Edition 12.2011 · 610.44440.40.300

Original Operating Instructions · English

Repair Instructions

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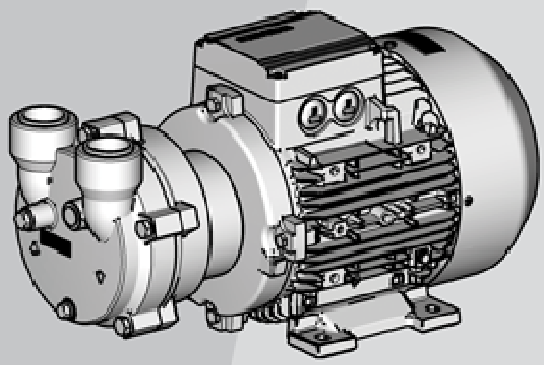


2BV2 060

2BV2 061

2BV2 070

2BV2 071

L-Serie
L-Series

Flüssig-
keitsring
Liquid Ring

Contents

1.1 Content of this document

These repair instructions

- are part of the liquid ring vacuum pump and compressor L-BV2, types 2BV2060, 2BV2061, 2BV2070, 2BV2071.
- Describes the safe, correct and economical repair procedures for the L-BV2
- must always be available to personnel at the place of use.

1.2 Explanation of the terms and symbols

In these instructions symbols and terms will be used to mean the following.

Symbol	Explanation
!	Requirement, pre-requisite
①	One-step handling instructions
1 2 3	Multi-step handling instructions
✓	Result
[→ 54]	Cross reference with page reference
	Additional information, tips
	General safety symbols: Warning against potential risk of injury.
	Electrical hazard: Warning against specific hazards caused by electricity

Term	Explanation
Plant	Part provided by the user in which the L-BV2 is installed
Motor	Drive motor of the L-BV2
Pump part	Mechanical part of the liquid ring - vacuum pump/compressor
Liquid ring - vacuum pump/compressor = pump	Ready to connect combination of pump part and motor of the L-BV2

1.3 Previous versions

09.2009

1.4 Other valid documents

In addition to these instructions consider the following documents.

Document number	Purpose
610.44440.40.000	Operating instructionsL-BV2
610.44475.40.000	Additional operating instructions L-BV2 ATEX

The manufacturer is not liable for damage caused by failure to adhere to the overall documentation.

2.1 Labelling of warning signs

Warning sign	Level of risk	Consequences if not observed
⚠ **DANGER**	Immediate danger	Death, serious physical injury
⚠ **WARNING**	Possible danger	Death, serious physical injury
⚠ **CAUTION**	Potentially dangerous situation	Slight physical injury
NOTICE	Potentially dangerous situation	Material damage

2.2 Working in a safety-conscious manner

Changes, additions and conversions

Changes, additions and conversion to the L-BV2 can lead to unforeseeable dangers.

- Changes, additions and conversions to the L-BV2 that are not described anywhere in the documentation must be authorised by the manufacturer.
- Only use original parts or parts approved of by the manufacturer. The use of other parts may exempt the manufacturer from liability for all resultant consequences.
- Re-attach safety and protective devices and put them back into operation immediately after completion of work.
- Keep unauthorised persons away from the L-BV2.
- Keep all notices attached to the L-BV2 in a clearly legible condition. This applies, for instance, to
  - Labelling of connections,
  - Direction of rotation arrow,
  - Rating plate,
  - Warning signs.

Work at a standstill

Work on the L-BV2 when it is running can lead to serious injuries.

- Work on the L-BV2 at a standstill only and in a de-energized condition.
  - Disconnect.
  - Secure it to prevent it from being switched back on.
  - Make sure that it is de-energised.
  - Earth it and short-circuit it.
  - Cover or block off adjacent parts which are still supplied with voltage.

Hot surfaces

After decommissioning, contact with hot surfaces can lead to burns.

- Allow the L-BV2 to cool after shutting it down.

Improper repair

Improper repair can lead to severe injuries due to damaged or incorrectly-installed parts.

- Observe the procedures for decommissioning described in the operating instructions.
- Exercise caution when disassembling and assembling, do not damage parts when using tools.
- Do not use striking tools.
- Replace damaged parts.
- Observe the assembly and start-up procedures described in the operating instructions before starting the device.

2.3 Requirements for personnel

2.3.1 Personnel qualifications and training

- All those who will work on the L-BV2 must have read and understood these and all related instructions.
- Only allow work on the L-BV2 to be carried out by personnel with the following knowledge.
- Personnel in training may only work on the L-BV2 under supervision of personnel with the specified knowledge.

Tasks	Personnel	Knowledge
Transportation, storage	Shipper, qualified personnel	▪ Safe handling with lifting gear such as hoists and fork lift trucks
Repair	Qualified personnel	▪ Safe handling of tools and materials ▪ Disassembly and assembly of vacuum pumps and compressors ▪ Assessment of damage to vacuum pumps and compressors
Working on the electrical system	Electrician	▪ Laying and connection of electrical lines ▪ Assembly of electrical machines, switches, sensors, circuit breakers ▪ Analysis and testing of electrical systems ▪ Assessment of the effectiveness of electrical protection measures
Disposal	Qualified personnel	▪ Decontamination of harmful substances ▪ Knowledge of recycling ▪ Correct and environmentally-friendly disposal of materials and substances

2.3.2 Personal protective equipment

⚠ WARNING

Danger of crushing and cutting on the open L-BV2

Crushing and cutting of body parts due to sharp edges, small clearance gaps or falling parts!

1. Wear protective goggles and safety footwear for all repair work.
2. Use protective gloves when disassembling or assembling sharp-edged parts (e.g. impeller, housing).
3. In addition, wear a safety helmet for transportation and overhead work.

2.4 Requirements of the operator

The operator of the repair operation ensures that

- All work on the L-BV2 is carried out by qualified personnel, who are sufficiently informed of these and all related instructions.
- Assignment, responsibility and supervision of qualified personnel is regulated.
- The contents of these and locally applicable instructions are always available to qualified personnel.
- Personnel are informed of the conveyed media and the emergency safety measures, so as to prevent injuries.
- All local and plant specific safety measures are kept to, such as for example:
  - Prevention of accidents,
  - Safety and operating regulations,
  - Utility company regulations,
  - Standards and laws.
- Dangers due to electrical energy are not possible.
- Smoking and open flames are forbidden.

3.1 Lifting and transporting

Transportation is expected to be carried out by crane using lifting straps/chains.

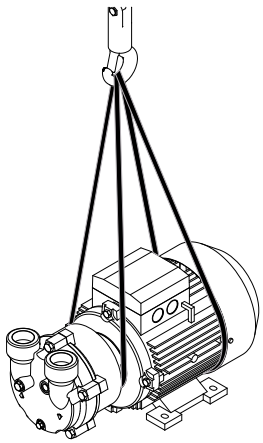
Transportation with a crane

⚠ WARNING

Danger of crushing and cutting due to tipping or falling loads!
Danger of crushing and cutting of body parts due to falling loads!

! Adhere to the following when transporting with lifting gear:

1. The load-bearing capacity of the lifting gear and load-handling devices must correspond to the mass of the L-BV2.
2. Secure the L-BV2 to prevent it from toppling or falling.
3. Do not remain under supported loads.
4. Set the L-BV2 down on a horizontal surface.



1. Run the lifting straps under the pump housing and under the fan cover and hook into the crane hook.
   - ✓ Ensure the lifting straps are secured in the indentations.
   - ✓ Lifting straps must be long enough, with the spreading angle less than 90°.
2. Take care that the fittings are not damaged.
3. Lifting and transporting the L-BV2.
4. Place the L-BV2 down and remove the lifting strap.

3.2 Storage

NOTICE

Mechanical damage and corrosion due to incorrect storage
Ambient temperatures over **+40°C** [+104°F] can shorten the interval for replacing the grease!

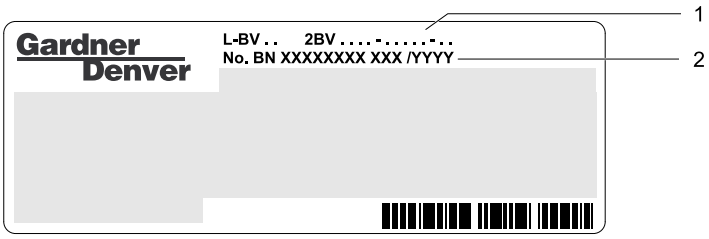
① Observe the given storage conditions

Storage prerequisites	permitted values	
ambient pressure	atmospheric	
composition of the environment	dry, dust-free atmosphere (relatively humid < 60%)	
Ambient temperature	**-30°C to +40°C**	-22°F to +104°F
static impacts	none	
Speed of oscillation V_{eff}	**< 2.8 mm/s**	<0.11 in/s

4.1 Ordering spare parts

The following information must be included when ordering spare parts:

- Type designation (product code) (1) see rating plate
- Serial number (2), see rating plate
- No. and designation from the spare parts list



Example order

- 2BV2060-0KH01-8S
- No. BN Y9 99 999 99 001
- 047 Impeller

4.2 Spare parts list

Parts designated with "Scope of delivery **contains:**" are supplied as a kit with the listed part numbers.

Parts designated with "scope of delivery **from:**" cannot be supplied separately and must be ordered as a kit using one of the listed part numbers.

Damaged and worn parts, as well as parts labelled "Replace during **disassembly**", cannot be reused and must be replaced with new parts.

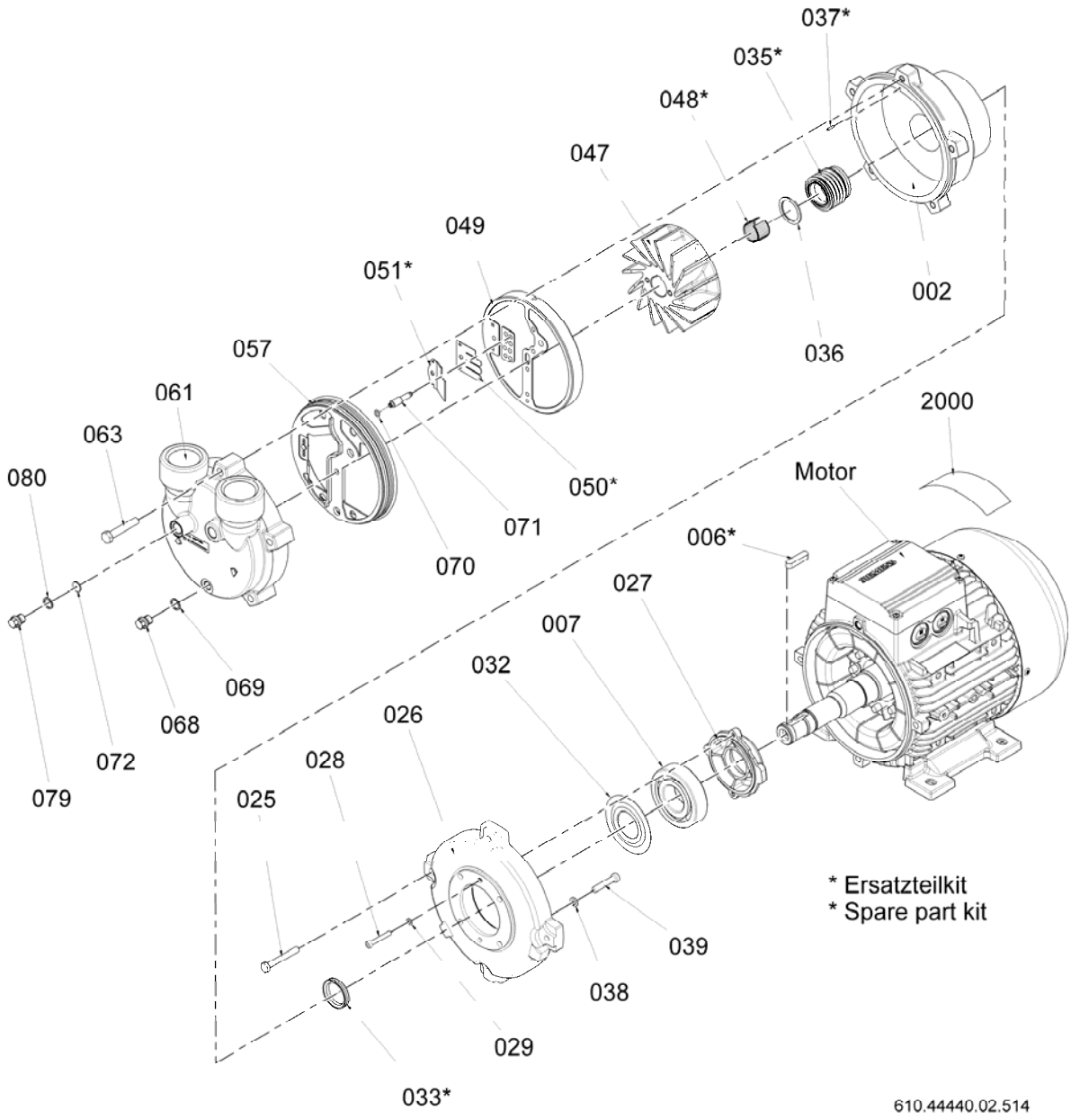
Parts designated with "Replace when**worn**" should be checked and replaced depending on their condition.

All re-usable parts must be thoroughly cleaned.

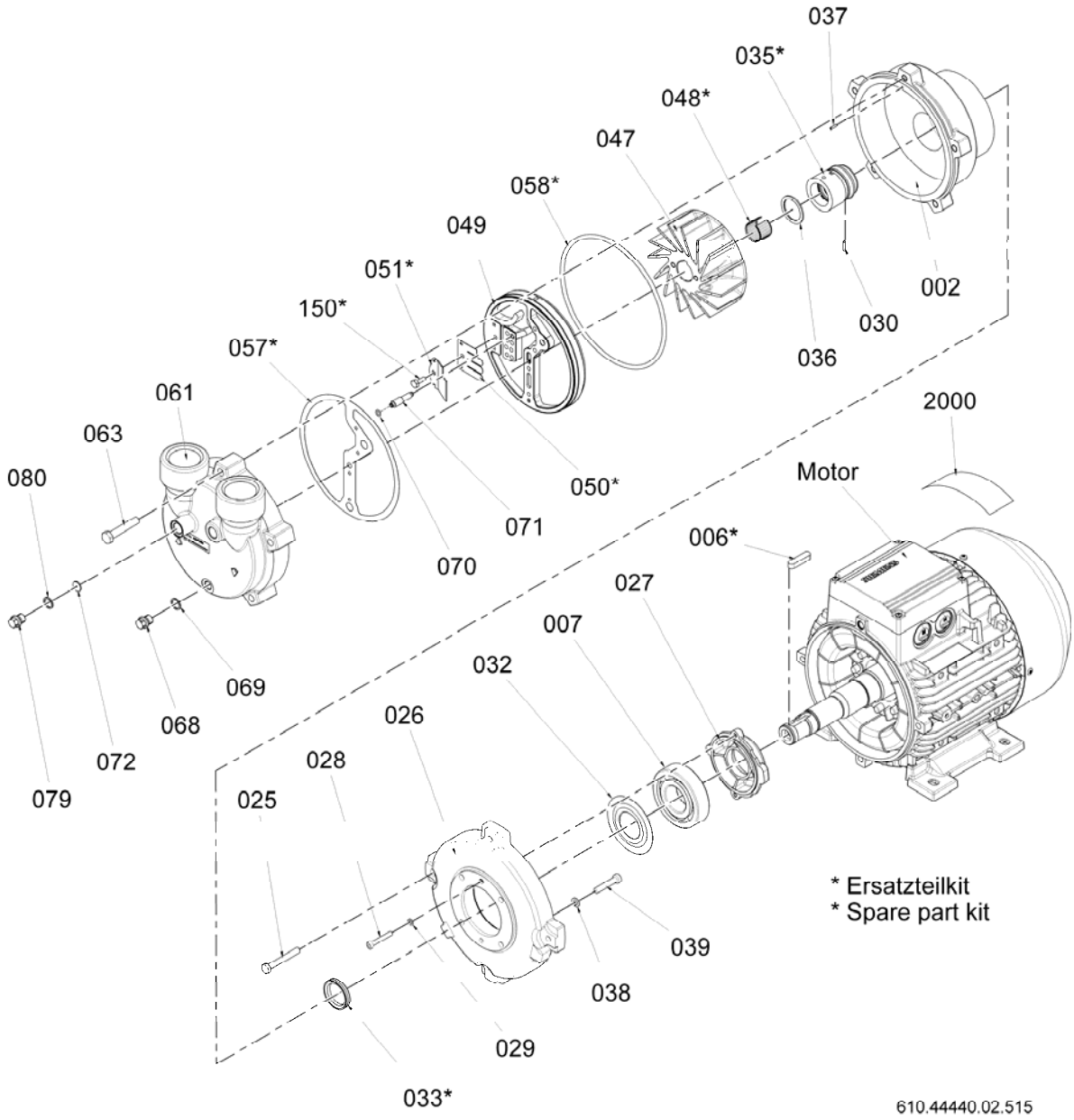
No.	Part	Scope of delivery	Replace when
001	Motor housing complete		
002	Pump housing		Wear
005	Rotor		
006	Feather key	from: KIT	
007	Rolling bearing		Disassembly
008	Rolling bearing		Disassembly
025	Screw		
026	End plate		
027	Bearing end-plate		Wear
028	Screw		
029	Sealing washer		
030	Spiral locking pin		
032	Ring		
033	V-ring	from: KIT	
035	Rotary seal	from: KIT	
036	Washer		
037	Spiral locking pin	from: KIT	
038	Spring washer		
039	Screw		
042	Terminal box, complete	Includes: 650	
047	Impeller		
048	Tolerance ring	from: KIT	

No.	Part	Scope of delivery	Replace when
049	Control disc		
050	Valve plate	from: KIT	
051	Catch plate	from: KIT	
057	Seal	from: KIT	
058	O-ring	from: KIT	
061	Pump cover		
063	Screw		
068	Screw		
069	Sealing ring		
070	O-ring		
071	Pipe for cavitation protection		
072	Washer		
079	Screw		
080	Sealing ring		
150	Screw	from: KIT	
409	Hexagon nut		
410	O-ring		
450	End plate		
451	Screw		
452	Radial shaft seal		Disassembly
455	Steel tape		
459	Hexagon nut		
467	Spring washer		Disassembly
500	Fan guard		
501	Motor ventilator		Disassembly
503	Screw		Disassembly
505	Feather key		
506	Circlip		
650	Terminal board, complete		
670	Condenser		
KIT	Spare parts kit	Includes: 006, 033, 035, 037, 048, 050, 051, 057, 058, 150	
2000	Rating plate		Wear

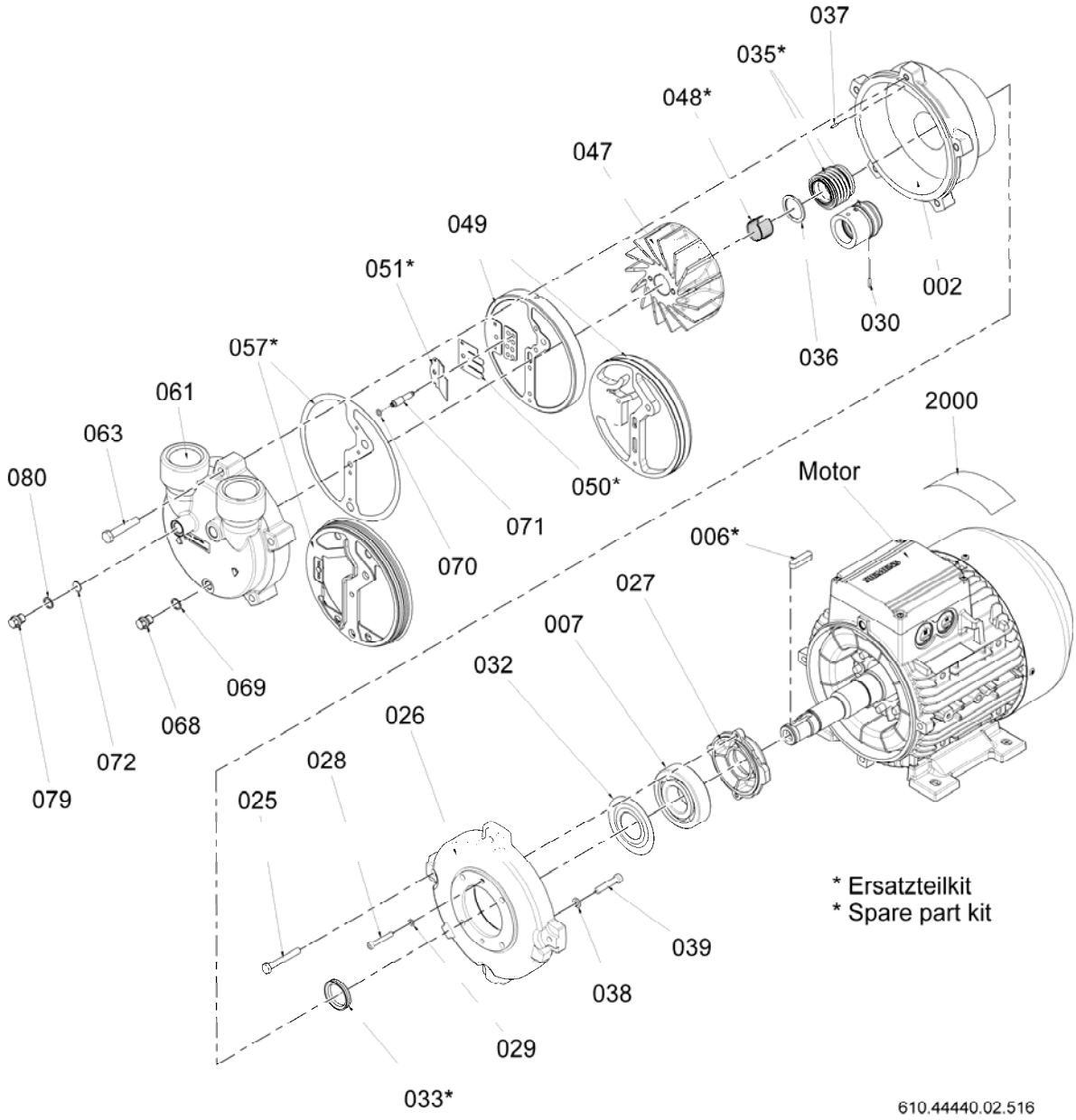
4.3 Exploded view drawings



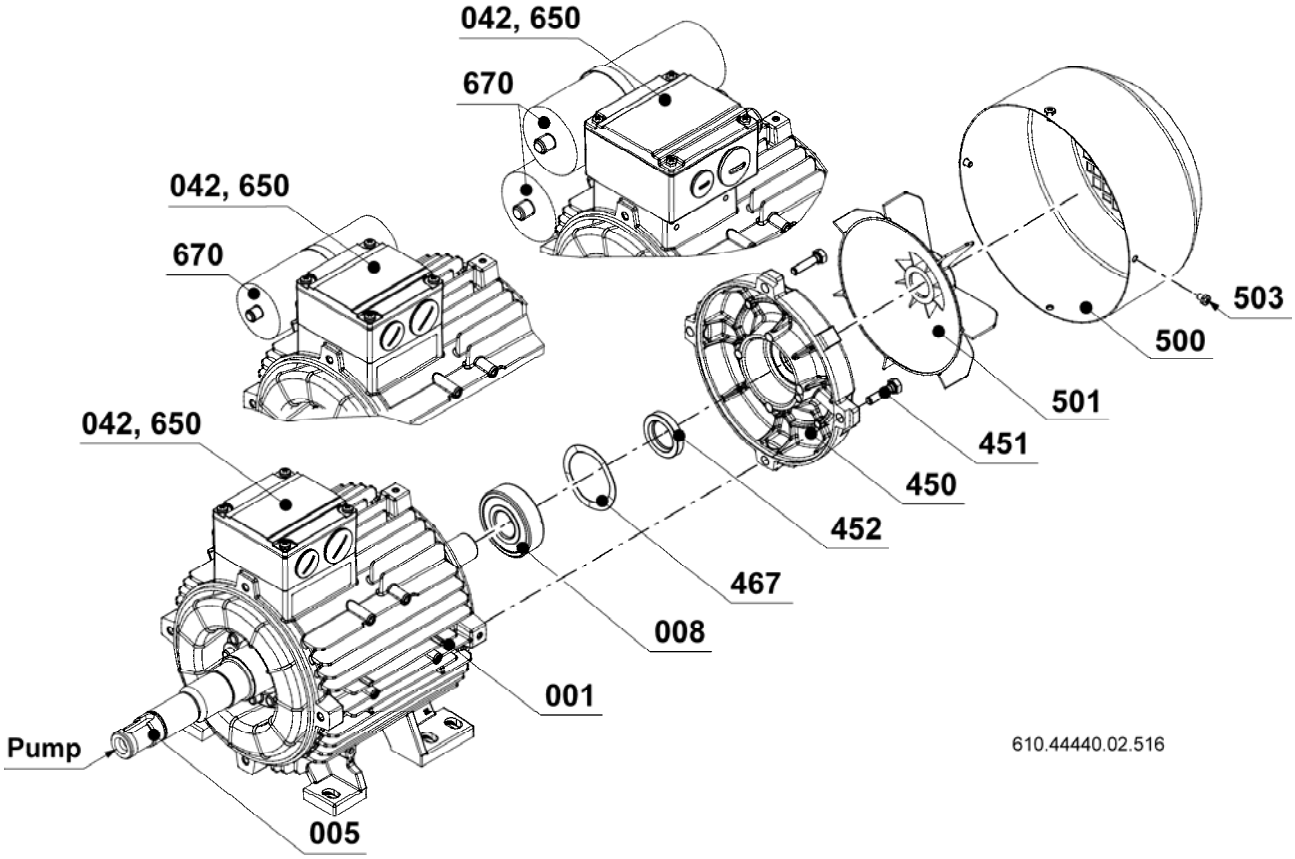
2BV2...-.N....-.S Standard design and 2BV2...-.P....-.S Combined version



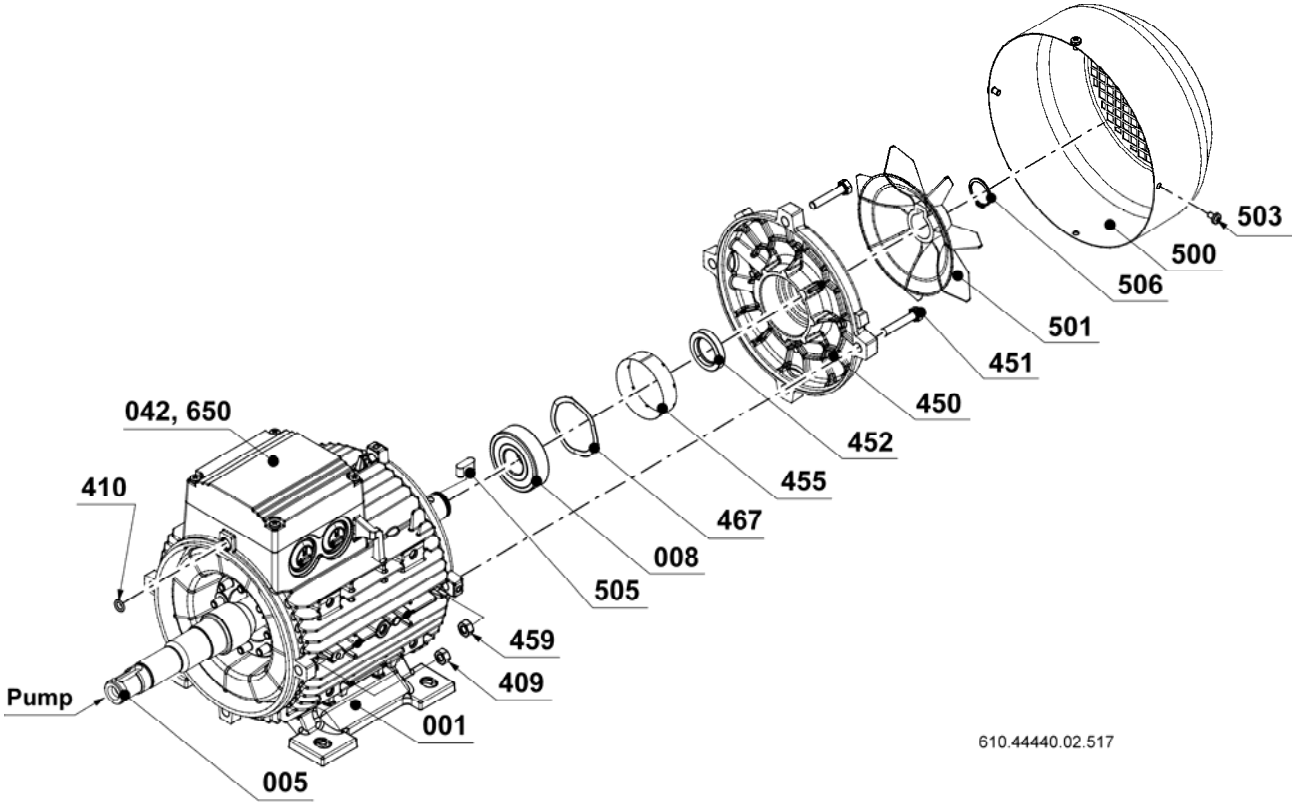
2BV2...-.H....-.S Non-rusting steel



2BV2...-.Z....-.S Various materials



Motor axle height 80 and 90



Motor axle height 100 and 132

5.1 Tools

The following tools are required for disassembly and assembly:

- Beam with dial gauge
- Bolt for control disc disassembly
- Housing/bearing puller
- Hammer
- Hot plate
- Temperature sensor with indication unit
- Metal sleeve, the same diameter as the deep groove ball bearing
- Allen key/hexalobular drive
- Plastic pipe assembly rotary seal
- Plastic pipe for fitting the rolling bearing
- Impeller puller
- Screwdriver (slotted, Phillips, hexalobular)
- Screwdriver/ratchet with socket tools
- Sidecutters/combination pliers
- Circlip pliers
- Clamping device for the rotor, when fitting the rolling bearing
- Locating pin for the housing end plate

5.2 Materials

The following expendable materials are required for assembly:

- Elastosil A33 sealant, Wacker company
- Loctite 496 sealant
- **Sealing compound** Epple 03213
- **WARNING! UNIREX N3 or alternative grease should only be applied in standard operating conditions. Request the most suitable grease type from your manufacturer for special operating conditions (e.g. oxygen supply, use in the food production industry, ambient temperatures below -20°C [-4°F]).**
- commercially-available flushing liquid

6 Tightening torque values

The values apply if no other specifications are available.

Steel screws

On non-electrical connections strength classes of 8 and 8.8 or higher according to ISO 898-1 are assumed.

Thread	Non-electrical		Electrical*	
	[Nm]	[ft lbs]	[Nm]	[ft lbs]
M4	**2,2 - 2,8**	1.65 - 2.05	**0,8 - 1,2**	0.60 - 0. 90
M5	**3,8 - 4,6**	2.80 - 3.40	**1,8 - 2,5**	1.35 - 1.85
M6	**8,8 - 10,8**	6.50 - 8.00	**2,7 - 4,0**	2.00 - 3.00
M8	**18,0 - 22,0**	13.5 - 16.2	-	-
M10	**31,5 - 38,5**	23.5 - 38.5	-	-
M12	**52,0 - 64,0**	38.5 - 47.0	-	-
M16	**90,0 - 110**	66.5 - 81.0	-	-

* applicable for terminal plate connections, except for terminal strips

Stainless steel screws

Mechanical properties A4-70 according to ISO 3506-1.

Thread	[Nm]	[ft lbs]
M4	**1,1 - 1,6**	0.81 - 1.18
M5	**2,3 - 3,5**	1.69 - 2.58
M8	**15,0 - 19,0**	11.0 - 14.0
M10	**23,0 - 29,0**	17.0 - 21.4

Cable and wiring screw connections

Thread	Metal		Plastic	
	[Nm]	[ft lbs]	[Nm]	[ft lbs]
M12x1.5	**4,0 - 6,0**	2.95 - 4.43	**2,0 - 3,5**	1.48 - 2.58
M16x1.5	**5,0 - 7,5**	3.69 - 5.53	**3,0 - 4,0**	2.21 - 2.95
M25x1.5	**6,0 - 9,0**	4.43 - 6.64	**4,0 - 5,0**	2.95 - 3.69
M32x1.5	**8,0 - 12,0**	5.9 - 8.85	**5,0 - 7,0**	3.69 - 5.16
M40x1.5	**8,0 - 12,0**	5.9 - 8.85	**5,0 - 7,0**	3.69 - 5.16

⚠ WARNING

Burns, chemical burns or poisoning

Burns, chemical burns or poisoning due to contact with harmful substances remaining in the L-BV2 !

① Any L-BV2 exposed to harmful substances must be decontaminated before repair.

Before carrying out maintenance work, the L-BV2 must be:

- permanently isolated from the power supply
  (including all components connected to the electricity supply, e.g. frequency converter, auxiliary ventilator)
- cleaned of any media residue
- disconnected from the connections and the foot mount
- removed from the plant/from the place of installation

7.1 Flushing

1. Switch off current supply.
2. Turn off the operating liquid supply.
3. Position collection tray for flushing liquid.
4. Feed flushing liquid (water or decontamination product) through a suitable access.
5. Switch on current supply.
6. L-BV2 flush with flushing liquid, until all inflammable, corrosive or toxic residues are flushed out.
7. Switch off current supply.
8. Dispose of inflammable, corrosive or toxic operation and flushing liquid as per the local regulations.

7.2 Decalcifying

! The unit has been switched off and emptied.

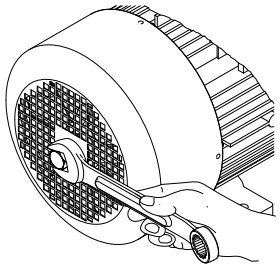
1. Shut down the L-BV2.
2. Drain the L-BV2.
3. Dismantle the piping/hoses.
4. Fill the L-BV2 with a decalcifying agent through one of the connection openings. Use a 10% acetic acid or another commercially-available decalcifying agent.
5. Leave the decalcifying liquid in the unit for at least 30 min.
6. Meanwhile, occasionally turn the shaft against the direction of rotation.

See also

Draining down [➙ 18]

7.3 Draining down

1. Switch off current supply.
2. Meet the safety measures for operation of the L-BV2.
3. Place a suitable drain-off container underneath the pump cover ().
4. Open the lock screw of the drain-off opening (068).
5. Drain the liquid, turning the shaft in the direction of rotation.
   - ✓ Insert a screw M8 of sufficient screw length into the shaft end, through the hole in the fan guard (500).
   - ✓ Use a spanner to turn the shaft manually.
   - ✓ If necessary, remove the fixings from the mounting feet (001) and tip the L-BV2 by 45° over the cover.
6. Repeat measures until no more liquid comes out.
7. Tighten the lock screw of the drain-off opening (068).
   Tightening torque: 2...3 Nm [1.48...2.21 ft lbs]
8. Remove the screw M8 from the shaft end on the exterior fan.
9. Dispose of inflammable, corrosive or toxic operating and flushing liquid as per the local regulations.



Turning the shaft

NOTICE

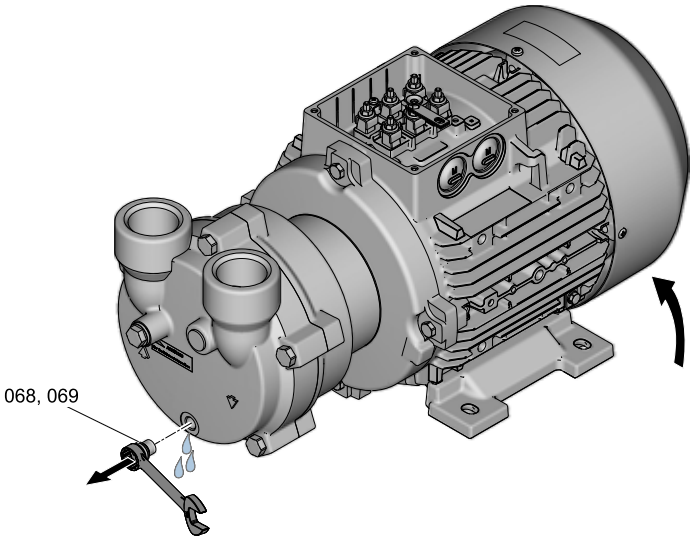
Assembly problems with screw connections that should be re-used where thread locking agent has been applied!

① Following disassembly of the screw connections, remove the thread locking agent from the threaded holes and screw thread.

8.1 Disassembly of pump cover

Open the drain-off opening

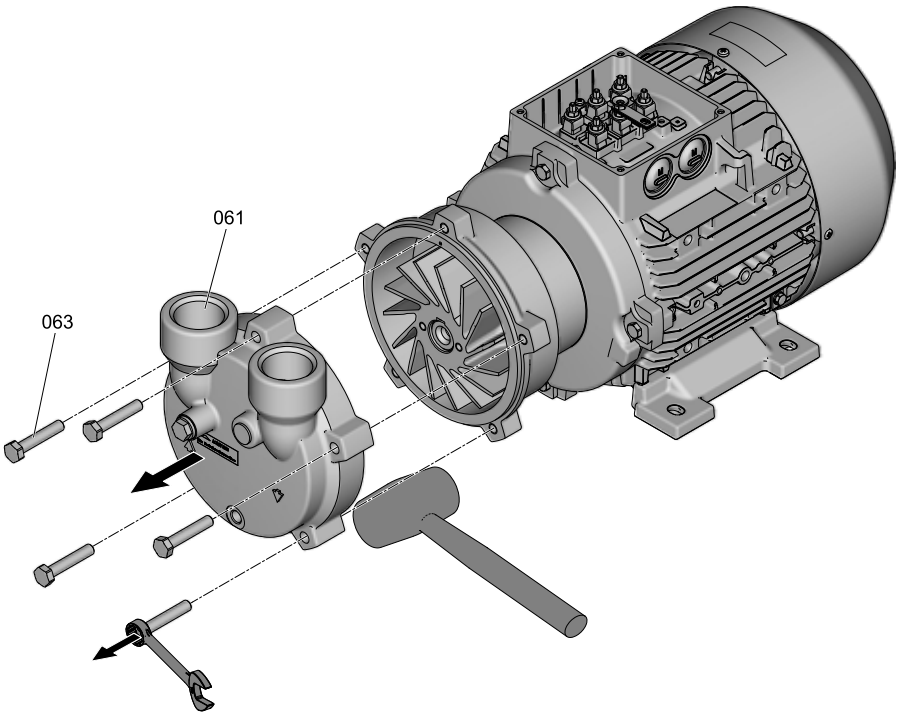
1. Unscrew the drain-off opening screw (068) with sealing ring (069) (anti-clockwise).
2. Lift the unit on the side of the motor and leave the operating liquid residues to drain.



Remove the drain-off opening screw

Removing the pump cover

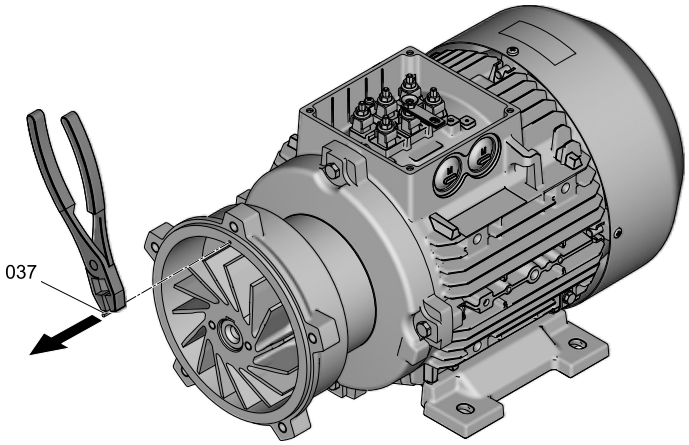
1. Undo the screws of the pump cover (063) (anti-clockwise).
2. Pull off the pump cover (061).



Removing the pump cover

Removing the spiral locking pin

① If necessary, remove the spiral locking pin (037) with a pair of pliers.



Disassembling the spiral locking pin

8.2 Disassembling the control disc

NOTICE

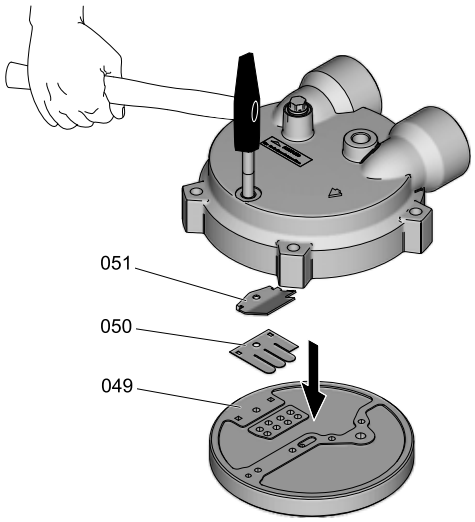
Control disc is destroyed!

! Depending on the deposit between the control disc and the pump cover, it may not be possible to remove the control disc undamaged.

① Replacing the control disc.

Removing the control disc from the pump cover

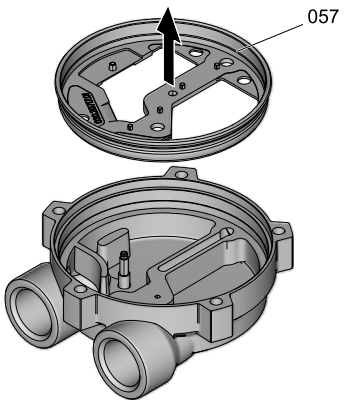
1. Insert a bolt with a suitable diameter through the drain-off hole and knock out the control disc (049).
2. Separate the valve plate (050) and catch plate (051) from the control disc.



Disassembling the control disc

Removing the control disc seal

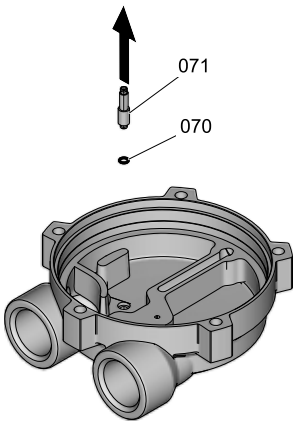
① Pull out the seal of the control disc (057).



Disassembling the seal of the control disc

Removing the cavitation protection

① Pull off the pipe for the cavitation protection (071) and the O-ring (070).

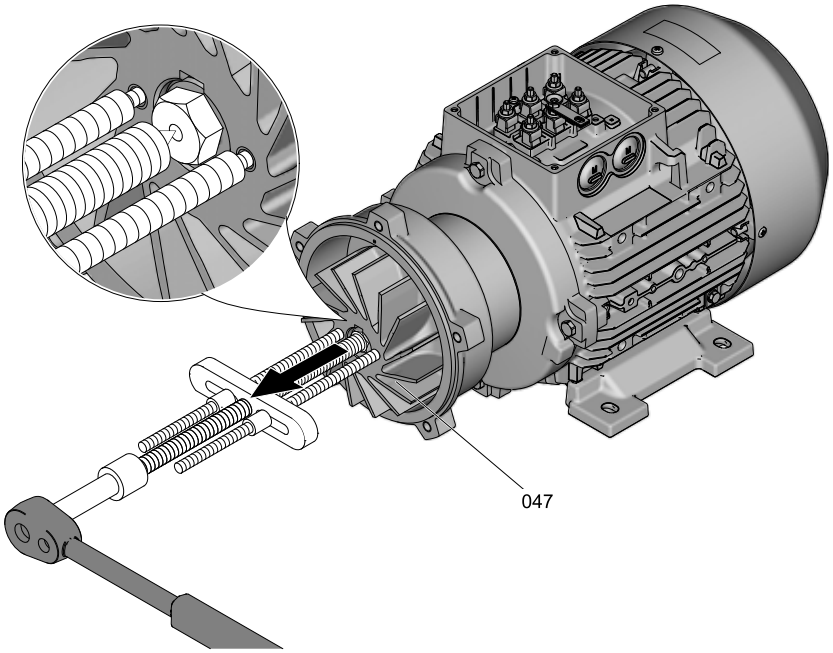


Remove pipe for cavitation protection

8.3 Disassembly of the impeller

Pulling off the impeller

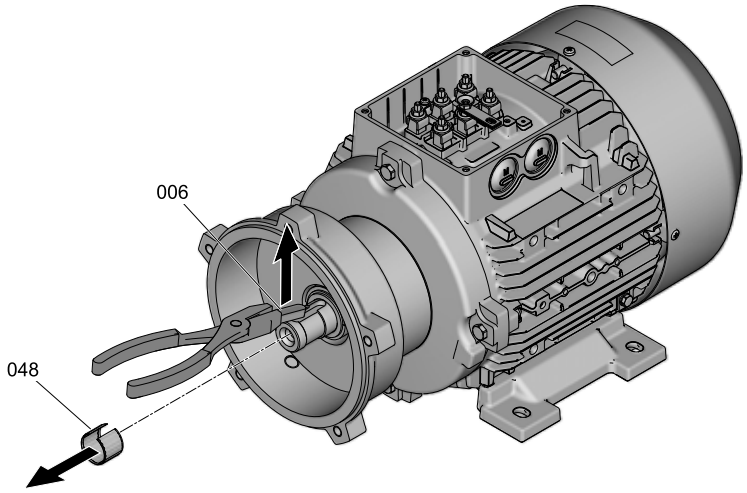
1. Remove any residues from the impeller pulling holes. If necessary, use rust remover/descaler (e.g. WD 40).
2. Screw a suitable screw with drill hole for the centre pin of the impeller puller into the rotor.
3. Screw the outer thread rods of the impeller puller into the holes of the impeller puller on the impeller (clockwise).
4. Screw the middle thread rod of the impeller puller until the screw in the front edge of the rotor (clockwise).
5. Pull the impeller (047) off the middle thread rod with a screwdriver/ratchet (clockwise).
6. Remove the impeller puller from the impeller (anti-clockwise).
7. Remove the screw from the rotor (anti-clockwise).



Removing the impeller

Removing the tolerance ring/feather key

1. Removing the tolerance ring (048).
2. Remove the feather key (006) using sidecutters/combination pliers.



Disassemble the feather key/tolerance ring of the impeller

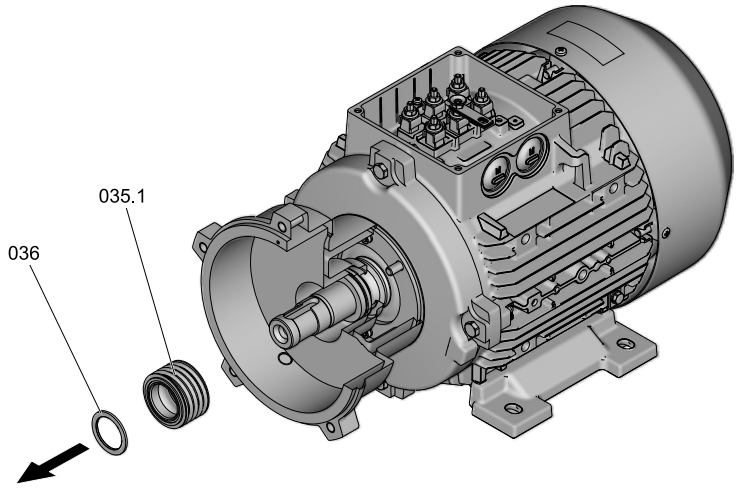
8.4 Disassembling the rotary seal

NOTICE

The rotor may be damaged during disassembly of the rotary seal.

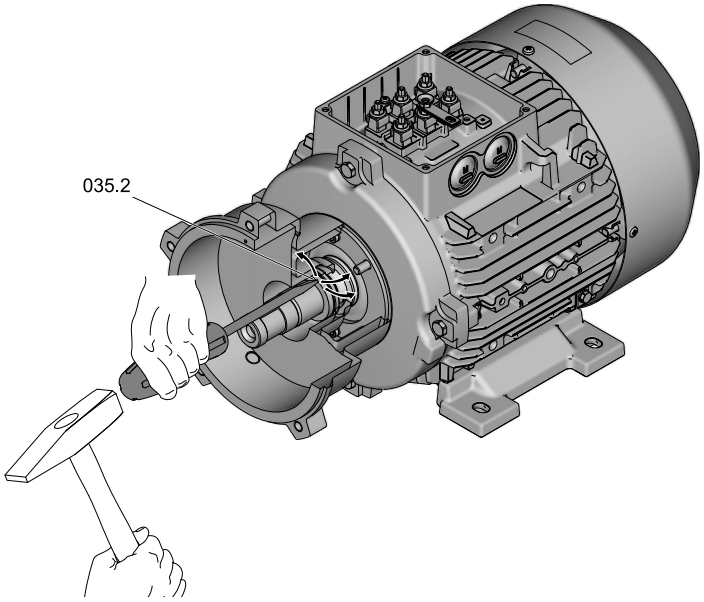
1. Carefully disassemble the rotary seal.
2. When using tools, do not damage the shaft.

1. Remove any residues from the rotary seal disc (036) and rotary seal (035.1/035.2). If necessary, use rust remover/descaler (e.g. WD 40).
2. Pull off the rotary seal disc.
3. Pull off the rotary seal (035.1).



Disassembling the rotary seal

4. Pull off the counter ring (035.2), destroy counter ring if necessary.

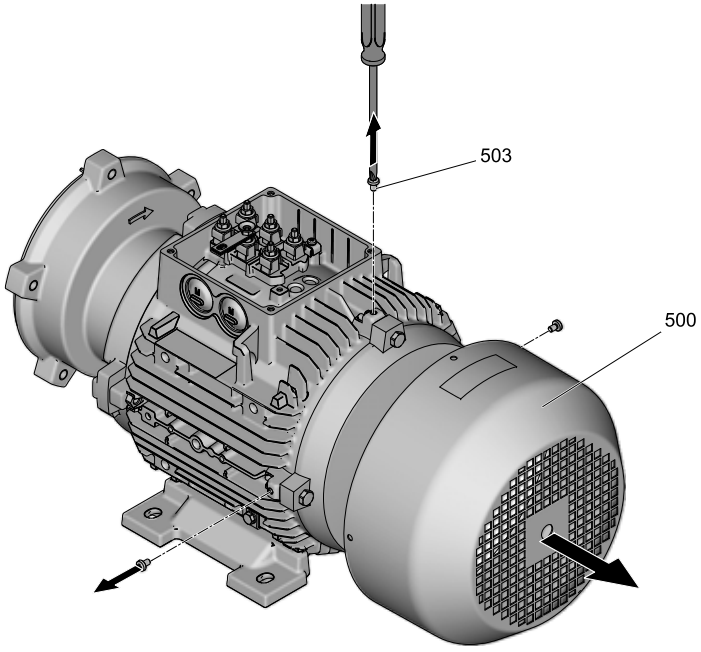


Disassembling the counter ring from the rotary seal

8.5 Disassembly on the ventilation side

Disassembling the fan guard

1. Undo the screws of the fan guard (503) (anti-clockwise).
2. Pull the fan guard off (500).



Disassembling the fan guard

Removing the exterior fan*

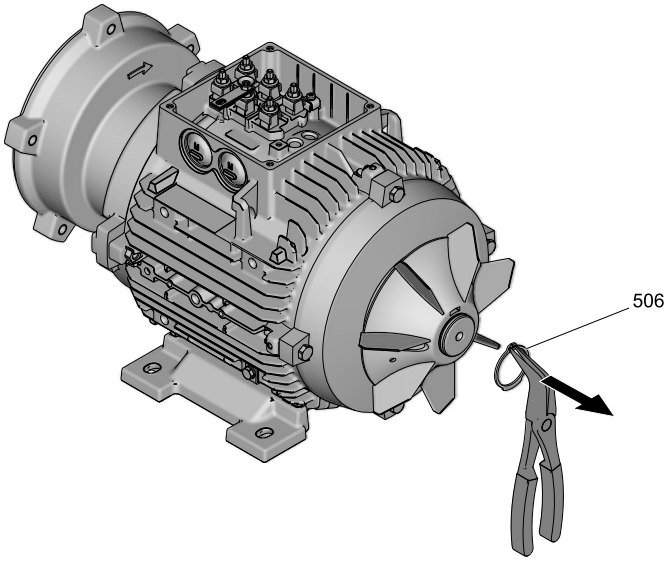
*only 2BV2070-....1-../ 2BV2070-....3-../ 2BV2070-....4-../ 2BV2070-....5-.. and all 2BV2071

NOTICE

Fixed exterior fans may be destroyed during disassembly

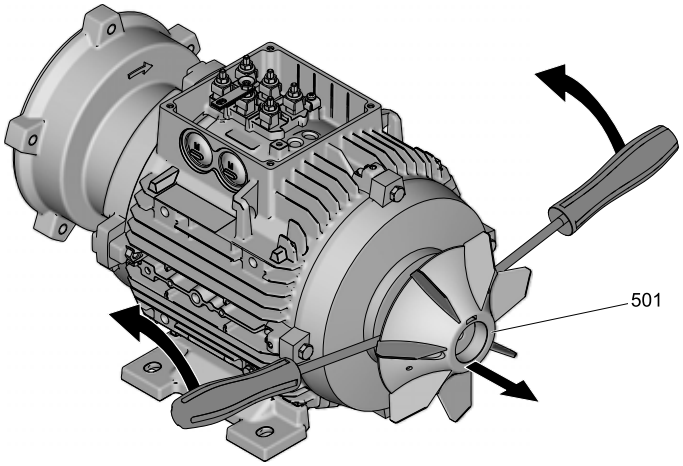
① Prepare exterior fan as spare part.

1. Fit the exterior fan's circlip (506) using a pair of circlip pliers.



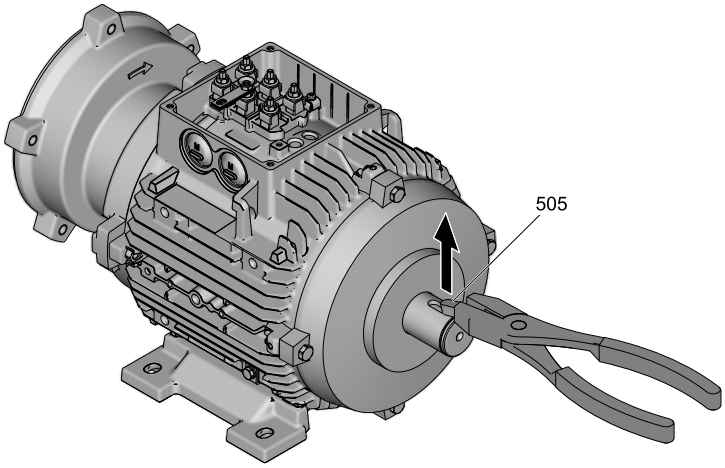
Removing the exterior fan circlip

2. Pull the exterior fan (501) off, use two screwdrivers to prise it off if necessary.



Removing the exterior fan

3. Remove the feather key (505) using a pair of pliers/sidecutters.

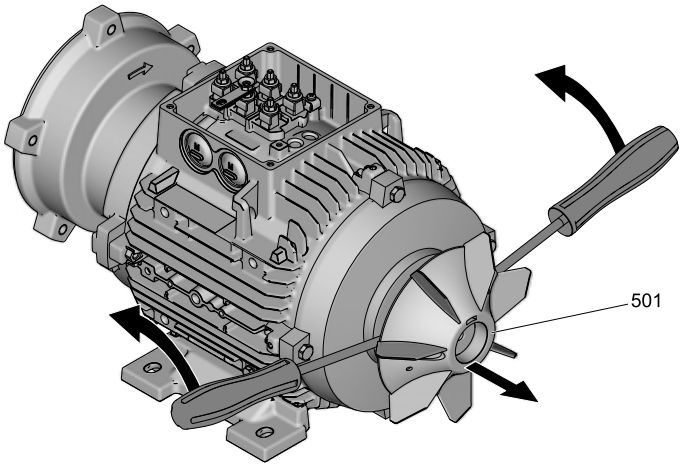


Removing the exterior fan feather key

Removing the exterior fan*

*all 2BV2060/ 2BV2061 and 2BV2070-....0-..

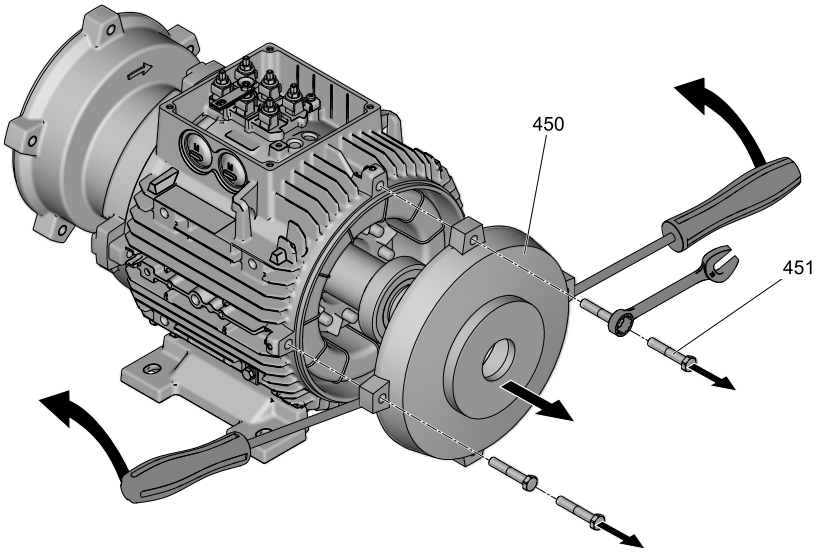
① Pull the exterior fan (501) off, use two screwdrivers to prise it off if necessary.



Removing the exterior fan

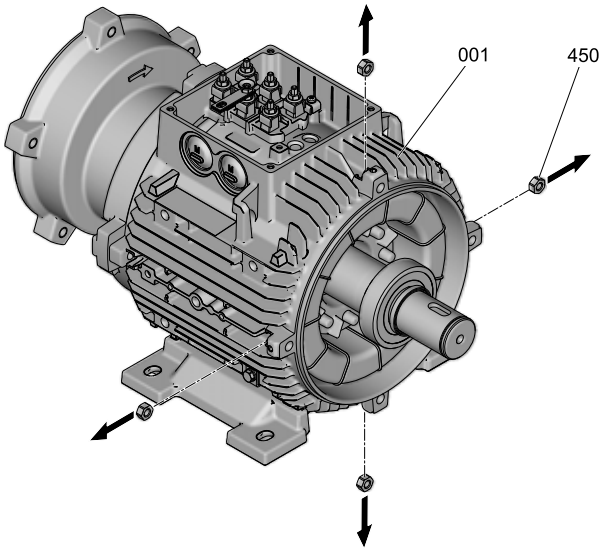
Disassembling the ventilation side end plate

1. Undo the screws of the end plate fixture (451) (anti-clockwise).
2. Pull the end plate (450) off, use two screwdrivers to prise it off if necessary.



Disassembling the ventilation side end plate

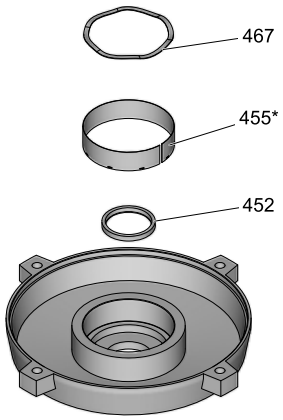
3. Remove the nuts* in the end plate fixture (459) from the pocket in the motor housing (001).
   * only 2BV2070-....1-../ 2BV2070-....3-../ 2BV2070-....4-../ 2BV2070-....5-.. and all 2BV2071



Removing the nuts in the end plate on the ventilation side

Removing the spring washer/steel tape

1. Remove the spring washer (467).
2. Remove the steel tape (455*).
   * only 2BV2070-....1-../ 2BV2070-....3-../ 2BV2070-....4-../ 2BV2070-....5-.. and all 2BV2071
3. Remove the radial shaft seal (452).

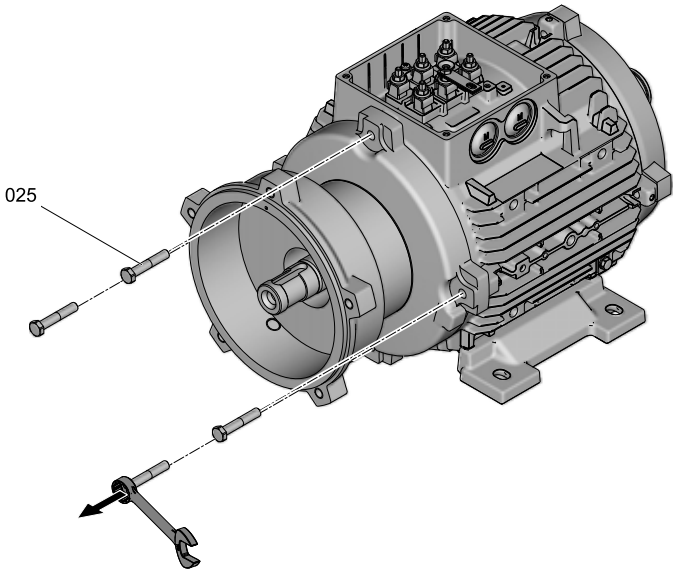


Removing the spring washer/steel tape

8.6 Disassembling the rotor

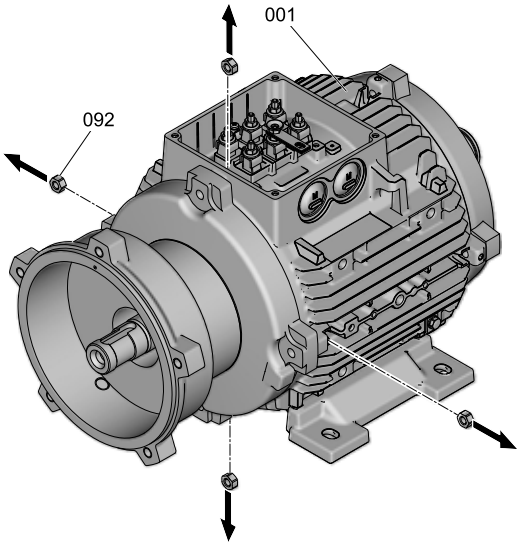
Disassembling the end plate on the pump side

1. Undo the screws of the end plate fixture (025) (anti-clockwise).



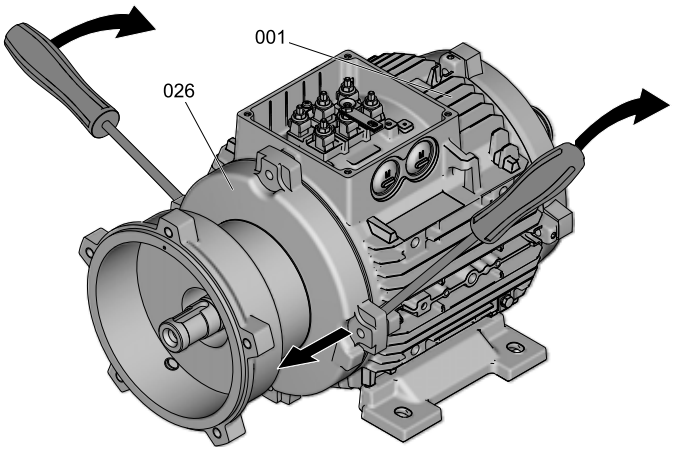
Disassembling the end plate on the pump side

2. Remove the nuts* from the end plate fixture (092) from the pocket in the motor housing (001).
   * only 2BV2070-....1-../ 2BV2070-....3-../ 2BV2070-....4-../ 2BV2070-....5-.. and all 2BV2071



Removing the nuts from the end plate on the pump side

3. Loosen the sealed connection between the end plate (026) and the motor housing (001) with screwdrivers.



Loosen the end plate on the pump side

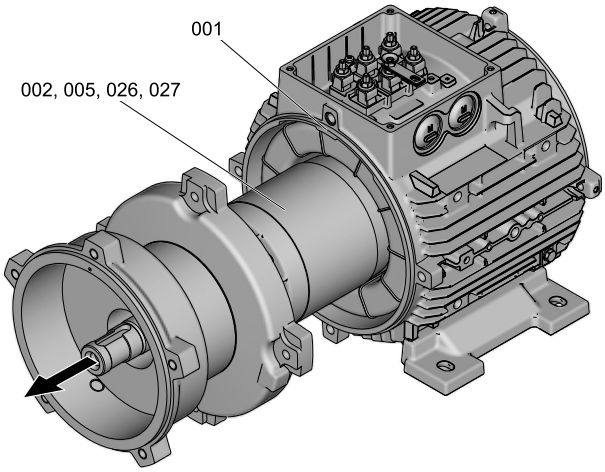
Disassembling the rotor

NOTICE

The motor coil can be damaged due to the rotor.

① Do not jam the rotor during disassembly.

1. Carefully pull the rotor (005) with the pump housing, end plate and bearing cover (002, 026, 027) from the motor housing (001).



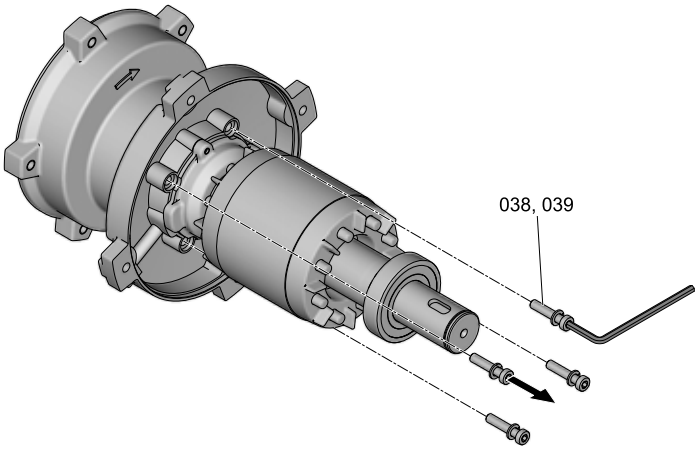
Disassembling the rotor

2. Remove any sealant residues from the motor housing (001) and the end plate (026).

8.7 Disassembling the pump housing

Removing the screws and spring washers

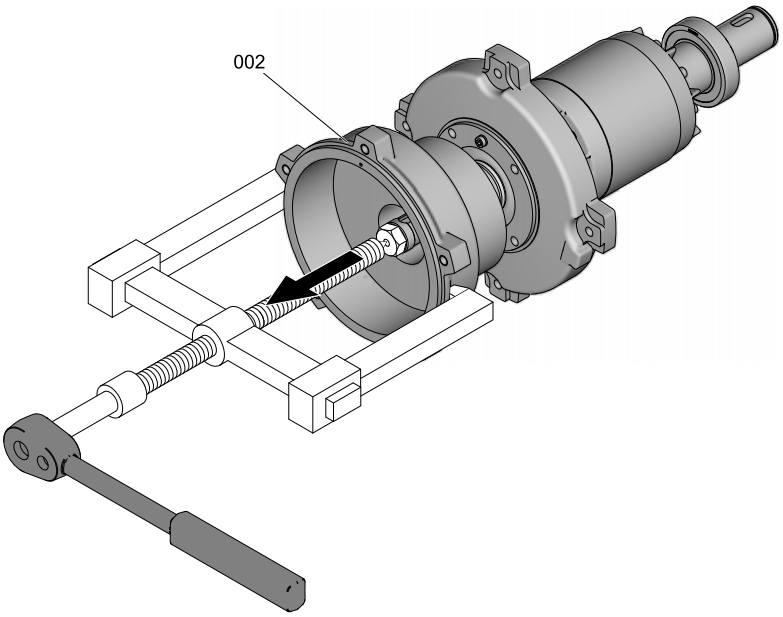
① Undo the screws in the pump housing (39) (anti-clockwise) and pull off the spring washers in the pump housing (038).



Disassembling the pump housing

Pulling off the pump housing

1. Screw an adequate screw with drill hole for the centre pin of the housing/impeller puller into the rotor.
2. Position the puller arms of the housing/bearing puller on the edges of the pump housing (002).
3. Screw the thread rod of the housing/bearing puller up to the screw in the front edge of the rotor (clockwise).
4. Pull over the thread rod with a screwdriver/ratchet (clockwise).
5. Remove the housing/bearing puller.
6. Leave the screw in the rotor (for disassembly of the groove ball bearing).

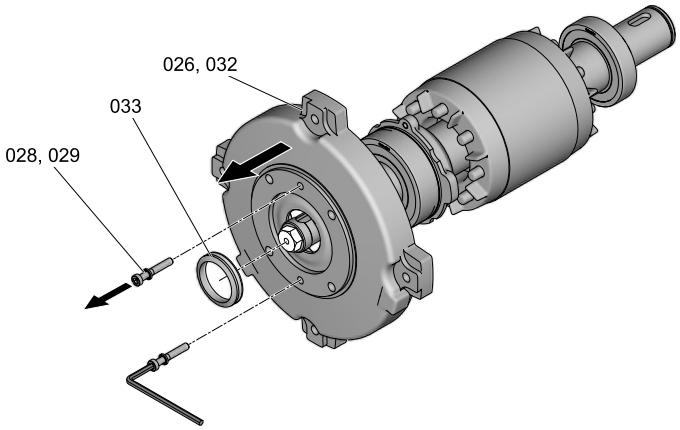


Pulling off the pump housing

8.8 Disassembly of the rolling bearings

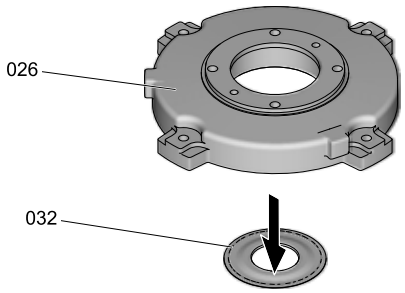
Disassembling the end plate

1. Unscrew the screws of the end plate (028) with the sealing discs (029) of the end plate (anti-clockwise).
2. Pull off the end plate (026) with the sealing ring (032).



Disassembling the end plate from the rotor

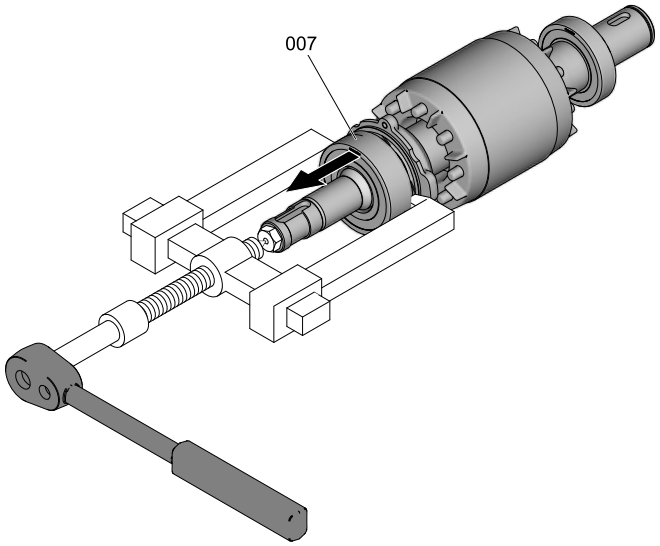
3. Separate the sealing ring (032) from the end plate (026).
4. Remove any sealant product residues from the sealing ring and end plate.



Separating the sealing ring from the end plate

Pulling off the groove ball bearing on the pump side

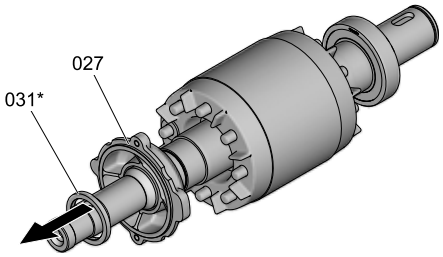
1. Position the puller arms of the housing/bearing puller underneath the groove ball bearing (007).
2. Insert the thread rod into the rotor and pull off the groove ball bearing with a screwdriver/ratchet
3. Remove the housing/bearing puller.
4. Remove the screw from the rotor (anti-clockwise).



Pulling off the rolling bearings

Pulling off the bearing cover

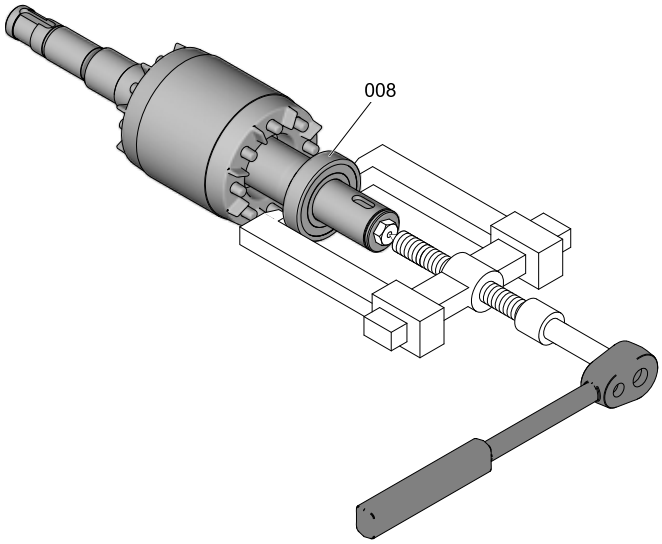
1. Remove the disc (031).
2. Pull off the bearing cover (027).



Disassembling the bearing cover

Disassembling the groove ball bearing on the motor side

1. Position the puller arms of the housing/bearing puller underneath the groove ball bearing (008).
2. Insert the thread rod into the rotor and pull off the groove ball bearing with a screwdriver/ratchet
3. Remove the housing/bearing puller.



Pulling off the motor side rolling bearing

NOTICE

Risk of breakage due to overloading screw connections resulting from incorrect tightening torque values!

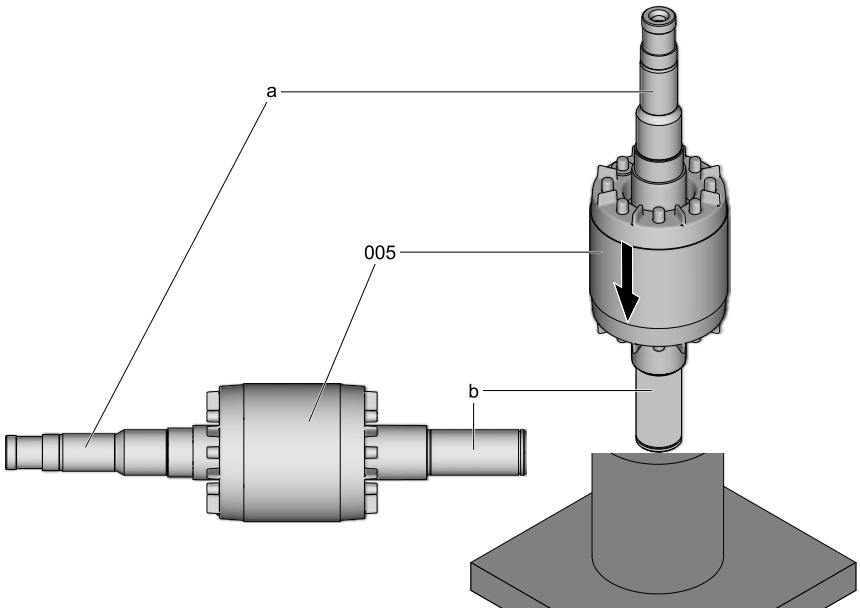
① Maintain the specified tightening torque values for all screw connections.

9.1 Fitting the rolling bearings

Preparing the rotor

① Insert the ventilation side (b) of the rotor (005) into the assembly fixture.

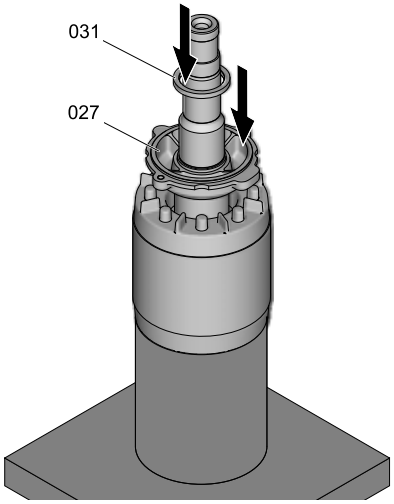
✓ The pump side (a) of the rotor points upwards.



Fitting the rotor into the assembly fixture

Fitting the bearing cover

1. Fit the bearing cover (027).
2. Fit the disc (031).

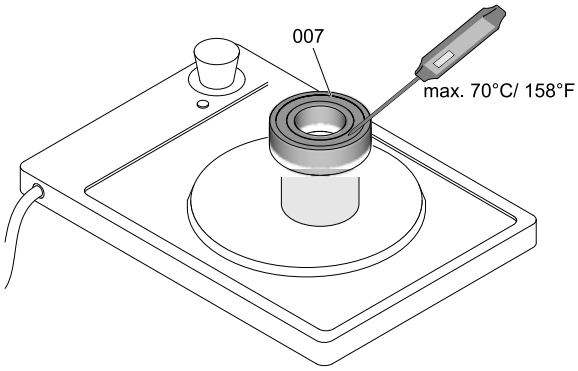


Sliding the bearing cover onto the shaft

Fitting the rolling bearings on the pump side

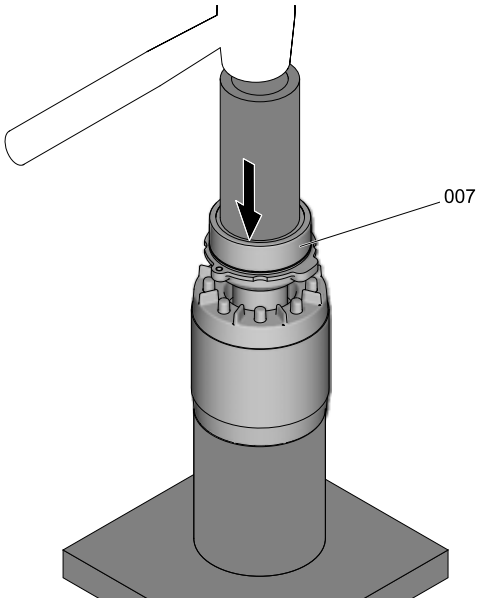
1. Wear protective gloves!
2. Switch on the hot plate.

3. Place the rolling bearing (007) onto the hot plate, using a metal sleeve as a spacer.
4. Heat the rolling bearing to a max. temperature of 70°C [158°F]. Check the temperature of the rolling bearing using a thermometer.



Heating up the rolling bearing

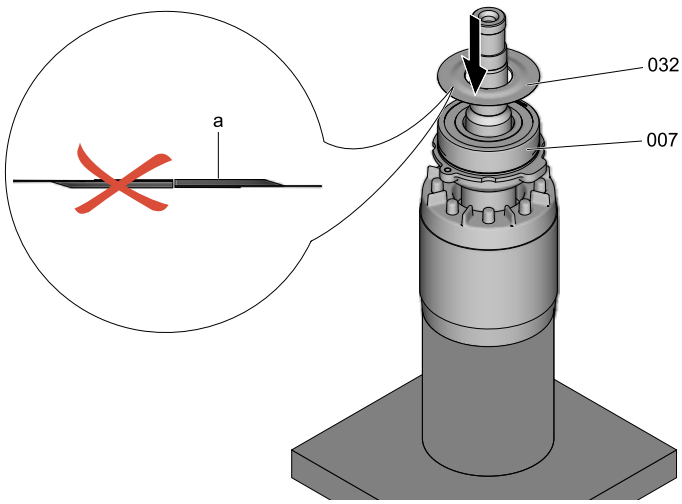
5. Drive the rolling bearing (007) onto the rotor (005). If necessary, drive it on as far as it will go using a plastic tube and hammer.



Tighten the rolling bearing

Fitting the sealing ring

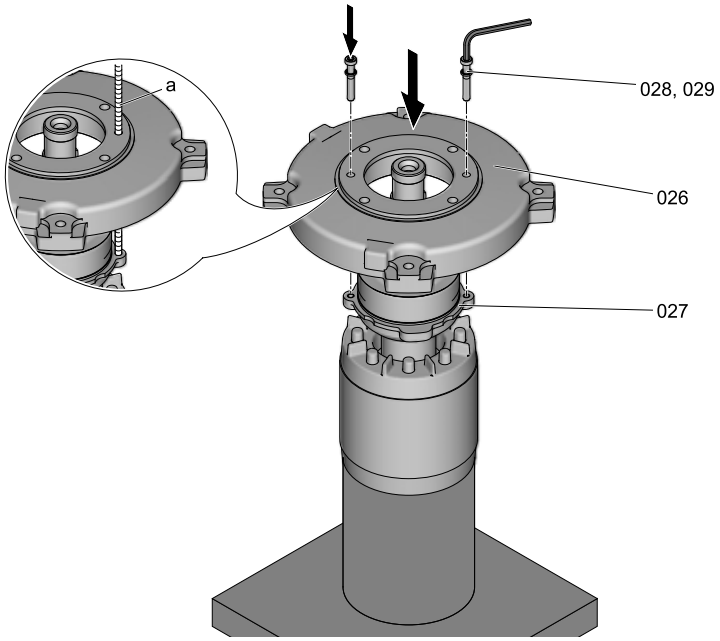
1. Grease the sliding face (a) of the sealing ring (032). Recommended grease: UNIREX N3 ESSO, (alternative grease as per DIN 51825-K3N)
2. Slide on the sealing ring, ensuring that the outer surface rests on the outer ring of the rolling bearing (007).



Sliding on the sealing ring

Assembling the end plate

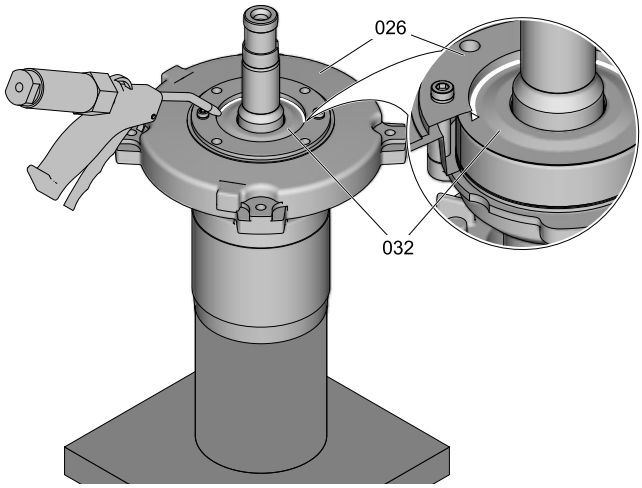
1. Screw the erection bolt (a) into the bearing cover (027).
2. Slide the end plate (026) over the rolling bearing and the sealing ring onto the bearing cover.
3. Screw the bearing cover using the screws (028) and seal discs (029) with the end plate. Remove the erection bolt after screwing in the first screw.



Assembling the end plate

Sealing the end plate and the sealing ring

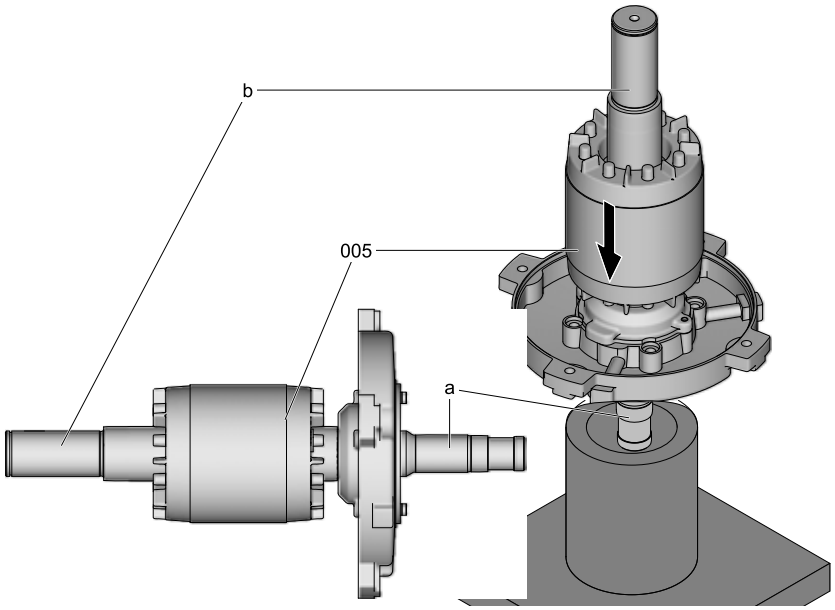
① Seal all around the contact area between the end plate (026) and sealing ring (032).
Sealant: Elastosil A33 Wacker company



Sealing the end plate and the sealing ring

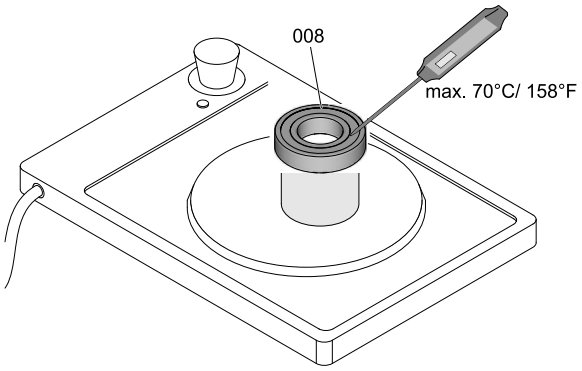
Sliding on the rolling bearing on the ventilation side

1. Insert the rotor (005) fitted with the bearing on the pump side, with the side of the motor (a) pointing towards the assembly fixture.
   ✓ The ventilation side (b) of the rotor points upwards.



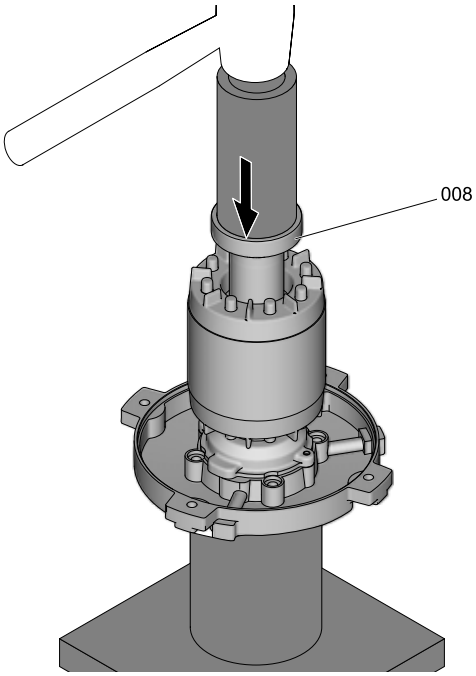
Fitting the rotor into the assembly fixture

2. Wear protective gloves!
3. Switch on the hot plate.
4. Place the rolling bearing (008) onto the hot plate, using a metal sleeve as a spacer.
5. Heat the rolling bearing to a max. temperature of 70°C [158°F].
   Check the temperature of the rolling bearing using a thermometer.



Heating up the rolling bearing

6. Slide the rolling bearing (008) onto the shaft. If necessary, slide it on as far as it will go using a plastic tube and hammer.



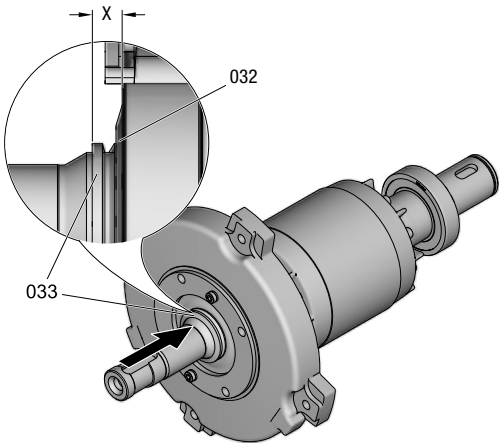
Tightening the rolling bearing

9.2 Assembling the pump housing

Fitting the V-ring

① Slide the V-ring (033) onto the shaft until measurement X (V-ring [033] - sealing ring [032]) following the table below.

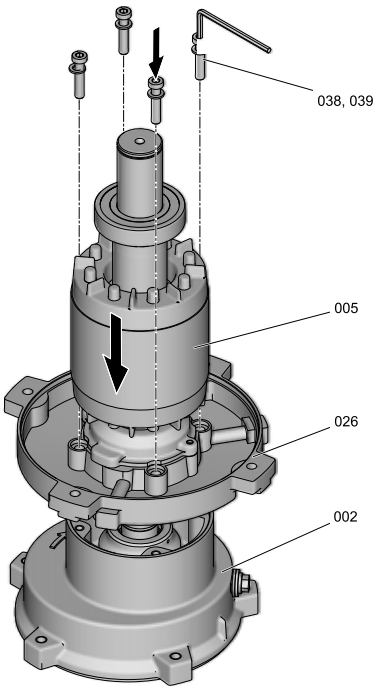
Type	Measurement X [mm]
2BV2060/ 2BV2061/ 2BV2070	8,2 - 0,5
2BV2071	9,7 - 0,5



Fitting the V-ring

Assembling the pump housing

1. Place the pump housing (002) on a flat surface.
2. Insert the assembled rotor (005) into the pump housing.
3. Assemble the pump housing and the end plate together (026), using screws (039) and spring washers (038).

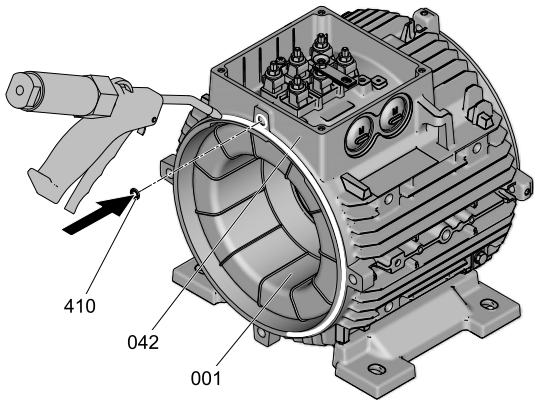


Assembling the pump housing

9.3 Assembling the rotor

Preparing the motor housing for assembly

1. Apply sealant to the pump side sealing surface of the motor housing (001).
   Sealant: Epple 03213
2. Insert the O-ring (410) with sealant into the hole in the terminal box (042).
   Sealant: Epple 03213



Applying the sealant onto the motor housing

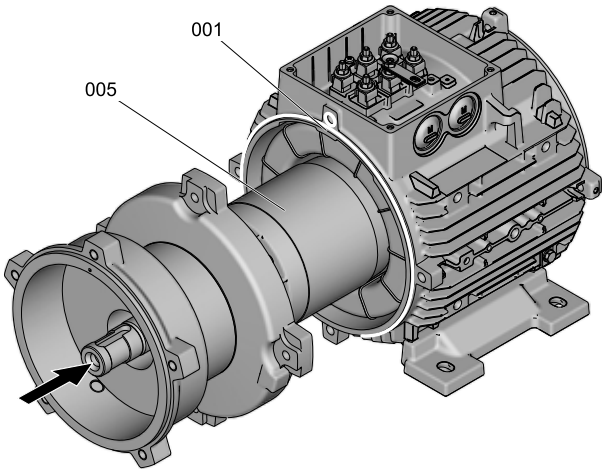
Assembling the rotor

NOTICE

The motor coil can be damaged by the rotor.

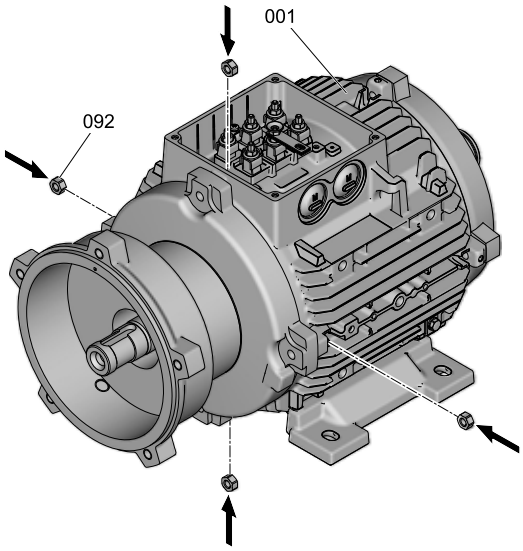
① Do not jam the rotor.

1. Carefully insert the assembled rotor (005) into the motor housing (001).



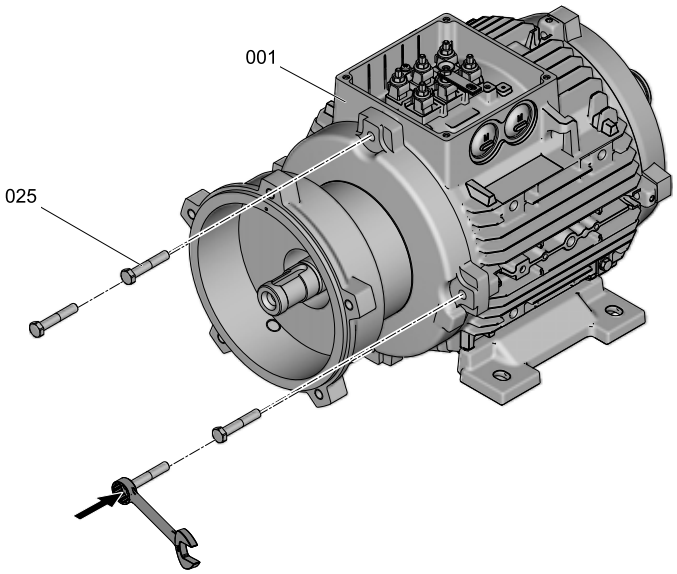
Fitting the rotor

2. Insert the nuts* in the end plate fixture (409) into the pocket in the motor housing (001).
   * only 2BV2070-....1-../ 2BV2070-....3-../ 2BV2070-....4-../ 2BV2070-....5-.. and all 2BV2071



Insert the pump side end plate nuts

3. Screw the assembled rotor together with the motor housing (001), using screws (025) (clockwise).

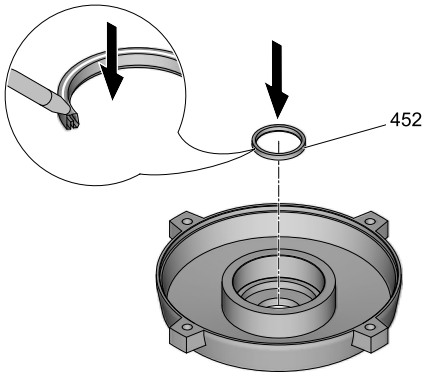


Fitting the pump housing and motor housing

9.4 Fitting on the ventilation side

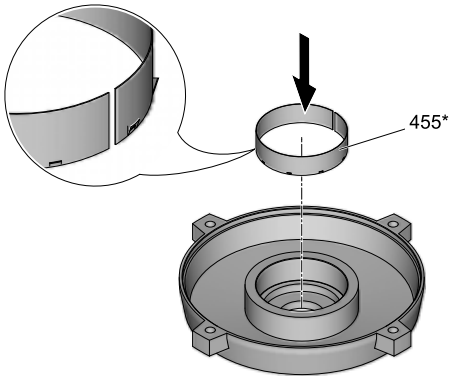
Inserting the sealings

1. Grease the radial shaft seal (452).
2. Insert the radial shaft seal into the end plate.



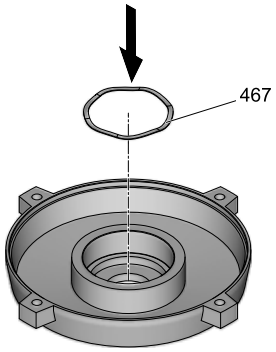
Fitting the radial shaft seal

3. Insert the steel tape (455*) below with the hook facing outwards.
   * only 2BV2070-....1-../ 2BV2070-....3-../ 2BV2070-....4-../ 2BV2070-....5-.. and all 2BV2071



Fitting the steel tape

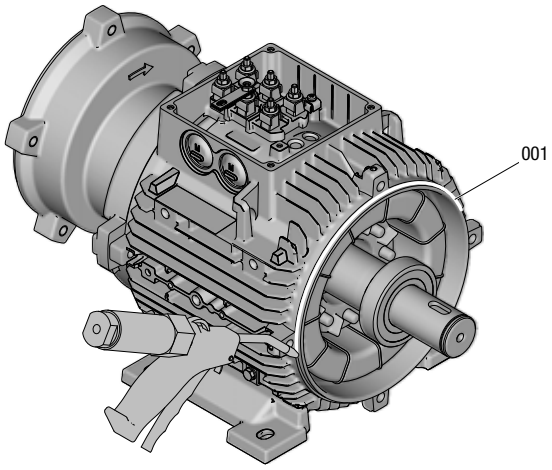
4. Insert the spring washer (467) into the end plate.



Fitting the spring washer

Preparing the motor housing for assembly

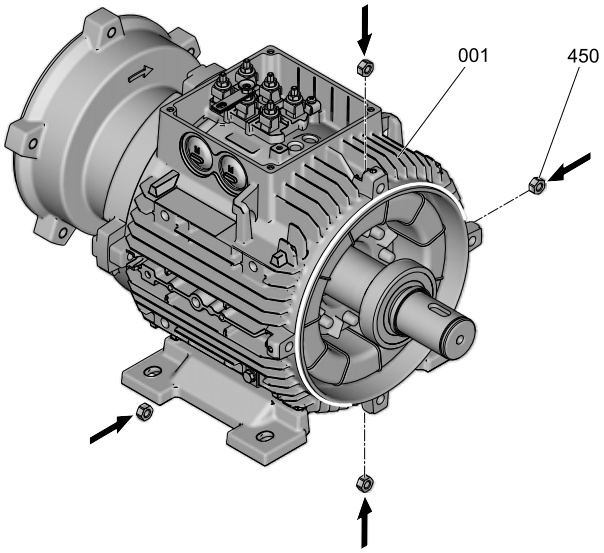
① Apply sealant to the ventilation side sealing surface of the motor housing (001).
Sealant: Epple 03213



Apply sealant to the ventilation side of the motor housing

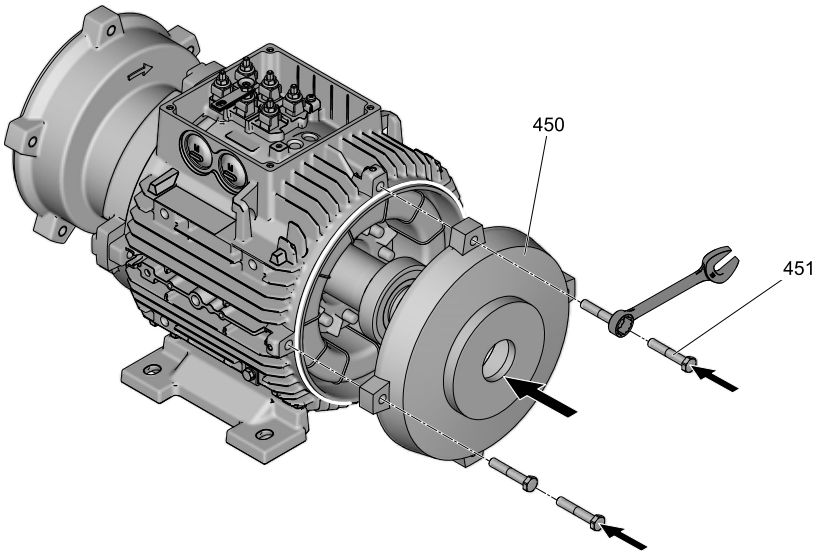
Assembling the end plate

1. Insert the nuts* in the end plate fixture (459) into the pocket in the motor housing (001).
   * only 2BV2070-....1-../ 2BV2070-....3-../ 2BV2070-....4-../ 2BV2070-....5-.. and all 2BV2071



Inserting the ventilation side end plate nuts

2. Position the end plate (450) over the rolling bearing on the centring ring of the motor housing.
3. Assemble the end plate and the motor housing together with screws (451) (clockwise).

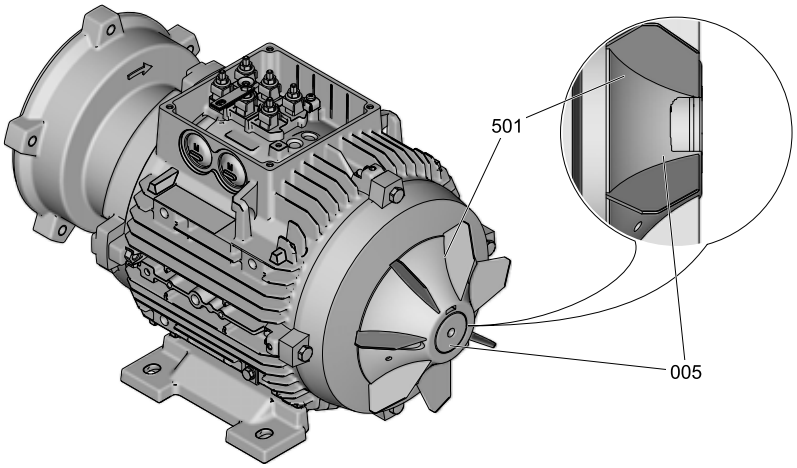


Assembling the end plate on the ventilation side

Fitting the exterior fan*

*all 2BV2060/ 2BV2061 and 2BV2070-....0-..

① Press on exterior fan (501), aligning it with the shaft end.

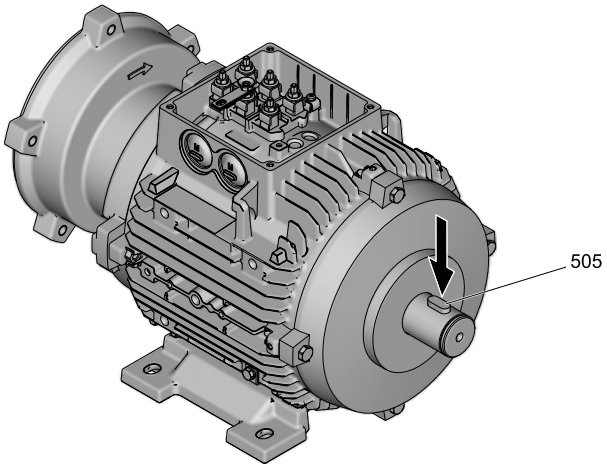


Fitting the fan impeller

Fitting the exterior fan*

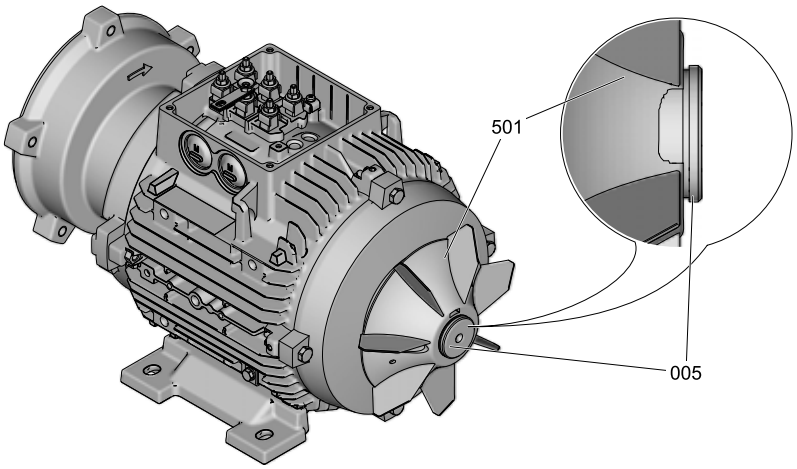
*only 2BV2070-....1-../ 2BV2070-....3-../ 2BV2070-....4-../ 2BV2070-....5-.. and all 2BV2071

1. Insert the feather key (505) with a hammer.



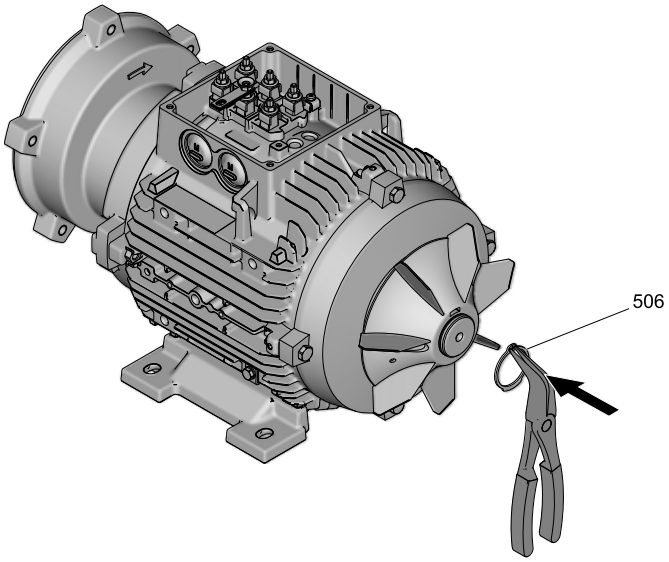
Inserting the feather key

2. Slide exterior fan (501) up until the shaft inset.



Fitting the fan impeller

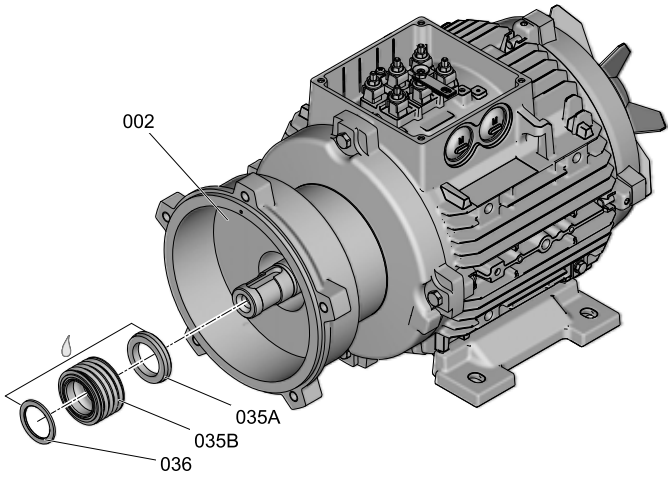
3. Fit the exterior fan's circlip (506) using a pair of circlip pliers.



Fitting the circlip of the fan impeller

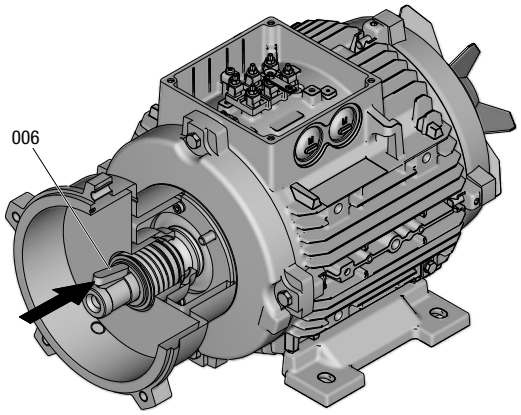
9.5 Assembling the rotary seal

1. Brush the rotary seal (035) with a standard flushing liquid.
2. Push the counter ring with the O-ring (035A) into the pump housing (002) up to the inset, use a sleeve if necessary.
3. Slip on the rotary seal (035B).
4. Slip on the washer (036).



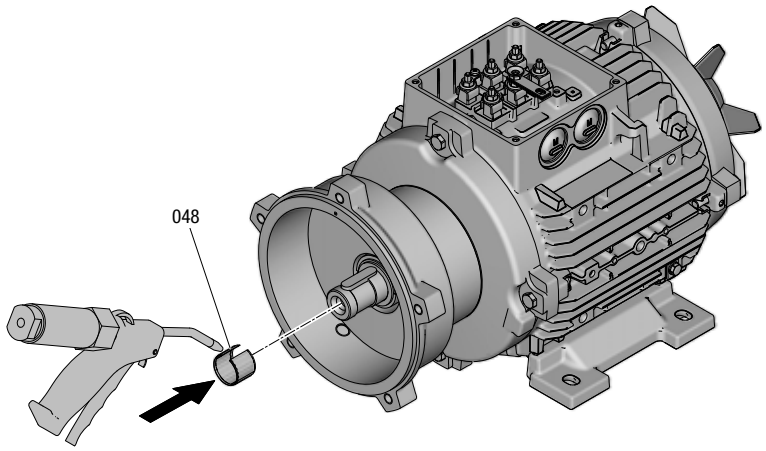
Fitting the rotary seal

5. Compress the rotary seal with a feather key (006).
6. Insert the feather key with a hammer.



Fitting the feather key

7. Grease the tolerance ring (048).
   Grease: UNIREX N3 (ESSO)
   Alternative grease as per DIN 51825-K3N
8. Slide the tolerance ring onto the shaft



Fitting the tolerance ring

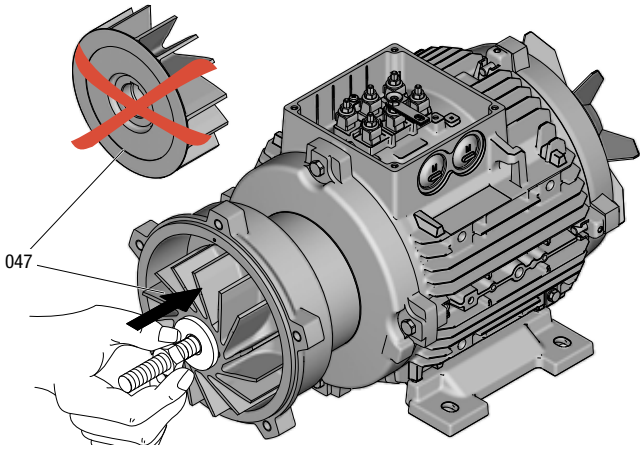
9.6 Fitting the impeller and adjusting the clearance gap

NOTICE

If the impeller is fitted above the required clearance gap, it must be completely removed and refitted using a new tolerance ring (048).
Consequences

① Pull on the impeller step by step and keep checking the clearance gap!

1. Fit the impeller (047) onto the shaft by hand where possible.
2. Screw a thread rod of the appropriate size into the shaft end.
3. Screw a shim with nut until the inset of the thread rod.
4. Tighten the impeller using a nut and spanner.

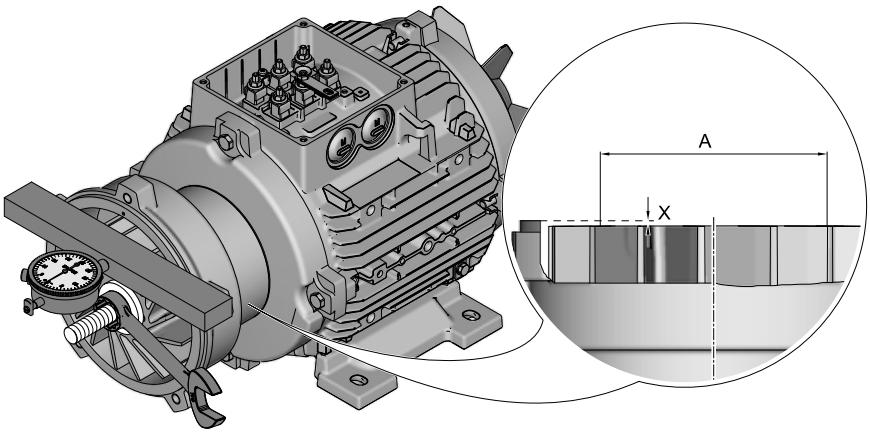


Fitting the impeller

5. Keep checking the clearance gap and adjust to measurement X.
   Measurement range A:
   2BV206. ø 82 mm (3.23 inch)
   2BV207. ø 108 mm (4.25 inch)

Adjusting the clearance gap

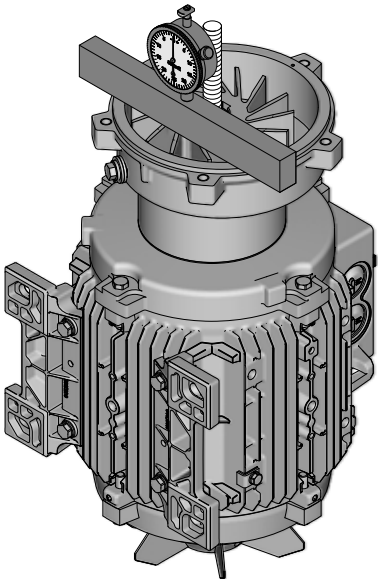
Type	Measurement X [mm]	Measurement X [inch]
2BV2…-.N…-.. (Standard version)	0,15 ± 0,05	0.00591 ± 0.00197
2BV2…-.H…-.. (Stainless steel version)	0,15 + 0,05	0,00591 + 0.00197



Adjusting the clearance gap

! The unit is stressed from the ventilation side during operation. The clearance gap must thus be checked by applying pressure to the ventilation side.

1. Place the unit upright on the shaft end and secure from overturning.
2. Check clearance gap X.
3. Remove the thread rod with the shim and nut from the shaft.

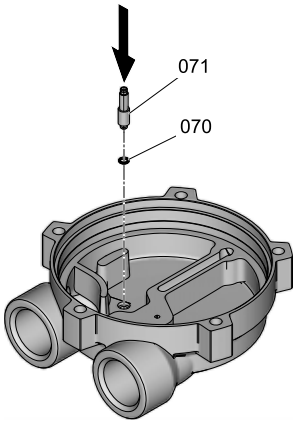


Monitoring the clearance gap

9.7 Assembling the pump cover

Fitting the cavitation protection

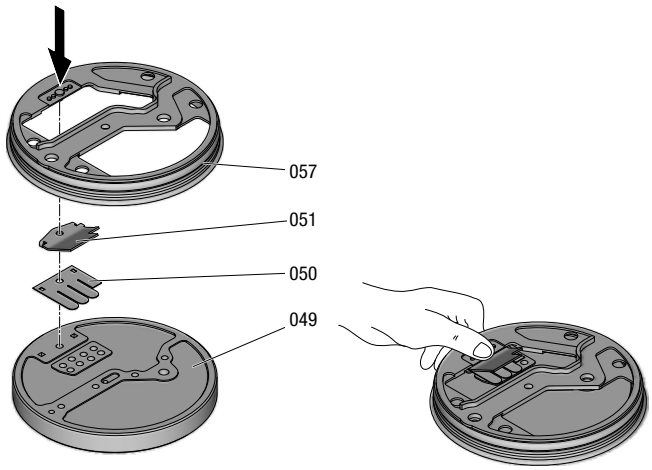
1. Insert the O-ring (070) onto the short side of the pipe for the cavitation protection (071).
2. Insert the pipe for the cavitation protection into the pump cover.



Fitting the pipe for cavitation protection

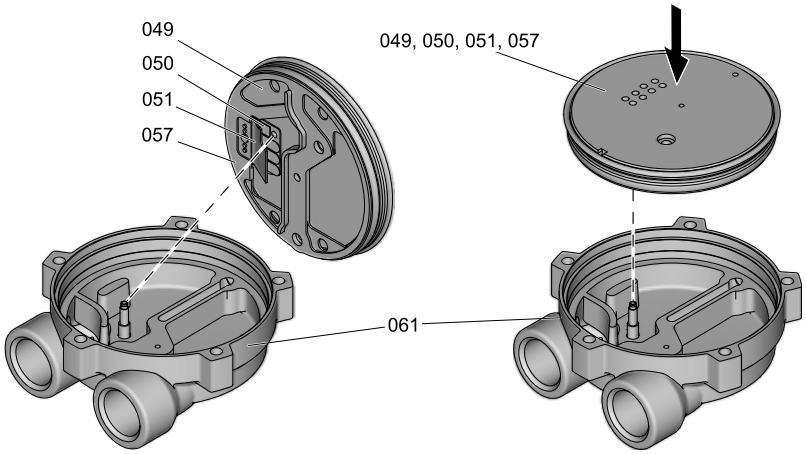
Fitting the control disc

1. Place the control disc (049).
2. Place the valve plate (050) onto the control disc.
3. Place the catch plate (051) onto the valve plate.
4. Fit the seal of the control disc (057), securing it on the control disc with the fitting of the seal valve and catch plate.



Assembling the control disc

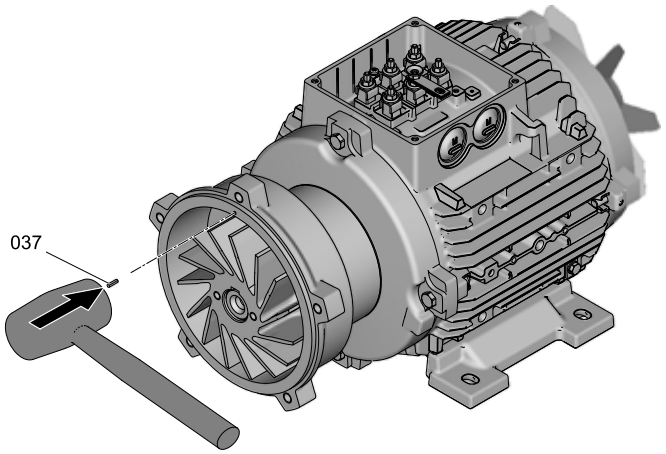
5. Align the control disc with seal, valve and catch plate (049, 050, 051,057) with hole for cavitation protection on the cavitation protection pipe in the pump cover (061), and insert.



Assembling the control disc and pump cover

Inserting the spiral pin

① If not already fitted, insert the spiral pin (037) with a hammer.

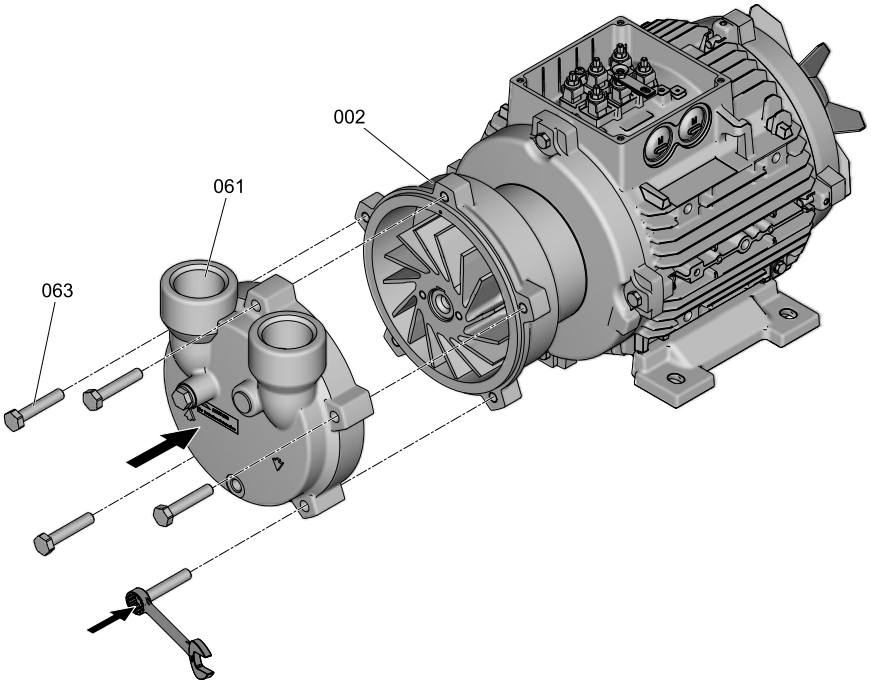


Fitting the spiral pin

Fitting the pump cover

1. Align the pump cover (061) with the control disc on the spiral pin (037) and fit onto the housing.

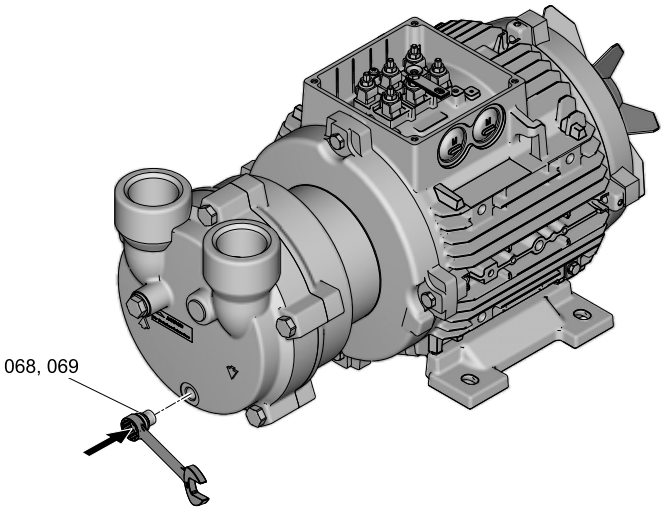
2. Insert the screws on the pump cover (063).
3. Screw the pump cover and pump housing (002) with screws (clockwise).



Fitting the pump cover

Closing the drain-off opening

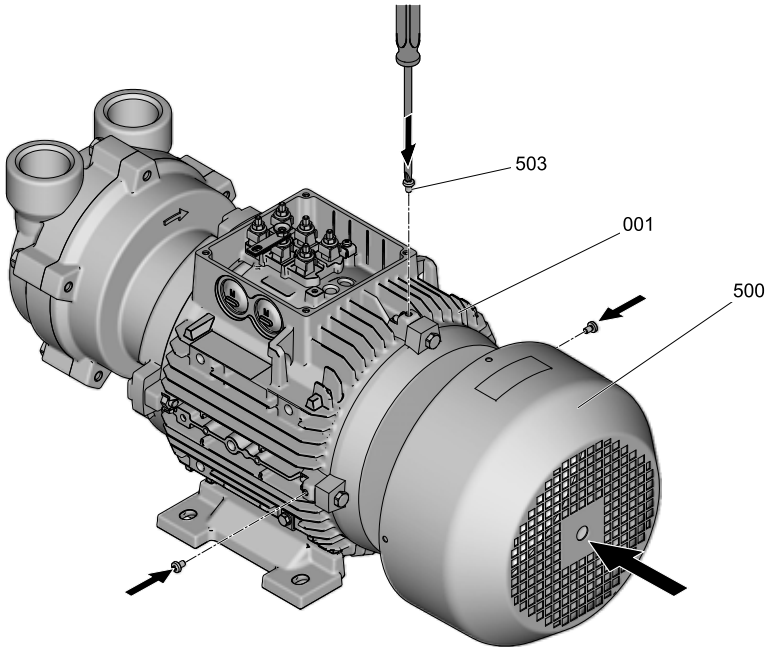
① Seal the drain-off opening in the pump cover with a screw (068) and seal (069) (clockwise).



Fitting the drain-off opening screw(s)

9.8 Assembling the fan guard

1. Position the fan guard (500) on the motor housing (001), over the exterior fan.
2. Tighten the fan guard with fan guard screws (503) (clockwise).



Fitting the fan guard

Carry out the following tests after completing the maintenance:

- Insulation test
- Functional test

⚠ WARNING

Special requirements for L-BV2 for potentially explosive atmospheres (ATEX)

① Before commissioning with L-BV2, carry out the prescribed tests and inspections for potentially explosive atmospheres.

For installation and commissioning, refer to the corresponding Chapter of the Operating Instructions .

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