be tightened with the values specified in Table 6. Decisive for the allocation is the dimension of the intermediate flange VZ. (Fig. 6)

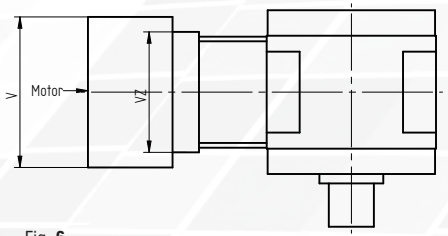



Fig. **6**

| Gearbox type | Metal bellows coupling (Standard) | | VZ |
|---|---|---|---|
| | Screw | Starting torque | |
| HC090 | M4 | 3Nm | 64 |
| | M4 | 4,5Nm | 88 |
| HC115 | M5 | 6Nm | 88 |
| | M6 | 10Nm | 119 |
| HC140 | M8 | 25Nm | 119/137 |
| HC170 | M10 | 85Nm | 137/157 |
| HC215 | M12 | 120Nm | 198 |
| HC260 | M12 | 120Nm | 198 |
| | M16 | 250Nm | 258 |

Table **6**

The sealing plug removed at Step 2 is to be re-inserted.

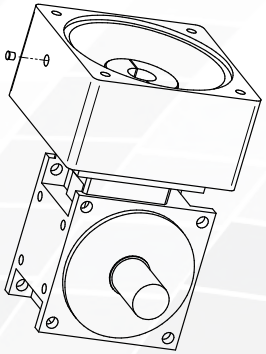


Fig. **8** *Sealing the assembly opening with the sealing plug*

**Design EOS or KOS**
**(hollow shafts with shrink discs)**
The screws are to be tightened with the starting torques from the assembly instructions “Clamping Sets”.



Fig. **7** *Metal bellows coupling*

## **13** Special assembly instructions for clamping sets

Dirty or used clamping sets are to be disassembled and cleaned before installation. Subsequently only the conical surfaces and the tensioning screws are to be greased with Molykote MoS2.

**Assembly**

- The clamping set supplied by ATEK is generally supplied assembled.
- Check that the shaft seat is within the prescribed tolerance (see Table 7).
- The contact surfaces inside the hollow shaft and on the shaft are to be cleaned and degreased!
- Loosen the tensioning screws slightly and mount the clamping set on the outside of the hollow shaft. The outer surface of the hollow shaft can be greased in the area of the external clamping set seat.
- Tighten the tensioning screws evenly in turn. Thereby increase the starting torque step by step. Repeat the procedure until all tensioning screws have been tightened to the starting torque specified in Table 8. The outer rings of the shrink disc must thereby be plane-parallel.

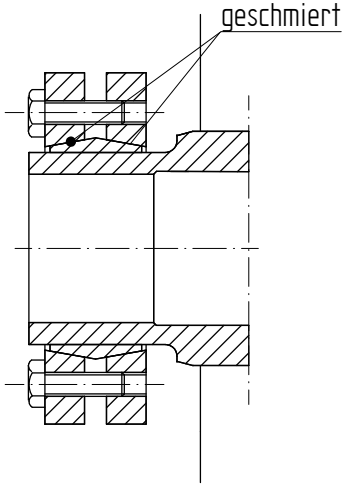



Fig. **9**

| Shaft-Ø dw [mm] | 18 bis 30 | 31 bis 50 | 51 bis 80 | 81 bis 500 |
|---|---|---|---|---|
| Tolerance | H6 / j6 | H6 / h6 | H6 / g6 | H7 / g6 |

Table **7**

Greater tolerances are possible in principle! Please ask us!

| Gearbox size Type V | 065 | 090 | 120 | | 140, 160 | | 200 | | | 230, 260 | | | 350 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gearbox size Type H | | 090 | 115 | 140, 170 | | | | | 215 | | 260 | | | | |
| Gearbox size Type S | | 040 | 050 | 063 | | 080 | | 100 | | 125 | | 160 | | 200 | |
| Outside diameter of the clamping set [mm] | 38 | 50 | 60 | 72 | 80 | 90 | 100 | 110 | 115 | 138 | 145 | 155 | 170 | 188 | |
| Thread size | M5 | M5 | M5 | M6 | M6 | M6 | M6 | M6 | M6 | M8 | M8 | M8 | M8 | M10 | |
| Starting torque [Nm] | 3,5 | 5 | 6 | 12 | 12 | 12 | 12 | 12 | 12 | 30 | 30 | 30 | 30 | 59 | |

Table **8**

**Disassembly**

- Loosen all tensioning screws evenly and in turn. Thereby, at the beginning each tensioning screw must only be loosened about a 1/4 turn per circulation, to prevent canting of the outer rings. Do not unscrew the tensioning screws completely out of the thread.
- The clamping sets are not self-locking. If the front and rear outer tapered rings do not release, the release operation is to be initiated by appling a little pressure to the front and rear outer tapered rings at several places around the circumference.

## EC Declaration of Incorporation

- Original Document –

according to 2006/42/EC dated 09.06.2006, Annex II Part B for the incorporation of an incomplete machine.
We, as manufacturer of the incomplete machine, declare that:

- The machine described below complies with the fundamental requirements of the directive 2006/42/EC listed below and the relevant technical design standards. In particular according to directive 2006/42/EC Annex I: 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.5.8, 1.5.9, 1.5.13
- The special technical documents according to Annex VII Part B have been prepared.
- These special technical documents according to Annex VII Part B will be communicated in written form or digitally (pdf) in response to a reasoned request by the national authorities.

| | |
|---|---|
| **Company name and complete postal address of the manufacturer** | ATEK Antriebstechnik<br>Willi Glapiak GmbH<br>Siemensstr. 47<br>25462 Rellingen<br>Germany |
| **Name and postal address of the authorised person** | Dipl.-Ing. Axel Brügmann<br>Address see manufacturer |
| **Description and identification of the incomplete machine** | Bevel gearboxes<br>Worm gearboxes |
| **Type** | L / LC / V / VS / VL / VLM / VC /HDV<br>H / HC / S / SL / SC |
| **Size** | 035 - 350 |
| **Serial number** | Valid from No.: 0117XXXX |
| **Directive, Standards** | 2006/42/EG, DIN EN ISO 12100 |

The incomplete machine may only be put into operation, when the machine in which the incomplete machine is installed, complies with the provisions of the directive 2006/42/EC, insofar as this directive is to be applied for this machine.
In the case of an exchange gearbox, this has no effect on the declaration of incorporation.

Rellingen, 01.06.2017

General Manager
Axel Brügmann

notes

ATEK

ANTRIEBSTECHNIK

**Das Winkelgetriebe**

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