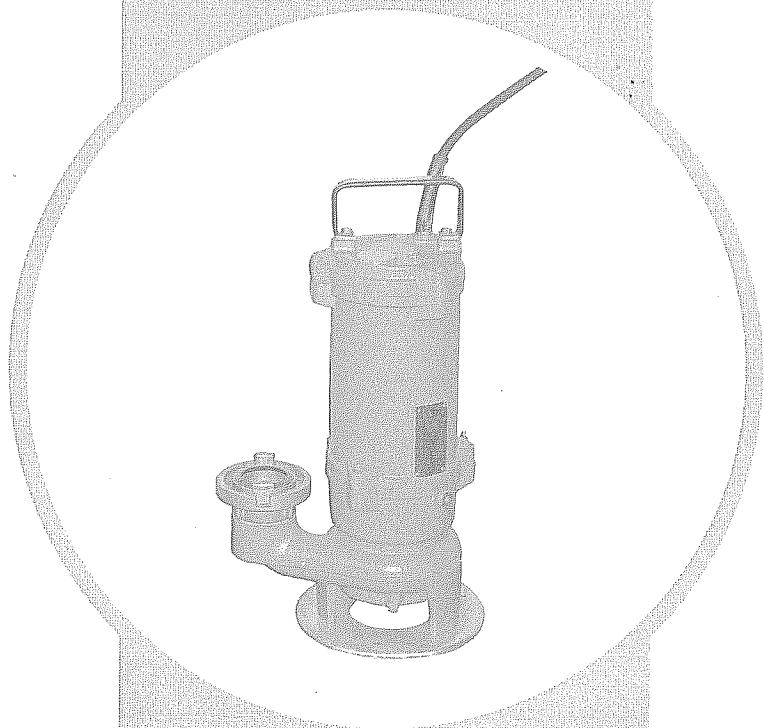


**OPERATING AND INSTALLATION
INSTRUCTIONS FOR SLUDGE PUMPS
AND MIXERS IN WET INSTALLATIONS,
SERIES**

**GF.U
M**





SIGMA 1868
spol. s r.o.

Original number of Declaration: 011/A-

EC DECLARATION OF CONFORMITY ES PROHLÁŠENÍ O SHODĚ

Producer/Výrobce:

SIGMA 1868 spol. s r.o.
ul. Jana Sigmunda 79, 783 50 Lutín, Czech Republic

Hereby declares that the machinery described below (assembly)
Tímto se prohlašuje, že popsané strojní zařízení (sestava):

Product/výrobek: Submersible sludge pump is intended for mixing waste water, raw sludge in sewer treatment plant etc./
Ponorné kalové michadlo určené k promíchávání odpadních vod, surových kalů v čistírně odpadních vod apod.

- GFAU
- M.

Complies with the provisions of the machinery directive (MD- 98/37/EEC, as amended) and the regulation transposing it into national law (government order no. 24/2003 Dig., as amended)/

Je v souladu s ustanovením směrnice pro strojní zařízení (98/37/EHS, ve znění pozdějších předpisů) s předpisy, které ji převádějí do vnitrostátních právních předpisů (nařízení vlády č. 24/2003 Sb., ve znění pozdějších předpisů).

Also complies with the provisions of the following European directives (into national law)/
Rovněž je v souladu s ustanovením těchto evropských směrnic (vnitrostátních právních předpisů):

LVD- 73/23/EEC, as amended (government order no. 17/2003 Dig., as amended)/
Směrnice 73/23/EHS, ve znění pozdějších předpisů (nařízení vlády č. 17/2003 Sb., ve znění pozdějších předpisů)

EMC- 89/336/EEC, as amended (government order no. 18/2003 Dig., as amended)/
Směrnice 89/336/EHS, ve znění pozdějších předpisů (nařízení vlády č. 18/2003 Sb., ve znění pozdějších předpisů)

Also complies with the provisions of the following harmonized technical standards/
Je v souladu s ustanovením těchto harmonizovaných technických norem:

Tech. standard/ Tech. norma	Date of issue Datum vydání	Tech. standard Tech. norma	Date of issue Datum vydání
ČSN EN 60 335-2-41, ed. 2	4/04	ČSN EN 60 335-1, ed. 2	5/03
ČSN EN 60 204-1	3/00	ČSN EN 61000-6-3	8/02
ČSN EN 61000-6-1	8/02	ČSN EN 13 386	12/98

Also complies with the provisions of the following technical standards/
Je v souladu s ustanovením těchto technických norem:

ČSN 33 1310 2/90


Place and date of issue:

Místo a datum vydání: Lutín, 2006-01-25

Name, function

Jméno, funkce

Pavel Majer
Manager Director
SIGMA 1868 spol. s r.o.


Signature/podpis



SIGMA 1868 spol. s r.o.
místo: Česká republika, Lutín,
ulice Jana Sigmunda č. 79,
PSČ 783 50

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1.0 GENERAL INFORMATION

1.1 Application

Pumps of series GFLU, GFEU, GFRU, GFSU, GFDU, GFZU and mixers M are destined for wet installations.



IT IS IMPOSSIBLE TO USE THESE PUMPS AND MIXERS IN EXPLOSION HAZARD ENVIRONMENTS!

Noisiness

Equivalent level of acoustic pressure A in the distance of 1 m from the unit surface (using the weighted filter A) does not exceed the value $L_{PA} = 70$ DBA.

Application of pumps GFLU

Pumps GFLU with two-vane scroll impeller are destined for pumping waste water and sludge with content of small fragmentary stuffs, without fibrous stuffs susceptible to winding-up, and so on.

Application of pumps GFEU

Pumps GFEU with single-vane scroll impeller are destined for pumping thick sludge, sewages, waste water, and so on.

Application of pumps GFRU

Pumps with vortex impeller are destined for pumping waste water, faeces, raw sludge, with content of soft piece short-fibrous stuffs, and with content of gases, and so on.

ATTENTION!

It is inevitable to operate the pump GFRU of a single-phase version with connected hose or mounted piping DN 50.

Application of pumps GFSU

Pumps with single-vane impeller are destined for pumping sludge, sewages, waste water with a content of solids of organic nature.

Application of pumps GFDU

Pumps with multi-vane open impeller are destined for pumping clean and slightly polluted water with a content of solids, and so on.

Application of pumps GFZU

Pumps with disintegrator (contra block system) and multi-vane open impeller are destined for pumping long-fibrous stuffs of organic nature, as grass, straw, tatters, liquids with leftovers (without fats), and so on.

Application of mixers M

Mixers with two-blade propeller are destined for stirring-up sludge and sewage in basins and sumps, for aeration of water in sumps, and for oxidation of water in treatment plants, and so on.

Some information on pumping liquid

Specific weight, max. 1050 kg.m⁻³

Max. temperature of a pumped liquid and ambience

..... 40 °C

Permissible scope of pH of a pumped liquid 6.5 – 9

1.2 Information on product

Supply cable

It is resistant to waste water containing hydrocarbons and oily liquids.

Electric motor running may be both continuous and intermittent. Numbers of switching per hour (distributed regularly) is given in the Technical Data Sheet. At continuous operation of the pump and/or mixer it is necessary to keep the pump specified submersion level in a pumped liquid due to the electric motor cooling – see Fig. 1. Provided the pumps and/or mixers are hung on a lowering gear, the minimal level shall be such that the pump (mixer) casing cylindrical part is submerged completely.

At a sump final pumping the pump may work for a short term (about 10 minutes) with its motor part being emerged fully. Pumps may work in horizontal and inclined positions (when keeping conditions of minimal submersion, see Fig. 1). To ensure the level automatic monitoring (H_{min} to H_{max}), the pumps in their single- and three-phase versions may be provided with a float device.

ATTENTION!

Pumps of the three-phase version with a float device shall work only in vertical position (permitted axis deviation is 30°). Pump running dry, without flooding the hydraulic space with a pumped liquid for a longer time than necessary (e.g. to estimate the direction of rotation, or reading values on measuring devices) is inadmissible – there is a real danger of mechanical seal damage.

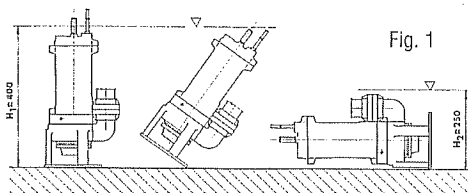


Fig. 1

Maximal submersion of the pump or mixer is 10 m.

H_1 ... pump min. submersion in its vertical position (except the mixer M)

H_2 ... min. submersion of mixers M and pumps in horizontal position

1.3 Scope of deliveries and the summary of available electrical equipment for protection

1.3.1 Scope of standard delivery of pumps

Standard version (stationary connection):

- a) Pumps in workmanship for a hose:
- Single-phase version with a float (without a circuit-breaker, without a plug)
 - Three-phase version without a float (without a circuit-breaker, without a plug)

Scope of delivery for pumps in workmanship for a hose:

- Complete pump with 10 m of a supply cable, with the single-phase version including a float switch,
- Fast coupling C 52 for a hose connection (it is not available with the pumps 40-GFDU and 40-GFZU with their discharge being ended with the internal thread G 1 1/4")
- Barrel spanner, size 10 (with the pumps GFZU the hexagon socket key 5)
- Package

b) Pumps in workmanship (SZ) for a lowering gear

- Single-phase version with a float (without a circuit-breaker, without a plug)
- Three-phase version without a float (without a circuit-breaker, without a plug)

Scope of delivery for pumps in version (SZ) for a lowering gear:

- Complete pump in its flanged version, with 10 m of a supply cable, and with the single-phase version including a float switch
- Barrel spanner, size 10 (with the pumps GFZU – the hexagon socket key 5)
- Package

c) Accessories for a lowering gear (SZ)

with the pumps GFLU, GFDU, GFRU, GFSU, GFZU they include:

- a frame, bend (G2"), suspension, bracket, guide gib and two screws for the guide gib (a guide pipe is not a part of delivery)

d) Hose for pumps in their workmanship for a hose (it is possible to supply it only with the pumps 50-GFLU, 50-GFEU, 50-GFSU and 50-GFZU) consists of 10 m of a hose (the fire hose C) with two laminated quick couplers C 52.

Workmanship on a special request

- Three-phase version with a float – the delivery scope is the same as with the standard version + connected float switch

- Three-phase with a float, with a circuit-breaker and a plug (a portable version) – scope of delivery is the very same as with the standard workmanship + connected float switch, motor circuit breaker and a plug
- Single-phase, without a circuit breaker and a plug – scope of delivery is the very same as with the standard workmanship, but without a float switch.

1.3.2 Scope of standard delivery of mixers

Standard workmanship

a) Three-phase mixer without a float, without a circuit breaker and a plug.

Scope of delivery of mixers:

- Complete mixer with 10 m of a supply hose
- Mixer holder (mounted-on)
- Barrel spanner, size 10
- Package

b) Mixer in workmanship a) + lowering gear

- lowering gear of the mixer contains: two bolts M8x25, one nut M8, arm, step thrust bearing, locking segment, upper bracket, stud bolt (safety pin), hook, chain, cable holder, guide bar (lower), guide bar (upper).

1.3.3 Scope of delivery on request – by agreement

By agreement with the manufacturer it is possible to deliver this equipment also in other versions than mentioned in this document. The scope of delivery shall be given in the delivery note. Variances other than given in these instructions shall be solved individually.

1.3.4 Summary of proper electric protection devices

A) With three-phase pumps 50-GFEU, 50-GFSU for voltages 400 V, 415 V it is possible to use the following types of protection:

- a) Circuit-breaker SM1-2.5 with adjustable current range $1.6 \div 2.5$ A, with the box SI-SM1 and protection IP41 (for internal spaces), or with the box SI1-SM1-M and protection IP55 (for external spaces) of the Company OZ Letohrad being provided by two entry bushes, e.g. of the HSK-K Pg 16 type (for sealing the conductor of diameters 7-12 mm); of the Company Hummel being represented in the Czech Republic by the Company Jork s.r.o.
- b) Circuit-breaker ESM1-2.5 with adjustable current range $1.6 \div 2.5$ A, with the box GE1 in protection IP55 (for external spaces) of the Company ESG Görlitz (exported from Germany) being provided with two entry bushes, e.g. of the HSK-K Pg 16 (for sealing the conductor of diameters 7-12 mm) of the Company Hummel being represented in the Czech Republic by the Company Jork s.r.o.

c) Circuit-breaker 80202 206 with adjustable current range $1.6 \div 2.5$ A, with the four-pin plug 3P+E, or the five-pin plug 3P+E+N of the Company NOLTA (exported from Germany). This circuit-breaker is offered with protection IP44 (for external workmanship).

B) For three-phase pumps 50-GFLU, 50-GFRU, 40-GFDU, 40-GFZU and mixers M for voltages of 400 V, 415 V; for protection it is possible to use e.g. the following types:

- Circuit-breaker of the SM1-4.0 type, with adjustable current range $2.5 \div 4.0$ A and in another workmanship according to the Aa).

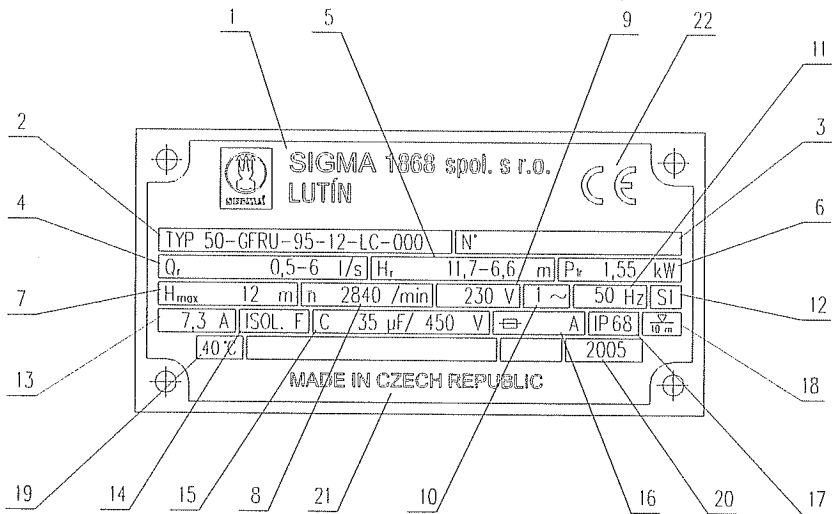
- Circuit-breaker of the ESM1-4.0 type, with adjustable current range $2.5 \div 4.0$ A and in another workmanship according to the Ab).

- Circuit-breaker of the 80204 207 type, with adjustable current range $2.5 \div 4.0$ A and in another workmanship according to the Ac).

Circuit-breakers from the Company Nolta can be namely used for pumps, where easy mobility is required primarily.

For pumps being delivered in three-phase workmanships, with a float, with a circuit-breaker and a plug, it is necessary to use circuit-breakers produced by the Company Nolta with the five-pole plug 3P+E+N and the circuit-breakers SM1 with zero terminal, and a box with cable entries of the HSK-K Pg16 type (for sealing the conductor of diameters $10 \div 14$ mm).

1.4. Pump data plate



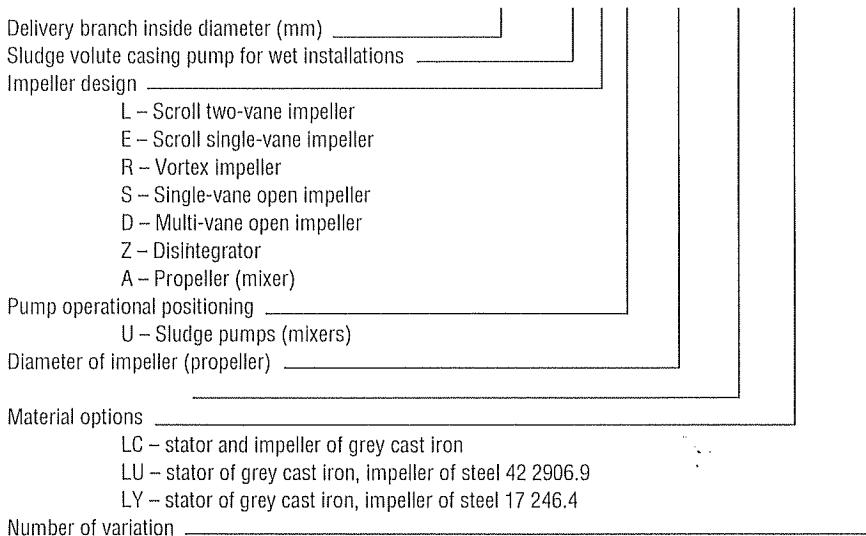
- 1 Manufacturer's trade name and place of business
- 2 Type designation
- 3 Serial number
- 4 Rate of flow
- 5 Delivery head
- 6 Pump set power input
- 7 Max. delivery head
- 8 Speed
- 9 Rated voltage
- 10 Number of phases, current type
- 11 Rated frequency

- 12 Type of loading
- 13 Rated current
- 14 Class of insulation
- 15 Capacity and voltage of condenser (only with single-phase pumps)
- 16 Nominal value of upstream fuse
- 17 Motor protection
- 18 Maximum working depth
- 19 Maximum temperature of liquid
- 20 Year of production
- 21 Country of origin
- 22 Mark of conformity

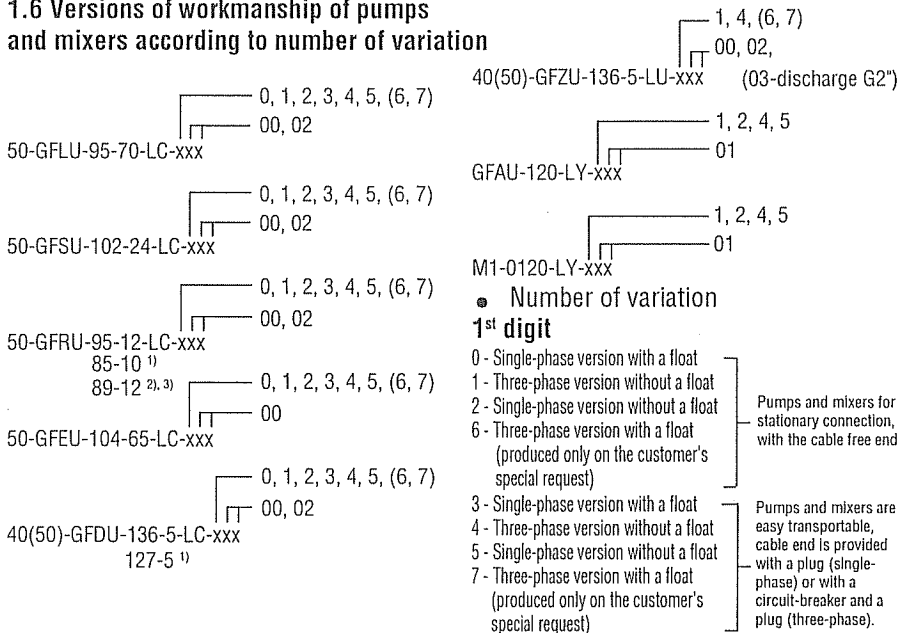
1.5 Designation of pump (mixer)

Example of pump model key

50 - G F R U - 95 - 70 - LC - XXX



1.6 Versions of workmanship of pumps and mixers according to number of variation



2 nd and 3 rd digits		00	01	02	03
Delivery branch	axial threaded	X			X
	radial flanged			X	
Material of mechanical seal rings	SiC/Al ₂ O ₃	X	X	X	X
Mixing equipment			X		

NOTE

- 1) Trimmed impeller for 110 V / 50 Hz
- 2) Trimmed impeller for 115 V / 60 Hz
- 3) Trimmed impeller for 3x230 V / 60 Hz

6.7 List of service centres

List of service centres is usually a part of the Certificate of Warranty. However, it may be also enclosed to the accompanying technical documentation.

6.8 Technical data sheet

Technical data sheet is an integral part of these Operating Instructions. It is specified for the real size and workmanship.

2.0 SAFETY

These Operating Instructions contain basic instructions which 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. And further, not only the above mentioned general safety rules as given in this Clause, but all specific rules listed under other Clauses should be observed, too. Safety rules included in these Operating 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 functioning, shall be provided with the advice

ATTENTION!

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



2.1 Safety within maintenance and operation

ATTENTION!

- Only an employee being qualified sufficiently in electrical engineering may handle electric devices.
- When dismantling, the pump shall be clean thoroughly, without any remains of a pumped liquid.
- Provided some chemically polluted liquids shall be pumped, it is necessary to neutralize them before handling.
- Thorough personal hygiene shall be kept (hazard of infection).



- At any manipulation with the pump (handling, impeller turning, dismantling) it is necessary to disconnect it from mains and prevent its connection across the line by mistake.

In case of the pump motor overloading the pump is disconnected from mains by the motor circuit-breaker (three-phase version) or by means of an internal thermal protection (single-phase version).



In the single-phase version the thermal protection is built in a motor winding, and the pump motor is switched on again after its cooling-down. So, it is inevitable to make sure before any handling, whether the pump has been disconnected from mains.

3.0 TRANSPORTATION AND STORAGE

Pump may be transported only in its horizontal position. During transportation the pump shall be locked to prevent its undesirable movement.

This pump may be only carried out with the aid of its handle with plastic coating.



It is not permitted to subject the cable to excessive axial tension, pressure, abrasive wear, and so on, or another mechanical stress (Fig. 8).

This pump shall be stored in a dry space with temperatures ranging from -30 °C to +40 °C. It is possible to store this pump in both horizontal and vertical positions.

ATTENTION!

Before storage this pump shall be clean and dry.

4.0 DESCRIPTION OF PUMP (MIXER) AND ITS ACCESSORIES

4.1 Section through pump (in the Figure below there is the GFLU pump as an example)

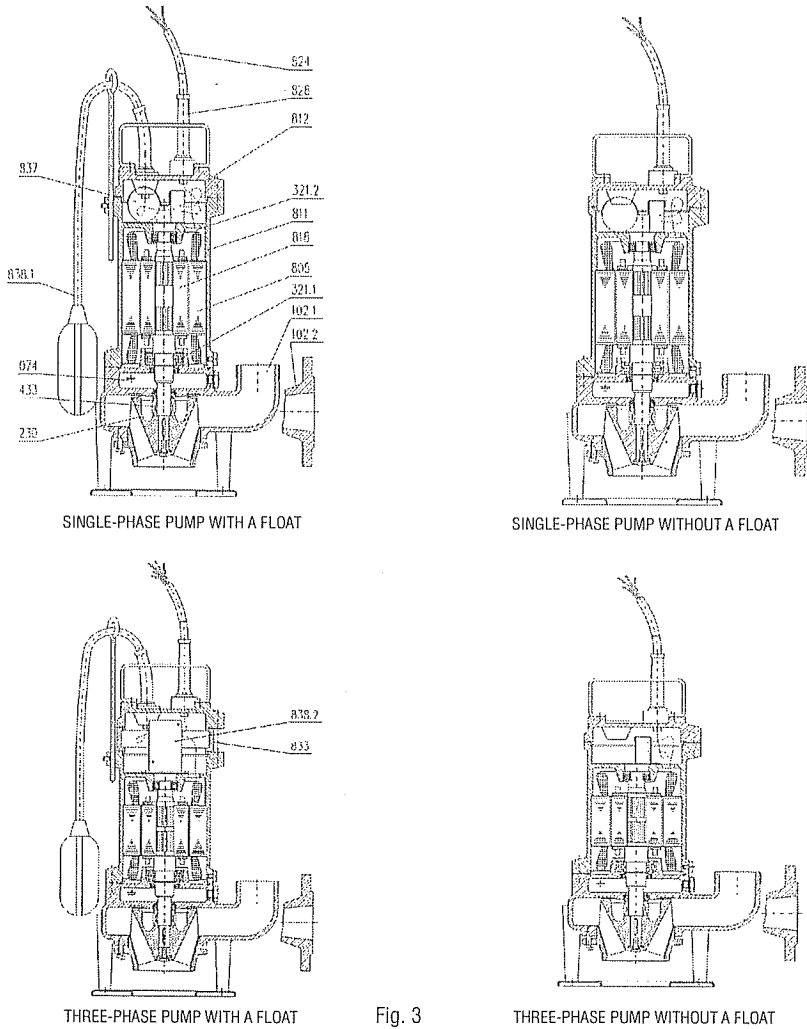


Fig. 3

- 074 - Oil cartridge (friendly to environment)
- 102.1 - Volute casing (hose or piping)
- 102.2 - Volute casing (for lowering gear)
- 230 - Impeller
- 321.1 - Lower bearing
- 321.2 - Upper bearing
- 433 - Mechanical seal
- 805 - Stator
- 811 - Stator body

- 812 - Cover
- 818 - Rotor
- 824 - Cable sheath
- 833 - Adapter (only three-phase version, with a float)
- 837 - Condenser (only single-phase version)
- 838.1 - Float switch
- 838.2 - Contactor (only three-phase version, with a float)

4.2 In general

Single types of pumps have got either single-phase or three-phase motor unit and they differ only in their hydraulic unit. Single models of pumps are sold only as a set and they may be delivered in their basic workmanship, that is, the discharge for a hose or with a flange (SZ version). Pumps are of centrifugal, vertical, submersible, single stage in close coupled arrangement with an electric motor.

Hydraulic part consists of the impeller (230) being placed on the elongated shaft of the pump electric motor rotor (818) with the aid of a key and a bolt of the impeller with a thrust washer. Volute casing (102), stator body (811) and the terminal board box cover (812) are put together with the aid of bolts. Rotor of the electric motor and the pump is supported on rolling-contact bearings (321) with a grease cartridge in the pump casing and the stator body.

Spaces of the electric motor and the terminal board box is separated watertight from the external space and the hydraulic space by special high-performance locks – the rotor shaft by the mechanical seal (433) and a radial lip seal, outlets of a cable and float by the cable sheath (828) and by other elements, stator body by o-rings.

Single-phase and three-phase workmanships may be delivered with the float device (838) for fluid level monitoring.

Motor

Single-phase workmanship

Single-phase asynchronous squirrel-cage motor, 230 V, 50 Hz. Electric motor starting and running is provided by a condenser located right in the pump. Thermal insulation of winding is of the Class F. Thermal protection is built in the winding.

Three-phase workmanship

Three-phase asynchronous squirrel-cage motor, 400 V, 50 Hz.

Lubrication



Mechanical seal

For mechanical seal lubrication and cooling when running-in (or short-time running dry) between the pump hydraulic part and the motor part there is an oil pan with oil friendly to environment (information about quality and amount can be found in the Technical Data Sheets NO 00 034.01 to 06). This workmanship also allows easy check-up of the mechanical seal tightness (water in oil).

After the pump running-in its mechanical seal is lubricated and cooled namely by a pumped liquid.

Bearings

Ball bearings guarantee max. service life, and they are lubricated by the grease cartridge PM-LV2-3 TR 22-257-85.

ATTENTION!

It is necessary to replace the upper bearing not later than after 20,000 operating hours.

Re-lubrication of the lower bearing shall be carried out after 10,000 operating hours (during major overhaul) and they must be replaced not later than after 20,000 operating hours.

Radial lip seal

It is lubricated by grease cartridge of the bearing PM-LV2-3 TP 22-257-85 (or by an oil cartridge from the outside).

Volute casing

Standard workmanship is available with axial delivery branch (parallel to the pump axis), with the external thread G 2" (GFRU, GFLU, GFEU, GFSU), or the internal thread G 1 1/4" (GFDU, GFZU). Workmanship with a lowering gear is provided with the radial branch (perpendicular to the pump axis), with the flange DN 50.

4.3 Material options

Pump main parts, that is, the volute casing, stator body, terminal board box cover, impeller (except the workmanship Z and mixers) are of grey cast iron 42 2415.3. Shafts are of stainless steel of the Class 17. Connection accessories are of stainless steel.

5.0 INSTALLATION

5.1 Pump preparation before starting-up



ATTENTION!

- Re-check visually condition of the supply cable to the pump (and to a float), whether it has not been damaged during transportation or handling.
- Find out even before turning the rotor by hand and a wrench (or with the aid of a propeller, when turning the mixer), whether the pump (mixer) has been disconnected from mains! There is a hazard of injury even by a tool ejected due to accidental starting-up!
- Turn the rotor with the aid of a wrench "to the right" – Fig. 4 (after "detachment" the rotor cannot rotate tightly).

5.2 Connection across the line



Overload protection of the single-phase pump is realized by self-acting thermal fuses in the electric motor winding, and it is not necessary to protect it by another circuit-breaker. Short-circuit protection of the pump is realized by preliminary fuses of maximum values according to the table in the Technical Data Sheet. Overload protection of the three-phase pump motor shall be realized by an over-current circuit-breaker with a motor characteristic or a motor starting gear set for a

value of breaking current (according to the table in the Technical Data Sheet). Short-circuit protection of the pump is realized by preliminary fuses of maximum values according to the table in the Technical Data Sheet in such a case that there is a protection device protecting the electric motor solely against overloading.

In such a case that the pump mains supply has not been provided by a plug and the pump shall be connected to a fixed distribution system, it will be necessary to install a device for the pump disconnection from mains in this distribution system with distance of open contacts being 3 mm, at least.



Only an employee being qualified sufficiently in

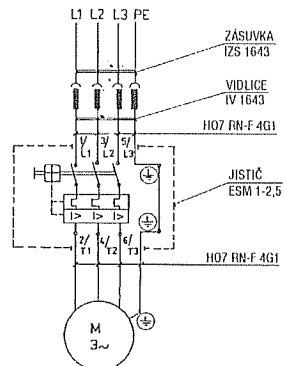
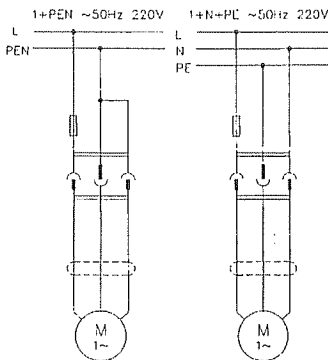
electrical engineering - according to the project requests - may install and handle electric devices.

After assembly finishing it is necessary to re-check the whole electric equipment, namely:

- Insure protection against danger contact voltage
- Setting-up over-current protection according to the pump set rating plate values
- Insulation resistance that shall be greater than 20 MΩ (in cold condition).

Re-check, whether the pump rating plate values correspond to the electric power supply (voltage, frequency). By means of correspondent cable end connector (plug, plug-in socket circuit-breaker) or a switch it is possible to connect the pump across the line.

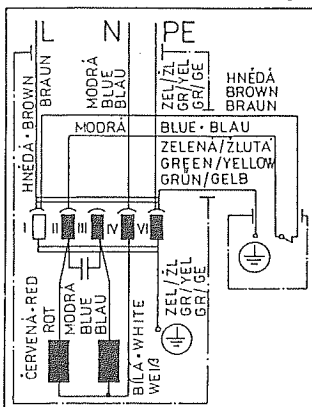
Pump connection across the line



Note: Circuit-breaker ESM1 has also a short circuit protection

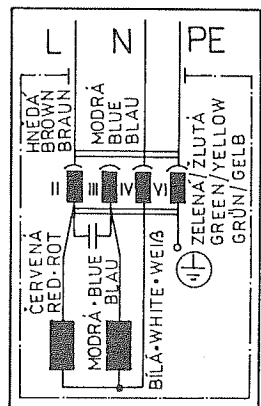


Wiring diagram of single-phase pump internal connection



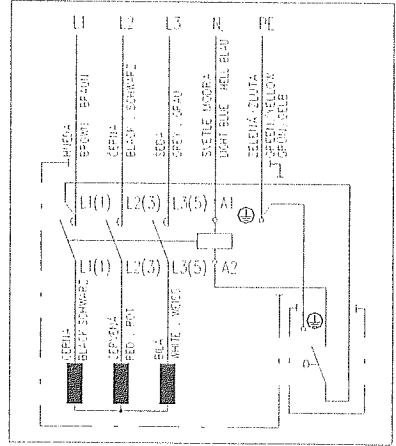
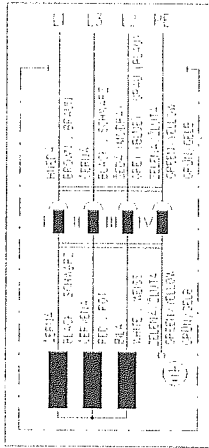
a) with a float

Connection of conductors of mains supply:
 Brown (black) cable core - phase conductor L
 Light-blue cable core - central conductor N
 Green/yellow cable core - guard conductor PE



b) without a float

Wiring diagram of three-phase pump (mixer) internal connection



Connection of conductors of mains supply:

a) without a float

brown cable core – phase L1
black cable core – phase L2
grey (light-blue) cable core – phase L3
green/yellow – guard conductor (PE)

b) with a float (only pumps)

brown cable core – phase L1
black cable core – phase L2
grey (black) cable core – phase L3
light-blue – conductor N
green/yellow – guard conductor (PE)

With the single-phase workmanship:
Switch on for a short time – re-check, whether the rotor is "free".

With the three-phase workmanship:

ATTENTION!

Re-check correct sense of rotation by short switching-on dry – either visually or the pump response at switching-on (pump twitching in the opposite direction of rotation, see Fig. 5).

5.3 Putting the pump to its working position

Pump can work (when keeping min. submersion level):

- being hung (on a rope or a chain, Fig. 7)
- placed on a hard support plate
- placed freely in various positions (except three-phase version with a float)
- pump with a lowering gear fixed on a suspension – locked in a frame

Pump discharge consists of:

- fixed piping
- a hose

ATTENTION!

When lowering the pump into an excavation pit, a sump and at any manipulation it is not permitted to pull the cable!

5.4 Putting the mixer to its working position

Mixer can work (when keeping min. submersion level) attached to the lowering gear.

6.0 PUTTING INTO OPERATION AND PUTTING OUT OF OPERATION

6.1 Putting the pump into operation

After putting the pump to its working position and connection of discharge it is possible to realize its starting-up by plugging the plug into a socket, and besides it, with the three-phase pump pressing down the starting push button I of the circuit-breaker, and further placing the pump float to the switching position after submerging the pump to the proper and specified depth – see Fig. 6 – provided it is a part of its accessories.

6.2 Putting the mixer into operation

After putting the mixer to its working position on the lowering gear it is possible to start it up by the circuit-breaker switching-on.

6.3 Putting out of operation

Single-phase pump – by pushing the plug out of the socket or switching-off the device for disconnection from mains.

Three-phase pump (mixer) – by pressing the switching-off push button 0 of the circuit breaker or pushing the plug out of the socket.

After putting the pump out of operation for a longer time it is necessary to lift the pump out of a pumped

liquid and wash and rinse it with clean water. Neither the pump, nor the mixer may be left in water in freezing temperatures, when they are not running.

ATTENTION!

For de-freezing ice residues it is necessary to immerse the pump in water (before its putting into operation). It is not allowed to use a flame for its de-freezing.



Fig. 4

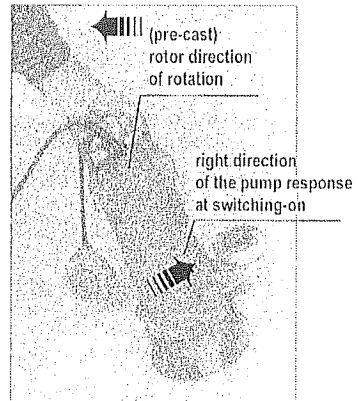


Fig. 5

Turn only with the pump disconnected from the mains!

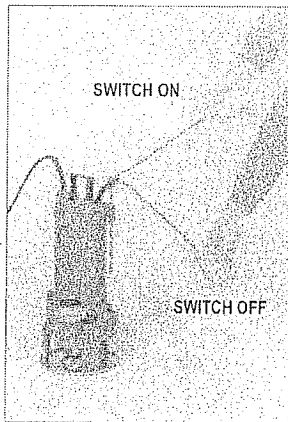


Fig. 6

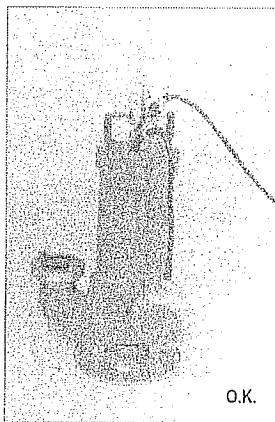


Fig. 7

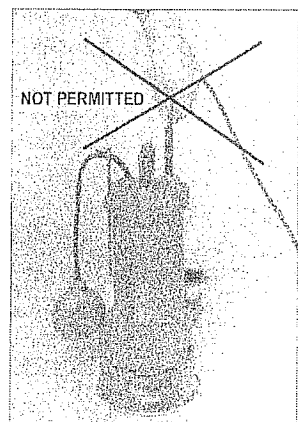


Fig. 8

7.0 ATTENDANCE AND MAINTENANCE

After 200 operating hours it is recommended to re-check:
- Oil cartridge, using a filling plug in the pump casing. Provided there is water or a strong emulsion of water and oil, find out the cause and replace the cartridge – Fig. 9 (it should be carried out by the authorized service centre).

- Motor compartment, using a checking plug in the motor body. Drain off water, if there is any, dry the motor compartment – Fig. 10 (find out the cause, or remedy – it should be carried out by the authorized service centre).

After 2 000 hours of standard operation it is recommended to carry out inspection of expendable parts and elements (Impeller, cover...) and inspection of the oil cartridge (volume and presence of water).

Once a year it is necessary to realize replacement of oil.

After 10 000 operating hours it is necessary to carry out the pump major overhaul in a specialized special centre.

After every dismantling or replacement of wear rings and after 20 hours of operation, re-inspect oil cartridge.

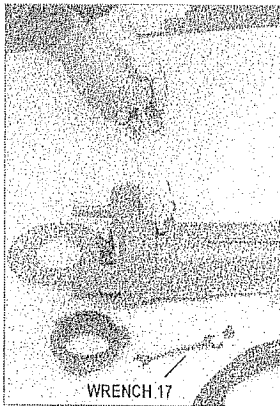


Fig. 9

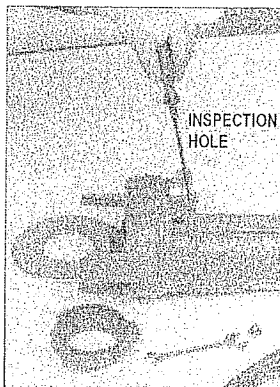


Fig. 10

Adjusting clearance of impeller

With pumps GFLU, GFSU, GFEU, GFDU, GFZU it is necessary to adjust clearance of the impeller after their longer operation in hard and severe working conditions.

Adjusting clearance (0.2 – 0.4) between vanes of the impeller and the suction cover shall be carried out with the aid of forcing-off screws. Suction cover shall be attached to the impeller by re-tightening them up to the stop, using 3 connection screws. Specified clearance shall be obtained by loosening the connection bolts within clearance length and re-tightening 3 forcing-off screws up to the stop. Rotor free running shall be re-checked by it turning for several times – Fig. 11. Clearance may be also re-checked up and set correctly with the aid of feeler gauges.



Fig. 11

Impeller replacement

With pumps GFLU, GFEU and mixers M it is recommended to replace the whole dynamically balanced rotor together with the impeller – it shall be realized by the special department or by the authorized repair centre.

GFRU, GFSU, GFDU: dismantle the pump bottom, loosen 3 connection bolts of the suction cover and take the impeller out after loosening the impeller screw – see Fig. 12.

GFZU: dismantle suction part (3 screws), dismantle the screw of cutting tool, remove the impeller together with the cutting tool.

Follow the procedure outlined under disassembly. (Replacement of mechanical seal is carried out by the authorized service centre, in consideration of its seriousness and weightiness.

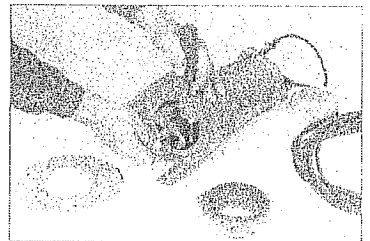


Fig. 12

Every further repair shall be carried out by the manufacturer's special department or the authorized service centre, considering their seriousness and weightiness.

8.0 PACKAGE

Pumps are packaged separately (see the Technical Data Sheet) together with the Certificate of Warranty, Operating Instructions and the Technical Data Sheet for the given pump type).

9.0 WARRANTY

Time duration of the warranty is given in the Certificate of Warranty. The manufacturer does not answer for damages caused by wrong or

unprofessional and incompetent attendance, wilful overloading the machine or by other accidental cause owing to breach of directions given in the Operating and Installation Instructions. During the warranty period the pump dismantling may be carried out solely by the manufacturer or by the authorized service centre with the agreement of the manufacturer.

10.0 SERVICE

List of service stations is a part of the Certificate of Warranty.



11.0 FAULTS, THEIR CAUSES AND FAULT CLEARANCE

Repairs of mains supply and repairs associated with the inlet into the terminal guard box space shall be carried out solely by the manufacturer or the authorized service centre.

These notes have been prepared to help you prevent problems with the pump output and delivery as well as deal with them.

FAULT	CAUSE	FAULT CLEARANCE
1. Pump is not starting-up and its motor is not working as well.	1.1 Dead electrical power network.	1.1 Fault shall be cleared by the employee sufficiently qualified in electrical engineering.
	1.2 Interrupted supply to the pump (broken cable, pump terminal board).	1.2 Fault shall be cleared by the authorized service centre.
	1.3 Float switch failure.	1.3 Fault shall be cleared by the authorized service centre.
	1.4 Thermal switches in the motor winding are switched off – single-phase version.	1.4 Cool the pump down and ensure operation at the right submerged length (see "APPLICATION").
2. Pump is not starting-up and its motor is "buzzing".	2.1 Defective condenser with the single-phase version, interrupted supply to some of phases.	2.1 Fault shall be cleared by the authorized service centre.
	2.2 Locked impeller by matters penetrated between the impeller and the volute casing.	2.2 Remove foreign matters. Pump shall be disconnected from the mains!
	2.3 Locked rotor stuck to sealing surfaces and joints. (It may happen with the single-phase pump version after its longer outage time).	2.3. Turn the impeller for several times (Fig. 4). Pump shall be disconnected from the mains!
	2.4 A fuse rupture or one phase interruption with the three-phase pump version.	2.4 Fault shall be cleared by the employee sufficiently qualified in electrical engineering.
3. Pump is starting-up, but its output/delivery is low, and its running is sometimes noisy.	3.1 Motor's reverse sense of rotation (with the three-phase version).	3.1 Realize interchange of two conductors in mains supply by the employee sufficiently qualified in electrical engineering.
	3.2 Clogged discharge hose (delivery piping) or the suction part.	3.2 Clean up.

- | | | |
|---|--|--|
| 4. Ruptures of fuses or the circuit-breaker releasing. | 4.1 Short circuit in supply, great drop of voltage in mains, motor overloading or a defect in the motor winding. | 4.1 Fault shall be cleared by the employee sufficiently qualified in electrical engineering. |
| 5. Water in the terminal board box space or in the motor winding (insulation state 0). | 5.1 Some of sealing elements have been damaged (radial lip seal, mechanical seal, o-ring, and so on). | 5.1 Fault shall be cleared by the authorized service centre. |
| 6. Damaged mains supply (cable). | 6.1 Instructions to handling of supply mains have not been observed. | 6.1 ATTENTION! Replacement of mains supply shall be realized by the manufacturer or an authorized organization, using a special tool. |
| 7. Pump is starting-up and stopping of its own accord. | 7.1 Pump is working out of its working zone, electric motor has been overloaded.

7.2 Pump hydraulic space is "clogged" or the rotor is "braked" owing to fibrous materials or solids.
7.3 A pumped liquid has got too great specific weight (density). | 7.1 It is necessary to increase resistance on the discharge side (pump only with connected hose of the length 10 m).
7.2 Clean the hydraulic space.
7.3 Dilute a pumped mixture to permitted values or modify performance parameters of pumps (reduce delivered amount) – reduction of electric motor power input. |
| 8. Parameters of the pumps 50-GF (L, S, D, E, Z) U have reduced. | 8.1 Impeller vane has been worn out. | 8.1 Adjust clearance between the impeller and the suction cover (Fig. 11). |
| 9. Water in oil. | 9.1 Damage of some of sealing elements of mechanical seal. | 9.1 Fault shall be cleared by the authorized service centre. |
| 10. Pump (with a lowering gear) is running, but it is only curling water and cannot obtain required parameters. | 10.1 The pump was not embedded into the frame properly. | 10.1 Turn the pump around the guide/interposer bar (with the aid of a lowering rope) until it is installed in its right position (the pump may be moved by 0.3 m down). |
| 11. Mixer is not able to start-up (level of a mixed liquid in places of the mixer installation is not moving). | 11.1 Mixer propeller is locked (long grasses, branches, algae, and so on). | 11.1 Lift the mixer (with the aid of a lifting gear) above the level and clean the propeller space. |

12.0 LIST OF SIZES AND TECHNICAL DATA SHEETS

Provided the pump and the mixer types are not specified in the text of single chapters, it means, that wording of the chapter is related to both pumps and mixers.

Size	Technical data sheet
50 - GFLU	NO 00 034.01
50 - GFU	NO 00 034.02
50 - GFRU	NO 00 034.03
50 - GFSU	NO 00 034.04
40/50-GFDU	NO 00 034.05
40/50-GFZU	NO 00 034.06
Lowering gear for pumps 50-GF.U	NO 00 034.08
M1-0120 with lowering gear	NO 00 034.09

13.0 LIST OF SPARE PARTS

Pos.	Pcs	Name of part	GFLU	GFRU	GFEU	GFSU	GFDU	GFZU	GFAU	MI-0120
230	1	Impeller	V 733 121	V 736 837	V 734 668	V 734 176	V 736 849	V 737 057	V 734 965	V 742 729
162	1	Suction part	V 733 024	-	V 734 673	-	V 809 950	-	-	
162	1	Volute cover	-	V 734 468	-	-	-	-	-	
018	1	Annulus	-	-	-	-	-	-	V 589 470	V 589 470
011	1	Tool	-	-	-	-	-	V 583 645	-	
010	1	Cutting ring	-	-	-	-	-	V 736 099	-	
162.2	1	Flanged suction cover	-	-	-	-	-	V 811 618	-	
162.1	1	Threaded suction cover	-	-	-	-	-	V 810 994	-	
162	1	Suction cover	-	-	-	V 734 371	-	-	-	
433	1	Mechanical seal	BURGMANN MG1/18 rotor part							
475	1	Seat "D"	AL ₂ O ₃							
412.4	1	Ring	26,57x3,53 NBR							
550	1	Impeller bottom plate	V 119 466		-	V 119 466		-	V 119 466	V 119 466
940	1	Key CSN 02 2562	5x5x25	4x4x14	5x5x25	4x4x14		5x5x25	5x5x25	
901.2	1	Bolt CSN 02 1103.9	M6x30	M6x20	M6x60	M6x20	M6x20	-	M6x50	M6x50
900.4	1	Bolt CSN 02 1131.9	-	-	-	-	-	M6x30	-	
562.2	1	Pin 5x8	-	-	-	-	-	V 120 833	-	
562.1	1	Pin CSN 02 1150.1	-	-	-	-	-	5x12	-	
901.3	3	Bolt CSN 02 1103.2	M6x16	M6x16	M6x16	M6x25	-	-	-	
901.4	3	Bolt CSN 02 1103.2	M6x16	-	M6x16	M6x20	-	-	-	
908	3	Bolt CSN 02 1115.2	-	-	-	-	M8x15		-	
901.3	3	Bolt CSN 02 1103.2	-	-	-	-	M8x20		-	
901.1	3	Bolt CSN 02 1101.5	-	-	-	-	-	-	M8x55	
420	1	Radial lip seal CSN 02 9401.0	25x40x7							
932.1	3	Washer CSN 02 1740	6			-				
932.4	3	Washer CSN 02 1740	-			8				
412.3	1	Ring CSN 02 9281.2	110x3							
412.1	1	Ring CSN 02 9280.9	12x8							
411	1	Ring	12x8x1							
412.2	1	Ring CSN 02 9281.9	110x3							
412.5	1	Ring CSN 02 9181.2	-	-	-	-	-	140x3	-	

14.0 DISPOSAL OF WASTE



Directions to disposal of waste generating during life cycle of the pump / pump set (by course of § 18, Par. 3 of the Law No. 125/1997 of the Code of Law, of wastes).

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 purchase and taking waste or secondary raw materials.
Paper and/or cardboard	20 01 01	0	
Cables	17 04 08	0	
Other scrapped/disabled materials – 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 materials – rubber elements of pumps	16 02 05	0	Other waste – it is necessary to collect and hand it over to disposal in a waste dump.
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 oil	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	
Materials containing unfixed asbestos	16 02 04	N	It is not used at present time

*) 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 guaranteed within the scope of the collective system RETELA, by course of requirements of the Law No. 185/2001 of the Code of Law, of waste, as amended. Collection spots of electro-waste are disclosed at the internet site www.retela.cz.



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 Law No. 477/2001 of the Code of Law, of packages, as amended. Information on collection, selection a utilization of waste of packing are given at the internet site www.ekokom.cz.

We reserve the right to alter specifications and illustrations without prior notice.



EN ISO 9001:2000
Certifikáty č. 44 100 075006

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