

TP⁺ ATEX MA-Version (grease lubricated)

Operating Manual



Revision history

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1 Regarding this manual

These instructions contain necessary information for the safe operation of the planetary gearhead TP+ in areas with explosion hazards, referred to as gearhead in the following.

The operator must ensure that these instructions are read through by all persons assigned to install, operate, or maintain the gearhead, and that they fully comprehend them.

Store these instructions within reach of the gearhead.

These **safety instructions** should be shared with colleagues working in the vicinity of the device to ensure individual safety.

The original instructions were prepared in German; all other language versions are translations of these instructions.

1.1 Signal words

The following signal words are used to indicate possible hazards, prohibitions, and important information:

| | |
|--|--|
| | ⚠ DANGER |
| | This signal word points out to an imminent danger that can cause serious injuries and even death. |
| | ⚠ WARNING |
| | This signal word points out to a possible danger that can cause serious injuries and even death. |
| | ⚠ CAUTION |
| | This signal word points out to a possible danger that can cause slight to serious injuries. |
| | NOTICE |
| | This signal word points out to a possible danger that can cause material damage. |
| | A note without a signal word indicates application tips or especially important information for handling the gearhead. |

1.2 Safety symbols

The following safety symbols are used to indicate possible hazards, prohibitions, and important information:



General danger



Hot surface



Suspended loads



Danger of being pulled in



Environment protection



Information



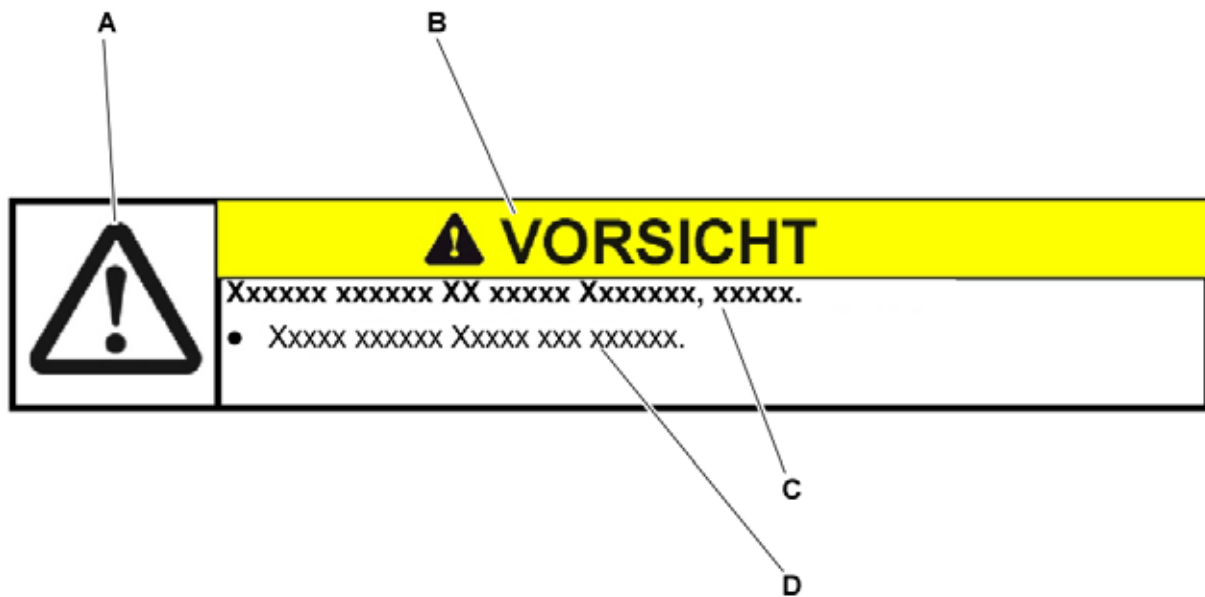
Explosion



Electric voltage

1.3 Design of the safety instructions

The safety instructions of these instructions are designed according to the following pattern:



A = Safety symbol (see Chapter 1.2 "Safety symbols")

B = Signal word (see Chapter 1.1 "Signal words")

C = Type and consequence of the danger

D = Prevention of the danger

1.4 Information symbols

The following information symbols are used:

- Indicates an action to be performed
- ➡ Indicates the results of an action
- ⓘ Provides additional information on handling



An "explosion protection symbol" indicates information on handling in areas with explosion hazards.

2 Safety

These instructions, especially the safety instructions and the rules and regulations valid for the operating site, must be observed by all persons working with the gearhead.

In addition to the safety specifications mentioned in this operating manual, the general and also the local regulations on the prevention of accidents (for instance, personal safety equipment) and on environmental protection should be observed.

2.1 EU directive for devices and protective systems in areas with explosion hazards



According to Directive 2014/34/EU, the gearhead is considered a device that is installed together with other devices in a machine. A declaration of conformity for this gearhead can be found in the appendix (see Chapter 2.4 "Intended use").

Operation is prohibited within the area of validity of the directive until it has been determined that the machine in which this product is installed corresponds to the regulations within this directive.

2.2 Dangers

The gearhead has been constructed according to current technological standards and accepted safety regulations.

To avoid danger to the operator or damage to the machine, the gearhead may be put to use only for its intended usage (see chapter 2.4 "Intended use") and in a technically flawless and safe state.

- Be informed of the general safety instructions before beginning work. (see Chapter 2.7 "General safety instructions").

2.3 Personnel

Only persons who have read and understood these instructions may carry out work on the gearhead.

2.4 Intended use

The gearhead serves to convert torques and speeds. It is designed for industrial applications.



The gearhead can be used in areas with explosion hazard group II, zone 2, and thus in the device category 3. The gearhead can be operated in a gas atmosphere in temperature class T3.

- Observe the instructions on the identification plate and the appendix on the written certificate of conformity.

The gearhead is manufactured and certified for use in areas with explosion hazards in compliance with standard EN 13463 standard and the following EC/EU Directive :

- **94/9/EC** valid until 19 April 2016 [time of production]
- **2014/34/EU** valid until 20 April 2016 [time of production]
- Strictly observe the restrictions of speeds and torques (see Chapter 9.5 "Technical specifications").
- Our Customer Service department (technical customer service) is available to answer any questions.



The gearhead is intended for installation on motors that:

- Correspond to the design B5 (in the event of deviations, consult our Customer Service department [technical Customer Service department]).
 - Have a radial and axial runout tolerance according to DIN EN 50347
 - Have a smooth shaft.
 - Feature at least the same temperature class as the gearhead.
- ① We recommend temperature class T3 and higher, because the gearhead may not be allowed to heat up to over 90°C in normal conditions. The gearhead can be heated additionally through heat connection to the motor, and thus reach a higher housing temperature than 90 °C. The performance of our gearhead in explosion-risk areas would therefore no longer be guaranteed.

2.5 Reasonably predictable misuse



Any use transgressing the maximum permitted speeds, torques and temperature (especially ignoring the regulations on explosion protection) is not compliant with the regulations, and thus prohibited.

2.6 Guarantee and liability



Guarantee and liability claims are excluded for personal injury and material damage in case of


- Ignoring the information on transport and storage
- Improper use (misuse)
- Improper or neglected maintenance and repair
- Improper assembly / disassembly or improper operation
- Operation of the gearhead when safety devices and equipment are defective
- Operation of the gearhead without lubricant
- Operation of a heavily soiled gearhead
- Operating the gearhead despite leakage or unusual running noises




- Operating the gearhead in an atmosphere whose ignition temperature lies under the temperature class specified on the type plate.
- Modifications or reconstructions that have been executed without written approval of **WITTENSTEIN alpha GmbH**


2.7 General safety instructions


| | |
|---|------------------------|
|  | <p>⚠ DANGER</p> |
| <p>Operating the gearhead in areas for which it is not approved can lead to explosions that can cause serious injuries and even death.</p> <ul style="list-style-type: none"> ● Make sure that the gearhead is only used in those areas for which it is permitted according to the identification plate (see Chapter 3.1 "Identification plate"). | |
|  | <p>⚠ DANGER</p> |
| <p>Assembly and maintenance in areas with explosion hazards can lead to explosions that can cause serious injuries and even death.</p> <ul style="list-style-type: none"> ● Be certain that there is no explosive atmosphere during assembly and maintenance. | |





 Table "Tbl-1" lists a summary of the possible hazards, their causes and protective measures for areas with explosion hazards.

|  | Dangers | Possible causes | Protective measures |
|---|---|---|--|
| | Hot surfaces | Increased friction and dissipated power because of wear, improper assembly, overload, or leaks. | Reduction of the torques and speeds in comparison to standard gears |
| | | | Limiting the motor current and maximum speed of the motor |
| | | | Maintenance intervals for wear parts and lubrication according to maintenance schedule |
| | | Increased friction and dissipated power because of wear, improper assembly, overload, or leaks. | Inspection of the temperature behavior and the running-in behavior before startup |
| | | | Regular visual and acoustic inspections |
| | | | Prohibition of certain mounting positions and conditions |
| | Increased surface temperature because of dust deposits. | Cleaning regulations according to maintenance plan | |
| Mechanically caused sparks | Overload on shafts, moving parts and connection elements. | Reduction of the torques and external loads in comparison to standard gears | |
| | | Limiting the motor current of the motor | |
| | | Maximum load test before startup | |
| Electrostatic loading | Potential differences between components, cleaning processes, insulating layers | Grounding the gearhead and the motor | |

Tbl-1: Summary of the hazards and protective measures for areas with explosion hazards

| | |
|---|---|
|  | ⚠ WARNING |
| | <p>Objects flung out by rotating components can cause serious injuries.</p> <ul style="list-style-type: none"> Remove objects and tools from the gearhead before putting it into operation. |

| | |
|---|---|
|  | ⚠ WARNING |
| | <p>Rotating components on the gearhead can pull in parts of the body and cause serious injuries and even death.</p> <ul style="list-style-type: none"> Keep a sufficient distance to rotating machinery while the gearhead is running. Secure the machine against restarting and unintentional movements during assembly and maintenance work. |

| | |
|--|---|
|  | <p style="text-align: center;">⚠ WARNING</p> <p>A damaged gearhead can cause accidents and injury.</p> <ul style="list-style-type: none"> • Never use a gearhead that has been overloaded to due misuse or a machine crash (see chapter 2.5 "Reasonably predictable misuse"). • Replace the affected gearhead, even if no external damage is visible. |
|  | <p style="text-align: center;">⚠ CAUTION</p> <p>Hot gearhead housing can cause serious burns.</p> <ul style="list-style-type: none"> • Touch the gearhead housing only when wearing protective gloves or after the gearhead has been at standstill for some time. |
|  | <p style="text-align: center;">NOTICE</p> <p>Loose or overloaded screw connections can damage the gearhead.</p> <ul style="list-style-type: none"> • Use a calibrated torque wrench to tighten and check all screw connections for which tightening torques have been specified. |
|  | <p>Solvents and lubricants can pollute soil and water.</p> <ul style="list-style-type: none"> • Use and dispose of cleaning solvents as well as lubricants appropriately. |

3 Description of the gearhead

The gearhead is a single- or multi-stage, low-backlash planetary gearhead, which is manufactured as standard in the "M" version (motor-mounted).

Motor centering of the motor-mounted gearhead is performed:

- up to gearhead size TP+ 025 and a motor shaft diameter of 28 mm by the clamping hub (socket or coupling)
- from gearhead size TP+ 050 and a motor shaft diameter of >28 mm through the centering collar of the motor

A radial distortion of the motor is avoided.

Adaptation to various motors is done by an adapter plate and a bushing.

The output flange bearing is designed to withstand high tilting moments and axial forces.

3.1 Identification plate

The identification plate is attached to the gearhead housing.

| | | | |
|---|---|---|---|
| A | Ordering code (see Chapter 3.2 "Ordering code") | G | Production date |
| B | Ratio | H | Maximum permitted gear output torque T_{2B} |
| C | Lubricant | I | Maximum permitted drive speed n_{1Max} |
| E | Atex identification | J | CE identification |
| F | Serial number | K | Name and address of manufacturer |

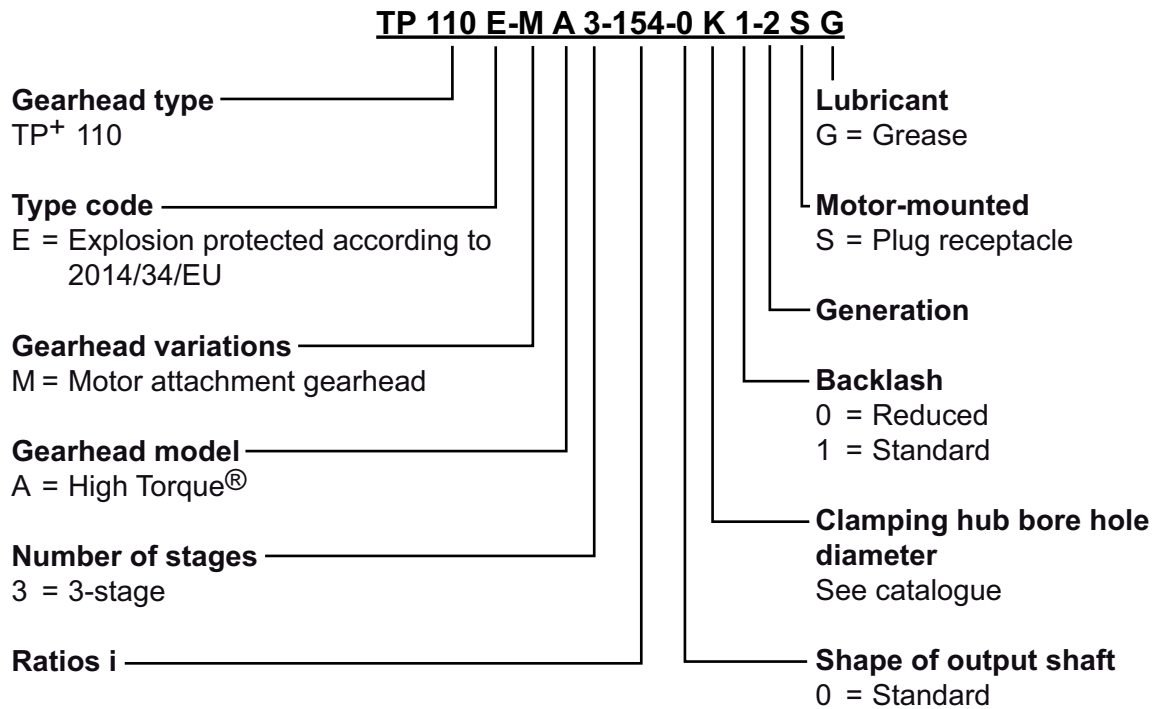
Tbl-2: Identification plate (sample values)

3.1.1 Atex identification in gas atmospheres with explosion hazard

| | | Designation |
|--|---|---|
| | L | Group, category |
| | M | Type of ignition protection, explosion group, temperature class |
| | N | Ambient temperature (See chapter 6.1 "Note during startup") |


Tbl-3: Identification plate (sample values)

3.2 Ordering code



3.3 Performance statistics

Based on test results, torques and speeds are reduced in relation to the standard gearhead. The shaft loads are also reduced in relation to the standard gear. Refer to Chapter 9.5 "Technical specifications".

| | |
|---|--|
|  | ⚠ DANGER |
| | <p>Deviant values can cause the loss of explosion protection.</p> <ul style="list-style-type: none"> • If values are divergent, consult our Customer Service department. |

3.4 Dimensioning

| | |
|---|---|
|  | ⚠ DANGER |
| | <p>Erroneous dimensioning and inspection may lead to loss of explosion protection.</p> <ul style="list-style-type: none"> • Observe all instructions in this chapter. |



- Adopt the construction according to specifications in the total catalogue, Chapter "Information" or "Detailed construction", or contact **WITTENSTEIN alpha GmbH**.
- Note the reduced output specifications in construction according to Chapter 9.5 "Technical specifications".
- Our Customer Service department is available to answer any questions.
- Note the instructions in Chapter 7.1.3 "Replacing the gearhead", if the calculated **bearing life is less than 20,000 h**.



- Prevent gearhead overloading by the motor by limiting motor current and motor speed.
- Clarify the chemical stability of the gearhead for every individual case so as to avoid a premature failure of a shaft seal or corrosion on the gearhead.
This also includes water and steam, which can cause corrosion. Contact **WITTENSTEIN alpha GmbH** about this.

3.4.1 Inspection



- Ensure that the connection of the motor to the gearhead corresponds to the required protection types (according to EN 60529):
 - in dust atmosphere IP6x,
 - in gas atmosphere IP54.

- ① The required protection types can be achieved for example by the following measures:
- Use surface-bonding agent between motor flange and adapter plate.
 - Use sealing plates between motor flange and adapter plate to seal the through-holes of the adapter plate.

Sealing plates are available upon request from **WITTENSTEIN alpha GmbH**.

3.5 Weight


The table "Tbl-4" specifies the gearhead dimensions with medium-sized adapter plate. If another adapter plate is mounted, the actual dimensions can deviate by up to 10%.

| Gearhead size TP+ | | 025 | 110 |
|-------------------|--------|-----|------|
| Design | Stages | | |
| M | 3 | 6,1 | 35,4 |

Tbl-4: Weight [kg]

3.6 Noise emission

Depending on the gearhead type and product size, the continuous sound pressure level is up to 66 dB(A).

| | |
|---|---|
|  | <p>Contact our Customer Service department if further information is needed regarding a particular product.</p> |
|---|---|

4 Transport and storage

4.1 Scope of delivery



- Check the completeness of the delivery against the delivery note.
 - ① Missing parts or damage must be notified immediately in writing to the carrier, the insurance, or **WITTENSTEIN alpha GmbH**.

4.2 Packaging

The gearhead is delivered packed in foil and cardboard boxes.

- Dispose of the packaging materials at recycling sites intended for that. Observe the locally valid regulations for disposals.

4.3 Transport

| | |
|--|--|
|  | NOTICE |
| | <p>Hard knocks, because of falling or hard dropping, can damage the gearhead.</p> <ul style="list-style-type: none"> • Only use hoisting equipment and transports with sufficient capacity. • The maximum permitted lift capacity of a hoist may not be exceeded. • Lower the gearhead slowly. |
|  | ⚠ WARNING |
| | <p>Suspended loads can fall and can cause serious injuries and even death.</p> <ul style="list-style-type: none"> • Do not stand under suspended loads. |

No special transport mode is prescribed for transporting the gearhead.
 Specifications on the weights, refer to Chapter 3.5 "Weight".

4.4 Storage


Store the gearhead in horizontal position and dry surroundings at a temperature of 0 °C to +40 °C in the original packaging. Store the gearhead for a maximum of 2 years.


For storage logistics, we recommend the "first in – first out" method.

5 Assembly

- Be informed of the general safety instructions before beginning work. (see Chapter 2.7 "General safety instructions").

5.1 Preparations

| | |
|---|--|
|  | NOTICE |
| | <p>Pressurized air can damage the gearhead seals.</p> <ul style="list-style-type: none"> • Do not use pressurized air to clean the gearhead. |

| | |
|---|--|
|  | NOTICE |
| | <p>Directly sprayed cleaning agents can alter the frictional values of the clamping hub.</p> <ul style="list-style-type: none"> • Only spray cleaning agents onto a cloth for wiping off the clamping hub. |

- Clean / de-grease the following components with a clean and lint-free cloth and grease-dissolving, non-aggressive detergent:
 - All fitting surfaces to neighboring components
 - Centering
 - The motor shaft
 - The inside diameter of the clamping hub
 - The bushing inside and out
- Dry all fitting surfaces to neighboring components in order to achieve the proper friction values of the screw connections.
- Check the fitting surfaces additionally for damage and impurities.

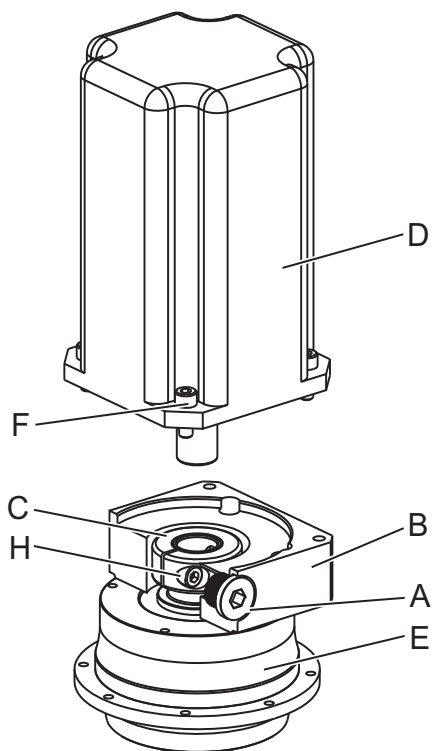
5.2 Installation conditions



- Provide a metallic frame for connection of the gearhead.
- Provide a ground in the areas of the motor gear and gear-gear connection, so as to prevent any electrostatic charge that may arise.

5.3 Mounting the motor onto the gearhead

| | |
|--|--|
| | <ul style="list-style-type: none"> • Observe the general information and safety instructions of the motor manufacturer. • Observe the safety and processing instructions of the screw-bonding agents to be used. |
|--|--|



- Ensure that the motor is mounted if possible in a vertical direction.
- If the motor shaft has a shaft key, remove the shaft key.
 - ① If recommended by the motor manufacturer, insert a half wedge.
- Turn the clamping hub (C) until the clamping bolt (H) can be reached by the mounting bore.
- Loosen the clamping bolt (H) of the clamping hub (C) by one revolution.
- Push the motor shaft into the clamping hub of the gearhead (E).
 - ① The motor shaft should slip in easily. If this is not the case, the clamping bolt must be loosened more.
 - ① A slotted bushing has to be installed extra for certain motor shaft diameters and applications.
 - ① The slot of the bushing (if provided) and clamping hub have to be flush with the groove (if provided) of the motor shaft, see table "Tbl-5".
 - ① No gap is permitted between motor (D) and the adapter plate (B).

| | | Designation |
|--|---|---|
| | H | Clamping bolt |
| | I | Clamping ring [part of the clamping hub (C)] |
| | J | Bushing |
| | K | Keyed shaft |
| | L | Smooth shaft |

Tbl-5: Arrangement of motor shaft, clamping hub, and bushing

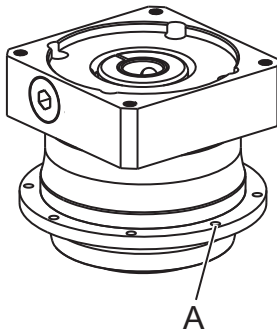
- Coat the four bolts (F) with a threadlocker (e.g. Loctite 243).
- Fasten the motor (D) onto the adapter plate (B) with the four screws.
- Tighten the clamping bolt (H) of the clamping hub (C).
 - ① For screw sizes and prescribed tightening torques refer to Chapter 9.1 "Specifications on mounting onto a motor", Table "Tbl-9".
- Screw in plug (A) of the adapter plate (B).
 - ① For screw sizes and prescribed tightening torque, refer to table "Tbl-6".

| Width across flats [mm] | 5 | 8 | 10 |
|-------------------------|----|----|----|
| Tightening torque [Nm] | 10 | 35 | 50 |

Tbl-6: Tightening torque for the plugs

5.4 Mounting the gearhead to a machine

- | | |
|--|--|
| | <ul style="list-style-type: none"> ● Observe the safety and processing instructions of the screw-bonding agents to be used. |
|--|--|



- Center the gearhead in the machine bed.
- Smear a screw-bonding agent (for example Loctite 243) onto the fastening screws.
- Fasten the gearhead on the machine with the fastening screws through the through-holes (A).
 - ① Mount the gearhead in such a way that the type plate remains legible.
 - ① Do not use washers (e.g. plain washers, tooth lock washers).
 - ① For prescribed screw sizes and torques refer to Chapter 9.3 "Specifications on mounting onto a machine", table "Tbl-11".

5.5 Mounted components on the gear output side



NOTICE


Distortions during mounting operations can damage the gearhead.

- Mount gearwheels and toothed belt pulleys onto the output flange without forcing.
- Do not on any account attempt an assembly by force or hammering!
- Only use suitable tools and equipment for assembly.


- ① For prescribed screw sizes and tightening torques refer to Chapter 9.2 "Specifications on mounting on the gear output side", table "Tbl-10".

6 Startup and operation

- Be informed of the general safety instructions before beginning work. (see Chapter 2.7 "General safety instructions").

| | |
|---|---|
|  | ⚠ DANGER |
| | <p>Operating the gearhead in areas for which it is not approved can lead to explosions that can cause serious injuries and even death.</p> <ul style="list-style-type: none"> • Ensure that the gearhead is only used in those areas for which it is approved according to the identification plate (see Chapter 3.1 "Identification plate"). |

- Check the gearhead before startup for possible damage, especially the radial shaft seal on the gear output.

| | |
|---|--|
|  | ⚠ DANGER |
| | <p>A damaged gearhead can lead to explosions that can cause serious injuries and even death.</p> <ul style="list-style-type: none"> • Never operate damaged or abnormally running or sounding gearheads in an area of explosion hazard. |

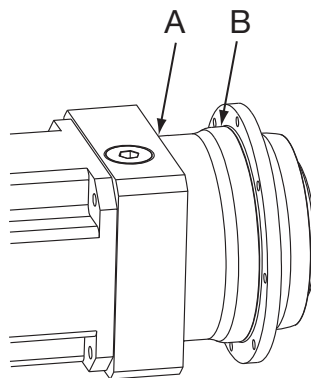
6.1 Note during startup



Improper use can cause damage to the gearhead and cause ignition dangers.

- Make sure that
 - the **ambient temperature** does not drop below 0 °C or exceed +40 °C and
 - the **operating temperature** does not exceed +90 °C.
- Prevent gearhead from overloading by limiting the motor current and the maximum motor speed. Otherwise, the drive output should be switched off in case the motor temperature rises 10 °C above the usual operational temperature.
- Use the gearhead only in a clean and dry environment. Contact our Customer Service department if the gearhead is exposed to dust or fluids of any type when in operation.

6.2 Check running-in behavior



- After 4 running hours in maximum operating conditions, check the gearhead for leakage between gear and motor and on the output shaft seal.
- Measure the surface temperature on the input flange (A) and on the housing (B). Consult our Customer Service Department if the temperature exceeds +90 °C.
- Check the proper assembly of the clamping hub before startup by a maximum load test.

Increased running noises may be caused by faulty motor mounting.

- If so, mount onto motor again according to the operating manual, or consult our Customer Service Department.

7 Maintenance and disposal

- Be informed of the general safety instructions before beginning work. (see Chapter 2.7 "General safety instructions").

7.1 Maintenance work



The following maintenance work is crucial for the explosion protection.

- Perform these tasks thoroughly and diligently.

7.1.1 Visual/Noise inspection

- Dust off the housing. Make sure that the deposit of dust layers on the housing never exceeds a layer thickness of 5 mm.
- Check the entire gearhead for exterior damage and corrosion.
- Check the clamping hub for external damage when inspecting the tightening torques of the clamping bolt.
- Check the gearhead for unusual running noises and vibrations during operation.
- ① For special information on maintenance-related issues, contact our Customer Service department.

7.1.2 Checking the tightening torques

- Check the tightening torque of the fastening screws on the gearhead housing and at the output flange.
 - ① The prescribed tightening torques can be found in Chapter 9.3 "Specifications on mounting onto a machine", table "Tbl-11" and in Chapter 9.2 "Specifications on mounting on the gear output side", table "Tbl-10".
- Check the tightening torque of the clamping bolt on the motor mounting.
 - ① The prescribed tightening torques can be found in Chapter 9.1 "Specifications on mounting onto a motor", table "Tbl-9".

7.1.3 Replacing the gearhead

- Replace the gearhead:
 - When 90 % of the calculated life of the gear output bearing has been reached (see "Cymex®" design or total catalogue: Chapter "Information" or "Detailed construction").
 - At the latest after a total of 20,000 operating hours.
- ① Alternatively, the gearhead can be checked by **WITTENSTEIN alpha GmbH** and if necessary, released for further operation.

7.2 Startup after maintenance work


- Clean the outside of the gearhead.
- Attach all safety devices.
- Do a trial run before releasing the gearhead again for operation.

7.3 Maintenance schedule

| Maintenance work | At initial startup | After running-in (4 hours) | After every 500 operating hours or 3 months | Yearly |
|--|--------------------|----------------------------|---|--------|
| Visual/Noise inspection | X | X | X | X |
| Checking the tightening torques | X | X | X | X |
| Check running-in behavior (see Chapter 6.2 "Check running-in behavior") | - | X | - | - |
| Replace gearhead after reaching 90 % of the calculated nominal bearing life, but at the latest after 20,000 operating hours. | | | | |

Tbl-7: Maintenance schedule

7.4 Notes on the lubricant used

| | |
|---|--|
|  | <p>All gearheads have been lubricated in the factory with high-performance grease for their entire working life. All bearings are permanently lubricated by the company.</p> <p>For information on the type of lubricant, see the type plate or contact our Customer Service department.</p> |
|---|--|

The manufacturer listed below will provide any further information on the lubricants:

Castrol Industrie GmbH, Mönchengladbach

Tel.: + 49 (0) 21 61 / 9 09 - 30



www.castrol.com

7.5 Disposal

Consult our Customer Service department for supplementary information on exchanging the adapter plate, on disassembly, and on disposal of the gearhead.

- Dispose of the gearhead at the recycling sites intended for this purpose.
 - ① Observe the locally valid regulations for disposals.

8 Malfunctions

| | |
|--|--|
|  | NOTICE |
| <p>Changed operational behavior can be an indication of existing damage to the gearhead or cause damage to the gearhead.</p> <ul style="list-style-type: none"> Do not put the gearhead back into operation until the cause of the malfunction has been rectified. | |
|  | <p>Rectifying of malfunctions may only be done by specially trained technicians.</p> |

| Fault | Possible cause | Solution |
|--|--|---|
| Increased operating temperature | The gearhead is not suited for the task. | Check the technical specifications. |
| | Motor is heating the gearhead. | Check the wiring of the motor. |
| | | Ensure adequate cooling. |
| | Change the motor. | |
| | Ambient temperature too high. | Ensure adequate cooling. |
| Increased noises during operation / increased vibrations | Distortion in motor mounting, misalignment | Consult our Customer Service department. |
| | Damaged bearings | |
| | Damaged gear teeth | |
| Loss of lubricant | Lubricant quantity too high | Wipe off discharged lubricant and continue to watch the gearhead. Lubricant discharge should stop after a short time. |
| | Seals not tight | Consult our Customer Service department. |
| Clamp connection of the clamping hub is slipping | Clamping bolt not tightened properly | Check the shaft seat and hub bore for damages. Replace damaged parts. Check the clamping bolt for proper tightening torque and secure it against loosening by itself. Check the operating parameters. |
| | Operating parameters not maintained | |

Tbl-8: Malfunctions

9 Appendix

9.1 Specifications on mounting onto a motor

| Gearhead size TP ⁺ | | Clamping hub interior Ø "x" [mm] | Clamping screw (H) / DIN ISO 4762 | Width across flats [mm] | Tightening torque [Nm] property class 12.9 | max. axial force clamping hub [N] | |
|----------------------------------|---------|---|--|-------------------------------|---|--------------------------------------|----------|
| | | | | | | Plug recepta cle | Coupling |
| 110 | 3-stage | x≤38 | M10 | 8 | 79 | 250 | 200 |

Tbl-9: Specifications on mounting onto a motor, version "MA"

9.2 Specifications on mounting on the gear output side

| Thread in output flange | | | |
|---|----------------|---|--|
| Gearhead size / Design TP ⁺ | Bore Ø [mm] | Quantity x Thread x Depth [] x [mm] x [mm] | Tightening torque [Nm] Property class 12.9 |
| 110 MA | 125 | 12 x M12 x 19 | 126 |

Tbl-10: Specifications on mounting on the gear output side

9.3 Specifications on mounting onto a machine

| Through-holes in gearhead housing | | | | |
|---|----------------|--------------------------------------|-----------------------------------|---------------------------|
| Gearhead size / Design TP ⁺ | Bore Ø [mm] | Quantity x diameter [] x [mm] | For screw size/ property class | Tightening torque [Nm] |
| 110 MA | 233 | 24 x 9.0 | M8 / 12.9 | 37.3 |

Tbl-11: Specifications on mounting onto a machine

9.4 Tightening torques for common thread sizes in general mechanics

The specified tightening torques for headless screws and nuts are calculated values and are based on the following conditions:

- Calculation acc. VDI 2230 (Issue February 2003)
- Friction value for thread and contact surfaces $\mu=0.10$
- Exploitation of the yield stress 90 %

| Property class Bolt / nut | Tightening torque [Nm] for threads | | | | | | | | | | | | |
|---------------------------------|------------------------------------|------|------|------|------|------|------|-----|-----|-----|-----|-----|------|
| | M3 | M4 | M5 | M6 | M8 | M10 | M12 | M14 | M16 | M18 | M20 | M22 | M24 |
| 8.8 / 8 | 1.15 | 2.64 | 5.24 | 8.99 | 21.7 | 42.7 | 73.5 | 118 | 180 | 258 | 363 | 493 | 625 |
| 10.9 / 10 | 1.68 | 3.88 | 7.69 | 13.2 | 31.9 | 62.7 | 108 | 173 | 265 | 368 | 516 | 702 | 890 |
| 12.9 / 12 | 1.97 | 4.55 | 9.00 | 15.4 | 37.3 | 73.4 | 126 | 203 | 310 | 431 | 604 | 821 | 1042 |

Tbl-12: Tightening torques for headless screws and nuts

9.5 Technical specifications

9.5.1 Technical specifications for TP+ 110 for use in areas with explosion hazards

| Technical specifications for TP+ 110 | | |
|--|--|--|
| Ratio | | 154 |
| Max. acceleration torque T_{2B} (max. 1000 cycles per hour) | Nm | 2080 |
| | in.lb | 18408 |
| Nominal torque at gear output T_{2N} (At n_{1N}) | Nm | 1225 |
| | in.lb | 10841 |
| Permissible medium drive speed in n_{1N} (At T_{2N} and 20 °C ambient temperature) ^a | min⁻¹ | 2800 |
| Max. drive speed in n_{1Max} | min⁻¹ | 3600 |
| Average no-load running torque T_{012} (At $n_1=3000$ min ⁻¹ and 20 °C gearhead temperature) | Nm | 2.0 |
| | in.lb/arcmin | 17.7 |
| Max. torsional backlash j_t | arcmin | ≤ 1 |
| Torsional rigidity C_{t12} | Nm/arcmin | 650 |
| | in.lb/arcmin | 5753 |
| Tilting rigidity C_{2K} | Nm/arcmin | 1452 |
| | in.lb/arcmin | 12850 |
| Max. axial force F_{2AMax} ^b | N | 8040 |
| | lb_f | 1809 |
| Max. tilting moment M_{2KMax} | Nm | 2400 |
| | in.lb | 21240 |
| Life L_h | h | See chapter 7.1.3 "Replacing the gearhead" |
| Weight incl. standard adapter plate m | kg | 35.4 |
| | lb_m | 78.2 |
| Noise level L_{PA} (At $n_1=3000$ min ⁻¹ w/o load) | dB(A) | ≤ 66 |
| Max. permissible housing temperature (at $i=10$) | °C | +90 |
| | F | 194 |
| Ambient temperature | °C | See chapter 6.1 "Note during startup" |
| | F | |
| Paint | | Blue RAL 5002 |
| Direction of rotation | | Drive and gear output equidirectional |
| Protection class (w/o connection to motor) | | IP 65 |
| Mass moment of inertia J_1 referring to the drive; Bore diameters of the clamping hub: 38 mm | kgcm² | 9.47 |
| | 10⁻³ in.lb.s² | 8.38 |

^a At higher ambient temperatures, lower the speeds and, in the case of mounting position V1, reduce the medium drive speeds n_{1N} by 20%

^b Based on the shaft or flange center at the gear output

TbI-13: TP+ 110, Technical specifications for use in areas with explosion hazards

9.6 Declaration of Conformity



EU-Konformitätserklärung

EC-Declaration of Conformity

Wir / We, **WITTENSTEIN alpha GmbH**
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erklären hiermit in alleiniger Verantwortung, dass die Erzeugnisse
hereby declare under our sole responsibility that the products

Bezeichnung: **TP⁺ ATEX MA-Planetenge triebe**
 Designation: **TP⁺ ATEX MA Planetary gearheads**
 Baugröße / Size: **TP⁺ 025S-MA3-110, TP⁺ 110S-MA3-154**
 Ausführung: **MA-Version (Fettschmierung)**
 Version: **MA-Version (Grease lubrication)**

mit den wesentlichen Anforderungen der folgenden EN-Normen
comply with the principle demands of the following EN standards

DIN EN 13463-1:2009-07 Nicht-elektrische Geräte für den Einsatz in explosions-
 gefährdeten Bereichen - Teil 1: Grundlagen und Anforderungen;
 Deutsche Fassung EN 13463-1:2009
*DIN EN 13463-1:2009-07 Non-electrical equipment for use in potentially explosive atmospheres - Part 1:
 Basic method and requirements; German version EN 13463-1:2009*

DIN EN 13463-5: 2011-10 Nicht-elektrische Geräte für den Einsatz in explosions-
 gefährdeten Bereichen - Teil 5: Schutz durch konstruktive
 Sicherheit 'c'; Deutsche Fassung EN 13463-5:2011
*DIN EN 13463-5:2011-10 Non-electrical equipment intended for use in potentially explosive
 atmospheres - Part 5: Protection by constructional safety 'c'; German version
 EN 13463-5:2011*

und den Prüfdokumenten übereinstimmt. Die TP⁺-Planetenge triebe in der explosionsgeschützten
 Ausführung sind Geräte im Sinne des Artikels 1 (3) a) der EG-Richtlinie 94/9/EG (bis
 Produktionszeitpunkt 19.04.2016) bzw. im Sinne des Artikels 1 (1) a) der EU-Richtlinie 2014/34/EU
 (ab Produktionszeitpunkt 20.04.2016). Sie erfüllen die grundlegenden Sicherheits- und
 Gesundheitsanforderungen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten
 Bereichen gemäß EG-Richtlinie 94/9/EG, Anhang II (bis Produktionszeitpunkt 19.04.2016) bzw.
 gemäß EU-Richtlinie 2014/34/EU, Anhang II (ab Produktionszeitpunkt 20.04.2016).

*and agree with the test documents. TP⁺ planetary gearheads in highly explosive versions are devices in terms of Article 1
 (3) a) of the EU directive 94/9/EC (up to the time of production 19.04.2016) respectively in terms of
 Article 1 (1) a) of the EU directive 2014/34/EC (from the time of production 20.04.2016) and fulfil the basic safety and
 health requirements for use according to regulations in explosive areas in accordance with appendix II of EU directive
 94/9/EC (up to the time of production 19.04.2016) respectively with appendix II of the EU directive 2014/34/EC (from the
 time of production 20.04.2016).*

Kennzeichnung / Marking:  II 3G c IIC T3 X



Die explosionsgeschützten TP⁺ ATEX MA-Planetengetriebe tragen das CE-Zeichen.

The explosion-proof TP⁺ ATEX MA planetary gearheads carry the CE symbol.

Die zugehörige Betriebsanleitung (WITTENSTEIN alpha-Dokument 2022-D025379) enthält wichtige sicherheitstechnische Hinweise und Vorschriften für die Inbetriebnahme, Umgang und Wartung der TP⁺ ATEX MA-Planetengetriebe.

The accompanying manual (WITTENSTEIN alpha document 2022-D025379) contains important safety-related information and regulations for start-up, handling and maintenance of the TP⁺ ATEX MA gear reducer.

Das Verfahren der Konformitätsbewertung entspricht bis zum Produktionszeitpunkt 19.04.2016 der EG-Richtlinie 94/9/EG, Artikel 8 (1) b) ii). Die technischen Unterlagen (WITTENSTEIN alpha-Dokument 2098-D056890) gemäß EG-Richtlinie 94/9/EG, Anhang VIII Nummer 3 sind bei der WITTENSTEIN AG hinterlegt.

Ab dem Produktionszeitpunkt 20.04.2016 entspricht das Verfahren der Konformitätsbewertung der EU-Richtlinie 2014/34/EU, Artikel 13 (1) b) ii). Die technischen Unterlagen (WITTENSTEIN alpha-Dokument 2098-D056890) gemäß EU-Richtlinie 2014/34/EU, Anhang VIII Nummer 2 sind bei der WITTENSTEIN AG hinterlegt.

The procedure of the conformity assessment corresponds to EC Directive 94/9 / EC, Article 8 (1) b) ii) up to the time of production 04/19/2016. The technical documentation (WITTENSTEIN alpha document 2098- D056890) according to EC Directive 94/9 / EC, Annex VIII, No. 3 are deposited at the WITTENSTEIN AG.

From the time of production 04/20/2016 the procedure of the conformity assessment corresponds to EC Directive 2014/34 / EU, Article 13 (1) b) ii). The technical documentation (WITTENSTEIN alpha document 2098- D056890) according to EC Directive 2014/34 / EU, Annex VIII, No. 2 are deposited at the WITTENSTEIN AG.

Igersheim, 02.06.2016

Ort und Datum der Ausstellung
Place and Date of Issue



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