WITTENSTEIN | alpha

TP+

Assembly Instructions

2022-D036009

Revision: 03

Revision history

Revision	Date	Comment	Chapter
01	27.10.10	New version	All
02	18.04.11	Technical Data	2
03	22.10.12	Safety	All

Service

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Motor mounting video

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Contents

1 Regarding this manual

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

If this manual is supplied with an amendment (e.g. for special applications), then the information in the amendment is valid. Contradictory specifications in this manual thereby become obsolete.

1.1 Information symbols

The following information symbols are used:

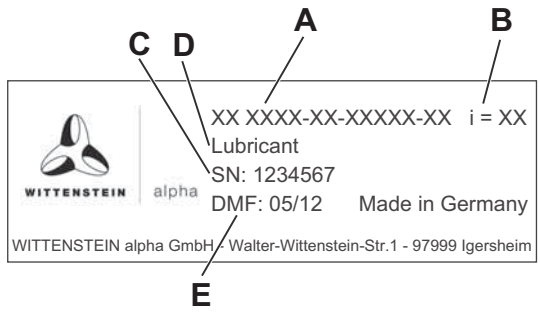
- Indicates an action to be performed
  - ➲ Indicates the results of an action

ⓘ Provides additional information on handling

2 General safety instructions

2.1 Identification plate

The type plate is attached to the gearhead housing as well input flange.

		Designation
	A	Ordering code (see Chapter 3.14 "Supplementary information")
	B	Ratio
	C	Serial number
	D	Lubricant
	E	Production date

Tbl-1: Identification plate (template)

2.2 Intended use

The gearhead serves to convert torques and speeds in industrial applications.

The gearhead may not be operated in areas with explosion hazards. In food processing, the gearhead may be used only next to or under the foodstuff area.

2.3 Reasonably predictable misuse

Any usage that exceeds the maximum permitted speeds, torques and temperature is considered a misuse and is therefore prohibited.

2.4 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 (e.g. test run without secure attachment)
- Operation of the gearhead when safety devices and equipment are defective
- Operation of the gearhead without lubricant
- Operation of a heavily soiled gearhead
- Modifications or reconstructions that have been carried out without the approval of **WITTENSTEIN alpha GmbH**

2.5 General safety instructions

⚠ WARNING

Suspended loads can fall and can cause serious injuries and even death.

- Only use hoisting equipment and transports with sufficient capacity.
- Do not stand under suspended loads.

Objects flung out by rotating components can cause serious injury and death.

- Remove objects and tools from the gearhead before putting it into operation.
- Remove/Secure the shaft key (if available) if the gearhead is operated without attachments on the output/drive side.

Rotating components on the gearhead can pull in parts of the body and cause serious injuries and even death.

- 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 (e.g. uncontrolled lowering of lifting axes).

A damaged gearhead can cause accidents and injury.

- Never use a gearhead that has been overloaded to due misuse or a machine crash (see chapter 2.3 "Reasonably predictable misuse").
- Replace the concerned gearhead, even if external damage is visible.

Lubricants are flammable.

- Do not spray with water to extinguish.
- Suitable extinguishing agents are powder, foam, water mist, and carbon dioxide.
- Observe the safety instructions of the lubricant manufacturer.

⚠ CAUTION

Hot gearhead housing can cause serious burns.

- Touch the gearhead housing only when wearing protective gloves or after the gearhead has been at standstill for some time.

Solvents and lubricants can cause skin irritations.

- Avoid direct skin contact.

NOTICE

Loose or overloaded screw connections can damage the gearhead.

- Use a calibrated torque wrench to tighten and check all screw connections for which a tightening torque has been specified.

All gearheads are permanently lubricated by the manufacturer with synthetic gear oil (polyglycols) or with a grease (see identification plate).

- Do not mix polyglycols with mineral oils.

Solvents and lubricants can pollute soil and water.

- Use and dispose of cleaning solvents as well as lubricants appropriately.

2.6 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.

2.7 Checking the tightening torques

- Check the tightening torque of the fastening screws on the gearhead housing.
- Check the tightening torque of the clamping bolt on the motor mounting.

  ⓘ The prescribed tightening torque can be found in 3 "Technical data sheets" in this manual.

2.8 Maintenance schedule

Maintenance work	At startup	First time after 500 operating hours or 3 months	Every 3 months	Yearly
Visual inspection	X	X	X	
Checking the tightening torques	X	X		X

Tbl-2: Maintenance schedule

2.9 Malfunctions

Unusual operating behavior (noise, heat, vibration) can be an indication of faulty assembly, improper dimensioning, or technical defects.

- Do not put the gearhead back into operation until the cause of the malfunction has been rectified.

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	Distortion in motor mounting.	Consult our Customer Service department.
	Damaged bearings.	
	Damaged gear teeth.	
	Toothed belt pretension too great (if it exists).	
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.

Tbl-3: Malfunctions

3 Technical data sheets

- Be informed of the general safety instructions before beginning work. (see Chapter 2.5 "General safety instructions").

3.1 Transport of gearheads up to and including size TP+ 050

No special transport mode is prescribed for transporting the gearhead.

3.2 Transport of gearheads as of size TP+ 110

For gearheads of size TP+ 110 or greater, we recommend the use of hoisting equipment.

3.3 Preparations

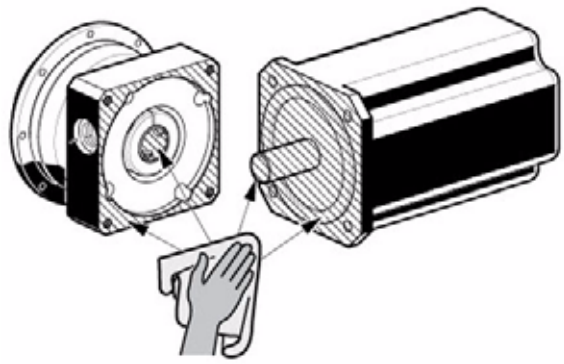
NOTICE

Pressurized air can damage the gearhead seals.

- Do not use pressurized air to clean the gearhead.

Directly sprayed cleaning agents can alter the frictional values of the clamping hub.

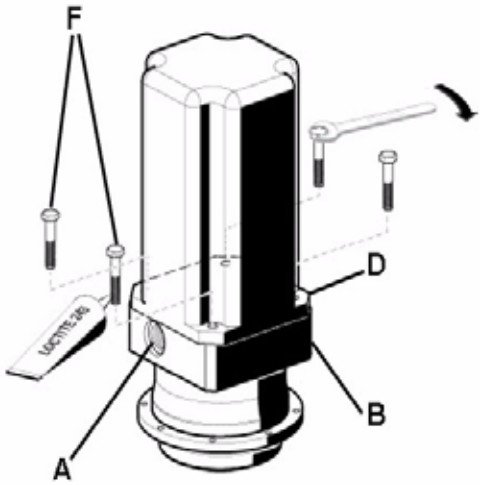
- Only spray cleaning agents onto a cloth for wiping off the clamping hub.



- 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
- Check the fitting surfaces additionally for damage and impurities.

3.4 Mounting the motor onto the gearhead

- Observe the specifications and safety instructions of the motor manufacturer.
- Observe the safety and processing instructions of the screw-bonding agents to be used.



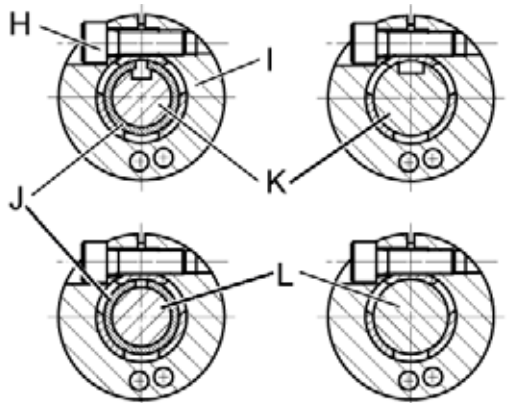
- Ensure that the motor is mounted if possible in a vertical direction.
- If the motor shaft has a shaft key, remove the shaft key.
  ⓘ If recommended by the motor manufacturer, insert a half wedge.
- Remove the plug (A) from the mounting bore in the adapter plate (B).
- Turn the clamping hub until the clamping bolt (H, see table "Tbl-4") can be reached by the mounting bore.
- Loosen the clamping bolt (H) of the clamping hub by one revolution.

- Push the motor shaft into the clamping hub of the gearhead.
  ⓘ The motor shaft should slip in easily. If this is not the case, the clamping bolt needs to be loosened some more.

ⓘ A slotted bushing has to be installed extra for certain motor shaft diameters and applications.

ⓘ 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-4".

ⓘ No gap is permitted between motor (D) and the adapter plate (B).

		Designation
	H	Clamping bolt
	I	Clamping ring [part of the clamping hub]
	J	Bushing
	K	Keyed motor shaft
	L	Smooth motor shaft

Tbl-4: Arrangement of motor shaft, clamping hub, and bushing

ⓘ 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

- Coat the four screws (F) with a threadlocker (e.g. Loctite 243).
- Fasten the motor (D) onto the adapter plate (B) with the four screws (F).
- Select the tightening torque for the clamping bolt (H) according to the material of the clamping ring (I).
  - Clamping bolt for **steel** clamping ring: Property class 12.9
  - Clamping bolt for **aluminum** clamping ring: Property class 8.8

  ⓘ For screw sizes and specified torques refer to chapter 3.9 "Details regarding the attachment to a motor", table "Tbl-8".
- Tighten the clamping bolt (H) of the clamping hub.
- Screw in plug (A) of the adapter plate (B).

  ⓘ For screw sizes and tightening torques, see Table "Tbl-5".

Width across flats [mm]	5	8	10	12
Tightening torque [Nm]	10	35	50	70

Tbl-5: Tightening torque for the plugs

3.5 Mounting the gearhead to a machine

	● Observe the safety and processing instructions of the screw-bonding agents to be used.

- Center the gearhead in the machine base.
- Coat the fastening screws with a threadlocker (e.g. Loctite 243).
- Fasten the gearhead to the machine with the fastening screws through the through-holes.

  ⓘ Mount the gearhead in such a way that the identification plate remains legible.

ⓘ Do not use washers (e.g. plain washers, tooth lock washers).

ⓘ For prescribed screw sizes and torques refer to Chapter 3.10 "Specifications on mounting onto a machine", table "Tbl-9".

3.6 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.

ⓘ For prescribed screw sizes and tightening torques refer to Chapter 3.11 "Specifications on mounting on the gear output side", table "Tbl-10".

3.7 Startup and operation

Improper use can cause damage to the gearhead.

- Make sure that
  - the **ambient temperature** does not drop below –15 °C or exceed +40 °C and
  - the **operating temperature** does not exceed +90 °C.
- Avoid icing, which can damage the seals.
- For other conditions of use, consult our Customer Service department.
- Only use the gearhead only up to its maximum limit values, see Chapter 3.13 "Performance statistics".
- Only use the gearhead only in a clean, dust-free and dry environment.

3.8 Notes on the lubricant used

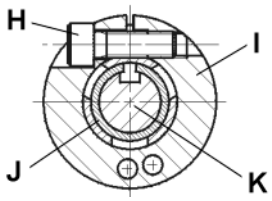
All gearheads are permanently lubricated by the manufacturer with synthetic gear oil (polyglycols) of viscosity class ISO VG100, ISO VG220 or with a high-performance lubricant (see type plate). All bearings are permanently lubricated by the company.

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

Standard lubricants	Lubricants for the food industry (NSF-H1 registered)
Castrol Industrie GmbH, Mönchengladbach Tel.: + 49 2161 909-30 www.castrol.com	Klüber Lubrication München KG, Munich Tel.: + 49 89 7876–0 www.klueber.com

Tbl-6: Lubricant manufacturers

3.9 Details regarding the attachment to a motor

		Designation
	H	Clamping bolt
	I	Clamping ring (part of the clamping hub)
	J	Bushing
	K	Motorshaft

Tbl-7: Arrangement of motor shaft, clamping hub, and bushing

Gearhead size TP+		Clamping hub interior Ø "x" [mm]	Clamping screw (H) / DIN ISO 4762	Width across flats [mm]	Tightening torque [Nm] property class		Max. axial force clamping hub [N]	
					12.9 (steel)	8.8 (alu)	Plug receptacle	Coupling
004	1-stage	x≤11	M4	3	4.1	2.8	100	10
		11< x ≤14	M5	4	9.5	5.6		
		14< x ≤19	M6	5	14	9.5		
	2-stage	x≤11	M4	3	4.1	2.8	80	—
		11< x ≤14	M5	4	9.5	5.6		
010	1-stage	x≤14	M5	4	9.5	5.6	120	20
		14< x ≤19	M6	5	14	9.5		
		19< x ≤24	M8	6	35	23		
	2-stage	x≤11	M4	3	4.1	2.8	100	10
		11< x ≤14	M5	4	9.5	5.6		
		14< x ≤19	M6	5	14	9.5		
	3-stage	x≤14	M5	4	9.5	5.6	100	10
025	1-stage	x≤19	M6	5	14	9.5	150	30
		19< x ≤24	M8	6	35	23		
		24< x ≤28	M6	5	14	9.5		
		28< x ≤38	M10	8	79	45		
	2-stage	x≤14	M5	4	9.5	5.6	120	20
		14< x ≤19	M6	5	14	9.5		
		19< x ≤24	M8	6	35	23		
	3-stage	x≤19	M6	5	14	9.5	120	20
050	1-stage	x≤24	M8	6	35	23	200	50
		24< x ≤38	M10	8	79	45		
		38< x ≤48	M12	10	135	78		
	2-stage	x≤19	M6	5	14	9.5	150	30
		19< x ≤24	M8	6	35	23		
		24< x ≤38	M10	8	79	45		
	3-stage	x≤24	M8	6	35	23	150	30

Gearhead size TP+		Clamping hub interior Ø "x" [mm]	Clamping screw (H) / DIN ISO 4762	Width across flats [mm]	Tightening torque [Nm] property class		Max. axial force clamping hub [N]	
					12.9 (steel)	8.8 (alu)	Plug receptacle	Coupling
110	1-stage	x≤38 38< x ≤48	M10 M12	8 10	79 135	45 78	250	200
	2-stage	x≤24 24< x ≤38 38< x ≤48	M8 M10 M12	6 8 10	35 79 135	23 45 78	200	50
	3-stage	x≤38	M10	8	79	45	200	50
300	1-stage	x≤55	M12	10	135	78	300	—
	2-stage	x≤48	M12	10	135	78	250	—
	3-stage	x≤38	M10	8	79	45	250	—
500	1-stage	x≤60	M16	14	330	195	300	—
	2-stage	x≤48	M12	10	135	78	250	—
	3-stage	x≤38 38< x ≤48	M10 M12	8 10	79 135	45 78	250	—

Tbl-8: Specifications on mounting onto a motor

3.10 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]**
004 MF	79	8 x 4.5	M4 / 12.9	4.55
010 MF	109	8 x 5.5	M5 / 12.9	9
025 MF	135	8 x 5.5	M5 / 12.9	9
050 MF	168	12 x 6.6	M6 / 12.9	15.4
110 MF	233	12 x 9.0	M8 / 12.9	37.3
300 MF	280	16 x 13.5	M12 / 12.9	126
500 MF	310	16 x 13.5	M12 / 12.9	126
010 MA	109	16 x 5.5	M5 / 12.9	9
025 MA	135	16 x 5.5	M5 / 12.9	9
050 MA	168	24 x 6.6	M6 / 12.9	15.4
110 MA	233	24 x 9.0	M8 / 12.9	37.3
300 MA	280	32 x 13.5	M12 / 12.9	126
500 MA	285	32 x 13.5	M12 / 12.9	126
MA = HIGH TORQUE				

Tbl-9: Specifications on mounting onto a machine

3.11 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**
004 MF	31.5	8 x M5 x 7	9
010 MF	50	8 x M6 x 10	15.4
025 MF	63	12 x M6 x 12	15.4
050 MF	80	12 x M8 x 15	37.3
110 MF	125	12 x M10 x 20	73.4
300 MF	140	12 x M16 x 31	310
500 MF	160	12 x M20 x 31	604
010 MA	50	12 x M6 x 10	15.4
025 MA	63	12 x M8 x 12	37.3
050 MA	80	12 x M10 x 15	73.4
110 MA	125	12 x M12 x 19	126
300 MA	145	12 x M20 x 31	604
500 MA	166	12 x M24 x 37	1042
MA = HIGH TORQUE			

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

3.12 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 μ=0.10
- Exploitation of the yield stress 90 %

	Tightening torque [Nm] for threads												
Property class Screw / nut	**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-11: Tightening torques for headless screws and nuts

3.13 Performance statistics

Refer to our catalogue or our Internet page for the maximum permitted speeds and torques: http://www.wittenstein-alpha.de

	Consult our Customer Service department if the gearhead is older than a year. You will then receive the valid performance data.

3.14 Supplementary information

The complete operating manual can be found on our website: www.wittenstein-alpha.de/en/operating-manuals or scan this code, to receive the detailed operating manual directly as a PDF (max. 1 MB).

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Motor mounting video