

WARNING

The operating instructions contain important information that must be followed during installation, operation and maintenance. The installer and all qualified personnel and operators are required, without exception, to have read these operating instructions, and it must remain available at the machine/installation at all times.

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1 Manual Introduction

1.1 Preface

The manual contains important information for reliable, proper and efficient operation. Compliance with the operating instructions is of vital importance to ensure reliability and a long service life of the pump and to avoid any risks.

The first chapters contain information about this manual and safety in general. The following chapters provide information about normal use, installation, maintenance and repairs of the product. The annexes contain the technical data and the parts drawings.

- Make yourself familiar with the content.
- Accurately follow the directions and instructions.
- Never change the sequence of the operations to be carried out.
- Keep this manual or a copy of it together with the logbook in a fixed place near the product, which can be accessed by all personnel.

1.2 Icons and symbols

In this manual and in all accompanying documentation the following icons and symbols are used.



WARNING
Danger of electric tension!
Safety sign to IEC 417 – 5036



WARNING
Operations or procedures, if carried out without caution, may cause personal injury or damage to the product.
General hazard sign to ISO 7000-0434



ATTENTION
Is used to introduce safety instructions whose non-observance may lead to damage to the product and its functions.

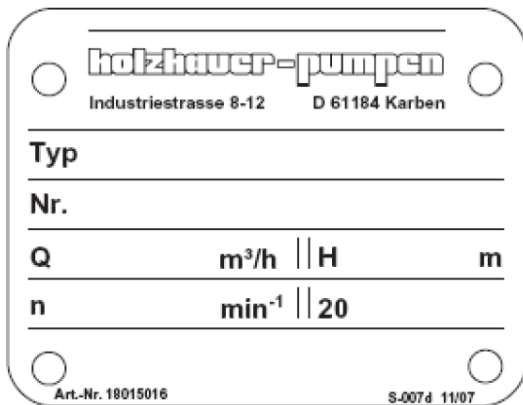


ENVIRONMENTAL INSTRUCTION
Remarks with respect to the environment.

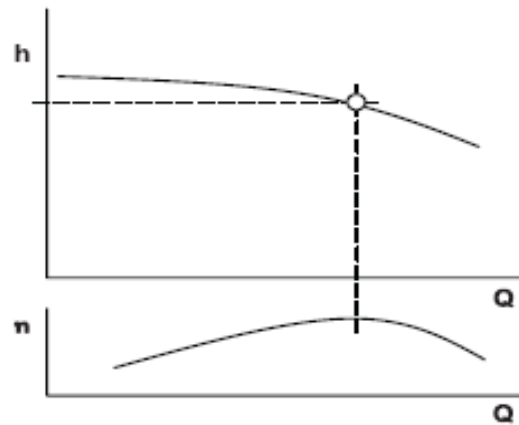
2 Identification, service and technical support

2.1 Obtaining data and information

The name plate indicates the type / serial number, main operating data and identification number. Please quote this information in all queries, repeat orders and particularly when ordering spare parts. If you need any additional information or instructions exceeding the scope of this manual or in case of damage please contact our customer service department.



Name Plate



Dutypoint

Indication	Meaning
MCV	Pump type
Nr./no. :	Serial number
Q : m³/h	Nominal capacity in 1000 l per hour
H : m	Nominal pressure in meters liquid column
n : min⁻¹	Typical speed in revolutions per minute

2.2 Nominal current

The nominal allowable current of the motor is mentioned on the motor plate. This shows the nominal working range of the motor and can be used to protect the motor.



WARNING

Not only the motor, but also the pump has to be protected in its application.

In the unit data sheet (technical documentation) this 'pump current at 400 Volts' will be mentioned as 'rated current', and can be used to pre-set the motor protection switch to protect the pump/motor combination. This current value can also be used to determine the proper electrical equipment such as variable frequency drive, main switch, wiring diameter etc.

2.3 Supplementary documentation

Apart from this manual, the documentation listed below is also available:

Document	Date / Version	Code
General Terms and Conditions of Sales	Issue 01.08.2005	

3 Warranty

3.1 Terms of Warranty

The warranty period is settled by terms of your contract or at least by the general terms and conditions of sales.



ATTENTION

Modifications or alterations of the product supplied are only permitted after consultation with the manufacturer. Original spare parts and accessories authorized by the manufacturer ensure safety. The use of other parts can invalidate any liability of the manufacturer for consequential damage.



ATTENTION

The warranty relating to the operating reliability and safety of the product supplied is only valid if the product is used in accordance with its designated use as described in the following sections of this manual. The limits stated in the data sheet must not be exceeded under any circumstances.

The guarantee becomes invalid if one or more of the points below occur.

- The buyer makes modifications himself.
- The buyer carries out repairs himself or has these carried out by a third party.
- The pump has been handled or maintained improperly.
- The pump has non original spare parts fitted.

HolzhaueR-Pumpen remedies defects under guarantee if the points below are observed.

- Defects are caused by flaws in the design, the materials or the production.
- The defect has been reported within the guarantee period.

Other terms of guarantee have been included in the general terms and conditions of sales, which are available upon request.

4 Safety and environment

4.1 General

This product has been developed using state-of-the-art technology; it is manufactured with utmost care and subject to continuous quality control.

Holzhauep-Pumpen does not accept any liability for damage and injury caused by not observing the directions and instructions in this manual. This also applies in cases of carelessness during the installation procedure, use and maintenance of the product.

Non-compliance with safety instructions can jeopardize the safety of personnel, the environment and the product itself. Non-compliance with these safety instructions will also lead to forfeiture of any and all rights to claims for damages. In particular, non-compliance can, for example, result in:

- failure of important pump/system functions,
- failure of prescribed maintenance and servicing practices,
- injury to persons by electrical, mechanical and chemical effects,
- hazard of the environment due to leakage of hazardous substances,
- explosions.

Depending on specific activities extra safety measures may be required. Contact Holzhauep-Pumpen if a potential danger arises during use.



ATTENTION

The owner of the product is responsible for compliance with the local safety regulations and internal company guidelines.



ATTENTION

Not only must the general safety instructions laid down in this chapter on "Safety" be complied with, but also the safety instructions outlined under specific headings.

4.2 Users

All personnel involved in the operation, maintenance, inspection and installation of the product must be fully qualified to carry out the work involved.

Personal responsibilities, competence and supervision must be clearly defined by the operator. If the personnel in question is not already in possession of the required know-how, appropriate training and instruction must be provided. If required, the operator may commission the manufacturer / supplier to take care of such training. In addition, the operator is responsible for ensuring that the contents of the operating instructions are fully understood by the responsible personnel.

4.3 Safety provisions

This product has been designed with the greatest possible care. Original parts and accessories meet the safety regulations. modifications in the construction or the use of non-original parts may lead to a safety risk.



ATTENTION

Make sure that the product operates within its working range. Only then the product performance is guaranteed.

4.3.1 Labels on the product

The icons, warnings and instructions applied to the product are part of the safety provisions. The labels may not be removed or covered. Labels must remain legible during the entire life of the pump. Replace damaged labels immediately.

4.4 Safety precautions

4.4.1 During normal use

- Contact the local electricity company for questions about the power supply.
- Shield parts, that can become hot in such a way, that direct contact is impossible.
- When applicable, always place undeformed coupling protection plates to protect the coupling, before putting the pump into use. Make sure that the coupling protection plates are never in contact with the running coupling.
- Always close the terminal box.

4.4.2 During installation, maintenance and repair

Only authorised personnel may install, maintain and inspect the product and repair electrical components. Observe the local safety regulations.



WARNING

Always disconnect the energy supply to the pump first, before installation, maintenance and repairs. Secure this disconnection.



WARNING

Surfaces of a pump can be hot, after continuous operation.



WARNING

Make sure that no one can be near rotating components when starting a pump.



WARNING

Handle a pump with dangerous liquids with the utmost care. Avoid danger for persons or the environment when repairing leakages, draining liquids and venting. It is strongly recommended to place a relief barge under the pump.



WARNING

Immediately following completion of the work, all safety-relevant and protective devices must be re-installed and / or re-activated.



WARNING

Please observe all instructions set out in the chapter on "Commissioning/Start-up" before returning the product to service.

4.5 Environmental Aspects

4.5.1 General

The products of Holzhauser-Pumpen are designed to function in an environmentally friendly way during their entire life. Therefore, when applicable, always use biodegradable lubricants for maintenance.



ENVIRONMENTAL INSTRUCTION

Always act according to the law, bylaws regulations and instructions with respect to health, safety and the environment.

4.5.2 Dismantling

Dismantle the product and dispose of it in an environmentally friendly way. The owner is responsible for this.



ENVIRONMENTAL INSTRUCTION

Ask the local authorities about the re-use or the environmentally friendly processing of discarded materials.

5 Pump Introduction

5.1 Model Key

Table 1: Model key MCV(S)F

MC	V(..)	F	125	-5	Pump type	
MC	V				Material Code	all wetted parts 1.4301 (AISI 304)
MC	VS					all wetted parts 1.4404 (AISI 316)
MC	VC					Pump bracket and motor stool lower JL 1040 (GG25), Hydraulics 1.4301 (AISI 304)
MC	V	F				Round flange DIN, ASME, JIS / PN16, PN25/40
MC	V		125			type designation
MC	V			-5		Number of impeller / diffuser stages

5.2 Description of the product

The vertical, single or multi stage centrifugal pump series are designed for pumping clean, or lightly aggressive, water mediums.

Suction and discharge of the pump are in-line, making the pump easy to install.

The hydraulic assembly is driven by an electric motor. All hydraulic parts of the pump are made of stainless steel.

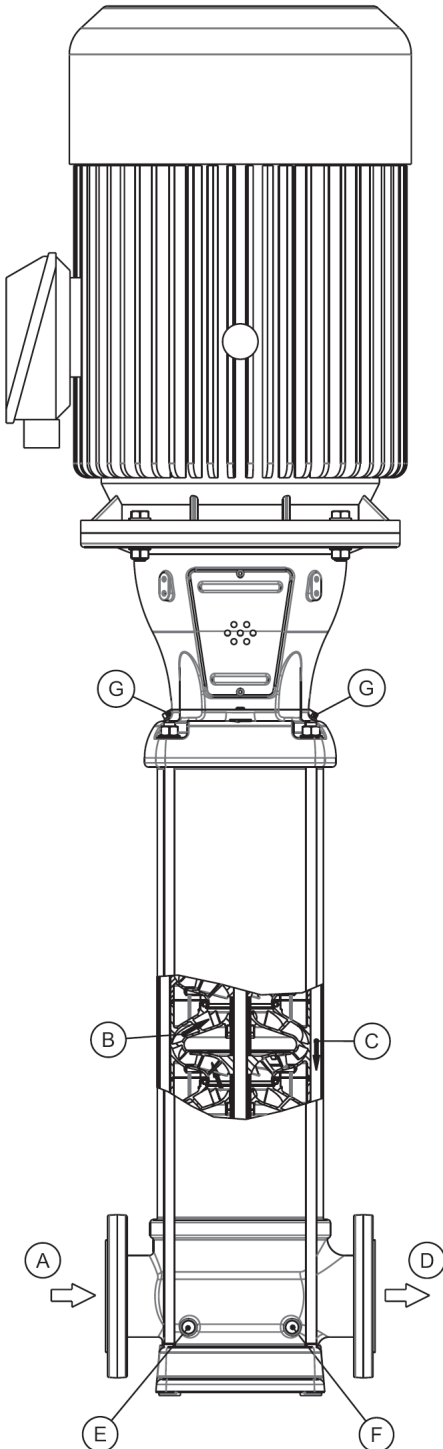
5.3 Modular built-up

To suit almost every application the pump is built-up out of modules which can be selected depending on the required working range.

Basic modules are:

- **Basic pump model**, which defines the capacity, pressure and basic material.
- **Connections**, which defines the suction and discharge connection as well as the base plate.
- **Sealings**, which defines the elastomers, the mechanical seal and the shaft seal type.
- **Electric motor**, which defines all requirements of the motor such as motor size, power, voltage, frequency and all possible motor accessories.

5.4 Operation



At the centrifugal operation of the pump an underpressure is created at the inlet of the impeller. This underpressure enables the medium to enter the pump at the suction connection (A).

Every stage (B) consists of an impeller and diffuser. The passage of this stage determines the capacity of the pump. The stages diameter is related to the centrifugal forces and its "stage pressure": the more stages, the more pressures.

This total capacity and built-up pressure will be guided to the outside of the pump, between the pump stages and the outer sleeve (C) and the medium will leave the pump at the discharge connection (D).

5.5 Measuring, draining and venting

The pump is provided with plugs for measuring, draining and venting.

Connection (E) is meant to drain the inlet part of the pump. Or to measure the inlet / suction pressure using a G 1/4 connection.

Connection (F) is meant to drain the outlet part of the pump. Or to measure the discharge pressure using a G 1/4 connection.

Connections (G) are meant to vent the pump system when the pump is not in operation. Or to measure the discharge pressure of the pump using a G 3/8 connection.

5.6 Working range

The working range is depending on the application and a combination of pressure and temperature. For specific and detailed limits advise the working ranges as described in the chapter Modules. The overall working range of the pumps can be summarized as follows:

Table 2: Specification of the working range

Type	MCV	Note
Ambient temperature [°C]	- 30 up to 40	1
Medium temperature [°C]	- 30 up to 40	2
Maximum working pressure [bar]	40	2
Minimum inlet pressure	$NPSH_{req} + 1 \text{ m}$	
Maximum inlet pressure [bar]	40 - pump pressure	
Viscosity [cST]	1 – 100	3
Density [kg/m ³]	1000-2500	3
Cooling	forced motor cooling	4
Minimum frequency [Hz]	10	
Maximum frequency [Hz]	60	5
Nominal flow (Q _{opt.}) [m ³ /h]	85 (50 Hz – 2 pole) 102 (60 Hz – 2 pole)	
Maximum flow [m ³ /h]	112.8 (50 Hz – 2 pole) 135 (60 Hz – 2 pole)	
Efficiency (% at Q _{opt.})	81	
$NPSH_{req}$ (m at Q _{opt.})	2.9	
Maximum motor power [kW]	45	
Maximum pump pressure [m]	176 (50 Hz – 2 pole) 151 (60 Hz – 2 pole)	

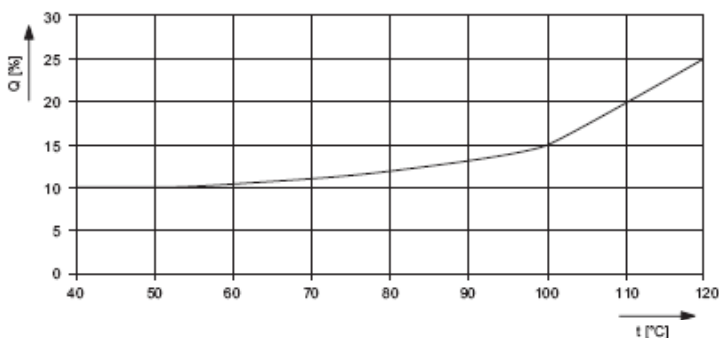
- ¹ If the ambient temperature exceed the above value or the motor is located more than 1000 m above sea level, the motor cooling is less effective and could require an adapted motor power. See table 9: Motor load dep. sea level or amb. temp. or please contact your supplier for more detailed advice.
- ² High temperature or high pressure could require a special pump selection, see 3.0: Sealing.
- ³ Deviation in viscosity and/or density could require an adapted motor power. Please contact your supplier for more detailed advice.
- ⁴ The free space above the motor cooling fan must be at least ¼ of the diameter of the inlet of the cooling fan in order to have a sufficient flow of (cooling) air.
- ⁵ Pumps that are intended for 50 Hz operation, may not be connected to 60 Hz power supply.

For minimum flow at medium temperature of 20°C see table 3: Minimum capacity (Q_{min}); for higher temperatures see table 4: Minimum capacity vs – temperature (Q) (in % of Q optimum)

Table 3: Minimum capacity (Q_{min})

Size	Q _{min} in m ³ /h	
	50 Hz – 2 pole	60 Hz – 2 pole
85	8.5	10.2

Table 4: Minimum capacity vs – temperature (Q) (in % of Q optimum)

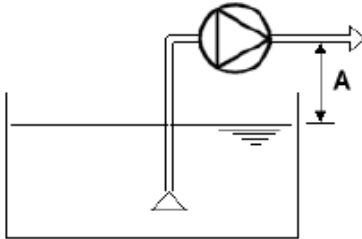


5.6 Minimum inlet pressure / maximum suction lift

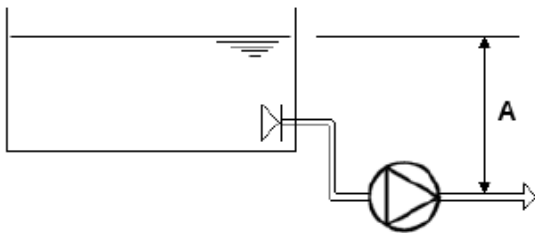
A: Inlet pressure



B: Suction lift



C: Floated suction



A	B/C				
+	+	$P_{atm.}$	mwc	(ambient pressure)	Absolute pressure present at the location
	+	P_{tank}	mwc	(overpressure in tank)	Overpressure in tank (a e.g. de-aeration tank)
+		P_{inlet}	mwc	(inlet pressure)	Minimum inlet pressure in mwc. at the inlet (overpressure)
	+	H_{stat}	mtrs	(static height)	Total height in mtrs from water level to pump inlet connection
-	-	$H_{dyn.}$	mwc	(dynamic height)	Pressure losses in suction pipe and non-return valve
-	-	$P_{vap.}$	mwc	(vaporisation pressure)	Minimum pressure in suction line to avoid boiling > read from the diagram at water temp.
-	-	$NPSH_{req.}$	mwc	(required NPSH)	Pump required NPSH > read from the pump curve at required capacity
+1	+1	Safety	mtrs	(practical deviation)	total of minor deviations which could in practice
-----	-----				
result	result	$NPSH_{avail.}$		(available NPSH)	Available NPSH is the NPSH that is available as a result of the chosen setup
		MARGIN		(safety margin)	The margin is the difference between required and available NPSH, negative means that application is impossible!

5.8 Explosion safety



ATTENTION

This sub chapter contains fundamental information which has to be taken into consideration when installing the pump with ATEX permission in a hazardous environment.

5.8.1 General

Stickers or indicators on the pump sleeve and the motor indicate whether the pump is suitable for use in an environment with risk of explosion. It is allowed to install the pump in a zone which is classified in directive 1999/92/EC.

When in doubt it is compulsory to check the above directive.

5.8.2 Indication

Table 5: Explosion safety

Indication	Meaning
II	Product group for use above ground, with the exception of mine working where there can be danger of explosion due to mine gas and/or flammable substances.
2/3	Category 2: Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or by air/dusts mixtures are likely to occur. Category 3: Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or by air/dusts mixtures are likely to occur or, if they do occur, are likely to do so only infrequently and for a short period only.
G	Suitable for an environment that is explosive due to gas, vapour or fumes; not suitable for an environment that is explosive due to dust.
EEx C	Protection principle type c: for products that are constructively safe.
T4/T3	Temperature class: T4 for medium temperatures up to 100°C; T3 for medium temperatures above 100°C



ATTENTION

If the pump is placed in an explosion hazardous environment the pump should not be opened or disassembled at site. Due to the probable creation of sparks during loosening and tightening of nuts and bolts.

5.8.3 Commissioning (check list)

It is compulsory to check these points prior to putting the pump into operation.

- Check if the ATEX-data on the motor and the pump are in line with the specified category. See table 6: ATEX-Categories 14.
- When the categories of the motor and the pump are different, the lowest category is leading.
- For category 2: make sure that the pump is protected against damage from outside.
- Check that the motor cable is suitable for the current drawn by the motor. See: motor type plate.
- Check that the pump is fully filled with the liquid (de-aerated). Do not run the pump dry.
- Check the rotational direction of the motor. The motor has to run clockwise (seen from the non driven side). This direction is indicated with an arrow on the pump top bracket.
- Make sure that the liquid temperature never exceeds the temperature mentioned in the explosion safety code T3 or T4. See table 5: Explosion safety.
- Avoid overheating of the pump to ensure a minimum flow in the pump according to the description in chapter 5.3: Working range 11.

- The pumps has to be de-aerated again if:
 - the pump is taken out of operation.
 - some air is gathered in the pump.
- Make sure that the pump and the motor shaft are running smoothly and without excessive noise (e.g. no parts are running against each other).
- Make sure that the pump is connected to ground.

Table 6: ATEX-Categories

Group	Category		Zone	Pumps	Motors
I	M	1		none	none
		2		none	none
II	1	G	0	none	none
		D	20	none	none
	2	G	1	MCV(S) MCV(C/S)F	2G Eex e T3 2G Eex d T4
		D	21	none	none
	3	G	2	MCV(S) MCV(C/S)F	2G Eex e T3 2G Eex d T4
		D	22	none	none

6 Transport

6.1 Transport

1. Transport the pump in the position indicated on the pallet or packaging.
2. Make sure the pump is stable.
3. Observe the instructions on the packaging.



WARNING

Lift the pump, if necessary using a hoist and suitable slings. Attach the slings to the transport lugs on the packaging, where present.



WARNING

The pump must be lifted according to the current hoist guidelines. Only qualified personnel are allowed to lift the pump.



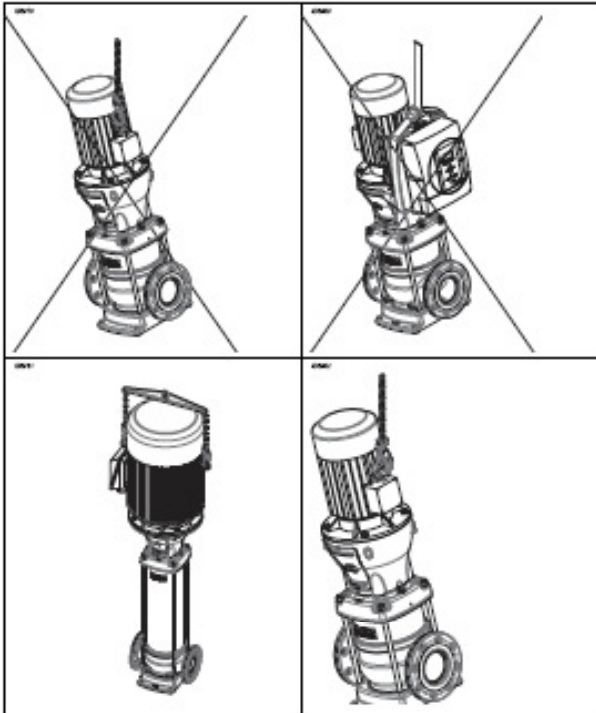
WARNING

Do not lift the pump by using the frequency converter (if placed), electrical parts or the motor cover. Be sure that the pump is always in balance.



WARNING

Pumps could heel while lifting. Do not remove the lever or protection from the pump before the pump is placed and mounted correctly.



6.2 Storage

Fill the pump with glycol in order to protect it against the risk of frost.

Storage	
t_{ambient} [°C]	-10/40
Max. rel. humidity [%]	80% at 20° C not condensing

6.2.1 Inspection during storage

1. Turn the shaft every three months and just before putting into operation.

7 Installation

7.1 Setting up the pump



ATTENTION

Make sure that the pump connections are not over-stressed at the inlet and outlet connections. Please see the table below.

Table 7: Allowable force MCV(C/S)F

Type	DN [mm]	Force [N]			
		F _x	F _y	F _z	Σ F
MCV(C/S)F 125	100	60000	40000	40000	82500

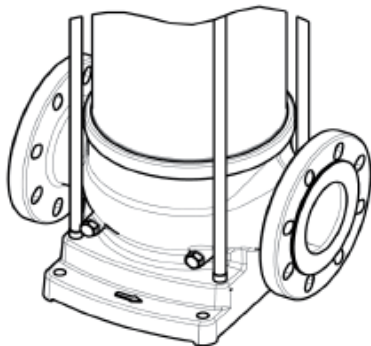
Table 8: Allowable moment MCV(C/S)F

Type	DN [mm]	Moment [Nm]			
		M _x	M _y	M _z	Σ M
MCV(C/S)F 125	100	3600	6100	4800	8600



ATTENTION

For the values mentioned in the tables above, it is assumed that they occur simultaneously.



ATTENTION

Pumps which do not stand steady or stable of their own, should be mounted on a rigid and stable base.



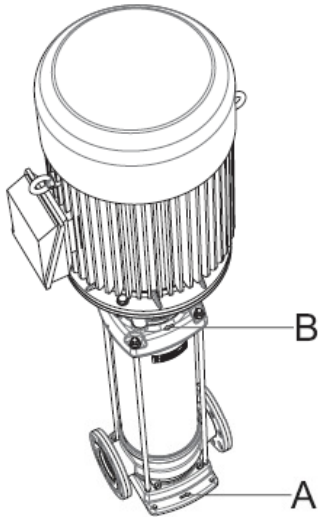
ATTENTION

Locate the pump at the place with the lowest risk for noise nuisance.

1. Place and install the pump on a level, stable surface in a dry and frost-proof room.
2. Make sure that sufficient air can reach the cooling fan of the motor. For this purpose the free space above the cooling fan should be at least ¼ of the diameter of the fan cover air intake.
3. Install the pump with counter flanges. For pumps with non-standardised connections; counter flanges are delivered separately.
4. It is to be advised to install a valve on the supply and on the delivery connection of the pump.

- At the possibility of medium flowing back through the pump, when idle, it is advised to install a non-return valve.
- Make sure that the inlet of the pump is never clogged.

7.1.1 Indicators



The arrow (A) on the pump foot indicates the flow direction of the liquid. The arrow (B) on the top bracket indicates the rotating direction of the motor.

7.1.2 Installation of a bypass

Install a bypass if the pump operates against a closed valve. The required capacity of the bypass is at least 10% of the optimum volume flow. At high operating temperatures a higher volume flow is required. Refer to the table "Minimum volume flows" in the paragraph "Working range".

7.2 Mounting a motor on the pump



ATTENTION

It is to be advised to use a special designed HolzhaueR-Pumpen motor. Before installing an other brand/standard IEC-norm motor, HolzhaueR-Pumpen has to be consulted to judge the applicability.

The motor has to conform to the following conditions:

- Reinforced bearing at driven end (to withstand the axial force)
- Axial fixed rotor (to minimize the axial play of the pump hydraulic)
- Smooth shaft, no key lock (to improve the coupling grip and to improve the motor balance)

The advised bearings per motor type are:

Table 9: Minimum required motor drive end bearing

kW	Axial bearing	kW	Co-axial bearing
5.5	6308-2Z-C3	11	7309-BEP
7.5	6308-2Z-C3	15	7309-BEP
		18.5	7309-BEP
		22	7311-BEP
		30	7312-BEP
		37	7312-BEP
		45	7314-BEP

7.3 Electrical installation



WARNING



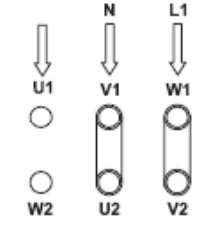
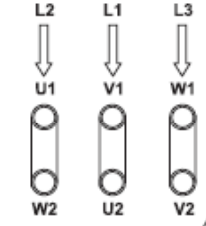
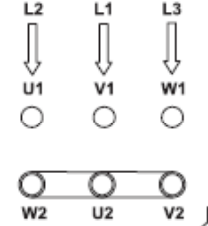
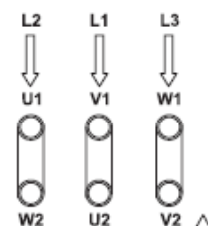
Only authorised personnel is allowed to make electrical connections to the motor. This is in accordance with the local regulations.



ATTENTION

Connect the motor according to table 10: Motor connections and always check the rotation direction.

Table 10: Motor connections

 V~	1x 230V	 V~	3x 230V	3x 400V
230V		230/400V		
		400/692V		

PTC connection STM 140 EK:

- Standard motors 3 kW and up are equipped with a PTC thermistor. Consult 11.2: Technical specifications.
- Connect the PTC on a thermistor relay.

7.4 Commissioning



WARNING

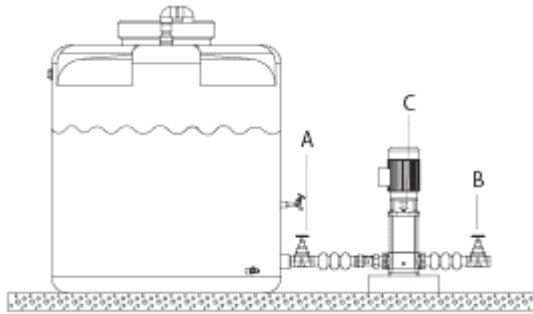
The pump must not be switched on when it is not completely filled up.



ATTENTION

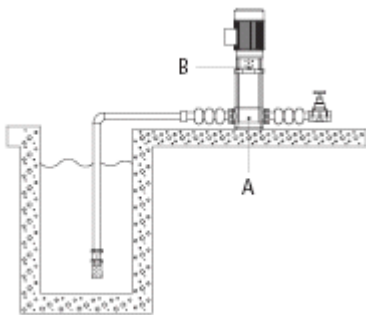
Seen from the top of the motor the pump should rotate clockwise. See 7.1.1 Indicators (B). In case of a 3-phase motor the rotating direction can be changed by exchanging two of the three phase wires.

7.4.1 In an open or closed circuit with sufficient supply pressure



1. Close the suction shut-off valve (A) and the outlet shut-off valve (B).
2. Open the fill plug (C).
3. Gradually open the suction shut-off valve until the liquid flows from the fill plug (C).
4. Close the fill plug.
5. Fully open the suction shut-off valve.
6. Check the rotational direction of the pump.
7. Fully open the outlet shut-off valve.

7.4.2 In an open circuit with a liquid level lower than the pump



1. Remove the fill plug (B) from the top bracket.
2. Close the outlet shut-off valve.
3. Fill the pump housing to the maximum through the fill plug with the liquid that is to be pumped.
4. Insert the fill plug in the top bracket.
5. Check the rotational direction of the pump.
6. Open the outlet shut-off valve.

7.4.3 After an extended period of non-operation or storage

During first start-up, check the mechanical seals for leakage due to seizure or dehydration of the lubricating film. If so, please proceed as follows:

1. Turn shaft manually or;
2. Start-up the pump, then open and close the outlet shut-off valve quickly during operation.
3. Check if the mechanical seal is still leaking.

If the shaft is still leaking:

1. Disassemble the mechanical seal.
2. Thoroughly clean and degrease the running surfaces.
3. Assemble the mechanical seal again and retry start-up.

If this does not solve the shaft leakage, replacement of the mechanical seal is necessary.

8 Operation

8.1 Operation

The pump is controlled externally and does not need any operation guidance.

9 Maintenance

9.1 Introduction



WARNING

Observe the general safety precautions for installation, maintenance and repair.

Regular maintenance is necessary for the correct operation of a pump. For maintenance of the pump, please contact your supplier.

9.2 Lubrication

Standard motors, with a maximum power of 11 kW, are provided with maintenance-free sealed bearings.

Motors with lubricating nipples must be lubricated after 2000 hours. If the pump works under extreme conditions, such as vibrations and high temperatures, the motors must be lubricated more often.

Use the lubricant SKF LGHT 3 (about 15 gram).

If the pump is delivered without a motor and fitted with an other brand or the standard motor is replaced by an other brand than Holzhauser-Pumpen, please consult the maintenance instructions of the motor supplier.



ATTENTION

Also follow the instructions in § 7.2: Mounting a motor on the pump.

9.3 Maintaining the pump for an extended period of non-operation

Turn the shaft every three months. This protects the seals from seizure.

Protect the pump against the risk of frost. Proceed as follows:

1. Close all pump valves.
2. Drain each pump and/or the system.
3. Remove all plugs from the pump.
4. Open the shut-off and fill/air vent plug, if present.

10 Failures

10.1 Failure table



WARNING

Observe the general safety precautions for installation, maintenance and repair.

Problem	Possible cause	Possible solution	Checkpoints
Leakage along the shaft	Running surfaces of the mechanical seal worn or damaged	Replace the mechanical seal.	Check the pump for dirt – abrasive parts.
	New pump: seal stuck due to assembly	Open and close the outlet shut-off valve quickly during operation	
	Mechanical seal mounted incorrectly	Install the mechanical seal correctly. Use water and soap as a lubricant	
	Elastomers affected by medium	Use the right rubber compound for the mechanical seal	
	Pressure too high	Use the right type of mechanical seal	
	Shaft worn	Replace shaft and mechanical seal.	
	Pump has been operating without water	Replace the mechanical seal	
Leakage along the shroud at the top bracket or at the pump foot	O-ring worn	Replace the O-ring	
	O-ring not resistant to the medium to be pumped	Replace O-ring by an O-ring with better resistance	
	Too much tension on the pump foot, it becomes oval	Decrease tension on piping. Mount the pump foot tensionless. Support the connections.	
Pump is vibrating or noisy	Coupling mounted incorrectly	Install the coupling in parallel	
	Faulty setting of the hydraulic assembly	Adjust the assembly according to the manual	
	There is no water in the pump	Fill and vent the pump	
	No supply	Make sure there is sufficient supply. Check for blockages in the supply line	
	Bearings of pump and/or motor worn	Have the bearings replaced by a certified company	
	Available NPSH too low (cavitation)	Improve suction condition	
	Pump does not work in its working range	Select another pump or adjust the system to work within its working range	
	Pump is standing on an uneven surface	Level the surface	

Problem	Possible cause	Possible solution	Checkpoints
Malfunction	Internal blockage in the pump	Have the pump inspected by a certified company	
Pump does not start	No voltage on the terminal clamps	Check the power supply	<ul style="list-style-type: none"> • Circuit • Main switch • Fuses
		Check the motor safety relay	<ul style="list-style-type: none"> • Earth leakage switch • Protective relay
	Thermal motor safety switch triggered	Reset the thermal motor safety. Contact the supplier, if this problem occurs more often.	Check if the correct value is set. Find the correct value (I_{nom}) on the pump, see § 2.1: Obtaining data and information.
The motor is running, but the pump does not work	The motor shaft has been broken.	Contact the supplier	
	The pump shaft has been broken	Contact the supplier	
	The coupling between pump and motor shaft is loose	Tighten the connecting screws to the recommended torque	
Pump supplies insufficient capacity and/or pressure	Outlet and/or inlet shut-off valve is closed	Open both shut-off valves	
	There is air in the pump	Vent the pump	
	The suction pressure is insufficient	Increase the suction pressure	
	Pump rotates in the wrong direction	Change over L1 and L2 of the three phase supply.	
	The suction line has not been vented	Vent the suction line	
	Air bubble in the suction line	Install the suction line with pump end higher than the other end	
	Pump sucks air because of leakage in the suction line	Repair the leakage	
	Too little water consumption so air bubbles clog up in the pump	Make sure the consumption increases or use a smaller pump	
	The diameter of the suction line is too small	Increase the diameter of the suction line	
	Capacity of water meter in the supply line is too small	Increase the capacity of the water meter	
	Foot valve blocked	Clean the foot valve	
	The impeller or the diffuser is blocked	Clean the inside of the pump	
	O-ring between impeller and diffuser is gone	Replace the O-rings	
	O-ring not resistant to the medium to be pumped	Replace O-ring by an O-ring with better resistance	

11 Annexes

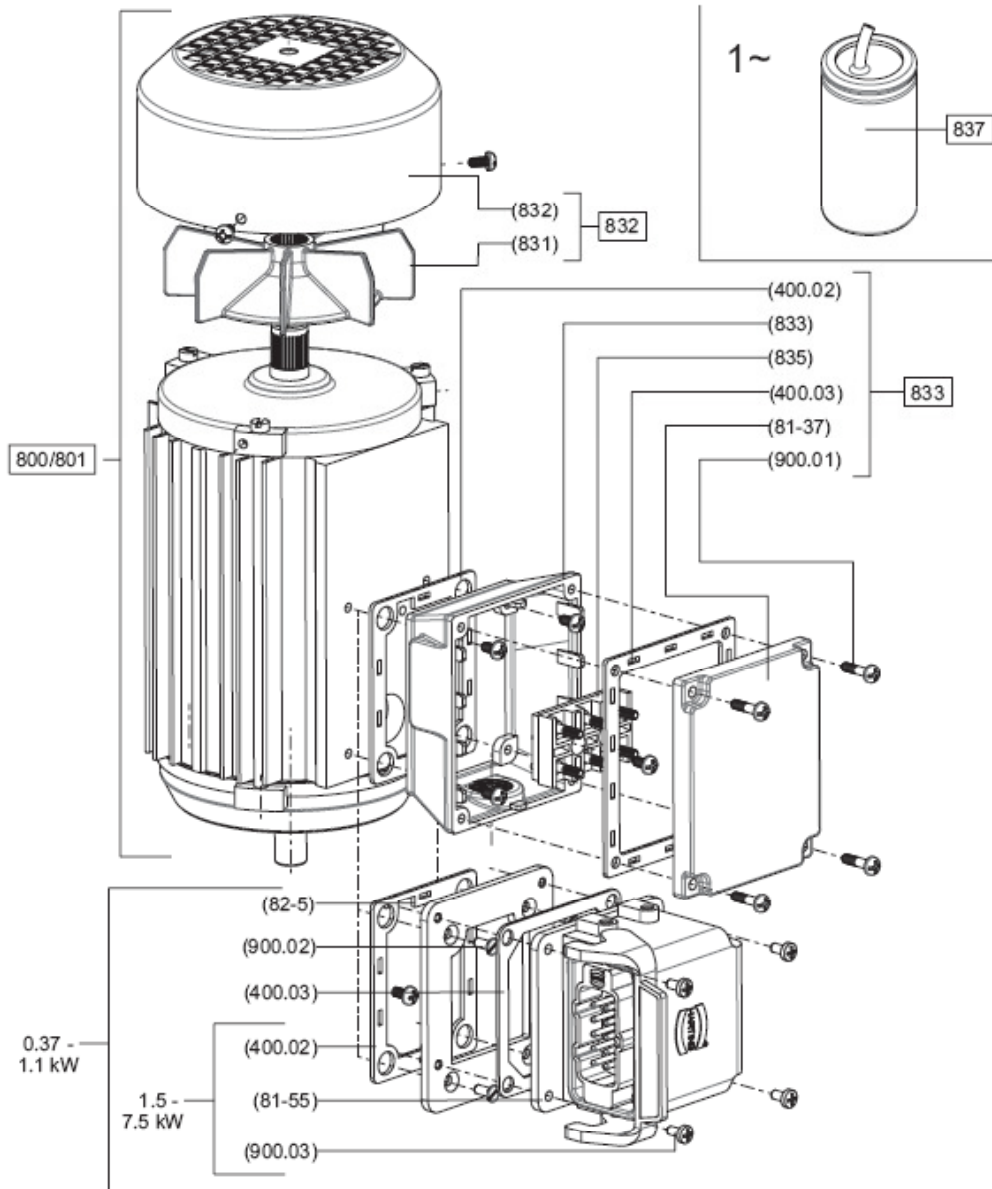
11.1 Parts List

11.1.1 ZN-Numbers

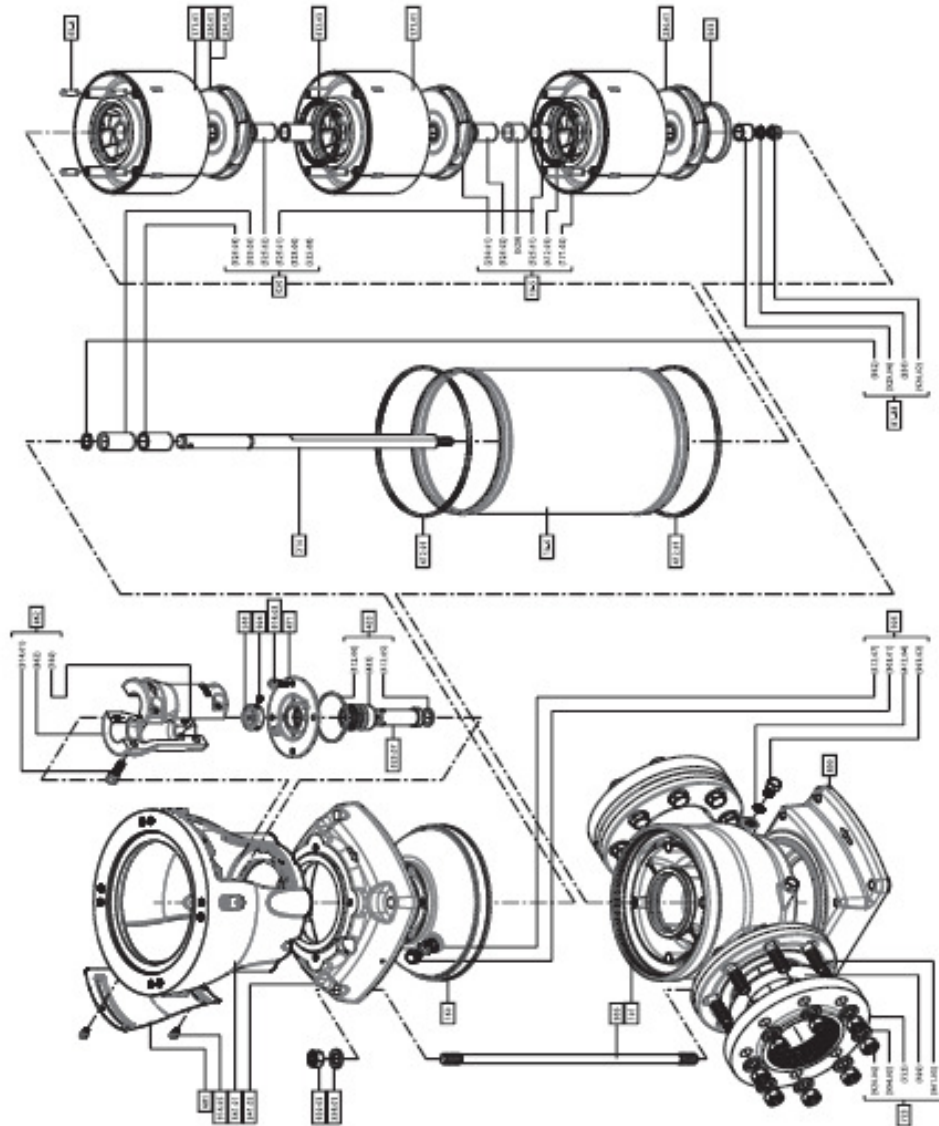
Number (ZN)	Name
101	Pump casing
108	Stage casing
108.01	Diffuser
108.02	Diffuser with ceramic bearing
160	Cover
210	Shaft
230	Impeller
230.01	Impeller
230.02	Impeller, reduced head
341	Motor stool
400	Gasket
411	Joint ring
412	O-ring
412.01	O-ring
412.03	O-ring
433	Mechanical seal
471	Seal cover
500	Ring
503	Impeller wear ring
509	Intermediate ring
525	Spacer sleeve
525.07	Spacer sleeve
525.08	Spacer sleeve
529	Bearing sleeve
554	Washer
560	Pin
595	Buffer
681	Coupling Guard
722	Taper piece, flanged
723	Flange
742	Non-return valve
800	Motor
801	Flanged motor
802	Motor for close coupling
831	Fan impeller
832	Fan hood
833	Terminal box
835	Terminal board
837	Condenser
862	Coupling Shell
890	Base plate fabricated or cast
900	Screw
901	Hexagon head bolt
903	Screwed plug
904	Grub screw
905	Tie bolt
913	Vent plug
914	Hexagon socket head cap screw

914.03	Hexagon socket head cap screw
920	Nut
930	Safety device
932	Circlip
10-5	Part pump
81-37	Terminal box cover plate
81-88	Shaft end

11.1.2 Parts drawing motor



11.1.3 Parts drawing MCV(S)F 125



11.2 Technical specification

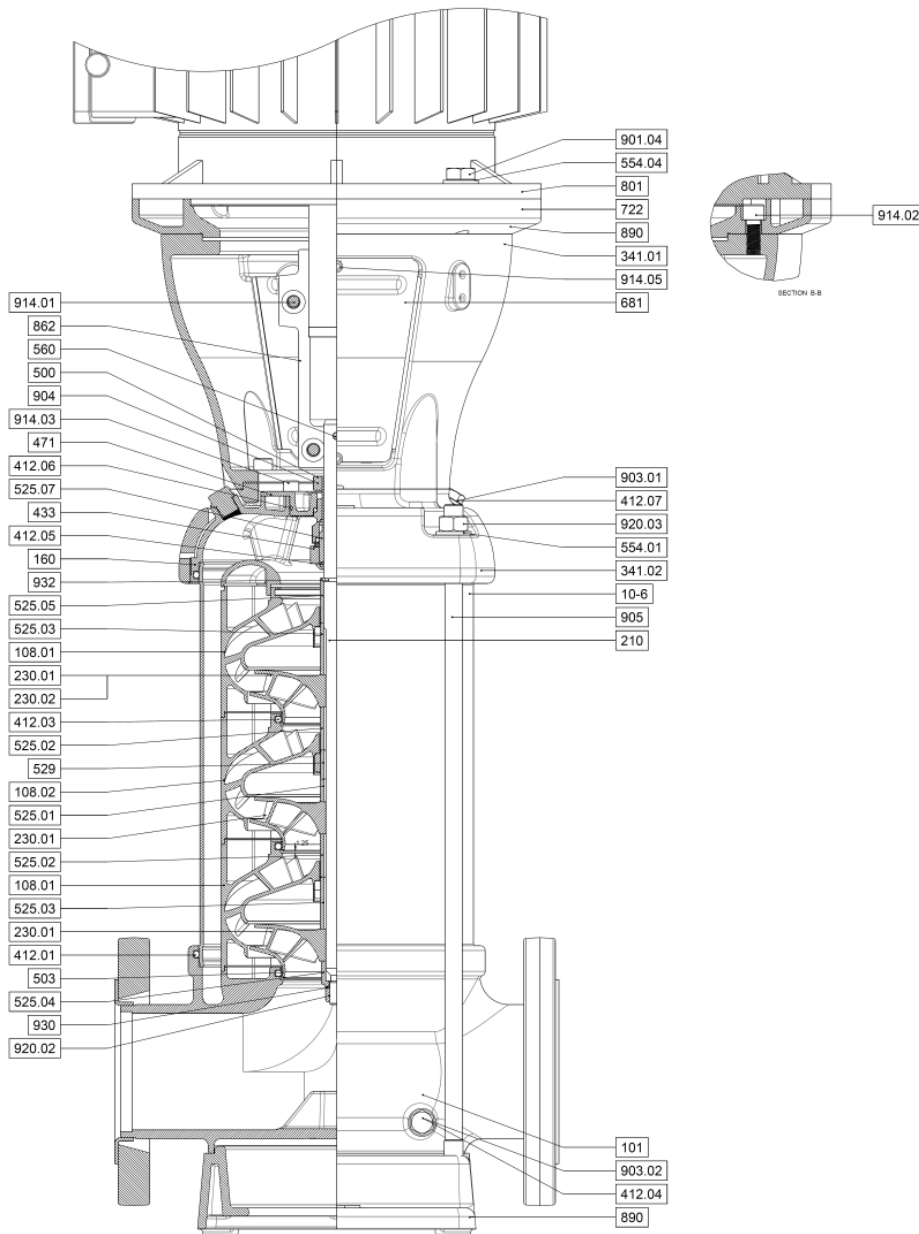
Table 11: Technical specification PTC STM 140 EK

	Value
t_n [°C]	140
$R_{20^\circ\text{C}}$ [Ω]	~ 20
$R_{t_n-20^\circ\text{C}}$ [Ω]	~ 250
$R_{t_n-5^\circ\text{C}}$ [Ω]	< 550
$R_{t_n+5^\circ\text{C}}$ [Ω]	> 1330
$R_{t_n+15^\circ\text{C}}$ [Ω]	> 4000
U_n [VDC]	$2.5 < U < 30$

11.3 Torques of coupling bolts

Material	Dimensions	Torques [Nm]
Steel	M6	16
Steel/Cast Iron	M8	30
Aluminium	M8	22
Cast Iron	M10	70

11.4 Sectional drawing



Part-No.	Description
10-6	Pump shroud
101	Pump casing
108.01	Stage casing
108.02	Stage casing
160	Cover
230.01	Impeller
230.02	Impeller
341.01	Motor stool
341.02	Motor stool
412.01	O-ring
412.03	O-ring
412.04	O-ring
412.05	O-ring
412.06	O-ring
412.07	O-ring
433	Mechanical seal
471	Seal cover
500	Ring
503	Impeller wear ring
525.01	Spacer sleeve
525.02	Spacer sleeve
525.03	Spacer sleeve
525.04	Spacer sleeve
525.05	Spacer sleeve
525.07	Spacer sleeve
529	Bearing sleeve
554.01	Washer
554.04	Washer
560	Pin
681	Coupling guard
722	Taper piece, flanged
801	Flanged motor
862	Coupling
890	Baseplate
901.04	Hex. head bolt
903.01	Vent plug
903	Screwed plug
904	Grub screw
905	Tie bolt
914.01	Hex. socket head cap screw
914.02	Hex. socket head cap screw
914.03	Hex. socket head cap screw
914.05	Hex. socket head cap screw
920.02	Nut
920.03	Nut
930	Safety device
932	Circlip

