

TP Series 400

50/60 Hz

3~

Service instructions



Original service instructions.

CONTENTS

	Page
1. Symbols used in this document	2
2. Type identification	2
2.1 Nameplate, TP Series 400	2
2.2 Type key	3
3. Lifting the pump	3
4. Torques and lubricants	4
5. Service tools	5
6. Dismantling and assembly	7
6.1 General information	7
7. TP 65 to TP 300	7
7.1 Removing the pump housing and impeller	7
7.2 Removing the shaft seal (10 bar)	7
7.3 Removing the shaft seal (25 bar)	7
7.4 Removing the pump head with shaft seal housing	7
7.5 Removing the motor stool, pump shaft and coupling	7
7.6 Removing the stationary shaft seal part	8
7.7 Fitting the shaft seal retainer	8
7.8 Fitting the coupling, pump shaft and motor stool	8
7.9 Fitting the pump head with shaft seal housing	8
7.10 Fitting the shaft seal (10 bar)	8
7.11 Fitting the shaft seal (25 bar)	8
7.12 Fitting the impeller and pump housing	8
8. TP 400	8
8.1 Removing the pump housing and impeller	8
8.2 Removing the motor stool	8
8.3 Removing the shaft seal	9
8.4 Removing the motor stool, pump shaft and coupling	9
8.5 Fitting the coupling, pump shaft and motor stool	9
8.6 Fitting the shaft seal	9
8.7 Fitting the pump head	9
8.8 Adjusting the shaft seal	9
8.9 Fitting the impeller and pump housing	9
9. Drawings	10
9.1 TP 100 - TP2 00, 10 bar	10
9.2 TP 250, 10 bar	11
9.3 TP 65 - TP 300, 25 bar	12
9.4 TP 400, 25 bar	13

**Warning**

Prior to service work, read these service instructions carefully. Installation and service work must comply with local regulations and accepted codes of good practice.

Observe the safety instructions in the installation and operating instructions for the product.

1. Symbols used in this document

**Warning**

If these safety instructions are not observed, it may result in personal injury.

Note

Notes or instructions that make the job easier and ensure safe operation.

2. Type identification

2.1 Nameplate, TP Series 400

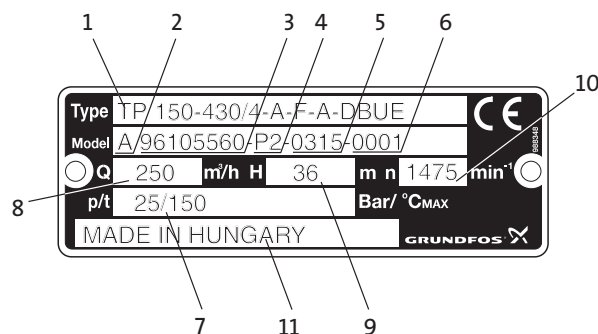


Fig. 1 Nameplate for TP pump with Ø150 discharge flange

Pos.	Designation
1	Type designation
2	Model
3	Product number
4	Place of production
5	Production year and week
6	Serial number
7	Maximum pressure and temperature
8	Rated flow rate
9	Head at rated flow rate
10	Speed
11	Country of production

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2.2 Type key

Example	TP	150	-430	/4	-A	-F	-A	-DBRE
Pump range								
Nominal diameter of suction and discharge ports (DN)								
Maximum head [dm]								
Pole number								
Code for pump version								
A: Basic version								
I: PN 6 flange								
X: Special version								
U: NEMA standard								
Code for pipe connection								
F: DIN flange								
J: JIS flange								
G: ANSI flange								
R: External thread								
Code for materials								
A: Basic version								
Code for shaft seal and plastic/rubber parts, except the neck ring								

2.2.1 Shaft seal

The following variants are available as standard:

Variant code	Maximum pressure
BBDE	10 bar
DBUE	25 bar

2.2.2 Codes for shaft seal

The positions 1 to 4 cover four pieces of information about the shaft seal:

Example	D	B	U	E
1: Grundfos type designation				
2: Material, rotating seal ring				
3: Material, stationary seat				
4: Material, secondary seal and other rubber and plastic parts, excluding the neck ring				

The following table explains the positions 1, 2, 3 and 4.

Position	Type	Short description of seal
1	B	Rubber bellows seal
	D	O-ring seal, balanced
Position	Type	Material
2 and 3		Synthetic carbon:
	B	Carbon, resin-impregnated
		Metal:
	D	Steel
		Carbide:
	U	Tungsten carbide
Position	Type	Material
4	E	EPDM

3. Lifting the pump

Lift the pump by means of nylon straps and shackles.

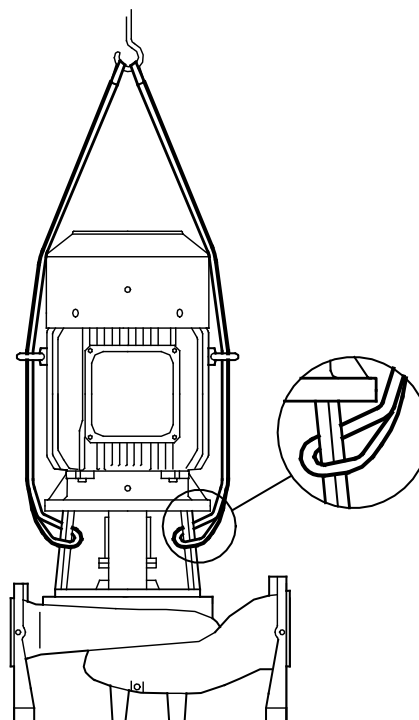


Fig. 2 Position of lifting straps



Warning

The lifting eyes of the motor must only be used for lifting the motor.

The lifting eyes not be used for lifting the entire pump.

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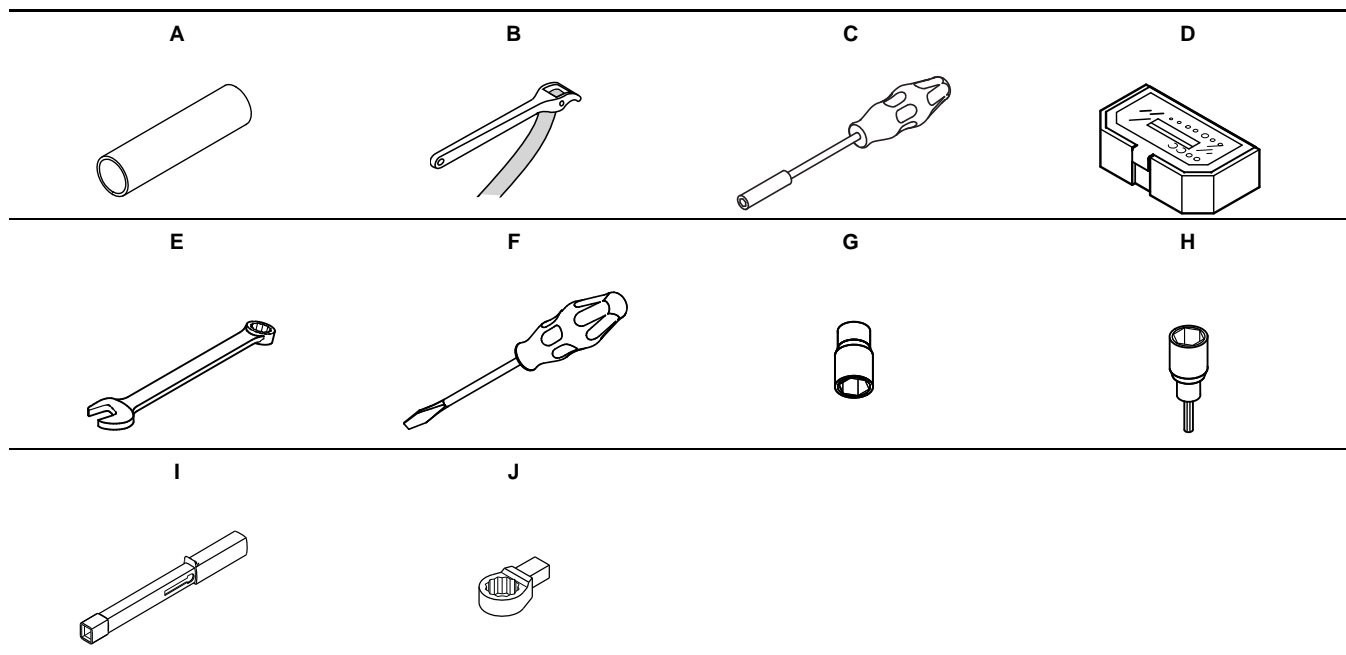
4. Torques and lubricants

Pos.	Designation	Quantity	Material	Size	Torque [Nm]	Lubricant
9	Hexagon socket head cap screw	2		M8 x 12	20	
13	Hexagon head screw	1		M12 x 30	65	
17	Air vent screw	1/2		3/8" R		
18	Pipe plug	5		1/2" R		
23	Hexagon head screw	6/8		M8 x 30	20	
				M10 x 35	40	
				M12 x 35	69	
24	Countersunk screw	6/12		M4 x 10	2.3	
				M4 x 16		
				M6 x 16	7.9	
25	Countersunk screw	2/4		M6 x 25	7.9	
				M6 x 35		
26	Hexagon head screw	8		M12 x 45	69	
				M16 x 45		
				M16 x 55	167	
				M16 x 65		
29	Hexagon head screw	4/8		M12 x 30	69	
				M16 x 40	167	
				M20 x 45	327	
30	Union	2		∅6 x 1/8"		
51	Pump shaft	1				
58a	Hexagon head screw			M6 x 20	8.3	
				M8 x 40	20	
59	Lock pin	1		3.5 - 10		
62	O-ring	1				
68	Prelubricated hexagon socket head cap screw	1		M8 x 30	18.7	-
				M12 x 40	65	
				M16 x 50	159	
72a	O-ring	1/2				
105	Shaft seal	1				
109	O-ring	1				

Loctite 243: product No V7137215.

Rocol 22: product No RM2924.

5. Service tools



Special tools

Pos.	Designation	For pos.	Further information	Product number
A	Punch for shaft seal	105	Ø48	70007172
			Ø55	70007173
			Ø60	70007174
B	Strap wrench	49	48"	SV0853

Standard tools

Pos.	Designation	For pos.	Further information	Product number	
C	Bit holder	D	1/4"	SV2011	
D	Bits kit	9, 13, 24, 25, 68	M4	SV2010	
			M6		
			M8		
			M12		
			M16		
E	Ring/open-end spanner	23, 26, 29, 58a	M6 - 10 mm	SV0083	
			M8 - 13 mm	SV0055	
			M10 - 17 mm	SV0056	
			M12 - 19 mm	SV0054	
			M16 - 24 mm	SV0122	
F	Screwdriver	105	M20 - xx mm	SV0084	
				-	
G	Hexagon socket driver	23, 26, 29, 58a	M8 - 13 mm	SV0297	
			M10 - 17 mm	SV0298	
			M12 - 19 mm		
			M16 - 24 mm		
			M20 - xx mm		
H	Hexagon socket driver	9, 13, 24, 25, 68	M4	SV0296	
			M6		
			M8		SV0297
			M12		

Torque tools

Pos.	Designation	For pos.	Further information	Product number
I	Torque wrench	G, H	4-20 Nm	SV0292
			20-100 Nm	SV0269
			30-300 Nm	SV0500
J	Ring insert tool	I	M6 - 10 mm	SV0310
			M8 - 13 mm	SV0294
			M10 - 17 mm	SV0270
			M12 - 19 mm	SV0271
			M16 - 24 mm	SV0524

6. Dismantling and assembly

6.1 General information

Position numbers of parts (digits) refer to drawings and parts lists, and position numbers of tools (letters) refer to section 5. *Service tools*.

Before dismantling

- Switch off the power supply and make sure that it cannot be accidentally switched on.
- Close the isolating valves, if fitted, and make sure that they cannot be accidentally opened.
- Allow the product and pumped liquid to cool down before starting work on the product.
- Note the centre of gravity of the pump to prevent it from overturning. This is especially important in the case of long pumps.

Before assembly

- Clean and check all parts.
- Replace defective parts by new parts.
- Order the necessary service kits.
- Always replace gaskets and O-rings.

During assembly

- Lubricate and tighten screws and nuts to the torque stated in section 4. *Torques and lubricants*.

6.1.1 Shaft seal

It is not unusual for the shaft seal to be leaking a little during the first operating hours, but then it will run-in and be tight. In case of large variations of the liquid temperature or during standstill, minor short-term leakages may occur. Mechanical shaft seals are never completely tight. In order to ensure the lubrication of the sliding faces, a small amount of liquid seeps through. The liquid will usually evaporate immediately. If the pump is insulated, the evaporated liquid must be led away without condensating in the insulating material.

6.1.2 Wear rings

Wear ring (pos. 45 and 45b) must be replaced if the difference of diameter between ring and impeller skirt is maximum 1.3 mm. At delivery, the internal diameter of the wear ring is 0.3 to 0.6 mm larger than the diameter of the impeller skirt. When this gap is increased due to wear, the pump efficiency is reduced.

6.1.3 Start-up

Before starting the pump, check that the pump housing and suction pipe are filled with liquid. The pump must not be started before it has been vented; not even briefly to check the direction of rotation or to ensure lubrication of bearings during standstill, as the shaft seal cannot stand running without liquid lubrication.

7. TP 65 to TP 300

7.1 Removing the pump housing and impeller

1. Loosen screws (pos. 7a) and remove coupling guards (pos. 7).
2. Mark motor stool (pos. 2), pump head (pos. 77) and pump housing (pos. 6) so that they can be placed in the same position at assembly.
3. Remove screws (pos. 26) in motor stool (pos. 2).
4. Fit and tighten the screws in the extractor holes of the pump head.
5. Lift the motor with pump head and impeller off the pump housing.
6. Lay down the motor with the terminal box upwards and make sure that it cannot move during service.
7. Remove O-ring (pos. 72a).
8. Remove screw (pos. 68) and washer (pos. 66).
9. Remove impeller (pos. 49) and key for impeller (pos. 11).

7.2 Removing the shaft seal (10 bar)

1. Check the shaft for damage and remove any burrs with a fine emery cloth. Lubricate the shaft with soapy water.
2. Remove spacer (pos. 61) for shaft seal (pos. 105).
3. Remove the spring for shaft seal.
4. Pull out the rotating shaft seal part using two screwdrivers or a special tool.

7.3 Removing the shaft seal (25 bar)

1. Check the shaft for damage and remove any burrs with a fine emery cloth. Lubricate the shaft with soapy water.
2. Remove spacer (pos. 61) including rotating shaft seal part (pos. 105).

7.4 Removing the pump head with shaft seal housing

1. Remove the pipe for shaft seal cooling, if fitted.
2. Remove screws (pos. 25) holding pump head (pos. 77) and motor stool (pos. 2) together.
3. Remove the pump head including the shaft seal housing.
4. Remove O-ring (pos. 109).

7.5 Removing the motor stool, pump shaft and coupling

1. Mark motor stool (pos. 2) and the motor so that they can be placed in the same position at assembly.
2. Remove screws (pos. 29).
3. Remove motor stool (pos. 2).
4. Mark the flange of pump shaft (pos. 51) and coupling (pos. 8a) so that they can be placed in the same position at assembly.
5. Remove screws (pos. 23).
6. Remove screw (pos. 13) and washer (pos. 14) at the end of the motor shaft.
7. Loosen screws (pos. 9) in the coupling and pull the coupling off using a puller.

7.6 Removing the stationary shaft seal part

1. Remove screws (pos. 58a) and fit two screws in the extractor holes in shaft seal retainer (pos. 58).
2. Loosen shaft seal retainer (pos. 58) and remove it including the stationary shaft seal part.
3. Carefully remove the stationary shaft seal part using a screwdriver.

7.7 Fitting the shaft seal retainer

1. Mark the inside of the stationary shaft seal part where the hole for the pin in the shaft seal retainer is.
2. Fit shaft seal retainer (pos. 58) on pump head (pos. 77).
3. Fit and tighten screws (pos. 58a).

7.8 Fitting the coupling, pump shaft and motor stool

1. Press the coupling on the motor shaft.
2. Fit washer (pos. 14) and screw (pos. 13), and tighten the screw so that the coupling is pressed home.
3. Tighten screws (pos. 9).
4. Place pump shaft (pos. 51) on the coupling with the marks aligned.
5. Fit and slightly tighten screws (pos. 23).
6. Align the pump shaft using a measuring gauge. The shaft must run untrue by maximum 4/100 mm.

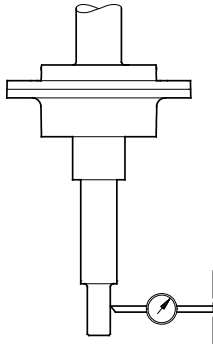


Fig. 3 Aligning the pump shaft

7. Tighten screws (pos. 23).
8. Check the shaft using the measuring gauge.
9. Fit the motor stool on the motor with the marks aligned.
10. Fit and tighten screws (pos. 29).

7.9 Fitting the pump head with shaft seal housing

1. Fit O-ring (pos. 109).
2. Fit pump head (pos. 77) on motor stool (pos. 2) with the marks aligned.
3. Fit and tighten screws (pos. 29).

7.10 Fitting the shaft seal (10 bar)

1. Fit the stationary shaft seal part with the mark facing the hole.
2. Fit rotating shaft seal part (pos. 105) and the spring for shaft seal.
3. Fit spacer (pos. 61).

7.11 Fitting the shaft seal (25 bar)

1. Fit the stationary shaft seal part with the mark facing the hole.
2. Fit spacer (pos. 61) including rotating shaft seal part (pos. 105).

7.12 Fitting the impeller and pump housing

1. Fit key for impeller (pos. 11) and impeller (pos. 49).
2. Fit washer (pos. 66) and screw (pos. 68) and tighten the screw.

Note

The screw must always be replaced if it has been removed, as it is factory-lubricated with lock liquid.

3. Fit O-ring (pos. 72a).
4. Lift the motor including motor stool, pump head and impeller, and fit it on pump housing (pos. 6) with the marks aligned.
5. Fit screws (pos. 26) and tighten two of them.
6. Check that the shaft and impeller run freely.
7. Tighten the other screws.
8. Fit coupling guards (pos. 7) and screws (pos. 7a).

8. TP 400

8.1 Removing the pump housing and impeller

1. Loosen screws (pos. 7a) and remove coupling guards (pos. 7).
2. Mark motor stool (pos. 2), pump head (pos. 77) and pump housing (pos. 6) so that they can be placed in the same position at assembly.
If you install a new pump head, only mark the motor stool (pos. 2) and pump housing (pos. 6).
3. Remove screws (pos. 26) in motor stool (pos. 2).
4. Fit and tighten the screws in the extractor holes of the pump head.
5. Lift the motor with pump head and impeller off the pump housing.
6. Lay down the motor with the terminal box upwards and make sure that it cannot move during service.
7. Remove O-rings (pos. 72a).
8. Remove screw (pos. 68) and washer (pos. 66).
9. Remove impeller (pos. 49) and key for impeller (pos. 11).

8.2 Removing the motor stool

1. Remove pipe for shaft seal cooling (pos. 32).
2. Remove screws (pos. 58a).
3. Remove screws (pos. 25) holding pump head (pos. 77) and motor stool (pos. 2) together.
4. Fit two screws (pos. 58a) in the extractor holes of shaft seal retainer (pos. 58) and tighten them.
5. Remove the pump head excluding shaft seal retainer (pos. 58).
6. Remove O-ring (pos. 109).

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8.3 Removing the shaft seal

1. Check the shaft for damage and remove any burrs with a fine emery cloth. Lubricate the shaft with soapy water.
2. Loosen screws (pos. 103).
3. Remove spacer for shaft seal (pos. 61) including shaft seal (pos. 105) and shaft seal retainer (pos. 58).
4. Remove driver (pos. 104).
5. Remove shaft seal retainer (pos. 58) from the spacer and shaft seal.
6. Carefully remove the stationary shaft seal part in retainer (pos. 58) using a screwdriver.

8.4 Removing the motor stool, pump shaft and coupling

1. Mark motor stool (pos. 2) and the motor so that they can be placed in the same position at assembly.
2. Remove screws (pos. 29).
3. Remove motor stool (pos. 2).
4. Mark the flange of pump shaft (pos. 51) and coupling (pos. 8a) so that they can be placed in the same position at assembly.
5. Remove screws (pos. 23).
6. Remove screw (pos. 13) and washer (pos. 14) at the end of the motor shaft.
7. Loosen screws (pos. 9) in the coupling and pull the coupling off using a puller.

8.5 Fitting the coupling, pump shaft and motor stool

1. Press the coupling on the motor shaft.
2. Fit washer (pos. 14) and screw (pos. 13), and tighten the screw so that the coupling is pressed home.
3. Tighten screws (pos. 9).
4. Place pump shaft (pos. 51) on the coupling with the marks aligned.
5. Fit and slightly tighten screws (pos. 23).
6. Align the pump shaft using a measuring gauge. The shaft must run untrue by maximum 4/100 mm.

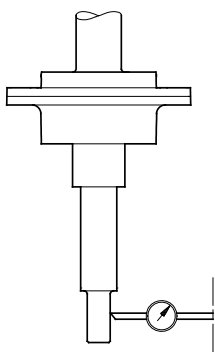


Fig. 4 Aligning the pump shaft

7. Tighten screws (pos. 23).
8. Check the shaft using the measuring gauge.
9. Fit motor stool (pos. 2) on the motor with the marks aligned.
10. Fit and tighten screws (pos. 29).

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8.6 Fitting the shaft seal

1. Push driver (pos. 104) on pump shaft (pos. 51).
2. Fit the stationary shaft seal part in shaft seal retainer (pos. 58).
3. Fit the rotating shaft seal part and spacer for shaft seal (pos. 61) in shaft seal retainer (pos. 58).
4. Push shaft seal retainer (pos. 58) on pump shaft (pos. 51).

8.7 Fitting the pump head

1. Fit O-ring (pos. 109).
2. Fit pump head (pos. 77) on motor stool (pos. 2) with the marks aligned.

When you fit a new pump head, the drain hole in the pump housing (pos. 6) must be aligned with the drain hole in the pump head (pos. 77). See fig. 5.

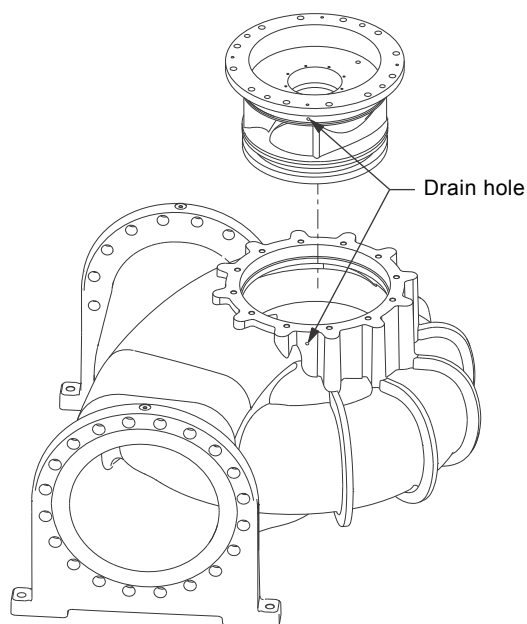


Fig. 5 Drain hole in pump housing and pump head

3. Fit and tighten screws (pos. 25).

8.8 Adjusting the shaft seal

1. Push shaft seal retainer (pos. 58) into pump head (pos. 77).
2. Fit and tighten screws (pos. 58a).
3. Fit an 11 mm distance piece between retainer (pos. 58) and driver (pos. 104).
4. Push the driver against the retainer and tighten screws (pos. 103). The line on the shaft seal must be flush with the steel washer.
5. Remove the distance piece.

8.9 Fitting the impeller and pump housing

1. Fit key for impeller (pos. 11) and impeller (pos. 49).
2. Fit washer (pos. 66) and screw (pos. 68) and tighten the screw.

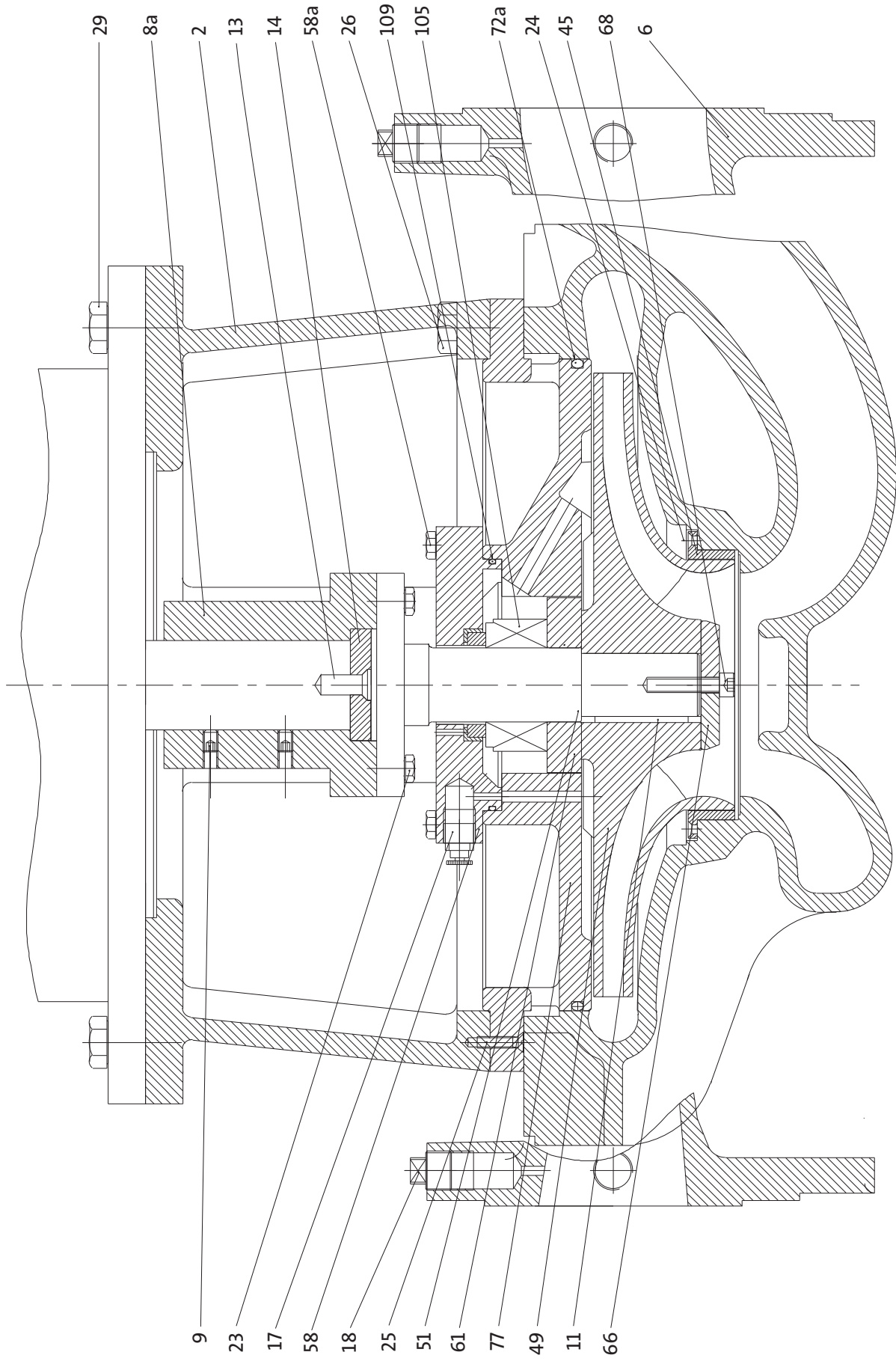
Note *The screw must always be replaced if it has been removed, as it is factory-lubricated with lock liquid.*

3. Fit O-rings (pos. 72a).
4. Lift the motor including motor stool, pump head and impeller, and fit it on pump housing (pos. 6) with the marks aligned.
5. Fit screws (pos. 26) and tighten two of them.
6. Check that the shaft and impeller run freely.
7. Tighten the other screws.
8. Fit pipe for shaft seal cooling (pos. 32).
9. Fit coupling guards (pos. 7) and screws (pos. 7a).

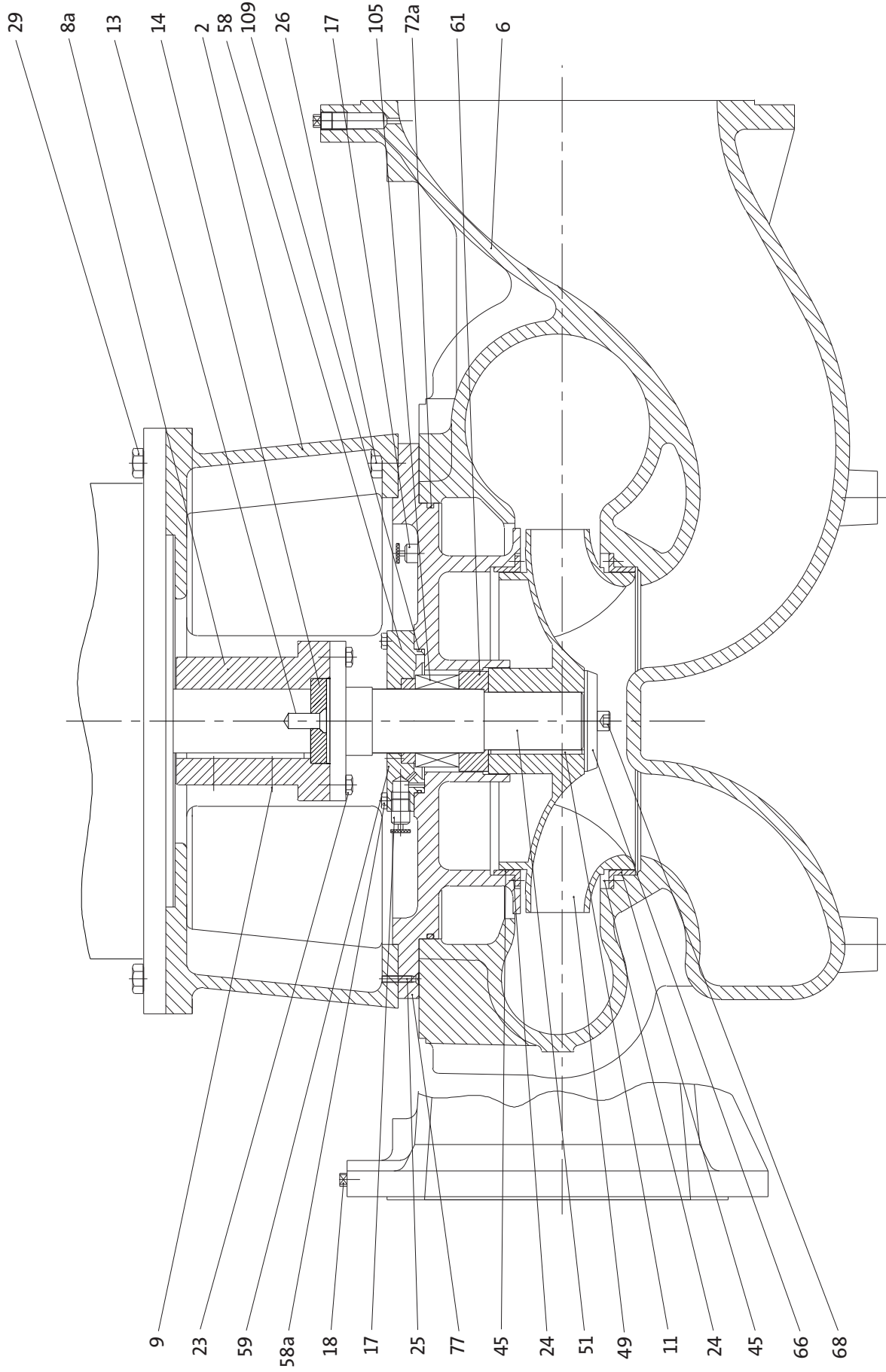
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9. Drawings

9.1 TP 100 - TP2 00, 10 bar

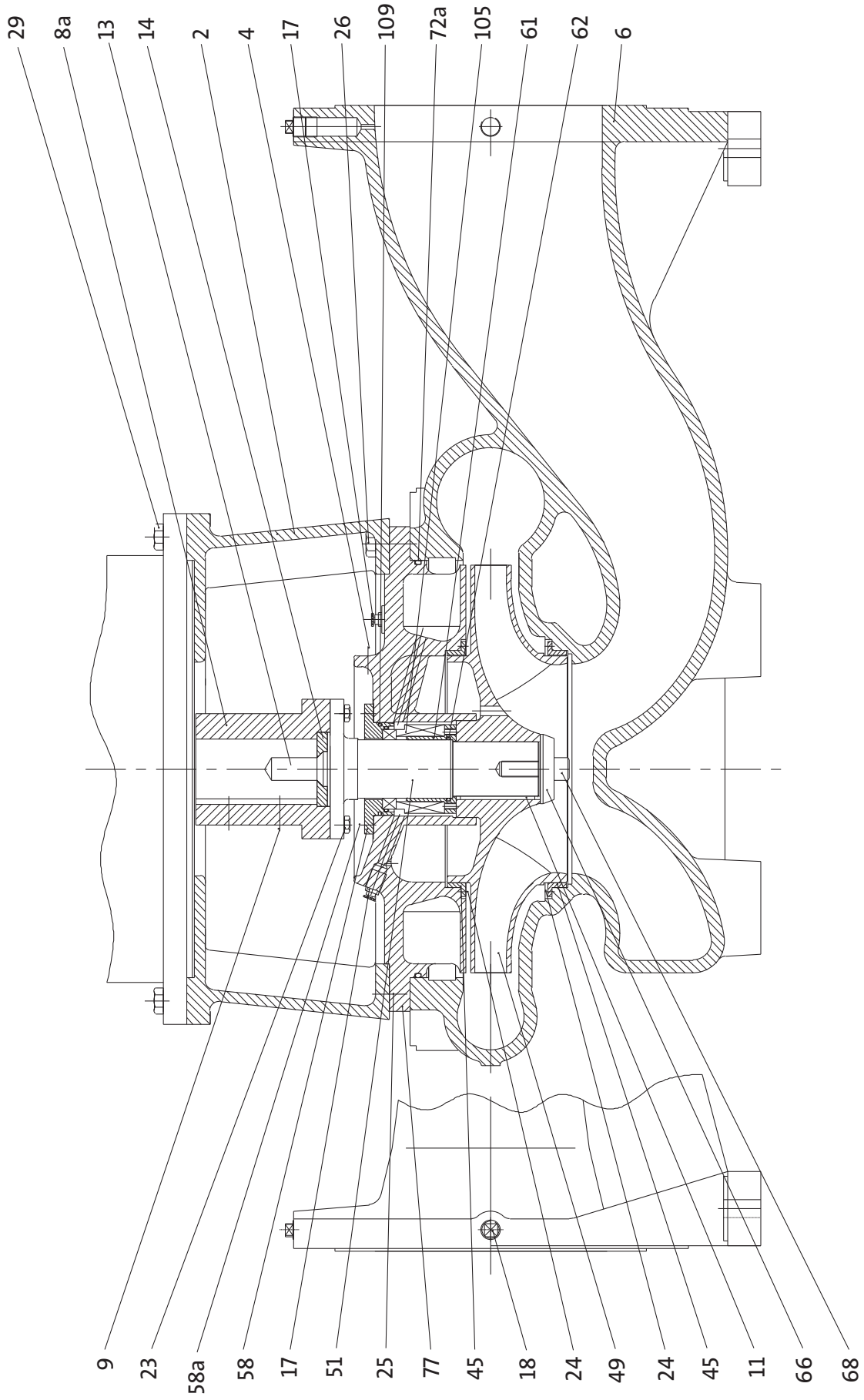


9.2 TP 250, 10 bar

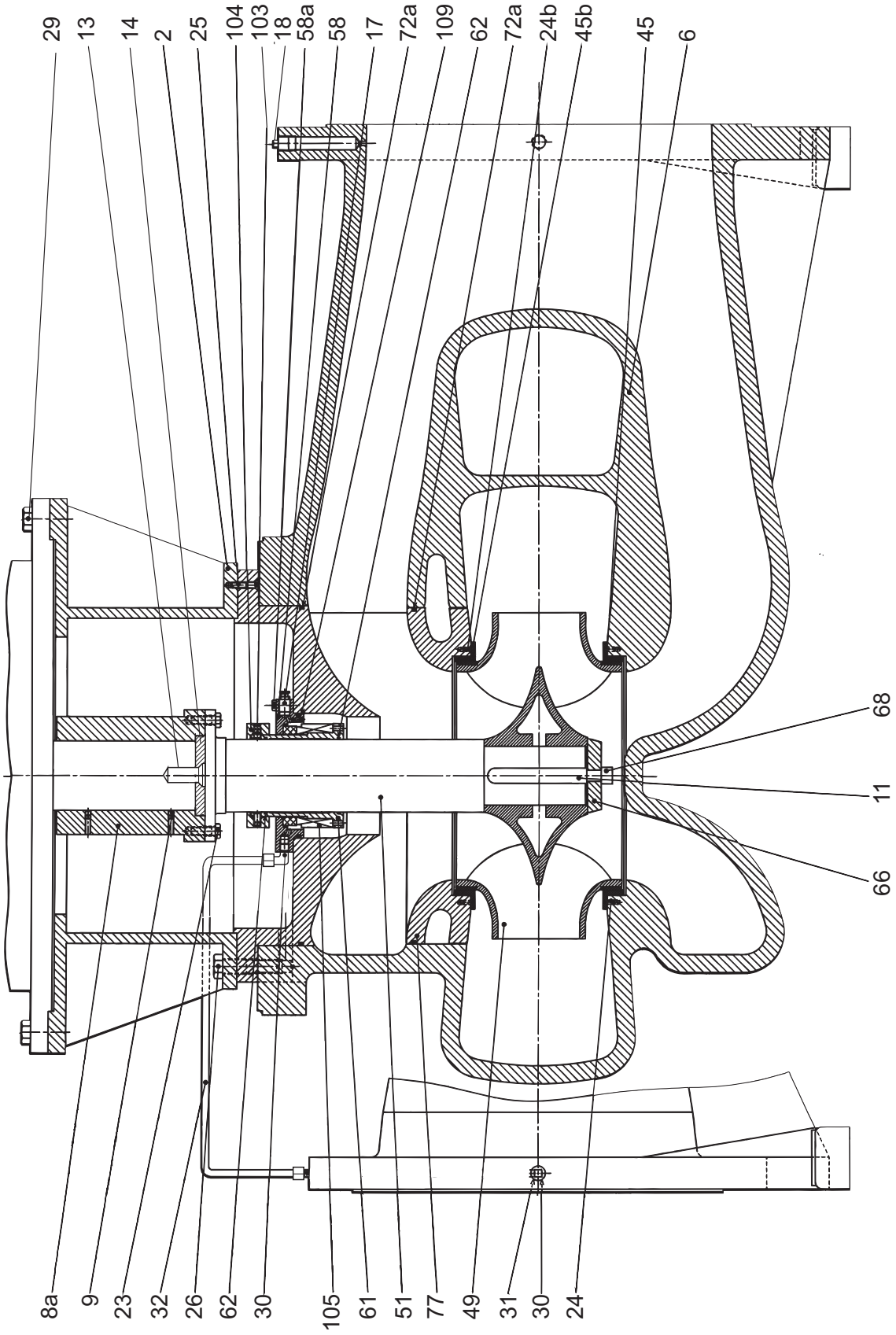


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9.3 TP 65 - TP 300, 25 bar



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