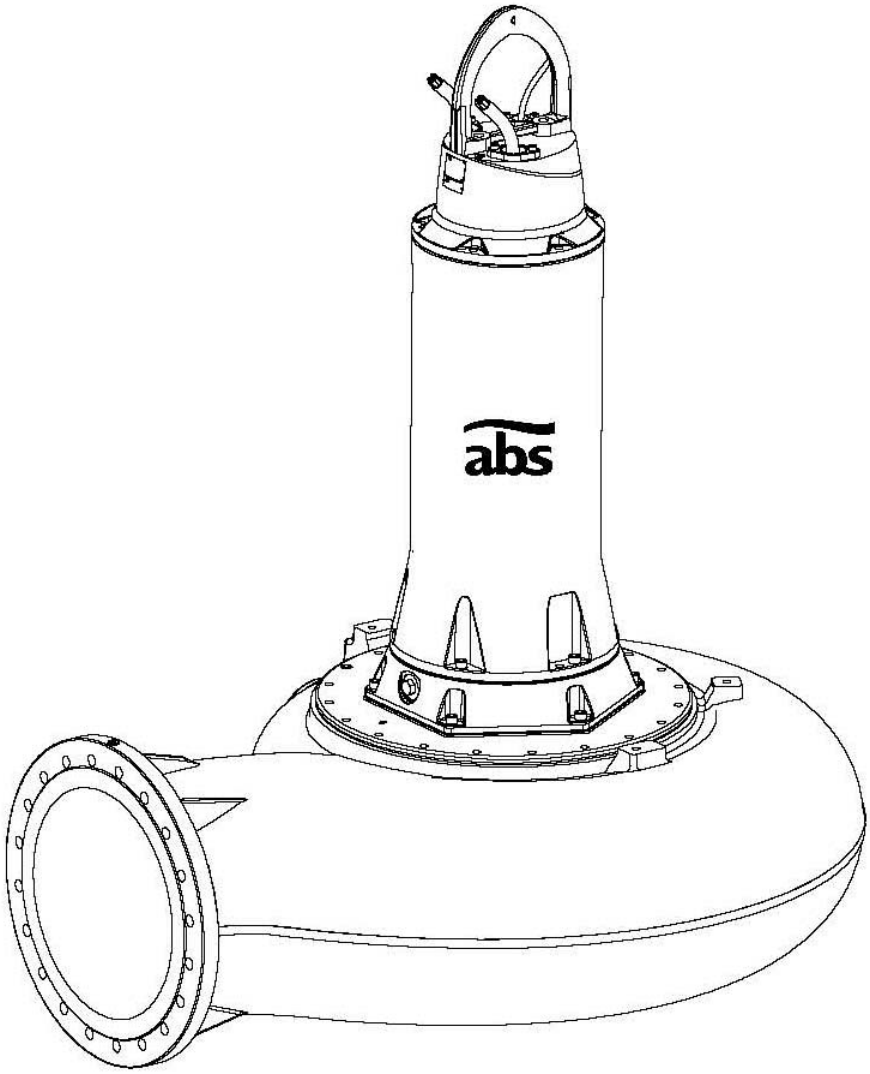
SULZER

ABS Submersible sewage pump

XFP-PE5



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Workshop Manual

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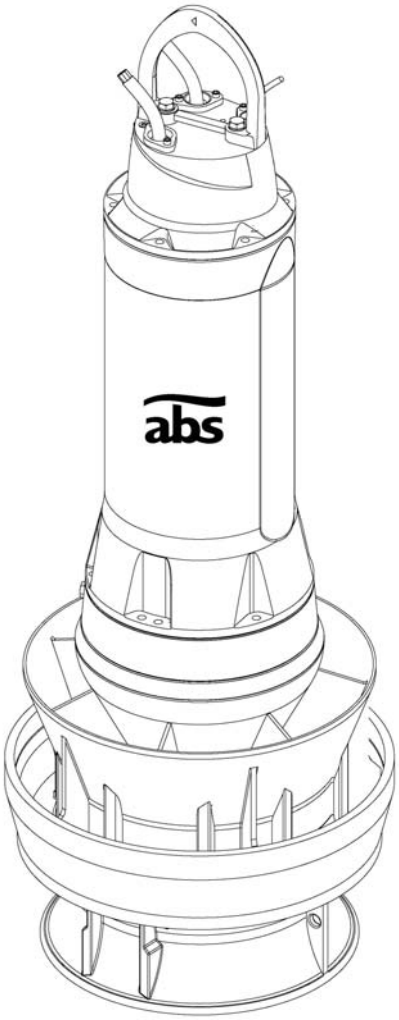
ABS Submersible sewage pump

VUPX-PE5



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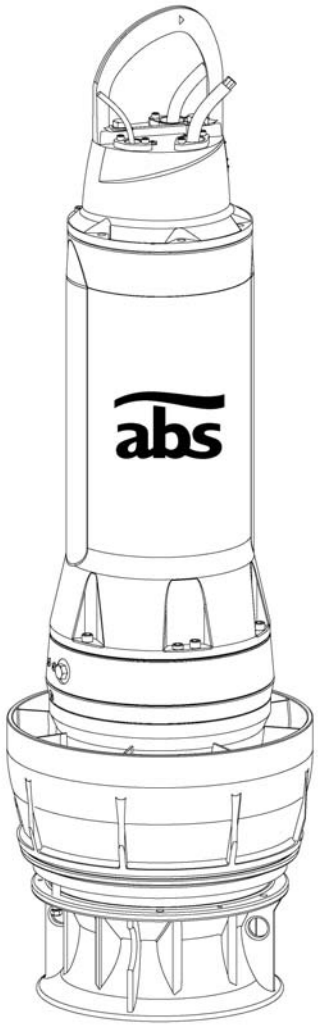
ABS Submersible sewage pump

AFLX-PE5



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Workshop Manual

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Contents:

Explosion approved motor

NOTE!
Explosion approved motor may only be repaired or maintained by authorized ABS personnel or personnel authorized by ABS. The personnel and /or your workshop may also require authorisation by your local government.

IEC 60079-19 and EU Directive 94/9/EC are valid for all maintenance and repair work of products used in hazardous locations.

To ensure that the motor complies with the regulations and approval of the authorities, use only genuine ABS spare parts when carrying out repair work.

Always check the dimensions of vital parts before assembly. See picture and table for respective motor below.

The assembled pumps shall always be insulation-tested and test-run before delivery.

General

In an explosion approved motor (Ex), the gaps between different parts, for example between the motor housing and the connection Chamber, shall prevent any sparks from interior of the motor from getting out and igniting surrounding gases.

All flame path length and gaps shall be measured with accurate and calibrated instruments. All gap surfaces shall be inspected. No scratches, tool marks or the like are permissible.

Failure to meet the above requirements may render the explosion approval invalid. Note that the work requires experienced and specially trained personnel. The personnel and/ or your workshop may require authorisation by your local government.

Workshop repair

The parts for which dimensions must be checked are given in the part list. It is important to ensure that the gap surfaces for these parts are not damaged during dismantling.

The product must be thoroughly examined and a report must be prepared on all findings. Any measurements, dimensional checks, test readings, details of material, parts of windings which are found to require attention should be carefully noted.
It is required to affix a repair nameplate on the product after repair.

If the products have been modified and do not comply with original approval, the owner must be informed and further information on the application must be requested.

If there are any doubts during the repair as to the results of measurements, tests, the continued integrity of parts or the possible reclamation of damage parts, reference must be made to your local Ex Coordinator.

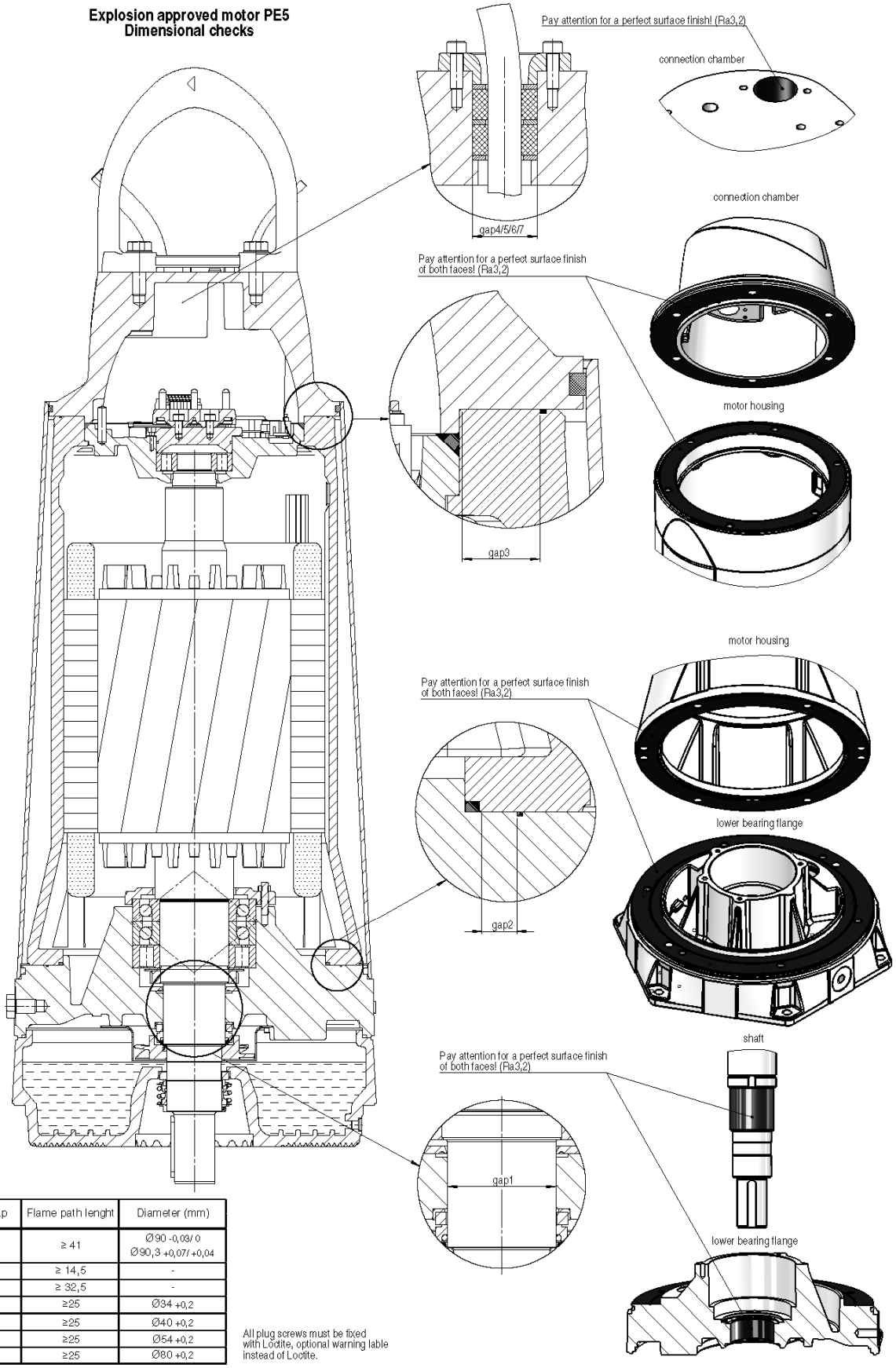
Guidelines for repair

Care must be taken when dismantling Ex approved products, as damage to flame proof faces can easily occur. For instance, if difficulties are found in separating spigot gaps, draw studs should be used wherever possible rather than trying to wedge the components apart, as not only will damage occur at the point of wedging, but he wedges are liable to be driven through and damage the flame path surface of the spigot.
Similarly care should be exercised when removing the main bearing assembly and bearing cover to ensure that damage does not occur on the part of the shaft that constitutes the flame path.
Once the motor has been completely dismantled, detailed examination of all parts should be made and a concise record kept of all findings.
When assembling an Ex approved product, measure the gaps and the flame path length. Inspect the flame path surfaces and smear them with grease to prevent corrosion.
If a part does not meet the requirements on dimensional accuracy or surface finish, it must be discarded and a new specially approved part ordered. The new part must also be inspected.
Observe caution during assembly to prevent damage to the flame path surfaces.

Flame paths

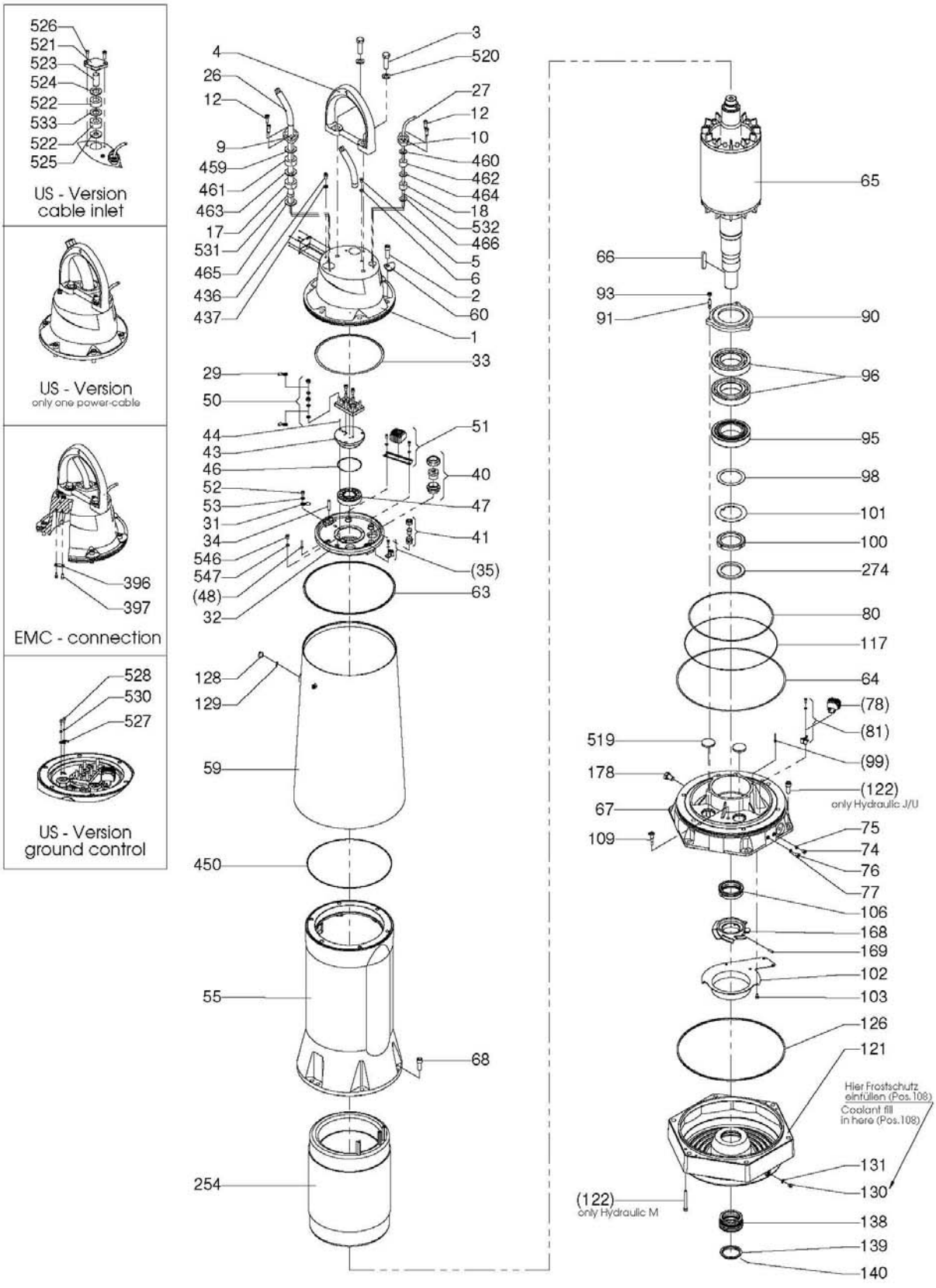
By referring to the spare parts list and dimensional drawings, the trained person can ascertain the parts of the motor that require special examination. The flame paths should be examined for any corrosive pitting or damage which may have occurred.
All castings should be examined for blow holes or hairline cracks. If there is evidence that there has been an internal explosion of gases, this may be confirmed by the user and will probably be evident by smoke and debris tracking across the flame paths.

Explosion approved motor PE5
Dimensional checks



Gap	Flame path lenght	Diameter (mm)
1	≥ 41	Ø 90 -0,03/ 0 Ø 90,3 +0,07/ +0,04
2	≥ 14,5	-
3	≥ 32,5	-
4	≥25	Ø34 +0,2
5	≥25	Ø40 +0,2
6	≥25	Ø54 +0,2
7	≥25	Ø80 +0,2

All plug screws must be fixed with Loctite, optional warning lable instead of Loctite.


526
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533
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US - Version
cable inlet
US - Version
only one power-cable
396
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EMC - connection
528
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527
US - Version
ground control
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Hier Frostschutz
einfüllen (Pos.108)
Coolant fill
in here (Pos.108)
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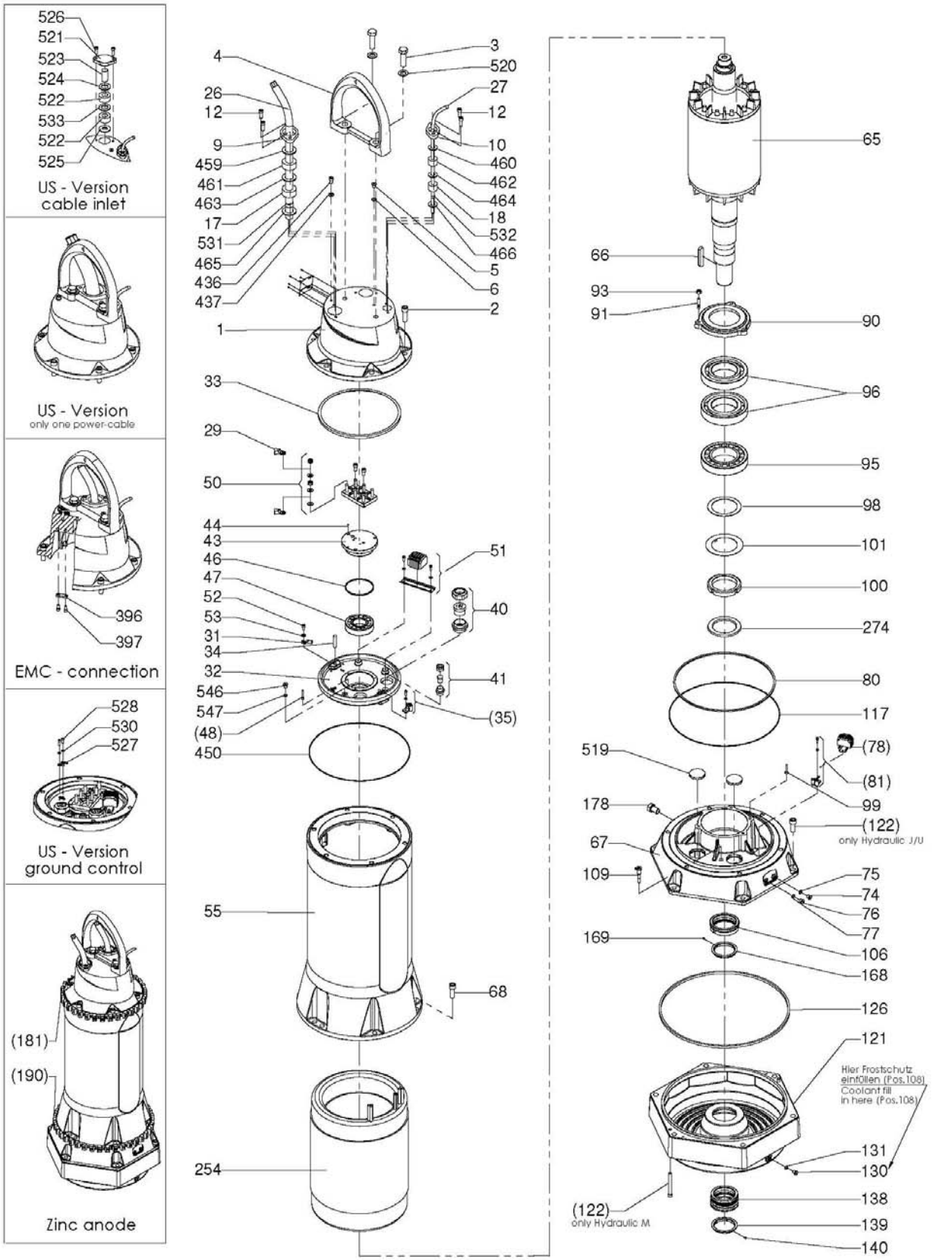
1 **Connection chamber**
2 **Screw** (Connection chamber)
3 **Screw** (Lifting hoop)
4 **Lifting hoop**
5 **Plug Screw** (Connection chamber)
6 **Seal**
9 **Cable entry** (Power cable)
10 **Cable entry** (Control cable)
12 **Screw** (Cable cap control cable)
17 **Seal** (Power cable lower)
18 **Seal** (Control cable)
26 **Power cable**
27 **Control cable**
29 **Cable shoe**
31 **Cable shoe**
32 **Upper bearing lid**
33 **O- ring** (Upper bearing flange)
34 **Grooved pin**
(35) **Moisture sensor (DI)** (Connection chamber)
40 **Cable duct** (Power cable)
41 **Cable duct** (Control cable)
43 **Cover lid** (Upper bearing)
44 **Screw** (Cover lid)
46 **O-Ring** (Cover lid)
47 **Upper bearing**
(48) **Temperature monitoring** (Upper bearing)
50 **Terminal board** (Power cable complete)
51 **Terminal block** (Monitoring cables complete)
52 **Screw cable shoe**
53 **Washer cable shoe**
55 **Motor housing**
59 **Cooling jacket**
60 **Strip**
63 **O- ring** (Cooling jacket)
64 **O- ring** (Cooling jacket lower)
65 **Motor shaft**
66 **Key**
67 **Lower bearing flange**
68 **Screw** (Motor housing lower)
74 **Seal** (plug screw)
75 **Plug screw** (Lower bearing flange)
76 **Plug screw** (Inspection chamber)
77 **Seal** (plug screw)
78 **Terminal block** (Motor housing)
80 **O-Ring** (Motor housing)
(81) **Moisture sensor (DI)** (motor housing)
93 **Nut** (bearing lid)
98 **Distance washer** (Lower bearing 95)
90 **Lower bearing lid**
91 **Stud screw** (Lower bearing lid)
95 **Cylinder roller bearing**
96 **Angular ball bearing**
(99) **Temperature monitoring** (Lower bearing)
100 **Shaft nut** (Main bearing)
101 **Looking washer** (Main bearing)
102 **Cover plate**
103 **Screw**
106 **Mechanical Seal** (Engine side)
108 **Coolant** (33% Glycol and 67% Water; Frost-resistant up to -20°C/-4° F)
109 **Moisture sensor (DI)** (separation chamber)
117 **O-Ring** (Bearing flange)
121 **Seal cover**
122 **Screw**
126 **O- ring**
128 **Plug Screw** (Cooling jacket)
129 **Seal**
130 **Plug screw** (Seal cover)
131 **Seal**
138 **Mechanical seal** (Medium side)
139 **Adjusting ring** (Mechanical seal medium side)
140 **Grub screw**
168 **Auxiliary Impeller**
169 **Grub screw** (Auxiliary Impeller)
178 **Screw** / **Attachment swivel** (only horizontal version)
254 **Stator**
274 **Shaft seal ring**
396 **Washer** (EMC-Connection)
397 **Screw** (EMC-Connection)
436 **Screw**
437 **Washer**
450 **O-ring** (Motor housing)
459 **Pressure washer** (Power cable upper)
460 **Pressure washer** (Control cable upper side)
461 **Seal** (Power cable)
462 **Seal** (Control cable)
463 **Washer**
464 **Washer**
465 **Pressure washer** (Power cable lower)
466 **Pressure washer Control cable** (lower)
519 **Sealing washer**
520 **Washer** (Lifting hoop)
521 **Cover lid** (only US-Version)
522 **Seal** (only US-Version)
523 **Blind plug** (only US-Version)
524 **Pressure washer** (Power cable upper – only US-Version)
525 **Pressure washer** (Power cable lower - only US-Version)
526 **Screw** (only US-Version)
527 **Cable shoe** (US-Version)
528 **Screw** (US-Version)
530 **Washer** (US-Version)
531 **Shrink hose** (strain relief)
532 **Shrink hose** (strain relief)
533 **Washer**
546 **Plug screw** (Upper bearing flange)
547 **Seal**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US - Version
cable inlet
US - Version
only one power-cable
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EMC - connection
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US - Version
ground control
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Hier Frostschutz
einfüllen (Pos.108)
Coolant fill
in here (Pos.108)
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(122)
only Hydraulic M
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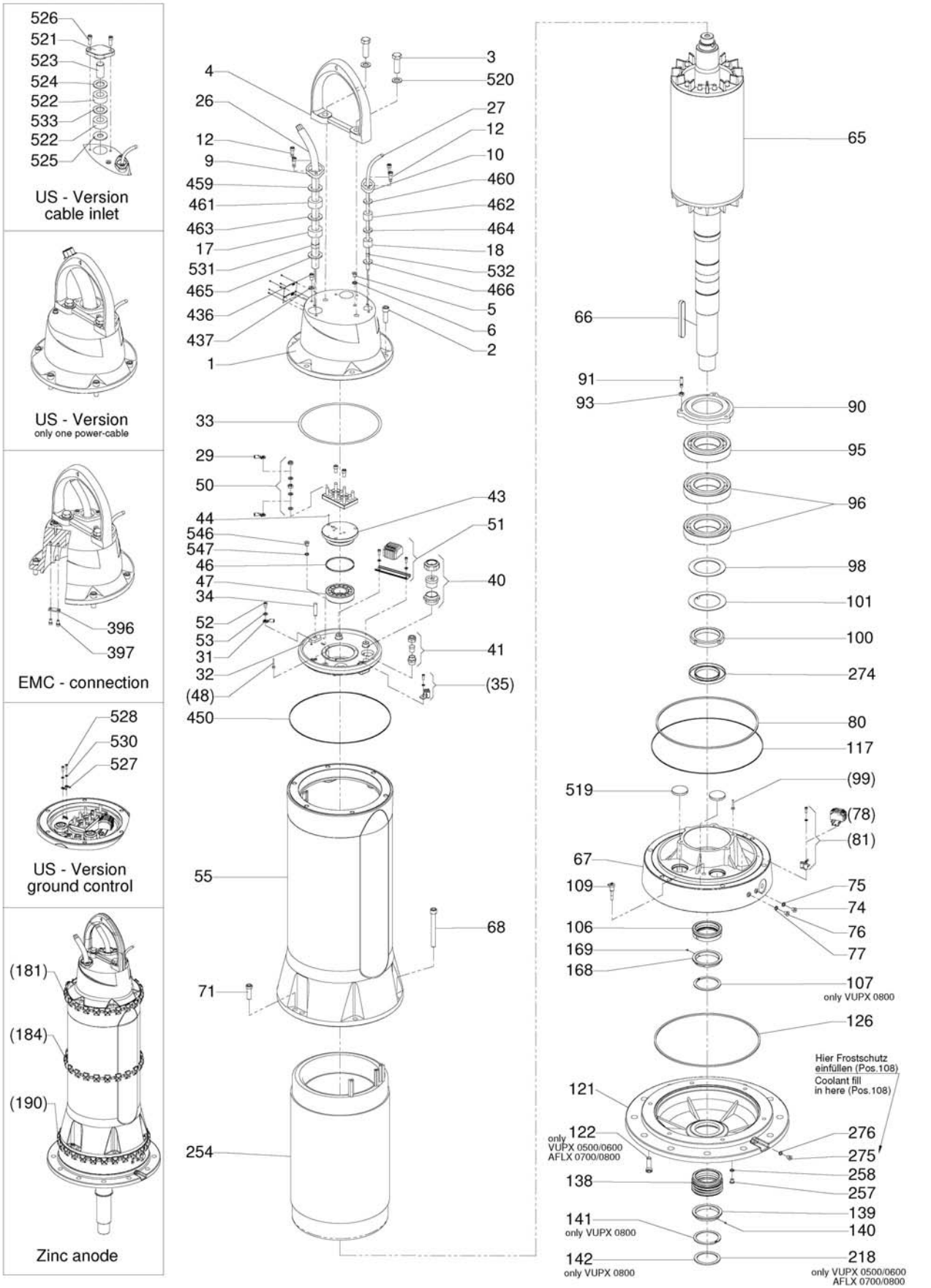
1 **Connection chamber**
2 **Screw** (Connection chamber)
3 **Screw** (Lifting hoop)
4 **Lifting hoop**
5 **Plug Screw** (Connection chamber)
6 **Seal**
9 **Cable entry** (Power cable)
10 **Cable entry** (Control cable)
12 **Screw** (Cable cap control cable)
17 **Seal** (Power cable lower)
18 **Seal** (Control cable)
26 **Power cable**
27 **Control cable**
31 **Cable shoe**
32 **Upper bearing flange**
33 **O-ring** (Upper bearing flange)
34 **Grooved pin**
(35) **Moisture sensor (DI)** (Connection chamber)
40 **Cable duct** (Power cable)
41 **Cable duct** (Control cable)
43 **Cover lid** (upper bearing)
44 **Screw** (Cover lid)
46 **O-Ring** (Cover lid)
47 **Upper bearing**
(48) **Temperature monitoring** (Upper bearing)
50 **Terminal board** (Power cable complete)
52 **Screw cable shoe**
53 **Washer cable shoe**
55 **Motor housing**
65 **Motor shaft**
66 **Key**
67 **Lower bearing flange**
68 **Screw** (Motor housing lower)
74 **Seal** (plug screw)
75 **Plug screw** (Motor housing)
76 **Plug screw** (Inspection chamber)
77 **Seal** (plug screw)
78 **Terminal block** (Motor housing)
80 **O-ring** (Motor housing)
(81) **Moisture sensor (DI)** (motor housing)
90 **Lower bearing lid**
91 **Stud screw** (Lower bearing lid)
93 **Nut** (bearing lid)
95 **Cylinder roller bearing**
98 **Distance washer** (Lower bearing 95)
(99) **Temperature monitoring** (Lower bearing)
100 **Shaft nut** (Main bearing)
101 **Looking washer** (Main bearing)
106 **Mechanical Seal** (Engine side)
108 **Coolant** (33% Glycol and 67% Water; Frost-resistant up to -20°C/-4° F)
109 **Moisture sensor (DI)** (separation chamber)
117 **O-Ring** (Lower bearing flange)
121 **Seal cover**
122 **Screw**
126 **O-ring**
130 **Plug screw** (Seal cover)
131 **Seal**
138 **Mechanical seal** (Medium side)
139 **Adjusting ring** (Mechanical seal medium side)
140 **Circlip** (Mechanical seal medium side)
168 **Adjusting ring**
169 **Grub screw** (Adjusting ring)
178 **Screw** / **Attachment swivel** (only horizontal version)
190 **Zinc anode belt** (Lower part)
181 **Zinc anode belt** (Upper part)
254 **Stator**
274 **Shaft seal ring**
396 **Washer** (EMC-Connection)
397 **Screw** (EMC-Connection)
436 **Screw**
437 **Washer**
450 **O-ring (**Motor housing)
459 **Pressure washer** (Power cable upper)
460 **Pressure washer** (Control cable upper side)
461 **Seal** (Power cable)
462 **Seal** (Control cable)
463 **Washer**
464 **Washer**
465 **Pressure washer** (Power cable lower)
466 **Pressure washer Control cable** (lower)
519 **Sealing washer**
520 **Washer** (Lifting hoop)
521 **Cover lid** (only US-Version)
522 **Seal** (only US-Version)
523 **Blind plug** (only US-Version)
524 **Pressure washer** (Power cable upper – only US-Version)
525 **Pressure washer** (Power cable lower - only US-Version)
526 **Screw** (only US-Version)
527 **Cable shoe** (US-Version)
528 **Screw** (US-Version)
530 **Washer** (US-Version)
531 **Shrink hose** (strain relief)
532 **Shrink hose** (strain relief)
533 **Washer**
546 **Plug screw** (Upper bearing flange)
547 **Seal**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cable inlet
US - Version
only one power-cable
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EMC - connection
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US - Version
ground control
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only VUPX 0800
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Hier Frostschutz
einfüllen (Pos.108)
Coolant fill
in here (Pos.108)
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VUPX 0500/0600
AFLX 0700/0800
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141
only VUPX 0800
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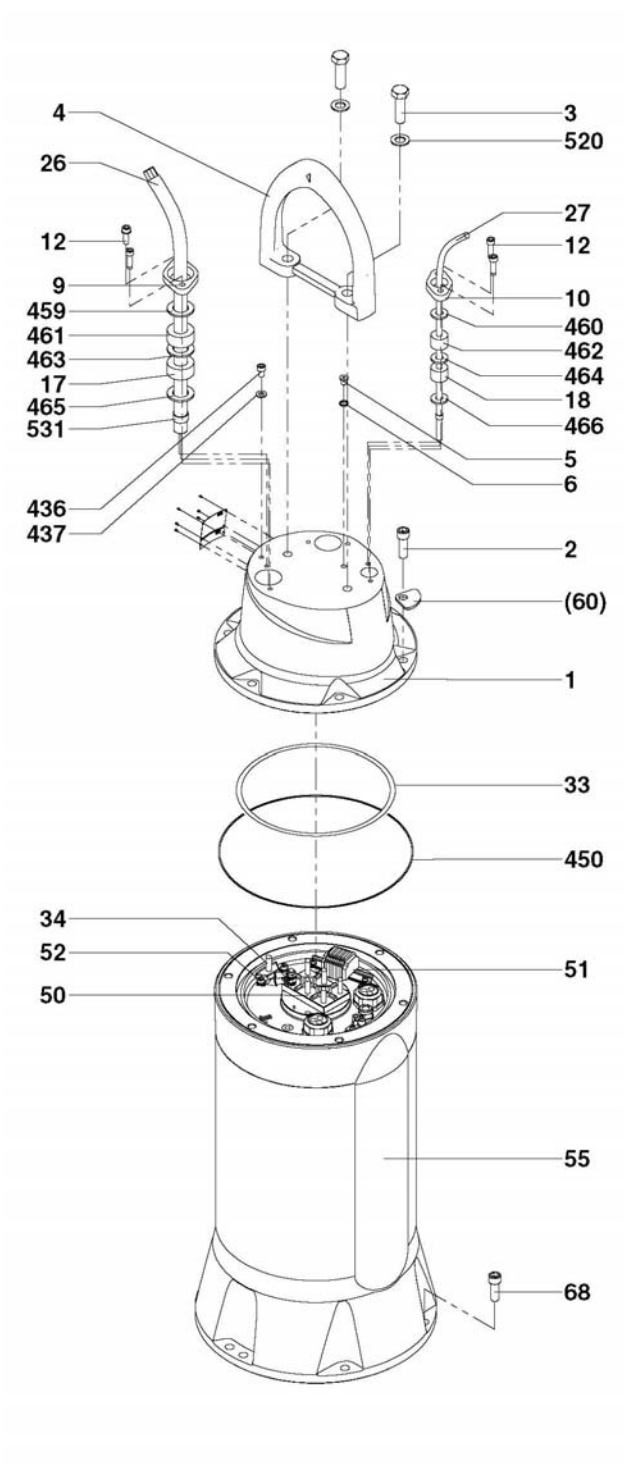
142
only VUPX 0800
218
only VUPX 0500/0600
AFLX 0700/0800

1 **Connection chamber**
2 **Screw** (Connection chamber)
3 **Screw** (Lifting hoop)
4 **Lifting hoop**
5 **Plug Screw** (Connection chamber)
6 **Seal**
9 **Cable entry** (Power cable)
10 **Cable entry** (Control cable)
12 **Screw** (Cable cap control cable)
17 **Seal** (Power cable lower)
18 **Seal** (Control cable)
26 **Power cable**
27 **Control cable**
31 **Cable shoe**
32 **Upper bearing flange**
33 **O-ring** (Upper bearing flange)
34 **Grooved pin**
(35) **Moisture sensor (DI)** (Connection chamber)
40 **Cable duct** (Power cable)
41 **Cable duct** (Control cable)
43 **Cover lid** (upper bearing)
44 **Screw** (Cover lid)
46 **O-Ring** (Cover lid)
47 **Upper bearing**
(48) **Temperature monitoring** (Upper bearing)
50 **Terminal board** (Power cable complete)
52 **Screw cable shoe**
53 **Washer cable shoe**
55 **Motor housing**
65 **Motor shaft**
66 **Key**
67 **Lower bearing flange**
68 **Screw** (Motor housing lower)
71 **Screw**
74 **Seal** (plug screw)
75 **Plug screw** (Motor housing)
76 **Plug screw** (Inspection chamber)
77 **Seal** (plug screw)
(78) **Terminal block** (Motor housing)
80 **O-ring** (Motor housing)
(81) **Moisture sensor (DI)** (motor housing)
90 **Lower bearing lid**
91 **Stud screw** (Lower bearing lid)
93 **Nut** (bearing lid)
95 **Angular ball bearing** (counter bearing)
96 **Angular ball bearing** (main bearing)
98 **Distance washer** (Lower bearing 95)
(99) **Temperature monitoring** (Lower bearing)
100 **Shaft nut** (Main bearing)
101 **Looking washer** (Main bearing)
106 **Mechanical Seal** (Engine side)
107 **Circlip**
108 **Coolant** (33% Glycol and 67% Water; Frost-resistant up to -20°C/-4° F)
109 **Moisture sensor (DI)** (separation chamber)
117 **O-Ring** (Lower bearing flange)
121 **Seal cover**
122 **Screw**
126 **O-ring**
138 **Mechanical seal** (Medium side)
139 **Adjusting ring** (Mechanical seal medium side)
140 **Circlip** (Mechanical seal medium side)/ **grub screw** (adjusting ring)
141 **Circlip**
142 **supporting disc**
168 **Adjusting ring**
169 **Grub screw** (Adjusting ring)
181 **Zinc anode belt** (Upper part)
184 **Zinc anode belt** (Middle part)
190 **Zinc anode belt** (Lower part)
218 **clamping ring**
254 **Stator**
257 **Plug screw** (seal cover)
258 **Seal**
274 **Shaft seal ring**
275 **Plug screw** (seal cover)
276 **seal**
396 **Washer** (EMC-Connection)
397 **Screw** (EMC-Connection)
436 **Screw**
437 **Washer**
450 **O-ring (**Motor housing)
459 **Pressure washer** (Power cable upper)
460 **Pressure washer** (Control cable upper side)
461 **Seal** (Power cable)
462 **Seal** (Control cable)
463 **Washer**
464 **Washer**
465 **Pressure washer** (Power cable lower)
466 **Pressure washer Control cable** (lower)
519 **Sealing washer**
520 **Washer** (Lifting hoop)
521 **Cover lid** (only US-Version)
522 **Seal** (only US-Version)
523 **Blind plug** (only US-Version)
524 **Pressure washer** (Power cable upper – only US-Version)
525 **Pressure washer** (Power cable lower - only US-Version)
526 **Screw** (only US-Version)
527 **Cable shoe** (US-Version)
528 **Screw** (US-Version)
530 **Washer** (US-Version)
531 **Shrink hose** (strain relief)
532 **Shrink hose** (strain relief)
533 **Washer**
546 **Plug screw** (Upper bearing flange)
547 **Seal**



Dismantling of the connection chamber

Unscrew the socket head screw (2) and remove Strip (60) if fitted (only for cooling jacket version of XFP).

Carefully lift off the connection chamber (1) with the aid of an adequately dimensioned hoist.

Dismantle the cable entries (9 and 10) if the cables (26 or 27) need to be replaced. Remove the screws (12) .

ATTENTION *Prior to cut off the damaged cables or disconnecting the leads from the terminal board (50), the terminal assignment of the leads should always be noticed!*

Assembly of the connection chamber

Insert new o-ring (33) into the groove between motor housing (55) and upper bearing lid (32).

In case of cooling jacket version:
Insert a new o-ring (63) into the groove of the connection chamber (1).
Insert a new o-ring (450) into the groove of the plane face of the motor housing (55).

Bring the connection chamber (1) into line with the grooved pin (34) of the upper bearing lid (32) and opposite to the bulge of the motor housing (55) as shown in the drawing.

The notch inside of the connection chamber (1) must be in line with the grooved pin (34) from the upper bearing lid!

Observe the correct position of the lifting hoop (4) as well!

Lower the connection chamber carefully into the centring seat of the motor housing (55).

Screw in and tighten the screws (2).

Dismantling of the power- and control cables

ATTENTION *Do not cut off the cables! Prior to cut off damaged cables or disconnecting the leads from the terminal board (50), the terminal assignment of the leads should be noticed!*

Dismantle the connection chamber as described above.

Dismantle the cable entries (9 and 10) if the cables (26 or 27) need to be replaced. Remove the screws (12) .

IMPORTANT *Use always the old cable as a sample for lead designation and for cut to length of the leads and the insulations!*

Disconnect the plug from the optionally DI-probe (35).

Disconnect the cable leads from the clamps of the terminal board (50 and 51).

Assembly of the power- and control cables

Cut to length and removing of the cable- and lead- insulations should be done in accordance with the old (sample) cable ends.

Fit the new shrink hose (531) to its final position and shrink it with care by the aid of a hot-air gun. This piece of shrink hose is an additional strain relief for the cable!

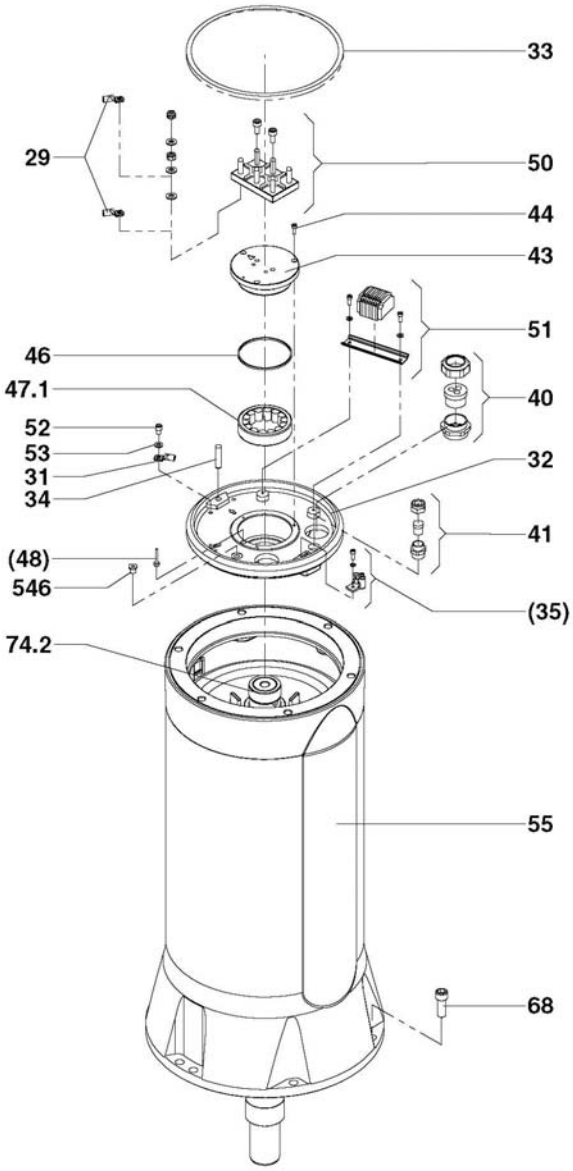
ATTENTION *The earth connection leads should be a few cm longer than the other leads of the cables for safety reasons.*

Fit all parts of the cable entries (9 and 10) together with all washers and seals in the correct order (as shown in the drawing).

First ensure that the earth connection leads (52) (PE) of the power- and control cables are connected to the earthing clamps (PE) of the terminal board!

Connect the monitoring and the power leads to the terminal board (50). (See also Chapter 5.3 of the Installation and Operating Instructions).

ATTENTION
Observe the correct terminal assignment of the leads!



Dismantling and assembly of the connection chamber

See module *"Connection chamber / Cables"*

Dismantling and assembly of the power- and control cables

See module *"Connection chamber / Cables"*

Dismantling of the upper bearing

ATTENTION *Prior to pull through the leads from the stator through the cable ducts (40 and 41) the lead designations should always be noticed!*

The leads should be marked immediately after pull through the cable ducts!

Disconnect the plug from the optionally DI-probe (35).

Dismantle the terminal clamps (50 and 51) by unscrewing the socket head screws in the mounting rail.

Dismantle the optionally DI-probe (35) – only if the upper bearing flange (32) needs to be replaced.

Pull out the upper bearing flange (32).

Remove the cover lid (43 and 44) which covers the bearing.

Push out the outer bearing part (47.1) of the upper bearing lid

Withdraw the inner bearing ring (47.2) from the rotor shaft (65) with the aid of a puller.

Assembly of the upper bearing

Press new inner bearing ring (472) on the rotor shaft (65)

Bring upper bearing flange (32) into correct position to the motor housing (55). The grooved pin (34) must be opposite into line with the bulge on the motor housing (55)

Push the leads of the stator through the seals of the cable ducts (40/41) and mark again the leads immediately.

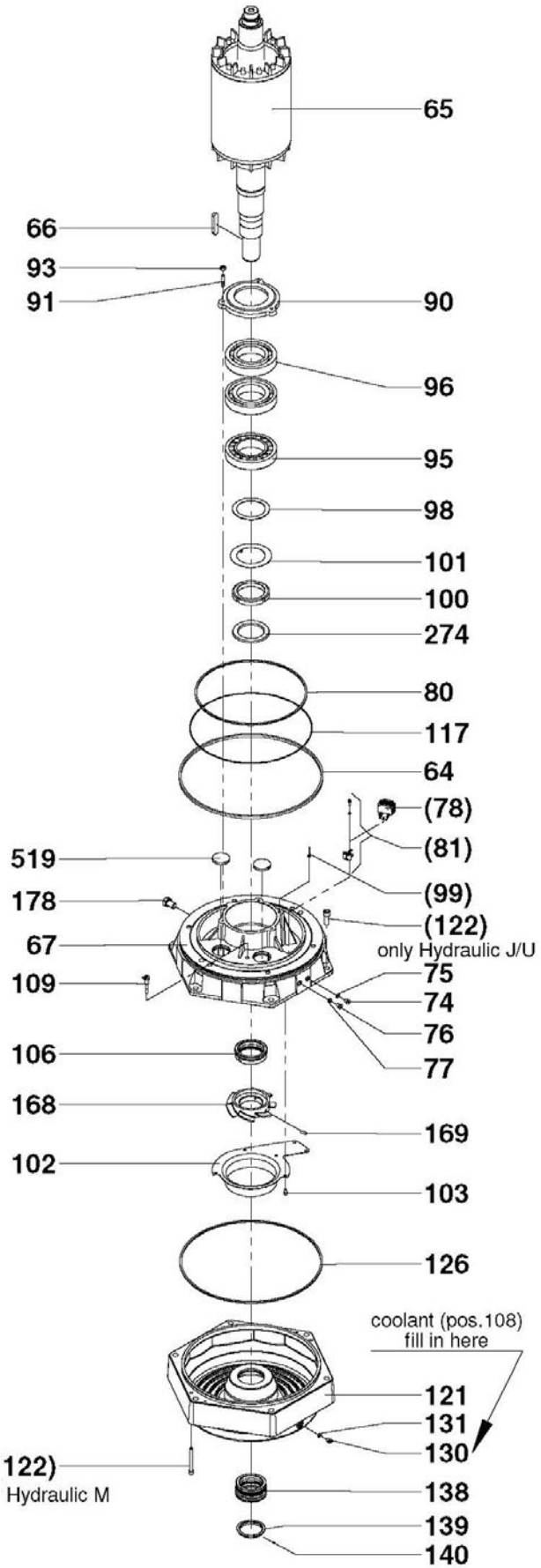
Push the upper bearing flange (32) carefully into the centring seat of the motor housing.

Fit the new outer bearing part (47.1) into the bearing seat of the upper bearing flange (32).

Grease the bearing with bearing grease as specified:
Rivolta SKD 4002 (ABS part no.: 1 103 0053).

Cover the bearing with the cover lid (43 and 44). Insert new O-Ring (46)

Assemble the terminal clamp (50) by fixing the mounting rail with the both socket head screws on the upper bearing lid.



Release the coolant

See module "Coolant filling of the PE motors"

Dismantle the cooling jacket

See module "Motor housing and Cooling jacket"

Dismantle the motor housing

See also module "Motor housing and Cooling jacket"

HINT *The connection chamber don't need to be dismantled.*

Screw out the socket head screws (68).

Raise the motor housing (55) only a few cm from the intermediate flange (67) with the aid of a hoist.

Disconnect the control leads.

Lift off the motor housing (55) and place it safely on an even flat surface.

Dismantling of the pump case and the impeller

Unscrew the nuts (152). See also according "hydraulic module"

Dismantling of the motor shaft unit

Screw in a suitable auxiliary eyelet screw into the threaded hole on the motor shaft end (65).

Lift off the motor shaft unit and place and support the motor shaft unit safely in a horizontal position. Make sure that the motor shaft unit cannot roll over!

Dismantling of the mechanical seal (medium side)

Remove key (66).

Loosen grub screw (140) and withdraw adjusting ring (139) from the shaft end.
Carefully pull off the rotating part of the mechanical seal (138) from the shaft.

Dismantling of the seal cover

Loosen socket head screws (122) and withdraw the seal cover (121) from the motor shaft (65) and lower bearing flange (67).

Dismantling of the cover plate

HINT *The cover plate don't need to be dismantled.*

Screw out the socket head screws (103) and withdraw the cover plate (102) carefully from the motor shaft.

Dismantle the Auxiliary impeller

Loosen grub screw (169) and withdraw the auxiliary impeller (168) from the motor shaft.

Dismantling of the mechanical seal (motor side)

Withdraw the mechanical seal (106) carefully from the motor shaft.

Dismantling of the lower bearings

Unscrew the nuts (93) and withdraw the lower bearing lid (90)

Withdraw the lower bearing flange (67) together with the bearings and the lip seal ring (274) from the motor shaft with the aid of a suitable puller.

Loosen and remove shaft nut (100).

Pull the bearings out of lower bearing flange (67) with the aid of a suitable puller.

Push the lip seal ring (274) out of the its seat in the lower bearing flange (67).

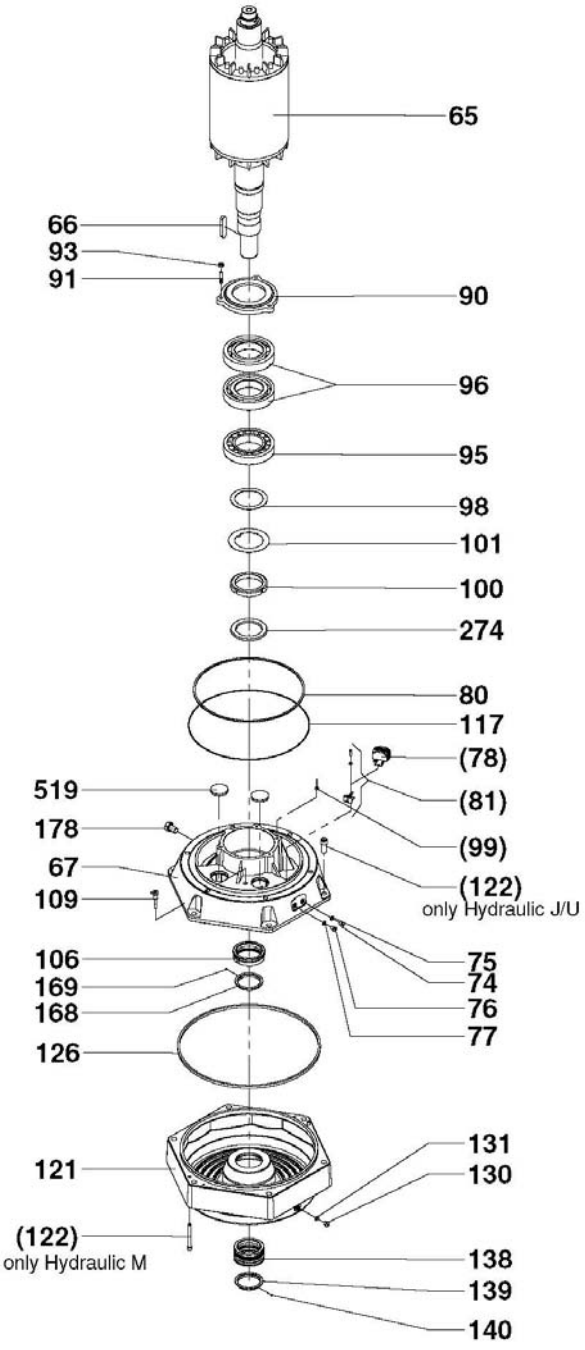
HINT *See also module "Bearing arrangement lower bearings XFP- PE5"*

Assembly

The assembly of the motor shaft and the coolant chamber has to be made in a reverse manner.

ATTENTION *Bearings must be cold pressed on motor shaft. The bearings may not be by heated for assembly!*

ATTENTION *The plug screws (74 and 75) from the lower bearing flange (67) have to be in line with the plug screw (130) from the coolant chamber (121).*
IMPORTANT All o-rings should be replaced during the assembly!



Release the coolant

See module "Coolant filling of the PE motors"

Dismantle the motor housing

See also module "Motor housing and Cooling jacket"

***HINT** The connection chamber don't need to be dismantled.*

Screw out the socket head screws (68).

Raise the motor housing (55) only a few cm from the lower bearing flange (67) with the aid of a hoist.

Disconnect the control leads.

Lift off the motor housing (55) and place it safely on an even flat surface.

Dismantling of the pump case and the impeller

Unscrew the nuts (152). See also according "hydraulic module"

Dismantling of the motor shaft unit

Screw in a suitable auxiliary eyelet screw into the threaded hole on the motor shaft end (65).

Lift off the motor shaft unit and place and support the motor shaft unit safely in a horizontal position. Make sure that the motor shaft unit cannot roll over!

Dismantling of the mechanical seal (medium side)

Remove key (66).

Loosen grub screw (140) and withdraw adjusting ring (139) from the shaft end.
Carefully pull off the rotating part of the mechanical seal (138) from the shaft.

Dismantling of the seal cover

Loosen socket head screws (122) and withdraw the seal cover (121) from the motor shaft (65) and lower bearing flange (67).

Dismantling of the mechanical seal (motor side)

Loosen grub screw (169) and withdraw the adjusting ring (168) from the motor shaft.

Withdraw the mechanical seal (106) carefully from the motor shaft.

Dismantling of the lower bearings

Unscrew the nuts (93) and withdraw the lower bearing lid (90)

Withdraw the lower bearing flange (67) together with the bearings and the lip seal ring (274) from the motor shaft with the aid of a suitable puller.

Loosen and remove the shaft nut (100).

Pull the bearings out of lower bearing flange (67) with the aid of a suitable puller.

Push the lip seal ring (274) out of its seat in the intermediate flange (67).

***HINT** See also module "Bearing arrangement lower bearings XFP- PE5"*

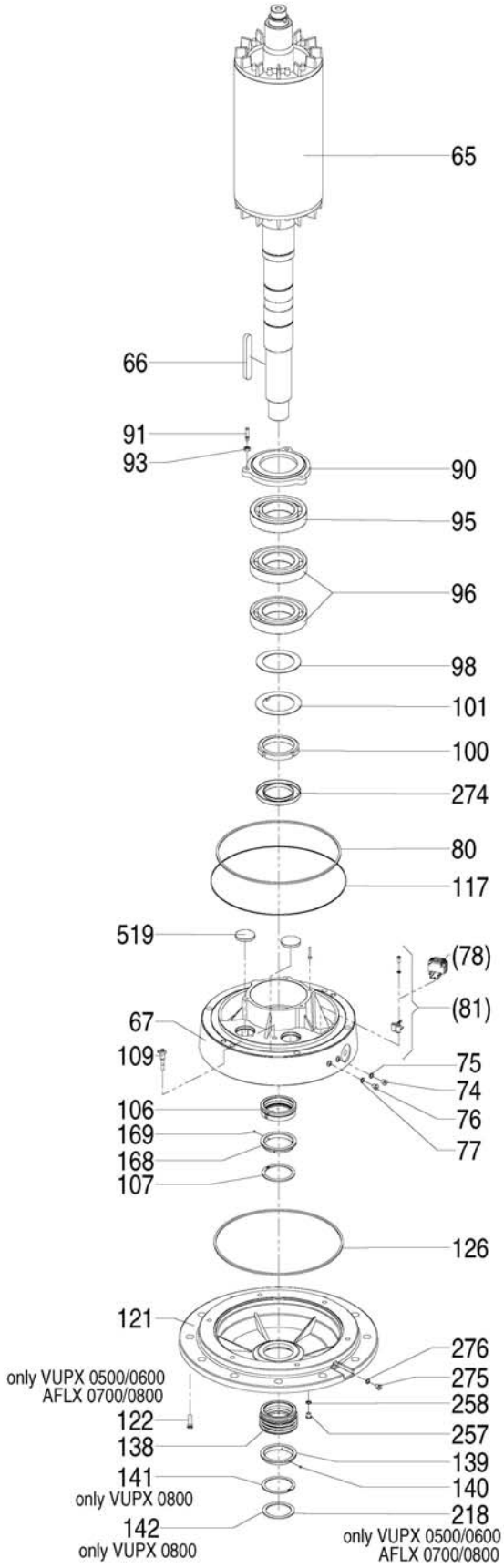
Assembly

The assembly of the motor shaft and the coolant chamber has to be made in a reverse manner.

***ATTENTION** Bearings must be cold pressed on motor shaft. The bearings may not be by heated for assembly!*

***ATTENTION** The plug screws (74 and 75) from the intermediate flange (67) have to be in line with the plug screw (130) from the coolant chamber (121).*

IMPORTANT All o-rings should be replaced during the assembly!



Dismantling of the pump hydraulics

See according *"*hydraulic module*"*

Release the coolant

See module "Coolant filling of the PE motors"

Dismantling of the mechanical seal (medium side)

Remove key (66).

Remove circlip (218) and support washer (142)

Loosen grub screw (140) and withdraw adjusting ring (139) from the shaft end.

Carefully pull off the rotating part of the mechanical seal (138) from the shaft.

Dismantling of the coolant chamber

Loosen socket head screws (68) and withdraw the coolant chamber (121) from the motor shaft (65).

Dismantling of the mechanical seal (motor side)

Remove circlip (107).

Loosen grub screw (169) and withdraw the adjusting ring (168) from the motor shaft.

Withdraw the mechanical seal (106) carefully from the motor shaft.

Dismantle the motor housing

See also module "Motor housing and Cooling jacket"

HINT *The connection chamber don't need to be dismantled.*

Screw out the two flat socket head screws (71).

Raise the motor housing (55) only a few cm from the lower bearing flange (67) with the aid of a hoist.

Disconnect the control leads.

Lift off the motor housing (55) and place it safely on an even flat surface.

Dismantling of the motor shaft unit

Screw in a suitable auxiliary eyelet screw into the threaded hole on the motor shaft end (65).

Lift off the motor shaft unit and place and support the motor shaft unit safely in a horizontal position. Make sure that the motor shaft unit cannot roll over!

Dismantling of the lower bearings

Unscrew the nuts (93) and withdraw the lower bearing lid (90)

Remove circlip (100).

Withdraw the lower bearing flange (67) together with the bearings and the lip seal ring (274) from the motor shaft with the aid of a suitable puller.

Pull the bearings out of the lower bearing flange (67) with the aid of a suitable puller.

Push the lip seal ring (274) out of the seat in the lower bearing flange (67).

HINT *See also module "Bearing arrangement lower bearings XFP- /VUPX- /AFLX- PE4"*

Assembly

The assembly of the motor shaft and the coolant chamber has to be made in a reverse manner.

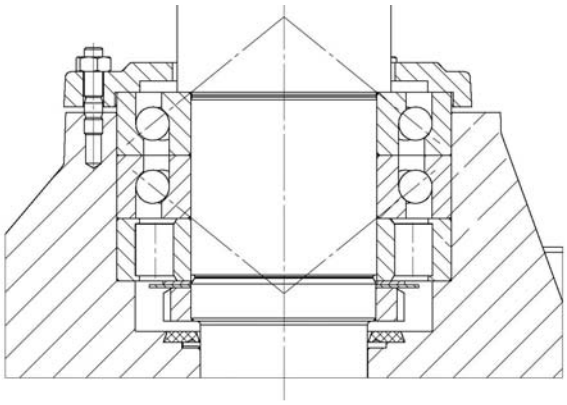
ATTENTION *Bearings must be cold pressed into its seats. The bearings may not be heated for assembly!*

ATTENTION *The plug screws (74 and 76) from the lower bearing flange (67) have to be in line with the plug screws (275) from the coolant chamber (121).*

IMPORTANT All o-rings should be replaced during the assembly!

XFP- PE5

(O- Arrangement)



ATTENTION
Bearings must be cold pressed into its seats!

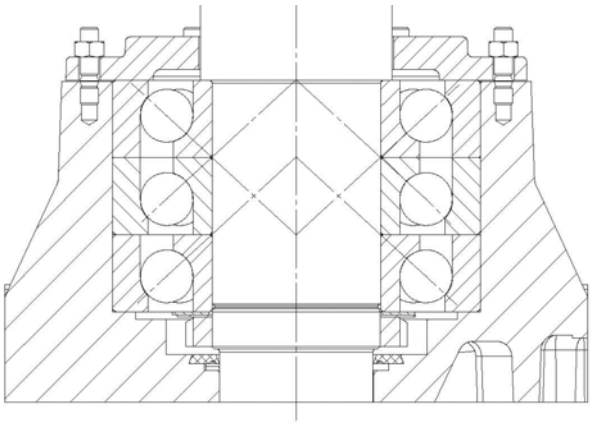
The bearings may not be heated for assembly to avoid gaps between them caused of temperature shrinking.
Due to the PE ATEX/ FM design it is very important that the bearings are cold pressed!

50 Hz	60 Hz
PE 550 / 4	PE 630 / 4 .60
PE 750 / 4	PE 860 / 4 .60
PE 900 / 4	PE 1040 / 4 .60
PE 1100 / 4	PE 1250 / 4 .60
PE 450 / 6	PE 520 / 6 .60
PE 550 / 6	PE 630 / 6 .60
PE 750 / 6	PE 860 / 6 .60
PE 900 / 6	PE 1040 / 6 .60
PE 370 / 8	PE 430 / 8 .60
PE 450 / 8	PE 520 / 8 .60
PE 550 / 8	PE 630 / 8 .60
PE 750 / 8	PE 860 / 8 .60
PE 300 / 10	PE 350 / 10 .60
PE 370 / 10	PE 430 / 10 .60
PE 450 / 10	PE 520 / 10 .60
PE 550 / 10	PE 630 / 10 .60

ATTENTION
Other bearing arrangements are possible for special versions. In these cases the according assembly drawings should be requested.

VUPX/ AFLX- PE5

(Tandem- Arrangement)

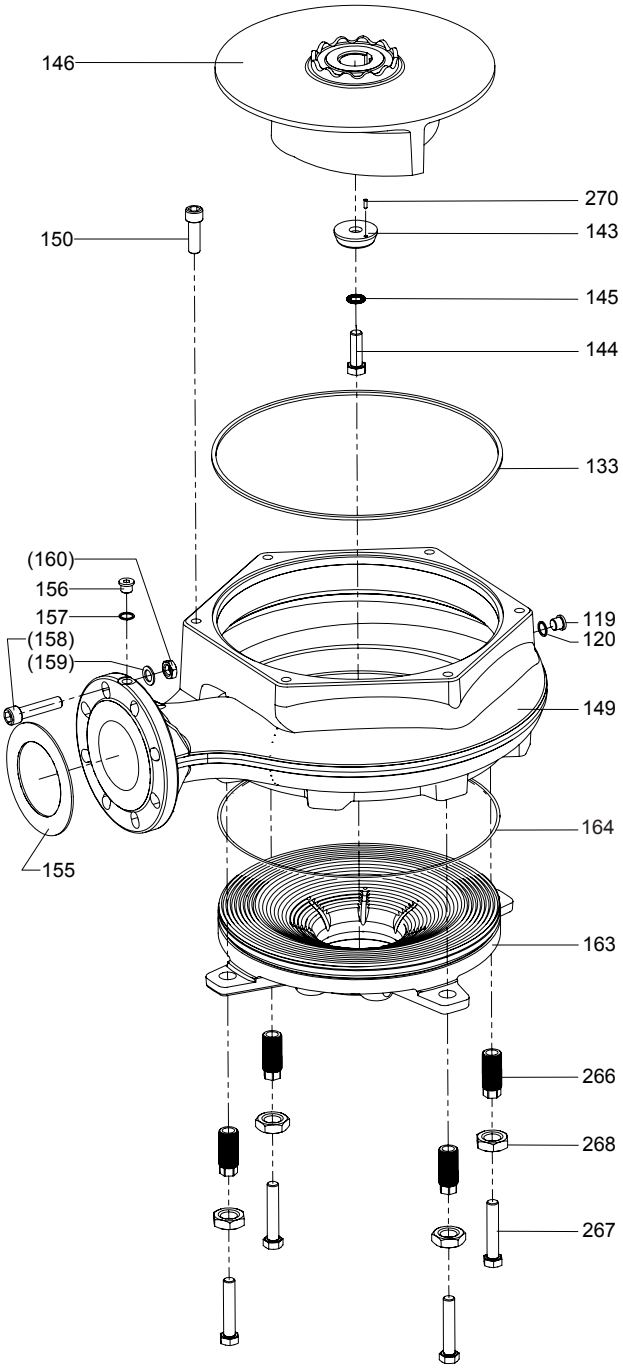


ATTENTION
Bearings must be cold pressed into its seats!

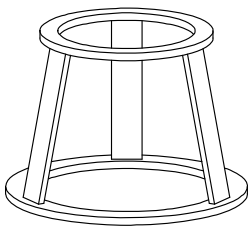
The bearings may not be heated for assembly to avoid gaps between them caused of temperature shrinking.
Due to the PE ATEX/ FM design it is very important that the bearings are cold pressed!

50 Hz	60 Hz
PE 550 / 4	PE 630 / 4 .60
PE 750 / 4	PE 860 / 4 .60
PE 900 / 4	PE 1040 / 4 .60
PE 1100 / 4	PE 1250 / 4 .60
PE 450 / 6	PE 520 / 6 .60
PE 550 / 6	PE 630 / 6 .60
PE 750 / 6	PE 860 / 6 .60
PE 900 / 6	PE 1040 / 6 .60
PE 370 / 8	PE 430 / 8 .60
PE 450 / 8	PE 520 / 8 .60
PE 550 / 8	PE 630 / 8 .60
PE 750 / 8	PE 860 / 8 .60
PE 300 / 10	PE 350 / 10 .60
PE 370 / 10	PE 430 / 10 .60
PE 450 / 10	PE 520 / 10 .60
PE 550 / 10	PE 630 / 10 .60

ATTENTION
Other bearing arrangements are possible for special versions. In these cases the according assembly drawings should be requested.



Lifting devices for XFP-PE assembly					
VUPX / AFLX- Lifting hoop:			**Attachment swivels:**		
PE4	Part no.:	3 206 2500	M12	Part no.:	1 499 0096
PE5	Part no.:	3 206 2510	M16	Part no.:	1 499 0100
PE6A	Part no.:	3 206 2520	M20	Part no.:	1 499 0097



mounting pedestal

Dismantling and assembly of the hydraulic

NOTE *For professional and safe dismantling or assembly we recommend to change the asymmetric lifting hoop of the XFP against suitable attachment swivels or against the symmetric lifting hoop version used for VUPX/AFLX versions (part nos. see table). Only this measure enables to hang the motor unit in a vertical upright position!*

Dismantling of the motor unit

Unscrew the screws (150) and lift off the motor unit carefully with the aid of an adequately dimensioned hoist.

Observe the total weight of the pump (see name plate)!

Place the motor unit carefully on its side, taking care that it cannot roll over. Do not place it on the cooling jacket!

Assembly of the motor unit

Clean the surface of the centring seat of the motor unit and the volute (149).

Insert new o-ring (133).

Bring the motor unit into line to the volute. The marking arrow on the flange of cooling-/ or oil chamber must be in line with the discharge flange of the volute.

Lower the motor unit with care.

Fit and tighten the screws (150).

NOTE *If the impeller (148) is being changed then care should be taken that the bottom plate (163) is fitted in such a manner that the smallest possible gap between the shearing edge of the impeller and the bottom plate is adjusted.*

Dismantling of the impeller

Dismantle the volute.

Dismantling of the impeller (A) = hanging at the hoist

Hang the motor unit in a **vertical upright position** above a **suitable solid mounting pedestal**. Lower the motor unit carefully so far that the impeller will be supported at the mounting pedestal.

Loosen impeller screw (144) and screw it out together with securing washers (145).

Remove collar washer (143) together with grooved pin (270).

Raise the motor unit a few cm and withdraw the impeller (146). If necessary with the aid of two levers.

Dismantling of the impeller (B) = horizontal position

Lift off the motor unit carefully with the aid of an adequately dimensioned hoist. Place the motor unit carefully on its side, taking care that it cannot roll over. Do not place it on the cooling jacket!

Remove impeller screw (144) together with securing washers (145), collar washer (143) and the grooved pin (270).

Withdraw and lift off the impeller (146) from the shaft end e.g. with the aid of two levers or with an impeller puller at the gap between the shroud of the impeller and the cooling-/oil chamber.

Assembly of the impeller (AB)

Prior assembling the impeller the shaft end and key (66) should be cleaned and checked for any damage. Any damaged or worn parts should be replaced.

Impeller bore and the shaft end should be lightly lubricated with graphite-grease or a suitable mounting paste.

Fit the key (66) into the motor shaft and push the impeller on the motor shaft.

Assembly of the impeller (A)

Place the impeller (146) to the mounting pedestal and bring it into line.

Hang the motor unit above the impeller with a hoist.

Bring the shaft end with impeller bore and key with key groove into line and lower the motor unit with care as far as the stop.

Assembly of the impeller (B)

Push impeller to the shaft.

(AB) Insert collar washer (143) together with the grooved pin (270).

(AB) Screw in the impeller screw (144) together with the two securing washers (145).

(AB) Tighten the impeller screw (144) with the correct **tightening**

Tightening torques for ABS stainless steel screws A4-70	
Thread	**Tightening torque**
M6	7 Nm
M8	17 Nm
M10	33 Nm
M12	56 Nm
M16	136 Nm
M20	267 Nm
M24	460 Nm

torque (depending of the screw dimension).

Observe the correct fitting orientation of the securing washers (145)! (See detail in the drawing).

Dismantling of the bottom plate

Lift off the pump carefully with the aid of an adequately dimensioned hoist.

Support the pump safely in a horizontal position.

Make sure that the pump cannot roll over!

Screw out the screws (267).

Remove the bottom plate (163) with the aid of two levers.

Assembly of the bottom plate

Fit o-ring (164) into the groove of the bottom plate.

Screw out the adjusting screws (266) together with screwed on locking nuts (268).

Press the bottom plate (163) against the shearing edge of the impeller.

Adjusting of the gap between impeller and bottom plate.

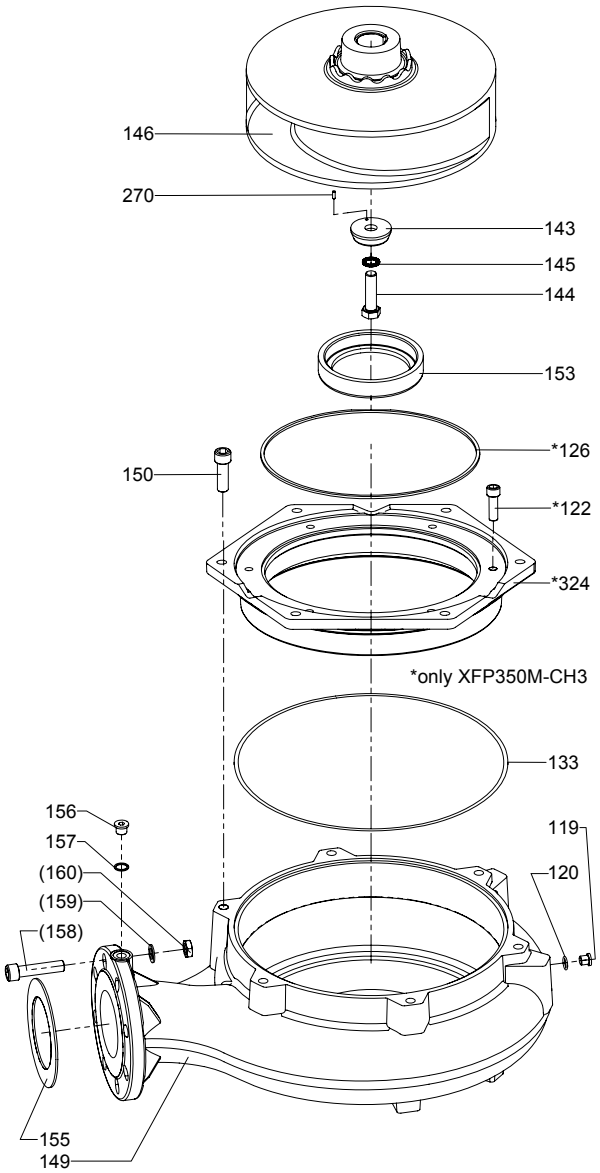
Screw in the adjusting screws (266) sufficiently until the smallest possible gap is present all around between the bottom plate and the shearing edge of the impeller.

Screw in and tighten the screws (267).

Tighten the locking nuts (268)

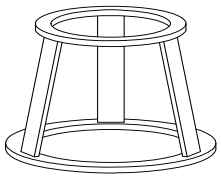
Bring the pump to upright position and turn the impeller a few turns by hand.

ATTENTION *Prior to installation and commissioning of the pump a check should be made that the impeller can rotate contact-free to the bottom plate! If the impeller cannot be rotated by hand the gap has to be adjusted and checked again.*



Tightening torques for ABS stainless steel screws A4-70	
Thread	**Tightening torque**
M6	7 Nm
M8	17 Nm
M10	33 Nm
M12	56 Nm
M16	136 Nm
M20	267 Nm
M24	460 Nm

Lifting devices for XFP-PE assembly					
VUPX / AFLX- Lifting hoop:			**Attachment swivels:**		
PE4	Part no.:	3 206 2500	M12	Part no.:	1 499 0096
PE5	Part no.:	3 206 2510	M16	Part no.:	1 499 0100
PE6A	Part no.:	3 206 2520	M20	Part no.:	1 499 0097
PE6B	Part no.:	3 206 2521			



mounting pedestal

Dismantling and assembly of the hydraulic

NOTE *For professional and safe dismantling or assembly we recommend to change the asymmetric lifting hoop of the XFP-PE4 to PE6 against suitable attachment swivels or against the symmetric lifting hoop version used for VUPX/AFLX versions (part nos. see table). Only this measure enables to hang the motor unit in a vertical upright position!*

Dismantling of the motor unit

Unscrew the screws (150) and lift off the motor unit carefully with the aid of an adequately dimensioned hoist.

Observe the total weight of the pump (see name plate)!

Place the motor unit carefully on its side, taking care that it cannot roll over. Do not place it on the cooling jacket!

Assembly of the motor unit

Clean the surface of the centring seat of the motor unit and the volute (149).

Insert new o-ring (133).

Bring the motor unit into line to the volute. The marking arrow on the flange of cooling-/ or oil chamber must be in line with the discharge flange of the volute.

Lower the motor unit with care.

Fit and tighten the screws (150).

Dismantling of the impeller

Dismantle the volute.

Dismantling of the impeller (A) = hanging at the hoist

Hang the motor unit in a **vertical upright position** above a **suitable solid mounting pedestal**. Lower the motor unit carefully so far that the impeller will be supported at the mounting pedestal.

Loosen impeller screw (144) and screw it out together with securing washers (145).

Remove collar washer (143) together with grooved pin (270).

Raise the motor unit a few cm and withdraw the impeller (146). If necessary with the aid of two levers.

Dismantling of the impeller (B) = horizontal position

Lift off the motor unit carefully with the aid of an adequately dimensioned hoist. Place the motor unit carefully on its side, taking care that it cannot roll over. Do not place it on the cooling jacket!

Remove impeller screw (144) together with securing washers (145).

Remove collar washer (143) together with grooved pin (270).

Withdraw and lift off the impeller (146) from the shaft end e.g. with the aid of two levers or with an impeller puller at the gap between the shroud of the impeller and the cooling-/oil chamber.

Assembly of the impeller (AB)

Prior assembling the impeller the shaft end and key (66) should be cleaned and checked for any damage. Any damaged or worn parts should be replaced.

Impeller bore and the shaft end should be lightly lubricated with graphite-grease or a suitable mounting paste.

Fit the key (66) into the motor shaft.

Assembly of the impeller (A)

Place the impeller (146) to the mounting pedestal and bring it into line.

Hang the motor unit above the impeller with a hoist.

Bring the shaft end with impeller bore and key with key groove into line and lower the motor unit with care as far as the stop.

Assembly of the impeller (B)

Push impeller to the shaft.

(AB) Insert collar washer (143) together with the grooved pin (270).

(AB) Screw in the impeller screw (144) together with the two securing washers (145).

(AB) Tighten the impeller screw (144) with the correct **tightening torque** (depending of the screw dimension).

ATTENTION *Observe the correct fitting orientation of the securing washers (145)! (See detail in the drawing).*

Fig. 01

Fig. 02

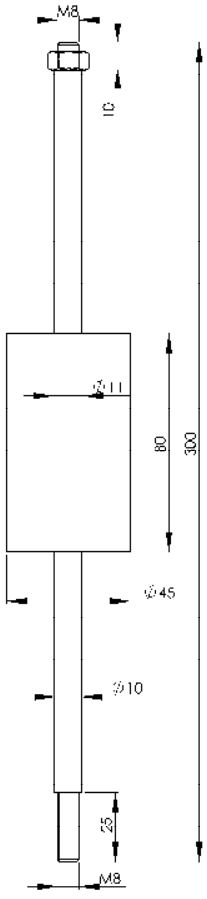


Fig. 03

Changing of the volute wear ring

Tools

Hammer

Centre punch

Drill

Drill bit ∅ 6,8

Thread-cutting tap M8

Cutting oil

Knocking out device (see also Fig. 3)

Gas burner (not shown)

Dismantling of the volute wear ring

Punch mark the old wear ring at 120° intervals. Drill holes to about 15 mm deep and tap them M8.

Heat the wear ring with the flame of a gas burner.

Screw in the device for knocking out the wear ring into the threaded holes.

Use heat protecting gloves.

Loosen and release the old wear ring (148) with firm blows of a hammer. The knocking out device is screwed into each hole in turn and the procedure repeated.

Assembly of the volute wear ring

Clean the outside of the new wear ring and the inside of volute with **Rivolta A.C.S.3 cleaner** (part number 9 510 0221).

Rub down the wear ring seating of the volute with paper to ensure that the graphite residues of the cast iron are removed. Otherwise the adhesive will not work.

Wet the surface of the volute with **Loctite 7649** (part number 1 595 0010). The activator will accelerate the hardening process.

Spread **Loctite industrial adhesive 3504** (part number 1 595 0009) evenly on the surface of the wear ring.

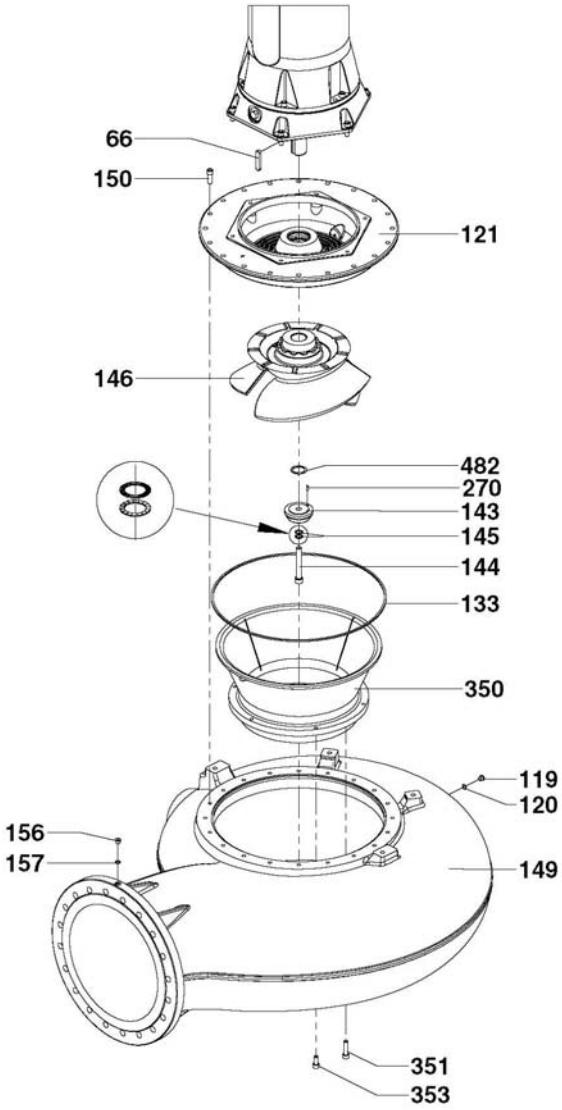
Place the wear ring into the volute making sure that the entry chamfer enters first.

Allow the adhesive at least **12 hours** to set.

Use heat protecting gloves and wear goggles!

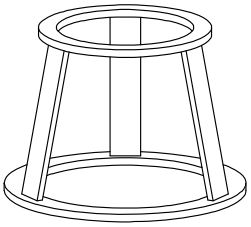
Changing of the impeller wear ring (option)

The wear ring (147) of the impeller **(Option)** is shrink-fitted and secured by heavy duty dowel pins. The wear ring can be exchanged if necessary. Please contact your responsible Sulzer Service Organisation.



Tightening torques for ABS stainless steel screws A4-70	
Thread	**Tightening torque**
M6	7 Nm
M8	17 Nm
M10	33 Nm
M12	56 Nm
M16	136 Nm
M20	267 Nm
M24	460 Nm

Lifting devices for XFP-PE assembly			
Lifting hoop: VUPX / AFLX			
PE5	Part no.: 3 206 2510		
PE6A	Part no.: 3 206 2520		
PE6B	Part no.: 3 206 2521		



mounting pedestal

Dismantling and assembly of the hydraulic

NOTE *For professional and safe dismantling or assembly we recommend to change the asymmetric lifting hoop of the XFP-PE5 to-PE6 against suitable attachment swivels or against the symmetric lifting hoop version used for VUPX/AFLX versions (part nos. see table). Only this measure enables to hang the motor unit in a vertical upright position!*

Dismantling of the motor unit

Unscrew the screws (150) and lift off the motor unit carefully with the aid of an adequately dimensioned hoist.

To dismantle the motor from seal cover (121) as shown is not necessary!

Observe the total weight of the pump (see name plate)!

Place the motor unit carefully on its side, taking care that it cannot roll over. Do not place it on the cooling jacket!

Assembly of the motor unit

Clean the surface of the centring seat of the motor unit and the volute (149).

Insert new o-ring (133).

Bring the motor unit into line to the volute. The marking arrow on the flange of cooling-/ or oil chamber must be in line with the discharge flange of the volute.

Lower the motor unit with care.

Fit the screws (150).

NOTE *If the impeller is being changed the gap between shroud and blades of the impeller has to be checked and adjusted if necessary (see table page 2).*

Dismantling of the impeller

Dismantle the volute.

Dismantling of the impeller (A) = hanging at the hoist

Hang the motor unit in a **vertical upright position** above a **suitable solid mounting pedestal**. Lower the motor unit carefully so far that the impeller will be supported at the mounting pedestal.

Loosen impeller screw (144) and screw it out together with securing washers (145).

Remove collar washer (143) together with grooved pin (270).

Raise the motor unit a few cm and withdraw the impeller (146). If necessary with the aid of two levers.

Dismantling of the impeller (B) = horizontal position

Lift off the motor unit carefully with the aid of an adequately dimensioned hoist. Place the motor unit carefully on its side, taking care that it cannot roll over. Do not place it on the cooling jacket!

Remove impeller screw (144) together with securing washers (145).

Remove collar washer (143) together with grooved pin (270).

Withdraw and lift off the impeller (146) from the shaft end e.g. with the aid of two levers or with an impeller puller at the gap between the shroud of the impeller and the cooling-/oil chamber.

Assembly of the impeller (AB)

Prior assembling the impeller the shaft end and key (66) should be cleaned and checked for any damage. Any damaged or worn parts should be replaced.

Impeller bore and the shaft end should be lightly lubricated with graphite-grease.

Fit the key (66) into the motor shaft.

Assembly of the impeller (A)

Place the impeller (146) to the mounting pedestal and bring it into line.

Hang the motor unit above the impeller with a hoist.

Bring the shaft end with impeller bore and key with key groove into line and lower the motor unit with care as far as the stop.

Assembly of the impeller (B)

Push impeller to the shaft.

(AB) Insert collar washer (143) together with the grooved pin (270).

(AB) Screw in the impeller screw (144) together with the two

Impeller gap		
Hydraulics	Angular impeller gap	Tolerance
XFP 500U-SK	0,5 mm	-0,2mm
XFP 600X-SK	0,6 mm	-0,2 mm

securing washers (145).
(AB) Tighten the impeller screw (144) with the correct **tightening torque** (depending of the screw dimension).

ATTENTION *Observe the correct fitting orientation of the securing washers (145)! (See detail in the drawing).*

Dismantling of the shroud

Lift off the motor from the volute (149) and place it safely.

Remove the screws (351).

Screw in 2 compatible auxiliary eyelet screws in the threaded holes of the shroud.

Lift off the shroud (149).

Assembly of the shroud

Turn the adjusting screws (353) and the fixing screws (351) a few turns out.

Screw in 2 compatible auxiliary eyelet screws in the threaded holes of the shroud. Lift down the shroud into the fit of the volute (149) to the lowest possible position.

Screw in the fixing screws (351) a few turns to make sure that the shroud is in its correct position.

Assemble the motor with mounted impeller to the volute.

Adjusting of the angular impeller gap

To adjust the gap between impeller blades and the shroud (350) the pump should be lifted vertically and should be placed on its volute on an adequately dimensioned support device. The pump should be always secured with the hoist!

Open the fixing screws (351) so far that a sufficient adjusting range is present.

Screw in the adjusting screws (353) so far that the prescribed gap (see table) is present over the full circumference.

After adjusting the gap the impeller should be turned by hand a few turns. Check the gap (see table) with a feeler gauge. If the gap is in tolerance, fix the shroud finally with the fixing screws (351).

Bring the pump to a vertical upright position and turn the impeller by hand. It must be guaranteed that the impeller runs free without any contact to the shroud!