



# **SIGMA GROUP a. s.**

## **INDUSTRIAL PUMP DIVISION**



**SUBMERSIBLE SEWAGE  
PUMPS**

**GFHU**

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**INDUSTRIAL PUMP DIVISION**

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## Application

Submersible sewage pumps of „GFHU“ Series are of special design, intended for pumping waste water, sewage and raw sludge containing non-abrasive solid broken and fibrous stuffs, as e.g. paper, rags, dressings, left-overs and various street washings or smaller amount of sand, ash, grit, wooden pieces and further stuffs entering sewerage systems.

They may be applied to sewerage systems, water treatment plants, industrial plants, sewer intake schemes, various receiving objects, and so on.

Max. density of a pumped liquid ..... 1,100 kg.m<sup>-3</sup>

Max. temperature of a pumped liquid ..... 40 °C

Max. temperature of ambience ..... 40 °C

Permissible pH values ranging ..... from 6.5 to 7.5 pH

Max. submersion into a liquid with density 1,000 kg.m<sup>-3</sup> 10 m

Supply electrical cable must not be in contact with water containing oils and hydrocarbons.

**Pumps are not intended for operation in explosion-hazard environments.**

## Construction

Submersible sludge pumps of GFHU Series are of centrifugal single-stage volute-casing type, with single-vaned shrouded impeller with large passability. Electric motor is close-coupled with the pump. Between hydraulic part and electric motor there is a pool with oil charge sealed with a special double mechanical seal.

**Three-phase AC electric motor** is waterproof thoroughly and suitable for works under water level. Water tightness is ensured with hermetic sealing of supply cable being placed in a specially formed bushing. In motor winding there are thermal receptors built-in which shall cut a contactor control circuit off, and so they may protect the motor against damage. Rotor is supported on rolling-contact bearings, grease-lubricated.

**Seal.** Against water penetration from hydraulic part the electric motor is protected safely with shaft sealing which consists of a special double mechanical seal with wear rings of hard metal. Mechanical seal is provided with continuous closure and it is lubricated from an oil pool.

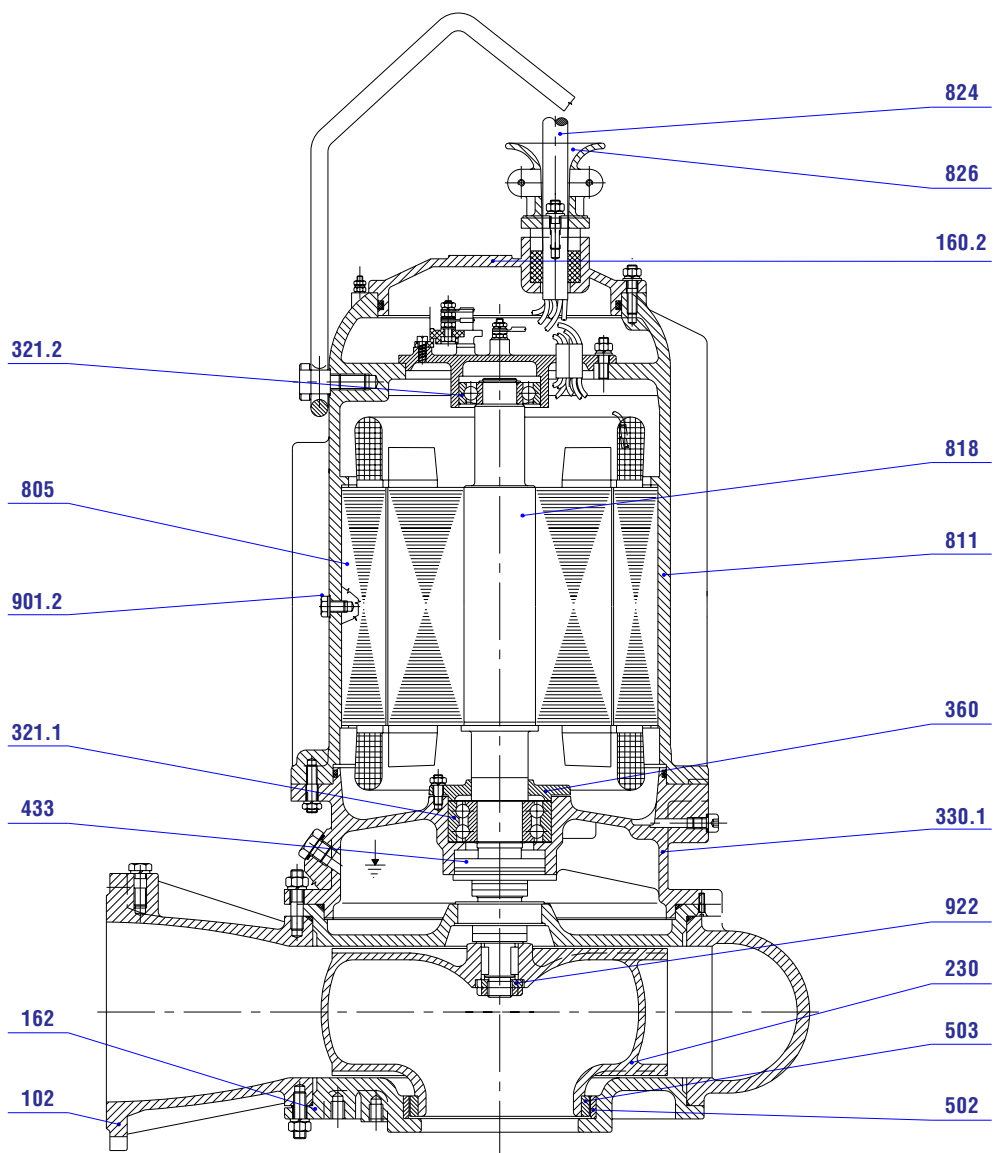
**Material** is selected according to a pumped stuffs characteristics, favourable weight and service life of a pump-set. Motor stator body is of aluminium-silicon alloy. Shaft and important connection bolts in contact with a pumped stuff are of corrosion-proof steel. Impeller is of rub-resistant and corrosion-proof steel. Pump volute and lantern pedestal with a suction elbow (workmanship „SJ“) are of grey cast iron.

## Starting-up

To ensure the pump electric motor switching it is necessary to use a suitable electrical switching device. A distribution instrument control cabinet of „GPS“ or „GHS-B“ Series may be recommended (more-detailed information about the control cabinet type may be found among technical data given for the pump single sizes).

Switching device makes manual- and/or automatic control of the pump-set (from level-controllers) possible. Recommended types of instrument control cabinets may be considered to be the optimum solution of electrical package, **with the set portable arrangement, principally**. In case of the pumping station stationary arrangement the end user shall solve electrical devices and peripheral electrics individually, according to pumping station complete layout. Instrument control cabinet may be supplied on the customer request together with the pump.

## Informatory sectional arrangement



102	Volute casing	502	Wear ring
160.2	Cover	503	Wear ring
162	Suction cover	805	Electric motor stator
230	Impeller	811	Stator jacket
321.1	Lower bearing	818	Electric motor rotor
321.2	Upper bearing	824	Power cable
330.1	Lower bearing housing	826	Cable bushing
360	Bearing cover	901.2	Bolt
433	Mechanical seal	922	Nut

## Performance data

### 80 GFHU

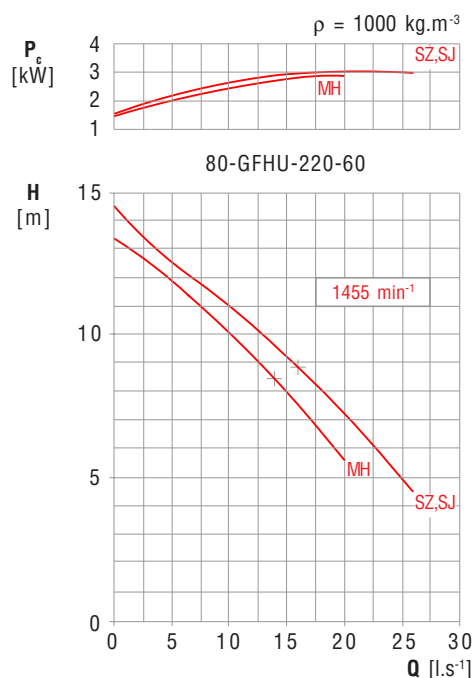
Impeller outer diameter.....	Ø 220 mm
Impeller passage.....	60 x 50 mm
Suction branch.....	DN 100 mm
Discharge branch.....	DN 80 mm
Electric motor - type.....	HOM 132S 04
Rated power output.....	3 kW
Speed of rotation.....	1,455 min <sup>-1</sup>
Voltage - as standard.....	380 V
on special request.....	500 V
Frequency.....	50 Hz
Rated current: with voltage 380 V.....	6.5 A
with voltage 500 V.....	5.0 A
Motor covering.....	IP 68 $\nabla$ 10 m
Supply electrical cable CGAZ.....	6 x 1.5 mm <sup>2</sup>
Supply cable of standard lengths.....	10, 15, 20, 25 m

Pump-set weight without a cable and discharge hose

Workmanship „SZ“.....	~ 95 kg
Workmanship „MH“.....	~ 91 kg
Workmanship „SJ“.....	~ 138 kg

Recommended type of electrical instrument control cabinet:

for standard voltage.....	380 V80-GPS-380 V
or 80-GHS-B-380 V	
for voltage 500 V.....	80-GPS-500 V
or 80-GHS-B-500 V	



It is the smallest size intended for small pumping stations in industrial plants, small waste water treatment plants, and so on. In their portable workmanship „MH“, they can cope namely with cleaning thickeners and digesters, rain water reservoirs and flood wells, further with pumping-out leaky water from armature pits and in building industry with pumping thick sludge from excavation pits.

### 100 GFHU

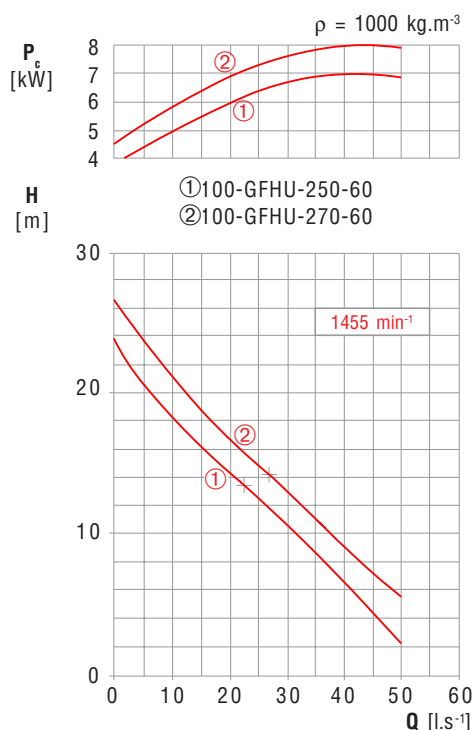
Impeller diameter - versions SZ, MH. Ø 220 mm or Ø 270 mm	
- version SJ.....	Ø 250 mm
Impeller passage.....	60 x 70 mm
Suction branch.....	DN 100 mm
Discharge branch.....	DN 100 mm
Electric motor - type.....	HOM 160M 04
Rated power output.....	6.5 kW
Speed of rotation.....	1,450 min <sup>-1</sup>
Voltage - as standard.....	380 V
on special request.....	500 V
Frequency.....	50 Hz
Rated current: with voltage 380 V.....	14.0 A
with voltage 500 V.....	10.6 A
Motor covering.....	IP 68 $\nabla$ 10 m
Supply electrical cable CGAZ.....	6 x 1.5 mm <sup>2</sup>
Supply cable of standard lengths.....	10, 15, 20, 25 m

Pump-set weight without a cable and discharge hose

Workmanship „SZ“.....	~ 146 kg
Workmanship „MH“.....	~ 152 kg
Workmanship „SJ“.....	~ 193 kg

Recommended type of electrical instrument control cabinet:

for standard voltage 380 V.....	100-GPS-380 V
or 100-GHS-B-380 V	
for voltage 500 V.....	100-GPS-500 V
or 100-GHS-B-500 V	



This pump model may be supplied with greater (Ø 270) or smaller (Ø 250) sizes of impellers for various delivery heads H, without any modifications of the pump and motor other parts. There is a possibility of pump modification to real conditions, considering technology and operational economy. Also a later replacement of impeller will be simple and without further modifications. Commonly, the pump may be applied to pumping stations for waste water of medium capacities, conception of which may be simplified substantially.

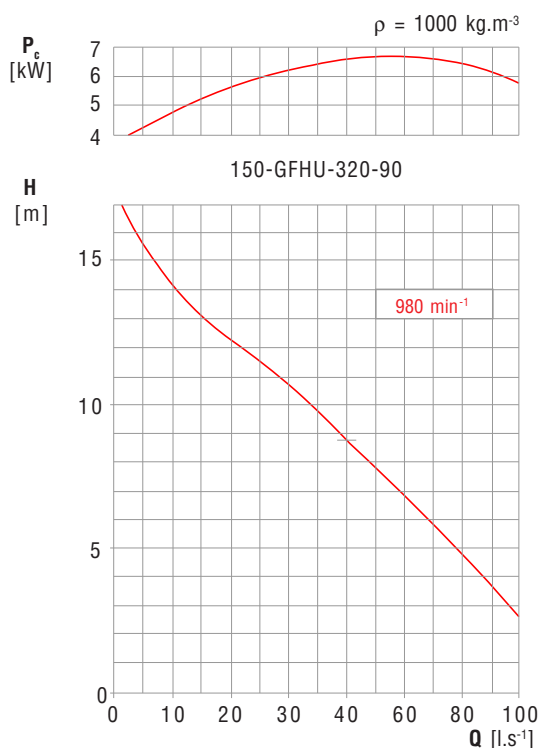
## Performance data

### 150 GFHU

Impeller outer diameter.....	Ø 320 mm
Impeller passage .....	90 x 80 mm
Suction branch.....	DN 150 mm
Discharge branch .....	DN 150 mm
Electric motor - type .....	HOC 180L 06
Rated power output .....	6.5 kW
Speed of rotation .....	980 min <sup>-1</sup>
Voltage - as standard .....	400 V
on special request .....	500 V
Frequency .....	50 Hz
Rated current: with voltage 380 V .....	13.3 A
with voltage 500 V .....	10.0 A
Motor covering.....	IP 68 $\geq$ 10 m
Supply electrical cable CGAZ .....	6 x 1.5 mm <sup>2</sup>
Supply cable of standard lengths .....	10, 15, 20, 25 m

Pump-set weight without a cable and discharge hose  
Workmanship „SZ“ ..... ~ 248 kg

Recommended type of electrical instrument control cabinet:  
for standard voltage 400 V ..... 150-GPS-400 V  
or 150-GHS-B-400 V  
for voltage 500 V ..... 150-GPS-500 V  
or 150-GHS-B-500 V



Low speed and rather small delivery head  $H$  predetermine that pump model for both continuous duties and re-pumping purposes. Consequently, they may be applied to waste water treatment plants for sludge recycling in digesters, pumping-out sludge collecting tanks in industry and agriculture, level rising from lower-situated sewer tanks up to level of natural flowing-out networks in cascade-type systems, and so on.

## Special modification

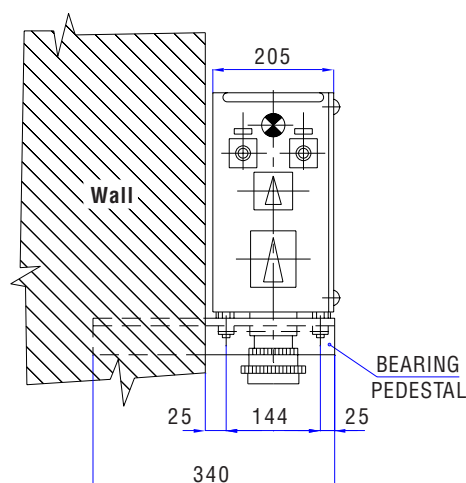
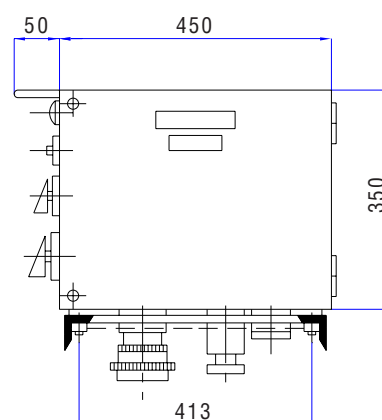
### 80 GFHU

The smallest model of sludge submersible pump „80-GFHU“ in its portable workmanship „MH“ has been modified specially (see the illustration close by), considering as small sizes as possible to facilitate its using in small and **even very narrow spaces**. That special modification is available **as the standard workmanship for general purposes**.

It is advantageous and practical to use it as a „mobile“ pump-set for cleaning various sumps and wells in sewerage networks **with minimal dimension of an inlet hole, that is, from diameter 500 mm**.

Easy and fast handling with application and transportation of that pump also allows a light-weight discharge fire hose of polyamide fibre fabric with inside rubber lining, that is supplied together with the pump **in standard length of 10 m**. Discharge hose is ended with a half of fire quick-coupler of Size DN 75, so it is possible to provide further and additional discharge line lengthening.

## Instrument control cabinet



Built-in dimensions of both instrument control cabinets Series are the same.

# Submersible sewage pumps GFHU

## Performance data

### Version „SZ“

**Intended for wet sumps with lifting equipment;** the following parts are included in the scope of a standard supply:

- 1 - Pump itself with leading-in cable of standard lengths (10, 15, 20 or 25 m)
- 2 - Flange of lifting equipment with guide sleeve on pump
- 3 - Discharge elbow inclusive of holding-down anchor bolts
- 4 - Clamp of guide pipes, without fixing bolts.

(For pump pipe line there galvanized pipes DN 2" in lengths according to a sump depth are suitable (Pos. 5), but they are not included in the scope of the pump manufacturer supply). Submersible stationary version is advantageous, because the pump is lowered direct into a wet sump with the aid of pipe line down until it fits with its flange on the counterflange of a foot-type elbow attached to the sump bottom. Modified flanged joint may be sealed **without any mounting** with the pump own weight. In a similar way it will be possible to lift the pump by a chain or a rope for a revision, repair, cleaning or even replacement without any need of dismantling.

### Version „MH“

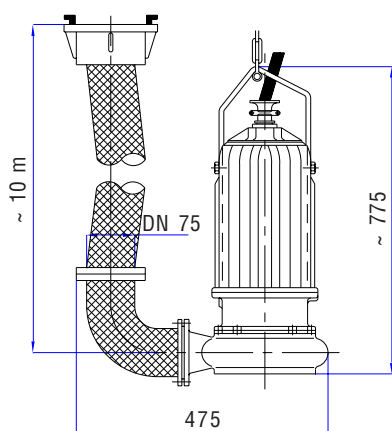
**It is portable version for wet sumps.** The following parts are included in the scope of a standard supply:

- 1 - The pump itself with leading-in cable in standard lengths (10, 15, 20 or 25 m)
- 2 - Discharge elbow with connecting thread Rd 130 (with 100-GFHU Size)
- 3 - Complete suction pipe screw joint 110 (with 100-GFHU Size)
- 4 - Discharge polyamide fibre hose DN 110 with inner rubber lining in standard length 10 m (with 100-GFHU). Discharge hose ending is with suction pipe branch with thread Rd 130, which facilitates possible additional extension the pump 100-GFHU discharge side.

With the smallest size „80-GFHU“ having been modified for narrow spaces there is the scope and structure of accessories for its discharge side (positions 2, 3, 4) given separately.

Submersible portable version is intended for using it as a „mobile“ pump-set for occasional or temporary pumping-out sumps, with auxiliary and emergency interventions and for using in various places. Within its operation the pump is suspended on a rope or a chain.

**That version is not available** with the pump greatest size „150-GFHU“.



### Version „SJ“

**for dry sumps.** The following parts are included in the scope of a standard supply.

- 1 - The pump itself with leading-in cable in standard lengths (10, 15, 20 or 25 m)
- 2 - Lantern bracket for fixed fastening the pump-set on the foundation being attached to the pump, inclusive of holding-down anchor bolts
- 3 - Suction flanged elbow attached to the pump

Stationary version for dry sumps is considered with fitting **dry sumps in existence**. Besides basic position of suction branch (I) there are further positions of suction branch (II, III) against discharge one, that may be reached by turning suction branch and lantern bracket by 90° - they are marked with dashed lines in the dimensional drawing.

Model	80-GFHU			100-GFHU			150-GFHU	
Version	SZ	MH	SJ	SZ	MH	SJ	SZ	SJ
a	775	See a separate dimensioned drawing	1125	870	870	1221	980	1340
b	793		-	858	683	-	1105	-
b1	-		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		-	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	94		-	94	-	-	92	-
u	406		-	406	-	-	463	-
v	410		-	410	-	-	450	-
z	200		-	200	-	-	250	-
Ds	-	See a separate dimensioned drawing	DN 100	-	-	DN 100	-	DN 150
Dv	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 L	-		4xØ40	-	-	4xØ40	-	4xØ40
R	min 600		-	min 650	-	-	min 750	-
S	min 620		-	min 700	-	-	min 900	-

Dimensions are in mm.

**Suction branch** of „SJ“ Version is available with flange for PN 6, and raised face (with the exception of 150-GFHU Size, that is provided with the suction branch flange for PN 10).

**Discharge branch** of „SZ“ Version is available for PN 16, with raised face. With „SJ“ Version there is the flange for PN 10, with raised face (with the exception of 80-GFHU, that is provided with the discharge branch flange for PN 16).

**Dimension „d“** -galvanized 2" pipe.

**Dimensions „v“ and „z“** are for the base of foot-type discharge elbow; base layout is marked with dashed lines.

# Submersible sewage pumps GFHU

## Cascade connection

Application of pumps GFHU may be extended by tandem-connection of two pumps for so called cascade pumping, that may be connections SJ+SJ or SZ+SJ. It may happen that the only one pump fails in reaching higher delivery head. Under some

circumstances it is advantageous to connect two pumps of the same capacities for reaching substantially higher head - nearly double one with given flow.

