



# ATLANTA

## BWS 109-10 e

### Operating and Maintenance Instructions


### 4100-001-12.93

Abteilung	TB, Schell
Änd. Index	C
Datum	2010-04-13

## STANDARD WORM-GEAR UNIT SERIES 56

Seite	1	8
Name	Schillinger	29.04.03
freigegeben	Schell	22.08.03

These instructions supersede all earlier instructions, in particular BWS 109-0 till BWS 109-3.

For applications in areas with explosion hazard it is obligatory to observe the instructions identified by the symbol . These were prepared in accordance with the ignition danger rating KGA 112.









### 1. Short description

The ATLANTA standard worm-gear unit was developed for use with three-phase AC and DC servo motors. Its housing is machined on all sides so that the gear unit can be mounted in any position. The ribbed aluminium housing ensures optimal heat dissipation. Robust bearings and the excellent stiffness permit the transmission of high moments and supplementary forces. The gear unit is supplied test-run, tightness-checked and thus ready for operation.

### 2. Proper application

The ATLANTA high-performance worm-gear unit may only be used for speed and torque conversion in machines and mechanical equipment under atmospheric conditions.

The permissible input speed and the output torque must not be exceeded. The layout instructions in the Atlanta catalogue must be observed.

-  The gear unit must not be used in combination with combustion engines – risk of overheating and inadmissible shock loads!
-  The gear unit is designed for input drive via the worm shaft. The input drive via the worm wheel (hollow output shaft) may be chosen only after consulting ATLANTA. The indicated efficiency rating is based upon input drive via worm shaft.
-  The gear unit is not self-braking.
-  The gear unit must not be used outdoors or under water.
-  The surface temperature of the gearbox must not exceed 80°C during operation.
-  If in doubt, measure the surface temperature and, if necessary, warn or switch off.
-  The gear unit is designed for continuous operation (S1 acc. to DIN EN 60034-1). The design parameters are based upon the temperature and/or the maximum flank load (pitting).
-  In the case of continuous operation (S1 acc. to DIN EN 60034-1) in areas with explosion hazard, it may be necessary to reduce the input speed (approx. 1500 min<sup>-1</sup>).



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## 4100-001-12.93

Abteilung	TB, Schell
Änd. Index	C
Datum	2010-04-13

### STANDARD WORM-GEAR UNIT SERIES 56

Seite	2	8
Name	Schillinger	29.04.03
freigegeben	Schell	22.08.03

#### Transport and handling

There are no special holes or threads provided for transporting and handling the gear unit. There are, however, numerous fixing threads available in the gear housing permitting to screw in eye-bolts so that it is possible to handle the gearbox safely.

- Observe all safety regulations in connection with transport and handling using lifting gear.
- Make sure that the load is handled and set down slowly and carefully.

Gear centre distance	Weight
40	≈3 kg
50	≈5 kg
63	≈8 kg
80	≈14 kg
100	≈20 kg
125	≈30 kg

#### 3. Preparing the installation

- Check the gear unit for damage and soiling on the outside.
- A damaged or soiled gear unit must neither be installed nor operated.
- The gear unit and in particular the area of the seals must not be cleaned with sharp-edged objects or a cleansing liquid.

#### 4. Mounting instructions

- ① The installation work may be carried out only by qualified or specially trained personnel.

##### Building in the worm-gear unit:

There are 6 machined mounting faces with sufficiently dimensioned pre-drilled fixing bores and tapped holes. It is important to ensure tension-free mounting. Use all fixing bores of the particular contact face. Tighten the screws to the specified torque (see table). If the supplementary forces are to be fully used, the gear unit should be attached to the largest contact faces, i.e. to one of the two output sides. Mounting the worm-shaft (input drive shaft) in a lateral and/or inferior position is ideal with a view to lubrication. Mounting the shaft in a top position will reduce the driving power by about 10 %. It should be avoided to install the unit with the motor hanging downward. In this position leakage oil could get into the motor.

Gear centre distance	Screw size	Depth of thread	Depth of thread	Tightening torque <sup>1)</sup>
40 mm	M 6	15 mm	8.8	7 Nm
50 mm	M 8	18 mm	8.8	14 Nm
63 mm	M 10	22 mm	8.8	30 Nm
80 mm	M 12	27 mm	8.8	47 Nm
100 mm	M 12	30 mm	8.8	47 Nm
125 mm	M 16	40 mm	8.8	102 Nm

<sup>1)</sup> Use only calibrated torque wrenches! If the tightening torque of the screws 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. Secure screws against loosening (e.g. Loctite 243).

- ① Use screws with an effective length of at least 1.6 x the thread diameter.



# ATLANTA

## Operating and Maintenance Instructions

# BWS 109-10 e

## 4100-001-12.93

Abteilung	TB, Schell
Änd. Index	C
Datum	2010-04-13

### STANDARD WORM-GEAR UNIT SERIES 56

Seite	3	8
Name	Schillinger	29.04.03
freigegeben	Schell	22.08.03

- ☒ Any additional attachments and/or modifications of the gear unit are not permissible unless approved by ATLANTA in writing.
- ☒ Do not use gear units at ambient temperatures of  $< -10\text{ °C}$  and  $> 40\text{ °C}$ .
- ⊗ The most suitable point for measuring the max. permissible surface temperature of the housing is in the area of the input-side worm-shaft bearing.
- ⊗ The vertical arrangement of the shaft (input or output vertically downward) is only permissible with an oil level monitor stopping the gear unit in case of a sudden loss of oil.

#### Mounting the drive flange:

- Clean all contact faces before attaching the input flange .
- Insert the input flange into the gear centering piece and tighten the screws slightly.
- Then tighten screws uniformly to the proper torque by turning them alternately crosswise.

Use the tightening torque figures shown in the table.

Screw size	Depth of thread	Strength rating of screws	Tightening torque <sup>*)</sup>
M 6	18 mm	8.8	9 Nm
M 8	17 mm	8.8	23 Nm
M 10	20 mm	8.8	40 Nm
M 12	26 mm	8.8	45 Nm
M 16	30 mm	8.8	117 Nm

\*) Use only calibrated torque wrenches! If the tightening torque of the screws 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. Secure screws against loosening (e.g. Loctite 243).

- ① Use screws with an effective length of at least 1.6 x the thread diameter.
- ⊗ When used in areas with explosion hazard, improper installation may lead to inadmissibly high temperatures. Check the connection to the motor in accordance with the operating instructions.

#### Mounting the driving clutch (version with solid shaft end):

The standard worm-gear units with solid shaft end are supplied with feather, but without clutch.

- Before mounting the driving clutch clean the shaft stub and the clutch and coat them with a thin oil film.
- Attach the clutch as described in the clutch operating instructions.
- ⊗ In areas with explosion hazard only clutches conforming to the ATEX guidelines are to be used.
- ⊗ Unsuitable clutches or the improper installation can cause an increased ignition hazard. Check for true running after 10 h of operation under working conditions.
- ① The face end thread in the shaft stub can be used for locking the clutch axially.

Gear centre distance	Face end thread in the shaft stub	Depth of thread	Strength rating of screws	Max. tightening torque
40 mm	M 5	13 mm	8.8	5,5 Nm
50 mm	M 5	10 mm	8.8	5,5 Nm
63 mm	M 5	14 mm	8.8	5,5 Nm
80 mm	M 8	20 mm	8.8	23 Nm
100 mm	M 8	20 mm	8.8	23 Nm
125 mm	M 12	26 mm	8.8	80 Nm



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# BWS 109-10 e

## 4100-001-12.93

Abteilung	TB, Schell
Änd. Index	C
Datum	2010-04-13

### STANDARD WORM-GEAR UNIT SERIES 56

Seite	4	8
Name	Schillinger	29.04.03
freigegeben	Schell	22.08.03

#### Mounting the motor (version with hollow input shaft):

- Clean all contact surfaces before attaching the motor.
- If necessary, rotate motor on the motor axle until the key connection fits.
- ☒ The motor must easily slide on.
- ☒ There must not be any gap between motor and gearbox flange.
- Screw motor and gearbox together using the specified torque (see table)..
- ① The motor can be optimally centered with the worm-shaft standing vertically upright
- ① Use screws with an effective length of at least 1.6 x the thread diameter.

Screw size	Depth of thread	Strength class of screws	Tightening torque <sup>*)</sup>
M 5	15 mm	8.8	2,8 Nm
M 6	15 mm	8.8	7 Nm
M 8	15 mm	8.8	14 Nm
M 10	22 mm	8.8	30 Nm
M 12	24 mm	8.8	47 Nm

<sup>\*)</sup> Use only calibrated torque wrenches! If the tightening torque of the screws 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. Secure screws against loosening (e.g. Loctite 243).

#### Mounting the motor (version with shaft stub):

- Clean all contact surfaces before attaching the motor.
- If necessary, mount the parts of the clutch to be used onto the motor shaft (observe the clutch operating instructions).
- If necessary, rotate motor on the motor axle until the clutch can be fitted.
- ☒ The motor must easily slide on..
- ☒ There must not be any gap between motor and gearbox flange.
- Screw motor and gearbox together using the specified torque (see table).
- ① The motor can be optimally centered with the worm-shaft standing vertically upright.
- ① Use screws with an effective length of at least 1.6 x the thread diameter.

Screw size	Depth of thread	Strength class of screws	Tightening torque <sup>*)</sup>
M 5	15 mm	8.8	2,8 Nm
M 6	15 mm	8.8	7 Nm
M 8	15 mm	8.8	14 Nm
M 10	22 mm	8.8	30 Nm
M 12	24 mm	8.8	47 Nm

<sup>\*)</sup> Use only calibrated torque wrenches! If the tightening torque of the screws 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. Secure screws against loosening (e.g. Loctite 243).



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## Operating and Maintenance Instructions

# BWS 109-10 e

## 4100-001-12.93

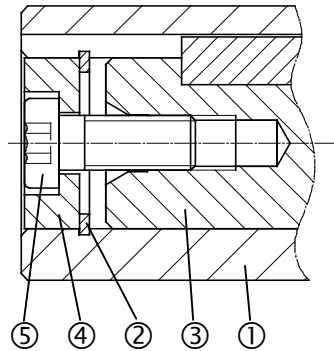
Abteilung	TB, Schell
Änd. Index	C
Datum	2010-04-13

### STANDARD WORM-GEAR UNIT SERIES 56

Seite	5	8
Name	Schillinger	29.04.03
freigegeben	Schell	22.08.03

#### Mounting the output shaft (one-sided variations):

If the output pinion shaft is not yet mounted at delivery, we recommend to proceed as follows:



- Clean the seat of the hollow shaft ① and rub with MoS<sub>2</sub> powder or grease (reduces fretting corrosion).
- Insert the retaining ring ② in the recess of the hollow shaft ①.
- Slide the output shaft ③ in up to the stop.
- Slide the retaining disk ④ from the opposite side into the hollow shaft ① right up to the stop.
- Connect the retaining disk ④ and the output shaft ③ using the screw ⑤.
- Secure the screw ⑤ with a suitable adhesive (e.g. Loctite 243).

⚠ When used in areas with explosion hazard, improper installation may lead to inadmissibly high temperatures. Check the tightening torque and the axial locking after 10 h under operating conditions.

Gear centre distance	Screw size	Strength class of screws	Tightening torque <sup>*)</sup>
40 mm	M 5	8.8	5,5 Nm
50 mm	M 8	8.8	23 Nm
63 mm	M 8	8.8	23 Nm
80 mm	M 12	8.8	80 Nm
100 mm	M 12	8.8	80 Nm
125 mm	M 12	8.8	80 Nm

\*) Use only calibrated torque wrenches! If the tightening torque of the screws 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. Secure the screws against loosening (e.g. Loctite 243).

#### Mounting the output shaft (both-sided variations):

If the output pinion shaft is not yet mounted at delivery, we recommend to proceed as follows:

- If necessary, remove both outer keys and clean driving shaft.
- Clean the seat inside the hollow shaft and rub with MoS<sub>2</sub> powder or grease (reduces fretting corrosion).
- Mount one retaining ring and one supporting plate on the side of the middle key.
- Push the output shaft in right up to the stop. The middle key should look toward the side, where the highest torque is taken off.
- Mount the supporting plate and the retaining ring on the other side of the output shaft.
- Insert the outer keys into both shaft ends.

#### Mounting the output flange:

The output flanges are already mounted at the factory. Gear units which are already supplied can be converted in our factory. If desired, please contact us.

The various mounting possibilities are shown in the catalogue.



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## Operating and Maintenance Instructions

# BWS 109-10 e

## 4100-001-12.93

Abteilung	TB, Schell
Änd. Index	C
Datum	2010-04-13

### STANDARD WORM-GEAR UNIT SERIES 56

Seite	6	8
Name	Schillinger	29.04.03
freigegeben	Schell	22.08.03

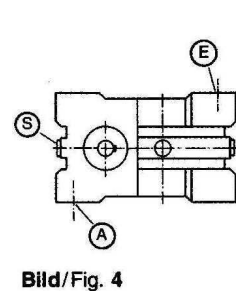
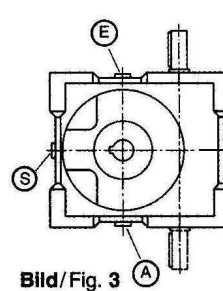
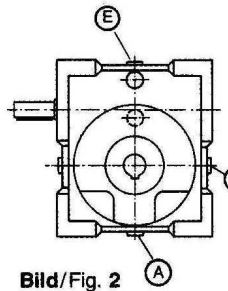
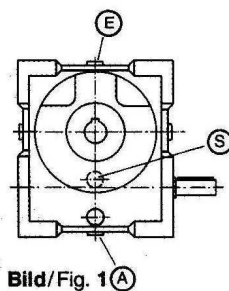
#### Oil level and installation of the vent screw:

Because of the many predrilled holes and threaded fixing bores the Atlanta standard worm-gear units can be mounted in any position. Whatever position you choose, there are sufficient easily accessible screws available for filling in oil/venting **E**, for draining oil **A**, and for checking the oil level **S**.

- One vent plug is supplied separately and must be exchanged for the corresponding screw plug, before taking the unit into operation
- ⊗ For use in areas with explosion hazards the vent plug must not be used. Check the unit for loss of oil. It may be necessary to measure the surface temperature and warn or switch off, if the permissible temperature is exceeded.
- The gear units are supplied filled with a synthetic lubricant. The quantity of this first filling meets the requirements of the mounting position shown in fig. 4. The necessary oil quantities for the various mounting positions possible are shown in the table.
- We recommend to use one of the following gearbox lubricants:
 

SHELL Tivela S 220	Klübersynth GH6-220	BP Enersyn SG-XP 220
ARAL Degol GS 220	TRIBOL 800/220	OPTIMOL Optimax A 220
FUCHS Renolin PG 220	DEA Polydea PGL P220	

Mounting position:



Oil quantity:

Gear centre distance	Mounting position acc. to pict. 1	Mounting position acc. to pict. 2	Mounting position acc. to pict. 3	Mounting position acc. to pict. 4
40 mm	0.10 litres	0.14 litres	0.16 litres	0.17 litres
50 mm	0.15 litres	0.18 litres	0.20 litres	0.20 litres
63 mm	0.30 litres	0.40 litres	0.40 litres	0.40 litres
80 mm	0.50 litres	0.70 litres	0.80 litres	0.80 litres
100 mm	1.00 litres	1.40 litres	1.70 litres	1.70 litres
125 mm	1.70 litres	2.60 litres	3.10 litres	3.20 litres

- ⊗ Synthetic oils must not be mixed with mineral oils.
- ⊗ Mineral oils reduce the power transmission performance and must not be used without the approval of ATLANTA.
- ⊗ The non-observance of these instructions may cause breakdowns and damage to the gear unit!



# ATLANTA

## BWS 109-10 e

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### 4100-001-12.93

Abteilung	TB, Schell
Änd. Index	C
Datum	2010-04-13

## STANDARD WORM-GEAR UNIT SERIES 56

Seite	7	8
Name	Schillinger	29.04.03
freigegeben	Schell	22.08.03

### 5. Operation

 When used in areas with explosion hazard, the operator must assure that the temperature on the housing surface does not exceed 80°C. It may be necessary to monitor the surface temperature of the housing.



#### Attention!

**During operation the gearbox surface may reach temperatures of more than 65 °C and cause burns.**

**The person building in the gear unit must make sure that persons cannot be endangered by hot surfaces.**



#### Warning!

**Rotating parts may catch pieces of clothing, hair and parts of the body and injure persons.**

**The person building in the gear unit must assure that persons cannot be endangered by rotating parts.**

### 6. Maintenance

The following points must be assured before starting to perform any maintenance work on the standard worm-gear units:

- The machine/plant into which the gear unit is installed must be at a standstill.
- The machine/plant must be secured against accidental starting.
- The machine/plant must be cooled down so that there is no risk of burns.

#### Changing the gear oil:

ATLANTA servo-worm-gear units are filled with synthetic polyglycol oil .


Under the following conditions this is a lifetime lubrication:


- The gear unit is laid out strictly in accordance with the instructions given in the ATLANTA catalogue.
- The gear unit is operated exclusively within the permissible nominal values and limit values.
- The operator checks the gear unit regularly (every two weeks) for loss of oil..
- The surface temperature reaches max. 80°C.

① If the unit is predominantly operated with low input speeds (peripheral speed of the worm:  $v < 0.5 \text{ m/s}$ ), we recommend to change the lubricant every two years.

Gear centre distance	Input speed for $v < 0,5 \text{ m/s}$	Mounting position as in picture 1	Mounting position as in picture 2	Mounting position as in picture 3	Mounting position as in picture 4
40 mm	500 $\text{min}^{-1}$	0.10 litres	0.14 litres	0.16 litres	0.17 litres
50 mm	400 $\text{min}^{-1}$	0.15 litres	0.18 litres	0.20 litres	0.20 litres
63 mm	320 $\text{min}^{-1}$	0.30 litres	0.40 litres	0.40 litres	0.40 litres
80 mm	280 $\text{min}^{-1}$	0.50 litres	0.70 litres	0.80 litres	0.80 litres
100 mm	220 $\text{min}^{-1}$	1.00 litres	1.40 litres	1.70 litres	1.70 litres
125 mm	180 $\text{min}^{-1}$	1.70 litres	2.60 litres	3.10 litres	3.20 litres

① Order code for 1 litre Klübersynth GH 6-220: 65 90 010

 Synthetic oils must not be mixed with mineral oils.

 Mineral oils reduce the power transmission capacity and must not be used without the approval of ATLANTA.



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### Operating and Maintenance Instructions

### 4100-001-12.93

Abteilung	TB, Schell
Änd. Index	C
Datum	2010-04-13

## STANDARD WORM-GEAR UNIT SERIES 56

Seite	8	8
Name	Schillinger	29.04.03
freigegeben	Schell	22.08.03

☒ The non-observance of these instructions may cause breakdowns and damage to the gear unit!

#### Cleaning:

- ☒ Dust layers on the gearbox of more than 5 mm thickness are not permissible because they increase the surface temperature and may thus cause the ignition of the dust. Keep the surface clean.
- ☒ Cleaning with high-pressure cleaner is not permitted because it destroys the sealing rings so that water may penetrate into the gear unit causing premature failure of the gear unit.

#### 7. Identification

The bevel gear unit is identified by a nameplate showing the type of gear, the gear ratio, the max. speed, the mounting date, and the serial number of the gear unit.

A separate oil-type nameplate indicates the type of oil.

- ☒ If the gearbox is to be used in areas with explosion hazard it must be identified accordingly by an additional plate. Only units with the respective marking may be used in such areas.

#### 8. Storage

If the gear unit is not installed immediately after its delivery, the following measures are to be taken:

- Store the gear unit with horizontal hollow output shaft and horizontal input drive shaft (worm shaft) on top in such a way that - except for the supporting surface - it cannot come into contact with any other objects.
- Protect the gear unit against environmental influences (ozone, UV light, electric welding, dust, dirt, moisture, temperature fluctuations, shocks etc.).
- Connecting parts, e.g. coupling or output shaft, are to be stored separately.
- Protect the steel parts against corrosion
- ① Occasionally turning the input shaft of the gear unit will facilitate the start-up.
- The max. storage time under such conditions is 2 years.

**ATLANTA does not assume any liability for damage to the drive or any resulting consequential damage if these instructions are not observed.**