SERVICE AND ASSEMBLY INSTRUCTIONS FOR CENTRIFUGAL PUMPS

NPB

SIGMA®

CONTENTS

1.0 APPLICATION

These Service and Assembly Instructions are valid for centrifugal pumps of the NPB type in compact, close-coupled workmanship version destined for pumping various sorts of liquids. They are used for pumping well-flowing products of food-stuff industry (milk and fluid dairy products, juices, hopped wort, water containing carbon dioxide, and so on), for pumping solutions of acids, hydroxides, solutions of acid, alkaline and neutral salts in chemical industry, as well as in pharmaceutical, textile industries, and so on.

Pumps NPB represent highly efficient and reliable pump sets thoroughly adapted to requirements of the food-stuff industry.

Advantages of theirs are the following:
- Unit in compact workmanship
- High-quality structural material – guarantee of the pump service durability and design, premise of maintaining a pumped product quality
- Easy and quick dismountability
- Perfect surface cleanability
- Absolutely minimum and modest operational service

Pump set is delivered in fully-assembled state, with a mounted screwed connection on suction and discharge branches.
Max. temperature of a pumped liquid ..... 100°C
Max. kinematic viscosity of a pumped liquid. 75 $mm^2.s^{-1}$
Max. density of a pumped liquid ..... 1,050 $kg.m^{-3}$
Range of pH .....from 5.5 to 14
If pH is lower it is necessary to consult the Producer.

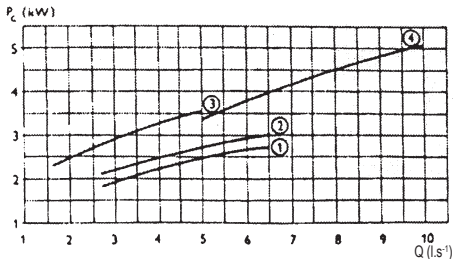
2.0 VIEW OF TYPES AND PERFORMANCE DATA

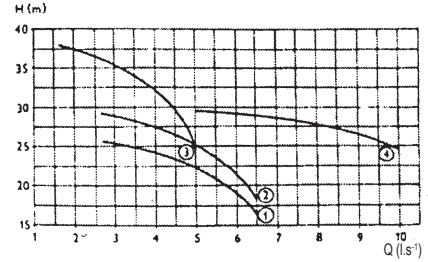
Pump set types			50-NPB-150-12.5	50-NPB-160-12	50-NPB-180-10	65-NPB-160-16
Suction branch	DN	(mm)	50	50	50	65
Discharge branch	DN	(mm)	50	50	50	65
Max. permissible overpressure on discharge side	p_v	(MPa)	0.45	0.45	0.45	0.45
Electric motor – type			1LA 7096-2AA11K94	1LA 7106-2AA11K94	1LA 7106-2AA11K94	1LA 9113-2AA61K94
Power output	P	(kW)	2.2	3	3	6.5
Speeds	n	(min^{-1})	2,865	2,865	2,865	2,900
Voltage	U	(V)	400 ± 5 %	400 ± 5 %	400 ± 5 %	400 ± 5 %
?????	f	(Hz)	50 ± 2 %	50 ± 2 %	50 ± 2 %	50 ± 2 %
Protection of pump set			IP 55	IP 55	IP 55	IP 55
Pump set weight	m	(kg)	34	46	46	55
Level of acoustic power	L_{PA}	(dBa)	77[1)]	77[1)]	77[1)]	93[1)]

Data Q, H have been set for fresh, clean water of temperature 20°C, viscosity of 1 $mm^2.s^{-1}$ and density 1,000 $kg.m^3$. When pumping viscous liquids these parameters are changed depending on viscosity degree, in such a way the parameters Q, H partly dropp due-to viscosity, but power requirement is going up. However, electric motor power output is determined for pumping liquids up to limit viscosity.

[1)] Values of radiated noise were obtained according to the EN12639, using standards ISO 3744, e. g. acoustic power level LPA weighted by the function A being measured in the distance of 1m from the pump.

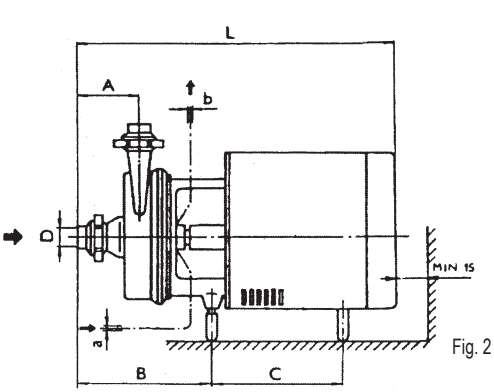
Informative characteristic of pumps





1 **-** 50-NPB-150-12,5 ***2*** **-** 50-NPB-160-12 ***3*** **-** 50-NPB-180-10 ***4*** **-** 65-NPB-160-16 Fig. 1

Dimensions of pumps



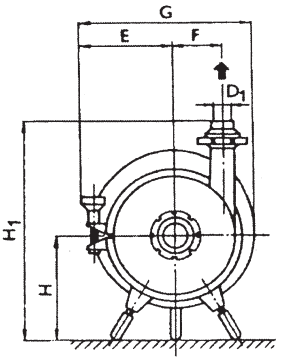


Fig. 2

Table 1

Pump set type	A	B	C	E	F	G	H	H_1	L	Branches		a	b
										D	D_1		
50-NPB-150-12,5-YC-04	100	203	200	171	92	298	165	359	525	50	50	8	8
50-NPB-160-12-YC-04	100	180	228	171	92	309	180	374	550	50	50	-	-
50-NPB-180-10-YC-04	100	213	228	171	92	309	180	374	583	50	50	8	8
50-NPB-160-16-YC-03	91	211	235	192	94	330	190	421	658	65	65	8	8

Dimensions in millimetres.

a …. Flushing water supply into a mechanical seal, with overpressure up to 0.1 MPA, volume of flushing water from 0.08 to 0.2 $l.s^{-1}$
b …. Flushing water withdrawal from the mechanical seal.

Safety

These Service and Assembly 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 learn these Instructions carefully even before the pump installation and putting into operation. Keep this Manual handy for future reference at site.
Not only all above mentioned general safety rules as given in this Clause devoted to safety, but also all specific safety rules given in other Clauses shall be observed.
Safety rules included in these Service and Assembly 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 that shall be considered due to safety working of the pump or the pump set and/or protection of the pump itself or the pump set shall be provided with the advice

ATTENTION

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

3.0 PUMP DESCRIPTION

Design and Technical Description

The pump "NPB" is of rotary centrifugal horizontal single stage type consisting of the hydraulic part (the pump itself) and the electrical part. The hydraulic part together with an electric motor forms a compact unit – a close coupled - of a small size, and easy-portable. The pump set sits on three footings, two front ones of which (closer to the hydraulic part) are vertically adjustable.

Pump casing forming together with a spacer the stator of hydraulic part is provided in axial direction with a suction branch destined for entry of a pumped stuff, as well as with a tangential discharge branch for withdrawal of a pumped liquid. Discharge casing can be turned at choice to a position by request and the real running conditions.
Connection of the pump casing to the spacer is to be carried out with the aid of a tightening/clamp sleeve offering very fast and easy dismantling. The pump stator is attached to the electric motor flange by screws. The rotor of hydraulic part is formed of the electric motor shaft on which end an impeller is overhang and re-tightened by the impeller nut. The impeller is of a shrouded type with single axial entry of a pumped liquid – with drilled-in straight-way channels (for easy cleaning).

The shaft of hydraulic part is sealed by a mechanical seal. The pump 50-NPB-160 is provided with the mechanical seal – see Fig. 4 – being satisfactory for these pumps using in some processes of re-pumping, always with a liquid inlet onto the suction side, on principle. The pumps 50-NPB-150, 50-NPB-180, 65-NPB-160 are provided with a hydraulic closure (a mechanical seal and radial lip seal ring) primed by clean pressure water to prevent a possibility of air leakage, as well as heat removal from the stuffing box – see Fig. 3.
Pump electrical part consists of a fully enclosed three-phase asynchronous squirrel-cage electric motor, with its surface self-cleaning. The electric motor rotor is balanced dynamically and it is supported on radial ball bearings.
The electric motor is covered by a removable guard of stainless metal plate.

Pump sectional view

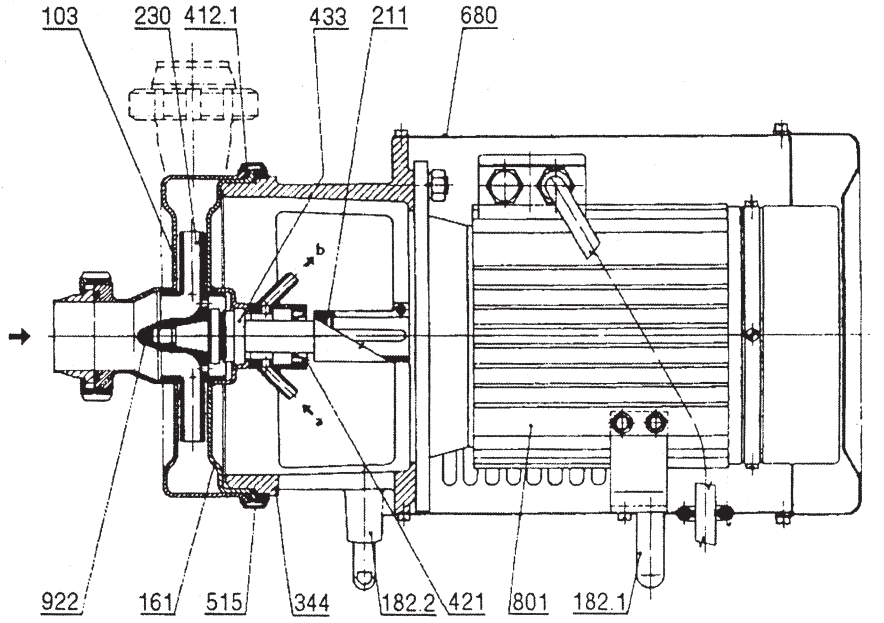
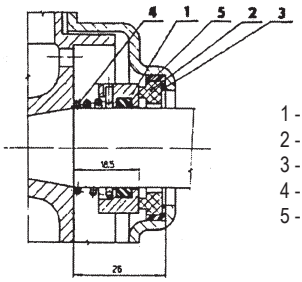


Fig. 3

103	- Pump casing	412.1	- Wear ring
161	- Interstage plate	421	- Radial lip seal ring
182.1	- Rigid support	433	- Mechanical seal
182.2	- Adjustable support	515	- Tightening/clamp sleeve
211	- Pump shaft	680	- Electric motor guard hood
230	- Impeller	801	- Electric motor
344	- Spacer	922	- Impeller nut



1 - Slip ring
2 - Seat
3 - Sealing collar
4 - Spring
5 - "O"-ring

Fig. 4

Sense of Rotation

Shaft sense of rotation is clockwise as viewed from the electric motor side.

Material

The hydraulic part getting into contact with a pumped stuff and the electric motor guard hood are of stainless steel based on chromium-nickel, the impeller on the base of chromium-nickel-molybdenum.

The spacer being placed between the pump and an electric motor of grey cast iron is provided with fast and hygienic coat of paint.

The Producer admits possibility of using another suitable material if it conforms to the Hygiene Regulations.

Designation

Specifications of a driving motor are given in the rating plate attached to the motor case.

Pump set specifications are stamped on the electric motor guard hood.

4.0 ASSEMBLY

Pump positioning

The pump is to be placed so that the suction piping would be as short as possible and suction head should conform to the given technical data. It is necessary to ensure free access to the pump to facilitate inspection and servicing within the operation and easy assembly and disassembly in case of repair.

Pump installation in a building

Advantage of these pumps is a small space needed for installation in a building. The pump can be installed right on the floor pavement, no foundation is needed. Installation shall be carried out as follows: reducing

CAUTION sockets of dairy fittings delivered together with the pump are to be welded to suction and delivery pipeline.

BEWARE OF union nuts that must be put on the pipeline before welding sockets on.

With the aid of these union nuts the pipeline is to be screwed to the pump branches.

Pipeline must be clamped so that the pipeline does not load the pump by its weight or due to forces being generated by dilatation during pumping liquids at higher temperatures. Inside diameter of the suction pipeline cannot be smaller than the inside diameter of suction branch and it must be placed so that no air pockets can be formed. If a liquid of density higher than 1,000 $kg.m^{-3}$ is pumped, the available suction head will be reduced in due proportion to density. If the total static head is higher than 10m it is recommended to install a non-return flap valve near the pump.

If the pump sucks a liquid (only with pump sizes 50-NPB-150, 50-NPB-180 or 65-NPB-160-YC-03) the suction piping must be perfectly airtight, continuously rising and its end shall be provided by the non-return flap valve.

Floor unevenness is limited by two front adjustable supports. Required height shall be set up by the support bolt screwing-up and/or its loosening.

Electrical installation

Electrical installation is to be carried out according to valid CZ standards. Before assembling the pump it is necessary to re-check whether the electric motor insulation condition was not changed due to transport or storage. Insulation resistance of the electric motor winding shall not be lesser than 10MΩ (when cold). The electric motor is to be connected across the line according to the wiring diagram being placed inside of the terminal board cover. Voltage and frequency of mains should conform to data given in the electric motor rating plate. After connection it is necessary to re-check the rotor running direction. In case of opposite direction it is recommended to carry out exchange of any of two phases. Protection from overcurrent is to be set at the current rated value given in the rating plate of an electric motor guard hood.

Earthing terminals are both internal and external. The internal earthing terminal is placed near connecting terminals inside the terminal box. The external earthing terminal is placed in the lower part of the spacer flange. Both terminals are stamped with the ground symbol.

5.0 SERVICING AND MAINTENANCE

Pump preparation for starting-up

a) Pump 50-NPB-160

Before putting into operation the pump is to be primed with a pumped liquid, because due to "running-dry" the

mechanical seal should be damaged or destroyed.
b) Pumps 50-NPB-150, 50-NPB-180, 65-NPB-160-16-YC-03
Before putting the pump into operation it is necessary to open the liquid inlet to the hydraulic closure. In such a case the pump shall work with the suction, it is necessary to prime the pump with a liquid before its starting-up (without priming the pump and suction pipeline by a liquid the pump is not able to suck-in). If the pump shall work with a liquid inlet it can be primed with a pumped stuff by opening the gate valve in the feed / supply pipeline.

CAUTION: It is inevitable to wash the stuffing box chamber by clean, fresh water of pressure up to 0.1 MPA, with the volume of washing water 0.08 – 0.2 $l.s^{-1}$.
b) Sense of rotation shall conform to the rotation / direction arrow. Right sense of rotation is to be preferable re-checked by the motor switching-on for a short time watching the shaft rotation in the space between the case and the electric motor.

Putting the pump into operation

If requirements of the previous clause were met the pump can be started up from the operator's station that was built-up according to the project of technological equipment. After the pump starting-up it is necessary to start opening the pressure gate valve until the required volume is reached.

Pump stopping

If a gate valve is on the delivery side, it is necessary to shut it first and then the electric motor is to be switched off.

Pump servicing and maintenance during operation

Before beginning the works it is recommended to re-check whether the pump is disconnected from mains and protected from connection to mains by mistake!

a) Electric motor check

It is necessary to re-check the electric motor regularly within the framework of periodical checks of electrical equipment (in the respective buildings) at appointed time according to the Czech Standard CSN 33 1500. Minimum value of insulation resistance in the electric motor winding may not be under 2MΩ (in cold conditions).

b) Check of mechanical seal and liquid closure

From time to time it is necessary to check the mechanical seal functioning. If leakage of a pumped liquid is too extensive it is inevitable to put the pump out of operation and re-check wear rings of the stuffing box.
Further, it is inevitable to prevent running the pump "dry". Otherwise the mechanical seal overheating and destroying may happen (with the pump being provided by only one mechanical seal).
If a pumped liquid dripping or leakage out of the liquid closure appears it is necessary to put the pump out of operation and replace the radial lip seal ring - "gufero". Re-check of mechanical seal is to be carried-out if any pumped liquid is leaking into the effluent conduit of flushing water, or if flushing water outlet was changed during operation.

6.0 PUMP CLEANING AND DISINFECTION

It is carried namely due to hygienic purposes, it is very easy and simply. It is possible thanks to the pump set form conception offering ideal smooth surface. For cleaning and disinfection of pumps serving in food-stuff industry for pumping milk, dairy products and other products it is recommended to use cleaning and disinfecting solutions prepared in fresh water.

Pump cleaning

Pumps are to be cleaned daily with alkaline solutions or acid solutions, if need be, without need of the pump dismantling.

Pump surface

At first, remains of pumped stuffs shall be removed from the pump external surface by washing it with cold fresh water, as for extra fat products (e.g. cream) warm fresh water is to be used, for broken surfaces it is recommended to brush them using a warm cleaning solution of temperature 45°C destined for hand washing and flushing these pump parts that do not come into contact with a pumped liquid, then they can be wiped with wet cloth, or slightly oiled cloth, if necessary.

Pump interior

Remains of milk, dairy products and other products of the food-stuff industry shall be removed off the pump internal parts and the mechanical seal with the aid of washing them by cold or lukewarm water for 5 – 10 minutes, with drain to sewerage system.
Every day it should be cleaned by an alkaline solution. For cleaning a solution with content of 0.75 – 1.5% of alkaline cleaning agent circulating for 20 minutes at temperature 60 – 80°C with time of circulation about

20 minutes, is to be used while the time of circulation is to be calculated since reaching temperature 60°C at least.
Acid solution is used for the pump cleaning if there are sediments of hard water or milk stone by circulation of solution perhaps 0.5 – 1% of nitric acid (HNO_3) at temperature ranging from 50°C to 60°C for time of 20 minutes. Further, the pump is washed and flushed with drinking water for a period of 5 minutes, eventually it is neutralized by alkaline solution with subsequent flushing-out with drinking water.

Mechanical seal

Mechanical seal belongs to intricate and broken parts of this pump. Stuffing box is built-in in the place rather hardly accessible for cleaning solutions. The Producer recommends carry out overall cleaning and disinfection of the mechanical seal parts after 200 running hours, at the latest. For the stuffing box mechanical and manual cleaning it is recommended to use some tools needed for releasing and removing impurities, e.g. a brush with fine hair. It shall be cleaned by a cleaning solution de-

CAUTION stined for manual cleaning with temperature 45°C.

Both sealing surfaces of mechanical seal (carbon-steel) shall be protected from damaging (never put these parts on these surfaces, it shall be only wiped by soft moistened cloth or a buckskin).
After finishing cleaning and disinfection and before rebuilding into the pump it is necessary to wash the mechanical seal with warm (70°C) drinking water.

Pump disinfection

Pump shall be washed with hot drinking water for 10 minutes at least since reaching the maximum temperature of pasteurization, or some chlorine solutions may be used with content of free chlorine from 150 to 300 mg in a litre, for ten minutes, at least, at temperature of 25°C.

Efficiency of cleanup and disinfection

During the course of cleaning and disinfection it is necessary to recheck concentration and temperature of applied solutions both physical and chemical. Efficiency of cleanup and disinfection is assessed by using senses or microbiologically, according to corresponding standards in force.
When cleaning the pump by washing in a circuit it is necessary to ensure the right setting-up and shutting the cocks to prevent penetration of washing water, cleaning or disinfection solutions into milk or other products being pumped by the pump.

Recommended cleaning and disinfection solutions

a) Simple cleaning agents
- alkaline and neutral:
  sodium hydroxide, technical – with concentration from 0.5 to 1.5%
  soda ash, technical – with concentration from 0.2 to 0.3%
- acid:
  nitric acid, technical – with concentration from 0.3 to 0.5%.

b) Chlorine disinfection agents
Chloroamine B, technical
Sodium chloroamine, technical

Hygiene and safety at work during the pump sanitation

When working with chemical cleaning agents and detergents it is inevitable to observe all measures relating to protection of health at work given in Technical Standards and in Service Instructions for using these chemical agents and detergents. Sanitary facilities for employees and working places equipment shall conform to respective hygienic regulations!
In every manufacturing plant a sufficient number of specified protection devices and aids should be available!
Every employee is obliged to be familiar with regulations relating to hygiene and safety at work, toxicants and substances endangering health, as well as works with caustics.

Pump storage and protection

If it is not possible to install the pump immediately after delivery and putting into operation, or if the pump is taken out of operation for a longer time it must be protected from moisture, dust and accidental damage. Branches shall be sealed by plugs.
Temperature in storage spaces may not drop below +5 °C. In these storage spaces no sudden changes of temperature may happen, because they can produce moisture condensation on the pump surfaces. With long-term storage it is necessary to re-check the pump set condition every six months, at least.

7.0 PUMP DISMANTLING AND INSTALLATION

Hydraulic part dismantling

The hydraulic part dismantling can be carried out with removing the sleeve that connects the pump casing

with the spacer. After dismantling there is a perfect access to the impeller. Before dismantling the impeller it is possible to loose the impeller nut so that a gap of size about 1mm is created between the nut thrust face and the impeller. By tapping the nut it is possible to release the impeller from the extender taper. After loosening the impeller nut it is possible to remove the impeller.

Mechanical seal dismantling

At first, the mechanical seal rotating part shall be removed by hand, and then non-rotating parts can be taken out.

Electric motor rotor dismantling

- Dismantle the hydraulic part and the mechanical seal.
- Dismantle the electric motor guard hood and release the spacer by loosening nuts of the electric motor flange.
- Dismantle the pump shaft by loosening the clamping bolt and remove the shaft.
- Remove the air box cover and loose the bolts attaching the bearing housing (shield) to the stator frame. Unfasten the bearing cover on the opposite side and remove the entire rotor together with the bearing housing out of the stator.

Pump set assembly

Follow the reverse procedure outlined under disassembly. Give care to the mechanical seal to prevent damage sealing faces of friction rings.

- The seal can be used as internal one that is, from the side of a liquid being pumped.
- Surface of the shaft extender in the space of mechanical seal and the interstage plate in the space of the mechanical seal seat must be free of sharp edges and burrs. Before the seal mounting it is necessary to position the extender/lengthening piece according to the Figure and level it so that the extent of radial run-out would be 0.05 mm, at the most.
- No special tool is needed for this seal mounting. Protect both sealing friction areas of the mechanical seal. Observe all cleanliness requirements! Do not lubricate with oil or vaseline during assembly – you can only submerge it into water for a short time.
- Carbon seat with the collar shall be inserted into the interstage plate by hand. Complete rotating part of the seal shall be put on the shaft and pushed to the seat. Then the impeller is to be mounted and re-tightened by the nut.
- Re-check thoroughly right sense of the shaft rotation. If the shaft rotation is opposite, incorrect, the mechanical seal will not work and damage of the mechanical seal and the extender/lengthening piece can happen

CAUTION

All interventions into the pump set electrical part can be carried out by competent persons properly qualified in electrical engineering, and cognizant of requirements of CZ standards.

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

CAUSE OF PROBLEM	MEASURES
A - Pump is not supplying a pumped liquid.	
a) Suction pipeline and/or the pump were not primed thoroughly.	a) Stop the operation, prime and vent the pump and suction pipeline.
b) The impeller and/or the suction pipeline are clogged.	b) Clean the impeller and suction pipeline
c) Gate valve in the suction pipeline was damaged – it has failed in opening.	c) Repair the gate valve.
d) Suction head is too high either due to actual working conditions or due to rise of density of a pumped stuff in comparison of expected level.	d) Reduce suction head.
e) Delivery head is higher than the maximum pressure of the pump.	e) Delivery head must not exceed values given in the diagram.
f) Pump suction strainer has been clogged or the suction strainer valve has got stuck.	f) Clean the suction strainer.
B – Pump is supplying too little water	
a) Incorrect sense of rotation of the pump shaft.	a) Exchange any of two phases in mains supply.

b) Too low speed.	b) Re-check speed and remove fault in the electrical part.
c) Worn-out or deformed parts of the hydraulic part.	c) Replace damaged - defected parts.
d) Leaky suction line – air leakage by the pump.	d) Repack the suction pipeline.
e) Some of reasons given in the Paragraph A.	e) See the Paragraph A.
C – Pump is overloading the drive motor	
a) Liquid density is higher than expected.	a) If density cannot been reduced, it is necessary to reduce volume delivered.
b) Pump is working with too small delivery head – operating point has moved to the area of too big delivered volume.	b) Use the gate valve for throttling-down a bit.
c) Pipeline is crossing the pump either due its weight or due to stress.	c) Level the pipeline and anchor it thoroughly.
d) Impeller seizing.	d) Inspect and repair or replace it, in dependence of damage extent.
D – Pump is not rotating at starting-up	
a) Current interruption or another fault in the electrical equipment.	a) Re-check wiring.
b) Rotating parts have been seized or damaged howsoever.	b) Repair or replace damaged parts.
E – Liquid leakage (untightness of sleeve or delivery screw-coupling)	
a) Sleeve is not retightened sufficiently.	a) Retighten the sleeve using the tightening nut.
b) Damages of sealing.	b) Replace packing.
c) Sleeve nut of the screw-coupling on the delivery side has not been retightened sufficiently.	c) Retighten the nut.
d) Damaged rubber packing in the screw-connection.	d) Replace packing.
F – Liquid is dripping strongly or it is flowing from the mechanical seal	
a) Sealing faces of mechanical seal have been rubbed-out – they do not seal.	a) Dismantle the pump, lap the mechanical seal sealing faces or replace damaged parts.
b) Some impurities have penetrated between the mechanical seal sealing faces, or the mechanical seal has been damaged in other way.	b) Re-check mechanical seal, replace damaged parts.
c) Radial lip seal ring “gufero” has been damaged.	c) Replace the radial lip seal ring “gufero”.
G – Washing water cannot be drained from stuffing box chamber	
a) See – the reason of it is given in the Par. F.	a) See the Paragraph F.
H – Pump is running too noisy	
a) Seized-out or damaged bearings.	a) Replace bearings.

9.0 SPARE PARTS

When ordering spare parts it is recommended to give their name, number of their position in the assembly drawing, pump type and serial number being stamped on the electric motor guard hood.
For information purposes we give the specification of the pump main parts that are subjected to wear, considering the number of running hours (Table 2)

Serial number	Part Name	9,000 running hours		15,000 running hours	
		50-NPB-160 Mech.seal	50-NPB-150 50-NPB-180 65-NPB-160 Mech.seal + Gufero	50-NPB-160 Mech.seal	50-NPB-150 50-NPB-180 65-NPB-160 Mech.seal + Gufero
1	Mechanical seal	1	1	2	2
2	Ring DN 50, CSN 13 7791.4 – for 50-NPB	6	6	12	12
3	Ring DN 65, CSN 13 7791.4 – for 65-NPB	6	6	12	12
4	Ring 220x5, CSN 02 9281.9 – for 50-NPB	3	3	5	5
5	Ring 220x5, CSN 02 9281.9 – for 65-NPB	3	3	5	5
6	Radial lip seal ring “gufero 22x40x10”, CSN 02 9401 – for types provided with a liquid closure	-	1	-	2

10.0 WARRANTY

Time duration of the warranty is given in the certificate of warranty. The warranty does not cover defects and failures incurred due to wear and tear.
However, the producer does not answer for faults and damages caused by incorrect and unprofessional servicing, the pump set overload or due to non-observance or breach of instructions given in these Service and Assembly Instructions, or using this pump in running and operating conditions other than those for which it was destined and delivered.

11.0 DISPOSAL OF WASTE

Directions to disposal of waste being generated during life cycle of the pump (by course of § 18, Par. 3 of the Waste Act No. 125/1997 of the Code of Law, as amended).

Sort of waste	Code *)	Category*)	Method of disposal
Paper and/or cardboard packing	15 01 01	0	**Utilizable waste** – after sorting-out it is necessary to hand it over to an authorized person ensuring taking and purchase of waste or secondary raw materials
Paper and/or cardboard	20 01 01	0	
Cables	17 04 08	0	
Other scrapped/disabled equipment – pump metallic parts (without oil remains)	16 02 05	0	
Other scrapped/disabled parts – non-metallic elements of pumps (e.g. of carbon, carbide, ceramics, SIC)	16 02 05	0	**Other waste** – it is necessary to collect it and hand it over to an operator of a waste dump.
Other scrapped equipment – rubber elements of pumps	16 02 05	0	**Other waste** – it is necessary to collect and hand it over to disposal in an incineration plant
Wood packing	15 01 03	0	
Plastic packing – foil of PE	15 01 02	0	
Small plastic matters **)	20 01 03	0	
Non-chlorinated motor, gearbox oil and/or lubrication oil	13 02 02	N	**Hazardous waste** – it is necessary to collect and hand it over to disposal by an authorized person.
Other motor, gearbox and/or lubrication oils	13 02 03	N	
Other solvents and their mixtures with preservative products (except of organic-decomposable)	14 01 03	N	
Products of tar – smooth roofing paper	17 03 03	N	
Equipment containing free asbestos	16 02 04	N	It is not used in these days

*) See the Public Notice No. 337/1997 of the Code of Law, in which the Catalogue of Waste was published
0 – Other waste
N – Hazardous waste

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

Ecological disposal of this equipment is provided within the collective system "RETELA" in accordance with the requirements of the Waste Act No. 185/2001 of the Code of Law, as amended.
Collection spots of hazardous electro-waste are published on the Internet page: www.retela.cz.

(GREEN POINT)
Re-acceptance and re-usage of waste of packing is guaranteed within the scope of the collective system EKO-KOM by course of requirements of the Package Act No. 477/2001 of the Code of Law, as amended. Information on collection, selection and utilization of waste of packing are given at the internet site www.ekokom.cz.

EN ISO 9001:2000
Certifikáty č. 44 100 075006

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