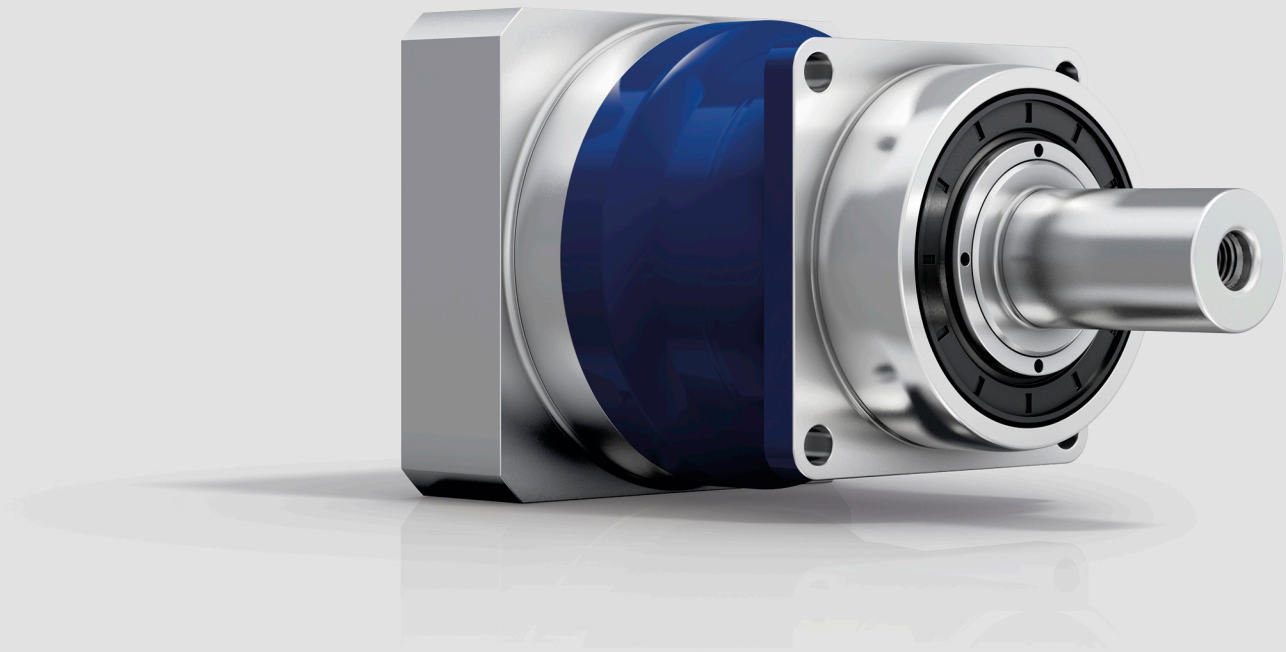
WITTENSTEIN | alpha

alpha Advanced Line

SP+

Operating manual including assembly instructions



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Revision: 01

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Assembly video

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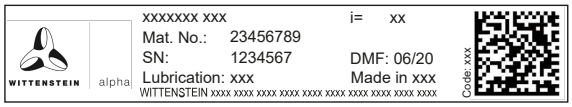
Table of Contents

1 Introduction

This manual contains necessary information to safely operate this gearbox: **SP+**

The original was prepared in German, all other language versions are translations of the original manual.

If this manual is supplied with any amendments (e.g. for special applications), the information in the amendments is primarily and exclusively valid.



WITTENSTEIN alpha GmbH provides this manual for all production sites worldwide. The manufacturer of the product is indicated on the name plate (example image).

The operator must ensure that:

– All persons assigned to install, operate, or maintain the gearbox have read and understood this manual in full.
– The manual is stored within reach of the gearbox.
– All persons who work in the area around the machine are informed about the **safety instructions and warnings** so that no one sustains injuries.

1.1 Information symbols

The following information symbols are used:

1. Indicates an action to be performed

   ⓘ Provides additional handling information

   I. Prompts you to perform a substep of the action

   → Indicates the results of an action

1.2 Cross references

A cross reference refers to the chapter number and the header of the target section. For example: *2.2 Intended use*

A cross reference to a table refers to the table number. For example: *Table Tab. 3*

1.3 Checking the delivery

1. Check the completeness of the delivery against the delivery note.

   ⓘ Missing parts or damage must be reported immediately in writing to the carrier, the insurance, or **WITTENSTEIN alpha GmbH**.

2 Safety

2.1 Observing safety regulations

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

Personnel	Skill
All persons who work with the gearbox.	Persons are able to read these instructions and understand the information that is relevant to them.

Personal injuries or material damage, or other claims arising from non-observance of these minimum requirements, are the sole responsibility of the operator.

In particular, the following must be strictly adhered to:

1. When configuring your higher-level machine, observe the defined limits of the gearbox, including its intended use.
2. Observe the instructions for transport and storage.
3. Use the gearbox exclusively in accordance with its intended use.
4. Carry out maintenance and repair work appropriately and professionally in conformity with the specified intervals.
5. Always mount, dismantle, and operate the gearbox properly (e.g. even test run only with secure mounting).
6. In accordance with his risk assessment, the manufacturer of the higher-level machine shall, if necessary, install protective devices and equipment to protect the user from the residual hazards of the gearbox. Operate the gearbox only if these protective devices and equipment are intact and active.
7. Only operate the gearbox with the correct lubricant (type and amount).
8. Prevent the gearbox from becoming extremely soiled.
9. Only carry out modifications or reconstructions when these are approved in writing by **WITTENSTEIN alpha GmbH**.
10. In addition to the safety-related information in this manual, also observe any legal and otherwise applicable rules and regulations, particularly for accident prevention (e.g. personal safety equipment) and environmental protection.
11. Furthermore, inform all persons who work in the area around the gearbox about the **safety instructions and warnings** so that no one sustains injuries.

2.2 Product conformity

The product conformity of the gearboxes covers the following legal areas/regulations:

– 2.2.1 European Union (EU): Product conformity
– 2.2.2 United Kingdom (UK): Product conformity

2.2.1 European Union (EU): Product conformity

The product conformity of the gearboxes covers the following regulations of the European Union (EU):

– 2.2.1.1 Machine safety (EU)

2.2.1.1 Machine safety (EU)

The gearbox is within the scope of the Machinery Directive 2006/42/EC . According to the Machinery Directive, the gearbox is classified as partly completed machinery. For this reason, it does not bear a CE mark with reference to the Machinery Directive.

The partly completed machinery must not be put into operation before it is verified that the machinery in which the partly completed machinery is to be incorporated complies with the regulations of the Machinery Directive.

The declaration of incorporation for this gearbox is attached to the instructions.

ⓘ see 14.8 Conformity documentation

2.2.2 United Kingdom (UK): Product conformity

The product conformity of the gearboxes covers the following regulations of the United Kingdom (UK):

– 2.2.2.1 Machine safety (UK)

2.2.2.1 Machine safety (UK)

The gearbox is within the scope of the regulation S.I. 2008 No. 1597, Supply of Machinery (Safety) Regulations 2008. According to the Supply of Machinery (Safety) Regulation, the gearbox is classified as partly completed machinery. For this reason, it does not bear a UKCA mark with reference to the Supply of Machinery (Safety) Regulation.

The partly completed machinery must not be put into operation before it is verified that the machinery in which the partly completed machinery is to be incorporated complies with the regulations of the Supply of Machinery (Safety) Regulation.

The declaration of incorporation for this gearbox is attached to the instructions.

ⓘ see 14.8 Conformity documentation

2.3 Intended use

Areas of application

The gearbox is used to convert torques and speeds. It is suitable for industrial applications.

The gearbox may not be operated in areas with explosion hazards.

To meet the requirements for food machinery and machines for cosmetic or pharmaceutical products (according to Product conformity), we recommend the following:

– Perform a hygiene risk assessment (according to DIN EN 1672–2).
– Take appropriate measures (e.g. encapsulate the gearbox or use the gearbox only next to or below the product area).

Important

Product-specific deviations regarding the positioning and mounting position are explained in the product description.

ⓘ see 3 Product description

Safety-conscious behavior

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

The operator must ensure that:

– To avoid risk to the operator or damage to the machine, the gearbox is used only in accordance with its intended use and in a technically flawless and safe condition.
– The gearbox is checked immediately if a change in operating behavior is identified.

ⓘ see 11 Malfunctions

– All relevant persons inform themselves about the general safety instructions before beginning work.

ⓘ see 2.6 General safety instructions

Screw connections

Screw connections between the gearbox and customer interfaces have to be calculated, dimensioned, mounted and tested according to the state of the art. We recommend the use of VDI directives VDI 2862 sheet 2 and VDI 2230.

Tip

The tightening torques recommended by us can be found in the appendix.

ⓘ see 14.7 Tightening torques for common thread sizes in general mechanical engineering

Deviating from the general recommendations for installation, **washers** may be used if the material of the screw surface features an excessively low interface pressure.

When using washers, the following conditions must be met:

– The hardness of the washer needs to match the property class of the screw.
– The washer must be taken into account in the screw calculation (joints, additional compression set, surface pressure under screw head and under disc).

Motor-mounted gearbox variant

If the gearbox is intended to be mounted on a motor, the motor must meet the following conditions:

– It corresponds to design form B5.
– It has at least a radial and axial runout tolerance according to DIN EN 50347.
– It has a cylindrical shaft end with tolerance class h6 to k6.

Tip

For motor shaft diameters of 55 mm and up, m6 is also permissible.

In the case of deviations (e.g. design form B14), our Customer Service department [Technical Customer Service] will advise you.

2.4 Reasonably foreseeable misuse

Any misuse is prohibited. Misuse occurs in particular in the following cases:

– The use is contrary to the requirements for the intended use.

ⓘ see 2.3 Intended use

– The permitted technical data is exceeded, for example:
  ○ Speeds
  ○ Force and moment load
  ○ Temperature
  ○ Service life

2.5 Personnel

Only technicians who have read and understood this operating manual may perform work on the gearbox. Based on their training and experience, technicians must be able to evaluate the tasks assigned to them in order to recognize and avoid risks.

The following specialists are considered as target groups in this guide:

– Electrician
– Commissioning engineer
– Maintenance engineer
– Design engineer
– Logistics specialist
– Logistics planner

– Machine operator
– Mechanic
– Sustainability manager

The relevant target group is specified at the beginning of tasks.

2.6 General safety instructions

Operating the gearbox involves residual risks even when it is used as intended.

⚠ **WARNING! Rotating/moving parts** can cause serious injury as they present several potential hazards:

– Ejected objects
– Catching, winding, pulling in or crushing of body parts
– Unintended movements

1. Before startup, remove objects, loose components (e.g. keys), and tools from the gearbox, to avoid any risk of parts being thrown by the machine.
2. Keep a sufficient distance from moving machine components when the gearbox is running.
3. Secure the higher-level machine against restarting and unintentional movements during assembly and maintenance work (e.g. uncontrolled lowering of lifting axes).

⚠ **CAUTION!** A **hot gearbox** can cause serious burns.

1. Touch the hot gearbox only with protective gloves.

⚠ **CAUTION!** The **noise emissions** can cause hearing damage.

The continuous noise pressure level may vary according to product type and size.

1. For noise protection measures, observe the total noise pressure level of the machine.

   Tip

   Information about your gearbox is available in the customer-specific performance data, in the catalog under alpha.wittenstein.de or contact our Customer Service/Sales department:

NOTICE! **Loose or overloaded screw connections** can cause damage to the gearbox.

1. Use a calibrated torque wrench to tighten and check all screw connections for which tightening torques have been specified.

⚠ **CAUTION! Solvents and lubricants** pose several potential hazards:

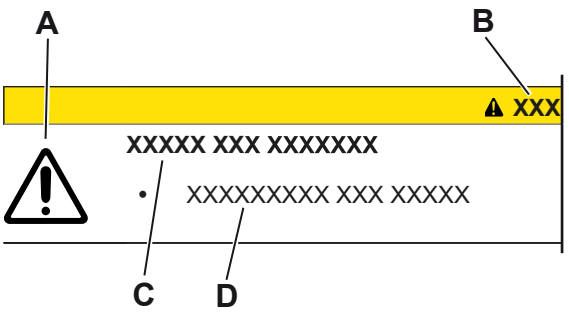
– Solvents and lubricants are combustible.
– Solvents and lubricants can cause skin irritations.
– Solvents and lubricants can pollute soil and water.

1. In case of fire: Use powder, foam, water *mist* or carbon dioxide for extinguishing.
   Explosion hazard: Do not use water *jets* to extinguish fires.
2. Observe the safety instructions of the lubricant manufacturer.
   ⓘ see 3.5 Information about the lubricant
3. Use protective gloves to avoid direct skin contact with solvents and lubricants.
4. Use and dispose of solvents and lubricants properly.

⚠ **WARNING!** A **damaged gearbox** can cause accidents and injury.

1. Immediately shut down a gearbox that has been overloaded due to misuse or a machine crash.
   ⓘ see 2.4 Reasonably foreseeable misuse
2. Replace the damaged gearbox, even if there is no visible external damage.

2.7 Structure of warning instructions



Warning instructions are situation-specific. They are positioned directly before any tasks that can cause hazards. The warning instructions in this manual are designed according to the following pattern:

A = safety symbol

ⓘ see 2.7.1 Safety symbols

B = signal word

ⓘ see 2.7.2 Signal words

C = Type and consequence of the danger

D = Avoiding the danger

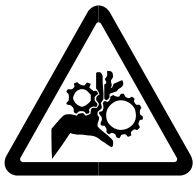
2.7.1 Safety symbols

The following safety symbols are used where necessary to indicate hazards, things that are forbidden and important information:

General danger

Hot surface

Suspended loads



Entanglement

Environmental protection

2.7.2 Signal words

The following signal words are used where necessary to indicate hazards, things that are forbidden and important information:

⚠ DANGER

This signal word indicates an impending danger that could result in severe injuries or even death.

- A "prompt to action" indicates how the danger can be avoided.

⚠ WARNING

This signal word indicates a potential danger that could result in severe injuries or even death.

- A "prompt to action" indicates how the danger can be avoided.

⚠ CAUTION

This signal word indicates a potential danger that could result in minor to severe injuries.

- A "prompt to action" indicates how the danger can be avoided.

NOTICE

This signal word indicates a potential danger that could result in material damage.

- A "prompt to action" indicates how the danger can be avoided.

Important

This signal word indicates application tips or especially important information for handling the gearbox.

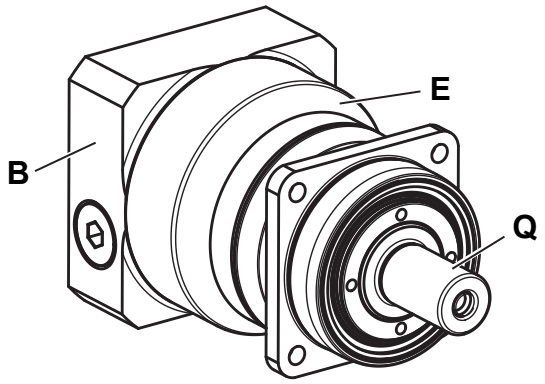
3 Product description

The gearbox is a single- or multi-stage, low-backlash gearbox that can be used in any mounting position.

If the gearbox is designed to be motor-mounted:

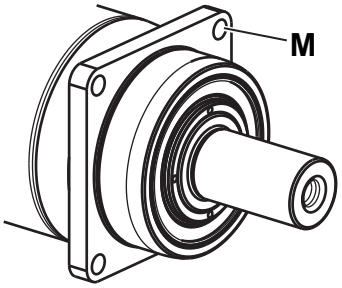
– Various types of motors can be accommodated using an adapter plate and, where necessary, a bushing.
– The gearbox can be optionally equipped with a coupling for linear length compensation.

3.1 Overview of gearbox components

		Gearbox components
	E	Gearbox housing
	Q	Output shaft / Hollow shaft
	B	Adapter plate

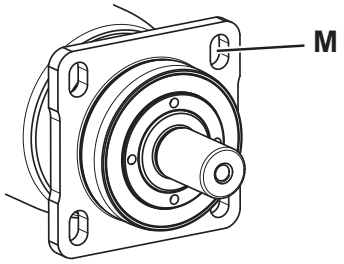
Tab. 1: Overview of gearbox components SP+

3.1.1 Version with through-holes

		Gearbox components
	M	Through-holes; see 7.4.1 Mounting the gearbox with through-holes

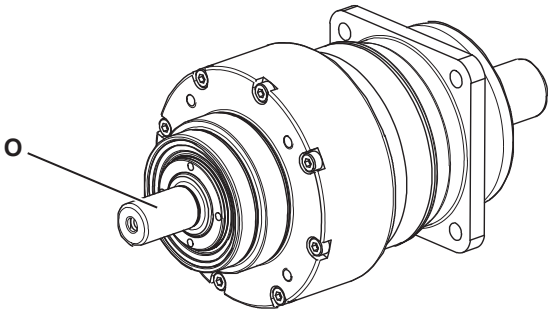
Tab. 2: Through-holes

3.1.2 Version with slotted holes

		Gearbox components
	M	Slotted holes; see 7.4.2 Mounting the gearbox with slotted holes
		Important Use only the washers included within the scope of delivery.

Tab. 3: Slotted holes

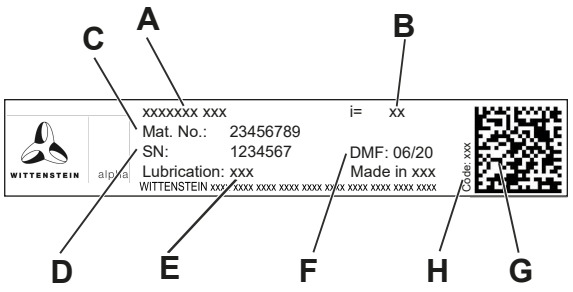
3.1.3 Gearbox variant: Self-contained version

		Gearbox components
	O	Input shaft; see 7.3 Mounting the mechanical input on the gearbox

Tab. 4: Gearbox variant: Self-contained version

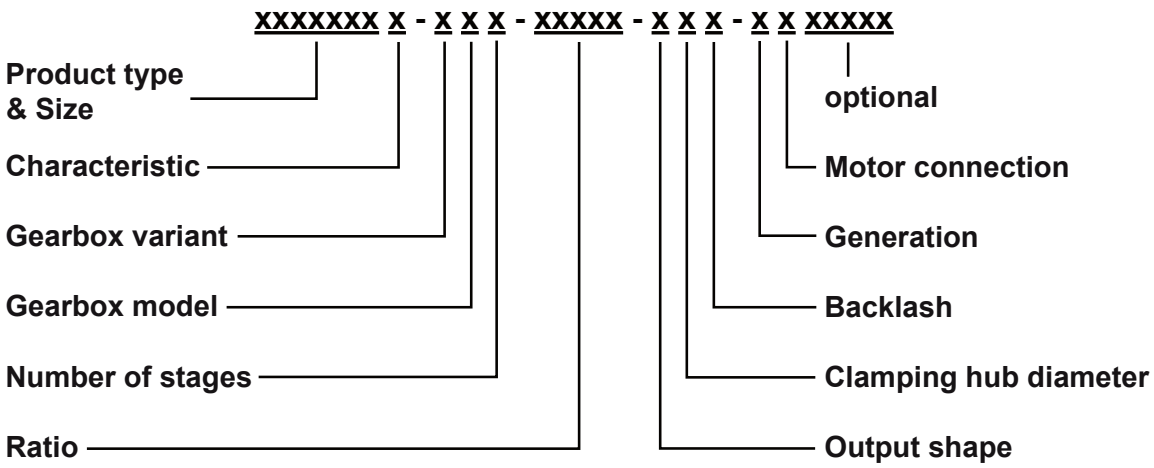
3.2 Name plate

The name plate is attached or lasered to the gearbox housing or the drive flange.

		Designation
	A	Ordering code: ⓘ 3.3 Ordering code
	B	Ratio i
	C	Material number / Customer material number (optional)
	D	Serial number
	E	Lubricant
	F	Date of manufacture (kW/year)
	G	Data matrix code (access to WITTENSTEIN Service Portal)
	H	Code (identifier and entry WITTENSTEIN Service Portal)

Tab. 5: Name plate (sample values)

3.3 Ordering code



More information is available in our catalog or at alpha.wittenstein.de.

3.4 Dimensions and performance data

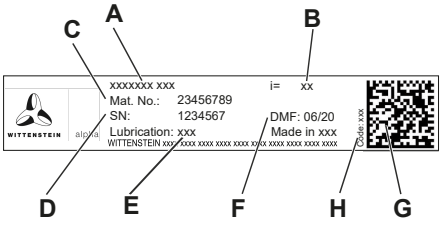
The dimensions and permissible performance data can be found in the following sources:

– In our catalog
– Under alpha.wittenstein.de
– In the cymex® design software,
– In the respective customer-specific performance data

Tip

For more information, please contact our Customer Service department.

3.5 Information about the lubricant



Important

The following applies for standard gearboxes:

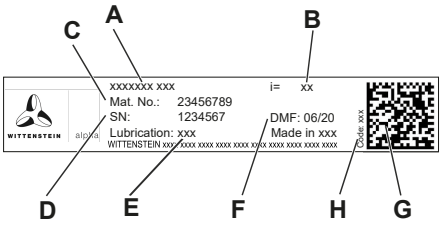
All gearboxes with the characteristic "S = standard" are permanently lubricated by the manufacturer with synthetic gear oil (polyglycols) (see name plate [E]).

All gearboxes with the characteristic "G= grease lubrication" are permanently lubricated by the manufacturer with gear grease (see name plate [E]).

All gearboxes with the characteristic "F = food-grade lubrication" are permanently lubricated by the manufacturer with synthetic gear oil approved for the food sector according to NSF H1 (see name plate [E]).

All gearboxes with the characteristic "F = food-grade grease" are permanently lubricated by the manufacturer with synthetic grease approved for the food sector according to NSF H1 (see name plate [E]).

All bearings are permanently lubricated by the manufacturer.



Important

The following applies for **HIGH SPEED** gearboxes:

All gearboxes with the characteristic "S = standard" are permanently lubricated by the manufacturer with gear grease (see name plate [E]).

All gearboxes with the characteristic "F = food-grade lubrication" are permanently lubricated by the manufacturer with synthetic grease approved for the food sector according to NSF H1 (see name plate [E]).

All bearings are permanently lubricated by the manufacturer.

3.6 Notes regarding the IP protection class

Important

The products comply with the protection class according to the catalog in accordance with EN 60529.

The operator must ensure that:

– Moisture penetration in the area of the output is avoided.

  We recommend the use of additional protection measures or alternative products where necessary.

– The operator ensures that the connection of the motor to the gearbox corresponds to the required protection classes (according to EN 60529):

  ⓘ The required protection classes can be achieved, for example, by the following measures:

  ○ Use a surface bonding agent between the motor flange and adapter plate.

  ○ Use sealing plates between the motor flange and adapter plate to seal the through-holes of the adapter plate. Sealing plates are available upon request from **WITTENSTEIN alpha GmbH**.

4 Sizing

A sizing/life calculation is used to determine the suitability of the gearbox for given process parameters (e.g. torques, speeds, operating mode).

Personnel	Skill
Design engineer	The specialist personnel is skilled in the design and construction of machines as well as the professional selection of suitable components for this design.

The following tools are available to you for the sizing:

– cymex® design software
– Catalog

Tip

For detailed sizing, please use our cymex® design software – alpha.wittenstein.de/en-en/cymex-5
The software enables the precise simulation of motion and load variables.

For *simplified* sizing, you can use the chapter "Information" in our catalog.
The current catalog can be found at alpha.wittenstein.de

5 Storage

If the gearbox is not to be unpacked and installed immediately after delivery, it must be stored properly.

The individual storage steps are described here:

– 5.1 Storing gearboxes

Personnel	Skill
Logistics specialist	The specialist personnel is qualified to handle lifting gear and carry out safe transport of high-quality machine components without any damage and ensuring their proper storage.
Logistics planner	The specialist personnel is skilled in the company's internal processes for the safe and professional storage, unpacking and transport of goods.

5.1 Storing gearboxes

The gearbox must be stored properly.

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

Personnel	Skill
Logistics specialist	The specialist personnel is qualified to handle lifting gear and carry out safe transport of high-quality machine components without any damage and ensuring their proper storage.
Logistics planner	The specialist personnel is skilled in the company's internal processes for the safe and professional storage, unpacking and transport of goods.

1. Read the general safety instructions before beginning work.

   ⓘ see 2.6 General safety instructions

2. Store the gearbox in horizontal position and dry surroundings at a temperature of 0 °C to +40 °C in the original packaging.
3. Store the gearbox for a maximum of 2 years.
4. Consult our Customer Service department if conditions are different.

6 Transport

The following list states the individual steps in the recommended order.

– 6.1 Unpacking the gearbox
– 6.2 Preparing for transport

  The specifications for transport can vary depending on the size.

  ○ 6.3 Transporting gearboxes: up to and including size SP+ 140
  ○ 6.4 Transporting gearboxes: from size SP+ 180

Personnel	Skill
Logistics specialist	The specialist personnel is qualified to handle lifting gear and carry out safe transport of high-quality machine components without any damage and ensuring their proper storage.
Logistics planner	The specialist personnel is skilled in the company's internal processes for the safe and professional storage, unpacking and transport of goods.

6.1 Unpacking the gearbox

The gearbox is delivered packed in foil and cardboard boxes.

The gearbox must be unpacked before further work.

Personnel	Skill
Logistics specialist	The specialist personnel is qualified to handle lifting gear and carry out safe transport of high-quality machine components without any damage and ensuring their proper storage.
Logistics planner	The specialist personnel is skilled in the company's internal processes for the safe and professional storage, unpacking and transport of goods.

1. Read the general safety instructions before beginning work.

   ⓘ see 2.6 General safety instructions

2. Unpack the gearbox correctly to prevent damage.
3. Dispose of the packaging materials at the recycling sites intended for this purpose. Observe the valid national regulations for waste disposal.

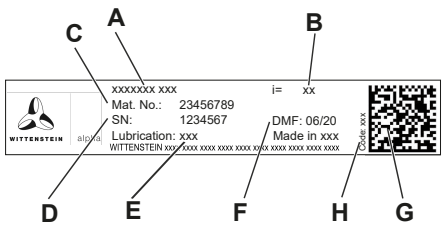
6.2 Preparing for transport

The gearbox is to be transported to another workplace.

The gearbox has already been unpacked.

ⓘ see 6.1 Unpacking the gearbox

Personnel	Skill
Logistics specialist	The specialist personnel is qualified to handle lifting gear and carry out safe transport of high-quality machine components without any damage and ensuring their proper storage.
Logistics planner	The specialist personnel is skilled in the company's internal processes for the safe and professional storage, unpacking and transport of goods.



The type and size are specified on the name plate (item [A]).

1. Read the general safety instructions before beginning work.

   ⓘ see 2.6 General safety instructions

2. Check the size on the name plate or in the accompanying documentation for the gearbox.

   The size tells you which transport conditions apply to the next steps.

3. Proceed to the section that corresponds to the established size.

   I. 6.3 Transporting gearboxes: up to and including size SP+ 140

   II. 6.4 Transporting gearboxes: from size SP+ 180

6.3 Transporting gearboxes: up to and including size SP+ 140

The gearbox is to be transported to another workplace.

⚠ WARNING

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

- Do not stand under suspended loads.
- Secure the gearbox before transport with suitable fasteners (e.g. belts).

NOTICE

Hard knocks, for instance because of falling or hard dropping, can damage the gearbox.

- Only use hoisting equipment and lifting accessories with sufficient capacity.
- Never exceed the maximum permissible load for hoisting equipment.
- Lower the gearbox slowly.

Transport has already been prepared.

ⓘ see 6.2 Preparing for transport

Personnel	Skill
Logistics specialist	The specialist personnel is qualified to handle lifting gear and carry out safe transport of high-quality machine components without any damage and ensuring their proper storage.
Logistics planner	The specialist personnel is skilled in the company's internal processes for the safe and professional storage, unpacking and transport of goods.

The following table specifies the maximum gearbox weights. Depending on the version, the actual weight can be considerably less.

Gearbox size SP+ (without mounting hole)	maximum weight [kg]
060	3.4
075	6.5

Gearbox size SP+ (without mounting hole)	maximum weight [kg]
100	12.4
140	27.4

Tab. 6: maximum weight [kg]

No special mode of transport is prescribed for the specified sizes.

1. Use the maximum weight information to decide which method you use to transport the gearbox.
2. Transport the gearbox to its destination safely and without damage.

6.4 Transporting gearboxes: from size SP+ 180

The gearbox is to be transported to another workplace.

⚠ WARNING

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

- Do not stand under suspended loads.
- Secure the gearbox before transport with suitable fasteners (e.g. belts).

NOTICE

Hard knocks, for instance because of falling or hard dropping, can damage the gearbox.

- Only use hoisting equipment and lifting accessories with sufficient capacity.
- Never exceed the maximum permissible load for hoisting equipment.
- Lower the gearbox slowly.

Transport has already been prepared.

ⓘ see 6.2 Preparing for transport

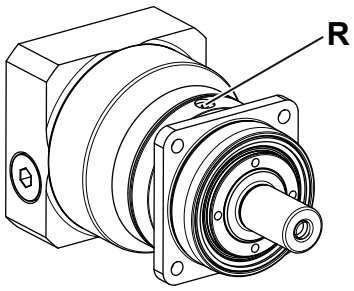
Personnel	Skill
Logistics specialist	The specialist personnel is qualified to handle lifting gear and carry out safe transport of high-quality machine components without any damage and ensuring their proper storage.
Logistics planner	The specialist personnel is skilled in the company's internal processes for the safe and professional storage, unpacking and transport of goods.

The following table specifies the maximum gearbox weights. Depending on the version, the actual weight can be considerably less.

Gearbox size SP+ (with mounting hole)	maximum weight [kg]
180	57.3
210	86
240	96

Tab. 7: maximum weight [kg]

The following table shows those gearboxes for which at least one support bore [R] is provided for an eye bolt (e.g. in accordance with DIN 580). The eye bolts are used for attaching the gearbox securely to the hoisting equipment.

	Gearbox size	Support bore Ø
	**SP+**	**[R]**
	180	M8
	210	M10
	240	M12

Tab. 8: Support bore Ø: SP+

We recommend the use of lifting gear for the specified sizes.

1. Use the maximum weight information to decide which lifting gear you use to transport the gearbox.
2. If using eye bolts (e.g. according to DIN 580), screw them into the indicated mounting holes.
3. Attach the lifting gear.
4. Transport the gearbox to its destination safely and without damage.
5. Set the load down carefully.
6. Detach the lifting gear.
7. Remove the eye bolts.

7 Installation

The following list states the individual steps in the recommended order. Depending on the application or gearbox model, this order can be deviated from.

– 7.1 Preparing for installation
– 7.2 Mounting the motor to the gearbox
– 7.3 Mounting the mechanical input on the gearbox
– 7.4 Mounting the gearbox on a machine
– 7.5 Mounting an add-on part on the output side

Personnel	Skill
Mechanic	The specialist personnel is qualified to carry out professional tightening connections, to join components and to connect lines for liquid media.

1. Read the general safety instructions before beginning work.

   ⓘ see 2.6 General safety instructions

2. If you have questions about correct assembly, consult our Customer Service department.

7.1 Preparing for installation

The gearbox must be cleaned and inspected before installation work.

NOTICE

Pressurized air can damage the gearbox seals.

- Do not use pressurized air to clean the gearbox.

If the gearbox is designed to be motor-mounted, the following additional information applies:

NOTICE

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.

NOTICE

Operation without an adapter plate might lead to damage.

- Only install your own adapter plate or replace an adapter plate according to the specifications of **WITTENSTEIN alpha GmbH**. For more information, please see the separate manual "Adapter plate replacement" (doc. no 2022–D063062). The manual will be provided by our Sales / Customer Service department on request. Always state the serial number when making the request.
- Operation without an adapter plate is prohibited.

Important

In rare cases, seeping may occur at the input (slight, non-continuous discharge of lubricant).

For optimized sealing of the motor/gearbox interface, we recommend sealing the following surfaces using a surface sealing adhesive (e.g. Loctite® 573 or 574):
- Between the adapter plate and drive housing (gearbox)
- Between the adapter plate and motor

ⓘ For further information, see the separate manuals "Adapter plate replacement" (doc no. 2022-D063062) and "Adapter plate with sealing adhesive" (doc no. 2098-D021746). The manual will be provided by our Sales / Customer Service department on request. Always state the serial number when making the request.

Personnel	Skill
Mechanic	The specialist personnel is qualified to carry out professional tightening connections, to join components and to connect lines for liquid media.

The following steps apply to all gearboxes:

1. Clean/degrease and dry the following components using a clean and lint-free cloth and a grease-dissolving, non-aggressive cleaning agent:
   - All fitting surfaces to neighboring components
   - Centering
2. Dry all fitting surfaces to neighboring components to achieve sufficient friction values for the screw connections.
3. In addition, check the fitting surfaces for damage and impurities.
4. Check whether all corrosion protection was removed from all extern components without any residues.
5. If the gearbox is designed to be motor-mounted, complete the following steps:
   I. Ensure that the motor meets the following conditions:
      - It corresponds to design form B5.
      - It has at least a radial and axial runout tolerance according to DIN EN 50347.
      - It has a cylindrical shaft end with tolerance class h6 to k6.

      Tip

      For motor shaft diameters of 55 mm and up, m6 is also permissible.

   II. Select the screws for fastening the motor to the adapter plate according to the motor manufacturer's specifications. Observe the minimum screw-in depth in relation to the property class (see following table).

Property class of screws for fastening the motor	8.8	10.9	Ax-70	Ax-80
Minimum screw-in depth	1.5 x d	1.8 x d	1.5 x d (*)	
d = Screw diameter				
(*) Only use a tool that is suitable for working with stainless steel.				

Tab. 9: Minimum screw-in depth of screws for fastening the motor to the adapter plate

   III. Have a threadlocker (e.g. Loctite® 243) ready to hand.

   IV. For **corrosion-resistant** gearboxes, have a sealing adhesive (e.g. Loctite® 573) ready to hand.

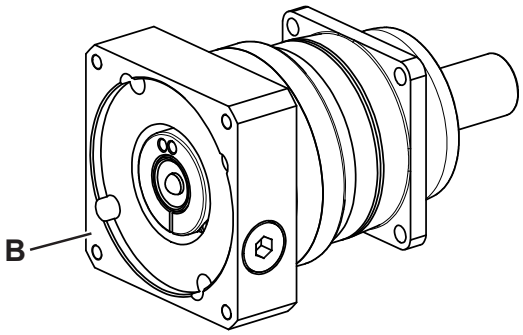
   V. Clean/degrease and dry the following components using a clean and lint-free cloth and a grease-dissolving, non-aggressive cleaning agent:
      - The motor shaft
      - The inner diameter of the clamping hub
      - The bushing, inside and out

If the gearbox is a self-contained version, the input shaft allows the gearbox to be driven directly via an add-on part (e.g. belt pulley).

6. If the gearbox is a self-contained version, complete the following steps:
   I. Have the add-on part (e.g. belt pulley) ready to hand. Clean it with a grease-dissolving, non-aggressive detergent.
   II. Clean/degrease and dry the following components using a clean and lint-free cloth and a grease-dissolving, non-aggressive cleaning agent:
      - The input shaft
      - The adjacent surfaces of the gearbox

7.2 Mounting the motor to the gearbox

A motor is to be mounted on the gearbox.



Only the gearbox variant "M" is intended for motor mounting. For other gearbox variants, the specified section can be skipped: 7.2 Mounting the motor to the gearbox

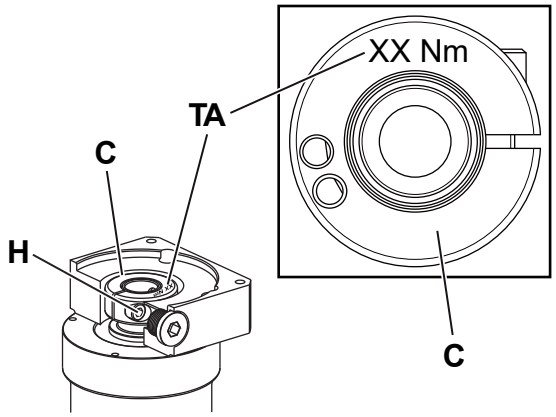
Various types of motors can be accommodated using an adapter plate [B] and, where necessary, a bushing.

Installation has already been prepared and all materials are ready to hand.

ⓘ see 7.1 Preparing for installation

Personnel	**Skill**
Mechanic	The specialist personnel is qualified to carry out professional tightening connections, to join components and to connect lines for liquid media.

1. Observe the specifications and safety instructions of the motor manufacturer.
2. Note down the tightening torque value [TA] for later use.

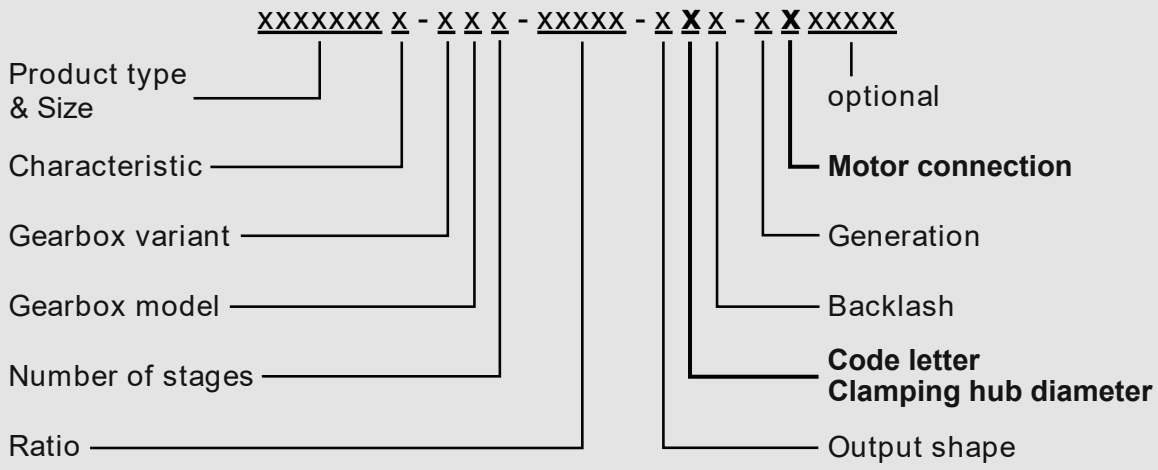


The tightening torque value [TA] of the clamping screw [H] can be found on the clamping hub [C].

ⓘ The value for the tightening torque can also be found in the following table.

Tightening torque for clamping bolt (H_1)

Ordering code:

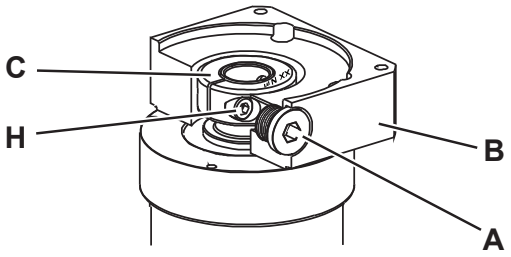


Clamping hub Ø [1] [mm]	(.)* Code letter	Width across flats [mm]	Tightening torque [Nm]
8	Z	2.5	2
9	A	2.5	2
11	B	3	4.1
14	C	4	9.5
16	D	5	14
19	E	5	14
24	G	6	35
28	H	5	14
32	I	8	79
38	K	8	79
48	M	10	135
55	N	10	135
60	O	14	330

[1] The availability of particular clamping hub diameters can be found in the catalog.

Tab. 10: SP+: Clamping bolt, eccentrical [H_1]

3. Ensure that the motor is mounted in a vertical direction if possible.
4. Remove the closure [A] from the mounting hole in the adapter plate [B].



Closure [A]:

- Locking screw

Adapter plate [B]

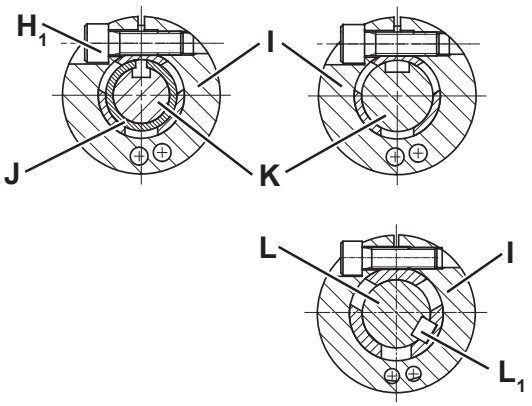
Clamping hub [C]

Clamping screw [H]

5. Rotate the clamping hub [C] until the clamping screw [H] can be reached via the mounting bore.

ⓘ A slotted bushing [J] has to be additionally installed for certain motor shaft diameters and applications.

- For the version with **clamping screw, eccentrical [H_1]:**
  The slots of the bushing (if present) and the clamping hub must be flush with the groove (if present) of the motor shaft; see following table.

Product type: SP+		
		**Designation**
	H_1	Clamping bolt, eccentrical
	I	Clamping ring
	J	Bushing
	K	Keyed motor shaft
	L	Motor shaft with shaft key
	L_1	Key

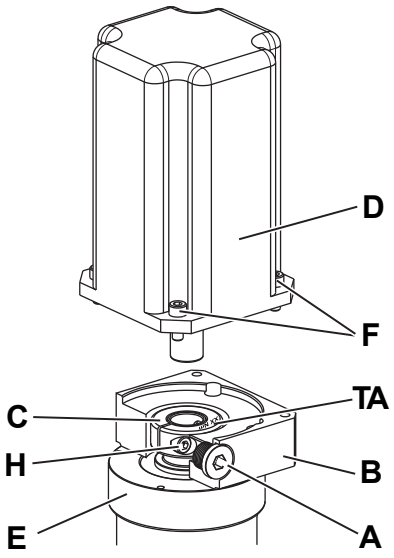
Tab. 11: Arrangement of motor shaft, clamping hub, and bushing

6. **The following applies only to corrosion-resistant gearboxes:** Apply a sealing adhesive (e.g. Loctite® 573) to the sealing surface of the adapter plate to prevent the ingress of foreign media.

Important

Observe the safety and processing instructions for the sealing adhesive used.

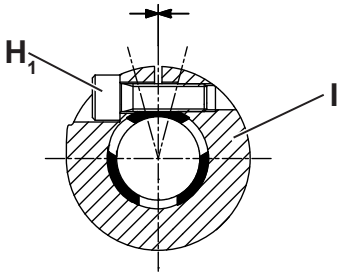
7. Slide the motor shaft into the clamping hub [C] f the gearbox [E].



Important

No gap must remain between the motor [D] and the adapter plate [B].

ⓘ The motor shaft should slide in easily. If this is not the case, the clamping screw [H] needs to be loosened by **one** revolution.



ⓘ If the clamping screw [H_1] is loosened too far or removed, the clamping ring [I] can rotate on the clamping hub. In this case, align it so that the clamping screw [H_1] is centered in the keyway of the clamping hub.

8. Apply threadlocker (e.g. Loctite® 243) to the four screws [F].

   Important

   Observe the safety and processing instructions for the threadlocker to be used.

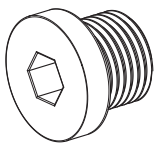
9. Fasten the motor [D] onto the adapter plate [B] with the four screws. Evenly tighten the screws crosswise with increasing torque.
10. Tighten the clamping screw [H] of the clamping hub [C].

    ⓘ Use the previously recorded tightening torque value [TA].

11. Seal the mounting hole of the adapter plate depending on the type of closure:

    I. **Locking screw** [A_1]: Screw it into the adapter plate [B].

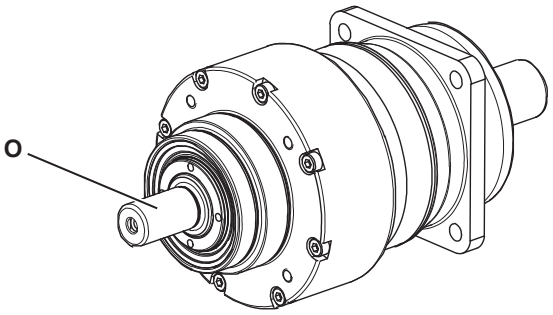
ⓘ The screw size and prescribed tightening torque can be found in the following table.

[A]			Tightening torque [Nm]						
		Width across flats [mm]	3	5	6	8	10	13	17
A_1		Locking screw	-	10	-	35	50	-	70

Tab. 12: Tightening torque

7.3 Mounting the mechanical input on the gearbox

A mechanical input is to be mounted on the gearbox.



Only the gearbox variant "S = self-contained version" is designed for a direct mechanical input. For other gearbox variants, the specified section can be skipped:
7.3 Mounting the mechanical input on the gearbox

The input shaft [O] allows the gearbox to be driven directly via an add-on part (e.g. belt pulley).

Installation has already been prepared.

ⓘ see 7.1 Preparing for installation

Personnel	Skill
Mechanic	The specialist personnel is qualified to carry out professional tightening connections, to join components and to connect lines for liquid media.

NOTICE

Distortions during assembly operations can damage the gearbox.

- Mount the add-on parts onto the gearbox input without using force.
- **Never** attempt to use force or hammering during mounting!
- Only use suitable tools and devices for assembly.
- Make sure not to exceed the maximum permissible static axial forces on the input bearing when pulling or shrink-fitting an add-on part onto the input side.

Product type SP+	
Gearbox size	**Maximum permitted static axial forces (Input shaft); F_{1AMax} [N]**
060	8200
075	9250
100	9250
140	10750
180; 1–stage	31250
180; 2–stage	10750
210; 1–stage	31250
210; 2–stage	10750
240	31250
Maximum permissible static axial forces at static structural safety (s0) = 1.8 and radial force (Fr) = 0	

Tab. 13: Maximum permitted static axial forces (Input shaft) SP+

The input shaft [O] allows the gearbox to be driven directly via an add-on part (e.g. belt pulley).

1. Check the input shaft and add-on part for cleanliness again.

2. Establish a secure connection to the input shaft [O].
   The requirements for the add-on part also apply here.

7.4 Mounting the gearbox on a machine

The gearbox is to be mounted on a machine.

Different mounting options exist depending on the gearbox model:

– 7.4.1 Mounting the gearbox with through-holes
– 7.4.2 Mounting the gearbox with slotted holes

7.4.1 Mounting the gearbox with through-holes

The gearbox is to be mounted on a machine by means of through-holes.

Installation has already been prepared.

ⓘ see 7.1 Preparing for installation

Personnel	Skill
Mechanic	The specialist personnel is qualified to carry out professional tightening connections, to join components and to connect lines for liquid media.

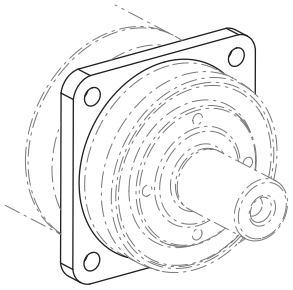
1. Center the gearbox in the machine bed.
2. Apply threadlocker (e.g. Loctite® 243) to the fastening screws.

   Important

   Observe the safety and processing instructions for the threadlocker to be used.

3. Mount the gearbox in such a way that the name plate can still be read.

   ⓘ The prescribed screw size and tightening torque can be found in the following table.

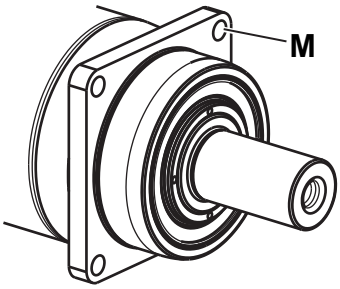
Product type: SP+; Through-holes					
	Gearbox size	Hole circle Ø	Bore Ø	Screw size / Property class	Tightening torque
	SP+	[mm]	[mm]		[Nm]
	060	68	5.5	M5 / 12.9	9
	075	85	6.6	M6 / 12.9	15.4
	100	120	9	M8 / 12.9	37.5
	140	165	11	M10 / 12.9	73.5
	180	215	13.5	M12 / 12.9	126
	210	250	17	M16 / 12.9	310
	240	290	17	M16 / 12.9	310

Tab. 14: SP+: Through-holes

ⓘ If your gearbox is equipped with a liquid-cooled adapter plate, the separate manual "Cooled adapter plate" (doc. no. 2022–D063351) applies. The manual will be provided by our Sales / Customer Service department on request. Always state the serial number when making the request.

ⓘ We recommend applying a clearance fit between the mounting flange and centering collar of the gearbox. The mounting flange should have a minimum tolerance of H7.

4. Fasten the gearbox onto the machine with the fastening screws through the through-holes [M].



Tip

We recommend not using washers if the material of the screw surface has sufficient interface pressure.

7.4.2 Mounting the gearbox with slotted holes

The gearbox is to be mounted on a machine by means of slotted holes.

Installation has already been prepared.

ⓘ see 7.1 Preparing for installation

Personnel	Skill
Mechanic	The specialist personnel is qualified to carry out professional tightening connections, to join components and to connect lines for liquid media.

1. Center the gearbox in the machine bed.
2. Use only the washers included within the scope of delivery.

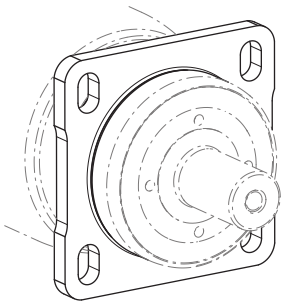
   Further information on the washers can be found in the following table.

Dimensions of the washers		
Gearbox size	**Outer Ø [mm]**	**Clamping length [mm]**
060	14	5
075	16	6
100	20	8
140	24	10

Tab. 15: Dimensions of the washers

3. Slide the washers onto the fastening screws.

   ⓘ The prescribed screw size and tightening torque can be found in the following table.

Product type: SP+; Flange with slotted holes					
	Gearbox size	Hole circle Ø	Bore Ø	Screw size / Property class	Tightening torque
	SP+	[mm]	[mm]		[Nm]
	060	75	6.6	M6 / 12.9	15.4
	075	91	9	M8 / 12.9	37.5
	100	125	11	M10 / 12.9	73.5
	140	165	13.5	M12 / 12.9	126

Tab. 16: SP+: Flange with slotted holes

4. Apply threadlocker (e.g. Loctite® 243) to the fastening screws.

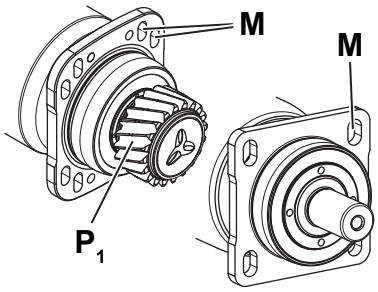
Important

Observe the safety and processing instructions for the threadlocker to be used.

5. Mount the gearbox in such a way that the name plate can still be read.

ⓘ If your gearbox is equipped with a liquid-cooled adapter plate, the separate manual "Cooled adapter plate" (doc. no. 2022–D063351) applies. The manual will be provided by our Sales / Customer Service department on request. Always state the serial number when making the request.

ⓘ We recommend applying a clearance fit between the mounting flange and centering collar of the gearbox. The mounting flange should have a minimum tolerance of H7.



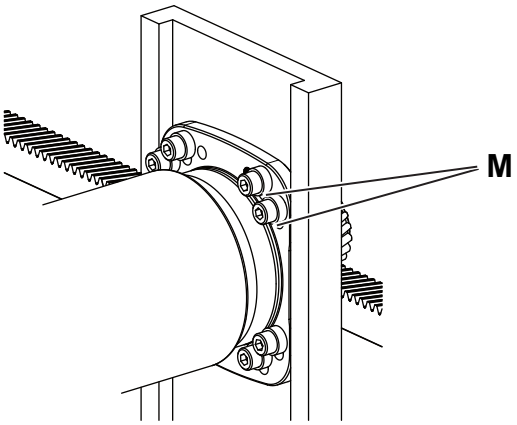
Optionally, the gearbox can be fitted with an output pinion [P_1]. The gearing backlash between the output pinion and toothed rack/ counter-wheel can be adjusted using the slotted holes [M] and the lateral guides. An additional adjustment mechanism is no longer necessary.

Tip

Detailed information on the design of the gearbox interface is available on request.

Tip

You will find further information on the proper setting of the gearing backlash in the "alpha rack and pinion system" manual (doc. no. 2022–D001333). The manual will be provided by our Sales / Customer Service department on request. Always state the serial number when making the request.



Important

Operating the gearbox without a motor (e.g. using a hand wheel) is permitted for setting/aligning the output pinion on the toothed rack.

When doing so, ensure **never** to tilt/bend the clamping hub.

6. Fasten the gearbox to the machine with the fastening screws through the slotted holes [M].

7.5 Mounting an add-on part on the output side

An add-on part is to be mounted on the output side of the gearbox.

Installation has already been prepared.

ⓘ see 7.1 Preparing for installation

Personnel	Skill
Mechanic	The specialist personnel is qualified to carry out professional tightening connections, to join components and to connect lines for liquid media.

Depending on the product type and version, the gearbox has the following output shape(s):

– Smooth shaft
– Shaft with key
– Splined shaft (DIN 5480)
– Blind hollow shaft

NOTICE

Distortions during assembly operations can damage the gearbox.

- Mount the add-on parts onto the gearbox output without using force.
- **Never** attempt to use force or hammering during mounting!
- Only use suitable tools and devices for assembly.
- Make sure not to exceed the maximum permissible static axial forces on the output bearing when pulling or shrink-fitting an add-on part onto the output side.

Product type SP+	
Gearbox size	**Maximum permitted static axial forces (Output shaft); F_{2AMax} [N]**
060	9250
075	10750
100	18500
140	31250
180	49750

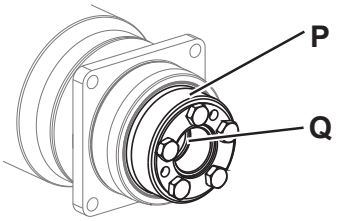
Product type SP+	
Gearbox size	**Maximum permitted static axial forces (Output shaft); F_{2AMax} [N]**
210	83250
240	97750
Maximum permissible static axial forces at static structural safety (s0) = 1.8 and radial force (Fr) = 0	

Tab. 17: SP+: Maximum permitted static axial forces (Output shaft)

1. **Smooth shaft / shaft with key / splined shaft (DIN 5480):** Establish a secure connection to the shaft.

   The requirements for the add-on part also apply here.

2. **Blind hollow shaft / hollow shaft interface:** The shaft is axially secured to the load shaft by means of a shrink disc connection. Check that the shrink disc [P] is already applied.



If a gearbox with shrink disc [P] was ordered, then it is already mounted on the blind hollow shaft / hollow shaft interface.

ⓘ With the recommended fit size h6 for the load shaft, it must be possible to push the disk on without exerting force, but without a noticeable fit tolerance. The required dimensions for the blind hollow shaft / hollow shaft interface can be found in the catalog.

I. **Shrink disc [P]:** Tighten the clamping screws gradually and evenly, one after the other in multiple circular passes until the prescribed tightening torque is reached.

   Further important instructions on how to handle the shrink disc can be found in the separate manual "Shrink disc" (doc. no. 2022–D063039). The manual will be provided by our Sales / Customer Service department on request. Always state the serial number when making the request.

   If you are using a shrink disc from a different manufacturer, observe this manufacturer's instructions.

8 Startup / operation

The gearbox is to be put into operation or operation is to continue.

Even if the gearbox does not require any intervention by the (machine) operator during intended operation, the external operating conditions must be met. These external operating conditions are identical for commissioning and operation and are summarized in this section.

Requirement: The gearbox has been correctly installed.

ⓘ see 7 Installation

Personnel	Skill
Commissioning engineer	The specialist personnel is skilled in setting up and commissioning mechatronic drive components in higher-level machines as well as troubleshooting compatibility problems.
Maintenance engineer	The specialist personnel is skilled in the scheduled maintenance of mechatronic drive components in higher-level machines as well as the professional rectification of malfunctions.
Machine operator	The specialist personnel is skilled in the proper operation and maintenance of machines as well as the identification of malfunctions.

1. Read the general safety instructions before beginning work.

   ⓘ see 2.6 General safety instructions

Improper use can cause damage to the gearbox.

2. Make sure that the **ambient temperature** is within the permissible range.

   ⓘ Refer to the table below for the permitted ambient temperature.

Ambient temperature		
Product type	**Minimum temperature [°C]**	**Maximum temperature [°C]**
SP+	-15	+40

Tab. 18: Ambient temperature

3. Make sure that the **operating temperature** does not exceed +90 °C (measured on the gearbox housing).
4. Avoid icing, which can damage the seals.
5. Use the gearbox only in a clean, dust-free, and dry environment. Moisture penetration in the area of the output in particular is inadmissible. In this connection, we recommend additional protection measures or alternative products.
6. Only use the gearbox up to its maximum limit values. For other conditions of use, consult our Customer Service department.

   ⓘ Observe the main technical data:

   - Speeds
   - Force and moment load
   - Temperature
   - Service life

7. When cleaning the gearbox, note that different cleaning procedures apply depending on the gearbox model.

   ⓘ see 9 Cleaning

9 Cleaning

The gearbox is to be cleaned.

Different cleaning procedures apply depending on the gearbox model:

– 9.1 Cleaning standard gearboxes

– 9.2 Cleaning corrosion-resistant gearboxes

Personnel	Skill
Maintenance engineer	The specialist personnel is skilled in the scheduled maintenance of mechatronic drive components in higher-level machines as well as the professional rectification of malfunctions.
Machine operator	The specialist personnel is skilled in the proper operation and maintenance of machines as well as the identification of malfunctions.

1. Shut down the gearbox.
2. Secure the higher-level machine against restarting and unintentional movements (e.g. uncontrolled lowering of lifting axes).
3. Allow the gearbox to cool.
4. Select the correct cleaning procedure and carry it out.

9.1 Cleaning standard gearboxes

The gearbox (standard gearbox) is to be cleaned.

The cleaning procedure described here does **not** apply to corrosion-resistant gearboxes or gearboxes in Hygienic Design. Other procedures exist for these gearboxes.

The gearbox was stopped and has cooled down.

Personnel	Skill
Maintenance engineer	The specialist personnel is skilled in the scheduled maintenance of mechatronic drive components in higher-level machines as well as the professional rectification of malfunctions.
Machine operator	The specialist personnel is skilled in the proper operation and maintenance of machines as well as the identification of malfunctions.

NOTICE

Pressurized air can damage the gearbox seals.

- Do not use pressurized air to clean the gearbox.

1. Use only clean, lint-free cloths and a grease-removing, non-aggressive cleaning agent for cleaning.
   I. For use of **shrink discs**, including those made of stainless steel, the following applies: Use only **halogen-free** (especially **chloride-free**) cleaning agents for cleaning.
2. Spray the cleaning agent onto a cloth and then wipe down the gearbox.
3. Clean/degrease all surfaces of the gearbox.
4. Dry all surfaces of the gearbox.
5. In addition, check the gearbox for corrosion, damage and impurities.

9.2 Cleaning corrosion-resistant gearboxes

The gearbox (corrosion-resistant gearbox) is to be cleaned.

The cleaning procedure described here does **not** apply to standard gearboxes or gearboxes in Hygienic Design. Other procedures exist for these gearboxes.

The gearbox was stopped and has cooled down.

A painted gearbox must be cooled down to a temperature of max. 40 °C before cleaning.

Personnel	Skill
Maintenance engineer	The specialist personnel is skilled in the scheduled maintenance of mechatronic drive components in higher-level machines as well as the professional rectification of malfunctions.
Machine operator	The specialist personnel is skilled in the proper operation and maintenance of machines as well as the identification of malfunctions.

NOTICE

Pressurized air can damage the gearbox seals.

- Do not use pressurized air to clean the gearbox.

1. Use only a grease-removing, non-aggressive cleaning agent for cleaning.
   I. For use of **shrink discs**, including those made of stainless steel, the following applies: Use only **halogen-free** (especially **chloride-free**) cleaning agents for cleaning.
2. Apply the cleaning agent to the gearbox.
3. Take care not to scratch the gearbox.

High-pressure water jets can damage the seals and paint of the gearbox and thus lead to leakage.

4. Use a **non-pressurized** water jet to rinse the gearbox.
5. Never aim the water jet directly at the seals.

   Attach a deflector in front of the seals if necessary.
6. Use only clean and lint-free cloths to dry the gearbox.
7. Dry all surfaces of the gearbox.
8. Remove applied media from the sealing of the gearbox.
9. In addition, check the gearbox for corrosion, damage and impurities.

10 Maintenance

The gearbox is to be checked for its required condition by means of regular maintenance.

The following list states the individual parts of a maintenance process.

– 10.1 Maintenance schedule
– 10.2 Maintenance work
– 10.3 Startup after maintenance work

Personnel	Skill
Maintenance engineer	The specialist personnel is skilled in the scheduled maintenance of mechatronic drive components in higher-level machines as well as the professional rectification of malfunctions.
Machine operator	The specialist personnel is skilled in the proper operation and maintenance of machines as well as the identification of malfunctions.

1. Read the general safety instructions before beginning work.

   ⓘ see 2.6 General safety instructions

10.1 Maintenance schedule

Maintenance work	During installation / At startup	For the first time after 500 operating hours or 3 months	Every 3 months
Visual inspection	X	X	X
Checking the tightening torques	X		

Tab. 19: Maintenance schedule

10.2 Maintenance work

The gearbox is to be checked for its required condition by means of regular maintenance.

The following list states the individual steps in the recommended order.

– 10.2.1 Visual inspection
– 10.2.2 Checking the tightening torques

Personnel	Skill
Maintenance engineer	The specialist personnel is skilled in the scheduled maintenance of mechatronic drive components in higher-level machines as well as the professional rectification of malfunctions.
Machine operator	The specialist personnel is skilled in the proper operation and maintenance of machines as well as the identification of malfunctions.

1. Shut down the gearbox.
2. Secure the higher-level machine against restarting and unintentional movements (e.g. uncontrolled lowering of lifting axes).
3. If possible, allow the gearbox to cool to ambient temperature.

10.2.1 Visual inspection

The gearbox is to be checked for its required condition by means of a visual inspection.

The higher-level machine has already been stopped and the gearbox has cooled down.

ⓘ see 10.2 Maintenance work

Personnel	Skill
Maintenance engineer	The specialist personnel is skilled in the scheduled maintenance of mechatronic drive components in higher-level machines as well as the professional rectification of malfunctions.
Machine operator	The specialist personnel is skilled in the proper operation and maintenance of machines as well as the identification of malfunctions.

1. Check the entire gearbox for exterior damage.
2. Seals are subject to wear. Therefore, also check the gearbox for leakage during each visual inspection.
   I. Clean/degrease and dry the seals using a clean and lint-free cloth and a grease-dissolving, non-aggressive cleaning agent. Minimize mechanical effects.
   II. Check the mounting position to ensure that no foreign media (e.g. oil) or particles (e.g. chips) have collected on the output shaft.
3. The following applies only to **corrosion-resistant** gearboxes: Check the lacquer layer and the nickel-plated surfaces for damages and corrosion.

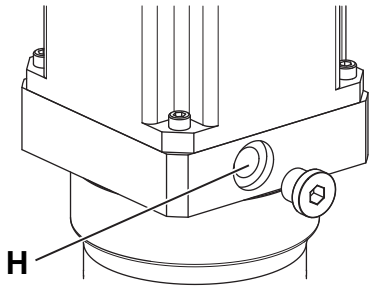
10.2.2 Checking the tightening torques

The gearbox is to be checked for its required condition by checking the tightening torques.

The higher-level machine has already been stopped and the gearbox has cooled down.

ⓘ see 10.2 Maintenance work

Personnel	Skill
Maintenance engineer	The specialist personnel is skilled in the scheduled maintenance of mechatronic drive components in higher-level machines as well as the professional rectification of malfunctions.
Machine operator	The specialist personnel is skilled in the proper operation and maintenance of machines as well as the identification of malfunctions.



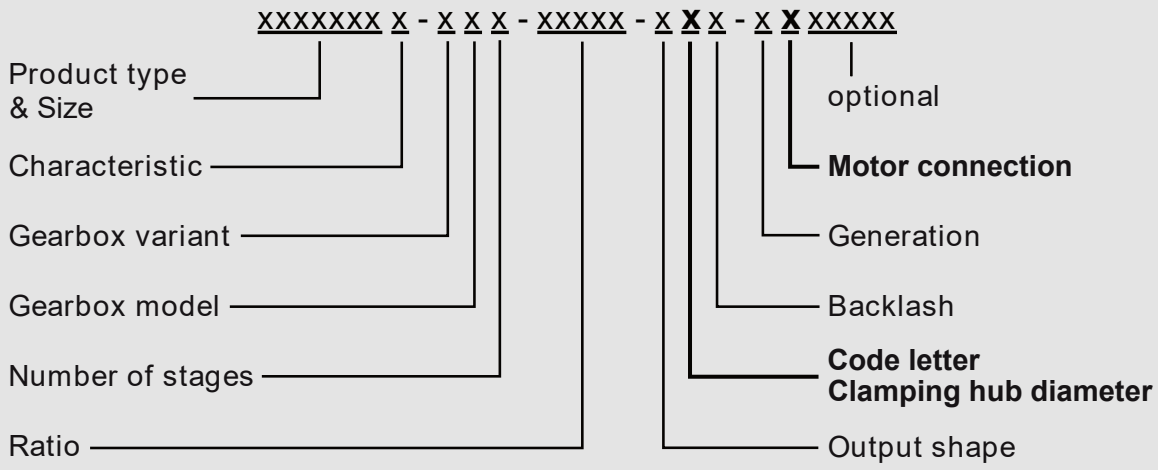
We recommend not using washers if the material of the screw surface has sufficient interface pressure.

1. Check the tightening torque of the clamping screw [H] on the motor mounting. If, while checking the tightening torque, you discover that the clamping screw can be turned further, tighten it to the prescribed tightening torque.

   ⓘ The value for the tightening torque can be found in the following table.

Tightening torque for clamping bolt (H_1)

Ordering code:



Clamping hub Ø [1] [mm]	(.)* Code letter	Width across flats [mm]	Tightening torque [Nm]
8	Z	2.5	2
9	A	2.5	2
11	B	3	4.1
14	C	4	9.5
16	D	5	14
19	E	5	14
24	G	6	35
28	H	5	14
32	I	8	79
38	K	8	79
48	M	10	135
55	N	10	135
60	O	14	330

[1] The availability of particular clamping hub diameters can be found in the catalog.

Tab. 20: SP+: Clamping bolt, eccentrical [H_1]

Screw connections between the gearbox and customer interfaces have to be calculated, dimensioned, mounted and tested according to the state of the art. We recommend the use of VDI directives VDI 2862 sheet 2 and VDI 2230.

ⓘ The tightening torques recommended by us can be found in table Tab. 21:.

	Tightening torque [Nm] with thread												
Property class Screw / nut	**M3**	**M4**	**M5**	**M6**	**M8**	**M10**	**M12**	**M14**	**M16**	**M18**	**M20**	**M22**	**M24**
8.8 / 8	1.15	2.64	5.2	9.0	21.5	42.5	73.5	118	180	258	362	495	625
10.9 / 10	1.68	3.88	7.6	13.2	32.0	62.5	108	173	264	368	520	700	890
12.9 / 12	1.97	4.55	9.0	15.4	37.5	73.5	126	202	310	430	605	820	1040

Tab. 21: Tightening torques for set screws and nuts

Deviating from the general recommendations for installation, washers may be used if the material of the screw surface features an excessively low interface pressure.

ⓘ The hardness of the washer needs to match the property class of the screw.

ⓘ Consider the washer in the screw calculation (joints, additional compression set, surface pressure under screw head and under disc).

10.3 Startup after maintenance work

The gearbox is to be put back into operation upon completion of maintenance work.

Personnel	**Skill**
Maintenance engineer	The specialist personnel is skilled in the scheduled maintenance of mechatronic drive components in higher-level machines as well as the professional rectification of malfunctions.
Machine operator	The specialist personnel is skilled in the proper operation and maintenance of machines as well as the identification of malfunctions.

1. Clean the outside of the gearbox.
   I. For use of **shrink discs**, including those made of stainless steel, the following applies: Use only **halogen-free** (especially **chloride-free**) cleaning agents for cleaning.
2. Attach all safety devices.
3. Before startup, remove objects, loose components (e.g. keys), and tools from the gearbox, to avoid any risk of parts being thrown by the machine.
4. Do a trial run before releasing the gearbox again for operation.

11 Malfunctions

NOTICE

Changed operational behavior can be an indication of existing damage to the gearbox, or cause damage to the gearbox.

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

Important

Malfunctions may only be rectified by specially trained technicians.

Error	Possible cause	Solution
Gearbox is blocked **⚠ WARNING!** Secure the higher-level machine against restarting and unintentional movements (e.g. uncontrolled lowering of lifting axes).	Foreign part blocking movement	Remove the foreign part and check the add-on parts for damage.
	Motor damage	Replace the motor.
	Gearbox damage	Consult our Customer Service department.
Increased operating noises	Tension in motor mounting Damaged bearings Toothing damage	Consult our Customer Service department.
Increased operating temperature	The gearbox is not suited for the task.	Check the technical data.
	Motor is heating the gearbox	Check the wiring of the motor. Ensure adequate cooling. Change the motor.
	Ambient temperature too high.	Ensure adequate cooling.
Loss of lubricant	Seeping	Wipe off discharged lubricant and continue to monitor the behavior of the gearbox. Lubricant discharge should stop after a short time.
	Seals not tight	Consult our Customer Service department.

12 Removal

The gearbox is to be removed for repair or disposal.

The following list states the individual steps in the recommended order. Depending on the application or version, this order can be deviated from.

– 12.1 Detaching an add-on part from the output side
– 12.2 Detaching the drive unit from the machine
– 12.3 Detaching the motor from the gearbox
– 12.4 Detaching the mechanical input from the gearbox

Personnel	Skill
Electrician	The specialist personnel is qualified to carry out connections for power and signal inputs.
Mechanic	The specialist personnel is qualified to carry out professional tightening connections, to join components and to connect lines for liquid media.

1. Read the general safety instructions before beginning work.

   ⓘ see 2.6 General safety instructions

2. If you have questions about correct removal, consult our Customer Service department.
3. Secure the higher-level machine against restarting and unintentional movements (e.g. uncontrolled lowering of lifting axes).

→ The previously listed tasks can now be carried out.

12.1 Detaching an add-on part from the output side

An add-on part is to be detached from the output side of the gearbox.

The preparatory steps for removal have already been completed.

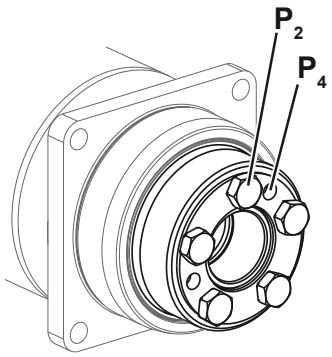
ⓘ see 12 Removal

Personnel	Skill
Mechanic	The specialist personnel is qualified to carry out professional tightening connections, to join components and to connect lines for liquid media.

Depending on the product type and version, the gearbox has the following output shape(s):

– Smooth shaft
– Shaft with key
– Splined shaft (DIN 5480)
– Blind hollow shaft

1. **Smooth shaft / shaft with key / splined shaft (DIN 5480):** Loosen any securing components and remove the add-on part from the shaft.
2. **Blind hollow shaft / hollow shaft interface:** Secure the load shaft against unintended movements before removing the shrink disc.



The shaft is axially secured to the load shaft by means of a shrink disc containing clamping screws [P_2].

I. **Shrink disc:** If possible, use the following procedure for removal.

II. Loosen the clamping screws [P_2] one after the other in multiple circular passes.

III. If the outer ring does not detach itself from the inner ring, remove a few of the clamping screws and screw them into the adjacent extraction threads [P_4].

IV. Remove the load shaft with care to protect adjacent parts against damage.

The removal process for special customer designs cannot be described here.

12.2 Detaching the drive unit from the machine

The drive unit (e.g. gearbox with motor) is to be detached from a machine.

Different mounting options may exist depending on the version:

– Through-holes

– Slotted holes

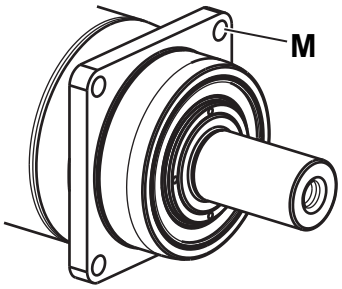
Requirement: The preparatory steps for removal have already been completed.

ⓘ see 12 Removal

Personnel	Skill
Electrician	The specialist personnel is qualified to carry out connections for power and signal inputs.
Mechanic	The specialist personnel is qualified to carry out professional tightening connections, to join components and to connect lines for liquid media.

1. Disconnect the electrical connections of the motor.
2. Secure the drive unit against falling.
3. For a drive unit with **through-holes**, proceed as follows:

ⓘ The figure shows the position of the connection screws [M].



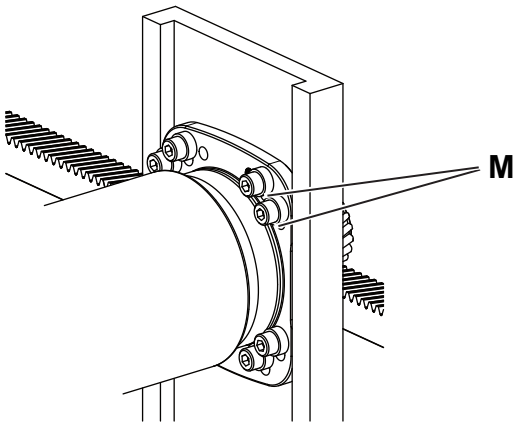
I. Release the connection screws [M] from the drive unit to the machine.

II. Carefully remove the drive unit from its position to protect adjacent parts against damage.

→ You have now detached a drive unit with through-holes from a machine.

4. For a drive unit with **slotted holes**, proceed as follows:

ⓘ The figure shows the position of the connection screws [M].



I. Also secure the drive unit against tilting in order to protect any toothed parts from damage.

II. If the drive unit is secured with cylindrical pins, remove them with an extractor.

III. Release the connection screws [M] from the drive unit to the machine.

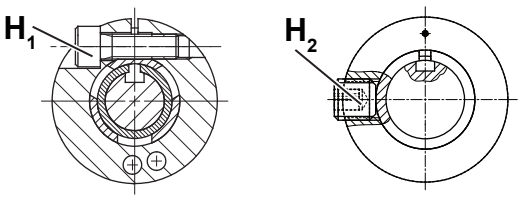
IV. Carefully remove the drive unit from its position to protect adjacent parts against damage.

→ You have now detached a drive unit with slotted holes from a machine.

12.3 Detaching the motor from the gearbox

A motor is to be detached from the gearbox.

Different mounting options may exist depending on the gearbox model.



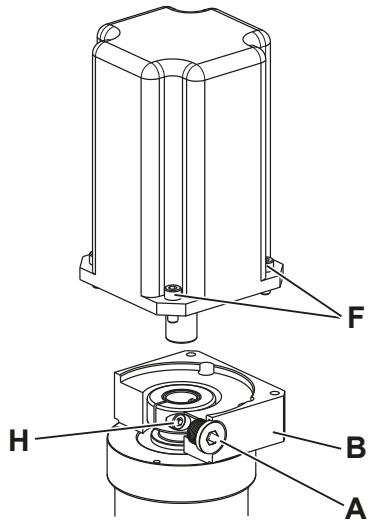
Clamping bolt, eccentrical [H_1]

Clamping bolt, centrical [H_2]

The preparatory steps for removal have already been completed.

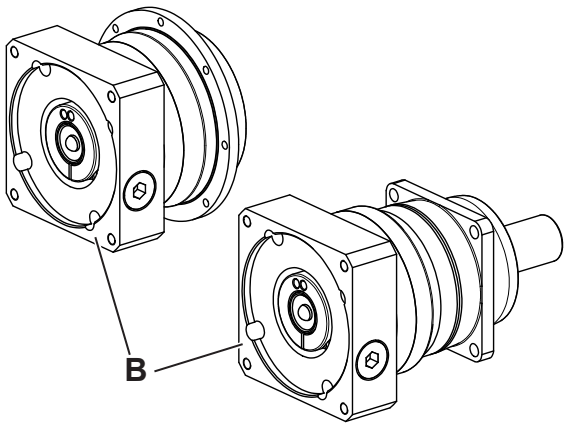
ⓘ see 12 Removal

Personnel	Skill
Mechanic	The specialist personnel is qualified to carry out professional tightening connections, to join components and to connect lines for liquid media.



1. Ensure that the motor is removed in a vertical direction if possible.
2. Remove the locking screw / set screw / sealing plug [A] from the mounting bore in the adapter plate [B].
3. Turn the gearbox until the clamping screw (H) can be reached via the assembly bore.
4. Loosen the clamping screw (H) in the clamping ring.
5. Loosen the screws [F] between the motor and the adapter plate.

   It must be possible to pull off the motor without effort.
6. Pull the motor off the gearbox.



ⓘ The adapter plate [B] is part of the gearbox. Include this part when returning the gearbox.

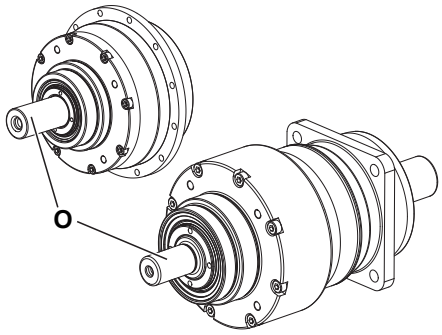
12.4 Detaching the mechanical input from the gearbox

An add-on part (mechanical input) is to be detached from the gearbox.

The preparatory steps for removal have already been completed.

ⓘ see 12 Removal

Personnel	Skill
Mechanic	The specialist personnel is qualified to carry out professional tightening connections, to join components and to connect lines for liquid media.



1. Loosen any securing components, and remove the add-on part from the input shaft [O].

13 Disposal

The gearbox has reached the end of its useful life and you now want to dispose of it.

The removal process has already been completed.

ⓘ see 12 Removal

Personnel	Skill
Sustainability manager	The specialist personnel is skilled in the professional testing and evaluation of internal company processes with regard to the requirements for sustainability and waste disposal.

Consult our Customer Service department for supplementary information on disassembly and disposal.

You have several disposal options:

– You dispose of the gearbox at a recycling site intended for this purpose.
– You return the gearbox to: **WITTENSTEIN alpha GmbH**
– You break the gearbox down into subassemblies and dispose of these pre-sorted parts at a recycling site intended for this purpose.

1. Choose one of the above disposal options.
2. If you want to **return** the gearbox, proceed as follows:
   I. Send the gearbox to the following address in appropriate packaging:
   WITTENSTEIN alpha GmbH
   Customer Service
   Walter-Wittenstein-Str.1, Tor 1,
   97999 Igersheim-Harthausen
   Germany

   ⓘ The return costs are borne by the sender.

   II. You are welcome to use the WITTENSTEIN Service Portal to register returns.
   Please note the RMA number generated in the portal or the reason for the return on the delivery note.

   WITTENSTEIN Service Portal

   ⚠ **WARNING!** Contaminated objects can cause damage to health. Inform us in writing in a timely manner about any contamination, any hazardous residues in or on the returned items as well as about transport risks and other measures to be taken.
3. If you want to **disassemble** the gearbox, we recommend the following steps:
   - 13.1 Disassembling the gearbox
   - 13.2 Recycling raw materials

13.1 Disassembling the gearbox

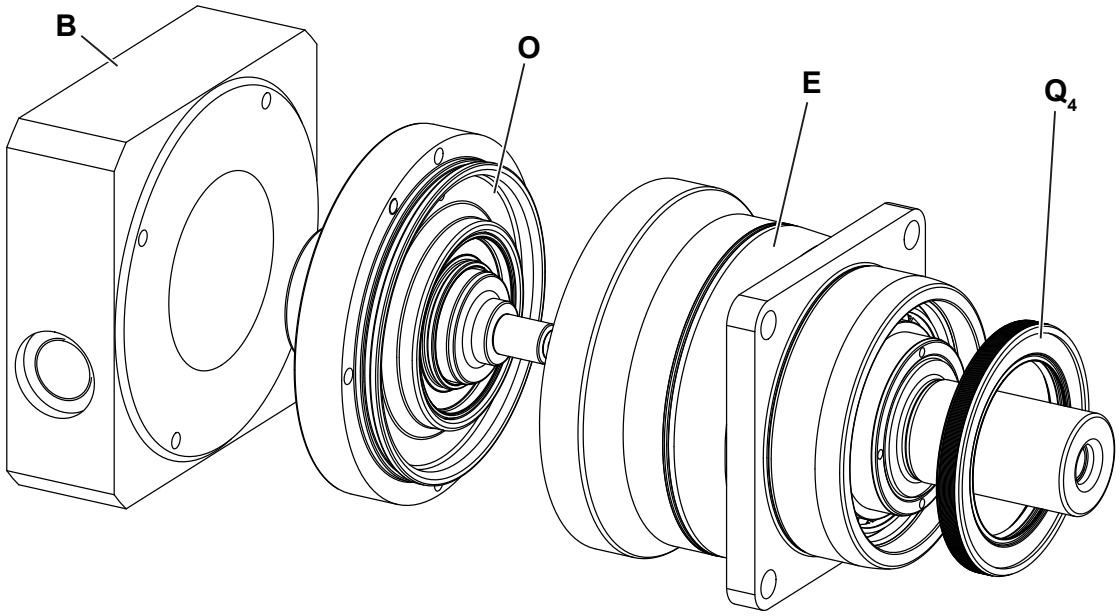
You want to break the gearbox down into individual subassemblies in order to recycle them separately.

The removal process has already been completed.

ⓘ see 12 Removal

Personnel	Skill
Sustainability manager	The specialist personnel is skilled in the professional testing and evaluation of internal company processes with regard to the requirements for sustainability and waste disposal.
Mechanic	The specialist personnel is qualified to carry out professional tightening connections, to join components and to connect lines for liquid media.

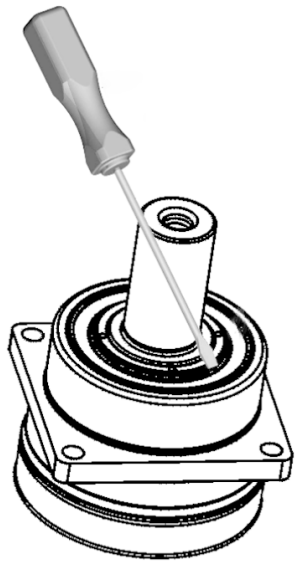
The gearbox consists of the following subassemblies:



Marking	Designation	Material
B	Adapter plate	Aluminum
O	Drive stage	Steel *and* Aluminum
E	Output stage	Steel *and* Aluminum
Q_4	Radial shaft seal	Plastic / mixed material

Tab. 22: Coaxial gearbox subassemblies (example image)

1. Remove the radial shaft seal [Q_4] of the output from the gearbox.



2. Drain all lubricant and collect it in an appropriate container.
3. Clean the radial shaft seal to remove any residual oil or grease.
4. Remove the adapter plate [B], if fitted. On some gearboxes, the fastening screws of the adapter plate also hold the drive stage [O] and output stage [E] together.
5. ***Note***

   Further disassembly is not recommended, as mechanically prestressed components can lead to hazards.

   Sort the subassemblies according to material.

   ⓘ Depending on the version, the material allocation of some subassemblies must be checked in advance.

13.2 Recycling raw materials

They want to recycle the subassemblies of the gearbox.

The gearbox has already been dismantled. The individual subassemblies and the collected lubricant have been sorted and are ready for recycling.

ⓘ see 13.1 Disassembling the gearbox

Personnel	Skill
Sustainability manager	The specialist personnel is skilled in the professional testing and evaluation of internal company processes with regard to the requirements for sustainability and waste disposal.
Mechanic	The specialist personnel is qualified to carry out professional tightening connections, to join components and to connect lines for liquid media.

1. **Polyglycol** (lubricant): Do not mix polyglycol with mineral oils that are intended for reprocessing. Dispose of polyglycol separately.
2. **Aluminum** (e.g. adapter plate): Recycle these parts as aluminum.
3. **Steel *and* aluminum** (e.g. output stage): Recycle these parts as mixed material (steel and aluminum).
4. **Steel** (e.g. toothed parts and shaft): Recycle these parts as steel.
5. **Plastic / mixed material** (sealing rings): Recycle these parts as mixed material (plastic and metal).
6. Dispose of the pre-sorted residual materials at a designated disposal site.

ⓘ Observe the valid national regulations for waste disposal.

14 Appendix

The appendix contains the technical information used in other sections as well as certificates and attestations for the product.

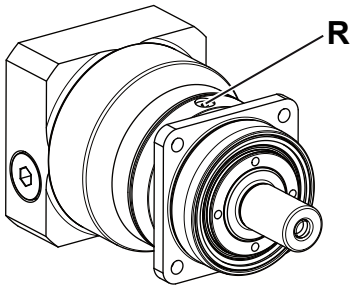
14.1 Maximum weight

Gearbox size SP+ (without mounting hole)	maximum weight [kg]
060	3.4
075	6.5
100	12.4
140	27.4

Tab. 23: maximum weight [kg]

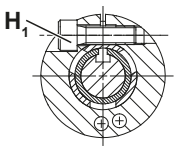
Gearbox size SP+ (with mounting hole)	maximum weight [kg]
180	57.3
210	86
240	96

Tab. 24: maximum weight [kg]

	Gearbox size	Support bore Ø
	SP+	[R]
	180	M8
	210	M10
	240	M12

Tab. 25: Support bore Ø: SP+

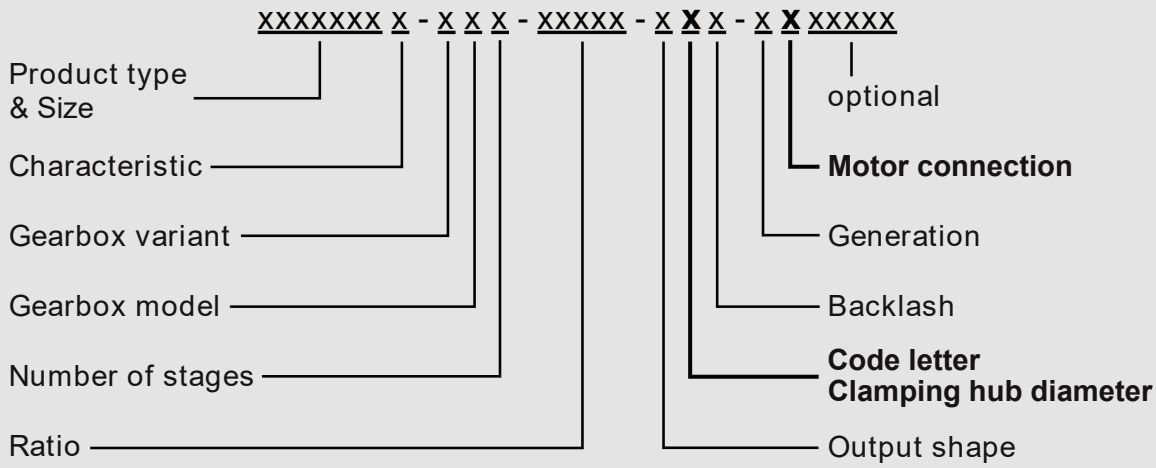
14.2 Specifications for mounting to a motor

		Designation
	H_1	Clamping bolt, eccentrical

Tab. 26: SP+: Arrangement of motor shaft, clamping hub, and bushing

Tightening torque for clamping bolt (H_1)

Ordering code:



Clamping hub Ø [1] [mm]	(.)* Code letter	Width across flats [mm]	Tightening torque [Nm]
8	Z	2.5	2
9	A	2.5	2
11	B	3	4.1
14	C	4	9.5
16	D	5	14
19	E	5	14
24	G	6	35
28	H	5	14
32	I	8	79
38	K	8	79
48	M	10	135
55	N	10	135
60	O	14	330

[1] The availability of particular clamping hub diameters can be found in the catalog.

Tab. 27: SP+: Clamping bolt, eccentrical [H_1]

14.3 Specifications for mounting a mechanical input

Product type SP+	
Gearbox size	**Maximum permitted static axial forces (Input shaft); F_{1AMax} [N]**
060	8200
075	9250
100	9250

Product type SP+	
Gearbox size	**Maximum permitted static axial forces (Input shaft); F_{1AMax} [N]**
140	10750
180; 1–stage	31250
180; 2–stage	10750
210; 1–stage	31250
210; 2–stage	10750
240	31250
Maximum permissible static axial forces at static structural safety (s0) = 1.8 and radial force (Fr) = 0	

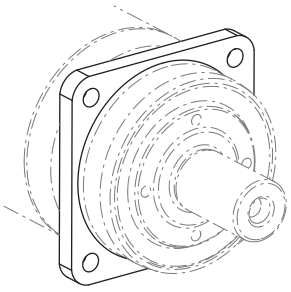
Tab. 28: Maximum permitted static axial forces (Input shaft) SP+

14.4 Specifications for mounting to a machine

Different mounting options exist depending on the gearbox model:

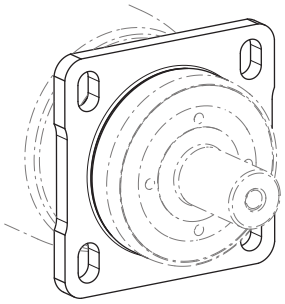
– 14.4.1 Specifications for mounting with through-holes
– 14.4.2 Specifications for mounting with slotted holes

14.4.1 Specifications for mounting with through-holes

Product type: SP+; Through-holes					
	Gearbox size	**Hole circle Ø**	**Bore Ø**	**Screw size / Property class**	**Tightening torque**
	**SP+**	**[mm]**	**[mm]**		**[Nm]**
	060	68	5.5	M5 / 12.9	9
	075	85	6.6	M6 / 12.9	15.4
	100	120	9	M8 / 12.9	37.5
	140	165	11	M10 / 12.9	73.5
	180	215	13.5	M12 / 12.9	126
	210	250	17	M16 / 12.9	310
	240	290	17	M16 / 12.9	310

Tab. 29: SP+: Through-holes

14.4.2 Specifications for mounting with slotted holes

Product type: SP+; Flange with slotted holes					
	Gearbox size	Hole circle Ø	Bore Ø	Screw size / Property class	Tightening torque
	SP+	[mm]	[mm]		[Nm]
	060	75	6.6	M6 / 12.9	15.4
	075	91	9	M8 / 12.9	37.5
	100	125	11	M10 / 12.9	73.5
	140	165	13.5	M12 / 12.9	126

Tab. 30: SP+: Flange with slotted holes

Dimensions of the washers		
Gearbox size	Outer Ø [mm]	Clamping length [mm]
060	14	5
075	16	6
100	20	8
140	24	10

Tab. 31: Dimensions of the washers

14.5 Specifications for mounting to the output side

Product type SP+	
Gearbox size	Maximum permitted static axial forces (Output shaft); F_{2AMax} [N]
060	9250
075	10750
100	18500
140	31250
180	49750
210	83250
240	97750
Maximum permissible static axial forces at static structural safety (s0) = 1.8 and radial force (Fr) = 0	

Tab. 32: SP+: Maximum permitted static axial forces (Output shaft)

Further important instructions on how to handle the shrink disc can be found in the separate manual "Shrink disc" (doc. no. 2022–D063039). The manual will be provided by our Sales / Customer Service department on request. Always state the serial number when making the request.

14.6 Specifications for startup and operation

Ambient temperature		
Product type	**Minimum temperature [°C]**	**Maximum temperature [°C]**
SP+	-15	+40

Tab. 33: Ambient temperature

14.7 Tightening torques for common thread sizes in general mechanical engineering

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

– Calculation according to VDI 2230 (edition 11/2015)
– Friction value for thread and contact surfaces μ=0.10
– Utilization of the yield stress 90%
– Torque tools type II classes A and D in accordance with ISO 6789

The settings are values rounded to usual commercial scale gradations or settings.

Important

Use the **exact** values in this table to set your tools.

	Tightening torque [Nm] with thread												
Property class Screw / nut	**M3**	**M4**	**M5**	**M6**	**M8**	**M10**	**M12**	**M14**	**M16**	**M18**	**M20**	**M22**	**M24**
8.8 / 8	1.15	2.64	5.2	9.0	21.5	42.5	73.5	118	180	258	362	495	625
10.9 / 10	1.68	3.88	7.6	13.2	32.0	62.5	108	173	264	368	520	700	890
12.9 / 12	1.97	4.55	9.0	15.4	37.5	73.5	126	202	310	430	605	820	1040

Tab. 34: Tightening torques for set screws and nuts

14.8 Conformity documentation

Declaration of incorporation (EU)

WITTENSTEIN alpha

Einbauerklärung

(Originaltext)

Wir WITTENSTEIN alpha GmbH
Walter-Wittenstein-Straße 1
97999 Igersheim
GERMANY

erklären als Hersteller, dass die unten bezeichnete unvollständige Maschine den nachfolgend aufgeführten Sicherheits- und Gesundheitsschutzanforderungen der Richtlinie 2006/42/EG Anhang I entspricht (siehe „Anhang zur Einbauerklärung").

Bezeichnung: **Getriebe**

Ausführung: **CP, CP Gen 2, CPK, CPS, CPSK, DP+, DPK+, KPG, PKF+, HDP, HDV, HG+, LK+, LPB, LPB+, LPBK+, LPK+, NP, NPK, NPL, NPLK, NPR, NPRK, NPS, NPSK, NPT, NPTK, RP+, RPC+, RPK+, SC+, SK, SK+, SP, SP+, SPC+, SPK, SPK+, TK+, TP, TP+, TPC+, TPK, TPK+, VDH+, VDS+, VDT+, VH+, VS+, VT+, CVH, CVS, NVH, NVS, VDHe, VDSe, XP, XPC+, XPK+**

Seriennummer:	SN: 7386950, 7-8stellig fortlaufend
Einschlägige EG-Richtlinie:	2006/42/EG (Maschinen)
Angewandte harmonisierte Normen:	EN 60529:1991 + A1:2000 + A2:2013 EN ISO 12100:2010
Bevollmächtigter für die Zusammenstellung der technischen Unterlagen:	WITTENSTEIN alpha GmbH (Adresse siehe oben)

Die speziellen technischen Unterlagen gemäß Anhang VII Teil B der Maschinenrichtlinie 2006/42/EG wurden erstellt. Wir verpflichten uns, die speziellen technischen Unterlagen den einzelstaatlichen Stellen auf begründetes Verlangen innerhalb einer angemessenen Zeit in elektronischer Form zu übermitteln.

Die unvollständige Maschine darf erst dann in Betrieb genommen werden, wenn gegebenenfalls festgestellt wurde, dass die Maschine, in die die unvollständige Maschine eingebaut werden soll, den Bestimmungen der Maschinenrichtlinie entspricht.

Igersheim, den 06.12.2022
Ort und Datum der Ausstellung

Norbert Pastoors, Geschäftsführer

Document No.: 1000117477 Rev.:01

WITTENSTEIN alpha

Anhang zur Einbauerklärung

Liste der für das in der Einbauerklärung angegebene Produkt angewandten und eingehaltenen grundlegenden Sicherheits- und Gesundheitsschutzanforderungen für Konstruktion und Bau von Maschinen.

Kapitel	Bezeichnung	Nicht anwendbar	Eingehalten	Bemerkung
1.1.	Allgemeines			
1.1.1.	Begriffsbestimmungen		x	
1.1.2.	Grundsätze für die Integration der Sicherheit		x	
1.1.3.	Materialien und Produkte		x	
1.1.4.	Beleuchtung	x		
1.1.5.	Konstruktion der Maschine in Hinblick auf die Handhabung		x	
1.1.6.	Ergonomie	x		
1.1.7.	Bedienungsplätze	x		
1.1.8.	Sitze	x		
1.2.	Steuerungen und Befehlseinrichtungen			
1.2.1.	Sicherheit und Zuverlässigkeit von Steuerungen	x		
1.2.2.	Stellteile	x		
1.2.3.	Ingangsetzen	x		
1.2.4.	Stillsetzen	x		
1.2.4.1.	Normales Stillsetzen	x		
1.2.4.2.	Betriebsbedingtes Stillsetzen	x		
1.2.4.3.	Stillsetzen im Notfall	x		
1.2.4.4.	Gesamtheit von Maschinen	x		
1.2.5.	Wahl der Steuerungs- oder Betriebsarten	x		
1.2.6.	Störung der Energieversorgung	x		
1.3.	Schutzmassnahmen gegen mechanische Gefährdungen			
1.3.1.	Verlust Standsicherheit		x	
1.3.2.	Bruchrisiko beim Betrieb		x	
1.3.3.	Risiken durch herabfallende oder herausgeschleuderte Gegenstände	x		
1.3.4.	Risiken durch Oberflächen, Ecken, Kanten		x	
1.3.5.	Risiken durch mehrfach kombinierte Maschinen	x		
1.3.6.	Risiken durch Änderung der Verwendungsbedingungen	x		
1.3.7.	Risiken durch bewegliche Teile	x		
1.3.8.	Wahl der Schutzeinrichtungen gegen Risiken durch bewegliche Teile	x		
1.3.8.1.	Bewegliche Teile der Kraftübertragung	x		

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Kapitel	Bezeichnung	Nicht anwendbar	Eingehalten	Bemerkung
1.3.8.2.	Bewegliche Teile die am Arbeitsprozess beteiligt sind	x		
1.3.9.	Risiko unkontrollierter Bewegungen	x		
1.4.	Anforderungen an Schutzeinrichtungen			
1.4.1.	Allgemeine Anforderungen an Schutzeinrichtungen	x		
1.4.2.	Besondere Anforderungen an trennende Schutzeinrichtungen	x		
1.4.2.1.	Feststehende trennende Schutzeinrichtungen	x		
1.4.2.2.	Bewegliche trennende Schutzeinrichtungen mit Verriegelung	x		
1.4.2.3.	Zugangsbeschränkte verstellbare Schutzeinrichtungen	x		
1.4.3.	Besondere Anforderungen an nichttrennende Schutzeinrichtungen	x		
1.5.	Risiken durch sonstige Gefährdungen			
1.5.1.	Elektrische Energieversorgung	x		
1.5.2.	Statische Elektrizität		x	
1.5.3.	Nichtelektrische Energieversorgung	x		
1.5.4.	Montagefehler		x	
1.5.5.	Extreme Temperaturen		x	
1.5.6.	Brand	x		
1.5.7.	Explosion	x		
1.5.8.	Lärm		x	
1.5.9.	Vibration		x	
1.5.10.	Strahlung	x		
1.5.11.	Strahlung von außen	x		
1.5.12.	Laserstrahlung	x		
1.5.13.	Emission gefährlicher Werkstoffe und Substanzen		x	
1.5.14.	Risiko, in einer Maschine eingeschlossen zu werden	x		
1.5.15.	Ausrutsch, Stolper, Sturzrisiko	x		
1.5.16.	Blitzschlag	x		
1.6.	Instandhaltung			
1.6.1.	Wartung der Maschine		x	
1.6.2.	Zugang zu Bedienständen und den Eingriffspunkten für die Instandhaltung	x		
1.6.3.	Trennung von Energiequellen	x		
1.6.4.	Eingriffe des Bedienpersonals	x		
1.6.5.	Reinigung innenliegender Maschinenteile	x		
1.7.	Informationen			
1.7.1.	Informationen und Warnhinweise an der Maschine		x	

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Kapitel	Bezeichnung	Nicht anwendbar	Eingehalten	Bemerkung
1.7.1.1.	Informationen und Informationseinrichtungen	x		
1.7.1.2.	Warneinrichtungen	x		
1.7.2.	Warnung vor Restrisiken		x	
1.7.3.	Kennzeichnung der Maschine		x	
1.7.4.	Betriebsanleitung		x	
1.7.4.1.	Allgemeine Grundsätze für die Abfassung einer Betriebsanleitung		x	
1.7.4.2.	Inhalt der Montageanleitung		x	
1.7.4.3.	Verkaufsprospekte		x	

Document No.: 1000117477 Rev.:01

WITTENSTEIN alpha

Declaration of Incorporation

(Translation of original text)

We, WITTENSTEIN alpha GmbH
Walter-Wittenstein-Straße 1
97999 Igersheim
GERMANY

hereby declare that the partly completed machinery designated below is in conformity with the safety and health protection requirements of Directive 2006/42/EC, Annex I (refer to "Appendix regarding the Declaration of Incorporation").

Description: **Gearbox**

Model: **CP, CP Gen 2, CPK, CPS, CPSK, DP+, DPK+, KPG, PKF+, HDP, HDV, HG+, LK+, LPB, LPB+, LPBK+, LPK+, NP, NPK, NPL, NPLK, NPR, NPRK, NPS, NPSK, NPT, NPTK, RP+, RPC+, RPK+, SC+, SK, SK+, SP, SP+, SPC+, SPK, SPK+, TK+, TP, TP+, TPC+, TPK, TPK+, VDH+, VDS+, VDT+, VH+, VS+, VT+, CVH, CVS, NVH, NVS, VDHe, VDSe, XP, XPC+, XPK+**

Serial number:	SN: 7386950, consecutive number (7-8 digits)
Relevant EC Directive:	2006/42/EC (Machinery)
Applied harmonized standards:	EN ISO 12100:2010 EN 60529:1991 + A1:2000 + A2:2013
The person authorized to compile technical documents:	WITTENSTEIN alpha GmbH (address see above)

The special technical documentation in accordance with appendix VII part B of directive 2006/42/EG have been created. We undertake to forward the special technical documentation to a reasoned request to the national authorities. We shall submit them by means of electronic data carrier.

The designated partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of this Directive.

Igersheim, 06.12.2022
City and date

Norbert Pastoors, Managing Director

Document No.: 1000117477 Rev.: 01

WITTENSTEIN alpha

Appendix regarding the Declaration of Incorporation

List of the essential health and safety requirements applied and fulfilled for the product named in the Declaration of Incorporation.

Chapter	Designation	not applicable	fulfilled	remark
1.1.	General Remarks			
1.1.1.	Definitions		x	
1.1.2.	Principles of safety integration		x	
1.1.3.	Materials and products		x	
1.1.4.	Lighting	x		
1.1.5.	Design of machinery to facilitate its handling		x	
1.1.6.	Ergonomics	x		
1.1.7.	Operating positions	x		
1.1.8.	Seating	x		
1.2.	Control systems			
1.2.1.	Safety and reliability of control systems	x		
1.2.2.	Control devices	x		
1.2.3.	Starting	x		
1.2.4.	Stopping	x		
1.2.4.1.	Normal stop	x		
1.2.4.2.	Operational stop	x		
1.2.4.3.	Emergency stop	x		
1.2.4.4.	Assembly of machinery	x		
1.2.5.	Selection of control or operating modes	x		
1.2.6.	Failure of the power supply	x		
1.3.	Protection against mechanical hazards			
1.3.1.	Risk of loss of stability		x	
1.3.2.	Risk of break-up during operation		x	
1.3.3.	Risks due to falling or ejected objects	x		
1.3.4.	Risks due to surfaces, edges or angles		x	
1.3.5.	Risks related to combined machinery	x		
1.3.6.	Risks related to variations in operating conditions	x		
1.3.7.	Risks related to moving parts	x		
1.3.8.	Choice of protection against risks arising from moving parts	x		
1.3.8.1.	Moving transmission parts	x		
1.3.8.2.	Moving parts involved in the process	x		
1.3.9.	Risks of uncontrolled movements	x		

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Chapter	Designation	not applicable	fulfilled	remark
1.4.	Required characteristics of guards and protective devices			
1.4.1.	General requirements	x		
1.4.2.	Special requirements for guards	x		
1.4.2.1.	Fixed guards	x		
1.4.2.2.	Interlocking movable guards	x		
1.4.2.3.	Adjustable guards restricting access	x		
1.4.3.	Special requirements for protective devices	x		
1.5.	Risks due to other hazards			
1.5.1.	Electricity supply	x		
1.5.2.	Static electricity		x	
1.5.3.	Energy supply other than electricity	x		
1.5.4.	Errors of fitting		x	
1.5.5.	Extreme temperatures		x	
1.5.6.	Fire	x		
1.5.7.	Explosion	x		
1.5.8.	Noise		x	
1.5.9.	Vibrations		x	
1.5.10.	Radiation	x		
1.5.11.	External radiation	x		
1.5.12.	Laser radiation	x		
1.5.13.	Emissions of hazardous materials and substances		x	
1.5.14.	Risk of being trapped in a machine	x		
1.5.15.	Risk of slipping, tripping or falling	x		
1.5.16.	Lightning	x		
1.6.	Maintenance			
1.6.1.	Machinery maintenance		x	
1.6.2.	Access to operating positions and servicing points	x		
1.6.3.	Isolation of energy sources	x		
1.6.4.	Operator intervention	x		
1.6.5.	Cleaning of internal parts	x		
1.7.	Information			
1.7.1.	Information and warnings on the machinery		x	
1.7.1.1.	Information and information devices	x		
1.7.1.2.	Warning devices	x		
1.7.2.	Warning of residual risks		x	
1.7.3.	Marking of machinery		x	

Document No.: 1000117477 Rev.: 01

Chapter	Designation	not applicable	fulfilled	remark
1.7.4.	Instructions		x	
1.7.4.1.	General principles for the drafting of instructions		x	
1.7.4.2.	Contents of the instructions		x	
1.7.4.3.	Sales literature		x	

Document No.: 1000117477 Rev.: 01

Declaration of incorporation (UK)

WITTENSTEIN alpha

Declaration of Incorporation

(Translation of original text)

We, WITTENSTEIN alpha GmbH
Walter-Wittenstein-Straße 1
97999 Igersheim
GERMANY

with our authorized representative for GB, WITTENSTEIN Ltd.
Unit 3 The Glades, Festival Way
ST1 5SQ Stoke on Trent, Staffordshire, GB

hereby declare that the partly completed machinery designated below is in conformity with the safety and health protection requirements of S.I. 2008:1597, Annex I (refer to "Appendix regarding the Declaration of Incorporation").

Description: **Gearbox**

Model: **CP, CP Gen 2, CPK, CPS, CPSK, DP+, DPK+, KPG, PKF+, HDP, HDV, HG+, LK+, LPB, LPB+, LPBK+, LPK+, NP, NPK, NPL, NPLK, NPR, NPRK, NPS, NPSK, NPT, NPTK, RP+, RPC+, RPK+, SC+, SK, SK+, SP, SP+, SPC+, SPK, SPK+, TK+, TP, TP+, TPC+, TPK, TPK+, VDH+, VDS+, VDT+, VH+, VS+, VT+, CVH, CVS, NVH, NVS, VDHe, VDSe, XP, XPC+, XPK+**

Serial number:	SN: 7386950, consecutive number (7-8 digits)
Relevant statutory instrument:	S.I. 2008:1597 Supply of Machinery (Safety) Regulations
Applied designated standard:	EN ISO 12100:2010
Additionally applied standard:	EN 60529:1991 + A1:2000 + A2:2013
The person authorized to compile technical documents:	WITTENSTEIN alpha GmbH (address see above)

The relevant technical documentation in accordance with the requirements of Annex VII (Part 7 of Schedule 2), part B have been created. We undertake to forward the special technical documentation to a reasoned request to the national authorities. We shall submit them by means of electronic data carrier.

The designated partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of this Directive.

Igersheim, 06.12.2022
City and date

Norbert Pastoors, Managing Director

Document No.: 1000117479 Rev.: 01

WITTENSTEIN alpha

Appendix regarding the Declaration of Incorporation

List of the essential health and safety requirements applied and fulfilled for the product named in the Declaration of Incorporation.

Chapter	Designation	not applicable	fulfilled	remark
1.1.	General Remarks			
1.1.1.	Definitions		x	
1.1.2.	Principles of safety integration		x	
1.1.3.	Materials and products		x	
1.1.4.	Lighting	x		
1.1.5.	Design of machinery to facilitate its handling		x	
1.1.6.	Ergonomics	x		
1.1.7.	Operating positions	x		
1.1.8.	Seating	x		
1.2.	Control systems			
1.2.1.	Safety and reliability of control systems	x		
1.2.2.	Control devices	x		
1.2.3.	Starting	x		
1.2.4.	Stopping	x		
1.2.4.1.	Normal stop	x		
1.2.4.2.	Operational stop	x		
1.2.4.3.	Emergency stop	x		
1.2.4.4.	Assembly of machinery	x		
1.2.5.	Selection of control or operating modes	x		
1.2.6.	Failure of the power supply	x		
1.3.	Protection against mechanical hazards			
1.3.1.	Risk of loss of stability		x	
1.3.2.	Risk of break-up during operation		x	
1.3.3.	Risks due to falling or ejected objects	x		
1.3.4.	Risks due to surfaces, edges or angles		x	
1.3.5.	Risks related to combined machinery	x		
1.3.6.	Risks related to variations in operating conditions	x		
1.3.7.	Risks related to moving parts	x		
1.3.8.	Choice of protection against risks arising from moving parts	x		
1.3.8.1.	Moving transmission parts	x		
1.3.8.2.	Moving parts involved in the process	x		
1.3.9.	Risks of uncontrolled movements	x		

Document No.: 1000117479 Rev.: 01

Chapter	Designation	not applicable	fulfilled	remark
1.4.	Required characteristics of guards and protective devices			
1.4.1.	General requirements	x		
1.4.2.	Special requirements for guards	x		
1.4.2.1.	Fixed guards	x		
1.4.2.2.	Interlocking movable guards	x		
1.4.2.3.	Adjustable guards restricting access	x		
1.4.3.	Special requirements for protective devices	x		
1.5.	Risks due to other hazards			
1.5.1.	Electricity supply	x		
1.5.2.	Static electricity		x	
1.5.3.	Energy supply other than electricity	x		
1.5.4.	Errors of fitting		x	
1.5.5.	Extreme temperatures		x	
1.5.6.	Fire	x		
1.5.7.	Explosion	x		
1.5.8.	Noise		x	
1.5.9.	Vibrations		x	
1.5.10.	Radiation	x		
1.5.11.	External radiation	x		
1.5.12.	Laser radiation	x		
1.5.13.	Emissions of hazardous materials and substances		x	
1.5.14.	Risk of being trapped in a machine	x		
1.5.15.	Risk of slipping, tripping or falling	x		
1.5.16.	Lightning	x		
1.6.	Maintenance			
1.6.1.	Machinery maintenance		x	
1.6.2.	Access to operating positions and servicing points	x		
1.6.3.	Isolation of energy sources	x		
1.6.4.	Operator intervention	x		
1.6.5.	Cleaning of internal parts	x		
1.7.	Information			
1.7.1.	Information and warnings on the machinery		x	
1.7.1.1.	Information and information devices	x		
1.7.1.2.	Warning devices	x		
1.7.2.	Warning of residual risks		x	
1.7.3.	Marking of machinery		x	

Document No.: 1000117479 Rev.: 01

Chapter	Designation	not applicable	fulfilled	remark
1.7.4.	Instructions		x	
1.7.4.1.	General principles for the drafting of instructions		x	
1.7.4.2.	Contents of the instructions		x	
1.7.4.3.	Sales literature		x	

Document No.: 1000117479 Rev.: 01

Revision history

Revision	Date	Comment	Chapter
01	04/17/2025	New version	All

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WITTENSTEIN - one with the future

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