

**OPERATING AND INSTALLATION
INSTRUCTIONS FOR SEWER SLUDGE
SUBMERSIBLE PUMPS**

80
100 - **GFHU**
150

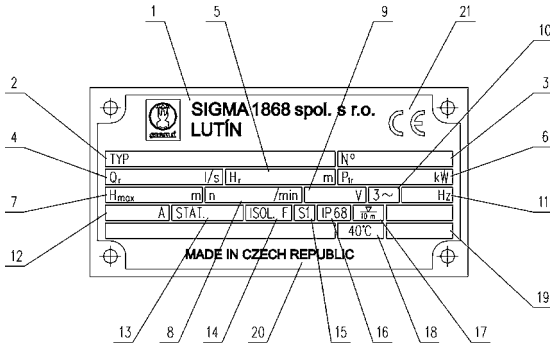


OEM'S SERVICE INSTRUCTIONS

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Pump Rating Plate



- 1 Producer's Business name and Headquarters
- 2 Type designation
- 3 Serial number
- 4 Rate of flow
- 5 Delivery head
- 6 Pump set power demand
- 7 Max. delivery head
- 8 Speed
- 9 Rated voltage
- 10 Current type, Number of phases
- 11 Rated frequency
- 12 Rated current
- 13 Stator connection
- 14 Class of insulation
- 15 Type of load
- 16 Motor protection
- 17 Max. working depth
- 18 Max. temperature of a pumped liquid
- 19 Year of production
- 20 Country of origin
- 21 Mark of conformity

1.0 APPLICATION

Pumps 80-150-GFHU are destined for pumping wastewater, faeces and raw, non-treated sludge containing non-abrasive solids, fine fragmented and fibrous materials (as ash, wood pieces, tatters, dressings, odds and ends, smaller rodents, grease, smaller amount of sand and street wash-offs) and other stuffs entering the sewer systems.

Pumps are not destined for operation in explosion hazard environments. As for the standard workmanship version, no cables can get in contact with a pumped liquid being polluted with petroleum products and hydrocarbons.

Permissible scope of pH of a pumped liquid 6.5 – 7.5 pH
Higher values are possible by agreement with the producer and after examination of actual operating conditions

Max. density of a pumped liquid 1,100 kg.m⁻³
Max. temperature of a pumped liquid and ambience 40°C

Pump submersion..... 10 m
Max. inflow on the suction side with the "SJ" version 10 m

This equipment is not destined for using by persons (including children) whose physical, sensory or mental deficiency and/or lack of experience and the knowledge do not make possible to use this equipment safely, without supervision and initial briefing and training by a person responsible for their safety in respect of this equipment using.

It is necessary to watch the children and prevent their playing with this machine.

Noise level

Equivalent level of acoustic pressure A in the distance of 1 m from the pump set surface (while using a weighting filter A) does not exceed the value $L_{PA} = 70$ dBa.

2.0 SAFETY

These Service and Installation Instructions contain basic instructions that shall be observed within installation, operation and maintenance of these pumps. That is why it is inevitable for competent and responsible workers and service staff to learn these Instructions carefully even before the pump installation and putting into operation. Keep this Manual handy for future reference at

site. All general rules given in these Service and Installation Instructions shall be observed, without exception.

Safety rules included in these Instructions, breach of which could be a menace to people, are marked with the symbol



Or in cases covering electric safety they are marked with the symbol



Safety rules breach of which could cause damage of the pump and endanger its safe functioning shall be provided with the advice

ATTENTION!

Safety rules breach of which could endanger quality of human environment are marked with the symbol



3.0 PERFORMANCE DATA

3.1 Parameters of pumps

Table 1

Pump type		80-GFHU „MH“	80-GFHU „SZ, SJ“	100-GFHU-250	100-GFHU-270	150-GFHU-320
Rate of flow	Q_{opt} (l.s ⁻¹)	15.7	15	24	25.5	40
Delivery head	H_{opt} (m)	8.8	9.3	13.3	15.5	8.6
Impeller throughput rate	(mm)	60x50		60x70		90x80
Suction branch " SJ"	(mm)	-	DN 100	DN 100		DN 150
Discharge branch	(mm)	DN 80		DN 100		DN 150
Electric motor type		definite-purpose				
Power output	P (kW)	3		6.5		6.5
Voltage U (V)	standard	400				
	on request	500				
Speed	n (min ⁻¹)	1450		1450		980
Frequency	f (Hz)	50				
Rated I (A) current	at 400V	7	6.5	14	16	13.3
	at 500V	5.0		10.6	12.8	10.0
Motor protection		IP 68 \leq 10 m				
Lead-in cable		H07RN - F 6G 1.5				
Standard lengths of lead-in cable	(m)	15*				
Weight m (kg) (without a cable and delivery hose)	„SZ“	-	95	146		248
	„MH“	91	-	152		-
	„SJ“	-	138	193		296

* On the special request it is possible to deliver another cable length Weight of 10 m lead-in cable is 4.8 kg.

3.2 Performance characteristics of pumps

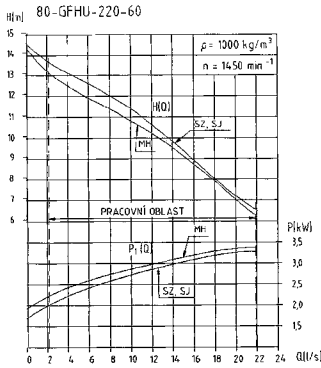


Fig. 1

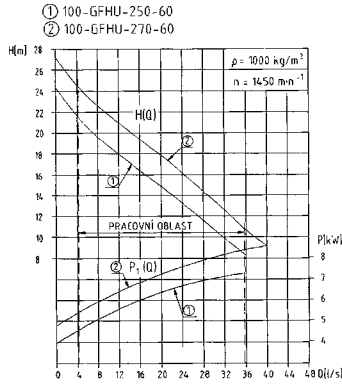


Fig. 2

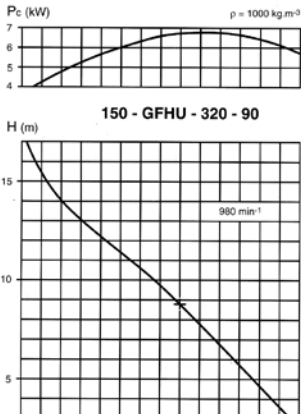
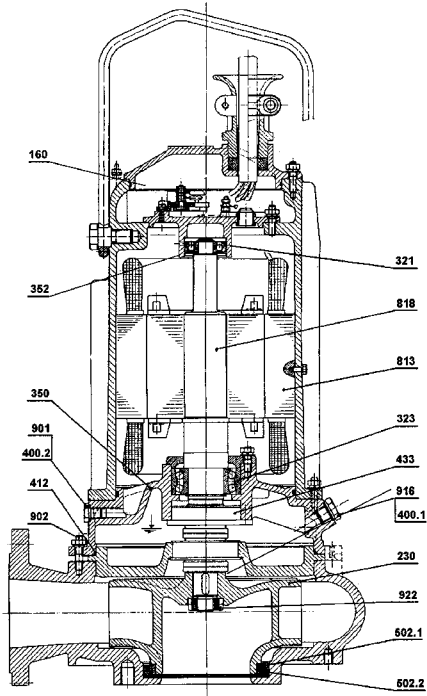


Fig. 3

3.3 Main parts of pumps

These pumps are manufactured in the following workmanship versions:

- 80 - GFHU - 220 - 60 - LU - 00
- 100 - GFHU - 250 - 60 - LU - 00
- 100 - GFHU - 270 - 60 - LU - 00
- 150 - GFH - 320 - 90 - LC - 00



- | | |
|---|----------------------------|
| 160 - Cover of terminal board compartment | 433 - Mechanical seal |
| 230 - Impeller | 502.1 - Impeller seal ring |
| 321 - Bearing | 502.2 - Volute joint ring |
| 323 - Bearing | 818 - Electric motor |
| 350 - Lower bearing housing | 813 - Rotor |
| 352 - Upper bearing housing | 901 - Check screw |
| 400.1 - Packing | 902 - Bolt |
| 400.2 - Wear ring | 916 - Plug |
| 412 - Ring | 922 - Impeller nut |

Fig. 4

3.3.1 Description of pump main parts

Pos. 813 - Electric motor

- Three-phase asynchronous type;
- Direct-on-line starting-up;
- Continuous or intermittent operation with max. number of 10 equalized switching operations per hour;
- Winding insulation, Class F;
- Motor protection IP 68-10;
- Voltage tolerance (+6%), (-10%);
- Control and monitoring devices – two thermal receptors built in winding with cut-out temperature of 130°C.

Pos. 230 - Impeller

- 80, 100-GFHU - Single vane impeller made of heat-treated cast steel for pumping heavily polluted liquids with mechanical impurities, according to the Section 1.0.;
- 150-GFHU – Single vane impeller made of grey cast iron.

Pos. 818 - Rotor

- Rotor shaft is made of stainless steel.

Pos. 321, 323 - Bearings

- Lower bearing (323) of double-row angular-contact type;
- Upper bearing (321) of single-row type with cover sheet
- Lubrication of bearings with plastic lubricant.

Pos. 433 - Mechanical seal

- Double mechanical seal, sealing faces are of sintered carbide.

Pos. 350 - Lower bearing housing

- It separates oil compartment from the electric motor compartment, oil in the oil compartment lubricates and cools mechanical seals, using the turbine oil TB 32.

3.4 Workmanship versions

Version SJ

The pump is destined for dry sump installations where it is attached fast to the foundation, using screws. The motor is watertight, so possible flooding of a sump cannot endanger the pump safety.



However, it is necessary to avoid the protection and control cabinet!

ATTENTION!

As for the pump 100-GFHU, the “SJ” version can be solely operated with the impeller of Ø 250 mm.

Installation of this pump is very easy. Just embed holding-down bolts in concrete (the screws are an integral part of the delivery) and screw the pump down.

ATTENTION!

When connecting the pipeline it is necessary to prevent any transfer of stress and/or weight from the pipeline onto the pump.

Version SZ

The “SZ” version consists of the pump and a lowering gear. The lowering gear has got the following parts:

- Flange of lowering gear;
- Discharge elbow;
- Clamp of guide pipes;
- Guide pipes – they are not included in the delivery scope;
- Holding-down bolts.

Attach the elbow to the sump bottom with the aid of holding-down bolts embedded in concrete. Apply an anticorrosion coating to screws, bolts and nuts. On the foundation plate of the elbow there are two orifices for positioning guide bars/rails that are fastened with a clamp of guide pipes in the upper inlet opening. The clamp of guide pipes can be screwed and/or welded to the frame. Guide pipes shall be installed in their vertical position. Guide pipes are not included in the scope of deliveries. Then, the pump is to be lowered into a sump along the guide pipes until it sits on the elbow all by itself.

It is possible to lift the pump for the purpose of an overhaul and/or a repair without any need of dismounting.

ATTENTION!

- **Prevent cables sagging and/or dropping under the pump**, because there is a risk of their sucking into the hydraulic space. It is recommended to use clamps for the cable attachment to the delivery pipeline – every three metres, or so;
- Before the pump lowering it is necessary to remove larger solids out of the shaft;
- Re-check the pump correct sitting on the discharge elbow even before the first flooding of a sump.

Version MH

Pump is placed in a wet sump being submerged in a pumping liquid. During operation the pump is hung freely on a rope or a chain.



It is necessary to prevent rotation or rocking & swinging around the axis to prevent the cable damaging.

This workmanship version is not used for the 150-GFHU Model.

The Size 80-GFHU is modified with a view to the

smallest possible dimensions in order to using it in small and very narrow spaces of minimum size of inlet openings from the diameter 500 mm.

As an integral part of delivery of this workmanship version there is a fire hose of polyamide fibres with a rubber bedding ended with the half of fire quick-acting coupling of the size DN 75.

3.5 Pump dimensions

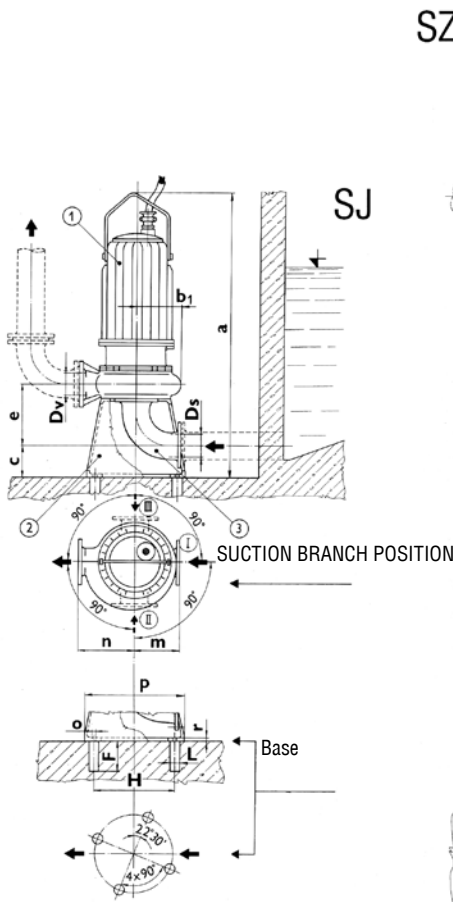


Fig. 5

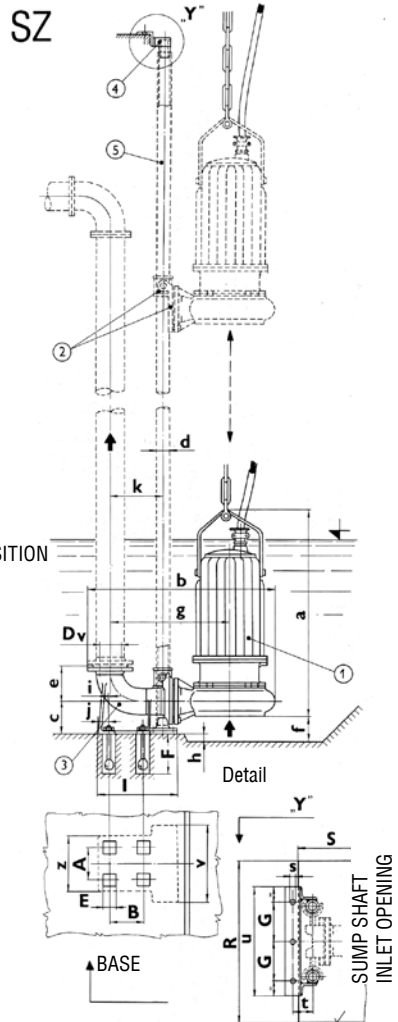


Fig. 6

Version SJ

- 1 – The pump itself with a lead-in cable
- 2 – The base for mounting the pump set on the foundation attached to the pump, including anchor holding-down bolts;
- 3 – Suction flanged elbow attached to the pump;

Besides the suction branch (I) basic position, in the dimensional drawing there are other possible positions of the suction branch (II, III) against the discharge branch marked with dashed lines that are attainable by respective turning of the suction branch and the base turning through an angle of 90°.

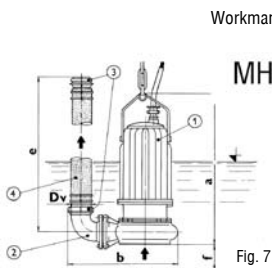


Fig. 7

Version SZ

- 1 – The pump itself with a lead-in cable
- 2 – Flange of lowering gear with a pilot sleeve on the pump bolted to the pump discharge branch;
- 3 – Discharge branch, including anchor holding-down bolts;
- 4 – Clamp of guide pipes, without fixing bolts;

As for the pump pipe line the galvanized pipes DN 2" in length according to the sump depth (Position 5) and according to the ČSN 42 5710 are acceptable.

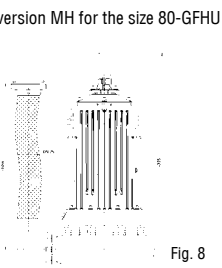


Fig. 8

Version MH

- 1 – The pump itself with an electrical supply cable;
- 2 – Discharge branch with a connecting thread Rd 130 (with the type 100-GFHU);
- 3 – Complete assembly of suction hose screw joint 110, according to the ČSN 38 9409 (with the type 100-GFHU);
- 4 - Delivery hose DN 110 of polyamide fibres with a rubber bedding in standard length of 10m (with the type 100-GFHU). End of delivery hose with a suction hose branch provided with the thread Rd 130 allows any other additional extension of the pump 100-GFHU discharge side

Type	80-GFHU		100-GFHU			150-GFHU			
Version	SZ	MH	SZ	MH	SJ	SZ	SJ		
a	775		1125	870	870	1221	980	1340	
b	793		-	858	683	-	1105	-	
b ₁	-		183	-	-	203	-	270	
c	150		150	150	-	155	185	175	
Ø d	2"		2"	2"	-	-	2"	-	
e	160		280	160	10 200	286	255	290	
f	min. 120	See the separate dimensional drawing, Fig. 8	-	min. 120	min. 120	-	min. 120	-	
g	511		-	546	-	-	695	-	
h	min. 56		-	min. 56	-	-	min. 56	-	
i	11		-	11	-	-	65	-	
j	45		-	45	-	-	50	-	
~ k	241		-	241	-	-	294	-	
l	362		-	362	-	-	480	-	
m	-			200	-	-	200	-	265
n	-			225	-	-	260	-	350
Ø o	-			4xØ14	-	-	4xØ14	-	4xØ14
Ø p	-			455	-	-	455	-	455
r	-			20	-	-	20	-	20
Ø s	3xØ18			-	3xØ18	-	-	3xØ18	-
t	92		-	92	-	-	92	-	
u	406		-	406	-	-	463	-	
v	410		-	410	-	-	450	-	
z	200		-	200	-	-	250	-	
D _s	-		DN 100	-	-	DN 100	-	DN 150	
D _v	DN 80		DN 80	DN 100	DN 100	DN 100	DN 150	DN 150	
A	140		-	140	-	-	190	-	
B	155		-	155	-	-	250	-	
E	60/60		-	60/60	-	-	70/70	-	
F	180		200	180	-	200	250	200	
G	180		-	180	-	-	210	-	
Ø H	-		370	-	-	370	-	370	
Ø I	-		4xØ40	-	-	4xØ40	-	4xØ40	
R	min. 600		-	min. 650	-	-	min. 750	-	
S	min. 620		-	min. 700	-	-	min. 900	-	

Pump suction branch of the version "SJ" is with a flange for PN 6, according to the ČSN 13 1201, with raised face.

Pump discharge branch of the version "SZ" is with a flange for PN 16, according to the ČSN 13 1211, with raised face. As for the version "SJ", it is with a flange for PN 10, according to the ČSN 13 1202, with raised face (with the exception of the type 80-GFHU that has got a flange of the discharge branch for PN 16, according to the ČSN 13 1203).

Dimension "d" – the galvanized pipe 2", according to the ČSN 42 5710.

Dimensions "v" and "z" relate to the base of foot-type discharge elbow; the base ground plan is marked with dashed lines.

4.0 TRANSPORT AND STORAGE

ATTENTION!



Pump can be transported in vertical and/or horizontal positions. It must be fast anchored to prevent its turning-over and rolling-away.

Hang the pump only on a suspension support, never subject the cable to axial tension!

In frosty weather it is necessary to keep the pump submerged in a pumped liquid that cannot get frozen or lift the pump and dry it. If it happens that residues in water have frozen in the hydraulic space it is necessary to submerge the pump in a liquid, **never use flame for defrosting.**

During the pump long-time storage or its outage it is necessary:

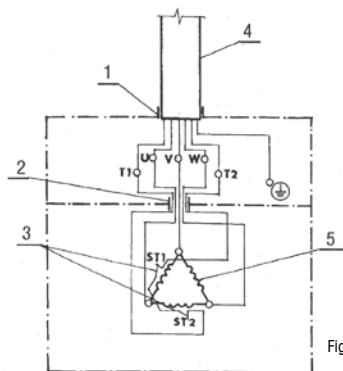
- Turn the rotor from time to time for several times (perhaps every two months) to prevent sticking-together with the wear rings of mechanical seal, when storing longer than 6 months it is inevitable;
- Place the pump in a dry room

After a longer storage or long-time outage it is necessary to re-check the pump in the same way as before putting the new pump into operation.

5.0 MAINS CONNECTION



Only a specialist qualified in electrical engineering is allowed to connecting the pump to mains.



The pump can be connected only to the mains whose values of voltage and frequency conform to the data given at the electric motor rating plate. The pump can be connected to the mains conforming to respective and valid regulations. The pump shall be protected from over-current with time-current characteristics T1 and T2, as well as from short circuit with bimetallic thermal receptors being connected to the pump control circuit. The thermal bimetallic receptor is provided with a circuit-opening contact and it is possible to connect it to the control circuit with max. voltage 250V. Other voltage is available on request.

Over-current protection shall be set to the pump rated current that is given in the rating plate.

The pump set must be disconnectable from the mains with the aid of a device that is provided with opening contacts at all poles, so the complete disconnection is secured in terms of overvoltage of the Category III. This equipment must be installed into a stationary line in accordance with all regulations valid for lines.

After assembly it is necessary to measure the pump insulation condition, as well as electric equipment ($2 \text{ M}\Omega$ at least) and re-check connection of a protective earth conductor, including retightening all terminal connections. The pumps that are operated shall be controlled regularly. Connection diagram of the supply lead in the pump is according to the Fig. 9.

- 1 – Stuffing box inlet
- 2 - Stuffing box bushing
- 3 – Two sensors for monitoring electric motor winding temperature
- 4 – Six-core conductor
- 5 – Electric motor

Single conductor cores and outlets of the electric motor winding are marked with colour and a coloured tube and they shall be connected to single terminals as follows:

The terminals are marked in this way:

- U ... black colour
- V ... brown colour
- W ... dark grey
- T1, T2 ... white colour
- green and yellow

Protection core is marked with green and yellow colour and it is longer than other cores by 50 mm, at least.

6.0 PUMP ASSEMBLY

ATTENTION!



1. Never work alone;
2. Detect presence of toxic gases;
3. Use safety belts, ropes or gas masks, minimize a possibility of drowning;
4. Before beginning any welding works eliminate any explosion hazards;
5. Prevent any electrical accidents;
6. Keep the lifting gear in top condition;
7. Enclose the working space;
8. Escape way must be always clear.

Lifting gear:

- Suspension device shall be placed right above the pump;
- Never work just under a load.

7.0 OPERATION AND MAINTENANCE

7.1 Recommended measures before putting into operation

ATTENTION!

- Before starting any works it is recommended to re-check whether the pump has been disconnected from mains, and whether it is not under voltage;



- Re-check the equipment condition whether its cable is undamaged, as well as its electric protection;
- If the supply lead was damaged, it must be replaced by the producer, their service engineer or another qualified person to avoid any hazardous conditions;
- When a new pump is putting into operation or after the pump longer operational shutdown it is recommended to turn the rotor over for several times;
- Re-check oil charge in the pump;
- Re-check the rotor right direction of rotation – suspend the pump on a rope and switch the electric motor for very short time. If the pump direction of jerking is opposite to direction of the arrow marked on the pump, the direction of rotation is correct. If the sense of rotation is not correct, it is necessary to interchange any of two phases.

ATTENTION!

Jerking can be very strong with large and heavy pumps!

7.2 Operation

During its operation the pump does not need any servicing.

It is necessary to avoid the discharge hose bending (or even breaking).

These pumps need minimum maintenance during their operation.

In frosty weather the pump shall be submerged in non-freezing liquid, otherwise it would be better to lift the pump out of a liquid, wash it out and dry it up. In case of some water freezing in the hydraulic space, it is necessary to immerse the pump in water before its putting into operation. To prevent the pump running “dry”, it is recommended by the pump producer to monitor the minimum level of water.

Safety Instructions

ATTENTION!



- Before starting any works it is recommended to re-check whether the pump has been disconnected from mains, and whether it is not under voltage (it is also valid for the alarm circuit);
- Neutralize the pump before disassembly, as well as single parts after dismounting;
- Avoid any risk to health or life, observe personal hygiene;
- Use a safety helmet, protective spectacles, safety shoes;
- Avoid splashing a liquid dangerous to health, if it happens it is necessary to ensure first-aid treatment:

Eyes – flush with fresh running water over a period of 15 minutes and seek medical advice;

Skin – Get out splashed-up clothing, wash skin with soap and water, and seek medical advice.

It is necessary to observe all generally valid regulations as regards safety and hygiene of work, as well as by-laws of the operator.

7.2.1 Inadmissible methods of application

- Pump must not convey other liquids than water
- Pump must not be used in explosion hazard environments
- Pump must not convey water containing acids, lyes, carbon, sea water, chemicals, and so on

- Pump must not work dry or with the opposite sense of rotation
- Pump has got clear purpose of using specified by its name, design and application defined in this section and other purpose of its using cannot be supposed either advisedly, accidentally or due-to ignorance.

7.2.2 Analysis of residual risks

- Due-to declared throughput rate of the pump hydraulic part it is not possible to avoid absolutely the access to the impeller space. That is why it is needed to observe all warnings given in the sections 7.1 and 7.2 when handling the pump, recheck its disconnection from mains and simultaneously prevent its unexpected switching-on. The same measures should be taken with the workmanship versions MH and SZ namely when the service personnel are moving in the sump where the pump is installed.

7.3 Scope of checking

Namely after the mechanical seal replacement or its repairing oil condition and quantity and the electric motor compartment are to be checked with the new pump, as well as with an older one after the lapse of 20 – 30 working hours.

And further, it is necessary to carry out checks and preventive inspections to guarantee the pump faultless operation and extend the pump service-life. These checks and inspections shall be carried out once a year, at least, under hard conditions and long-term continuous service even more frequently, namely with the pumps of the “SJ” workmanship version.

Regular checks and preventive inspections

- Inspection of oil quantity and condition;
- Inspection of electric motor compartment (water occurrence);
- Inspection and check of screwed /threaded joints (retightening);
- Inspection of condition of suspensions and chains (retightening and rusting through);
- Inspection of condition of the volute and the impeller;
- Inspection of a lead-in cable;
- Inspection of the motor insulation condition;
- Inspection and re-lubrication of bearings.

Inspection of oil charge

- Put the pump in its vertical position;
- Dismount partly the hexagonal plug (916). If oil is pouring out of the plug its quantity is sufficient, if it is not pouring out it is necessary to re-fill it.

Turbine oil TB 32 is used there.

ATTENTION!

Beware of overpressure!

When dismantling plugs of the motor and oil compartments it is recommended to cover plugs by a cloth to prevent splashing

Oil condition

- Oil for inspection is to be sucked up from the oil cup bottom after dismantling the hexagonal plug (916);
- Inspection of the oil charge quality can also show the mechanical seal condition;
- Permissible leakage is 0.05 ml/h;
If water gets into oil (a white emulsion can be formed), it is recommended to leave it standing, exposed to air, because water will separate like that, and then water will drop to the tank bottom. Oil charge (upper part is without any water) can be used once again;
- If there is a strong emulsion or too much water it is necessary to change oil charge for a new one;
- Re-check oil after week-long operation;
- If water occurs in the oil compartment repeatedly, it means, that the plug seal ring (400.1) is defective, or the plug (916) has not been tightened enough, the bearing housing (350), or the wear “o”-ring (412), and/or the mechanical seal lower part (433) have been damaged.

Motor compartment inspection

- Disassemble the cheese head check screw with internal hexagon (901);
- Re-check whether water or oil is not in the motor compartment;

ATTENTION!

Beware of overpressure!

Inspection of the volute and impeller condition:

- Wear inspection – if any drop of hydraulic parameters was found out, it is necessary to replace the decisive elements;
- If a gap between wear rings of pos. 502.1, 502.2 is larger than 2 mm it is necessary to replace the rings

Inspection of lead-in cable



- It is necessary to re-inspect insulation condition;
- **Cable installation must be without any sharp bends and deformations due-to compression.**

Motor insulation condition

- Resistance value between phases and the frame must be greater than 2 MΩ in their cold state.

Inspection and re-lubrication of bearings

To extend service life of bearings – namely with the pumps 100-GFHU in the version “SJ” operated in a dry sump, it is necessary to re-check lubricant in the upper bearing, or re-fill plastic lubricant LV-2-3 after lapse of 2,500 working hours. (Fill in only one third of lubricant volume between the bearing rings). For this purpose it is necessary to dismount the cover of the terminal board compartment (160), and then remove the upper bearing housing (352) with the aid of screws. After re-assembly of the cover of the terminal board compartment it is necessary to re-check tightness (the motor compartment pressurizing), namely in the case of the pump endangering due-to its flooding. If there are some uncertainties as for the bearing re-lubrication, please contact the authorized contract service centre.

8.0 REPLACEMENT OF COMPONENT PARTS

Oil change

- Suck the oil out with a hand pump. Sucking hose must touch the oil cup bottom.

ATTENTION!

If an overpressure and water in oil were found out when unscrewing the plug, it is necessary to change the oil. After lapse of 24 hours it is inevitable to re-check the oil condition.

Put a new packing under the plug with every handling. For filling-up it is recommended to use the turbine oil in the amount of 2.6 l (80-100 GFHU), 4.5 l – (150-GFHU).

Replacement of wear rings

- It is carried out in such a case that the gap between the rings is larger than 2 mm.

Replacement of volute ring (502.2)

- Remove the motor part from the volute (the bolt nuts 902), the old wear ring is to be ground off or milled off, a new ring shall be struck on with using wooden pads.

Replacement of impeller ring (502.1)

- Remove the motor part from the volute (bolt nuts 902), lift a bit, and the ring can be struck down and/or ground off. A new ring shall be warmed up and slid on.

Replacement of impeller

ATTENTION!

Worn impeller has got too sharp edges, there is a risk of injury!

Remove the motor part from the volute (bolt nuts 902) and lift a bit. Loosen the impeller nuts (922), remove the impeller with the aid of a forcing-off device.

ATTENTION!

After dismantling it is inevitable to protect the mechanical seal from damage

Impeller assembly

- Inspect the shaft end, whether it is clean and free of burrs. Re-check, whether the key in the key-way is tight enough, and whether the mechanical seal is in its correct position. Lubricate the impeller hub and the shaft end and slide a new impeller on. Assembly can be easier if the impeller has been warmed up to 100°C. Re-check, whether the rotor together with the impeller rotate free. Complete motor part assembly which includes the impeller and the volute (Do not forget to mount the “o”-ring – 412).

It is allowed to carry out solely the above mentioned interventions. Other interventions can be carried out solely by the pump producer or an authorized contract service centre, and/or the operator by agreement with the producer and under specified conditions.

Together with the pump, a wrench with a handle for loosening the impeller nut is delivered.

Table 3

Pump type		80-GFHU		100-GFHU		150-GFHU	
102	Volute	V9-7007 MH	1	-	-	-	-
102	Volute	VO-1494 SZ,SJ	1	V0-1413	1	V9-7226	1
160	Cover of terminal board compartment	V805 968	1	V805 979			1
162	Suction cover	-	-	-	-	V802 902	1
180	Bottom of oil cup	V804 959	1	V804 960	1	V806 040	1
230	Impeller	V9-7084	1	V9-7078	1	V9-7231	1
321	Bearing CSN 02 4640	6303Z	1	6306Z			1
323	Bearing CSN 02 4665	3208			1	3308 C3	1
350	Lower bearing housing	V9-9748	1	V9-9774	1	V9-9851	1
352	Upper bearing housing	V805 959	1	V805 980			1
360	Bearing cover	V533 957			1	V534 342	1
400.1	Packing CSN 029312.2			18x24			1
400.2	Wear ring CSN 02 9312.2			10x16			1
412	Ring CSN 02 9281.2	160x3	1	200x5			1
412.1	Ring CSN 02 9281.2	190x5	1	260x5	1	280x5	1
412.2	Ring CSN 02 9281.2	240x3	2	250x3	1	300x3	1
412.3	Ring CSN 02 9281.2	260x3			1	320x3	1
412.4	Ring ČSN 029281.2	-	-	-	-	320x3	1
433	Mechanical seal 2Z-SP-KK-28			V805 831			1
463	Cover sheet	V537 410			1	V537 409	1
502.1	Impeller wear ring	V518 845	1	V519 034	1	V520 906	1
502.2	Volute wear ring	V518 844	1	V518 850	1	V520 907	1
576	Handle	V726 538	1	V725 953	1	V728 011	1
811	Stator body	V900 436	1	V900 437	1	V9-9850 *) V904 048 **)	1
813	Electric motor HOC	132 S 04	1	160 M 04	1	180 L 06	1
818	Rotor	V723 591	1	V723 645	1	V723 834 *) V735 940 **)	1
824	Cable			H07RN - F 6G 1,5			
826	Bushing yoke			V527 389			1
826.1	Bushing insert			V115 942			1
834	Bushing			V720 539			1
835	Complete terminal board			V520 311			1
839	Earthing clip			V517 142			1
900.1	Bolt	V116 553	8	V107 778			8
900.2	Bolt	V116 725	3	V107 778			3
900.3	Bolt M 8x30			V108 713			2
900.4	Suspension screw			V116 892			2
901	Screw CSN 02 1103.2	M6x12	1	M 10x16			1
901.1	Check screw			V114 926			1
902	Screw CSN 02 1176.9	M 10x35			8	M 10x40	8
902.1	Screw CSN 02 1176.2			M8x20			3
902.3	Screw CSN 02 1178.2			M8x25			2
902.4	Screw ČSN 021176.9	-	-	-	-	M10x25	8
904	Screw CSN 02 1151.9	M 6x16	2	M6x20			2
916	Plug			V116 491			1
922	Impeller nut			V109 685			2
932	Retaining ring CSN 02 2930	17	1	30			1
932.1	Retaining ring CSN 02 2930			40			1
940	Key CSN 02 2562.9			8x7x25			1

*) For pumps produced till the year 1993

**) For pumps have been produced since the year 1993

9.0 SPARE PARTS

All parts of the pumps are replaceable.

When ordering the spare parts and for the purpose of other negotiations it is necessary to give:

- Pump type
- Pump serial number
- Correct numeric and nominal designation of parts (tab. 3).

Pump type and its serial number are given in the rating plate that is attached to the pump.

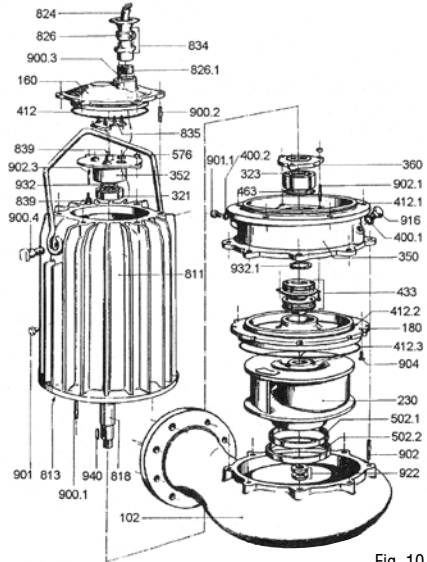


Fig. 10

10.0 NOTES PREPARED TO HELP YOU PREVENT PROBLEMS AS WELL AS DEAL WITH THEM

Problem	Cause of problem	Measures
1. Pump cannot be started up, its motor is quiet.	1.1 Source is dead – absence of voltage.	1.1 Correct the fault (a specialist qualified in electrical engineering).
	1.2 Fuse burn-out or energization of overcurrent relay.	1.2 Correct the fault (a specialist qualified in electrical engineering).
	1.3 Bimetal switches in winding are switched out.	1.3 Let the pump cool down and then switch it on again.
	1.4 Interrupted power supply to the motor.	1.4 Correct the fault (a specialist qualified in electrical engineering or an authorized service centre).
2. Pump cannot be started up, the motor is buzzing.	2.1 One of the fuses is burnt-out. Power supply to one of the phases has been interrupted.	2.1 Correct the faults between the mains and a cable (a specialist qualified in electrical engineering), other defects shall be corrected by an authorized service centre.
	2.2 Impeller is locked-up due-to solids entering the space between the impeller and the volute.	2.2 Re-check, whether the rotor can be turned freely. If not, remove the solids – dismantle the impeller, and perhaps even the volute.
3. Pump has started running, but volume rate of flow is too small and the running is sometimes noisy.	3.1 Reverse sense of motor rotation.	3.1 Repair.
	3.2 Partly clogged pipeline.	3.2 Clean up.
	3.3 Excessive worn impeller.	3.3. Replace.

	3.4 Pump is working at operating point in front of its work area.	3.4 It is necessary to change the discharge line, and/or use a pump with a higher delivery head.
4. Pump is running, but volume rate of flow is too big and the running is noisy.	4.1 Pump is working at the operating point behind its work area.	4.1 It is necessary to use a pump with a smaller delivery head, and/or change the pipeline resistance characteristic, e.g. with the discharge throttling-down a bit.
5. Pump has started running, volume rate of flow is correct. Excessive vibration of pump, its running is too noisy.	5.1 Excessive worn and thus unbalanced impeller.	5.1 Replace.
6. Fuse burn-out.	6.1 Mains cut-off.	6.1 Correct the fault (a specialist qualified in electrical engineering).
	6.2 Voltage drop in mains.	6.2 Correct the fault (a specialist qualified in electrical engineering).
	6.3 Undersized mains.	6.3 Correct the fault (a specialist qualified in electrical engineering).
7. Over-current protection of motor switches off.	7.1 Incorrectly set value of the overcurrent relay.	7.1 Set at $I_{(m(rated))}$ (a specialist qualified in electrical engineering).
	7.2 Motor overload due-to rotor "braking" caused by a solid penetrated between the impeller and the volute.	7.2 Re-check, whether the rotor can be turned freely. If not, remove the solids – dismantle the impeller, and perhaps even the volute.
8. Water and/or oil in the motor compartment.	8.1 Re-tighten all loose screws.	8.1 Re-check after the lapse of 24 working hours, in case of repeated leakage it is necessary to correct the fault in an authorized service centre.

11. DELIVERY SCOPE

11.1 Workmanship version "SZ"

- The pump in its assembled state with a cable;
- Flange of a lowering gear with a guide/pilot sleeve on the pump being bolted to the pump discharge branch;
- Delivery elbow, including 4 pieces of anchor holding-down bolts;
- Tool-kit – 1pc of a wrench for the impeller nut + a handle.

11.2 Workmanship version "MH"

- The pump in its assembled state with a cable;
- Discharge elbow;
- Hose 10m (on request);
- Tool-kit – 1pc of a wrench for the impeller nut + a handle, and 1pc of the wrench 100/75, ON 38 9450 (only for the 100-GFHU type).

11.3 Workmanship version "SJ"

- The pump in its assembled state, with its base and a suction flanged elbow, with a cable;
- Anchor bolts – 4pcs;
- Tool-kit – 1pc of a wrench for the impeller nut + a handle.

As an integral part of every delivery of this pump there are Service and assembly instructions and the Certificate of warranty.

12.0 WARRANTY

Time duration of the warranty, as well as conditions of warranty are given in the certificate of warranty, and/or in the contract of purchase. Within

the warranty period solely the manufacturing plant, and/or an authorized service centre – see the Certificate of Warranty - are in capacity to carry out dismantling and/or repairs – see the Certificate of Warranty.

13.0 LIST OF AUTHORIZED SERVICE CENTRES

List of authorized service centres is given in the Certificate of Warranty.

14.0 GUIDELINES ON DISPOSAL OF WASTE



Directions to disposal of waste generating during life cycle of the pump (by course of § 10, Cl. 3 of the Law of Wastes No. 185/2001 of the Code of Law, as amended).

1. Component parts of industrial pumps

Sort of waste	Kode ¹⁾	Category	Method of disposal
Waste of electrical and electronic devices - scrapped/disabled parts	16 02 14	0	Other waste – Utilizable waste – after sorting it is necessary to hand it over to a person authorized for purchase of waste or secondary raw material.
Paper and/or cardboard packages	15 01 01	0	
Other scraped devices – metallic components of pumps (without any oil remains)	17 04 07	0	
Other scraped devices – non-metallic components of pumps (e.g. of carbon, carbide, ceramics)	16 02 16	0	Other waste – it is necessary to collect and hand it over to a waste dump operator.
Other scrapped materials – rubber elements of pumps	16 02 16	0	Other waste – it is necessary to collect and hand it over to disposal in a waste incineration plant.
Wood packing	15 01 03	0	
Plastic packages– foil of PE	15 01 02	0	
Small plastic things ²⁾	16 02 16	0	
Other motor, gearbox and/or lubrication oils	13 02 08	N	Hazardous waste – it is necessary to collect and hand it over to disposal by an authorized person.
Solvents and their mixtures with preservative products (except of organic-decomposable)	14 06 01 14 06 02 14 06 03	N	

¹⁾ See the Public Notice No. 381/2001 of the Code of Law, in which the Catalogue of waste was published
0 – Other waste
N – Hazardous waste

²⁾ **ATTENTION !**
Polytetrafluoroethylene (Teflon, PTFE) shall not be incinerated elsewhere than in a waste incineration plant due to their toxicity!

15.0 BOOK OF RECORDS

Latest maintenance		Pump workplace	Notes	Signature
Date	Serial number			

We reserve the right to alter data, text and illustrations without prior notification.

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